

# COMPUTER TROUBLESHOOTING GUIDE SIMPLIFIED

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## INTRODUCTION

The Simplified Computer Troubleshooting Guide was developed to help solve the most common system problems quickly and simply. However, if you do not feel qualified to perform any of these measures, it is suggested you solicit the expertise of a professional.

This guide is divided into the following problem categories:

- **System Will Not Boot**
- **System Locks UP**
- **Peripheral Issues**
- **Performance Issues**

**Just go to the appropriate section and follow the steps described.**

## CAUTION

### ELECTRO STATIC DISCHARGE AND ESD CONSIDERATIONS

Static Electricity is your worst enemy when working on computers. You always want the potential for ESD to be zero. Wearing an anti-static wrist strap, working on an anti-static work bench mat, or discharging static electricity by grounding yourself (turning the computer off, then touching the chassis with your hand) are all ways of keeping yourself static free.

Don't take this warning lightly! What might sound like a small spark (that you may not even see and barely hear) can cause expensive damage to your and prevent ESD, is computer.

## CAUTION

### HAZARDOUS ENERGY CONSIDERATIONS

**Power Off, Plug Out (POPO).** POPO is normally recommended prior to working on the inside of your machine. Don't take any chances! Turn the power off and unplug the computer either from the wall or remove the power cord from the back of the computer before you work on it. Do not remove the cover from your computer until you have done this. I would be negligent to not tell you this. However, one of the best ways to keep your machine grounded and protect it from ESD, is to ground it through the local electrical system, or through the wall plug.

## SYSTEM WILL NOT BOOT

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The following is a suggested list of check points to follow to correct your problems. It will require opening your computer. If you do not feel qualified to do this, you may want to enlist the help of a professional.

1. **Is power properly applied?**

- All cables plugged in? (Wall outlet, Computer Outlet, Power cables to the motherboard and peripherals, Monitor power and video cables, etc. )
- This would include making sure there is power from the wall outlet.

**NO** - secure all cables and power source.

**YES** - Proceed to next check point.

2. **Do you hear the computer turning on but nothing is happening on the monitor?**

**NO** - (I hear nothing) This is going to indicate that something is not plugged in. Go through check point One again.

**YES** - Proceed to next check point (This will require opening the computer).

3. **Is the video card firmly "seated" in the slot? NOTE: the card may look seated when it is not.**

**NO** - Re-seat the video card by removing it ( probably will require removing one mounting screw that secures the card in place) and reinserting it into the slot (replace screw).

**YES** - Proceed to next check point.

4. **Are all peripherals attached properly? (This will take some time you need to check several things).**

- Are all SIMMS (memory) firmly in place? (Each one should be firmly down in its own slot and latched by being push to it's upright position).
- Are the Hard Drive cables attached correctly? Make sure both connectors (one on each end) of the cable are securely in place and that they are oriented correctly. The red edge of the cable indicates pin one and the connector on the back of the Hard Drive as well as the connector for the other end of the cable will have pin one designated.

5. **Is the processor firmly seated?**

- Release the latch on the ZIF Socket and make sure that the processor is firmly and evenly down into the socket. Reset the latch.

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- Make sure that everything inside the computer is securely in place and correctly installed. Any item that is not secure or incorrectly installed can keep the computer from booting.

**NO** - (to any item) take appropriate corrective action. Firmly seat all cards. Check all cables, memory, etc.

**YES** - Proceed to the next check point.

## 7. Is your motherboard using the correct voltage setting for the processor in use?

- All CPU'S have a voltage rating and the motherboard must be set accordingly. There are jumpers on your motherboard (check your owners manual for the correct jumper and correct setting) to make sure it is set correctly.
- You may look on the processor itself to determine the correct voltage setting. In most cases you will have to remove the heatsink/fan module to find the setting which is branded on the top of the processor. You need not remove the processor to find the voltage setting. The heatsink/fan usually locks, via clips, on opposite sides of the processor. Once the clips are removed, you should be able to remove the heatsink/fan and read the top of the chip. There may be some sort of thermal adhesive that you may have to wipe away.

**NO** - Set the voltage jumper correctly.

**YES** - Proceed to next check point.

## 8. Is your motherboard set to the right megahertz (MHz) speed for the processor in use?

- Typically, running a processor faster than its megahertz rating will not prevent the computer from booting, but it can cause it to hang during booting.
- Make sure that the MHz setting on your motherboard is correct. This is usually set with a jumper (consult your owners manual for correct jumper location and setting).

