USER MANUAL

PA-J581 Series

15” Fanless Slim POS Terminal
Powered by Intel® Celeron®
J6412 CPU Processor

PA-J581 M1

PA-J581 POS 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 open and disassemble the system. Please operate the LCD and Touchscreen with extra care as they can be broken easily.

Contents

Revision History

The revision history of PA-J581 User Manual is described below:

Version No.	Revision History	Page No.	Date
M1	Initial Release	-	2023/02/21

1 Introduction

This chapter gives you the information for the PA-J581.
It also outlines the system specifications.

The following topics are included:

- About This Manual
- POS System Overview
- System Specifications
- Safety Precautions

Experienced users can go to Chapter 2 for a quick start.

1.1 About This Manual

Thank you for purchasing our PA-J581 Series System. The PA-J581 is an updated system designed to be comparable with the highest performance of IBM AT personal computers. The PA-J581 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 3 chapters and 2 appendixes. Users can configure the system according to their own needs.

Chapter 1 Introduction

This chapter introduces you to the background of this manual. It also includes illustrations and specifications for the whole system. The final section of this chapter indicates some safety reminders on how to take care of your system.

Chapter 2 System Configuration

This chapter outlines the location of the main board, VFD components and their functions. You will learn how to set the jumpers and configure the system to meet your own needs.

Chapter 3 Software Utilities

This chapter contains detailed information for driver installations of the Intel® Chipset Software Installation Utility, Graphics, Intel® Management Engine Components Installer, LAN, Sound, embedded peripheral devices, API and BIOS setup & update.

Appendix A System Diagrams

This chapter shows the easy maintenance diagrams as well as the exploded diagrams and part numbers of PA-J581 components.

Appendix B Technical Summary

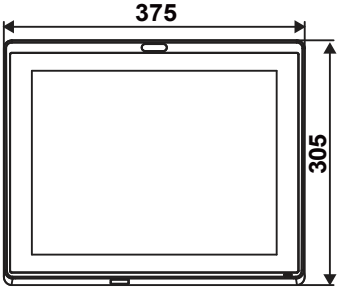
This appendix provides the information about the allocation maps for board block diagram, system resources, Watchdog Timer Configuration and Flash BIOS Update.

1.2 POS System Overview

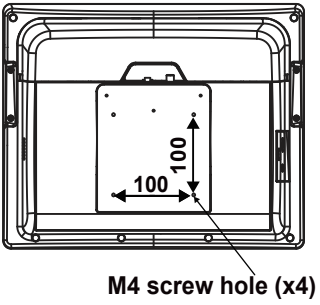
Unit: mm

1.2.1 Panel PC

Front View



Rear View



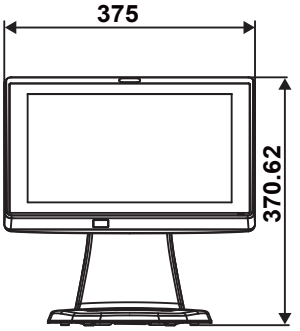
Left Side View

Right Side View

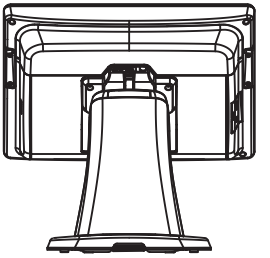
1.2.2 Normal Stand

Unit: mm

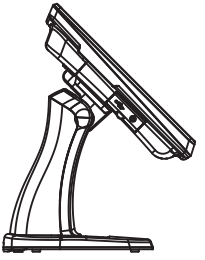
Front View



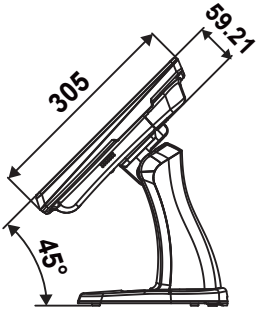
Rear View



Left Side View



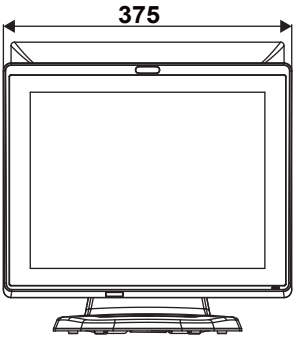
Right Side View



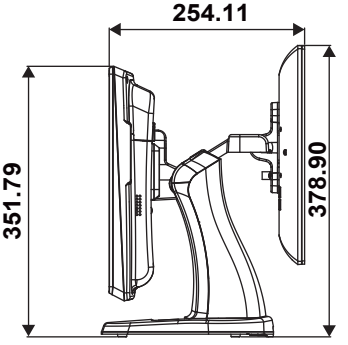
1.2.3 Normal Stand with 15” 2nd Display

Unit: mm

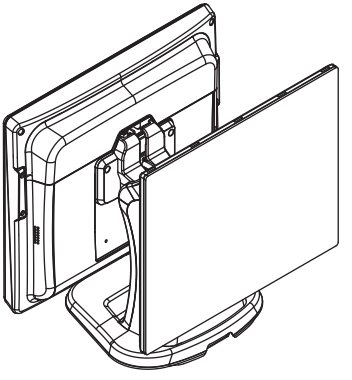
Front View



Side View



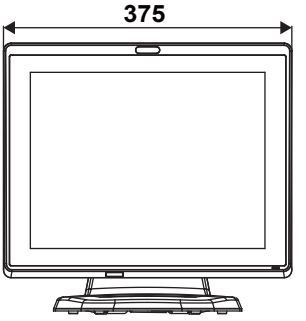
Quarter View



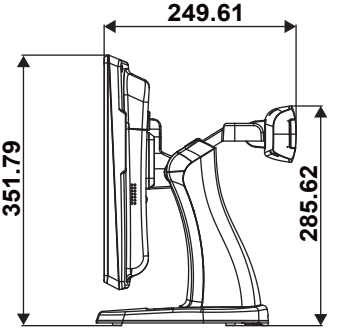
1.2.4 Normal Stand with VFD

Unit: mm

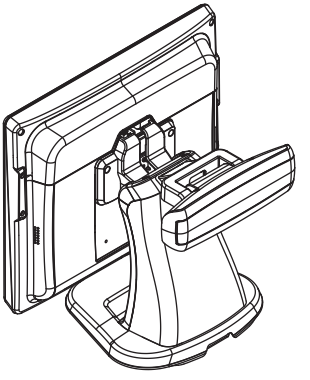
Front View



Side View



Quarter View



1.3 System Specifications

System	
CPU Support	Intel® Celeron® J6412 CPU
Memory	1 x DDR4 SO-DIMM (up to 16GB)
Network	Gigabit 10/100/1000 Base-T Fast Ethernet
Power Supply	60W/90W power adapter
O.S. Support	Windows® 10 IoT Enterprise / Windows® 11 IoT Enterprise
Audio	2W speaker
BIOS	AMI SPI BIOS
System Weight	• POS type: With power adaptor approx. 7kg • PPC type: 3.8kg
Dimensions (W x H x D)	• POS type: 375 x 364 x 290 mm (with 45 degree) • PPC type: 375 x 305 x 59.2mm
I/O Ports	
USB	**Rear:** • 2 x USB 2.0 • 2 x USB 3.0 • 1 x USB 2.0 (option) **Side:** • 1 x USB 2.0
Serial Ports	3 + 1 (optional) x RJ45 (all support +5V/12V selectable)
LAN	1 x RJ45
HDMI	1 x HDMI
Audio	2 x 3.5 mm phone jack (option)
Cash Drawer	1 x RJ11 (+12V or +24V selectable)
DC In	1 x 4-pin DC power jack
Storage	
SATA	1 x 2.5" HDD or SSD
Display	
LCD	15” TFT LCD
Brightness	300 cd/m²
Max. Resolution	1024 x 768
Touchscreen	Bezel-free 5-wire analog resistive or projected capacitive
Tilt Angle	0~50 degree
Add-ons	
Customer Display	FD kit, 20 columns and 2 lines, each column is 5 x 7 dots
MSR & iButton	ISO I,II,III; JIS II and support information key (USB interface)
Camera	2.0M pixel CMOS camera module

Barcode Scanner	• **1D:** EEAN-13, EAN-8, UPC-A, UPC-E, ISSN, ISBN, Codabar, Code 128, Code 93, ITF-6, ITF-14, Interleaved 2 of 5, Industrial 2 of 5, Standard 2 of 5, Matrix 2 of 5, GS1 Databar, Code 39, Code 11 • **2D:** PDF417, QR Code, Micro QR, Data Matrix, Chinese sensible code
Fingerprint	8-bit grayscale reader
Environment	
EMC & Safety	CE / FCC
Operating Temp.	0˚C ~ 35˚C (32˚F ~95˚F)
Storage Temp.	-20˚C ~ 60˚C (-4˚F ~140˚F)
Humidity	20% ~ 90%

1.4 Safety Precautions

Before using this system, read the following information carefully to protect your system from damages, and extend the life cycle of the system.

1. Check the Line Voltage
   - The operating voltage for the power supply should be within the range of 100V to 240V AC; otherwise, the system may be damaged.

2. Environmental Conditions
   - Place your PA-J581 on a sturdy, level surface. Be sure to allow enough space around the system to have easy access needs.
   - Avoid installing your PA-J581 POS 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 PA-J581 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 PA-J581 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 operation system before you turn off the power.

3. Handling
   - Avoid placing heavy objects on the top of the system.
   - Do not turn the system upside down. This may cause the hard drive to malfunction.
   - Do not allow any objects to fall into this device.
   - If water or other liquid spills into the device, unplug the power cord immediately.

4. Good Care
   - When the outside case gets stained, remove the stains using neutral washing agent with a dry cloth.
   - Never use strong agents such as benzene and thinner to clean the surface of the case.
   - If heavy stains are present, moisten a cloth with diluted neutral washing agent or alcohol and then wipe thoroughly with a dry cloth.
   - If dust is accumulated on the case surface, remove it by using a special vacuum cleaner for computers.

2 System Configuration

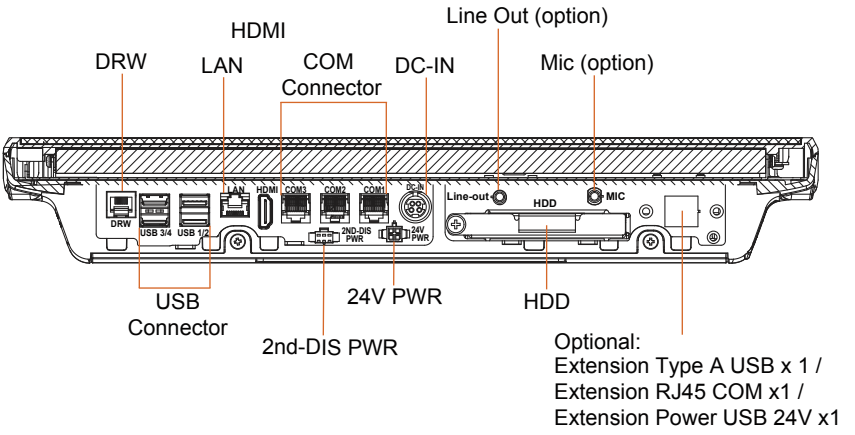
This chapter contains helpful information that describes the jumper and connector settings, component locations, and pin assignment.

The following topics are included:

- System External I/O Ports Diagram
- Function Button and I/O Ports
- Main Board Component Locations & Jumper Settings
- Jumper & Connector Quick Reference Table
- Setting Jumpers
- Setting Main Board Connectors and Jumpers
- Setting VFD Board Connectors and Jumpers
- VFD Board Component Locations & Pin Assignment

2.1 System External I/O Ports Diagram & Pin Assignment

Rear I/O Ports



2.2 Function Button and I/O Ports

2.2.1 Power Button

To turn on the system, press the power button on the side of the system briefly.

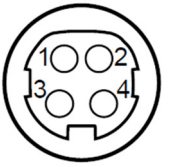
ACTION	ASSIGNMENT
Click	0V
Release	+3.3V

Power Button

2.2.2 DC-IN Port

Port Location: DC-IN
Description: DC Power-In Port (rear I/O)

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



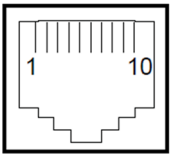
DC-IN

2.2.3 COM Ports (COM1, COM2, COM3)

There are multiple COM ports enhanced on this board: COM1, COM2, COM3.

Port Location: COM1, COM2, COM3
Description: COM1, COM2, COM3 Connector
The pin assignments are as follows:

PIN	ASSIGNMENT
1	COM1/2/3_DCDJ_I
2	COM1/2/3_RX_I
3	COM1/2/3_TX_I
4	COM1/2/3_DTRJ_I
5	GND
6	COM1/2/3_DSRJ_I
7	COM1/2/3_RTSJ_I
8	COM1/2/3_CTSJ_I
9	COM1/2/3_RI_SEL
10	NC



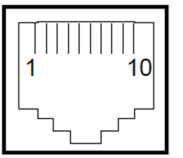
COM1/ COM2/ COM3

2.2.4 Extension RJ45 COM Port (option)

Port Location: Extension RJ45 COM Port (rear I/O)
Description: Extension RJ45 COM Connector

The pin assignments are as follows:

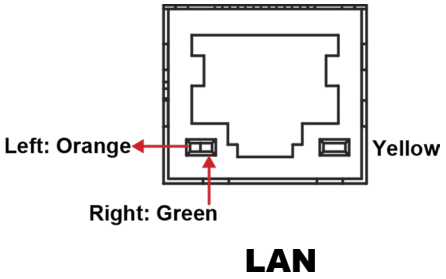
PIN	ASSIGNMENT
1	COM_DCDJ_I
2	COM_RX_I
3	COM_TX_I
4	COM_DTRJ_I
5	GND
6	COM_DSRJ_I
7	COM_RTSJ_I
8	COM_CTSJ_I
9	COM_RI_SEL
10	NC



COM Port Connector (option)

2.2.5 LAN Port (LAN)

Port Location: LAN
Description: LAN Port
The pin assignments are as follows:



LAN: a Giga LAN RJ-45 port (rear I/O)

Pin	Assignment
1	LAN1_MDI0_DP
2	LAN1_MDI0_DN
3	LAN1_MDI1_DP
4	LAN1_MDI1_DN
7	LAN1_MDI2_DP
8	LAN1_MDI2_DN
9	LAN1_MDI3_DP
10	LAN1_MDI3_DN

LAN LED Indicator:

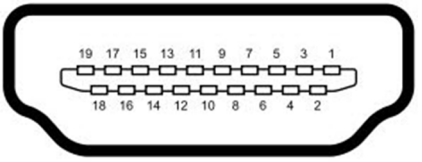
Orange Color Blinking	1G Giga LAN Message Active
Green Color Blinking	2.5G Giga LAN Message Active

Yellow Color On	LAN switch / hub connected.

