USER'S MANUAL

MANO566

Intel® Socket 1700 Core™ i9/ i7/ i5/ i3 Series Processors Mini ITX Motherboard

User's Manual

AXIOMTEK®

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CAUTION

If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

■ Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.

■ Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.

■ Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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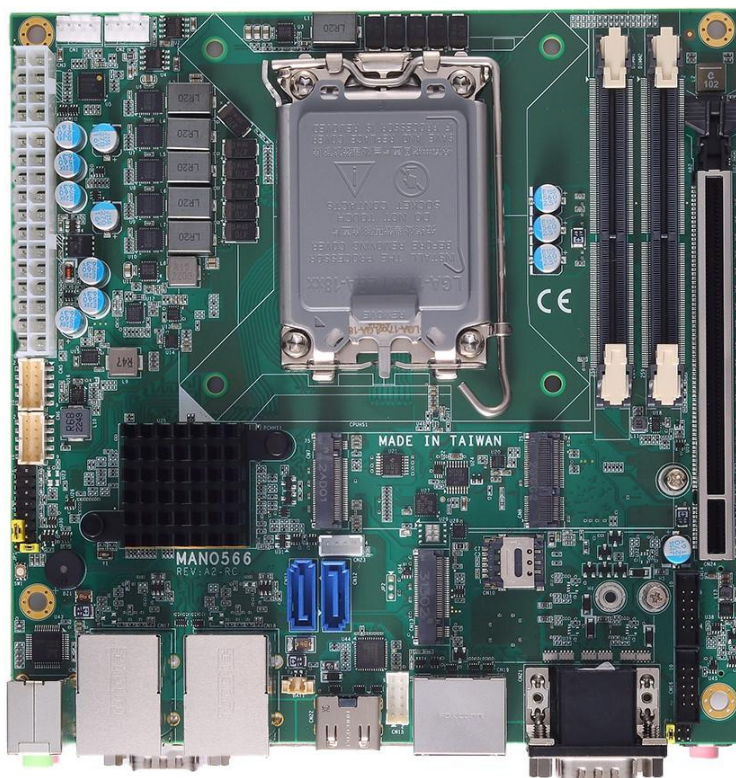
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Section 1
Introduction

The MANO566 Mini-ITX motherboard supports the new Intel 7 14th/ 13th/ 12th Generation Intel® Core™ i9/ i7/ i5/ i3 (65W CPU) and Pentium® processors in LGA1700 package. Featuring the new Intel® Q670E, R680E, H610E Express chipset with two DDR4 3200MHz memory support, this motherboard is built to perform best stability and reliability for industrial applications.

It comes with two SATA 3.0, four USB 3.2, four USB 2.0 and four serial ports (RS-232/422/485) providing robust storage and I/O options. Users also can increase board functionality with PCI-Express x16 and M.2 slot. The high quality MANO566 allows four display interfaces via eDP, DisplayPort++ and two HDMI, making it an ideal solution for gaming, workstation, digital signage, medical and other IoT&M2M applications.

1.1   Features

- LGA1700 Socket for 14th/ 13th/ 12th Generation Intel® Core™ i9/ i7/ i5/ i3 processors and Pentium® processor (up to 65W) (Alder Lake-S)
- 2 DDR4-3200MhzMHz memory with maximum capacity up to 64 GB
- 1 PCI-Express x16
- 1 M.2 Key E 2230 for WiFi (support PCIE x1, USB 2.0 signal)
- 1 M.2 Key M 2260, 2280 for NvME storage(support PCIE x4 signal)
- 1 M.2 Key B 3042/3052 with SIM slot for 4G LTE/ 5G (PCIE x1, USB 3.2)
- 2 SATA-600 support RAID 0/1.
- 4 USB 3.2 and 4 USB 2.0
- TPM 2.0 supported.
- iAMT supported.

1.2 Specifications

● **CPU**
- LGA1700Socket for 14th/ 13th/ 12th Generation Intel® Core™ i9/ i7/ i5/ i3 processors and Pentium® processor (up to 65W CPU).

● **Chipset**
- Intel® Q670E
- Intel® R680E
- Intel® H610E

● **BIOS**
- AMI BIOS via SPI interface.

● **System Memory**
- Two 260-pin SO-DIMM sockets.
- Maximum up to 64GB DDR4 memory.
- Support 2400/2666/3200MhzMHz.

● **Onboard Multi I/O**
- Controller: F81966
- Four serial ports:
  - COM1~2 with RS-232/422/485 by BIOS selectable (Rear I/O)
  - COM3~4 with RS-232/422/485 by BIOS selectable (2x5P 2.0mm box header)

● **USB Interface**
- Four USB 3.2 Ports (on the rear I/O).
- Four USB 2.0 Ports via 2x5 pin 2.0mm wafe (internal).

● **Ethernet**
  Two 2500/1000/100/10Mbps Gigabit/Fast Ethernet support Wake-on-LAN, PXE via Intel® I226-LM. (Support Q670E & R680E version) and Intel® I226-V. (Support H610E version)

● **Serial ATA**
- Two SATA 3.0 ports (6Gb/s).

● **Audio**
- Realtek ALC888S HDA codec.
- Support MIC-in/line-out (on the rear I/O).
- Support MIC-in/line-out/line-in in box header (internal).

● **Display**
- Two HDMI 1.4b connector in wafer connector. Resolution max. up to 4096x2304 @30Hz.
- One DisplayPort++ with resolution max. up to 4096x2304 @60Hz.
- One Embedded DisplayPort (eDP) with resolution max. up to 4096x2304 @60Hz.

● **Expansion Interface**
- One PCI-Express x16 slot.
- One M.2 key M slot (support PCIE x4 signal).
- One M.2 Key E slot (support PCIE x1, USB 2.0 signal).
- One M.2 Key B slot (support PCIE x1, USB 3.2 signal, only Q670E & R680E version)

● **Power Input**
- One ATX power input connector.
- One 12V ATX power input connector for CPU power.

- **Operating Temperature**
  - 0°C ~ 60°C.

- **Storage Temperature**
  - -20°C ~ 65°C.

- **Form Factor**
  - Mini ITX (6.7" x 6.7", 17.0cm x 17.0cm).

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

1.3 Utilities Supported

- Chipset driver
- Graphics driver
- Intel ME driver
- Ethernet driver
- Serial IO driver
- Intel RST driver
- Intel DTT driver
- Intel GNA driver (13th/14th support only)

1.4   Block Diagram
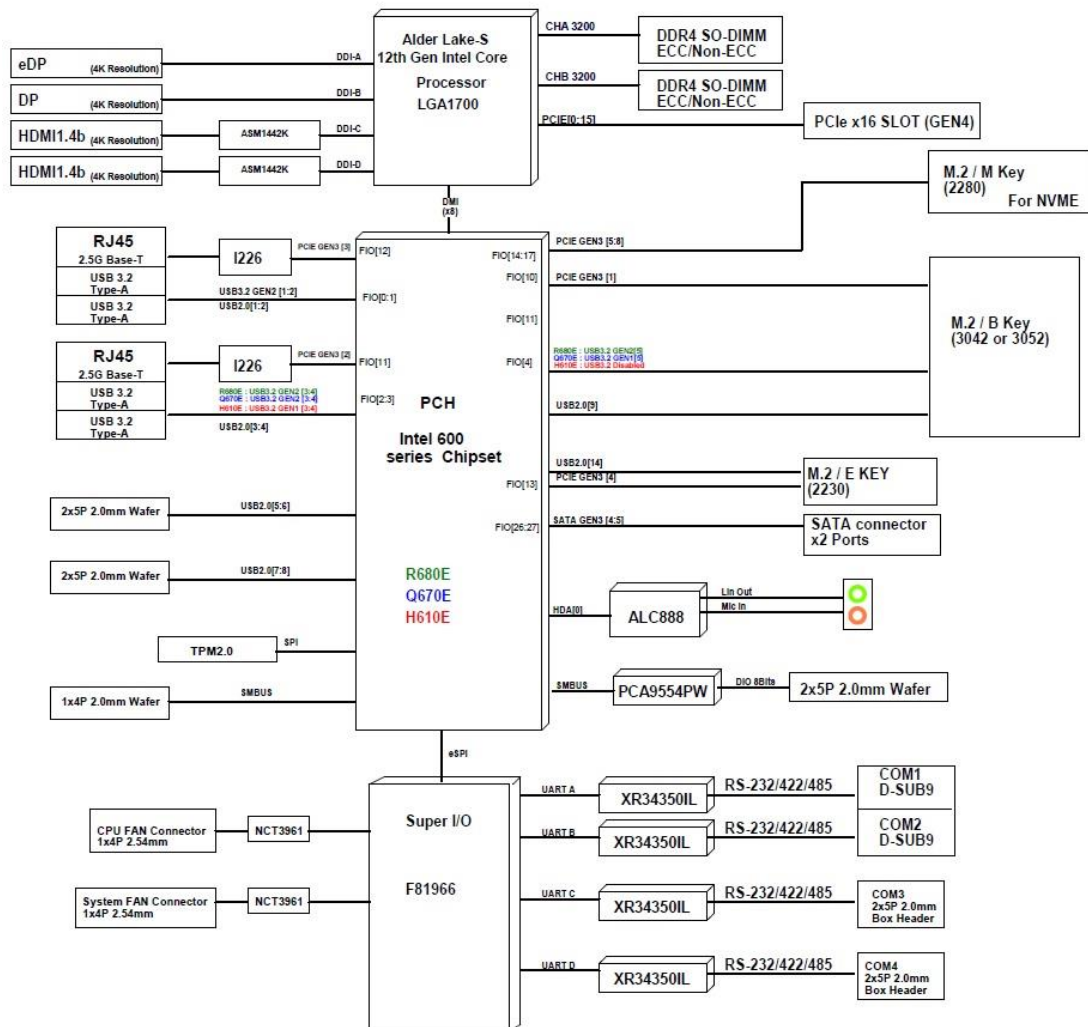
Section 2
Board and Pin Assignments

2.1   Board Layout

Top View

Rear I/O

SCN2
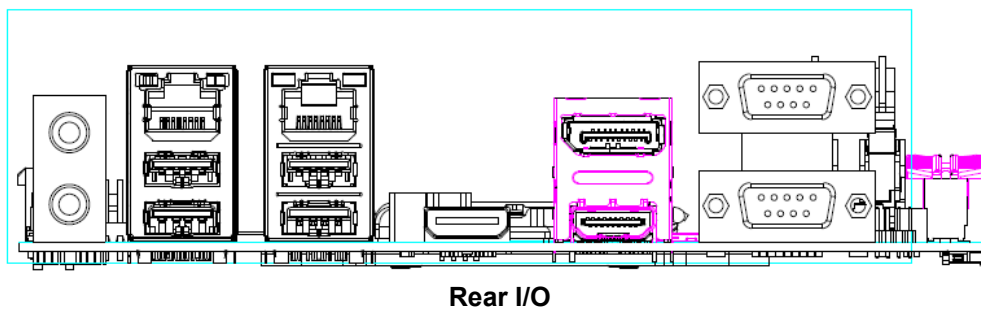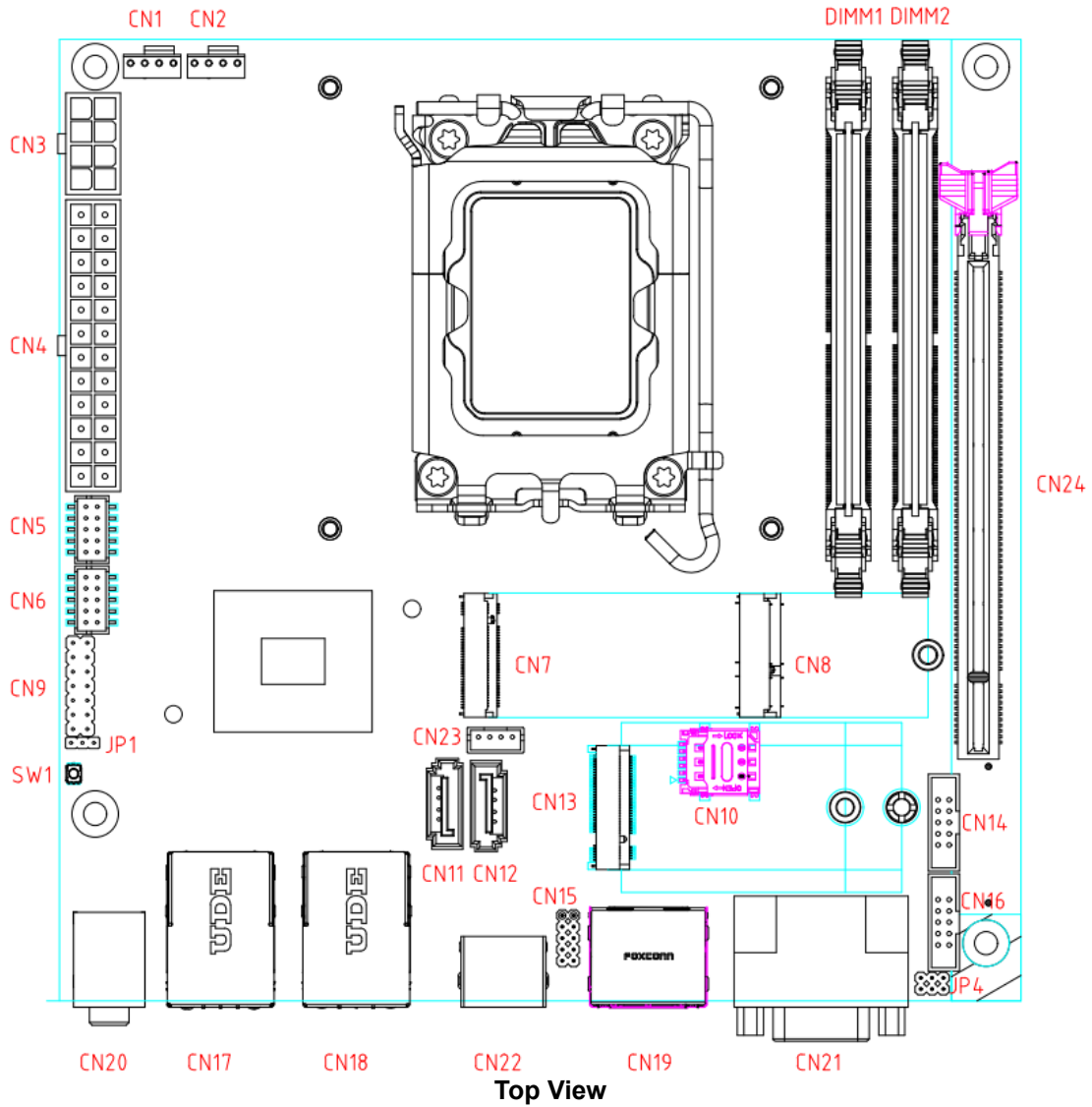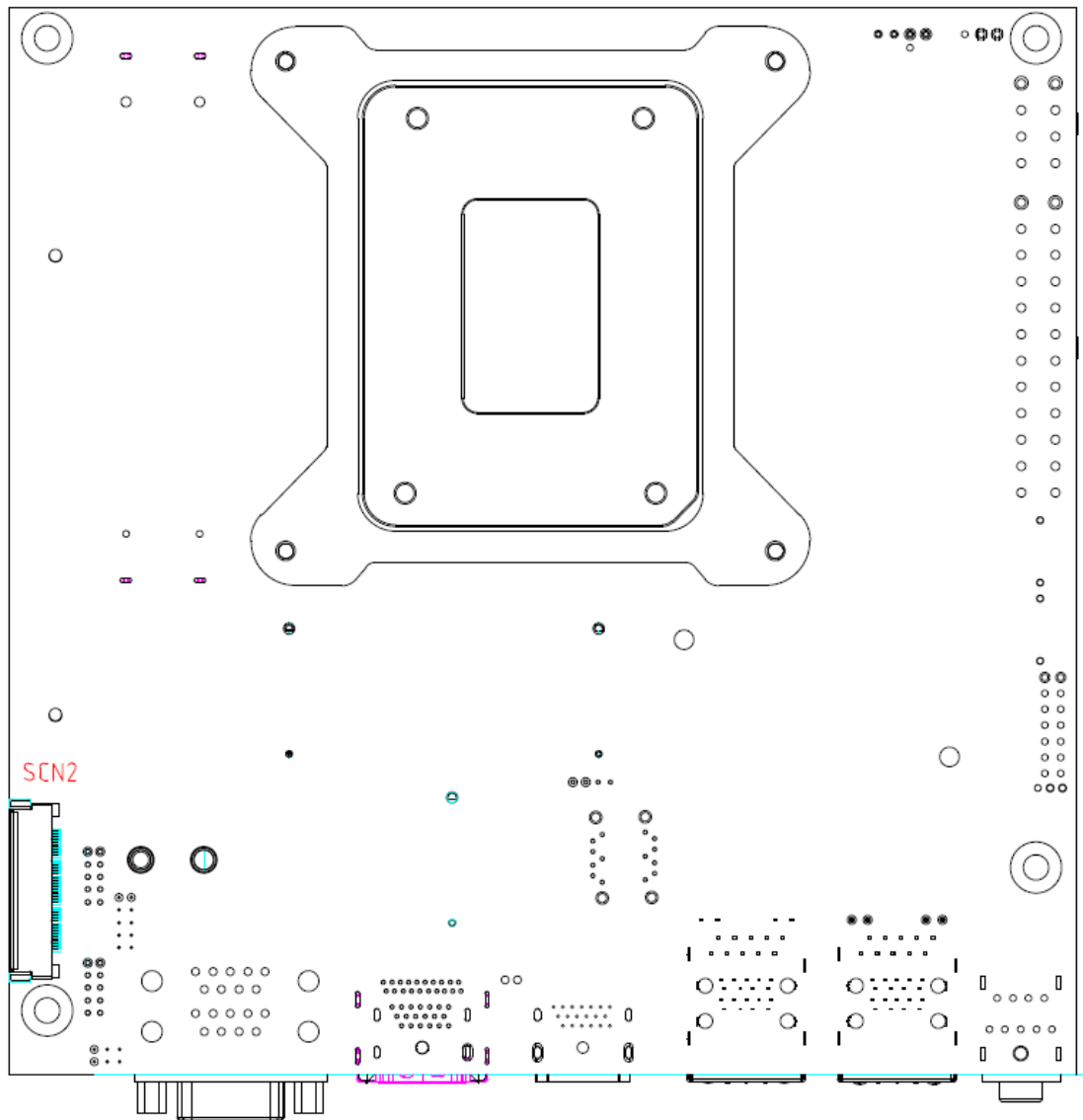
Bottom View

Note

> **To identify the first pin of a header or jumper, please refer to the following information:**
> ● **Usually, there is a thick line or a triangle near the header or jumper pin 1.**
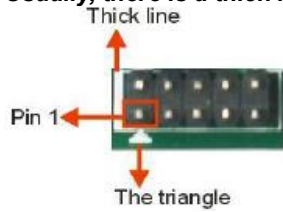
2.3   Jumper and Switch Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. The following illustration shows how to set up jumper.
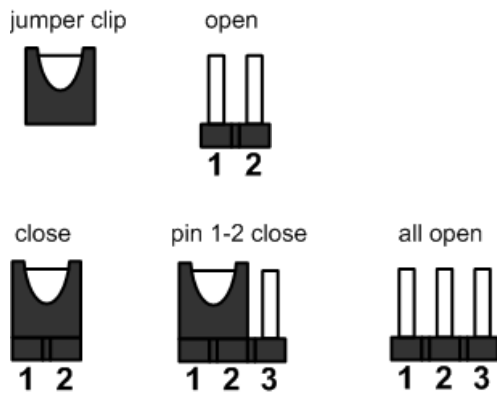
Before applying power to MANO566 Series, please make sure all of the jumper and switch are in factory default position. Below you can find a summary table of jumper, switch and onboard default settings.

Note

> **Once the default jumper and switch settings need to be changed, please do it under power-off condition.**

Jumper	Description	Setting
JP1	Auto Power On Default: Disable	2-3 Close
JP4	EDP VDD Select Default: +3.3V	1-2 Close
SW1	Clear CMOS Default: Normal Operation	Release

2.3.1 Auto Power On (JP1)

If JP1 is enabled for power input, the system will be automatically power on without pressing soft power button. If JP1 is disabled for power input, it is necessary to manually press soft power button to power on the system.

Function	Setting
Enable auto power on	1-2 close
Disable auto power on (Default)	2-3 close

2.3.2 EDP VDD Select (JP4)

The motherboard supports voltage selection for embedded DisplayPort (eDP). Use this jumper to set up VDD power of the eDP connector. To prevent hardware damage, before connecting please make sure that the input voltage of display panel is correct.

Function	Setting
+3.3V (Default)	1-2 close
+5V	2-4 or 4-6 close
+12V	5-6 close
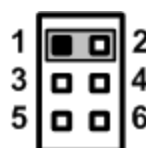
2.3.3 Clear CMOS (SW1)

This switch 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. Press the tact switch for at least 1 second.
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 (Default)	Release
Restore BIOS optimal defaults	Press
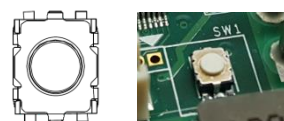
2.4   Connectors

Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table showing connectors on the hardware.

Connector	Description
CN1, CN2	Fan Wafer Connectors
CN3, CN4	ATX Power Input Connectors
CN5, CN6	USB 2.0 Wafer Connectors
CN7	M.2 Key M Connector
CN8	M.2 Key E Connector
CN9	Front Panel Connector
CN10	Nano SIM Socket
CN11, CN12	SATA 3.0 Connectors
CN13	M.2 Key B Connector
CN14, CN16	COM3 and COM4 Wafer Connectors
CN15	Digital I/O Wafer Connector
CN17, CN18	LAN and USB 3.2 Ports
CN19	DisplayPort++ and HDMI Connector
CN20	Audio Jack
CN21	COM Double-deck D-Sub Connector
CN22	HDMI Type-A Connector
CN24	PCIe x16 Slot (Gen4)
DIMM1, DIMM2	DDR4 SO-DIMM CHA~CHB Connectors
SCN2	eDP Connector

2.4.1 Fan Connectors (CN1 CPU Fan and CN2 SYS Fan)

The motherboard has two 4-pin (pitch=2.54mm) fan connectors. You can find fan speed option within BIOS Setup Utility if fan is installed. For further information, see BIOS Setup Utility: Advanced\Hardware Monitor\PC Health Status in section 4.4.

