Module 9

Laptops and Printers

Objectives

1. 3.0 Laptops
2. 4.0 Printers

LAPTOPS

The Components of a Laptop

Common laptop features:

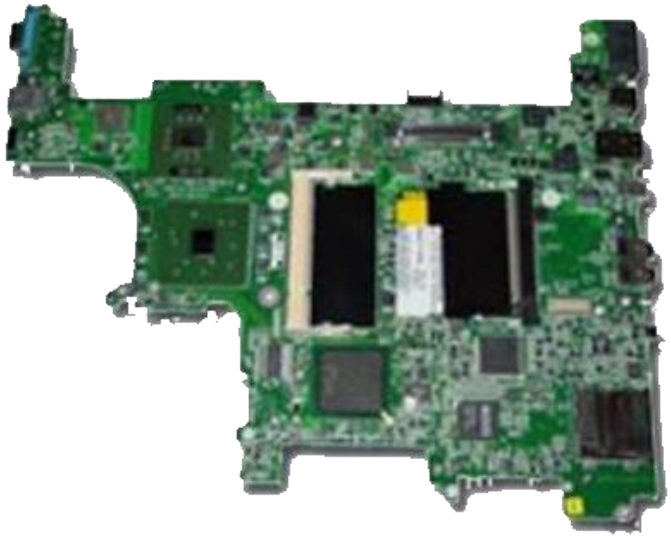
1. Small and portable
2. Integrated LCD display screen in lid
3. Integrated keyboard and mouse
4. AC power source or rechargeable battery
5. Hot-swappable drives and peripherals
6. Optical Drives
7. Docking station or port replicator

Compare Laptop Components and Desktop Components

1. Desktop
    A. Components standardized
    B. Meet universal form factors
2. Laptop
    A. Proprietary
    B. Non-interchangeable components
3. Both
    A. Interchangeable peripherals

