CompTIA A+ Cheat Sheet (Updated for Latest Exam)

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You've made an excellent choice aiming for the CompTIA A+ certification. It goes without saying that you want to excel in this exam. As A+ covers many technical topics broadly, it is tricky to remember fine details, especially when troubleshooting the problems described in the exam questions.

A+ is a popular entry point into the IT and cyber security industry. To become a technical support specialist, field service technician, help desk technician, service desk analyst, data support technician, or desktop support administrator, the CompTIA A+ certification will get your foot in the door. It also contains essential IT knowledge for a career in cyber security.

Therefore, we've prepared this CompTIA A+ cheat sheet for you as an ongoing revision checklist and provide direction in your exam preparation. Get a copy of this CompTIA A+ cheat sheet for your desk here. When you're ready, let's review our must-know concepts below.

Search cheats here

About CompTIA A+ Certifications

CompTIA A+ comprises two examinations: Core 1, which focuses on hardware, and Core 2, which is about software. The latest CompTIA A+ exam codes are **220-1101** for Core 1 and **220-1102** for Core 2, and you must pass both to obtain the CompTIA A+ certification.

Each of the Core examinations has at most 90 questions, usually 82–83, and you must complete each exam in 90 minutes. That means you only have 180 minutes to finish the A+ exams. On a scale of 100–900, the passing scores for Core 1 and Core 2 are 675 and 700, respectively.

Here is a chart on CompTIA A+ exam objectives (domains):

CompTIA A+ Exam Domains

Core 1 220-1101 Cheat Sheet

This section covers important concepts for Core 1.

Hardware and Mobile Devices

Revisit these hardware-related concepts often.

CONCEPT	ELABORATION
Motherboard	• For connecting all components. • Form factors: ATX, microATX, and ITX. • Types of expansion buses: PCI Express (PCIe) and PCI. • Intel chipsets link to CPU via DMI or QPI. • AMD CPU-to-chipset connection is HyperTransport.
Central processing unit (CPU)	Handles most calculations. Each core contains L1/L2 cache. The entire CPU shares L3 cache. Intel CPUs use these sockets: • LGA775 • 1150 • 1155 • 1156 • 1366 • 2011 AMD CPUs use these sockets:AM3 • AM3+ • FM1 • FM2 • FM2
Random Access Memory (RAM)	• RAM DIMMs include DDR (184 pins), DDR2 (240 pins), DDR3 (240 pins) and DDR4 (288 pins). • RAM SODIMMs include DDR (200 pin), DDR2 (200 pin), DDR3 (204 pin), and DDR4 (260 pin). • Dual-channel: 2× width of 128-bit bus. • Triple-channel: 3× width of 192-bit bus.

CONCEPT	ELABORATION
	• Quad-channel: 4× width of 256-bit bus. • Latency measured as CL or CAS.
Serial Advanced Technology Attachment (SATA)	Consists of a 15-pin power connection and a 7-pin data connector. Revisions: • Rev 1 (1.5 Gb/s), • Rev 2 (3 Gb/s), • Rev 3 (6 Gb/s), • Rev 3.2 (SATA Express) (16 Gb/s), • Rev 3.2 (SATA Express) (16 Gb/s). mSATA = mini-SATA.
Hard disk drive (HDD)	Speeds: 5,400 RPM, 7,200 RPM, 10,000 RPM, 15,000 RPM Form factors: 3.5”, 2.5”
Solid-state drive (SSD)	Communication interfaces: • Non-Volatile Memory Express (NVMe) • SATA • Peripheral Component Interconnect Express (PCIe): x1, x2, x8, x16 Form factors: M.2, mSATA
Solid-state media	Examples: • SSDs • USB flash drives • CompactFlash • Secure Digital (SD) cards
Redundant Array of Independent/Inexpensive Disks (RAID)	• RAID 0 = striping; not fault-tolerant. • RAID 1 = mirroring. RAID 1 + two disk controllers = disk duplexing. • RAID 5 = striping with parity. • RAID 10 = mirrored sets in a striped set.

