

How to Use This Book

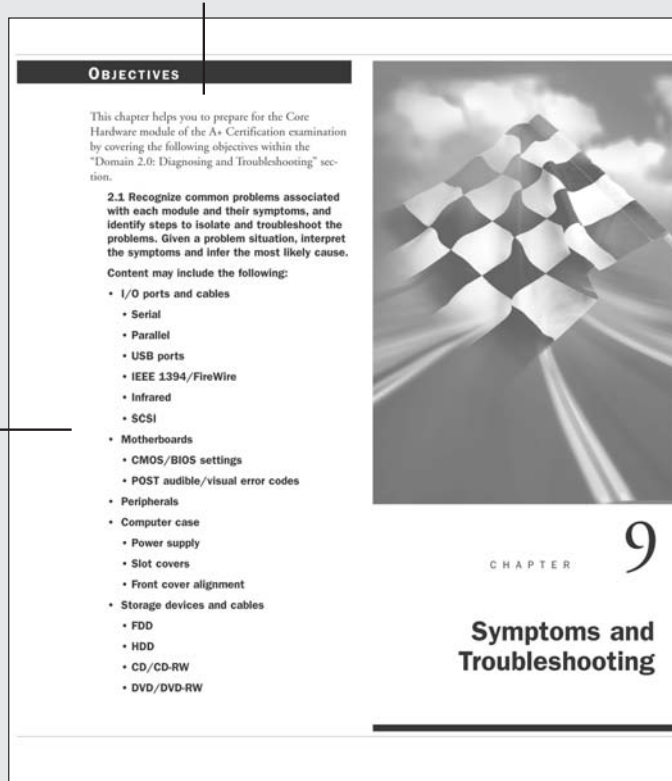
Que Certification has made an effort in its Training Guide series to make the information as accessible as possible for the purposes of learning the certification material. Here, you have an opportunity to view the many instructional features that have been incorporated into the books to achieve that goal.

CHAPTER OPENER

Each chapter begins with a set of features designed to allow you to maximize study time for that material.

List of Objectives: Each chapter begins with a list of the objectives as stated by the exam's vendor.

Objective Explanations: Immediately following each objective is an explanation of it, providing context that defines it more meaningfully in relation to the exam. Because vendors can sometimes be vague in their objectives list, the objective explanations are designed to clarify any vagueness by relying on the authors' test-taking experience.



OUTLINE	
Introduction	340
Isolating Power-Supply Problems	340
Checking Dead Systems	341
Other Power-Supply Problems	341
Troubleshooting the System Board	342
System Board Symptoms	343
Configuration Checks	345
Hardware Checks	347
RAM	348
Microprocessors	348
ROM	349
Microprocessor Cooling Systems	349
CMOS Batteries	351
Troubleshooting Keyboard Problems	352
Keyboard Symptoms	352
Basic Keyboard Checks	353
Keyboard Hardware Checks	353
Troubleshooting Mouse Problems	354
Problems with Port Connections	354
Problems with Correct Mouse Drivers	355
Problems with the Mouse Trackball	355
Problems with Mouse Buttons	355
Mouse Hardware Checks	356
Mouse Configuration Checks	356
Troubleshooting Video	357
Video Hardware Checks	359
Windows OS Video Hardware Problems	360
Troubleshooting Monitors	362
Diagnosing Monitor Problems	364
Troubleshooting Floppy-Disk Drives	365
Basic FDD Checks	366
Troubleshooting Hard-Disk Drives	367
HDD Configuration Checks	369
Basic HDD Checks	370
HDD Hardware Checks	371
Troubleshooting CD-ROM and DVD Drives	372
Basic Checks	372
Windows Checks	373
CD-ROM/DVD Hardware Checks	374
Writable Drive Problems	374
Troubleshooting Tape Drives	376
Troubleshooting Other Removable Storage Systems	378
Troubleshooting Port Problems	379
Port Problem Symptoms	379
Basic Port Checks	380
Basic Parallel Ports	381
Basic Serial Ports	382
Windows Parallel Port Checks	382
Windows Serial Port Checks	384
USB Port Checks	385
IEEE-1394 Adapters and Ports	387
Troubleshooting Infrared Ports	388

Chapter Outline: Learning always gets a boost when you can see both the forest and the trees. To give you a visual image of how the topics in a chapter fit together, you will find a chapter outline at the beginning of each chapter. You will also be able to use this for easy reference when looking for a particular topic.

