USER'S MANUAL

DSP511 Series

Digital Signage Player with 11th Gen Intel® Core™ i5/i3 & Celeron® Processor

AXIOMTEK

www.axiomtek.com

Disclaimers

This manual has been carefully checked and believed to contain accurate information. Axiomtek Co., Ltd. assumes no responsibility for any infringements of patents or any third party's rights, or any liability arising from such uses.

Axiomtek does not warrant or assume any legal liability or responsibility for the accuracy, completeness or usefulness of any information in this document. Axiomtek does not make any commitment to update any information in this manual.

Axiomtek reserves the right to change or revise this document and/or product at any time without notice.

No part of this document may be reproduced, stored in a retrieval system, or transmitted in any forms or by any means, electronic, mechanical, photocopying, recording, among others, without prior written permissions of Axiomtek Co., Ltd.

Safety Precautions

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

1. The DSP511 does not come with an operating system which must be loaded first before installation of any software into the computer.

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

3. Disconnect the power cord from the DSP511 prior to making any installation. Be sure both the system and all external devices are turned OFF. Sudden surge of power could ruin sensitive components. Make sure the DSP511 is properly grounded.

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

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

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

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

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

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

Classifications

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

General Cleaning Tips

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

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

Cleaning Tools:

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

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

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

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

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

Scrap Computer Recycling

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

Trademarks Acknowledgments

Axiomtek is a trademark of Axiomtek Co., Ltd.

IBM, PC/AT, PS/2, VGA are trademarks of International Business Machines Corporation. Intel® and Pentium® are registered trademarks of Intel Corporation.

MS-DOS, Microsoft C and QuickBasic, Windows 10, Windows 8.1, Windows 8, Windows 7, Windows XPE, Windows XP, Windows CE embedded, Linux are trademarks of Microsoft Corporation.

Other brand names and trademarks are the properties and registered brands of their respective owners.

Table of Contents

SECTION 1
INTRODUCTION

This section contains general information and detailed specifications of the DSP511. Section 1 consists of the following sub-sections:

- General Descriptions
- System Specifications
- Dimensions
- I/O Outlets
- Packing List

1.1 General Descriptions

The DSP511 is a fanless digital signage player that comes with an Intel® Core™ i5-1145G7E, i3-1115G4E, or Celeron® 6305E processor onboard (formally codename: Tiger Lake) with low power consumption design. To fulfill the application needs of digital signage, smart retail, and smart cities, the embedded system supports Windows® 10 IoT and can be wall-mounted and VESA mounted as optional requests.

The DSP511 features an ultra-slim size, low power consumption, and functions fundamental to successful digital signage deployment. It is equipped with dual 260-pin DDR4-3200 SO-DIMMs with up to 64GB memory capacity and has a full range of I/O interfaces to support RS-232, audio, USB 3.2 and USB 2.0 signals. This compact fanless signage player is capable of serving four independent displays with 4K resolution through its HDMI ports. Furthermore, the DSP511 is offering 12 voltage DC power input and six antenna connectors for setting up Wi-Fi or 5G networks.

Features

- 11th generation Intel® Core™ i5-1145G7E 4.1GHz, i3-1115G4E 3.9GHz, Celeron® 6305E 1.8GHz SoC
- 2 x DDR4-3200 SO-DIMM max. up to 64GB
- 1 COM port, 4 USB ports, 1GbE and 2.5GbE LANs
- 4 HDMI 2.0 for 4K UHD content
- 1 x M.2 M Key 2280 (SATA/NVMe) for storage
- 1 x M.2 E Key 2230 for WLAN and WWAN
- 1 x M.2 B Key 3052 for 4G/5G option
- Fanless, ultra-slim and compact design
- Suitable for digital signage and smart retail applications

Reliable and Stable Design

The DSP511 signage player comes equipped with Intel® Core™ i5-1145G7E 4.1GHz, i3-1115G4E 3.9GHz, Celeron® 6305E 1.8GHz, ultra-slim size and basic functions, providing the best solution for smart retails and light industries.

Flexible Connectivity

The DSP511 comes with basic interfaces including one RS-232 port, three USB 3.2 ports, one USB 2.0 port, four HDMI, one GbE and one 2.5GbE LAN ports.

Embedded O.S. Supported

The DSP511 supports Windows® 11, Windows® 10 IoT and Linux.

1.2 System Specifications

1.2.1 CPU

- **CPU**
  - ■ 11th generation Intel® Core™ i5-1145G7E 4.1GHz, i3-1115G4E 3.9GHz, Celeron® 6305E 1.8GHz SoC

- **Chipset**
  - ■ SoC integrated

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

- **System Memory**
  - ■ Two 260-pin DDR4-3200 SO-DIMM sockets, up to 64GB at the maximum.

1.2.2 I/O System

● **Display**
   ■ 4 x HDMI (HDMI 2.0 up to 4096 x 2160@60Hz)

● **Ethernet**
   ■ 1 x 10/100/1000 Ethernet port (i219LM)
   ■ 1 x 10/100/1000/2500 Ethernet port(i225LM)

● **USB Ports**
   ■ 1 x USB 2.0
   ■ 3 x USB 3.2

● **Serial Ports**
   ■ 1 x RS-232 (9-pin D-Sub male connector)

● **Expansion Interface**
   ■ 1 x M.2 E Key 2230 socket for WiFi/Bluetooth options
   ■ 1 x M.2 B Key 3052 socket for 5G/4G options
   ■ 1 x M.2 M Key 2280 (SATA/NVMe) storage

● **Storage**
   ■ 1 x M.2 M Key 2280 (SATA/NVMe)
   ■ 1 x SIM slot

● **Audio**
   ■ HD audio compliant with Realtek ALC888
   ■ Support Line-out and MIC-in through 1 x audio jack.

● **Indicator**
   ■ 1 x Green LED as indicator for HDD active

● **Switch**
   ■ 1 x ATX PWR switch
   ■ 1 x Remote PWR switch
   ■ 1 x Reset switch

● **Antenna**
   ■ 6 x SMA type connector openings for antenna

1.2.3 System Specifications

● **Watchdog Timer**
  - 1~255 seconds or minutes; up to 255 levels.

● **Power Supply**
  - 12VDC /84W AC to DC adapter

● **Operation Temperature**
  - 0℃ ~+50℃ (32 ⁰F ~ 122⁰F)

● **Humidity**
  - 10% ~ 95% (non-condensation)

● **Vibration Endurance**
  - 3Grm (5-500Hz, X, Y, Z directions)

● **Weight**
  - 1.15 kg (2.53 lb) without package
  - 1.50 kg (3.3 lb) with package

● **Dimension**
  - 260 mm (10.23") x 160 mm (6.3") x 26 mm (1.02")

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

1.3 Dimensions

The following diagrams show dimensions and outlines of the DSP511.

1.3.1 System Dimensions
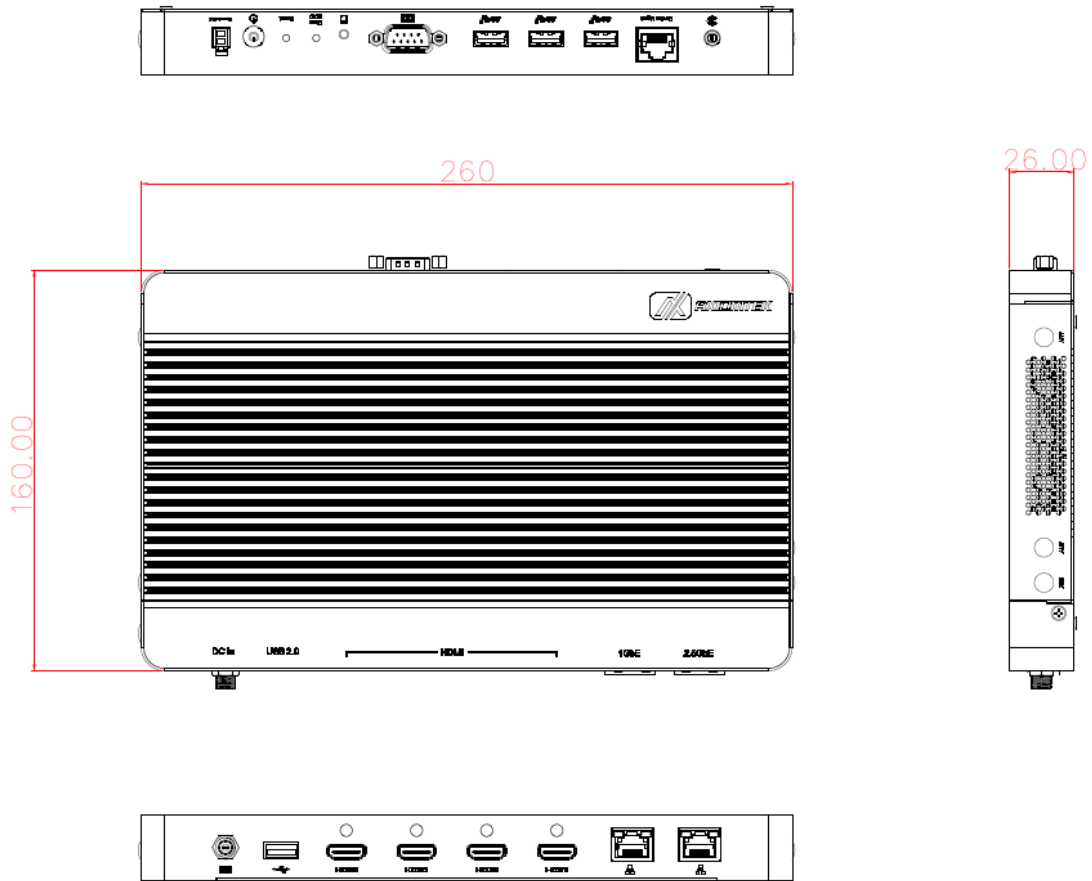
1.3.2 Wall/VESA-mount Bracket Dimensions
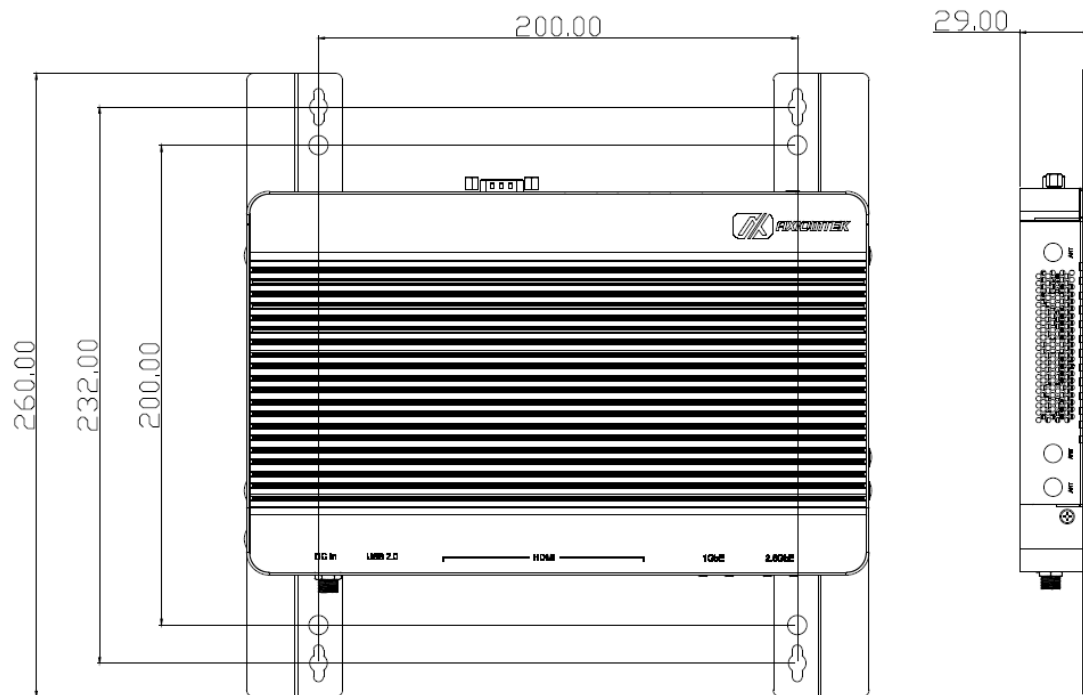
Instruction
Step 1: Screw the two pieces of vesa/wall-mount kits to the bottom plate of the device. Total four screws (metric 3 x6) are required.

