G586IPB/W

**Rev. 0+
System Board
User's Manual**

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❖ FCC Statement on Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and the receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio TV technician for help.*

Notice:

1. *The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.*

2. *Shielded interface cables must be used in order to comply with the emission limits.*

❖ Table of Contents ❖

❖ Introduction

The G586IPB/W system board offers several advanced features integrated into the system board. Its design is based on the new Peripheral Component Interconnect (PCI) local bus and Industry Standard Architecture (ISA) standards.

The G586IPB/W provides a 321-pin Zero Insertion Force (ZIF) CPU socket for Pentium™ processors running at 75MHz, 90MHz, 100MHz, 120MHz, 133MHz or 150MHz frequencies. This ZIF socket allows users to easily upgrade their CPUs. It also provides a VRM (Voltage Regulation Module) header which lets you to upgrade to future low-voltage CPUs.

The G586IPB/W is equipped with four PCI slots and three ISA slots.

The G586IPB/W board has two bus master PCI IDE connectors. Bus mastering reduces CPU use during disk transfer. The system board is also equipped with two NS16C550A-compatible serial ports, an SPP parallel port, a floppy disk drive controller, one PS/2 mouse port and one PS/2 or AT keyboard connector.

The G586IPB/W can support 8MB to 128MB of memory using 1Mx36, 2Mx36, 4Mx36 and 8Mx36 72-pin SIM modules.

Features and Specifications

Processor
- Intel Pentium™ Processor 75/90/100/120/133/150MHz
- Future Pentium OverDrive Processor

System Design
- Intel Triton chipset
- Four 72-pin SIMM sockets
- 8MB to 128MB onboard memory
- Uses EDO or fast page mode x32 DRAM, 60 or 70ns, 5V
- 256KB or 512KB L2 cache, direct-map WB or WT
- Uses 3.3V pipeline burst or asynchronous cache SRAM on 160-pin cache module
- EDO DRAM and pipeline burst cache SRAM give optimal performance
- 4 PCI slots (all bus masters)
- 3 ISA slots (one shared with PCI slot)
- Award BIOS, Windows 95 Plug and Play compliant
- Flash EPROM for easy BIOS upgrades

Energy Efficient Design
- System power management supported
- CPU stopped clock control
- Hardware supports SMI green mode
- Microsoft/Intel APM 1.1 compliant
- External power management switch supported

Two Bus Master PCI IDE Connectors
- PIO Mode 3 & 4 Enhanced IDE (data transfer rate up to 16.6MB/sec.)
- DMA Mode 2 Bus Master IDE (data transfer rate up to 22.2MB/sec.)
- Bus mastering reduces CPU utilization during disk transfer

• ATAPI IDE CD-ROM supported

Integrated I/O
- Winbond super I/O controller
- One 720KB/1.2MB/1.44MB floppy controller
- Two NS 16C550A-compatible high speed UARTs
- One parallel port
- Plug and Play compliant

Connectors
- Serial ports: 2 connectors
- Parallel port: 1 connector
- IDE: 2 shrouded headers
- Floppy: 1 connector
- PS/2 mouse connector
- PS/2 keyboard connector or AT keyboard connector

CPU Socket
- VRM (Voltage Regulation Module) header allows upgrade to future low-voltage CPUs
- 321-pin ZIF socket (Intel Socket 7)

PCB
- 4 layers
- 280mm (11.02") x 220mm (8.66")

Slot Limitations

Due to the size of the CPU with its accompanying heatsink/fan component, the length of the add-in cards in PCI slots 2, 3 and 4 is limited to 205mm (measured from the bracket of the card).

The length of the add-in card in PCI slot 1 is limited to 205mm only if its components protrude more than 5mm from the components and/or solder side of the card.

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Package Checklist

The G586IPB/W package contains the following items:

- The G586IPB/W system board
- The G586IPB/W user's manual
- One 34-pin floppy disk drive cable
- One 25-pin printer port cable for chassis mounting
- One card-edge bracket with serial and mouse port cables
- Cache module (optional)

If any of these items is missing or damaged, please contact your dealer or sales representative for assistance.

❖ Installation Overview

This chapter summarizes the steps in installing the G586IPB/W system board into your system unit. It also includes a description of the area in which you must work and directions for memory installation. Before installing the system board, obtain the memory you plan to install. Please refer to the memory chart on page 9 for the number and type of SIM modules needed for the amount of memory you require.

Preparing the Area

Before unpacking the system board, make sure the location you have selected is relatively free of dust and static electricity. Excessive exposure to dust, static electricity, direct sunlight, excessive humidity, extreme cold, and water can damage the operational capabilities of your system board. Avoid placing the unit on surfaces such as carpeted floors. These areas also attract static electricity which can damage some circuits on your system board.

Make sure the power source has a properly grounded, three-pronged socket. It is essential that the power connection be properly grounded for correct functioning of your system board. For further protection, we recommend that you use a surge suppressor. This will protect the system board from damage that may result from a power surge on the electrical line.

Move items that generate magnetic fields away from your system board since magnetic fields can also damage your system board. Once you have selected the

ideal location, unpack the G586IPB/W system board carefully.

Handling the System Board

It is quite easy to inadvertently damage your system board even before installing it in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling the system board to ensure against electrostatic build-up.

Tips in Handling the System Board

1. To prevent electrostatic build-up, leave the board in its anti-static bag until you are ready to install it.

2. Wear an antistatic wrist strap.

3. Do all preparation work on a static-free surface with components facing up.

4. Hold the system board by its edges only. Be careful not to touch any of the components, contacts or connections, especially gold contacts, on the board.

5. Avoid touching the pins or contacts on all modules and connectors. Hold modules and connectors by their ends.

Warning:
Electrostatic discharge (ESD) can damage your upgrade processor, disk drives, add-in boards, and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some

ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Hardware Installation

If you are installing the G586IPB/W system board, follow the instruction below. Before installing the system board into your system unit, you should prepare the tools you will need:

You will need:
- *one medium size, flat-bladed screwdriver*
- *one medium Phillips screwdriver*

Step 1

Unlock your system unit. Turn off the power and disconnect all power cords and cables.

Step 2

Remove the system unit cover. Refer to the manufacturer's instructions if necessary.

Step 3

Remove expansion cards seated in any of the expansion slots and detach all connectors from the old system board.

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Step 4

Loosen the screws holding the original system board and remove the board from the system. Save the screws.

Step 5

Remove the G586IPB/W from its original packing box. Be careful to avoid touching all connectors and pins on the board. Please refer to the handling instructions on pages 6-8 for proper handling techniques.

Step 6

Insert the SIMMs into the SIMM banks on the G586IPB/W. The quantity and location of the SIMMs is dependent upon the memory configuration and type of modules you intend to use.

Step 7

Install the CPU. Be sure pin 1 of the CPU is aligned with pin 1 of the socket.

Step 8

Set the corresponding jumpers.

Step 9

Install the prepared G586IPB/W system board into the case and replace the screws.

Step 10

Reinstall all cards and connectors and replace the system unit cover. Reconnect all power cords and cables.

Memory Installation

The G586IPB/W system board can support 8MB to 128MB of memory using 72-pin SIMMs (Single In-line Memory Module).

The SIM sockets are divided into two banks on the system board. Each bank consists of 2 SIMM sockets. The G586IPB/W system board uses 1Mx36, 2Mx36, 4Mx36 and 8Mx36 SIMMs. You will need 2 or 4 pieces of SIM modules, depending on the amount of memory you intend to install.

The table on the next page summarizes the bank locations and modules needed for the corresponding memory sizes.

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| Memory Size	Bank 0		Bank 1	
	SIMM1	SIMM2	SIMM3	SIMM4
8MB	1Mx36	1Mx36	—	—
8MB	—	—	1Mx36	1Mx36
16MB	1Mx36	1Mx36	1Mx36	1Mx36
16MB	2Mx36	2Mx36	—	—
16MB	—	—	2Mx36	2Mx36
24MB	1Mx36	1Mx36	2Mx36	2Mx36
24MB	2Mx36	2Mx36	1Mx36	1Mx36
32MB	2Mx36	2Mx36	2Mx36	2Mx36
32MB	4Mx36	1Mx36	—	—
32MB	—	—	4Mx36	4Mx36
40MB	1Mx36	1Mx36	4Mx36	4Mx36
40MB	4Mx36	4Mx36	1Mx36	1Mx36
48MB	2Mx36	2Mx36	4Mx36	4Mx36
48MB	4Mx36	4Mx36	2Mx36	2Mx36
64MB	4Mx36	4Mx36	4Mx36	4Mx36
64MB	8Mx36	8Mx36	—	—
64MB	—	—	8Mx36	8Mx36
72MB	1Mx36	1Mx36	8Mx36	8Mx36
72MB	8Mx36	8Mx36	1Mx36	1Mx36
80MB	2Mx36	2Mx36	8Mx36	8Mx36
80MB	8Mx36	8Mx36	2Mx36	2Mx36
96MB	4Mx36	4Mx36	8Mx36	8Mx36
96MB	8Mx36	8Mx36	4Mx36	4Mx36
128MB	8Mx36	8Mx36	8Mx36	8Mx36
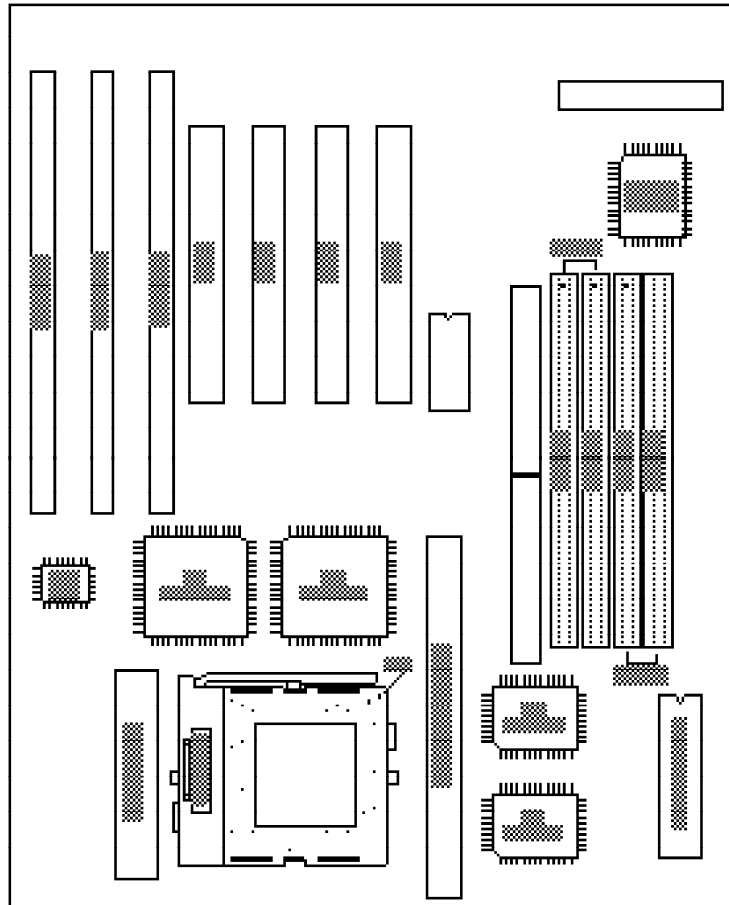
• Pin 1 of the SIMM socket

