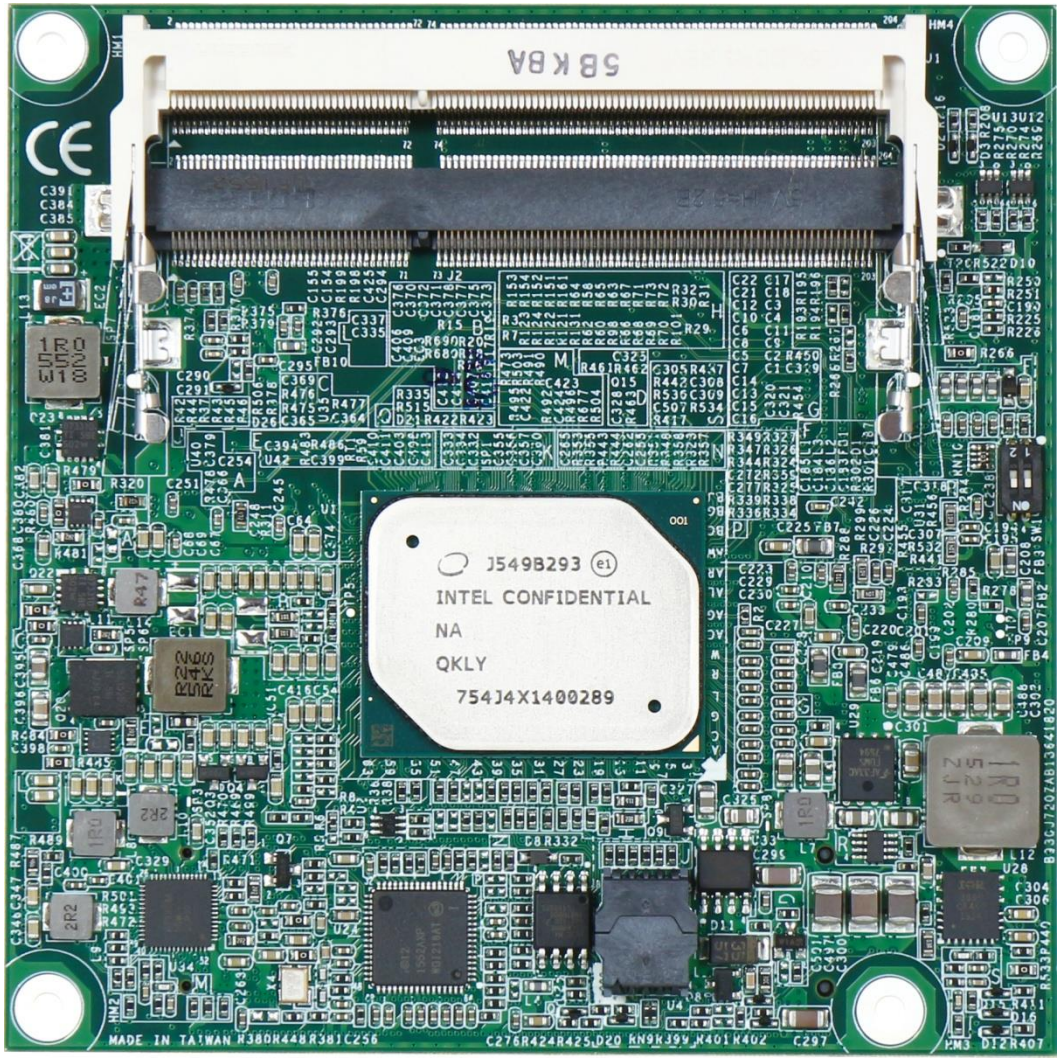

COM Express™ PCOM-B641VG User's Guide Revision 1.1

Revision History

R1.0	Official Release Rev 1.0
R1.1	Add COMe 3.0 function

Contents

List of Tables

List of Figures

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1 Introduction

This PCOM-B641VG User's Guide contains detail information of the product specifications, features, mechanical dimensions, heat sink/cooler and BIOS Setup.

PCOM-B641VG is designed according to COM (Computer On Module) PICMG Open Modular Computing Standards COM Express™ Specification Rev3.0 Type 6 and Compact form factor (95x95cm).

PCOM-B641VG is designed with Intel 6th Generation processor code name Apollo Lake. PCOM-B641VG is the successor of PCOM-B636VG (Intel Braswell platform) targeted on low power ATOM processors from TDP 6W to 12W fan less system and suitable for wide working temperature from -40°C to +80°C. PCOM-B641 supports dual channel DDR3L memory up to 8GB and provides dual core and quad core options, base frequency 1.3GHz and 1.6GHz, with turbo boost up to 1.8 and 2.0GHz. HD Graphic supports triple independent 4K x 2K high resolution display, and a On board eMMC 5.1 storage is also available

2 Block Diagram

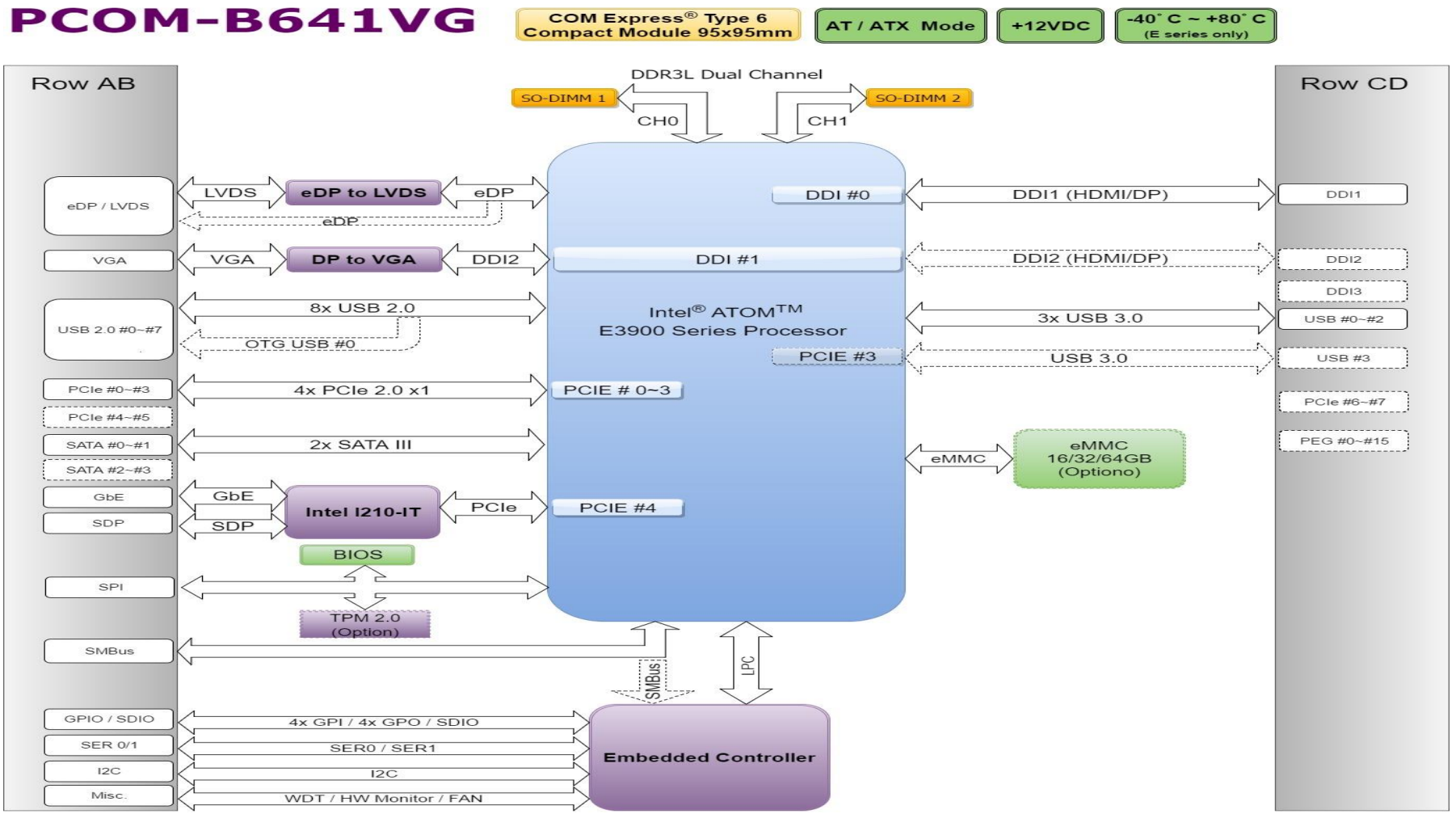


Figure 1 Block Diagram

3 Specifications

General	
Product	➢ PCOM-B641VG
Form Factor	➢ Compact COM Express™ Type 6 Rev. 3.0
Processor	➢ Intel Atom® x5-E3950 Processor ➢ Intel Atom® x5-E3940 Processor ➢ Intel Atom® x5-E3930 Processor ➢ Intel® Pentium® Processor N4200 ➢ Intel® Celeron® Processor N3350
Chipset	➢ SoC
BIOS	➢ AMI Aptio5 UEFI BIOS
Memory	➢ 2 SODIMM DDR3L ➢ Dual channel ➢ Up to 8GB 1867MHz
Security	➢ TPM (Option)
I/O Interface	
Embedded Controller	➢ ITE8528 Embedded Controller, Voltage, Fan and Temperature
Serial IO	➢ 8 GPIO (4 GPI and 4 GPO) ➢ I2C (PCH & Embedded Controller) ➢ 2 Serial Ports (TX and RX) ➢ SMBus (EC and SoC)
Processor PCI Express	➢ 1 PCI Express x4 Gen2 (5.0 GT/s) ; (PCIE 0/1/2/3) can be configured to x1,x2,x4\

USB	➢ 8 x USB2.0 (480 Mbps) (Port 0~7) ➢ USB OTG (Optional) (Port 0) ➢ 3 x USB3.0 (5 Gbps) (Port 0/1/2)
SATA	➢ 2 x SATA3.0 (6 Gbps) (Port 0/1)
Ethernet	➢ GbE Intel I210-IT -40°C to 80°C
Audio	➢ Intel® High Definition Audio
Display	
Graphic Controller	➢ Intel® HD Graphics 500 (Processor dependent) ➢ Intel® HD Graphics 505 (Processor dependent)
Graphics Options	➢ VGA (1920x1200 @ 60 Hz) ➢ DP 1.2a 4096x2160@60Hz ➢ HDMI 1.4b 3840x2160@30Hz (Optional) ➢ LVDS 1920x1600@60Hz
Mechanical & Environment	
Dimension	➢ COM Express™ standard pin out Type 6 Rev. 3.0 ➢ 95 x 95mm / 3.74” x 3.74” (Compact COM Express)
Hardware Monitors	➢ ITE8528 Embedded Controller, Voltage, Fan and Temperature
Power DC IN	➢ +12VDC (Nominal) ➢ + 6 VDC ~ + 18 VDC (Wide range)
Power Management	➢ ACPI 4.0
Environment	➢ Operating Temperature -40 ° C ~ +80 ° C (processor dependent) ➢ Storage Temperature -40 ° C ~ +80 ° C ➢ Relative Humidity 5%~95%
MTBF	➢ Over 100,000 hours at room ambient 40 ° C

Table 1 PCOM-B641VG Specification

3.1 PCOM-B641VG Processor list

PCOM-B641VG Processor list

PCOM-B641VG Series	PCOM-B641VG	PCOM-B641VG	PCOM-B641VG	PCOM-B641VG	PCOM-B641VG
Processor Number	Intel® Celeron® N3350	Intel® Pentium® N4200	Intel® Atom™ x5-E3930	Intel® Atom™ x5-E3940	Intel® Atom™ x7-E3950
Essentials					
Processor Number	N3350	N4200	E3930	E3940	E3950
Lithography	14 nm	14 nm	14 nm	14 nm	14 nm
Performance					
# of Cores	2	4	2	4	4
# of Threads	2	4	2	4	4
Processor Base Frequency	1.10 GHz	1.10 GHz	1.30 GHz	1.60 GHz	1.60 GHz
Burst Frequency	2.40 GHz	2.50 GHz	1.80 GHz	1.80 GHz	2.00 GHz
Cache	2 MB L2	2 MB L2	2 MB L2	2 MB L2	2 MB L2
TDP	6 W	6 W	6.5 W	9.5 W	12 W
Memory Specifications					
Max Memory Size (dependent on memory type)	8 GB	8 GB	8 GB	8 GB	8 GB
Max # of Memory Channels	2	2	4	4	4
Graphics Specifications					
Processor Graphics	Intel® HD Graphics 500	Intel® HD Graphics 505	Intel® HD Graphics 500	Intel® HD Graphics 500	Intel® HD Graphics 505
Graphics Base Frequency	200.00 MHz	200.00 MHz	400.00 MHz	400.00 MHz	500.00 MHz
Graphics Burst Frequency	650.00 MHz	750.00 MHz	550.00 MHz	600.00 MHz	650.00 MHz
Graphics Video Max Memory	8 GB	8 GB	2 GB	2 GB	2 GB

DirectX* Support	Yes	Yes	Yes	Yes	Yes
OpenGL* Support	Yes	Yes	Yes	Yes	Yes
Intel® Quick Sync Video	Yes	Yes	Yes	Yes	Yes
Intel® Clear Video HD Technology	Yes	Yes	Yes	Yes	Yes
Intel® Clear Video Technology	Yes	Yes	Yes	Yes	Yes
# of Displays Supported	3	3	3	3	3
4K Support			Yes, at 60Hz	Yes, at 60Hz	Yes, at 60Hz
Max Resolution (HDMI 1.4)			3840x2160 @30Hz	3840x2160 @30Hz	3840x2160 @30Hz
Max Resolution (DP)			4096x2160 @60Hz	4096x2160 @60Hz	4096x2160 @60Hz
Max Resolution (eDP - Integrated Flat Panel)			3840x2160 @ 60Hz	3840x2160 @ 60Hz	3840x2160 @ 60Hz
Expansion Options					
PCI Express Revision	2.0	2.0	2.0	2.0	2.0
PCI Express Configurations	x4,x2,x1	x4,x2,x1	x4,x2,x1	x4,x2,x1	x4,x2,x1
Max # of PCI Express Lanes	6	6	6	6	6
I/O Specifications					
USB Revision	2.0/3.0	2.0/3.0	2.0/3.0	2.0/3.0	2.0/3.0
# of USB Ports	8	8	8	8	8
Total # of SATA Ports	2	2	2	2	2
Package Specifications					
TJUNCTION	105°C	105°C	110°C	110°C	110°C
Advanced Technologies					
Secure Boot	Yes	Yes	Yes	Yes	Yes
Intel® Virtualization Technology (VT-x)	Yes	Yes	Yes	Yes	Yes

Intel® Virtualization Technology for Directed I/O (VT-d)	Yes	Yes	Yes	Yes	Yes
Intel® VT-x with Extended Page Tables (EPT)	Yes	Yes	Yes	Yes	Yes
Intel® 64	Yes	Yes	Yes	Yes	Yes
Instruction Set	64-bit	64-bit	64-bit	64-bit	64-bit
Idle States	Yes	Yes	Yes	Yes	Yes
Enhanced Intel SpeedStep® Technology	Yes	Yes	Yes	Yes	Yes
Thermal Monitoring Technologies	Yes	Yes	Yes	Yes	Yes
Intel® HD Audio Technology	Yes	Yes	Yes	Yes	Yes
Intel® Identity Protection Technology	Yes	Yes	Yes	Yes	Yes
Intel® Data Protection Technology					
Intel® AES New Instructions	Yes	Yes	Yes	Yes	Yes
Secure Key	Yes	Yes	Yes	Yes	Yes
Intel® Platform Protection Technology					
Execute Disable Bit	Yes	Yes	Yes	Yes	Yes

Table 2 PCOM-B641VG Processor list

3.2 Supported Operating Systems

The PCOM-B641VG supports the following operating systems.

Vendor	Operating System	Supported
Microsoft	Windows 8 (64bit)	Yes
	Windows 8.1 (64bit)	Yes
	Windows 10 (64bit)	Yes
	Windows 10 IoT Enterprise RS1 (64bit)	Yes
	Windows 10 IoT Core RS1	Yes
Linux	Yocto Project (4.14 Kernel)	Yes
	WR Linux WRL9	Yes
Android	Android M	Yes

Table 3 Supported Operating Systems

3.3 Windows OS driver

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

Item	Driver version	Windows 10 OS
Chipset	10.1.1.35	Driver_PCOM-B641_Chipset_WIN_10_10.1.1.35
Graphic	21.20.16.4550	Driver_PCOM-B641_GFX_WIN_10_21.20.16.4550
LAN	21.1	Driver_PCOM-B641_LAN_64bit_21.1
Audio	279	Driver_PCOM-B641_Audio_64bit_279
TXE	3.0.10.1129	Driver_PCOM-B641_TXE_64bit_3.0.10.1129
Serial IO	30.100.1631.03	Driver_PCOM-B641_SerialIO_64bit_30.100.1631.03

Table 4 Windows OS driver list

3.4 Electrical Characteristics

Input voltage	+12VDC (Nominal) + 6 VDC ~ + 18 VDC (Wide range)
RTC Battery	3.4u A
Power on mode	AT / ATX

Table 5 Electrical Characteristics

3.5 Power sequence

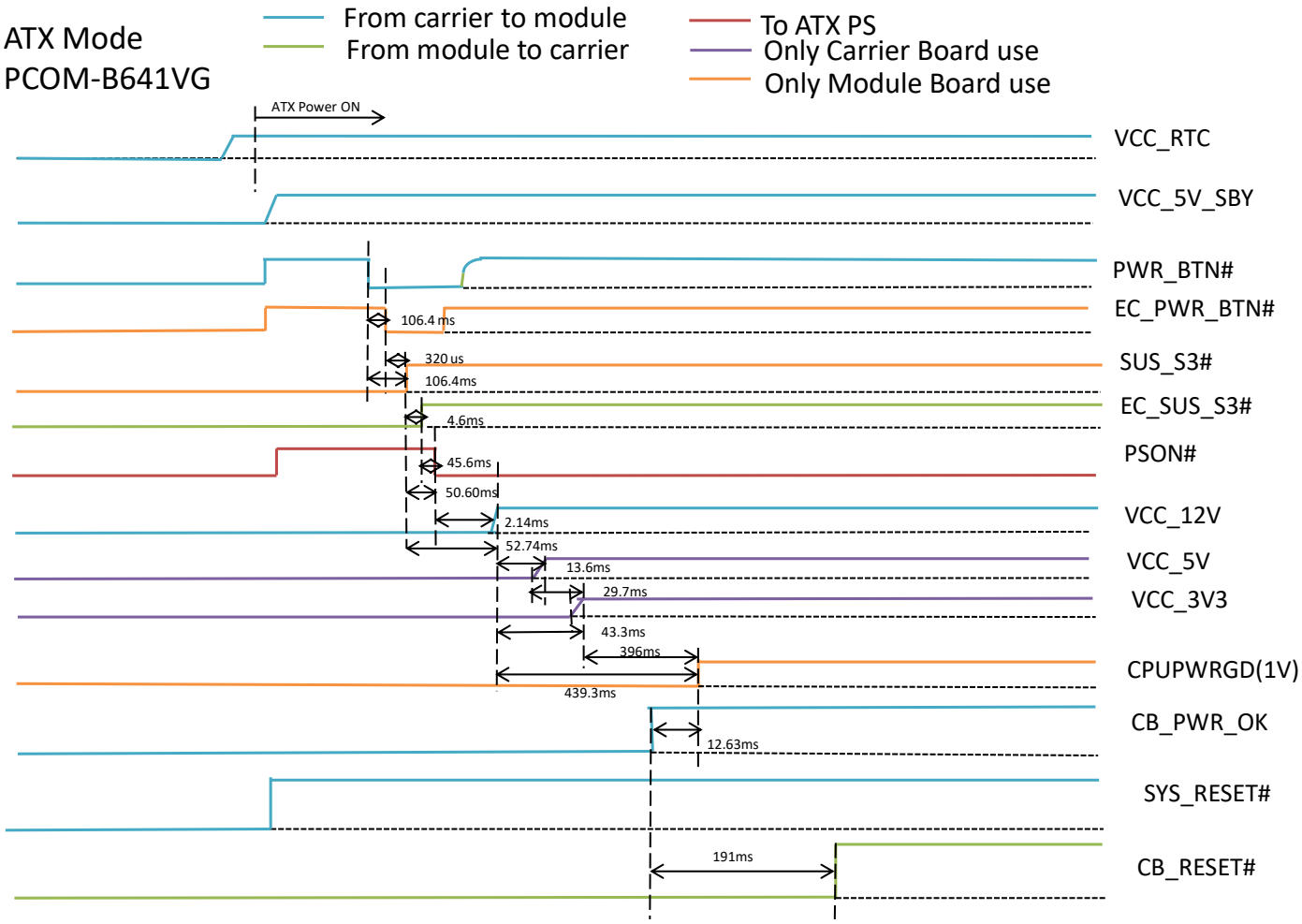


Figure 2 PCOM-B641VG Power Sequence

3.6 Circuit protection design

PCOM-B641VG Type 6 is also compatible with COM Express Type 2 carrier, Schottky diode protection has been design on the COM Express module for Serial Port, FAN(PWMOUT & TACHIN), LID and SLEEP. Considerations must be taken while designing carrier board.

