USER MANUAL

SA-N718

Intel® 10th Gen. Core™ i9/i7/i5/i3 / Pentium® / Celeron® Processor Book Size PC

SA-N718 M1

SA-N718

Intel® 10th Gen. Core

i9/i7/i5/i3 / Pentium® /

Celeron® Processor Book Size PC

FCC NOTICE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any change or modifications to the equipment not expressly approve by the party responsible for compliance could void your authority to operate such equipment.

⚡	**CAUTION:** Danger of explosion may occur when the battery is incorrectly replaced. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

⚠	**WARNING:** Some internal parts of the system may have high electrical voltage. We strongly recommend that only qualified engineers are allowed to service and disassemble the system. If any damages should occur on the system and are caused by unauthorized servicing, it will not be covered by the product warranty.

Contents

Revision History

The revision history of SA-N718 User Manual is described below:

Version No.	Revision History	Page No.	Date
M1	Initial Release	-	2022/01/27

1   **Introduction**

This chapter provides the introduction for the SA-N718 system as well as the framework of the user manual.

The following topic is included:
- About This Manual

1.1 About This Manual

Thank you for purchasing our SA-N718 system. The SA-N718 is an updated system designed to be comparable with the highest performance of IBM AT personal computers. The SA-N718 provides faster processing speed, greater expandability and can handle more tasks than before. This manual is designed to assist you how to install and set up the whole system. It contains 5 chapters and 2 appendixes. Users can configure the system according to their own needs. This user manual is intended for service personnel with strong hardware background. It is not intended for general users.

The following section outlines the structure of this user manual.

Chapter 1 Introduction
This chapter introduces you to the background of this manual.

Chapter 2 Getting Started
This chapter describes the package contents and outlines the system specifications. It also includes the physical illustrations for the SA-N718 system. Read the safety reminders carefully on how to take care of your system properly.

Chapter 3 System Configuration
This chapter outlines the locations of the motherboard components and their respective functions. You will learn how to set the jumpers and configure the system to meet your own needs.

Chapter 4 Software Utilities
This chapter contains helpful information for proper installations of the Intel Chipset Software Installation Utility, Intel Management Engine Components Installer Driver Utility, Graphics Driver Utility, LAN Driver Utility, Sound Driver Utility and Intel® Rapid Storage Utility.

Chapter 5 BIOS Setup
This chapter indicates you how to change the BIOS configurations.

Appendix A System Diagrams
This appendix provides the system exploded diagrams and part numbers of SA-N718.

Appendix B Technical Summary
This appendix provides the information about the system block diagram, allocation maps for system resources, Watchdog Timer Configuration and Flash BIOS Update.

2 Getting Started

This chapter provides the information for the SA-N718 system. It describes how to set up the system quickly and outlines the system specifications.

The following topics are included:

- Package List
- System Overview
- System Diagrams
- System Specification
- Safety Precautions

Experienced users can go to Chapter 3 System Configuration on page 3-1 for a quick start.

2.1   Package List

If you discover any of the items listed below are damaged or lost, please contact your local distributor immediately.

Item	Q'ty
SA-N718	1
Manual / Driver DVD	1
Quick Guide	1
Mini Jumper (2 mm)	6

2.2 System Overview

Unit: mm

2.2.1 Front View
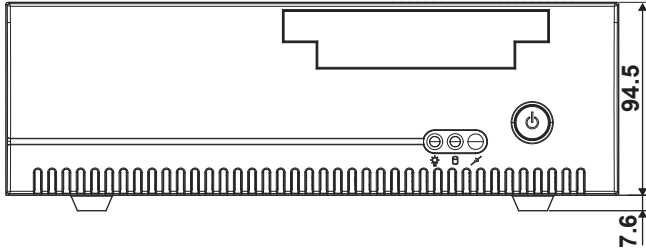
2.2.2 Rear View

2.2.3 Top View

300.20
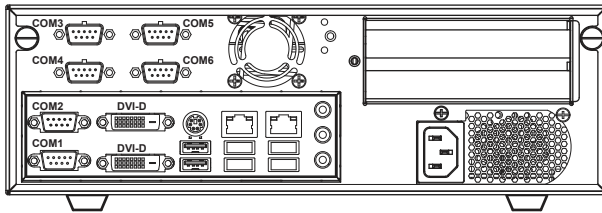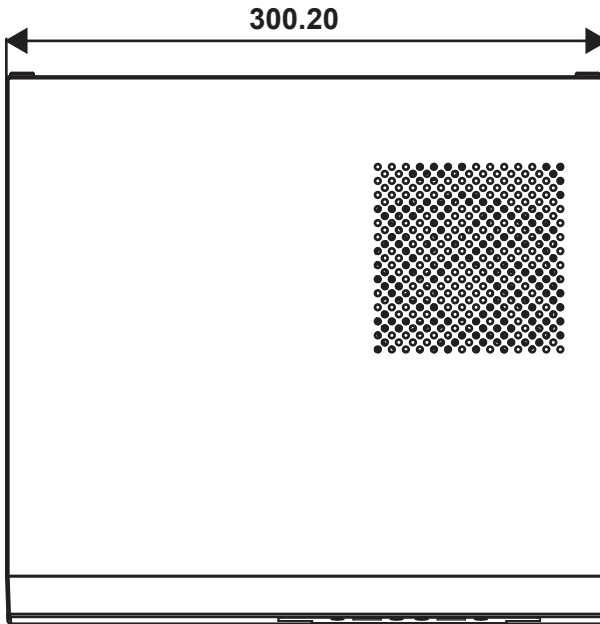
2.2.4 Bottom View

2.2.5 Side View

1.75

272.79
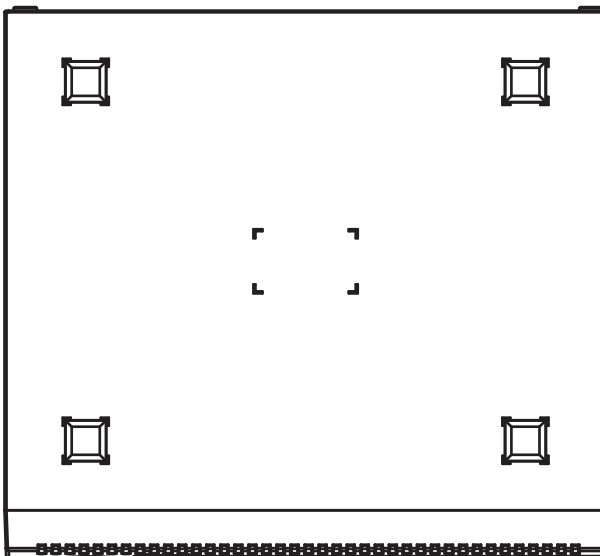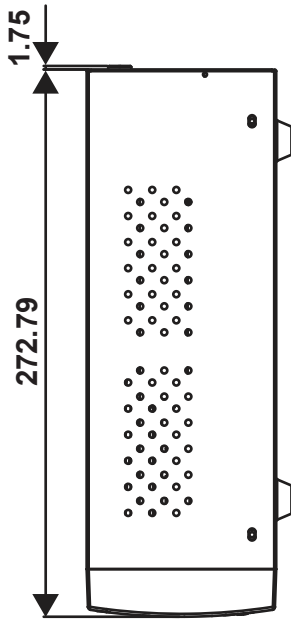
2.2.6 Quarter View
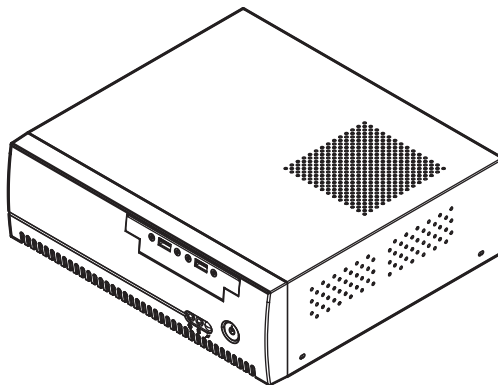
2.3 System Specifications

System	
CPU Type	➢ LGA1200 socket for Intel® 10th Gen. Xeon® / Core™ i9 / i7 / i5 / i3 / Pentium® / Celeron® desktop CPU ➢ Target TDP 65W
CPU List	➢ **Xeon®:** W-1290TE, W-1270TE, W-1250TE ➢ **10th Core™:** i9-10900E(TE), i7-10700E(TE), i5-10500E(TE), i3-10100E(TE) ➢ **Pentium®:** G6400E, G6400TE ➢ **Celeron®:** G5900E, G5900TE
Chipset	➢ Intel® W480E (supports Xeon® / Core™ CPU) ➢ Intel® Q470E / H420E (supports Core™ / Pentium® / Celeron® CPU)
Memory Support	➢ 2 x SODIMM sockets, support 2933MHz DDR4 up to 64GB (W1-1290TE, W-1270TE, i9, i7 CPU) ➢ 2 x SODIMM sockets, support 2666MHz DDR4 (up to 64GB) (W-1250TE, i5, i3 CPU) ➢ 2 x SODIMM sockets, support 2400MHz DDR4 (up to 64GB) (Pentium® / Celeron® CPU) ➢ Supports ECC (Xeon®, i3 CPU)/non-ECC (all sku)
BIOS	➢ AMI UEFI BIOS
API	➢ Hardware monitor / WatchDog
Storage Support	➢ 2 x 2.5" 7mm SATAIII HDD / SSD drive space
Expansion Slots	➢ 1 x PCIeX16 slot, supports PCIe Gen3. ➢ 1 x M.2 slot, M-Key, supports NVMe PCIeX4/X2 and SATA, for storage only without USB signal, supports 2242 only
Power Supply	➢ ATX 250W
O.S. Support	➢ Windows 10 IoT Enterprise LTSC 2019, 2021 ➢ Linux Ubuntu 20.04 LTS
Speaker	➢ 1 x internal buzzer
Dimensions (W x H x D)	➢ 300.2 x 94.5 x 272.79 mm
Weight	➢ 5kg
Certificate	➢ FCC/CE
I/O Ports	
USB	➢ 4 x USB 3.0 (rear side) ➢ 2 x USB 2.0 (rear side) ➢ 2 x USB 3.0 (front side, option)

Serial Ports	➢ COM 1 for RS-232/422/485, COM2 for RS-232 (COM 1/2 support +5V/+12V/RI by setting jumper) ➢ COM3~COM6 for RS-232 only (option)
Audio	➢ Line In, Line Out, Mic In
LAN	➢ 2 x GbE LANs support Wake-on-LAN, PXE ➢ LAN1: Intel® I219 LM ➢ LAN2: Intel® I210 AT
Display	➢ 2 x DVI-D ➢ 1 x DP (optional)
Parallel Port	➢ 1 x parallel port (optional)
PS/2	➢ 1 x PS/2 Combo connector for keyboard & mouse (rear I/O) **Note:** PS/2 Keyboard can work alone; if customer intends to insert PS/2 Keyboard and Mouse simultaneously, PS/2 extended cable attached in packing must be used.
LED	➢ 1 x Power LED, 1 x HDD LED
Environment	
Operating Temp.	➢ **HDD:** 0°C ~40°C (32°F~104°F)
Storage Temp.	➢ -20°C ~60°C (-4°F~140°F)
Humidity	➢ 20%~ 90%

2.4 Safety Precautions

Before operating this system, read the following information carefully to protect your system from damages, and extend the life cycle of the system.
1. Check the Line Voltage
    - The operating voltage for the power supply should be within the range of 100V to 240V AC; otherwise, the system may be damaged.

2. Environmental Conditions
    - Place your SA-N718 on a sturdy, level surface. Be sure to allow enough space around the system to have easy access needs.
    - Avoid installing your SA-N718 system in extremely hot or cold places.
    - Avoid direct sunlight exposure for a long period of time (for example, in a closed car in summer time. Also avoid the system from any heating device.). Or do not use SA-N718 when it has been left outdoors in a cold winter day.
    - Avoid moving the system rapidly from a hot place to a cold place, and vice versa, because condensation may occur inside the system.
    - Protect your SA-N718 from strong vibrations which may cause hard disk failure.
    - Do not place the system too close to any radio-active device. Radio-active device may cause signal interference.
    - Always shut down the operating system before you turn off the power.
3. Handling
    - Avoid placing heavy objects on the top of the system.
    - Do not turn the system upside down. This may cause the hard drive to malfunction.
    - Do not allow any objects to fall into this device.
    - If water or other liquid spills into the device, unplug the power cord immediately.
4. Good Care
    - When the outside case gets stained, remove the stains using neutral washing agent with a dry cloth.
    - Never use strong agents such as benzene and thinner to clean the surface of the case.
    - If heavy stains are present, moisten a cloth with diluted neutral washing agent or alcohol and then wipe thoroughly with a dry cloth.
    - If dust is accumulated on the case surface, remove it by using a special vacuum cleaner for computers.

3 System Configuration

This chapter contains helpful information about the external I/O Ports diagram, and jumper & connector settings, and component locations for the main board.

The following topics are included:
- External I/O Ports Diagram
- Main Board Jumper Settings and Component Locations
- How to Set Jumpers
- Setting Main Board Connectors and Jumpers

3.1 External I/O Ports Diagram
3.1.1 Rear I/O Ports Diagram

PS/2 Combo
Connector for
KB and MS

COM5

COM6

LAN2 LAN1

Line In

Line Out

COM4

COM3

COM3

COM5

COM4

COM6

COM2

DVI-D

COM1

DVI-D

COM2

2 x DVI-D

COM1

USB 2.0 USB 3.0

Mic In
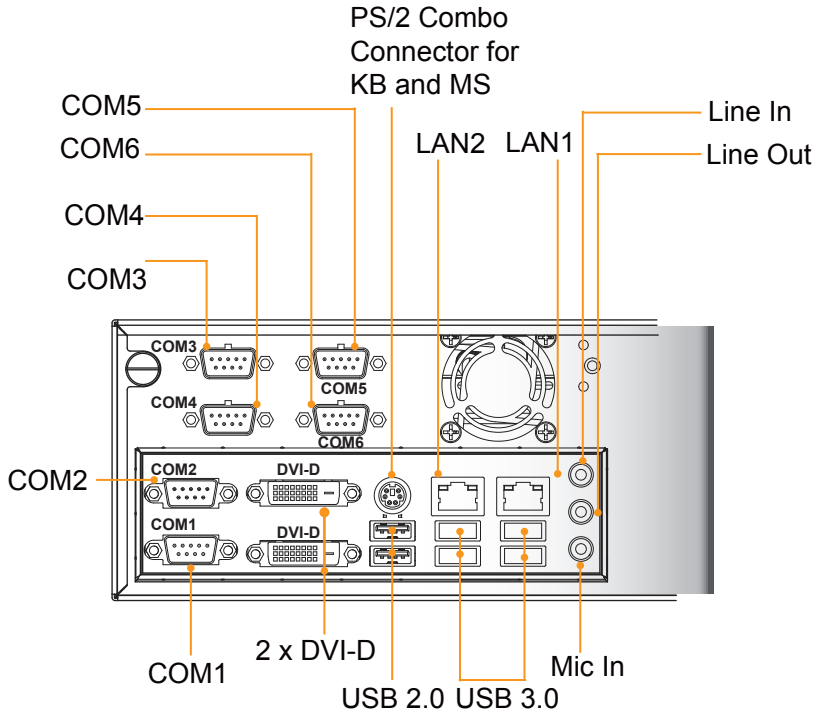
3.2 JUMPER & CONNECTOR QUICK REFERENCE TABLE

JUMPER Description	NAME
Clear CMOS Data Selection	JCMOS1
Hardware Power Failure Selection	JP_AT1
COM Port RI/Voltage Selection	JPCOM1, JPCOM2,JPCOM4
Flash Descriptor Override Selection	JP1
PCH Configuration / Recovery Selection	JP4
LPC Connector IRQ / GND Selection	JP7

CONNECTOR Description	NAME
COM Port Connectors	COM1, COM2, COM3, COM4, COM5, COM6
Dual DVI-D Ports	DVI1
LAN & USB Ports	LAN1_USB1, LAN2_USB2
Internal USB 3.0 Connector	USB1
DisplayPort Connector	DP1
Printer Port Connector	LPT1
PS/2 Combo & Dual USB 2.0 Port	KB_MS_USB1
Audio Port Connector	AUDIO1, JAUDIO1
FAN Connector	CPU_FAN1, SYS_FAN1, SYS_FAN2
Front Panel Connector	JFP1
Case Open Connector	JP5
LPC Connector	JLPC1
M.2 Slot	M2_SSD1
PCIe Slot	PCI_E1
Power Input Connector	ATX_PWR1, ATX_PWR2
SATA Connector	SATA1, SATA2,

3.3 COMPONENT LOCATIONS

3.3.1 Top View and Jumper Settings of BM-D025 Main Board
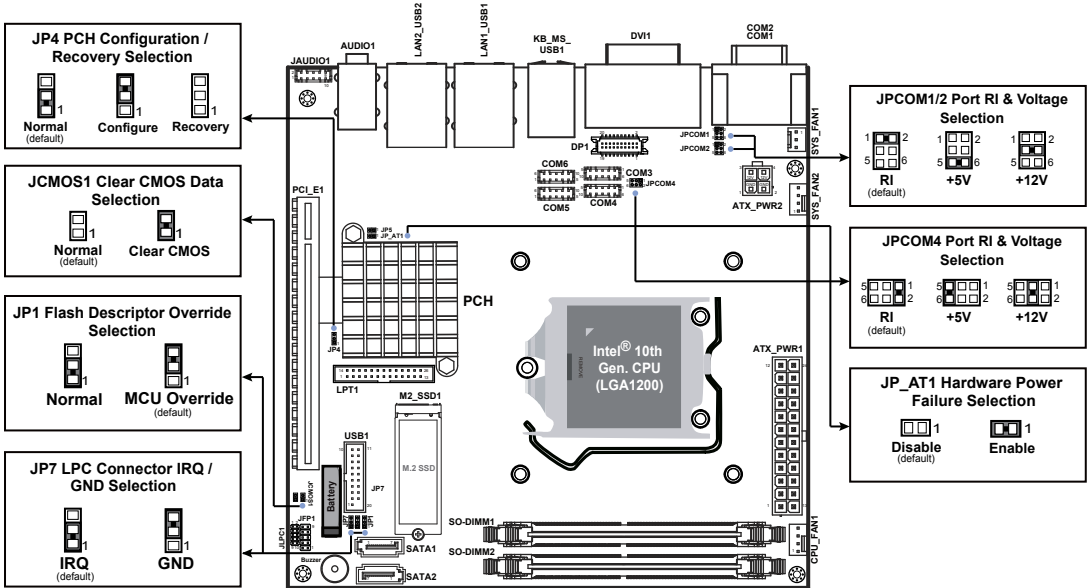
Figure 3-1. BM-D025 Main Board Component Location (Top View)

⚡	**WARNING:** Always disconnect the power cord when you are working with connectors and jumpers on the main board. Make sure both the system and peripheral devices are turned OFF as sudden surge of power could damage sensitive components. Make sure the main board is properly grounded.
⚠	**CAUTION:** Observe precautions while handling electrostatic sensitive components. Make sure to ground yourself to prevent static charge while you are working on the connectors and jumpers. Use a grounding wrist strap and place all electronic components in any static-shielded devices.
⚠	**CAUTION:** Always touch the motherboard components by the edges. Never touch components such as a processor by its pins. Take special cares while you are holding electronic circuit boards by the edges only. Do not touch the main board components.

3.3.2 Bottom View of BM-D025 Main Board
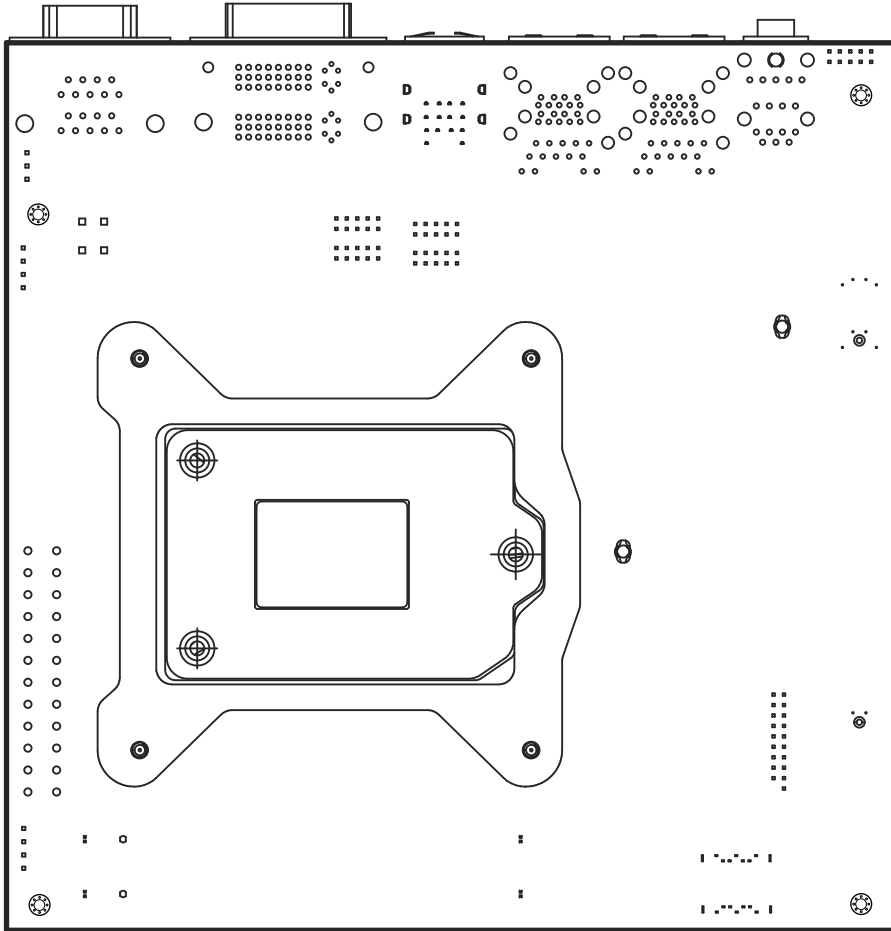
Figure 3-2. BM-2505 Main Board Component Location (Bottom View)

3.4 Setting Jumpers

You can configure your board by setting the jumpers. A jumper consists of two or three metal pins with a plastic base mounted on the card. By using a small plastic "cap", also known as the jumper cap (with a metal contact inside), you are able to connect the pins. So you can configure your hardware settings by "opening" or "closing" jumpers.

Jumpers can be combined into sets that are called jumper blocks. When jumpers are all in the block, you have to put them together to set up the hardware configuration. The figure below shows what this looks like.

