CompTIA A+ Certification Exam Objectives
Exam Number: 220-801

Introduction

In order to receive CompTIA A+ certification a candidate must pass two exams. The first exam is CompTIA A+ 220-801 Certification Exam. The CompTIA A+ 220-801 examination measures necessary competencies for an entry-level IT professional with the equivalent knowledge of at least 12 months of hands-on experience in the lab or field. Successful candidates will have the knowledge required to assemble components based on customer requirements, install, configure and maintain devices, PCs and software for end users, understand the basics of networking and security/forensics, properly and safely diagnose, resolve and document common hardware and software issues while applying troubleshooting skills. Successful candidates will also provide appropriate customer support; understand the basics of virtualization, desktop imaging, and deployment.

CompTIA A+ is ISO 17024 Accredited (Personnel Certification Accreditation) and, as such, undergoes regular reviews and updates to the exam objectives. The following CompTIA A+ 220-801 exam objectives result from subject matter expert workshops and industry-wide survey results regarding the skills and knowledge required of an entry-level IT professional. The percentages in this document represent the relative importance of the subject areas (domains) in the associated body of knowledge, and together establish the foundation of an entry-level IT professional.

This examination blueprint includes domain weighting, test objectives, and example content. Example topics and concepts are included to clarify the test objectives and should not be construed as a comprehensive listing of all the content of this examination.

Candidates are encouraged to use this document to guide their studies. The table below lists the domains measured by this examination and the extent to which they are represented. The CompTIA A+ 220-801 exam is based on these objectives.

Domain	**Percentage of Examination**
PC Hardware	40%
Networking	27%
Laptops	11%
Printers	11%
Operational Procedures	11%
Total	100%

**Note: The lists of examples provided in bulleted format below each objective are not exhaustive lists. Other examples of technologies, processes or tasks pertaining to each objective may also be included on the exam although not listed or covered in this objectives document.

CompTIA is constantly reviewing the content of our exams and updating test questions to be sure our exams are current and the security of the questions is protected. When necessary, we will publish updated

exams based on existing exam objectives. Please know that all related exam preparation materials will still be valid.

1.0 PC Hardware

1.1 Configure and apply BIOS settings.

- Install firmware upgrades – flash BIOS
- BIOS component information
  - RAM
  - Hard drive
  - Optical drive
  - CPU
- BIOS configurations
  - Boot sequence
  - Enabling and disabling devices
  - Date/time
  - Clock speeds
  - Virtualization support
    - BIOS security (passwords, drive encryption: TPM, lo-jack)
- Use built-in diagnostics
- Monitoring
  - Temperature monitoring
  - Fan speeds
  - Intrusion detection/notification
  - Voltage
  - Clock
  - Bus speed

1.2 Differentiate between motherboard components, their purposes, and properties.

- Sizes
  - ATX
  - Micro-ATX
  - ITX
- Expansion slots
  - PCI
  - PCI-X
  - PCIe
  - miniPCI
  - CNR
  - AGP2x, 4x, 8x
- RAM slots
- CPU sockets
- Chipsets
  - North Bridge
  - South Bridge
  - CMOS battery
- Jumpers
- Power connections and types
- Fan connectors
- Front panel connectors
  - USB
  - Audio
  - Power button
  - Power light

        - Drive activity lights
        - Reset button
    - Bus speeds

1.3 Compare and contrast RAM types and features.

- Types
    - DDR
    - DDR2
    - DDR3
    - SDRAM
    - SODIMM
    - RAMBUS
    - DIMM
    - Parity vs. non-parity
    - ECC vs. non-ECC
    - RAM configurations
        - Single channel vs. dual channel vs. triple channel
    - Single sided vs. double sided
- RAM compatibility and speed

1.4 Install and configure expansion cards.

- Sound cards
- Video cards
- Network cards
- Serial and parallel cards
- USB cards
- Firewire cards
- Storage cards
- Modem cards
- Wireless/cellular cards
- TV tuner cards
- Video capture cards
- Riser cards