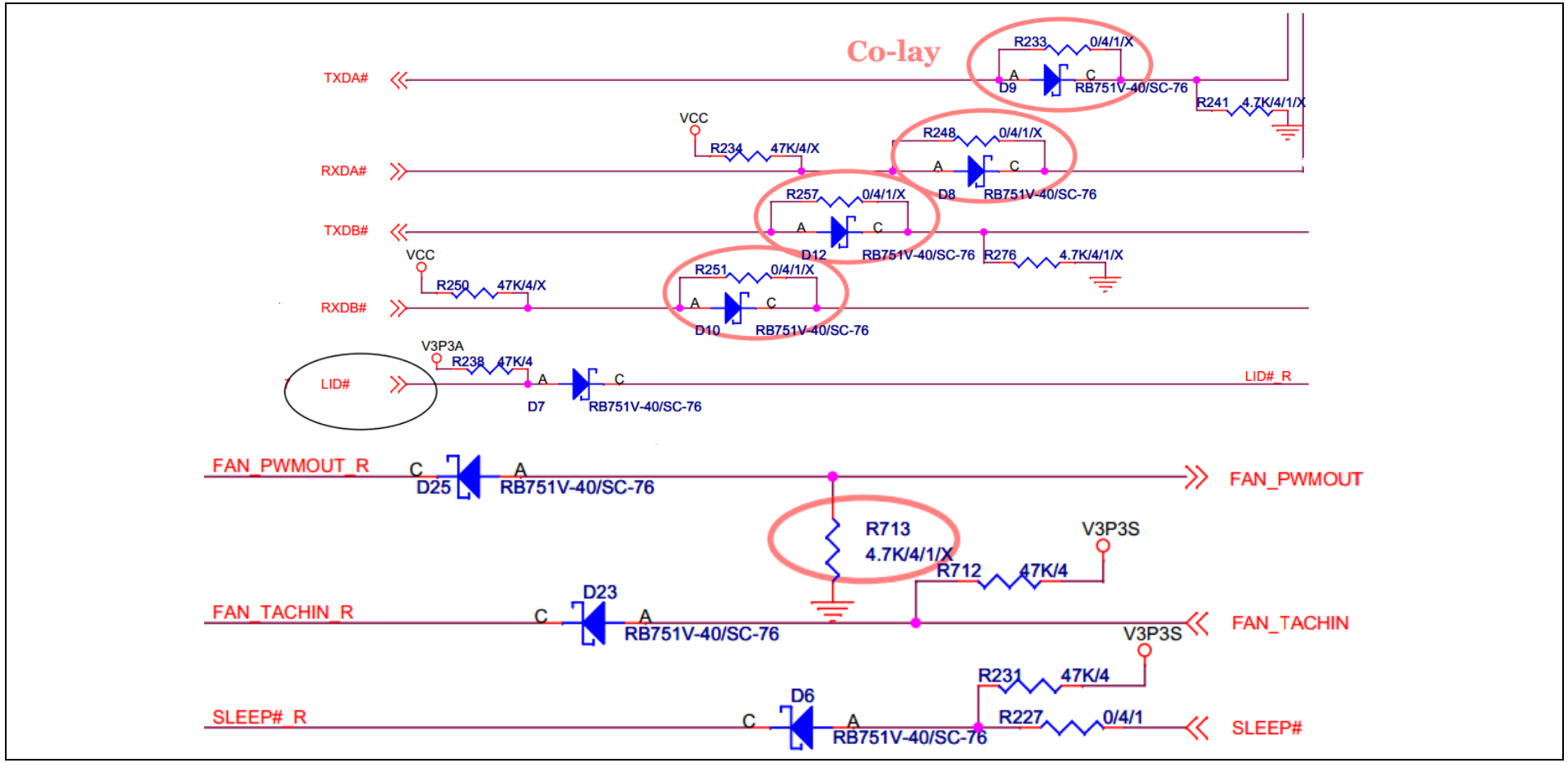


Figure 3 Circuit protection design

3.7 Mechanical Dimensions

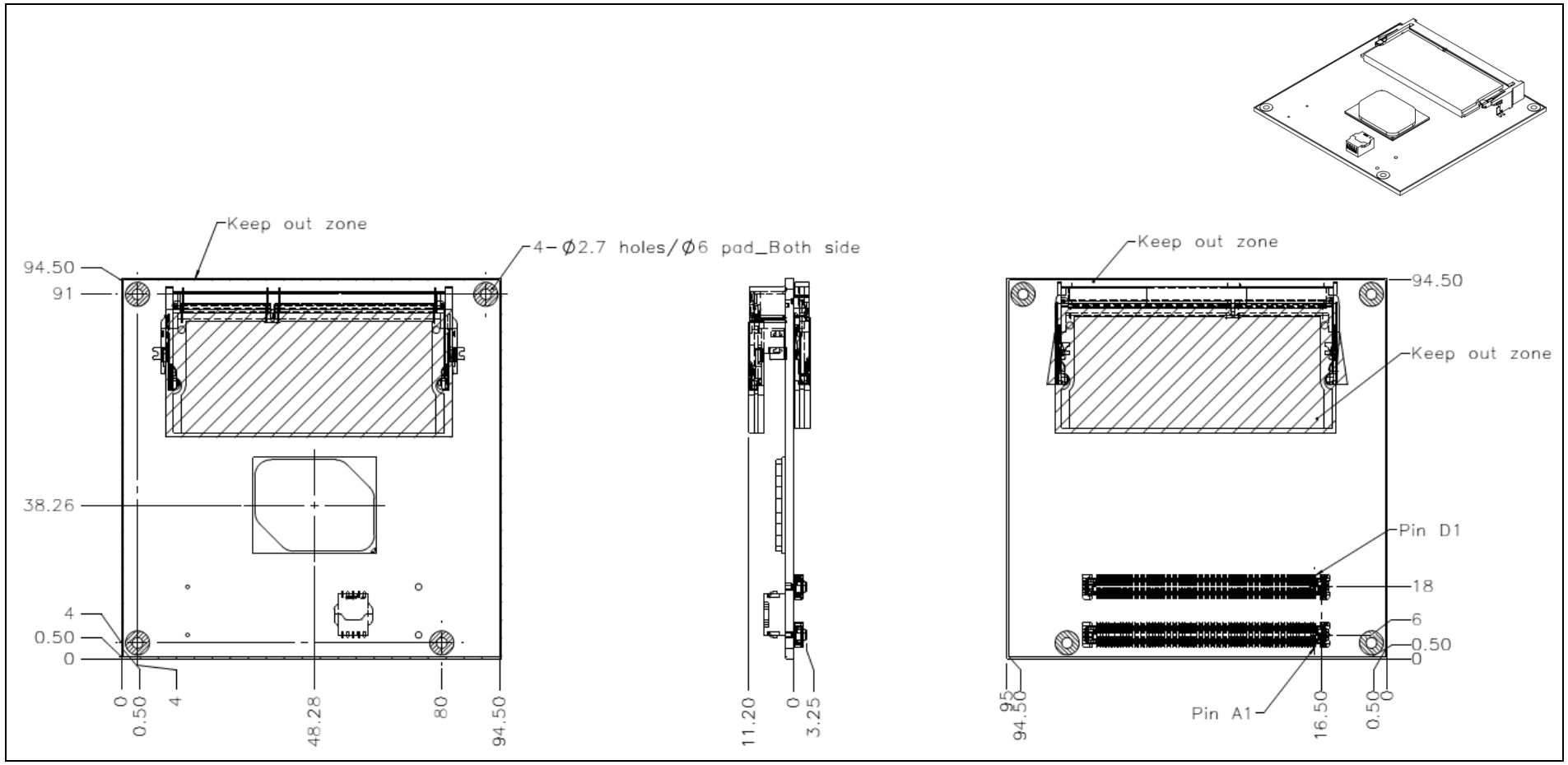


Figure 4 Mechanical Dimensions - Top/Bottom

Restricted component height on the top side of the module : 8 mm

Restricted component height on the bottom side of the module：3.8 mm

Do not place plugging component in the zone of restricted component height.

Do not place DIP type component in the zone of restricted component height.

3.8 PCOM-B641VG and Cooler weight

PCOM-B641VG	73.0g +/- 2%
H/S with Stand-Off & screws	168.0g +/- 2%
PCOM-B641VG + HS Set	246.5.0g +/- 2%

Table 6 Net weight

3.9 Environmental Specifications

Storage Temperature	0~80°C
Operation Temperature	0~80°C
Storage Humidity	0%~95%
Operation Humidity	0%~95%

Table 7 Environmental Specifications

3.10 Optional function rework SOP

1. Optional function rework SOP : eDP

PCOM-B641 Default display is LVDS, rework following SOP for eDP display interface.

- Step 1

Switch pin 2 to ON position

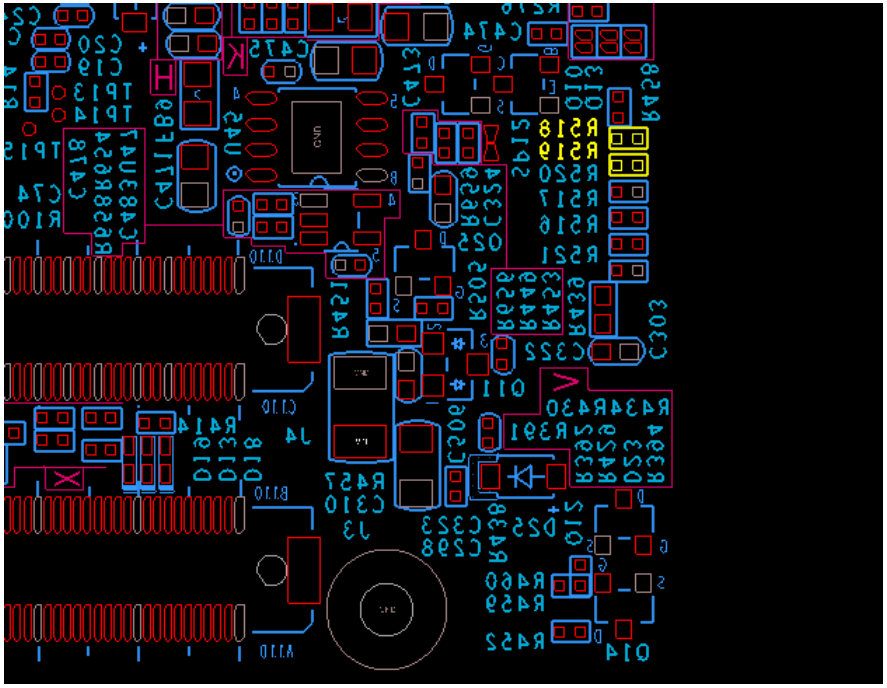
- Step 2

Solder off component R518

- Step 3

Solder the R518 component to R519

Rework position



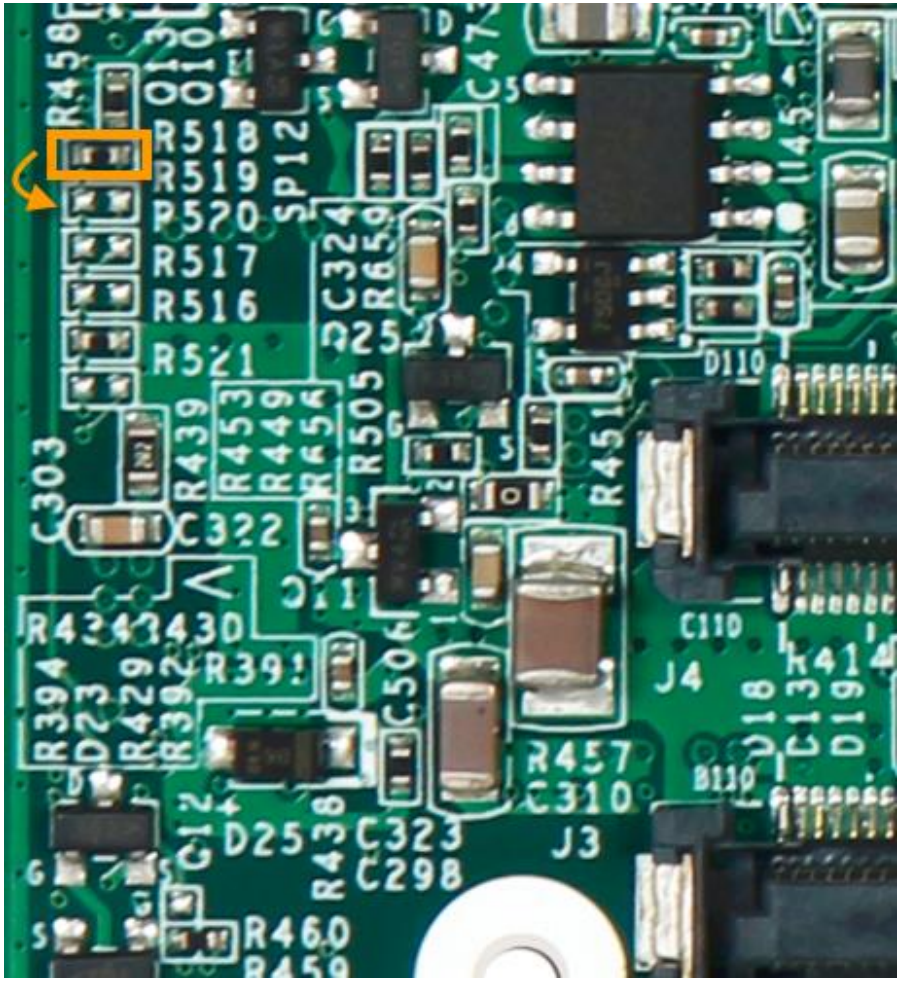
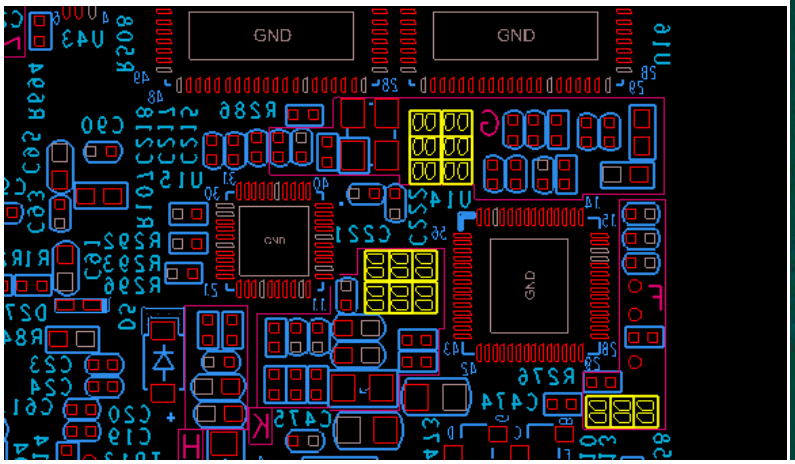


Figure 5 Optional function rework SOP : eDP 1-2

- Step 4

Solder off below red rectangle component to next position (refer to below photos)

Rework position



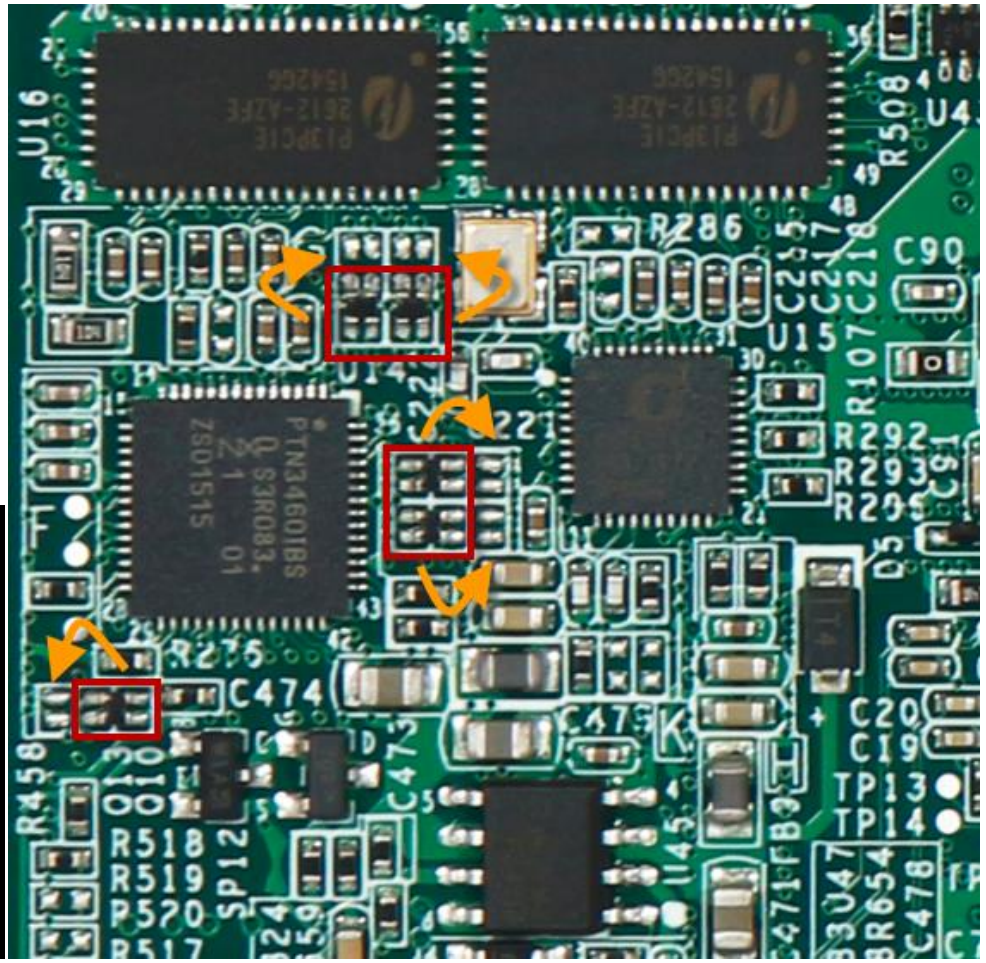


figure 6 Optional function rework SOP : eDP 2-2

2. Optional function rework SOP : DDI2

PCOM-B641 Default display is VGA, rework following SOP for DDI2 (HDMI / DP*) display interface.
DP* - BIOS modification is required. Please contact your Sales Representative for new BIOS.

