TVET CERTIFICATE III in COMPUTER SYSTEM TECHNOLOGY

COMPUTER TROUBLESHOOTING

COSCT301

Troubleshoot Computer

Competence

Credits: 3

Sector: ICT

Sub-Sector: COMPUTER SYSTEM TECHNOLOGY

Learning hours:

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Purpose statement

This core module describes the skills, knowledge and attitude required to Troubleshooting a computer system. The learner will be able to select and arrange different materials, equipment and tools used when doing Computer System troubleshooting.

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Learning unit 1: Prepare tools, Material and Equipment

LO 1.1 Identify tools, Material and equipment

Content/Topic 1 Identification of Hand and safety tools and equipments

- ✓ **Personal safety equipment**

Employers have duties concerning the provision and use of personal protective equipment (PPE) at work.

PPE is equipment that will protect the user against health or safety risks at work. It can include items such as safety helmets, gloves, eye protection, high-visibility clothing, safety footwear and safety harnesses. It also includes respiratory protective equipment (RPE).

- ✓ **Why is PPE important?**

Making the workplace safe includes providing instructions, procedures, training and supervision to encourage people to work safely and responsibly.

Even where engineering controls and safe systems of work have been applied, some hazards might remain. These include injuries to:

- the lungs, eg from breathing in contaminated air
- the head and feet, eg from falling materials
- the eyes, eg from flying particles or splashes of corrosive liquids
- the skin, eg from contact with corrosive materials
- the body, eg from extremes of heat or cold
- PPE is needed in these cases to reduce the risk.

✓ **ESD(Electrostatic Discharge) Tools**

➢ **Antistatic Wrist Strap**

Safety in the workplace is everyone's responsibility. You are much less likely to injure yourself or damage components when using the proper tool for the job.

Before cleaning or repairing equipment, make sure that your tools are in good condition. Clean, repair, or replace items that are not functioning adequately.

An example of ESD is the small shock that you receive when you walk across a carpeted room and touch a doorknob. Although the small shock is harmless to you, the same electrical charge passing from you to a computer can damage its components. Self-grounding or wearing an antistatic wrist strap can prevent ESD damage to computer components.

The purpose of self-grounding or wearing an antistatic wrist strap is to equalize the electrical charge between you and the equipment. Self-grounding is done by touching a bare metal part of a computer case. The antistatic wrist strap is a conductor that connects your body to the equipment that you are

working on. When static electricity builds up in your body, the connection made by the wrist strap to the equipment, or ground, channels the electricity through the wire that connects the strap.

As shown in Figure 1, the wrist strap has two parts and is easy to wear. Following is the proper procedure for using an antistatic wrist strap:

- **Step 1.** Wrap the strap around your wrist and secure it using the snap or Velcro. The metal on the back of the wrist strap must remain in contact with your skin at all times.
- **Step 2.** Snap the connector on the end of the wire to the wrist strap, and connect the other end either to the equipment or to the same grounding point that the antistatic mat is connected to. The metal skeleton of the case is a good place to connect the wire. When connecting the wire to equipment that you are working on, choose an unpainted metal surface. A painted surface does not conduct electricity as well as unpainted metal.

Figure 1: Antistatic Wrist Strap

NOTE

Attach the wire on the same side of the equipment as the arm wearing the antistatic wrist strap. This helps keep the wire out of the way while you are working.

Although wearing a wrist strap helps prevent ESD, you can further reduce the risks by not wearing clothing made of silk, polyester, or wool. These fabrics are more likely to generate a static charge.

NOTE

Technicians should roll up their sleeves, remove scarves or ties, and tuck in shirts to prevent interference from clothing. Ensure that earrings, necklaces, and other loose jewelry are properly secured.

CAUTION

Never wear an antistatic wrist strap if you are repairing a CRT monitor or a power supply unit.

- ***Antistatic Mat***

You might not always have the option to work on a computer in a properly equipped workspace. If you can control the environment, try to set up your workspace away from carpeted areas. Carpets can cause

the buildup of electrostatic charges. If you cannot avoid the carpeting, ground yourself to the unpainted portion of the case of the computer on which you are working before touching any components.

An antistatic mat is slightly conductive. It works by drawing static electricity away from a component and transferring it safely from equipment to a grounding point, as shown in Figure 2-8. Following is the proper procedure for using an antistatic mat:

- **Step 1.** Lay the mat on the workspace next to or under the computer case.
- **Step 2.** Clip the mat to the case to provide a grounded surface on which you can place parts as you remove them from the system.

Figure 2: Antistatic Mat

When you are working at a workbench, ground the workbench and the antistatic floor mat. By standing on the mat and wearing the wrist strap, your body has the same charge as the equipment and reduces the probability of ESD. Either connect the table-top mat and the floor mat to each other, or connect both to the electrical earth ground.

Reducing the potential for ESD reduces the likelihood of damage to delicate circuits or components.

NOTE

Always handle components by the edges.

- ***Hand Tools (2.2.4.3)***

A technician needs to be able to properly use each tool in the toolkit. This topic covers many of the various hand tools used when repairing computers.

✓ **Screwdriver**

A screwdriver is a tool, manual or powered, used for screwing and unscrewing screws. A typical simple screwdriver has a handle and a shaft, ending in a tip the user puts into the screw head before turning the handle.

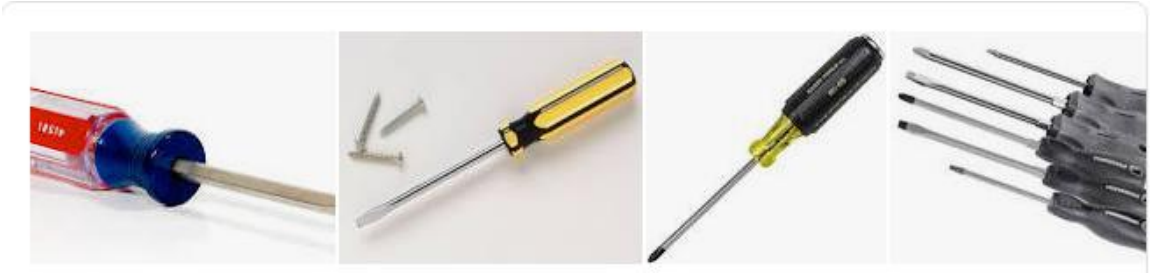


Figure 3: Screwdriver

- Do not use a screwdriver as a punch, wedge, pinch bar or pry.
- Keep the tip clean and sharp to permit a solid grip on the tip of the screw.
- Keep the handle of the screwdriver clean and intact to allow for a solid grip.
- Never hold the piece you are working on in your hand. Always lay it on a workbench or place it in a vice.
- Carry screwdrivers in toolboxes or work belts – never in your pocket. In wood and sheet metal, make a pilot hole for the screw.
- Never use a screwdriver during electrical work unless it is properly insulated.

Match each screw with the proper screwdriver. Place the tip of the screwdriver on the head of the screw. Turn the screwdriver clockwise to tighten the screw and counterclockwise to loosen the screw.

Screws can become stripped if you over-tighten them with a screwdriver. A stripped screw, as shown in Figure 4, may get stuck in the screw hole, or it may not tighten firmly. Discard stripped screws.

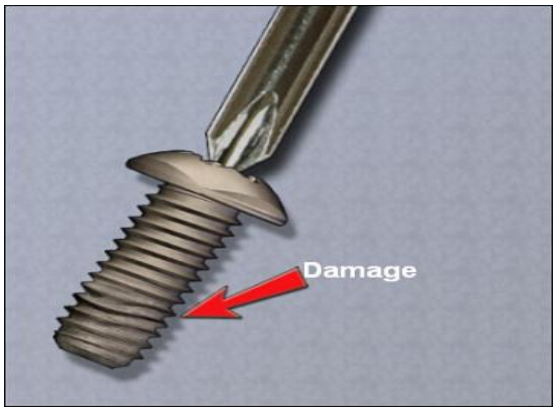


Figure 4:Stripped Screw

CAUTION

Some tools are magnetized. When working around electronic devices, be sure that the tools you are using have not been magnetized. Magnetic fields can be harmful to data stored on magnetic media. Test your tool by touching the tool with a screw. If the screw is attracted to the tool, do not use the tool.

Component Retrieving Tools

Needle-nose pliers and tweezers can be used to place and retrieve parts that may be hard to reach with your fingers. There are also tools called part retrievers that are specifically designed for this task. Do not scratch or hit any components when using these tools.

CAUTION

Pencils should not be used inside the computer to change the setting of switches or to pry off jumpers. The pencil lead can act as a conductor and may damage the computer components.

Various specialty tools, such as Torx bits, antistatic bags and gloves, and integrated circuit pullers, can be used to repair and maintain computers. Always avoid magnetized tools, such as screwdrivers with magnetic heads, or tools that use extension magnets to retrieve small metal objects that are out of reach. Using magnetic tools can cause loss of data on hard drives and floppy disks. Magnetic tools can also induce current, which can damage internal computer components.

- ✓ **Cleaning Tools**

A computer needs to be cleaned just like any other object in your home.

Cleaning Materials

Keeping computers clean inside and out is a vital part of a maintenance program. Dirt can cause problems with the physical operation of fans, buttons, and other mechanical components. On electrical components, an excessive buildup of dust acts like an insulator and traps the heat. This insulation impairs the ability of heat sinks and cooling fans to keep components cool, causing chips and circuits to overheat and fail.

NOTE

When using compressed air to clean inside the computer, blow the air around the components with a minimum distance of 4 in. (10 cm) from the nozzle. Clean the power supply and the fan from the back of the case.

CAUTION

Before cleaning any device, turn it off and unplug the device from the power source.

Here are some cleaning tool examples

Cleaning Tools

Having the appropriate cleaning tools is essential when maintaining and repairing computers. Using the appropriate cleaning tools helps ensure that computer components are not damaged during cleaning. Cleaning tools include the following:

Soft cloth: Used to clean different computer components without scratching or leaving debris

- **Compressed air:** Used to blow away dust and debris from different computer parts without touching the components
- **Cable ties:** Used to bundle cables neatly inside and outside of a computer

- **Parts organizer:** Used to hold screws, jumpers, fasteners, and other small parts and prevents them from getting mixed together

Figure 5:Tool box organizer

✓ **Diagnostic Tools**

There are specialized testing devices used to diagnose computer and cable problems:

- **Multimeter:**

A digital multimeter, as shown in Figure 2-3, is a device that can take many types of measurements. It tests the integrity of circuits and the quality of electricity in computer components. A digital multimeter displays the information on an LCD or LED.

Figure 6:Multimeter

- **Power supply tester: A** device that checks whether the computer power supply is working properly. A simple power supply tester might just have indicator lights, while more advanced versions show the amount of voltage and amperage.

Figure 7:Power supply tester

- **Cable tester:** A device that checks for wiring shorts or faults, such as wires connected to the wrong pin.

Figure 8: Cable tester

- **Loopback plug:** A device that connects to a computer, hub, switch, or router port to perform a diagnostic procedure called a loopback test. In a loopback test, a signal is transmitted through a circuit and then returned to the sending device to test the integrity of the data transmission.

Figure 9: Loopback plug

- **Adapter:**
  - Adapter is a device for connecting pieces of equipment that cannot be connected directly
  - An adapter is a device that allows a specific type of hardware to work with another device that would otherwise be incompatible. ... For example, desktop computers typically have the adapter built into the internal power supply. Video adapters and audio adapters adapt one type of interface to another type of connector.

Figure 10: Adapter

L.O 1.2: Test tools, material and equipment

- **Content/Topic1: Testing of hand and safety tools**

Personal Protective Equipment (PPE) is vital to most Work at Height and will protect personnel from potentially hazardous falls. PPE should be visually inspected once every 6 months, and fully tested for compliance every 12 months by a competent specialist.

What is a PPE test?

A personal protective equipment (PPE) test ensures different types of PPE equipment are safe and secure and can protect the wearer as intended. PPE includes clothing and other articles intended to protect the wearer from injury or other health-related risks. Conducting a PPE test is a legal obligation in many jurisdictions, and it also helps R&D teams discover faults early.

Why are PPE tests important?

In potentially dangerous workplace environments, workers rely on PPE to protect against health and safety risks, and on the assurances of PPE manufacturers that their equipment will perform as promised. Electrostatic Discharge test meters (ESD testers) are used to measure the level of electrostatic discharge on a person, surface, or piece of equipment.

Other ESD devices with integrated circuits will be needed to prevent damage, that might be caused by sparks from excess ESD.

ESD test meters measure electrostatic discharge by monitoring the surface resistance level to determine whether it is within an acceptable range for safety.

ESD test meters can vary quite widely in their specific function, depending on what they are measuring..

- ✓ **Testing ESD wrist strap Tools**

Testing the Wrist Strap The best test of the wrist strap system is while it is worn. This includes all three components: the wristband, the ground cord (including resistor), and the interface with the wearer's skin. "Because wrist straps have a finite life, it is important to develop a test frequency that will

guarantee integrity of the system. Typical test programs recommend that wrist straps that are used daily should be tested daily. However, if the products that are being produced are of such value that a guarantee of a continuous, reliable ground is needed then continuous monitoring should be considered of even required.

How do you test an ESD wrist strap with a multimeter?

Use an ohmmeter or multimeter to determine if there is conductivity between the metal part of the wrist strap, and the end part where you connect it to ground. You should see some measurable resistance (indicating good conductivity) if the strap is functioning correctly.

- ✓ **Testing ESD mat Tools**

What Tester do you use for continuity?

The most common and basic way of performing a continuity test is with the help of a resistance tester (any simple Multimeter with this function will do). This is because the resistance of conductors between the two ends is usually very small (less than 100 ohm).

- ✓ **Testing screwdriver:** Testing screwdriver, Touch the tip of the tester screwdriver to the wire you're testing, being sure to hold the tester screwdriver's insulated handle. Look at the handle of the screwdriver. If the small neon light in the handle lights up, there is power going to the circuit. Otherwise the circuit is dead.

Figure 11: Testing screwdriver

- ✓ **Testing needle**

A **needle** is a small, very thin piece of polished metal which is **used** for sewing. It has a sharp point at one end and a hole in the other for a thread to go through. Knitting **needles** are thin sticks that are **used** for knitting.

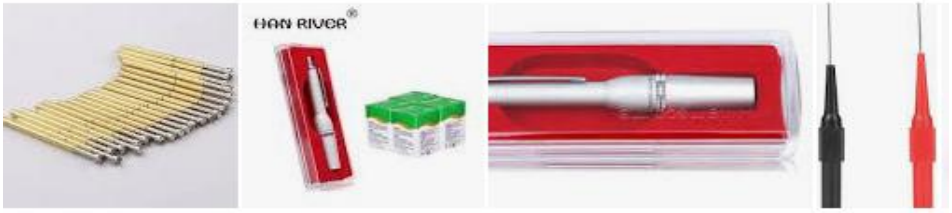


Figure 12:Testing needle

- ✓ **Testing pliers**

Pliers are a hand tool used to hold objects firmly, possibly developed from tongs used to handle hot metal in Bronze Age Europe. They are also useful for bending and compressing a wide range of materials.

Figure 13: Testing pliers

- **Content/Topic2: Testing diagnostic Tools**

✓ **Testing multimeter**

- There is also another way to examine if a multimeter is capable of measuring voltage. All you will need to do is to purchase a new 9 V battery. Now, you should carefully place the red probe to the positive terminal of the battery and the black probe to the negative terminal. If the multimeter provides a reading of 9 V or very close to it, the multimeter works!
- If you want to find out if your multimeter works at measuring current, you will first need to have a loaded circuit. You could have a battery connected to the resistance. Then, you should place the multimeter in the series to the circuit. If it shows a reading, it works. If it doesn´t show a propereading, it doesn´t work.

Figure 14: Testing multimeter

✓ **Testing loopback**

Why do we use loopback test?

A loopback test is a test in which a signal in sent from a communications device and returned (looped back) to it as a way to determine whether the device is working right or as a way to pin down a failing node in a network.

Testing adaptor

Testing your AC adapter is crucial to the longevity of your adapter powered devices.

Step 1

Disconnect the adapter at both ends. Visually inspect the adapter and cable for physical signs of abuse including broken insulation, housing or plug parts. A physically broken adapter is an electrical shock hazard and should be repaired or discarded.

Step 2

Inspect for scorch marks, deformed or molten housing or soot indicating an overheated or burnt adapter. Discard the adapter if it indicates damage from overheating or misuse.

Step 3
Connect the voltmeter to the outlet powering the adapter. Determine if the outlet is appropriately powering the adapter. Outlets that may be wired to switches or switched circuits may falsely indicate a bad adapter. Verify that the outlet the adapter is connected to is polarized or grounded to match the adapter.
Step 4
Read your adapter to determine input and output voltages prior to testing. Switch your voltmeter to the setting corresponding with the adapter output. Switch your power strip off and plug in the AC adapter.
Step 5
Attach the voltmeter leads to the adapter. Turn the voltmeter and power strip on. Switch the adapter on, if equipped with a switch.
Step 6
Read the voltmeter to determine the voltage put out by the AC adapter. Discard the adapter if the voltage indicated on the voltmeter does not correspond with the written rating.

L .O 1.3: Arrange workplace

Content/Topic 1 Arrangement of Hand and safety tools and equipments

- All PPE clothing and equipment should be of safe design and construction, and should be maintained in a clean and reliable fashion. Employers should take the fit and comfort of PPE into consideration when selecting appropriate items for their workplace. PPE that fits well and is comfortable to wear will encourage employee use of PPE. Most protective devices are available in multiple sizes and care should be taken to select the proper size for each employee. If several different types of PPE are worn together, make sure they are compatible. If PPE does not fit properly, it can make the difference between being safely covered or dangerously exposed. It may not provide the level of protection desired and may discourage employee use. OSHA requires that many categories of PPE meet or be equivalent to standards developed by the American National Standards Institute (ANSI). ANSI has been preparing safety standards since the 1920s, when the first safety standard was approved to protect the heads and eyes of industrial workers. Employers who need to provide PPE in the categories listed below must make certain that any new equipment procured meets the cited ANSI standard. Existing PPE stocks must meet the ANSI standard in effect at the time of its manufacture or provide protection equivalent to PPE manufactured to the ANSI criteria. Employers should inform employees who provide their own PPE of the employer's selection decisions and ensure that any employee-owned PPE used in the workplace conforms to the employer's criteria, based on the hazard assessment, OSHA requirements and ANSI standards. OSHA requires PPE to meet the following ANSI standards: Eye and Face Protection: ANSI Z87.1-1989 (USA Standard for Occupational and Educational Eye and Face Protection). Head Protection: ANSI Z89.1-1986. Foot Protection: ANSI Z41.1-1991.

For hand protection, there is no ANSI standard for gloves but OSHA recommends that selection be based upon the tasks to be performed and the performance and construction characteristics of the glove material. For protection against chemicals, glove selection 9 must be based on the chemicals encountered, the chemical resistance and the physical properties of the glove material.

Training Employees in the Proper Use of PPE

Employers are required to train each employee who must use PPE. Employees must be trained to know at least the following:

When PPE is necessary.

- What PPE is necessary?
- How to properly put on, take off, adjust and wear the PPE.
- The limitations of the PPE.
- Proper care, maintenance, useful life and disposal of PPE.

Employers should make sure that each employee demonstrates an understanding of the PPE training as well as the ability to properly wear and use PPE before they are allowed to perform work requiring the use of the PPE. If an employer believes that a previously trained employee is not demonstrating the proper understanding and skill level in the use of PPE, that employee should receive retraining. Other situations that require additional or retraining of employees include the following circumstances: changes in the workplace or in the type of required PPE that make prior training obsolete. The employer must document the training of each employee required to wear or use PPE by preparing a certification containing the name of each employee trained, the date of training and a clear identification of the subject of the certification

Content/Topic 2: Arrangement of cleaning tools and diagnostic tools

How to Organize Your Household Cleaning tools

Smart organization of household cleaning supplies can help you locate specific supplies when you need them. Organizing your supplies wisely can also help ensure that potentially hazardous products are stored properly and safely. There are lots of ways to store cleaning supplies, so you have plenty of organization options!

Picking a Location for Your Cleaning Supplies

Store your supplies where they'll be used. If you have the space, locating them where they get used is often the best solution. Bathroom cleaning supplies might be best stored in the bathroom, kitchen cleaners in the kitchen, and so on

Store everything in a single location. The suggestion above may not be suitable for a small home, and putting all of your cleaning supplies in a single location may be your only solution. The advantage is that all of your supplies will be easy to find.

Convert a spare closet into a broom closet. Consolidate a couple of partially-filled closets to create one dedicated to cleaning supply storage. Add shelves, racks and hooks to accommodate your cleaning products and tools.

Use extra pantry space. Pantries can often be arranged to create new space for cleaning supplies. Take care not to put food and harmful chemicals in close proximity to one another.

Arrangement of cleaning tools

Soft cloth: Used to clean different computer components without scratching or leaving debris, it must be well cleaned and washed after work and arranged in proper place.

Compressed air: Used to blow away dust and debris from different computer parts without touching the components it must be well cleaned and washed after work and arranged or stored in proper place.

Arrangement diagnostic tools

- ✓ **Multimeter :**

A digital multimeter, is a device that can take many types of measurements. It tests the integrity of circuits and the quality of electricity in computer components. A digital multimeter displays the information on an LCD or LED. See how it is arranged.

- ✓ **Loopback**

A loopback adapter, as shown in Figure 2, also called a loopback plug, tests the basic functionality of computer ports. The adapter is specific to the port that you want to test.

- ✓ **Adapter**

Learning unit 2: Fix Computer system

L.O 2.1: Systematic diagnosis of computer system

Content/Topic 1: Description of External cables

VGA Cable:

VGA or HD15 is the analog connection used to connect computers and laptops to projectors or additional monitors. In light of Analog Sunset, VGA is considered a legacy connector, and will be replaced with a digital HDMI

DVI Cable:

Digital Visual Interface (DVI) is a video display interface developed by the Digital Display Working Group (DDWG). The digital interface is used to connect a video source, such as a video display controller, to a display device, such as a computer monitor.

The main difference between VGA and DVI is in picture quality and the way the video signals travel. VGA connectors and cables carry analog signals while DVI can carry both analog and digital. DVI is newer and offers better, sharper display compared to VGA.

- **Power Cable:** A power cable is an electrical cable, an assembly of one or more electrical conductors, usually held together with an overall sheath. The assembly is used for transmission of electrical power
- **HDMI Cable :HDMI (High-Definition Multimedia Interface)**

is a proprietary audio/video interface for transmitting uncompressed video data and compressed or uncompressed digital audio data from an HDMI-compliant source device, such as a display controller, to a compatible computer monitor, video projector, digital television, or digital audio device.[4] HDMI is a digital replacement for analog video standards.

- **USB Cable:** A USB port is a standard cable connection interface for personal computers and consumer electronics devices. USB stands for Universal Serial Bus, an industry standard for short-distance digital data communications. USB ports allow USBdevices to be connected to each other with and transfer digital data over USBcables.

Serial Cable: A serial cable is a cable used to transfer information between two devices using a serial communication protocol

- **Parallel Cable:** parallel cable. A series of metal wires that enable multiple bits of data to be transferred simultaneously. Parallel cables have mostly given way to serial cables, where data is transferred one bit after another

- **Content/Topic 2 Description of I/O devices**

A *device* is a unit of physical hardware or equipment that provides one or more computing functions within a computer system. It can provide input to the computer, accept output or both. ... Typical hardware includes a computer mouse, speakers, printer and microphone.

➢ **Mouse:** A computer mouse is a hand-held pointing device that detects two-dimensional motion relative to a surface.

Why my mouse is not working?

There may be several issues that cause the mouse not to work properly with Microsoft Windows. ... Mouse driver outdated or missing. Outdated USB driver. Other USB driver issues.

Cause of a Mouse Not Working

Mouse failures source from five sources:

- Irreparable hardware damage.
- Loss of power or connection.
- Interference between the mouse and the work surface.
- Outdated software.
- Operating system glitches or misconfigurations.

How to Fix a PC or Laptop Mouse That's Not Working

Since several factors could be at the root of a mouse failing to work properly, troubleshooting the problem is the best way to make it work once more. Try these steps, organized in order of most-common and easiest to most intensive.

1. **Inspect the mouse for hardware damage.** A cracked housing, a missing ball, sticky or silent clicking of the finger switches, or a failure of the optical sensor to glow suggest that the device is damaged. Given how inexpensive most mice are, hardware damage usually suggests that replacement, rather than repair, is the optimal solution.
2. **Clean the mouse.** If the pointer moves in jerking motions or is less responsive than usual, clean the mouse to see if it improves the performance. It's easy to clean a wireless mouse or a wired mouse with a roller ball.

While you're cleaning the mouse, make sure there is nothing covering the laser on the bottom of the mouse. Anything that obstructs the laser (like paper, tape, etc.) will interfere with the movement of the mouse/cursor.

3. **Replace the batteries.** Swap the batteries out for a new set, especially if you're still using the batteries that came with the device. Consider using rechargeable batteries. Likewise, verify the batteries are properly installed. Sometimes, closing the panel door before the battery bounces out can be tricky.

Similarly, plug the mouse into its charger for 30 minutes to let it get enough juice to connect. Mice with USB charger ports and non-rechargeable batteries sometimes appear to fail without warning when charge levels decline too much.

4. **Try a different USB port.** There might be a problem with the one you're using, so unplug the mouse or the receiver and try an alternate USB port. Most desktop computers offer ports on the front and back of the computer, so try all of the ports before jumping to a different step. It could also be the case that the plug partially unseated.

5. **Connect the mouse directly to the USB port.** If you use a multi-card reader or an external USB hub, there may be a problem with that device instead of the mouse or USB port. Plug the mouse directly into the computer to see if the problem clears.

6. **Use the mouse on an appropriate surface.** Some mice can be used on (almost) any kind of surface. Many can't. Study your device's limitations—it may require a mouse pad, especially if you're using an older mouse. Some optical mice, for example, cannot track movement on shiny surfaces or surfaces with either very dark or very light colors.

7. **Update the driver.** Check the manufacturer's website for available driver updates or use driver-updater tools. If your mouse won't do something that the manufacturer promised it would do (side-to-side scrolling, for example), check the manufacturer's website to see if a driver is required. These files are usually free.

8. **Release and re-pair a Bluetooth mouse.** It's not uncommon for Bluetooth devices to either lose pairing status or to be forgotten by the computer if a different Bluetooth mouse is paired with it.

9. **Disable an integrated trackpad.** If your laptop supports an internal trackpad, disable it through your operating system's settings utility. An internal trackpad may conflict with, or override, an external mouse.

How to Fix It When Your Mouse Scroll Is Not Working

It's common for a mouse wheel to suddenly stop scrolling. Before you throw your mouse in the trash, there are a few troubleshooting tips you can follow to get it working again.

Causes of Mouse Wheel Not Scrolling

When the mouse won't scroll, there are two issues that most commonly cause it. The first is dust and dirt causing mechanical issues with the mouse wheel. The second is low battery issues on wireless mice. However, these aren't always the root cause. Other issues include incorrect mouse settings in the OS system settings, corrupt system files, or using a mouse that's incompatible with your operating system.

How to Fix a Mouse Wheel That's Not Scrolling

The issues below apply to all computer systems that use mice, including Windows 10 or macOS. In most cases, the fix involves the mouse itself. In other cases, the instructions will include steps for each operating system.

Before you get too far, are you only experiencing an issue with the mouse wheel not scrolling in Excel (a common issue)? If so, make sure the cursor movement direction in Excel is set up properly.

1. Reconnect the mouse. Before doing anything, make sure the issue isn't a temporary one. You can do this by disconnecting the mouse from the USB port and plugging it back in. Whenever you plug in a mouse, it restarts the mouse drivers and this alone could resolve the issue. You might even try using a different USB port. If you're using a wireless mouse, make sure you've connected it properly to your PC.
2. Replace the batteries. If you're using a wireless mouse, low battery power is the most common cause of strange mouse behavior. Whether the mouse wheel isn't scrolling or the mouse is otherwise acting erratically, swapping the batteries is a very quick and inexpensive way to rule out this cause.

   You might also consider switching to rechargeable batteries so that you can always have fully charged batteries on hand that you swap out on a schedule. This way you don't have to wait until your mouse starts acting up before changing them.
3. Clean the mouse. Most modern mice don't have rollers to clean anymore, but now the scroll wheel is the one mechanical part. This also means it's the part prone to attracting dirt, dust, and food particles. These slip in through the cracks on the side of the wheel and can lead to the mouse scroll wheel not working. If your mouse is wireless, there are some special wireless mouse cleaning considerations to keep in mind.
4. Check the touchpad. Another common issue is mouse interference from something touching the touchpad on your laptop. This could be something as simple as water leaking from a cup nearby. You might even consider temporarily disabling your touchpad just to see if this fixes the problem.
5. Check mouse wheel settings. Each OS has unique settings to control the mouse wheel. If these change you could experience the mouse wheel not scrolling. Look through your mouse settings on your Windows 10 or Mac to ensure wheel scrolling is actually enabled and configured properly. If you're using a Mac, also check that the scrolling direction is set up the way you want it to be.
6. Update mouse drivers. The most effective way to update your mouse driver is to download and install the latest mouse driver from the manufacturer's website. On a Windows 10 PC, check the

Device Manager to ensure there isn't an exclamation mark next to the mouse driver after you've updated. If there is, you'll want to roll back the mouse driver and try something else.

Before moving on to the final step, try using a different mouse to make sure that the issue is actually with your system and not a mouse hardware failure. You wouldn't want to take more drastic measures with your computer if all you need is to buy a new mouse.

7. Fix corrupt system files. At this point, it is possible your system files may be corrupt. Before you try anything drastic, make sure you've installed the latest system updates for Windows 10 or your Mac OS updates from the Apple App Store. Next, try to perform an automatic repair for Windows 10. If all else fails, you may need to do a full Windows 10 system restore or a clean install of Windows if you don't have a recovery backup. If you're using a Mac, you may need to do a full Mac OS re-install.

- **Keyboard:** A computer keyboard is one of the primary input devices used with a computer that looks similar to those found on electric typewriters, but with some additional keys.Keyboards allow you to input letters, numbers, and other symbols into a computer that can serve as commands or be used to type text

How To Fix Windows Keyboard Keys Which Stop Working

A keyboard without working keys may seem like a blow to productivity, but it’s possible to repair. If you’ve been working on your PC and suddenly some or no characters appear on your computer screen, we’re going to show you how to fix it.

If you have a desktop PC, it’s easy to just swap the keyboard and use a different one. For laptops though, this isn’t possible, which makes it a big problem.

It could be that your computer could use some simple hardware or software maintenance, or your keyboard settings are set to use the wrong language or region.

Before you visit the repair shop, buy a new keyboard, or chuck your laptop altogether, try some of the quick fixes below.

Note: The instructions below apply to a Windows PC.

Fix Keyboard Keys Which Stop Working

- Quick checks
- Clean up the keyboard
- Restart your PC
- Use a different keyboard
- Check the region or language settings
- Adjust keyboard input settings
- Run a malware scan

- Reinstall keyboard driver
- Visit a service tech/Replace the keyboard

Quick Checks

- If you're using a Bluetooth keyboard, check that it's powered on and that it's connected.
- Re-pair the keyboard with your computer (for wireless keyboards).
- Try a different USB port (wired keyboard).
- Check the keyboard's battery level as it may cause performance problems.
- If the keyboard keys still won't work after carrying out these basic checks, try the solutions below.

Clean Up The Keyboard

It's not easy to clean a standard keyboard, but it's easier to do if you have a wireless or USB keyboard compared to a laptop keyboard. This may not necessarily fix any deep-seated issues with your keyboard keys, but it'll help if debris and dirt are preventing the keyboard keys from working.

To clean up the laptop keyboard:

- Shut down the device, turn it upside down and then tap gently on the base to avoid risking damage to the entire unit.
- Run your fingers across the keys to dislodge any debris or dirt that's left and clean the table when you're done.
- Pick up a compressed air can and give it a good blast, or keyboard cleaning putty to remove any dirt that's stuck.
- If the keys are stuck because of liquid spills, pop off the key from the keyboard and try to clean the dried liquid off the key switch as much as you can. To remove a key without breaking it, place the tip of your finger or a flathead screwdriver under a corner of the key and pry it up gently until it pops off. You can dab some soapy water or rubbing alcohol on a rag or cotton swab to clean away any residue.

Restart Your PC

A reboot helps refresh the system and correct any software glitches that could cause your keyboard keys not to work.

Use a Different Keyboard

Try connecting a different USB or wireless keyboard, or use the Windows on-screen keyboard and see if it helps. If it does, then your current keyboard could be defective.

Check the Region Or Language Settings

When your keyboard's language or layout settings are wrong, you may see different letters on your screen than what's indicated on the keyboard. This happens based on the different characters used in different regions, so the keyboard layouts aren't the same everywhere.

To correct this, change the region or language settings using these steps:

- Click **Start>Settings>Time & Language**.
- Click **Region** to select your current region.
- Click **Language** and then click **Add a preferred language** to choose the right option for your keyboard.
- Click **Next** and then click **Install**.
- Go to the Languages section and select the new language for your keyboard, and then try typing a few characters again to see if it works.
- You can also change your keyboard options by going back to **Language**, click on the current keyboard language, and then click **Options** to select the keyboard type. For instance, US users will have English (United States) as their keyboard language, and the US QWERTY keyboard layout option.

Adjust Keyboard Input Settings

Your keyboard keys have certain software settings that may cause erratic behavior, even if they're meant to be helpful. You can adjust such input settings like Filter Keys, Sticky Keys, or Repeat Delay settings.

If pressing a particular key types more than one character:

- Click **Start>Control Panel** and search for **Keyboard** in the Control Panel search bar.
- Under the **speed** tab, adjust the **Repeat Delay** settings and try typing the characters again.
- If there's a delay between pressing a key and the character showing up on your screen, you need to adjust **Filter Keys**. Type **Ease of Access** in the search bar, and click on it.
- Click **Make the keyboard easier to use.**

- Uncheck the **Filter Keys** box if it's on, and click **OK**. Turn off **Sticky Keys** in the same menu if your keyboard is acting up.

Run a Malware Scan

As crazy as it sounds, it's possible that your keyboard could be infected with a virus. Run a malware scan using your currently installed antivirus software, or try a free online malware scanner just to rule out any potential threats.

Reinstall the Keyboard Driver

An outdated driver could cause your keyboard keys not to work. However, sometimes the keyboard driver can malfunction especially if you regularly install third-party software, or turn off your computer without using the Shut Down command.

To reinstall your keyboard driver, take these steps:

- Right-click Start and select Device Manager.
- Click on Keyboards to expand the list. Here you can check for any entry that could be having a yellow exclamation mark next to it, indicating a problem.
- Right-click your keyboard and select Uninstall Driver.
- Restart your computer, and it'll automatically install the generic keyboard drivers, after which you can check if the keys work again.

Note: You can also go to your computer manufacturer's website and install the latest drivers for the specific keyboard for your model. If it's not available, you can reinstall the USB drivers or chipset.

Replace The Keyboard

If none of these solutions helped, and your computer is still in its warranty period, you can check with the manufacturer for further support and repair, or get it replaced altogether.

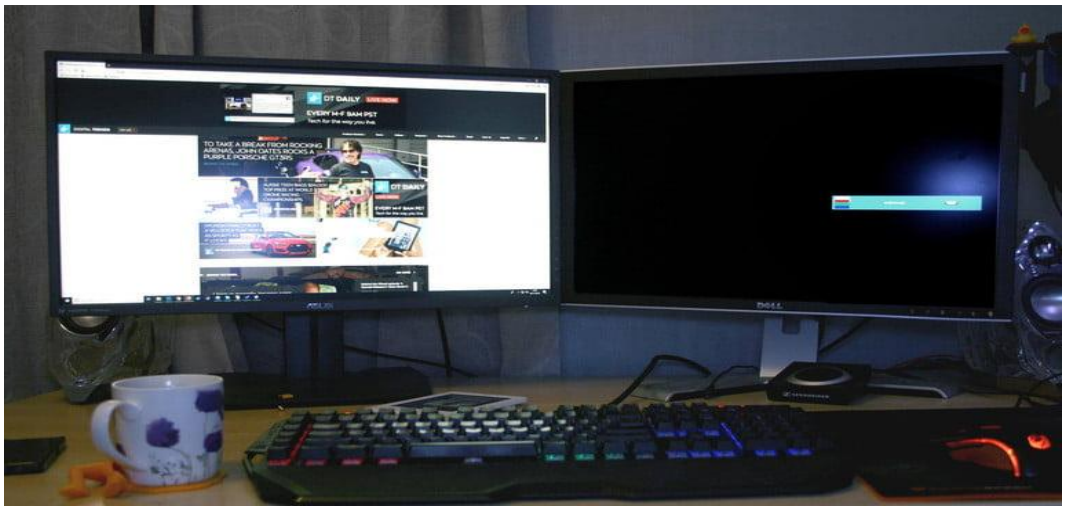
If it's a laptop, back up your hard drive or remove it before sending it to a service technician, just so you don't lose your precious data.

- **Monitor:** A computer monitor is an output device which displays information in pictorial form.

The most common multi-monitor problems, and how to fix them

If you've followed our guide on how to set up multiple monitors and you're running into difficulties, check out the list below of the most common multi-monitor problems, and how to fix them in Windows 10.

No signal



Although getting no "signal" to your new monitor can be cause for concern, it's arguably the easiest problem to fix. It simply means that the display has power, but it isn't receiving visual data. There are a number of reasons why this happens and plenty of fixes you can try to sort it out.

Force Windows to detect your monitor – Maybe Windows didn't recognize your second display's connection. To force it to check again, right-click the desktop and select *Display Settings* from the resulting pop-up menu. In the following window, click the *Detect* button located under the display diagram.

Turn the screen off and on – Some connection types don't like hot swapping while a monitor is powered on. Turn the display off and then on again. That may be all it needs to recognize the video feed and start displaying it correctly.

Verify cable connections – A loose cable can cause "no signal" errors more often than any other problem. If they do seem well secured, unplug, and plug them in again just to be sure.

Verify the correct input – Monitors with multiple input options need you to manually select which cable (port) you're using, like HDMI 1, HDMI 2, DisplayPort, and so on. Use the buttons on your monitor to cycle through the channels and select the correct input from your PC. If you are using an adapter to switch from one type of input to another, this may be causing issues with the other monitor. Try to remove the adapter if possible, or replace with another adapter to see if this fixes the issue.

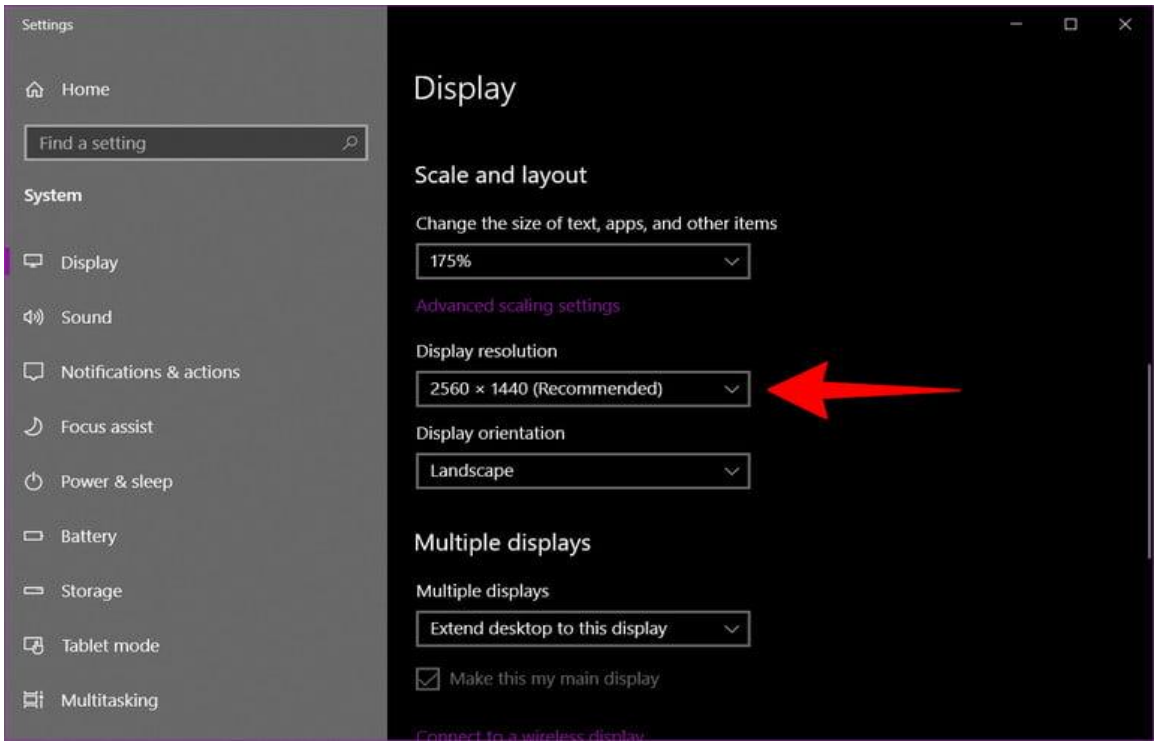
Change data cable – If you're using an older cable standard like VGA or DVI-D, you might want to try a newer alternative like HDMI or DisplayPort. You can also try using a new cable in case the old one has issues (bent pins, a short, exposed wire, etc.).

Change the graphics port – If you're using a dedicated graphics card with multiple output ports, try switching to another port. Sometimes ports themselves can go bad or somehow get damaged. Switching to another is all you need to do to correct the problem.

Update your drivers – Windows 10 supports multiple monitors by default, but your current setup may not be configured correctly. Making sure you're running the latest graphics drivers for your system can sometimes fix problems with no signal errors.

If you're still having trouble with the additional monitor, verify that it works by unplugging the primary screen and double-checking the above steps again. If it does, consider running it as the primary display until you determine the root problem. If it doesn't, contact your retailer or manufacturer to discuss a return or replacement.

Wrong resolution



If you add a new, higher-resolution monitor to your system and find that it's not displaying correctly, it might be borrowing settings from an older display, or simply trying to match your primary screen.

Step 1: Right-click your desktop and select the *Display Settings* option on the resulting pop-up menu.

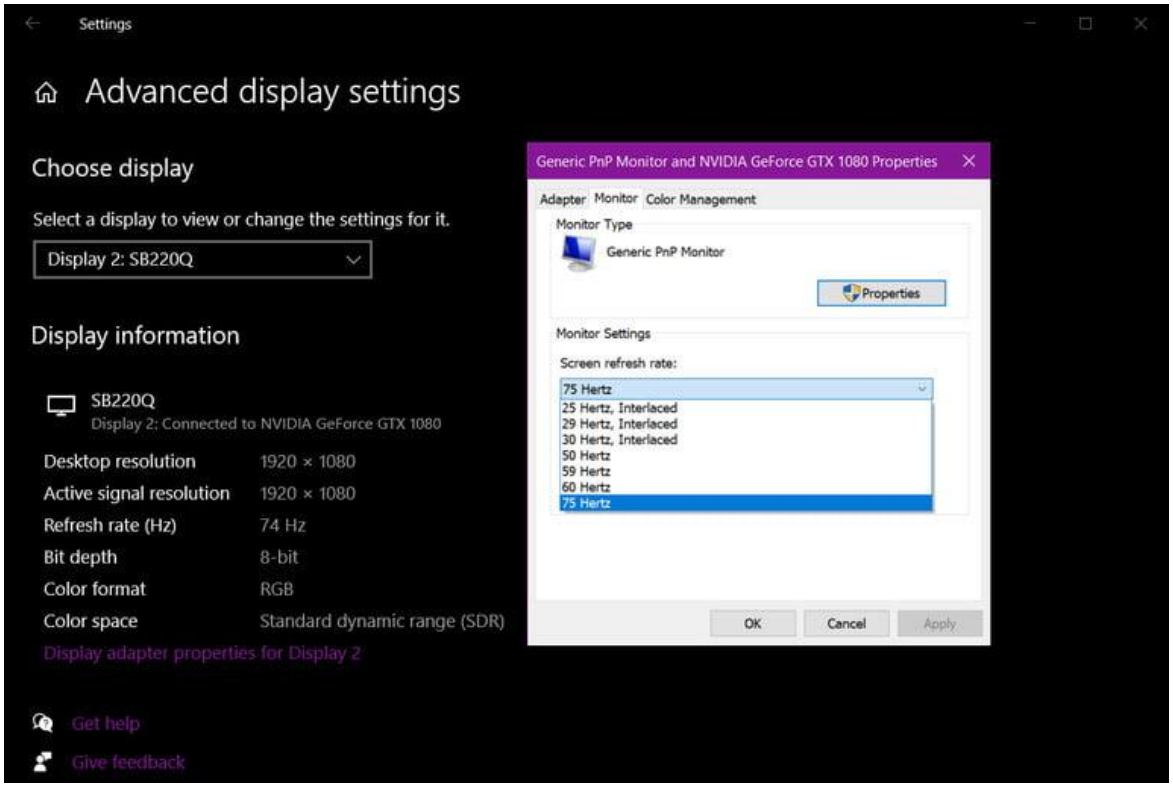
Step 2: The *Settings* app opens with the *Display* panel loaded by default. Click on the secondary display shown in the diagram.

Step 3: With your secondary screen highlighted, scroll down to *Scale and Layout* and click the drop-down menu located under *Display Resolution*.

Step 4: Select a screen resolution that works best for you. Windows 10 designates one of these resolutions as "recommended" based on the display's hardware.

If this didn't work, make sure your monitor and graphics card can run at your chosen resolution. If you're still running into problems, try updating your graphics drivers.

Wrong refresh rate



If your monitor is set at an incorrect refresh rate, it will display a “no signal” error. That means the PC is outputting a signal the display simply can’t handle, requiring you to manually adjust the output in Windows 10.

Step 1: Right-click your desktop and select the *Display Settings* option on the resulting pop-up menu.

Step 2: The *Settings* app opens with the *Display* panel loaded by default. Scroll down and click the *Advanced Display Settings* link located under *Multiple Displays*.

Step 3: On the following screen, click the drop-down menu located under *Choose Display* and select the problematic monitor.

Step 4: Under *Display Information*, click the *Display Adapter Properties for Display #* link.

Step 5: In the following pop-up window, click the *Monitor* tab.

Step 6: Under *Monitor Settings*, use the drop-down menu to select another refresh rate.

You can double-check what refresh rate your monitor is running at with the Testufo tool.

Duplicate or extended

There are a few different ways to display content on two screens, but *Duplicate* is often the default. If your second display merely copies the desktop rather than extend it, here's how to change that view.

Step 1: Press the *Windows + P* keys to load the *Project* menu.

Step 2: Select the *Extend* option. You can do this by using your mouse, going up or down with the arrow keys and pressing *Enter*, or by pressing the *Windows + P* keys to cycle through options.

Alternatively, you can take the long route:

Step 1: Right-click your desktop and select the *Display Settings* option on the resulting pop-up menu.

Step 2: The *Settings* app opens with the *Display* panel loaded by default. Select your secondary monitor shown in the diagram.

Step 3: With your second screen highlighted, scroll down to *Multiple Displays* and select *Extend Desktop to This Display* on the drop-down menu.