OUTLINE	STUDY STRATEGIES
Troubleshooting Modems	389
Modem Symptoms	390
COM Port Conflicts	390
Windows Modem Checks	391
Communication Software	393
AT Command Set	393
Modem Hardware Checks	396
Troubleshooting Sound Cards	397
Sound Card Configuration Checks	397
Sound Card Hardware Checks	398
Troubleshooting Network Cards	399
Troubleshooting Portable Systems	400
Troubleshooting Touch Pads	402
Troubleshooting PCMCIA	402
Troubleshooting Portable Unique Storage	403
Troubleshooting Batteries	404
Troubleshooting Docking Stations/Port Replicators	405
Chapter Summary	407
Key Terms	407
Apply Your Knowledge	409
Review Questions	409
Answers and Explanations	413
Challenge Solutions	416
Suggested Readings and Resources	417
	<p>To prepare for the Diagnosing and Troubleshooting objective of the Core Hardware exam:</p> <ul style="list-style-type: none"> ▶ Use the Practice Test CD in the back of the book—At this point, use the exam material from this chapter to become comfortable in identifying the parts and components presented here. Later, you can use the test bank to get ready for the real exam. Work on this chapter until you consistently score 85–90% on the practice exams. ▶ Use all the traditional study tools we've placed in the chapter—Pay attention to the Objectives, Challenges and end-of-chapter questions and use them to learn the material. ▶ Use the pedagogy in this chapter to focus on the exam-specific material—We've included lots of features geared expressly to the A+ exam. The Exam Tips scattered throughout the chapter are placed there to point to known exam-related materials. The same is true of the embedded Challenge Items. ▶ Key in on Exam Tips in the chapter—While reading through this chapter, make sure to concentrate on the following test-related items: <ul style="list-style-type: none"> • Remember the first step of checking out electrical equipment that appears dead. • Memorize the standard IBM error code numbers used in this chapter. • Know what types of failures hard- and soft-memory errors are and know how they affect the system. • Be aware of the consequences of mixing RAM types within a system. • Know the effects on the system of heat buildup and microprocessor fan failures. • Be aware that a defective battery can cause the system to continually lose track of time. • Know the most common conditions that produce keyboard error messages.

Study Strategies: Each topic presents its own learning challenge. To support you through this, Que Certification has included strategies for how to best approach studying in order to retain the material in the chapter, particularly as it is addressed on the exam.

INSTRUCTIONAL FEATURES WITHIN THE CHAPTER

These books include a large amount and different kinds of information. The many different elements are designed to help you identify information by its purpose and importance to the exam and also to provide you with varied ways to learn the material. You will be able to determine how much attention to devote to certain elements, depending on what your goals are. By becoming familiar with the different presentations of information, you will know what information will be important to you as a test-taker and which information will be important to you as a practitioner.

Warning: In using sophisticated information technology, there is always potential for mistakes or even catastrophes that can occur through improper application of the technology. Warnings appear in the margins to alert you to such potential problems.

EXAM TIP

Remember the first step of checking out electrical equipment that appears dead.

Exam Tip: Exam Tips appear in the margins to provide specific exam-related advice. Such tips may address what material is covered (or not covered) on the exam, how it is covered, mnemonic devices, or particular quirks of that exam.

Note: Notes appear in the margins and contain various kinds of useful information, such as tips on the technology or administrative practices, historical background on terms and technologies, or side commentary on industry issues.

disk-drive cables for proper connection at both ends. In many systems, the pin-1 designation is difficult to see. Reversing the signal cable causes the FDD activity light to stay on continuously. The reversed signal cable also erases the master boot record from the disk, making it nonbootable. Because this is a real possibility, you should always use an expendable backup copy of the boot disk for troubleshooting FDD problems.

If a problem occurs reading or writing to a particular disk, try the floppy disk in a different computer to see whether it works in that machine. If not, the problem most likely has to do with the format of the disk or the files on the disk. In the case of writing to the disk, you could be dealing with a write-protected disk, but the system normally informs you of this situation when you attempt to write to it. However, if the other computer can read and write to the disk, you must troubleshoot the floppy-drive hardware.

Hardware troubleshooting for floppy-disk drives primarily involves exchanging the FDD unit for another one that is working. If necessary, exchange the signal cable with a known-good one. Finally, the only other option with most PC-compatible systems is to exchange the system board with a known-good one.