Jumpers & Caps

2 Pin Jumper   **3 Pin Jumper**   **Jumper Block**   **Jumper Cap**
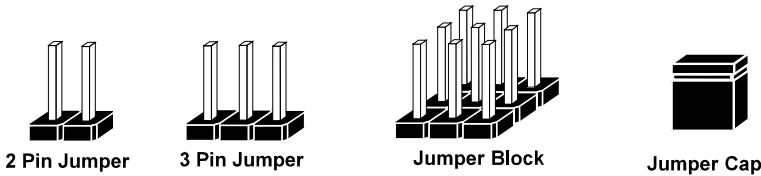
If a jumper has three pins, for example, labeled 1, 2 and 3. You can connect pins 1 and 2 to create one setting and shorting. You can also select to connect pins 2 and 3 to create another setting. The format of the jumper picture will be illustrated throughout this manual. The figure below shows different types of jumpers and jumper settings.

Jumper diagrams

Jumper Cap looks like this
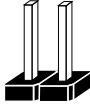
2 pin Jumper looks like this
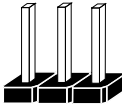
3 pin Jumper looks like this
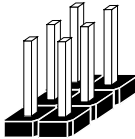
Jumper Block looks like this
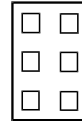
Jumper settings

2 pin Jumper closed(enabled)
looks like this

1
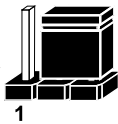
3 pin Jumper
2-3 pin closed(enabled)
looks like this

1
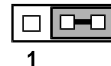
Jumper Block
1-2 pin closed(enabled)
looks like this

1   2
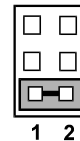
3.5 Setting Main Board Connectors and Jumpers
3.5.1 COM1 and COM2 PORT (COM1, COM2)
Port Location: COM1, COM2
Description: COM1 and COM2 Connectors (Default: RS-232)

COM1: COM1 is selectable as RS-232/422/485 mode under BIOS.

PIN	Signal		
	RS-232	**RS-422**	**RS-485**
1	DCD#	TX-	RS-485-
2	RX	TX+	RS-485+
3	TX	RX+	NC
4	DTR#	RX-	NC
5	GND	GND	GND
6	DSR#	NC	NC
7	RTS#	NC	NC
8	CTS#	NC	NC
9	RI#	NC	NC
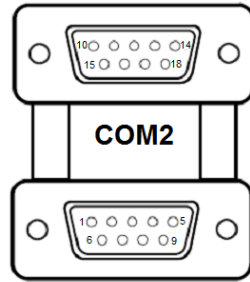
COM2

COM1

COM1/ COM2

COM2: COM2 Connector
The pin assignments are as follows:

PIN	Signal
	RS-232
10	DCD#
11	RX
12	TX
13	DTR#
14	GND
15	DSR#
16	RTS#
17	CTS#
18	RI#

Notes:
1. COM1 is selectable as RS-232, RS-422, RS-485 under BIOS setting.
2. Default setting is RS-232. Please see **Chapter 5 "Advanced – Super IO Configuration"** for details.

3.5.2 COM3, COM4, COM5, COM6 CONNECTOR (COM3 ~ COM6)

Connector Location: COM3, COM4, COM5, COM6
Description: COM Connector, fixed as RS-232

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DCD#	6	DSR#
2	RX	7	RTS#
3	TX	8	CTS#
4	DTR#	9	RI#
5	GND	-	-
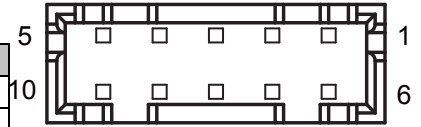
COM3/ COM4
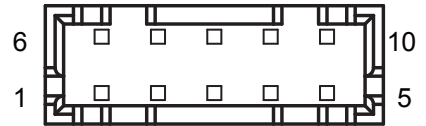
COM5/ COM6
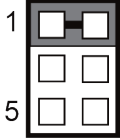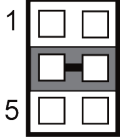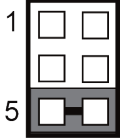
Note:
1. COM1, COM2, COM4: COM1 Pin 9, COM2 Pin 18, COM4 pin 9 are selectable for RI, +5V or +12V by jumper setting. Default setting is RI. Please see "**COM1, COM2 and COM4 PIN9 Definition Selection Guide"** for details.

3.5.3 COM1, COM2 and COM4 PIN9 DEFINITION SELECTION GUIDE (JPCOM1, JPCOM2, JPCOM4)
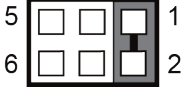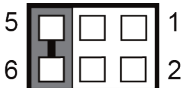
Jumper Location: JPCOM1, JPCOM2
Description: COM1 and COM2 RI & Voltage Selection

Selection	Jumper Setting (Pin Closed)	Jumper Illustration
RI	**1-2** *(Default Setting)*	1 ▢ ▢ 2 / 5 ▢ ▢ 6 **JPCOM1/JPCOM2**
+12V	3-4	1 ▢ ▢ 2 / 5 ▢ ▢ 6 **JPCOM1/JPCOM2**
+5V	5-6	1 ▢ ▢ 2 / 5 ▢ ▢ 6 **JPCOM1/JPCOM2**

Jumper Location: JPCOM4
Description: COM4 RI & Voltage Selection

Selection	Jumper Setting (Pin Closed)	Jumper Illustration
RI	**1-2** *(Default Setting)*	5 ☐ ☐ ▇ 1 6 ☐ ☐ ☐ 2 **JPCOM4**
+12V	3-4	5 ☐ ▇ ☐ 1 6 ☐ ☐ ☐ 2 **JPCOM4**
+5V	5-6	5 ▇ ☐ ☐ 1 6 ☐ ☐ ☐ 2 **JPCOM4**

3.5.4   PS/2 COMBO & DUAL USB 2.0 PORT (KB_MS_USB1)
Port Location: KB_MS_USB1
Description: PS/2 Combo Port & Dual USB 2.0 Ports

Supports both keyboard and mouse function on PS/2 by Y-cable.

PS/2:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
9	GND	12	+5V
10	KB_DATA	13	KB_CLK
11	MS_DATA	14	MS_CLK

Dual USB 2.0:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	5	GND
2	USB D+	6	USB D+
3	USB D-	7	USB D-
4	+5V	8	+5V
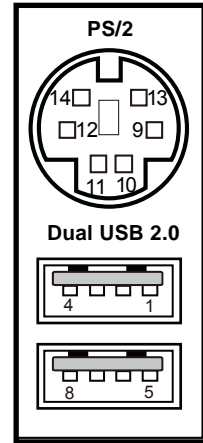
KB_MS_USB1

3.5.5 DISPLAYPORT (DP1)
Port Location: DP1
Description: DisplayPort
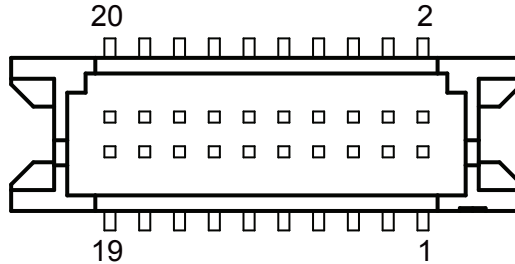
DP1

DP1 signals:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	LANE 0_P	2	GND
3	LANE 0_N	4	LANE 1_P
5	GND	6	LANE 1_N
7	LANE 2_P	8	GND
9	LANE 2_N	10	LANE 3_P
11	GND	12	LANE 3_N
13	AUX_EN	14	GND
15	AUX CH_P	16	HPD
17	AUX CH_N	18	+3.3V
19	+5V	20	+3.3V

3.5.6 DUAL DVI-D PORTS (DVI1)

Port Location: DVI1 (rear I/O)
Description: 2 x DVI (Digital Visual Interface) Integrated Connectors
(Supports only DVI-D signals)
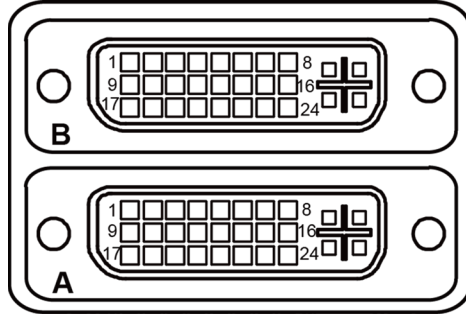
DVI1

DVI1 connector signals (A):

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	TMDS_D2-	A13	NC
A2	TMDS_D2+	A14	+5V
A3	GND	A15	GND
A4	NC	A16	TMDS_HPD
A5	NC	A17	TMDS_D0-
A6	TMDS_CLK	A18	TMDS_D0+
A7	TMDS_DATA	A19	GND
A8	NC	A20	NC
A9	TMDS_D1-	A21	NC
A10	TMDS_D1+	A22	GND
A11	GND	A23	TMDS_D3+
A12	NC	A24	TMDS_D3-
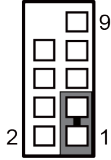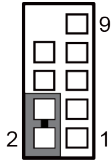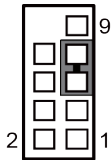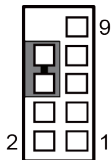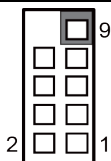
DVI1 connector signals (B):

PIN	ASSIGNMENT	PIN	ASSIGNMENT
B1	TMDS_D2-	B13	NC
B2	TMDS_D2+	B14	+5V
B3	GND	B15	GND
B4	NC	B16	TMDS_HPD
B5	NC	B17	TMDS_D0-
B6	TMDS_CLK	B18	TMDS_D0+
B7	TMDS_DATA	B19	GND
B8	NC	B20	NC
B9	TMDS_D1-	B21	NC
B10	TMDS_D1+	B22	GND
B11	GND	B23	TMDS_D3+
B12	NC	B24	TMDS_D3-

3.5.7 FRONT PANEL CONNECTOR (JFP1)
Connector Location: JFP1
Description: Front Panel Connector

SELECTION	PIN & ASSIGNMENT	JUMPER SETTINGS	JUMPER ILLUSTRATION
HDD LED	1. HDD_LED+	1-3	JFP1
	3. HDD_LED-		
Power LED	2. PWR_LED+	2-4	JFP1
	4. PWR_LED-		
Reset Button	5. GND	5-7	JFP1
	7. RST_BTN		
Power Button	6. PWR_BTN	6-8	JFP1
	8. GND		
+5V	9. VCC5	9	JFP1

3.5.8 LAN & USB PORT (LAN1_USB1, LAN2_USB2)

Dual LAN ports are provided to support 10/100/1000Mbps, RJ45, rear I/O, and supports Wake-On-LAN & PXE.

Port Location: LAN1_USB1
Description: LAN & Two USB 3.0 Ports
LAN1: Intel® PHY 219-LM (10/100/1000 Mbps)

Green/Orange   Yellow

LAN1 pin assignment:

PIN	ASSIGNMENT
1	MDI_P0
2	MDI_N0
3	MDI_P1
4	MDI_N1
5	MDI_P2
6	MDI_N2
7	MDI_P3
8	MDI_N3
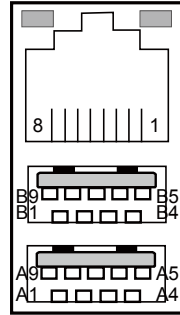
LAN1_USB1

LAN1 LED Indicator:

Left Side LED

Green Color On7	10/100 LAN Speed Indicator
Orange Color On8	Giga LAN Speed Indicator
Off	No LAN Switch/HUB connected

Right Side LED

Yellow Color Blinking	LAN Message Active
Off	No LAN Message Active

USB 3.0 signals:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	+5V	A9	USB_TX_P
A2	USB D-	A8	USB_TX_N
A3	USB D+	A7	GND
A4	GND	A6	USB_RX_P
-	-	A5	USB_RX_N

PIN	ASSIGNMENT	PIN	ASSIGNMENT
B1	+5V	B9	USB_TX_P
B2	USB D-	B8	USB_TX_N
B3	USB D+	B7	GND
B4	GND	B6	USB_RX_P
-	-	B5	USB_RX_N

Port Location: LAN2_USB2
Description: LAN & Two USB 3.0 Ports
LAN2: Intel® PHY 211AT (10/100/1000 Mbps)

Green/Orange   Yellow

LAN2 Pin Assignment:

PIN	ASSIGNMENT
1	MDI_P0
2	MDI_N0
3	MDI_P1
4	MDI_N1
5	MDI_P2
6	MDI_N2
7	MDI_P3
8	MDI_N3
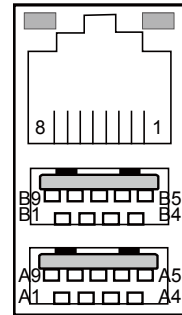
LAN2_USB2

LAN2 LED Indicator:
Left Side LED

Green Color On7	10/100 LAN Speed Indicator
Orange Color On8	Giga LAN Speed Indicator
Off	No LAN Switch/HUB connected

Right Side LED

Yellow Color Blinking	LAN Message Active
Off	No LAN Message Active

USB 3.0 signals:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	+5V	A9	USB_TX_P
A2	USB D-	A8	USB_TX_N
A3	USB D+	A7	GND
A4	GND	A6	USB_RX_P
-	-	A5	USB_RX_N

PIN	ASSIGNMENT	PIN	ASSIGNMENT
B1	+5V	B9	USB_TX_P
B2	USB D-	B8	USB_TX_N
B3	USB D+	B7	GND
B4	GND	B6	USB_RX_P
-	-	B5	USB_RX_N

3.5.9   LINE IN, LINE OUT, MIC IN PORT (AUDIO1)
Port Location: AUDIO1
Description: Line In, Line Out & Microphone

Line In:

PIN	ASSIGNMENT
32	HD_LINE-IN-L
33	GND
34	GND
35	HD_LINE-IN-R

Line Out:

PIN	ASSIGNMENT
22	HD_LINE-OUT-L
23	GND
24	GND
25	HD_LINE-OUT-R

Mic In:

PIN	ASSIGNMENT
2	HD_MIC-L
3	GND
1	GND
4	GND
5	HD_MIC-R
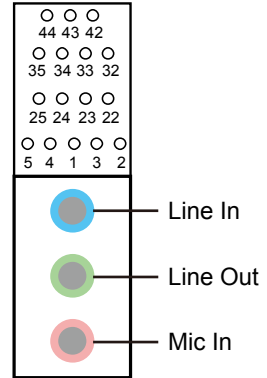
AUDIO1

3.5.10 PRINTER PORT CONNECTOR (LPT1)
Connector Location: LPT1
Description: Printer Port Connector
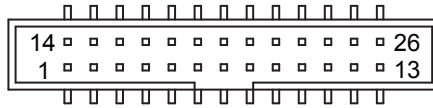
LPT1

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	PRN_STRB#	14	PRN_AFD
2	PRN_D0	15	PRN_ERR#
3	PRN_D1	16	PRN_INIT
4	PRN_D2	17	PRN_SLIN
5	PRN_D3	18	GND
6	PRN_D4	19	GND
7	PRN_D5	20	GND
8	PRN_D6	21	GND
9	PRN_D7	22	GND
10	PRN_ACK#	23	GND
11	PRN_BUSY	24	GND
12	PRN_PE	25	GND
13	PRN_SLCT	26	GND

3.5.11 FRONT PANEL AUDIO CONNECTOR (JAUDIO1)
Connector Location: JAUDIO1
Description: Front Panel Audio Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	MIC1-L	2	GND
3	LINE-IN-L	4	GND
5	LINE-OUT-L	6	MIC1-R
7	GND	8	LINE-IN-R
9	GND	10	LINE-OUT-R
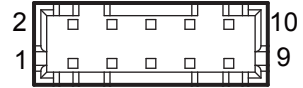
Note: JAUDIO1 is only supported in BM-D025-Z0N.

JAUDIO1

3.5.12 CASE OPEN CONNECTOR (JP5)
Connector Location: JP5
Description: Case Open Connector

PIN	ASSIGNMENT
1	COPEN#
2	GND
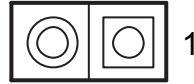
JP5

3.5.13 M.2 SLOT (M2_SSD1)
Connector Location: M2_SSD1
Description: M.2 M-key slot supports PCIeX4/X2 and 2242/2260/2280 size.

M2_SSD1

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	2	+3.3V
3	GND	4	+3.3V
5	PE_RX_N3	6	NC
7	PE_RX_P3	8	NC
9	GND	10	NC
11	PE_TX_N3	12	+3.3V
13	PE_TX_P3	14	+3.3V
15	GND	16	+3.3V
17	PE_RX_N2	18	+3.3V
19	PE_RX_P2	20	NC
21	GND	22	NC
23	PE_TX_N2	24	NC
25	PE_TX_P2	26	NC
27	GND	28	NC
29	PE_RX_N1	30	NC
31	PE_RX_P1	32	NC
33	GND	34	NC
35	PE_TX_N1	36	NC
37	PE_TX_P1	38	NC
39	GND	40	NC
41	PE_RX_N0 / SATA	42	NC
43	PE_RX_P0 / SATA	44	NC
45	GND	46	NC
47	PE_TX_N0 / SATA	48	NC
49	PE_TX_P0 / SATA	50	PERST#

PIN	ASSIGNMENT	PIN	ASSIGNMENT
51	GND	52	CLKREQ#
53	REFCLK_N	54	PEWAKE#
55	REFCLK_P	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	NC	68	NC
69	PE-NC / SATA-GND	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND	-	-

3.5.14 PCIE BUS (PCI_E1 (x16))
Connector Location: PCI_E1
Description: 164-pin PCIE Bus (x16)
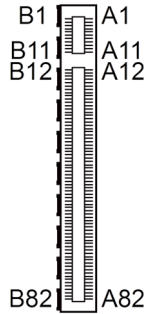
PCI_E1

PIN	ASSIGNMENT	PIN	ASSIGNMENT
B1	+12V	A1	PRSNT#1
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	GND
B5	SMB_CLK	A5	NC
B6	SMB_DATA	A6	NC
B7	GND	A7	NC
B8	+3.3V	A8	NC
B9	NC	A9	+3.3V
B10	+3.3V_AUX	A10	+3.3V
B11	WAKE#	A11	PERST#
B12	RSVD	A12	GND
B13	GND	A13	REFCLK+
B14	HSOP0	A14	REFCLK-
B15	HSON0	A15	GND
B16	GND	A16	HSIP0
B17	PRSNT#2	A17	HSIN0
B18	GND	A18	GND
B19	HSOP1	A19	RSVD
B20	HSON1	A20	GND
B21	GND	A21	HSIP1
B22	GND	A22	HSIN1
B23	HSOP2	A23	GND
B24	HSON2	A24	GND

PIN	ASSIGNMENT	PIN	ASSIGNMENT
B25	GND	A25	HSIP2
B26	GND	A26	HSIN2
B27	HSOP3	A27	GND
B28	HSON3	A28	GND
B29	GND	A29	HSIP3
B30	RSVD	A30	HSIN3
B31	PRSNT#2	A31	GND
B32	GND	A32	RSVD
B33	HSOP4	A33	RSVD
B34	HSON4	A34	GND
B35	GND	A35	HSIP4
B36	GND	A36	HSIN4
B37	HSOP5	A37	GND
B38	HSON5	A38	GND
B39	GND	A39	HSIP5
B40	GND	A40	HSIN5
B41	HSOP6	A41	GND
B42	HSON6	A42	GND
B43	GND	A43	HSIP6
B44	GND	A44	HSIN6
B45	HSOP7	A45	GND
B46	HSON7	A46	GND
B47	GND	A47	HSIP7
B48	PRSNT#2	A48	HSIN7
B49	GND	A49	GND
B50	HSOP8	A50	RSVD
B51	HSON8	A51	GND
B52	GND	A52	HSIP8
B53	GND	A53	HSIN8
B54	HSOP9	A54	GND
B55	HSON9	A55	GND
B56	GND	A56	HSIP9
B57	GND	A57	HSIN9
B58	HSOP10	A58	GND
B59	HSON10	A59	GND
B60	GND	A60	HSIP10
B61	GND	A61	HSIN10
B62	HSOP11	A62	GND
B63	HSON11	A63	GND
B64	GND	A64	HSIP11

PIN	ASSIGNMENT	PIN	ASSIGNMENT
B65	GND	A65	HSIN11
B66	HSOP12	A66	GND
B67	HSON12	A67	GND
B68	GND	A68	HSIP12
B69	GND	A69	HSIN12
B70	HSOP13	A70	GND
B71	HSON13	A71	GND
B72	GND	A72	HSIP13
B73	GND	A73	HSIN13
B74	HSOP14	A74	GND
B75	HSIN14	A75	GND
B76	GND	A76	HSIP14
B77	GND	A77	HSIN14
B78	HSIP15	A78	GND
B79	HSIN15	A79	GND
B80	GND	A80	HSIP15
B81	PRSNT#2	A81	HSIN15
B82	RSVD	A82	GND

3.5.15 CPU / SYSTEM FAN CONNECTOR (CPU_FAN1, SYS_FAN1, SYS_FAN2)

Connector Location: CPU_FAN1
Description: CPU Fan Connector (CPU_FAN1)

PIN	ASSIGNMENT
1	GND
2	+12V
3	CPU_FANTAC
4	CPU_FANCTRL
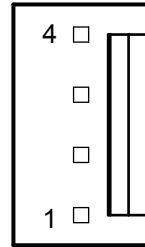
CPU_FAN1

Connector Location: SYS_FAN1
Description: System Fan Connector (SYS_FAN1)

PIN	ASSIGNMENT
1	GND
2	+12V
3	NC
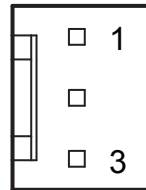
SYS_FAN1

Connector Location: SYS_FAN2
Description: System Fan Connector 2 (SYS_FAN2)

PIN	ASSIGNMENT
1	GND
2	+12V
3	SYS_FANTAC
4	SYS_FANCTRL
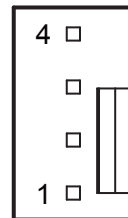
SYS_FAN2

3.5.16 SERIAL ATA (SATA) CONNECTOR (SATA1, SATA2)
Connector Location: SATA1, SATA2
Description: SATA Connectors

Pin Assignments for SATA1, SATA2:

