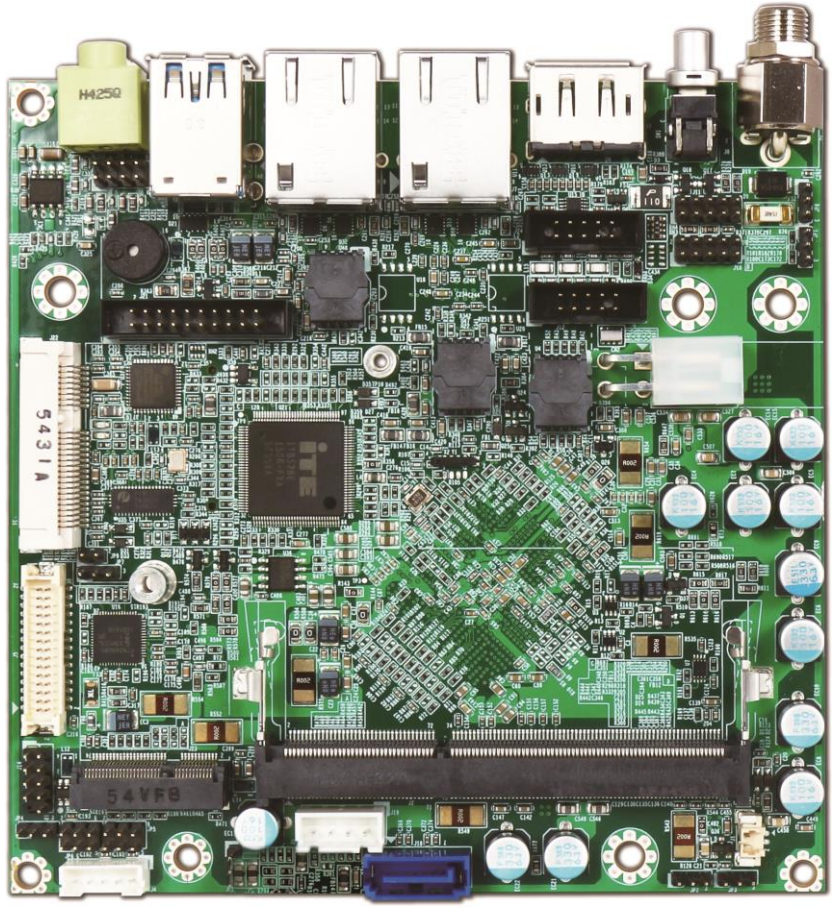

NANO-6061

Portwell

Version 1.3

Revision History

R1.0	Preliminary
R1.1	Add EMI/ESD certification Revised drawing of LVDS connector
R1.2	Revised Block Diagram
R1.3	Revised typo

Contents

Preface

This user's guide provides information about the components, features, connectors and BIOS Setup menus available on the NANO-6061. This document should be referred to when designing NANO-ITX application. The other reference documents that should be used include the following:

- ✧ Intel Braswell Guide
- ✧ Intel Braswell Specification

Please contact Portwell Sales Representative for above documents.

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1 Introduction

Portwell Inc., a world-leading innovator in the Industrial PC (IPC) market and a member of the Intel® Communications Alliance, has launched its new NANO-ITX form factor based NANO-6061 for embedded system board (ESB) that offers lower power consumption, robust computing power and with longevity support.

The NANO-6061 is specifically designed to operate at very low power consumption and low heat, so it can be a truly fanless configuration and battery operated. based on Intel® Pentium® N3000 family SoC, the NANO-6061 supports one DDR3L SODIMM socket up to 8GB system memory and comes with one SATA III, one mSATA socket, one M.2 type-E socket, triple display by VGA, DP and 24-bit LVDS, two GbE Ethernet, one SD socket and three USB ports (two for 3.0, one for 2.0). It also built with DC 12V or ATX 12V input.

Base on leading Intel® Pentium solution, NANO-6061 is a compact and low power dissipation board for Digital Signage, Digital Security Surveillance (DSS) and Medical applications…etc.

2 Specifications

Main Processor	◆ Intel® Braswell Celeron®/ Pentium® Processor
System BIOS	◆ AMI BIOS
Main Memory	◆ Up to 8 GB in one SODIMM sockets. ◆ Supports DDR3L 1333/1600 MHz.
Graphics	◆ Intel® HD Graphics with OpenCL 1.2, OpenGL 4.2 and DirectX12 support; up to three independent displays. ◆ Hardware Video Decode: H.265/HEVC @ level 5, H.264 @ Level 5.1, MPEG2, MVC, VC-1, WMV9, JPEG, VP8 ◆ Hardware Video Encode: H.264 @ Level 5.1, MVC, JPEG ◆ Intel® HD Graphics 400/405 Processor (up to 400MHz) ◆ DP up to 3840x2160 ◆ VGA up to 1920x1200 ◆ LVDS (eDP to LVDS) up to 1920x1200 with dual channel 24bit
Expansion Interface	◆ One M.2(NGFF) Type-E socket for wireless application
SATA Interface	◆ One SATA III ports (6Gb/s) ◆ One mSATA socket (6Gb/s)
Input/ Output	◆ Serial Ports: 1x RS-232/422/485, switched by BIOS ◆ USB Port: 2x USB 3.0 on Rear I/O, 1x USB 2.0 on board ◆ Audio Interface: 1x Audio Line-out Jack. Connector for Mic-In, Line-In and Line-Out.
Ethernet	◆ Supports dual 10/100/1000 Mbps Ethernet ports via PCI Express x1 bus. ◆ Controller: Intel I211AT

High Drive GPIO	◆ One pin-header for 8 bit GPIO(4bit in & 4bit out)
Mechanical and environmental specifications	◆ Operating temperature: 0 ~ 60° C ◆ Storage temperature:-20 ~ 80° C ◆ Humidity: 5 ~ 90% non-condensing ◆ Power supply voltage: +12 V ◆ Board size: 120mm x 120 mm (4.72" x 4.72")
EMI/ESD	◆ESD: IEC 61000-4-2:2008 ◆EMI: EN 55022: 2010/ AC:2011 Class A

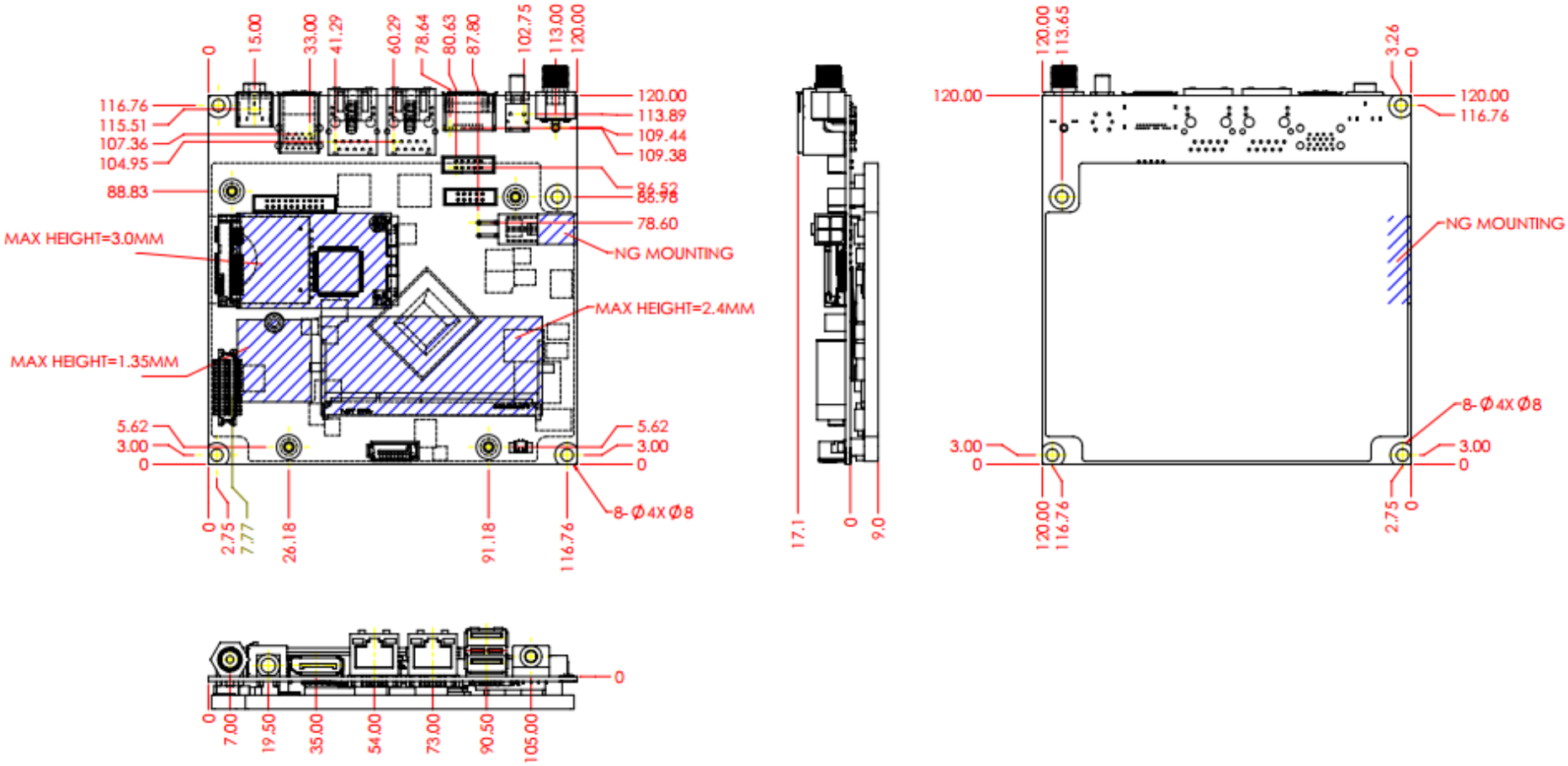
2.1 Supported Operating Systems

The NANO-6061 supports the following operating systems.

- ◆ Windows 8.1u (64 bit)
- ◆ Windows Embedded Industry 8.1 (64 bit)
- ◆ Windows 7 (32/64 bit)
- ◆ Windows 7 (POS ready 7 & WES7) (32/64 bit)
- ◆ Windows 10 (64 bit)
- ◆ Yocto Tool-based Embedded Linux Distribution (64 bit)
- ◆ VxWorks* (RTOS) (64 bit)

*Those operating system list is based on Intel document. In Portwell, we verify Windows 8.1 and Windows 7 in our DVT test.

2.2 Mechanical Dimensions



2.3 Power Consumption

CPU Type	Intel ® Pentium® CPU N3710 @1.60GHz
SBC BIOS	Portwell, Inc. NANO-6061 TEST BIOS (51201T00)
Memory	Transcend DDR3L 1600 SO-DIMM 8G (H5TC4G83BFR)
VGA Card	Onboard Intel ® HD Graphics
VGA Driver	Intel ® HD Graphics, Version:10.18.14.4277
LAN Card	Onboard Intel ® I211 Gigabit Network Connection
LAN Driver	Intel ® I211 Gigabit Network Connection, Version:12.14.7.0
LAN Card	Onboard Intel ® I211 Gigabit Network Connection#2
LAN Driver	Intel ® I211 Gigabit Network Connection, Version:12.14.7.0
Audio Card	Onboard Realtek High Definition Audio
Audio Driver	Realtek High Definition Audio,Version:6.0.1.7083
Chip Driver	Intel® Chipset Device Software,Version:10.1.1
USB3.0 Driver	Intel ® USB3.0 Host Controller Adaptation Driver, Version:1.0.1.45
EC Version	R04.E00 (09/10/2015)
CDROM	Transcend TS8XDVDRW-K
Power Supply	FSP GROUP INC. FSP350-60PFB 350W

Item	*Power ON*	*Full Loading 10Min*	*Full Loading 30Min*
CPU +12V	0.42	0.81	0.89
Device+12V	0.12	0.12	0.12
Device +5V	0.32	0.20	0.23
CPU+ Device +12V	0.66	1.11	1.12
USB2.0 Loading Test	4.86 V/ 380 mA		
USB3.0 Loading Test (up)	4.87 V/ 840 mA		
USB3.0 Loading Test (dowm)	4.88 V/ 860 mA		

2.4 Environmental Specifications

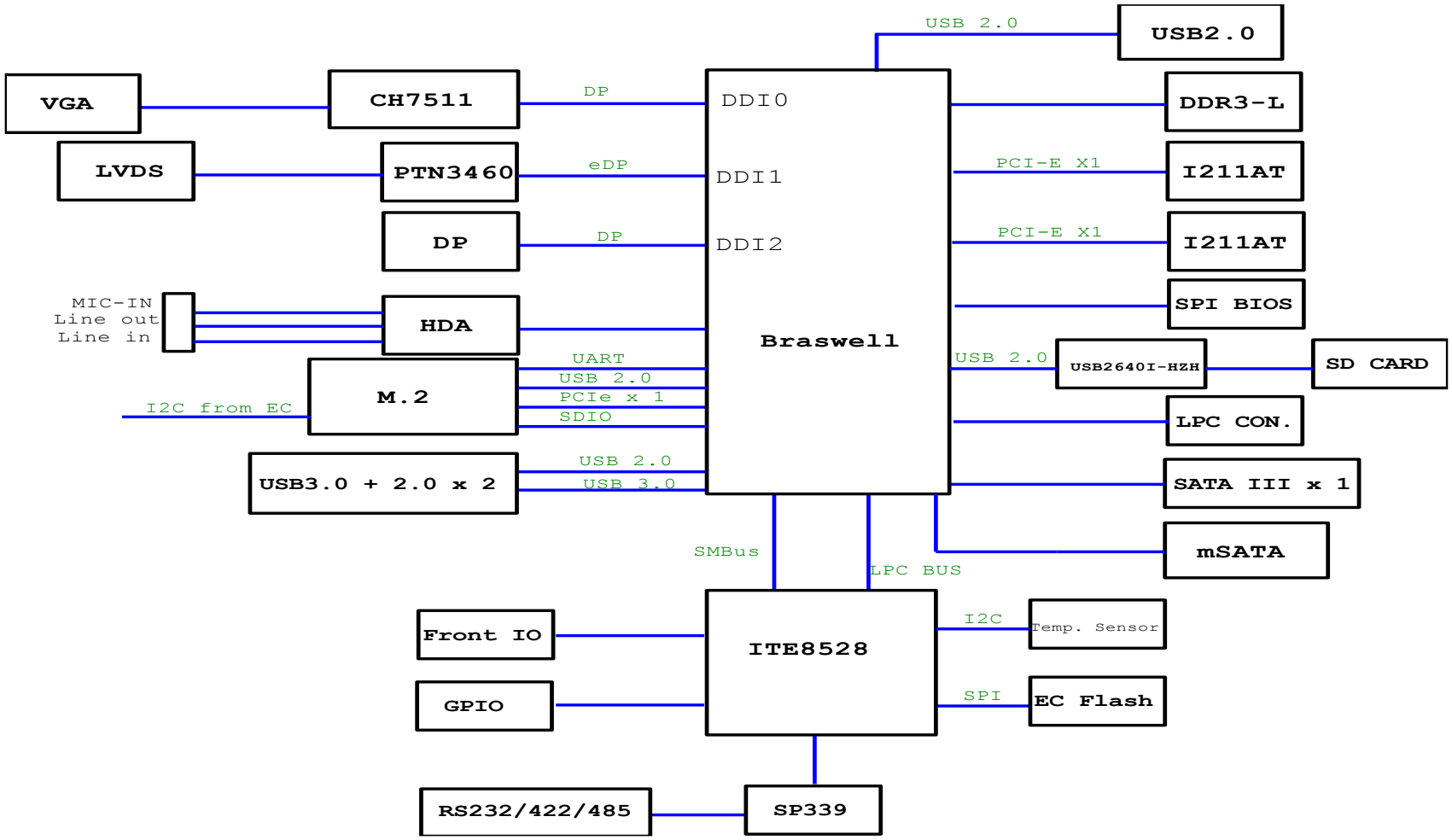
Storage Temperature : -20~80°C

Operation Temperature : 0~60°C

Storage Humidity : 5~90%

Operation Humidity: 10~90%

3 Block Diagram



4 Hardware Configuration

4.1 Jumpers and Connectors

This chapter indicates jumpers, headers, and connector's locations. Users may find useful information related to hardware settings in this chapter.

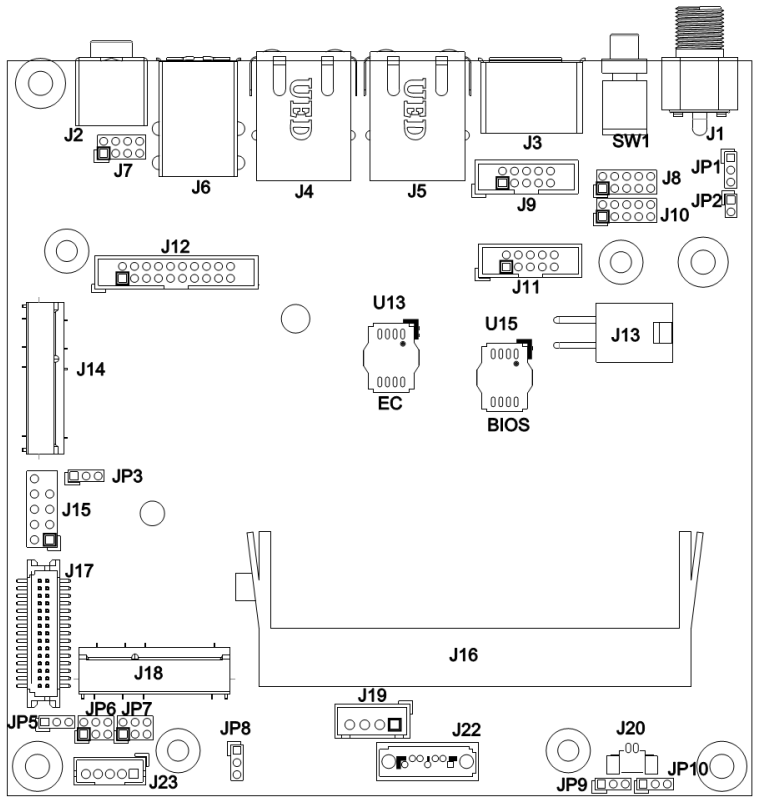


Figure 1,NANO-6061 Top View

4.2 Jumpers Settings

For users to customize NANO-6061's features. In the following sections, **Short** means covering a jumper cap over jumper pins; **Open** or **N/C** (Not Connected) means removing a jumper cap from jumper pins. Users can refer to Figure 1 for the Jumper allocations.