2.2.6 HDMI Port Connector (HDMI)

Port Location: HDMI

Description: HDMI Connector (rear I/O)

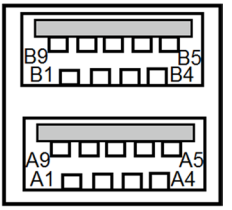


HDMI

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	HDMI_P2	2	GND
3	HDMI_N2	4	HDMI_P1
5	GND	6	HDMI_N1
7	HDMI_P0	8	GND
9	HDMI_N0	10	HDMI_CLKP
11	GND	12	HDMI_CLKN
13	NC	14	NC
15	HDMI_SCL_5V	16	HDMI_SDA_5V
17	GND	18	V5P0S_HDMI
19	HDMI_HPD	20	-

2.2.7 Dual USB 3.0 Port Connector (USB1, USB2)

Port Location: USB1, USB2
Description: Dual USB 3.0 Type A Connector (rear I/O)
The pin assignments are as follows:



USB1 / USB2
(USB 3.0)

USB 3.0 signals:

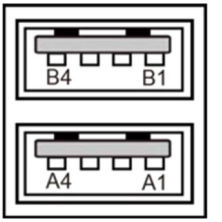
PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	USB_PWR1	B1	USB_PWR2
A2	USB2_P1_DN	B2	USB2_P2_DN
A3	USB2_P1_DP	B3	USB2_P2_DP
A4	GND	B4	GND
A5	USB31_P1_RX_DN	B5	USB31_P2_RX_DN
A6	USB31_P1_RX_DP	B6	USB31_P2_RX_DP
A7	GND	B7	GND
A8	USB31_P1_TX_DN	B8	USB31_P2_TX_DN
A9	USB31_P1_TX_DP	B9	USB31_P2_TX_DP

2.2.8 Dual USB 2.0 Port Connector (USB3, USB4)

Port Location: USB3, USB4
Description: USB 2.0 Type A Connector (rear I/O)

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	USB_PWR3	B1	USB_PWR4
A2	USB2_P3_DN_CL	B2	USB2_P4_DN_CL
A3	USB2_P3_DP_CL	B3	USB2_P4_DP_CL
A4	GND	B4	GND



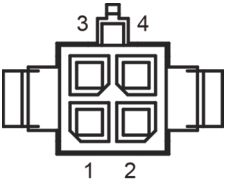
USB3 / USB4
(USB 2.0)

2.2.9 24V Power Port Connector (24V PWR)

Port Location: 24V PWR
Description: 24V Power Port Connector

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	24V	3	GND
2	24V	4	GND



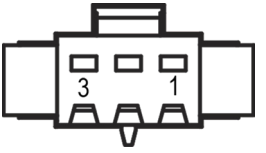
24V PWR

2.2.10 2nd Display Power Port Connector (2ND-DIS PWR)

Port Location: 2ND-DIS PWR
Description: 2nd Display Power Port Connector

The pin assignments are as follows:

PIN	ASSIGNMENT
1	VCC12
2	GND
3	VCC12

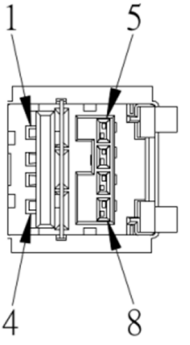


2ND-DIS PWR

2.2.11 Extension Power USB 24V Port / Dual USB 2.0 Port (option)

Port Location: Extension Power USB 24V Port (option)
Description: 24V Power USB Port (rear I/O)

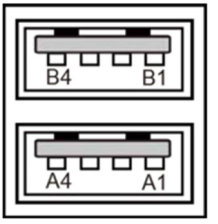
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	+5V	5	GND
2	USB D-	6	+24V
3	USB D+	7	+24V
4	GND	8	GND



24V Power USB (option)

Connector Location: Extension Dual USB 2.0 Connector (option)
Description: Extension Dual USB 2.0 Connector (rear I/O)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	USB_PWRX	B1	USB_PWRX
A2	USB2_PX_DN_C	B2	USB2_PX_DN_C
A3	USB2_PX_DP_C	B3	USB2_PX_DP_C
A4	GND	B4	GND



Dual USB 2.0 Connector (option)

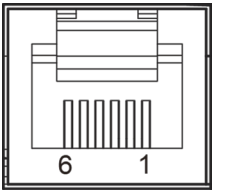
2.2.12 Cash Drawer Port (DRW)

Port Location: DRW

Description: RJ-11 Cash Drawer Connector (+12V/+24V selectable, default: +12V). DRW1 is used by default.

The pin assignments are as follows:

PIN	ASSIGNMENT
1	GND / DRW2_OPEN
2	DRW1_OPEN
3	DRW1_SEN
4	PWR_CASH1
5	DRW2_SEN
6	GND



DRW

2.2.13 Line Out Audio Jack (Line-out)

Connector Location: Line-out

Description: Line Out Audio Jack

PIN	ASSIGNMENT
1	GND
2	HD_LINE-OUT-R
3	GND
4	GND
5	HD_LINE-OUT-L

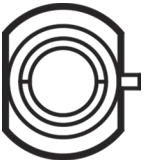
Line-out

2.2.14 Mic In Audio Jack (MIC)

Connector Location: MIC

Description: Mic In Audio Jack

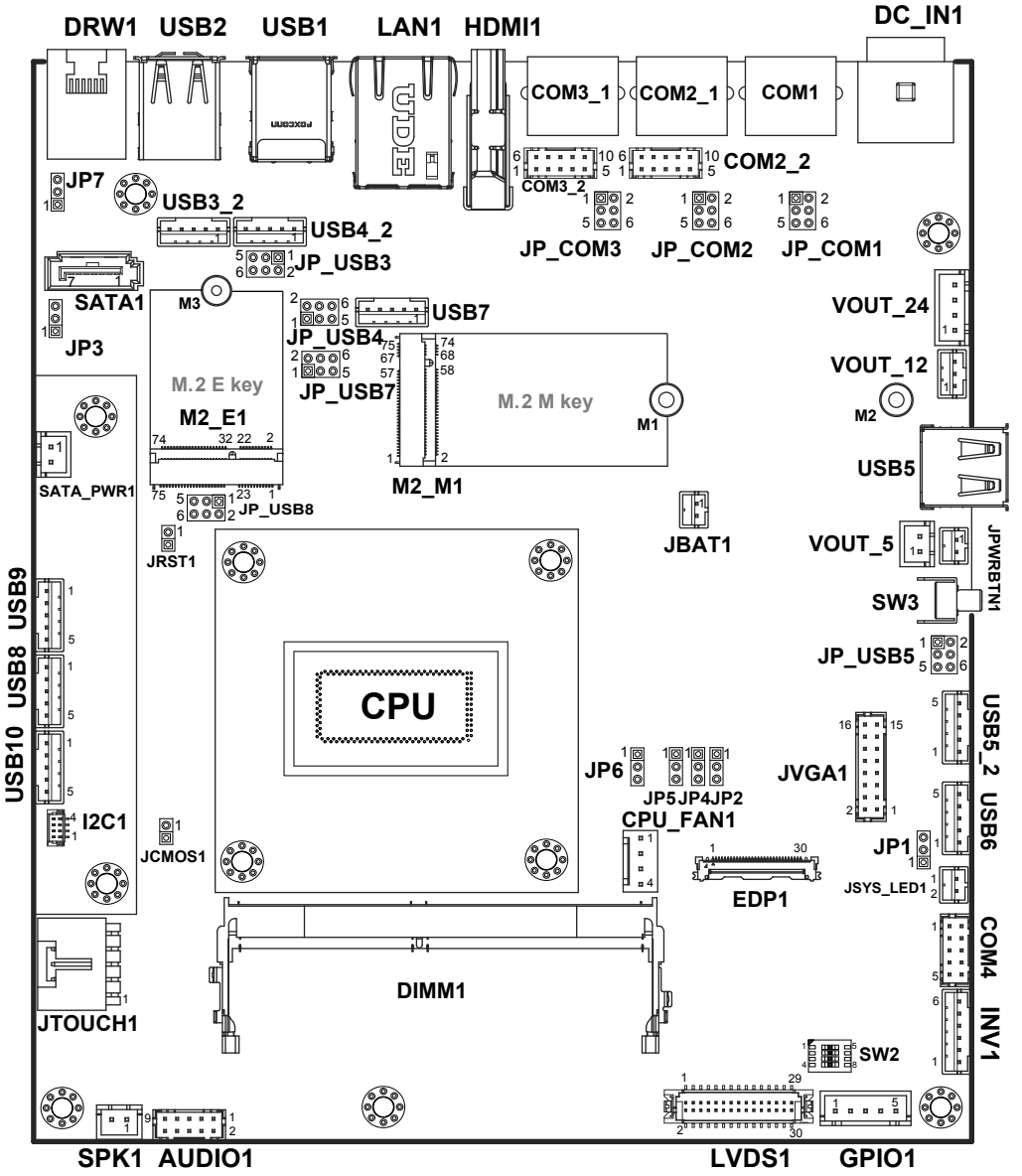
PIN	ASSIGNMENT
P1	HD_MIC1-L
P2	HD_MIC1-R
P3	GND



MIC

2.3 Main Board Component Locations & Jumper Settings

M/B: PB-J581



	**WARNING:** Always disconnect the power cord when you are working with the connectors and jumpers on the main board. Make sure both the system and the external devices are turned OFF as sudden surge of power could ruin sensitive components. Make sure the main board is properly grounded.
	**CAUTION:** Observe precautions while handling electrostatic sensitive components. Make sure to ground yourself to prevent static charge while configuring the connectors and jumpers. Use a grounding wrist strap and place all electronic components in any static-shielded devices.

2.4 Jumper & Connector Quick Reference Table

JUMPER	NAME
Clear CMOS Data Selection	JCMOS1
COM Port RI & Voltage Selection	JP_COM1, JP_COM2, JP_COM3
USB3 Port Selection	JP_USB3
USB4 Port Selection	JP_USB4
USB5 Port Selection	JP_USB5
USB7 Port Selection	JP_USB7
USB8 / M.2 Selection	JP_USB8
LVDS VCC Voltage Selection	JP1
LVDS BKLCTL PWM Voltage Level Selection	JP2
Cash Drawer Voltage Selection	JP3
LVDS BKLCTL PWM Fix Voltage Selection	JP4
LDVS BKLCTL PWM Selection	JP5
LVDS BKLTEN Voltage Level Selection	JP6
Dual Cash Drawer Selection with Y-Cable	JP7
LVDS Slide Switch	SW2

SYSTEM CONNECTOR	NAME
DC-IN Port (rear I/O)	DC-IN
24V Power Port (rear I/O)	24V PWR
2nd Display Power Port Connector (rear I/O)	2ND-DIS PWR
(option) Line Out and Mic In Audio Jack (rear I/O)	Line-out, MIC
COM Port Connector (rear I/O)	COM1, COM2, COM3
Extension RJ45 COM Port Connector (rear I/O) (option)	COM Port Connector
COM4 Connector	COM4
COM Port Wafer	COM2_2, COM3_2
LAN Port Connector (rear I/O)	LAN
Dual USB 3.0 Port Type A Connector	USB1, USB2
Dual USB 2.0 Port Type A Connector	USB3, USB4
Extension Dual USB 2.0 Port Type A Connector (option)	Dual USB 2.0 Connector
Extension Power USB 24V Port (option)	24V Power USB Port
USB 2.0 Port Type A Connector (side I/O)	USB5
USB 2.0 Port Wafer	USB3_2, USB4_2, USB5_2, USB6, USB7, USB8, USB9, USB10
VGA Connector	JVGA1
Cash Drawer Connector (rear I/O)	DRW
SATA Connector	SATA1
SATA Power Wafer	SATA_PWR1

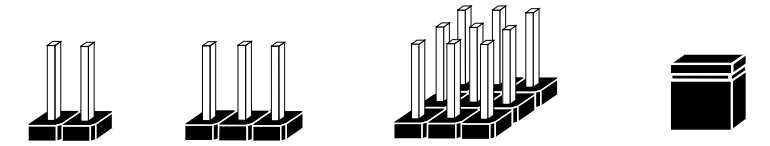
SYSTEM CONNECTOR	NAME
Battery Wafer	JBAT1
Panel Inverter Wafer	INV1
Speaker Wafer	SPK1
Audio Codec Line Out / Mic Pin Header	AUDIO1
LVDS Connector	LVDS1
HDMI Port Connector (rear I/O)	HDMI
EDP Connector	EDP1
Power Button Wafer	JPWRBTN1
System Reset Wafer	JRST1
System LED Wafer	JSYS_LED1
I2C Wafer	I2C1
CPU FAN Wafer (PA-J581 is a fanless system)	CPU_FAN1
M.2 M-Key Connector for SSD	M2_M1
M.2 E-Key Connector for Wi-Fi	M2_E1
General-Purpose Input / Output Connector	GPIO1
On Board Touch Wafer	JTOUCH1
24V DC Out Connector	VOUT_24
Power for 2nd Display Connector	VOUT_12
DC 5V Power Connector	VOUT_5

2.5 Setting Jumpers

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

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

Jumpers & Caps

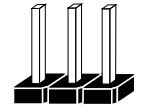


If a jumper has three pins, for example, labeled 1, 2 and 3. You can connect pins 1 and 2 to create one setting and shorting. You can also select to connect pins 2 and 3 to create another setting. The format of the jumper picture will be illustrated throughout this manual. The figure below shows different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

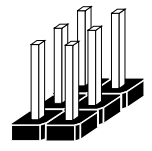
Jumper Diagrams

Jumper Cap looks like this

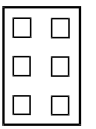
2 pin Jumper looks like this



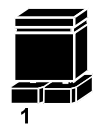
3 pin Jumper looks like this



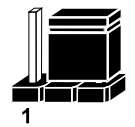
Jumper Block looks like this



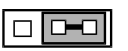
Jumper Settings

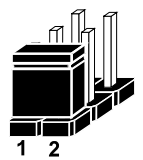


2 pin Jumper closed(enabled)
looks like this

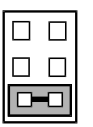


3 pin Jumper
2-3 pin closed(enabled)
looks like this





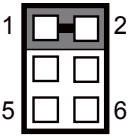
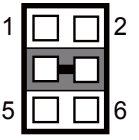
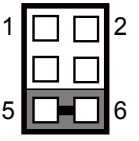
Jumper Block
1-2 pin closed(enabled)
looks like this



2.6 Setting Main Board Connectors and Jumpers

2.6.1 COM1, COM2_1, COM3_1 Voltage Selection (JP_COM1, JP_COM2, JP_COM3)

Jumper Location: JP_COM1, JP_COM2, JP_COM3
Description: COM1, COM2_1, COM3_1 voltage are set by jumpers on board.

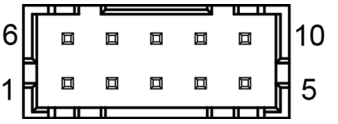
SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
RI	**1-2** *(Default Setting)*	 **JP_COM1/ JP_COM2/ JP_COM3**
12V	3-4	 **JP_COM1/ JP_COM2/ JP_COM3**
5V	5-6	 **JP_COM1/ JP_COM2/ JP_COM3**

2.6.2 COM Connectors (COM2_2, COM3_2)

Connector Location: COM2_2, COM3_2

Description: COM Connectors

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM2/3_DCDJ_I	6	COM2/3_DSRJ_I
2	COM2/3_RX_I	7	COM2/3_RTSJ_I
3	COM2/3_TX_I	8	COM2/3_CTSJ_I
4	COM2/3_DTRJ_I	9	COM2/3_RI_SEL
5	GND	10	NC



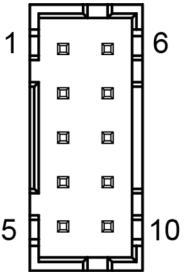
COM2_2 / COM3_2

2.6.3 COM4 Connector (COM4)

Connector Location: COM4

Description: COM4 Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM4_DCDJ_I	6	COM4_DSRJ_I
2	COM4_RX_I	7	COM4_RTSJ_I
3	COM4_TX_I	8	COM4_CTSJ_I
4	COM4_DTRJ_I	9	COM4_RI
5	GND	10	NC

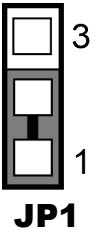
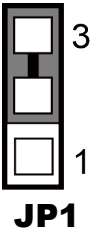


COM4

2.6.4 LVDS VCC Voltage Selection (JP1)

Jumper Location: JP1

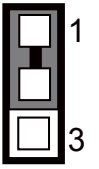
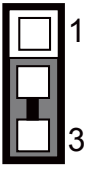
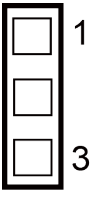
Description: LVDS VCC Voltage Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
3.3V	**1-2** ***(Default Setting)***	 **JP1**
5V	2-3	 **JP1**

2.6.5 LVDS BKLCTL PWM Voltage Level Selection (JP2)

Jumper Location: JP2

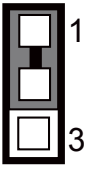
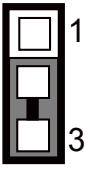
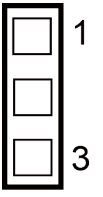
Description: LVDS BKLCTL PWM Voltage Level Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
3.3V	**1-2** ***(Default Setting)***	 **JP2**
5V	2-3	 **JP2**
JP4 Select	Open	 **JP2**

2.6.6 LVDS BKLCTL PWM Fix Voltage Selection (JP4)

Jumper Location: JP4

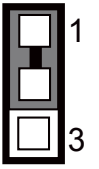
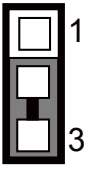
Description: LVDS BKLCTL PWM Fix Voltage Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
GND	1-2	 **JP4**
5V	2-3	 **JP4**
JP2 Select	***Open*** ***(Default Setting)***	 **JP4**

2.6.7 LDVS BKLCTL PWM Selection (JP5)

Jumper Location: JP5

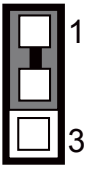
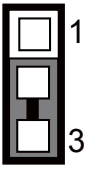
Description: LDVS BKLCTL PWM Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
SOC PWM	***1-2 (Default Setting)***	 **JP5**
7511 PWM	2-3	 **JP5**

2.6.8 LVDS BKLTEN Voltage Level Selection (JP6)

Jumper Location: JP6

Description: LVDS BKLTEN Voltage Level Selection

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

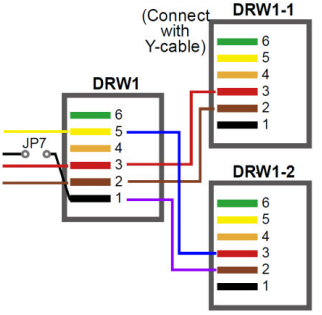
2.6.9 Drawer Ports (DRW1, DRW1-1, DRW1-2)

Connector Location: DRW1, DRW1-1, DRW1-2

Description: DRW1 is used by default. If you need a second port, adopt either way as below:

Step 1: Set JP7 to DRW1-1 & DRW1-2 or DRW1 only.

