Chapter 2 System Board

This chapter describes the system board and all its major components, including:

- Details about the system board layout
- Jumper and connector locations and functions
- Jumper settings

The system board supports the Intel Pentium II processor with MMX (MultiMedia eXtensions) technology and the Celeron processor. The Pentium II comes in a card design with 512-KB second-level cache already integrated. The Celeron processor is Intel's Pentium II cost-down solution. It comes without or with 128-KB second-level cache. Both are capable of handling multimedia functions and enhancing the performance of 32-bit applications.

The system memory is upgradable to 256 MB via the two onboard 168-pin DIMM (Double In-line Memory Module) sockets. These sockets accommodate 8-, 16-, 32-, 64- and 128-MB DIMMs.

The board also incorporates a 3-D video controller with AGP (Accelerated Graphics Port), 4-MB SGRAM (Synchronous Graphics Random Access Memory), and a 3-D audio controller to fully support multimedia functions.

Onboard I/O (input/output) interfaces are comprised of a UART (Universal Asynchronous Receiver-Transmitter) 16C550 serial port, a parallel port with SPP (Standard Parallel Port)/ECP (Extended Capabilities Port)/EPP (Enhanced Parallel Port) support, and PS/2 keyboard and mouse ports. Two USB (Universal Serial Bus) ports, one VGA (Video Graphics Accelerator) port, one Feature connector, one mono Microphone-in port, one stereo Line-in port, one Line-out port, and one Game/MIDI (Musical Instrument Digital Interface) port are also added to the board design to enable the system to support additional peripherals.

For expansion, the board comes with two PCI (Peripheral Component Interface) slots.

Special features such as PnP (Plug-and-Play) support, Power Management, Wireless Communication, Hardware Monitoring, Wake-on Ring, and Wake-on LAN (Local Area

Network) functions are also supported. These functions are individually discussed in this chapter.

The system is fully compatible with MS-DOS V6.X, OS/2, SCO UNIX, Windows NT, and Windows 95/98 operating systems.

2.1 Major Components

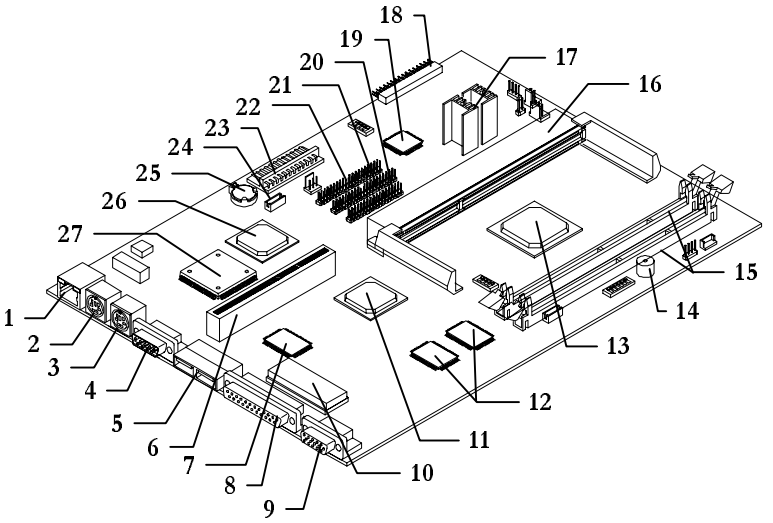
The system board has the following major components:

- A CPU (Central Processing Unit) connector that supports either of the following:
  - Pentium II processor running at 266, 300, 333, 350, 400, or 450 MHz
  - Celeron processor running at 266, 300, or 333 MHz
- Two DIMM sockets that accept 8-, 16-, 32-, 64-, and 128-MB Standard DRAMs, with Parity Check or Error Correction Code (ECC) feature. These sockets allow memory upgrade of up to 256 MB
- PCI local bus IDE (Integrated Device Electronics) controller
- 3-D audio controller
- AGP-compliant 3-D video graphics accelerator with 4-MB SGRAM
- One Feature connector
- One Wake-on LAN connector
- One Modem ring-in connector
- One Modem connector
- One external LCD (Liquid Crystal Display) connector
- Two PCI enhanced IDE interfaces that support up to four IDE devices
- External ports

