USER MANUAL

KS-M220 / KS-M221

21.5” Multi-Functional
Modular Kiosk System

KS-M220 & KS-M221 M2

KS-M220 / KS-M221

21.5” Multi-Functional Modular Kiosk System

DISCLAIMER

This user’s manual is meant to assist users in installing and setting up the system. The information contained in this document is subject to change without any notice.

CE NOTICE

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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 KS-M220 / KS-M221 User Manual is described below:

Version No.	Revision History	Date
M2	• In Section 2.4 Safety Precautions, added the caution message: "**The equipment power supply cord shall be connected to a socket-outlet with earthing connection.**" on Page 2-13. • The name of the power input port for KDS type has been corrected to **"DC In (Power)**" in Section 3.1 System Rear I/O Ports Diagrams on Page 3-2.	2021/03/31
M1	Initial Release	2020/08/05

1 Introduction

This chapter provides the introduction for KS-M220 / KS-M221 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 KS-M220 / KS-M221 system. The KS-M220 / KS-M221 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 provides the introduction for the KS-M220 / KS-M221 system as well as the framework of the user manual.

Chapter 2 Getting Started
This chapter describes the package contents and outlines the system specifications. Read the safety reminders carefully on how to take care of your system properly.

Chapter 3 System Configuration
This chapter describes the external I/O ports, 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, Graphics Driver Utility, LAN Driver Utility, Sound Driver Utility, Microsoft Hotfix kb3211320 and kb3213986 Driver and Intel® Serial I/O Driver Utility.

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

Appendix A System Diagrams
This appendix provides easy maintenance diagrams, exploded diagrams and part numbers of KS-M220 / KS-M221 system.

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

2 Getting Started

This chapter provides the information for the KS-M220 / KS-M221 system. It describes the package contents 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 Packing List

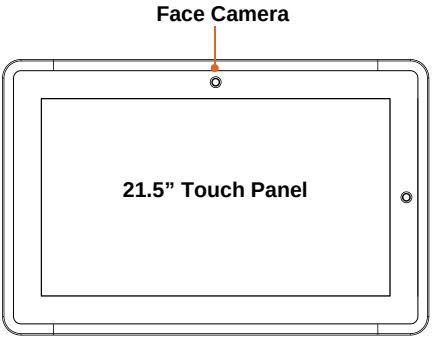
If you discover any of the items listed above are damaged or lost, please contact your local distributor immediately.

Item	Q'ty
KS-M220 / KS-M221 system	1
Quick Reference Guide	1
Manual / Driver DVD	1
AC Power Adaptor	1
Door Key	2

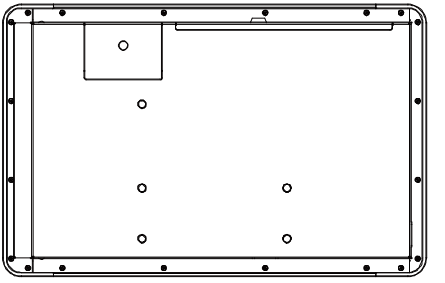
2.2 System Overview

2.2.1 KDS Type

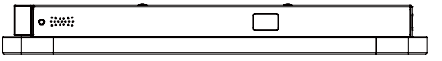
Front View



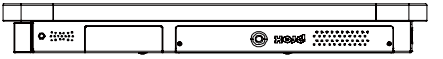
Rear View



Left Side View



Right Side View

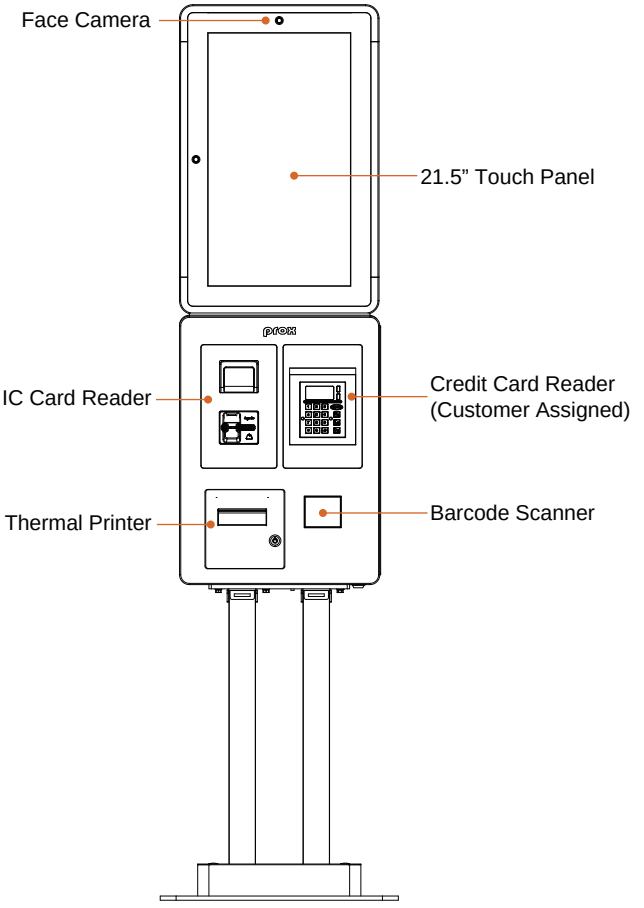


Top View

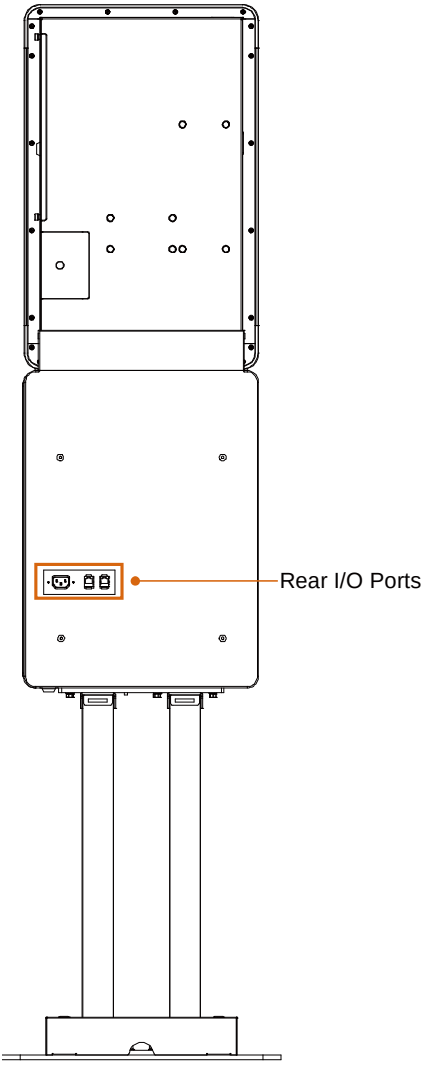
Bottom View

2.2.2 M-Type

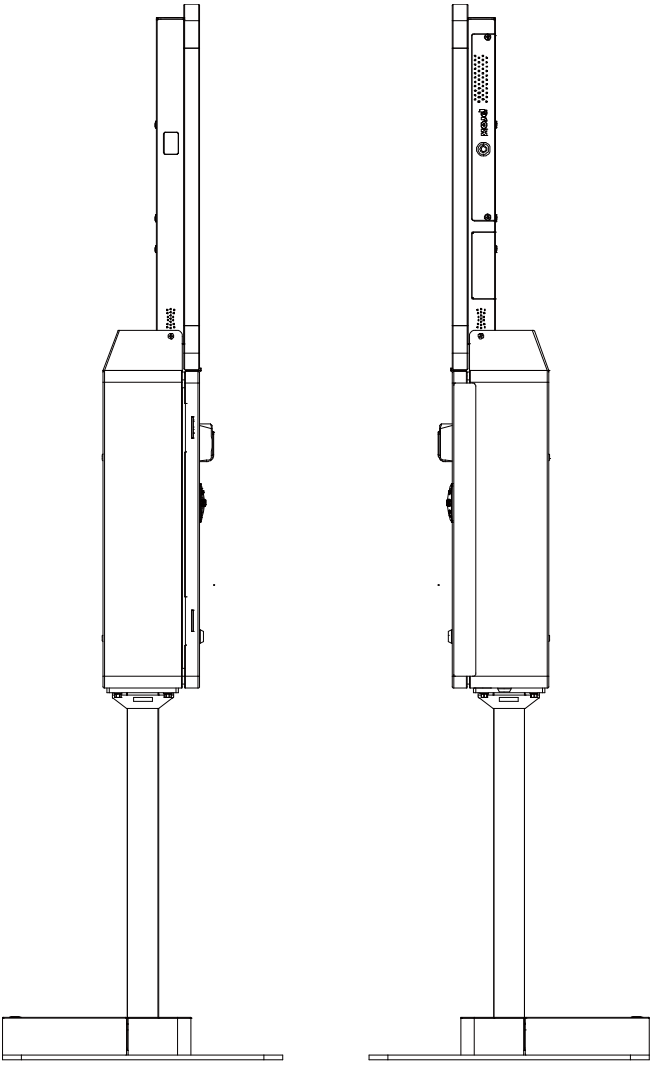
Front View



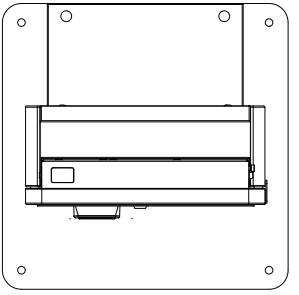
Rear View



Side View

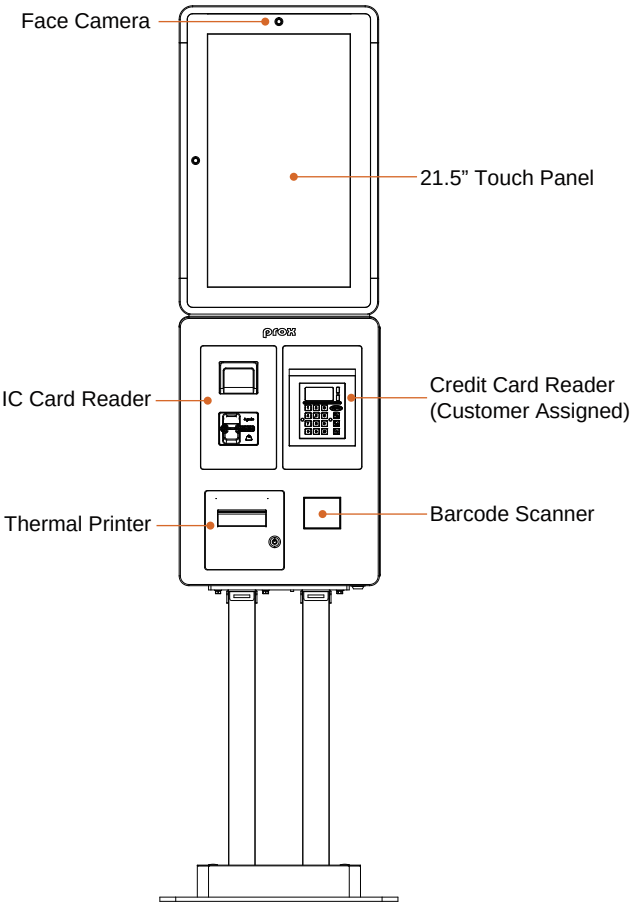


Top View

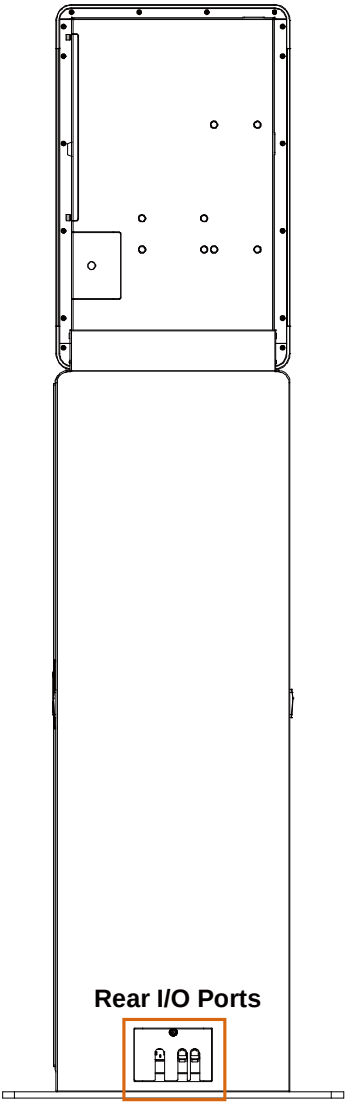


2.2.3 Cash Pay Type

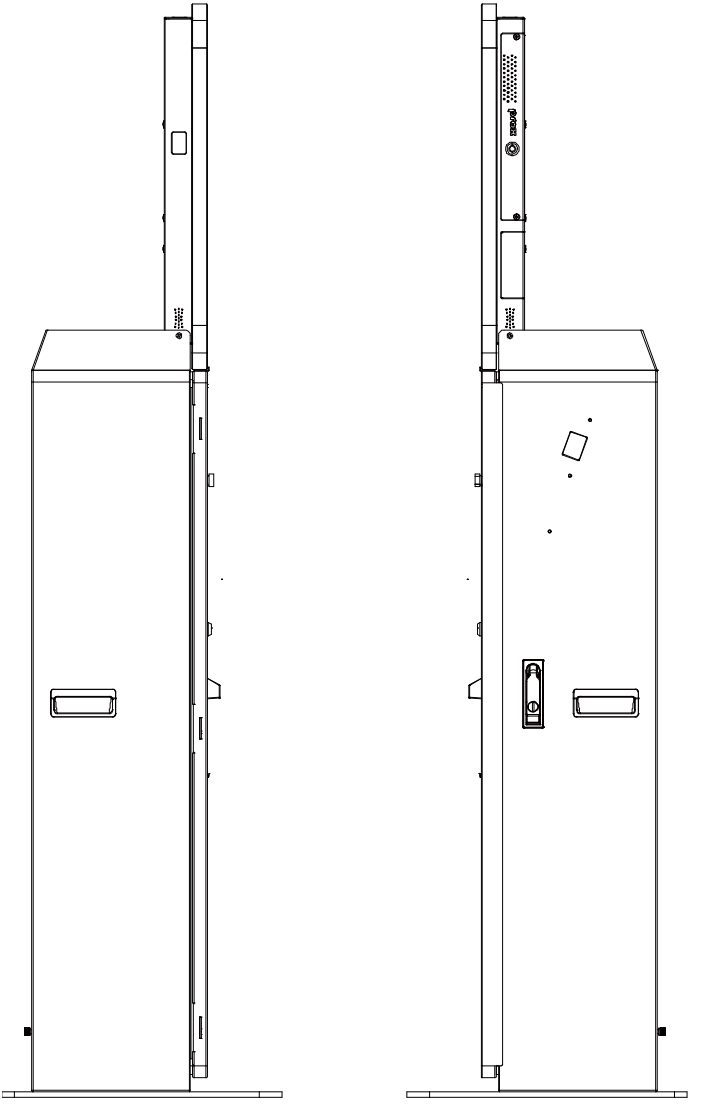
Front View



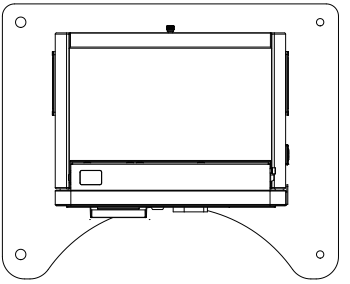
Rear View



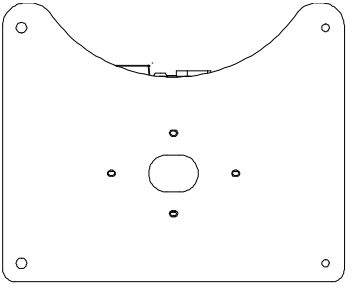
Side View



Top View



Bottom View



2.3 Specifications

System	
CPU	**High-End Level:** ➢ Intel® Core™ i5-7300U ➢ Intel® Core™i3-7100U ➢ Intel® Pentium® 4415U **Entry Level:** ➢ Intel® Celeron J3455
Memory Support	➢ 1 x DDR4 SO-DIMM slot (Default: 4GB)
Storage	➢ 1 x 2.5" SATA HDD (Default: 500GB)
Network	➢ 2 x Gigabit 10/100/1000 Base-T Fast Ethernet (RJ45)
Power Supply	➢ 100-240V available
System Weight	➢ **KDS:** 15.29kg ➢ **M-type:** 33.02kg (without Stand) / 54.22kg (with Stand) ➢ **Cash Pay type:** 76.44kg
Dimensions (WxHxD)	➢ **KDS:** 377 x 585 x 70mm ➢ **M-type:** 377 x 585 x 160mm (without stand) ➢ **M-type:** 450 x 1636 x 450mm (with stand) ➢ **Cash pay type:** 377 x 1704.6 x 282mm
Operating System	➢ Windows 10 IoT Enterprise LTSB 2016
Speaker	➢ 2 x 2W Speaker
LED Indicator	➢ 1 x Green LED for Power on indication (on PPC front)
EMC & Safety	➢ CE / FCC
Operating Display	
LCD	➢ 21.5" TFT Backlight (LED) LCD (Dual LVDS interface)
Max. Resolution	➢ FHD 1920 x 1080
Brightness	➢ 250 cd/m²
Touchscreen	➢ Projected capacitive touch (USB interface)
Viewing Angle	➢ Horizontal: (R) 89°/ (L) 89° ➢ Vertical: (U) 89°/ (L) 8°
External I/O Ports	
Power On/Off	➢ Power Button on I/O
Add-ons	
Face Camera (optional)	➢ 2.1M FHD Camera
Barcode Scanner (optional)	➢ 1D / 2D Barcode
Thermal Printer (optional)	➢ 2" or 3" Standalone Thermal printer
Wi-Fi Module (optional)	➢ 2T2R PCIe Half-Mini Card
Environment	
Operating Temp.	➢ 5°C ~ 35°C (41°F~ 95°F)
Storage Temp.	➢ 0°C ~ 60°C (32°F~ 140°F)
Humidity	➢ 20%~ 85% (no condensation)

2.4 Safety Precautions

Before operating this system, read the following information carefully to protect your systems 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.
   - The equipment power supply cord shall be connected to a socket-outlet with earthing connection.

2. **Environmental Conditions**
   - Place your kiosk system on a sturdy, level surface. Be sure to allow enough space around the system to have easy access needs.
   - Avoid installing your kiosk 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 the kiosk system 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 kiosk system 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 turning 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

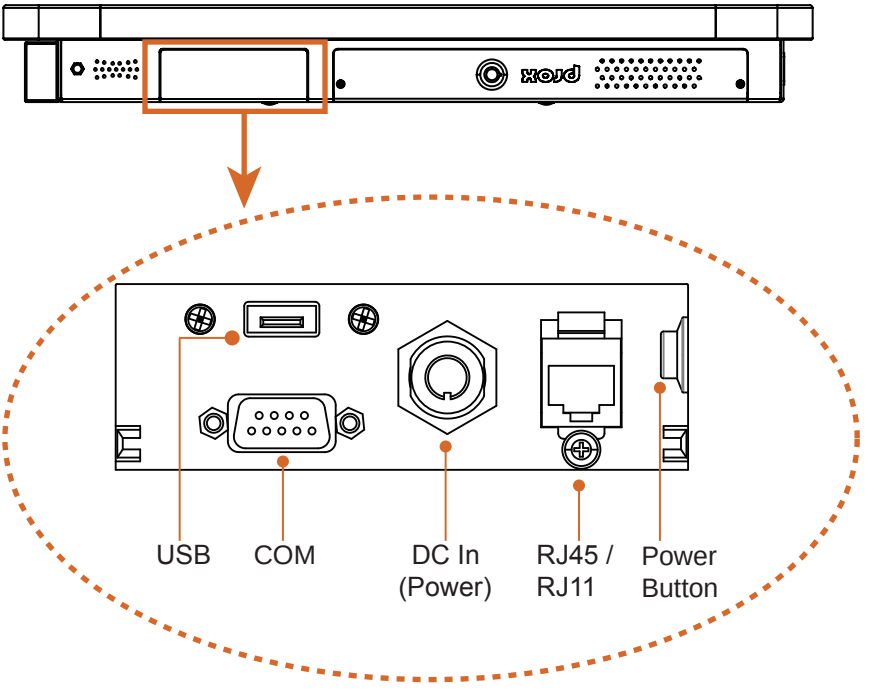
This chapter contains helpful information about the external I/O Ports diagrams, and jumper & connector settings, and component locations for the main board.

The following topics are included:

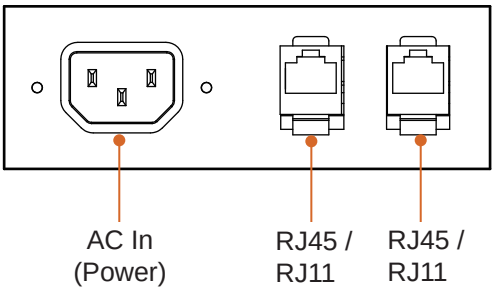
- External I/O Ports Diagrams
- Main Board Jumper Settings and Component Locations
- How to Set Jumpers
- Setting Main Board Connectors and Jumpers

3.1 System Rear I/O Ports Diagrams

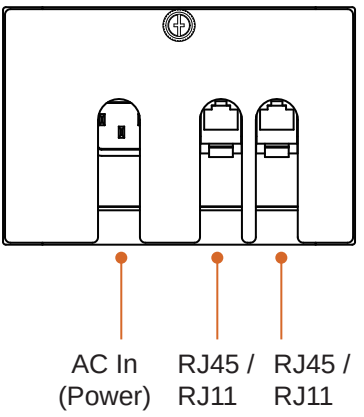
3.1.1 KDS Type



3.1.2 M-Type



3.1.3 Cash Pay Type



3.2 KS-M220 High-End Level System Jumper & Connector Quick Reference Table

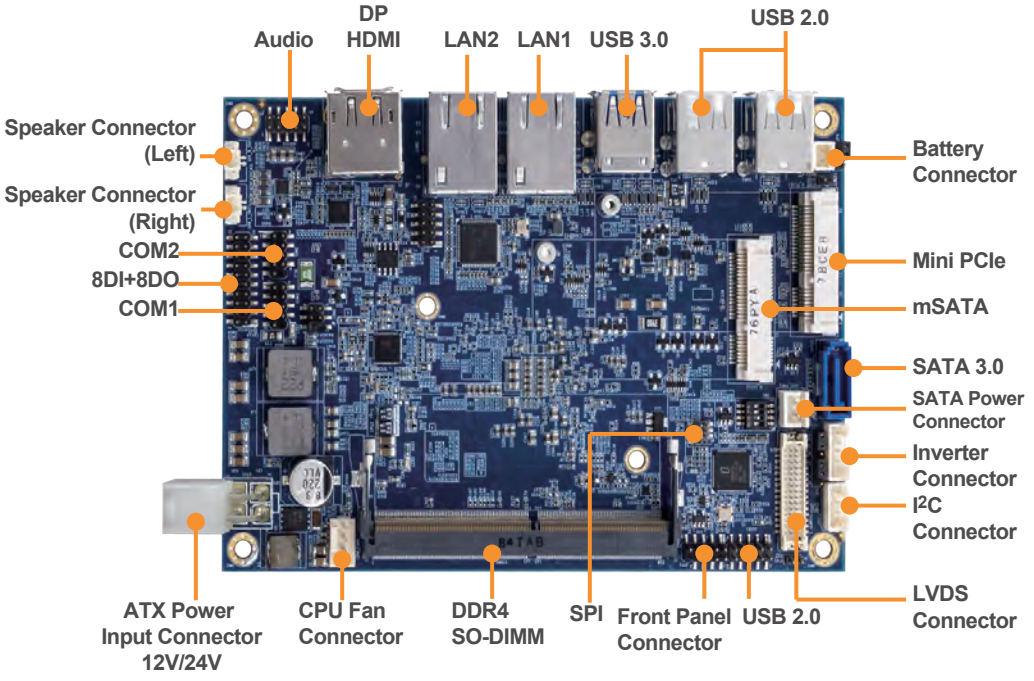
JUMPER Description	NAME
Clear CMOS Data Selection	JCMOS1
COM2 Pin9 RI/5V/12V Selection	JP_COM2
SPI Override Protection Selection	JP1
LVDS VCC Selection	JP5
Backlight PWM Level Selection	JP6
V3P3 MPCIE Selection	JP9
Slide Switch For LVDS Resolution Selection	SW1

System CONNECTOR Description	NAME
COM Connector (Rear)	COM1
COM Connector (For Type 1 Front I/O only)	COM2 (D-Sub), COM3 (optional), COM4 (optional)
COM Connector (For Type 2 Front I/O only)	COM2 (RJ45), COM3 (optional), COM4 (optional)
DC In 3-Pin Lockable Connector (Rear)	DC In
HDMI Connector + DisplayPort Connector (Rear)	J1
Digital I/O Port (For Type 2 Front I/O only)	DIO
2 x LAN Ports (Rear)	LAN1, LAN2
Dual USB 3.1 Gen.1 Ports (Rear)	USB 3.1
Dual USB 2.0 Ports (For Type 1 Front I/O only)	USB 2.0
2 x Dual USB 2.0 Ports (Rear)	USB 2.0
Line Out Connector (Rear)	Line Out
I^2C Connector (Rear)	I^2C

Onboard CONNECTOR Description	**NAME**
COM Connectors (Onboard Pin Header)	COM1, COM2
Dual USB 2.0 Port	USB2, USB3
Dual USB 3.0 Ports	USB1
2 x LAN Ports	LAN1, LAN2
Internal USB 2.0 Connector	JUSB1
DP and HDMI Port	J1
ATX Power Input Connector	ATX1
HD Audio Connector	AUDIO1
Speaker Connectors	SPK_L_OUT1, SPK_R_OUT1
Digital Input / Output Connector	JDIO1
CPU Fan Connector	CPU_FAN1
Front Panel Connector	JFP1
Battery Wafer	JBAT1
SATA 3.0 Connector	SATA1
SATA Power Connector	JHDD_PWR1
I2C Wafer	JI2C1
LVDS Connector	JLVDS1
Panel Inverter Connector	JINV1
Mini PCI Express Slot	M_PCIE1
mSATA Connector	M_SATA1
SPI Connector	JP7
DDR4 SO-DIMM Memory Socket 1	DIMM1

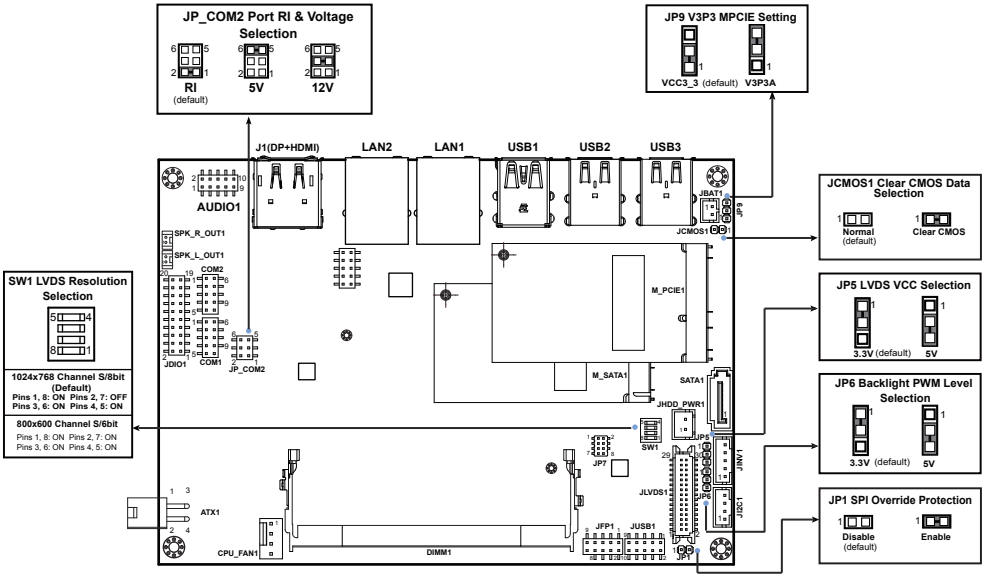
3.3 KS-M220 High-End Level System Component Locations

3.3.1 Top View of BE-0996RA-**N

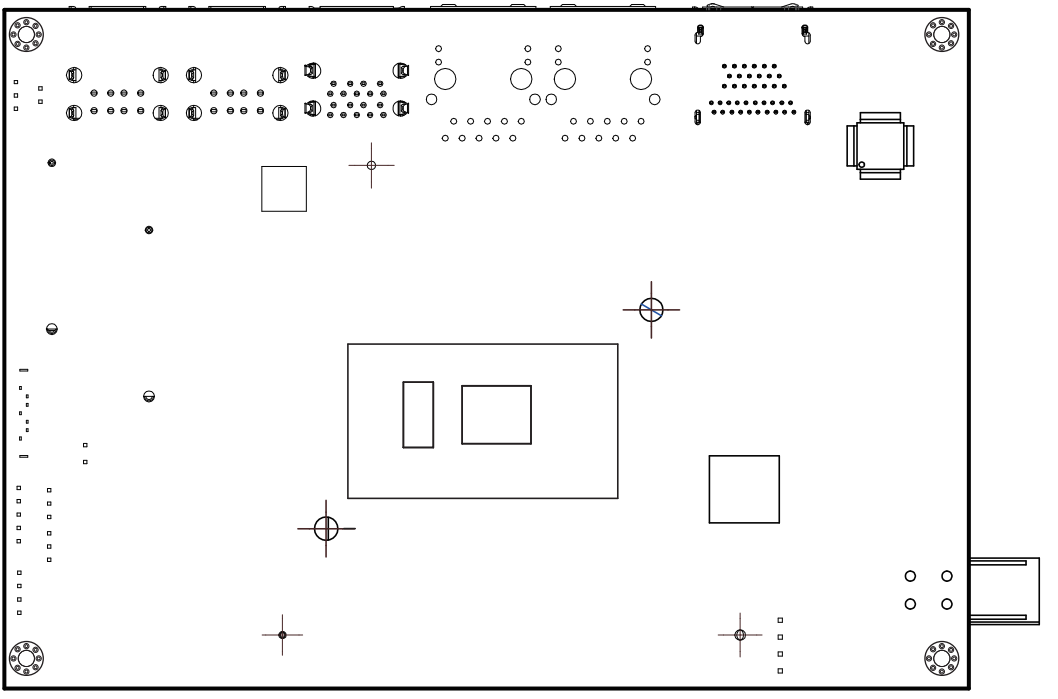


	**WARNING:** Always disconnect the power cord when you are working with connectors and jumpers on BE-0996. Make sure both the system and peripheral devices are turned OFF as sudden surge of power could damage sensitive components. Make sure BE-0996 is properly grounded.
	**CAUTION:** Observe precautions 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 BE-0996 components by the edges. Never touch components such as the processor by its pins. Take special cares while you are holding electronic circuit boards by the edges only. Do not touch BE-0996 components.

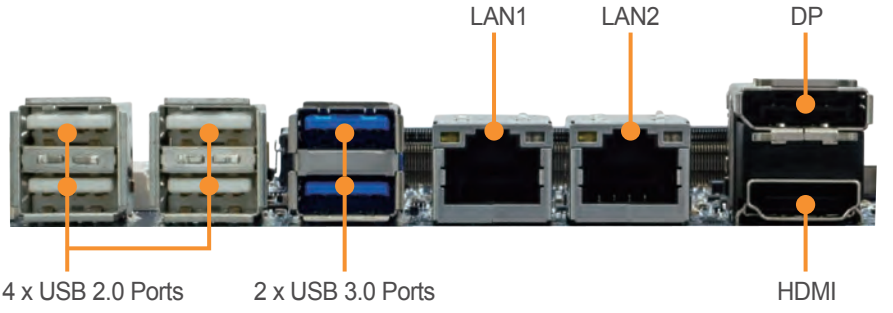
3.3.2 Jumper Setting of BE-0996RA-**N



3.3.3 Bottom View of BE-0996RA-**N



3.3.4 I/O View of BE-0996RA-**N

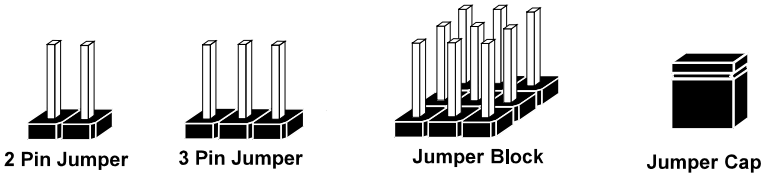


3.4 How To Set Jumpers

You can configure your board by setting jumpers. Jumper is consists of two or three metal pins with a plastic base mounted on the card, and 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 set-up your hardware configuration by "open" or "close" pins.

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

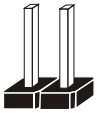
JUMPERS AND CAPS



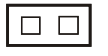
If a jumper has three pins (for examples, labelled PIN1, PIN2, and PIN3), you can connect PIN1 & PIN2 to create one setting by shorting. You can either connect PIN2 & PIN3 to create another setting. The same jumper diagrams are applied all through this manual. The figure below shows what the manual diagrams look and what they represent.

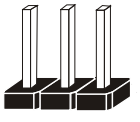
Jumper Diagrams

Jumper Cap looks like this



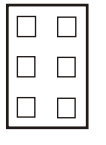
2 pin Jumper looks like this





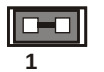
3 pin Jumper looks like this

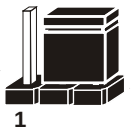
Jumper Block looks like this



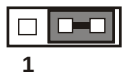
Jumper Settings

2 pin Jumper close(enabled) Looks like this

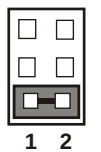




3 pin Jumper 2-3 pin close(enabled) Looks like this



Jumper Block 1-2 pin close(enabled) Looks like this

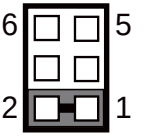
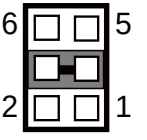
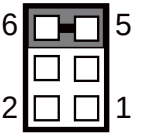


3.5 Setting KS-M220 High-End Level Connectors and Jumpers

3.5.1 COM2 Connector Pin9 Definition Selection Guide (JP_COM2)

Jumper Location: JP_COM2

Description: COM2 Port pin9 RI/+5V/+12V Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
RI	***1-2 (Default Setting)***	 JP_COM2
12V	3-4	 JP_COM2
5V	5-6	 JP_COM2

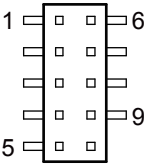
3.5.2 COM Connectors (COM1, COM2)

Connector Location: COM1

Description: COM1 (RS-232) Connector (onboard pin header)

COM1 Connector Pin Assignment:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DCD#	6	DSR#
2	RX	7	RTS#
3	TX	8	CTS#
4	DTR#	9	RI#
5	GND	-	-



COM1/ COM2

Connector Location: COM2

Description: COM2 Connector (onboard pin header)
COM2 is RS-232/422/485 selectable under BIOS.

COM2 Connector Pin Assignment:

PIN	ASSIGNMENT		
	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

Note:

COM2: Pin 9 is selectable for RI, +5V or +12V by **JP_COM2** jumper setting. Default setting is RI. Please see "**COM2 PIN9 Definition Selection Guide"** for selection details.

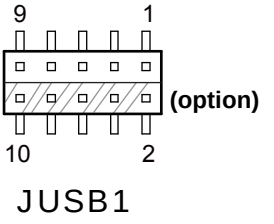
3.5.3 Internal USB 2.0 Connector (JUSB1)

Connector Location: JUSB1

Description: Internal USB 2.0 Connector

USB 2.0 connector signals:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	+5V	2	+5V
3	USBP7N	4	USBP10N
5	USBP7P	6	USBP10P
7	GND	8	GND
9	GND	10	GND



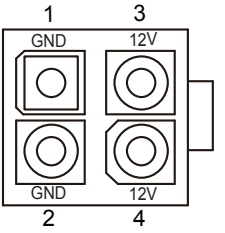
Note: The functions of **JUSB1** option pins are only supported on Core-i5 / i3 SoC boards.

3.5.4 ATX Power Input Connector (ATX1)

Connector Location: ATX1

Description: ATX Power Input Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	3	+12V / +24V
2	GND	4	+12V / +24V



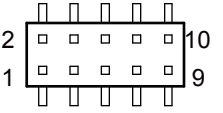
ATX1

3.5.5 HD Audio Connector (AUDIO1)

Connector Location: AUDIO1

Description: HD Audio Connector for Line In/Line Out/Mic In.

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	MIC1-L	2	MIC1-R
3	GND	4	GND
5	HD_LINE-IN-L_L	6	HD_LINE-IN-R_L
7	GND	8	GND
9	LINE-OUT-L	10	LINE-OUT-R



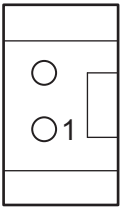
AUDIO1

3.5.6 Speaker Connectors (SPK_L_OUT1, SPK_R_OUT1)

Connector Location: SPK_L_OUT1

Description: Speaker Out Connector (Left side)

PIN	ASSIGNMENT
1	AMP_OUTL+
2	AMP_OUTL-

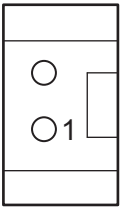


SPK_L_OUT1

Connector Location: SPK_R_OUT1

Description: Speaker Out Connector (Right side)

PIN	ASSIGNMENT
1	AMP_OUTR+
2	AMP_OUTR-



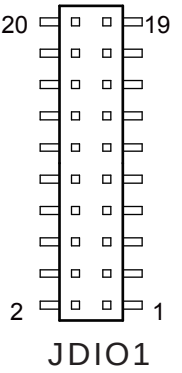
SPK_R_OUT1

3.5.7 Digital Input / Output Connector (JDIO1)

Connector Location: JDIO1

Description: Digital Input / Output Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	5V	2	5V
3	GND	4	GND
5	DIN_0	6	DOUT_0
7	DIN_1	8	DOUT_1
9	DIN_2	10	DOUT_2
11	DIN_3	12	DOUT_3
13	DIN_4	14	DOUT_4
15	DIN_5	16	DOUT_5
17	DIN_6	18	DOUT_6
19	DIN_7	20	DOUT_7

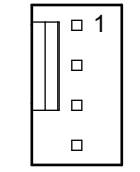


3.5.8 CPU Fan Connector (CPU_FAN1)

Connector Location: CPU_FAN1
Description: CPU Fan Connector

CPU Fan Connector signals:

PIN	ASSIGNMENT
1	GND
2	VCC12
3	TAC
4	CTL

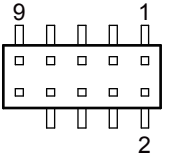


CPU_FAN1

3.5.9 Front Panel Connector (JFP1)

Connector Location: JFP1
Description: Front Panel Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	HDD LED+	2	PWR LED+
3	HDD LED-	4	PWR LED-
5	GND	6	Power Button
7	Reset Button	8	GND
9	5V	-	-

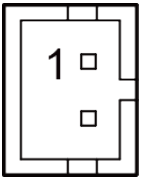


JFP1

3.5.10 Battery Wafer (JBAT1)

Connector Location: JBAT1
Description: Battery Wafer

PIN	ASSIGNMENT
1	VBAT+
2	GND



JBAT1

3.5.11 SPI Override Protection Selection (JP1)

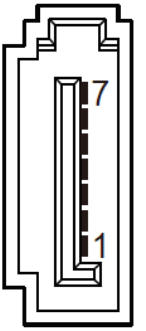
Jumper Location: JP1
Description: SPI Override Protection Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
Disable	***Open (Default Setting)***	 JP1
Enable	Close	 JP1

3.5.12 SATA 3.0 Connector (SATA1)

Connector Location: SATA1

Description: Serial ATA (SATA) 6GB/s Connector



SATA1

Serial ATA 6GB/s Connector (SATA1) signals:

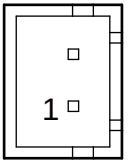
PIN	ASSIGNMENT
1	GND
2	TXPC
3	TXNC
4	GND
5	RXNC
6	RXPC
7	GND

3.5.13 SATA Power Connector (JHDD_PWR1)

Connector Location: JHDD_PWR1
Description: Serial ATA Power Connector

SATA Power Connector signals:

PIN	ASSIGNMENT
1	5V
2	GND

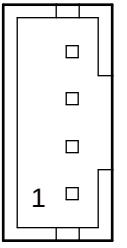


JHDD_PWR1

3.5.14 I2C Wafer (JI2C1)

Connector Location: JI2C1
Description: I2C Wafer

PIN	ASSIGNMENT
1	5V
2	GND
3	I2C0_SCL
4	I2C0_SDA



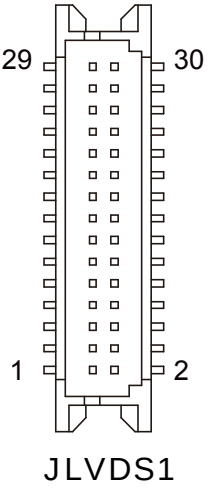
JI2C1

3.5.15 LVDS Connector (JLVDS1)

Connector Location: JLVDS1

Description: LVDS Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	+3.3V/+5V	2	GND
3	LVDS_CLKBM	4	LVDS_CLKBP
5	GND	6	LVDS_YBM2
7	LVDS_YBP2	8	GND
9	LVDS_YBM1	10	LVDS_YBP1
11	LVDS_YBP3	12	LVDS_YBM3
13	LVDS_YBP0	14	LVDS_YBM0
15	GND	16	LVDS_CLKAP
17	LVDS_CLKAM	18	GND
19	LVDS_YAP2	20	LVDS_YAM2
21	GND	22	LVDS_YAP1
23	LVDS_YAM1	24	GND
25	LVDS_YAP0	26	LVDS_YAM0
27	LVDS_YAP3	28	LVDS_YAM3
29	+3.3V/+5V	30	+3.3V/+5V

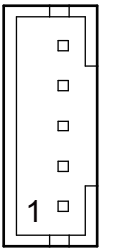


3.5.16 Panel Inverter Connector (JINV1)

Connector Location: JINV1

Description: Panel Inverter Connector

PIN	ASSIGNMENT
1	+12V
2	GND
3	Backlight PWM
4	GND
5	Backlight Enable



JINV1

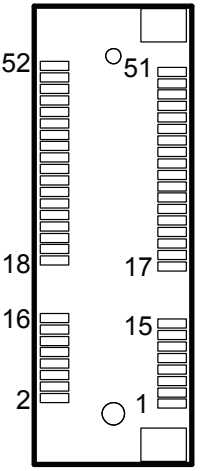
3.5.17 Mini PCI Express Slot (M_PCIE1)

Connector Location: M_PCIE1

Description: Mini-PCI Express Slot

Mini-PCI Express Slot (M_PCIE1) signals:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	WAKEJ	2	VCC3_3_SB
3	NC	4	GND
5	NC	6	VCC1_5
7	CLKREQJ	8	NC
9	GND	10	NC
11	CLK_DN	12	NC
13	CLK_DP	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	NC
21	GND	22	PLTRSTJ_BUF
23	PCIE_RXN	24	VCC3_3_SB
25	PCIE_RXP	26	GND
27	GND	28	VCC1_5
29	GND	30	SMB_CLK
31	PCIE_TXN	32	SMB_DATA
33	PCIE_TXP	34	GND
35	GND	36	USBN
37	GND	38	USBP
39	VCC3_3_SB	40	GND
41	VCC3_3_SB	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	VCC1_5
49	NC	50	GND
51	NC	52	VCC3_3_SB



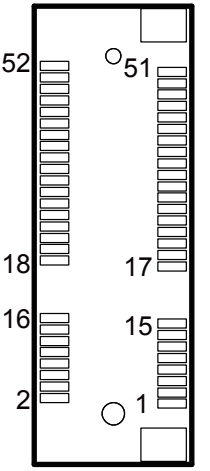
M_PCIE1

Mini PCI Express is the successor of the Mini PCI card and provides an increased data throughput. The cards have a detached network interface and are equipped with one lane. They are used in particular in embedded designs or compact box PCs.

3.5.18 mSATA Connector (M_SATA1)

Connector Location: M_SATA1
Description: mSATA Slot

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	NC	2	3.3V
3	NC	4	GND
5	NC	6	NC
7	NC	8	NC
9	GND	10	NC
11	NC	12	NC
13	NC	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	NC
21	GND	22	NC
23	mSATA1_RX_DP	24	3.3V
25	mSATA1_RX_DN	26	GND
27	GND	28	NC
29	GND	30	NC
31	mSATA1_TX_DN	32	NC
33	mSATA1_TX_DP	34	GND
35	GND	36	USB2_P9_DN
37	GND	38	USB2_P9_DP
39	3.3V	40	GND
41	3.3V	42	NC
43	NC	44	NC
45	NC	46	NC
47	NC	48	NC
49	NC	50	GND
51	NC	52	3.3V



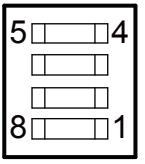
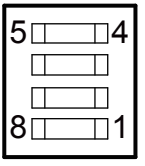
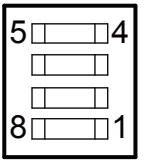
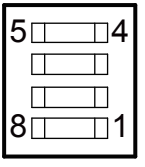
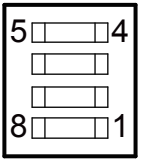
M_SATA1

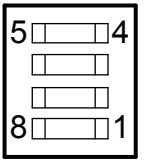
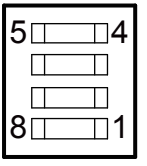
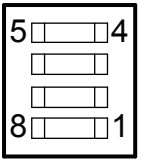
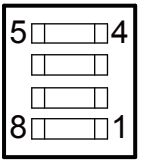
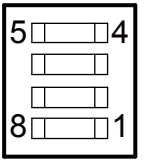
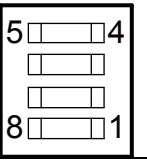
Note: The USB function is only supported on Core-i5 / i3 SoC boards.

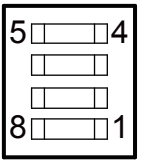
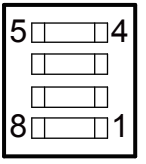
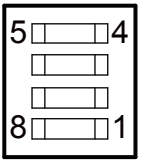
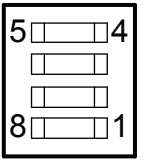
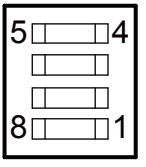
3.5.19 Slide Switch For LVDS Resolution Selection (SW1)

Jumper Location: SW1

Description: LVDS Resolution/Channel/Color Bit Selection

SELECTION	SW1	PIN	SETTING
1024 x 768 Channel S/8bit (Default Setting)		**1-8**	**ON**
		2-7	**OFF**
		3-6	**ON**
		4-5	**ON**
800 x 600 Channel S/6bit		1-8	ON
		2-7	ON
		3-6	ON
		4-5	ON
1024 x 768 Channel S/6bit		1-8	OFF
		2-7	ON
		3-6	ON
		4-5	ON
1280 x 768 Channel S/6bit		1-8	OFF
		2-7	OFF
		3-6	ON
		4-5	ON
1280 x 800 Channel S/6bit		1-8	ON
		2-7	ON
		3-6	OFF
		4-5	ON

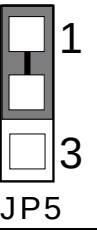
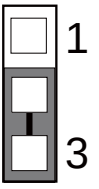
SELECTION	SW1	PIN	SETTING
1280 x 960 Channel S/6bit		1-8	OFF
		2-7	ON
		3-6	OFF
		4-5	ON
1280 x 1024 Channel D/8bit		1-8	ON
		2-7	OFF
		3-6	OFF
		4-5	ON
1366 x 768 Channel S/6bit		1-8	OFF
		2-7	OFF
		3-6	OFF
		4-5	ON
1366 x 768 Channel S/8bit		1-8	ON
		2-7	ON
		3-6	ON
		4-5	OFF
1440 x 900 Channel D/8bit		1-8	OFF
		2-7	ON
		3-6	ON
		4-5	OFF
1400 x 1050 Channel D/8bit		1-8	ON
		2-7	OFF
		3-6	ON

SELECTION	SW1	PIN	SETTING
		4-5	OFF
1600 x 900 Channel D/8bit		1-8	OFF
		2-7	OFF
		3-6	ON
		4-5	OFF
1680 x 1050 Channel D/8bit		1-8	ON
		2-7	ON
		3-6	OFF
		4-5	OFF
1600 x 1200 Channel D/8bit		1-8	OFF
		2-7	ON
		3-6	OFF
		4-5	OFF
1920 x 1080 Channel D/8bit		1-8	ON
		2-7	OFF
		3-6	OFF
		4-5	OFF
1920 x 1200 Channel D/8bit		1-8	OFF
		2-7	OFF
		3-6	OFF
		4-5	OFF

3.5.20 LVDS VCC Selection (JP5)

Jumper Location: JP5

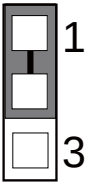
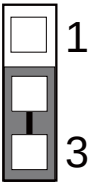
Description: LVDS VCC Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
3.3V	***1-2 (Default Setting)***	 JP5
5V	2-3	 JP5

3.5.21 Backlight PWM Level Selection (JP6)

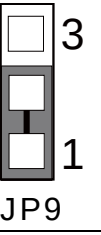
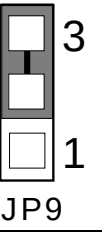
Jumper Location: JP6

Description: Backlight PWM Level Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
3.3V	***1-2 (Default Setting)***	 JP6
5V	2-3	 JP6

3.5.22 V3P3 MPCIE Selection (JP9)

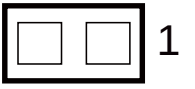
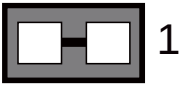
Jumper Location: JP9
Description: V3P3 MPCIE Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
VCC3_3	***1-2 (Default Setting)***	
V3P3A	2-3	

3.5.23 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 SETTINGS	JUMPER ILLUSTRATION
Normal	***Open*** ***(Default Setting)***	 JCMOS1
Clear CMOS Data	Close	 JCMOS1

Note: Please make sure the main power is off before you clear CMOS.