Jumper Table

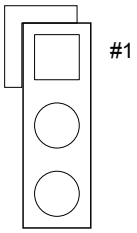
The jumper settings are schematically depicted in this manual as follows:

Jump Function List:

Jump	Function	Remark
J1	DC Jack	+12V Input
J2	Audio Jack (Line_out)	
J3	DP++ Port	
J4/J5	RJ45 Connector	
J6	USB3+USB2 Connector	
J7	External Audio (Mic + Line_in + Line_out)Pin HDR.	4x2 pin header
J8	Front Panel Pin HDR	5x2 pin header
J9	VGA Pin HDR.	5x2 pin header
J10	General Purpose I/O Pin HDR	5x2 pin header
J11	RS232/422/485 Pin HDR	5x2 pin header
J12	TPM Connector	10x2 connector

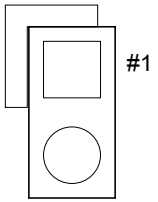
J13	ATX 4 Pin Connector	+12V Input
J14	mSATA Socket	
J15	External USB2 Connector	
J16	DDR3 SO-DIMM Socket	
J17	LVDS Connector	
J18	M.2 key E Socket	2230
J19	SATA Power Connector	
J20	Battery Socket	
J22	SATA GEN3 Connector	
J23	Backlight Connector	
J24	SD Card Socket	
U13	EC Flash	
U15	BIOS Flash	

JP1: GPIO4~7 Voltage Output Level Selection



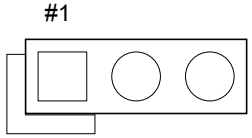
PIN No.	Signal Description
1-2 Short	5V
2-3 Short	3.3V ★

JP2: Flash Descriptor Security Override



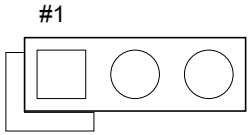
PIN No.	Signal Description
Short	Not Support
Open	Normal Operation ★

JP3 : Power On Mode Selection



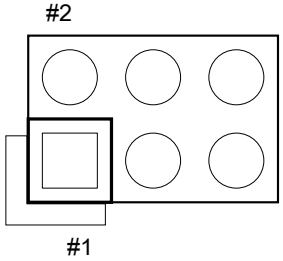
PIN No.	Signal Description
1-2 Short	AT
2-3 Short	ATX ★

JP5 : BKLTCTRL Signal Source Selection



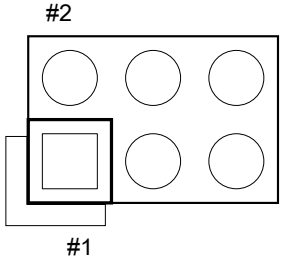
PIN No.	Signal Description
1-2 Short	EC
2-3 Short	SOC ★

JP6 : PANEL Voltage Selection



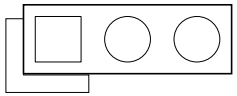
PIN No.	Signal Description
1-3 Short	VCC3
3-5 Short	VCC5 ★
3-4 Short	+12V

JP7: BACKLIGHT Enable Voltage Level Selection



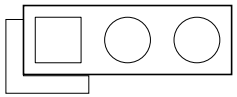
PIN No.	Signal Description
1-3, 2-4	5V, Active High ★
1-3, 4-6	12V, Active High
3-5,2-4	5V, Active Low
3-5,4-6	12V, Active Low

JP8 : BKLTCTRL Signal Level Selection



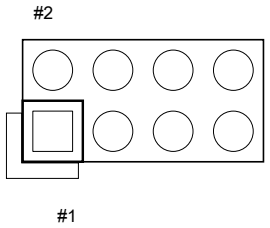
PIN No.	Signal Description
1-2 Short	+3.3V ★
2-3 Short	+5V

JP9/JP10 : CMOS Clear



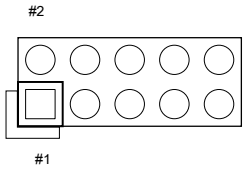
PIN No.	Signal Description
1-2 Short	Normal Operation ★
2-3 Short	Clear CMOS Contents

J7 : External Audio Connector



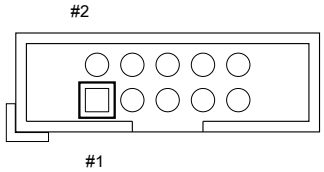
PIN No.	Signal Description	PIN No.	Signal Description
1	MIC_L	2	Line_in_L
3	Ground	4	Line_in_R
5	Line_out_L	6	Ground
7	Line_out_R	8	MIC_R

J8 : Front Panel Pin HDR



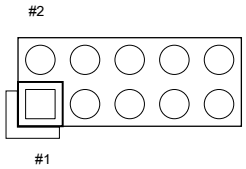
PIN No.	Signal Description	PIN No.	Signal Description
1	Ground	2	N/C
3	External Power LED(+)	4	External Power LED(-)
5	HDD_LED(+)	6	HDD_LED(-)
7	Reset (+)	8	Power On(-)
9	Reset (-)	10	Power On(+)

J9 : VGA Connector



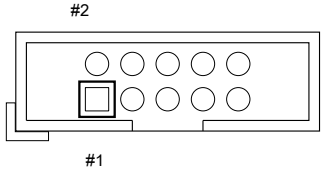
PIN No.	Signal Description	PIN No.	Signal Description
1	RED	2	SCL
3	GREEN	4	GND
5	BLUE	6	SDA
7	VSYNC	8	GND
9	HSYNC	10	+5V

J10: General Purpose I/O Connector



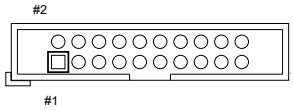
PIN No.	Signal Description	PIN No.	Signal Description
1	GPIO0	2	GPIO4 (Output Only)
3	GPIO1	4	GPIO5 (Output Only)
5	GPIO2	6	GPIO6 (Output Only)
7	GPIO3	8	GPIO7 (Output Only)
9	Ground	10	+5V

J11: RS-232/422/485 I/O Connector



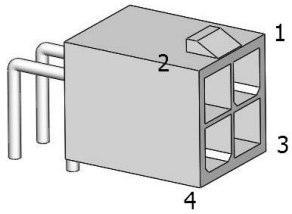
PIN No.	Signal Description	PIN No.	Signal Description
1	DCD#/485D-/422T-	2	RXD#/485D+/422T+
3	TXD#/422R+	4	DTR#/422R-
5	Ground	6	DSR#
7	RTS#	8	CTS#
9	RI#	10	N/C

J12 : TPM Connector



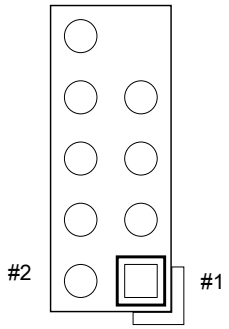
PIN No.	Signal Description	PIN No.	Signal Description
1	CLK	2	Ground
3	FRAME#	4	NC
5	PLTRST#	6	+5V
7	LAD3	8	LAD2
9	+3.3V	10	LAD1
11	LAD0	12	Ground
13	SMB_CLK	14	SMB_DATA
15	+3.3V_Standby	16	SERIRQ
17	Ground	18	NC
19	NC	20	NC

J13 : ATX 4 Pin Connector



PIN No.	Signal Description
1	+12V
2	+12V
3	Ground
4	Ground

J15 : External USB Connector

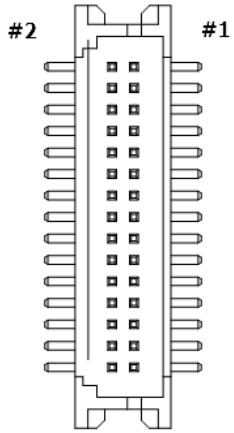


PIN No.	Signal Description	PIN No.	Signal Description
1	5V always	2	5V always
3	USB-	4	N/C
5	USB+	6	N/C
7	Ground	8	Ground
	Key(no pin)	10	N/C

Note:

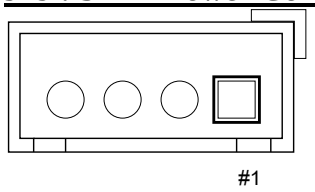
5V Dual is always available. It's supplied by either 5V VCC power source in normal operation mode or 5V standby power source in standby mode.

J17 : LVDS Connector



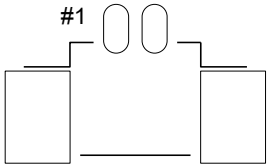
PIN No.	Signal Description	PIN No.	Signal Description
1	VDD_LVDS	2	VDD_LVDS
3	LVDSA_DATA0	4	LVDSA_DATA#0
5	LVDSA_DATA1	6	LVDSA_DATA#1
7	LVDSA_DATA2	8	LVDSA_DATA#2
9	LVDSA_DATA3	10	LVDSA_DATA#3
11	LVDSA_CLKP	12	LVDSA_CLKN
13	DDC_SCL	14	DDC_SDA
15	Ground	16	Ground
17	LVDSB_DATA0	18	LVDSB_DATA#0
19	LVDSB_DATA1	20	LVDSB_DATA#1
21	LVDSB_DATA2	22	LVDSB_DATA#2
23	LVDSB_DATA3	24	LVDSB_DATA#3
25	LVDSB_CLKP	26	LVDSB_CLKN
27	N/C	28	N/C
29	Ground	30	Ground

J19 : SATA Power Connector



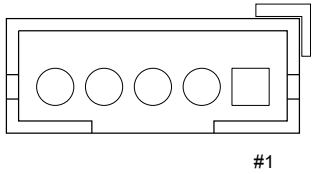
PIN No.	Signal Description
1	+12V
2	Ground
3	Ground
4	+5V

J20 : Battery Connector



PIN No.	Signal Description
1	Battery Voltage
2	Ground

J23 : Backlight Connector



PIN No.	Signal Description
1	+5V
2	BL_CTRL
3	+12V
4	Ground
5	BL_Enable

5 Signal Descriptions

5.1 Watch Dog Signal

WDT Control Command Example

```
#include <stdio.h>
#include <stdlib.h>
#include <conio.h>
#include <dos.h>

#define EC_DATA          0x62
#define EC_CMD           0x66
#define EC_CMD_READ   0x80
#define EC_CMD_WRITE  0x81

#define    WDT_MODE            0x06    // WDT Select mode.
#define    WDT_MIN             0x07    // Minute mode counter
#define    WDT_SEC             0x08    // Second mode counter

// Use port 62 and port 66 to access EC command / data.
static intIBF_Check()
{
      unsigned char IBF_status;
      do
      {
            pw_udelay (20);    // delay 20 us
            outportb (EC_CMD, &IBF_status);
      } while (IBF_status& 0x02);
```

```
	return 1;
}

static intOBF_Check ()
{
	unsigned char OBF_status;
	do
	{
		pw_udelay (20);    // delay 20 us
		OBP_status = inportb (EC_CMD);
	} while (!(OBF_status& 0x01));
	return 1;
}

static void Write_EC (unsigned char index, unsigned char data)
{
	IBF_Check ();
	outportb (EC_CMD, EC_CMD_WRITE);
	IBF_Check ();
	outportb (EC_DATA, index);
	IBF_Check ();
	outportb (EC_DATA, data);
}

static unsigned char Read_EC (unsigned char address)
{
	unsigned char data;
	IBF_Check ();
	outportb (EC_CMD, EC_CMD_READ);
	IBF_Check ();
```

```
	outportb (EC_DATA, address);
	OBF_Check();
	data = inportb (EC_DATA);
	return data;
}

void EC_WDT_Trigger ()
{
	/* WDT Counter */
	Write_EC (WDT_SEC, 0x05);
	/* if use minute mode */
	/* Write_EC (WDT_MIN, 0x05); */

	/* 0x01 is second mode */
	/* 0x03 is minute mode */
	Write_EC (WDT_MODE, 0x01);
}

Write_EC ((b->wdt.ec.count_m_addr& 0xFF), b->wdt.ec.timeout);
		Write_EC ((b->wdt.ec.cfg_addr& 0xFF), 0x03); // WDTCFG[1:0]=11
int main ()
{
inti;
	EC_WDT_Trigger ();
	for (i = 0; i< 5; i++)
	{
		printf ("Reset counter .....%d\n", 5 - i);
		delay (1000);
	}
	return 0;
```

```
}
```

5.2 GPIO Signal

GPIO Control Command Example (C Language)

```
#include <stdio.h>
#include <stdlib.h>
#include <conio.h>
#include <dos.h>

#define EC_DATA              0x62
#define EC_CMD               0x66
#define EC_CMD_READ          0x80
#define EC_CMD_WRITE         0x81

#define GPIO_DIR             0x2B
#define GPIO_DATA            0x2C

static void Write_EC (unsigned char index, unsigned char data)
{
      delay(100);
outportb (EC_CMD, EC_CMD_WRITE);
      delay(100);
outportb (EC_DATA, index);
      delay(100);
outportb (EC_DATA, data);
}

static unsigned char Read_EC (unsigned char address)
{
      unsigned char data;
```

```
        delay(100);
outportb (EC_CMD, EC_CMD_READ);
        delay(100);
outportb (EC_DATA, address);
        delay(100);
        data = inportb (EC_DATA);
        return data;
}

int main ()
{
        unsigned char d2;
printf("\n\n");
printf("NANO-6061 GPIO TEST Program v1.0\n");
printf("Please short the following pins with 2.0mm-pitched jumper on J10\n");
printf("PIN 1,3,5,7 is input ; PIN 2,4,6,8 is output\n");
printf("GPIO1 ---- GPIO5\n");
printf("GPIO2 ---- GPIO6\n");
printf("GPIO3 ---- GPIO7\n");
printf("GPIO4 ---- GPIO8\n");
printf("GND      xxxxVcc<==PWR/GND pins, DO NOT short them!\n\n");
printf("Test Begins...\n");

        /* Set GPIO Port In/Out mode */
/* Port 1 ~ 4 In mode, 5 ~ 8 Out mode*/
Write_EC (GPIO_DIR, 0x0F);

        /* Set Port 5 ~ 8 Low */
Write_EC (GPIO_DATA, 0x0F);
        sleep(1);
```

```
        d2 = Read_EC (GPIO_DATA);

printf("GPIO_DATA = %x\n", d2);
        if ((d2 & 0x01) == 0)
printf ("GPIO70->GPIO74 test ok !! (pull low)\n");
        else
printf ("GPIO70->GPIO74 test fail (pull high) \n");

        if ((d2 & 0x02) == 0)
printf ("GPIO71->GPIO75 test ok !! (pull low)\n");
        else
printf ("GPIO71->GPIO75 test fail (pull high)\n");

        if ((d2 & 0x04) == 0)
printf ("GPIO72->GPIO76 test ok !! (pull low)\n");
        else
printf ("GPIO72->GPIO76 test fail (pull high)\n");

        if ((d2 & 0x08) == 0)
printf ("GPIO73->GPIO77 test ok !! (pull low)\n");
        else
printf ("GPIO73->GPIO77 test fail (pull high)\n");
        return 0;
}
```

6 System Resources

6.1 Intel® Brodwell-U PCH

Intel® Celeron® Processor N3060 (2M Cache, up to 2.48 GHz)
Intel® Celeron® Processor N3160 (2M Cache, up to 2.24 GHz)
Intel® Pentium® Processor N3710 (2M Cache, up to 2.56 GHz)

6.2 Main Memory

NANO-6061 provides 1 x 204-pin SO-DIMM sockets which supports DDR3L non-ECC memory. The maximum memory can be up to 8GB. Memory clock and related settings can be detected by BIOS via SPD interface.

Watch out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedures to install memory module into memory socket. Before locking, make sure that all modules have been fully inserted into the card slots.

6.3 Installing the Single Board Computer

To install your NANO-6061 into standard chassis or proprietary environment, please perform the following:

Step 1 : Check all jumpers setting on proper position

Step 2 : Install and configure memory module on right position

Step 3 : Place NANO-6061 into the dedicated position in the system

Step 4 : Attach cables to existing peripheral devices and secure it

WARNING

Please ensure that mother board is properly inserted and fixed by mechanism.

Note:

Please refer to section 6.3.1 to 6.3.4 to install INF/Graphic/LAN

6.3.1 Chipset Component Driver

NANO-6061 uses state-of-art Intel® Braswell Soc. It's a new chipset that some old operating systems might not be able to recognize. To overcome this compatibility issue, for Windows Operating Systems such as Windows 8, please install its INF before any of other Drivers are installed. You can find very easily this chipset component driver in NANO-6061 CD-title

6.3.2 Intel® HD Graphics 400/405

NANO-6061 has integrated Intel® HD Graphics 400/405 which supports DX12, OpenGL 4.2 / OpenCL 1.2. It is the most advanced design to gain an outstanding graphic performance. NANO-6061 supports VGA, DP, and LVDS display. This combination makes NANO-6061 an excellent graphic performance.

Drivers Support

Please find the Graphic driver in the NANO-6061 CD-title. The driver supports Windows 8.

6.3.3 Intel LAN I211AT Gigabit Ethernet Contoller

- Intel I211AT Gigabit Ethernet controller and 2x RJ45 connectors on rear I/O

Drivers Support

Please find Intel I211AT LAN driver in Ethernet directory of NANO-6061 CD-title. The driver supports Windows 8.

7 BIOS Setup Items

7.1 Introduction

The following section describes the BIOS setup program. The BIOS setup program can be used to view and change the BIOS settings for the module. Only experienced users should change the default BIOS settings.

7.2 BIOS Setup

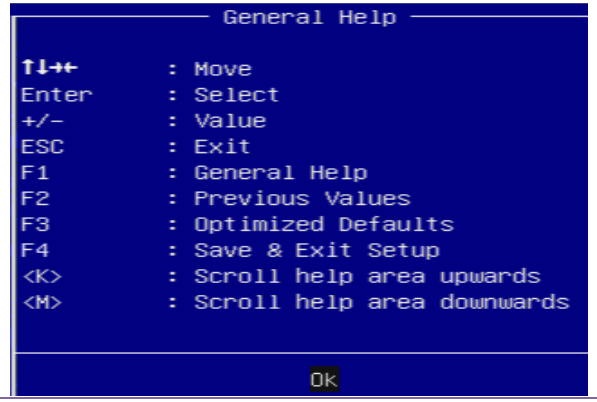
Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press<ESC> or <DEL> key will enter BIOS setup screen.

Press <ESC> or <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.

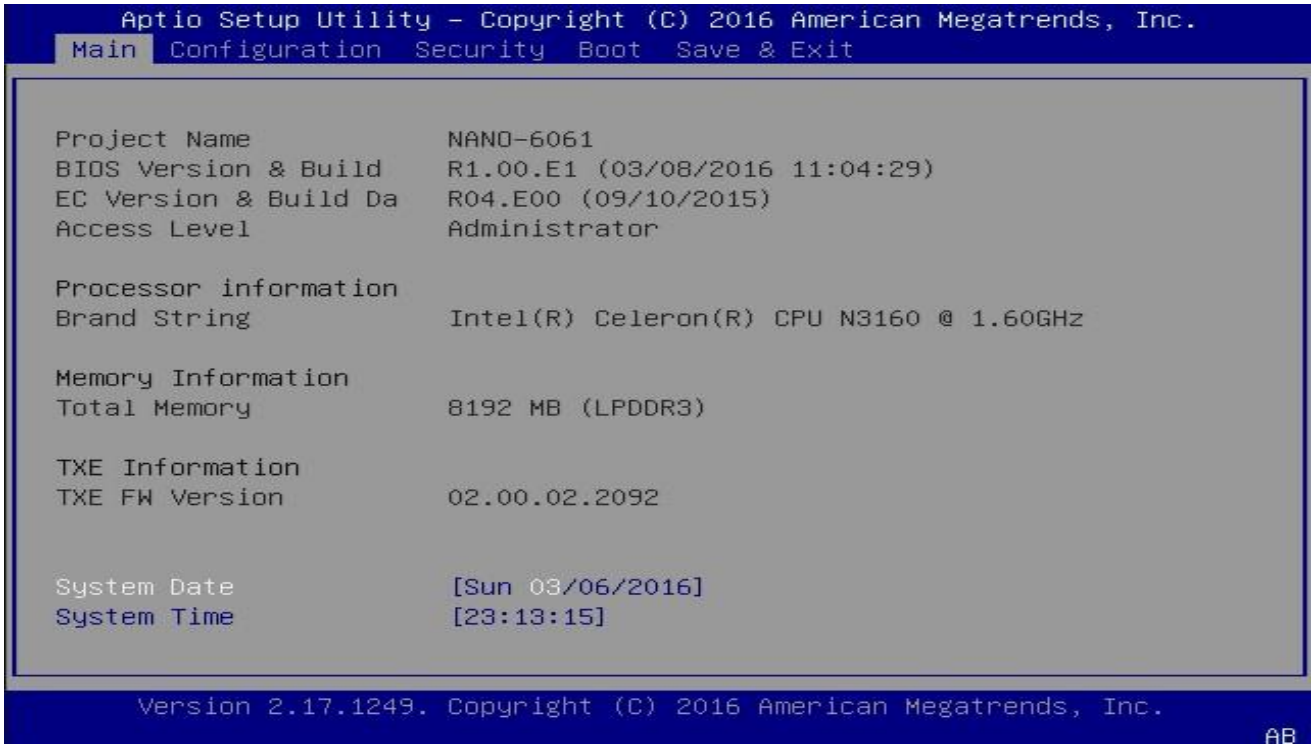
Press <F1> to Run General Help or Resume

The BIOS setup program provides a General Help screen. The menu can be easily called up from any menu 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.



