SBC-590

Full-size PCI/ISA
Pentium CPU Card
with SVGA

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Packing list

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

- 1 SBC-590 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
- 3 Utility disks with SVGA 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.

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, PURSU-ANT 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 GENER-ATES, 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.

Contents

General Information

This chapter gives background information on the SBC-590.

Sections include:

• Card specifications

• Board layout

Introduction

The SBC-590 is an all-in-one single board Pentium computer with an **on-board SVGA controller, with PCI-bus and ISA-bus support**. It packs all the functions of an industrial computer with display capabilities on a single full-size card. The SBC-590 is fully PC/AT compatible, so your software will run without modifications.

The on-board PCI-bus SVGA controller uses the ALG 2032 chipset with 1 MB shared memory. This chipset, used with the local PCI-bus, enables 32-bit graphic throughput and has a built-in **Standard Feature Connector**. These features make the SBC-590 particularly suited for graphics intensive applications.

Another feature of the SBC-590 is the inclusion of a high speed local bus IDE controller. This controller supports (through ATA PIO) mode 3 and mode 4 hard disks, which enables data transfer rates in excess of 11 MB/sec. 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 the IDE boost in performace improvements.

On-board features also 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 Pentium's 16 KB of on-chip cache memory, the SBC-590 comes with an extra 256 KB or 512 KB of second level memory on-board.

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, provided the watchdog timer has been programmed in advance. This ensures reliability in unmanned or stand-alone systems.

The SBC-590 supports 5V EDO DRAM. It also provides four 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 128 MB of DRAM using the most economical combination of SIMMs.

Features

- Accepts Intel Pentium 75-200 MHz CPUs and other compatible CPUs at 66/60/50/40 MHz (external clock speed)

- Fully PC/AT-compatible PCI/ISA-bus CPU card

- On-board 32-bit PCI-bus SVGA controller

- Built-in, fast PCI enhanced IDE controller; supports four IDE devices (large hard disks, CD-ROM, tape backup, etc.)

- Supports 5 V EDO DRAM and up to 128 MB of on-board DRAM

- Supports pipeline burst SRAM module

- Two high-speed serial RS-232 ports (16C550 UARTs with 16-byte FIFO); IRQ3, 4, or IRQ 10, 11 can be individually selected

- One enhanced bidirectional parallel port; supports SPP/EPP/ECP

- Watchdog timer (64 steps, 1 seconds per step)

- On-board keyboard and PS/2 mouse connector

- Connectors for PC/104 module expansion

- "Green" function; supports power management

- Supports a Feature Connector

Specifications

- **CPU**: Intel Pentium 75-200 MHz CPUs and other compatible CPUs at 66/60/50/40 MHz (external clock speed)

- **Bus interface**: ISA and PCI (PC/AT) bus

- **Data bus**: 64 bit

- **Processing ability**: 64 bit

- **Chipset**: VT 82C575/82C576/82C577

- **RAM memory**: 1 MB to 128 MB. Uses four 72-pin SIMM sockets supporting EDO RAM

- **L2 Cache memory size**: 256 KB/512 KB 2nd level cache memory (Supports pipeline burst SRAM module)

- **Shadow RAM memory**: Supports system and video BIOS shadow memory

- **Display controller**: SVGA, PCI-bus, ALG 2032 chipset with 1 MB shared video memory. Provides 32-bit graphic through-put. Supports resolutions up to 1280 x 1024 in 16 colors, 1024 x 768 in 256 colors,

- **Feature connector:** 26-pin header for external VGA Display

- **Enhanced IDE hard disk:** Fast PCI bus. Supports up to four enhanced IDE (ATA-2)

- **Driver interface:** Large hard disk drives or other enhanced IDE devices. Supports mode 3 and mode 4 hard disks (data transfer rate, minimum of 11.1 MB/sec)

- **Floppy disk drive interface**: Supports up to two floppy disk drives, 5.25" (360 KB and 1.2 MB) and/or 3.5" (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; use 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**: Award BIOS

- **Watchdog timer**: Can generate a system reset or IRQ15. The time interval is software selectable from 1 to 64 seconds.

- **PC/104**: 104-pin connector for a 16-bit bus
- **DMA channels**: 7
- **Interrupt levels**: 15
- **Keyboard or PS/2 mouse connector**: A 6-pin mini DIN keyboard connector is located on the mounting bracket for easy access to the keyboard and PS/2 mouse.
- **Bus speed**: 8 MHz for ISA bus; 20/25/30/33 MHz (for PCI bus) dependent upon CPU clock speed
- **Max. power requirements**: +5 V @ 5 A
- **Power supply voltage**: +5 V (4.75 V to 5.25 V)
- **Operating temperature**: 32 to 140ºF (0 to 60ºC)
- **Board size**: 13.3" (L) x 4.8" (W) (338 mm x 122 mm)
- **Board weight**: 1.2 lbs (0.5 Kg)

