

A graphic consisting of a grey square with a black border, containing the word "Chapter" in a cursive font above the number "1" in a bold, sans-serif font. The graphic is set against a black rectangular background.

Chapter
1

System Board

This high-performance system board features the 64-bit, 3.3V Intel Pentium CPUs running at speeds of 75/50, 90/60, 100/66, 120/60, 133/66, 150/60 or 166/66 MHz. It utilizes the Peripheral Component Interconnect (PCI) local bus architecture and integrates an enhanced PCI IDE controller. The PCI local bus operates at 25, 30, or 33 MHz.

The system board has four ISA and four PCI expansion slots, with one PCI- and ISA-shared slot. The memory size is expandable to 128 MB by adding single in-line memory modules (SIMMs). The system supports first-level write-back cache and 256-KB second-level pipeline-burst cache.

Standard features such as two serial ports, one parallel port, a diskette drive interface, and an embedded fixed disk interface are incorporated in the system board.

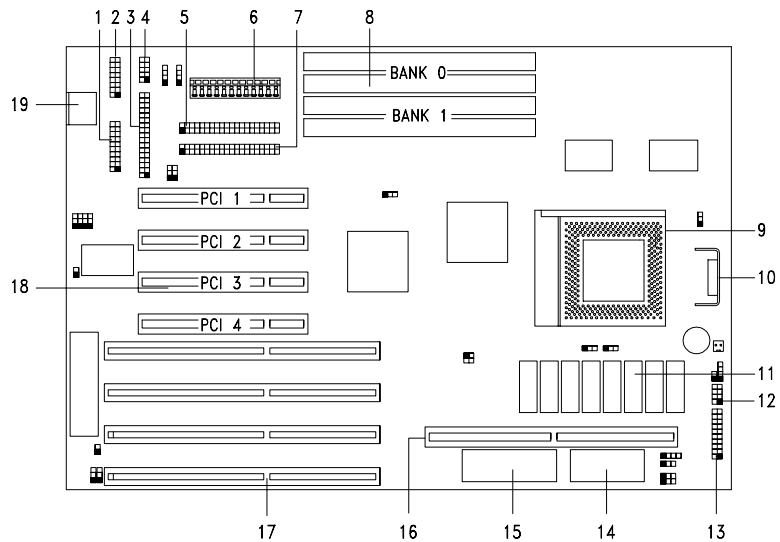
The system is fully compatible with MS-DOS V6.X, OS/2, UNIX, Windows NT and Windows 95 operating systems.

1.1 System Board Layout

The system board has the following features and components:

- Supports 3.3V Intel Pentium CPU (75/50 MHz, 90/60 MHz, 100/66 MHz, 120/60 MHz, 133/66 MHz, 150/60 MHz, 166/66 MHz)
- Integrates an enhanced PCI local-bus IDE controller
- 128 MB maximum system memory
- Four 72-pin SIMM sockets that accept 4-, 8-, 16-, and 32-MB SIMMs
- 256-KB second-level cache (default) or optional cache upgrade socket for 256-KB pipeline-burst cache
- Supports Extended Data Output (EDO) memory
- 128-KB Flash ROM for system BIOS
- Four ISA- and four PCI-expansion slots (one PCI- and ISA-shared slot)
- Dual 16C550 buffered serial ports and one ECP/EPP parallel port
- Plug-and-Play function
- Power-Management function

Figure 1-1 shows the board layout and the locations of the important components.



- | | |
|-------------------------------------|---------------------------------------|
| 1. Parallel port | 11. Second-level cache ¹ |
| 2. COM 2 connector | 12. ID3P LED connector |
| 3. FDD connector | 13. Multifunction connector |
| 4. COM 1 connector | 14. Real-time clock |
| 5. IDE 2 connector | 15. System BIOS |
| 6. 5V power connector | 16. Cache upgrade socket ¹ |
| 7. IDE 1 connector | 17. ISA slots |
| 8. SIMM sockets | 18. PCI slots |
| 9. ZIF-type CPU socket | 19. Keyboard connector |
| 10. Voltage regulator with heatsink | |

Figure 1-1 System Board Layout



The heatsink becomes very hot when the system is on. NEVER touch the heatsink with any metal or with your hands.

¹ Optional. The system board may come with either an onboard cache or a cache upgrade socket.

