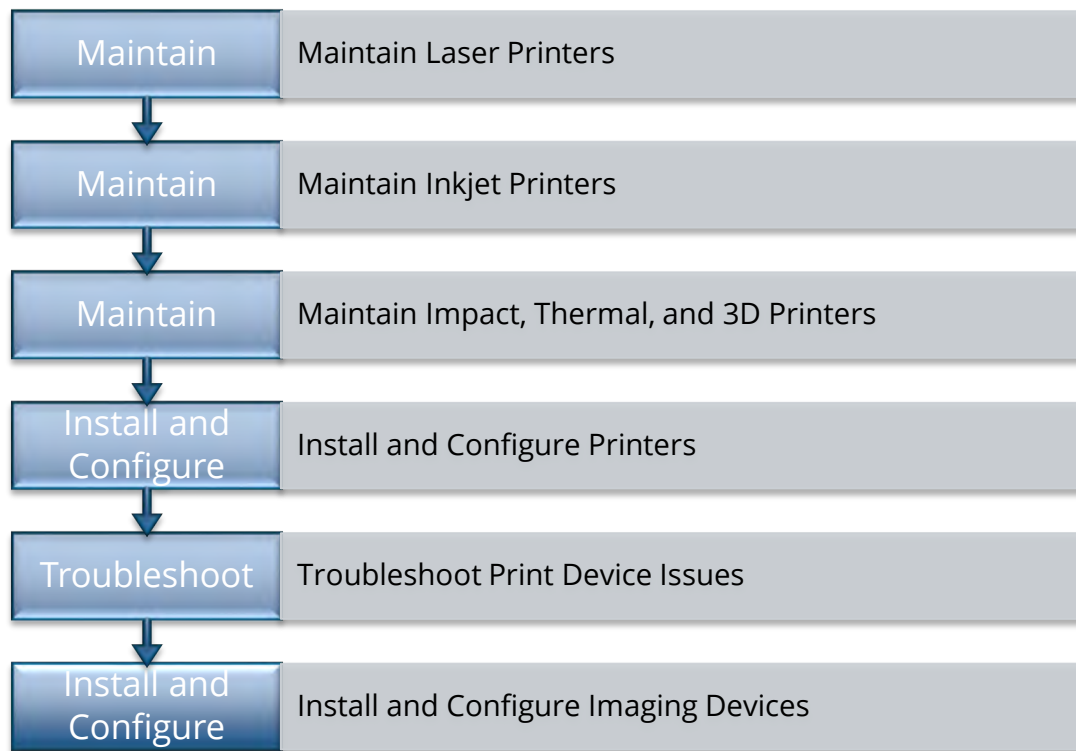


CH 10: All Things Printing



Installing, Configuring, and Troubleshooting Print Devices



Topic A: Maintain Laser Printers



Printer Setup

- Setup location
 - Cable and power considerations
 - Environment and noise considerations
 - Access and security considerations
- Unboxing
 - Proper lifting techniques
 - Packing strips
 - Acclimation

IN THE BOX



MFC-L8895CDW
Business Color Laser
All-in-One Printer

High-yield 4,500-page black toner cartridge¹
Standard yield 1,800-page color toner cartridges¹



DR431CL 30,000-page drum unit²



Quick Setup Guide
Reference Sheet
Installer for Drivers and Utilities
Product Safety Guide
Telephone Line Cord
AC Power Cord



Printer Types

- Laser Printers.
- Solid Ink Printers.
- LED Printers.
- Business Inkjet Printers.
- Home Inkjet Printers.
- Multifunction Printers.
- Dot Matrix Printers.
- 3D Printers.



Printer Features



- Print Speed. ...
- Printer Quality. ...
- Duty Cycle. ...
- Laser vs. ...
- Ink Replacement Costs. ...
- Scanner Resolution. ...
- Scanner Element Type. ...
- OCR Scanner Software.

Laser Printers

test



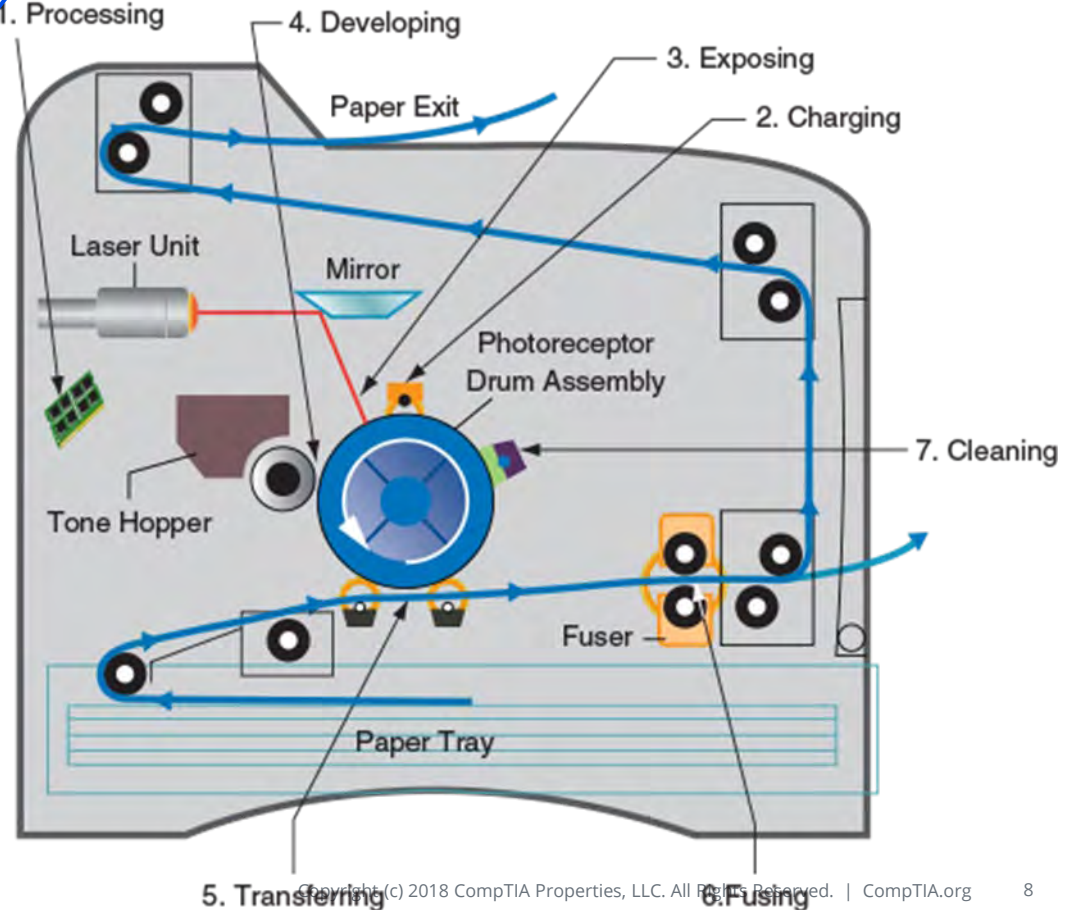
- Laser printing process results in a durable printout that does not smear or fade.
- Very popular for office environments:
 - Inexpensive to buy and run
 - Quiet
 - Fast
 - High-quality output
- Grayscale and color options.

Laser Printer Imaging Process

Handwritten signature

1. Processing
2. Charging
3. Exposing (Writing)
4. Developing
5. Transferring
6. Fusing
7. Cleaning

important in the teters



Laser Printer Imaging Process

- Duplex printing and paper output path
- Color laser printers
- LED printers are non-impact but use a light-emitting diode instead of a laser in the printhead.



Laser Printer Maintenance

always check the page count of the printer

- Loading paper
 - Media type selection
 - Media guides
 - Proper storage
- Replacing the toner cartridge
 - Packing strips
 - Recycling



Laser Printer Maintenance Tasks

Guidelines for loading paper:

- Use good quality paper designed for use with the model of printer that you have and the printing function.
- Do not overload a paper tray.
- Do not use creased, dirty, or damp paper.
- Refer to the instruction manual when loading non-standard print media.

Laser Printer Maintenance

Toner cartridge replacement:

- Cartridges differ for different printer models.
- Refill or recycle spent cartridges.
- Remove the old cartridge and place it in a bag toner gets everywhere!



Laser Printer Maintenance Tasks



Cleaning guidelines:

Unplug the printer

Use a damp cloth with mild cleaner

Inside of printer may be hot

Use a special toner-safe vacuum when necessary

If you get toner on skin or clothes, remove it with a cloth or cold water

Use isopropyl alcohol and lint-free swabs to clean rollers

Check documentation for replacing dust and ozone filters if installed

Laser Printer Maintenance Tasks



Calibration:

- Usually, automatic
- Access calibration routine from:
 - Printer control panel
 - Printer software

Laser Printer Maintenance Tasks



Maintenance kit:

- Replacement feed rollers, transfer roller, and fuser unit.
- Normally replace these items after an established number of (Page count) is printed.
- Allow printer to cool down before replacing fuser unit to avoid burns.
- Print a test page to verify operation and reset copy count.

Discussing Laser Printer Maintenance

- What must you do before installing a new toner cartridge into a printer?
- **ANSWER:**
 - Remove the packing strips.
 - Turn off let cool
 - Put old cartridge into a sealed bag for recycling.



Discussing Laser Printer Maintenance

- What makes the power supply in a printer different to that used in a PC?
- **ANSWER:**
 - A PC's Power Supply Unit (PSU) only needs to generate voltages up to 12 V DC.
 - The charging and transfer corona wires/rollers in a laser printer require much higher voltages.
 - To apply a 600 V charge to the drum, for instance, the corona wire must be charged to 1000 V.



Discussing Laser Printer Maintenance

- How is the imaging drum in a laser printer charged?
- **ANSWER:**
 - Applying a uniform high charge to the photosensitive drum using the primary corona wire or roller.



Discussing Laser Printer Maintenance

- What is the removal of the charge from the photosensitive drum by a laser called?
- **ANSWER:**
 - Laser imaging or writing.



Discussing Laser Printer Maintenance

- What is the process of image transfer?
- **ANSWER:**
 - Passing paper between the photosensitive drum and the secondary or transfer corona wire or roller. This attracts the toner from the drum to the paper.



