CompTIA A+ Certification Exam Objectives

EXAM NUMBER: 220-901

CompTIA

About the Exam

Candidates are encouraged to use this document to help prepare for CompTIA A+ 220-901. In order to receive the CompTIA A+ certification, you must pass two exams: 220-901 and 220-902. CompTIA A+ 220-901 measures the necessary skills for an entry-level IT professional. 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**
- **Apply troubleshooting skills**
- **Provide appropriate customer support**
- **Understand the basics of virtualization, desktop imaging and deployment**

These content examples are meant to clarify the test objectives and should not be construed as a comprehensive listing of all the content of this examination.

EXAM ACCREDITATION

CompTIA A+ is accredited by ANSI to show compliance with the ISO 17024 standard and, as such, undergoes regular reviews and updates to the exam objectives.

EXAM DEVELOPMENT

CompTIA exams result from subject-matter expert workshops and industry-wide survey results regarding the skills and knowledge required of an entry-level IT professional.

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PLEASE NOTE

The lists of examples provided in bulleted format 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.

TEST DETAILS

Required exam	220-901
Number of questions	Maximum of 90
Types of questions	Multiple choice and performance-based
Length of test	90 minutes
Recommended experience	Six to 12 months hands-on experience in the lab or field
Passing score	675 (on a scale of 900)

EXAM OBJECTIVES (DOMAINS)

The table below lists the domains measured by this examination and the extent to which they are represented:

DOMAIN	PERCENTAGE OF EXAMINATION
1.0 Hardware	34%
2.0 Networking	21%
3.0 Mobile Devices	17%
4.0 Hardware & Network Troubleshooting	28%
Total	**100%**

1.0 Hardware

1.1 Given a scenario, configure settings and use BIOS/UEFI tools on a PC.

- **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, LoJack, secure boot)
- **Built-in diagnostics**
- **Monitoring**
  - Temperature monitoring
  - Fan speeds
  - Intrusion detection/notification
  - Voltage
  - Clock
  - Bus speed

1.2 Explain the importance of motherboard components, their purpose and properties.

- **Form factors/sizes**
  - ATX
  - Micro-ATX
  - Mini-ITX
  - ITX
- **Expansion slots**
  - PCI
  - PCI-X
  - PCIe
  - miniPCI
- **RAM slots**
- **CPU sockets**
- **Chipsets**
  - Northbridge
  - Southbridge
- **CMOS battery**
- **Power connections and types**
- **Fan connectors**
- **Front/top panel connectors**
  - USB
  - Audio
  - Power button
  - Power light
  - Drive activity lights
- **Bus speeds**
- **Reset button**

1.3 Compare and contrast various RAM types and their features.

- **Types**
  - DDR
  - DDR2
  - DDR3
  - SODIMM
  - DIMM
  - Parity vs. non-parity
  - ECC vs. non-ECC
  - RAM configurations
    - Single channel vs. dual channel vs. triple channel
  - Single sided vs. double sided
  - Buffered vs. unbuffered
- **RAM compatibility**

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1.4 Install and configure PC expansion cards.

- **Sound cards**
- **Video cards**
- **Network cards**
- **USB cards**
- **Firewire cards**
- **Thunderbolt 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/CD-RW
  - DVD-ROM/DVD-RW/DVD-RW DL
  - Blu-ray
  - BD-R
  - BD-RE
- **Magnetic hard disk drives**
  - 5400 rpm
  - 7200 rpm
  - 10,000 rpm
- **Hot swappable drives**
- **Solid state/flash drives**
  - Compact flash
  - SD
  - MicroSD
  - MiniSD
  - xD
  - SSD
  - Hybrid
  - eMMC
- **RAID types**
  - 0
  - 1
  - 5
  - 10
- **Tape drive**
- **Media capacity**
  - CD
  - CD-RW
  - DVD-RW
  - DVD
  - Blu-ray
  - Tape
  - DVD DL