The multifunction connector is 20-pin connector that accommodates the LED and reset cables. Figure 1-2 shows the connector location on the system board and the cable connections.

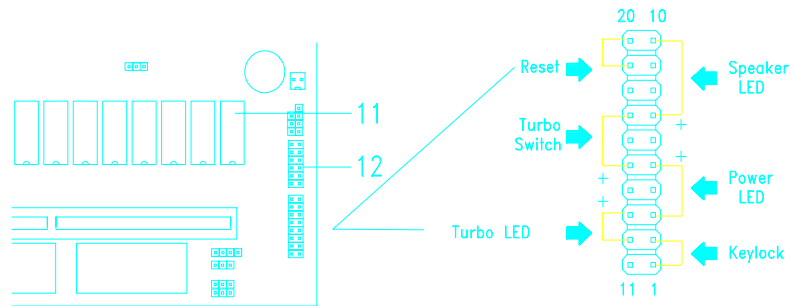


Figure 1-2 Multifunction connector

1.2 ESD Precautions

Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.

1. Do not remove a component from its protective packaging until you are ready to install it.
2. Wear a wrist grounding strap and attach it to a metal part of the system unit before handling components. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.

1.3 Pre-installation Instructions

Always observe the following before you install a system component:

1. Turn off the system power and all the peripherals connected to the unit before opening it.
2. Open the system according to the instructions in the housing installation manual.
3. Follow the ESD precautions in section 1.2 before handling a system component.
4. Remove any expansion boards or peripherals that block access to the SIMM sockets or CPU socket.
5. See the following sections for specific instructions on the component you wish to install.



Do not attempt the procedures described in the following sections unless you are a qualified service technician.

1.4 Installing a CPU



Observe the ESD precautions when installing components. See section 1.2.

The system board features a zero-insertion force (ZIF) socket for easy CPU installation.

Follow these steps to install a 3.3V Intel Pentium CPU:

1. Pull up the socket lever.
2. Insert the CPU, making sure that pin 1 (indicated by a notched corner) of the CPU connects to hole 1 of the socket.
3. Pull down the socket lever to lock the CPU into the socket.

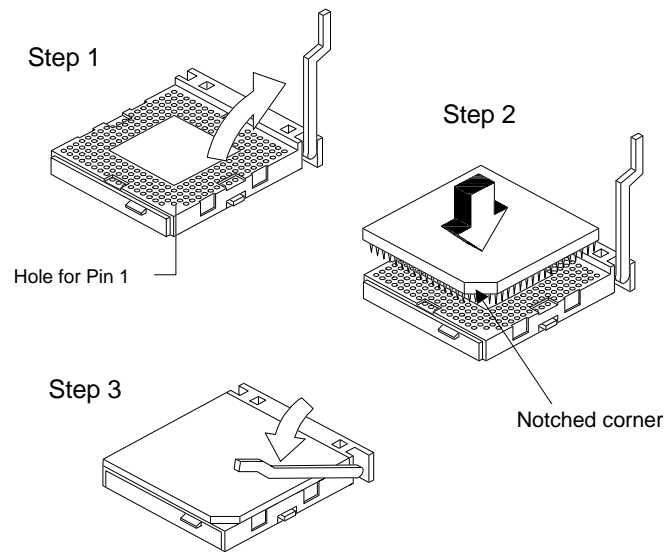


Figure 1-3 Installing a 3.3V Intel Pentium CPU

1.4.1 Installing an OverDrive™ CPU

The OverDrive CPU comes with a heatsink already mounted. To maintain proper airflow around the CPU and heatsink, follow the required clearances in Table 1-1.

Table 1-1 Clearances for OverDrive CPU and Heatsink

Location	Minimum Clearance
Above the heatsink	0.4 inches
Sides of the CPU (at least 3 of 4)	0.2 inches

Follow these steps to install an OverDrive CPU:

1. Locate the CPU socket and pull up the socket lever.
2. Remove the old CPU carefully from the socket and place it in an antistatic package.
3. Take the upgrade CPU out of its antistatic package.
4. Carefully insert the CPU into the socket such that pin 1 (indicated by a notched corner) of the CPU connects to hole 1 of the socket.