Locations of the SIMM sockets on the system board

Installing the Modules

A SIM module simply snaps into a socket on the system board. Pin 1 of the SIM module must correspond with Pin 1 of the socket.
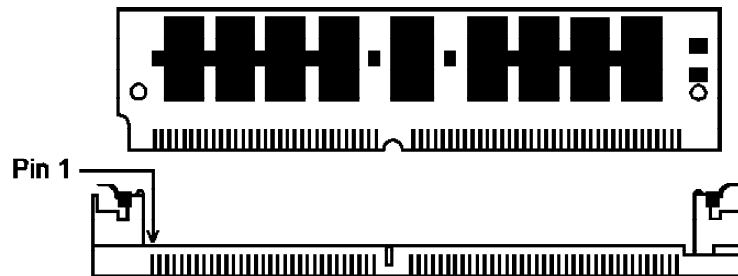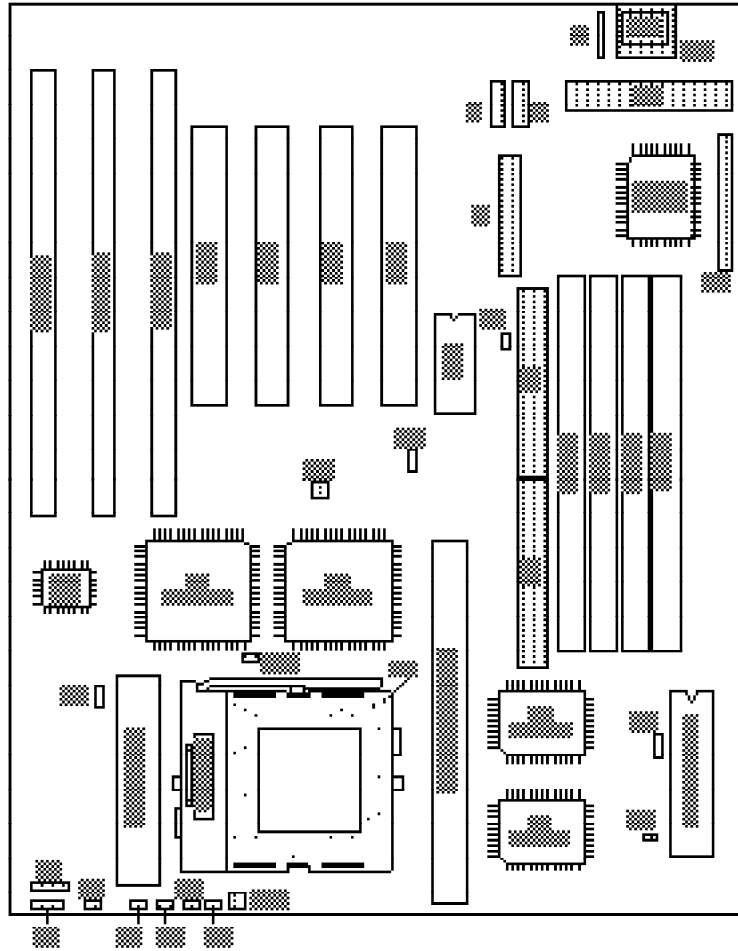

1. Position the SIMM above the socket with the "notch" in the module aligned with the "key" on the socket.

2. Seat the module at a 45° angle into the bank. Make sure it is completely seated. Tilt the module upright until it locks in place in the socket.

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Board Configuration

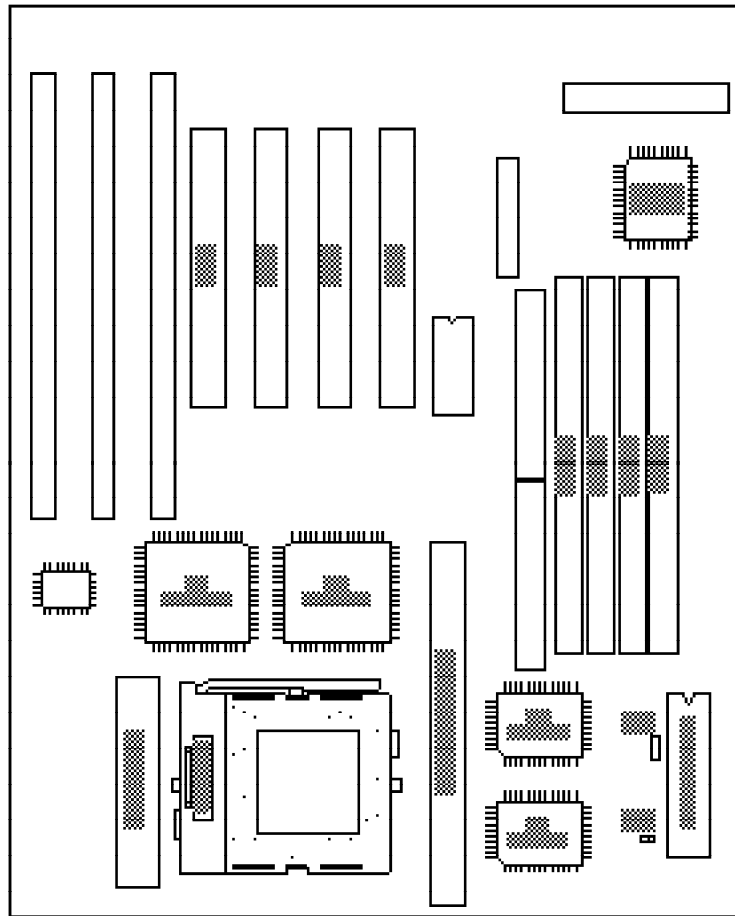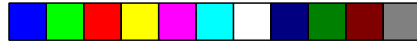Locations of Jumpers and Connectors on the system board

Jumper Settings

Jumper Settings for Display Type, CMOS Clean ,and IRQ Select are located in JP2 and JP3.

Locations of Jumpers JP2 and JP3
on the system board

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Jumper JP2
Password Clear

If you set a password in the "Password Setting" option and forget your password, power off your system and set Jumper JP2 to On to clear the password stored in your CMOS. Now power on your system. After your system has detected the floppy or hard drive, turn it off again and set JP2 to Off.
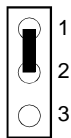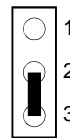
JP2 Off: Normal
(Default)

JP2 On: Password
Clear

Jumper JP3
Display Type Select

Jumper JP3 sets the display adapter to color or mono. This jumper must match the type of display adapter installed. If you change your video adapter, make sure this jumper is changed accordingly.

JP3, Pins 1-2 On :
Color (Default)

JP3, Pins 2-3 On:
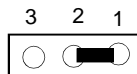Mono

15

Jumper JP52
IRQ Select

Use Jumper JP52 to select between IRQ5.

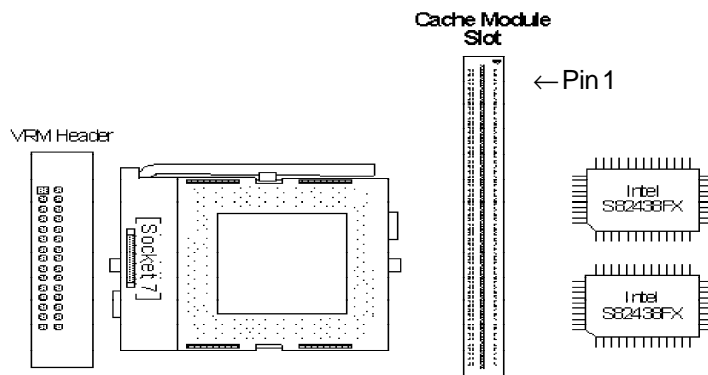JP52, Pins 1-2 On:
IRQ5

Cache Configuration

The G586IPB/W system board supports 3.3V pipeline burst or asynchronous cache SRAM installed in the 160-pin cache module slot. The board can be configured to the following cache sizes: 256KB and 512KB.

Installing the Cache Module

Cache Module Slot

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1. Locate the 160-pin cache module slot on the system board. Position the cache module above the slot. Make sure pin 1 of the cache module is aligned with pin 1 of the slot. Carefully slide the module into the slot. Press firmly on the top of it to seat it properly.