Compare Motherboards

Laptop motherboards are proprietary and often model specific



Laptop Motherboard

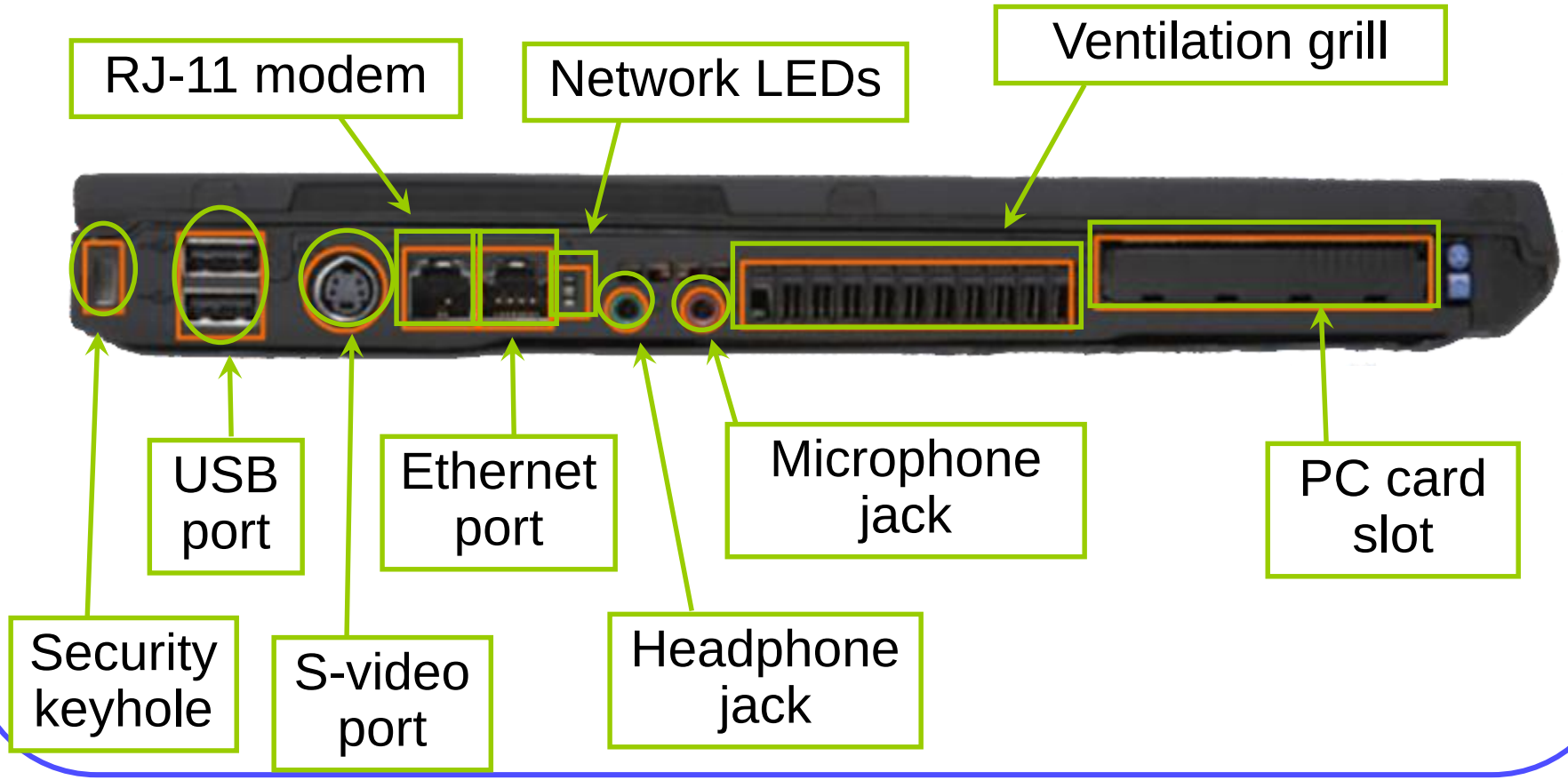
Desktop Motherboard

Compare Expansion Capabilities

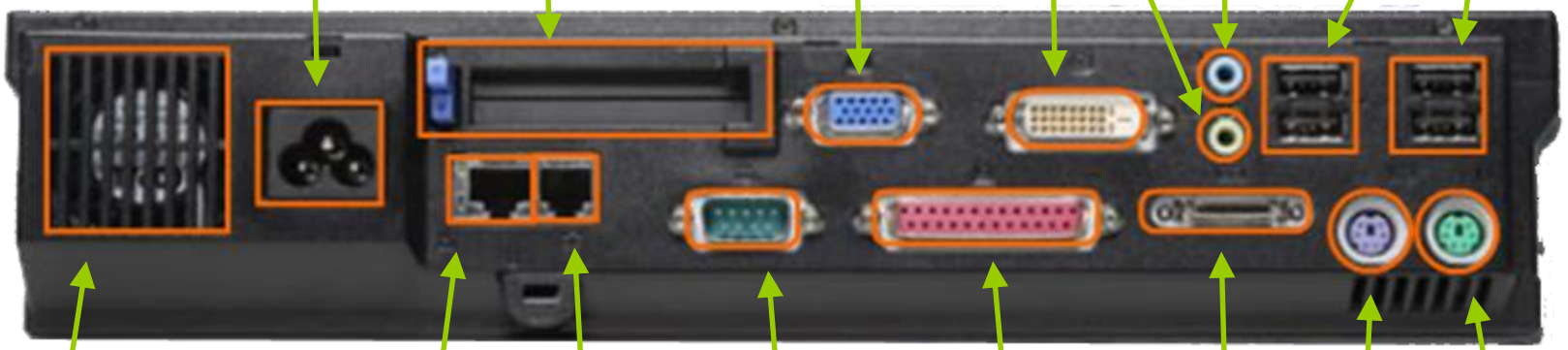
	Laptops			Desktops		
Components	PC Card	Integrated	External Ports	Integrated	Adaptor Card	External Ports
External Monitor			X			X
Printer			X			X
Keyboard		X	X			X
Mouse		X	X			X
External Drives			X			X
Network Card	X	X	X	X	X	X
Wireless	X	X	X	X	X	X
CD/DVD Drives			X	X		X
Drive Controllers	X	X		X	X	

Laptops are a better options when size and mobility are important

Side View of a Typical Laptop



Components on a Docking Station

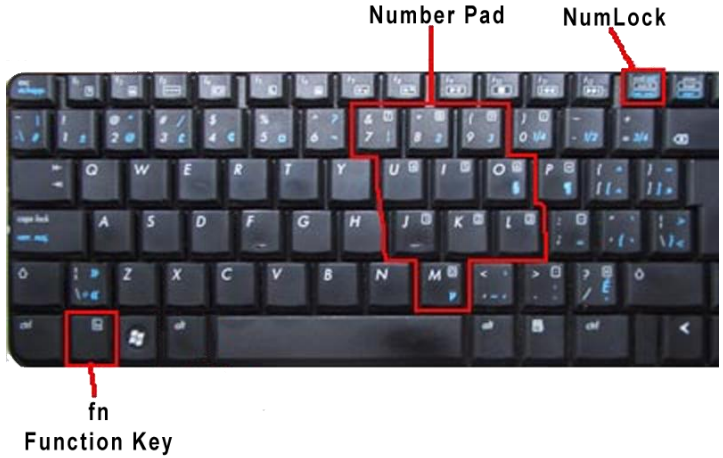


Docking Station vs Port Replicator

1. Port Replicator
    A. Duplicates the ports present on a laptop
2. Docking Station
    A. May add other functionality
        - PCI slots
        - Speakers
        - Multiple monitors

Special Function Keys

1. Used to toggle features off and on.
2. Press the function (*fn*) key + appropriate key to activate
3. Common Keys:
   A. Display (Dual Monitors)
   B. Wireless On/Off
   C. Volume Settings
   D. Screen Brightness
   E. Bluetooth On/Off
   F. Keyboard Backlight
   G. Numeric Pad



Dual Monitor

External Switch for Wireless

Using a Projector with a Laptop

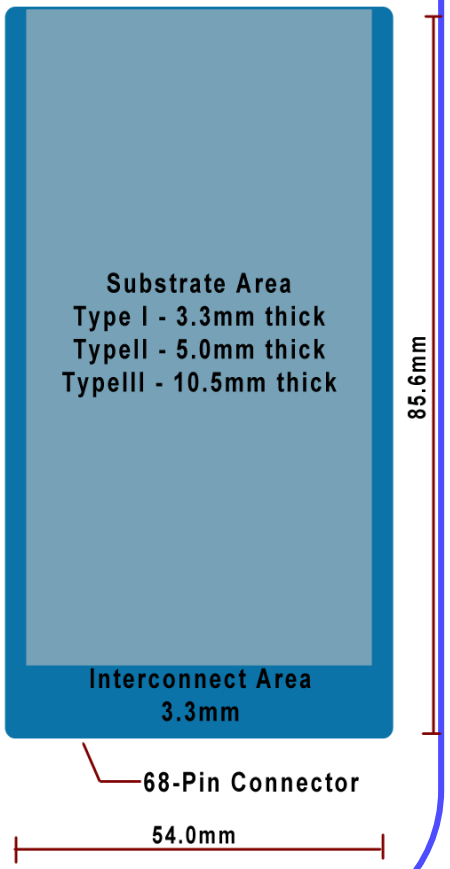
1. Display in large format
2. Look for:
    A. Lumens (brightness)
    B. Native resolution
    C. Inputs
3. Toggle settings:
    A. Computer monitor only
    B. Computer and projector
    C. Projector only

Display Power

1. Older Laptop Displays
   A. Backlight powered by a cold cathode fluorescent lamp (CCFL)
2. Newer Laptop Displays
   A. Inverter provides power backlight
      - Commonly the culprit when the monitor goes out

