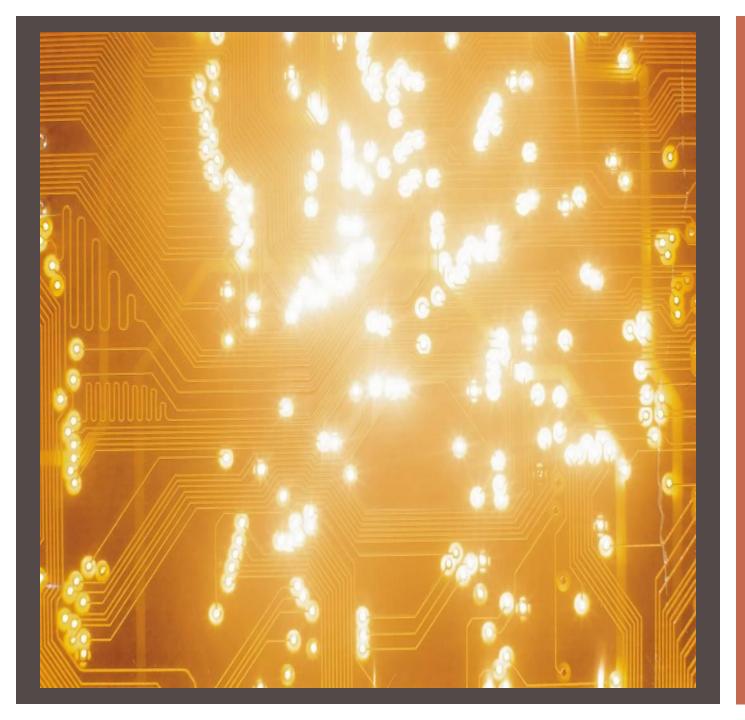
THINK ABOUT IT...

Two Antennas got married - the wedding was lousy, but the reception was outstanding

OBJECTIVES (P1)

- Define computer bridges
- Explain the function of BIOS
- Distinguish among various CMOS setup utility options
- Troubleshoot the power-on self test (POST)
- State the need and operational requirements of a PSU
- Test a PSU for it operational functionality

BIOS AND CMOS



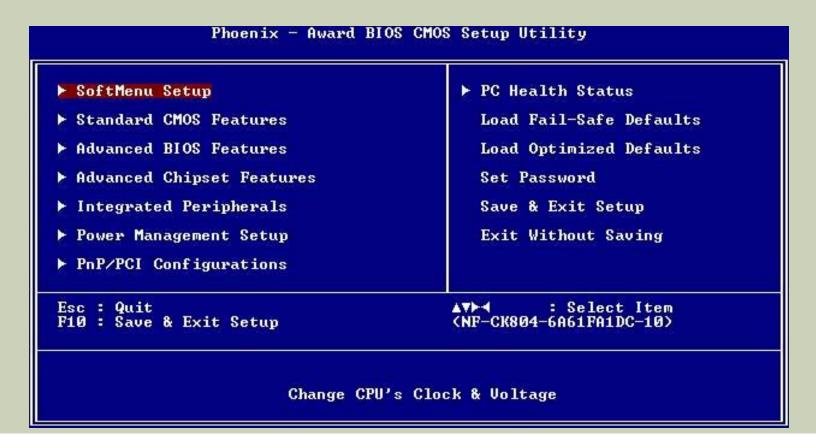
BIOS (BASIC INPUT OUTPUT SYSTEM)

- The **BIOS** contains instructions and setup for how your system should boot and how it operates
- The BIOS has 4 main functions:
 - POST Test computer hardware, ensuring hardware is properly functioning before starting process of loading operating system
 - Bootstrap Loader Process of locating the operating system, once found the BIOS will pass the control to it
 - BIOS Software and drivers interface between the operating system and your hardware
 - BIOS / CMOS Setup Configuration program that allows you to configure hardware settings including system settings such as computer passwords, time, and date

