



ETX PEM-E205VLA User's Guide

Revision 0.1

Revision History

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R0.1	Preliminary	May.2016

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1 Introduction

PEM-E205VLA User's Guide provides detail product information, which contains block diagram, electrical specifications, mechanical dimension, Pin-Out, BIOS menu settings.

PEM-E205VLA is a Computer On Module (COM) and designed according to Embedded Technology eXtended (ETX) specification V3.02. The form factor of PEM-E205VLA is 95 x 114mm (3.7" x 4.4") in size, all legacy buses, IDE, ISA, PCI, Parallel port are supported. The processor of PEM-E205VLA is Vortex86DX3, dedicating to low power computing applications.

On board 2GB DDR3 memory and SSD (optional) are designed on PEM-E205VLA, a flexible SSD storage capacity options are available.

2 Block Diagram

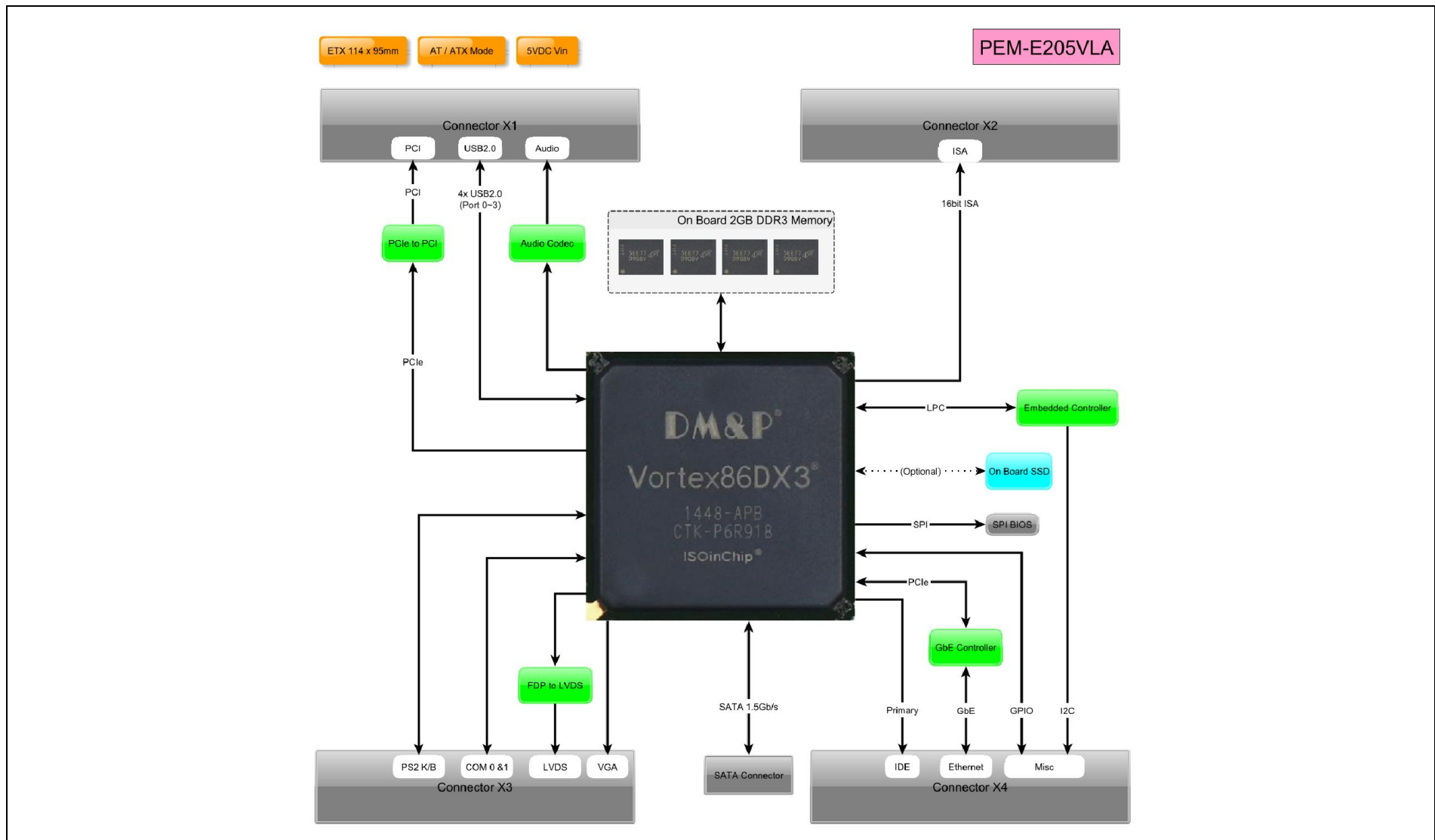


Figure 1 PEM-E205VLA Block Diagram

3 Specifications

Product	➤ PEM-E205VLA
Form Factor	➤ ETX 95 x 114mm (3.7" x 4.5").
Processor	➤ Vortex86DX3 SoC ➤ Dual core / 1GHz / L1 32KB / L2 512KB
BIOS	➤ AMI BIOS
Memory	➤ On-Board DDR3 2GB
Graphics Options	➤ Integrated graphic engine ➤ VGA (1920x1440 @ 60Hz) ➤ LVDS (1920 x 1200 , Single / Dual Channel, 18/24bit)
Ethernet	➤ RTL8119I GbE controller
PCI	➤ 4x PCI, 32bit
IDE	➤ Primary
ISA	➤ 16bit ISA Bus
SATA	➤ On-Board SATA connector ➤ On-Board SSD (Optional)
USB 2.0	➤ 4 USB 2.0 Ports
Audio	➤ 6-channel Audio CODEC
Hardware Monitors	➤ ITE8528VG Embedded Controller, Voltage, Fan and Temperature
Power Management	➤ ACPI 3.0
Environment	➤ Operating Temperature -40 ° C ~ +85 ° C ➤ Storage Temperature -40 ° C ~ +85 ° C ➤ Relative Humidity 5%~95%

Table 1 PEM-E205VLA Specifications

3.1 Supported Operating Systems

The PEM-E205VLA supports the following operating systems.

Vendor	Operating System	Supported
Microsoft	Windows XP	Yes
Linux	Fedora 22	To be verified
	Ubuntu 15.04	To be verified
	CentOS	To be verified
	Red Hat Enterprise Linux Server	To be verified
	Novell SuSE Linux Enterprise Server	To be verified
	Yocto	To be verified
	FreeBSD	To be verified

Table 2 Supported Operating Systems

3.2 Windows OS driver

Please download the drivers from Portwell download center website http://www.portwell.tw/support/download_center.php

Item	Driver version	Description
VGA Driver	M2015_T3	Driver_PEM-E205VLA_VGA Driver_WINXP
Audio	PCAudio	Driver_PEM-E205VLA_Audio_Driver_WINXP
Ethernet	R6040-120408	Driver_PEM-E205VLA_LAN_WINXP

Table 3 Windows OS driver list

3.3 Electrical Characteristics

Input voltage	+5VDC (Nominal)
Power consumption	TBD
RTC Battery	TBD
Power on mode	AT /ATX

Table 4 Electrical Characteristics

3.4 Power sequence

ATX Mode

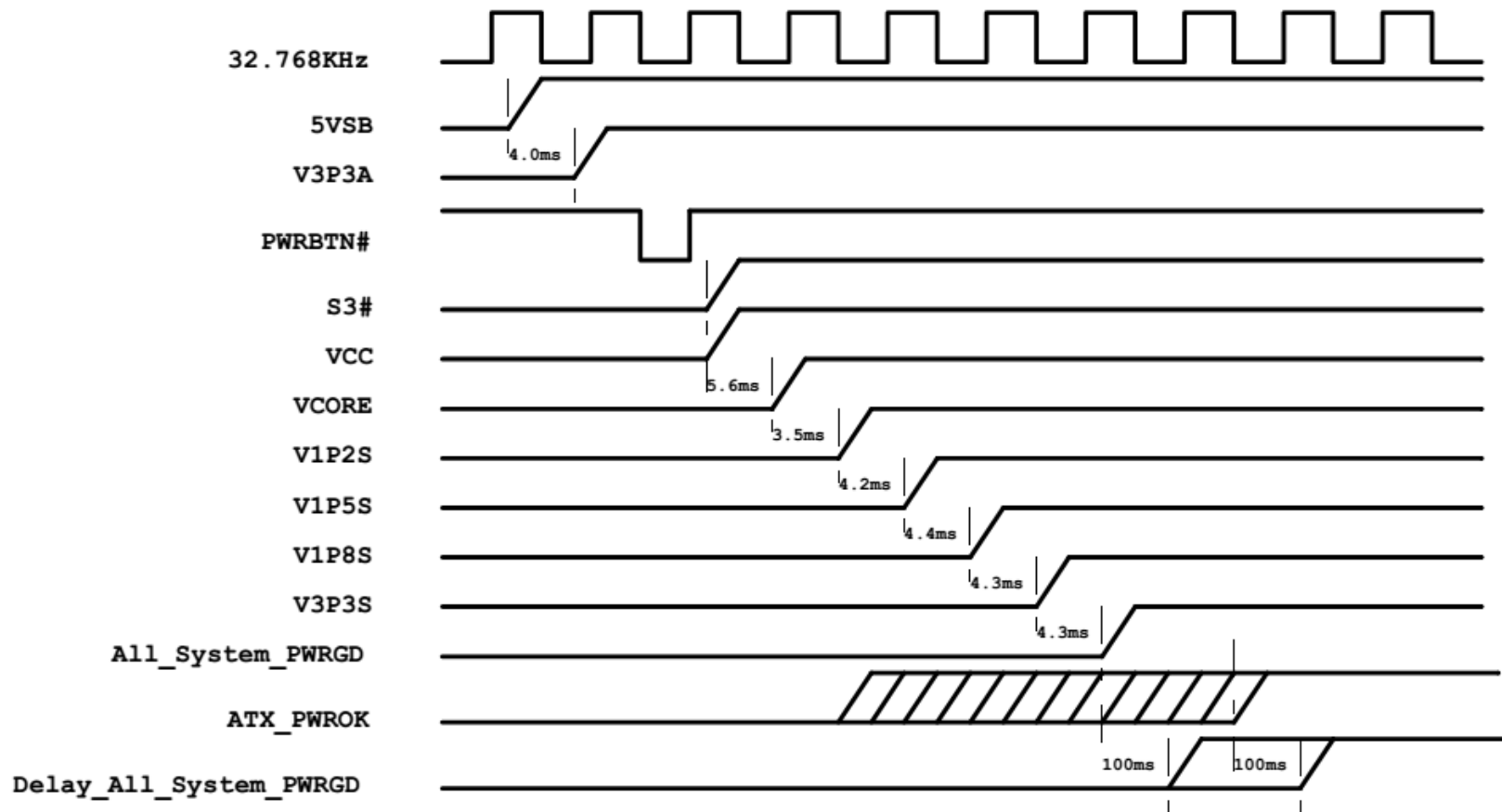


Figure 2 ATX Power Sequence

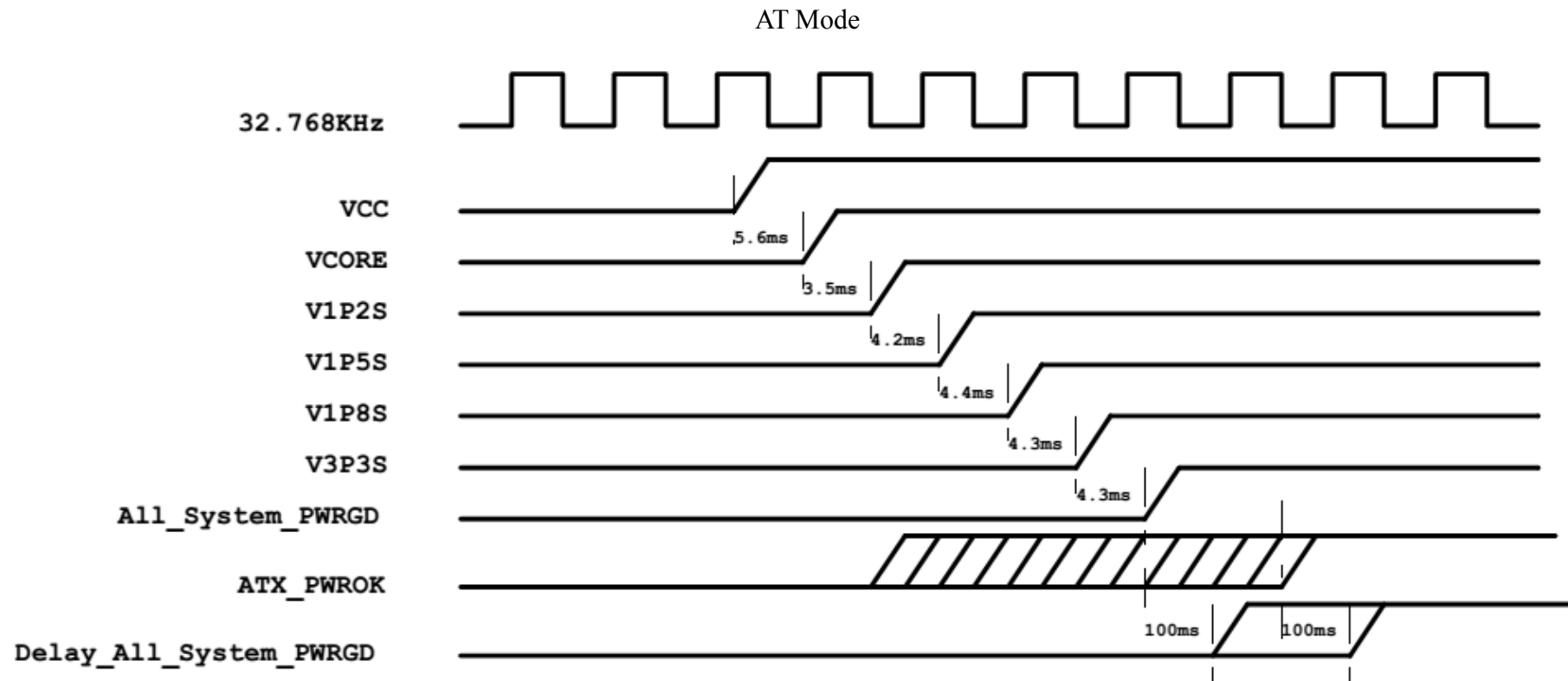


Figure 3 AT Power Sequence

3.5 Mechanical Dimensions

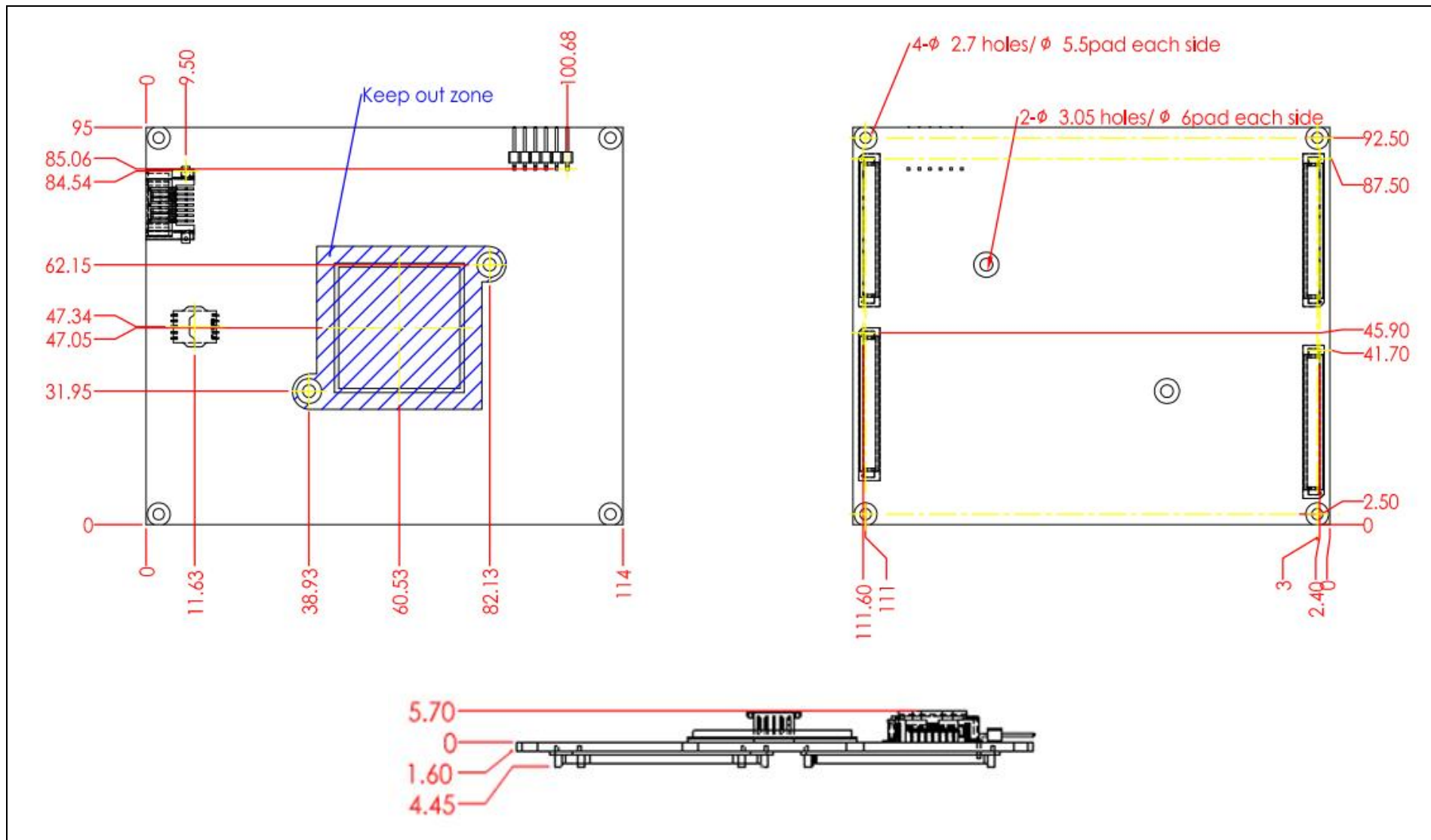


Figure 4 Mechanical Dimensions Top & Bottom

3.6 Net weight

Module	58g +/- 2%
H/S	74g +/- 2%

Table 5 Net weight

3.7 Environmental Specifications

Storage Temperature	0~60°C
Operation Temperature	0~60°C
Storage Humidity	0%~95%
Operation Humidity	0%~95%