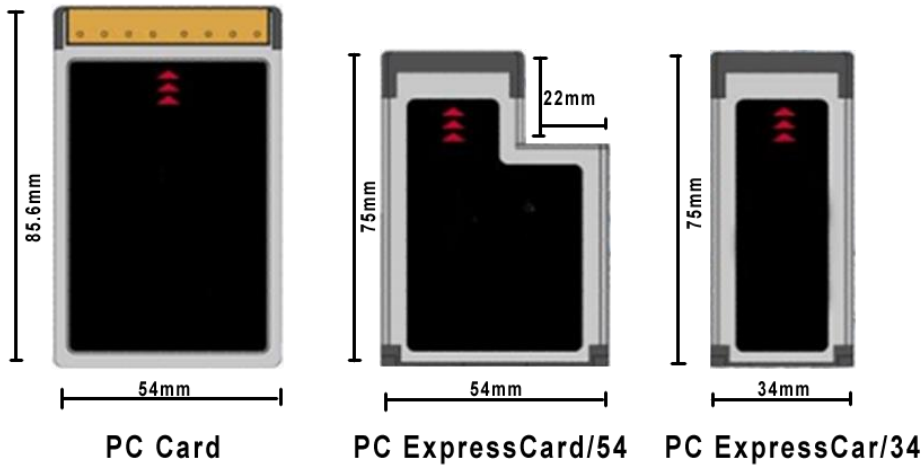
Personal Computer Memory Card International Association (PCMCIA)

1. Also known as PC Card or CardBus
2. Used to add functionality
3. Three types:
   - **A. Type I**
     - 6-bit interface
     - 3.3 mm thick
     - Dual row of 34 holes (68 in total)
     - Used for memory devices
   - **B. Type II**
     - 16- or 32-bit interface
     - 5.0 mm thick
     - dual row of 34 holes (68 in total)
     - Introduced I/O support
     - Has miniature interface connectors
     - Connect to a dongle
   - **C. Type III**
     - 16- or 32-bit interface
     - 10.5 mm thick
     - Full-size connectors
     - Do not require dongles



PC ExpressCards

1. Newer laptops use PC Express Cards or Card Bus
2. 34-pin or 54-pin configurations
3. Use different dimensions



Compare Expansion Capabilities

PC Bus	Size	Thickness	Interface	Examples
Type I	85.6mm x 54mm	3.3mm	Memory, IO, CardBus	SRAM Flash
Type II	85.6mm x 54mm	5mm	Memory, IO, CardBus	Modem, LAN, Wireless
Type III	85.6mm x 54mm	10.5mm	Memory, IO, CardBus	Hard Drive
Express Card/34	75mm x 34mm	5mm	PCIe or USB 2.0+	Firewire, TV Tuner, Wireless
Express Card/54	75mm x 54mm	5mm	PCIe or USB 2.0+	Smart Card Reader, Compact Flash Reader, Disk Drive

PCMCIA slots add functionality to laptops

Replacing Laptop Components

Replaceable parts:

1. Keyboard
2. Hard Drive (2.5”)
3. Memory (S0-DIMM) (May be located on the bottom of the laptop or under the keyboard)
4. Optical Drive
5. Wireless Card (Antenna usually housed along the side (bezel) of the monitor)
6. Power Supply
7. Battery

CAUTION: Always disconnect power and remove the battery before installing or removing laptop components that are not hot-swappable.

Proper Cleaning Procedures

Follow proper cleaning procedures:

- Keyboard
- Ventilation
- LCD display
- Touch pad
- Floppy drive
- Optical disk drive
- CD or DVD disc

CAUTION:

1. Use products specifically designed for cleaning LCD displays
2. Use a soft, lint-free cloth
3. Apply the cleaning solution to the lint-free cloth
4. Use a cleaning disk for optical drives
5. Wipe CD disc from the center outward

Batteries

1. **Lithium-ion battery** (sometimes **Li-ion battery** or **LIB**)
   A. Lighter weight
   B. Greater storage capacity
   C. No memory effect
   D. Slow loss of charge when not in use
   E. Intrinsic safety
   F. Most used

2. N**ickel-cadmium battery** (commonly abbreviated **NiCd** or **NiCad**)
   A. Medium weight
   B. Memory effect great
   C. Leakage problems
   D. Short life
   E. Cost more

PRINTERS

Printer Definition

A printer produces a paper copy of information generated by a computer.

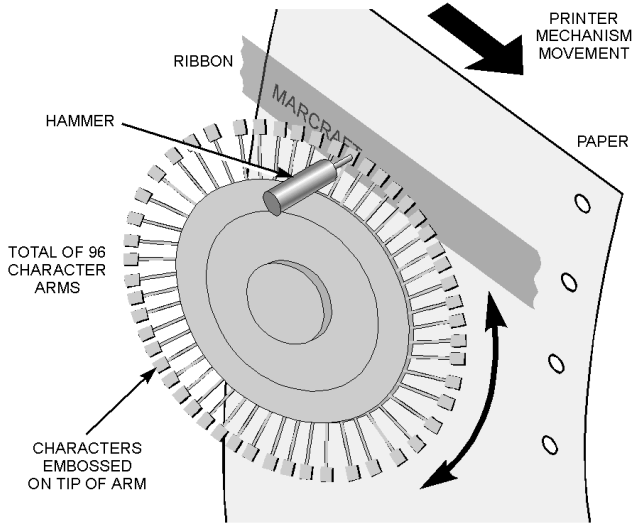
Printer Types

Two categories:

1. **Impact**
   A. Strikes an inked ribbon
   B. Interchangeable Print Heads
   C. Dot Matrix Printers
2. **Non-impact**
   A. Use different methods to place ink
   B. Ink Jet Printers
   C. Laser Printers
   D. Snapshot Printers
   E. Plotters/Wide Format Printers
   F. Thermal Printers