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

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

1.4 I/O Outlets

The following figures show I/O outlets on the DSP511.

Front View

Rear View

1	12VDC power input	8	USB 3.2
2	USB 2.0	9	RS-232
3	4x HDMI	10	Clear EDID button
4	GbE LAN	11	Reset button
5	2.5GbE LAN	12	Power button
6	Audio jack (line_out/Mic_in)	13	Remote power switch
7	Device management port		

1.5 Packing List

The DSP511 comes with the following bundle package:

- DSP511 System Unit x 1

- Screw Type AC 84W (12V/7A) Adaptor x 1

- Optional DDR4 SO-DIMM Memory

- Optional Antenna

- Optional M.2 WiFi/BT module

- Optional 5G/4G module

- Optional M.2 2280 SSD

- Optional Power Cord

- Optional VESA/Wall-mount bracket

SECTION 2
HARDWARE INSTALLATION

The DSP511 is convenient for various hardware configurations such as DRAM, SSD (Solid State Drive) and M.2 modules. Section 2 contains guidelines for hardware installation.

2.1 Installation of SO-DIMM Memory

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

Step 2 Turn the system upside down to locate screw at the bottom then loosen one screw.
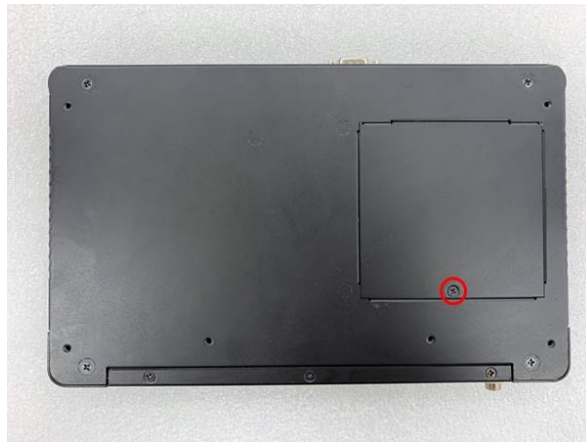
Step 3 Open the DRAM cover and locate the SO-DIMM socket on the board.
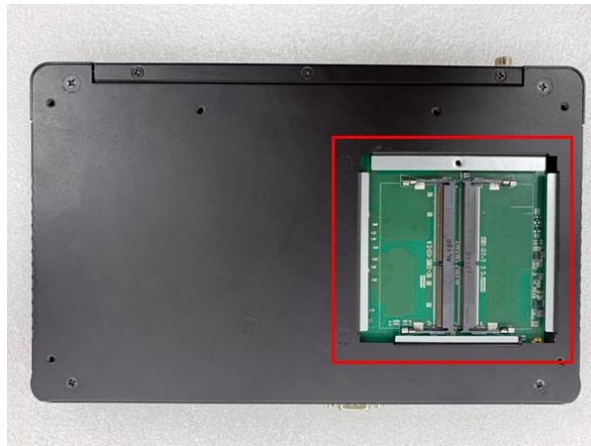
**Step 4 Insert a gold-colored contact into the socket and push the module two
end latches till locked of the DRAM.**

Step 5 Put the DRAM cover and fasten one screw back into the system.

2.2 Installation of SSD Module (M.2 M Key)

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

Step 2 **Turn the system upside down to locate screws at the bottom then loosen all screws.**

Step 3 **Open the TOP cover , located the M.2 socket on main board.**

Step 4 **Identify the M.2 M Key slot, insert a SSD module into the socket and then fasten a screw.**

Step 5 **Put the TOP cover and fasten four screws back into the system.**

2.3 Installation of 5G/4G/LTE module (M.2 B Key)

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

Step 2 Turn the system upside down to locate screw at the bottom then loosen one screw.
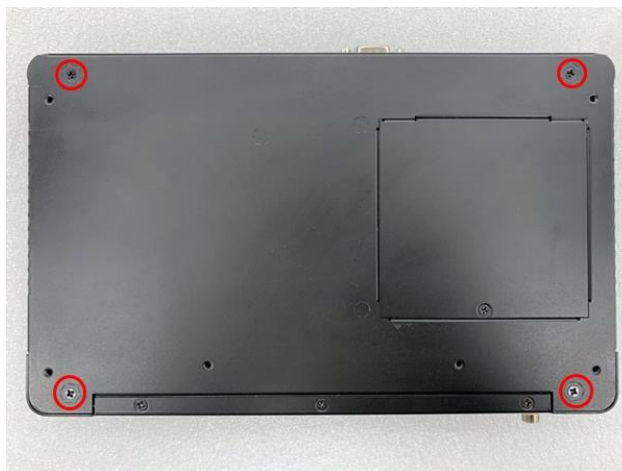
Step 3 Open the TOP cover , located the M.2 socket on main board.

Step 4 Identify the M.2 B Key slot, insert a 5G/4G/LTE module into the socket and then fasten a screw.

Step 5 Put the TOP cover and fasten four screws back into the system.

2.4 Installation of SIM card module

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

Step 2 Turn the system upside down to locate screws at the bottom then loosen all screws.

Step 3 Open the TOP cover , located the SIM Card socket on main board.

Step 4 Identify the SIM Card slot, insert a SIM Card module into the socket.
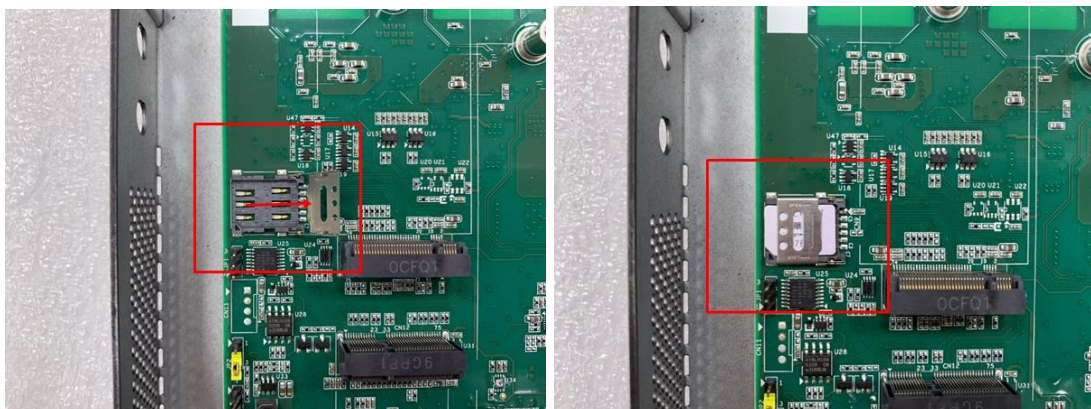
Step 5 Put the TOP cover and fasten four screws back into the system.

2.5 Installation of M.2 Key E WiFi/BT Module

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

Step 2   Turn the system upside down. Locate and loosen the four screws at the bottom, as illustrated below.
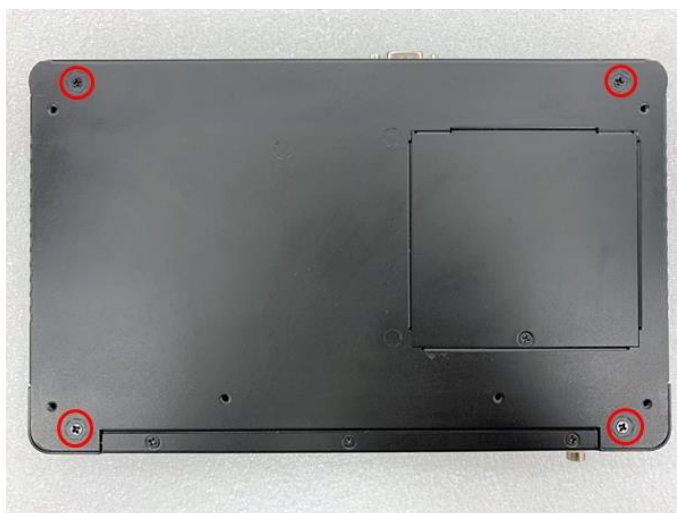
Step 3 Open the TOP cover and locate the M.2 E key slot on the main board.