**NO** - Set speed (MHz) jumper correctly.

**YES** - Proceed to next check point (Considerations).

## CONSIDERATIONS

Check the following considerations if the above troubleshooting methods have not proved successful:

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1. There is the potential that a component in your computer does not have the performance capabilities to keep pace with the processor. For example, is there an older part from an older computer that you installed into your system? If so, remove the older part and see if your computer will boot. This could be an old modem, sound card, scanner card, etc. (if it's the video card, you would have to replace it with a newer one to run this test.) You can complete this test, by removing adapter cards one at a time until you find the offending part.

**Suggestion:** replace slower part with newer, faster components.

2. Your motherboard could be defective, or not properly engineered to work with the processor.

**Suggestion:** replace the motherboard.

## SYSTEM LOCKS UP

The following is a suggested list of check points to follow to correct your problems. It will require opening your computer. If you do not feel qualified to do this, you may want to enlist the help of a professional.

### Definition

The definition of a **system lock** is that the system boots up (something actually appears on the monitor) but the boot up process stops, the system locks as the operating system software comes up, or a lock occurs in an application. This troubleshooting procedure can be used for tracing exception and fatal exception errors in Windows 95, general protection faults in Windows, and Windows NT blue screen dumps.

1. **Do you have the latest BIOS for your motherboard?**
  - Typically, your motherboard manufacturer will supply you with the latest BIOS, but this is not always the case. Call the manufacturer and tell them the motherboard model number, that you're using the (YOUR) processor, and that you need to have the latest BIOS.
  - One way to help you determine if your BIOS is correct is to determine if the processor is properly identified when the computer goes through POST (Power On Self Test). Shortly after initial boot up, you should see the processor ID. If it does not properly identify your processor by model and speed, then you may not have the latest BIOS for your system.
  - Fortunately, most BIOS's are programmable (referred to as FLASH) and come with a software utility file to load and code the BIOS.

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**NO** - Obtain the latest BIOS for your motherboard.

**YES** - Proceed to next check point.

## 2. Are the BIOS settings correct?

- Shortly after booting your computer, you should see a message similar to **Hit Delete (DEL)** to enter setup. (Another key could be designated). Press this key and go into your BIOS setup opening screen.
- My suggestion is that you load the BIOS defaults, save and exit, reboot the computer, and see if your system still locks.

**NO** - Load setup defaults, test the computer.

**YES** - Proceed to next Check point (This will require opening the computer).

## 3. Does running defrag and/or scandisk fix this problem?

- **Defrag** is a tool that comes with all Microsoft operating systems. It checks your hard drive for fragmented files and/or arranges the files on your hard drive so that files are contiguous and not fragmented. Run this utility.
- **Scandisk** checks several Integral functional areas of your hard drive and fixes them if there are problems. Run this utility.

**NO** - Proceed to next check point.

**YES** - Problem resolved.

## 4. Does the processor have the correct CPU fan properly installed and working?

- The processor must have an active cooling device installed on it to dissipate the heat generated by the processor. A small fan should be on top of a heatsink that covers virtually the entire surface of the processor. Additionally, there is a power connector (male) that must be connected to an available power connector (female) from your computer's power supply.
- The fan must be properly rated for the CPU. If the fan has a label on it, check if it is properly rated for the chip.

**NO** - Correct problems with fan.

**YES** - Proceed to next check point.

## 5. Are all of the adapter cards properly seated?

- Remove the card and re-install it. (An adapter card may look seated when in fact it is not).

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- The primary offending adapter card is usually the video card, but this is not always the case. Check the video card first.

**NO** - Re-seat all adapter cards.

**YES** - Proceed to next check point.

## 6. Is the processor firmly seated?

- Release the latch on the ZIF Socket and make sure that the processor is firmly and evenly down into the socket. Reset the latch.

**NO** - Firmly seat processor.

**YES** - Proceed to next check point.

## 7. Is your motherboard using the correct voltage setting for the processor in use?

- All processors have a voltage rating and the motherboard must be set accordingly. There are jumpers on your motherboard (check your owners manual for the correct jumper and correct setting) to make sure it is set correctly.
- You may look on the processor itself to determine the correct voltage setting. In most cases you will have to remove the heatsink/fan module to find the setting which is branded on the top of the processor). You need not remove the processor to find the voltage setting). The heatsink/fan usually locks, via clips, on opposite sides of the processor. Once the clips are removed, you should be able to remove the heatsink/fan and read the top of the chip. There may some sort of thermal adhesive that you may have to wipe away.