Step 4: Go back up to the diagram and use your mouse to drag your second monitor to the left or right of your primary screen.

These same processes can be used to change to duplicate if you'd prefer it that way.

Use a third-party app – Applications like the Dual Monitor Tool can let you lock a mouse pointer to a specific monitor. Just remember to unlock the mouse when you're done.

Turn off the second screen – It's a little drastic, but turning off the second screen when playing games that don't need it prevents you from drifting into that extended space mid-game. Simply press the display's power button, or press the *Windows + P* keys and select the *PC Screen Only* option.

Now that your multiple monitors are all working correctly, make sure you get a good dual-screen wallpaper for them.

Distortion and artifacts

Sometimes your secondary monitor will work, but it will encounter distortions and artifacting that make it difficult to use or impossible to play games with. If your first monitor does not have these display issues, then the issue is probably related to your hardware. You can usually fix it by trying these steps:

Check monitor ports – Make sure all ports on your computer are clean and dust-free. If it's been a while, clean them out very carefully with a few jets of compressed air and make sure there is no damage or debris to the port or cable.

Buy a new monitor cable for the secondary monitor – It may be that your cable is old and failing. This is especially true if it isn't shielded and is experiencing interference from Wi-Fi, Bluetooth, and nearby electrical noise. Find a new cable that has great shielding.

Shorten the cable length – If possible, pick a new cable that's shorter than the older one. The longer data has to travel through the cable, the more chance of interference, so a shorter cable can cut down on artifacting and similar problems.

If you are using switch converters or adapters, try connecting without them – Look for cables that don't need separate adapters or switches to control.

No display or black screen on a computer monitor

Figure 15: Computer with black screen

If your computer monitor displays only a black screen when you turn on your computer, the following steps may help you fix the problem.

Tip

If your monitor initially works and then goes blank when Windows starts, see: How to fix distorted video after increasing resolution in Windows.

Tip

If you have a laptop, see our laptop screen is black page, see: My laptop computer screen is black.

Monitor is not on

It may seem obvious, but make sure the monitor is turned on. If you do not see a power LED (blue, green, or orange light) on the front or bottom of the monitor, press the power button again. If no light comes on after several attempts, proceed to the next section.

How to turn on a computer monitor or another display.

Computer is asleep

If you stepped away from the computer for a bit and returned to a black screen, the computer is likely asleep. Try moving your mouse, clicking the mouse buttons, or pressing any key (e.g., spacebar) to wake it up. If none of those actions work, press the power button.

Loose or improper connections

The following steps help you ensure the monitor is connected correctly to the computer.

Figure 16: HDMI cable Connector

Check the data cable

Ensure the monitor's data transfer cable is connected correctly to the computer. It should be completely inserted and firmly in place. Most new displays utilize a DVI or HDMI cable and port.

Check the power cable

Next, verify the monitor has power by looking for a blue, green, or orange light. This light is found on the front or the bottom of the monitor's bezel.

If you see no lights on the monitor, make sure it is connected to a working wall outlet. If the power cord is removable from the back of the monitor, try replacing it with another power cable. If you still cannot

turn on the monitor after trying another wall outlet and cable, the monitor is broken and should be replaced.

Check the LED status

If the monitor status light is orange or flashing, verify the monitor is not in Standby mode, by moving the mouse or pressing the Esc key. If this doesn't help, reconnect the data cable to the computer and back of the monitor, and then restart your computer.

Try a different cable

If your monitor is getting power, but you still don't see an image, the data cable may be the issue. Try using a different DVI, HDMI, or DisplayPort cable with your monitor.

Turn up the brightness and contrast

If you're able to view your monitor's settings menu even though the screen is blank, you likely need to turn up the brightness and contrast.

No POST

If the computer doesn't pass POST, it won't turn on, and your monitor remains black. If you hear beeping when you turn on your computer, run through the POST troubleshooting steps to determine the issue.

Hardware issue

If you have followed the recommendations above and still have the same issue, your computer may have either a bad monitor, video card, or motherboard. The best method of determining this is to try the suggestions below.

Borrow someone else's computer monitor and connect it to your computer

If another monitor works on your computer, it's safe to assume the non-working monitor is bad and should be replaced. While it may be possible to have the monitor serviced, it is often cheaper and easier to purchase a new one.

Disconnect your monitor and connect it to another computer

If your monitor works on another computer, the video card is bad. Try removing video card from the affected computer and installing it in another computer. If it does not work in the other computer, the video card is most likely bad and needs to be replaced.

If your monitor and video card work with another computer, your motherboard probably has an issue. You can attempt to troubleshoot motherboard problems using the link below. If you determine the motherboard is bad, or you cannot successfully run any tests, we suggest replacing the motherboard to fix the display problem.

Scanner: The computer mouse and scanner fall under the input device category. As the name suggests, input devices are used to send information to the computer. A mouse is used to input the movements of a cursor, while a scanner is used to inputphysical media into digital format.

Fix scanning problems

Diagnose and fix any of the following scanning problems or error messages using the HP Print and Scan Doctor

An error occurred communicating with the scanning device

An error occurred while communicating with the HP imaging device

Computer not found

No Computer Detected

Scan to computer is currently unavailable

Scan to computer no longer activated

Scan Unsuccessful

Scanner not found

Scanner Unreachable

The scanner could not be initialized

Scan issues

Is your HP scanner not working? There are many symptoms and error messages that could cause HP scanner problems such as:

- Can't communicate or connect to HP scanner
- Computer can't find HP scan
- HP Printer will not scan to computer or email
- HP scan button not working
- HP scanner keeps disconnecting or freezing
- Computer not found on HP scanner

Resolve HP scanning issues using our HP Print and Scan diagnostic tool or automated HP Virtual Agent or follow manual troubleshooting steps provided below.

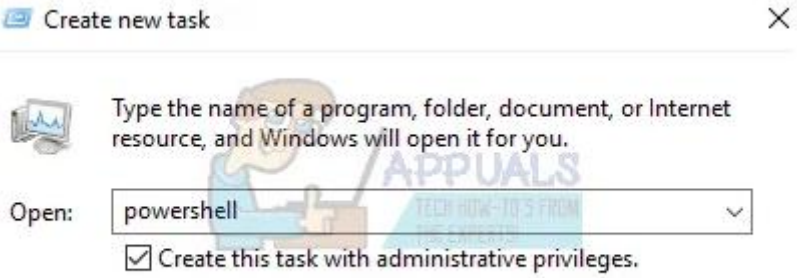
✓ **Fix: Scanner Not Working**

Solution 1: Running SFC Scan

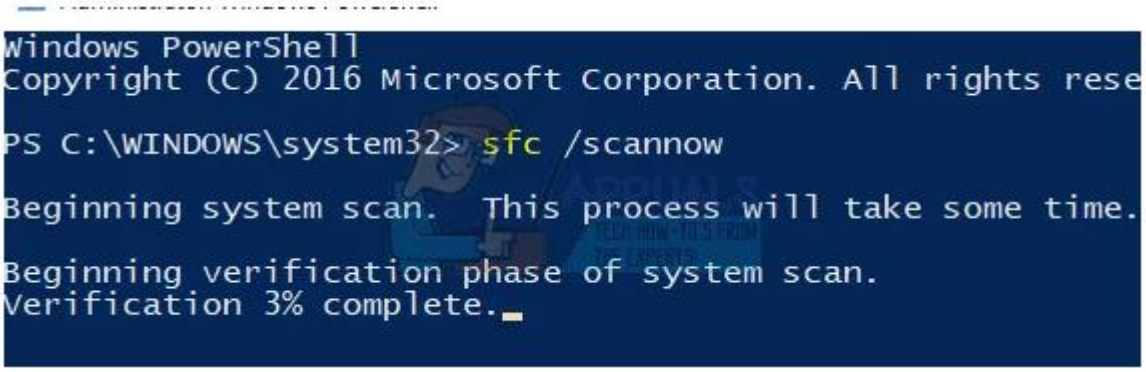
This error might be generated because of bad configurations present on your computer. Because of these errors, your computer might not be able to connect properly with the scanner hence making it inaccessible to you. We can try running the SFC scan and check if there are any integrity violations. If there are, we can run the DISM command to fix them.

1. Press **Windows + R** to launch the Run application. Type "**taskmgr**" in the dialogue box and hit Enter to launch your computer's task manager.
2. Now click on File option present at the top left side of the window and select "**Run new task**" from the list of options available.

3. Now type "**powershell**" in the dialogue box and **check** the option underneath which states "**Create this task with administrative privileges**".



4. Once in the Windows Powershell, type "**sfc /scannow**" and hit **Enter**. This process may take some time as your entire Windows files are being scanned by the computer and being checked for corrupt phases.



5. If you encounter an error where Windows states that it found some error but was unable to fix them, you should type "**DISM /Online /Cleanup-Image /RestoreHealth**" in the PowerShell. This will download the corrupt files from the Windows update servers and replace the corrupt ones. Do note

that this process can also consume some time according to your internet connection. Don't cancel at any stage and let it run.

If an error was detected and was fixed using the above methods, restart your computer and check if the scanner started working normally.

Solution 2: Turning off Firewall and other Applications

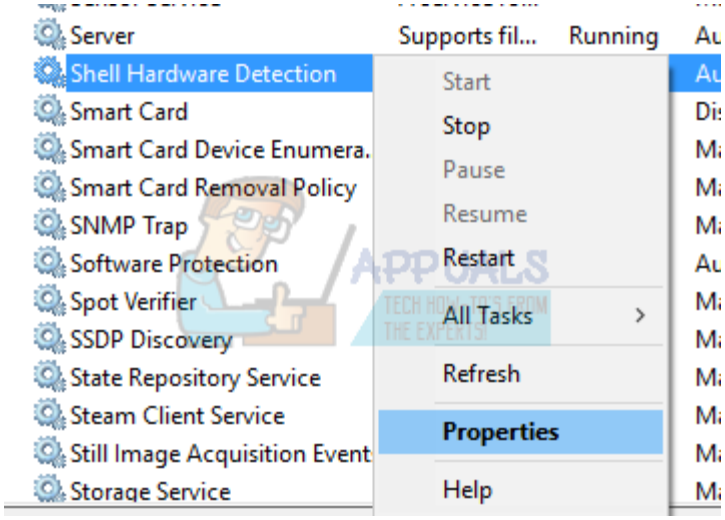
Another workaround which worked for many people was disabling Firewall applications (including Windows Firewall, Windows Defender, and other Antivirus applications). If you are trying to access the scanner over any network, it is possible that it is the firewall which is blocking some ports and restraining the information from being passed on.

1. **Turn off all firewalls**. You check our article on how to disable Windows Firewall.
2. Turn off your running **Antivirus** You can either pause it temporarily or if you don't have that option, you can uninstall it. Make sure that you have the installation package and your registration keys at hand while uninstalling.
3. After making all the necessary changes, check if you can make the scanner work as expected.

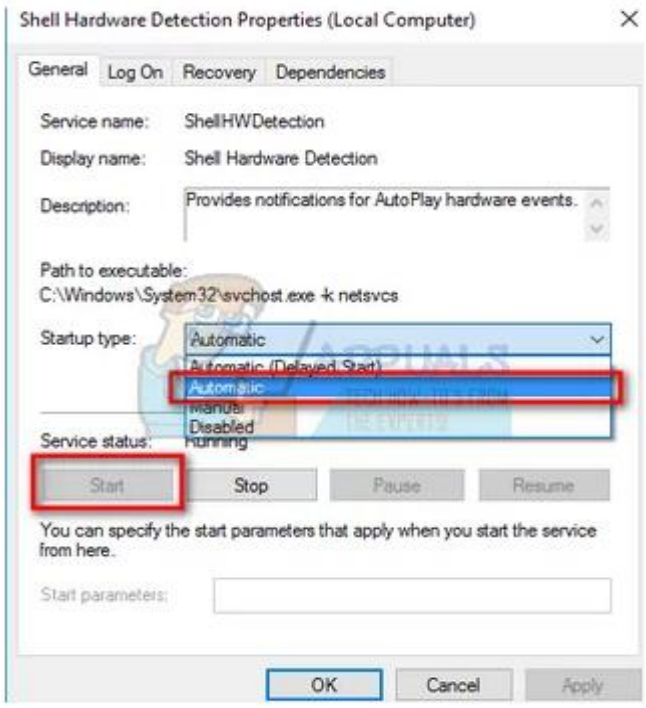
Solution 3: Making Sure all Related Processes are Running

There are few processes which drive the operation of the scanner. If these processes are not running or if they are disabled, you will not be able to access the scanner. Make sure that you are logged into an administrator account while carrying out this solution.

1. Press Windows + R, type "**services.msc**" in the dialogue box and press Enter.
2. Once in the services window, navigate through the list and locate each of the following processes:
3. We need to make sure that all these processes are running and have their startup state set as "**Automatic**". I will take one service as a reference (Shell Hardware Detection) and show you how to check.
4. After identifying the processes, right-click it and select "**Properties**".



5. Once in the Properties, click on "**Start**" (if the processes are stopped), click the drop-down window and select "**Automatic**". Press Apply to save changes and exit.



6. Once you have made sure that all the processes are up and running, restart and reconnect with your scanner and see if you can access it as expected.

Solution 4: Installing Scanner Patch and Scanner Utility from Manufacturer

Most of the scanners nowadays are simply plug and play. You don't need to install any additional software to run them; you can simply use the inbuilt Microsoft utilities to directly forward the job for scanning.

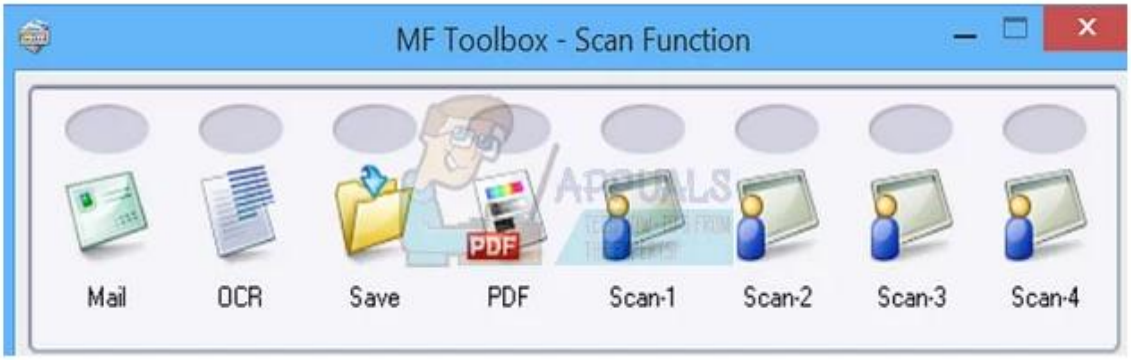


Figure 17:Scanner Patch and Scanner Utility

However, not all scanners work that way. There are many scanners out there which require that you install the required patch, install scanner software (such as Canon MF Toolbox), and then operate the scanner.

You should input your model into the search engine and look around for any related software which you are meant to install on your computer. After installing the software, restart your computer and check if you can use the functionality of the scanner as expected.

Solution 5: Doing a Full Power Cycle

Another workaround which works for a lot of users is power cycling your computer and the scanner utility. Power cycling is an act of turning off a device completely off and then on again. Reasons for power cycling include having an electronic device reinitialize its set of configurations parameters or recover from an unresponsive state or module. It is also used to reset all the network configurations as they are all lost when you turn the device completely turned off.

After **turning off your scanner and computer**, **take out the main power cable** and let them stay idle for a couple of minutes (~10). After the required time, plug in the cables, turn both devices on and try connecting them.

Solution 6: Checking the Scanning Program for Updates

Whenever your scanner doesn't work, you automatically assume that the problem lies with the scanner hardware only. That is true in most cases but there are also scenarios where the software you use for managing scanning is out of date or the version is not supported anymore.

These software are mostly multipurpose programs (such as IrfanView) which are used for more than one tasks. Head over to the software developer's website and check if there are any **pending updates** you did not perform. After updating the software, restart your computer and check if this makes any difference.

Solution 7: Checking Toner Cartridge

If all above solutions don't give any positive results, you should check your toner cartridge if it is full or not. Sometimes if the cartridge is not full up to the required level, the scanner will not print any pages. You will be inputting blank pages only to receive blank pages in the output.

Check your toner cartridge if it is **inserted correctly** and are the **levels up to the mark**. If not, replace the cartridge and after performing all the necessary checks above, power cycle the scanner (solution 5), and then check if the problem got solved.

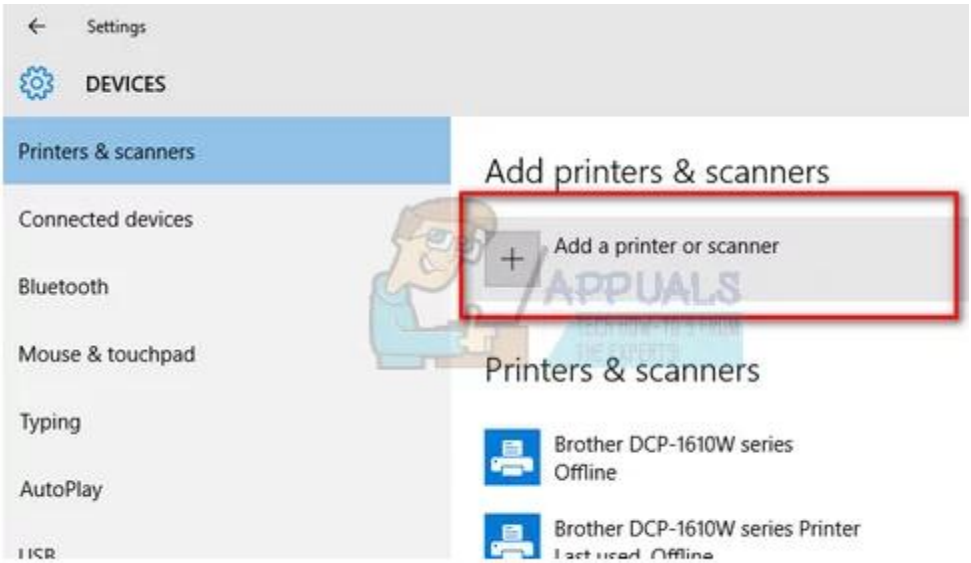
Solution 8: Using USB instead of WiFi for connection

Another widespread problem which many users face is connecting to the scanner over a WiFi connection. There are several cases where the scanner works with a USB connection to the computer over a wireless one. Plug in the USB and see if your computer detects the scanner successfully. If it does, it means you have to configure the WiFi connection on both machines (your scanner and your computer).

1. Make sure that your **scanner is connected to the wireless network correctly** with the correct password. Each scanner configuration is different but you can easily find the wireless network option in its menu. Use the arrows to navigate and make sure that it is connected.

2. On your computer, press Windows + S, type "**printers and scanners**" in the dialogue box and open the first application.

3. Click on “**Add a printer or scanner**” and wait for Windows to detect. After the detection, click on the scanner for the computer to connect.



4. Send in a test job to check if the scanner is performing all the functionalities correctly.

Solution 9: Checking Compatibility

Each scanner/printer is designed to target a particular version of the operating system. But after you buy a scanner, its hardware doesn’t upgrade itself whereas you might receive major updates on your operating system on your computer. Such is the case with Windows 7 and Windows 10.

There were many reports that some scanners were not compatible with the newer version of Windows (Windows 10), and there was also no support available (for example **PIXMA MX310**). Head over to your manufacturers’ website and check if it is compatible with the version of operating system you are running on your computer.

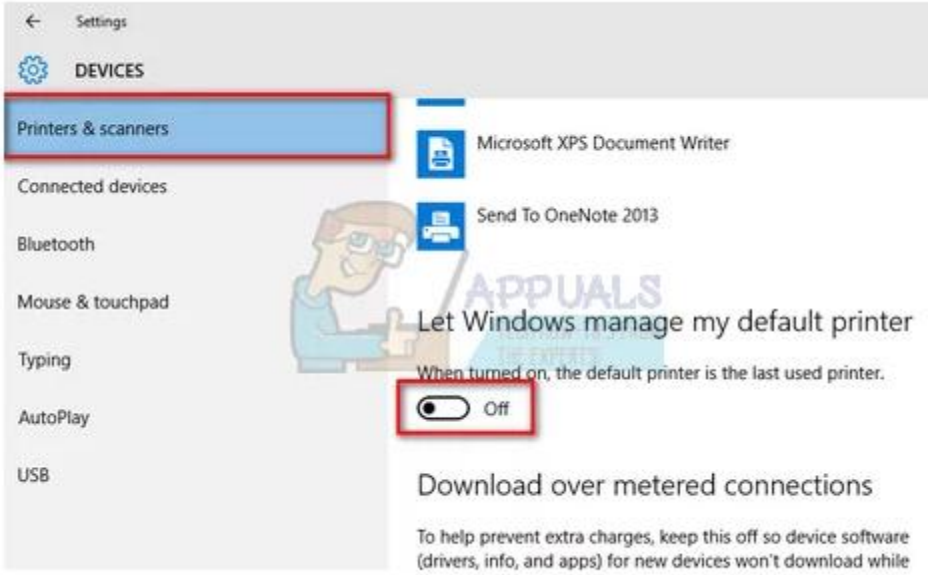
Solution 10: Turning off Auto Management by Windows

Windows has an automatic management feature which lets it decide the default printer and manage all the other ones. This might be useful in various scenarios but it can prove to be a menace sometimes when you are installing scanner software on your computer. You can try disabling it using the steps given below and try installing the software again.

1. Press Windows + S, type “**settings**” and open the application.

2. Once in settings, click on the subheading of “**Devices**”.

3. Click on "**Printers and scanners**" using the left navigation bar and scroll to the bottom of the page until you find "**Let Windows manage my default printer**". Make sure it is **unchecked**.



4. After making the necessary changes, exit Settings and try installing the software again.

Solution 11: Updating Scanner Drivers

If all the above solutions don't work, we can try updating the scanner drivers. You should navigate to the manufacturer's website and download the latest scanner drivers available. Make sure to download the exact drivers meant for your scanner. You can look for the model number present on the front of your scanner or in its box.

Note: There are few cases where a newer driver doesn't work. In that case, download an older version of the driver and install it using the same method described below.

1. Press Windows + R to launch the Run Type "devmgmt.msc" in the dialogue box and hit Enter. This will launch your computer's device manager.

2. Navigate through all the hardware, open the sub-menu “Imaging devices”, right click on your scanner hardware and select “Update driver”.

Note: If your scanner is inbuilt with your printer, you should update the drivers of your printer using the same method explained below. In that case, you should look in the category of ‘Print Queues’.

3. Now Windows will pop a dialogue box asking you which way do you want to update your driver. Select the second option (**Browse my computer for driver software**) and proceed.

Select the driver file you downloaded using the browse button when it appears and update it accordingly.

4. Restart your computer and check if the problem gets resolved.

Note: If you can’t update the drivers manually, you can also select the first option “Search automatically for updated driver software”. This option will make Windows search the web automatically and select the best driver out there.

- **Printer:** A printer is a device that accepts text and graphic output from a computer and transfers the information to paper, usually to standard size sheets of paper. Printers vary in size, speed, sophistication, and cost. In general, more expensive printers are used for higher-resolution color printing

Fix printer connection and printing problems in Windows 10

If you’re trying to use your printer and run into problems, here are some steps for common printer problems to try to get things working again.

Notes:

- If you're running Windows 8.1 or Windows 7, see Fix printer problems in Windows 7 and Windows 8.1.

- If you need help installing your printer in Windows 10, see Install a printer in Windows 10.
- If your PC is running Windows 10 S, some printers might not work with it, or they might have limited functionality. For more info, see Device support on Windows 10 S.
- If a USB printer port is missing, see USB printer port missing after disconnecting printer while Windows 10 (version 1903 or later) is shut down.

Sometimes power cycling your printer can resolve the issue. Turn off your printer and unplug it, wait 30 seconds, plug your printer back in, and then turn the printer back on.

If your printer still doesn't work, continue to step 2.

Step 2. Check cables or wireless connection

Check the cables (for wired printers). Make sure that the printer's USB cable is properly connected from the printer to your PC. If your USB isn't recognized, see Automatically diagnose and fix Windows USB problems.

Check the wireless connection (for wireless printers). Do one of the following:

- Make sure the printer's wireless option is turned on and available. Many printers have a button that displays a blue wireless icon when a wireless connection option for the printer is available. To learn where this button is located on your printer and to find instructions about how to turn it on, see the instructions that came with the printer or check the manufacturer's website for instructions.
- Run the printer's wireless connectivity test. Many printers have a menu option to test the printer's wireless connectivity. Read the instructions that came with the printer or check the printer manufacturer's website for instructions about how to do this.
- If those check out and you're still having problems, your PC may not be connecting to your wireless network. To learn more, see Why can't I get online? For more advanced help, see Fix network connection issues in Windows.
- If you're having trouble connecting to a Bluetooth printer, see Fix Bluetooth problems in Windows 10: FAQ.

Note: If you use wireless access points, extenders, or multiple wireless routers with separate SSIDs, make sure you're connected to the same network as the printer for your PC.

If your printer still doesn't work, continue to step 3.

Step 3. Uninstall and reinstall your printer

✓ **Try removing and reinstalling the printer.**

Remove your printer

1. Select the Start button, then select **Settings > Devices > Printers & scanners** .

2. Under **Printers & scanners**, find the printer, select it, and then **select Remove device.**

Reinstall your printer

You'll need to follow different steps to reinstall or add a wireless or local printer. Here's how.

Reinstall a wireless printer

1. Select the Start button, then select Settings > Devices > Printers & scanners .
2. Select Add a printer or scanner. Wait for your device to find nearby printers, choose the one you want, and then select Add device.

   If your printer is turned on and connected to the network, Windows should find it easily. Available printers can include all printers on a network, such as Bluetooth and wireless printers, or printers that are plugged into another computer and shared on the network. You might need permission to install some printers.

Notes:

1. If you use wireless access points, extenders, or multiple wireless routers with separate SSIDs, make sure you're connected to the same network as the printer for your PC to find and install it.

2. If you have a new wireless printer that hasn't been added to your home network, read the instructions that came with the printer and check the printer manufacturer's website to learn more and to get up-to-date software for your printer.

Tip: You can print a test page to make sure the printer is working correctly. If you've installed the printer but it doesn't work, check the manufacturer's website for troubleshooting information or driver updates.

Reinstall a local printer

If you want to reinstall or add a local printer, plug the USB cable from your printer into an available USB port on your PC, and then turn on the printer.

1. Select the **Start** button, then select **Settings** > **Devices** > **Printers & scanners** .

2. Under **Printers & scanners**, look for your printer.

- If you see your printer listed, you'll know it's installed.

- If you don't see your printer listed, select **Add a printer or scanner**. Wait for your device to find available printers, choose the one you want, and then select **Add device**.

Tip: You can confirm the printer is working by printing a test page. If you've installed the printer but it doesn't work, check the manufacturer's website for troubleshooting information or driver updates.

If your printer still doesn’t work, continue to step 4.

Step 4. Install the latest driver for your printer

Most printers require the latest driver to work well.
If your printer still doesn’t work after you install the latest driver for your printer, continue to step 5.

Step 5. Run the printing troubleshooter

Download and run the printing troubleshooter. It can fix problems with installing and connecting to a printer. (This link should open a browser page and download dialog. Select Open,and follow the steps provided in the troubleshooter.)

If the printing troubleshooter link doesn't open the troubleshooter, in the search box on the taskbar, enter Printing problem in, select Printing problem in in the list of results, and then select Troubleshooter to download it. Select Open, and follow the steps provided in the troubleshooter.

If your printer still doesn’t work, continue to step 6.

Step 6. Clear and reset the print spooler

If the previous troubleshooting step is not successful, you may need to clear spooler files and restart the spooler service. The print spooler is a file that manages the printing process. To clear and reset the print spooler:

1. In the search box on the taskbar, type **services**, and then select **Services** in the list of results.
2. Select the **Standards** tab, and then double-click **Print Spooler** in the list of services.
3. Select **Stop**, and then select **OK**.
4. In the search box on the taskbar, enter **%WINDIR%\system32\spool\printers**, select **%WINDIR%\system32\spool\PRINTERS** in the list of results, and then delete all files in the folder.
5. In the search box on the taskbar, search for **services**, and then select **Services** in the list of results.
6. Select the **Standards** tab, and the double-click **Print Spooler** in the list of services.
7. Select **Start**, select **Automatic** in the **Startup Type** box, and then select **OK**.

If your printer still doesn’t work, continue on to step 7.

Step 7. Fix printer problems after updating Windows 10

If you're having problems printing after upgrading or updating to the latest version of Windows 10, see Fix printer problems after upgrading or updating Windows 10.

If your printer still doesn’t work, continue to step 8.

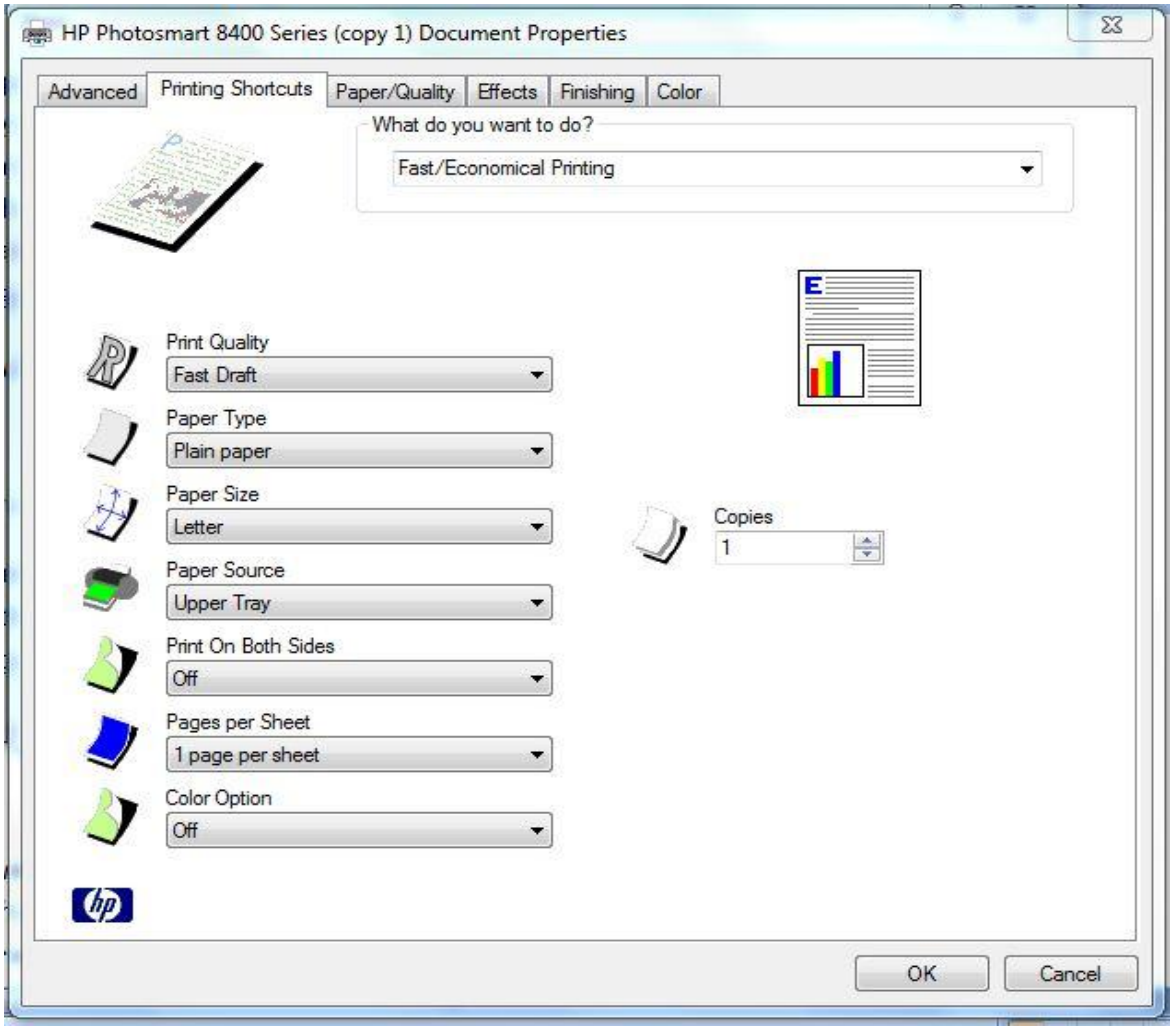
Step 8. Change a printer's status to "online"

If your printer displays an "offline" status, check out Troubleshooting offline printer problems.

Biggest Printer Problems -- And How To Fix Them

Printers: Can't live with them, can't nuke them. You could always toss a misbehaving inkjet or laser out the window, but where would that leave you? Truth be told, we need our printers, despite their maddening quirks. Here's a saner idea: Take a deep breath, channel your inner tech support rep, and repair that which has failed you.

Problem: Printing is too slow.



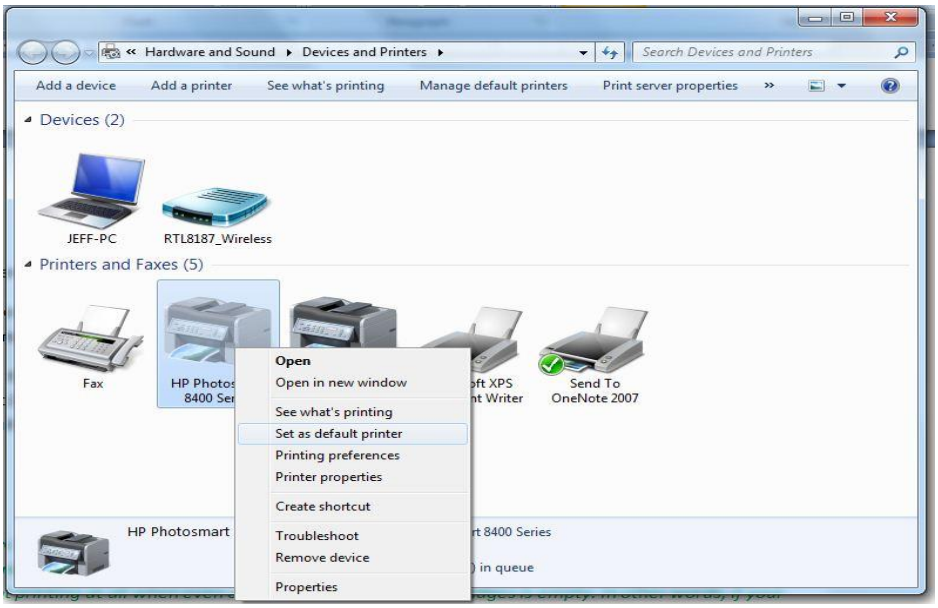
Solution: Rev up printer performance--and save ink in the process--by reducing print quality for everyday output. While printer settings vary by model, here's how to switch to draft-printing mode in most Windows apps. Select *Print* and *Properties*, and then look for a setting that reduces print quality. With the HP Photosmart 8450, for instance, change the default print quality setting from *Normal* to *Fast Draft* (click screen-shot at right). Other speedup suggestions: Print pages from websites without graphics, and add RAM to your printer, if possible. Read "Speed Up Everything" for more tips.

- **Problem: Ink and/or toner costs too much.**

Solution: PC World has written a lot about the printing industry's sneaky practices over the years. To wit: They snare you with dirt-cheap printers sold at or below cost, and then stick it to you later with ultra-pricey consumables.

Based on our tests, we can't recommend third party vendors' remanufactured or refilled ink cartridges, which may not give you your money's worth. One cost-saving solution is to buy higher-capacity cartridges. If you print a lot, try an ink cartridge with a 250-plus page yield, or a toner cartridge with a 2,000-plus page yield.

- **Problem: Windows is sending print jobs to the wrong printer.**



- **Solution:** For some mysterious reason, Windows may select a new default printer--the one it automatically sends print jobs to. (This happened to me when I upgraded from Vista to Windows 7.) To fix this glitch in Windows 7, click *Start* (the Windows icon in the lower-left corner of the screen) and select Devices and Printers. Under Printers and Faxes, right-click the printer you want to make the default, and select Set as default printer.
- If you're using earlier versions of Windows, these steps vary a bit. Here are instructions for Windows XP and Vista users.

- **Projector:** A projector or image projector is an optical device that projects an image (or moving images) onto a surface, commonly a projection screen. Most projectors create an image by shining a light through a small transparent lens, but some newer types of projectors can **project** the image directly, by using lasers.

How to Fix Common Projector Issues

If you're desperately trying to fix projector problems in your school, try some of the following tips from the experts at K-12 Tech.

1. Projector Not Turning On

There are a number of reasons that a projector may not be turning on. If your projector doesn't power on, try the following:

- Ensure the projector is properly plugged into a working outlet.
- Check the temperature lights to make sure the device hasn't overheated and shut down.
- If you are using a remote control to turn on the projector, check the batteries.
- Be sure all of the projector latches are closed.
- Try resetting the lamp timer.
- Ensure the projector is not in standby mode.

If after trying all of the above tips the projector is still not turning on, the issue could be something more complex like damage to internal components.

2. Projector is Overheating

It is natural for projectors to become hot as they are in use, but sometimes projectors overheat when they need cleaning, maintenance or better air circulation. If your projector is randomly shutting down or displaying a warning message, utilize the following tips to resolve the overheating:

- Clear the area around the projector.
- Ensure there is nothing blocking the projector vents.
- Clean the filter and vent of any dust.

3. Light On Projector is Blinking

There are countless makes and models of projectors –all with different parts and pieces– so it's generally best to refer to the owner's manual to determine the meaning of a blinking projector light. However, these are the most common reasons and solutions to blinking lights on your projector:

- Power Light: If the power button light is green or flashing green, the projector is likely on or warming up. If the power light is orange or flashing orange, the projector might be in standby mode or turning off.
- Lamp Light: If the lamp light is flashing orange or red, this usually means the lamp light is going to burn out soon or needs to be replaced.
- Temperature Light: If the temperature light is flashing orange or red, this typically means your projector is overheating or in need of cleaning. Be sure to clear any clutter from around the projector and to remove any items that may be blocking its vents.

4. Projector Image is Discolored

Projector discoloration can occur for a number of reasons. Below are several of the most common reasons for discoloration and how to fix them.

- Inspect the condition of your VGA cable. If you notice any bent prongs, the VGA cable likely needs to be replaced.
- Optimize the display and color settings for the lighting in the classroom.
- Check if your projector is in need of a lamp replacement.

If none of the above suggestions help with the discoloration, the problem could be more serious. Contact a professional projector repair service to inspect the color wheel or polarizing plates.

5. Projector Lamp is Burnt Out

Although lamp life varies from projector to projector, all lamps need to be replaced at some point making this one of the most common projector issues. Signs of a burnt out lamp include:

- Inspect the lamp light. If the light is flashing red or orange, you need to replace the lamp.
- If the projector turns on, but the image doesn't appear, your lamp may be burnt out.
- If the image being projected is discolored or dim, the lamp may burn out soon.

If you are experiencing any of the above common projector problems or are in need of additional assistance, contact the professionals at K-12 Tech. We specialize in maintenance and repair of school technology ranging from computer and tablets to projectors and more. Through our projector repair services, we can provide onsite repairs, mail-in repairs, and pickup repairs. We look forward to serving your school's technology needs with unmatched repair turnaround time and superior customer service.

- **Speaker:** A device that converts analog audio signals into the equivalent air vibrations in order to make audible sound.

Why do my computer speakers not work?

The troubleshooting sections below should be followed in order because they help you identify your problem through the process of elimination.

Volume issues

If you are experiencing problems with the volume of your computer's audio, following these steps may help you fix the problem.

Figure 18:Speaker volume knobs

Desktop speakers turned down

This step may seem trivial, but problem-solving works best when you start with the basics. Verify that the volume knob on the speakers is turned up enough to produce a sound. Every pair of speakers with knobs increases the volume by turning it left to right, otherwise known as clockwise.

Laptop speakers turned down

Figure 19:Laptop volume and mute buttons

If you are using a laptop computer with no external speakers connected, make sure the volume is turned up by using controls on the keyboard. The volume controls may be buttons (shown in picture),

or a secondary function of another key indicated with blue text. To activate these keys hold the Fn key at the secondary function key at the same time.

Make sure volume of the software is also turned up

An important aspect of sound on a computer with external speakers is that it's primarily controlled by software. For example, if the volume is lowered or off in the software settings, it won't matter how high the external speakers are turned up. The speakers won't produce sound. Therefore, users should verify the sound settings in the software are properly turned up.

Mute is on

Another common mistake is for the mute to be accidentally activated on the keyboard. To check if mute is turned on, look in the lower right side of the Taskbar for a symbol resembling a speaker with a "no" sign.

Speakers are not connected properly Some audio problems may be caused by improperly connected speakers. To verify your speakers are connected correctly, follow these steps.

Laptop computers

If you are troubleshooting a laptop computer, skip this step since you cannot verify the laptop speaker connections.

External desktop speakers

Sound devices connected to the computer have different cables and therefore use different ports. First, check the speaker cable connects to the sound card on the back of the computer. As seen in the picture, the sound card has multiple jacks. Speakers must be plugged into the Line Out connector, which is usually indicated by an image of sound waves with an arrow pointing out. The jack itself is usually green in color. If your speakers connect through USB, plug them into any of the USB ports.

Tip

Even if the speakers worked in the past, check the connection since it's not uncommon for cables to become loose or be pulled out of place.

Ensure the power cable connects to the back of the right speaker, or in some cases, the subwoofer. Most speakers have a small LED (light) indicating if the speaker is on or off. Once you've turned the speakers on (usually by using a button or by moving the volume knob from left to right), look for a light. If no LED is visible, or the speakers still don't appear to be getting power, and you've checked the power connections, you may have a faulty power source.

Default playback device in Windows

If your computer has the Windows operating system, make sure the correct playback device is set as the default device for sound output. If the wrong playback device is set as the default device, the sound doesn't come out of the expected device (i.e., speakers or headphones).

1. Open the Control Panel.
2. Click or double-click the **Hardware and Sound** or **Sound** icon.
3. In Windows XP and older, click **Manage audio devices** under *Sound*.
4. In the Sound window, on the **Playback** tab, find the entry for the speakers connected to your computer.
5. Right-click the speaker's entry and select **Set as Default Device**.
6. Click OK at the bottom of the Sound window to save the settings change.

Windows speaker setup

If you are running Microsoft Windows, make sure the speaker setup is
correct by following the steps below.

1. Open the Control Panel.
2. Select **Hardware and sound** or **Sound** in the Control Panel window.
3. In Windows XP and older, click **Manage audio devices** under *Sound*.
4. On the **Playback** tab, select your speakers, and click the **Configure** button.
5. If the speakers still don't work after configuring and testing them, double-click the speakers on the Playback tab to bring up **Speaker Properties**.
6. **Verify** all settings and then **Test** on the **Advanced** tab.
7. After verifying all settings and making any changes, click **Apply** then **OK** in each of the appropriate windows before closing them.

Corrupt Windows system files

It is possible for Windows system files to become corrupted for any number of reasons. If system files responsible for sound output become corrupted, the computer can stop producing sound of any kind.

If the computer was producing sound recently but is not now, you can **try restoring Windows to a previous point** when sound was working. If corrupt Windows system files are causing the sound problem, restoring Windows to a point when the sound did work should resolve the issue. For more information,

Make sure to back up your important documents before activating a Windows restore point.

Integrated or onboard audio disabled

If your computer has integrated or onboard audio, it's possible it is disabled in the BIOS. Access the BIOS and find the entry for integrated audio. It may be located in a menu named something similar to *Integrated Peripherals* or *Onboard Devices*, or it may be under the *Advanced* menu.

After you have located the integrated audio entry, check if it's set to *Enabled* or *Disabled*. If set to *Disabled*, change the setting to *Enabled*. Restart the computer and test the sound.

Bad sound card

If the issue is not software related, it is likely a hardware issue. Like any other hardware component in a computer, the device producing sound can fail. Make sure the computer sound card works properly by connecting another pair of speakers or headphones to the computer.

Note

Do not test the sound through a game or another program. Instead, see if a CD or a sound file works. A program or game may have sound-related problems that don't relate to the sound card.

If another pair of speakers or headphones also don't work, your sound card is likely experiencing issues. See the following page for troubleshooting help.

Bad speakers

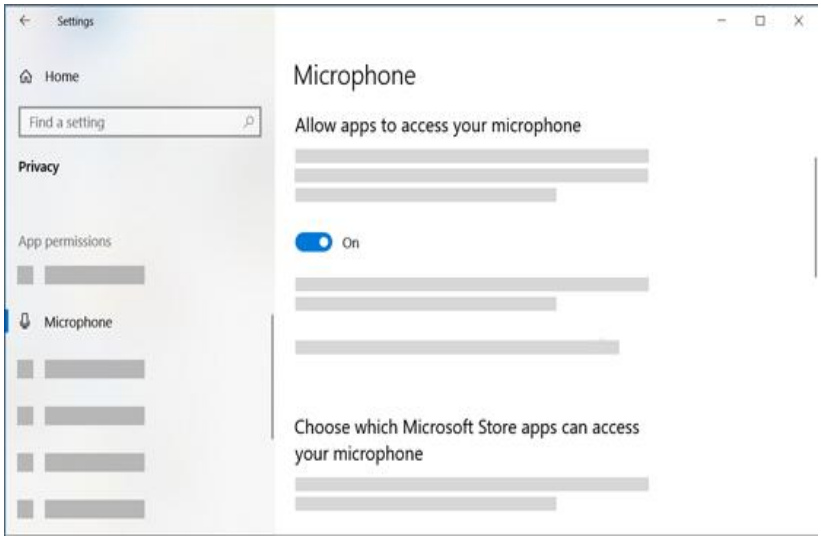
Finally, if none of the recommendations above fix the problem, but connecting a different pair of speakers or headphones did work, the speakers are bad. We recommend you contact the manufacturer of the speakers or computer for a new replacement if they are still under warranty. Otherwise, you can buy a new pair of speakers and connect them to your computer

- **Microphone:** A microphone, colloquially nicknamed mic or mike, is a transducer that converts sound into an electrical signal.

Fix microphone problems

If you are having trouble with your microphone features, the following information can help you troubleshoot and resolve issues.

Make sure apps have access to the microphone



If your microphone isn't detected after updating Windows 10, you may need to give your apps permission to use it.

- To let apps access the microphone, select **Start** ,thenselect **Settings** > **Privacy** > **Microphone** . Select **Change**, then turn on **Allow apps to access your microphone**.
- After allowing access to the microphone, you can choose which Microsoft Store apps can access these features under **Choose which Microsoft Store apps can access your microphone**, and give access to non-Microsoft-Store desktop apps by ensuring that the switch beneath **Allow desktop apps to access your microphone** is set to **On**.