- PS/2 keyboard and mouse ports
- One buffered high-speed serial port
- One SPP/ECP/EPP high-speed parallel port
- Two USB ports
- One standard VGA port
- One mono Microphone-in port
- One stereo Line-in port
- One stereo Line-out port
- One Game/MIDI port
- One external LCD port
- One riser card with two PCI slots

2.2 Layout

Figure 2-1 shows the locations of the major components on the system board.



1	RJ-45 LAN port	15	DIMM sockets
2	PS/2 keyboard port	16	CPU connector
3	PS/2 mouse port	17	Voltage regulators
4	Serial port	18	AIO board connector
5	USB ports	19	Sound Blaster compatible audio controller
6	Riser card slot		
7	Ultra I/O controller	20	FDD connector
8	Parallel port	21	IDE1 connector
9	VGA port	22	IDE2 connector
10	System BIOS chipset	23	Power connector
11	3-D AGP video controller	24	CD-in connector
12	Video memory	25	Battery
13	PCI/AGP/memory controller	26	PCI IDE controller
14	Buzzer	27	Ethernet controller

Figure 2-1 System Board Layout

2.3 Jumpers and Connectors

2.3.1 Jumper and Connector Locations

Figure 2-2 shows the jumper and connector locations.

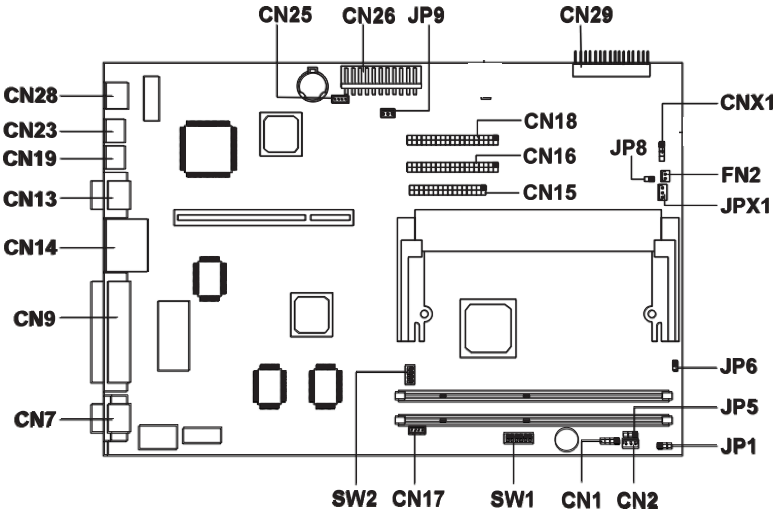


Figure 2-2 System Board Jumper and Connector Locations

The blackened pin of a jumper or a connector represents pin 1.

2.3.2 Jumper Settings

The following table lists the possible jumper settings:

Table 2-1 SW1 Settings

Switch		Setting		Function
1		On* Off		**Bus Frequency** 66 MHz 100 MHz
2		On Off*		**Password** Check Bypass
3	**4**	**5**	**6**	**Core/Bus Clock Ratio**
On	Off	Off	On	3.5
Off	On	On	On	4
Off	On	Off	On	4.5
Off	Off	On	On	5
Off	Off	Off	On	5.5
On	On	On	Off	6

Table 2-2 SW2 Settings

Switch	Setting	Function
4	On* Off	**VGA IRQ Assignment** Disabled Enabled
1	**2**	**3**	**Note**
Off	Off	Off	Required

* Default

2.3.3 Onboard Connector Functions

Table 2-3 lists the different connectors on the system board and their respective functions.

