# A+
# Certification
# Information

# TABLE OF CONTENTS

# A+

Certification is a testing program sponsored by the Computing Technology Industry Association (CompTIA) that certifies the competency of service technicians in the computer industry. Anyone who wants a nationally-recognized credential as a competent computer service professional can take the A+ exams. The program is backed by major computer hardware and software vendors, distributors, resellers and publications, as well as a leading industry service organization, the Association of Field Service Management, Inc. The test, which is administered by Drake Prometric (Bloomington, MN), was first available in July 1993, with periodic updates since then.

Earning A+ certification means that you possess the knowledge, skills, and customer relations skills essential for a successful computer service technician, as defined by experts from companies across the industry. The exams cover a broad range of hardware and software technologies, but are not related to any vendor-specific products. More than 40 organizations have contributed time and budget resources to develop the A+ computer-based tests.

To become certified, you must pass two test modules Ð the Core and one of two other specialties, either the Microsoft™ Windows®/DOS® module or the Macintosh™ module. When candidates pass the Core plus a specialty, they receive a certificate that mentions the specialty module they passed, such as

*"A+ Certification Exam with a specialty in Microsoft™ Windows®/DOS® environments"*

*"A+ Certification Exam with a specialty in Macintosh™ OS-based Computers"*

Individuals who were already A+ certified when the enhanced exams 'went live' in April 1995 need not retake the test to remain A+ certified.

Candidates for certification may register by phone by calling 1-800-77-MICRO (1-800-776-4276) and schedule their testing session at a Drake Authorized Testing Center, in any of the 50 states nationwide, and in 150+ other countries worldwide. Candidates who pass the two computer-based test modules become certified, demonstrating basic knowledge of configuring, installing, diagnosing, repairing, upgrading, and maintaining microcomputers and associated technologies.

## What is CompTIA?

The Computing Technology Industry Association, based in Lombard, IL (a Chicago suburb), is a not-for-profit international trade association of close to 6,150 members, serving all segments of the computer industry. Members of the Association, located in all 50 states and Canada, represent every major company that manufactures, distributes, publishes or resells computer-related products and services. A 13 year-old, industry-wide umbrella organization, CompTIA's mission is to foster high levels of professional competence and business ethics among its members and the computer industry.

The Association was formed to encourage professionalism, sound business practices, and fair and honest treatment of customers, resellers, and vendors. CompTIA committees, sections and task forces deal with issues affecting the computer industry and act as a representative voice for members and the industry as a whole.

In 1994, the Association began an aggressive expansion cycle in the areas of certification, public policy, and standardization. In addition, CompTIA was named to the "Associations Advance America" Honor Roll in recognition of five of its outstanding programs. Sponsored by the American Society of Association Executives (ASAE), the awards honor significant contributions made to society by associations. Among the programs that CompTIA was cited for is the hallmark A+ Certification Program. For more information on the Association's programs and benefits, call the Computing Technology Industry Association at (708) 268-1818, ext. 301.

## Why certification is important

Individual service technicians gain valuable benefits from becoming A+ certified, including:

- *Recognized proof of professional achievement:* The A+ credential validates that the holder has reached a level of competence commonly accepted and valued by the industry.

- *Enhanced job opportunities:* Many employers give preference in hiring applicants with A+ Certification. Some employers may require A+ as a condition of employment. They view A+ as proof that a new hire knows the procedures and technologies required to be a successful computer service technician.

- *Opportunity for advancement:* The A+ credential can be a plus when an employer awards job advancements and promotions.

- *Training requirement:* A+ Certification may be required as a pre-requisite to attending a vendor's training course, so employers will offer advanced training to those employees who are already A+ Certified.

- *Customer confidence:* As the general public learns about A+, customers will require that only certified technicians be assigned to their accounts. The technician then arrives at a client site already known as a competent computer service professional.

The industry also gains benefits from the widespread acceptance of the A+ credential, including:

- *Lower training costs:* Resellers and other employers of service technicians can save money and increase productive work-time when vendors eliminate redundant, time-consuming base-level training and instead require A+ Certification as a pre-requisite.