CONCEPT	ELABORATION
Small Computer Systems Interface (SCSI)	Modern SCSI standards: • Serial Attached SCSI (SAS) • Internet SCSI
IPS	In-plane switching. Possesses wider viewing angle.
TN	Twisted nematic
Optical media	Optical disc drives use changeable media to store and retrieve data. Versions: • read-only memory (ROM) • write-once ® • rewritable/write-many (RW)
Compact Disc (CD)	Capacity: 650–700 MB
Digital video/versatile disc (DVD)	Special formats: • DL: dual-layered • DS: double-sided Capacity: 4.37 – 17 GB Recording technologies: DVD+R, DVD-R, DVD+RW, and DVD-RW.
Blu-ray disc (BD)	For games and HD movies. Capacity: 25–128 GB(Mini-disc capacity: 7.8 or 15.6 GB)
Laptop	Portable miniaturized versions of desktop computers. Uses M.2, Mini PCIe, and Mini PCI (internal) and ExpressCard /34 and /54 (external). Replaceable components: • Keyboards • Touchpads • SODIMM RAM • Screens • Inverters • Batteries

CONCEPT	ELABORATION
	• Optical disc drives • Smart card readers • Hard drives (SSD, HDD, or hybrid).
Heat sink	When installing a heat sink, use thermal paste or pads for filling in gaps and increasing thermal conductivity between CPU and heat sink. Liquid-based cooling systems have higher thermal transfer capabilities than air cooling. To minimize overheating, a “dual-rail” power supply unit (PSU) separates and controls the current in each wire.
Sound card	Links as x1 PCIe (or PCI cards) and will typically have PC 99 color-coded 1/8” mini-jacks for I/O and speakers and optical I/Os known as S/PDIF.
Video card	You link them to motherboards through x16 PCIe or PCI expansion slots. Video connector types and cables: • DVI • VGA • HDMI • Mini-HDMI • DisplayPort • Mini Display Port • S-Video • Component Video/RGB • Composite Typical color depths: • 16-bit • 24-bit • 32-bit

CONCEPT	ELABORATION
	Typical resolutions (aspect ratio) • 1280×720 (720p, 16:9) • 1920×1080 (1080p, 16:9) • 1366×786 (16:9) • 1680×1050 (WSXGA+, 8:5) • 1920×1200 (WUXGA, 8:5) • 640×480 (VGA, 4:3)
Image processing of laser printing	1. Processing 2. Charging 3. Exposing 4.Developing 5. Transferring 6. Fusing 7. Cleaning
Printer configuration settings	• Duplexing: printing on both sides. • Collation: printing many jobs in a row. • Orientation: portrait/landscape.Quality: 600 or 1200 DPI.
BIOS/UEFI	• Locates, tests, and initializes components and boots to the hard drive, optical disc, USB flash drive, or network by PXE. • CMOS stores time/date and passwords. • A CR2032 lithium battery powers the CMOS.
BIOS/UEFI configurations	• Time/date • Boot device order • Passwords • Power management • WOL • Monitoring • Clock and bus speeds • Virtualization support (Intel VT or AMD-V) • Enable/disable devices • Diagnostics

CONCEPT	ELABORATION
	• Security • Intrusion detection

Networking

A+ covers network topologies and the devices connecting them.

CONCEPT	EXPLANATION
LAN	Local area network
WAN	Wide area network
MAN	Metropolitan area network
PAN	Personal area network
SAN	Storage area network
WLAN	Wireless local area network
Network Address Translation (NAT)	Modifying IP address as it crosses a router
Port forwarding	Forwards outside network port to internal IP address and port
Switch	Connect computers in LAN
Router	Connects ≥2 LANs to the Internet
Firewall	Safeguards computers and networks against unauthorized access
IDS	Intrusion detection system
IPS	Intrusion prevention system
UTM	Unified threat management

Network cables: Familiarize yourself with the examples.

TYPE	EXAMPLES/ELABORATION
Twisted pair	RJ45, RJ11
Fiber optic	SC, ST, LC
Coaxial	F-connector, BNC
Plenum-rated	Fire-resistant cable designed for airways, conduits, and regions where sprinklers cannot reach.

Cabling standards:

CATEGORY	RATED FOR
3	10 Mb/s
5	100 Mb/s
5e	100 Mb/s and gigabit networks
6/6a	gigabit and 10 Gb/s networks
7	gigabit and 10 Gb/s networks

Wiring patterns:

STANDARD	EXPLANATION
T568A	1. White/green 2. Green 3. White/orange 4. Blue 5. White/blue 6. Orange 7. White/brown 8. Brown
T568B	Swap “green” and “orange” in T568A.

