

# 1

## Answers

### Week One

#### (covers Chapters 1 and 2)

#### True or False

1. **T** Vacuum tubes consumed a lot of electricity and were very unreliable.
2. **T** Vacuum tubes also were very large compared to a transistor.
3. **T** The two types are XT and AT.
4. **F** Both XT and AT motherboards have 16-bit slots.
5. **T** See Question 3.
6. **F** PCs commonly use Intel or Intel-compatible processors.
7. **T** The processor is almost always the largest component on the motherboard.
8. **F** Service contracts are a convenience and not usually the most cost-effective PC maintenance method.
9. **T** Intel is by far the leading manufacturer of processors.
10. **F** Norton Utilities can identify both the processor (CPU) type and speed.
11. **F** The chipset manufacturer is responsible for the settings in the Advanced CMOS setup and should be contacted for technical information.
12. **T** Intel makes motherboards for major vendors such as Dell, Micron, and Gateway.
13. **F** Phoenix used the clean-room technique to develop a non-infringing version of the IBM BIOS.
14. **F** Wintel refers to **Windows** software running on **Intel** or Intel-compatible processors.

15. **T** Gordon Moore's observation (Moore's Law) has also been applied to the growth of processor power and disk-drive storage capacity.
16. **F** The Pentium is an AT-class processor because of its 64-bit data bus and 32-bit expansion bus. XT-class computers have 8-bit data and expansion buses.
17. **F** Proper cleaning can dramatically increase a power supply's life.
18. **T** A PC will not boot until it has received a Power Good signal from the power supply.
19. **T** These can be found at many computer stores.
20. **T** This is why it is important to take care when servicing power supplies.
21. **F** LPX uses two 6-pin connectors (P8/P9), and ATX uses one 20-pin connector.
22. **T** This is why you must hold in the power switch for several seconds on most models.
23. **F** Black wires are ground wires.
24. **T** Some motherboards are more sensitive to Power Good than others, so you might suspect the motherboard is the problem.
25. **F** Leave the power supply connected to the motherboard and drives so there's a load on it.
26. **F** Excessive power-on and power-off cycles put thermal stress on the entire system.
27. **T** This size is large enough to handle about any combination of internal cards and drives.
28. **F** You should increase the wattage because the power supply might have failed due to a lack of capacity to handle the load.
29. **F** Recent motherboards often use the CR-2032 flat 3v battery, but many other models have been used.

### Multiple Choice

1. **A and C** Apple was the dominating computing force in the 80s. CP/M machines such as the Kaypro and Osborne 1 were popular with hobbyists.
2. **C** This is how the software giant was born.
3. **B** The expansion bus is where adapters are plugged in.

4. **A and B** Motherboards and video cards both can have video chipsets onboard.
5. **C** See true and false answers 1 and 2 above.
6. **C** This voltage is not generated by power supplies.
7. **A** This term can be used to describe motherboards, cases, and other PC components.
8. **B** ATX also refers to the shape and layout of the motherboard.
9. **A** This wire is usually orange.
10. **B** These wires are always hot when the power supply is plugged in.
11. **D** These colors are typically used on both LPX and ATX power supplies, as well as drive cables.
12. **C** This formula is useful if you must determine whether you are overloading your power supply.
13. **A** You must also be sure you don't offset the wires when you attach them to the motherboard.
14. **B** This signal comes from the power supply.
15. **B** This phrase refers to running the probe through the top (rear) of the power connectors.
16. **A and B** Most systems use a battery.

# 2-3

## Answers

### Weeks 2 and 3

#### True or False

1. **T** LPX motherboards are not interchangeable because of the differing locations of the riser card on various brands.
2. **T** Compare this to the North Bridge, which connects the CPU bus to the PCI bridge and other high-speed components, such as the L2 cache controller and AGP port.
3. **F** The chipset does not include the CPU, allowing a system designer to choose from a variety of chipset solutions that are compatible with a given processor.
4. **T** The ISA bus[md]unlike its faster 32-bit cousins, VL-Bus and EISA[md] still clings to life. The capability to use ISA cards in these faster slots enables you to extend the life of older systems because VL-Bus and EISA cards are obsolete and hard to locate.
5. **F** AGP is called the accelerated graphics port because it is made strictly for high-speed video.
6. **T** This feature, introduced with Windows 95 OSR 2.0 and above (Windows 95B), also requires a compatible chipset.
7. **T** If you install a so-called "legacy" (non-PnP) card, you can still have a hardware conflict. Some legacy cards can be switched (through software or physical switches) into PnP mode.
8. **F** The layout and back panel of an ATX motherboard is completely different from a Baby-AT motherboard. You would need to buy a new case and power supply for

your ATX motherboard, and you also might need to replace your existing processor and RAM.