CMOS SETUP

Main menu

Access to all submenus



STANDARD CMOS FEATURES

Clock, hard drives, floppy drives

```
Phoenix - Award BIOS CMOS Setup Utility
Standard CMOS Features
    Date (mm:dd:yy)
Time (hh:mm:ss)
                                                              Item Help
                               Wed, Jun 7 2006
                               13:19:35
                                                         Menu Level
                               WDC WD1200JB-75CRA0
    IDE Channel 1 Master
    IDE Channel 1 Slave
                                None
                                                         Change the day, month,
    IDE Channel 2 Master
                               SONY
                                       CD-CW CRX17
                                                         year and century
                               TOSHIBA CD/DUDW SDR5
        Channel 2 Slave
        Channel 3 Master
                                None
       Channel 4 Master
                                None
    IDE Channel 5 Master
                               WDC WD2000JS-00MHB0
    IDE Channel 6 Master
                                None
    Drive A
                               1.44. 3.5 in.
    Drive B
                               None
    Floppy 3 Mode Support
                               Disabled
    Halt On
                               All , But Keyboard
    Base Memory
                                   640K
    Extended Memory
                               1047552K
           Enter:Select
                             +/-/PU/PD:Value F10:Save
                                                          ESC:Exit
                                                                    F1:General He
A▼►≺:Move
    F5: Previous Values
                              F6:Fail-Safe Defaults
                                                         F7:Ontimized Defaults
```

SOFTMENU SETUP

Normally set to Default or Auto for all

```
Phoenix - Award BIOS CMOS Setup Utility
                              SoftMenu Setup
  AMD Athlon(tm) 64 Processor 3200+
                                                           Item Help
 Frequency : 2000MHz
                                                      Menu Level
                               Default
   CPU Operating Speed
  x - CPU FSB Clock(MHz)
                               200
                                                      Select User Define.AMD
  x - Multiplier Factor
                               10x
                                                      K8 Cool 'n' Quite
 x - PCIe Clock
                                                      Function will Disable
                               100Mhz
   Voltages Control
                               Default
  x - CPU Core Voltage
                               1.400 U
   - DDR RAM Voltage
                               2.60 U
   - DDR Ref Voltage
                               - 60 mU
                               1.50 U
  x - nForce4 Voltage
  x - HyperTransport Voltage
                               Default
A▼▶ 4: Move Enter: Select
                           +/-/PU/PD:Value F10:Save
                                                       ESC:Exit F1:General Help
   F5: Previous Values
                            F6:Fail-Safe Defaults
                                                       F7:Optimized Defaults
```

ADVANCED FEATURES

■ POST, boot order

AV≻ d: Move Enter: Select

F5:Previous Ualues

Phoenix - Award BIOS CMOS Setup Utility Advanced BIOS Features Quick Power On Self Test Enabled Item Help ► Hard Disk Boot Priority Press Enter Menu Level First Boot Device Floppy Hard Disk Second Boot Device Select User Define.AMD Third Boot Device CDROM Boot Other Device K8 Cool 'n' Quite Enabled Function will Disable Boot Up Floppy Seek Disabled Boot up NumLock Status 0n Security Option Setup MPS Version Control For OS 1.4 Delay For HDD (Secs) Full Screen LOGO Show Disabled

+/-/PU/PD:Value F10:Save

F6:Fail-Safe Defaults

ESC:Exit F1:General Help

F7:Optimized Defaults

POWER MANAGEMENT

Use to enable/disable power-saving features

```
Phoenix - Award BIOS CMOS Setup Utility
                        Power Management Setup
  ACPI Suspend Type
                               $3 (Suspend-ToRAM)
                                                            Item Help
  -USB Resume from S3
                               Enabled
  Power Button Function
                               Delay 4 Sec
                                                      Menu Level
                               Disabled
  Wakeup by PME# of PCI
  Wakeup by Ring
                               Disabled
  Wakeup by OnChip LAN
                               Enabled
  Wakeup by Alarm
                               Disabled
x - Day of Month Alarm
x - Time (hh:mm:ss) Alarm
                               0:0:0
  AMD K8 Cool'n'Quite controlAuto
  Power On Function
                               Button Only
x - KB Power On Password
                               Enter
                              Ctr1-F1
x - Hot Key Power On
  Restore on AC Power Loss
                              Power Off
```