PIN	ASSIGNMENT
1	GND
2	SATA_TX_P
3	SATA_TX_N
4	GND
5	SATA_RX_N
6	SATA_RX_P
7	GND

SATA1
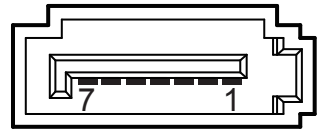
SATA2

3.5.17 INTERNAL USB 3.0 CONNECTOR (USB1)
Connector Location: USB1
Description: Internal USB 3.0 Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	+5V	11	USB_D+
2	USB_RX_N	12	USB_D-
3	USB_RX_P	13	GND
4	GND	14	USB_TX_P
5	USB_TX_N	15	USB_TX_N
6	USB_TX_P	16	GND
7	GND	17	USB_RX_P
8	USB D-	18	USB_RX_N
9	USB D+	19	+5V
10	GND	-	-
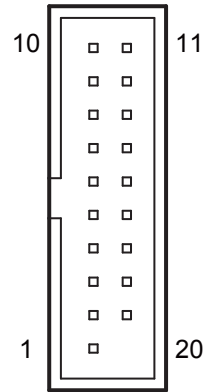
USB1

3.5.18 POWER INPUT CONNECTOR (ATX_PWR1, ATX_PWR2)
Connector Location: ATX_PWR1
Description: ATX Power Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PSON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	POK	20	-5V
9	+5V_SB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND
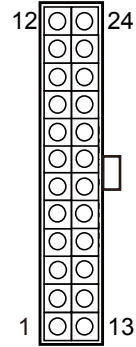
ATX_PWR1

Connector Location: ATX_PWR2
Description: Power Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
3	+12V	4	+12V
1	GND	2	GND
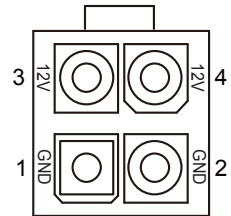
ATX_PWR2

3.5.19   LOW PIN COUNT (LPC) CONNECTOR (JLPC1)
Connector Location: JLPC1
Description: LPC Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	CLK	2	GND
3	FRAME	4	SERIRQ / GND
5	RESET	6	LAD0
7	LAD3	8	LAD2
9	+3.3V	10	LAD1
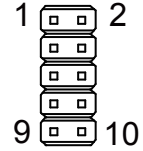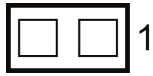
JLPC1

3.5.20 HARDWARE POWER FAILURE SELECTION (JP_AT1)
Jumper Location: JP_AT1
Description: Hardware Power Failure Selection
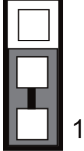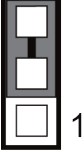
Selection	Jumper Setting (Pin Closed)	Jumper Illustration
Enable	1-2	**JP_AT1**
Disable	**Open** *(Default Setting)*	**JP_AT1**

3.5.21 FLASH DESCRIPTOR OVERRIDE SELECTION (JP1)
Jumper Location: JP1
Description: Flash Descriptor Override Selection
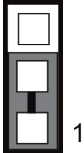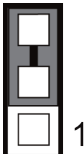
Selection	Jumper Setting (Pin Closed)	Jumper Illustration
Normal	1-2	
MCU Override	**2-3** *(Default Setting)*	

3.5.22 PCH CONFIGURATION / RECOVERY SELECTION (JP4)
Jumper Location: JP4
Description: PCH Configuration / Recovery Selection
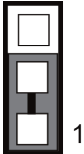
Selection	Jumper Setting (Pin Closed)	Jumper Illustration
Normal	**1-2** *(Default Setting)*	JP4
Configure	2-3	JP4
Recovery	Open	JP4

3.5.23 LPC CONNECTOR IRQ / GND SELECTION (JP7)
Jumper Location: JP7
Description: LPC Connector IRQ / GND Selection

Selection	Jumper Setting (Pin Closed)	Jumper Illustration
IRQ	**1-2** *(Default Setting)*	JP7
GND	2-3	JP7

3.5.24 CLEAR CMOS DATA SELECTION (JCMOS1)
Jumper Location: JCMOS1
Description: Clear CMOS Data Selection

Step 1. Remove the main power of the PC.
Step 2. Close JCMOS1 (pins 1-2) for 6 seconds by a cap.
Step 3. Remove the cap which is just used on JCMOS1 (1-2), so that JCMOS1 returns to "OPEN".
Step 4. Power on the PC and the PC will then auto-reboot for once in order to set SoC's register.
Step 5. Done!

Selection	Jumper Setting (Pin Closed)	Jumper Illustration
Normal	**Open** *(Default Setting)*	1 JCMOS1
Clear CMOS	1-2	1 JCMOS1

4   **Software Utilities**

This chapter provides the detailed information that guides users to install driver utilities for the system. The following topics are included:

- Installing Intel® Chipset Software Installation Utility
- Installing Intel® Management Engine Components Installer
- Installing Graphics Driver Utility
- Installing LAN Driver Utility
- Installing Sound Driver Utility
- Installing Intel® Rapid Storage Utility

4.1   Introduction

Enclosed with the SA-N718 Series package is our driver utilities contained in a DVD-ROM disk. Refer to the following table for driver locations:

Filename (Assume that DVD- ROM drive is D :)	Purpose
D: \Driver\Platform\1_Main Chip\Win10(64Bit)	Intel® Chipset Device Software installer
D: \Driver\Platform\2_Graphics\ Win10(64Bit)	Intel® HD Graphics installer
D:\ Driver\Platform\ 3_Sound\ Win10(64Bit)	Realtek® ALC888S HD Audio Driver installer
D:\ Driver\Platform\4_ME\ Win10(64Bit)	Intel® Management Engine Components installer
D: \Driver\Platform\5_LAN Chip\ Win10(64Bit)	Intel® Network Connections Software
D: \Driver\Platform\6_Serial IO\ Win10(64Bit)	Intel® Serial IO Driver installer
D: \Driver\Platform\7_RAID\ Win10(64Bit)	Intel® RST Tool

Note: Install the driver utilities immediately after the OS installation is completed.

4.2 Installing Intel® Chipset Software Installation Utility

4.2.1 Introduction

The Intel® Chipset Software Installation Utility installs the Windows *.INF files to the target system. These files outline to the operating system how to configure the Intel chipset components in order to ensure that the following functions work properly:

- Core PCI and ISAPNP Services
- PCIe Support
- SATA Storage Support
- USB Support
- Identification of Intel® Chipset Components in the Device Manager

4.2.2 Intel® Chipset Software Installation Utility

The utility pack is to be installed only for Windows® 10 series, and it should be installed immediately after the OS installation is finished. Please follow the steps below:

1 Connect the USB DVD-ROM device to SA-N718 and insert the driver disk.

2 Enter the **Main Chip** folder where the Chipset driver is located.

3 Select Windows 10 (64Bit) for your OS platform.

4 Click **SetupChipset.exe** driver installation file for driver installation.

5 Follow the on-screen instructions to install the driver.

6 Once the installation is completed, shut down the system and restart SA-N718 for the changes to take effect.

4.3 Intel® Management Engine Components Installer Installation

1 Connect the USB DVD-ROM device to SA-N718 and insert the driver disk.

2 Enter the **ME** folder where the driver is located.

3 Select Windows 10 (64Bit) for your OS platform.

4 Click **SetupME.exe** file for ME driver installation.

5 Follow the on-screen instructions to complete the installation.

6 Once the installation is completed, shut down the system and restart SA-N718 for the changes to take effect.

4.4 Installing Graphics Driver Utility

The graphics interface embedded in SA-N718 can support a wide range of display types. You can have dual displays via DVI-D ports and make the system work simultaneously.

To install the Graphics driver utility, follow the steps below:

1 Connect the USB DVD-ROM device to SA-N718 and insert the driver disk.

2 Enter the **Graphics** folder where the driver is located.

3 Select Windows 10 (64Bbit) for your OS platform.

4 Click **igxpin.exe** file for driver installation.

5 Follow the on-screen instructions to complete the installation.

6 Once the installation is completed, shut down the system and restart SA-N718 for the changes to take effect.

4.5 Installing LAN Driver Utility

Enhanced with LAN function, SA-N718 supports various network adapters. To install the LAN Driver, follow the steps below:

1 Connect the USB DVD-ROM device to SA-N718 and insert the driver disk.

2 Enter the **LAN** folder where the driver is located.

3 Select Windows 10 (64-bit) for your OS platform.

4 Click **Autorun.exe** file for driver installation.

5 Follow the on-screen instructions to complete the installation.

6 Once the installation is completed, shut down the system and restart SA-N718 for the changes to take effect.

For more details on the installation procedure, refer to the README.txt file that you can find on LAN Driver Utility.

4.6 Installing Sound Driver Utility

The sound function enhanced in this system is fully compatible with Windows® 10 series.

To install the Sound Driver, follow the steps below:

1 Connect the USB DVD-ROM device to SA-N718 and insert the driver disk.

2 Open the **Sound** folder where the driver is located.

3 Select Windows 10 (64-bit) for your OS platform.

4 Click **Setup.exe** file for driver installation.

5 Follow the on-screen instructions to complete the installation.

6 Once the installation is completed, shut down the system and restart SA-N718 for the changes to take effect.

4.7 Installing Serial IO Driver Utility

To install the Serial I/O Driver, follow the steps below:

1 Connect the USB DVD-ROM device to SA-N718 and insert the driver disk.

2 Open the **Serial IO** folder where the driver is located.

3 Select Windows 10 (64Bit) for your OS platform.

4 Click **SetupSerialIO.exe** file for driver installation.

5 Follow the on-screen instructions to complete the installation.

6 Once the installation is completed, shut down the system and restart SA-N718 for the changes to take effect.

4.8 Installing Intel® Rapid Storage Utility

The Intel® Rapid Storage Technology option ROM provides the following functions:

- Pre-operating system user interface for RAID volume management
- Ability to create, delete and reset RAID volumes
- RAID recovery

Entering option ROM User Interface from BIOS Setup Utility

Follow the instructions below to enter the Intel® Rapid Storage Technology option ROM user interface:

1 Press **<Del>** to access the BIOS Setup Utility program when prompted during the Power-On Self-Test (POST).

2 Enter **Chipset > PCH-IO Configuration > SATA Configuration** menu screen and select "**Intel RST With Intel Optane System Acceleration**" option for **SATA Controller(s)** option item. See the pictures below:

```
                                Aptio Setup - AMI
        Chipset

  SATA Configuration                                    Determines how SATA
                                                        controller(s) operate.
  SATA Controller(s)              [Enabled]
  SATA Mode Selection             [Intel RST With Intel
                                  Optane System
                                  Acceleration]

  Serial ATA Port 1               ST1000NM0008-2
                                  (1000.2GB)
    Port 1                        [Enabled]
    Hot Plug                      [Disabled]
  Serial ATA Port 2               ST1000NM0008-2
                                  (1000.2GB)
    Port 2                        [Enabled]           →←: Select Screen
    Hot Plug                      [Disabled]          ↑↓: Select Item
  Serial ATA Port 3               Empty               Enter: Select
    Port 3                        [Enabled]           +/-: Change Opt.
    Hot Plug                      [Disabled]          F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit



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```

3   Press **F4** to save and validate the changed BIOS configuration
      and reset the system.

4 Press **<Del>** to enter the BIOS Setup Utility program again and the **Intel(R) Rapid Storage Technology** option item will display under the **Advanced** menu screen as below:

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

    ▶ CPU Configuration                      This formset allows the user
    ▶ PCH-FW Configuration                   to manage RAID volumes on the
    ▶ Trusted Computing                      Intel(R) RAID Controller
    ▶ ACPI Settings
    ▶ Super IO Configuration
    ▶ Hardware Monitor
    ▶ Super IO Watchdog
    ▶ Secondary Super IO Configuration
    ▶ S5 RTC Wake Settings
    ▶ USB Configuration
    ▶ Network Stack Configuration
    ▶ NVMe 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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```

5 Select the **Intel(R) Rapid Storage Technology** option item and press**<Enter>**, and the following screen will display. Select a RAID level that you want to enter and press **<Enter>**.
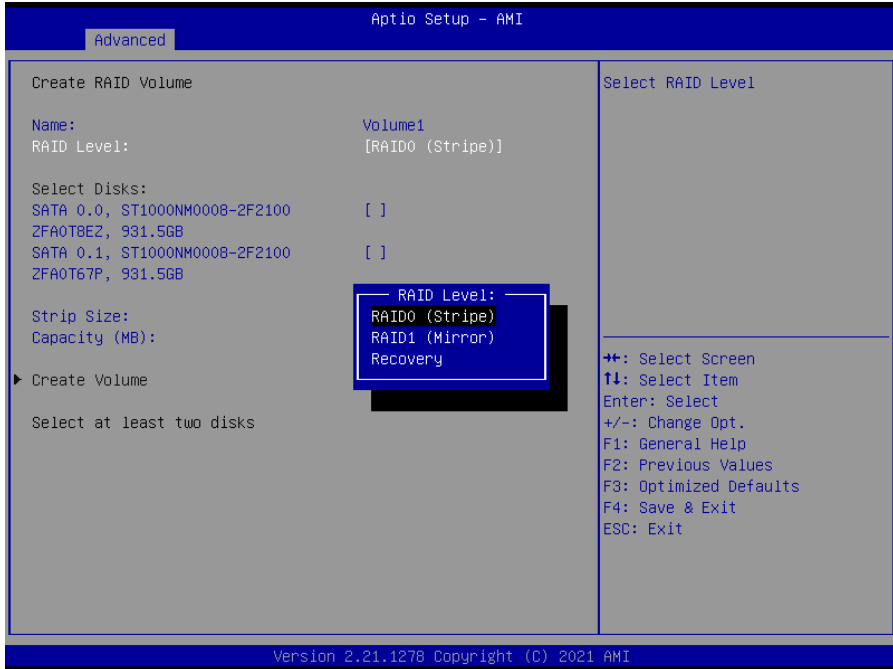
The hard drive(s) and hard drive information of the RAID level you selected in the previous step will display:

```
                                Aptio Setup - AMI
     Advanced

   Create RAID Volume                              X - to Select Disk

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

   Select Disks:
   SATA 0.0, ST1000NM0008-2F2100    [X]
   ZFA0T8EZ, 931.5GB
   SATA 0.1, ST1000NM0008-2F2100    [X]
   ZFA0T67P, 931.5GB

   Strip Size:                 [64KB]
   Capacity (MB):              1907734
                                                 ++: 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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```

Heed that in the user interface, the hard drive(s) and hard drive information listed for your system will differ from the example above.

6 Create a RAID volume from the picture below as necessary.

```
                          Aptio Setup - AMI
      Advanced

   Intel(R) RST 17.8.2.4684 RAID Driver            This page allows you to create
                                                   a RAID volume
 ▶ Create RAID Volume


   Non-RAID Physical Disks:
 ▶ SATA 0.0, ST1000NM0008-2F2100 ZFA0T8E2, 931.5GB
 ▶ SATA 0.1, ST1000NM0008-2F2100 ZFA0T67P, 931.5GB

                                                   →←: 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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```

Installing Intel® RST Utility (Only for W480E and Q470E, Optional)

The Intel® Rapid Storage Technology (Intel® RST) utility supports RAID 0, 1 in W480E/Q470E SKU.

To install the RAID utility, follow the steps below:

1   Connect the USB DVD-ROM device to SA-N718 and insert the driver disk.

2   Enter the **RAID** folder where the utility is located.

3   Click **SetupRST.exe** file for utility installation.

4   Follow the on-screen instructions to complete the installation.

5   Once the installation is completed, shut down the system and restart SA-N718 for the changes to take effect.

6   Execute Windows 10 LTSC 2019 update procedure.
      The Intel® RST Utility can be activated successfully only after the Windows Update procedure is finished.

Note: The Intel® RST Utility is not supported for H420E SKU.

5 BIOS SETUP

This chapter guides users how to configure the basic system configurations via the BIOS Setup Utilities. The information of the system configuration is saved in battery-backed BIOS NVRAM so that the Setup information is retained when the system is powered off. The BIOS Setup Utilities consist of the following menu items:

- Accessing Setup Utilities
- Main Menu
- Advanced Menu
- Chipset Menu
- Security Menu
- Boot Menu
- Save & Exit Menu

5.1   Introduction

The board BM-D025 uses an AMI (American Megatrends Incorporated) Aptio BIOS that is stored in the Serial Peripheral Interface Flash Memory (SPI Flash) and can be updated. The SPI Flash contains the built-in BIOS setup program, Power-On Self-Test (POST), PCI auto-configuration utility, LAN EEPROM information, and Plug and Play support.

Aptio is AMI's BIOS firmware based on the UEFI (Unified Extensible Firmware Interface) specifications and the Intel Platform Innovation Framework for EFI. The UEFI specification defines an interface between the operating system and platform firmware. The interface consists of data tables that contain platform-related information, boot service calls, and runtime service calls that are available to the operating system and its loader. These elements have combined to provide a standard environment for booting the operating system and running pre-boot applications.

The diagram below shows the Extensible Firmware Interface's location in the software stack.
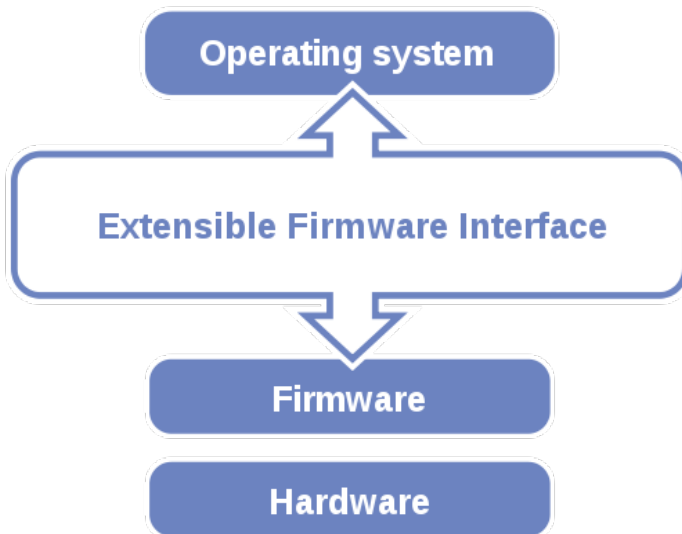
Figure 5-1. Extensible Firmware Interface Diagram

EFI BIOS provides an user interface that allows you to modify hardware configuration, e.g. change the system date and time, enable/disable a system component, determine bootable device priority, set up personal password, etc., which is convenient for engineers to perform modifications and customize the computer system and allows technicians to troubleshoot the occurred errors when the hardware is faulty.

The BIOS setup menu allows users to view and modify the BIOS settings for the computer. After the system is powered on, users can access the BIOS setup menu by pressing <Del> or <Esc> immediately while the POST message is running before the operating system is loading.

All the menu settings are described in details in this chapter.

5.2 Accessing Setup Utility

After the system is powered on, BIOS will enter the Power-On Self-Test (POST) routines and the POST message will be displayed:

Figure 5-2. POST Screen with AMI Logo

Press **<Del>** or **<Esc>** to access the Setup Utility program and the **Main** menu of the Aptio Setup Utility will appear on the screen as shown:

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

  BIOS Information                                    Set the Time. Use Tab to
  BIOS Vendor              American Megatrends        switch between Time elements.
  Core Version             5.17
  Compliancy               UEFI 2.7; PI 1.6
  Project Version          D0250PQ1 x64
  Build Date and Time      08/05/2021 16:01:21

  PCH Information
  Name                     CML PCH-H
  PCH SKU                  Q470
  Stepping                 A0

  System Date              [Thu 08/05/2021]
  System Time              [16:01:21]           ─────────────────────────
                                                →←: 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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```

BIOS Setup Menu Initialization Screen

You may move the cursor by <↑> and <↓> keys to highlight the individual menu items. As you highlight each item, a brief description of the highlighted selection will appear on the right side of the screen.

The language of the BIOS setup menu interface and help messages are shown in US English. You may use <↑> or <↓> key to select among the items and press <Enter> to confirm and enter the sub-menu. The following table provides the list of the navigation keys that you can use while operating the BIOS setup menu.

BIOS Setup Navigation Key	Description
<←> and <→>	Select a different menu screen (move the cursor from the selected menu to the left or right).
<↑> and <↓>	Select a different item (move the cursor from the selected item upwards or downwards)

BIOS Setup Navigation Key	Description
<Enter>	Execute the command or select the sub-menu.
<F2>	Load the previous configuration values.
<F3>	Load the default configuration values.
<F4>	Save the current values and exit the BIOS setup menu.
<Esc>	Close the sub-menu. Trigger the confirmation to exit BIOS setup menu.

5.3 Main

Menu Path   *Main*

The **Main** menu allows you to view the BIOS Information, change the system date and time, and view the user access privilege level. Use tab to switch between date elements. Use <↑> or <↓> arrow keys to highlight the item and enter the value you want in each item. This screen also displays the BIOS version (project) and BIOS Build Date and Time.

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

     BIOS Information                                        Set the Time. Use Tab to
     BIOS Vendor              American Megatrends            switch between Time elements.
     Core Version             5.17
     Compliancy               UEFI 2.7; PI 1.6
     Project Version          D0250PQ1 x64
     Build Date and Time      08/05/2021 16:01:21

     PCH Information
     Name                     CML PCH-H
     PCH SKU                  Q470
     Stepping                 A0

     System Date              [Thu 08/05/2021]
     System Time              [16:01:21]               →←: 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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```

Main Screen

BIOS Setting	Options	Description/Purpose
BIOS Vendor	No changeable options	Displays the BIOS vendor.
Core Version	No changeable options	Displays the current BIOS core version.
Compliancy	No changeable options	Displays the current UEFI version.
Project Version	No changeable options	Displays the version of the BIOS currently installed on the platform.
Build Date and Time	No changeable options	Displays the date of current BIOS version is built.
Name	No changeable options	Displays the name of the PCH.
PCH SKU	No changeable options	Displays the SKU for the PCH.
Stepping	No changeable options	Displays the stepping of the PCH
System Date	month, day, year	Sets the system date. The format is [Day

BIOS Setting	Options	Description/Purpose
		Month/ Date/ Year]. Users can directly enter values or use <+> or <-> arrow keys to increase/decrease it.
System Time	hour, minute, second	Sets the system time. The format is [Hour: Minute: Second]. Users can directly enter values or use <+> or <-> arrow keys to increase/decrease it.

5.4 Advanced

Menu Path   *Advanced*

This menu provides advanced the sub-menu items such as CPU Configuration, PCH-FW Configuration, Trusted Computing, ACPI Settings, Super IO Configuration, Hardware Monitor, Super IO Watchdog, Secondary Super IO Configuration, S5 RTC Wake Settings, USB Configuration, Network Stack Configuration and NVMe Configuration.

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

 ▶ CPU Configuration                         CPU Configuration Parameters
 ▶ PCH-FW Configuration
 ▶ Trusted Computing
 ▶ ACPI Settings
 ▶ Super IO Configuration
 ▶ Hardware Monitor
 ▶ Super IO Watchdog
 ▶ Secondary Super IO Configuration
 ▶ S5 RTC Wake Settings
 ▶ USB Configuration
 ▶ Network Stack Configuration
 ▶ NVMe 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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```

Advanced Menu Screen

BIOS Setting	Options	Description/Purpose
CPU Configuration	Sub-Menu	CPU Configuration Parameters.
PCH-FW Configuration	Sub-Menu	Management Engine Technology Parameters.
Trusted Computing	Sub-Menu	Trusted Computing Settings.
ACPI Settings	Sub-Menu	System ACPI Parameters.
Super IO Configuration	Sub-Menu	System Super I/O Chip Parameters.
Hardware Monitor	Sub-Menu	Monitors hardware status.
Super IO Watchdog	Sub-Menu	Super I/O Watchdog Parameters.
Secondary Super IO Configuration	Sub-Menu	Secondary System Super I/O Chip Parameters.
S5 RTC Wake Settings	Sub-Menu	S5 RTC Wake Parameters.

BIOS Setting	Options	Description/Purpose
USB Configuration	Sub-Menu	USB Configuration Parameters.
Network Stack Configuration	Sub-Menu	Network Stack Settings.
NVMe Configuration	Sub-Menu	NVMe Device Options Settings.

5.4.1 Advanced – CPU Configuration

Menu Path   *Advanced > CPU Configuration*

The **CPU Configuration** provides advanced CPU settings and some information about CPU.