Others can't hear me

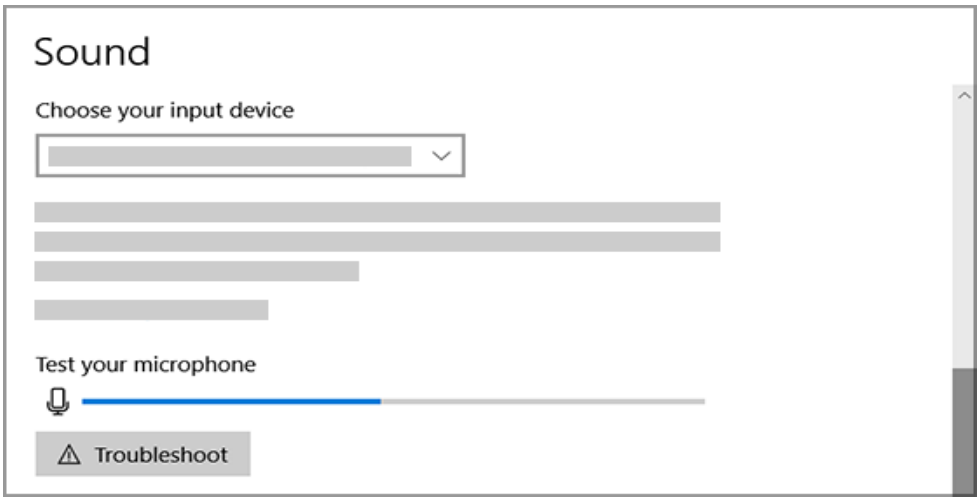
Try the following solutions:

- If your headset has a Mute button, make sure it isn't active.
- Make sure that your microphone or headset is connected correctly to your computer.
- Make sure that your microphone or headset is the system default recording device. Here's how to do this in Windows 10:

a. Select **Start** , then select **Settings** > **System** > **Sound** .

b. In **Input**, ensure your microphone is selected in **Choose your input device**.

c. To test your microphone, speak into it and check **Test your microphone** to make sure Windows is hearing you.



1. **The microphone volume is too low or does not appear to be working at all**

   Try the following solutions:

- Make sure that the microphone or headset is connected correctly to your computer.
- Make sure that the microphone is positioned correctly.
- Increase the volume of your microphone. Here's how to do this in Windows 10:

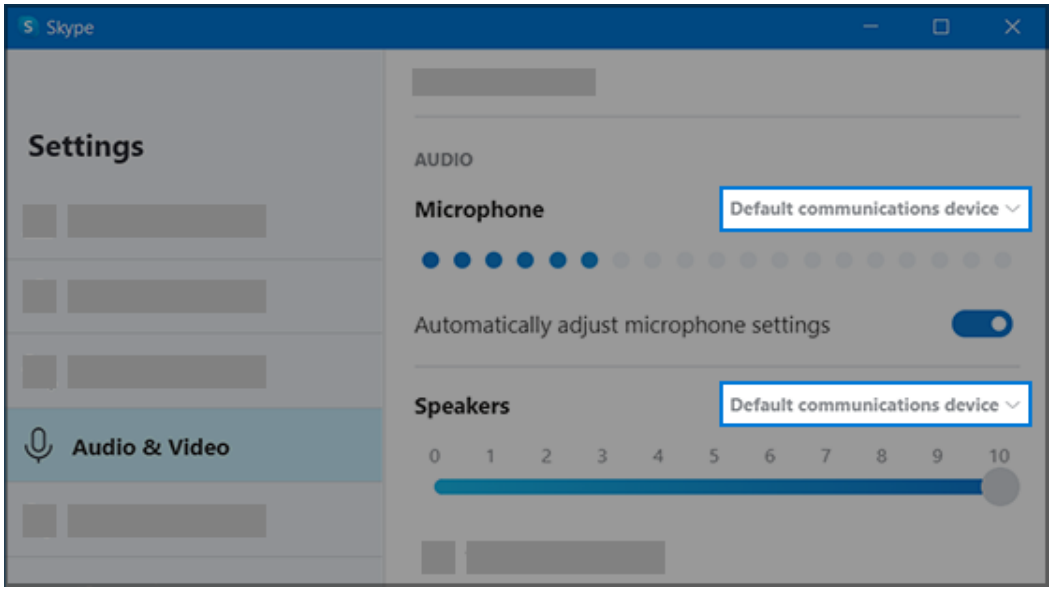
  a. Select **Start** , then select **Settings** > **System** > **Sound** .

  b. In **Input**, ensure your microphone is selected under **Choose your input device**, then select **Device Properties**.

  c. On the **Levels** tab of the Microphone Properties window, adjust the **Microphone** and **Microphone Boost** sliders as needed, then select **OK**.

  d. Speak into your microphone while checking under **Test your microphone** to make sure your settings work. If you see the line moving from left to right, your microphone is working. If you see no change, the microphone is not picking up sound.

Others cannot hear me in Skype calls



Make sure that your microphone or headset is the Skype default recording device. Here's how:

1. If Skype is not open, select Start , then Skype to open it.
2. In the upper right corner of the Contacts List in Skype, select **More** , then **Settings**.
3. In **Audio & Video**, under **Microphone**, make sure your microphone or headset is selected.
4. Under **Speakers**, make sure your preferred speaker or headset is selected

- **Bar code scanner:** A bar code reader is an electronic device that can read and output printed barcodes to a computer. Like a flatbed scanner, it consists of a light source, a lens and a light sensor translating optical impulses into electrical ones. Barcodes are integral to your daily workflow, whether you're a business, laboratory, or healthcare institution. For many businesses, they help track and trace inventory; for labs, they're also necessary to identify samples and patient specimens. But what happens when you have problems reading your barcodes, or they fail to scan? Here are some reasons (and solutions) that might help you navigate through this unwanted situation.

Poor label placement

The most obvious culprit of an unreadable barcode is poor label placement. Imagine wrapping a 1D barcode label around the circumference of 15 mL tube. Now take a **scanner** and try reading the barcode. There's no way the laser emitting from the scanner can read all the lines of the barcode if it's wrapped around the tube. Unfortunately, samples that are labeled by one user are frequently analyzed by another later down the road (a nurse who takes a blood sample and delivers it to a medical lab to be processed, for instance), making it difficult for lab personnel to control how samples are labeled.

Solution: The best way to avoid a poorly placed barcode is to have a standard operating protocol **(SOP)** in place that specifies an appropriate methodology for each container that requires labeling, including the type of label, barcode, and label placement. When designing your SOP, be sure to include pictograms that make it clear how each type of tube is supposed to be labeled.

Poor barcode/scanner position

A failed barcode scan can be caused by a few things related to the position of the barcode or scanner:

- The barcode might be too close or too far from the scanner, depending on the scanner's optimal focal distance (the distance at which the barcode comes into focus).
- The barcode might be located at a poor angle relative to the scanner. Mounting a scanner perpendicularly to the barcode can cause specular reflection, where light is reflected directly back at the scanner, blinding it to the signal of the barcode.
- The orientation of the barcode might not be compatible with the scanner. For example, laser barcode scanners must be placed such that the laser line is perpendicular to the bars of the barcode for it to be read.

Solution: For applications requiring challenging scanning conditions, using readers with built-in autofocus is ideal, as they can adjust to a range of variable barcode distances, angles, and orientations. Employing barcode imagers instead of barcode scanners, which use cameras to read images of codes rather than the signal of the reflective laser, may also be helpful as they are less liable to suffer interference from the reflecting laser and can often read barcodes no matter the orientation. Right-angle mirrors can also reflect the light of the barcode towards the scanner; however, when using right-angle mirrors, it's important to have a scanner that can read flipped images.

Damaged barcodes

Barcodes can be exposed to many harsh conditions, such as extreme temperatures and chemical exposure. This can make your barcodes fade or smudge, causing them to become unreadable. Barcodes can also suffer from mechanical damage, like scratches, tears, or crinkling.

Solution: Here is where **choosing the right label is** crucial. Using a label that's appropriate for your application will not only make sure that it stays affixed to your container, but it will also prevent damage to the label (and barcode) from the harsh environment(s) it encounters. Remember, prevention is always worth more than a cure, especially when it comes to physically damaged labels. This also applies to the printout; not all types printouts will protect your barcodes. Thermal-transfer printers provide your labels with the greatest resistance against extreme temperatures as well as organic solvents and other chemical substances, ensuring your barcodes won't smudge or fade over time. For the times

where physical damage is unavoidable, some high-performance readers can utilize symbol reconstruction technology, which allows them to reform the original barcode from the scan lines that are still intact. Varnishing or laminating your labels will also help protect your barcodes from scratches and other damage.

Figure 20:Insufficient contrast

To properly read a barcode, the scanner must be able to differentiate between the light and dark features of the symbol. However, the contrast between these two elements can vary depending on the type of material the barcode is printed on (e.g. thermoplastic film labels might provide more contrast than printing on metal). The contrast might also be affected if the printed bars—or the surface they're printed on—aren't uniform across the entire barcode. If there isn't enough contrast, the scanner won't be able to properly distinguish the marking of the barcode, making it impossible to read. Low-contrast barcodes will also reduce the distance at which a barcode can be read.

Solution: Adjusting your printer settings to ensure that ink is distributed evenly across your label (or other surface) is a good first step to avoid low contrast barcodes. It's usually the surface, though, that's the problem. Enhancing the brightness/contrast of the barcode is the best way to deal with low contrast due to uneven or noisy surfaces. Some barcode readers are designed with extra lighting features that, depending on the surface, can employ either diffused lighting (for glossy, flat surfaces) or dark-field lighting (for embossed or engraved barcodes) techniques to read barcodes.

Quiet zone infractions

The quiet zone, or no-print zone, is the area around the barcode that's completely free of markings. This zone makes it possible for the reader to verify the boundaries of the barcode and scan it in its entirety. The quiet zone has specific requirements that depend on what kind of barcode you're using. For 1D barcodes, the quiet zone should be at least 10 times the width of the smallest bar on both the right and left ends of the barcode. For 2D barcodes, each type has its own requirement, but it's usually

recommended that the quiet zone on each side of the barcode be at least 10% of either the height or width (whichever is smallest) of the symbol. On many occasions, however, markings can bleed into the quiet zone, making the scanner fail to read the barcode appropriately.

Solution: Adjusting the settings of your printer to ensure that the quiet zone requirements for your barcodes are met is the simplest solution. Because there is no maximum amount of space for quiet zones, you can always increase their space past the minimum requirements to make sure the barcode is read properly. If the printout frequently bleeds into the quiet zone, you'll want to ensure your printout isn't smudging. Again, using a thermal-transfer printer for your barcodes is ideal, no matter the environment.

Inconsistent printout

There are many reasons your printer isn't reliably rendering barcodes. For digital printers (inkjet and laser), low ink and toner levels are the main cause of barcode inconsistency. If the ink or toner levels are too low, your barcodes will suffer, as the intensity can start to fluctuate (some printers will even stop you from printing if the ink is too low, but this is undesirable as well, since there could be up to 40% of the cartridge left over. You might also have any number of problems, from your ink not sticking to your label to printer jams and air bubbles in the cartridge.

Solution: Using a thermal-transfer printer solves many of the issues related to inconsistent printouts from digital printers. They employ wax and/or resin ribbons, giving a more uniform printout right until the very end of the ribbon. With that said, it's important to continuously verify the settings of your printer and to properly maintain it. The distance between the printhead and your labels, as well as the integrity of the printheads and the nozzles, should be checked regularly. For those using laser printers, a simple trick is to switch the "Media/Paper Type" in your print settings to "Label" or "Thicker Paper" instead of "Plain Paper" in cases where the ink isn't adhering to your labels.

Inappropriately programmed scanner

When programming your scanner, limiting the number of acceptable digits in the data field can make any barcode fail to scan.

Solution: Check your scanner and the requirements of the type of barcode you're using! Some symbologies, such as Code 39 and Interleaved Two-of-Five (ITF), encode 13 digits, not 12, and may require some toggling for your scanner to properly read them

- **Content/Topic 3 Description of Connectors/Ports**

➢ ***VGA Port***

VGA port is found in many computers, projectors, video cards and High Definition TVs. It is a D-sub connector consisting of 15 pins in 3 rows. The connector is called as DE-15.

VGA port is the main interface between computers and older CRT monitors. Even the modern LCD and LED monitors support VGA ports but the picture quality is reduced. VGA carries analogue video signals up to a resolution of 648X480.

With the increase in use of digital video, VGA ports are gradually being replaced by HDMI and Display Ports. Some laptops are equipped with on-board VGA ports in order to connect to external monitors or projectors.

If you're having no signal for your VGA monitor, don't panic! There are solutions to fix **VGA no signal** problem.

VGA having no signal means that your monitor is powered on but not connected to a video card, so you should make sure the connection is working properly.

Fix 1: Troubleshoot hardware problems

As you may know, the VGA no signal issue generally comes from the connection faulty, which has something to do with the hardware problems. So you have to ensure that the **connector** has been plugged into the correct port and it can't be pulled out too easily.

Check the **VGA port** and make sure there is no damage, and check if there is something inside the port that can prevent your VGA signal from transmitting.

In addition, make sure the **cables** are working properly. You can try another cable and see if it works.

Try pushing the connector further until you feel the pointy bits on the plug lock it in .

Fix 2: Restart and reconnect your devices

Since many technical issues can be resolved by restarting, it never hurts to restart your devices and reconnect. Sometimes this is enough to fix issues like VGA no signal.

1) Completely **turn off** your computer and monitor and unplug their power cables.

2) Wait for several minutes.

3) Connect the VGA **cable** back to the monitor and your computer.

4) Plug the **power cable** back.

5) **Turn on** your computer and monitor.

Try and see if the VGA connection works.

Fix 3: Check if it's in hibernation, sleep or power-saving mode

Sometimes your computer enters hibernation mode, sleep mode, or power-saving mode, so the monitor can't receive any signal even if it's on.

You can press any key (the **Enter** key) on your keyboard, and wait for a while. By doing so, you can wake up your computer and your monitor, then it can fix the VGA no signal problem.

Fix 4: Update your graphics card driver

A missing or outdated graphics card driver can cause the VGA no signal issue, so you should keep your graphics card driver up to date. If you can't update your graphics card driver with the problematic VGA connection, you should another type of connection, such as HDMI.

You can go to the manufacturer's website, and download and install the latest version of your graphics card driver. This requires time and computer skills.

If you don't have time or patience, you can do it automatically with Driver Easy.

Driver Easy will automatically recognize your system and find the correct drivers for it. You don't need to know exactly what system your computer is running, you don't need to risk downloading and installing the wrong driver, and you don't need to worry about making a mistake when installing.

You can update your drivers automatically with either the **FREE** or the **Pro** version of Driver Easy. But with the Pro version it takes just 2 clicks (and you get full support and a **30-day money back guarantee**):

- ***USB Port***

Universal Serial Bus (USB) replaced serial ports, parallel ports, PS/2 connectors, game ports and power chargers for portable devices.

USB port can be used to transfer data, act as an interface for peripherals and even act as power supply for devices connected to it. There are three kinds of USB ports: Type A, Type B or mini USB and Micro USB.

Serial Port

Even though the communication in PS/2 and USB is serial, technically, the term Serial Port is used to refer the interface that is compliant to RS-232 standard. There are two types of serial ports that are commonly found on a computer: DB-25 and DE-9.

How can I make sure my serial port is working in Windows?

To check whether or not an RS-232 serial port is working, perform an RS-232 loopback test by doing the following:

1. If your serial port is not female, convert it by taking a female/female cable or gender changer and plugging it into the serial port.

2. Take a metal paperclip or wire and cross pins 2 and 3. If you look closely at the female end, the pins should be numbered.
3. Open a telnet session on the COM port number of the device that you are testing. To find out the COM port number, refer to the following FAQ: https://www.startech.com/faq/com-port-listing-windows.

Note: To open a telnet session on the COM port, you need a telnet client like PuTTY or Hyper Terminal. Windows XP comes with Hyper Terminal.

4. When the session is open, anything you type into it you should see. The loopback test fails when you cannot see what you are typing.

If the loopback test fails, make sure that the serial cable or gender changer that you are using works and that the adapter is in the correct port.

You can check multiple ports at the same time by opening multiple sessions, putting the loopback adapter on one port, and trying to type into each session. When you can see what you are typing, you know that the COM port is working and you can see which port number the physical serial port is. Close the window for the port that you just tested to speed up the testing of the remaining serial ports.

HDMI Port

HDMI is an abbreviation of High Definition Media Interface. HDMI is a digital interface to connect High Definition and Ultra High Definition devices like Computer monitors, HDTVs, Blu-Ray players, gaming consoles, High Definition Cameras etc.HDMI can be used to carry uncompressed video and compressed or uncompressed audio signals.

DVI Port

Digital Video Interface (DVI)DVI is a high speed digital interface between a display controller like a computer and a display device like a monitor. It was developed with an aim of transmitting lossless digital video signals and replace the analogue VGA technology.

Parallel Port or Centronics 36 Pin Port

Parallel port is an interface between computer and peripheral devices like printers with parallel communication. The Centronics port is a 36 pin port that was developed as an interface for printers and scanners and hence a parallel port is also called as a Centronics port.

Before the wide use of USB ports, parallel ports are very common in printers. The Centronics port was later replaced by DB-25 port with parallel interface.

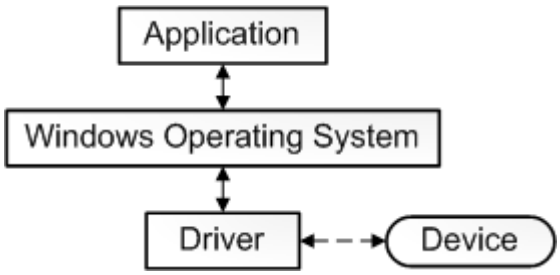
- ***Microphone Jack:*** Audio **jacks** on most computers are color coded or labeled for easy identification. The Line Out (1) or

Headphone **jack** is typically green, the **microphone** in (**Mic** In)**jack** is typically pink or labeled with a **microphone** symbol.

- ***Speaker Jack*** Audio jacks are found on many types of audioequipment and musical instruments that accept external sound sources. In a car or truck, an audio jack, also called a "media jack" or "auxiliary (AUX) jack," is a mini-phone socket that connects any portable music player to the vehicle's amplifier and speakers.
- ***Ethernet Port (RJ-45 Connector)*** **RJ45** is a type of connector commonly used for Ethernet networking. ... Since Ethernet cables have an **RJ45** connector on each end, Ethernet cables are sometimes also called **RJ45** cables. The "**RJ**" in **RJ45** stands for "registered jack," since it is a standardized networking interface.

- **Content/Topic 4 Description of Drivers**

A driver is a software component that lets the operating system and a device communicate with each other. For example, suppose an application needs to read some data from a device. The application calls a function implemented by the operating system, and the operating system calls a function implemented by the driver. The driver, which was written by the same company that designed and manufactured the device, knows how to communicate with the device hardware to get the data. After the driver gets the data from the device, it returns the data to the operating system, which returns it to the application.



A **driver** communicates with the device through the computer bus or communications subsystem to which the hardware connects. When a calling program invokes a routine in the **driver**, the **driver** issues commands to the device.

- **DVD/CD ROOM Drive**

  an optical disc drive (ODD) is a disc drive that uses laser light or electromagnetic waves within or near the visible light spectrum as part of the process of reading or writing data to or from optical discs. Some drives can only read from certain discs, but recent drives can both read and record, also called burners or writers (since they physically burn the organic dye on write-once CD-R,

DVD-R and BD-R LTH discs). Compact discs, DVDs, and Blu-ray discs are common types of optical media which can be read and recorded by such drives.

Your CD or DVD drive is not recognized by Windows or other programs

Symptoms

Your CD or DVD drive is not seen in File Explorer (called Windows Explorer in Windows 7 and earlier versions of Windows), and the device is marked with a yellow exclamation point in Device Manager. Additionally, after you open the device's **Properties** dialog box, one of the following errors is listed in the **Device status** area:

- Windows cannot start this hardware device because its configuration information (in the registry) is incomplete or damaged. (Code 19)
- The device is not working properly because Windows cannot load the drivers required for this device. (Code 31)
- A driver (service) for this device has been disabled. An alternate driver may be providing this functionality. (Code 32)
- Windows cannot load the device driver for this hardware. The driver may be corrupted or missing. (Code 39)
- Windows successfully loaded the device driver for this hardware but cannot find the hardware device. (Code 41)

This issue may have occurred after one of the following situations:

- You upgrade the Windows operating system.
- You install or uninstall CD or DVD recording programs.
- You uninstall Microsoft Digital Image.

There are various reasons why a CD or DVD drive is not detected. The resolutions that are listed in this article may help solve some instances but not all instances of this problem. You may also need to contact your hardware manufacturer for assistance with your hardware.

Resolution

For each of the following methods, click on the header, and it will open to show you more info:

Method 1: Windows 7 and 8.1 - Use the Hardware and Devices troubleshooter

For Windows 10, skip to Method 2.

In Windows 7 and 8.1, to open the Hardware and Devices troubleshooter, follow these steps:

1. Press the Windows logo key + R to open the **Run** dialog box.

2. Type control in the **Run** dialog box, then press Enter.
3. In the **Search** box in **Control Panel**, type troubleshooter, and then click **Troubleshooting**.
4. Under the **Hardware and Sound** item, click **Configure a device**. If you are prompted to enter an administrator password or provide confirmation, type the password or provide confirmation.

If your problem is not solved, try the next method.

Method 2: Check BIOS settings and chipset drivers

1. Verify the drive is activated in the BIOS. BIOS systems vary by device. If you are not sure how to verify the drive settings in your device's BIOS, contact the manufacturer of your device.
2. Also, verify with the manufacturer of the computer if the drive came with it, or the manufacturer of the drive if it was purchased separately that the chipset drivers for the device are current.

If your problem is not solved, try the next method.

Method 3: Update or reinstall the driver

To update the driver, search for the driver on the device manufacturer's website, and then follow the installation instructions on the website.

To reinstall the driver, follow these steps:

1. Press the Windows logo key + R to open the **Run** dialog box.
2. Type **devmgmt.msc** in the **Run** dialog box, then press Enter. If you are prompted for an administrator password or for a confirmation, type the password, or select **Allow**
3. In Device Manager, expand **DVD/CD-ROM drives**, right-click the CD and DVD devices, and then select **Uninstall**.
4. When you are prompted to confirm that you want to remove the device, select **OK**.
5. Restart the computer.

After the computer restarts, the drivers will be automatically installed.

If your problem is not solved, try the next method.

Method 4: Remove and reinstall IDE/ATAPI drivers

To remove and reinstall IDE/ATAPI driver, follow these steps:

1. From **Start**, search for **Device Manager**. Open Device Manager from the search results, and select the **View** menu. Choose **Show Hidden Devices**.
2. Expand IDE/ATAPI Controllers, and then:
    - ✓ Select and right-click **ATA Channel 0**, and then click **Uninstall**
    - ✓ Select and right-click **ATA Channel 1**, and then click **Uninstall**
    - ✓ Select and right-click **Standard Dual Channel PCI IDE Controller**, and then click **Uninstall**

- ✓ If there are additional entries, right-click them and then choose **Uninstall**

3. Reboot the device.

After the computer restarts, the drivers will be automatically installed.

If your problem is not solved, try the next method.

Method 5: Fix corrupted registry entries

This problem may be caused by two Windows registry entries that have become corrupted. To use Registry Editor to delete the corrupted Registry entries, follow these steps:

1. Press the Windows logo key + R to open the **Run** dialog box.
2. Type **regedit** in the **Run** dialog box, then press Enter. If you are prompted for an administrator password or for a confirmation, type the password, or select **Allow**
3. In the navigation pane, locate and then select the following registry subkey: **HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Class\{4D36E965-E325-11CE-BFC1-08002BE10318}**
4. In the right pane, select **UpperFilters**.

   Note You may also see an UpperFilters.bak registry entry. You do not have to remove that entry. Click **UpperFilters** only. If you do not see the UpperFilters registry entry, you still might have to remove the LowerFilters registry entry. To do this, go to step 7.
5. On the **Edit** menu, select **Delete**.
6. When you are prompted to confirm the deletion, select **Yes**.
7. In the right pane, select **LowerFilters**.

   Note If you do not see the LowerFilters registry entry, go to the next method.
8. On the **Edit** menu, select **Delete**.
9. When you are prompted to confirm the deletion, select **Yes**.
10. Exit Registry Editor.
11. Restart the computer.

Note: To use this method, you must be logged on to Windows as an administrator. To verify that you are signed in as an administrator, bring up the Control Panel, select **User Accounts**, and then choose **Manage User Accounts**.

Important:

- Follow the steps in this section carefully. Serious problems might occur if you modify the registry incorrectly. Before you modify it, back up the registry for restoration in case problems occur.
- After trying this method, some apps, such as CD or DVD recording software, might not work correctly. If so, try uninstalling and reinstalling the affected app. Check with the creator of the app to see if there is an updated version.

If your problem is not solved, try the next method.

Method 6: Create a registry subkey

To create the registry subkey, follow these steps:

1. Press the Windows logo key + R to open the **Run** box.
2. Type **regedit** in the **Run** box, then press Enter. If you are prompted for an administrator password or for a confirmation, type the password, or select **Allow.**
3. In the navigation pane, locate the following registry subkey:

   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\atapi
4. Right-click **atapi**, point to **New**, then select **Key**.
5. Type Controller0, and then press Enter.
6. Right-click **Controller0**, point to **New**, and then select **DWORD(32-bit) Value** .
7. Type **EnumDevice1**, and then press Enter.
8. Right-click **EnumDevice1**, select **Modify...**.
9. Type 1 in the **Value data** box, and then select **OK**.
10. Exit Registry Editor.
11. Restart the computer.

Notes

- To use this method, you must be logged on to Windows as an administrator. To verify that you are signed in as an administrator, bring up the Control Panel, select **User Accounts**, and then choose **Manage User Accounts**.
- This method should be used on Windows 7, Windows 8 or 8.1, or Windows 10 version 1507. The issues fixed by this method shouldn't occur in Windows 10 1511 or later.

➢ **SD Driver:**

SD Cards should be recognized through your plug and play facility on your PC, but occasionally *SD*Cards experience problems which cause computer errors.

List of Common Driver Problems & Its Fixes

Problem 1: My device used to work, but now it doesn't

Well, this is a common problem encountered by the Windows users and there is no specific reason responsible for this. To fix this driver problem you need to try various solutions.

Solutions: Follow the different solutions:

- Update drivers with the latest update, you can check it on Windows update and click View available updates and see if any update is available.
- If no any new driver update is available then reinstall the software came with the device

Problem 2: Printer Driver Problem

The printer driver problem is the common driver issue faced by the users and as a result, the printer is unable to works. It doesn't matter which brand printer you are using like **HP, Canon, Epson, Samsung or others,** the driver problem is caused by any of one of them.

Well, there are many reasons responsible for it like outdated or incompatible drivers, or the drivers get corrupted or damaged.

Solutions: Well, the solutions are almost the same for various brands printers, however, you need to first check for the outdated drivers and try updating them or contact the customer support of the printer brand.

Problem 3: Audio Driver Problem

Just like printer driver problems, this is another driver issue. Users are found complaining about various driver issues and errors such as:

- **MIDI output error detected**
- **Your audio hardware unable to play files like the current file**
- **There is no wave device which can play files in the current format is installed**

➢ **Realtek High Definition Audio driver issue for Windows 10**

Here check out the possible solutions to fix the audio driver problems.

Solutions: Try the solutions given below to fix your audio driver issues.

1: Reinstall the Audio Driver – Follow the steps to do so

- In the search box type **device manager > hit Enter**
- Then choose the arrow next to **Sound, video and game controllers to expand it.**
- Next, right-click **sound card or audio device listing >** choose **Uninstall device >** choose **Delete the driver software for this device checkbox >**choose**Uninstall.**
- And **Restart system**
- As the PC restart, it will automatically prompt to reinstall your audio driver.

I hope this works but if not then try updating the sound driver or else make use of the generic audio driver comes with Windows.

Problem 4: Windows 10 Upgrade Driver Problem: Error 0x800F092

Many users are getting the error 0x800F092 while installing or updating Windows 10 with the latest anniversary update due to driver issues.

Solutions: In order to fix the Windows 10 update error 0x800F092 follow the solutions given in the article: Get Rid of Windows 10 Upgrade Driver Problems: How to Fix Error Code 0X800F0923

Problem 4: DRIVER_IRQL_NOT_LESS_OR_EQUAL Error in Windows 10

The Windows 10 users are encountering the BSOD error **"DRIVER_IRQL_NOT_LESS_OR_EQUAL"** due to the computer uses the wrong memory address used by system driver or due to broken or error full network drivers.

Well, this is a very irritating error and faced by the users due to driver problems.

Solutions: Check out the article to know more about the error and fix it completely – [Solved] How to Fix DRIVER_IRQL_NOT_LESS_OR_EQUAL Windows 10 Error

Problem 5: The Driver WudfRd failed to load for the Device with Event ID 219

The **WudfRd is unable to load with Event ID 219** is faced after upgrading to Windows 10 and when the Windows 10 is updated the drivers are also updated and as a result affected by Microsoft.

And due to this, some driver becomes incompatible with the available hardware and also cause driver problem.

Solutions: Read the article to learn about the error and fix the error – **[Fixed] The Driver WudfRd failed to load for the Device with Event ID 219**

Problem 6: Dell Broadcom USH Driver Problem

Many **DELL Broadcom USH** users are encountering the driver problem and looking on how to fix driver issues.

Solutions: Follow the solutions give in the article to fix driver issues: **How to Fix Dell Broadcom USH Driver Issues**

Problem 7: USB Driver Problem

USB driver problems are common and due to this many users start encountering various errors. Here check out some of the common USB driver errors:

- **USB device not recognized**

- **No USB Drivers Installed**
- **Windows is unable to initialize the device driver for this hardware**
- **Windows is unable to start the hardware device because the configuration information is damaged or it is incomplete.**
- **USB driver not working**

Well, there are many error codes and messages that you may come across due to USB driver problems.

Solutions: There are many solutions that you need to try to get rid of the USB driver not recognized error. Try updating or reinstalling the device drivers, if this works then well and good but if not then follow the fixes given in the article: **[SOLVED] How to Fix USB Device Not Recognized in Windows 10/8/7**

How Do I Fix USB Device Not Recognized?

To fix such type of issue, you should try to remove the other connected USB devices first and after removing all restart the system and then reconnects the removed USB devices to the computer.

Problem 8: NVIDIA Driver Problem

The users who upgraded their Windows OS to the latest Windows 10 or update the Window with the latest update start facing Nvidia's driver problems. Also, some of the updates conflict with the NVIDIA driver and triggers various graphics related issues.

Solutions: If you are the one who is also struggling with the NVIDIA driver issues the read the article to follow the complete fixes: **Top 3 Solutions to Get Rid of Windows 10 Nvidia Driver Issues**

Problem 9: AMD Driver Crashing Windows 10

Well, this driver problem is encountered by the users after updating the **AMD GPU drivers to version 15.7.1**. Well, this is very irritating as the users start encountering various problems like

- **AMD driver freezes Windows 10,**
- **AMD driver crash black screen issues when they boot their Windows computer, crash during install, crashes while playing the game, etc.**

Solutions: To get rid of the AMD driver problems read the article and follow the solutions given here: **Top 5 Solutions to Fix AMD Driver Crashing Windows 10**

So, these are various driver problems encountered by the users from time to time with complete fixes.

Additional Solutions to Fix any Device Driver Problems Manually

- Go to desktop, select "**My Computer Icon"** and then right-click on it. After that small pop-up menu will appear > select **"properties"** and then hit on the hardware tab, > "**Device Manager".**
- All the list of devices connected to your system will appear. From that list, you look for the yellow triangle, as problematic devices which will have a **yellow triangle** next to their name in the left column.
- After recognizing, right-click on the device which is showing yellow mark and after that select **"properties**". A window will appear which comprises of tabs under the "**resources**" tab, check "**resources allocation**" and "**modify resource settings**" so that you can avoid conflict problems. After that, hit on the "**update driver**" button so that to install the updates when the driver is outdated.
- If the driver is corrupted or damaged, then uninstall that driver and reinstall it again. If again you face the same problem then restore the original by selecting "**Roll Back Driver**"
- Also if the driver manager does not work then just go to the recovery console by inserting the Windows installation disk and then reboot the system. When the welcome screen appears, select **R** and login with administrator credentials. Next, type in "C**D Windows\system32\drivers"** and select **"Enter."**
- Carry on with the recover console mode > type in **"Ren Driver_Name.sys Driver_Name.old,"** hit "**Enter**" > type "**copy CD-Drive:\i386 Driver_Name.sys**" and hit "**Enter**" again. This process will help you to copy the original driver to the driver folder. After finishing this, way out from Recovery console, eject the CD and then **reboot your system.**

Automatic Solution To Fix Driver Problem

So, these are some of the manual solutions that you try to fix common driver problem, but if you are unable to follow the manual solutions to fix the driver issues than simply go for the **Driver Easy**. This is an advanced tool that just by scanning once, detects and updates the entire outdated drivers. Also identify the corrupted, damaged drivers and inform you about them.

Get Driver Easy to update the drivers automatically

Things You Should Try if the Newly Installed Hardware Device is Not Working Properly.

- Check the **hardware device is compatible** with your computer and Windows version. And if it is not compatible then locate the correct driver. Search for the compatible device on the Microsoft official website or the **manufacturer website.**
- Most of the devices requires special drivers to work appropriately. So make sure you have installed any software discs came with the device.

- Restart your **Windows computer**, as restarting the system is necessary to let the thing settle in the computer.
- If using USB device then disconnect it and **plug it into different USB port**. Windows will detect the device and install the drivers and notifies the users if the device driver won't install properly.
- Check for the driver updates in the **View available updates** to check if an updated driver is available for your device. Or you can also go to the manufacturer website to check for the latest updates.

Conclusion:

So this is all about different **driver problems and the ways to fix them**. I tried my best to list down entire common driver issues with complete fixes.

Check out the **driver problem** you are facing and follow the solutions given, despite this also try the manual fixes to get rid of the common driver problem.

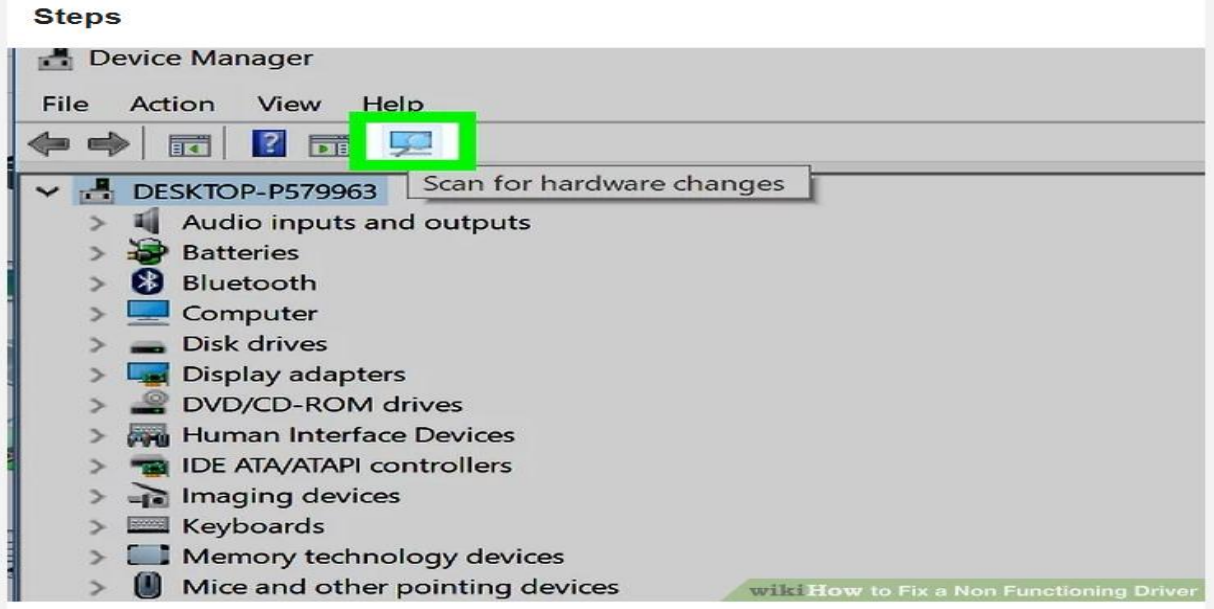
Hope the article worked for you to resolve the common driver problems but if you are facing any other driver related problem that I missed to list down then visit our **Fix Driver Issues Hub.**

Moreover you can scan your system with the **PC Repair Tool**, to get rid of various computers problems and other errors related to it. It also help you to improve your Windows PC performance.

Also, we love to hear from you if you are having any query, suggestion or comments, then feel free to write down in the comment section below.

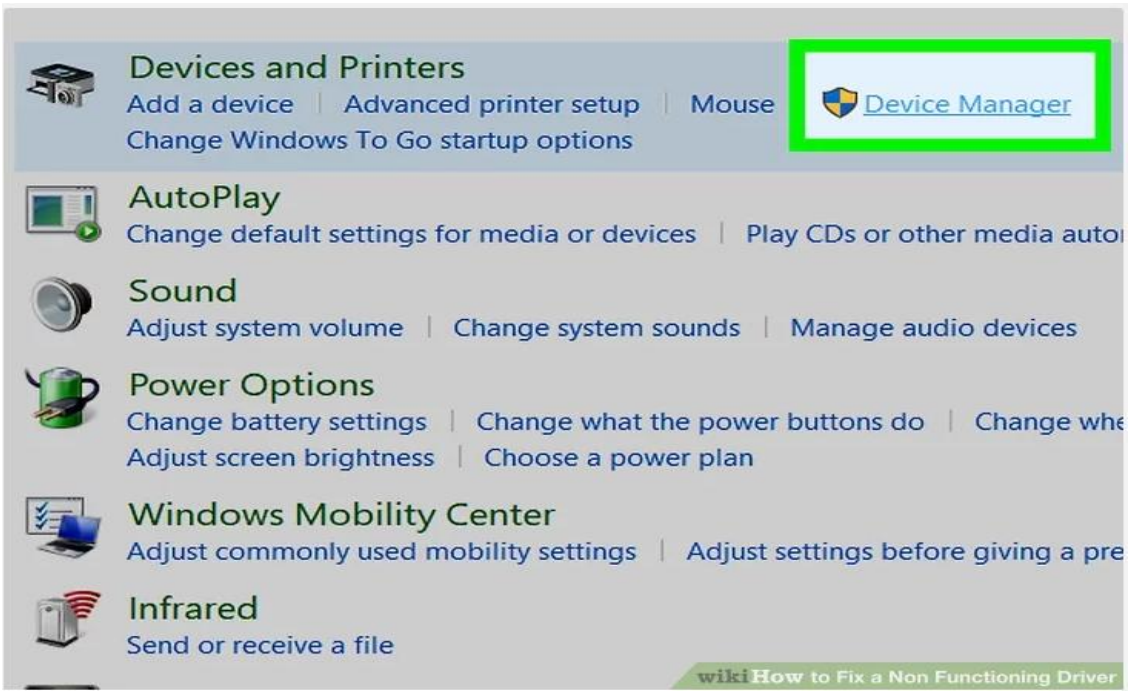
How to Fix a Non Functioning Driver

Your computer is made up of several devices called hardware. For hardware to function properly with your computer you must have software (Programs) installed called drivers that allow the hardware to communicate with you computer. When you experience problem with sound or visuals on your computer, the simplest solution that almost always works is reinstalling the drivers.

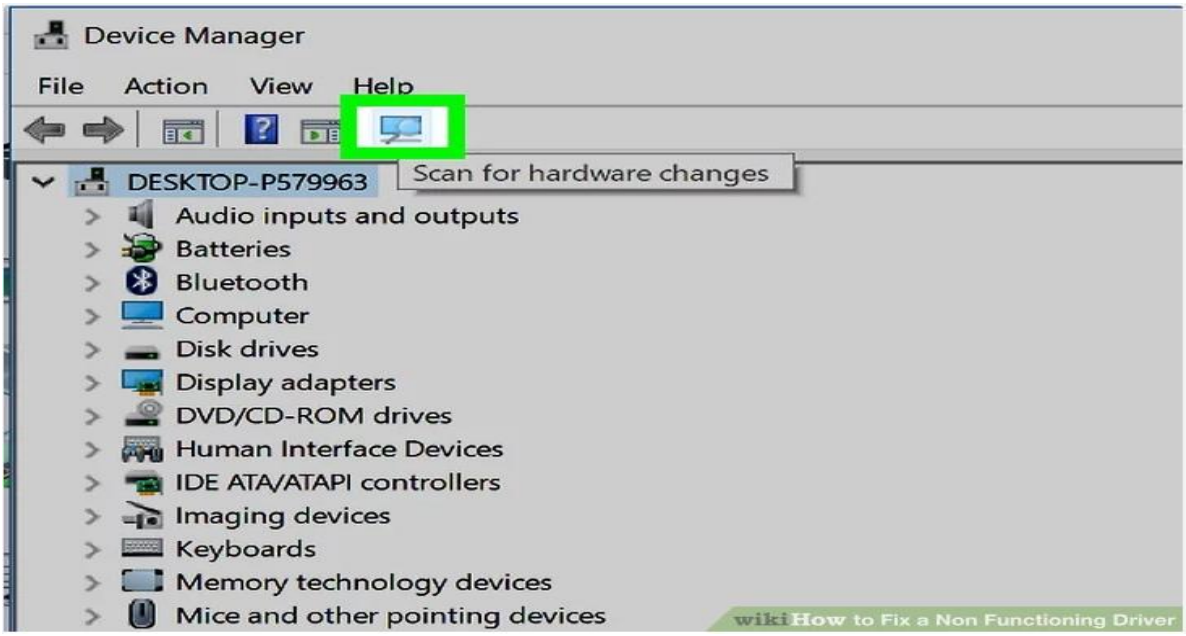


1. Determine the cause of the problem: The first step is to identify the problem. Is it with your sound. Then the problem is most likely with your sound card driver (Just make sure your volume is turned up before you continue). If have problems when playing games or have a strange looking picture when watching videos, then the problem is most likely with your graphics card. And if your problems are with a device that you attach to your computer via USB (A camera, an external hard drive, etc.) there is a problem with your USB drivers.

2.Check for updates for your drivers: Most computer manufactures have websites for drivers and updates for your computer. Always try updating first before you reinstall the driver. Simply go to the manufactures website and click on the drivers and downloads link. If your manufacture doesn't have a link, you might have to contact support.

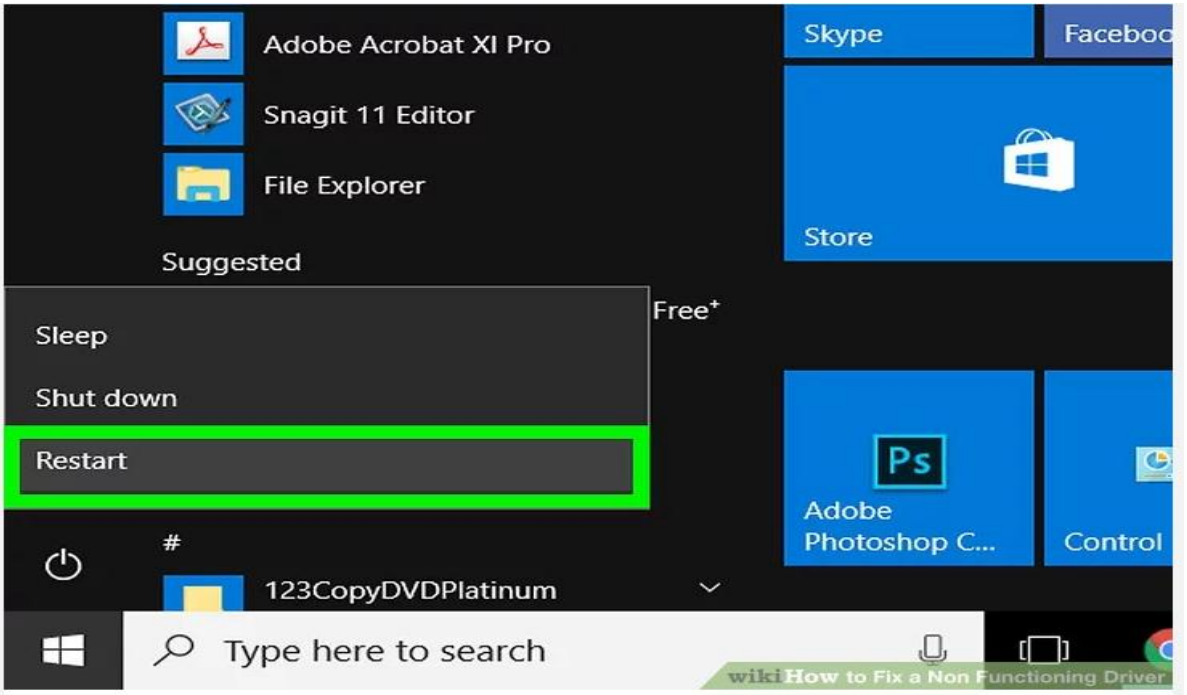


3.Open the Device Manager: If there are no updates for your drivers or you have updated and the problem persists, you will have to uninstall and then reinstall the driver. To do this you first have to open up device manager. Click start, right click on My Computer and click Properties. If you have Windows XP click on the Devices tab and then click on Device Manager. If you have Windows Vista click on the Device Manager link on the top left (You may have to click allow if prompted).



4.Find the driver you need fixed: Search through the list by clicking the plus button next to each category. Sound drivers are usually under the Sounds category, video drivers are usually under the Video Display category, and USB drivers under the USB Hub category.

5.Uninstall the Driver: To uninstall the driver simply right click on it and click the uninstall button. If prompted say yes when asked if you want to uninstall (Windows Vista users may also have to click allow).



6.Restart your computer: Click start and then click the shutdown button. Once shutdown wait a few minutes and then boot your computer back up. The driver should have reinstalled. Test to make sure the problem is fixed

Learning Outcome 2.2: Accurate H/W and S/W repair

- **Content/Topic 1 Description of system memories**

Primary Memories

Primary storage, also known as main storage or memory, is the area in a computer in which data is stored for quick access by the computer's processor. The terms Random Access Memory (RAM) and memory are often as synonyms for primary or main storage. T**here are two main types of RAM:**

- DRAM (Dynamic Random Access Memory)
- SRAM (Static Random Access Memory)

Primary Storage Device. ... Random Access **Memory** (RAM) and cache are both **examples** of a **primary storage** device. The image shows three different types of **storage** for computer data. **Primary storage's** key differences from the others are that it is directly accessible by the CPU, it is volatile, and it is non-removable.

The different types of primary memory in computers are as follows:

- RAM [Random Access Memory] ...

- ROM [Read Only Memory]: ...
- PROM [Programmable Read Only Memory]: ...
- EPROM [Erasable Programmable Read Only memory]: ...
- Registers: ...
- Flash memory:

ROM is a secondary memory?

ROM (Read Only **Memory**) and RAM make up the primary **memory**.Although one is volatile and the other contains non volatile firmware, the similarity is in that they are both directly accessed by the CPU. **ROM** is NOT **secondary**/Auxilary/external storage.

- **Cache Memory** A CPU ***cache*** is a hardware ***cache*** used by the central processing unit (CPU) of a computer to reduce the average cost (time or energy) to access data from the main ***memory***. A ***cache***is a smaller, faster ***memory***, closer to a processor core, which stores copies of the data from frequently used main ***memory*** locations. The *Cache Memory* (Pronounced as "cash") is the volatile computer memory which is very nearest to the CPU so also called **CPU memory**,

Secondary Memories

Secondary memory is where programs and data are kept on a long-term basis. Common secondary storage devices are the hard disk and optical disks. The hard disk has enormous storage capacity compared to main memory.

