LEARNING OUTCOME 2

Test Components:

POWER CABLE & POWER SUPPLY

OBJECTIVES

At the end of the lesson the learner shall be able to:

- ➔ Describe the power cable;
- ➔ Determine the types of wire; and
- ➔ Appreciate the importance of continuity testing.

TESTING COMPUTER POWER CABLE

Power Cable

- Alternatively referred to as a power cord, mains cable or flex, is the primary cable that provides power to the computer, printer, monitor, and components within a computer.

2 Types of Connector

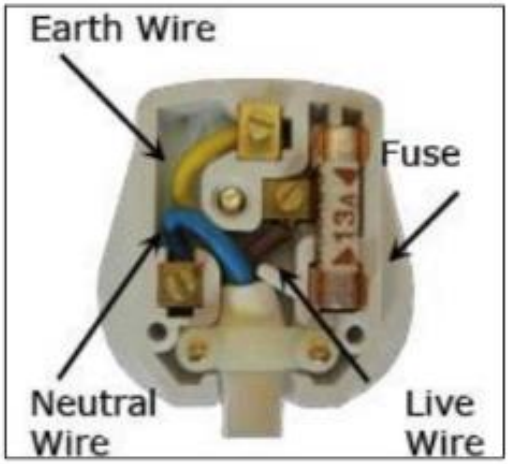
➔ Female Connectors - slot, socket, outlet

➔ Male Connectors - pin, plug

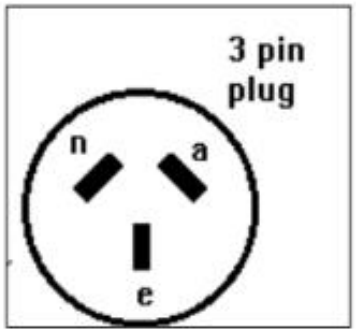
The three pronged plug contain three wires:

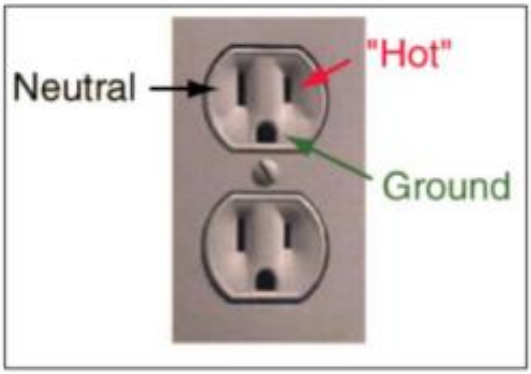
1. The live wire
2. The neutral wire
3. The earth wire

- In a plug the earth (ground) wire should be at the top of the plug, the live (hot) wire towards the right hand side of the plug (bottom right) and the neutral wire towards the bottom left of the plug (bottom left).



- By the process of elimination the earth wire is placed in the only remaining part of the wire, that is, the top. In Alternating Current system there is no signs (+,-) so the two wires should be interchangeable





TYPES OF WIRE IN A POWER CABLE

1. **Earth (Ground)-** circuit's safety protective wire that normally carries no current.
2. **Live(active,line,hot)-** carrying electric current
3. **Neutral (cold, return)** - carries electricity from an outlet back to the service panel

- Live shorted to ground or neutral: fuse blows immediately.
- The neutral is the normal return where the load is supplied from live, the neutral completes the circuit and carries current back from the load to the power station.

- **Continuity** means, 2 things electrically connected. If 2 electronic parts are connected with a wire, they are continuous.
- Continuity just means that there is no break in a part of the electrical circuit.

Meters as Continuity Testers

- The continuity test is arguably the most basic electrical test done with this diagnostic tool. With an analog multitester, set the selector control knob to RX1.
- Touch one probe to point A and the other to point B. If the needle swings to zero ohms, there is continuity.
- With a digital, put the function on OHMS and the range control to the lowest setting. Touch the probes as above. If it beeps or the display says 0.00, continuity exists.