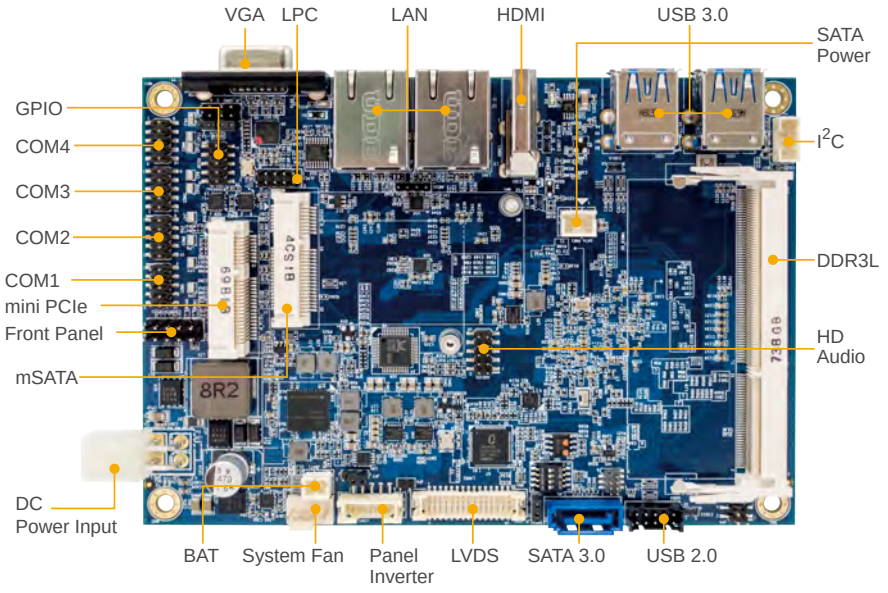
3.6 KS-M221 Entry Level System Jumper & Connector Quick Reference Table

JUMPER Description	NAME
COM3 Pin9 RI/5V/12V Selection	JP_COM3
COM4 Pin9 RI/5V/12V Selection	JP_COM4
LVDS VCC Voltage Selection	JP_VDD1
Clear CMOS Data Selection	JP4
LVDS Backlight Control Selection	JP7
Slide Switch for LVDS Resolution Selection	SW1

CONNECTOR Description	NAME
COM Connector	COM1, COM2, COM3, COM4
VGA Connector (Rear)	VGA1
HDMI Port Connector	HDMI1
2 x LAN Ports (Rear)	LAN1, LAN2
2 x Dual USB 3.0 Ports (Rear)	USB1, USB2
2 x USB 2.0 Ports (Internal)	USB3
Programmable GPIO Pin Header	JDIO1
I2C Wafer	JI2C1
MCU FW Rewrite Connector	JMCU1
System Fan Connector	FAN1
DC Power Input Connector	PWR2
Mini PCI Express Slot	M_PCIE1
mSATA Connector	M_SATA1
LVDS Connector	LVDS1
Front Panel Connector	JFP1
HD Audio Connector	AUDIO1
Panel Inverter Connector	JINV1
SATA 3.0 Connector	SATA1
SATA Power Connector	SATA_PWR1
BIOS Reset Connector	JP9

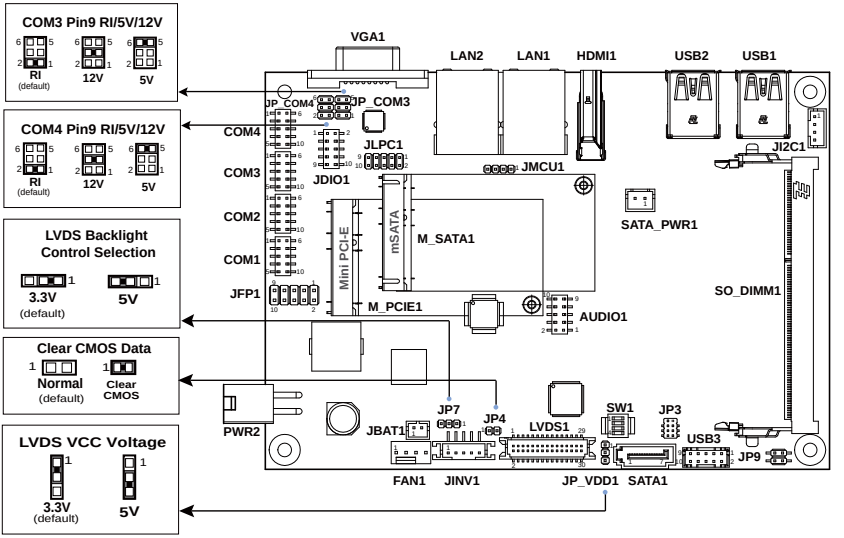
3.7 KS-M221 Entry Level System Component Locations

3.7.1 Top View of BE-0986RB

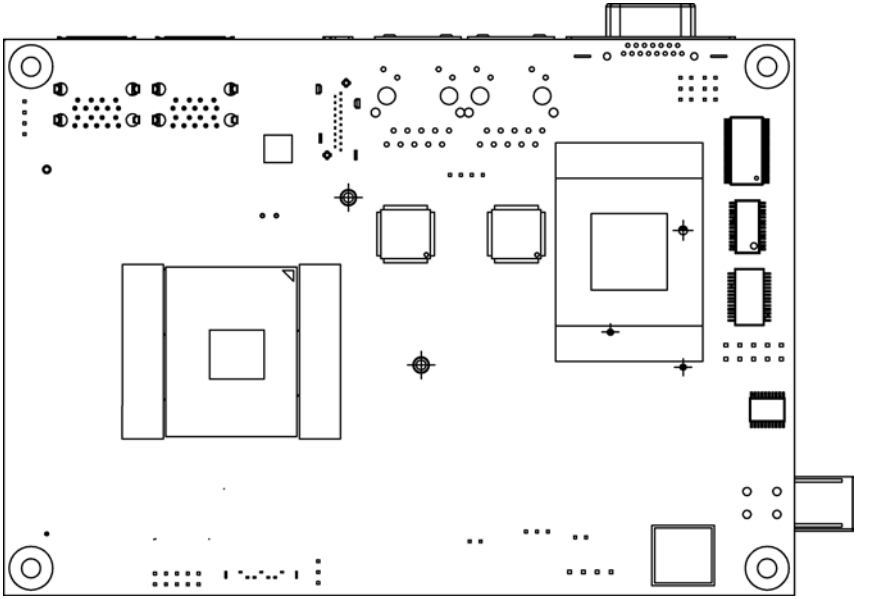


	WARNING: Always disconnect the power cord when you are working with connectors and jumpers on the main board. Make sure both the system and peripheral devices are turned OFF as sudden surge of power could damage sensitive components. Make sure BE-0986 is properly grounded.
	CAUTION: Observe precautions 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 mainboard components.

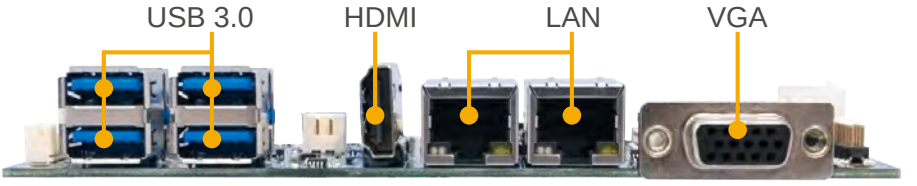
3.7.2 Jumper Setting of BE-0986RB



3.7.3 Bottom View of BE-0986RB



3.7.4 I/O View of BE-0986RB

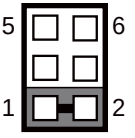
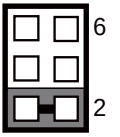
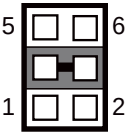
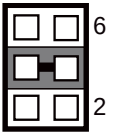
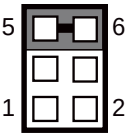
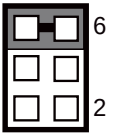


3.8 Setting KS-M221 Entry Level Connectors and Jumpers

3.8.1 COM3 and COM4 PIN9 Definition Selection Guide (JP_COM3, JP_COM4)

Jumper Location: JP_COM3, JP_COM4

Description: COM3 and COM4 Port pin9 RI/5V/12V Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION	
RI	***1-2 (Default Setting)***	 JP_COM3	 JP_COM4
+12V	3-4	 JP_COM3	 JP_COM4
+5V	5-6	 JP_COM3	 JP_COM4

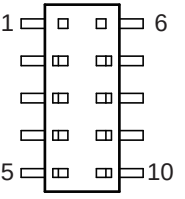
3.8.2 COM Port (COM1, COM2, COM3, COM4)

Port Location: COM1, COM2, COM3, COM4

Description: COM1, COM2, COM3, COM4 Port

COM1 (RS-232) Connector Pin Assignment:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM1_DCD	6	COM1_DSR
2	COM1_RX	7	COM1_RTS
3	COM1_TX	8	COM1_CTS
4	COM1_DTR	9	COM1_RI
5	GND	10	NC



COM1/
COM2

COM2 (RS-232) Connector Pin Assignment:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM2_DCD	6	COM2_DSR
2	COM2_RX	7	COM2_RTS
3	COM2_TX	8	COM2_CTS
4	COM2_DTR	9	COM2_RI
5	GND	10	NC

COM2 (RS-422) Connector Pin Assignment:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	TX-	6	NC
2	TX+	7	NC
3	RX-	8	NC
4	RX+	9	NC
5	GND	10	NC

COM2 (RS-485) Connector Pin Assignment:

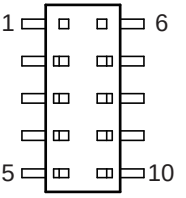
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	D-	6	NC
2	D+	7	NC
3	NC	8	NC
4	NC	9	NC
5	GND	10	NC

Notes:

1. COM2 is selectable as RS232, RS422, RS485 by BIOS setting.
2. Default setting is RS232. Please see **Chapter 5 "Advanced – Onboard Device Configuration"** for selection details.

COM3 (RS-232) Connector Pin Assignment:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM3_DCD	6	COM3_DSR
2	COM3_RX	7	COM3_RTS
3	COM3_TX	8	COM3_CTS
4	COM3_DTR	9	COM3_RI_SEL
5	GND	10	NC



COM3/
COM4

COM4 (RS-232) Connector Pin Assignment:

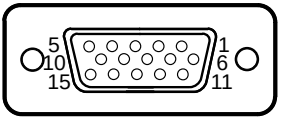
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM4_DCD	6	COM4_DSR
2	COM4_RX	7	COM4_RTS
3	COM4_TX	8	COM4_CTS
4	COM4_DTR	9	COM4_RI_SEL
5	GND	10	NC

Note:
COM3, COM4: Pin 9 is selectable for RI, +5V or +12V by jumper setting. Default setting is RI, please see "**COM3 and COM4 PIN9 Definition Selection Guide"** for selection details.

3.8.3 VGA Port (VGA1)

Port Location: VGA1

Description: VGA Port, D-Sub 15-pin (I/O port)



VGA1

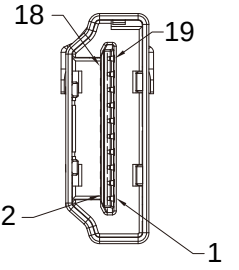
PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	CRT_RED	6	GND	11	NC
2	CRT_GREEN	7	GND	12	CRT_DATA
3	CRT_BLUE	8	GND	13	CRT_HSYNC
4	NC	9	CRT_VCC	14	CRT_VSYNC
5	GND	10	GND	15	CRT_CLK

3.8.4 HDMI Port (HDMI1)

Port Location: HDMI1

Description: HDMI Port Connector

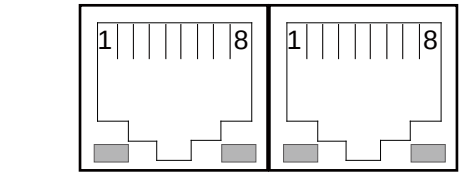
PIN	ASSIGNMENT	PIN	ASSIGNMENT
18	+5V	19	HOT_PLUG_DET
16	I2C_DATA	17	GND
14	NC	15	I2C_CLK
12	CLK-	13	NC
10	CLK+	11	GND
8	GND	9	D0-
6	D1-	7	D0+
4	D1+	5	GND
2	GND	3	D2-
-	-	1	D2+



HDMI1

3.8.5 LAN Port (LAN1, LAN2)

Port Location: LAN1, LAN2
Description: LAN RJ-45 Port (rear I/O)



LAN1 / LAN2

LAN1 Pin Assignment

PIN	ASSIGNMENT
1	LAN1_MDIP0
2	LAN1_MDIN0
3	LAN1_MDIP1
4	LAN1_MDIP2
5	LAN1_MDIN2
6	LAN1_MDIN1
7	LAN1_MDIP3
8	LAN1_MDIN3

LAN2 Pin Assignment

PIN	ASSIGNMENT
1	LAN2_MDIP0
2	LAN2_MDIN0
3	LAN2_MDIP1
4	LAN2_MDIP2
5	LAN2_MDIN2
6	LAN2_MDIN1
7	LAN2_MDIP3
8	LAN2_MDIN3

LAN LED Status

There are LAN LED indicators on the rear side of the mainboard. By observing their status, you can know the status of the Ethernet connection.

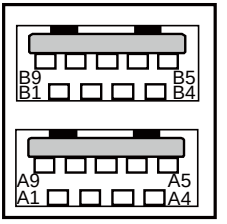
LAN LED Indicator	Color	Status	Description
Right Side LED	Yellow	Blink	LAN Message Active
	-	Off	No LAN Message Active
Left Side LED	Green	On	10/100Mbps LAN connection is enabled.
	Orange	On	Giga LAN connection is enabled.
	-	Off	No LAN switch/hub is connected

3.8.6 Dual USB 3.0 Port (USB1)

Port Location: USB1
Description: USB 3.0 port x 2

USB 3.0 signals

PIN	ASSIGNMENT	PIN	ASSIGNMENT
B5	USB3_RXN2	-	-
B6	USB3_RXP2	B4	GND
B7	GND	B3	USB2_P2_DP
B8	USB3_TXN2	B2	USB2_P2_DN
B9	USB3_TXP2	B1	VCC5_USB1
A5	USB3_RXN1	-	-
A6	USB3_RXP1	A4	GND
A7	GND	A3	USB2_P1_DP
A8	USB3_TXN1	A2	USB2_P1_DN
A9	USB3_TXP1	A1	VCC5_USB1



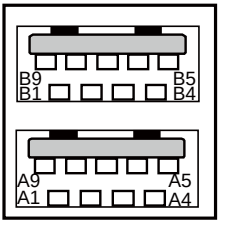
USB1

3.8.7 USB 3.0 Port (USB2)

Port Location: USB2
Description: USB 3.0 port x 2

USB 3.0 signals

PIN	ASSIGNMENT	PIN	ASSIGNMENT
B5	USB3_RXN2	-	-
B6	USB3_RXP2	B4	GND
B7	GND	B3	USB2_P2_DP
B8	USB3_TXN2	B2	USB2_P2_DN
B9	USB3_TXP2	B1	VCC5_USB1
A5	USB3_RXN1	-	-
A6	USB3_RXP1	A4	GND
A7	GND	A3	USB2_P1_DP
A8	USB3_TXN1	A2	USB2_P1_DN
A9	USB3_TXP1	A1	VCC5_USB1



USB2

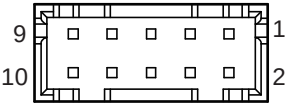
3.8.8 USB 2.0 Port (USB3)

Port Location: USB3

Description: Internal USB 2.0 Port x 2

USB 2.0 signals

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC5_USB3	2	VCC5_USB3
3	USB2_P5_DN	4	USB2_P6_DN
5	USB2_P5_DP	6	USB2_P6_DP
7	GND	8	GND
9	GND	10	GND



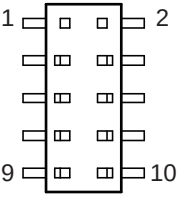
USB3

3.8.9 Programmable GPIO PIN HEADER (JDIO1)

Connector Location: JDIO1

Description: GPIO pin header and 5V power

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC5	2	GND
3	GPI/GPO 0	4	GPI/GPO 4
5	GPI/GPO 1	6	GPI/GPO 5
7	GPI/GPO 2	8	GPI/GPO 6
9	GPI/GPO 3	10	GPI/GPO 7



JDIO1

Notes:

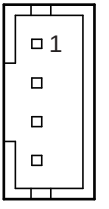
1. Users can set the GPI/GPO configuration via Protech's API/Utility.
2. Default setting is GPI every time when system AC power is re-applied from power failure state
3. Configuration can still be kept even in S5 state unless system AC power is lost.

3.8.10 I2C Wafer (JI2C1)

Connector Location: JI2C1

Description: I2C Wafer

PIN	ASSIGNMENT
1	GND
2	VCC5
3	I2C0_SCL_33
4	I2C0_SDA_33

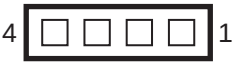


JI2C1

3.8.11 MCU FW Rewrite Connector (JMCU1)

Connector Location: JMCU1

Description: MCU FW Rewrite Connector



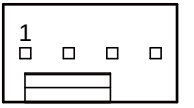
JMCU1

PIN	ASSIGNMENT
1	MCU_5VSB
2	GND
3	MCU_SPD
4	MCU_SPC

3.8.12 System Fan Connector (FAN1)

Connector Location: FAN1

Description: System Fan Connector



FAN1

PIN	ASSIGNMENT
1	GND
2	VCC12
3	SYSFANIN
4	SYSFANOUT

Notes:

1. Fan speed mode can be set by BIOS or API.
2. Default BIOS setting is "Auto Duty-Cycle Mode". Please see Chapter 5 or check API document for more details.

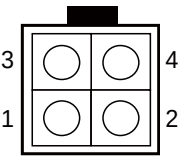
3.8.13 DC Power Input Connector (PWR2)

Connector Location: PWR2

Description: DC Power Input Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
3	VCC12	4	VCC12
2	GND	1	GND

Note: The voltage of input power should be 12V or 16~24V.

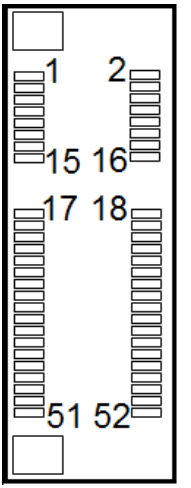


PWR2

3.8.14 Mini PCI Express Slot (M_PCIE1)

Connector Location: M_PCIE1
Description: Mini PCI Express Slot

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	PCIE_WAKEJ	2	V3P3S
3	Reserved	4	GND
5	Reserved	6	VCC1_5
7	M_CLKREQJ	8	Reserved
9	GND	10	Reserved
11	M_PCIE_CLKN	12	Reserved
13	M_PCIE_CLKP	14	Reserved
15	GND	16	Reserved
17	Reserved	18	GND
19	Reserved	20	Reserved
21	GND	22	PMU_PLTRST_N
23	PCIE_P2_RXN	24	V3_3SB
25	PCIE_P2_RXP	26	GND
27	GND	28	VCC1_5
29	GND	30	SMB_3P3_SCL
31	PCIE_P2_TXN	32	SMB_3P3_SDA
33	PCIE_P2_TXP	34	GND
35	GND	36	USB2_P7_DN
37	GND	38	USB2_P7_DP
39	V3P3S	40	GND
41	V3P3S	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	VCC1_5
49	NC	50	GND
51	NC	52	V3P3S



M_PCIE1

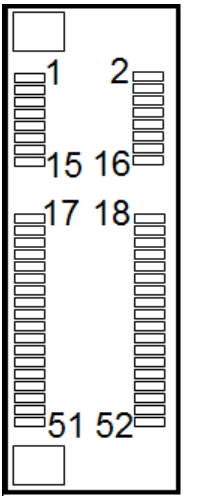
Mini PCI Express is the successor of the Mini PCI card and provides an increased data throughput. The cards have a detached network interface and are equipped with one lane. They are used in particular in embedded designs or compact box PCs.

3.8.15 mSATA Connector (M_SATA1)

Connector Location: M_SATA1

Description: mSATA Slot (USB type mPCIe card is supported.)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	NC	2	V3P3S_MSATA
3	NC	4	GND
5	NC	6	NC
7	NC	8	NC
9	GND	10	NC
11	NC	12	NC
13	NC	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	NC
21	GND	22	NC
23	SATA_RXP1	24	V3P3S_MSATA
25	SATA_RXN1	26	GND
27	GND	28	NC
29	GND	30	NC
31	SATA_TXN1	32	NC
33	SATA_TXP1	34	GND
35	GND	36	USB2_P0_DN
37	GND	38	USB2_P0_DP
39	V3P3S_MSATA	40	GND
41	V3P3S_MSATA	42	NC
43	NC	44	NC
45	NC	46	NC
47	NC	48	NC
49	NC	50	GND
51	NC	52	V3P3S_MSATA



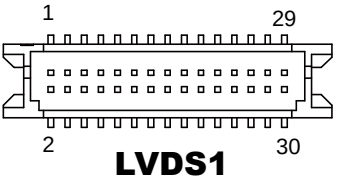
M_SATA1

3.8.16 LVDS Connector (LVDS1)

Connector Location: LVDS1

Description: LVDS Connector

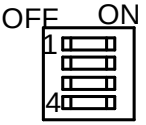
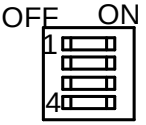
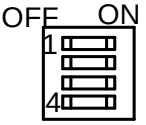
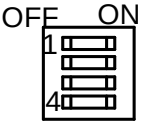
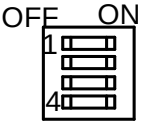
PIN	ASSIGNMENT	PIN	ASSIGNMENT
2	GND	1	LVDS_VCC
4	LVDS_CLKB_DP	3	LVDS_CLKB_DN
6	LVDS_B2_DN	5	GND
8	GND	7	LVDS_B2_DP
10	LVDS_B1_DP	9	LVDS_B1_DN
12	LVDS_B3_DN	11	LVDS_B3_DP
14	LVDS_B0_DN	13	LVDS_B0_DP
16	LVDS_CLKA_DP	15	GND
18	GND	17	LVDS_CLKA_DN
20	LVDS_A2_DN	19	LVDS_A2_DP
22	LVDS_A1_DP	21	GND
24	GND	23	LVDS_A1_DN
26	LVDS_A0_DN	25	LVDS_A0_DP
28	LVDS_A3_DN	27	LVDS_A3_DP
30	LVDS_VCC	29	LVDS_VCC

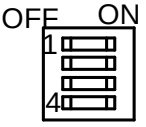
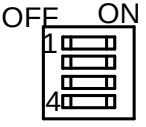
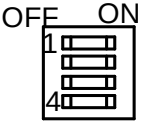
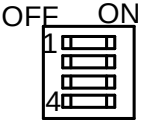
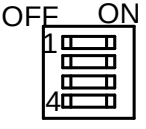


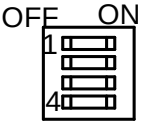
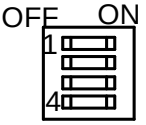
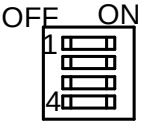
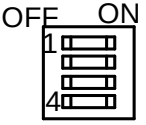
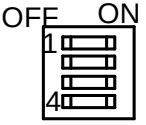
3.8.17 Slide Switch for LVDS Resolution Selection (SW1)

Jumper Location: SW1

Description: Slide Switch for LVDS Resolution/Channel/Color Bit Selection

SELECTION	SW1	PIN	SETTING
800 x 600 1CH/18bit ***(Default Setting)***		1	ON
		2	ON
		3	ON
		4	ON
1024 x 768 1CH/18bit		1	OFF
		2	ON
		3	ON
		4	ON
1024 x 768 1CH/24bit		1	ON
		2	OFF
		3	ON
		4	ON
1280 x 768 1CH/18bit		1	OFF
		2	OFF
		3	ON
		4	ON
1280 x 800 1CH/18bit		1	ON
		2	ON
		3	OFF
		4	ON

SELECTION	SW1	PIN	SETTING
1280 x 960 1CH/18bit		1	OFF
		2	ON
		3	OFF
		4	ON
1280 x 1024 2CH/24bit		1	ON
		2	OFF
		3	OFF
		4	ON
1366 x 768 1CH/18bit		1	OFF
		2	OFF
		3	OFF
		4	ON
1366 x 768 1CH/24bit		1	ON
		2	ON
		3	ON
		4	OFF
1440 x 900 2CH/24bit		1	OFF
		2	ON
		3	ON
		4	OFF
1400 x 1050 2CH/24bit		1	ON
		2	OFF
		3	ON

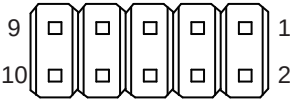
SELECTION	SW1	PIN	SETTING
		4	OFF
1600 x 900 2CH/24bit		1	OFF
		2	OFF
		3	ON
		4	OFF
1680 x 1050 2CH/24bit		1	ON
		2	ON
		3	OFF
		4	OFF
1600 x 1200 2CH/24bit		1	OFF
		2	ON
		3	OFF
		4	OFF
1920 x 1080 2CH/24bit		1	ON
		2	OFF
		3	OFF
		4	OFF
1920 x 1200 2CH/24bit		1	OFF
		2	OFF
		3	OFF
		4	OFF

3.8.18 Front Panel Connector (JFP1)

Connector Location: JFP1

Description: Front Panel Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	HDD LED+	2	POWER LED+
3	HDD LED-	4	GND
5	GND	6	GND
7	RESET BTN	8	GND
9	NC	10	POWER BTN



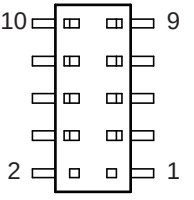
JFP1

3.8.19 HD Audio Connector (AUDIO1)

Connector Location: AUDIO1

Description: HD Audio Connector for Line In/Line Out/Mic In

PIN	ASSIGNMENT	PIN	ASSIGNMENT
10	LINE-OUT-L	9	LINE-OUT-L
8	HD_GND	7	HD_GND
6	HD_LINE-IN-R	5	HD_LINE-IN-L
4	HD_GND	3	HD_GND
2	HD_MIC1-R	1	HD_MIC1-L



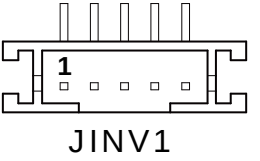
AUDIO1

3.8.20 Panel Inverter Connector (JINV1)

Connector Location: JINV1

Description: Panel Inverter Connector

PIN	ASSIGNMENT
1	VCC12
2	VCC12
3	GND
4	LVDS_BKLCTL
5	LVDS_BKLTEN

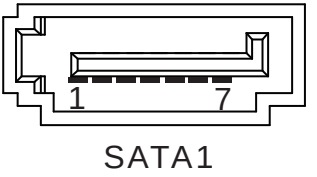


3.8.21 SATA 3.0 Connector (SATA1)

Connector Location: SATA1

Description: Serial ATA 3.0 Connector

PIN	ASSIGNMENT
1	GND
2	SATA_TXP0
3	SATA_TXN0
4	GND
5	SATA_RXN0
6	SATA_RXP0
7	GND

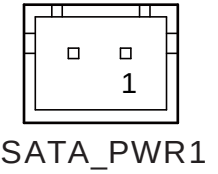


3.8.22 SATA Power Connector (SATA_PWR1)

Connector Location: SATA_PWR1

Description: Serial ATA Power Connector

PIN	ASSIGNMENT
2	GND
1	VCC5



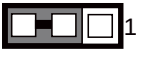
3.8.23 BIOS Reset Connector (JP9)

Jumper Location: JP9
Description: BIOS Reset Usage Connector

This connector is only for Protech's engineers. (Purpose: BIOS reset). Please do not use this connector; otherwise, the system might be crashed.

3.8.24 LVDS Backlight Control Selection (JP7)

Jumper Location: JP7
Description: Jumper for selecting PIN4 (LVDS_BKLCTL) voltage of JINV1.

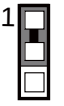
SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
3.3V	**1-2** ***(Default Setting)***	 JP7
5V	2-3	 JP7

Note 1: Users can change the setting according to panel specification
Note 2: Please refer to **PANEL INVERTER CONNECTOR** for more details about pin definition of JINV1.

3.8.25 LVDS VCC Voltage Selection (JP_VDD1)

Jumper Location: JP_VDD1

Description: Voltage selection jumper for selecting PIN1, PIN29, PIN30 (LVDS_VCC) voltage of LVDS1.

SELECTION	JUMPTER SETTING	JUMPER ILLUSTRATION
3.3V	**1-2** ***(Default Setting)***	 JP_VDD1
5V	2-3	 JP_VDD1

Note: Please refer to **PANEL INVERTER CONNECTOR** for more information about pin definition of JINV1.

3.8.26 Clear CMOS Data Selection (JP4)

Jumper Location: JP4

Description: Clear CMOS Data Selection

Step 1. Remove the main power of the PC.
Step 2. Close JP4 (pins 1-2) for 6 seconds by a cap.
Step 3. Remove the cap which is just used on JP4 (1-2), so that JP4 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	JUMPER ILLUSTRATION
Normal	**Open** ***(Default Setting)***	
Clear CMOS*	1-2	

4 Software Utilities

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

High-End Level System:

- Installing Intel® Chipset Software Installation Utility
- Installing Graphics Driver Utility
- Installing LAN Driver Utility
- Installing Sound Driver Utility
- Installing Intel® Management Engine Components Installer
- Installing Intel® Serial I/O Driver Utility

Entry Level System:

- Installing Intel® Chipset Software Installation Utility
- Installing Graphics Driver Utility
- Installing Sound Driver Utility
- Installing LAN Driver Utility
- Installing Microsoft Hotfix kb3211320 and kb3213986 Driver
- Installing Intel® Serial I/O Driver Utility

4.1 Driver and OS Support For High-End Level System

Enclosed with the KS-M220 Series package is our driver utilities contained in a DVD-ROM disk. Refer to the following table for driver locations:

For Windows 10 OS:

Filename (Assume that DVD-ROM drive is D :)	Purpose	OS	
		Shell	Win10 (64bit)
D:\Driver\Flash BIOS	For Aptio(EFI) BIOS update utility	✓	X
D:\BE-0996_V1.0\Platform\ 1_Main Chip\Win10(64Bit)	Intel® Chipset Device Software installer	X	✓
D:\BE-0996_V1.0\Platform\ 2_Graphics\Win10(64Bit)	Intel® HD Graphics Family For Graphics driver installation	X	✓
D:\BE-0996_V1.0\Platform\ 3_Sound\Win10(64Bit)	Realtek ALC888S-VD2-GR HD Audio codec System Software	X	✓
D:\BE-0996_V1.0\Platform\ 4_ME\ Win10 (64Bit)	Intel® Management Engine Components Installer for Intel Kaby Lake chipset	X	✓
D:\BE-0996_V1.0\Platform\ 5_LAN Chip\ Win10 (64Bit)	Intel® I219-V & Intel® I211 For LAN Driver installation	X	✓
D:\BE-0996_V1.0\Platform\ 6_Serial IO\Win10 (64Bit)	Intel® Serial I/O Driver	X	✓
D:\Driver\Device	Driver Installation for Barcode Scanner and Thermal Printer	X	✓

X : Not supported

✓: Supported

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

For more details on the installation sequence, refer to the Readme.txt file.

4.1.1 Installing Intel® Chipset Software Installation Utility

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
- PCI-e Support
- SATA Storage Support
- USB Support
- Identification of Intel® Chipset Components in the Device Manager

Intel® Chipset Software Installation Utility

The utility pack is to be installed only for Windows 10 (64-bit), 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 KS-M220 and insert the driver disk.
2. Enter the **Main Chip** folder where the Chipset driver is located (depending on your OS platform).
3. Click **Setup.exe** file for driver installation.
4. Follow the on-screen instructions to install the driver.
5. Once the installation is completed, shut down the system and restart KS-M220 for the changes to take effect.

4.1.2 Installing Graphics Driver Utility

The Graphics interface embedded in KS-M220 can support dual displays via DP and HDMI interfaces and make the system work simultaneously.

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

1. Connect the USB DVD-ROM device to KS-M220 and insert the driver disk.
2. Enter the **Graphics** folder where the driver is located (depending on your OS platform).
3. Click the **Setup.exe** file for driver installation.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart KS-M220 for the changes to take effect.

4.1.3 Installing LAN Driver Utility

Enhanced with LAN function, KS-M220 supports various network adapters. To install the LAN Driver, follow the steps below:

1. Connect the USB DVD-ROM device to KS-M220 and insert the driver disk.
2. Enter the **LAN** folder where the driver is located (depending on your OS platform).
3. Click **Autorun.exe** file for driver installation.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart KS-M220 for the changes to take effect.

4.1.4 Installing Sound Driver Utility

To install the Sound Driver, follow the steps below:

1. Connect the USB DVD-ROM device to KS-M220 and insert the driver disk.
2. Open the **Sound** folder where the driver is located (depending on your OS platform).
3. Click the **Setup.exe** file for driver installation.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart KS-M220 for the changes to take effect.

4.1.5 Intel® Management Engine Components Installer Installation

Installation Instructions for Intel® Management Engine Components Installer

1. Connect the USB DVD-ROM device to KS-M220 and insert the driver disk.
2. Enter the **ME** folder where the driver is located.
3. Select Windows 10 (64-bit) for your OS platform.
4. Click **Setup.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 KS-M220 for the changes to take effect.

4.1.6 Installing Intel® Serial I/O Driver Utility

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

1. Connect the USB DVD-ROM device to KS-M220 and insert the driver disk.
2. Open the **Serial I/O** folder where the driver is located.
3. Select Windows 10 (64-bit) for your OS platform.
4. Click the **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 KS-M220 for the changes to take effect.

4.2 Driver and OS Support For Entry Level System

Enclosed with the KS-M221 Series package is our driver utilities contained in a DVD-ROM disk. Refer to the following table for driver locations:

For Windows 10 OS:

Filename (Assume that DVD-ROM drive is D :)	Purpose	OS	
		Shell	Win10 (64bit)
D:\Driver\Flash BIOS	For Aptio(EFI) BIOS update utility	✓	X
D:\BE-0986_V1.0\Driver\Platform\Chipset	Intel® Chipset Device Software Installation Utility	X	✓
D:\BE-0986_V1.0\Driver\Platform\TXE	For Intel® Trusted Execution Engine Interface	X	✓
D:\BE-0986_V1.0\Driver\Platform\Graphics	Intel® HD Graphics	X	✓
D:\BE-0986_V1.0\Driver\Platform\LAN	Intel® I210 For LAN Driver installation	X	✓
D:\BE-0986_V1.0\Driver\Platform\Sound	Realtek ALC888 For Sound driver installation	X	✓
D:\BE-0986_V1.0\Driver\Platform\Hotfix	Microsoft Hotfix kb3211320 and kb3213986 for Windows 10	X	✓
D:\BE-0986_V1.0\Driver\Platform\Serial IO	Intel® Serial I/O driver for Windows 10	X	✓
D:\Driver\Device	Driver Installation for Barcode Scanner and Thermal Printer	X	✓

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

4.2.1 Installing Intel® Chipset Software Installation Utility

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

Intel® Chipset Software Installation Utility

The utility pack is to be installed only for Windows 10 64bit, 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 KS-M221 and insert the driver disk.
2. Enter the **Main Chip** folder where the Chipset driver is located.
3. Click **Setup.exe** file for driver installation.
4. Follow the on-screen instructions to install the driver.
5. Once the installation is completed, shut down the system and restart KS-M221 for the changes to take effect.

4.2.2 Installing Graphics Driver Utility

The Graphics interface embedded in KS-M221 can support dual displays via DP and HDMI interfaces and make the system work simultaneously.

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

1. Connect the USB DVD-ROM device to KS-M221 and insert the driver disk.
2. Enter the **Graphics** folder where the driver is located.
3. Click the **Setup.exe** file for driver installation.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart KS-M221 for the changes to take effect.

4.2.3 Installing LAN Driver Utility

Enhanced with LAN function, KS-M221 supports various network adapters. To install the LAN Driver, follow the steps below:

1. Connect the USB DVD-ROM device to KS-M221 and insert the driver disk.
2. Enter the **LAN** folder where the driver is located.
3. Click **Autorun.exe** file for driver installation.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart KS-M221 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.

4.2.4 Installing Sound Driver Utility

To install the Sound Driver, follow the steps below:

1 Connect the USB DVD-ROM device to KS-M221 and insert the driver disk.

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

3 Click the **Setup.exe** file for driver installation.

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

5 Once the installation is completed, shut down the system and restart KS-M221 for the changes to take effect.

4.2.5 Microsoft Hotfix kb3211320 and kb3213986 Driver installation

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

1. Connect the USB DVD-ROM device to BE-0986 and insert the driver disk.
2. Enter the **Hotfix** folder where the driver is located.
3. Click the **windows10.0-kb3211320-x64** and **windows10.0-kb3213986-x64** files for critical security update.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart BE-0986 for the changes to take effect.

4.2.6 Installing Intel® Serial I/O Driver Utility

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

1. Connect the USB DVD-ROM device to KS-M221 and insert the driver disk.
2. Open the **Serial I/O** folder where the driver is located.
3. Select Windows 10 (64-bit) for your OS platform.
4. Click the **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 KS-M221 for the changes to take effect.

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 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:

- Main Menu
- Advanced Menu
- Chipset Menu
- Boot Menu
- Security Menu
- Save & Exit Menu

5.1 Introduction

The KS-M220 / KS-M221 System 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.

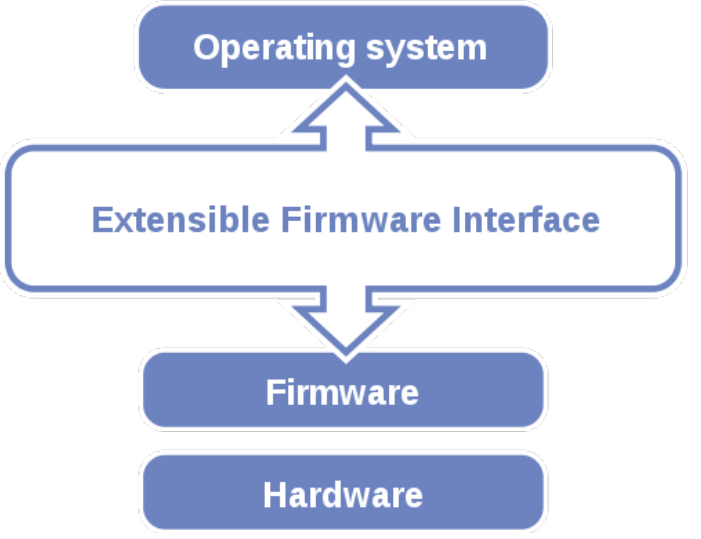


Figure 5-1. Extensible Firmware Interface Diagram

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 for KS-M220 High-End Level System

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 below:

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.

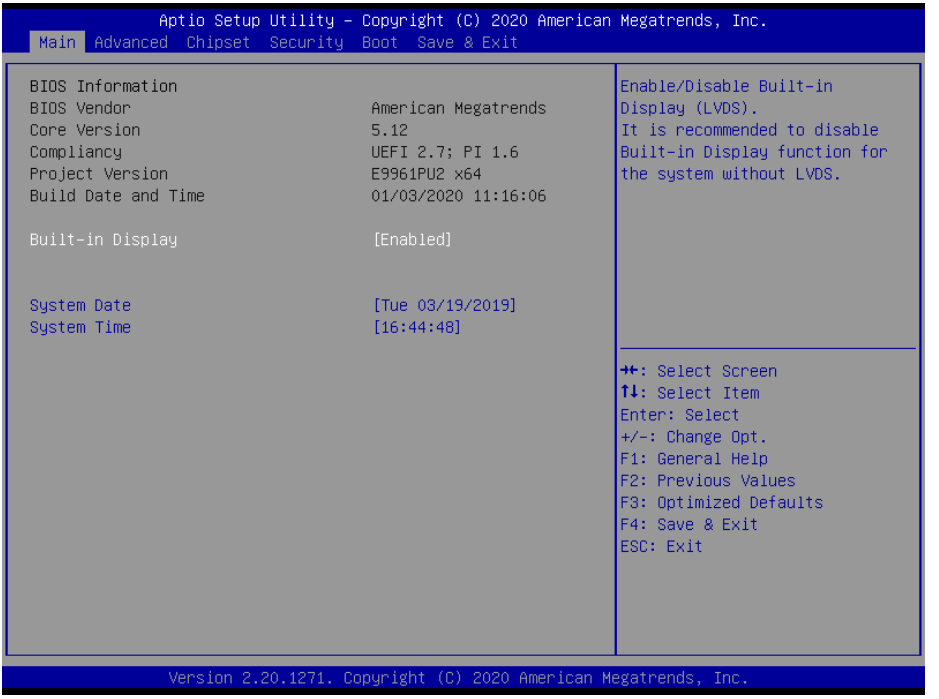
The language of the BIOS setup menu interface and help messages are shown in US English. You may use <↑> or <↓> key to select among the items and press <Enter> to confirm and enter the sub-menu. The following table provides the list of the navigation keys that you can use while operating the BIOS setup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

5.2.1 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.



Main Screen

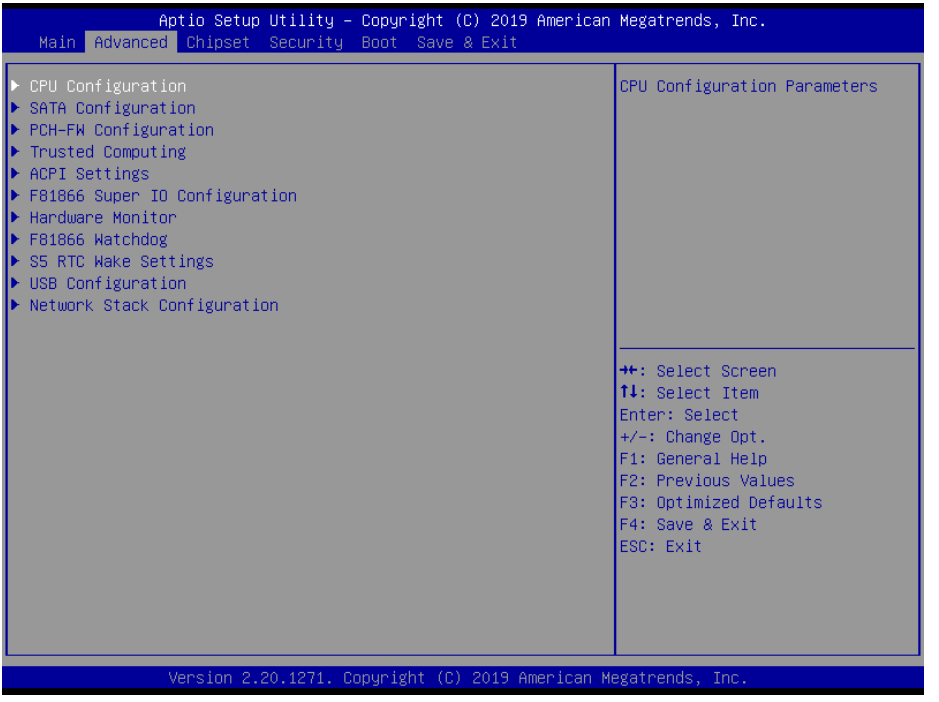
BIOS Setting	Options	Description/Purpose
BIOS Vendor	No changeable options	Displays the name of the BIOS vendor.
Core Version	No changeable options	Displays the current BIOS core version.
Compliancy	No changeable options	Displays the current UEFI version.
Project Version	No changeable options	Displays the version of the BIOS currently installed on the platform.
Build Date and Time	No changeable options	Displays the date that the current BIOS version is built.
Built-in Display	- Disabled - Enabled	Enables/Disables Built-in Display (LVDS). It is recommended to disable Built-in Display function for the system without LVDS.

BIOS Setting	Options	Description/Purpose
System Date	Month, day, year	Sets the system date. The format is [Day Month/ Date/ Year]. Users can directly enter values or use <+> or <-> arrow keys to increase/decrease it. The "Day" is automatically changed.
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.

5.2.2 Advanced

Menu Path *Advanced*

This menu provides advanced the sub-menu items such as CPU Configuration, SATA Configuration, PCH-FW Configuration, Trusted Computing, ACPI Settings, F81866 Super IO Configuration, Hardware Monitor, F81866 Watchdog, S5 RTC Wake Settings , USB Configuration and Network Stack Configuration.



Advanced Menu Screen

BIOS Setting	Options	Description/Purpose
CPU Configuration	Sub-Menu	CPU Configuration Parameters.
SATA Configuration	Sub-Menu	SATA Device Options Settings.
PCH-FW Configuration	Sub-Menu	Management Engine Technology Parameters.
Trusted Computing	Sub-Menu	Trusted Computing Settings.
ACPI Settings	Sub-Menu	System ACPI Parameters.
F81866 Super IO Configuration	Sub-Menu	System Super I/O Chip Parameters.
Hardware Monitor	Sub-Menu	Monitor hardware status.
F81866 Watchdog	Sub-Menu	F81866 Watchdog Parameters.
USB Configuration	Sub-Menu	USB Configuration Parameters.
S5 RTC Wake Settings	Sub-Menu	Enables system to wake from S5 using RTC alarm.

BIOS Setting	Options	Description/Purpose
Network Stack Configuration	Sub-Menu	Network Stack Settings

5.3.3.1 Advanced – CPU Configuration

Menu Path *Advanced > CPU Configuration*

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

CPU Configuration Screen

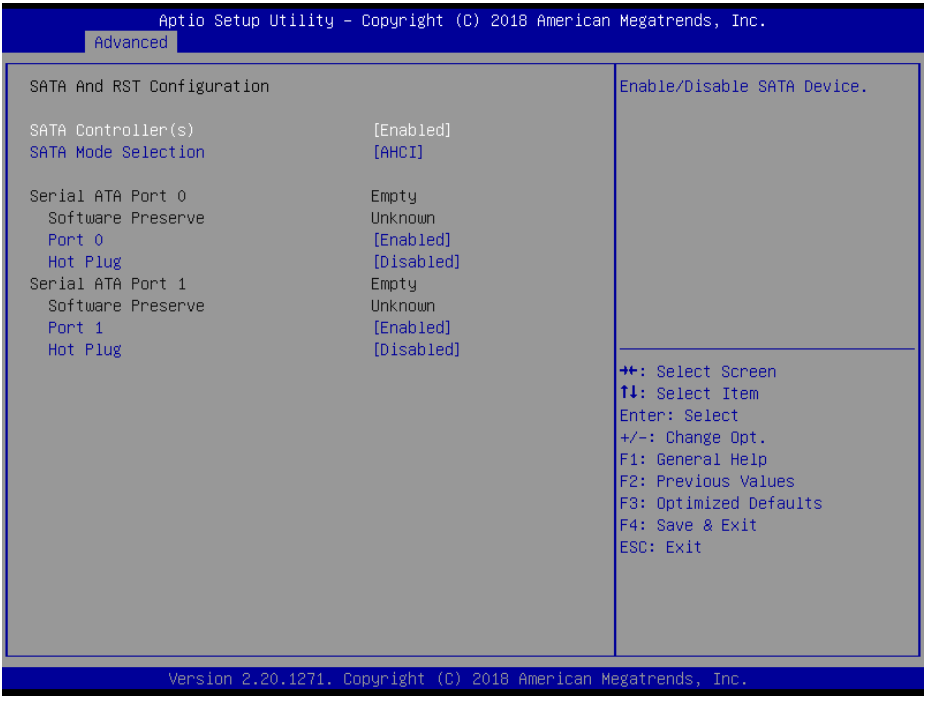
BIOS Setting	Options	Description/Purpose
Type	No changeable options	Displays the CPU Type.
ID	No changeable options	Displays the CPU ID.
Microcode Revision	No changeable options	Displays the CPU Microcode Revision.
Speed	No changeable options	Displays the CPU Speed.
Number of Processors	No changeable options	Displays the number of CPU processors.
VMX	No changeable options	CPU VMX hardware support for virtual machines.
SMX (Secure Mode	No changeable options	Secure Mode extensions support.

BIOS Setting	Options	Description/Purpose
Extensions) /TXT		
L1 Data Cache	No changeable options	Displays L1 Data Cache Size.
L1 Instruction Cache	No changeable options	Displays L1 Instruction Cache Size.
L2 Cache	No changeable options	Displays L2 Cache Size.
L3 Cache	No changeable options	Displays L3 Cache Size.
L4 Cache	No changeable options	Displays L4 Cache Size.
Hyper-Threading	- Disabled - Enabled	When Disabled, only one thread per enabled core is enabled.
Intel (VMX) Virtualization Technology	- Disabled - Enabled	When enabled, VMM can utilize the additional hardware capabilities provided by Vanderpool Technology

5.3.3.2 Advanced – SATA Configuration

Menu Path *Advanced > SATA Configuration*

The **SATA Configuration** allows users to enable / disable the SATA controller as well as the operational mode after the SATA controller is enabled. The following screen indicates the functions available when the SATA controller is enabled and the AHCI mode is selected.