Pin	Signal
1	GND
2	+12V
3	FAN Speed Detection
4	FAN Speed Control
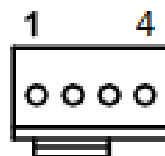
2.4.2 ATX Power Input Connectors (CN3 and CN4)

Steady and sufficient power can be supplied to all components on the board by connecting power connector. Please make sure all components and devices are properly installed before connecting the power connector.

External power supply plug fits into the connector in only one orientation. Properly press down power supply plug until it completely and firmly fits into this connector. Loose connection may cause system instability.

CN3: 8-pin connector for +12V DC power input.

Pin	Signal	Pin	Signal
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V
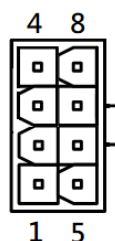
CN4: 24-pin connector for DC power input.

Pin	Signal	Pin	Signal
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWR OK	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	3.3V	24	GND
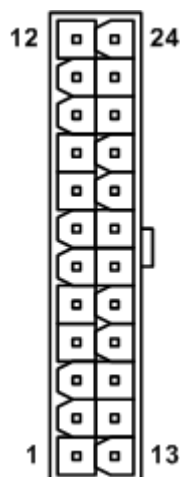
2.4.3 USB 2.0 Wafer Connector (CN5 and CN6)

These are 2x5-pin (Pitch=2.00mm/Model:CSI-2211-101R) connectors for USB 2.0 interfaces.

CN5/CN6:

Pin	Signal	Pin	Signal
1	USB VCC (+5V_SBY)	2	USB VCC (+5V_SBY)
3	USB_D5_N	4	USB_D6_N
5	USB_D5_P	6	USB_D6_P
7	GND	8	GND
9	GND	10	GND
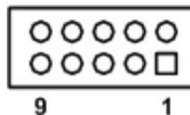
2.4.4 M.2 Key M Connector (CN7)

The motherboard comes with one M.2 Key M connector suitable for mounting SATA/PCIE storage card.

Pin	Signal	Pin	Signal
1	GND	2	+3.3V
3	GND	4	+3.3V
5	PCIE_RX3_N	6	NC
7	PCIE_RX3_P	8	NC
9	GND	10	NC
11	PCIE_TX3_N	12	+3.3V
13	PCIE_TX3_P	14	+3.3V
15	GND	16	+3.3V
17	PCIE_RX2_N	18	+3.3V
19	PCIE_RX2_P	20	NC
21	GND	22	NC
23	PCIE_TX2_N	24	NC
25	PCIE_TX2_P	26	NC
27	GND	28	NC
29	PCIE_RX1_N	30	NC
31	PCIE_RX1_P	32	NC
33	GND	34	NC
35	PCIE_TX1_N	36	NC
37	PCIE_TX1_P	38	DEVSLP
39	GND	40	NC
41	PCIE_RX0_N	42	NC
43	PCIE_RX0_P	44	NC
45	GND	46	NC
47	PCIE_TX0_N	48	NC
49	PCIE_TX0_P	50	PERST#
51	GND	52	CLKREQ#
53	REF_CLK_N	54	PEWAKE#
55	REF_CLK_P	56	NC
57	GND	58	NC
59	Key M	60	Key M
61	Key M	62	Key M
63	Key M	64	Key M
65	Key M	66	Key M
67	NC	68	SUSCLK
69	NC	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		
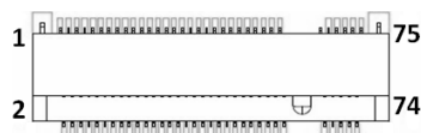
2.4.5 M.2 Key E Connector (CN8)

The motherboard comes with one M.2 Key E connector.

Pin	Signal	Pin	Signal
1	GND	2	+3.3V
3	USB_D+	4	+3.3V
5	USB_D-	6	NC
7	GND	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	GND
19	NC	20	NC
21	NC	22	NC
23	NC	24	
25		26	
27	KEY E	28	KEY E
29		30	
31		32	NC
33	GND	34	NC
35	PCIE_TX_P	36	NC
37	PCIE_TX_N	38	NC
39	GND	40	NC
41	PCIE_RX_P	42	NC
43	PCIE_RX_N	44	NC
45	GND	46	NC
47	REF_CLK_P	48	NC
49	REF_CLK_N	50	SUSCLK
51	GND	52	PERST#
53	CLKREQ#	54	W_DISABLE2#
55	PEWAKE#	56	W_DISABLE1#
57	GND	58	I2C_DAT
59	NC	60	I2C_CLK
61	NC	62	ALERT#
63	GND	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	NC
71	NC	72	+3.3V
73	NC	74	+3.3V
75	GND		
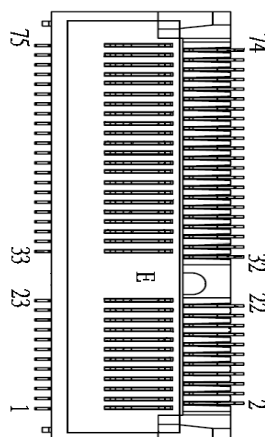
2.4.6 Front Panel Connector (CN9)

The CN9 is a 2x7-pin (pitch=2.54mm) header for front panel interface.

Pin	Signal
1	Power LED+
2	SPK-
3	GND
4	BUZZER-
5	Power LED-
6	NC
7	NC
8	SPK+
9	PWRSW-
10	PWRSW+
11	HWRST-
12	HWRST+
13	HDDLED-
14	HDDLED+
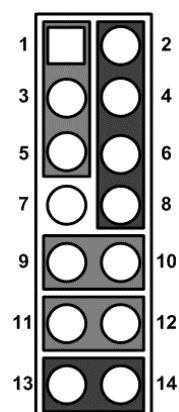
Power LED
Pin 1 connects LED+ and pin 5 connects LED-. The power LED lights up when the system is powered on.

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 front panel to the board, which allows users to turn on or off power supply.

System Reset Switch
Pin 11 and 12 connect the case-mounted reset switch that reboots your computer without turning off the power switch. It is a better way to reboot your system for a longer life of system power supply.

HDD Activity LED
This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 13 and 14 connect the hard disk drive to the front panel HDD LED, pin 13 is assigned as cathode(-) and pin 14 is assigned as anode(+).

2.4.7 Nano SIM Socket (CN10)

The motherboard is equipped with CN10 socket for inserting SIM Card.

Pin	Signal
C1	SIM VCC
C2	SIM Reset
C3	SIM CLK
C5	GND
C6	SIM VPP
C7	SIM Data
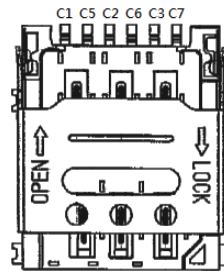
2.4.8 SATA Connectors (CN11 and CN12)

This Serial Advanced Technology Attachment (Serial ATA or SATA) connector is for SATA 3.0 interface allowing up to 6.0Gb/s data transfer rate. It is a computer bus interface for connecting to device such as hard disk drive.

CN11/CN12:

Pin	Signal
1	GND
2	SATA_4_TX_P
3	SATA_4_TX_N
4	GND
5	SATA_4_RX_N
6	SATA_4_RX_P
7	GND

2.4.9　M.2 Key B Connector (CN13)

The motherboard comes with one M.2 Key B connector suitable for mounting SATA/PCIE storage card, or USB 3.2 and USB 2.0 application card.

Pin	Signal	Pin	Signal
1	CONFIG_3	2	+3.3V_SBY
3	GND	4	+3.3V_SBY
5	GND	6	Full Card PWR OFF_SBY (+1.8V)
7	USB_DP	8	W_DISABLE1#_SBY (+3.3V)
9	USB_DN	10	NC
11	GND	12	Key B
13	Key B	14	Key B
15	Key B	16	Key B
17	Key B	18	Key B
19		20	NC
21	CONFIG_0	22	NC
23	GPIO_11_SBY (+1.8V)	24	NC
25	NC	26	NC
27	GND	28	NC
29	USB3_RX_N	30	SIM_RESET
31	USB3_RX_P	32	SIM_CLK
33	GND	34	SIM_DATA
35	USB3_TX_N	36	SIM_PWR
37	USB3_TX_P	38	NC
39	GND	40	SMB_CLK_SBY (+1.8V)
41	PCIE_RX_N	42	SMB_DATA_SBY (+1.8V)
43	PCIE_RX_P	44	NC
45	GND	46	NC
47	PCIE_TX_N	48	NC
49	PCIE_TX_P	50	PERST#
51	GND	52	CLKREQ#
53	REF_CLK_N	54	PEWAKE#
55	REF_CLK_P	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	RESET#_SBY (+1.8V)	68	SUSCLK
69	CONFIG_1	70	+3.3V_SBY
71	GND	72	+3.3V_SBY
73	GND	74	+3.3V_SBY
75	CONFIG_2		
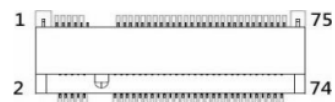
2.4.10   COM Wafer Connectors (CN14 and CN16)

The motherboard comes with two 2x5-pin (Pitch=2.00mm/Model: 520-90-10GB00) wafer connectors for COM3 and COM4 serial port interfaces. Both COM3 and COM4 are 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. (Maximum baud rate 115200bit/s)

Pin	RS-232	RS-422	RS-485
1	DCD#	TX-	485-
2	RXD	TX+	485+
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
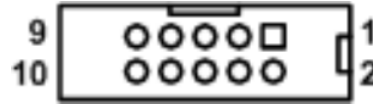
2.4.11   Digital I/O Wafer Connector (CN15)

The motherboard comes with a 2x5-pin (Pitch=2.00mm / Model:2417SJ-10-PHD) header for 8-bit digital I/O interface.

Pin	Signal	Pin	Signal
1	DIO1	2	DIO8
3	DIO2	4	DIO7
5	DIO3	6	DIO6
7	DIO4	8	DIO5
9	+5V	10	GND
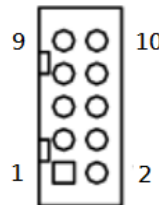
2.4.12 LAN and USB 3.2 Ports (CN17 and CN18)

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 2500/1000/100/10 Base-T hub.
* Only CN17 with Q670E/R680E supported Intel AMT(Active Management Technology)

The Universal Serial Bus (compliant with USB 3.2) connectors on the rear I/O are for installing USB peripherals such as keyboard, mouse, scanner, etc.

CN17/CN18

Pin	LAN Signal	Pin	LAN Signal
L1	LAN1_MDI0_P	L2	LAN1_MDI0_N
L3	LAN1_MDI1_P	L4	LAN1_MDI1_N
L5	LAN1_MDI2_P	L6	LAN1_MDI2_N
L7	LAN1_MDI3_P	L8	LAN1_MDI3_N
A	10/100M LED (Non) 1000M LED(Orange) 2500M LED(Green)		
B	Active LED(Yellow)		

Pin	USB Signal	Pin	USB Signal
1	+5V	10	+5V
2	USB#1_D-	11	USB#2_D-
3	USB#1_D+	12	USB#2_D+
4	GND	13	GND
5	USB#1_SSRX-	14	USB#2_SSRX-
6	USB#1_SSRX+	15	USB#2_SSRX+
7	GND	16	GND
8	USB#1_SSTX	17	USB#2_SSTX
9	USB#1_SSTX+	18	USB#2_SSTX+

LAN1
LAN2

USB
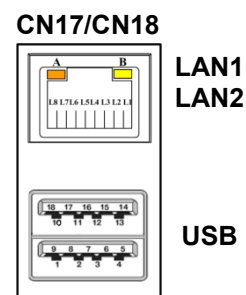
2.4.13   DisplayPort++ and HDMI Connector (CN19)

The motherboard comes with DisplayPort++ and HDMI interface on the rear I/O.

Pin	Signal	Pin	Signal
1	LANE 0	21	DATA2
2	GND	22	GND
3	LANE 0#	23	DATA2#
4	LANE 1	24	DATA1
5	GND	25	GND
6	LANE 1#	26	DATA1#
7	LANE 2	27	DATA0
8	GND	28	GND
9	LANE 2#	29	DATA0#
10	LANE 3	30	Clock
11	GND	31	GND
12	LANE 3#	32	Clock#
13	Detect Pin	33	NC
14	GND	34	NC
15	AUX CH	35	SCL
16	GND	36	SDA
17	AUX CH#	37	GND
18	Hot Plug Detect	38	+5V POWER
19	GND	39	Hot Plug Detect
20	DP_PWR(3.3V)		
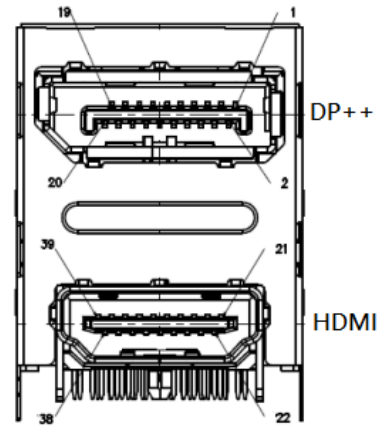
2.4.14   Audio Jack (CN20)

The motherboard provides HD audio jack on the rear I/O. Install audio driver, and then attach audio devices to CN20.

Pin Color	Signal
Green	Line-out
Pink	MIC-in

2.4.15   COM Double-deck D-Sub Connector (CN21)

The CN21 is a double-deck D-Sub connector for COM1 and COM2 serial port interfaces. Both COM1 and COM2 are 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. (Maximum baud rate 115200bit/s)

COM1 and COM2:

Pin	RS-232	RS-422	RS-485
1	DCD#	TX-	485-
2	RXD	TX+	485+
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
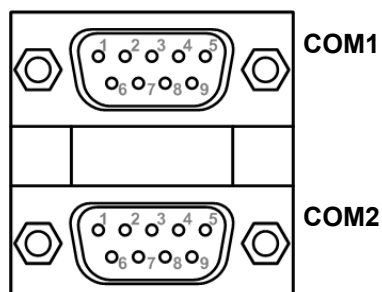
2.4.16   HDMI Type-A Connector (CN22)

The HDMI (High-Definition Multimedia Interface) is a compact digital interface which is capable of transmitting high-definition video and high-resolution audio over a single cable.

Pin	Signal
1	DATA2
2	GND
3	DATA2#
4	DATA1
5	GND
6	DATA1#
7	DATA0
8	GND
9	DATA0#
10	Clock
11	GND
12	Clock#
13	NC
14	NC
15	SCL
16	SDA
17	GND
18	+5V POWER
19	Hot Plug Detect
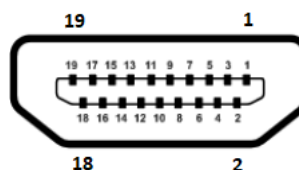
2.4.17   eDP Connector (SCN2)

The embedded DisplayPort (eDP) interface is available through 40-pin connector (SCN2), which is compliant with I-PEX-CABLINE II HT1 20143.

Pin	Signal	Pin	Signal
1	+DVCCM	21	eDP_TXN0
2	+DVCCM	22	eDP_TXP0
3	+DVCCM	23	GND
4	+DVCCM	24	eDP_AUX_DP
5	NC	25	eDP_AUX_DN
6	GND	26	GND
7	GND	27	GND
8	GND	28	GND
9	GND	29	GND
10	eDP_HPD#	30	GND
11	GND	31	NC
12	eDP_TXN3	32	eDP_BLT_CTRL
13	eDP_TXP3	33	eDP_BLT_EN
14	GND	34	NC
15	eDP_TXN2	35	NC
16	eDP_TXP2	36	+12V_EDP_BKLT
17	GND	37	+12V_EDP_BKLT
18	eDP_TXN1	38	+12V_EDP_BKLT
19	eDP_TXP1	39	+12V_EDP_BKLT
20	GND	40	NC
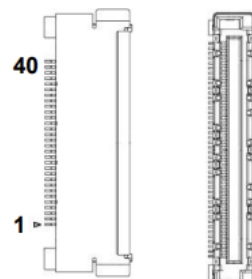
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Section 3
Hardware Description

3.1   Microprocessors

The MANO566 Series supports 14th/ 13th/ 12th Generation Intel® Core™ i9/ i7/ i5/ i3 processors and Celeron / Pentium® processor, which enable your system to operate under Windows® 10/ 11 and Linux environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

3.2   BIOS

The MANO566 Series uses AMI Plug and Play BIOS with a single SPI Flash.

3.3   System Memory

The MANO566 supports two 260-pin DDR4 SO-DIMM sockets for maximum memory capacity up to 32GB DDR4 SDRAMs. The memory module comes in sizes of 2GB, 4GB, 8GB and 16GB.

> **Note**
> - *For single memory channel configuration, install memory module in channel A (DIMM1) DDR4 SO-DIMM socket.*
> - *For dual memory channel configuration, install memory modules of the same size, chip width, density and rank in both channel A (DIMM1) and channel B (DIMM2) DDR4 SO-DIMM sockets.*

3.4   I/O Port Address Map

Input/output (IO)

- [0000000000000000 - 0000000000000CF7] PCI Express Root Complex
- [0000000000000020 - 0000000000000021] Programmable interrupt controller
- [0000000000000024 - 0000000000000025] Programmable interrupt controller
- [0000000000000028 - 0000000000000029] Programmable interrupt controller
- [000000000000002C - 000000000000002D] Programmable interrupt controller
- [000000000000002E - 000000000000002F] Motherboard resources
- [0000000000000030 - 0000000000000031] Programmable interrupt controller
- [0000000000000034 - 0000000000000035] Programmable interrupt controller
- [0000000000000038 - 0000000000000039] Programmable interrupt controller
- [000000000000003C - 000000000000003D] Programmable interrupt controller
- [0000000000000040 - 0000000000000043] System timer
- [000000000000004E - 000000000000004F] Motherboard resources
- [0000000000000050 - 0000000000000053] System timer
- [0000000000000061 - 0000000000000061] Motherboard resources
- [0000000000000063 - 0000000000000063] Motherboard resources
- [0000000000000065 - 0000000000000065] Motherboard resources
- [0000000000000067 - 0000000000000067] Motherboard resources
- [0000000000000070 - 0000000000000070] Motherboard resources
- [0000000000000080 - 0000000000000080] Motherboard resources
- [0000000000000092 - 0000000000000092] Motherboard resources
- [00000000000000A0 - 00000000000000A1] Programmable interrupt controller
- [00000000000000A4 - 00000000000000A5] Programmable interrupt controller
- [00000000000000A8 - 00000000000000A9] Programmable interrupt controller
- [00000000000000AC - 00000000000000AD] Programmable interrupt controller
- [00000000000000B0 - 00000000000000B1] Programmable interrupt controller
- [00000000000000B2 - 00000000000000B3] Motherboard resources
- [00000000000000B4 - 00000000000000B5] Programmable interrupt controller
- [00000000000000B8 - 00000000000000B9] Programmable interrupt controller
- [00000000000000BC - 00000000000000BD] Programmable interrupt controller
- [00000000000002E8 - 00000000000002EF] Communications Port (COM4)
- [00000000000002F8 - 00000000000002FF] Communications Port (COM2)
- [00000000000003E8 - 00000000000003EF] Communications Port (COM3)
- [00000000000003F8 - 00000000000003FF] Communications Port (COM1)
- [00000000000004D0 - 00000000000004D1] Programmable interrupt controller
- [0000000000000680 - 000000000000069F] Motherboard resources
- [0000000000000A00 - 0000000000000A0F] Motherboard resources
- [0000000000000A10 - 0000000000000A1F] Motherboard resources
- [0000000000000A20 - 0000000000000A2F] Motherboard resources
- [0000000000000D00 - 000000000000FFFF] PCI Express Root Complex
- [000000000000164E - 000000000000164F] Motherboard resources
- [0000000000001854 - 0000000000001857] Motherboard resources
- [0000000000002000 - 00000000000020FE] Motherboard resources
- [0000000000003000 - 000000000000303F] Intel(R) UHD Graphics 770
- [0000000000003060 - 000000000000307F] Standard SATA AHCI Controller
- [0000000000003080 - 0000000000003083] Standard SATA AHCI Controller
- [0000000000003090 - 0000000000003097] Standard SATA AHCI Controller
- [0000000000000EFA0 - 000000000000EFBF] Intel(R) SMBus - 7AA3

3.5　Interrupt Controller (IRQ) Map

The interrupt controller (IRQ) mapping list is shown as follows:

Interrupt request (IRQ)