```
                            Aptio Setup – AMI
      Advanced

   CPU Configuration                                    When enabled, a VMM can
                                                        utilize the additional
   Type                       Intel(R) Xeon(R)          hardware capabilities provided
                              W-1270E CPU @ 3.40GHz     by Vanderpool Technology.
   ID                         0xA0655
   Speed                      3400 MHz
   L1 Data Cache              32 KB x 8
   L1 Instruction Cache       32 KB x 8
   L2 Cache                   256 KB x 8
   L3 Cache                   16 MB
   VMX                        Supported
   SMX/TXT                    Supported

   Intel Virtualization Technology   [Enabled]
   Hyper-Threading                   [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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```

CPU Configuration Screen

BIOS Setting	Options	Description/Purpose
Type	No changeable options	Displays the CPU Type.
ID	No changeable options	Displays the CPU ID.
Speed	No changeable options	Displays the CPU Speed.
L1 Data Cache	No changeable options	L1 Data Cache Size.
L1 Instruction Cache	No changeable options	L1 Instruction Cache Size.
L2 Cache	No changeable options	L2 Cache Size.
L3 Cache	No changeable options	L3 Cache Size.

BIOS Setting	Options	Description/Purpose
VMX	No changeable options	CPU VMX hardware support for virtual machines.
SMX (Secure Mode Extensions) / TXT	No changeable options	Secure Mode extensions support.
Intel® Virtualization Technology	- Disabled - Enabled (default)	When enabled, VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Hyper-Threading	- Disabled - Enabled (default)	When Disabled, only one thread per enabled core is enabled.

5.4.2   Advanced – PCH-FW Configuration

Menu Path   *Advanced > PCH-FW Configuration*

The **PCH-FW** allows users to view the information about ME (Management Engine) firmware information, such as ME firmware version, firmware mode and firmware SKU.

```
                        Aptio Setup – AMI
     Advanced

  ME Firmware Version        14.0.47.1516
  ME Firmware Mode           Normal Mode
  ME Firmware SKU            Corporate SKU




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


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```
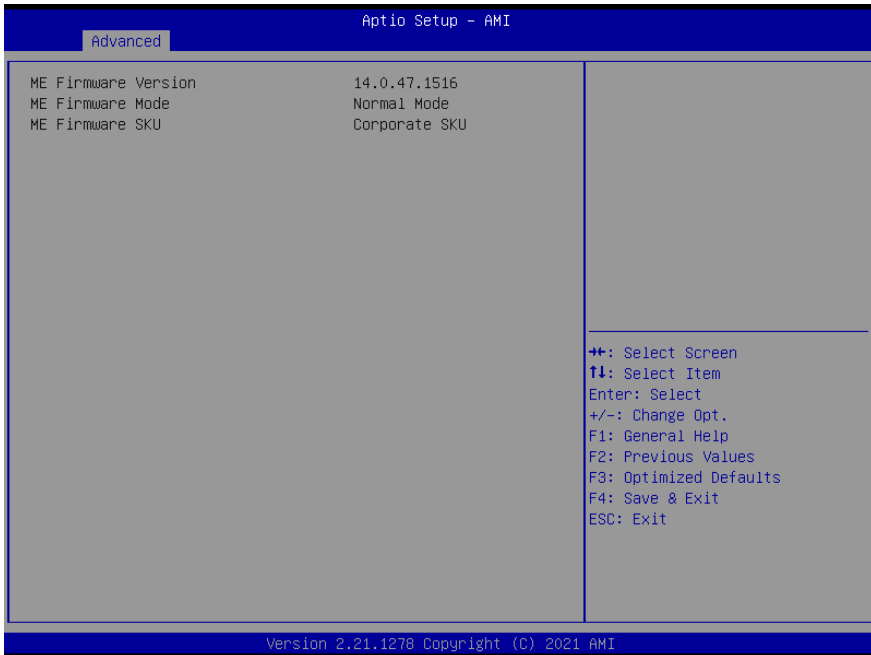
PCH-FW Configuration Screen

BIOS Setting	Options	Description/Purpose
ME Firmware Version	No changeable options	Displays the ME Firmware Version.
ME Firmware Mode	No changeable options	Displays the ME Firmware Mode.
ME Firmware SKU	No changeable options	Displays the ME Firmware SKU.

5.4.3　Advanced – Trusted Computing

Menu Path　　　　　　*Advanced > Trusted Computing*

```
                            Aptio Setup — AMI
   Advanced

    TPM 2.0 Device Found                          Selects TPM device: PTT or
 TPM Device Selection              [PTT]          dTPM. PTT — Enables PTT in
                                                  SkuMgr dTPM 1.2 — Disables PTT
    Firmware Version:              500.14         in SkuMgr Warning !  PTT/dTPM
    Vendor:                        INTC           will be disabled and all data
                                                  saved on it will be lost.
    Security Device Support        [Enable]


                                                  ↔: 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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```

Trusted Computing Screen

BIOS Setting	Options	Description/Purpose
TPM Device Selection	- dTPM - PTT (Default)	Selects TPM device: PTT or dTPM. PTT - Enables PTT in SkuMgr dTPM 1.2 - Disables PTT in SkuMgr Warning ! PTT/dTPM will be disabled and all data saved on it will be lost.
Firmware Version:	No changeable options	TPM firmware version.
Vendor:	No changeable options	TPM module vendor.
Security Device Support	- Enable (Default) - Disable	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

5.4.4 Advanced – ACPI Settings

Menu Path   *Advanced > ACPI Settings*

The **ACPI Settings** allows users to configure relevant ACPI (Advanced Configuration and Power Management Interface) settings, such as enable/disable ACPI Auto Configuration, Hibernation, ACPI Sleep State and S3 Video Repost.

```
                          Aptio Setup - AMI
    Advanced

 ACPI Settings                                     Enables or Disables BIOS ACPI
                                                   Auto Configuration.
 Enable ACPI Auto Configuration   [Disabled]

 Enable Hibernation               [Enabled]
 ACPI Sleep State                 [S3 (Suspend to RAM)]
 S3 Video Repost                  [Disabled]




                                                   →←: 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 Settings Screen

BIOS Setting	Options	Description/Purpose
Enable ACPI Auto Configuration	- Disabled (Default) - Enabled	Enables or Disables BIOS ACPI Auto Configuration.
Enable Hibernation	- Disabled - Enabled (Default)	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	- Suspend Disabled - S3 (Suspend to RAM) (Default)	Selects the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
S3 Video Repost	- Disabled (Default) - Enabled	Enables or Disables S3 Video Repost.

5.4.5   Advanced – Super IO Configuration

Menu Path   *Advanced > Super IO Configuration*

```
                          Aptio Setup – AMI
        Advanced

    Super IO Configuration                              Set Parameters of Serial Port
                                                        1 (COMA)
    Super IO Chip                    Super IO
  ▶ Serial Port 1 Configuration
  ▶ Serial Port 2 Configuration
  ▶ Serial Port 3 Configuration
  ▶ Serial Port 4 Configuration
  ▶ Serial Port 5 Configuration
  ▶ Serial Port 6 Configuration
  ▶ Parallel Port 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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```
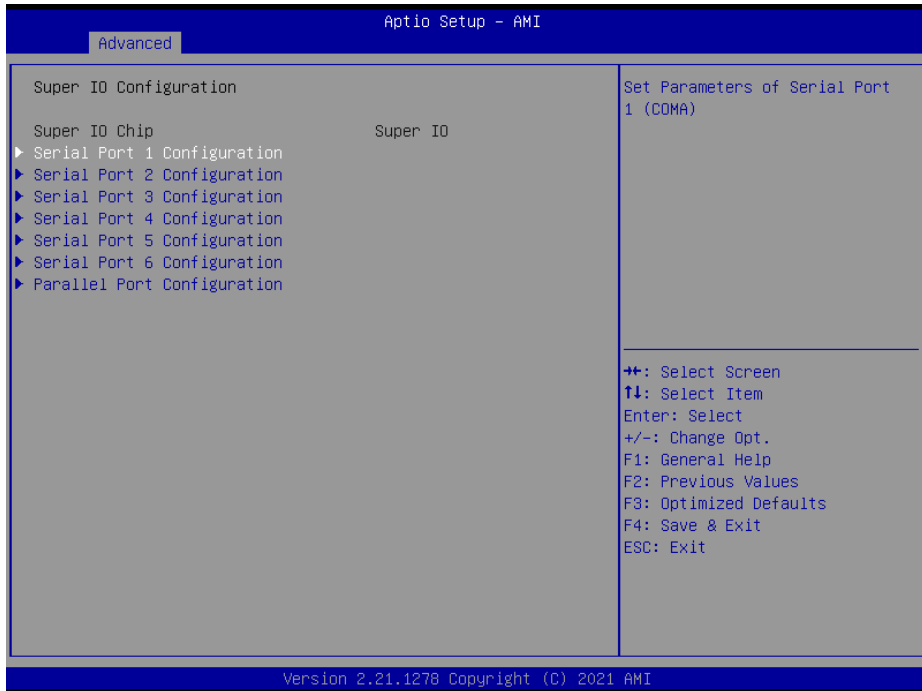
Super IO Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port 1 Configuration	Sub-Menu	Sets Parameters of Serial Port 1 (COM1).
Serial Port 2 Configuration	Sub-Menu	Sets Parameters of Serial Port 2 (COM2).
Serial Port 3 Configuration	Sub-Menu	Sets Parameters of Serial Port 3 (COM3).
Serial Port 4 Configuration	Sub-Menu	Sets Parameters of Serial Port 4 (COM4).
Serial Port 5 Configuration	Sub-Menu	Sets Parameters of Serial Port 5 (COM5).
Serial Port 6 Configuration	Sub-Menu	Sets Parameters of Serial Port 6 (COM6).
Parallel Port Configuration	Sub-Menu	Sets Parameters of Parallel Port (LPT/LPTE).

5.4.5.1 Super IO Configuration – Serial Port 1 Configuration

Menu Path   *Advanced > Super IO Configuration > 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;

    Change Settings               [Auto]

    Mode                          [RS-232]




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




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```

Serial Port 1 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (Default)	Enables or Disables Serial Port 1.
Device Settings	No changeable options	Displays current settings of Serial Port 1.
Change Settings	- Auto (default) - IO=3F8h; IRQ=4; - IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	Selects IRQ and I/O resource for Serial Port 1.
Mode	- RS-232 (Default) - RS-422 - RS-485	Selects COM mode.

5.4.5.2 Super IO Configuration – Serial Port 2 Configuration

Menu Path   *Advanced > Super IO Configuration > Serial Port 2 Configuration*

```
                              Aptio Setup – AMI
        Advanced

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

    Change Settings                  [Auto]



                                                          →←: 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 2 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (Default)	Enables or Disables Serial Port 2.
Device Settings	No changeable options	Displays current settings of Serial Port 2.
Change Settings	- Auto (default) - IO=2F8h; IRQ=3; - IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	Selects IRQ and I/O resource for the Serial Port 2.

5.4.5.3   Super IO Configuration – Serial Port 3 Configuration

Menu Path   *Advanced > Super IO Configuration > Serial Port 3 Configuration*

```
                              Aptio Setup - AMI
        Advanced

    Serial Port 3 Configuration                            Enable or Disable Serial Port
                                                           (COM)
    Serial Port                     [Enabled]
    Device Settings                 IO=3E8h; IRQ=7;

    Change Settings                 [Auto]




                                                           →←: 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 3 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (Default)	Enables or Disables Serial Port 3.
Device Settings	No changeable options	Displays current settings of Serial Port 3.
Change Settings	- Auto (default) - IO=3E8h; IRQ=7; - IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	Selects IRQ and I/O resource for Serial Port 3.

5.4.5.4   Super IO Configuration – Serial Port 4 Configuration

Menu Path   *Advanced > Super IO Configuration > Serial Port 4 Configuration*

```
                          Aptio Setup – AMI
        Advanced

  Serial Port 4 Configuration                          Enable or Disable Serial Port
                                                       (COM)
  Serial Port                    [Enabled]
  Device Settings                IO=2E8h; IRQ=10;

  Change Settings                [Auto]




                                                       →←: 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 4 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (Default)	Enables or Disables Serial Port 4.
Device Settings	No changeable options	Displays current settings of Serial Port 4.
Change Settings	- Auto (default) - IO=2E8h; IRQ=10; - IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	Selects IRQ and I/O resource for the Serial Port 4.

5.4.5.5 Super IO Configuration – Serial Port 5 Configuration

Menu Path   *Advanced > Super IO Configuration > Serial Port 5 Configuration*

```
                                    Aptio Setup - AMI
          Advanced

       Serial Port 5 Configuration                         Enable or Disable Serial Port
                                                           (COM)
       Serial Port                      [Enabled]
       Device Settings                  IO=2F0h; IRQ=6;

       Change Settings                  [Auto]




                                                           →←: 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 5 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (Default)	Enables or Disables Serial Port 5.
Device Settings	No changeable options	Displays current settings of Serial Port 5.
Change Settings	- Auto (default) - IO=2F0h; IRQ=6; - IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	Selects IRQ and I/O resource for the Serial Port 5.

5.4.5.6 Super IO Configuration – Serial Port 6 Configuration

Menu Path   *Advanced > Super IO Configuration > Serial Port 6 Configuration*

```
                            Aptio Setup – AMI
        Advanced

  Serial Port 6 Configuration                            Enable or Disable Serial Port
                                                         (COM)
  Serial Port                        [Enabled]
  Device Settings                    IO=2E0h; IRQ=11;

  Change Settings                    [Auto]




                                                         ↔: 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 6 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (Default)	Enables or Disables Serial Port 6.
Device Settings	No changeable options	Displays current settings of Serial Port 6.
Change Settings	- Auto (default) - IO=2E0h; IRQ=11; - IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	Selects IRQ and I/O resource for the Serial Port 6.

5.4.5.7   Super IO Configuration – Parallel Port Configuration

Menu Path   *Advanced > Super IO Configuration > Parallel Port Configuration*

```
                              Aptio Setup – AMI
        Advanced

    Parallel Port Configuration                          Enable or Disable Parallel
                                                         Port (LPT/LPTE)
    Parallel Port                   [Enabled]
    Device Settings                 IO=378h; IRQ=5;

    Change Settings                 [Auto]
    Device Mode                     [STD Printer Mode]




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




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```

Parallel Port Configuration Screen

BIOS Setting	Options	Description/Purpose
Parallel Port	- Disabled - Enabled (Default)	Enables or Disables Parallel Port (LPT/LPTE).
Device Settings	No changeable options	Displays current settings of Parallel Port.
Change Settings	- Auto (Default) - IO=378h; IRQ=5; - IO=378h; IRQ=5,6,7,9,10,11,12; - IO=278h; IRQ=5,6,7,9,10,11,12; - IO=3BCh; IRQ=5,6,7,9,10,11,12;	Selects IRQ and I/O resource for the Parallel Port,
Device Mode	- STD Printer Mode (Default) - SPP Mode; - EPP-1.9 and SPP Mode; - EPP-1.7 and SPP Mode; - ECP Mode; - ECP and EPP 1.9 Mode; - ECP and EPP 1.7 Mode;	Changes the Printer Port mode.

5.4.6   Advanced – Hardware Monitor

Menu Path	*Advanced > Hardware Monitor*

The **Hardware Monitor** allows users to configure Smart Fan Mode for CPU fan, monitor the health and status of the system such as CPU temperature, system temperature, system and CPU fan speed and voltage levels in supply.

```
                           Aptio Setup – AMI
        Advanced

   Pc Health Status                                   Smart Fan Mode Select

 ▶ Smart Fan Mode Configuration
   CPU    Temperature              : +37 %
   System Temperature              : +39 %
   CPU Fan Speed                   : N/A
   System Fan Speed                : 1421 RPM
   VCORE                           : +1.016 V
   VCC5V                           : +5.003 V
   VCC12                           : +11.968 V
   VSB5V                           : +5.003 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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```

Hardware Monitor Screen

BIOS Setting	Options	Description/Purpose
Smart Fan Mode Configuration	Sub-Menu	Smart Fan Mode Selection.
CPU Temperature	No changeable options	Displays processor's temperature.
System Temperature	No changeable options	Displays system's temperature.
CPU Fan Speed	No changeable options	Display CPU Fan speed
System Fan Speed	No changeable options	Display System Fan speed
VCORE	No changeable options	Displays the voltage level of VCORE in supply.
VCC5V	No changeable options	Displays the voltage level of VCC5V in supply.
VCC12	No changeable options	Displays the voltage level of VCC12 in supply.

BIOS Setting	Options	Description/Purpose
VSB5V	No changeable options	Displays the voltage level of VSB5V in supply.

5.4.6.1 Smart Fan Mode Configuration

Menu Path   *Advanced > Hardware Monitor > Smart Fan Mode Configuration*

```
                           Aptio Setup – AMI
   Advanced

  Smart Fan Mode Configuration                        Smart Fan Mode Select

  CPU Smart Fan Control          [Manual Duty Mode]
  Manual Duty Mode               100
  Sys Smart Fan Control          [Manual Duty Mode]
  Manual Duty Mode               100




                                                     →←: 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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```
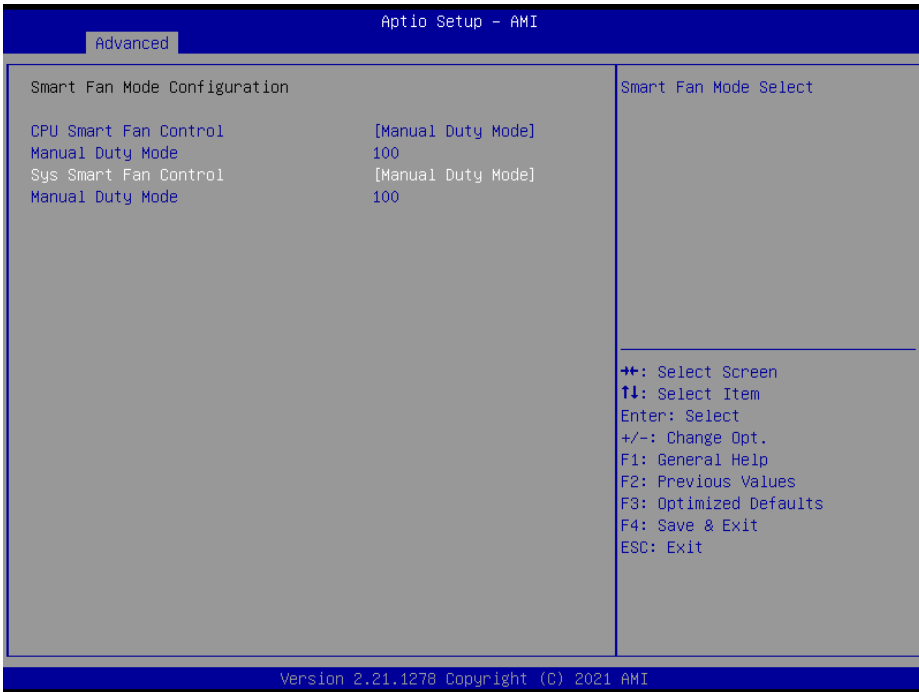
Smart Fan Mode Configuration Screen

BIOS Setting	Options	Description/Purpose
CPU Smart Fan Control	- Manual Duty Mode - Auto Duty-Cycle Mode (Default)	Smart Fan Mode selection for CPU Fan.
Manual Duty Mode	Numeric (from 1 to 100)	Manual mode fan control. Users can write expected duty cycle (PWM fan type) 1-100.
Sys Smart Fan Control	- Manual Duty Mode - Auto Duty-Cycle Mode (Default)	Smart Fan Mode selection for System Fan.
Manual Duty Mode	Numeric (from 1 to 100)	Manual mode fan control. Users can write expected duty cycle (PWM fan type) 1-100.