Step 4 Insert a Wireless module into the socket and then fasten it with a screw.

Step 5 Put the TOP cover and fasten four screws back into the system.

SECTION 3
JUMPER & CONNECTOR SETTINGS

Proper jumper settings configure the DSP511 to meet various application needs. Hereby all jumpers settings along with their default settings are listed for devices onboard.

3.1 Locations of Jumpers & Connectors

SBC87535 Top View

Bottom View
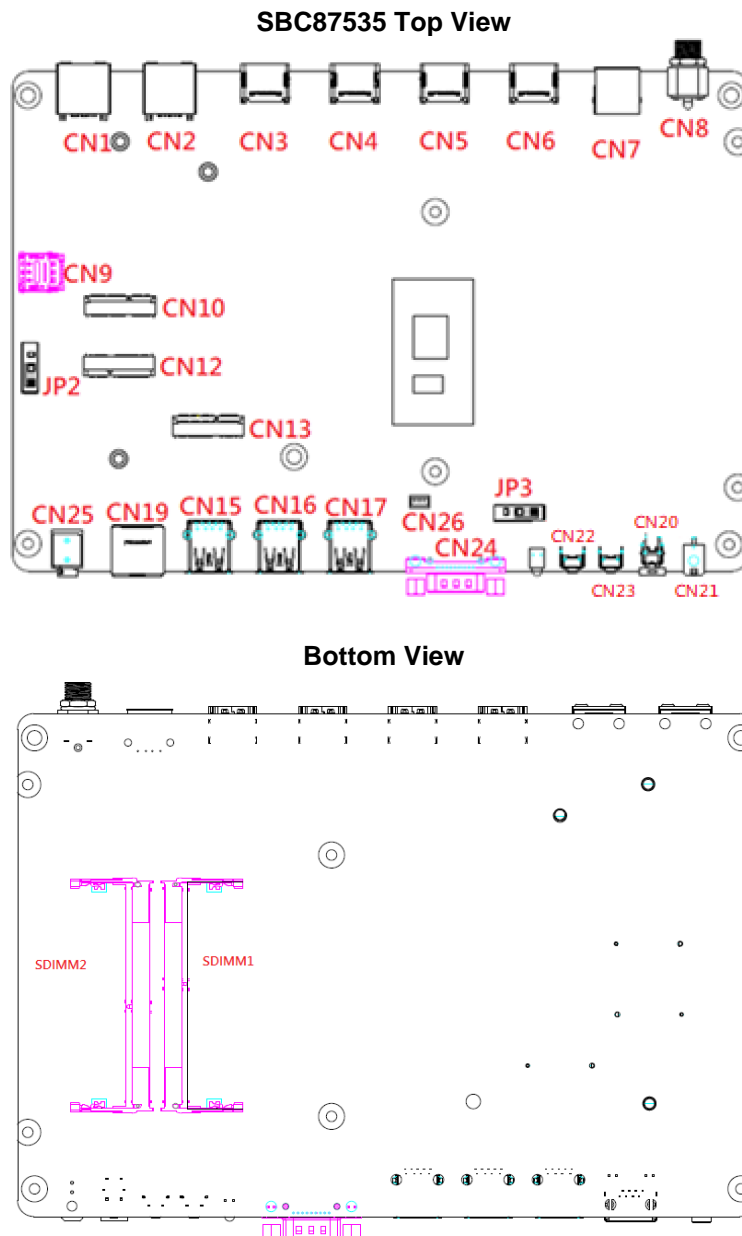
【Note】: *It is strongly recommended that any unmentioned jumper settings should not be modified without instructions by Axiomtek FAEs. Any modifications without instructions might cause system failure.*

3.2 Summary of Jumper Settings

Proper jumper settings configure the DSP511 to meet various application purposes. A table of all jumpers and their default settings is listed below.

Jumper	Description	Setting
JP2	Auto Power On Default: Enable	1-2 Enable (Default)
		2-3 Disable
JP3	Restore BIOS Optimal Defaults Default: Normal Operation	1-2 Normal (Default)
		2-3 Enable

【Note】 : **How to setup Jumpers**

A jumper is a small component consisting of a jumper clip and jumper pins. Place a jumper clip on two jumper pins to close; remove a jumper clip from two jumper pins to open. The following illustration shows how to set up a jumper.
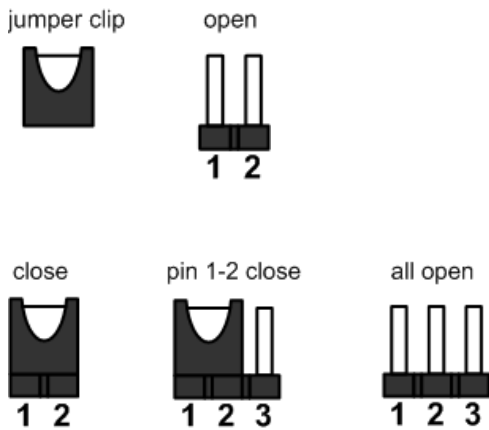
【Note】 : *Once the default jumper or switch setting needs to be changed, please do it under power-off condition.*

3.2.1 Auto Power On (JP2)

If the pin 1_2 of JP2 is shorted, the system will be automatically power on without pressing soft power button. If the pin 2_3 of JP2 is shorted, it is necessary to manually press soft power button to power on the system.

Functions	Settings
Auto Power On: Enabled (Default)	1-2 close
Auto Power On: Disabled	2-3 close

3.2.2 Restore BIOS Optimal Defaultes (JP3)

To restore BIOS optimal defaults, please put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2.

Functions	Settings
Normal (Default)	1-2 close
Restore BIOS optimal defaults	2-3 close

3.3 Connectors

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

Connector	Description
CN8	DC Power Jack
CN24	COM1 DB9 Connector
CN3~CN6	HDMI Connector
CN1	2.5GbE LAN Port
CN2	One GbE LAN Port
CN20	ATX Power On/Off Button
CN23	Reset Button
CN21	Remote Power Switch Connector
CN7	USB 2.0 Port
CN15~CN17	USB 3.2 Port
CN25	Audio Jack(Line Out/Mic In)
CN10	M.2 B Key Socket
CN9	SIM Card Slot
CN13	M.2 M Key Socket
CN12	M.2 E Key Socket
CN19	Device Management Port
CN22	Clear EDID Button
SDIMM1	260-Pin DDR4 Channel A SO-DIMM Socket
SDIMM2	260-Pin DDR4 Channel B SO-DIMM Socket

3.3.1 DC Power Jack Connector (screw type) (CN8)

The system supports 12V DC-in connector for system power input. The CN8 is a DC jack with a screw. Firmly insert an adapter with at least 84W power output into this connector. To prevent system instability caused by loose connection, make sure all components/devices are properly installed before connecting.
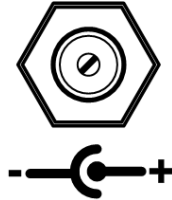
3.3.2 COM1 DB9 Connector (CN24)

The system has one serial port. COM1 is an RS-232 port.

Pins	Signals
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI
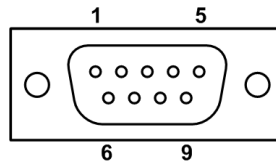
3.3.3 HDMI Connector (CN3~CN6)

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

Pins	Signals	Pins	Signals
1	HDMI OUT_DATA2+	2	GND
3	HDMI OUT_DATA2-	4	HDMI OUT_DATA1+
5	GND	6	HDMI OUT_DATA1-
7	HDMI OUT_DATA0+	8	GND
9	HDMI OUT_DATA0-	10	HDMI OUT_Clock+
11	GND	12	HDMI OUT_Clock-
13	N.C.	14	N.C.
15	HDMI OUT_SCL	16	HDMI OUT_SDA
17	GND	18	+5V
19	HDMI_HTPLG		
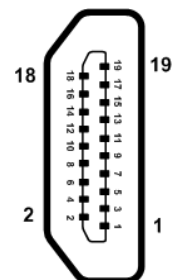
3.3.4 2.5GbE LAN Port (CN1)

The system has one RJ-45 connectors: CN1. Ethernet connection can be established by plugging one end of the Ethernet cable into this RJ-45 connector and the other end (phone jack) to a 2500/1000/100/10-Base-T hub.

Pins	2500/1000 Base-T	100/10 Base-T	Descriptions
L1	BI_DA+	TX+	Bidirectional or Transmit Data+
L2	BI_DA-	TX-	Bidirectional or Transmit Data-
L3	BI_DB+	RX+	Bidirectional or Receive Data+
L4	BI_DC+	N.C.	Bidirectional or Not Connected
L5	BI_DC-	N.C.	Bidirectional or Not Connected
L6	BI_DB-	RX-	Bidirectional or Receive Data-
L7	BI_DD+	N.C.	Bidirectional or Not Connected
L8	BI_DD-	N.C.	Bidirectional or Not Connected
A	Active Link LED (Yellow) Off: No link Blinking: Data activity detected		
B	Speed LED 2500: Orange 1000: Green 100: OFF 10: OFF		
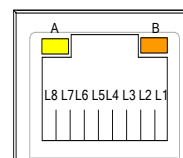
3.3.5 One GbE LAN Port (CN2)

The system has one RJ-45 connectors: CN2. Ethernet connection can be established by plugging one end of the Ethernet cable into this RJ-45 connector and the other end (phone jack) to a 2500/1000/100/10-Base-T hub.

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

	Blinking: Data activity detected
B	Speed LED 1000: Orange 100: Green 10: OFF
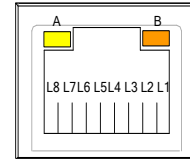
3.3.6 ATX Power On/Off button (CN20)

The ATX power button is on the I/O side. It allows users to control DSP511 power on/off.

Functions	Descriptions
On	Turn on/off system
Off	Keep system status

3.3.7 Reset button (CN23)

The Reset button allows users to reset DSP511 when an abnormal situation occurs during system operation.

Functions	Descriptions
On	Reset system
Off	Keep system status

Reset

3.3.8 Remote Power Switch Connector (CN21)

The system has one 2-pin connector output for remote power on/off switch.

