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Mother Board Component

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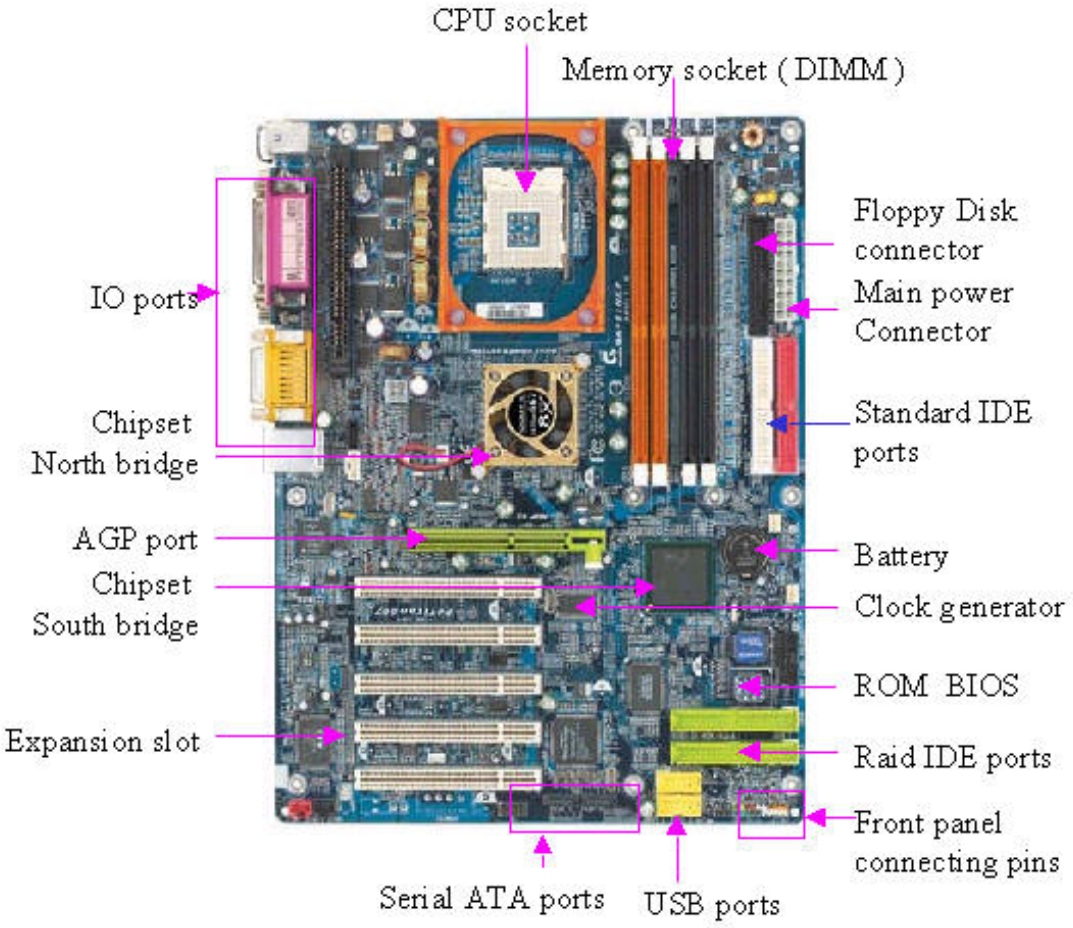

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Books

1. Mother board explain

2. Select the component

3. Building the PC step by step putting component togather

4. Setup Bios

5. Partition the hard disk

6. Install Windows XP

7. Install add on card

8. Install application software

Down load books

Introduction

This site will provide you the instant PC building knowledge

Building the PC is fun and can be a hobby or a real job that makes you a significant money.

These web site will bring your PC knowledge up to speed from the ground, give a good background knowledge and step by step building and trouble shooting while you are building the PC.

For the very beginner please briefly read through all books from book one to seven to get the idea of how the PC building is carried out.

When you ready to purchase the PC component to build one your self read it again on each topic.

The brief steps in building a PC are;

1. Mother Board component explain.
2. Select the component.
3. Building PC by put component together and trouble shoot.
4. Setup BIOS
5. Partition the hard disk (to make hard disk recognizable by the system as drive C, drive D and more).
6. Install Windows XP.
7. Install add on cards.
8. Install application Software's….and complete.

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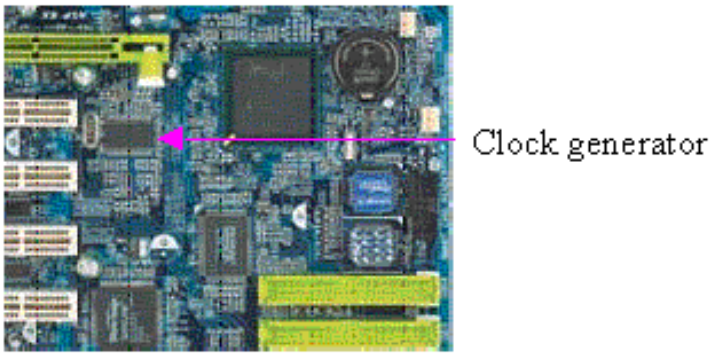
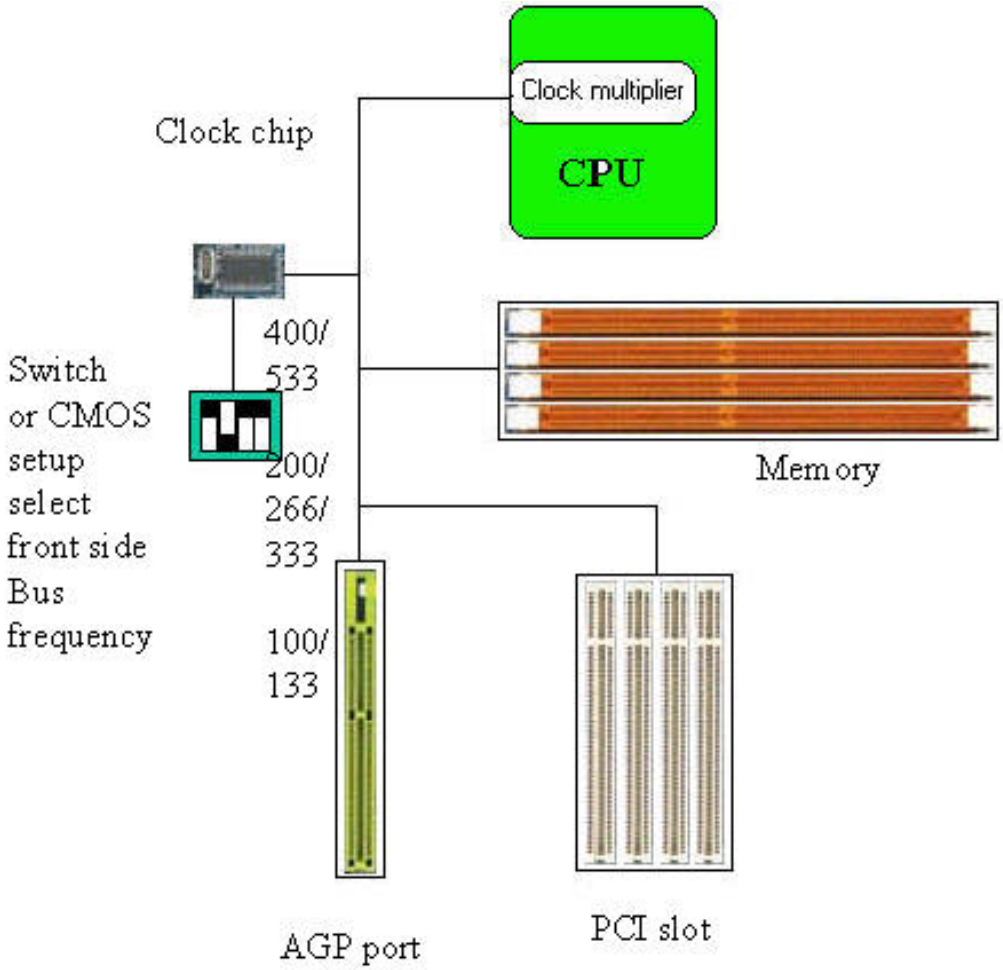
1. Clock Generator



Simplify Clock distribution diagram



Clock generator on the mother board will generate the clock signal called;

System bus clock or,

Front side bus clock.

Front side bus clock is a common reference signal that distributed to almost all component on the mother board, it also define the speed of the component.

The major component that use Front side bus clock are,

- The CPU
- The Memory
- AGP Port
- PCI bus

Changing the frequency of the front side bus clock will effect all above component, higher clock frequency will make them run faster, but the component has it's limitation of what speed they can run.

The CPU

Front side bus clock distributed to the CPU, in side the CPU front side bus clock will be multiplied by the multiplying circuit to make the frequency high enough to reach the core clock frequency of the CPU.

For example if the front side bus is 100 Mhz and the core clock of the CPU is 1.1 Ghz the front side bus must be multiplied by 11 (100 x 11 = 1100 Mhz or 1.1 Ghz).

There are many types of front side bus clock for to day's mother board.

1. Front side bus 400/533 Mhz this mean that the mother board will generate either 400 or 533 Mhz, the user can chose to have the mother board to generate clock 400 or 533

   533MHz front side bus is for Pentium 4 at 3.06 GHz, 2.80 GHz, 2.66 GHz, 2.53 GHz, 2.40B GHz, 2.26 GHz

400MHz system bus is for Pentium 4 at 2.60 GHz, 2.50 GHz, 2.40 GHz, 2.20 GHz, 2A GHz, 2 GHz, 1.90 GHz, 1.80 GHz, 1.70 GHz

2. Front side bus 200/266/333 the mother board with this front side bus is for CPU AMD Athlon or Duron or Pentium 4.

3. Front side bus 100/133 the mother board with this front side bus is for CPU Pentium III or Celeron II and Pentium 4.
   for example;

   CPU Celeron 1.4 Ghz use Front side bus clock 100 multiply by 14.