1.5 Install and configure storage devices and use appropriate media.

- Optical drives
    - CD-ROM
    - DVD-ROM
    - Blu-Ray
- Combo drives and burners
    - CD-RW
    - DVD-RW
    - Dual Layer DVD-RW
    - BD-R
    - BD-RE
- Connection types
    - External
        - USB
        - Firewire
        - eSATA
        - Ethernet
    - Internal SATA, IDE and SCSI
        - IDE configuration and setup (Master, Slave, Cable Select)
        - SCSI IDs (0 – 15)
    - Hot swappable drives
- Hard drives
    - Magnetic

    - 5400 rpm
    - 7200 rpm
    - 10,000 rpm
    - 15,000 rpm
- Solid state/flash drives
    - Compact flash
    - SD
    - Micro-SD
    - Mini-SD
    - xD
    - SSD
- RAID types
    - 0
    - 1
    - 5
    - 10
- Floppy drive
- Tape drive
- Media capacity
    - CD
    - CD-RW
    - DVD-RW
    - DVD
    - Blu-Ray
    - Tape
    - Floppy
    - DL DVD

1.6 Differentiate among various CPU types and features and select the appropriate cooling method.

- Socket types
    - Intel: LGA, 775, 1155, 1156, 1366
    - AMD: 940, AM2, AM2+, AM3, AM3+, FM1, F
- Characteristics
    - Speeds
    - Cores
    - Cache size/type
    - Hyperthreading
    - Virtualization support
    - Architecture (32-bit vs. 64-bit)
    - Integrated GPU
- Cooling
    - Heat sink
    - Fans
    - Thermal paste
    - Liquid-based

1.7 Compare and contrast various connection interfaces and explain their purpose.

- Physical connections
    - USB 1.1 vs. 2.0 vs. 3.0 speed and distance characteristics
        - Connector types: A, B, mini, micro
    - Firewire 400 vs. Firewire 800 speed and distance characteristics
    - SATA1 vs. SATA2 vs. SATA3, eSATA, IDE speeds
    - Other connector types
        - Serial
        - Parallel
        - VGA

        - HDMI
        - DVI
        - Audio
        - RJ-45
        - RJ-11
    - Analog vs. digital transmission
        - VGA vs. HDMI
- Speeds, distances and frequencies of wireless device connections
    - Bluetooth
    - IR
    - RF

1.8 Install an appropriate power supply based on a given scenario.

- Connector types and their voltages
    - SATA
    - Molex
    - 4/8-pin 12v
    - PCIe 6/8-pin
    - 20-pin
    - 24-pin
    - Floppy
- Specifications
    - Wattage
    - Size
    - Number of connectors
    - ATX
    - Micro-ATX
- Dual voltage options

1.9 Evaluate and select appropriate components for a custom configuration, to meet customer specifications or needs.

- Graphic / CAD / CAM design workstation
    - Powerful processor
    - High-end video
    - Maximum RAM
- Audio/Video editing workstation
    - Specialized audio and video card
    - Large fast hard drive
    - Dual monitors
- Virtualization workstation
    - Maximum RAM and CPU cores
- Gaming PC
    - Powerful processor
    - High-end video/specialized GPU
    - Better sound card
    - High-end cooling
- Home Theater PC
    - Surround sound audio
    - HDMI output
    - HTPC compact form factor
    - TV tuner
- Standard thick client
    - Desktop applications
    - Meets recommended requirements for running Windows
- Thin client
    - Basic applications

    - Meets minimum requirements for running Windows
- Home Server PC
    - Media streaming
    - File sharing
    - Print sharing
    - Gigabit NIC
    - RAID array

1.10 Given a scenario, evaluate types and features of display devices.

- Types
    - CRT
    - LCD
    - LED
    - Plasma
    - Projector
    - OLED
- Refresh rates
- Resolution
- Native resolution
- Brightness/lumens
- Analog vs. digital
- Privacy/antiglare filters
- Multiple displays