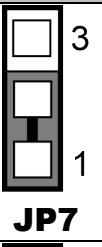
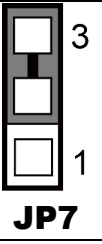
Step 2: You can split DRW1 into two channels of DRW1-1 & DRW1-2 with the Y-Cable (option).

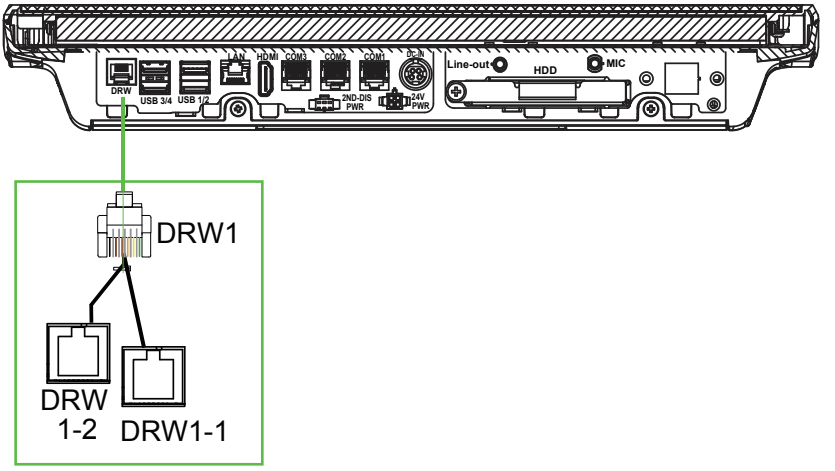


2.6.10 Dual Cash Drawer Selection with Y-Cable (JP7)

Jumper Location: JP7

Description: Dual Cash Drawer Selection with Y-Cable

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
DRW1-1 & DRW1-2	1-2	
DRW1 Only	**2-3** ***(Default Setting)***	

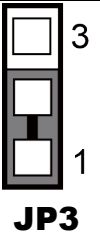
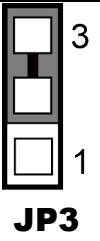


Step 3: DRW1, DRW1-1, DRW1-2 shares the same power source.

2.6.11 Cash Drawer Voltage Selection (JP3)

Jumper Location: JP3

Description: Cash Drawer Voltage Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
24V	1-2	
12V	***2-3 (Default Setting)***	

Cash Drawer CONFIGURATION

The I/O port address 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).

SIO Address	
Cash drawer Open	LDN06, 0x81, bit1
Cash drawer Status	LDN06, 0x81, bit0

Configuration Sequence

To program F81967 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

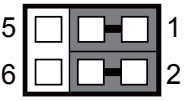
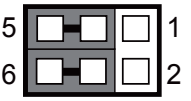
To exit the Extended Function Mode, writing 0xAA to the EFER is required. Once the chip exits the Extended Function Mode, it is in the normal running mode and is ready to enter the configuration mode.

Code example for open the cash drawer

```
; ------------------------ Enter to extended function mode ------------------------------
mov     dx,     2Eh
mov     al,     87h
out     dx,     al
out     dx,     al
; ---------------------- Select Logical Device 6 of Cash Drawer ---------------------
mov     al,     07h
out     dx,     al
inc     dx
mov     al,     06h
out     dx,     al
;--------------------------------Open the Cash Drawer ----------------------------
mov     al,     81h
out     dx,     al
inc     dx
in      al,     dx
or      al,     02h
out     dx,     al
;--------------------------------Close the Cash Drawer ----------------------------
mov     al,     81h
out     dx,     al
inc     dx
in      al,     dx
and     al,     FDh
out     dx,     al
;--------------------------------Exit the extended function mode ------------------------
dec     dx
mov     al,     AAh
out     dx,     al
```

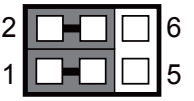
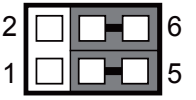
2.6.12 USB3 Port Selection (JP_USB3)

Jumper Location: JP_USB3
Description: USB3 Port Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
USB3	***1-3, 2-4 (Default Setting)***	 **JP_USB3**
USB3_2	3-5, 4-6	 **JP_USB3**

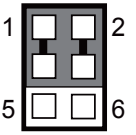
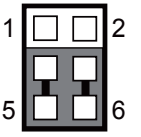
2.6.13 USB4 Port Selection (JP_USB4)

Jumper Location: JP_USB4
Description: USB4 Port Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
USB4	***1-3, 2-4 (Default Setting)***	 **JP_USB4**
USB4_2	3-5, 4-6	 **JP_USB4**

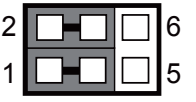
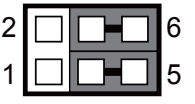
2.6.14 USB5 Port Selection (JP_USB5)

Jumper Location: JP_USB5
Description: USB5 Port Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
USB5	***1-3, 2-4 (Default Setting)***	 **JP_USB5**
USB5_2	3-5, 4-6	 **JP_USB5**

2.6.15 USB7 Port Selection (JP_USB7)

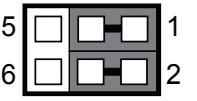
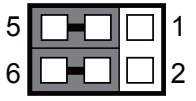
Jumper Location: JP_USB7
Description: USB7 Port Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
Touch	***1-3, 2-4 (Default Setting)***	 **JP_USB7**
USB7	3-5, 4-6	 **JP_USB7**

2.6.16 USB8 / M.2 Selection (JP_USB8)

Jumper Location: JP_USB8

Description: USB8 / M2_M1 Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
M2_M1	***1-3, 2-4 (Default Setting)***	 **JP_USB8**
USB8	3-5, 4-6	 **JP_USB8**

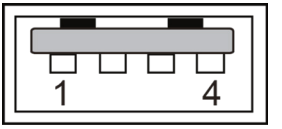
2.6.17 USB5 Connector (USB5)

Connector Location: USB5

Description: USB 2.0 Type A Connector (side I/O)

USB 2.0 signals:

PIN	ASSIGNMENT
1	USB_PWR5
2	USB2_P5_DN_CL
3	USB2_P5_DP_CL
4	GND



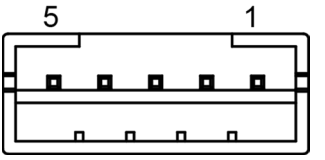
USB5

2.6.18 Internal USB Wafers (USB3_2, USB4_2, USB5_2, USB6, USB7, USB8, USB9, USB10)

Wafer Location: USB3_2, USB4_2, USB5_2, USB6, USB7, USB8, USB9, USB10

USB3_2 Description: Internal USB wafer USB2 option

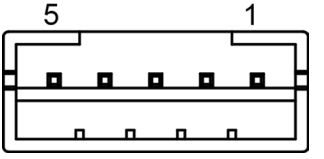
PIN	ASSIGNMENT
1	USB_PWR3
2	USB2_P3_DN_HL
3	USB2_P3_DP_HL
4	GND
5	GND



USB3_2

USB4_2 Description: Internal USB wafer USB4 option

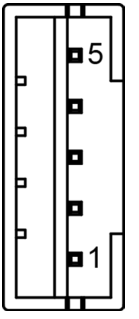
PIN	ASSIGNMENT
1	USB_PWR4
2	USB2_P4_DN_HL
3	USB2_P4_DP_HL
4	GND
5	GND



USB4_2

USB5_2 Description: Internal USB wafer USB5 option

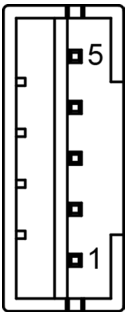
PIN	ASSIGNMENT
1	USB_PWR5
2	USB2_P5_DN_HL
3	USB2_P5_DP_HL
4	GND
5	GND



USB5_2

USB6 Description: Internal USB wafer

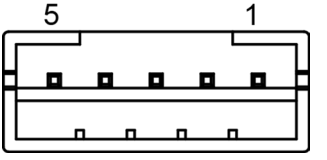
PIN	ASSIGNMENT
1	USB_PWR6
2	USB2_P6_DN_C
3	USB2_P6_DP_C
4	GND
5	GND



USB6

USB7 Description: Internal USB wafer Touch option

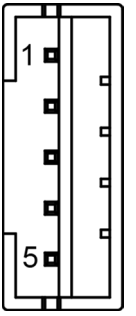
PIN	ASSIGNMENT
1	USB_PWR7
2	USB2_P7_DN_HL
3	USB2_P7_DP_HL
4	GND
5	GND



USB7

USB8 Description: Internal USB wafer M2_M1 option

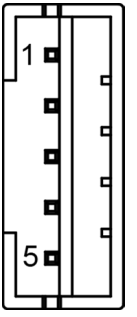
PIN	ASSIGNMENT
1	USB_PWR8
2	USB2_P8_DN_HL
3	USB2_P8_DP_HL
4	GND
5	GND



USB8

USB9 Description: Internal USB wafer

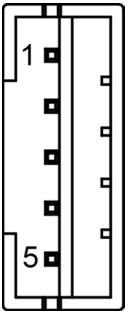
PIN	ASSIGNMENT
1	USB_PWR9
2	USB2_P9_DN
3	USB2_P9_DP
4	GND
5	GND



USB9

USB10 Description: Internal USB wafer

PIN	ASSIGNMENT
1	USB_PWR10
2	USB2_P10_DN
3	USB2_P10_DP
4	GND
5	GND



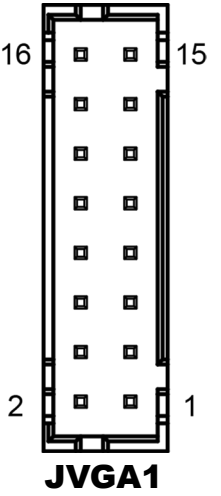
USB10

2.6.19 VGA Connector (JVGA1)

Connector Location: JVGA1

Description: VGA Connector

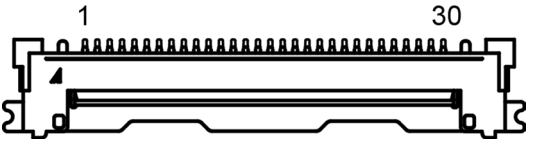
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	CRT_RED_LL	2	CRT_GREEN_LL
3	CRT_BLUE_LL	4	SPC_R
5	GND	6	GND
7	GND	8	GND
9	CRT_VCC_L	10	GND
11	SPD_R	12	CRT_DDC_DATA_O
13	CRT_HSYNC_O	14	CRT_VSYNC_O
15	CRT_DDC_CLK_O	16	NC



2.6.20 EDP Connector (EDP1)

Connector Location: EDP1

Description: EDP Connector



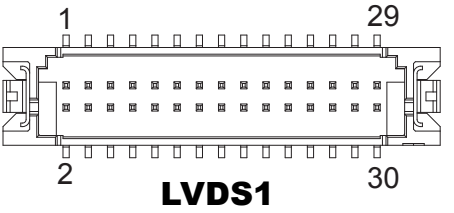
EDP1

PIN	ASSIGNMENT
1	EDP_DCR_EN
2	GND
3	DDIA_TX1_DN_EDP
4	DDIA_TX1_DP_EDP
5	GND
6	DDIA_TX0_DN_EDP
7	DDIA_TX0_DP_EDP
8	GND
9	DDIA_AUX_DP_EDP
10	DDIA_AUX_DN_EDP
11	GND
12	LVDS_VCC
13	LVDS_VCC
14	EDP_SELF_TEST
15	GND
16	GND
17	EDP_HPD_R
18	GND
19	GND
20	GND
21	GND
22	SOC_BKLTEN_EDP
23	SOC_BKLTCTL_EDP
24	NC
25	NC
26	12V
27	12V
28	12V
29	12V
30	TP

2.6.21 LVDS Connector (LVDS1)

Connector Location: LVDS1

Description: LVDS Connector



LVDS1

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

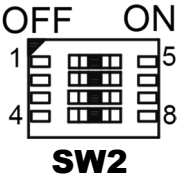
2.6.22 Slide Switch For LVDS Resolution Selection (SW2)

Switch Location: SW2

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

←	←	←	←
1	2	3	4
ON	ON	ON	ON

→	→	→	→
1	2	3	4
OFF	OFF	OFF	OFF

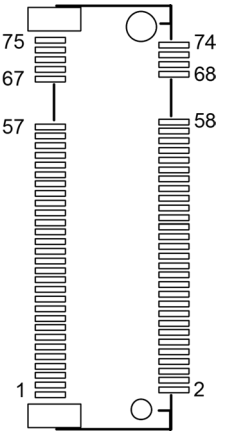


1	2	3	4	Resolution	Channel	6 or 8 bit
ON	ON	ON	ON	1280x800	S	8
OFF	ON	ON	ON	1024x768	S	6
ON	OFF	ON	ON	***1024x768 (Default)***	S	8
OFF	OFF	ON	ON	1280x768	S	6
ON	ON	OFF	ON	1280x800	S	6
OFF	ON	OFF	ON	1280x960	S	6
ON	OFF	OFF	ON	1280x1024	D	8
OFF	OFF	OFF	ON	1366x768	S	6
ON	ON	ON	OFF	1366x768	S	8
OFF	ON	ON	OFF	1440x900	D	8
ON	OFF	ON	OFF	1400x1050	D	8
OFF	OFF	ON	OFF	1600x900	D	8
ON	ON	OFF	OFF	1680x1050	D	8
OFF	ON	OFF	OFF	1600x1200	D	8
ON	OFF	OFF	OFF	1920x1080	D	8
OFF	OFF	OFF	OFF	1920x1200	D	8

2.6.23 M.2 M-Key Slot (M2_M1)

Connector Location: M2_M1

Description: M.2 M-Key Connector for SSD.



M2_M1

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	2	V3P3S_M2_CPU
3	GND	4	V3P3S_M2_CPU
5	NC	6	NC
7	NC	8	NC
9	GND	10	M2_LED1
11	NC	12	V3P3S_M2_CPU
13	NC	14	V3P3S_M2_CPU
15	GND	16	V3P3S_M2_CPU
17	NC	18	V3P3S_M2_CPU
19	NC	20	NC
21	GND	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	PCIE4_RX_N1	30	NC
31	PCIE4_RX_P1	32	NC
33	GND	34	NC
35	PCIE4_TX_N1	36	NC
37	PCIE4_TX_P1	38	NC
39	GND	40	NC
41	PCIE4_RX_N0_SATA1_RXP	42	NC

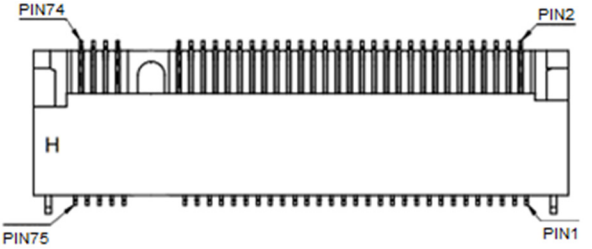
PIN	ASSIGNMENT	PIN	ASSIGNMENT
43	PCIE4_RX_P0_SATA1_RXN	44	NC
45	GND	46	NC
47	PCIE4_TX_N0_SATA1_TXN	48	NC
49	PCIE4_TX_P0_SATA1_TXP	50	M2_KEYM_CPU_SSD_RST_R_N
51	GND	52	GPPC_D5_SRCCLKREQ0_N
53	CLK_SRC0_DN	54	WAKE_N
55	CLK_SRC0_DP	56	NC
57	GND	58	NC
59	M_KEY	60	NC
61	M_KEY	62	NC
63	M_KEY	64	NC
65	M_KEY	66	NC
67	NC	68	NC
69	PCIE_SEL	70	V3P3S_M2_CPU
71	GND	72	V3P3S_M2_CPU
73	GND	74	V3P3S_M2_CPU
75	GND	-	

Note: M.2 M-key slot supports SATAIII only.

