AF_IC05_ Motherboards Unit 2

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Introduction

When you boot a computer, the first thing you can see on the monitor is the BIOS. BIOS means Basic Input/Output System.

It's a chip integrated in the motherboard that contains a set of programs that are needed in order to boot a computer. Usually it is recorded in a ROM Flash that can be updated.

BIOS has a lot of menus and options, but you will learn the most important of these options.

Nowadays, in new motherboards it has been replaced by UEFI (Unified Extension Firmware Interface).

In order to do this Unit you need Internet access.

TO KNOW MORE

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http://en.wikipedia.org/wiki/BIOS

http://en.wikipedia.org/wiki/Unified_Extensible_Firmware_Interface

Glossary

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Visit these webpages one more time. You will learn and listen to some words related to this activity:

Quizlet activity about motherboard components and form factors

Quizlet activity about motherboard components and other computer parts

BIOS Boot process

- 1. System switched on Power-On Self-Test or POST process: hardware test.
- 2. After POST, BIOS initializes the necessary system hardware for booting (disk, keyboard controllers etc.)
- 3. BIOS launches the Master Boot Record (MBR) of the first disk in the BIOS disk order
- 4. The MBR boot code then takes control from BIOS.
- 5. And finally Operating System is loaded into system memory (RAM) and launched.

UEFI Boot process

- 1. System switched on Power On Self Test, or POST process: hardware test.
- 2. UEFI firmware is loaded. Firmware initializes the hardware required for booting.
- 3. Firmware then reads its Boot Manager data to determine which UEFI application to be launched and from where (i.e. from which disk and partition).
- 4. Firmware then launches the UEFI application as defined in the boot entry in the firmware's boot manager.
- 5. The launched UEFI application may launch another application or Operating System depending on how the UEFI application was configured.

TO KNOW MORE

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https://wiki.archlinux.org/index.php/Arch_Boot_Process

https://wiki.archlinux.org/index.php/Unified_Extensible_Firmware_Interface

Cold boot vs Warm boot

A cold boot or hard boot is a complete boot process, the computer starts from a powerless state. A complete boot sequence is done.

A warm boot or soft boot is a partial boot process, after typing Ctrl-Alt-Del or pressing the Reset button. A partial boot sequence is done, without POST.



Beep codes

When something is wrong in POST phase, BIOS or UEFI performs some beeping sounds that are usually different for every BIOS/UEFI maker. In this web page there are some examples:

0	http://www.computerhope.com/beep.htm
	http://www.technick.net/public/code/cp_dpage.php?aiocp_dp=guide_beep_codes

TO KNOW MORE

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http://en.wikipedia.org/wiki/Power-on_self-test

BIOS/UEFI setup

Sometimes a change in BIOS/UEFI setup is needed. In order to change it, a special key must be pressed. It can be: F1, F2, F10, Delete, ...



BIOS menus

Images of **BIOS** menus of a desktop computer.

File menu: System information, About BIOS, Time and Date, Save or Discard Changes, ...

File Storage Security	Power	Advanced	
System Information About			
Set Time and Date Flash System ROM			
Replicated Setup			
Default Setup			
Apply Defaults and Exit Ignore Changes and Exit Save Changes and Exit			
OCAL: <f1=help> REMOTE: F</f1=help>	1=ESC+1	1, F5=ESC+5, F10=ESC+0	
	System Information About Set Time and Date Flash System ROM Replicated Setup Default Setup Apply Defaults and Exit Ignore Changes and Exit Save Changes and Exit	System Information About Set Time and Date Flash System ROM Replicated Setup Default Setup Apply Defaults and Exit Ignore Changes and Exit Save Changes and Exit	About Set Time and Date Flash System ROM Replicated Setup Default Setup Apply Defaults and Exit Ignore Changes and Exit

Storage menu: configure hard disk and CD/DVD/Blue-ray devices, Order of booting devices, ...

File	Storage Securit	Dourse	Setup	Utility	
THE	Storage Securit	y Power	Advanced		
	Device Configura	tion			
	Storage Options				
Sec. 1	DPS Self-test				
	Boot Order				
	boot order				
A Statutes					Contraction of the local division of the
					AND A DECK

Device Security USB Security Slot Security Network Service Boot System IDs DriveLock Security System Security Master Boot Record Security Setup Security Level	Setup Password Power-On Password Password Options	
Network Service Boot System IDs DriveLock Security System Security Master Boot Record Security	Device Security USB Security	
System Security Master Boot Record Security	Network Service Boot	
Master Boot Record Security	DriveLock Security	
	System Security	
Setup Security Level	Master Boot Record Security	
	Setup Security Level	

Security: BIOS and Power-On password and other security options.

Power: some power options.

File	Storage	Sacuritu	Deve	Setu	p Utility			I
THE	otorage	Security						
			US Power Hardward	r Manageme e Power Ma	nt nagement			
			Thermal					
LOCAL :	<f1=help></f1=help>	REMOTE	F1=ESC+1,	F5=ESC+5,	F10=ESC+0			
						Strand The State	Text Internet States	

Advanced: Power-On option, test memory, configure motherboard integrated and PCI devices, ...



System Information: Product, CPU, memory, ...