Discussing Laser Printer Maintenance

- Why is a laser printer better suited to most office printing tasks than an inkjet?
- **ANSWER:**
 - Laser printers are much faster, quieter, and better quality (the pages do not smear).
 - They also have lower running costs.

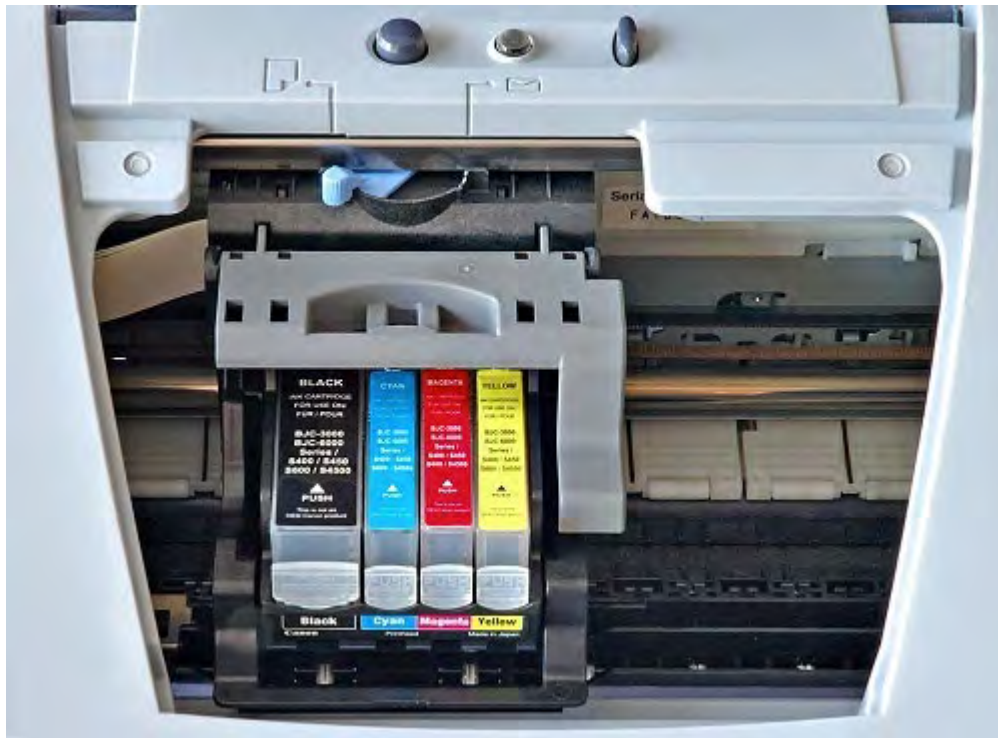


Discussing Laser Printer Maintenance

- Which components are provided as part of a laser printer maintenance kit?
- **ANSWER:**
 - The fuser assembly.
 - Transfer/secondary charge roller
 - Paper transport rollers for each tray (pickup rollers and a new separation pad).

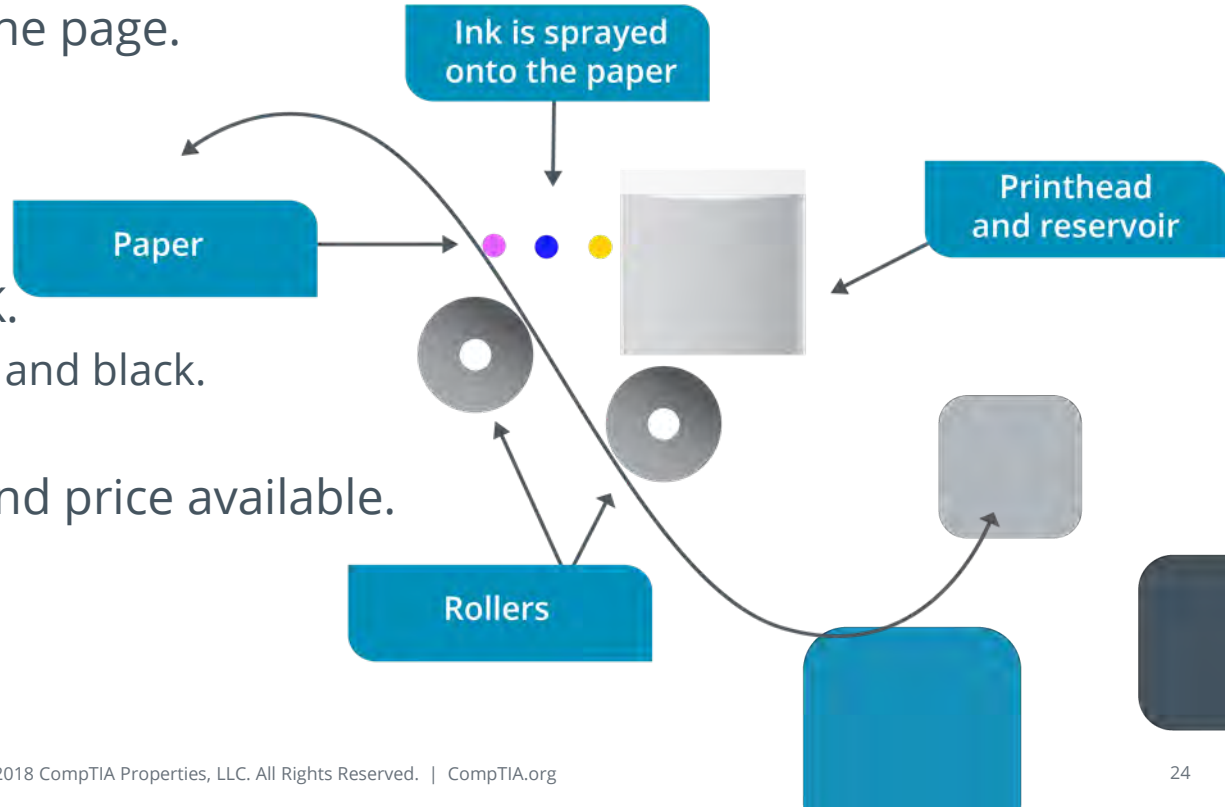


Topic B: Maintain Inkjet Printers



Inkjet Printers

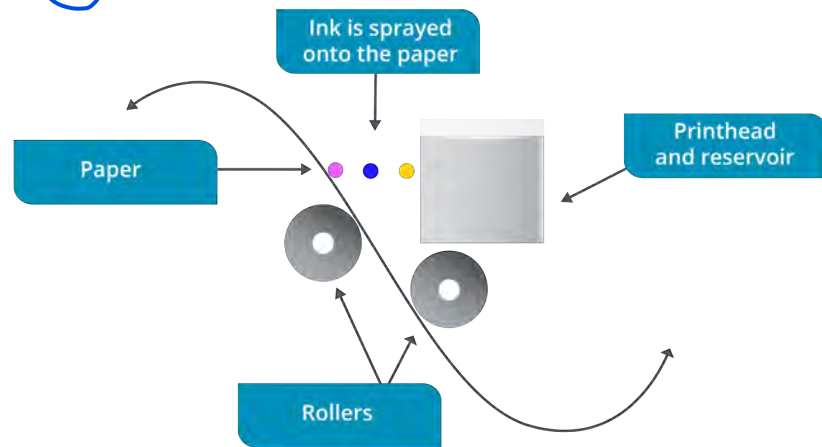
- Liquid ink is propelled out of nozzles in a carriage assembly that moves back and forth across the page.



- Color images use CMYK.
 - Cyan, magenta, yellow, and black.
- Wide range of quality and price available.

Inkjet Printer Imaging Process

- **Print head**
 - Thermal/Bubblejet
 - Piezoelectric (Epson)
- **Carriage system**
 - Line printing
 - Stepper motor (unidirectional versus bidirectional)
 - Platen gap



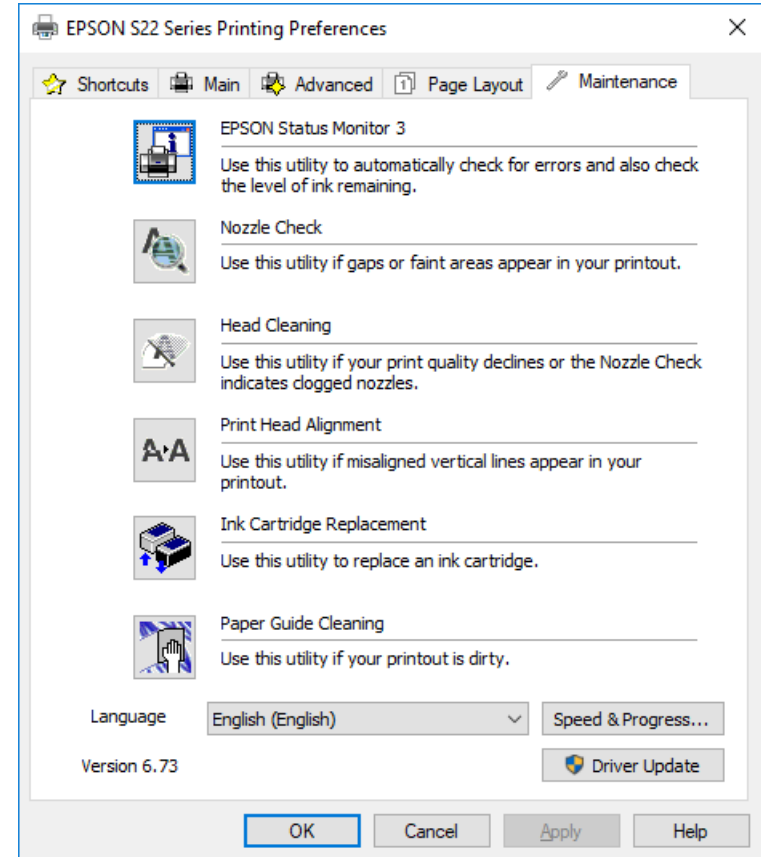
Components of Inkjet Printers

- Print heads
- Ink cartridges
- Carriage system
- Paper handling and duplex assembly



Inkjet Printer Maintenance Tasks

- Loading paper
- Replacing inkjet cartridges
- Print head alignment
- Print head cleaning



Discussing Inkjet Printer Maintenance

- You have been asked to perform basic maintenance on an inkjet printer.
- One of the users noticed that the colors are not printing correctly and that the bottom of some letters are not printing. What would you do?
- **ANSWER:**
 - Try using the printer's built-in cleaning cycle
 - Replacing the ink cartridge
 - Try using the printer properties sheet to check for print head alignment, color settings, and other settings.