**NO** - Set the voltage jumper correctly.

**YES** - Proceed to next check point.

## 8. Is your motherboard set to the right megahertz (MHz) speed for the processor in use?

- Typically, running a processor faster than it's megahertz rating will not prevent the computer from booting, but it can cause it to hang during booting.
- Make sure that the MHz setting on your motherboard is correct. This is usually set with a jumper (consult your owners manual for correct jumper location and setting).

**NO** - Set speed (MHz) jumper correctly.

**YES** - Proceed to next check point (Considerations).

## 9. Are all peripheral devices turned on and functioning properly?

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- An application may be trying to write to a peripheral that is either not on, not initialized, or is otherwise not functioning.
- In these cases, the lock would typically occur at the same or similar places. This will require observation on your part.

**NO** - Correct peripheral problems.

**YES** - Proceed to next check point.

## 10. Have you re-installed your operating system?

- Sometimes the Windows 95 registry gets corrupted to the point it cannot be repaired. Reinstalling the operating system will fix this. Windows 95, Windows 3.11, and Windows NT can have similar problems. Though this can take time, it's the only process that will fix this problem.

**NO** - After file back up, re-install the operating system.

**YES** - Proceed to next check point (considerations).

## CONSIDERATIONS

1. Typically, system locks are the most difficult problems to fix, and consequently the most frustrating. Move through the above steps carefully and slowly. After completing all steps, it may be time to begin swapping out components with newer, faster, or different ones until you find one that is causing the problem. Older and slower devices can cause the system to lock.
2. Heat can also be an Issue for the motherboard VRM (voltage regulator module). This module will have a power rating and come with some sort of heatsink installed on it. If the VRM gets too hot (which can happen as a result of being under rated or having inadequate heat dissipation) it can cause the system to lock. You'll need to check your owners manual or call your dealer for these specifications.
3. You can also slow your computer down by jumpering the MHz down to the next slower speed. If the problem goes away, then you potentially have a problem with your motherboard and you need to return it to your dealer for a replacement.

## PERIPHERAL ISSUES

The following is a suggested list of check points to follow to correct your problems. It will require opening your computer. If you do not feel qualified to do this, you may want to enlist the help of a professional.

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## 1. Is power applied to your device?

- Many devices (printers, scanners, speakers, external modems, etc.) have power plugs that need to be plugged in. Be sure and check that the plug is secure both at the wall outlet and the device itself.
- Many devices will have a power button. Be sure that this button is turned on and the power LED is on.

**NO** - Apply power to the device.

**YES** - Proceed to the next Check point.

## 2. If a driver is needed for this device, is it being properly loaded?

- Many devices (printers, scanners, modems, SCSI cards and devices etc.) have drivers (software that introduces the device or its interface card with the host computer and/or operating system).
- Running DOS and Windows 3.11, typically you can watch these drivers load as the computer brings up the operating system during the boot process. Then Windows will have other software drivers that it may load in order for the device to work in Windows.

**NO** - Acquire and correctly load drivers.

**YES** - Go to the following list of peripherals and proceed to the next check point.

## 3. Select the device you are Trouble Shooting:

- Keyboard
- Mouse

### Keyboard

#### 1. Is the keyboard a known working keyboard?

- Test it on another system and test another keyboard on this system.

**NO** - Replace keyboard.

**YES** - Proceed to next check point

#### 2. Is the keyboard securely and firmly plugged in?

- Before testing, make sure that the system is off.
- Unplug the keyboard and plug it back in.

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- Sometimes the plastic insulator around the metal shield of the connector hangs on the edges of the hole punched out for the keyboard on the back panel of the chassis. Make sure the connector is plugged all the way in.

**NO** - Plug the keyboard in firmly.

**YES** - Proceed to next check point.

### 3. Are the pins inside the keyboard connector in good shape?

- With the computer turned off, unplug the keyboard and inspect the pins inside the connector to make sure they are all present and straight.
- The correct number of pins for a PS/2 (small) connector is 6 arranged in a circular fashion inside the connector.
- The correct number of pins for an AT (large) connector is 5 arranged in a semi-circular fashion.
- If you notice pins that are bent, they must be carefully straightened or they will break. Bent pins are "weakened" pins; therefore, it would probably be best to replace the keyboard.

**NO** - Straighten pin/pins or replace keyboard.

**YES** - Proceed to next check point.

### 4. For PS/2 only: Is the keyboard plugged into the correct connector?

- The PS/2 keyboard connector and the PS/2 Mouse connector are identical and therefore can be plugged into each others places.
- Make sure that the keyboard is plugged into the keyboard connector.