7.2.1 Main

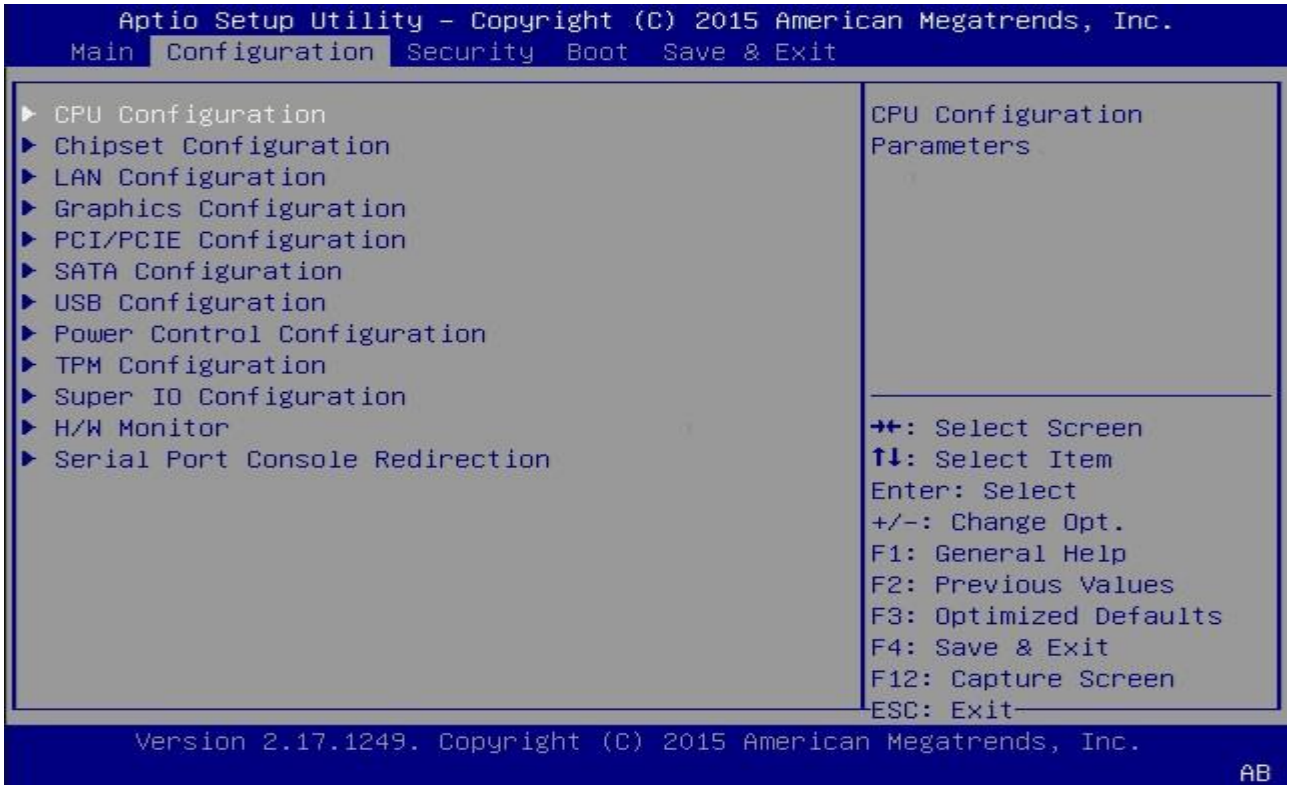
Use this menu for basic system configurations, such as time, date etc.



Feature	Description	Options
System Date	The date format is <Day>, <Month> <Date> <Year>. Use [+] or [—] to configure system Date.	
System Time	The time format is <Hour> <Minute> <Second>. Use [+] or [—] to configure system Time.	

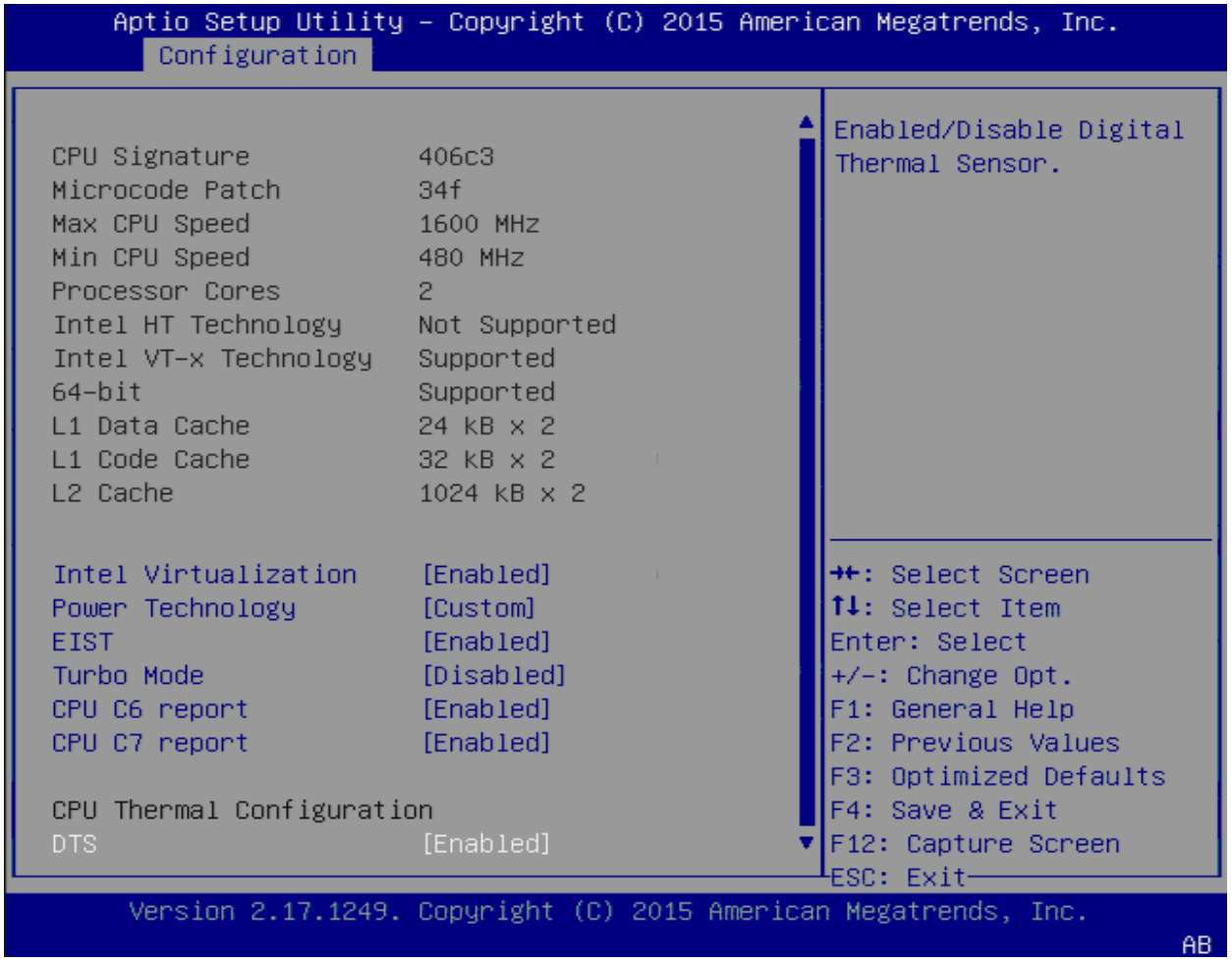
7.2.2 Configuration

Use this menu to set up the items of special enhanced features



CPU Configuration

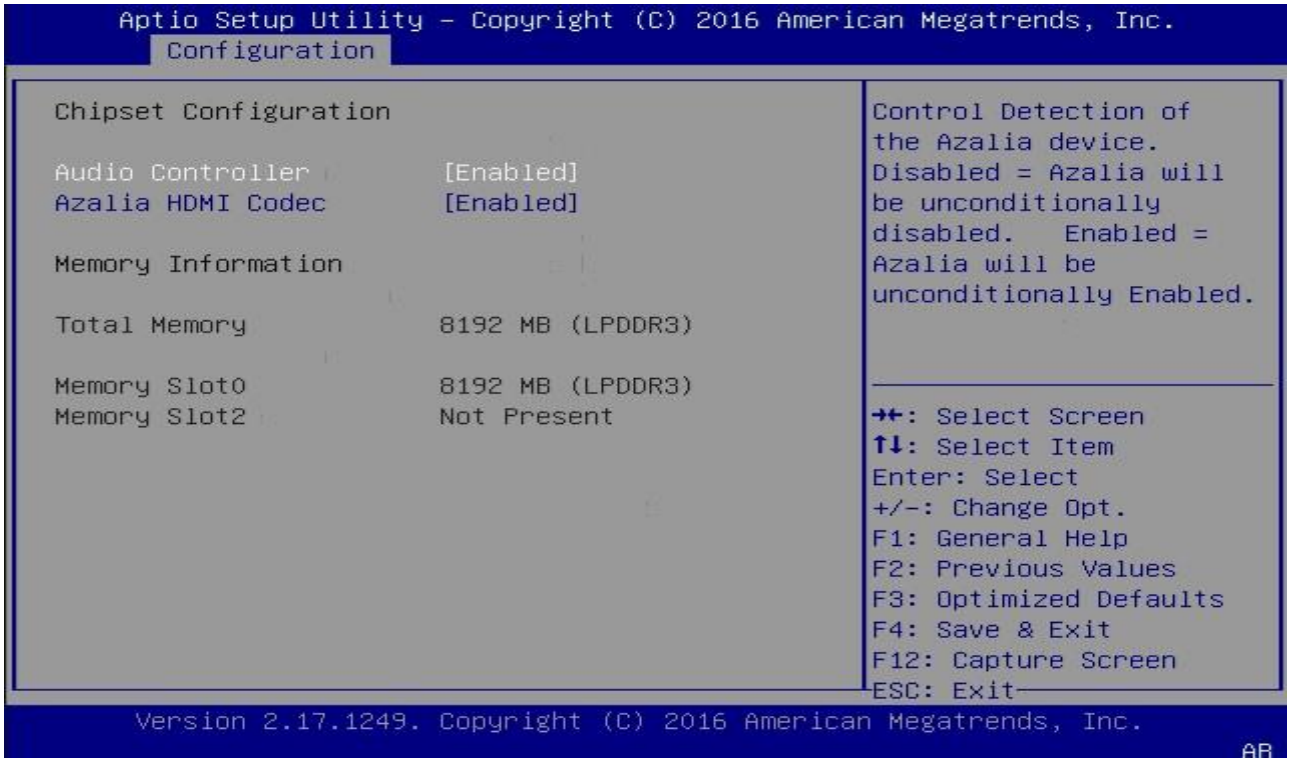
CPU Configuration Parameters



Feature	Description	Options
Intel Virtualization Technology	When enable, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology	Disabled, ★ Enabled
Power Technology (custom)	Enable the power management features	Disable, ★ Energy Efficient, Custom
EIST	Enable/Disable Intel SpeedStep	★ Enabled, Disabled
Turbo Mode	Turbo Mode.	★ Disabled, Enabled
CPU C6 report	Enable/ Disable CPU C6(ACPI C3) report to OS	★ Enabled, Disabled
CPU C7 report	Enable/ Disable CPU C7(ACPI C3) report to OS	★ Enabled, Disabled
DTS	Enable/Disable Digital Thermal Sensor	Enabled, ★ Disabled

Chipset Configuration

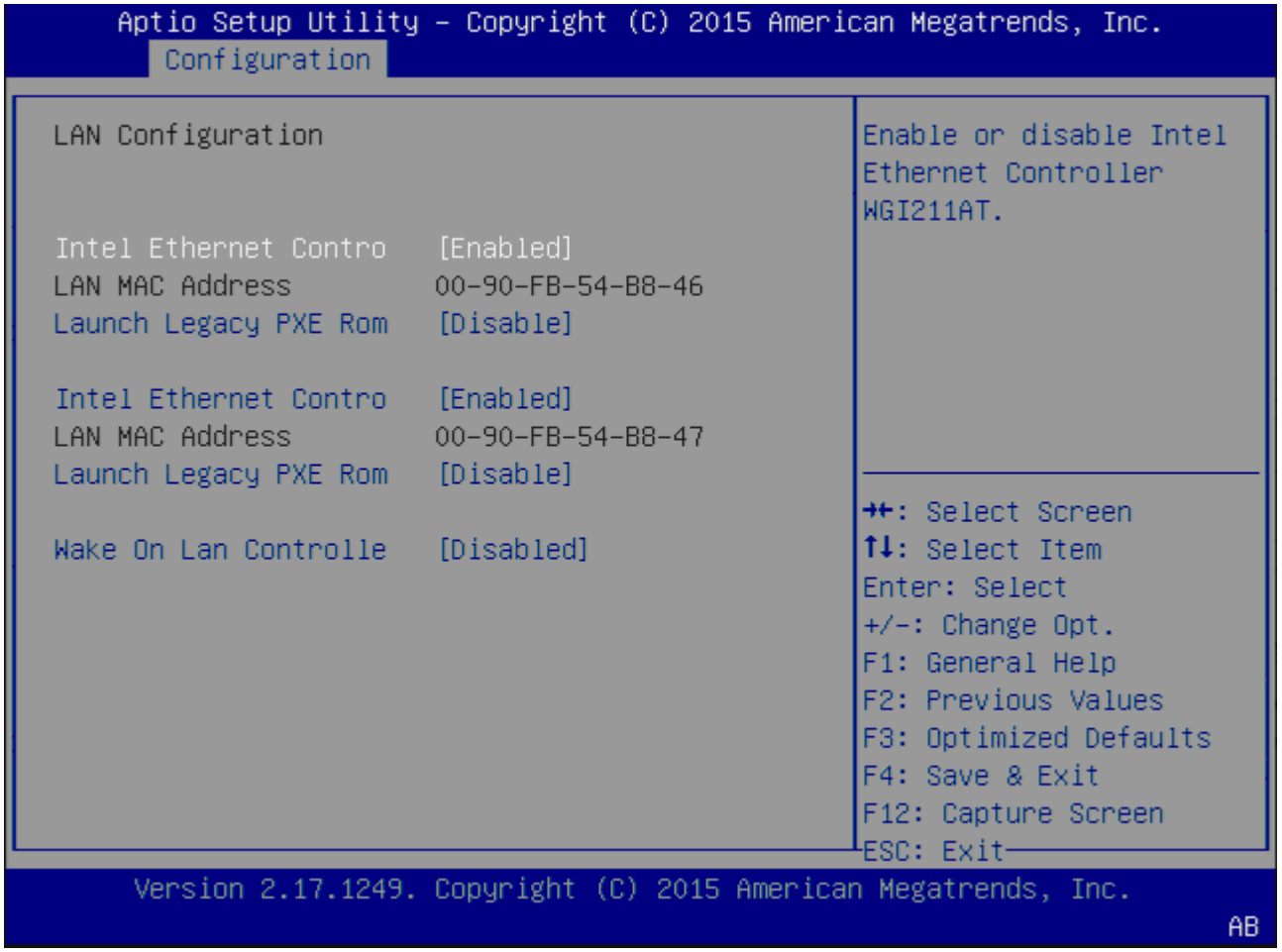
Configure Chipset feature.



Feature	Description	Options
Audio Controller	Control Detection of the Azalia device. Disable = Azalia will be unconditionally disabled. Enable = Azaliawill be unconditionally Enable.	Disabled, ★ Enabled
Azalia HDMI Codec	Enable/Disable internal HDMI codec for Azalia	Disabled, ★ Enabled

LAN Configuration

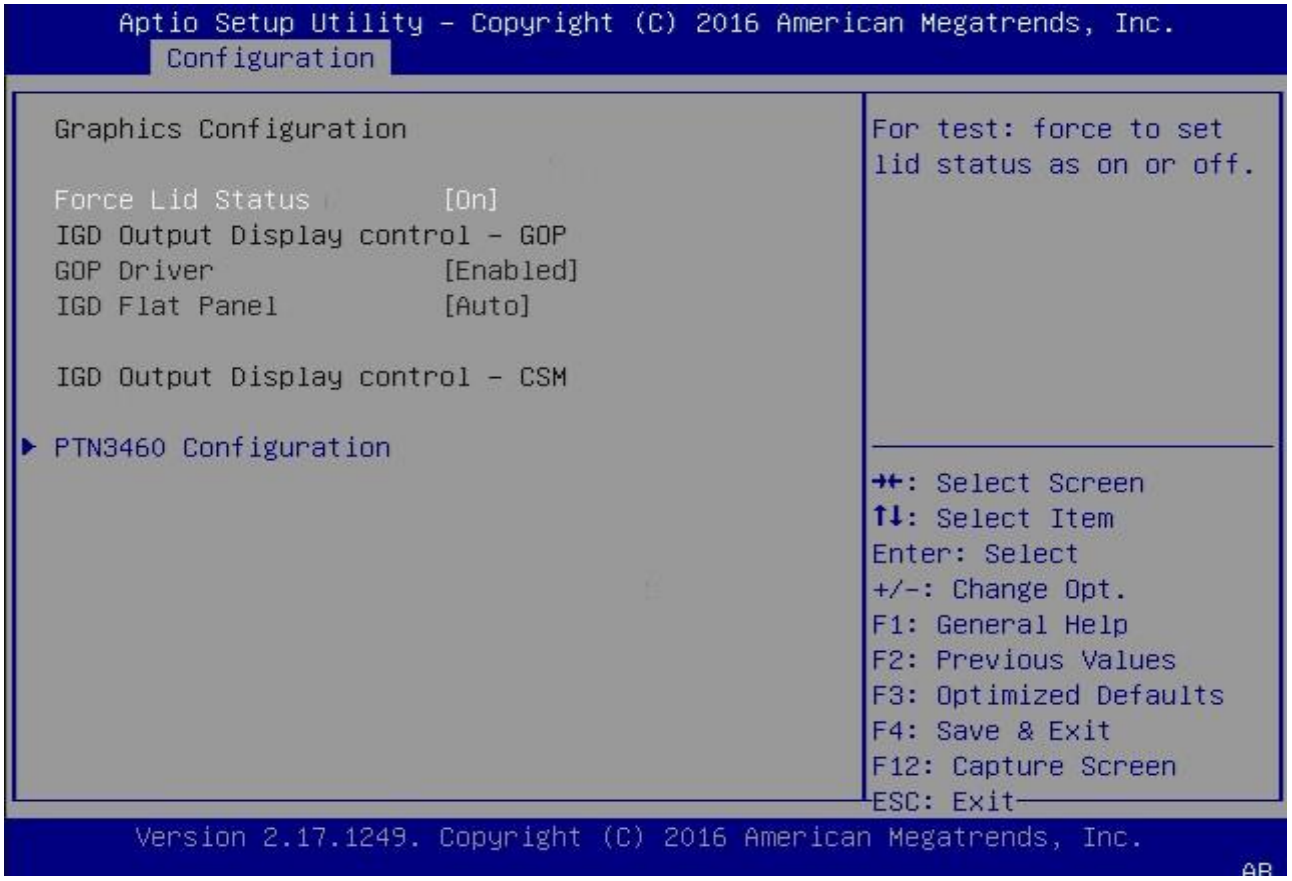
Configuration On Board LAN device



Feature	Description	Options
Intel Ethernet Controller WGI211AT	Enable or disable Intel Ethernet Controller WGI211AT.	Disabled, ★ Enabled
Launch Legacy PXE Rom	Launch Legacy PXE Rom. [Disable] Not launch Rom, [Enable] Force Launch Rom, [Auto] Auto detect LAN Cable status to Enable/Disable Rom initial	★ Disable, Enable, Auto
Intel Ethernet Controller WGI211AT	Enable or disable Intel Ethernet Controller WGI211AT.	Disabled, ★ Enabled
Launch Legacy PXE Rom	Launch Legacy PXE Rom. [Disable] Not launch Rom, [Enable] Force Launch Rom, [Auto] Auto detect LAN Cable status to Enable/Disable Rom initial	★ Disabled, Enabled, Auto
Wake on Lan Controller	Enable/Disable Intel Lan WGI211AT wakeup function.	Enabled, ★ Disabled