The front side bus clock, one of the two (400 or 533, 200 or 266, 100 or 133) on the mother board is selectable by the user by using,

1. The switch on the mother board or,
2. The Jumper on the mother board or,
3. By CMOS setup.

The front side is very much directly related to the frequency used by the memory (not a must) for example ,

RDRAM use front side bus 400 Mhz

DDR ram use front side bus 200, 266, 333, 400

SD Ram use front side bus 100 or 133 Mhz

Over clocking the CPU

Is a way to make the CPU run at a higher clock frequency that specified by the manufacturer, in the old day of CPU socket 7 the clock multiplier switch or jumper is mounted on the mother board and they are easily to be changed, changing the switch setting will change the multiplier, we can over clock

the CPU by two ways,

1. Choose the bigger multiplier figure to multiply, for example with CPU 400 Mhz is 100 Mhz front side bus
   multiply by 4, over clock this CPU to make this CPU run at 500 Mhz we multiply by using 5.

2. Choose the higher Front side bus frequency, with the mother board that has front side bus 100 and 133 Mhz, can choose 100 or 133 to supply to the CPU, with CPU 400, we choose 133 x 4 the CPU will run at 532 Mhz.

Some mother board has more than 2 step of front side bus clock for the user to choose this makes more flexible to do ocverclocking.

With to day's CPU, you may not be able to change the multiplier but you may still can change the front side bus, and remember changing the front side bus will effect all of the component on the mother board, *Memory, AGP port and PCI Bus and etc.*

Note The web site of the CPU manufacturer should have the information of which CPU will use what frequency of the Front side bus.

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2. CPU Socket

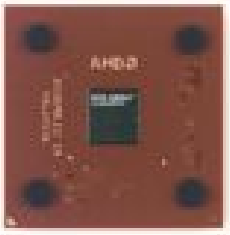
There are 4 types of the CPU that are currently popular in the market.

1. Intel PENTIUM 4 and Celeron 478 these CPU's will fit in to socket 478, the mother board must supply front side bus 400 or 533 Mhz. to use them.

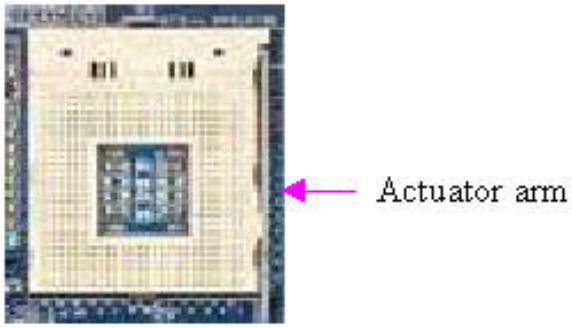
2. Pentium III and CELERON II these CPU's will fit in to socket 370, the mother board must supply front side bus 100 or 133 Mhz. to use them.

3. VIA Cyrix C3, this CPU will fit in to socket 370, the mother board must supply front side bus 100 or 133 Mhz to use them.

4. AMD ATHLON and DURON these CPU's will fit in to socket 468 (or called socket A), the mother board must supply front side bus 200 or 266 Mhz to use them.



CPU Socket



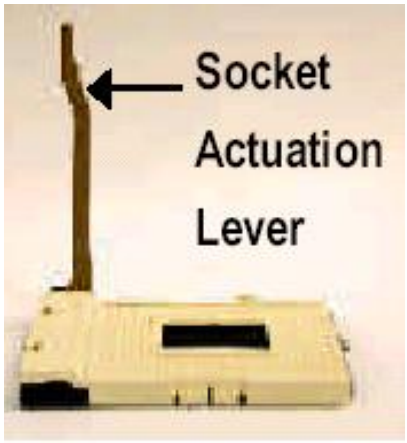
There are 3 type of CPU Socket that are currently popular in the market,

1. Socket 478 this socket is for CPU Pentium 4 and Celeron 478.

2. Socket 370 this socket is for CPU Pentium III, Celeron II and Cyrix C3,

3. Socket A or called socket 462, this socket is for CPU AMD Athlon and Duron.

All of the 3 type of socket are ZIF (zero insert force) socket the CPU can be inserted in to the socket with out having to be forced.



By lift up the socket actuator arm 90 degree the socket hole array are opened, the CPU can now be dropped into the socket with out being forced, make sure that the CPU is fully seated on the socket.

Before insert the CPU in to the socket make sure that pin one of the CPU is aligned with pin one of the socket as indicated above.

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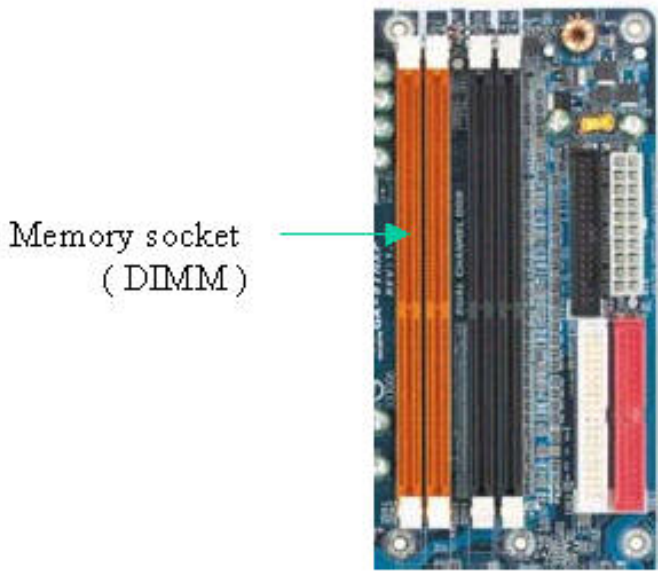
3. Memory Socket (DIMM socket)

The memory socket is called DIMM (Dual Inline Memory Module) socket.



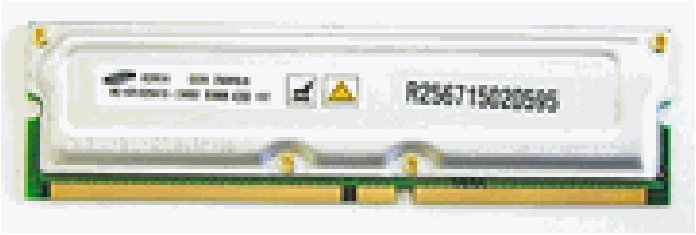
There are 3 types of memory that currently popular used in the PC,

1. RDRAM 2. DDR ram 3. SDRAM

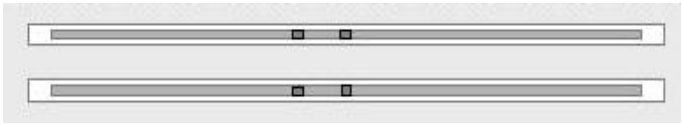
each type of memory are difference in speed and use difference frequency of front side bus clock, the socket of each memory type are little difference.

The memory is configured in to Banks, one Bank of RDRAM is 2 sockets (when purchase the RDRAM you must buy them 2 piece at a time), one Bank of DDR Ram is one socket and one Bank of SDRAM is one socket, to make the PC work at least one full bank must have memory installed.

1. RDRAM memory (or called RAMBUS)



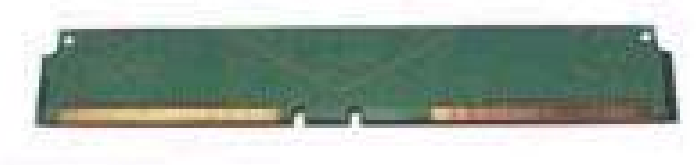
This type of memory is used mainly in Pentium 4 mother board, it use front side bus clock at 400 Mhz, it has highest performance and is most expensive.



RDRAM Socket

The memory will have 2 notches and the socket will have 2 keys to prevent different type of memory to fit in.

One bank of the memory is two sockets and must have 2 memory stick installed, if there are some bank that do not have memory installed the empty bank must have C-RIMM installed.

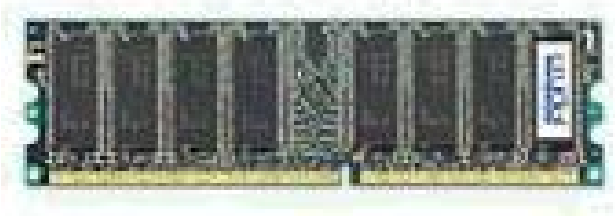


C-RIMM

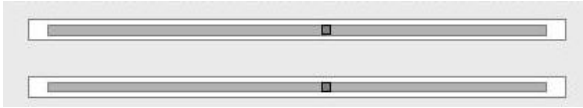
C-RIMM is a dummy stick that has no memory chip on it, it is used to to complete the memory circuit, *when you buy the mother board with RDRAM sockets please make sure that C-RIMM's come with the mother board .*

Please refer to the mother board user manual for which slot to install RDRAM and which slot to install C-RIMM.

2. DDR ram



DDR Ram is a medium high performance memory and medium price, it is a very popular memory to day, it is used in Pentium 4, and AMD Athlon and Duron mother board, use front side bus at 200, 266, 333 and
400 Mhz.

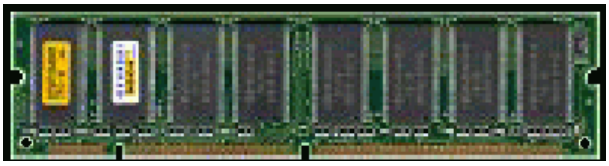


DIMM socket for DDR Ram

One memory bank is one socket, and can be 128 MB, 256 MB, 512 MB.

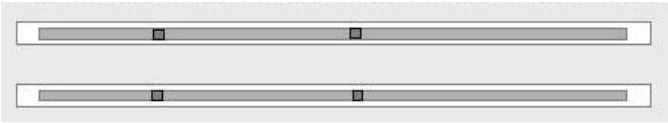
3. SDRAM

This is a lowest performance memory of the 3 types and lowest price, this type of memory use front side bus 100 or 133 Mhz, it is used mainly in socket 370 mother board (Pentuim III, Celeron II, Cyrix C3) and also in Pentium 4 mother board with front side bus clock at 100 or 133 Mhz.



SDRAM

SDRAM socket



One bank of SDRAM is one socket and it can be 128 Mb, 256 MB and so on.

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3.1 Memory Error checking

Memory error checking

Data in a byte written in to the Memory and later on read back if the Memory has some problem the data read back may pick up some extra bit or drop some bit.

Parity Bit

One way of checking error is by using the Parity bit, before the byte of 8 bit is wrote to the memory, the memory controller will count the number of bit in a byte and if the number of bit is Even the circuit will add one more bit in to that byte to make them Odd this bit being added is called Parity bit, the byte become 9 bit byte, when the byte is read from the memory the controller expect to see the number of bit in Odd, if a bit was pick up or dropped the number of bit become even and the memory controller will recognized that this is an error and if 2 bits were picked up or drop the parity checking will not able to detect error.