- ROOM
- PROOM
- EPROOM
- EEPROOM
- USB flash drives
- Floppy disks,
- Magnetic tape,
- Paper tape,
- Punched cards,
- Standalone RAM
- disks,
- Lomega Zip drives
- Flash memory

8 Ways to Free Up RAM on Your Windows Computer

Before we dive into tips on how to clear RAM, we'll briefly describe what RAM does in case you're not familiar.

RAM stands for Random Access Memory. It's a short term storage medium that holds programs and processes currently running on your computer.

The more RAM that's in your machine, the more programs you can run at once without negatively affecting performance. When your computer runs low on RAM, it uses a part of the storage drive called the page file that acts as pretend RAM. This is much slower than actual RAM, which is why you notice slowdowns when Windows uses it.

Because RAM is volatile, you'll lose its contents when your computer shuts off. Anything you want to keep must save to permanent storage, like a hard drive or solid-state drive.

How To Free Up Memory On Your PC: 8 Methods

Let's look at the ways to reduce the amount of RAM you're using. You shouldn't need to do this most of the time, but they come in handy when you notice a problem.

1. Restart Your PC

This is a tip you're probably familiar with, but it's popular for a reason.

Restarting your PC will also completely clear the RAM and restart all running processes. While this obviously won't increase the maximum RAM available, it will clean up processes running in the background that could be eating up your memory.

You should restart your computer regularly to keep it from getting bogged down, especially if you use it all the time.

2. Check RAM Usage With Windows Tools

You don't have to guess what's using your RAM; Windows provides tools to show you. To get started, open the Task Manager by searching for it in the Start menu, or use the Ctrl + Shift + Esc shortcut.

Click More details to expand to the full utility if needed. Then on the Processes tab, click the Memory header to sort from most to least RAM usage. Keep the apps you see here in mind, as we'll discuss more on them later.

For more information, switch to the Performance tab. In the Memory section, you'll see a chart of your RAM usage over time. Click Open Resource Monitor at the bottom and you can get further details on its Memory tab.

The chart at the bottom will show you how much RAM you have free. Sort by Commit (KB) on the top list to see which programs use the most RAM. If you suspect you have a deep problem based on what you see here, see the complete guide to troubleshooting memory leaks.

3. Uninstall Or Disable Software

Now that you've seen what apps use the most RAM on your system, think about whether you really use them. An easy way to free up RAM is to keep programs you never use anyway from consuming it!

Apps you haven't opened in months are just wasting resources on your computer, so you should remove them. Do so by navigating to Settings > Apps and clicking Uninstall on any app you want to remove.

If you don't want to uninstall an app because you use it sometimes, you can instead prevent it from running at startup. Many apps set themselves to automatically run every time you log in, which is overkill if you rarely use them.

4. Use Lighter Apps And Manage Programs

What if you really need to cut down on RAM usage, but the apps hogging RAM are necessary to your workflow? You can handle this in two ways.

First, try using lighter app alternatives when you can. If your computer struggles when you have Photoshop open, try using a smaller app like Paint.NET or GIMP for minor edits. Only use Photoshop when you're fully dedicated to working on a project.

Second, pay closer attention to the programs you have open. Close any software that you're not actively working with. Bookmark open browser tabs that you want to read later, then close them to free up RAM. Keeping a tighter leash on what's open will help free up RAM.

Google Chrome is in its own category here, as it's notorious for gobbling RAM. See how to control Chrome's memory usage for tips.

5. Scan For Malware

It's worth checking for malware on your PC. Rogue software stealing resources will obviously suck up your available RAM.

We recommend running a scan with Malware bytes. Hopefully, it won't find anything, but at least you can rule out the possibility.

6. Adjust Virtual Memory

Earlier, we mentioned the paging file. If you see error messages that your system is low on virtual memory, you can increase this and hopefully keep performance stable.

To do so, search for the Control Panel on the Start menu to open it. Switch the Category view in the top-right to Small icons (if needed) and choose System. On the left side, click Advanced system settings, which will open a new window.

Here, on the Advanced tab, click the Settings button under Performance. Switch to the Advanced tab once again and click the Change button in the Virtual memory section.

Now you'll see the paging file size for your main drive. In most cases, you can leave the Automatically manage box checked and let Windows take care of it. However, if you're running low on virtual memory, you may need to uncheck this and set the Initial size and Maximum size to higher values.

7. Try Ready Boost

If your computer still has an older mechanical hard disk drive (HDD) inside, you can try a lesser-known Windows feature called Ready Boost to increase RAM. This allows you to plug in a flash drive or SD card that Windows effectively treats as extra RAM.

While it sounds great, this feature offers limited use today. If your computer has an SSD, ReadyBoost won't do anything. This is because an SSD is faster than a flash drive.

Plus, since computers have more RAM installed by default now, you won't see as much gain from ReadyBoost as you would on an anemic system from many years ago. The "pretend RAM" from ReadyBoost doesn't offer the same performance gains as actually adding more RAM.

8. Install More RAM

If you're always running low on RAM or want to run more programs at once, there's really no way around it: you need to add some more RAM to your machine. While it's not cheap, adding RAM will grant much-improved performance if your computer hasn't had much until now.

If you're wondering how to get more RAM, know that it's only possible to increase your RAM by adding physical sticks into your machine. Claims online about "downloading more RAM" are jokes; it's impossible to add memory this way.

On a desktop, increasing your RAM is a pretty simple upgrade. But due to the confined space on a laptop, it may be difficult or even impossible on portable machines. You'll also need to make sure you buy RAM that's compatible with your system.

Take a look at your PC manufacturer's documentation to learn what kind of RAM works with your system and whether the upgrade is easy. Online forums will also help with this. For more info, we've compared whether faster RAM or the overall amount of RAM is more important.

What About RAM Cleaners?

You've likely seen RAM cleaning utilities that promise to help you boost your RAM in various ways. While these sound great, we recommend avoiding them.

Have a look at our coverage of CleanMem, one such app, for the reasons why. In summary, RAM boosters are placebos at best, as they "free up" RAM by taking it from programs that probably need it.

Memory management is a complex computing issue. The developers of Windows, who are experts in their field, have a much better grasp on how to do this than some random developer who publishes a RAM cleaner.

RAM Is Just One Important Upgrade

We've taken a look at several ways to free up RAM on Windows 10. Ultimately, adding more physical RAM to your machine is the best solution for RAM-related issues. Walking through the above steps will help you decide if this is necessary, though.

With all this talk of RAM, don't forget that other PC components are important too. Find out what upgrades will improve your computer's performance the most.

Fixed storage is an internal media used by a computer to store data, and usually referred to as the Fixed Disks or Hard Drives.

Fixed storage devices obviously can be removed from the system for repair, maintenance, upgrade etc.

But generally this cannot be done without a toolkit to open up the system for physical access by an engineer.

Techically, almost all data processing on a computer are stored on some built-in fixed storage device.

The term is used mainly to differentiate these items from removable storage media (such as stream tapes, floppy diskettes, CDs, or from network-attached devices, like NAS storages, FTP etc.)

So these devices are both most hard-labouring and most vulnerable of all data storage uints in the particular infrastructure. These units must be backed up regularly to avoid crucial data losses.

There are three main types of secondary storage in a computer system:

Solid state storage devices, such as USB memory sticks.

Optical storage devices, such as CD, DVD and Blu-ray discs.

Magnetic storage devices, such as hard disk drives.

- **Content/Topic 2: Description of motherboard**

AT Motherboard

AT motherboard –Computer Definition. (Advanced Technology motherboard) A motherboard that follows the same design and **12x13"** form factor that was in the original IBM PC/AT.

ATX Motherboard Dimensions of a full-size ATX board are 12 × 9.6 in (**305 × 244 mm**), which allows many ATX chassis to also accept micro ATX boards. The official ATX specifications were released by Intel in 1995 and have been revised numerous times since. The most recent ATX motherboard specification is version 2.2.

Description of motherboard and its components:

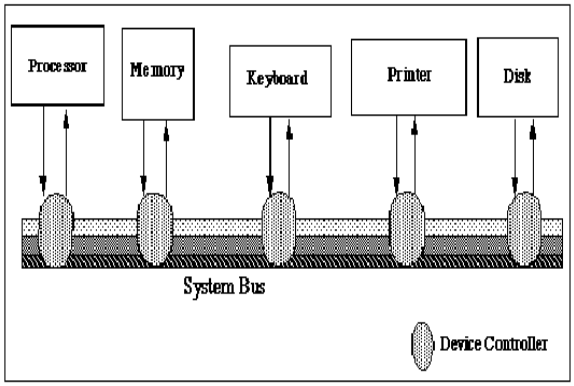
Processor: The CPU is one of **the most important elements of the personal computer.** On the motherboard, the CPU is contained on a single integrated circuit called the microprocessor. The computer will not run without a CPU. **Often referred to as the brains of a computer**, the CPU contains two basic components:

A **control unit** instructs the rest of the computer system on how to follow program instructions. It directs the movement of data to and from processor memory. The control unit temporarily holds data, instructions, and processed information in its arithmetic/logic unit. In addition, it directs control signals between the CPU and external devices such as hard disks, main memory, I/O ports, and so on.

The Arithmetic/Logic Unit (ALU) performs both arithmetic and logical operations. Arithmetic operations are fundamental math operations like addition, subtraction, multiplication, and division. **Logical operations** such as the **AND, OR,** and **XOR** are used to make comparisons and decisions, and these determine how a program is executed.

On board cash memory: A CPU cache is a hardware cache used by the central processing unit (CPU) of a computer to reduce the average cost (time or energy) to access data from the main memory. A cacheis a smaller, faster memory, closer to a processor core, which stores copies of the data from frequently used main memory locations.

System Buses :A **system bus** is a single computer bus that connects the major components of a computer system. It combines the functions of a **data bus** to carry information, an address bus to determine where it should be sent, and a control bus to determine its operation. Internally, the CPU has a **CPU bus** for transferring information between its components (e.g. the control unit, the ALU and the registers). Information is transferred from one device to another on the bus for example; information keyed in at the keyboard is passed along the bus to the processor. The processor then executes programs made up of instructions, which are stored in the computer memory. In order to attach any device to a computer, it must be connected to the computer's bus system as shown in the table below.



Bus types

These include the address bus, data bus, and control bus.

- The **address bus** is a uni-directional pathway, which means that information can only flow one way. Its function is to carry addresses generated by the CPU to the memory and I/O elements of the computer. The number of conductors in the bus determines the size of the address bus; this, in turn, determines the number of memory locations and I/O elements that the microprocessor can address.
- The **data bus**, unlike the address bus, is a bi-directional pathway for data flow, which means that information can flow in two directions. Data can flow along the data bus from the CPU to memory during a write operation, and data can move from the computer memory to the CPU during a read operation.
- The **control bus** carries the control and timing signals needed to coordinate the activities of the entire computer. Control bus signals, unlike information carried by the data and address buses, are not necessarily related to each other. Some are output signals from the CPU, and others are input signals to the CPU from I/O elements of the system. The most common control signals in use today are:
    - System Clock (SYSCLK)
    - Memory Read (MEMR)
    - Memory Write (MEMW)
    - Read/Write Line (R/W Line)
    - I/O Read (IOR)
    - I/O Write (IOW)

Expansion slots

All computers have expansion slots that **allow additional devices to be added.** Video cards, I/O cards, and sound cards are examples of components that are located in expansion slots.

The common expansion slots that are likely to be encountered include the following:

The **Industry Standard Architecture (ISA)** is a 16-bit expansion slot developed by **IBM.** It transfers data with the motherboard at **8 MHz.** ISA slots are becoming obsolete and are being replaced by PCI slots in new systems.

In 1987, IBM introduced the 32-bit, Extended ISA (EISA) bus, which accommodates the Pentium chip. EISA became fairly popular in the PC market.

The **Peripheral Component Interconnect (PCI)** is a **32-bit** local bus slot developed **by Intel**. Since they talk to the motherboard at **33 MHz,** the PCI bus slots offer a significant improvement over ISA or EISA expansion slots. With the PCI bus, each add-on card contains information that the processor uses to automatically configure the card. The **PCI** bus is one of the three components necessary for **plug-and-**

play. The **main purpose of the PCI bus is to allow direct access to the CPU for devices such as memory and video.** PCI expansion slots are the most commonly used type in motherboards today.

The **Accelerated Graphics Port (AGP)** was developed **by Intel**, AGP is a dedicated high-speed bus that is used to support the high demands of graphical software. This slot is reserved for video adapters..

- **Bridge controller**

  The USB-Serial bridge controllers integrate the industry-leading Cap Sense capacitive-touch sensing technology (for touch sensitive key switches) and Battery Charger Detection compliant to USB-IF Battery Charging specification ver. 1.2 (to detect the source of power on the USB port). These controllers are ideal for applications such as portable medical devices (like blood-glucose meters), point-of-sales terminals, Serial Cables (including USB-to-UART and RS232 cables) and many other applications requiring USB connectivity.

- ✓ **How to test a computer motherboard and CPU for failures**

A bad computer motherboard or CPU can cause an assortment of different issues on your computer. Below are a few of the possible issues you may encounter. It is important to remember that the issues below can also be caused by more than a bad motherboard and CPU.

1. Computer does not boot, instead you get a beep code.
   (Computer POST and beep codes).

2. Random computer crashes causing general protection fault error messages, illegal operations, or fatal exceptions, etc.
   (How to fix a general protection fault.

   How to fix illegal operations on a computer.

   How to fix a fatal exception error.)

3. Computer randomly reboots.

   (Why does Windows restart without warning?)

There are different ways to test your computer's motherboard and CPU to determine if it's bad or has flaws. Below is a listing of these recommendations.

Visual hardware check

The first thing to do is a visual check of the motherboard. A common cause of motherboard issues or failure is bulged or blown capacitors. Check the top of each capacitor to see if it's bulging or leaking, which is an indication the capacitor is blown. If you find any bulging or blown capacitors, that's very likely causing computer motherboard problems.

For the CPU, a visual check requires you to remove the CPU from the computer. Once the CPU is removed, check for bent pins on the side that is inserted into the motherboard. If you find a bent pin, that's likely causing issues with the CPU and computer.

How to install a computer processor.

It may be possible to replace a bulging or blown capacitor, but it requires precision soldering to install a new capacitor. Bent pins on a CPU can be bent back into place, but very carefully. However, can break off when trying to bend it back, and if that happens, the CPU needs to be replaced.

If a visual check shows there are no obvious visible issues, use a software utility or hardware tools to diagnose the problem.

Software and hardware solutions

Below are a couple software programs designed to test your computer's motherboard and CPU. However, with the complexity and wide variety of computer motherboards and CPUs, these programs may not detect every possible failure.

- **Hot CPU Tester -** Great tool for testing a computers motherboard and CPU. Easy to run and use to look for failures with your computer. Hot CPU Tester also includes a burn-in feature for new computers or computers with a new motherboard or CPU.
- **Intel Processor Diagnostic Tool -** If you have an Intel processor the Intel Processor Diagnostic Tool is a great free utility for testing variety of Intel processors.

There are also some excellent hardware tools for testing and diagnosing motherboards and CPUs. Below are a few of these tools.

- **PC-doctor -** A fantastic, but not cheap, solution often used for service centers and technicians to diagnose computer hardware issues including motherboard issues.
- **Ultra-X** - Another great collection of products to test computer hardware, including the motherboard.

Replace the motherboard and CPU

If the tools listed above used to test the motherboard or CPU show that either or both are bad, then replace them. There is no easy or cheap way to fix either piece of hardware.

If you have not tried a software or hardware tool to analyze the motherboard or CPU, you may want to take your computer to a computer repair shop. Be aware that they may also recommend replacing the motherboard or CPU if they find either or both to be defective.

- **Content/Topic 3: Description of drives**

A drive is a computer component used to store data. It may be a static storage device or may use removable media. All drives store nonvolatile data, meaning the data is not erased when the power is turned off.

Over the past several decades, drives have evolved along with other computer technologies. Below is a list of different types of computer drives.

1. **5.25 inch floppy drive -** uses flexible removable media drive, stores up to 800 KB per floppy disk, popular in the 1980s

2. **3.5 inch floppy drive** - uses more rigid removable media, stores up to 1.44 MB per disk, popular in the 1990s
3. **Optical drive -** uses removable optical media such as CDs (800 MB), DVDs (4.7 - 17 GB), and Blu-ray discs (25-50 GB), available in both read-only and writable models, popular in the 2000s
4. **Flash drive** - a small, highly portable storage device that uses flash memory and connects directly to a USB port
5. **HDD (hard disk drive) -** the most common internal storage device used by computers over the past several decades, can store several terabytes (TB) of data
6. **SSD (solid state drive)** - serves the same purpose as a hard drive but contains no moving parts; uses flash memory and provides faster performance than a hard drive

While there are many different types of drives, they are all considered secondary memory since they are not accessed directly by the CPU. Instead, when a computer reads data from a drive, the data first gets sent to the RAM so that it can be accessed more quickly. Even the fastest drives, likes SSDs, have much slower read/write speeds than RAM.

Why are computer drives called "drives?"

While an official answer remains elusive, a compelling reason is that early drives required a rotating device that would spin or "drive" the disk. While some modern drives have no moving parts, the legacy term "drive" seems to have stuck.

- **Content/Topic 4: Description of Cable**

Power cable

Alternatively known as a **power cable**, mains **cable** or flex, a **power cord** is the primary **cable** that provides **power** to the **computer**, printer, monitor, and components within a **computer**. The image is an example of the **power cord** that is commonly used with **computers**, monitors, printers, and other peripherals.

Computer Power Cord (Kettle Plug)

Connect one end to AC power socket

Connect another end to power supply unit

Note: Always turn off your power supply unit (with the 1-0 switch at the back) before connecting a power cord to it.

✓ **Data cable**

Data Cables: These facilitate communication between devices. A good example would be the HDMI, DVI, or VGA cables that connect to your computer monitor or TV. There are a bunch of other data cables, such as USB cables, SATA, CAT5, and so on.

USB (Universal Serial Bus)

For USB computer cable connections, there are two popular formats: USB 2.0 and the newer USB 3.0

How to tell USB 2.0 and 3.0 cables apart: USB 3.0 cables have a blue tip, and sometimes you can find a SS "Super Speed" label on it.

Since USB was intended to be the one computer cable connection to replace them all, it's no surprise that the possible uses for a USB port are quite mind-blowing. For this computer cable guide, we have listed its more common uses below:

Connect one end to: USB device

- Storage devices: USB flash drive, external hard drive, external optical drive
- Input devices: USB keyboard (wired and wireless), USB mouse (wired and wireless), webcam, scanner, gamepad
- Output devices: printer, all-in-one office machine, USB speaker
- Wireless adapters: network (Wi-Fi) adapter, bluetooth adapter, 3G adapter
- Data (and charging) cable for mobile devices such as mobile phone, tablet, MP3 player

Connect other end to: USB ports on computer (see image below)

How to tell USB 2.0 and 3.0 ports apart: USB 2.0 ports have black tips while USB 3.0 ports come with blue tips. See image below:

USB 3.0 is backwards-compatible... meaning that you can connect a USB 2.0 device to a USB 3.0 port and vice versa (but the USB 3.0 devices hooked up to a USB 2.0 port will perform at lowered rates)
There are also USB cables which connect new external backup drives (see below), these are described as USB-A to Micro-B

VGA (Video Graphics Array) and DVI (Digital Visual Interface) Cables

The VGA cable is also known as the analog video cable or D-sub cable. This helps to transmit media from your computer to a VGA enabled projection devices such as a monitor or TV. VGAs have 15 pins arranged in three rows of 5 each.

DVI cables came as an improvement of VGA cables when display devices moved from analog to digital video technology.

HDMI (High-Definition Multimedia Interface) Cables

HDMI cables pretty much wiped out the VGAs and DVIs of the world. With the capability to send both video and audio signals (unlike VGA and DVI that send only video), these cables are only compatible with newer devices because they only send digital signals.

They come in five different types from Type A (19 pins), Type B (29 pins), Type C Mini (19 pins and is mostly used with portable devices such as digital cameras), Type D Micro (19 pins used for mobile devices such as phones) and Type E which is much larger and used for automotive purposes.

DisplayPort

A DisplayPort is very much like an HDMI cable and was designed to replace VGA and DVI. This cable also transmits both video and audio in digital format.

Thunderbolt

You probably have one of these on you right now. Thunderbolt cables carry data and video from an external device to your computer. These are most common with Apple devices.

Ethernet Cable

Commonly referred to as RJ-45 cable, these are cables designed to connect your computer to the router or network switch. Before there was Wi-Fi, these were the cables that you need to connect to your computer to get the internet. Now they connect to your wireless router.

They come in 3 different types, each version transmitting data at a faster speed than the previous model:

- Cat 5
- Cat 5e
- Cat 6

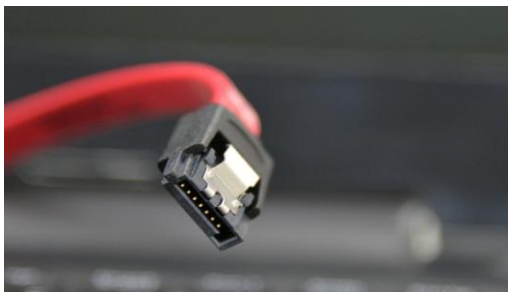
IDE (Integrated Drive Electronics)

This is an "ancient" cable that used to connect the storage devices to your computer's motherboard. If you ever opened up an old computer, you will notice a ribbon-looking cable that has more than two plugs.

IDE 40-Pin Male to Female Hard Drive ...

SATA (Serial Advanced Technology Attachment)

SATA is to IDE what HDMI is to VGA. Newer computers use SATA ports. These cables have higher data transfer speeds. A SATA cable has more of an L-shape and can be identified by two connectors that each has seven pins.



There are also other lesser cables, such as the 3.5mm audio cable, also known as audio jacks that can connect to your computer and an audio device such as a microphone or speakers. These are the kind of cables that your wired headphones use to connect to your phone.

The thing about these cables is that, like almost everything else, they evolve with the times. Faster, better, and smarter cables are replacing older ones. A good example is the VGA to HDMI transformation and the IDE to the SATA shift. Within these types of cables, there are ranks often designated with ascending numbers with USB 3.0 being faster than USB 2.0 and such.

eSATA Cable – External Serial Advanced Technology Attachment

Same as SATA cables, with an extra "e" standing for "External", eSATA cables are the improved version of SATA cables and offer the possibility to connect devices such as optical drives and external hard drives.

FireWire

A bit like USB cables, although not as commonly used, FireWire serve multiple and similar purposes. They are used for connecting printers and scanners for example. They exist in two types, according to their transmission rate:

- 1394-A type: transfers up to 400 Mbps,
- 1394-B type: transfers up to 800 Mbps.

Now we hope computer cables have fewer secrets for you. Do you still have any question we could answer regarding computer cables? We would love to help!

PS/2 Cable

Connect one end to: PS/2 keyboard, PS/2 mouse

Connect other end to: PS/2 ports on computer (see image below)

- Purple PS/2 port: keyboard
- Green PS/2 port: mouse

3.5mm Audio Cable

Also known as phone connector (since 3.5mm jacks are often found on mobile phones too)

Connect one end to: computer speakers, 3.5mm headphones, 3.5mm microphone
Connect other end to: audio ports on computer (see image below use Green socket)

- Green audio port: computer speakers or headphones
- Pink audio port: microphone
- Blue audio port: MP3 player, CD player, DVD player, turntable, electric guitar etc (line-in port to play and record sounds from the above devices)

ThunderBolt/USB-C

Mostly seen on laptops and Apple Macs these cables are high speed and are capable of carrying Data, video and other information.

There are 2 current types of Thunderbolt, the older version Thunderbolt 2 is seen below but this can also be confused with Mini Display ports as they look identical and only visual difference is the picture beside the port. Thunderbolt 2 (left) has a lightning symbol and carries Data and video.

The Mini Display Port (right) will only carry Video.

And Thunderbolt 3 also known as USB-C on Apple Macs.

- **Content/Topic 1: Description of Power supply types**

A power supply is an electrical device that supplies electric power to an electrical load. The primary function of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load.

- ✓ **AT Power supply**

AT uses the P8 and P9 as the main connectors where it connects to the AT socket of the motherboard

AT Power Supply

ATX Power supply

ATX (Advanced Technology eXtended) is a motherboard and **power supply** configuration specification developed by Intel in 1995 to improve on previous de facto standards like the AT design. ... Dimensions of a full-size **ATX** board are 12 × 9.6 in (305 × 244 mm), which allows many **ATX** chassis to accept micro ATX boards.

1800W ATX Power Supply 80 ...

Difference between AT power supply and ATX power supply:

S. NO.	CATEGORY	AT POWER SUPPLY	ATX POWER SUPPLY
1.	Full Form	AT power supply stands for Advanced Technology power supply.	ATX power supply stands for Advanced Technology Extended power supply.
2.	Motherboard Required	It can be supplied to AT motherboard	It can be supplied to ATX motherboard
3.	Number of power connectors	The main power connectors in AT power supply are 2 in number.	There is only 1 main power connector in ATX power supply.
4.	Number of pins per connector	There are 6 pins per connector in AT power supply.	There are 20 or 24 pins per connector in ATX power supply.
5.	Number of rows on pins	The pins in AT power supply are arranged in a single row.	The pins in ATX power supply are arranged in 2 rows.
6.	Switching the power on/off	It has a physical switch which can be operated manually.	It has a switch which can be operated by a software by the motherboard.
7.	Power Supply	Power provided by AT power supply is less than 250 Watts.	Power provided by ATX power supply is more than 300 Watts
8.	Unique Connectors	It has mini-Molex connectors for floppy devices.	It has a SATA (Serial Advanced Technology Attachment) connector.
9.	Manufactured by	It was manufactured by IBM.	It was manufactured by Intel.
10.	Year of Manufacture	It was manufactured in 1984.	It was manufactured 1995.

Learning Outcome 2. 3: Proper fixing of Threats

- **Content/Topic 1: Identification of External cables**

Computer Cable types and descriptions

With so many types of cables, it's hard to find a singular source of information that highlights the important differences between them all. Here's an overview of the most common computer cable types you'll encounter when dealing with computers.

1. VGA Cable

Connect one end to: computer monitor, television (PC input port)

Connect other end to: VGA port on computer (see image below)

- **How to fix "no input signal" error message**

If your computer monitor is displaying the error message "No Input Signal," try the troubleshooting options in the sections below.

Tip

This page is for troubleshooting a "no input signal" on a desktop computer. If you are using a laptop, see: How to connect an external display to my laptop.

Note

To connect to a TV, see: How to display a computer image on a TV or projector.

Computer not transmitting a signal

Make sure the computer has power. If the computer is turned off, it cannot transmit a signal and causes the "no input signal" message.

Monitor not connected properly

Verify the monitor cable is connected correctly and securely on the back of the monitor and the back of the computer. The monitor cable connects to the back of your computer using either a VGA, DVI, HDMI, or DisplayPort connector. The pictures below are examples of the VGA, DVI, HDMI, and DisplayPort connectors on a video card.

Figure 21:Display port

Verify the monitor cable is not loose by disconnecting the cable from the back of the monitor and reconnect the cable. It's also a good idea to rock the cable back and forth to make sure it's not loose.

Tip

When disconnecting the cable, make sure none of the cable's pins are bent by examining the end of the cable. If any of the cable's pins are bent or broken, the cable may be defective and should be replaced.

Note

Some older monitors may have cables that cannot be disconnected from the back of the monitor.

Next, disconnect the monitor cable from the back of the computer and reconnect the cable. When connecting the cable to the computer, ensure the cable connection is tight. With a VGA or DVI style connector, like the ones shown above, screws can be tightened and hold the connector in place.

Tip

Some computers may have an onboard video and a video card. When working with this type of computer, you'll have two different connections for your monitor on the back of your computer. If you see more than one VGA, DVI, HDMI, or DisplayPort connector and the monitor is not working, try the other connector.

Incorrect input selected

Newer monitors are capable of connecting to a computer using a VGA, DVI, HDMI, or DisplayPort connector. For these types of monitors, the correct input selection needs to be used. Access the settings on the monitor using the buttons on the front or bottom edge of the monitor. Look for options to select

the type of connector, either (e.g., VGA, DVI, HDMI, or DisplayPort), and select the cable your monitor is using.

Bad hardware

If the connections appear to be correct, either the monitor or the video card is likely bad. It's also possible that the motherboard in the computer is defective, preventing a signal from getting to the video card and monitor. To test what component is bad, either connect a different monitor to your computer or connect your monitor to a different computer. We recommend testing the motherboard for any issues as well. See: How to test a computer motherboard and CPU for failures.

If another monitor works on your computer, the monitor is bad.

If your monitor works on another computer, your video card may be having issues. See: My video card isn't working.

Tip: If you believe your video card is bad and your computer has an onboard video, the motherboard needs to be replaced. You could also install a new video card instead of replacing the motherboard. See: How to install a computer video card.

Computer not posting

Verify your computer is getting past the POST process and that it is starting up. The "No input signal" message can sometimes appear if the POST process is failing, and the computer cannot boot properly.

If the POST process is failing and the computer is not starting up, the motherboard could be at fault. A short in the motherboard or a bad capacitor are common causes for a computer motherboard to not pass the POST process.

Monitor works for a while, then loses signal

If the monitor works for a while, then stops working and displays the "No input signal" message, the monitor or computer may be overheating. In the event of the monitor overheats, it stops working to prevent further damage. If the computer overheats, the computer may stop sending a signal to the monitor, and may also shut down to prevent further damage to the computer hardware.

Fixing a monitor that is overheating is generally not worthwhile. The cost to fix it is likely more than the cost of buying a new monitor. For that reason, we recommend replacing an overheating monitor.

If the computer is overheating, the fans that keep the processor, video card, or power supply cool may have failed. Check the fans to see if they are spinning. If they are not spinning at all when the computer is turned on, the fans need to be replaced. If the fans are spinning, use a software diagnostic tool, like HW Monitor, to determine if the fans are spinning at the correct RPM. It is possible that the fans are not spinning fast enough, indicating they are bad or full of dust and need to be cleaned or replaced.

If the overheating is related to the computer processor, you may need to replace the heat sink and fan assembly. It's possible that the CPU may be damaged and needs to be replaced, as well.

For a video card or power supply, the fans are usually integrated into the hardware and not easily replaced, if they can be replaced at all. You may need to replace the power supply or video card to fix the overheating problem.

2. DVI Cable

Connect one end to: computer monitor

Connect other end to: DVI port on computer (see image below)

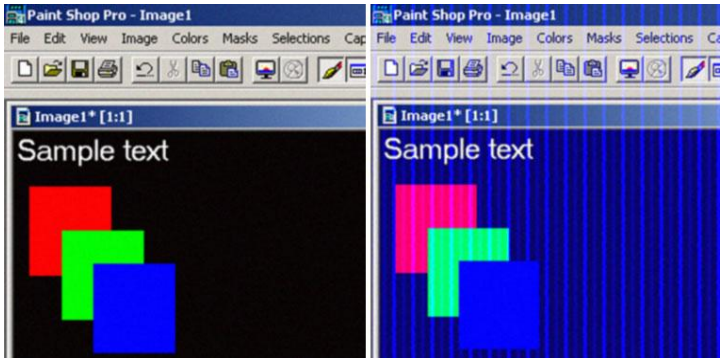
However there are 2 types of DVI, DVI-I and DVI-D.

DVI-D does not have the extra pins around the long pin, this is also a pure digital signal over DVI-I.

Troubleshooting DVI problems

You'll be thrilled to know that the video BIOS, PNP, DDC, EDID, and other unintelligible jumbles of letters have been finely tuned to assure that your video card and monitor work together perfectly. That thrill may be somewhat diminished if you're staring at a "no signal" message on your new LCD monitor. DVI is supposed to set itself up automatically but they don't call it "plug and pray" for nothing. Usually, DVI works just fine but there are plenty of things which can go wrong. Below are some things to try which may help get your video card and LCD monitor working together properly. If you don't know DVI inside-out then please read this page before continuing with this one. Below is a list of common symptoms and what sorts of things you can try to fix them. If you can't get it working (and you've got some time on your hands) then you should try running through all the possible solutions.

DVI



troubleshooting: symptoms

Symptoms: corrupted screen in digital mode

If you're using a digital DVI connection between your video card and monitor then you can get DVI corruption problems which usually appear as wobbly vertical lines. The left part of the image above is displayed correctly. The right part is showing DVI corruption. The severity of the corruption varies. You can see other example screenshots of DVI corruption here and here. The corruption can happen for any number of reasons including: a weak DVI transmitter in the video card, a cable which is too long for the DVI data rate, a very low-quality cable, or a weak DVI receiver in the monitor.

- **Update your display drivers** - You should always do this first if you're having any problems.
- **Use reduced blanking** - This reduces the pixel clock which may fix the corruption.
- **Use another DVI output** - The corruption may be caused by a weak DVI transmitter in the video card. Try each DVI output on the video card because DVI transmitters on separate outputs can sometimes be very different.
- **Use a shorter cable -** Shorter cables make it easier for the image data to get through the cable in good enough shape to display properly.
- **Lower the refresh rate** - Lowering the screen refresh rate makes it easier for the image data to get through the cable in good enough shape to display properly.

Symptoms: BIOS and powerup screens aren't visible but monitor works fine in Windows

PCs are supposed to start up using the ancient 640 X 480 at 60 Hz video mode which was introduced with VGA. This is a very standarized set of timings which all DVI monitors are required to support. And yet, sometimes you get a blank screen running in DVI digital mode when powering up. The display drivers aren't loaded until later in the boot process so you can rule out any driver problems. The most likely cause is that the video card has decided not to use the standard ancient 640 X 480 mode when it powers up. That's more likely than the DVI monitor not being able to display it. A few techs who work for Sapphire (a manufacturer of video cards) report that their cards start up at 640 X 480 @ 50 Hz. Even though they work for Sapphire, I'm not sure that I believe them. DVI monitors are not required to support that screen mode so it would make much more sense to obey the DVI spec and use the standard 640 X 480 @ 60 Hz. But it certainly would explain the symptoms. Once Windows is loaded then you can set the screen mode to the standard 640 X 480 at 60 Hz mode to prove that the monitor can display it. Something's seriously wrong with the monitor if it can't. Since the Windows display driver can't be causing the BIOS and powerup screens to be invisible, you have limited options to try out. If Windows is visible then it's probably not a hardware problem because the old, slow VGA mode puts way less strain on the DVI transmitter, cable, and receiver than any mode you're actually using in Windows.

- **Flash the video BIOS -** The video BIOS controls all of the BIOS and power up screens. This is the only place where video card makers can add patches to try to solve compatibility problems before the operating system display driver is loaded.

- **Go analog when you need to access the BIOS** - If your monitor also supports analog mode then you may be able to get away with connecting it in analog mode when you need to access the BIOS and running in digital mode the rest of the time. Lots of monitors are less picky about which display modes are visible in analog mode than in digital mode. This is a dodge rather than a solution but it will allow you to keep using the computer while you try to figure out the problem.

Symptoms: BIOS and power up screens are visible but monitor does not display in Windows

This means that the Windows display driver is setting a screen mode that the monitor can't display. It could be a non supported resolution and refresh rate. It's also possible that the display driver is confused and has tried to display an analog screen mode when you only have a digital cable or vice versa. The EDID data in the monitor tells the display driver which screen modes it can support so this should never happen. And yet, it does.

- **Update your display drivers** - It could just be a display driver bug so update to the latest drivers to get any fixes.
- **Go analog -** As a last resort you can try to run in analog mode if you're currently in digital mode. Analog mode is often less picky about which screen modes it will display than digital mode.
- **Rewrite the EDID data -** If your monitor's EDID data has a mistake or has been corrupted then the display driver may try to set a mode which the monitor can't display.
- **Turn the monitor on after Windows boots -** Sometimes the BIOS and powerup screens display properly because the video BIOS correctly chooses between analog and digital and then Windows chooses incorrectly. This has been known to happen with monitors which have DVI-I inputs and video cards which have DVI-I outputs. Delaying when you turn on the monitor can apparently affect whether the Windows display driver selects analog or digital in some systems.
- **Stop using a DVI-I cable -** A DVI-I cable used with a DVI-I video card can cause drivers to have a hard time selecting between analog and digital screen modes.
- **Use the monitor's on-screen-display to manually select analog or digital -** This forces the monitor to run either as analog or digital rather than make the choice automatically. You can use this to try to make sure that the video BIOS and the display driver both make the same choice between analog and digital display modes.
- **Install a monitor .INF file -** This is in case the video card can't read the EDID data from the monitor.

Symptoms: monitor never displays at all

This could be caused by many things including a dead monitor, dead video card output, or a dead cable. You can troubleshoot those by swapping in known-good parts. But there's other things to check before you resort to swapping hardware.

- **Use another DVI output -** If you've got two DVI outputs then give the other one a try. You may just have a bad DVI transmitter.
- **Go analog -** If you're running in digital mode and you've never gotten the monitor to work at all then try analog mode.
- **Use a shorter cable -** A long DVI cable can prevent some video cards from reading the EDID data from the monitor. If it's bad enough that the data can't be read at all then the video card thinks that no monitor is connected.
- **Flash the video BIOS -** There may be a compatibility problem with the combination of video card and monitor. If you can't even see the BIOS and powerup screens then the video BIOS is one of the few places that they can fix it.
- **Check your DVI cable type -** Check your cable to make sure you don't have a monitor accepting digital only while using an analog only cable or vice versa.

Symptoms: sometimes the monitor starts up in analog mode and other times it starts up in digital mode

This has been known to happen with some monitors which use DVI-I inputs when connected to a video card with a DVI-I output by a DVI-I cable. This is usually the monitor's fault because it has to decide whether to return a digital EDID or an analog EDID. Some monitors seem to be inconsistent when making that choice.

- **Stop using a DVI-I cable -** Sometimes switching to a DVI-D cable can convince the monitor to return only digital EDIDs.
- **Use the monitor's on-screen-display to manually select analog or digital -** This is another way to force the monitor to always return an analog or digital EDID consistently.
- **Go analog -** This is a crummy solution but it often works.

DVI troubleshooting: solutions

Solutions: update your display drivers

The "update your display drivers" dance is popular for a reason: it often works. If there's a problem with a particular video card and monitor then the display driver is the easiest place to fix it. Updating monitor code is usually not possible and updating the video BIOS is a bit of a pain. But updating display drivers is a time-honored tradition. If you're having a problem then you should always try this first because it's the easiest fix. You should always uninstall your old display driver before installing a new one. This page gives detailed instructions on how to uninstall your display driver and this page tells you how to get a new display driver and install it.

Solutions: use reduced blanking

Reducing the DVI pixel clock makes it much easier to transmit the digital image through the cable. If you have a corrupted image then using reduced blanking reduces the pixel clock without reducing the screen

resolution or refresh rate. LCD monitors usually support reduced blanking for modes which require pixel clocks anywhere close to the 165 MHz limit. There's really no point in not using reduced blanking all the time. Display drivers are usually pretty good about selecting reduced blanking automatically when it makes sense. If you're having a digital image quality problem then you can force reduced blanking to be sure. This page explains how to do that.

Solutions: use another DVI output

If you're having some kind of hardware problem and your video card has more than one DVI output, then try using another output. Some DVI outputs use a DVI transmitter integrated into the GPU. Other DVI outputs use a DVI transmitter in an external chip. One DVI transmitter is often better than the other so you should try all of the DVI outputs. One of them may be able to handle a much higher pixel clock than the other. And there's always the possibility that one of your outputs is just broken. Most video cards have two outputs but most people only use one of them. It's a good idea to try both of them.

Solutions: use a shorter cable

This can solve a lot of different problems. When running in analog mode, the longer a cable gets, the more it degrades the image quality. Long analog cables won't prevent the image from being displayed. They just make it look smeary. When running in digital mode, the quality of the digital signals in the cable also get worse as the cable lengthens but the the image quality stays perfect until it hits a certain length. That's because the digital data only has to be above a certain quality level to be correctly received. Once it goes below that level the image quality deteriorates rapidly and you end up with a corrupted screen.

One rather unusual problem with long cables relates to the EDID data. With certain video cards, long cables can prevent the EDID data from being received correctly. This prevents the video card from reading the capabilities of the monitor. It can get bad enough that a video card can't even recognize the presence of the monitor at all. Shortening the cable can solve this problem. For those of you who know some electronics, I'll explain why this happens. The rest of you can just skip the rest of this paragraph. The EDID data is sent over the DDC bus. It's based on an I²C bus which uses open collector lines. Chips connected to open collector lines only drive the line low. A pull up resistor pulls the line high if nothing is driving the line low. The capacitance of a cable increases as it gets longer. So you've got an RC circuit pulling the open collector line high with the pull up resistor and the cable capacitance determining how fast the line goes from low to high. The problem is that some video cards have used too high a pullup resistor value to pull the clock line high fast enough on a long cable. With some video cards the open collector clock line looks more like a saw tooth pattern than a digital signal. If it gets bad enough then the monitor doesn't receive the clock signal at all and the EDID read fails. Reducing the cable length can

reduce the capacitance enough to make the EDID readable. But, of course, the proper solution is for the video card makers to use a lower valued resistor. If you have a digital storage scope laying around then it's easy to check if you have this problem. It can be solved by adding a lower valued resistor in parallel with the improperly-selected pull up resistor. Some pull up resistors are bad enough that the DDC bus fails long before the TMDS part of the cable at a given length. It's a shame to have cable length limited by something as easy to implement as an I^2C bus rather than the difficult to implement TMDS connection.

Solutions: lower the refresh rate

Lowering the screen refresh rate lowers the DVI pixel clock which makes it much easier to transmit the digital image through the cable. If you're having image corruption in digital mode then you may be able to solve it by lowering the screen refresh rate. LCD monitors do not flicker like CRTs when using slower refresh rates so you won't have eyestrain problems if you do it. Most LCDs default to a screen refresh rate of 60 Hz which is the slowest rate supported in digital mode so they're already running as slowly as possible. But if you're running higher than 60 Hz then you can try reducing it to see if your problem goes away.

Solutions: go analog

This is more of a dodge than a solution. If you're having problems running DVI in digital mode and your video card and monitor support analog, then give analog a try. The standard response to that suggestion is something like, "I've got a digital monitor and I'm going to run it in digital mode!!!". Well guess what? Analog mode is actually extremely good these days. In the older LCD monitors you could run into pixel jitter problems in analog mode. But most modern LCDs have excellent automatic synchronization which allows them to be just as sharp in analog mode as in digital. Most people can't even tell the difference. There may be a small reduction in color accuracy but it's usually not noticeable. Don't assume that because it's not working in digital mode that it will also fail in analog mode. I've seen lots of people (who are usually angry about it) with new LCD monitors which work perfectly in analog mode but show blank screens in digital. Analog mode has more benefits than just being almost guaranteed to work. Many video cards and monitors support higher screen refresh rates in analog mode than they can support in single link digital mode. That's because analog signal transmission doesn't have the 165 MHz speed limit of digital DVI. You can continue to push the analog signal very fast if you're willing to tolerate a little image quality degradation. If you have a card with a slower DVI transmitter (like many older NVIDIA cards) then analog mode can be much quicker than digital mode. Quite often gamers feel they get better performance running with a higher analog screen refresh rate rather than a slower digital refresh

rate. Give analog mode a try. You might be perfectly satisfied with it. Analog is definitely better than staring at a blank screen.

Solutions: flash the video BIOS

The video BIOS is a program built into the video card which allows it to provide basic video functions before an operating system display driver is loaded. The powerup screens and initial Windows screens are all displayed before the Windows display driver is loaded. The video BIOS is responsible for making that work. If you're trying to solve a problem which happens before Windows loads its display driver, then the only kind of video driver you can update is the video BIOS. The code is built into a chip on the video card. You can update that code by flashing the video BIOS. You need to be careful because a mistake while flashing the video BIOS will render the video card inoperative.

Solutions: rewrite the EDID data

The video card reads the EDID data from the monitor to get the capabilities of the monitor. Unfortunately, some monitors have less-than-stellar EDID data. Some LCD-TVs which are supposed to be compatible with computers through a DVI connection understate their maximum resolution in the EDID data. It doesn't make sense, but it has happened. In some cases, you can update the EDID data in the monitor by running a program on your computer. Most monitors can't do this but it's worth checking the monitor manufacturer's web site to see if they have any EDID patches for your monitor. These usually affect the maximum resolution which can be displayed but can sometimes solve other problems as well. If you know quite a bit about your monitor specifications then you can check your EDID data to make sure it matches what you know about the monitor. ViewSonic provides a handy program called EDID.EXE which can read your EDID data and display it in a readable format. You don't need a ViewSonic monitor to use it.

Solutions: turn the monitor on after Windows boots

If you're getting no display on your monitor then you may be able to get it working by leaving your monitor off until after Windows boots. This solution doesn't sound like it makes any sense but it has worked for a number of people. It apparently affects how the monitor is recognized by the display driver. When Windows boots, it reads the EDID data from the monitor to find its capabilities. As I read the specification, the EDID data can be read whether the monitor is on or off because the video card provides the power to the monitor circuitry which provides the EDID. However, the monitor returns different sets of EDID data depending on whether it is to display in digital or analog mode. Having the monitor off may affect whether the monitor returns the analog or digital version of the EDID data for monitors which have a DVI-I input. This document describes the analog/digital confusion issue with DVI-I

monitors. In some monitors, turning the monitor off may force it to return the digital version of the EDID. Or, it may be something completely different. I've never seen a good explanation of why this sometimes works but it's an easy one to try. Of course, you won't be able to get to the BIOS this way but at least you can use Windows to try to figure out the problem.

Solutions: stop using a DVI-I cable

The video card reads the EDID data from the monitor to find its capabilities. The monitor returns different sets of EDID data depending on whether it is to display in digital or analog mode. If you have a monitor which can display in both digital and analog mode, then it may have a VGA connector for analog mode and a DVI-D connector for digital mode. When the video card reads the EDID data from the VGA connector the monitor returns the analog version. When it reads from the DVI-D connector it returns the digital version. Things aren't so simple if you have a video card with a DVI-I output, a DVI-I cable, and a DVI-I monitor. There's only one set of wires in the DVI-I connector for both its analog and digital sections so the monitor has to figure out whether to return the analog or digital version. This document describes the analog/digital confusion issue with DVI-I monitors. In some monitors, all that is required to force the monitor to return the digital EDID is to use a DVI-D cable. In other monitors, it doesn't help. The only way to be sure is to try. Using an analog cable (DVI-A or a VGA cable) may force the monitor to return the analog EDID if you want to run in analog mode.

Solutions: use monitor's on-screen-display to manually select analog or digital

Some blank screen problems can happen when the video card outputs analog video data when using a digital cable or when it outputs digital video data when using an analog cable. In theory it should never happen. But in theory you should never get a black screen either. Many monitors with DVI-I inputs have a way to force them to operate only in digital mode or analog mode. You can access that option using the on-screen-display for the monitor. Some DVI-I monitors support an "auto" option which allows the monitor to automatically decide whether to be analog or digital. If you have persistent black screens then it can be useful to force the monitor to work one way or the other so you are 100% sure exactly what mode it is using.