Functions	Descriptions
Short(1-2)	Turn on/off system
Open	Keep system status
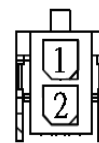
3.3.9 USB 2.0 Port (CN7)

The USB1 is a Universal Serial Bus (compliant with USB 2.0 (480Mbps)) connector on the rear I/O. It is commonly used for installing USB peripherals such as keyboard, mouse, scanner, etc.

CN7

Pins	Signals
1	USB VCC (+5V_SBY)
2	USB #4_D-
3	USB #4_D+
4	GND
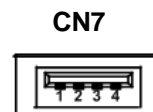
3.3.10 USB 3.2 Port (CN15/CN16/CN17)

The Universal Serial Bus (compliant with USB 3.2 (5Gb/s)) connector on the rear I/O is for installing USB peripherals such as keyboard, mouse, scanner, etc.

Pin	Signal	Pin	Signal
1	USB_VCC (+5V_SBY)	10	USB_VCC (+5V_SBY)
2	USB_Data3-	11	USB_Data4-
3	USB_Data3+	12	USB_Data4+
4	GND	13	GND
5	SSRX3-	14	SSRX4-
6	SSRX3+	15	SSRX4+
7	GND	16	GND
8	SSTX3-	17	SSTX4-
9	SSTX3+	18	SSTX4+

CN15/16/17
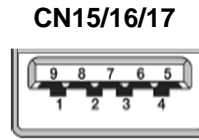
3.3.11 Audio Jack Line-out Connector (CN25)

The DSP511 provides one HD audio combo jack Line_out/MIC_in connector.

Pins	Signals
1	SLEEVE
2	LINEOUT_L
3	RING
4	LINEOUT_R
5	GND
6	HPOUT_JD
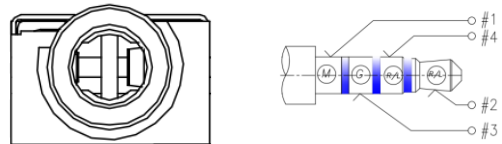
3.3.12 M.2 B Key Connector (CN10)

The DSP511 has one M.2 B Key 3052 socket.

Pins	Signals	Pins	Signals
1	CONFIG_3	2	+3.3V
3	GND	4	+3.3V
5	GND	6	FULL_CARD_POWER_OFF
7	USB_D+	8	W_DISABLE1#
9	USB_D-	10	GPIO_9/DAS/DSS#(I/O)/LED1#
11	GND	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	GPIO_5(I/O)
21	CONFIG_0	22	GPIO_6(I/O)
23	GPIO_11	24	GPIO_7(I/O)
25	DPR	26	GPIO_10(I/O)
27	GND	28	GPIO_8(I/O)
29	PERn1/USB3.0-Rx-/SSIC-RxN	30	UIM-RESET
31	PERp1/USB3.0-Rx+/SSIC-RxP	32	UIM-CLK
33	GND	34	UIM-DATA
35	PETn1/USB3.0-Tx-/SSIC-TxN	36	UIM-PWR
37	PETp1/USB3.0-Tx+/SSIC-TxP	38	DEVSLP
39	GND	40	GPIO_0(I/O)
41	PERn0/SATA-B+	42	GPIO_1(I/O)
43	PERp0/SATA-B-	44	GPIO_2(I/O)
45	GND	46	GPIO_3(I/O)
47	PETn0/SATA-A-	48	GPIO_4(I/O)
49	PETp0/SATA-A+	50	PERST#
51	GND	52	CLKREQ#
53	REFCLKN	54	PEWAKE#
55	REFCLKP	56	N/C_56
57	GND	58	N/C_58
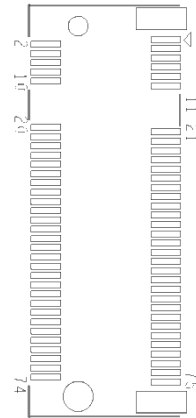
59	ANTCTL0	60	COEX3
61	ANTCTL1	62	COEX2
63	ANTCTL2	64	COEX1
65	ANTCTL3	66	SIM DETECT
67	RESET#	68	SUSCLK(32kHz)
69	CONFIG_1	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	CONFIG_2		

3.3.13 SIM Card slot (CN11)

This system has one CN11 socket for inserting a SIM Card. In order to work properly, the SIM Card must be used together with a 5G/4G module which is inserted into CN11. It is mainly used in 5G/4G wireless network application.

Pins	Signals
1	PWR
2	RST
3	CLK
4	NC
5	GND
6	VPP
7	I/O
8	NC
9	SIM_DETECT
10	NC
11	NC
12	GND
13	GND
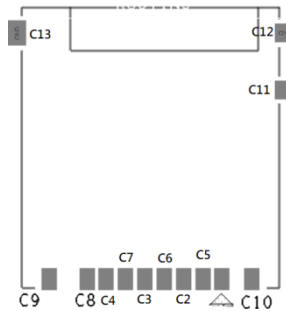
3.3.14 M.2 M KEY Connector (CN13)

This system has one M.2 M key socket for inserting M.2 2280 SATA/NVMe SSD module.

Pins	Signals	Pins	Signals
1	GND	2	+3.3V
3	GND	4	+3.3V
5	NC	6	NC
7	NC	8	NC
9	GND	10	LED1#
11	NC	12	+3.3V
13	NC	14	+3.3V
15	GND	16	+3.3V
17	NC	18	+3.3V
19	NC	20	NC
21	GND	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	NC	30	NC
31	NC	32	NC
33	GND	34	NC
35	NC	36	NC
37	NC	38	DEVSLP
39	GND	40	NC
41	SATA2_RXP	42	NC
43	SATA2_RXN	44	NC
45	GND	46	NC
47	SATA2_TXN	48	NC
49	SATA2_TXP	50	PERST#
51	GND	52	NC
53	NC	54	PEWARK#
55	NC	56	NC
57	GND	58	NC
59	NC	60	NC
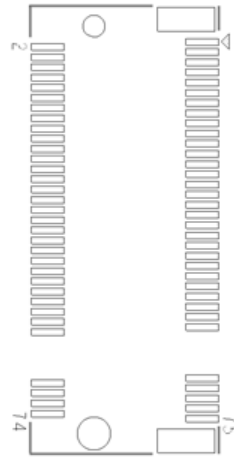
Pins	Signals	Pins	Signals
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		-

3.3.15 M.2 E KEY Connector (CN12)

The system has one M.2 E Key 2230 socket on the top side supporting PCI Express x1 and USB 2.0.

Pin	Signal	Pin	Signal
1	GND	2	+3.3V
3	USB_D+	4	+3.3V
5	USB_D-	6	LED1#(I)(OD)
7	GND	8	PCM_CLK/I2S SCK
9	SDIO CLK(O)(0/1.8V)	10	PCM_SYNC/I2S WS
11	SDIO CMD(IO)(0/1.8V)	12	PCM_IN/I2S SD_IN
13	SDIO DATA0(IO)(0/1.8V)	14	PCM_OUT/I2S SD_OUT
15	SDIO DATA1(IO)(0/1.8V)	16	LED2#(I)(OD)
17	SDIO DATA2(IO)(0/1.8V)	18	GND
19	SDIO DATA3(IO)(0/1.8V)	20	UART WAKE#(I)(0/3.3V)
21	SDIO WAKE#(I)(0/1.8V)	22	UART RXD(I)(0/1.8V)
23	SDIO RESET#(O)(0/1.8V)	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	UART_TXD(O)(0/1.8V)
33	GND	34	UART_CTS(I)(0/1.8V)
35	PETp0	36	UART_RTS(O)(0/1.8V)
37	PETn0	38	VENDOR DEFINED_38
39	GND	40	VENDOR DEFINED_40
41	PERp0	42	VENDOR DEFINED_42
43	PERn0	44	COEX3(IO)(0/1.8V)
45	GND	46	COEX2(IO)(0/1.8V)
47	REFCLKP0	48	COEX1(IO)(0/1.8V)
49	REFCLKN0	50	SUSCLK(32kHz)(O)(0/3.3V)
51	GND	52	PERST0#(I)(0/3.3V)
53	CLKREQ0#(IO)(0/3.3V)	54	W_DIS2#(I)(0/3.3V)
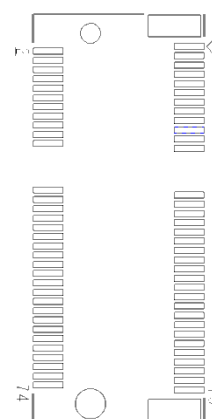
55	PEWAKE0#(IO)(0/3.3V)	56	W_DIS1#(I)(0/3.3V)
57	GND	58	I2C DATA(I0)(0/3.3V)
59	RSVD/PETp1	60	I2C CLK(I)(0/3.3V)
61	RSVD/PETn1	62	ALERT#(O)(0/3.3V)
63	GND	64	RSVD_64
65	RSVD/PERp1	66	UIM_SWP/PERST1#
67	RSVD/PERn1	68	UIM_PWR_SNK/CLKREQ1#
69	GND	70	UIM_PWR_SRC/GPIO1/PEWAKE1#
71	RSVD/REFCLKP1	72	+3.3V
73	RSVD/REFCLKN1	74	+3.3V
75	GND		-

3.3.16 Device Management Port (CN19)

The system provides one device management port supporting remote device management (RDM) function. Please contact with FAE to get detailed information.

Pin	Signal
L1	MCU_TXP1
L2	MCU_TXN1
L3	MCU_RXP1
L4	GND
L5	GND
L6	MCU_RXN1
L7	GND
L8	GND

L8 L7L6 L5L4 L3 L2 L1
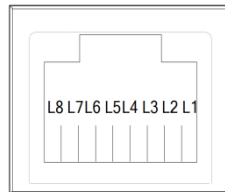
3.3.17 Clear EDID Button (CN22)

The clear EDID button allows users to clear the EDID data when the connected display monitors cannot be recognized. Please press the button at least 3 seconds to make sure the EDID data have been reset.

Functions	Descriptions
Pressed	Reset EDID
Off	Keep the original EDID data

Clear
EDID
◎

SECTION 4
BIOS SETUP UTILITY

This section provides users with detailed descriptions in terms of how to set up basic system configurations through the BIOS setup utility.