PNP/PCI

Rarely need to manipulate on today's PCs

```
Phoenix - Award BIOS CMOS Setup Utility
PnP/PCI Conigurations
```

Resources Controlled By	Auto(ESCD)	Item Help
PCI/UGA Palette Snoop PIRQ_Ø Use IRQ No. PIRQ_1 Use IRQ No. PIRQ_2 Use IRQ No. PIRQ_3 Use IRQ No. PIRQ_3 Use IRQ No. *** PCI Express relative Maximum Payload Size	Press Enter Disabled Auto Auto Auto Auto Auto 4096	Menu Level BIOS can automatically configure all the boot and Plug and Play compatible devices. If you choose Auto, you cannot select IRQ DMA and memory base address fields, since BIOS automatically assigns them

POWER-ON SELF TEST (POST)

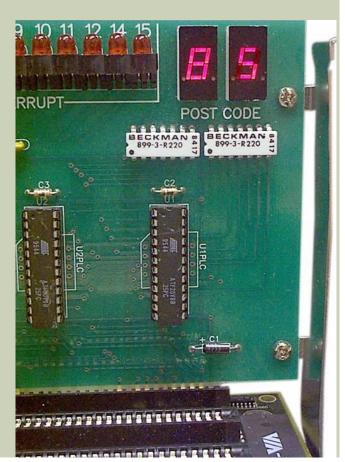
- The power-on self test (POST) is a special program stored on the ROM chip
 - Initiated when the computer is turned on or is reset
 - Checks out the system every time the computer boots
- Communicates errors
 - Beep codes
 - Text errors

BEEP CODES

- If video is determined to be missing or faulty
 - One long beep followed by three short beeps
- If everything checks out
 - One or two short beeps
- If RAM is missing or faulty
 - Buzzing noise that repeats until power turned off
- More complicated beep codes may be found in legacy computers
 - Check motherboard manual for meaning

POST CARDS

- POST cards are devices that monitor POSTs and report on the hardware that may be causing problems
 - Turn the PC off, plug in the card, and reboot
 - POST error codes do not fix the computer
 they just tell you where to look
 - If all else fails, replace the motherboard



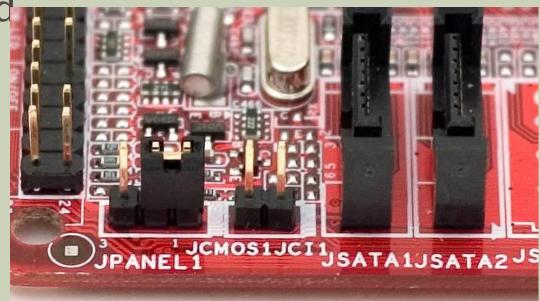
UPDATING/FLASHING THE BIOS

- Flashing your BIOS to the latest release is crucial because it enhances your system's capabilities
 - It helps it to detect newer devices and components
 - Bigger hard drivers
 - Newer processors
 - Support for updated USB/Firewire
 - PCE-E / PCI-X ports
- Improves stability (very often in the latest BIOS flashes manufacturers apply a series of bug fixes)
- There is always a "change-log" included with every newer BIOS release that should help you decide whether or not it's worth it to flash that specific version
- Dangers of 'flashing'
- How to protect against failed flashes...?!?!?

