Please Note: This document is provided as an article and not intended to be a techincal manual.
Please install your PC under the scrutiny of a knowledgeable vendor only.

Building Your Own Personal Computer

This document is designed to help you assemble your own Computer quickly and easily. To build your own PC, you will need a cross head screw driver, a small pair of pliers, a clean work surface and an anti static wrist strap would be advisable. Once you have all the above requirements ready you can begin to assemble the PC.

1. The Case

Remove the case from the packaging and place it on your desk or work surface. Remove the lid of the case by undoing the screws on the rear, unless it is a newer design where the sides just clip off, put the lid back in the box to avoid scratches appearing.

Inside the case may be:

1. Power Lead
2. Box of accessories (screws, blanking plates, motherboard supports and drive rails and four rubber feet or plastic feet).

install the rubber feet or plastic feet on the base of the case first, to avoid if slipping on the desk.

2. Installing the components

You are now ready to install your components into the case. The motherboard should be the first item installed. You should make sure that you are earth yourself. At this point as all components are static sensitive devices. Either wear your A−S wrist strap or earth yourself by touching the power supply in the case whilst holding the components.

Before installing the board, check the motherboard manual for the settings that MUST be configured for the processor you are installing.

Install the processor. see CPU Installation

Insert the memory SIMMS or DIMMS into bank 0 first, and bank 1 if applicable.

Seat the SIMM or DIMM module's as firmly as possible in the sockets. With SIMMS Align the module so the pin 1 marking and corner notch correspond with the SIMM socket pin 1 marking on the board. The module can only fit one way. Don't force it! Push the module against the clip arms with your thumbs until a "Click" is heard. The plastic tabs will lock into the holes on the SIMM and the clip arms fully grab the SIMM module. With DIMMS simply match the notches on the bottom of the DIMM with those on the socket and push down firmly until it click into place.

The motherboard has mounting holes drilled in the printed circuit board which line up with the mounting holes on the case. The case comes with both metal and plastic fasteners. Which snap into the board and then lock into the slotted holes in the case bracket. The metal fasteners screw into the holes in the case and are used to ground the board to the case by using the screws provided.

3. Front panel connectors

These connectors extend from the front panel and have plastic female sockets attached. The connectors should be plugged into the appropriate connecting pins on the motherboard and only work one way round. Each position is labelled on the board. The motherboard is now fully installed in the case, and now you are ready to install the floppy, hard drives and CD−ROM etc. in the machine.

4. Installing drives

Remove the drive blanking plate(s) from the front of the case where you want the floppy drives(s) to be positioned. Insert the hard disk first into the chassis in the case, in a position that will not obstruct the floppy drive(s) when the hard drive is in place, secure it with four screws, making sure they are small enough not to penetrate the circuit board on the bottom of the drive.

Then install the floppy drive(s) in the desired bay in the case and secure it with the screws provided. Once all the drives are in place, you can connect up the power supply leads to each device. If you are fitting a 3.5" floppy drive into a 5.25" bay, you will need to secure it into a 5.25" chassis prior to fitting it into the case. These power leads are polarised i.e. they will only fit in one way round. Make sure they are firmly pressed in to each device.

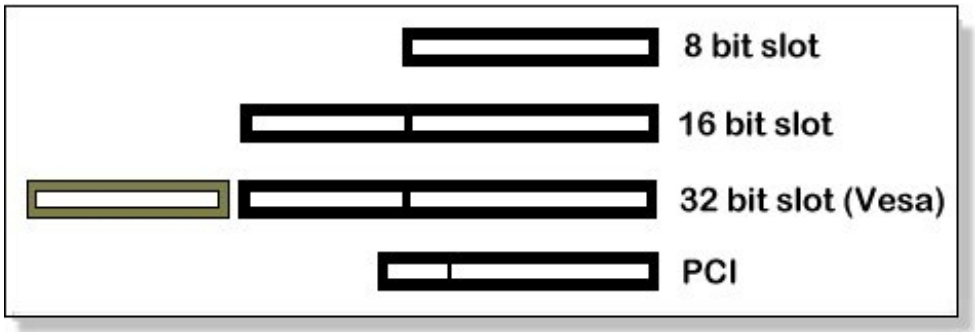
Install CD−ROM and Sound Card.