1.11 Identify connector types and associated cables.

- Display connector types
    - DVI-D
    - DVI-I
    - DVI-A
    - DisplayPort
    - RCA
    - HD15 (i.e. DE15 or DB15)
    - BNC
    - miniHDMI
    - RJ-45
    - miniDin-6
- Display cable types
    - HDMI
    - DVI
    - VGA
    - Component
    - Composite
    - S-video
    - RGB
    - Coaxial
    - Ethernet
- Device connectors and pin arrangements
    - SATA
    - eSATA
    - PATA
        - IDE
        - EIDE
    - Floppy
    - USB
    - IEEE1394
    - SCSI

    - PS/2
    - Parallel
    - Serial
    - Audio
    - RJ-45
- Device cable types
    - SATA
    - eSATA
    - IDE
    - EIDE
    - Floppy
    - USB
    - IEEE1394
    - SCSI
        - 68pin vs. 50pin vs. 25pin
    - Parallel
    - Serial
    - Ethernet
    - Phone

1.12 Install and configure various peripheral devices.

- Input devices
    - Mouse
    - Keyboard
    - Touch screen
    - Scanner
    - Barcode reader
    - KVM
    - Microphone
    - Biometric devices
    - Game pads
    - Joysticks
    - Digitizer
- Multimedia devices
    - Digital cameras
    - Microphone
    - Webcam
    - Camcorder
    - MIDI enabled devices
- Output devices
    - Printers
    - Speakers
    - Display devices

2.0 Networking

2.1 Identify types of network cables and connectors.

- Fiber
    - Connectors: SC, ST and LC
- Twisted Pair
    - Connectors: RJ-11, RJ-45
    - Wiring standards: T568A, T568B
- Coaxial
    - Connectors: BNC, F-connector

2.2 Categorize characteristics of connectors and cabling.

- Fiber
  - Types (single-mode vs. multi-mode)
  - Speed and transmission limitations
- Twisted pair
  - Types: STP, UTP, CAT3, CAT5, CAT5e, CAT6, plenum, PVC
  - Speed and transmission limitations
- Coaxial
  - Types: RG-6, RG-59
  - Speed and transmission limitations

2.3 Explain properties and characteristics of TCP/IP.

- IP class
  - Class A
  - Class B
  - Class C
- IPv4 vs. IPv6
- Public vs. private vs. APIPA
- Static vs. dynamic
- Client-side DNS
- DHCP
- Subnet mask
- Gateway

2.4 Explain common TCP and UDP ports, protocols, and their purpose.

- Ports
  - 21 – FTP
  - 23 – TELNET
  - 25 – SMTP
  - 53 – DNS
  - 80 – HTTP
  - 110 – POP3
  - 143 – IMAP
  - 443 – HTTPS
  - 3389 – RDP
- Protocols
  - DHCP
  - DNS
  - LDAP
  - SNMP
  - SMB
  - SSH
  - SFTP
- TCP vs. UDP

2.5 Compare and contrast wireless networking standards and encryption types.

- Standards
  - 802.11 a/b/g/n
  - Speeds, distances and frequencies
- Encryption types
  - WEP, WPA, WPA2, TKIP, AES

2.6 Install, configure, and deploy a SOHO wireless/wired router using appropriate settings.

- MAC filtering
- Channels (1 – 11)
- Port forwarding, port triggering
- SSID broadcast (on/off)
- Wireless encryption

- Firewall
- DHCP (on/off)
- DMZ
- NAT
- WPS
- Basic QoS

2.7 Compare and contrast Internet connection types and features.

- Cable
- DSL
- Dial-up
- Fiber
- Satellite
- ISDN
- Cellular (mobile hotspot)
- Line of sight wireless internet service
- WiMAX

2.8 Identify various types of networks.

- LAN
- WAN
- PAN
- MAN
- Topologies
    - Mesh
    - Ring
    - Bus
    - Star
    - Hybrid

2.9 Compare and contrast network devices their functions and features.

- Hub
- Switch
    - PoE
- Router
- Access point
- Bridge
- Modem
- NAS
- Firewall
- VoIP phones
- Internet appliance

