AXIOMTEK

eBOX640-521-FL Series

Embedded System

User's Manual

RoHS

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Safety Precautions

Before getting started, please read the following important safety precautions.

1. The eBOX640-521-FL does not come with an operating system which must be loaded first before installation of any software into the computer.

2. Be sure to ground yourself to prevent static charge when installing any internal components. Use a wrist grounding strap and place all electronic components in any static-shielded devices. Most electronic components are sensitive to static electrical charge.

3. Disconnect the power cord from the eBOX640-521-FL prior to making any installation. Be sure both the system and all external devices are turned OFF. Sudden surge of power could ruin sensitive components. Make sure the eBOX640-521-FL is properly grounded.

4. Make sure the voltage of the power source is correct before connecting it to any power outlet.

5. Turn Off system power before cleaning. Clean the system using a cloth only. Do not spray any liquid cleaner directly onto the screen.

6. Do not leave equipment in an uncontrolled environment where the storage temperature is below -40℃ or above 80℃ as it may damage the equipment.

7. Do not open the system's back cover. If opening the cover for maintenance is a must, only a trained technician is allowed to do so. Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:

   ● Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This will help discharge any static electricity on the human body.

   ● When handling boards and components, wear a wrist grounding strap available from most electronic component stores.

8. Warning!! Caution with touch! eBOX640-521-FL will become extremely hot when it's on.

Classification

1. Degree of production against electric shock: not classified
2. Degree of protection against ingress of dust: IP40
3. Equipment not suitable for use in the presence of a flammable anesthetic mixture with air, oxygen or nitrous oxide.
4. Mode of operation: Continuous

General Cleaning Tips

Please keep the following precautions in mind while understanding the details fully before and during any cleaning of the computer and any components within.

A piece of dry cloth is ideal to clean the device.
1. Be cautious of any tiny removable components when using a vacuum cleaner to absorb dirt on the floor.
2. Turn the system off before cleaning up the computer or any components within.
3. Avoid dropping any components inside the computer or getting circuit board damp or wet.
4. For cleaning, be cautious of all kinds of cleaning solvents or chemicals which may cause allergy to certain individuals.
5. Keep foods, drinks or cigarettes away from the computer.

Cleaning Tools:

Although many companies have created products to help improve the process of cleaning computer and peripherals, users can also use house hold items accordingly for cleaning. Listed below are items available for cleaning computer or computer peripherals.

Pay special attention to components requiring designated products for cleaning as mentioned below.

- Cloth: A piece of cloth is the best tool to use when rubbing up a component. Although paper towels or tissues can be used on most hardware as well, it is recommended to use a piece of cloth.
- Water or rubbing alcohol: A piece of cloth may be somewhat moistened with water or rubbing alcohol before being rubbed on the computer. Unknown solvents may be harmful to plastic parts.
- Absorb dust, dirt, hair, cigarette and other particles outside of a computer can be one of the best methods of cleaning a computer. Over time these items may restrict the airflow in a computer and cause circuitry to corrode.
- Cotton swabs: Cotton swabs moistened with rubbing alcohol or water are applicable to reach areas in a keyboard, mouse and other areas.
- Foam swabs: If possible, it is better to use lint free swabs such as foam swabs.
  .

【Note】: *It is strongly recommended that the customer should shut down the system before starting to clean any single components.*

Please follow the steps below:
1. Close all application programs;
2. Close operating software;
3. Turn off power switch;
4. Remove all devices;
5. Pull out the power cable.

Scrap Computer Recycling

Please inform the nearest Axiomtek distributor as soon as possible for suitable solutions in case computers require maintenance or repair; or for recycling in case computers are out of order.

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Windows 8.1, Windows 10, Linux and other brand names and trademarks are the properties and registered brands of their respective owners.

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SECTION 1
INTRODUCTION

This section contains general information and detailed specifications of the eBOX640-521-FL. Section 1 includes the following sections:

■ General Description
■ System Specifications
■ Dimensions
■ I/O Outlets
■ Packing List
■ Model List

1.1 General Description

The eBOX640-521-FL is an embedded system that is powered by LGA1151 socket 8th/9th gen Intel® Core™ i7/i5/i3 & Celeron® processors (Coffee Lake) to support Windows 10, and Linux, suitable for the most endurable operation. It is designed with full feature I/O, two 260-pin unbuffered SO-DIMM sockets for one channel DDR4-2400 MHz memory, and enhanced system dependability through built-in Watchdog Timer.

● **Features**
  1. LGA1151 socket 8th/9th gen Intel® Core™ i7/i5/i3 & Celeron® processor (CPU TDP max. up to 35W)
  2. Supports 2 COM, 6 USB and 8-CH DI/DO
  3. Front I/O connectivity design
  4. M.2 Key E for Wi-Fi

● **Reliable and Stable Design**
  The embedded system supports LGA1151 socket 8th/9th gen Intel® Core™ i7/i5/i3 & Celeron® processors (TDP up to 35W), with high flexibility and multi-functional design to provide the best solution for any industrial field applications.

● **Embedded O.S. Supported**
  The eBOX640-521-FL supports not only Windows 10, but also embedded OS, such as Windows 10 Embedded and Linux.

● **Various Storage devices supported**
  For storage device, the eBOX640-521-FL supports two 2.5" SATA storage drive bays.

1.2   System Specifications

1.2.1   CPU

● **CPU**
   ■ LGA1151 socket 8th/9th gen Intel® Core™ i7/i5/i3 & Celeron® processors (CPU TDP max. up to 35W)

● **Chipset**
   ■ Intel® H310

● **BIOS**
   ■ American Megatrends Inc. UEFI (Unified Extensible Firmware Interface) BIOS.

● **System Memory**
   ■ Two 260-pin unbuffered DDR4-2400 MHz SO-DIMM sockets, max. up to 32 GB

1.2.2   I/O System

● **One RS-232/422/485 9-pin D-Sub male connector (COM1) (select by BIOS)**

● **One RS-232 9-pin D-Sub male connector (COM2)**

● **One HDMI with resolution max. up to 3840 x 2160@30Hz.**

● **One DisplayPort++ (max. up to 4096 x2 304@60Hz)**

● **Two RJ-45 connectors for 10/100/1000 Base-T Ethernet ports**

   - LAN1: 1000/100/10Mbps Gigabit/Fast Ethernet support Wake-on-LAN, PXE with Intel® i211AT.

   - LAN2: 1000/100/10Mbps Gigabit/Fast Ethernet PXE with Intel® i219V

● **Two USB 3.0 connectors**

● **Four USB 2.0 connectors**

● **One 19V DC Jack power input (12V,24V DC can be used by option adapter)**

● **Two LED indicators (System Power, HDD Active)**

● **One Audio (Line out)**

● **One 8-CH DIO (4-in/4-out)**

● **One flexible IO window**

1.2.3   System Specification

- **Watchdog Timer**
  - 1~255 seconds or minutes; up to 255 levels.
- **Power Supply**
  - Input : 19V DC (12V,24V DC can be used by option adapter)
- **Operation Temperature**
  - -10°C to +50°C (14°F to 122°F) (with W.T. SSD/DRAM)
- **Humidity**
  - 10% ~ 90% (non-condensation)
- **Vibration Endurance**
  - IEC 60068-2-64 (w/SSD: 3Grms STD, random, 5 - 500 Hz, 1 hr/axis)
- **Shock Vibration**
  - IEC 60068-2-27 (w/SSD: 50G, half sine, 11 ms duration)
- **Weight**
  - 3 kg (6.61 lb) without package
  - 3.6 kg (7.94 lb) with package
- **Dimensions**
  - 195 mm (7.67") (W) x 210.3 mm (8.27") (D) x 80 mm (3.14") (H)

1.2.4   Driver CD Content

Please download the following eBOX640-521-FL drivers from the Axiomtek official website.

- **Chipset**
- **Ethernet**
- **Graphic**
- **USB 3.0**
- **Intel® ME**
- **HD Audio**
- **Rapid Storage Technology (for AHCI and RAID)**
- **User's Manual**

【Note】 *All specifications and images are subject to change without notice.*

1.3   Dimensions

The following diagrams show dimensions and outlines of the eBOX640-521-FL.

1.3.1   System Dimensions
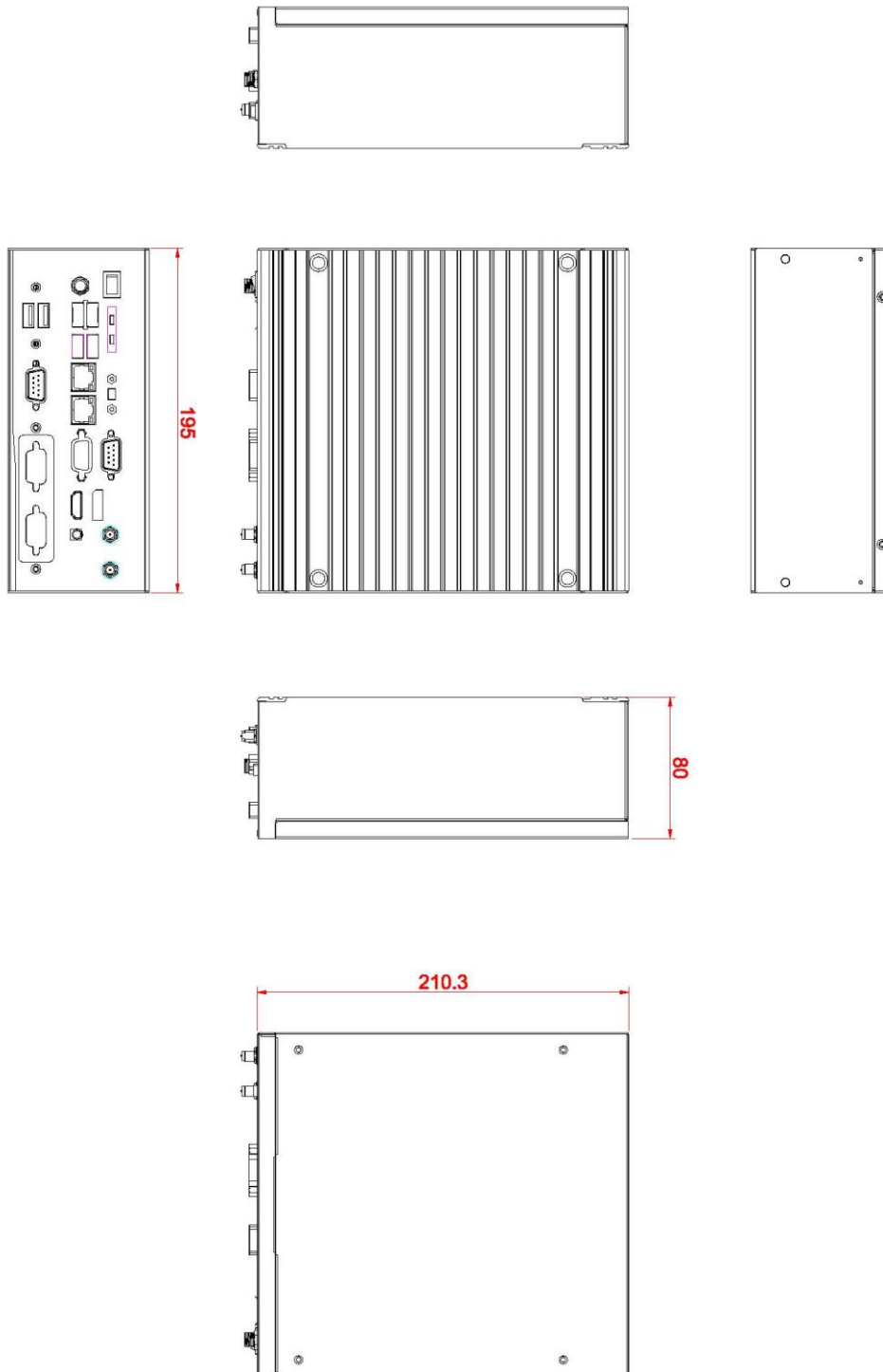
1.3.2 Wall mount Bracket Dimensions
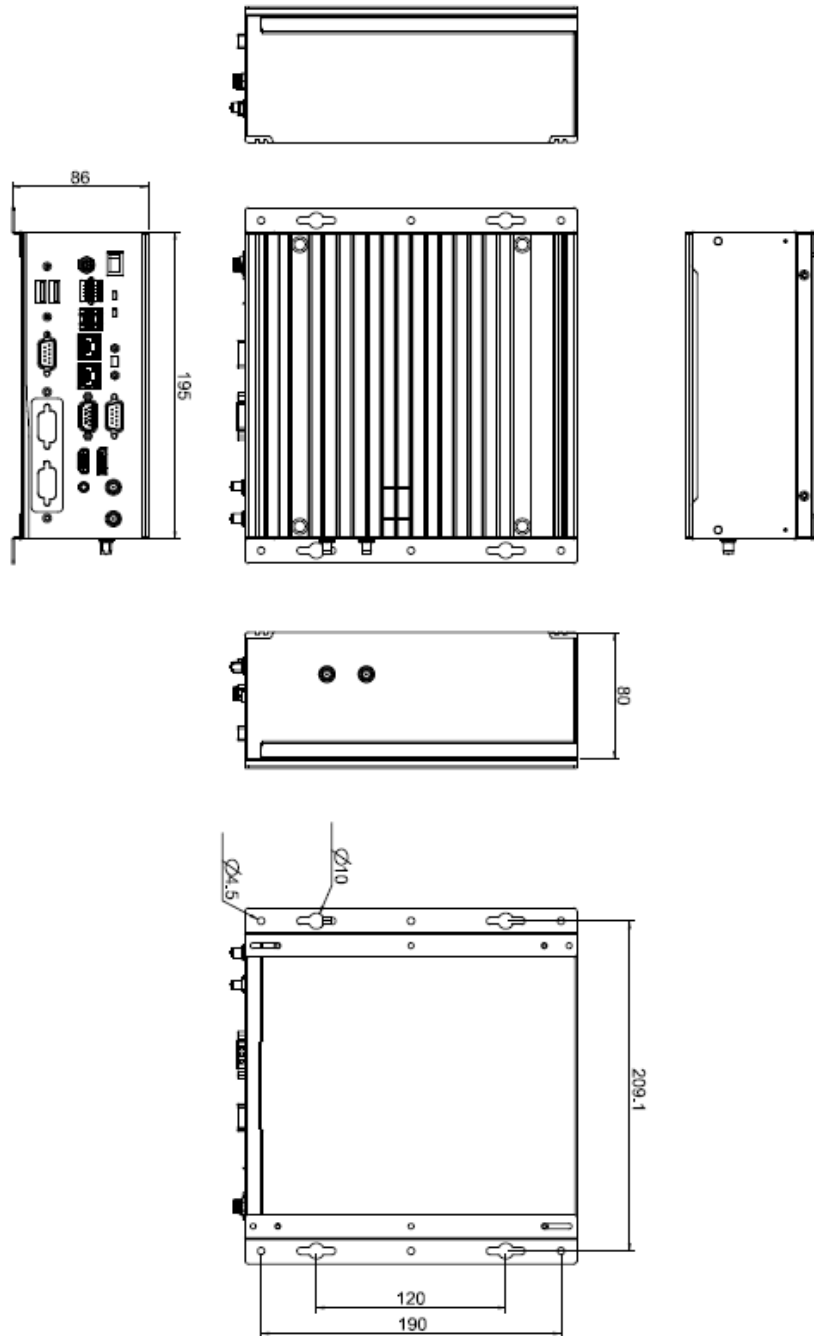
Instructions

Step 1: Screw the two pieces of wall-mount kits to the bottom plate of the device. Total four screws (metric 3 x6) are required.

Step 2: Use the device, with the wall mount plate attached, as a guide to mark the correct locations of the four screws.

Step 3: Insert a Truss head screw (thread diameter less than 4mm)) head through the middle of the keyhole-shaped aperture on the plate, and then slide the device downwards. Tighten the screw head for added stability.