ECC (error checking and correction)

The more accurate in checking memory error is by implement ECC the ECC process is done by calculate the Syndrome byte from a multiple data byte normally use 8 byte (64 bit)
the Syndrome byte is wrote together with the data byte and when the data is read back the Syndrome will be calculated again and compare with the Syndrome byte read if they are the same then the data read is no error.

The ECC process can can correct single bit error automatic with out the system being notified and if there are multiple bit error ECC can recognize and notify the system.

The Mother board must support Parity or ECC Memory to to be able to use them.

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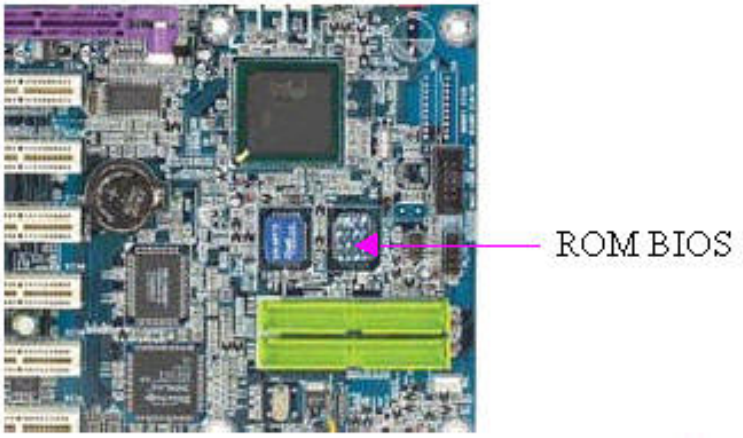
4. ROM BIOS

BIOS (Basic Input Output System) BIOS is a program that work as a part of the hardware, the program is stored in the read only memory (ROM) ROM can retain BIOS permanently even though electric power was removed from the system.



BIOS will start work immediately when the PC is powered on, BIOS will make the hardware ready and the IO (in put out put devices) works at the initial state, Floppy disk and CD-ROM able to read and boot, PC able to detect the installed hard disk, the screen able to display, all this will help us to be able to install the Operating System or install Windows.

The ***brief function*** of the BIOS that we want to discuss here are;

1. Bios test the hardware component on the mother board,
    - Test the CPU
    - Test The memory
    - Initialize and test the hardware and Chipset on the mother board.

    This is called POST(Power On Self Test) If BIOS found any hardware error during test it will generate POST code and Beep code.

The POST code is a 2 digit hexadecimal code, will display on the POST display card during powering on, we will have to plug the POST Display card on the expansion slot before we power on the PC, this card is very helpful in doing trouble shooting the dead PC.

The POST display card is available to be purchased on the internet, you can search by using key word Power On Self Test.

The meaning of the post code is varied depends on the manufacturer of the BIOS, with Award BIOS code C6 mean the memory is not working properly, code 42 mean hard disk is not found.

The Beep code is a sound generated by BIOS during POST, this is another aid to help diagnose the PC hardware problem, with Award BIOS, if the memory error is found the series of long beep sound will be generated, beep.....beep.....beep.

2. Bios has utilities to detect the installed hard disk.
3. Bios controls input out put component,
    - Communication ports
    - Printer port
    - Hard disk
    - Floppy disk
4. Bios manage power saving of the PC.
5. Bios has utility to enter CMOS setup (or called Bios setup).
6. After all hardware tested successfully Bios will read (Boot) the operating system from the boot device, the boot devices is definable by the user, the default boot devices is the sequence of A:, then C: with this sequence the PC will boot from drive A: the floppy disk first and if drive A does not have the floppy to read the PC will skip drive A: and boot from drive C:, the hard disk, if we want to install Windows from bootable CD-

Rom we have to specify the boot sequence start from CD-Rom.

To specify the boot device, you must enter the CMOS setup utilities, most of the cloned PC we can go to the CMOS setup by pressing the delete key during boot, at the CMOS setup screen menu go to BIOS features setup, then move the cursor to the boot sequence and select the device you want to boot from by pressing the page up or page down on the key board to select the boot device.

BIOS Update

Bios is a program, after some time it is released to the user, it may need to updated to support some newly manufactured hardware or some problem was discovered or new version is released.

BIOS update is done by a special program that has the ability to write the new version of BIOS in to ROM.

Prior to do the BIOS update we recommend that old BIOS in the ROM should be read and save, in case if the new BIOS does not give the satisfactory result due to the data error or the file was damaged we can still write the old BIOS back.

The BIOS update program and the new version of BIOS can be downloaded from the Mother board manufacturer, the program may be run stand alone by boot it from the diskette or run under Windows, after the ROM is written with the new version of BIOS the PC must be reboot to make new BIOS take control of the system.

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5. CMOS Ram

Because the ROM BIOS is a read only memory and we are not able to store the user defined information which is needed by bios to run, the information such as,

- The boot sequence A, C, CD-ROM
- The hard disk and floppy disk size
- The information of how the user wants the BIOS to work.
- The parameter for chipset to work.
- IO port address and how they should work.
- Time of day clock and the password .... and more.

Every time the PC is powered on BIOS will use the above information, these information may be changed by the user and must retained in the memory even though the electric power is removed from the system, the memory that is used to store these information is called CMOS Ram, CMOS Ram is located on the mother board and will need the power from battery during PC powered off to retain the information.

The password that was set during CMOS setup time will al so stored in the CMOS Ram, if the password was forgot or password need to be cleared this can be done by remove the battery and leave the mother board with out battery for a big while, the other proper way and faster to clear CMOS is by using clear CMOS jumper on the mother board, please consult mother board user manual for location on the mother board and how to use, *please remember after using jumper to clear CMOS the jumper must be set back to normal, if not then the PC will not boot.*

After CMOS was cleared the stored information will disappeared, CMOS setup must be performed and the time of day clock will has to be set again.

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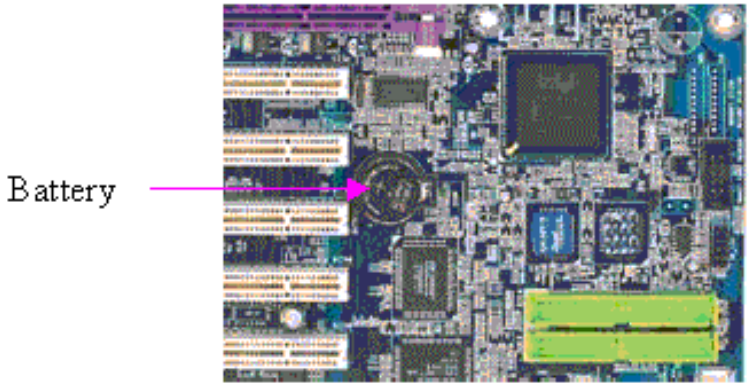
6. Battery



This is a 3 volt battery, this battery supplies the power to CMOS ram for CMOS ram to retain the information during system powered off, the battery may be last for 5 or 6 years.

When the battery is weak the PC will show and inaccurate time of day clock, or show CMOS check sum error message during boot, at this time the user defined information in the CMOS ram may be lost, the PC may be still able to run by using the default value in the BIOS that was defined by manufacturer.

After the battery is replaced the BIOS parameter may need be fine tune and save in CMOS ram, how to do BIOS setup and save in CMOS ram will be discussed in a separate topic.

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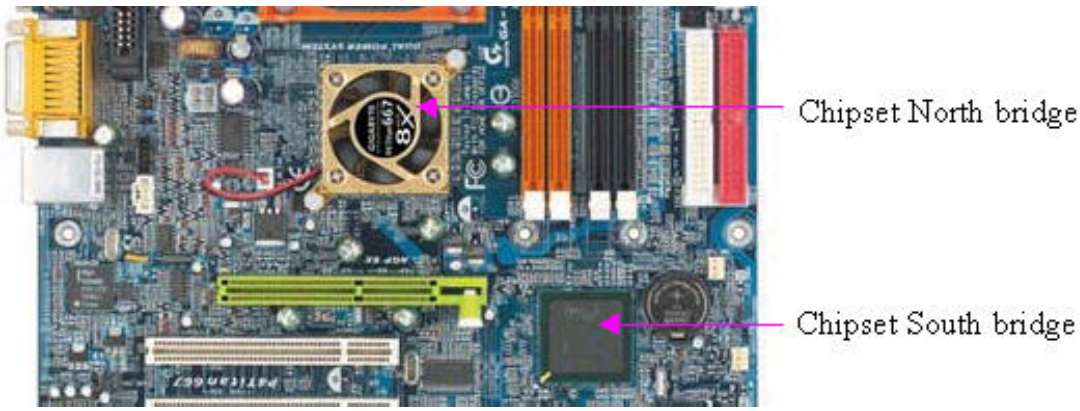
7. Chip set

Chip set is a set of IC, used to be many IC's work together to provide support to CPU and I/O (input out device) and make the whole system works, currently the chipset are integrated in to very few large scale IC.



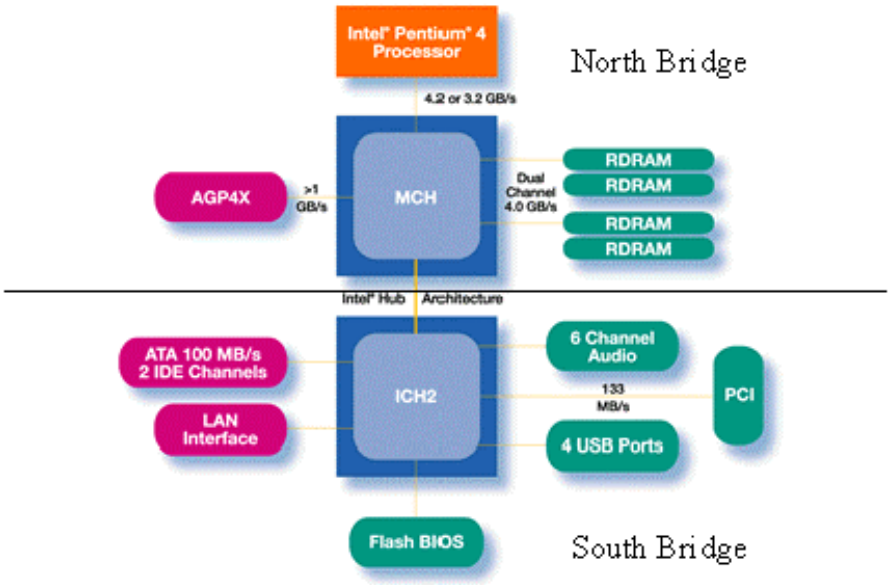
The most chipset today's composed of to component,

- North bridge and

- South bridge

The North bridge will work closely with CPU, Memory and AGP port.