TROUBLESHOOTING HARD-DISK DRIVES

Typical symptoms associated with hard-disk drive failures include the following:

- ▶ The computer boots up to a system disk in the A: drive but not to the hard drive, indicating that the system files on the HDD are missing or have become corrupt.
- ▶ The computer does not boot up when turned on.
- ▶ An IBM-compatible 17xx error code is produced on the monitor screen.
- ▶ No motor sounds are produced by the HDD while the computer is running. (In desktop units, the HDD should always run when power is applied to the system; this also applies to portables because of their advanced power-saving features.)

NOTE

If the system has a second floppy-disk drive, turn it off and exchange the drive's connection to the signal cable so that it becomes the A: drive. Try to reboot the system using this other floppy-disk drive as the A: drive.

WARNING

Before changing any board or connection, always turn off the system first. In an ATX-style system, you should also disconnect the power cable from the power supply. This step is necessary because even with the power switch off, some levels of voltages are still applied to the system board in these units.

printing. In Windows, this task involves sharing the printer with the network users. The local computer that the printer is connected to, referred to as the *print server*, should appear in the Windows 9x Network Neighborhood window of the remote computer. If the local computer cannot see files and printers at the print server station, file and print sharing may not be enabled there.

EXAM TIP

Be aware that not having file and print sharing enabled prevents other computers on the network from "seeing" your computer across the network.

In Windows 9x/Me, you can enable file and printer sharing at the print server in a number of ways. First, double-click the printer's icon in the My Computer window or the Windows Explorer screen. Select the Printer, Properties, Sharing option and then choose the desired configuration. For the second method, right-click on the printer's icon, select Share from the context menu, and then choose the desired configuration. The final method is similar except that you right-click the printer's icon, click on Properties and Sharing, and then choose the configuration.

The print server may not have enough memory or hard-drive space available. In Windows 9x/Me systems, check the *spool settings*, shown in Figure 31.4, by opening the Control Panel; selecting Printers, Properties; and then selecting Details. If the spooler is set to EMF, set it to RAW spooling. If the print spool is set to RAW, turn off the spool by clicking the Print Directly to the Printer radio button. Then click the OK button and try to print a test page. If the unit prints the test page from the local print server, use the ScanDisk utility to check the disk space. Clear the contents of the \Temp directory.

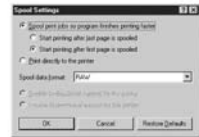


FIGURE 31.4
Windows 9x Spool Settings.

If the local print server operation is working correctly, verify the operation of the network by attempting to perform other network functions, such as transferring a file from the remote unit to the print server. In a client/server network, users at a remote client computer may not be able to print to a print server across the network due to insufficient permission settings. Check with the network administrator to verify that permissions are present to enable remote printing using the network.

In Windows 9x/Me, open the Control Panel's Printer folder on the remote computer, right-click on the desired printer, and select the Properties entry from the drop-down File menu. Check the printer's information under the Details and Sharing tabs. If this information appears to be correct, click the Print a Test Page button on the General tab of the printer's Properties page.

Figure: To improve readability, the figures have been placed in the margins wherever possible so they do not interrupt the main flow of text.

CHALLENGE #2

You have upgraded your mouse to one of those new two-button wheel mice, and you cannot get it to work. You return it to the distributor and exchange it for another one. It also does not work. When you try one from your co-worker's machine, it works fine. What should you conclude about the wheel mouse?

Refer to the "Challenge Solutions" section at the end of this chapter for the resolution to the challenge.

Challenge: Challenges provide you with a problem-solving scenario in which you must analyze a situation and suggest a solution. Answers appear at the end of the chapter.

EXTENSIVE REVIEW AND SELF-TEST OPTIONS

At the end of each chapter, along with some summary elements, you will find a section called “Apply Your Knowledge” that gives you several different methods with which to test your understanding of the material and review what you have learned.

CHAPTER SUMMARY

This chapter presented typical symptoms and standard troubleshooting procedures for various system hardware components. It included troubleshooting procedures such as software, configuration, and hardware segments for each device. The procedures for most of the devices included related software troubleshooting information associated with command prompt and Windows-level procedures.

At this point, review the objectives listed at the beginning of the chapter to be certain that you understand each point and can perform each task listed there. Afterward, answer the review questions that follow to verify your knowledge of the information.

KEY TERMS

- AT command set
- ATDT*70
- ATZ
- Auto-configuration
- BIOS defaults
- Bus mouse
- Cable Select
- Clean boot disk
- CMOS setup
- COMMAND.COM
- Conflicting Device list
- Degaussing

Chapter Summary: Before the Apply Your Knowledge section, you will find a chapter summary that wraps up the chapter and reviews what you should have learned.