9. **T** The position of the processor on many VL-Bus and PCI/ISA-based systems prevented the use of full-length cards in as many as three expansion slots.
10. **F** Many late-model 486 and Pentium Baby-AT motherboards have built-in ports, but clumsy ribbon cables were required to extend the motherboard connectors to the rear panel or to expansion slot brackets for use.
11. **F** Sharing DMAs is almost certain to lead to a system crash. Because DMA transfers bypass the CPU, no oversight exists to prevent two simultaneous DMA transfers from happening to the same memory location.
12. **F** Packard Bell, IBM Aptiva, HP, and Compaq have all made systems with LPX motherboards, which are not standardized. Systems with these proprietary motherboards are often called "throwaway PCs" because they can't be upgraded beyond the limits of their motherboard designs.
13. **F** The chipset is the limiting factor. Systems with identical Intel Pentium III processors, for example, may use SDRAM or RIMM modules, depending on the motherboard's chipset.
14. **T** The new DDR SDRAM modules will plug into a 184-pin slot, compared with standard SDRAM's 168-pin slot.
15. **T** Motherboards that use the new Rambus RDRAM module must have either a RIMM module or a continuity module (which resembles a RIMM but without memory chips) in each memory slot.

### Multiple Choice

1. **A and D** ATX motherboards, by contrast, always have two rows of built-in ports. Most, but not all, LPX motherboards have expansion slots parallel to the motherboard. Some IBM and HP tower systems have a different type of riser that allows the slots to be at right angles to the motherboard, but the slots are raised off the motherboard level.
2. **B** A typical Pentium motherboard can be used with MS-DOS, Windows 3.1, Windows 9x, Windows NT, Windows 2000, and Linux.

3. **B** Many systems sold today come with 128 or 256 megabytes of RAM, which severely limits performance. Doubling the RAM is the most cost-effective way to speed up both new and older systems.

# 4-5

## Answers

### Weeks 4 and 5

#### True or False

1. **F** CPUs such as the Intel Pentium, Pentium MMX, and AMD K6 and K6-2 have no built-in level 2 cache, but most systems using these processors do have level 2 cache. On these systems, level 2 cache is located on the motherboard.
2. **T** All CPUs since the first 80286 processor have been limited by the memory map because memory beyond the 1MB limit of the 8088 must be handled in a way completely different from how conventional memory is handled.
3. **F** The original 60MHz and 66MHz Pentium processors fit into Socket 4, which ran at 5 volts (instead of 3.3v as with Sockets 5 and 7) and had a different pinout.
4. **F** Whereas the original Athlon, like some Pentium III versions, is a slot-mounted CPU, the Pentium III uses Slot 1. In addition, the Athlon uses a different design called Slot A.
5. **T** The device used to adapt socketed Pentium III and Celeron CPUs to Slot 1 is called a slot-ke~~t~~.
6. **F** Although the Celeron is an "economy" version of the Pentium II that can fit into the same slot, the AMD K6 and Athlon are not similar. The K6 uses Socket 7, and the Athlon uses Slot A or Socket A.
7. **F** The Duron is an Athlon processor with less L2 cache; all other capabilities are essentially the same.
8. **F** The Pentium 4 uses Socket 423.

9. **T** Originally packaged in the SECC2 slot package, the Pentium III more recently was released in the FC-PGA (socket) package and is used in Socket 370 but can be used in Slot 1 with a slot-kef adapter.
10. **F** Pentium 4 processors make especially good use of DDR SDRAM.