CLEARING THE CMOS

- To clear the CMOS settings, place the shunt on the CMOS jumper
 - Resets to factory settings

Resets password



BRIDGE INTRODUCTION

- Data flows through the computer
 - Between CPU and RAM
 - Between CPU and video
 - Between CPU and other devices
- Bridges are used to connect the pieces
 - Northbridge
 - Bridge closest to the CPU
 - Southbridge
 - The farther bridge



NORTHBRIDGE & SOUTHBRIDGE

 A chipset is a set of Northbridge and Southbridge chips that work together

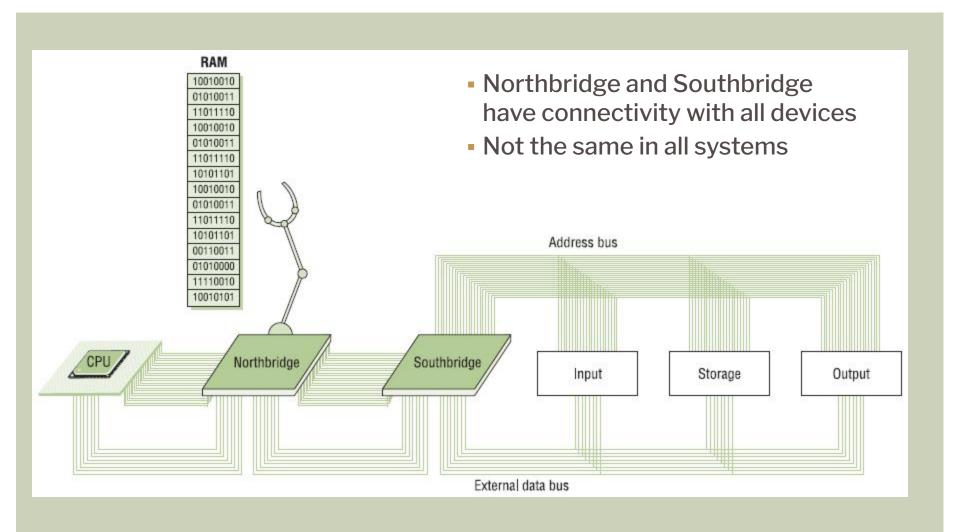
Northbridge

 Chip or chips that connect the CPU to video and/or memory

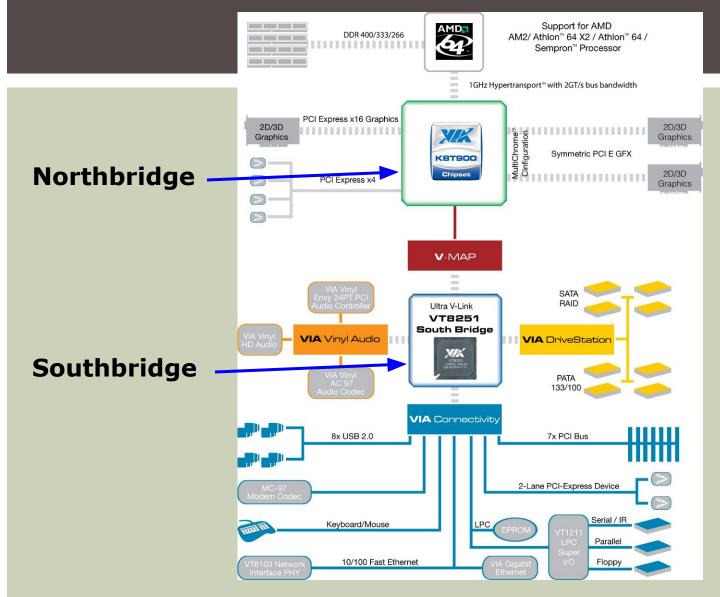
Southbridge

 Handles all of the inputs and outputs to the many devices in the PC

DATA FLOW

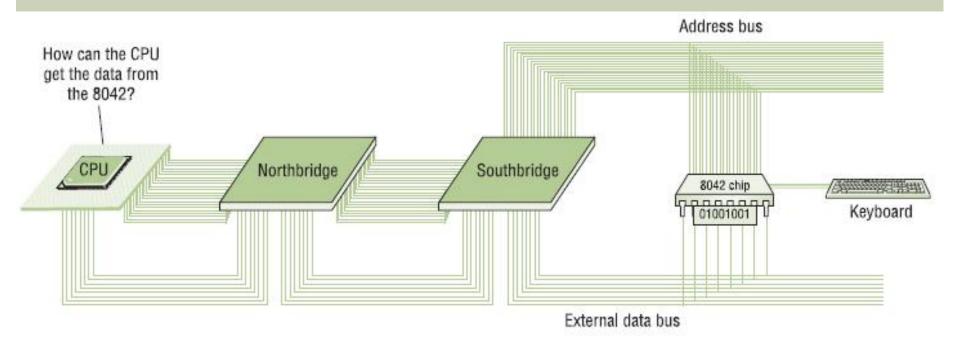


EXAMPLE AMD CHIPSET



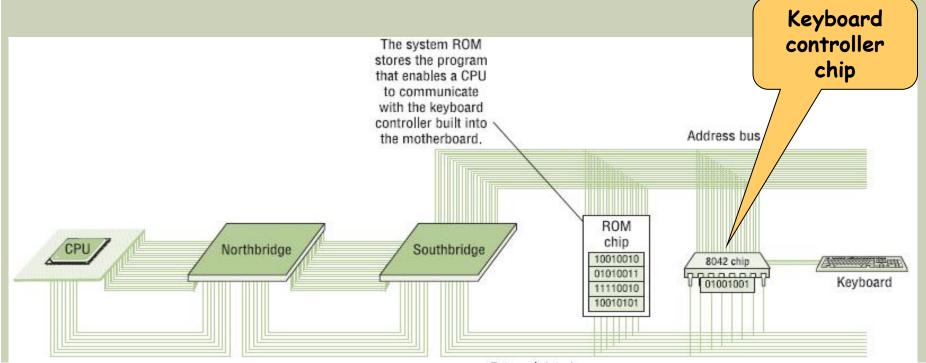
TALKING TO THE KEYBOARD

- The keyboard talks to the external data bus
 - Uses the keyboard controller chip (8042)
 - The Southbridge chip handles the keyboard interface, acting as the keyboard controller chip among its many other functions. Manufacturers today choose a specific chipset, rather than an individual keyboard controller



BIOS

- Each program is called a service