Connection methods:

CONCEPT	ELABORATION
Thunderbolt	• Version 1 is 10 Gb/s and uses DisplayPort; • Version 2 is 20 Gb/s and also uses DisplayPort; • Version 3 is 40 Gb/s and uses USB-C.
Universal Serial Bus (USB)	Can support up to 127 devices. • USB 1.1 (full speed) runs at 12 Mb/s by a max cable length of 3m. • USB 2.0 (high-speed) runs at 480 Mb/s by a max cable length of 5m. • USB 3.0 (SuperSpeed) runs at 5 Gb/s. • USB 3.1 (SuperSpeed+) runs at 10 Gb/s. Version 3.x ports are blue. Desktop/laptop computers use USB-A/B connectors. Tablets/smartphones use mini- and micro-connectors. USB-C: one-third size of USB-A plug; compatible with USB 3.1.
Bluetooth	Short-range technology for simplifying communication and connectivity among network devices
Bluetooth transmission range	• Class I: 100m
Bluetooth maximum data transfer rate	• Version 1: 721 Kb/s • Version 2: 2.1 Mb/s • Version 3: 24 Mb/s

Internet Protocol (IP) addressing:

CONCEPT	ELABORATION
IPv4 address	32-bit number, consisting of four decimals from 0 to 255 separated by period (.), e.g., 192.168.1.1 Manual entry or Dynamic Host Configuration Protocol (DHCP) determines your IPv4 address.
IPv4 loopback	127.0.0.1
APIPA/link-local	169.254.x.x
Classless Inter-Domain Routing (CIDR)	CIDR IPv4 addresses have a prefix; e.g., "/24" in "10.150.23.58/24" denotes a 255.255.255.0 subnet mask.
IPv6 address	128-bit hexadecimal number, e.g., 2001:7120:0000:8001:0000:0000:0000:1F10
IPv6 loopback	::1 (unicast)
Network speed	• 1000 Mb/s (gigabit Ethernet) • 10 Gb/s (10 Gb Ethernet)

IPv4 address classes:

CLASS	RANGE (1ST DECIMAL)	SUBNET MASK	PRIVATE
A	1–126	255.0.0.0	10.x.x.x
B	128–191	255.255.0.0	172.16.0.0–172.31.255.255

Wireless Ethernet:

VERSION	DATA TRANSMISSION RATE	FREQUENCY MODULATION (GHZ)
802.11a	54 Mb/s	5
802.11b	11 Mb/s	2.4
802.11g	54 Mb/s	2.4

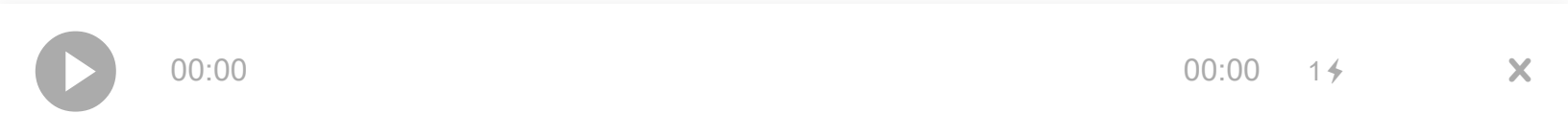
VERSION	DATA TRANSMISSION RATE	FREQUENCY MODULATION (GHZ)
802.11n	300/600 Mb/s	2.4, 5
802.11ac	≥1.7 Gb/s	5
802.11ax	≤9.6 Gb/s	2.4, 5, 6

Ports and Protocols:

PORT	NETWORK PROTOCOL
21	File Transfer Protocol (FTP)
22	Secure Shell (SSH)
23	Telnet
25, 587	Simple Mail Transfer Protocol (SMTP)
53	Domain Naming System (DNS)
80	Hypertext Transfer Protocol (HTTP)
110	Post Office Protocol (POP3)
137–139	NetBIOS
143	Internet Message Access Protocol (IMAP)
443	HTTP Secure (HTTPS)

548	Apple Filing Protocol (AFP)
3389	Remote Desktop Protocol (RDP)

Remember to check out our **Common Ports Cheat Sheet**.



Well-Known Ports: Unencrypted vs Encrypted

Virtualization and Cloud Computing

Despite its small weighting, we'd like to cover basic concepts in this domain.

ABBREVIATION	EXPLANATION
IaaS	Infrastructure as a service
PaaS	Platform as a service
SaaS	Software as a service
VDI	Virtual desktop infrastructure

Virtual machines (VMs) come in these two types:

HYPERVISOR	ELABORATION
Type 1	Bare or native metal
Type 2	App-like VM on the operating system

Core 2 220-1102 Cheat Sheet

This section covers key ideas for Core 2.

Operating Systems

The following table focuses on the Windows operating system. You can also get our command-line cheat sheets for **Linux** and **Unix** (applies to Mac).