5.4.7   Advanced – Super IO Watchdog

Menu Path   *Advanced > Super IO Watchdog*

```
                              Aptio Setup – AMI
      Advanced

   Super IO Watchdog                                    Super IO Watchdog timer
                                                        settings Enable/Disable
   Enable Watchdog              [Enabled]

   Watchdog Timer Unit          [1s]
   Watchdog Timer Count         10




                                                        →←: 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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```
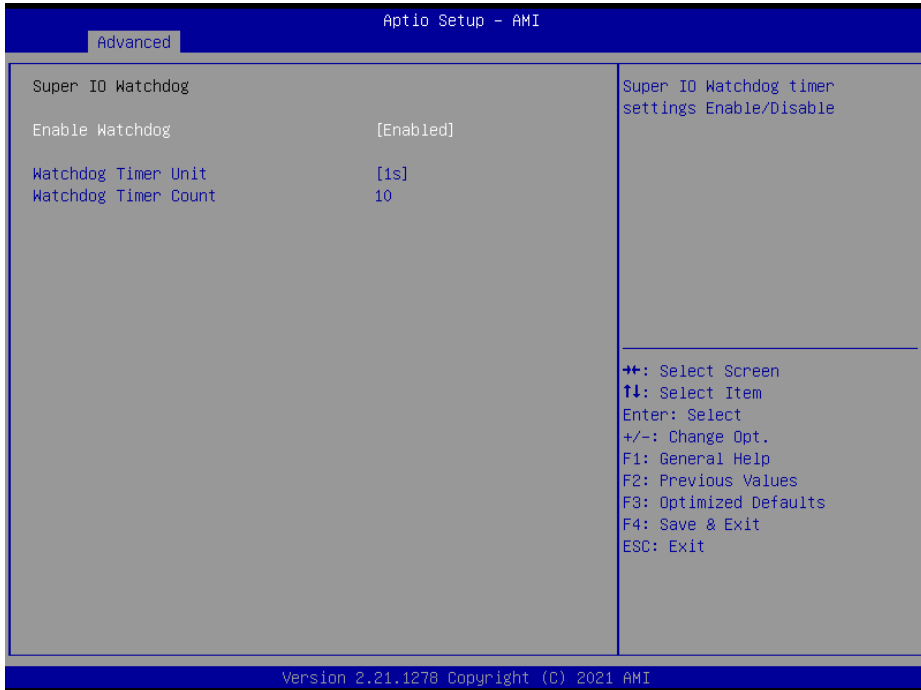
Super IO Watchdog Screen

BIOS Setting	Options	Description/Purpose
Enable Watchdog	- Enabled - Disabled (Default)	Super I/O Watchdog timer settings enabled/disabled.
Watchdog Timer Unit	- 1s (Default) - 60s	Selects time unit (1sec/ 60sec) of watchdog timer.
Watchdog Timer Count	Numeric	The number of second count for Timer (10-59 seconds).

5.4.8 Advanced – Secondary Super IO Configuration

Menu Path   *Advanced > Secondary Super IO Configuration*

```
                           Aptio Setup – AMI
      Advanced

   Secondary Super IO Configuration                    Set Parameters of Serial Port
                                                       1 (COMA)
   Super IO Chip                    F81216SEC
 ▶ 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



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```
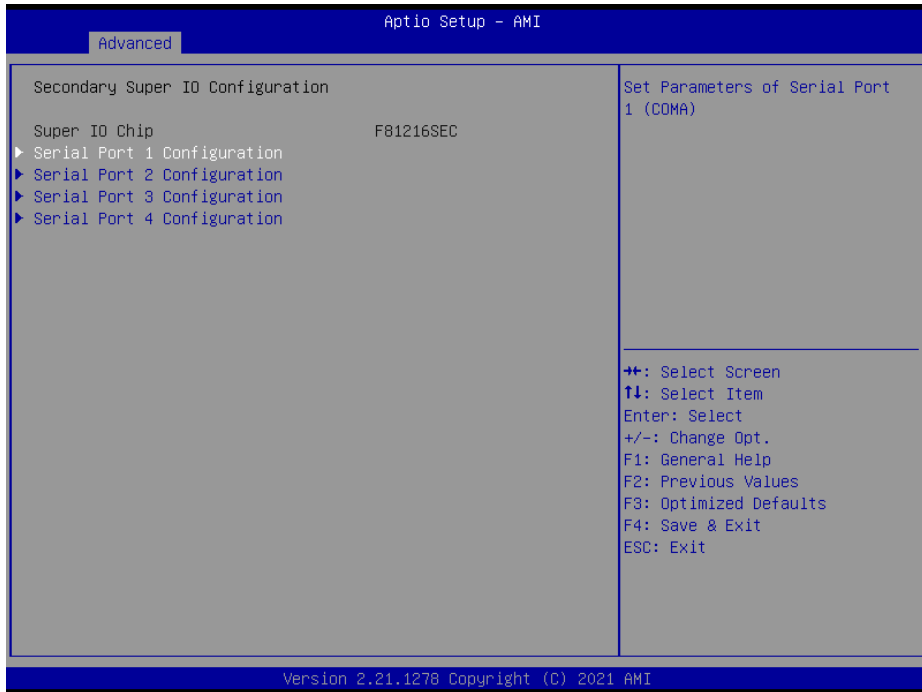
Secondary Super IO Configuration Screen

BIOS Setting	Options	Description/Purpose
Super IO Chip	No changeable options	F81216SEC
Serial Port 1 Configuration	Sub-Menu	Set Parameters of Serial Port 1 (COM1)
Serial Port 2 Configuration	Sub-Menu	Set Parameters of Serial Port 2 (COM2)
Serial Port 3 Configuration	Sub-Menu	Set Parameters of Serial Port 3 (COM3)
Serial Port 4 Configuration	Sub-Menu	Set Parameters of Serial Port 4 (COM4)

5.4.8.1   Advanced – Secondary Super IO Configuration – Serial Port 1 Configuration

Menu Path   *Advanced > Secondary Super IO Configuration >*
                     Serial Port 1 Configuration
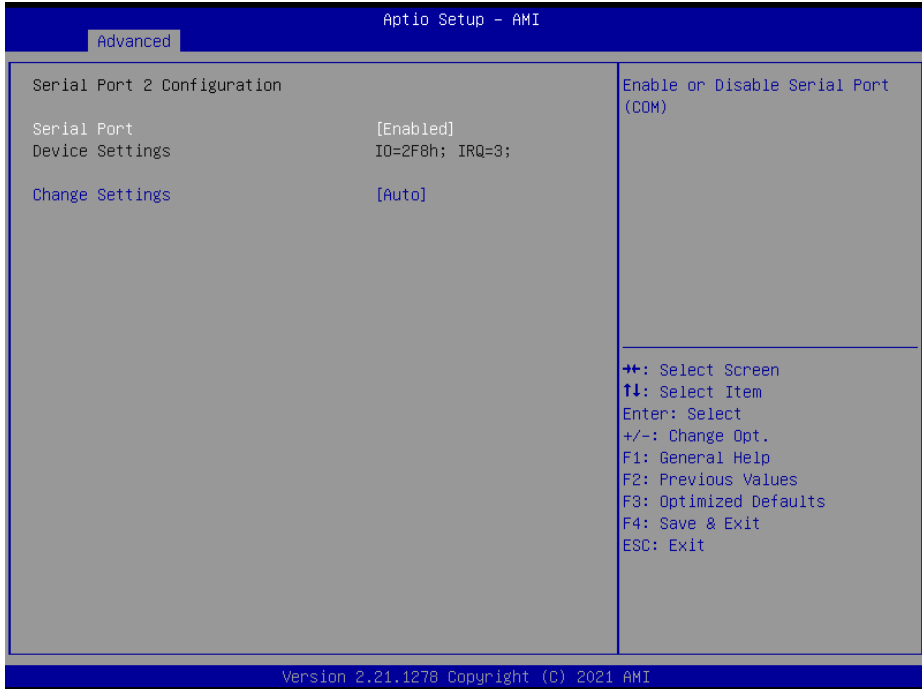
```
                              Aptio Setup – AMI
      Advanced

    Serial Port 1 Configuration                          Enable or Disable Serial Port
                                                         (COM)
    Serial Port                      [Enabled]
    Device Settings                  Reset Required

    Change Settings                  [Auto]




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


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```

Serial Port 1 Configuration (Secondary Super IO Configuration)

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (Default)	Enables or Disables Serial Port 1.
Device Settings	No changeable options	Displays current settings of Serial Port 1.
Change Settings	- Auto (default) - IO=240h; IRQ=12; - IO=240h; IRQ=3,4,5,6,7,9,10,11,12; - IO=248h; IRQ=3,4,5,6,7,9,10,11,12; - IO=250h; IRQ=3,4,5,6,7,9,10,11,12; - IO=258h; IRQ=3,4,5,6,7,9,10,11,12;	Selects IRQ and I/O resource for the Serial Port 1.

5.4.8.2   Advanced – Secondary Super IO Configuration – Serial Port 2 Configuration

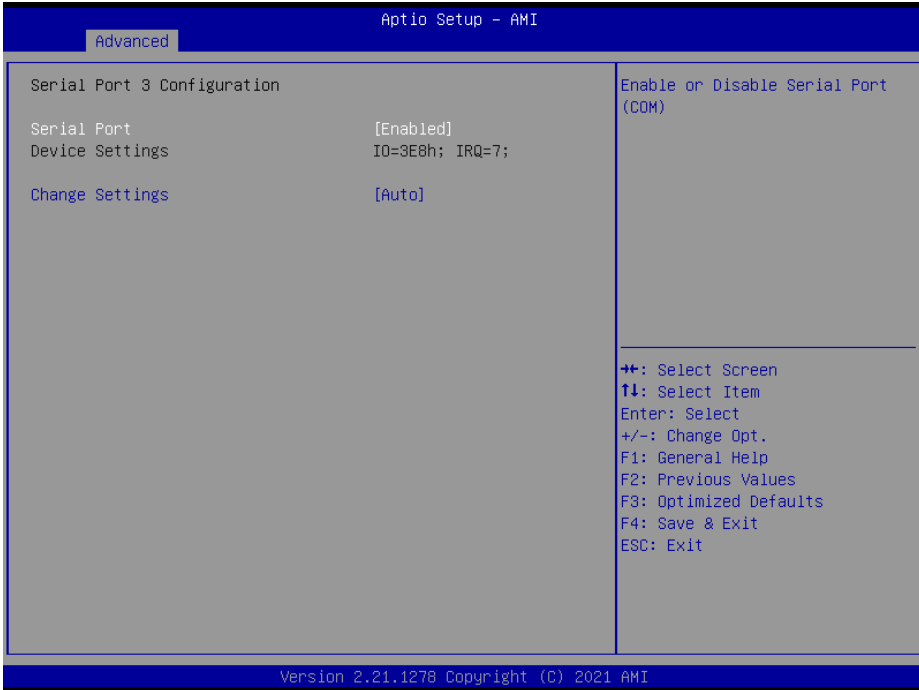Menu Path   *Advanced > Secondary Super IO Configuration > Serial Port 2 Configuration*

```
                            Aptio Setup - AMI
      Advanced

    Serial Port 1 Configuration                          Enable or Disable Serial Port
                                                         (COM)
    Serial Port                    [Enabled]
    Device Settings                Reset Required

    Change Settings                [Auto]




                                                         ↔: 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 2 Configuration (Secondary Super IO Configuration)

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (Default)	Enables or Disables Serial Port 2.
Device Settings	No changeable options	Displays current settings of Serial Port 2.
Change Settings	- Auto (default) - IO=248h; IRQ=12; - IO=240h; IRQ=3,4,5,6,7,9,10,11,12; - IO=248h; IRQ=3,4,5,6,7,9,10,11,12; - IO=250h; IRQ=3,4,5,6,7,9,10,11,12; - IO=258h; IRQ=3,4,5,6,7,9,10,11,12;	Selects IRQ and I/O resource for the Serial Port 2.

5.4.8.3   Advanced – Secondary Super IO Configuration – Serial Port 3 Configuration

Menu Path   *Advanced > Secondary Super IO Configuration >*
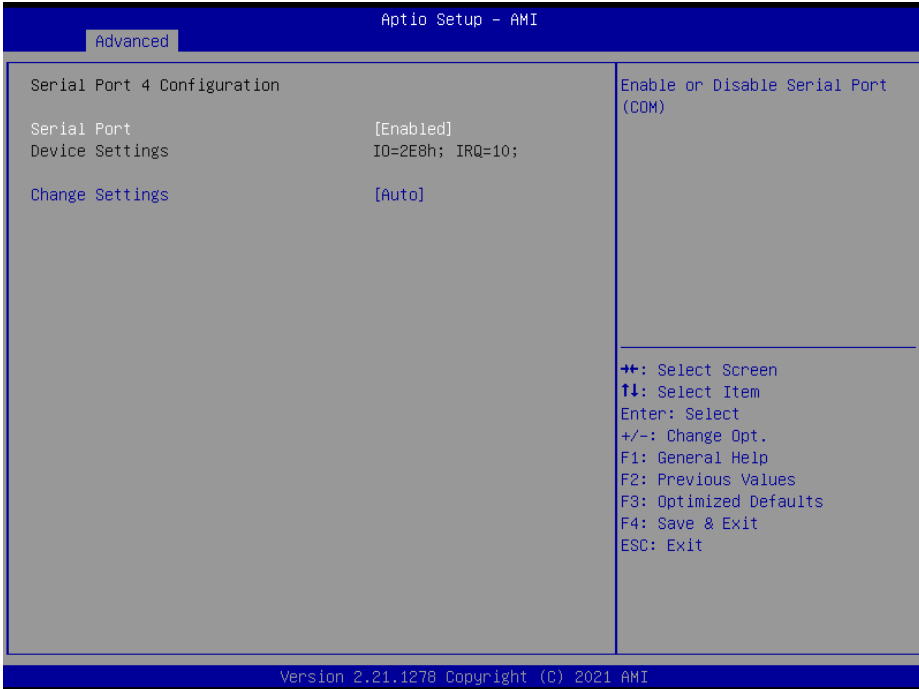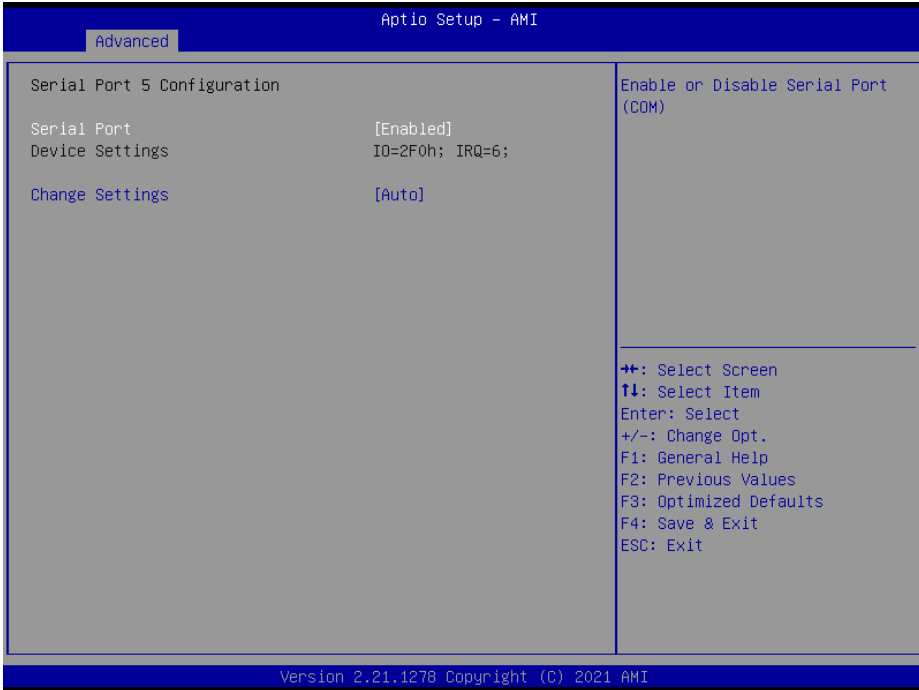   *Serial Port 3 Configuration*

```
                              Aptio Setup - AMI
        Advanced

    Serial Port 1 Configuration                            Enable or Disable Serial Port
                                                           (COM)
    Serial Port                        [Enabled]
    Device Settings                    Reset Required

    Change Settings                    [Auto]



                                                           ↔: 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 3 Configuration (Secondary Super IO Configuration)

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (Default)	Enables or Disables Serial Port 3.
Device Settings	No changeable options	Displays current settings of Serial Port 3.
Change Settings	- Auto (default) - IO=250h; IRQ=12; - IO=240h; IRQ=3,4,5,6,7,9,10,11,12; - IO=248h; IRQ=3,4,5,6,7,9,10,11,12; - IO=250h; IRQ=3,4,5,6,7,9,10,11,12; - IO=258h; IRQ=3,4,5,6,7,9,10,11,12;	Selects IRQ and I/O resource for the Serial Port 3.

5.4.8.4 Advanced – Secondary Super IO Configuration – Serial Port 4 Configuration

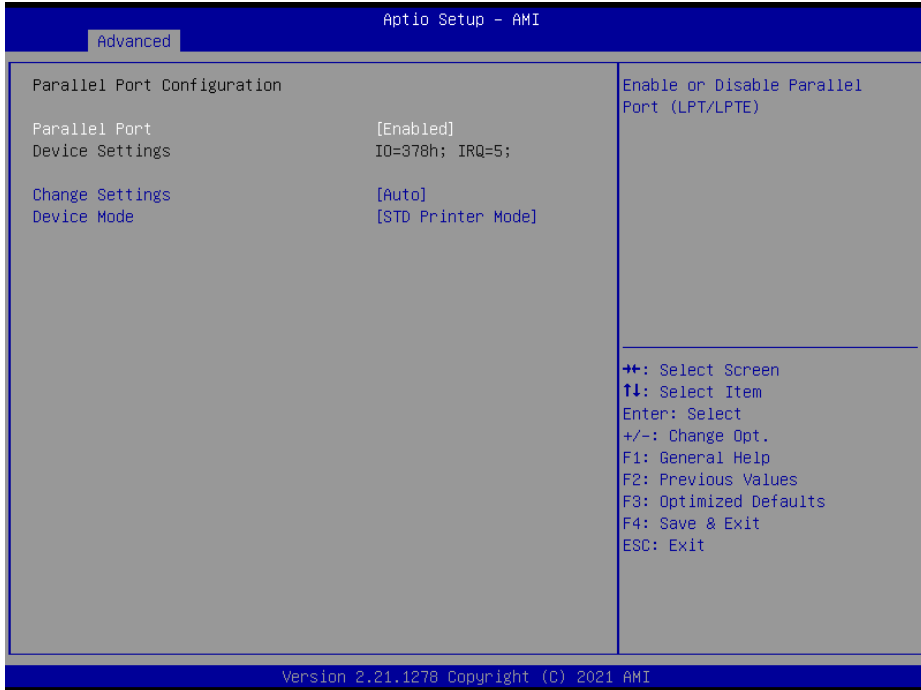Menu Path   *Advanced > Secondary Super IO Configuration > Serial Port 4 Configuration*

```
                              Aptio Setup – AMI
        Advanced

    Serial Port 1 Configuration                          Enable or Disable Serial Port
                                                         (COM)
    Serial Port                     [Enabled]
    Device Settings                 Reset Required

    Change Settings                 [Auto]




                                                         ↔: 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 4 Configuration (Secondary Super IO Configuration)

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (Default)	Enables or Disables Serial Port 4.
Device Settings	No changeable options	Displays current settings of Serial Port 4.
Change Settings	- Auto (default) - IO=258h; IRQ=12; - IO=240h; IRQ=3,4,5,6,7,9,10,11,12; - IO=248h; IRQ=3,4,5,6,7,9,10,11,12; - IO=250h; IRQ=3,4,5,6,7,9,10,11,12; - IO=258h; IRQ=3,4,5,6,7,9,10,11,12;	Selects IRQ and I/O resource for the Serial Port 4.

5.4.9 Advanced – S5 RTC Wake Settings [Fixed Time]

Menu Path   *Advanced > S5 RTC Wake Settings[Fixed Time]*

The **S5 RTC Wake Settings** enables/disables the system to wake up at a preset time of a day from S5 State using RTC alarm.

```
                              Aptio Setup – AMI
    Advanced

 Wake system from S5            [Fixed Time]         Enable or disable System wake
 Wake up hour                   0                    on alarm event. Select
 Wake up minute                 0                    FixedTime, system will wake on
 Wake up second                 0                    the hr::min::sec specified.
                                                     Select DynamicTime , System
                                                     will wake on the current time
                                                     + Increase minute(s)




                                                     →←: 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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```

S5 RTC Wake Settings Screen[Fixed Time]

BIOS Setting	Options	Description/Purpose
Wake system from S5	- Disabled (Default) - Fixed Time - Dynamic Time	Enables or disables System to wake on alarm events. • **Fixed Time:** The system will wake on the time (hr::min::sec) specified. • **Dynamic Time:** The system will wake on the current time + Increase minute(s).
Wake up hour	Numeric (from 0 to 23)	Enters **0-23** to set the wake-up hour, e.g.: enters 3 for 3 a.m. and 15 for 3 pm
Wake up minute	Numeric (from 0 to 59)	Enters **0-59** to set the wake-up minute.
Wake up second	Numeric (from 0 to 59)	Enters **0-59** to set the wake-up second.

5.4.9.1 Advanced – S5 RTC Wake Settings [Dynamic Time]

Menu Path   *Advanced > S5 RTC Wake Settings[Dynamic Time]*

```
                            Aptio Setup – AMI
      Advanced

 Wake system from S5              [Dynamic Time]      Enable or disable System wake
 Wake up minute increase          1                   on alarm event. Select
                                                      FixedTime, system will wake on
                                                      the hr::min::sec specified.
                                                      Select DynamicTime , System
                                                      will wake on the current time
                                                      + Increase minute(s)


                                                      ──────────────────────
                                                      →←: 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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```

S5 RTC Wake Settings Screen[Dynamic Time]

BIOS Setting	Options	Description/Purpose
Wake system from S5	- Disabled (Default) - Fixed Time - Dynamic Time	Enables or disables System to wake on alarm events. • **Fixed Time:** The system will wake on the time (hr::min::sec) specified. • **Dynamic Time:** The system will wake on the current time + Increase minute(s).
Wake up minute increase	Numeric (from 1 to 5)	Enters **1-5** to set the increased minute(s) for dynamic wake-up time.

5.4.10 Advanced – USB Configuration

Menu Path   *Advanced > USB Configuration*

The **USB Configuration** allows users to configure advanced USB settings such as USB mass storage driver support.

```
                         Aptio Setup – AMI
     Advanced

  USB Configuration                                Enable/Disable USB Mass
                                                   Storage Driver Support.
  USB Module Version              24

  USB Controllers:
      1 XHCI
  USB Devices:
      1 Drive, 1 Keyboard

  USB Mass Storage Driver Support     [Enabled]

  Mass Storage Devices:
  SanDisk Cruzer Blade 1.26           [Auto]

                                                   ➔←: 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 Configuration Screen

BIOS Setting	Options	Description/Purpose
USB Module Version	No changeable options	Displays USB module version.
USB Controllers	No changeable options	Displays number and type of USB controllers (if any).
USB Devices	No changeable options	Displays number and type of connected USB devices (if any).
USB Mass Storage Driver Support	- Disabled - Enabled (Default)	Enables/Disables USB Mass Storage Driver Support.
MASS STORAGE DEVICES: [drive(s)]	- Auto (Default) - Floppy - Forced FDD - Hard Disk - CD-ROM	**Auto** enumerates devices according to their media format. Optical drives are emulated as 'CD-ROM'. Drives with no media will be emulated according to a drive type.

5.4.11 Advanced – Network Stack Configuration

Menu Path   *Advanced > Network Stack Configuration*

The **Network Stack Configuration** allows users to enable/disable UEFI Network Stack, IPv4/IPv6 PXE (Pre-Boot Execution) support and configure PXE boot wait time and detects the media presence.

PXE allows a workstation to boot from a server on a network prior to booting the operating system on the local hard drive. A PXE-enabled workstation connects its NIC to the LAN via a jumper, which keeps the workstation connected to the network even when the power is turned off.