(ISA) 0x00000000 (00)	System timer
(ISA) 0x00000003 (03)	Communications Port (COM2)
(ISA) 0x00000004 (04)	Communications Port (COM1)
(ISA) 0x00000005 (05)	Communications Port (COM3)
(ISA) 0x00000006 (06)	Communications Port (COM4)
(ISA) 0x0000000E (14)	Intel(R) Serial IO GPIO Host Controller - INTC1056
(ISA) 0x00000037 (55)	Microsoft ACPI-Compliant System
(ISA) 0x00000038 (56)	Microsoft ACPI-Compliant System
(ISA) 0x00000039 (57)	Microsoft ACPI-Compliant System
(ISA) 0x0000003A (58)	Microsoft ACPI-Compliant System
(ISA) 0x0000003B (59)	Microsoft ACPI-Compliant System
(ISA) 0x0000003C (60)	Microsoft ACPI-Compliant System
(ISA) 0x0000003D (61)	Microsoft ACPI-Compliant System
(ISA) 0x0000003E (62)	Microsoft ACPI-Compliant System
(ISA) 0x0000003F (63)	Microsoft ACPI-Compliant System
(ISA) 0x00000040 (64)	Microsoft ACPI-Compliant System
(ISA) 0x00000041 (65)	Microsoft ACPI-Compliant System
(ISA) 0x00000042 (66)	Microsoft ACPI-Compliant System
(ISA) 0x00000043 (67)	Microsoft ACPI-Compliant System
(ISA) 0x00000044 (68)	Microsoft ACPI-Compliant System
(ISA) 0x00000045 (69)	Microsoft ACPI-Compliant System
(ISA) 0x00000046 (70)	Microsoft ACPI-Compliant System
(ISA) 0x00000047 (71)	Microsoft ACPI-Compliant System
(ISA) 0x00000048 (72)	Microsoft ACPI-Compliant System
(ISA) 0x00000049 (73)	Microsoft ACPI-Compliant System
(ISA) 0x0000004A (74)	Microsoft ACPI-Compliant System
(ISA) 0x0000004B (75)	Microsoft ACPI-Compliant System
(ISA) 0x0000004C (76)	Microsoft ACPI-Compliant System
(ISA) 0x0000004D (77)	Microsoft ACPI-Compliant System
(ISA) 0x0000004E (78)	Microsoft ACPI-Compliant System
(ISA) 0x0000004F (79)	Microsoft ACPI-Compliant System
(ISA) 0x00000050 (80)	Microsoft ACPI-Compliant System
(ISA) 0x00000051 (81)	Microsoft ACPI-Compliant System
(ISA) 0x00000052 (82)	Microsoft ACPI-Compliant System
(ISA) 0x00000053 (83)	Microsoft ACPI-Compliant System
(ISA) 0x00000054 (84)	Microsoft ACPI-Compliant System
(ISA) 0x00000055 (85)	Microsoft ACPI-Compliant System
(ISA) 0x00000056 (86)	Microsoft ACPI-Compliant System
(ISA) 0x00000057 (87)	Microsoft ACPI-Compliant System
(ISA) 0x00000058 (88)	Microsoft ACPI-Compliant System
(ISA) 0x00000059 (89)	Microsoft ACPI-Compliant System
(ISA) 0x0000005A (90)	Microsoft ACPI-Compliant System
(ISA) 0x0000005B (91)	Microsoft ACPI-Compliant System
(ISA) 0x0000005C (92)	Microsoft ACPI-Compliant System
(ISA) 0x0000005D (93)	Microsoft ACPI-Compliant System
(ISA) 0x0000005E (94)	Microsoft ACPI-Compliant System
(ISA) 0x0000005F (95)	Microsoft ACPI-Compliant System
(ISA) 0x00000060 (96)	Microsoft ACPI-Compliant System
(ISA) 0x00000061 (97)	Microsoft ACPI-Compliant System
(ISA) 0x00000062 (98)	Microsoft ACPI-Compliant System
(ISA) 0x00000063 (99)	Microsoft ACPI-Compliant System
(ISA) 0x00000064 (100)	Microsoft ACPI-Compliant System
(ISA) 0x00000065 (101)	Microsoft ACPI-Compliant System
(ISA) 0x00000066 (102)	Microsoft ACPI-Compliant System
(ISA) 0x00000067 (103)	Microsoft ACPI-Compliant System
(ISA) 0x00000068 (104)	Microsoft ACPI-Compliant System
(ISA) 0x00000069 (105)	Microsoft ACPI-Compliant System
(ISA) 0x0000006A (106)	Microsoft ACPI-Compliant System
(ISA) 0x0000006B (107)	Microsoft ACPI-Compliant System
(ISA) 0x0000006C (108)	Microsoft ACPI-Compliant System
(ISA) 0x0000006D (109)	Microsoft ACPI-Compliant System
(ISA) 0x0000006D (109)	Trusted Platform Module 2.0
(ISA) 0x0000006E (110)	Microsoft ACPI-Compliant System
(ISA) 0x0000006F (111)	Microsoft ACPI-Compliant System
(ISA) 0x00000070 (112)	Microsoft ACPI-Compliant System
(ISA) 0x00000071 (113)	Microsoft ACPI-Compliant System
(ISA) 0x00000072 (114)	Microsoft ACPI-Compliant System
(ISA) 0x00000073 (115)	Microsoft ACPI-Compliant System
(ISA) 0x00000074 (116)	Microsoft ACPI-Compliant System
(ISA) 0x00000075 (117)	Microsoft ACPI-Compliant System
(ISA) 0x00000076 (118)	Microsoft ACPI-Compliant System
(ISA) 0x00000077 (119)	Microsoft ACPI-Compliant System
(ISA) 0x00000078 (120)	Microsoft ACPI-Compliant System
(ISA) 0x00000079 (121)	Microsoft ACPI-Compliant System
(ISA) 0x0000007A (122)	Microsoft ACPI-Compliant System
(ISA) 0x0000007B (123)	Microsoft ACPI-Compliant System
(ISA) 0x0000007C (124)	Microsoft ACPI-Compliant System
(ISA) 0x0000007D (125)	Microsoft ACPI-Compliant System
(ISA) 0x0000007E (126)	Microsoft ACPI-Compliant System
(ISA) 0x0000007F (127)	Microsoft ACPI-Compliant System
(ISA) 0x00000080 (128)	Microsoft ACPI-Compliant System
(ISA) 0x00000081 (129)	Microsoft ACPI-Compliant System
(ISA) 0x00000082 (130)	Microsoft ACPI-Compliant System
(ISA) 0x00000083 (131)	Microsoft ACPI-Compliant System
(ISA) 0x00000084 (132)	Microsoft ACPI-Compliant System
(ISA) 0x00000085 (133)	Microsoft ACPI-Compliant System
(ISA) 0x00000086 (134)	Microsoft ACPI-Compliant System
(ISA) 0x00000087 (135)	Microsoft ACPI-Compliant System
(ISA) 0x00000088 (136)	Microsoft ACPI-Compliant System
(ISA) 0x00000089 (137)	Microsoft ACPI-Compliant System
(ISA) 0x0000008A (138)	Microsoft ACPI-Compliant System
(ISA) 0x0000008B (139)	Microsoft ACPI-Compliant System
(ISA) 0x0000008C (140)	Microsoft ACPI-Compliant System
(ISA) 0x0000008D (141)	Microsoft ACPI-Compliant System
(ISA) 0x0000008E (142)	Microsoft ACPI-Compliant System
(ISA) 0x0000008F (143)	Microsoft ACPI-Compliant System
(ISA) 0x00000090 (144)	Microsoft ACPI-Compliant System
(ISA) 0x00000091 (145)	Microsoft ACPI-Compliant System
(ISA) 0x00000092 (146)	Microsoft ACPI-Compliant System
(ISA) 0x00000093 (147)	Microsoft ACPI-Compliant System
(ISA) 0x00000094 (148)	Microsoft ACPI-Compliant System
(ISA) 0x00000095 (149)	Microsoft ACPI-Compliant System

(ISA) 0x00000096 (150)	Microsoft ACPI-Compliant System	(ISA) 0x000000C9 (201)	Microsoft ACPI-Compliant System
(ISA) 0x00000097 (151)	Microsoft ACPI-Compliant System	(ISA) 0x000000CA (202)	Microsoft ACPI-Compliant System
(ISA) 0x00000098 (152)	Microsoft ACPI-Compliant System	(ISA) 0x000000CB (203)	Microsoft ACPI-Compliant System
(ISA) 0x00000099 (153)	Microsoft ACPI-Compliant System	(ISA) 0x000000CC (204)	Microsoft ACPI-Compliant System
(ISA) 0x0000009A (154)	Microsoft ACPI-Compliant System	(ISA) 0x00000100 (256)	Microsoft ACPI-Compliant System
(ISA) 0x0000009B (155)	Microsoft ACPI-Compliant System	(ISA) 0x00000101 (257)	Microsoft ACPI-Compliant System
(ISA) 0x0000009C (156)	Microsoft ACPI-Compliant System	(ISA) 0x00000102 (258)	Microsoft ACPI-Compliant System
(ISA) 0x0000009D (157)	Microsoft ACPI-Compliant System	(ISA) 0x00000103 (259)	Microsoft ACPI-Compliant System
(ISA) 0x0000009E (158)	Microsoft ACPI-Compliant System	(ISA) 0x00000104 (260)	Microsoft ACPI-Compliant System
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(ISA) 0x000000A0 (160)	Microsoft ACPI-Compliant System	(ISA) 0x00000106 (262)	Microsoft ACPI-Compliant System
(ISA) 0x000000A1 (161)	Microsoft ACPI-Compliant System	(ISA) 0x00000107 (263)	Microsoft ACPI-Compliant System
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(ISA) 0x000000A3 (163)	Microsoft ACPI-Compliant System	(ISA) 0x00000109 (265)	Microsoft ACPI-Compliant System
(ISA) 0x000000A4 (164)	Microsoft ACPI-Compliant System	(ISA) 0x0000010A (266)	Microsoft ACPI-Compliant System
(ISA) 0x000000A5 (165)	Microsoft ACPI-Compliant System	(ISA) 0x0000010B (267)	Microsoft ACPI-Compliant System
(ISA) 0x000000A6 (166)	Microsoft ACPI-Compliant System	(ISA) 0x0000010C (268)	Microsoft ACPI-Compliant System
(ISA) 0x000000A7 (167)	Microsoft ACPI-Compliant System	(ISA) 0x0000010D (269)	Microsoft ACPI-Compliant System
(ISA) 0x000000A8 (168)	Microsoft ACPI-Compliant System	(ISA) 0x0000010E (270)	Microsoft ACPI-Compliant System
(ISA) 0x000000A9 (169)	Microsoft ACPI-Compliant System	(ISA) 0x0000010F (271)	Microsoft ACPI-Compliant System
(ISA) 0x000000AA (170)	Microsoft ACPI-Compliant System	(ISA) 0x00000110 (272)	Microsoft ACPI-Compliant System
(ISA) 0x000000AB (171)	Microsoft ACPI-Compliant System	(ISA) 0x00000111 (273)	Microsoft ACPI-Compliant System
(ISA) 0x000000AC (172)	Microsoft ACPI-Compliant System	(ISA) 0x00000112 (274)	Microsoft ACPI-Compliant System
(ISA) 0x000000AD (173)	Microsoft ACPI-Compliant System	(ISA) 0x00000113 (275)	Microsoft ACPI-Compliant System
(ISA) 0x000000AE (174)	Microsoft ACPI-Compliant System	(ISA) 0x00000114 (276)	Microsoft ACPI-Compliant System
(ISA) 0x000000AF (175)	Microsoft ACPI-Compliant System	(ISA) 0x00000115 (277)	Microsoft ACPI-Compliant System
(ISA) 0x000000B0 (176)	Microsoft ACPI-Compliant System	(ISA) 0x00000116 (278)	Microsoft ACPI-Compliant System
(ISA) 0x000000B1 (177)	Microsoft ACPI-Compliant System	(ISA) 0x00000117 (279)	Microsoft ACPI-Compliant System
(ISA) 0x000000B2 (178)	Microsoft ACPI-Compliant System	(ISA) 0x00000118 (280)	Microsoft ACPI-Compliant System
(ISA) 0x000000B3 (179)	Microsoft ACPI-Compliant System	(ISA) 0x00000119 (281)	Microsoft ACPI-Compliant System
(ISA) 0x000000B4 (180)	Microsoft ACPI-Compliant System	(ISA) 0x0000011A (282)	Microsoft ACPI-Compliant System
(ISA) 0x000000B5 (181)	Microsoft ACPI-Compliant System	(ISA) 0x0000011B (283)	Microsoft ACPI-Compliant System
(ISA) 0x000000B6 (182)	Microsoft ACPI-Compliant System	(ISA) 0x0000011C (284)	Microsoft ACPI-Compliant System
(ISA) 0x000000B7 (183)	Microsoft ACPI-Compliant System	(ISA) 0x0000011D (285)	Microsoft ACPI-Compliant System
(ISA) 0x000000B8 (184)	Microsoft ACPI-Compliant System	(ISA) 0x0000011E (286)	Microsoft ACPI-Compliant System
(ISA) 0x000000B9 (185)	Microsoft ACPI-Compliant System	(ISA) 0x0000011F (287)	Microsoft ACPI-Compliant System
(ISA) 0x000000BA (186)	Microsoft ACPI-Compliant System	(ISA) 0x00000120 (288)	Microsoft ACPI-Compliant System
(ISA) 0x000000BB (187)	Microsoft ACPI-Compliant System	(ISA) 0x00000121 (289)	Microsoft ACPI-Compliant System
(ISA) 0x000000BC (188)	Microsoft ACPI-Compliant System	(ISA) 0x00000122 (290)	Microsoft ACPI-Compliant System
(ISA) 0x000000BD (189)	Microsoft ACPI-Compliant System	(ISA) 0x00000123 (291)	Microsoft ACPI-Compliant System
(ISA) 0x000000BE (190)	Microsoft ACPI-Compliant System	(ISA) 0x00000124 (292)	Microsoft ACPI-Compliant System
(ISA) 0x000000BF (191)	Microsoft ACPI-Compliant System	(ISA) 0x00000125 (293)	Microsoft ACPI-Compliant System
(ISA) 0x000000C0 (192)	Microsoft ACPI-Compliant System	(ISA) 0x00000126 (294)	Microsoft ACPI-Compliant System
(ISA) 0x000000C1 (193)	Microsoft ACPI-Compliant System	(ISA) 0x00000127 (295)	Microsoft ACPI-Compliant System
(ISA) 0x000000C2 (194)	Microsoft ACPI-Compliant System	(ISA) 0x00000128 (296)	Microsoft ACPI-Compliant System
(ISA) 0x000000C3 (195)	Microsoft ACPI-Compliant System	(ISA) 0x00000129 (297)	Microsoft ACPI-Compliant System
(ISA) 0x000000C4 (196)	Microsoft ACPI-Compliant System	(ISA) 0x0000012A (298)	Microsoft ACPI-Compliant System
(ISA) 0x000000C5 (197)	Microsoft ACPI-Compliant System	(ISA) 0x0000012B (299)	Microsoft ACPI-Compliant System
(ISA) 0x000000C6 (198)	Microsoft ACPI-Compliant System	(ISA) 0x0000012C (300)	Microsoft ACPI-Compliant System
(ISA) 0x000000C7 (199)	Microsoft ACPI-Compliant System	(ISA) 0x0000012D (301)	Microsoft ACPI-Compliant System
(ISA) 0x000000C8 (200)	Microsoft ACPI-Compliant System	(ISA) 0x0000012E (302)	Microsoft ACPI-Compliant System

(ISA) 0x0000012F (303)	Microsoft ACPI-Compliant System	(ISA) 0x00000162 (354)	Microsoft ACPI-Compliant System
(ISA) 0x00000130 (304)	Microsoft ACPI-Compliant System	(ISA) 0x00000163 (355)	Microsoft ACPI-Compliant System
(ISA) 0x00000131 (305)	Microsoft ACPI-Compliant System	(ISA) 0x00000164 (356)	Microsoft ACPI-Compliant System
(ISA) 0x00000132 (306)	Microsoft ACPI-Compliant System	(ISA) 0x00000165 (357)	Microsoft ACPI-Compliant System
(ISA) 0x00000133 (307)	Microsoft ACPI-Compliant System	(ISA) 0x00000166 (358)	Microsoft ACPI-Compliant System
(ISA) 0x00000134 (308)	Microsoft ACPI-Compliant System	(ISA) 0x00000167 (359)	Microsoft ACPI-Compliant System
(ISA) 0x00000135 (309)	Microsoft ACPI-Compliant System	(ISA) 0x00000168 (360)	Microsoft ACPI-Compliant System
(ISA) 0x00000136 (310)	Microsoft ACPI-Compliant System	(ISA) 0x00000169 (361)	Microsoft ACPI-Compliant System
(ISA) 0x00000137 (311)	Microsoft ACPI-Compliant System	(ISA) 0x0000016A (362)	Microsoft ACPI-Compliant System
(ISA) 0x00000138 (312)	Microsoft ACPI-Compliant System	(ISA) 0x0000016B (363)	Microsoft ACPI-Compliant System
(ISA) 0x00000139 (313)	Microsoft ACPI-Compliant System	(ISA) 0x0000016C (364)	Microsoft ACPI-Compliant System
(ISA) 0x0000013A (314)	Microsoft ACPI-Compliant System	(ISA) 0x0000016D (365)	Microsoft ACPI-Compliant System
(ISA) 0x0000013B (315)	Microsoft ACPI-Compliant System	(ISA) 0x0000016E (366)	Microsoft ACPI-Compliant System
(ISA) 0x0000013C (316)	Microsoft ACPI-Compliant System	(ISA) 0x0000016F (367)	Microsoft ACPI-Compliant System
(ISA) 0x0000013D (317)	Microsoft ACPI-Compliant System	(ISA) 0x00000170 (368)	Microsoft ACPI-Compliant System
(ISA) 0x0000013E (318)	Microsoft ACPI-Compliant System	(ISA) 0x00000171 (369)	Microsoft ACPI-Compliant System
(ISA) 0x0000013F (319)	Microsoft ACPI-Compliant System	(ISA) 0x00000172 (370)	Microsoft ACPI-Compliant System
(ISA) 0x00000140 (320)	Microsoft ACPI-Compliant System	(ISA) 0x00000173 (371)	Microsoft ACPI-Compliant System
(ISA) 0x00000141 (321)	Microsoft ACPI-Compliant System	(ISA) 0x00000174 (372)	Microsoft ACPI-Compliant System
(ISA) 0x00000142 (322)	Microsoft ACPI-Compliant System	(ISA) 0x00000175 (373)	Microsoft ACPI-Compliant System
(ISA) 0x00000143 (323)	Microsoft ACPI-Compliant System	(ISA) 0x00000176 (374)	Microsoft ACPI-Compliant System
(ISA) 0x00000144 (324)	Microsoft ACPI-Compliant System	(ISA) 0x00000177 (375)	Microsoft ACPI-Compliant System
(ISA) 0x00000145 (325)	Microsoft ACPI-Compliant System	(ISA) 0x00000178 (376)	Microsoft ACPI-Compliant System
(ISA) 0x00000146 (326)	Microsoft ACPI-Compliant System	(ISA) 0x00000179 (377)	Microsoft ACPI-Compliant System
(ISA) 0x00000147 (327)	Microsoft ACPI-Compliant System	(ISA) 0x0000017A (378)	Microsoft ACPI-Compliant System
(ISA) 0x00000148 (328)	Microsoft ACPI-Compliant System	(ISA) 0x0000017B (379)	Microsoft ACPI-Compliant System
(ISA) 0x00000149 (329)	Microsoft ACPI-Compliant System	(ISA) 0x0000017C (380)	Microsoft ACPI-Compliant System
(ISA) 0x0000014A (330)	Microsoft ACPI-Compliant System	(ISA) 0x0000017D (381)	Microsoft ACPI-Compliant System
(ISA) 0x0000014B (331)	Microsoft ACPI-Compliant System	(ISA) 0x0000017E (382)	Microsoft ACPI-Compliant System
(ISA) 0x0000014C (332)	Microsoft ACPI-Compliant System	(ISA) 0x0000017F (383)	Microsoft ACPI-Compliant System
(ISA) 0x0000014D (333)	Microsoft ACPI-Compliant System	(ISA) 0x00000180 (384)	Microsoft ACPI-Compliant System
(ISA) 0x0000014E (334)	Microsoft ACPI-Compliant System	(ISA) 0x00000181 (385)	Microsoft ACPI-Compliant System
(ISA) 0x0000014F (335)	Microsoft ACPI-Compliant System	(ISA) 0x00000182 (386)	Microsoft ACPI-Compliant System
(ISA) 0x00000150 (336)	Microsoft ACPI-Compliant System	(ISA) 0x00000183 (387)	Microsoft ACPI-Compliant System
(ISA) 0x00000151 (337)	Microsoft ACPI-Compliant System	(ISA) 0x00000184 (388)	Microsoft ACPI-Compliant System
(ISA) 0x00000152 (338)	Microsoft ACPI-Compliant System	(ISA) 0x00000185 (389)	Microsoft ACPI-Compliant System
(ISA) 0x00000153 (339)	Microsoft ACPI-Compliant System	(ISA) 0x00000186 (390)	Microsoft ACPI-Compliant System
(ISA) 0x00000154 (340)	Microsoft ACPI-Compliant System	(ISA) 0x00000187 (391)	Microsoft ACPI-Compliant System
(ISA) 0x00000155 (341)	Microsoft ACPI-Compliant System	(ISA) 0x00000188 (392)	Microsoft ACPI-Compliant System
(ISA) 0x00000156 (342)	Microsoft ACPI-Compliant System	(ISA) 0x00000189 (393)	Microsoft ACPI-Compliant System
(ISA) 0x00000157 (343)	Microsoft ACPI-Compliant System	(ISA) 0x0000018A (394)	Microsoft ACPI-Compliant System
(ISA) 0x00000158 (344)	Microsoft ACPI-Compliant System	(ISA) 0x0000018B (395)	Microsoft ACPI-Compliant System
(ISA) 0x00000159 (345)	Microsoft ACPI-Compliant System	(ISA) 0x0000018C (396)	Microsoft ACPI-Compliant System
(ISA) 0x0000015A (346)	Microsoft ACPI-Compliant System	(ISA) 0x0000018D (397)	Microsoft ACPI-Compliant System
(ISA) 0x0000015B (347)	Microsoft ACPI-Compliant System	(ISA) 0x0000018E (398)	Microsoft ACPI-Compliant System
(ISA) 0x0000015C (348)	Microsoft ACPI-Compliant System	(ISA) 0x0000018F (399)	Microsoft ACPI-Compliant System
(ISA) 0x0000015D (349)	Microsoft ACPI-Compliant System	(ISA) 0x00000190 (400)	Microsoft ACPI-Compliant System
(ISA) 0x0000015E (350)	Microsoft ACPI-Compliant System	(ISA) 0x00000191 (401)	Microsoft ACPI-Compliant System
(ISA) 0x0000015F (351)	Microsoft ACPI-Compliant System	(ISA) 0x00000192 (402)	Microsoft ACPI-Compliant System
(ISA) 0x00000160 (352)	Microsoft ACPI-Compliant System	(ISA) 0x00000193 (403)	Microsoft ACPI-Compliant System
(ISA) 0x00000161 (353)	Microsoft ACPI-Compliant System	(ISA) 0x00000194 (404)	Microsoft ACPI-Compliant System