Table 2-3 Onboard Connectors

Connector	Function
CN1	Modem ring-in connector
CN2	Wake-on LAN connector
CN7	VGA port
CN8	LCD Interface connector
CN9	Printer/parallel port
CN13	Serial port
CN14	USB ports
CN15	FDD connector
CN16	IDE1 connector
CN17	Voice modem connector
CN18	IDE2 connector
CN19	Mouse port
CN23	Keyboard port
CN25	CD-in connector
CN26/JP9	Power connector
CN28	LAN (RJ45) port
CN29	AIO board connector
CNX1	IDE LED connector
JP1	Power LED connector
JP5	Turbo LED connector
JP6	Power switch connector
JP8	Thermal sensor connector
JPX1*	3-pin fan connector
FN2*	2-pin fan connector

* You cannot use FN2 and JPX1 at the same time. Refer to Figure 4-19 for the installation of the fansink with two connectors.

2.4 IDE Hard Disk Support

The board comes with an enhanced IDE controller that supports PIO mode 4 and Ultra DMA (Direct Memory Access) mode data transfers. In addition, two EIDE interfaces are mounted on the system board supporting a maximum of four IDE hard disks, or any other IDE devices. See Figure 2-2 for the location of the IDE interfaces.

Connect the cables according to the IDE hard disk configuration in Table 2-4. Follow the instructions in the housing installation manual on how to install a hard disk in the system.

Table 2-4 IDE Hard Disk Configuration

IDE Connector	Master	Slave
IDE1 (CN16)	Hard disk 0	Hard disk 1
IDE2 (CN18)	Hard disk 2/ IDE CD-ROM drive	Hard disk 3

2.5 Video Function

The onboard video controller is capable not only of enhancing video display, but supporting 3-D video applications as well. The video controller features the Accelerated Graphics Port (AGP) design - the latest bus architecture that is considered to be the best solution for 3-D applications. AGP offers greater bandwidth; thus, it is capable of speeding up the VGA bus in order to meet the requirements of 3-D applications.

The board comes with 4-MB video memory. Larger video memory allows you to display higher resolutions and more colors.

The following table lists the video resolutions supported by the onboard VGA:

Table 2-5 Supported Video Resolutions

Resolution	bpp	Vertical Freq. (Hz)	Horizontal Freq. (KHz)
640 x 480	8/16/24/32	60	31.5
640 x 480	8/16/24/32	72	37.4
640 x 480	8/16/24/32	75	37.5
640 x 480	8/16/24/32	85	43.3
640 x 480	8/16/24/32	90	48.0
640 x 480	8/16/24/32	100	52.9
640 x 480	8/16/24/32	120	63.7
640 x 480	8/16/24/32	160	84.1
640 x 480	8/16/24/32	200	100.2
800 x 600	8/16/24/32	48	33.8
800 x 600	8/16/24/32	56	35.2
800 x 600	8/16/24/32	60	37.8
800 x 600	8/16/24/32	70	44.5
800 x 600	8/16/24/32	72	48.0
800 x 600	8/16/24/32	75	46.9
800 x 600	8/16/24/32	85	53.7
800 x 600	8/16/24/32	90	57.1
800 x 600	8/16/24/32	100	62.5
800 x 600	8/16/24/32	120	76.0
800 x 600	8/16/24	160	99.6
800 x 600	8/16	200	125.9
1024 x 768	8/16/24/32	43	35.5
1024 x 768	8/16/24/32	60	48.4
1024 x 768	8/16/24/32	70	56.5
1024 x 768	8/16/24/32	72	58.2
1024 x 768	8/16/24/32	75	60.0
1024 x 768	8/16/24/32	85	68.7
1024 x 768	8/16/24/32	90	76.2