Table 6 Environmental Specifications

3.8 Ordering Guide

PEM-E205VLA

Product	Ordering P/N	Status
PEM-E205VLA	AB1-3D65Z	Available

Table 7 Ordering Guide - PEM-E205VLA

Accessory

Product	Ordering P/N	Status
PEM-C200	AB1-3246	Available
PEM-E205VLA H/S	B8308090	Available

Table 8 Ordering Guide - Accessory

4 Heat sink dimensions

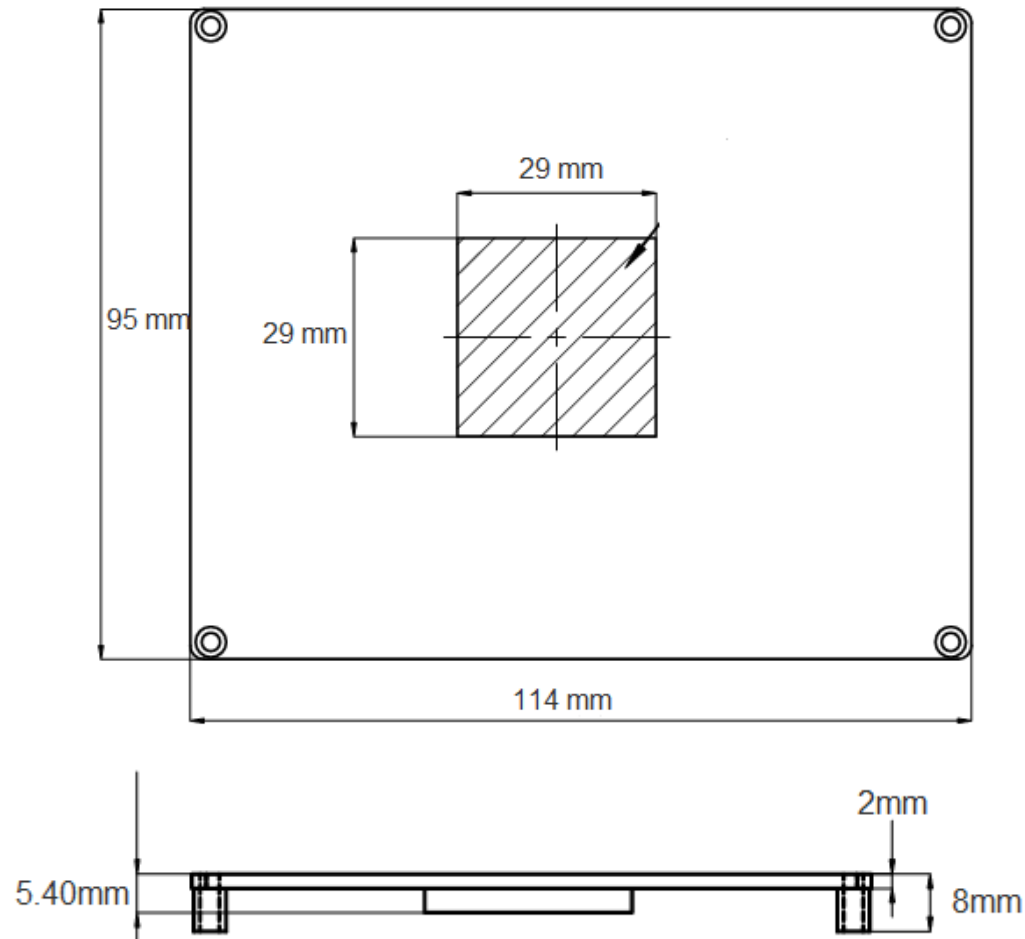


Figure 5 Heat sink mechanical dimensions

4.1 Packaging

Package	Appearance	Size
Anti-Static bubble bag		180x135mm
White Paper Box		210x151x40mm
Shipping Box (10 pcs White paper box)		595x300x195mm

Table 9 Packaging

5 Pin out Tables

NC Pins are highlighted as gray color.

Connector X1				Connector X2				Connector X3				Connector X4			
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	GND	A2	GND	A1	GND	A2	GND	A1	GND	A2	GND	A1	GND	A2	GND
A3	PCICLK3	A4	PCLCLK4	A3	SD14	A4	SD15	A3	R	A4	B	A3	5V_SB	A4	PWGIN
A5	GND	A6	GND	A5	SD13	A6	MASTER#	A5	HSY	A6	GND	A5	PS_ON#	A6	SPKER
A7	PCLCLK1	A8	PCLCLK2	A7	SD12	A8	DREQ7	A7	VSYS	A8	DDCK	A7	PWRBTN#	A8	BATT
A9	REQ3#	A10	GNT3#	A9	SD11	A10	DACK7#	A9	DETECT#	A10	DDCA	A9	KBINH#	A10	LILED
A11	GNT2#	A12	VCC3*	A11	SD10	A12	DREQ6	A11	LCDD016	A12	LCDD18	A11	RSMRST#	A12	ACTLED
A13	REQ2#	A14	GNT1#	A13	SD9	A14	DACK6#	A13	LCDD017	A14	LCDD19	A13	ROMKBCS#	A14	SPEEDLED
A15	REQ1#	A16	VCC3*	A15	SD8	A16	DREQ5	A15	GND	A16	GND	A15	EXT_PRG	A16	2CLK
A17	GNT0#	A18	NC	A17	MEMW#	A18	DACK5#	A17	LCDD013	A18	LCDD15	A17	VCC	A18	VCC
A19	VCC	A20	VCC	A19	MEMR#	A20	DREQ0	A19	LCDD012	A20	LCDD14	A19	OVCR#	A20	GPCS
A21	SERIRQ	A22	REQ0#	A21	LA17	A22	DACK0#	A21	GND	A22	GND	A21	EXTSMI#	A22	2CDAT
A23	AD0	A24	VCC3*	A23	LA18	A24	IRQ14	A23	LCDD08	A24	LCDD11	A23	SMBCLK	A24	SMBDATA
A25	AD1	A26	AD2	A25	LA19	A26	IRQ15	A25	LCDD09	A26	LCDD10	A25	SIDE_CS3#	A26	NC
A27	AD4	A28	AD3	A27	LA20	A28	IRQ12	A27	GND	A28	GND	A27	SIDE_CS1#	A28	DASP-S0#
A29	AD6	A30	AD5	A29	LA21	A30	IRQ11	A29	LCDD04	A30	LCDD07	A29	SIDE_A2	A30	PIDE_CS3#
A31	CBE0#	A32	AD7	A31	LA22	A32	IRQ10	A31	LCDD05	A32	LCDD06	A31	SIDE_A0	A32	PIDE_CS1#
A33	AD8	A34	AD9	A33	LA23	A34	IO16#	A33	GND	A34	GND	A33	GND	A34	GND
A35	GND	A36	GND	A35	GND	A36	GND	A35	LCDD01	A36	LCDD03	A35	PDIAG-S	A36	PIDE_A2
A37	AD10	A38	AUXAL	A37	SBHE#	A38	M16#	A37	LCDD00	A38	LCDD02	A37	SIDE_A1	A38	PIDE_A0
A39	AD11	A40	MIC	A39	SA0	A40	OSC	A39	VCC	A40	VCC	A39	SIDE_INTRQ	A40	PIDE_A1
A41	AD12	A42	AUXAR	A41	SA1	A42	BALE	A41	ILID_DAT	A42	LIGIO0	A41	BATLOW#	A42	GPE1#
A43	AD13	A44	ASVCC	A43	SA2	A44	TC	A43	ILID_CLK	A44	BLON#	A43	SIDE_ACK#	A44	PIDE_INTRQ
A45	AD14	A46	SNDL	A45	SA3	A46	DACK2#	A45	BIASON	A46	DIGON	A45	SIDE_RDY	A46	PIDE_ACK#
A47	AD15	A48	ASGND	A47	SA4	A48	IRQ3	A47	COMP	A48	Y	A47	SIDE_IOR#	A48	PIDE_RDY
A49	CBE1#	A50	SNDR	A49	SA5	A50	IRQ4	A49	SYNC	A50	C	A49	VCC	A50	VCC

Table 10 PEM-E205VLA Pin-Out 1-2

ETX

A51	VCC	A52	VCC
A53	PAR	A54	SERR#
A55	GPERR#	A56	NC
A57	PME#	A58	USB2#
A59	OCK#	A60	DEVSEL#
A61	TRDY#	A62	USB3#
A63	RDY#	A64	STOP#
A65	FRAME#	A66	USB2
A67	GND	A68	GND
A69	AD16	A70	CBE2#
A71	AD17	A72	USB3
A73	AD19	A74	AD18
A75	AD20	A76	USB0#
A77	AD22	A78	AD21
A79	AD23	A80	USB1#
A81	AD24	A82	CBE3#
A83	VCC	A84	VCC
A85	AD25	A86	AD26
A87	AD28	A88	USB0
A89	AD27	A90	AD29
A91	AD30	A92	USB1
A93	PCIRST#	A94	AD31
A95	NTC#	A96	INTD#
A97	NTA#	A98	INTB#
A99	GND	A100	GND

PORTWELL PEM-E205VLA

A51	VCC	A52	VCC
A53	SA6	A54	IRQ5
A55	SA7	A56	IRQ6
A57	SA8	A58	IRQ7
A59	SA9	A60	SYSCLK
A61	SA10	A62	REFSH#
A63	SA11	A64	DREQ1
A65	SA12	A66	DACK1#
A67	GND	A68	GND
A69	SA13	A70	DREQ3
A71	SA14	A72	DACK3#
A73	SA15	A74	IOR#
A75	SA16	A76	IOW#
A77	SA18	A78	SA17
A79	SA19	A80	SMEMR#
A81	IOCHRDY	A82	AEN
A83	VCC	A84	VCC
A85	SD0	A86	SMEMW#
A87	SD2	A88	SD1
A89	SD3	A90	NOWS#
A91	DREQ2	A92	SD4
A93	SD5	A94	IRQ9
A95	SD6	A96	SD7
A97	IOCHK#	A98	RSTDRV
A99	GND	A100	GND

A51	LPT/FLPY#	A52	RESERVED
A53	VCC	A54	GND
A55	STB#	A56	AFD#
A57	RESERVED	A58	PD7
A59	IRRX	A60	ERR#
A61	IRTX	A62	PD6
A63	RXD2	A64	INIT#
A65	GND	A66	GND
A67	RTS2#	A68	PD5
A69	DTR2#	A70	SLIN#
A71	DCD2#	A72	PD4
A73	DSR2#	A74	PD3
A75	CTS2#	A76	PD2
A77	TXD2	A78	PD1
A79	RI2#	A80	PD0
A81	VCC	A82	VCC
A83	RXD1	A84	ACK#
A85	RTS1#	A86	BUSY
A87	DTR1#	A88	PE
A89	DCD1#	A90	SLCT#
A91	DSR1#	A92	MSCLK
A93	CTS1#	A94	MSDAT
A95	TXD1	A96	KBCLK
A97	RT1#	A98	KBDAT
A99	GND	A100	GND

A51	SIDE_IOW#	A52	PIDE_IOR#
A53	SIDE_DRQ	A54	PIDE_IOW#
A55	SIDE_D15	A56	PIDE_DRQ
A57	SIDE_D0	A58	PIDE_D15
A59	SIDE_D14	A60	PIDE_D0
A61	SIDE_D1	A62	PIDE_D14
A63	SIDE_D13	A64	PIDE_D1
A65	GND	A66	GND
A67	SIDE_D2	A68	PIDE_D13
A69	SIDE_D12	A70	PIDE_D2
A71	SIDE_D3	A72	PIDE_D12
A73	SIDE_D11	A74	PIDE_D3
A75	SIDE_D4	A76	PIDE_D11
A77	SIDE_D10	A78	PIDE_D4
A79	SIDE_D5	A80	PIDE_D10
A81	VCC	A82	VCC
A83	SIDE_D9	A84	PIDE_D5
A85	SIDE_D6	A86	PIDE_D9
A87	SIDE_D8	A88	PIDE_D6
A89	GPE2#	A90	CBLID_P
A91	LAN_RXD-	A92	PIDE_D8
A93	LAN_RXD+	A94	SIDE_D7
A95	LAN_TXD-	A96	PIDE_D7
A97	LAN_TXD+	A98	HDRST#
A99	GND	A100	GND

Table 11 PEM-E205VLA Pin-Out 2-2

6 BIOS Setup Items

PEM-E205VLA is equipped with the AMI BIOS stored in Flash ROM. These BIOS has a built-in Setup program that allows users to modify the basic system configuration easily. This type of information is stored in CMOS RAM so that it is retained during power-off periods. When system is turned on, PEM-E205VLA communicates with peripheral devices and checks its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the start up.

6.1 Entering Setup -- Launch System Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press key will enter BIOS setup screen.

Press to enter SETUP

If the message disappears before responding and still wish to enter Setup, please restart the system by turning it OFF and On or pressing the RESET button. It can be also restarted by pressing <Ctrl>, <Alt>, and <Delete> keys on keyboard simultaneously.

Press <F1> to Run General Help or Resume

The BIOS setup program provides a General Help screen. The menu can be easily called up by pressing <F1>. The Help screen lists all the possible keys to use and the selections for the highlighted item. Press <Esc> to exit the Help screen.