### Multiple Choice

1. **A** The Celeron 300MHz chip was made in two versions; the 300 has no level 2 cache, and the 300A has 128 kilobytes of L2 cache, like all Celerons to follow.
2. **C** The Pentium Pro[md]the first of the P6 line[md]used the rectangular Socket 8, which was never used again. Slot 1 and Socket 370 have the same signals but are different physically.
3. **D** The 386SX was a surface-mounted chip; the 386DX was a socketed chip.
4. **D** The clock multiplier always needs to be changed. The new chip will run at a higher multiplier of the motherboard speed than the old one.
5. **B** The PIII processor L2 cache can cache up to 4GB of addressable memory space and include error correction.

# 6

## Answers

### Week 6

#### True or False

1. **T** This memory needs to be managed by an XMS memory manager, such as HIMEM.SYS, to be available to your system.
2. **F** You can use PC100 memory (made for 100MHz memory access) in slower systems. Celerons have a memory access speed (bus speed) of just 66MHz.
3. **T** Most DIMM modules are SDRAM, but EDO DIMMs are also available.
4. **T** The new DDR SDRAM modules will plug into a 184-pin slot, compared with standard SDRAM's 168-pin slot.
5. **T** Motherboards that use the new Rambus RDRAM module must have either a RIMM module or a continuity module (which resembles a RIMM but without memory chips) in each memory slot.
6. **F** When parity-checked memory is used on a system that doesn't check parity, the extra memory bits are ignored.
7. **T** ECC (error correcting code) systems use the parity bits to correct single-bit memory errors in the data bits.
8. **F** Memory shadowing, which uses some of the physical RAM in the system as a location to copy ROM chips such as the motherboard and video BIOS to RAM, always reduces the amount of usable memory, but only by 128KB[nd]384KB.
9. **F** 72-pin SIMMs must be installed in pairs on Pentium systems that use SIMMs. Each 72-pin has 32 bits of data, and the Pentium's data bus is 64 bits ( $64/2 = 32$ ). However, many late-model 486 systems also use SIMMs, and on these, only a single SIMM is necessary. The 486 has a 32-bit data bus ( $32/32 = 1$ ).
10. **F** You should match the metal on the SIMM contacts to the metal used in the SIMM memory socket: gold to gold and tin to tin.
11. **F** The system BIOS is burnt into a ROM chip.
12. **T** It is a software program that can be configured.

13. **F** BIOS chips are also found on video cards and on some network and SCSI cards.
14. **T** The chip that stores settings is referred to as the CMOS chip or the NVRAM/RTC chip.
15. **F** ROM is a very slow form of memory[md]around 150ns access time.
16. **F** 32-bit operating systems load their own drivers in place of BIOS routines.
17. **T** Most BIOSes used in PCs are customized for the manufacturer.
18. **T** AMI and Award BIOS have far fewer beep codes.
19. **F** You can upgrade the BIOS or add a BIOS helper card to support larger drives.
20. **F** You might need to replace the BIOS chip if your motherboard doesn't have a recovery option.
21. **T** The extra bytes support Plug and Play and other BIOS options.
22. **F** The keystrokes used to access the BIOS vary by BIOS version.
23. **T** If you are not careful, though, you can also degrade the performance of your system or make your system inoperable.
24. **T** This is why many PnP boards do not allow you to change the IRQ manually, even through the Windows Device Manager.
25. **T** If you lose the password, you must clear the CMOS, which discards both the password and all other setup information.
26. **F** The operating system's power management overrides the system BIOS settings.
27. **T** This allows you to avoid booting from a floppy or setting a CD-ROM to be the first boot device.
28. **F** Most boot errors do not have beep codes, especially on non-Phoenix BIOS systems, and boot errors early in the boot process halt the system before the display is enabled.

### **Multiple Choice**

1. **B** Only 640 kilobytes could be used for programs, but adapter cards could use the memory from 640 kilobytes to 1 megabyte for RAM and ROM addresses.
2. **C** This area is also referred to as UMBS, and memory managers such as EMM386.EXE and QEMM were used with MS-DOS to move programs into this area to increase free conventional memory.
3. **A** This memory is at the bottom (or base) of the memory map.