SELECTOR KNOB

POWER CABLE TESTING

1. Set your multimeter function to measure the continuity of power cable (X1).
2. Connect the multimeter probes to the two ends of power cable in same position.
3. Check the continuity of each part.

INFORMATION SHEET 2.2

POWER SUPPLY

A power supply unit (PSU) is a type of power converter that provides direct current (DC) voltage to internal computer components. Some of these units are designed specifically for use with 110 or 230 volts alternating current (AC), while others can be switched between the two or even accept any voltage within that range. The level of direct current voltage that they provide can also vary, typically between 3 and 12 volts DC. Desktop and laptop computers both use power supply units, though they are somewhat different in design. A desktop power supply unit usually has several bundles of wires designed to hook up directly to various internal components, while laptop "power bricks" are external units that typically utilize coaxial power connectors.

How a Power Supply Works

- The power supply converts AC from your homes outlet into DC which your computer needs to run.
- It adjust the supplied voltage to the levels needed.
- It filters the voltages.
- Prevents any damaging power from reaching or take effect at the output.

How the Computer Uses the Voltages

- In the power supply the computer uses the 3.3 voltage and 5 volt to run the digital circuits.
- The 12 volt is used to run motors like in the disk drive and the fan to keep the computer from overheating.

Common Power Supplies Form Factor

Form Factor - Specifies size, shape, and features of a device and determined by motherboard.

AT and ATX are the two types of power supplies that can be installed in any PC.

- The ATX form factor motherboard, with its unique ATX power supply, dominates today's systems.
- ATX standard supplies three positive rails: +3.3 V, +5 V, and +12 V.
- There are two basic differences between AT and ATX power supplies: the connectors that provide power to the motherboard, and the soft switch. In ATX-style systems, the front-panel power switch provides only a control signal to the power supply and does not switch the mains AC voltage. This low-voltage control allows other hardware or software to turn the system on and off.

The AT Power Supply

- There are 2- 6 pin connectors that supply power to the motherboard.
- There are 4 voltages that AT supplies +5, -5 +12, -12.

ATX POWER SUPPLY

The ATX has a 20-pin connector for mainboard power. It has +12, -12, +5, -5 3.3 voltage output and the on/off switch of ATX units is controlled through the motherboard.

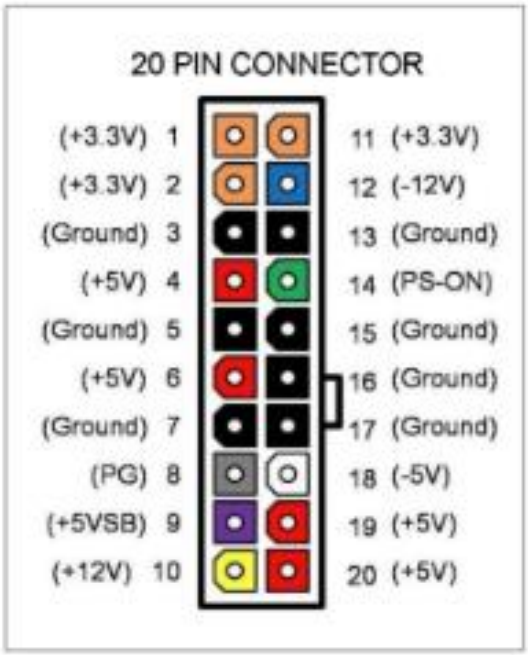
VOLTAGE	DEVICES POWERED
3.3 V	chipsets
5V	Disk drives, memory, PCI/AGP cards, ISA cards, miscellaneous chips
12 V	Motors, voltage regulators