Note:
You do not need to modify any jumpers when you install the cache module.
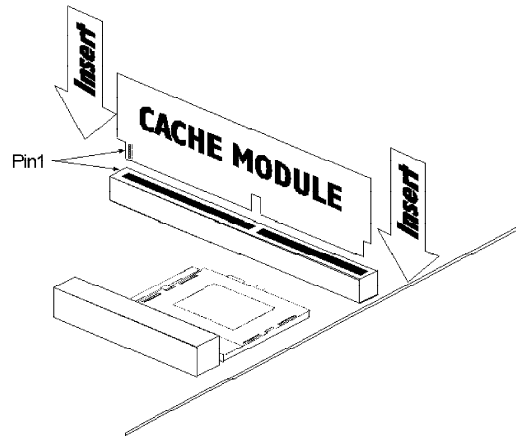
2 Once the cache module has been installed, make sure the "External Cache" option in the "BIOS Features Setup" menu of the Award BIOS CMOS Setup Utility is set to "Enabled".

Note:
With the cache module installed in the cache module slot, the length of the add-on card in PCI Slot 1 is limited to 205 mm only if its components protrude more than 5 mm from the components and/or solder side of the card.

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VRM Header

Your G586IPB/W system board is equipped with a VRM (Voltage Regulation Module) header shown below. It allows you to upgrade to future low-voltage CPUs by installing a Voltage Regulation Module.
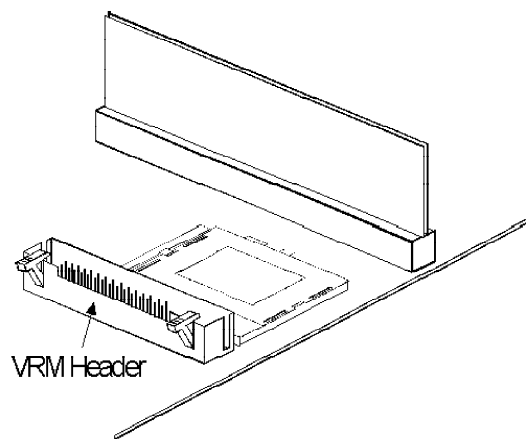
VRM Header

VRM Header and 3.3V Pentium Processor

A DVRM (Dummy Voltage Regulation Module) must be installed if you are using a 3.3V Pentium processor.

To Install:
Position the DVRM above the header. Make sure pins A1 and B1 of the module are aligned with pins A1 and B1 of the VRM header (see the illustration on the next page). Carefully slide the module into the slot. Press firmly on the top of it to seat it properly. The handles on the VRM header will lift up automatically to secure the module.

18

DVRM

Handle   B1

A1

VRM Header

Handle
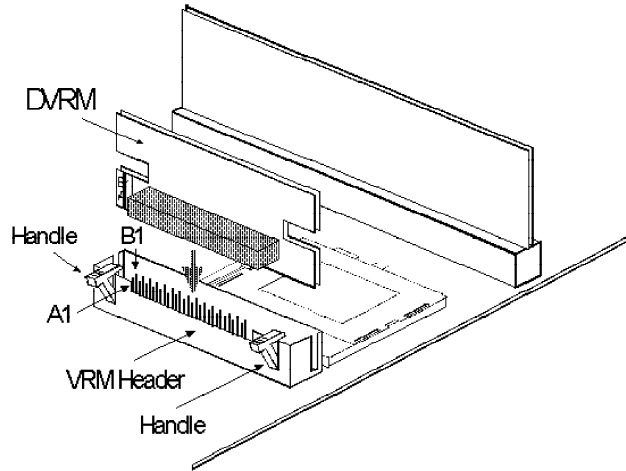
VRM Header and Future Low-Voltage CPUs

The types of VRM supported and installation procedures will be described in a future edition of the G586IPB/W manual.

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CPU Installation

The G586IPB/W is equipped with a 321-pin Zero Insertion Force (ZIF) socket at location U31 of the system board. The ZIF socket let you easily upgrade your CPU as your system needs grow. Make sure all jumpers are set correctly before applying power, or you may damage the CPU or system board.
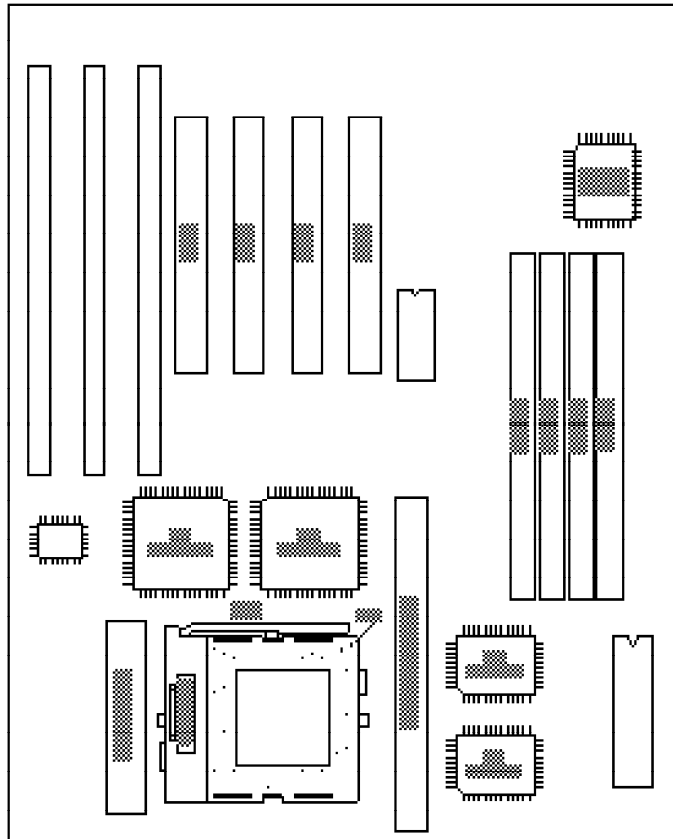
Jumper Settings for CPU
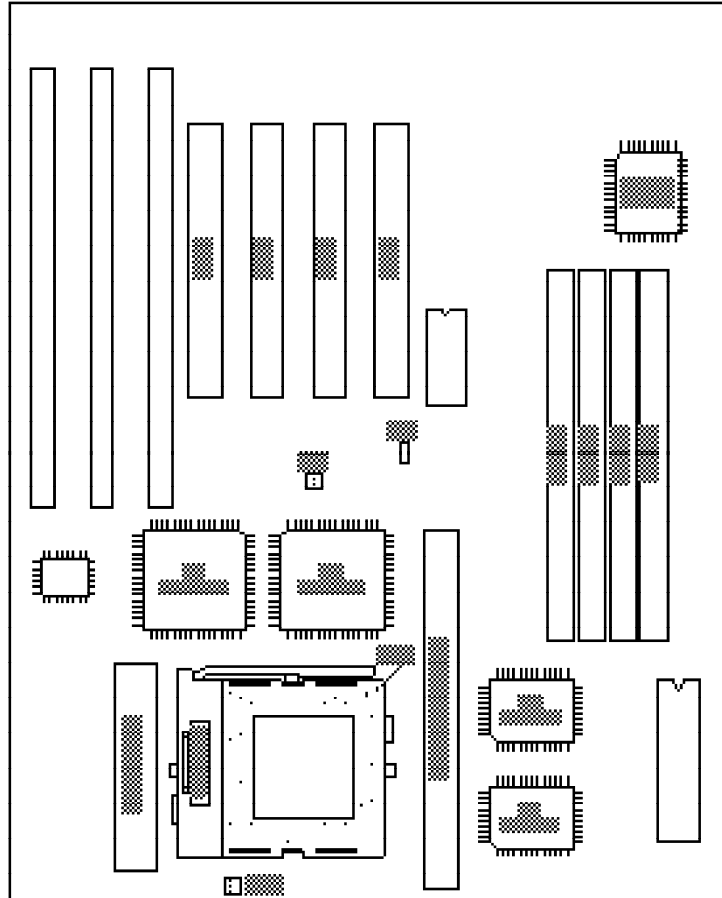
Locations of Jumpers JP5, JP6 and JP15
on the System Board
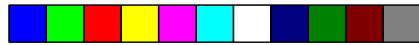
75MHz Pentium Processor (3.3V) jumper setting
System (External) Bus Speed: 50MHz

Pin 1

JP5

4 | 3
2 | 1

JP6

3 | 1
4 | 2
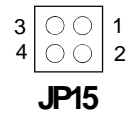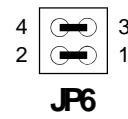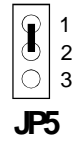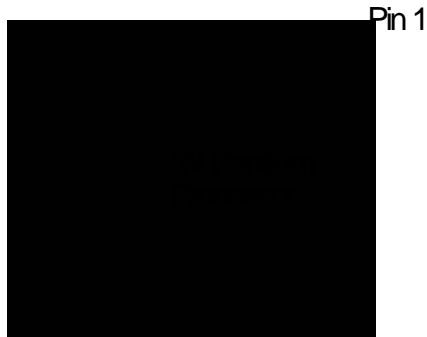
JP15

3.3V Pentium Processor (90MHz) *
System (External) Bus Speed: 60MHz
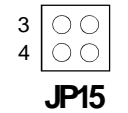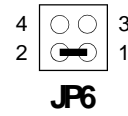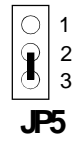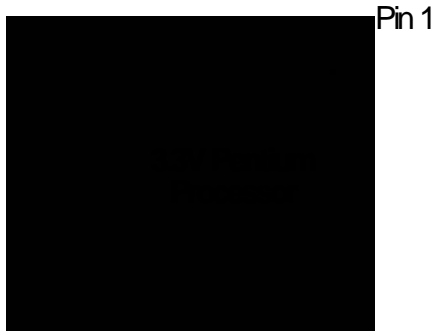
Pin 1

1
2
3

JP5

4 | 3
2 | 1

JP6

3 |
4 |

JP15

* Default Setting

22
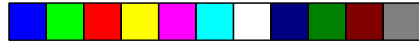
3.3V Pentium Processor (100MHz)
System (External) Bus Speed: 66MHz

Pin 1

JP5
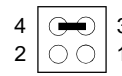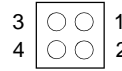
4 3
2 1