2.10 Given a scenario, use appropriate networking tools.

- Crimper
- Multimeter
- Toner probe
- Cable tester
- Loopback plug
- Punchdown tool

3.0 Laptops

3.1 Install and configure laptop hardware and components.

- Expansion options
    - Express card /34

    - Express card /54
    - PCMCIA
    - SODIMM
    - Flash
- Hardware/device replacement
    - Keyboard
    - Hard Drive (2.5 vs. 3.5)
    - Memory
    - Optical drive
    - Wireless card
    - Mini-PCIe
    - screen
    - DC jack
    - Battery
    - Touchpad
    - Plastics
    - Speaker
    - System board
    - CPU

3.2 Compare and contrast the components within the display of a laptop.

- Types
    - LCD
    - LED
    - OLED
    - Plasma
- Wi-Fi antenna connector/placement
- Inverter and its function
- Backlight

3.3 Compare and contrast laptop features.

- Special function keys
    - Dual displays
    - Wireless (on/off)
    - Volume settings
    - Screen brightness
    - Bluetooth (on/off)
    - Keyboard backlight
- Docking station vs. port replicator
- Physical laptop lock and cable lock

4.0 Printers

4.1 Explain the differences between the various printer types and summarize the associated imaging process.

- Laser
    - Imaging drum, fuser assembly, transfer belt, transfer roller, pickup rollers, separate pads, duplexing assembly
    - Imaging process: processing, charging, exposing, developing, transferring, fusing and cleaning
- Inkjet
    - Ink cartridge, print head, roller, feeder, duplexing assembly, carriage and belt
    - Calibration
- Thermal
    - Feed assembly, heating element
    - Special thermal paper

- Impact
    - Print head, ribbon, tractor feed
    - Impact paper

4.2 Given a scenario, install, and configure printers.

- Use appropriate printer drivers for a given operating system
- Print device sharing
    - Wired
        - USB
        - Parallel
        - Serial
        - Ethernet
    - Wireless
        - Bluetooth
        - 802.11x
        - Infrared (IR)
    - Printer hardware print server
- Printer sharing
    - Sharing local/networked printer via Operating System settings

4.3 Given a scenario, perform printer maintenance.

- Laser
    - Replacing toner, applying maintenance kit, calibration, cleaning
- Thermal
    - Replace paper, clean heating element, remove debris
- Impact
    - Replace ribbon, replace print head, replace paper

5.0 Operational Procedures

5.1 Given a scenario, use appropriate safety procedures.

- ESD straps
- ESD mats
- Self-grounding
- Equipment grounding
- Personal safety
    - Disconnect power before repairing PC
    - Remove jewelry
    - Lifting techniques
    - Weight limitations
    - Electrical fire safety
    - CRT safety – proper disposal
    - Cable management
- Compliance with local government regulations

5.2 Explain environmental impacts and the purpose of environmental controls.

- MSDS documentation for handling and disposal
- Temperature, humidity level awareness and proper ventilation
- Power surges, brownouts, blackouts
    - Battery backup
    - Surge suppressor
- Protection from airborne particles
    - Enclosures
    - Air filters
- Dust and debris
    - Compressed air
    - Vacuums

- Component handling and protection
    - Antistatic bags
- Compliance to local government regulations

5.3 Given a scenario, demonstrate proper communication and professionalism.

- Use proper language – avoid jargon, acronyms, slang when applicable
- Maintain a positive attitude
- Listen and do not interrupt the customer
- Be culturally sensitive
- Be on time (if late contact the customer)
- Avoid distractions
    - Personal calls
    - Talking to co-workers while interacting with customers
    - Personal interruptions
- Dealing with difficult customer or situation
    - Avoid arguing with customers and/or being defensive
    - Do not minimize customer's problems
    - Avoid being judgmental
    - Clarify customer statements (ask open ended questions to narrow the scope of the problem, restate the issue or question to verify understanding)
- Set and meet expectations/timeline and communicate status with the customer
    - Offer different repair/replacement options if applicable
    - Provide proper documentation on the services provided
    - Follow up with customer/user at a later date to verify satisfaction
- Deal appropriately with customers confidential materials
    - Located on a computer, desktop, printer, etc