Graphics Configuration

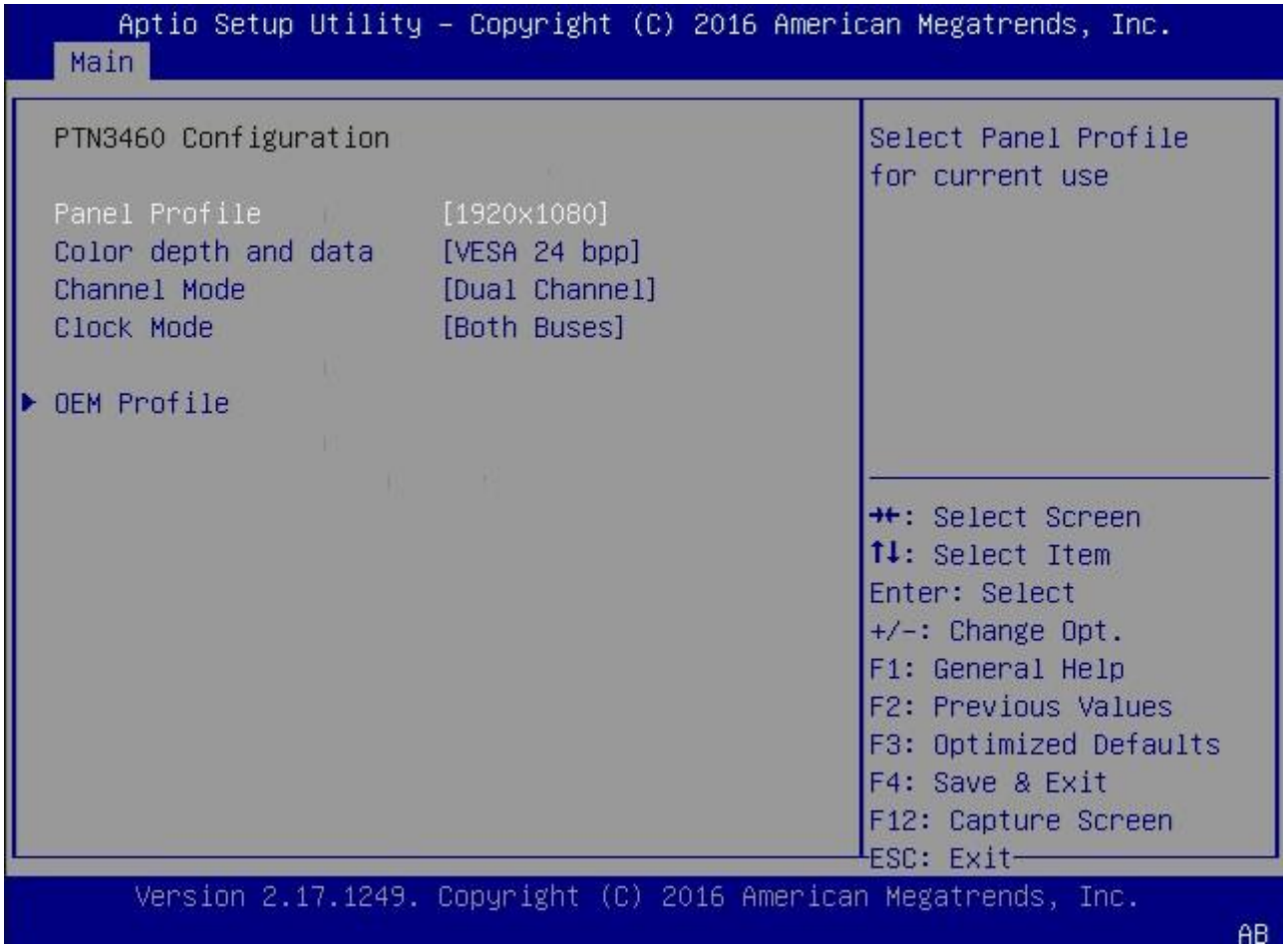
Configuration Graphic Settings



Feature	Description	Options
Force Lid Status	For test: force to set lid status as on or off.	★ On, Off

PTN3460 Configuration

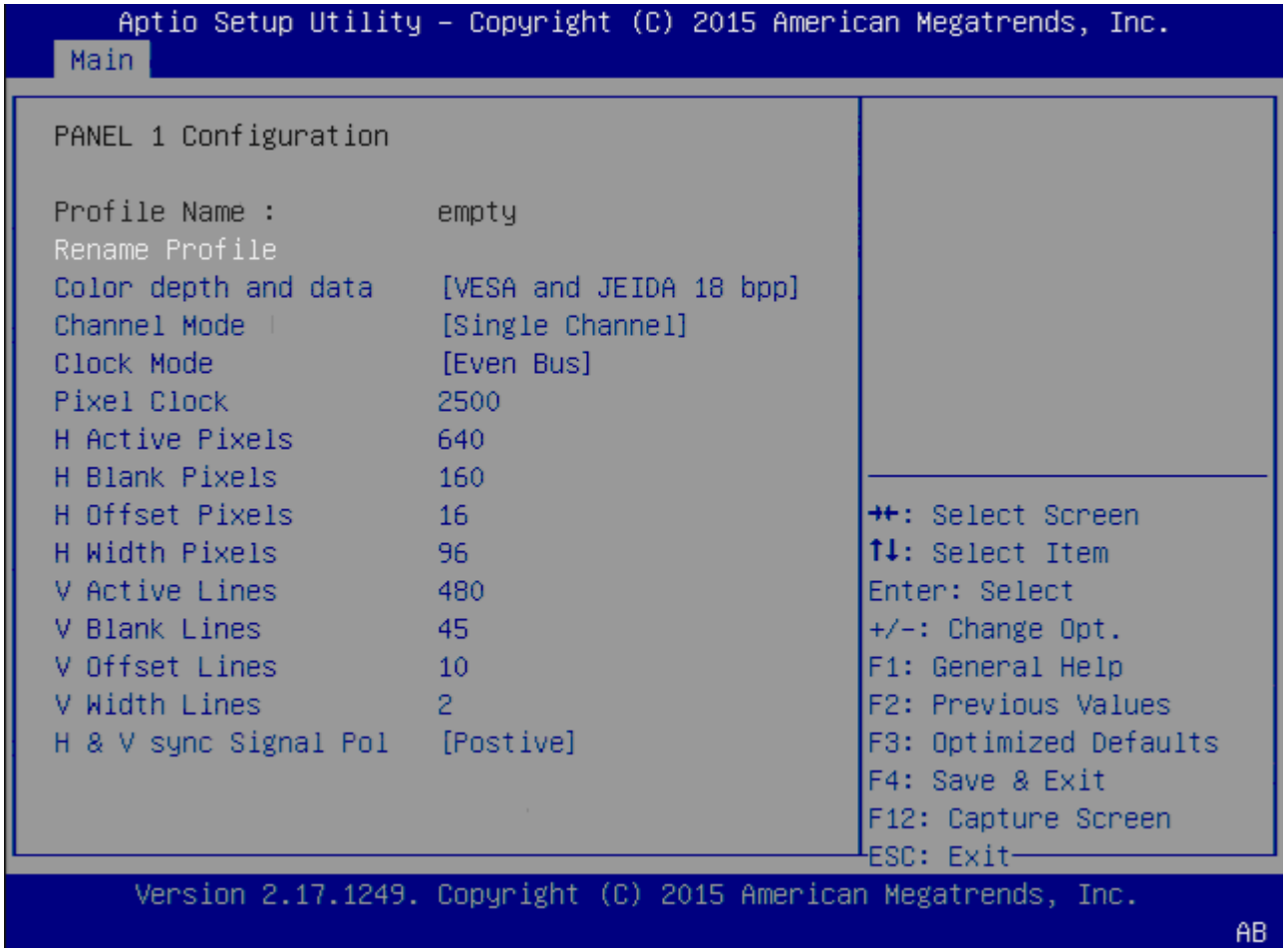
PTN3460 Help



Feature	Description	Options
Panel Profile	Select Panel Profile for current use.	640x480 800x480 800x600 1024x768 1280x800 1280x1024 1366x768 1440x900 ★ 1920x1080 OEM Profile
Color depth and data	Select Color depth and data format	★ VESA 24 bpp JEIDA 24 bpp VESA and JEIDA 18 bpp
Channel Mode	Select LVDS Channel Mode	Single Channel ★ Dual Channel
Clock Mode	Select clock output for LVDS.	Even Bus Odd Bus ★ Both Bus

OEM Profile

PANEL 1 HELP

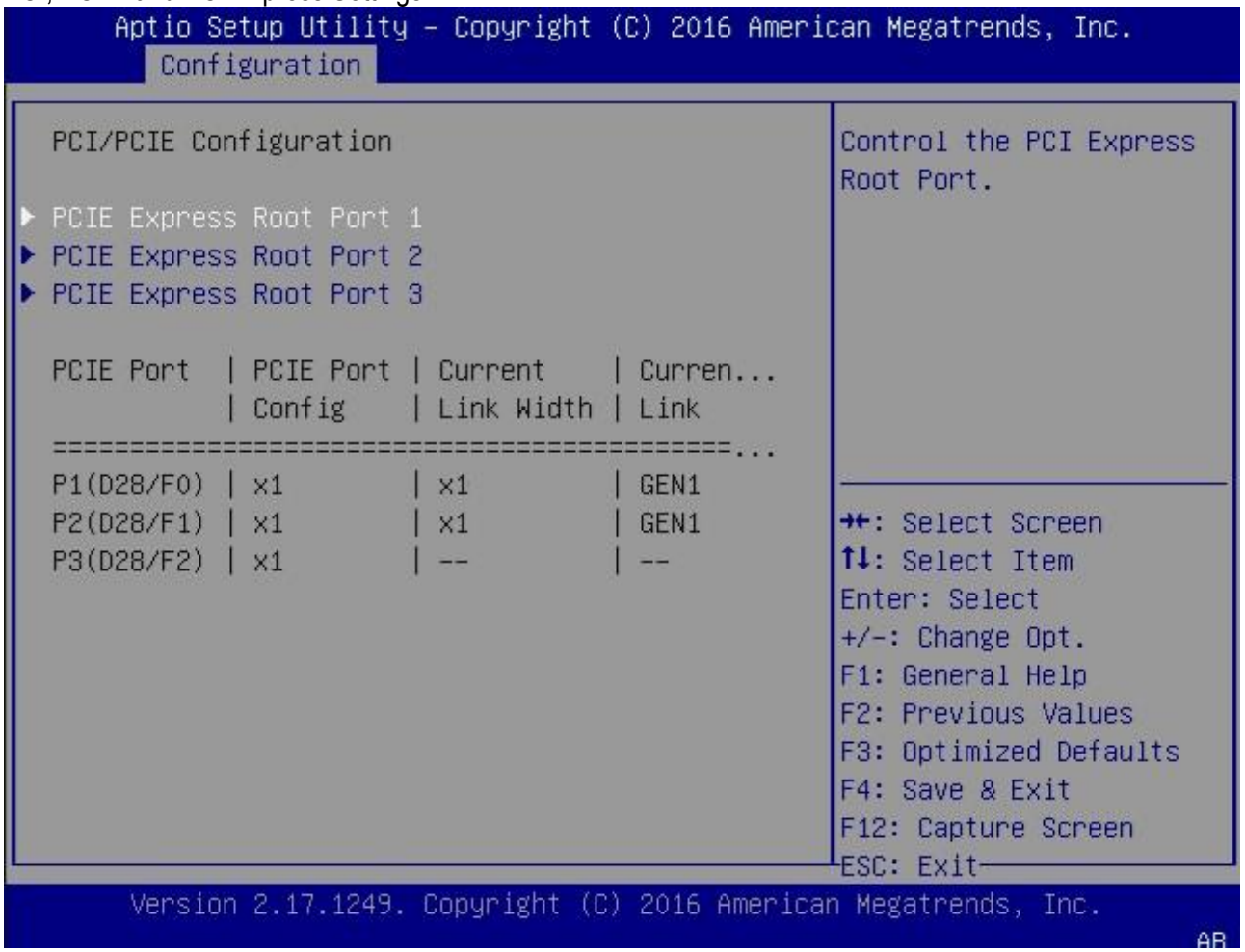


Feature	Description	Options

Rename Profile		
Color depth and data	Select Color depth and data format.	VESA 24 bpp JEIDA 24 bpp ★ VESA and JEIDA 18 bpp
Channel Mode	Select LVDS Channel Mode	★ Single Channel Dual Channel
Clock Mode	Select clock output for LVDS.	★ Even Bus, Odd Bus, Both Bus
Pixel Clock	Pixel Clock (10Khz)	
H Active Pixels	H Active Pixels (Pixel)	
H Blank Pixels	H Blank Pixels (Pixel)	
H Offset Pixels	H Offset Pixels (Pixel)	
H Width Pixels	H Width Pixels (Pixel)	
V Active Lines	V Active Lines (Line)	
V Blank Lines	V Blank Lines (Line)	
V Offset Lines	V Offset Lines (Line)	
V Width Lines	V Width Lines (Line)	
H & V sync Signal Pol	Flag: 0x1E Signal Polarity is Postive 0x18 Signal Polarity is Non-Postive	★ Postive, Non-Postive

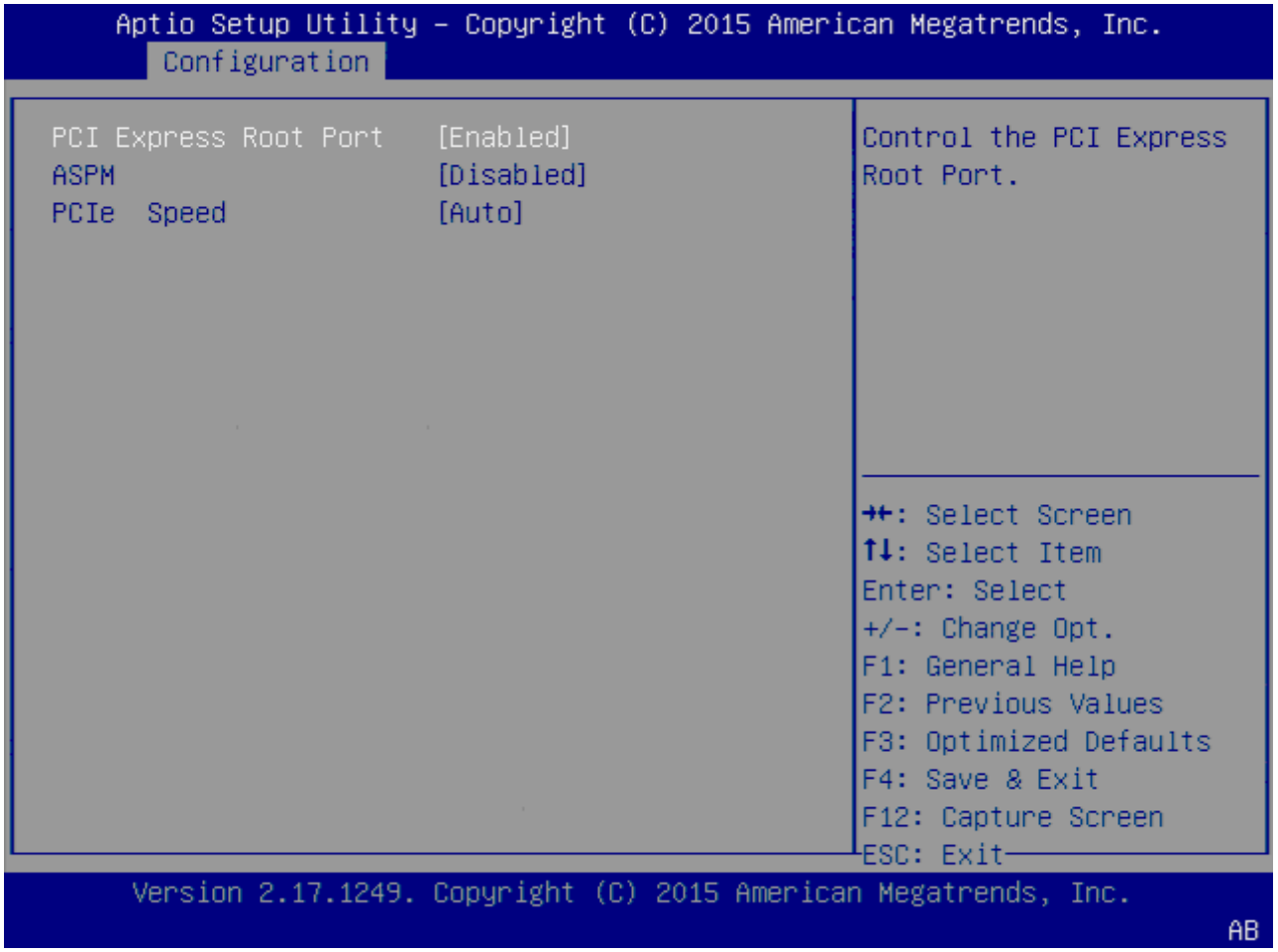
PCI/PCIE Configuration

PCI, PCI-X and PCI Express Settings.



PCIE Express Root Port 1

Control the PCI Express Root Port



Feature	Description	Options
PCI Express Root Port	Control the PCI Express Root Port.	★ Enabled, Disabled
ASPM	PCI Express Active State Power Management settings.	★ Disabled L0s L1 L0sL1 Auto
PCIe Speed	Configure PCIe Speed. CHV A1 always with Gen1 Speed.	★ Auto Gen 2 Gen1

PCIE Express Root Port 2

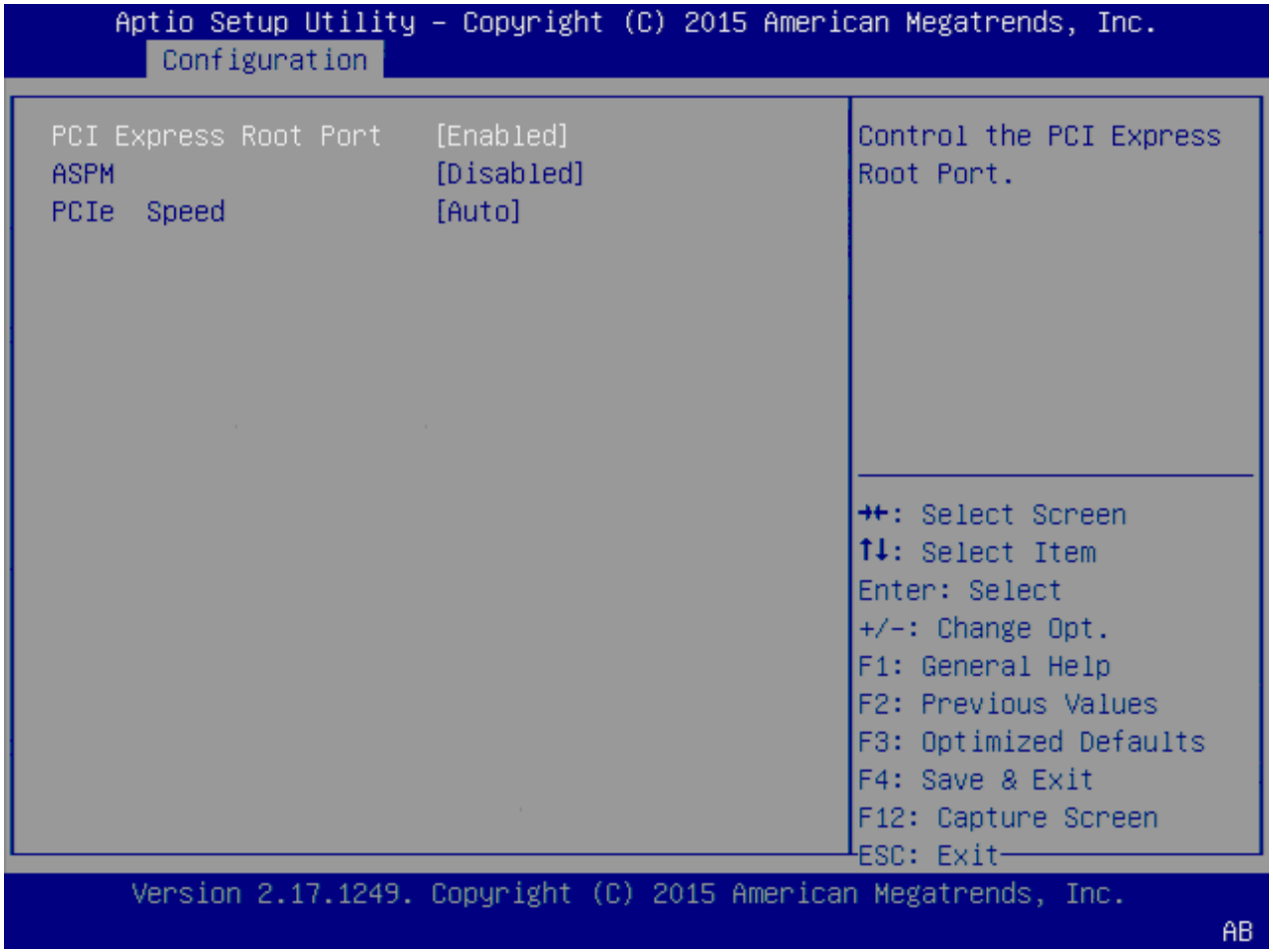
Control the PCI Express Root Port

Feature	Description	Options

PCI Express Root Port	Control the PCI Express Root Port.	★ Enabled, Disabled
ASPM	PCI Express Active State Power Management settings.	★ Disabled, L0s, L1, L0sL1, Auto
PCIe Speed	Configure PCIe Speed. CHV A1 always with Gen1 Speed.	★ Auto, Gen 2, Gen1