- Step 1

Switch pin 1 to ON position

- Step 2

Solder off component R6

- Step 3

Solder the R6 component to R5

Rework position - R6 to R5

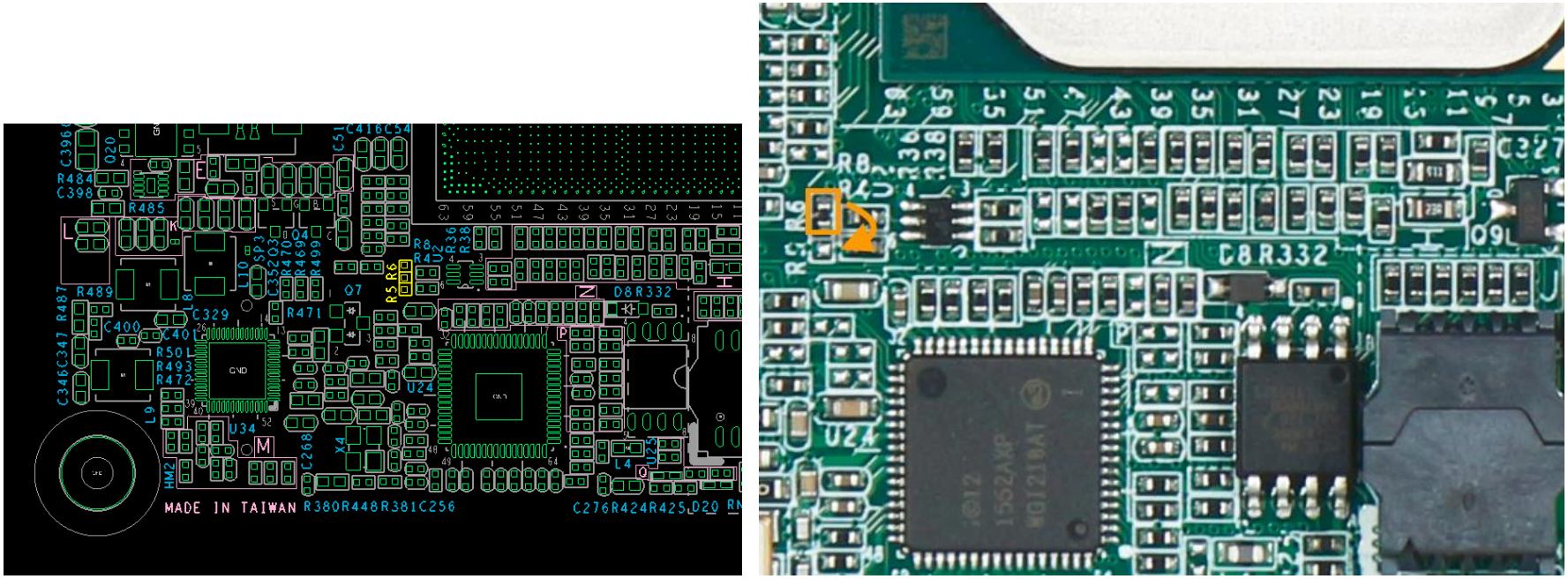


Figure 7 Optional function rework SOP : DDI2

3. Optional function rework SOP - CPU I2C

PCOM-B641 Default I2C is controlled by Embedded Controller, rework following SOP for CPU controlled I2C.

- Step 1

Solder off component R387

- Step 2

Solder the component R387 to R389

- Step 3

Solder off component R388

- Step 4

Solder the component R388 to R390

Rework position

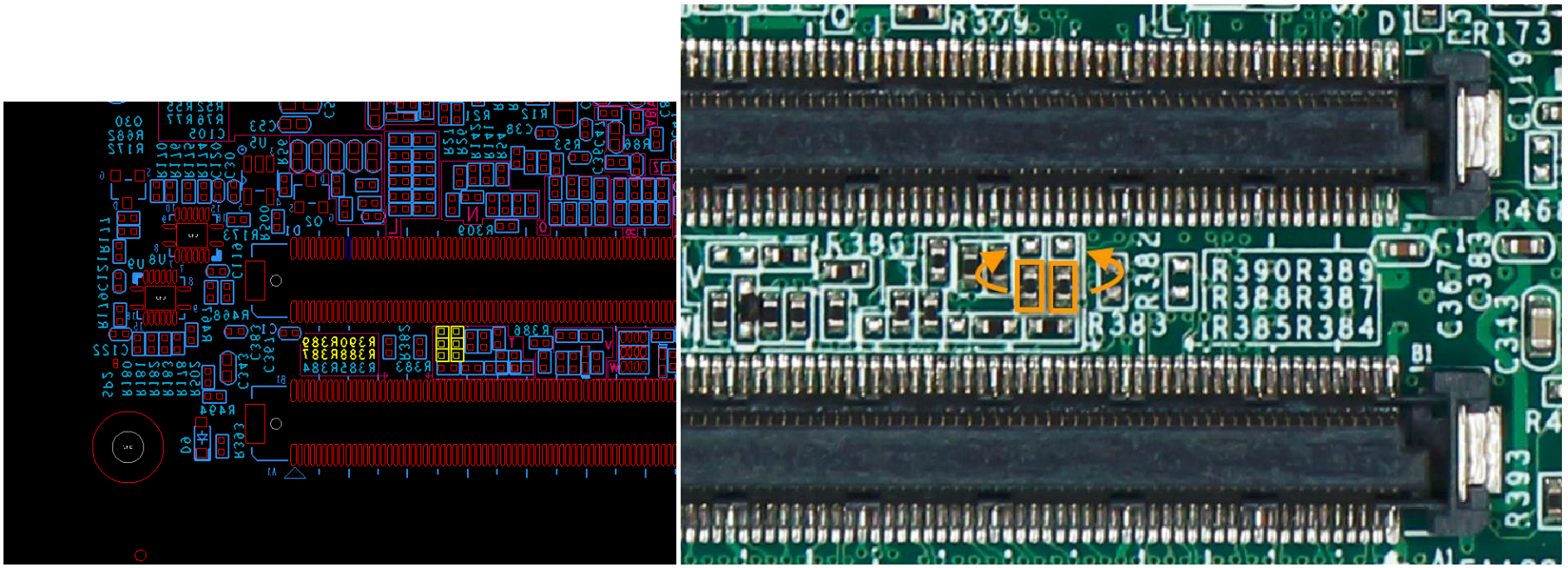


Figure 8 Optional function rework SOP - CPU I2C

4 Heat sink / Cooler dimensions

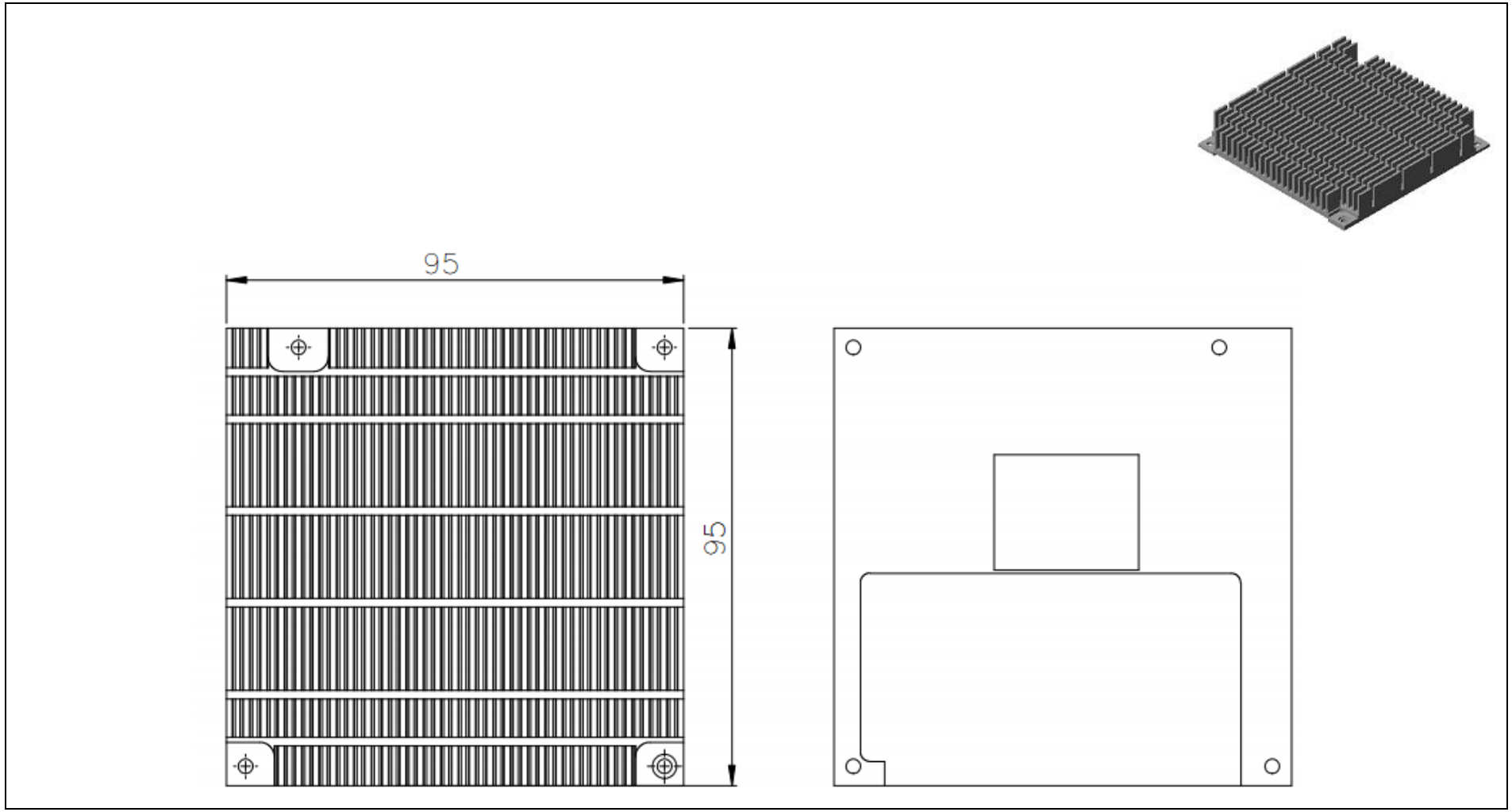


Figure 9 Heat sink / cooler mechanical dimensions

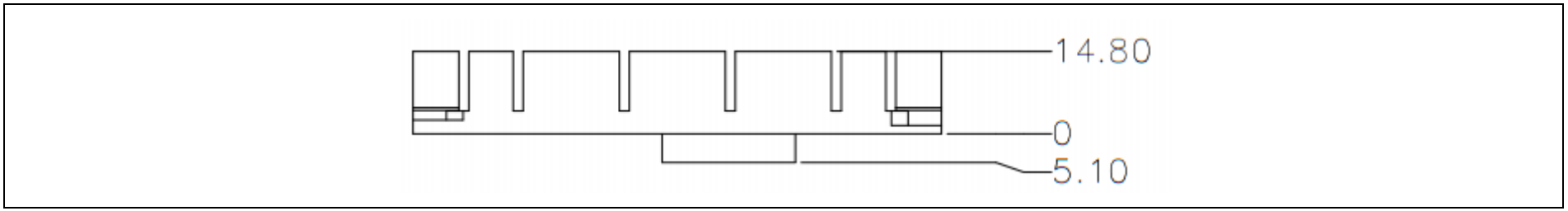


Figure 10 PCOM-B641VG with HS

4.1 H/S Assembly Guide

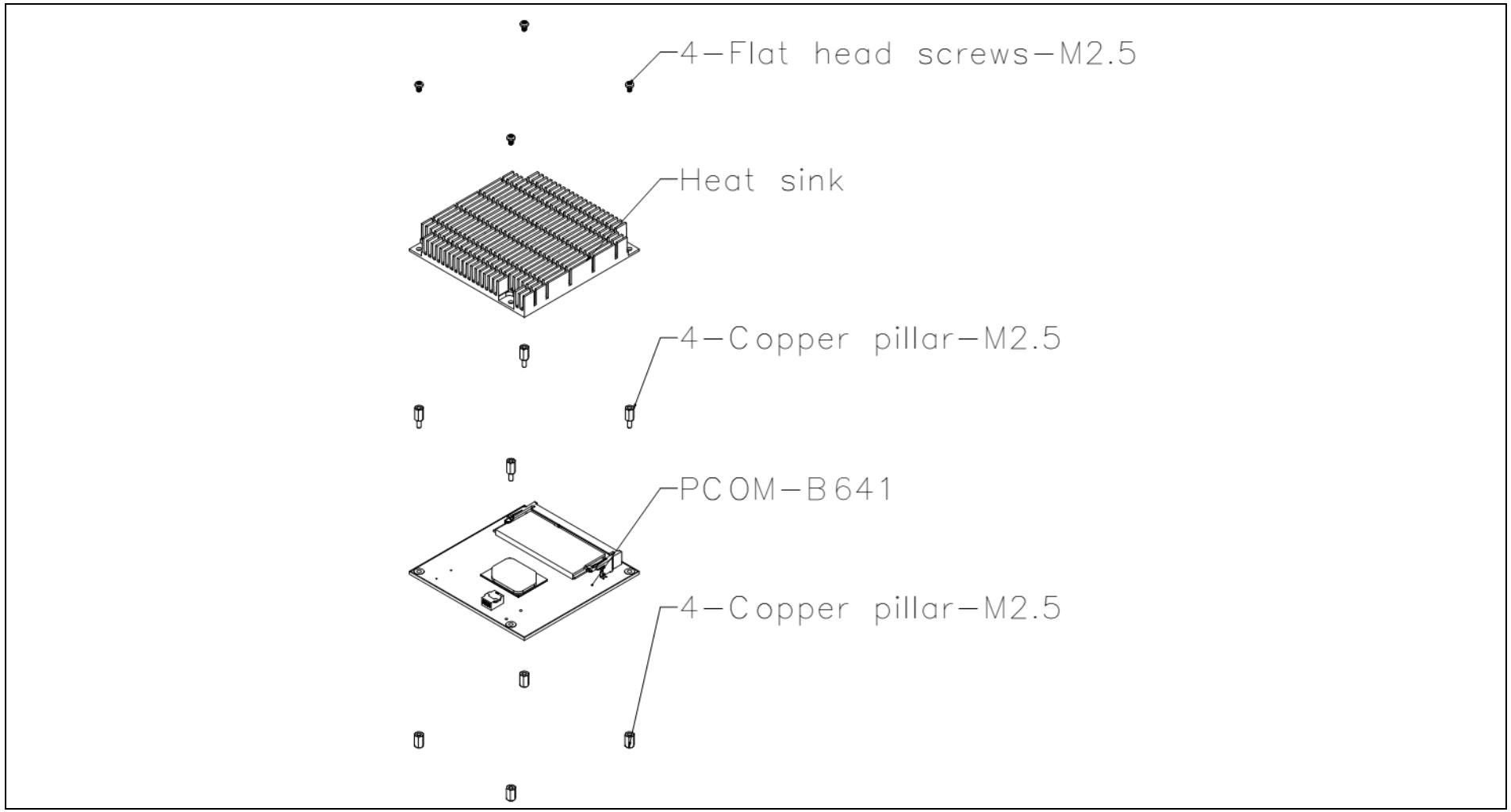


Figure 11 H/S Assembly guide

4.2 Packaging

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

Table 8 Packaging

4.3 Ordering Guide

PCOM-B641VG

Product	Ordering P/N	Status
PCOM-B641VG-E3950	AB1-3F71Z	Available
PCOM-B641VG-E3940	AB1-3F39Z	Available
PCOM-B641VG-E3930	AB1-3F38Z	Available
PCOM-B641VG-N4200	AB1-3F28Z	Available
PCOM-B641VG-N3350	AB1-3F72Z	Available

Table 9 Ordering Guide - PCOM-B641VG

Accessory

Product	Ordering P/N	Status
PCOM-B641VG Heat Sink	B9971380	Available
PCOM-C605	AB1-3998	Available

Table 10 Ordering Guide - Accessory

5 Pin out Tables

Below tables lists PCOM-B641VG AB and CD Row connectors Type 6 pin name, un-connected pins are present as N/A.

PCOM-B641VG ZR3 Pin Out				
Pin	Row A	Row B	Row C	Row D
1	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
2	L1_MDI3_N	L1_LINK#/ACT#	GND	GND
3	L1_MDI3_P	LFRAME_N	USB3_RXN0	USB3_TXN0
4	L1_100#	LAD0	USB3_RXP0	USB3_TXP0
5	L1_1000#	LAD1	GND	GND
6	L1_MDI2_N	LAD2	USB3_RXN1	USB3_TXN1
7	L1_MDI2_P	LAD3	USB3_RXP1	USB3_TXP1
8	L1_LINK#	N/A	GND	GND
9	L1_MDI1_N	N/A	USB3_RXN2	USB3_TXN2
10	L1_MDI1_P	LPC_CLKOUT1	USB3_RXP2	USB3_TXP2
11	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
12	L1_MDI0_N	PWRBTN#_D	USB3_RXN3	USB3_TXN3
13	L1_MDI0_P	SMB_CLK_3P3A	USB3_RXP3	USB3_TXP3
14	L1_V_1P5 (Option)	SMB_DATA_3P3A	GND	GND
15	KBC_SLP_S3	SMB_ALERT_N_EC	N/A	DDI0_CTRLCLK_AUXP

Table 11 PCOM-B641VG Pin-out 1-6

PCOM-B641VG ZR3 Pin Out				
Pin	Row A	Row B	Row C	Row D
16	SATA_TXP0	SATA_TXP1	N/A	DDI0_CTRLDATA_AUXN
17	SATA_TXN0	SATA_TXN1	N/A	N/A
18	KBC_SLP_S4	ICH_SUS_STAT_N	N/A	N/A
19	SATA_RXP0	SATA_RXP1	N/A	N/A
20	SATA_RXN0	SATA_RXN1	N/A	N/A
21	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
22	N/A	N/A	N/A	N/A
23	N/A	N/A	N/A	N/A
24	KBC_SLP_S4	ATX_PWROK	DDI0_HPD	N/A
25	N/A	N/A	N/A	N/A
26	N/A	N/A	N/A	DDI0_LANE0_DP
27	BATLOW_N_3P3	WDTO	N/A	DDI0_LANE0_DN
28	SATA_LED_N	HDA_SDIN2_3P3 (Option)	N/A	N/A
29	HDA_SYNC_3P3	HDA_SDIN1_3P3 (Option)	N/A	DI0_LANE1_DP
30	HDA_RST_N_3P3	HDA_SDIN0_3P3	N/A	DDI0_LANE1_DN
31	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
32	HDA_BIT_CLK_3P3	SPKR_3P3	DDI1_CTRLCLK_AUXP	DDI0_LANE2_DP
33	HDA_SDOUT_3P3	KBC_SCL1/ SOC_SCL0_3P3A	DDI1_CTRLDATA_AUXN	DDI0_LANE2_DN
34	BIOS_DIS0#	KBC_SDA1/ SOC_SDA0_3P3A	DP1_AUX_SEL	DP0_AUX_SEL
35	THRMTRIP#	PM_THRM#_R	N/A	N/A
36	USB2_DN6	USB2_DN7	N/A	DDI0_LANE3_DP
37	USB2_DP6	USB2_DP7	N/A	DDI0_LANE3_DN

Table 12 PCOM-B641VG Pin-out 2-6

PCOM-B641VG ZR3 Pin Out				
Pin	Row A	Row B	Row C	Row D
38	USB_OC1_N_3P3	USB_OC1_N_3P3	N/A	N/A
39	USB2_DN4	USB2_DN5	N/A	DDI1_TXP0_L
40	USB2_DP4	USB2_DP5	N/A	DDI1_TXN0_L
41	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
42	USB2_DN2	USB2_DN3	N/A	DDI1_TXP1_L
43	USB2_DP2	USB2_DP3	N/A	DDI1_TXN1_L
44	USB_OC1_N_3P3	USB_OC0_N_3P3	N/A	DDI1_HPD
45	USB2_DN0	USB2_DN1	N/A	N/A
46	USB2_DP0	USB2_DP1	N/A	DDI1_TXP2_L
47	V3P3_RTC	N/A	N/A	DDI1_TXN2_L
48	N/A	USB0_HOST_PRSNT	N/A	N/A
49	GBE0_SDP	SYS_RESET_N	N/A	DDI1_TXP3_L
50	ICH_SERIRQ	CB_PLTRST	N/A	DDI1_TXN3_L
51	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
52	N/A	N/A	N/A	N/A
53	N/A	N/A	N/A	N/A
54	GPI0 /SD_D0	GPO1/ SD_CMD	TYPE0	V3P3S
55	N/A	N/A	N/A	N/A
56	N/A	N/A	N/A	N/A
57	GND	GPO2/ SD_WP	TYPE1	TYPE2
58	PCIE_TXP3	PCIE_RXP3	N/A	N/A
59	PCIE_TXN3	PCIE_RXN3	N/A	N/A