4.1 Starting

To enter the setup screens, follow the steps below:

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

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

4.2 Navigation Keys

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

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

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

4.3 Main Menu

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

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

      BIOS Information                                    Set the Date. Use Tab to
      Build Date and Time          09/15/2021 10:48:57    switch between Date elements.
      Project Version              SBC87535 V1.00         Default Ranges:
                                                          Year: 1998-9999
      Firmware Information                                Months: 1-12
      MCU Version                  X005                   Days: Dependent on month
      ME Firmware Version          15.0.10.1469           Range of Years may vary.
      ME Firmware Mode             Normal Mode
      ME Firmware SKU              Corporate SKU

      System Date                  [Wed 09/15/2021]
      System Time                  [06:18:30]

      Access Level                 Administrator          ++: 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
```

BIOS Information
Display the auto-detected BIOS information.

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

4.4 Advanced Menu

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

> ► NCT55250 Super IO Configurations
> ► Hardware Monitor
> ► Trusted Computing
> ► CPU Configuration
> ► Storage Configuration
> ► AMT Configurations
> ► USB Configuration
> ► DSP Configuration

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

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

  ▶ NCT5525D Super IO Configuration        System Super IO Chip
  ▶ Hardware Monitor                       Parameters.
  ▶ Trusted Computing
  ▶ CPU Configuration
  ▶ AMT Configuration
  ▶ USB Configuration
  ▶ DSP Configuration




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



               Version 2.21.1278 Copyright (C) 2021 AMI
```
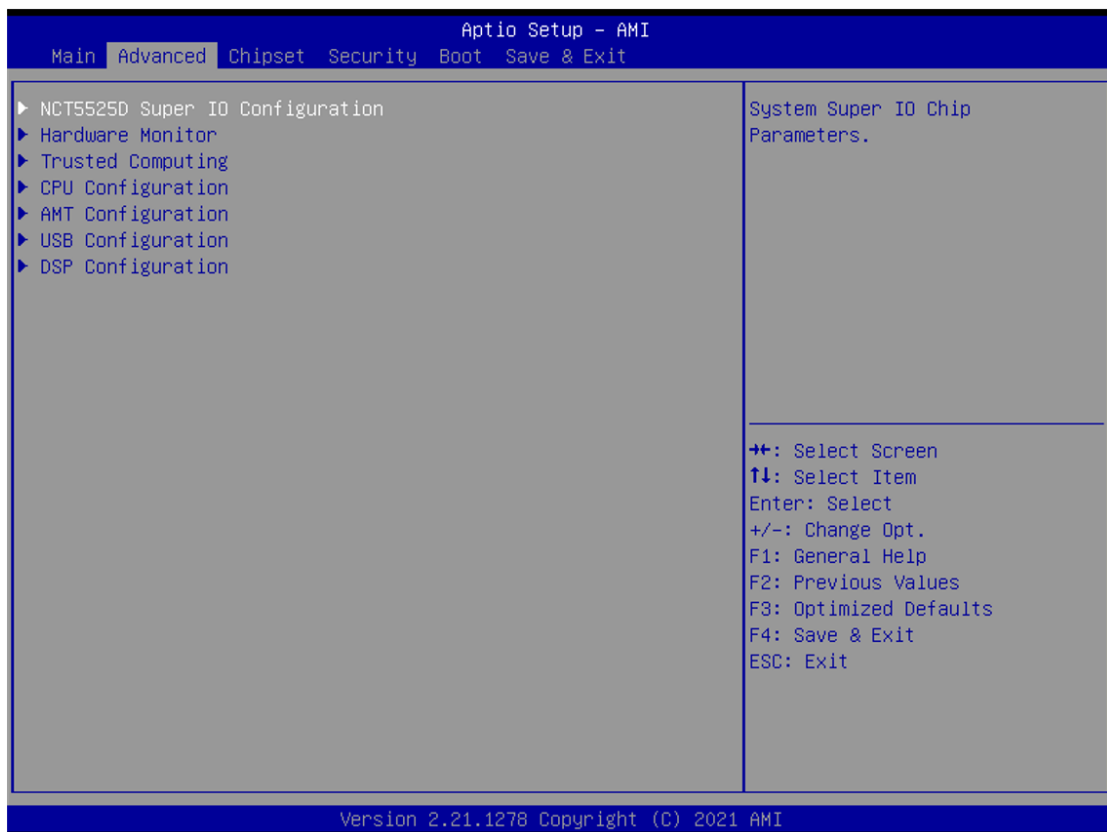
NCT55250 Super IO Configurations

Use this screen to select options for the NCT55250 Super IO Configurations, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.

```
                              Aptio Setup – AMI
        Advanced

    NCT5525D Super IO Configuration                 Set Parameters of Serial Port
                                                    1 (COMA)
    Super IO Chip                    NCT5525D
  ▶ Serial Port 1 Configuration




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



                     Version 2.21.1278 Copyright (C) 2021 AMI
```

Serial Port 1 (COM1) Configuration

Enable or disable serial port(COM).

```
                              Aptio Setup – AMI
        Advanced

    Serial Port 1 Configuration

    Serial Port                      [Enabled]
    Device Settings                  IO=3F8h; IRQ=4;

    Change Settings                  [Auto]
```
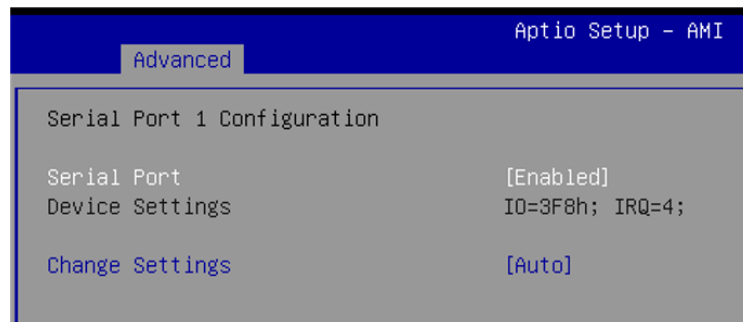
WatchDog

Use the items to set WatchDog parameters.

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

  NCT6102D Super IO Configuration                                    WatchDog Count Mode Selection

  Super IO Chip                        NCT6102D
▶ Serial Port 1 Configuration

  WatchDog                             [Enabled]
  WatchDog Count Mode                  [Minute]
  WatchDog TimeOut Value               30

                          ┌───── WatchDog Count Mode ─────┐
                          │ Second                        │
                          │ Minute                        │
                          └───────────────────────────────┘
                                                                   ++: Select Screen
                                                                   ↑↓: Select Item
                                                                   Enter: Select
                                                                   +/-: Change Opt.
                                                                   F1: General Help
                                                                   F2: Previous Values
                                                                   F3: Optimized Defaults
                                                                   F4: Save & Exit
                                                                   ESC: Exit

                Version 2.20.1275. Copyright (C) 2020 American Megatrends, Inc.
```

Hardware Monitor

This screen monitors hardware health status.

```
                              Aptio Setup – AMI
        Advanced

    Pc Health Status

    CPU temperature                    : +69 %
    System temperature                 : +38 %
    VBAT                               : +2.889 V
    +5V                                : +5.030 V




                                                    ++: 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
```
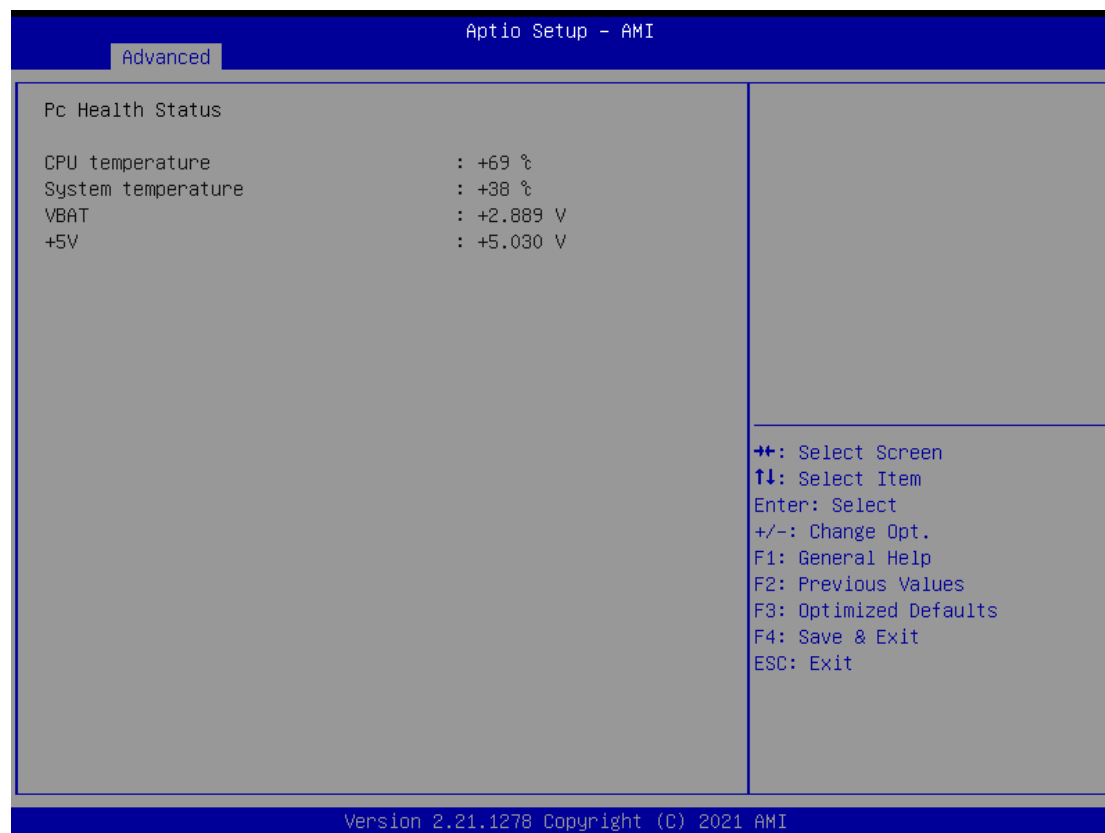
This screen displays the temperature of the system and CPU as well as system voltages (VBAT and +5V).

Trusted Computing

You can use this screen for TPM (Trusted Platform Module)configuration. It also shows current TPM status information.