Discussing Inkjet Printer Maintenance

- What two types of print heads are used by inkjet printers?
- **ANSWER:**
 - Thermal and piezoelectric.
 - The thermal type is also known by Canon's Bubble Jet trademark it creates an ink bubble by heating.
 - Most other printer vendors use thermal technology
 - Epson printers use their piezoelectric pump-like process.



Discussing Inkjet Printer Maintenance

- Which inks are typically used in the color printing process?
- **ANSWER:**
 - Cyan, Magenta, Yellow, and Black (CMYK).



Discussing Inkjet Printer Maintenance

- Can inkjet printers use plain copy paper?
- **ANSWER:**
 - Yes, but this type of paper will not produce the best results. It is better to use paper designed for inkjets.



Discussing Inkjet Printer Maintenance

- What is an ASF?
- **ANSWER:**
 - An AutoSheet Feeder (ASF)



Topic C: Maintain Impact, Thermal, and 3D Printers



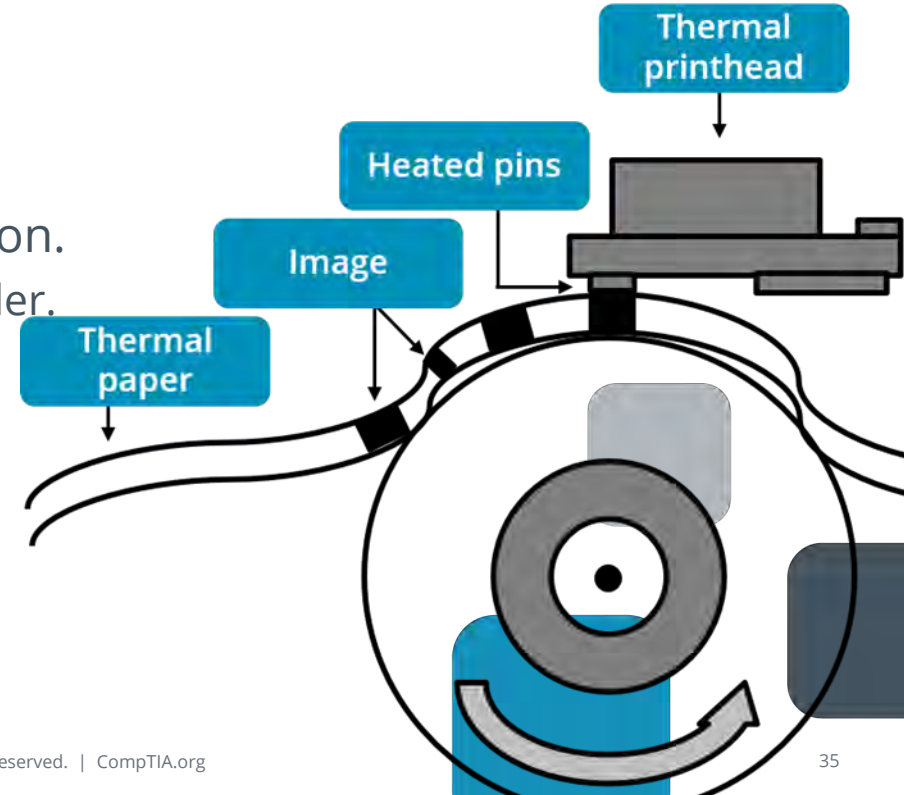
Thermal Printer Needs



- Direct thermal process and components
 - Feed assembly and heating element
 - Heat sensitivity of special thermal paper
- Used for:
 - Used for barcodes, labels, receipts, clothe tags, plastic labels!
- Receipt and label printing require high availability

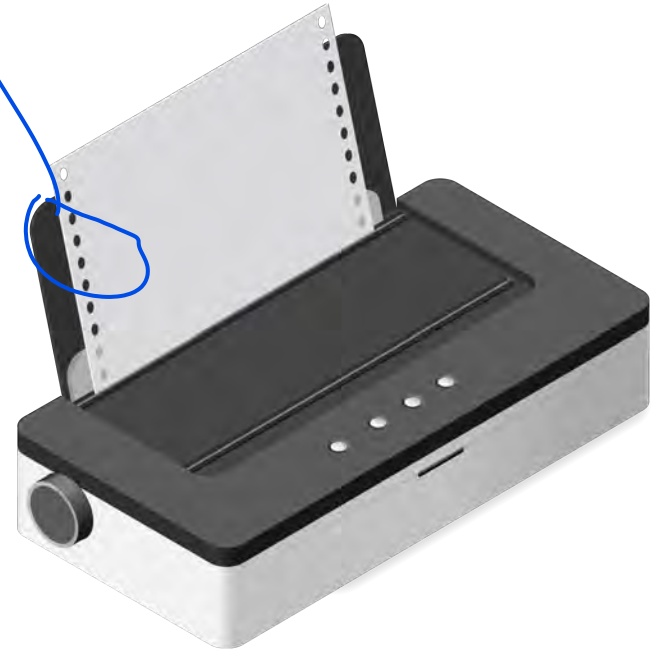
Components of Thermal Printers

- Thermal paper designed to change color when heat is applied.
- Heating element applies the heat.
- Feed assembly provides paper via friction.
 - Stepper motor turns a rubber-coated roller.
- Paper can be fanfold or roll format.



Impact Printer Maintenance

- Impact process and components
 - Dot matrix print head
 - Ribbon
- Paper selection and loading
 - Tractor fed paper
 - Carbon/impact paper
- Ribbon and print head replacement
- Platen gap lever deals with different paper thicknesses.



Impact Printer Maintenance Tips

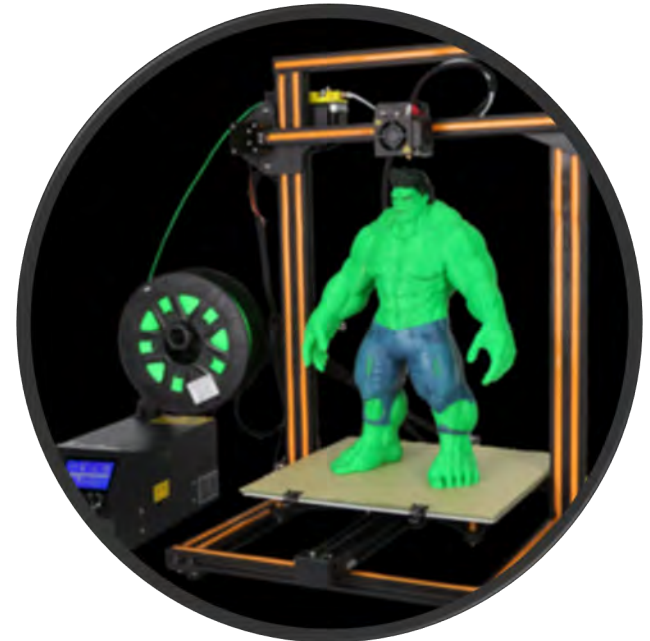
- Take care when loading tractor-fed printers.
 - Align the marginal holes with the printer sprockets.
 - Paper is unobstructed at printer entryway.
- Follow manufacturer's instructions for replacing print heads and ribbon cartridges.
 - Allow print head to cool before removing it.

3D Printers



3D print process: A printing process that builds a solid object from successive layers of material.

- Plastic, rubber, carbon fiber, and metal
- Uses are growing:
 - Manufacturing, for proof-of-concept models
 - Healthcare, for dentistry and prosthetics
 - Clothing
 - Product samples
 - Marketing materials