```
                              Aptio Setup – AMI
        Advanced

 Network Stack                    [Enabled]              Enable/Disable UEFI Network
 IPv4 PXE Support                 [Disabled]             Stack
 IPv4 HTTP Support                [Disabled]
 IPv6 PXE Support                 [Disabled]
 IPv6 HTTP Support                [Disabled]
 PXE boot wait time               0
 Media detect count               1


                                                         →←: 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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```

Network Stack Configuration Screen

BIOS Setting	Options	Description/Purpose
Network Stack	- Disabled (Default) - Enabled	Enables / Disables UEFI Network Stack.
IPv4 PXE Support	- Disabled (Default) - Enabled	Enables / Disables IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
IPv4 HTTP Support	- Disabled (Default) - Enabled	Enables / Disables IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.

BIOS Setting	Options	Description/Purpose
IPv6 PXE Support	- Disabled (Default) - Enabled	Enable s/ Disables IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.
IPv6 HTTP Support	- Disabled (Default) - Enabled	Enables / Disables IPv6 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.
PXE boot wait time	Numeric (from 0 to 5)	Wait time to press ESC key to abort the PXE boot.
Media detect count	Numeric (from 1 to 50)	Numbers of times presence of media will be checked.

5.4.12 Advanced – NVMe Configuration

Menu Path   *Advanced > NVMe Configuration*
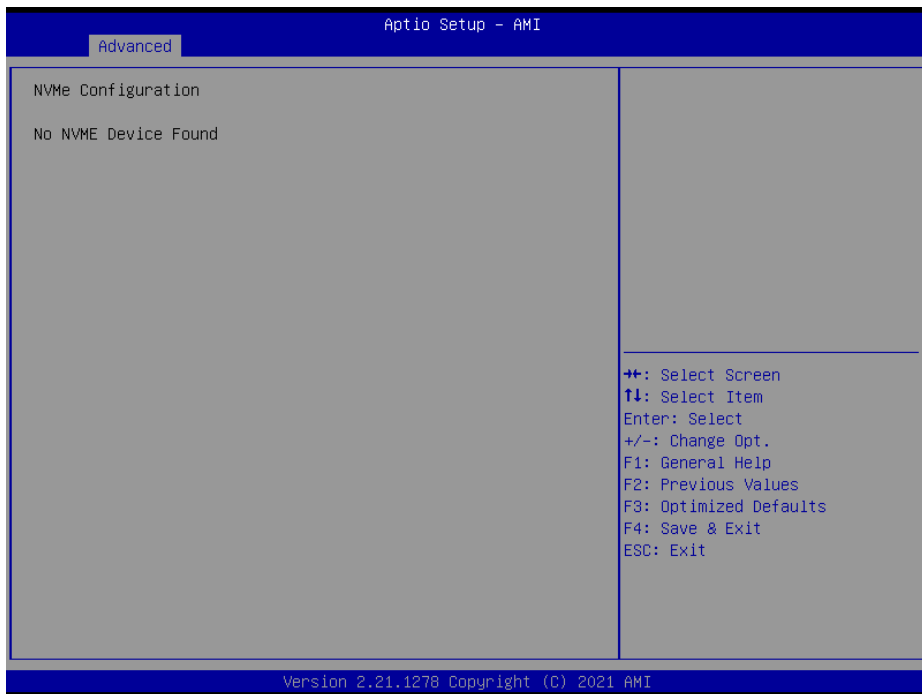
NVMe Configuration Screen

BIOS Setting	Options	Description/Purpose
NVMe Configuration	No changeable options	Displays NVMe device.

5.5   Chipset

Menu Path   *Chipset*

This menu allows users to configure advanced Chipset settings such as System Agent (SA) and PCH-IO configuration parameters.

```
                        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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```

Chipset Screen

BIOS Setting	Options	Description/Purpose
System Agent (SA) Configuration	Sub-Menu	System Agent (SA) Parameters.
PCH-IO Configuration	Sub-Menu	PCH Parameters.

5.5.1   Chipset – System Agent (SA) Configuration

Menu Path   *Chipset > System Agent (SA) Configuration*

```
                          Aptio Setup – AMI
          Chipset

  System Agent (SA) Configuration                    Memory Configuration Parameters

▶ Memory Configuration
▶ Graphics Configuration
▶ PEG Port Configuration

  VT-d                          [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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```
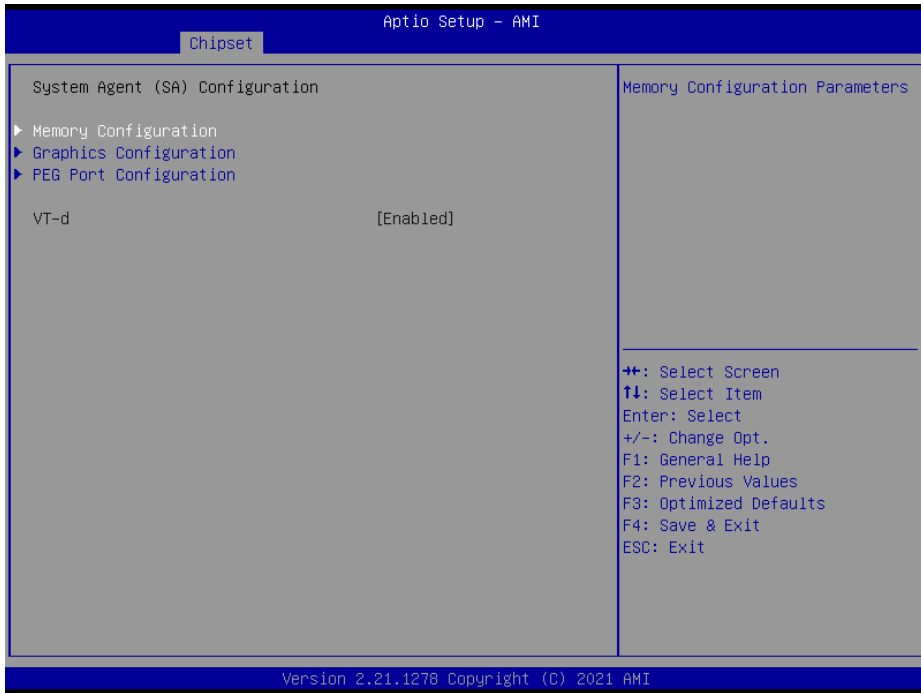
System Agent (SA) Configuration Screen

BIOS Setting	Options	Description/Purpose
Memory Configuration	Sub-Menu	Memory Configuration.
Graphics Configuration	Sub-Menu	Graphics Configuration.
PEG Port Configuration	Sub-Menu	PEG Port Configuration.
VT-d	- Disabled - Enabled (Default)	Enables or Disables VT-d function.

5.5.1.1 System Agent (SA) Configuration – Memory Configuration

Menu Path   *Chipset > System Agent (SA) Configuration >*
Memory Configuration

```
                              Aptio Setup – AMI
            Chipset

   Memory Configuration

   Memory Frequency                 2667 MHz

   DIMM1                            Not Populated / Disabled
   DIMM2                            4096 MB

                                                        →←: 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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```
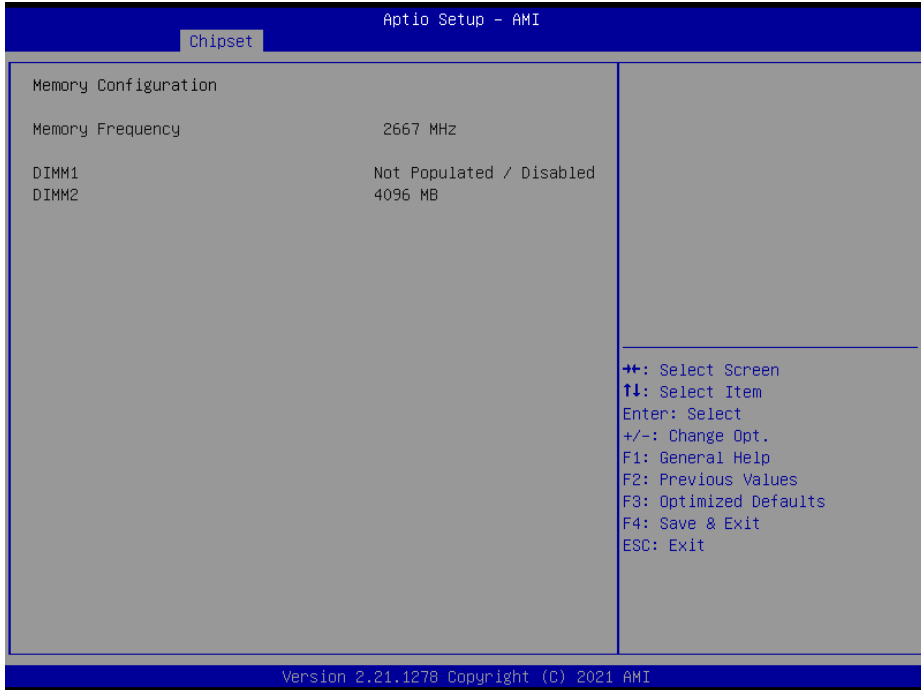
Memory Configuration Screen

BIOS Setting	Options	Description/Purpose
Memory Frequency	No changeable options	Displays the Frequency of Memory.
DIMM1	No changeable options	Displays the size of DIMM1.
DIMM2	No changeable options	Displays the size of DIMM2.

5.5.1.2 System Agent (SA) Configuration – Graphics Configuration

Menu Path   *Chipset > System Agent (SA) Configuration >*
                   Graphics Configuration

The **Graphics Configuration** allows users to configure the display settings for the LCD panel.

```
                              Aptio Setup – AMI
            Chipset

Graphics Configuration                                  Select which Graphics device
                                                        should be Primary Display.
Primary Display                    [Auto]




                                                        ↔: 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 Screen

BIOS Setting	Options	Description/Purpose
Primary Display	- Auto (Default) - IGFX	Select the Graphics device that should be Primary Display.

5.5.1.3   System Agent (SA) Configuration – PEG Port Configuration

Menu Path   *Chipset > System Agent (SA) Configuration >*
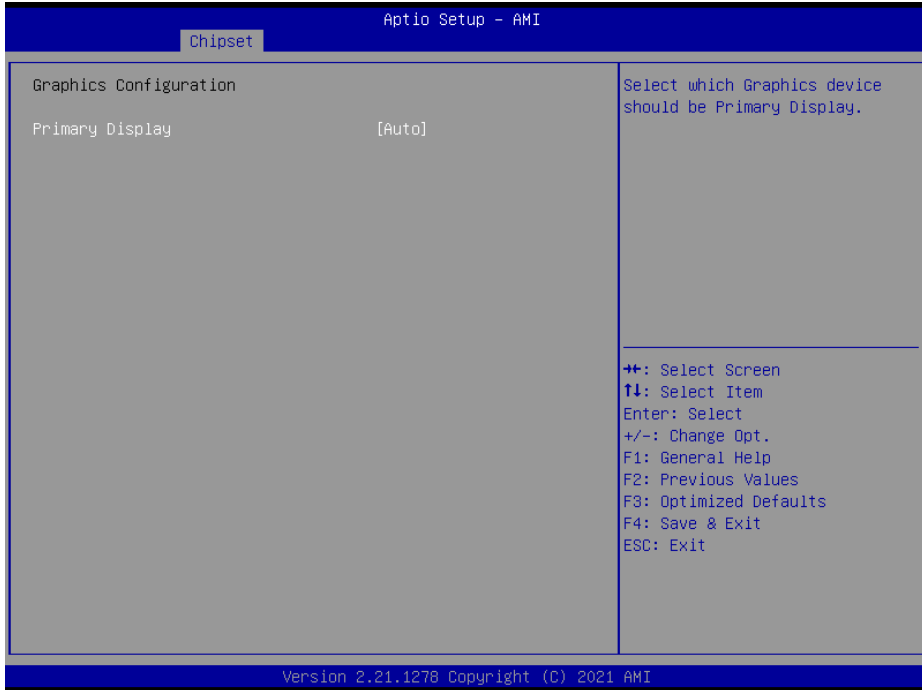   *PEG Port Configuration*

The **PEG Port Configuration** allows users to display the PEG status, enable Root
Port and configure the maximum speed for PCI Express x16 slot.

```
                              Aptio Setup – AMI
                Chipset

  PEG Port Configuration                                 Enable or Disable the Root Port

  PCI Express x16 – SLOT#1           Not Present
   Enable Root Port                  [Auto]
   Max Link Speed                    [Auto]




                                                         ↔: 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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```
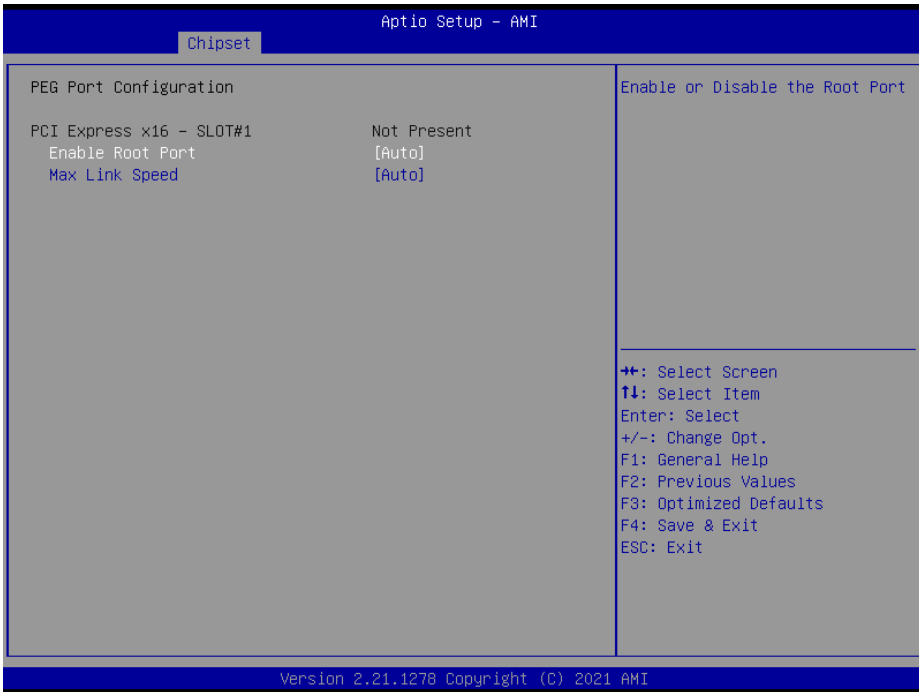
PEG Port Configuration Screen

BIOS Setting	Options	Description/Purpose
PCI Express x16 – SLOT#1	No changeable options	PCI Express x16 Slot Link and Speed information.
Enable Root Port	- Disabled - Enabled - Auto (Default)	Enables or Disables the Root Port.
Max Link Speed	- Auto (Default) - Gen1 - Gen2 - Gen3	Configures PCI-E1 Max Speed.

5.5.2   Chipset – PCH IO Configuratioin

Menu Path   *Chipset > PCH-IO Configuration*

The **PCH-IO Configuration** allows users to configure PCI Express and SATA configuration parameters, enable/disable PCH LAN Controller and Wake-On-LAN function and determine the power on/off state that the system will go to following a power failure (G3 state).

```
                         Aptio Setup – AMI
        Chipset
┌─────────────────────────────────────────────┬─────────────────────────────┐
│  PCH-IO Configuration                        │ PCI Express Configuration   │
│▶ PCI Express Configuration                   │ settings                    │
│▶ SATA Configuration                          │                             │
│  PCH LAN Controller          [Enabled]       │                             │
│    Wake on LAN Enable        [Enabled]       │                             │
│  Restore AC Power Loss       [Power Off]     │                             │
│                                              │                             │
│                                              │                             │
│                                              │                             │
│                                              │                             │
│                                              │ ↔: Select Screen            │
│                                              │ ↑↓: Select Item             │
│                                              │ Enter: Select               │
│                                              │ +/-: Change Opt.            │
│                                              │ F1: General Help            │
│                                              │ F2: Previous Values         │
│                                              │ F3: Optimized Defaults      │
│                                              │ F4: Save & Exit             │
│                                              │ ESC: Exit                   │
│                                              │                             │
└─────────────────────────────────────────────┴─────────────────────────────┘
            Version 2.21.1278 Copyright (C) 2021 AMI
```
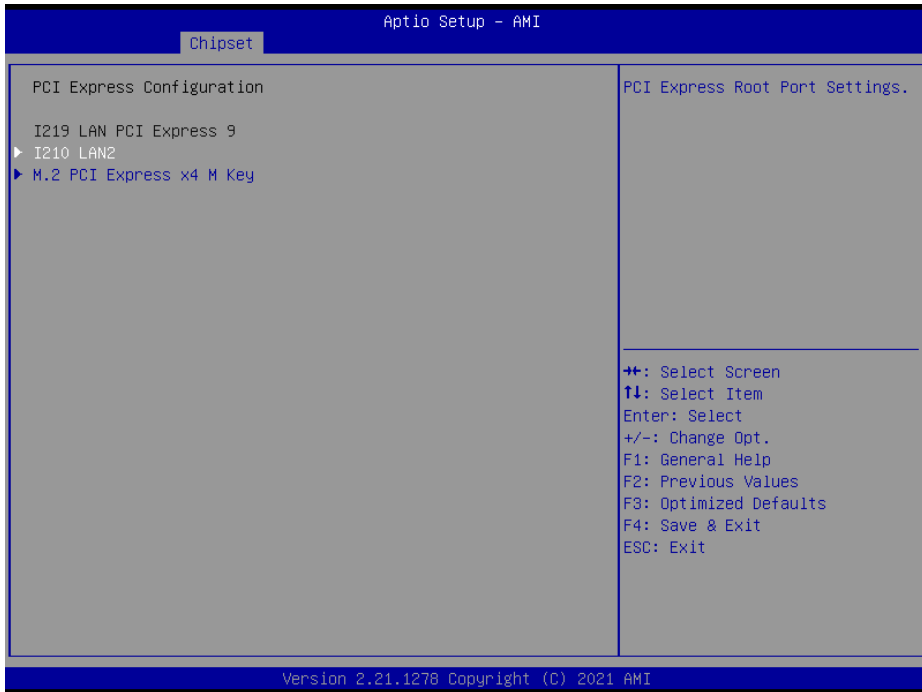
PCH-IO Configuration Screen

BIOS Setting	Options	Description/Purpose
PCI Express Configuration	Sub-Menu	PCI Express Configuration settings.
SATA Configuration	Sub-Menu	SATA Configuration settings.
PCH LAN Controller	- Disabled - Enabled (Default)	Enables or Disables onboard NIC.
Wake On LAN Enable	- Disabled - Enabled (Default)	Enables or Disables integrated LAN to wake up the system.
Restore AC Power Loss	- Power On - Power Off (Default)	Specifies what state to go to when power is re-applied following a power failure (G3 state).

5.5.2.1 PCH-IO Configuration – PCI Express Configuration

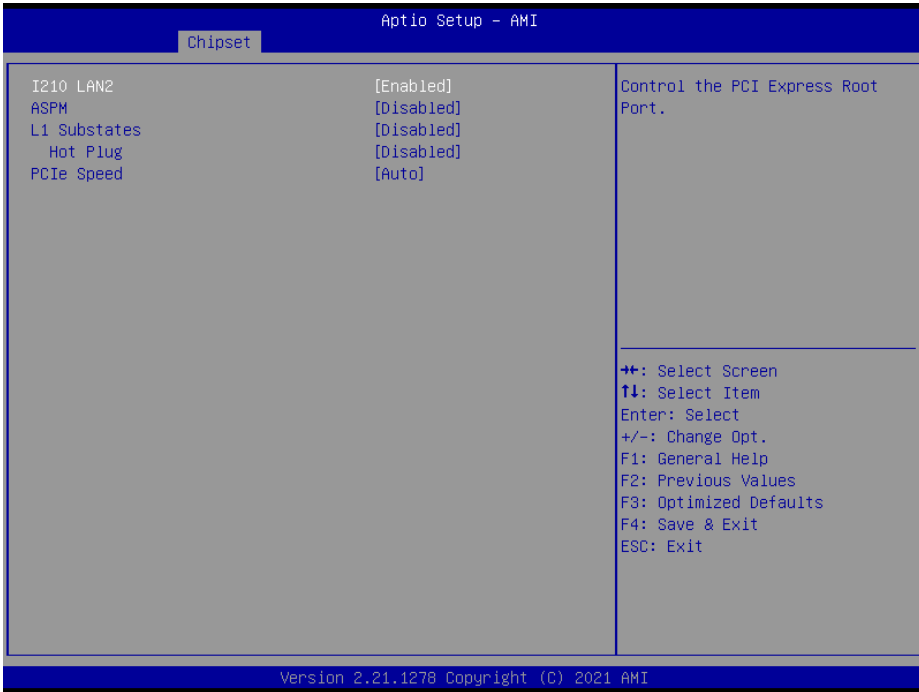Menu Path   *Chipset > PCH-IO Configuration > PCI Express Configuration*

```
                          Aptio Setup – AMI
        Chipset

  PCI Express Configuration                          PCI Express Root Port Settings.

    I219 LAN PCI Express 9
  ▶ I210 LAN2
  ▶ M.2 PCI Express x4 M Key




                                                   →←: 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 Screen

BIOS Setting	Options	Description/Purpose
I219 LAN PCI Express 9	No changeable options	PCI Express 9 settings.
I219 LAN PCI Express 9	No changeable options	PCI Express 9 settings
I210 LAN2	Sub-Menu	PCI Express Root Port Settings
M.2 PCI Express x4 M Key *(for Q470/W480 only)*	Sub-Menu	PCI Express Root Port Settings.