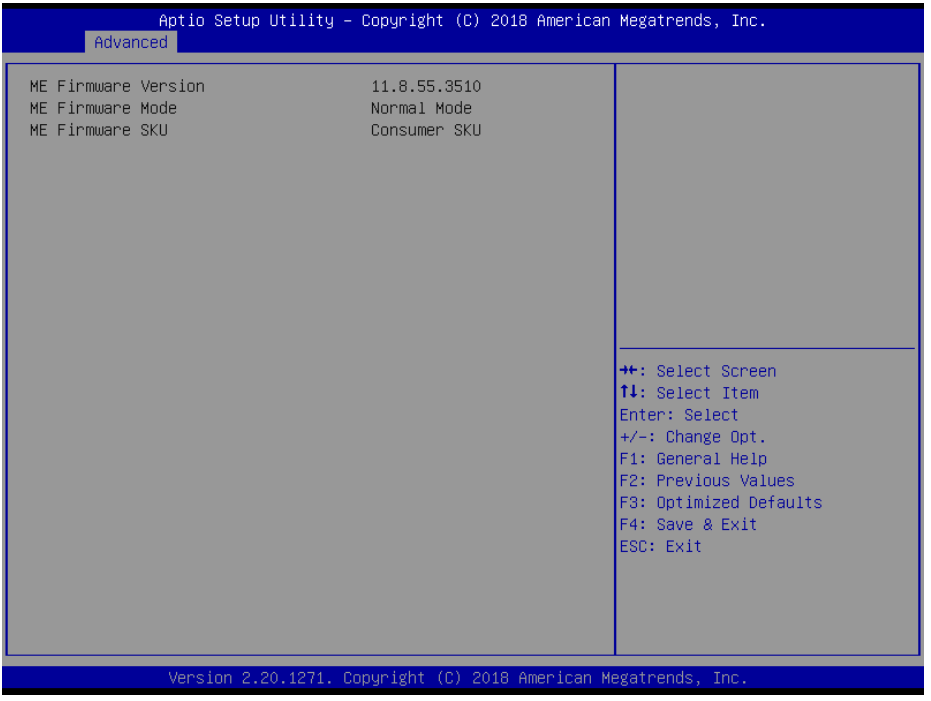
SATA Configuration Screen

BIOS Setting	Options	Description/Purpose
SATA Controller(s)	- Disabled - Enabled	Enables or Disables SATA Device.
SATA Mode Selection	- AHCI	Determines how SATA controller(s) operate.
Serial ATA Port 0 – 1	No changeable options	Displays the SATA device's name.
Software Preserve	No changeable options	Indicates whether the connected SATA device supports Software Setting Preservation (SSP).
Port 0 - 1	- Disabled - Enabled	Enables or Disables SATA Port Device.
Hot Plug	- Disabled - Enabled	Enables or Disables Hot Plug function to designate a SATA port device as hot-pluggable.

5.3.3.3 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 ME firmware version, firmware mode and firmware SKU.



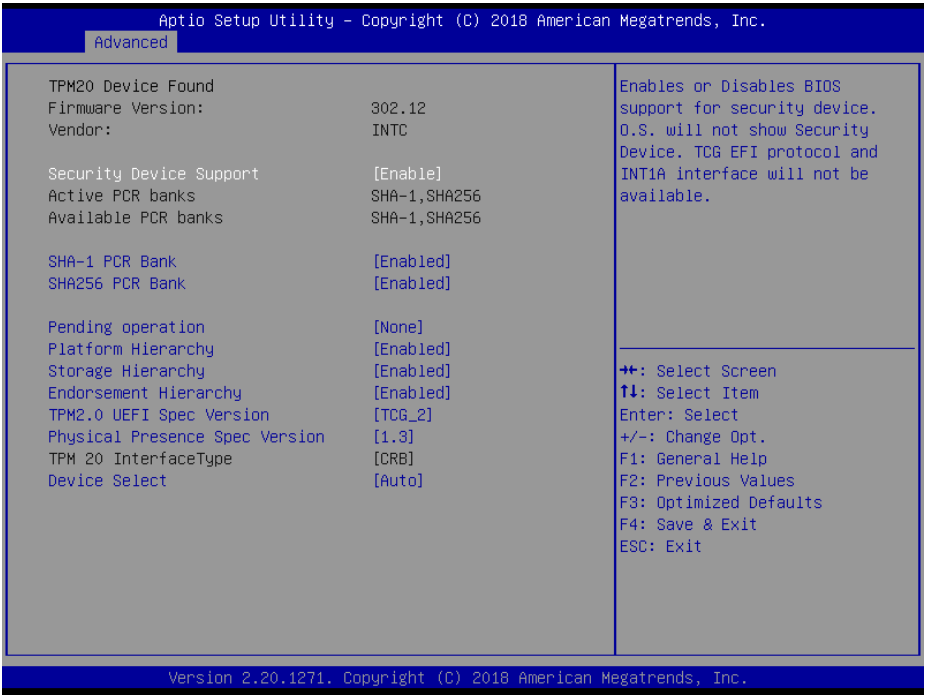
PCH-FW Configuration Screen

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.

5.3.3.4 Advanced – Trusted Computing

Menu Path *Advanced > Trusted Computing*

The Trusted Computing allows users to enable/disable BIOS support for security device. The operating system will not show Security Device. The TCG EFI protocol and INT1A interface will not be available.



Trusted Computing Screen

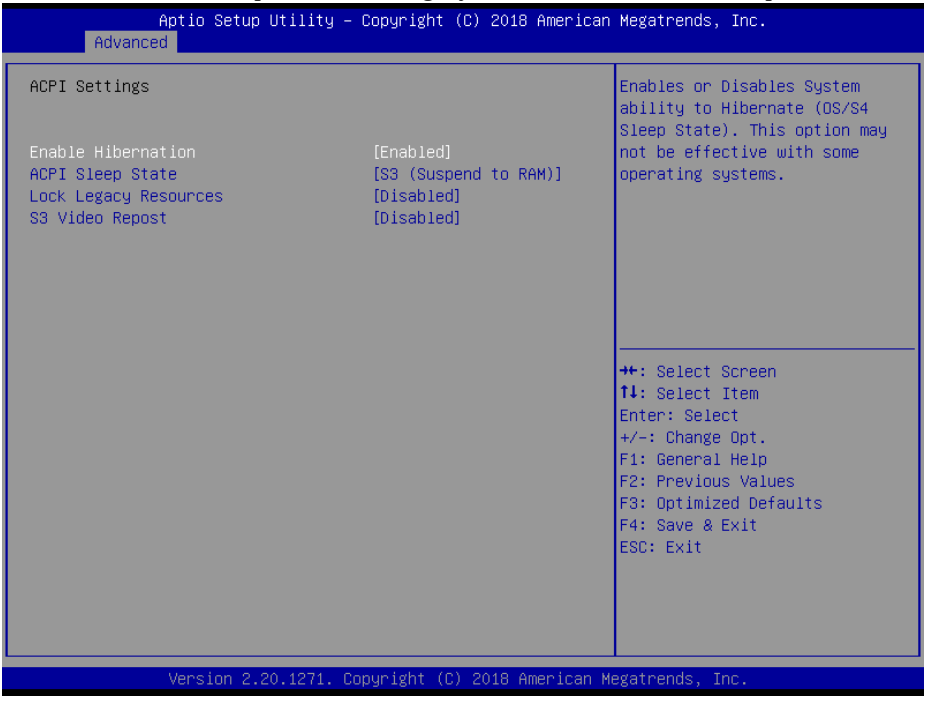
*Trusted Computing Screen function is supported for "CPU i5-7300U" SKU only.

BIOS Setting	Options	Description/Purpose
Firmware Version	No changeable options	Displays the Firmware Version.
Vendor	No changeable options	Displays the Vendor information.
Security Device Support	- Disabled - Enabled	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.
Active PCR banks	No changeable options	Displays the Active PCR banks.
Available PCR banks	No changeable options	Displays the Available PCR banks.
SHA-1 PCR Bank	- Disabled - Enabled	Enables or Disables SHA-1 PCR Bank.
SHA256 PCR Bank	- Disabled - Enabled	Enables or Disables SHA256 PCR Bank.
Pending operation	- None - TPM Clear	Schedules an operation for the Security Device. Note: Your Computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	- Disabled - Enabled	Enables or Disables the Platform Hierarchy.
Storage Hierarchy	- Disabled - Enabled	Enables or Disables the Storage Hierarchy.
Endorsement Hierarchy	- Disabled - Enabled	Enables or Disables the Endorsement Hierarchy.
TPM2.0 UEFI Spec Version	- TCG_1_2 - TCG_2	Selects the TCG2 Spec Version Support, TCG_1_2: the Compatible mode for Win8/Win10, TCG_2: Support new TCG2 protocol and event format for Win10 or later.
Physical Presence Spec Version	- 1.2 - 1.3	Selects to tell O.S to support PPI Spec. version 1.2 or 1.3. Note some HCK tests might not support Spec. version 1.3.
TPM 20 InterfaceType	No changeable options	Displays the TPM 20 Interface Type.
Device Select	- TPM 1.2 - TPM 2.0 - Auto	• **TPM 1.2:** Restricts support to TPM 1.2 devices. • **TPM 2.0:** Restricts support to TPM 2.0 devices • **Auto:** Supports both TPM 1.2 and TPM 2.0 with the default setting set to TPM 2.0 devices if not found. TPM 1.2 devices will be enumerated.

5.3.3.5 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 Hibernation, ACPI Sleep State, Lock legacy resources and S3 Video Repost.



ACPI Settings Screen

BIOS Setting	Options	Description/Purpose
Enable Hibernation	- Disabled - Enabled	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)	Selects the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
Lock Legacy Resources	- Disabled - Enabled	Enables or Disables Lock of Legacy Resources.
S3 Video Repost	- Disabled - Enabled	Enables or Disables S3 Video Repost.

5.3.3.6 Advanced – F81866 Super IO Configuration

Menu Path *Advanced > F81866 Super IO Configuration*

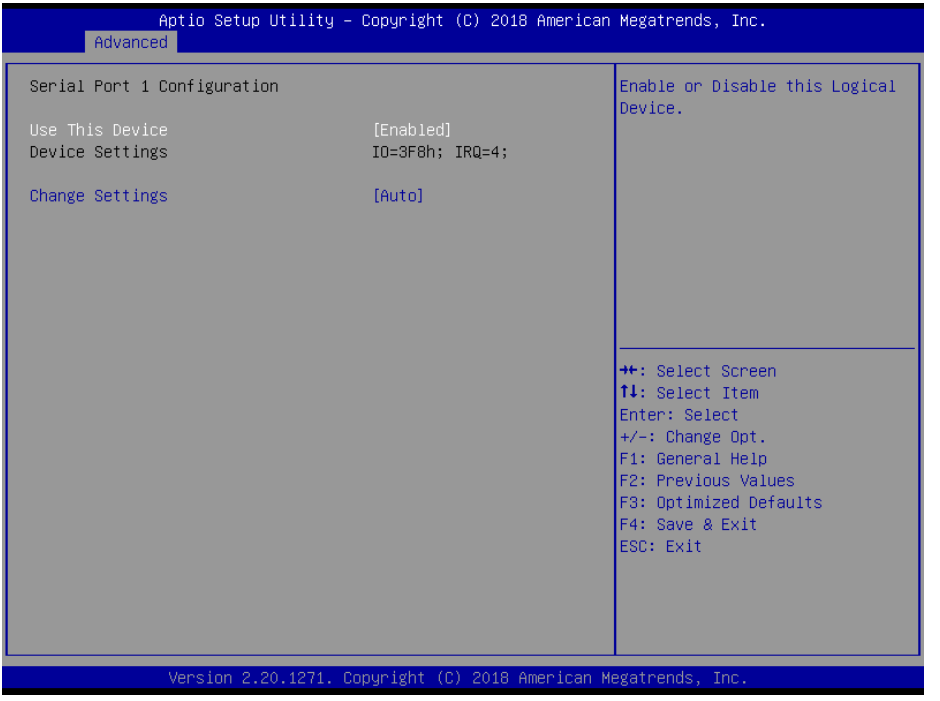
The **F81866 Super IO Configuration** allows users to configure the serial ports 1-2.

F81866 Super IO Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port 1 Configuration	Sub-Menu	Configures Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Sub-Menu	Configures Parameters of Serial Port 2 (COMB).

F81866 Super IO Configuration – Serial Port 1 Configuration

Menu Path *Advanced > F81866 Super IO Configuration > Serial Port 1 Configuration*



Serial Port 1 Configuration Screen

BIOS Setting	Options	Description/Purpose
Use This Device	- Disabled - Enabled	Enables or Disables Serial Port 1.
Device Settings	No changeable options	Displays the current settings of Serial Port 1.
Change Settings	- Auto - IO=3F8h; IRQ=4; - IO=3F8h; IRQ=3,4,5,7,10,11,12; - IO=2F8h; IRQ=3,4,5,7,10,11,12; - IO=3E8h; IRQ=3,4,5,7,10,11,12; - IO=2E8h; IRQ=3,4,5,7,10,11,12;	Selects IRQ and I/O resource settings for Serial Port 1.

F81866 Super IO Configuration – Serial Port 2 Configuration

Menu Path *Advanced > F81866 Super IO Configuration > Serial Port 2 Configuration*

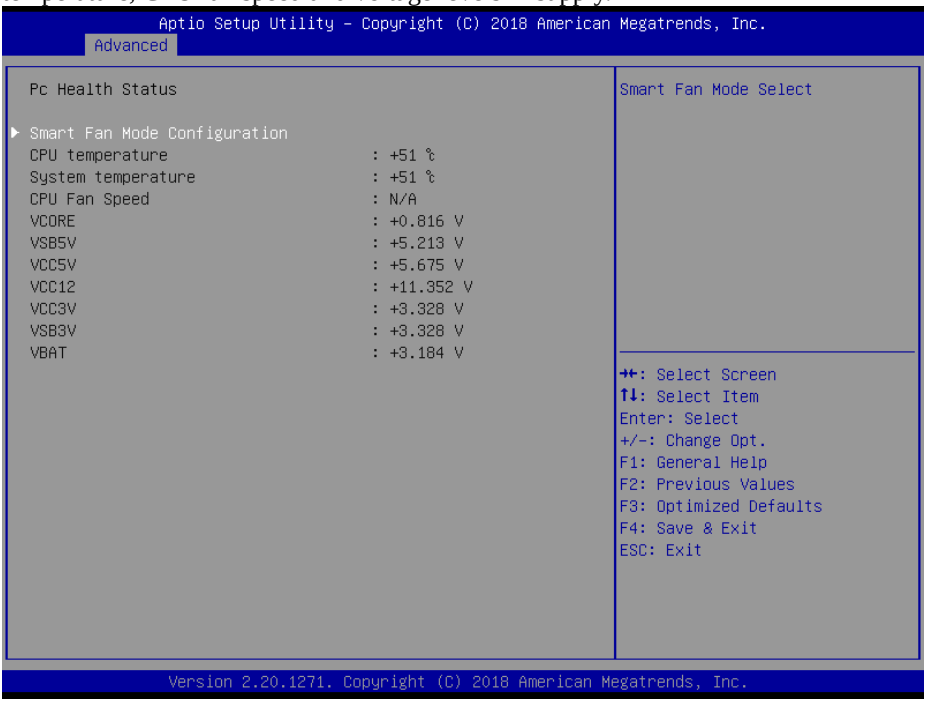
Serial Port 2 Configuration Screen

BIOS Setting	Options	Description/Purpose
Use This Device	- Disabled - Enabled	Enables or Disables Serial Port 2.
Device Settings	No changeable options	Displays the current settings of Serial Port 2.
Change Settings	- Auto - IO=2F8h; IRQ=3; - IO=3F8h; IRQ=3,4,5,7,10,11,12; - IO=2F8h; IRQ=3,4,5,7,10,11,12; - IO=3E8h; IRQ=3,4,5,7,10,11,12; - IO=2E8h; IRQ=3,4,5,7,10,11,12;	Selects IRQ and I/O resource settings for Serial Port 2.
Mode	- RS-232 - RS-422 - RS-485	Selects COM2 mode.

5.3.3.7 Advanced – Hardware Monitor

Menu Path *Advanced > Hardware Monitor*

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



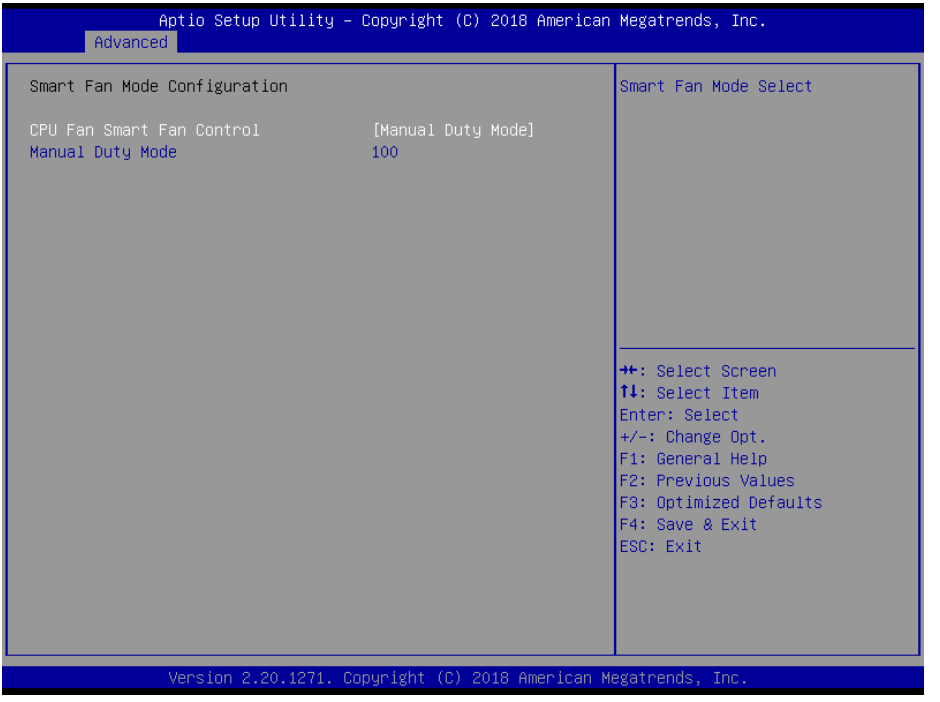
Hardware Monitor Screen

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

BIOS Setting	Options	Description/Purpose
VSB5V	No changeable options	Detects and displays the voltage level of the VSB5V in supply.
VCC5V	No changeable options	Detects and displays the voltage level of VCC5V in supply.
VCC12	No changeable options	Detects and displays the voltage level of VCC12 in supply.
VCC3V	No changeable options	Detects and displays the voltage level of VCC3V in supply.
VSB3V	No changeable options	Detects and displays the voltage level of VSB3V in supply.
VBAT	No changeable options	Detects and displays the battery voltage.

Smart Fan Mode Configuration

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



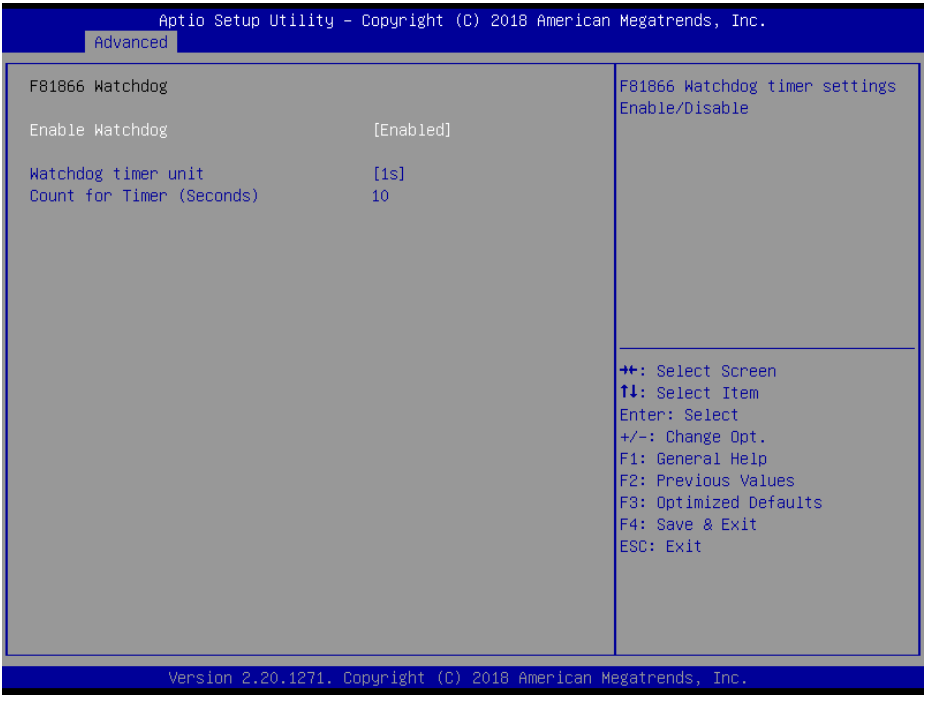
Smart Fan Mode Configuration Screen

BIOS Setting	Options	Description/Purpose
CPU Fan Smart Fan Control	- Manual Duty Mode - Auto Duty-Cycle Mode	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) from 1 to 100.

5.3.3.8 Advanced – F81866 Watchdog

Menu Path *Advanced > F81866 Watchdog*

If the system hangs or fails to respond, enable the F81866 watchdog function to trigger a system reset via the 255-level watchdog timer.



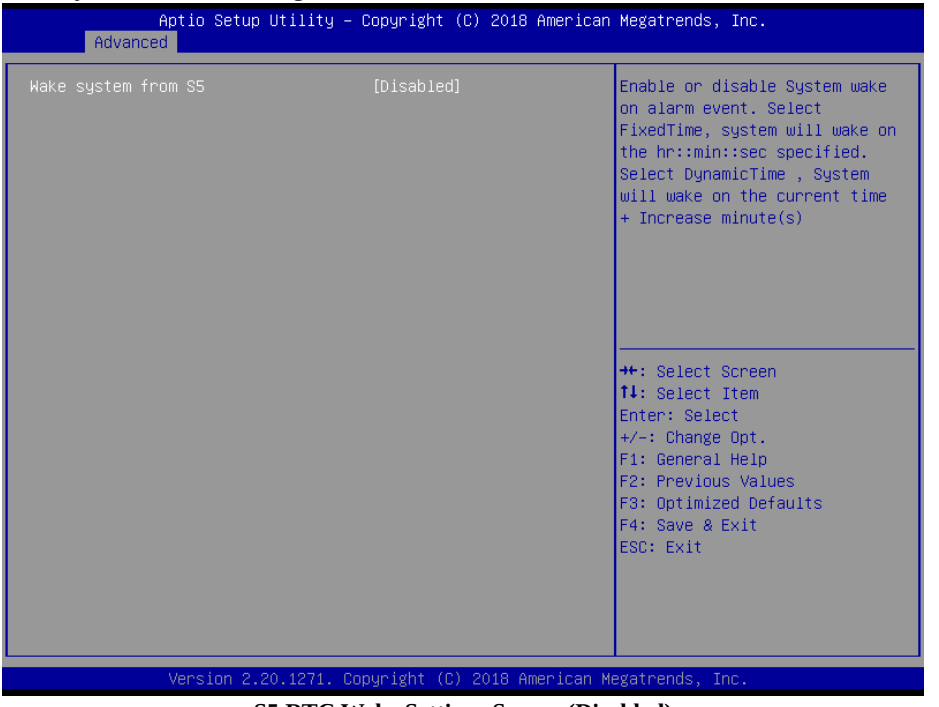
F81866 Watchdog Screen

BIOS Setting	Options	Description/Purpose
Enable Watchdog	- Enabled - Disabled	Enables/Disables F81866 Watchdog timer settings.
Watchdog timer unit	- 1s - 60s	Watchdog timer unit.
Count for Timer (Seconds)	Numeric (from 1 to 255)	The number of count for Timer.

5.3.3.9 Advanced – S5 RTC Wake Settings

Menu Path	*Advanced > S5 RTC Wake Settings (Disabled)*

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.



S5 RTC Wake Settings Screen (Disabled)

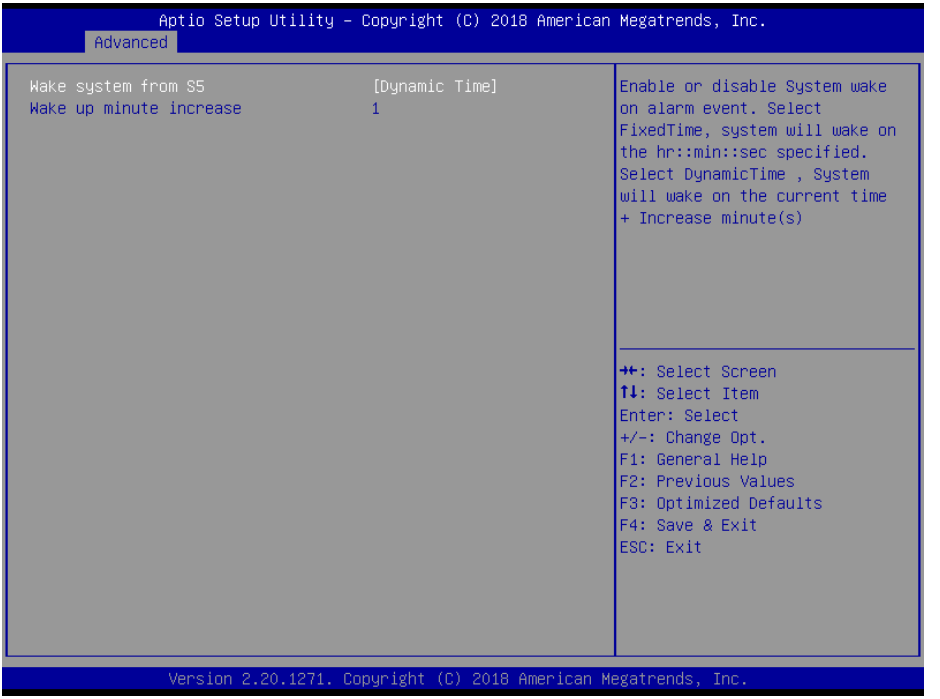
BIOS Setting	Options	Description/Purpose
Wake system from S5	- Disabled - Fixed Time - Dynamic Time	Allows enabling scheduled S5 to S0 (option **enabled**). • **Fixed Time:** System will wake on the hr::min::sec specified. • **Dynamic Time:** System will wake on the current time + Increased minute(s).

Menu Path *Advanced > S5 RTC Wake Settings (Fixed Time)*

S5 RTC Wake Settings Screen (Fixed Time)

BIOS Setting	Options	Description/Purpose
Wake system from S5	- Disabled - Fixed Time (selected) - Dynamic Time	• **Fixed Time:** System will wake on the hr::min::sec specified.
Wake up hour	Multiple options ranging from 0 to 23	Specifies an hour for a scheduled power-on event.
Wake up minute	Multiple options ranging from 0 to 59	Specifies a minute for a schedule power-on event.
Wake up second	Multiple options ranging from 0 to 59	Specifies a second for a schedule power-on event.

Menu Path *Advanced > S5 RTC Wake Settings (Dynamic Time)*



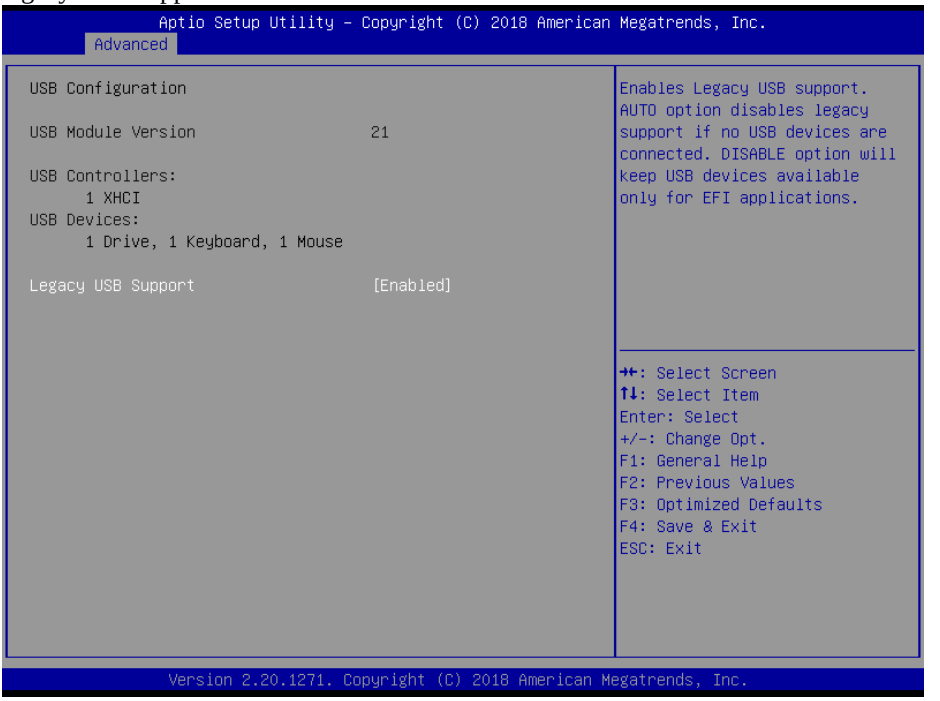
S5 RTC Wake Settings Screen (Dynamic Time)

BIOS Setting	Options	Description/Purpose
Wake system from S5	- Disabled - Fixed Time - Dynamic Time (selected)	• **Dynamic Time:** System will wake on the current time + Increased minute(s).
Wake up minute increase	Multiple options ranging from 1 to 5	Specifies a period of time (in minutes) after which the board wakes up from S5 state.

5.3.3.10 Advanced – USB Configuration

Menu Path *Advanced > USB Configuration*

The **USB Configuration** allows users to configure advanced USB settings such as legacy USB support.



USB Configuration Screen

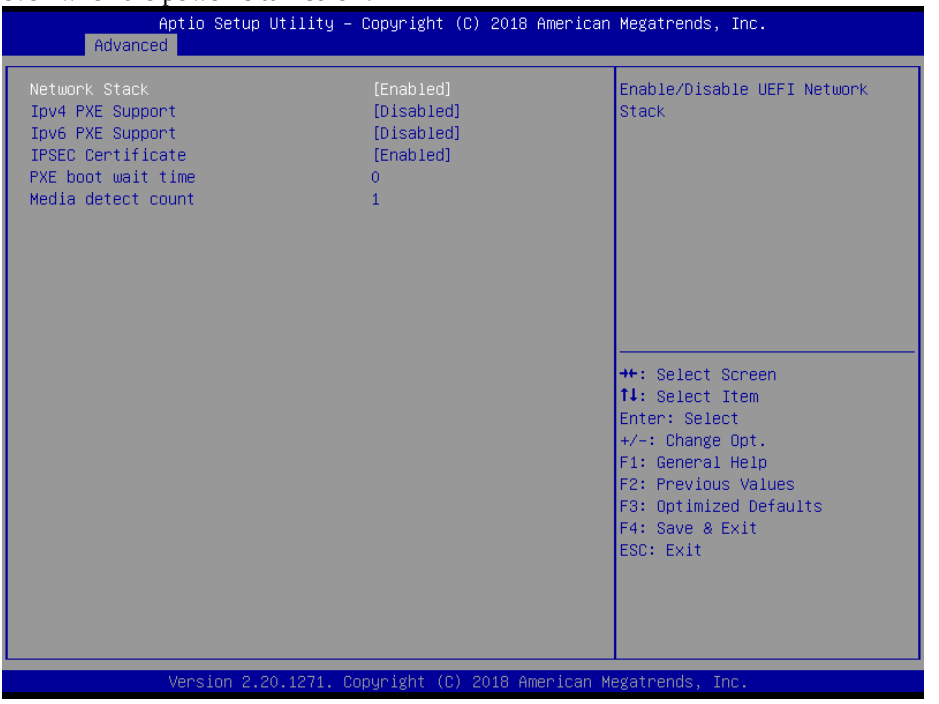
BIOS Setting	Options	Description/Purpose
Legacy USB Support	- Disabled - Enabled	Enables/Disables Legacy USB Support.

5.3.3.11 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.



Network Stack Configuration Screen

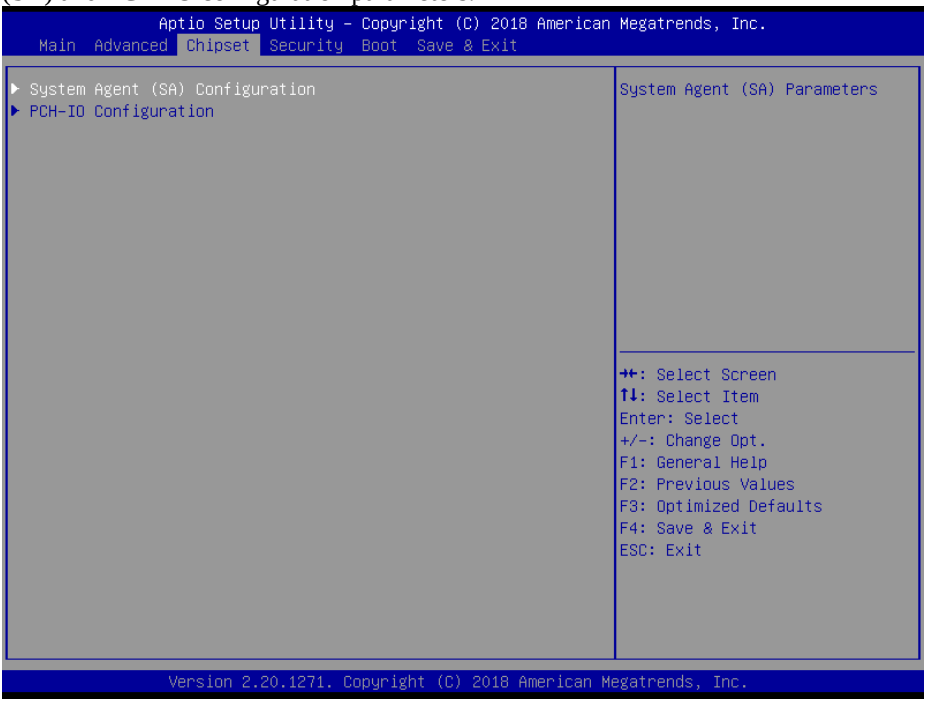
BIOS Setting	Options	Description/Purpose
Network Stack	- Disabled - Enabled	Enables or Disables UEFI Network Stack.
Ipv4 PXE Support	- Disabled - Enabled	Enables Ipv4 PXE Boot Support. If disabled, Ipv4 PXE boot option will not be created.
Ipv6 PXE Support	- Disabled - Enabled	Enables Ipv6 PXE Boot Support. If disabled, Ipv6 PXE boot option will

BIOS Setting	Options	Description/Purpose
		not be created.
IPSEC Certificate	- Disabled - Enabled	Support to enable/disable IPSEC certificate for Ikev.
PXE boot wait time	Numeric (from 0 to 5)	Number of seconds to wait for PXE boot to abort after the Esc key is pressed.
Media detect count	Numeric (from 1 to 50)	Number of times that the media presence will be checked.

5.2.3 Chipset

Menu Path *Chipset*

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

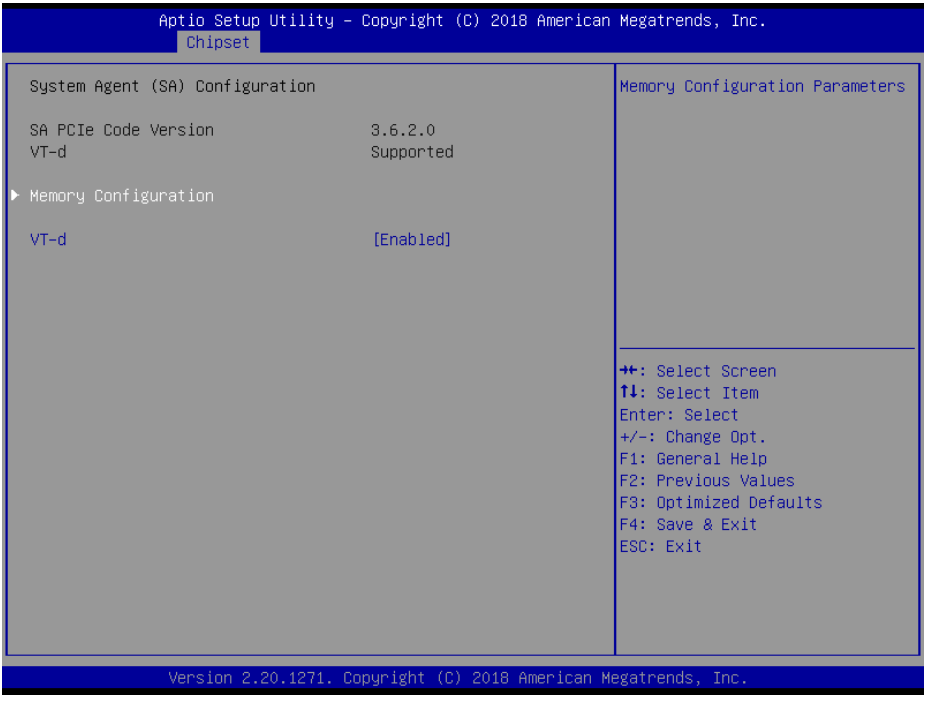


Chipset Screen

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

5.2.3.1 Chipset – System Agent (SA) Configuration

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

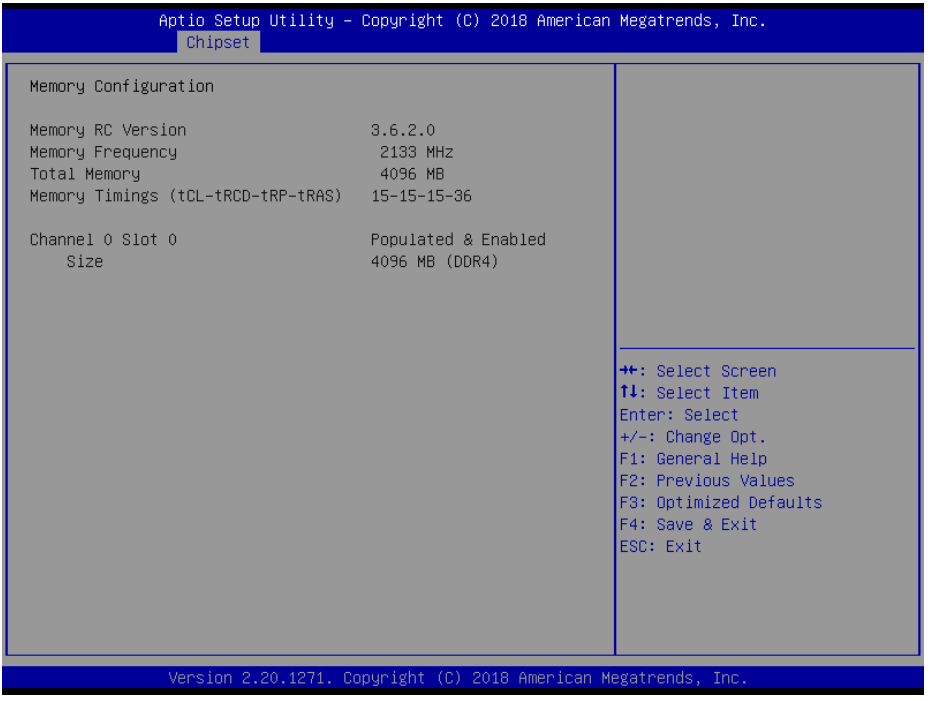


System Agent (SA) Configuration Screen

BIOS Setting	Options	Description/Purpose
SA PCIe Code Version	No changeable options	Displays the SA PCIe Code Version.
VT-d	No changeable options	Supports VT-d capability.
Memory Configuration	Sub-Menu	Memory Configuration.
VT-d	- Disabled - Enabled	Enables or Disables VT-d function.

System Agent (SA) Configuration – Memory Configuration

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



Memory Configuration Screen

BIOS Setting	Options	Description/Purpose
Memory RC Version	No changeable options	Displays the Memory RC Version.
Memory Frequency	No changeable options	Displays the Frequency of Memory.
Total Memory	No changeable options	Displays the Total Memory.
Memory Timings (tCL-tRCD-tRP-tRAS)	No changeable options	Displays the Memory Timings.
Channel 0 Slot 0	No changeable options	Displays the populated and enabled channel and slot.
Size	No changeable options	Displays the size of Channel 0 Slot 0.

5.2.3.2 Chipset – PCH IO Configuratioin

Menu Path *Chipset > PCH-IO Configuration*

The **PCH-IO Configuration** allows users to configure North Bridge chipset, set PCI Express 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).

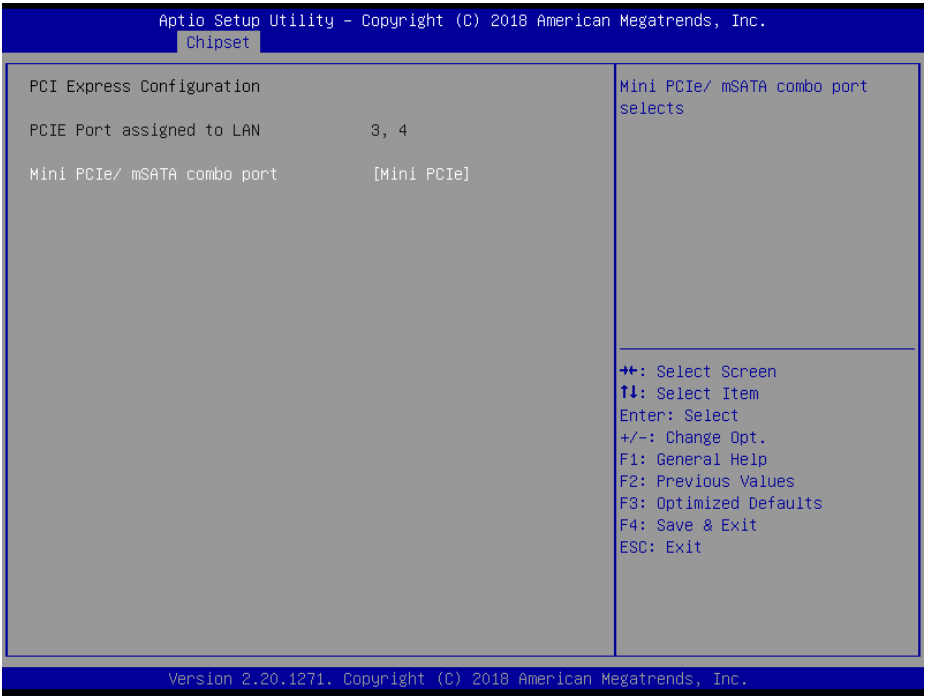
PCH-IO Configuration Screen

BIOS Setting	Options	Description/Purpose
Name	No changeable options	Displays the Intel PCH Name.
PCH SKU	No changeable options	Displays the Intel PCH SKU.
Stepping	No changeable options	Displays the Intel PCH Stepping.
PCI Express Configuration	Sub-Menu	PCI Express Configuration settings.
PCH LAN Controller	- Disabled - Enabled	Enables or Disables onboard NIC.
Wake on LAN Enable	- Disabled - Enabled	Enables or Disables integrated LAN to wake the system.

BIOS Setting	Options	Description/Purpose
State After G3	- Power On - Power Off	Specifies the Power On/Off state that the system will go to after the power is re-applied following a power failure (G3 state).

PCH-IO Configuration – PCI Express Configuration

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



PCI Express Configuration Screen

* Mini PCIe/ mSATA combo port function is supported for "CPU i5-7300U" SKU only.

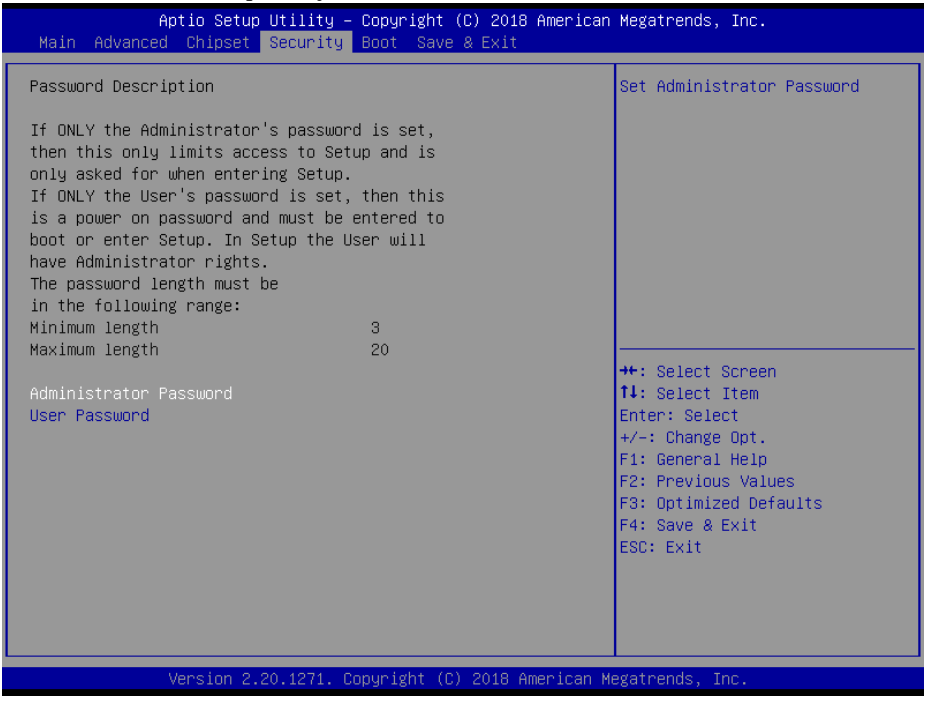
BIOS Setting	Options	Description/Purpose
PCIE Port assigned to LAN	No changeable options	Displays the LAN assigned PCIE Port.
Mini PCIe/ mSATA combo port	- Mini PCIe - mSATA	Mini PCIe/ mSATA combo port selection.

5.2.4 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.



Security Screen

BIOS Setting	Options	Description/Purpose
Administrator Password	Password can be 3-20 alphanumeric characters.	Specifies the administrator password.

BIOS Setting	Options	Description/Purpose
User Password	Password can be 3-20 alphanumeric characters.	Specifies the user password.

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>.

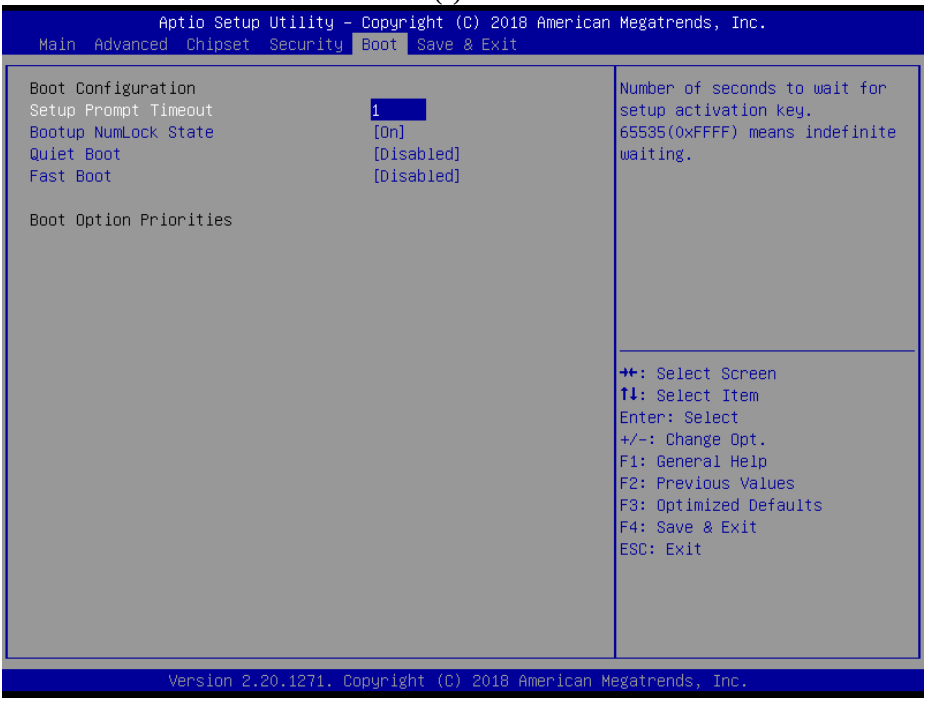
Remove an Administrator or User Password

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.

5.2.5 Boot

Menu Path *Boot*

This menu provides control items for system boot configuration such as setting setup prompt timeout, enabling/disabling quiet boot and fast boot and changing the boot order from the available bootable device(s).