Key Terms: A list of key terms appears at the end of each chapter. These are terms that you should be sure you know and are comfortable defining and understanding when you go in to take the exam.

Review Questions: These open-ended, short answer questions allow you to quickly assess your comprehension of what you just read in the chapter. Instead of asking you to choose from a list of options, these questions require you to state the correct answers in your own words. Although you will not experience these kinds of questions on the exam, these questions will indeed test your level of comprehension of key concepts.

Chapter 9 SYMPTOMS AND TROUBLESHOOTING 409

APPLY YOUR KNOWLEDGE

Review Questions

1. What is the first step in checking out electrical equipment that appears dead?
 - A. Check the power-supply connection to the motherboard.
 - B. Check the motherboard battery.
 - C. Check to see that the power cord is plugged in.
 - D. Check to see that the power light is on.
2. What does a 201 error code indicate?
 - A. invalid switch memory error
 - B. DMA controller error
 - C. CMOS checksum test error
 - D. RAM failure
3. What types of failures are hard-memory errors?
 - A. infrequent errors in the OS and applications
 - B. RAM failures that generate NMI errors
 - C. errors in the storage and retrieval of data to the hard drive
 - D. errors caused by a physical jolt to the system
4. How can you correct soft-memory errors?
 - A. Replace the microprocessor.
 - B. Remove all RAM modules.
 - C. Replace all RAM modules.
 - D. Restart the computer.
5. What are the consequences of mixing RAM types and speeds within a system?
 - A. There is no effect.
 - B. The system runs slower.
 - C. Only part of the RAM is recognized by the system.
 - D. The system crashes.
6. What are the effects of heat buildup and microprocessor fan failure on the system?
 - A. The system locks up.
 - B. The system shuts down.
 - C. The system restarts.
 - D. The system slows down.
7. A defective _____ can cause the system to continually lose track of time.
 - A. RAM module
 - B. microprocessor
 - C. battery
 - D. BIOS ROM
8. What is a common condition that produces a keyboard error message?
 - A. The operating system keyboard settings are incorrect.
 - B. A key is stuck down.
 - C. A key is stuck open.
 - D. The keyboard is plugged in wrong.
9. Which of the following connectors are used for devices that can be hot-swapped?
 - A. 5-pin DIN
 - B. 6-pin PS/2 mini-DIN

APPLY YOUR KNOWLEDGE

- C. Exchange the monitor with a known-good one of the same type.
 D. Replace the power supply with a known-good one of the same type.
34. Booting to Windows results in a distorted image that prevents you from manipulating the operating system. What can you do to correct this problem?
 A. Reboot the system to the command line.
 B. Boot to Safe Mode and reinstall/configure the drives.
 C. Replace the video card.
 D. Replace the monitor.
35. An Energy Star-compliant monitor _____
 A. uses more energy than non-ESC monitors
 B. shuts off automatically
 C. adjusts for room lighting automatically
 D. switches to low-power mode when no signal change occurs for a given period of time
36. In newer systems, where is SCSI drive support and large drive support enabled?
 A. in the Device Manager
 B. in the CMOS Setup utility
 C. in the `COMS.BIOS` file
 D. in the Registry
37. Which AT command is used to reset a modem?
 A. ATZ
 B. ATM

- C. ATW
 D. ATT

Answers and Explanations

- C. Begin by checking the external connections of the power supply. This is the first step in checking any electrical equipment that shows no signs of life. For example, confirm that the power-supply cord is plugged into a functioning outlet and check the position of the On/Off switch.
- D. A 201 error code display indicates a RAM failure.
- B. Soft-memory errors are caused by infrequent and random glitches in the operation of applications and the system. You can clear these events just by restarting the system. Hard-memory errors are permanent physical failures that generate NMI errors in the system and require that the memory units be checked by substitution.
- D. You can clear soft-memory errors just by restarting the system.
- D. Make sure that the replacement RAM is consistent with the installed RAM. Mixing RAM types and speeds can cause the system to lock up and produce hard-memory errors.
- A. If the system consistently locks up after being on for a few minutes, this is a good indication that the microprocessor's fan is not running or that some other heat buildup problem is occurring.
- C. A defective motherboard battery can cause the system to continually lose track of time.

Answers and Explanations: For each of the Review and Exam questions, you will find thorough explanations located at the end of the section.