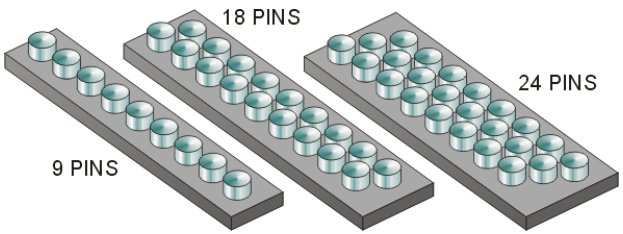
Impact Printers

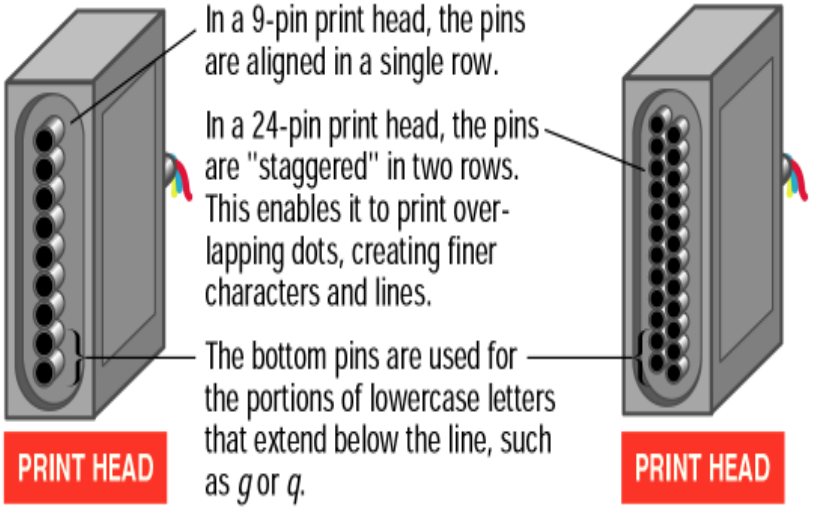
1. Impacts a printer tape or inked ribbon to cause characters to be formed on paper
2. Requirement for carbon paper or NCR paper
3. Interchangeable print heads (ball or wheel)
4. Can print multi-copy documents
5. Print head moves across width of paper
6. Uses a typewriter type key
7. Uses a ribbon
8. Can not printer graphics
9. Requires manual alignment
10. Dot matrix

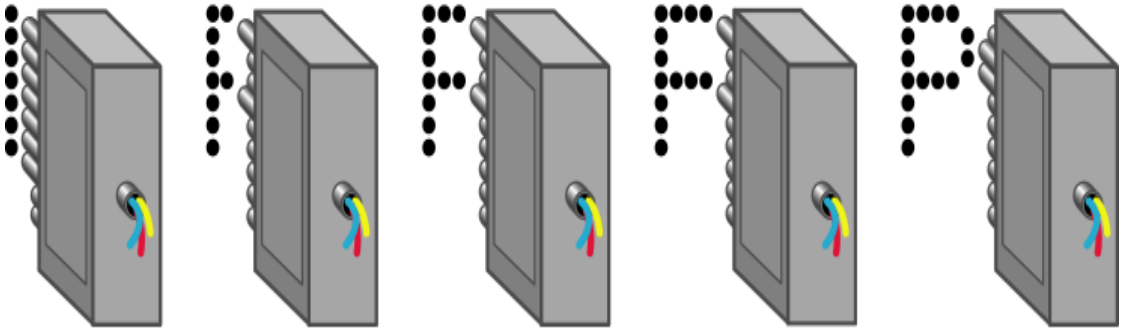


Impact Printers (Dot-matrix)

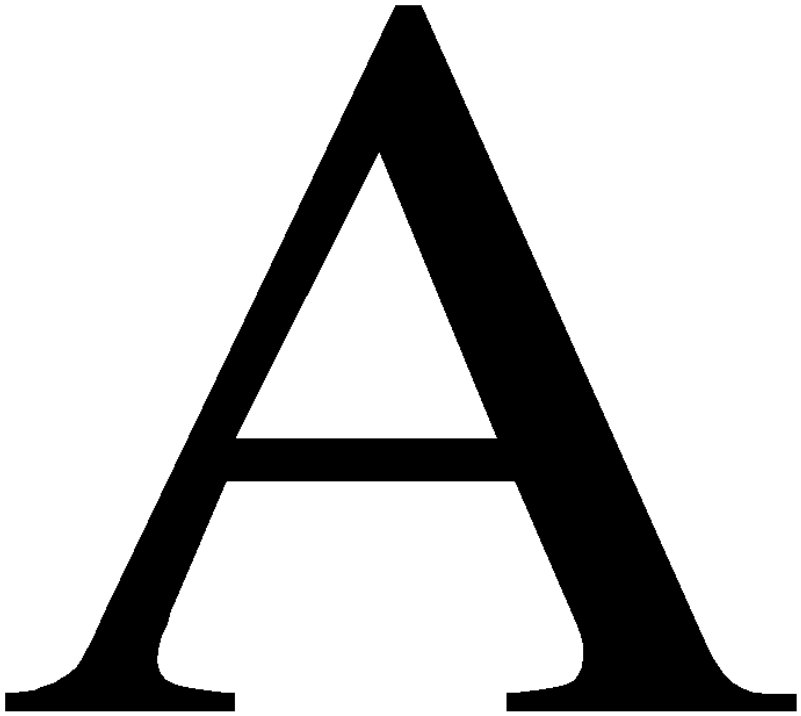
1. Print head contain small blunt pins
2. Stamps image on page