**NO** - Plug keyboard into correct connector.

**YES** - Go to Next check point (Considerations).

### Keyboard Considerations

1. Older or sub-standard keyboards can fail when used in a high performance platform.
2. There is circuitry on the motherboard that supports the keyboard (controller, etc.) and this circuitry can fail. This requires motherboard replacement; though, in some instances, you can replace the keyboard controller.
3. If your keyboard lights (**Num Lock**, **Caps Lock**, **Scroll Lock**) light up at boot but the keyboard is not initialized, then there is probably a motherboard problem.

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## Mouse - Serial or PS/2

1. **Is the mouse functional?**
2. **The mouse pad clean?**
3. **What is the factor for determining that the mouse is not working?**
  - The machine may be locked, which means that the mouse will not move, but that doesn't mean that the mouse has failed.
  - If the keyboard works, but the mouse doesn't move, or the mouse cursor doesn't show up, then there is likely a mouse problem.
  - Some newer BIOS's show the mouse being initialized during POST and it will show an initialization error if it cannot initialize the mouse.
4. **Once determined that there is a mouse failure, follow the procedures below for either a PS/2 or Serial Mouse.**

## Serial Mouse

1. **Verify that you know that you have a good working mouse.**
  - Does the mouse work in another computer?  
  
**NO** - Replace mouse.  
**YES** - Proceed to the next check point.
2. **Is the Serial port configured and operational?**
  - The serial port that the mouse is plugged into must be enabled. The configuration screen that comes up shortly after post and before the operating system loads should show whether the COM port is enabled. If it shows up disabled, then you will have to enter the BIOS setup and enable the com port.
  - Make sure the mouse is plugged into the enabled port.  
  
**NO** - Enable the appropriate COM port.  
**YES** - Proceed to the next check point.

## PS/2 Mouse

1. **Verify that you know that you have a good working mouse.**
  - Does the mouse work in another computer?

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**NO** - Replace Mouse.

**YES** - Proceed to the next Check Point.

## 2. Is the mouse connector Inserted firmly into the PS/2 connector?

- With the unit turned off, unplug the mouse from back of the computer and plug it back in, firmly. Turn computer back on.

**NO** - Firmly plug in mouse.

**YES** - Go to Next check point.

## 3. Does the computer see the mouse?

- Shortly after POST you will see a configuration screen that should show the mouse if it has found it.
- Additionally, with some systems, you can see "mouse initialized" as the computer boots up.

**NO** - Go back to first two check points.

**YES** - Proceed to the next check point (Considerations).

### Mouse Considerations

1. With the above hardware checks done, then there is the potential that a driver is not installed or properly installed.
2. Rare things do happen, such as the mouse connector "shorts against the case or chassis of your computer. If you are installing a motherboard, make sure that the PS/2 connector on the board is in the center of the hole provided for it on the rear panel of the chassis.
3. In some cases, a particular mouse is simply not going to function in a particular system. Replacing the mouse with a slightly better mouse or one from another manufacturer may solve the problem.
- 4.

### PERFORMANCE ISSUES

The following is a suggested list of check points to follow to correct your problems. It will require opening your computer. If you do not feel qualified to do this, you may want to enlist the help of a professional.

#### 1. Is your turbo button in fast mode?

- Most modern computers do not come with a turbo button.

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- If your machine has one, it will be on the front of the computer and labeled turbo. Be sure it's in fast mode.

**NO** - Place the turbo switch in fast mode.

**YES** - Proceed to next check point.

## 2. Do you have the latest BIOS for your motherboard?

- Typically, your motherboard manufacturer will supply you with the latest BIOS, but this is not always the case. Call the manufacturer and tell them the motherboard model number, and processor type, and that you need to have the latest BIOS.
- One way to help you determine if your BIOS is correct is to determine if the processor is properly identified when the computer goes through POST (Power On Self Test). Shortly after initial boot up, you should see the processor ID. If it does not properly identify your processor by model and speed, then you may not have the latest BIOS for your system.
- Fortunately, most BIOS's are programmable (referred to as FLASH) and come with a software utility file to load and code the BIOS.