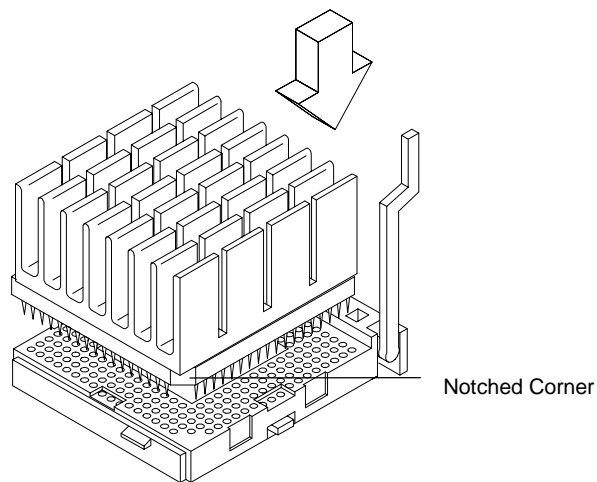


Figure 1-4 *Installing an Upgrade CPU*

5. Push down the socket lever to lock the CPU into the socket.

1.5 Post-installation Instructions

Observe the following after installing a system component:

1. See to it that the components are installed according to the step-by-step instructions in their respective sections.
2. Make sure you have set all the required jumpers. See section 1.6 for the correct jumper settings.
3. Replace any expansion boards or peripherals that you removed earlier.
4. Replace the system cover.
5. Connect the necessary cables and turn on the system.

1.6 Jumper Settings

Figure 1-5 shows the jumper locations.

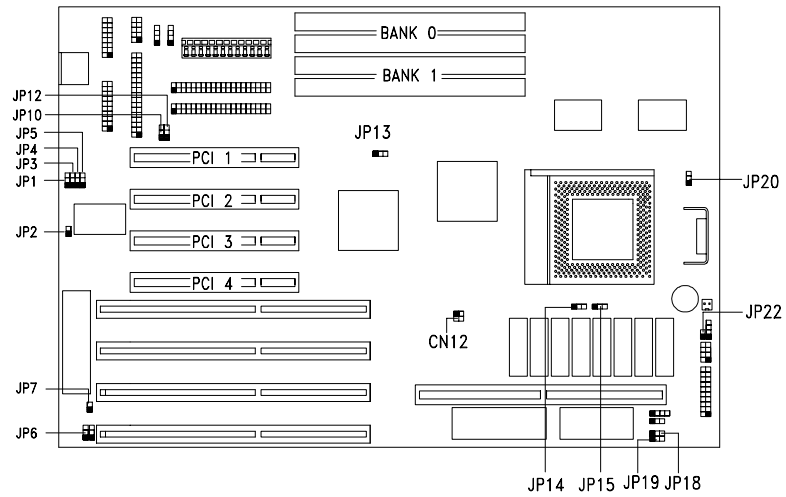


Figure 1-5 Jumper Locations



The shaded pin indicates pin 1.

The following tables list the jumper settings and their corresponding functions.

Table 1-2 System Board Jumper Settings

Jumper	Setting	Function
JP2	Open Closed	Normal or standard function Enable ECP function
JP3*	1-2 2-3	DRQ 3 DRQ 1
JP4*	1-2 2-3	DACK 3 DACK 1
JP5	1-2 2-3	Enable SMC 665 Disable SMC 665
JP6	1-2 2-3	Check password Bypass password
JP7	Open Closed	Disable keyboard controller IRQ 12 Enable keyboard controller IRQ 12
JP17	1-2 2-3	Clear RTC Normal
JP20	1-2 2-3	VR or standard CPU (3.3V) VRE CPU (3.6V)
Non-configurable Jumpers		
JP1	Open	Reserved
JP10, JP12	Closed	Reserved
JP18	1-2	Reserved
JP19	Open	Reserved
JP22	Closed	Keylock



All jumpers with Reserved functions have fixed settings. Do not change them.

* for SMC665 ECP function

Table 1-3 CPU Frequency Select

CPU Freq.	JP13	JP14	JP15	CN12
75 MHz	1-2	1-2	1-2	1-3, 2-4
90 MHz	2-3	1-2	1-2	1-3
100 MHz	2-3	1-2	1-2	2-4
120 MHz	2-3	1-2	2-3	1-3
133 MHz	2-3	1-2	2-3	2-4
150 MHz	2-3	2-3	2-3	1-3
166 MHz	2-3	2-3	2-3	2-4

The jumper **JP13** is for adjusting the ISA bus speed. The available settings are listed as follows:

Table 1-4 JP13 (ISA Bus Speed Select) Settings

JP13	ISA Bus Speed
1-2	1/3 PCI bus frequency
2-3	1/4 PCI bus frequency

The jumpers **JP14** and **JP15** lets you select the internal CPU speed.