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 - Off	Specifies the power-on state of the NumLock Key.
Quiet Boot	- Disabled - Enabled	Enables or Disables Quiet Boot options.
Fast Boot	- Disabled - Enabled	Enables or Disables Fast Boot options.
Boot Option #1~#n	- [Drive(s)] - Disabled	Sets the system boot order.

5.2.6 Save & Exit

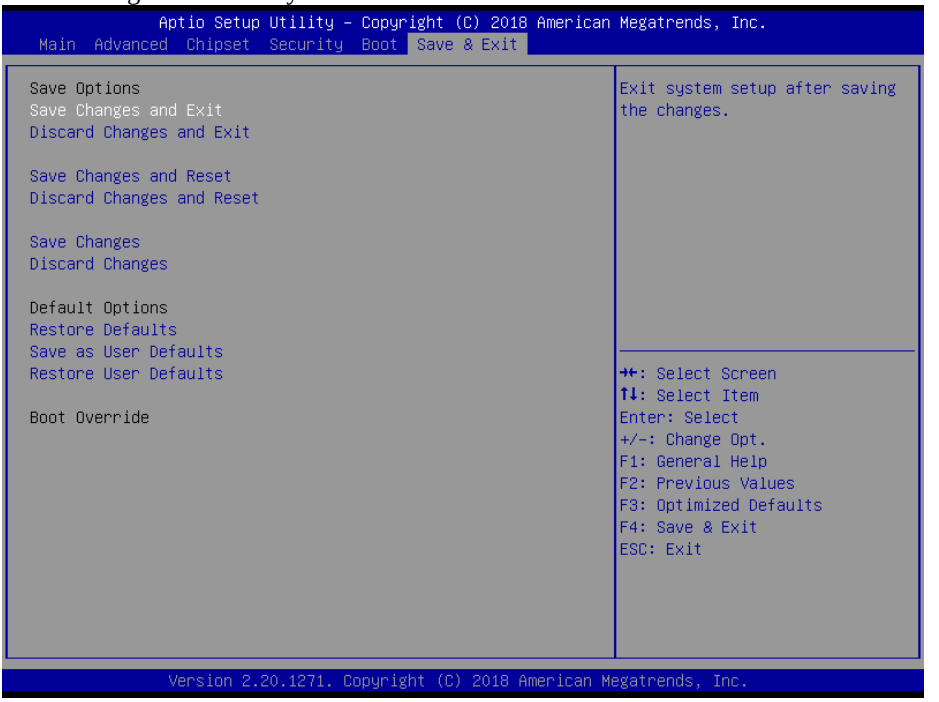
Menu Path *Save & Exit*

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.



Save & Exit Screen

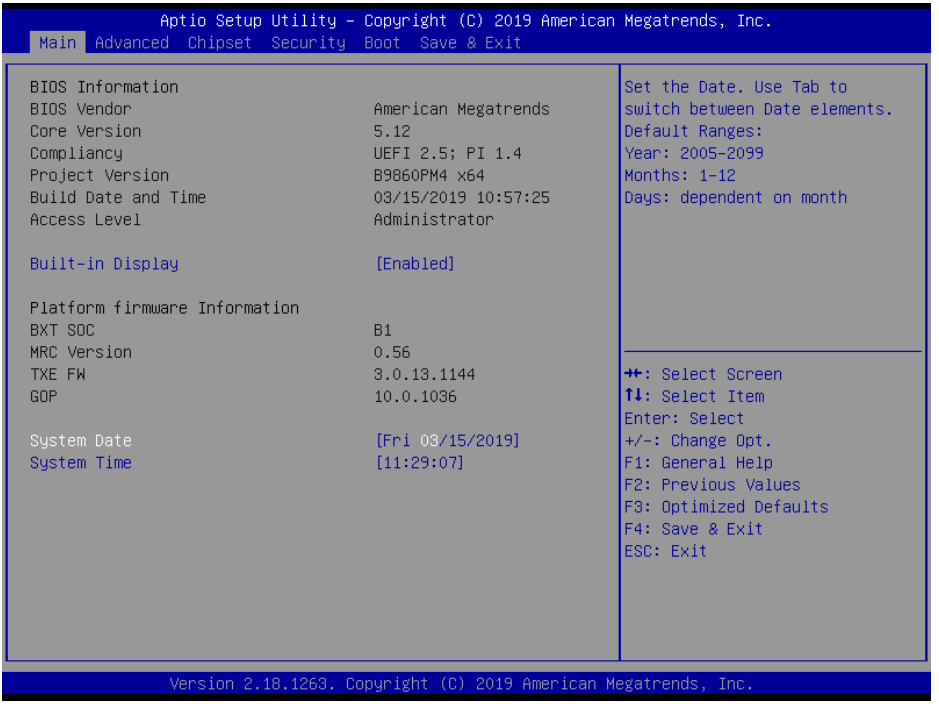
BIOS Setting	Options	Description/Purpose
Save Changes and Exit	No changeable options	Saves the changes and then exit BIOS setup.
Discard Changes and Exit	No changeable options	Exits without saving any changes made in BIOS settings.
Save Changes and Reset	No changeable options	Saves the changes and resets.
Discard Changes and Reset	No changeable options	Resets without saving any changes made in BIOS settings.
Save Changes	No changeable options	Save Changes done so far to any of the setup options.
Discard Changes	No changeable options	Discard 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)].

5.3 Accessing Setup Utility for KS-M221 Entry Level System

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

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 below:



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.

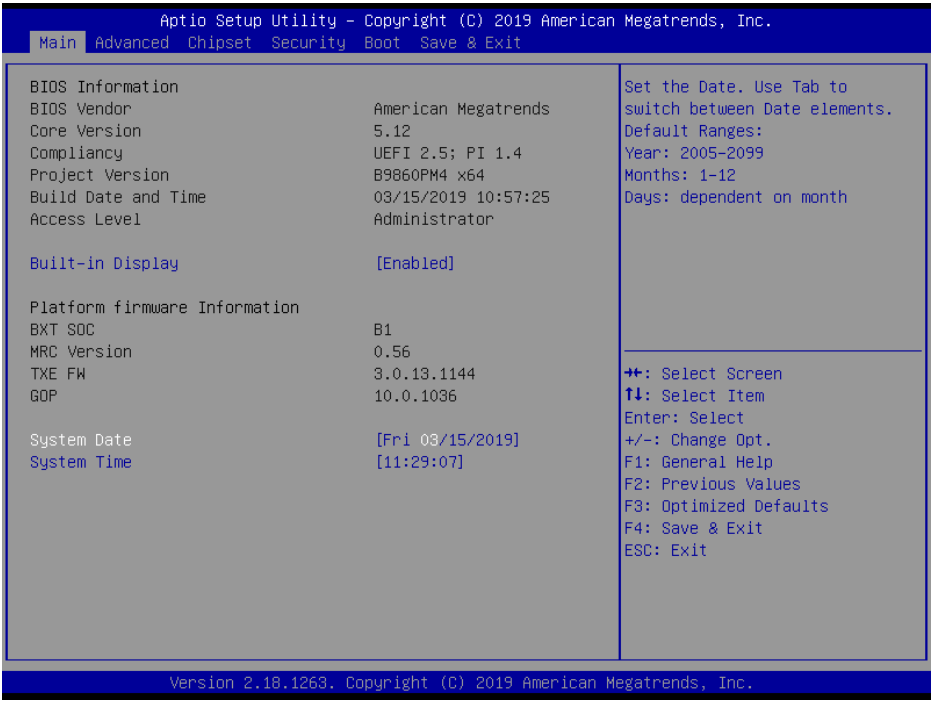
The language of the BIOS setup menu interface and help messages are shown in US English. You may use <↑> or <↓> key to select among the items and press <Enter> to confirm and enter the sub-menu. The following table provides the list of the navigation keys that you can use while operating the BIOS setup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

5.3.1 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.



Main Screen

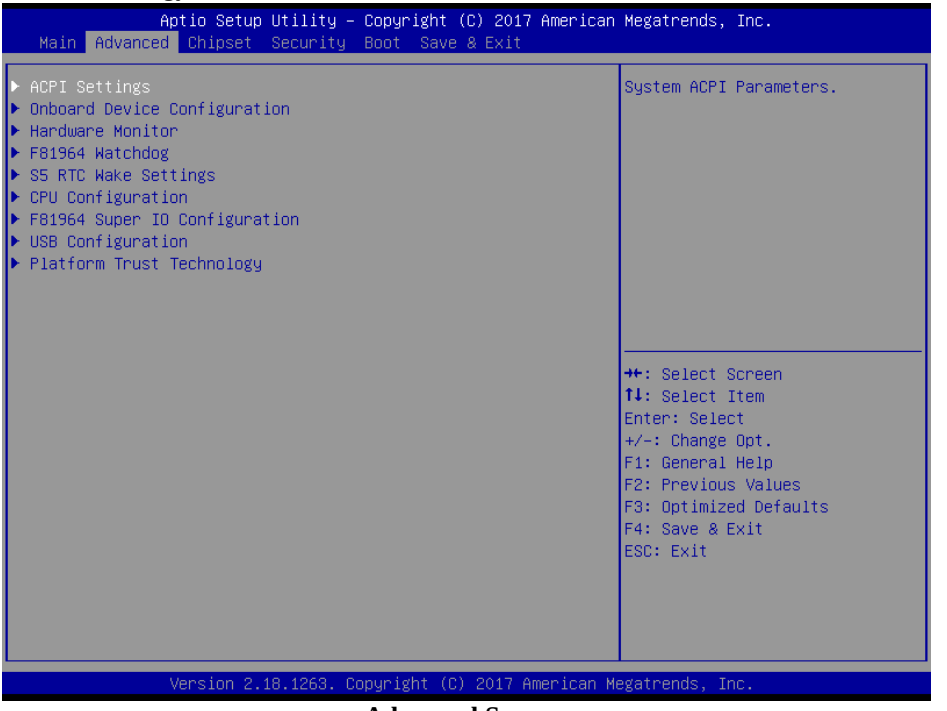
BIOS Setting	Options	Description/Purpose
BIOS Vendor	No changeable options	Displays the BIOS vendor.
Core Version	No changeable options	Displays the current BIOS core version.
Compliancy	No changeable options	Displays the current UEFI version.
Project Version	No changeable options	Displays the version of the BIOS currently installed on the platform.
Build Date and Time	No changeable options	Displays the date of current BIOS version.
Access Level	No changeable options	Displays the current access level.

BIOS Setting	Options	Description/Purpose
Built-in Display	-Disabled -Enabled (default)	Enables/Disables Built-in Display (LVDS). It is recommended that you disable Built-in Display function for the system without LVDS.
BXT SOC	No changeable options	Displays the SOC stepping.
MRC Version	No changeable options	Displays the MRC version.
TXE FW	No changeable options	Displays the TXE FW version.
GOP	No changeable options	Displays the GOP version.
System Date	month, day, year	Specifies the current date.
System Time	hour, minute, second	Specifies the current time.

5.3.2 Advanced

Menu Path *Advanced*

This menu provides advanced configurations such as ACPI Settings, Onboard Device Configuration, Hardware Monitor, F81964 Watchdog, S5 RTC Wake Settings, CPU Configuration, F81964 Super I/O Configuration, USB Configuration and Platform Trust Technology.



Advanced Screen

BIOS Setting	Options	Description/Purpose
ACPI Settings	Sub-Menu	System ACPI parameters.
Onboard Device Configuration	Sub-Menu	Project specific parameters.
Hardware Monitor	Sub-Menu	Monitor hardware status.
F81964 Watchdog	Sub-Menu	Watchdog timer parameters.
S5 RTC Wake Settings	Sub-Menu	RTC wake parameters.
CPU Configuration	Sub-Menu	CPU configuration parameters.

BIOS Setting	Options	Description/Purpose
F81964 Super IO Configuration	Sub-Menu	System Super IO chip parameters
USB Configuration	Sub-Menu	USB configuration parameters.
Platform Trust Technology	Sub-Menu	Platform Trust Technology.

5.3.2.1 Advanced - ACPI Settings

Menu Path *Advanced > ACPI Settings*

The **ACPI Settings** allows users to configure relevant ACPI (Advanced Configuration settings such as Enable Hibernation (S4) and Enable Sleep (S3).

ACPI Settings Screen

BIOS Setting	Options	Description/Purpose
Enable Hibernation (S4)	-Disabled -Enabled (default)	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
Enable Sleep (S3)	-Disabled -Enabled (default)	Enables or Disables System ability to Sleep (OS/S3 Sleep State).

5.3.2.2 Advanced - Onboard Device Configuration

Menu Path *Advanced > Onboard Device Configuration*

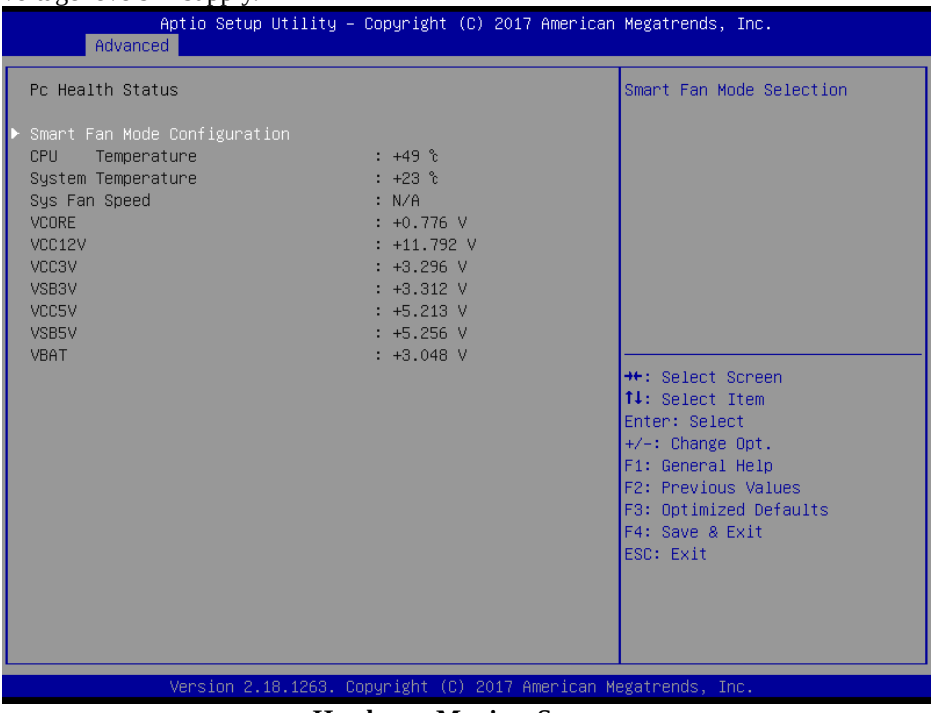
Onboard Device Configuration Screen

BIOS Setting	Options	Description/Purpose
COM2 Mode Selection	- RS-422 - RS-232 (default) - RS-485	Selects COM2 mode.

5.3.2.3 Advanced - Hardware Monitor

Menu Path *Advanced > Hardware Monitor*

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



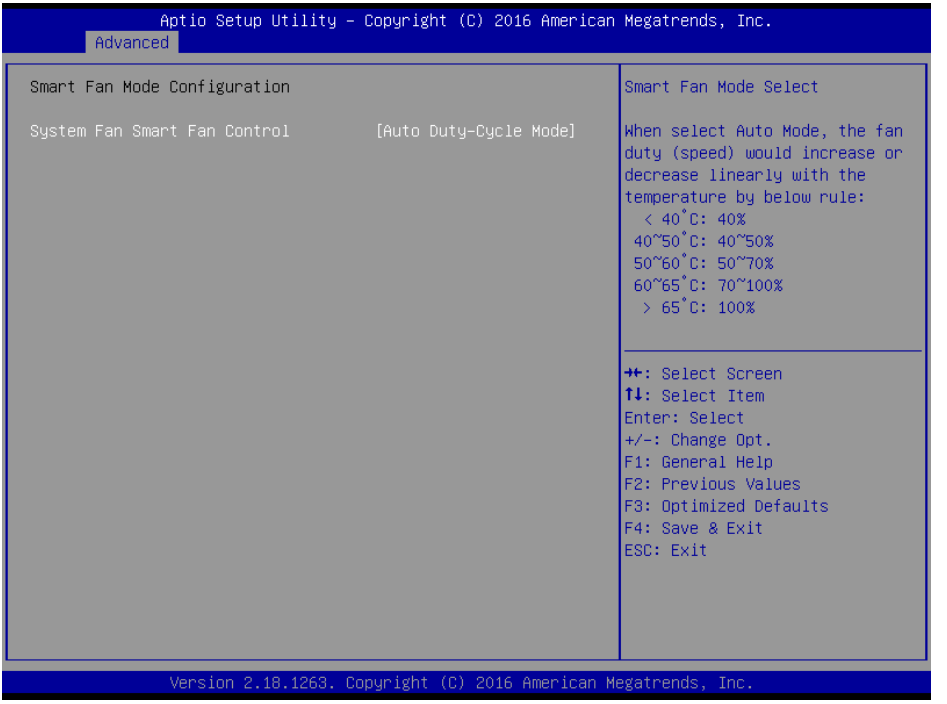
Hardware Monitor Screen

BIOS Setting	Options	Description/Purpose
Smart Fan Mode Configuration	Sub-Menu	Smart Fan parameters.
CPU Temperature	No changeable options	Displays processor's temperature.
System Temperature	No changeable options	Displays system's temperature.
Sys Fan Speed	No changeable options	Displays fan speed of the system fan.
VCORE	No changeable options	Displays the voltage level of VCORE in supply.
VCC12V	No changeable options	Displays the voltage level of VCC12V in supply.

BIOS Setting	Options	Description/Purpose
VCC3V	No changeable options	Displays the voltage level of VCC3V in supply.
VSB3V	No changeable options	Displays the voltage level of VSB3V in supply.
VCC5V	No changeable options	Displays the voltage level of VCC5V in supply.
VSB5V	No changeable options	Displays the voltage level of VSB5V in supply.
VBAT	No changeable options	Displays the voltage level of VBAT in supply.

Advanced - Hardware Monitor - Smart Fan Mode Configuration

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

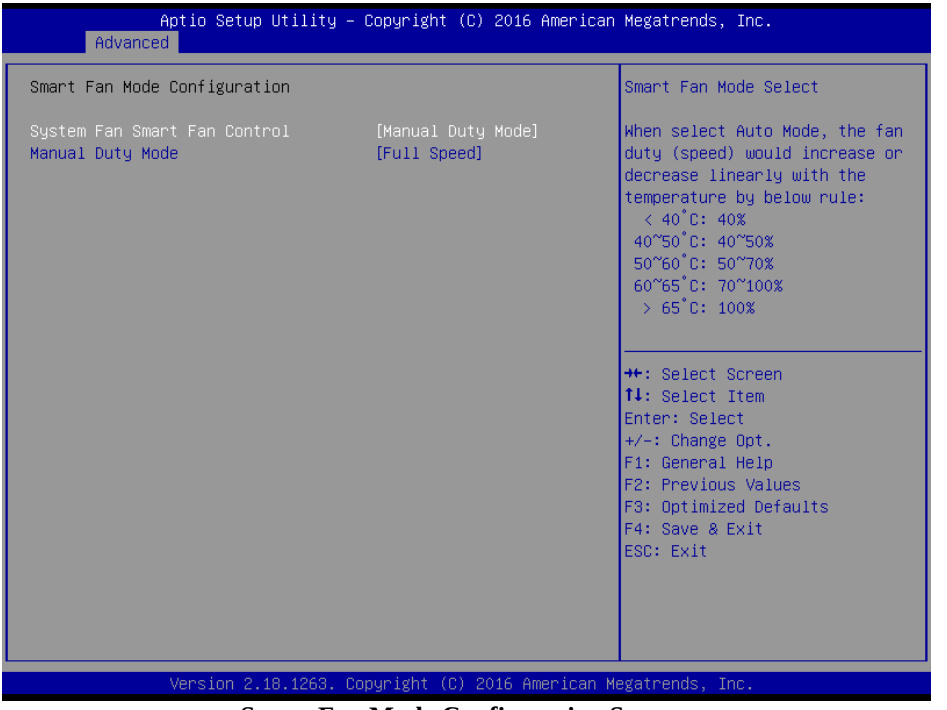


Smart Fan Mode Configuration Screen

BIOS Setting	Options	Description/Purpose
System Fan Smart Fan Control	-Manual Duty Mode -Auto Duty-Cycle Mode (default)	When Auto Duty-Cycle Mode is selected, the fan duty cycle (speed) will be increased or decreased linearly according to system temperature. The rule is as follows: < 40°C: 40% 40~50°C: 40~50% 50~60°C: 50~70% 60~65°C: 70~100% > 65°C: 100%

Advanced - Hardware Monitor - Smart Fan Mode Configuration - [Manual Duty Mode]

Menu Path *Advanced > Hardware Monitor > Smart Fan Mode Configuration [Manual Duty Mode]*

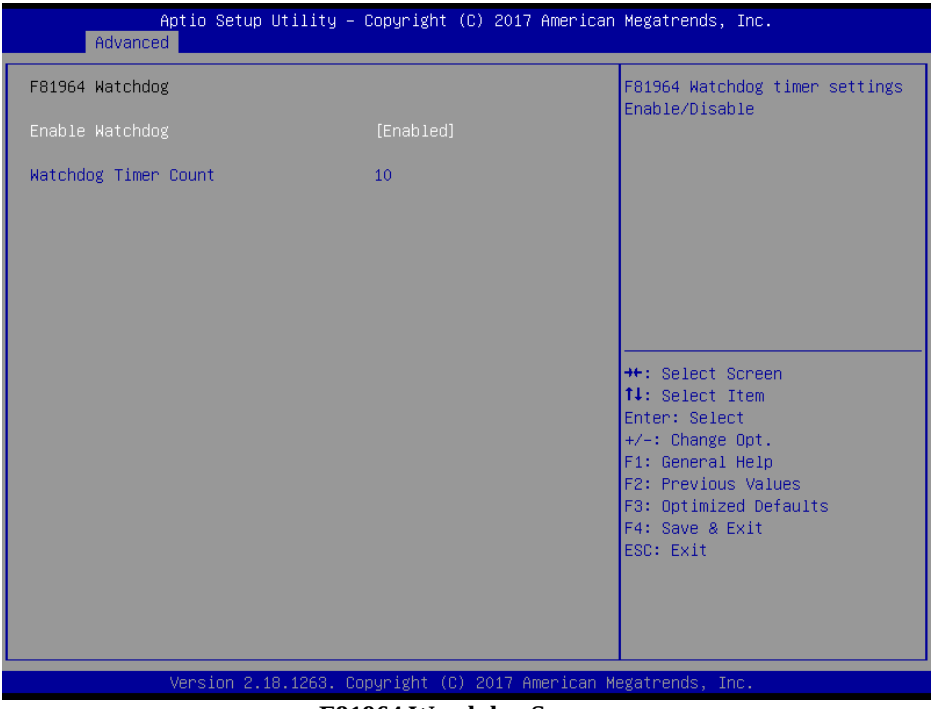


Smart Fan Mode Configuration Screen

BIOS Setting	Options	Description/Purpose
Manual Duty Mode	-0% -30% -40% -50% -60% -70% -80% -90% - Full Speed (default)	Users can select expected duty cycle (PWM fan type).

5.3.2.4 Advanced - F81964 Watchdog

Menu Path *Advanced > F81964 Watchdog*



F81964 Watchdog Screen

BIOS Setting	Options	Description/Purpose
Enable Watchdog	- Disabled (default) - Enabled	Enables / Disables F81846 Watchdog timer settings.
Watchdog Timer Count	Multiple options ranging from 10 to 255	Selects count of watchdog timer. Watchdog Timer = 1sec * Count

5.3.2.5 Advanced - S5 RTC Wake Settings

Menu Path *Advanced > S5 RTC Wake Settings*

S5 RTC Wake Settings Screen

BIOS Setting	Options	Description/Purpose
Wake system from S5	- Disabled (default) - Fixed Time - Dynamic Time	Enables or disables System wake on alarm event. • **FixedTime:** System will wake on the hr::min::sec specified. • **Dynamic Time:** System will wake on the current time + Increased minute(s)

Advanced - S5 RTC Wake Settings [Fixed Time]

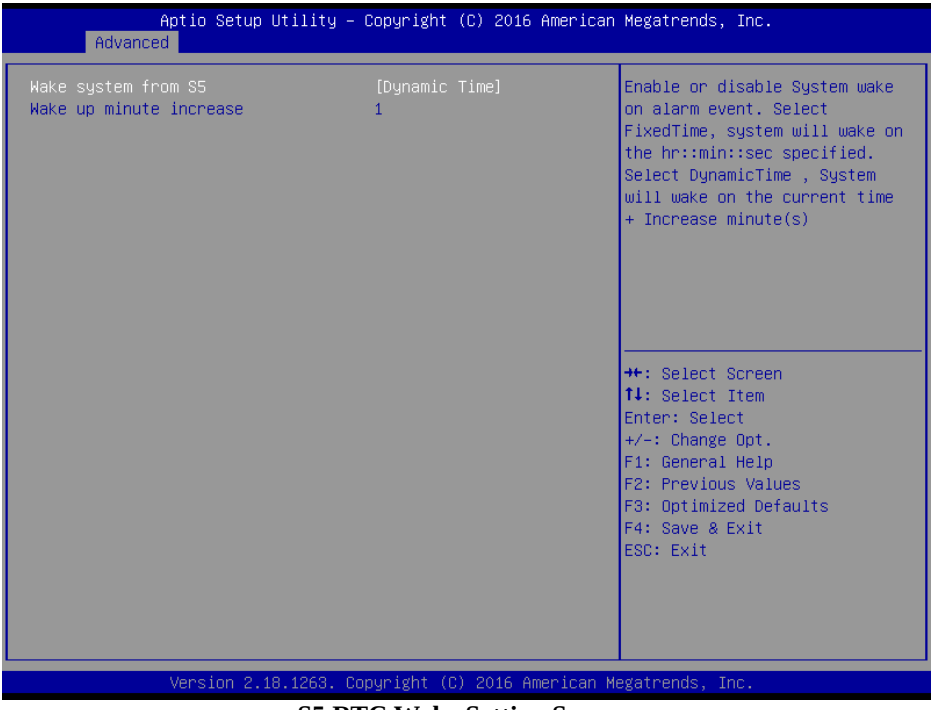
Menu Path *Advanced > S5 RTC Wake Settings [Fixed Time]*

S5 RTC Wake Settings Screen

BIOS Setting	Options	Description/Purpose
Wake up hour	Multiple options ranging from 0 to 23	Sets an hour for a scheduled power-on event.
Wake up minute	Multiple options ranging from 0 to 59	Sets a minute for a scheduled power-on event.
Wake up second	Multiple options ranging from 0 to 59	Sets a second for a scheduled power-on event.

Advanced - S5 RTC Wake Settings [Dynamic Time]

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

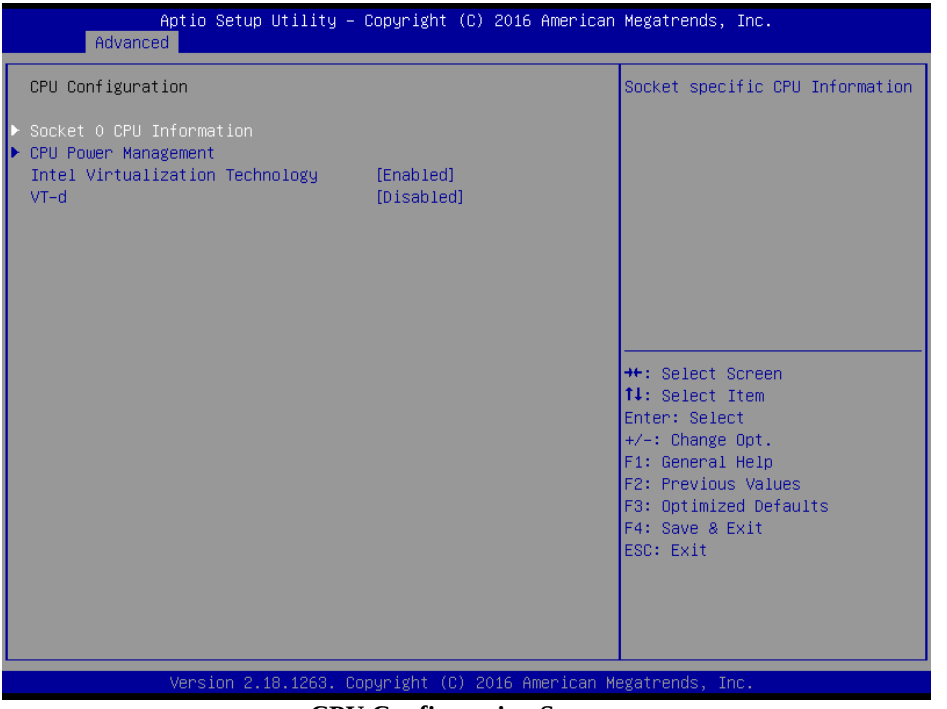


S5 RTC Wake Setting Screen

BIOS Setting	Options	Description/Purpose
Wake up minute increase	Multiple options ranging from 1 to 5	Sets a period of time (in minutes) to wake up the system after it enters S5 state.

5.3.2.6 Advanced - CPU Configuration

Menu Path *Advanced > CPU Configuration*



CPU Configuration Screen

BIOS Setting	Options	Description/Purpose
Socket 0 CPU Information	Sub-Menu	Socket-specific CPU Information.
CPU Power Management	Sub-Menu	CPU power management options.
Intel Virtualization Technology	- Disabled - Enabled (default)	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology
VT-d	- Disabled (default) - Enabled	Enables / Disables CPU VT-d.

Advanced - CPU Configuration - Socket 0 CPU Information

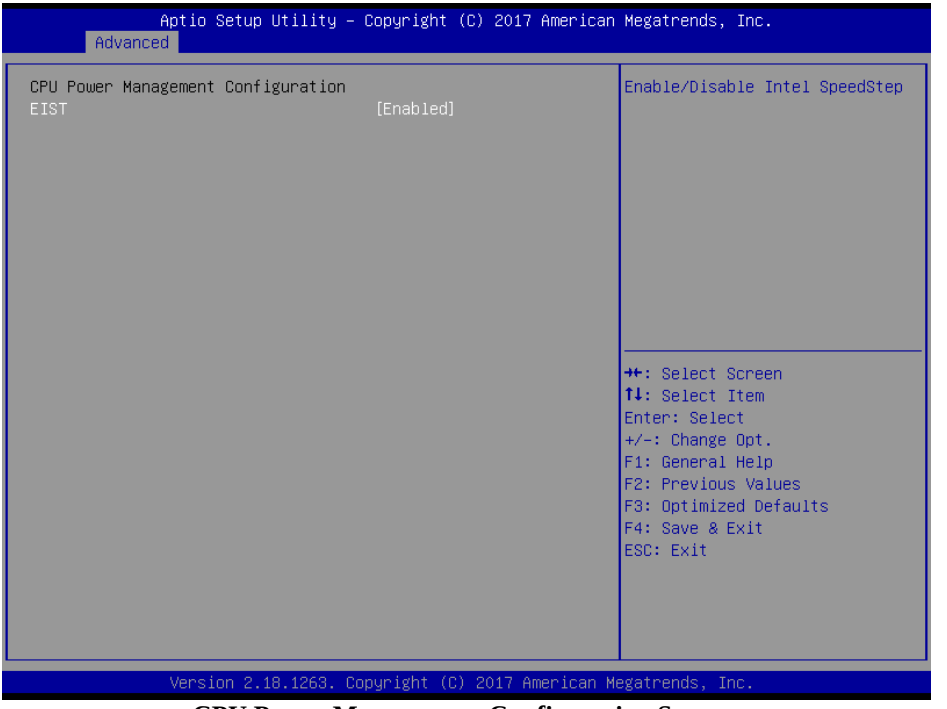
Menu Path *Advanced > CPU Configuration > Socket 0 CPU Information*

Socket 0 CPU Information Screen

BIOS Setting	Options	Description/Purpose
CPU Branding String	No changeable options	Displays CPU Branding String.
CPU Signature	No changeable options	Displays CPU Signature.
Microcode Patch	No changeable options	CPU Microcode Patch Revision.
Max CPU Speed	No changeable options	Displays the maximum CPU speed.
Min CPU Speed	No changeable options	Displays the minimum CPU speed.
Processor Cores	No changeable options	Displays number of cores.
Intel HT Technology	No changeable options	Displays Hyper Threading support.
Intel VT-x Technology	No changeable options	Displays VT-x support.
L1 Data Cache	No changeable options	L1 Data Cache size.
L1 Code Cache	No changeable options	L1 Code Cache size.
L2 Cache	No changeable options	L2 Cache size.
L3 Cache	No changeable options	L3 Cache size.

Advanced - CPU Configuration - CPU Power Management

Menu Path *Advanced > CPU Configuration > CPU Power Management*

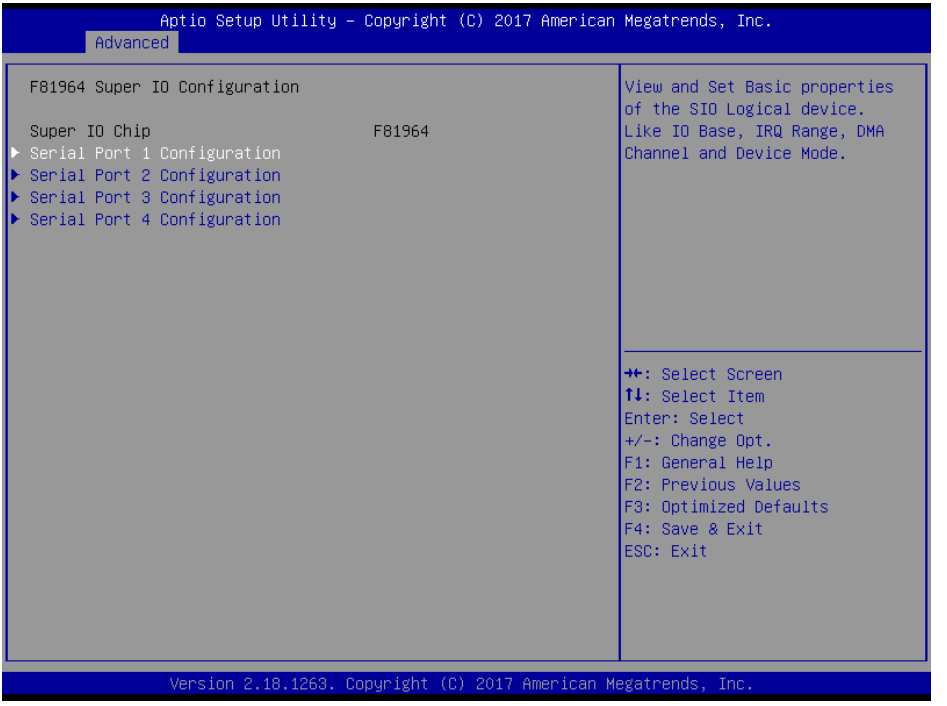


CPU Power Management Configuration Screen

BIOS Setting	Options	Description/Purpose
EIST	- Disabled - Enabled (default)	Enables / Disables Intel Speed Step feature for dynamic scaling processor frequency.

5.3.2.7 Advanced - F81964 Super IO Configuration

Menu Path	*Advanced > F81964 Super IO Configuration*

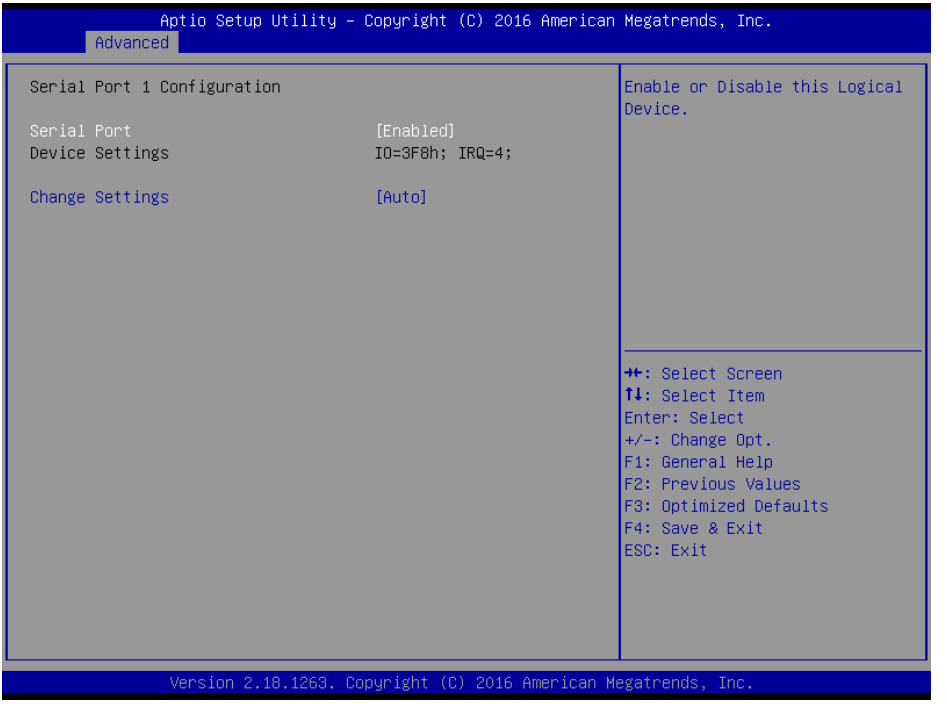


F81964 Super IO Configuration Screen

BIOS Setting	Options	Description/Purpose
Super IO Chip (F81964)	No changeable options	Displays the super I/O chip model.
Serial Port 1 Configuration	Sub-Menu	COM1 parameters configuration.
Serial Port 2 Configuration	Sub-Menu	COM2 parameters configuration.
Serial Port 3 Configuration	Sub-Menu	COM3 parameters configuration.
Serial Port 4 Configuration	Sub-Menu	COM4 parameters configuration.

Advanced - F81964 Super IO Configuration - Serial Port 1 Configuration

Menu Path *Advanced > F81964 Super IO Configuration > Serial Port 1 Configuration*

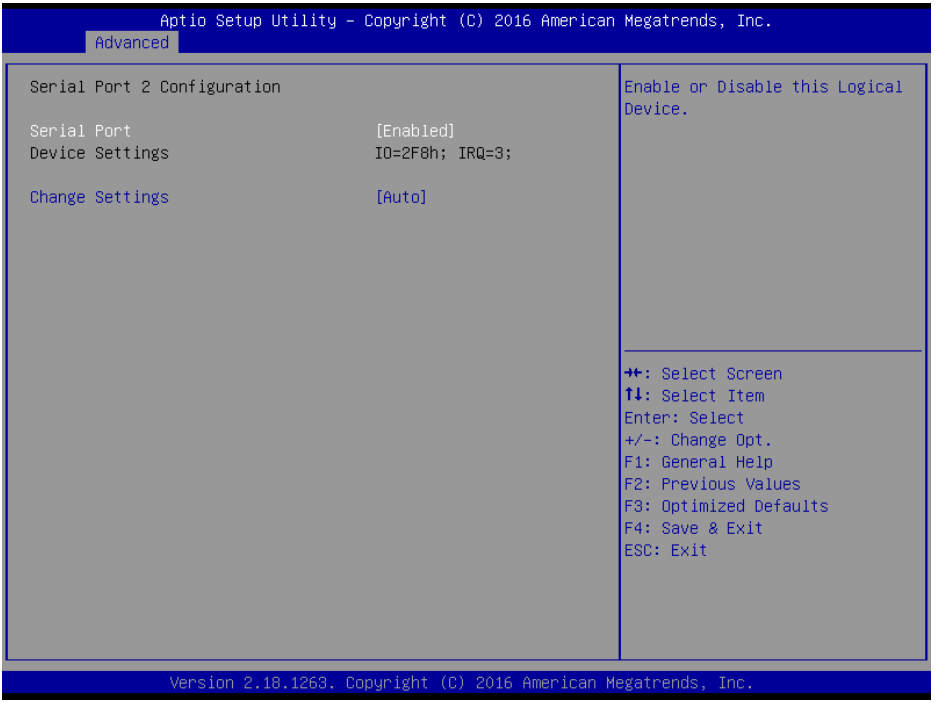


Serial Port 1 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (default)	Enables / Disables COM1 port.
Device Settings	No changeable options	Reports the current COM setting.
Change Settings	- Auto (default) - IO=3F8h; IRQ=4 - IO=3F8h; IRQ=3,4,5,7,9,10,11,12; - IO=2F8h; IRQ=3,4,5,7,9,10,11,12; - IO=3E8h; IRQ=3,4,5,7,9,10,11,12; - IO=2E8h; IRQ=3,4,5,7,9,10,11,12;	Allows user to change Device's Resource settings. New settings will be reflected on this Setup Page after System restarts.

Advanced - F81964 Super IO Configuration - Serial Port 2 Configuration

Menu Path *Advanced > F81964 Super IO Configuration > Serial Port 2 Configuration*



Serial Port 2 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (default)	Enables / Disables COM2 port.
Device Settings	No changeable options	Reports the current COM setting.
Change Settings	- Auto (default) - IO=2F8h; IRQ=3 - IO=3F8h; IRQ=3,4,5,7,9,10,11,12; - IO=2F8h; IRQ=3,4,5,7,9,10,11,12; - IO=3E8h; IRQ=3,4,5,7,9,10,11,12; - IO=2E8h; IRQ=3,4,5,7,9,10,11,12;	Allows users to change Device's Resource settings. New settings will be reflected on this Setup Page after System restarts.

Advanced - F81964 Super IO Configuration - Serial Port 3 Configuration

Menu Path *Advanced > F81964 Super IO Configuration > Serial Port 3 Configuration*

Serial Port 3 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (default)	Enables / Disables COM3 port.
Device Settings	No changeable options	Reports the current COM setting.
Change Settings	- Auto (default) - IO=3E8h; IRQ=7 - IO=3E8h; IRQ=3,4,5,7,9,10,11,12; - IO=2E8h; IRQ=3,4,5,7,9,10,11,12; - IO=2F0h; IRQ=3,4,5,7,9,10,11,12; - IO=2E0h; IRQ=3,4,5,7,9,10,11,12;	Allows users to change Device's Resource settings. New settings will be reflected on this Setup Page after System restarts.

Advanced - F81964 Super IO Configuration - Serial Port 4 Configuration

Menu Path *Advanced > F81964 Super IO Configuration > Serial Port 4 Configuration*

Serial Port 4 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (default)	Enables / Disables COM4 port.
Device Settings	No changeable options	Reports the current COM setting.
Change Settings	- Auto (default) - IO=2E8h; IRQ=10 - IO=3E8h; IRQ=3,4,5,7,9,10,11,12; - IO=2E8h; IRQ=3,4,5,7,9,10,11,12; - IO=2F0h; IRQ=3,4,5,7,9,10,11,12; - IO=2E0h; IRQ=3,4,5,7,9,10,11,12	Allows user to change Device's Resource settings. New settings will be reflected on this Setup Page after System restarts.

5.3.2.8 Advanced - USB Configuration

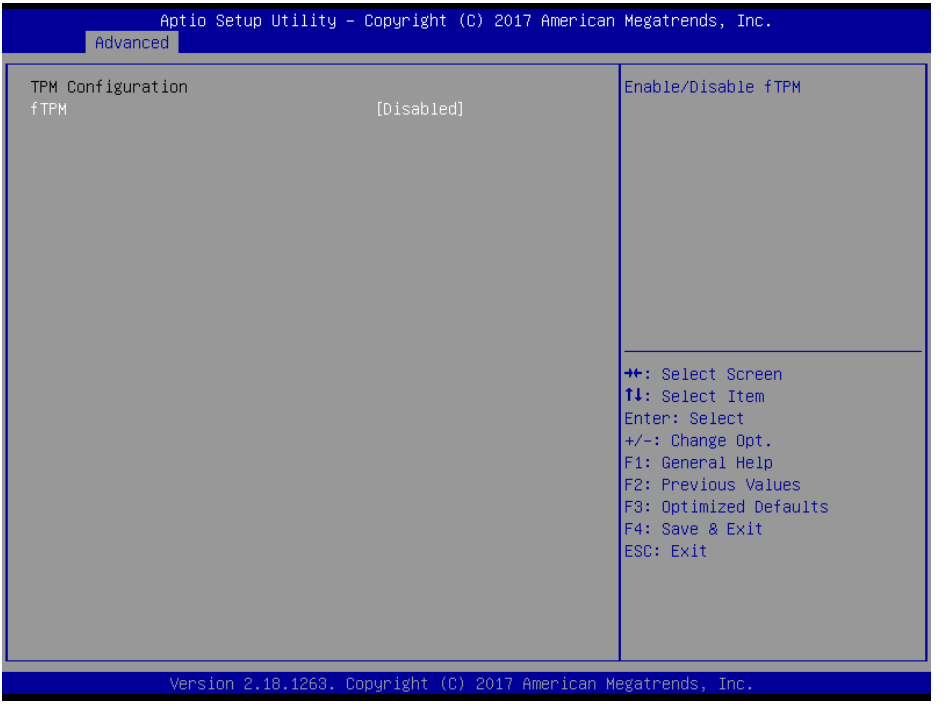
Menu Path *Advanced > USB Configuration*

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.

5.3.2.9 Advanced - Platform Trust Technology

Menu Path	*Advanced > Platform Trust Technology*

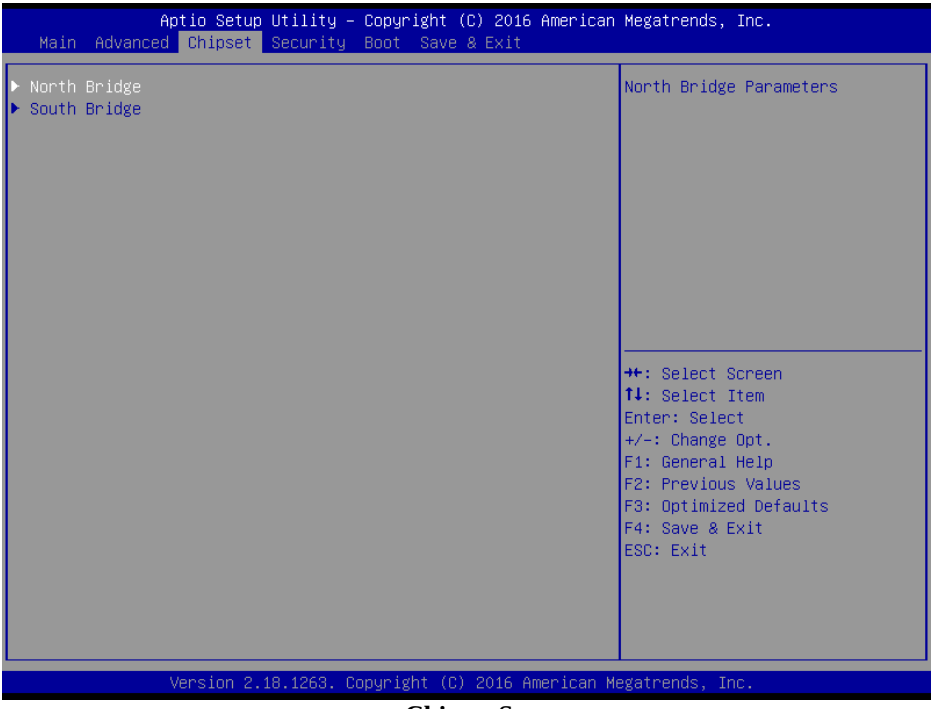


Platform Trust Technology Screen

BIOS Setting	Options	Description/Purpose
fTPM	- Enabled - Disabled (default)	Enables / Disables fTPM.

5.3.3 Chipset

Menu Path *Chipset*

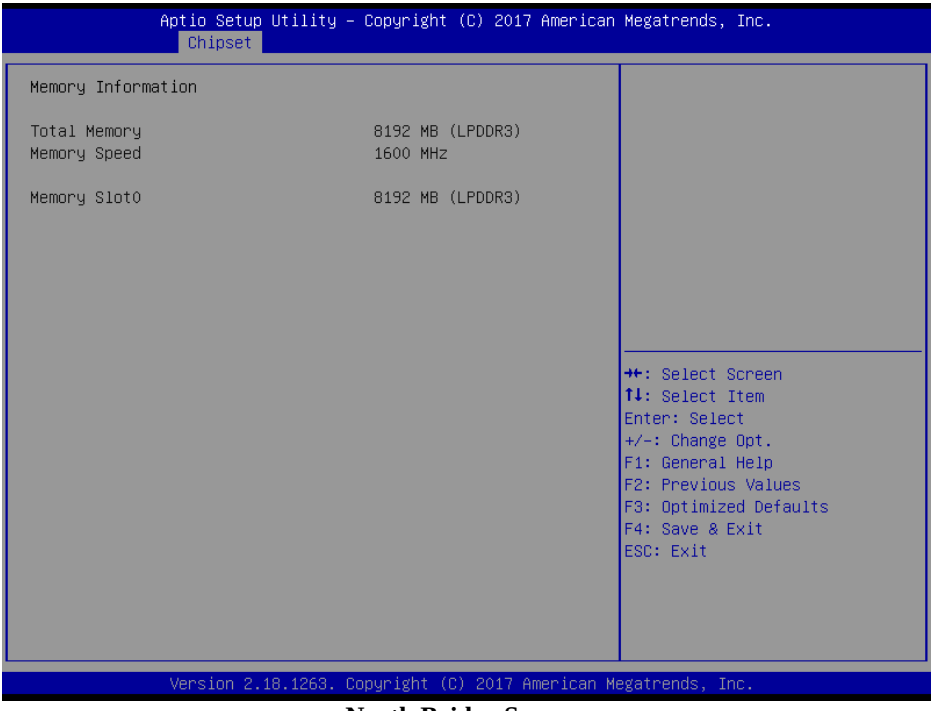


Chipset Screen

BIOS Setting	Options	Description/Purpose
North Bridge	Sub-Menu	North Bridge Parameters.
South Bridge	Sub-Menu	South Bridge Parameters.