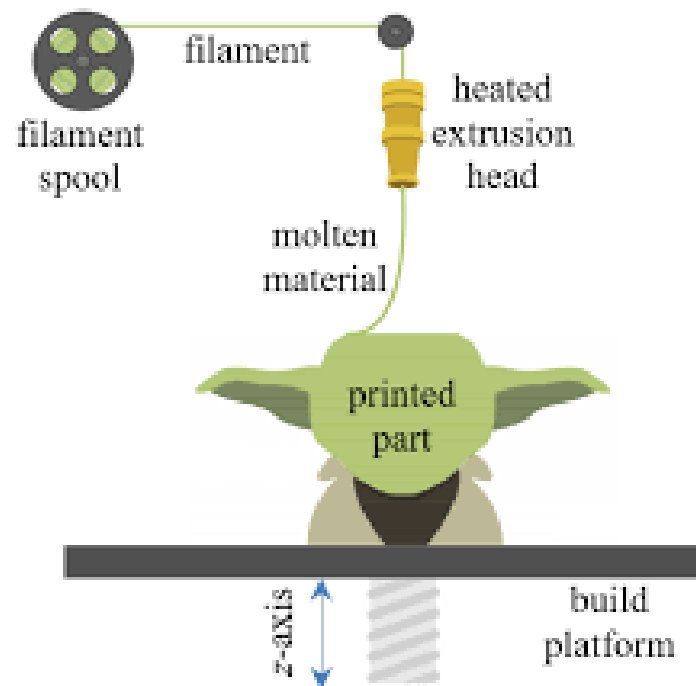


3D Printer Imaging Process

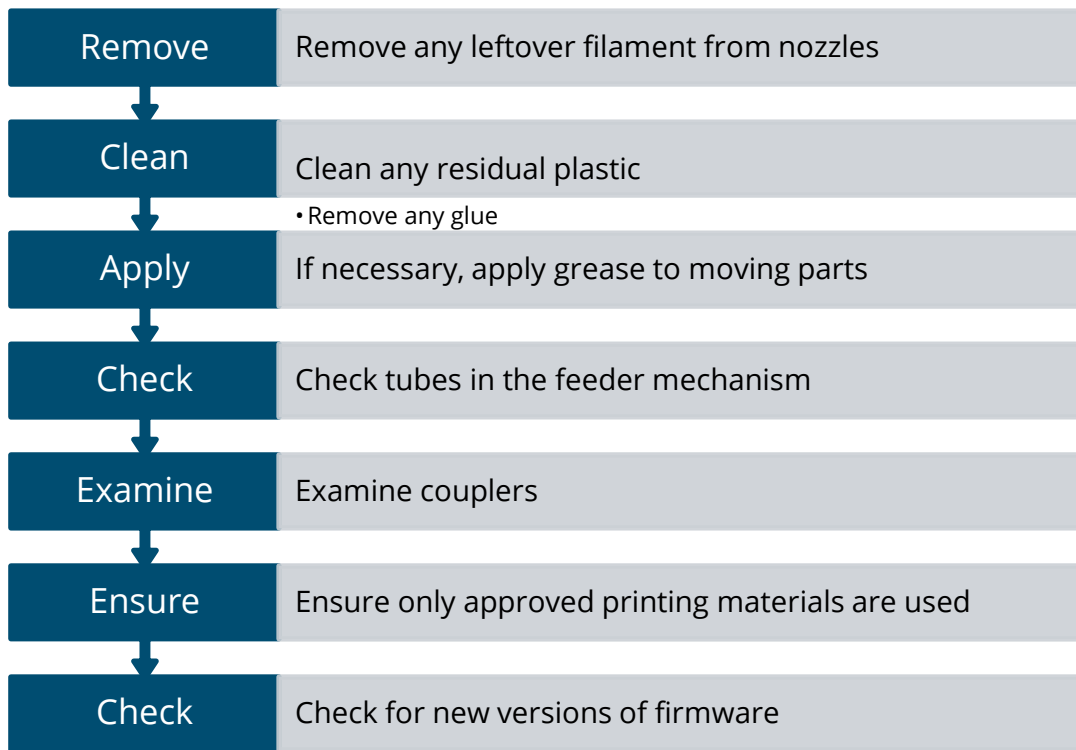
- Start with a 3D scan or 3D modeling software output.
- Create and save a 3D model.
- Model is sliced into horizontal layers.
- Resulting print job defines how each layer should be deposited onto the build surface.
- Printer melts filament and extrudes it to the build surface layer by layer.
- Extruder and build surface can move along any axis to produce the intended result.

Components of 3D Printers

- Print bed/build plate
- Bed/build surface
- Extruder
- Gears/motors/motion control
- Fan
- Filament
 - LPA
 - ABS



3D Printer Maintenance Tips



3D Printer Maintenance



- 3D print job rendering
- Media selection and loading
 - Filament types
 - Stereolithography (SLA) resin printers
 - Selective laser sintering (SLS) printers
- Maintenance tasks

Other 3D Printer Types

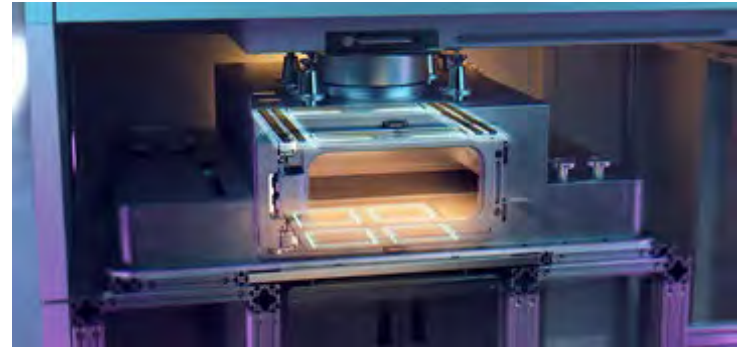


Both use a laser to trace out and build individual layers. For SLA a liquid resin is cured, whereas in SLS powder is selectively fused together.

SLA

VS

SLS



Discussing Impact, Thermal, and 3D Printer Maintenance

- What types of paper/stationery can dot matrix printers use that laser and inkjet printers cannot?
- **ANSWER:**
 - Tractor-fed stationery and Carbon copy paper.



Discussing Impact, Thermal, and 3D Printer Maintenance

- What type of printer technology is a dot matrix printer?
- **ANSWER:**
 - It is commonly described as an impact printer.



Discussing Impact, Thermal, and 3D Printer Maintenance

- Where are you most likely to encounter thermal printers?
- **ANSWER:**
 - Handheld receipt.



Discussing Impact, Thermal, and 3D Printer Maintenance

- A thermal printer used to create labels for parts bins, kits, and boxes is jammed due to a label coming loose during printing. How should you resolve this problem?
- **ANSWER:**
 - Remove the label and if there is any sticky residue, clean it with isopropyl alcohol (IPA) applied to a swab.
 - Ensure the roll of labels is properly loaded.



Discussing Impact, Thermal, and 3D Printer Maintenance

- What considerations for locating a 3D printer do you have to make?
- **ANSWER:**
 - Sensitive to movement and vibration,
 - Dust and the ambient temperature and humidity



Discussing Impact, Thermal, and 3D Printer Maintenance

- What do you need to create objects with an FDM-type 3D printer?
- **ANSWER:**
 - You will need spools of filament, usually made of some type of plastic, to create 3D objects on a print bed or build surface.



Topic D: Install and Configure Printers



Windows Print Process



WPF print jobs:

Formatted and spooled as XPS files.

Stored in %SystemRoot%\System32\Spool\Printers\ folder.

Processed by the device driver.



Output:

Sent to XPS-compatible print device, or

Rendered via a PDL and converted to a raster.



Print monitor sends job to the printer.



Legacy GDI process:

EMF

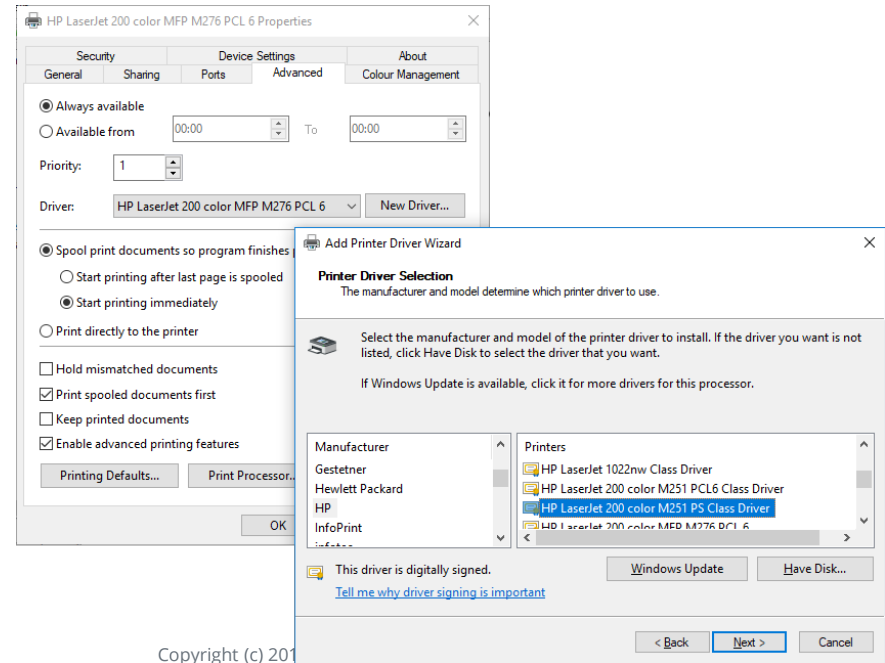
RAW

WPF XML XPS

- WPF: Windows Presentation Foundation
Microsoft .NET, application for developers.
- (WPF) has a rich set print system management APIs.
- The core of this WPF functionality is the (XML) Paper Specification a (XPS) file format and the XPS print path.
- XPS: Format acts as a Virtual Printer for programs

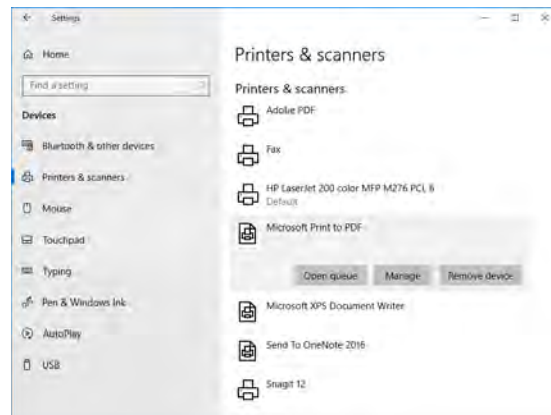
Windows Print Process

- A (PDL) Page Description Language specifies the arrangement of a printed page.
- Scalable fonts
- Color printing
- Vector graphics



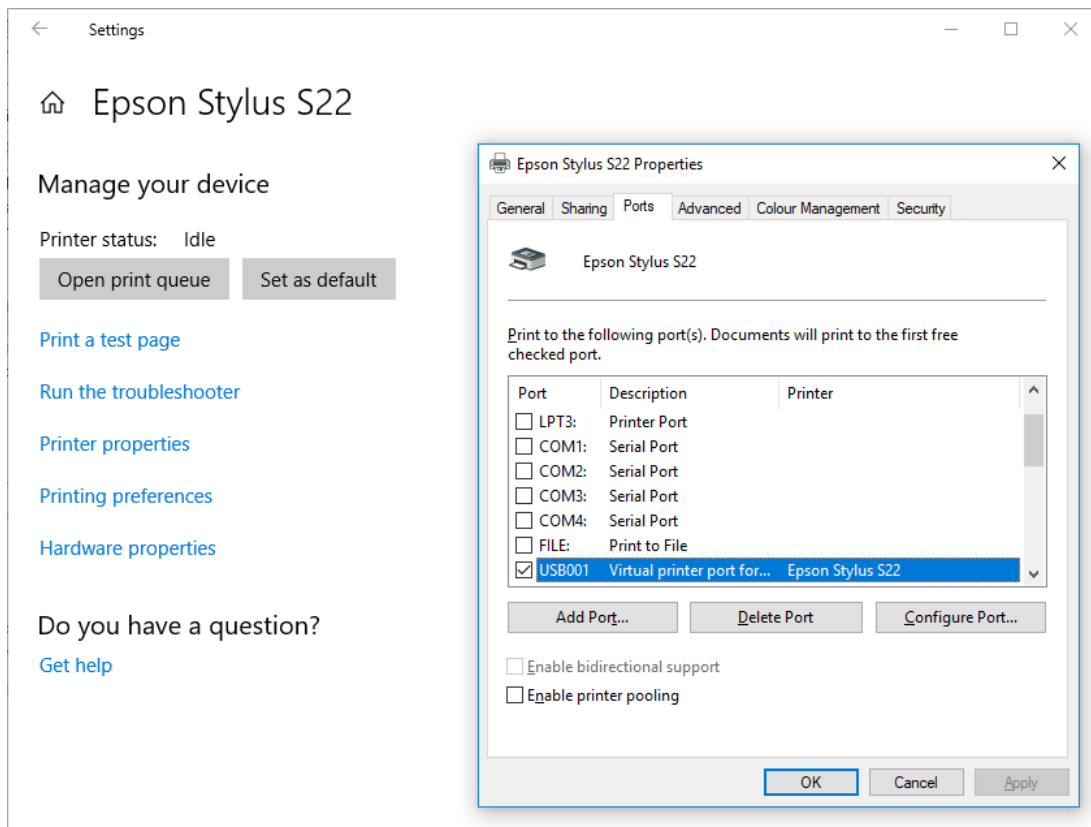
Virtual Printers

- No physical printing.
- Output is a file.
- Why use virtual printers?
 - Sending documents to a fax server
 - Creating read-only documents
- Options for file formats:
 - Print to file
 - Print to PDF
 - Print to(XPS), and (XML) and other industry standards to create a cross-platform document format.