JP6

3 1
4 2

JP15

3.3V Pentium Processor (100MHz)
System (External) Bus Speed: 50MHz

Pin 1

1
2
3

JP5

4 3
2 1

JP6

3 1
4 2

JP15

23
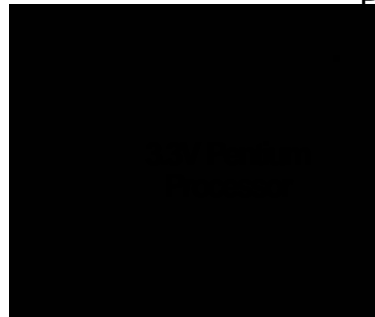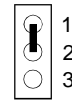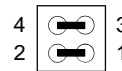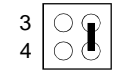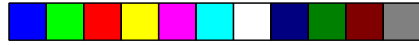
3.3V Pentium Processor (120MHz)
System (External) Bus Speed: 60MHz

Pin 1

1
2
3

JP5

4   3
2   1

JP6

3   1
4   2
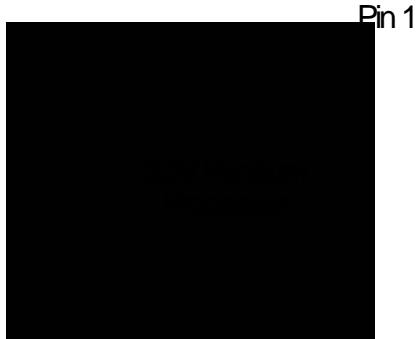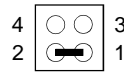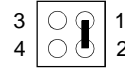
JP15

3.3V Pentium Processor (133MHz)
System (External) Bus Speed: 66MHz
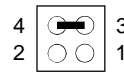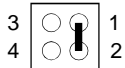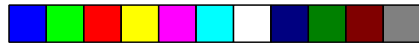
Pin 1

1
2
3

JP5

4   3
2   1

JP6

3   1
4   2

JP15

24

3.3V Pentium Processor (150MHz)
System (External) Bus Speed: 50MHz

Pin 1

1
2
3

JP5

4   3
2   1

JP6

3   1
4   2

JP15

3.3V Pentium Processor (150MHz)
System (External) Bus Speed: 60MHz

Pin 1

1
2
3

JP5

4   3
2   1

JP6

3   1
4   2

JP15

25
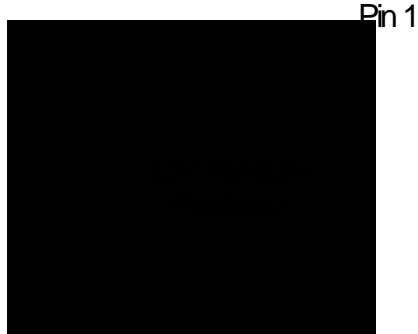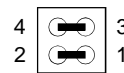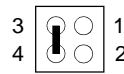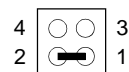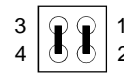
Jumpers JP11 and J50
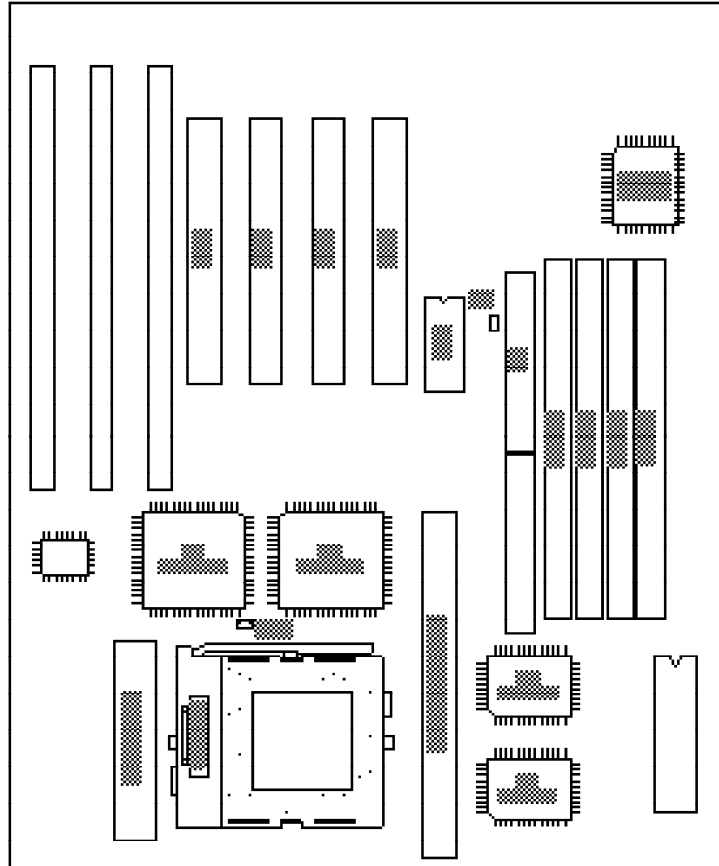
The following jumpers are for factory testing only and should always be set to their default configurations. Reconfiguring these jumpers will cause problems with your system board. The default setting is

JP11, J50: Off

Installing Upgrade CPUs

The G586IPB/W is equipped with a 321-pin Zero Insertion Force (ZIF) socket at location U31 of the system board. This socket is designed for easy removal of an old CPU and easy insertion of an upgrade CPU. The socket allows you to carefully place the new CPU into its position. If you need to apply excessive force to insert the CPU, you are not installing the CPU correctly.

Warning:
Open the socket only if you are actually installing a CPU. The warranty on the original CPU will be voided if the S/N seal is broken.

Do not change any factory CPU speed jumper settings. You do not need to change any jumpers to properly install the 3.3V Pentium Upgrade Processor.

Before proceeding with the upgrade, take note of the following. The microprocessor and heat sink may be hot if the system has been running. To avoid the possibility of a burn, power the system off and let the processor and heat sink cool for 10 minutes.

The 321-pin ZIF socket consists of five rows of pin holes on each side. To prevent improper OverDrive Processor installation, the ZIF socket has a Plug/Keying mechanism. Several holes in the socket are plugged so OverDrive Processors will go in only one way. If you cannot easily insert the OverDrive Processor, verify that pin 1 of the CPU is aligned with pin 1 of the socket. A warning note — be extremely careful to match pin 1 of the CPU with pin 1 of the socket. Only Intel's OverDrive Processor is keyed to prevent improper placement in the ZIF socket. Other Intel CPUs, as well

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as CPUs from other vendors, can be placed incorrectly and will be permanently damaged if incorrectly placed.
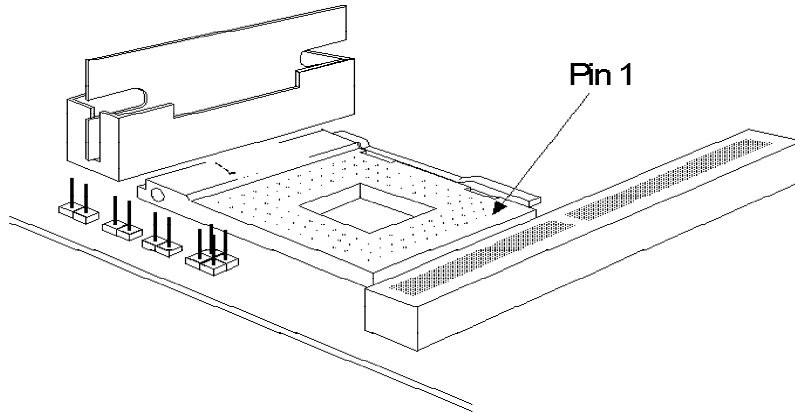
Zero Insertion Force (ZIF) Socket

To install an upgrade CPU, do the following.

1. Make sure the handle on the side of the ZIF socket is up. To raise the handle, push it down, slightly pull it out to the side, then raise it as far as it will go. The top plate will slide back. Do not use screwdrivers or other tools to open the socket, or you may damage the system or socket. It may be necessary to initially apply a small amount of sideways force to free the handle from its retaining "tab." Once clear of the "tab," the handle will open relatively easily.
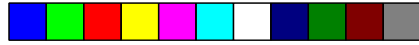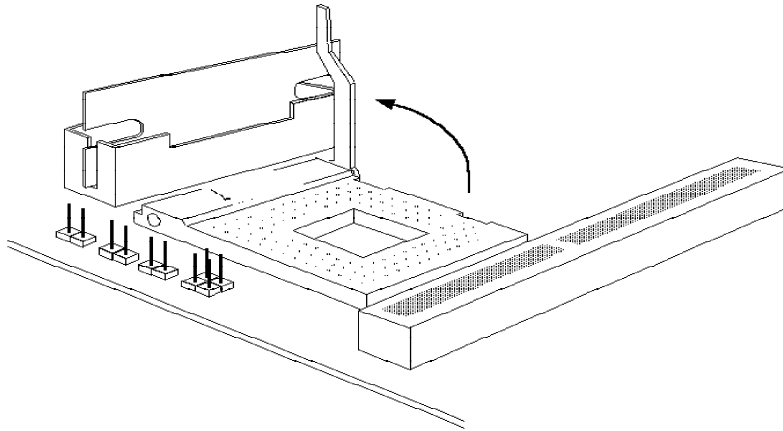
Lifting the Handle

2. Once the lever is completely up, remove the old
    CPU by carefully lifting it straight out of the socket.
    You are now ready to insert the new CPU.