CONCEPT	ELABORATION
Microsoft Management	

Master boot record (MBR)	Hard drive has up to four partitions but only one extended partition.
GPT (GUID Partition Table)	Hard drive has 128 partitions and may exceed MBR's 2 TB limit. Stored in multiple locations. Requires UEFI-compliant motherboard.
Logical drive	Segment of an extended partition
Active partition	Computer boots from here, usually contains operating system
Volume	Any section of a drive with a letter

CONCEPT	ELABORATION
Samba	File- and printer-sharing service
EOL	End-of-life
CDFS	Compact disc file system
NFS	Network file system
NTFS	New Technology File System
FAT32	File Allocation Table 32
ext3, ext4	Third and fourth extended file systems
APFS	Apple File System
exFAT	Extensible File Allocation Table

Common system tools in Windows:

TOOL	PURPOSE
Command Prompt	Command-line program. For elevated privileges: Click START (bottom left corner) > type “cmd” > select “Run as administrator”.
Control Panel	View/change settings
Device Manager	Monitor and (dis)connect devices
Remote Desktop software	View/control a remote computer
User State Migration Tool (USMT)	Move user data
System Restore	Revert to earlier system configuration (“restore point”)

Windows upgrade minimum prerequisites:

WINDOWS	CPU (GHZ)	RAM (GB)	FREE DISK SPACE (GB)
10 (32-bit)	1	1	16
10 (64-bit)	1	2	20
11	1; 2 cores	4	64

Security

Know the advantages and vulnerabilities of these protocols.

WIRELESS ENCRYPTION PROTOCOL	EXPLANATION
WPA	Wi-Fi Protected Access
TKIP	Temporal Key Integrity Protocol
AES	Advanced Encryption Standard
RADIUS	Remote Authentication Dial-In User Service
TACACS+	Terminal Access Controller Access-Control System

Social Engineering:

TECHNIQUE	EXPLANATION
Vishing	Attack by telephone or voicemail
Shoulder surfing	Look over someone's shoulder, often with a recording device
Whaling	Phishing that targets high-ranking people, such as C-suite executives
Tailgating	Unauthorized entity follows authorized party into secured premises
Impersonation	Attacks using stolen credentials or personal information

TECHNIQUE	EXPLANATION
Dumpster diving	Recover information from trash
Evil twin	Setting up a fake Wi-Fi access point, hoping people choose it over the genuine one.

Threats:

NAME	EXPLANATION
Denial of service (DoS)	Overwhelming a target using a single machine
Distributed denial of service (DDoS)	DoS using multiple machines
Zero-day attack	Vulnerability unbeknownst to developers
Spoofing	Gain unauthorized access by pretending to be authorized
On-path attack	Setting up Wi-Fi networks to trap unsuspecting users
Brute-force attack	Trying character combinations
Dictionary attack	Using lists of probable passwords
Insider threat	Potential for an insider to use their authorized access or understanding of an organization to harm that organization
Structured Query Language (SQL) injection	Manipulating SQL to modify remote database (such as by using **sqlmap**)

Malware:

NAME	EXPLANATION
Virus	Runs on a computer without the user's knowledge. Examples: Boot Sector, Macro, Program, Polymorphic, Stealth, and Multipartite.
Worm	Replicates itself across a network

NAME	EXPLANATION
Trojan Horse	Performs useful functions superficially but runs malicious programs covertly
Spyware	Spies on a computer and records its activities. Examples: keylogger and browser-hijacking adware
Rootkit	Gains administrator-level access to the system core undetected
Ransomware	Holds a computer hostage until the user pays

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Proper Communication Techniques and Professionalism for Technicians

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Location of A+ in the StationX Cyber Security Certification Roadmap

Conclusion

We hope this CompTIA A+ cheat sheet helps you in your studies as a brief recap of key points. Don't forget to look into our **latest CompTIA A+ courses** and **practice tests** for comprehensive exam preparation. Above all, we wish you success in the exam and beyond.

Frequently Asked Questions

What is the hardest part of the A+ exam?

The **performance-based questions** are the most difficult because you need to know the granular details of technical components and concepts. Therefore, when you study and practice for exams, pay attention to numerical and seemingly trivial details.

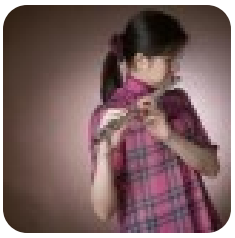
How many questions can you miss on the A+ exam?

Can you cheat on CompTIA A+?

How many times can you fail the A+ exam?

Are CompTIA exams proctored?

CATEGORIES CERTIFICATIONS CHEAT SHEETS



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I make connections across disciplines: cyber security, writing/journalism, art/design, music, mathematics, technology, education, psychology, and more. I've been advocating for girls and women in STEM since the 2010s, having written for Huffington Post, International Mathematical Olympiad 2016, and Ada Lovelace Day, and I'm honored to join StationX. You can find me on **LinkedIn** and **Linktree**.

Nmap Cheat Sheet 2023: All the Commands, Flags & Switches

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