PCIE Express Root Port 3

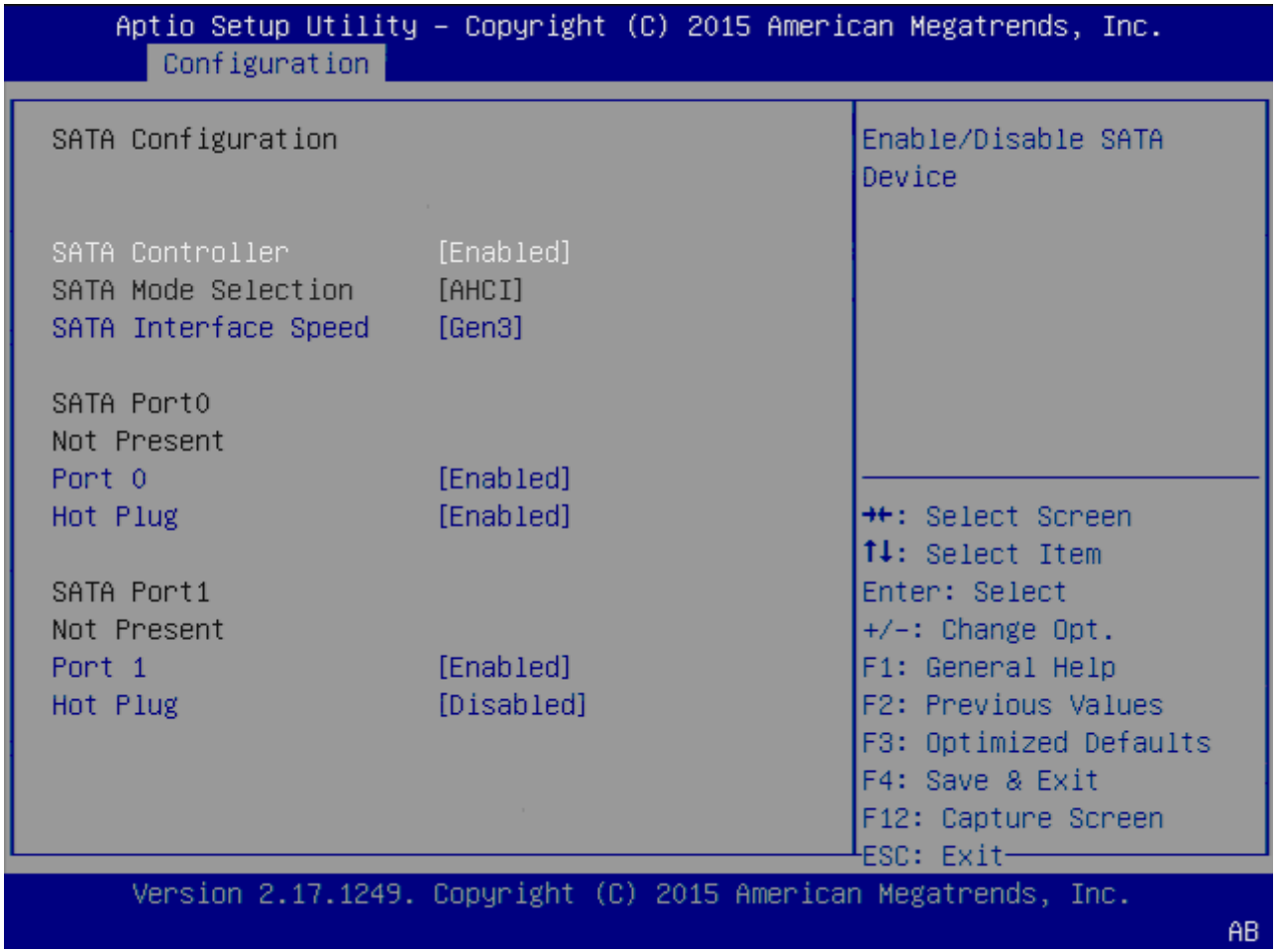
Control the PCI Express Root Port



Feature	Description	Options
PCI Express Root Port	Control the PCI Express Root Port.	★ Enabled, Disabled
ASPM	PCI Express Active State Power Management settings.	★ Disabled L0s L1 L0sL1 Auto
PCIe Speed	Configure PCIe Speed. CHV A1 always with Gen1 Speed.	★ Auto Gen 2 Gen1

SATA Configuration

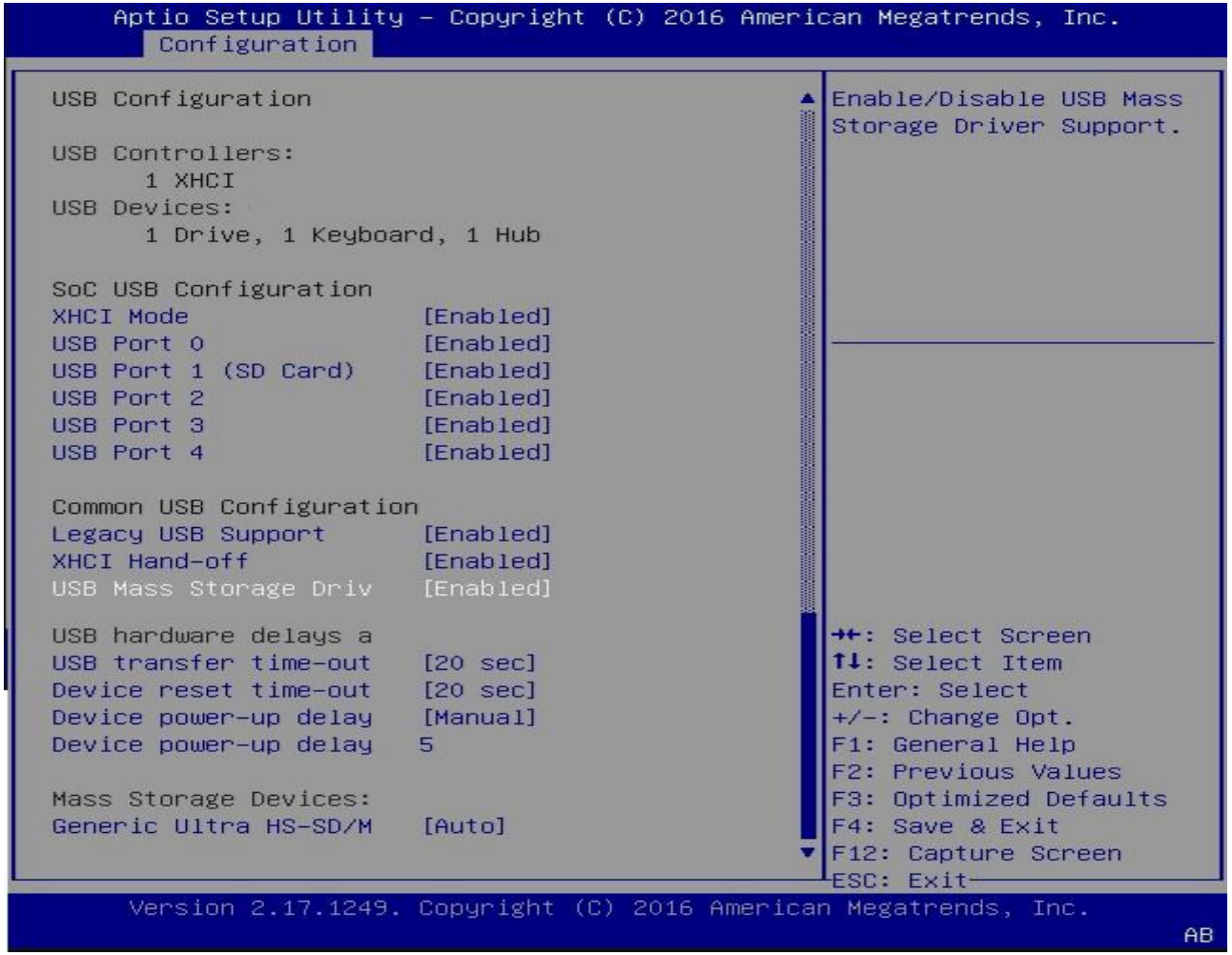
SATA Device Options Settings



Feature	Description	Options
SATA Controller	Enable/Disable SATA Device	★ Enabled, Disabled
SATA Interface Speed	Select SATA Interface Speed, CHV A1 always with Gen1 Speed.	Gen1 Gen2 ★ Gen3
Port 0	Enable/Disable SATA Port.	★ Enabled, Disabled
Hot Plug	Designates this port as Hot Pluggable.	Enabled, ★ Disabled
Port 1	Enable/Disable SATA Port.	★ Enabled, Disabled
Hot Plug	Designates this port as Hot Pluggable.	Enabled, ★ Disabled

USB configuration

USB Configuration Parameters.

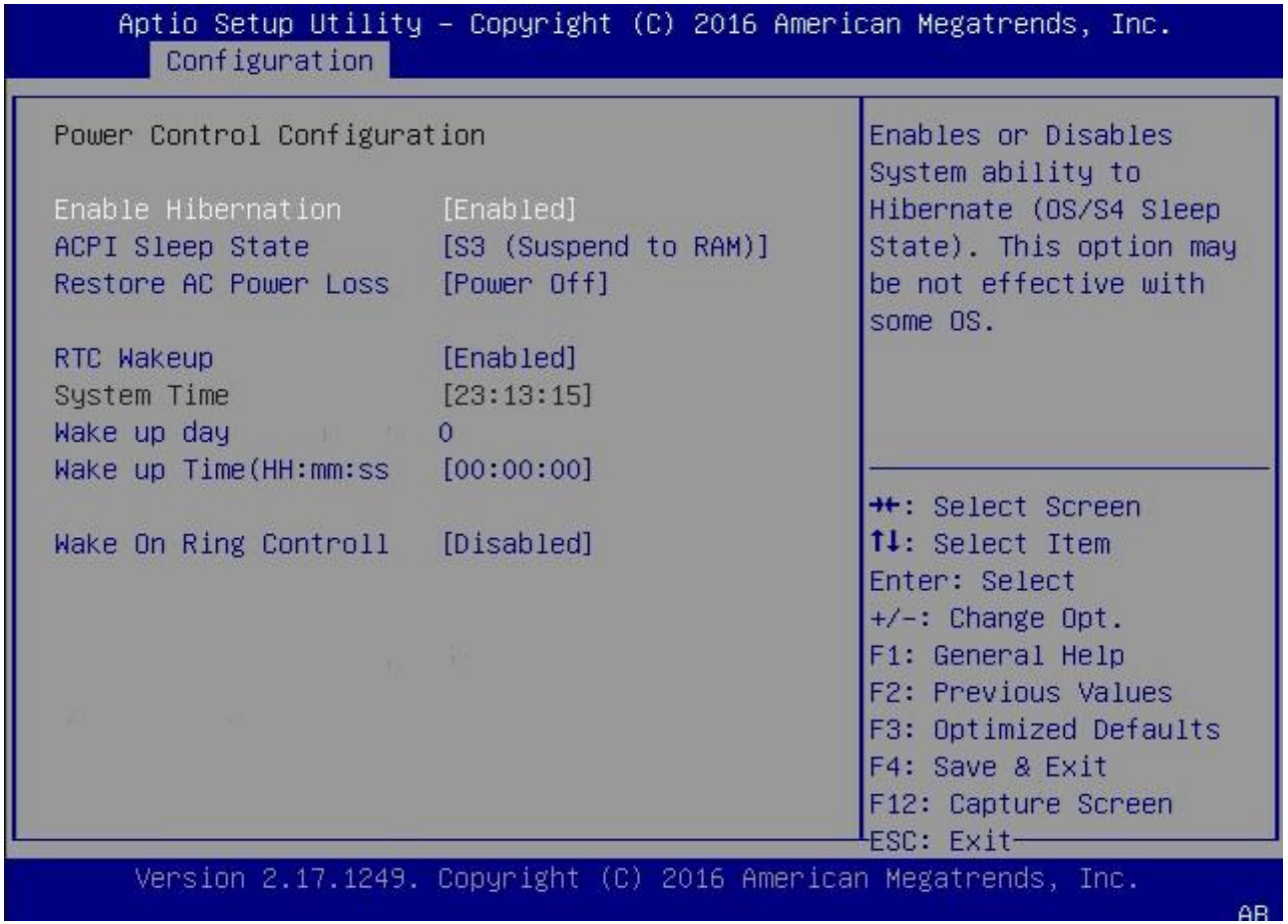


Feature	Description	Options
XHCI Mode	Made of operation of xHCI controller	★ Enabled Disabled
USB Port 0	Enable / Disable USB Port 0	★ Enabled Disabled
USB Port 1 (SD Card)	Enable / Disable USB Port 1. This port is connected to 2.0 SD/MMC Memory Card Reader.	★ Enabled Disabled
USB Port 2	Enable / Disable USB Port 2	★ Enabled Disabled
USB Port 3	Enable / Disable USB Port 3	★ Enabled Disabled
USB Port 4	Enable / Disable USB Port 4	★ Enabled Disabled
Legacy USB Support	Enables Legacy USB support. AUTO option disable legacy support if no USB device are connected. DISABLE option will keep USB devices available only for EFI applications.	★ Enabled Disabled AUTO
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.	★ Enabled Disabled
USB Mass Storage Driv	Enable/ Disable USB Mass Storage Driver Support.	Disabled ★ Enabled
USB transfer time-out	The time-out value for Control, Bulk, and Interrupt transfers.	1 sec 5 sec 10 sec ★ 20 sec
Device reset time-out	USB mass storage device Start Unit command time-out.	10 sec ★ 20 sec 30 sec 40 sec

Device power-up delay (Manual)	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.	★ Auto Manual
Device power-up delay	Delay range is 1..40 seconds, in one second increments	
Generic Ultra HS-SD/M	Mass storage device emulation type. 'Auto" enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.	★ Auto Floppy Forced FDD Hard Disk CD-ROM

Power Control Configuration

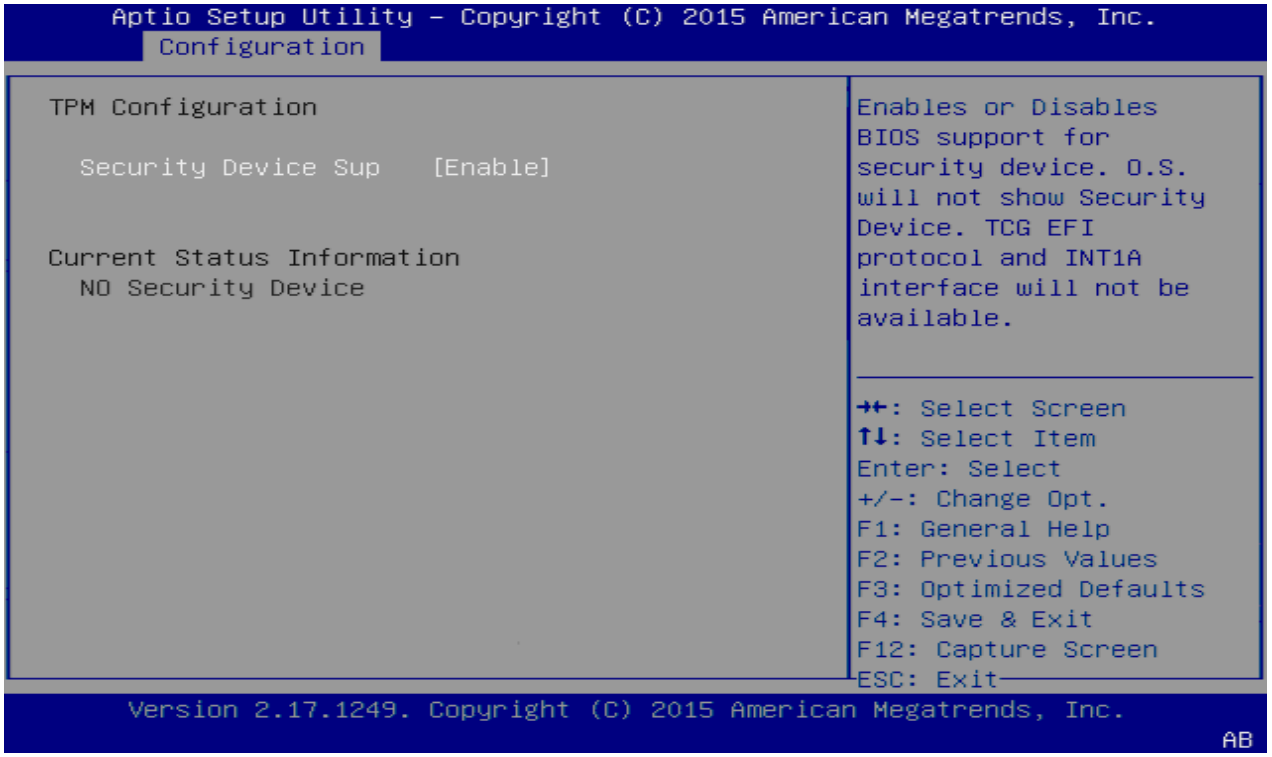
System Power Control Configuration Parameters.