1.4   I/O Outlets

The following figures show I/O outlets on the front of the eBOX640-521-FL.
● **Front View**
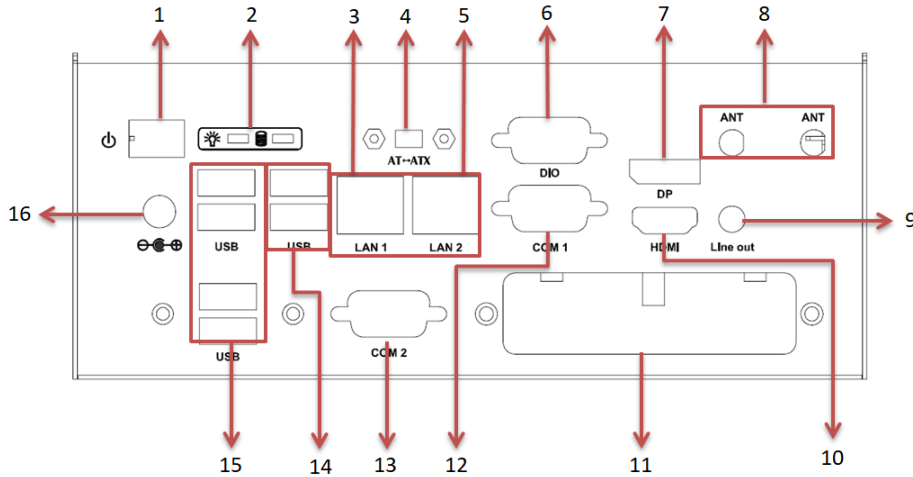
● **Side View**
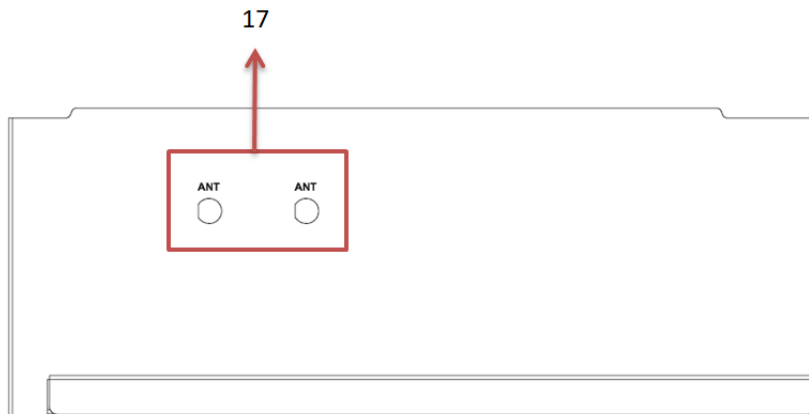
1	Power button	9	Line out
2	LEDs (power, HDD)	10	HDMI port
3	LAN 1	11	Flexible IO Window (default : 2 x DB9 half cut bracket)
4	AT-ATX quick switch	12	COM 1 (RS232/422/485)
5	LAN 2	13	COM 2 (RS232)
6	DIO port	14	2 x USB 3.0
7	DisplayPort	15	4 x USB 2.0
8	2 x Antenna opening hole	16	DC Jack power input
		17	2 x Antenna opening hole

1.5   Packing List

The eBOX640-521-FL comes with the following bundle package:

● **eBOX640-521-FL system unit x 1**

● **Screws pack x 1**

● **Foot pad x 4**

● **HDD bracket x 2**

● **DRAM Thermal pad x 2**

1.6   Model List

eBOX640-521-FL-DC	Fanless embedded system with LGA1151 8th gen Intel® Core™ i7/i5/i3 & Celeron® processor, Intel® H310, HDMI, DisplayPort, 6 USB, 2 COM, M.2 slot and 19VDC

Please contact Axiomtek's distributors immediately in case any abovementioned items are missing.

SECTION 2
HARDWARE INSTALLATION

The eBOX640-521-FL is convenient for your various hardware configurations, such as HDD (Hard Disk Drive), SSD (Solid State Drive), Long-DIMM or PCI Express Mini Card modules. Section 2 will show how to install the hardware.

2.1   Installation of the CPU Processor

Step 1   Turn off the system, and unplug the power cord.

Step 2   Locate the four screws on the top heatsink used to fasten the heatsink to the chassis.

Step 3   Loosen these screws to remove the top heatsink.

Step 4   Remove the warning label and disengage load lever.

● Disengage the load lever by pushing its hook down and then pulling it slightly outward.

● Rotate the load lever to the open position at approximately 135°.

● Rotate the load plate to the open position at approximately 150°.

【Note】 *Apply pressure to corner with the right-hand thumb when opening or closing the load lever - otherwise the lever will bounce back (as a mouse trap does) causing bent contacts.*
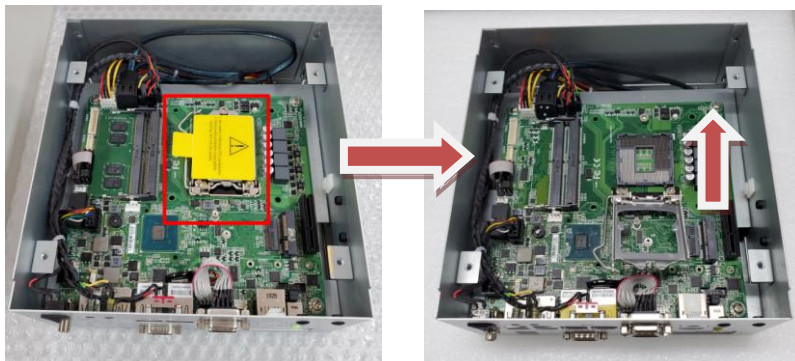
Step 5   Installation steps of the CPU processor

● Lift the processor package from shipping media by grasping the substrate edges.

● Scan the processor package gold pads for any presence of foreign material.

● Locate connection 1 indicator on the processor which aligns with connection 1 indicator chamfer on the socket, and notice processor keying features that line up with posts along socket walls.

● Grasp the processor with the thumb and index finger along the top and bottom edges. The socket will have cutouts for your fingers to fit into.

● Carefully place the processor into the socket body vertically.
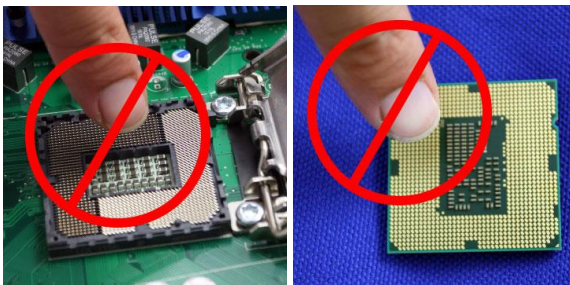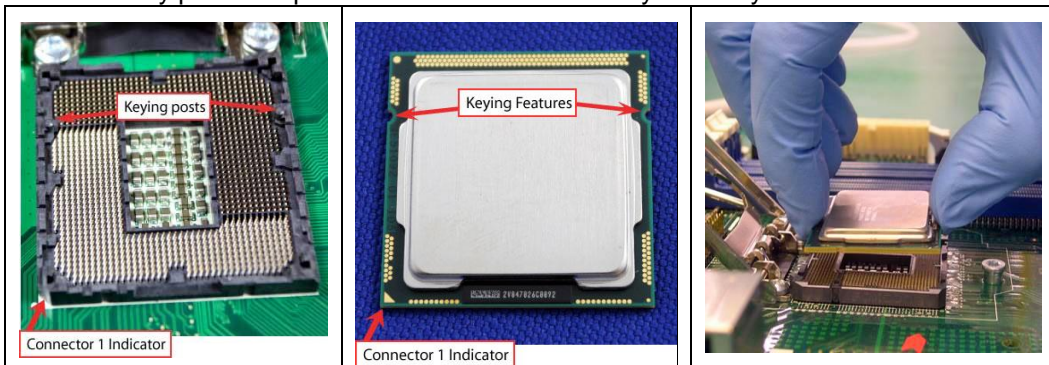
【Note】   *Never touch the fragile socket contacts to avoid damage and do not touch the processor's sensitive contacts at any time during installation.*

Step 6   Installation steps of the CPU processor

Align pins of the CPU with pin holes of the socket. Be careful of the CPU's orientation that users need to align the arrow mark on the CPU with the arrow key on the socket.
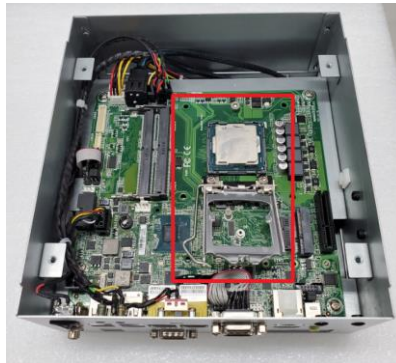
Step 7   Put the top cover and fasten all screws back onto the system.

2.2 Installation of SO-DIMM Memory

Step 1 **Turn off the system, and unplug the power cord.**

Step 2 **On the top heatsink, locate the four screws used to fasten the heatsink to the chassis.**

Step 3 **Loosen the screws to remove the top heatsink and locate the two SO-DIMM sockets on the main board. Then place a thermal pad on the DRAM socket.**
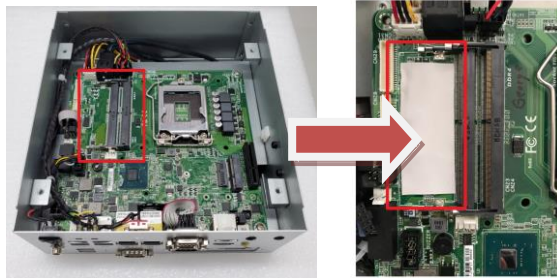
Please also put another DRAM thermal pad on top cover as red marked.
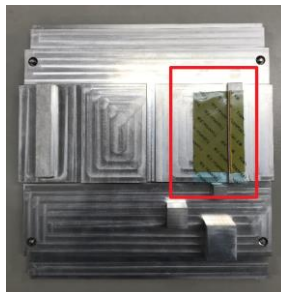
Step 4 **Locate the memory module, insert the gold colored contact into the socket, and push the module down until it is locked in place by the two end latches.**
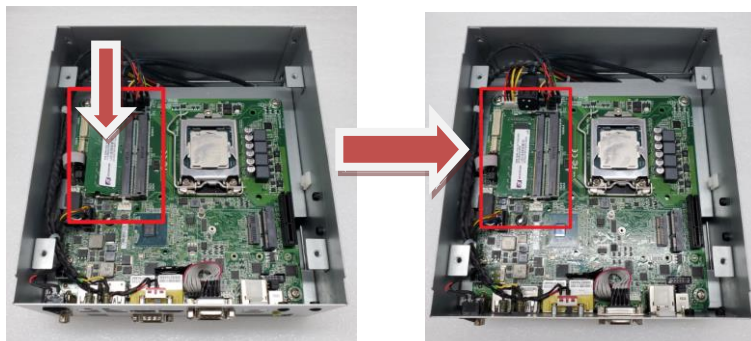
Step 5 **Put the top cover and fasten four screws back onto the system.**

2.3   Installation of the Express Mini Card

Step 1 **Turn off the system, and unplug the power cord.**
Step 2 **Turn the system upside down to locate the two screws at the rear side, and then loosen the two screws.**

Step 3 **Locate the Express Mini Card slot within the red line marked.**

Step 4 **Slide the Mini Card into the Mini Card slot with caution, and fasten the screw of the Express Mini Card.**

Step 5 **Assemble the bottom cover back and fasten all screws.**

2.4   Installation of the 2.5" SATA Device

Step 1   **Turn off the system, and unplug the power adaptor.**

Step 2   **Turn the system upside down to locate the two screws at the rear side, and then loosen the two screws.**

Step 3   **Remove the bottom cover and locate the SSD/HDD within the red line marked.**
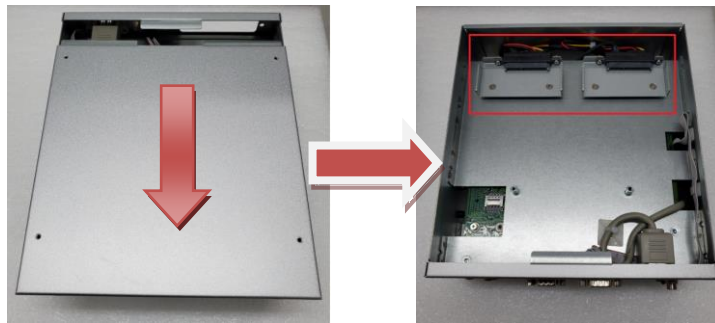
Step 4   **Please prepare the following items to assemble SSD/HDD and then fasten two screws to fix SSD/HDD.**
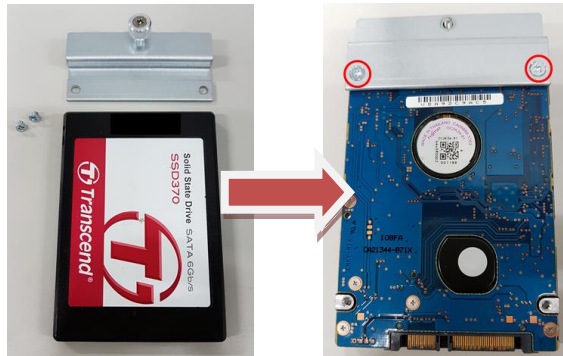
Step 5   **Connect the SSD/HDD directly and make sure the insertion is complete.**

2.5   Installation of Flexible I/O Modules

The eBOX640-521 provides an optional I/O window for customers to add flexible I/O kits via mPCIe interface. For details of the available modules listed below, please refer to their respective quick manuals.

-AX92902 LAN Module (RJ45*1)

-AX92903 CAN Bus/CAN Open Module (DB9*1)

-AX92906 COM Module (DB9*2)

Flexible IO window for mPCIe IO kits

(Default: 2 x DB9 half cut bracket)

Step 1   Prepare the optional flexible I/O kit as the below photo shows.
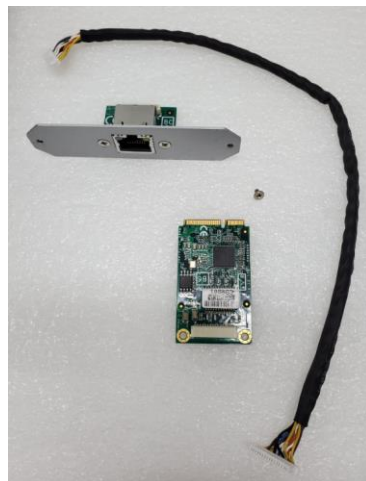
Step 2   Turn off the system and unplug the power cord.
Step 3   Loosen all screws to open the bottom cover and then insert the mPCIe module into one of the mPCIe slots.