1.6 Install various types of CPUs and apply the appropriate cooling methods.

- **Socket types**
  - Intel: 775, 1155, 1156, 1366, 1150, 2011
  - AMD: AM3, AM3+, FM1, FM2, FM2+
- **Characteristics**
  - Speeds
  - Cores
  - Cache size/type
  - Hyperthreading
  - Virtualization support
  - Architecture (32-bit vs. 64-bit)
  - Integrated GPU
  - Disable execute bit
- **Cooling**
  - Heat sink
  - Fans
  - Thermal paste
  - Liquid-based
  - Fanless/passive

1.7 Compare and contrast various PC connection interfaces, their characteristics and purpose.

- **Physical connections**
  - USB 1.1 vs. 2.0 vs. 3.0
    - Connector types: A, B, mini, micro
  - Firewire 400 vs. Firewire 800
  - SATA1 vs. SATA2 vs. SATA3, eSATA
  - Other connector types
    - VGA
    - HDMI
    - DVI
  - Audio
    - Analog
    - Digital (Optical connector)
  - RJ-45
  - RJ-11
  - Thunderbolt
- **Wireless connections**
  - Bluetooth
  - RF
  - IR
  - NFC
- **Characteristics**
  - Analog
  - Digital
  - Distance limitations
  - Data transfer speeds
  - Quality
  - Frequencies

1.8 Install a power supply based on given specifications.

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

1.9 Given a scenario, select the appropriate components for a custom PC configuration to meet customer specifications or needs.

- **Graphic/CAD/CAM design workstation**
  - Multicore 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**
  - Multicore processor
  - High-end video/specialized GPU
  - High-definition 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 selected OS
- **Thin client**
  - Basic applications
  - Meets minimum requirements for selected OS
  - Network connectivity
- **Home server PC**
  - Media streaming
  - File sharing
  - Print sharing
  - Gigabit NIC
  - RAID array

1.10 Compare and contrast types of display devices and their features.

- **Types**
  - LCD
    - TN vs. IPS
    - Fluorescent vs. LED backlighting
  - Plasma
  - Projector
  - OLED
- **Refresh/frame rates**
- **Resolution**
- **Native resolution**
- **Brightness/lumens**
- **Analog vs. digital**
- **Privacy/antiglare filters**
- **Multiple displays**
- **Aspect ratios**
  - 16:9
  - 16:10
  - 4:3

1.11 Identify common PC connector types and associated cables.

- **Display connector types**
  - DVI-D
  - DVI-I
  - DVI-A
  - DisplayPort
  - RCA
  - HD15 (i.e., DE15 or DB15)
  - BNC
  - miniHDMI
  - miniDin-6
- **Display cable types**
  - HDMI
  - DVI
  - VGA
  - Component
  - Composite
  - Coaxial
- **Device cables and connectors**
  - SATA
  - eSATA
  - USB
  - Firewire (IEEE1394)
  - PS/2
  - Audio
- **Adapters and convertors**
  - DVI to HDMI
  - USB A to USB B
  - USB to Ethernet
  - DVI to VGA
  - Thunderbolt to DVI
  - PS/2 to USB
  - HDMI to VGA

1.12 Install and configure common peripheral devices.

- **Input devices**
  - Mouse
  - Keyboard
  - Scanner
  - Barcode reader
  - Biometric devices
  - Game pads
  - Joysticks
  - Digitizer
  - Motion sensor
  - Touchpads
  - Smart card readers
  - Digital cameras
  - Microphone
  - Webcam
  - Camcorder
- **Output devices**
  - Printers
  - Speakers
  - Display devices
- **Input & output devices**
  - Touch screen
  - KVM
  - Smart TV
  - Set-top box
  - MIDI-enabled devices

1.13 Install SOHO multifunction device/printers and configure appropriate settings.

- **Use appropriate drivers for a given operating system**
  - Configuration settings
    - Duplex
    - Collate
    - Orientation
    - Quality
- **Device sharing**
  - Wired
    - USB
    - Serial
    - Ethernet
  - Wireless
    - Bluetooth
    - 802.11 (a/b/g/n/ac)
    - Infrastructure vs. ad hoc
  - Integrated print server (hardware)
  - Cloud printing/remote printing
- **Public/shared devices**
  - Sharing local/networked device via operating system settings
    - TCP/Bonjour/AirPrint
  - Data privacy
    - User authentication on the device
    - Hard drive caching

1.14 Compare and contrast differences between the various print technologies and 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
- **Virtual**
  - Print to file
  - Print to PDF
  - Print to XPS
  - Print to image

1.15 Given a scenario, perform appropriate 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
- **Inkjet**
  - Clean heads, replace cartridges, calibration, clear jams

2.0 Networking

2.1 Identify the various 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 Compare and contrast the characteristics of connectors and cabling.