6.2 Main

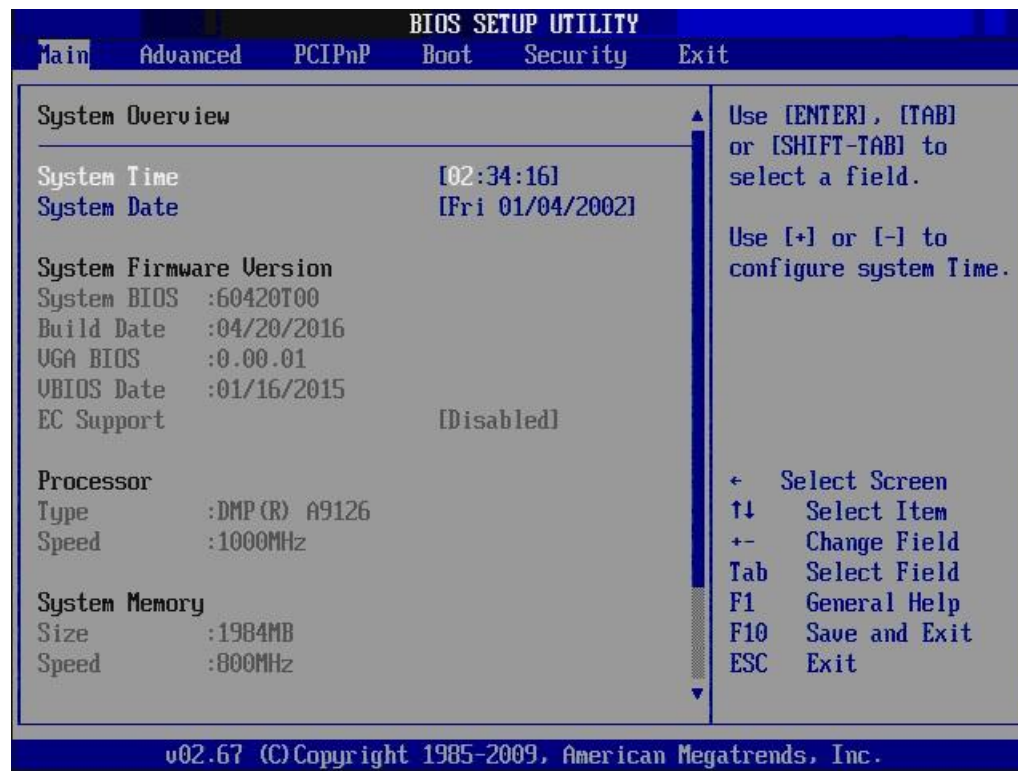


Figure 6 BIOS - Main

6.3 Advanced

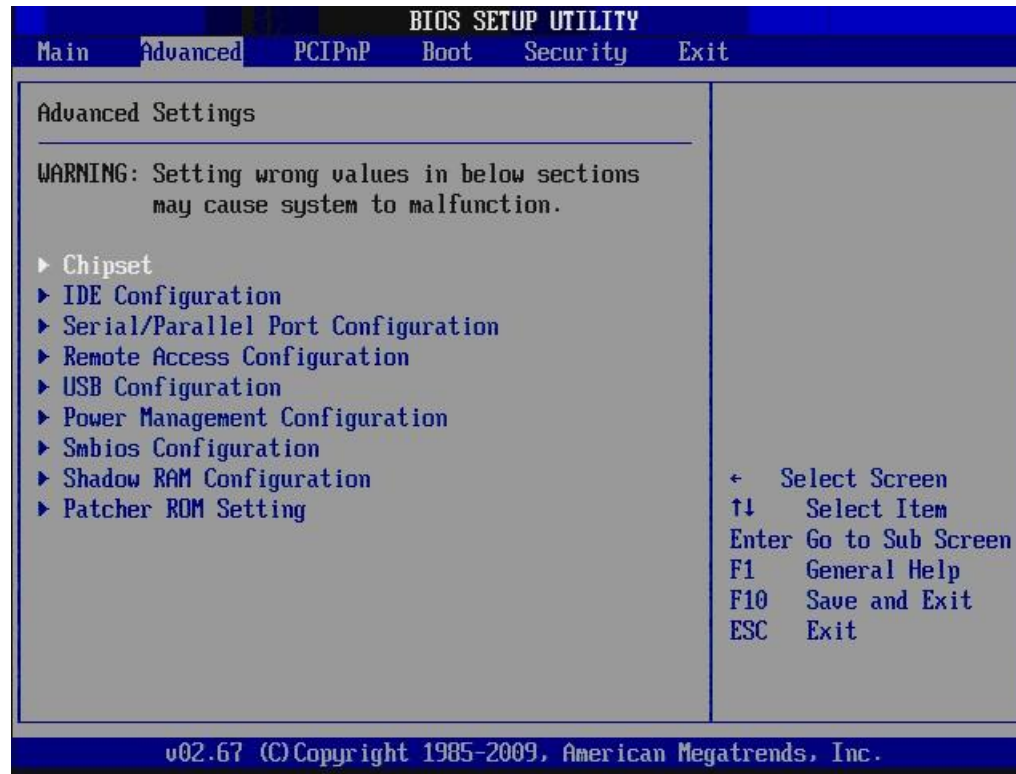


Figure 7 BIOS - Advanced

6.3.1 Chipset



Figure 8 BIOS - Advanced - Chipset 1-2

Chipset

Figure 9 BIOS - Advanced - Chipset 2-2

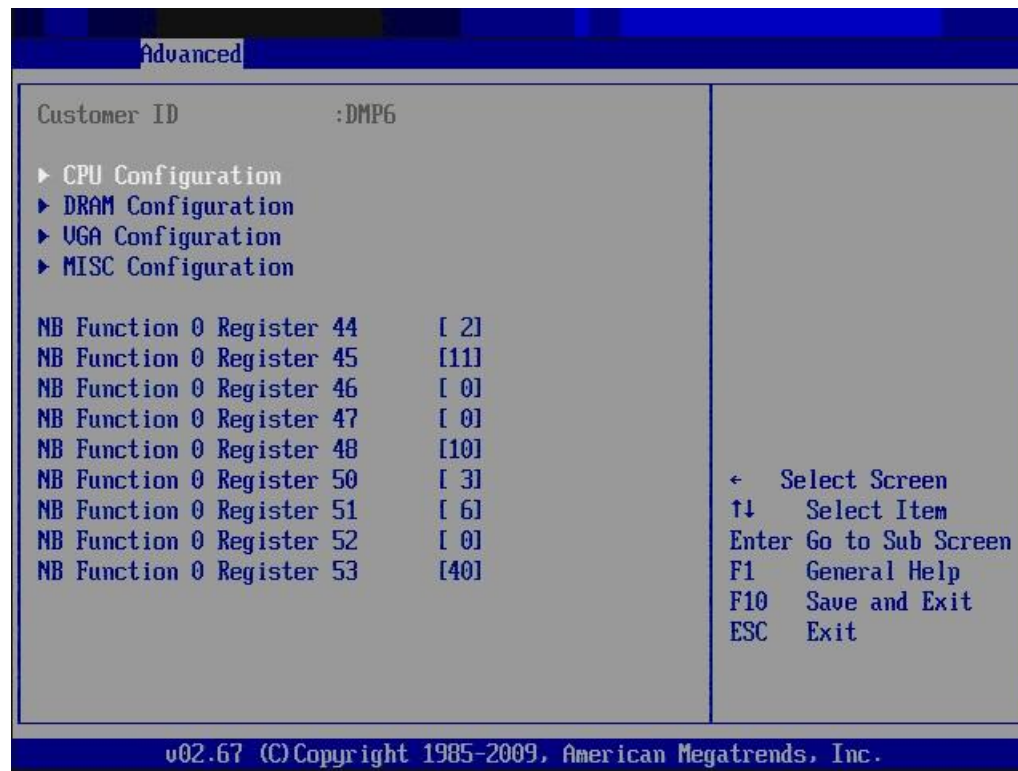
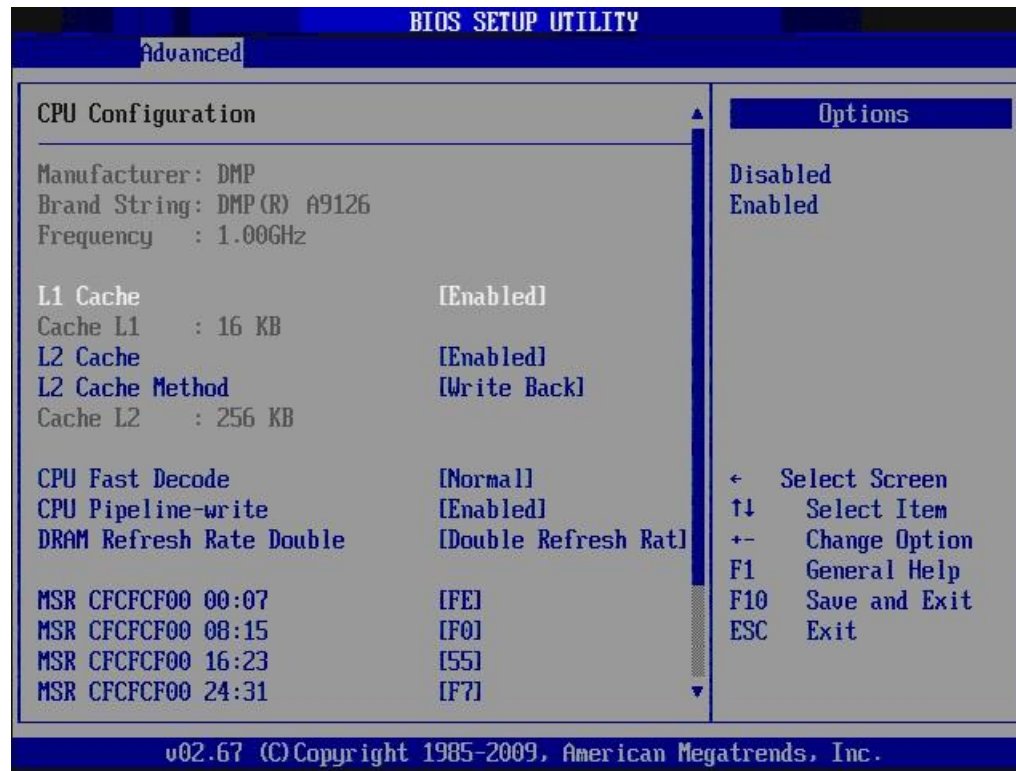
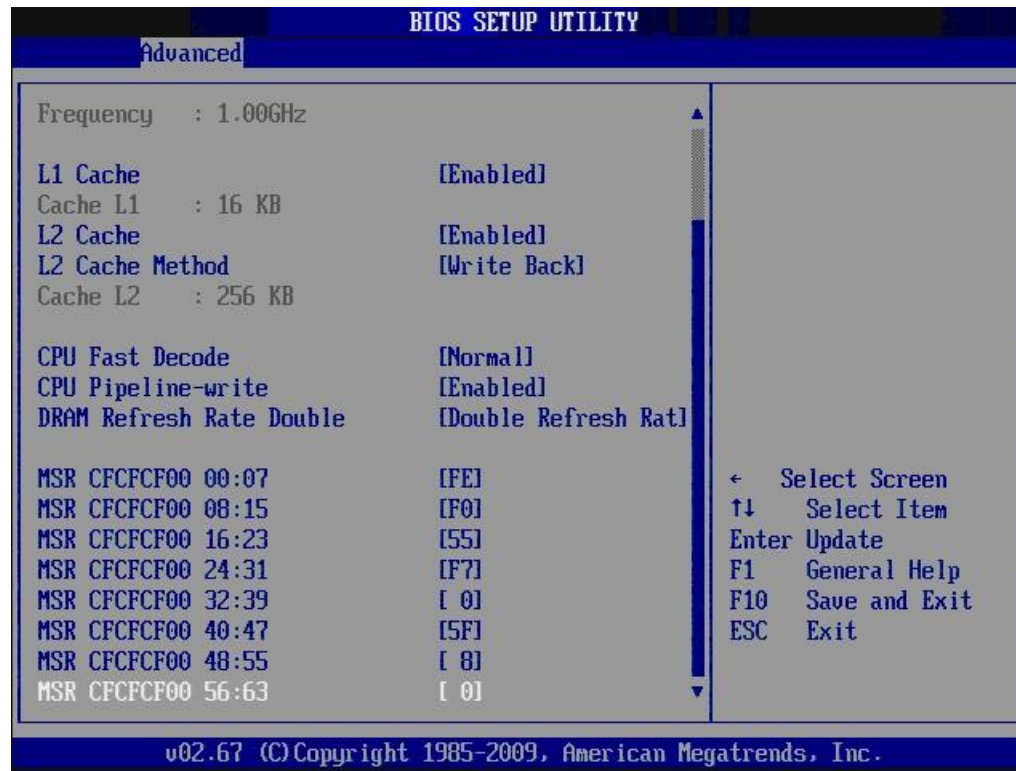
CPU