2.6.24 M.2 E-Key Slot (M2_E1)

Connector Location: M2_E1

Description: M.2 E-Key Connector for Wi-Fi



M2_E1

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	2	V3.3A_WLAN
3	M_USB2_P10_DP	4	V3.3A_WLAN
5	M_USB2_P10_DN	6	M.2_WLAN_LED1_N
7	GND	8	AVS_I2S2_SCLK_R
9	NC	10	AVS_I2S2_SFRM
11	NC	12	AVS_I2S2_RXD
13	GND	14	AVS_I2S2_TXD
15	NC	16	M.2_BT_LED2_N
17	NC	18	GND
19	GND	20	UART_BT_WAKE_N
21	NC	22	SIO_UART0_RXD
23	NC	24	E-KEY
25	E-KEY	26	E-KEY
27	E-KEY	28	E-KEY
29	E-KEY	30	E-KEY
31	E-KEY	32	SIO_UART0_TXD
33	GND	34	SIO_UART0_CTS
35	PCIE_P4_TXP	36	SIO_UART0_RTS
37	PCIE_P4_TXN	38	NC
39	GND	40	NC
41	PCIE_P4_RXP	42	NC
43	PCIE_P4_RXN	44	NC
45	GND	46	NC
47	CLK_SRC5_DP	48	NC
49	CLK_SRC5_DN	50	SUS_CLK
51	GND	52	M.2_WLAN_PERST_R_N

PIN	ASSIGNMENT	PIN	ASSIGNMENT
53	PCIE_CLKREQ1_N	54	GPPC_A13_BT_RF_KILL_N
55	GPPC_C23_WIFI_WAKE_N	56	GPPC_B15_WIFI_RF_KILL_N
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	GND	64	TP11
65	NC	66	NC
67	NC	68	NC
69	GND	70	NC
71	NC	72	V3.3A_WLAN
73	NC	74	V3.3A_WLAN
75	GND	-	-

2.6.25 SATA 3.0 & SATA Power Connectors (SATA1, SATA_PWR1)

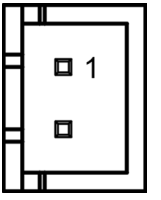
Connector Location: SATA1
Description: Serial ATA 3.0 Connector

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

SATA1

Connector Location: SATA_PWR1
Description: SATA Power Wafer

PIN	ASSIGNMENT
1	5V
2	GND



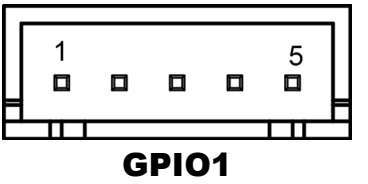
SATA_PWR1

2.6.26 General-Purpose Input / Output Connector (GPIO1)

Connector Location: GPIO1

Description: General-Purpose Input / Output Connector

PIN	ASSIGNMENT
1	DIO1
2	DIO2
3	5V
4	3.3V
5	GND



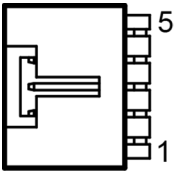
GPIO1

2.6.27 On Board Touch Wafer (JTOUCH1)

Connector Location: JTOUCH1

Description: On Board Touch Wafer

PIN	ASSIGNMENT
1	L+
2	L-
3	COM
4	U+
5	U-

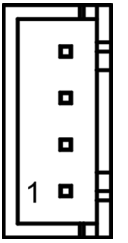


JTOUCH1

2.6.28 24V DC Out Connector (VOUT_24)

Connector Location: VOUT_24
Description: 24V DC Out Connector

PIN	ASSIGNMENT
1	24V
2	24V
3	GND
4	GND

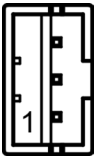


VOUT_24

2.6.29 Power for 2nd Display Connector (VOUT_12)

Connector Location: VOUT_12
Description: Power for 2nd Display Connector

PIN	ASSIGNMENT
1	12V
2	GND
3	12V



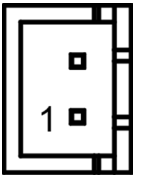
VOUT_12

2.6.30 DC 5V Power Connector (VOUT_5)

Connector Location: VOUT_5

Description: DC 5V Power Connector

PIN	ASSIGNMENT
1	5V
2	GND



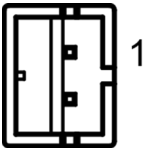
VOUT_5

2.6.31 Power Button Wafer (JPWRBTN1)

Connector Location: JPWRBTN1

Description: Power Button Wafer

PIN	ASSIGNMENT
1	PWRBTN_N
2	GND

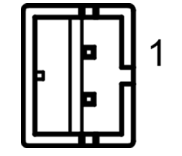


JPWRBTN1

2.6.32 System LED Wafer (JSYS_LED1)

Connector Location: JSYS_LED1
Description: System LED Wafer

PIN	ASSIGNMENT
1	SYS_LED
2	GND

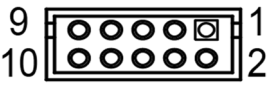


JSYS_LED1

2.6.33 Audio Connector (AUDIO1)

Connector Location: AUDIO1
Description: Audio Codec Line Out / Mic Pin Header

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

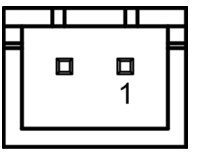


AUDIO1

2.6.34 Speaker Wafer (SPK1)

Connector Location: SPK1
Description: Speaker Wafer

PIN	ASSIGNMENT
1	VOUTP
2	VOUTN



SPK1

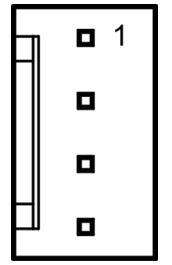
2.6.35 CPU Fan Connector (CPU_FAN1)

Connector Location: CPU_FAN1

Description: CPU Fan Connector

PIN	ASSIGNMENT
1	GND
2	12V
3	CPU_FANIN
4	CPU_FANOUT

Note: PA-J581 is a fanless system.



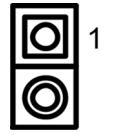
CPU_FAN1

2.6.36 System Reset Wafer (JRST1)

Connector Location: JRST1

Description: System Reset Wafer

PIN	ASSIGNMENT
1	RSTJ_BTN
2	GND



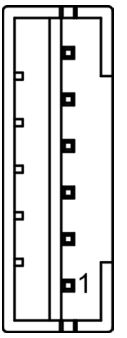
JRST1

2.6.37 Panel Inverter Wafer (INV1)

Connector Location: INV1

Description: Panel Inverter Wafer

PIN	ASSIGNMENT
1	12V
2	12V
3	GND
4	LVDS BKLCTL
5	GND
6	LVDS BKLTEN



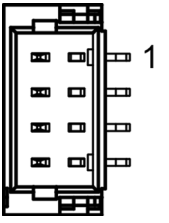
INV1

2.6.38 I2C Wafer (I2C1)

Connector Location: I2C1

Description: I2C Wafer

PIN	ASSIGNMENT
1	GND
2	3.3V
3	I2C_SCL
4	I2C_SDA



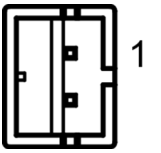
I2C1

2.6.39 Battery Wafer (JBAT1)

Connector Location: JBAT1

Description: Battery Wafer

PIN	ASSIGNMENT
1	VRTC_BATT
2	GND



JBAT1

2.6.40 Clear CMOS Data Selection (JCMOS1)

Jumper Location: JCMOS1

Description: Clear CMOS data selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
Normal	**Open** *(Default Setting)*	
Clear CMOS Data	1-2	

Note: To clear CMOS data, you must power off the computer and set the jumper to "Clear CMOS Data" as illustrated above. After 5 to 6 seconds, set the jumper back to "Normal" and power on the computer.

2.7 VFD Board Component Locations & Pin Assignment

2.7.1 VFD Board: MB-4003

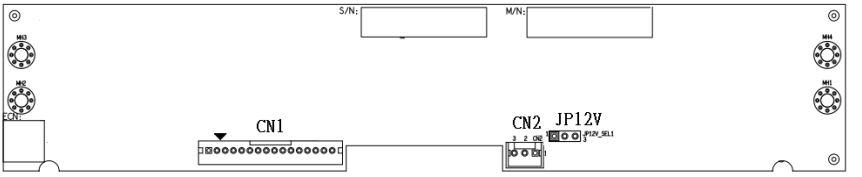


Figure 2-1. MB-4003 VFD Board Component Locations

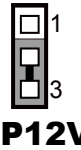
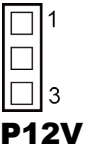
2.7.2 Jumper & Connector Quick Reference Table

Jumper / Connector	NAME
Power Switch Selection	JP12V
RS-232 Serial Interface Connector	CN1

2.7.3 Setting MB-4003 VFD Board Connector and Jumper

2.7.3.1 Power Switch Selection (JP12V)

Jumper Location: JP12V
Description: Power Switch Selection

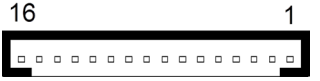
SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
OFF	1-2	 **JP12V**
ON	**2-3** ***(Default Setting)***	 **JP12V**
NC	Open	 **JP12V**

Note: If CN2 (External Power Switch Connector) is connected with the cable, JP12V (Power Switch Jumper) should not be set (NC).

2.7.3.2 RS-232 Serial Interface Connector (CN1)

Connector Location: CN1
Description: RS-232 serial interface wafer

PIN	ASSIGNMENT
1	GND
2	TXD
3	RXD
4	DTR
5	DSR
6	RTS
7	CTS
8	+12V/+5V
9-16	NC



CN1

3 Software Utilities

This chapter provides the detailed information of driver utilities and BIOS settings for the system. The following topics are included:

- Driver
  - Intel® Chipset Software Installation Utility
  - Graphics Driver Utility
  - Intel® Management Engine Driver Installation
  - LAN Driver Utility
  - Sound Driver Utility
- Embedded Peripheral Devices
  - VFD: MB-4003 (RS-232)
  - OPOS Driver
- API
- BIOS Operation

3.1 Driver

3.1.1 Introduction

Enclosed with the PA-J581 Series package is our driver utilities, which comes in a DVD-ROM disc. See the following table for driver locations.

Filename (Assume that DVD- ROM drive is D :)	Purpose
D:\Driver\Platform\1_Main Chip\Win10(64-bit)	Intel(R) Chipset Device Software installer
D:\Driver\Platform\2_Graphics\Win10 (64-bit)	Intel(R) HD Graphics Driver installer
D:\Driver\Platform\3_ME\Win10 (64-bit)\	Intel(R) *Management Engine* Driver installer
D:\Driver\Platform\4_LAN Chip\Win10 (64-bit)	Intel(R) LAN Driver installer
D:\Driver\Platform\5_sound\Win10 (64-bit)	Realtek(R) ALC888S HD Audio Driver installer

Note 1: Be sure to install the driver utilities right after the OS is fully installed.

3.1.2 Intel® Chipset Software Installation Utility

Introduction

The Intel® Chipset Software Installation Utility installs to the target system the Windows* INF files that outline to the operating system how the chipset components will be configured. This is required for the following features to function properly:

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

Installation of Intel® Chipset Driver

The utility pack is to be installed only for Windows 10 Enterprise 2019 LTSC / 2016 LTSB (64-bit) series, and it should be installed right after the OS installation is completed. Please follow the steps below:

1. Connect the USB DVD-ROM device to PA-J581 and insert the driver disk inside.
2. Enter the **"Main Chip"** folder where the Chipset driver is located.
3. Click **SetupChipset.exe** file for driver installation for Windows 10 OS platform.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart the PA-J581 for the changes to take effect.

3.1.3 Graphics Driver Utility

The Graphics interface embedded with the PA-J581 series can support a wide range of display types.

Installation of Graphics Driver

To install the Graphics Driver, follow the steps below:

1. Connect the USB DVD-ROM device to PA-J581 and insert the driver disk inside.
2. Enter the **"Graphics"** folder where the Graphics driver is located.
3. Click **Installer.exe** file for driver installation for Windows 10 OS platform.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart the PA-J581 for the changes to take effect.

3.1.4 Intel® Management Engine Components Installer Installation

Follow the steps below to install the Intel® Management Engine Components Installer:

1. Connect the USB DVD-ROM device to PA-J581 and insert the driver disk.
2. Enter the **"ME"** folder where the driver is located.
3. Click **SetupME.exe** file for ME driver installation.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart PA-J581 for the changes to take effect.

3.1.5 LAN Driver Utility

The PA-J581 Series is enhanced with LAN function that can support various network adapters.

For more details on the Installation procedure, please refer to the Readme.txt file found on LAN Driver Utility.

Installation of LAN Driver

To install the LAN Driver, follow the steps below:

1. Connect the USB DVD-ROM device to PA-J581 and insert the driver disk inside.
2. Enter the **"LAN Chip"** folder where the LAN driver is located.
3. Click **Wired_driver_27.6_x64.exe** file for driver installation for Windows 10 OS platform.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart the PA-J581 for the changes to take effect.

3.1.6 Sound Driver Utility

The sound function enhanced in this system is fully compatible with 10 (64-bit) series.

Installation of Sound Driver

To install the Sound Driver, refer to the readme.txt file on the driver disc.

1. Connect the USB DVD-ROM device to PA-J581 and insert the driver disk inside.
2. Enter the **"Sound"** folder where the Sound driver is located.
3. Click **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 the PA-J581 for the changes to take effect.

3.2 Embedded Peripheral Devices

The Command lists and driver installation guide for peripheral devices of the system - VFD – are explicitly included in the sections below:

3.2.1.1 VFD: MB-4003 (RS-232) Commands List

1. VFD Registry Operation

Registry Path:
[HKEY_LOCAL_MACHINE\SOFTWARE\OLEforRetail\ServiceOPOS\LineDisplay\Prox-PMP4000]

Registry Name	Default Data	Notes
Default Value	LineDisplay.PMP4000.1	-
BaudRate	9600	-
BitLength	8	-
Parity	0	-
Port	COM3	-
Stop	1	-

2. OPOS VFD Service Object and Method Relations

Method	Status of Support	Notes
Open	○	-
Close	○	-
ClaimDevice	○	-
ReleaseDevice	○	-
Enable	○	-
Disable	○	-
DisplayText	○	-
DisplayTextAt	○	-
ClearText	○	-

3.2.1.2 OPOS Driver

The **MB4000_OposSetup.exe** program sets up the registry information and example program of VFD for OPOS program uses.

1. Installation

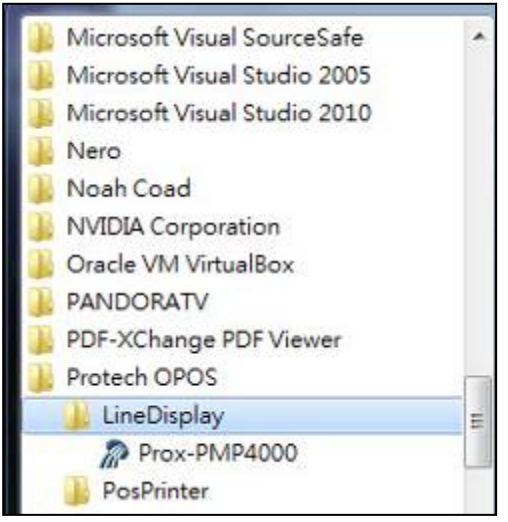
The steps below guide you to install the **MB4000_OposSetup** program.

- Run the **MB4000_OposSetup** setup file
- This setup also installs the **Prox-PMP4000** program.
- Follow the wizard instructions to complete the installation.

2. Launching the Program

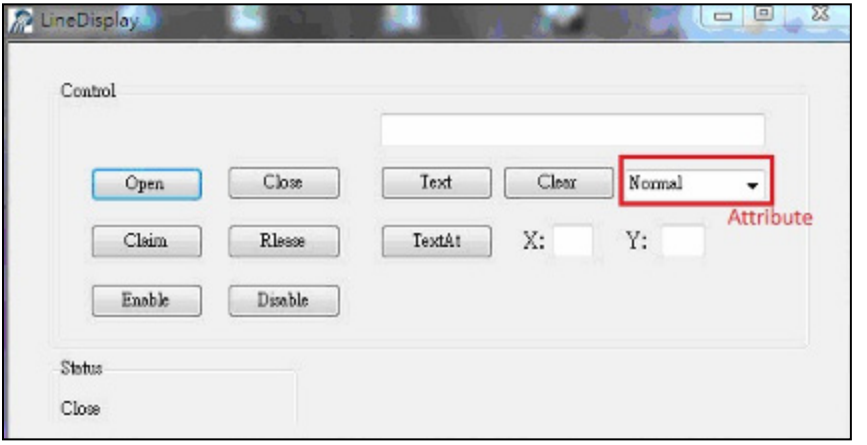
The steps below guide you to load the **Prox-PMP4000** program.

- Click the *LineDisplay* folder from the path: *Start/Programs/Protech OPOS*.
- Click **Prox-PMP4000** to launch the program.



3. OPOS Control Object of **Prox-PMP4000** program

Main screen buttons:



Button/Item	Description
Text	Display the text at the current cursor position.
TextAt	Display the string of characters at the point of the specified “y-coordinate” and “x-coordinate”.
Clear	Clear the message shown in the current window.
Attribute	• **Normal:** Display the normal characters on the display screen. • **Blink:** Enable the display screen to blink. • **Reverse:** Enable the character printing in reverse black and white. • **Blink+Reverse:** Enable the display screen to blink and activate the character printing in reverse black and white.