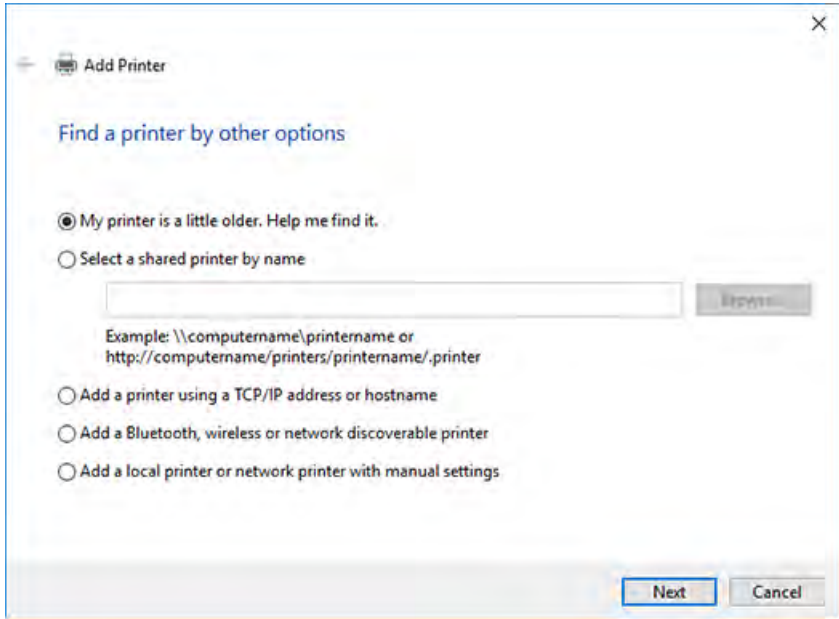
Local Printer Connections

- USB
- Ethernet
- Serial port
- Wireless



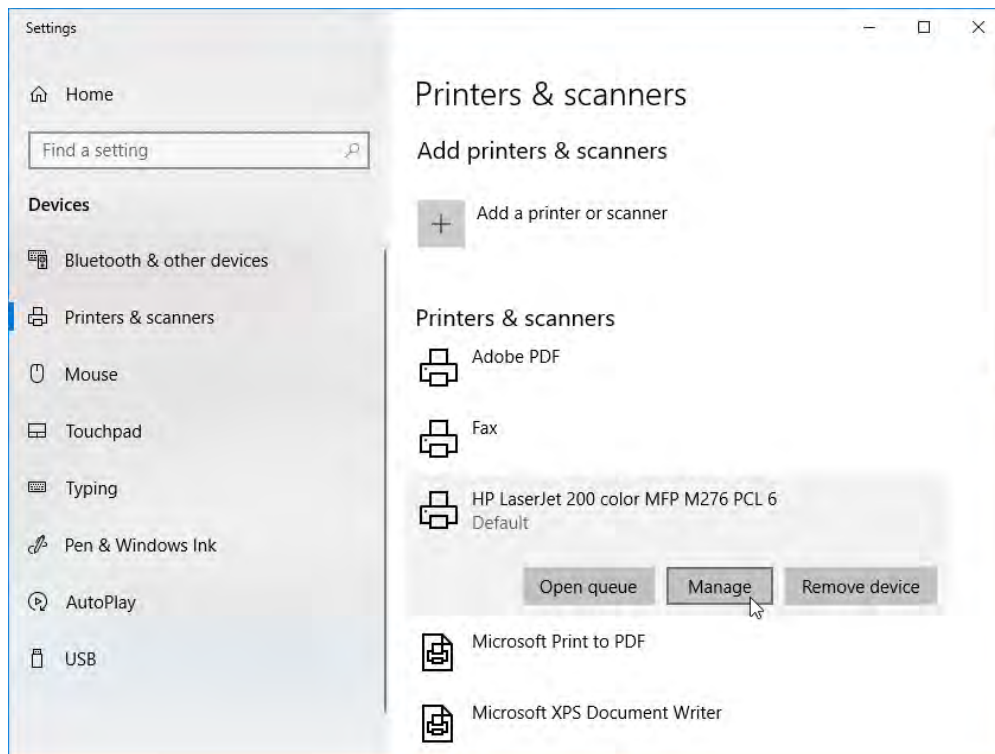
Printer Drivers

- When a print device is not auto-detected, use the
- **Devices and Printers** or **Windows Settings** app to install drivers.
 - UAC privileges needed.
 - 32-bit and 64-bit drivers are different.
- Print a test page after installing the drivers.

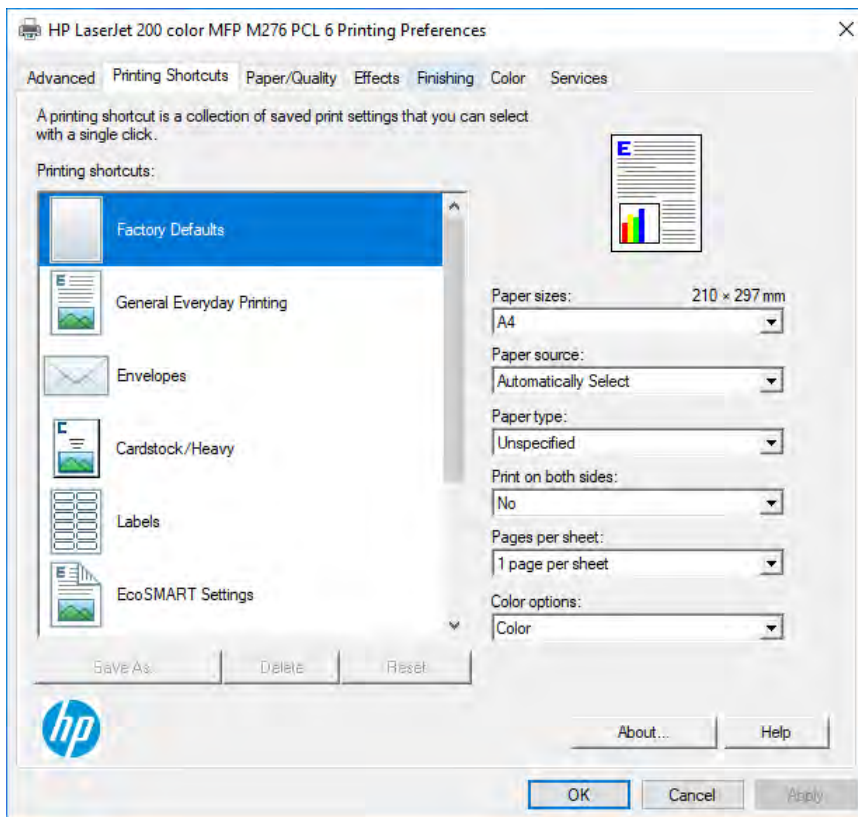
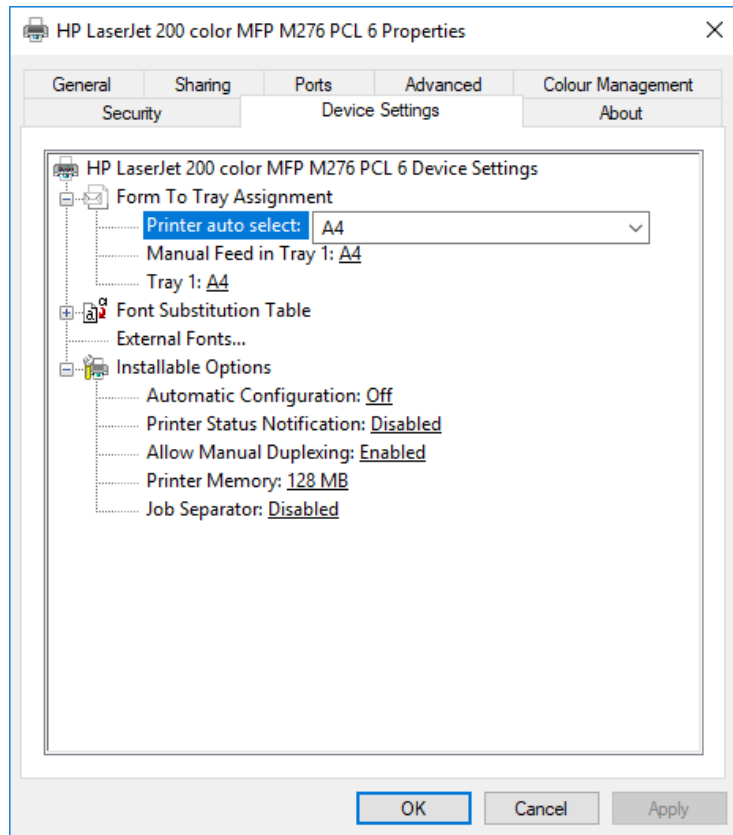


Configuration Settings

- View print queue
- Open printer properties
- Open printer preferences
- Set the default printer
- Start the troubleshooter



Configuration Settings



Print Device Connectivity

- USB
- Ethernet
 - Static versus dynamic IP configuration
 - Register printer name in DNS
 - Local control panel configuration
 - Network management suites

🏠 Epson Stylus S22

Manage your device

Printer status: Idle

[Open print queue](#)

[Set as default](#)

[Print a test page](#)