Step 4   Assemble the I/O cable to the I/O bracket, and then fasten the dual screws of the flexible I/O Window to fix the I/O bracket to the I/O window.
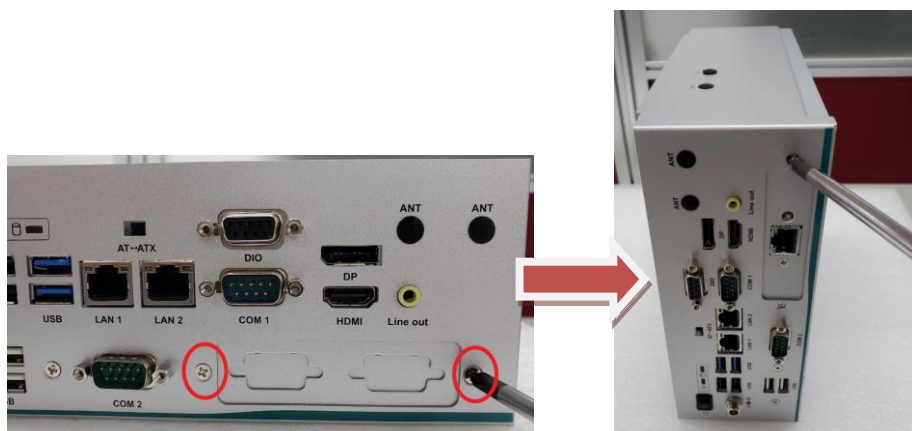
Step 5   Connector the cable to the mini card slot.
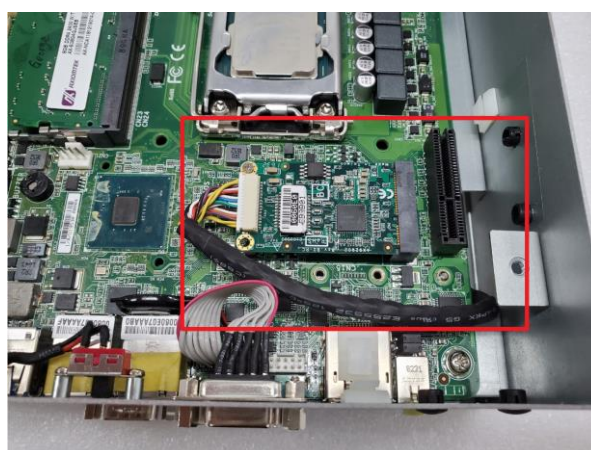
Step 6   Fasten the bottom cover with all screws onto the system.

SECTION 3
JUMPER & CONNECTOR SETTINGS

Proper jumper settings configure the eBOX640-521-FL to meet various application needs. Hereby all jumpers settings along with their default settings are listed for devices onboard.

3.1 Locations of Jumpers & Connectors

MANO521 Top Side
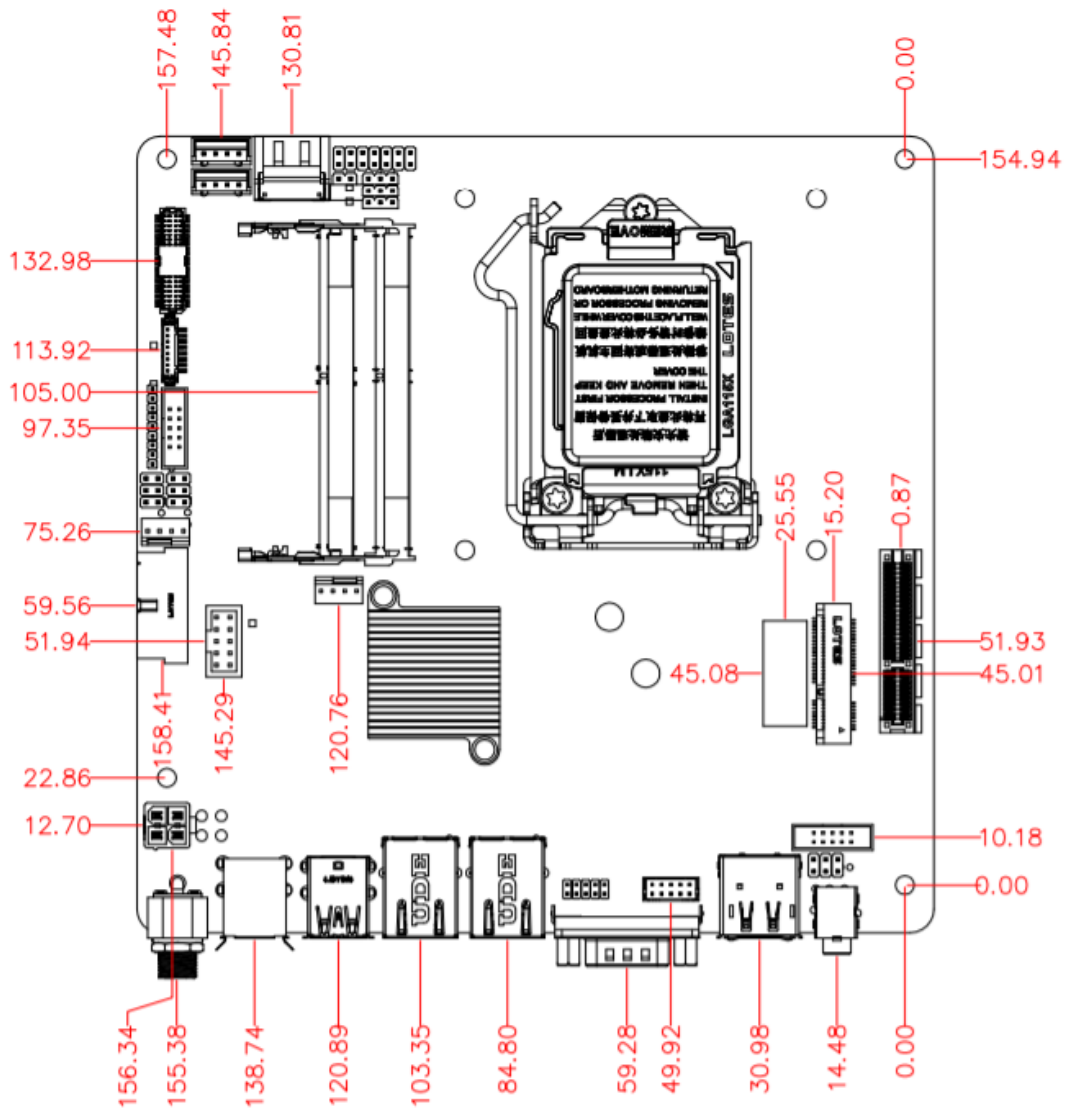
MANO521 Bottom Side
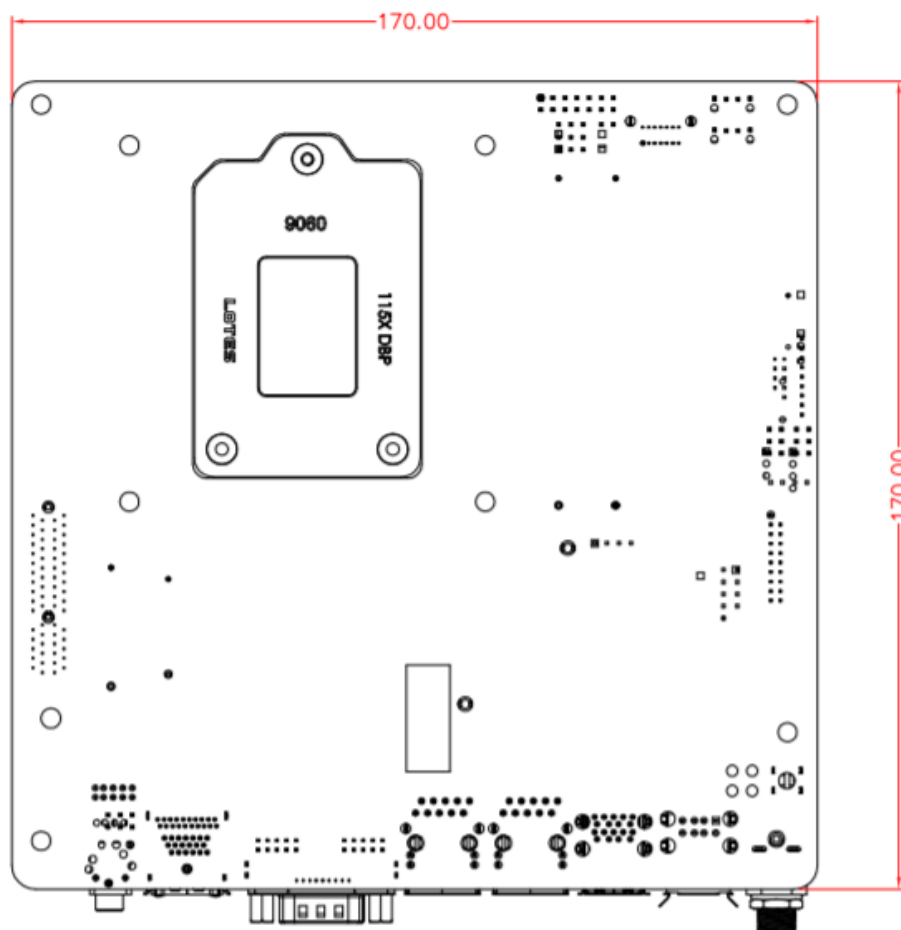
🔏 【Note】 *It is strongly recommended that any unmentioned jumper settings should not be modified without instructions by Axiomtek FAEs.*

Any modifications without instructions might cause system failure.

3.2 Summary of Jumper Settings

Proper jumper settings configure the eBOX640-521-FL to meet various application purposes. A table of all jumpers and their default settings is listed below.

MANO521

Jumpers	Descriptions		Settings
JP1	COM2 Data/Power Select Default: RS-232 Data	CN27 Pin 1: DCD#	3-5 Close
		CN27 Pin 8: RI#	4-6 Close
JP2	Audio Output Select (Line-out only)		1-3,2-4 Close
JP4	Clear CMOS Default: Normal Operation		1-2 Close
JP5	Case Open Select Default: Close		1-2 Close
JP6	AT/ATX Power Mode for Quick-SW-Cable Select Default: ATX Mode		1-2 Close

【Note】 *How to setup Jumpers*

That a cap on a jumper is to "close" the jumper, whereas that off a jumper is to "open" the jumper.

[Open]   [Closed]   [Pin1-2 Closed]

3.2.1   COM2 Data/Power Select (JP1)

The COM2 port has +5V level power capability on DCD# and +12V level on RI# by setting JP1.

Functions	Settings
Power: Set CN27 pin 1 to +5V level	1-3 close
Data: Set CN27 pin 1 to DCD# (Default)	3-5 close
Power: Set CN27 pin 8 to +12V level	2-4 close
Data: Set CN27 pin 8 to RI# (Default)	4-6 close
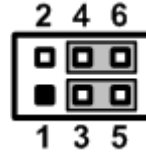
3.2.2   Audio(JP2)

Function	Setting
Line-out (Default)	1-3, 2-4 close
Speaker out (non-used for internal-CNN)	3-5, 4-6 close

3.2.3   Clear CMOS

This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which includes system setup information such as system passwords.

To erase the RTC RAM:
1. Turn OFF the computer and unplug the power cord.
2. Remove the onboard battery.
3. Move the jumper clip from pins 1-2 (default) to pins 2-3. Keep the clip on pins 2-3 for about 5~10 seconds, then move the clip back to pins 1-2.
4. Re-install the battery.
5. Plug the power cord and turn ON the computer.
6. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

Function	Setting
Normal operation (Default)	1-2 close
Clear CMOS	2-3 close

3.2.4   AT/ATX Power Mode Select (JP6)

Use this Quick-SW to select AT or ATX power mode.

Function	Setting
ATX mode (Default)	1-2 close
AT mode	2-3 close
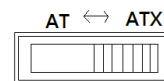
3.3   Connectors

Connectors connect the board with other parts of the system. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected. Here is a table summarizing all connectors on the **eBOX640-521-FL** series.

External Connectors	Sections
DC Jack Power Connector (CN1)	3.3.1
USB 2.0 Stack connector (CN2)	3.3.2
USB 3.0 Connector (CN3)	3.3.3
Ethernet Connector (CN4,CN5)	3.3.4
COM1 D-Sub Connector (CN6)	3.3.5
COM2 D-Sub Connector (CN27)	3.3.6
DisplayPort and HDMI Connector (CN8)	3.3.7
Audio Jack Connector (CN7)	3.3.8
8-CH DIO Connector (CN10)	3.3.9
Internal Connectors	**Sections**
M.2 Key E Connector (CN15,TOP)	3.3.10
mSATA/Full Size Mini Card Connector (CN16,TOP)	3.3.11
Front Panel Connector (CN34)	3.3.12

3.3.1 DC Jack Power Connector (CN1)

The CN1 is a DC jack with screw supporting the 12V, 19-24VDC power input connector. Firmly insert an adapter with at least 90W power supply into this connector. Loose connection may cause system instability and make sure all components/devices are properly installed before connecting.
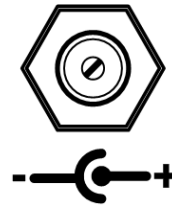
【Note】*Screw metric thread size: M8.0x0.75.*

3.3.2 USB 2.0 Stack Port (CN2)

The motherboard comes with one stacked Universal Serial Bus (compliant with USB 2.0) connector on the rear I/O for installing USB peripherals such as a keyboard, mouse, scanner, etc.

Pins	Signals	Pins	Signals
1	USB_PWR	2	USB_PWR
3	USB#5_D-	4	USB#6_D-
5	USB#5_D+	6	USB#6_D+
7	GND	8	GND
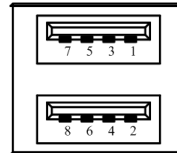
3.3.3 USB 3.0 Stack Port (CN3)

The motherboard comes with one stacked Universal Serial Bus (compliant with USB 3.0) connector on the rear I/O for installing USB peripherals such as a keyboard, mouse, scanner, etc.

Pins	Signals	Pins	Signals
1	USB_PWR	10	USB_PWR
2	USB#1_D-	11	USB#2_D-
3	USB#1_D+	12	USB#2_D+
4	GND	13	GND
5	SSRX1-	14	SSRX2-
6	SSRX1+	15	SSRX2+
7	GND	16	GND
8	SSTX1-	17	SSTX2-
9	SSTX1+	18	SSTX2+
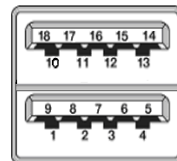
3.3.4 Ethernet Connector (CN4 & CN5)

The motherboard comes with two high performance plug and play Ethernet interfaces (RJ-45) which are fully compliant with the IEEE 802.3 standard. Connection can be established by plugging one end of the Ethernet cable into this RJ-45 connector and the other end to a 1000/100/10-Base-T hub.

Pins	1000 Base-T	100/10 Base-T	Descriptions
L1	BI_DA+	TX+	Bidirectional or Transmit Data+
L2	BI_DA-	TX-	Bidirectional or Transmit Data-
L3	BI_DB+	RX+	Bidirectional or Receive Data+
L4	BI_DC+	N.C.	Bidirectional or Not Connected
L5	BI_DC-	N.C.	Bidirectional or Not Connected
L6	BI_DB-	RX-	Bidirectional or Receive Data-
L7	BI_DD+	N.C.	Bidirectional or Not Connected
L8	BI_DD-	N.C.	Bidirectional or Not Connected
A	Active Link LED (Yellow) Off: No link Blinking: Data activity detected		
B	Speed LED 1000: Orange 100/10: Green/OFF		

CN4   CN5
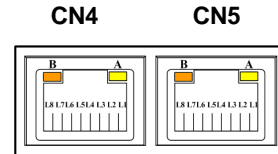
CN4: LAN1 with Intel® i211AT

CN5: LAN2 with Intel® i219V

【Note】
- *Speed LED turns orange for 1000Mbps or green for 100Mbps.*
- *Both CN4 and CN5 support Wake-on-LAN.*

3.3.5 COM1 D-Sub Connector (CN6)

This connector is a standard D-Sub connector for COM1 serial port interface which is selectable for RS-232/422/485 mode by BIOS setting (see section 4.4). The pin assignments of RS-232/422/485 are listed in table below.

Pins	RS-232	RS-422	RS-485
1	DCD#	TX-	Data-
2	RXD	TX+	Data+
3	TXD	RX+	N/C
4	DTR#	RX-	N/C
5	GND	GND	GND
6	DSR#	N/C	N/C
7	RTS#	N/C	N/C
8	CTS#	N/C	N/C
9	RI#	N/C	N/C
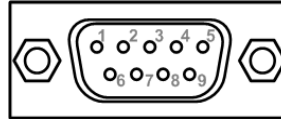
3.3.6 COM2 D-Sub Connector (CN27)

This connector is a standard D-Sub connector for COM2 serial port interface which is selectable for RS-232 mode by BIOS setting (see section 4.4). The pin assignments of RS-232 are listed in table below.