5.5.2.2 PCH-IO Configuration – PCI Express Configuration – I210 LAN2

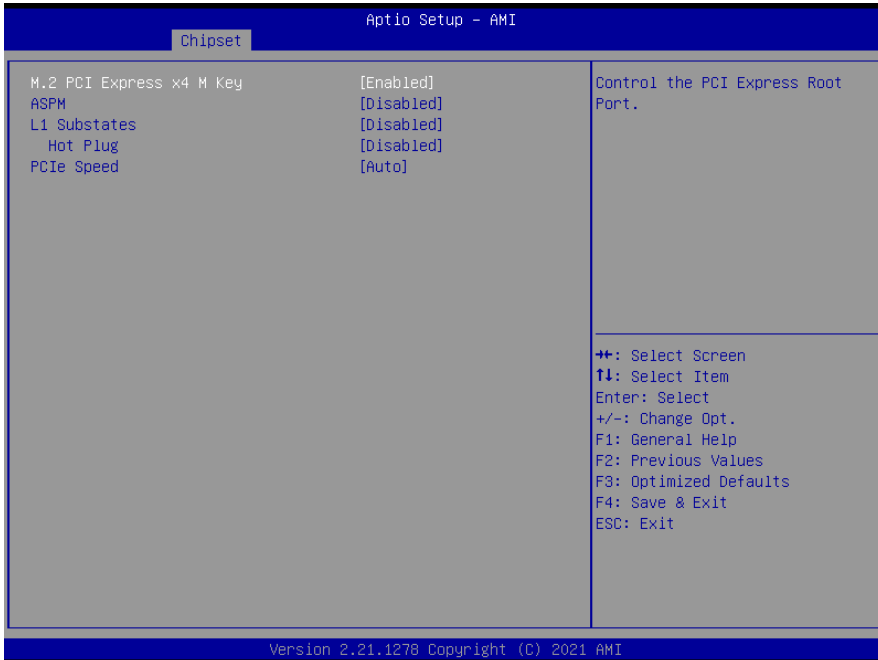Menu Path   *Chipset > PCH-IO Configuration > PCI Express Configuration > I210 LAN2*

```
                          Aptio Setup - AMI
              Chipset

   I210 LAN2                      [Enabled]              Control the PCI Express Root
   ASPM                           [Disabled]             Port.
   L1 Substates                   [Disabled]
    Hot Plug                      [Disabled]
   PCIe Speed                     [Auto]




                                                         →←: 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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```

I210 LAN2 Screen

BIOS Setting	Options	Description/Purpose
I210 LAN2	- Disabled - Enabled (Default)	Control the PCI Express Root Port
ASPM	- Disabled (Default) - L0s - L1 - L0sL1 - Auto	Sets the ASPM Level: • **Force L0s** - Force all links to L0s State. • **Auto** - BIOS auto configure. • **Disabled** - Disables ASPM.
L1 Substates	- Disabled (Default) - L1.1 - L1.1 & L1.2	PCI Express L1 Substates settings.
Hot Plug	- Disabled (Default) - Enabled	Hot Plug support enabled / disabled.
PCIe Speed	- Auto (Default) - Gen1	Configures PCIe Speed.

BIOS Setting	Options	Description/Purpose
	- Gen2 - Gen3	

5.5.2.3 PCH-IO Configuration – PCI Express Configuration – M.2 PCI Express x4 M Key (for Q470E/W480E only)

Menu Path   *Chipset > PCH-IO Configuration > PCI Express Configuration > M.2 PCI Express x4 M Key (for Q470E/W480E only)*
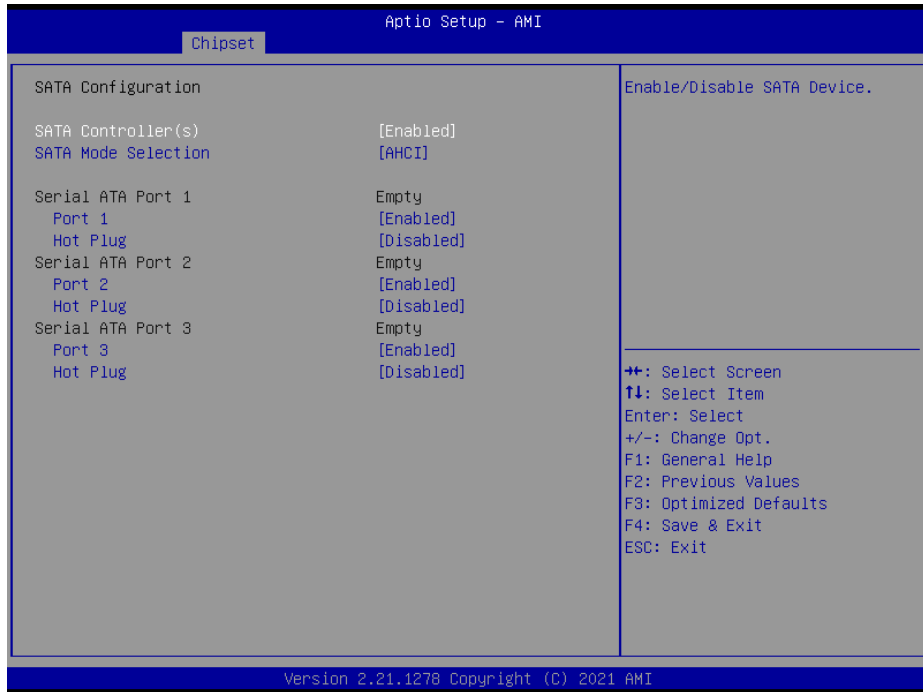
```
                          Aptio Setup — AMI
          Chipset

 M.2 PCI Express x4 M Key        [Enabled]              Control the PCI Express Root
 ASPM                           [Disabled]             Port.
 L1 Substates                   [Disabled]
   Hot Plug                     [Disabled]
 PCIe Speed                     [Auto]




                                                        ↔: 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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```

M.2 PCI Express x4 M Key Screen

BIOS Setting	Options	Description/Purpose
M.2 PCI Express x4 M Key	- Disabled - Enabled (Default)	Controls the PCI Express Root Port.
ASPM	- Disabled (Default) - L0s - L1 - L0sL1 - Auto	Sets the ASPM Level: • **L0s** - Force all links to L0s State • **Auto** - BIOS auto configure. • **Disabled** - Disables ASPM.
L1 Substates	- Disabled (Default) - L1.1 - L1.1 & L1.2	PCI Express L1 Substates settings.
Hot Plug	- Disabled (Default) - Enabled	Hot Plug support enabled / disabled.

BIOS Setting	Options	Description/Purpose
PCIe Speed	- Auto (Default) - Gen1 - Gen2 - Gen3	Configures PCIe speed.

5.5.2.4　PCH-IO Configuration – SATA Configuration

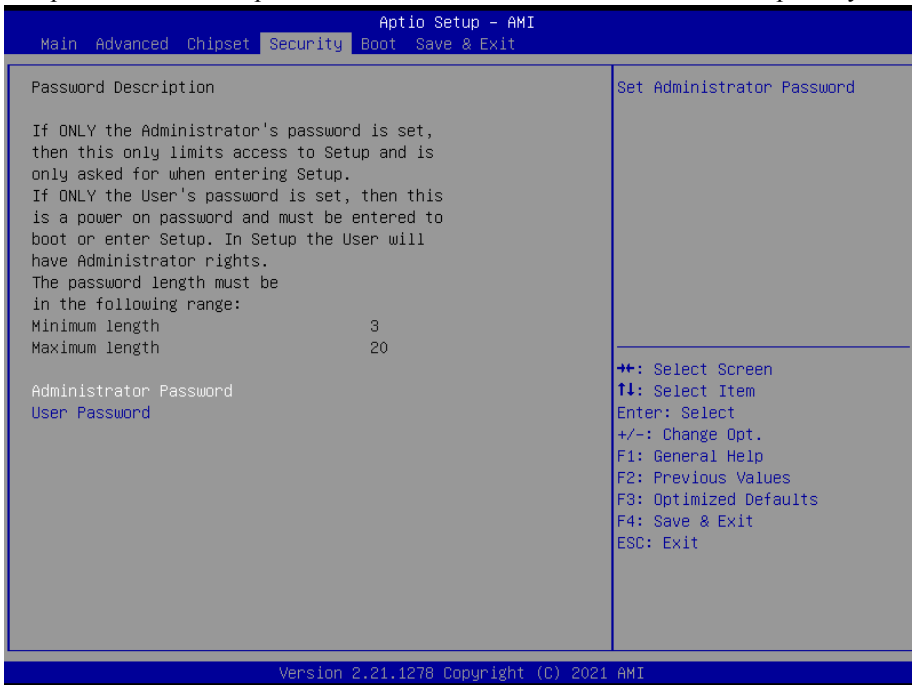Menu Path　　　　　　*Chipset > PCH-IO Configuration > SATA Configuration*

```
                          Aptio Setup - AMI
          Chipset

   SATA Configuration                              Enable/Disable SATA Device.

   SATA Controller(s)           [Enabled]
   SATA Mode Selection          [AHCI]

   Serial ATA Port 1            Empty
     Port 1                     [Enabled]
     Hot Plug                   [Disabled]
   Serial ATA Port 2            Empty
     Port 2                     [Enabled]
     Hot Plug                   [Disabled]
   Serial ATA Port 3            Empty
     Port 3                     [Enabled]
     Hot Plug                   [Disabled]
                                                   ↔: 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 Screen

BIOS Setting	Options	Description/Purpose
SATA Controller(s)	- Disabled (Default) - Enabled	Enables or Disables SATA Device.
SATA Mode Selection	- AHCI (Default) - Intel® RST (RAID)	Determines how SATA controller(s) operate.
Serial ATA Port 1 – 3	No changeable options	Displays the SATA device's name.
Port 1 - 3	- Disabled - Enabled (Default)	Enables or Disables SATA Port Device.
Hot Plug	- Disabled (Default) - Enabled	Enables or Disables SATA Port Device Hot Plug function.

5.6 Security

Menu Path   *Security*

From the **Security** menu, you are allowed to create, change or clear the administrator password. You will be asked to enter the configured administrator password before you can access the Setup Utility. By setting an administrator password, you will prevent other users from changing your BIOS settings. You can configure an Administrator password and then configure a user password. An administrator has much more privileges over the settings in the Setup utility than a user. Heed that a user password does not provide access to most of the features in the Setup utility.

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



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```

<p align="center">Security Screen</p>

BIOS Setting	Options	Description/Purpose
Administrator Password	Password can be 3-20 alphanumeric characters.	Specifies the administrator password.
User Password	Password can be 3-20 alphanumeric characters.	Specifies the user password.
HDD Security Configuration	Sub-Menu	Enters sub-menu with option to enabled password protected HDD/SSD (if supported by SATA device).

Create an Administrator or User Password
1. Select the **Administrator Password** / **User Password** option from the Security menu and press <Enter>, and the password dialog entry box appears.
2. Enter the password you want to create. A password can be 3-20 alphanumeric characters. After you have configured the password, press <Enter> to confirm.
3. Type the new password again and press <Enter>.

Change an Administrator or User Password
1. Select the **Administrator Password** / **User Password** option from the Security menu and press <Enter>, and the password dialog entry box appears.
2. Select the Administrator Password or User Password that you want to change. A password can be 3-20 alphanumeric characters. After you have changed the password, press <Enter> to confirm.
3. Type the changed password again and press <Enter>.

Remove an Administrator or User Password
1. Select the **Administrator Password** / **User Password** option from the Security menu and press <Enter>, and the password dialog entry box appears.
2. Select the configured Administrator Password or User Password that you want to delete. Leave the dialog box blank and press <Enter>.
3. Press <Enter> again when the password confirmation box appears.

5.7 Boot

Menu Path	*Boot*

This menu provides control items for setting system boot configuration and boot priorities.

```
                              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.

   Boot Option Priorities
   Boot Option #1                    [UEFI: SanDisk Cruzer
                                     Blade 1.26, Partition
                                     1]

                                                   ↔: 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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```

Boot Screen

BIOS Setting	Options	Description/Purpose
Setup Prompt Timeout	Numeric (from 1 to 65535)	Number of seconds to wait for setup activation key.
Bootup NumLock State	- On (Default) - Off	Specifies the power-on state of the NumLock Key.
Quiet Boot	- Disabled (Default) - Enabled	Enables or Disables Quiet Boot options.
Boot Option #1~#n	- [Drive(s)] - Disabled	Sets the system boot order.

5.8   Save & Exit

Menu Path   *Save & Exit*

The **Save & Exit** allows users to save or discard changed BIOS settings as well as load factory default settings.

Save Changed BIOS Settings
To save and validate the changed BIOS settings, select **Save Changes** from the **Save & Exit** menu, or you can select **Save Changes and Exit** (or press **F4**) to validate the changes and then exit the system. Select **Save Changes and Reset** to validate the changed BIOS settings and then restart the system.

Discard Changed BIOS Settings
To cancel the BIOS settings you have previously configured, select **Discard Changes and Exit** from this menu, or simply press **Esc** to exit the BIOS setup. You can also select **Discard Changes and Reset** to discard any changes you have made and restore the factory BIOS defaults.