Table 1-5 JP14 and JP15 (Internal CPU Speed Select) Settings

JP14	JP15	CPU speed
1-2	1-2	1.5 x External bus speed
1-2	2-3	2 x External bus speed
2-3	2-3	2.5 x External bus speed

The jumper **CN12** lets you select the external bus speed.

Table 1-6 CN12 (External Bus Speed Select) Settings

CN12	External Bus Speed
1-3, 2-4	50 MHz
1-3	60 MHz
2-4	66 MHz

Table 1-7 lists the system board connectors.

Table 1-7 System Board Connectors

Connector	Function
JP16	External battery connector
JP21	Fan connector
JP23	HDD LED connector

1.7 Installing Memory

The system memory is expandable to 128 MB by adding single in-line memory modules (SIMMs). See Figure 1-1 for the location of the SIMM sockets. Section 1.7.1 tells how to install SIMMs.

The four 72-pin SIMM sockets on board accept single-density (4- and 8-MB) and double-density (16- and 32-MB) SIMMs, with 70 ns or less DRAM speed. Table 1-8 lists the possible memory configurations.

Table 1-8 Memory Configurations

Bank 0		Bank 1		Total Memory
Socket 1	Socket 2	Socket 3	Socket 4	
4 MB	4 MB			8 MB
4 MB	4 MB	4 MB	4 MB	16 MB
8 MB	8 MB			16 MB
8 MB	8 MB	4 MB	4 MB	24 MB
8 MB	8 MB	8 MB	8 MB	32 MB
16 MB	16 MB			32 MB
16 MB	16 MB	4 MB	4 MB	40 MB
16 MB	16 MB	8 MB	8 MB	48 MB
16 MB	16 MB	16 MB	16 MB	64 MB
32 MB	32 MB			64 MB
32 MB	32 MB	4 MB	4 MB	72 MB
32 MB	32 MB	8 MB	8 MB	80 MB
32 MB	32 MB	16 MB	16 MB	96 MB
32 MB	32 MB	32 MB	32 MB	128 MB



You can install SIMMs with or without parity even if the system board does not support the parity checking feature.

1.7.1 Installing a SIMM



Observe the ESD precautions when installing components. See section 1.2.

Follow these steps to install a SIMM:

1. Slip a SIMM at a 45° angle into a socket with the component side facing down. Always install SIMMs beginning with bank 0.



Be careful when inserting or removing SIMMs. Forcing a SIMM in or out of a socket can damage the socket or the SIMM (or both).

2. Gently push the SIMM up until the pegs of the socket slip into the holes on the SIMM and the holding clips lock the SIMM into a vertical position.



The SIMM should be at a 90° angle when installed.

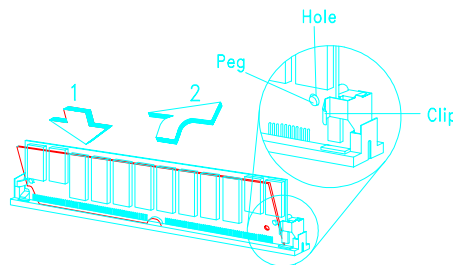


Figure 1-6 Installing a SIMM



See section 1.5 for the post-installation instructions.

1.7.2 Removing a SIMM

1. Press the holding clips on both sides of the SIMM outward to release it.
2. Press the SIMM downward to about a 45° angle.
3. Gently pull the SIMM out of the socket.

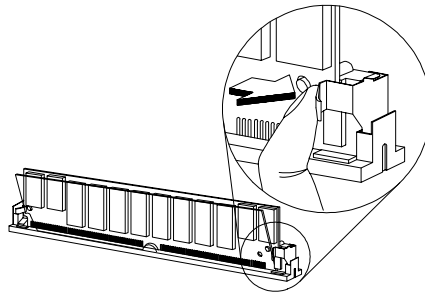


Figure 1-7 Removing a SIMM

1.7.3 Reconfiguring the System

The system automatically detects the amount of memory installed. Run Setup to view the new value for total system memory and make a note of it.

1.8 Upgrading Cache Memory



Observe ESD precautions when installing components. See section 1.2.