- **Fiber**
  - Types (single-mode vs. multi-mode)
  - Speed and transmission limitations
- **Twisted pair**
  - Types: STP, UTP, Cat 3, Cat 5, Cat 5e, Cat 6, Cat 6e, Cat 7, plenum, PVC
  - Speed and transmission limitations
  - Splitters and effects on signal quality
- **Coaxial**
  - Types: RG-6, RG-59
  - Speed and transmission limitations
  - Splitters and effects on signal quality

2.3 Explain the properties and characteristics of TCP/IP.

- **IPv4 vs. IPv6**
- **Public vs. private vs. APIPA/link local**
- **Static vs. dynamic**
- **Client-side DNS settings**
- **Client-side DHCP**
- **Subnet mask vs. CIDR**
- **Gateway**

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

- **Ports**
  - 21 – FTP
  - 22 – SSH
  - 23 – TELNET
  - 25 – SMTP
  - 53 – DNS
  - 80 – HTTP
  - 110 – POP3
  - 143 – IMAP
  - 443 – HTTPS
  - 3389 – RDP
  - 137-139 – NetBIOS/NetBT
  - 445 – SMB/CIFS
  - 427 – SLP
  - 548 – AFP
- **Protocols**
  - DHCP
  - DNS
  - LDAP
  - SNMP
  - SMB
  - CIFS
  - SSH
  - AFP
- **TCP vs. UDP**

2.5 Compare and contrast various WiFi networking standards and encryption types.

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

2.6 Given a scenario, install and configure SOHO wireless/ wired router and apply appropriate settings.

- **Channels**
- **Port forwarding, port triggering**
- **DHCP (on/off)**
- **DMZ**
- **NAT/DNAT**
- **Basic QoS**
- **Firmware**
- **UPnP**

2.7 Compare and contrast Internet connection types, network types and their features.

- **Internet connection types**
  - Cable
  - DSL
  - Dial-up
  - Fiber
  - Satellite
  - ISDN
  - Cellular
    - Tethering
    - Mobile hotspot
  - Line-of-sight wireless Internet service
- **Network Types**
  - LAN
  - WAN
  - PAN
  - MAN

2.8 Compare and contrast network architecture devices, their functions and features.

- **Hub**
- **Switch**
- **Router**
- **Access point**
- **Bridge**
- **Modem**
- **Firewall**
- **Patch panel**
- **Repeaters/extenders**
- **Ethernet over Power**
- **Power over Ethernet injector**

2.9 Given a scenario, use appropriate networking tools.

- **Crimper**
- **Cable stripper**
- **Multimeter**
- **Tone generator and probe**
- **Cable tester**
- **Loopback plug**
- **Punchdown tool**
- **WiFi analyzer**

3.0 Mobile Devices

3.1 Install and configure laptop hardware and components.

- **Expansion options**
  - Expresscard /34
  - Expresscard /54
  - SODIMM
  - Flash
  - Ports/Adapters
    - Thunderbolt
    - DisplayPort
    - USB to RJ-45 dongle
    - USB to WiFi dongle
    - USB to Bluetooth
    - USB optical drive
- **Hardware/device replacement**
  - Keyboard
  - Hard drive
    - SSD vs. hybrid vs. magnetic disk
    - 1.8in vs. 2.5in
  - Memory
  - Smart card reader
  - Optical drive
  - Wireless card
  - Mini-PCIe
  - Screen
  - DC jack
  - Battery
  - Touchpad
  - Plastics/frames
  - Speaker
  - System board
  - CPU