The south bridge will control the IO's



Intel(R) 850 Chipset

Chipset will determine the capability of the mother board, for example,

- what is the type and maximum speed of the CPU can be used with this mother board.

- what is the type, speed and how many megabyte of memory (SDRAM, DDR RAM, RDRAM), can be installed on this mother board, chipset will control the memory operation.

- what type of Hard Disk this mother board will support
(DMA 66, ATA, 100, ATA 133 or serial ATA).

- speed of AGP port (1X/2X, 4X/8X)

- the number of PCI slot.

- the number and speed of USB port on this mother board.

- Chipset also includes the control function of the PC system, IRQ controller, DMA controller.

Some example of the chipset at the time this book is being written are;

Intel 850E for Pentium 4 and Celeron 478 with RDRAM.

Intel 845PE for Pentium 4 and Celeron 478 with DDR RAM speed 333 or 266 Mhz,

Intel 845GV for Pentium 4 and Celeron 478 with DDR RAM speed 266 or 200 Mhz. or SDRAM speed 100 or 133 Mhz.

AMD 760 MPX for AMD Athlon MP processor with DDR RAM 266 Mhz speed.

AMD 760 MP for AMD Athlon MP processor with DDR RAM speed 266 Mhz.

AMD 760 for AMD Athlon and Duron Processor with DDR RAM speed 200/266 Mhz.

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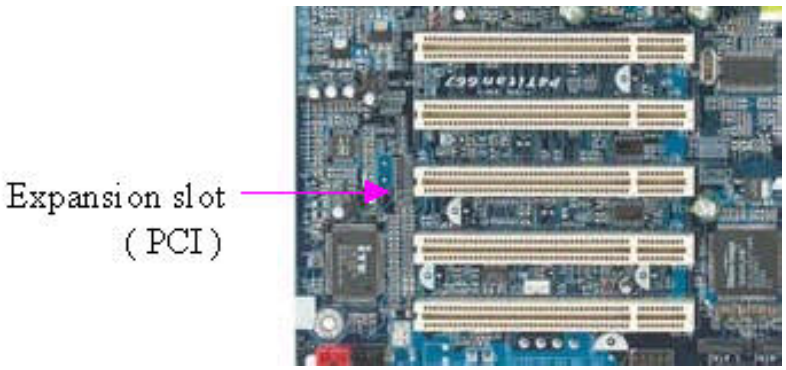
8. Expansion Slot (PCI type)



Expansion slot or Expansion bus is the slot that enable the user to add the adapter card for additional function to the system for example,

- Sound card or Multimedia card.
- LAN card.
- SCSI controller card.
- Internal Modem card.
- TV tuner card.
- Additional hard disk controller card.

or other special purpose adapter card.

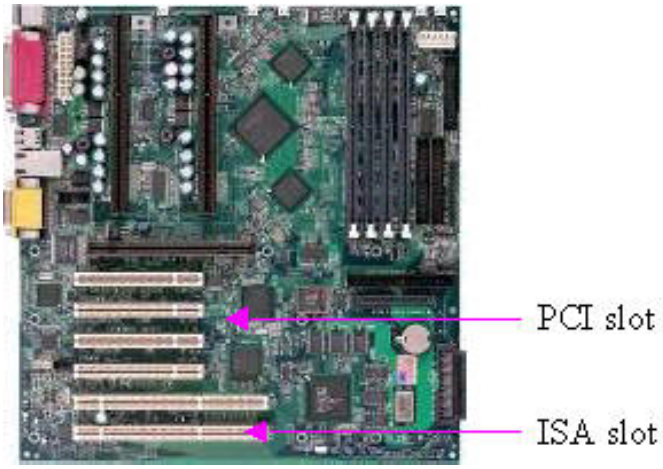
The expansion slot that currently very popular and use by every mother boards is the PCI Bus (Peripheral Component Inter connect).

These card after inserted in to the slot may need the driver software to be installed with the operating system to make the card works.

PCI slot is the 32 bit bus running at clock speed 33 Mhz, the maximum transfer speed of PCI bus is 133 megabyte/second.

The other type of Expansion slot is ISA slot, this is 16 bit bus running at clock speed 8.33 Mhz data transfer rate is 16 Mbyte/sec, it has been widely used in the pass, today's mother board it is very rare.

8. Expansion slot



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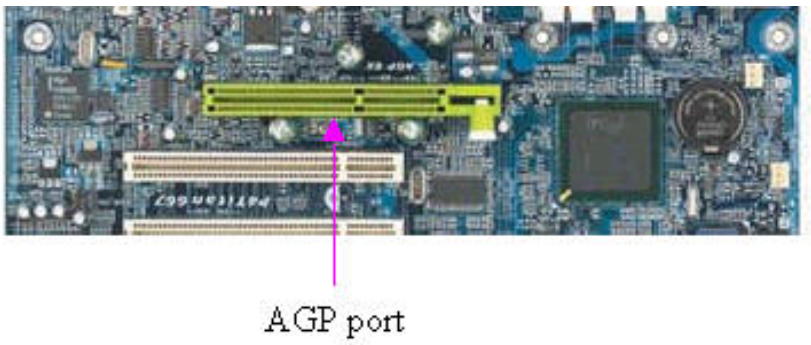
9. AGP Port



AGP (Accelerated Graphic Port) port is a high speed data transfer port, this port is used by the display adapter card that demands so much data with in short period of time.

The way AGP port works is similar to the PCI bus, AGP port runs at clock speed 66 Mhz, with in one clock cycle of AGP operation, the multiple of 32 byte can be transferred.

The speed of AGP port can be 1x, 2x, and 4x, 8x of PCI speed.

AGP adapter card 1x/2x is using 3.3 volt power,

AGP adapter card 4x/8x is using 1.5 volt power.

Some mother board has got the universal AGP port connector that can accept 1x/2x or 4x/8x card, the mother board with this type of port should have the jumper for the user to set for selection of using 1x/2x or 4x/8x AGP card .

Or some mother board only support one type of AGP card.

The mother board may not boot if the wrong type of card is plugged.

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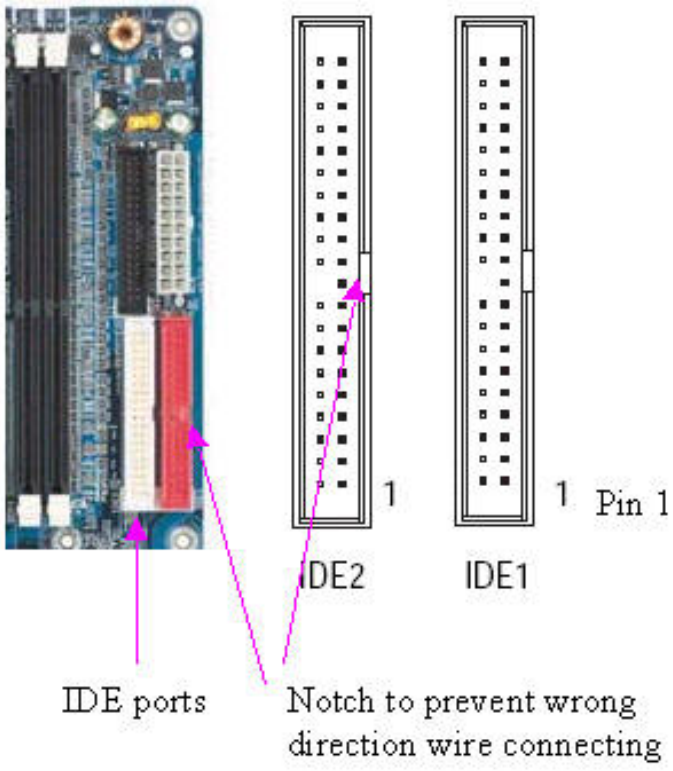
10. IDE Ports



IDE ports, the 40 pin connector, these ports are for connecting hard disk drives or IDE CD-ROM or IDE CD writer.

There two type of hard disk that can be connected to this ports;

- ATA interface hard disk (Advance Technology Attached)
- Pre ATA, they were called DMA 33 and PIO hard disk (Programmable Input Output)

ATA Interface

The current hard disk interface are
- UDMA 66 data transfer rate 66 Mbyte/sec.
- ATA 100 data transfer rate 100 Mbyte/sec.
- ATA 133 data transfer rate 133 Mbyte/sec.

Most of today's hard disk drive are ATA100 or ATA133 enabled.

The IDE cable for ATA hard disk is a flat cable with 80 wires connect to 40 pin connecter on the mother board, 40 extra wires are for noise shield.

The hard disk must compiled with UDMA 66, ATA 100 or 133 to be able transfer at the mother board's ATA specify speed.

DMA 33

The data tranfer rate of DMA 33 is 33 Mbyte/sec

PIO Hard disk

The hard disk prior to ATA time were operated in PIO mode there are 5 modes of PIO, PIO mode 5 is the highest data transfer rate and is 22 Mbyte/sec.

The flat IDE cable for DMA 33 and PIO is 40 wire cable.

One of these two ports is called Primary IDE and the other port called Secondary IDE.

Primary IDE can have 2 hard disk drives connected on the IDE cable,
- one hard disk is called Master (Primary Master).
- the other hard disk is called Slave (Primary Slave).

Secondary IDE also can have 2 hard disk drives connected on the IDE cable,
- one hard disk is called Master (Secondary Master).
- the other hard disk is called Slave (Secondary Slave).

CD-ROM can be connected on the same cable with hard disk and should always be connected to Secondary IDE and configure as a *slave device*.

To identify which port is Primary IDE and which port is

Secondary IDE please consult the Mother Board user manual.

The standard configuration of the mother board will have 2 IDE ports and can connect up to maximum of 4 drives.