5.3.3.1 Chipset - North Bridge

Menu Path	*Chipset > North Bridge*

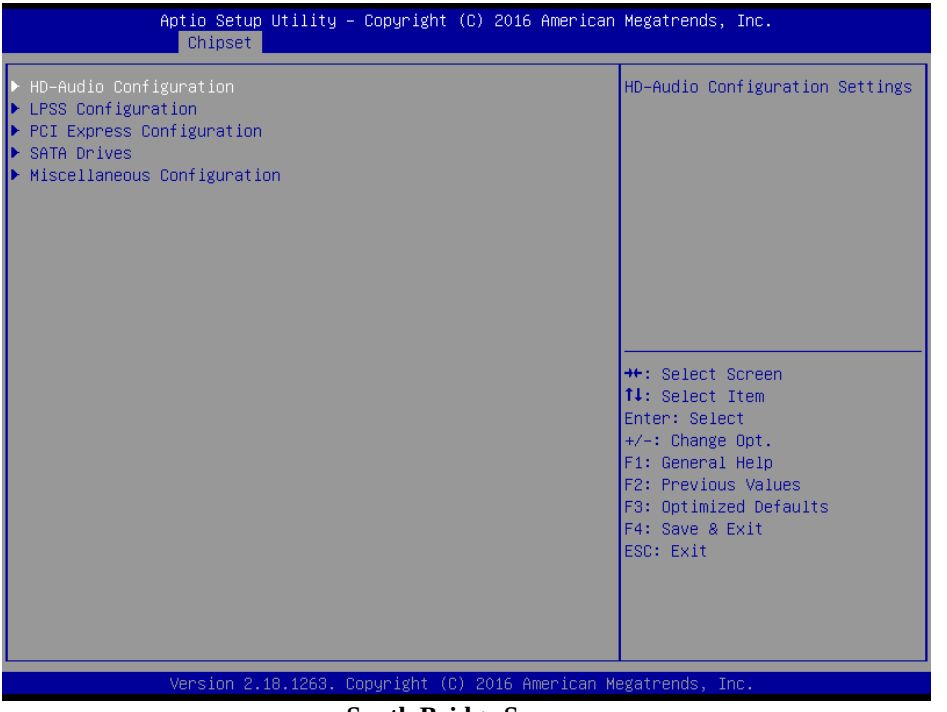


North Bridge Screen

BIOS Setting	Options	Description/Purpose
Total Memory	No changeable options	Displays current amount and type of memory on the system, e.g. "8192 MB (LPDDR3)".
Memory Speed	No changeable options	Displays memory speed.
Memory Slot0	No changeable options	Displays current amount and type of memory on each memory slot, e.g. "8192 MB (LPDDR3)".

5.3.3.2 Chipset - South Bridge

Menu Path *Chipset > South Bridge*

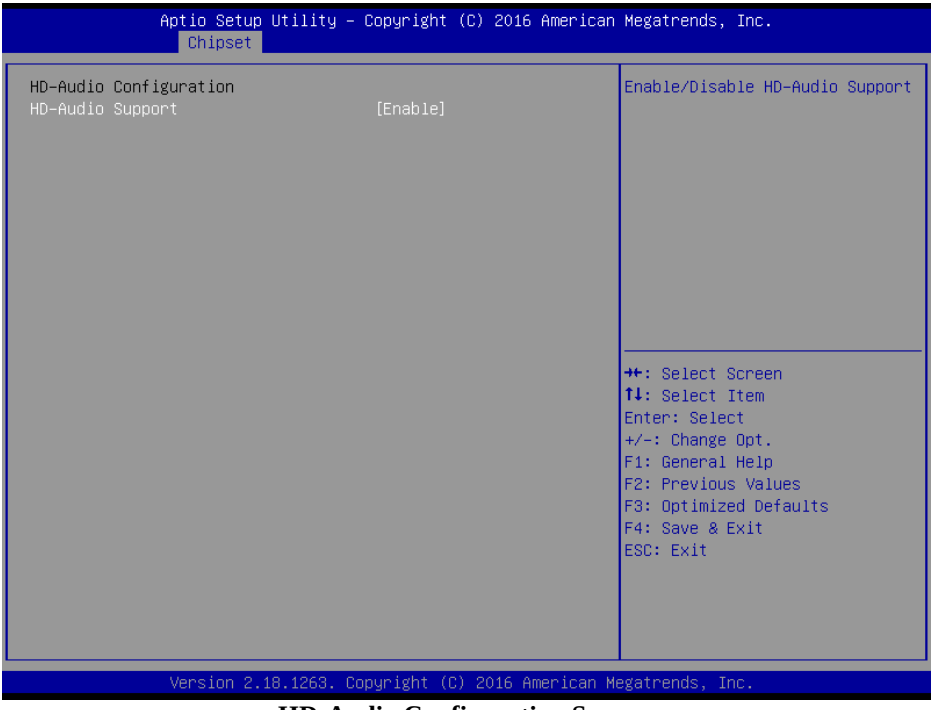


South Bridge Screen

BIOS Setting	Options	Description/Purpose
HD-Audio Configuration	Sub-Menu	HD-Audio configuration settings.
LPSS Configuration	Sub-Menu	LPSS configuration settings.
PCI Express Configuration	Sub-Menu	PCI Express configuration settings.
SATA Drives	Sub-Menu	SATA Drives configuration settings.
Miscellaneous Configuration	Sub-Menu	Miscellaneous configuration settings

Chipset - South Bridge - HD-Audio Configuration

Menu Path *Chipset > South Bridge > HD-Audio Configuration*

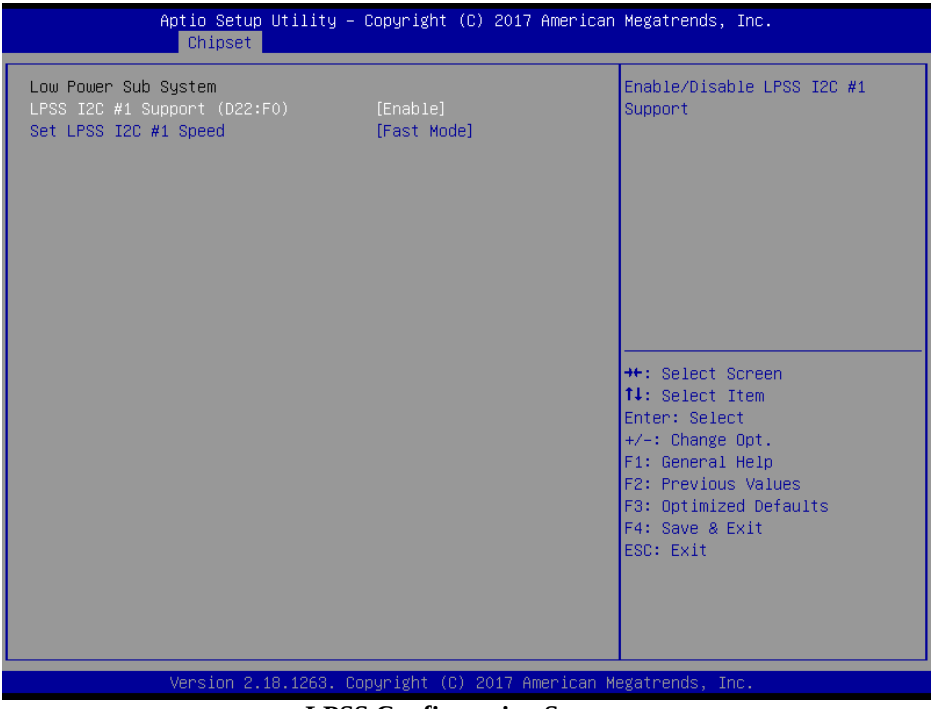


HD-Audio Configuration Screen

BIOS Setting	Options	Description/Purpose
HD-Audio Support	- Disable - Enable (default)	Enables / Disables HD-Audio support.

Chipset - South Bridge - LPSS Configuration

Menu Path *Chipset > South Bridge > LPSS Configuration*

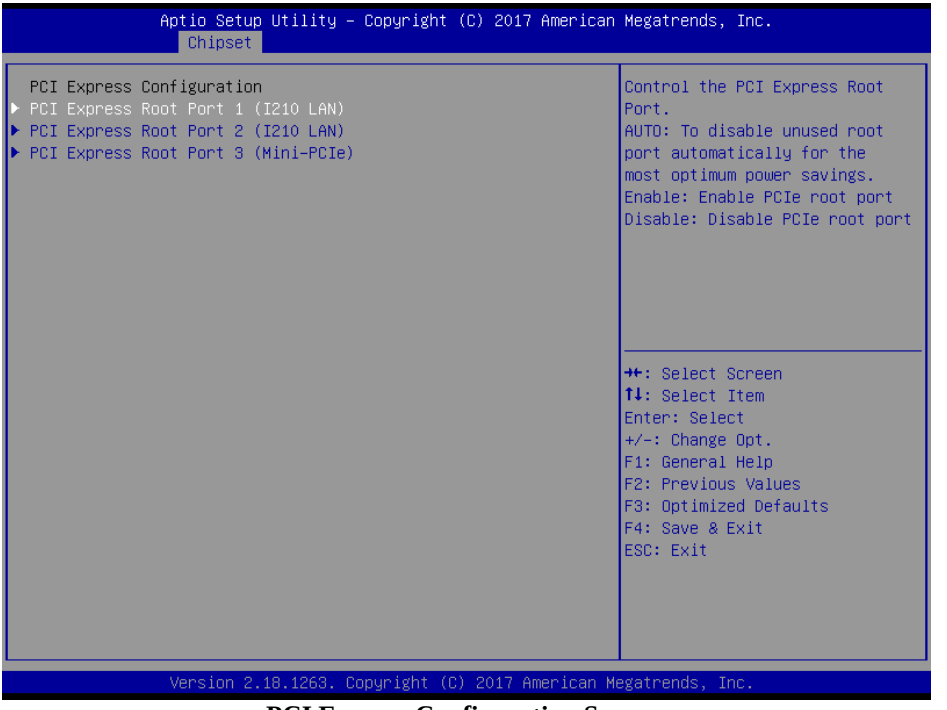


LPSS Configuration Screen

BIOS Setting	Options	Description/Purpose
LPSS I2C #1 Support (D22:F0)	- Disable - Enable (default)	Enables / Disables LPSS I2C #1 support.
Set LPSS I2C #1 Speed	- Standard Mode - Fast Mode (default) - Fast Plus Mode - High Speed Mode	Selects LPSS I2C #1 speed.

Chipset - South Bridge - PCI Express Configuration

Menu Path *Chipset > South Bridge > PCI Express Configuration*

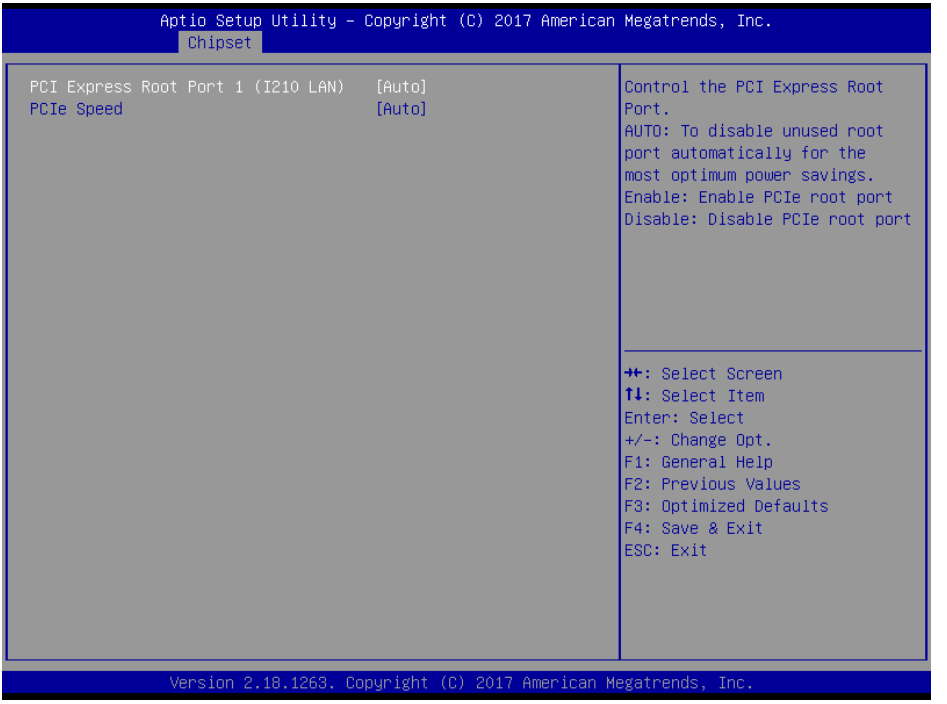


PCI Express Configuration Screen

BIOS Setting	Options	Description/Purpose
PCI E Express Root Port 1 (I210 LAN)	Sub-Menu	PCIE RP1 parameters (I210 LAN).
PCI E Express Root Port 2 (I210 LAN)	Sub-Menu	PCIE RP2 parameters (I210 LAN).
PCI E Express Root Port 3 (Mini-PCIe)	Sub-Menu	PCIE RP3 parameters (Mini-PCIe).

Chipset - South Bridge - PCI Express Configuration - PCI Express Root Port 1 (I210 LAN)

Menu Path *Chipset > South Bridge > PCI Express Configuration > PCI Express Root Port 1 (I210 LAN)*

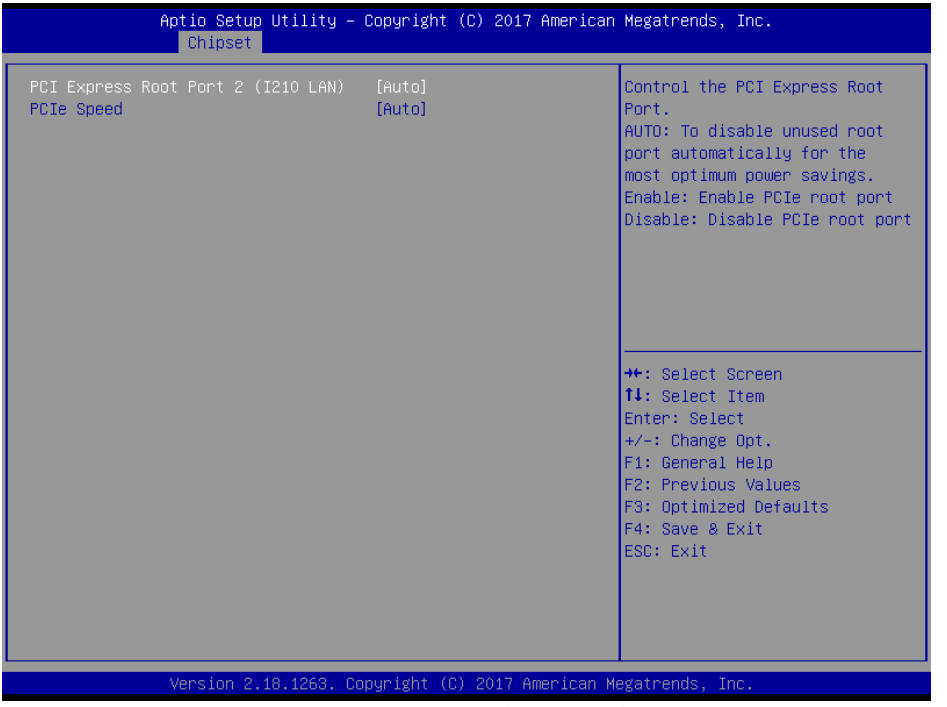


PCI Express Root Port 1 (I210 LAN) Screen

BIOS Setting	Options	Description/Purpose
PCI E Express Root Port 1 (I210 LAN)	- Disable - Enable - Auto (default)	Enables / Disables PCIE root port 1 (I210 LAN).
PCIe Speed	- Auto (default) - Gen1 - Gen2	Configures PCIe speed.

Chipset - South Bridge - PCI Express Configuration - PCI Express Root Port 2 (I210 LAN)

Menu Path *Chipset > South Bridge > PCI Express Configuration > PCI Express Root Port 2 (I210 LAN)*

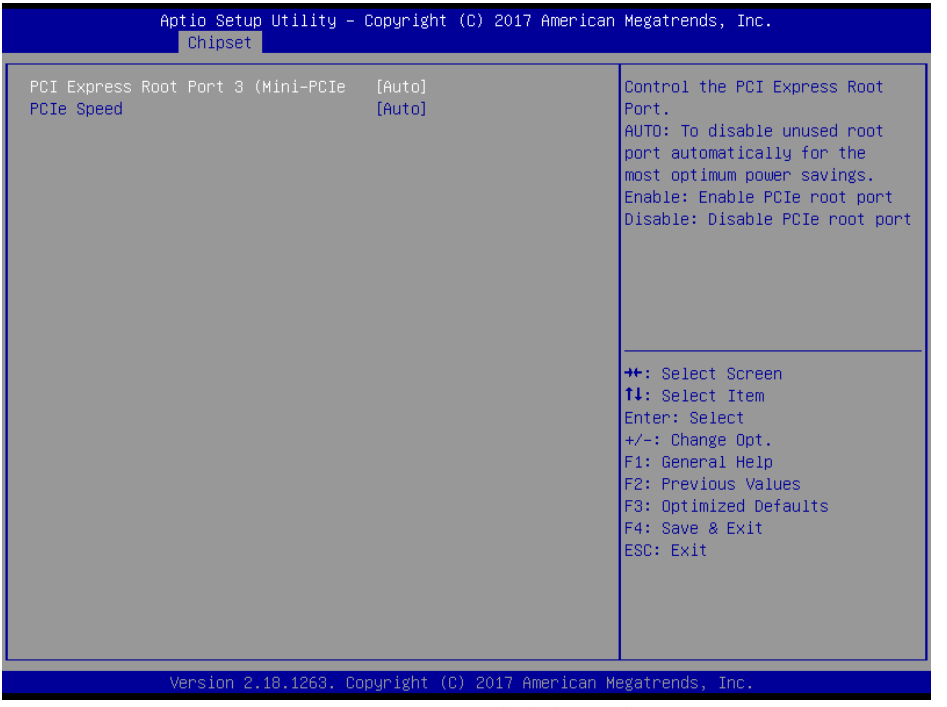


PCI Express Root Port 2 (I210 LAN) Screen

BIOS Setting	Options	Description/Purpose
PCI E Express Root Port 2 (I210 LAN)	- Disable - Enable - Auto (default)	Enable/Disable PCIE root port 2 (I210 LAN).
PCIe Speed	- Auto (default) - Gen1 - Gen2	Configure PCIe speed.

Chipset - South Bridge - PCI Express Configuration - PCI Express Root Port 3 (Mini-PCIe)

Menu Path *Chipset > South Bridge > PCI Express Configuration > PCI Express Root Port 3 (Mini-PCIe)*

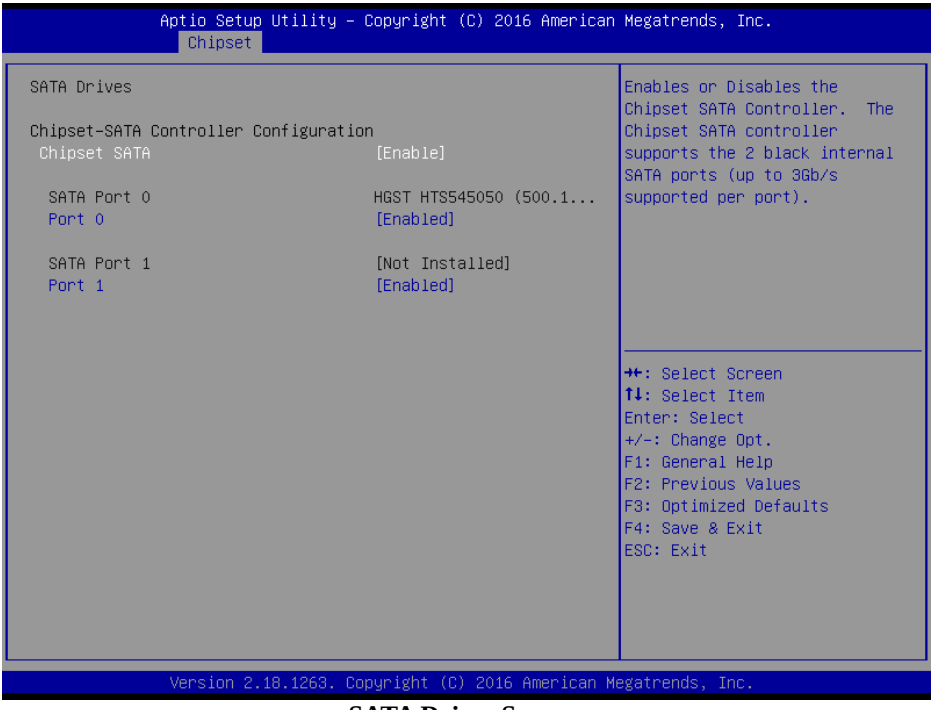


PCI Express Root Port 3 (Mini-PCIe) Screen

BIOS Setting	Options	Description/Purpose
PCI E Express Root Port 3 (Mini-PCIe)	- Disable - Enable - Auto (default)	Enables / Disables PCIE root port 3 (Mini-PCIe).
PCIe Speed	- Auto (default) - Gen1 - Gen2	Configures PCIe speed.

Chipset - South Bridge - SATA Drives

Menu Path *Chipset > South Bridge > SATA Drives*

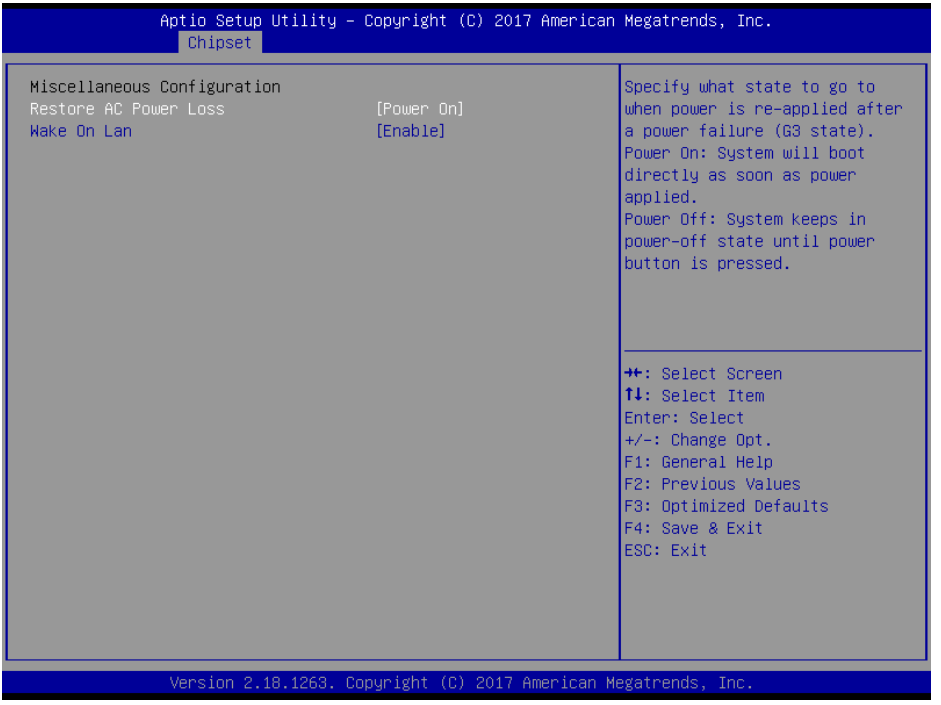


SATA Drives Screen

BIOS Setting	Options	Description/Purpose
Chipset SATA	- Enable (default) - Disable	Enables / Disables the chipset SATA controller.
SATA Port 0	No changeable options	Displays SATA drive branding information if device exists on port 0.
Port 0	- Disabled - Enabled (default)	Enables / Disables SATA port 0.
SATA Port 1	No changeable options	Displays SATA drive branding information if device exists on port 1.
Port 1	- Disabled - Enabled (default)	Enables / Disables SATA port 1.

Chipset - South Bridge - Miscellaneous Configuration

Menu Path *Chipset > South Bridge > Miscellaneous Configuration*

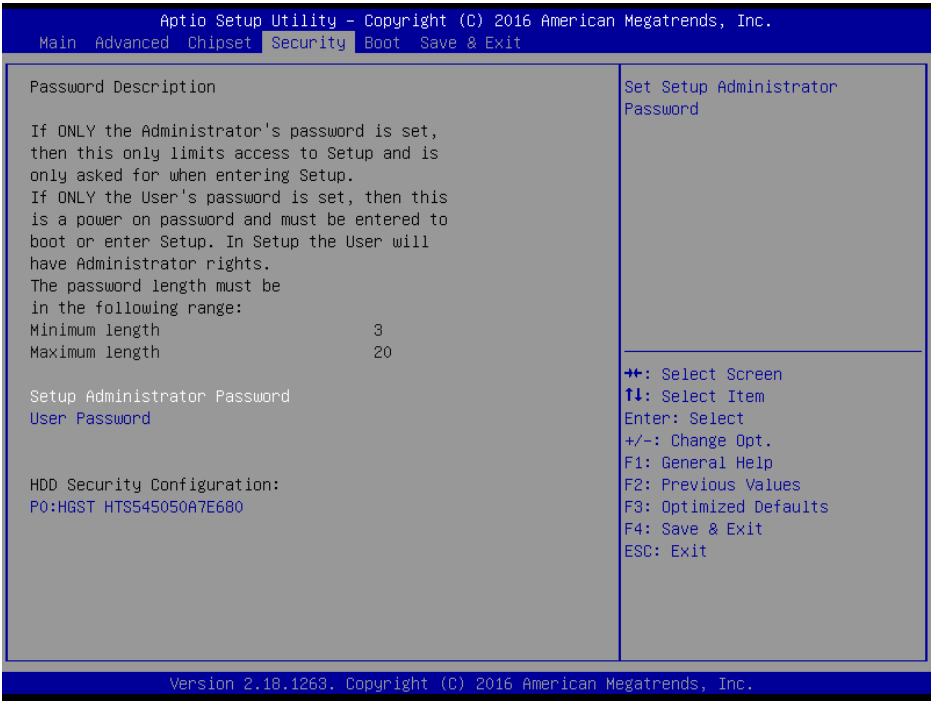


Miscellaneous Configuration Screen

BIOS Setting	Options	Description/Purpose
Restore AC Power Loss	- Power On (default) - Power Off	Specify the state to go to when power is re-applied after a power failure (G3 state). • **Power On:** System will boot directly as soon as power is applied. • **Power Off:** System remains in power-off state until the power button is pressed.
Wake On Lan	- Disable - Enable (default)	Enables or Disables the Wake-On LAN (WOL) function. Win 8/8.1/10 don't support WOL from hybrid shutdown state (S4). If user needs WOL from classic shutdown state (S5), please turn off 'fast startup' feature in OS.

5.3.4 Security

Menu Path *Security*

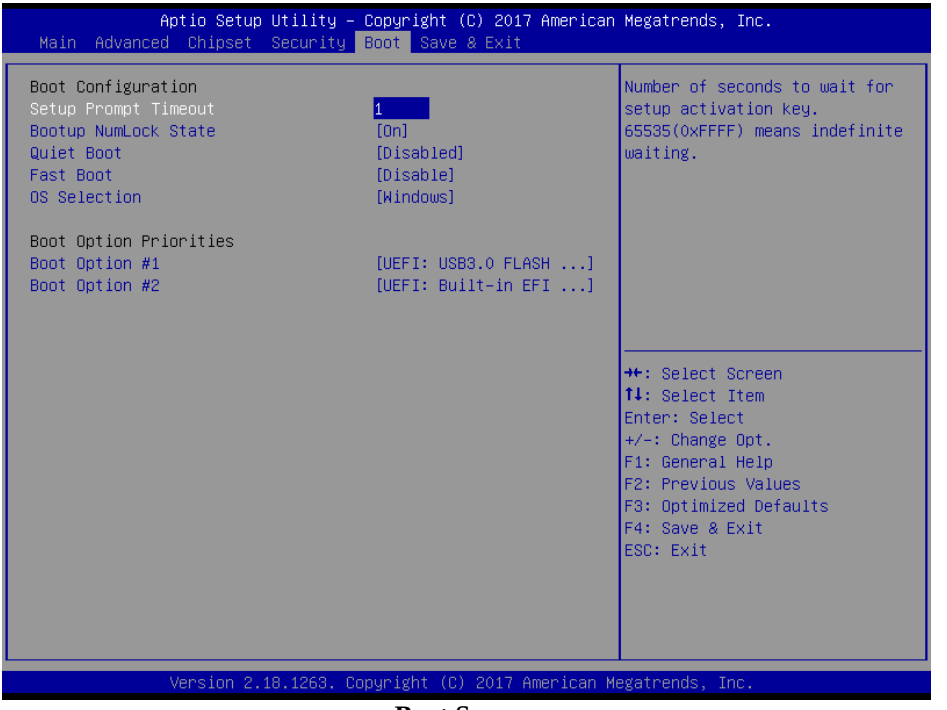


Security Screen

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	Enter the sub-menu with option to enable password-protected HDD/SSD (if supported by SATA device).

5.3.5 Boot

Menu Path *Boot*



Boot Screen

BIOS Setting	Options	Description/Purpose
Setup Prompt Timeout	Multiple option ranging 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	When quiet boot is enabled, it displays AMI or OEM logo (if implemented) instead of POST messages during the boot procedure.
Fast Boot	- Disabled (default) - Enabled	Enable or Disable Fast Boot options.
OS Selection	- Windows (default) - Android - Intel Linux	Selects the targeted OS.
Boot Option #1~#n	- [Drive(s)] - Disabled	Sets the system boot order.

5.3.6 Save & Exit

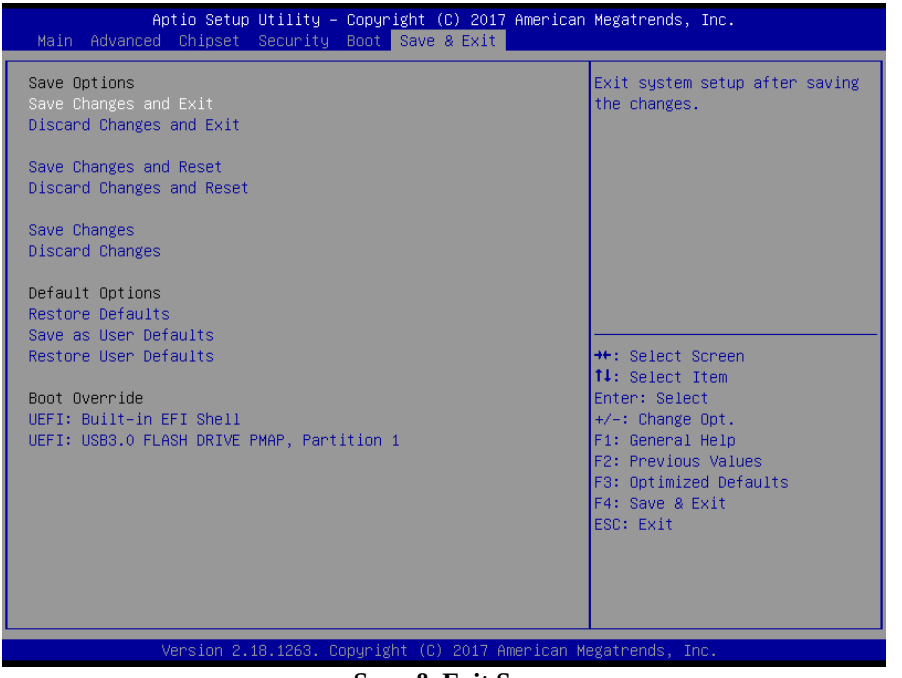
Menu Path	*Save & Exit*

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.



Save & Exit Screen

BIOS Setting	Options	Description/Purpose
Save Changes and Exit	No changeable options	Saves the changes and then exit BIOS setup.
Discard Changes and Exit	No changeable options	Exits the system without saving any changes configured in BIOS settings.
Save Changes and Reset	No changeable options	Saves the changes and resets the system.
Discard Changes and Reset	No changeable options	Resets the system without saving any changes configured in BIOS settings.
Save Changes	No changeable options	Saves the changes done so far to any of the setup options.
Discard Changes	No changeable options	Discards the changes done so far to any of the BIOS settings.
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 BIOS settings.
Boot Override	- [Drive(s)]	Forces to boot the system from selected [drive(s)].

Appendix A System Diagrams

This appendix provides the easy maintenance diagrams, system exploded diagrams and part numbers of KS-M220 / KS-M221 system.

The following topics are included:

- Easy Maintenance
- KS-M220 / KS-M221 KDS Body Exploded Diagrams
- KS-M220 / KS-M221 KDS Control Box Exploded Diagrams
- KS-M220 / KS-M221 Cash Pay Lower Parts Exploded Diagrams
- KS-M220 / KS-M221 M-Type Lower Parts Exploded Diagrams

Easy Maintenance

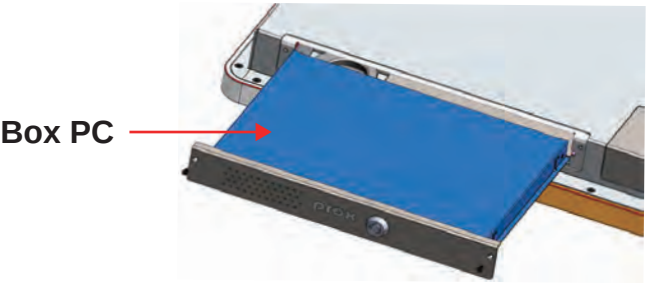
Removing Box PC

Step 1. Remove the 2 screws on the left and right sides, use the key to unlock and pull out the Box PC.

Installing Box PC

Step 1. Insert the Box PC into the KDS and insert the key to lock up.

Step 2. Pull out the key and fasten back the 2 screws to complete.

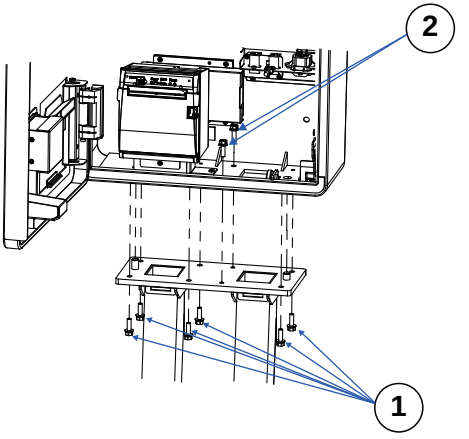


Assembling Tripod

Step 1. Fasten the 6 screws numbered “1” in the drawing below.
Step 2. Fasten the 2 screws numbered “2” as shown to complete.

Disassembling Tripod

Step 1. Fasten the 6 screws numbered “1” in the drawing below.
Step 2. Fasten the 2 screws numbered “2” as shown to complete.

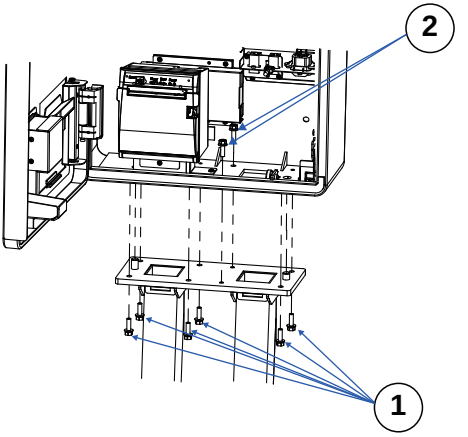


Removing KDS From M-Type

Step 1. Open the M-type central cabinet.
Step 2. Remove the 6 nuts (numbered 1) in the drawing below.
Step 3. Remove the 2 screws (numbered 2) in the drawing below.
Step 4. Lift up the KDS to remove and complete.

Installing KDS Onto M-Type

Step 1. Insert KDS from top to bottom.
Step 2. Fasten the two screws (numbered 2) in the drawing below.
Step 3. Fasten the six nuts (numbered 1) in the drawing below to complete.

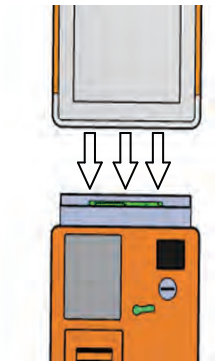


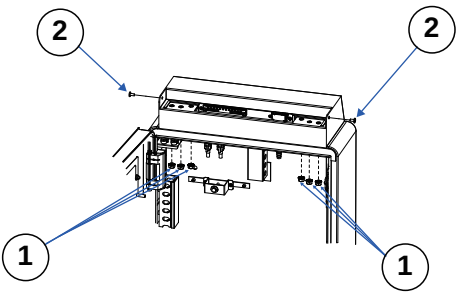
Removing KDS From Cash Pay

Step 1. Open the Cash Pay central cabinet.
Step 2. Remove the 6 nuts (numbered 1) in the drawing below.
Step 3. Remove the 2 screws (numbered 2) in the drawing below.
Step 4. Lift up the KDS to remove and complete.

Installing KDS Onto Cash Pay

Step 1. Insert KDS onto the Cash Pay central cabinet.
Step 2. Fasten the 2 screws (numbered 2) in the drawing below.
Step 3. Fasten the 6 nuts (numbered 1) in the drawing below to complete.

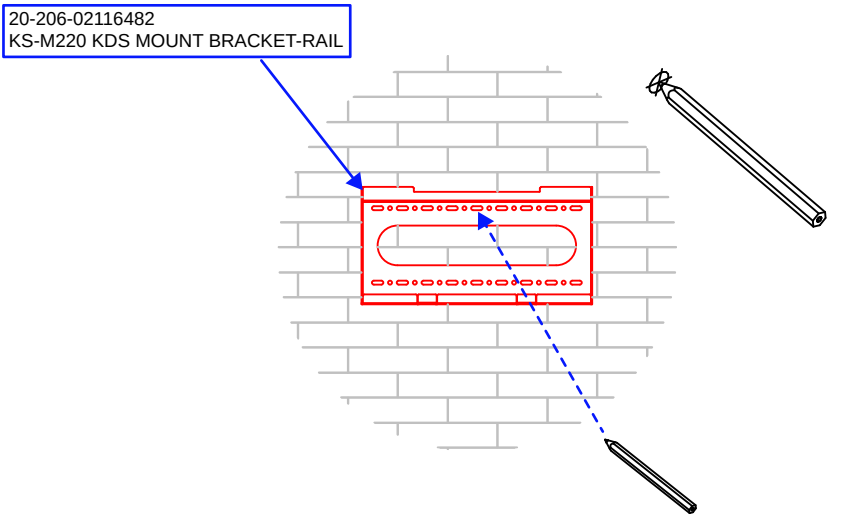




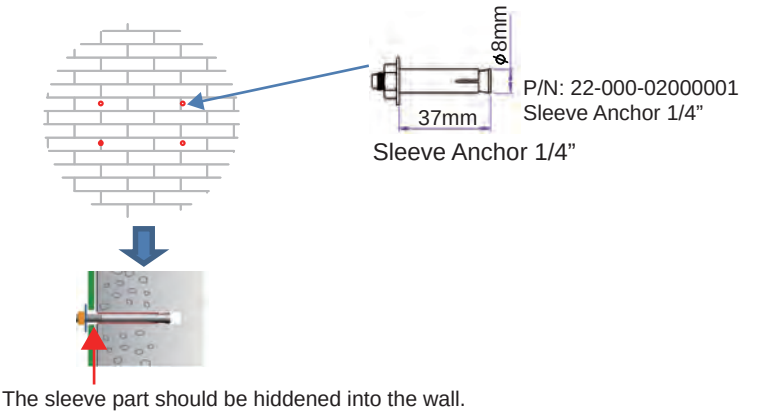
Installing Wall Mount (Horizontal Touchscreen)

Note: The pictures below are only for reference. You can determine the number of holes and sleeve anchors that you need.

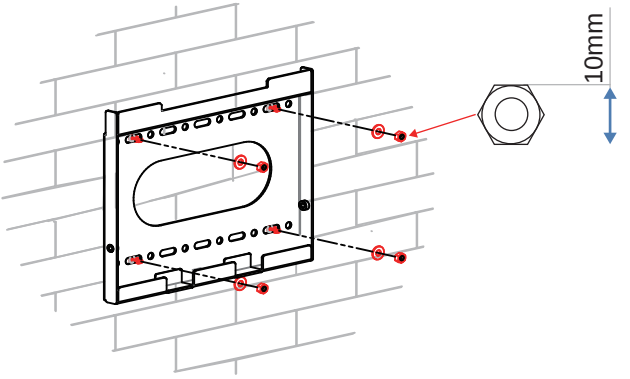
Step 1. Determine the location of the wall mount bracket to be installed on the wall and use a pencil to mark the locations that the sleeve anchors will be fastened.



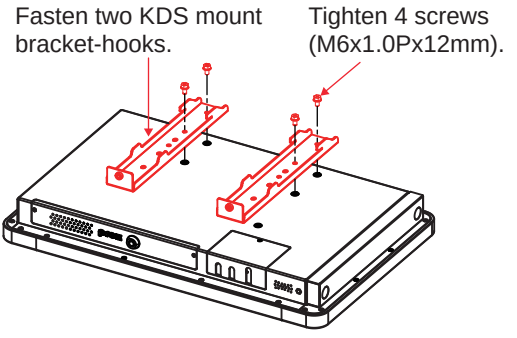
Step 2. Install the sleeve anchors into the intended locations. Note that the sleeve should be installed inside the wall.



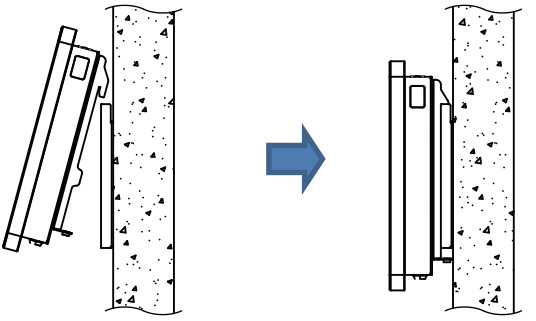
Step 3. Fix the KDS mount bracket-rail onto the wall:



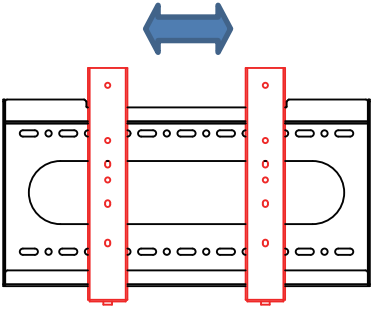
Step 4. Fasten 2 mount bracket-hook (P/N: 202-206-02115482) onto the rear of KDS with 4 screws (M6x1.0Px12mm (P/N: 22-251-60012011).



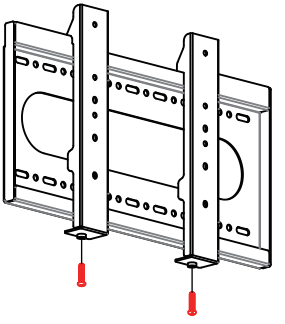
Step 5. Attach the KDS installed with the mount bracket-hook onto the mount bracket-rail fixed on the wall.



Step 6. Adjust KDS to secure the mount bracket-hook into mount bracket-rail firmly.



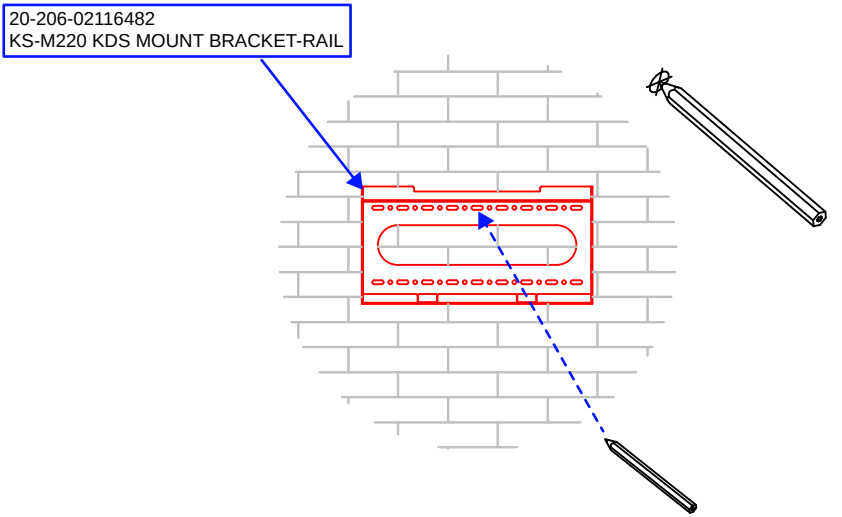
Step 7. Fasten the two M6x25mm (P/N: 22-225-60025031) screws to complete the installation.



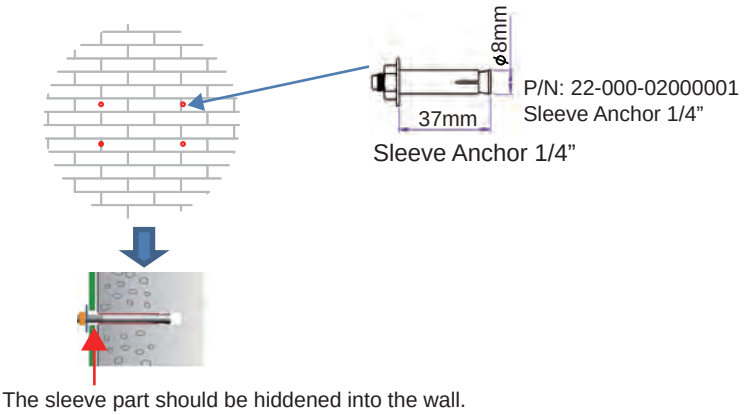
Installing Wall Mount (Vertical Touchscreen)

Note: The pictures below are only for reference. You can determine the number of holes and sleeve anchors that you need.

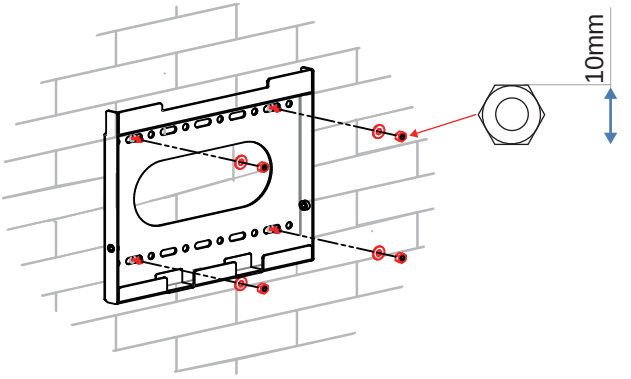
Step 1. Determine the location of the wall mount bracket to be installed on the wall and use a pencil to mark the locations that the sleeve anchors will be fastened.



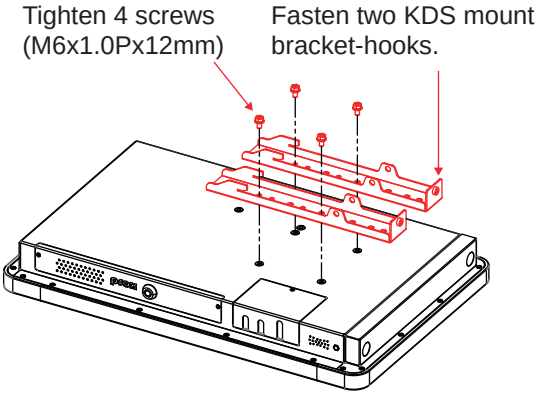
Step 2. Install the sleeve anchors into the intended locations. Note that the sleeve should be installed inside the wall.



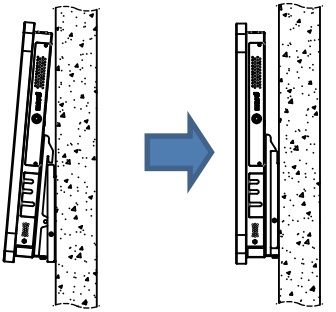
Step 3. Fix the KDS mount bracket-rail onto the wall:



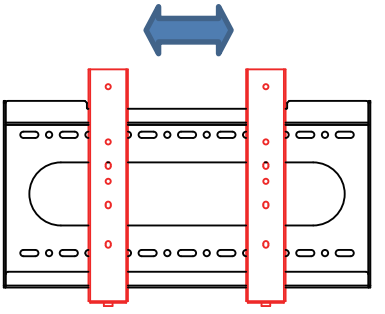
Step 4. Fasten 2 mount bracket-hook (P/N: 202-206-02115482) onto the rear of KDS with 4 screws (M6x1.0Px12mm (P/N: 22-251-60012011).