4. **B** This memory is made available to the system through XMS memory managers such as HIMEM.SYS.
5. **A** A large portion of DOS 5 and above is copied to this area, also called the HMA, when DEVICE=HIMEM.SYS and DOS=HIGH are added to the CONFIG.SYS file on DOS and Windows 3.1 systems.
6. **D** The Windows 9x Plug and Play (PnP) technology handles all these potential problems, plus memory address conflicts.
7. **C** Memory access is far faster than disk access, which is measured in milliseconds (1 millisecond = 1 thousandth of a second).
8. **A** Chip creep, in which individual RAM chips gradually work loose due to heating/cooling cycles, caused immense reliability headaches on early 286 and 386 computers, which might use as many as 36 chips per megabyte of RAM!
9. **B** Many systems sold today come with 128 or 256 megabytes of RAM, which severely limits performance. Doubling the RAM is the most cost-effective way to speed up both new and older systems.

#### **Fill-in-the-Blank**

1. **API.** This stands for Application Programming Interface.
2. **BIOS.** This abstracts the OS from the hardware.
3. **POST (power on self test), BIOS Setup, Bootstrap loader, and BIOS (basic input/output system).**
4. **Flash ROM.** This enables upgrading the BIOS through software.
5. **8.4GB.** Many of these systems do not have flashable BIOS chips, so manual upgrading (by replacing the BIOS chip) is necessary.
6. **Moving a jumper.** Or by removing the BIOS battery and replacing it.
7. **Beep or display an error message.** The CD included with this book has a list of the major beep error codes.
8. **FDISK.** This is done during the partitioning of the drive.

# 7

## Answers

### Week 7

#### True or False

1. **T** Many CRTs now offer flat tubes.
2. **F** The visible image quality of the monitor should be the deciding factor.
3. **F** Refresh rates higher than those that provide a flicker-free display can slow down the computer.
4. **F** Most video cards no longer have sockets for additional RAM; you replace the card instead of upgrading it.
5. **T** Built-in AGP is often referred to as onboard or integrated AGP and is a feature of chipsets developed by Intel and other vendors for low-cost computers.
6. **F** Various numbers of monitors are supported by these versions of Windows, and card compatibility is listed in different ways.
7. **F** DirectX is backward compatible, and installing an old version of DirectX can corrupt your Windows installation.
8. **T** Many video card makers standardize on one chipset and use varying amounts of RAM, TV tuners, and other features for multiple models.
9. **T** These problems result from converting analog VGA signals back into digital signals for LCD panels.
10. **T** MP3 files use compression to achieve much smaller sizes than WAV files, but both are digitized from live sound.

11. **F** Low-quality sound cards can cause recognition problems.
12. **T** Low-cost sound cards often lack the digital inputs necessary for the best DVD sound quality.
13. **F** PCI cards use fewer IRQs.
14. **F** Speaker problems and onscreen volume controls should be checked first and are the cause of most no-sound problems.
15. **F** Because sound cards have multiple components, you should skip rebooting until you come to the Windows desktop. This enables Windows to detect all the components without repeated rebooting.

### Multiple Choice

1. **C** The 15-pin port also doubles as the MIDI connector on most sound cards.
2. **B** De facto standards are shaped by market popularity rather than by an official body, such as ANSI or IEEE.
3. **B** Software developers write code to activate DirectX features rather than trying to directly support the many brands and models of sound cards.
4. **B and D** The only disadvantage of PCI sound cards is that some have a less-than-perfect emulation of the old Sound Blaster Pro for DOS games.
5. **A and D** These factors affect sound quality and are caused by poor components or design.
6. **B** Sampling at higher bit rates (such as with MP3 recording) produces more-realistic sound.
7. **A** Telephone-quality sound is recorded at 11KHz, which reduces disk space requirements and quality.
8. **A** Use these connectors for direct digital feed from newer CD-ROM drives and DVD decoders.
9. **D** Sound Blaster Pro is the de facto standard for DOS games.

10. **A** This low power level is a good reason to use powered speakers.
11. **D** Device Manager displays the resources used by all components on the sound card. MSD, on the other hand, is a DOS-based utility that is incapable of detecting sound hardware in most cases.