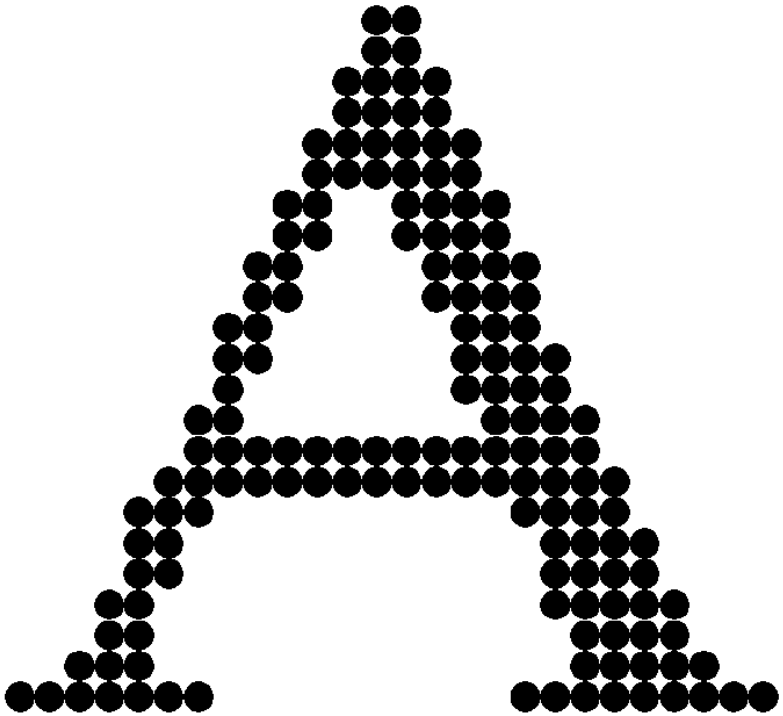




Impact vs Dot-Matrix Characters



FULLY-FORMED



DOT-MATRIX

Paper

Two common methods of moving paper through the printer:

1. **Friction-feed**
2. **Pin-feed or Tractor-feed**

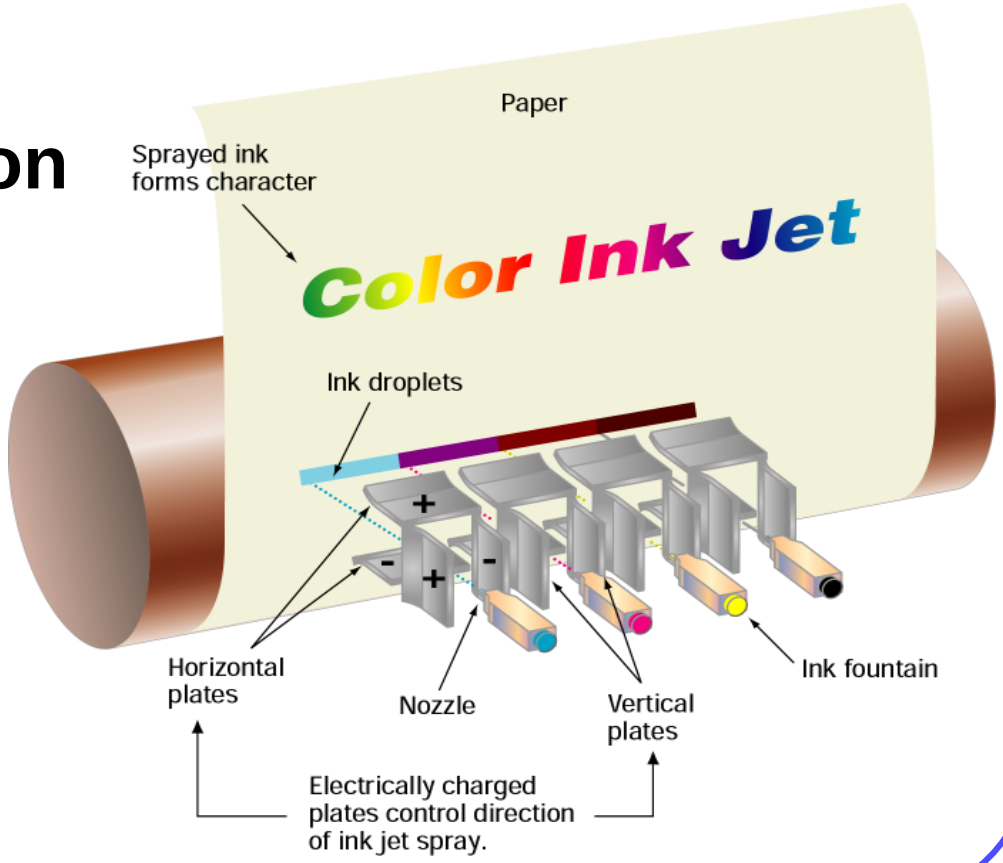
Non-Impact Printers

1. Use liquid ink-filled cartridges
2. Spray ink particles on the page
3. Print one line at a time
4. Faster than dot matrix printer
5. Small form factor
6. Print color inexpensively
7. Tend to smudge on inexpensive paper
8. Slower than lasers
9. Quality of paper

Inkjet Printers

Two methods of forming Ink drops:

1. **Thermal shock**
2. **Mechanical vibration**



Snapshot Printer

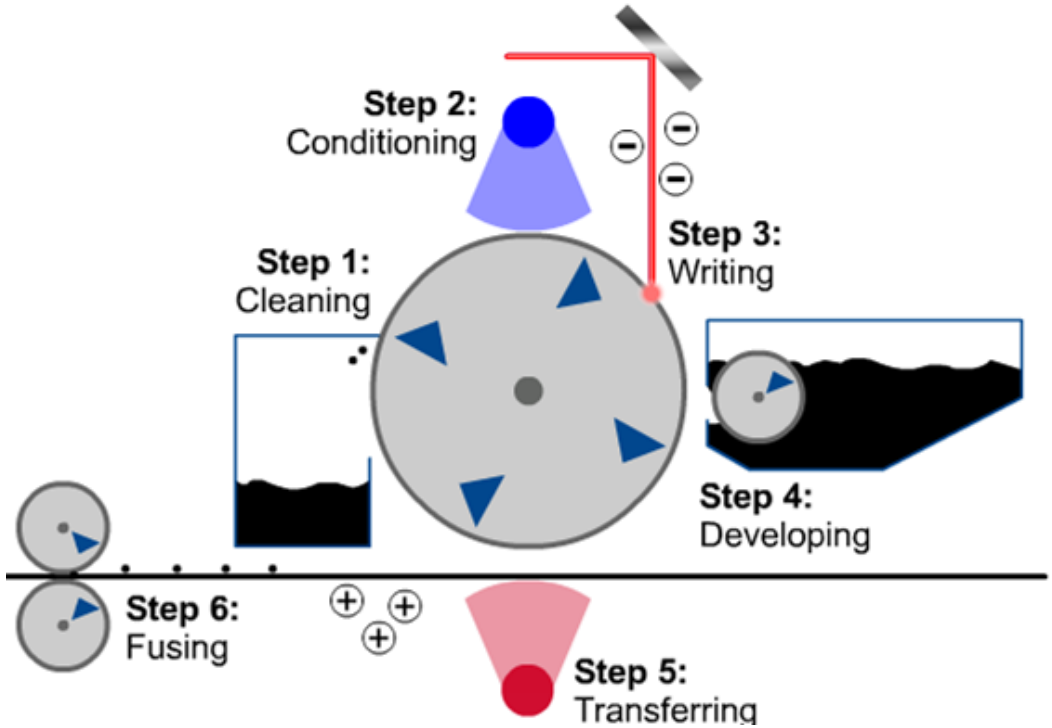
1. Small-format printers
2. Print digital photographs
3. Slower
4. Expensive to operate

Laser Printer

1. Printer of choice
2. High resolution
3. Superior operation
4. Speed
5. Uses static electricity
6. Uses small dry ink particles called toner
7. Uses electro-photographic drum
8. Uses laser beam to draw image
9. Perfect for high volume situations

Laser Printer Operation

1. Cleaning*
2. Conditioning*
3. Writing*
4. Developing*
5. Transferring
6. Fusing

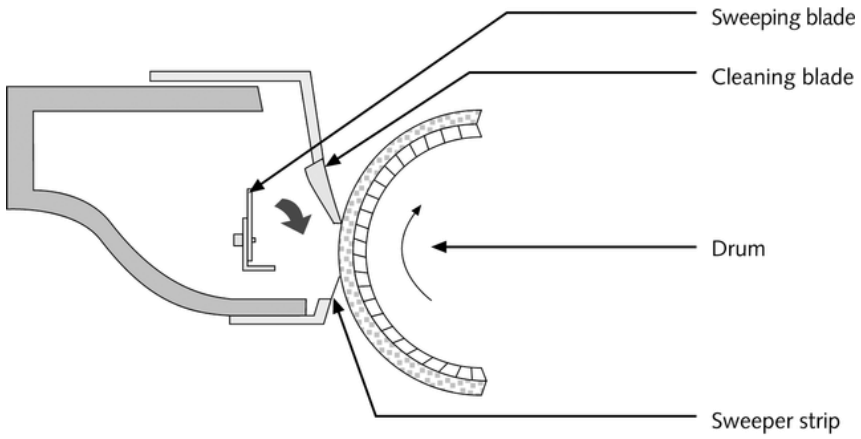


***Takes place inside the Toner Cartridge on most printers**

Laser Printer Operation

Cleaning

1. After image has been deposited on the paper and the drum has separated from the paper
2. Removes toner from the drum
3. Uses a blade
4. Excess toner falls away
5. Excess toner stored in a used toner container



Laser Printer Operation

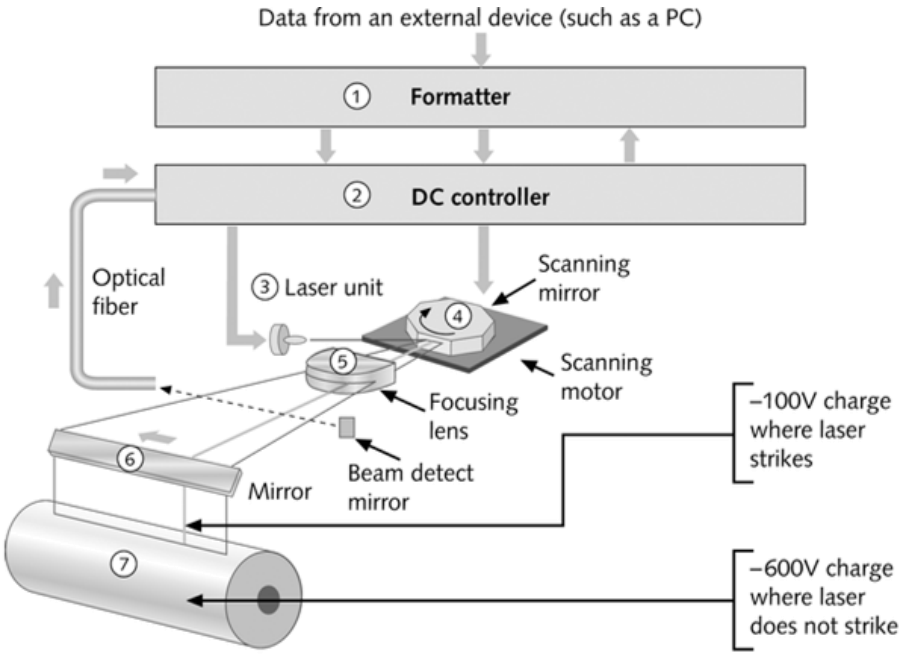
Conditioning

1. Removes latent image from the drum
2. Conditions drum for new image
3. Uses special wire charged to about -6000 volts DC
4. Referred to as the primary corona wire
5. Remaining charge -600 to -1000 Volts DC

