



EUCIP - IT Administrator

Module 1 - PC Hardware

Version 2.0

Module 1 Goals

Module 1 The **PC Hardware** module requires the candidate to know and recognise the basic physical make-up of a personal computer as well as its functions. Furthermore, he should be able to diagnose and repair the hardware problems that may occur. The candidate should be capable of working effectively, updating the hardware and operate as a market consultant for the hardware the company buys.

CATEGORY	KNOWLEDGE AREA	REF.	KNOWLEDGE ITEM
1.1 Introduction to Personal Computer	1.1.1 Basic Components	1.1.1.1	Understand the basic concepts of hardware and software
		1.1.1.2	Know the basic components of a PC
		1.1.1.3	Understand the basic function of a PC, input, processing, storage, output data
	1.1.2 Different types of PCs	1.1.2.1	Differences between Standard PC, Workstation and Server
		1.1.2.2	Know Apple computers main properties
		1.1.2.3	Know about mobile computing (Notebook, PDA, Tablet Computer) and Network computer
		1.1.2.4	Know the main constraints of notebook computers
1.2 Motherboards	1.2.1 Function	1.2.1.1	Understand the role of a motherboard
		1.2.1.2	Know the basic integrated functions of a motherboard
		1.2.1.3	Know the basic components of a motherboard, such as CPU slot/socket, chipset, cache memory, buses, ports, expansion slots etc
		1.2.1.4	Be able to identify the basic components of a motherboard
	1.2.2 Types and differences	1.2.2.1	Know the different types of motherboards and the differences between them, such as AT, ATX, BTX, LPX, NLX etc.
		1.2.2.2	Be aware of the different types of connectors each motherboard has
		1.3.1.1	Know what BIOS is, where is it stored and its functions
1.3 BIOS	1.3.1 Basic features	1.3.1.2	Understand the terms: POST, SETUP, CMOS, Firmware and their function
		1.3.1.3	Know the basic settings we can adjust from BIOS
		1.3.2.1	Know how to check the current BIOS version
	1.3.2 Upgrading	1.3.2.2	Know how and when to upgrade the BIOS.
		1.3.2.3	Be able to check or modify the settings in BIOS which concern PnP.
		1.4.1.1	Know what is the main task of a CPU.
1.4 Microprocessors	1.4.1 Basic features		

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		1.4.1.2	Be aware of the terms: CPU speed, Overclocking, multiple factor. Also know the factors, which may affect them.
		1.4.1.3	Know the basic components and their function, such as core, registers, FPU, L1 cache, Buses etc
		1.4.1.4	Be aware of the factors that determine the processor's capacity.
		1.4.1.5	Know the difference between RISC and CISC architectures.
		1.4.1.6	Be aware of the different CPU voltages and how it can be regulated.
	1.4.2 Types and differences	1.4.2.1	Be aware of the different processor makers.
		1.4.2.2	Be aware of the different personal computers families of processors.
		1.4.2.3	Know the differences between different CPU's (such as Pentium, Athlon, Xeon, Crusoe, Efficeon, PowerPC, ARM, ecc ...), their capacities and their limitations.
	1.4.3 Slots and Sockets	1.4.3.1	Understand and distinguish the difference between slots and sockets.
		1.4.3.2	Be aware of main types of slots, sockets and CPU packages
		1.4.3.3	Know how to install main types of packages
		1.4.3.4	Know thermal CPU problems and how they are solved
1.5 Memory	1.5.1 RAM	1.5.1.1	Understand the terms RAM and ROM and know the differences between them.
		1.5.1.2	Know the difference between static and dynamic memory.
		1.5.1.3	Know the different types of memory modules, such as SIMM, DIMM and RIMM. Also be aware of their function.
		1.5.1.4	Know the features of the different types of modules (DRAM/SDRAM/DDR), such as speed, capacity etc.
		1.5.1.5	Understand the terms Parity and ECC memory, their function and why they are used.
		1.5.1.6	Be aware of the number of bits each type of memory module uses. Also understand the term Banking
	1.5.2 ROM	1.5.2.1	Be aware of the function of ROM memory. Also know its features. Know the different types of ROM, such as PROM, EPROM, EEPROM and their features.
	1.5.3 Cache	1.5.3.1	Understand the benefits of cache memory
		1.5.3.2	Know how cache memory works.