Pins	RS-232
1	DCD#
2	RXD
3	TXD
4	DTR#
5	GND
6	DSR#
7	RTS#
8	CTS#
9	RI#
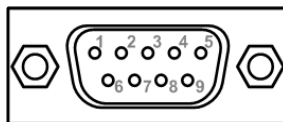
3.3.7 DisplayPort and HDMI Connector (CN8)

The CN8 is a stacked connector comprising an upper connector for DisplayPort++ interface and a lower connector for HDMI interface.

Pins	Signals	Pins	Signals
1	DP_TX0_P	21	HDMI OUT_DATA2+
2	GND	22	GND
3	DP_TX0_N	23	HDMI OUT_DATA2-
4	DP_TX1_P	24	HDMI OUT_DATA1+
5	GND	25	GND
6	DP_TX1_N	26	HDMI OUT_DATA1-
7	DP_TX2_P	27	HDMI OUT_DATA0+
8	GND	28	GND
9	DP_TX2_N	29	HDMI OUT_DATA0-
10	DP_TX3_P	30	HDMI OUT_Clock+
11	GND	31	GND
12	DP_TX3_N	32	HDMI OUT_Clock-
13	GND	33	NC
14	GND	34	NC
15	DP_AUXP	35	HDMI OUT_SCL
16	GND	36	HDMI OUT_SDA
17	DP_AUXN	37	GND
18	DP_HPD	38	+5V
19	GND	39	HDMI_HTPLG
20	+3.3V		
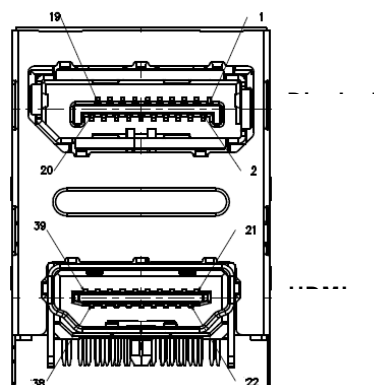
3.3.8 Audio Jack (CN7)

The motherboard provides HD audio jack for line-out on the rear I/O. Install audio driver, and then attach audio devices to CN7.

Pin Color	Signal
Green	Line-out

3.3.9   8-CH DIO Connecotr (CN10)

This digital I/O has 8 bits (DIO0~7) by CN10 connector. Each bit can be set to function as input or output by software programming.

Pin	Description
1	DIO0 (GPI70, 0xA06, Bit0, H) [*]
2	DIO1 (GPI71, 0xA06, Bit1, H) [*]
3	DIO2 (GPI72, 0xA06, Bit2, H) [*]
4	DIO3 (GPI73, 0xA06, Bit3, H) [*]
5	DIO4 (GPI74, 0xA06, Bit4, H) [*]
6	DIO5 (GPI75, 0xA06, Bit5, H) [*]
7	DIO6 (GPI76, 0xA06, Bit6, H) [*]
8	DIO7 (GPI77, 0xA06, Bit7, H) [*]
9	GND

Digital I/O
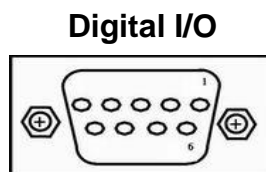
【**Note**】 [*]: *"H" or "L" means the default voltage is High or Low level, and GPIO output is 5V.*

3.3.10 M.2 Key E Connector (CN15)

The system comes with one M.2 Key E connector (Wi-Fi & Bluetooth).

Pins	Signals	Pins	Signals
2	+3.3V	1	GND
4	+3.3V	3	USB#14_D+
6	N/C	5	USB#14_D-
8	N/C	7	GND
10	PCM_CRF_RST[*]	9	CNV_WR_1_DN[*]
12	N/C	11	CNV_WR_1_DP[*]
14	PCMOUT_CLKREQ0[*]	13	GND
16	N/C	15	CNV_WR_0_DN[*]
18	GND	17	CNV_WR_0_DP[*]
20	UART_BT_WAKE[*]	19	GND
22	CNV_BRI_RSP[*]	21	CNV_WR_CLK_DN[*]
		23	CNV_WR_CLK_DP[*]
32	CNV_RGI_DT[*]		
34	CNV_RGI_RSP[*]	33	GND
36	CNV_BRI_DT[*]	35	PCIE12_TX_DP[*]
38	CL_RST[*]	37	PCIE12_TX_DN
40	CL_DATA[*]	39	GND
42	CL_CLK[*]	41	PCIE12_RX_DP
44	CNV_PA_BLANKING[*]	43	PCIE12_RX_DN
46	CNV_MFUART2_TXD[*]	45	GND
48	CNV_MFUART2_RXD[*]	47	CLKOUT_PCIE_P3
50	PCH_SUSCLK	49	CLKOUT_PCIE_N3
52	BUF_PLT_RST	51	GND
54	BT_KILL1	53	NGFF_CLKREQ3
56	WLAN_KILL1	55	PCH_WAKE
58	N/C	57	GND
60	N/C	59	CNV_WT_1_DN[*]
62	N/C	61	CNV_WT_1_DP[*]
64	M2_REFCLK	63	GND
66	N/C	65	CNV_WT_0_DN[*]
68	N/C	67	CNV_WT_0_DP[*]
70	N/C	69	GND
72	+3.3V	71	CNV_WT_CLK_DN[*]
74	+3.3V	73	CNV_WT_CLK_DP[*]
		75	GND
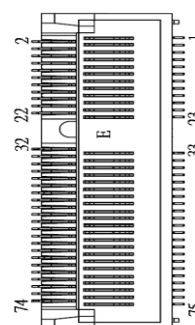
【Note】 *Support CNVI module.*
[*]: *These pins are for the CNVI module.*

3.3.11 Express Mini Card Slot (CN16)

The mini card interface is available through connector CN16.

Pins	Signals	Pins	Signals
1	WAKE#	2	+3.3VAUX
3	N/C	4	GND
5	N/C	6	+1.5V
7	CLKREQ#	8	UIM_PWR
9	GND	10	UIM_DAT
11	REFCLK-	12	UIM_CLK
13	REFCLK+	14	UIM_REST
15	GND	16	UIM_VPP
17	N/C	18	GND
19	N/C	20	+3.3VAUX (pull-high R)
21	GND	22	PERST#
23	SATA0_RX_DP	24	+3.3VAUX
25	SATA0_RX_DN	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	SATA0_TX_DN	32	SMB_DATA
33	SATA0_TX_DP	34	GND
35	GND	36	USB#9_D-
37	GND	38	USB#9_D+
39	+3.3VAUX	40	GND
41	+3.3VAUX	42	N/C
43	GND	44	N/C
45	N/C	46	N/C
47	N/C	48	+1.5V
49	N/C	50	GND
51	+3.3VAUX	52	+3.3VAUX
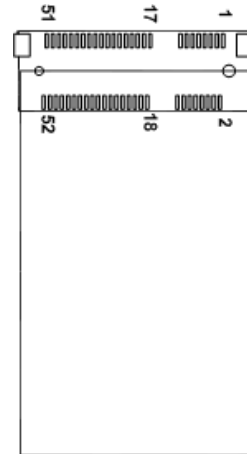
3.3.12 Front Panel Connector (CN34)

The CN34 is a 2x7-pin (pitch=2.54mm) header for front panel interface.

Pins	Signals	Pins	Signals
1	Power LED+	2	SPK-
3	N/C	4	Buzzer
5	Power LED-	6	N/C
7	N/C	8	SPK+
9	PWR-	10	PWR+
11	RESET-	12	RESET+
13	HD LED-	14	HD LED+
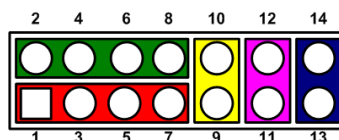
Power LED

Pin 1 connects anode (+) of LED and pin 5 connects cathode(-) of LED. The power LED lights up when the system is powered on.

External Speaker and Internal Buzzer

Pin 2, 4, 6 and 8 connect the case-mounted speaker unit or internal buzzer. While connecting the board to an internal buzzer, please set pin 2 and 4 closed; while connecting to an external speaker, you need to set pins 2 and 4 opened and connect the speaker cable to pin 8(+) and pin 2(-).

Power On/Off Button

Pin 9 and 10 connect the power button on the front panel to the board, which allows users to turn on or off power supply.

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SECTION 4
BIOS SETUP UTILITY

This section provides users with detailed description how to set up basic system configuration through the BIOS setup utility.

4.1   Starting

To enter the setup screens, follow the steps below:

1.   Turn on the computer and press the <Del> key immediately.
2.   After press the <Del> key, the main BIOS setup menu displays. Users can access to other setup screens, such as the Advanced and Chipset menus, from the main BIOS setup menu.

It is strongly recommended that users should avoid changing the chipset's defaults. Both AMI and system manufacturer have carefully set up these defaults that provide the best performance and reliability.

4.2   Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.

【Note】 *Some of the navigation keys differ from one screen to another.*

Hot Keys	Description
→ ← Left/Right	The Left and Right <Arrow> keys allow users to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow users to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow users to change the field value of a particular setup item.
Tab	The <Tab> key allows users to select setup fields.
F1	The <F1> key allows users to display the General Help screen.
F2	The <F2> key allows users to Load Previous Values.
F3	The <F3> key allows users to Load Optimized Defaults.
F4	The <F4> key allows users to save any changes they made and exit the Setup. Press the <F4> key to save any changes.
Esc	The <Esc> key allows users to discard any changes they made and exit the Setup. Press the <Esc> key to exit the setup without saving any changes.
Enter	The <Enter> key allows users to display or change the setup option listed for a particular setup item. The <Enter> key can also allow users to display the setup sub- screens.

4.3   Main Menu

The Main Menu screen is the first screen users see when entering the setup utility. Users can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is also shown below.

```
           Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
    Main   Advanced  Chipset  Security  Boot  Save & Exit

    BIOS Information                                         Set the Date. Use Tab to
    Build Date and Time           01/10/2020 13:45:23        switch between Date elements.
    Project Version               MANO521 XD102 H310         Default Ranges:
                                                             Year: 2005-2099
    System Date                   [Wed 03/18/2020]           Months: 1-12
    System Time                   [22:04:58]                 Days: dependent on month

    Access Level                  Administrator


    Board Information
     Processor Name               CoffeeLake DT
             Type                 Intel(R) Core(TM)
                                  i7-8700T CPU @ 2.40GHz    →←: Select Screen
             Stepping             U0                        ↑↓: Select Item
                                                            Enter: Select
    PCH      Name                 CNL PCH-H                  +/-: Change Opt.
             SKU                  H310                       F1: General Help
             Stepping             B0                         F2: Previous Values
    Memory   Size                  8192 MB                   F3: Optimized Defaults
             Frequency             2400 MHz                  F4: Save & Exit
                                                             ESC: Exit



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```

BIOS Information
Display the auto-detected BIOS detail information.

System Date/Time
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

Access Level
Display the access level of current user.

4.4   Advanced Menu

The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

- ► IT8625 Super IO Configurations
- ► Hardware monitor
- ► Trusted computing
- ► ACPI settings
- ► CPU Configuration
- ► SATA and RST Configuration
- ► PCH-FW Configurations
- ► USB Configurations

For items marked with "►", please press <Enter> for more options.

```
              Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
      Main  Advanced  Chipset  Security  Boot  Save & Exit

  ▶ IT8625 Super IO Configuration                    System Super IO Chip
  ▶ Hardware Monitor                                 Parameters.
  ▶ Trusted Computing
  ▶ ACPI Settings
  ▶ CPU Configuration
  ▶ SATA And RST Configuration
  ▶ PCH-FW Configuration
  ▶ USB Configuration



                                                     →←: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit




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```

● **IT8625 Super IO Configuration**

Users can use this screen to select options for the Super IO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with " ", please press for more options.

```
            Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
    Advanced

   IT8625 Super IO Configuration                           Set Parameters of Serial Port
                                                           1 (COMA)
   Super IO Chip                         IT8625
 ▶ Serial Port 1 Configuration
 ▶ Serial Port 2 Configuration




                                                           ──────────────────────────────
                                                           ➡◀: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit




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```

Serial Port 1~2 Configuration
Use these items to set parameters related to serial port 1~2

```
          Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
    Advanced

  Serial Port 1 Configuration                           COM Port Type: RS232, RS422,
                                                        RS485
  Serial Port                         [Enabled]
  Device Settings                     IO=3F8h; IRQ=4;

  COM Port Type                       [RS232]


                          ┌──── COM Port Type ────┐
                          │ RS232                  │
                          │ RS485                  │
                          │ RS422                  │
                          └────────────────────────┘
                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit



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```

```
          Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
    Advanced

  Serial Port 2 Configuration                           Enable or Disable Serial Port
                                                        (COM)
  Serial Port                         [Enabled]
  Device Settings                     IO=2F8h; IRQ=3;








                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit




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```

● **Hardware Monitor**

This screen monitors hardware health status.

```
                 Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
        Advanced

   Pc Health Status                                              Switch On/Off case open

   System temperature              : +25 %
   PCH temperature                 : +34 %
   CPU temperature                 : +37 %
   VCC_CPU                         : +0.913 V
   +3.3V                           : +3.357 V
   +12V                            : +12.078 V
   +5V                             : +5.005 V
   +5V_SBY                         : +5.060 V
   +3.3V_SBY                       : +3.430 V
   VBAT                            : +2.992 V
   Case Open                       [Enabled]
                                                               →←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit




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```

● **Trust Computing**

This screen provides function for specifying the TPM settings.

```
              Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
   Advanced

   TPM20 Device Found                                          Enables or Disables BIOS
   Firmware Version:              402.1                        support for security device.
   Vendor:                        INTC                         O.S. will not show Security
                                                               Device. TCG EFI protocol and
   Security Device Support        [Enable]                     INT1A interface will not be
 TPM Device Selection             [PTT]                        available.
   Active PCR banks               SHA-1,SHA256
   Available PCR banks            SHA-1,SHA256


   Pending operation              [None]


                                                               →←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit




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```

Security Device Support

Enable or disable BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available.

TPM Device Selection:

Select TPM device:

- dTPM: External extended Infineon's TPM .
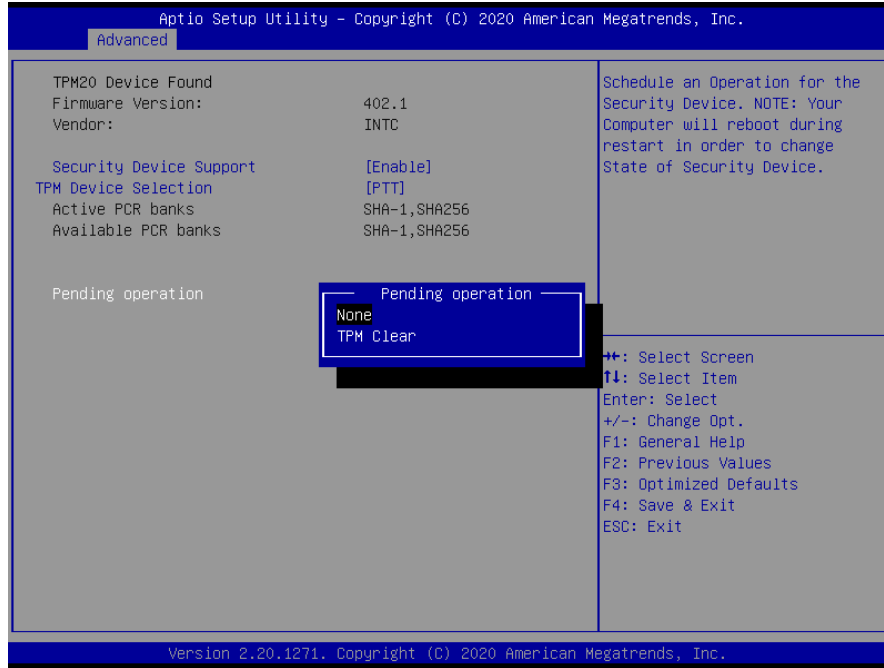
Pending operation

Schedule an operation for the security device, see image below.

- None

- TPM Clear: Clear all data secured by TPM.

● **ACPI Settings**
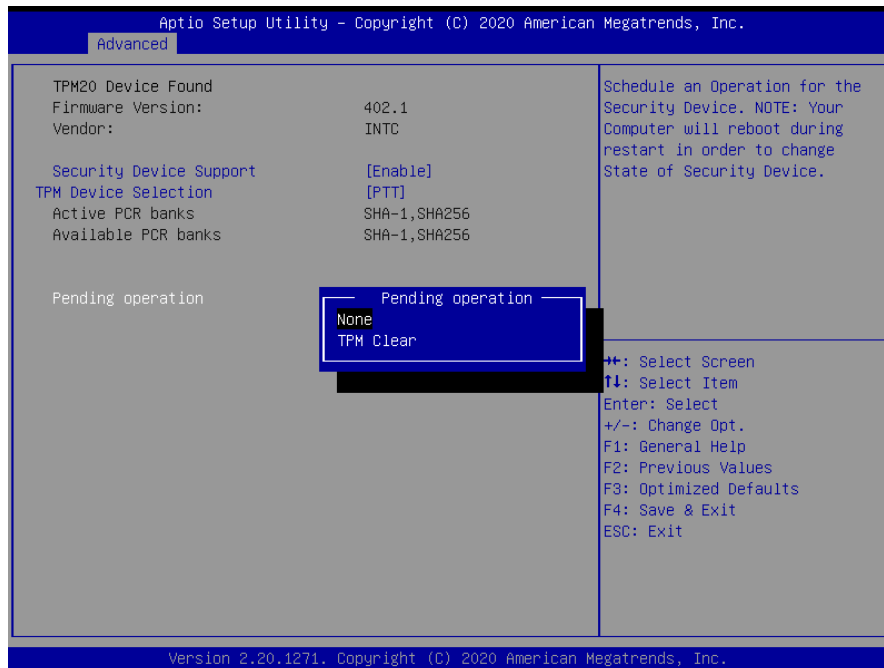
```
           Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
    Advanced

 ACPI Settings

 ACPI Sleep State                    [S3 (Suspend to RAM)]




                                                      →←: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit




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```

ACPI Sleep State

When the suspend button is pressed, the ACPI (Advanced Configuration and Power Interface) sleep state is S3 (Suspend to RAM).

● **CPU Configurations**

This screen shows the CPU version and its detailed information.

```
         Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
   Advanced

  CPU Configuration                                      When enabled, a VMM can
                                                         utilize the additional
           Type                 Intel(R) Core(TM)        hardware capabilities provided
                                i7-8700T CPU @ 2.40GHz   by Vanderpool Technology.
  ID                            0x906EA
  Speed                         2400 MHz
  L1 Data Cache                 32 KB x 6
  L1 Instruction Cache          32 KB x 6
  L2 Cache                      256 KB x 6
  L3 Cache                      12 MB
  L4 Cache                      N/A
  VMX                           Supported
  Intel (VMX) Virtualization    [Enabled]
  Technology                                             →←: Select Screen
  Intel(R) SpeedStep(tm)        [Disabled]               ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit




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```

Intel Virtualization Technology

Enable or disable Intel Virtualization Technology. When enabled, a VMM (Virtual Machine Mode) can utilize the additional hardware capabilities. It allows a platform to run multiple operating systems and applications independently, hence enabling a single computer system to work as several virtual systems.

Intel(R) SpeedStep(tm)

Enable or disable Intel® SpeedStep. It allows more than two frequency ranges to be supported.

● **SATA & RTS Configuration**

During system boot up, BIOS automatically detects the presence of SATA devices. In the SATA Configuration menu, you can see the currently installed hardware in the SATA ports.
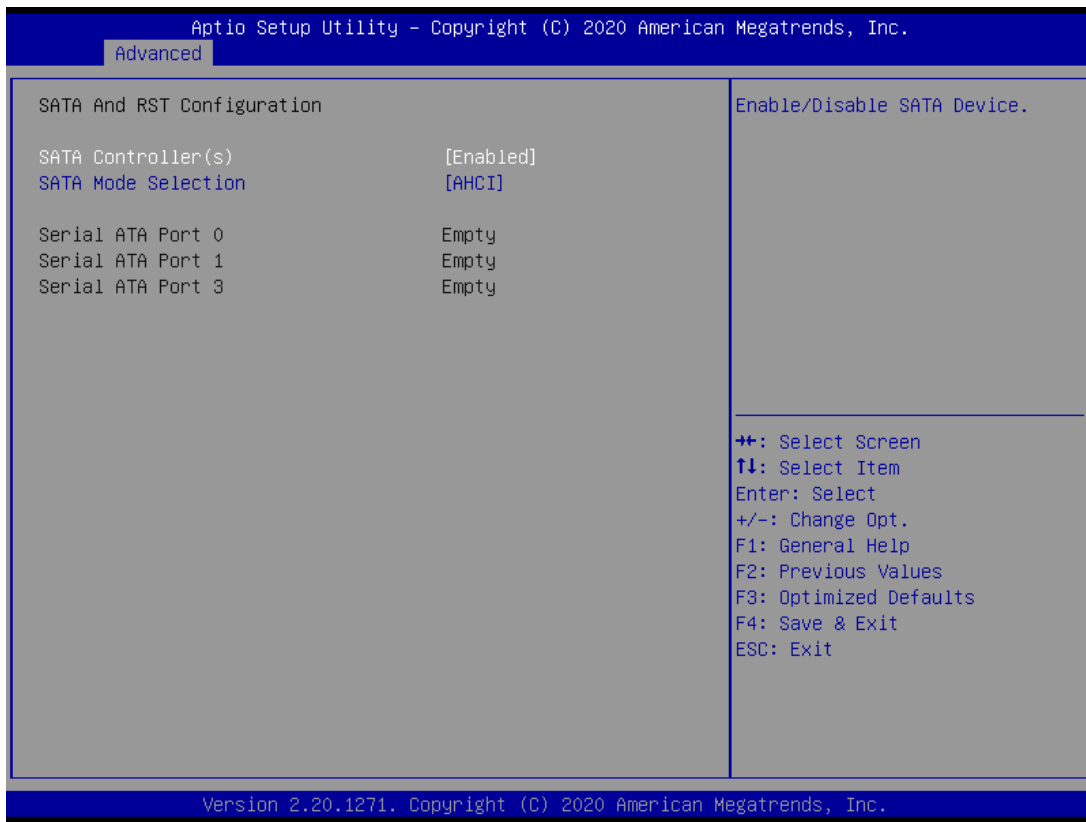
SATA Controller(s)

Enable or disable the SATA Controller feature. The default is Enabled.
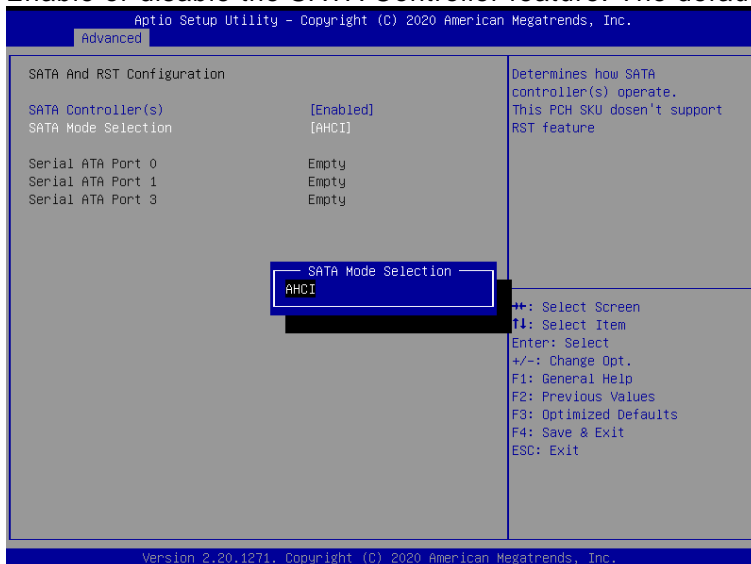
SATA Mode Selection
Determine how SATA controller(s) operate.

● **PCH-HW**

This screen shows ME Firmware information.

```
          Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
    Advanced

  ME Firmware Version            12.0.5.1117
  ME Firmware Mode               Normal Mode
  ME Firmware SKU                Consumer SKU




                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit




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```

● **USB Configurations**

```
              Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
        Advanced

 USB Configuration

 USB Module Version                    21

 USB Devices:
       1 Drive, 1 Keyboard, 1 Mouse



                                                        ↔: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit




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```

USB Devices
Display all detected USB devices.

4.5   Chipset Menu

The Chipset menu allows users to change the advanced chipset settings. Users can select any of the items in the left frame of the screen to go to the sub menus:

> ►   PCH-IO Configuration
> ►   System Agent (SA) Configuration

For items marked with "►", please press <Enter> for more options.

```
             Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
      Main  Advanced  Chipset  Security  Boot  Save & Exit

   ▶ System Agent (SA) Configuration                    System Agent (SA) Parameters
   ▶ PCH-IO Configuration






                                                        ──────────────────────────
                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit



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```
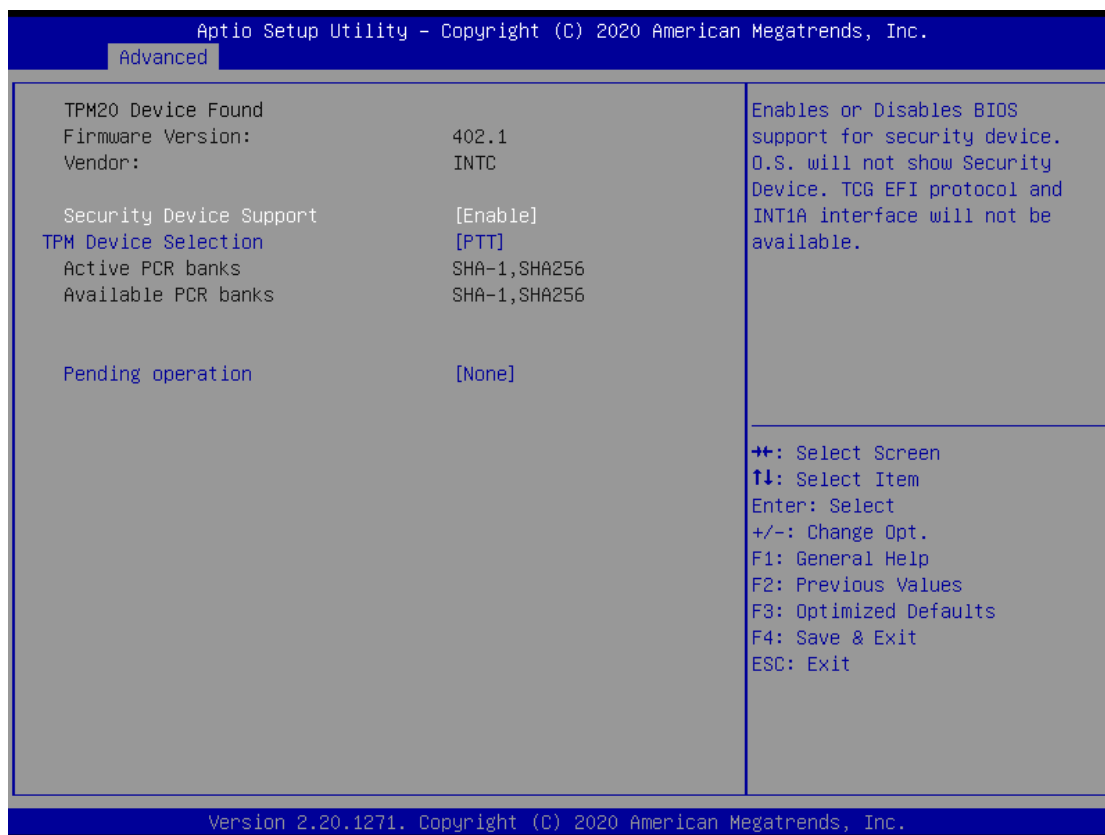
● **System Agent(SA) Configuration**

This screen allows users to configure System Agent (SA) parameters. For items marked with " " , please press <Enter> for more options.

```
              Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
               Chipset

  SA PCIe Code Version          7.0.56.48              Graphics Configuration
  VT-d                          Supported

▶ Graphics Configuration
▶ Memory Configuration





                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit




              Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
```

Graphics Configuration
Select to open sub menu for parameters related to graphics configuration.

Memory Configuration
Select to open sub menu for information related to system memory

● **Graphic Configuration**

```
             Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
              Chipset

   Graphics Configuration                                    Select the Video Device which
   Primary IGFX Boot Display          [HDMI]                 will be activated during POST.
   Secondary IGFX Boot Display        [DP]                   This has no effect if external
                                                             graphics present.
                                                             Secondary boot display
                                                             selection will appear based on
                                                             your selection.
                                                             VGA modes will be supported
                                                             only on primary display

                      ┌─── Primary IGFX Boot Display ───┐
                      │ DP                              │
                      │ HDMI                            │
                      └─────────────────────────────────┘    Select Screen
                                                             Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit


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```

Primary IGFX Boot Display
Select the video device which will be activated during POST (Power-On Self Test).
The secondary boot display selection will appear based on your selection.

Secondary IGFX Boot Display
● After selecting other than "AUTO" on "Primary IGFX Boot Display", the Secondary IGFX Boot Display will show up and its options are DP and HDMI.

● **Memory Configuration**

This screen shows the system memory information.