The system board may come with either a standard 256-KB second-level asynchronous cache or a cache upgrade socket. See Figure 1-1 for the location of the 256-KB cache and the optional cache upgrade socket.

Upgrading the cache memory improves system performance. The cache upgrade socket allows you to upgrade the second-level cache. The socket supports 256-KB pipeline-burst cache. To upgrade, simply insert the memory board into the cache socket. See 1.5 for the post-installation instructions.



If the board does not have the cache upgrade socket, then the system cache is not upgradable.

1.9 Error Messages

In the event that you receive an error message, do not continue using the computer. Note the message and take corrective action immediately. This section describes the different types of error messages and suggests corrective measures.

There are two general types of error messages:

- Software
- System

1.9.1 Software Error Messages

Software error messages are returned by your operating system or application. These messages typically appear after you boot the operating system or when you run your applications. If you receive this type of message, consult your application or operating system manual for help.

1.9.2 System Error Messages

A system error message indicates a problem with the computer itself. These messages normally appear during the power-on self-test, before the operating system prompt appears. Table 1-9 lists the system error messages in alphabetical order.

Table 1-9 System Error Messages

Error Message	Corrective Action
Bad CMOS Battery	Replace battery. Contact your dealer.
CMOS Checksum Error	Run Setup.
Diskette Drive Controller Error	Check and connect the cable to the diskette drive or controller.
Diskette Drive Error	Diskette may be bad. If not, check the diskette drive and replace if necessary.
DRAM Configuration Error	Check and modify DRAM configuration to agree with Table 1-8.
Equipment Configuration Error	Run Setup.
Fixed Disk Controller Error	Check and connect the cable to the fixed disk drive or controller.
Fixed Disk 0 Error	Check all cable connections. Check the fixed disk and replace if necessary.
Fixed Disk 1 Error	Check all cable connections. Check the fixed disk and replace if necessary.
Fixed Disk 0 Extended Type Error	Run Setup.
Fixed Disk 1 Extended Type Error	Run Setup.
I/O Parity Error	Contact your dealer.
Keyboard Error or No Keyboard Connected	Check and connect the keyboard to the system unit.
Keyboard Interface Error	Contact your dealer.

Table 1-9 System Error Messages (continued)

Error Message	Corrective Action
Keyboard Locked	Unlock the keyboard.
Memory Error	Check SIMMs on the system board. Contact your dealer.
Memory Size Mismatch	Run Setup.
Serial 1 Conflict	Run Setup. Disable Onboard Serial 1.
Serial 2 Conflict	Run Setup. Disable Onboard Serial 2.
Parallel Port Conflict	Run Setup. Disable Onboard Parallel Port.
Pointing Device Error	Check or connect the pointing device. Contact your dealer.
Pointing Device Interface Error	Contact your dealer.
Press F1 key to continue or Ctrl-Alt-Esc for Setup	Press F1 or CTRL ALT ESC .
Press F1 to Setup or other key to continue	Press F1 and reconfigure the system.
Press Esc to turn off NMI, any key to reboot	Press ESC to disregard NMI error. Press any key to reboot the system.
Protected Mode Test Fail	Contact your dealer.
RAM BIOS Error	Contact your dealer.
Real Time Clock Error	Run Setup.
Shadow RAM Fail	Contact your dealer.
System Memory Address Error	Check SIMMs on system board or contact your dealer.

1.9.3 Correcting Error Conditions

As a general rule, the "Press F1 to continue" error message is caused by a configuration problem which can be easily corrected. An equipment malfunction is more likely to cause a fatal error, i.e., an error that causes complete system failure.

Here are some corrective measures for error conditions:

1. Run Setup. You must know the correct configuration values for your system before you enter Setup, which is why you should write these values down when the system is correctly configured. An incorrect Setup configuration is a major cause of power-on error messages, especially for a new system.
2. Remove the system cover, following the directions in the system housing installation guide. Check that the system board and any expansion boards are set correctly.
3. If you cannot access a new disk, it may be because your disk is not physically formatted. Physically format the disk using the FDISK and FORMAT commands.
4. Check that all connectors and boards are secure. Consult the system housing installation guide for assistance.

If you follow the corrective steps above and still receive an error message, the cause may be an equipment malfunction.

If you are sure that your configuration values are correct and your battery is in good condition, the problem may lie in a damaged or defective chip. Contact an authorized service center for assistance.