Figure 10 BIOS - Chipset - NorthBridge

CPU Configuration 1Figure 11 Northbridge - CPU 1-2

CPU Configuration 2Figure 12 Northbridge - CPU 2-2

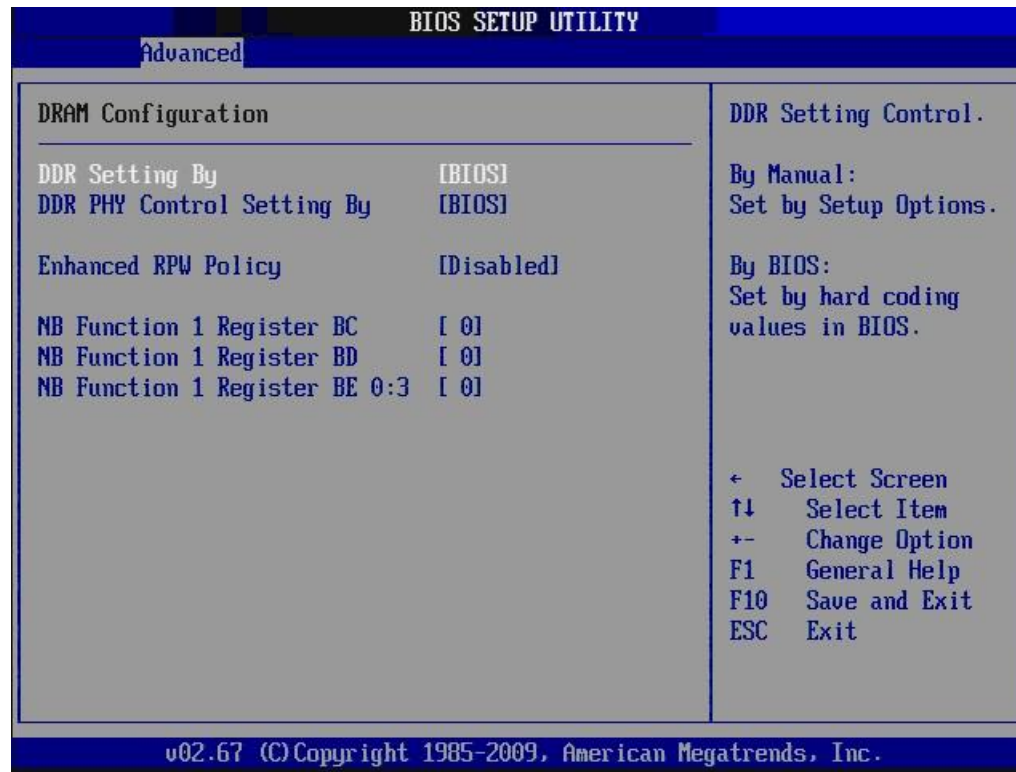
DRAM

Figure 13 Northbridge - DRAM

VGA

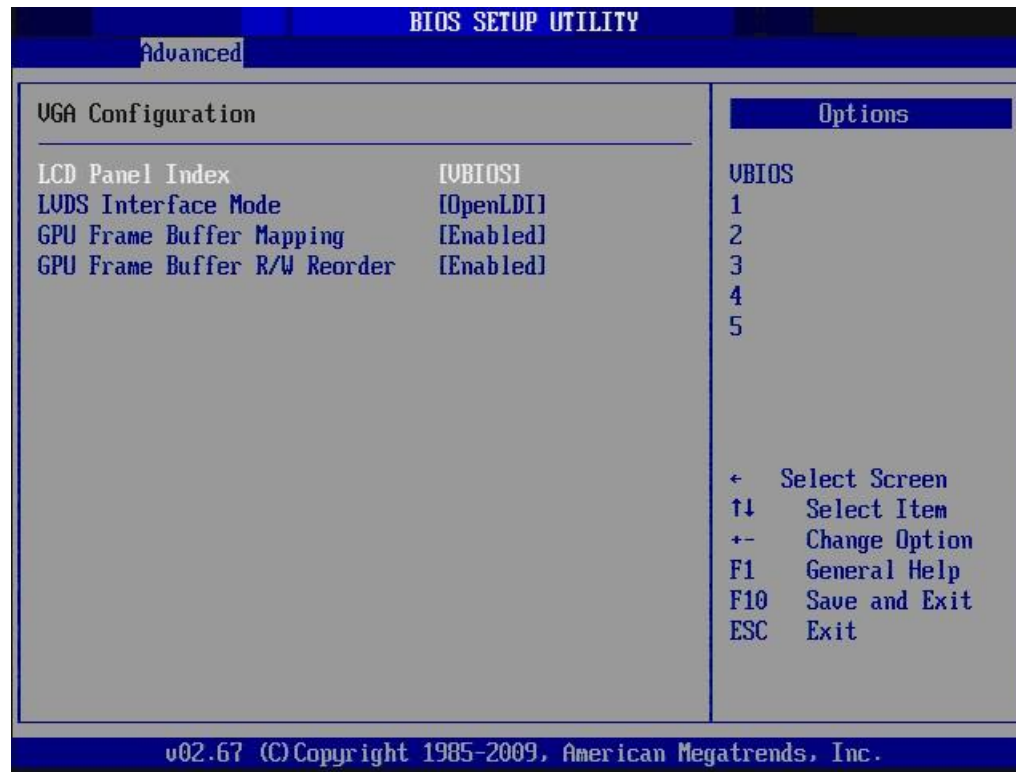


Figure 14 Northbridge - VGA Configuration

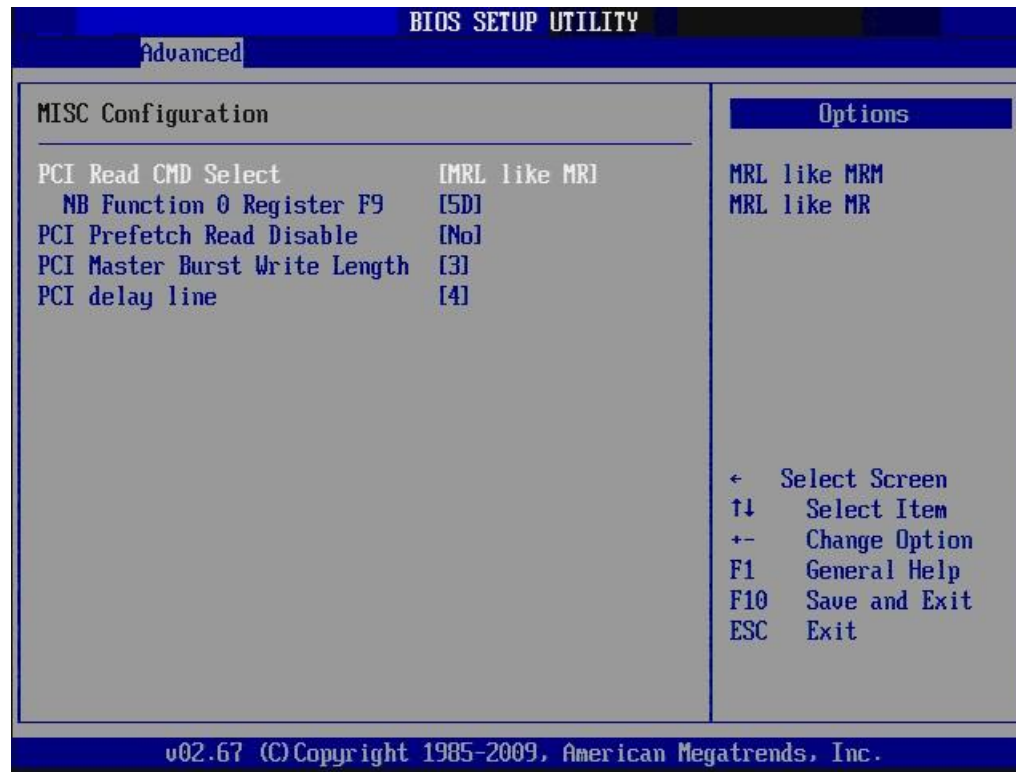
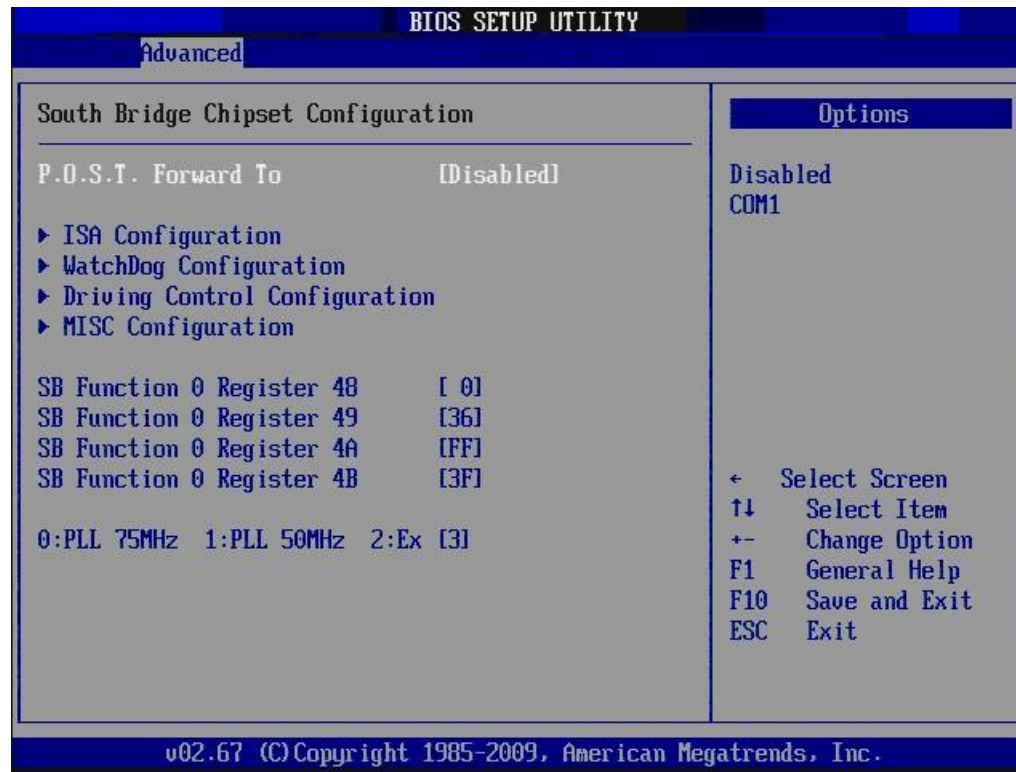
MISC