- Programs that typically reside in RAM or on other erasable media are called "software," while programs that reside in ROM are called "firmware."



External data bus

BIOS VS. CMOS

BIOS

- Programs
- Non-volationafter pow
- Can be ch "flashing"
- Typically (though F bigger)
- Often a se

Motherboard Schematic & Chipset research Activity t alive with

CMOS setup

B K of data

size is typically

uthbridge

Updated via BIOS program

Three primary BIOS brands

- American Megatrends (AMI), Award,
 Phoenix
- To enter setup, press key combination (may be Del, ESC, F1, F2, CTRL-ALT-ESC, CTRL-ALT-INS, CTRL-ALT-INS, CTRL-ALT-Enter, or CTRL-S)

 To enter setup, press key combination (may be Del, ESC, F1, F2, CTRL-ALT-ESC, GN A ain Processor in the Copyright (C) (CTRL-ALT-Enter, GPUØ Memory Info CTRL-S)

```
Updating CMOS
```

```
Award Modular BIOS v6.00PG, An Energy Star Ally Copyright (C) 1984-2003 Phonix Technologies, LTD

Main Processor: AMD Athlon(tm) 64 Processor 3200+
Memory Testing: 1048576K OK
CPU0 Memory Information: DDR 400 CL:3 ,1T Dual Channel, 128-bit

IDE Channel 1 Master: WDC WD1200JB-75CRA0 16.06U16

IDE Channel 1 Slave: None
IDE Channel 2 Master: SONY CD-RW CRX175E2 S002
IDE Channel 2 Slave: TOSHIBA CD=DUDW SDR5372U TU11

IDE Channel 3 Master: None
IDE Channel 4 Master: None
Detecting IDE drives ...
```