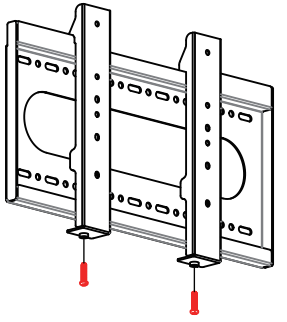
Step 5. Attach the KDS installed with the mount bracket-hook onto the mount bracket-rail fixed on the wall.



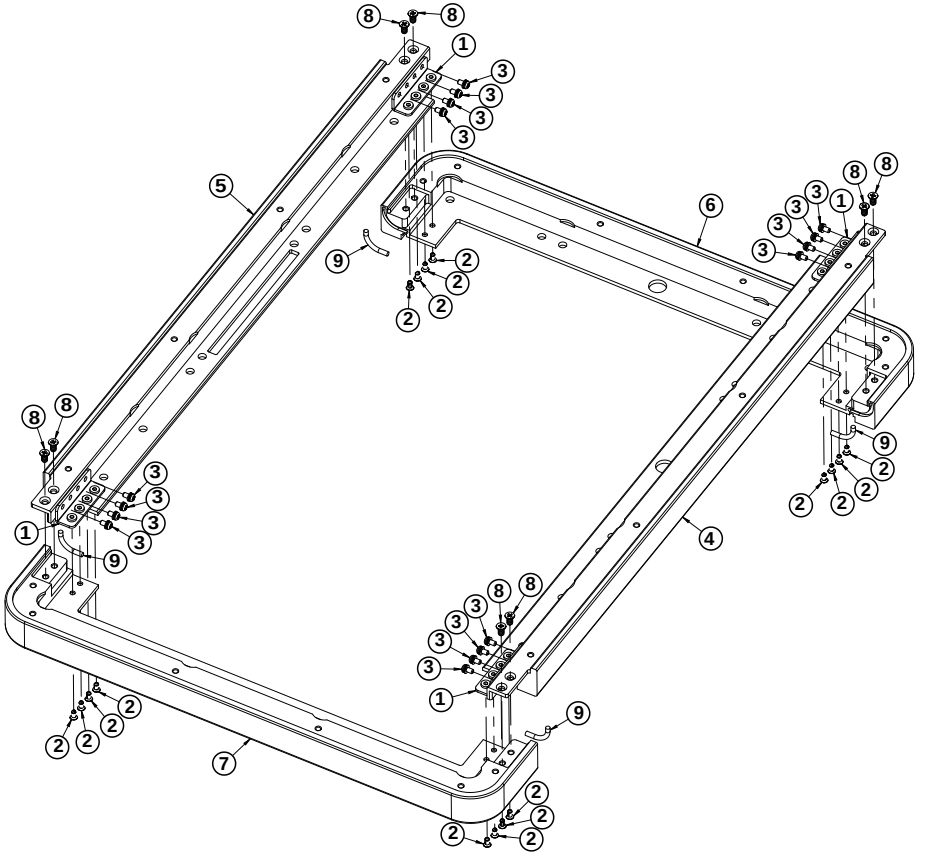
Step 6. Adjust KDS to secure the mount bracket-hook into mount bracket-rail firmly.



Step 7. Fasten the two M6x25mm (P/N: 22-225-60025031) screws to complete the installation.



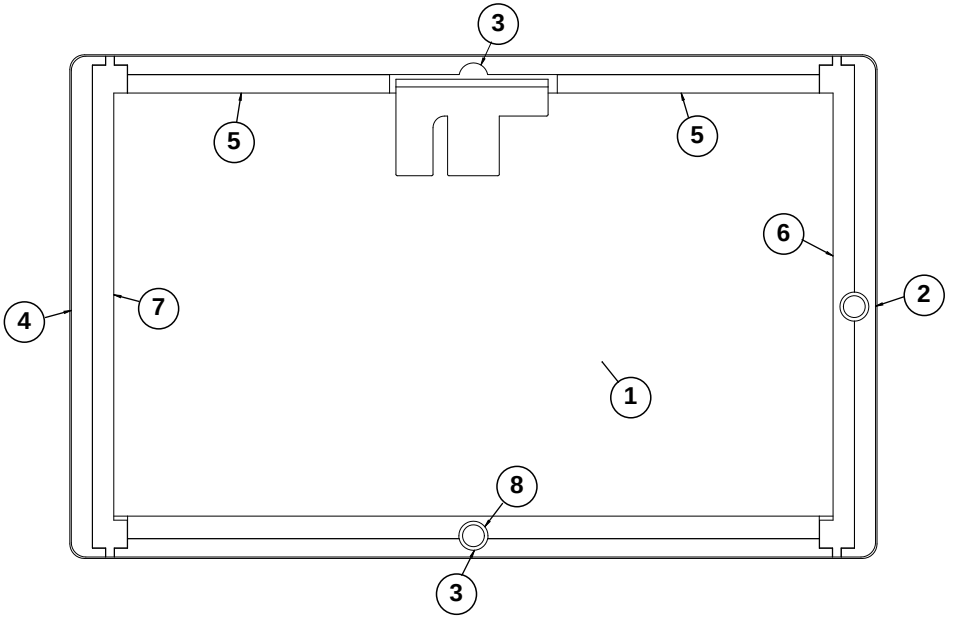
KS-M220 / KS-M221 KDS Body Exploded Diagrams
Step 1-1



ITEM	Description	Part No.	Q'ty
1	KS-M220 KDS L-TYPE BRACKET (w/Plate)	20-206-02024482	4
2	FLAT HEAD SCREW (M3x0.5Px6mm) (Black)	22-215-30006111	16
3	ROUND HEAD WITH SPRING WASHER SCREW M3x0.5Px6mm	22-232-30060211	16
4	KS-M220 KDS FRAME-L (Black)	20-007-01002482	1
5	KS-M220 KDS FRAME-R (Black)	20-007-01003482	1

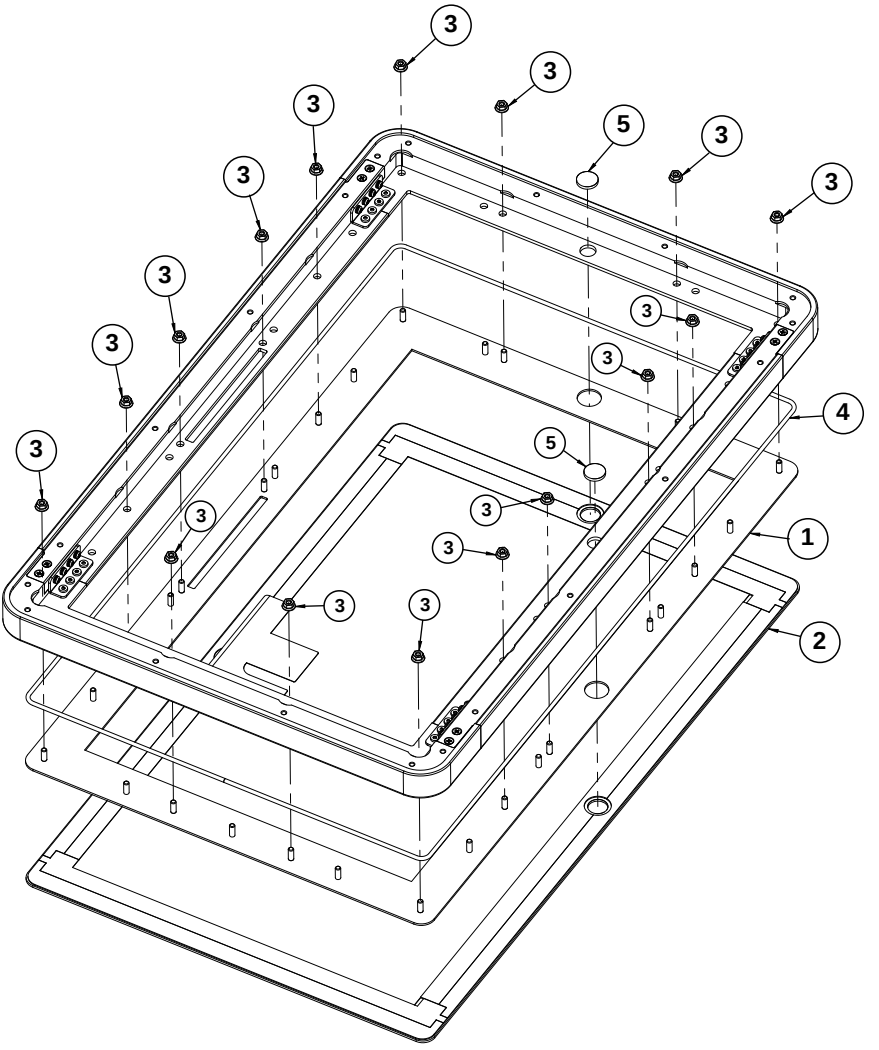
ITEM	Description	Part No.	Q'ty
6	KS-M220 KDS FRAME-TOP (Black)	20-007-01004482	1
7	KS-M220 KDS FRAME-BTM (Black)	20-007-01001482	1
8	FLAT HEAD SCREW ϕ6.4 / M4x0.7Px8mm (Black)	22-215-40008711	8
9	KS-M220 SILICONE FOAM STRIP(White) D3 L=26mm	30-013-06200482	4

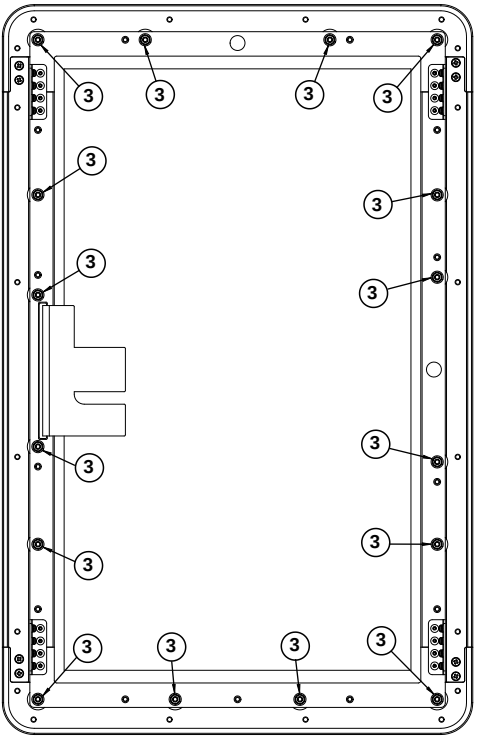
Step 1-2



ITEM	Description	Part No.	Q'ty
1	21.5" Capacitive Touch Panel (GFF)	52-380-13795701	1
2	KS-M220 TOUCH PANEL VHB ELO-S	34-026-05002482	1
3	KS-M220 TOUCH PANEL VHB ELO-L	34-026-05001482	2
4	KS-M220 TOUCH PANEL VHB ELO-B1 (344x23.5x0.8mm)	34-026-05006482	1
5	KS-M220 TOUCH PANEL VHB (180x12.6x0.8mm)	34-026-05005482	2
6	KS-M220 TOUCH PANEL VHB ELO-INNER (344x24x0.8mm)	34-026-05004482	1
7	KS-M220 TOUCH PANEL VHB ELO-B2 (344x24x0.8mm)	34-026-05007482	1
8	KS-M220 TOUCH PANEL VHB ELO-CAM (475.2x15.5x0.8mm)	34-026-05003482	1

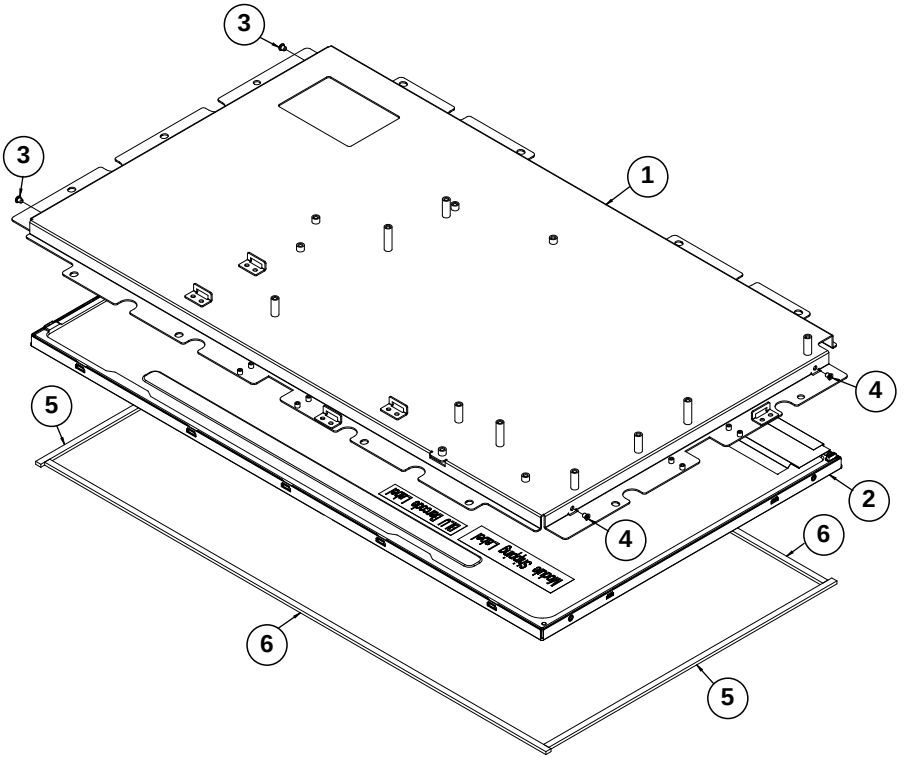
Step 1-3



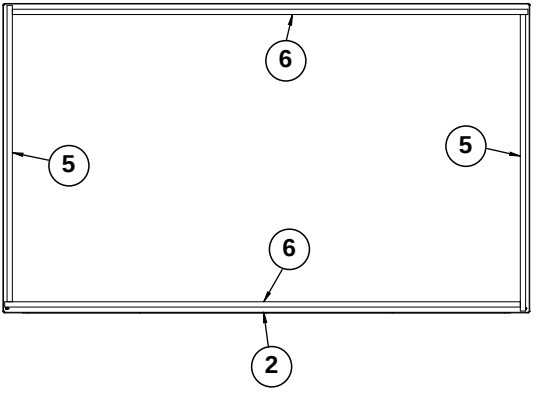


ITEM	Description	Part No.	Q'ty
1	KS-M220 KDS TOUCH HOLDER (w/Paint) (Black)	20-229-02027482	1
2	21.5'' Capacitive Touch Panel	52-380-13632101	1
3	SLIP NUTS (M4x0.7P,H=4.5mm)	23-142-40450801	16
4	KS-M220 SILICONE FOAM STRIP (White) L=1770mm	30-013-06100482	1
5	KS-M220 EVA (D16xT2.5mm)	30-013-16100482	2

Step 1-4

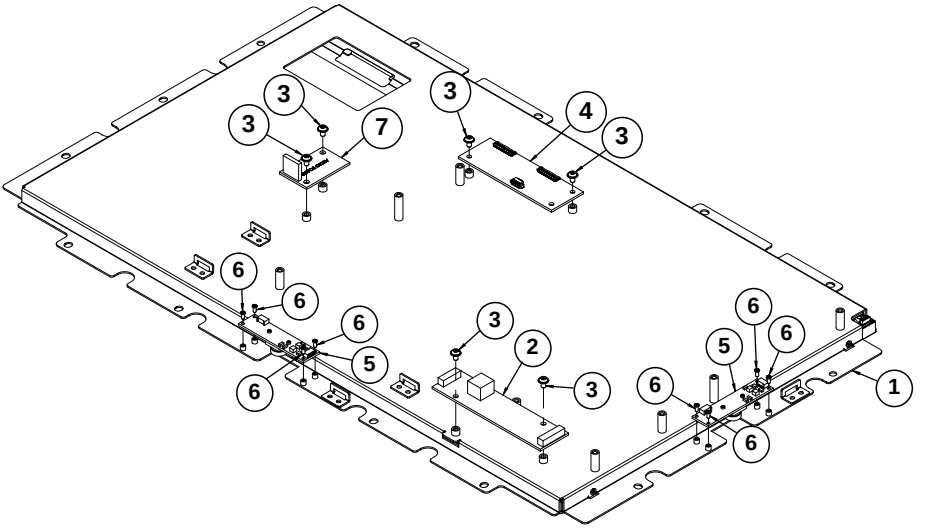


Locations to attach LCD Panel Poron



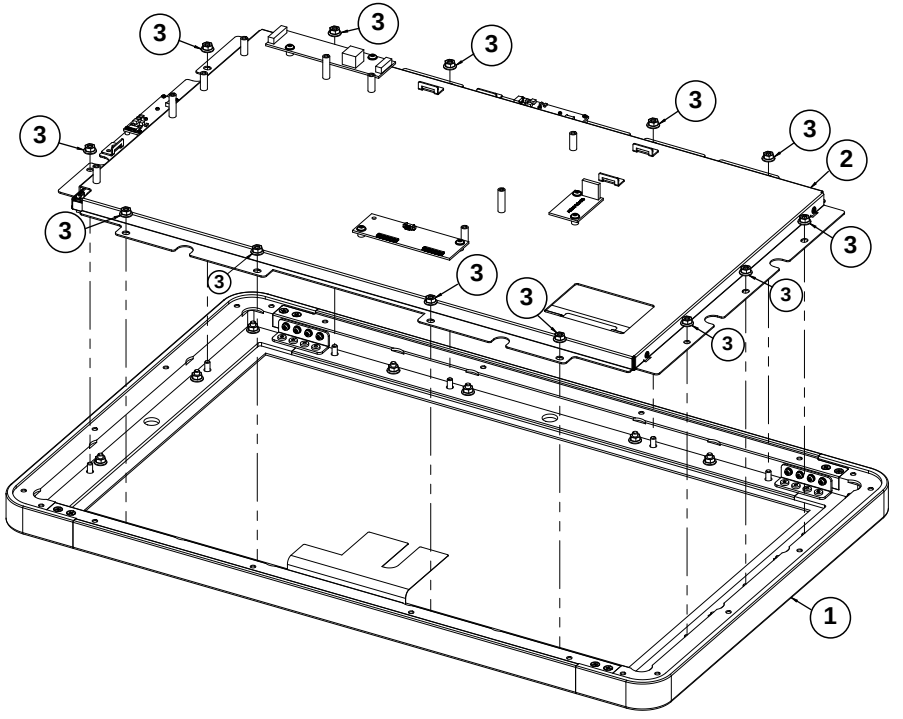
ITEM	Description	Part No.	Q'ty
1	KS-M220 KDS LCD HOLDER (w/Plate)	20-229-02026482	1
2	21.5" TFT LCD Panel(LED Backlight), 250nits (1920x1080)	52-351-13215302	1
3	FILLISTR HEAD SCREW M3x0.5Px3mm	22-272-30003011	2
4	FLAT HEAD SCREW#1/ ϕ 5.0 / M3x0.5Px4mm, FLAT=1.1mm	22-212-30004311	2
5	KS-M220 LCD PANEL PORON-S (280x5x2.5mm)	30-013-24200482	2
6	KS-M220 LCD PANEL PORON-L (487x5x2.5mm)	30-013-24100482	2

Step 1-5



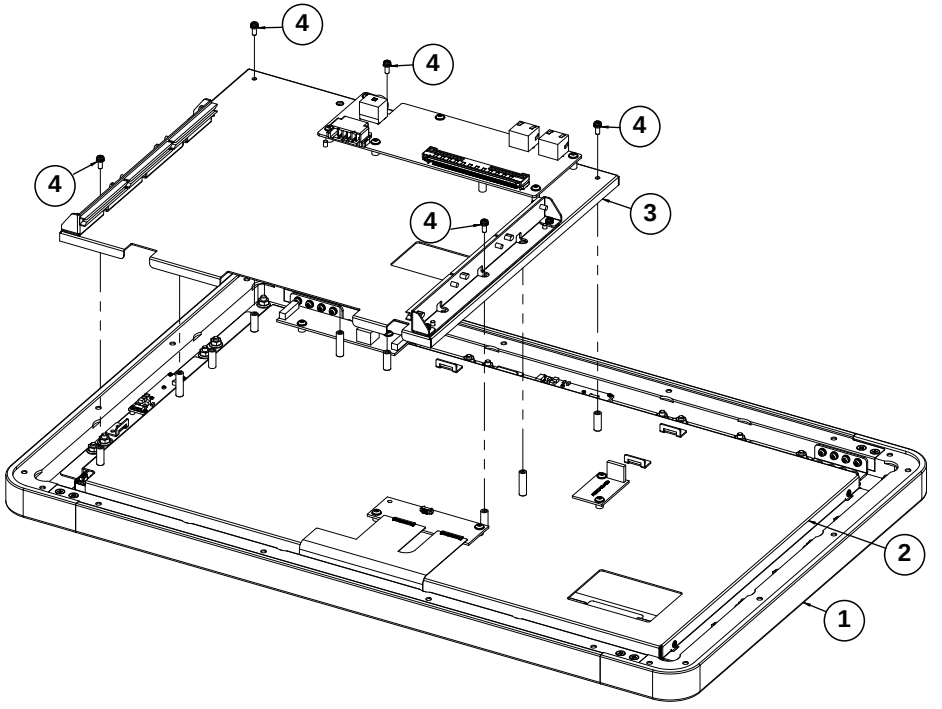
ITEM	Description	Part No.	Q'ty
1	KS-M220 KDS LCD HOLDER (w/Plate)	20-229-02026482	1
2	LED Driver Board	52-152-29201530	1
3	ROUND WASHER HEAD SCREW M3x0.5Px5mm	22-242-30005311	6
4	Touch Control Board for 21.5" ELO	52-370-07241301	1
5	2.1M FHD Fixed-Focus Face Camera	52-151-08000231	2
6	ROUND HEAD SCREW ϕ3.3 / #1/M2x0.4Px4mm	22-232-20004811	8
7	Audio Board	52-152-05036500	1

Step 1-6



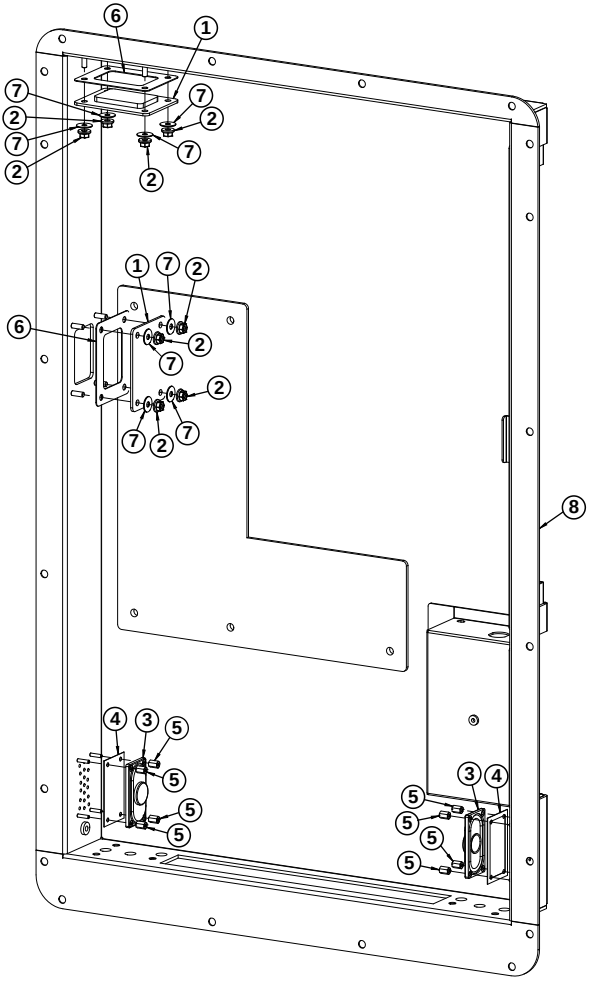
ITEM	Description	Part No.	Q'ty
1	KS-M220 KDS Frame Module	N/A	1
2	KS-M220 KDS LCD Module	N/A	1
3	SLIP NUTS (M4x0.7P,H=4.5mm)	23-142-40450801	13

Step 1-7



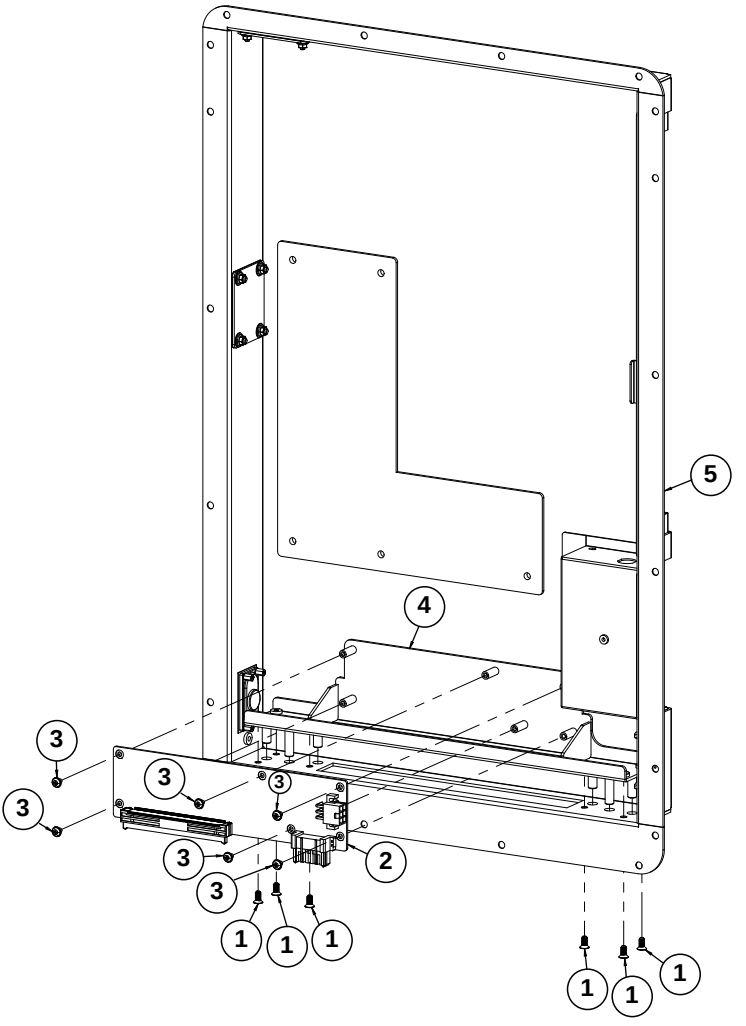
ITEM	Description	Part No.	Q'ty
1	KS-M220 KDS Frame Module	N/A	1
2	KS-M220 KDS LCD Module	N/A	1
3	Drawer Support Module	N/A	1
4	ROUND HEAD WITH SPRING WASHER SCREW #2/M3x0.5Px8mm	22-235-30008011	5

Step 2-1



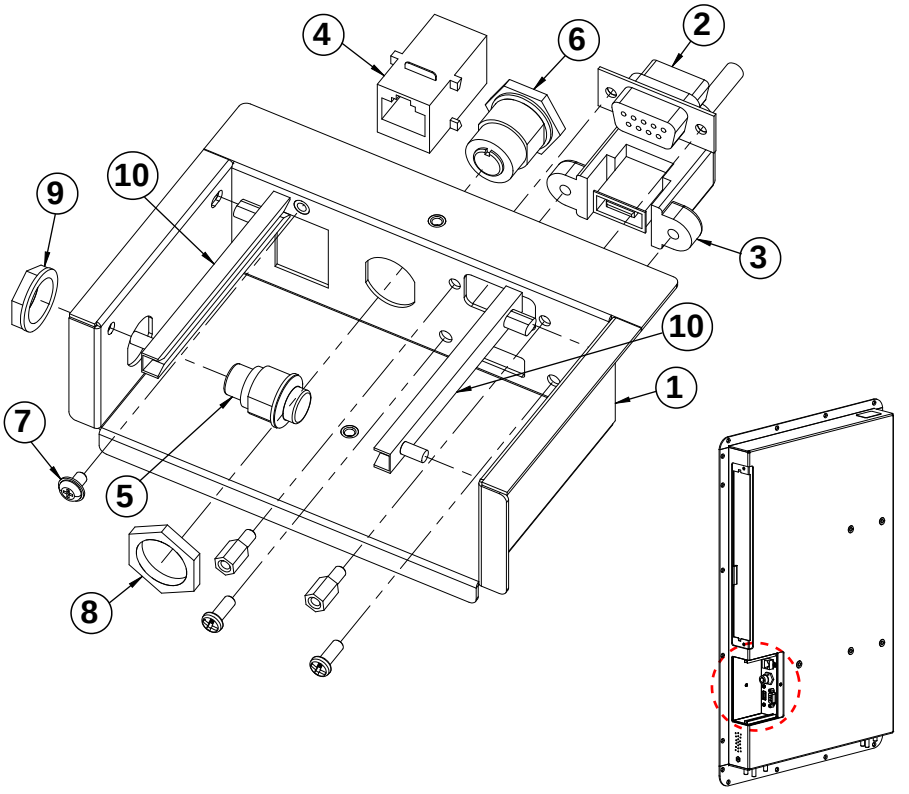
ITEM	Description	Part No.	Q'ty
1	KS-M220 KDS WIFI ANT ACRYLIC	30-021-10130482	2
2	SLIP NUTS(M3x0.5P,H=4mm)	23-142-30400801	9
3	PA-6222/6225 SPEAKER CABLE L=250mm	27-021-33505071	2
4	KS-M220 KDS SPEAKER FILM	90-083-25100482	2
5	HEX CU NUTS (M2x0.4P,H=6mm)	23-160-20060041	8
6	KS-M220 KDS WIFI ACRYLIC PORON	30-013-24300482	2
7	WASHER (OD= φ 10mm,ID= φ 3.2mmx0.5T)	23-202-03050101	8
8	KS-M220 KDS REAR COVER WELD SPCC(w/Paint)(Black)	20-204-02118482	1

Step 2-2



ITEM	Description	Part No.	Q'ty
1	FLAT HEAD SCREW ϕ6.4 / M4x0.7Px8mm(Black)	22-215-40008711	6
2	HSF,KR-M220 Male pin Daughter Card	KR-M220-G0B-A1N	1
3	ROUND WASHER HEAD SCREW M3x0.5Px5mm	22-242-30005311	6
4	KS-M220 KDS FH PLATE (w/Plate)	20-205-02001482	1
5	KS-M220 KDS REAR COVER WELD SPCC (w/Paint) (Black)	20-204-02118482	1

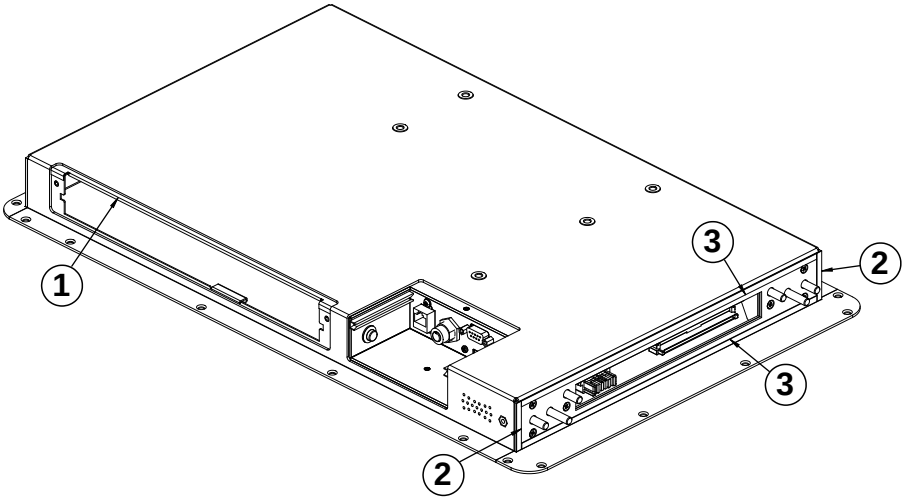
Step 2-3



ITEM	Description	Part No.	Q'ty
1	KS-M220 KDS REAR COVER WELD	20-004-01001482	1
2	D-Sub 9-Pin F Cable	N/A	1
3	USB2.0 CABLE (Type A(F) to 10F/P2.0) L=550mm	27-006-48211111	1
4	8P8C MODULAR COUPLER JACK SHIELDED	10-085-08012135	1
5	Power Switch	N/A	1
6	M12(12F) to ATX 6F/P4.2x2+POWER DIN(4M) L=200mm+350mm+650mm	27-012-48213111	1
7	ROUND WASHER HEAD SCREW M3x0.5Px5mm	22-242-30005311	1

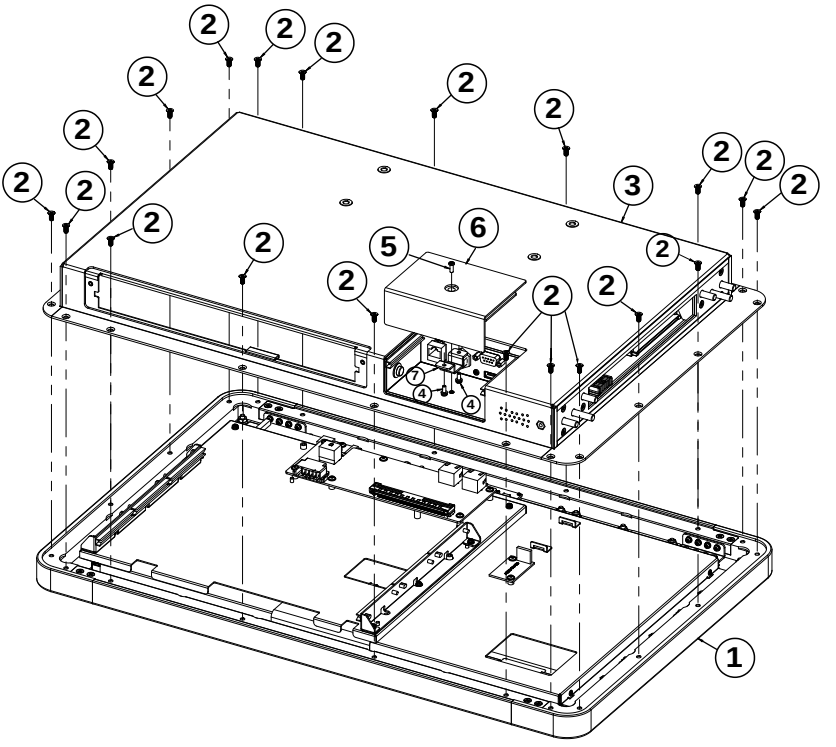
ITEM	Description	Part No.	Q'ty
8	M12(12F) to ATX 6F/P4.2x2+POWER DIN (4ML=200mm+350mm+650mm)	27-012-48213111	1
9	Power Switch Nut	N/A	1
10	CARD GUIDE	90-062-04200000	1

Step 2-4



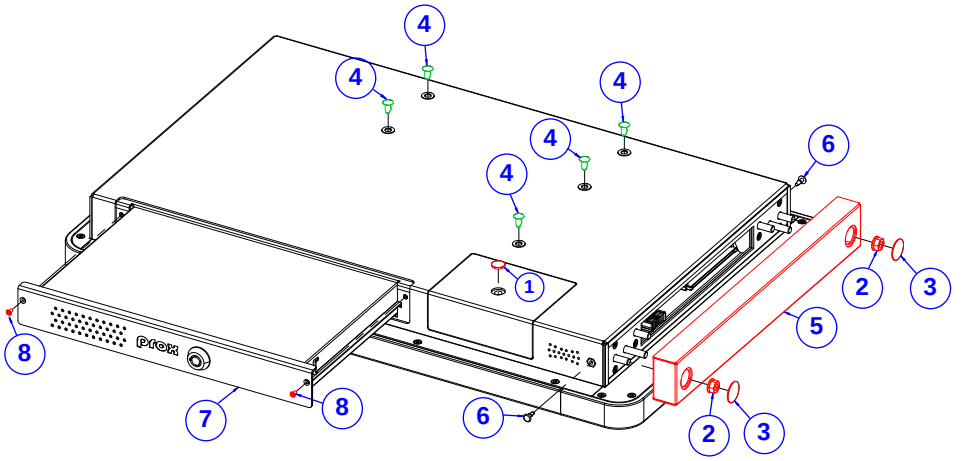
ITEM	Description	Part No.	Q'ty
1	KS-M220 KDS REAR COVER DRAWER EVA (268.8x13.2x0.5mm)	30-013-15400482	1
2	KS-M220 KDS EVA (42x5x0.5mm)	30-013-15300482	2
3	KS-M220 KDS EVA (315.5x5x0.5mm)	30-013-15200482	2

Step 3-1



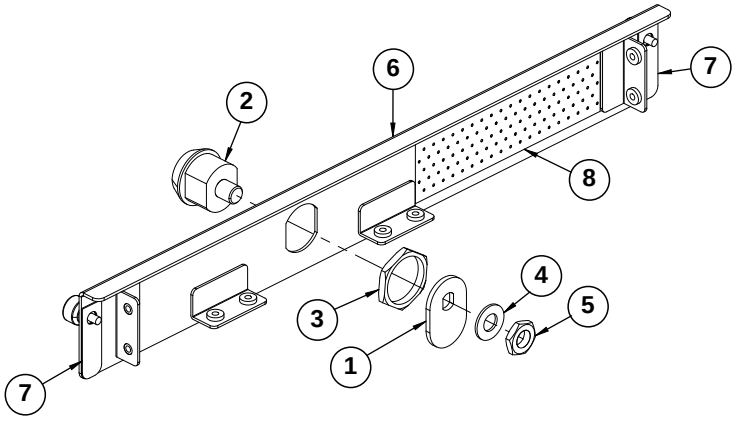
ITEM	Description	Part No.	Q'ty
1	KS-M220 KDS Frame Module	N/A	1
2	FLAT HEAD SCREW ϕ6.4 / M4x0.7Px8mm(Black)	22-215-40008711	20
3	KS-M220 KDS Rear Cover Module	N/A	1
4	ROUND HEAD WITH SPRING WASHER SCREW #2/M3x0.5Px8mm	22-235-30008011	2
5	PAN HEAD SCREW M3x0.5Px12mm	22-222-30012811	1
6	KS-M220 KDS IO COVER (w/Paint) (Black)	20-204-02068482	1
7	KS-M220 KDS IO COVER BRACKET (w/Plate)	20-206-02113482	1

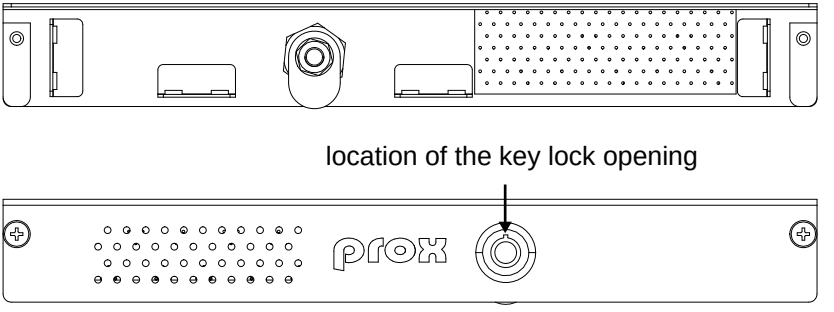
Step 3-2



ITEM	Description	Part No.	Q'ty	Remark
1	Rubber Foot 12x1.5mm	N/A	1	
2	SLIP NUTS(M6x1.0P,H=6mm)	23-142-60601271	2	
3	KS-M220 Side Cover Patch	30-013-36100482	2	Used on KDS Wall Mount type
4	SNAP RIVET	90-016-04300000	5	
5	KS-M220 KDS SIDE COVER (w/Paint) (Black)	20-204-02069482	1	Used on KDS Wall Mount type
6	PLASTIC RIVET(Φ3.5mm) (Black)	30-076-04300000	2	
7	KS-M220 KDS Drawer	N/A	1	
8	FLAT HEAD SCREW M3x0.5Px6mm(Black)	22-215-30006111	2	

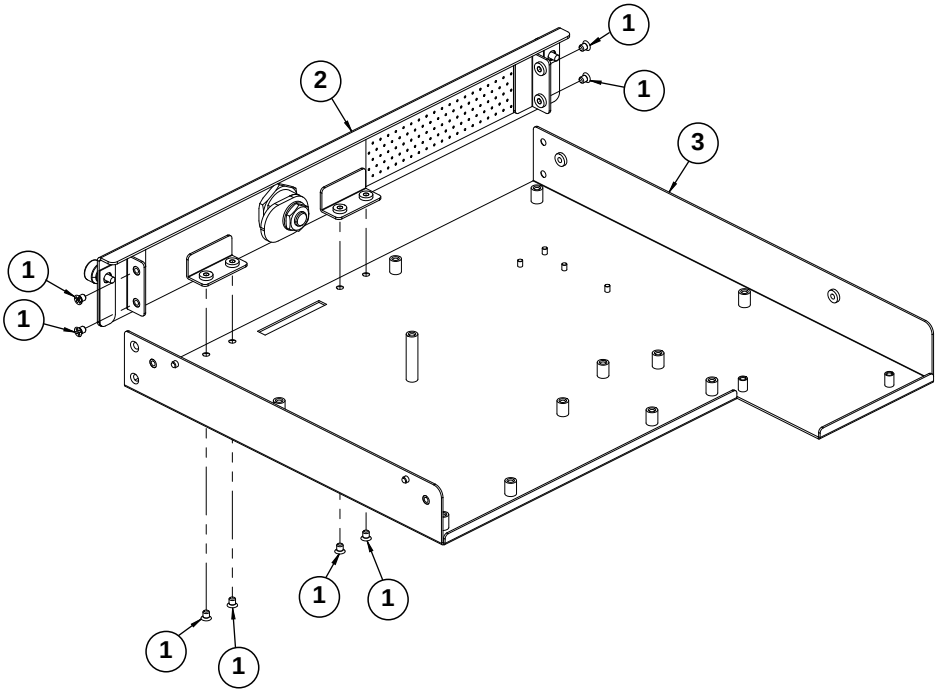
KS-M220 / KS-M221 KDS Control Box Exploded Diagrams Step 4-1



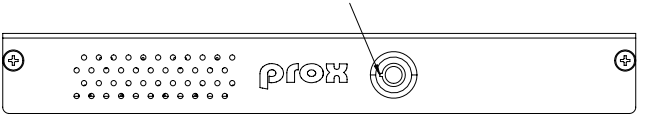


ITEM	Description	Part No.	Q'ty
1	KS-1132 C510ZSS-1 Lock Plate	80-025-02001450	1
2	LOCK_C510ZSS-1_CORE	20-025-35001000	1
3	LOCK_C510ZSS-1_BIG NUT	20-025-35001000	1
4	LOCK_C510ZSS-1_WASHER	20-025-35001000	1
5	LOCK_C510ZSS-1_S NUT	20-025-35001000	1
6	KS-M220 KDS DRAWER FRONT COVER (w/Paint) (Black)	20-204-02067482	1
7	KS-M220 KDS DRAWER SIDE EVA (30.7x10x0.5mm)	30-013-15100482	2
8	KS-M220 KDS DRAWER FRONT FILTER (96x31mm)	30-056-02100482	1

Step 4-2

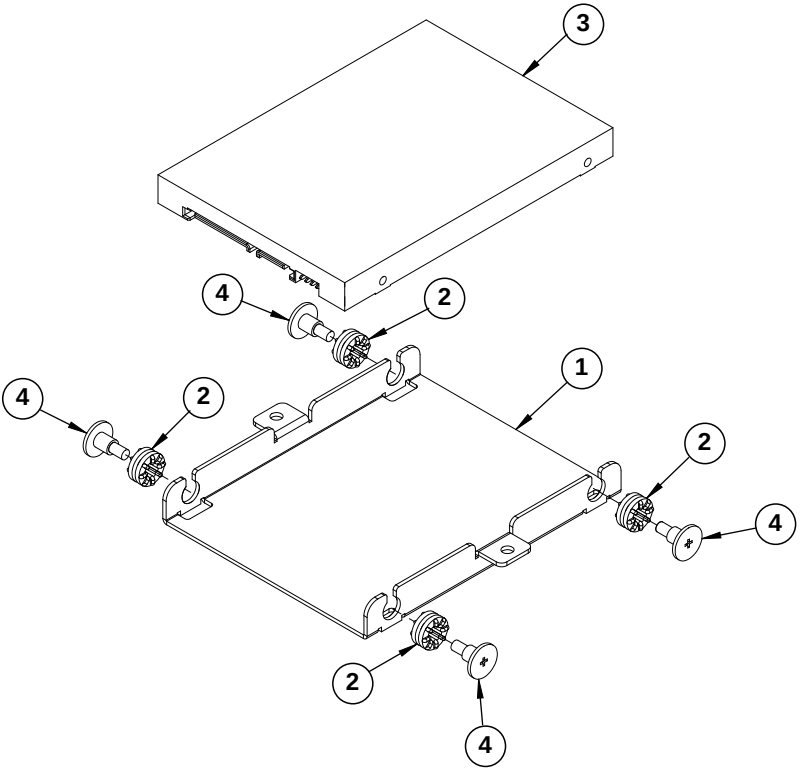


Before you start, use the key to rotate the key lock opening to the left side as shown:



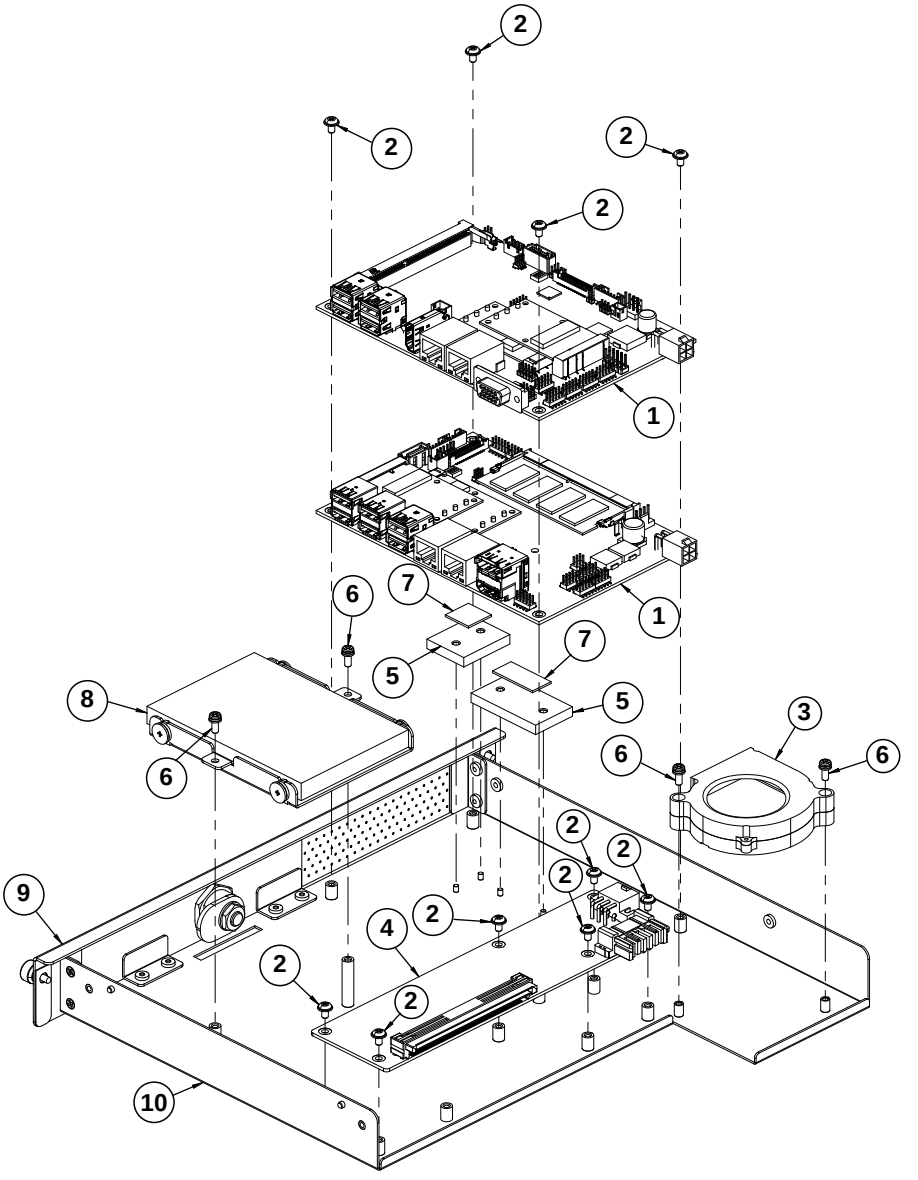
ITEM	Description	Part No.	Q'ty
1	FLAT HEAD SCREW #1/ ϕ 5.0 / M3x0.5Px4mm, FLAT=1.1mm	22-212-30004311	8
2	KS-M220 KDS DRAWER FRONT COVER (w/Paint) (Black)	20-204-02067482	1
3	KS-M220 KDS DRAWER TRAY	20-254-01001482	1