(ISA) 0x00000195 (405) Microsoft ACPI-Compliant System	(ISA) 0x000001C8 (456) Microsoft ACPI-Compliant System
(ISA) 0x00000196 (406) Microsoft ACPI-Compliant System	(ISA) 0x000001C9 (457) Microsoft ACPI-Compliant System
(ISA) 0x00000197 (407) Microsoft ACPI-Compliant System	(ISA) 0x000001CA (458) Microsoft ACPI-Compliant System
(ISA) 0x00000198 (408) Microsoft ACPI-Compliant System	(ISA) 0x000001CB (459) Microsoft ACPI-Compliant System
(ISA) 0x00000199 (409) Microsoft ACPI-Compliant System	(ISA) 0x000001CC (460) Microsoft ACPI-Compliant System
(ISA) 0x0000019A (410) Microsoft ACPI-Compliant System	(ISA) 0x000001CD (461) Microsoft ACPI-Compliant System
(ISA) 0x0000019B (411) Microsoft ACPI-Compliant System	(ISA) 0x000001CE (462) Microsoft ACPI-Compliant System
(ISA) 0x0000019C (412) Microsoft ACPI-Compliant System	(ISA) 0x000001CF (463) Microsoft ACPI-Compliant System
(ISA) 0x0000019D (413) Microsoft ACPI-Compliant System	(ISA) 0x000001D0 (464) Microsoft ACPI-Compliant System
(ISA) 0x0000019E (414) Microsoft ACPI-Compliant System	(ISA) 0x000001D1 (465) Microsoft ACPI-Compliant System
(ISA) 0x0000019F (415) Microsoft ACPI-Compliant System	(ISA) 0x000001D2 (466) Microsoft ACPI-Compliant System
(ISA) 0x000001A0 (416) Microsoft ACPI-Compliant System	(ISA) 0x000001D3 (467) Microsoft ACPI-Compliant System
(ISA) 0x000001A1 (417) Microsoft ACPI-Compliant System	(ISA) 0x000001D4 (468) Microsoft ACPI-Compliant System
(ISA) 0x000001A2 (418) Microsoft ACPI-Compliant System	(ISA) 0x000001D5 (469) Microsoft ACPI-Compliant System
(ISA) 0x000001A3 (419) Microsoft ACPI-Compliant System	(ISA) 0x000001D6 (470) Microsoft ACPI-Compliant System
(ISA) 0x000001A4 (420) Microsoft ACPI-Compliant System	(ISA) 0x000001D7 (471) Microsoft ACPI-Compliant System
(ISA) 0x000001A5 (421) Microsoft ACPI-Compliant System	(ISA) 0x000001D8 (472) Microsoft ACPI-Compliant System
(ISA) 0x000001A6 (422) Microsoft ACPI-Compliant System	(ISA) 0x000001D9 (473) Microsoft ACPI-Compliant System
(ISA) 0x000001A7 (423) Microsoft ACPI-Compliant System	(ISA) 0x000001DA (474) Microsoft ACPI-Compliant System
(ISA) 0x000001A8 (424) Microsoft ACPI-Compliant System	(ISA) 0x000001DB (475) Microsoft ACPI-Compliant System
(ISA) 0x000001A9 (425) Microsoft ACPI-Compliant System	(ISA) 0x000001DC (476) Microsoft ACPI-Compliant System
(ISA) 0x000001AA (426) Microsoft ACPI-Compliant System	(ISA) 0x000001DD (477) Microsoft ACPI-Compliant System
(ISA) 0x000001AB (427) Microsoft ACPI-Compliant System	(ISA) 0x000001DE (478) Microsoft ACPI-Compliant System
(ISA) 0x000001AC (428) Microsoft ACPI-Compliant System	(ISA) 0x000001DF (479) Microsoft ACPI-Compliant System
(ISA) 0x000001AD (429) Microsoft ACPI-Compliant System	(ISA) 0x000001E0 (480) Microsoft ACPI-Compliant System
(ISA) 0x000001AE (430) Microsoft ACPI-Compliant System	(ISA) 0x000001E1 (481) Microsoft ACPI-Compliant System
(ISA) 0x000001AF (431) Microsoft ACPI-Compliant System	(ISA) 0x000001E2 (482) Microsoft ACPI-Compliant System
(ISA) 0x000001B0 (432) Microsoft ACPI-Compliant System	(ISA) 0x000001E3 (483) Microsoft ACPI-Compliant System
(ISA) 0x000001B1 (433) Microsoft ACPI-Compliant System	(ISA) 0x000001E4 (484) Microsoft ACPI-Compliant System
(ISA) 0x000001B2 (434) Microsoft ACPI-Compliant System	(ISA) 0x000001E5 (485) Microsoft ACPI-Compliant System
(ISA) 0x000001B3 (435) Microsoft ACPI-Compliant System	(ISA) 0x000001E6 (486) Microsoft ACPI-Compliant System
(ISA) 0x000001B4 (436) Microsoft ACPI-Compliant System	(ISA) 0x000001E7 (487) Microsoft ACPI-Compliant System
(ISA) 0x000001B5 (437) Microsoft ACPI-Compliant System	(ISA) 0x000001E8 (488) Microsoft ACPI-Compliant System
(ISA) 0x000001B6 (438) Microsoft ACPI-Compliant System	(ISA) 0x000001E9 (489) Microsoft ACPI-Compliant System
(ISA) 0x000001B7 (439) Microsoft ACPI-Compliant System	(ISA) 0x000001EA (490) Microsoft ACPI-Compliant System
(ISA) 0x000001B8 (440) Microsoft ACPI-Compliant System	(ISA) 0x000001EB (491) Microsoft ACPI-Compliant System
(ISA) 0x000001B9 (441) Microsoft ACPI-Compliant System	(ISA) 0x000001EC (492) Microsoft ACPI-Compliant System
(ISA) 0x000001BA (442) Microsoft ACPI-Compliant System	(ISA) 0x000001ED (493) Microsoft ACPI-Compliant System
(ISA) 0x000001BB (443) Microsoft ACPI-Compliant System	(ISA) 0x000001EE (494) Microsoft ACPI-Compliant System
(ISA) 0x000001BC (444) Microsoft ACPI-Compliant System	(ISA) 0x000001EF (495) Microsoft ACPI-Compliant System
(ISA) 0x000001BD (445) Microsoft ACPI-Compliant System	(ISA) 0x000001F0 (496) Microsoft ACPI-Compliant System
(ISA) 0x000001BE (446) Microsoft ACPI-Compliant System	(ISA) 0x000001F1 (497) Microsoft ACPI-Compliant System
(ISA) 0x000001BF (447) Microsoft ACPI-Compliant System	(ISA) 0x000001F2 (498) Microsoft ACPI-Compliant System
(ISA) 0x000001C0 (448) Microsoft ACPI-Compliant System	(ISA) 0x000001F3 (499) Microsoft ACPI-Compliant System
(ISA) 0x000001C1 (449) Microsoft ACPI-Compliant System	(ISA) 0x000001F4 (500) Microsoft ACPI-Compliant System
(ISA) 0x000001C2 (450) Microsoft ACPI-Compliant System	(ISA) 0x000001F5 (501) Microsoft ACPI-Compliant System
(ISA) 0x000001C3 (451) Microsoft ACPI-Compliant System	(ISA) 0x000001F6 (502) Microsoft ACPI-Compliant System
(ISA) 0x000001C4 (452) Microsoft ACPI-Compliant System	(ISA) 0x000001F7 (503) Microsoft ACPI-Compliant System
(ISA) 0x000001C5 (453) Microsoft ACPI-Compliant System	(ISA) 0x000001F8 (504) Microsoft ACPI-Compliant System
(ISA) 0x000001C6 (454) Microsoft ACPI-Compliant System	(ISA) 0x000001F9 (505) Microsoft ACPI-Compliant System
(ISA) 0x000001C7 (455) Microsoft ACPI-Compliant System	(ISA) 0x000001FA (506) Microsoft ACPI-Compliant System

(ISA) 0x000001FB (507)   Microsoft ACPI-Compliant System
(ISA) 0x000001FC (508)   Microsoft ACPI-Compliant System
(ISA) 0x000001FD (509)   Microsoft ACPI-Compliant System
(ISA) 0x000001FE (510)   Microsoft ACPI-Compliant System
(ISA) 0x000001FF (511)   Microsoft ACPI-Compliant System
(PCI) 0x00000010 (16)   Intel(R) Serial IO UART Host Controller - 7AA8
(PCI) 0x00000011 (17)   High Definition Audio Controller
(PCI) 0x0000001B (27)   Intel(R) Serial IO I2C Host Controller - 7ACC
(PCI) 0x0000001D (29)   Intel(R) Serial IO I2C Host Controller - 7ACE
(PCI) 0x0000001F (31)   Intel(R) Serial IO I2C Host Controller - 7AFC
(PCI) 0x00000020 (32)   Intel(R) Serial IO I2C Host Controller - 7AFD
(PCI) 0x00000025 (37)   Intel(R) Serial IO SPI Host Controller - 7AAB
(PCI) 0x00000028 (40)   Intel(R) Serial IO I2C Host Controller - 7ACD
(PCI) 0x0000002B (43)   Intel(R) Serial IO I2C Host Controller - 7ACF
(PCI) 0xFFFFFFB5 (-75)   Intel(R) Management Engine Interface #1
(PCI) 0xFFFFFFB6 (-74)   Intel(R) GNA Scoring Accelerator module
(PCI) 0xFFFFFFB7 (-73)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFB8 (-72)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFB9 (-71)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFBA (-70)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFBB (-69)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFBC (-68)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFBD (-67)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFBE (-66)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFBF (-65)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFC0 (-64)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFC1 (-63)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFC2 (-62)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFC3 (-61)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFC4 (-60)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFC5 (-59)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFC6 (-58)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFC7 (-57)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFC8 (-56)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFC9 (-55)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFCA (-54)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFCB (-53)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFCC (-52)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFCD (-51)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFCE (-50)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFCF (-49)   Intel(R) Ethernet Controller I226-V
(PCI) 0xFFFFFFD0 (-48)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFD1 (-47)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFD2 (-46)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFD3 (-45)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFD4 (-44)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFD5 (-43)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFD6 (-42)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFD7 (-41)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFD8 (-40)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFD9 (-39)   Intel(R) Ethernet Controller I226-V #2

(PCI) 0xFFFFFFDA (-38)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFDB (-37)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFDC (-36)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFDD (-35)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFDE (-34)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFDF (-33)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFE0 (-32)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFE1 (-31)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFE2 (-30)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFE3 (-29)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFE4 (-28)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFE5 (-27)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFE6 (-26)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFE7 (-25)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFE8 (-24)   Intel(R) Ethernet Controller I226-V #2
(PCI) 0xFFFFFFE9 (-23)   Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
(PCI) 0xFFFFFFEA (-22)   Intel(R) UHD Graphics 770
(PCI) 0xFFFFFFEB (-21)   Standard NVM Express Controller
(PCI) 0xFFFFFFEC (-20)   Standard NVM Express Controller
(PCI) 0xFFFFFFED (-19)   Standard NVM Express Controller
(PCI) 0xFFFFFFEE (-18)   Standard NVM Express Controller
(PCI) 0xFFFFFFEF (-17)   Standard NVM Express Controller
(PCI) 0xFFFFFFF0 (-16)   Standard NVM Express Controller
(PCI) 0xFFFFFFF1 (-15)   Standard NVM Express Controller
(PCI) 0xFFFFFFF2 (-14)   Standard NVM Express Controller
(PCI) 0xFFFFFFF3 (-13)   Standard NVM Express Controller
(PCI) 0xFFFFFFF4 (-12)   Standard NVM Express Controller
(PCI) 0xFFFFFFF5 (-11)   Standard NVM Express Controller
(PCI) 0xFFFFFFF6 (-10)   Standard NVM Express Controller
(PCI) 0xFFFFFFF7 (-9)   Standard NVM Express Controller
(PCI) 0xFFFFFFF8 (-8)   Standard NVM Express Controller
(PCI) 0xFFFFFFF9 (-7)   Standard NVM Express Controller
(PCI) 0xFFFFFFFA (-6)   Standard NVM Express Controller
(PCI) 0xFFFFFFFB (-5)   Standard SATA AHCI Controller
(PCI) 0xFFFFFFFC (-4)   Intel(R) PCI Express Root Port #5 - 7ABC
(PCI) 0xFFFFFFFD (-3)   Intel(R) PCI Express Root Port #3 - 7ABA
(PCI) 0xFFFFFFFE (-2)   Intel(R) PCI Express Root Port #2 - 7AB9

3.6 Memory Map

Memory
- [00000000000A0000 - 00000000000BFFFF] PCI Express Root Complex
- [00000000000E0000 - 00000000000E3FFF] PCI Express Root Complex
- [00000000000E4000 - 00000000000E7FFF] PCI Express Root Complex
- [00000000000E8000 - 00000000000EBFFF] PCI Express Root Complex
- [00000000000EC000 - 00000000000EFFFF] PCI Express Root Complex
- [00000000000F0000 - 00000000000FFFFF] PCI Express Root Complex
- [0000000080400000 - 00000000806FFFFF] Intel(R) PCI Express Root Port #3 - 7ABA
- [0000000080400000 - 00000000BFFFFFFF] PCI Express Root Complex
- [0000000080500000 - 00000000805FFFFF] Intel(R) Ethernet Controller I226-V #2
- [0000000080600000 - 0000000080603FFF] Intel(R) Ethernet Controller I226-V #2
- [0000000080700000 - 00000000809FFFFF] Intel(R) PCI Express Root Port #2 - 7AB9
- [0000000080800000 - 000000000808FFFF] Intel(R) Ethernet Controller I226-V
- [0000000080900000 - 0000000080903FFF] Intel(R) Ethernet Controller I226-V
- [0000000080A00000 - 0000000080A03FFF] Standard NVM Express Controller
- [0000000080A00000 - 0000000080AFFFFF] Intel(R) PCI Express Root Port #5 - 7ABC
- [0000000080B00000 - 0000000080B01FFF] Standard SATA AHCI Controller
- [0000000080B02000 - 0000000080B027FF] Standard SATA AHCI Controller
- [0000000080B03000 - 0000000080B030FF] Standard SATA AHCI Controller
- [00000000C0000000 - 00000000CFFFFFFF] Motherboard resources
- [00000000E0690000 - 00000000E069FFFF] Intel(R) Serial IO GPIO Host Controller - INTC1056
- [00000000E06A0000 - 00000000E06AFFFF] Intel(R) Serial IO GPIO Host Controller - INTC1056
- [00000000E06B0000 - 00000000E06BFFFF] Intel(R) Serial IO GPIO Host Controller - INTC1056
- [00000000E06D0000 - 00000000E06DFFFF] Intel(R) Serial IO GPIO Host Controller - INTC1056
- [00000000E06E0000 - 00000000E06EFFFF] Intel(R) Serial IO GPIO Host Controller - INTC1056
- [00000000FE001210 - 00000000FE001247] Intel(R) Time-Aware GPIO device - 1023
- [00000000FE001310 - 00000000FE001347] Intel(R) Time-Aware GPIO device - 1024
- [00000000FE010000 - 00000000FE010FFF] Intel(R) SPI (flash) Controller - 7AA4
- [00000000FED00000 - 00000000FED003FF] High precision event timer
- [00000000FED20000 - 00000000FED7FFFF] Motherboard resources
- [00000000FED40000 - 00000000FED44FFF] Trusted Platform Module 2.0
- [00000000FED45000 - 00000000FED8FFFF] Motherboard resources
- [00000000FED90000 - 00000000FED93FFF] Motherboard resources
- [00000000FEDA0000 - 00000000FEDA0FFF] Motherboard resources
- [00000000FEDA1000 - 00000000FEDA1FFF] Motherboard resources
- [00000000FEDC0000 - 00000000FEDC7FFF] Motherboard resources
- [00000000FEE00000 - 00000000FEEFFFFF] Motherboard resources
- [0000000400000000 - 000000400FFFFFFF] Intel(R) UHD Graphics 770
- [0000000600000000 - 0000000600FFFFFF] Intel(R) UHD Graphics 770
- [0000006001120000 - 000000600112FFFF] Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
- [0000006001130000 - 0000006001137FFF] Intel(R) Crashlog - A77D
- [0000006001148000 - 00000060011480FF] Intel(R) SMBus - 7AA3
- [0000007FFFEF2000 - 0000007FFFEF2FFF] Intel(R) Serial IO UART Host Controller - 7AA8
- [0000007FFFEF3000 - 0000007FFFEF3FFF] Intel(R) Serial IO I2C Host Controller - 7AFD
- [0000007FFFEF4000 - 0000007FFFEF4FFF] Intel(R) Serial IO I2C Host Controller - 7AFC
- [0000007FFFEF5000 - 0000007FFFEF5FFF] Intel(R) Management Engine Interface #1
- [0000007FFFEF6000 - 0000007FFFEF6FFF] Intel(R) Serial IO I2C Host Controller - 7ACF
- [0000007FFFEF7000 - 0000007FFFEF7FFF] Intel(R) Serial IO I2C Host Controller - 7ACE
- [0000007FFFEF8000 - 0000007FFFEF8FFF] Intel(R) Serial IO I2C Host Controller - 7ACD
- [0000007FFFEF9000 - 0000007FFFEF9FFF] Intel(R) Serial IO I2C Host Controller - 7ACC
- [0000007FFFEFA000 - 0000007FFFEFAFFF] Intel(R) Serial IO SPI Host Controller - 7AAB
- [0000007FFFEFB000 - 0000007FFFEFBFFF] Intel(R) GNA Scoring Accelerator module
- [0000007FFFEFC000 - 0000007FFFEFFFFF] High Definition Audio Controller
- [0000007FFFF00000 - 0000007FFFFFFFFF] High Definition Audio Controller

Section 4
AMI BIOS Setup Utility

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI BIOS setup utility.

4.1　Starting

To enter the setup screens, follow the steps below:

1.　Turn on the computer and press <Del> during the Power On Self Test (POST) to enter BIOS setup, otherwise, POST will continue with its test routines.
2.　Once you enter the BIOS, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

> **Note** *If your computer cannot boot after making and saving system changes with BIOS setup, you can restore BIOS optimal defaults by setting SW1 (see section 2.3.3).*

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your 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 you to select a setup screen.
⬆⬇ **Up/Down**	The Up and Down <Arrow> keys allow you to select a setup screen or sub screen.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub screens.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
F1	The <F1> key allows you to display the General Help screen.
F2	The <F2> key allows you to Load Previous Values.
F3	The <F3> key allows you to Load Optimized Defaults.
F4	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.

4.3 Main Menu

When you first enter the setup utility, you will enter the Main setup screen. You 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 shown below.

```
                              Aptio Setup - AMI
   Main   Advanced   Chipset   Security   Boot   Save & Exit

   BIOS Information                                    Set the Date. Use Tab to
   Build Date and Time        08/14/2023 09:45:57      switch between Date elements.
   Project Version            MANO566 x113             Default Ranges:
                                                       Year: 1998-9999
   Firmware Information        16.0.15.1735            Months: 1-12
   ME Firmware Version         Normal Mode             Days: Dependent on month
   ME Firmware Mode            Corporate SKU           Range of Years may vary.
   ME Firmware SKU

    Memory   Size             16384 MB
             Frequency         2667 MHz

   PCH Information
    PCH       Name            PCH-S                    →←: Select Screen
              SKU             Q670E                    ↑↓: Select Item
                                                       Enter: Select
   System Date               [Sat 09/09/2023]          +/-: Change Opt.
   System Time               [01:30:32]                F1: General Help
                                                       F2: Previous Values
   Access Level              Administrator             F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit



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```

BIOS Information
Display the BIOS information.

Firmware Information
Display the firmware 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:

- ► Device Configuration
- ► CPU Configuration
- ► Trusted Computing
- ► ACPI Settings
- ► Storage Configuration
- ► NVMe Configuration
- ► F81966 Super IO Configuration
- ► Hardware Monitor
- ► USB Configuration
- ► AMT Configuration (Only Supported Q670E & R680E version)

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

```
                            Aptio Setup - AMI
    Main    Advanced   Chipset   Security   Boot   Save & Exit

 ▶ Device Configuration                          Device Configuration
 ▶ CPU Configuration
 ▶ Trusted Computing
 ▶ ACPI Settings
 ▶ Storage Configuration
 ▶ NVMe Configuration
 ▶ F81966 Super IO Configuration
 ▶ Hardware Monitor
 ▶ USB Configuration
 ▶ AMT 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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```

● **Device Configuration**
A description of the selected item appears on the right side of the screen. For items marked with "▶", please press <Enter> for more options.

```
                        Aptio Setup - AMI
    Advanced

▶Onboard Device Configuration                 Onboard Device Configuration
                                              status




                                              ↔: 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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```
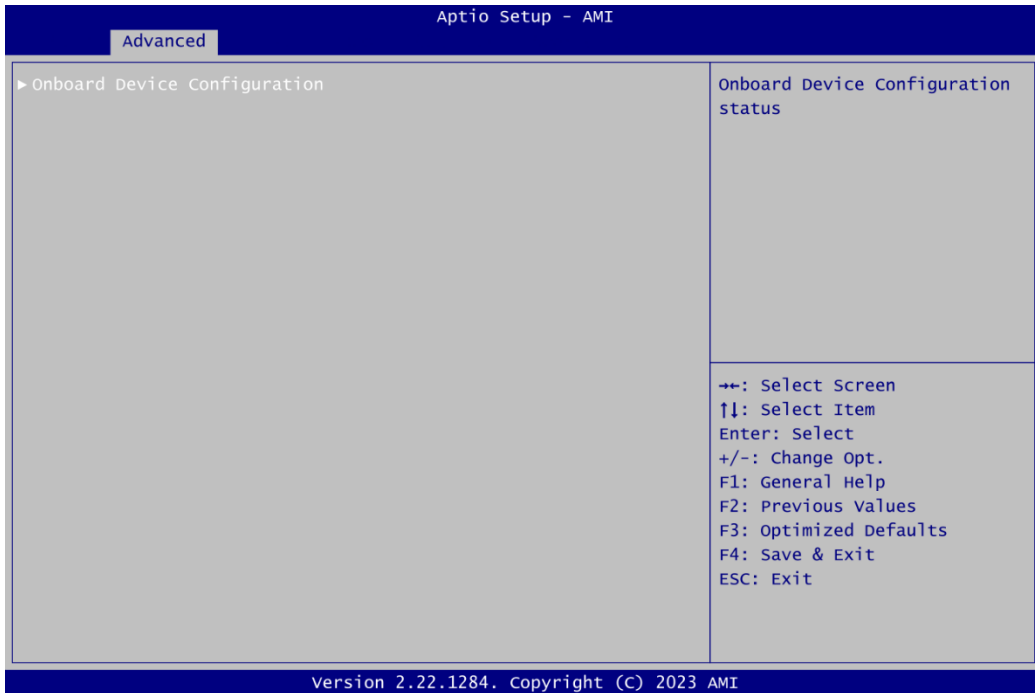
Onboard Device Configuration
Use this option to configure onboard device (e.g., Digital I/O setting).

● **Onboard DIO Configuration**
You can use this screen to select options for Digital I/O Configuration.