[Run the troubleshooter](#)

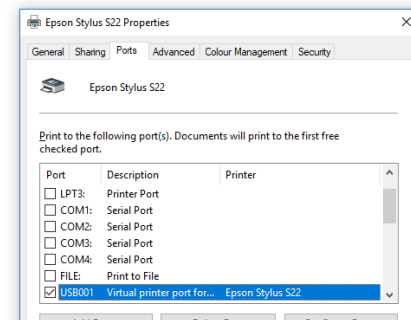
[Printer properties](#)

[Printing preferences](#)

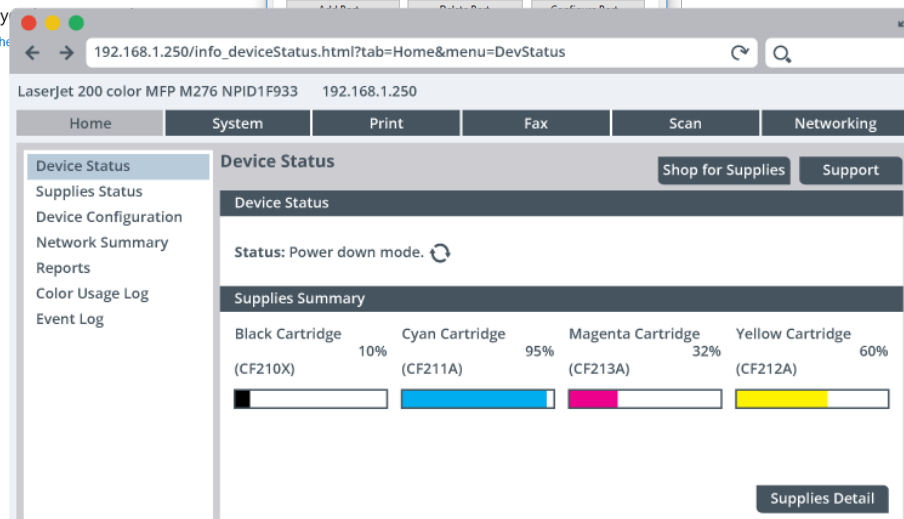
[Hardware properties](#)

Do y

Get he



Screenshot courtesy of Microsoft



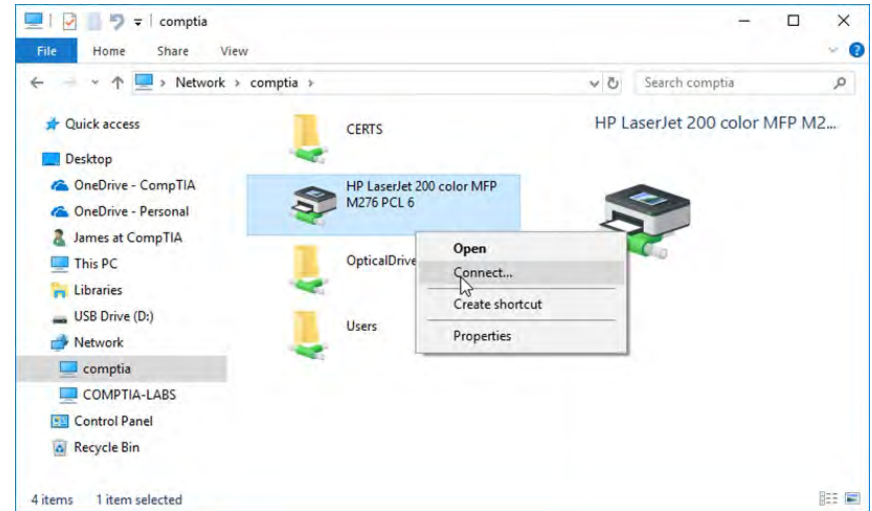
Print Device Connectivity



- Wireless
 - Join printer to WLAN via access point and SSID
 - Wi-Fi direct connections from clients to print device
 - Connect via WPS
 - Press the WPS button on your printer
 - Give your home network router a minute
 - The printer will automatically detect the router and WiFi
 - Add printer!

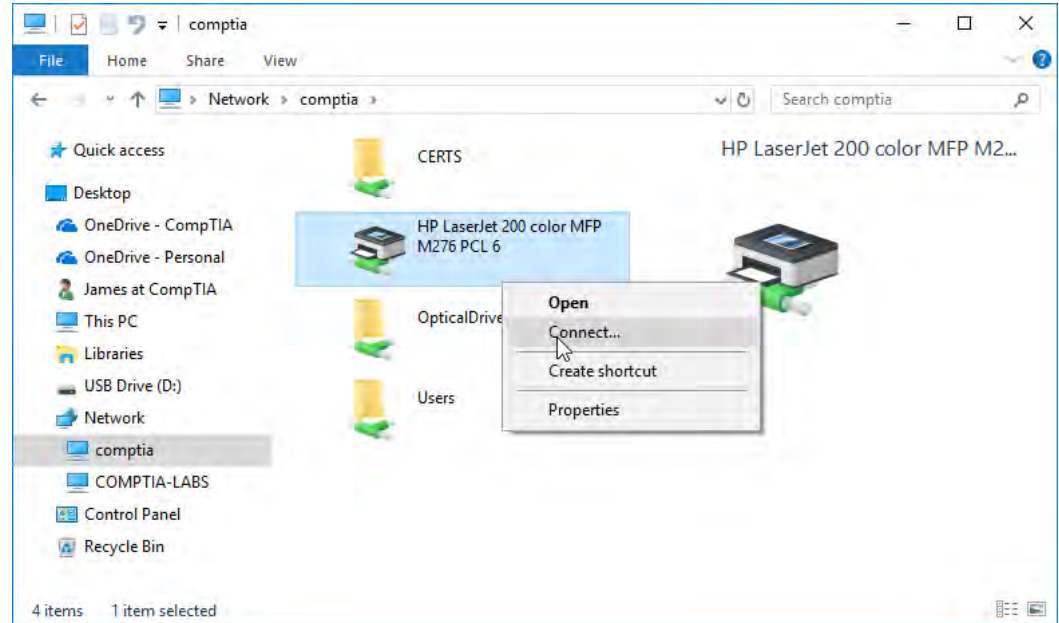
Printer Sharing

- Print server
 - Printer is attached to network and clients connect directly
 - Each client manages its own print queue
- Printer share
 - Printer is attached to/managed by PC server host
 - Printer object is shared via Properties
 - Clients connect to printer object
 - Print queue is managed on PC server



Printer Sharing and Networking

- Shared printer connections
- Integrated hardware print servers/NAS
- Bonjour and AirPrint which is a zero-configuration networking technology.
- To find each other without you having to set them up.



Printer Security Issues

- When you use shared printers:
 - Hard drive caching might allow someone with access to cached print files to recover confidential information.
 - User authentication might be needed to prevent improper use of network or cloud printers.
 - Data privacy might be more difficult to guarantee for print jobs that travel over a network.

Printer Security

- User authentication
 - Print server versus shared printer
- Secured print and badging
 - Hold print jobs until user releases at the print device
 - Release by entering PIN or swipe/contactless smart badge reader on printer
- Audit log
 - History of print jobs
 - Centralized logging

Discussing Printer Installation and Configuration

- You use three Windows applications that need to print to a Canon BJC-4300 printer. How many printer drivers must you install?
- **ANSWER:**
 - One. Applications rely on the operating system.



Discussing Printer Installation and Configuration

- You are setting up a print server and want to enable access for the widest range of Windows 10 machines possible.
- Should you install separate drivers for the Home and Enterprise editions?
- **ANSWER:**
 - No—there is no difference between editions.
 - You do need to install drivers for x86 (32-bit) and x64 (64-bit) versions, though.



Discussing Printer Installation and Configuration

- When you are purchasing a new printer, what would you need to decide between as you evaluate connections?
- **ANSWER:**
 - Almost all new printers use USB, so support for a wireless or Ethernet connection.



Discussing Printer Installation and Configuration

- What tool can you use to confirm that basic print functionality is available?
- **ANSWER:**
 - Print a test page



Discussing Printer Installation and Configuration

- You have installed an automatic duplex unit in an office laser printer. What configuration setting would you change to make the unit available for print jobs?
- **ANSWER:**
 - From **Devices and Printers** or **Settings**,
 - **Printer Properties** and then select the **Device Settings** tab.
 - Select the **Duplex Unit** setting and select **Installed**.



Discussing Printer Installation and Configuration

- What configuration information does a user need to use a print device connected to the same local network?
- **ANSWER:**
 - The print device's IP address or host name.



Discussing Printer Installation and Configuration

- What service should a network print device run to enable an Apple iPad to use the device over Wi-Fi?
- **ANSWER:**
 - The Bonjour service.



Discussing Printer Installation and Configuration

- True or false? When you print 10 copies of an uncollated job, 10 copies of page one are printed, followed by 10 copies of page two, then 10 copies of page three, and so on.
- **ANSWER:**
 - True.



Discussing Printer Installation and Configuration

- True or false? To enable printer sharing via Windows, the print device must be connected to the Windows PC via an Ethernet or Wi-Fi link.
- **ANSWER:**
 - False—any print device can be shared via printer properties.
 - The print device can be connected USB, Bluetooth, Ethernet, or Wi-Fi.