# 8-9

## Answers

### Weeks 8 and 9

#### True or False

1. **T** The 3 1/2[dp] double-density drive spins at 300rpm.
2. **F** Floppy drive heads make contact with the media; dirty read/write heads can damage or contaminate the media.
3. **F** The Ferrite head is actually the earliest head design.
4. **T** X-rays can't harm magnetic media; metal detectors, on the other hand, can harm data on your disks.
5. **F** This condition usually indicates a reversed or incorrectly inserted data cable.
6. **F** These terms have identical meanings; the term allocation unit was introduced with DOS 4.0.
7. **F** With floppy drives selling for as little as \$15 each and having little if any manual adjustments, replacing a defective drive is a no-brainer.
8. **F** Standard floppy drive cables have a twist on lines 10[nd]16.
9. **F** You can purchase a Y-splitter cable to convert one power connector to two connectors.
10. **T** You must enable termination on each end of the SCSI daisy-chain. If your new device will be on the end of the daisy-chain, you must disable termination on the former end of the daisy-chain and enable termination on the new device.
11. **F** The colored stripe on the ribbon cable indicates pin 1.
12. **F** FDISK option 3 from the main menu removes disk partitions and the data they contain.
13. **F** Some cases require you to add rails to drives that will be installed into the 5 1/4[dp] wide drive bays. Screws or clips hold the rails in place inside the case.

14. **F** ISO 9660 is a cross-platform CD format; use it for compatibility with non-Windows operating systems such as Unix, Mac, and Linux.
15. **F** Multitasking is actually one of the best ways to create an unusable "coaster" during CD-R mastering because the additional activity makes it harder to maintain a full-data buffer.
16. **F** A CD-ROM drive must be MultiRead compatible to read CD-RW media. Due to its lower reflectivity, a different laser must be used. Most 24x and faster drives are MultiRead compatible.
17. **F** Recordable DVD drives can use any one of several competing standards, with DVD-R (similar to CD-R) and DVD-RAM being the most popular at present.
18. **F** Never open a hard drive. Doing so voids the warranty.
19. **T** The thinness of the atmosphere can affect the drives; hard drives for use in high altitudes need to have airtight pressurized HDAs to work properly.

### Multiple Choice

1. **A** The stepper motor drives the head actuator.
2. **A** Some power adapter cables for small drives omit this wire because many newer drives don't require 12v DC power.
3. **C** There are two ground wires[md]one for the 5v and one for the 12v power lines.
4. **B** One drive is A:; the other is B:.
5. **A** This limitation is not common; if you need to add a second floppy drive, check the BIOS configuration to see whether the system supports drives A: and B:.
6. **A** Because the far end of the cable is always the A: drive, you don't need to adjust jumpers on floppy drives to set drive letters.
7. **C** The wet kit avoids the possibility of head damage or misalignment; compressed air should be used only on very dusty drives.
8. **B** If you are unable to save a file with a different name to either drive, perform the following: On a floppy disk, check the write-protect slider; on a hard disk, check the advanced BIOS settings. If you can save a file using a different name, the file you tried to replace had its attributes set as read-only. Change the attributes with DOS ATTRIB or Windows Explorer.

9. **B** Some floppy drives' cluster sizes are exactly 512 bytes (512 [ts] 1), but higher-capacity floppy and all hard drives use a multiple of 512.
10. **A** The middle of the cable is always the B: drive, *unless* your computer has a swap A & B option that is enabled in the Advanced settings in the BIOS.
11. **B** Partition Magic is truly "magical;" it can safely make partition size and type changes in just a few minutes that would take hours if the user made backup copies, ran FDISK, ran FORMAT, and restored data to newly created drives. This author highly recommends Partition Magic.
12. **D** Newer 80-minute CD-R media can hold 700MB of data.
13. **B** Drives larger than 2GB must be partitioned into multiple logical drives with FDISK.