Laser Printer Operation

Writing

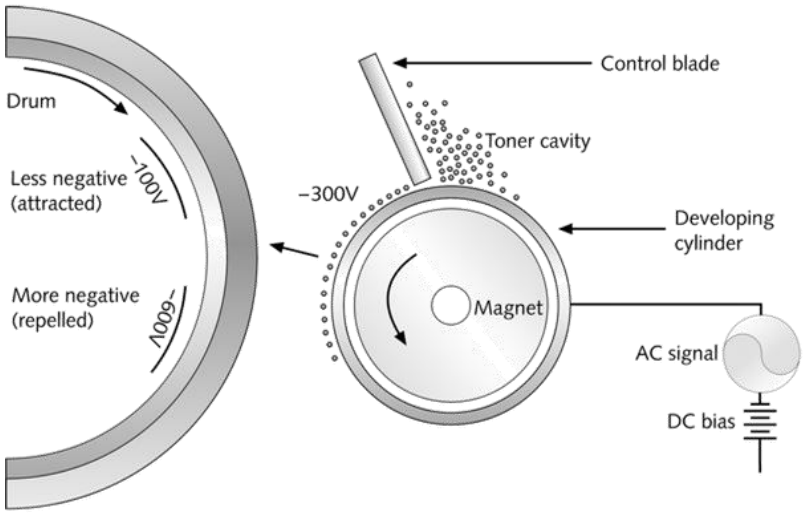
1. Scans photosensitive drum with laser beam
2. Exposed portion reduced to about -100 Volts DC
3. Lower negative charge than rest of drum
4. Creates invisible image



Laser Printer Operation

Developing

1. Toner applied to drum
2. Plastic covered Magnetic particles
3. Toner charged to around **-200** volts DC
4. Attracted to the more positive (-100 volts DC) areas of the photosensitive drum
5. Repelled by the more negative (-600 volts DC) areas of drum



Laser Printer Operation

Transferring

1. Toner transferred to paper
2. Transfer, or secondary corona places a positive charge on the paper
3. Attracts the negative toner image from the drum to the paper
4. Image held on paper by the positive charge

Laser Printer Operation

Fusing

1. Paper rolled between a heated roller and a pressure roller
2. Fuser roller heated to about 350 degrees
3. Melts the plastic particles
4. Paper moved to output tray

Plotter or Wide Format Printers

1. Creates large format image for architectural or engineering uses
2. Usually Inkjet

Thermal Printer

1. Uses special paper and a heating element
2. Burns image onto paper

Printer Types

	Dot Matrix	Inkjet	Laser
Quality Measurement	* Dots per inch	Dots per inch	Dots per inch
Speed Measurement	Characters Per second	Pages per Minute	Pages per Minute

* The number of pins, as in 9-pin, 24-pin, or 48-pin printers, indicates the quality of the print

Choosing a Printer

1. Resolution
2. Speed
3. Consumables
4. Print Media
5. Color
6. Warranty

Printer Connections

Parallel

1. Faster data transfer rates
2. Parallel printer cables have two unique ends:
    A. IEEE1284 DB25 connects to the PC
    B. Centronics 36 connects to the printer
3. 15 feet (5M) maximum cable length

Printer Connections

Serial

1. Slower transfer speed
2. Cables ends:
    A. DB 9-pin on both ends
    B. DB 25-pins on both ends
    C. combination of the two
3. 50 feet (18m) maximum cable length