```
                              Aptio Setup - AMI
        Advanced

   Onboard DIO Configuration                              Enabled or Disabled DIO
   DIO Modification                    [Disabled]         Modification
  ▶ DIO port 1-8




                                                          →←: 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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```
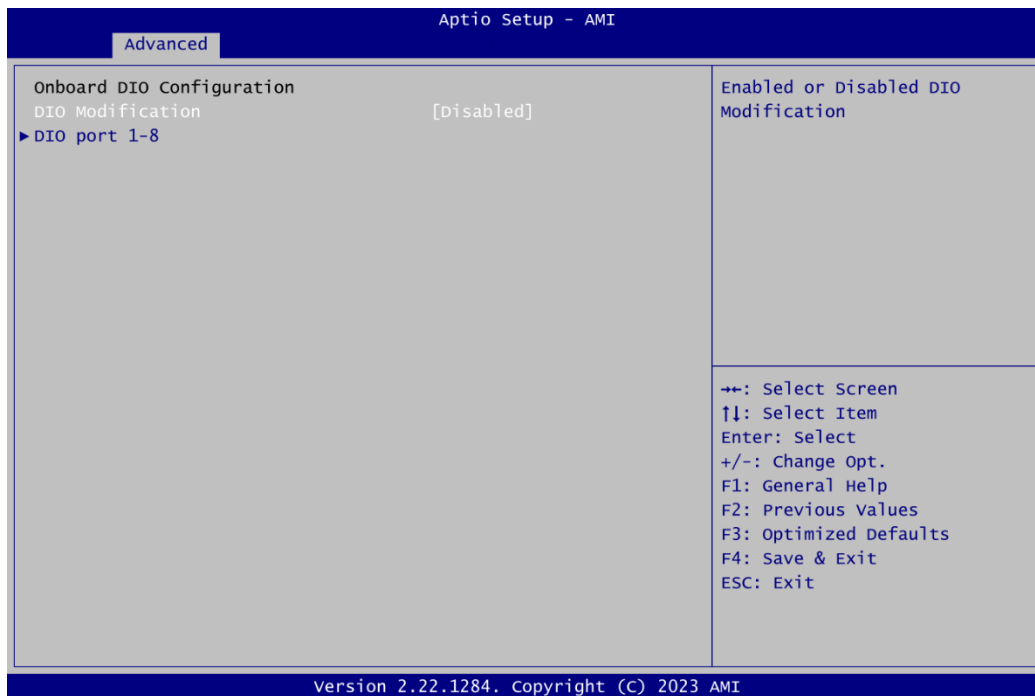
DIO Modification
Enable or disable digital I/O modification. The default is Disabled.

DIO port 1-8
Select this option to open DIO status sub-screen.

If DIO Modification is disabled, you are not allowed to change inputs/outputs setting. The DIO status sub-screen is as follows:

```
        Advanced

   DIO status
   1. Input/Output Status              Out & High
   2. Input/Output Status              Out & High
   3. Input/Output Status              Out & High
   4. Input/Output Status              Out & High
   5. Input/Output Status              Out & High
   6. Input/Output Status              Out & High
   7. Input/Output Status              Out & High
   8. Input/Output Status              Out & High
```
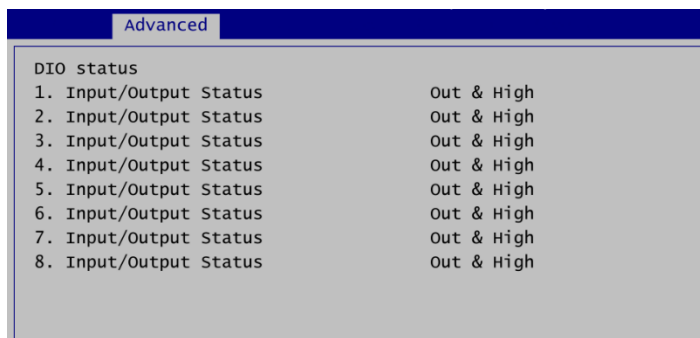
● **CPU Configuration**
This screen shows CPU information, and you can change the value of the selected option.

```
                        Aptio Setup - AMI
    ┌─────────────┐
    │  Advanced   │
    └─────────────┘

 CPU Configuration                                    Enable or Disable
                                                      Hyper-Threading Technology.
 Type                      12th Gen Intel(R)
                           Core(TM) i3-12100E
 ID                        0x90675
 Speed                     3200 MHz
 L1 Data Cache             48 KB x 4
 L1 Instruction Cache      32 KB x 4
 L2 Cache                  1280 KB x 4
 L3 Cache                  12 MB
 L4 Cache                  N/A
 VMX                       Supported
 SMX/TXT                   Not Supported

 Hyper-Threading           [Enabled]                  →←: Select Screen
 Intel (VMX) Virtualization [Enabled]                 ↑↓: Select Item
 Technology                                           Enter: Select
 Active Performance-cores  [All]                       +/-: Change Opt.
 Intel(R) Speed Shift Technology [Enabled]            F1: General Help
   Turbo Mode              [Disabled]                 F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit

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```

Hyper-Threading
Enable or disable Hyper-Threading Technology. When enabled, it allows a single physical processor to multitask as multiple logical processors. When disabled, only one thread per enabled core is enabled.

Intel (VMX) 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.

Active Performance-cores
The number of cores to enable in each processor package.

Intel(R) Speed Shift Technology
Enable or disable Intel® Speed Shift Technology support. Enabling will expose the   CPPC v2 interface to allow for hardware controlled P-states.

Turbo Mode
Enable or disable processor Turbo Mode (requires Intel® Speed Shift to be available and enabled).

● **Trusted Computing**
This screen provides function for specifying the TPM (Trusted Platform Module) settings.

```
                           Aptio Setup - AMI
    [ Advanced ]

  TPM 2.0 Device Found                              Enables or Disables BIOS
  Firmware Version:          1.258                  support for security device.
  Vendor:                    STM                    O.S. will not show Security
                                                    Device. TCG EFI protocol and
  Security Device Support    [Enable]               INT1A interface will not be
  Active PCR banks           SHA256                 available.
  Available PCR banks        SHA256



                                                    →←: 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.

● **ACPI Settings**
You can use this screen to select options for the ACPI configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.

```
                              Aptio Setup – AMI
        Advanced

  ACPI Settings                                      Select the highest ACPI sleep
                                                     state the system will enter
  ACPI Sleep State                [S3 (Suspend to RAM)]   when the SUSPEND button is
                                                     pressed.




                                                     ↦←: 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
Select the ACPI (Advanced Configuration and Power Interface) sleep state. The S3 (Suspend to RAM) option selects ACPI sleep state the system will enter when suspend button is pressed.

● **Storage Configuration**
You can use this screen to select options for storage 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 <Enter> for more options.

```
                         Aptio Setup – AMI
     Advanced

Storage Configuration                          SATA Device Options Settings

► SATA 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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```

SATA Configuration
During system boot up, BIOS automatically detects the presence of SATA devices. In the SATA configuration menu, you can see hardware currently installed in the SATA port.

```
                                   Aptio Setup - AMI
        ┌──────────┐
        │ Advanced │
        └──────────┘
  SATA Configuration                                      Enable/Disable SATA Device.

  SATA Controller(s)                    [Enabled]
▶ VMD setup menu

  Serial ATA Port 4                     Empty
    Port 4                              [Enabled]
    Hot Plug                            [Disabled]
    Spin Up Device                      [Disabled]
    SATA Device Type                    [Hard Disk Drive]
  Serial ATA Port 5                     Empty
    Port 5                              [Enabled]
    Hot Plug                            [Disabled]        ┌─────────────────────────┐
    Spin Up Device                      [Disabled]        │ →←: Select Screen       │
    SATA Device Type                    [Hard Disk Drive] │ ↑↓: Select Item         │
                                                          │ Enter: Select           │
                                                          │ +/-: Change Opt.        │
                                                          │ F1: General Help        │
                                                          │ F2: Previous Values     │
                                                          │ F3: Optimized Defaults  │
                                                          │ F4: Save & Exit         │
                                                          │ ESC: Exit               │
                                                          └─────────────────────────┘

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```

SATA Controller(s)
Enable or disable the SATA Controller feature.

Intel *VMD setup menu
Allows user to configure the VMD controllers.

```
        ┌──────────┐
        │ Advanced │
        └──────────┘
  VMD Configuration

  Enable VMD controller                 [Disabled]
```
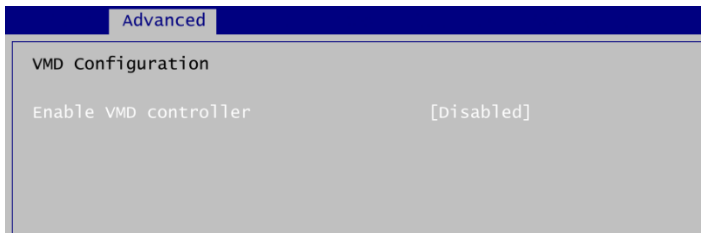
Enable VMD controller
Enable or disable to VMD controller.

*Intel Volume Management Device

- **NVMe Configuration**
  This screen displays NVMe (Non-Volatile Memory Express) controller and drive information.

```
                          Aptio Setup - AMI
    Advanced

NVMe Configuration

No NVME Device Found




                                                  ↔: 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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```
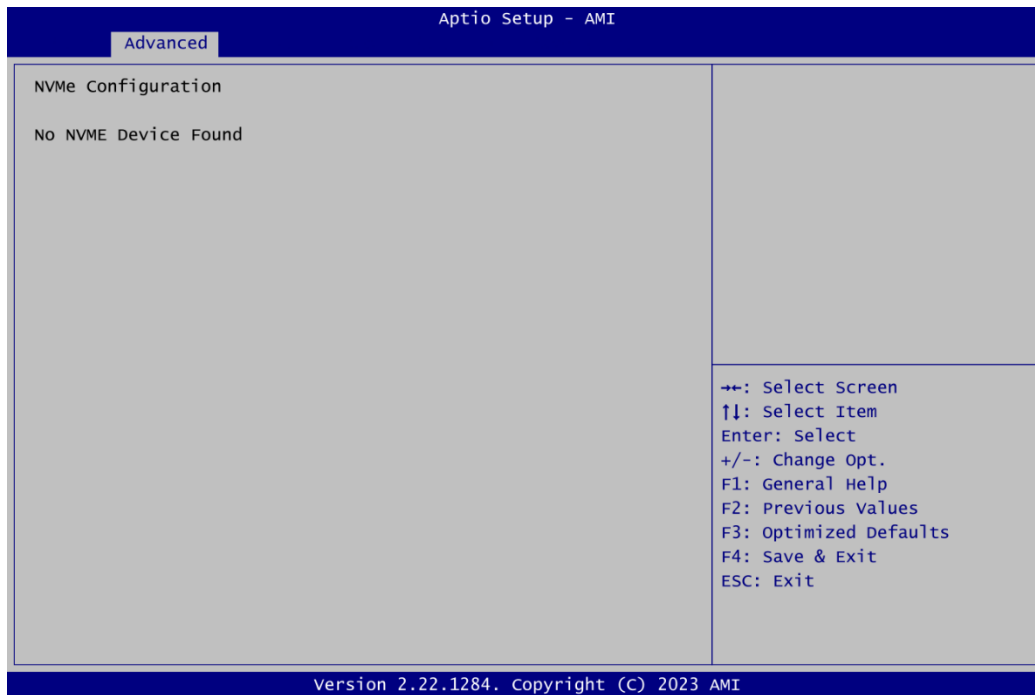
● **F81966 Super IO Configuration**
You can use this screen to select options for the Super IO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.

```
                        Aptio Setup - AMI
    Advanced

  F81966 Super IO Configuration                      Set Parameters of Serial Port
                                                     1 (COMA).
  Super IO Chip                    F81966
 ►Serial Port 1 Configuration
 ►Serial Port 2 Configuration
 ►Serial Port 3 Configuration
 ►Serial Port 4 Configuration




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



                 Version 2.22.1284. Copyright (C) 2023 AMI
```
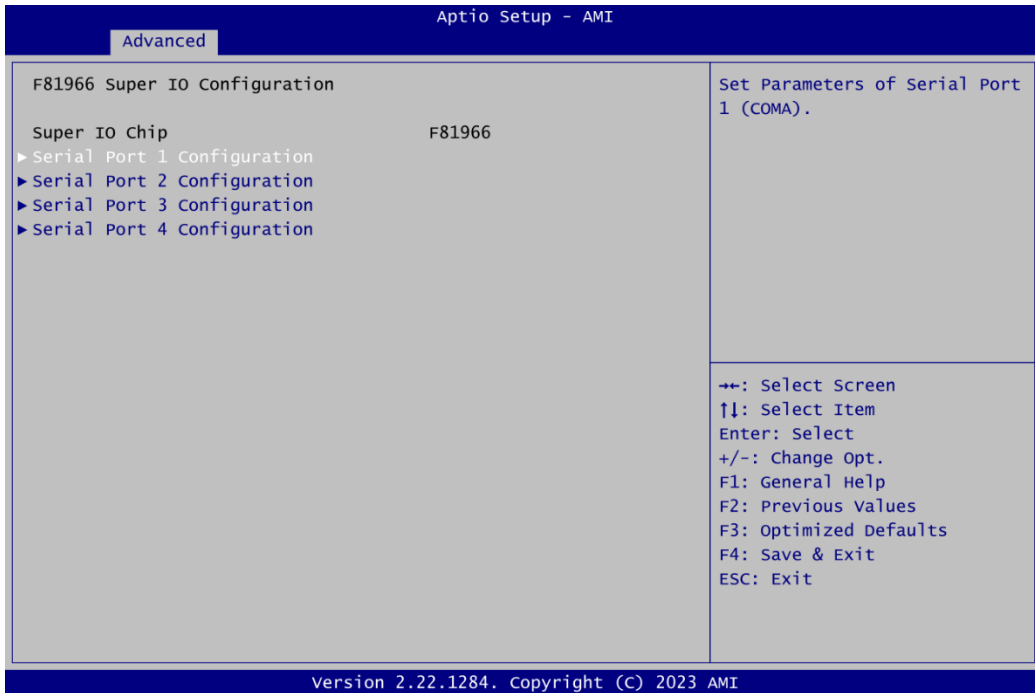
Serial Port 1~4 Configuration
Use these items to set parameters related to serial port 1~4.

● **Serial Port 1 Configuration**

```
                              Aptio Setup - AMI
        Advanced

  Serial Port 1 Configuration                              Enable or Disable Serial Port
                                                           (COM).
  Serial Port                        [Enabled]
  Device Settings                    IO=3F8h; IRQ=4;

  COM Port Type                      [RS232]




                                                           →←: 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
Enable or disable serial port 1. The optimal setting for base I/O address is 3F8h and for interrupt request address is IRQ4.

> **Note**
>
> ***Serial Port 2~4***
> ***The optimal settings for base I/O address and interrupt request address are:***
> - ***Serial port 2: 2F8h, IRQ3***
> - ***Serial port 3: 3E8h, IRQ5***
> - ***Serial port 4: 2E8h, IRQ6***

COM Port Type
Use this item to set RS-232/422/485 communication mode.

- **Hardware Monitor**
  Monitors hardware health status.

```
                              Aptio Setup - AMI
        ┌─────────────┐
        │  Advanced   │
        └─────────────┘

    Pc Health Status                                    Config Smart Fan setting

  ▶ Smart Fan Configuration
    System temperature1                   : +35 ºC
    System temperature2                   : +36 ºC
    CPU FAN Speed                         : 1195 RPM
    SYS FAN Speed                         : N/A
    +5VDUAL                               : +5.003 V
    VCC_RTC                               : +3.040 V
    +5V                                   : +5.003 V
    VSB3V                                 : +3.296 V
    VSB5V                                 : +4.968 V

                                                     ←→: 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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```

This screen displays the temperature of system, cooling fans speed in RPM and system voltages (+5VDUAL, VCC_RTC, +5V, VSB3V and VSB5V).

- **Smart Fan Configuration**
  Allows user to configure CPU fan and system fan mode.

```
                            Aptio Setup – AMI
      Advanced

 Config Smart Fan                                    Enable or Disable Smart Fan
                                                     Enable
 Smart Fan Function              [Enabled]            - Fan speed would change by
                                                     temp
 CPUFan Mode Select              [Auto (duty cycle)]  Disable
 CPUFan Boundary 1 temperature   70                    - Fan would keep full speed
 CPUFan Boundary 2 temperature   50
 CPUFan Boundary 3 temperature   40
 CPUFan Boundary 4 temperature   30
 CPUFan Highest Speed            100
 CPUFan Expect Speed 1           90
 CPUFan Expect Speed 2           70
 CPUFan Expect Speed 3           50
 CPUFan Expect Speed 4           30
                                                     →←: Select Screen
 SYSFan Mode Select              [Auto (duty cycle)]  ↑↓: Select Item
 SYSFan Boundary 1 temperature   60                   Enter: Select
 SYSFan Boundary 2 temperature   50                   +/-: Change Opt.
 SYSFan Boundary 3 temperature   40                   F1: General Help
 SYSFan Boundary 4 temperature   30                   F2: Previous Values
 SYSFan Highest Speed            100                  F3: Optimized Defaults
 SYSFan Expect Speed 1           60                   F4: Save & Exit
 SYSFan Expect Speed 2           50                   ESC: Exit
 SYSFan Expect Speed 3           40
 SYSFan Expect Speed 4           30


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```

Smart Fan Function
Enable or disable Smart Fan:
- Enable: Fan speed would change according to temperature.
- Disable: The fan always runs at full speed.

● **USB Configuration**

```
                           Aptio Setup - AMI
    ┌─────────────┐
    │  Advanced   │
    └─────────────┘

USB Configuration

USB Module Version                 28

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.

