The A+ Cram Sheet

This Cram Sheet contains the distilled, key facts about A+. As the last thing you do before you enter the testing room, review this information, paying special attention to those areas you feel you need to remember the most. You can transfer any of these facts from your head onto a blank sheet of paper when you enter the test room.

1. The ATX motherboard was an open standard and introduced built-in, double-high I/O connectors. The CPU was relocated towards the back of the board, near the cooling fan, for better cooling and accessibility.

2. The two basic expansion card types are the Industry Standard Architecture (ISA), used on XT, AT, and ATX boards, and the PCI bus. ISA is used less and less these days.

3. XT boards use an 8-bit ISA bus. AT and ATX boards use a two-part 8-bit/16-bit ISA bus, together with a PCI bus (typically four slots).

4. 16-bit ISA bus slots are usually long and two parts, and tend to be near one edge of a motherboard. If a slot is shorter and in one piece, it's probably an 8-bit ISA slot. Towards the middle of the board, it's PCI.

5. PCI bus is a 32-bit/64-bit bus specification with smaller slots, generally nearer the center of a motherboard. PCI slots can sometimes be interwoven between the ISA slots: ISA then PCI, then ISA again, and so forth.

6. CMOS is a battery-backed chip that contains system settings, configured from a hot-key combination at bootup. CMOS stores passwords. The best way to recover from a forgotten CMOS password is to disconnect the chip's power supply, thereby clearing all settings. A badly configured CMOS (where the hardware attached is set with the wrong name) usually means a device mismatch error.

7. Jumpers are used to set motherboard clock speeds. 1 Hertz (Hz) is one cycle per second, or one clock tick. 1 Megahertz (MHz) is one million cycles (clock ticks) per second. Motherboard speeds should match the fastest CPU speed. Jumpers can also configure a master/slave IDE or EIDE drive. ATA is a specification.

8. The power supply takes in 110 volts (AC) and typically puts out 12 and 5 volts (DC). Sometimes, jumpers can set a voltage regulator module (VRM) on the system board to provide other voltages. Many processors continue to use 3.3 volts.

9. Real Mode originates with the 8086 processor, when the chip could only address 1MB of real memory addresses. The first 1MB of physical memory is called *conventional memory* and can be split into low memory (IRQ tables), application memory (640KB), and upper and high memory (around 370KB).

10. Windows 9x creates a Real Mode virtual machine (VM) to run 16-bit applications and device drivers. Windows NT and Windows 2000 use the hardware abstraction layer (HAL) to control devices.

11. Enhanced Mode (386 Enhanced Mode, 32-bit Protected Mode), originated with the 80386 chip. Modern processors use Enhanced mode. The 32-bit 80386 was the first chip to switch between Real Mode and Protected Mode without requiring a system reset.

12. Parity tests RAM chips (on SIMMs and DIMMs) for structural integrity. Thermal changes can affect the RAM chips and cause parity errors. The POST routine cannot uncover heat-related problems, since everything on the board is cool. Heat problems usually cause software problems and are uncovered using software utilities.

13. First generation Pentium chips generally run between 66 and 200 MHz. Pentium Pro chips were sold in two speeds: 180 MHz and 200 MHz. Intel makes Pentium chips. AMD makes Athlon and Duron chips. Rambus makes RDRAM, but the generic copy is DDR DRAM or DDR SDRAM.

14. L1 cache (Level 1) is between 8KB and 64KB, and is internal to the CPU. L2 cache (Level 2) is usually an external chip or near the CPU on the chip die, and works best at between 256KB and 512KB.

15. Slot 1, Slot 2, Socket 7 and Socket 370 chip-mounting technologies used by Intel processors. Slot A and Socket A are technologies used by AMD Athlon and Duron processors.

16. One IEEE-1394 (i.Link or FireWire) controller can support speeds up to 400Mbps and 63 daisy-chained devices. USB supports speeds up to 12Mbps. 1 USB controller can support 127 devices, and uses hubs in a tiered-star topology.