4. MB-4003 type

Key Name	Type	Default Value	Note
BaudRate	String	9600	UART Baud Rate (default)
BitLength	String	8	UART Data Bit (default)

Key Name	Type	Default Value	Note
Parity	String	0	UART Parity Bit (default)
Port	String	COM3	UART Port (default)
Stop	String	1	UART Stop Bit (default)

5. OPOS APIs Support List

	Category Type	Name	Mutability	OPOS APG Version	VFD .SO
Properties	common bool	AutoDisable	R/W	1.2	Not Applicable
Properties	common long	BinaryConversion	R/W	1.2	Not Applicable
Properties	common long	CapPowerReporting	Read only	1.3	Not Applicable
Properties	common string	CheckHealthText	Read only	1.0	Supported
Properties	common bool	Claimed	Read only	1.0	Supported
Properties	common long	DataCount	Read only	1.2	Not Applicable
Properties	common bool	DataEventEnabled	Read only	1.0	Not Applicable
Properties	common bool	DeviceEnabled	R/W	1.0	Not Applicable
Properties	common bool	FreezeEvents	R/W	1.0	Not Applicable
Properties	common long	OpenResult	Read only	1.5	Not Applicable
Properties	common bool	OutputID	Read only	1.0	Not Applicable
Properties	common bool	PowerNotify	R/W	1.3	Not Applicable
Properties	common bool	PowerState	Read only	1.3	Not Applicable
Properties	common long	ResultCode	Read only	1.0	Supported
Properties	common long	ResultCodeExtended	Read only	1.0	Not Applicable
Properties	common long	State	Read only	1.0	Supported
Properties	common string	ControlObject Description	Read only	1.0	Not Applicable
Properties	common long	ControlObject Version	Read only	1.0	Not Applicable
Properties	common string	ServiceObject Description	Read only	1.0	Supported
Properties	common long	ServiceObject Version	Read only	1.0	Supported
Properties	common string	DeviceDescription	Read only	1.0	Supported
Properties	common string	ControlObject Description	Read only	1.0	Not Applicable
Properties	specific long	CapBlink	Read only	1.0	Not Applicable
Properties	specific bool	CapBlinkRate	Read only	1.6	Not Applicable
Properties	specific bool	CapBrightness	Read only	1.0	Not Applicable
Properties	specific long	CapCharacterSet	Read only	1.0	Not Applicable
Properties	specific long	CapCursorType	Read only	1.6	Not Applicable
Properties	specific bool	CapCustomGlyph	Read only	1.6	Not Applicable
Properties	specific bool	CapDescriptors	Read only	1.0	Not Applicable

	Category Type	Name	Mutability	OPOS APG Version	VFD .SO
Properties	specific bool	CapHMarquee	Read only	1.0	Not Applicable
Properties	specific bool	CapICharWait	Read only	1.0	Not Applicable
Properties	specific long	CapReadBack	Read only	1.6	Not Applicable
Properties	specific long	CapReverse	Read only	1.6	Not Applicable
Properties	specific bool	CapVMarquee	Read only	1.0	Not Applicable
Properties	specific long	BlinkRate	R/W	1.6	Not Applicable
Properties	specific long	DeviceWindows	Read only	1.0	Not Applicable
Properties	specific long	DeviceRows	Read only	1.0	Not Applicable
Properties	specific long	DeviceColumns	Read only	1.0	Not Applicable
Properties	specific long	DeviceDescriptors	Read only	1.0	Not Applicable
Properties	specific long	DeviceBrightness	R/W	1.0	Not Applicable
Properties	specific long	CharacterSet	R/W	1.0	Not Applicable
Properties	specific string	CharacterSetList	Read only	1.0	Not Applicable
Properties	specific long	CurrentWindow	R/W	1.0	Not Applicable
Properties	specific long	Rows	Read only	1.0	Not Applicable
Properties	specific long	Columns	Read only	1.0	Not Applicable
Properties	specific long	CursorRow	R/W	1.0	Not Applicable
Properties	specific long	CursorColumn	R/W	1.0	Not Applicable
Properties	specific long	CursorType	R/W	1.6	Not Applicable
Properties	specific bool	CursorUpdate	R/W	1.0	Not Applicable
Properties	specific long	MarqueeType	R/W	1.0	Not Applicable
Properties	specific long	MarqueeFormat	R/W	1.0	Not Applicable
Properties	specific long	MarqueeUnitWait	R/W	1.0	Not Applicable
Properties	specific long	MarqueeRepeatWait	R/W	1.0	Not Applicable
Properties	specific long	InterCharacterWait	R/W	1.0	Not Applicable
Properties	specific string	CustomGlyphList	Read only	1.6	Not Applicable
Properties	specific long	GlyphHeight	Read only	1.6	Not Applicable
Properties	specific long	GlyphWidth	Read only	1.6	Not Applicable
Methods	common	Open	-	1.0	Supported
Methods	common	Close	-	1.0	Supported
Methods	common	Claim	-	1.0	Supported
Methods	common	ClaimDevice	-	1.0	Supported
Methods	common	Release	-	1.0	Supported
Methods	common	ReleaseDevice	-	1.0	Supported
Methods	common	CheckHealth	-	1.0	Not Applicable
Methods	common	ClearInput	-	1.0	Not Applicable
Methods	common	ClearOutput	-	1.0	Not Applicable
Methods	common	DirectIO	-	1.0	Not Applicable
Methods	specific	DisplayText	-	1.0	Supported

	Category Type	Name	Mutability	OPOS APG Version	VFD .SO
Methods	specific	DisplayTextAt	-	1.0	Supported
Methods	specific	ClearText	-	1.0	Supported
Methods	specific	ScrollText	-	1.0	Not Applicable
Methods	specific	SetDescriptor	-	1.0	Not Applicable
Methods	specific	ClearDescriptors	-	1.0	Not Applicable
Methods	specific	CreateWindow	-	1.0	Not Applicable
Methods	specific	DestroyWindow	-	1.0	Not Applicable
Methods	specific	RefreshWindow	-	1.0	Not Applicable)
Methods	specific	ReadCharacterAtCursor	-	1.6	Not Applicable
Methods	specific	DefineGlyph	-	1.6	Not Applicable
Events	common	DataEvent	-	1.0	Not Applicable
Events	common	DirectIOEvent	-	1.0	Not Applicable
Events	common	ErrorEvent	-	1.0	Not Applicable
Events	common	OutputComplete Event	-	1.0	Not Applicable
Events	common	StatusUpdate Event	-	1.3	Not Applicable

3.3 API

3.3.1 API Package Content

You can find the enclosed API Package files in the Protech Manual / Driver DVD. Depending on the machine types, the API Package may include the following files:

Operation System	**Windows 10 64bits**	
Directory	**Contents / File Name**	**Description**
.	API User Guide A01-J581-000-01-221125.pdf	User Guide
.\Demo	Demo applications base on sample code	Include necessary library and xml files, see **Function DLL** for detail.
.\Demo Project	Sample code projects	See **Sample Program** for detail.
.\ProxAPI standard	Integrated test application for all functions.	Single application for test all functions quickly.

Function DLL		
Function	**File Name**	**Description**
Cash Drawer	CashDrawer.dll	Library for Cash Drawer API.
Device Power Control	DevPowerControl.dll	Library for Device Power Control API.
Digital IO	Digital.dll	Library for Digital IO API
Hardware Monitor	Hardware Monitor.dll	Library for Hardware Monitor API.
Watch Dog	WatchDog.dll	Library for Watch Dog API.
Windows Memory Access	WinIo64.dll	Common library for Memory Access.
Windows Memory Access	WinIo64.sys	Common driver for Memory Access.
Windows IO Port Access	inpoutx64.dll	Common library for IO Port Access.
XML configuration file Access	multilangXML.dll	Common library for XML access.

Sample Program		
Directory	**Contents / File Name**	**Description**
Demo Project\ CashDrawer	Sample code for Cash Drawer	Visual Studio Project
Demo Project\ DevicePowerControl	Sample code for Device Power Control	Visual Studio Project
Demo Project\ Digital	Sample code for Digital IO	Visual Studio Project
Demo Project\ HardwareMonitor	Sample code for Hardware Monitor	Visual Studio Project
Demo Project\ WatchDog	Sample code for Watch Dog	Visual Studio Project

3.3.2 API Procedure

Take **VB2005 .NET** for example, first you must declare a function. You may create a module in your project and fill in the function, cash drawer for example.

Declare Function GetCashDrawerStatus Lib CashDrawer.dll (ByVal num_drawer as short) As Boolean

Declare Function CashDrawerOpen Lib CashDrawer.dll (ByVal num_drawer as short) As Boolean
Next, create a button to call API Function

1. Call Cash drawer open event:
   Private Sub cash_btn1_Click (ByVal Sender As System.Object, ByVal e As System.EventArgs) Handles cash_btn1.Click
   CashDrawerOpen(1), "1" specifies the cash drawer 1 port
   CashDrawerOpen(2), "2" specifies the cash drawer 2 port
   Timer1.start
2. Detect Cash drawer status:
   A timer event can be created.
   Private Sub Timer1_Tick (ByVal Sender As System.Object,ByVal e As System.EventArgs) Handles Timer1.Tick
   Dim Receive_Status1 as Boolean
   Dim Receive_Status2 as Boolean Receive_Status1 = CashDrawerOpen(&H1)
   If Receive_Status1 = true then
   Text1.text = "cash drawer1 open" 'enter text into textbox.
   Else
   Text1.text = "cash drawer1 close" 'enter text into textbox.
   End if
   '==========
   Receive_Status2 = CashDrawerOpen(&H2)
   If Receive_Status2 = true then
   Text2.text = "cash drawer2 open" 'enter text into textbox.
   Else
   Text2.text = "cash drawer2 close" 'enter text into textbox.
   End if
   '==========
   End sub

Sample Code

(1) VB Declaration

Declare Function GetCashDrawerStatus Lib CashDrawer.dll (ByVal num_drawer as short) As Boolean

Declare Function CashDrawerOpen Lib CashDrawer.dll (ByVal num_drawer as short) As Boolean

(2) Call Function

Open cash drawer:
CashDrawerOpen(1)
Open cash drawer1
CashDrawerOpen(2)
Open cash drawer2

Check cash drawer status:
Dim receive_status as Boolean
Check cash drawer1 status
Receive_Status = CashDrawerOpen(&H1)
Check cash drawer2 status
Receive_Status = CashDrawerOpen(&H2)

==========

(1) C# Declaration Method

```
Public class PortAccess
{
[DllImport("CashDrawer.dll",EntryPoint = "Initial_CashDrawer")]
Public static extern void Initial_CashDrawer();
[DllImport("CashDrawer.dll",EntryPoint= "GetCashDrawerStatus")]
Public static extern bool GetCashDrawerStatus()
[DllImport("CashDrawer.dll",EntryPoint = "CashDrawerOpen")]
Public static extern bool CashDrawerOpen(short num_drawer);}
```

(2) Call Function

Open cash drawer1

```
PortAccess.CashDrawerOpen(0x01);          //check cash drawer1 status
```

Open cash drawer2

```
PortAccess.CashDrawerOpen(0x02);          //check cash drawer2 status
```

```
Bool bstatus;
bstatus = PortAccess.GetCashDrawerStatus(0x01);
bstatus = PortAccess.GetCashDrawerStatus(0x02); //Before get cash drawer status, need to initial cash drawer first
```

VB.NET external function:

```
Declare Function SetMinSec Lib “WatchDog.dll” (ByVal kind As Short,ByVal
delay_time As Short) As Boolean
Declare Function Stopwatchdog Lib “WatchDog.dll” ( ) As Short
Declare Function Setwatchdog Lib “WatchDog.dll” (ByVal value As Short) As
Boolean
‘=========================================
Declare Function Digital_Initial Lib “Digital.dll” ( ) As Long
Declare Function Digtial_Set Lib “Digital.dll”(ByVal hex_value As Short) As
Long
Declare Function Digtial_Get Lib ”Digital.dll” ( ) As Short
‘=========================================
Declare Function GPIO_Initial Lib “GPIO.dll” ( ) As Long
Declare Function GPIO_SetPort Lib “GPIO.dll”(ByVal direct As long)
Declare Function GPIO_Set Lib “GPIO.dll”(ByVal dout_value As long) As
Boolean
Declare Function GPIO_Get Lib “GPIO.dll”( ) As Short
‘=========================================
Declare Function GetCashDrawerStatus Lib CashDrawer.dll (ByVal
num_drawer as short) As Boolean
Declare Function CashDrawerOpen Lib CashDrawer.dll (ByVal num_drawer as
short) As Boolean
```

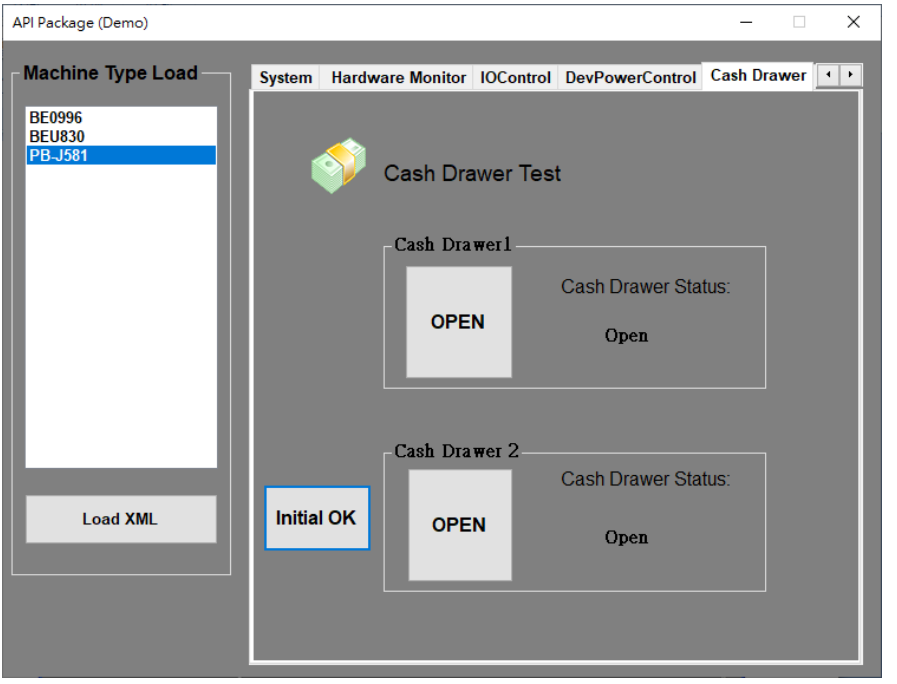
==========

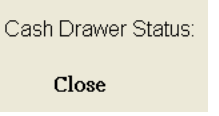
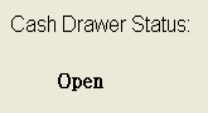
VB 6 external function:

```
Declare Function CashDrawerOpen Lib "CashDrawer.dll" (ByVal num_drawer
As Integer) As Boolean
Declare Function GetCashDrawerStatus Lib "CashDrawer.dll" (ByVal
num_drawer As Integer) As Boolean
```

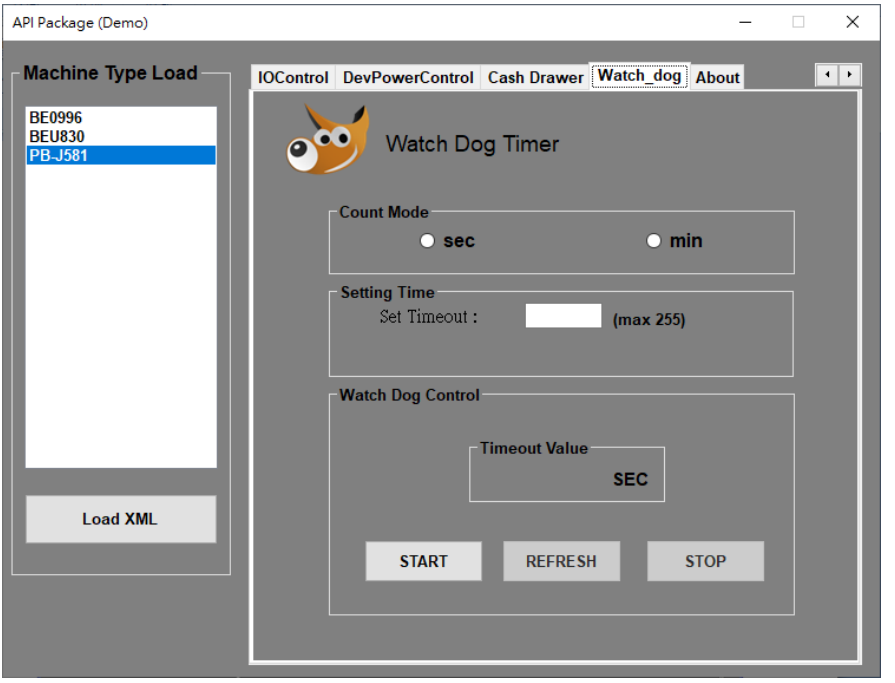
Note: VB.net short = integer VB6

3.3.3 Cash Drawer



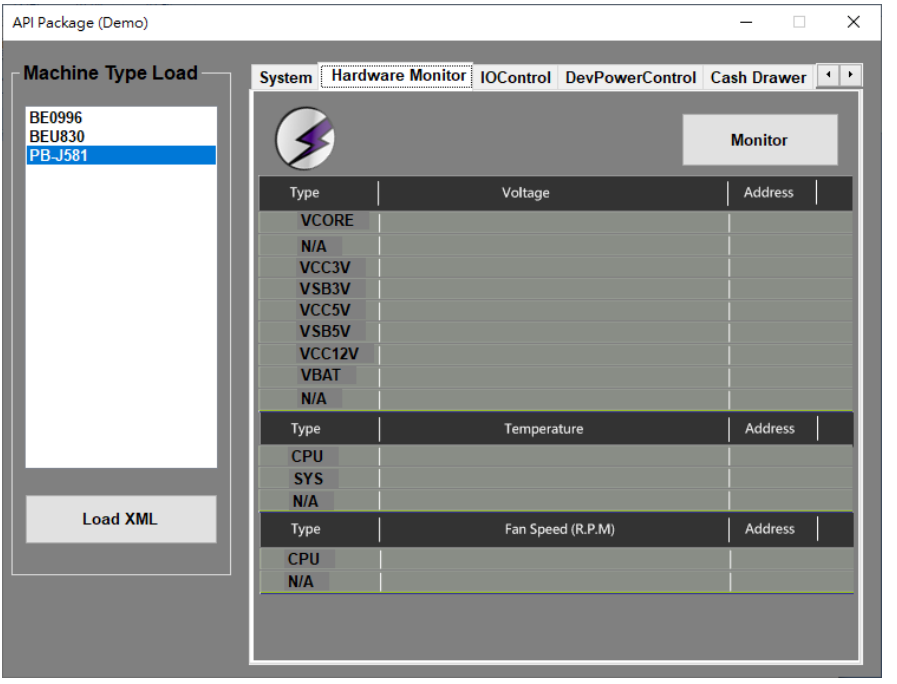
Button/Item	Description
Initial (button)	Status will be showing if Initial OK.
OPEN (button)	Tap to open the cash drawer.
Cash Drawer Status	Cash drawer status will be displayed after **OPEN** is tapped. • Cash Drawer is closed when the following picture is shown:  • Cash Drawer is opened when the following picture is shown: 