● **AMT Configuration**
Use this screen to configure AMT parameters. (Only Supported Q670E & R680E version)

```
                          Aptio Setup - AMI
     ┌─────────────┐
     │  Advanced   │
     └─────────────┘

  AMT Configuration                                    When disabled AMT BIOS
                                                       Features are no longer
  AMT BIOS Features              [Disabled]            supported and user is no
                                                       longer able to access MEBx
                                                       Setup.
                                                       Note:
                                                       This option does not disable
                                                       Manageability Features in FW.


                                                       →←: 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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```

AMT BIOS Features
Enable or disable Active Management Technology BIOS features.

4.5   Chipset Menu

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

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

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

```
                           Aptio Setup - AMI
     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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```
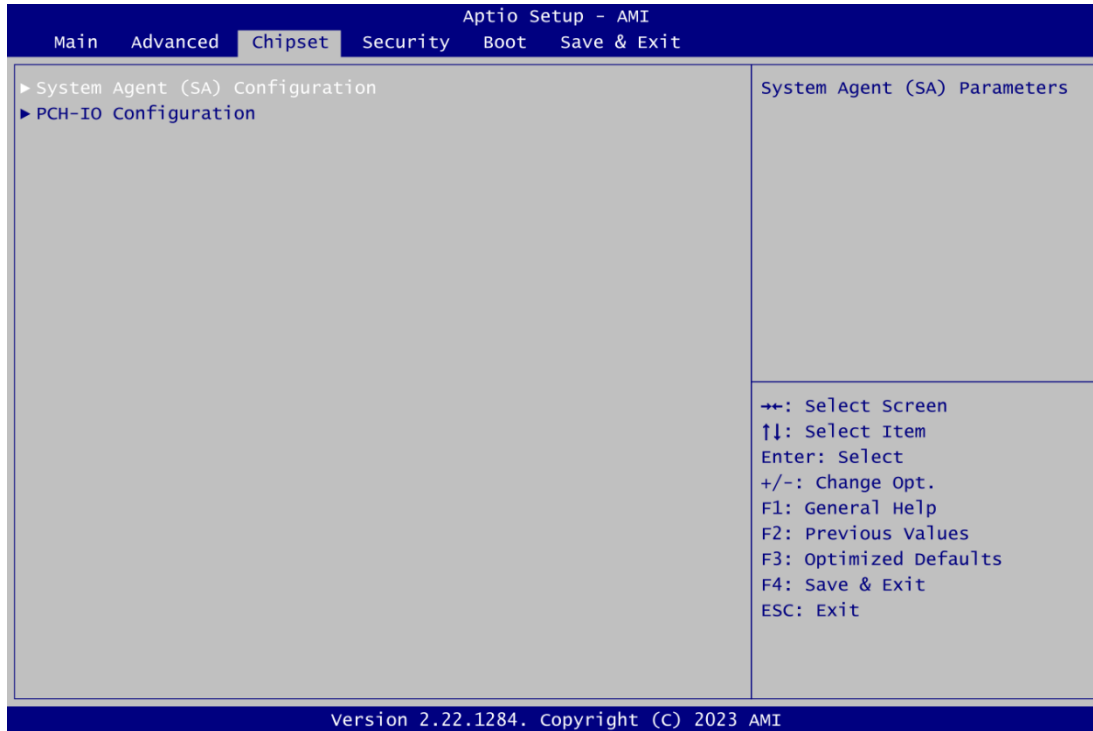
● **System Agent (SA) Configuration**
This screen allows users to configure System Agent (SA) parameters. For items marked with "▶", please press <Enter> for more options.

```
                         Aptio Setup - AMI
        Chipset

  System Agent (SA) Configuration                    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



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```
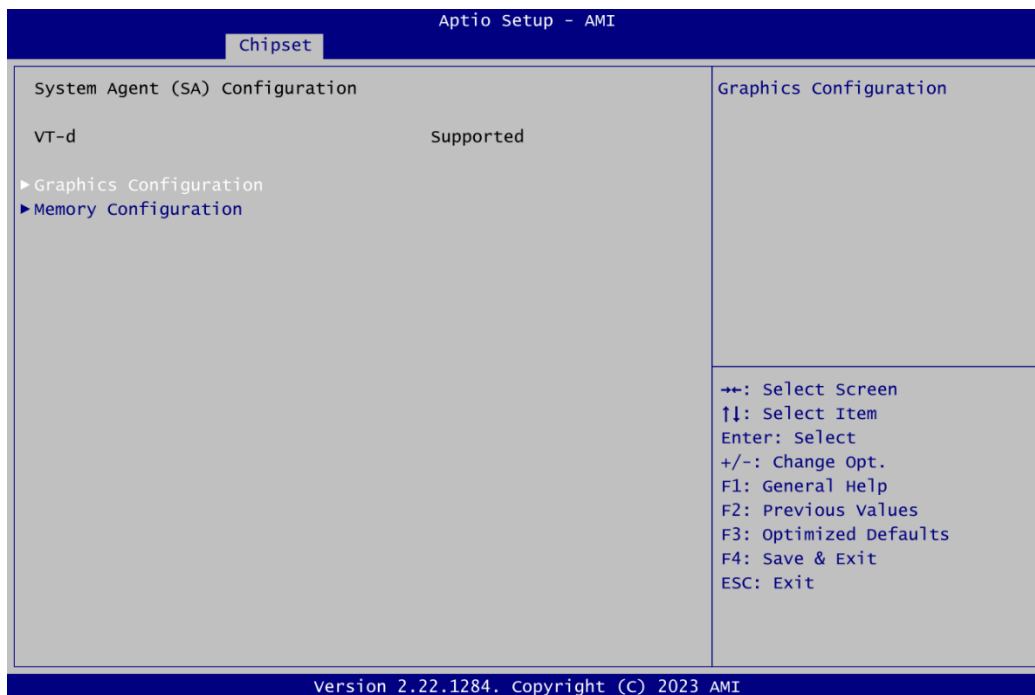
Graphics Configuration
Open sub menu for parameters related to graphics configuration.

Memory Configuration
Open sub menu for information related to system memory.

● **Graphics Configuration**

```
                          Aptio Setup - AMI
         Chipset

 Internal Graphics                   [Auto]          Keep IGFX enabled based on the
                                                     setup options.






                                                     →←: 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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```

Internal Graphics
Use this item to set parameters related to internal graphics controller.

● **Memory Configuration**
   This screen displays the system memory information.

```
                          Aptio Setup - AMI
        Chipset

Memory Configuration

Memory RC Version                  0.0.3.96
         Frequency                  2667 MHz
tCL-tRCD-tRP-tRAS                  19-19-19-43
MC 0 Ch 0 DIMM 0                   Not Populated / Disabled
MC 0 Ch 0 DIMM 1                   Not Populated / Disabled
MC 1 Ch 0 DIMM 0                   Not Populated / Disabled
MC 1 Ch 0 DIMM 1                   Populated & Enabled
    Size                          16384 MB (DDR4)
    Number of Ranks                2
    Manufacturer                   Kingston

                                              →←: 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 - AMI
        Chipset

  PCH-IO Configuration                              PCI Express Configuration
                                                    settings
  ▶ PCI Express Configuration
  ▶ HD Audio 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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```

PCI Express Configuration
PCI-Express Configuration settings.

```
        Chipset

  PCI Express Configuration

  ▶ PCI Express Root Port 4(M.2 E Key)
```
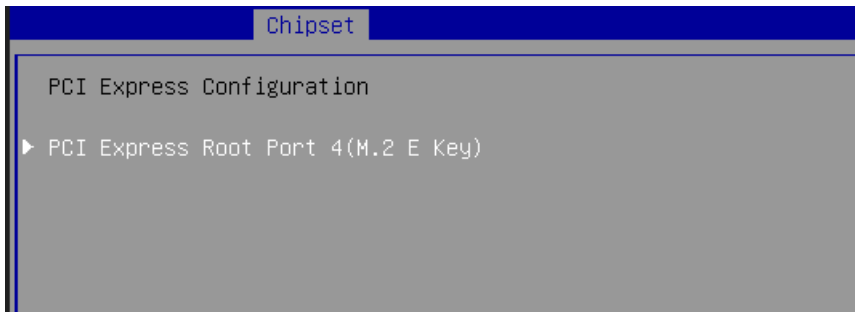
PCI Express Root Port 4(M.2 E Key)
Control the PCI-Express root port(M.2 E Key).

```
                          Chipset

   PCIe Speed                       [Auto]
   ASPM                             [Disabled]
     Hot Plug                       [Disabled]
   Detect Non-Compliance Device     [Disabled]
```
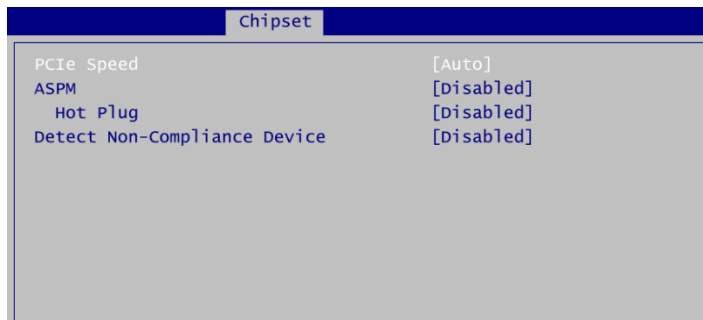
PCIe Speed
Allow user to configure PCI-Express speed.

ASPM
Sets the ASPM (Active State Power Management Settings) level:
- Force L0: Force all links to LO state.
- Auto: BIOS auto configures.
- Disabled: Disables ASPM.

Hot Plug
Enable or disable PCI-Express Hot Plug.

Detect Non-Compliance Device
Enable or disable the detection of a non-compliance PCI-Express device in PEG.

HD Audio Configuration
HD Audio subsystem configuration settings.

```
                   Chipset

   HD Audio Subsystem Configuration Settings

   HD Audio                          [Enabled]
```
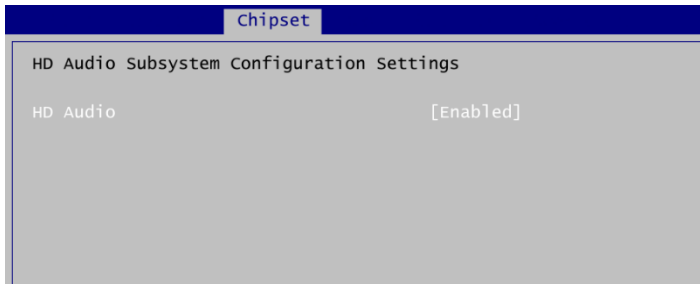
HD Audio
Control detection of the HD Audio device.
- Disabled: HDA will be unconditionally disabled.
- Enabled: HDA will be unconditionally enabled.

4.6   Security Menu

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

```
                              Aptio Setup - AMI
    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
                                               Enter: Select
  Administrator Password                       +/-: Change Opt.
  User Password                                F1: General Help
                                               F2: Previous Values
  ▶ Secure Boot                                F3: Optimized Defaults
                                               F4: Save & Exit
                                               ESC: Exit


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```

- ● **Administrator Password**
  Set administrator password.

- ● **User Password**
  Set password.

● **Secure Boot**

```
                              Aptio Setup - AMI
     Main   Advanced   Chipset   Security   Boot   Save & Exit

    System Mode                      Setup                  Secure Boot feature is Active
                                                            if Secure Boot is Enabled,
    Secure Boot                      [Disabled]             Platform Key(PK) is enrolled
                                     Not Active             and the System is in User mode.
                                                            The mode change requires
    Secure Boot Mode                 [Custom]               platform reset
  ▶ Restore Factory Keys
  ▶ Reset To Setup Mode

  ▶ Key Management


                                                            →←: 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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```

Secure Boot
Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset. Secure Boot ensures that the system only boots from trusted software, preventing malicious software from loading and compromising the device. It checks the digital signatures of boot loaders, firmware, and operating systems to verify that they are from trusted sources and have not been tampered with. Users can choose to enable it or not, between standard and custom mode.

Secure Boot Mode
Secure Boot mode options: Standard or Custom. In Custom mode, the policy of Secure Boot variables can be configured by a physically present user without full authentication.

Restore Factory Keys
Force the system into User Mode. Install factory default Secure Boot key databases.

Key Management
Enables expert users to modify Secure Boot Policy variables without full authentication.

4.7   Boot Menu

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

```
                              Aptio Setup - AMI
      Main    Advanced    Chipset    Security    Boot    Save & Exit

   Boot Configuration                                   Number of seconds to wait for
   Setup Prompt Timeout               1                 setup activation key.
   Bootup Numlock State               [On]              65535(0xFFFF) means indefinite
   Quiet Boot                         [Disabled]        waiting.
   Launch UEFI PXE OpROM policy       [Disabled]

   Boot Option Priorities
   Boot Option #1                     [UEFI:  USB DISK 3.0
                                      PMAP, Partition 1 (
                                      USB DISK 3.0 PMAP)]

                                                        →←: 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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```
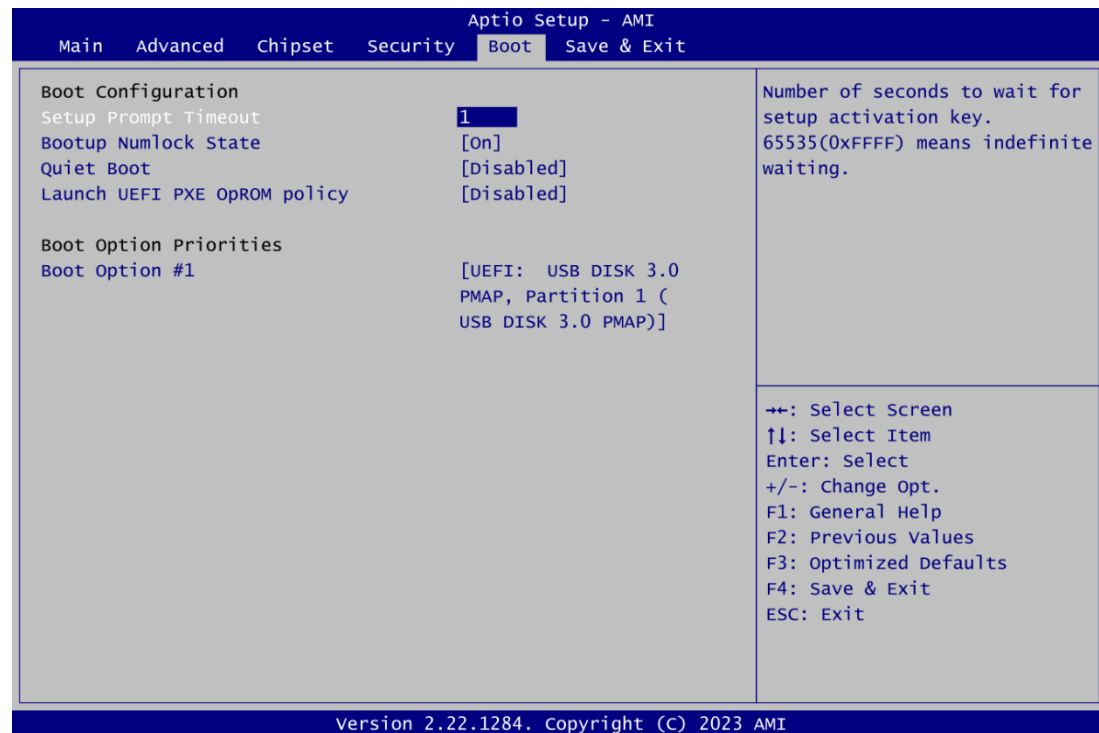
● **Setup Prompt Timeout**
Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

● **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.

● **Launch UEFI PXE OpROM policy**
Control the execution of UEFI PXE OpROM. When enabled, you may select LAN1 or LAN2 as PXE LAN port.

● **Boot Option Priorities**
These are settings for boot priority. Specify the boot device priority sequence from the available devices.

4.8   Save & Exit Menu

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

```
                              Aptio Setup - AMI
     Main    Advanced    Chipset    Security    Boot    Save & Exit

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

   Save Changes and Reset
   Discard Changes and Reset

   Save Changes
   Discard Changes

   Default Options
   Restore Defaults
   Save as User Defaults                             →←: Select Screen
   Restore User Defaults                             ↑↓: Select Item
                                                     Enter: Select
   Boot Override                                     +/-: Change Opt.
   UEFI: USB DISK 3.0 PMAP, Partition 1 (USB DISK 3.0 PMAP)   F1: General Help
                                                     F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit


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```

- **Save Changes and Exit**
  When you 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 configuration 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 you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can 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 you have 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 you 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
Digital I/O

B.1 Digital I/O Programming

1.   IOBASE: 0xEFA0
2.   Registers:
 Command byte

Command	Protocol	Function
0	Read byte	Input port register
1	Read/write byte	Output port register
2	Read/write byte	Polarity inversion register
3	Read/write byte	Configuration register

The command byte is the first byte to follow the address byte during a write transmission. It is used as a pointer to determine which of the following registers will be written or read.

Register 0: Input port register.
This register is a read-only port. It reflects the incoming logic levels of the pins, regardless of whether the pin is defined as an input or an output by Register 3. Writes to this register have no effect. The default 'X' is determined by the externally applied logic level, normally '1' when no external signal is externally applied because of the internal pull-up resistors.

Bit	Symbol	Access	Value	Description
7	I7	Read only	X	
6	I6	Read only	X	
5	I5	Read only	X	
4	I4	Read only	X	Determined by externally applied logic level.
3	I3	Read only	X	
2	I2	Read only	X	
1	I1	Read only	X	
0	I0	Read only	X	

Register 1: Output port register.
This register reflects the outgoing logic levels of the pins defined as outputs by Register 3. Bit values in this register have no effect on pins defined as inputs. Reads from this register return the value that is in the flip-flop controlling the output selection, not the actual pin value.

Bit	Symbol	Access	Value	Description
7	O7	R	1*	
6	O6	R	1*	
5	O5	R	1*	
4	O4	R	1*	Reflects outgoing logic levels of pins defined as outputs by Register 3.
3	O3	R	1*	
2	O2	R	1*	
1	O1	R	1*	
0	O0	R	1*	

* : Default value

Register 3: Configuration register.

This register configures the directions of the I/O pins. If a bit in this register is set, the corresponding port pin is enabled as an input with a high-impedance output driver. If a bit in this register is cleared, the corresponding port pin is enabled as an output. At reset, the I/Os are configured as inputs with a weak pull-up to VDD.

Bit	Symbol	Access	Value	Description
7	C7	R/W	1*	
6	C6	R/W	1*	
5	C5	R/W	1*	Configure the directions of the I/O pins.
4	C4	R/W	1*	0 = Corresponding port pin enabled as an output.
3	C3	R/W	1*	1 = Corresponding port pin configured as input
2	C2	R/W	1*	(default value).
1	C1	R/W	1*	
0	C0	R/W	1*	

* : Default value

B.2 Sample Code

```
//////////////////////////////////////////////////////////////////
#include <stdio.h>
#include <stdlib.h>

#include <sys/io.h>

//SMBUS IO base, Host Status Register Address(HSTS)
#define HSTS 0xEFA0
//Host Control Register (HCTL)
#define HCTL 0xEFA2
//Host Command Register (HCMD)
#define HCMD 0xEFA3
//Transmit Slave Address Register (TSA)
#define TSA 0xEFA4
//Data 0 Register (HD0)
#define HD0 0xEFA5
#define DIO_SLAVE_ADDR_WRITE 0x44
#define DIO_SLAVE_ADDR_READ 0x45
#define DIO_INPUT_OFFSET 0x00
#define DIO_OUTPUT_OFFSET 0x01
#define DIO_CONFIG_OFFSET 0x03

// Set DIO to output and print configuration register value
int SetDIO_to_output()
{
  unsigned char config_value;
  //Get Io Port Read/Write Permission
  iopl(3);
  // Clear host status register
  outb_p (0xFF, HSTS);

  //Set DIO device slave address and set command to write(slave
  //addr+0)
  outb_p ( DIO_SLAVE_ADDR_WRITE, TSA);

  //Set DIO offset to configuration register
  outb_p ( DIO_CONFIG_OFFSET, HCTL);

  //Set DIO configuration register bit 0~7 to 0 which means set all
```

```
  //DIO ports to output (0 -> output, 1 -> input)
  outb_p (0x0, HD0);

  //Raise the START bit(bit 6) of HCTL and set SMB_CMD (bit2~4) of
  //HCTL to 0x010(Byte Data) to start transfer
  outb_p (0x48, HCTL);

  //print configuration register value
  // Clear host status register
  outb_p (0xFF, HSTS);

  //Set DIO device slave address and set command to read(slave //addr+1)
  outb_p ( DIO_SLAVE_ADDR_READ, TSA);

  //Set DIO offset to configuration register
  outb_p ( DIO_CONFIG_OFFSET, HCTL);

  //Raise the START bit(bit 6) of HCTL and set SMB_CMD (bit2~4) of
  //HCTL to 0x010(Byte Data) to start transfer
  outb_p (0x48, HCTL);
  //Read from HS0 to print configuration register value
  config_value = inb_p (HD0);
  printf(" configuration value = %d\n",config_value);

  return 0;
}

// Set DIO output to low/high
int SetDIOoutput_low_high()
{
  //Get Io Port Read/Write Permission
  iopl(3);
  // Clear host status register
  outb_p (0xFF, HSTS);

  //Set DIO device slave address and set command to write(slave
  //addr+0)
  outb_p ( DIO_SLAVE_ADDR_WRITE, TSA);

  //Set DIO offset to output register
  outb_p ( DIO_OUTPUT_OFFSET, HCTL);

  //Set DIO 0~3 output low, 4~7 output high by configure DIO output
  //port register bit 0~7, 0x0F means bit 0~3 =1, 4~7 =0, 0-> low,
  // 1->high
  outb_p (0x0F, HD0);
  //Raise the START bit(bit 6) of HCTL and set SMB_CMD (bit2~4) of
  //HCTL to 0x010(Byte Data) to start transfer
  outb_p (0x48, HCTL);

  return 0;
}

// Set DIO to input and print status (should be 0xFF, all ports read
high)
int SetDIO_to_input()
{
  unsigned char input_value;
  //Get Io Port Read/Write Permission
  iopl(3);
  // Clear host status register
```

```
  outb_p (0xFF, HSTS);

  //Set  DIO  device  slave  address  and  set  command  to  write(slave
  //addr+0)
  outb_p ( DIO_SLAVE_ADDR_WRITE, TSA);

  //Set DIO offset to configuration register
  outb_p ( DIO_CONFIG_OFFSET, HCTL);

  //Set DIO configuration register bit 0~7 to 1 which means set all
  //DIO ports to input (0 -> output, 1 -> input)
  outb_p (0xFF, HD0);

  //Raise the START bit(bit 6) of HCTL and set SMB_CMD (bit2~4) of
  //HCTL to 0x010(Byte Data) to start transfer
  outb_p (0x48, HCTL);

  //print configuration register value
  // Clear host status register
  outb_p (0xFF, HSTS);

  //Set DIO device slave address and set command to read(slave //addr+1)
  outb_p ( DIO_SLAVE_ADDR_READ, TSA);

  //Set DIO offset to configuration register
  outb_p ( DIO_INPUT_OFFSET, HCTL);

  //Raise the START bit(bit 6) of HCTL and set SMB_CMD (bit2~4) of
  //HCTL to 0x010(Byte Data) to start transfer
  outb_p (0x48, HCTL);
  //Read from HS0 to print configuration register value
  input_value = inb_p (HD0);
  printf(" input value = %d\n",input_value);

  return 0;
}
```

//
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Appendix C
iAMT Settings

The Intel® Active Management Technology (Intel® AMT) utilizes built-in platform capabilities and popular third-party management and security applications to allow IT administrators to remotely discover, repair and better protect their networked computing assets, thus significantly improving IT management efficiency. Only Supported Q670E & R680E version

In order to use Intel® AMT you must enter the ME BIOS, change the ME BIOS password, and then select "Intel® iAMT" as the manageability feature.

D.1   Entering MEBx

1. Go to BIOS to enable the iAMT function.

```
                              Aptio Setup - AMI
    Advanced

  AMT Configuration                                    When disabled AMT BIOS
                                                       Features are no longer
  AMT BIOS Features            [Disabled]              supported and user is no
                                                       longer able to access MEBx
                                                       Setup.
                                                       Note:
                                                       This option does not disable
                                                       Manageability Features in FW.



                       ┌──── AMT BIOS Features ────┐
                       │ Disabled                  │
                       │ 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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```

2. After restarting BIOS, exit and enter MEBx Setting.

D.2   Set and Change Password

1. You will be asked to set a password when first logging in. The default password is "admin".
2. You will be asked to change the password before setting ME.
3. You must confirm your new password while revising. The new password must consist of eight characters, including at least:

    -   One upper case
    -   One lower case
    -   One number
    -   One special symbol, such as ! 、 $ or ; ， (、 " ，excepted)

    The default value demonstrates an example of a valid password: **!!11qqQQ**
    Underline (_) and space are valid characters for password, but they won't make higher complexity.