Table 2-5 Supported Video Resolutions

Resolution	bpp	Vertical Freq. (Hz)	Horizontal Freq. (KHz)
1024 x 768	8/16/24/32	100	79.0
1024 x 768	8/16/24	120	96.7
1024 x 768	8/16	140	113.3
1024 x 768	8	150	120.6
1152 x 864	8/16/24/32	43	45.9
1152 x 864	8/16/24/32	47	44.9
1152 x 864	8/16/24/32	60	54.9
1152 x 864	8/16/24/32	70	66.1
1152 x 864	8/16/24/32	75	75.1
1152 x 864	8/16/24/32	80	76.4
1152 x 864	8/16/24	85	77.1
1152 x 864	8/16	100	90.2
1152 x 864	8/16	120	108.7
1280 x 1024	8/16/24	43	50.0
1280 x 1024	8/16/24	47	50.0
1280 x 1024	8/16/24	60	64.0
1280 x 1024	8/16/24	70	74.6
1280 x 1024	8/16/24	74	77.9
1280 x 1024	8/16/24	75	80.0
1280 x 1024	8/16	85	91.2
1280 x 1024	8/16	90	96.1
1280 x 1024	8/16	100	106.7
1600 x 1200	8/16	52	68.0
1600 x 1200	8/16	58	75.0
1600 x 1200	8/16	60	76.2
1600 x 1200	8/16	72	89.7
1600 x 1200	8/16	75	93.8

You may disable the onboard video function in the BIOS Utility. For more details on BIOS, see Chapter 3.

2.6 Audio Function

The board provides a complete 3-D audio solution via the onboard 3-D video controller and the following audio connectors:

- Mono microphone port
- Stereo line-in port
- Stereo line-out port
- Game/MIDI port
- CD-in connector
- Modem connector

These connectors enable the system to accommodate external audio devices. For instructions on how to connect the external audio devices, refer to section 1.3.6. Connecting Multimedia Components.

2.7 USB

USB (Universal Serial Bus) is a new serial bus design that is capable of cascading low-/medium-speed peripherals (less than 12 Mbps) such as a keyboard, mouse, joystick, scanner, printer and modem/ISDN. With USB, complex cable connections at the back panel of your PC can be eliminated.

The board comes with two USB ports. See Figure 2-1 or Figure 2-2 (CN14) for the location of the ports.

2.8 LAN Function

The system supports LAN connection by integrating a 10/100 Base-TX Ethernet controller and an RJ45 network port.

The system uses a PS/2-type SPS (Switch Power Supply) which provides 5V/1A standby power via the onboard connector JP9 (see Figure 2-2 for the location of the connectors). The onboard LAN relies on this standby power for its operation. Once it receives a "magic packet"[1], the system automatically wakes up. These magic packets are sent via management software that supports remote wake-up capability.

2.9 Hardware Monitoring Function

The Hardware Monitoring function allows you to check the system resources, either locally or in a computer network, by using software such as Intel LDCM (LAN Desk Client Manager). Intel LDCM is a desktop management program that offers the SMART (System Monitoring Analysis and Reporting Technology) monitor function for checking local or network connected systems. In addition, it also enables the PC products and applications to be OS (operating system) independent.

To enable the Hardware Monitoring function, you need to install Intel LDCM. Contact your dealer for information on the availability of the software. Refer to the software documentation for more details on the Hardware Monitoring function.

2.10 Modem Ring-in Function

The Modem Ring-in function enables the system to resume from suspend mode by monitoring the fax/modem (or any device of similar type) activities. Any signal or activity detected from the Modem ring-in connector automatically returns the system to normal operation. Refer to Figure 2-2 for the location of the Modem ring-in connector (CN1) on the system board.

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[1] Magic packet is defined as a 16 bit "00000000011111111" header + NIC card Mac address. This packet passes through the Ethernet wire. Once received by the LAN chip and an identical MAC address has been detected, the LAN chip will start the WOL process.

2.11 Wake-on LAN Function

The system supports the Wake-on LAN feature via the onboard Wake-on LAN connector (CN2). This special feature allows the system to be activated via a network. Common network functions, such as remote access, file sharing, etc. are also supported.