3.3.4 Watchdog Timer



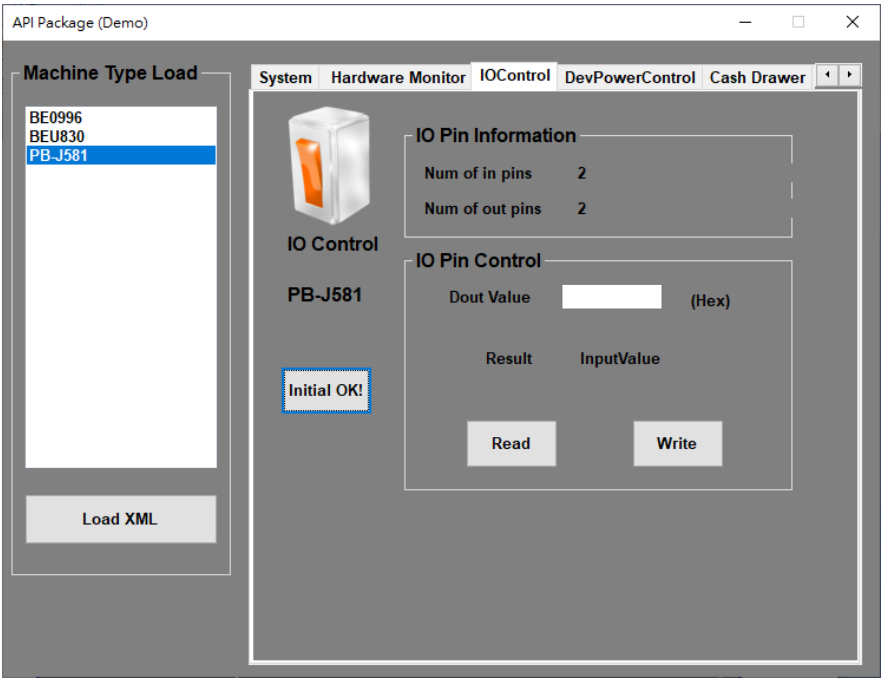
Button/Item	Description
Count Mode (radio button)	Select the unit of time, second or minute for the watchdog timer.
Setting Time	Set the timeout for the watchdog timer. (Maximum value: 255 seconds or minutes)
Watch Dog Control	• **Timeout Value**: Simulation timer of the API program. The running watchdog timeout will be displayed (in seconds). It is not as accurate as a hardware watchdog clock. • **START**: Tap to start the watchdog timer. Meanwhile, the **REFRESH** and **STOP** buttons will be enabled. • **STOP**: Tap to stop the watchdog timer. • **REFRESH**: Tap to restart the watchdog timer.

3.3.5 Hardware Monitor



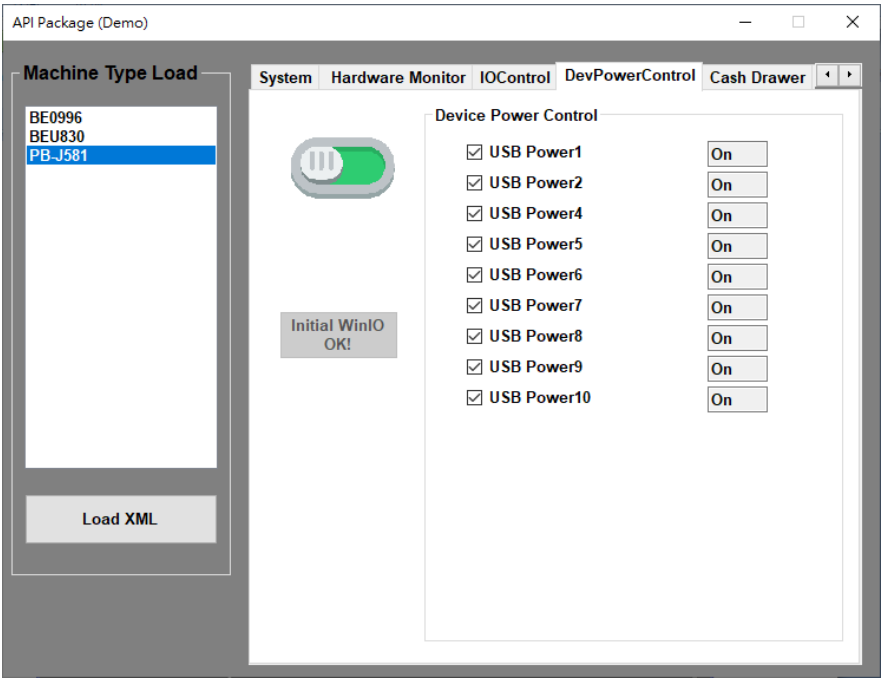
Button/Item	Description
Monitor (button)	Tap to get the hardware monitoring values, such as the voltages, temperatures, and fan speeds (rpm).

3.3.6 Digital IO Control



Button/Item	Description
Initial (button)	Must Initial OK to start Read/Write.
Dout Value	User need to input HEX value before Write.
Read (button)	Read the DIN value and show after the Result.
Write (button)	Write the value of "Dout Value" to DOUT.

3.3.7 Device Power Control



Button/Item	Description
Initial (button)	Must Initial OK to start Read/Write.
Device Power Control	Check to turn-on, Uncheck to turn-off.

3.4 API Function

The API program-related sample programs, developed in VB.Net and C#, are provided for easy use of the API Package. Refer to the main API functions listed as below:

Function DLL		
Function	**File Name**	**Description**
Cash Drawer	CashDrawer.dll	Library for Cash Drawer API.
Device Power Control	DevPowerControl.dll	Library for Device Power Control API.
Digital IO	Digital.dll	Library for Digital IO API
Hardware Monitor	Hardware Monitor.dll	Library for Hardware Monitor API.
Watch Dog	WatchDog.dll	Library for Watch Dog API.
Windows Memory Access	WinIo64.dll	Common library for Memory Access.
Windows Memory Access	WinIo64.sys	Common driver for Memory Access.
Windows IO Port Access	inpoutx64.dll	Common library for IO Port Access.
XML configuration file Access	multilangXML.dll	Common library for XML access.

3.4.1 Cash Drawer Function

Initial_CashDrawer

int Initial_CashDrawer(void);

Purpose: Initialize cash drawer library.
Return: True (1) on success, False (0) on failure

Example: Initial_CashDrawer(); // Initial the Cash Drawer dll

CashDrawerOpen

bool CashDrawerOpen (short num_drawer);

Purpose: Open the cash drawer API.
Value: num_drawer = 1 (Open the Cash Drawer1)
num_drawer = 2 (Open the Cash Drawer2)
Return: True (1) on success, False (0) on failure

Example: CashDrawerOpen(0x01); // Open the Cash Drawer1

GetCashDrawerStatus

bool GetCashDrawerStatus (short num_drawer);

Purpose: Get the cash drawer status.
Value: num_drawer = 1 (Get the Cash Drawer1 status)
num_drawer = 2 (Get the Cash Drawer2 status)
Return: True (1) on success, False (0) on failure

Example:
```
Short data;
data= GetCashDrawerStatus(0x01);    // Get the Cash Drawer1 status
if (data)
MsgBox("open1");      // Cash Drawer1 status "Open"
Else
MsgBox("close1");     // Cash Drawer1 status "Close"
Endif
```

3.4.2 Watch Dog Function

Watchdog_Set

bool Watchdog_Set (int value);

Purpose: Set the timeout for the watchdog timer.
Value value = 0 ~ 255
Return: True (1) on success, False (0) on failure

Watchdog_SetMinSec

bool Watchdog_SetMinSec (int kind);

Purpose: Set the unit of time as second/minute
Value kind = 1 (Measured in unit of second)
2 (Measured in unit of minute)
Return: True (1) on success, False (0) on failure

Watchdog_Stop

bool Watchdog_Stop (void);

Purpose: Stop the watchdog timer
Value None
Return: True (1) on success, False (0) on failure

Watchdog_Recount

bool Watchdog_Recount (void);

Purpose: Restart the watchdog timer
Value None
Return: True (1) on success, False (0) on failure

3.4.3 Hardware Monitor Function

HMWVoltage_Get

float HMWVoltage_Get (short VoltType)

Purpose: Get the hardware monitoring voltage value.
Value

VoltType	W83627HF	W83627EHF	SMSC3114	W83627UHG
0x01	VCoreA	CPU VCore	N/A	VCore
0x02	VCoreB	VIN0	+1.5V	VIN0
0x03	+3.3VIN	AVCC	N/A	AVCC
0x04	+5VIN	+3VCC	+5VIN	5VCC
0x05	+12VIN	VIN1	+12V	VIN1
0x06	-12VIN	VIN2	N/A	VIN2
0x07	-5VIN	VIN3	N/A	N/A
VoltType	81866			
0x01	VCore			
0x02	VCC12			
0x03	VCC5			
0x04	5VSB			
0x05	N/A			
0x06	N/A			
0x07	N/A			

Return: Float type data on voltage value

HMWTemperature_Get

float HMWTemperature_Get (short TempType)

Purpose: Get the hardware monitoring temperature value.

Value

TempType	W83627HF	W83627EHF	SMSC3114	W83627UHG
0x01	CPU temperature	System temperature	CPU temperature	CPU temperature
x02	N/A	CPU2 temperature	N/A	N/A
x03	N/A	N/A	N/A	N/A
TempType	81866			
x01	CPU temperature			
x02	System temperature			
x03	N/A			

Return: Float type data on temperature value

HMWFanSpeed_Get

float HMWFanSpeed_Get (short FanType)

Purpose: Get the hardware monitoring fan speed value.

Value

FanType	W83627HF	W83627EHF	SMSC3114	W83627UHG
0x01	Fan1	SysFanIN	FAN1	FAN1
0x02	Fan2	CPUFANIN	FAN2	FAN2
0x03	N/A	AUXFANIN	N/A	N/A
FanType	81866			
0x01	Fan1			
0x02	Fan2			
0x03	N/A			

Return: Float type data on fan speed value (rpm)

3.4.4 Digital IO Control Function

Digital_Initialize

bool Digital_Initialize(void);

Purpose: Initialize cash drawer library.
Return: True (1) on success, False (0) on failure

Digital_Set

bool Digital_Set(short logic_status);

Purpose: Set DOUT high/low.
Value logic_status = a set of bits represent the on/off status of DOUT pins.
Return: True (1) on success, False (0) on failure

Digital_Get

short Digital_Get(void);

Purpose: Get DIN high/low status.
Return: a set of bits represent the on/off status of DIN pins.

3.4.5 Device Power Control Function

DevPowerControl_Initialize

bool DevPowerControl_Initialize();

Purpose: Initialize cash drawer library.
Return: True (1) on success, False (0) on failure

DevPowerControl_Set

bool DevPowerControl_Set(int Index, bool data);

Purpose: Set the power on/off of indexed device
Value Index: the number of device to set.
data = 0 (Off)
1 (On)
Return: True (1) on success, False (0) on failure

DevPowerControl_Get

bool DevPowerControl_Get(int Index);

Purpose:	Get the power on/off status of indexed device
Value	Index: the number of device to set.
Return:	True (1) Power is On, False (0) Power is Off

DevPowerControl_Switch

bool DevPowerControl_Switch(int Index);

Purpose:	Switch the power of indexed device
Value	Index: the number of device to set.
Return:	True (1) Power is On, False (0) Power is Off

DevPowerControl_GetName

bool DevPowerControl_GetName(wchar_t wzBuf[], int Index);

Purpose:	Get the name of indexed device
Value	Index: the number of device to set. wzBuf[]: return the string of device name.
Return:	True (1) on success, False (0) on failure

DevPowerControl_GetNum

int DevPowerControl_GetNum();

Purpose:	Get the number of available devices
Return:	Number of available devices

3.5 BIOS Operation

3.5.1 BIOS Setup

The system **PA-J581** uses an AMI Aptio BIOS that is stored in the Serial Peripheral Interface Flash Memory (SPI Flash) and can be updated. The SPI Flash contains the BIOS Setup program, Power-on Self-Test (POST), the 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 an 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 provide standard environment for booting an operating system and running pre-boot applications. The following diagram shows the Extensible Firmware Interface's location in the software stack.

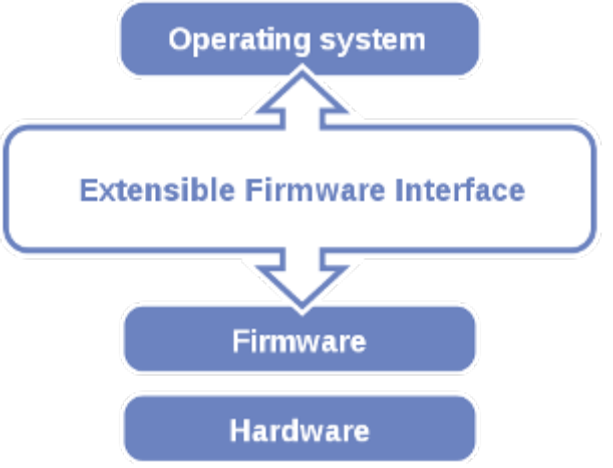


Figure 3-1. Extensible Firmware Interface Diagram

EFI BIOS provides an user interface allow users the ability to modify hardware configuration, e.g. change the system date and time, enable or disable a system component, decide bootable device priorities, setup personal password, etc., which is convenient for modifications and customization of the computer system and allows technicians another method for finding solutions if hardware has any problems.

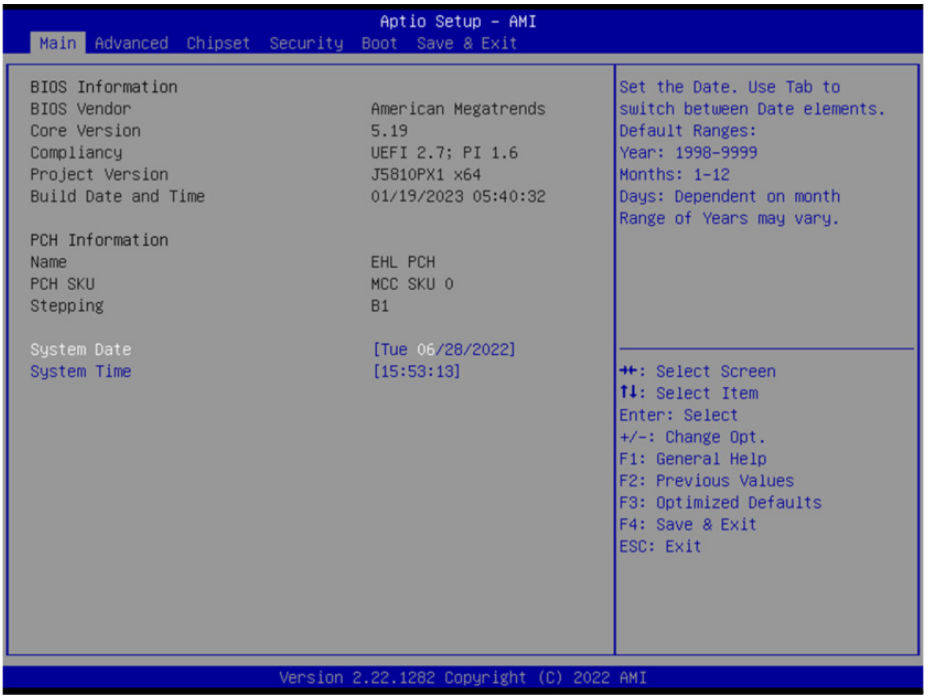
The BIOS Setup program can be used to view and change the BIOS settings for the computer. The BIOS Setup program is accessed by pressing the <Del> or <ESC> key after the POST memory test begins and before the operating system boot begins. The settings are shown below.