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10.1 IDE Ports continue

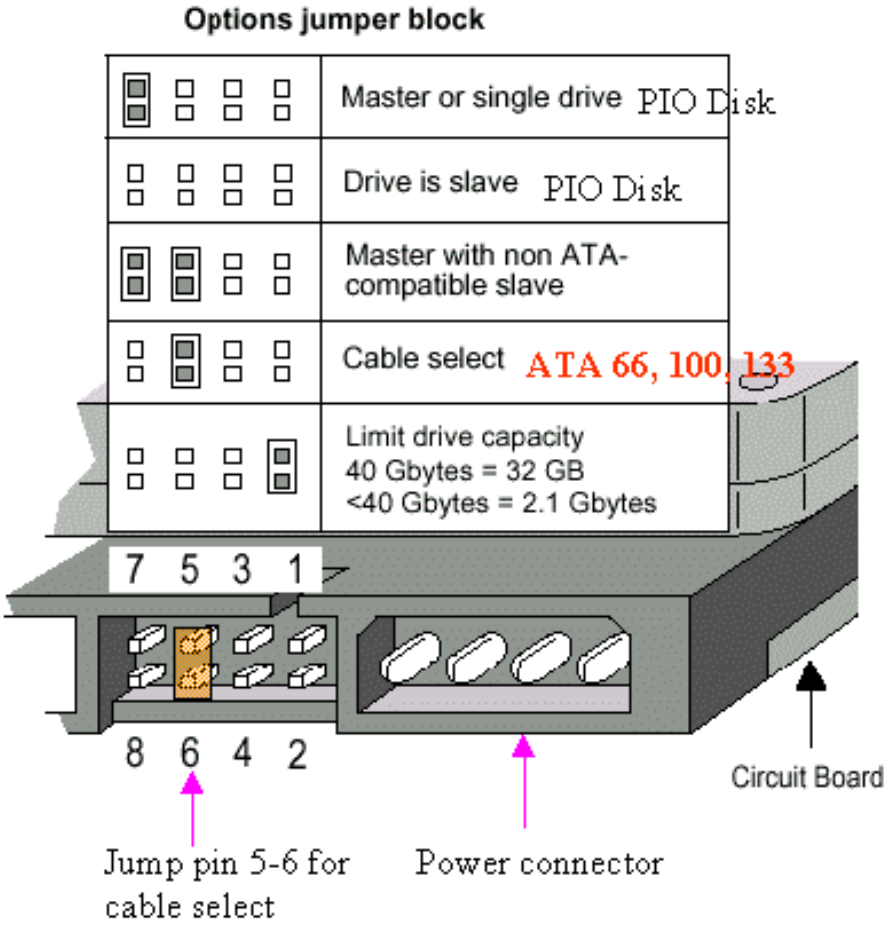
There are jumpers on the hard disk drive these jumpers will configure the hard disk to a master or a slave, with UDMA 66, ATA 100 or ATA 133 the jumper should always set at cable select.

With jumper set at cable select the hard disk that is connected at the end of the cable will be a Master drive and the drive that is connected at the middle of the cable is a Slave drive, same on both primary and secondary IDE cable.

With the non ATA disk drive (PIO and DMA 33 disk drive), to make them Master or Slave the jumpers are set differently.

The way of setting jumper of different hard disk manufacturer can be difference.

For Seagate disk drive please see the picture below, or you can go to the web site of each hard disk manufacturer for the detail of jumper setting.



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10.2 IDE Ports continue

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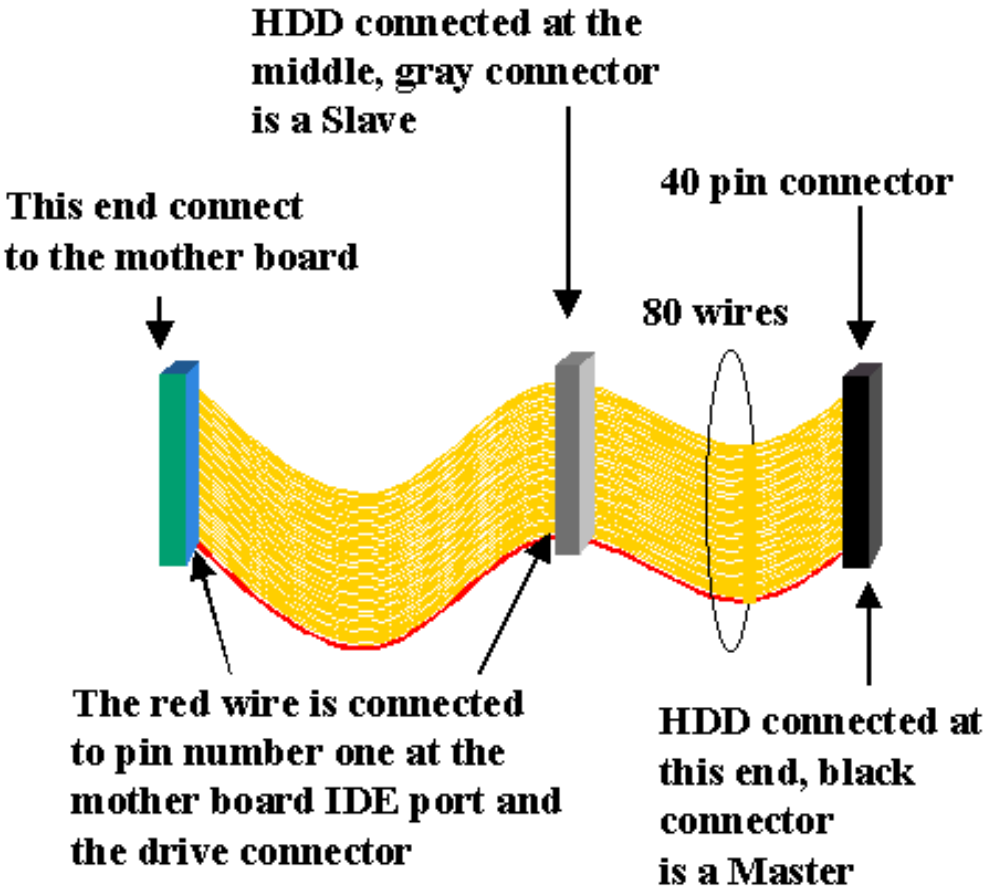
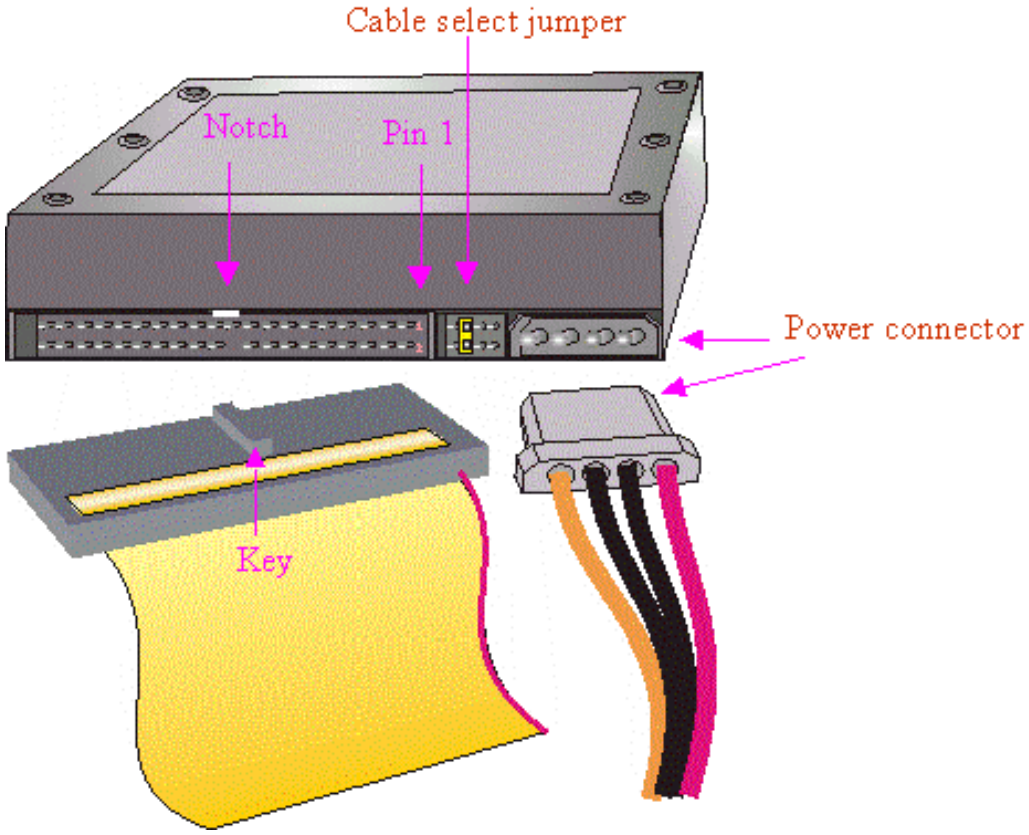
IDE ATA Hard disk cable





Pin Number 1 of the IDE connector on the hard disk is always near to the power connector, most of the connector and cable also have notch and key the chance in making wrong connection is not easy.