- *Customer satisfaction:* When employees have a credential that proves their competency, customer expectations are more likely met. More business may then be generated for the employer through repeat sales to these satisfied customers.

- *Self-regulation of the industry*: Several states have proposed legislation that would regulate the microcomputer industry. A self-regulating industry that certifies its own members with a program such as A+ can often minimize such government-imposed controls.

## Who may take the tests

A+ Certification is open to anyone who wants to take the tests. No specific requirements are necessary, except payment of the fee. Individuals may retake the test modules as often as they like, but the Core and one specialty must be passed within 90 days of each other in order to become certified.

## How the program was developed

Developing the A+ service technician test modules is a rigorous, continuous and thorough process, resulting in statistically-proven validity and reliability. A long list of CompTIA member companies, including the world's largest computer vendors, distributors, resellers, and third-party maintenance organizations, joined together to develop the A+ test. Committees consisting of CompTIA members spent hundreds of hours to develop a Certification program that is relevant to the industry as a whole. They contributed enormous resources to ensure that all aspects of the A+ Certification exams meet the highest quality standards. Hands-on service technicians from manufacturers and resellers defined the test content.

The questions were written by experts in the field of microcomputer service. A multi-level review process for all the questions ensured that they are accurate as well as psychometrically sound. Those who participated in writing the questions and reviewing them are confident that candidates will find the tests tough but fair.

The representatives from CompTIA, with the assistance and advice of Drake Prometric experts who administer the test, prepared the examination. The two organizations jointly hold responsibility for its validity.

## Organizations
## Supporting A+

The following is a list of the organizations that have funded the development of and on-going enhancements to the A+ Certification program:

*American Institute
American Power
*Apple Computer, Inc.
*AT&T Global Information Systems (formerly NCR/AT&T)
Aurora/Century Computer Marketing
Banctec Service Corp.
*Compaq Computer Corporation
*Computer Reseller News (CMP Publications, Inc.)
*CompuCom Systems Inc.
*CompUSA
Computer Curriculum Corporation
*Conner Peripherals
*Data Train Institute
*Digital Equipment Corporation
*Entex Information Services
Epson America, Inc.
*Exide Electronics Group Inc.
GE Capital Technology Service
*GE Information
*Hayes Microcomputer Products, Inc.
Heath Co.
*Hewlett-Packard Company
IBM Education & Training
*IBM PC Company, N.A.
*InaCom Corporation
*Ingram Micro Inc.
*Intel Corporation, Inc.
*Intelligent Electronics, Franchise Division, Inc.
*Learning Tree
Lexmark
*MicroAge Inc.
*Microsoft Corp.
OKIDATA
*Packard Bell Electronics
PC Parts Express
Permond Solutions Group Inc.
*PC Week (Ziff-Davis Publishing)
Self Test Software
*Service News
SHL Technical Service
*Systems & Support Management
*Tandy Services/Computer City
TechForce
*Technology Service Solutions
*Toshiba America Information Systems Inc.
*U.S. Robotics Inc.
*VAR Business (CMP Publications, Inc.)
VanStar
Wang Laboratories
*Wave Technologies
Wurts & Associates
Zenith Data Systems/Groupe Bull

* A+ Cornerstone Funding Partner                    (as of 5/1/95)

### Call 1-800-77-MICRO

To register to take any A+ test, call this number and talk to a Drake Prometric registrar. The registrar provides information about the tests and finds a convenient testing center and time for you to take your test. You schedule an appointment to take the exams and arrange for payment of the testing fee.

Please have the following information handy when you call:

- Social Security number
- Complete mailing address and phone number
- Employer or organization
- Date you want to take the test
- Method of payment (credit card number or check)

You must pay for a test before you take it. Payment is made at the time of registration, either by giving a credit card number or by requesting an invoice be sent to you or your employer. Vouchers and coupons are redeemed at this time, when applicable.

An exam must be taken within six months of payment. Scheduling may be arranged up to six weeks in advance. After making an appointment for an exam, you will receive verbal instructions about the cancellation procedures and directions to the testing center location.