5. Motherboard Power Leads

From the power supply, there are two six way sockets (unless its ATX then its a 20 pin connector) for the motherboard power, which plug into a single twelve way plug normally found near the keyboard connector.(except for ATX) Arrange them so that the black wires are innermost (that is together) and the red, yellow and orange one outermost.

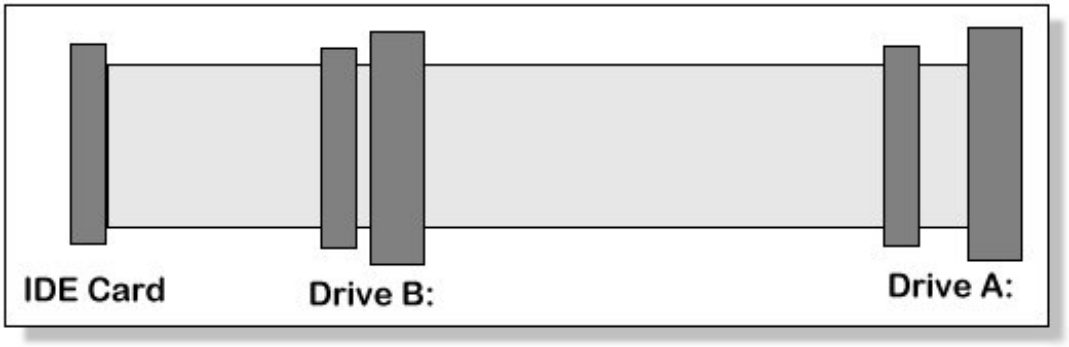
6. Installing Expansion cards

You should have a minimum of two expansion cards to install into the machine namely an IDE I/O card (mostly redundant now and found on the motherboard) to control the disk drives and provide serial and parallel ports, and a VIDEO card to attach a monitor. You can insert the expansion cards into any of the available slots on the motherboard. Ensure that the edge connector of the card is firmly seated into the socket provided, and screw it into the edge of the case with screws provided. When the expansion cards are in, use the blanking plates to cover up the spare slots on the back of the case and screw them in place.
Note there are different types of slots, 8 bit, 16 bit, 32 bit (vesa) and PCI see diagram below



7. Floppy/Hard drive cabling

The cables that come with the IDE I/O Card (which is now found on the motherboard) should be connected between the card itself and the floppy and the hard drives. Taking care to ensure that the red line on the cable mates with pin one on the controller and the drive, connect the 40 way ribbon cable between the controller and hard disk, and make sure it is firmly seated at either end. the cable to connect the floppy drives has multiple connectors for two floppy drives and should be connected as shown below.



You then need to set the MHz L.E.D display (if necessary this is something that was available pre−486 days) on the front of the case to display the speed of your processor i.e. 25mHZ/33Mhz/66Mhz etc.
The best way is to remove all the jumpers and lace them one by one until the desired figure is displayed.

Your PC is now prepared for configuration and your software supplied. So, you may now replace the outer case and screw in the screws your removed in step1.

8. CMOS Set−up

Before the PC can operate, you must set−up the BIOS information, to inform the PC what devices are in the machine. When you start up the PC, after it has checked the RAM it will prompt you to press (DEL) if you want to run set−up. Press the (DEL) key when this message appears. Enter the (STANDARD CMOS SETUP) menu and using the PG/DN PG/UP and the cursor keys. Set the time and date correctly (unless you have a winbios then using the mouse do the same). Then set the floppy drives A: + B: to the correct types. Now move onto step 9 to configure the hard drive.

9. Installing the Hard drive

Warning do not low−level format and IDE drive it will damage it.

Unless you are building an old computer please ignore step 1.

There are two ways to do this, the first explanation is for pre 80486 and pentium computers with processors such as the 8086/88, 80286 and 80386 processors.

1. In the BIOS under the standard settings where it says hard disk c: type, set the type to 47 and enter the parameters that are printed on the top of the drive. You only need to enter the CYLS (cylinders) the HDS (heads) and SECTORS. Once you have entered the CYLS/HDS/SECTORS, the MB capacity will be entered automatically for you.

2. In the BIOS under the standard settings simply set all the hard drive configurations to auto.

Press (ESC) and then move the cursor to (WRITE CMOS REGISTER AND EXIT) or (Save and Exit) in the new computer BIOS and then press (RETURN).

You can partition and format the drive ready for use as specified in the MS−DOS Manual, or look at the page Preparing and formatting a new drive for an explanation.

Installing Central processors.