Pin 1

29
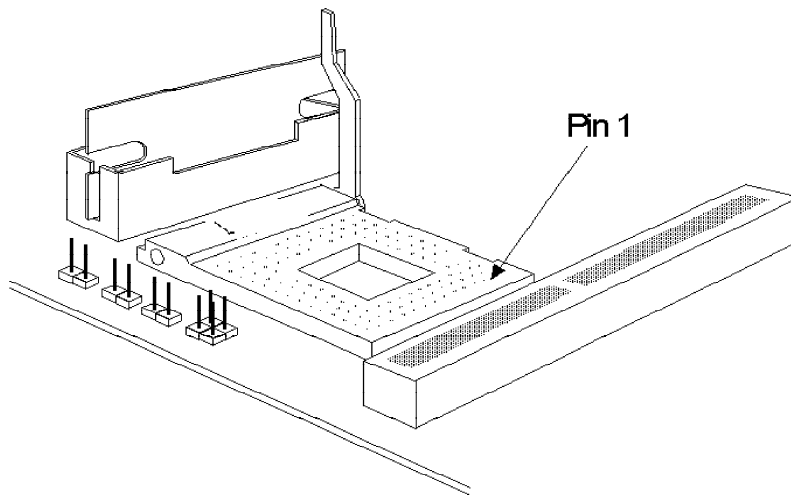
3. Position the CPU above the ZIF socket. Make sure
    pin 1 of the CPU is aligned with pin 1 of the socket.
    Lower the chip until the pins are inserted properly in
    their corresponding holes. Remember that very little
    force is needed to install the CPU. If the CPU will
    not insert easily, verify pin 1 of the CPU is aligned
    with pin 1 of the socket. Applying too much
    pressure can damage the CPU or the socket.
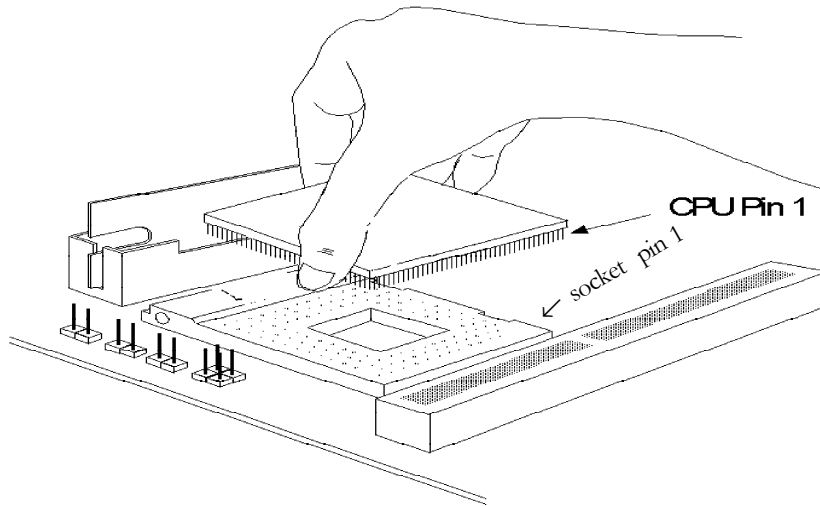
Positioning the CPU Above the ZIF Socket

4. Push the handle down until the handle locks into
    place. The top plate will slide forward. You will feel
    some resistance as the pressure starts to secure the
    CPU in the socket. This is normal and will not
    damage the CPU. However, if the handle is not
    completely closed, damage to the CPU and/or
    system board may result.

Clearance Requirements

The 3.3V Pentium Upgrade Processor comes with a heat sink mounted on top. To maintain proper airflow once the upgrade is installed on the system board, the processor and heatsink require certain space clearances.

The clearance above 3.3V Pentium Upgrade Processor's fan/heat-sink must be at least 0.4 inches. The clearance on at least 3 of 4 sides of the processor must be at least 0.2 inches. The cables (for floppy drive, hard drive, CD-ROM, etc.) must be routed clear of the CPU and its airspace.

Fan Exhaust

The CPU must be kept cool by using a fan exhaust configuration in connection with the heatsink. The temperature of the air entering the fan/heatsink cannot exceed 45°C (113°F). The ambient or room temperature must be below 37°C (99°F) for a system installed with the 3.3V Pentium Upgrade Processor.

In order to provide proper airflow to the CPU, all movable obstructions (power supply cables, cards, floppy disk cables) must be clear of the CPU fan/ heatsink component in accordance with the space clearance discussed in the CPU installation section of this manual.

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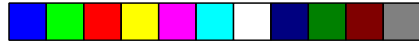
Built-in Ports

The G586IPB/W system board is equipped with two serial ports, one SPP parallel printer port, one FDD connector, one PS/2 mouse connector and two IDE hard disk shrouded headers.
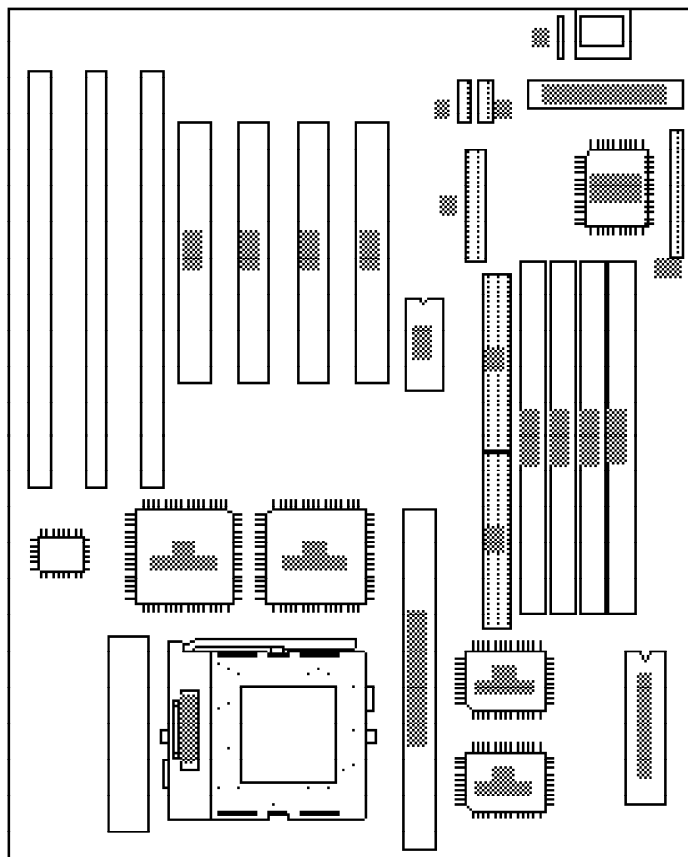
Locations of the built-in ports on the system board

Serial Ports

The built-in serial ports are RS-232C asynchronous communication ports with 16C550A-compatible UARTs that can be used with modems, serial printers, remote display terminals, and other serial devices. They use the following system I/O addresses:

Port Configuration	I/O Address
COM1	3F8h
COM2	2F8h

Connecting the Serial Ports

Two DB-9P serial port cables are provided with the motherboard. They are mounted on a card-edge bracket along with the PS/2 mouse cable. The upper serial port cable should be used for the COM 1 primary serial port; connect it to Connector J6 on the motherboard. The lower serial port cable should be used for the COM 2 secondary serial port; connect it to Connector J5 on the motherboard. Make sure the colored stripes on the ribbon cables align with pin 1 of Connectors J6 and J5. Mount the card-edge bracket to the system chassis. See the illustration on the next page.

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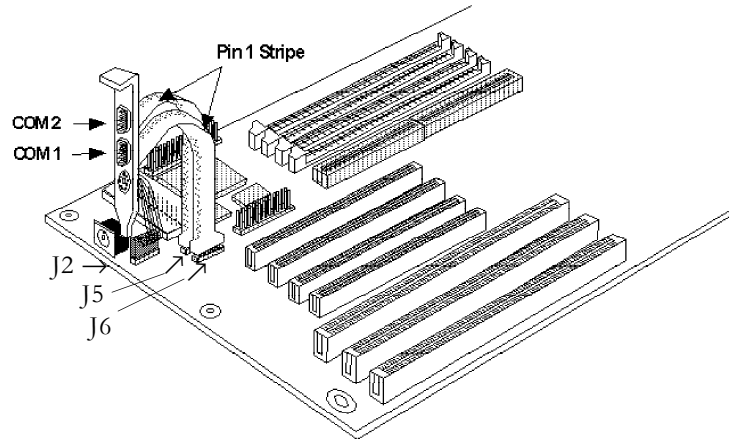
The Primary and Secondary Serial Ports
on the G586IPB/W system board

PS/2 Mouse Port

The PS/2 mouse port is a 6-pin connector on the
system board. Attach the 6-pin mouse port cable, which
came in the G586IPB/W box, to Connector J2. Make
sure the brown wire on the PS/2 mouse connector aligns
with pin 1 of Connector J2. See the illustration on the
next page.
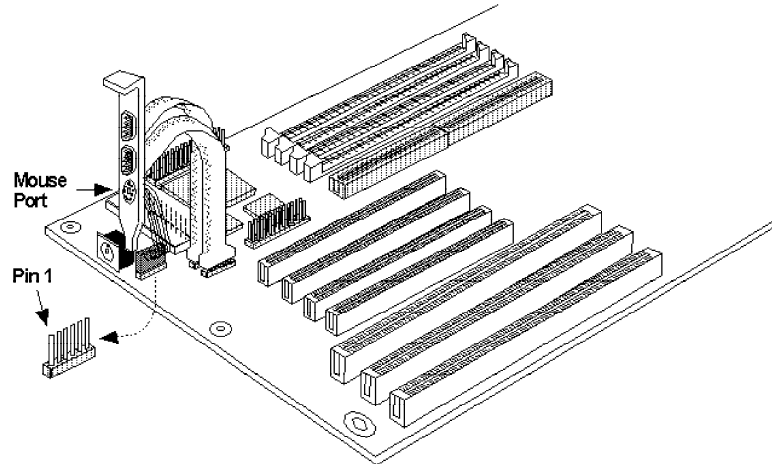
The PS/2 Mouse Port on the G586IPB/W System Board

Parallel Port

The G586IPB/W system board has a standard connector for interfacing your PC to a parallel printer. This port is compatible with both IBM AT printer ports and the new, high speed, bidirectional Extended Capabilities Port standard. The parallel port on your system board can be set to any of the following system I/O addresses:

I/O Address: 3BC-3BE Hex
                    378-37A Hex *
                    278-27A Hex

        * Default setting

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Connecting the Parallel Printer Port

Attach the DB-25S printer port cable, which came with
the motherboard, to Connector J8 on the G586IPB
system board. Make sure the colored stripe on the
ribbon cable aligns with pin 1 of Connector J8. Use a
small nutdriver to mount the cable into a DB-25 cutout
in the system chassis.
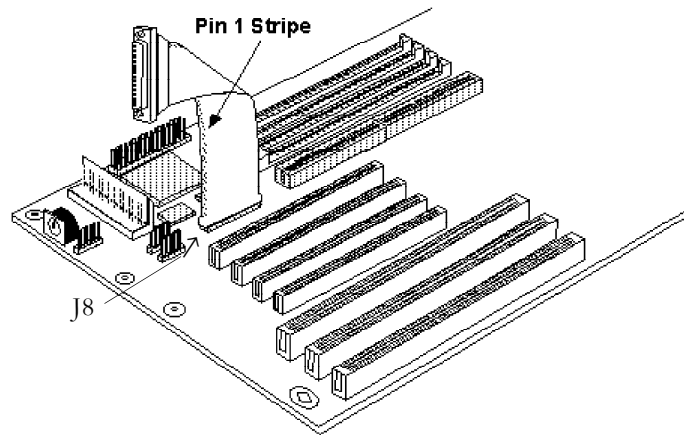
The Parallel Printer Port on the G586IPB/W
system board

Floppy Disk Drive Controller

The G586IPB/W system board has a built-in floppy disk
controller that supports two standard floppy disk drives.
You can install any 720KB/1.2MB/1.44MB floppy disk
drives.