## Test fees

The fee for taking the A+ Certification tests differs according to whether or not individuals are employed by organizations that are members of CompTIA. Also, taking two or three modules at one seating saves money. The current pricing schedule is:

| | For those employed by CompTIA member organizations | For non-members |
|---|---|---|
| Any module alone | $90 | $100 |
| Core + 1 module | 150 | 165 |
| Core + 2 modules | 195 | 215 |
| 2 modules | 150 | 165 |

Pay for the A+ test at the same time you call to register. You may use a credit card or have an invoice sent to you or your employer. If you have an invoice sent, you can pay by check. Remember that you cannot schedule time at the testing center until Drake has received your payment in full.

## Cancellation Policy

You may cancel or reschedule a test no later than 48 hours prior to the test date. If you cancel or reschedule later than 48 hours prior to the test date, you will forfeit your payment.

## Taking the test

You should arrive at the testing center at least 15 minutes before the test is scheduled to begin. You should identify yourself to the administrator of the testing center; you will then have an opportunity to learn how to use the computer-based testing system before your actual test begins.

Bring two forms of identification with you. One form should be a photo ID, such as a valid driver's license or a passport. The other can be a major credit card.

Books, calculators, laptop computers, or other reference materials are not allowed during any A+ test. Because the tests are computer-based, you will not need pens, pencils, or paper.

## After the test

As soon as you finish a test, you receive the final score. You see the results immediately on the computer screen. In addition, a hard copy of the score report is provided at the testing center.

The score report shows whether you passed the exam or not. You can also see how well you did on each section of the test.

The score report looks like this.

After you pass the Core exam and one specialty module, an A+ Certification certificate will be mailed to you within a few days. You will also receive a lapel pin and credit-card sized credential that shows you are A+ certified.

If you do not pass the exam, you can register at any time to take the exam again. *But the Core and specialty module must be taken within 90 days of each other.* If you fail to pass both exams within 90 days, you will not be granted certification. You would then have to retake the Core exam, even if you had passed it previously, as well as retake the specialty module.

The A+ Service Technician exams cover generic content areas. The Core module content covers procedures and information about technologies that are not related to vendor-specific products. Instead, the Core test is a tool to demonstrate your fundamental knowledge related to the tasks of a computer service technician, without regard for brand of products.

The specialty modules focus on the tasks of a computer service technician that are related to operating system environments commonly encountered in the industry: Microsoft™ Windows®/DOS® environments and the Mac™ operating system.

Even though the tests are designed to cover fundamental level knowledge and skills, they are still challenging.

# A+ Core Exam

*Technologies:*
The technologies covered in the test include:
- microcomputers
- displays
- storage media
- printers
- basic operating systems (DOS, Windows, Macintosh)
- modems
- buses
- CD-ROM

*Sections:*
The exam is divided into sections with groups of related questions. These sections correspond to a technician's areas of job responsibility including:
- configuration
- installing and upgrading
- diagnosis
- repair
- preventive maintenance
- interaction with customers
- safety

# A+ Core Exam
## Sections and Topics
In order to help you understand what is being tested, main topics covered in each section of the A+ Core exam are listed below.

**Configuring Section**
This section tests your knowledge of the following functions, modules and procedures:
- most common microcomputer field replaceable units (FRUs), their functions, and failures
- displays (monitors), storage devices, printers, modems, CD-ROMs, and NICs (network interface cards) and their functions
- connectors, ports and devices, and their functions
- testing parameters, distinguishing normal from abnormal operations
- performance of mechanical and electrical
- connections
- use of proper system setup tools, including visual inspections, documents, and diagnostics
- securing a system for transport

**Installing and Upgrading Section**
This section of the A+ Core exam tests your knowledge of these topics:
- common drivers used by MS-DOS and Macintosh computers
- functions of common peripheral ports, their symbols and their connectors
- parts and functions of a system board
- correctly set jumpers
- upgrades and performance enhancements to system logic board processors

**Diagnosis Section**
This portion of the A+ test lets you demonstrate know-how in these areas:
- proper questioning techniques of customers for problem determination
- common visual and audio indicators of system malfunction
- basic functions and use of a multimeter
- environmental hazards to a computer system