Table 13 PCOM-B641VG Pin-out 3-6

PCOM-B641VG ZR3 Pin Out				
Pin	Row A	Row B	Row C	Row D
60	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
61	PCIE_TXP2	PCIE_RXP2	N/A	N/A
62	PCIE_TXN2	PCIE_RXN2	N/A	N/A
63	GPI1/ SD_D1	GPO3/ SD_CD#	N/A	N/A
64	PCIE_TXP1	PCIE_RXP1	N/A	N/A
65	PCIE_TXN1	PCIE_RXN1	N/A	N/A
66	GND	ICH_WAKE_N_3P3_R	N/A	N/A
67	GPI2/ SD_D2	WAKE1#_R	N/A	GND
68	PCIE_TXP0	PCIE_RXP0	N/A	N/A
69	PCIE_TXN0	PCIE_RXN0	N/A	N/A
70	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
71	LVDS_A0+	LVDS0_CHB_TXP0	N/A	N/A
72	LVDS_A0-	LVDS0_CHB_TXN0	N/A	N/A
73	LVDS_A1+	LVDS0_CHB_TXP1	GND	GND
74	LVDS_A1-	LVDS0_CHB_TXN1	N/A	N/A
75	LVDS_A2+	LVDS0_CHB_TXP2	N/A	N/A
76	LVDS_A2-	LVDS0_CHB_TXN2	GND	GND
77	LVDS_VDDEN	LVDS0_CHB_TXP3	N/A	N/A
78	LVDS0_A3+	LVDS0_CHB_TXN3	N/A	N/A
79	LVDS0_A3-	LVDS_BKLT_EN	N/A	N/A
80	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
81	LVDS_CLKA+	LVDS0_CHB_CLKP	N/A	N/A

Table 14 PCOM-B641VG Pin-out 4-6

PCOM-B641VG ZR3 Pin Out				
Pin	Row A	Row B	Row C	Row D
82	LVDS_CLKA	LVDS0_CHB_CLKN	N/A	N/A
83	LVDS_I2CCLK	DDI0_BKLTCTL_3P3/ EC_BKLTCTRL	N/A	N/A
84	LVDS_I2CDAT	V5A	GND	GND
85	GPI3/ SD_D3	V5A	N/A	N/A
86	N/A	V5A	N/A	N/A
87	CB_EDP_HPD	V5A	GND	GND
88	PCIECLK_DIFF_P0	BIOS_DIS1#	N/A	N/A
89	PCIECLK_DIFF_N0	VGA_R	N/A	N/A
90	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
91	V3P3A	VGA_G	N/A	N/A
92	ICH_SPI_MISO_3P3	VGA_B	N/A	N/A
93	GPO0/ SD_CLK	VGA_HSY	GND	GND
94	ICH_SPI_CLK_3P3	VGA_VSY	N/A	N/A
95	ICH_SPI_MOSI_3P3	VGA_SCL	N/A	N/A
96	TPM_PP_C	VGA_SDA	GND	GND
97	TYPE10#	ICH_SPI_CS0_N_3P3	N/A	N/A
98	SER0_TX	N/A	N/A	N/A
99	SER0_RX	N/A	N/A	N/A
100	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
101	SER1_TX	FAN_PWMOUT_R	N/A	N/A

Table 15 PCOM-B641VG Pin-out 5-6

PCOM-B641VG ZR3 Pin Out				
Pin	Row A	Row B	Row C	Row D
102	SER1_RX	FAN_TACHIN_R	N/A	N/A
103	LID#_R	SLEEP#	GND	GND
104	VIN	VIN	VIN	VIN
105	VIN	VIN	VIN	VIN
106	VIN	VIN	VIN	VIN
107	VIN	VIN	VIN	VIN
108	VIN	VIN	VIN	VIN
109	VIN	VIN	VIN	VIN
110	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)

Table 16 PCOM-B641VG Pin-out 6-6

6 BIOS Setup Items

PCOM-B641VG enters the boot process by AMI Aptio5 BIOS which is stored in a EEPROM through SPI interface on Module. Boot from Carrier board is also supported, please consult with your Sales Representatives for PCOM-B641VG Carrier Design Guide.

6.1 Entering Setup -- Launch System Setup

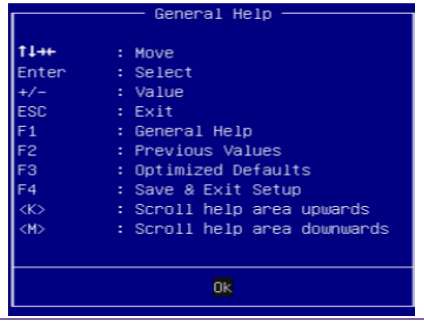
Power on PCOM-B641 Module and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press <Del> key will enter BIOS setup screen.

Press <Del> 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 see General Help