Figure 15 Northbridge - MISC

SouthbridgeFigure 16 SourthBridge

/ISA

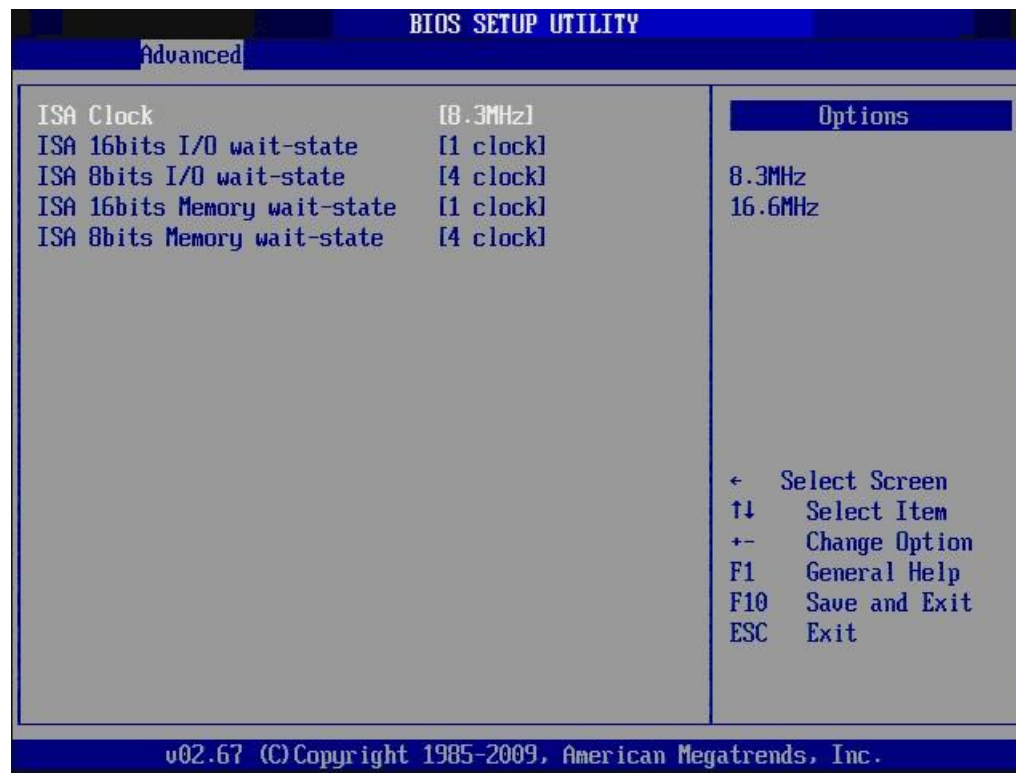


Figure 17 SourthBridge - ISA Configuration

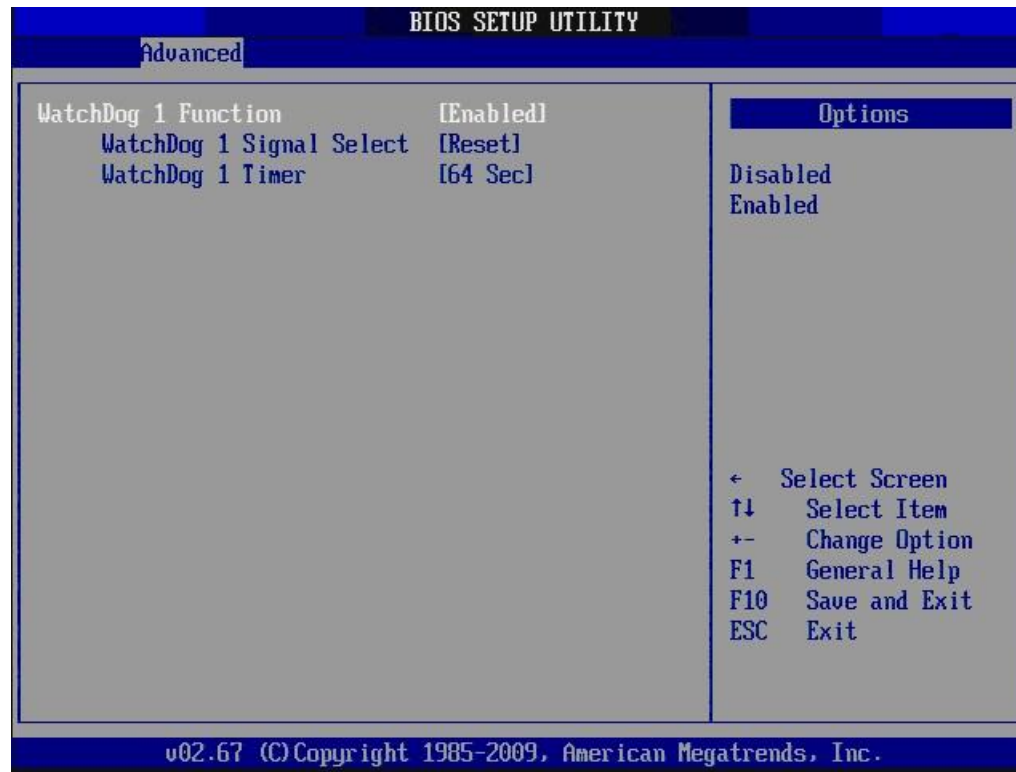
WatchDog

Figure 18 SourthBridge - WatchDog Configuration

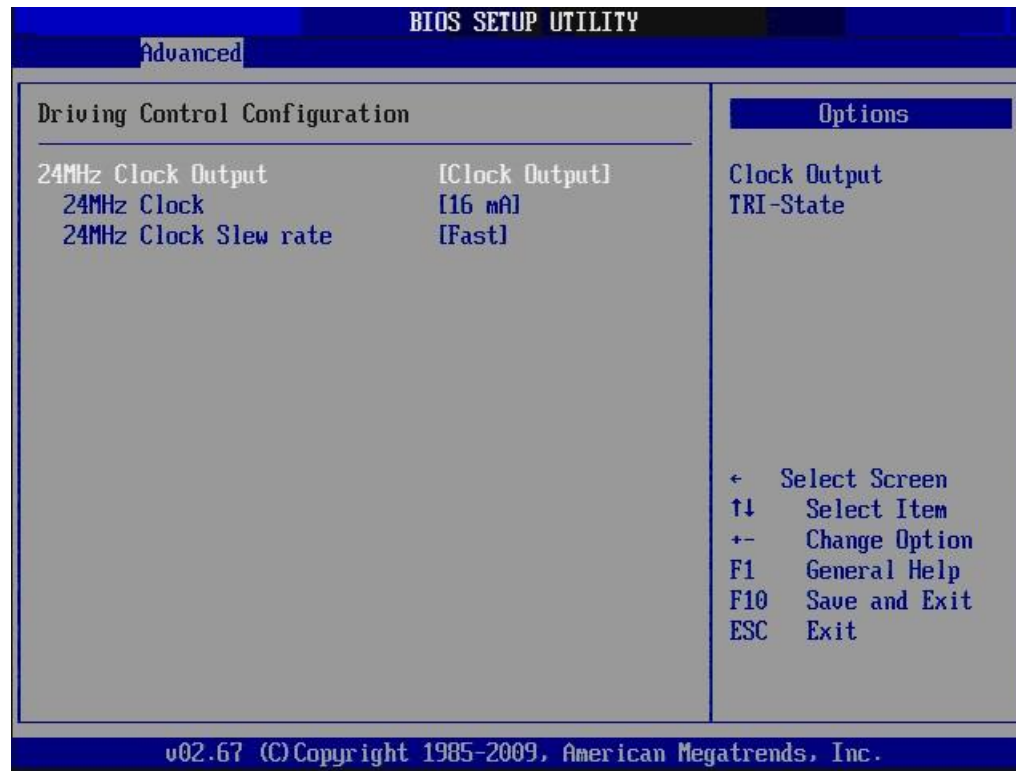
Driving Control

Figure 19 SouthBridge - Driving Control Configuration

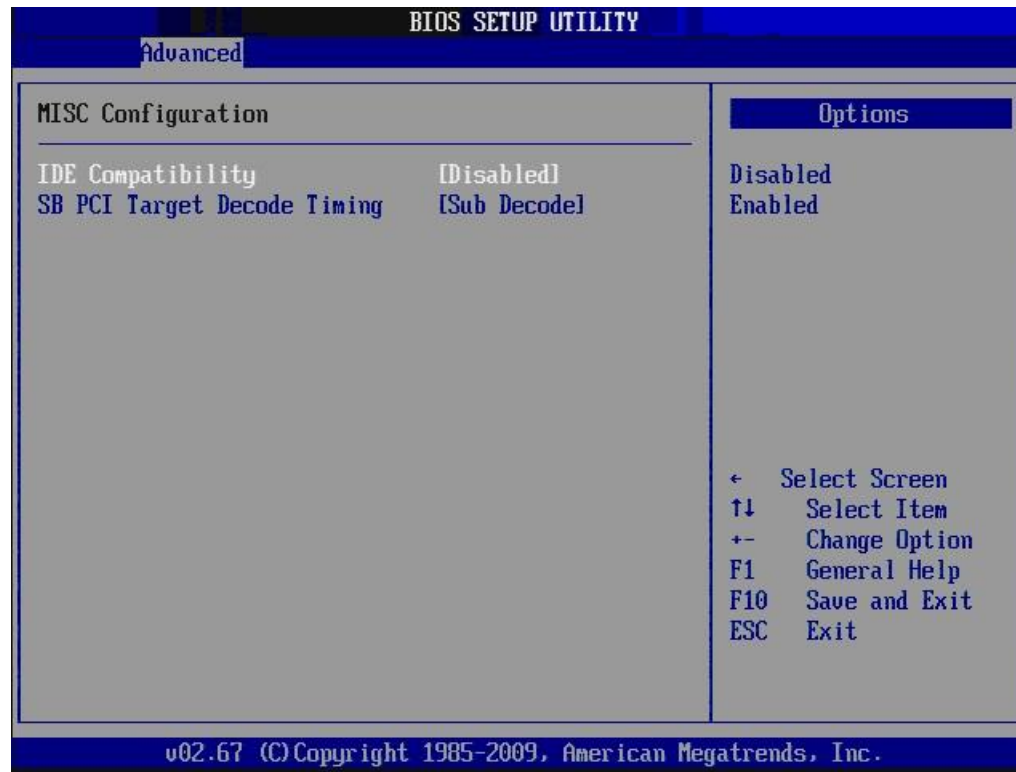
Southbridge MISC

Figure 20 SourthBridge - MISC Configuration

6.3.2 IDE



Figure 21 Advanced - IDE

6.3.3 Serial / Parallel Port

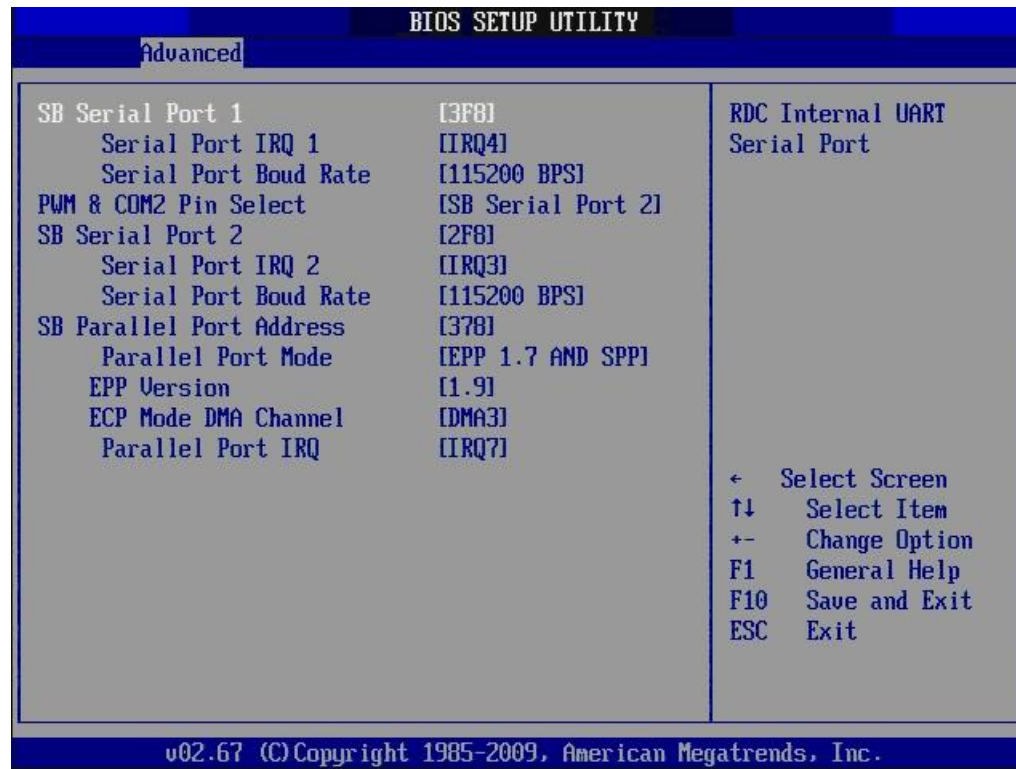


Figure 22 Advanced - Serial/Parallel Port

6.3.4 Remote Access

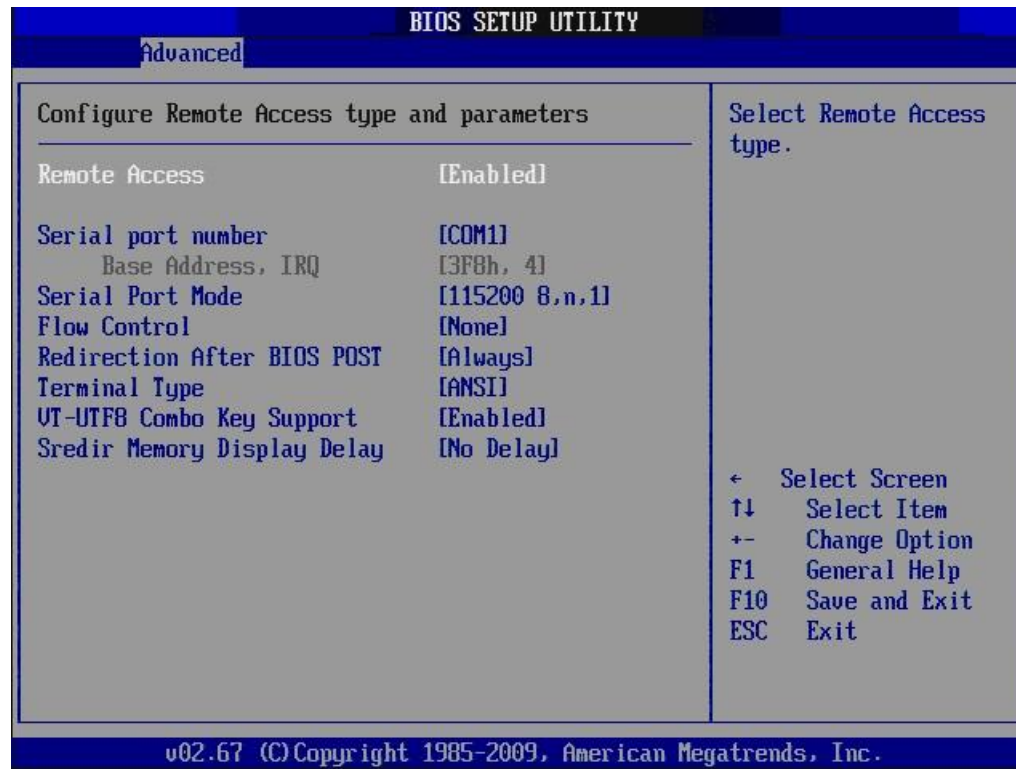


Figure 23 Advanced - Remote Access

6.3.5 USB

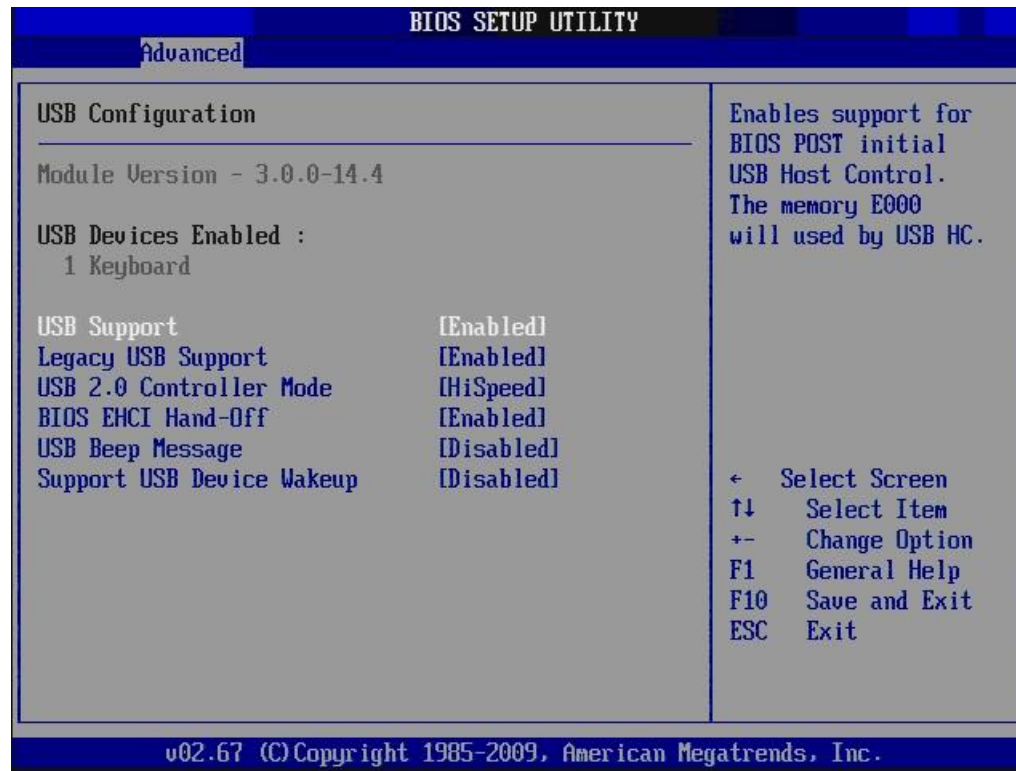


Figure 24 Advanced - USB

6.3.6 Power Management

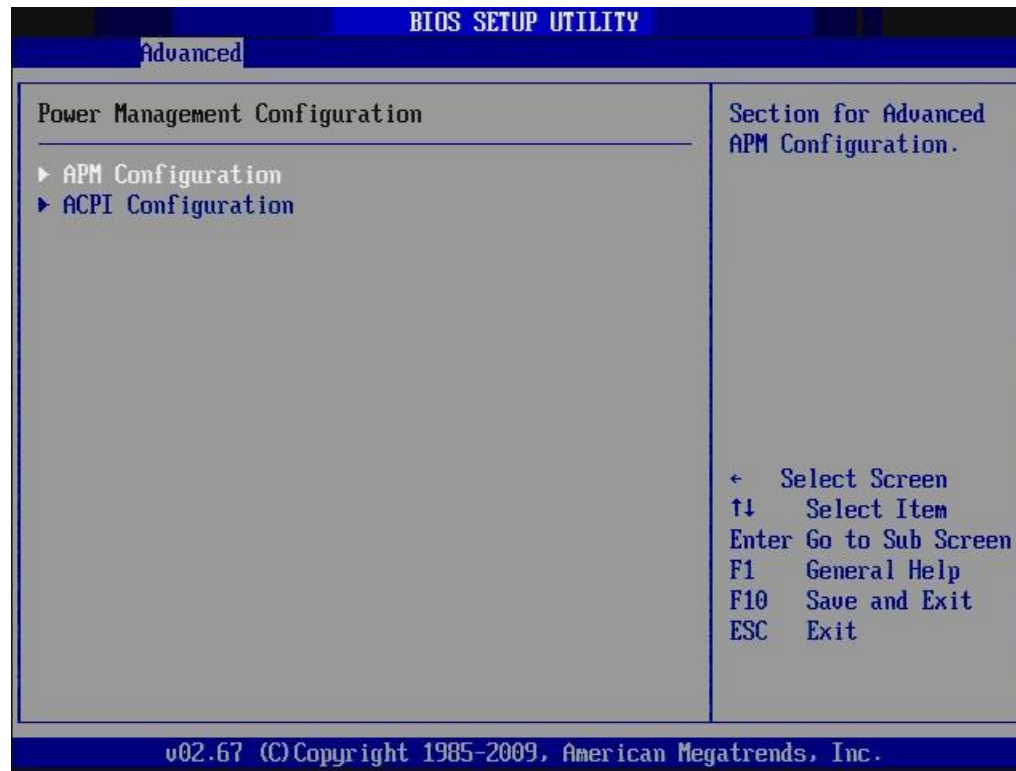


Figure 25 Advanced - Power Management

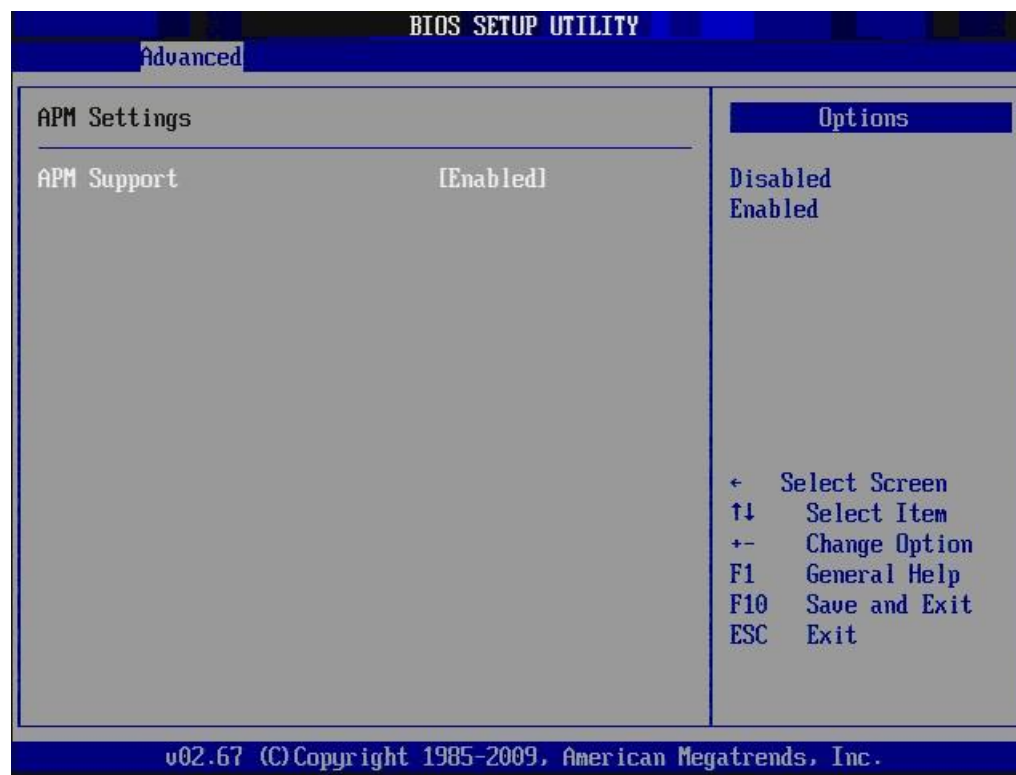
APM

Figure 26 Advanced - Power Management - APM

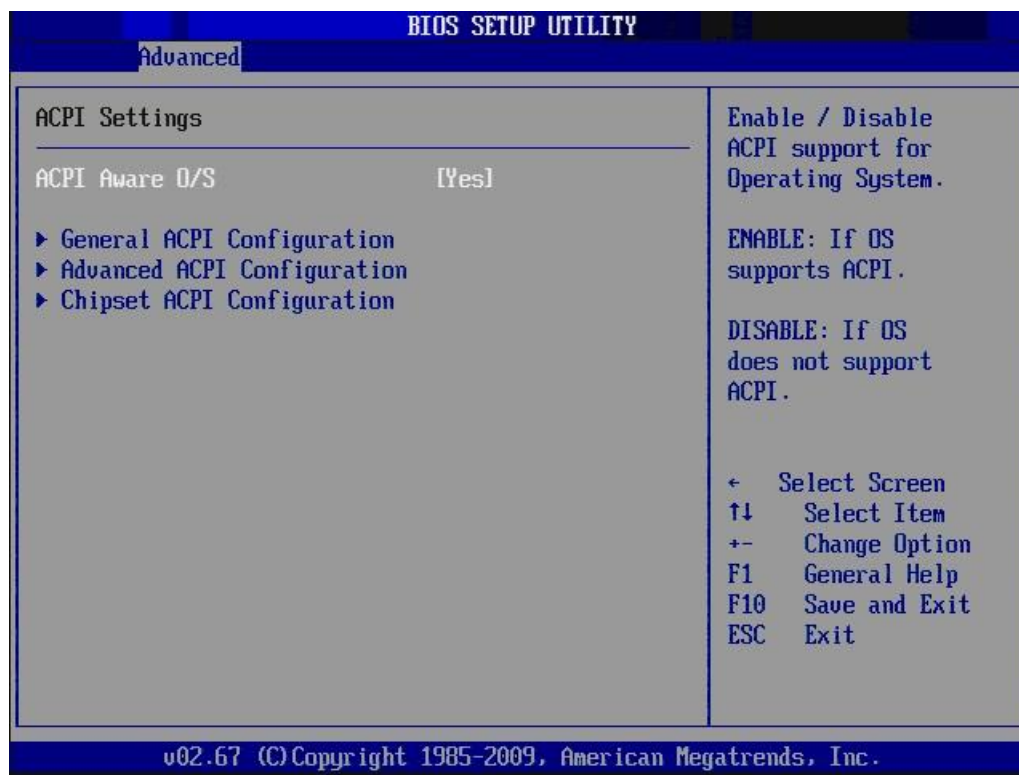
ACPI

Figure 27 Advanced - Power Management - ACPI

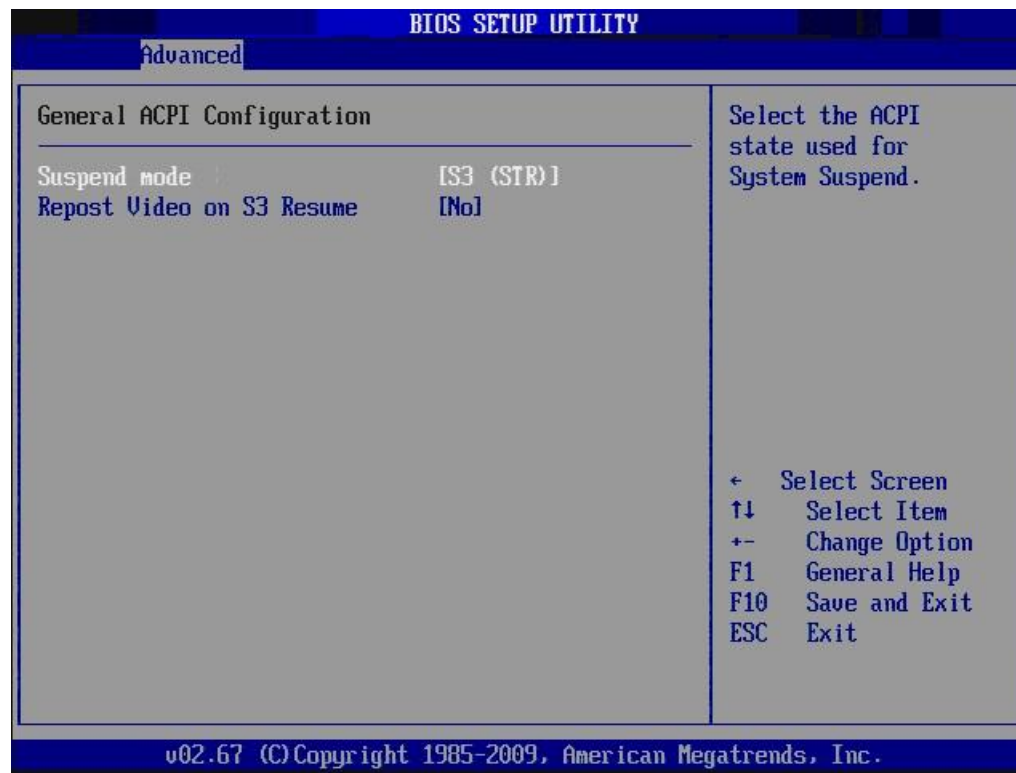
General ACPI

Figure 28 Advanced - Power Management - ACPI 1-2

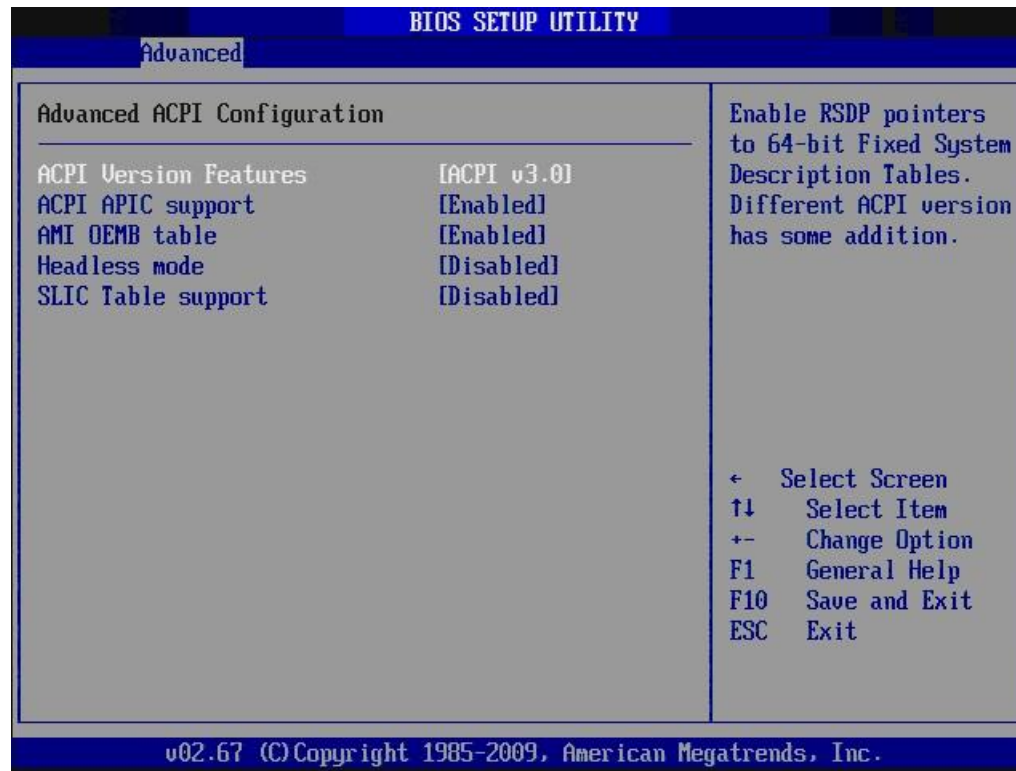
ACPI Version

Figure 29 Advanced - Power Management - ACPI 2-2