Feature	Description	Options
Enable Hibernation	Enables or Disable System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.	Disabled ★ Enabled
ACPI Sleep State	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.	Suspend Disabled ★ S3 (Suspend to RAM)
Restore AC Power Loss	Select AC power state when power is re-applied after a power failure.	★ Power Off Power On Last State
RTC Wakeup	Enable/Disable system wake on alarm event.. [Enabled], system will wake on the Hour: Min: Sec specified. [Disabled] Turn off RTC Wakeup.	★ Disabled Enabled
Wake up day	Select 0 for daily system wake up 1-31 for which day of the month that you would like the system to wake up	
Wake up Time (HH: mm: ss)	Use [Enter], [TAB] to select field, HH: 0-23, mm: 0-59, ss: 0-59	
Wake On Ring Controll	Enable/Disable GPIO Wake On Ring function.	Enabled ★ Disabled

TPM Configuration

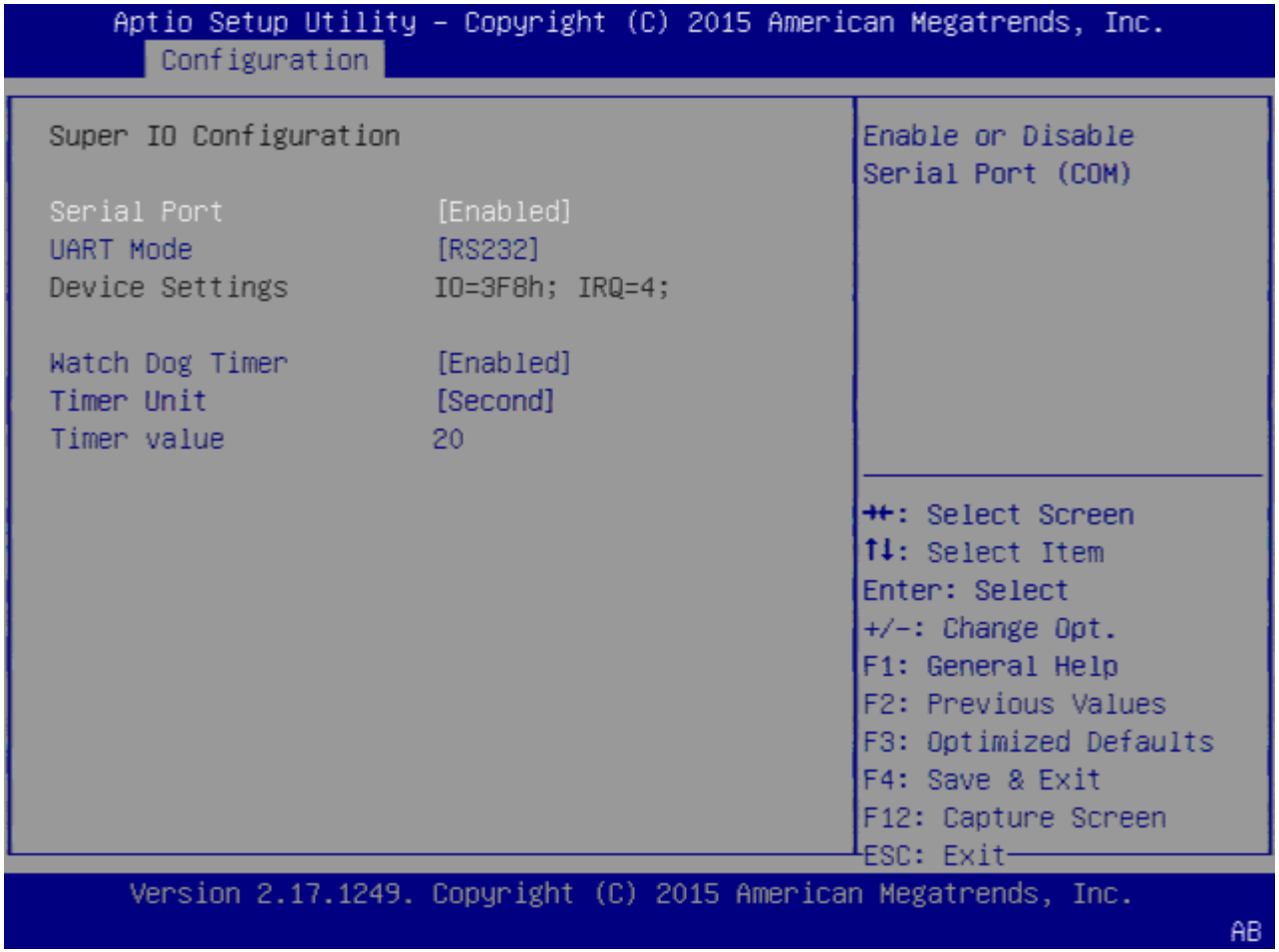
Trusted Computing Settings



Feature	Description	Options
Security Device Sup	Enable or Disables BIOS support fir security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.	Disable ★ Enable

Super IO Configuration

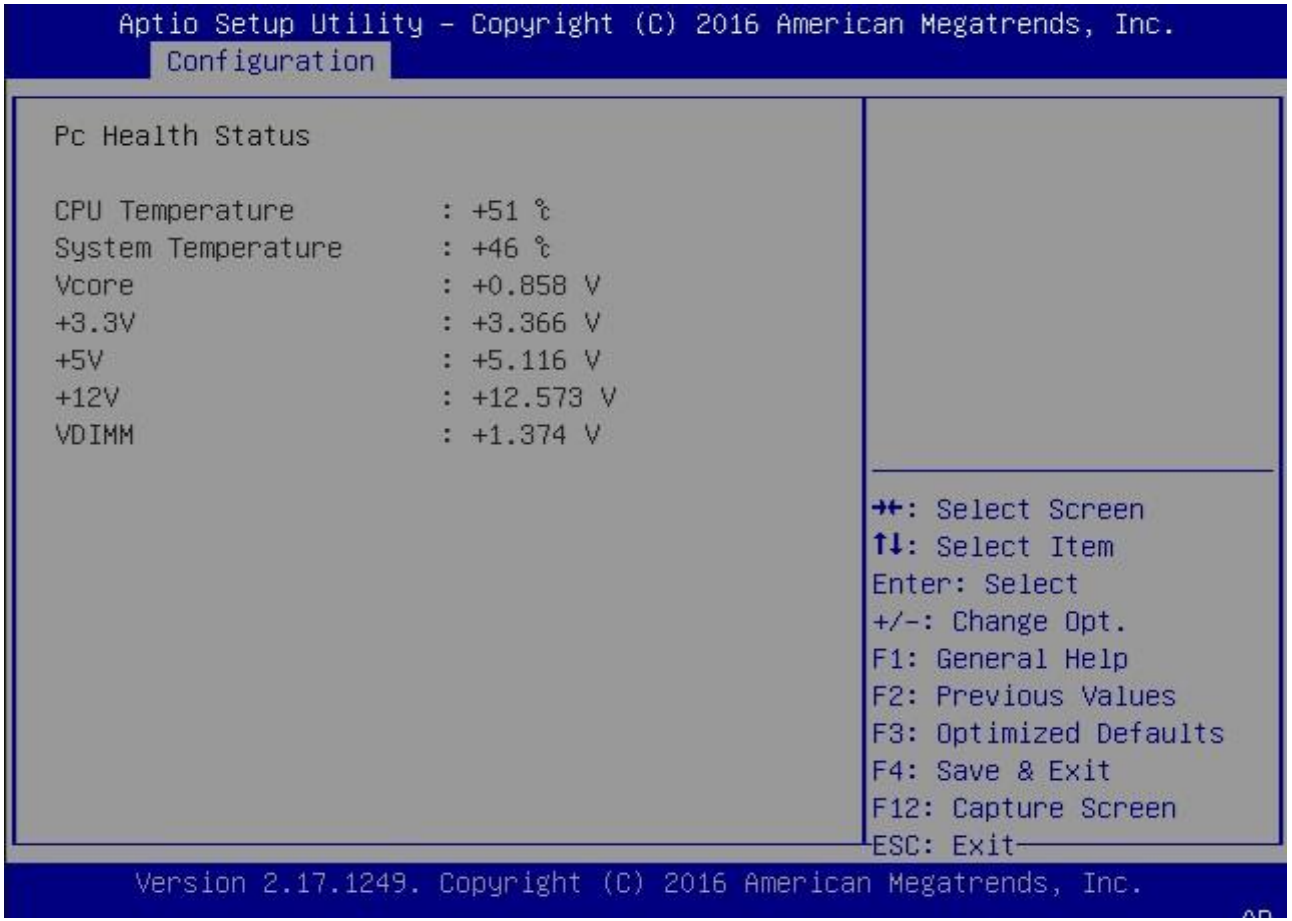
System Super IO Chip Parameters..



Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	Disabled ★ Enabled
UART Mode	Set Current UART MODE RS232, RS485, RS485/RS422	★ RS232 RS485 HALF DUFLEX RS485/422 FULL DUFLEX
Watch Dog Timer (Enable)	Enable/Disable Watch Dog Timer	★ Disabled Enabled
Timer Unit	Select Timer count unit of WDT	Second Minute
Timer value	Set WDT Timer value seconds/minutes	

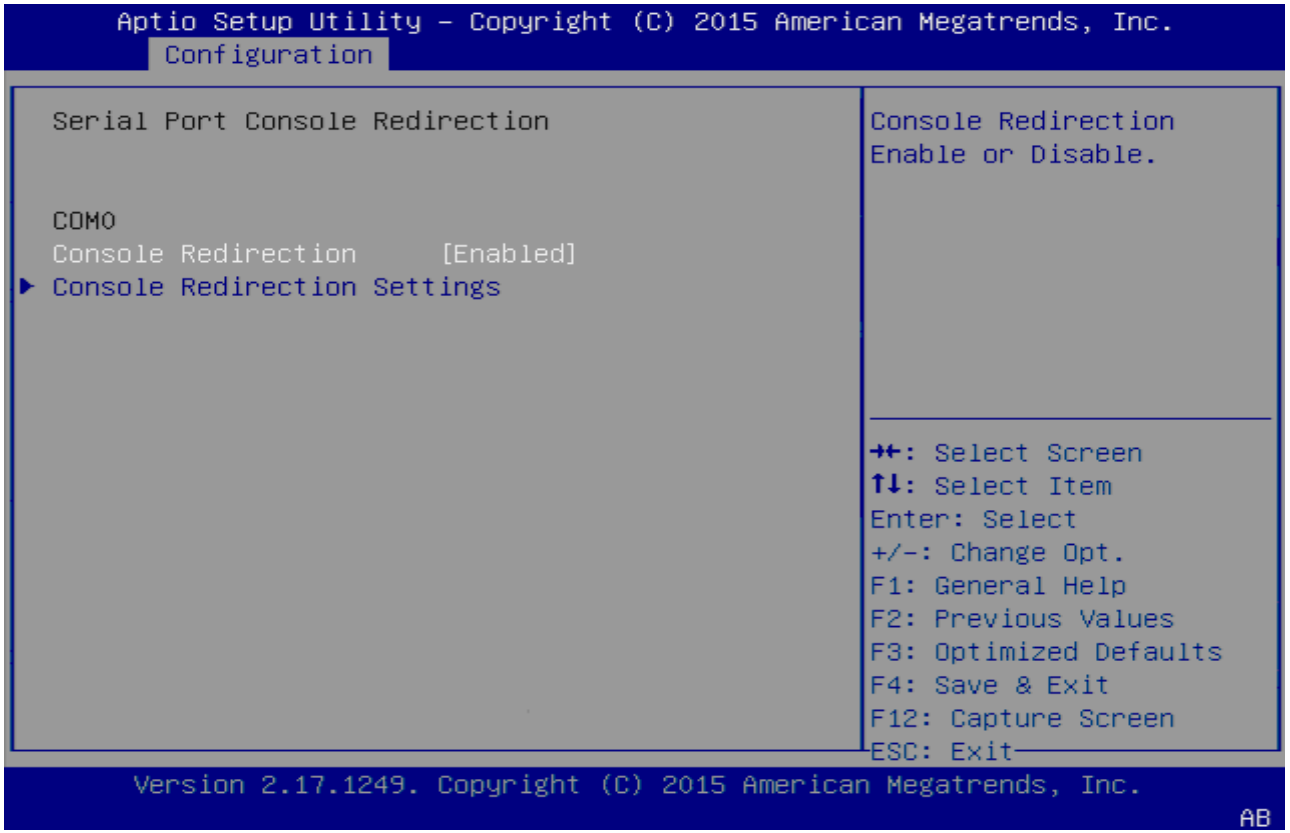
H/W Monitor

Monitor hardware status



Serial Port Console Redirection

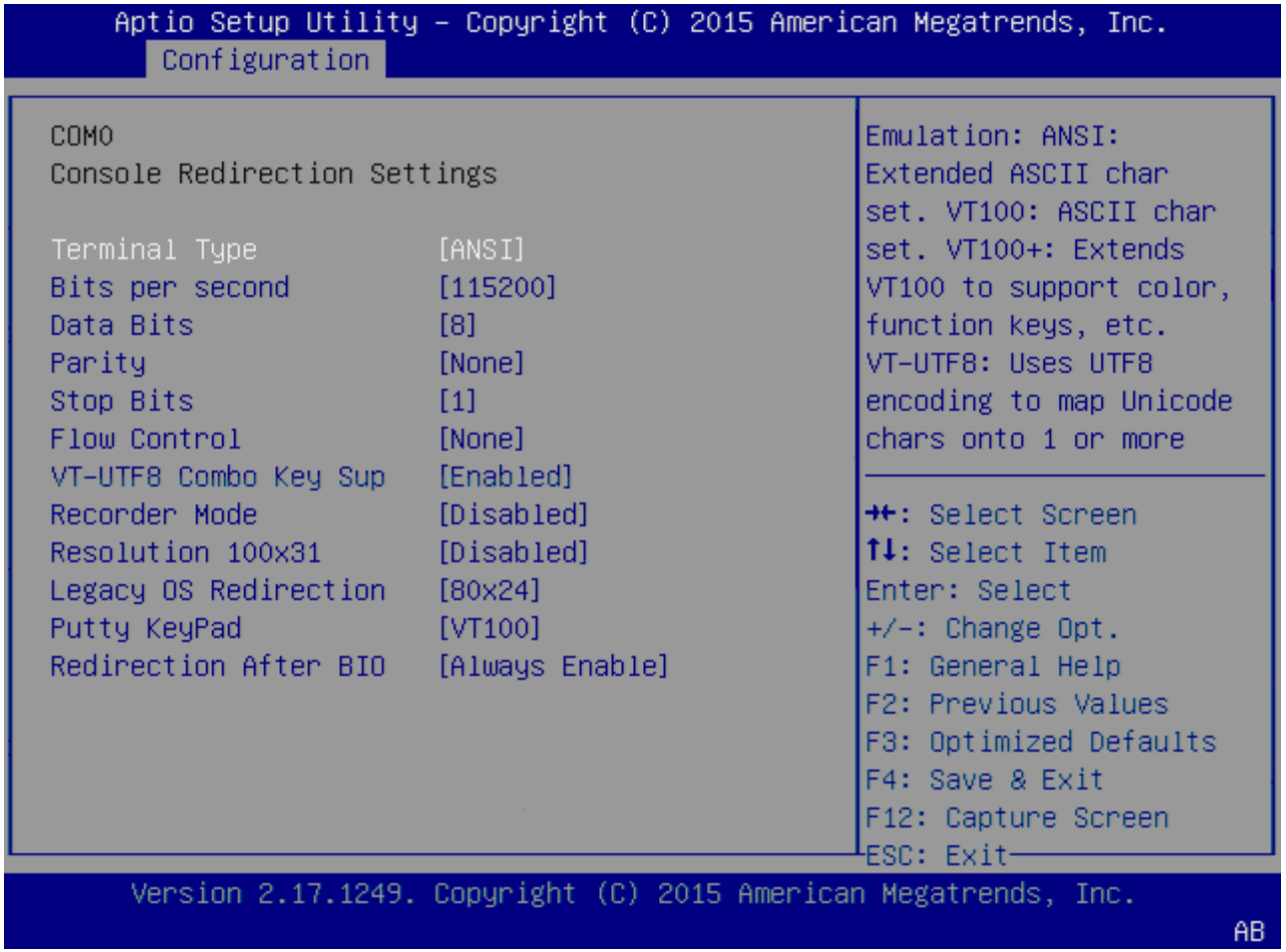
Serial Port Console Redirection.



Feature	Description	Options
Console Redirection (Enable)	Console Redirection Enable or Disable.	★ Disabled Enabled

Console Redirection Settings

Console Redirection Enable or Disable.

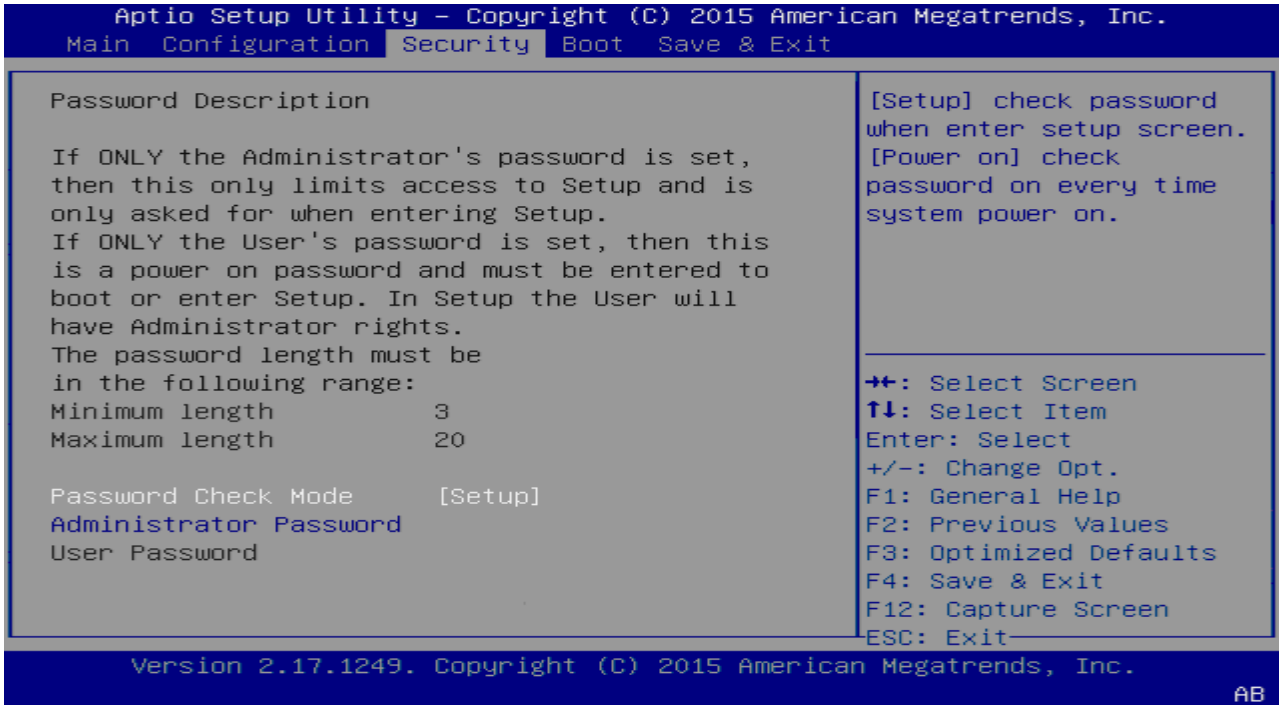


Feature	Description	Options
Terminal Type	Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes	VT100 VT100+ VT-UTF8 ★ ANSI
Bits per second	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.	9600 19200 38400 57600 ★ 115200
Data Bits	Data Bits	7, ★ 8
Parity	A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 is the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.	★ None Even Odd Mark Space
Stop Bits	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.	★ 1,2
Flow Control	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.	★ None Hardware RTS/CTS
VT-UTFB Combo Key Support	Enable VT-UTFB Combination Key Support for ANSI/VT100 terminals	Disabled ★ Enabled
Recorder Mode	With this mode enable only text will be sent. This is to capture Terminal data.	★ Disabled Enabled
Resolution 100x31	Enables or disables extended terminal resolution	★ Disabled

		Enabled
Legacy OS Redirection Resolution	On Legacy OS, the Number of Rows and Columns supported redirection	★ 80x24 80x25
Putty keypad	Select Function Key and Key Pad on Putty.	★ VT100 LINUX XTERM6 SCO ESCN VT400
Redirection After BIOS POST	The Setting specify if Boot Loader is selected then Legacy console redirection is disable before booting to Legacy OS. Default value always enable which means Legacy console Redirection is enable for Legacy OS.	★ Always Enable BootLoader

7.2.3 Security

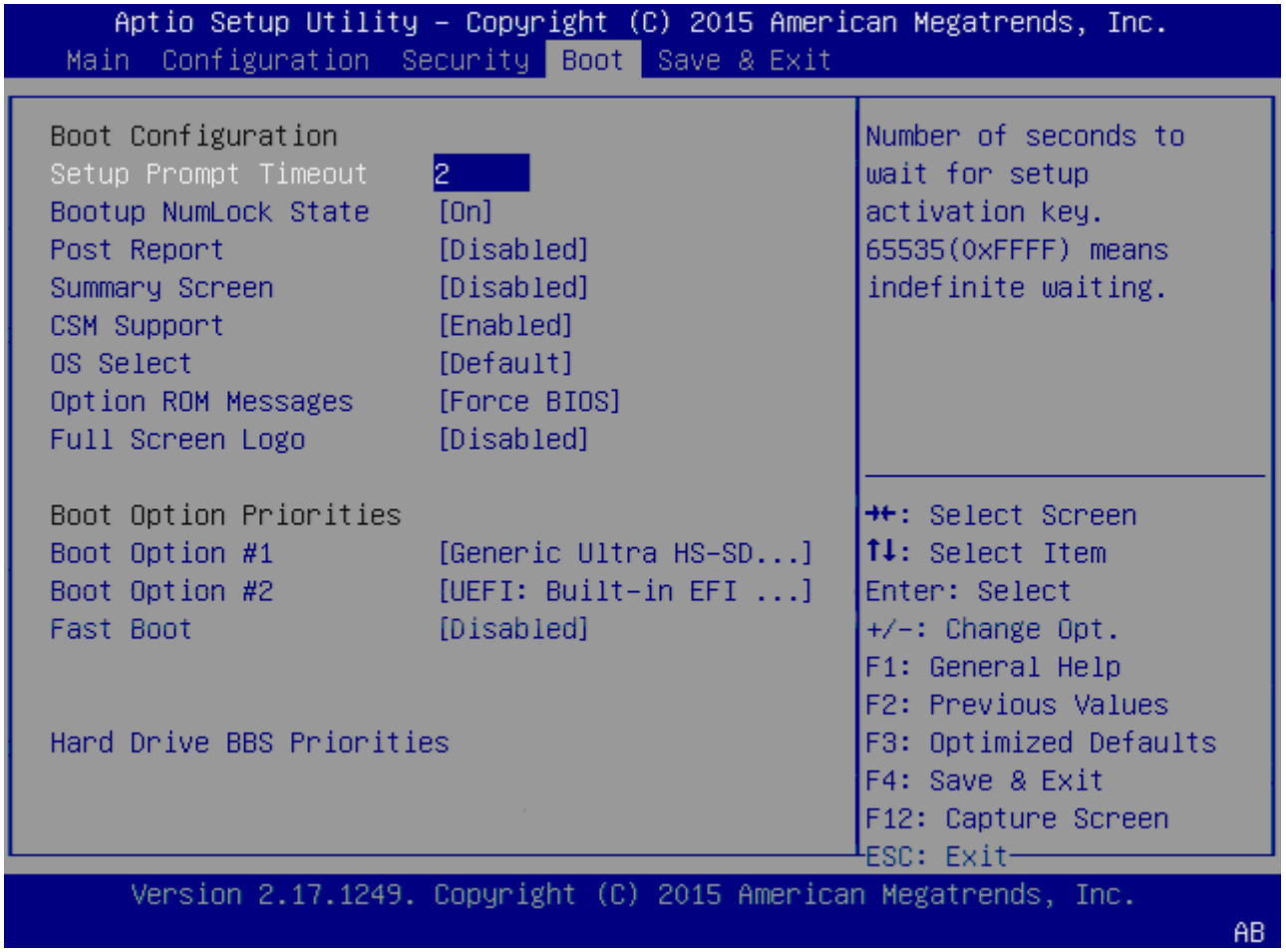
This section lets you set security passwords to control access to the system at boot time and/or when entering the BIOS setup program.