**NO** - Obtain the latest BIOS for your motherboard.

**YES** - Proceed to next check point.

## 3. Is your BIOS properly configured?

- There are several items to check in your BIOS setup. It is important to notice that there are differences between BIOS manufacturers, the way they present their **setup** information, and how you make changes to that data. AWARD and PHOENIX are the dominant manufacturers of BIOS's for computers today.
- In order to get into your BIOS setup, turn on or reboot your computer. Shortly after booting, you should see a message similar to **Hit Delete (DEL) to enter setup.** (Another key could be designated). Press this key and go into your BIOS setup opening screen.
- You can choose the load setup defaults and load BIOS defaults to make sure that the default settings are correct.
- You will then need to select advanced settings, potentially BIOS Features Setup, and make sure that both the internal and external cache is enabled. This option typically appears as a feature that can be either disabled or enabled. You may see a selection called cache and see external, internal, or both as your options to select. You need to select **both**. It's possible your setup may show one option for internal (CPU) Cache and one for External Cache. In this case you would enable each one.

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- Typically in the BIOS, advanced features or BIOS feature setup, you have an option to Boot Up system speed. This should be set to **High or Fast** depending on which BIOS you use In your computer.
- There potentially could be other performance options in your BIOS that need to be set correctly. Your motherboard or system manual could be of assistance here.

**NO** - Make the changes mentioned above.

**YES** - Proceed to the next check point.

#### 4. **Is your configuration substantially the same as the configuration used as a platform for the advertised benchmarks?**

- The particular mix of components that you are using can have substantial impacts on performance.
- Memory speed and type can have a large impact on performance. Are you using as much as was used in the benchmark computer? Is it EDO or Fast Page DRAM?
- Hard Drive access time can have a dramatic effect on benchmarks. Typical benchmarks today are run with EIDE or SCSI hard drives. Older drive technology will bottleneck your system and slow it down.
- Accelerated or enhanced video adapters with ample memory will help with the performance of your computer.
- A major factor to consider is the presence or absence of an external cache on the motherboard. Some entry level systems may have no cache or a very small cache. 256K or 512k are the dominant sizes.

**NO** - Use a similar configuration and run the benchmarks.

**YES** - Proceed to the next check point.

#### 5. **Are all drivers loaded correctly for all peripherals?**

- Every device will need a driver loaded in a MS windows operating system. For Windows 3.11, these drivers are, for the most part, manually loaded. For Windows 95, most of these drivers will load automatically for Plug and Play devices. If they are not Plug and Play, you'll need to assist Windows 95 in loading the drivers correctly.
- A driver turns a device on and optimizes it for performance. Without a properly loaded driver, a device may not work or it can be forced to use a default driver that does not optimize the device for its greatest level of performance. The manufacturer of your devices and peripherals may have to help you with the latest drivers for your particular configuration.
- If you are running Windows 95, a good place to look for verification on properly working devices is in **Device Manager**. You get there by selecting the System Icon in the Control Panel windows which is opened by clicking on the **My Computer** Icon

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on your desktop. Once there you can look at each device in your computer and know that it is working properly. If there is a problem with a particular device, it will have a yellow exclamation point to the left of it indicating an improperly functioning device.

**NO** - Install appropriate drivers.

**YES** - Proceed to the next check point.

## 6. Is the system Jumpered for the right speed?

- Your owners manual will identify the jumpers you need to set on your motherboard for the correct speed. Obviously, a motherboard Jumpered too slowly will not perform as fast as one set correctly.

**NO** - Set speed (MHz) jumper correctly.

**YES** - Proceed to the next check point.

## 7. Is your system motherboard Jumpered for the correct cache size on the board.

- There are jumpers on the motherboard that must be set for the size of the external cache on the motherboard. Check your owner's manual for these settings. In many cases the proper settings are silk screened on the motherboard itself in a table showing the correct settings.
- If your motherboard is Jumpered for a external cache module smaller than what is actually on the board, your system would benchmark a little slower than it should. On Winstone 32 there is about a 3% difference between two Identical systems but one with a 2SGk cache and one with a 512k cache.
- If your motherboard is Jumpered for an external cache larger than what is actually on the board, the system will not even boot.

**NO** - Jumper for appropriate cache size.

**YES** - Proceed to the next check point (Considerations).

## CONSIDERATIONS

1. Performance many times is a subjective assessment. It may not feel like the system is running as fast as it should. It does not appear to be faster or very fast. Benchmarks are the only way to tell as you compare them to published benchmarks. For benchmarks to be equal, platforms must equal or very close.
2. When a motherboard has a defective external cache, memory slots that are not working, or a BIOS that cannot be configured, it's a good Indicator that the board is bad. Contact your dealer or manufacturer for a replacement.

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