# 10

## Answers

### Week 10

#### True or False

1. **T** The most popular are IDE and SCSI.
2. **F** Early versions of IDE also included XT IDE and MCA IDE; both are now obsolete.
3. **F** They are built into the drive. The connector on the motherboard is merely a connector.
4. **T** Cost is the driving factor behind IDE.
5. **F** Various brands of older IDE drives built before the ATA specification, and some newer drives, either require a particular order as master or slave or can't work on the same cable with another brand of drive. You might need to try several configurations to find a combination that works.
6. **F** IDE drives are low-level, but not usually high-level formatted, by the manufacturer.
7. **F** This is a common misconception. Older IDE drives weren't to be low-level formatted by the user. However, most drive manufacturers have low-level format software made for their newer IDE drives available on their Web sites.
8. **T** This speeds up the drive and the rest of the system.
9. **T** These are both popular cabling for SCSI drives.
10. **T** Fundamentally, most hard drives are identical.
11. **T** This feature helps prevent damage to the heads and media and is a major benefit.
12. **F** The "smart" in S.M.A.R.T. drives refers to their capability to report their condition to the BIOS or drive-monitoring software.
13. **F** ECP mode uses a DMA channel, but EPP mode does not.
14. **T** This enables a USB port in your computer to handle up to 127 devices.

15. **F** Many USB adapters and hubs are available to support serial and parallel devices, although you should check to see specifically which devices they support.
16. **F** IEEE-1394 is also known as i.Link and FireWire, whereas IEEE-1284 is a parallel port standard.
17. **T** These UARTs can handle throughput up to 230Kbps and 460Kbps, respectively, which are data rates supported by external ISDN TAs.
18. **F** The UART function is integrated into the Super I/O chip, which also handles many other tasks. Instead, disable the onboard serial port(s) and install an I/O card with the faster UART.
19. **F** The 104-key keyboard is useful but not required. I still use a lot of 101-key models with Windows 9x.
20. **F** The capacitive switch keyboards are the Cadillac of keyboards because of their feel, durability, and price.
21. **F** Buy an inexpensive adapter to change the keyboard connector to the 5-pin DIN standard, or check the keyboard box for the adapter included with some models.
22. **T** If you don't enable USB legacy support, you can't use your keyboard to configure your BIOS or start the system at the DOS prompt.
23. **T** This applies primarily to retail-packaged mice sold with the serial adapter. Mice bundled with systems are normally PS/2 only.
24. **F** Unlike other USB devices, USB mice offer no benefits over normal mice.
25. **T** Unicomp and IBM sell various models of keyboards incorporating the IBM TrackPoint technology.
26. **F** Some systems allow you to disable the PS/2 port to free up IRQ 12, but the IRQ can't be changed to another setting.

### Multiple Choice

1. **A** This is the best measurement of drive performance.
2. **B and D** The others used external drive interfaces.
3. **B** 40 is the standard.
4. **B and D** CD-ROM, Zip drives, and other removable media and tape drives that attach to the ATA (IDE) interface are referred to as ATAPI devices.

5. **C** You must attach the master drive to the end of the cable opposite the blue end (which attaches to the motherboard) and jumper both drives as cable select.
6. **D** This version of SCSI is also referred to as SCSI-3 Fast20/Wide.
7. **C** Each device connected to a SCSI host adapter must have a unique ID number.
8. **C** ASPI is the acronym for the Adaptec SCSI Programming Interface, which is supported by most SCSI host adapter and peripheral makers.
9. **A** This is because they are acting as one logical drive.
10. **A** Loss of or lack of termination is a common source of problems.
11. **C** The host adapter is counted as one of the devices.
12. **B** 68-pin P-cables and connectors are defined for Wide SCSI.
13. **B** The other connector types use squeeze-to-release connectors.
14. **D** IEEE-1284 includes all parallel port modes, including the high-speed ECP and EPP modes.
15. **C** The default IRQ 4 setting for both COM 1 and COM 3 causes the computer to crash as soon as the modem tries to dial a number.
16. **B** The 16650 UART has a 32-byte buffer and can run at 230Kbps, the same speed as an ISDN terminal adapter's serial port.
17. **A** The keyboard is still the primary method for entering information (like this text!).
18. **D** This connector is also called the PS/2 connector.
19. **D** The connectors for both keyboard and mouse on most systems today look identical but are not interchangeable. Some are color-coded to minimize setup errors.
20. **D** QWERTY (named after the top row of letters on the normal keyboard) is still the overwhelming favorite.
21. **A and C** Both can be fixed, but most users prefer to replace the keyboards because of the low cost of replacements.
22. **A** This tool puts equal pressure on both sides of the keycap and prevents damage to the keyboard.
23. **A, B, and C** The SCSI interface is used for many devices, but not for the keyboard.
24. **D** The PS/2 mouse port IRQ can't be changed.