Board layout
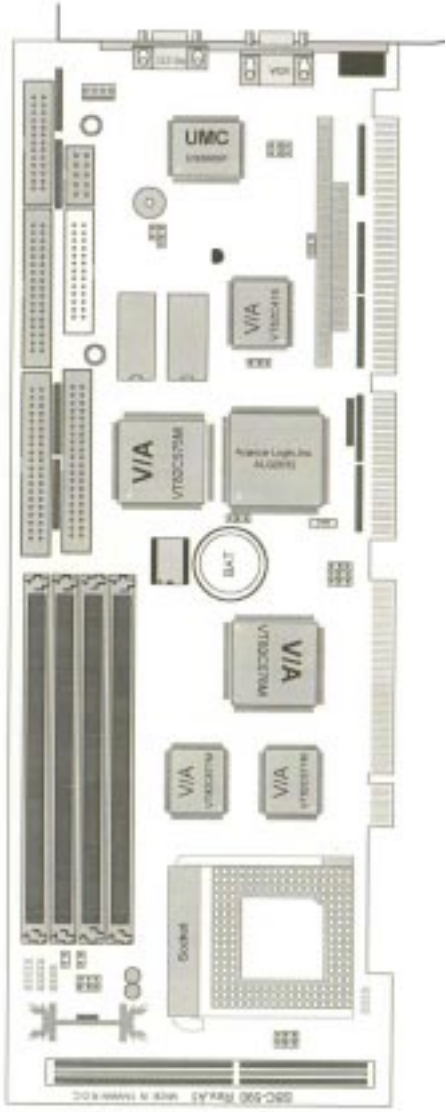
Card dimensions
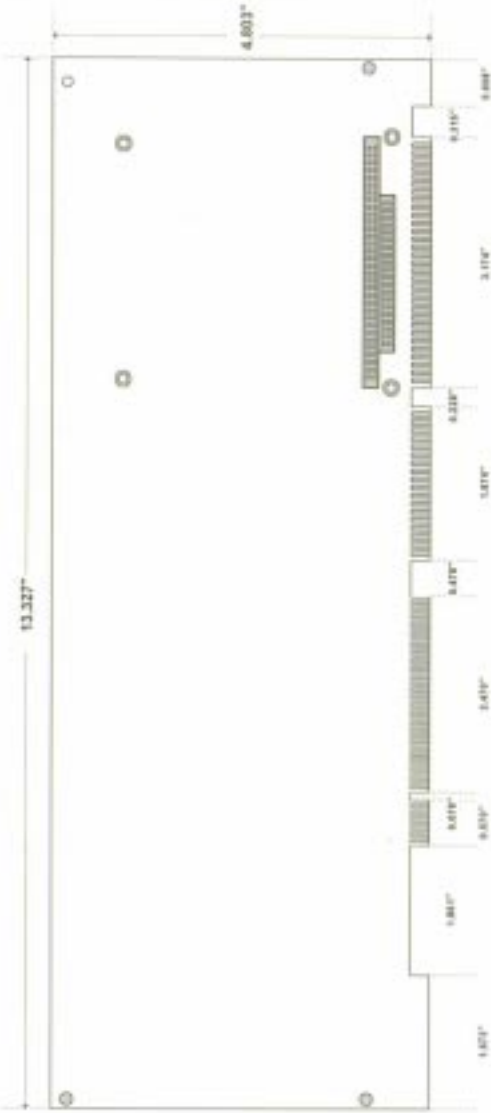
Hardware Configuration

This chapter gives background information on the SBC-590. It explains howe to configure the card and prepare it for installation into your PC.

Sections include:

• Jumper settings

• Safety precautions

• Installing DRAM (SIMMs)

Jumpers and connectors

Connectors on the board link it to external devices such as hard disk drives, a keyboard or floppy drives. In addition, the board has a number of jumpers that allows you to configure your system to suit your application.

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

Jumpers and connectors	
Label	**Function**
J1, J2	CPU clock ratio
J3, J4	CPU working voltage setting
J5, J6, J7	CPU, PCI clock setting
J8	On-board VGA enable/disable
J9	Clear CMOS control
J10	PS/2 mouse/IRQ12 control
J11	Internal buzzer control
J12	Watchdog timer control
J13	COM2 IRQ control
J14	COM1 IRQ control
CN1	IrDA Tx/Rx header
CN2	Keylock connector
CN3	Speaker connector
CN4	CPU fan power connector
CN5	HDD LED connector
CN6	RESET connector
CN7	Primary IDE
CN8	Secondary IDE
CN9	Floppy drive
CN10	Feature connector
CN11, CN13	PC/104 connector
CN12	COM2
CN14	Printer Port
CN15	Power connector (-5V, -12V, Gnd)
CN16	VGA connector
CN17	Keyboard connector
CN18	COM1
CN19	Power connector (+5V, +12V, Gnd)
CN20	Keyboard and PS/2 mouse connector

Locating jumpers and connectors

COMA　　VGA　　KB/PS2 MOUSE

PRINTER

COMB

FEATURE
CONNECTOR

FLOPPY
DISK

PRIMARY
IDE

SECOND-
ARY IDE

SIMM
SOCKET

KB CONNNECTOR

PC/104
CONNECTOR

CACHE
SOCKET

SBC 590 486SX/DX/DX2/DX4 CPU CARD Rev. B1

Setting jumpers

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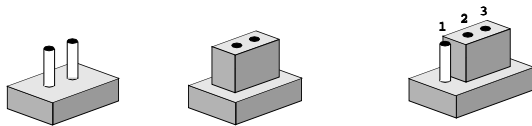
| Open | Closed | Closed 2–3 |

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

| Open | Closed | Closed 2–3 |

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

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

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

Safety precautions

Warning!   *Always completely disconnect the power cord from your chassis whenever you are working on it. Do not make connections while the power is on, 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-590 CPU card supports Intel Pentium 75~166 and other compatible CPUs at 66/60/50/40 MHz (external clock speed). The system's performance depends on the CPU you choose. You can install or upgrade the CPU in the board's ZIF 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. Pull the lever on the side of the ZIF socket out a little and raise it up as far as it will go.