CMOS (COMPLEMENTARY METAL OXIDE SEMICONDUCTOR)

- The CMOS is powered by a CMOS battery and contains your system settings and is modified and changed by entering the CMOS Setup
- CMOS is an on-board semiconductor chip powered by a CMOS battery inside computers that stores information such as the system time and date and the system hardware settings for your computer
- The standard lifetime of a CMOS battery is around 10 Years
- Volatile (kept alive by battery)
- Stores only changeable data, Not programs
- Often on Southbridge

LOSING CMOS SETTINGS

- Common errors
 - CMOS configuration mismatch
 - CMOS date/time not set
 - No boot device available
 - CMOS battery state low
- Common reasons for losing CMOS data
 - Jiggling the battery while doing other work
 - Dirt on the motherboard
 - Electrical surges
 - Faulty power supplies
 - Chip creep

POWER SUPPLY UNIT (PSU)

A PSU converts the 115-volt alternating current (AC) supplied by an electrical outlet into direct current that the PC can use

The PSU converts the AC into a 12-volt, 5-volt, or 2.2 welt direct ourren

or 3.3-volt direct curren

 12-volt DC is used to pow such as hard drives and C

 The 5-volt and 3.3-volt or various electronics on the

Although unlikely over 25% of all PSU's

http://www.helpwithpcs.com/courses

Power Supply Calculator:

AT & ATX PSU'S

- Every PSU in use today is either an AT or an ATX
- The main difference is the number of connectors attached to the wires
- But regardless of which type there are some basic components that apply to all PSU's
- The first is the power connection, which is where the power supply connects to the electrical outlet
- Next is the motherboard power, which is delivered via a set of cables running from the power supply
- Power supplies also have a fan (which you can troubleshoot easily by just looking at it to see if it's working)

PSU CONNECTORS



4 Pin Berg Connector

Used to connect the PSU to small form factor devices, such as 3.5" floppy drives. available in: AT, ATX & ATX-2



4 Pin Molex Connector

This is used to power various components, including hard drives and optical drives.

available in: AT, ATX & ATX-2



20 Pin Molex ATX Power Connector

This is used to power the motherboard in ATX systems. available in: ATX(ATX-2 have four extra pins)



4 Pin Molex P4 12V Power Connector

Used specifically for Pentium 4 Processor Motherboards. *available in:* **ATX** (integrated into the power connector in ATX-2)