Step 4-3



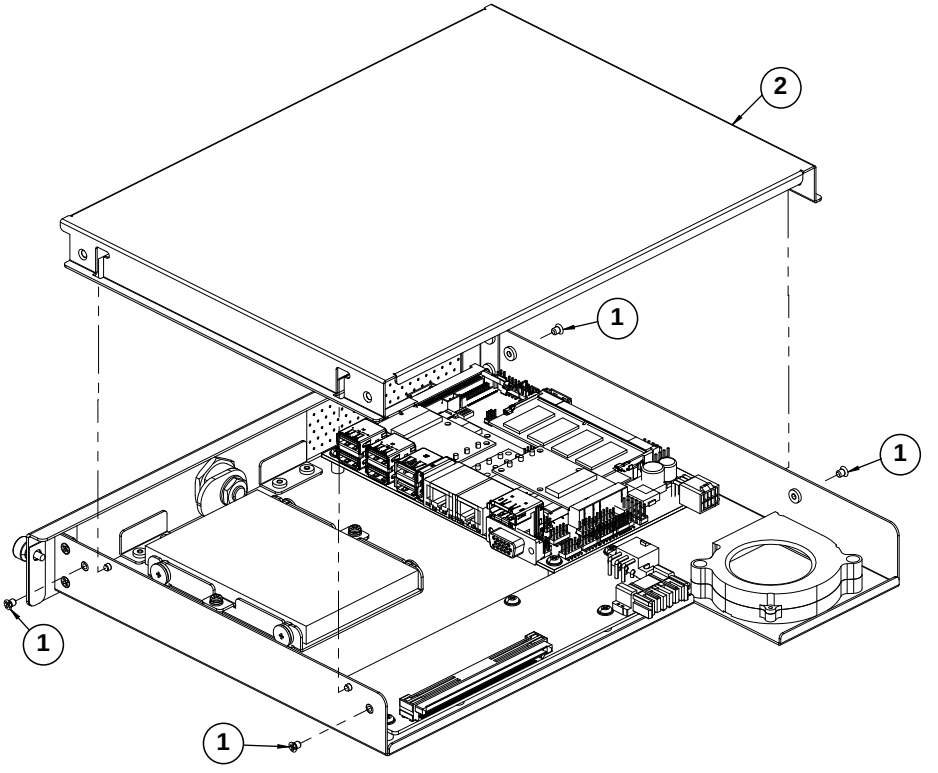
ITEM	Description	Part No.	Q'ty
1	KS-M220 HDD HOLDER	20-229-02001482	1
2	SHOCK ABSORB RUBBER(Black)	90-013-01200000	4
3	2.5" HDD (SSD)	N/A	1
4	FILLISTR HEAD SCREW M3x0.5Px4.8mm	82-272-30005013	4

Step 4-4



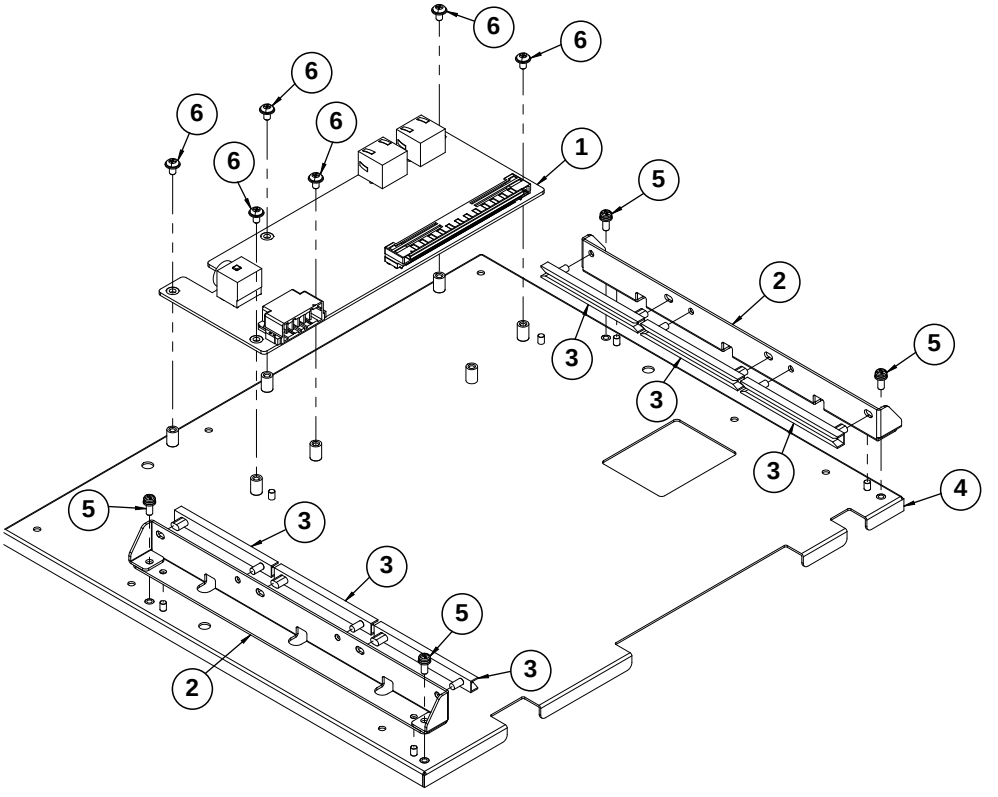
ITEM	Description	Part No.	Q'ty
1	BE-0996	BE-0996RA-D1N	1
	BE-0986RB-J0N	BE-0986RB-J0N	1
2	ROUND WASHER HEAD SCREW M3x0.5Px5mm	22-242-30005311	10
3	KS-M220 KDS BLOWER FAN (60x60x15mm)	21-004-06060401	1
4	HSF,KR-M220 Male pin Daughter Card	KR-M220-G0B-A1N	1
5	BE-0996 CPU THERMAL COPPER BLOCK (42x25x5mm)	81-002-24225001	1
	BE-0986 CPU THERMAL COPPER BLOCK (30x25x5mm)	81-002-23025001	1
6	ROUND HEAD WITH SPRING WASHER SCREW #2 / M3x0.5Px8mm	22-235-30008011	4
7	Thermal Interface Pads, K=8,15x15x1mm	81-006-81515501	1
	Thermal Interface Pads, K=11,26x12x1mm	81-006-82612002	1
8	HDD (SSD) Module	N/A	1
9	KS-M220 KDS DRAWER FRONT COVER (w/Paint)	20-204-02067482	1
10	KS-M220 KDS DRAWER TRAY	20-254-01001482	1

Step 4-5



ITEM	Description	Part No.	Q'ty
1	FLAT HEAD SCREW #1/ ϕ 5.0 / M3x0.5Px4mm,FLAT=1.1mm	22-212-30004311	4
2	KS-M220 KDS DRAWER COVER (w/Plate)	20-204-02021482	1

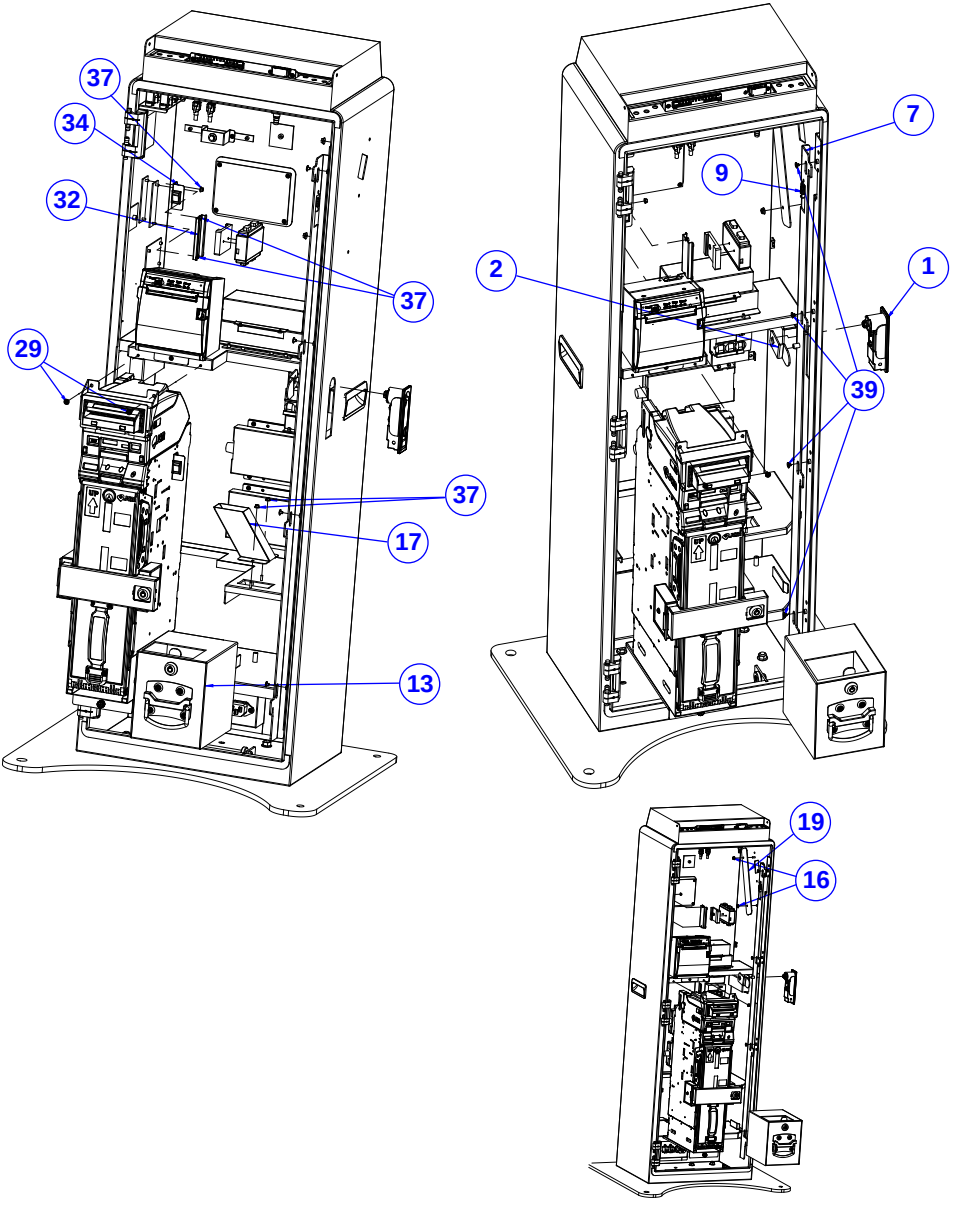
Step 4-6



ITEM	Description	Part No.	Q'ty
1	KR-M221 Female Daughter Card	KR-M221-G0B-A1N	1
2	KS-M220 KDS GUIDE RAIL SUPPORT (w/Plate)	20-202-02022482	2
3	CARD GUIDE	90-062-04200000	6
4	KS-M220 KDS DRAWER SUPPORT(w/Plate)	20-202-02021482	1
5	ROUND HEAD WITH SPRING WASHER SCREW #2 / M3x0.5Px8mm	22-235-30008011	4
6	ROUND WASHER HEAD SCREW M3x0.5Px5mm	22-242-30005311	6

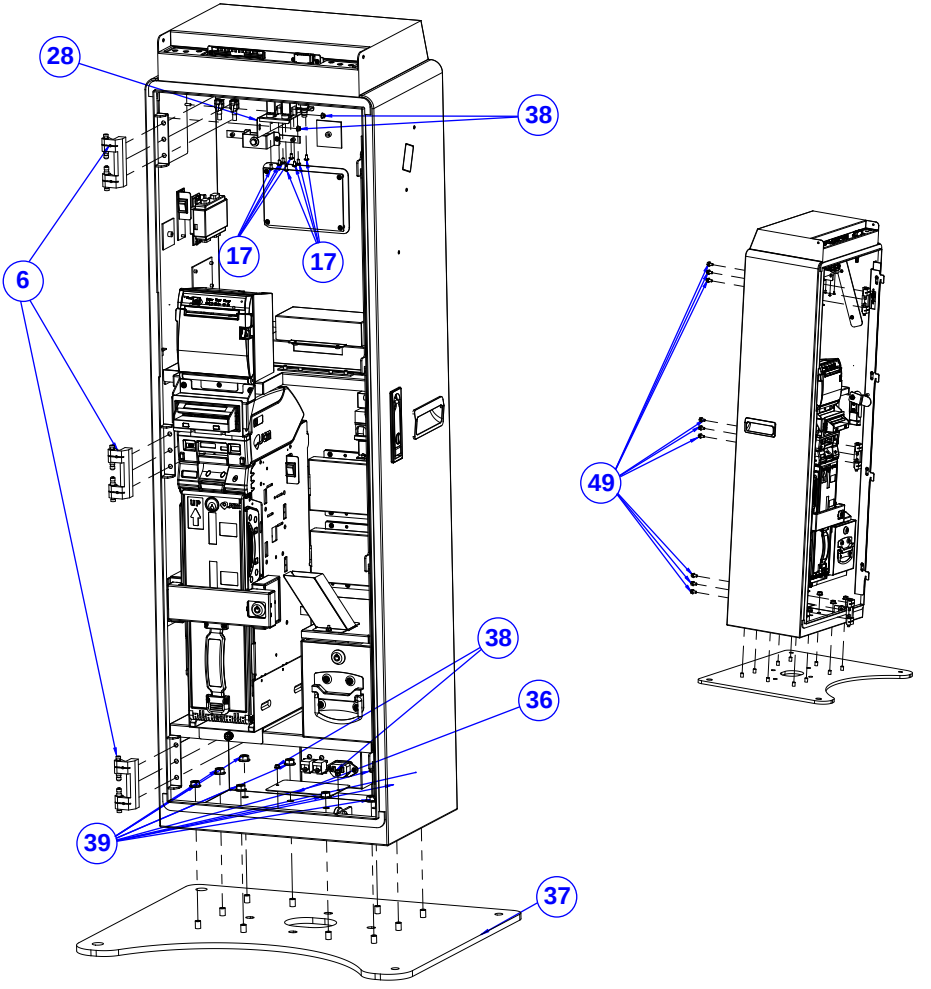
KS-M220 / KS-M221 Cash Pay Lower Parts Exploded Diagrams

KS-M220 / KS-M221 Cash Pay Body Parts Assembly Exploded Diagram (Part 1)



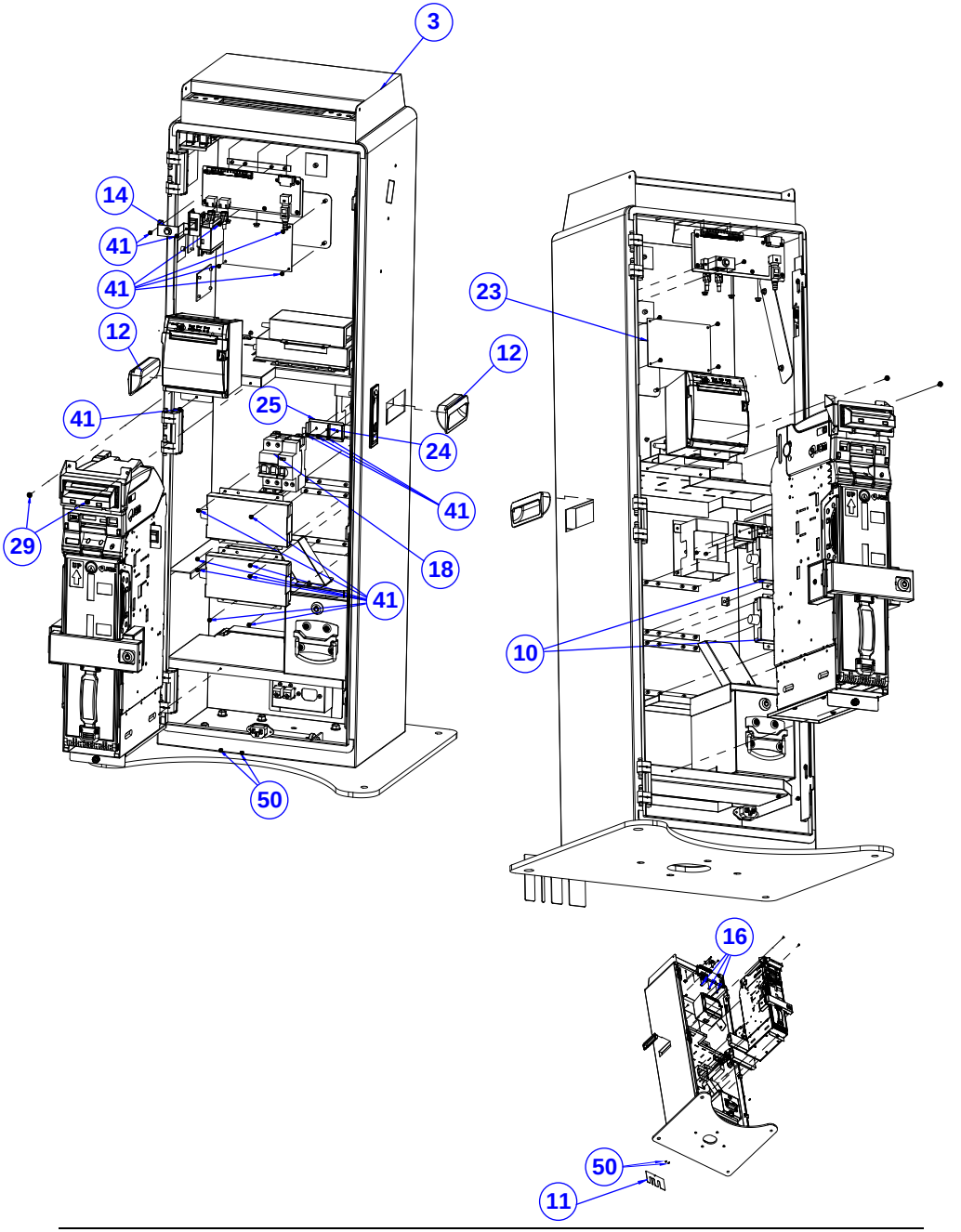
ITEM	Description	Part No.	Q'ty
1	LIFE AND TURN LATCH	20-035-35002000	1
2	KS-M220-C DOOR SHEET (w/Plate)	20-247-02022482	1
7	KS-M220-C LOCK BAR	20-208-07002482	2
9	KF-7330 PANEL LOCK SPRING(ϕ 10)	23-002-00001002	1
13	KS-C220_COIN_BOX_ASM	N/A	1
16	SLIP NUTS (M4x0.7P, H=4.5mm)	23-142-40450801	5
17	KS-M220-C DOWN COIN BOX RAIL (w/Plate)	20-240-02021482	1
19	KS-M220-C BODY COVER (w/Paint) (Black)	20-204-02115482	1
29	ROUND WASHER HEAD SCREW M4x0.7Px6mm	22-232-40006311	2
32	KS-M220-C COM RAIL	20-239-03002482	1
34	KS-M220-C POWER SWITCH BRACKET	20-206-03002482	1
37	SLIP NUTS (M3x0.5P,H=4mm)	23-142-30400801	9
39	FILLISTR HEAD SCREW #2 / M4x0.7Px4mm	22-275-40004911	4

KS-M220 / KS-M221 Cash Pay Body Parts Assembly Exploded Diagram (Part 2)



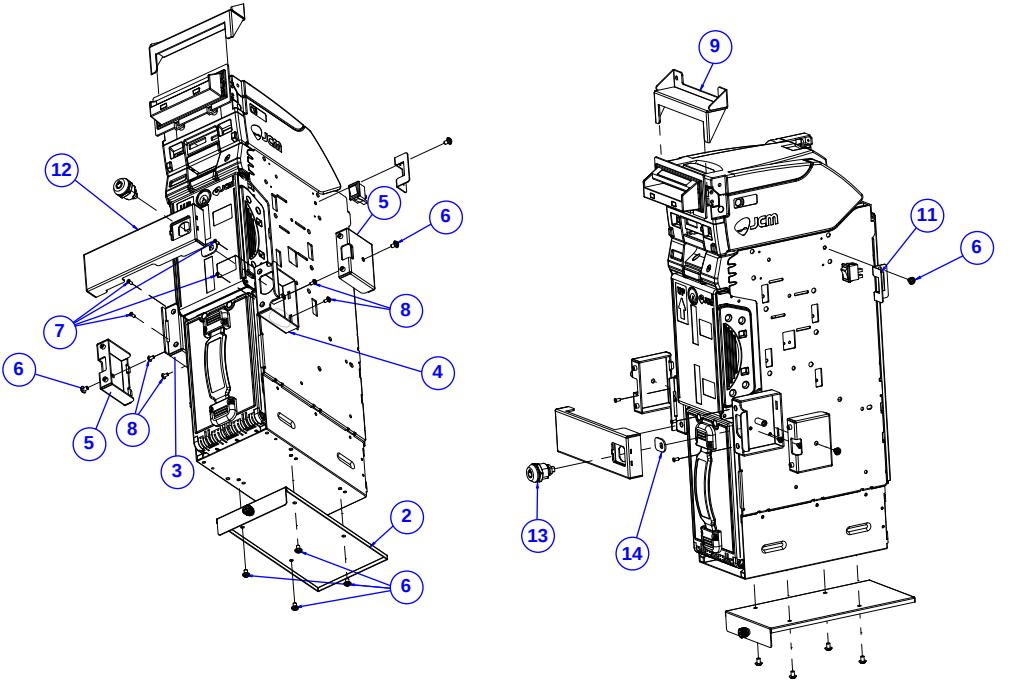
ITEM	Description	Part No.	Q'ty
6	PK-7090 CONCEALED HINGE	80-012-30001284	3
17	ROUND WASHER HEAD SCREW M3x0.5Px6mm	22-232-30006311	28
28	KS-M220-C USB CABLE BRACKET	20-206-03003482	1
36	KS-M220-C BOTTOM COVER	20-204-03001482	1
37	KS-M220-C BOTTOM PLATE (w/Paint)(Black)	20-205-02062482	1
38	SLIP NUTS (M3x0.5P, H=4mm)	23-142-30400801	9
39	SLIP NUTS (M8x1.25P, H=7.5mm)	23-142-80801201	10
49	HEX HEAD WITH SPRING WASHER SCREW #3 / M6x1.0Px12mm	22-251-60012011	9

KS-M220 / KS-M221 Cash Pay Body Parts Assembly Exploded Diagram (Part 3)



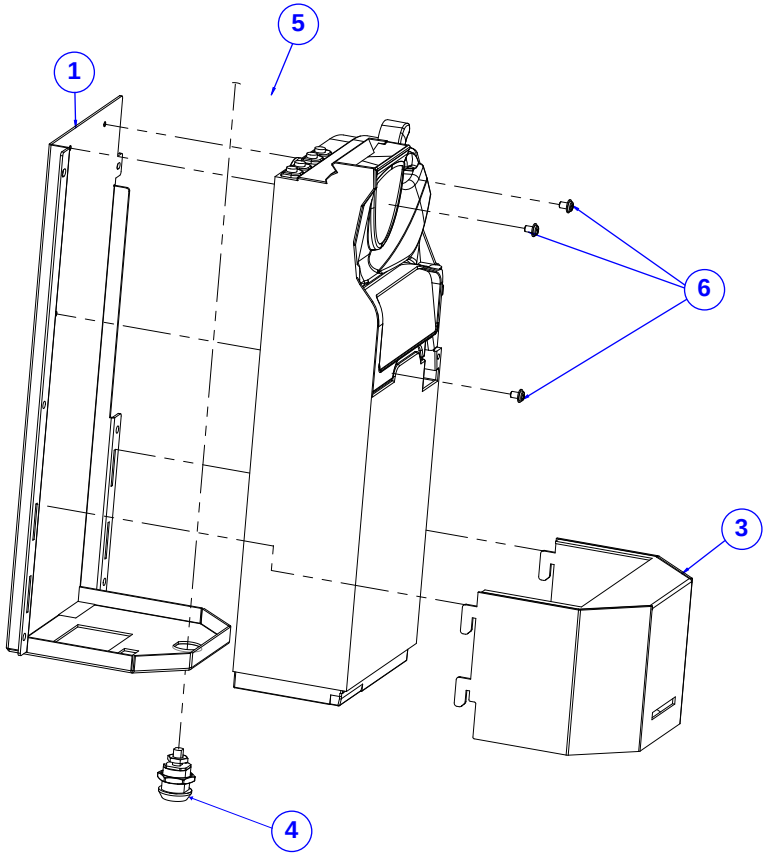
ITEM	Description	Part No.	Q'ty
3	KS-M220-C BODY SPOT CASE (w/Paint)(Black)	20-201-02064482	1
10	KS-M220 OAD BRACKET(w/Plate)	20-206-02023482	2
11	KS-M220-C AC IN BOX COVER (w/Paint)(Black)	20-204-02113482	1
12	KS-M220 FLUSH PULL (Black)	30-080-08100482	2
14	KS-M220 POWER BUTTON BRACKET(w/Plate)	20-260-02064482	1
16	SLIP NUTS (M4x0.7P,H=4.5mm)	23-142-40450801	5
18	Circuit Breaker & Residual Current Device	N/A	1
23	JYP Coin Control Board	N/A	1
24	KS-M220 BACK RAIL BLOCK	20-233-03001482	1
25	KS-M220 BACK RAIL	20-239-03001482	1
29	ROUND WASHER HEAD SCREW M4x0.7Px6mm	22-232-40006311	2
41	ROUND WASHER HEAD SCREW M3x0.5Px6mm	22-232-30006311	28
50	ROUND WASHER HEAD SCREW #2 / M3x0.5Px7mm	22-232-30007011	4

KS-M220 / KS-M221 Cash Pay Bill Acceptor Assembly Exploded Diagram



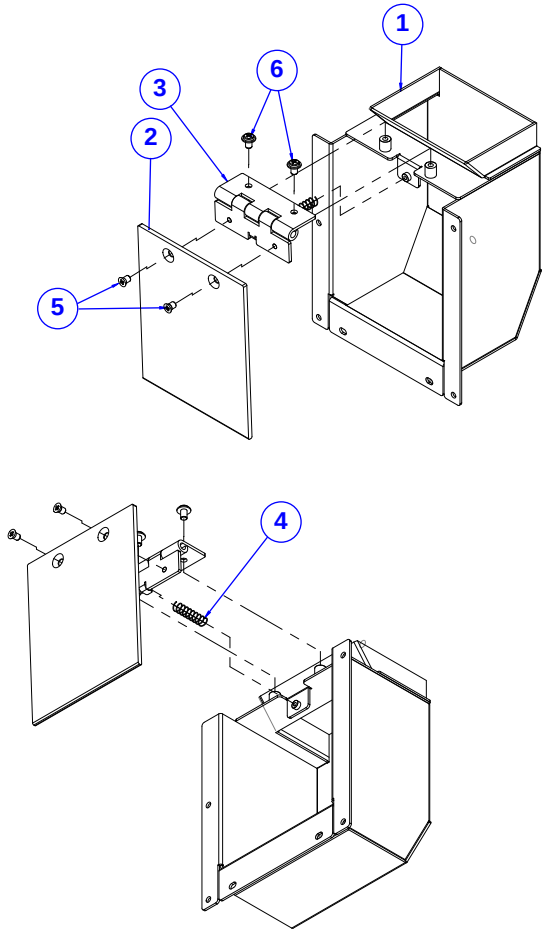
ITEM	Description	Part No.	Q'ty
2	KS-M220-C PAYOUT BRACKET-IPRO (w/Plate)	20-206-02029482	1
3	KS-M220-C IPRO SIDE BRACKET L (w/Plate)	20-206-02111482	1
4	KS-M220-C IPRO SIDE BRACKET R (w/Plate)	20-206-02028482	1
5	KS-M220-C IPRO SIDE BRACKET COVER (w/Plate)	20-206-02112482	2
6	ROUND WASHER HEAD SCREW M4x0.7Px6mm	22-232-40006311	7
7	FLAT HEAD SCREW M3x0.5Px6mm (Black)	22-215-30006111	4
8	ROUND WASHER HEAD SCREW M3x0.5Px6mm	22-232-30006311	4
9	KS-M220-C JCM HOLDER (w/Plate)	20-229-02025482	1
11	KS-M220-C POWER SWITCH BRACKET	20-206-03002482	1
12	KS-M220-C IPRO DOOR (w/Plate)	20-247-02023482	1
13	KF-7270_LOCK	20-025-35002000	1
14	KS-M220-C IPRO DOOR LOCK SHEET (w/Plate)	20-225-02021482	1

KS-M220 / KS-M221 Cash Pay Cash Flow Assembly Exploded Diagram



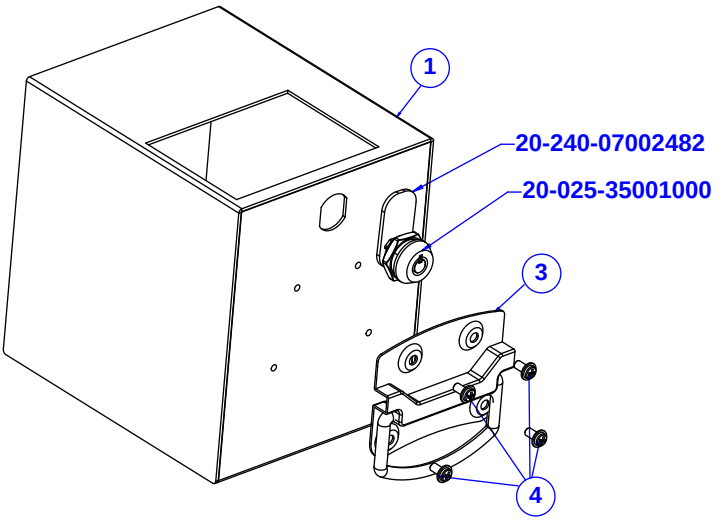
ITEM	Description	Part No.	Q'ty
1	KS-M220-C CF7900 HOLDER (w/Plate)	20-229-02023482	1
3	KS-M220-C CF7900 CLX COVER (w/Plate)	20-204-02022482	1
4	KF-7270 CAM LOCK	20-025-35002000	1
5	KS-M220-C_CF-7000_SHEET	N/A	1
6	ROUND WASHER HEAD SCREW M4x0.7Px6mm	22-232-40006311	3

KS-M220 / KS-M221 Cash Pay Change Box Assembly Exploded Diagram



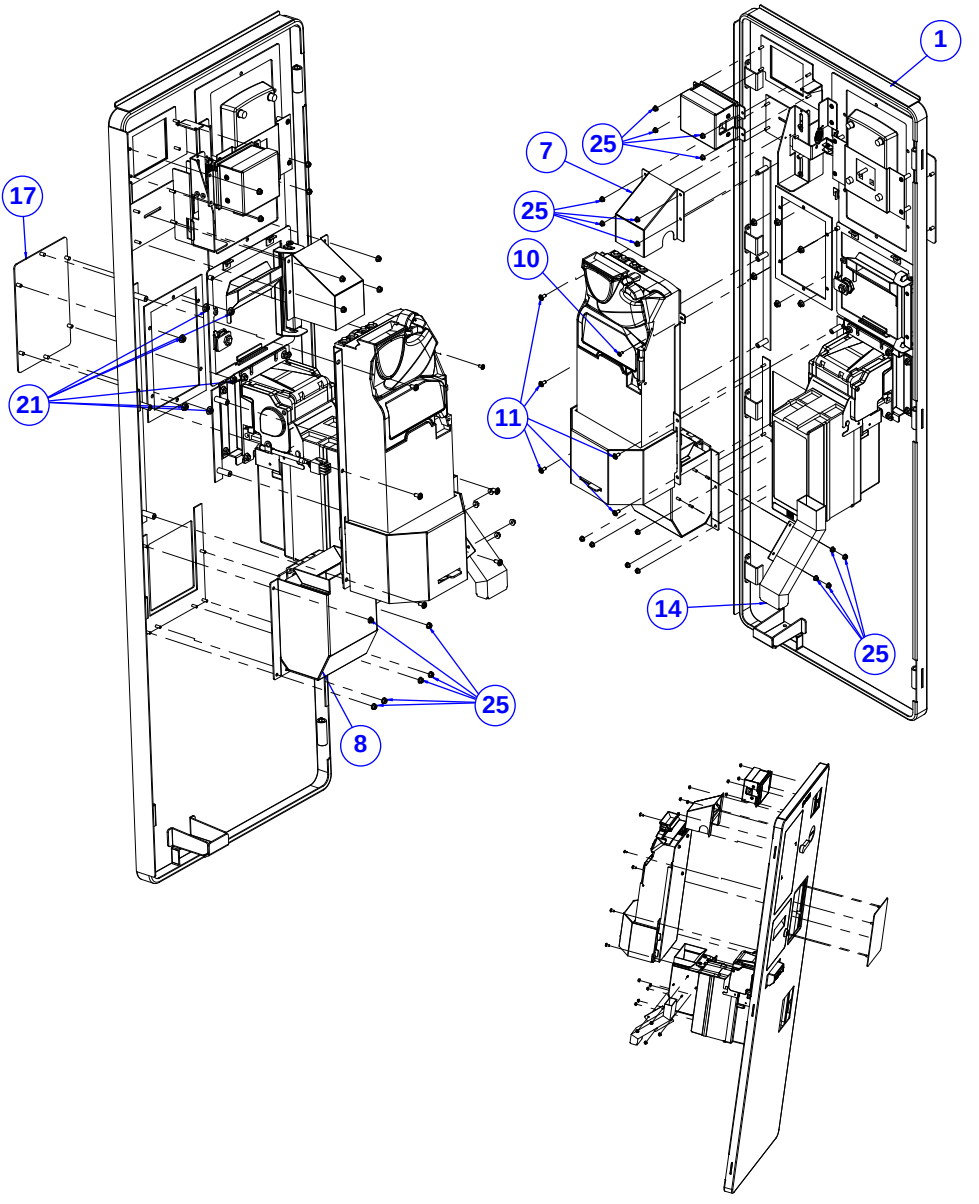
ITEM	Description	Part No.	Q'ty
1	KS-M220-C CHANGE BOX	20-240-07001482	1
2	KS-M220-C CHANGE DOOR	30-056-10130488	1
3	KF-7330 COIN DOOR HINGE	20-012-02001375	1
4	MH-5100 COMPRESSION SPRING (ϕ 6.1x25)	23-002-01000252	1
5	FLAT HEAD SCREW #2/ ϕ 6 / M4x0.7Px6mm	22-212-40006011	2
6	ROUND WASHER HEAD SCREW M4x0.7Px6mm	22-232-40006311	2

KS-M220 / KS-M221 Cash Pay Coin Box Assembly Exploded Diagram



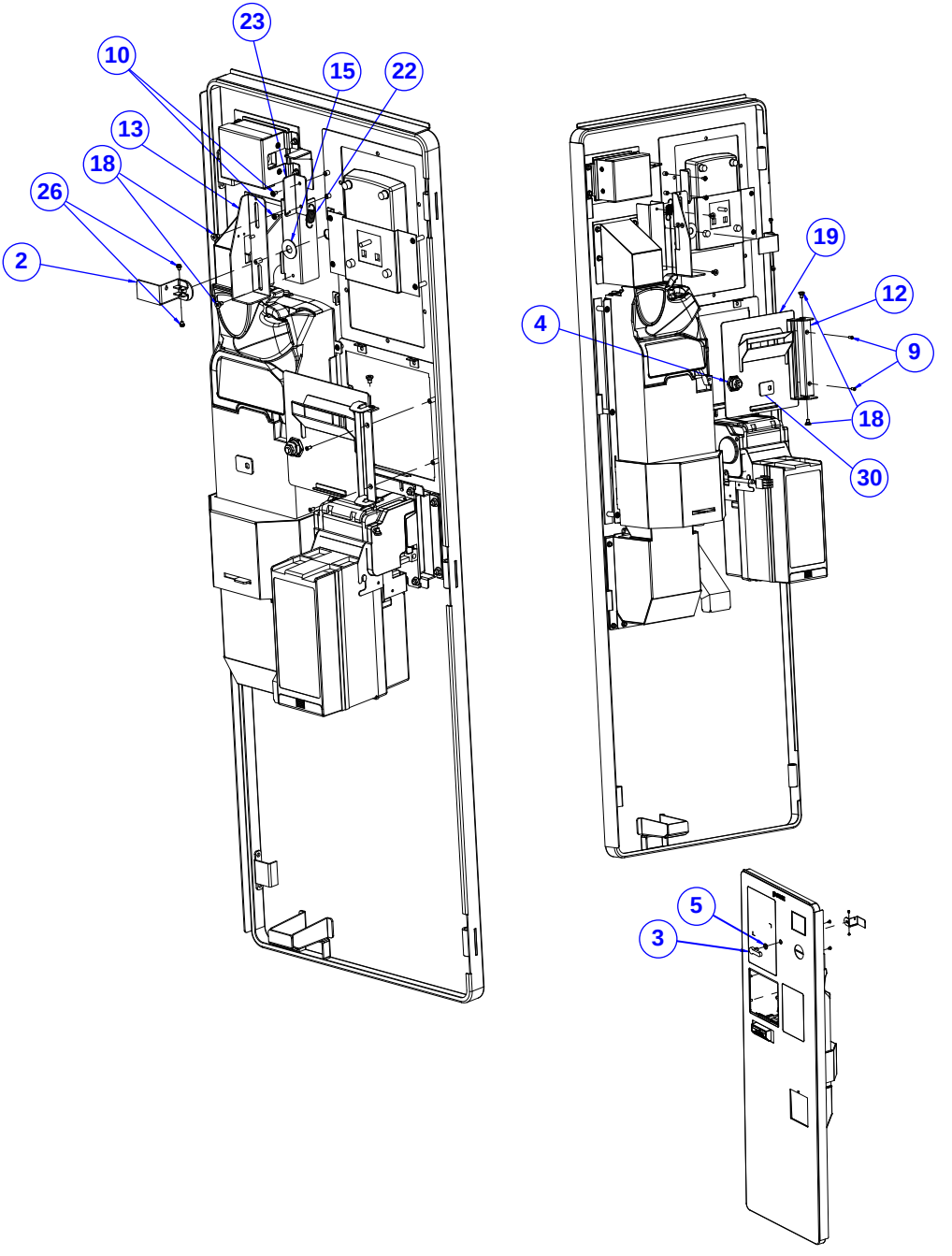
ITEM	Description	Part No.	Q'ty
1	KS-M220-C COIN BOX (w/Plate)	20-240-02023482	1
2	CAM LOCK	20-025-35004000	1
3	Lifting Handles	20-035-10001000	1
4	ROUND WASHER HEAD SCREW #2 / M4x0.7Px8mm	22-232-40008011	4

KS-M220 / KS-M221 Cash Pay Front Door Assembly Exploded Diagram (Part 1)



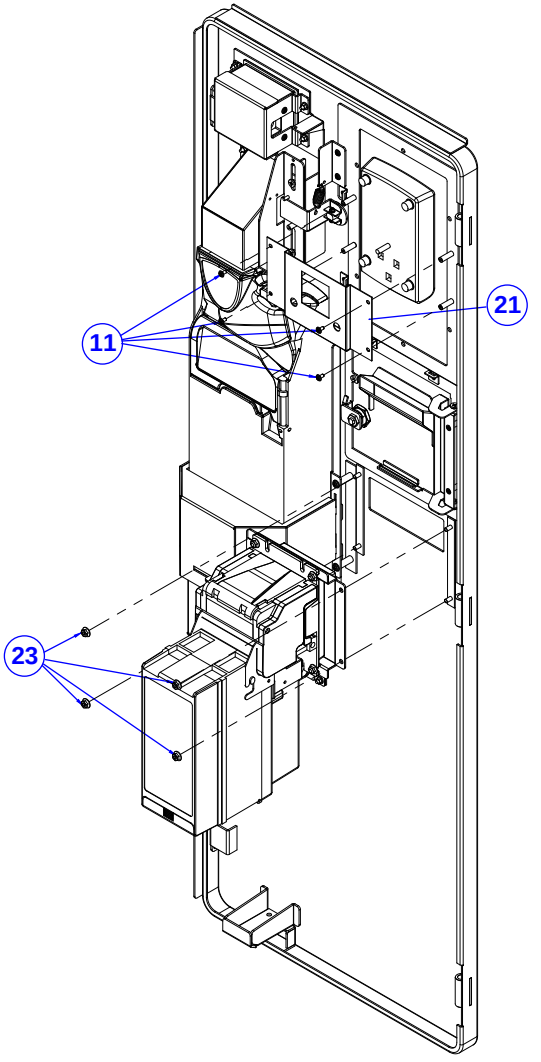
ITEM	Description	Part No.	Q'ty
1	KS-M220-C DOOR SPOT CASE (w/Paint)(Black)	20-201-02063482	1
7	KS-M220-C COIN INSERT CLX(w/Plate)	20-206-02027482	1
8	KS-C220_CHANGE_BOX_ASM	N/A	1
10	ROUND WASHER HEAD SCREW M3x0.5Px6mm	22-232-30006311	7
11	ROUND WASHER HEAD SCREW #2 / M4x0.7Px8mm	22-232-40008011	5
14	KS-M220-C TOP COIN BOX RAIL (w/Plate)	20-240-02022482	1
17	KS-M220-C IUC150 COVER (w/Paint) (Black)	20-204-02111482	1
21	SLIP NUTS (M4x0.7P,H=4.5mm)	23-142-40450801	10
25	SLIP NUTS (M3x0.5P,H=4mm)	23-142-30400801	18

KS-M220 / KS-M221 Cash Pay Front Door Assembly Exploded Diagram (Part 2)



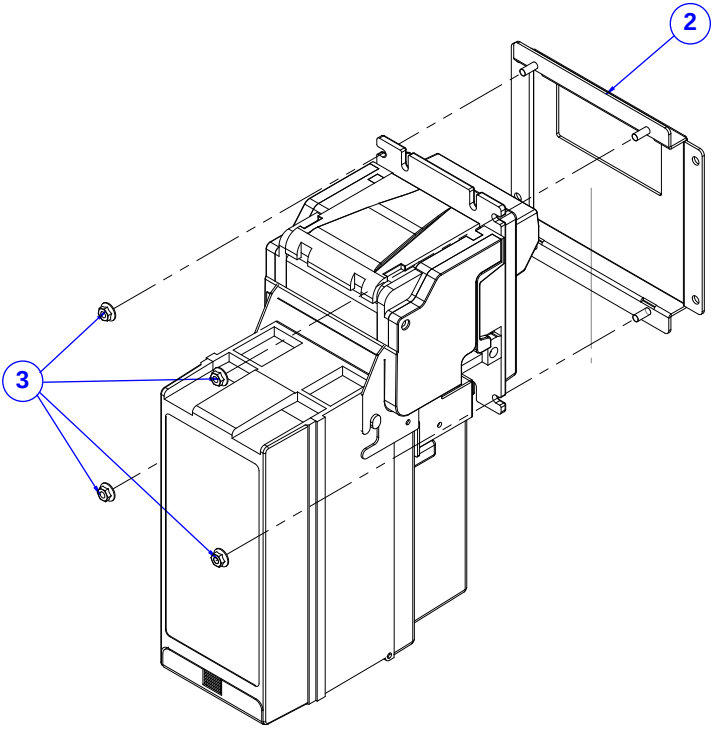
ITEM	Description	Part No.	Q'ty
2	KS-M220-C MONEY BAR SHEET (w/Plate)	20-208-02022482	1
3	KS-M220-C MONEY BAR (w/Paint) (Black)	20-208-02061482	1
4	PK-7090 CAM LOCK	20-025-30001284	1
5	WASHERS(Φ9.5x4mm)	90-041-04108000	1
9	FLAT HEAD SCREW M3x0.5Px6mm (Black)	22-215-30006111	2
10	ROUND WASHER HEAD SCREW M3x0.5Px6mm	22-232-30006311	7
12	KS-M220 HINGE BASE(w/Plate)	20-232-02021482	1
13	KS-M220-C MONEY BAR RAIL(w/Plate)	20-208-02021482	1
15	KS-M220-C MONEY BAR WASHER	20-208-07001482	1
18	FILLISTR HEAD SCREW M4x0.7Px4mm	22-272-40004911	4
19	KS-M220 PRINTER DOOR (w/Paint) (Black)	20-247-02061482	1
22	KF-7330 PANEL LOCK SPRING(ϕ10)	23-002-00001002	1
23	KS-M220-C MONEY BAR SPRING	20-208-03001482	1
26	ROUND HEAD WITH SPRING WASHER SCREW M3x0.5Px5mm	22-232-30060011	2
30	KS-M220 PRINTER DOOR SHEET	20-247-07001482	1

KS-M220 / KS-M221 Cash Pay Front Door Assembly Exploded Diagram (Part 3)



ITEM	Description	Part No.	Q'ty
11	ROUND WASHER HEAD SCREW M3x0.5Px6mm	22-232-30006311	7
21	KS-M220-C QP1000 PP(Black)	30-056-05100482	1
23	SLIP NUTS(M4x0.7P, H=4.5mm)	23-142-40450801	10

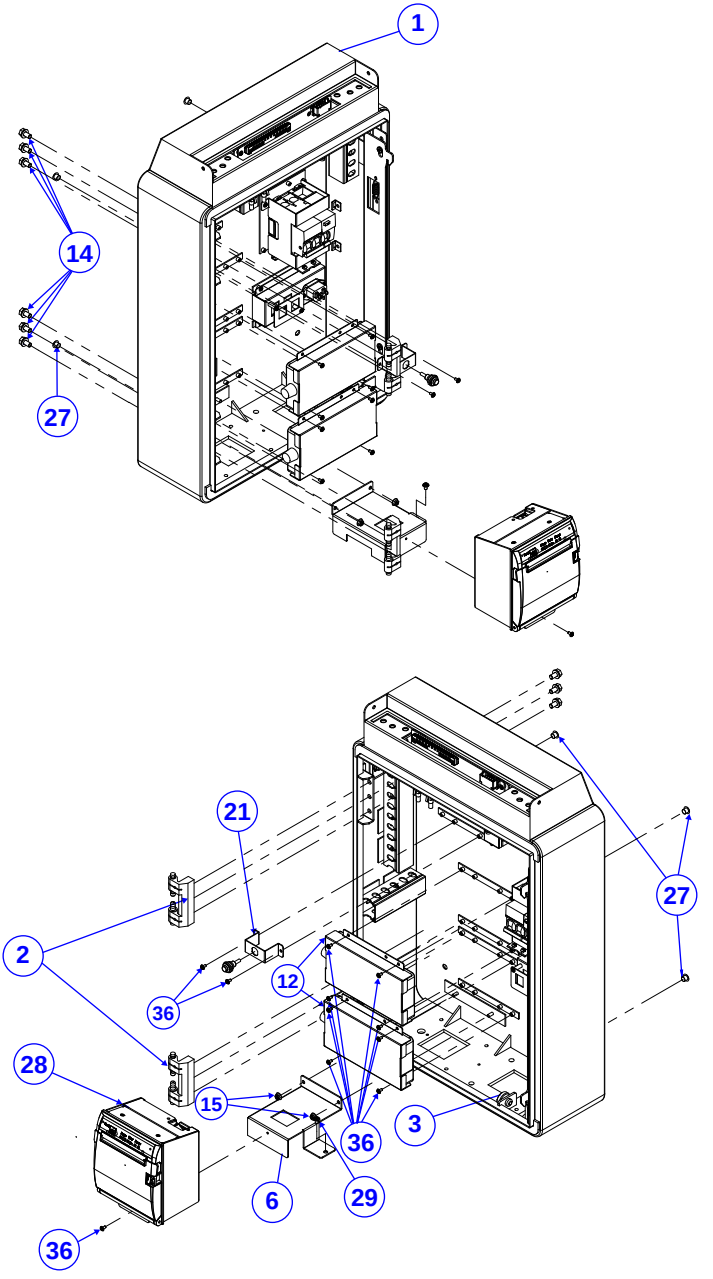
KS-M220 / KS-M221 Cash Pay L70 Assembly Exploded Diagram



ITEM	Description	Part No.	Q'ty
2	KS-M220-C L70 BRACKET (w/Paint) (Black)	20-206-02068482	1
3	SLIP NUTS (M4x0.7P, H=4.5mm)	23-142-40450801	4

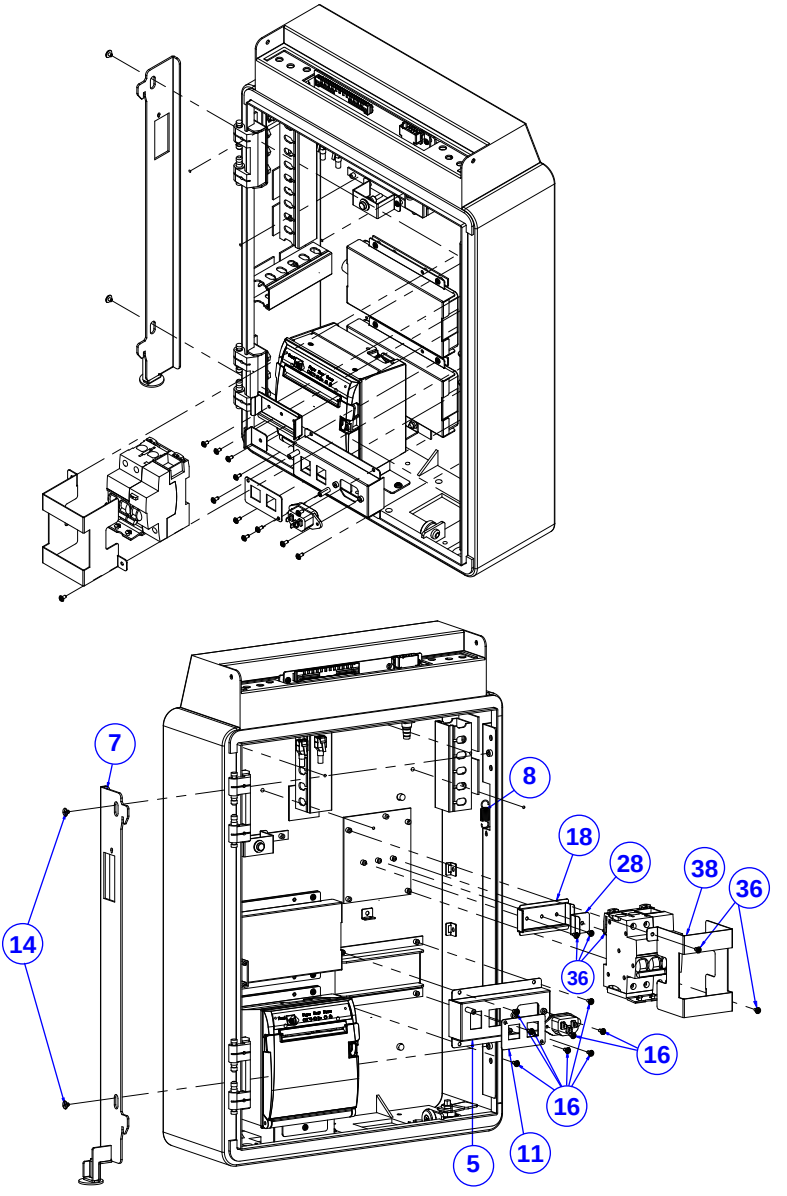
KS-M220 / KS-M221 M-Type Lower Parts Exploded Diagrams