```
                              Aptio Setup - AMI
     Advanced

   TPM 2.0 Device Found                              Enables or Disables BIOS
   Firmware Version:           73.4                  support for security device.
   Vendor:                     STM                   O.S. will not show Security
                                                     Device. TCG EFI protocol and
   Security Device Support     [Enable]              INT1A interface will not be
   Active PCR banks            SHA256                available.
   Available PCR banks         SHA-1,SHA256

                    ┌─── Security Device Support ───┐
                    │ Disable                       │
                    │ Enable                        │
                    └───────────────────────────────┘
                                                        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
```

Security Device Support
Enable or disable BIOS support for security device. The default is Disabled. Once the Security Device Support is enabled, you will see the following screen.

CPU Configurations

This screen shows the CPU version and its detailed information.

```
                              Aptio Setup - AMI
         Advanced

   CPU Configuration                                    Enable or Disable
                                                        Hyper-Threading Technology.
   Type                       11th Gen Intel(R)
                              Core(TM) i5-1145G7E @
                              2.60GHz
   ID                         0x806C1
   Speed                      2600 MHz
   L1 Data Cache              48 KB x 4
   L1 Instruction Cache       32 KB x 4
   L2 Cache                   1280 KB x 4
   L3 Cache                   8 MB
   L4 Cache                   N/A
   VMX                        Supported
   SMX/TXT                    Supported                 ++: Select Screen
   Package C State Limit      [C0/C1]                    ↑↓: Select Item
                                                        Enter: Select
   Hyper-Threading            [Enabled]                 +/-: Change Opt.
   Intel (VMX) Virtualization [Enabled]                 F1: General Help
   Technology                                           F2: Previous Values
   Intel(R) Speed Shift Technology  [Disabled]          F3: Optimized Defaults
   C states                   [Disabled]                F4: Save & Exit
   ConfigTDP Nominal          Ratio:26 TAR:25           ESC: Exit
                              PL1:28.0W
   Power Limit 1              15000
   Power Limit 2              15000

                    Version 2.21.1278 Copyright (C) 2021 AMI
```

Hyper-Threading
Enable or disable to the logical processor threads. The default is enabled.

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

Intel® Speed Shift Technology
Enable or disable to Intel Speed Shift Technology. The default is disabled.

C states
Enabled or disabled C states. The default is disabled.

```
                              Aptio Setup - AMI
   [ Advanced ]

   CPU Configuration                                    ▲  Enable/Disable CPU Power
                                                           Management. Allows CPU to go
   Type                          11th Gen Intel(R)          to C states when it's not 100%
                                 Core(TM) i5-1145G7E @      utilized.
                                 2.60GHz
   ID                            0x806C1
   Speed                         2600 MHz
   L1 Data Cache                 48 KB x 4
   L1 Instruction Cache          32 KB x 4
   L2 Cache                      1280 KB x 4
   L3 Cache             ┌──────── C states ────────┐
   L4 Cache             │ Disabled                  │
   VMX                  │ Enabled                   │
   SMX/TXT              └───────────────────────────┘      ➜←: Select Screen
   Package C State Limit         [C                         ↑↓: Select Item
                                                            Enter: Select
   Hyper-Threading               [Enabled]                  +/-: Change Opt.
   Intel (VMX) Virtualization    [Enabled]                  F1: General Help
   Technology                                               F2: Previous Values
   Intel(R) Speed Shift Technology [Enabled]                F3: Optimized Defaults
   C states                      [Disabled]                 F4: Save & Exit
     Turbo Mode                  [Disabled]                 ESC: Exit
   ConfigTDP Nominal             Ratio:26 TAR:25
                                 PL1:28.0W
   Power Limit 1                 15000                   ▼

                     Version 2.21.1278 Copyright (C) 2021 AMI
```

Turbo Mode
Enable or disable processor Turbo Mode. The processor can be up to maximum turbo frequency when the system loading becomes higher.

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

    CPU Configuration                                     Power Limit 1 in Milli Watts.
                                                          BIOS will round to the nearest
    Type                        11th Gen Intel(R)         1/8W when programming. 0 = no
                                Core(TM) i5-1145G7E @     custom override. For 12.50W,
                                2.60GHz                   enter 12500. Overclocking SKU:
    ID                          0x806C1                   Value must be between Max and
    Speed                       2600 MHz                  Min Power Limits (specified by
    L1 Data Cache               48 KB x 4                 PACKAGE_POWER_SKU_MSR). Other
    L1 Instruction Cache        32 KB x 4                 SKUs: This value must be
    L2 Cache                    1280 KB x 4               between Min Power Limit and
    L3 Cache                    8 MB                      TDP Limit.
    L4 Cache                    N/A
    VMX                         Supported                ─────────────────────────────
    SMX/TXT                     Supported                 ↔: Select Screen
    Package C State Limit       [C0/C1]                   ↑↓: Select Item
                                                          Enter: Select
    Hyper-Threading             [Enabled]                 +/-: Change Opt.
    Intel (VMX) Virtualization  [Enabled]                 F1: General Help
    Technology                                            F2: Previous Values
    Intel(R) Speed Shift Technology  [Disabled]           F3: Optimized Defaults
    C states                    [Disabled]                F4: Save & Exit
    ConfigTDP Nominal           Ratio:26 TAR:25           ESC: Exit
                                PL1:28.0W
    Power Limit 1               15000
    Power Limit 2               15000


                        Version 2.21.1278 Copyright (C) 2021 AMI
```

Power Limit 1
This feature configures package power limit 1, in milliwatts.

Power Limit 2
This feature configures package power limit 2, in milliwatts.

Storage Configuration

This screen specifies NVMe storage information. For items marked with " ►", please press <Enter> for more options.

```
                        Aptio Setup - AMI
       Advanced

   Storage Configuration                          NVMe Device Options Settings

 ▶ NVMe Configuration





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



               Version 2.21.1278 Copyright (C) 2021 AMI
```

```
              Aptio Setup Utility - Copyright (C) 2020 Ame
       Advanced

   Seg:Bus:Dev:Func                00:01:00:00
   Model Number                    INTEL SSDPEKKW256G8
   Total Size                      256.0 GB
   Vendor ID                       8086
   Device ID                       F1A6

   Namespace: 1                    Size: 256.0 GB
```

AMT Configuration
Enable or disable Active Management Technology BIOS features. The default is Enabled.

```
                            Aptio Setup - AMI
     Advanced

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


                      ┌──── AMT BIOS Features ────┐
                      │ Disabled                  │
                      │ Enabled                   │     →←: Select Screen
                      └───────────────────────────┘     ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit




                    Version 2.21.1278 Copyright (C) 2021 AMI
```

BIOS Setup Utility

USB Configurations

This screen specifies USB settings.

```
                             Aptio Setup - AMI
    Advanced

 USB Configuration

 USB Module Version              26

 USB Devices:
       1 Drive, 1 Keyboard, 1 Mouse


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



                   Version 2.21.1278 Copyright (C) 2021 AMI
```
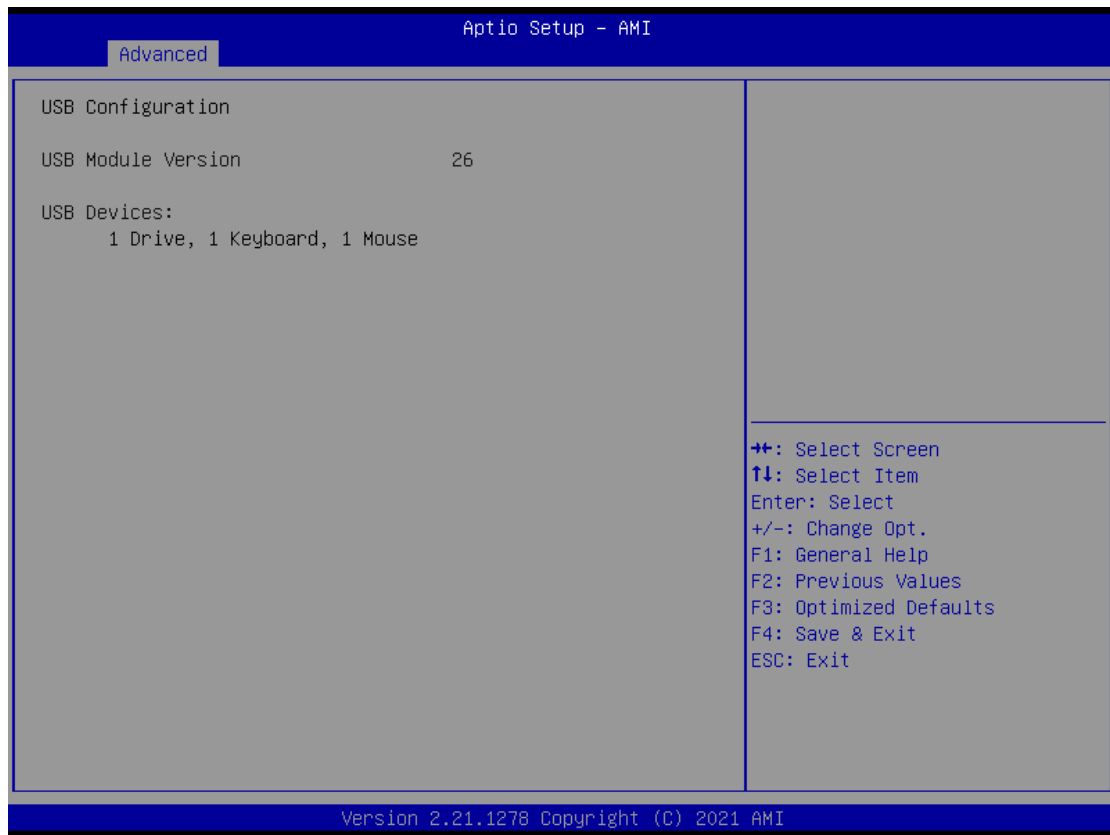
DSP Configurations

The section allows users to flash MCU firmware and EDID emulation. Users can select the items in the left frame of the screen to go to the sub menus:

```
                              Aptio Setup - AMI
    Advanced

  DSP Configuration                                    MCU F/W Utility Configuration
▶ MCU F/W Utility Configuration

  EDID auto emulate                 [Disabled]




                                                     ➤←: 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
```