25. **A** Thus, if the serial port has a conflict with another port, the mouse won't work (see Questions 2 and 14).
26. **A** This mode is configured through the system BIOS Setup screens.
27. **B** COM 1 and 3 share IRQ 4, but COM 2 uses IRQ 3, which prevents a conflict with the other ports.
28. **A** DOS uses MOUSE.COM or DEVICE=MOUSE.SYS, but Windows installs a 32-bit driver file.

# 11

## Answers

### Week 11

#### True or False

1. **F** Many variations exist; watch the display during boot or check the instruction manual.
2. **F** POST test codes are output to I/O port 80h on most systems and must be read with a POST diagnostics card.
3. **T** If the driver disk is missing, download drivers and diagnostics from the network card maker's Web site.
4. **F** Some still are .COM files.
5. **F** This error is displayed by the BIOS because the operating system can't be located.
6. **T** The Registry loads unless you select Safe Mode Command Prompt Only Startup for Windows 9x.
7. **T** Analog multimeters might use too high a current for some digital circuits.
8. **F** Logic probes can locate problems a multimeter can't.
9. **T** Many problems that go away when a computer is brought in for service can be attributed to bad power at the home or office.
10. **T** This product acts as a sort of "liquid metal" and greatly improves system reliability.
11. **F** Some BIOS and add-on card chips are still socketed.
12. **T** This prevents the defragger from stopping due to disk errors and ensures that data will be moved only to reliable areas of the media.
13. **T** Vacuum cleaners, coffee makers, and air conditioners can generate enough interference on a power line to shut you down in a hurry.
14. **F** A toroidal iron core is used on monitor and similar cables to ward off interference, not power fluctuations.
15. **F** These "pizza-box" systems are a nightmare to work inside.

16. **F** Upgrade versions can't boot, and they require you to have the previous version available during installation for compliance checking.
17. **F** Integrated I/O is common now, but you should avoid integrated audio and video if you want high-performance options.
18. **F** Bulk-packed OEM-style drives might not include screws or a cable.
19. **T** Failure to use thermal grease can cause a processor to run hot and possibly fail.
20. **F** Some cases have non-removable hard drive bays above the power supply or on the front wall of the computer.
21. **F** Magnetic fields from the screwdriver can harm only removable media, not any parts inside a computer.
22. **T** A flashlight, an electric screwdriver, needle-nose pliers, and an ESD wrist strap are popular add-ons.
23. **F** You connect it to the frame of the computer to equalize the static potential of your body relative to the computer.
24. **T** Plastic screws can be used for parts that don't need to be grounded.

### Multiple Choice

1. **C** This test is performed by the BIOS and stops the system if a fatal error is detected.
2. **B** These cards are available in both ISA and PCI versions; I recommend PCI because ISA slots are nearly obsolete.
3. **A and C** These should be used to ensure that the card is working correctly.
4. **A** After the master boot record is located and a valid operating system is found, the operating system takes over the boot process.
5. **D** This is the last major task performed by the ROM BIOS during boot.
6. **D** This enables the Registry and CONFIG.SYS to work together during boot.
7. **D** These VXD files are required in all configurations of Windows 9x.
8. **D** Windows 2000 is considered "NT5" and uses improved versions of NT 4.0 components.
9. **A** These cleaners can cause these products to swell.

10. **B and C** Pencil erasers can damage the gold coating and generate ESD; drugstore rubbing alcohol isn't pure enough for computer use.
11. **D** Most socketed chips aren't locked in their sockets, so they can work loose over time due to this process.
12. **D** You will be making a lot of calls to various suppliers if you have problems with your self-assembled system.
13. **C** These components are hard to reach after the motherboard is installed.
14. **B** Windows 98's boot disk has CD-ROM drivers for most popular drivers preinstalled.