First, something you should know about Thermal Paste (see below)

Yes its here, all you need to know to fit one of the latest processor's, however its already out of date with the short arrival of the Pentium III, these processors will be faster than 500mhz.

Super Socket 7
This is an evolution of the original Pentium design. It's a standard design with a ceramic square plate called a ZIF socket, this containing the main silicon element and an array of legs of pins sticking vertically out of the bottom.

Intel's new socket 370 system
This is essentially the same design used by super socket 7, the main difference being the pin count, hence the '370'.

Slot 1

This is the design used by the Pentium II. it uses a SECC (Single edge connect cartridge) arrangement (rather confusing the first time you see one, this system incorporates the main CPU silicon and the secondary cache memory in one convenient module with two effects: firstly it negates the need for cache on the motherboard and secondly, it allows the cache to run much more faster giving an overall faster system.

Installation section

Super socket 7 and socket 370

1. Wear an anti−static wrist strap (worn on the wrist like a bracelet) and connect the clip to a suitably earthed source such as a radiator.
2. Make sure that your PC is disconnected from the mains and remove the case.
3. Orientate the CPU, the correct orientation is shown by a small mark and a flattened corner on the CPU that corresponds to a flattened corner in the socket.
4. Install your heat sink and fan if it is the type that clips directly onto the CPU rather than the socket. In today's world of high speed CPU's this is a must as a CPU's running life will be dramatically shortened by prolonged exposure to the high temperatures a non−cooled CPU's would run at.
5. Lift the arm on the side of the socket and plug the CPU gently into the socket.

Caution: the CPU should fall into place with little of no help. Any unnecessary force can easily bend or break the delicate pins, so if for any reason the CPU does not slot into place or sit perfectly flat in the socket do not try to force it, simply remove the unit and check the orientation and try again.

6. Once the unit is fully home simply lower and latch the retaining arm in place and connect the relevant power leads on the heat sink/fan unit.
7. Set the correct voltage, bus speed and core multiplier.
8. Replace the case and restart the machine.

Slot 1

1. Wear an anti static wrist strap (worn on the wrist like a bracelet) and connect the clip to a suitably earthed source such as a radiator.
2. Make sure that your PC is disconnected from the mains and remove the case.
3. Orientate the CPU so that the latch mechanism, which sticks out from either side, is aligned with the notches on the motherboard retention uprights
4. Slide the unit down vertically until it is fully home in the slot and the retention clip pops into place.
5. Attach the three pin cable to the motherboard to supply power to the fan and supply the motherboard with fan speed information, jumpers will need to be set for bus speed and clock multiplier.

6. Replace the case and restart the machine.

Thermal Paste

One of the critical factors when overclocking is proper cooling. If you stop and think about it, the whole idea of having to place a heat sink and fan on a chip to cool it is rather absurd. It is the result of poor thermal design.

A heat sink is made of an extremely low heat resistance material. The larger the heat sink, the more heat it can hold and more importantly, the more surface area it has to dissipate the heat radiantly. To help increase the ever important surface area, fins are part of the mold with fans blowing air over these fins. The more air that flows over the fins, the more heat that is wicked away. In essence, this is how a heat skink pulls the heat away from the CPU out to the surrounding air.

The largest heat sink and fan will not help cool your CPU if you do not have a good connection between the two. Simply latching on a heat sink is not adequate as it will result in about a 1% surface area connection. The problem is that both surfaces are not machined to fit against each other. There are massive variations on the surfaces when you examine them at a microscopic level.

One solution to increase surface area is to use a Thermal Pad. The pad is placed between the two clamped surface areas, forcing the pad to mold into the surfaces.

Thermal Paste/Thermal Grease Thermal Pastes are non−conductive, non−corrosive greases that are applied in thin layers to increase heat transmission. Generaly, thermal pastes have a lower heat resistance than thermal pads. Also, since they are fluidic, they can be applied in much thinner layers. The idea is to fill only the air gaps with the paste and nothing more. An excellent layer of thermal paste would be about a tenth of a millimeter. This can be extremely difficult to achieve.

If you have a socket 7 chip, place the paste on the heat sink and spread it around. Place the heat sink on the CPU and rub them together, removing any excesses and being VERY careful for your CPU pins. Once you can start to hear or feel the surfaces grinding, you know you have probably the best connection you will get.

The most important thing to remember is, since heat transference is directly proportional to the thickness of your layer, the thinner the better.