MCU F/W Utility Configuration
Use this screen to flash MCU firmware.

```
                              Aptio Setup - AMI
    Advanced

  MCU F/W Utility Configuration                        MCU F/W Flash Utility

▶ MCU F/W Flash Utility




            ┌───────────────────────────────────────────────┐
            │         Select File from a File system          │
            │ ┌─────────────────────────────────────────────┐ │
            │ │Acpi(a0341d0, 0)\PCI(14|0)\USB(c,0)\HD(Part1, Sig ?)\│
            │ └─────────────────────────────────────────────┘ │
            └───────────────────────────────────────────────┘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
```

BIOS Setup Utility
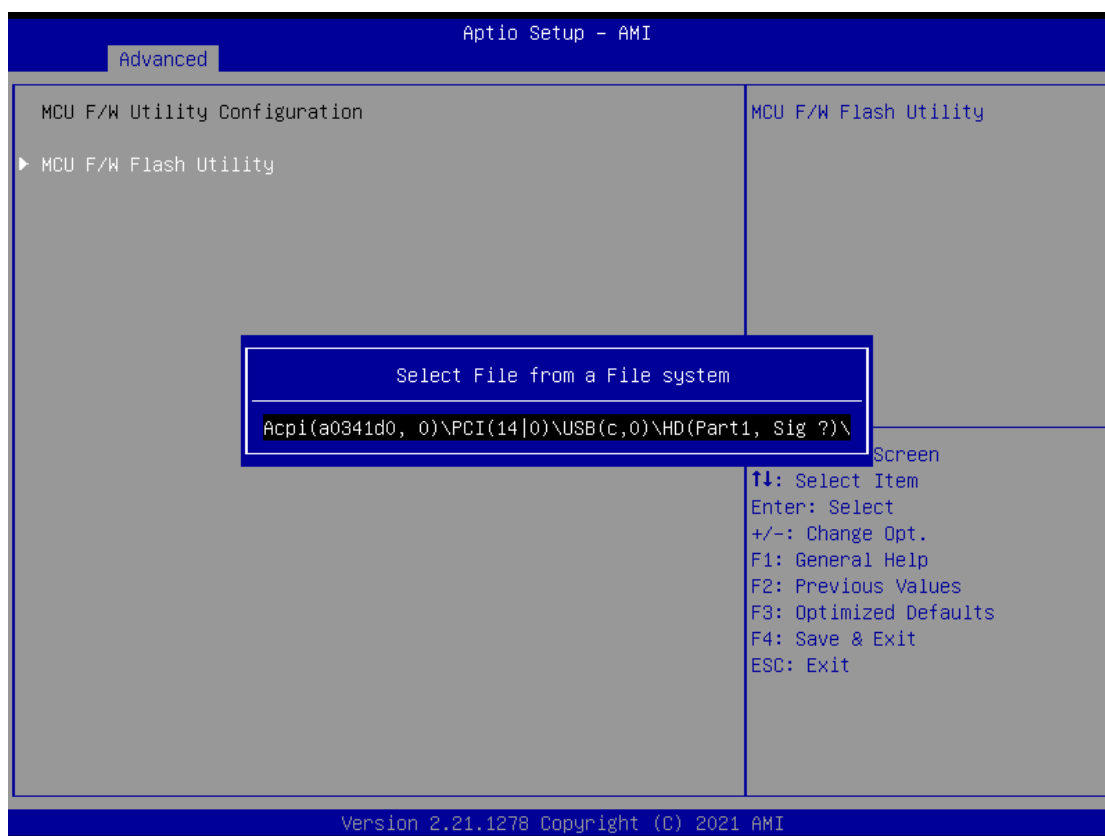
EDID auto emulate
Use this screen to Enabled or Disable EDID auto emulate function. The default is Disabled.
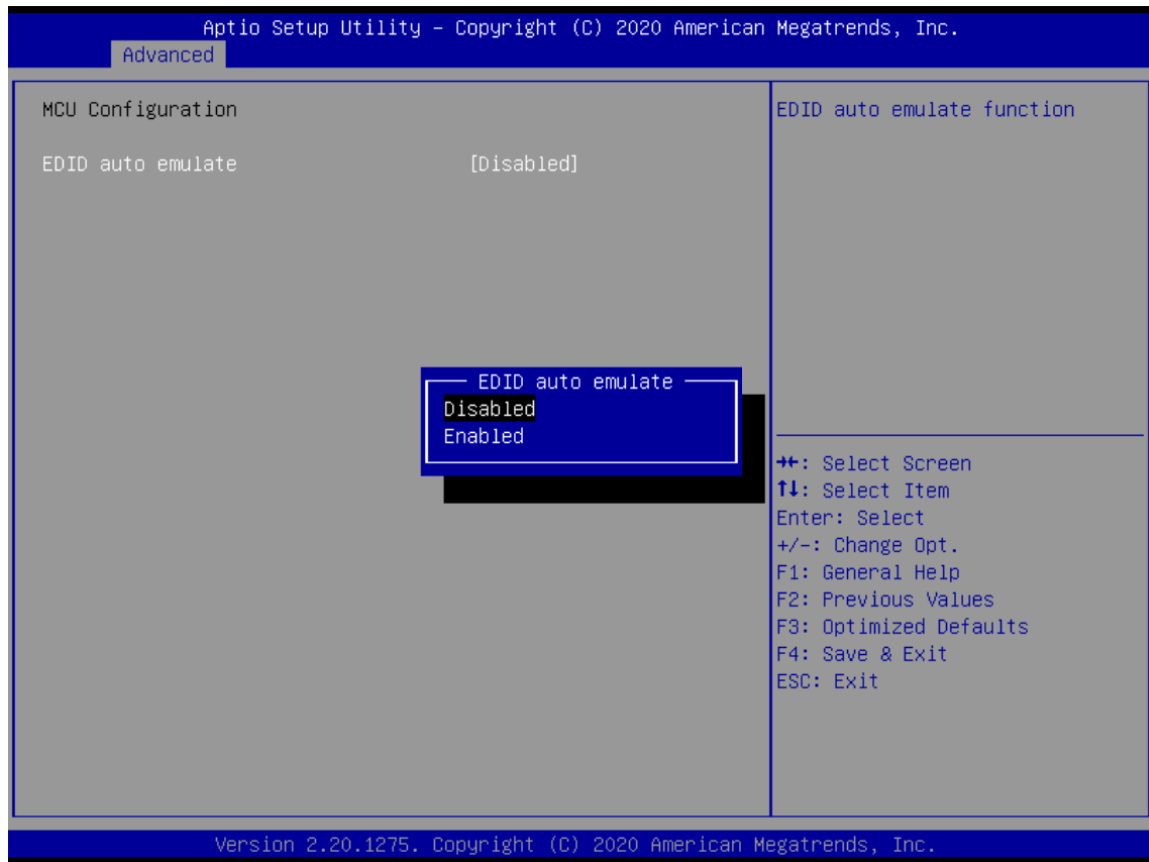
4.5 Chipset Menu

The Chipset menu allows users to change the advanced chipset settings.

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

    System Agent (SA) Configuration                          Delay 3 seconds to initial
                                                             BIOS when no display.
    Memory Configuration                                     If sometimes the monitor can't
                                                             be work fine, please try to
    Controller 0 Channel 0 Slot 0    Not Populated / Disabled  enable it.
       Size                             0 MB (DDR4)
       Number of Ranks               N/A
       Manufacturer                  UnKnown
    Controller 1 Channel 0 Slot 0    Populated & Enabled
       Size                          8192 MB (DDR4)
       Number of Ranks               1
       Manufacturer                  Kingston
    _____
    Graphics Configuration
    IGFX GOP Version                 17.0.1068               ++: Select Screen
    IGFX VBIOS Version               N/A                     ↑↓: Select Item
                                                             Enter: Select
    Display Timing Adjustment        [Disabled]              +/-: Change Opt.
                                                             F1: General Help
    PCH-IO Configuration                                     F2: Previous Values
                                                             F3: Optimized Defaults
    PCH LAN Controller               [Enabled]               F4: Save & Exit
       Wake on LAN Enable            [Enabled]               ESC: Exit



                   Version 2.21.1278 Copyright (C) 2021 AMI
```

Display Timing Adjustment

When no display or the monitor can't be work fine, please try to enable it. It will delay 3 seconds to initialize BIOS.

PCH LAN Controller

Use the items to enable/disable PCH LAN controller. The default setting is enable.

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

    System Agent (SA) Configuration                        Enable/Disable onboard NIC.

    Memory Configuration

    Controller 0 Channel 0 Slot 0      Not Populated / Disabled
        Size                              0 MB (DDR4)
        Number of Ranks                 N/A
        Manufacturer                    UnKnown
    Controller 1 Channel 0 Slot 0      Populated & Enabled
        Size                             8192 MB (DDR4)
        Number of Ranks      ┌──── PCH LAN Controller ────┐
        Manufacturer         │ Enabled                    │
                             │ Disabled                   │
    Graphics Configuration   └────────────────────────────┘
    IGFX GOP Version                                         ←→: Select Screen
    IGFX VBIOS Version                 N/A                  ↑↓: Select Item
                                                            Enter: Select
    PCH-IO Configuration                                    +/-: Change Opt.
                                                            F1: General Help
    PCH LAN Controller                 [Enabled]            F2: Previous Values
       Wake on LAN Enable              [Enabled]            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit



                       Version 2.21.1278 Copyright (C) 2021 AMI
```

Wake on LAN Enable

Enable or disable the integrated LAN to wake the system.