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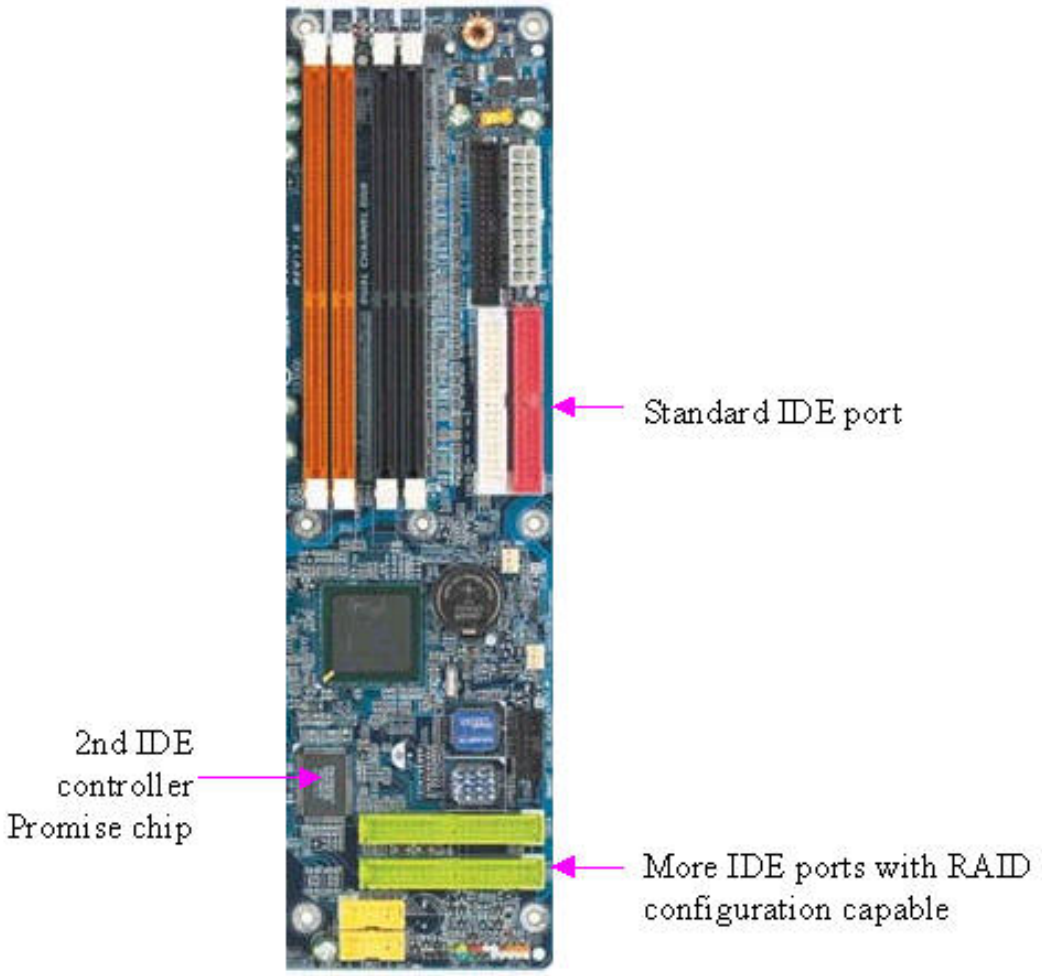
10.3 IDE Ports with RAID capability

Some mother board may want to include the extra IDE port together with special function of the port.



The mother board shown here for example, give 2 more IDE port by using separate IDE controller, this 2 ports can have 2 hard disk drives connected to each of them, in total of 2 ports can have 4 hard disks connect to them using 80 wires 40 pins ATA cable and these 4 Hard disk drive can be configured as RAID device (Redundancy Array of Independent Disk).

Configured more than one hard disk drive in to RAID system will make them capable of data protection, this mean that the same data will stored in to more than one hard disk during write and if one hard disk fail the data still available in the other hard disk, the

system still continue to run with out losing data, please consult the mother user manual for how to use them.

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10.4 Serial ATA

Serial ATA is a new design of the hard disk interface.

On some of the new released mother board you may find the port called Serial ATA using 7 pins connector.

With the data transfer in parallels on 40 wires cable of ATA 100/133, there are some difficulties that effects data integrity during transfer.

To overcome this issue, the serial data transfer interface has been designed using 7 pins connector.

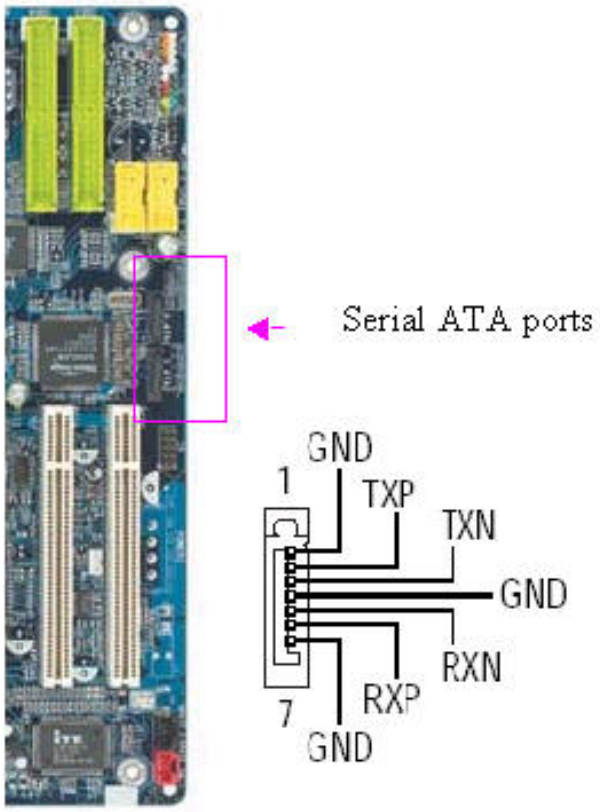
The data transfer rate on a serial ATA can be as high as

150 Megabyte/sec and will be

300 and 600 Megabyte in the future

Bridge Solution,

the disk drive must also be serial ATA type, mean while there is a bridge circuit that will convert a parallel ATA hard disk to a serial ATA but the data transfer rate will not go beyond original capability of parallel ATA that is 100 or 133 Mbyte/sec.


Serial ATA ports
GND
1
TXP
TXN
GND
RXN
RXP
7
GND

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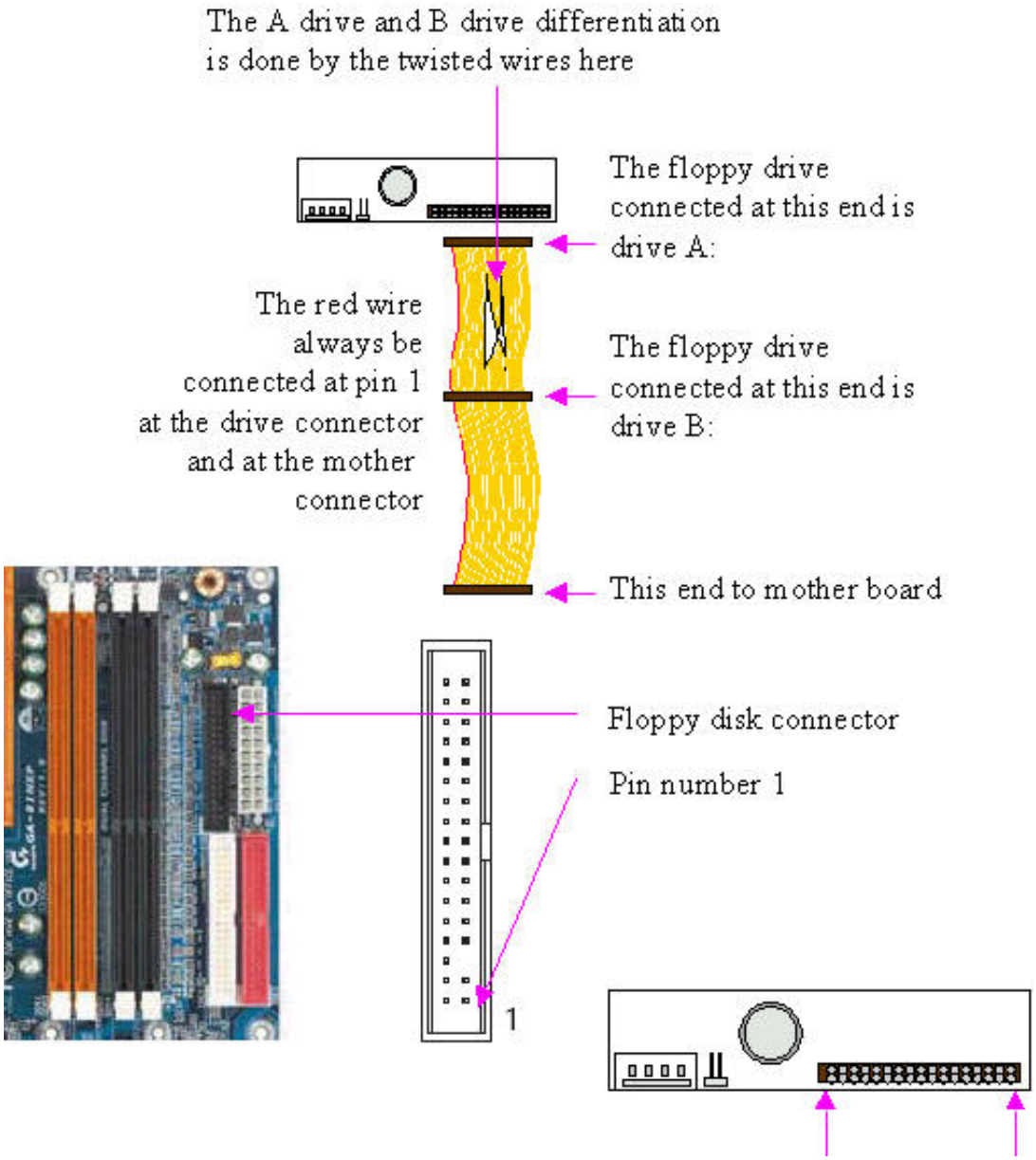
11. Floppy Disk Port

Floppy disk port is a 34 pin connector use 34 wires cable, the normal cable will have 2 connectors 2 floppy drives can be connected, one drive at the end of the cable is drive A the other drive is at the middle of the cable and is drive B.



Unlike the hard disk pin 1 of the floppy drive can be either side of the connector and most of the time the connector use no socket to guide the cable, the chance of making mistake wrong direction or shift pin right to left or left to right is high and cause the system can not find the floppy drive.

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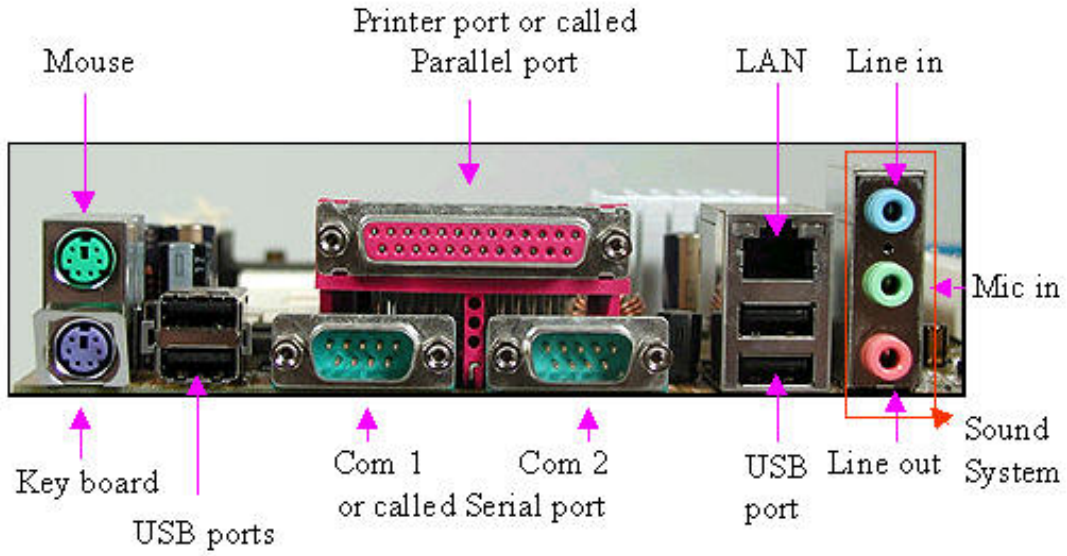
12. IO Connector/USB ports



Parallel port

Data transfer on this port is 8 bit in parallel, use 8 wires to carry 8 bit data (plus some more wire for control signal) between the device and the port controller in the mother board, this port is mainly use for connecting to the PRINTER and also use by some other parallel device in the old day (hard disk, CD-Rom, Scanner or Hard lock device to prevent using the software with out license).