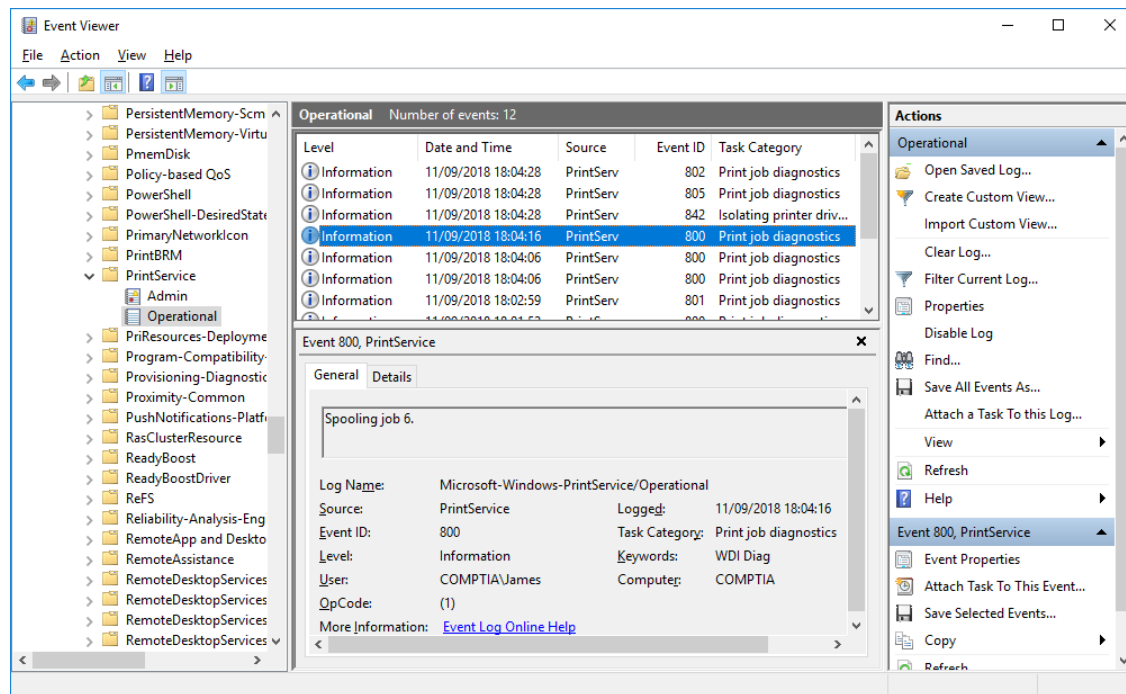


Topic E: Troubleshoot Print Device Issues



Printer Connectivity Troubleshooting

- Error code in
- printer's control panel
- Check Printer log files
- Device management software



Guidelines for Troubleshooting Print Device Issues

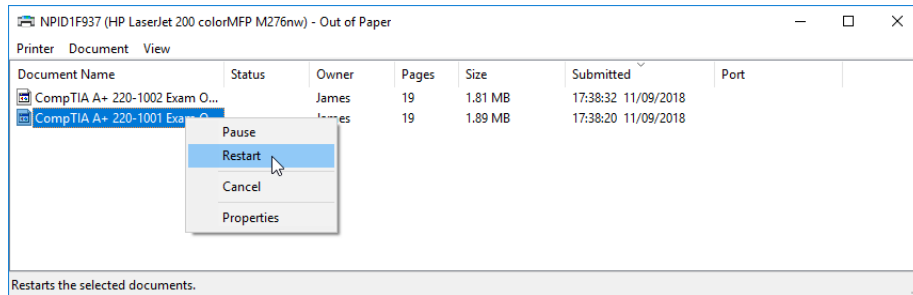
No image on the printer display, but power LED is on:

- Test the obvious things first.
- Check environmental conditions.
- What has changed?

77 Print Quality Issues

- Faded print
 - Replace toner cartridge
- Blank pages
 - Application/driver issue or packing seals left on toner cartridge
- White stripes
 - Toner distribution or replace transfer roller
- Black stripes or whole page black
 - Replace charge roller (toner cartridge) or power supply fault
- Speckling on printed pages
 - Clean inside of printer

78 Print Job Issues



- Print monitors
 - Print job spooling and queue
- Multiple jobs pending in queue
 - Check paper supply, jams, feed issues
 - Restart jobs
 - Clear print queue
- Garbled print *test*
 - Verify driver
 - Cycle power on print device
 - Check fonts are available

Guidelines for Troubleshooting Print Device Issues

No image on the printer display, but power LED is on:

- Verify that the printer has not gone into a power-saving sleep cycle.
- Try powering down the printer.

No connectivity:

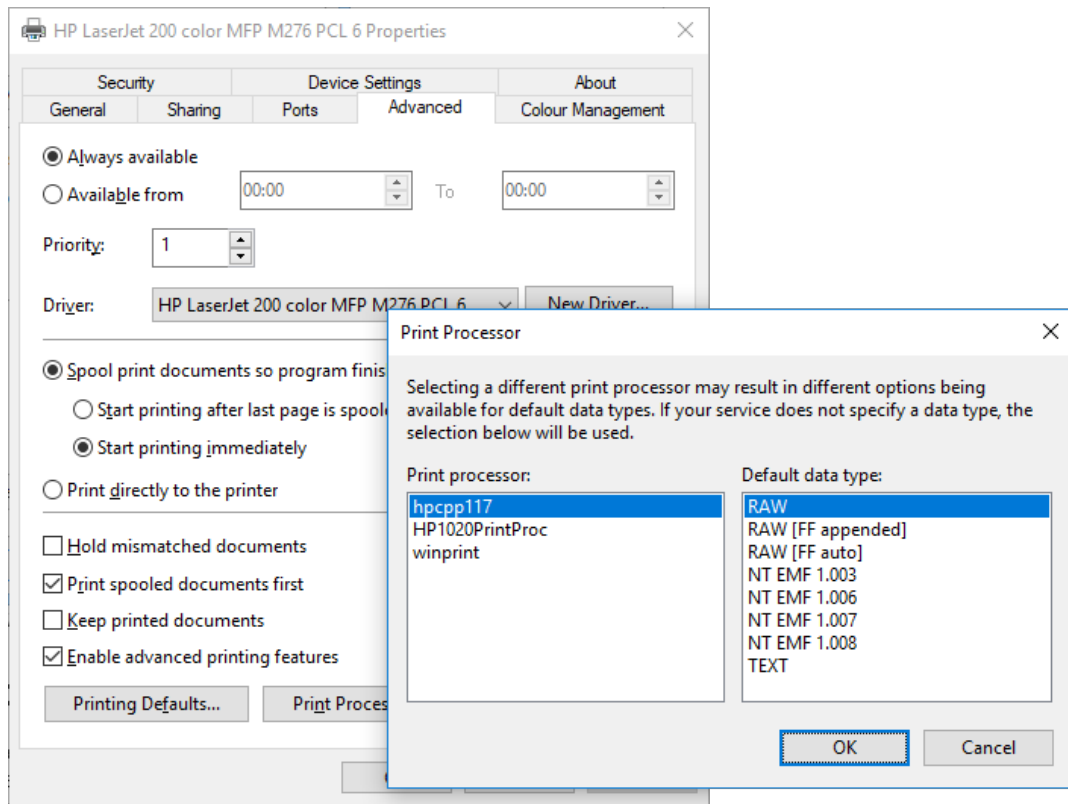
- Verify that the printer is switched on and "online."
- Check the connection between the host PC and printer.

Printer Connectivity Issues

- Can't detect printer to install it or printer reported offline by OS
 - Verify power and status via print device control panel
 - Check removable components/cartridges and service panels
 - Print test page from print device control panel
 - Cycle power on print device or consider factory reset
 - Inspect cables and connectors or test different connection methods

Print Queue and Spooler Troubleshooting

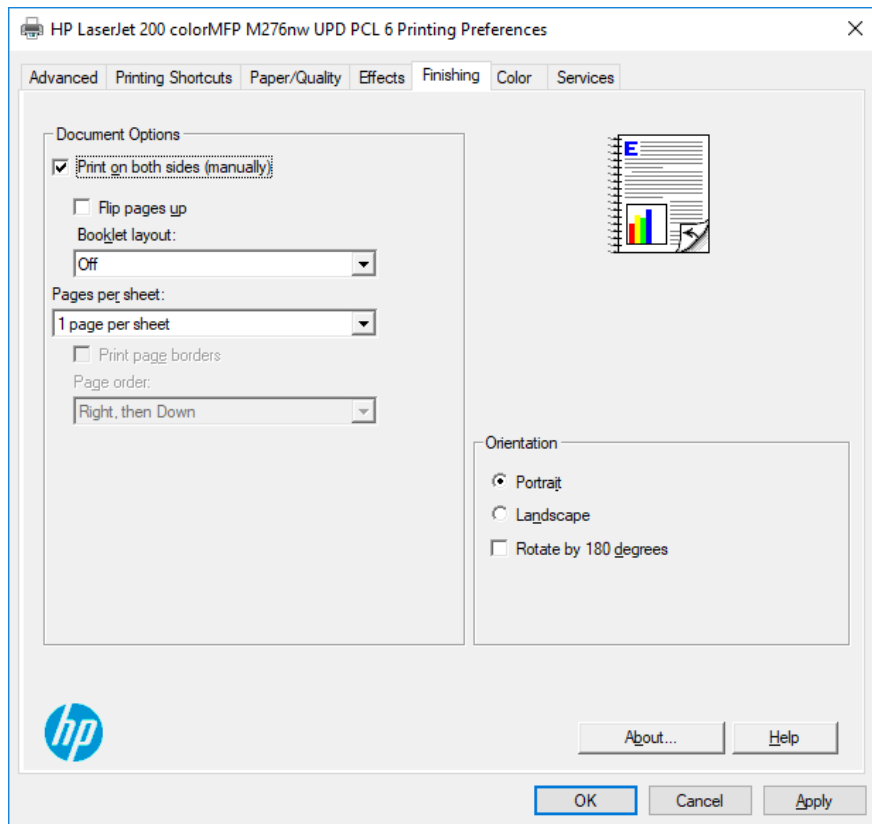
- Try different spool settings, and test after each change.
- Verify sufficient disk space on the spooler's volume.