2. Lift the CPU out.

Installing the CPU

1. Make sure the ZIF socket lever is up as far as it can go. The Pin 1 position is at the arm corner.

2. Match Pin 1 on the CPU with the Pin 1 position on the ZIF socket. The pins on the three inner rings of the CPU should be aligned with the holes on the ZIF socket.

3. Insert the CPU. If it does not go in easily, lift the lever higher.

4. Press the lever down. The sliding plate will move forward to position the CPU. You will feel some resistance in the lever as the CPU is secured into place. When the CPU is properly installed, the lever will snap into place at the side of the ZIF socket.

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.**

CPU Clock Ratio Select (J1,J2)

J1. J2 must be set to match the clok ratio of CPU. The chart
below shows the proper jumper setting.

CPU Clock Ratio Select (J1, J2)	J1	J2
freq ratio = 2.5	1 ■ 2 ■	1 ■ 2 ■
freq ratio = 2	1 ■ 2 ■	1 ○ 2 ○
freq ratio = 3	1 ○ 2 ○	1 ■ 2 ■
freq ratio = 1.5*	1 ○ 2 ○	1 ○ 2 ○

* default

CPU VCC Select (J3, J4)

J3, J4 must be set to match the CPU type. The chart below shows the proper jumper settings for their respectiver Vcc:

CPU Vcc Select (J3, J4)		
	J3	**J4**
Vcc = 3.3V*	1 ● 2 ● 3 ○	1 ○ 2 ○ 3 ○
Vcc = 3.45 V	1 ○ 2 ● 3 ●	1 ○ 2 ○ 3 ○
Vcc = 3.6 V	1 ○ 2 ○ 3 ○	1 ● 2 ● 3 ○
Vcc = 3.8 V	1 ○ 2 ○ 3 ○	1 ○ 2 ● 3 ●

* default

CPU/PCI Clock Slelect (J5, J6, J7)

J5, J6 and J7 are set to select the CPU Clock and PCI clock.

CPU/PCI Clock Select (J5, J6, J7)			
	J5	**J6**	**J7**
CPU clock = 40 MHz PCI clock = 20 MHz	1 ● 2 ● 3 ○	1 ○ 2 ● 3 ●	1 ○ 2 ● 3 ●
CPU clock = 50 MHz PCI clock = 25 MHz	1 ○ 2 ● 3 ●	1 ● 2 ● 3 ○	1 ○ 2 ● 3 ●
CPU clock = 60 MHz PCI clock = 30 MHz[*]	1 ● 2 ● 3 ○	1 ● 2 ● 3 ○	1 ● 2 ● 3 ○
CPU clock = 66 MHz PCI clock = 33 MHz	1 ○ 2 ● 3 ●	1 ○ 2 ● 3 ●	1 ● 2 ● 3 ○

* default

On-Board VGA ENABLE/DISABLE (J8)

You can enable or disable the on-board VGA by setting J8.

On-board VGA Enable/Disable Control (J8)
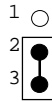
1 ●	1 ○
2 ●	2 ●
3 ○	3 ●
Disable	*Enable

* default

Clear CMOS (J9)

J9 provides a way to clear the CMOS setting which may be useful whenever the current setting is causing trouble. An example is when you forget the password. By clearing the CMOS data, the system can be entered and re-established again.

CLEAR CMOS (J9)

1 ●	1 ○
2 ●	2 ●
3 ○	3 ●
*Normal Operation	Clear CMOS

*default

Note: *Be very careful that, in all cases, J9 should remain in the Normal Operation position to avoid the battery current linkage.*

Should you set J9 to clear CMOS, you need to put J9 back to Normal Operation before the next system boot-up.

PS/2 Mouse/IRQ12 Select (J10)

J10 selects PS/2 mouse enable or IRQ12 enable.

PS/2 Mouse/IRQ12 Select (J10)

3 2 1	3 2 1
○ [●—●]	[●—●] ○
*Enable PS/2 mouse	Enable IRQ12

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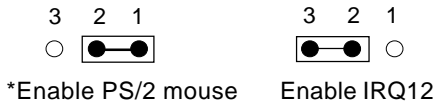
* default

Internal Buzzer Control (J11)

The internal buzzer is enabled or disabled by setting J11.

Internal Buzzer Control (J11)

[●—●]	○ ○
2 1	2 1
*Enabled	Disable

---

*default

Watchdog Timer Control (J12)

Watchdog timer generates a system reset signal or genereartes IRQ15.

Watchdog Timer Control (J12)

3 2 1	3 2 1
○ [●—●]	[●—●] ○
*Watchdog generates the SYSTEM RESET signal	Watchdog generates IRQ15

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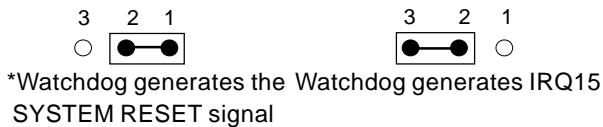
* default

Watchdog Timer Programming

Refer to Appendix A, Programming the Watchdog Timer, on page 56.

COM1 IRQ Control (J14)

J14 select either COM1 uses IRQ4 or COM1 uses IRQ11.

COM1 IRQ Control (J14)
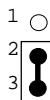
COM1 uses IRQ4   COM1uses IRQ11

COM2 IRQ Control (J13)

J13 select either COM2 uses IRQ3 or COM2 uses IRQ10.