Feature	Description	Options
Password Check Mode	[Setup] check password when enter setup screen. [Power on] check password on every time system power on.	★ Setup Power On
Administrator Password	Set Administrator Password	Create New Password

7.2.4 Boot

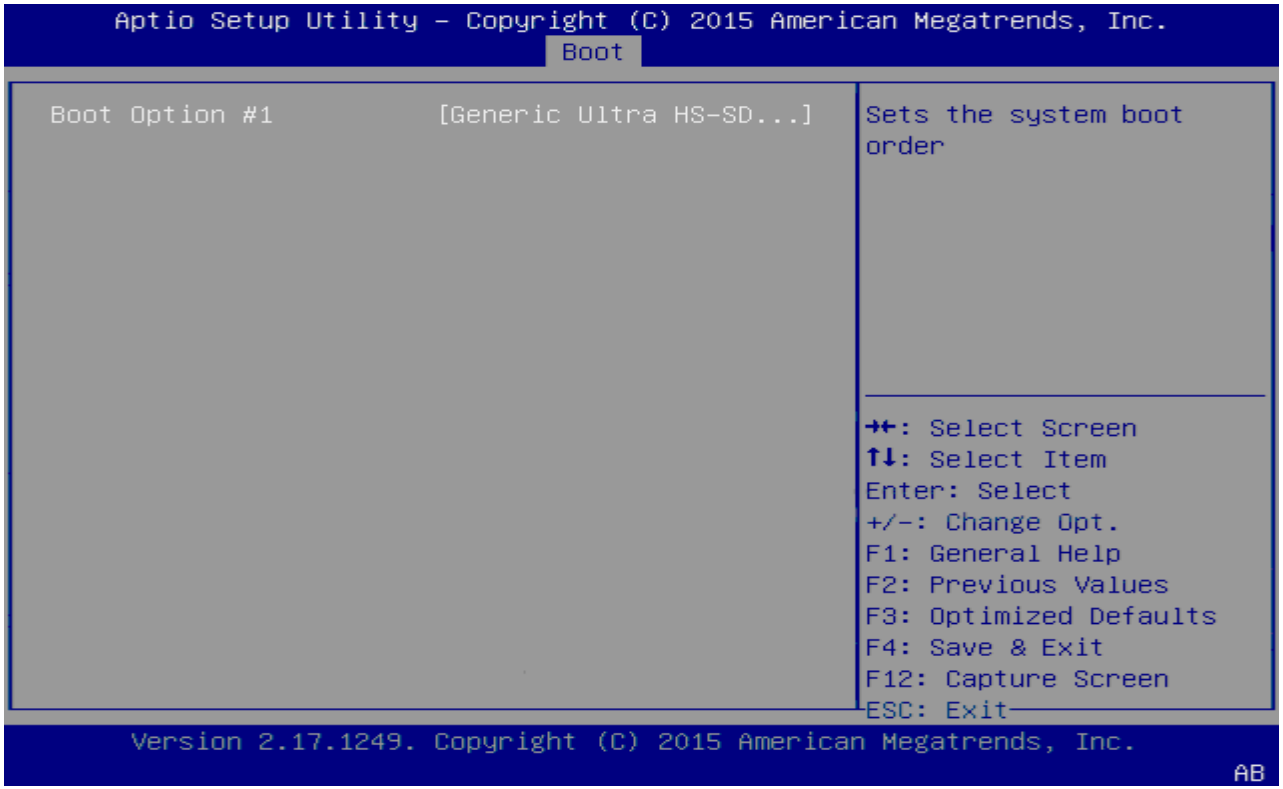
Use this menu to specify the priority of boot devices.


Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
Main Configuration Security Boot Save & Exit
Boot Configuration
Setup Prompt Timeout 2
Bootup NumLock State [On]
Post Report [Disabled]
Summary Screen [Disabled]
CSM Support [Enabled]
OS Select [Default]
Option ROM Messages [Force BIOS]
Full Screen Logo [Disabled]
Boot Option Priorities
Boot Option #1 [Generic Ultra HS-SD...]
Boot Option #2 [UEFI: Built-in EFI ...]
Fast Boot [Disabled]
Hard Drive BBS Priorities
Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
F12: Capture Screen
ESC: Exit
Version 2.17.1249. Copyright (C) 2015 American Megatrends, Inc.
AB

Feature	Description	Options
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.	2
Bootup NumLock State	Select the keyboard NumLock state	★ On Off
Post Report	Post Report Support Enabled/Disabled	★ Disabled Enabled
Summary Screen	Summary Screen Support Enabled/Disabled	★ Disabled Enabled
CSM support	Enable/Disable CSM support.	Disabled ★ Enabled
OS Select	[Default] To Win8.x / Android [Legacy System] Win7 /DOS [LINUX] Yocto Linux This item setting will effect LPSS & XHCI Hand-off items setting.	★ Default Legacy System Linux
Option ROM Messages	Set display mode for Option ROM	★ Force BIOS Keep Current
Full Screen Logo	Enables or disables Quiet Boot option and Full screen Logo.	★ Disabled Enabled
Boot Option #1	Sets the system boot order	UEFI: Built-in EFI Shell ★ Generic Ultra HS-SD/MMC Disabled
Boot Option #2	Sets the system boot order	★ UEFI: Built-in EFI Shell Generic Ultra HS-SD/MMC Disabled
Fast Boot	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.	★ Disabled Enabled

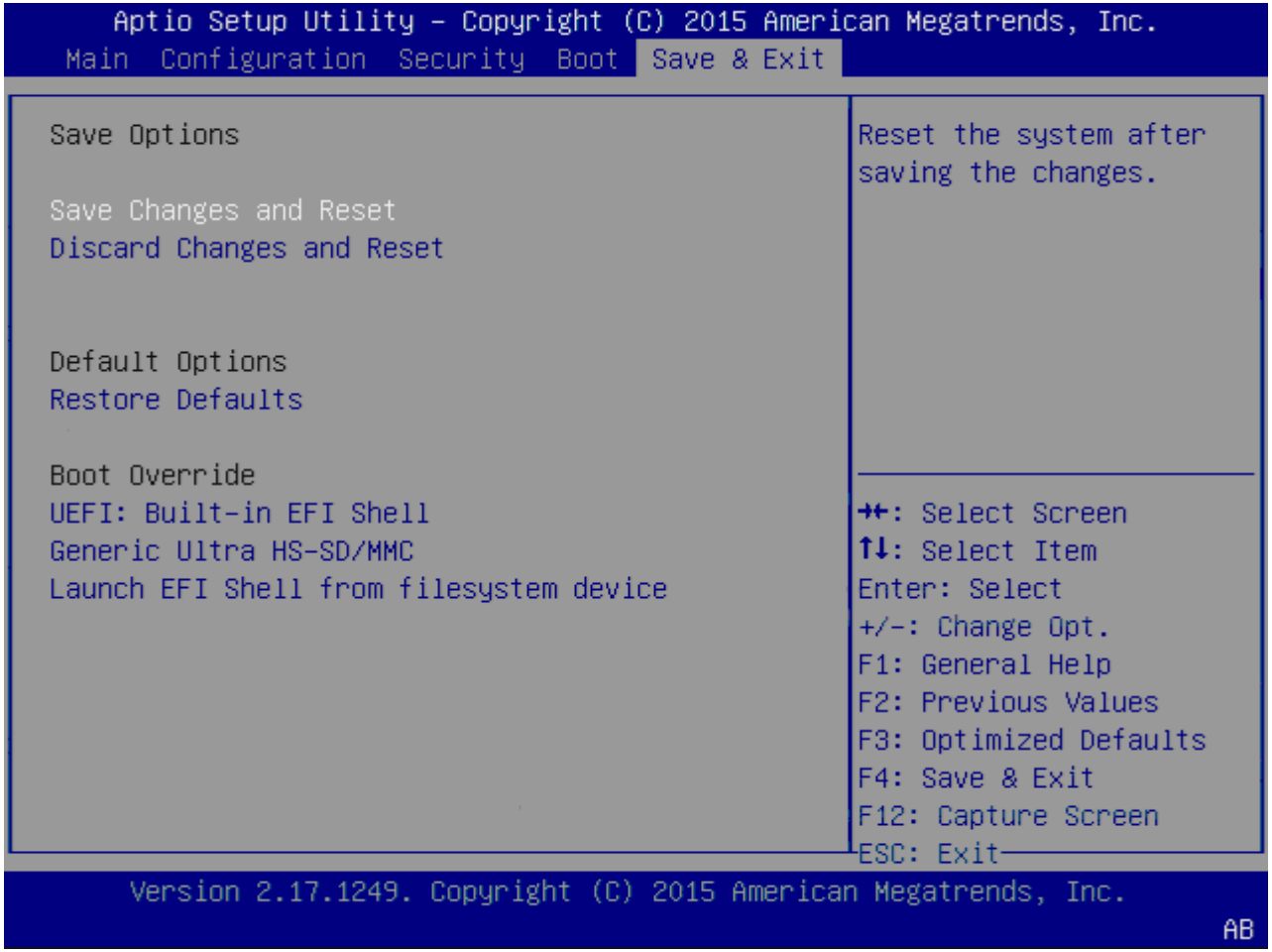
Hard Drive BBS Priorities

Set the order of the legacy devices in this group



Feature	Description	Options
Boot Option #1	Sets the system boot order	★ Generic Ultra HS-SD/MMC Disabled

7.2.4 Exit


Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
Main Configuration Security Boot Save & Exit
Save Options
Save Changes and Reset
Discard Changes and Reset
Default Options
Restore Defaults
Boot Override
UEFI: Built-in EFI Shell
Generic Ultra HS-SD/MMC
Launch EFI Shell from filesystem device
Reset the system after saving the changes.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
F12: Capture Screen
ESC: Exit
Version 2.17.1249. Copyright (C) 2015 American Megatrends, Inc.
AB

Feature	Description	Options
Save Changes and Reset	Reset the system after saving the changes	
Discard Changes and Reset	Reset system without saving any changes.	
Restore Defaults	Restore/Load Default values for all the setup options.	
Generic Ultra HS-SD/MMC	Save configuration and reset?	Yes, No
UEFI: Built-in EFI Shell	Save configuration and reset?	Yes, No
Launch EFI Shell from filesystem device	Attempts to Launch EFI Shell application (Shell.efi) from one of the available filesystem devices Save configuration and reset?	Yes, No

8 Trobleshooting

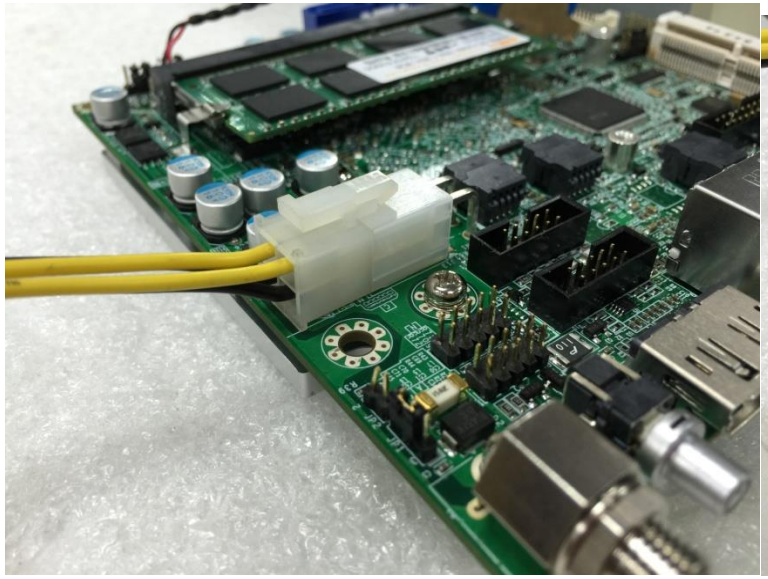
This section provides a few useful tips to quickly get NANO-6061 running with success. This section will primarily focus on system integration issues, in terms of BIOS setting, and OS diagnostics.

8.1 Hardware Quick Installation

ATX Power Setting

Unlike other Single board computer, NANO-6061 supports ATX 12V 4 Pin or Power adaptor only. Therefore, there is no other setting that needs to be setup.

However, there is ATX 4 Pin Connector – J13& DC JACK – J1 on the NANO-6061 board.



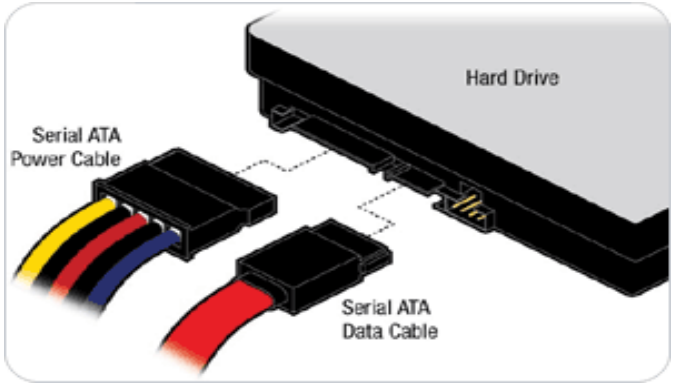
ATX 4 Pin Connector – J13

DC Jack – J1

Serial ATA

Unlike IDE bus, each Serial ATA channel can only connect to one SATA hard disk at a time;

The installation of Serial ATA is simpler and easier than IDE, because SATA hard disk doesn't require setting up Master and Slave, which can reduce mistake of hardware installation.



NANO-6061 can support two SATA interface (SATAIII, 6.0 Gb/s) on board. It has one J22 SATA ports on the board.

8.2 BIOS Setting

It is assumed that users have correctly adopted modules and connected all the devices cables required before turning on ATX power. 204-pin DDR3L Memory, keyboard, mouse, SATA hard disk, VGA connector, power cable of the device, ATX accessories are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To make sure that you have a successful start with NANO-6061, it is recommended, when going with the boot-up sequence, to hit “Del ” or ” Esc” key and enter the BIOS setup menu to tune up a stable BIOS configuration so that you can wake up your system far well.

Loading the default optimal setting

When prompted with the main setup menu, please scroll down to “Restore Defaults”, press “Enter” and select “Yes” to load default optimal BIOS setup. This will force your BIOS setting back to the initial factory configurations. It is recommended to do this so you can be sure the system is running with the BIOS setting that Portwell has highly endorsed. As a matter of fact, users can load the default BIOS setting at any time when system appears to be unstable in boot up sequence.

8.3 FAQ

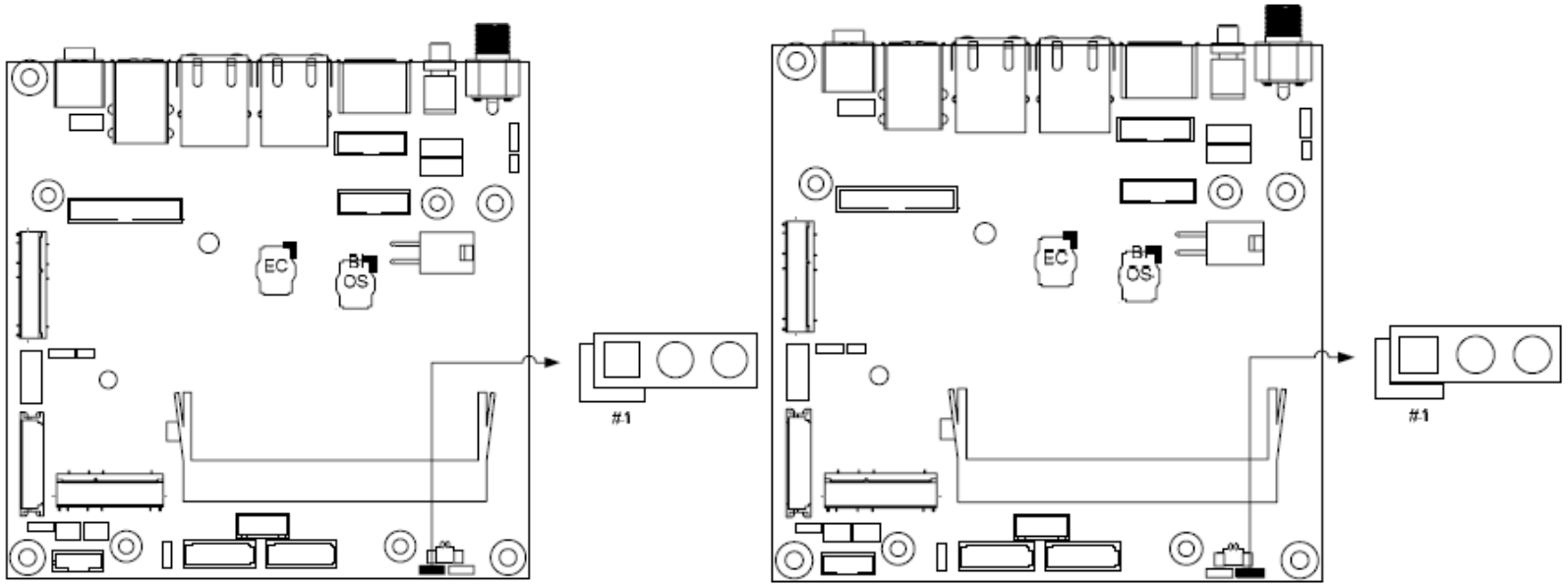
Information & Support

Question: How to clear CMOS?

Answer: You can switch off your power supply then find the JP9/10 to set it from 1-2 short to 2-3 short and wait 10 seconds to clean your password then set it back to 1-2 short to switch on your power supply.