- sequence of steps for logical troubleshooting
- diagnosis of a faulty printer, memory problem, faulty monitor and other peripherals
- determination of hardware vs. software problem

## Repair Section

This section questions you about:
- correct microcomputer components required to repair specific problems
- conditions and procedures necessary to swap out and/or repair suspected problem components
- steps in a generic repair process
- appropriate use of electrical safety, system safety, personnel, parts, and ESD (electrostatic discharge)
- major functions of each of the field replaceable system modules

## Preventive Maintenance Section

This section tests your knowledge of:
- common preventive maintenance routines for microcomputers — such as vacuuming, cleaning screens, keyboards, covers
- preventive maintenance routines for dot matrix and laser printers

## Interaction with Customers Section

- This section of the A+ Core exam asks you about:
- courteous responses to customers
- handling service calls and requests for additional service
- strategies to minimize disruption to customer operations
- handling a hostile customer situation

## Safety Section

This part of the exam tests your knowledge of:
- basic ESD protection procedures, tools, and technology
- potential risks to equipment
- disposal procedures for batteries, CRTs, etc.
- potential hazards working with displays, printers and other equipment
- proper steps to discharge a CRT

# Microsoft™ Windows®/ DOS® Specialty Exam

This specialty module tests your knowledge of Windows® Version 3.1 and DOS® Version 6.x, covering the following topics in four Sections: Configuring, Installing and Upgrading, Diagnosis, and Repair.

## Configuring Section

- appropriate hardware system components and set-up procedures
- appropriate commands and parameters to initialize media and back up data
- software configuration tools and commands
- major system files and how they are used
- methods of system optimization

## Installing and Upgrading Section

- system upgrade potential and compatibility of installable components
- commonly used drives and their functions
- methods for upgrading Windows® and DOS®

## Diagnosis Section

- common questions for determining customer problems
- common hardware and software failures
- system boot sequences

## Repair Section

- methods for replacing hardware components (FRUs)
- methods for solving software problems

## Macintosh™ OS-based

## Computers Specialty Exam

This specialty module tests your Mac™ OS-based Computers knowledge and skills on the following topics, in four Sections: Configuring, Installing and Upgrading, Diagnosis, and Repair.

**Configuring Section**
- steps for setting up Macintosh™ system hardware, including peripheral devices
- steps for installing system software
- steps for performing a "clean install" of the Macintosh™ OS
- proper utilities and system tools for setup
- key elements in Chooser related to changing configurations
- initializing and copying media types
- connecting to a network
- steps for upgrading
- hardware differences between Mac systems

**Installing and Upgrading Section**
- functions of steps in system startup sequence
- components of Macintosh™ OS and their functions
- functions and options of Chooser and Control Panel
- common inits and extensions and their functions
- special boot procedures and when to use them
- features and functions of various Mac OS versions
- common commands in applications
- features of the Desktop and their functions

**Diagnosis Section**
- common questions to determine customer's system problem
- likely meaning of common error codes, startup messages, icons, and the course of action required to correct error
- visual and audio indicators of common system malfunctions
- steps and/or tools to isolate software problems
- when to use Apple HDSC Setup, disk First Aid, and other utilities for hard drives

**Repair Section**
- correct modules, components, and utilities for repairing a given problem

## Test format

The A+ tests are administered on a computer at a Drake Authorized Testing Center, in an easy-to-use format.

**Computer-based format**
The format of the tests on the computer looks very much like other multiple-choice exams you have taken before. The difference is, you take this exam on a desktop computer connected into a testing network, where all the data is stored centrally and securely.

Directions for using the testing software are displayed on the screen. A tutorial is provided as well as the assistance of a nearby proctor. On-screen "help" is also available, including information at the bottom of the screen that lets you know how to enter your answer, move forward in the test, mark a question for answering later, or review a previous question. Of course, the software tells you how to enter the answer, not what answer to enter.

The A+ Core exam includes approximately 70 questions, all multiple-choice. The exact set and sequence of questions varies with each sign-on.