COM2 IRQ Control (J13)
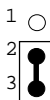
COM2 uses IRQ3   COM2 uses IRQ10

* default

Installing DRAM (SIMMs)

The SBC-590 has four 72-pin SIMM (Single In-Line Memory Module) sockets that provide anywhere from 1 MB to 128 MB of DRAM. Each socket accepts from 1 to 32 MB of DRAM. For more detailed information, refer to the memory configuration tables on the following page.

Table 1: Single SIMM (32-bit) boot-up

Total Memory	Bank 0		Bank 1		Remark
	SIMM 1	SIMM 2	SIMM 3	SIMM 4	
1MB	1MB				
4MB	4MB				
8MB	8MB				32-bit boot up
16MB	16MB				
32MB	32MB				

Table 2: Dual or Quad SIMM (64-bit) boot-up

Total Memory	Bank 0		Bank 1	
	SIMM 1	SIMM 2	SIMM 3	SIMM 4
2MB	1M	1M		
4MB	2MB	2MB		
4MB	1MB	1MB	1MB	1MB
8MB	4MB	4MB		
8MB	2MB	2MB	2MB	2MB
16MB	8MB	8MB		
16MB	4MB	4MB	4MB	4MB
32MB	16MB	16MB		
32MB	8MB	8MB	8MB	8MB
64MB	16MB	16MB	16MB	16MB
64MB	32MB	32MB		
128MB	32MB	32MB	32MB	32MB
24MB	4MB	4MB	8MB	8MB
48MB	8MB	8MB	16MB	16MB
96MB	16MB	16MB	32MB	32MB
40MB	4MB	4MB	16MB	16MB
80MB	8MB	8MB	32MB	32MB

Connecting Peripherals

This chapter tells how to connect peripherals, switches and indicators to the SBC-590 board. You can access most of the connectors from the top of the board while it is installed in the chassis. If you have a number of cards installed, or your chassis is very tight, you may need to partially remove the card to make all the connections.

The following table lists the connectors on the SBC-590. See Chapter 1 for help locating the connectors.

SBC-590 Connector functions	
Connector	**Function**
CN1	IrDA Tx/Rx header
CN2	Keylock connector
CN3	Speaker connector
CN4	CPU fan power connector
CN5	HDD LED connector
CN6	RESET connector
CN7	Primary IDE
CN8	Secondary IDE
CN9	Floppy drive
CN10	Feature connector
CN11/13	PC/104 connector
CN12	COM2
CN14	Printer port
CN15	Power connector (-5V, -12V, Gnd)
CN16	VGA connector
CN17	Keyboard connector
CN18	COM1
CN19	Power Connector (+5V, +12V, Gnd)
CN20	Keyboard and PS/2 mouse connector

The following sections tell how to make each connection. In most cases, you will simply need to connect a standard cable.

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. 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.*

IrDA Tx/Rx Header (CN1)

This connector supports the optional wireless transmitting and receiving infrared module. This module mounts on to a small opening on system cases that support this feature. You must also configure the setting through BIOS setup to select whether UART2 is directed for use with COM2 or IrDA

IrDA Tx/Rx header (CN1)

Pin	Function
1	+5V
2	No connection
3	Tx
4	GND
5	Rx

Power LED and Keylock (CN2)

You can use an LED to indicate when the CPU card is on. Pin 1 of CN2 supplies the LED's power, and Pin 3 is the ground.

You can use a switch (or a lock) to disable the keyboard so the PC will not respond to any input. This is useful is you do not want anyone to change or stop a running program. Connect the switch between Pins 4 and 5 of CN2

Power LED and keylock

Pin	Function
1	LED power (+5V)
2	NC
3	GND
4	Keyboard lock
5	GND

External Speaker (CN3)

The CPU card has its own buzzer. You can also connect to the external speaker on your computer chassis. Pin assignments for CN3 are shown below:

External speaker (CN3)	
Pin	**Function**
1	Speaker out
2	No connection
3	GND
4	+5 VDC

CPU cooling fan power connector (CN4)

The CN4 is a connector for the CPU cooling fan. It provides both +5V and +12V when power is on.

CPU cooling fan power connector (CN4)	
Pin	**Function**
1	+12V
2	GND
3	GND
4	+5V

Hard Drive LED (CN5)

You can connect a LED to connector CN5 to indicate when the HDD is active. Marks on the circuit board indicate LED polarity.

Reset Switch (CN6)

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.

Enhanced IDE (CN7, CN8)

You can attach four IDE (Integrated Device Electronics) drives to the SBC-590's internal controller. The SBC-590 CPU card has two EIDE connectors, CN7 and CN8. The first two IDE devices must be installed into CN7. CN8 may be used for a third and fourth IDE device.

Wire number 1 on the cable is red or blue, the other wires are gray. Connect one end to CN7 or CN8 on the CPU card. Make sure that the red (or blue) wire corresponds to pin 1 on the connector (on the right side).

Floppy Drive (CN9)

You can attach up to two floppy disk drives to the SBC-590's on-board controller. You can use any combination of 5.25" (360 KB and 1.2 MB) and 3.5" (720 KB and 1.44 MB) drives.

The card comes with a 34-pin daisy-chain drive connector cable. On one end of the cable is a 34-pin flat-cable connector. On the other end are two sets of floppy disk drive connectors. 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). You can use only one connector in each set. The set on the end (after the twist in the cable) connects to the **A** drive. The set in the middle connects to the **B** drive.

Display Connections

The SBC-590 Cpu card's VGA connector (labeled VGA) with PCU bus supports monochrome display as well as high resolution color displays. In addition, the card also features a Feature connector, which allows you to plug in other external display devices. The following table lists their pin assignments.