```
         Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
          Chipset

 Memory Configuration

 Memory RC Version               0.7.1.72
  Memory    Size                  8192 MB

 Channel 0 Slot 0                Not Populated / Disabled
 Channel 1 Slot 0                Populated & Enabled
     Size                        8192 MB (DDR4)
     Number of Ranks             1
     Manufacturer                UnKnown

                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit

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```

● **PCH- IO Configuration**

This screen allows you to set PCH parameters.

```
            Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
    Chipset

 PCH LAN Controller              [Enabled]          Enable/Disable onboard NIC.
    Wake on LAN Enable           [Enabled]




                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit




            Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
```
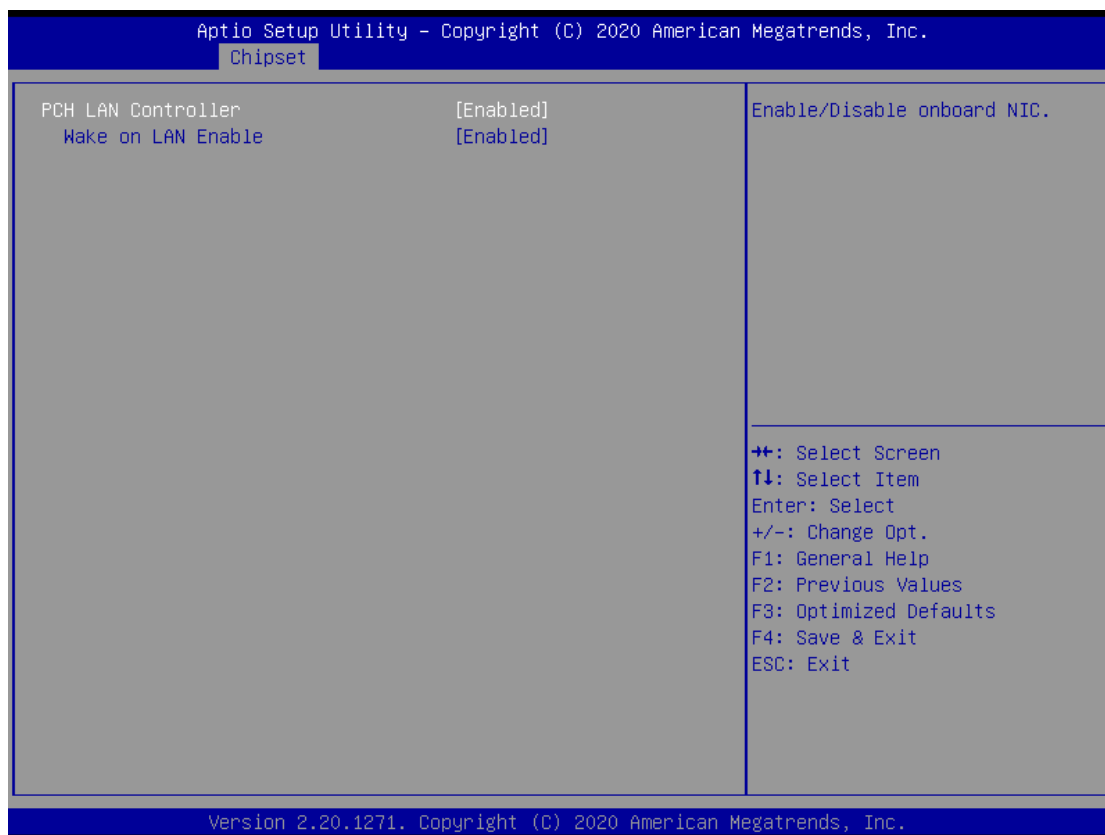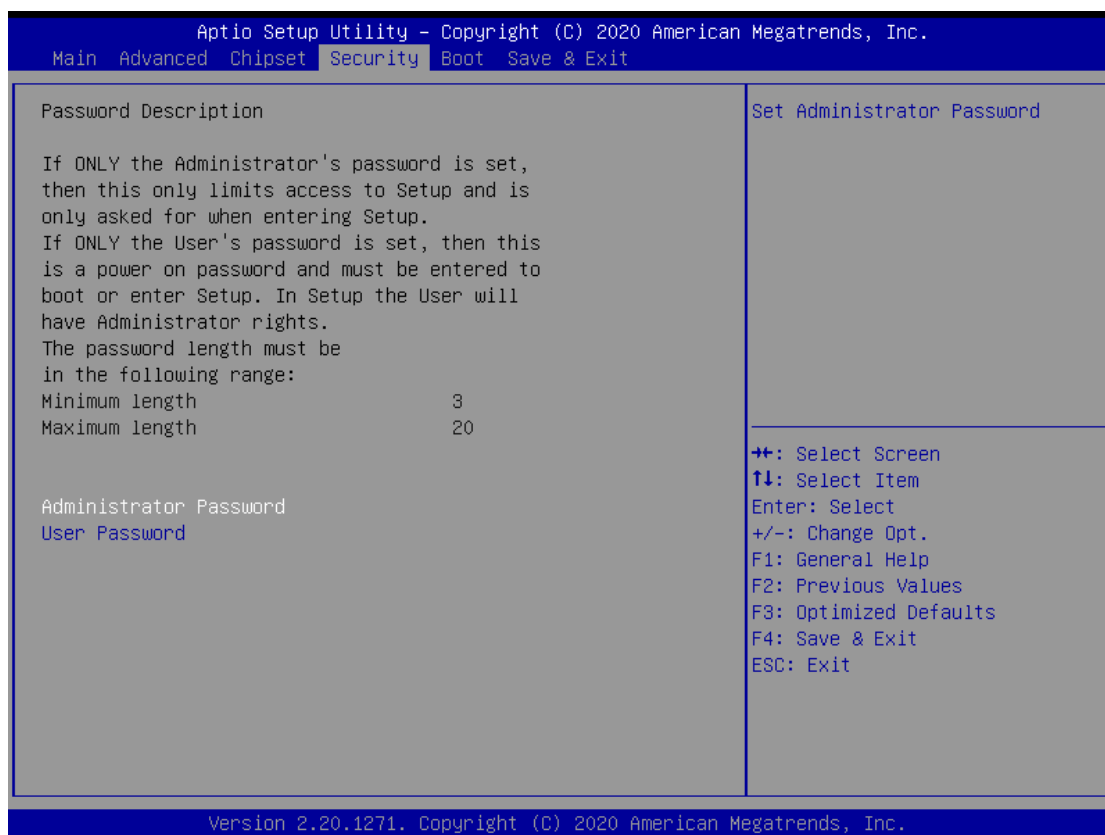
4.6   Security Menu

The Security menu allows users to change the security settings for the system.

```
            Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
      Main  Advanced  Chipset  Security  Boot  Save & Exit

     Password Description                                Set Administrator Password

     If ONLY the Administrator's password is set,
     then this only limits access to Setup and is
     only asked for when entering Setup.
     If ONLY the User's password is set, then this
     is a power on password and must be entered to
     boot or enter Setup. In Setup the User will
     have Administrator rights.
     The password length must be
     in the following range:
     Minimum length                  3
     Maximum length                  20
                                                        →←: Select Screen
                                                        ↑↓: Select Item
     Administrator Password                             Enter: Select
     User Password                                      +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit



            Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
```
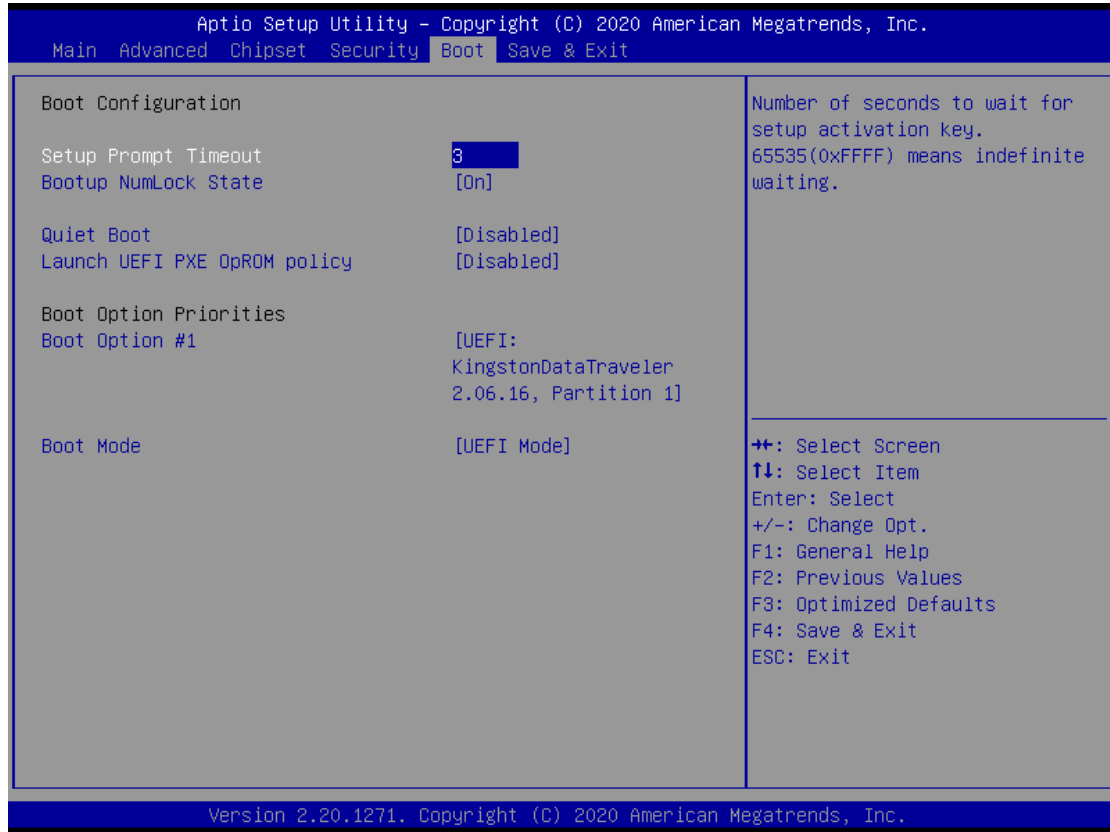
Administrator Password
This item indicates whether an administrator password has been set (installed or uninstalled).

User Password
This item indicates whether a user password has been set (installed or uninstalled).

4.7   Boot Menu

The Boot menu allows users to change boot options of the system.

```
         Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
   Main  Advanced  Chipset  Security   Boot  Save & Exit

   Boot Configuration                                    Number of seconds to wait for
                                                         setup activation key.
   Setup Prompt Timeout               3                  65535(0xFFFF) means indefinite
   Bootup NumLock State               [On]               waiting.

   Quiet Boot                         [Disabled]
   Launch UEFI PXE OpROM policy       [Disabled]

   Boot Option Priorities
   Boot Option #1                     [UEFI:
                                      KingstonDataTraveler
                                      2.06.16, Partition 1]


   Boot Mode                          [UEFI Mode]        ++: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit




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```

Setup Prompt Timeout

This item sets number of seconds to wait for setup activation key.
Options:1 (Default)

Bootup NumLock State

Use this item to select the power-on state for the keyboard NumLock.

Quiet Boot

Select to display either POST output messages or a splash screen during boot-up.

4.8   Save & Exit Menu

The Save & Exit menu allows users to load system configuration with optimal or fail-safe default values.

```
              Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
        Main  Advanced  Chipset  Security  Boot  Save & Exit

        Save Changes and Exit                              Exit system setup after saving
        Discard Changes and Exit                           the changes.
        Save Changes and Reset
        Discard Changes and Reset

        Save Options
        Save Changes
        Discard Changes

        Restore Defaults
        Save as User Defaults
        Restore User Defaults

        Boot Override                                      →←: Select Screen
        UEFI: KingstonDataTraveler 2.06.16, Partition 1    ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit

              Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
```

Save Changes and Exit

When users have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configurations and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

Save Changes and Reset

When completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configurations take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

Discard Changes and Reset

Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.

Save Changes
When completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

Discard Changes
Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.

Restore Defaults
It automatically sets all Setup options to a complete set of default settings when users select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

Save as User Defaults
Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

Restore User Defaults
It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.

Boot Override
Select a drive to immediately boot that device regardless of the current boot order.

APPENDIX A
WATCHDOG TIMER

A.1   About Watchdog Timer

Software stability is major issue in most application. Some embedded systems are not watched by human for 24 hours. It is usually too slow to wait for someone to reboot when computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us solution.

The watchdog timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software starts counter with an initial value and must reset it periodically. If the counter ever reaches zero which means the software has crashed, the system will reboot.

A.2   Sample Program

1. Enter **ADU**, and press <F4> to select the **superior ITE**
2. **PORT** setting **002E, 002F**
3. Address **07h** setting **07 GPIO**
4. Address **72h** to set the countdown, for example Sec: **C0**, Min: **40**
5. Address **73h** set the countdown time, for example 10sec: **0A**

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APPENDIX B
TPM SETTINGS

1. Setup BitLocker Drive Encryption main storage. Press <Win + R> and type "Control Panel", then select BitLocker Drive Encryption.
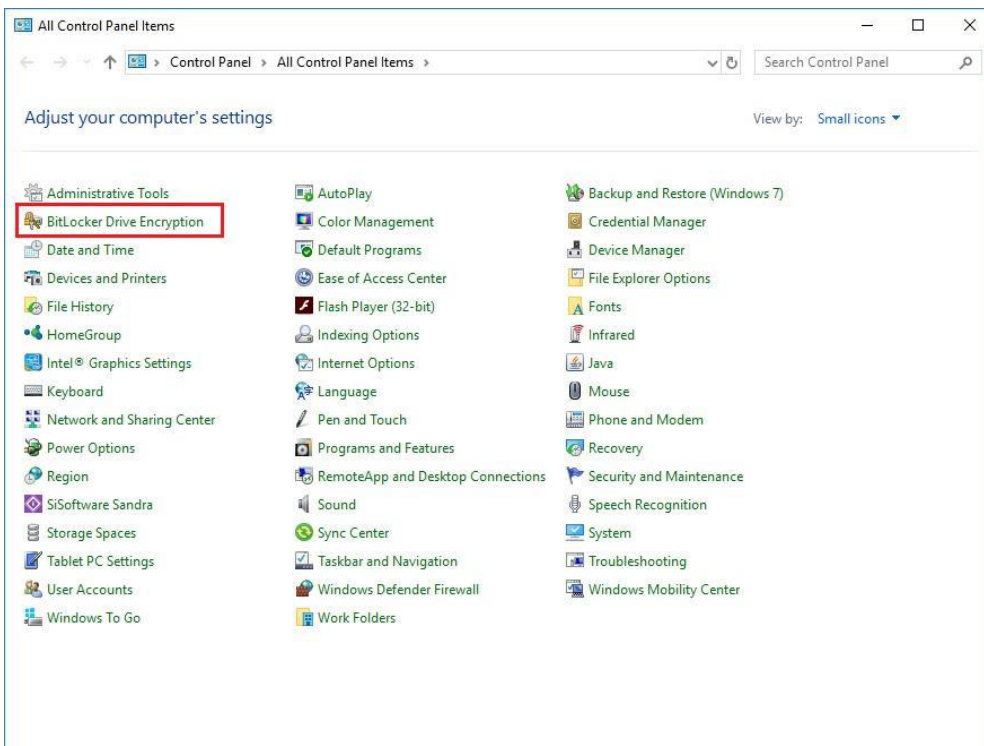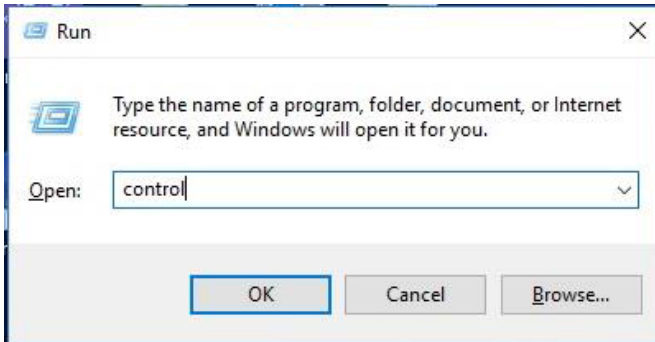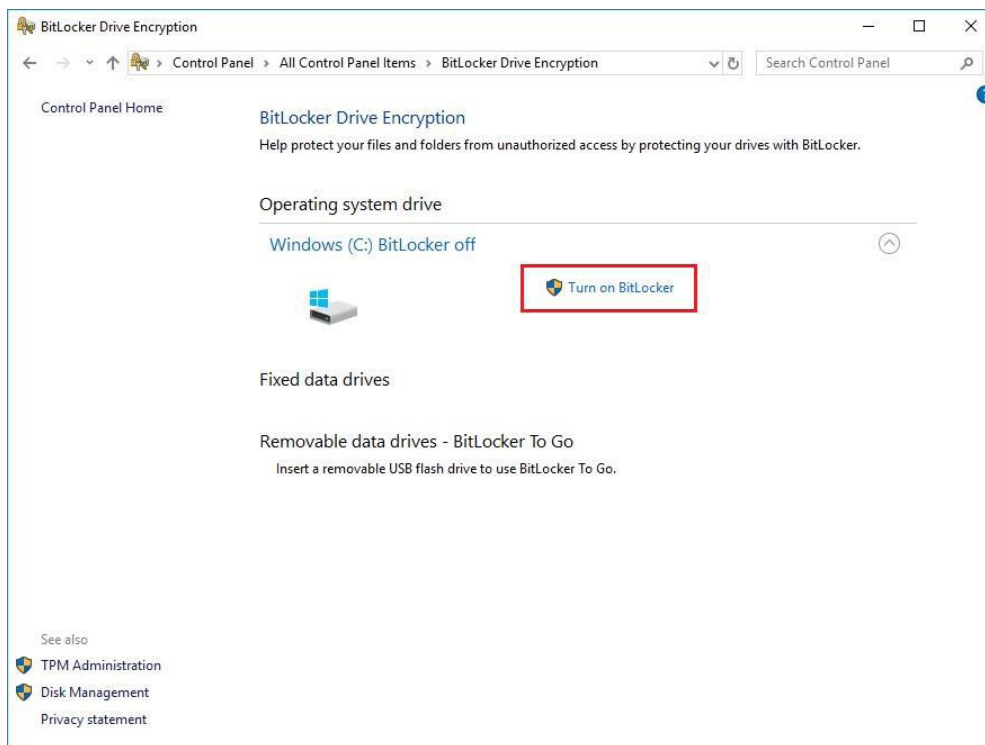
2. Insert an external storage device, for example USB Storage. To back up BitLocker recovery key in a new file and save it to the USB Storage.
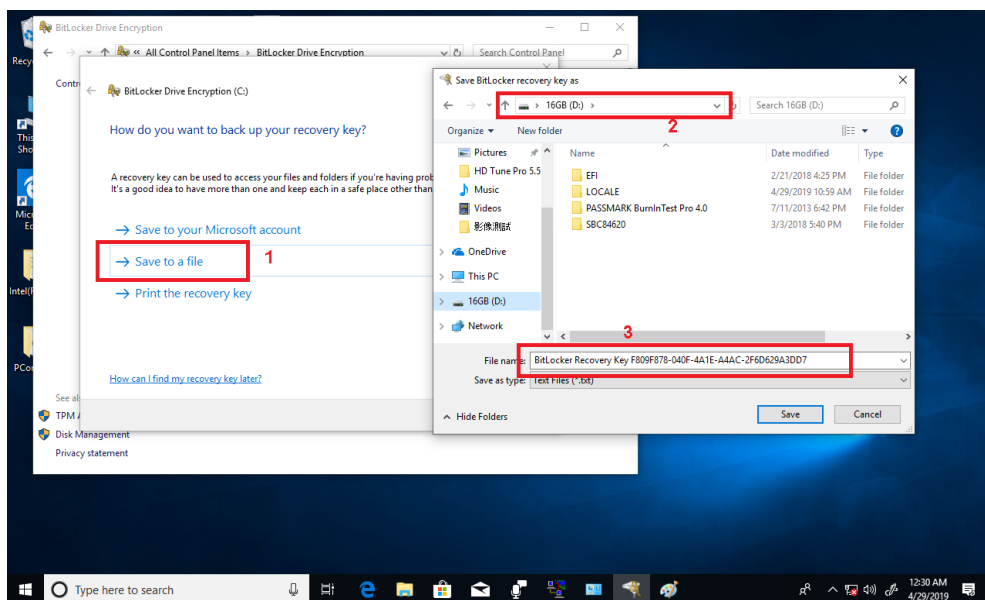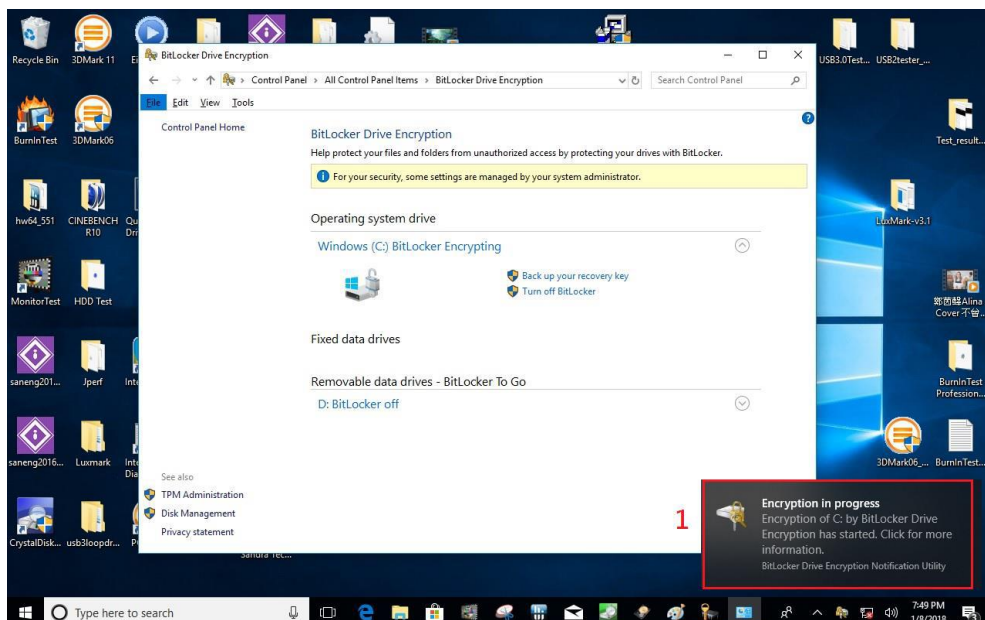
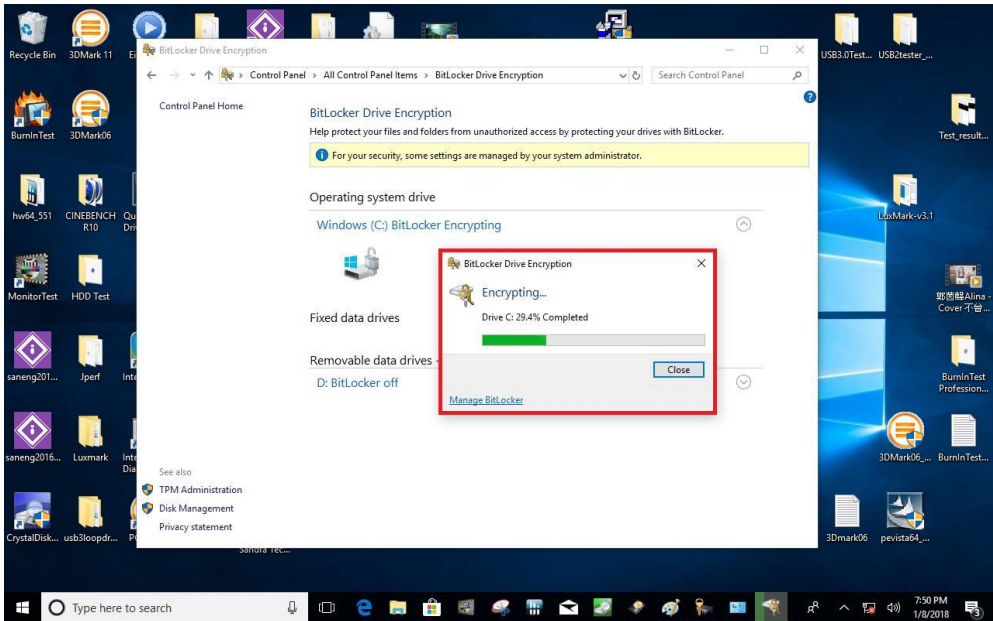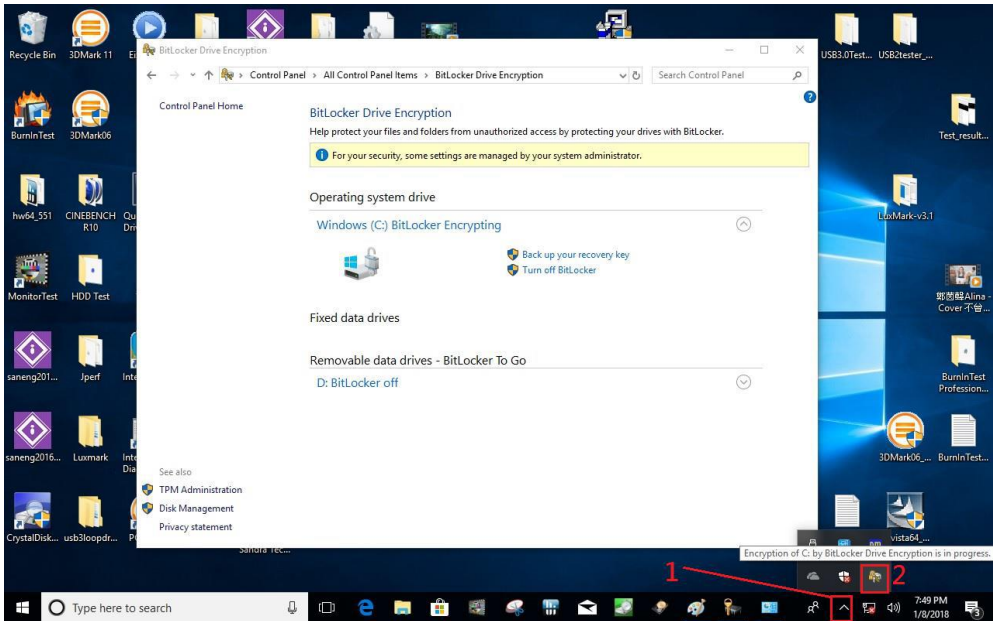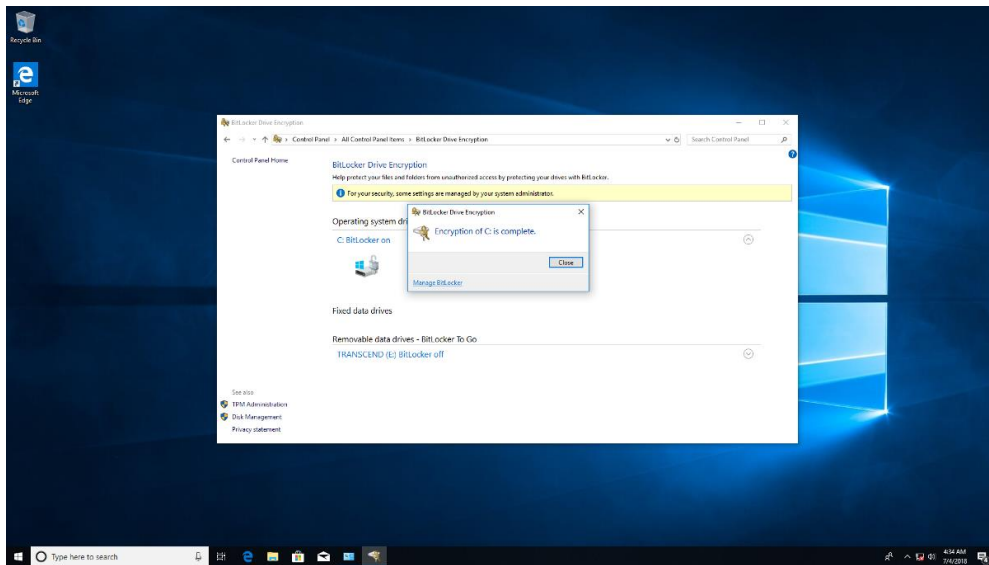3. Please follow the steps below to encrypt your storage device:
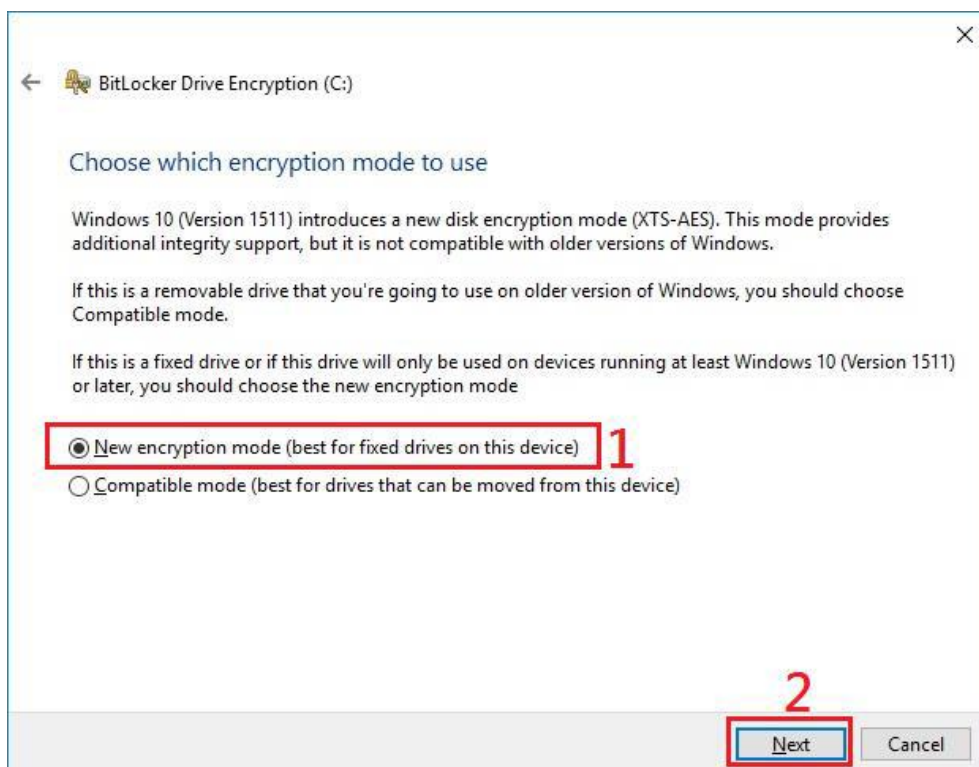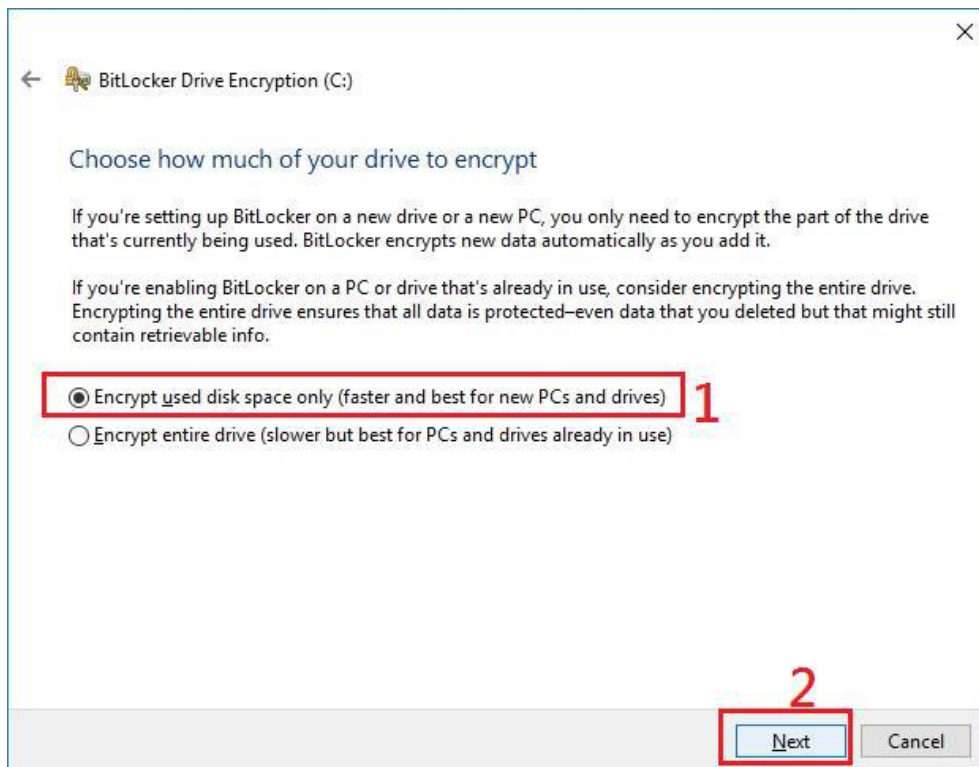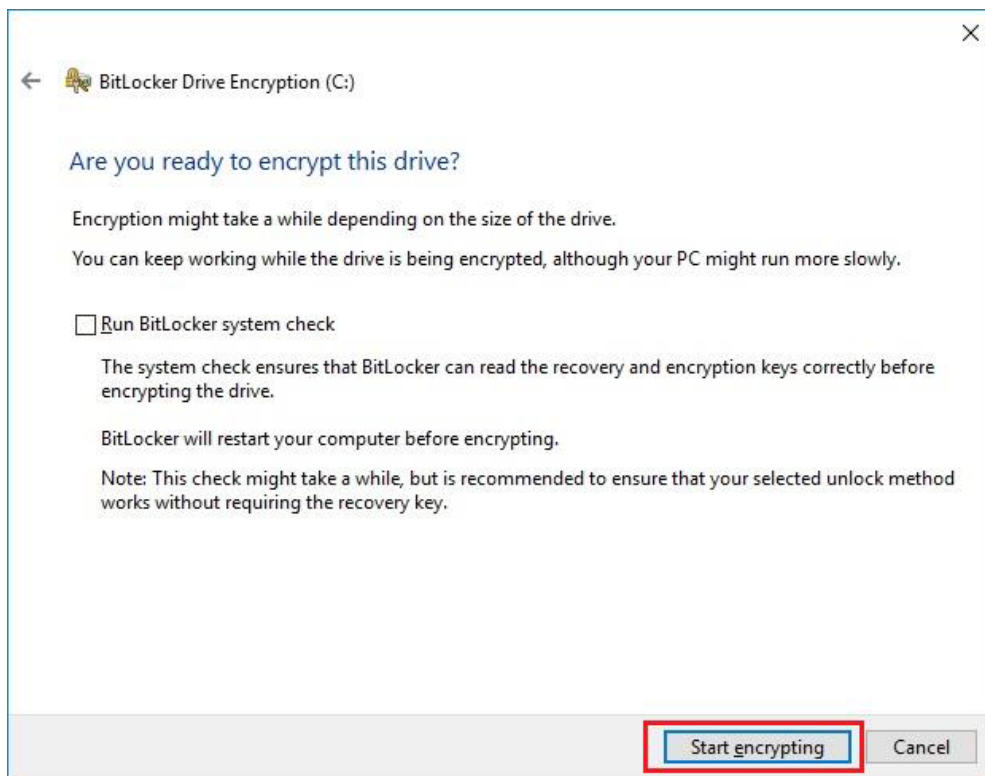
Now, the system prompts that the operating system drive encryption is in progress, and the encryption progress is checked.
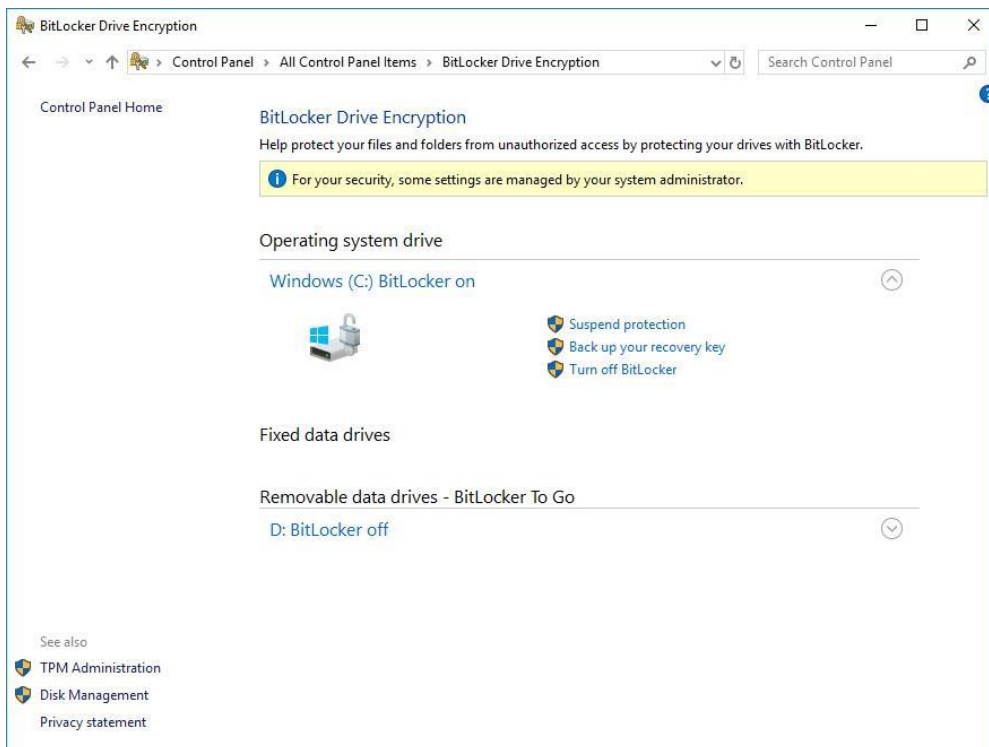
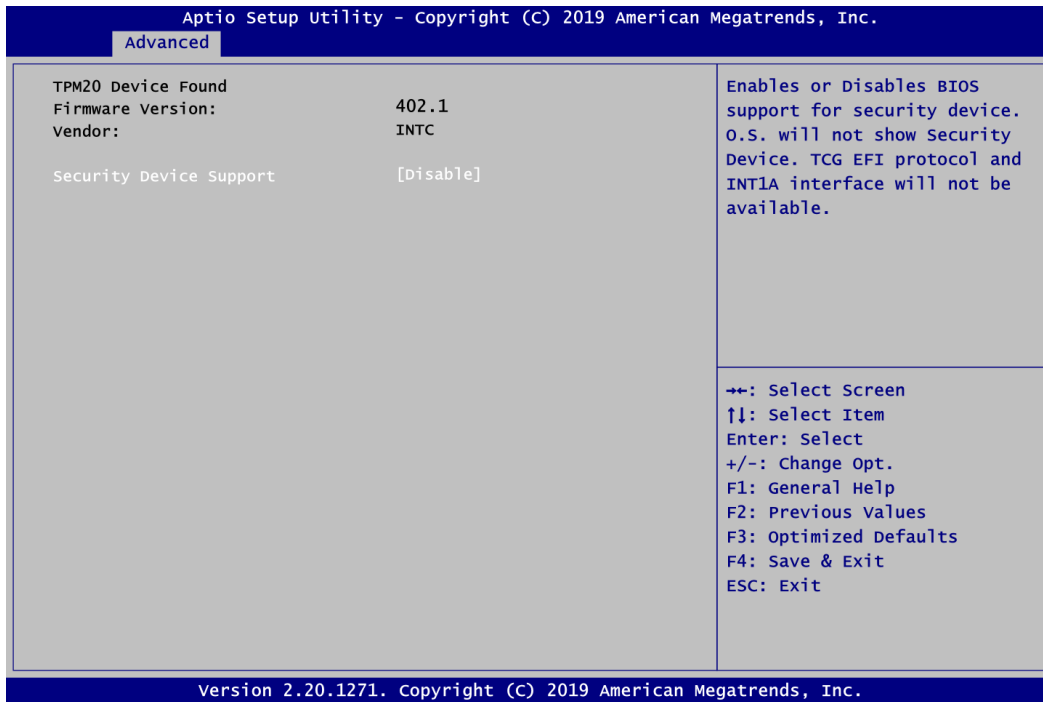Select and click the icon in the lower right corner to complete the encryption.

4. Confirm the completion of encryption.

5. Disable TPM function in BIOS Setup Utility.