3.2 Explain the function of components within the display of a laptop.

- **Types**
  - LCD
    - TN vs. IPS
    - Fluorescent vs. LED backlighting
  - OLED
- **WiFi antenna connector/placement**
- **Webcam**
- **Microphone**
- **Inverter**
- **Digitizer**

3.3 Given a scenario, use appropriate laptop features.

- **Special function keys**
  - Dual displays
  - Wireless (on/off)
  - Cellular (on/off)
  - Volume settings
  - Screen brightness
  - Bluetooth (on/off)
  - Keyboard backlight
  - Touchpad (on/off)
  - Screen orientation
  - Media options (fast forward/rewind)
  - GPS (on/off)
  - Airplane mode
- **Docking station**
- **Physical laptop lock and cable lock**
- **Rotating/removable screens**

3.4 Explain the characteristics of various types of other mobile devices.

- **Tablets**
- **Smartphones**
- **Wearable technology devices**
  - Smart watches
  - Fitness monitors
  - Glasses and headsets
- **Phablets**
- **e-readers**
- **Smart camera**
- **GPS**

3.5 Compare and contrast accessories and ports of other mobile devices.

- **Connection types**
  - NFC
  - Proprietary vendor-specific ports (communication/power)
  - MicroUSB/miniUSB
  - Lightning
  - Bluetooth
  - IR
  - Hotspot/tethering
- **Accessories**
  - Headsets
  - Speakers
  - Game pads
  - Docking stations
  - Extra battery packs/battery chargers
  - Protective covers/water proofing
  - Credit card readers
  - Memory/MicroSD

4.0 Hardware and Network Troubleshooting

4.1 Given a scenario, troubleshoot common problems related to motherboards, RAM, CPU and power with appropriate tools.

- **Common symptoms**
  - Unexpected shutdowns
  - System lockups
  - POST code beeps
  - Blank screen on bootup
  - BIOS time and settings resets
  - Attempts to boot to incorrect device
  - Continuous reboots
  - No power
  - Overheating
  - Loud noise
  - Intermittent device failure
  - Fans spin – no power to other devices
  - Indicator lights
  - Smoke
  - Burning smell
  - Proprietary crash screens (BSOD/pin wheel)
  - Distended capacitors
- **Tools**
  - Multimeter
  - Power supply tester
  - Loopback plugs
  - POST card/USB

4.2 Given a scenario, troubleshoot hard drives and RAID arrays with appropriate tools.

- **Common symptoms**
  - Read/write failure
  - Slow performance
  - Loud clicking noise
  - Failure to boot
  - Drive not recognized
  - OS not found
  - RAID not found
  - RAID stops working
  - Proprietary crash screens (BSOD/pin wheel)
  - S.M.A.R.T. errors
- **Tools**
  - Screwdriver
  - External enclosures
  - CHKDSK
  - FORMAT
  - File recovery software
  - Bootrec
  - DiskPart
  - Defragmentation tool

4.3 Given a scenario, troubleshoot common video, projector and display issues.

- **Common symptoms**
  - VGA mode
  - No image on screen
  - Overheat shutdown
  - Dead pixels
  - Artifacts
  - Color patterns incorrect
  - Dim image
  - Flickering image
  - Distorted image
  - Distorted geometry
  - Burn-in
  - Oversized images and icons

4.4 Given a scenario, troubleshoot wired and wireless networks with appropriate tools.

- **Common symptoms**
  - No connectivity
  - APIPA/link local address
  - Limited connectivity
  - Local connectivity
  - Intermittent connectivity
  - IP conflict
  - Slow transfer speeds
  - Low RF signal
  - SSID not found
- **Hardware tools**
  - Cable tester
  - Loopback plug
  - Punchdown tools
  - Tone generator and probe
  - Wire strippers
  - Crimper
  - Wireless locator
- **Command line tools**
  - PING
  - IPCONFIG/IFCONFIG
  - TRACERT
  - NETSTAT
  - NBTSTAT
  - NET
  - NETDOM
  - NSLOOKUP