17. Parallel cables usually have a DB25 male connector on one end, and a 36-pin male Centronics connector at the other end. The Parallel port on the back panel of the PC is usually a 25-pin female socket.

18. Serial cables connect to the back panel with a 9-pin connector. Video cables use a 15-pin connector. A PS/2 connector is a small, 6-pin circular connector. AT DIN connectors (older keyboards) are larger than PS/2 connectors: a 5-pin circular plug. A USB connector looks like a rectangle.

19. SCSI cables are usually 50-pin ribbon cables. SCSI chains almost always have 1 Host Adapter, and can have up to 7 additional devices. The cable must be terminated at both ends. IDE controllers can have up to 2 devices. SCSI and USB are usually used for external devices like CD-ROM drives and scanners.

20. COM1 and COM3 are logically joined, while COM2 and COM4 are logically joined. Com1 and 3 use IRQ 4 while Com2 and 4 use IRQ 3.

21. COM port addresses: com1=03F8; com3=03E8; com2=02F8; com4=02E8

22. LPT1 uses IRQ 7, and LPT2 uses IRQ 5.

23. IRQ 14 is the primary (first) drive controller. IRQ 15 is the secondary drive controller. Floppy controllers use IRQ 6. IRQ 2 cannot be used when it *cascades* to IRQ 9.

24. Laser printers use a *primary corona* wire to charge the EP drum. The drum is cleaned, charged, and written to. The image develops (by the corona charge) and pulls toner to the drum. Paper is charged and pulls toner from the drum, where it's fused by the *fuser rollers*. If the heat-sensor on the fuser rollers shuts down, the toner will fail to stick to the paper. Paper jams are usually caused by a bad separator pad.

25. Sectors are 512 bytes. Clusters grow to fit the size of the logical drive, depending on the formatting system. FAT16 is 16KB and uses 16-bit addressing. The Master Boot Record (MBR) is in Sector 0, Track 0, Head 0, Cylinder 0 of the Active, Primary partition. FAT32 uses smaller clusters and can address more than the FAT16 2GB drive limit. NTFS is the Windows NT File System.

26. Physical disks can have a maximum of 24 logical drives (A: and B: are floppies). When a Drive C: has been partitioned, the largest Extended partition can have 23 drive letters.

27. USB supports Plug-and-Play external peripherals. Devices can be changed without turning off the power (hot swapping). ESD is electrostatic discharge. EMI is electromagnetic interference.

28. If a keyed connector doesn't have a physical notch, the red stripe refers to Pin 1.

29. Interlaced monitors scan odd lines and then even lines in a two-step process. Non-interlaced monitors scan every line in one pass.

30. There are 8 DMA channels and 16 IRQ lines.

31. A good circuit (e.g., working fuse) shows 0 Ohms on a multimeter. Capacitors store an electrical charge and are used in power supplies.

32. Dots per inch is written as dpi (printers and scanners). Pixels measure graphics resolutions. Standard VGA is 640x480x16 colors. SVGA is *super* VGA and provided resolutions up to 1600x1200x16-million colors.

33. FDISK.EXE is used to create partitions. FORMAT.COM is used to create logical drives (volumes). FORMAT C: /S transfers system files to Drive C: making that drive bootable.

34. SYS C: (SYS.COM) is used to transfer system files to a corrupted Drive C: showing a "Missing or bad system files" error.

35. An operating system is a command line, a command interpreter (COMMAND.COM), and a user interface. The three critical DOS (system) files are IO.SYS, MSDOS.SYS, and COMMAND.COM (in that order).

36. The DOS load order is: ROM BIOS, POST, IO.SYS, CONFIG.SYS, MSDOS.SYS, COMMAND.COM, AUTOEXEC.BAT in that order. Beep codes are POST-level error codes, using the internal speaker.