6.3.7 SMBIOS

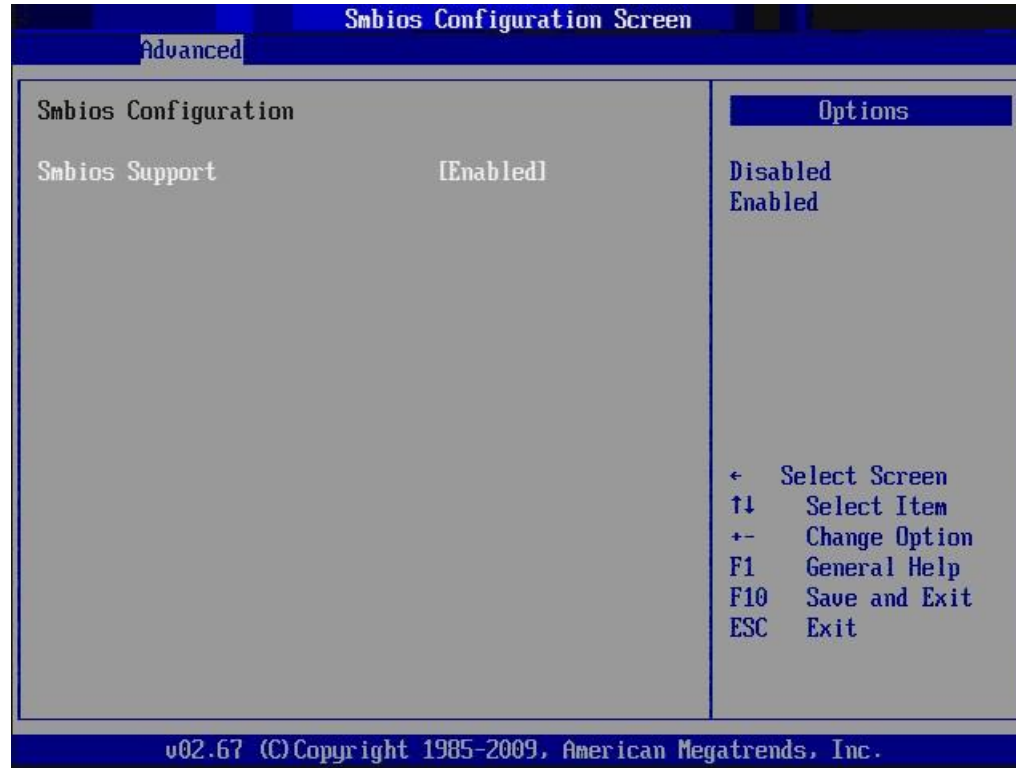


Figure 30 Advanced - SMBIOS

6.3.8 Shadow RAM

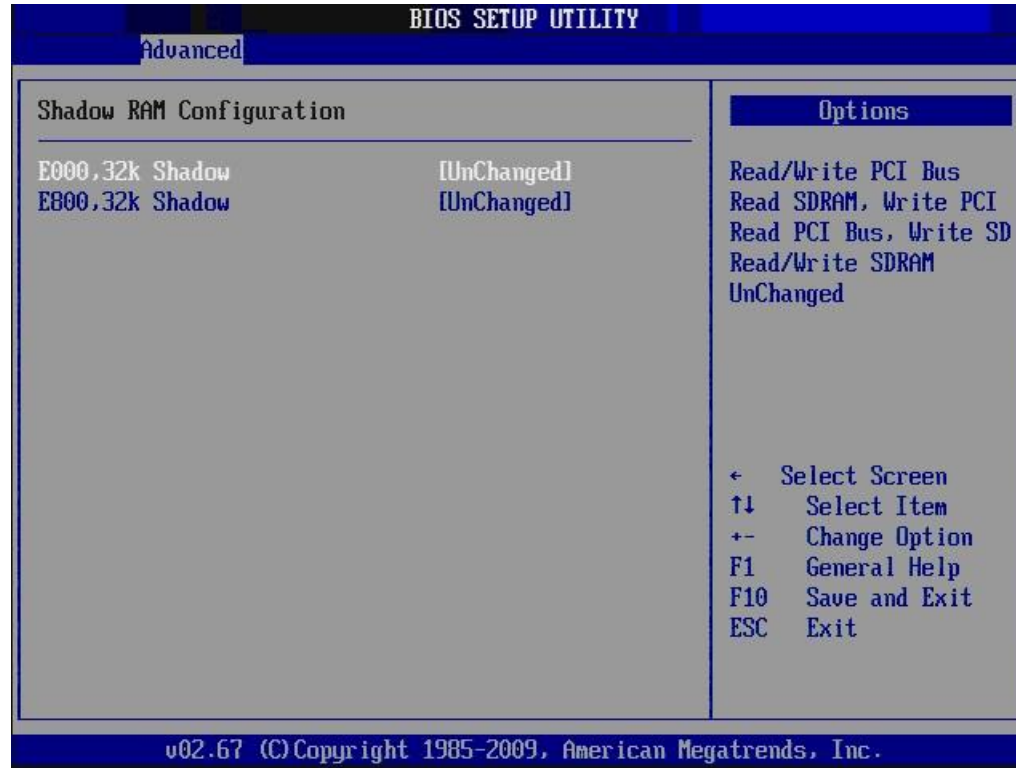


Figure 31 Advanced - Shadow RAM

6.3.9 Patcher RAM

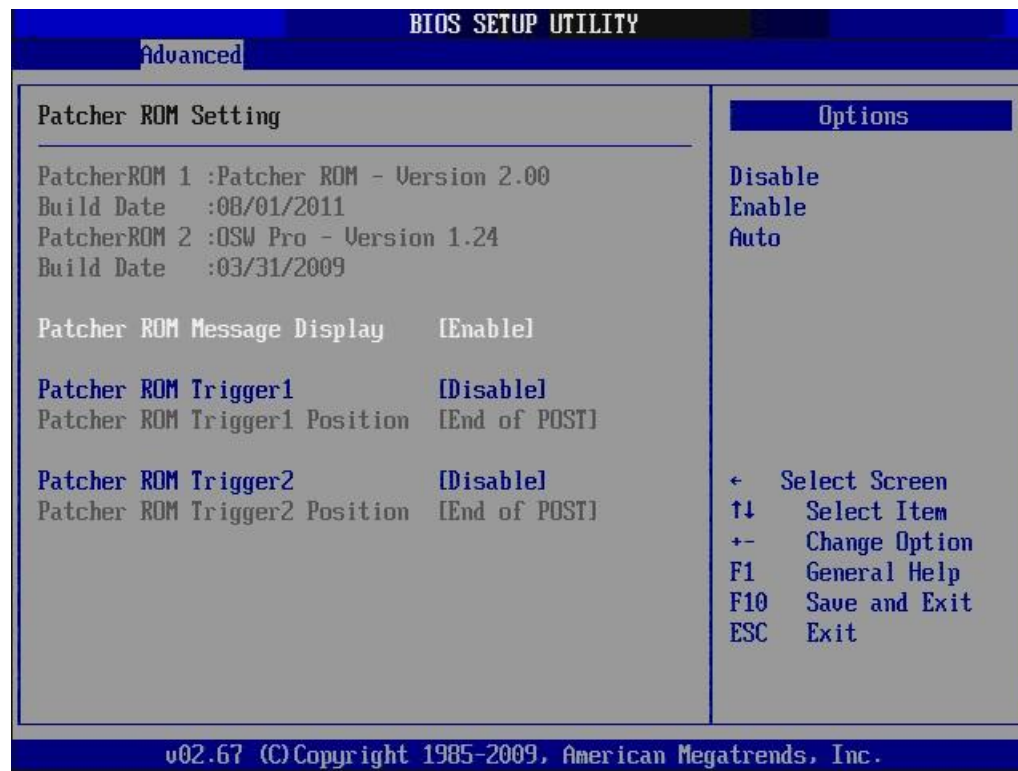


Figure 32 Advanced - Patcher ROM Setting

6.4 PCI PnP

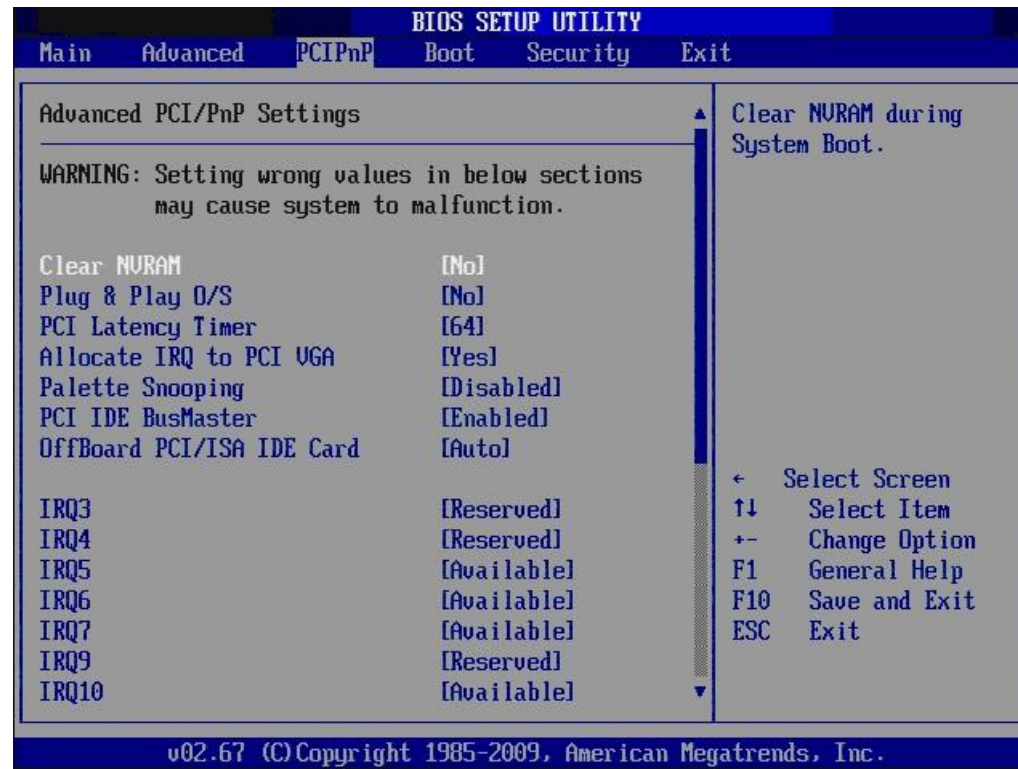


Figure 33 PCI PnP 1-2

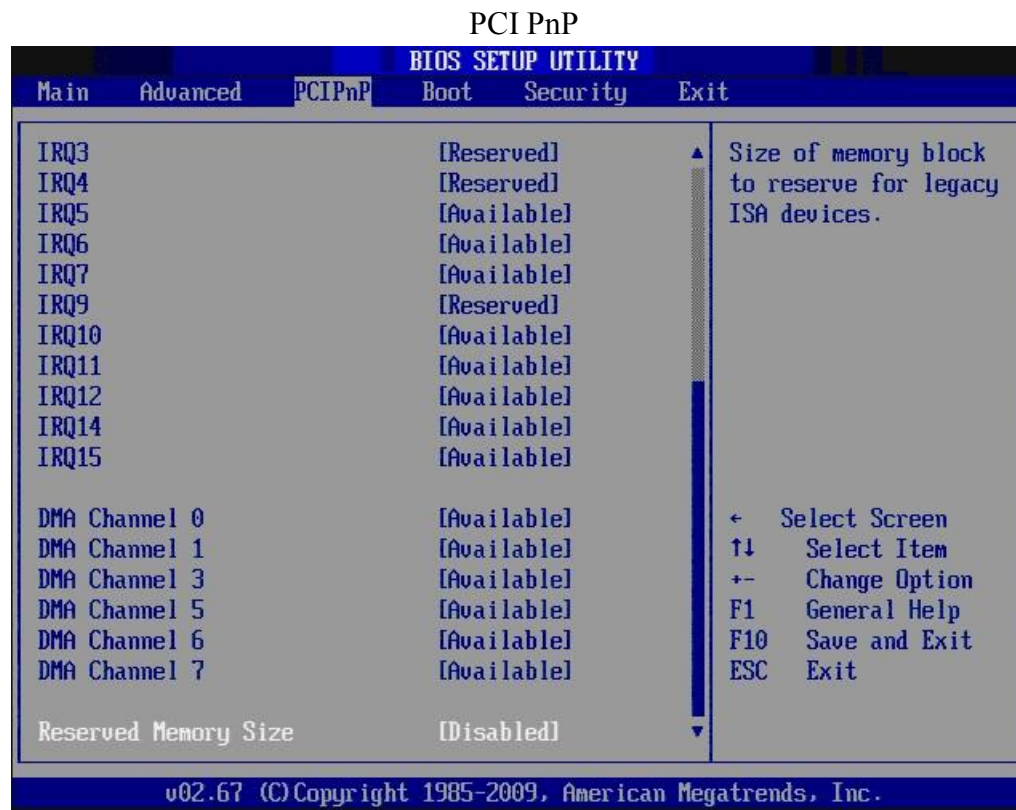


Figure 34 PCI PnP 2-2

6.5 Boot



Figure 35 Boot

6.5.1 Boot settings

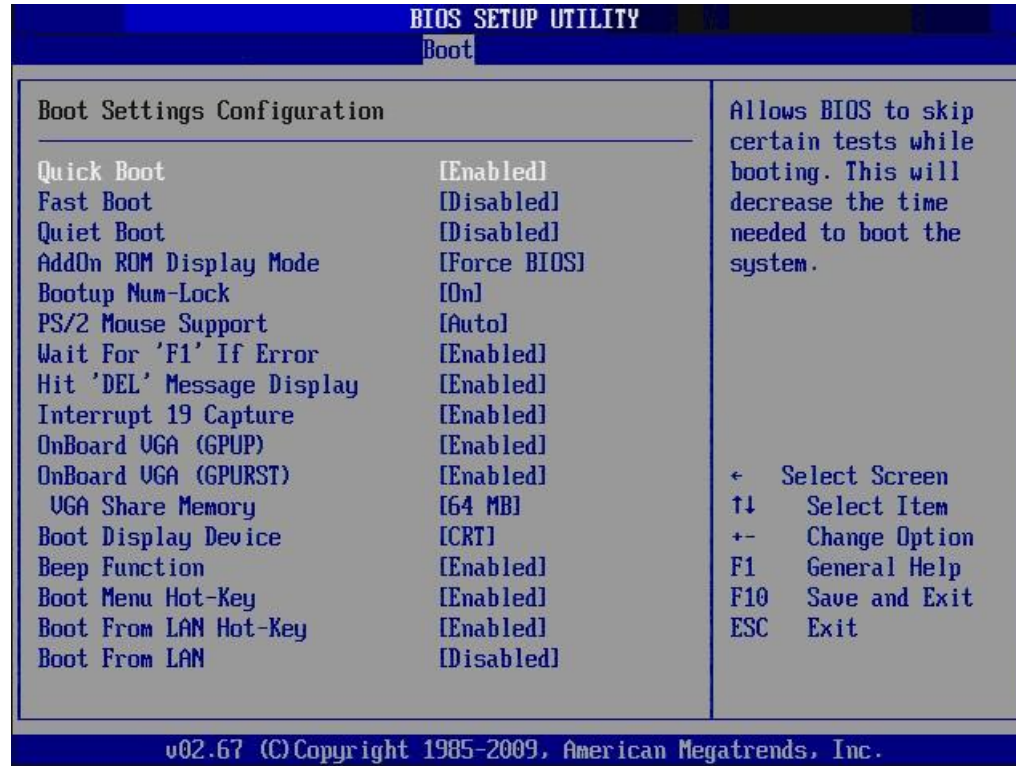


Figure 36 Boot - Boot Settings

6.5.2 Boot Device Priority

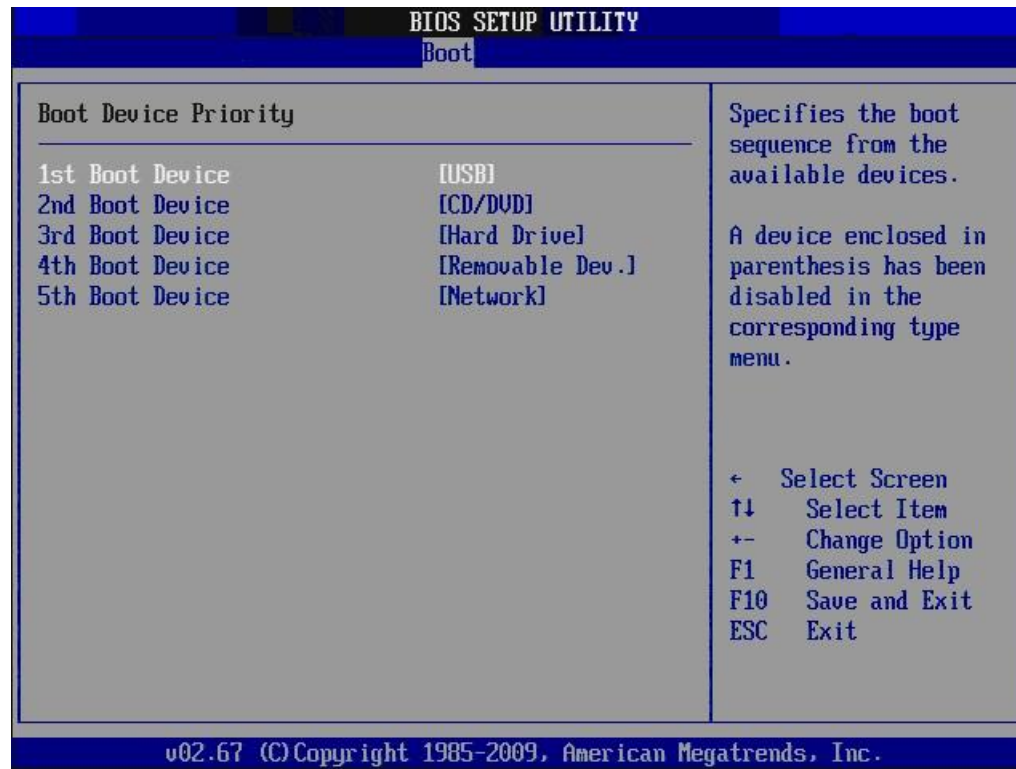


Figure 37 Boot - Boot Device Priority

6.6 Security

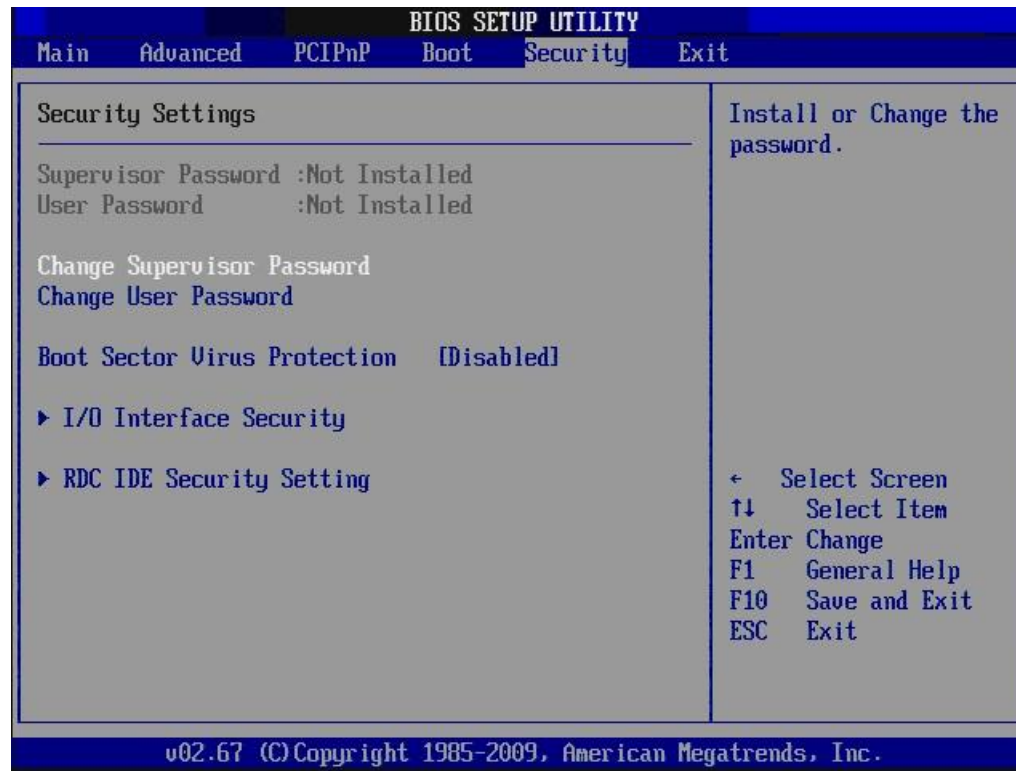


Figure 38 Security

6.6.1 I/O Interface Security

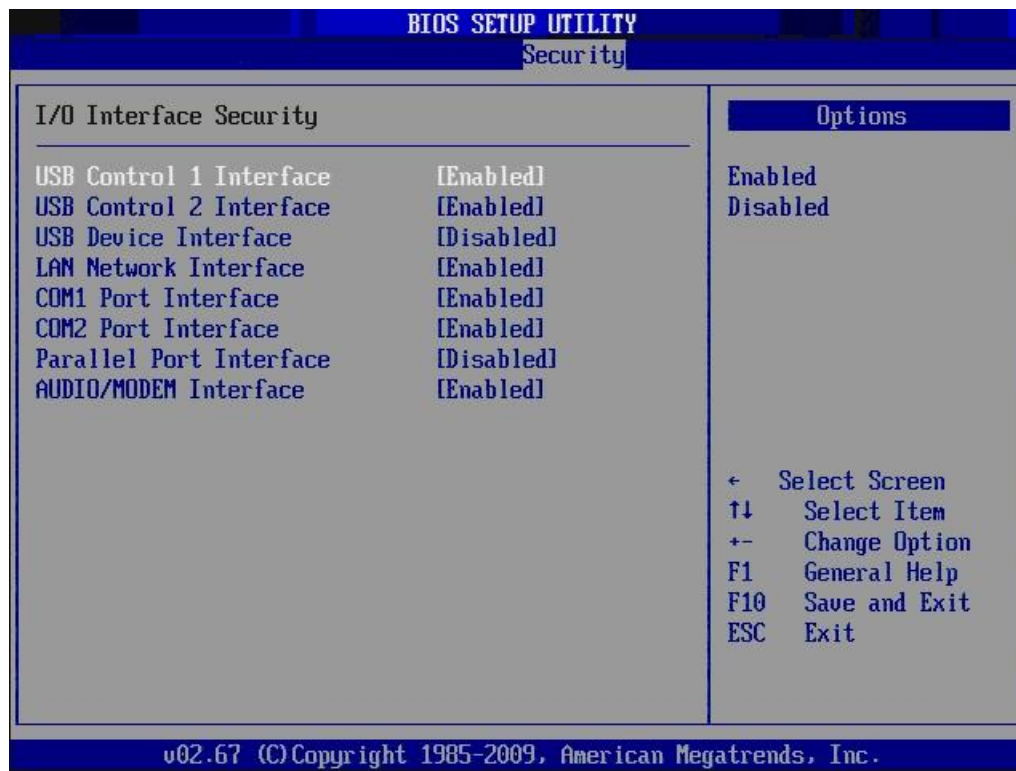


Figure 39 Security - I/O Interface Security

6.6.2 RDC IDE Security Setting

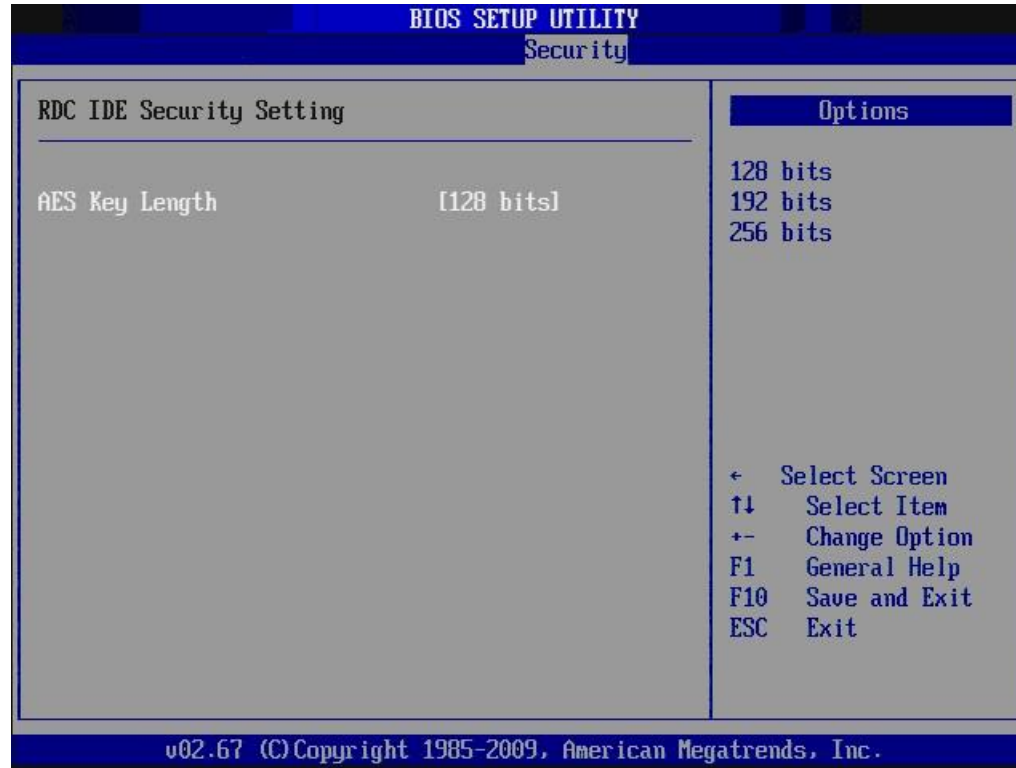


Figure 40 Security - RDC IDE Security Setting

6.7 Exit

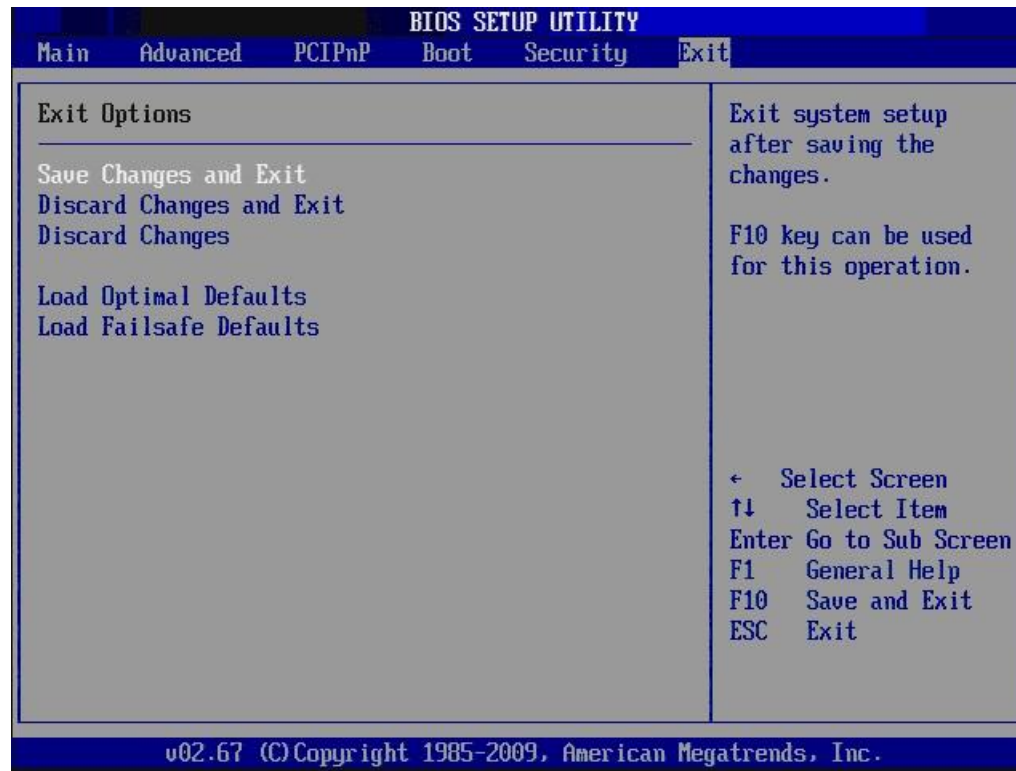


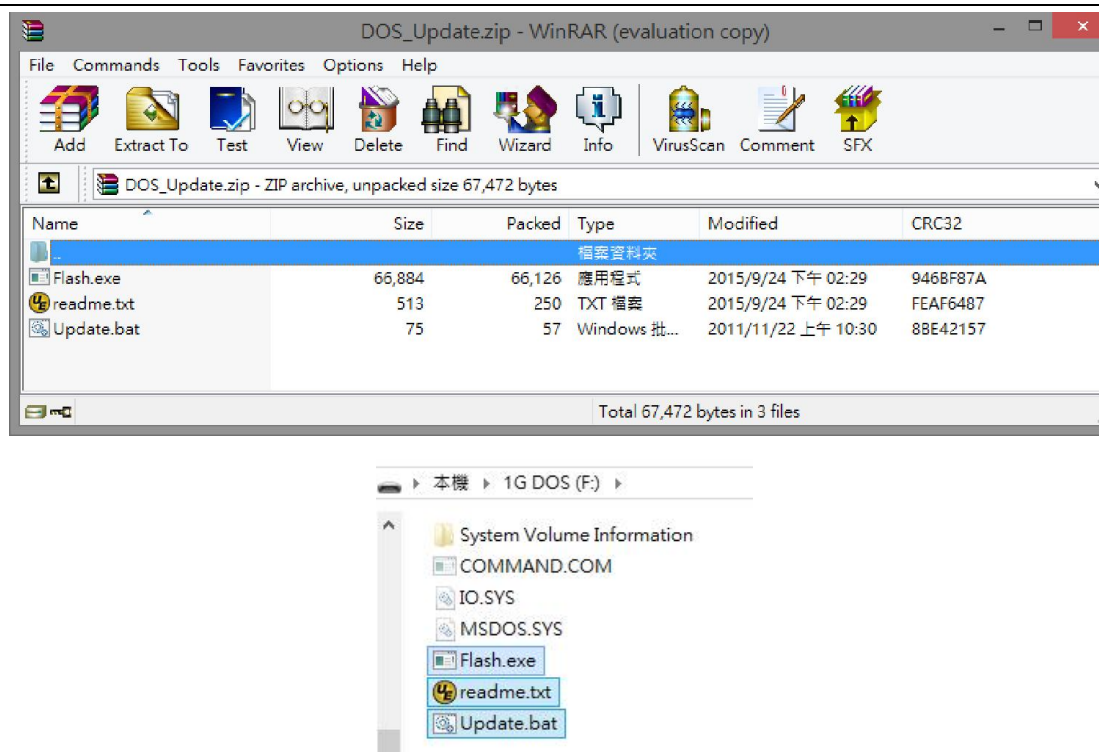
Figure 41 Exit

7 BIOS Update

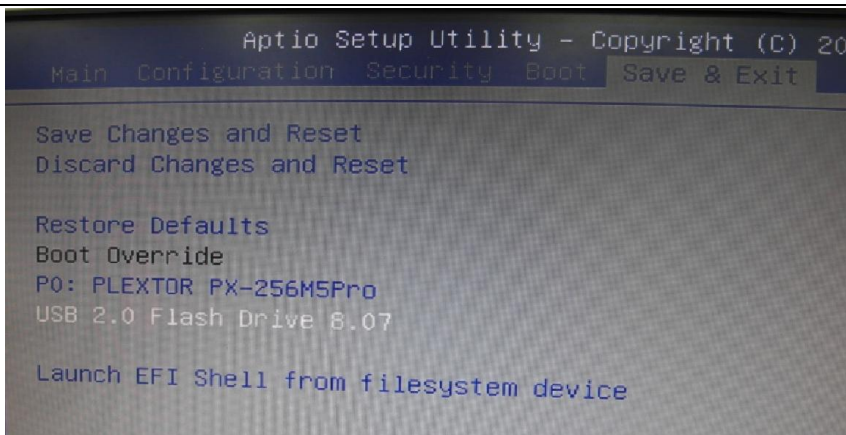
BIOS/EC DOS Update SOP process

Step 1. Create a DOS USB DOK (Caution : Must be FAT or FAT32 format).

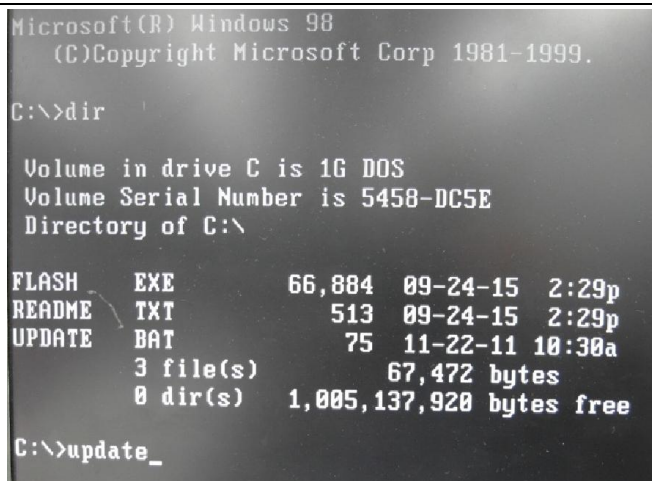