4.5 Given a scenario, troubleshoot and repair common mobile device issues while adhering to the appropriate procedures.

- **Common symptoms**
  - No display
  - Dim display
  - Flickering display
  - Sticking keys
  - Intermittent wireless
  - Battery not charging
  - Ghost cursor/pointer drift
  - No power
  - Num lock indicator lights
  - No wireless connectivity
  - No Bluetooth connectivity
  - Cannot display to external monitor
  - Touchscreen non-responsive
  - Apps not loading
  - Slow performance
  - Unable to decrypt email
  - Extremely short battery life
  - Overheating
  - Frozen system
  - No sound from speakers
  - GPS not functioning
  - Swollen battery
- **Disassembling processes for proper re-assembly**
  - Document and label cable and screw locations
  - Organize parts
  - Refer to manufacturer resources
  - Use appropriate hand tools

4.6 Given a scenario, troubleshoot printers with appropriate tools.

- **Common symptoms**
  - Streaks
  - Faded prints
  - Ghost images
  - Toner not fused to the paper
  - Creased paper
  - Paper not feeding
  - Paper jam
  - No connectivity
  - Garbled characters on paper
  - Vertical lines on page
  - Backed up print queue
  - Low memory errors
  - Access denied
  - Printer will not print
  - Color prints in wrong print color
  - Unable to install printer
  - Error codes
  - Printing blank pages
  - No image on printer display
- **Tools**
  - Maintenance kit
  - Toner vacuum
  - Compressed air
  - Printer spooler

CompTIA A+ Acronyms

The following is a list of acronyms that 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
AES	Advanced Encryption Standard
AGP	Accelerated Graphics Port
AHCI	Advanced Host Controller Interface
AP	Access Point
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
ATSC	Advanced Television Systems Committee
ATX	Advanced Technology Extended
AUP	Acceptable Use Policy
A/V	Audio Video
BD-R	Blu-ray Disk Recordable
BIOS	Basic Input/Output System
BNC	Bayonet-Neill-Concelman or British Naval Connector
BSOD	Blue Screen of Death
BTX	Balanced Technology Extended
CAD	Computer Aided Design
CAPTCHA	Completely Automated Public Turing Test to tell Computers and Humans Apart
CAS	Column Access Strobe
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
CERT	Computer Emergency Response Team

ACRONYM	SPELLED OUT
CFS	Central File System or Common File System or Command File System
CGA	Computer Graphics and Applications
CIDR	Classless Inter-Domain Routing
CIFS	Common Internet File System
CMOS	Complementary Metal-Oxide Semiconductor
CNR	Communications and Networking Riser
COMx	Communication Port (x=Port Number)
CPU	Central Processing Unit
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
DLT	Digital Linear Tape
DLP	Digital Light Processing or Data Loss Prevention
DMA	Direct Memory Access
DMZ	Demilitarized Zone
DNAT	Destination Network Address Translation
DNS	Domain Name Service or Domain Name Server
DoS	Denial of Service
DRAM	Dynamic Random Access Memory
DRM	Digital Rights Management
DSL	Digital Subscriber Line
DVD	Digital Video Disc or Digital Versatile Disc
DVD-RAM	Digital Video Disc-Random-Access Memory

ACRONYM	SPELLED OUT
DVD-ROM	Digital Video Disc-Read-Only Memory
DVD-R	Digital Video Disc-Recordable
DVD-RW	Digital Video Disc-Rewritable
DVI	Digital Visual Interface
DVR	Digital Video Recorder
ECC	Error Correcting Code or Error Checking and Correction
ECP	Extended Capabilities Port
EDO	Extended Data Out (RAM)
EEPROM	Electrically Erasable Programmable Read-Only Memory
EFS	Encrypting File System
EIDE	Enhanced Integrated Drive Electronics
ELP	Electroluminescence Panel
EMI	Electromagnetic Interference
EMP	Electromagnetic Pulse
EPROM	Erasable Programmable Read-Only Memory
EPP	Enhanced Parallel Port
ERD	Emergency Repair Disk
eSATA	External Serial Advanced Technology Attachment
ESD	Electrostatic Discharge
EULA	End-User License Agreement
EVGA	Extended Video Graphics Adapter/Array
EVDO	Evolution Data Optimized or Evolution Data Only
Ext2	Second Extended File System
exFAT	Extended File Allocation Table
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
GDDR	Graphics Double Data Rate
GDI	Graphics Device Interface
GHz	Gigahertz
GUI	Graphical User Interface
GPS	Global Positioning System
GPT	GUID Partition Table
GPU	Graphics Processing Unit