The A+ specialty modules (Windows®/DOS® and Macintosh™ OS) include approximately 50 questions each, all multiple-choice.

Every question has at least one correct answer provided in the list of alternative choices you are given on screen.

**Question formats**
Each question appears in one of the following three formats:
- Situational
- Traditional
- Identification

*Situational questions* describe a situation or scenario commonly encountered by service technicians while on the job. Your choice of answers will list different ways to resolve the problem or situation.

> *Example:* When you power up the system, the attached display remains blank. You're not sure whether it is a system unit or a display problem, but you can quickly decide which it is by:

a. turning the contrast control all the way up to the test position
b. installing a wrap connector onto the end of the display cable
c. unplugging the signal cable from the system unit, then powering the display
d. running the video tests on the diagnostic diskette
> [correct answer: "c"]

*Traditional multiple-choice questions* appear most commonly on the test. These questions ask you to fill in the blank or pick the correct answer to a question from a given list of choices.

> *Example:* What component determines the type of monitor to be used?

a. parallel controller      c. serial controller
b. memory board             d. video controller
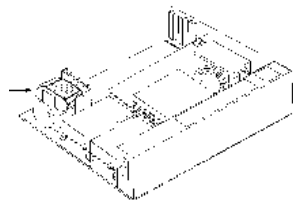> [correct answer: "d"]

*Identification questions* may include a diagram, flowchart, or illustration with several items called out with arrows, numbers or letters. You are asked to choose the answer that correctly identifies what is being shown or described in the question.

> *Example:* [A graphic of the inside of a PC is shown on screen.]

The item pointed out is a _____.

a. battery
b. central processing unit
c. floppy disk drive
d. mass storage
[correct answer: "a"]

No matter what the format of the question, there will be at least one correct answer and your challenge is to select it. When there are multiple correct answers, a message at the bottom of the screen tells you to "choose all that apply." Be sure to read the messages.

## Sample questions

Here are ten sample questions of the type found on the A+ Certification tests. They are for practice only and will not appear on your test. They are similar to ones you will find there.

**A+ Core Exam Sample Test Questions:**
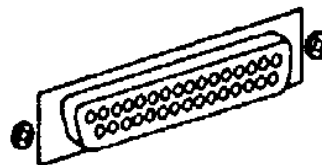
1. Which describes the connector shown in the picture? (Choose all that apply.)
   a. A 50-pin SCSI connector.
   b. An external peripheral connector.
   c. A serial printer connector.
   d. A connector used in daisy-chaining devices.

2. On plastic frame machines, where is it proper to attach the ESD wristband cord?
   a. To the plastic frame.
   b. To earth ground.
   c. To the power cord.
   d. To the monitor frame.

3. When you arrive on-site at 10:00 a.m. to service a dead computer, you realize it needs to go back to the shop for repairs. What can you do to minimally disrupt the customer's operations?
   a. Take it back immediately and begin repairs.
   b. Come back at 5:00 p.m. and take it then.
   c. Come back during lunch and take it.
   d. Pick it up before work the next day.

4. What are good preventive maintenance procedures for printers? (Choose all that apply.)
   a. Check to see if cooling fan (if installed) is working.
   b. Check toner to see if it's full.
   c. Use a small vacuum to keep paper dust from collecting in the paper route.
   d. Lubricate every moving part.

## Microsoft™ Windows®/DOS®
## Specialty Exam Sample Test Questions:

5. To make a program launch automatically immediately after Windows initializes _____. (Choose all that apply.)
   a. Add its name to the AUTO= line in the WIN.INI file.
   b. Add its icon to the STARTUP program group.
   c. Add its name to the RUN= line in the WIN.INI file.
   d. Add its icon to the AUTOEXE program group.
   e. Add its name to the LOAD= line in the WIN.INI file.

6. Which file contains the commands that configure a computer's hardware components?
   a. CONFIG.SYS
   b. DOSSHELL.EXE
   c. SETVER.EXE
   d. COMMAND.COM

7. When you begin to diagnose a computer problem, what is the best way to differentiate between a hardware and a software problem?
   a. Upgrade the operating system.
   b. Format drive C: and reload software.
   c. Replace the system board.
   d. Boot from a 'clean boot' diskette.