Product Name	HP Compaq 6000 Pro SFF PC
SKU Number	AT492AU
Processor Type	Pentium(R) Dual-Core CPU E6500 @ 2.93GHz
Processor Speed	2933/1066 MHz
Processor Stepping	0001067A 00000A07
Cache Size (L1/L2)	64KBx2 / 2048KBx1
Memory Size	4096 MB DDR3/1066 MHz/Flex Mode
Channel A	XMM1 1024 MB / XMM2 2048 MB
Channel B	XMM3 1024 MB / XMM4 0 MB
Integrated MAC	1CC1DE5566A5
System BIOS	786G2 v01.09
Chassis Serial Number	CZC0314395
Asset Tracking Number	CZC0314395
ME Firmware Version	5.2.10.1023
Management Mode	AMT
	Press any key to continue



Storage devices configuration: hardisk and CD/DVD/Blue-ray

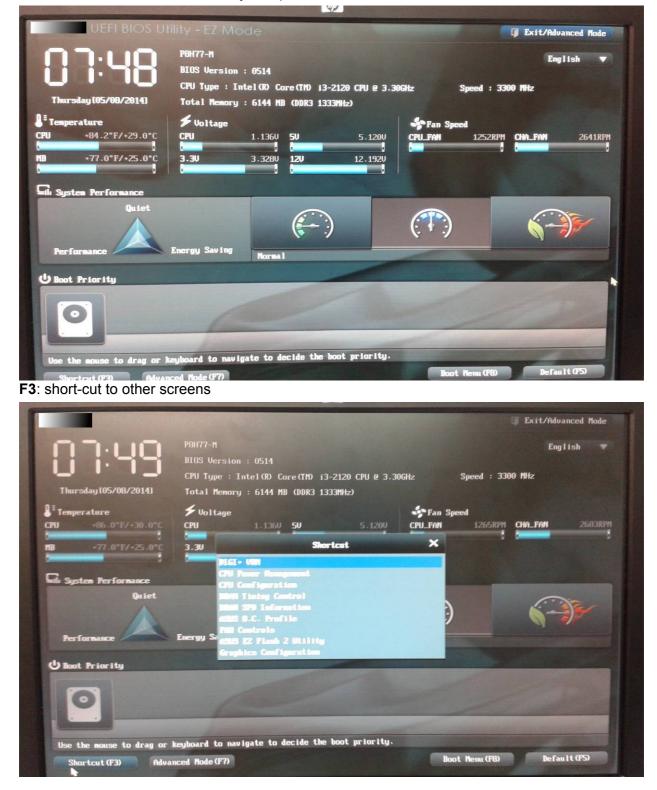
Devices boot order: 1t CD, 2d USB, 3d hard drive, 4h Network



UEFI menus

Images of UEFI menus of a desktop computer.

nitial UEFI screen: CPL	, memory, temperature,	and boot order
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Main screen: BIOS, CPU and memory information.

	- Cie	⊑ ⊕	CI	С U	2
Main	Ai Tweaker	Advanced	Monitor	Boot	Tool
BIOS Information BIOS Version Build Date ME Version South Bridge S ⁴			0514 x64 05/22/2012 8.0.4.1441 C1	Choose the system d	efault languag
CPU Information Intel(R) Core(Speed Memory Informat Total Memory Memory Frequen	TM) i3-2120 CPU @ 3.3064 tion	Iz	3300 MHz 6144 MB (DDR3) 1333 MHz		
System Languag System Date			English [Thursday 05/08/2014]		
System Time Access Level			TO7:51 Administrator	++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Pressie	
				F2: Previous Values F3: Shortcut F5: Optimized Defaul F10: Save ESC: Exit F12: Print Screen	ts

Ai Tweaker: adjust system configuration: form energy saving to performance.



Advanced configuration: CPU, SATA, ...



Monitor: temperature, voltage, ...



[Exit a 50 CI C 2 Monitor Boot Tool Select the keyboard NumLock state Bootup NumLock State Un Full Screen Logo Enabled Wait For 'F1' If Error Enabled Option ROM Messages Force BIOS EZ Mode Setup Mode Enabled bo... PCI ROM Priority Legacy ROM →+: Select Screen †↓: Select Item Enter: Sel<u>ect</u> Boot Option Priorities Boot Option #1 SATA PM: ... +/-F1: Hard Drive BBS Priorities F2: F3: zed Defaults ESC: Exit Boot Override SATA PH: UDC UD10EZRX-00A8LB0 (953869HB) F10: Save ES F12: Print Sc

Boot configuration: Numlock, logo, messages, ... and boot order.

Tool: BIOS update

UEFI	BIOS Utility - Adv	anced Mode			r Exit
II Main	Cic Ai Tueaker	Eo Advanced	C E Monitor	U Boot	ee Tool
 > 6505 EZ Flas > 6505 0.C. Pr > 6505 529 Ind 	nafile			Be used to update BIG	B
				**: Select Screen 14: Select Iten Enter: Select */-: Change Opt. F1: General Help F2: Previous Values F3: Shortcut F5: Optimized Defaults F10: Save ESC: Exit F12: Print Screen	

Activities

- 1. Using your own computer or classroom computer, enter to BIOS/UEFI setup, then answer and take a picture of the screen(s) where you have found the information:
 - 1. BIOS brand and version.
 - 2. CPU: brand, model, clock speed.
 - 3. RAM: number of modules, type of memory, size.
 - 4. Are there free memory slots?
 - 5. Boot sequence.
 - 6. SATA devices.
 - 7. IDE devices.
 - 8. Is it possible to boot the computer using Wake-on LAN? And using a clock alarm?
 - 9. Does the motherboard have an integrated graphics card? Is it possible to disable it?
 - 10. Search for a newer BIOS/UEFI version and describe the process for updating it.

Bibliography and Webgraphy

- http://en.wikipedia.org
- https://wiki.archlinux.org
- http://www.thefreedictionary.com
- https://dl.dropboxusercontent.com/u/1159579/SMX-M01.zip Authors: Joan Coll and Marc Nicolau