ACRONYM	SPELLED OUT
GSM	Global System for Mobile Communications
HAL	Hardware Abstraction Layer
HAV	Hardware-Assisted Virtualization
HCL	Hardware Compatibility List
HDCP	High-Bandwidth Digital Content Protection
HDD	Hard Disk Drive
HDMI	High-Definition Media Interface
HIPS	Host Intrusion Prevention System
HPFS	High-Performance File System
HSF	Heat Sink and Fan
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
ICS	Internet Connection Sharing
IDE	Integrated Drive Electronics
IDF	Intermediate Distribution Frame
IDS	Intrusion Detection System
IEEE	Institute of Electrical and Electronics Engineers
IIS	Internet Information Services
IMAP	Internet Mail Access Protocol
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IPCONFIG	Internet Protocol Configuration
IPP	Internet Printing Protocol
IPS	In-Plane Switching
IPSec	Internet Protocol Security
IR	Infrared
IrDA	Infrared Data Association
IRP	Incident Response Plan
IRQ	Interrupt Request
ISDN	Integrated Services Digital Network
ISO	International Organization for Standardization/ Industry Standards Organization
ISP	Internet Service Provider
JBOD	Just a Bunch Of Disks
Kb	Kilobit
KB	Kilobyte or Knowledge Base
KVM	Kernel-based Virtual Machine
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

ACRONYM	SPELLED OUT
LPT	Line Printer Terminal
LVD	Low Voltage Differential
LVDS	Low Voltage Differential Signaling
MAC	Media Access Control or Mandatory Access Control
MAN	Metropolitan Area Network
MAPI	Messaging Application Programming Interface
MAU	Media Access Unit or Media Attachment Unit
mATX	Micro Advanced Technology Extended
Mb	Megabit
MB	Megabyte
MBR	Master Boot Record
MBSA	Microsoft Baseline Security Analyzer
MDM	Master Data Management
MFA	Multifactor Authentication
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
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
MT-RJ	Mechanical Transfer Registered Jack
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
NFC	Near Field Communication
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
NTSC	National Transmission Standards Committee
NVM HCI	Non-Volatile Memory Host Controller Interface
OCR	Optical Character Recognition
OEM	Original Equipment Manufacturer
OLED	Organic Light Emitting Diode
OS	Operating System
PAL	Phase Alternating Line
PAN	Personal Area Network

ACRONYM	SPELLED OUT
PAT	Port Address Translation
PATA	Parallel Advanced Technology Attachment
PC	Personal Computer
PCI	Peripheral Component Interconnect
PCIe	Peripheral Component Interconnect express
PCI-X	Peripheral Component Interconnect Extended
PCL	Printer Control Language
PCMCIA	Personal Computer Memory Card International Association
PE	Preinstallation Environment
PGA	Pin Grid Array
PGA2	Pin Grid Array 2
PGP	Pretty Good Protection
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
PPM	Pages Per Minute
PPP	Point-to-Point Protocol
PPTP	Point-to-Point Tunneling Protocol
PRI	Primary Rate Interface
PRL	Preferred Roaming List
PROM	Programmable Read-Only Memory
PS/2	Personal System/2 Connector
PSTN	Public Switched Telephone Network
PSU	Power Supply Unit
PVA	Patterned Vertical Alignment
PVC	Permanent Virtual Circuit
PXE	Preboot Execution Environment
QoS	Quality of Service
RADIUS	Remote Authentication Dial-In User Server
RAID	Redundant Array of Independent (or Inexpensive) Discs
RAM	Random Access Memory
RAMBUS	Rambus Dynamic Random Access Memory
RAS	Remote Access Service
RDP	Remote Desktop Protocol
RF	Radio Frequency
RFI	Radio Frequency Interference
RGB	Red Green Blue
RIP	Routing Information Protocol
RIS	Remote Installation Service
RISC	Reduced Instruction Set Computer
RJ-11	Registered Jack Function 11
RJ-45	Registered Jack Function 45
RMA	Returned Materials Authorization
ROM	Read-Only Memory
RPO	Recovery Point Objective
RTC	Real-Time Clock