KS-M220 / KS-M221 M-Type Lower Parts Body Assembly Exploded Diagram (Part 1)



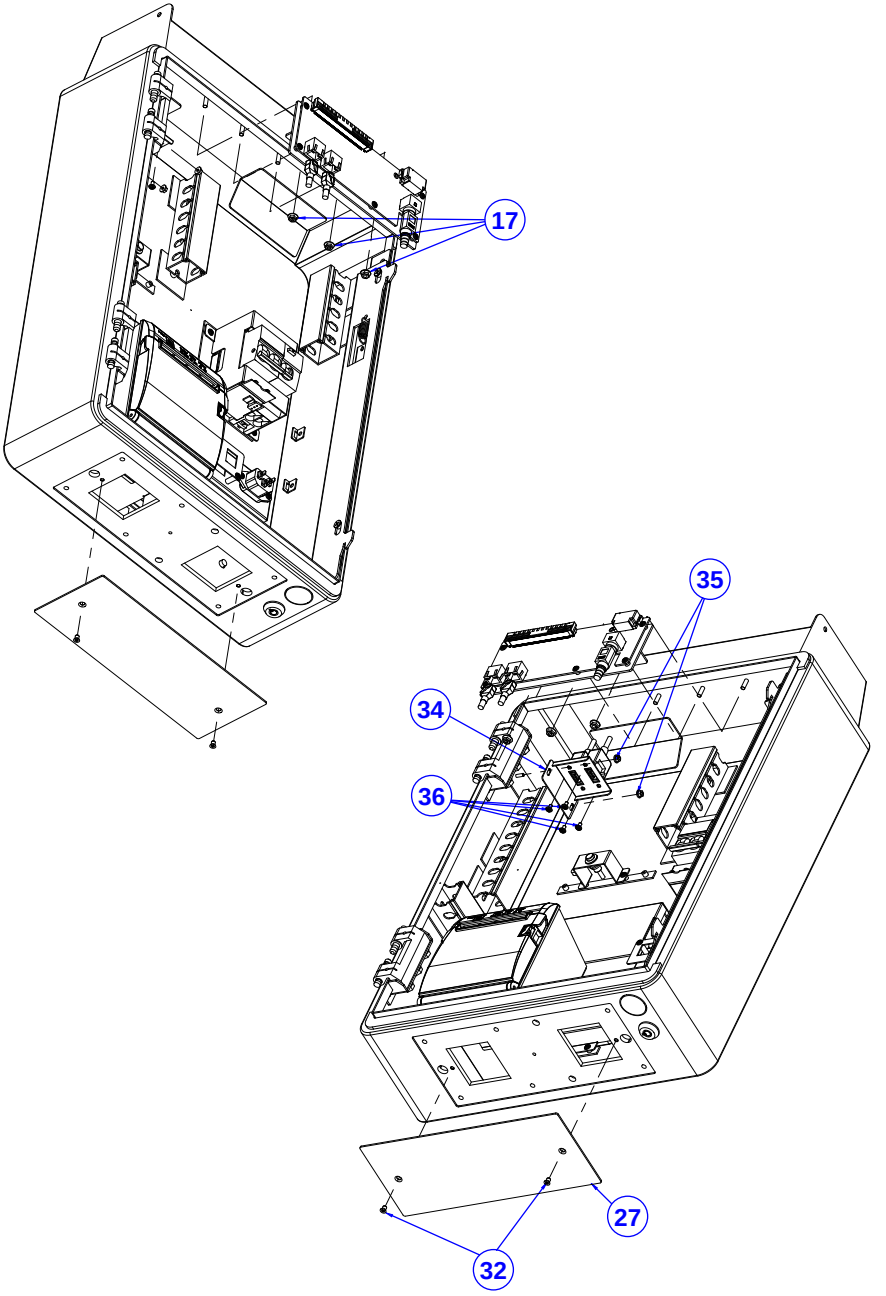
ITEM	Description	Part No.	Q'ty
1	KS-M220 BODY SPOT CASE (w/Paint)(Black)	20-201-02062482	1
2	PK-7090 CONCEALED HINGE	80-012-30001284	2
3	PK-7090 PLASTIC WHEEL M6x1.0Px7.1mm (White)	22-281-60007001	1
6	KS-M220 BODY PRINTER SUPPORT (w/Plate)	20-206-02021482	1
12	KS-M220 OAD BRACKET(w/Plate)	20-206-02023482	2
14	HEX HEAD WITH SPRING WASHER SCREW #3 / M6x1.0Px12mm	22-251-60012011	6
15	SLIP NUTS (M4x0.7P,H=4.5mm)	23-142-40450801	5
21	KS-M220 POWER BUTTON BRACKET (w/Plate)	20-260-02064482	1
27	HOLE PLUG(Φ7~7.1mm)(Black)	90-067-04300000	4
28	KS-M220_WP_ASM	N/A	1
29	ROUND WASHER HEAD SCREW M4x0.7Px6mm	22-232-40006311	1
36	ROUND WASHER HEAD SCREW M3x0.5Px6mm	22-232-30006311	20

KS-M220 / KS-M221 M-Type Lower Parts Body Assembly Exploded Diagram (Part 2)



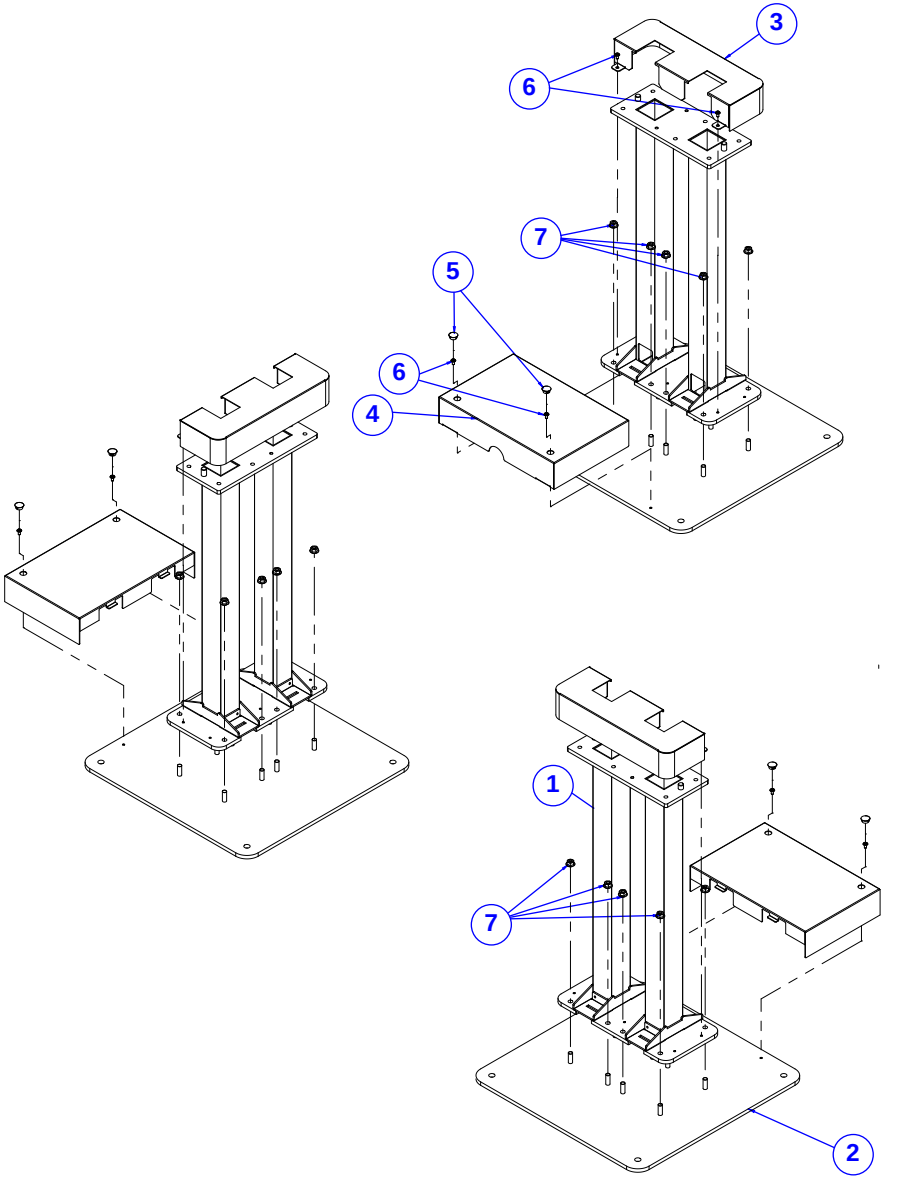
ITEM	Description	Part No.	Q'ty
5	KS-M220 AC IN BOX(w/Paint)(Black)	20-240-02061482	1
7	KS-M220 LOCK BAR	20-225-07001482	1
8	KF-7330 PANEL LOCK SPRING(ϕ 10)	23-002-00001002	1
11	KS-M220 RJ45 COVER (w/Plate)	20-204-02064482	1
14	FILLISTR HEAD SCREW #2 / M4x0.7Px4mm	22-275-40004911	2
16	ROUND WASHER HEAD SCREW #2 / M3x0.5Px7mm	22-232-30007011	8
18	KS-M220 BACK RAIL	20-239-03001482	1
28	KS-M220 BACK RAIL BLOCK	20-233-03001482	1
36	ROUND WASHER HEAD SCREW M3x0.5Px6mm	22-232-30006311	20
38	KS-M220 BREAKER COVER	20-204-03002482	1

KS-M220 / KS-M221 M-Type Lower Parts Body Assembly Exploded Diagram (Part 3)



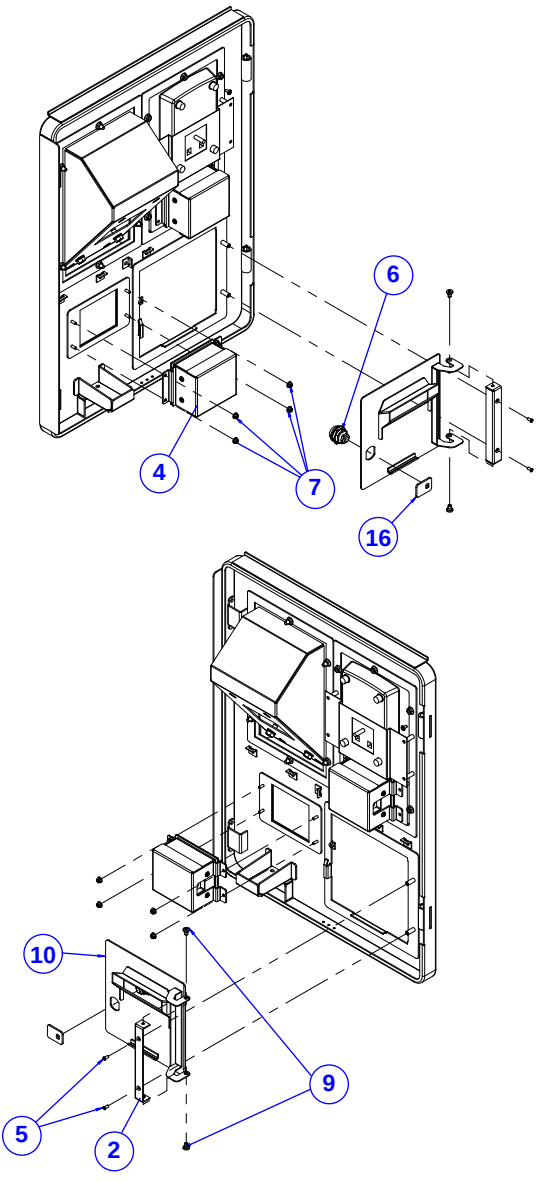
ITEM	Description	Part No.	Q'ty
17	SLIP NUTS (M4x0.7P,H=4.5mm)	23-142-40450801	5
27	KS-M220 BODY BOTTOM BRACKET (w/Paint)(Black)	20-206-02063482	1
32	FLAT HEAD SCREW M4x0.7Px6mm (Black)	22-215-40006911	2
34	KS-M220 USB CABLE BRACKET	20-206-03004482	1
35	SLIP NUTS (M3x0.5P,H=4mm)	23-142-30400801	2
36	ROUND WASHER HEAD SCREW M3x0.5Px6mm	22-232-30006311	20

KS-M220 / KS-M221 M-Type Lower Parts Base Assembly Exploded Diagram



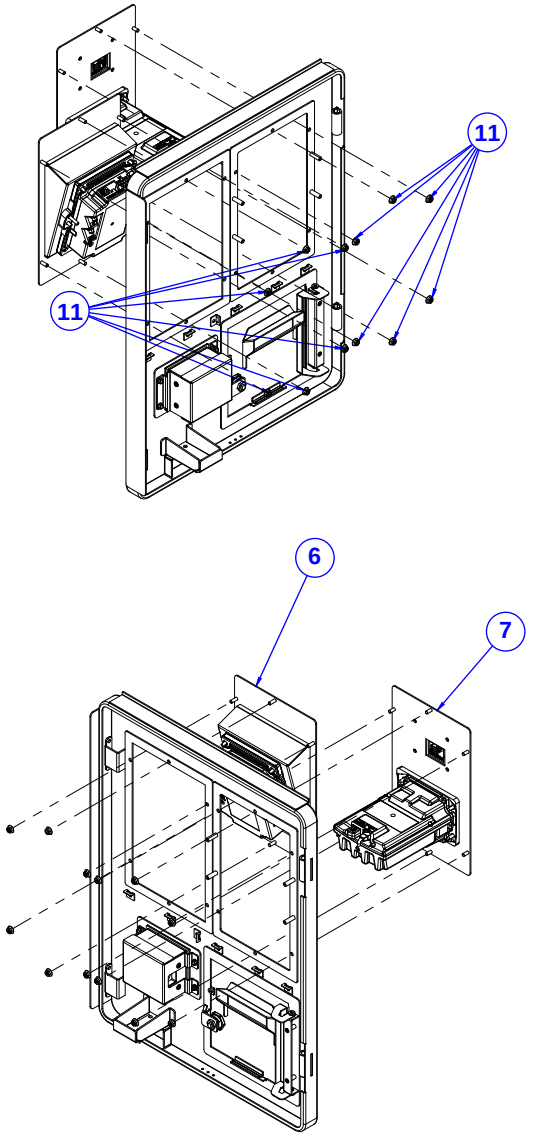
ITEM	Description	Part No.	Q'ty
1	KS-M220 TUBE(w/Paint)(Silver)	20-223-02061482	1
2	KS-M220 BASE PLATE(w/Paint)(Silver)	20-205-02061482	1
3	KS-M220 BASE FRONT COVER (w/Paint)(Silver)	20-204-02066482	1
4	KS-M220 BASE BACK COVER (w/Paint)(Silver)	20-204-02065482	1
5	HOLE PLUG (Φ12.7~13mm)(Black)	30-054-04100008	2
6	ROUND WASHER HEAD SCREW #2 / M4x0.7Px8mm	22-232-40008011	4
7	SLIP NUTS(M8x1.25P, H=7.5mm)	23-142-80801201	8

KS-M220 / KS-M221 M-Type Lower Parts Printer Door Assembly Exploded Diagram (Part 1)



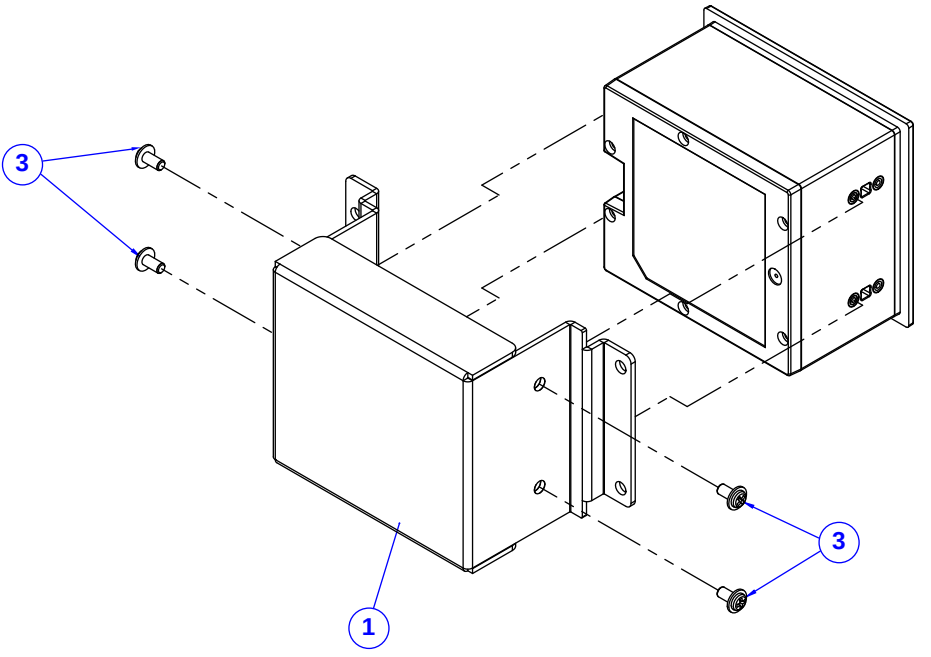
ITEM	Description	Part No.	Q'ty
2	KS-M220 HINGE BASE(w/Plate)	20-232-02021482	1
4	N/A	N/A	2
5	FLAT HEAD SCREW M3x0.5Px6mm (Black)	22-215-30006111	2
6	PK-7090 CAM LOCK	20-025-30001284	1
7	SLIP NUTS (M3x0.5P,H=4mm)	23-142-30400801	4
9	FILLISTR HEAD SCREW M4x0.7Px4mm	22-272-40004911	2
10	KS-M220 PRINTER DOOR (w/Paint)(Black)	20-247-02061482	1
16	KS-M220 PRINTER DOOR SHEET	20-247-07001482	1

KS-M220 / KS-M221 M-Type Lower Parts Printer Door Assembly Exploded Diagram (Part 2)



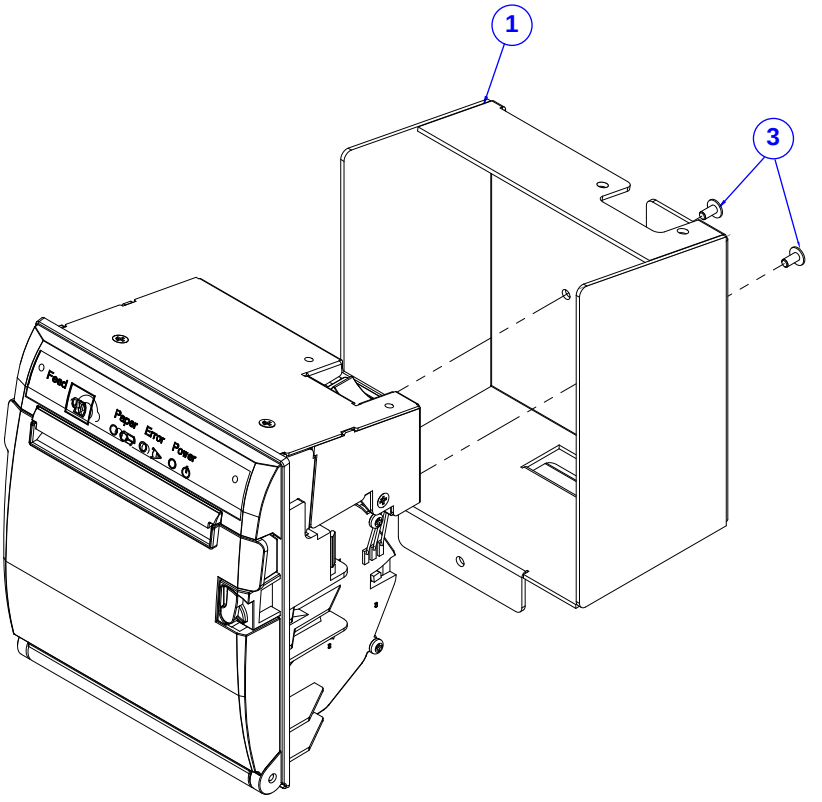
ITEM	Description	Part No.	IUR150+IUP250/ Q'ty
6	KS-M220 IUP250 BRACKET (w/Paint)(Black)	20-260-02062482	1
7	KS-M220 IUC150 IUR250 BRACKET(w/Paint)(Black)	20-260-02061482	1
11	SLIP NUTS (M4x0.7P, H=4.5mm)	23-142-40450801	12
12	KS-M220 PRINTER DOOR SHEET	20-247-07001482	1

KS-M220 / KS-M221 M-Type FM3080 Unit Assembly Exploded Diagram



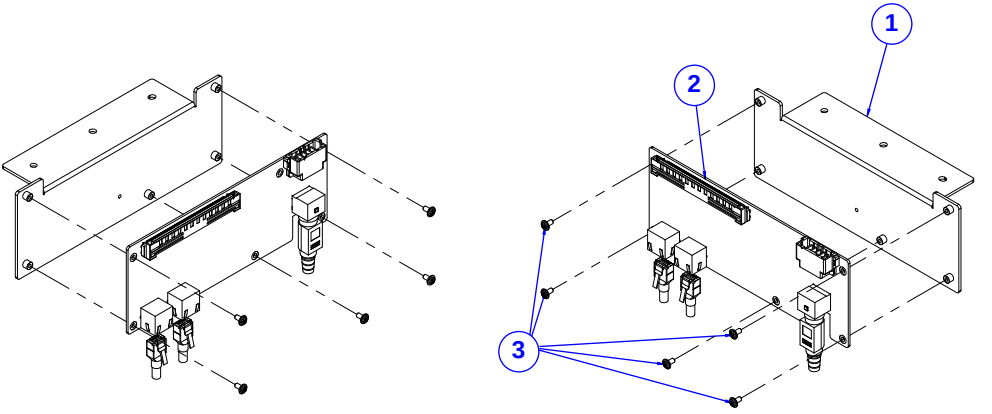
ITEM	Description	Part No.	Q'ty
1	KS-M220 FM3080 HOLDER (w/Plate)	20-229-02021482	1
3	ROUND WASHER HEAD SCREW M3x0.5Px6mm	22-232-30006311	4

KS-M220 / KS-M221 M-Type WP Assembly Exploded Diagram



ITEM	Description	Part No.	Q'ty
1	KS-M220 PRINTER HOLDER(w/Plate)	20-229-02022482	1
3	ROUND WASHER HEAD SCREW M3x0.5Px6mm	22-232-30006311	2

KS-M220 / KS-M221 M-Type Connecting Board Assembly Exploded Diagram



ITEM	Description	Part No.	Q'ty
1	KS-M220 KR-1221 HOLDER	20-229-07001482	1
2	Connecting Board	N/A	1
3	ROUND WASHER HEAD SCREW M3x0.5Px6mm	22-232-30006311	5

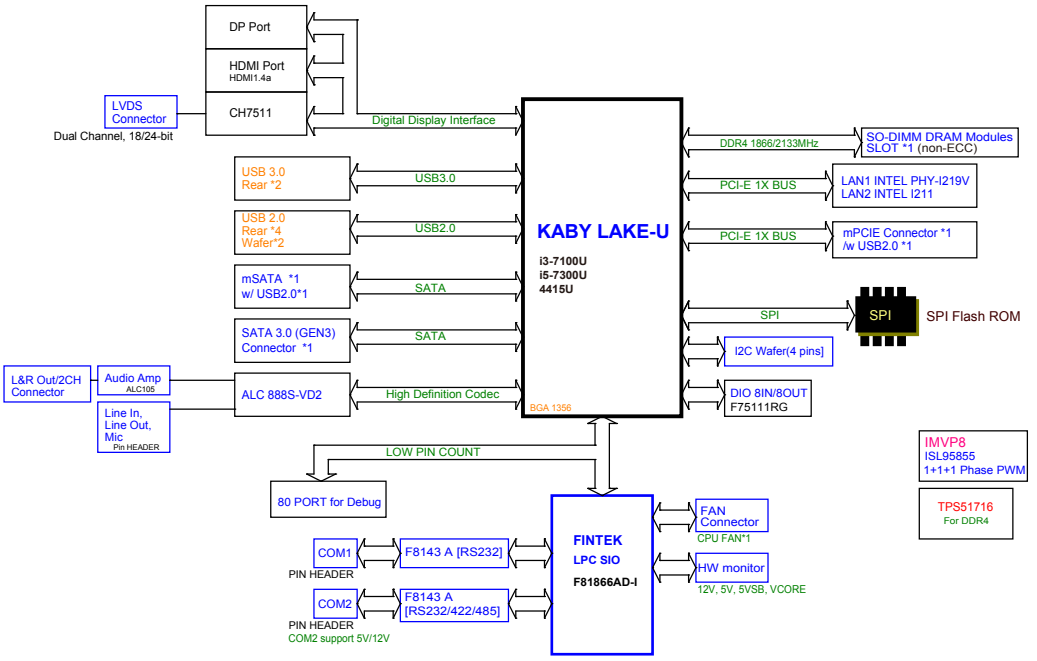
Appendix B Technical Summary

This appendix will give you a brief introduction of the allocation maps for KS-M220 / KS-M221 resources.

The following topics are included:

- BE-0996 M/B Block Diagram
- BE-0986 M/B Block Diagram
- Interrupt Map
- I/O Map
- Memory Map
- Configuring WatchDog Timer
- Flash BIOS Update

Technical Summary for KS-M220 High-End Level System BE-0996 M/B Block Diagram



Interrupt Map

IRQ	Assignment
IRQ 0	System timer
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 8	System CMOS/real time clock
IRQ 14	Motherboard resources
IRQ 16	Intel(R) Serial IO I2C Host Controller - 9D60
IRQ 16	High Definition Audio Controller
IRQ 20	Intel(R) Serial IO UART Host Controller - 9D27
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 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	Assignment
IRQ 84	Microsoft ACPI-Compliant System
IRQ 85	Microsoft ACPI-Compliant System
IRQ 86	Microsoft ACPI-Compliant System
IRQ 87	Microsoft ACPI-Compliant System
IRQ 88	Microsoft ACPI-Compliant System
IRQ 89	Microsoft ACPI-Compliant System
IRQ 90	Microsoft ACPI-Compliant System
IRQ 91	Microsoft ACPI-Compliant System
IRQ 92	Microsoft ACPI-Compliant System
IRQ 93	Microsoft ACPI-Compliant System
IRQ 94	Microsoft ACPI-Compliant System
IRQ 95	Microsoft ACPI-Compliant System
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IRQ 97	Microsoft ACPI-Compliant System
IRQ 98	Microsoft ACPI-Compliant System
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IRQ 111	Microsoft ACPI-Compliant System
IRQ 112	Microsoft ACPI-Compliant System
IRQ 113	Microsoft ACPI-Compliant System
IRQ 114	Microsoft ACPI-Compliant System
IRQ 115	Microsoft ACPI-Compliant System
IRQ 116	Microsoft ACPI-Compliant System
IRQ 117	Microsoft ACPI-Compliant System
IRQ 118	Microsoft ACPI-Compliant System
IRQ 119	Microsoft ACPI-Compliant System
IRQ 120	Microsoft ACPI-Compliant System
IRQ 121	Microsoft ACPI-Compliant System
IRQ 122	Microsoft ACPI-Compliant System

IRQ	Assignment
IRQ 123	Microsoft ACPI-Compliant System
IRQ 124	Microsoft ACPI-Compliant System
IRQ 125	Microsoft ACPI-Compliant System
IRQ 126	Microsoft ACPI-Compliant System
IRQ 127	Microsoft ACPI-Compliant System
IRQ 128	Microsoft ACPI-Compliant System
IRQ 129	Microsoft ACPI-Compliant System
IRQ 130	Microsoft ACPI-Compliant System
IRQ 131	Microsoft ACPI-Compliant System
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IRQ	Assignment
IRQ 162	Microsoft ACPI-Compliant System
IRQ 163	Microsoft ACPI-Compliant System
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IRQ	Assignment
IRQ 201	Microsoft ACPI-Compliant System
IRQ 202	Microsoft ACPI-Compliant System
IRQ 203	Microsoft ACPI-Compliant System
IRQ 204	Microsoft ACPI-Compliant System
IRQ 256	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
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IRQ 510	Microsoft ACPI-Compliant System
IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967286	Intel(R) Management Engine Interface
IRQ 4294967287	Intel(R) Ethernet Connection I219-V
IRQ 4294967288	Intel(R) HD Graphics 620
IRQ 4294967289	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967290	Intel(R) I211 Gigabit Network Connection
IRQ 4294967291	Intel(R) I211 Gigabit Network Connection
IRQ 4294967292	Intel(R) I211 Gigabit Network Connection
IRQ 4294967293	Intel(R) I211 Gigabit Network Connection
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
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000070-0x00000070	Motherboard resources
0x00000070-0x00000070	System CMOS/real time clock
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

I/O Map	Assignment
0x000000BC-0x000000BD	Programmable interrupt controller
0x000002F8-0x000002FF	Communications Port (COM2)
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
0x0000E000-0x0000EFFF	Mobile Intel(R) Processor Family I/O PCI Express Root Port #4 - 9D13
0x0000F000-0x0000F03F	Intel(R) HD Graphics 620
0x0000F040-0x0000F05F	Mobile Intel(R) Processor Family I/O SMBUS - 9D23
0x0000F060-0x0000F07F	Standard SATA AHCI Controller
0x0000F080-0x0000F083	Standard SATA AHCI Controller
0x0000F090-0x0000F097	Standard SATA AHCI Controller
0x0000FF00-0x0000FFFE	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources

Memory Map

Memory Map	Assignment
0xDE000000-0xDEFFFFFF	Intel(R) HD Graphics 620
0xC0000000-0xCFFFFFFF	Intel(R) HD Graphics 620
0xFF000000-0xFFFFFFFF	Legacy device
0xFF000000-0xFFFFFFFF	Motherboard resources
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
0xDFFE0000-0xDFFFFFFF	Motherboard resources
0xFE029000-0xFE029FFF	Motherboard resources
0xFE028000-0xFE028FFF	Motherboard resources
0xFDAF0000-0xFDAFFFFF	Motherboard resources
0xFDAE0000-0xFDAEFFFF	Motherboard resources
0xFDAC0000-0xFDACFFFF	Motherboard resources
0xFE034000-0xFE034FFF	Intel(R) Serial IO UART Host Controller - 9D27
0xDFFC0000-0xDFFDFFFF	Intel(R) Ethernet Connection I219-V
0xFED00000-0xFED003FF	High precision event timer
0xFD000000-0xFDABFFFF	Motherboard resources
0xFD000000-0xFDABFFFF	PCI Express Root Complex
0xFDAD0000-0xFDADFFFF	Motherboard resources
0xFDB00000-0xFDFFFFFF	Motherboard resources

Memory Map	Assignment
0xFE000000-0xFE01FFFF	Motherboard resources
0xFE036000-0xFE03BFFF	Motherboard resources
0xFE03D000-0xFE3FFFFF	Motherboard resources
0xFE410000-0xFE7FFFFF	Motherboard resources
0xFE03C000-0xFE03CFFF	Intel(R) Serial IO I2C Host Controller - 9D60
0xFE030000-0xFE033FFF	High Definition Audio Controller
0xFE400000-0xFE40FFFF	High Definition Audio Controller
0x90000000-0xDFFFFFFF	PCI Express Root Complex
0xFE035000-0xFE035FFF	Intel(R) Management Engine Interface
0xFED40000-0xFED44FFF	Trusted Platform Module 2.0
0xDF130000-0xDF13FFFF	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
0xDF14A000-0xDF14A0FF	Mobile Intel(R) Processor Family I/O SMBUS - 9D23
0xDF000000-0xDF01FFFF	Intel(R) I211 Gigabit Network Connection
0xDF000000-0xDF01FFFF	Mobile Intel(R) Processor Family I/O PCI Express Root Port #4 - 9D13
0xDF020000-0xDF023FFF	Intel(R) I211 Gigabit Network Connection
0xDF150000-0xDF150FFF	Mobile Intel(R) Processor Family I/O Thermal subsystem - 9D31
0xDF148000-0xDF149FFF	Standard SATA AHCI Controller
0xDF14D000-0xDF14D0FF	Standard SATA AHCI Controller
0xDF14C000-0xDF14C7FF	Standard SATA AHCI Controller
0xA0000-0xBFFFF	PCI Express Root Complex
0xC0000-0xC3FFF	PCI Express Root Complex
0xC4000-0xC7FFF	PCI Express Root Complex
0xC8000-0xCBFFF	PCI Express Root Complex
0xCC000-0xCFFFF	PCI Express Root Complex

Memory Map	Assignment
0xD0000-0xD3FFF	PCI Express Root Complex
0xD4000-0xD7FFF	PCI Express Root Complex
0xD8000-0xDBFFF	PCI Express Root Complex
0xDC000-0xDFFFF	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

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 F81866 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 the watchdog timer and set the 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 ----------------------------------
mov     al,     030h
out     dx,     al
inc     dx
mov     al,     01h
out     dx,     al
; ------------------------- Set timeout interval as 30 seconds --------------------------
dec     dx
mov     al,     0F6h
out     dx,     al
inc     dx
mov     al,     1Eh
out     dx,     al
;------------------------------ Enable Watch PME-------------------------------------------
dec     dx
mov     al,     0FAh
out     dx,     al
inc     dx
in      al,     dx
or      al,     51h
out     dx,     al
;------------------- Set second as counting unit and start counting ---------------------
dec     dx
mov     al,     0F5h
out     dx,     al
inc     dx
in      al,     dx
and     al,     0F7h
or      al,     20h
out     dx,     al
;---------------------------- Exit the extended function mode -----------------------------
dec     dx
mov     al,     0AAh
out     dx,     al
```

Flash BIOS Update

I. Prerequisites

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

2 Download and save the BIOS file (e.g. E9961PU2.bin) to the storage device.

3 Copy AMI flash utility – AFUEFIx64.exe (v5.12.02) into the storage device. The utility and BIOS file should be saved to the same path

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

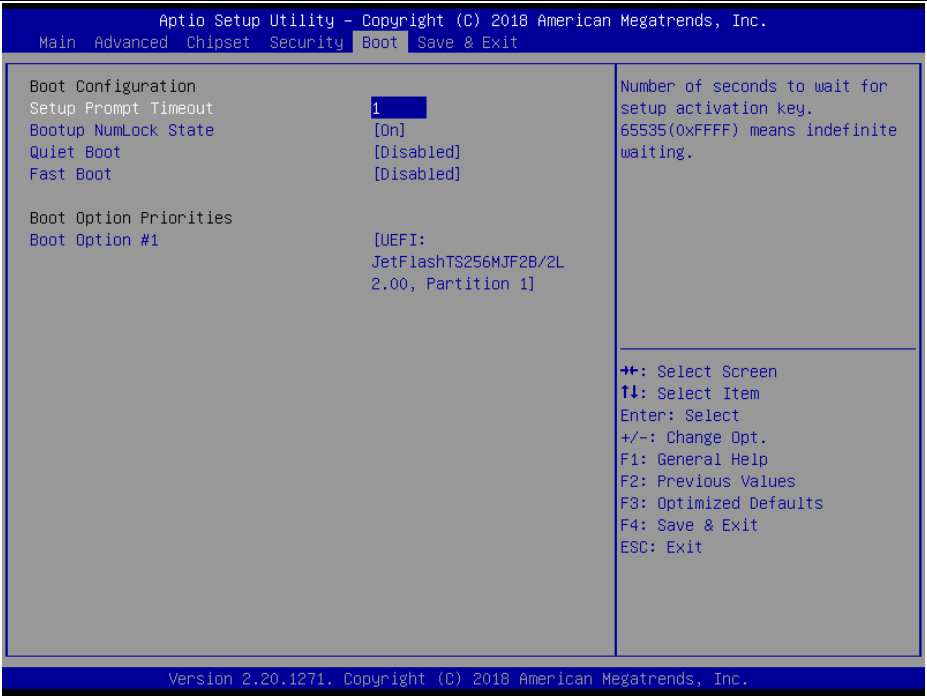
(1) Connect the USB storage device.

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

(3) The system will go into the BIOS setup menu.

(4) Select **[Boot]** menu and set the USB storage device as the 1st boot device.

(5) Press **<F4>** key to save the configuration and restart the system to boot into EFI Shell environment.



II. AFUEFIx64 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 and change to the path where you put BIOS image and AFUEFIx64.

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

2 **"AFUEFIx64 E9961Pxx.bin /p /b /n /x"** and press enter to start the flash procedure. (xx means the BIOS revision part, e.g. U2…)

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

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

```
fs0:\afuefix64> AFUEFIx64 E9961PU2.bin /p /b /n /x
+--------------------------------------------------------------------+
|              AMI Firmware Update Utility v5.12.02.2028             |
|    Copyright (C) 1985-2019, American Megatrends International LLC. |
|        All Rights Reserved. Sublect to AMI licensing agreement.    |
+--------------------------------------------------------------------+
   Reading flash ............. done
   - ME Data Size Checking. ok
   - FFS checksums ........ ok
   - Check RomLayout ...... 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:\afuefix64>
```

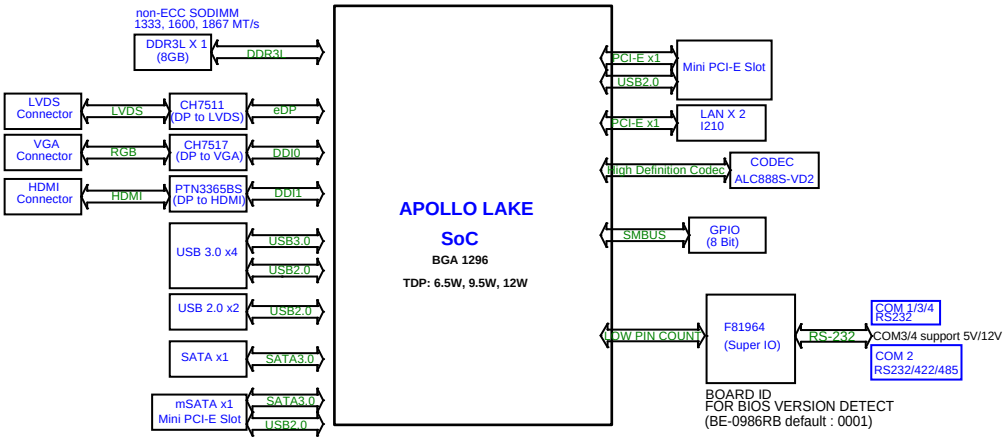
5 Restart the system and boot up with the new BIOS configurations.

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.

Technical Summary for KS-M221 Entry Level System

BE-0986 M/B Block Diagram



Interrupt Map

IRQ	Assignment
IRQ 0	System timer
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 7	Communications Port (COM3)
IRQ 8	System CMOS/real time clock
IRQ 10	Communications Port (COM4)
IRQ 25	High Definition Audio Controller
IRQ 27	Intel(R) Serial IO I2C Host Controller - 5AAC
IRQ 54	Microsoft ACPI-Compliant System
IRQ 55	Microsoft ACPI-Compliant System
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IRQ	Assignment
IRQ 80	Microsoft ACPI-Compliant System
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IRQ	Assignment
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IRQ	Assignment
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IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967277	Intel(R) I210 Gigabit Network Connection #2
IRQ 4294967278	Intel(R) I210 Gigabit Network Connection #2
IRQ 4294967279	Intel(R) I210 Gigabit Network Connection #2
IRQ 4294967280	Intel(R) I210 Gigabit Network Connection #2

IRQ	Assignment
IRQ 4294967281	Intel(R) I210 Gigabit Network Connection #2
IRQ 4294967282	Intel(R) I210 Gigabit Network Connection #2
IRQ 4294967283	Intel(R) I210 Gigabit Network Connection
IRQ 4294967284	Intel(R) I210 Gigabit Network Connection
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) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967290	Intel(R) Trusted Execution Engine Interface
IRQ 4294967291	Intel(R) HD Graphics
IRQ 4294967292	Standard SATA AHCI Controller
IRQ 4294967293	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD9
IRQ 4294967294	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8

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
0x00000000-0x0000006F	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
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000070-0x00000070	Motherboard resources
0x00000070-0x00000070	System CMOS/real time clock
0x00000078-0x00000CF7	PCI Express Root Complex
0x00000080-0x0000008F	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
0x000002E8-0x000002EF	Communications Port (COM4)
0x000002F8-0x000002FF	Communications Port (COM2)

I/O Map	Assignment
0x000003E8-0x000003EF	Communications Port (COM3)
0x000003F8-0x000003FF	Communications Port (COM1)
0x00000400-0x0000047F	Motherboard resources
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000500-0x000005FE	Motherboard resources
0x00000600-0x0000061F	Motherboard resources
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
0x0000D000-0x0000DFFF	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD9
0x0000E000-0x0000EFFF	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8
0x0000F000-0x0000F03F	Intel(R) HD Graphics
0x0000F040-0x0000F05F	Intel(R) Celeron(R)/Pentium(R) Processor SMBUS - 5AD4
0x0000F060-0x0000F07F	Standard SATA AHCI Controller
0x0000F080-0x0000F083	Standard SATA AHCI Controller
0x0000F090-0x0000F097	Standard SATA AHCI Controller

Memory Map

Memory Map	Assignment
0xE0000000-0xEFFFFFFF	Motherboard resources
0xE0000000-0xEFFFFFFF	PCI Express Root Complex
0xFEA00000-0xFEAFFFFF	Motherboard resources
0xFED01000-0xFED01FFF	Motherboard resources
0xFED03000-0xFED03FFF	Motherboard resources
0xFED06000-0xFED06FFF	Motherboard resources
0xFED08000-0xFED09FFF	Motherboard resources
0xFED80000-0xFEDBFFFF	Motherboard resources
0xFED1C000-0xFED1CFFF	Motherboard resources
0xFEE00000-0xFEEFFFFF	Motherboard resources
0x91310000-0x91313FFF	High Definition Audio Controller
0x91000000-0x910FFFFF	High Definition Audio Controller
0x91316000-0x913160FF	Intel(R) Celeron(R)/Pentium(R) Processor SMBUS - 5AD4
0x91100000-0x911FFFFF	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD9
0x91280000-0x912FFFFF	Intel(R) I210 Gigabit Network Connection #2
0x9127C000-0x9127FFFF	Intel(R) I210 Gigabit Network Connection #2
0x91180000-0x911FFFFF	Intel(R) I210 Gigabit Network Connection
0x9117C000-0x9117FFFF	Intel(R) I210 Gigabit Network Connection
0xFED00000-0xFED003FF	High precision event timer
0x91318000-0x91318FFF	Intel(R) Serial IO I2C Host Controller - 5AAC
0x91317000-0x91317FFF	Intel(R) Serial IO I2C Host Controller - 5AAC
0x91300000-0x9130FFFF	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
0x91200000-0x912FFFFF	Intel(R) Celeron(R)/Pentium(R) Processor PCI Express Root Port - 5AD8

Memory Map	Assignment
0x80000000-0x8FFFFFFF	PCI Express Root Complex
0x90000000-0x90FFFFFF	Intel(R) HD Graphics
0x9131D000-0x9131DFFF	Intel(R) Trusted Execution Engine Interface
0x80000000-0x8FFFFFFF	Intel(R) HD Graphics
0x91314000-0x91315FFF	Standard SATA AHCI Controller
0x9131A000-0x9131A0FF	Standard SATA AHCI Controller
0x91319000-0x913197FF	Standard SATA AHCI Controller
0x7B800001-0x7BFFFFFF	PCI Express Root Complex
0x7C000001-0x7FFFFFFF	PCI Express Root Complex

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 F81964 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 the watchdog timer and set the 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 (e.g. USB storage device) which can boot the system to EFI Shell.

2 Download and save the BIOS file (e.g. B9861PM1.bin) to the storage device.

3 Copy AMI flash utility – AfuEfix64.efi (v5.12.02.2028) into bootable device.

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

(1) Connect the bootable USB device.

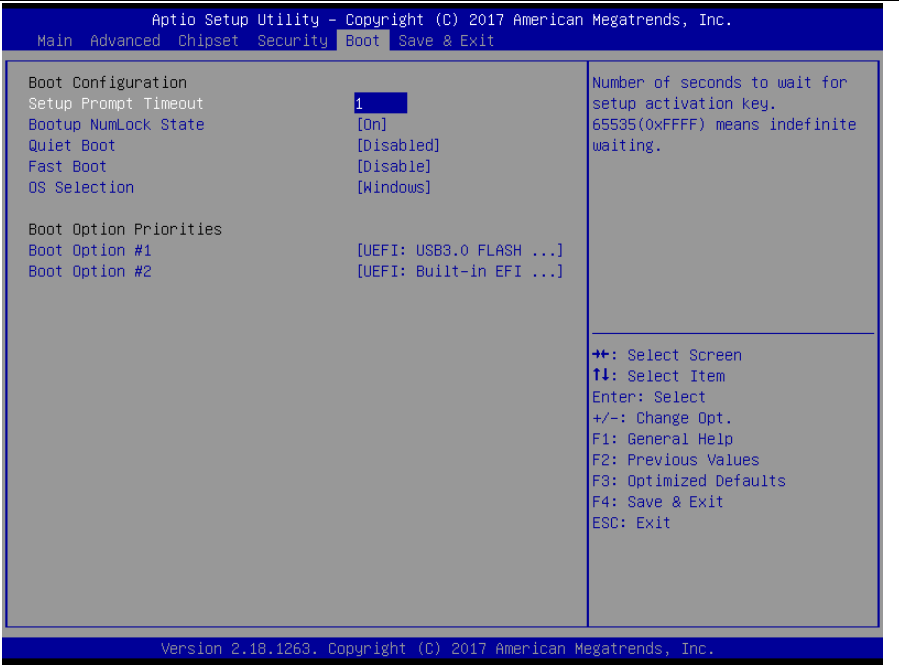
(2) Turn on the computer and press **<ESC>** or **<DEL>** key during boot to enter BIOS Setup.

(3) System will go into the BIOS setup menu.

(4) Select **[Boot]** menu.

(5) Set the USB bootable device to be the 1st boot device.

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



II. AFUEFIx64 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.

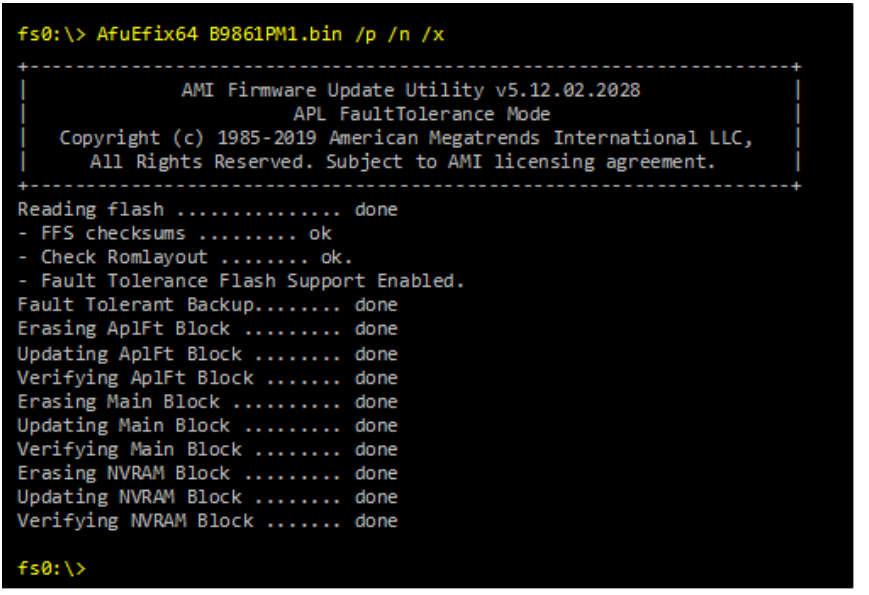
III. BIOS Update Procedure

1 Use the bootable USB storage to boot up system into the EFI Shell.

2 Type "**AfuEfix64 B986xxxx.bin /p /b /n /x"** and press enter to start the flash procedure. (xxxx means the BIOS revision part, ex. 0PM1…)

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

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



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

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.