5.4 Explain the fundamentals of dealing with prohibited content/activity.

- First response
    - Identify
    - Report through proper channels
    - Data/device preservation
- Use of documentation/documentation changes
- Chain of custody
    - Tracking of evidence/documenting process

CompTIA A+ Acronyms

Introduction

The following is a list of acronyms which appear on the CompTIA A+ exams. Candidates are encouraged to review the complete list and attain a working knowledge of all listed acronyms as a part of a comprehensive exam preparation program.

ACRONYM	SPELLED OUT
AC	alternating current
ACL	access control list
ACPI	advanced configuration power interface
ACT	activity
ADSL	asymmetrical digital subscriber line
AGP	accelerated graphics port
AMD	advanced micro devices
APIPA	automatic private internet protocol addressing
APM	advanced power management
ARP	address resolution protocol
ASR	automated system recovery
ATA	advanced technology attachment
ATAPI	advanced technology attachment packet interface
ATM	asynchronous transfer mode
ATX	advanced technology extended
A/V	Audio Video
BIOS	basic input/output system
BNC	Bayonet-Neill-Concelman or British Naval Connector
BTX	balanced technology extended
CAPTCHA	Completely Automated Public Turing Test To Tell Computers and Humans Apart
CCFL	Cold Cathode Fluorescent Lamp
CD	compact disc
CD-ROM	compact disc-read-only memory
CD-RW	compact disc-rewritable
CDFS	compact disc file system
CFS	Central File System, Common File System, Command File System
CMOS	complementary metal-oxide semiconductor
CNR	Communications and Networking Riser
COMx	communication port (x=port number)

CPU	central processing unit
CRIMM	Continuity Rambus Inline Memory Mode
CRT	cathode-ray tube
DAC	discretionary access control
DB-25	serial communications D-shell connector, 25 pins
DB-9	9 pin D shell connector
DC	direct current
DDOS	distributed denial of service
DDR	double data-rate
DDR RAM	double data-rate random access memory
DDR SDRAM	double data-rate synchronous dynamic random access memory
DFS	distributed file system
DHCP	dynamic host configuration protocol
DIMM	dual inline memory module
DIN	Deutsche Industrie Norm
DIP	dual inline package
DLT	digital linear tape
DLP	digital light processing
DMA	direct memory access
DMZ	demilitarized zone
DNS	domain name service or domain name server
DOS	denial of service
DRAM	dynamic random access memory
DSL	digital subscriber line
DVD	digital video disc or digital versatile disc
DVD-RAM	digital video disc-random access memory
DVD-ROM	digital video disc-read only memory
DVD-R	digital video disc-recordable
DVD-RW	digital video disc-rewritable
DVI	digital visual interface
ECC	error correction code
ECP	extended capabilities port
EEPROM	electrically erasable programmable read-only memory
EFS	encrypting file system
EIDE	enhanced integrated drive electronics
EMI	electromagnetic interference
EMP	electromagnetic pulse
EPROM	erasable programmable read-only memory
EPP	enhanced parallel port
ERD	emergency repair disk
ESD	electrostatic discharge
EVGA	extended video graphics adapter/array
EVDO	evolution data optimized or evolution data only
FAT	file allocation table