ACRONYM	SPELLED OUT
RTO	Recovery Time Objective
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
SFTP	Secured File Transfer Protocol
SIMM	Single In-line 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
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
SSO	Single Sign-On
ST	Straight Tip
STP	Shielded Twisted Pair
SXGA	Super Extended Graphics Array
TB	Terabyte
TCP	Transmission Control Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
TDR	Time Domain Reflectometer
TFT	Thin Film Transistor
TFTP	Trivial File Transfer Protocol
TKIP	Temporal Key Integrity Protocol
TLS	Transport Layer Security
TN	Twisted Nematic
TPM	Trusted Platform Module
UAC	User Account Control
UDF	User Defined Functions or Universal Disk Format or Universal Data Format
UDP	User Datagram Protocol
UEFI	Unified Extensible Firmware Interface
UNC	Universal Naming Convention
UPnP	Universal Plug and Play
UPS	Uninterruptible Power Supply
URL	Uniform Resource Locator
USB	Universal Serial Bus
USMT	User State Migration Tool
UTM	Unified Threat Management
UTP	Unshielded Twisted Pair
UUID	Universally Unique Identifier
UXGA	Ultra Extended Graphics Array
VA	Vertical Alignment
VDC	Volts DC
VDI	Virtual Desktop Infrastructure
VESA	Video Electronics Standards Association
VFAT	Virtual File Allocation Table
VGA	Video Graphics Array
VM	Virtual Machine
VNC	Virtual Network Computer
VoIP	Voice over Internet Protocol
VPN	Virtual Private Network
VRAM	Video Random-Access Memory
WAN	Wide Area Network
WAP	Wireless Access Protocol or Wireless Access Point
WEP	Wired Equivalent Privacy
WiFi	Wireless Fidelity
WINS	Windows Internet Name Service
WLAN	Wireless Local Area Network
WPA	WiFi Protected Access
WPA2	WiFi Protected Access 2
WPS	WiFi Protected Setup
WUXGA	Wide Ultra Extended Graphics Array
WWAN	Wireless Wide Area Network
XGA	Extended Graphics Array
ZIF	Zero Insertion Force
ZIP	Zig-zag 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 that wish to create a lab component to their training offering. The bulleted lists below each topic are sample lists and not exhaustive.

EQUIPMENT

- Apple tablet/smartphone
- Android tablet/smartphone
- Windows tablet/smartphone
- Windows laptop/Mac laptop/Linux laptop
- Windows desktop/Mac desktop/ Linux desktop
- Monitors
- Projectors
- SOHO router/switch
- Access point
- VoIP phone
- Printer
  - Laser/inkjet
  - Wireless
- Surge suppressor
- UPS

SPARE PARTS/HARDWARE

- Motherboards
- RAM
- Hard drives
- Power supplies
- Video cards
- Sounds cards
- Network cards
- Wireless NICs
- Fans/cooling devices/heat sink
- CPUs
- Assorted connectors/cables
  - USB
  - HDMI
  - etc
- Adapters
- Network cables
- Unterminated network cable/connectors
- AC adapters
- Optical drives
- Screws/stand-offs
- Cases
- Maintenance kit
- Mice/keyboards

TOOLS

- Screw drivers
- Multimeter
- Wire cutters
- Punchdown tool
- Crimper
- Power supply tester
- Cable stripper
- POST cards
- Standard technician toolkit
- ESD strap
- Thermal paste
- Cable tester
- WiFi analyzer
- SATA to USB connectors

SOFTWARE

- Operating system disks
- Antivirus software
- Virtualization software
- Anti-malware
- Driver software

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