3.5.1.1 Accessing Setup Utility

When the system is powered on, the BIOS will enter the Power-On Self Test (POST) routines and the following message will appear on the lower screen:

POST Screen with AMI Logo

As long as this message is present on the screen you may press the <Del> key (the one that shares the decimal point at the bottom of the number keypad) to access the Setup program. In a moment, the main menu of the Aptio Setup Utility will appear on the screen:



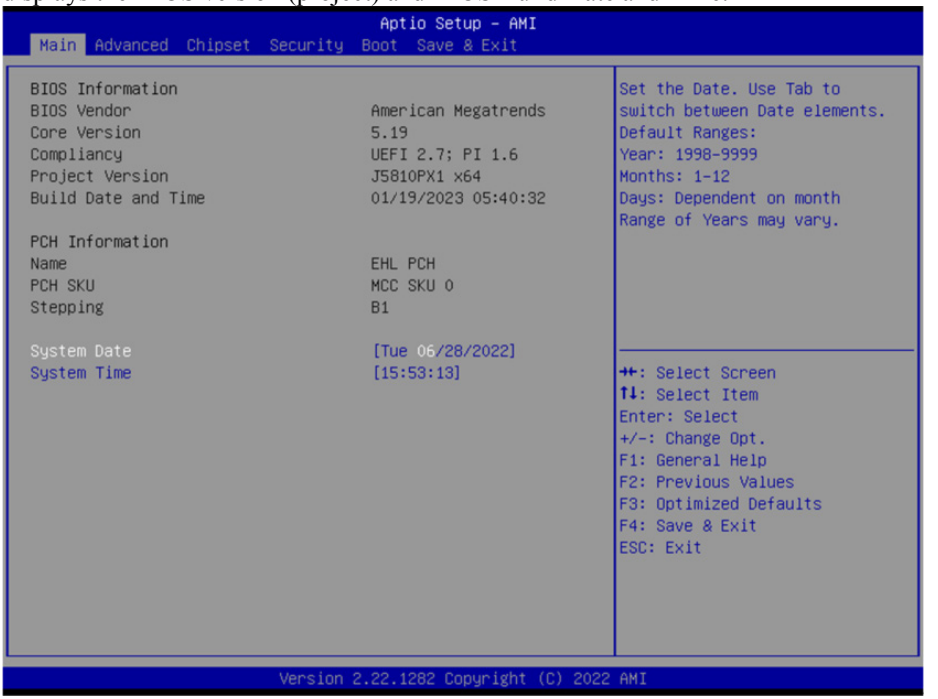
BIOS Setup Menu Initialization Screen

You may move the cursor by up/down keys to highlight the individual menu items. As you highlight each item, a brief description of the highlighted selection will appear at the bottom of the screen.

3.5.2 Main

Menu Path *Main*

The **Main** menu allows you to view the BIOS Information and change the system date and time. 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.



BIOS Main Menu

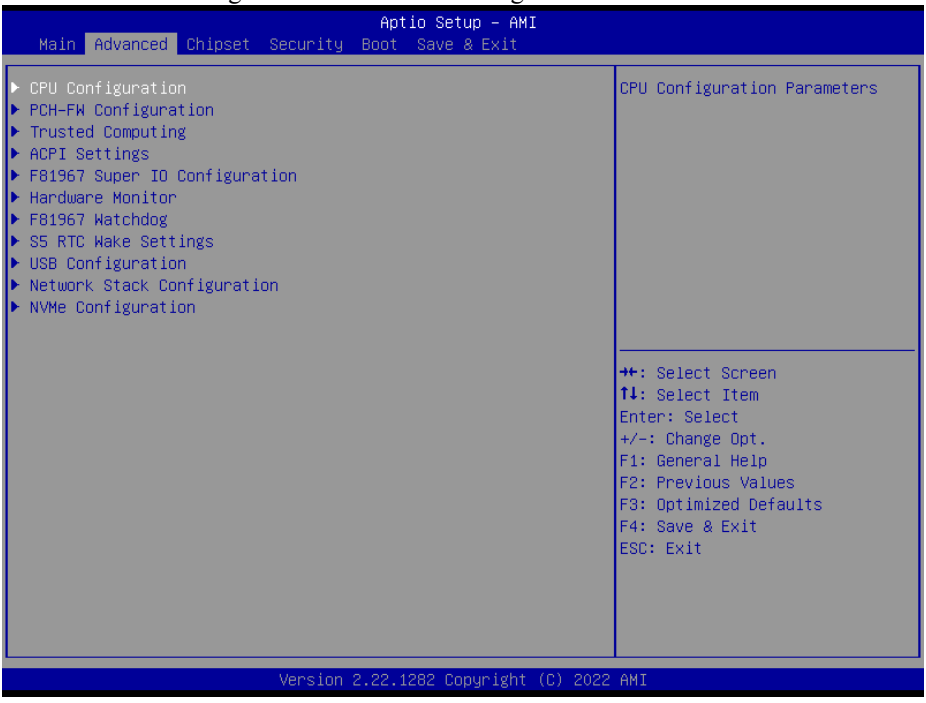
BIOS Setting	Options	Description/Purpose
BIOS Vendor	No changeable options	Displays the BIOS vendor.
Core Version	No changeable options	Displays the current BIOS core version.
Compliancy	No changeable options	Displays the current UEFI version.
Project Version	No changeable options	Displays the version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

BIOS Setting	Options	Description/Purpose
System Time	hour, minute, second	Sets the clock of the system.

3.5.3 Advanced

Menu Path *Advanced*

This menu provides advanced configurations such as CPU Configuration, PCH-FW Configuration, Trusted Computing, ACPI Settings, F81967 Super IO Configuration, Hardware Monitor, F81967 Watchdog, S5 RTC Wake Settings, USB Configuration, Network Stack Configuration and NVMe Configuration.



BIOS Advanced Menu

BIOS Setting	Options	Description/Purpose
CPU Configuration	Sub-Menu	CPU Configuration Parameters.
PCH-FW Configuration	Sub-Menu	Management Engine Technology Parameters.
Trusted Computing	Sub-Menu	Trusted Computing Settings.
ACPI Settings	Sub-Menu	System ACPI Parameters.

BIOS Setting	Options	Description/Purpose
F81967 Super IO Configuration	Sub-Menu	System Super IO Chip Parameters.
Hardware Monitor	Sub-Menu	Monitor hardware status.
F81967 Watchdog	Sub-Menu	Super IO Watchdog Parameters.
S5 RTC Wake Settings	Sub-Menu	S5 RTC Wake Parameters.
USB Configuration	Sub-Menu	USB Configuration Parameters.
Network Stack Configuration	Sub-Menu	Network Stack Settings.
NVMe Configuration	Sub-Menu	NVMe Device Options Settings.

3.5.3.1 Advanced – CPU Configuration

Menu Path *Advanced > CPU Configuration*

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

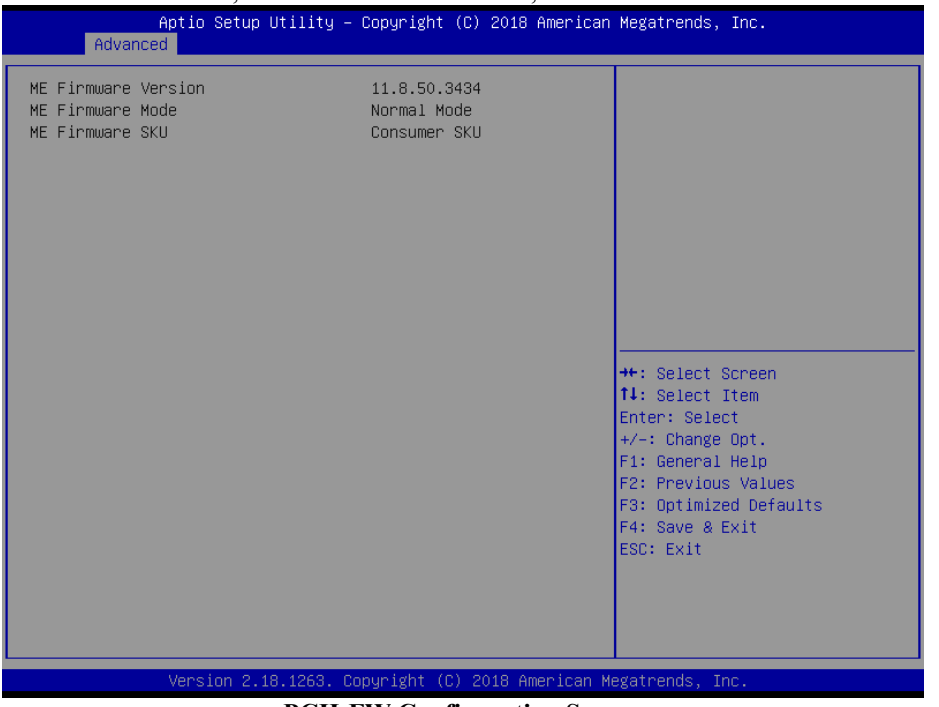
CPU Configuration Screen

BIOS Setting	Options	Description/Purpose
Type	No changeable options	Displays the CPU Type.
ID	No changeable options	Displays the CPU ID.
Speed	No changeable options	Displays the CPU Speed.
L1 Data Cache	No changeable options	L1 Data Cache Size.
L1 Instruction Cache	No changeable options	L1 Instruction Cache Size.
L2 Cache	No changeable options	L2 Cache Size.
L3 Cache	No changeable options	L3 Cache Size.
L4 Cache	No changeable options	L4 Cache Size.
VMX	No changeable options	CPU VMX hardware support for virtual machines.
SMX (Secure Mode Extensions) /TXT	No changeable options	Secure Mode extensions support.
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

3.5.3.2 Advanced – PCH-FW Configuration

Menu Path *Advanced > PCH-FW Configuration*

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



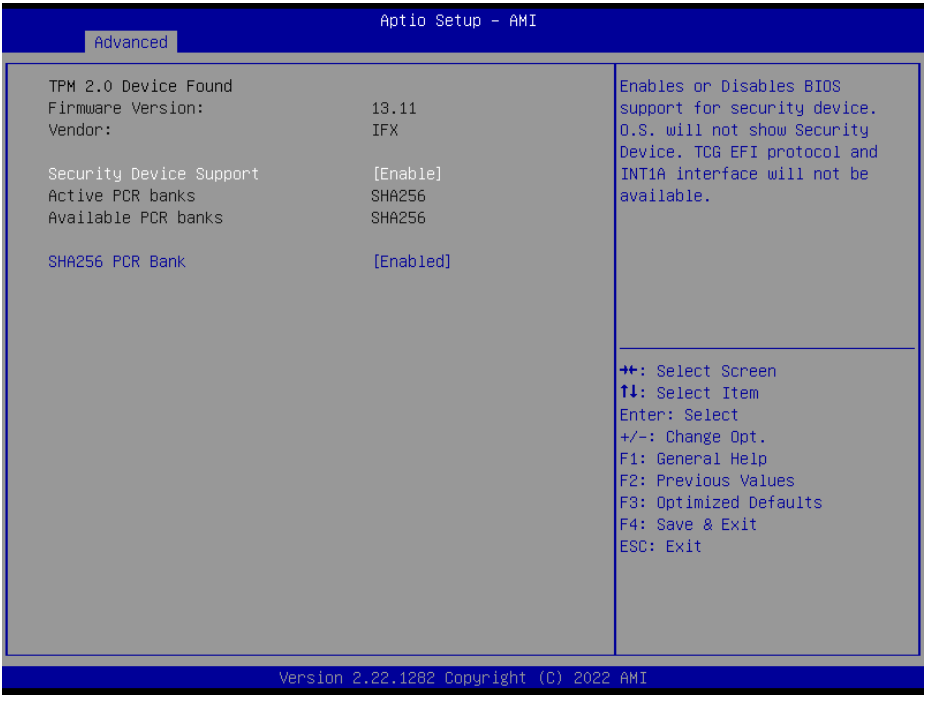
PCH-FW Configuration Screen

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.

3.5.3.3 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 now show Security Device. The TCG EFI protocol and INT1A interface will not be available.



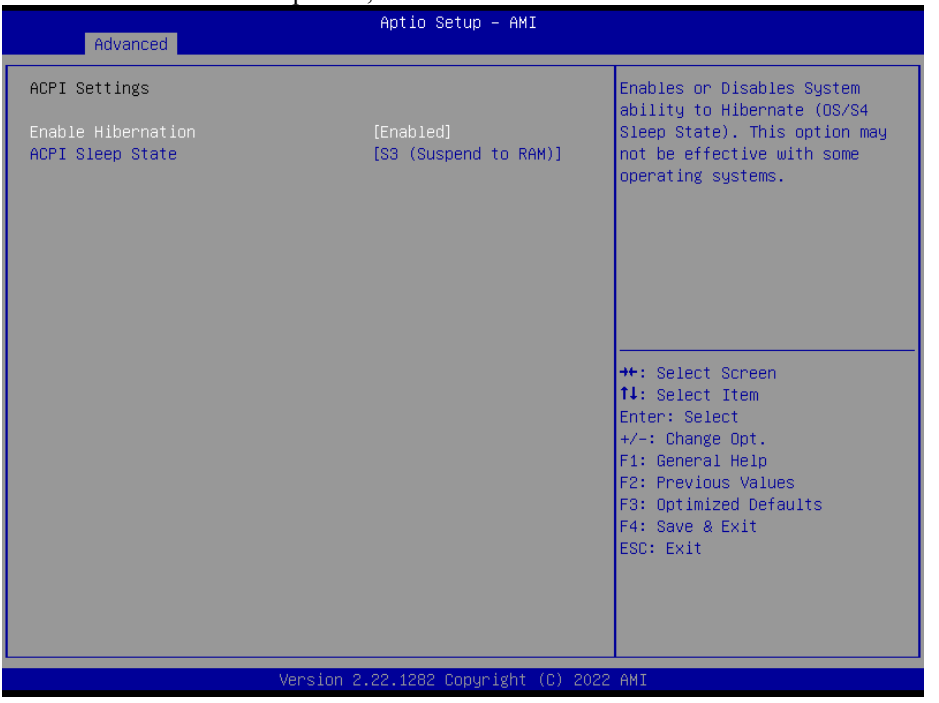
Trusted Computing Screen

BIOS Setting	Options	Description/Purpose
Firmware Version:	No changeable options	TPM firmware version
Vendor:	No changeable options	TPM module vendor
Security Device Support	- Enable (Default) - Disable	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Active PCR banks	No changeable options	Displays the Active PCR banks.
Available PCR banks	No changeable options	Displays the Available PCR banks.
SHA256 PCR Bank	- Disabled - Enabled (Default)	Enables or Disables SHA256 PCR Bank.

3.5.3.4 Advanced – ACPI Settings

Menu Path *Advanced > ACPI Settings*

The **ACPI Settings** allows users to configure relevant ACPI (Advanced Configuration and Power Management Interface) settings, such as enabling Hibernation and ACPI Sleep State, Hibernation

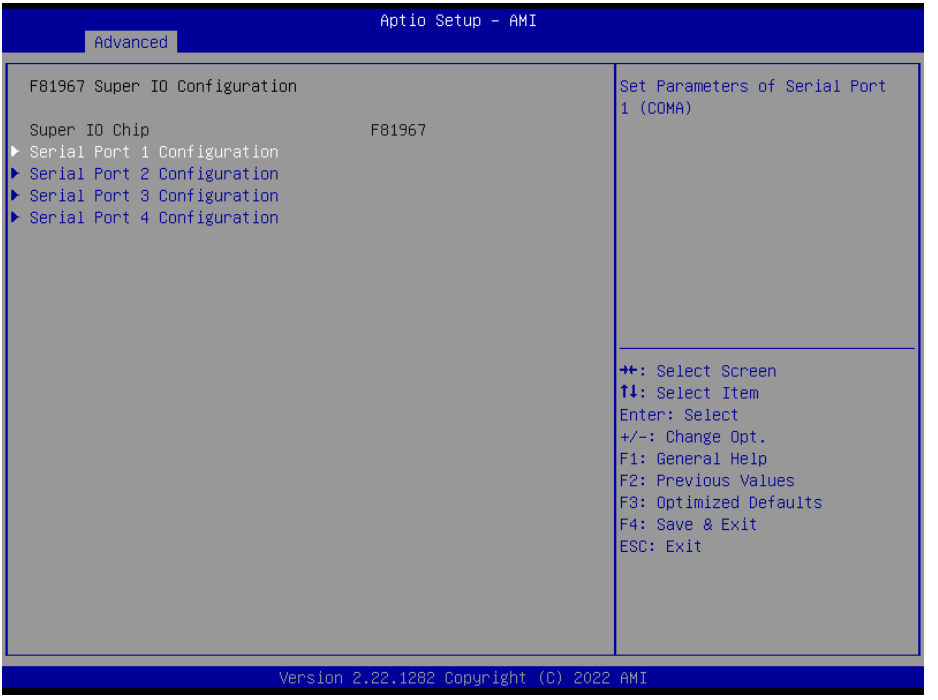


ACPI Settings Screen

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.