D.3 iAMT Settings

Select Intel® iAMT configuration and press <Enter>.

```
                          Aptio Setup - AMI
      Main  Advanced  Chipset  Security  Boot  Save & Exit  MEBx

   Intel(R) Standard Manageability     [Enabled]
 ▶ Intel(R) Standard Manageability Configuration
 ▶ Intel(R) OEM Debug Configuration
   Change ME Password

                                               ➜←: 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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```

1. Select Network Setup to configure iAMT.

```
                          Aptio Setup - AMI
                                         MEBx

 ▶ Redirection features                        Changes network state of ME.
 ▶ User Consent                                When disabling, it will also
   Password Policy              [Anytime]      clear some other settings.
 ▶ Network Setup
   Network Access State         [Network Inactive]
 ▶ Remote Setup And Configuration
 ▶ Power Control

                     ┌──── Network Access State ────┐
                     │  Network Active              │
                     │  Network Inactive            │
                     │  Full Unprovision            │
                     └──────────────────────────────┘
                                               ➜←: 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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```

2. Exit from MEBx after completing the iAMT settings.

D.4 iAMT Web Console

1. On a web browser, type http://(IP ADDRESS):16992, which connects to iAMT Web.

   Example: http://10.1.40.214:16992
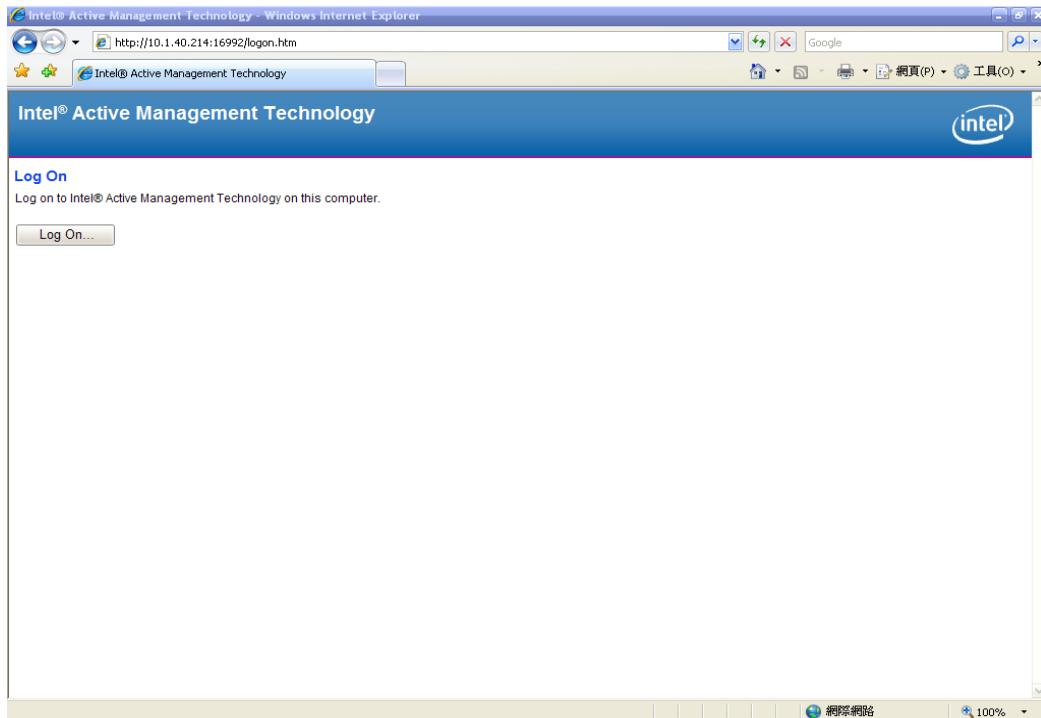
2. To log on, you will be required to type in username and password for access to the Web.

   USER: admin (default value)
   PASS: (MEBx password)

3. Enter the iAMT Web.
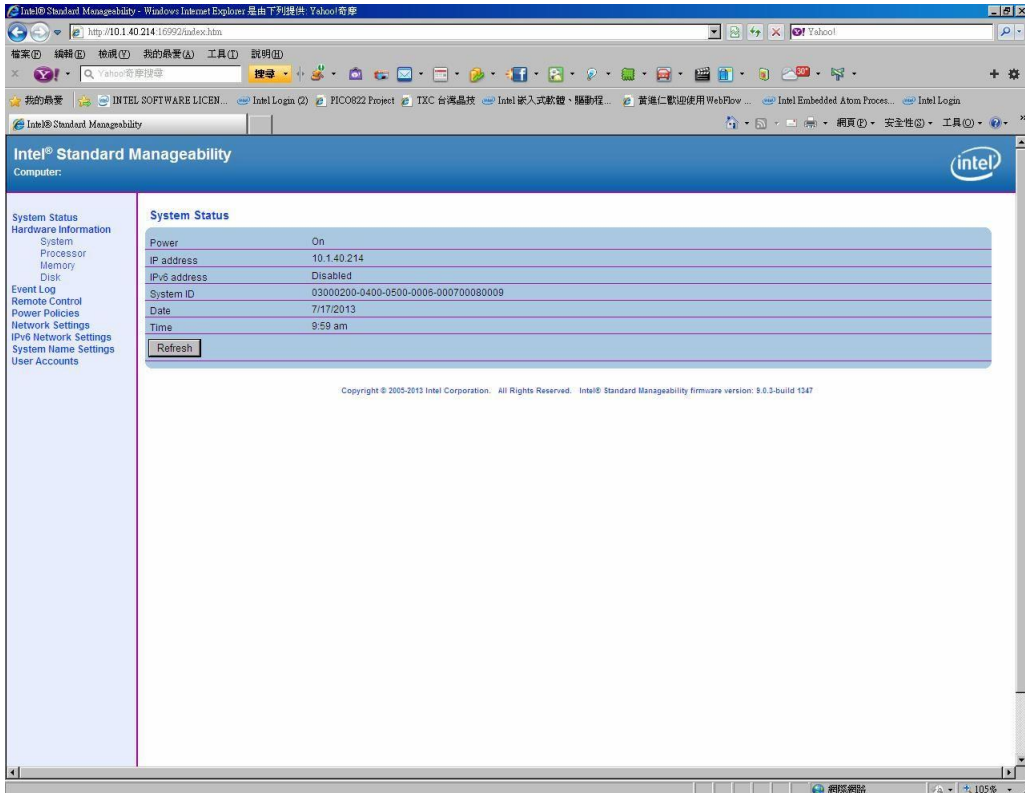
4. Click Remote Control, and select commands on the right side.
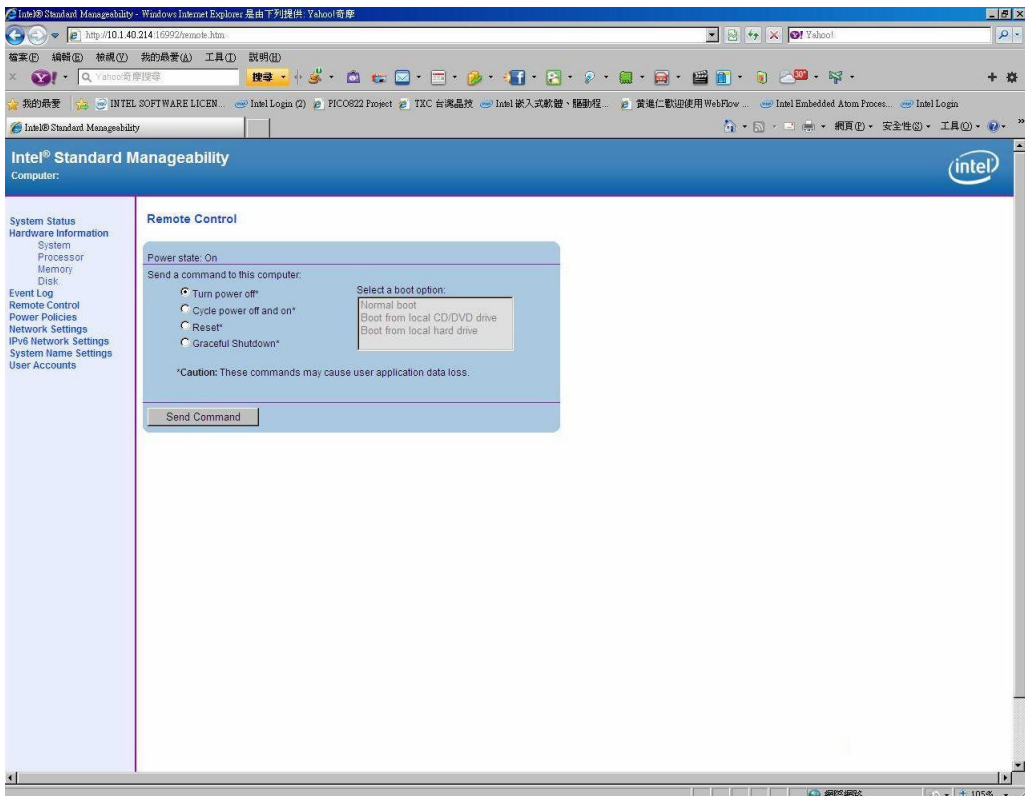
5. When you have finished using the iAMT Web console, close the Web browser.