Step 2. Unzip update file to the DOS USB DOK.



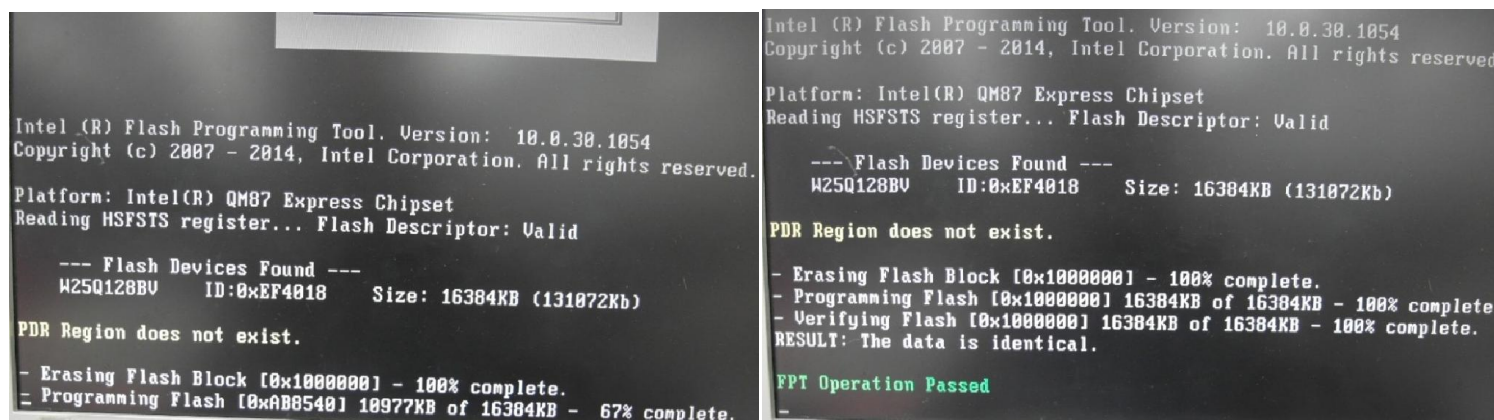
Step 3. Plug the DOS USB DOK to the target system and boot from the DOS USB DOK.



Step 4. Under the update file folder, type command : "update" and press enter.



Step 5. The update process will start and you can see the update progress. Once finished, please power off and restart the system.

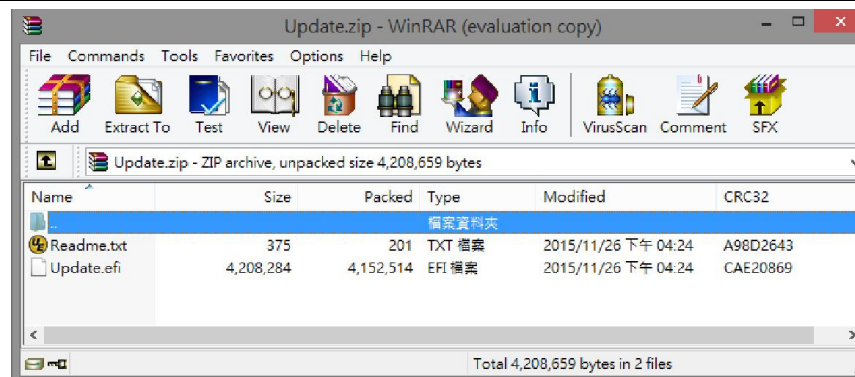


<End of BIOS/EC DOS update process>

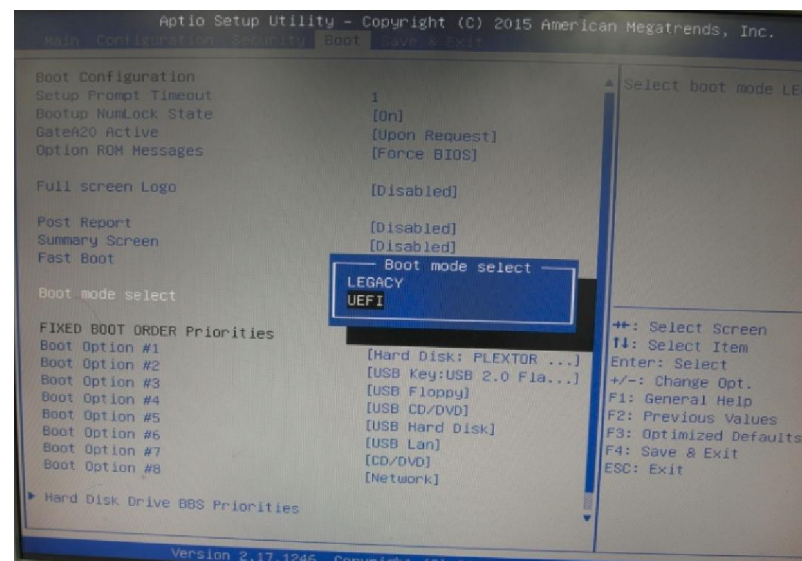
BIOS/EC UEFI Update SOP process

Step 1. Prepare a USB DOK (Caution : Must be FAT or FAT32 format).

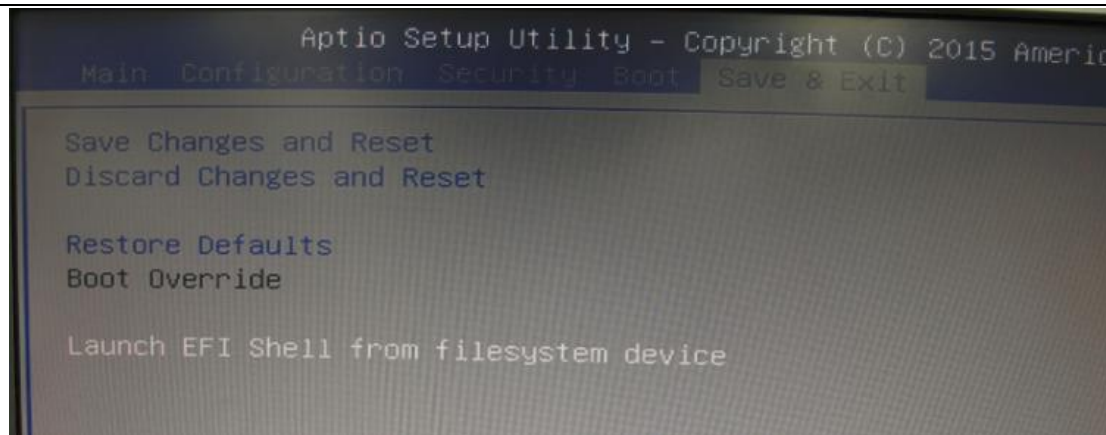
Step 2. Unzip update file to the USB DOK.



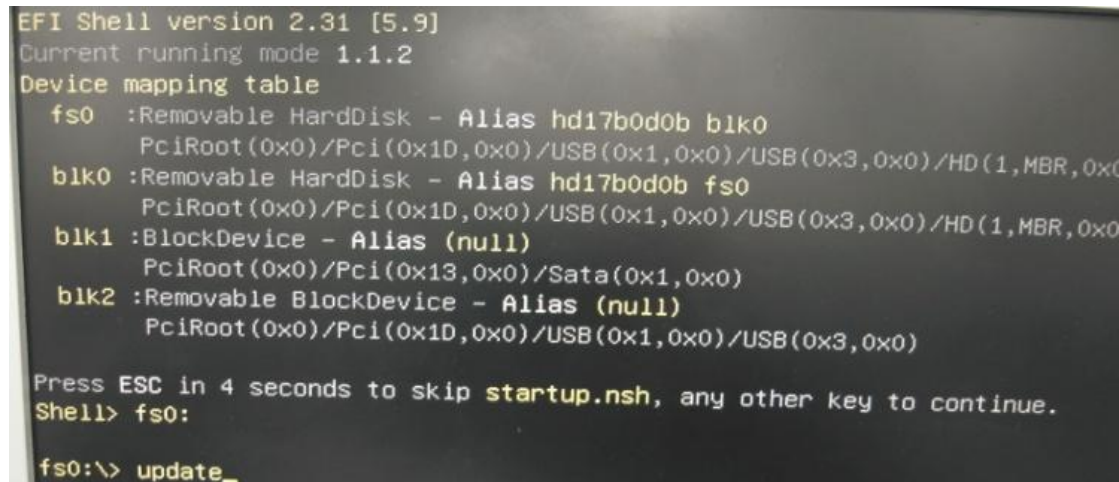
Step 3. Select UEFI boot mode in the BIOS boot menu and save, then restart the system.



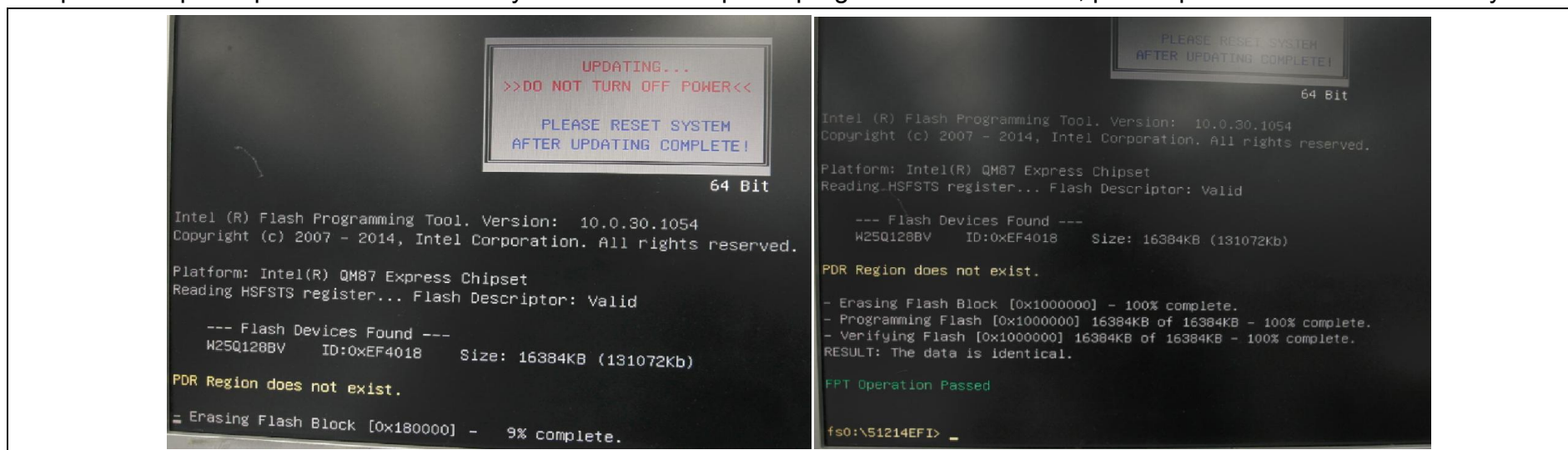
Step 4. Plug the USB DOK to the target system and boot from UEFI Shell.



Step 5. Under the UEFI shell, direct to your USB DOK, below example fs0 and type command : "update" and press enter.



Step 6. The update process will start and you can see the update progress. Once finished, please power off and restart the system.



<End of BIOS/EC UEFI update process>

8 PORTWELL Software Tool

PORTWELL Evaluation Tool (PET)