## Macintosh™ OS-based Computers
## Specialty Exam Sample Test Questions:

8. A customer complains that a lot of paper jams are occurring on her LaserWriter printer. What are possible causes that can be fixed by the customer? (Choose all that apply.)
   a. Fuser assembly too hot.
   b. Too much paper in cassette.
   c. Paper size incorrectly indicated in 'Page Setup' dialog box.
   d. Paper that is damp or wrinkled.
   e. Dirty fuser cleaning rod.

9. In a Macintosh system, how does a hard drive startup disk differ from a hard drive that is not a startup disk?
   a. A startup hard drive must be initialized with a special file system.
   b. The startup drive contains the System File and Finder applications.
   c. The startup hard drive must have an interleave ratio that matches the computer, but a disk that is not a startup disk can have a different interleave ratio.
   d. The startup hard drive must be connected directly to the computer; hard drives that are not startup disks can be daisy-chained.

10. A Macintosh PowerBook's main battery will not recharge while the computer is connected to a known-good power adapter and power source. Replacing the battery does not solve the problem. Of the components listed below, which is most likely to be at fault?
   a. RAM expansion card.
   b. Logic board.
   c. Keyboard.
   d. Modem on/off PCB.

| Here are the correct answers to the sample questions: | | | |
|---|---|---|---|
| 1. | a, b, d | 6. | a |
| 2. | a | 7. | d |
| 3. | a | 8. | b, d |
| 4. | a, b, c | 9. | b |
| 5. | b, c, e | 10. | b |

## Tips for test-taking

Here are six points to remember about taking multiple-choice tests, such as A+:

- Answer all questions.  An unanswered question is scored as an incorrect answer.
- Guess if you have to.  There is no penalty for guessing.
- Answer the easy questions first.  The testing software lets you move forward and backward through the exam.  Go through all the questions on the test once, answering those you are sure of first, then go back and spend time on the harder questions.
- Don't try to "psych-out" the questions.  There are mo trick questions.  The correct answer will always be among the list of choices.
- Eliminate the most obvious incorrect answers first.  This will make it easier for you to select the answer that seems most right to you.
- And finally, remember if you don't pass this time, you can take the exam again for an additional fee.

## Studying for the A+ Tests

One of the best ways to prepare for the A+ exams is to look over the list of sections or categories the tests cover: configuring, installing, upgrading, diagnosis, repair, preventive maintenance, interaction with customers, and safety.

If you feel you need to increase your knowledge in any of those categories, there are a number of industry organizations that offer training - both self-study and classroom.  And because of the widespread acceptance of the A+ Certification program, more and more companies are entering this training arena everyday.  In order to get the most up-to-date listing of the organizations that provide training for the A+ Certification exams, please contact the Computing Technology Industry Association at:

**Phone: (708) 268-1818
ext. 301
Fax: (708) 268-1384**

### GOOD LUCK WITH THE A+ COMPUTER SERVICE TECHNICIAN'S CERTIFICATION EXAM!

## A+ Authorized Service Centers - special recognition

In recognition of the special commitment that a variety of organizations have made to customer service and the A+ program, CompTIA is proud to issue the designation of "A+ Authorized Service Center" to those locations that have 50% or more of their computer service technicians A+ Certified.

To become an A+ Authorized Service Center, your company must fill out the form that comes with the kit each candidate receives from Drake Prometric when he or she becomes A+ Certified (the same kit in which you receive your lapel pin and certificate).  Then return the form to the Computing Technology Industry Association (CompTIA) at 450 East 22nd. St., Suite 230, Lombard, IL 60148: by fax: (708) 268-1384.

The application to become an A+ Authorized Service Center must be completely filled out and you must give the verification number for each A+ Certified Technician, as well as indicate the total number of computer service technicians, on staff.  With properly completed paperwork, your organization should receive its A+ Authorized Service Center certificate and decal within three weeks.

(NOTE: The kits mentioned above are generally mailed by Drake Prometric within 10 days after a candidate receives his or her A+ Certification.)