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Connecting the Floppy Disk Cable
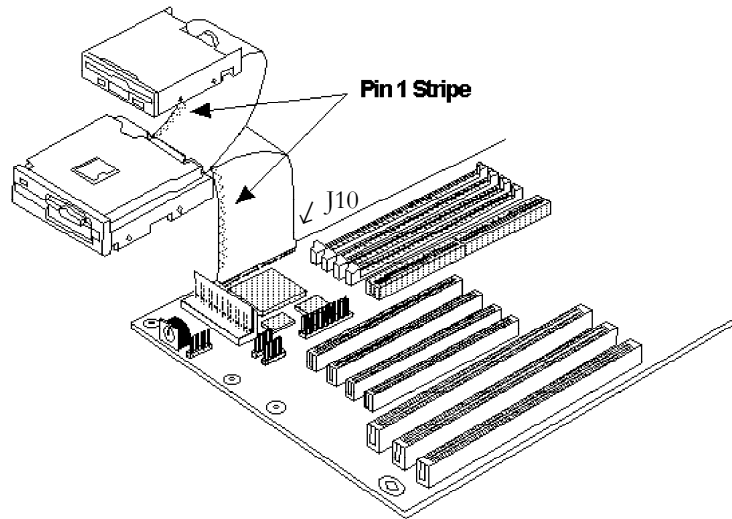
The Floppy Disk Connector on the
G586IPB/W System Board

Step 1
Install the 34-pin header connector into the floppy disk
connector (J10) on the system board. The colored edge
of the ribbon should be aligned to pin 1 of the J10
connector.

Step 2
Install the other 34-pin header connector(s) into the disk
drive(s) with the colored edge of the daisy chained
ribbon cable aligned with pin 1 of the drive edge
connector(s). The end-most connector should be at-
tached to the drive you want to designate as Drive A.

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IDE Hard Disk Interface

The G586IPB/W system board is equipped with two PCI
IDE shrouded headers that will interface four IDE
(Integrated Drive Electronics) hard disk drives.

Note:
Only IDE drives can be connected to the IDE interface.

Connecting the IDE Hard Disk Interface

To prevent improper IDE cable installation, each PCI
IDE shrouded header has a keying mechanism. The 40-
pin connector on the IDE cable can be placed into the
header only if pin 1 of the connector is aligned with pin
1 of the header.
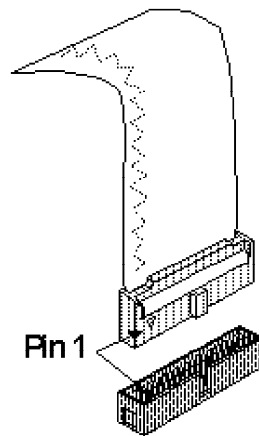
Pin 1

PCI IDE Shrouded Header

Note:
The IDE cable with a standard 40-pin connector can be installed in the PCI IDE shrouded header. Be extremely careful to match the colored edge of the ribbon with pin 1 of the header.
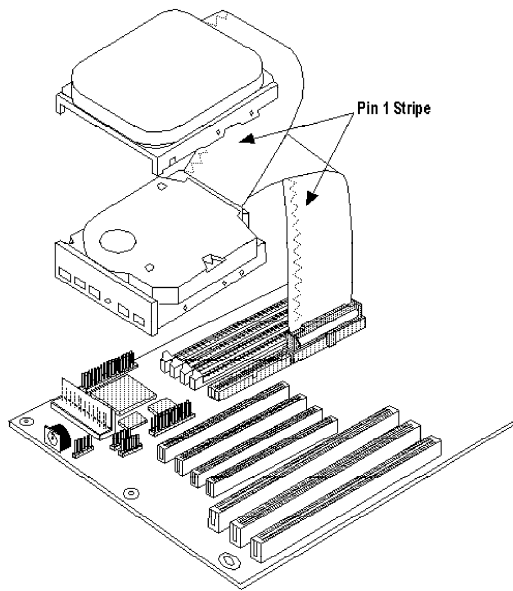
The IDE Hard Disk Connector on the
G586IPB/W system board

Step 1
If you are connecting two hard drives, install the 40-pin connector of the IDE cable into the primary IDE shrouded header (Connector J12). If you are adding a third or fourth IDE device, install the 40-pin connector of the other IDE cable into the secondary IDE shrouded header (Connector J11).

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Step 2
Install the other 40-pin header connector(s) into the
device with the colored edge of the ribbon cable aligned
to pin 1 of the drive edge connector(s).

Note:
*Refer to your disk drive user's manual for information
about selecting proper drive switch settings.*

Adding a Second IDE Hard Drive

When using two IDE drives, one must be set as the
master and the other as the slave. Follow the instruc-
tions provided by the drive manufacturer for setting the
jumpers and/or switches on the drives. No changes are
needed on the G586IPB/W system board when adding a
second hard drive.

We recommend that the IDE hard drives be from the
same manufacturer. In a few cases, drives from two
different manufacturers will not function properly when
used together. The problem lies in the hard drives, not
the G586IPB/W system board.

Preparing an IDE Drive for Use

IDE disk drives are already low-level formatted, with
any bad-track errors entered, when shipped by the drive
manufacturer. Do not attempt to do a low-level format
or you may cause serious damage to the drive.

To use an IDE drive, you need to enter the drive type
(this information is provided by the drive manufacturer)
into the system's CMOS setup table. Then run FDISK
and FORMAT provided with DOS.

.
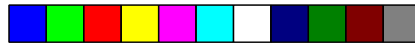
> **Warning:**
> *Do not run FDISK and FORMAT programs on a drive*
> *that has already been formatted, or you will lose all*
> *programs and data stored on the drive*

Installing Expansion Cards

The G586IPB/W is equipped with four PCI and three
ISA slots. All four PCI slots are bus masters. One PCI
slot and one ISA slot are shared. You can only install
one card in one or the other of the shared slots at a time;
you cannot install devices in both slots.

Due to the size of the CPU with its accompanying
heatsink/fan component, the length of the add-on cards
in PCI slot 2, 3 and 4 is limited to 205mm (measured
from the bracket of the card).

The length of the add-in card in PCI slot 1 is limited to
205mm only if its components protrude more than
5mm from the components and/or solder side of the
card.

The locations of the expansion slots are shown on the
next page.

> **Note:**
> *The BIOS needs to be configured for the PCI add-on*
> *cards installed in the PCI slots. Refer to the "PCI*
> *Configuration Setup" chapter presented in the "Initial*
> *Setup Program" section of the manual.*

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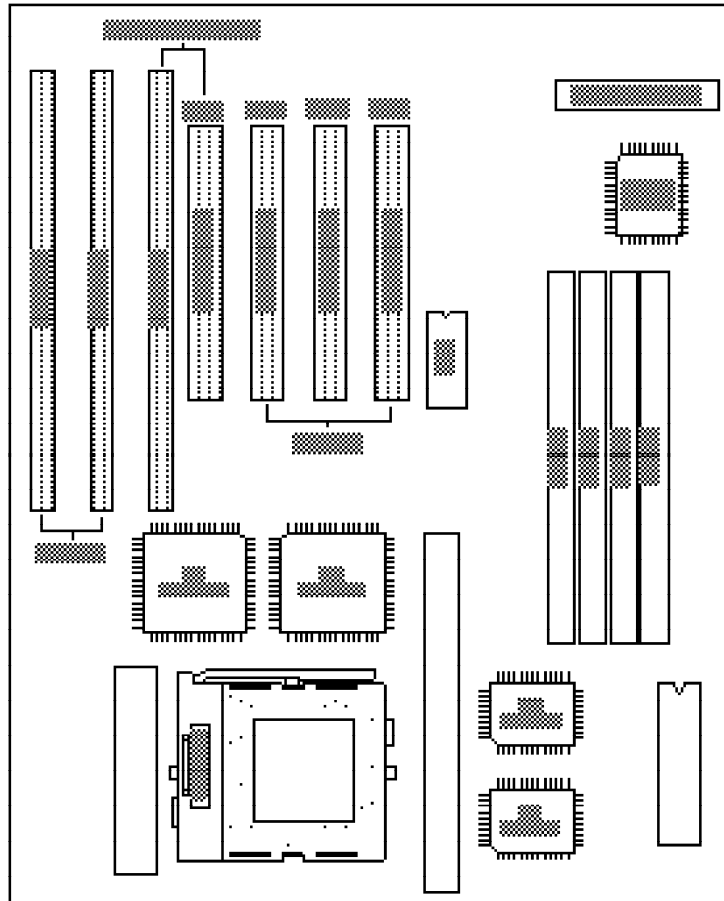
Expansion Slots on the G586IPB System Board

❖ Troubleshooting Checklist

If you experience difficulty with the G586IPB/W system board, refer to the checklist below. If you still cannot isolate the problem, please contact your dealer.