Solutions: check your DVI cable type

This may sound silly but have you checked your DVI cable to make sure you have the right kind? It's easy to think you're using a DVI-D cable when in fact you're using a DVI-I or vice versa. If your video card is outputing analog video then you must use a cable which implements the analog signals. The same goes for digital cables. Take a look and make sure you're using the right kind. DVI-I cables can cause more problems than DVI-Ds so make sure which one you're running. Another cabling problem you can have is if Windows is set up to use a screen mode which requires dual link but you are using a single link cable. If you have a dual link video card, a dual link monitor, and a single link cable, then the single link

video modes will work properly and the dual link modes may give you a blank screen (I don't have the hardware to try it myself). If Windows is giving you a blank screen then you can try to boot in VGA mode and then set a new screen mode. If the single link modes work and the dual link modes fail then it may be the cable. If you've used the on-screen-display to configure your monitor to display only analog or only digital then make sure you have the right kind of cable. Telling your monitor to work as digital only and then using a DVI-A or VGA cable is a sure way to a blank screen. The same goes for a monitor set up as analog only using a DVI-D cable.

Solutions: install a monitor .INF file

All modern monitors can provide EDID data to the video card which describes the capabilities of the monitor. When Windows says that a "plug and play monitor" is installed, it means that it is using the EDID data's description of the monitor. But older monitors can't provide EDID. In that case, Windows depends on the monitor's .INF file for basic info about what the monitor can do. If the video card fails to get the EDID data from the monitor then Windows may (I'm not 100% sure) fall back on the .INF file which is currently selected. I've seen people in Internet forums get their brand new LCD monitors (which clearly support EDID) working properly by installing the .INF file for their monitors. It's possible that there's another explanation for what solved their problem but falling back to the old .INF file when you can't read the EDID properly makes sense. If you've got a blank screen in Windows that you can't seem to get rid of then it's probably worth your trouble to try to track down a .INF file for your monitor and install it. Not all LCDs come with them but your best chance of finding one is on the monitor manufacturer's web site. Install the .INF and then be sure to select that monitor. You know you've gotten it right when the name of your monitor shows up in the display manager instead of "plug and play monitor".

3. HDMI Cable

Connect one end to: computer monitor, television

Connect other end to: HDMI port on computer (see image below)

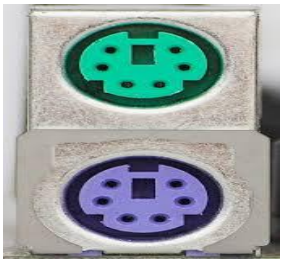
Note: If you're hooking up a television to your computer, then we would recommend that you use a HDMI cable as your PC cable connection since it is able to transmit both display and sound - So you can not only use your TV screen as a monitor, but also make use of your TV speakers to play PC audio.

4. PS/2 Cable

Connect one end to: PS/2 keyboard, PS/2 mouse

Connect other end to: PS/2 ports on computer (see image below)

- Purple PS/2 port: keyboard



- Green PS/2 port: mouse

Does USB to ps2 work?

The answer is yes, a **USB** HID device (mice and keyboards) must understand the alternative **PS/2** protocol in order to function in **PS/2** port using **USB**-**PS/2** adapter. Not every **USB** mice or keyboard support the **PS/2** mode.

Replacement PS/2 Mouse to USB Adapter - F/M

Plug your PS/2 mouse into a USB port

Replacement USB Keyboard to PS/2 Adapter - F/M

Plug your USB keyboard into a PS/2 port by converting a USB-A (female) connector into a 6-Din (PS/2) male connector

5. Ethernet Cable

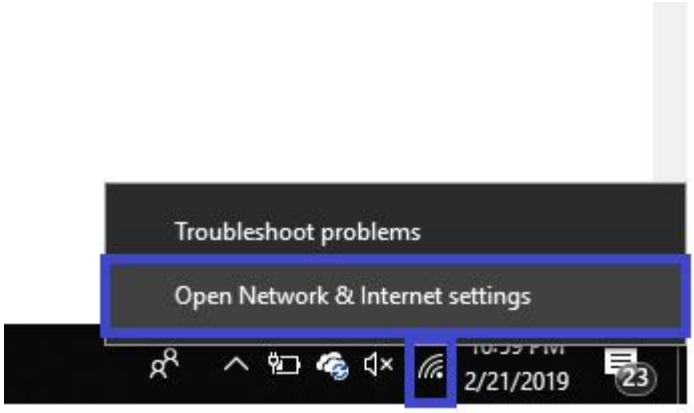
Also known as RJ-45 cable

Connect one end to: router, network switch

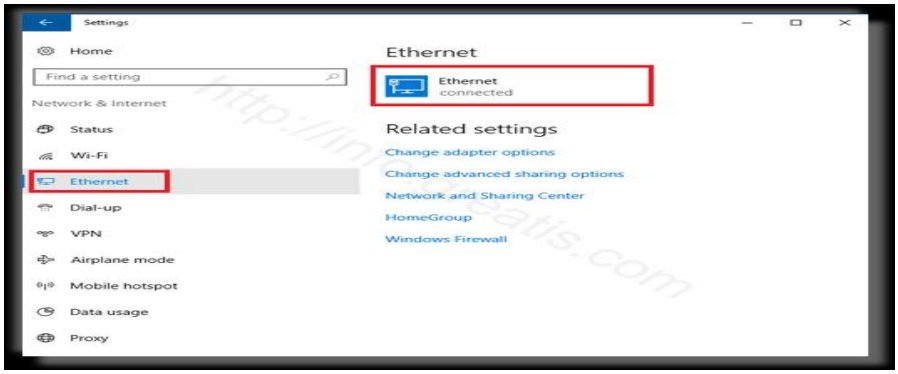
Connect other end to: Ethernet port on computer (see image below)

How To Fix Your Ethernet If It's Not Working

If your WiFi is working properly but your wired ethernet connection isn't, here's a bunch of things you can do. The first thing you need to do is turn off the WiFi. Right-click on the WiFi icon in the notification area and click "Open Network and Internet Settings". Go to the WiFi tab and use the toggle to turn it off.

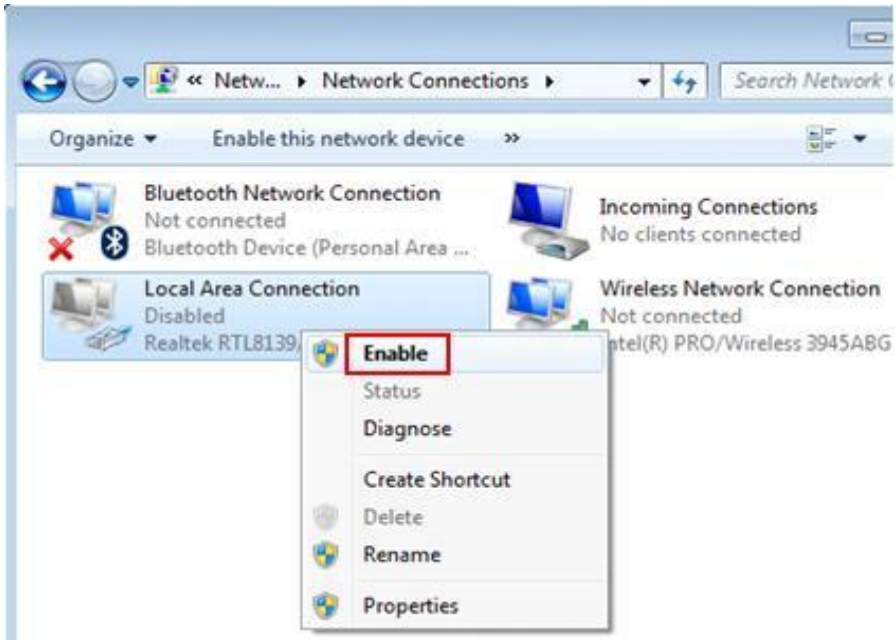


If this doesn't solve it, keep following our directions in the article.



Make Sure Your Ethernet is Enabled

If your WiFi is disabled and you still don't have a network connection, make sure that your ethernet is enabled. You can also check this in Network and Internet Settings.



Next thing to do is find the right network. It should say "Local Area Connection". Check under it. If it says "Not connected", right-click on it and select "Enable". Wait a few seconds to see if it works.

Plug the Ethernet Cable into a Different Port

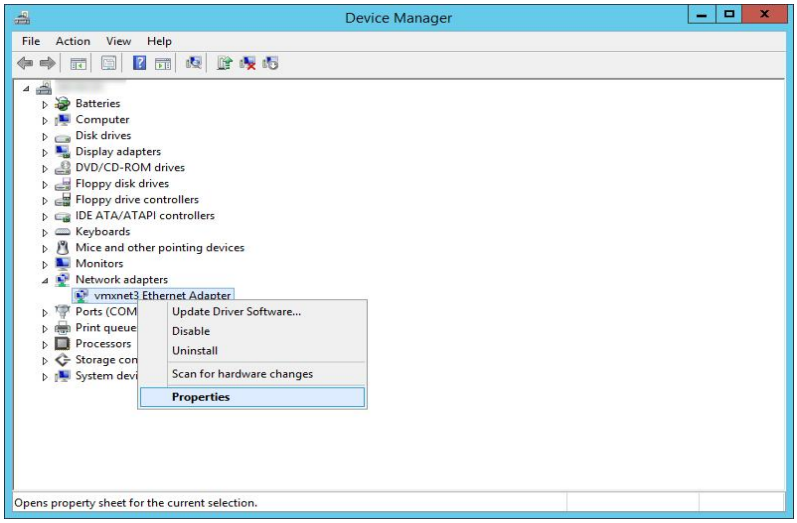
If it's been a minute and it still isn't working, try plugging the cable into another port on the router. If this works, it means your router is faulty and it might be time for you to replace it.

If that still doesn't work, you can try swapping your ethernet cables. You might have to borrow or buy a new cable for this.

Hardware Issues and OS Issues

If you've done everything above and nothing works, that means your computer is the problem. To find out whether it's the operating system or hardware that's faulty, you can set up a Live Linux disc and boot from that.

If it still doesn't work on Linux, then the problem lies in your hardware.



If your Ethernet works in Linux, then Windows is the problem. Try reinstalling your ethernet drivers by following these steps:

1. Go back to Windows. Enter "Device Manager" in the start menu and select it.
2. Expand the Network Adapter section.
3. Right-click on the Ethernet adapter then select "uninstall".
4. Click on "OK" to confirm.
5. Restart your computer to reinstall the driver.

Now that we've covered all bases, hopefully your ethernet is working now! Good luck!

6. Audio Cable

Also known as phone connector (since 3.5mm jacks are often found on mobile phones too)

Connect one end to: computer speakers, 3.5mm headphones, 3.5mm microphone

Connect other end to: audio ports on computer (see image below use Green socket)

- Green audio port: computer speakers or headphones
- Pink audio port: microphone
- Blue audio port: MP3 player, CD player, DVD player, turntable, electric guitar etc (line-in port to play and record sounds from the above devices)

7. USB Cable

For USB computer cable connections, there are two popular formats: USB 2.0 and the newer USB 3.0 How to tell USB 2.0 and 3.0 cables apart: USB 3.0 cables have a blue tip, and sometimes you can find a SS "Super Speed" label on it.

Since USB was intended to be the one computer cable connection to replace them all, it's no surprise that the possible uses for a USB port are quite mind-blowing. For this computer cable guide, we have listed its more common uses below:

Connect one end to: USB device

- Storage devices: USB flash drive, external hard drive, external optical drive
- Input devices: USB keyboard (wired and wireless), USB mouse (wired and wireless), webcam, scanner, gamepad
- Output devices: printer, all-in-one office machine, USB speaker
- Wireless adapters: network (Wi-Fi) adapter, bluetooth adapter, 3G adapter
- Data (and charging) cable for mobile devices such as mobile phone, tablet, MP3 player

Connect other end to: USB ports on computer (see image below)

How to tell USB 2.0 and 3.0 ports apart: USB 2.0 ports have black tips while USB 3.0 ports come with blue tips. See image below:

USB 3.0 is backwards-compatible... meaning that you can connect a USB 2.0 device to a USB 3.0 port and vice versa (but the USB 3.0 devices hooked up to a USB 2.0 port will perform at lowered rates)

There are also USB cables which connect new external backup drives (see below), these are described as USB-A to Micro-B.

USB port may stop working after you remove or insert a USB device

Symptoms

If you quickly and repeatedly insert and remove a USB device, the USB port may stop responding. When the port is in this state, it no longer recognizes any USB device, and the USB device will not work.

This article helps you fix the problem.

Prerequisites

You must use administrative credentials to log on to Windows to perform some of the troubleshooting methods that are listed in this article. If this is your personal computer, you are likely already logged on with an administrator account. If this is a computer that is part of a network at work, you might have to ask the system administrator for help.

Resolution

To fix this problem, use the following methods in the order in which they are listed. After each method, check the USB device to see whether the problem is fixed. If the problem is not fixed, try the next

method.
This article also includes a workaround that you can try if these methods do not work.

Method 1: Use Device Manager to scan for hardware changes

Use Device Manager to scan for hardware changes. After your computer scans for hardware changes, it might recognize the USB device that is connected to the USB port so that you can use the device. To scan for hardware changes, follow these steps:

1. Click **Start**, and then click **Run**.

   Note If you are running Windows Vista, click **Start**, and then use the **Start Search** box.
2. Type devmgmt.msc, and then click **OK**. Device Manager opens.
3. In Device Manager, click your computer so that it is highlighted.
4. Click **Action**, and then click **Scan for hardware changes**.
5. Check the USB device to see whether it is working.

If scanning for hardware changes fixed the problem, you are finished. If this method did not fix the problem, go to Method 2.

Method 2: Restart the computer

If scanning for new hardware did not fix the problem, try restarting the computer. After the computer has restarted, check the USB device to see whether it is working.
If restarting the computer fixed the problem, you are finished. If this method did not fix the problem, go to Method 3.

Method 3: Disable and re-enable the USB controller

Use Device Manager to disable and re-enable all the USB controllers. This lets the controllers recover the USB port from its unresponsive condition. The USB controllers represent the USB ports in Device Manager. If you are not comfortable with advanced troubleshooting, try the steps in the "Workaround" section.
To disable and re-enable the USB controllers, follow these steps:

1. Click Start, and then click Run.

   Note If you are running Windows Vista, click Start, and then use the Start Search box.
2. Type devmgmt.msc, and then click OK. Device Manager opens.
3. Expand Universal Serial Bus controllers.

   Note You might have to scroll down the list to find this item.
4. Right-click the first USB controller under Universal Serial Bus controllers, and then click Uninstall to remove it.
5. Repeat step 4 for each USB controller that is listed under Universal Serial Bus controllers.
6. Restart the computer. After the computer starts, Windows will automatically scan for hardware changes and reinstall all the USB controllers that you uninstalled.
7. Check the USB device to see whether it is working.

If the USB port recognizes the device and if you can use the device, you are finished.

If this method fixed the problem, you are finished. If this method did not fix the problem, go to the

"Workaround “section.

Workaround

If none of these methods worked for you, you can disable the Selective Suspend feature. However, be aware that when the Selective Suspend feature is disabled, all USB host controller drivers (and therefore all USB ports and connected USB devices) in the system are affected. Therefore, your computer cannot suspend any USB devices that are connected to it, and the USB devices can continue to use power while connected to the computer. Additionally, the **Allow the computer to turn off this device to save power** check box does not appear on the **Power Management** tab for the USB Root Hub.

This section is intended for an advanced computer user.

You can disable the USB Selective Suspend feature as a workaround by editing the registry. The USB device may become unresponsive because of a race condition in the Selective Suspend feature. The Selective Suspend feature suspends the USB device to efficiently maintain battery power by enabling the computer to turn off the USB device. However, sometimes this feature may not correctly wake up the USB device. Therefore, the USB device is unresponsive when you try to use it.

You might want to disable this feature for server products where power management is not important or required.

Important This section, method, or task contains steps that tell you how to modify the registry. However, serious problems might occur if you modify the registry incorrectly. Therefore, make sure that you follow these steps carefully. For added protection, back up the registry before you modify it. Then, you can restore the registry if a problem occurs. For more information about how to back up and restore the registry, click the following article number to view the article in the Microsoft Knowledge Base:

322756 How to back up and restore the registry in Windows

To disable the Selective Suspend feature, follow these steps:

1. Click **Start**, and then click **Run**.

   Note If you are running Windows Vista, click **Start**, and then use the **Start Search** box.

2. Type regedit, and then click **OK**. Registry Editor opens.

3. Locate and then click the following registry subkey:

   HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\USB

4. If the **DisableSelectiveSuspend** registry entry is present, double-click it. If it is not present, create the entry. To create the entry, follow these steps:

   1. On the **Edit** menu, point to **New**, and then click **DWORD**.

   2. Type DisableSelectiveSuspend, and then press ENTER.

3. On the **Edit** menu, click **Modify**.

5. In the Value data field, type 1 to disable the Selective Suspend feature, and then click **OK**.

Now go to the "Did this fix the problem?" section.

Cause

This problem may occur because of a timing issue that prevents the computer from detecting the USB device.

Microsoft and the hardware vendors that manufacture the chips that are used for USB have investigated the problem. However, the results were inconclusive because of the intermittent nature of the problem.

8. Computer Power Cord (Kettle Plug)

Connect one end to: AC power socket

Connect other end to: power supply unit (see image below), computer monitor

Note: Always turn off your power supply unit (with the 1-0 switch at the back) before connecting a power cord to it.

9. Thunderbolt/USB-C

Mostly seen on laptops and Apple Macs these cables are high speed and are capable of carrying Data, video and other information.

There are 2 current types of Thunderbolt, the older version Thunderbolt 2 is seen below but this can also be confused with Mini Display ports as they look identical and only visual difference is the picture beside the port. Thunderbolt 2 (left) has a lightning symbol and carries Data and video.

The Mini Display Port (right) will only carry Video.

And Thunderbolt 3 also known as USB-C on Apple Macs.

10. Display Port

Display Port is the best to use if you require a fast, high-resolution image.

The cable has better quality over HDMI and is the best option if you have this interface.

Function	Computer Connector	Cable Connector
Communication (serial)	9-pin or 25-pin male	9-pin or 25-pin female
Printer (parallel)	25-pin female	25-pin male
Monitor (VGA and SVGA)	15-pin female (three rows of pins)	15-pin male (three rows of pins)
Monitor (MGA and CGA)	9-pin female	9-pin male
Game port (joystick)	15-pin female (two rows of pins)	15-pin male (two rows of pins)
Keyboard	5-pin DIN female or 6-pin DIN female (PS/2)	5-pin DIN male or 6-pin DIN male (PS/2)

Troubleshooting Cables

Cables and connectors are a very common source of problems. Here are a few suggestions for troubleshooting:

- If a peripheral device doesn't work, always check the cables, especially if the device has been working recently.
- Always check for loose connections.
- Check for bent or broken pins on the connector. Bent pins can sometimes be repaired; however, they will always be susceptible to damage later, because the pin has been weakened. It is a good idea to mark these connectors and use them with care. A better idea is to replace them.
- If a connector or cable doesn't fit or if you have to push hard to make the connection, something is wrong. Either a connector has been damaged or it is not the right match.
- Check for worn or frayed cables. Replace if necessary.
- Make sure you have the right cable. Some, such as null-modem cables, look just like standard communication cables, but will not work with a modem.

- Always be wary of "homemade" cables.

Parallel ATA (PATA) cables are used to connect storage devices such as hard drives and CD-ROM drives to a computer's motherboard. These ribbon cables have two or three connectors, only one of which plugs into the motherboard. The remaining 40-pin or 44-pin connectors plug into the drives.

Serial ATA (SATA) cables are also designed to connect storage devices to motherboards. They provide higher data transfer speeds and have two 8-pin connectors, one on each end.

Extended SATA (eSATA) cables are used to connect external hard drives or optical drives. They provide transfer speeds that are approximately three times faster than FireWire 400 and USB 2.0.

USB cables use the universal serial bus (USB) protocol to connect standard PC peripherals such as mice and keyboards, as well as mass storage devices and digital cameras. USB versions include USB 1.1, USB 2.0, and USB 3.0.

FireWire cables are used to connect PCs to digital camcorders, set-top boxes and other digital devices that use FireWire, an interface standard developed by Apple and adopted by the IEEE. FireWire supports hot swapping and allows the transmission of data, video and audio over a single cable at very high bit rates.

- **Content/Topic 2: Selection of External cables to be used**

Computer Cables Information

Computer cables are used to connect monitors, keyboards, printers, hard drives, and other peripherals to computers.

The different types of computer External cables. Examples include:

USB cables use the universal serial bus (USB) protocol to connect standard PC peripherals such as mice and keyboards, as well as mass storage devices and digital cameras. USB versions include USB 1.1, USB 2.0, and USB 3.0.

FireWire cables are used to connect PCs to digital camcorders, set-top boxes and other digital devices that use FireWire, an interface standard developed by Apple and adopted by the IEEE. FireWire supports hot swapping and allows the transmission of data, video and audio over a single cable at very high bit rates.

VGA cables are used to connect personal computers (PCs) to computer monitors. They have connectors that consist of 15 contacts arranged in three rows. Each row corresponds to a separate channel: red (R), green (G), and blue (B).

DVI cables are used to provide high-quality outputs to display devices such as LCD monitors, plasma TVs, and projectors. DVI is faster than VGA.

Engineering360 also allows industrial buyers to search for battery, monitor, and keyboard cables; patch cables and cords; plotter and printer cables; and keyboard, video, mouse (KVM) cables.

✓ **Power Cable**

What is a power cable in a computer?

Alternatively known as a **power cable**, mains **cable** or flex, a **power cord** is the primary **cable** that provides **power** to the **computer**, printer, monitor, and components within a **computer**. The image is an example of the **power cord** that is commonly used with **computers**, monitors, printers, and other peripherals

✓ **Serial Cable**

In computing, a serial port is a serial communication interface through which information transfers in or out sequentially one bit at a time.

✓ **Parallel Cable**

A series of metal wires that enable multiple bits of data to be transferred simultaneously.

Other types of computer external cables and their typical use.

Specifying the application for a computer cable can help buyers select appropriate products.

- **Audio / visual (A/V) cables** may be used for connecting speakers or monitors.
- **Camera / imaging cables** connect video cameras and other imaging equipment.
- **Extender cables** are used to increase the length of another cable.
- **Networking cables** connect hubs, routers and switches. **LAN / Ethernet cables** represent a specific type of networking cable.

- **Content/Topic 3: Identification of I/O Devices(peripheries)**

Mouse : Next to the keyboard, the mouse is the most important device used to send commands to the computer. For Windows users who don't perform data entry, the mouse is even more important than the keyboard. Mouse alternatives, such as trackballs or touchpads, are considered mouse devices because they install and are configured the same way.

Current mice and pointing devices use the USB 1.1 or USB 2.0 port, but older models used the 6-pin PS/2 (mini-DIN), serial (COM) ports, or 8-pin bus mouse port.

Some mice sold at retail work with either the USB port or the PS/2 port and include a PS/2 adapter. Adapters cannot be used successfully unless the mouse (or keyboard) is designed to use an adapter. A mouse designed to use an adapter is sometimes called a hybrid mouse.

A USB mouse uses the IRQ and I/O port address of the USB port to which it is connected. Because a single USB port can support up to 127 devices through the use of hubs, a USB mouse doesn't tie up hardware resources the way other mouse types do.

A PS/2 mouse uses IRQ 12; if IRQ 12 is not available, the device using that IRQ must be moved to another IRQ to enable IRQ 12 to be used by the mouse. A serial mouse uses the IRQ and I/O port address of the serial port to which it is connected.

- ✓ **Keyboard :** The keyboard remains the primary method used to send commands to the computer and enter data. You can even use it to maneuver around the Windows Desktop if your mouse or other pointing device stops working.

Keyboards can be connected through dedicated keyboard connectors or through the USB port. Extremely old systems use the 5-pin DIN connector, whereas newer systems use the smaller 6-pin mini-DIN connector (also called the PS/2 keyboard connector)

Most recent systems use the USB port for the keyboard, and any system with USB ports can be equipped with a USB keyboard if the system BIOS supports USB Legacy mode and if the system runs an operating system that supports USB ports (Windows 98 or newer).

Most recent systems use the 104-key keyboard layout, which includes Windows keys on each side of the space bar and a right-click key next to the right Ctrl key. Otherwise, the standard 104-key keyboard's layout is the same as the older standard 101-key keyboard.

Keyboards are of two sizes 84 keys or 101/102 keys, but now keyboards with 104 keys or 108 keys are also available for Windows and Internet.

The keys on the keyboard are as follows −

S.No	Keys & Description
1	**Typing Keys** These keys include the letter keys (A-Z) and digit keys (09) which generally give the same layout as that of typewriters.
2	**Numeric Keypad** It is used to enter the numeric data or cursor movement. Generally, it consists of a set of 17

	keys that are laid out in the same configuration used by most adding machines and calculators.
3	**Function Keys** The twelve function keys are present on the keyboard which are arranged in a row at the top of the keyboard. Each function key has a unique meaning and is used for some specific purpose.
4	**Control keys** These keys provide cursor and screen control. It includes four directional arrow keys. Control keys also include Home, End, Insert, Delete, Page Up, Page Down, Control(Ctrl), Alternate(Alt), Escape(Esc).
5	**Special Purpose Keys** Keyboard also contains some special purpose keys such as Enter, Shift, Caps Lock, Num Lock, Space bar, Tab, and Print Screen.

- ✓ **Monitor:** The term "monitor" is often used synonymously with "computer screen" or "display." The monitor displays the computer's user interface and open programs, allowing the user to interact with the computer, typically using the keyboard and mouse.

Older computer monitors were built using cathode ray tubes (CRTs), which made them rather heavy and caused them to take up a lot of desk space.

Most modern monitors are built using LCD technology and are commonly referred to as flat screen displays. These thin monitors take up much less space than the older CRT displays. This means people with LCD monitors have more desk space to clutter up with stacks of papers, pens, and other objects.

- ✓ **Scanner :** A **scanner** is a device usually connected to a computer. Its main function is to scan or take a picture of the document, digitize the information and present it on the computer screen.

Different types of scanners are available with different resolutions. In the world of electronic data transmission, scanning is considered to be the most cost-effective and reliable way of transmitting images.

A scanner is a device that captures images from photographic prints, posters, magazine pages, and similar sources for computer editing and display. Scanners come in hand-held, feed-in, and flatbed types and for scanning black-and-white only, or color. Very high resolution scanners are used for scanning for high-resolution printing, but lower resolution scanners are adequate for capturing images for computer display. Scanners usually come with software, such as Adobe's Photoshop product, that lets you resize and otherwise modify a captured image.

Scanners usually attach to your personal computer with a Small Computer System Interface (SCSI). An application such as PhotoShop uses the TWAIN program to read in the image.

Some major manufacturers of scanners include: Epson, Hewlett-Packard, Microtek, and Relisys.

- ✓ **Printer:** A **printer** is an output device that prints paper documents. This includes text documents, images, or a combination of both. The two most common types of **printers** are inkjet and laser **printers**. Inkjet **printers** are commonly used by consumers, while laser **printers** are a typical choice for businesses.
- ✓ **Projector :** A projector is an output device that projects an image onto a large surface, such as a white screen or wall. It may be used an alternative to a monitor or television when showing video or images to a large group of people.

Projectors come in many shapes and sizes though they are commonly about a foot long and wide and a few inches tall. They can be mounted on ceilings or may be freestanding and portable. Ceiling-mounted projectors are typically larger, especially ones that project a long distance (such as 30 feet or more). These projectors are commonly found in classrooms, conference rooms, auditoriums, and places of worship.

Portable projectors can used wherever there is a bright surface (such as a white or light colored wall). Most projectors have multiple input sources, such as HDMI ports for newer equipment and VGA ports for older devices. Some projectors support Wi-Fi and Bluetooth as well.

- ✓ **Speaker: Speakers** are popular **output devices** used with computer systems. They receive audio input from the computer's sound card and produce audio **output** in the form of sound waves. **Speakers** usually come in pairs, which allows them to produce stereo sound from two separate audio channels.

- ✓ **Microphone:** A **microphone**, colloquially named **mic** or mike (/maɪk/), is a device – a transducer – that converts sound into an electrical signal. ... **Microphones** typically need to be connected to a preamplifier before the signal can be recorded or reproduced.

- ✓ **Bar code scanner :**

Bar code readers are used in a variety of point-of-sale retail, library, industrial, medical, and other environments to track inventory.

Bar code readers use one of the following technologies:

- **Pen-based readers—**Use a pen-shaped device that includes a light source and photo diode in the tip. The point of the pen is dragged across the bar code to read the varying thicknesses and positions of the bars in the bar code and translate them into a digitized code that is transmitted to the POS or inventory system.
- **Laser scanners—**Commonly used in grocery and mass-market stores. They use a horizontal-mounted or vertical-mounted prism or mirror and laser beam protected by a transparent glass cover to read bar codes.
- **Charge-coupled device (CCD) readers—**Use a hand-held gun-shaped device to hold an array of light sensors mounted in a row. The reader emits light that is reflected off the bar code and is detected by the light sensors.
- **Camera-based readers—**Contain many rows of CCD sensors that generate an image of the sensor that is processed to decode the barcode information.

- **Content/Topic 4 Selection of I/O Devices to be connected**

Following are some of the important input devices which are used in a computer −

- Keyboard
- Mouse
- Joy Stick
- Light pen
- Track Ball
- Scanner
- Graphic Tablet
- Microphone
- Magnetic Ink Card Reader(MICR)
- Optical Character Reader(OCR)

- Bar Code Reader
- Optical Mark Reader(OMR)

Keyboard

Keyboard is the most common and very popular input device which helps to input data to the computer. The layout of the keyboard is like that of traditional typewriter, although there are some additional keys provided for performing additional functions.

Mouse

Mouse is the most popular pointing device. It is a very famous cursor-control device having a small palm size box with a round ball at its base, which senses the movement of the mouse and sends corresponding signals to the CPU when the mouse buttons are pressed.

Generally, it has two buttons called the left and the right button and a wheel is present between the buttons. A mouse can be used to control the position of the cursor on the screen, but it cannot be used to enter text into the computer.

Advantages

- Easy to use
- Not very expensive
- Moves the cursor faster than the arrow keys of the keyboard.

Joystick

Joystick is also a pointing device, which is used to move the cursor position on a monitor screen. It is a stick having a spherical ball at its both lower and upper ends. The lower spherical ball moves in a socket. The joystick can be moved in all four directions.

The function of the joystick is similar to that of a mouse. It is mainly used in Computer Aided Designing (CAD) and playing computer games.

Light Pen

Light pen is a pointing device similar to a pen. It is used to select a displayed menu item or draw pictures on the monitor screen. It consists of a photocell and an optical system placed in a small tube.

When the tip of a light pen is moved over the monitor screen and the pen button is pressed, its photocell sensing element detects the screen location and sends the corresponding signal to the CPU.

Track Ball

Track ball is an input device that is mostly used in notebook or laptop computer, instead of a mouse. This is a ball which is half inserted and by moving fingers on the ball, the pointer can be moved.

Since the whole device is not moved, a track ball requires less space than a mouse. A track ball comes in various shapes like a ball, a button, or a square.

Scanner

Scanner is an input device, which works more like a photocopy machine. It is used when some information is available on paper and it is to be transferred to the hard disk of the computer for further manipulation.

Scanner captures images from the source which are then converted into a digital form that can be stored on the disk. These images can be edited before they are printed.

Digitizer

Digitizer is an input device which converts analog information into digital form. Digitizer can convert a signal from the television or camera into a series of numbers that could be stored in a computer. They can be used by the computer to create a picture of whatever the camera had been pointed at.

Digitizer is also known as Tablet or Graphics Tablet as it converts graphics and pictorial data into binary inputs. A graphic tablet as digitizer is used for fine works of drawing and image manipulation applications.

Microphone

Microphone is an input device to input sound that is then stored in a digital form.

The microphone is used for various applications such as adding sound to a multimedia presentation or for mixing music.

Magnetic Ink Card Reader (MICR)

MICR input device is generally used in banks as there are large number of cheques to be processed every day. The bank's code number and cheque number are printed on the cheques with a special type of ink that contains particles of magnetic material that are machine readable.

This reading process is called Magnetic Ink Character Recognition (MICR). The main advantages of MICR is that it is fast and less error prone.

Optical Character Reader (OCR)

OCR is an input device used to read a printed text.

OCR scans the text optically, character by character, converts them into a machine readable code, and stores the text on the system memory.

Bar Code Readers

Bar Code Reader is a device used for reading bar coded data (data in the form of light and dark lines). Bar coded data is generally used in labelling goods, numbering the books, etc. It may be a handheld scanner or may be embedded in a stationary scanner.

Bar Code Reader scans a bar code image, converts it into an alphanumeric value, which is then fed to the computer that the bar code reader is connected to.

Optical Mark Reader (OMR)

OMR is a special type of optical scanner used to recognize the type of mark made by pen or pencil. It is used where one out of a few alternatives is to be selected and marked.

It is specially used for checking the answer sheets of examinations having multiple choice questions.

Output devices

An output device can receive data from another device and generate output with that data, but it cannot send data to another device. Examples of output devices include the following.

Monitor - Receives data from a computer (output) and displays that information as text and images for users to view. It cannot accept data from a user and send that data to another device.

Projector - Receives data from a computer (output) and displays, or projects, that information as text and images onto a surface, like a wall or screen. It cannot accept data from a user and send that data to another device.

Speakers - Receives sound data from a computer and plays the sounds for users to hear. It cannot accept sound generated by users and send that sound to another device.

Input/output devices

An input/output device can receive data from users, or another device (input), and send data to another device (output). Examples of input/output devices include the following.

- **CD-RW drive and DVD-RW drive -** Receives data from a computer (input), to copy onto a writable CD or DVD. Also, the drive sends data contained on a CD or DVD (output) to a computer.
- **USB flash drive -** Receives, or saves, data from a computer (input). Also, the drive sends data to a computer or another device (output).

- **Content/Topic 5: Identification of Connectors or Ports**

In computer hardware, a port is an interface for the computer and other computers or other devices. Physically, a port is a specialized outlet on a piece of equipment to which a plug or cable connects. Electronically, the several conductors making up the outlet provide a signal transfer between devices.

The different ports and connectors: serial port (for external modems and old computer mice), parallel port (connector for scanners and printers), USB port (a new universal connectors), PS/2 port (keyboard and mouse interface), video card port (a video port for your monitor) power port (for your power plug), modem port (connect by phone to the Internet), ethernet network port (connect to a network and high speed Internet), fireware/IEEE 1394 port (fast camcorder connector). Because all of them do different things, no type is the "best."

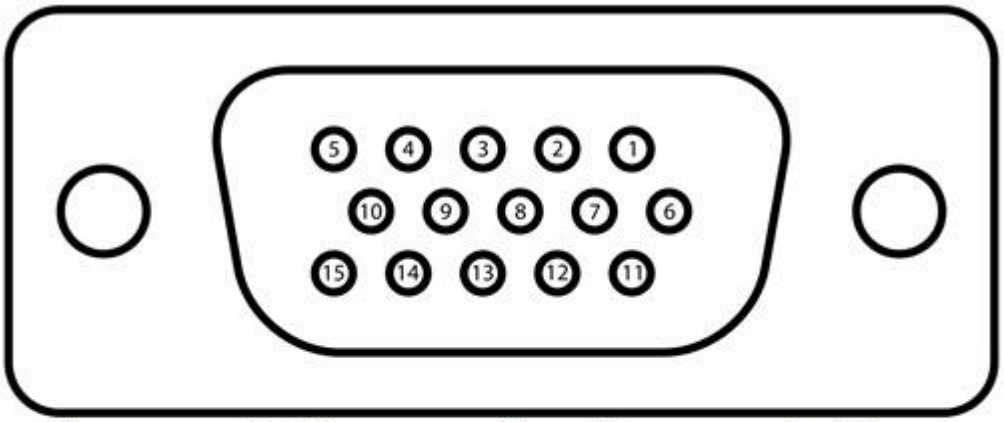
- ✓ **VGA Port**

VGA Port

VGA port is found in many computers, projectors, video cards and High Definition TVs. It is a D-sub connector consisting of 15 pins in 3 rows. The connector is called as DE-15.

VGA port is the main interface between computers and older CRT monitors. Even the modern LCD and LED monitors support VGA ports but the picture quality is reduced. VGA carries analogue video signals up to a resolution of 648X480.

With the increase in use of digital video, VGA ports are gradually being replaced by HDMI and Display Ports. Some laptops are equipped with on-board VGA ports in order to connect to external monitors or projectors. The pinout of a VGA port is shown below.



Pin no	*Name*	*Description*	*Pin no*	*Name*	*Description*
Pin 1	RED	Red video	Pin 9	KEY/PWR	formerly key, now +5V DC
Pin 2	GREEN	Green video			
Pin 3	BLUE	Blue video	Pin 10	GND	Ground (VSync, DDC)
Pin 4	ID2/RES	formerly Monitor ID bit 2, reserved since E-DDC	Pin 11	ID0/RES	formerly Monitor ID bit 0, reserved since E-DDC
Pin 5	GND	Ground	Pin 12	ID1/SDA	formerly Monitor ID bit 1, I²C data since DDC2
Pin 6	REDGND Red GND				
Pin 7	GREENGND	Green GND	Pin 13	HSync	Horizontal sync
Pin 8	BLUEGND	Blue GND	Pin 14	VSync	Vertical sync
			Pin 15	ID3/SCL	formerly Monitor ID bit 3, I²C clock since DDC2

- ✓ **USB Port**

USB

Universal Serial Bus (USB) replaced serial ports, parallel ports, PS/2 connectors, game ports and power chargers for portable devices.

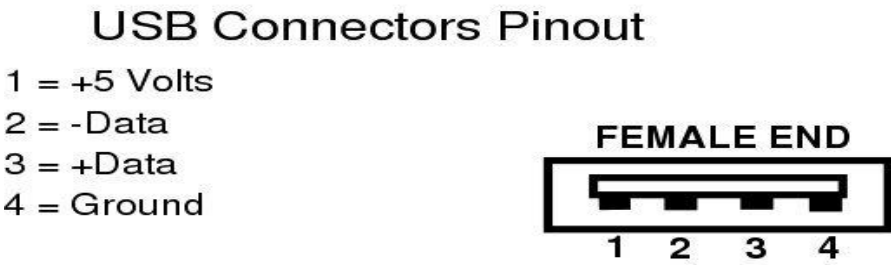
USB port can be used to transfer data, act as an interface for peripherals and even act as power supply for devices connected to it. There are three kinds of USB ports: Type A, Type B or mini USB and Micro USB.

USB Type A

USB Type-A port is a 4 pin connector. There are different versions of Type – A USB ports: USB 1.1, USB 2.0 and USB 3.0. USB 3.0 is the common standard and supports a data rate of 400MBps.

USB 3.1 is also released and supports a data rate up to 10Gbps. The USB 2.0 is Black color coded and USB 3.0 is Blue. The following image shows USB 2.0 and USB 3.0 ports.

The pinout diagram of USB Type – A port is shown below. The pinout is common to all standards of Type – A.



USB Type C

USB Type – C is the latest specification of the USB and is a reversible connector. USB Type – C is supposed to replace Types A and B and is considered future proof.

The port of USB Type – C consists of 24 pins. The pinout diagram of USB Type – C is shown below. USB Type – C can handle a current of 3A.

This feature of handling high current is used in the latest Fast Charging Technology where a Smart Phone's battery will reach its full charge is very less time.

- ✓ **Serial Port**

Even though the communication in PS/2 and USB is serial, technically, the term Serial Port is used to refer the interface that is compliant to RS-232 standard. There are two types of serial ports that are commonly found on a computer: DB-25 and DE-9.

DB-25

DB-25 is a variant of D-sub connector and is the original port for RS-232 serial communication. They were developed as the main port for serial connections using RS-232 protocol but most of the applications did not require all the pins.

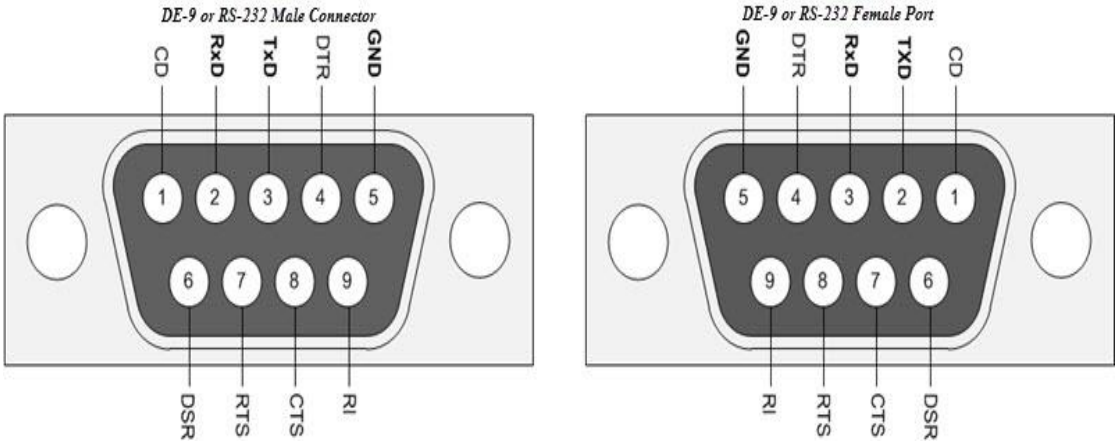
Hence, DE-9 was developed for RS-232 based serial communication while DB-25 was rarely used as a serial port and often used as a parallel printer port as a replacement of the Centronics Parallel 36 pin connector.

DE-9 or RS-232 or COM Port

DE-9 is the main port for RS-232 serial communication. It is a D-sub connector with E shell and is often miscalled as DB-9. A DE-9 port is also called as a COM port and allows full duplex serial communication between the computer and it's peripheral.

Some of the applications of DE-9 port are serial interface with mouse, keyboard, modem, uninterruptible power supplies (UPS) and other external RS-232 compatible devices.

The pinout diagram of DE-9 port is shown below.



The use of DB-25 and DE-9 ports for communication is in decline and are replaced by USBs or other ports.

✓ **HDMI Port**

- HDMI is an abbreviation of High Definition Media Interface. HDMI is a digital interface to connect High Definition and Ultra High Definition devices like Computer monitors, HDTVs, Blu-Ray players, gaming consoles, High Definition Cameras etc.

- HDMI can be used to carry uncompressed video and compressed or uncompressed audio signals. The HDMI port of type A is shown below.

- The HDMI connector consists of 19 pins and the latest version of HDMI i.e. HDMI 2.0 can carry digital video signal up to a resolution of 4096×2160 and 32 audio channels. The pinout diagram of an HDMI port is as follows.

✓ **DVI Port**

- DVI is a high speed digital interface between a display controller like a computer and a display device like a monitor. It was developed with an aim of transmitting lossless digital video signals and replace the analogue VGA technology.

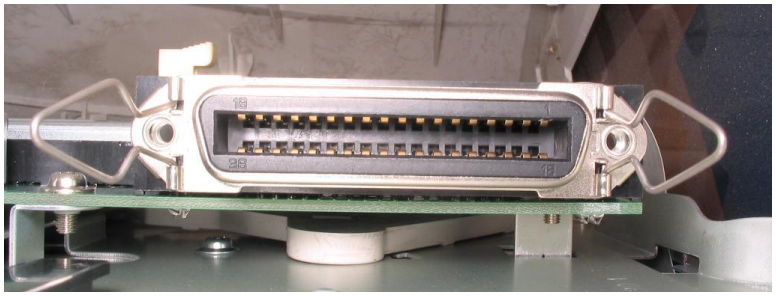
- There are three types of DVI connectors based on the signals it can carry: DVI-I, DVI-D and DVI-A. DVI-I is a DVI port with integrated analogue and digital signals. DVI-D supports only digital signals and DVI-A supports only analogue signals.

✓ **Parallel Port**

Parallel Port or Centronics 36 Pin Port

Parallel port is an interface between computer and peripheral devices like printers with parallel communication. The Centronics port is a 36 pin port that was developed as an interface for printers and scanners and hence a parallel port is also called as a Centronics port.

Before the wide use of USB ports, parallel ports are very common in printers. The Centronics port was later replaced by DB-25 port with parallel interface.



- ✓ **Microphone Jack**

3.5mm microphone

A **mic jack** is the female-type **connector** in a **mic** or **mic** cable. A **mic plug** is the male **connector** that is inserted into the **jack**. The XLR output of a professional **mic** is a **mic plug**. A **mic** preamplifier **input** is considered a **mic jack**.


- ✓ **Speaker Jack**

Color	**Function**	**Connector on PC**
User input		
Pink	Analog microphone audio input (mono or stereo)	3.5 mm TRS
Light blue	Analog line level audio input	3.5 mm TRS
Lime green	**Analog line level audio output, front stereo (speakers or headphones)**	3.5 mm TRS

- ✓ **Ethernet Port (RJ-45 Connector)**

RJ-45

Ethernet is a networking technology that is used to connect your computer to Internet and communicate with other computers or networking devices.

The interface that is used for computer networking and telecommunications is known as Registered Jack (RJ) and RJ – 45 port in particular is used for Ethernet over cable. RJ-45 connector is an 8 pin – 8 contact (8P – 8C) type modular connector.

The latest Ethernet technology is called Gigabit Ethernet and supports a data transfer rate of over 10Gigabits per second. The Ethernet or a LAN port with 8P – 8C type connector along with the male RJ-45 cable is shown below.

The un-keyed 8P – 8C modular connector is generally referred to the Ethernet RJ-45. Often, RJ-45 ports are equipped with two LEDs for indicating transmission and packet detection.

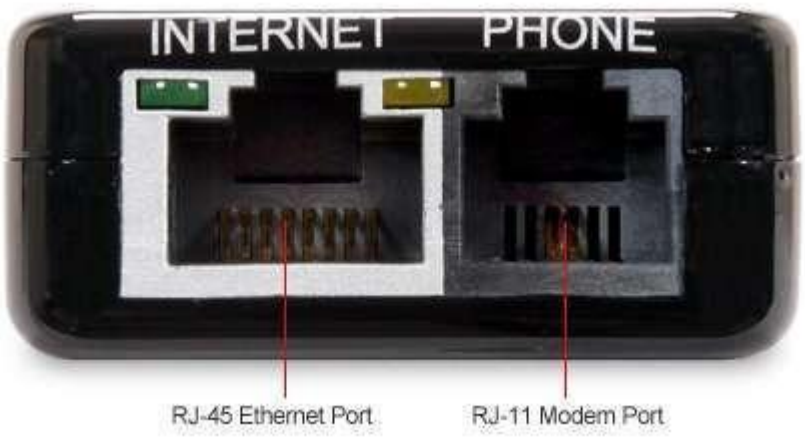
As mentioned earlier, an Ethernet RJ-45 port has 8 pins and the following picture depicts the pinout of one.

RJ-11

RJ-11 is another type of Registered Jack that is used as an interface for telephone, modem or ADSL connections. Even though computers are almost never equipped with an RJ-11 port, they are the main interface in all telecommunication networks.