82 Print Quality Issues

- Vertical or horizontal lines (repetitive defects)
 - Clean or replace feed rollers or issue with imaging drum
- Toner not fused to paper
 - Replace fuser unit (maintenance kit)
- Double/echo images
 - Issue with imaging drum
- Incorrect chroma display
 - Check configuration of color cartridges and run calibration routine
- Color missing
 - Missing cartridge or cartridge not registering (clean contacts)
- Inkjet and dot matrix defects

83 Finishing Issues



- Finisher unit
 - Add-on to automate stapling or hole punching
 - Set printer properties to enable finisher unit
- Incorrect page orientation
 - Check default preferences/job-specific settings
- Hole punch issues
 - Check maximum paper depth
- Staple jam issues
 - Check maximum paper depth
 - Remove stuck staples

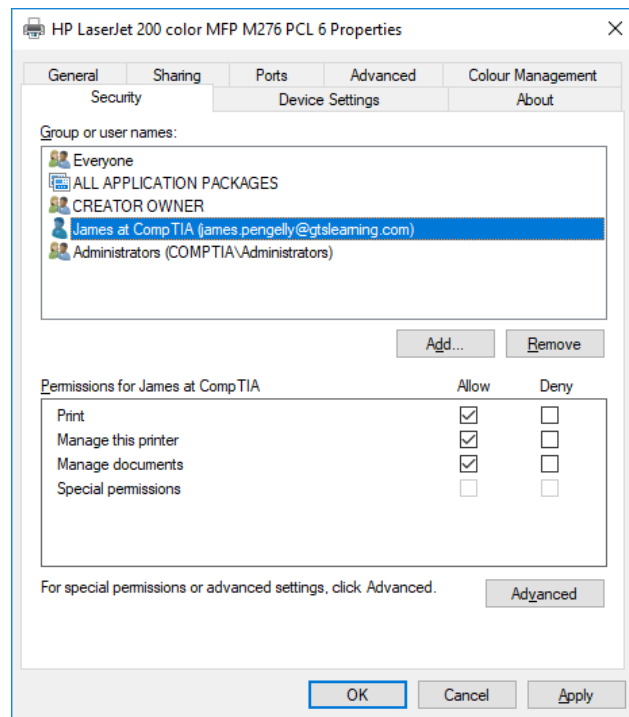
Print Feed Issues

- Grinding noise
 - Reseat cartridges and rollers
 - Clean debris
 - Replace maintenance kit on laser
 - Check carriage system/clutch on inkjet
- Paper jam
 - Identify location
 - Proper release
- Paper not feeding or multipage misfeed
 - Improper paper type, size, or loading
 - Pickup and separation pads/rollers



Permission Issues Troubleshooting

- **Access Denied** message:
 - Check user permissions for the printer.
 - Verify security software is not interfering.
 - Check permissions on spool folder.
- User cannot install printer:
 - User account elevation required to install the driver.
 - Administrator needs to install, or policies can allow users to install signed drivers.
 - Verify that the driver is designed for your Windows installation (version and type).
 - Make sure print spooler service is running.



Troubleshooting Printer Issues

- How would you track down the source of a paper jam?
- **ANSWER:**
 - Check the error message
 - Reported by the printer
 - Visually inspect the various feed and output mechanisms.



Troubleshooting Printer Issues

- You need to restart the Print Spooler service on a Windows 10 machine. You have logged on as Administrator.
- What are your next steps?
- **ANSWER:**
 - Right-click **Computer** and select **Manage**.
 - Select **Services and Applications**→**Services**.
 - Right-click **Print Spooler** and select **Restart**.



Troubleshooting Printer Issues

- If print jobs do not appear at the printer and the queue is clear, what could you try first to solve the problem?
- **ANSWER:**
 - Cycle the power on the printer.



Troubleshooting Printer Issues

- A user reports that the printed output is not up to the usual standards for her printer.
- **ANSWER:**
 - Print out a test page



Troubleshooting Printer Issues

- What should you do if you cannot delete a job stuck in the print queue?
- **ANSWER:**
 - Stop the print spooler service, delete the spooled file, then restart the spooler.



Troubleshooting Printer Issues

- Where on disk is the print file spooled in Windows?
- **ANSWER:**
 - %SystemRoot%\System32\Spool\Printers.



Troubleshooting Printer Issues

- A laser printer is producing white stripes on the paper. What could be causing this?
- **ANSWER:**
 - Poorly distributed toner
 - Damaged/worn transfer corona wire.



Troubleshooting Printer Issues

- Paper is jamming in an inkjet printer. What could be causing this?
- **ANSWER:**
 - The paper might not be loaded squarely
 - Too much paper loaded
 - Paper is creased or dirty.



Troubleshooting Printer Issues

- What effect does a worn photosensitive drum have on printing?
- **ANSWER:**
 - Faint printing.



Troubleshooting Printer Issues

- What effect does a dirty primary corona wire have on laser printing?
- **ANSWER:**
 - Black strip all the way down the paper



Topic F: Install and Configure Imaging Devices

- Digital cameras
- Webcams
- Scanners



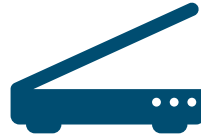
Scanners

Typically used to input flat objects:

Documents

Receipts

Photos



OCR enables translation of scanned text into editable content.

USB, Ethernet, and wireless connections.

Scanner: A type of photocopier that can convert the image of a physical object into an electronic data file.

Optical Character Recognition (OCR): Software that can identify the shapes of characters and digits to convert them from printed images to electronic data files that can be modified in a word processing program.

Flatbed Scanners



Flatbed scanner: A type of scanner where the object is placed on a glass faceplate and the scan head moves underneath it.

- Light shines at an object placed on the faceplate.
- Mirrors reflect the lit-up object onto a lens.
- Lens processes image.

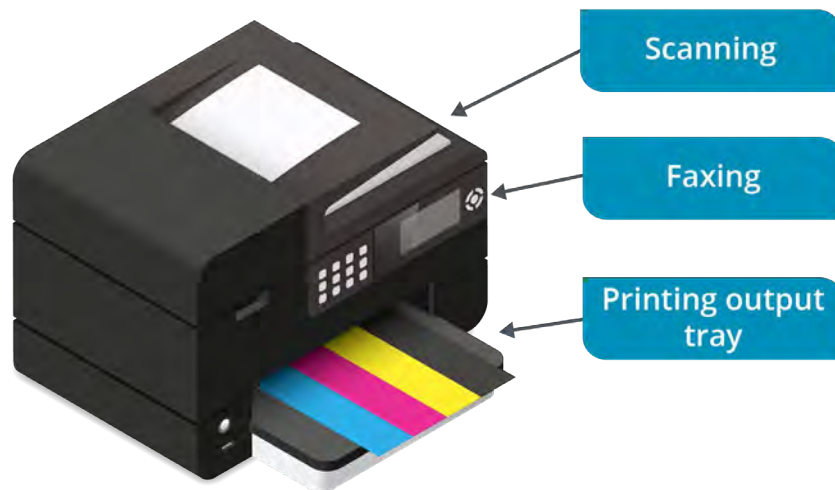


Multi-Function Devices



Multi-function device (MFD): An imaging device that performs several related functions.

- Printer
- Scanner
- Copier
- Possibly fax



Sheet-Fed and ADF Scanners



- Sheet-fed scanner: A scanner in which the paper is passed over a fixed scan head.
 - Automatic Document Feeder (ADF): A device that feeds media automatically into a scanner or printer.
-
- Strobes between red, green, and blue to illuminate an object.
 - Lens is rod-shaped.
 - Compact design.



QR Scanners

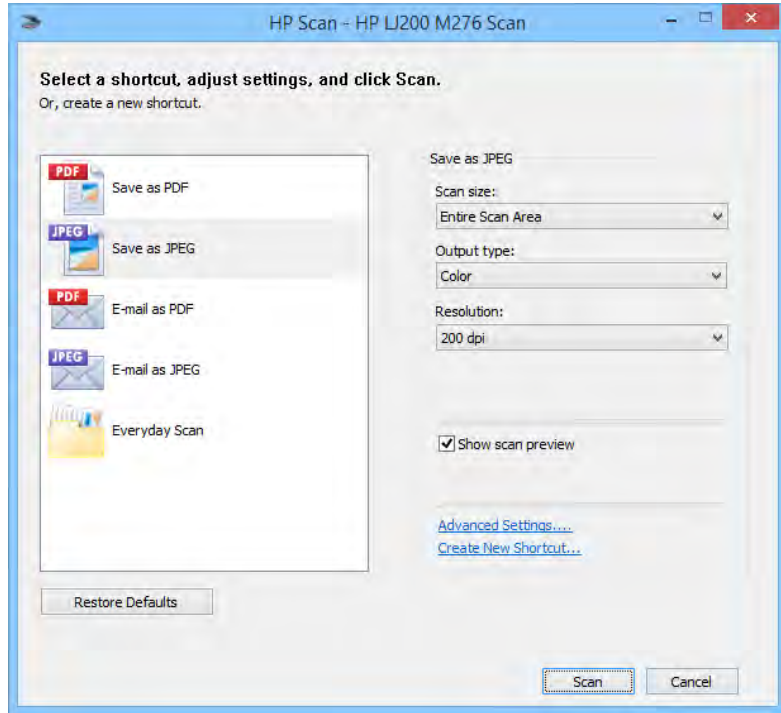


Quick Response scanner (QR scanner): A type of 2D barcode scanner used to store information of barcode scanner or the camera on a smartphone

- Any smartphone camera, digital camera, and webcam can scan QR codes.
- No need for special scanning hardware.
- QR scanning software reads instructions in the code to perform an action.
 - Open a web page or import a contact record or calendar event.



Scan Options



- Windows Plug-and-Play enables apps to use the scanner
- Older scanners used TWAIN-based software
- Newer scanners use WIA
- Output format (PDF, JPG, others)
- Tools for selecting and editing images
- OCR conversion
- Options on the printer panel:
 - Format
 - Resolution
 - More options

Barcode Scanners



Barcode scanner: A handheld device designed to scan patterns of parallel bars, typically representing ISBN, or UPC.

- Sensor records the light reflected off a barcode.
- Application software correlates the light reading to a product database.
- USB connections most common.



Activity



Discussing Imaging Device Installation and Configuration

Discussing Imaging Device Installation and Configuration

- What type of connection interface is a scanner most likely to use?
- **ANSWER:**
 - USB.
 - Ethernet network port (RJ-45)
 - Wireless (Wi-Fi and/or Bluetooth)



Discussing Imaging Device Installation and Configuration

- What is the function of OCR?
- **ANSWER:**
 - Optical Character Recognition (OCR) software can convert a scanned image of text into a digital text file editor or word doc.



Discussing Imaging Device Installation and Configuration

- True or false? Any type of smartphone camera can be used to read a QR code.
- **ANSWER:**
 - True. The smartphone just needs to capture the image of the Quick Response (QR) code and be installed with software to decode it.



Discussing Imaging Device Installation and Configuration

- What type of sensor is used to capture an image for conversion to a digital file?
- **ANSWER:**
 - Charge Coupled Device (CCD) or Complementary Metal Oxide Semiconductor (CMOS).



Discussing Imaging Device Installation and Configuration

- What type of imaging input device would be most useful for a Point-of-Sale (POS) system?
- **ANSWER:**
 - Barcode scanner.