Most of the mother board only provide 1 port Parallel port, with the default value of the BIOS setup the printer connect to this port is seen by Windows as the LPT1.

But in real BIOS can control 3 Printers LPT1, LPT2, LPT3
these 3 printers can print different job at the same time, we will discuss how to add more printer ports in separate topic.

Serial ports

Data bit are transferred on this port in series using one wire for transmit and one wire for receive this is very convenience for the computer that are located very far from each other to communicate and exchange data over the two wires like phone line.

We call these ports Communication ports most of the Computer will

provide 2 ports called Com 1 and Com2, the major use of these ports is to transmit and receive data with the other Computer located far away the data transfer between the Computer is transferred in Asynchronous mode.

MODEM

To prevent the data being distorted when traveling on the way with big distance between Computers, the Modem is needed to modulate the data from this Computer in to carrier and Transmit via media like phone line and at the other we will need another modem to Demodulate the data out of the Carrier and present to the Computer over there.

The Modem connected to the Comport is called external Modem.

Serial mouse.

The Com port also used for connecting Mouse, the Mouse that connected to Com port is called Serial Mouse.

The maximum transfer rate of the port is 115200 Bit/sec.

Internal Modem

The adapter card that has the Com port and the Modem included in one card has been manufactured and is very wide use even more popular than the External Modem and it is cheaper, we plug this card on the expansion slot on the Mother board, to make external Modem or internal Modem works properly the *software driver must be installed.*

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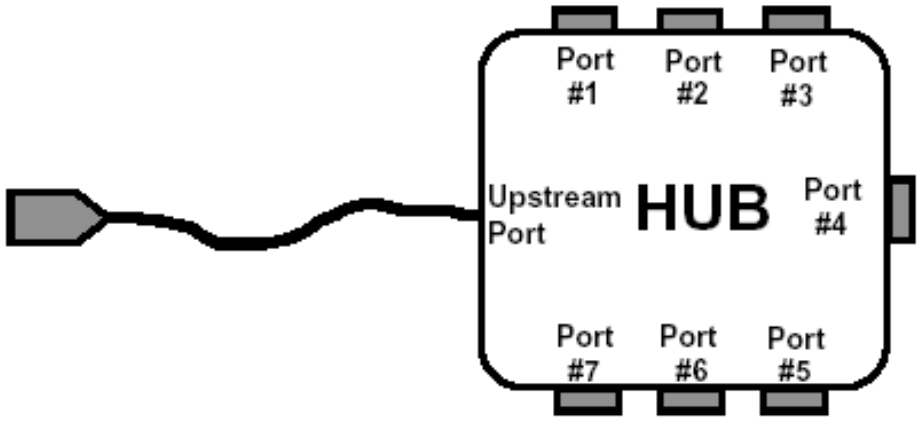
12.1 IO Connector/USB ports

USB Universal Serial Bus, the data is serially transferred on this port between USB device and USB controller by using 2 wires.

USB port has just newly implement with in CPU Pentium's time, in the time of CPU 8046 USB port is not yet in placed.

The port was designed for ease of use, the USB device may be hot pluggable to the port or remove from the port, in theory one USB controller may have up 127 devices connected, the device connection can be propagated by using USB hub.

Universal Serial Bus Specification Revision 2.0



The current version of the USB port is version 2.0, the maximum data transfer rate is 480 Megabit/sec approximate

60 Megabyte/sec, the Communication port is only 115.2 Kbit/sec (.115 Mb/sec)

The port also provides electric power to the connecting device but very small amount if the device consume big current the separate power must be used for that device.

USB devices are now widely available, Digital camera, Memory device, Scanner, Key board, Mouse and more.

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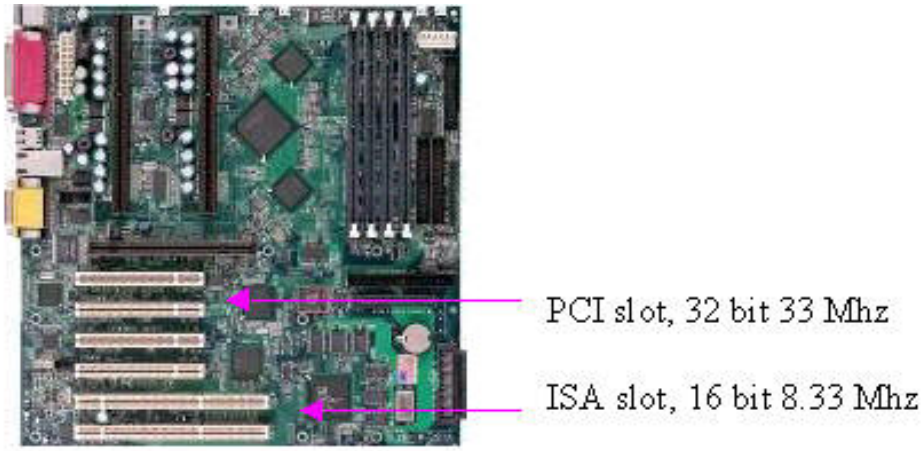
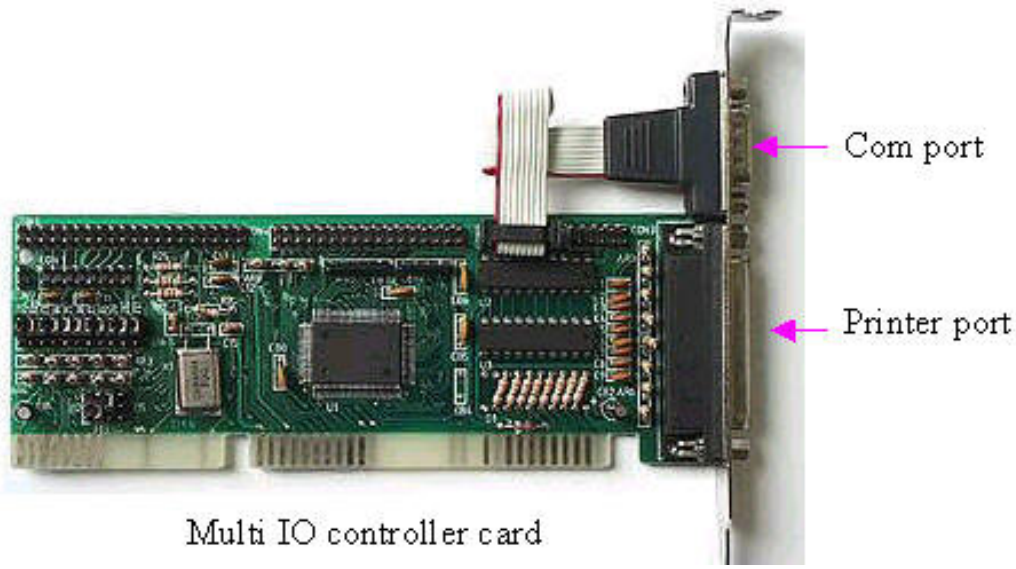
12.2 Adding more Printer ports

(this project is rather for experienced person)

This procedure will apply to the mother board with ISA slot by using old style multi IO controller card that were existed during the 80486 and early Pentium time, you can add 1 or 2 more Printer ports addition to the existing on board Printer port with low cost, simple and no driver is needed.

Or you may be able to buy this IO card from the used computer part store.





Multi IO controller card

The multi IO controller card controls;

- Hard disk drive, 2 or 4 drives

- Floppy disk drives, 2 drives
- Communication, 2 ports
- Pinter port, 1 port

All the function of the IO card has now been integrated in the mother board and that eliminate the use of IO card.

There are jumpers on the card to enable or disable any port on the card, the detail of how to set the jumper may be printed on the card or at the back of the card.

If you only want to use the Printer port all the other ports, HDD port, FDD port and COM port must be disabled, and only Printer port is enabled, there are also the jumpers that set the mode and LPT number of the printer port, as mention on page 12, the printer port may be set to;

LPT1, LPT2 or LPT3

The mode of the printer can be set to;

SPP, EPP or ECP

The LPT number and the mode of the port can be accomplished by setting the jumper on the card.

The LPT number of the card must not be the same as the LPT number of the printer port on the mother board, with the default Bios set up the Printer port on the mother board is LPT1 there for to avoid conflict the LPT on the card must set to either LPT2 or LPT3, in summery the step to add printer port are below;

1. Make sure that the printer port on the mother board is set to LPT1 address 378h. by follow the procedure here
    - During boot press delete key to go to Bios set up screen.
    - Select Integrated Peripheral.
    - Select the Parallel port and select the address of the port to 378 if it is not the default value should

already be 378 some time it set to AUTO, please change from AUTO to 378 then press the Esc key and Save and Exit Bios set up. (this is for Award Bios, this concept can also apply to other Bios vendor.)
    - IRQ 5 should be free for LPT2 to use.
2. Set jumper on the IO card to;
    - Disable hard disk drive port.
    - Disable Floppy disk drive port.
    - Disable communication port.
    - Enable Parallel port
        - Set mode of the port to EPP.
3. With PC powered off plug the IO card to ISA slot.
4. Power on The PC, if the PC has Windows installed Windows should should indicate the detection of LPT2.

You can issue MSD command at the Dos prompt to to see whether the LPT2 is recognized by the system.