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

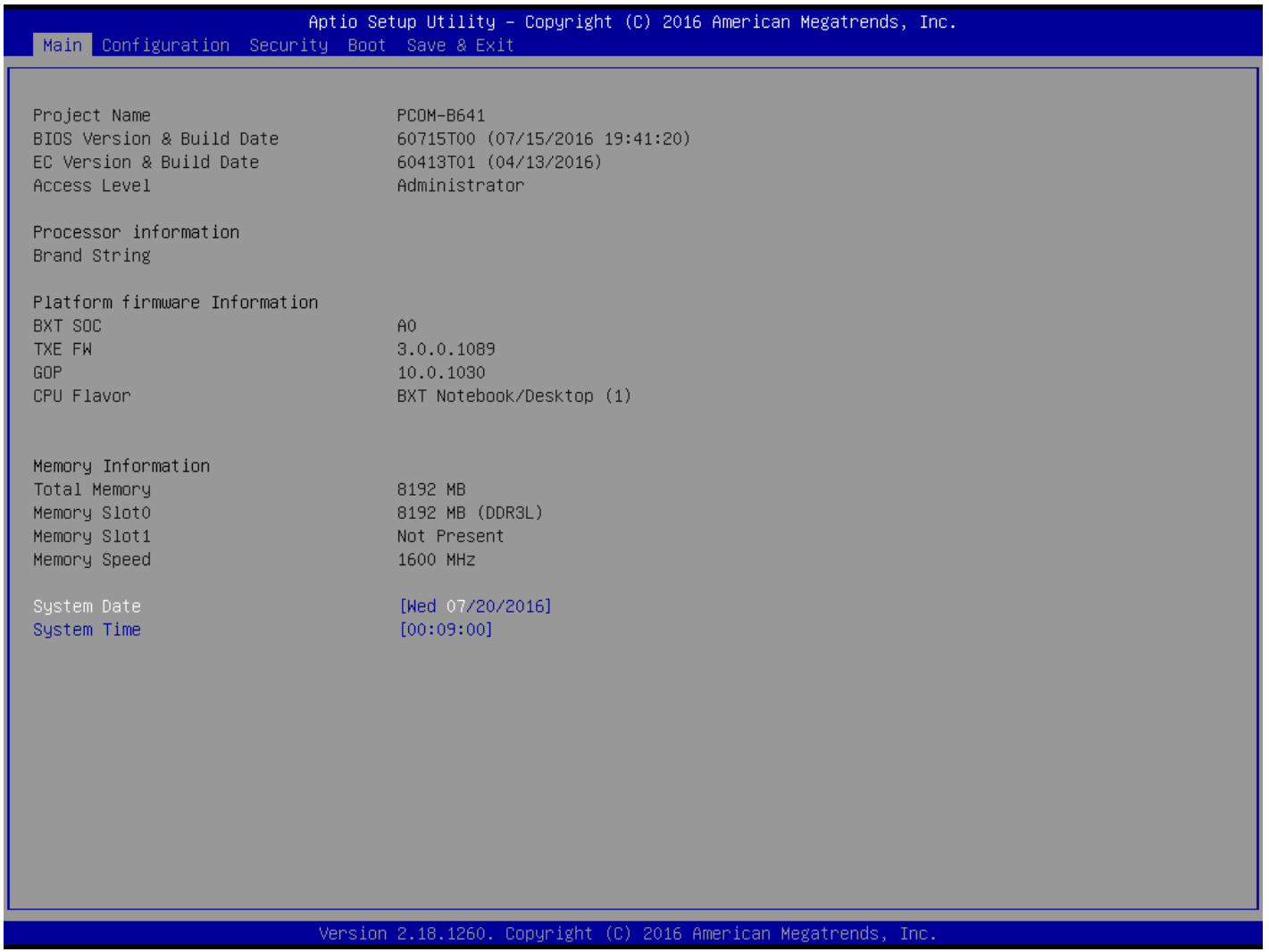


Figure 12 BIOS - Main

6.3 Configuration

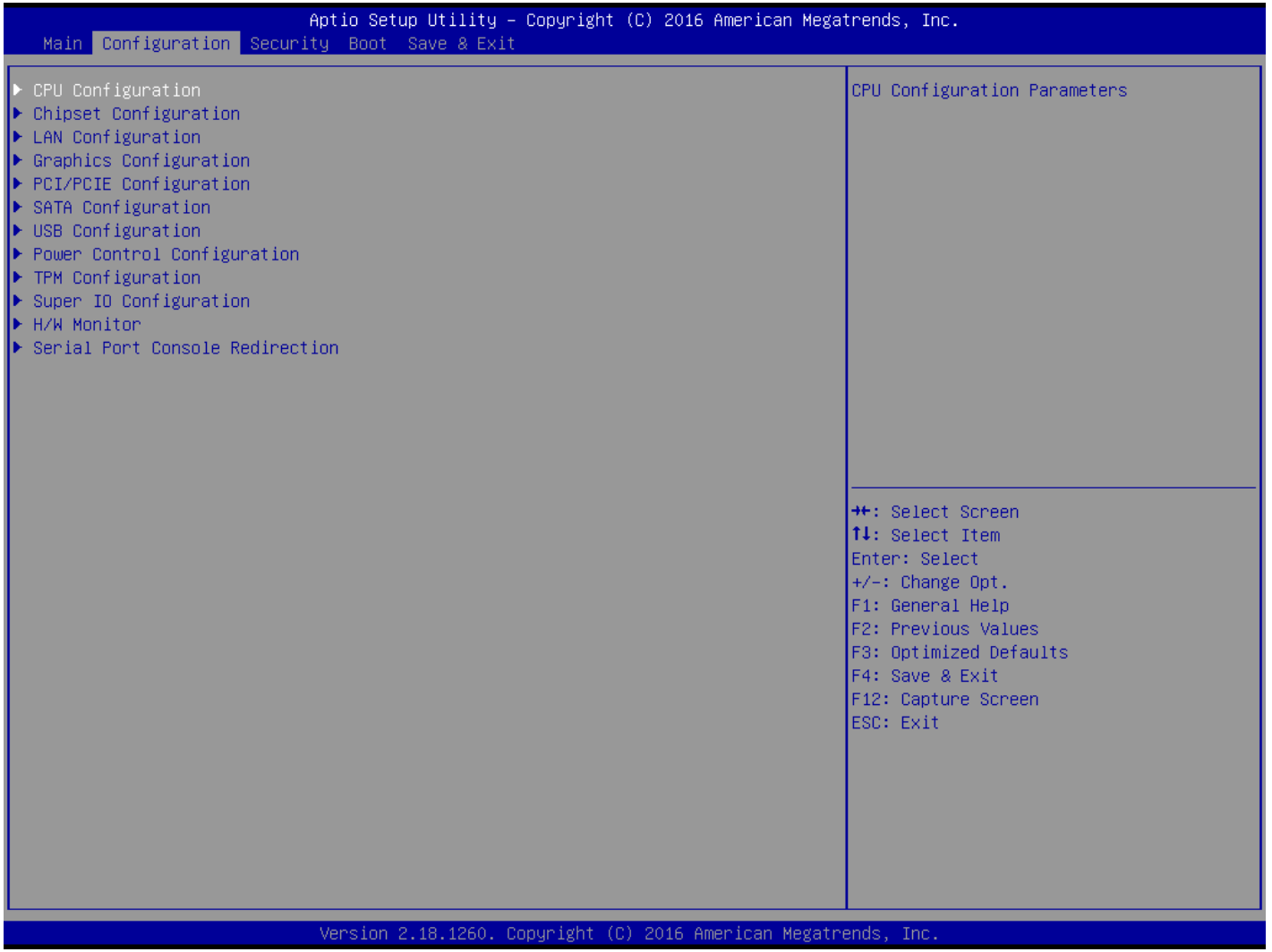


Figure 13 BIOS - Configuration

6.4 CPU

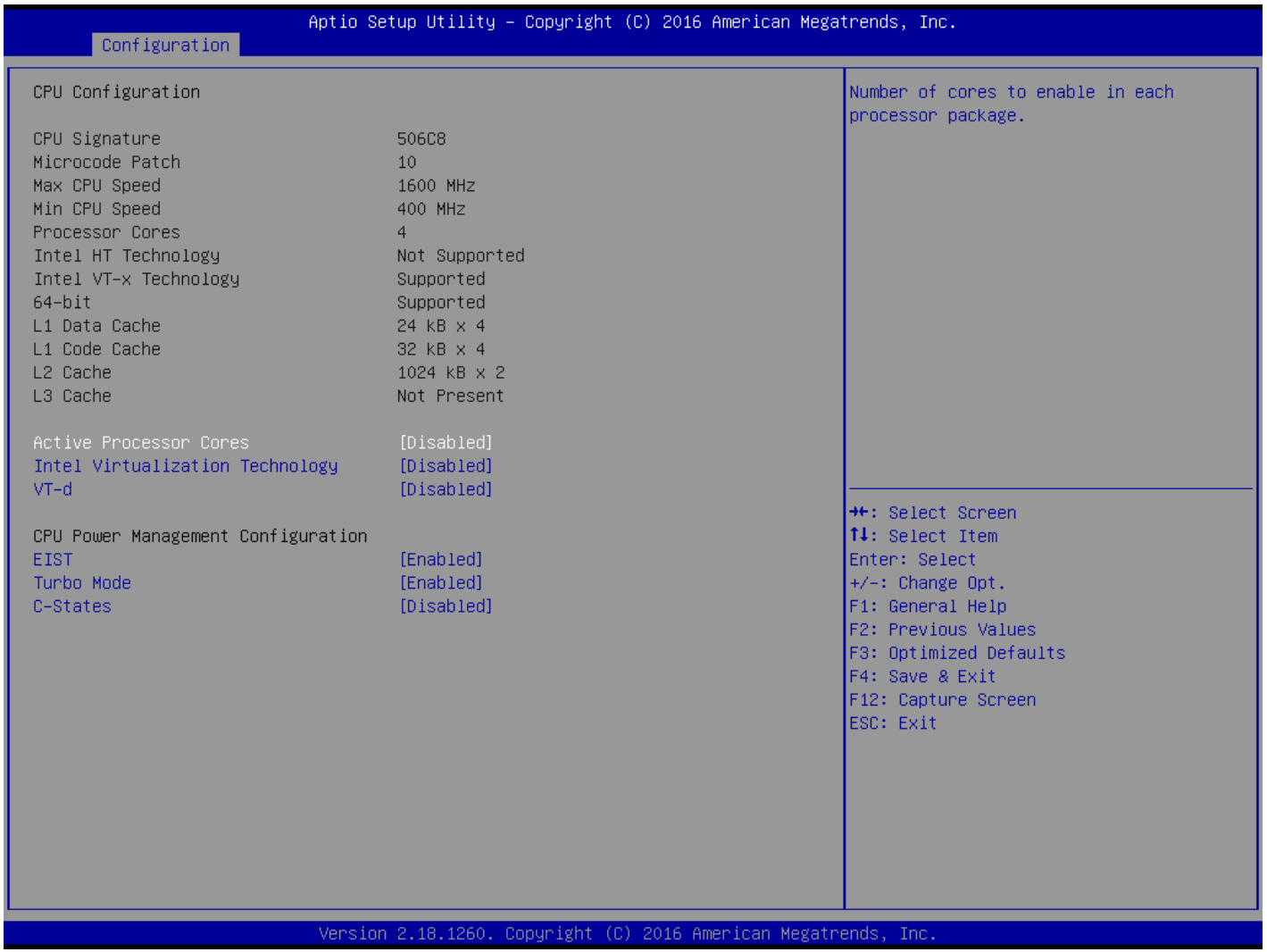


Figure 14 BIOS - Configuration - CPU

6.5 Chipset

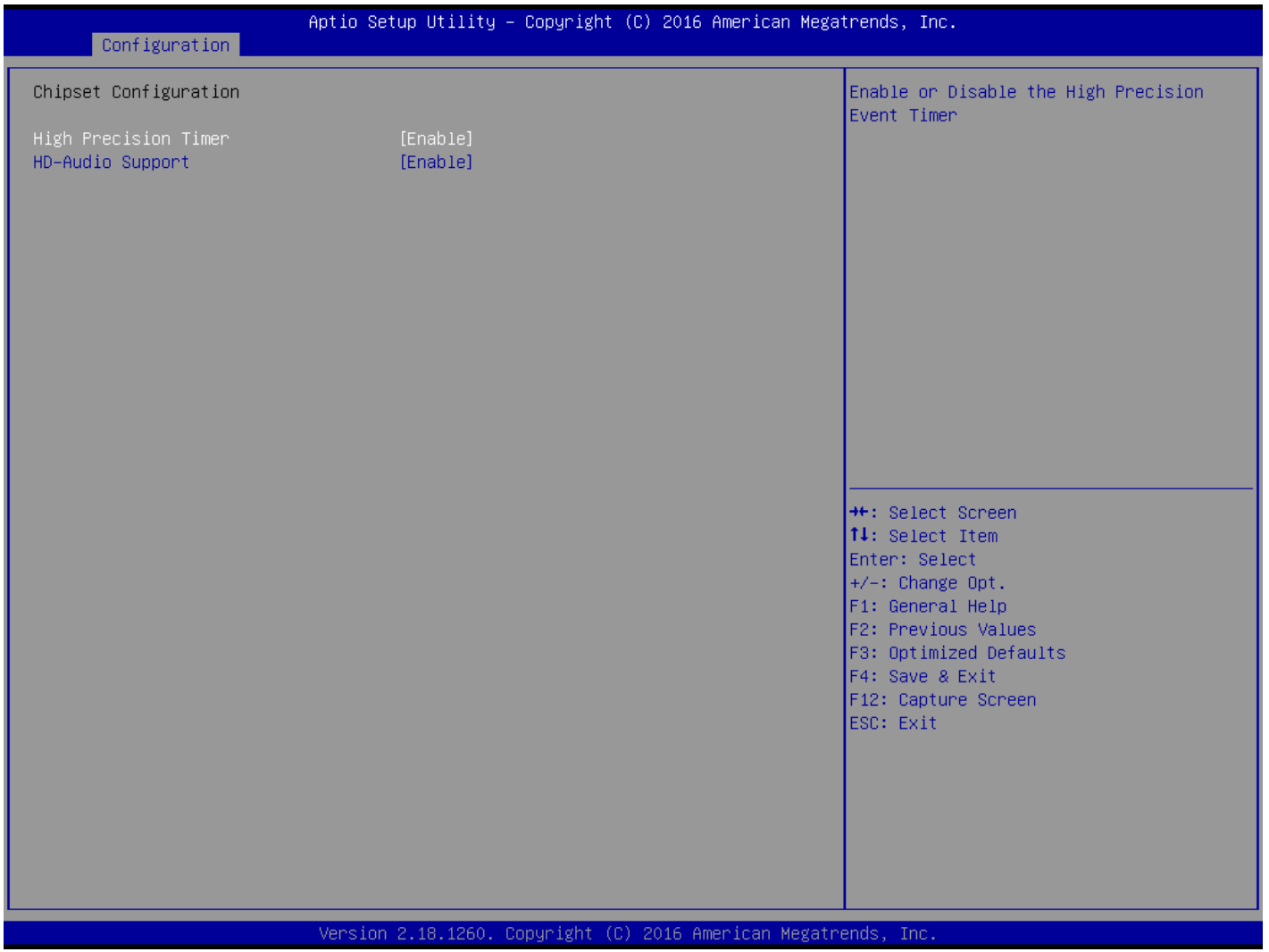


Figure 15 BIOS - Configuration - Chipset

6.6 LAN

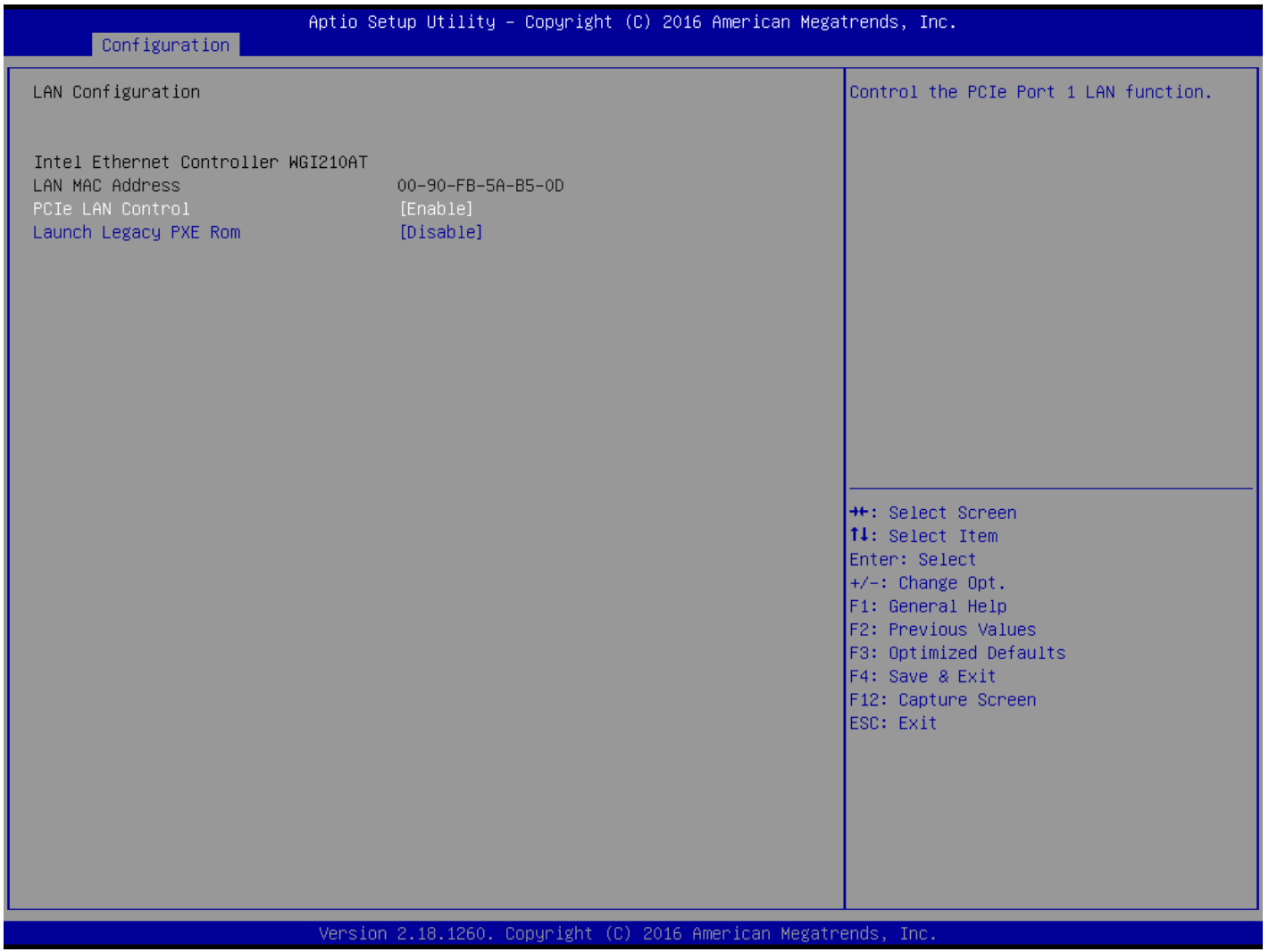


Figure 16 BIOS - Configuration - LAN

6.7 Graphics

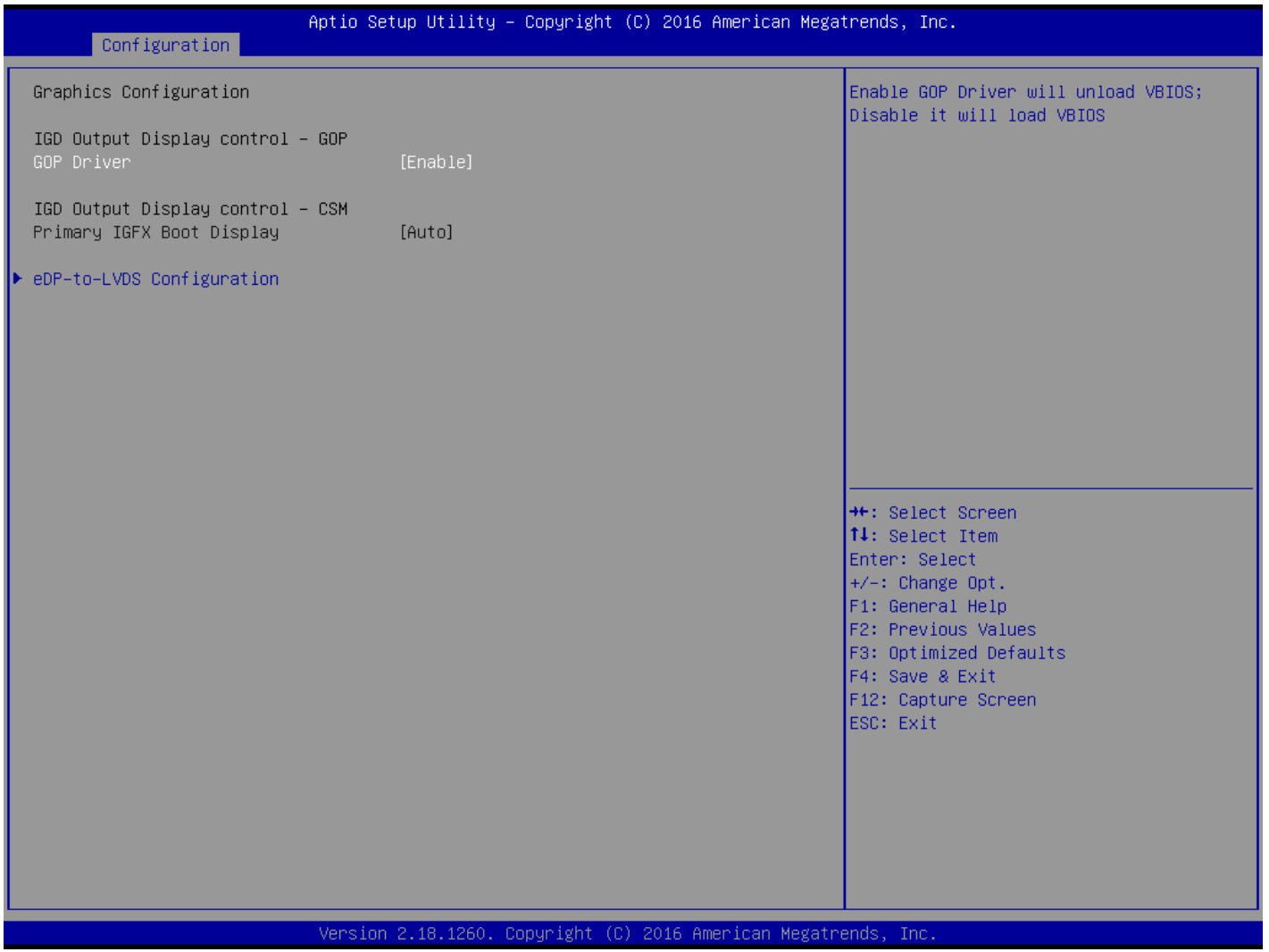


Figure 17 BIOS - Configuration - Graphics

6.7.1 eDP to LVDS Configuration

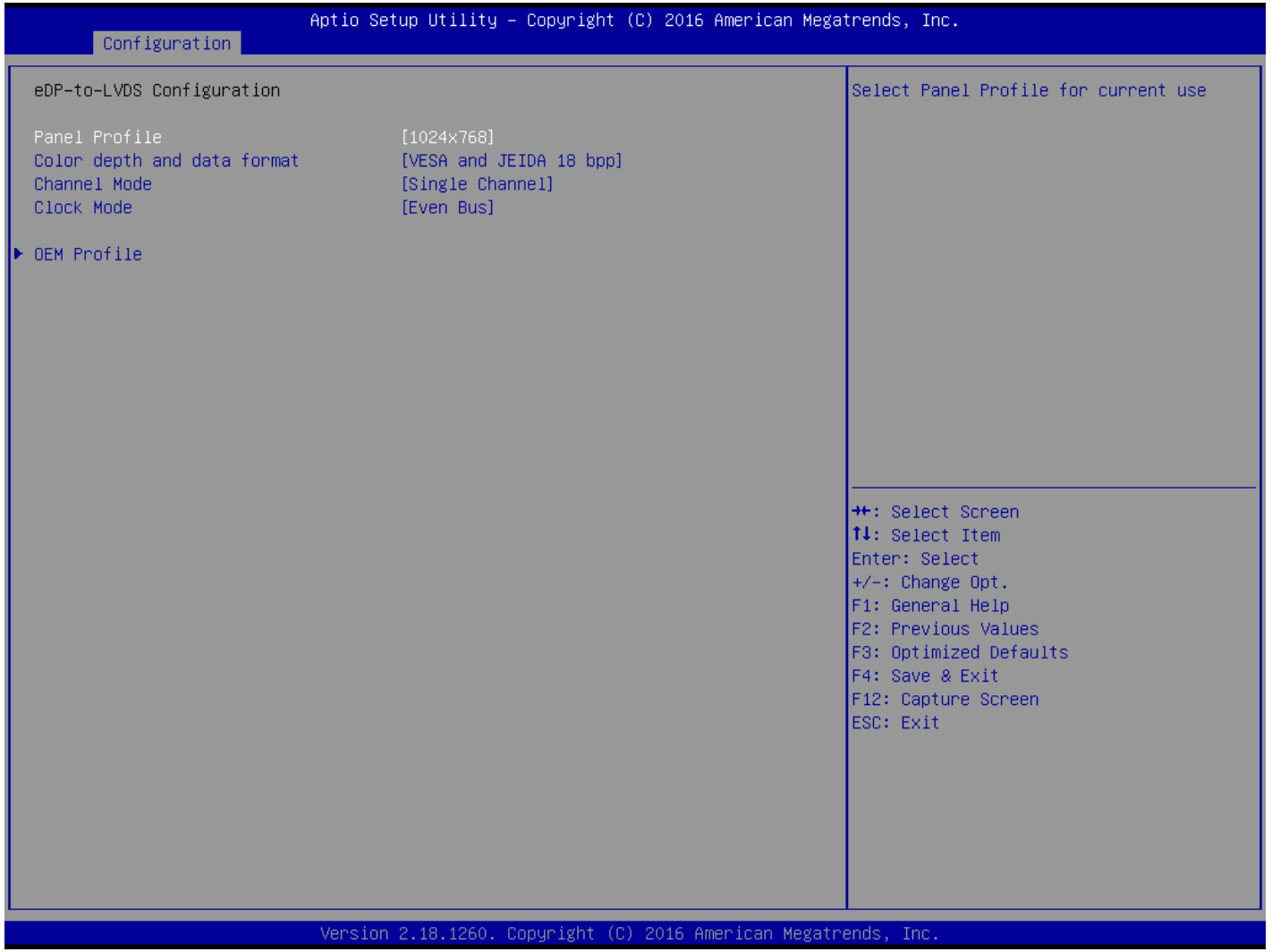


Figure 18 BIOS - Graphics - eDP to LVDS

6.7.2 OEM Profile

