Troubleshooting procedures

KT1701 Troubleshooting process

Identify the problem.

Establish a theory of probable cause.

Test the theory to determine the cause.

Establish a plan of action to resolve the problem and implement the solution.

Verify full system functionality and, if applicable, implement preventive measures

KT1702 Hardware tools required

Hardware Tools

For every job there is the right tool. Make sure that you are familiar with the correct use of each tool and that the correct tool is used for the current task. Skilled use of tools and software makes the job less difficult and ensures that tasks are performed properly and safely.

A toolkit should contain all the tools necessary to complete hardware repairs. As you gain experience, you learn which tools to have available for different types of jobs. Hardware tools are grouped into four categories:

ESD tools

Hand tools

Cleaning tools

Diagnostic tools

Figure shows some common tools used in computer repair.

Computer Tools

ESD Tools

There are two ESD tools: the antistatic wrist strap and the antistatic mat. The antistatic wrist strap protects computer equipment when grounded to a computer chassis. The antistatic mat protects computer equipment by preventing static electricity from accumulating on the hardware or on the technician.

Hand Tools

Most tools used in the computer assembly process are small hand tools. They are available individually or as part of a computer repair toolkit. Toolkits range widely in size, quality, and price. Some common hand tools and their uses are:

Flat-head screwdriver: Used to tighten or loosen slotted screws.

Phillips-head screwdriver: Used to tighten or loosen cross-headed screws.

Torx screwdriver: Used to tighten or loosen screws that have a star-like depression on the top, a feature that is mainly found on laptops.

Hex driver: Used to tighten or loosen nuts in the same way that a screwdriver tightens or loosens screws (sometimes called a nut driver).

Needle-nose pliers: Used to hold small parts.

Wire cutters: Used to strip and cut wires.

Tweezers: Used to manipulate small parts.

Part retriever: Used to retrieve parts from locations that are too small for your hand to fit.

Flashlight: Used to light up areas that you cannot see well.

Wire stripper: A wire stripper is used to remove the insulation from wire so that it can be twisted to other wires or crimped to connectors to make a cable.

Crimper: Used to attach connectors to wires.

Punch-down tool: Used to terminate wire into termination blocks. Some cable connectors must be connected to cables using a punch down tool.

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

Diagnostic Tools

Diagnostic tools are used to test and diagnose equipment. Diagnostic tools include the following:

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 2-3.Multimeter

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

The toner probe, as shown in Figure 2-4, is a two-part tool. The toner part is connected to a cable at one end using specific adapters, such as an RJ-45, coaxial, or metal clips. The toner generates a tone that travels the length of the cable. The probe part traces the cable. When the probe is in near proximity to the cable to which the toner is attached, the tone can be heard through a speaker in the probe.

Figure 2-4.Toner Probe

Although an external hard drive enclosure is not a diagnostic tool, it is often used when diagnosing and repairing computers. The customer hard drive is placed into the external enclosure for inspection, diagnosis, and repair using a known-working computer. Backups can also be recorded to a drive in an external enclosure to prevent data corruption during a computer repair.

KT1703 Software tools e.g. boot disks and system rescue, etc.

Software Tools

Like hardware tools, there are a variety of software tools that can be used to help technicians pinpoint and troubleshoot problems. Many of these tools are free and several come with the Windows operating system.

Disk Management Tools

Software tools help diagnose computer and network problems and determine which computer device is not functioning correctly. A technician must be able to use a range of software tools to diagnose problems, maintain hardware, and protect the data stored on a computer.

You must be able to identify which software to use in different situations. *Disk management tools* help detect and correct disk errors, prepare a disk for data storage, and remove unwanted files.

The following are some disk management tools:

FDISK: A command-line tool that creates and deletes partitions on a hard drive. The FDISK tool is not available in Windows XP, Vista, or 7. It has been replaced with the Disk Management tool.

***Disk Management Tool*:** Initializes disks, creates partitions, and formats partitions.

***Format*:** Prepares a hard drive to store information.

***ScanDisk or CHKDSK*:** Checks the integrity of files and folders on a hard drive by scanning the file system. These tools might also check the disk surface for physical errors.

***Defrag*:** Optimizes space on a hard drive to allow faster access to programs and data.

***Disk Cleanup*:** Clears space on a hard drive by searching for files that can be safely deleted.

***System File Checker (SFC)*:** A command-line tool that scans the operating system critical files and replaces files that are corrupted.

Use the Windows 7 boot disk for troubleshooting and repairing corrupted files. The Windows 7 boot disk repairs Windows system files, restores damaged or lost files, and reinstalls the operating system.

Third-party software tools are also available to assist in troubleshooting problems.

Protection Software Tools

Each year, viruses, spyware, and other types of malicious attacks infect millions of computers. These attacks can damage operating systems, applications, and data. Computers that have been infected may even have problems with hardware performance or component failure.

To protect data and the integrity of the operating system and hardware, use software designed to guard against attacks and to remove malicious programs.

Various types of software protect hardware and data:

***Windows 7 Action Center*:** Checks the status of essential security settings. The Action Center continuously checks to make sure that the software firewall and antivirus programs are running. It also ensures that automatic updates download and install automatically.

Antivirus program: Protects against virus attacks.

***Antispyware program*:** Protects against software that sends information about web surfing habits to an attacker. Spyware can be installed without the knowledge or consent of the user.

***Window 7 Firewall*:** Runs continuously to protect against unauthorized communications to and from your computer.

Worksheet Diagnostic Software

In this worksheet, you use the Internet, a newspaper, or a local store to gather information about a hard drive diagnostic program. Be prepared to discuss the diagnostic software you researched. Refer to the worksheet in *IT Essentials: PC Hardware and Software Lab Manual*, Fifth Edition.

Organizational Tools

Keeping accurate records and journals during a busy workday can be challenging. Many organizational tools, such as work-order systems, can help the technician document their

work.

Reference Tools

A technician must document all repairs and computer problems. The documentation can then be used as a reference for future problems or for other technicians who may not have encountered the problem before. The documents can be paper based, but electronic forms are preferred because they can be easily searched for specific problems.

It is important that a technician document all services and repairs. These documents need to be stored centrally and made available to all other technicians. The documentation can then be used as reference material for similar problems that are encountered in the future. Good customer service includes providing the customer with a detailed description of the problem and the solution.

Internal Assessment Criteria and Weight

• IAC1701 Troubleshooting procedures are explained

• IAC1702 Hardware and software tools and the respective functions are described

(Weight 2%)

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