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		1.5.3.3	Know the different types of cache and their location.
		1.5.3.4	Know the differences between L1 and L2 cache.
		1.5.3.5	Know the differences between write back and write through cache.
		1.5.3.6	Know how disk cache works.
1.6 Buses	1.6.1 Structure and bandwidth	1.6.1.1	Know what a bus is and its function.
		1.6.1.2	Know the structure of a bus. Address bus, data bus, control bus.
		1.6.1.3	Know the function of address bus, data bus, and control bus.
		1.6.1.4	Know how the bandwidth can affect an address bus
		1.6.1.5	Know how the bandwidth can affect a data bus
	1.6.2 Different types of buses	1.6.2.1	Be aware of the terms Front Side Bus and Back Side Bus.
		1.6.2.2	Know what I/O buses are and their function.
		1.6.2.3	Know the various I/O buses, such as ISA, MCA, EISA, PCI, PCI-Express, PC-card, USB, Firewire. Know the main differences between them.
		1.6.2.4	Know how different buses communicate (or cooperate) together.
		1.6.2.5	Know the system resources a disk controller uses.
		1.6.2.6	Know new standard PCI Express, its function and its advantages.
1.7 System Resources	1.7.1 Understanding system resources	1.7.1.1	Know the basic system resources, such as I/O port addresses, IRQ's and DMA's.
		1.7.1.2	Know what I/O port addresses are and their function.
		1.7.1.3	Know what IRQ's are and their function.
		1.7.1.4	Know what DMA's are and their function.
		1.7.1.5	Be aware of APIC
	1.7.2 Manage system resources	1.7.2.1	Be able to check the used and available system resources.
		1.7.2.2	Be able to change system resources
		1.7.2.3	Be able to configure the system resources of new hardware.
1.8 Interfaces	1.8.1 Parallel ATA interface	1.8.1.1	Know the different interfaces
		1.8.1.2	Be aware of the way IDE interface works, their limitations and their capacities.
		1.8.1.3	Know the different types of IDE, such as ATA, DMA and Ultra DMA.

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		1.8.1.4	Understand the terms: Primary IDE, Secondary IDE, Master and Slave.
		1.8.1.5	Know how many IDE drives can a PC handle and how to configure them using the BIOS settings.
	1.8.2 SCSI interface	1.8.2.1	Know how the SCSI interface works and its differences, comparing to PATA.
		1.8.2.2	Understand the terms Host adapter, SCSI ID, LUN and Terminator.
		1.8.2.3	Know the main types of SCSI, their capacities and limitations.
		1.8.2.4	Know how many SCSI devices a SCSI chain can handle and how to configure them.
		1.8.2.5	Be able to recognize the different SCSI cables and connectors. Also know how to connect SCSI devices to them.
	1.8.3 Serial ATA interface	1.8.3.1	Know SATA interface.
		1.8.3.2	Know how the SATA interface works and its differences, comparing to PATA.
	1.8.4 USB Interface	1.8.4.1	Know the different USB interfaces, working principles, capacities and limitations.
		1.8.4.2	Physical USB connection.
		1.8.4.3	Know how many USB devices can be used and limitation.
		1.8.4.4	Be aware of USB Version
	1.8.5 FireWire Interface	1.8.5.1	Know the different FireWire interfaces, working principles, capacities and limitations.
		1.8.5.2	Physical FireWire connection.
		1.8.5.3	Know how many FireWire devices can be used and limitations.
	1.8.6 InfraRed interface	1.8.6.1	Know the different infrared interfaces, working principles, capacities and limitations.
		1.8.6.2	Physical infrared connection.
		1.8.6.3	Know how many infared devices can be used and limitations.
	1.8.7 Bluetooth	1.8.7.1	Know Bluetooth connection work.
		1.8.7.2	Typical applications (PDA, Mobile Phones, printers, etc.)
	1.8.8 Memory Card	1.8.8.1	Know the different types of memory card (Flash, SD, Memory Stick, etc.)
		1.8.8.2	Be aware of card reader
	1.8.9 RAID Controller	1.8.9.1	Know RAID configuration types: performance & security
		1.8.9.2	Know Hot Swap drive
		1.8.9.3	Know PATA RAID Controller Card.
		1.8.9.4	Know Raid Controller Card SATA version.

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		1.8.9.5	Know SCSI RAID Controller Card.
1.9 Mass storage	1.9.1 Principles	1.9.1.1	Know how a disk works and the way data is stored on it. Understand the terms track, sector, cylinder, cluster, CHS.
		1.9.1.2	Know the structure of a floppy disk.
		1.9.1.3	Know how to partition a hard disk. Also know the terms Logical drives and Active partition.
		1.9.1.4	Know how to install a floppy disk, hard drive e CD-ROM drive. Also know which cables are necessary and how to connect them.
		1.9.1.5	Know how many disk drivers a PC can handle and how to configure them using the BIOS settings.
		1.9.1.6	Know the translation methods ECHS and LBA and the differences between them.
		1.9.1.7	Understand the terms Low level format, Partition, High level format.
		1.9.1.8	Be aware of the differences of technologies as (CD-R, CD-RW, DVD+/-R, DVD+/-RW, Double Layer, Blue Ray).
	1.9.2 Other magnetic media	1.9.2.1	SLR, DAT, DLT, etc.
		1.9.2.2	Be aware of jukebox units
1.10 Video Display	1.10.1 Monitor	1.10.1.1	Be aware of the most common monitor types, such CRT and TFT and how they work.
		1.10.1.2	Be aware of the factors, which can determine the image quality, such as resolution, refresh rate, number of colours.
	1.10.2 Graphics adapter	1.10.2.1	Be aware of the most common modes of resolution, such as VGA, SVGA, and XGA.
		1.10.2.2	Be aware of the most important components of a graphics adapter, such as GPU, memory, Video BIOS, RAMDAC and their function.
		1.10.2.3	Be aware of the most common video memory types, from SDRAM to DDR2 SDRAM. Also know the differences between them and their advantages.
		1.10.2.4	Know different type of AGP, its function and its advantages.
		1.10.2.5	Know thermal problems and cooling hints
	1.10.3 Graphics library	1.10.3.1	Be aware of DirectX
		1.10.3.2	Be aware of OpenGL
1.11 Printers	1.11.1 Types	1.11.1.1	Be aware of the different printing technologies, such as dot-matrix, inkjet and laser.