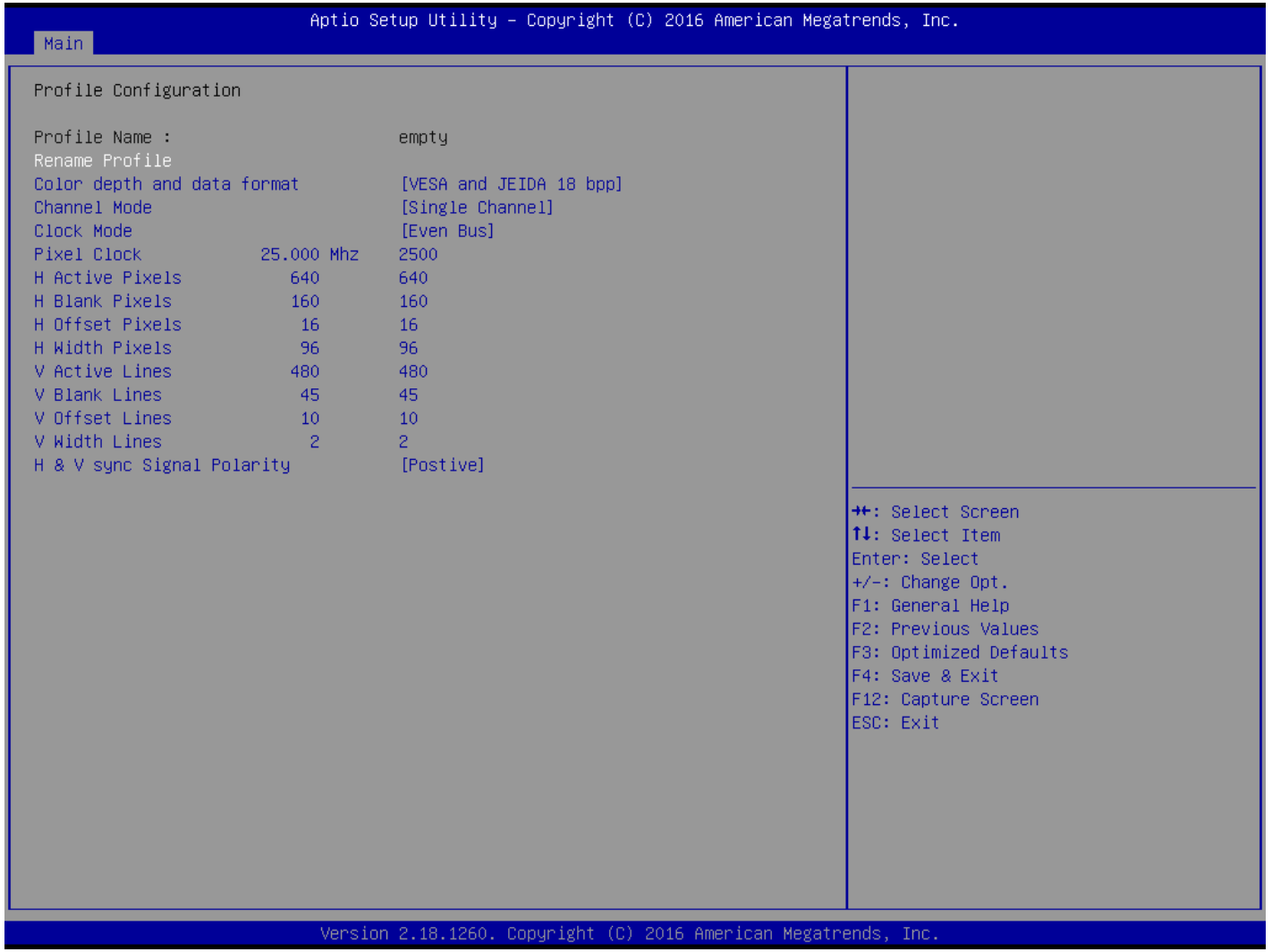


Figure 19 BIOS - eDP to LVDS - OEM

6.8 PCIE

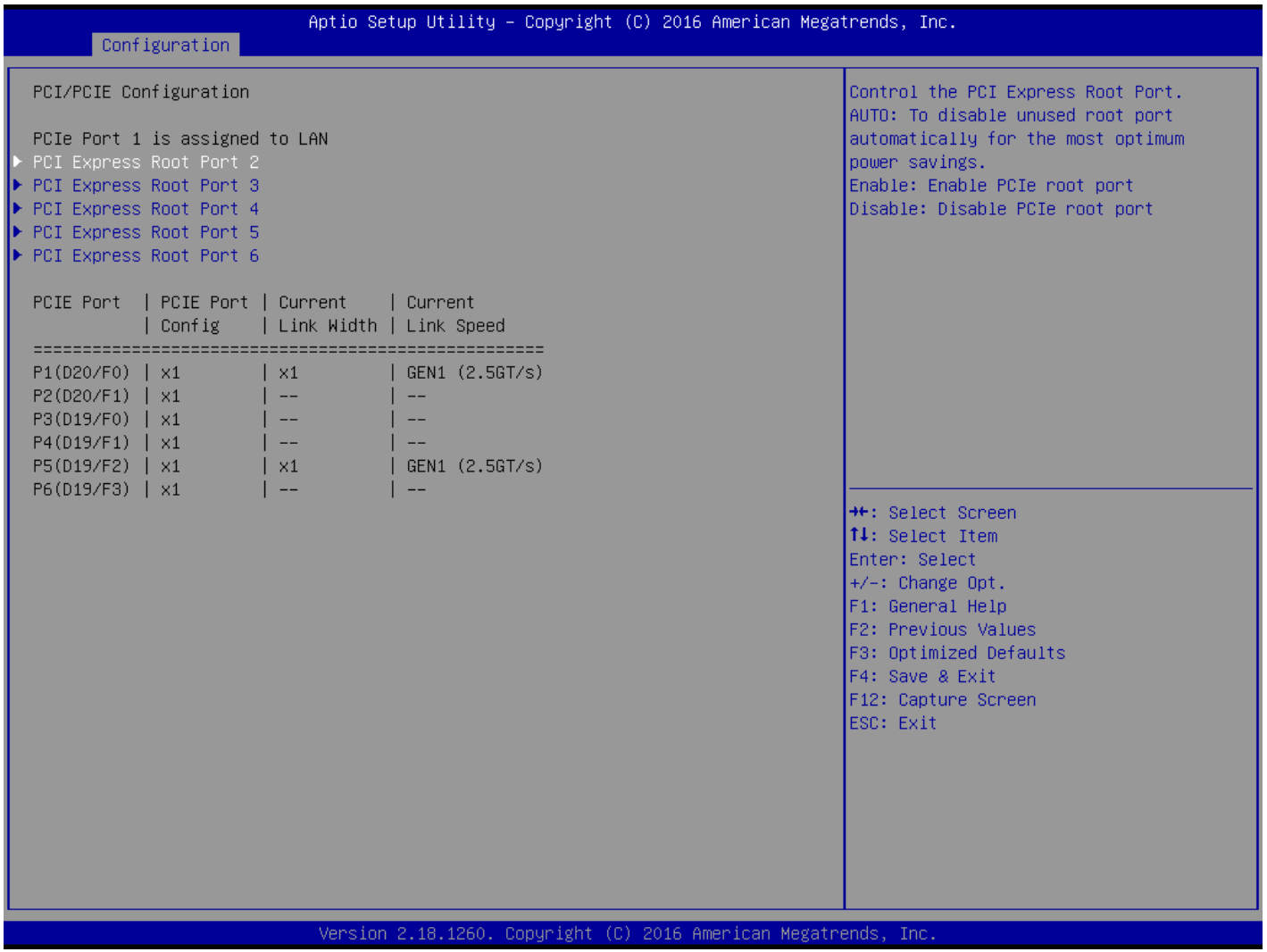


Figure 20 BIOS - Configuration - PCIE

6.9 SATA

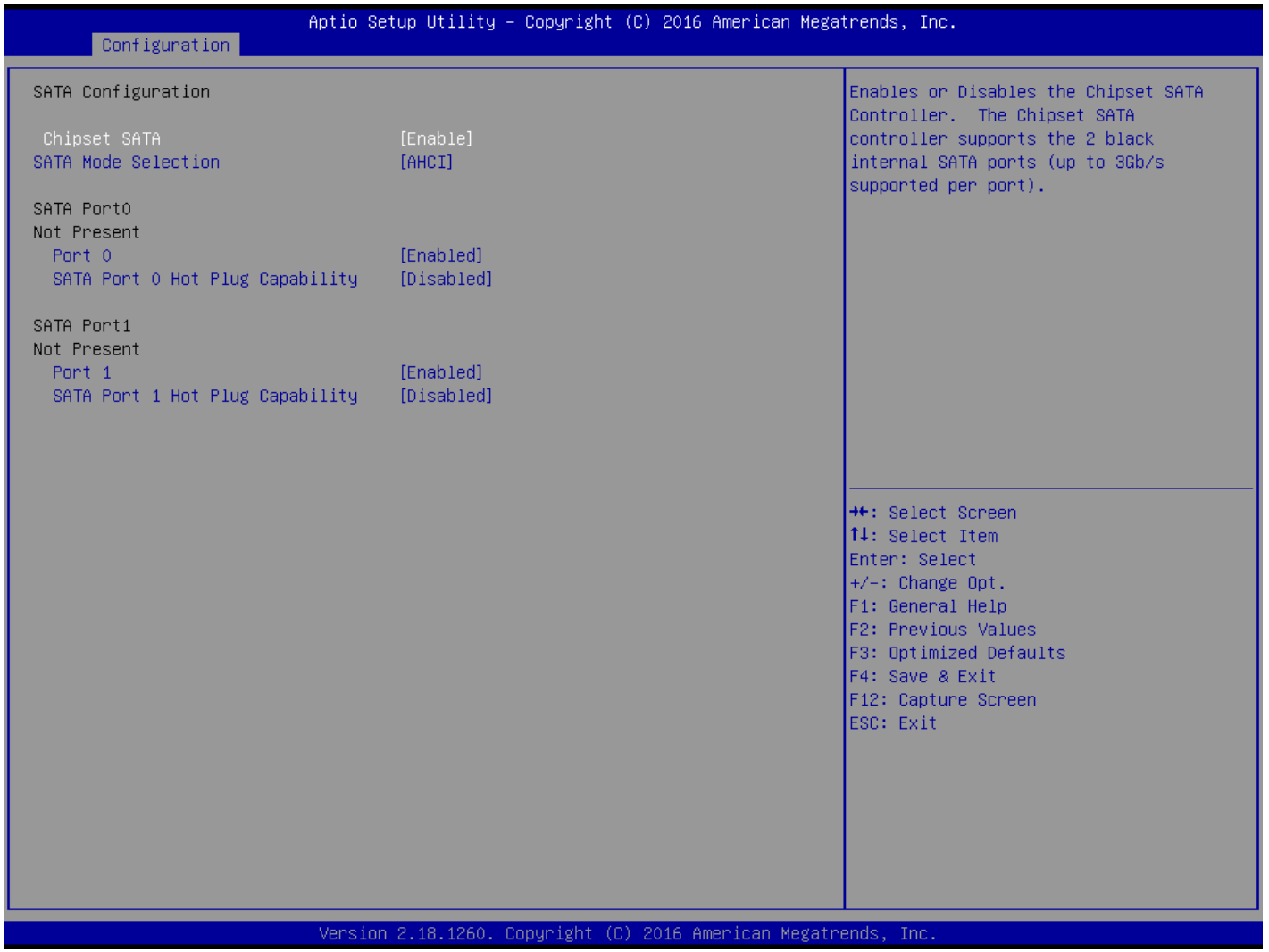


Figure 21 BIOS - Configuration - SATA

6.10 USB

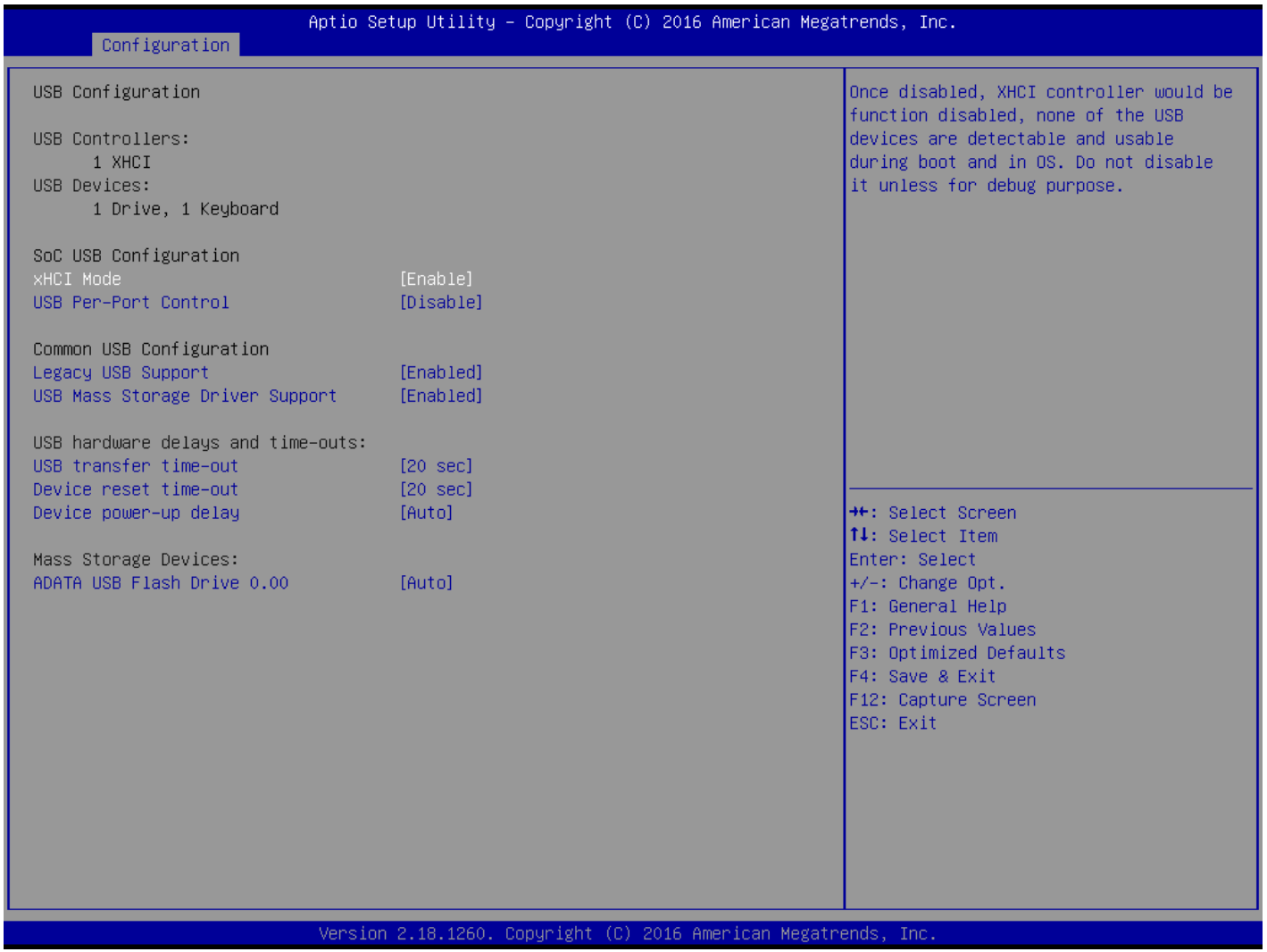


Figure 22 BIOS - Configuration - USB

6.11 Power

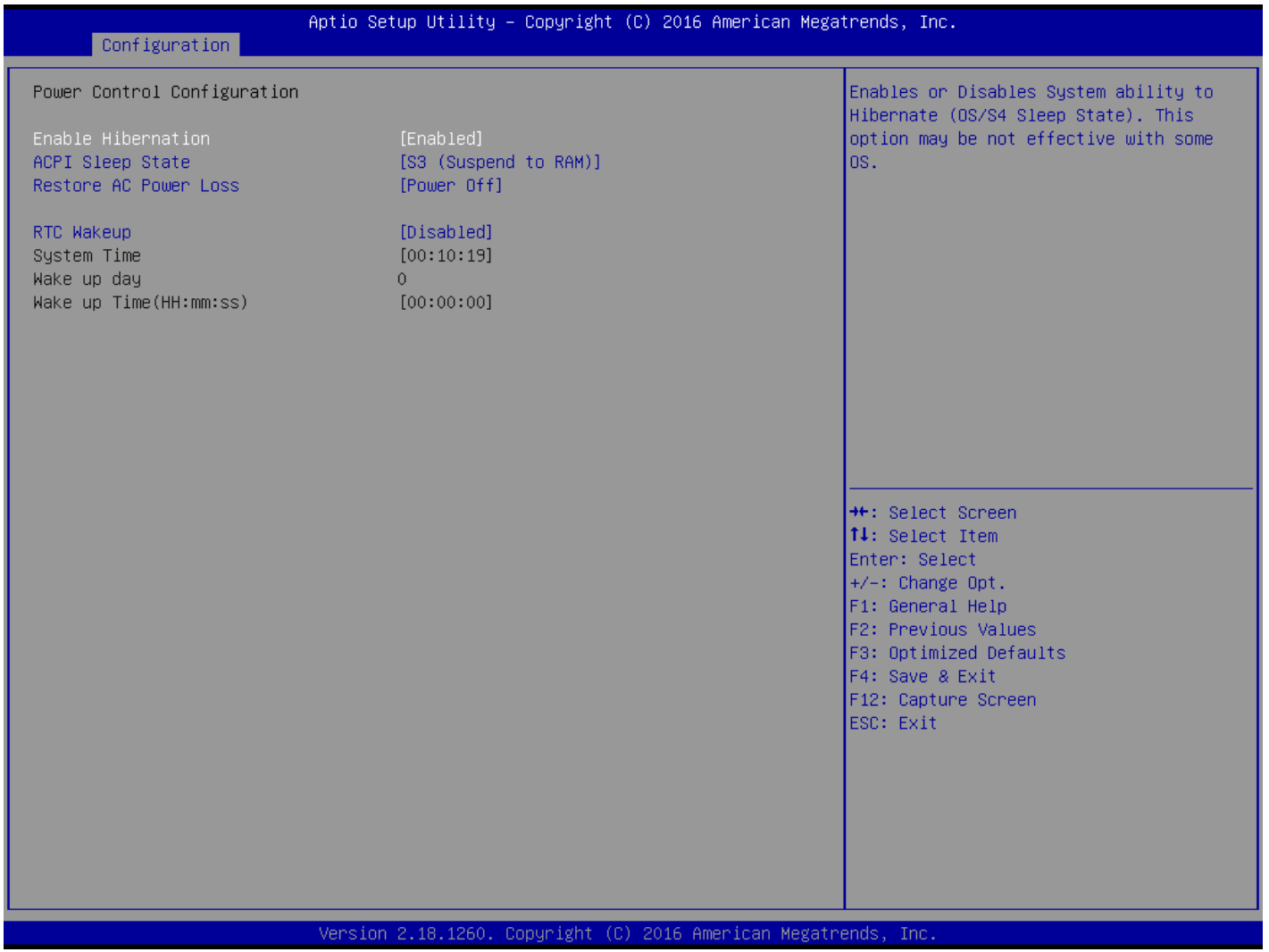


Figure 23 BIOS - Configuration - Power

6.12 TPM

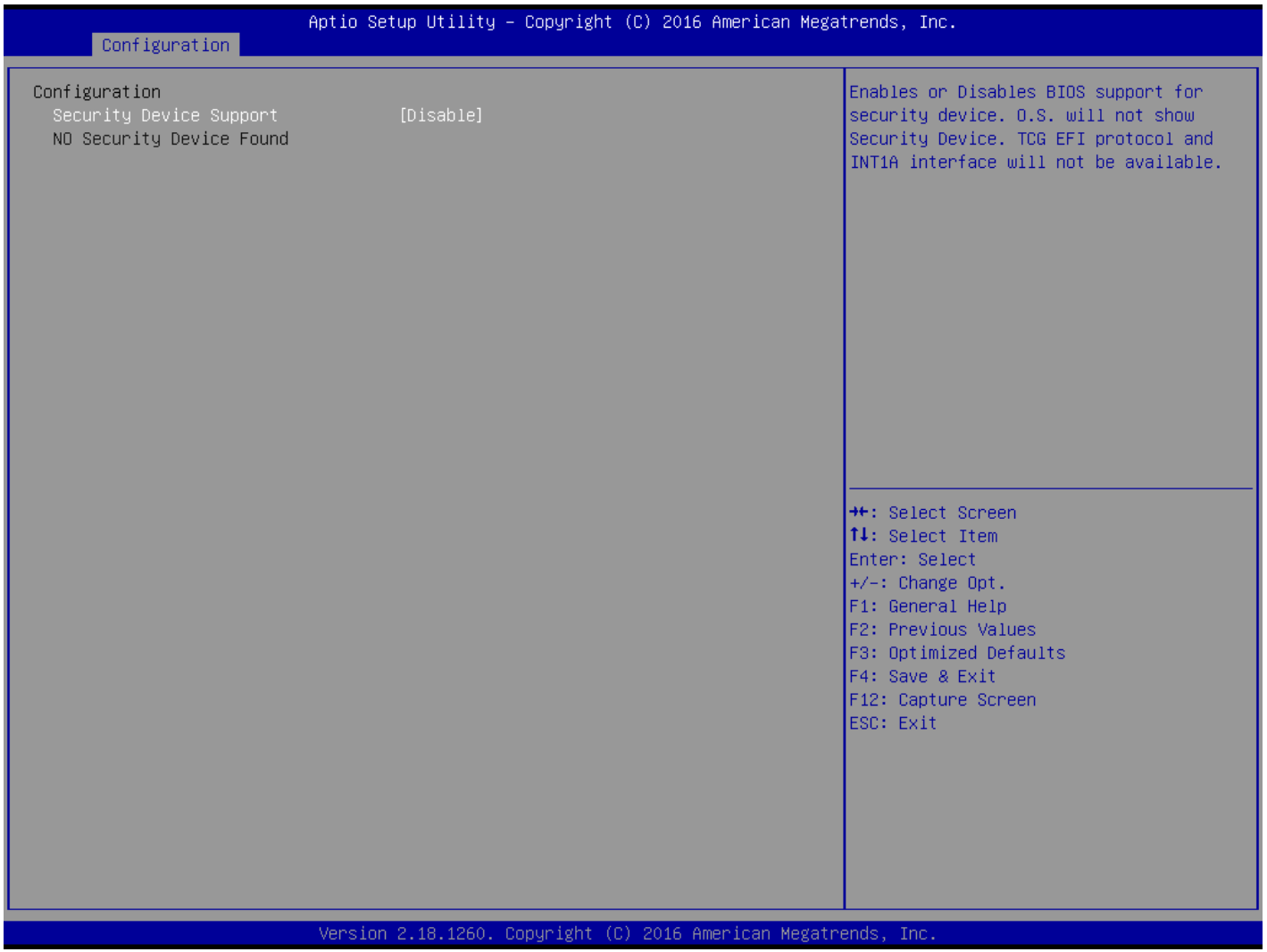


Figure 24 BIOS - Configuration - TPM

6.13 Super IO

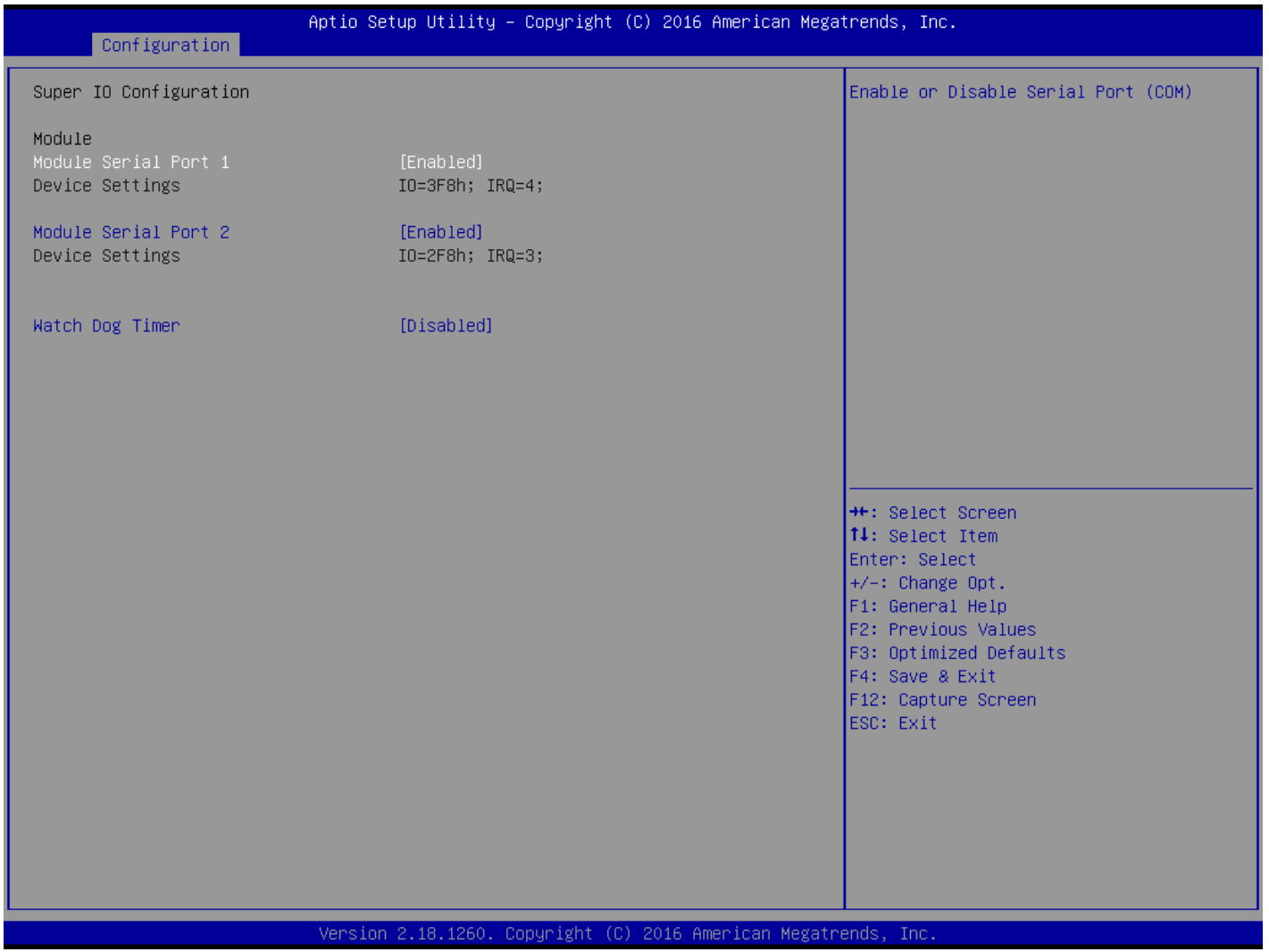


Figure 25 BIOS - Configuration - SuperIO

6.14 H/W Monitor

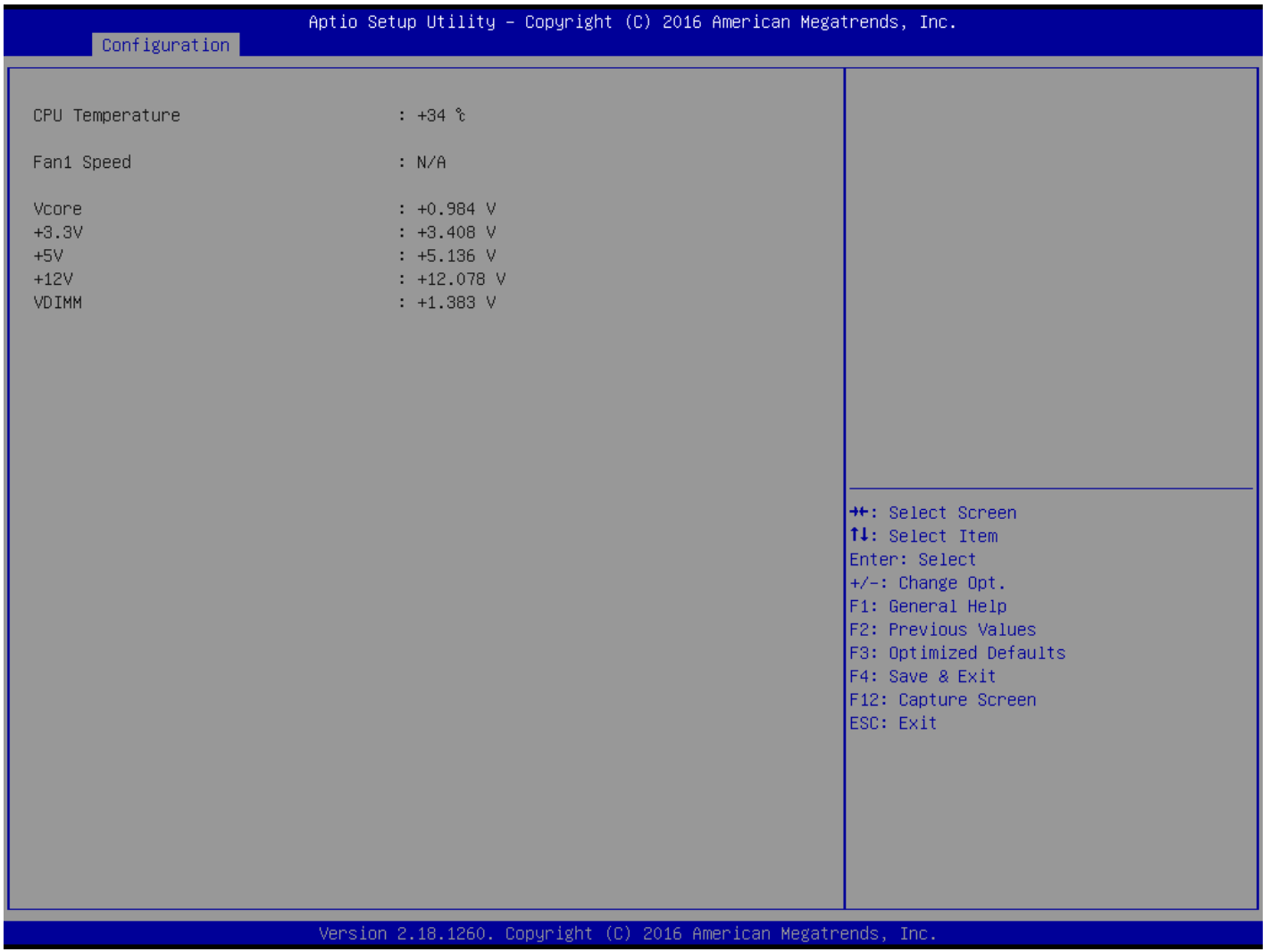