Feature connector (CN10)		VGA connector (CN16)	
Pin	Function	Pin	Function
1	CO	1	Red video
2	C1 (blue)	2	Green video
3	C2 (green)	3	Blue video
4	C3 (red)	4	not used
5	C4 (2nd green)	5	GND
6	C5 (2nd blue)	6	Red return (GND)
7	C6 (2nd red)	7	Green return (GND)
8	C7	8	Blue return (GND)
9	DAC block	9	Vcc
10	Blank	10	Sync return (GND)
11	Horizontal sync	11	NC
12	Vertical sync	12	DACWR
13	Ground	13	Horizontal sync
14	Ground	14	Vertical sync
15	Ground	15	DACRD
16	Ground		
17	SIV (Select Internal Video)		
18	SIS (Select Internal Sync)		
19	SICLK (Select Internal Clock)		
20	NC		
21	NC		
22	Ground		
23	Ground		
24	Ground		
25	NC		
26	NC		

Parallel Port (CN14)

The parallel port is normally used to connect the CPU card to a printer. The SBC-590 includes an on-board parallel port, accessed through CN14, a 26-pin flat-cable connector. The 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. The bracket installs at the end of an empty slot in your chassis, giving you access to the connector.

To install the bracket:

1. Find an empty slot in your chassis.

2. Unscrew the plate that covers the end of the slot, and screw in the bracket.

3. Attach the flat-cable connector to CN14 on the CPU card. Wire 1 of the cable is red or blue, and the other wires are gray. Make sure that wire 1 corresponds to pin 1 of CN14. Pin 1 is on the right side of CN14.

Power Supply connections

Power supply connector (CN15, CN19)

In single-board computer (non-passive backplane) applications you will need to connect power directly to the SBC-590 board using the connector labeled POWER CON. This connector is fully compatible with the standard PC power supply connector. See the following table for its pin assignments:

Power Connector (CN19)	
Pin	**Function**
1	+12V
2	GND
3	GND
4	+5V

Power Connector (CN15)	
Pin	**Function**
1	GND
2	-5V
3	GND
4	-12V

Serial Ports (CN18, CN12)

The SBC-590 offers two RS-232 serial ports, COM1 and COM2, which let you connect to serial devices (a mouse, printers, etc.) or a communication network. CN18 is COM1, and CN12 is COM2.

You can disable each port or select its address (3F8H [COM1], 2F8H [COM2] or 3E8H) using the BIOS Advanced Setup program, covered in Chapter 4.

DCD	1		
RX	2	6	DSR
TX	3	7	RTS
DTR	4	8	CTS
GND	5	9	RI
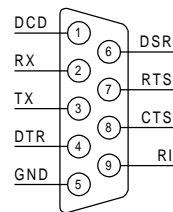
Different devices implement the RS-232 standard in different ways. If you are having problems with a serial device, be sure to check the pin assignments for the connector. The following figure shows the pin assignments for the card's RS-232 ports:

Keyboard & PS/2 Mouse (CN20, CN17)

CN20, the card's keyboard connector, is a 6-pin mini-DIN connector on the card mounting bracket. The SBC-590 also comes with an adapter to convert to a standard DIN connector and to a PS/2 mouse connector
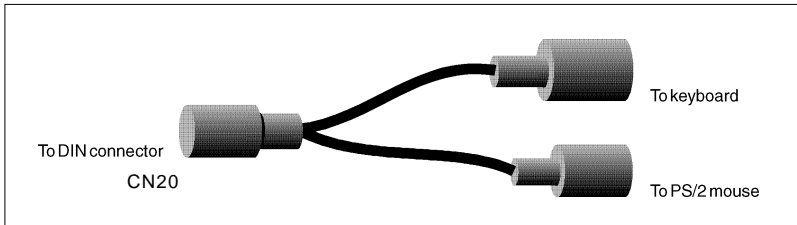
The SBC-590 provides a second connector designed for external keyboard input (CN17). To locate CN20 and CN17 please see the board layout in chapter 2.

AWARD BIOS SETUP

This chapter describes how to set the card's BIOS configuration data.

AWARD BIOS Setup

```
┌──────────────────────────────────────────────────────────┐
│              ROM ISA BIOS (2C4L6AK1)                     │
│               CMOS SETUP UTILITY                         │
│              AWARD SOFTWARE, INC.                        │
├──────────────────────────────────────────────────────────┤
│                                                          │
│  STANDARD CMOS SETUP          SUPERVISOR PASSWORD        │
│                                                          │
│  BIOS FEATURES SETUP          IDE HDD AUTO DETECTION     │
│                                                          │
│  CHIPSET FEATURES SETUP       SAVE & EXIT SETUP          │
│                                                          │
│  POWER MANAGEMENT SETUP       EXIT WITHOUT SAVING        │
│                                                          │
│  LOAD BIOS DEFAULTS                                      │
│                                                          │
│  LOAD SETUP DEFAULTS                                     │
│                                                          │
├──────────────────────────────────────────────────────────┤
│    ESC: QUIT              ←→↑↓: SELECT ITEM              │
│    F10: Save & Exit Setup    (Shift)F2: Change Color     │
├──────────────────────────────────────────────────────────┤
│            Time, Date, Hard Disk Type....                │
└──────────────────────────────────────────────────────────┘
```

Setup program initial screen

Award's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed RAM so that it retains the Setup information when the power is turned off.

Entering setup

Turning on the computer and pressing <DEL> immediately will allow you to enter Setup.