37. CONFIG.SYS loads Real Mode device drivers (DEVICE=). AUTOEXEC.BAT executes commands at startup. Device drivers usually have a .SYS extension. LASTDRIVE= tells the system how many logical drive letters have been assigned, and is a directive in CONFIG.SYS. The default is 5 drives.

38. Wildcards are * and ?. The * finds any number of characters to the right and ? finds only one character per question mark. **DIR *.DLL** will find all .DLL files in a folder. **DIR *.DLL /S** will search all subfolders.

39. ATTRIB.EXE is used to set file attributes such as Hidden, Read-only, System, Archive. The Hidden and System attributes prevent DOS from showing a file with the **DIR** command.

40. DEFRAG.EXE is a way to move parts of files (clusters) next to each other and speed up access times on a hard drive. SCANDISK.EXE checks a disk for bad sectors and file allocation problems.

41. SMARTDRV.EXE is a software cache for reading hard drives. Windows 9x removes SMARTDRV from a CONFIG.SYS file by placing a REM (remark) at the beginning of the line. The semi-colon (;) remarks out lines in an .INI file.

42. EMS is expanded memory. XMS is extended memory (X-10). EMM386.EXE is never used in Windows 9x (it's commented out if found). HIMEM.SYS loads from MSDOS.SYS (Windows 9x) and is a required extended memory manager in Windows 9x, Windows NT, and Windows 2000.

43. Core files for Windows 3.x are: USER.EXE, GDI.EXE, KRNL386.EXE. GDI is the acronym for graphics device interface. The global heap is all the memory Windows can use.

44. WIN.COM starts Windows. SYSTEM.INI contains device drivers and program configurations. WIN.INI holds user options and environment configurations. WIN.INI is not necessary, but it is created if it doesn't exist.

45. Windows 9x loads IO.SYS, CONFIG.SYS, and MSDOS.SYS. HIMEM.SYS must load from MSDOS.SYS or Windows 9x won't start. All versions of Windows may use an optional CONFIG.SYS and AUTOTEXEC.BAT file.

46. Registry files are SYSTEM.DAT and USER.DAT. Windows 9x uses the REGEDIT.EXE editor. Windows NT and Windows 2000 use the REGEDT32.EXE editor.

47. ERU.EXE is used to back up the system registration (Registry). SCANREGW.EXE is used to check the Registry for structural integrity. LOGVIEW.EXE opens Windows 9x startup logs. BOOTLOG.TXT contains startup error conditions. SYSEDIT.EXE opens startup configuration files.

48. HKEY_LOCAL_MACHINE, HKEY_CLASSES_ROOT, HKEY_CURRENT_CONFIG, HKEY_CURRENT_USER, and HKEY_USERS are the five main Registry handles.

49. Safe Mode loads VGA drivers and keyboard drivers, but no network drivers. F8 interrupts the startup and presents a text Startup menu (Windows 9x). Hold down an arrow key to start Windows 2000 in Safe Mode.

50. Windows 2000 and Windows NT use NTLDR.COM to control the boot process. Other files are: BOOT.INI, NTDETECT.COM, NTOSKRNL.EXE, HAL.DLL, SYSTEM, SMSS.EXE, WINLOGON.EXE, and LSASS.EXE.

51. Ethernet is a Bus network that can be wired in a *star* or *bus* configuration. Token ring networks can be wired in a *ring* or *star* topology. Star topology uses hubs.

52. Network Interface Cards (NICs) usually include a link-status light indicating whether they're working or not.

53. Bridges *segment* a congested network. Routers *direct traffic* between networks. PING tests a connection.

54. Ethernet cables are: 10Base5, 10Base2, and 10BaseT. The "2" and 5" are 200 and 500 meter limits. The "T" stands for twisted-pair wire.

55. An email address (aplus@jamesgjones.com) requires a *user name* (a-plus) and a *domain name* (james-gjones.com). Email uses the Internet TCP/IP networking protocol.

56. An IP address consists of many numbers and periods. A Domain Name Systems (DNS) server converts the IP address to a readable name.