```
Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
Advanced

TPM20 Device Found                                  Enables or Disables BIOS
Firmware Version:          402.1                     support for security device.
Vendor:                    INTC                      O.S. will not show Security
                                                     Device. TCG EFI protocol and
Security Device Support    [Disable]                 INT1A interface will not be
                                                     available.




                                                     →←: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit


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```

6. When the system is powered on and you see the following screen, it means the TPM module function is working fine. Note that BitLocker cannot be executed if your system does not have TPM function.

```
BitLocker recovery

Enter the recovery key for this drive

|

For more information on how to retrieve this key, go to
http://windows.microsoft.com/recoverykeyfaq from another PC or mobile device.

Use the number keys or function keys F1-F10(use F10 for 0).


Recovery key ID: 995386D1-889B-4ADA-BA42-DCD3929AF074




Press Enter to continue
Press Esc for more recovery options
```

System with no TPM function support is demonstrated as below:
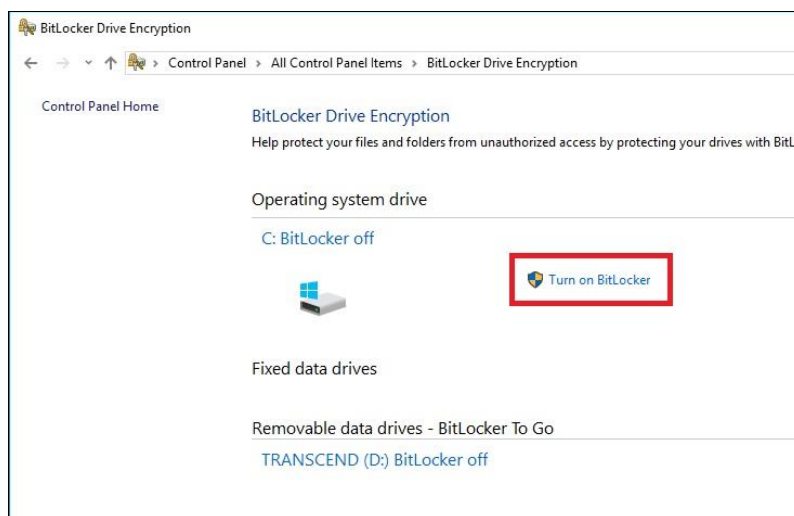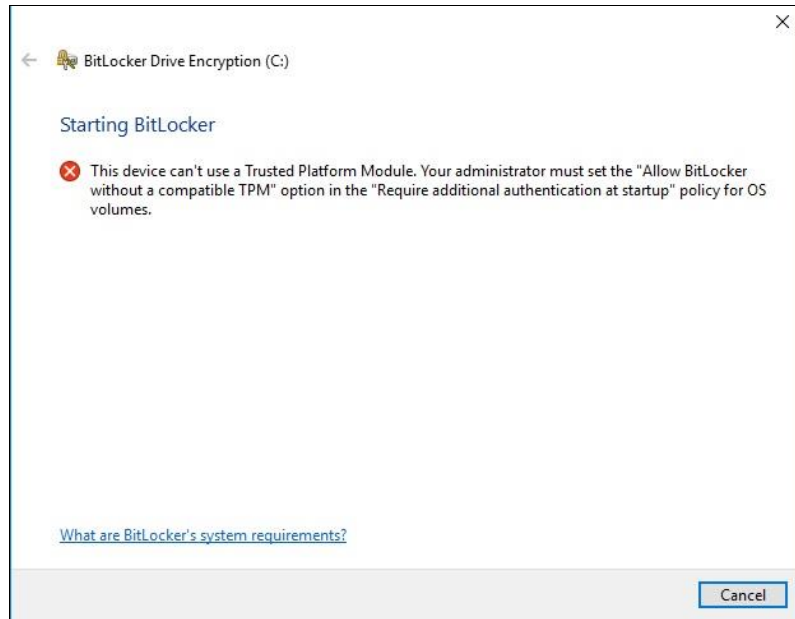
【Note】

1. ***TPM information is not found in Device Manager.***

2. ***When trying to turn on Bitlocker, the following error message shows up.***

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APPENDIX C
DIGITAL I/O SETTINGS

This digital I/O has 8 bits (DIO0~7) by CN10 connector. Each bit can be set to function as input or output by software programming.
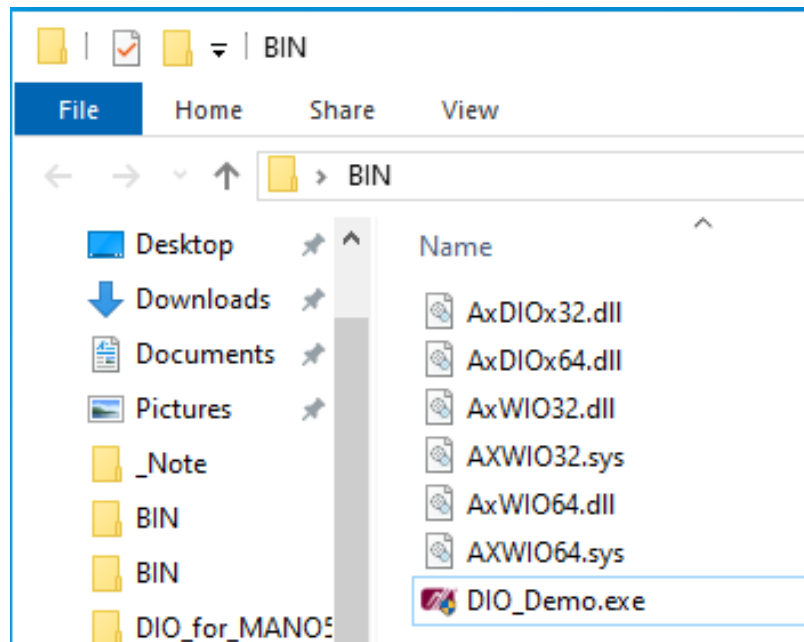
| Pins	Descriptions
1	DIO0 (GPI70, 0xA06, Bit0, H) [*]
2	DIO1 (GPI71, 0xA06, Bit1, H) [*]
3	DIO2 (GPI72, 0xA06, Bit2, H) [*]
4	DIO3 (GPI73, 0xA06, Bit3, H) [*]
5	DIO4 (GPI74, 0xA06, Bit4, H) [*]
6	DIO5 (GPI75, 0xA06, Bit5, H) [*]
7	DIO6 (GPI76, 0xA06, Bit6, H) [*]
8	DIO7 (GPI77, 0xA06, Bit7, H) [*]
9	GND

Digital I/O
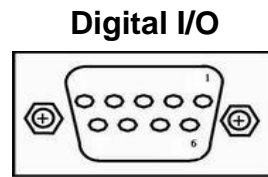
AP Programming

※Please download the DIO demo source code from AXIOMTEK website for programming AP.

Step 1 Run DIO_Demo.exe

Step 2 setup input or output
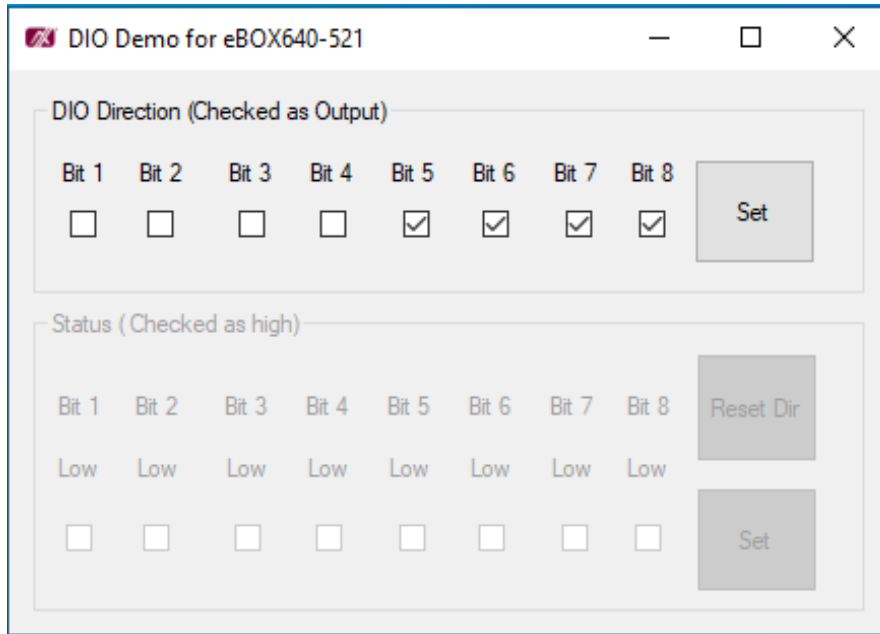
Step 3 Read status of input

Setup low/high level of output