Suggested Readings and Resources: The very last element in every chapter is a list of additional resources you can use if you want to go above and beyond certification-level material or if you need to spend more time on a particular subject that you are having trouble understanding.

APPLY YOUR KNOWLEDGE

Suggested Readings and Resources

- | | |
|--|---|
| 1. Troubleshooting
http://www.pcmach.com/troubleshoot.htm | 10. Troubleshooting Floppy Drives
http://support.microsoft.com/default.aspx?scid=kb;EN-US;q31499 |
| 2. Technical Library
http://www.pctusa.com/techlib.htm | 11. Troubleshooting HDDs
http://www.comsysystechnic.com/troubleshooting/hardware/hd_0_and_1.html |
| 3. General Troubleshooting Techniques
http://www.pcpguide.com/ts/gen/index.htm | 12. Troubleshooting CD-ROM Drives
http://www.techadvice.com/tech/C/CDROM_TS.htm |
| 4. Hardware Installation and Troubleshooting
http://citabria.westmont.edu/tech/hardware.html | 13. Troubleshooting Floors
http://www.pcpguide.com/ts/x/comp/so.htm |
| 5. Troubleshooting the Motherboard and System Devices
www.pcpguide.com/ts/x/comp/mobsys/index.htm | 14. Troubleshooting Scanners
http://www.watershield.com/04ides/Trouble_Shooting/scanner/scanners.htm |
| 6. Troubleshooting Keyboards
http://www.pcpguide.com/ts/x/comp/kb_failure.htm | 15. Troubleshooting Tape Drives
http://vtstate.stsci.edu/documents/000/00_54.html |
| 7. Problems with a Mouse
www.colosys.net/computeraid/te.htm | 16. Troubleshooting Modems
http://www.modemsite.com/56k/trouble.asp |
| 8. Troubleshooting Video Cards
http://www.pcpguide.com/ts/x/comp/video/index.htm | 17. Troubleshooting Sound Cards
http://netlab.gmu.edu/classwise/sound_cards.html |
| 9. TV and Monitor Information
http://ftp.unina.it/pub/electronics/repairfaq/REPAIR_f_crtfaq.html | |

APPLY YOUR KNOWLEDGE

36. **B.** Check the CMOS Setup utility to make sure that SCSI support has been enabled, along with large SCSI drive support.
37. **A.** AT commands are entered at the command line using an ATnn format. The nn nomenclature identifies the type of command being given (n) and the particular function to be used (n). The ATnn commands reset the modem by loading new default initialization information. At the command line, just type ATZ to reset the modem. You should receive a # or OK response if the command was processed.

supply is working (although you might want to revisit these assumptions in some rare cases). The sound of the single beep indicates that the system has made it through the POST test and that most of the basic hardware (including the video controller) is working; however, the POST tests cannot check the monitor's internal operation (only its video adapter). Therefore, you should bring a replacement monitor to swap out the existing one. The presence of the light on the monitor indicates only that it is plugged in and turned on—not that it is working. If swapping the monitor does not clear up the problem, check the video driver to make sure that it is correct and replace the video adapter card last.

4. Check the drive to make sure that the master/slave jumper setting is set properly for the drive's logical position in the system. There can be only one master drive selection on each IDE channel. If you have more than one device attached to a single interface cable, make sure that all the devices are of the same type (for example, all are EIDE devices or all are ATA-100 devices). Mixing IDE device types can create a situation in which the system cannot provide the different types of control information each device needs. The drives are incompatible, and you may not be able to access either device.
5. You must be aware that having different devices share the same resources can lead to intermittent failures. Verify that they are set correctly for the installation. Run a diagnostic program or examine the Device Manager in Windows operating systems to check for resource conflicts that may be preventing the sound card from operating (such as IRQ and base memory addressing).

Challenge Solutions: A solution is presented for each challenge as well as an explanation for the solution

Challenge Solutions

1. You should tell the customer that you think his system board battery is defective or that its charging circuitry is bad. If a system refuses to maintain time and date information, check the backup battery and check the contacts of the battery holder for corrosion. Tell the customer to remove the system board battery if possible and clean its contacts by using a contact cleaner or gently using a pencil eraser. If cleaning the battery terminals does not cause the clock to keep proper time, replace the battery with a new one and allow it to completely charge.
2. If you install a new mouse in a working system, and it does not work when you restart the system, chances are very high that the driver software or a port configuration setting must be the cause of the failure.
3. Because the system's light comes on, and the hard drive spins, you can at least initially conclude that the system has power and that the power