RJ-45 and RJ11 ports look alike but RJ-11 is a smaller port and uses a 6 point – 4 contact (6P – 4C) connector even though a 6 point – 2 contact (6P – 2C) is sufficient. The following is a picture of an RJ-11 port and its compatible connector.

The following image can be used to compare RJ-45 and RJ-11 ports.



- **Content/Topic 6 : Connecting ,disconnecting and verification of I/O Devices errors**

What are I/O device errors?

Because most hardware devices do not require an input and output communication with the computer, most IO devices are storage devices. So, when you encounter an I/O error or I/O device error it's an indication that the operating system cannot read or write to a device.

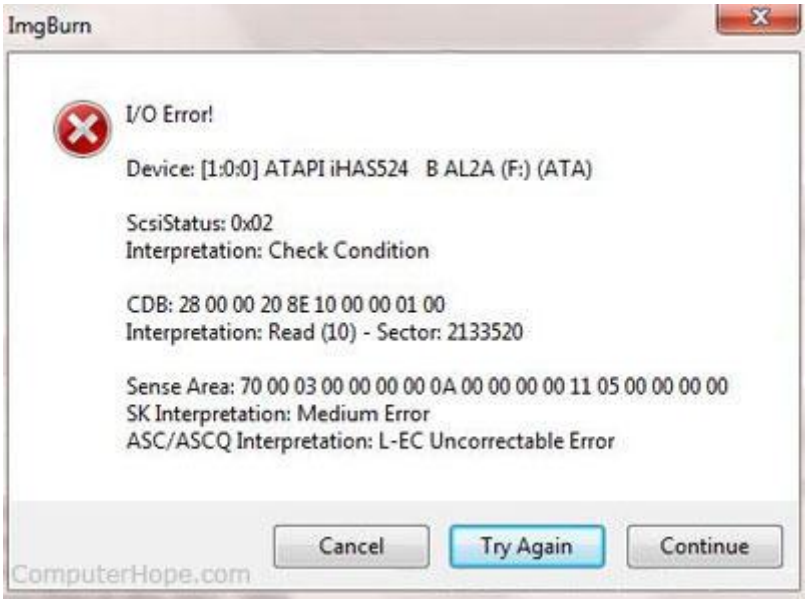
Reasons why you may get an IO device error

- Write protection is enabled. For example, if write-protection on an SD card.
- Trying to write to a disc that is not writable. For example, trying to burn to a CD and not a CD-R disc.

- No more disk space.
- The file is used by another user or computer program.
- Not enough rights or permissions to read or write.
- No physical or virtual connection.
- Bad or missing drivers preventing the drive from being accessed.
- Failing or bad hardware.

What can fix I/O errors?

Depending on what device is giving you the **I/O error** can change how to troubleshoot these errors. If you are not certain what device is giving you the error, follow the general troubleshooting steps. Otherwise, try following the specific steps for the device giving you the error.



General troubleshooting for I/O errors

1. Reboot the computer.
2. Make sure you have all of the latest drivers for your devices.
3. If you are using Microsoft Windows, make sure there are no errors in Device Manager.
4. If you have recently moved the computer, open the computer and make sure the cables inside the computer are firmly connected.

Troubleshooting I/O errors with removable media

With removable media such as a floppy diskette, CDs, or SD cards I/O errors may be occurring because the removable media you are using has failed. The best way to quickly determine if this is the cause is to try an alternative. For example, if you are getting an I/O error with a disc, try another disc in the

computer to see if you get the same error. If the same error occurs, then you have a problem with the drive. If you can read another disc with no errors, then it may be a bad or dirty disc.

If you are using removable media such as a floppy diskette or SD card, make sure it is not write protected.

If you are trying to burn (write) information to a CD-R disc, make sure you are using a new disc. If the disc was closed, you cannot write any more information to that disc.

Troubleshooting I/O errors occurring when accessing a network file

Any I/O error encountered when trying to read or write a file over the network is caused by either a permission error or a connection issue. Make sure your connection works by trying to read/write another file in a different location. If the connection looks good, then it's likely you either lack the proper rights or the file is in use and is locked.

Learning Outcome 2. 4: Proper Testing of the computer

Content/Topic 1 Identification and selection of External cables

- ✓ **VGA Cable :**

Definition - What does VGA Cable mean?

A video graphics array (VGA) cable is a type of computer cable that carries visual display data from the CPU to the monitor. A complete VGA cable consists of a cable and a connector at each end, and the connectors are typically blue

A VGA cable is used primarily to link a computer to a display device. One end of the VGA cable is attached to the port in the graphics card on the computer motherboard, and the other to the port in the display device. When the computer is running, the video card transmits video display signals via the VGA cable, which are then displayed on the display device. VGA cables are available in different types, where shorter cables with coaxial cable and insulation provide better video/display quality.

Why is my VGA cable not working?

Monitor **not** connected properly

The monitor **cable** connects to the back of your computer using either a **VGA**, DVI, HDMI, or DisplayPort

connector. ... Verify the monitor **cable** is **not** loose by disconnecting the **cable** from the back of the monitor and reconnect the **cable**.

How to resolve VGA no signal problems on Windows?

How to fix VGA no signal issues: A definitive guide

You're all keen to start that important computer work until you find the clear and eerie "VGA No signal" display. What this means: there's no signal for your VGA monitor.

It's not a time to panic – what VGA having no signal means is that the monitor is powered on but not connected to a video card. Your mission now is to ensure the connection is properly working.

Here is a thorough guide on how to fix VGA no signal issues quickly and easily:

Option 1: Troubleshoot hardware or connection issues

A hardware problem could be giving rise to the VGA no signal issue, so you have to make sure that the connector is plugged into the right port and isn't pulled out too easily.

First, check the VGA port. Check if there is any damage or something inside the port is preventing VGA signal from getting through. Next, check if the cables are working properly; if necessary, replace them with another identical signal cable, e.g., HDMI or DVI, to conduct a cross test.

Try to push the connector even more until you feel the pins or pointed bits on the plug are well locked in place, not bent. In addition, plug another electrical equipment into the power outlet to check if the outlet is working normally.

Option 2: Is your computer merely sleeping?

Check if your computer has entered hibernation mode, sleep mode, or power-saving mode. This way, the monitor is unable to receive any signal even if it's turned on.

To perform this check, press any key (the Enter key or Power key) on your keyboard, wait for a couple of seconds, and see if the computer wakes up. You may also move the mouse to wake it up. If it does, you have successfully resolved the VGA no signal glitch.

Option 3: Restart your devices

Sometimes all a computer system needs is a little jolt in the form of restarting and reconnecting the device. VGA no signal is one among many technical issues that can be addressed by this quick move.

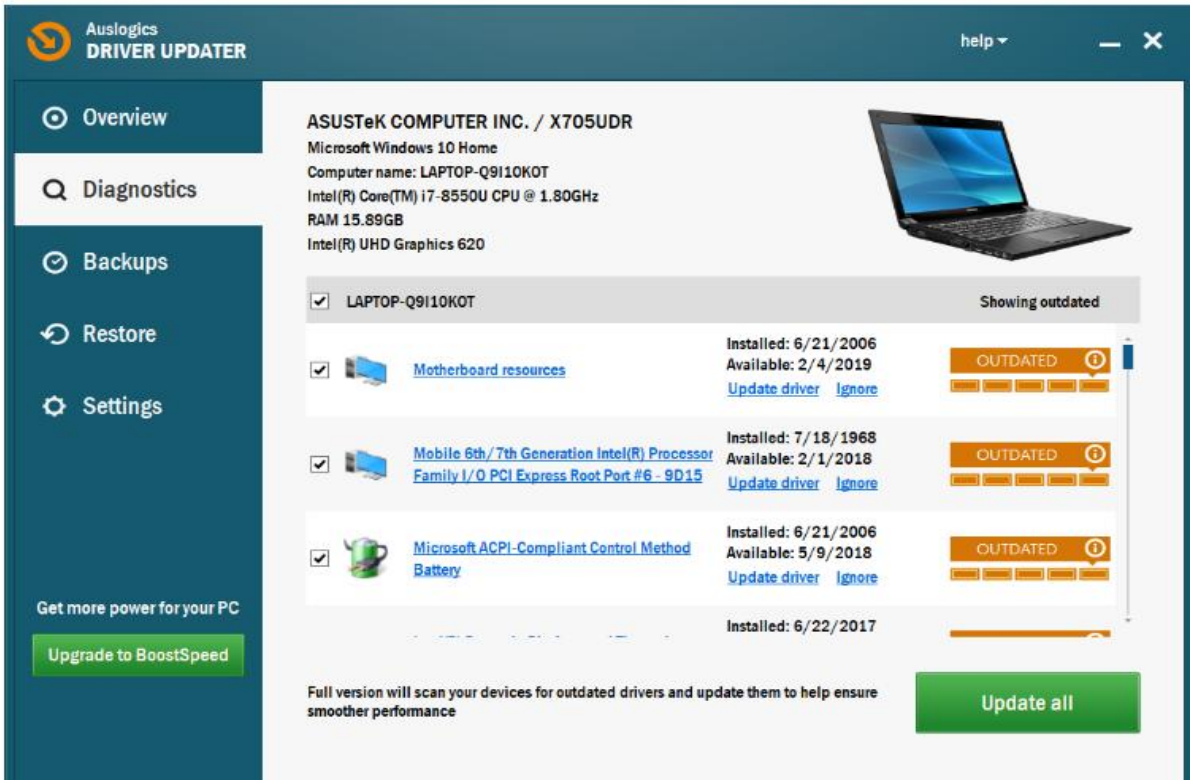
Here are some steps to take:

1. Turn off your computer and monitor. Unplug their power cables.
2. Wait a few minutes. Afterwards, reconnect the VGA cable to the computer and monitor. Plug the power cable back, too.
3. Turn on your computer and monitor and see if the VGA connection works just right.

Option 4: Update the graphics card driver

The VGA no signal problem can also stem from an outdated or missing graphics card driver, making it a must to keep it up to date at all times. If an update cannot be done right now, try HDMI or another kind of connection.

The latest version of the graphics card driver can be downloaded from the manufacturer's website and installed onto the computer. If you don't have the time and relevant skills to do so, you can rely on Auslogics Driver Updater, a tool that scans your system for the drivers on your PC that need an update. It gets things done automatically and in one click in order to prevent device conflicts and ensure smooth hardware operation.



Safe, fast, and intuitive, Auslogics Driver Updater will check your computer for potential driver problems. It delivers a report on outdated or missing drivers it has detected, and lets you quickly update them to the latest manufacturer-recommended versions.

Update those drivers with Auslogics Driver Updater using the following steps:

1. Simply download and install Auslogics Driver Updater.
2. Run it on your computer and let it scan for potential problem drivers.
3. Go through the prescribed steps and instructions for driver updating.
4. Restart your computer to see if the VGA connection is finally working all right.

Perform the recommended checks above on how to fix VGA no signal issues, and get the job done in no time. Good luck!

- ✓ **DVI Cable** :

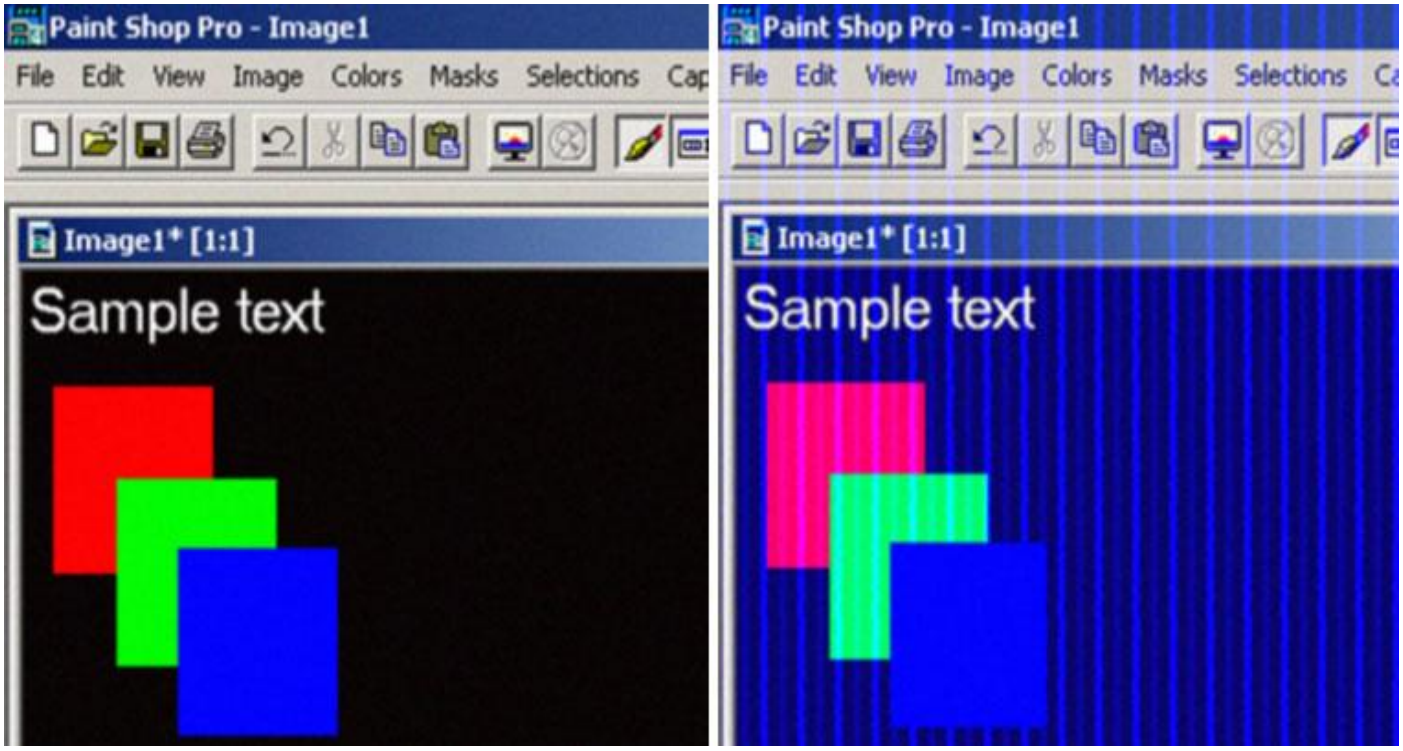
Digital Visual Interface (**DVI**) is a video display interface developed by the Digital Display Working Group (DDWG). The digital interface is used to connect a video source, such as a video display controller, to a display device, such as a computer monitor.

Troubleshooting DVI problems

You'll be thrilled to know that the video BIOS, PNP, DDC, EDID, and other unintelligeable jumbles of letters have been finely tuned to assure that your video card and monitor work together perfectly. That thrill may be somewhat diminished if you're staring at a "no signal" message on your new LCD monitor. DVI is supposed to set itself up automatically but they don't call it "plug and pray" for nothing. Usually, DVI works just fine but there are plenty of things which can go wrong. Below are some things to try which may help get your video card and LCD monitor working together properly. If you don't know DVI inside-out then please read this page before continuing with this one. Below is a list of common symptoms and what sorts of things you can try to fix them. If you can't get it working (and you've got some time on your hands) then you should try running through all the possible solutions.

DVI troubleshooting: symptoms

Symptoms: corrupted screen in digital mode



If you're using a digital DVI connection between your video card and monitor then you can get DVI corruption problems which usually appear as wobbly vertical lines. The left part of the image above is displayed correctly. The right part is showing DVI corruption. The severity of the corruption varies. You can see other example screenshots of DVI corruption here and here. The corruption can happen for any number of reasons including: a weak DVI transmitter in the video card, a cable which is too long for the DVI data rate, a very low-quality cable, or a weak DVI receiver in the monitor.

- **Update your display drivers -** You should always do this first if you're having any problems.
- **Use reduced blanking -** This reduces the pixel clock which may fix the corruption.
- **Use another DVI output -** The corruption may be caused by a weak DVI transmitter in the video card. Try each DVI output on the video card because DVI transmitters on separate outputs can sometimes be very different.
- **Use a shorter cable -** Shorter cables make it easier for the image data to get through the cable in good enough shape to display properly.
- **Lower the refresh rate -** Lowering the screen refresh rate makes it easier for the image data to get through the cable in good enough shape to display properly.

✓ **Power Cable** :

Alternatively known as a **power cable**, mains **cable** or flex, a **power cord** is the primary **cable** that provides **power** to the **computer**, printer, monitor, and components within a **computer**. The image is an example of the **power cord** that is commonly used with **computers**, monitors, printers, and other peripherals.

HDMI Cable : HDMI (High-**Definition** Multimedia Interface) is a proprietary audio/video interface for transmitting uncompressed video data and compressed or uncompressed digital audio data from an **HDMI**-compliant source device, such as a display controller, to a compatible computer monitor, video projector, digital television,....

Fig. 2-2: HDMI connectors.

USB Cable: How to Test a USB Cable

USB cables are a common way to connect peripherals to computers and other electronic devices such as game consoles. While USB cables come in a variety of shapes and sizes, the function is typically the same. Capable of powering or recharging the very device they connect to your computer, they're very practical. Testing a USB cable's functionality is easy to do and only takes a few minutes if you have a device to test it with.

Step 1

Check the USB cable for any tears or fraying. A damaged cable is dangerous and must not be used under any circumstances.

Step 2

Plug the PC end of the USB cable into any of your PC's USB ports. This end is rectangular in shape, and the side of the cable with the line running from the center always faces downward.

Step 3

Connect the other end of the USB cable to a compliant USB device that has the appropriate input for the cable. Options include external hard drives, cameras, certain game controllers, and other PC compatible peripherals.

Step 4

Power on your PC. All modern-day PCs with USB support automatically install the drivers needed to run the peripheral when connected. If the USB cable is functioning properly, it will power on with your

computer or shortly after it turns on. You may get a message telling you that your computer is installing software drivers for the device---this is normal.

Step 5

Check to see if the device works as it normally would. If it doesn't, test the cable on another peripheral to make sure it is the cable and not the device. If this doesn't work, try another USB port on your PC to make sure your PC isn't malfunctioning before calling it quits and tossing the cable to the curb.

Serial Cable :

By looping the transmit and receive pins, you can test serial cable port communication by checking if the serial ports connections transmit and receive valid information. This is called a loopback test and can be used to test rs232 communication. Use a screwdriver to loop pins for testing.

Parallel Cable :

What is the standard for parallel cable?

A standard parallel port connector has two rows of 25 total pins surrounded by a metal casing. It is roughly an inch in width and has two screw-in connectors to keep the cable in place. Parallel port cables used for printing often have an even larger 36-pin "Centronics 36" connector that connects to the printer.

How do you test a parallel port?

When you test the parallel ports and parallel device, it is recommended that you do the following: Press the Windows key + R, type devmgmt. msc, and press Enter. Check to see if the parallel ports and parallel device is listed under Ports (COM & LPT).

- **Content/Topic 2 Identification of I/O Devices(peripheries)**

I/O devices are the pieces of hardware used by a human (or other system) to communicate with a computer. For instance, a keyboard or computer mouse is an input device for a computer, while monitors and printers are output devices. ... The designation of a device as either input or output depends on perspective.

- ✓ **Computer input devices**

1. Keyboard

Keyboards are the most common type of input device. Before keyboards, interaction with computers was generally carried out using punch cards and paper tape. Most English language keyboards use the QWERTY layout for the alphabetic keys, which are surrounded by number, symbol, function, and other key types. By pressing the relevant keys, a user can feed data and instructions to the computer.

Input devices like keyboards and mice allow users to interact with their computers by selecting icons and entering text and commands.

2. Mouse

A mouse interacts with a computer through a process known as "point and click." Essentially, when a user moves the mouse on the mouse pad, the pointer moves in a corresponding direction on the computer's monitor screen. The concept of a computer mouse has its roots in the trackball, a related pointing device invented in 1946 that used a "roller ball" to control a pointer. Most modern computer mice have two buttons for clicking and a wheel in the middle for scrolling up and down documents and web pages.

3. Touchpad

Also known as a trackpad, a touchpad is a common substitute for a computer mouse. It is essentially a specialized surface that can detect the movement of a user's finger and use that information to direct a pointer and control a computer. Touchpads were first introduced for laptops in the 1990s, and it's now rare to find a laptop without one.

4. Scanner

The word "scanner" can be used in a number of different ways in the computer world, but here I am using it to refer to a desktop image scanner. Essentially, a scanner is an input device that uses optical technology to transfer images (or sometimes text) into a computer, where the signal is converted into a digital image. The digital image can then be viewed on a monitor screen, saved, edited, emailed, or printed.

5. Digital Camera

Digital cameras are used to capture photographs and videos independently. Later, these photo and video files can be transferred to a computer by connecting the camera directly with a cable, removing the memory card and slotting it into the computer, or through wireless data transfer methods such as Bluetooth. Once the photos are on the computer, they can be saved, edited, emailed, or printed.

6. Microphone

Microphones are input devices that allow users to record, save, and transmit audio using a computer.

A microphone captures audio and sends it to a computer where it is converted to a digital format. Once the audio has been digitized, it can be played back, copied, edited, uploaded, or emailed. Microphones can also be used to record audio or to relay sounds live as part of a video chat or audio stream.

7. Joystick

Joysticks are commonly used to control characters and vehicles in computer video games. Essentially, a joystick is a handle that pivots on a base and sends its angle or direction to the computer as data. Many

video gaming joysticks feature triggers and buttons that can be pressed to use weapons or projectiles in games.

8. Graphic Tablet

Also known as digitizers, graphic tablets are input devices used for converting hand-drawn artwork into digital images. The user draws with a stylus on a special flat surface as if they were drawing on a piece of paper. The drawing appears on the computer screen and can be saved, edited, or printed. While scanners can only create digital images from drawings, graphic tablets offer greater control and versatility for artists by allowing them to see their drawing appear live on their monitor as they create it.

9. Touch Screen

Touch screens provide the same functionality as a mouse or trackpad by allowing users to make selections and commands directly through a device's display screen.

Many devices nowadays use a touch screen rather than a mouse as a way for users to point, drag, or select options on a screen. As the name suggests, a touch screen is a touch-sensitive monitor screen that reacts to fingers moving across it. Touch screens are particularly common in portable devices, such as tablets, palmtops, laptops, and smartphones.

10. Webcam

Webcams are different from digital cameras in two ways. Firstly, they cannot operate independently from a computer, and second, they have no inbuilt memory. Although webcams can capture photographs and videos, they are more often used to live-stream videos or facilitate video chats.

- ✓ **Computer output devices**

Computer output devices receive information from the computer, and carry data that has been processed by the computer to the user. Output devices provide data in myriad different forms, some of which include audio, visual, and hard copy media. The devices are usually used for display, projection, or for physical reproduction. Monitors and printers are two of the most commonly-known output devices used with a computer.

Computer output devices are all peripheral hardware, and are connected to a computer by cables, or by wireless networking.

Reasons for Having an Output Device

A computer can still function without an output device. However, without an output device, there's no way to determine what the computer is doing. There is no indicator of errors, nor of the need for

additional input. For example, if you detach your monitor from your computer, the computer will still function, but it's not going to be very helpful.

Examples of Output Devices

Monitor – This is the most common computer output device. It creates a visual display by the use of which users can view processed data. Monitors come in various sizes and resolutions.

Common Types of Monitors

- Cathode Ray Tube – this uses phosphorescent dots to generate the pixels that constitute displayed images.
- Flat Panel Screen – this makes use of liquid crystals or plasma to produce output. Light is passed through the liquid crystals in order to generate pixels.

All monitors depend on a video card, which is positioned either on the computer motherboard or in a special expansion slot. The video card sorts out the computer data into image details that the monitors can then show.

Printer – this device generates a hard copy version of processed data, like documents and photographs. The computer transmits the image data to the printer, which then physically recreates the image, typically on paper.

Types of Printers

- Ink Jet – this kind of printer sprays tiny dots of ink onto a surface to form an image.
- Laser – this type utilises toner drums that roll through magnetized pigment, and then transfers the pigment onto a surface.
- Dot Matrix – dot matrix printers utilise a print head to set images on a surface, using an ink ribbon. These printers were commonly used between 1980 and

Speakers – speakers are attached to computers to facilitate the output of sound; sound cards are required in the computer for speakers to function. The different kinds of speakers range from simple, two-speaker output devices right the way up to surround-sound multi-channel units.

Headset – this is a combination of speakers and microphone. It is mostly used by gamers, and is also a great tool for communicating with family and friends over the internet using some VOIP program or other.

Projector – this is a display device that projects a computer-created image onto another surface: usually some sort of whiteboard or wall. The computer transmits the image data to its video card, which then sends the video image to the projector. It is most often used for presentations, or for viewing videos.

Plotter – this generates a hard copy of a digitally depicted design. The design is sent to the plotter through a graphics card, and the design is formed by using a pen. It is generally used with engineering applications, and essentially draws a given image using a series of straight lines.

Input/Output Devices

Input/Output devices don't only produce output, but can also be used as storage and input devices. The computer transmits data to the drive, where it is saved and can be later accessed.

Examples of I/O devices are CD drives, DVD drives, USB drives, hard disk drives (HDDs), and floppy disk drives.

CDs and DVDs are two kinds of optical disc which save data in a digital format. Data is written onto the disc using a laser writer that embeds the data directly into the disc's coating.

A floppy disk is a magnetic storage device. A layer of magnetised material is placed within a proactive plastic casing. The computer then embeds the data into the magnetized material, by using a writing head.

Common Problems With PC Peripherals And How To Fix Them

Are you experiencing problems with PC-attached peripherals, such as your mouse, keyboard, webcam, or another accessory? Whether you're using legacy or USB peripherals, problems could arise at some point. In some cases, peripherals stop working following an update. The good news is that fixing these common problems with PC peripherals is often simple. A shortcut is to use the Windows troubleshooter. The interface may vary from one Windows operating system to another, but the purpose is the same. Click the Start button, open the Hardware and Devices troubleshooter, and then select Troubleshooting. This will automatically check your computer for any problems with hardware and other devices.

Common PC Peripheral Problems and How to Solve Them

The first step is to always check the hardware. The cables may be damaged or the USB hub you're using between your PC and the peripheral may not have power.

#1: Problems with a port

If the attached peripherals suddenly stop working, check the Device Manager to see if the port itself is to blame. A red exclamation mark (!) means there's an error with the port. Delete a device from the Device Manager and then reboot your computer. Once your PC is up and running again, install the device driver.

#2: Problems with the port connectors

Especially with PS/2 ports, one or two of those holes could be clogged with dust, causing a loss in connection with the pins. The same thing could happen when the pins on the peripheral connector are damaged.

A USB port can get damaged, too, resulting in no power or connection. A solution would be to use another USB port.

#3: USB standards don't match

Newer USB devices may not run on old USB ports. Most of them would need a 3.0 cable for high-speed processing. If the USB port and device are incompatible, attached peripherals will not work.

#4: Error with wireless keyboard or mouse

Common Problems with PC Peripherals

Wireless peripherals often rely on the IR or RF controller to work and communicate with a computer. If it doesn't work the first time you use it, you could be using an old operating system. Most wireless PC peripherals need a newer OS Service Pack. So, if you're still using Windows 95 OS or older, an upgrade will fix the problem.

If you're using the current operating system and the wireless keyboard and mouse still don't work, the problem may be an interference with the line of sight or a weak battery. Use the peripherals on other PCs to help identify the cause of error.

If the wireless device has a reset button, use it to reset the device and refresh the connection. It would

also help if you unplug the USB wireless receiver and leave it off for about 10 seconds. This will help reestablish the wireless connection once you plug the receiver back into the port.

#5: PS/2 keyboard and mouse not working

See that the device is plugged in the correct port. If the port and cable are color-coded, the keyboard cable should go into the purple-colored port and the mouse into the green-colored port.

Color coding can vary. Try to switch them up and see if doing so helps fix the problem. Follow the same process if the PS/2 connectors are identical in color and you need to identify which one is designated for the **keyboard and the mouse.**

If the cables are on the right parts and the peripherals still don't work, try to use other devices. The keyboard or mouse may need replacement.

#6: Blocked keys or sensors

Dirt blocking the keys or sensors prevents PC peripherals from responding to commands. Regardless of how much you click on a mouse or press a key, nothing will happen if contact is not established.

#7: Input devices stop working after updates

Following an operating system or software update, one or two of your attached PC referrals may no longer work. There are several ways to restore a device's functionality.

- **Switch USB ports**

Doing so will force your computer to recognize a device. A computer system usually recognizes a device based on their location or the specific USB port where the device was attached before any updates were made. If the system thinks nothing has changed, it will not reload drivers, resulting in peripherals not working. Thus, the need to switch USB ports.

- **Start in safe mode**

In some cases, a driver in the cache will not load properly after an update. The result is a broken mouse and keyboard … or so it might appear. With a bit of a system purge in safe mode, the boot will reload drivers and load them properly.

- **Reset the PRAM**

During a firmware update, the PRAM settings of your computer, which include peripheral devices, video settings, startup disk, and audio volumes, may be reconfigured. Reset the PRAM to fix the problem. Reboot the system and then press and hold down the option-command-P-R keys at the same time. Wait for your computer to reset and chime a couple of times at reboot before you release the keys.

- **Power cycle the entire system**

Faulty settings may occur after an update. Remove a peripheral device from your computer and leave it off for a few minutes. For better results, shut down your computer as well and power cycle it. After 5 to 10 minutes, turn the computer back on and then plug the attached peripherals back in.

#8: Mouse and keyboard stopped working when the printer is turned on

- **Ensure efficient power**

This could happen when the USB ports for the keyboard and mouse receive too little power to work because the printer is hogging all of it. Make sure not to connect the printer to a USB hub that is shared by the **keyboard and mouse.**

Another solution is to plug the devices into different USB ports. Attached peripherals can go at the back of the computer while the printer is plugged in at the front.

- **Fix interference**

Do your keyboard, mouse, and printer all use a wireless connection? They could be interfering with one another, even if one is using radio frequency while the other relies on Bluetooth.
To avoid conflict and establish different frequencies for different devices, switch off the keyboard and mouse. When you switch them back on, they will be forced to reconnect to your computer using a free frequency.

- **Check driver compatibility**

Conflicts between drivers could cause problems with different devices. Communication with your operating system will be effected and will result in devices not working properly. Open Device Manager and check that drivers for peripherals and the printers are updated.

Double click on a device and open the Properties windows. Under Driver tab, check if the option to Update Driver is available. This means a newer version of a driver is available.

- **Reinstall devices**

If you've done all the steps above and the problem persists, you may need to reinstall devices to resolve the issue.

1. Remove the PC-attached peripherals from Device Manager.
2. Any related software must be uninstalled from your computer.
3. Restart the system.
4. Switch on the printer and see that it is connected to your computer and working properly.
5. Reconnect the keyboard and mouse like you're using them for the first time. This reinstalls the peripherals and ensures there are no conflicts.

If you're still having issues with these common problems with PC peripherals, check out our guide on how to reset your Windows 10 computer here.

- **Content/Topic 3 Selection of I/O Devices to be connected**

Input and Output Devices

Input and output devices allow the computer system to interact with the outside world by moving data *into* and *out of* the system. An *input device* is used to bring data into the system. Some input devices are:

- Keyboard
- Mouse
- Microphone
- Bar code reader
- Graphics tablet

An *output device* is used to send data out of the system. Some output devices are:

- Monitor
- Printer
- Speaker

Input/output devices are usually called I/O devices. They are directly connected to an electronic module inside the systems unit called a **device controller**. For example, the speakers of a multimedia computer system are directly connected to a device controller called an audio card (such as a Soundblaster), which in turn is connected to the rest of the system.

Sometimes secondary memory devices like the hard disk are called I/O devices (because they move data in and out of main memory.) What counts as an I/O device depends on context. To a user, an I/O device is something outside of the system box. To a programmer, everything outside of the processor and main memory looks like an I/O devices. To an engineer working on the design of a processor, everything outside of the processor is an I/O device.

- **Content/Topic 4 Identification of Connectors or Ports**

A Computerr Port is an interface or a point of connection between the computer and its peripheral devices. Some of the common peripherals are mouse, keyboard, monitor or display unit, printer, speaker, flash drive etc.

The main function of a computer port is to act as a point of attachment, where the cable from the peripheral can be plugged in and allows data to flow from and to the device.

A computer port is also called as a Communication Port as it is responsible for communication between the computer and its peripheral device. Generally, the female end of the connector is referred to as a port and it usually sits on the motherboard.

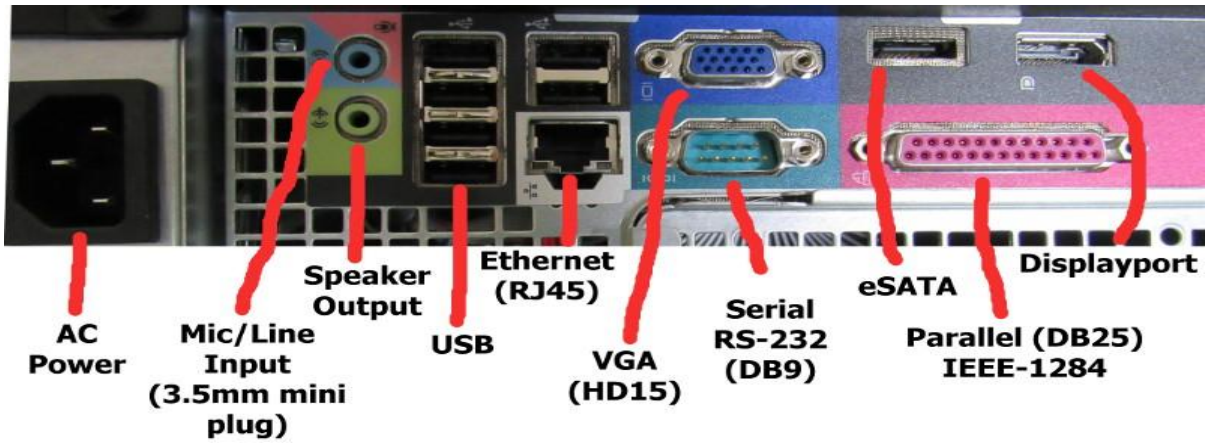
In Computers, communication ports can be divided into two types based on the type or protocol used for communication. They are Serial Ports and Parallel Ports.

A serial port is an interface through which peripherals can be connected using a serial protocol which involves the transmission of data one bit at a time over a single communication line. The most common type of serial port is a D-Subminiature or a D-sub connector that carry RS-232 signals.

A parallel port, on the other hand, is an interface through which the communication between a computer and its peripheral device is in a parallel manner i.e. data is transferred in or out in parallel using more than one communication line or wire. Printer port is an example of parallel port.

Computer external connector types and pictures

AC Power, Mic/Line Input, Speaker/Headphone Output, USB, Ethernet, VGA, Serial RS-232, eSATA, Parallel DB25, Displayport



DVI, Firewire, USB

PS/2, USB, Serial, Parallel

LEGACY CONNECTORS:

(many of these are still in use today)

MONITOR CONNECTORS

HD15 15 pins in three rows, pins are skinnier than a usual "DB" connector, thus it's got an "H" for High Density. Used for PC's SVGA video cards and monitor cables.

DB15 15 pins in two rows, pins are just like a DB9 or DB25. Used for Mac monitors.

BNC connectors are used on Macs, Sun's and just about anything that's old and good.

DB9 9 pins in two rows, used on older monitors, and VGA's. PS/2 style Serial ports also use DB9 connectors.

13W3 a bunch of "DB" style pins and three funny looking coax contacts. Used on Sun and Mac monitors.

Other PC /MAC Connectors

Parallel/Printer

CN36 (female) This is the connector you see on the back of most printers.

CN36 (male) This is the connector used by most printer cables.

DB25 (female) This connector is used for parallel printer output on the PC. It is also used for SCSI output, especially on the Mac.

DB25 (male) This is used for parallel printers (and other parallel port devices) as well as SCSI and serial ports. If you see a male on the back of your computer, it is usually your COM2 serial port.

HPCN36 male This is the new "Type-C" IEEE-1284 Parallel port connector which is used on some new laser printers.

MINIDIN-8 (female) ***Serial*** Mac connector. Mac Printers, Mac printer and modem outputs, etc.

Serial

DB25 serial connector. On a computer, this would be a male not a female as pictured above.

DB9 serial connectors. On the computer

there should be a "male" connector, the mouse or

other serial device (modem, digital camera) would have a female.

USB and Firewire connectors

"i.Link" connector. This is basically a 4-pin Firewire/i.link/IEEE-1394 connector.

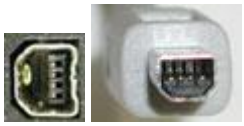
"Firewire" connector.

This is a 6-pin Firewire/IEEE-1394 connector.

USB type "A" connector. Connects to computer or USB Hub.

USB type "B" connector. Connects to peripheral or

to USB Hub.



Mini USB connector used on many new USB digital cameras.

Mini USB 2.0 connector used on many new USB digital cameras.

Other connectors

S-Video connector, sometimes called S-VHS or Y/C video. There're 4 little pins in there, it's called a DIN4.

RCA (above) connector. Standard stereo connector.

3.5 mm Mini Phone Plug connector, (below) used on computer sound cards. 

SC connector, fiber optic network connector.

ST connector, fiber optic network connector.

MTRJ fiber optic network connector.

Toslink connector. Used for digital audio.

- **Content/Topic 5 Connecting and disconnecting of I/O Devices**

I/O Devices(peripheries)

✓ **Mouse :** Today, almost all wired and wireless mice use USB as the interface to the computer. However, older computers may utilize PS/2 or serial ports. If your mouse is wireless, it can be communicating over Bluetooth, RF (radio frequency), or IR(infrared). To proceed, select your connection type from the list below and follow the instructions.

Connecting a wireless USB mouse

A cordless mouse has a small receiver that communicates with the mouse. The receiver connects to the computer via a USB port.

1. Look for a USB port in the back or on the side of your computer and plug in the receiver.
2. Once the wireless receiver is connected to the computer, Windows should automatically find and install the appropriate drivers as long as you're connected to the Internet.
3. Make sure there are batteries in the mouse or that it is charged.
4. Next, verify that the mouse is turn on. Many wireless devices have an on and off switch on the bottom of them.

Connecting a wired USB mouse

Connect the USB cable coming from the mouse to one of the USB ports (shown right) on the back or side of your computer. If you are using a USB port hub, connect the mouse cable to that.

After the mouse is connected, the computer should automatically install the drivers and provide basic functionality. If the mouse you want to change how any special buttons work, additional software may need to be installed.

If the mouse is not functioning, see our mouse troubleshooting section.

Connecting a Bluetooth mouse

A Bluetooth mouse connects to a computer wirelessly using a Bluetooth signal. The computer must have built-in Bluetooth or have a Bluetooth adapter connected to it.

To connect a Bluetooth mouse to your computer, follow the steps below.

1. Open the Bluetooth utility on your computer and make sure Bluetooth is turned on. The Bluetooth utility, if enabled, is found in the notification area, with an icon that looks like the Bluetooth symbol.
2. Turn on the mouse if it has an On/Off switch. Check the Bluetooth utility to see if it detects the Bluetooth mouse.
3. When the Bluetooth utility finds the Bluetooth mouse, select the mouse in the Bluetooth device list and click the **Pair** button.
4. If successful, the mouse connects to the computer.

Tip

If the Bluetooth utility does not detect the Bluetooth mouse, check the bottom of the mouse or inside the battery compartment for a small button. If found, press the button, as it may be required for the mouse to be discoverable by the computer. If no button is found and the mouse came with a software installation disc, install the mouse software on the computer. After installing, check the Bluetooth utility to see if it detects the Bluetooth mouse.

Connecting a PS/2 mouse

Note

Before connecting or disconnecting the PS/2 mouse, make sure the computer is turned off.

Connect the cable coming from the mouse to the green-colored PS/2 port (shown right) on the back of the computer. If your PS/2 ports are not color-coded, the mouse port is the furthest port from the left side of computer chassis (when viewed from the back).

After the mouse is connected, the computer should automatically install the drivers and provide basic functionality. If the mouse you want to change how any special buttons work, additional software may need to be installed. If the mouse is not functioning, see our mouse troubleshooting section.

Connecting a serial mouse

Note

When connecting or disconnecting a serial mouse, make sure the computer is turned off.

Connect the mouse to the serial port on the back of the computer. If you have more than one serial port on the computer, we recommend connecting the mouse to the first port. Once connected, depending on your computer setup, you may need to configure the mouse COM ports in BIOS setup.

Today, most computers no longer have serial ports. Most serial mice are specialized, so to use one, you need to install the software included with the mouse, or from the mouse manufacturer's website.

If you're having problems connecting a serial mouse because the computer has no serial port or the port is not working, consider using a serial to USB adapter.

BIOS setup

If you have an older computer (2005 or earlier) with a serial or USB mouse, it may be necessary to configure the ports in BIOS setup. If you have a newer computer, this section can be skipped.

How to enter the BIOS or CMOS setup.

Older computers with serial mice

If you're using a serial mouse and it's not detected, verify that the serial ports or COM ports are enabled and properly assigned in BIOS.

Older computers with USB

If the mouse connects via USB, make sure USB is enabled and if available, also ensure that the USB legacy support is enabled. USB legacy support allows the mouse to work in legacy mode, for example, DOS.

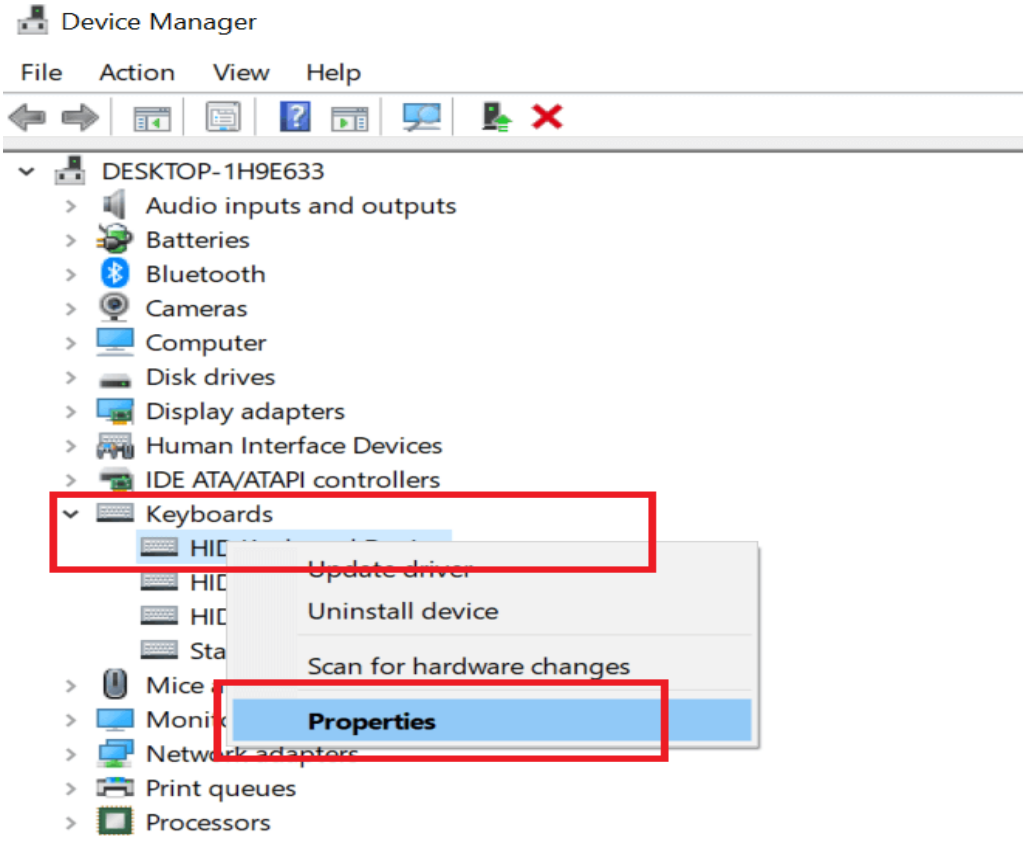
Mouse troubleshooting

If your mouse is not working after following the steps above, additional troubleshooting may be required.

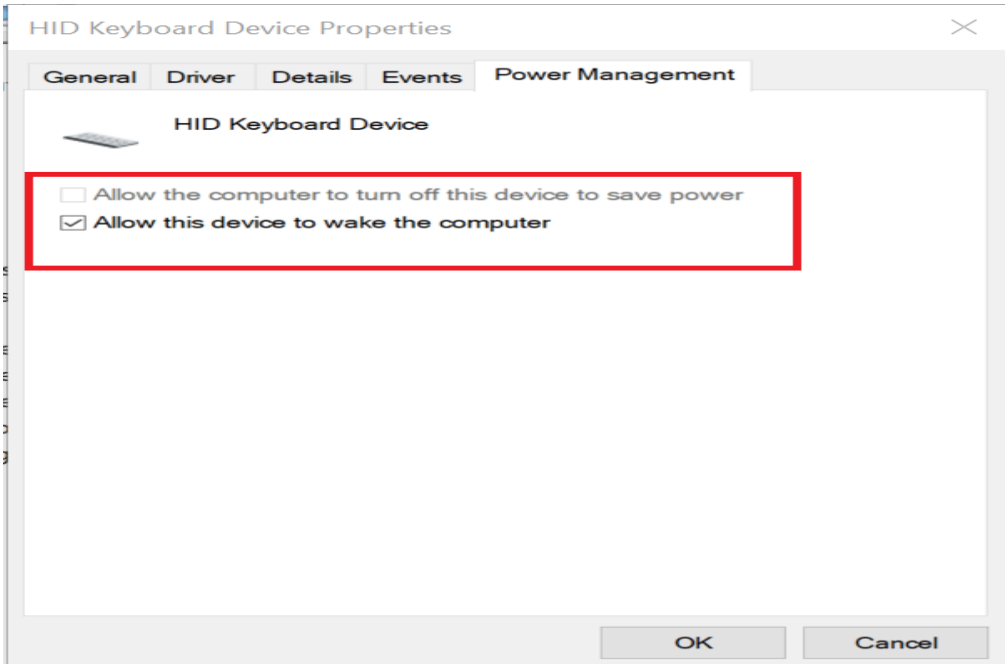
Keyboard : What can I do if my USB keyboard isn't working in Windows?

1. Turn off power saving options

1. The power-saving option in Windows allows the computer to disconnect the idle devices to conserve power. However, this can also cause issues with USB devices. Try disabling the option and check for any improvements.
2. Press "**Windows Key + R"** to open Run.
3. Type **devmgmt.msc** and click **OK** to open the **Device Manager.**
4. Click to expand the **Keyboard** section.



5. Right-click on “**HID Keyboard Device”** and select “**Properties”**.



6. In the **Properties** window, click the **Power Management**
7. Uncheck “**Allow the computer to turn off the device to save power**” option.
8. Click **OK** to save the changes.
9. Disconnect your keyboard and plug it back in. Check for any improvements.