Figure 26 BIOS - Configuration - H/W Monitor

6.15 Serial Port Console

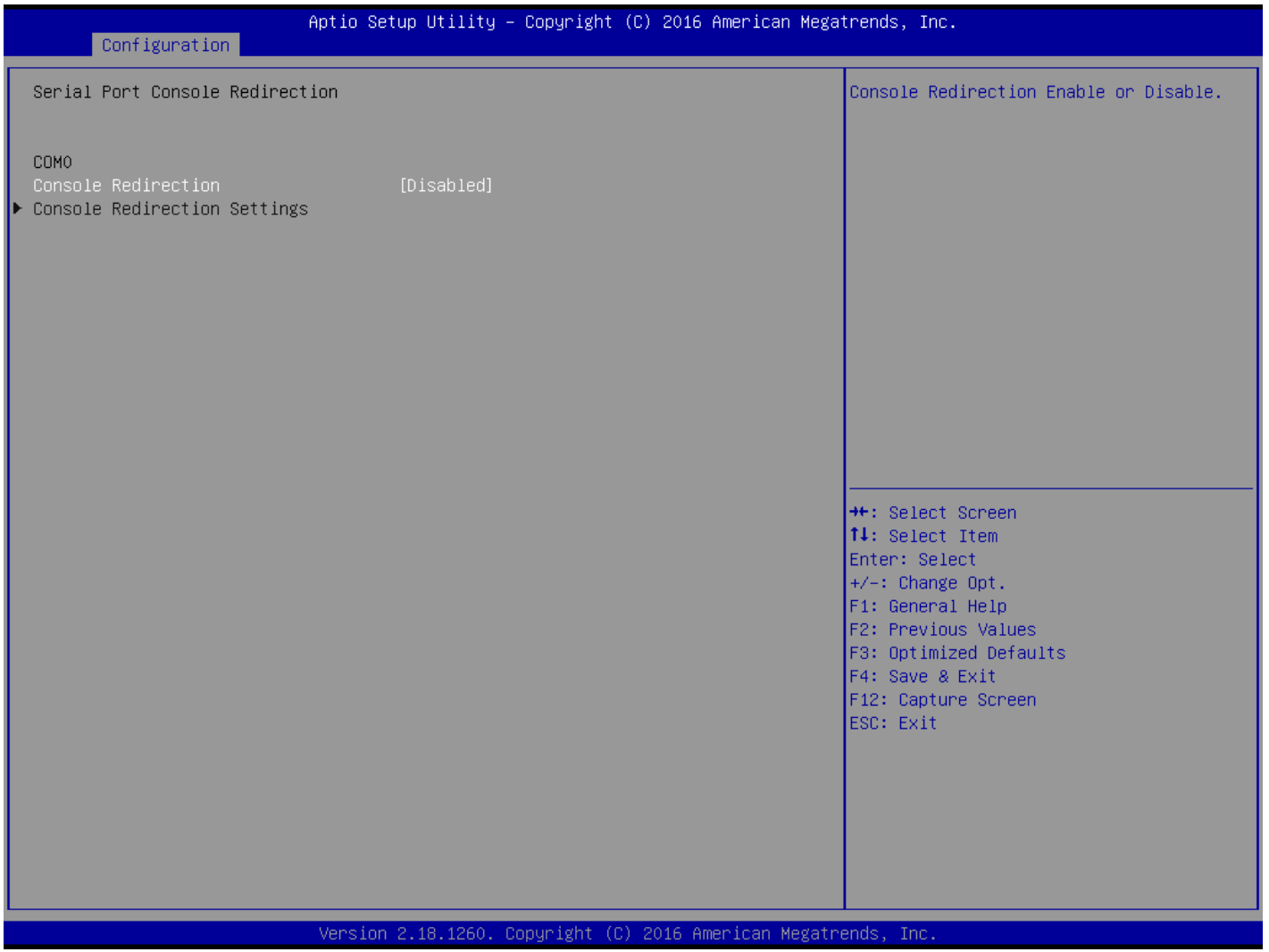


Figure 27 BIOS - Configuration - Serial Port Console 1-2

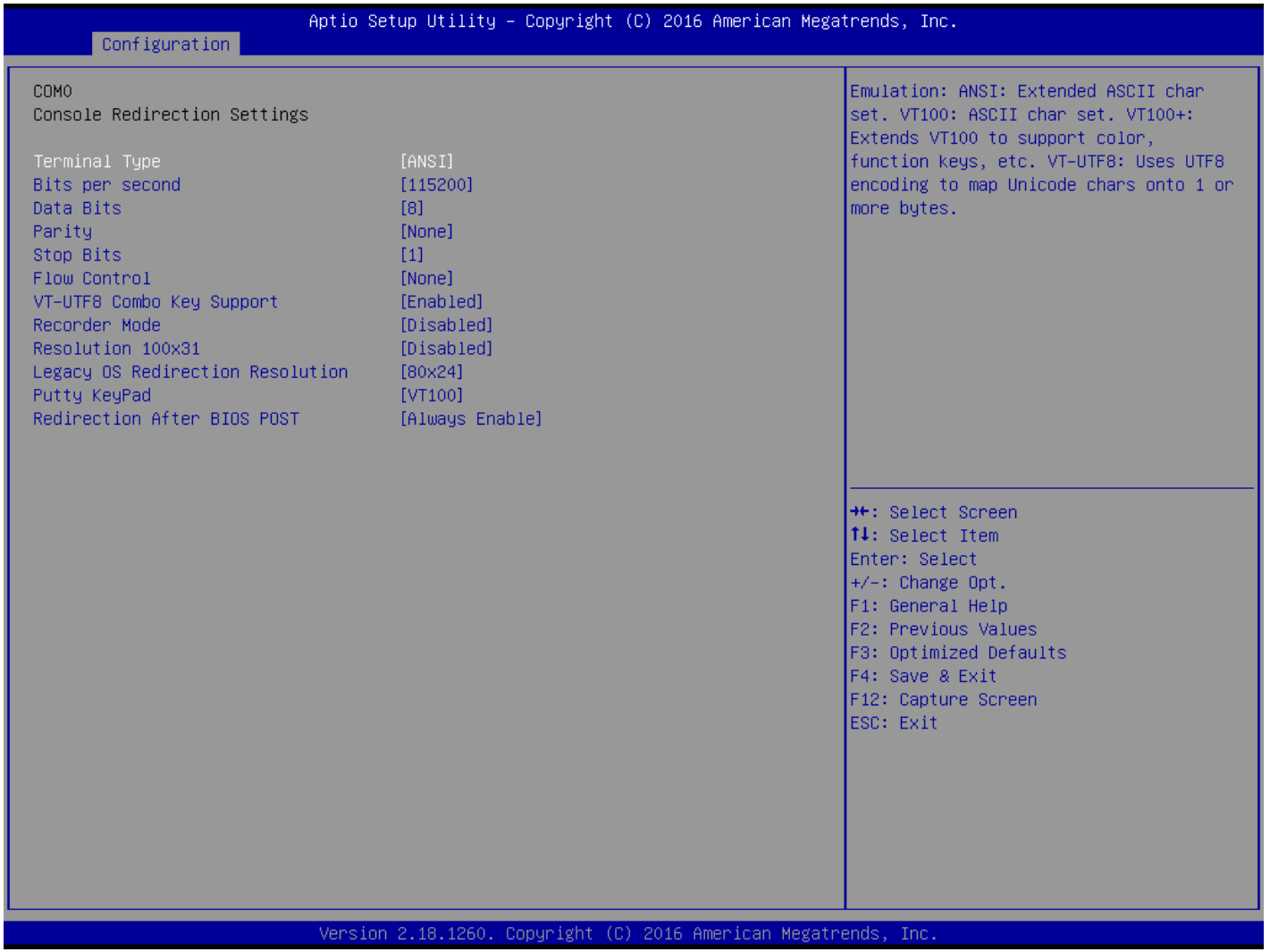


Figure 28 BIOS - Configuration - Serial Port Console 2-2

6.16 Security

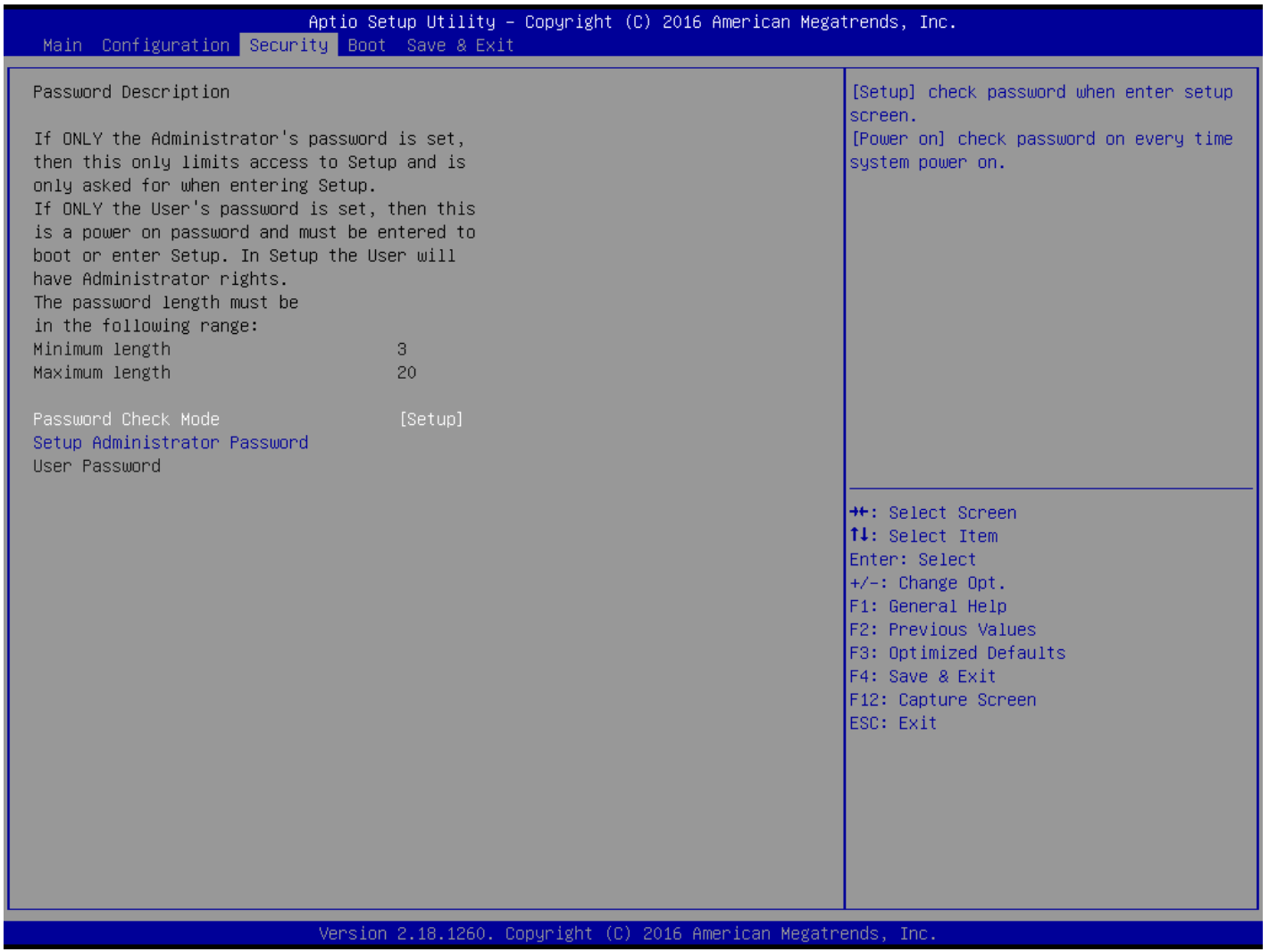


Figure 29 BIOS - Security

6.17 Boot

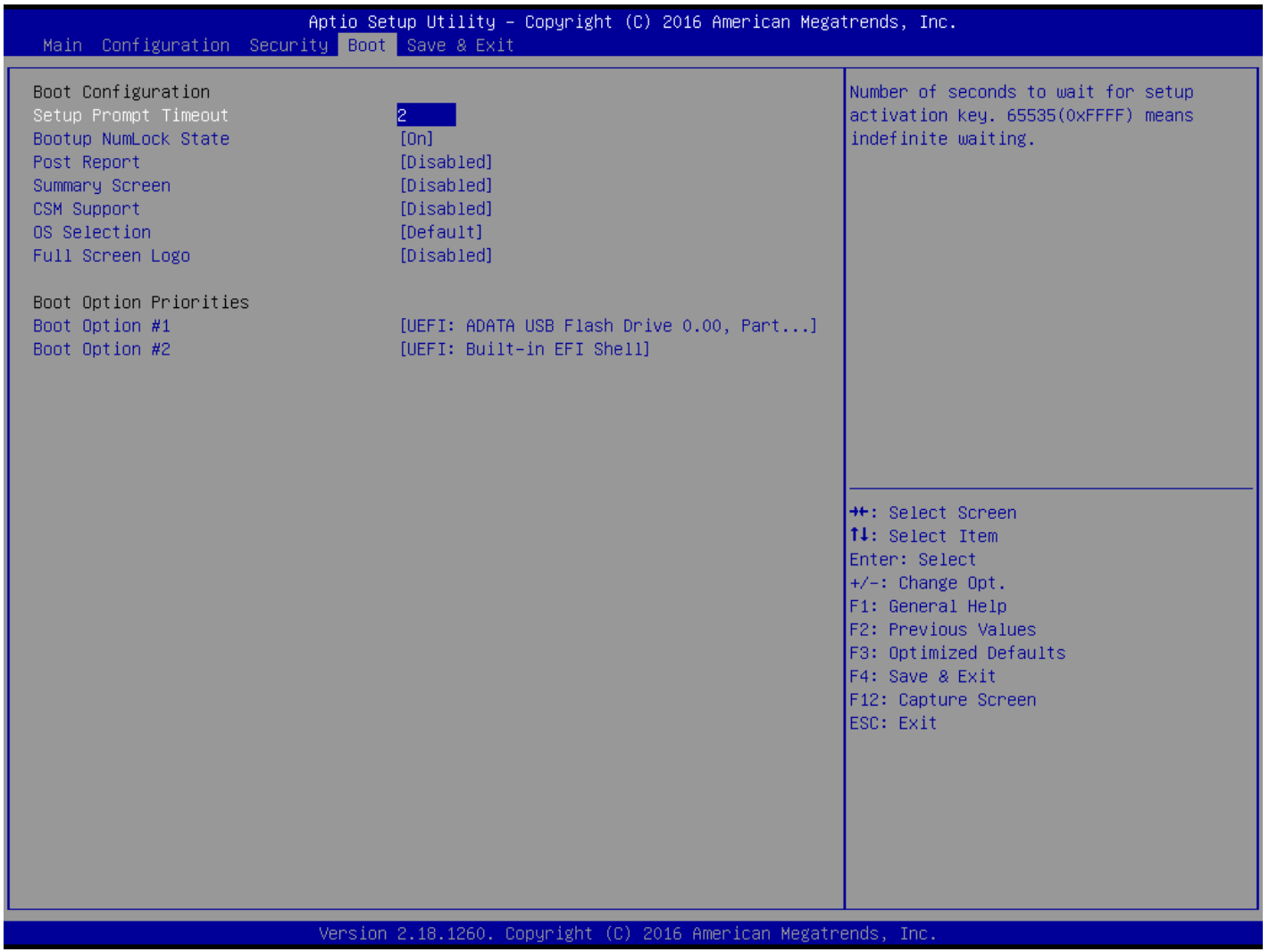


Figure 30 BIOS - Boot

6.18 Save & Exit

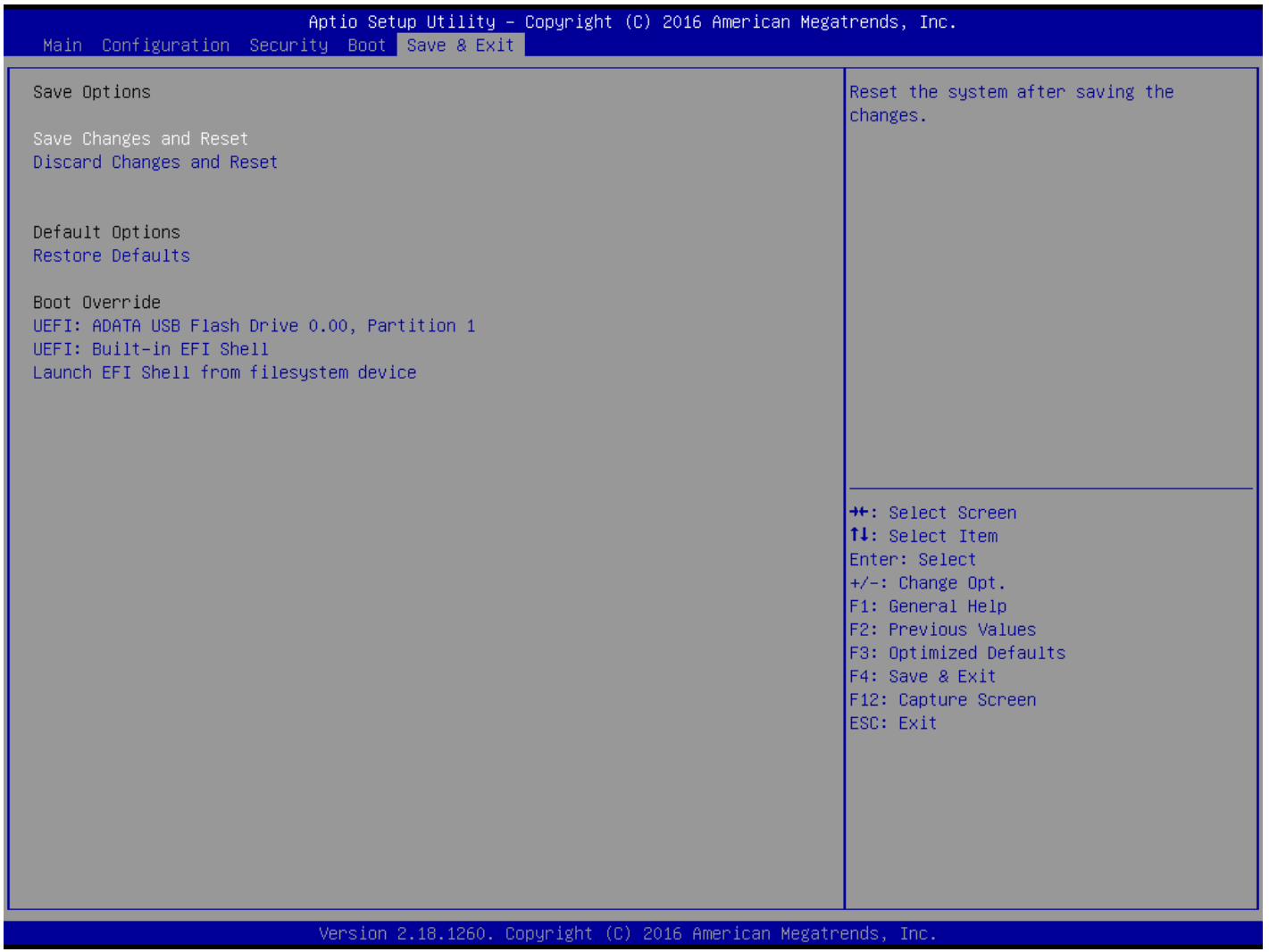


Figure 31 BIOS - Save & Exit

7 System Resources

Device	I/O Address	Note
Embedded Controller (ITE8528)	6E/6F	EC Address
	62/66	EC ACPI CMD Port
	200/201	EC BRAM Port for I2C function
	E300	EC LPC IO Space
	03FB	EC UART1
	02FB	EC UART2