JP9/JP10：CMOS Setting

	Jumper Setting Describe
*1-2	Default
2-3	Clean CMOS

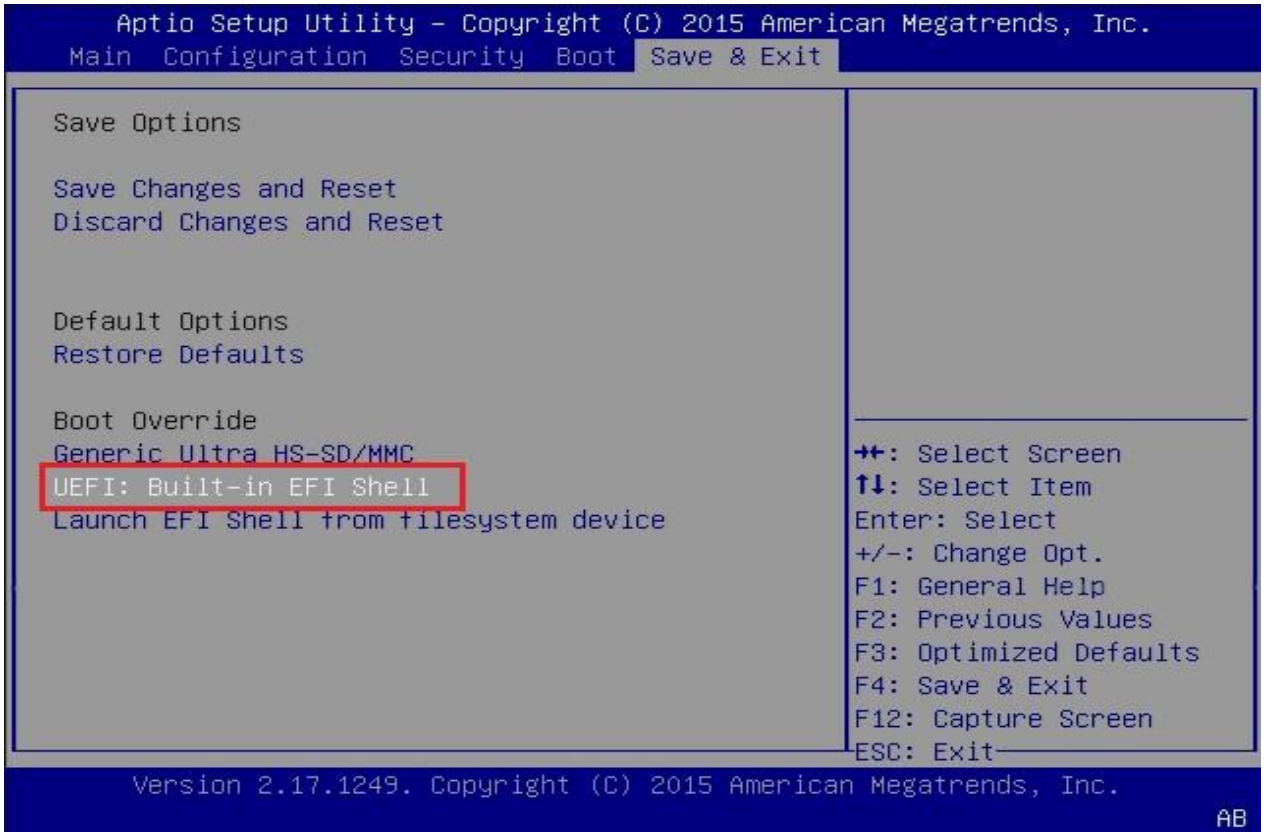


JP9 JP10

Question: How to update the BIOS file of NANO-6061?

Answer: 1. Please visit web site of **Portwell download center** as below hyperlink
http://www.portwell.com.tw/support/download_center.php
Registering an account in advance is a must. **(The E-Mail box should be an existing Company email address that you check regularly.)**
http://www.portwell.com.tw/member/newmember.php
2. Type in your User name and password and log in the download center.
3. Select **"Search download"** and type the keyword **"NANO-6061"**.
4. Find the **"BIOS "**page and download the ROM file and flash utility.
5. Unzip file to bootable USB flash drive which can boot to dos mode. Then execute the **"update.efi"**. It will start to update BIOS.

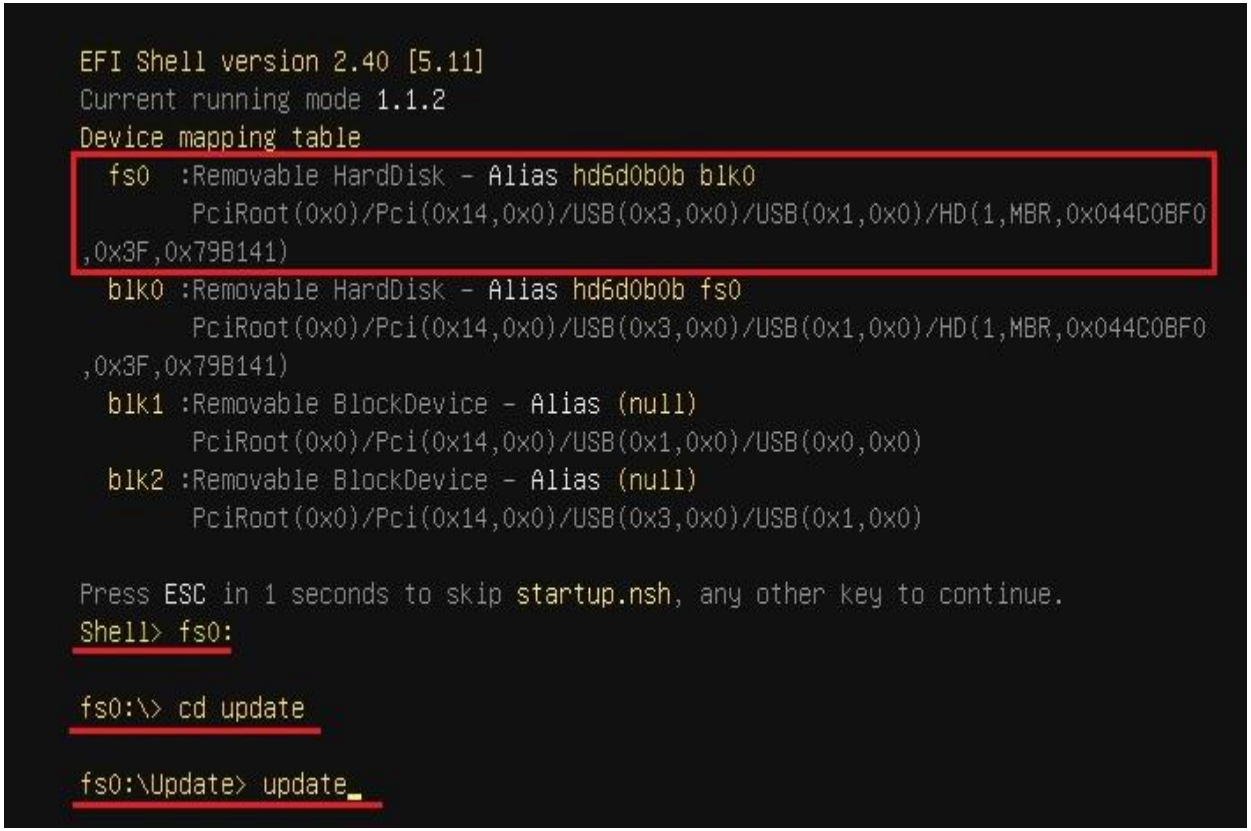
6. Reboot the system and getting into [Shell]. Please follow the below instruction to update BIOS.



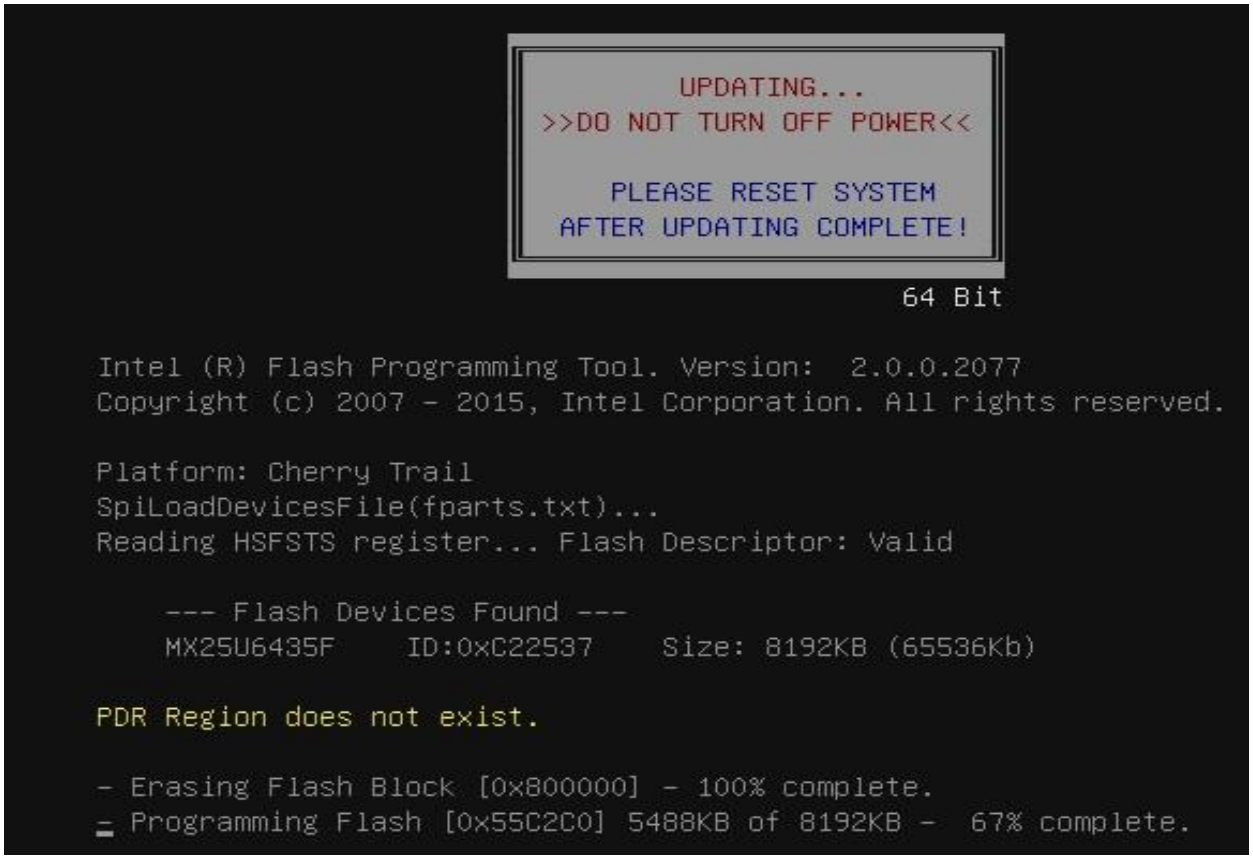
a. Key-in “fs0” to access your pen driver.

b. “cd update” to access the root folder.

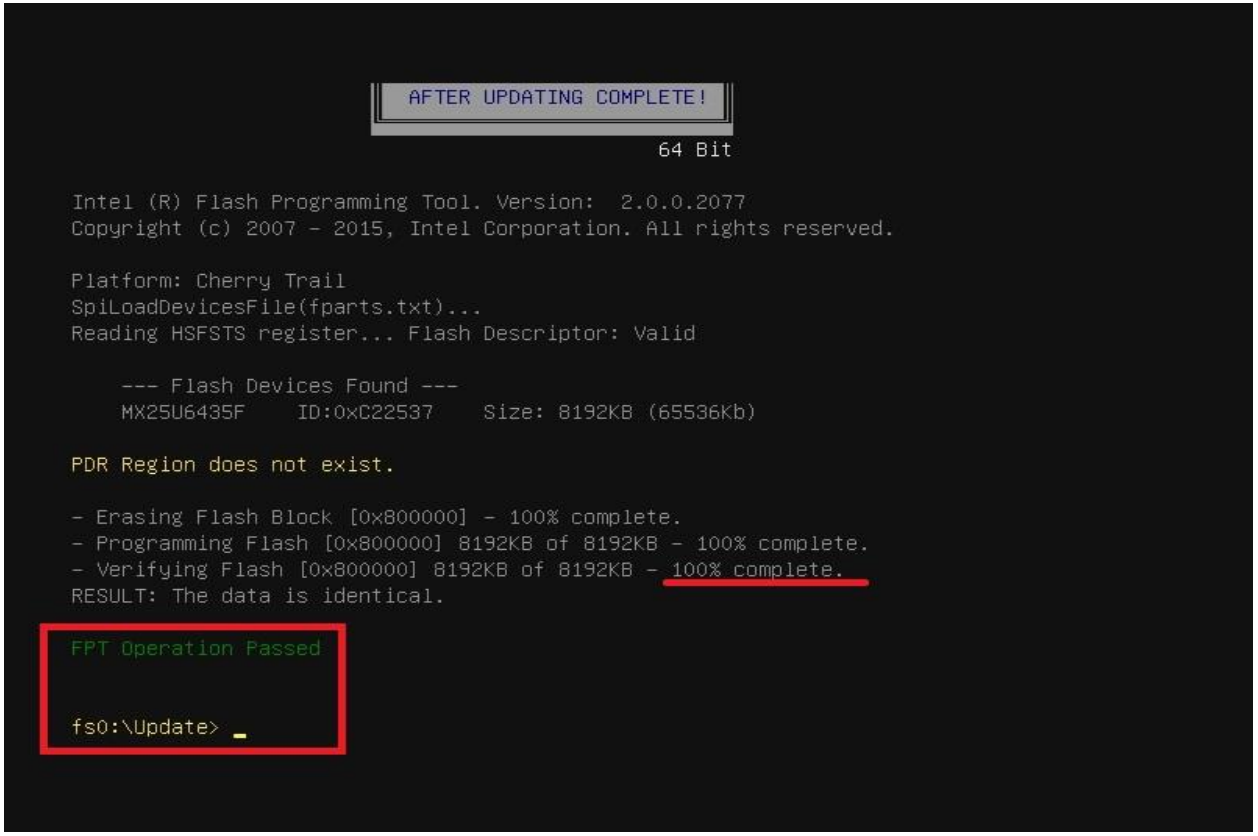
c. Key-in”**update**” this command to run updating procedure.



7. Update procedure

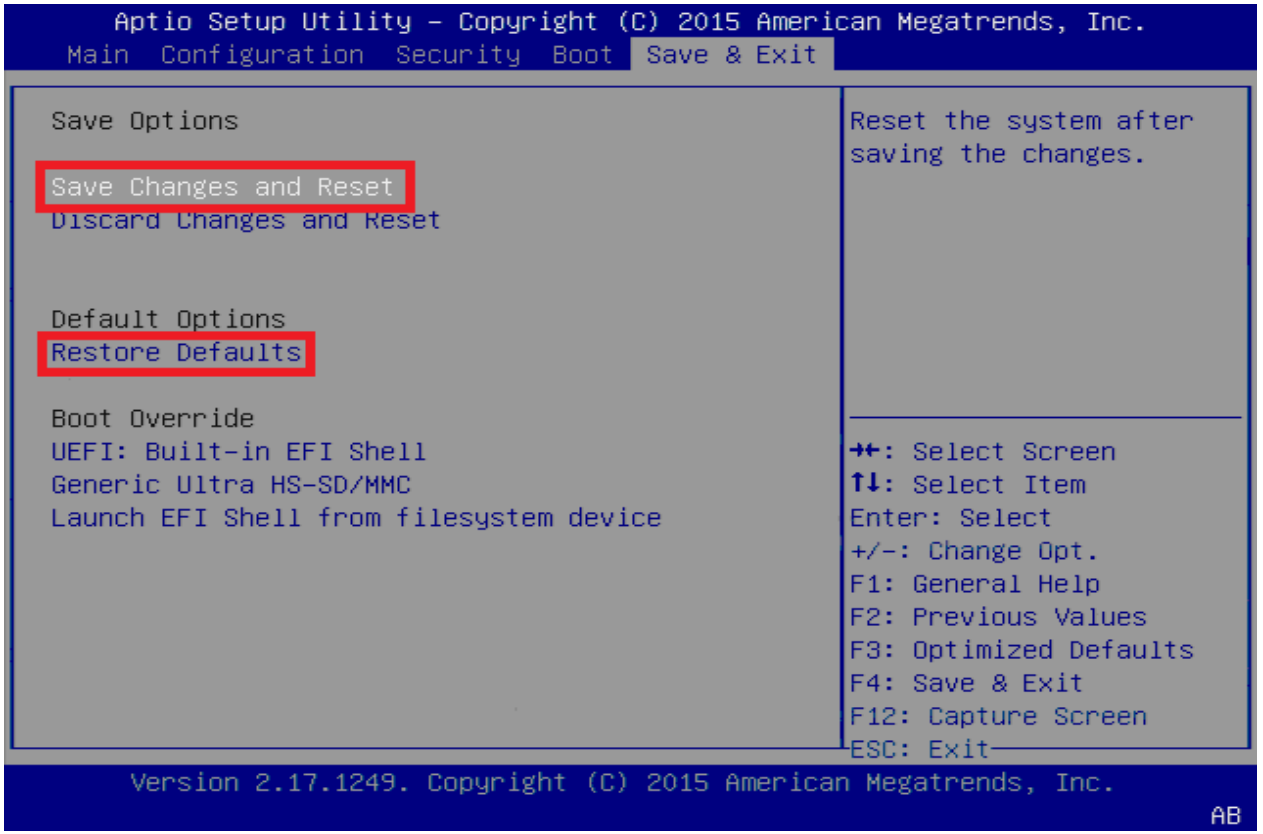


8. Complete


AFTER UPDATING COMPLETE!
64 Bit
Intel (R) Flash Programming Tool. Version: 2.0.0.2077
Copyright (c) 2007 - 2015, Intel Corporation. All rights reserved.
Platform: Cherry Trail
SpiLoadDevicesFile(fparts.txt)...
Reading HSFSTS register... Flash Descriptor: Valid
--- Flash Devices Found ---
MX25U6435F ID:0xC22537 Size: 8192KB (65536Kb)
PDR Region does not exist.
- Erasing Flash Block [0x800000] - 100% complete.
- Programming Flash [0x800000] 8192KB of 8192KB - 100% complete.
- Verifying Flash [0x800000] 8192KB of 8192KB - 100% complete.
RESULT: The data is identical.
FPT Operation Passed
fs0:\Update>

9. Power off the system (wait 10 sec) and power on again to initial the BIOS

10. Press **"del"** key into the BIOS setup menu and switch to **"Save & Exit"** page then select **"Restore Defaults"** option and press **"Yes"** then select **"Save Changes and Reset"** to finish all BIOS update processes.



Question: What are the display options while using NANO-6061?

Answer: 1. One DP port on rear I/O and support DP++ (DP to DP: Port 2)

2. One VGA port on board connector (DP to VGA: Port 0)

3. One dual channel LVDS(18/24bit) port (eDP to LVDS: Port 1). Please refer the following LVDS pin define to install your panel.

PIN No.	Signal Description	PIN No.	Signal Description
1	VDD_LVDS	2	VDD_LVDS
3	LVDSA_DATA0	4	LVDSA_DATA#0
5	LVDSA_DATA1	6	LVDSA_DATA#1
7	LVDSA_DATA2	8	LVDSA_DATA#2
9	LVDSA_DATA3	10	LVDSA_DATA#3
11	LVDSA_CLKP	12	LVDSA_CLKN
13	DDC_SCL	14	DDC_SDA
15	Ground	16	Ground
17	LVDSB_DATA0	18	LVDSB_DATA#0
19	LVDSB_DATA1	20	LVDSB_DATA#1
21	LVDSB_DATA2	22	LVDSB_DATA#2
23	LVDSB_DATA3	24	LVDSB_DATA#3
25	LVDSB_CLKP	26	LVDSB_CLKN
27	N/C	28	N/C
29	Ground	30	Ground

Question: What are the combination of multi-display?

Answer: Dual display: DP+LDS, DP+VGA, LVDS+VGA
Triple display: LVDS+VGA+DP

Question: OS limitation

Answer: In DVT test, we install popular OS as below and all of Braswell products pass Compatibility Test in Win8.1 Ultimate and Windows 7. Regarding Linux operation system, Braswell has not supported Ubuntu 15.04, Fedora 22, SUSE 13.2 until now.

Software Compatibility Test				
Win 8.1 Ultimate (64 bit)	Ubuntu 15.04	Fedora22	SUSE13.2	Yocto
O	TBA	TBA	TBA	TBA

Question: Function limitation

Answer: 1. USB 3.0: In PssMark Software, the speed of USB3.0 should higher than 2400 Mb/S, but Brasewll products only can reach 2000.8 Mb/S.

2. UART (M.2 socket for NANO-6061): In Win7, the UART from SoC can be extended to M.2, so we can apply UART signal. However, UART cannot be extended to M.2 in Win8.

3. For memory support, the different between 32bit and 64bit type of operating system as following:

	32bit OS	64bit OS
Memory sizing	**Up to 4GB**	UP to 8GB

(Notice: Braswell supports memory sizing up to 8GB/per channel)

Question: How to install Windows 7 in NANO-6061?

Answer: Windows 7 installation media does not include native driver support for USB 3.0, so during installation, when you get to the screen to select your preferred language, a keyboard or mouse connected to a USB 3.0 port does not respond. If you need the solution for this issue, please fill in the technical request form as below hyperlink and we will contact you as soon as possible.

http://www.portwell.com.tw/support/problem_report.php

Note:

Please visit our Download Center to get the Catalog, User manual, BIOS, and driver files.

http://www.portwell.com.tw/support/download_center.php

If you have other additional technical information or request which is not covered in this manual, please fill in the technical request form as below hyperlink.

http://www.portwell.com.tw/support/problem_report.php

We will do our best to provide a suggestion or solution for you.

Thanks

9 Portwell Software Service

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 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/
PCI Express Base Specification, Revision 2.0 https://www.pcisig.com/specifications