1) Check the jumper settings to ensure that the jumpers are properly set. If in doubt, refer to the "Board Configuration" section.

2) Verify that all SIMMs are seated securely into the bank sockets.

3) Make sure the SIMMs are in the correct locations.

4) Check that all populated memory banks are filled with correctly sized SIMMs.

5) If your board fails to function, place the board on a flat surface and seat all socketed components (gently press each component into the socket).

6) If you made changes to the BIOS settings, re-enter setup and load the BIOS defaults.

❖ Appendix A: Types of Modules

The G586IPB/W system board allows you to populate memory with 1Mx36, 2Mx36, 4Mx36 and 8Mx36 SIMMs. The following modules have been tested with this board. Most untested brands will work but a few may fail to do so.

For 1Mx36 SIMMs

Brand	Chip Number
OKI	M514400A-70SJ

For 2Mx36 SIMMs

Brand	Chip Number
NEC	4218160-60
Micron	MT4C4001JDJ-60
Micron	MT4C4007JDJ-70 (EDO)

For 4Mx36 SIMMs

Brand	Chip Number
NEC	4217400-60
Mitsubishi	M5M417400BJ-70

❖ Appendix B: Memory & I/O Maps

Memory Address Map

Address	Name	Function
0000000 to 009FFFFF	640KB System Board RAM	System Board Memory
00A0000 to 00BFFFF	128KB Video Display Memory	Reserved for Graphics Display Memory
00C0000 to 00E7FFF	160KB I/O Expansion ROM	Reserved for ROM on I/O Adapter Card
00E8000 to 00FFFFF	96KB ROM on the System Board	System Board BIOS
0100000 to 3FFFFFF	Maximum Memory 128MB	System Board Memory

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I/O Address Map

I/O Address	Function
000-01F	DMA Controller 1, 8237A-5
020-03F	Interrupt Controller 1, 8259A, Master
040-05F	Timer, 8254-2
060-06F	8742 (Keyboard Controller)
070-07F	Real-time Clock, NMI (Non-maskable Interrupt) Mask
080-09F	DMA Page Memory, 74LS612
0A0-08F	Interrupt Controller 2, 8259A
0C0-0DF	DMA Controller 2, 8237A-5
0E8	Shadow RAM and Cache Control Bit
0F0	Clear Numeric Processor Extension Busy
0F1	Reset Numeric Processor Extension
0F8-OFF	Numeric Processor Extension
1F0-1F8	Fixed Disk
200-207	Game I/O
278-27F	Parallel Printer Port 2
2F8-2FF	Serial Port 2
300-31F	Prototype Card
360-36F	Reserved
378-37F	Parallel Printer Port 1
380-38F	SDLC, Bisynchronous 2
3A0-3AF	Bisynchronous 1
3B0-3BF	Monochrome Display and Printer Adapter
3C0-3CF	Reserved
3D0-3DF	Color/Graphics Monitor Adapter
3F0-3F7	Diskette Controller
3F8-3FF	Serial Port 1

Note:
The I/O address hex 000 to 0FF are reserved for the system board I/0. Hex 100 to 3FF are available on the I/O channels.

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❖ Appendix C: PCI I/O Pin Assignments

Component Side B	Pin	Solder Side A
-12V	- 01 -	TRST#
TCK	- 02 -	+12V
Ground	- 03 -	TMS
TDO	- 04 -	TDI
+5V	- 05 -	+5V
+5V	- 06 -	INTA#
INTB#	- 07 -	INTC#
INTD#	- 08 -	+5V
PRSNT1#	- 09 -	Reserved
Reserved	- 10 -	+5V (I/O)
PRSNT2#	- 11 -	Reserved
Ground	- 12 -	Ground
Ground	- 13 -	Ground
Reserved	- 14 -	Reserved
Ground	- 15 -	RST#
CLK	- 16 -	+5V (I/O)
Ground	- 17 -	GNT#
REQ#	- 18 -	Ground
+5V (I/O)	- 19 -	Reserved
AD[31]	- 20 -	AD[30]
AD[29]	- 21 -	+3.3V
Ground	- 22 -	AD[28]
AD[27]	- 23 -	AD[26]
AD[25]	- 24 -	Ground
+3.3V	- 25 -	AD[24]
C/BE[3]#	- 26 -	IDSEL
AD[23]	- 27 -	+3.3V
Ground	- 28 -	AD[22]
AD[21]	- 29 -	AD[20]
AD[19]	- 30 -	Ground
+3.3V	- 31 -	AD[18]
AD[17]	- 32 -	AD[16]
C/BE[2]#	- 33 -	+3.3V
Ground	- 34 -	FRAME#
IRDY#	- 35 -	Ground
+3.3V	- 36 -	TRDY#
DEVSEL#	- 37 -	Ground
Ground	- 38 -	STOP#
LOCK#	- 39 -	+3.3V
PERR#	- 40 -	SDONE
+3.3V	- 41 -	SBO#
SERR#	- 42 -	Ground
+3.3V	- 43 -	PAR
C/BE[1]#	- 44 -	AD[15]
AD[14]	- 45 -	+3.3V
Ground	- 46 -	AD[13]
AD[12]	- 47 -	AD[11]
AD[10]	- 48 -	Ground
Ground	- 49 -	AD[09]

Component Side	Pin	Solder Side
AD[08]	- 52 -	C/BE[0]#
AD[07]	- 53 -	+3.3V
+3.3V	- 54 -	AD[06]
AD[05]	- 55 -	AD[04]
AD[03]	- 56 -	Ground
Ground	- 57 -	AD[02]
AD[01]	- 58 -	AD[00]
+5V (I/O)	- 59 -	+5V (I/O)
ACK64#	- 60 -	REQ64#
+5V	- 61 -	+5V
+5V	- 62 -	+5V

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❖ Appendix D: ISA I/O Pin Assignments

A		B
-I/OChck	- 01 -	Gnd
SD7	- 02 -	ResetDrv
SD6	- 03 -	+5VDC
SD5	- 04 -	IRQ9
SD4	- 05 -	-5VDC
SD3	- 06 -	DRQ2
SD2	- 07 -	-12VDC
SD1	- 08 -	OWS
SD0	- 09 -	+12VDC
-I/OChrdy	- 10 -	Gnd
AEN	- 11 -	-SEMEMW
SA19	- 12 -	-SEMEMR
SA18	- 13 -	-IOW
SA17	- 14 -	-IOR
SA16	- 15 -	-Dack3
SA15	- 16 -	-DRQ3
SA14	- 17 -	-Dack1
SA13	- 18 -	DRQ1
SA12	- 19 -	-Refresh
SA11	- 20 -	CLK
SA10	- 21 -	IRQ7
SA9	- 22 -	IRQ6
SA8	- 23 -	IRQ5
SA7	- 24 -	IRQ4
SA6	- 25 -	IRQ3
SA5	- 26 -	-Dack2
SA4	- 27 -	T/C
SA3	- 28 -	Bale
SA2	- 29 -	+5VDC
SA1	- 30 -	OSC
SA0	- 31 -	Gnd

C		D
SBHE	- 01 -	-MemCS16
LA23	- 02 -	-I/OCS16
LA22	- 03 -	IRQ10
LA21	- 04 -	IRQ11
LA20	- 05 -	IRQ12
LA19	- 06 -	IRQ13
LA18	- 07 -	IRQ14
LA17	- 08 -	-Dack0
-Memr	- 09 -	DRQ0
-Memw	- 10 -	-Dack5
SD08	- 11 -	DRQ5
SD09	- 12 -	-Dack6
SD10	- 13 -	DRQ6
SD11	- 14 -	-Dack7
SD12	- 15 -	DRQ7
SD13	- 16 -	+5VDC
SD14	- 17 -	-Master
SD15	- 18 -	Gnd

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Appendix E: System Overview

DMA Channels

DMA Controller 1	DMA Controller 2
Ch0-Reserved for User	Ch4-Cascade for CTRL 1
Ch1-Reserved for User	Ch5-Reserved for User
Ch2-Diskette	Ch6-Reserved for User
Ch3-Reserved for User	Ch7-Reserved for User

Note:
DMA controller 1 supports 8-bit data transfer.
DMA controller 2 supports 16-bit data transfer.

Address Generation for DMA Channels 3 to 0

Source	DMA Page Memory	DMA Controller 1
Address	A23 $\leftrightarrow$ A16	A15 $\leftrightarrow$ A0

Address Generation for DMA Channels 7 to 5

Source	DMA Page Memory	DMA Controller 2
Address	A23 $\leftrightarrow$ A17	A16 $\leftrightarrow$ A1

Page Memory Address

I/O Port Address	Page Memory
0081H	DMA Channel 2
0082H	DMA Channel 3
0083H	DMA Channel 1
0087H	DMA Channel 0
0089H	DMA Channel 6
008AH	DMA Channel 7
008BH	DMA Channel 5

System Interrupts

Interrupt Controller 1	Interrupt Controller 2
IRQ0-Timer Output (Out 0)	IRQ8-Realtime Clock INT
IRQ1-Keyboard (Output Buffer Full)	IRQ9-Software Redirected to INT 0AH (IRQ2)
IRQ2-Interrupt from INTR2	IRQ10-Reserved
IRQ3-Serial Port 2	IRQ11-Reserved
IRQ4-Serial Port 1	IRQ12-PS/2 Mouse
IRQ5-Parallel Port 2 or 3 *	IRQ13-Coprocessor
IRQ6-Diskette Controller	IRQ14-Primary Fixed Disk Controller (1F0)
IRQ7-Parallel Port 1 or 2 *	IRQ15-Secondary Fixed Disk Controller (170)

* The one on-board parallel port can be configured to either Parallel Port 1, 2 or 3. Parallel Port 1 uses I/O address 3BCh, Parallel Port 2 I/O address 378h, and Parallel Port 3 uses I/O address 278H.