After the LPT2 is recognized by Windows then the printer can be installed to this port, this mean that 2 printers can be connected to this PC, the printer on LPT1 and on LPT2 can print different job at the same time.

2 Com ports on the IO card can also be added to mother board using same procedure.

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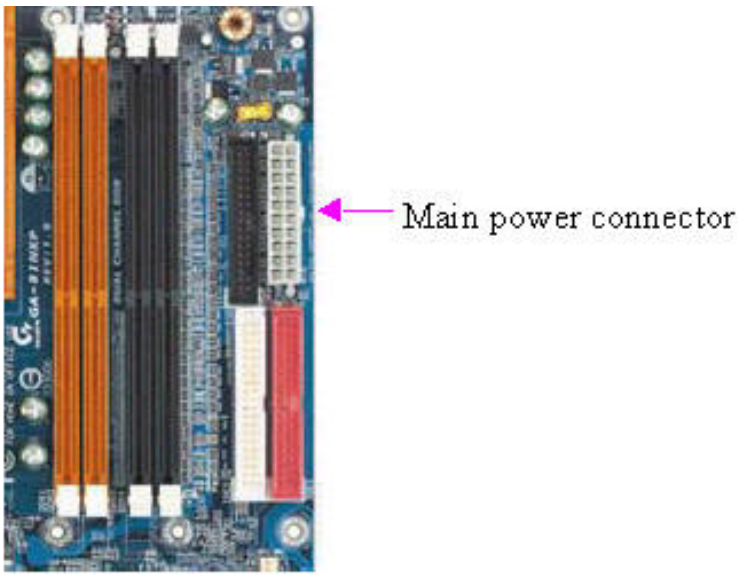
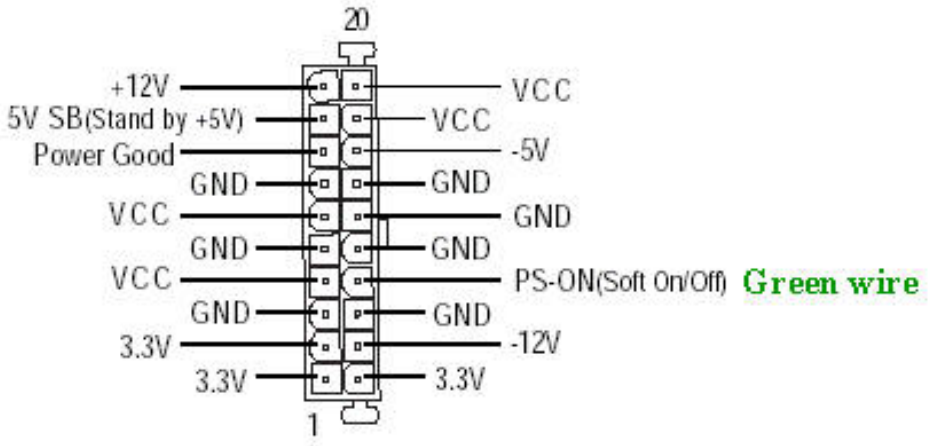
13. Power Connector





Power supply connector from power supply will easily insert in to the mother board connector, if you find it is hard to insert this mean the connector is in the wrong direction.

With the AC power cord plug on to the receptacle of the power supply the 5 volt standby voltage will turns on with out powering on the system, this voltage will be used by power on mechanism and by the system for soft power on, for example wake up on land wake up on modem or when the system is in the power suspend mode.

To turn on the power supply,

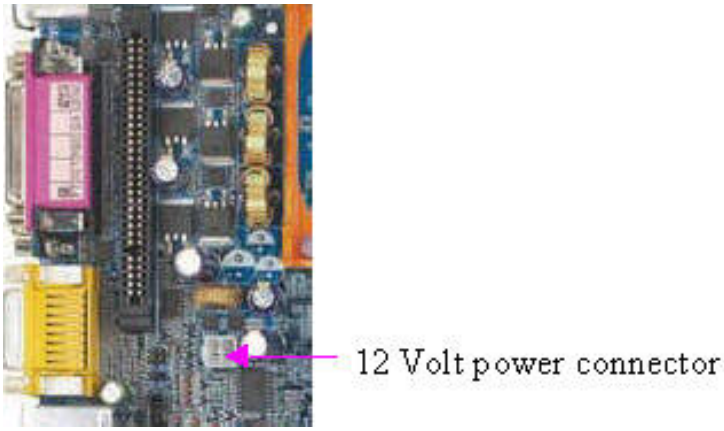
1. The connector from the power supply must

be plugged on to the mother board.

2. The 2 wires power on lead from front panel power on switch at the case must be connected to the mother board.
3. Power on switch is pressed, pressing power on switch will provide contact between 2 wires and cause PS-ON pin 14 voltage to go to go low and activate the whole power supply.

To turn on the power supply while stand alone with out connecting to the mother board may be possible by inserting the jumper wire between pin 14 and any black wire of the connector from power supply.

12 Volt power connector



This 12 volt power is required by the CPU socket 478 (Pentium 4) if this is not plugged the CPU will not work this is not required by the CPU socket 370, or AMD, when you purchase the power supply or the PC case please check that 12 volt connector is available with the power supply.

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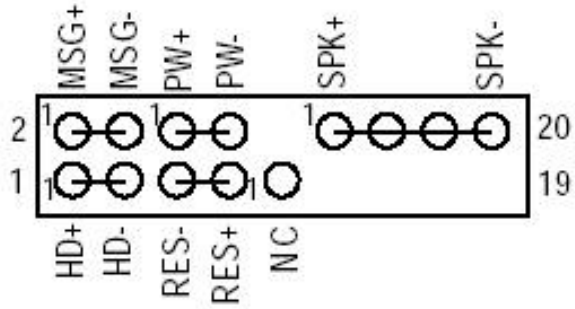
14. Front Panel Connecting pins

Introduction
Mother Board Component
1.Clock Generator
2. CPU socket
3. Memory Socket
Memory error checking
4. ROM Bios
5. CMOS Ram
6. Battery
7. Chipset
8. Expansion Slot
9. AGP Port
10. IDE Ports
10.1 IDE Port continue
10.2 IDE Port continue
10.3 IDE Port with Raid
10.4 Serial ATA
11. Floppy Disk port
12. IO Connectors/USB ports
USB port
add more printer ports
13. Main Power Connector
14. Front Panel Connecting Pin

Front panel connecting Pins

Front panel connecting pins



The pin lay out show here is a guide line and explanation of the meaning, difference mother board the pin lay out can be difference.

HD+, HD- to connect to the hard disk indicator at front of the PC, when hard disk is working the HDD indicator at the front of the case will blink.

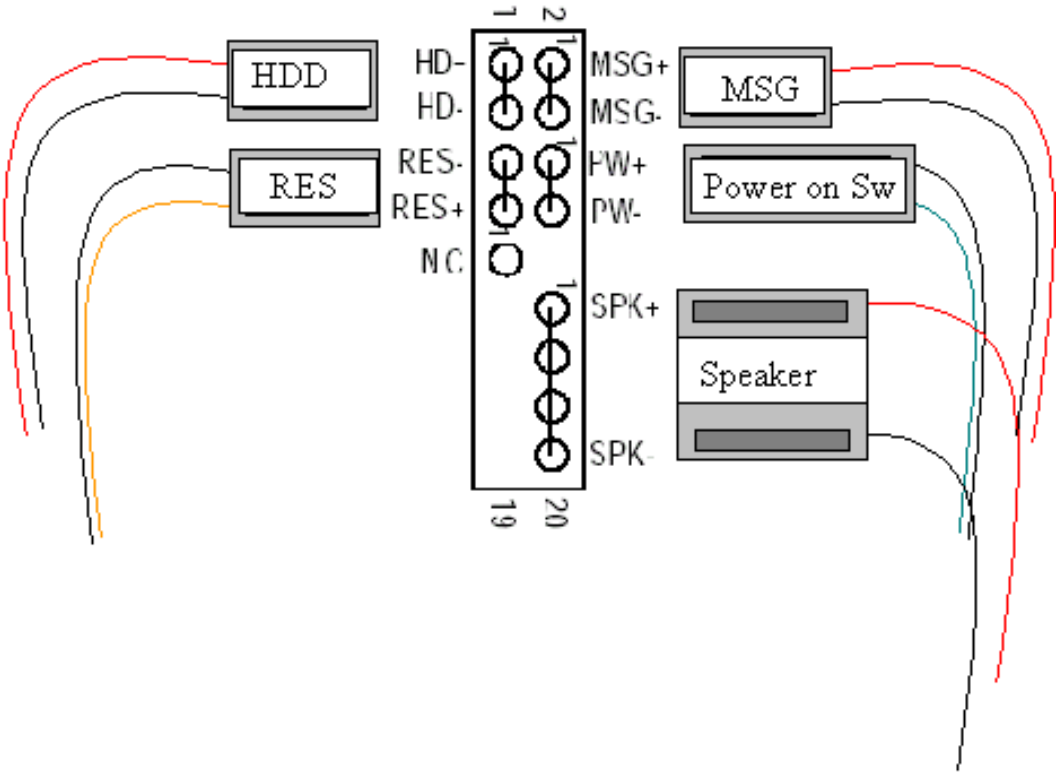
Power Led +, Power Led- (not shown in the picture below) to connect to the power on indicator at the front of the PC when the PC is powered on the indicator will turns on.

MSG +, MSG - to connect to the Led indicator at the front of the PC, this light will turns on when the PC is in stand by mode.

Power +, Power - to connect to the power on/off switch at the front of the PC.

RES+, RES- to connect to the the Reset switch from the front of the PC.

SPK+, SPK- to connect to the small speaker in side the case this is useful for diagnostic purpose, during power on selftest if the BIOS found some hardware problem BIOS will generate the sound on this speaker, this is called BIOS beep code.



The lead wires from the front of the case are from the indicators and the switches, the indicators are the LED (Light Emitting Diode), they are polarity specific, if they were plugged to the pin on mother board with wrong polarity the LED is not lighted.

The + wire will be plugged on to the + pin, the - wire will plugged on to the -pin.

The mother board user manual should indicate which pin is + and which pin is - , the wire lead of the case some time they show polarity some time polarity not shown but RED colored wire is always +, if there are no printed polarity or red color you can try it out if the LED is not turned on you can turn them around, no harm.

The wire from the switches, Power on switch or Reset switch they are no polarity.

14. Front panel connecting pins