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

    System Agent (SA) Configuration                        Enable/Disable integrated LAN
                                                           to wake the system.
    Memory Configuration

    Controller 0 Channel 0 Slot 0      Not Populated / Disabled
        Size                              0 MB (DDR4)
        Number of Ranks                 N/A
        Manufacturer                    UnKnown
    Controller 1 Channel 0 Slot 0      Populated & Enabled
        Size                             8192 MB (DDR4)
        Number of Ranks      ┌──── Wake on LAN Enable ────┐
        Manufacturer         │ Enabled                    │
                             │ Disabled                   │
    Graphics Configuration   └────────────────────────────┘
    IGFX GOP Version                                         ←→: Select Screen
    IGFX VBIOS Version                 N/A                  ↑↓: Select Item
                                                            Enter: Select
    PCH-IO Configuration                                    +/-: Change Opt.
                                                            F1: General Help
    PCH LAN Controller                 [Enabled]            F2: Previous Values
       Wake on LAN Enable              [Enabled]            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit



                       Version 2.21.1278 Copyright (C) 2021 AMI
```

4.6 Security Menu

```
                              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
      Administrator Password                            ↑↓: Select Item
      User Password                                     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
```

Administrator Password

This item indicates whether an administrator password has been set (installed or uninstalled).

User Password

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

4.7 Boot Menu

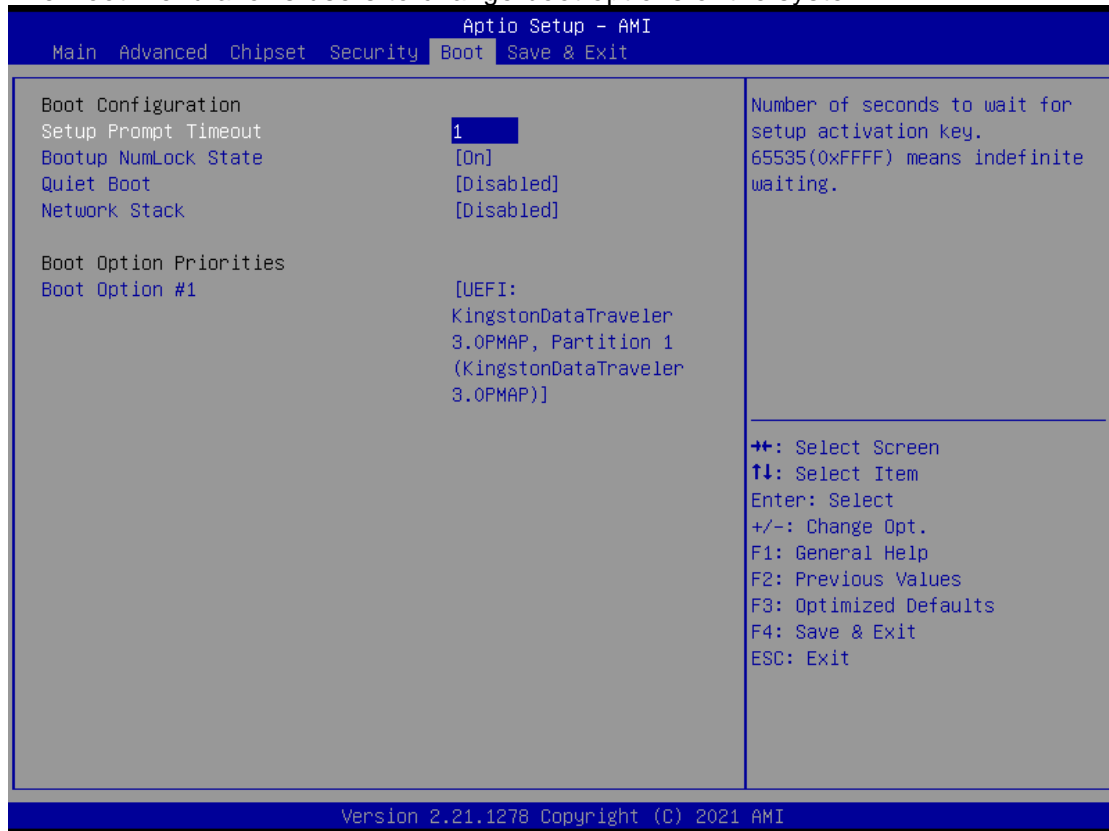The Boot menu allows users to change boot options of the system.

```
                              Aptio Setup - 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.
    Network Stack                  [Disabled]

    Boot Option Priorities
    Boot Option #1                 [UEFI:
                                   KingstonDataTraveler
                                   3.0PMAP, Partition 1
                                   (KingstonDataTraveler
                                   3.0PMAP)]
                                                       →←: 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
```

Setup Prompt Timeout
Use this item to set up number of seconds to wait for setup activation key where 65535(0xFFFF) means indefinite waiting.

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

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

4.8 Save & Exit Menu

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

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

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

    Save Changes and Reset
    Discard Changes and Reset

    Save Changes
    Discard Changes

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




               Version 2.21.1278 Copyright (C) 2021 AMI
```

Save Changes and Exit

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

Discard Changes and Exit

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

Save Changes and Reset

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

Discard Changes and Reset

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

Save Changes

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

Discard Changes

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

Restore Defaults

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

Save as User Defaults

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

Restore User Defaults

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

Boot Override

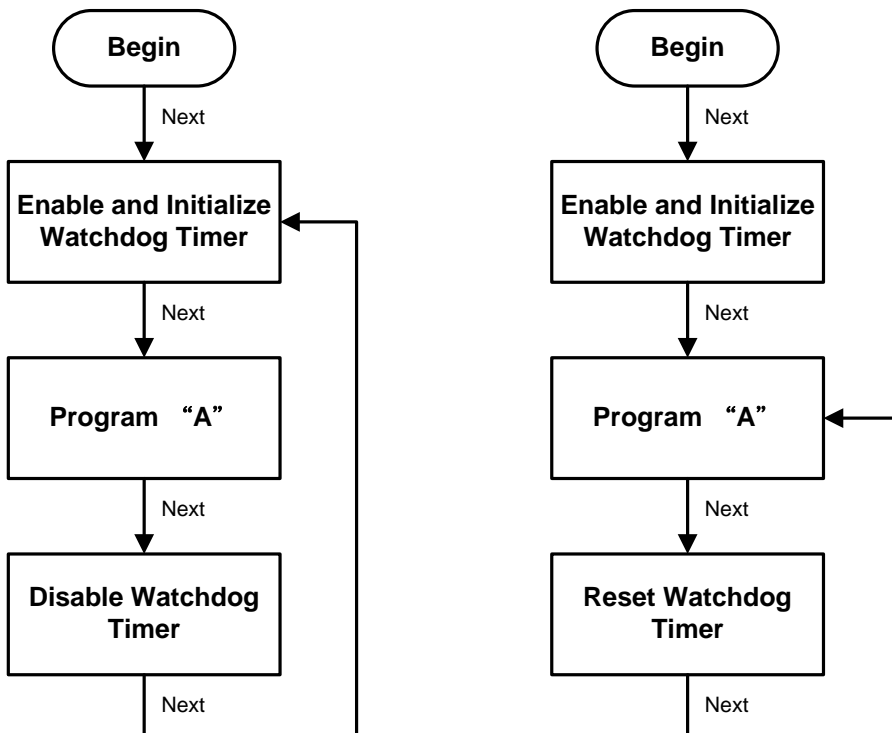Select a drive to immediately boot that device regardless of the current boot order.

This page is intentionally left blank.

APPENDIX A
WATCHDOG TIMER

About Watchdog Timer

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

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

```
   ( Begin )                              ( Begin )
       |                                      |
     Next                                   Next
       |                                      |
 ┌──────────────────┐               ┌──────────────────┐
 │ Enable and       │◄──┐           │ Enable and       │
 │ Initialize       │   │           │ Initialize       │
 │ Watchdog Timer   │   │           │ Watchdog Timer   │
 └──────────────────┘   │           └──────────────────┘
       |                │                  |
     Next               │                Next
       |                │                  |
 ┌──────────────────┐   │           ┌──────────────────┐
 │                  │   │           │                  │◄──┐
 │  Program "A"     │   │           │  Program "A"     │   │
 │                  │   │           │                  │   │
 └──────────────────┘   │           └──────────────────┘   │
       |                │                  |                │
     Next               │                Next              │
       |                │                  |                │
 ┌──────────────────┐   │           ┌──────────────────┐   │
 │ Disable Watchdog │   │           │ Reset Watchdog   │   │
 │ Timer            │   │           │ Timer            │   │
 └──────────────────┘   │           └──────────────────┘   │
          |             │                     |             │
        Next────────────┘                   Next───────────┘
```

Sample Program

```c
#include <pc.h>
#include <stdio.h>

#define SIO_Index_Port            0x2E
#define SIO_Data_Port             0x2F
#define SIO_Enter_Configuration_Mode   0x01
#define SIO_Entry_key             0x87
#define SIO_LDN_SEL_REGISTER         0x07
#define SIO_LogicalDevice_WDT        0x08
#define SIO_LogicalDevice_EnableOffset 0x30
#define SIO_LogicalDevice_Enable      0x01
#define SIO_LogicalDevice_Disable     0x00
#define SIO_Offset_Countdown_Type     0xF0
#define SIO_Offset_Countdown_Timer    0xF1
#define SIO_Countdown_Type_Second     0x00
#define SIO_Countdown_Type_Minute     0x08
#define SIO_Exit_Configuration_Mode   0xAA

void main() {
        int CountdownType=0;
        int WDTtimer=0;

        printf("Input Watch Dog Timer type, 1:Second ; 2:Minute  :");
        scanf("%d",&CountdownType);

        printf("\nInput Timer to countdown:");
        scanf("%d",&WDTtimer);
        printf("Start to countdown...");

         //
        // Enter Configuration Mode
        //
        outportw(SIO_Index_Port,SIO_Entry_key);
        outportw(SIO_Index_Port,SIO_Entry_key);
```

```
//
// Select Logical device : WDT
//
outportw(SIO_Index_Port,SIO_LDN_SEL_REGISTER);
outportw(SIO_Data_Port,SIO_LogicalDevice_WDT);


//
// Enable WDT Timer
//
outportw(SIO_Index_Port,SIO_LogicalDevice_EnableOffset);
outportw(SIO_Data_Port,SIO_LogicalDevice_Enable);


//
// Select count type for minute type or second type to execute WDT timer
// by below method.
//
outportw(SIO_Index_Port,SIO_Offset_Countdown_Type);
if(CountdownType == 1)
outportw(SIO_Data_Port,SIO_Countdown_Type_Second);
else if(CountdownType == 2)
outportw(SIO_Data_Port,SIO_Countdown_Type_Minute);


//Set Timer
outportw(SIO_Index_Port,SIO_Offset_Countdown_Timer);
outportw(SIO_Data_Port,WDTtimer);


//
// Exit Configuration Mode
//
outportw(SIO_Index_Port,SIO_Exit_Configuration_Mode);
outportw(SIO_Index_Port,SIO_Exit_Configuration_Mode);


}
```