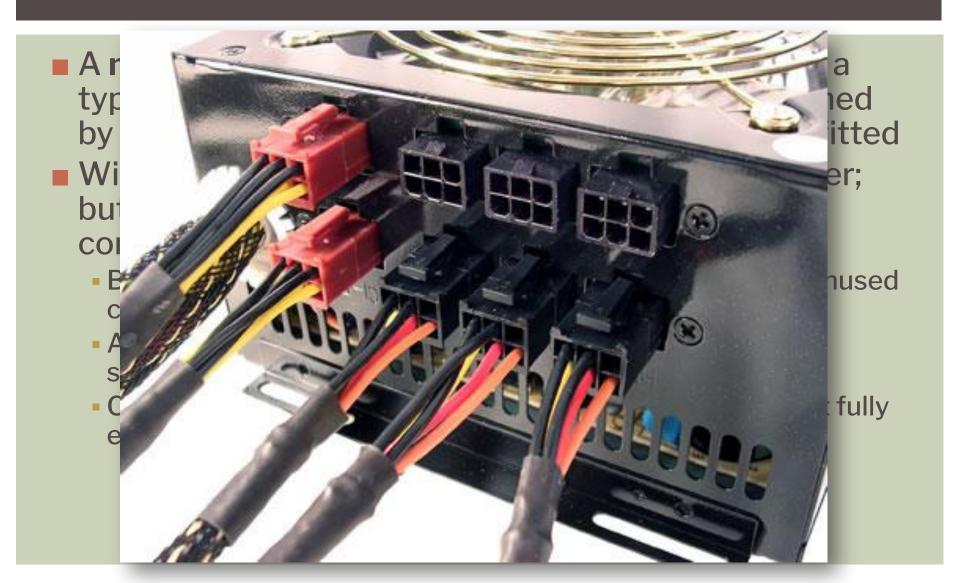
6 Pin AUX Connector

Provides +5V DC, and two connections of +3.3V. available in: **ATX/ATX-2**



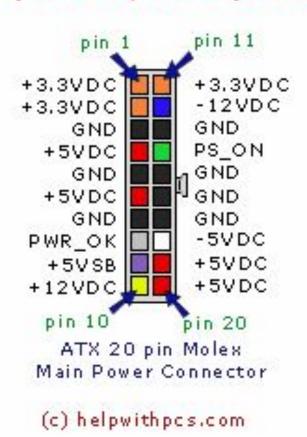
A 15-pin SATA power connector, the shape prevents accidental mis-identification and forced insertion of the wrong connector type,

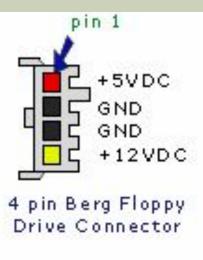
MODULAR PSU

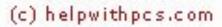


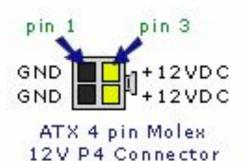
ATX POWER SUPPLY PIN OUTS

diagrams with pins facing forward

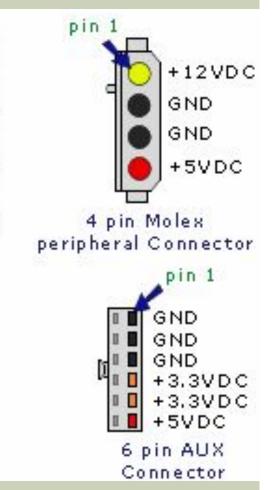








(c) helpwithpos.com



WHAT IS A MULTI-METER?

- A multimeter measures electrical properties such as AC or DC voltage, current, and resistance
- Electricians and the general public might use a multimeter on batteries, components, switches, power sources, and motors to diagnose electrical malfunctions and narrow down their cause
- The two main kinds of a multimeter are analogue and digital

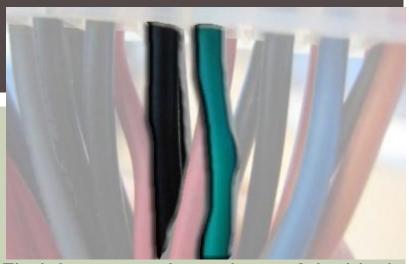
MULTIMETERS CONT.

- A digital multimeter has an LCD screen that gives a straight forward decimal read out, while an analogue display moves a bar through a scale of numbers and must be interpreted.
- Any multimeter will work over a specific range for each measurement. Select one that's compatible with what you meter most, from low-voltage power sources to high-voltage car batteries.
- Multimeters are specified with a sensitivity range, so make sure you get the appropriate one.

THE PSU POWER ON TRICK



First of all, find a paperclip and bend it to something like in the picture



Find the green wire and one of the black wires



Next, put your paperclip into the pin with the green wire and the other end into one of the two black ground wires beside the green wire. With your teachers permission power on the

PSU unit

PSU PIN-OUT TESTING

- In groups (chosen by your teacher)
- Collect the equipment required to complete this weeks activity
 - Power Supply Unit
 - Paperclip
 - Multimeter
 - Power cable(if not a)
- Under the careful w trick
- Measure the pin-ou correct output stan

PSUWorksheet
Task;