ATX

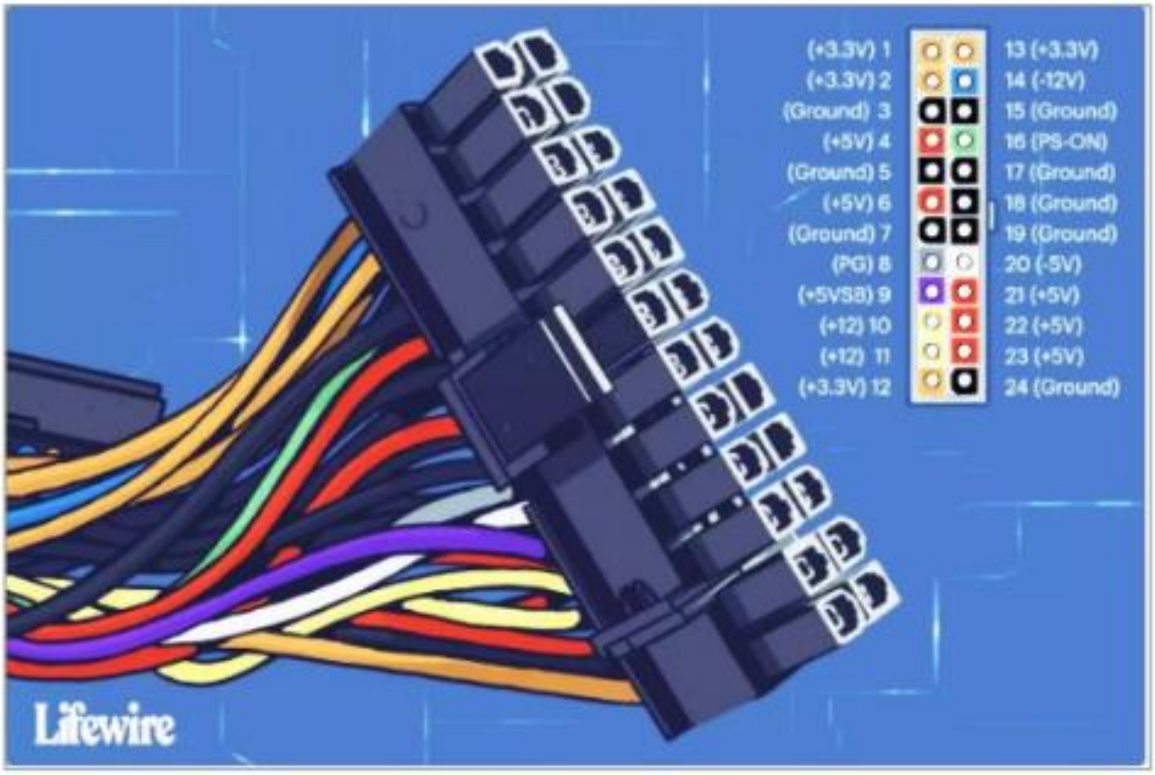
Voltage	Wire Color	Use
+ 12 volts	Yellow	Disk drive motors, fans, cooling devices, and the systems bus slots
- 12 volts	Blue	Some types of serial port circuits and early programmable read only memory (PROM)
+ 5 volts	Red	Motherboard, Baby AT and earlier CPUs, and many motherboard components
- 5 volts	White	ISA bus cards and early PROMS
+ 3.3 volts	Orange	Most newer CPUs, some types of memory, and AGP video cards