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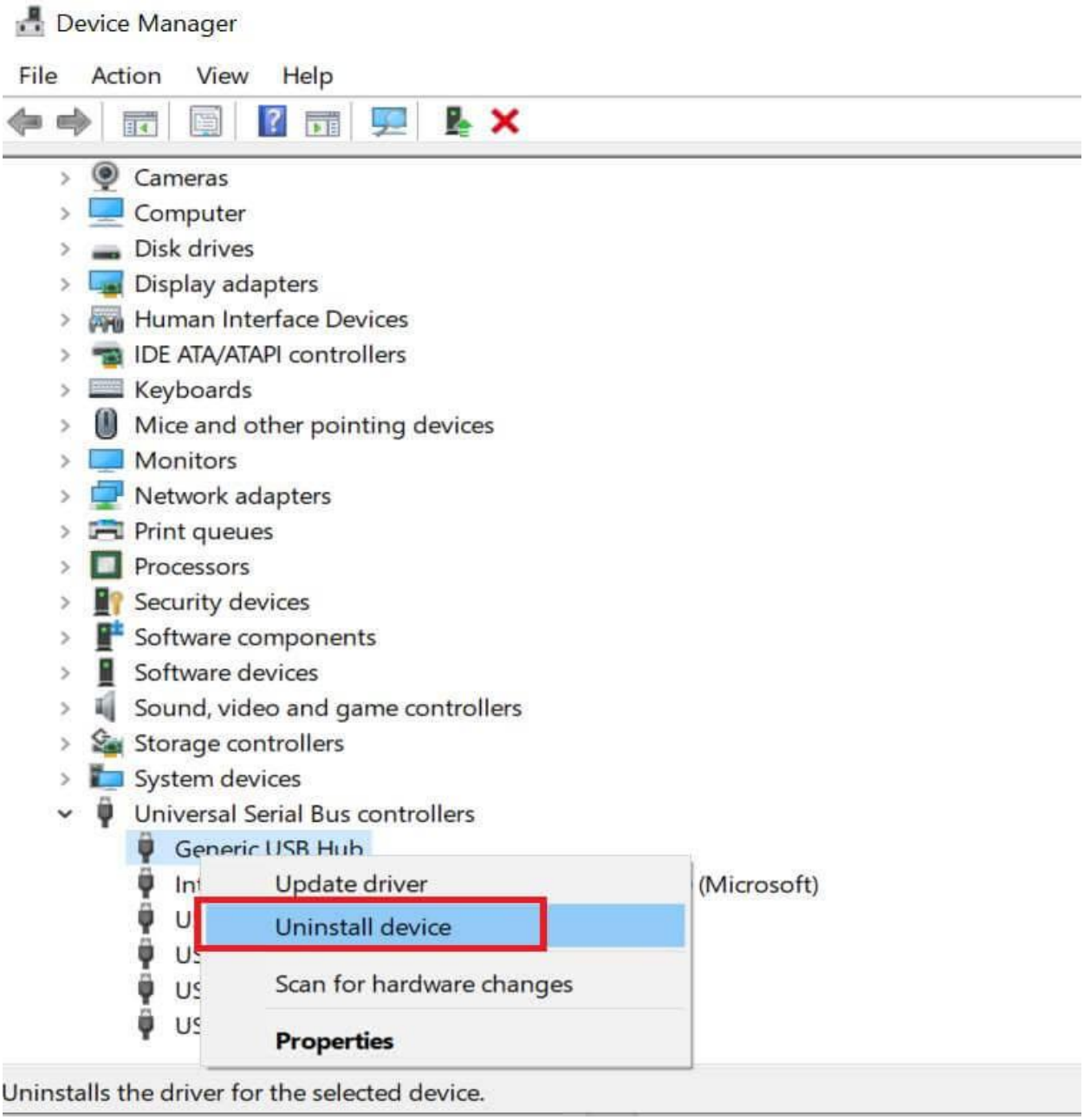
2. Reinstall Universal Serial Bus controller driver

1. If the issue persists, you can fix it by reinstalling the USB controller driver from the device manager.
2. Open the **Device Manager** by searching for **Device Manager** in the search bar.
3. Click on the **Universal Serial Bus controllers** section to expand it.

4. Now look for the list which is related to your keyboard.

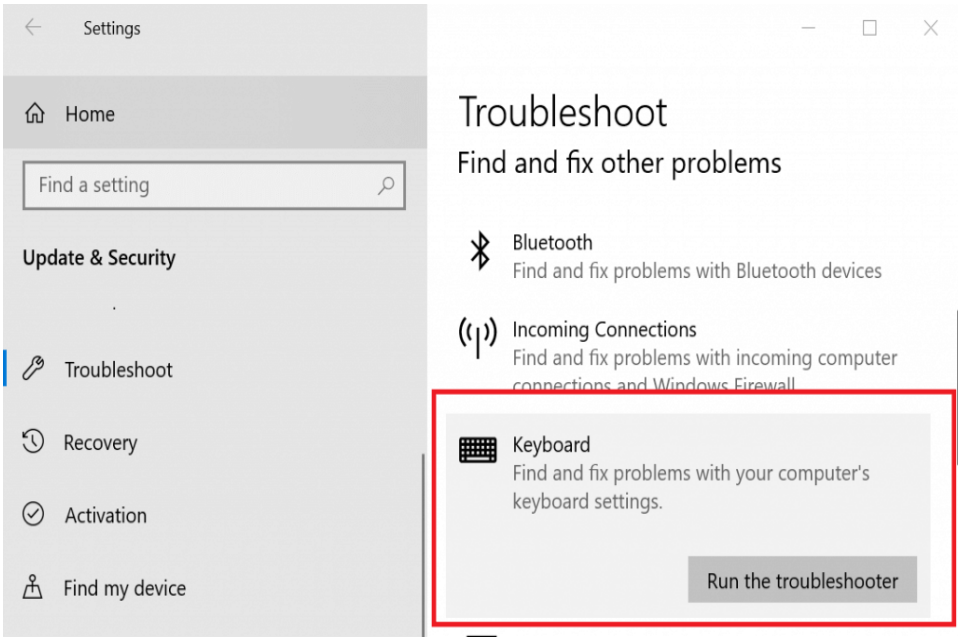


5. Right-click on the **Keyboard device** and select the "**Uninstall Device"** option.
6. Once the device is uninstalled, restart the computer.
7. After the restart, Windows will automatically install the device.
8. Connect your keyboard to the computer and check for any improvements.

3. Run the hardware troubleshooter

3. Windows 10 comes with a built-in hardware troubleshooter. It can help you to fix any issues with the peripheral devices.
4. Click on **Start** and select **Settings.**
5. Go to **Update and Security > Troubleshoot.**

6. Scroll down and click on **Keyboard.**



7. Click on **Run the Troubleshooter** option.
8. The troubleshooter will scan the system for any issues. Follow the on-screen instructions to apply any recommended fix.

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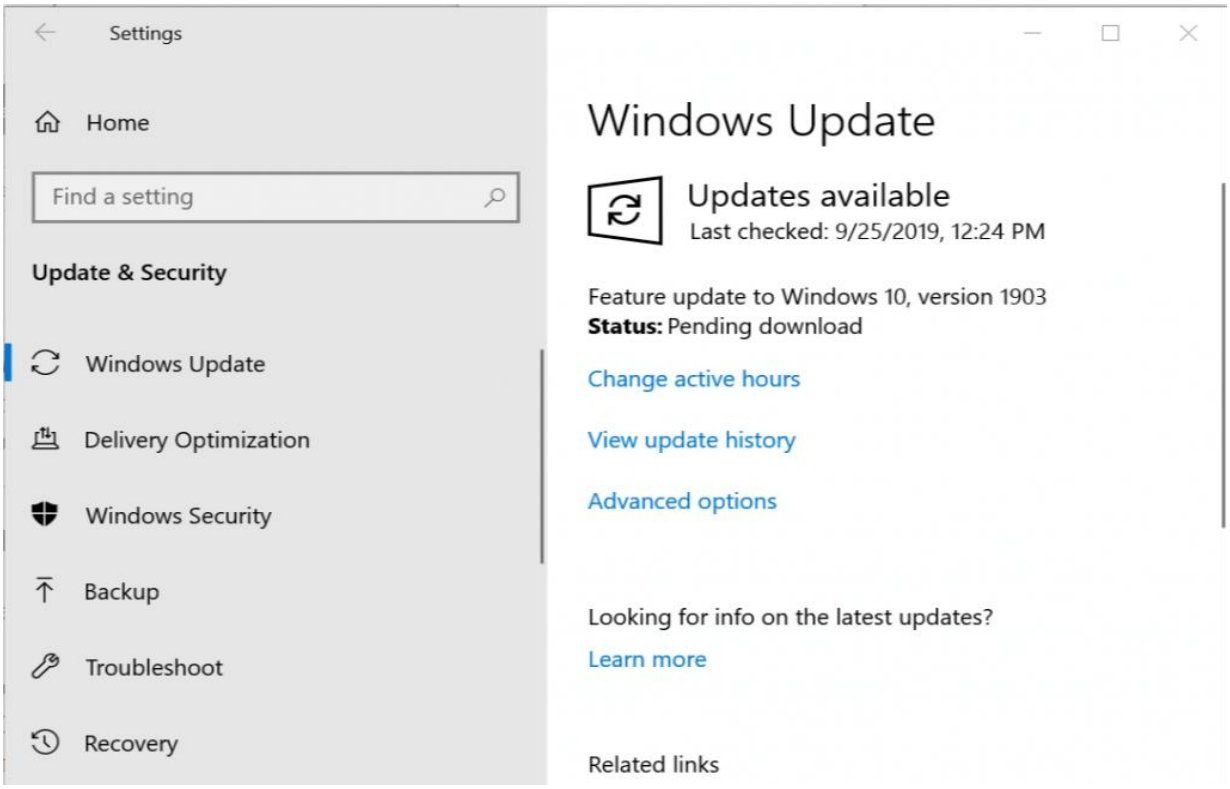
4. Update Windows firmware



4. Microsoft releases new updates to fix bugs and security issues periodically. If you haven't updated your computer for a long time now, it may be the right time to do so.
5. Click on **Start** an select **Settings**.
6. Click on **Update and Security.**
7. If no updates are pending, click on **Check Now**.
8. Download and install any pending Windows update and reboot the computer.
9. After the restart, check if the keyboard disconnecting and reconnecting issue is resolved.

Still having issues? Fix them with this tool:

This software will repair common computer errors, protect you from file loss, malware, hardware failure and optimize your PC for maximum performance. Fix PC issues and remove viruses now in 3 easy steps:

1. **Download this PC Repair Tool** rated *Great* on TrustPilot.com.
2. Click **Start Scan** to find Windows issues that could be causing PC problems.
3. Click **Repair All** to fix issues with Patented Technologies (Exclusive Discount for our readers).

✓ **Monitor:**

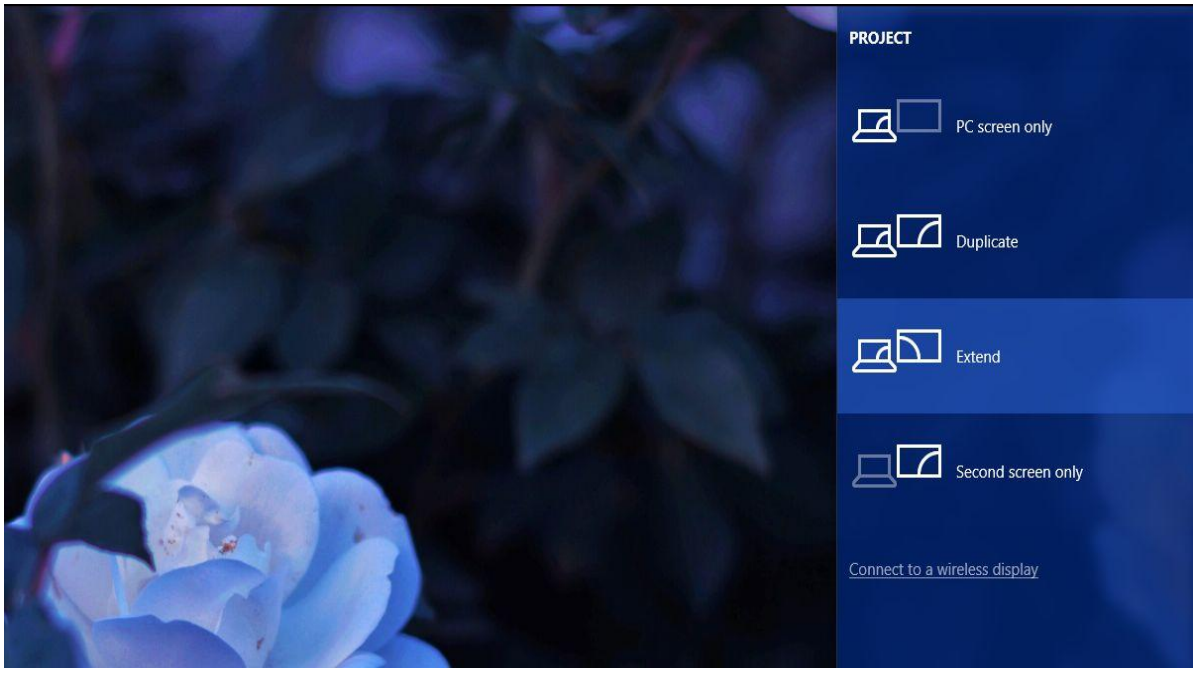
How To Disconnect A Monitor Without Unplugging It

Disconnecting an external monitor is easy; just pull out the VGA or HDMI cord that's connected to your laptop. It's pretty simple but if you don't feel like yanking cords out whenever you want to disconnect a monitor, you need a simpler solution that doesn't force you to repeatedly connect and disconnect cables. We're not saying connecting and disconnecting a cable isn't a viable solution. In fact, it's probably the simplest one that will work every single time and has no side-effects. The only thing is, cables and ports can be damaged if you connect and disconnect them too much, or if you're not careful when you do it. Here are two viable solutions to disconnecting a monitor without unplugging it.

Mirror Your Display

If you want to disconnect a monitor simply because you don't need an extended desktop for a short period of time, you can just mirror your displays. This will make it so that both internal and external displays show you the exact same thing. There's no selecting which is the primary display, and which is the secondary display. All apps that you open will appear on both screen.

To mirror your display, tap the Win+P keyboard shortcut. From the menu that appears, select the Duplicate option. You can cycle through these options by holding down the Windows key and tapping the P key.

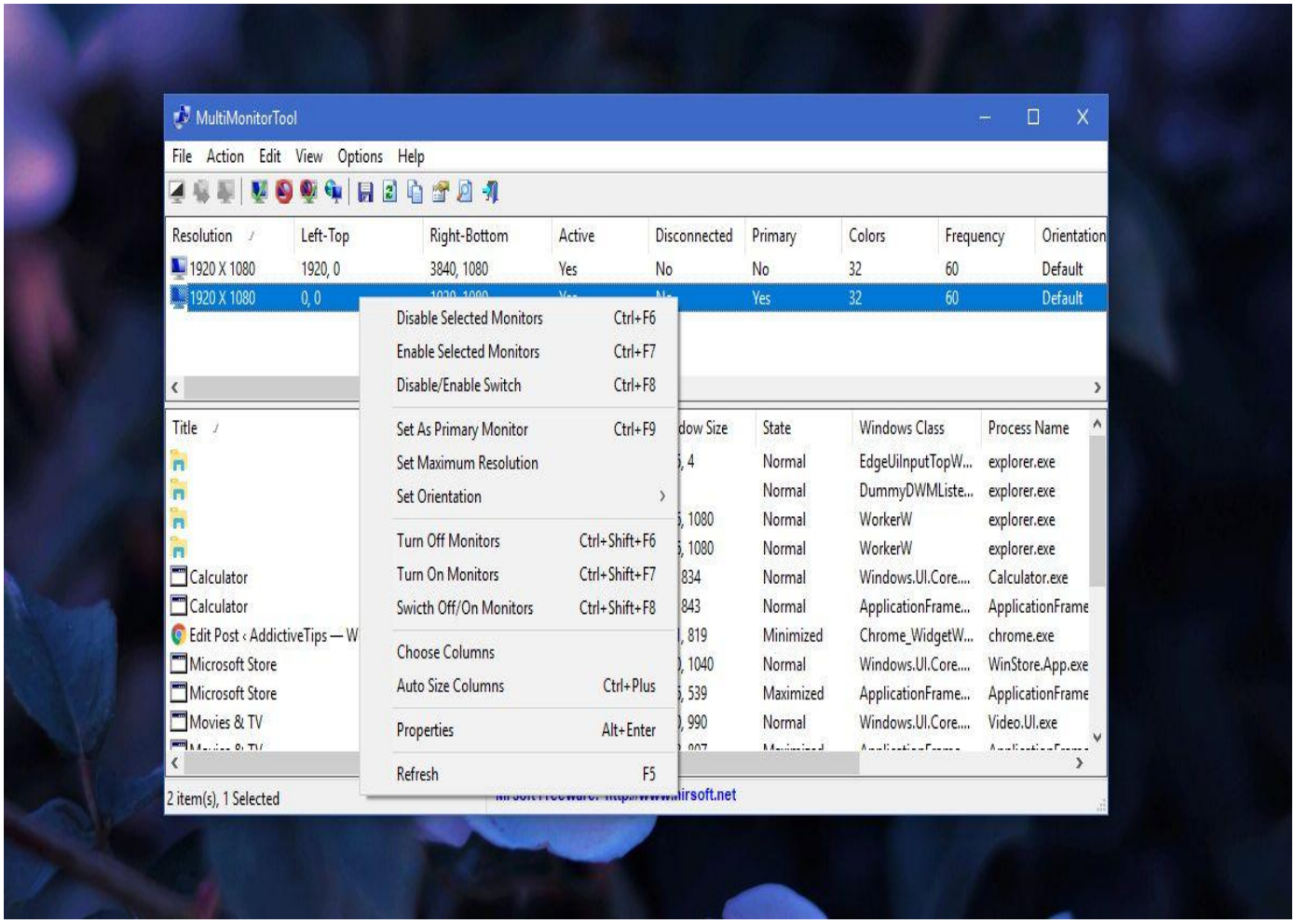


When you extend your display again, Windows will remember which display was the primary one, and which was the secondary one.

Disconnect A Monitor

If duplicating the display doesn't do the trick and you need to simulate the display actually being disconnected, consider using the Multi Monitor Tool. It's a free utility by Nirosoft that lets you manage multiple displays. It has quite a few features including an option to turn off or disable any connected display. This tool works only if you have two or more displays.

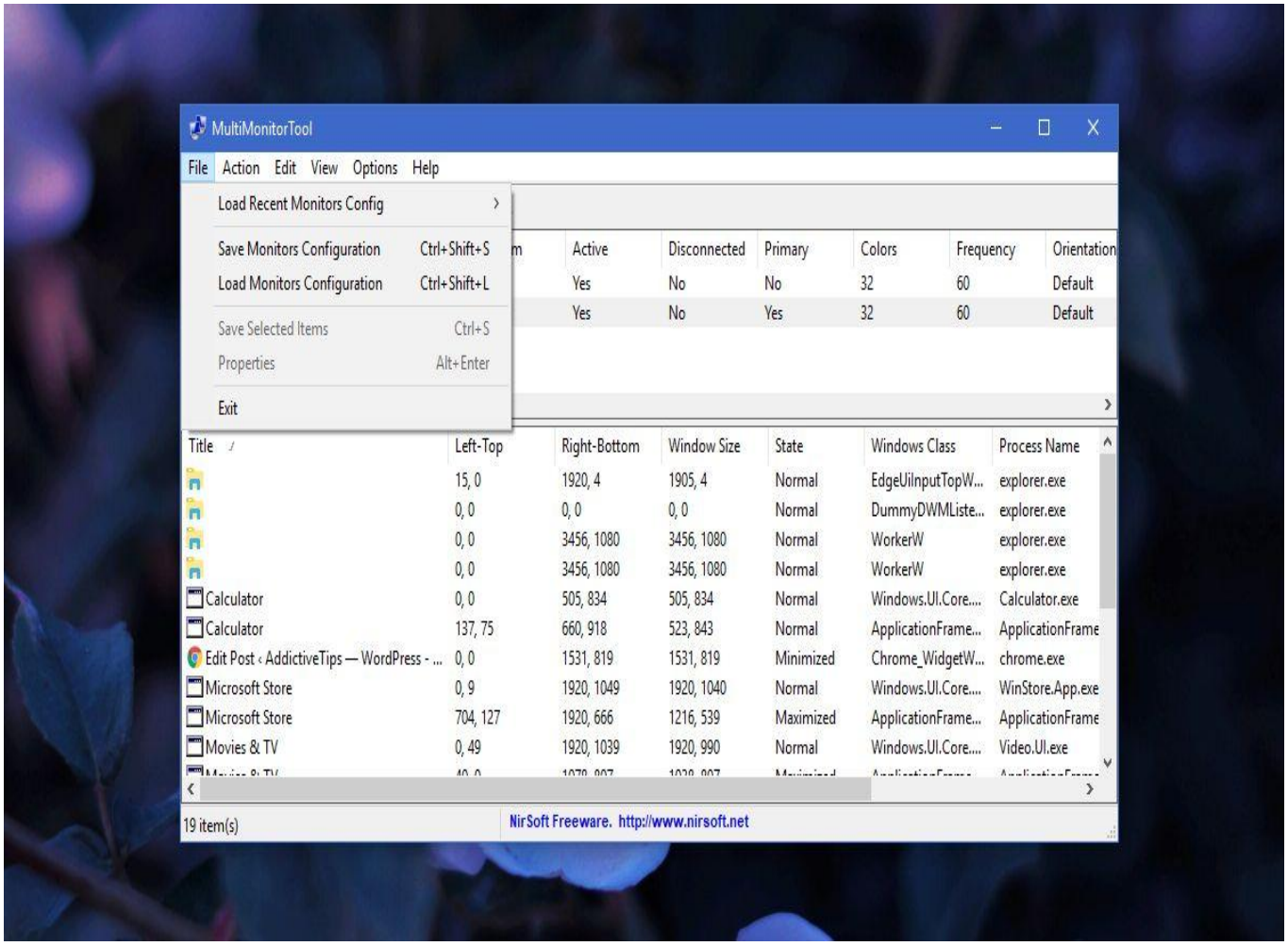
Run Multi Monitor Tool and from the list of displays that it populates, select your external display. Right-click it and select either 'Disable selected monitors', or 'Turn Off Monitors'. This will apply only to the monitor you've selected. To turn the monitor back on, select it again, and select the Enable or Turn On option.



This method has a small problem; when you enable or turn on an external monitor, Windows doesn't remember which was your primary and which was your secondary monitor. The monitor that you connect is always set as the secondary monitor.

You can go to the Settings app on Windows 10 and under System>Display, set your primary and secondary monitors again. If that is too inconvenient, you can instead save your current monitor configuration and load it after enabling your second monitor. This will return your display settings back to the way they were before you disconnected the external monitor.

To save your current monitor configuration, set up your displays exactly how you like them. Open the Multi Monitor Tool and go to File>Save Monitors Configuration. To load a configuration, go to File>Load monitors configuration.



Scanner: Scanner Error: Cannot Connect to a PC

Improper communication between your computer and scanner can result in a “Scanner Cannot Connect to PC” error message or no response at all. This can occur on just about any brand of computer and scanner combination for a variety of reasons, including outdated drivers and incorrect installation.

Check Cords and Connections

One simple reason your computer may not detect the scanner is a loose connection. Check the USB and AC adapter cords and all connections to make sure they're tight and secure. Examine the cables themselves for signs of damage that may prevent them from working properly. Pets can chew on cords or the cables can rub against nearby furniture to wear through the protective outer coating and cause failure. If you're connected through a network, check the various cables and connections at the router.

Follow Directions Exactly

Scanners can be complicated to install, and often require a careful ballet of multiple steps to do it correctly. If you skip steps or do them out of order, your computer will not see the scanner. Follow all directions exactly for proper installation. Double-check that the scanner works with your operating

system, as your scanner may not be compatible with older or the newest versions. Check online at your scanner manufacturer's website for any updates or information for installation problems.

Reboot

When it comes to computers, conventional wisdom says to reboot if things seem wonky. Sometimes rebooting helps reset settings that may have gone off, and correct program and operational issues. If your computer suddenly refuses to connect to your scanner -- a scanner you have used in the past without trouble -- restart and see if the problem persists.

Update Drivers

If your drivers are outdated or corrupted, the computer may have problems detecting or communicating with that device. Check for the newest version of your scanners drivers, and make sure your operating system is updated to promote proper connections. If you've installed a piece of hardware or device before your scanner stopped working, that newcomer may be conflicting with your scanner. Update its driver too, or disconnect it if possible, and see if your scanner works again.

Scanning Problems

Was the connection test successful?

If it fails, verify that there are no problems with the network.

Is the IP address set correctly on the computer?

For details on network settings such as the IP address.

Was the communication disconnected?

If the communication was disconnected during EPSON Scan startup, exit EPSON Scan, and restart after a while. If EPSON Scan cannot restart, turn the printer off and back on, then retry.

Check the **Timeout Setting** in **EPSON Scan Settings**. For details, see the EPSON Scan Help.

Is the Firewall function active in Windows XP or later, or commercially available security software?

If the Firewall function is active, the search may not work in **EPSON Scan Settings**. In this case, click **EPSON Scan Settings** - **Add** - **Enter address**, and directly enter the IP address.

Are you scanning a wide range in high resolution?

If a wide range is scanned in high resolution, a communication error may occur. If the scan did not work, lower the resolution.

Does your computer have more than one network interface?

The scanner may not be able to communicate with computers that have multiple network interfaces. To communicate with the scanner, click **EPSON Scan Settings** - **Add** - **Enter address**, and directly enter the IP address.

Cannot operate Scan to PC (WSD)

Is a WSD compatible computer connected to the network?

The Scan to PC (WSD) function is only available for Windows 7/Vista English version computers. Make sure that a computer running Windows 7/Vista English version is connected to the scanner on the same network.

- ✓ **Printer :**

Fix printer connection and printing problems in Windows 10

If you're trying to use your printer and run into problems, here are some steps for common printer problems to try to get things working again.

Step 1. Unplug and restart your printer

Step 2. Check cables or wireless connection

Step 3. Uninstall and reinstall your printer

Step 4. Install the latest driver for your printer

Step 5. Run the printing troubleshooter

Step 6. Clear and reset the print spooler

Step 7. Fix printer problems after updating Windows 10

Step 8. Change a printer's status to "online"

- ✓ **Projector :**

How to Connect a Projector to a PC

What comes in the projector bag? The projector bag contains the projector, a power cable and a VGA cable. You are going to need a laptop or any other device that will put a signal out through a VGA port.

Step 1. Turning on the projector

1. Remove the projector and the power cable from the bag. Find the "AC In" port on the projector and put the correct end of the power cable in to it.

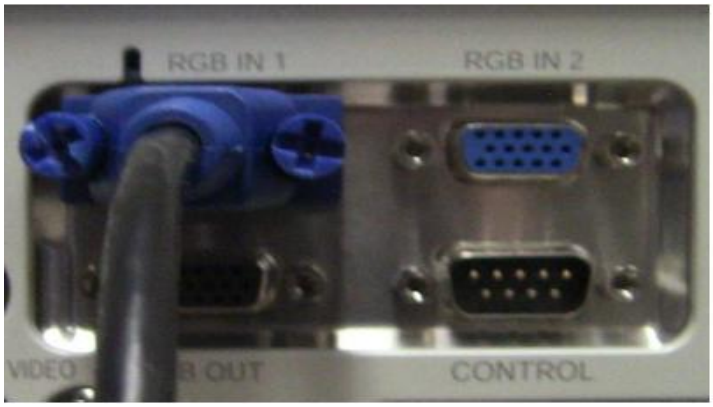
2. Plug the other end of the power cable into the wall outlet or power strip you will be using.

3. Make sure the power switch on the projector is in the correct position. The "Power" LED light will come on once you have completed these steps.

Step 2. Connecting the Laptop to the Projector

1. Find the VGA cable located in the projector bag.

2. Locate the “RGB In” or VGA In” port on the projector and connect one end of the VGA cable to that.

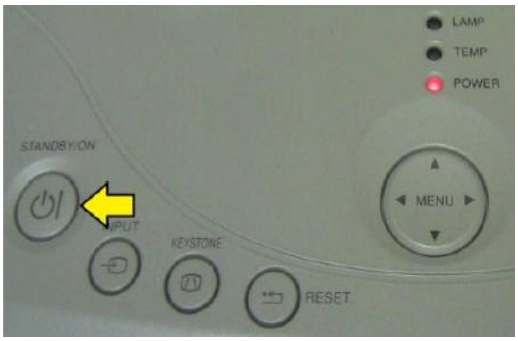


3. Connect the other end of the VGA cable to the “VGA Out” port on your laptop or other applicable device.

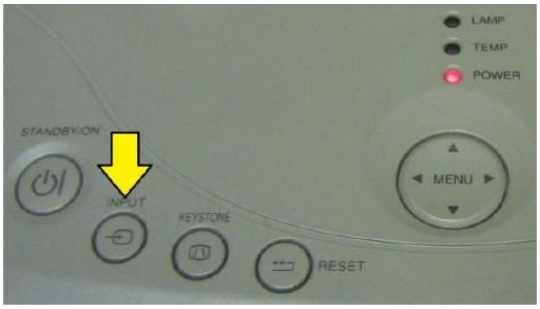
Step 3. Find the Laptop Signal Using the Projector.

1. Turn on your laptop and get logged in.

2. Turn on the projector using the “Standby/On” button on the top of the projector. At this time the projectors main screen will start to be projected.



3. To force the projector to search for your laptops signal press the “Input” button on top of the projector. You should see “Searching…”on the projection screen. Within a few seconds the projector will find the signal and project your desktop to the projection screen.



4. If the projector does not find your laptops signal you may have to configure the display settings on the laptop. For Windows 7 you will want to press the windows key and the P key together. This will bring up a small menu on the screen. Choose “Duplicate” to project your desktop through the projector.

Disconnecting the Projector

Step 1. Turning Off the Projector

1. Once you are finished with the presentation you were using the projector for press the “Standby/On” button. A message will appear on the projection asking if you are sure you want to turn off the projector. If you are sure you want to turn off the projector press the “Standby/On” button again.

2. The projector has now turned off the lamp but the fan will still be running. ***Note: It is important to not disconnect the projector from its power supply until the fan has stopped running. Not doing so may cause serious damage to the projector.***

3. While the projector is cooling down it is safe to remove the VGA cable that is also connected to your laptop and place it back into the projector bag.

Step 2. Putting the Projector Away

1. Once the projectors internal fan has stopped running it is safe to disconnect it from the power supply.

2. Disconnect the power cable from the “AC In” port on the projector.

3. Place the power cable and the projector back into the projector bag.

4. ***Before returning the projector to Media Services please ensure that all parts that came in the bag when you checked it out are returning with the bag when you drop it off.***

Connect to a projector or PC

When you're in a conference room and need to project, connect your PC using one of the cable connectors in the room, press the **Windows logo key + P**, and then choose one of the four options:

- **PC screen only**. You'll see everything on your PC. (When you're connected to a wireless projector, this option changes to Disconnect.)
- **Duplicate**. You'll see the same things on both screens.
- **Extend**. You'll see everything across both screens, and you can drag and move items between the two.
- **Second screen only**. You'll see everything on the connected screen. The other screen will be blank.

Then again, you might not even need a cable. If your PC and the projector both support Miracast, press the **Windows logo key + P**, select **Connect to a wireless display**, choose a projector, and you're set. Not sure if your PC has Miracast and can be projected to? Windows will let you know. To check, select the **Start** button, type **Connect**, and then select **Connect** from the list of results.

✓ **Speaker:**

To help you resolve the concern of disconnect and connect sounds playing over and over again, please follow steps below:

1. Search for **Display Settings** and then click it.

2. Click **Power & sleep.**

3. Click **Additional power settings.**

4. Click **Change plan settings.**

5. Click **Change advanced power settings.**

6. Click the plus sign (+) beside **USB settings.**

7. Click the plus sign (+) beside **USB selective suspend setting**

8. Set it to **Disabled.**

9. Click **Apply**, then click **OK**.

If the issue is still there you may try the next troubleshooting steps:

1. Right click the sound icon on the bottom right of the desktop screen (near the date and time).

2. Choose **sounds**, when the sound box opens scroll down to you see **device disconnect**, click and highlight it.

3. Now the bottom left you will see a box with the sound name **Windows Hardware Remove**, click the arrow on this box. Scroll to the top where you see **NONE** at the top of the list. Click on **apply**, and notice the speaker icon symbol is now missing for the **device disconnect** meaning no sound is chosen.

4. Close the sounds box.

✓ **Microphone :** When you're ready to listen to that important business presentation or audio file, you can connect a headset to your computer to listen to the files rather than using external speakers. Both desktop and laptop computers include the jacks, or small, round outlets, necessary to connect your headset. If your headset features two cylindrical plugs, one plug is for the headphones and the second plug is for the microphone. Your computer also includes USB ports as a possible alternative for connecting your headset. If the cable attached to your headset includes a USB plug, then it is a USB-enabled device and will fit in the USB port.

Standard Headset With Mic

Step 1

Locate the headphone and microphone connectors on your computer. These round sockets may be located at the top, front or back of your desktop, or the side or front of your laptop. The panel surrounding the sockets shows tiny symbols for the headphone and microphone.

Step 2

Examine the headset's metal plugs for thin color bands: the headset plug displays green markings; the microphone plug displays pink markings. The black rubber or plastic part next to the metal plugs displays tiny symbols for the headset and microphone.

Step 3

Insert the green headphone plug into your computer's headphone jack. Insert the pink mic plug into the microphone jack.

USB Cable

Step 1

Locate the USB port on the front, side or back of your computer. This connector features a rectangular slot approximately ½-inch long. A front or side port may offer easier access for connecting and disconnecting the headset.

Step 2

Insert the headset's USB cable into the USB port. If the cable does not fit one way, rotate the cable plug 180 degrees and try to insert it again. Do not force the plug into the slot. If the slot is horizontal, the plug's USB symbol displaying three wires should face up.

Step 3

Wait for your computer to install the headset drivers, if necessary. The confirmation notice will display on the screen.

Microphone: HP PCs - Resolve Microphone and Audio Line-in Problems (Windows)

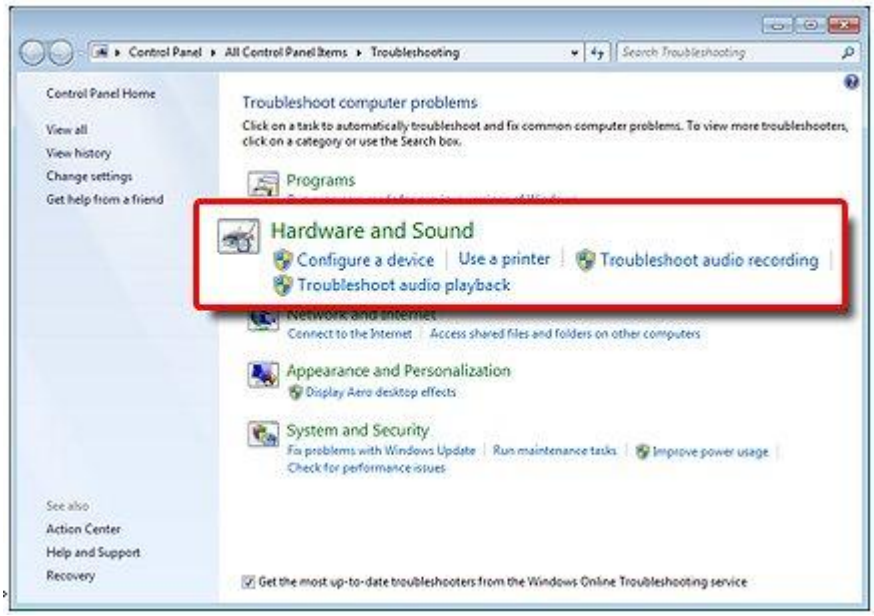
Step 1: Run the audio recording troubleshooter

Automatically identify and fix audio problems with the Windows troubleshooting tool.

NOTE:

As an option for device testing, search Windows for and open **Sound recorder**. Click **Start Recording** to create an audio file you can play back to verify functionality.

1. In Windows, search for and open **Troubleshooting**.
2. Under **Hardware and Sound**, click **Troubleshoot audio recording**.



3. Select the device you want to troubleshoot, and then click **Next** to start the troubleshooter.

4. If a recommended action displays, select **Apply this fix**, and then test the device.

Step 2: Check microphone or line-in device status

Check the device status and settings, and then test for an audio signal in Windows sound settings.

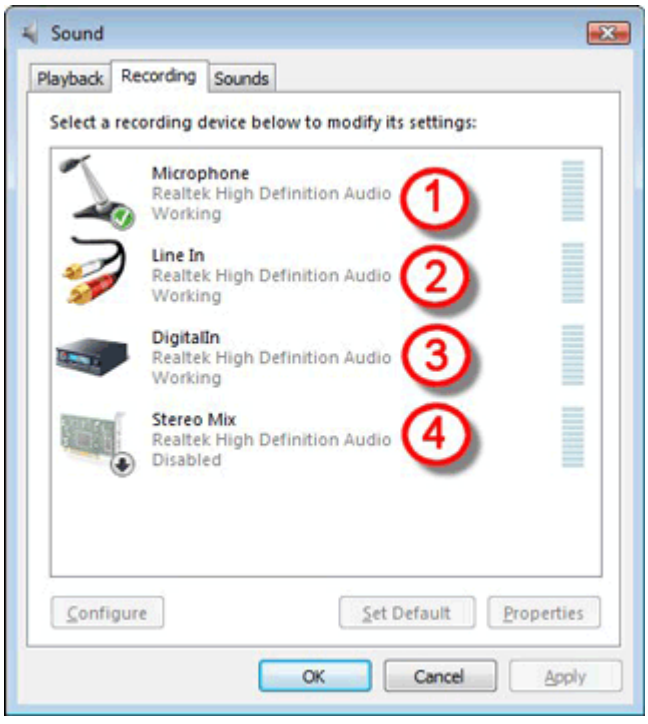
1. In Windows, search for and open **Control Panel**.

2. Click **Hardware and Sound**, and then click **Manage audio devices**.

3. Click the **Recording** tab and note the status of each device.

NOTE:

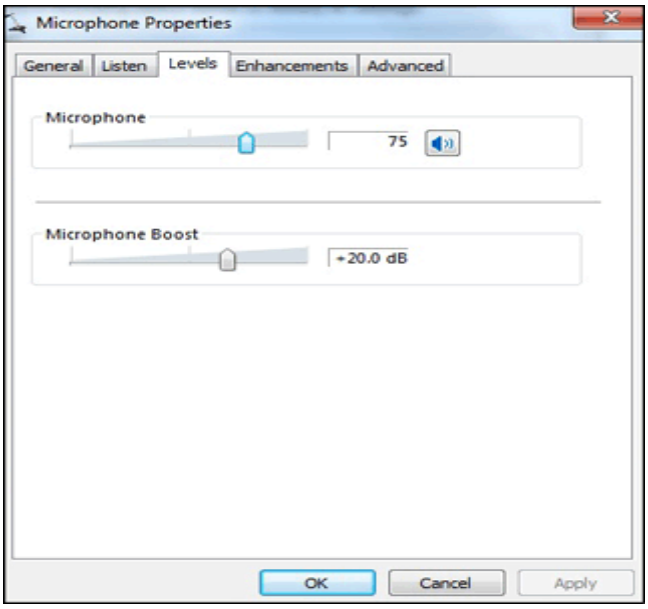
Available devices differ depending on the computer model and what is currently connected.



1. Microphone port is working and set as Default
2. Line In device is working
3. Digital In (S/PDIF port) is working
4. Stereo Mix (Software mixer) is disabled

- **If multiple microphones or line-in devices are available**, select the device you want to use, and then click **Set Default**.
- **If the device contains a small circle with an arrow pointing down**, the device is disabled. Right-click the device, and then select **Enable**.

Click the device name, click **Properties**, and then click the **Levels** tab.



Adjust the level slider to 75.

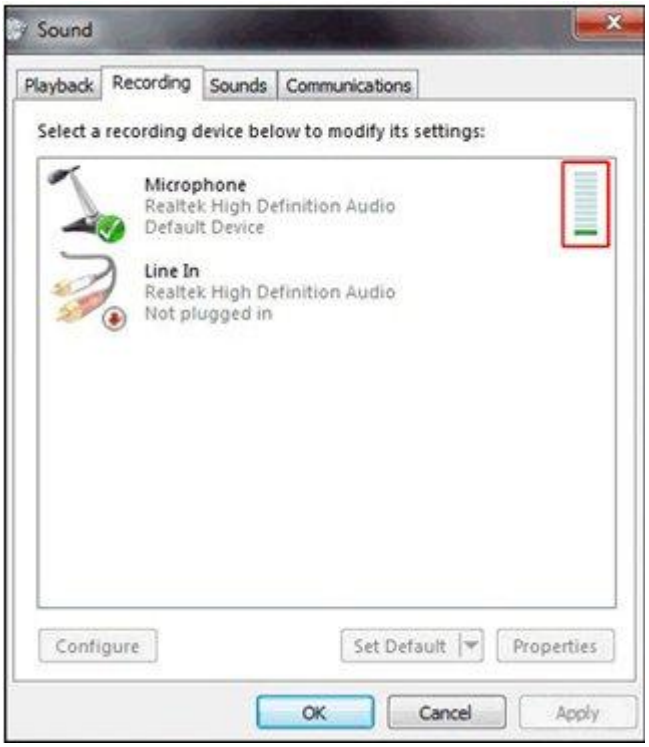
Look for any muted icons , and then click the icon to unmute the device.

If **Microphone Boost** is available, adjust to +20.0 dB, and then click **OK**.

Speak into the microphone or start the line-in audio device, and then view the gray bars next to the device name on the **Recording** tab.

CAUTION:

To avoid hardware damage when testing a line-in device, start at a low volume and slowly increase it to the desired level. Never turn up volume more than half way to maximum.



- **If the bars change to green**, the device is detected but you might need to adjust the playback sound settings. Click the **Playback** tab, select the device used to hear audio, click **Properties**, adjust volume and mute settings on the **Levels** tab, and then test the microphone or line-in device.
- **If the bars remain gray**, test the device on another computer or audio device. If this test fails, the device could be damaged or faulty.
- **If the device works with another computer or audio device**, continue to the next step.

Step 3: Check the device connection

Confirm the correct port is used for the connector type on the microphone or line-in device.

1. Identify the connector type on your microphone or line-in device. Most devices have either a USB connector or a pin connector. There are two types of pin connectors.

2. Four-pin connector: Voice and audio devices such as a headset
3. Three-pin connector: Audio-only devices such as headphones
4. Identify the compatible computer port for the device. Look for the following icons or color-coded ports.

- **Headset port**: Many newer computers have one port that supports both three and four-pin connector headsets and headphones.
- **Headphone port**: Supports headphones only.
- **Microphone port**: Supports microphones only.
- **Desktop computer ports**: Locate the color coded ports that help identify how to connect the device. Ports and color coding vary by computer model.

Pink (mic) is for microphones.

Blue (in) is for audio input devices such as DVD players, tape players, and musical instruments.

Green (out) is for headphones.

Gray, Black and Orange (side, rear, c/sub) are for speakers.

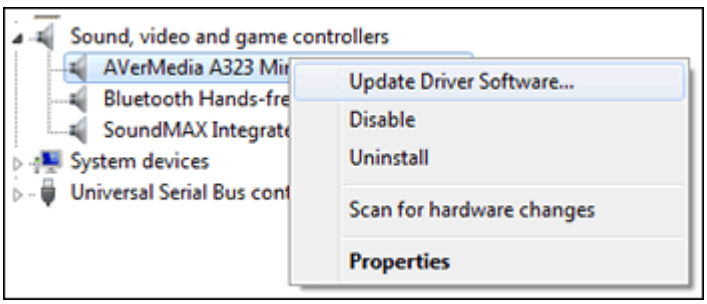
Disconnect and reconnect the device to resolve any connection or device detection issues. If you are using a USB device, try a different USB port on the computer and make sure the device driver is installed.

Test the device.

Step 4: Check for an updated audio driver

An outdated audio driver can cause sound errors. Check for and install a new driver in Device Manager.

1. In Windows, search for and open **Device Manager**.
2. Double-click **Sound, video and game controllers**.
3. Right-click the audio device, and then select **Update Driver Software**.



4. Click **Search automatically for updated driver software**.

- **If an update is available**, install it, and then test the device.
- **If an update is not available**, continue to the next step.

Step 5: Check sound settings in the app or hardware driver where the issue occurs

If the device works in Windows, check audio and voice settings in the app or device driver you are using (such as online meeting apps, games, and webcams). If the microphone or device is configured correctly, check the developer or manufacturer website for app or driver updates.
If the issue persists, contact HP Customer Support, or service the computer.

Microphone is not working on Windows PC

Whether you are using the microphone built in to your Windows PC, or you've got one plugged in to the analog microphone input you will need to make sure that it's set up correctly.

Test the microphone on your PC

1. ***Unplug audio accessories.***

   Unplug anything unneeded from the audio jacks, and any USB headphones or cameras. Some of these devices may also have microphones that are overriding the microphone you are trying to use.

2. ***Check the input Settings.***

   Right click the sound icon and then click **Open Sound settings**. Make sure the microphone is selected in the **Input** section.

3. ***Test the microphone.***

   Stay on the sound settings page and speak or make some noise. If the microphone is working correctly, you will see the bar in the **Test your microphone** section move.

✓ **Bar code scanner**: Barcode scanners can help you manage your inventory and assets, and come in three types: serial scanners connect into a computer's serial port via a serial cable; USB scanners plug into a USB port; and PS/2 scanners plug into a computer's PS/2 port, the port normally used for

keyboards, using a PS/2 cable adapter that enables you to plug both the scanner and your keyboard into the port. The barcode scanner is shipped with drivers and other software, so that you can fully utilize the device.

Install USB Barcode Scanner

Step 1

Plug one end of the included USB cable into the barcode scanner, and then plug the other end into a free USB port on the computer.

Step 2

Insert the installation CD or DVD that shipped with the device into your computer's CD/DVD drive.

Step 3

Click the “Install” option and follow the prompts to install the barcode scanner, including drivers and a barcode application.

Step 4

Mount the barcode scanner and secure it in place with brackets or screws, if required. Skip this step if you have a hand-held scanner.

Step 5

Open the barcode scanning application that shipped with your scanner.

Step 6

Scan a barcode label to test your device. When the barcode is scanned, the numbers under the barcode on the label should appear in the application window.

- **Content/Topic 2 Verification of connected or disconnected devices**

Input, Output, and Hybrid Devices

I/O devices (also called peripherals) can be used solely to input information, to output information, or to act as a hybrid of the two. Let’s start with the types of devices used to input information and the various peripherals a technician might see in the field.

The usual suspects include the keyboard, for typing information in Windows or other OS, and the mouse, for manipulating the GUI. These two are known as human interface devices (HID). Some other devices that you might not have worked with yet include touchpads, digital cameras, web cameras, microphones, biometric devices, bar code readers, and MIDI devices. Table 13.5 describes these devices.