FAT12	12-bit file allocation table
FAT16	16-bit file allocation table
FAT32	32-bit file allocation table
FDD	floppy disk drive
Fn	Function (referring to the function key on a laptop)
FPM	fast page-mode
FRU	field replaceable unit
FSB	Front Side Bus
FTP	file transfer protocol
FQDN	fully qualified domain name
Gb	gigabit
GB	gigabyte
GDI	graphics device interface
GHz	gigahertz
GUI	graphical user interface
GPS	global positioning system
GSM	global system for mobile communications
HAL	hardware abstraction layer
HAV	Hardware Assisted Virtualization
HCL	hardware compatibility list
HDD	hard disk drive
HDMI	high definition media interface
HPFS	high performance file system
HTML	hypertext markup language
HTPC	Home theater PC
HTTP	hypertext transfer protocol
HTTPS	hypertext transfer protocol over secure sockets layer
I/O	input/output
ICMP	internet control message protocol
ICR	intelligent character recognition
IDE	integrated drive electronics
IDS	Intrusion Detection System
IEEE	Institute of Electrical and Electronics Engineers
IIS	Internet Information Services
IMAP	internet mail access protocol
IP	internet protocol
IPCONFIG	internet protocol configuration
IPP	internet printing protocol
IPSEC	internet protocol security
IR	infrared
IrDA	Infrared Data Association
IRQ	interrupt request
ISA	industry standard architecture
ISDN	integrated services digital network

ISO	Industry Standards Organization
ISP	internet service provider
JBOD	just a bunch of disks
Kb	kilobit
KB	Kilobyte or knowledge base
LAN	local area network
LBA	logical block addressing
LC	Lucent connector
LCD	liquid crystal display
LDAP	lightweight directory access protocol
LED	light emitting diode
Li-on	lithium-ion
LPD/LPR	line printer daemon / line printer remote
LPT	line printer terminal
LVD	low voltage differential
MAC	media access control / mandatory access control
MAPI	messaging application programming interface
MAU	media access unit, media attachment unit
Mb	megabit
MB	megabyte
MBR	master boot record
MBSA	Microsoft Baseline Security Analyzer
MFD	multi-function device
MFP	multi-function product
MHz	megahertz
MicroDIMM	micro dual inline memory module
MIDI	musical instrument digital interface
MIME	multipurpose internet mail extension
MIMO	Multiple Input Multiple Output
MMC	Microsoft management console
MMX	multimedia extensions
MP3	Moving Picture Experts Group Layer 3 Audio
MP4	Moving Picture Experts Group Layer 4
MPEG	Moving Picture Experts Group
MSCONFIG	Microsoft configuration
MSDS	material safety data sheet
MUI	multilingual user interface
NAC	network access control
NAS	network-attached storage
NAT	network address translation
NetBIOS	networked basic input/output system
NetBEUI	networked basic input/output system extended user interface
NFS	network file system
NIC	network interface card

NiCd	nickel cadmium
NiMH	nickel metal hydride
NLX	new low-profile extended
NNTP	network news transfer protocol
NTFS	new technology file system
NTLDR	new technology loader
NTP	Network Time Protocol
OCR	optical character recognition
OEM	original equipment manufacturer
OLED	Organic Light Emitting Diode
OS	operating system
PAN	personal area network
PATA	parallel advanced technology attachment
PC	personal computer
PCI	peripheral component interconnect
PCIe	peripheral component interconnect express
PCIX	peripheral component interconnect extended
PCL	printer control language
PCMCIA	Personal Computer Memory Card International Association
PDA	personal digital assistant
PGA	pin grid array
PGA2	pin grid array 2
PII	Personally Identifiable Information
PIN	personal identification number
PKI	public key infrastructure
PnP	plug and play
POP3	post office protocol 3
PoS	Point of Sale
POST	power-on self test
POTS	plain old telephone service
PPP	point-to-point protocol
PPTP	point-to-point tunneling protocol
PRI	primary rate interface
PROM	programmable read-only memory
PS/2	personal system/2 connector
PSTN	public switched telephone network
PSU	power supply unit
PVC	permanent virtual circuit
PXE	preboot execution environment
QoS	quality of service
RAID	redundant array of independent (or inexpensive) discs
RAM	random access memory
RAS	remote access service
RDRAM	RAMBUS® dynamic random access memory