Note:
The 16 levels of system interrupts have the following priority: IRQ0>IRQ1>IRQ8>IRQ9>IRQ10>IRQ11> IRQ12>IRQ13>IRQ14>IRQ15>IRQ3>IRQ4>IRQ5> IRQ6>IRQ7.

System Timers

Channel 0	System Timer (IRQ0)
Channel 1	Refresh Request Generator (15us Rate Generator Period Signal)
Channel 2	Tone Generation for Speaker

Real-Time Clock

Address	Function
00	Seconds
01	Second Alarm
02	Minutes
03	Minute Alarm
04	Hours
05	Hour Alarm
06	Day of Week
07	Date of Month
08	Month
09	Year
0A	Register A
0B	Register B
0C	Register C
0D	Register D

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❖ Appendix F: Connector Pin Assignments
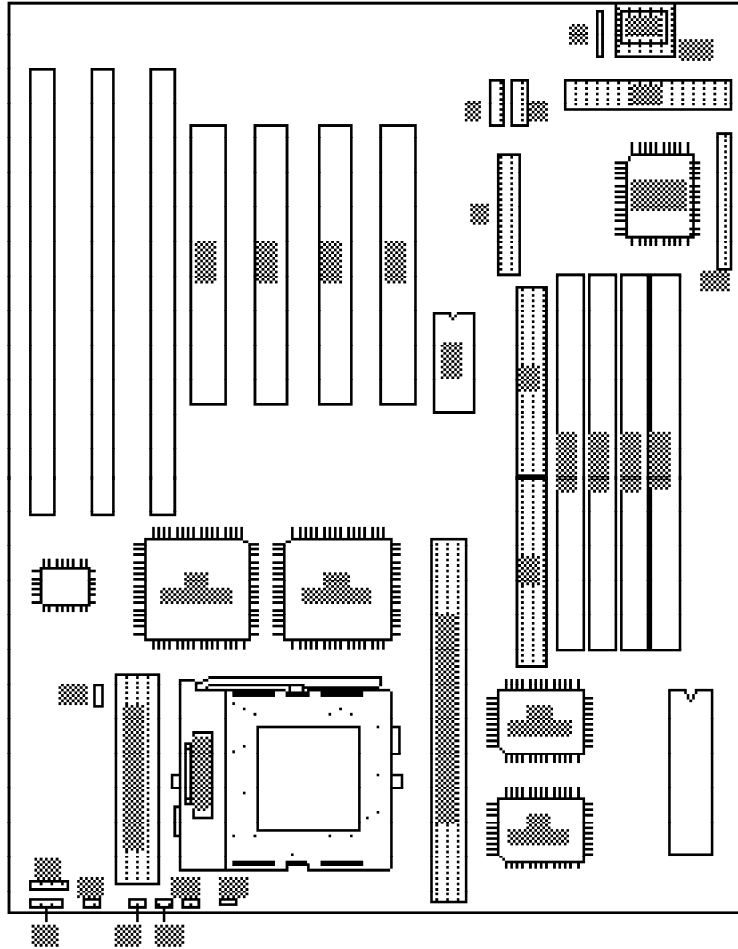
Locations of Connectors on the system board

Connector J2
PS/2 Mouse Connector

Pin	Function
1	Mouse Data
2	Reserved
3	Ground
4	+5V
5	Mouse Clock
6	Reserved

J5 and J6
Secondary (COM2) and Primary (COM1) Serial Ports

Pin	Function
1	DCD (Data Carrier Detect)
2	RX (Receive Data)
3	TX (Transmit Data)
4	DTR (Data Terminal Ready)
5	Ground (Signal Ground)
6	DSR (Data Set Ready)
7	RTS (Request to Send)
8	CTS (Clear to Send)
9	RI (Ring Indicator)

Connector J8
Parallel Printer Port

Pin	Function
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	-Ack
11	Busy
12	Paper Empty
13	Select
14	-Autofd
15	-Error
16	-Init
17	-Slctin
18	Ground
19	Ground
20	Ground
21	Ground
22	Ground
23	Ground
24	Ground
25	Ground

Connector J10
Floppy Disk Drive Connector

Pin	Function
1	Ground
2	DENSEL
3	Ground
4	Reserved
5	Ground
6	Drate0
7	Ground
8	Index
9	Ground
10	MTR0
11	Ground
12	DR1
13	Ground
14	DR0
15	Ground
16	MTR1
17	Drate1
18	Dir
19	Ground
20	Step
21	Ground
22	Write Data
23	Ground
24	Write Gate
25	Ground
26	Track 0
27	MSEN
28	Wr Protect

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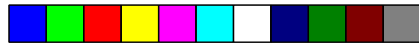
Pin	Function
29	Ground
30	Read Data
31	Ground
32	Head Select
33	Ground
34	Disk Change

Connector J11 and J12
Secondary/Primary IDE Hard Disk Drive Connectors

Pin	Function
1	-Reset
2	Ground
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

Pin	Function
19	Ground
20	Reserved
21	Reserved
22	Ground
23	-IOW
24	Ground
25	-IOR
26	Ground
27	Reserved
28	BALE
29	Reserved
30	Ground
31	IRQ
32	IOCS16
33	SA1
34	Reserved
35	SA0
36	SA2
37	HCS0
38	HCS1
39	LED
40	Ground

Connector J13
VRM Header

Pin	Function
A1	Ground
A2	Ground
A3	Not Connected
A4	VI/O
A5	3.3V
A6	3.3V
A7	VCORE
A8	VCORE
A9	Ground
A10	VCORE
A11	PWDGO
A12	Sense
A13	Ground
A14	5V
A15	5V
B1	Ground
B2	Ground
B3	VI/O
B4	VI/O
B5	3.3V
B6	3.3V
B7	VCORE
B8	VCORE
B9	VCORE
B10	VCORE
B11	UPVRM#
B12	Disabled
B13	Ground
B14	5V
B15	5V

Connector J14
Fan Connector

Pin	Function
1	Ground
2	+12V
3	Ground

Connector J15
Power LED/Keylock Connector

Pin	Function
1	LED Signal
2	Reserved
3	Ground
4	Keylock Signal
5	Ground

Connector J16
Primary/Secondary IDE LED Connector

Pin	Function
1	Signal
2	VCC

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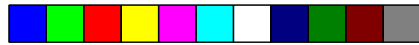
Connector J17
Green LED Connector

Pin	Function
1	Signal
2	VCC

Connector J18
Reset Switch Connector

Pin	Function
1	Ground
2	Reset

Connector J19
Turbo/Green Button Connector

Pin	Function
1	Ground
2	Signal

Connector J20
Speaker Connector

Pin	Function
1	Signal
2	Ground
3	Signal

Pin	Function
4	Ground

Connector J60
Turbo LED Connector

Pin	Function
1	Signal
2	VCC

Connector CN1
PS/2 Keyboard Connector

Pin	Function
1	Keyboard Data
2	Reserved
3	Ground
4	+5V
5	Keyboard Clock
6	Reserved

Connector CN2
AT Keyboard Connector

Pin	Function
1	Keyboard Clock
2	Keyboard Data
3	Reserved
4	Ground
5	+5V

Connector PL1
Power Connector

Pin	Function
1	Power Good
2	+5V
3	+12V
4	-12V
5	Ground
6	Ground
7	Ground
8	Ground
9	-5V
10	+5V
11	+5V
12	+5V

Connector SSM1
Cache Module Slot

Pin	Function
1	Ground
2	TIO0
3	TIO2
4	TIO6
5	TIO4
6	RSVD
7	VCC3
8	TWE#
9	CADS#/CAA3
10	Ground

Pin	Function
11	CWE4#
12	CWE6#
13	CWE0#
14	CWE2#
15	VCC3
16	CCS#/CAB4
17	GWE#
18	BWE#
19	Ground
20	A3
21	A7
22	A5
23	A11
24	A16
25	VCC3
26	A18
27	Ground
28	A12
29	A13
30	ADSP#
31	ECS1#/(CS#)
32	ECS2#
33	PD1
34	PD3
35	Ground
36	CLK1
37	Ground
38	D62
39	VCC3
40	D60
41	D58
42	D56
43	Ground

Pin	Function
44	D54
45	D52
46	D50
47	D48
48	Ground
49	D46
50	D44
51	D42
52	VCC3
53	D40
54	D38
55	D36
56	Ground
57	D34
58	D32
59	D30
60	VCC3
61	D28
62	D26
63	D24
64	Ground
65	D22
66	D20
67	D18
68	VCC3
69	D16
70	D14
71	D12
72	Ground
73	D10
74	D8
75	D6
76	VCC3

Pin	Function
77	D4
78	D2
79	D0
80	Ground
81	Ground
82	TIO1
83	TIO7
84	TIO5
85	TIO3
86	RSVD
87	VCC5
88	RSVD
89	CADV#/CAA4
90	Ground
91	COE#
92	CWE5#
93	CWE7#
94	CWE1#
95	VCC5
96	CWE3#
97	CAB3
98	CALE
99	Ground
100	RSVD
101	A4
102	A6
103	A8
104	A10
105	VCC5
106	A17
107	Ground
108	A9
109	A14

Pin	Function
110	A15
111	RSVD
112	PD0
113	PD2
114	PD4
115	Ground
116	CLK0
117	Ground
118	F63
119	VCC5
120	D61
121	D59
122	D57
123	Ground
124	D55
125	D53
126	D51
127	D49
128	Ground
129	D47
130	D45
131	D43
132	VCC5
133	D41
134	D39
135	D37
136	Ground
137	D35
138	D33
139	D31
140	VCC5
141	D29
142	D27

Pin	Function
143	D25
144	Ground
145	D23
146	D21
147	D19
148	VCC5
149	D17
150	D15
151	D13
152	Ground
153	D11
154	D9
155	D7
156	VCC5
157	D5
158	D3
159	D1
160	Ground