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		1.11.1.2	Know how a dot – matrix printer works, its benefits and limitations.
		1.11.1.3	Know how an inkjet printer works, its benefits and limitations.
		1.11.1.4	Know how a laser printer works, its benefits and limitations.
		1.11.1.5	Be aware of Thermal transfer and Sublimation process
	1.11.2 Installing and managing	1.11.2.1	Be aware of the different parallel ports, such as standard, ECP and EPP. Also know the differences between them.
		1.11.2.2	Be aware of the different ways in which a PC can communicate to a printer, such as parallel, serial, USB, wireless and LAN.
1.12 Network Hardware	1.12.1 Basic components	1.12.1.1	Know a simple network structure
		1.12.1.2	Know NIC (Network Interface Card)
	1.12.2 Network Equipment	1.12.2.1	Be aware of different HUB types
		1.12.2.2	Different SWITCH types (ports, Managed, unmanaged, etc)
		1.12.2.3	Be aware of VoIP capable switch
		1.12.2.4	Be aware of router, bridge and firewall hardware
	1.12.3 Network storage	1.12.3.1	Be aware of NAS (Network Attached Storage)
	1.12.4 Wi-Fi	1.12.4.1	Know how Wi-Fi connection works.
		1.12.4.2	Know the main types of Wi-Fi, their capabilities and limitations.
		1.12.4.3	Be aware of the typical applications (notebooks, printers, etc.)
		1.12.4.4	Be aware of access point, PCI adapter and wireless PC card
	1.12.5 Types and function	1.12.5.1	Know Analog modem
		1.12.5.2	Know ISDN adapter
		1.12.5.3	Know ADSL modem
		1.12.5.4	Be aware of electric wireline NIC/modem.
	1.12.6 Connection ports	1.12.6.1	Be aware of internal version (PCI, integrated)
		1.12.6.2	Be aware of external versions (Serial, USB, Bluetooth, PC Card)
	1.12.7 Mobile phone	1.12.7.1	Be aware of GSM/GPRS/EDGE/UMTS
1.13 Power Supply	1.13.1 Types and function	1.13.1.1	Understand the terms Volt, Ampere, Ohm, Watt, alternating current and direct current.
		1.13.1.2	Know the function of a power supply and different types; the different voltage in the wires.

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		1.13.1.3	Know the different connections to peripherals, their names and their appearance.
		1.13.1.4	Be aware of APM and ACPI
	1.13.2 ESD	1.13.2.1	Know what a surge protector is and how it works. Know what Electrostatic Discharge (ESD) is and when it occurs. Also know the damage it causes.
		1.13.2.2	Know how to protect your hardware from ESD damage. Also know how the weather conditions affect the ESD.
	1.13.3 UPS	1.13.3.1	Know what UPS is and its function. Also know how the different types of UPS work and communicate with a PC.
		1.13.3.2	Be aware of power-on current peack on switching PSU
1.14 Installation of new hardware	1.14.1 Install and replace hardware	1.14.1.1	Be able to install and replace a basic component, such as CPU, memory, power supply, motherboard, hard disk, graphics adapter, etc.
		1.14.1.2	Be able to install a second hard disk or CD-ROM and configure it.
		1.14.1.3	Be able to install expansion cards, such as sound card, network interface card etc.
		1.14.1.4	Be able to install a modem or other communication devices.
		1.14.1.5	Be able to install a wireless device.
		1.14.1.6	Be able to install SCSI host adapter and SCSI devices and configure them. Also be able to install and configure other peripheral devices, such as scanners, printers, external backup stations etc
		1.14.1.7	Be able to install normal controller adapter or RAID controller version. Also be able to configure it.
		1.14.1.8	Be able to install a network equipment
1.15 Diagnosing and Troubleshooting	1.15.1 Hardware problems	1.15.1.1	Be able to recognise any error message during start up. Also know what to do to resolve the problem.
		1.15.1.2	Be able to recognise an error message from a basic component.
		1.15.1.3	Be able to check the available installed hardware and its configuration. Also be able to create the necessary documentation.
		1.15.1.4	Be able to check the used resources, such as I/O addresses, IRQs and DMAs.
		1.15.1.5	Be able to check for resource conflict, using an available diagnostic program. Also, know what to do if resource conflict occurs.

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		1.15.1.6	Know how to test a Power supply works effectively.
		1.15.1.7	Be able to recognise a printer error message. Also know what to do to resolve the problem.
1.16 Trends	1.16.1 Trends	1.16.1.1	Be aware of modding
		1.16.1.2	Be aware of extreme cooling
		1.16.1.3	Be aware of embedding
		1.16.1.4	Be aware of wearable PC