20-Pin Connector

ATX style power supply connector cable

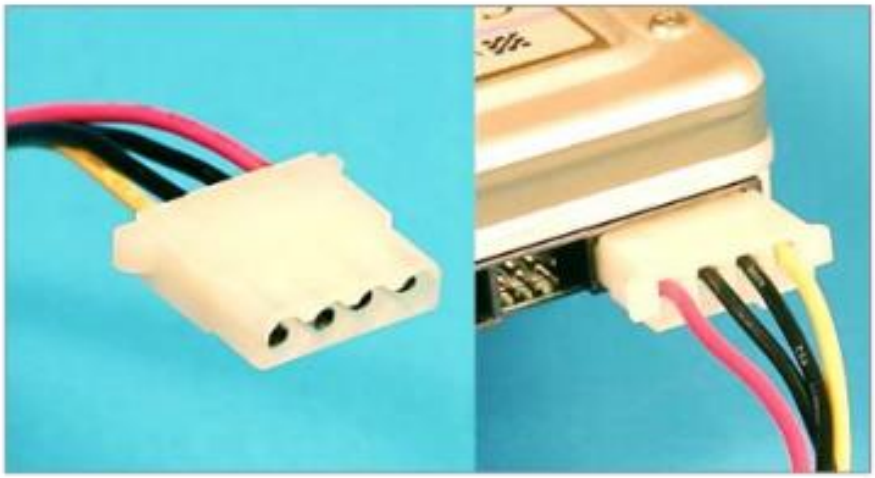


24-Pin Connector



Power Supply 4-Pin Usage

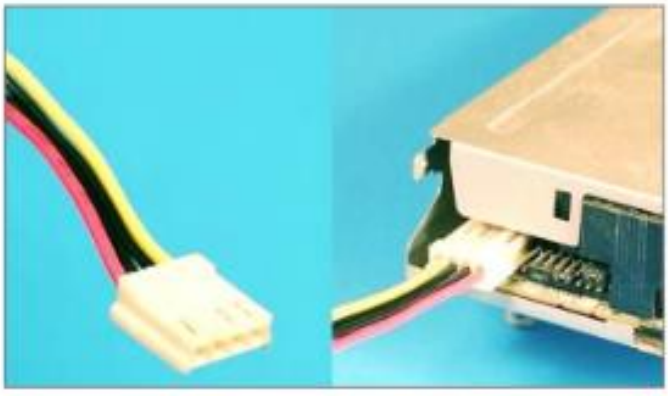
- **4-pin peripheral power connector/ molex –** use for hard drives and optical drives.



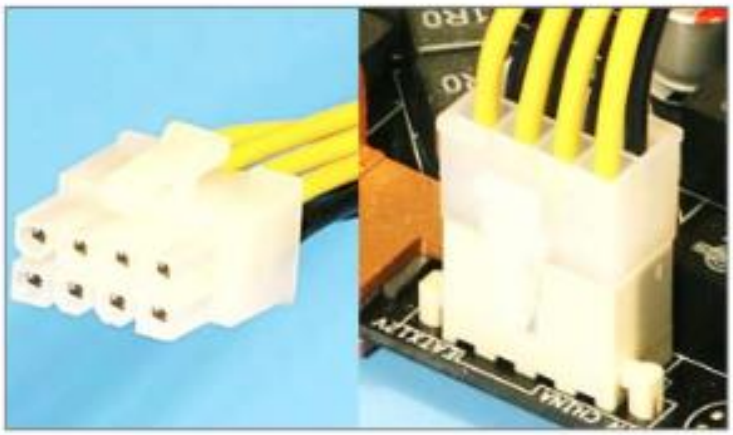
- **SATA (Serial AT Attachment)** power connector - replaces the old 4 pin peripheral cable (molex).

- 4 pin 12V power cable also known as **P4 -** used for CPU.

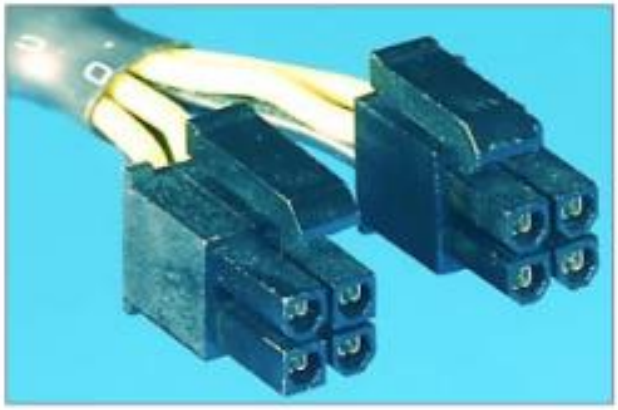
- **Floppy drive power connector / Berg connector –** used for floppy disk drives.



- **8 pin 12V power cable** - for multiple CPU for workstations that require more 12 volt power. Used for high-end motherboard and CPU.



- **4+4 pin 12V Power Cable -** compatible with both 4 and 8 pin volt connectors on the motherboards.



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