TABLE 13.5 Description of Various Input Devices and Peripherals

Device	Description	Types and Connections
Keyboard	Used to type text and numbers into a word processor or other application.	101-key keyboard is standard, USB, PS/2, and wireless connections.
Mouse	Used to control the GUI; works in two dimensions. Might have two or more buttons and a scroll wheel to manipulate the OS. The Buttons tab in Mouse Properties is used to change which buttons act as the primary and alternative click buttons.	Optical mouse, USB, PS/2, and wireless connections.
Touchpad	Device used on a laptop to control the cursor on the screen.	These are often integrated to the laptop but can also be connected externally via USB or Wi-Fi.
Motion sensor	Device used with PCs, Macs, and gaming consoles to allow a user to control the computer by swiping, grabbing, pinching, and so on in mid-air.	Often connected via USB or Wi-Fi, these are controlled with infrared technology. Some devices can also be controlled with voice activation.
Digital cameras/Camcorders	Takes still photographs and/or video using an electronic image sensor. Images are displayed on-screen and can be saved to solid-state media such as	Can be a single device or integrated into smartphones/tablets. Can connect to the PC via USB

Device	Description	Types and Connections
	SD cards and CompactFlash.	or Wi-Fi.
Web cameras (webcam)	Enables a user to monitor other areas of a home or building, communicate via video telephony, and take still images.	Can connect to a PC via USB, to a LAN via RJ45, or via Wi-Fi.
Scanner	Used to optically scan images and other objects and convert them into digital images to be stored on the computer.	Can connect via USB, and IEEE 1394, or via Wi-Fi.
Microphones	Enables users to record their voices or other sounds to the computer. Common usages are webcasts, podcasts, for voice-overs while screen capturing, and for gaming.	Can connect to a PC via 1/8-inch (3.5 mm) mini-jack (sound card) or via USB.
Biometric devices	Provides access to systems based on a particular physical characteristic of a user. Used for authentication purposes (for example, a fingerprint reader).	Can be integrated to the PC or can be connected via USB, Wi-Fi, or connected to the network.
Barcode readers	Reads barcodes (for example, linear barcodes, 2D barcodes, Post Office barcodes, and such). After physical installation, they need to be programmed to understand these codes.	Connects to the PC via USB, Wi-Fi, PS/2, or might be integrated into handheld computers and smartphones.
Smart card reader	Device that accepts smart cards used for authentication and data storage.	Can be integrated as a slot (for, example to a laptop).

Device	Description	Types and Connections
		Also available in USB versions.
Musical Instrument Digital Interface (MIDI) devices	Enables computers, music keyboards, synthesizers, digital recorders, samplers, and so on to control each other and exchange data.	Uses a 5-pin DIN Connector.
Gamepads and joysticks	Gamepads are game controllers made famous by Nintendo, PlayStation, and Xbox; there are also gamepads for PCs. Joysticks are often used for flight simulator games.	Connects via USB Type A connections. Older versions used the 15-pin gaming port on a sound card.

Troubleshooting any of the devices in Table 13.5 is usually quite easy. Make sure that the device is connected properly to the computer (or has a working wireless connection) and verify within the Device Manager that the latest drivers are installed for the device. Then find out if any additional software is necessary for the device to function. Portions of the software might have to be installed to the device and to the OS.

Keyboards and mice can be especially troublesome. Keyboard errors are commonly caused by jammed keys and defective cables or cable connectors. A common mouse issue is when the cursor jumps around the screen. This could be due to an incorrect mouse driver or perhaps the mouse is on an uneven or nonreflective surface. Also, you might encounter a mouse that stops working after a computer comes out of sleep mode. Make sure that Windows is updated and that the correct and latest driver is being used for the mouse. Use the associated Control Panel apps to troubleshoot the device. Calibrate the device and/or synchronize the device to the system as necessary.
The main output devices you should know for the exams are display devices and speakers (covered in Chapter 12) and printers (to be discussed in Chapter 14). Because they are covered in those chapters, we will not discuss them here.

A few of the hybrid devices you will encounter are touchscreens, KVMs, smart TVs, and set-top boxes. Table 13.6 describes those in brief.

TABLE 13.6 Description of Hybrid I/O Devices

Device	Description	Types and Connections
Touchscreen	A video display that detects the presence of either a finger, stylus, or light pen that enables interaction with the OS. It incorporates a digitizer (the input portion of the device) that converts the tapping on the screen into digital functions.	Used in tablet PCs, AIO PCs, smartphones, and drawing tablets.
KVM switch	Enables a user to control two or more computers from one Keyboard, Video display, and Mouse (KVM).	Passive: works off computer's USB power Active: plugs into an AC outlet.
Smart TV	Combines the functionality of a television with Internet features and streaming of media.	Users can interact with the TV by inputting information via keyboard, gamepad, or remote control.
Set-top box (STB)	Device used by cable TV and satellite-based TV providers to allow access to digital (and possibly encrypted) television stations. Also used as a hybrid device that combines conventional TV with Internet technologies.	These often manifest themselves as small computers offering two-way communications over TCP/IP networks.

Learning Unit 4 –Document the work done

- **Content/Topic 1: Documenting the review process**

A. Review of user manual and previous report

A great user manual educates people about a product, while also teaching them how to use product features effectively. As an author, your ultimate goal is comprehension—you want readers to easily be able to read, reference, and absorb information.

General guidelines for user manuals

- ✓ Provide a real (physical) user manual with the product.
- ✓ Make sure the instructions actually map on to the product in all respects.
- ✓ Include a one-page quick start guide.
- ✓ Present instructions as step-by-step procedures.
- ✓ Tell the user what functions there are, and what they are for — not just how to use them... but avoid marketing waffle (they already bought the product!)
- ✓ Ensure that the writers are part of the product design team.
- ✓ Write the user manual in synch with the product's development timeline — not under pressure of shipping deadlines.
- ✓ Make sure the writers have the product, understand the product, and actually use the product as they write.
- ✓ Consider the needs of disabled users (i.e., low vision, colour-blind) and provide alternative manuals in Braille, large print, audio etc.
- ✓ User-test the product and the user manual with real users (including disabled users).

B. Suggestion of solutions on problems found

Here are seven-steps for an effective problem-solving process.

1. Identify the issues.

- Be clear about what the problem is.
- Remember that different people might have different views of what the issues are.
- *Separate the listing of issues from the identification of interests (that's the next step!).*

2. Understand everyone's interests.

- This is a critical step that is usually missing.
- Interests are the needs that you want satisfied by any given solution. We often ignore our true interests as we become attached to one particular solution.
- The best solution is the one that satisfies everyone's interests.

- This is the time for active listening. Put down your differences for a while and listen to each other with the intention to understand.
- *Separate the naming of interests from the listing of solutions.*

3. List the possible solutions (options)

- This is the time to do some brainstorming. There may be lots of room for creativity.
- *Separate the listing of options from the evaluation of the options.*

4. Evaluate the options.

- What are the pluses and minuses? Honestly!
- *Separate the evaluation of options from the selection of options.*

5. Select an option or options.

- What's the best option, in the balance?
- Is there a way to "bundle" a number of options together for a more satisfactory solution?

6. Document the agreement(s).

- Don't rely on memory.
- Writing it down will help you think through all the details and implications.

7. Agree on contingencies, monitoring, and evaluation.

- Conditions may change. Make contingency agreements about foreseeable future circumstances (If-then!).
- How will you monitor compliance and follow-through?
- Create opportunities to evaluate the agreements and their implementation. ("Let's try it this way for three months and then look at it.")

Effective problem solving does take some time and attention more of the latter than the former. But less time and attention than is required by a problem not well solved. What it really takes is a willingness to slow down. A problem is like a curve in the road. Take it right and you'll find yourself in good shape for the straightaway that follows. Take it too fast and you may not be in as good shape.

C. Description of solution implementation

1. Definition

Implementation is the culmination of all your work in solving a problem and requires careful attention to detail. There are three basic stages involved:

- ✓ planning and preparing to implement the solution
- ✓ implementing and monitoring the action
- ✓ reviewing and analyzing the success of the action.

2. Planning and preparation

Planning and preparation **is** *the key to successful implementation.* The more important the problem, or the more complex the actions required to solve it, the more thorough your planning and preparation needs to be to ensure success.

These questions highlight the main features of planning and preparation, which involve:

- ✓ constructing a plan of action
- ✓ the actions required
- ✓ scheduling the actions
- ✓ the resources required
- ✓ measures to counter adverse consequences
- ✓ management of the action
- ✓ reviewing the plan

✓ selecting, briefing and training those involved.

- **Constructing a plan of action**

Basically**,** *the plan of action describes what actions are required and how they will be implemented to ensure success***.** Unless the problem is simple or routine, you need to construct a detailed plan of action.

This involves systematically identifying and recording the following elements:

✓ ***The actions required***

These must be identified fully and precisely, otherwise the results expected will not be achieved. The expected effects of these actions must also be identified, so that you will know when they have been carried out successfully. This part of the plan can be constructed as follows:

- state your objective
- list the individual goals in the order in which they must be achieved to reach that objective
- identify what actions are required to achieve each goal, determine the sequence in which they need to be carried out, and record them
- define, in measurable terms, what a successful outcome will be for each action and add the details to the plan.

✓ **Scheduling the *actions***

To create *a time schedule* for the actions, first you identify the time required to complete each action. By representing this information on the diagram you can calculate at what stage, relative to the starting time, each action will commence and finish, and determine the total time required to achieve the objective. Simple plans can be represented by a chart which uses bars to show the sequence and duration of the actions.

More complex plans require a more flexible structure, like a chain diagram or flow chart. Diagrams help you to arrange the actions in a way which makes the best use of time and other resources. In drawing up a schedule. it's important not to be over-optimistic in the time you allow for each action. Additional time is required to accommodate delays and unforeseen obstacles, particularly with actions which must be completed on time or which are susceptible to delays.

- ✓ **The resources required**

For each action the resources required have to be precisely defined along a number of parameters, including the type, amount and when they are required. Each resource is considered individually:

Time is sometimes overlooked but it can be a key resource in some situations. These can be defined by answering some simple questions.

- What time is available before the deadline for achieving each action/goal/the overall objective?
- Are these timings compatible?
- Whose time is required?
- Will this time be spent within normal working hours?

Manpower may come from within and outside the organization and can be defined by answering these questions

- How many people will be required?
- What skills, qualities and knowledge will they need to carry out the actions required of them?
- When and where will they be required?
- Will they be available when and where required?
- Will they be available for the length of time required?
- What briefing and training will they need to be able to carry out their tasks effectively?

Money can be defined by answering the questions

- How much will be needed?
- In what form? (eg cash, cheque, foreign currency)
- How will it be acquired? (eg loan, grant, endowment)
- What will be the source? (eg profits, merchant bank, local or central government)
- How will it be used and is this compatible with the source? (eg if it's a development grant does the plan use it appropriately?)
- When and where will it be required?
- Will it be available when and where required?
- Does it need to be repaid, and when?
- Will it be recouped, how, and when? (eg through increased profits)
- Will there be additional cost in using this money? (eg interest or handling charges)

- Have the costs of all other resources been included?

Materials may fall into a number of categories, including consumables, raw materials, and equipment (for temporary or permanent use). The material requirements can be defined by answering the questions

- What type of materials will be required?
- If capital equipment is required, how will it be financed? (eg lease, loan)
- What are the specifications of the materials required? (eg quality, size)
- What wastage is likely to occur?
- In what quantities are they required?
- When and where will they be required?
- Will they be available when and where required?
- Will transport be required?
- What handling (human and mechanical) will be required?
- Will storage space be required, where, how much, for how long, and will it be available?

Space can be defined by answering these questions

- What space will be required?
- How much space will be required?
- Where will the space be required?
- Does it have to be of a particular type (eg covered, with amenities) or with particular dimensions?
- How long will the space be required?

Information may form a part of the manpower resource (eg expert advice or skills) but it can also be a resource in its own right (eg renting a mailing list for a direct mail campaign). To define this resource, you need to answer these questions

- What specific information will be required?
- Is this information available from within the organization or does it have to be bought-in?
- Where specifically is it available?
- When and where will it be required?
- Will it be available when and where required?
- How long will it be required?

When you are calculating the resources required to implement a solution it's vital not to under-estimate. A shortage could disrupt implementation completely and possibly incur heavy penalties, eg having to pay a consultant for doing nothing while he's waiting for the installation of a piece of equipment. Sometimes you may have to adapt your plan of action to suit the availability of resources.

Once you have made a complete list of the resource requirements, draw up a schedule of resources, showing how and when they will be requested, from whom, and when and where they are to be delivered.

✓ ***Measures to counter adverse consequences***

These have to be included in the plan. Although you have considered the areas of risk and possible side-effects when constructing and evaluating your solution, and adapted it to try to minimize the adverse consequences, you need to identify everything that could go wrong during implementation and devise countermeasures. This includes even minor problems such as a key person being sick.

The steps involved are similar to those used to evaluate and minimize the risks associated with the solution, only more detailed.

There are certain features of a plan of action which can make it more susceptible to something going wrong. To identify these and make provision in your plan to deal with them, you should examine your plan step-by-step and follow these stages:

- ***identify everything that could go wrong****;* look for areas where, for example,

- timing is crucial (eg with delays, could a deadline be missed?)
- a slippage in timing could bring subsequent actions into conflict (eg so that they simultaneously require the same resource)
- two or more activities coincide (eg will they interfere with each other?)
- there is no way of predicting what may happen (eg because of lack of knowledge or experience)
- there is heavy reliance on facilities or equipment (eg could they fail?)
- there is heavy reliance on the cooperation and efforts of people (eg will they perform as required?)
- all available resources in a particular category are being used (eg could an unexpected event require their more urgent use elsewhere?)
- external factors could affect the actions required (eg withdrawal of labour in a national dispute) or the effectiveness of the results (eg a change in market needs)

- ***analyze and evaluate the consequences****,* eg .

- what are the effects if this happens?
- how serious are they?
- what is their relative seriousness?
- what is the probability of them happening (low, medium or high)?

- *define how you could recognize trouble* as early as possible, eg through the detection of unexpected changes in predicted events

- *devise countermeasures* where possible, either to prevent the cause of trouble or minimize its effects
- *incorporate* the method of recognition and the appropriate countermeasure into your plan.

Adverse consequences which have the highest probability of occurring combined with the greatest seriousness should be tackled first and every effort made to ensure that provision is made in your plan to counter them effectively. Even if time is short and it requires extensive work, you can only afford to omit minor adverse consequences with a low probability of occurrence. Although problems may not arise during Implementation, if they do your plan must contain appropriate countermeasures which can be taken without jeopardizing the rest of the plan.

✓ ***Management of the action***

Unless the solution is very simple or routine you must specify how the implementation will be monitored and controlled. This enables the manpower to be appropriately led and managed, their progress to be measured at specific intervals, and appropriate action to be taken to correct any variance from the plan. The following steps help to identify how to manage the implementation:

- identify actions which require on-the-job supervision and monitoring (eg where individuals have no previous experience of the actions required of them)
- identify the stages at which progress should be measured (eg upon completion of individual goals or major activities; at critical phases)
- specify exactly what results are expected to have been achieved at these stages
- specify how and by whom the actual results will be measured
- ensure that appropriate measures to correct any variance between the expected and the actual results are specified in the plan.

The stages you identify for measuring progress are, in effect, ***deadlines for achieving specific results***. These must be stated as a specific time or date in the overall time schedule. Unspecific or woolly deadlines make implementation difficult to manage and can lead to disaster. The frequency of measuring progress is dependent upon a number of factors:

- what is practical (eg economical and not interfering significantly with progress)
- the rate at which the situation is likely to change (eg major building works compared with delicate negotiations over a couple of days)
- the seriousness of potential variances from the plan
- Provision should also be made to monitor the solution once it has been implemented, so that any unforeseen adverse consequences arising in the long term can be detected. For example, has a change in the system created a bottleneck in processing work, or resulted in undue pressure on one individual or department?

✓ ***Reviewing the plan***

Finally, you need to check the plan to ensure that

- the actions listed will achieve the various goals and the overall objective
- your time schedule is workable and can accommodate unexpected delays
- your estimation of resources is accurate
- the plan for managing the action will enable it to be kept on course.
- Drawing up a plan of action is the most crucial stage in ensuring efficient implementation and it must be accurate and thorough. This plan provides a blueprint for the remaining stages of implementation.

✓ **Selecting, briefing and training those involved**

Your plan of action provides most of the information you require at this stage.

This situation is very similar to having to get your solution implemented successfully. You need to go through the following stages:

- select indjviduals with the appropriate skills, qualities and knowledge required to carry out the various actions effectively
- brief these people. so that they know and understand what they are required to do
- give training, if necessary, to individuals who do not meet the exact requirements for carrying out their assigned tasks effectively.

Selection involves comparing the skills, qualities and knowledge required for specific tasks with those available amongst individual members of the workforce. By identifying the ideal attributes for carrying out each action effectively - both what is required and what is to be avoided - you can construct a model of the ideal candidate. Selection then consists of finding the best match to this ideal amongst members of the workforce.

Once you have selected appropriate individuals you need to draw up a list of what actions each is required to carry out, the results they will be expected to achieve, and what responsibilities they have for achieving these results.

Frequently there will be at least some aspects of your plan for which the individuals available are not ideally suited. If the discrepancy is large it may be necessary to buy in manpower with the appropriate attributes. However, frequently the shortfall can be overcome by careful briefing or specific training.

Briefing is often the final step before a plan is implemented. As in any other type of communication, it must be planned and executed carefully to ensure that it's effective. The following steps will help you to brief people effectively:

- give individuals reasonable advance warning of what will be required of them

- prepare your briefing carefully so that it is clear, comprehensive and can be understood easily by everyone
- after the briefing, check that everyone has understood what they are required to do by asking them to repeat your instructions.

Your instructions should ***state clearly the responsibilities of each individual and the scope of their authority in carrying out their task***. It's important to give a level of authority which enables individuals to use their initiative and not be bound rigidly to the plan. For example, if they foresee a problem arising they need the freedom to act immediately if necessary.

The way you communicate your message is very important. Some individuals may have a different view of the situation and different attitudes to your own, particularly if they have not been involved in finding and evaluating solutions.

Training can be expensive and time-consuming. If people with the appropriate skills are not readily available you need to compare the advantages and disadvantages of training them or buying-in the necessary skills, eg training may provide individuals with skills which are of value in other aspects of their work; hiring a consultant may create a valuable business contact.

Once people have been briefed on what they are required to do and other appropriate resources have been arranged, the plan of action can be implemented.

✓ **Implementing and monitoring the action**

Once action has been initiated, it has to be supervised and monitored to ensure that the plan is followed accurately, implementing corrective action when necessary. The details of this stage are specified in the plan of action.

Supervising the action ensures that individuals carry out their tasks efficiently according to the plan.

Monitoring progress enables you to identify whether or not the results being achieved are meeting the planned requirements, and if not, why not. A decision can then be made on the action required to put the plan back on course. Reviewing the overall achievement once the plan has progressed significantly will indicate how well it is achieving the objective. If there are major discrepancies it suggests that the plan is inadequate and needs to be revised.

Taking corrective action may involve implementing the appropriate countermeasure laid down in the plan, or taking unplanned action to counter unforeseen problems. For example, if time. has been lost in completing one activity, other activities may have to be completed more quickly than planned in order to meet a deadline. Minor problems which are unlikely to recur may not require any action. Major faults in the plan may make it necessary to abandon implementation if no appropriate corrective action is possible.

These three processes must be maintained until the plan is completed.

✓ **Reviewing and analyzing the outcome**

When the plan has been completed and the solution implemented it is important to measure and analyze its success. This tells you whether the solution has been effective in solving the problem and how useful it will be in solving similar problems in the future. There are three stages

- measure the success of the solution by comparing the outcome of the action with the expected results
- analyze any discrepancy to identify the reasons for it
- take further action if necessary.

✓ **Remember**

- The more important them. problem, or the more complex the actions required to solve it, the more planning and preparation you need to do.
- Action must be monitored to ensure that it is being carried out effectively and having the desired effects; if not, corrective action must be taken.
- Once the action is completed, the outcome must be measured to check that it has provided an effective solution; if not, further action may be required.

D. Description of procedures of the task accomplished

3. What is a procedure?

The idea of what a procedure is, changes depending on who you ask. To many, a procedure is a set of detailed instructions that tell the reader how to complete a task.

4. How to write an effective procedure?

Now we're getting into the meat of the topic – learning how to write a procedure. Any of you who've read our other posts on documenting processes and recording standard operating procedures will know much of this already, but to summarize you need to:

1. Meet with the teams responsible for the procedure
2. Start with a short introduction
3. Make a list of required resources
4. Document the current procedure
5. Add supporting media
6. Include any relevant resources
7. Check the procedure is accurate
8. Test in a controlled environment
9. Make improvements if necessary
10. Deploy

E. Tools equipment and materials used

Explain clearly a proper selection of tools and equipment you have used in your installation, and how they work.

F. Technical journal and Recommendation report

- **Technical journal** is a multidisciplinary **journal** in the field of engineering science and technology that offers platform for researchers, engineers and scientists to publish their original and to date research of high scientific value.

The **journal** is being published electronically as well as in print form.

Technical Journal introduces its readers to all the latest technologies, products, and solutions to any problems to be occurred.

- **Recommendation report**

recommendation report proposes a solution to a problem or evaluates possible solutions and recommends one. Before proposing or recommending a solution, the **report** needs to identify the problem. Think about the various problems you encounter every day or read about in the paper.

3. Report: A report is a document that presents information in an organized format for a specific audience and purpose. Although summaries of reports may be delivered orally, complete reports are almost always in the form of written documents.

Learning Outcome 4.2: Report on the work done

- **Content/Topic 1: Reporting the procedures of the task accomplished are in place and used**

A. Review of user manual and previous report

The User Manual contains all essential information for the user to make full use of the information system. This manual includes a description of the system functions and capabilities, contingencies and alternate modes of operation, and step-by-step procedures for system access and use. Use graphics where possible. The manual format may be altered if another format is more suitable for the particular project.

B. Suggestion of solutions on problems found

The User Manual contains all essential information for the user to make full use of the information system. This manual includes a description of the system functions and capabilities, contingencies and alternate modes of operation, and step-by-step procedures for system access and use. Use graphics where possible. The manual format may be altered if another format is more suitable for the particular project.

1. Cable Problem: Cables that connect different parts of a network can be cut or shorted. A short can happen when the wire conductor comes in contact with another conductive surface, changing the path of the signal. Cable testers can be used to test for many types of cable problems such as: Cut cable, incorrect cable connections, Cable shorts, Interference level, Connector Problem

2. Connectivity Problem: A connectivity problem with one or more devices in a network can occur after a change is made in configuration or by a malfunction of a connectivity component, such as hub, a router or a Switch.

3. Excessive Network Collisions: These often lead to slow connectivity. The problem can occur as a result of bad network setup/plan, a user transferring a lot of information or jabbering network card.

NB: A jabbering Network card is a network card that is stuck in a transmit mode. This will be evident because the transmit light will remain on constantly, indicating that the Network card is always transmitting.

4. Software Problem: Network problems can often be traced to software configuration such as DNS configuration, WINS configuration, the registry etc.

5. Duplicate IP Addressing: A common problem in many networking environments occurs when two machines try to use the same IP address. This can result in intermittent communications.

C. Description of problem and solution implementation

In today's world, every organization relies upon a good and hassle free **Computer Network** to maintain a good flow of data or information exchange. A Computer Network is the cornerstone of every organization used to share or exchange information which can be a image, text, video, sound clip or any other type of media or file. But it's very embarrassing when we face some technical problems in our network which hampers our work. Here I am sharing some common network issues and some steps to come up with those issues.

Common Network Issues & Solutions :

Network issues are already irritating and frustrating to handle, but they can spell out disaster when they happen on a business network. While your IT department should be able to fix most network issues, you can save a lot of time by handling the issues yourself. Here are some of the most common network issues that people encounter along with their solutions:

1. Computer Viruses

The Problem: Help! I think I have a virus on my network!

Network viruses can completely disable a computer network, so this is the first issue we're going to tackle. There can be a number of causes of computer viruses. **Viruses can come from a wide range of sources,** such as e-mail attachments, malicious software, online advertisements, and yes, even social media.

What are some signs of computer viruses? While remediating an infection on a single computer can be daunting, removing a virus from an infected network is a real challenge since it can hide on any computer. So, here's how you can fix it:

The Solution:

Step 1: Check the severity of the infection by running a complete network scan to find malicious files or programs. Make sure that your antivirus and anti-malware programs are up to date and able to scan hidden files, the root directory, and all running programs. Also, try to have your antivirus/anti-malware software scan your e-mail inbox for any malicious materials.

Step 2: Back up all of your system files using the necessary tools. Running a complete system backup will ensure that your data isn't lost and that the network will remain stable. The Windows' "System Restore" option will allow you to set up a restoration that can often be useful in an emergency.

Step 3: Confine all suspicious, irregular files. Isolating them will prevent their exchanging with other files or your network system. Then, disinfect or completely wipe all quarantined files. Manually delete any emails that were identified by your antivirus software.

2. Unable to Connect to the Internet

The Problem: The wireless network shows a signal, but my device won't connect

Using a wireless network is great for mobility, but can hinder your productivity when it decides to malfunction. There are a few different reasons why your wireless network is having connectivity issues, such as the wireless router or the network card itself. This issue will require a bit of network troubleshooting to find a solution, so let's get to work:

The Solution:

Step 1: If your router won't connect to the internet, try putting your computer or device right next to the router. If this causes your equipment to connect, then the system hardware may have been the issue. If this didn't fix the problem, proceed to Step 2.

Step 2: Update the network card. Sometimes, your network card will receive a strong signal, but won't be able to transmit it quickly and effectively resulting in the need for network troubleshooting. Updating the driver might solve the problem entirely, but if it doesn't, you might need to contact your IT department or provider and consider replacing the hardware altogether.

3. Duplicated IP Address

The Problem: I got an error message that says that the IP address is already in use.

A small error window just popped up on your screen saying that your IP address is already in use. How is this even possible and what causes this IP address conflict? Well, there are a few reasons why this can happen:

- Your system administrator could have assigned two computers on a local area network (LAN) the same static IP address.
- Your internet service provider accidentally assigned two people the same IP address.
- The network's Dynamic Host Configuration Protocol (DHCP) server has allowed the same dynamic address to be assigned to multiple computers automatically.

- Your system administrator has assigned a static IP address to a computer within the local network's DHCP range, and the same address is automatically given by the local DHCP server

These are just a few of the plethora of reasons why IP address conflicts take place. Here are some ways to fix this issue:

The Solution:

Windows - If you have a dynamic IP address:

Step 1: Click the "Start" button and click "Run". Enter "cmd" into the text box and click "OK". The Windows command prompt will open.

Step 2: Type "ipconfig/renew" into the command prompt and press "Enter". This will refresh your dynamic IP address.

Step 3: Check your network connection. Your computer will receive an available IP address that isn't already taken.

Windows – if you have a static IP address:

Step 1: Right click "Network Neighborhood" on your desktop. On Windows 7 or Windows Vista, this will be labeled "Network". Next, click "Properties".

Step 2: Rick click onto your network card and click "Properties". In most cases, your network card will be labeled "Local area LAN Connection."

Step 3: Select "TCP/IP" in the list and then, click the "Properties" button under the list of options. Enter in a new IP address in the opened window. Click "OK" to confirm the changes you've made.

Mac

Step 1: Click on "System Preferences" in your dock. Then, click on "Network".

Step 2: Select "Wi-Fi" on the left side of the window. Then, click "Advanced", which is located on the bottom right.

Step 3: On the next page, select the "TCP/IP" tab and then click "Renew DHCP Lease" on the right side of the window.

4. Slow Performance

Problem: My applications are responding very slowly.

Why is my computer so slow? Slow-running applications can put a damper on your productivity in the workplace. One of the most common network issues that business networks fight with is slow applications. This happens especially when a computer first turns on or connects to a network. In most cases, this is caused by heavy bandwidth usage. In other instances, it can be caused by lack of hard drive space, running too many applications at once, having too many browser tabs open at one time, or even just a dusty room! The solution for this issue depends on the root of the problem.

Once you've gotten rid of some of your browser's extensions, eliminated applications you aren't using, or identified the application that's eating up all of your processing power, you should be able to see a huge difference in your computer's processing speed. (You can do this by using the Task Manager for Windows or the Activity Monitor for Mac to see which applications are slowing you down).

If this solution didn't work for you, here's what you can do:

The Solution:

Note: Be sure to enforce proper network use by making sure that users aren't viewing too much digital content via streaming or continuously downloading large files. Doing so will help you keep your bandwidth use under control. However, if you find that your employees are utilizing the network correctly, it might be time to upgrade your network to meet your business needs.

If you feel that the sluggishness of your applications is due to another issue, proceed to Step 1.

Step 1: Try restarting your PC. Sometimes, a quick reset will fix any and all issues right away. Doing so will clear your system memory (RAM). If this works, remember to shut down your PC when it's not in use. If this doesn't help, proceed to Step 2.

Step 2: Now, it's time to check on your hard drive and make sure that it's not approaching the end of its lifespan. So, let's run a hard drive check:

Windows

Right click on "Drive". Then, click "Properties" and then click "Tools". Click "Check Now". Select "Scan for and attempt recovery of bad sectors". Doing this will stop your computer from tapping into any malfunctioning areas of the hard drive.

Mac

Click "Applications" from the "Finder", then "Utilities", and then "Disk Utility". Highlight the hard drive that's giving you trouble and then select "First Aid".

If your hard drive is healthy, but you think it's becoming too full with data, proceed to Step 3.

Step 3: Get rid of unnecessary files from programs that have gone unused. System backups and restore points can eat up a lot of space, so don't hang onto more versions of this software than you need. You might also consider uploading your data onto the cloud to save your hard drive.

Step 4: If you've completely deep-cleaned your computer and checked all of the possible issues above, but your computer is still running slowly, it might be time to upgrade your RAM so that your computer has more memory. Certain programs take more RAM to run properly than others and if you don't have enough RAM ready, your computer will not be able to handle it. Look into RAM upgrade options.

5. IP Address Exhaustion

The Problem: I can't get an IP address.

So, your network seems to have gone down. Your operating system has sent you an alert stating that the address was not received from the DHCP server. You've just checked the network adapter status and noticed that there's actually no IP address to be found. What now?

There are a few different reasons why this could happen. It could be that the DHCP server is out of addresses, the device might be set to use a static address rather than a DHCP address, or maybe the DHCP request from the device never made it to the server. Either way, here's what we need to do:

The Solution:

Step 1: Check the network interface card (NIC). You can find this by opening the control panel, then the device manager. Then, select "Hardware and Sound" and then select "Device Manager". Expand the Network Adapters item to view all network adapters, although you will most likely only have one. Verify that your system is configured to utilize DHCP.

Step 2: Check the switch to see which virtual LAN (VLAN) the port is set as a member. Verify that other devices on this particular VLAN are able to get an IP address. If they can't, the issue is that the network is not sending DHCP requests to the server.

If this issue is taking place with more than one device, then the issue is likely the server itself.

6. VPN Errors

The Problem: I got an error message saying that my device was "unable to establish the VPN connection" or error 800.

Your virtual private network (VPN) works to provide a safe connection between a local client and a remote server. When you can't connect to a VPN, you'll receive an error message that usually states something along the lines of "VPN error 800 – Unable to establish the VPN connection". This can happen if the client device disconnected from the local network, the network's firewall is blocking the VPN traffic, or if the name/address specified for the VPN server was incorrect.

Here's how you can fix this issue:

The Solution:

Step 1: Check the connection between the client and server. Attempt to connect to the server from a different client device to verify whether the network issue is a widespread issue or if it is affecting only one client.

Step 2: Verify that the name entered on the client side matches the server name given by the VPN administrator. In some instances, users can specify an IP address rather than a name, while it's more typical for users to mistype the address than the name. VPN servers can also change their IP addresses in some instances, especially DHCP networks.

Step 3: If the first two steps didn't clear up the issue, now it's time to make sure that the firewall isn't blocking your connection with the VPN. Do so by temporarily disabling it to retry the connection. If this

solves the problem, you need to update the firewall settings specific to the port numbers that the VPN on the network is using to prevent this issue from happening again.

If none of this troubleshooting solved the issue, it could be possible that the server is overloaded with clients or that it is offline. Check with your IT department to see what can be done.

7. Connection Errors and Network Connectivity

The Problem: My network has limited connectivity or no connectivity at all.

Connection issues are some of the most annoying, frustrating network issues of all. These issues can be a result of all types of glitches and issues within the computer and/or the network itself. So, if your computer has handed you a lovely "Limited or no connectivity" error message, here's what you can do to fix it:

The Solution:

Step 1: Restart your computer. A quick reboot can often be a life-saver. If you've already tried this or restarting the computer didn't fix anything, proceed to Step 2.

Step 2: Restart your router or modem. DO NOT reset the router or modem or restore its settings back to factory default. Simply turn the router or modem off and back on. If this doesn't work or only works for a moment, keep going to Step 3.

Step 3: If you are connected to your network via Ethernet cable, unplug the cable and then reattach it. If needed, replace your network cable with a new or different cable to see if this was the cause of the issue.

Step 4: If you're connected via Wi-Fi when you see this error, it's a possibility that the network adapter is attempting to conserve power. Stop this by finding the Network and Sharing Center in the Control Panel. Right click "Wi-Fi Connection", select "Properties", click "Configure" and find the "Power Management" tab. Click and uncheck the option that allows your computer to turn off device to conserve power.

Step 5: If you've tried all of this and there's still no connection, unplug your router and connect your computer directly to your modem. If this solves the issue, then your router is likely to be malfunctioning. If not, contact the router manufacturer for support.

If the error remains and the network is still down, reach out to your internet service provider for help.

E. **Description of procedures of the task accomplished**

For an implementation process to be successful, many tasks between different departments need to be accomplished in sequence. Companies strive to use proven methodologies and enlist professional help to guide them through the implementation of a system but the failure of many implementation processes often stems from the lack of accurate planning in the beginning stages of the project due to inadequate resources or unforeseen problems that arise.

D. Tools equipment and materials used

Equipment and Accessories	Tools	Materials
LAN Card	Screwdriver(standard)	Software applications
UPS	Screwdriver(Philips)	Network OS Software
Server	Long nose pliers	RJ 45
24 port-hub	Mechanical pliers	UTP Cat 5 cable
Modem	Allen wrench	Motherboard's manual and
Fax machine	Multitester	installer
PC Video camera	Crimping tools	Sound device driver
USB External CD writer	Soldering iron (30 watts)	installer
USB scanner	Wire stripper	
USB printers	LAN Tester Anti-static wrist	
USB Flash Drive	wrap	
	Device drivers/installers	

LAN CARD

It is a network interface card. This is a computer circuit board or card that is installed in a computer so that it can be connected to a network.

SERVER

It is a part of a network. It is a special computer that users on the network can access to carry out a particular job.

HUB/PORT

It is a connector on the back of a computer or other device. A port is either a serial port or a parallel port.

MODEM

The modem is a device that allows a given computer to share data or otherwise a device which let computers exchange information

CANNER

It is an input device that read text or illustration printed on paper, translates the information into a form that a computer can use

FLAT SCREW DRIVER

It is used to drive or fasten negative slotted screws

USB

Universal Serial Bus, a hardware interface for low-speed peripherals such as the keyboard, mouse, joystick, scanner, printer and telephony devices.

PRINTER

It is a piece of hardware that produces a paper copy (also known as 'hardcopy') of the information generated by the computer.

RAM

Random Access Memory, is a primary memory. This memory is used inside the computer to hold programs and data while it is running.

BIOS

Basic Input / Output System, chip that controls the most basic functions of the computer and performs a self-test every time you turn it on.

FLASH DRIVE

RAM that can retain data without electrical power. It is widely used for BIOS chips and for digital camera and digital music storage

VIDEO CAMERA

A camera using videotape: a camera that records onto videotape

LONG NOSE PLIERS

It is used for holding, bending and stretching the lead of electronics component or connecting wire.

SOLDERINGIRON

It is used to join two or more metal conductors with the support of soldering lead melted around it.

DESOLDERING TOOL

It is used to unsolder unwanted parts or component in the circuit with the support of soldering pencil.

PHILIPS SCREW DRIVER

It is used to drive or fasten positive slotted screws.

LAN TESTER

For RJ11,12,45 & BNC w/ Remote Unit This ergonomic tester is designed to test most network cable wiring. You can either conduct an auto or manual test.

UTP

Unshielded Twisted Pair, is a popular type of cable used in computer networking that consists of two shielded wires twisted around each.

E. Technical journal and recommendation report

1. Technical journal

In the modern high performance computing systems, innovative as well as hi-tech research is required to address the challenges in the networking. The Journal of Networking Technology will act as a platform to publish and disseminate the cross cutting research in networking systems. The journal solicits original research in the following but not limited areas.

Computer network components

Network architecture and design

Digital networks

Broadband networks

Internet and Web Technology

Sensor networks

Adhoc networks

Mobile and wireless networks

Data networks

Next generation networks

Optical networks

Neural networks

Signal processing

Satellite communication

2. Recommendation report

Basic Network Recommendations

- ✓ **Correct User Rights**

Administrator rights should be granted with caution. Users who have administrator rights can potentially do things that could be seriously damaging. They can, and do, unintentionally make changes that decrease the level of network security. They can also be tricked into running malware, which would run with the user's administrator privileges.

If they are careless about protecting their authentication details, their user-name and password may be stolen. This may allow unauthorized third parties to log in and carry out damaging actions, intentionally or accidentally. For better security, make sure that users have a privilege level which is appropriate for the tasks they carry out and minimize the number of users that have administrator privileges.

- ✓ **Only Download from Trusted Websites**

You should determine who has a genuine business need to download files and applications from a website. Use web filtering to restrict this to people with a genuine requirement and ensure that the

select few are educated in how to download files safely. Files can often be downloaded from multiple locations on the Internet, but not all locations are equally secure. Make sure that your users can only download from trusted sites, such as primary source websites rather than file-sharing or generic websites.

- ✓ **Review Network Shares**

Carry out an audit of network shares. Users should only have access to files and folders that they need as part of their day-to-day work. You should also be aware that a lot of malware can spread via networks. This is typically due to there being little or no security on network shares. Remove access to unnecessary shares and secure the others and their contents to limit network-aware malware from spreading.

- ✓ **Restrict Network Connections**

When a computer connects to a network, it can adopt that network's security settings for that specific session. If the network is outside the administrator's control, the security settings may be weak and put the computer at risk. Restrict users from connecting computers to unapproved networks. In most instances users only need to connect to the main company network.

- ✓ **Change Your Default IP Range**

Networks typically use standard IP ranges, like 10.1.x.x or 192.168.x.x. This standard approach means machines configured to look for this range could accidentally connect to a network outside your control. Change the default IP range so that computers are less likely to find a similar range. You should also consider adding firewall rules, which allows only approved users to connect.

- ✓ **Review Open Ports**

You should periodically audit the open ports on your network and block all unused ones. If you leave them open for long periods of time without surveying them, you increase the chance of letting in intruders. If ports are left open, Trojans and Worms may use them to communicate with unauthorized third-parties.

- ✓ **Audit the Entry Points to Your Network**

Networks undergo frequent change, so it is very important to review all the routes into your organization's infrastructure on a regular basis. For each means of entry, consider how to best secure the routes to stop unwanted files and applications entering undetected or sensitive information leaking out.

- ✓ **Network Segmentation**

There are a number of advantages to segmenting your network.

Improved security comes from the fact that broadcasts will be contained to local network and internal network structure will not be visible from outside. If an attacker gains unauthorized access to a network, segmentation or "zoning" can provide effective controls to limit further movement across the network.

Improved performance can be achieved, because on a segmented network there are fewer hosts per subnetwork, thus minimizing local traffic. It can also help to containing network problems, limiting the effect of local failures on other parts of network.

When business critical systems are affected, they can slow business processes significantly. To help protect them, consider having them on a different network from the one used for day-to-day activities.

- ✓ **Resist the Temptation to Live Test**

Although most software developers are good people and rigorously test their software before releasing it, they are unlikely to have your infrastructure's exact configuration and setup. To ensure that a new software version or update does not cause problems, test it on a virtual system and check its effects before deploying to the real live network.

- ✓ **Block Unused USB Ports**

Many devices, when connected to a USB port, can be automatically detected and mounted as a drive. USB ports may also allow attached devices to auto-run stored software. Users are often unaware that even the safest and most trusted devices can potentially introduce malware onto their computer. To prevent any accidents, it is much safer to disable all unused ports.

Learning Outcome 4.3 Write technical journal and recommendation

- **Content/Topic 3: Writing technical journal and recommendation**

Report: A report is a document that presents information in an organized format for a specific audience and purpose. Although summaries of reports may be delivered orally, complete reports are almost always in the form of written documents.

The main advantages of report writing?

1. **Report gives consolidated and updated information.**

A report provides consolidated, factual and an up-to-date information about a particular matter or subject. Information in the report is well organized and can be used for future planning and decision making.

2. **Report as a means of internal communication.**

A report acts as an effective means of communication within the organization. It provides feedback to employees. It is prepared for the information and guidance of others connected with the matter/ problem.

3. **Report facilitates decision making and planning**

Report provide reliable data which can be used in the planning and decision making process. It acts as a treasure house of reliable information for long term planning and decision making.

4. **Report discloses unknown information**

Reports provide information, which may not be known previously. The committee members collect data, draw conclusions and provide information which will be new to all concerned parties. Even new business opportunities are visible through unknown information available in the reports.

2. **Report gives Information to employees**

Reports are available to managers and departments for internal use. They are widely used by the departments for guidance. Report provide a feedback to employees and are useful for their self-improvement.

3. **Report gives reliable permanent information**

The information provided by a report is a permanent addition to the information available to the office. We have census reports (prepared since last 100 years) which are used even today for reference purpose.

4. **Report facilitates framing of personnel policies**

Certain reports relating to employees are useful while preparing personnel policies such as promotion policy, training policy and welfare facilities to employees.

5. **Report gives information to shareholders**

Some company reports are prepared every year for the benefit of shareholders. Annual report for example, is prepared and sent to all shareholders before the AGM. It gives information about the progress of the company.

6. **Report gives information to the Registrar**

Annual report and annual accounts are sent to the Registrar every year for information. Such reports enable the government to keep supervision on the companies.

7. **Report solves current problems**

Reports are useful to managers while dealing with current problems faced by the company. They provide guidance while dealing with complicated problems.

8. **Report helps directors to take prompt decisions**

Company reports relate to internal working of the company and are extremely useful to directors in decision making and policy framing. Reports give reliable, updated and useful information in a compact form.

- **Report Writing Format**

Here are the main sections of the standard report writing format:

- **Title Section** – This includes the name of the author(s) and the date of report preparation.
- **Summary** – There needs to be a summary of the major points, conclusions, and recommendations. It needs to be short as it is a general overview of the report. Some people will read the summary and only skim the report, so make sure you include all the relevant information. It would be best to write this last so you will include everything, even the points that might be added at the last minute.
- **Introduction** – The first page of the report needs to have an introduction. You will explain the problem and show the reader why the report is being made. You need to give a definition of terms if you did not include these in the title section, and explain how the details of the report are arranged.
- **Body** – This is the main section of the report. There needs to be several sections, with each having a subtitle. Information is usually arranged in order of importance with the most important information coming first.
- **Conclusion** – This is where everything comes together. Keep this section free of jargon as most people will read the Summary and Conclusion.
- **Recommendations** – This is what needs to be done. In plain English, explain your recommendations, putting them in order of priority.
- **Appendices** – This includes information that the experts in the field will read. It has all the technical details that support your conclusions.

Remember that the information needs to be organized logically with the most important information coming first.

- Pointers to score high in Report Writing

1. **Use names and pronouns**
2. **Limit yourself to one idea per sentence.**

Short, straightforward sentences are easy to read, understand and save time for everyone. You will appreciate this time-saving tip when you are reviewing a report to prepare for an important business meeting. Also, the longer a sentence is, the more likely you are to make an error.

Short sentence and its structure in English generally begin with a noun, and the grammar is simple. Complicated sentences, on the other hand, require complicated punctuation, and they open the door to sentence errors.

Try to limit yourself to three commas per sentence. If a sentence has more than three commas, it's probably too complicated to be read easily, and it may contain usage or punctuation errors.

3. **Be as clear and specific as possible.**

"Contacted" is vague: Did you visit, phone, or email the witness? "Residence" is just as confusing: House, apartment or mobile home? Always strive for clarity.

4. **Use simple language.**

"Since" is easier to understand (and write)

5. **Stick to observable facts.**

Conclusions, guesses, hunches, and other thought processes do not belong in a report.

6. **Write in paragraphs.**
7. **Use active voice.**
8. **Use bullet style.**

- **Sample of Report**

Typical structure template for writing a committee report:

1. **Members to which the report is meant for**

- [Name, institution, location, Chair]
- [Name, institution, location, member]

2. **[Date, Time, and Location]**

- [Provide simple documentation of any meetings of the committee or subset of the committee, in whatever mode and format, e.g., in person, conference call, etc.]

3. **Purpose**

- [Here you mention the purpose of the report in a brief. This enables the reader to understand the purpose behind writing the format.]

4. **Issues** [Write different issues as sub headings and explain their highlights in bullet points below the respective sub headings]

- Current Status
- Accomplishments / Issue 1
- Future Goals

5. Near-Term Plans / Main Body of the Report
6. Informal Recommendation(s)

References:

https://www.hse.gov.uk/toolbox/ppe.htm
https://www.ciscopress.com/articles/article.asp?p=2086239&seqNum=7
https://www.tuvsud.com/en/services/testing/personal-protective-equipment-testing
https://hardsoft-support.kayako.com/article/66-computer-cable-types-and-descriptions
https://www.globalspec.com/learnmore/electrical_electronic_components/wires_cables_accessories/computer_cables
https://www.stellarinfo.co.in/blog/how-to-fix-the-io-errors-for-the-external-hard-disk-drives/
https://www.addictivetips.com/windows-tips/disconnect-a-monitor-without-unplugging-it-on-windows/
https://epson.ru/es/upload/ManualTypes/102389/html/probl_6.htm#top
https://support.microsoft.com/en-gb/help/4015401/windows-10-fix-printer-problems
http://www.playtool.com/pages/dvitrouble/dvitrouble.html
https://www.globalspec.com/learnmore/electrical_electronic_components/wires_cables_accessories/computer_cables
https://www.digitaltrends.com/computing/common-multi-monitor-problems-and-how-to-fix-them/
https://www.computerhope.com/issues/ch000241.htm

https://support.hp.com/us-en/topic/printscandoctor-scanning-problems

https://support.hp.com/lt-en/topic/diagnostics?category=printing&issue=scan-issues

https://www.pcworld.com/article/185111/10_biggest_printer_problems_and_how_to_fix_them.html

https://www.k12techrepairs.com/5-tips-to-fix-common-projector-issues/

https://www.computerhope.com/issues/ch000034.htm

https://support.microsoft.com/en-us/windows/fix-microphone-problems-5f230348-106d-bfa4-1db5-336f35576011 https://www.wikihow.com/Fix-a-Non-Functioning-Driver

https://www.computerhope.com/issues/ch000438.htm

http://www.playtool.com/pages/dvitrouble/dvitrouble.html

https://www.drivereasy.com/knowledge/how-to-fix-vga-no-signal-issues/

https://support.microsoft.com/en-au/help/817900/usb-port-may-stop-working-after-you-remove-or-insert-a-usb-device

https://www.startech.com/en-us/faq/serial-loopback-test-rs232-windows

https://www.tutorialspoint.com/computer_fundamentals/computer_input_devices.htm

https://www.computerhope.com/issues/ch001355.htm