Standard CMOS setup

Choose the "STANDARD CMOS SETUP" option from the INITIAL SETUP SCREEN Menu, and the screen below is displayed. This standard Setup Menu allows users to configure system components such as date, time, hard disk drive, floppy drive, display, and memory.

```
                    ROM ISA BIOS (2C4L6AK1)
                    STANDARD CMOS SETUP
                    AWARD SOFTWARE, INC.

  Date (mm:dd:yy)   :   Fri,  Aug  30 1996
  Time (hh:mm:ss)   :   15 : 24 : 55
                         CYLS.   HEADS  PRECOMP  LANDZONE  SECTORS  MODE
  Drive C  : Auto  (   0Mb)   0      0       0         0        0    AUTO
  Drive D  : Auto  (   0Mb)   0      0       0         0        0    AUTO

  Drive A : 1.44M, 3.5 in.
  Drive B : None                      Base Memory  :      640K
                                    Extended Memory  :   31744K
  Video  : EGA/VGA                       Other Memory  :      384K
  Halt On : All Errors
                                      Total Memory  :   32768K


   ESC : Quit            ←→↑↓ : Select Item       PU / PD / + / - : Modify
   F1  : Help           (Shift)F2 : Change Color
```

CMOS setup screen

BIOS features setup

By choosing the "BIOS FEATURES SETUP" option from the CMOS SETUP screen menu, the following screen is displayed. This sample scree contains the manufacturer's default values for the PCA-6144V.

```
              ROM ISA BIOS  (2C4L6AK1)
                 BIOS FEATURES SETUP
                AWARD SOFTWARE, INC.

Virus Warning            : Disabled    Video BIOS Shadow        : Enabled
CPU Internal Cache       : Enabled     C8000-CBFFF Shadow       : Disabled
External Cache           : Enabled     CC000-CFFFF Shadow       : Disabled
Quick Power On Self Test : Disabled    D0000-D3FFF Shadow       : Disabled
Boot Sequence            : C,A         D4000-D7FFF Shadow       : Disabled
Swap Floppy Drive        : Disabled    D8000-DBFFF Shadow       : Disabled
Boot Up Floppy Seek      : Enabled     DC000-DFFFF Shadow       : Disabled
Boot Up NumLock Status   : On
Boot Up System Speed     : High
IDE HDD Block Mode       : Enabled
Gate A20 Option          : Fast
Typematic Rate Setting   : Disabled
Typematic Rate (Chars/Sec) : 20        Esc : Quit          ←→↑↓: Select Item
Typematic Delay (Msec)   : 25          F1  : Help          PU / PD / + / - : Modify
Security Option          : Setup       F5  : Old Values    (Shift)F2    : Color
OS Select for DRAM > 64MB : Non-OS2    F6  : Load BIOS Defaults
                                       F7  : Load Setup Defaults
```

Virus Warning
During and after the system boots up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system. In this case, if Virus Warning is enabled, the following error message will automatically appear:

```
                    !WARNING!
         Disk boot sector is to be modified
   Type "Y" to accept write or "N" to abort write
               Award Software, Inc.
```

You can run the anti-virus program to locate the problem.

If Virus Warning is Disabled, no warning message will appear if anything attempts to access the boot sector or hard disk partition.

CPU Internal Cache/External Cache
Depending on the CPU/chipset design, these options can speed up memory access when enabled.

Quick Power On Self Test
This option speeds up the Power-On Self Test (POST) conducted as soon as the computer is turned on. When enabled, BIOS shortens or skips some of the items during the test. When disabled, normal POST procedures assumes.

Boot Sequence
This function determines the sequence in which the computer will search the drives for the disk operating system (i.e. DOS). The default value is "A, C".

C,A	System will first search the hard drive, then the floppy drive.
A,C	System will first search the floppy drive, then the hard drive.

Boot Up Floppy Seek
During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360 KB type is 40 tracks while 720 KB, 1.2 MB, and 1.44 MB are all 80 tracks.

Enabled	BIOS searches the floppy drive to determine if it is 40 or 80 tracks. Note that BIOS cannot differentiate 720 KB, 1.2 MB, and 1.44 MB type drives as they are all 80 tracks.
Disabled	BIOS will not search for the floppy drive type by track number. Note that there will not be any warning message if the drive installed is 360 KB.

Boot Up NumLock Status
The default is "On".

On	Keypad boots up to number keys.
Off	Keypad boots up to arrow keys.

Boot Up System Speed

High	Sets the speed to high
Low	Sets the speed to low

IDE HDD Block Mode

Enabled	Enable IDE HDD Block Mode. BIOS will detect the block size of the HDD and send a block command automatically.
Disabled	Disable IDE HDD Block Mode

Gate A20 option

Normal	The A20 signal is controlled by the keyboard controller or chipset hardware
Fast	Default: Fast. The A20 signal is controlled by Port 92 or chipset specific method.

Typematic Rate setting
The typematic rate determines the characters per second accepted by the computer. Typematic Rate setting enables or disables the typematic rate.

Typematic Rate (Char/Sec)
BIOS accepts the following input values (character/second) for Typematic Rate: 6, 8, 10, 12, 15, 20, 24, 30.

Typematic Delay (msec)
When holding down a key, the Typematic Delay is the time interval between the appearance of the first and second characters. The input values (msec) for this category are: 250, 500, 750, 1000.

Security Option
This setting determines whether the system will boot if the password is denied, while limiting access to Setup.