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Appendix D
TPM Settings

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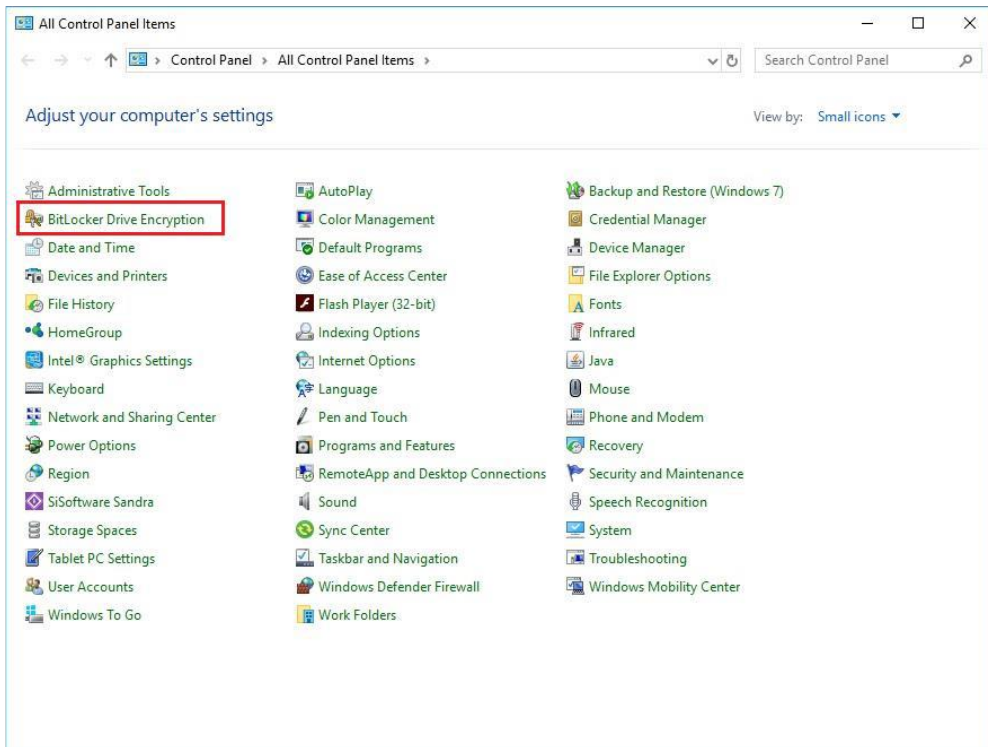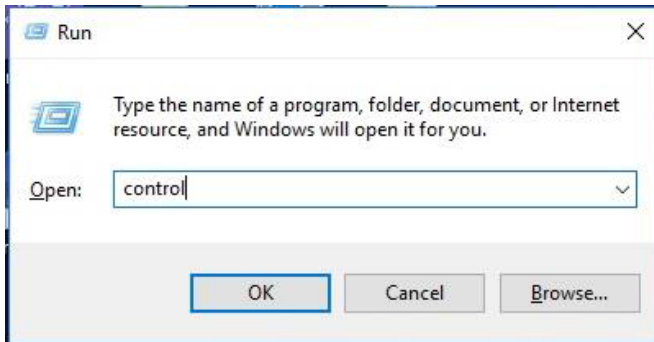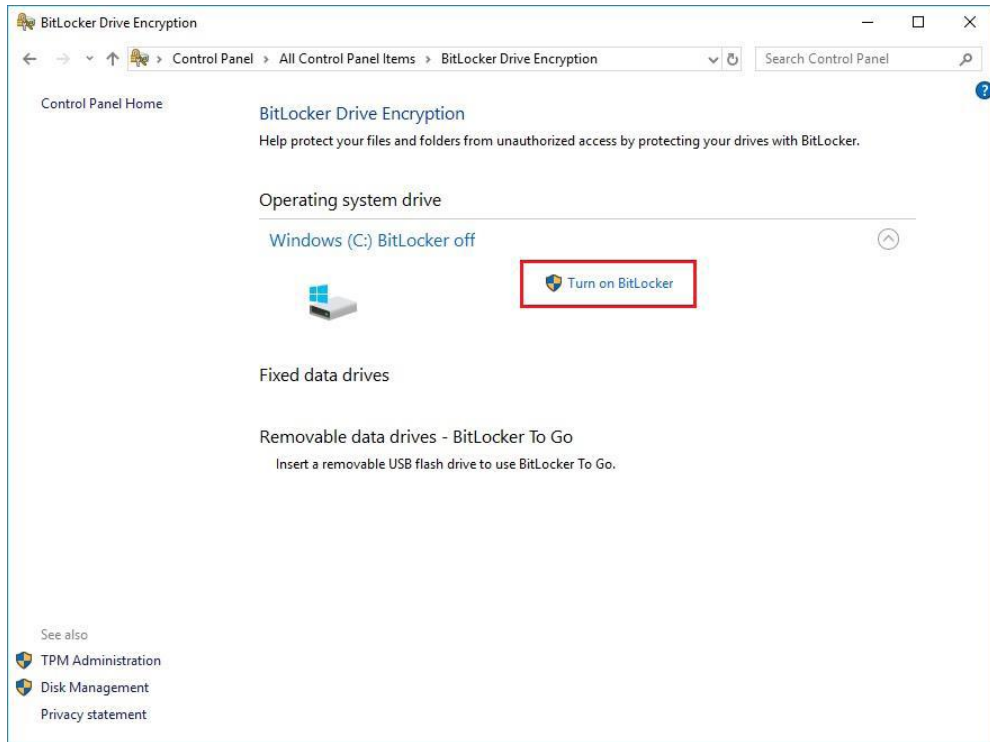
2. Insert an external storage device, for example USB Storage. Back up BitLocker recovery key in a new file and save it to the USB Storage.
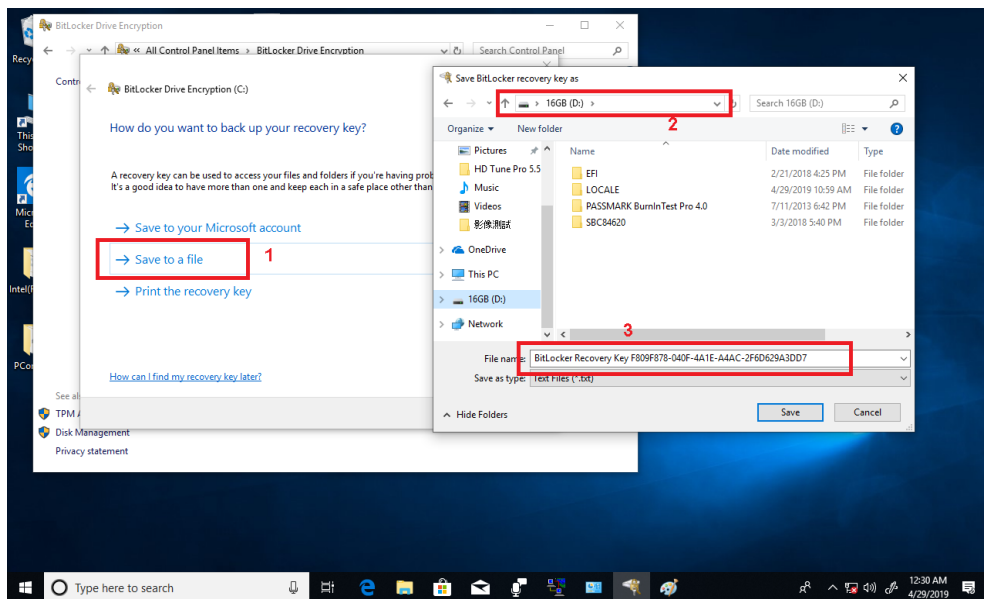
3. Please follow the steps below to encrypt your storage device:
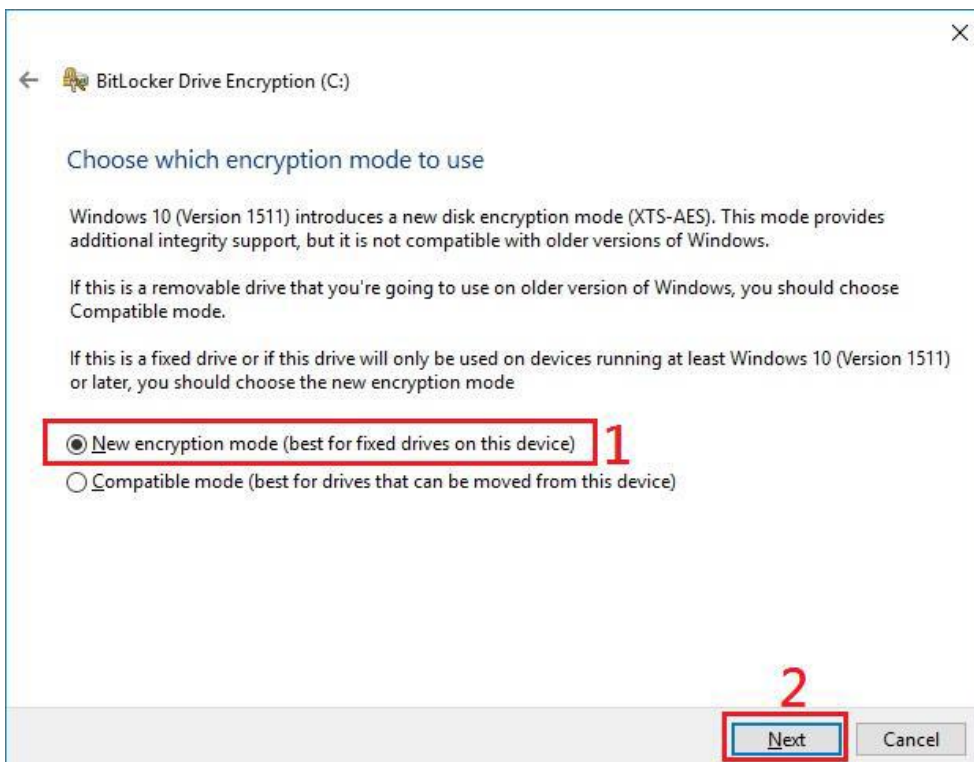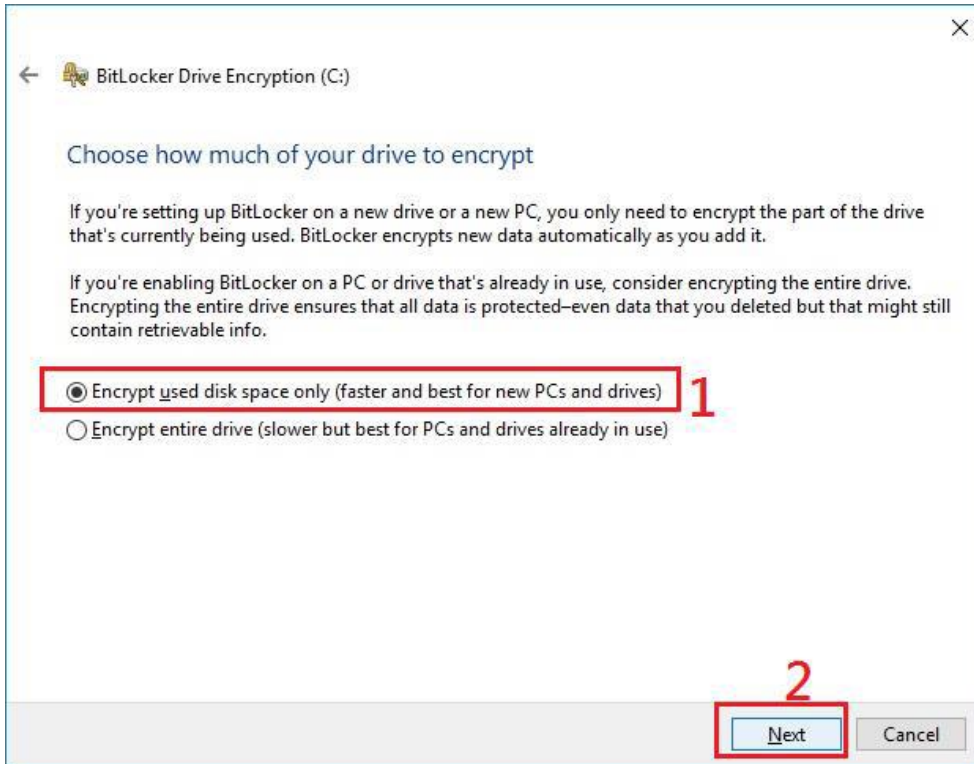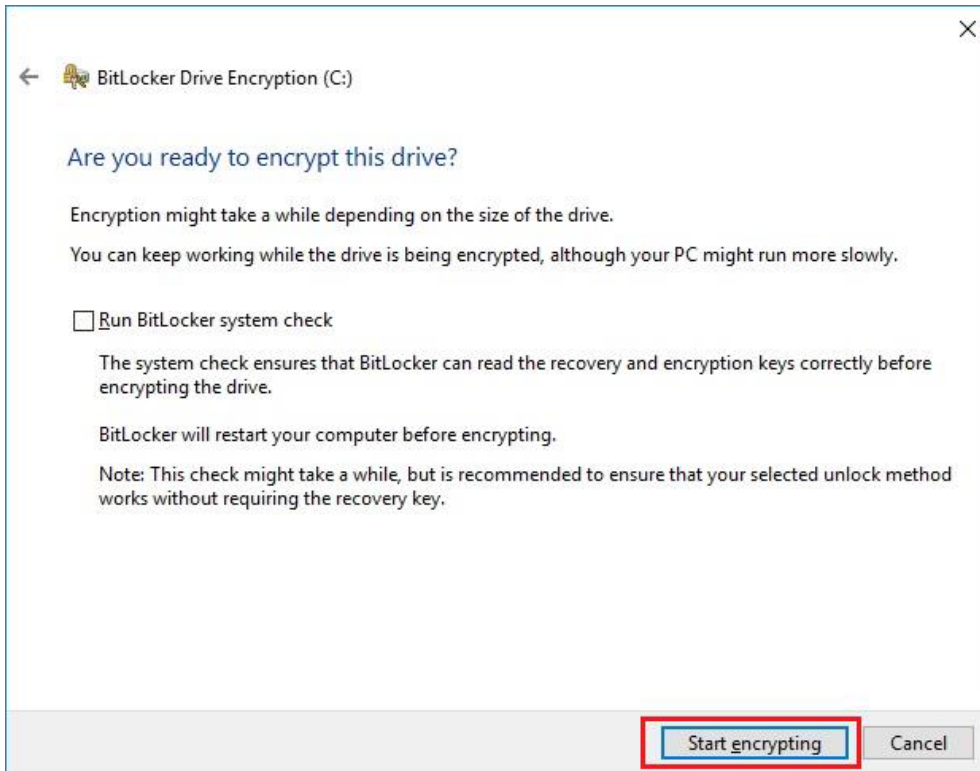
Now, the system prompts that the operating system drive encryption is in progress, and the encryption progress is checked.
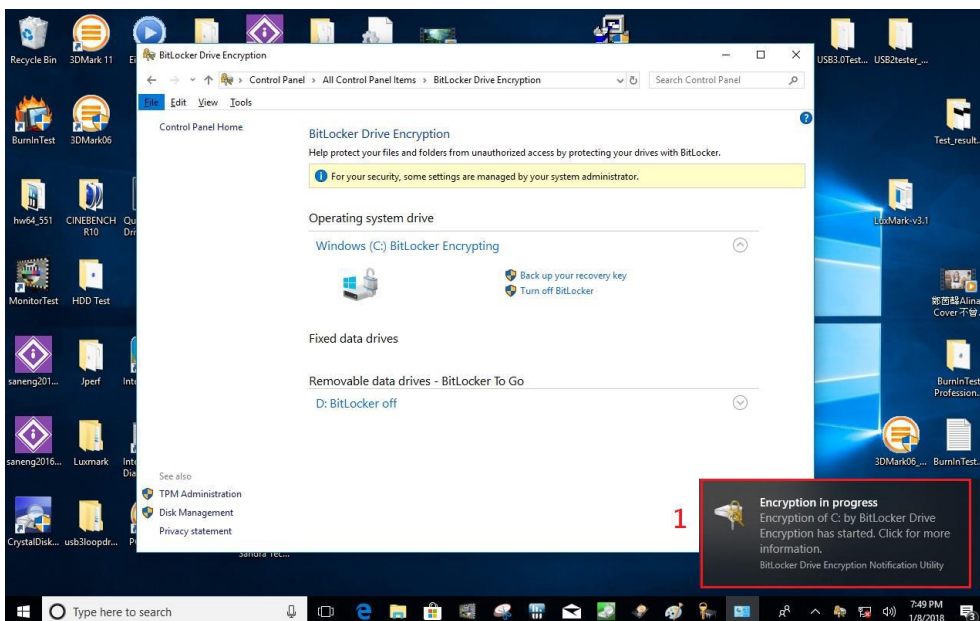
Select and click the icon in the lower right corner to complete the encryption.
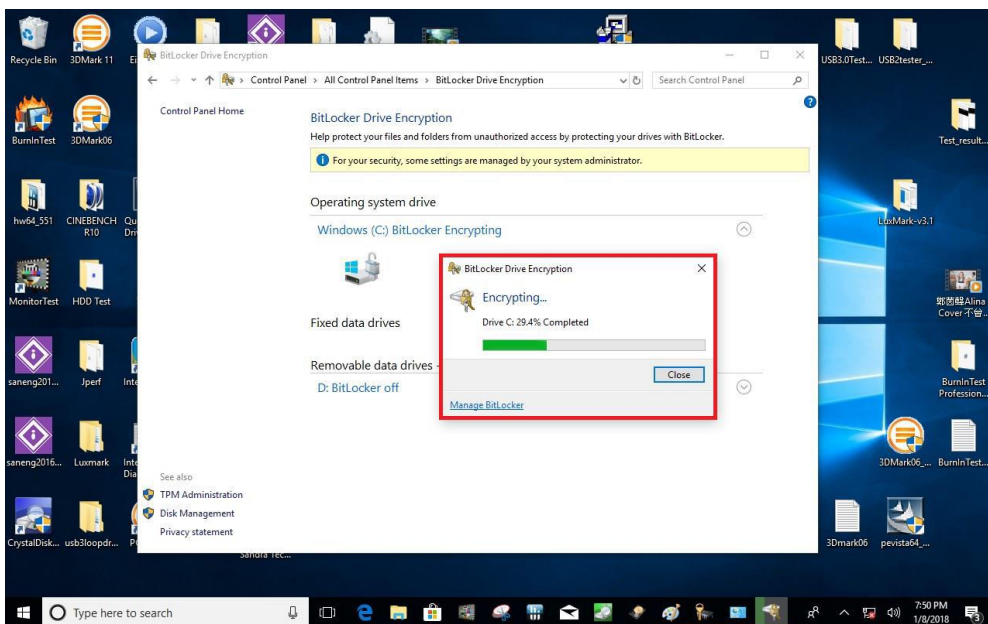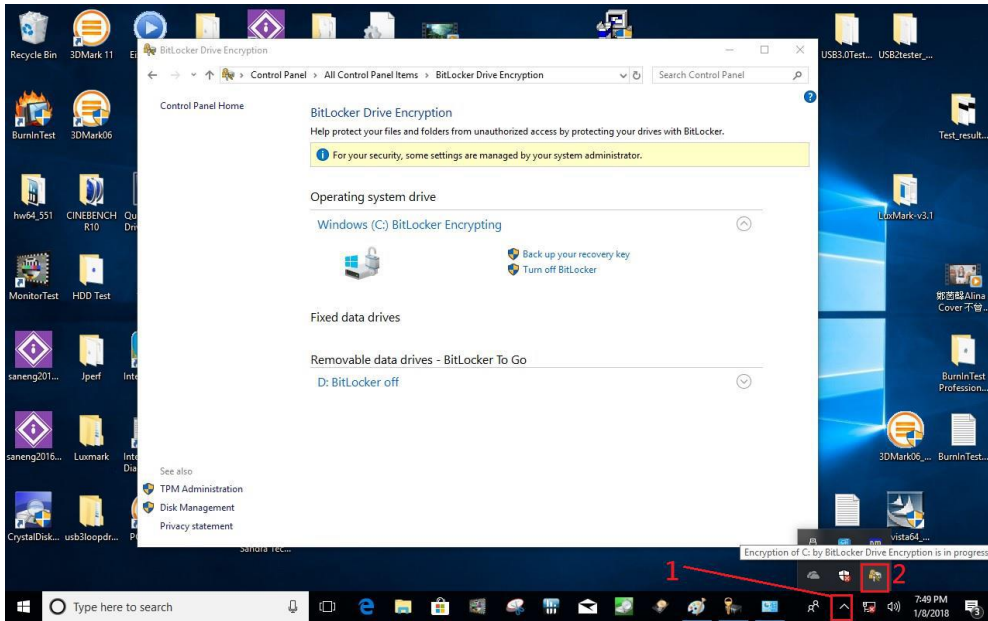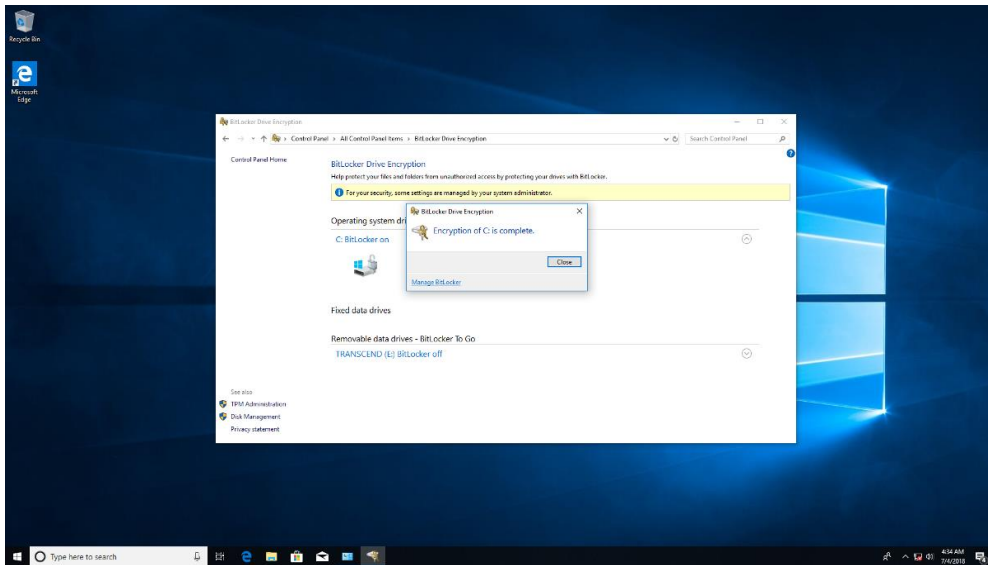
4. Confirm the completion of encryption.
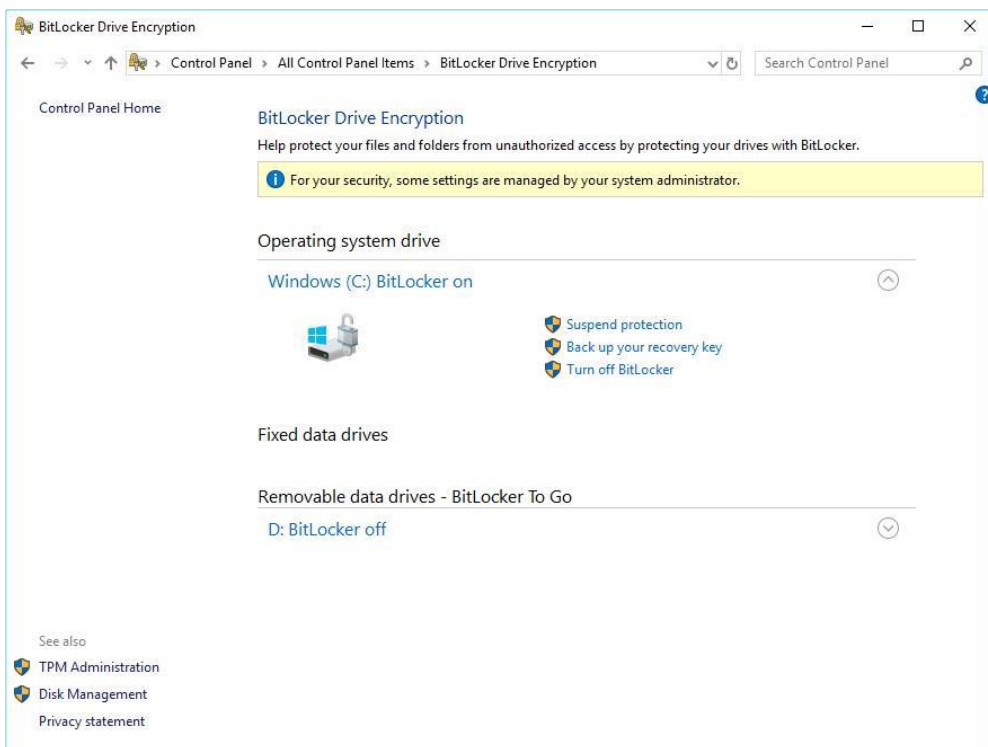
5. Disable TPM function in BIOS Setup Utility.

```
  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
```

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
```

Note

System with no TPM function support is as below:

1.   *TPM information is not found in Device Manager.*
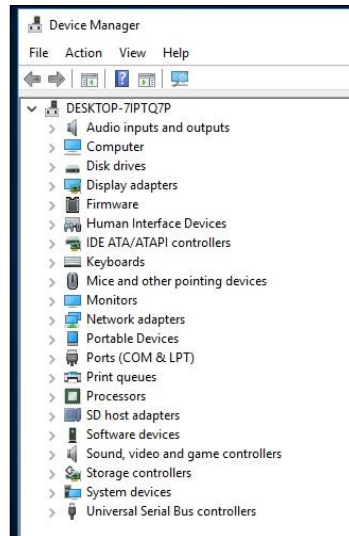
2.   **When trying to turn on Bitlocker, the following error message shows up.**
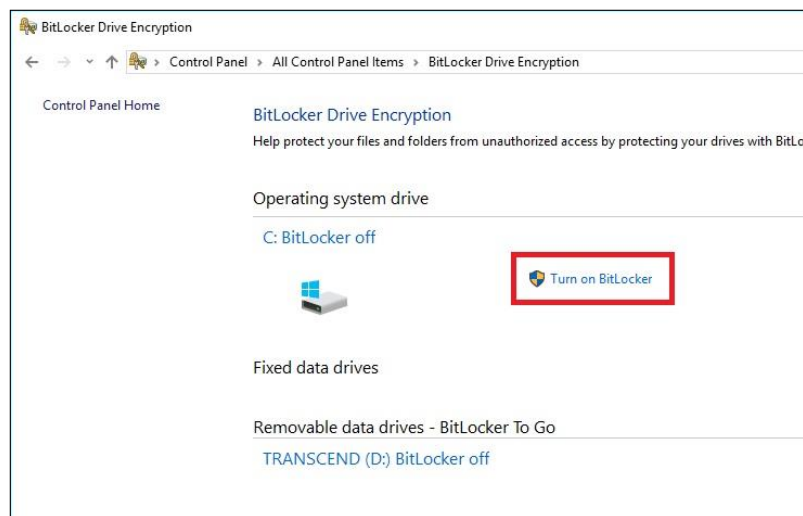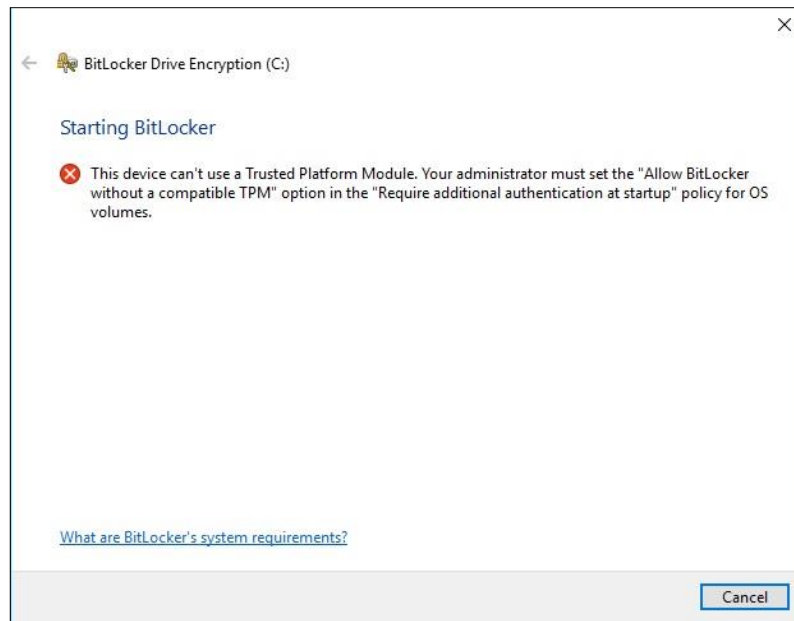
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Appendix E
VMD(RAID) Configuration

How to Create Raid? (Only Supported Q670E & R680E version)
Step 1.
In SATA Configuration, Enabled VMD Controller and save&reset.

```
                          Aptio Setup – AMI
    Advanced

  VMD Configuration                              Enable/Disable to VMD
                                                 controller
  Enable VMD controller        [Enabled]

  Enable VMD Global Mapping    [Enabled]
  Map this Root Port under VMD  [Disabled]
  Root Port BDF details        SATA Controller

  RAID0                        [Enabled]
  RAID1                        [Enabled]
  Intel Rapid Recovery Technology  [Enabled]
  RRT volumes can span internal and  [Enabled]
  eSATA drives
  Intel(R) Optane(TM) Memory   [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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```

Enable VMD Global Mapping
Enable/Disable to VMD Global Mapping

RAID0
Enable/Disable RAID0 support

RAID1
Enable/Disable RAID1 support

Intel Rapid Recovery Technology
Enable/Disable Intel Rapid Recovery Technology

RRT volumes can span internal and eSATA drives
Enable/Disable RRT volumes can span internal and eSATA drives.

Intel(R) Optane(TM) Memory
Enable/Disable System Acceleration with Intel(R) Optane(TM) Memory feature.

Step2.

After Restart, enter del to Bios Setup Menu. In Advanced Page, choose Intel(R) Rapid Storage Technology.

```
                          Aptio Setup - AMI
    Main  Advanced  Chipset  Security  Boot  Save & Exit

  ▶ Device Configuration              This formset allows the user
  ▶ CPU Configuration                 to manage RAID volumes on the
  ▶ Trusted Computing                 Intel(R) RAID Controller
  ▶ ACPI Settings
  ▶ Storage Configuration
  ▶ NVMe Configuration
  ▶ F81966 Super IO Configuration
  ▶ Hardware Monitor
  ▶ USB Configuration
  ▶ AMT Configuration
  ▶ Intel(R) Rapid Storage Technology

                                      →←: 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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```

Step3.

In Intel(R) Rapid Storage Technology page. Choose RAID Volume.

```
                          Aptio Setup - AMI
       Advanced

    Intel(R) RST 19.0.0.5428 RST VMD Driver      This page allows you to create
                                                 a RAID volume
  ▶ Create RAID Volume



    Non-RAID Physical Disks:
  ▶ SATA 0.0, 2.5" SATA SSD 3TE7 CA12202060270004, 55.8GB
  ▶ SATA 0.1, AXIOMTEK Corp.-FSA064GMW5T 0906AA0931116001,
    59.6GB

                                                 →←: 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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```

Step 4.
Select RAID Level, correspond to RAID Level in VMD Configuration.

```
                          Aptio Setup - AMI
     Advanced

  Create RAID Volume                                         Select RAID Level

  Name:                          Volume1
  RAID Level:                    [RAID0 (Stripe)]

  Select Disks:
  SATA 0.4, INTEL SSDSA2M080G2GC      [ ]
  PO0166047A080JGN, 74.5GB
  SATA 0.5, INTEL SSDSC2CW060A3       [ ]
  CV153400F6060AGN, 55.8GB

  Strip Size:                ┌──── RAID Level: ────┐
  Capacity (MB):             │ RAID0 (Stripe)      │
                             │ RAID1 (Mirror)      │
                             └─────────────────────┘           →←: Select Screen
  ▶ Create Volume                                             ↑↓: Select Item
                                                              Enter: Select
  Select at least two disks                                   +/-: Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F3: Optimized Defaults
                                                              F4: Save & Exit
                                                              ESC: Exit


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```

```
                          Aptio Setup - AMI
     Advanced

  VMD Configuration                                          Enable/Disable to VMD
                                                             controller
  Enable VMD controller              [Enabled]

  Enable VMD Global Mapping          [Enabled]
  Map this Root Port under VMD       [Disabled]
  Root Port BDF details              SATA Controller

  RAID0                              [Enabled]
  RAID1                              [Enabled]
  Intel Rapid Recovery Technology    [Enabled]
  RRT volumes can span internal and  [Enabled]
  eSATA drives
  Intel(R) Optane(TM) Memory         [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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```

Step 5.
Select the disk to be merged.

```
                          Aptio Setup - AMI
   Advanced

   Create RAID Volume                                    X - to Select Disk

   Name:                        Volume1
   RAID Level:                  [RAID0 (Stripe)]

   Select Disks:
   SATA 0.0, 2.5" SATA SSD 3TE7      [ ]
   CA12202060270004, 55.8GB
   SATA 0.1, AXIOMTEK                [ ]
   Corp.-FSA064GMW5T
   0906AA093111600 ┌─ SATA 0.0, 2.5" SATA SSD 3TE7 CA1220206027)0004, 55.8GB ─┐
                   │                                                         │
   Strip Size:     │  X                                                      │
   Capacity (MB):  └                                                         
 ► Create Volume                                         Enter: Select
                                                         +/-: Change Opt.
   Select at least two disks                             F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit



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```

Step6.
Finally, implement create Volume.

```
                          Aptio Setup - AMI
   Advanced

   Create RAID Volume                                    Create a volume with the
                                                         settings specified above
   Name:                        Volume1
   RAID Level:                  [RAID0 (Stripe)]

   Select Disks:
   SATA 0.0, 2.5" SATA SSD 3TE7      [X]
   CA12202060270004, 55.8GB
   SATA 0.1, AXIOMTEK                [X]
   Corp.-FSA064GMW5T
   0906AA0931116001, 59.6GB

   Strip Size:                  [64KB]
   Capacity (MB):               114479                   ──────────────────────────
                                                         ←→: Select Screen
 ► Create Volume                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit



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```