Table 17 System Resource - EC IO Address

Interrupt Request Lines IRQ		
IRQ#	*Current Use*	*Default Use*
IRQ 0	System ROM	System Timer
IRQ 1	System ROM	Keyboard Event
IRQ 2	【Unassigned】	Usable IRQ
IRQ 3	System ROM	COM2
IRQ 4	System ROM	COM1
IRQ 5	【Unassigned】	Usable IRQ
IRQ 6	System ROM	Diskette Event
IRQ 7	【Unassigned】	Usable IRQ
IRQ 8	System ROM	Real-Time Clock
IRQ 9	【Unassigned】	Usable IRQ
IRQ 10	【Unassigned】	Usable IRQ
IRQ 11	Video ROM	Usable IRQ
IRQ 12	System ROM	IBM Mouse Event
IRQ 13	System ROM	Coprocessor Error
IRQ 14	System ROM	Hard Disk Event
IRQ 15	【Unassigned】	Usable IRQ

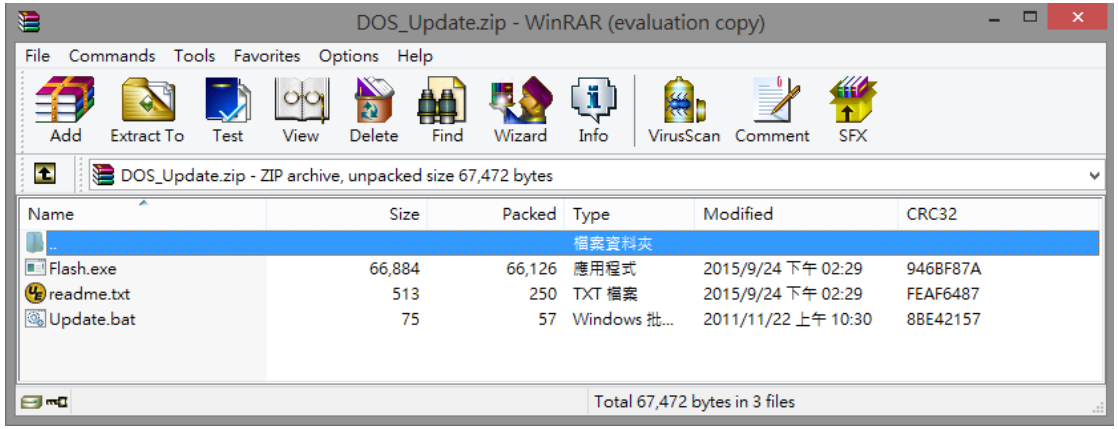
Table 18 System Resource IRQ

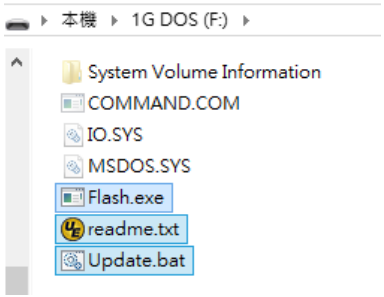
8 BIOS Update

BIOS/EC DOS Update SOP process

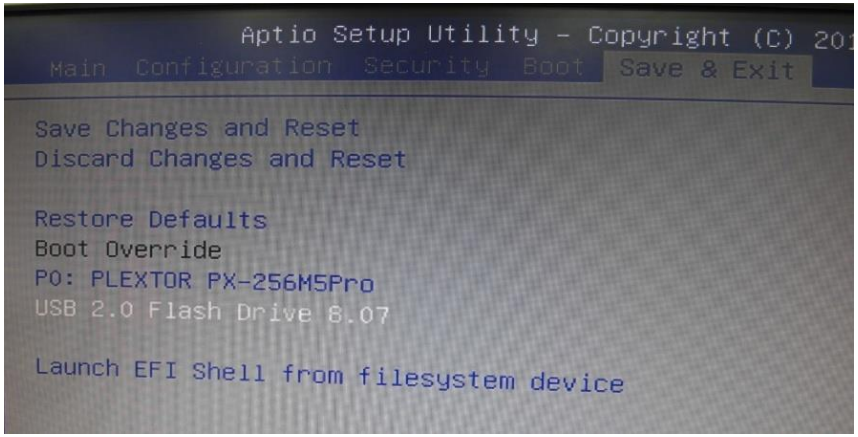
Step 1. Create a DOS USB DOK (Caution : Must be FAT or FAT32 format).

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

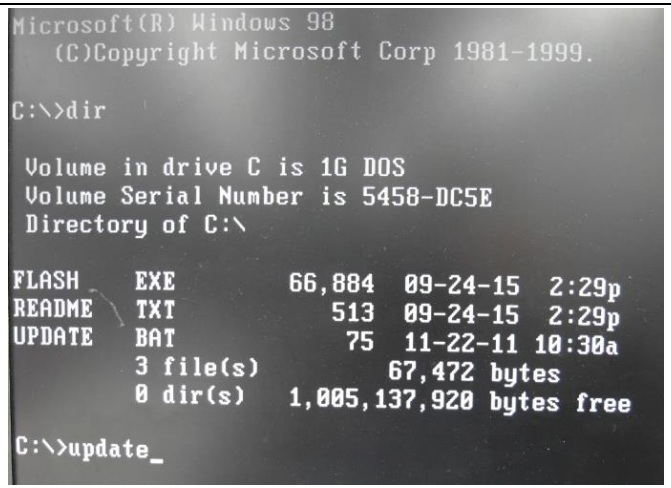




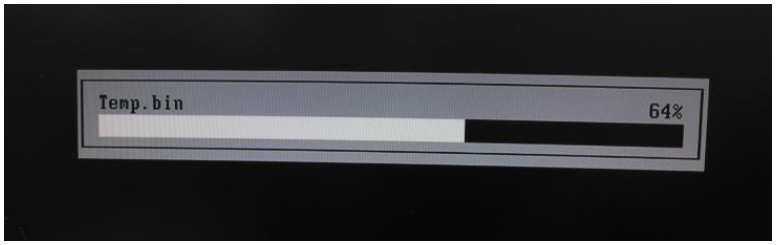
Step 3. Plug the DOS USB DOK to the target system and boot from the DOS USB DOK.

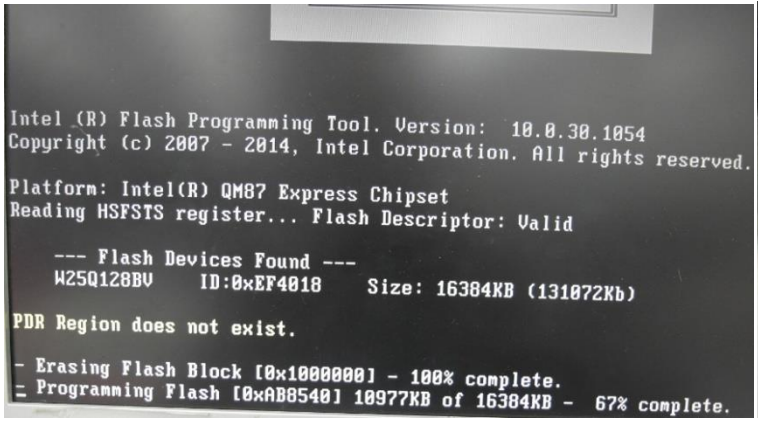


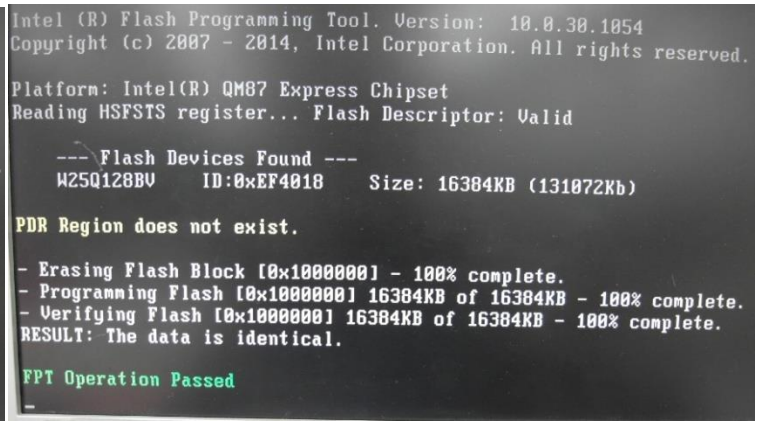
Step 4. Under the update file folder, type command : "update" and press enter.



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





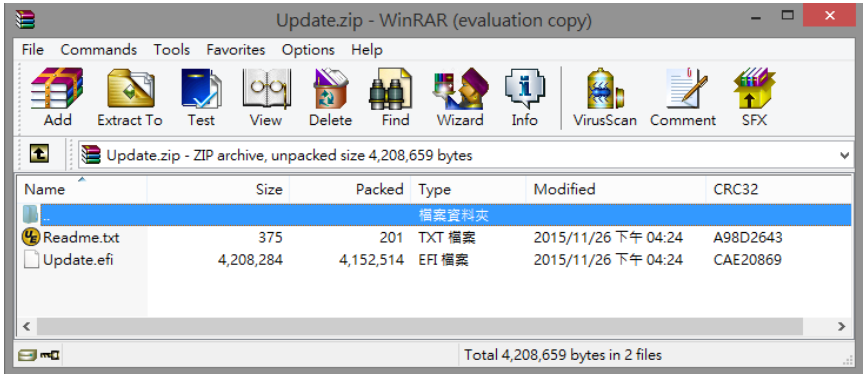


<End of BIOS/EC DOS update process>

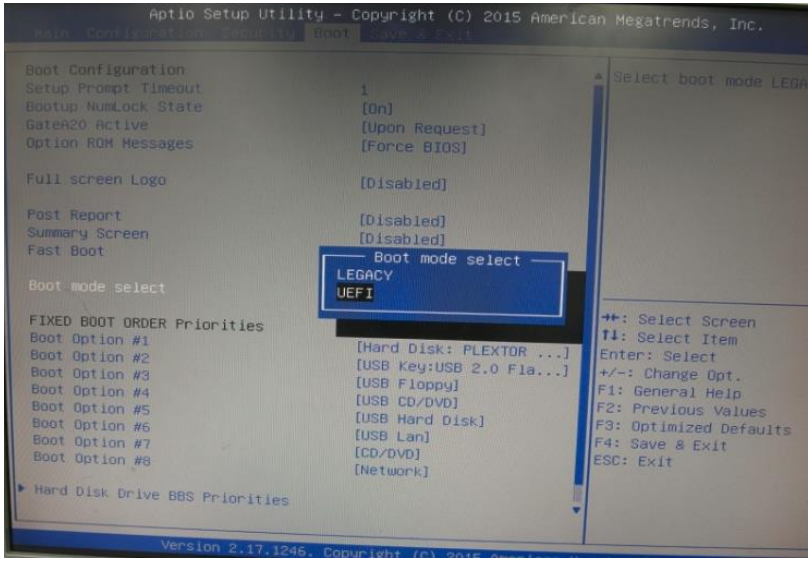
BIOS/EC UEFI Update SOP process

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

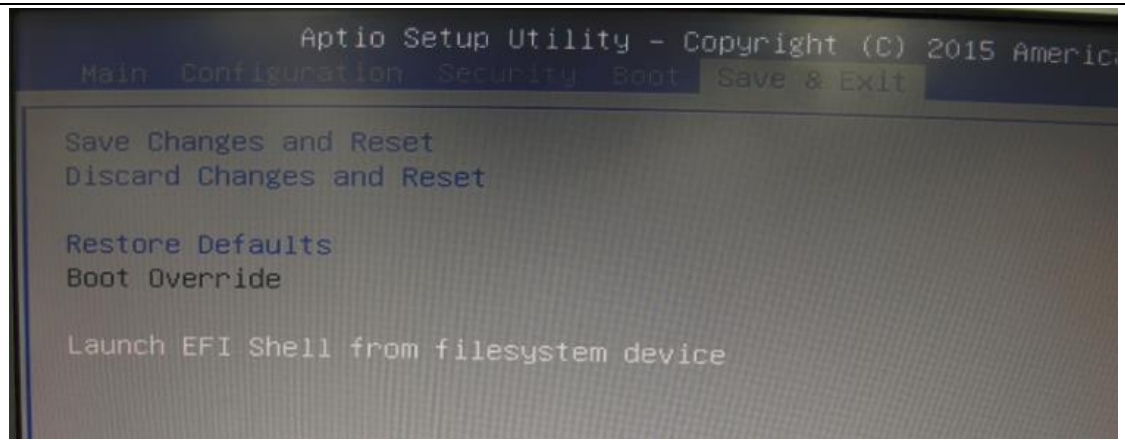
Step 2. Unzip update file to the USB DOK.



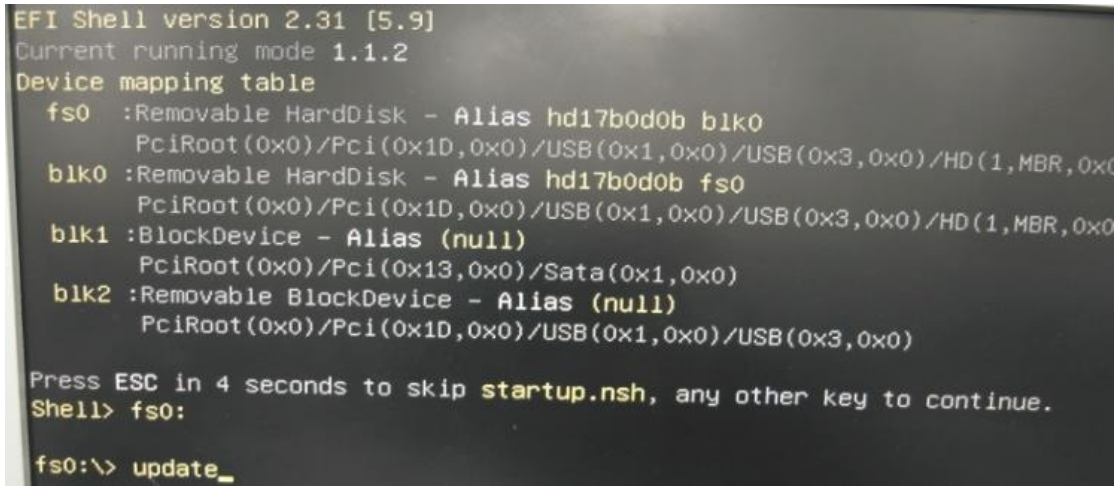
Step 3. Select UEFI boot mode in the BIOS boot menu and save, then restart the system.



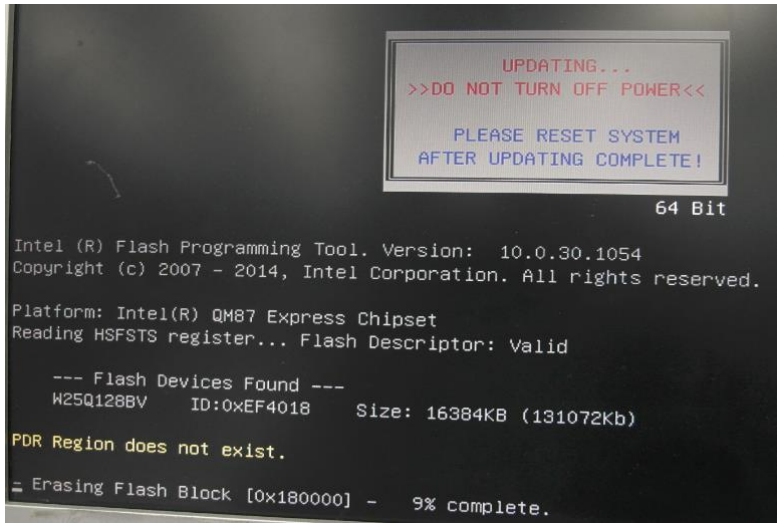
Step 4. Plug the USB DOK to the target system and boot from UEFI Shell.

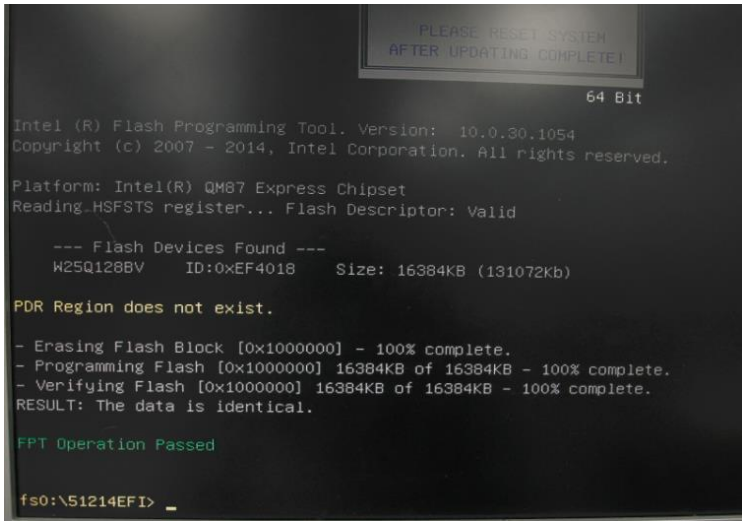


Step 5. Under the UEFI shell, direct to your USB DOK, below example fs0 and type command : "update" and press enter.



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>

9 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.

10 Industry Specifications

The list below provides links to industry specifications that apply to PORTWELL COM Express 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/
PICMG® COM Express Module™ Base Specification http://www.picmg.org/
PCI Express Base Specification, Revision 2.0 https://www.pcisig.com/specifications