RDP	Remote Desktop Protocol
RF	radio frequency
RFI	radio frequency interference
RGB	red green blue
RIMM	RAMBUS® inline memory module
RIP	routing information protocol
RIS	remote installation service
RISC	reduced instruction set computer
RJ	registered jack
RJ-11	registered jack function 11
RJ-45	registered jack function 45
RMA	returned materials authorization
ROM	read only memory
RS-232 or RS-232C	recommended standard 232
RTC	real-time clock
SAN	storage area network
SAS	Serial Attached SCSI
SATA	serial advanced technology attachment
SC	subscription channel
SCP	secure copy protection
SCSI	small computer system interface
SCSI ID	small computer system interface identifier
SD card	secure digital card
SDRAM	synchronous dynamic random access memory
SEC	single edge connector
SFC	system file checker
SFF	Small Form Factor
SGRAM	synchronous graphics random access memory
SIMM	single inline memory module
SLI	scalable link interface or system level integration or scanline interleave mode
S.M.A.R.T.	self-monitoring, analysis, and reporting technology
SMB	server message block or small to midsize business
SMTP	simple mail transfer protocol
SNMP	simple network management protocol
SoDIMM	small outline dual inline memory module
SOHO	small office/home office
SP	service pack
SP1	service pack 1
SP2	service pack 2
SP3	service pack 3
SP4	service pack 4
SPDIF	Sony-Philips digital interface format
SPGA	staggered pin grid array
SRAM	static random access memory

SSH	secure shell
SSID	service set identifier
SSL	secure sockets layer
ST	straight tip
STP	shielded twisted pair
SVGA	super video graphics array
SXGA	super extended graphics array
TB	terabyte
TCP	transmission control protocol
TCP/IP	transmission control protocol/internet protocol
TDR	time domain reflectometer
TFTP	trivial file transfer protocol
TKIP	Temporal Key Integrity Protocol
TPM	trusted platform module
UAC	user account control
UART	universal asynchronous receiver transmitter
UDF	user defined functions or universal disk format or universal data format
UDMA	ultra direct memory access
UDP	user datagram protocol
UNC	universal naming convention
UPS	uninterruptible power supply
URL	uniform resource locator
USB	universal serial bus
USMT	user state migration tool
UTP	unshielded twisted pair
UXGA	ultra extended graphics array
VESA	Video Electronics Standards Association
VFAT	virtual file allocation table
VGA	video graphics array
VM	Virtual Machine
VoIP	voice over internet protocol
VPN	virtual private network
VRAM	video random access memory
WAN	wide area network
WAP	wireless application protocol
WEP	wired equivalent privacy
WIFI	wireless fidelity
WINS	windows internet name service
WLAN	wireless local area network
WPA	wireless protected access
WUXGA	wide ultra extended graphics array
XGA	extended graphics array
ZIF	zero-insertion-force
ZIP	zigzag inline package

A+ Proposed Hardware and Software List

** CompTIA has included this sample list of hardware and software to assist candidates as they prepare for the A+ exam. This list may also be helpful for training companies who wish to create a lab component to their training offering. The bulleted lists below each topic are a sample list and not exhaustive.

Equipment

- iPad tablet
- Android tablet
- Laptop
- Desktop
- Monitors
- SOHO Router/switch
- Access point
- Printer (laser/wireless)
- Power strips
- Surge suppressor
- UPS

Spare parts/hardware

- Motherboards
- RAM
- Hard drives
- Power supplies
- Video cards

- Sounds cards
- Network cards
- Wireless NICs
- Fans/cooling devices
- CPUs
- Connectors/cables
- Adapters
- Network cables/connectors
- AC adapters
- Optical drives
- Jumpers/screws/stand-offs
- Cases
- Bulk cable
- Maintenance kit

Tools

- Screw drivers
- Multimeter
- Wire cutters
- Punchdown tool
- Crimper
- Power supply tester
- Cable stripper
- POST cards
- Standard technician toolkit
- ESD strap

Software

- Operating system disks (WinXP, Vista, Windows 7)
- Antivirus software
- Virtualization software
- Anti-malware
- Driver software
- Anti-spyware