Printer Connections

USB

1. Most common today
2. Plug and Play
3. Two unique ends:
    A. Type A
    B. Type B
4. 16 foot maximum cable length

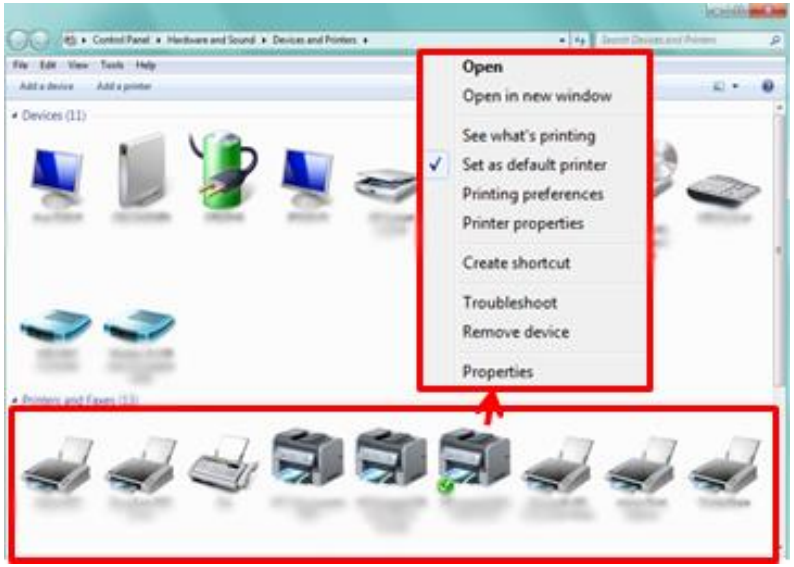
Printer Connections

Network

1. Share resources
2. RJ-45 Ethernet interface
3. 100 meter maximum cable length

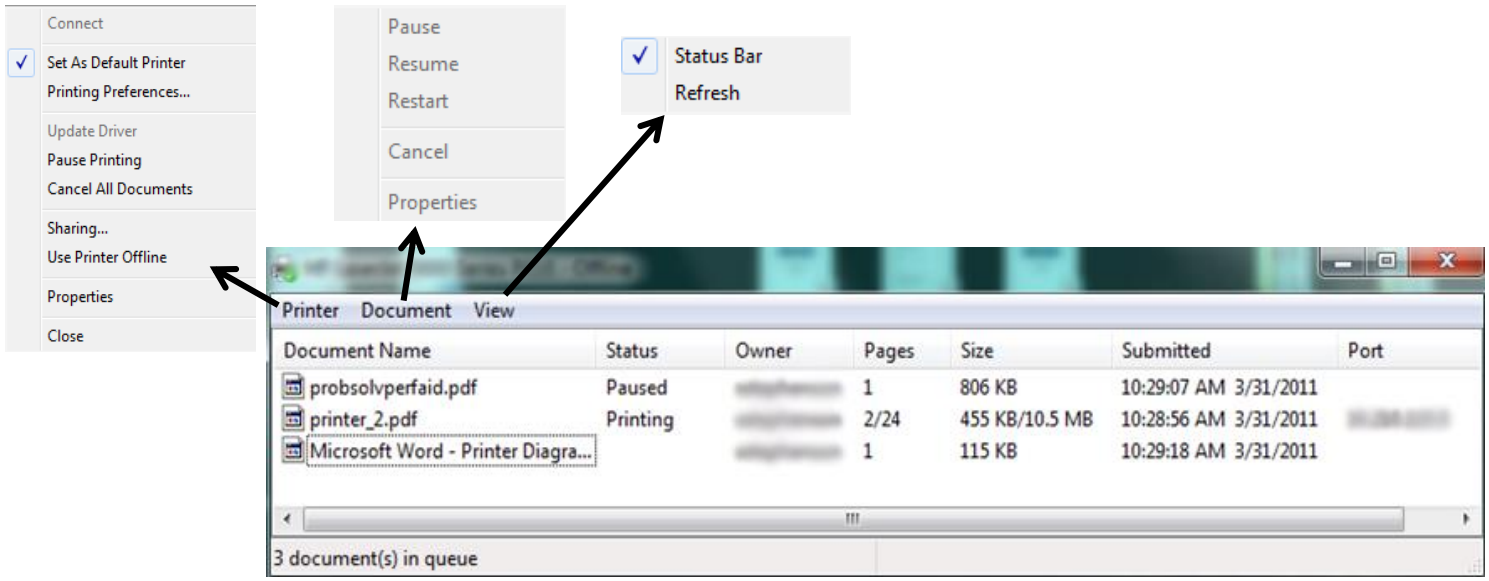
Default Printer

1. Devices and Printers
2. Check mark in a green circle
3. Right-click to set



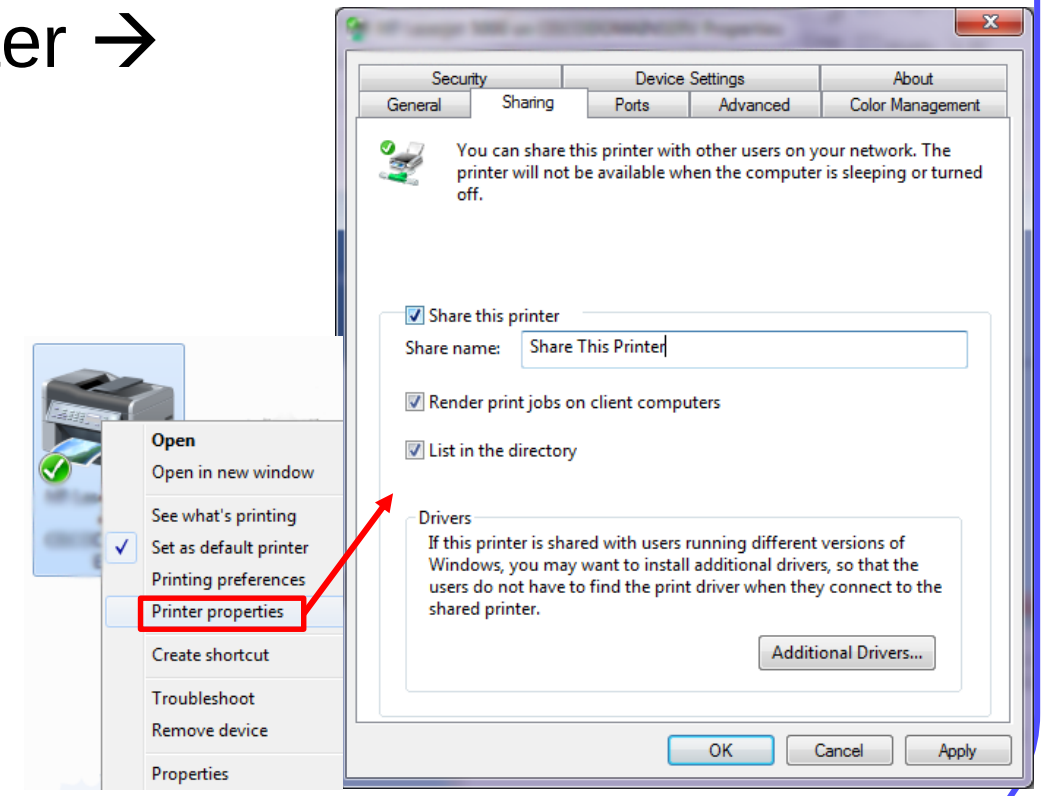
Print Queue

1. Prioritized list
2. Maintained by operating system
3. Queue is a service



Sharing a Local (Directly Connected) Printer

1. Start → Devices and Printers → Right-Click the printer → Printer Properties
2. Share the printer
3. Give it a name



Sharing Printers over a Network

Two ways:

1. Regular printer attached to PC
2. Network printer with a built-in NIC or attached **print server**

Calibration

1. Process of making the printed image match the image displayed image
2. Can be manually or automatically calibrated
3. Considerations:
   A. Printer overlaps dots, displays do not
   B. Printer images slightly darker than display
   C. Printers mix colored pigments (Cyan, Magenta, Yellow, Black)
   D. Paper can affect final printed image

Maintenance

Regular maintenance will extend the life of your printer

1. Perform printer head cleaning
2. Calibrate the printer
3. Remove dust, paper residue, spilled toner/ink
4. Clean pickup rollers
5. Reset the page count

Summary

In this module we discussed:

1. Laptop components compared to Desktops
2. Expansion capabilities
3. Common Laptop ports
4. Docking Stations and port replicators
5. Laptop field replacement units
6. Cleaning
7. Batteries
8. Printer types and capabilities
9. Laser printer operations
10. Printer connections
11. Sharing
12. Calibration and maintenance