Load User Defaults
You may simply press **F3** at any time to load the **Optimized Values** which resets all BIOS settings to the factory defaults.

```
                            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
   Restore User Defaults                     →←: Select Screen
                                             ↑↓: Select Item
   Boot Override                             Enter: Select
   UEFI: SanDisk Cruzer Blade 1.26, Partition 1   +/–: Change Opt.
                                             F1: General Help
                                             F2: Previous Values
                                             F3: Optimized Defaults
                                             F4: Save & Exit
                                             ESC: Exit



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```

Save & Exit Screen

BIOS Setting	Options	Description/Purpose
Save Changes and Exit	No changeable options	Exits and saves the changes in NVRAM.
Discard Changes and Exit	No changeable options	Exits without saving any changes made in BIOS settings.
Save Changes and Reset	No changeable options	Saves the changes in NVRAM and resets.
Discard Changes and Reset	No changeable options	Resets without saving any changes made in BIOS settings.
Save Changes	No changeable options	Saves Changes done so far to any of the setup options.
Discard Changes	No changeable options	Discards Changes done so far to any of the setup options.
Restore Defaults	No changeable options	Loads the optimized defaults for BIOS settings.
Save as User Defaults	No changeable options	Saves the changes done so far as User Defaults.
Restore User Defaults	No changeable options	Restores the User Defaults to all the setup options.
Boot Override	- [Drive(s)]	Forces to boot from selected [drive(s)].

Appendix A   System Diagrams

This appendix includes the exploded diagrams of the system and the parts list as well as the part numbers of the SA-N718 system.

- SA-N718 System Exploded Diagram
- SA-N718 CPU Heat Sink Exploded Diagram
- SA-N718 SATA HDD Exploded Diagram
- SA-N718 PS-8080 Front Panel Assembly Exploded Diagram

SA-N718 System Exploded Diagram
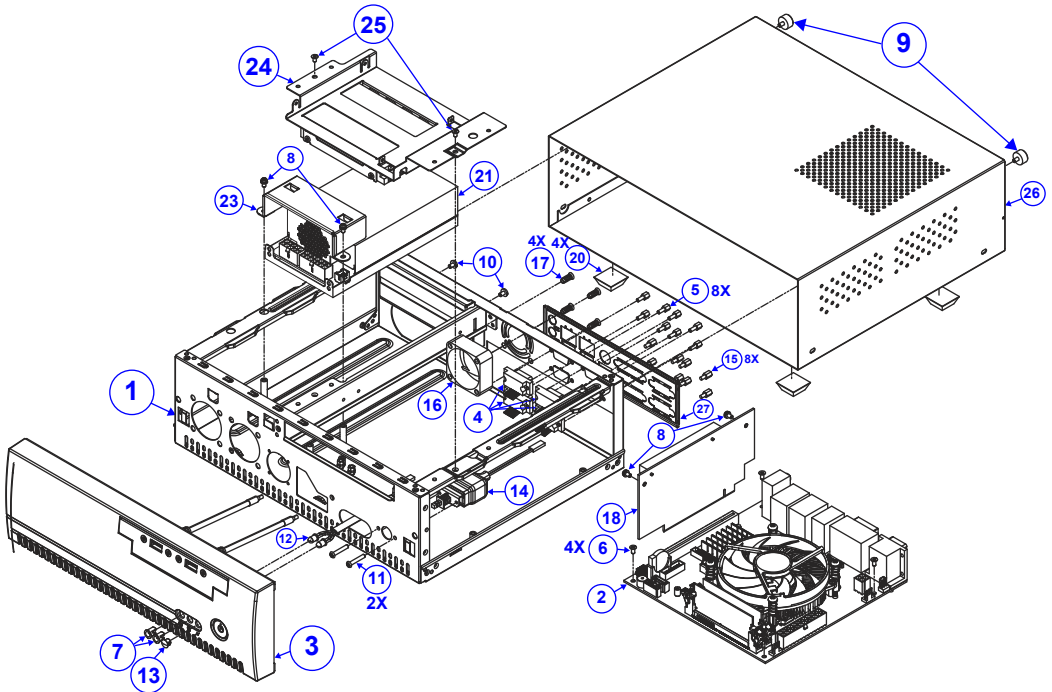
No.	Component Name	Part No.	Q'ty
1	SA-5701 Inner Chassis Asm	80-015-03001445	1
2	BM-D025_Main_PCB_Assy	See Page A-4	1
3	ST-1808 Front Panel STD Type C (Black)	See Page A-5	1
4	ST-1082/SA-5082 COM Port Cable (9M to 10F)L=95mm	27-024-23702031	4
5	HEX CU BOSS UNC No.4-40,L=4.8,H=7mm	22-692-40048051	8
6	Flat Head Screw M3x0.5Px6mm(Black)	22-215-30060011	4
7	LED HOUSING (Black)	30-014-04100009	2
8	Round Head With Spring Washer Screw M3x0.5Px6mm	22-232-30060211	4
9	Handel Head Screw #2 / UNC-No.6-32, L=6mm	22-302-06060011	2
10	Pan Head Screw UNC-No.6-32, L=5mm	22-622-60005011	2
11	Pan Head Screw M3x0.5Px18mm	22-222-30018011	2
12	PMB-531LF Power & HDD LED Cable L=190mm (GREEN&RED)	27-018-08204071	1
13	Hole Plug (Φ6.3~6.5mm)(Black)	30-054-04100000	1
14	SA-0897 Power Switch Cable L=200mm	27-019-25104071	1
15	HEX CU BOSS UNC No.4-40,L=5,H=6mm	22-392-40005301	8
16	S-C001/SA-5072/5706/5700/5852/5942/ST-1942 System Fan(40x40x20mm)L=250mm	21-004-04040360	1

No.	Component Name	Part No.	Q'ty
17	Flat Head Screw#2/T4.7x11mm	82-712-47011018	4
18	PCI-Express 16X Riser Card	52-152-16296000	1
20	BPC-8060/8070/8080/8580 Rubber Foot (20.5x20.5x7.6mm)(Black)	90-004-01100038	4
21	ATX 250W AC Power Supply(UL 62368)	52-001-00925001	1
23	SA-5701 FSP250-50FGBBI(M) Power Holder	20-229-03001445	1
24	Driver_Bay_Kit_Asm.	See Page A-5	1
25	Flat Head Screw #2/ ϕ 5/M3x0.5Px5mm	22-212-30005311	2
26	SA-5701 Top Chassis (w/Paint)(Black)	20-015-03061445	1
27	SA-5701 IO Shield + Mylar	80-010-07001445	1

SA-N718 CPU Heat Sink Exploded Diagram
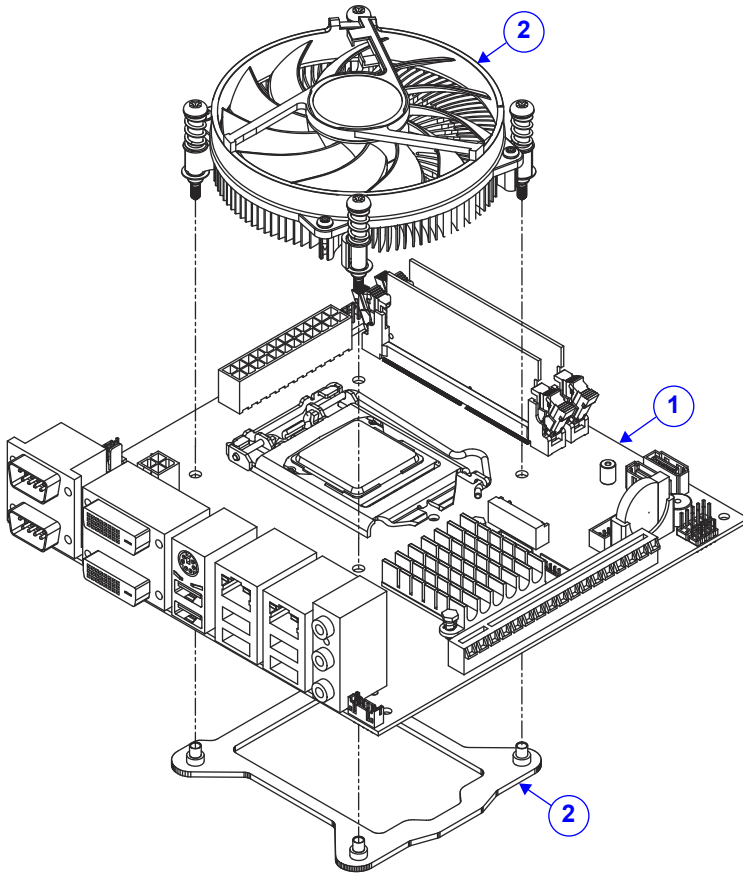
No.	Component Name	Part No.	Q'ty
1	BM_2505 MAINBOARD	-	1
2	CPU HEAT SINK(ϕ 90x13) & FAN (95x95x16.8mm) L=300mm	21-003-09595001	1

SA-N718 SATA HDD Exploded Diagram
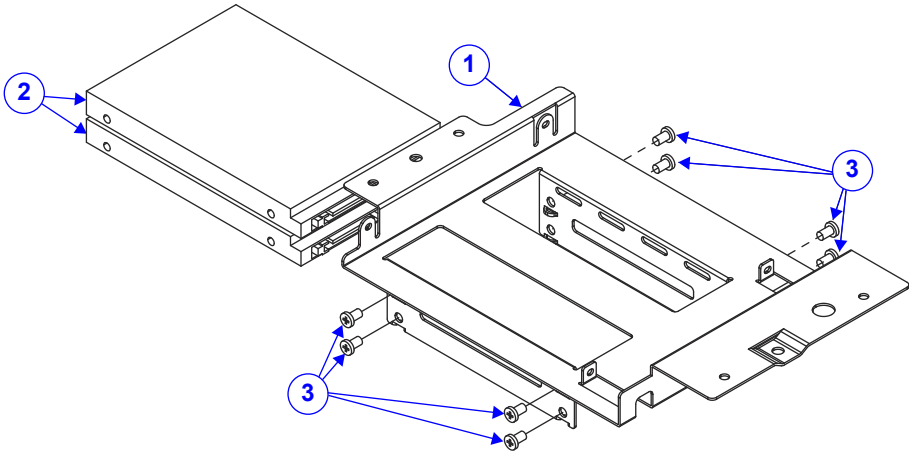
No.	Component Name	Part No.	Q'ty
1	PMB-531LF DRIVE BAY FOR 2.5" HDD	20-004-03001082	1
2	2.5"_HDD_SATA	-	2
3	FILLISTER HEAD SCREW #2 / M3x0.5Px5mm	22-272-30049015	8

SA-N718 PS-8080 Front Panel Assembly Exploded Diagram
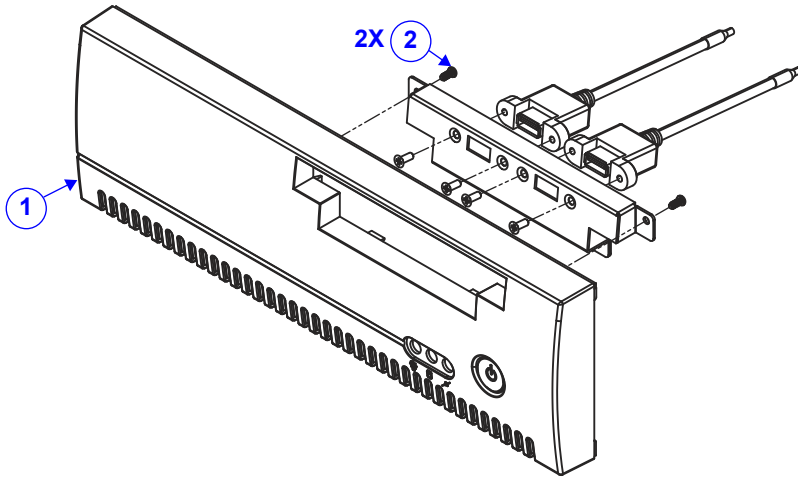
No.	Component Name	Part No.	Q'ty
1	ST-1808 Front Panel STD Type C(Black)	30-003-28210006	1
2	TRUSS Head Screw #2 / T3.0x1.3Px8mm	22-122-30008005	2

Appendix B   Technical Summary

This appendix will give you a brief introduction of the allocation maps for the system resources.

The following topics are included:
- Block Diagram
- Interrupt Map
- I/O Map
- DMA Channels Map
- Memory Map
- Configuring WatchDog Timer
- Flash BIOS Update

Block Diagram
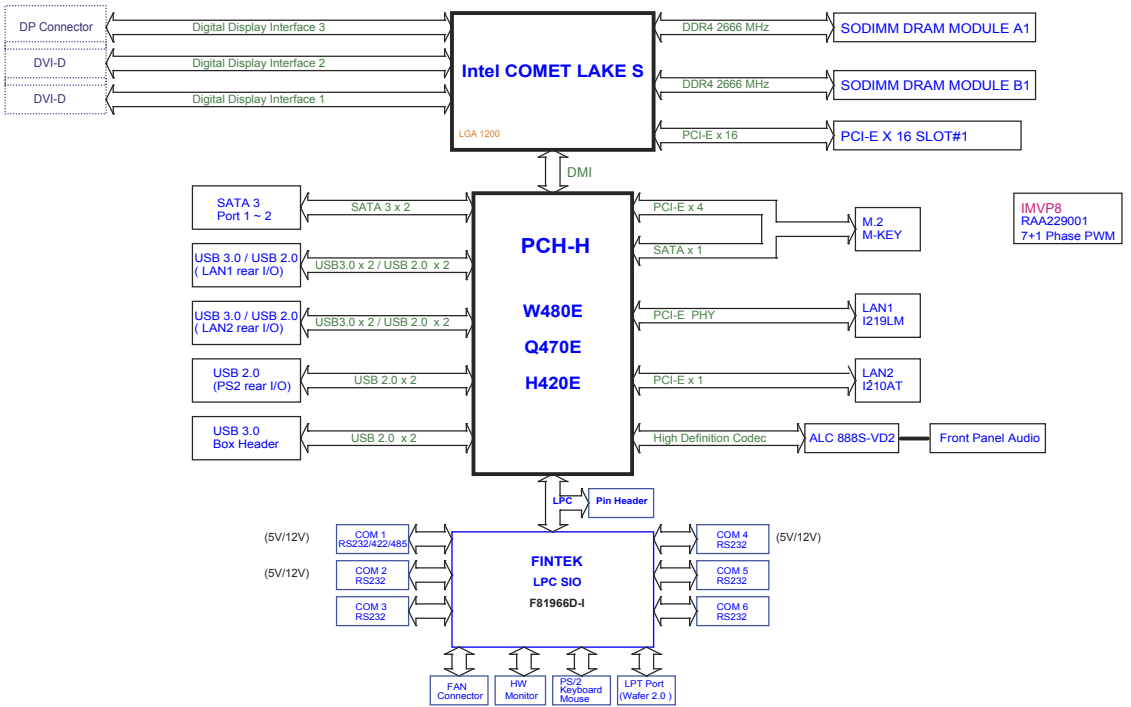
Interrupt Map

IRQ	Assignment
IRQ 0	System timer
IRQ 1	Standard PS/2 Keyboard
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 6	Communications Port (COM5)
IRQ 7	Communications Port (COM3)
IRQ 10	Communications Port (COM4)
IRQ 11	Communications Port (COM6)
IRQ 12	PS/2 Compatible Mouse
IRQ 13	Numeric data processor
IRQ 14	Intel(R) Serial IO GPIO Host Controller - INT3450
IRQ 16	High Definition Audio Controller
IRQ 19	SDA Standard Compliant SD Host Controller
IRQ 54	Microsoft ACPI-Compliant System
IRQ 55	Microsoft ACPI-Compliant System
IRQ 56	Microsoft ACPI-Compliant System
IRQ 57	Microsoft ACPI-Compliant System
IRQ 58	Microsoft ACPI-Compliant System
IRQ 59	Microsoft ACPI-Compliant System
IRQ 60	Microsoft ACPI-Compliant System
IRQ 61	Microsoft ACPI-Compliant System
IRQ 62	Microsoft ACPI-Compliant System
IRQ 63	Microsoft ACPI-Compliant System
IRQ 64	Microsoft ACPI-Compliant System
IRQ 65	Microsoft ACPI-Compliant System
IRQ 66	Microsoft ACPI-Compliant System
IRQ 67	Microsoft ACPI-Compliant System
IRQ 68	Microsoft ACPI-Compliant System
IRQ 69	Microsoft ACPI-Compliant System
IRQ 70	Microsoft ACPI-Compliant System
IRQ 71	Microsoft ACPI-Compliant System
IRQ 72	Microsoft ACPI-Compliant System
IRQ 73	Microsoft ACPI-Compliant System
IRQ 74	Microsoft ACPI-Compliant System
IRQ 75	Microsoft ACPI-Compliant System
IRQ 76	Microsoft ACPI-Compliant System
IRQ 77	Microsoft ACPI-Compliant System
IRQ 78	Microsoft ACPI-Compliant System

IRQ	Assignment
IRQ 79	Microsoft ACPI-Compliant System
IRQ 80	Microsoft ACPI-Compliant System
IRQ 81	Microsoft ACPI-Compliant System
IRQ 82	Microsoft ACPI-Compliant System
IRQ 83	Microsoft ACPI-Compliant System
IRQ 84	Microsoft ACPI-Compliant System
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IRQ 87	Microsoft ACPI-Compliant System
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IRQ 115	Microsoft ACPI-Compliant System
IRQ 116	Microsoft ACPI-Compliant System
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IRQ	Assignment
IRQ 118	Microsoft ACPI-Compliant System
IRQ 119	Microsoft ACPI-Compliant System
IRQ 120	Microsoft ACPI-Compliant System
IRQ 121	Microsoft ACPI-Compliant System
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IRQ	Assignment
IRQ 157	Microsoft ACPI-Compliant System
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IRQ	Assignment
IRQ 196	Microsoft ACPI-Compliant System
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IRQ	Assignment
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IRQ	Assignment
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IRQ	Assignment
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IRQ	Assignment
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IRQ	Assignment
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IRQ	Assignment
IRQ 481	Microsoft ACPI-Compliant System
IRQ 482	Microsoft ACPI-Compliant System
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IRQ 507	Microsoft ACPI-Compliant System
IRQ 508	Microsoft ACPI-Compliant System
IRQ 509	Microsoft ACPI-Compliant System
IRQ 510	Microsoft ACPI-Compliant System
IRQ 511	Microsoft ACPI-Compliant System
IRQ 1024	SDA Standard Compliant SD Host Controller
IRQ 4294967285	Intel(R) I210 Gigabit Network Connection
IRQ 4294967286	Intel(R) I210 Gigabit Network Connection
IRQ 4294967287	Intel(R) I210 Gigabit Network Connection
IRQ 4294967288	Intel(R) I210 Gigabit Network Connection
IRQ 4294967289	Intel(R) I210 Gigabit Network Connection
IRQ 4294967290	Intel(R) I210 Gigabit Network Connection
IRQ 4294967291	Intel(R) I210 Gigabit Network Connection

IRQ	Assignment
IRQ 4294967292	Intel(R) I210 Gigabit Network Connection
IRQ 4294967293	Intel(R) USB 3.1 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967294	Standard SATA AHCI Controller

Note: These resource information were gathered using Windows 10 (the IRQ could be assigned differently depending on OS).

I/O MAP

I/O Map	Assignment
0x00000000-0x00000CF7	PCI Express Root Complex
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x0000002E-0x0000002F	Motherboard resources
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller
0x0000003C-0x0000003D	Programmable interrupt controller
0x00000040-0x00000043	System timer
0x0000004E-0x0000004F	Motherboard resources
0x00000050-0x00000053	System timer
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000070-0x00000070	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A4-0x000000A5	Programmable interrupt controller
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B2-0x000000B3	Motherboard resources
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000000F0-0x000000F0	Numeric data processor
0x000002E0-0x000002E7	Communications Port (COM6)
0x000002E8-0x000002EF	Communications Port (COM4)
0x000002F0-0x000002F7	Communications Port (COM5)
0x000002F8-0x000002FF	Communications Port (COM2)
0x00000378-0x0000037F	Printer Port (LPT1)
0x000003E8-0x000003EF	Communications Port (COM3)

I/O Map	Assignment
0x000003F8-0x000003FF	Communications Port (COM1)
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000680-0x0000069F	Motherboard resources
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A20-0x00000A2F	Motherboard resources
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x0000164E-0x0000164F	Motherboard resources
0x00001800-0x000018FE	Motherboard resources
0x00001854-0x00001857	Motherboard resources
0x00002000-0x000020FE	Motherboard resources
0x00003000-0x00003FFF	Intel(R) PCI Express Root Port #11 - A332
0x00004000-0x0000403F	Intel(R) UHD Graphics P630
0x00004060-0x0000407F	Standard SATA AHCI Controller
0x00004080-0x00004083	Standard SATA AHCI Controller
0x00004090-0x00004097	Standard SATA AHCI Controller
0x0000EFA0-0x0000EFBF	Intel(R) SMBus - A323
0x0000FFF8-0x0000FFFF	Intel(R) Active Management Technology - SOL (COM8)

DMA Channels Map

DMA Channels Map	Assignment
Channel 3	Printer Port (LPT1)

Memory Map

Memory Map	Assignment
0xFED10000-0xFED17FFF	Motherboard resources
0xFED18000-0xFED18FFF	Motherboard resources
0xFED19000-0xFED19FFF	Motherboard resources
0xE0000000-0xEFFFFFFF	Motherboard resources
0xFED20000-0xFED3FFFF	Motherboard resources
0xFED90000-0xFED93FFF	Motherboard resources
0xFED45000-0xFED8FFFF	Motherboard resources
0xFEE00000-0xFEEFFFFF	Motherboard resources
0xA1100000-0xA111FFFF	Intel(R) I211 Gigabit Network Connection
0xA1100000-0xA111FFFF	Intel(R) PCI Express Root Port #11 - A332
0xA1120000-0xA1123FFF	Intel(R) I211 Gigabit Network Connection
0xFED00000-0xFED003FF	High precision event timer
0xA1220000-0xA122FFFF	Intel(R) USB 3.1 eXtensible Host Controller - 1.10 (Microsoft)
0xFE1DD000-0xFE1DDFFF	Intel(R) Serial IO I2C Host Controller - A369
0xFD000000-0xFD69FFFF	Motherboard resources
0xFD6C0000-0xFD6CFFFF	Motherboard resources
0xFD6F0000-0xFDFFFFFF	Motherboard resources
0xFE000000-0xFE01FFFF	Motherboard resources
0xFE200000-0xFE7FFFFF	Motherboard resources
0xFF000000-0xFFFFFFFF	Motherboard resources
0x90000000-0xDFFFFFFF	PCI Express Root Complex
0x90000000-0xDFFFFFFF	Intel(R) UHD Graphics P630
0xFC800000-0xFE7FFFFF	PCI Express Root Complex
0xA1234000-0xA1235FFF	Standard SATA AHCI Controller
0xA123A000-0xA123A0FF	Standard SATA AHCI Controller
0xA1239000-0xA12397FF	Standard SATA AHCI Controller
0xFE010000-0xFE010FFF	Intel(R) SPI (flash) Controller - A324
0xFE1DF000-0xFE1DFFFF	Intel(R) Active Management Technology - SOL (COM8)
0xFED40000-0xFED44FFF	Trusted Platform Module 2.0
0xFE1DC000-0xFE1DCFFF	Intel(R) Management Engine Interface

Memory Map	Assignment
0xFE1DE000-0xFE1DEFFF	Intel(R) Serial IO I2C Host Controller - A368
0xA0000000-0xA0FFFFFF	Intel(R) UHD Graphics P630
0xFE1E0000-0xFE1FFFFF	Intel(R) Ethernet Connection (7) I219-LM
0xFD6E0000-0xFD6EFFFF	Intel(R) Serial IO GPIO Host Controller - INT3450
0xFD6D0000-0xFD6DFFFF	Intel(R) Serial IO GPIO Host Controller - INT3450
0xFD6B0000-0xFD6BFFFF	Intel(R) Serial IO GPIO Host Controller - INT3450
0xFD6A0000-0xFD6AFFFF	Intel(R) Serial IO GPIO Host Controller - INT3450
0xFE1D8000-0xFE1DBFFF	High Definition Audio Controller
0xFCF00000-0xFCFFFFFF	High Definition Audio Controller
0xA1238000-0xA12380FF	Intel(R) SMBus - A323
0xA0000-0xBFFFF	PCI Express Root Complex
0xE0000-0xE3FFF	PCI Express Root Complex
0xE4000-0xE7FFF	PCI Express Root Complex
0xE8000-0xEBFFF	PCI Express Root Complex
0xEC000-0xEFFFF	PCI Express Root Complex
0xF0000-0xFFFFF	PCI Express Root Complex
0x40000000-0x403FFFFF	Motherboard resources

Configuring WatchDog Timer

The I/O port address of the watchdog timer is 2E (hex) and 2F (hex). 2E (hex) is the address port. 2F (hex) is the data port. User must first assign the address of register by writing address value into address port 2E (hex), then write/read data to/from the assigned register through data port 2F (hex).

Configuration Sequence

To program F81966 configuration registers, the following configuration sequence must be followed:

(1) Enter the extended function mode

To place the chip into the Extended Function Mode, two successive writes of 0x87 must be applied to Extended Function Enable Registers (EFERs, i.e. 2Eh or 4Eh).

(2) Configure the configuration registers

The chip selects the Logical Device and activates the desired Logical Devices through Extended Function Index Register (EFIR) and Extended Function Data Register (EFDR). The EFIR is located at the same address as the EFER, and the EFDR is located at address (EFIR+1). First, write the Logical Device Number (i.e. 0x07) to the EFIR and then write the number of the desired Logical Device to the EFDR. If accessing the Chip (Global) Control Registers, this step is not required. Secondly, write the address of the desired configuration register within the Logical Device to the EFIR and then write (or read) the desired configuration register through the EFDR.

(3) Exit the extended function mode

To exit the Extended Function Mode, writing 0xAA to the EFER is required. Once the chip exits the Extended Function Mode, it is in the normal running mode and is ready to enter the configuration mode.

Code example for watch dog timer

Enable watchdog timer and set timeout interval to 30 seconds.

```
; ---------------------- Enter to extended function mode ---------------------------
mov      dx,   2Eh
mov      al,   87h
out      dx,   al
out      dx,   al
; --------------------- Select Logical Device 7 of watchdog timer -------------------
mov      al,   07h
out      dx,   al
inc      dx
mov      al,   07h
out      dx,   al
;----------------------------Enable Watch dog feature ----------------------------
dec      dx
mov      al,   30h
out      dx,   al
inc      dx
mov      al,   01h
out      dx,   al
; --------------- Set timeout interval as 30seconds and start counting --------------
dec      dx
mov      al,   F6h
out      dx,   al
inc      dx
mov      al,   1Eh
out      dx,   al
;---------------------------- Enable Watch PME-----------------------------------
dec      dx
mov      al,   FAh
out      dx,   al
inc      dx
in       al,   dx
or       al,   51h
out      dx,   al
;------------------------ Set second as counting unit ----------------------------
dec      dx
mov      al,   F5h
out      dx,   al
inc      dx
in       al,   dx
and      al,   DEh
out      dx,   al
;------------------------ Start the watchdog timer --------------------------------
or       al,   20h
out      dx,   al
;----------------------------Exit the extended function mode -----------------------
dec      dx
mov      al,   AAh
out      dx,   al
```
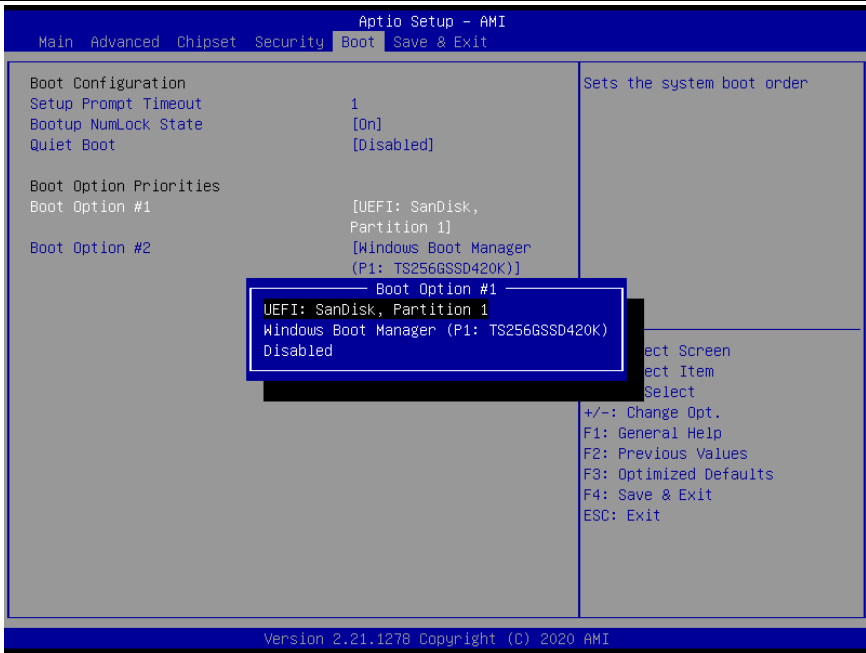
Flash BIOS Update

I. Prerequisites

1 Prepare a bootable media (ex. USB storage device) which can boot system to EFI Shell.

Note: Copy UEFI Shell into the storage device under specific directory path. (/efi/boot/bootx64.efi)

2 Download and save the BIOS file (e.g. D0250PQ1.bin) to the storage device.

3 Copy AMI flash utility – AfuEfix64.efi (v5.13.00.05) into bootable device.

4 Make sure the targeted system can first boot to the EFI shell environment.

(1) Connect the bootable USB device.

(2) Turn on the computer and press <**ESC**> or <**DEL**> key during boot to enter BIOS Setup.

(3) Select [**Boot**] menu and set the USB bootable device to be the 1st boot device.

(4) Press <**F4**> key to save configuration and exit the BIOS setup menu.

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

   Boot Configuration                                    Sets the system boot order
   Setup Prompt Timeout                1
   Bootup NumLock State                [On]
   Quiet Boot                          [Disabled]

   Boot Option Priorities
   Boot Option #1                      [UEFI: SanDisk,
                                       Partition 1]

   Boot Option #2                      [Windows Boot Manager
                                       (P1: TS256GSSD420K)]
                    ┌──────── Boot Option #1 ────────┐
                    │ UEFI: SanDisk, Partition 1     │
                    │ Windows Boot Manager (P1: TS256GSSD420K) │ect Screen
                    │ Disabled                       │ect Item
                    └────────────────────────────────┘ Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit



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```

II. AFUDOS Command for System BIOS Update

AFUEFIx64.efi is the AMI firmware update utility. The command line is shown as below:

AFUEFIx64 <ROM File Name> [option1] [option2]….

Users can type "AFUEFIx64 /?" to view the definition of each control option. The recommended options for BIOS ROM update include the following parameters:

/**P**: Program main BIOS image.

/**B**: Program Boot Block.

/**N**: Program NVRAM.

/**X**: Don't check ROM ID.

III. BIOS Update Procedure

1   Boot into EFI Shell, change to the path where you put BIOS image and AFUEFIx64.

```
Shell> fs0:
 fs0:\> cd afuefix64
```

2   Type "**AfuEfix64 D025xxxx.bin /p /b /n /x"** and press Enter to start the flash procedure. (xxxx means the BIOS revision part, e.g. 0PQ1…)

3   During the update procedure, you will see the BIOS update process status and the percentage it has been updated. **Beware!** Do not turn off system power or reset your computer if the whole update procedure is not completed yet, or it may crash the BIOS ROM and the system will be unable to boot up next time.

4   After BIOS update procedure is completed, the following messages will be shown:

```
fs0:\> afuefix64 D0250PQ1.bin /p /b /n /x

+------------------------------------------------------------------------------+
|                        AMI Firmware Update Utility v5.13.00.05              |
|      Copyright (C) 1985-2020, American Megatrends International LLC.         |
|         All rights reserved. Subject to AMI licensing agreement.            |
+------------------------------------------------------------------------------+
Reading flash ............... done
- FFS checksums ......... ok
Erasing Boot Block .......... done
Updating Boot Block ......... done
Verifying Boot Block ........ done
Erasing Main Block .......... done
Updating Main Block ......... done
Verifying Main Block ........ done
Erasing NVRAM Block ......... done
Updating NVRAM Block ........ done
Verifying NVRAM Block ....... done


fs0:\>
```

5   Restart the system and boot up with the new BIOS
      configuration.

6   The BIOS Update is completed after the system is restarted.

7   Reboot the system and verify if the BIOS version shown on the
      initialization screen has been updated.


```
Version 2.21.1278. Copyright (C) 2021 AMI.
BIOS Date: 08/05/2021 16:01:21 Ver: D0250PQ1
Press <DEL> or <ESC> to enter setup.
```