The PORTWELL Evaluation Tool (PET) is an API which PORTWELL's customers can access the GPIO, I2C, SMBus, etc under Windows and Linux OS. For more information please contact PORTWELL.

PORTWELL BIOS web Tool (PBT)

The PORTWELL BIOS web Tool (PBT) is a brand new on-line utility which innovated by PORTWELL. PBT now is available for PORTWELL's premiere customers who are able to [add customized BIOS logo](#) and [change BIOS default settings](#) on American Megatrends (AMI) BIOS. Please contact PORTWELL for more information.

PORTWELL EC Auto Test Tool (PECAT)

The PORTWELL EC Auto Test Tool (PECAT) is a brand new utility which innovated by PORTWELL. PECAT now is available for PORTWELL's premiere customers, who are able to [Test Embedded Controller Function](#) in UEFI Mode. Please contact PORTWELL for more information.

9 Industry Specifications

The list below provides links to industry specifications that apply to PORTWELL modules.

Low Pin Count Interface Specification, Revision 1.0 (LPC) <http://www.intel.com/design/chipsets/industry/lpc.htm>

Universal Serial Bus (USB) Specification, Revision 2.0 <http://www.usb.org/home>

PCI Specification, Revision 2.3 <https://www.pcisig.com/specifications>

Serial ATA Specification, Revision 3.0 <http://www.serialata.org/>

ETX Specification V3.02

ETX Design Guide