System	The system will not boot, and access to Setup will be denied if the correct password is not entered at the prompt.
Setup	The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

Note: To disable security, select PASSWORD SETTING in the
main menu. At this point, you will be asked to enter a password.
Simply hit the <ENTER> key to disable security. When security is
disabled, the system will boot, and you can enter Setup freely.

OS select for DRAM>64 MB.
This setting is underOS/2 system.

Video BIOS Shadow
This determines whether video BIOS will be copied to RAM,
which is optional according to the chipset design. When enabled,
Video Shadow increases the video speed.

C8000 - CFFFF Shadow/DC000-DFFFF Shadow
These determine whether optional ROM will be copied to RAM in
blocks of 16 KB.

Enabled	Optional shadow is enabled
Disabled	Optional shadow is disabled

CHIPSET features setup

By choosing the "CHIPSET FEATURES SETUP" option from the CMOS SETUP screen menu, the following screen is displayed. This sample screen contains the manufacturer's default values for the SBC-590 board.

```
                    ROM ISA BIOS (2C4L6AK1)
                      CMOS SETUP UTILITY
                    CHIPSET FEATURES SETUP

Auto Configuration      : Enabled    Onboard local bus IDE   : Enabled
Decoupled Refresh       : Enabled    IDE Primary Master PIO  : Auto
Relocate 256K/384K      : Disabled   IDE Primary Slave PIO   : Auto
Video BIOS Cacheable    : Enabled    Onboard FDD Controller  : Enabled
System BIOS Cacheable   : Enabled    Onboard Serial Port 1   : COM1/3F8
                                     On-board Serial Port 2  : COM2/2F8
External Cache Scheme    : Write back  Infra Red (IR) Function : Disabled
Combine Alter & Tag Bits : Enabled   Onboard Parallel Port   : 3BCH/IRQ7
CHRDY for ISA master     : Enabled   Onboard Parallel Mode   : Normal
Memory Hole at 15MB Addr. : Disabled
Cache Timing Control     : Normal    IR Tansfer Mode         : Half-Dup
DRAM Timing Control      : Normal    IR I/O Group            : B
FAST DRAM                : Enabled   ──────────────────────────────────
CPU Write Back Cache     : Disabled  Esc : Quit          ←→↑↓: Select Item
Set Turbo pin function   : Turbo     F1  : Help        PU/PD/+/- : Modify
Set Mouse Lock           : Disabled  F5  : Old Values    (Shift)F2 : Color
Internal Flash/ROM Disk  : Disabled  F6  : Load BIOS Defaults
                                     F7  : Load Setup Defaults
```

Power management setup

The power management setup controls the CPU board's "green" features. The following screen shows the manufacturer's default.

```
                    ROM ISA BIOS  (2C4L6AK1)
                      CMOS SETUP UTILITY
                    POWER MANAGEMENT SETUP

 Power Management      : Enabled      IRQ3  Activity      : Primary
 Doze Timer            : 32 sec       IRQ4  Activity      : Primary
                                      IRQ5  Activity      : Primary
 Sleep Timer           : 2 min        IRQ7  Activity      : Primary
 Sleep Mode            : Suspend      IRQ8  Activity      : Secondary
 HDD Power Management  : Disabled     IRQ10 Activity      : Primary
 VGA Activity Wakeup   : Disabled     IRQ11 Activity      : Primary
                                      IRQ12 Activity      : Primary
 IO  Activity          : Disabled

                                      Esc:Quit         ←→↑↓: Select Item
                                      F1  : Help        PU/PD/+/-: Modify
                                      F5  : Old Values      (Shift)F2: Color
                                      F6  : Load BIOS Defaults
                                      F7  : Load Setup Defaults
```

Power Management
This option allows you to determine if the values in power management are disabled, user-defined, or predefined.

HDD Power Management
You can choose to turn the HDD off after a one of the time interval listed, or when the system is in Suspend mode. If in a power saving mode, any access to the HDD will wake it up.

Note: HDD will not power down if the Power Management option is disabled.

IRQ Activity
IRQ can be set independently. Activity on any enabled IRQ will wake up the system.

Load BIOS defaults

"LOAD BIOS DEFAULTS" indicates the most appropriate values for the system parameters for minimum performance. These default values are loaded automatically if the stored record created by the Setup program becomes corrupted (and therefore unusable).

Load setup defaults

"LOAD SETUP DEFAULTS" loads the values required by the system for maximum performance.

Password setting

To change, confirm, or disable the password, choose the "PASS-WORD SETTING" option form the Setup main menu and press [Enter]. The password can be at most 8 characters long.

Remember, to enable this feature. You must first select the Security Option in the BIOS FEATURES SETUP to be either "Setup" or "System."

IDE HDD auto detection

"IDE HDD AUTO DETECTION" automatically self-detect for the correct hard disk type.

Save & Exit setup

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

Exit without saving

Selecting this option and pressing the [Enter] key lets you exit the Setup program without recording any new values or changing old ones.

SVGA Setup

The SBC-590 features an on-board VGA interface. This chapter provides instructions for installing and operating the software drivers on the included display driver diskette.

Windows 3.1x Driver Installation

Step 1: Install Windows as you normally would for a VGA display. Run Windows to make sure that it is working correctly.

Step 2: In Windows Program Manager, choose Run from the File Menu. At the Command Line prompt, type SETUP from your source directory to invoke the install program. 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. Press ENTER to complete the installation.

Windows 95 Installation

If Windows 95 is not installed on the system, install it using the manufacturer's installation procedure. In each section where the display option is selected, select VGA.

Installation Procedure

1. Double click on the My Computer icon.

2. Double click on the Display icon to bring up the Display Properties window.

3. Click on the Settings tab to change the Display Type to standard VGA if it is not already selected.

4. Click on the Change Display Type button to bring up the Change Display Type window.

5. Click on the Change Display Type button in the Adapter Type section of the window to bring up the Selection Device window.

6. Click on the [Have Disk] button if you need to select a different install driver option. Click on [OK].

7. When the copying of the diskette is complete, the Change Display type window will return. If you need to change your monitor resolution or type, click on [Close] in the Change Display Type window to bring back the Display Properties window.

8. Select the desired resolution, color and font size values in the Display Properties Window and then clike on [Apply] to bring back the System Settings Change window. The refresh rate will be adjusted properly based on the monitor type selected.

9. Click on [Yes] in the System Settings Change window to restart the system and activate the new settings.

Windows NT 3.51

Verify that Windows NT 3.51 is corectly installe don the system and then perform the follwoing procedure to install the Avance Logic software driver.

Installation Procedure

1. To begin the installation of the Avance Logic software driver on the fixed disk:

   • In the Program Manager window, double click on the Main program group icon.

   • In the Main window, double click on the Contrl Panel programgroup icon.

   • In the Control Panel window, double click on the Display icon.

   • In the Display Settings window, click on [Change Display Type].

   • In the Display Type dialog box, click on [Change].

2. If installing the Avance Logic software driver from diskette, in the Select Device dialog box, click on [Other] and insert the ALG2032 Driver for Windows NT 3.51 applications diskette into drive A. When the Install from Disk dialog box is displayed, click on [OK] and proceed to the next step. If the Advance Logic software driver is already installed, proceed to the next step.

3. In the Select Device dialog box, select Avance Logic, Inc. and click on [Install]; when the installation is complete, click on [OK].

4. In the Display Settings window, select the desired resolution and refresh frequency and click on [Test] to test that the system monito can display the selected parameters properly.

5. If an Avance Logic software driver diskette was inserted into diskette drive A earlier, remove it now.

6. To activate the new settings, restart the application.

OS/2 Warp

To install the Avance Logic software driver, perform the applicable steps of the following procedure. To change the resolution of the Avance Logic software driver, the refresh rate of the video screen , or the monitor make/type, perform step 3 of the following procedure.

Installation Procedure

1. Any previous level Avance Logic software driver installed on the system must be removed before attempting to install a new level. To remove the old Avance Logic software driver:

    • In the OS/2 Desktop, perform a Shutdown and then reboot the system with DOS.

    • When the C:\> prompt is displayed, insert the ALG2032 Driver for OS/2 Warp SVGA Applications diskette into diskette drive A.

    • At the C:\> prompt, type a: and press [Enter]

    • When the removal of the driver completes, reboot the system with OS/2.

2. To install the Avance Logic software driver:

- In the OS/2 desktop, double click on the OS/2 System program group icon.

- In the OS/2 System - Icon View, double click on the Command Prompts program group icon.

- In the Command Prompts - Icon View, double click on the OS/2 Full Screen program icon.

- When the C:\> prompt is displayed , insert the ALG2032 Driver for OS/2 Warp SVGA applications diskette into diskette drive A if it is not already inserted.

- At the C:\> prompt, type a: and press [Enter].

- At the A:\.> prompt, type install, press [Enter] , and follow the instructions on the screen.

- When the installation finishes, select the desired resolution in the System Settings dialog box, remove the Avance Logic software driver diskette from diskette drive A.

3. Reboot the system to activate the changes.

4. To change the resolution, refresh rate, or monitor make/type:

- In the OS/2 Desktop, double click on the OS/2 System program group icon.

- In the OS/2 System - Icon View, double click on the System Setup program group icon.

- In the System Setup - Icon View, double click on the System program icon.

- In the System Settings dialog box, select the desired resolution and/or refresh rate and make any changes to the monitor make/type.

- Perform a shutdown and reboot the system to activate the changes.

5. Once the Avance Logic software driver is installed, to change back to the standard VGA driver, double click on the Avance Logic icon and in response to the question, "Do you want to change the VGA driver?", press [Enter] to answer Yes (default) and the system will reinstall the standard VGA driver. Perform a Shutdown and reboot the system to activate the change.

6. To change back to the Avance Logic software driver, double click on the Avance Logic icon and press [Enter]. The Avance Logic software driver will be reinstalled. Perform a Shutdown and reboot the system to activate the change.

A

Programming the Watchdog Timer

The SBC-590 is equipped with a watchdog timer that resets the CPU or generates an interrupt if processing comes to a standstill for whatever reason. This feature ensures system reliability in industrial stand-alone and unmanned environments.

Programming the watchdog timer

If you decide to program the watchdog timer, you must write data to I/O port 443 (hex). The output data is a value timer. You can write from 1 (hex) to 3E (hex), and the related timer is 1 sec. to 63 sec.

After data entry, your program must refresh the watchdog timer by rewriting the I/O port 443 (hex) while simultaneously setting it. When you want to disable the watchdog timer, your program should read I/O port 043 (hex).

The following procedure is a program for the watchdog timer:

```
Step 1    Out 443h data REM Start and reset the watchdog
          timer.

Step 2    Your application program task #1

Step 3    Out 443h data REM Reset the timer

Step 4    Your application program task #2

Step 5    Out 443h data REM Reset the timer

Step 6    in 043h, REM Disable the watchdog timer
```

Data Values

```
01    1 sec.
02    2 sec.
03    3 sec.
04    4 sec.
.
.
.
3E    63 sec.
```