3.5.3.5 Advanced – F81967 Super IO Configuration

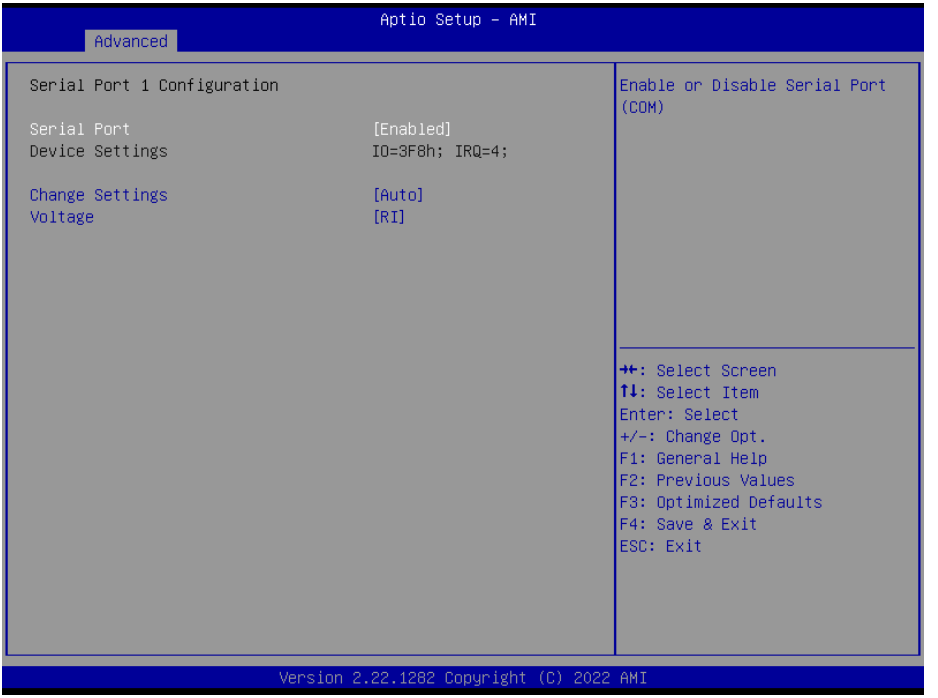
Menu Path *Advanced > F81967 Super IO Configuration*



F81967 Super IO Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port 1 Configuration	Sub-Menu	Sets Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Sub-Menu	Sets Parameters of Serial Port 2 (COMB).
Serial Port 3 Configuration	Sub-Menu	Sets Parameters of Serial Port 3 (COMC).
Serial Port 4 Configuration	Sub-Menu	Sets Parameters of Serial Port 4 (COMD).

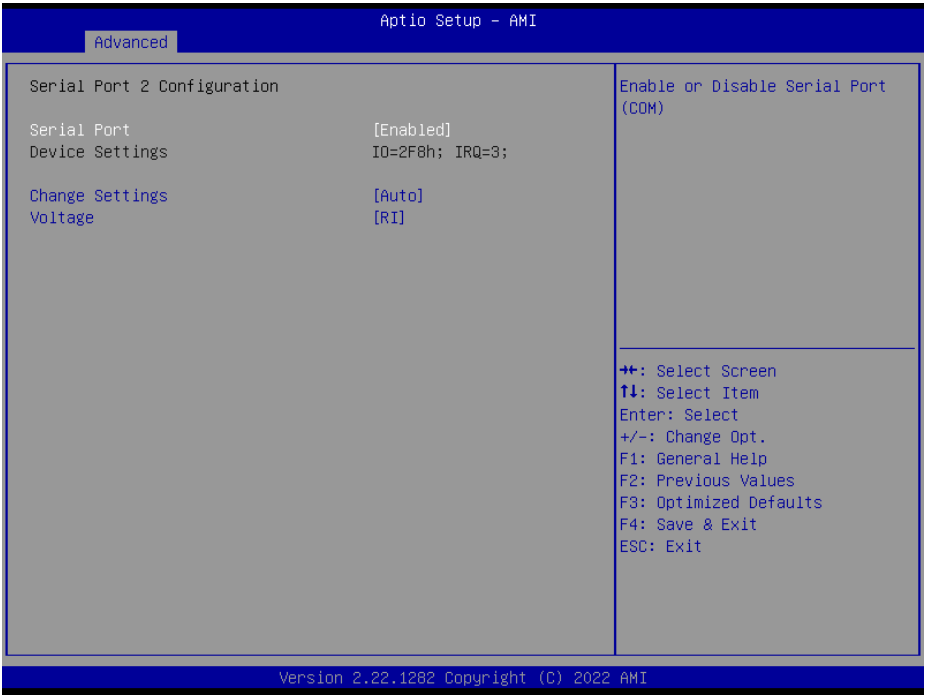
Menu Path *Advanced > F81967 Super IO Configuration > Serial Port 1 Configuration*



Serial Port 1 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (Default)	Enables or Disables Serial Port 1.
Device Settings	No changeable options	Displays current settings of Serial Port 1.
Change Settings	- Auto (Default) - IO=3F8h; IRQ=4; - IO=3F8h; IRQ=3,4,5,6,7,9,10,11.12; - IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	Selects IRQ and I/O resource for the Serial Port 1.
Voltage	- RI (Default) - 5V - 12V`	Selects COM port voltage

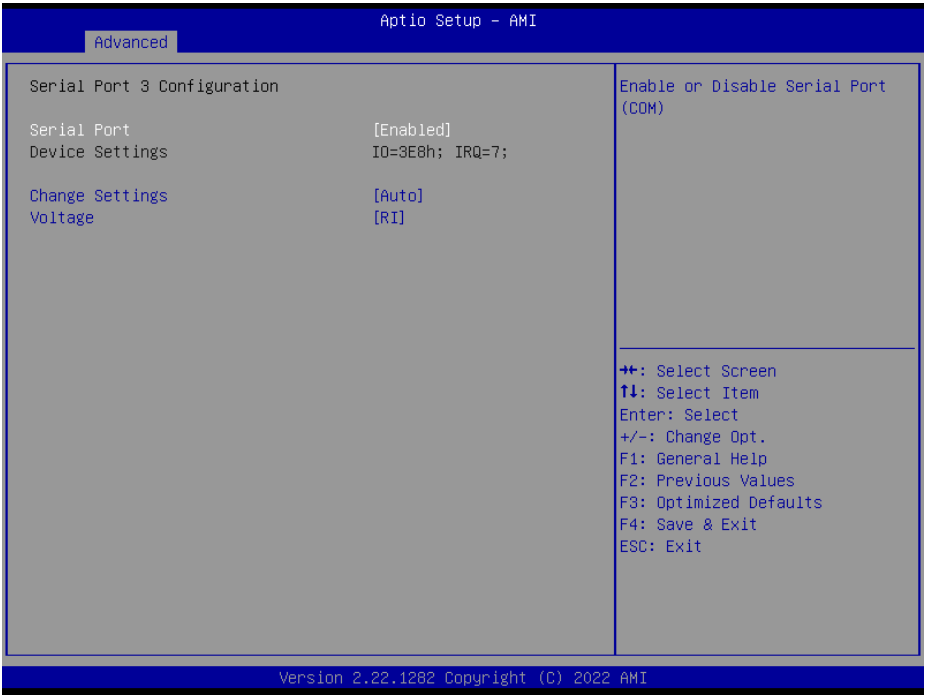
Menu Path *Advanced > F81967 Super IO Configuration > Serial Port 2 Configuration*



Serial Port 2 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (Default)	Enable or Disable Serial Port 2.
Device Settings	No changeable options	Displays current settings of Serial Port 2.
Change Settings	- Auto (Default) - IO=2F8h; IRQ=3; - IO=3F8h; IRQ=3,4,5,6,7,9,10,11.12; - IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; - IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	Selects IRQ and I/O resource for the Serial Port 2.
Voltage	- RI (Default) - 5V - 12V	Selects COM port voltage

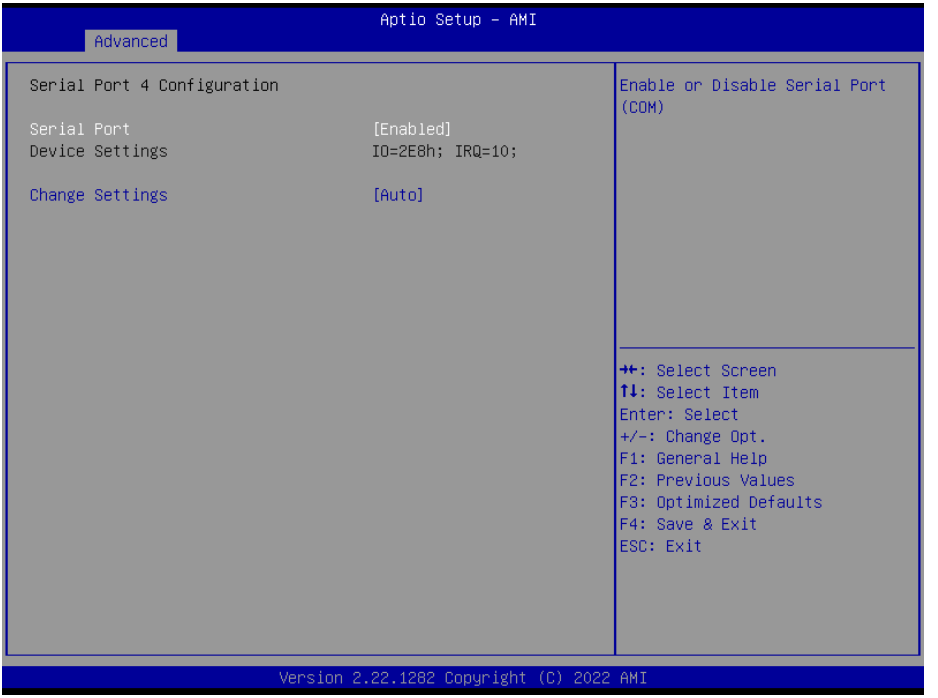
Menu Path *Advanced > F81967 Super IO Configuration > Serial Port 3 Configuration*



Serial Port 3 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled (Default)	Enables or Disables Serial Port 3.
Device Settings	No changeable options	Displays current settings of Serial Port 3.
Change Settings	- Auto (Default) - IO=3E8h; IRQ=7; - IO=3E8h;IRQ=3,4,5,6,7,9,10,11.12; - IO=2E8h;IRQ=3,4,5,6,7,9,10,11,12; - IO=3F0h;IRQ=3,4,5,6,7,9,10,11,12; - IO=2E0h;IRQ=3,4,5,6,7,9,10,11,12;	Selects IRQ and I/O resource for the Serial Port 3.
Voltage	- RI (Default) - 5V - 12V	Selects COM port voltage

Menu Path *Advanced > F81967 Super IO Configuration > Serial Port 4 Configuration*



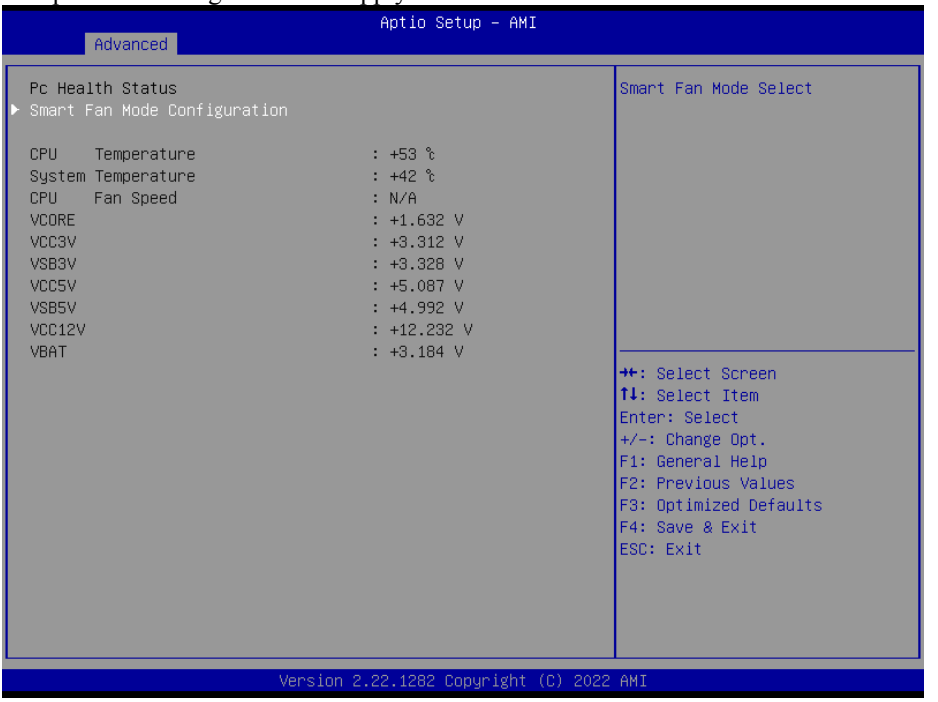
Serial Port 4 Configuration Screen

BIOS Setting	Options	Description/Purpose
Use This Device	- Disabled - Enabled (Default)	Enables or Disables Serial Port 4.
Current	No changeable options	Displays current settings of Serial Port 4.
Change Settings	-Auto (Default) -IO=2E8h; IRQ=7; -IO=3E8h;IRQ=3,4,5,6,7,9,10,11.12; -IO=2E8h;IRQ=3,4,5,6,7,9,10,11,12; - IO=2F0h;IRQ=3,4,5,6,7,9,10,11,12; - IO=2E0h;IRQ=3,4,5,6,7,9,10,11,12;	Selects IRQ and I/O resource for the Serial Port 4.

3.5.3.6 Advanced – Hardware Monitor

Menu Path *Advanced > Hardware Monitor*

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

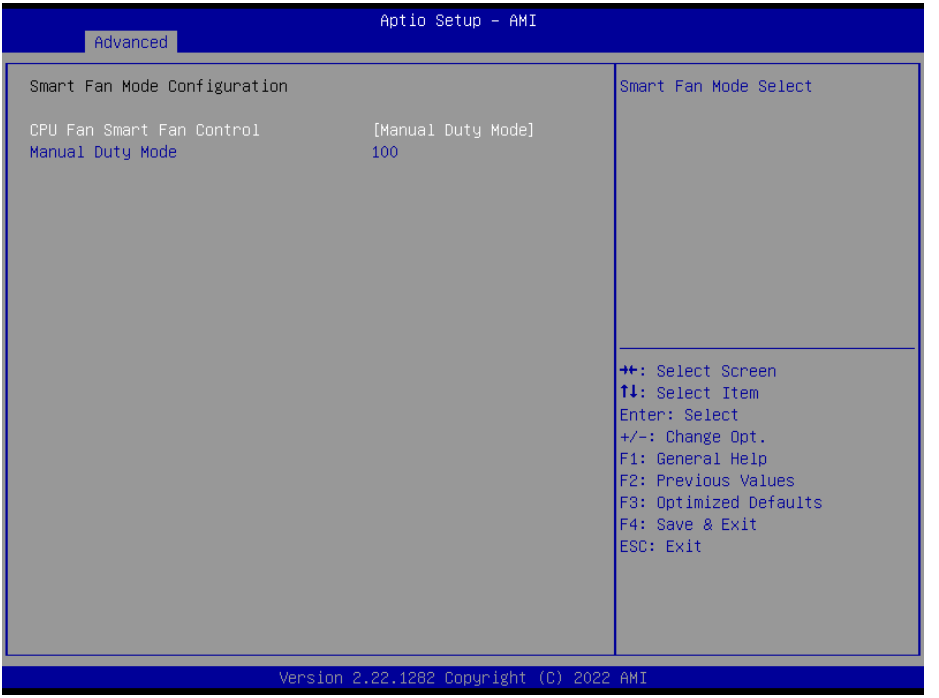


Hardware Monitor Screen

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's temperature.
CPU Fan Speed	No changeable options	Displays CPU Fan speed.
VCORE	No changeable options	Displays the voltage level of VCORE in supply.
VCC3V	No changeable options	Displays the voltage level of VCC3V in supply.

BIOS Setting	Options	Description/Purpose
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.
VCC12V	No changeable options	Displays the voltage level of VCC12V in supply.
VBAT	No changeable options	Displays the voltage level of VBAT in supply.

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



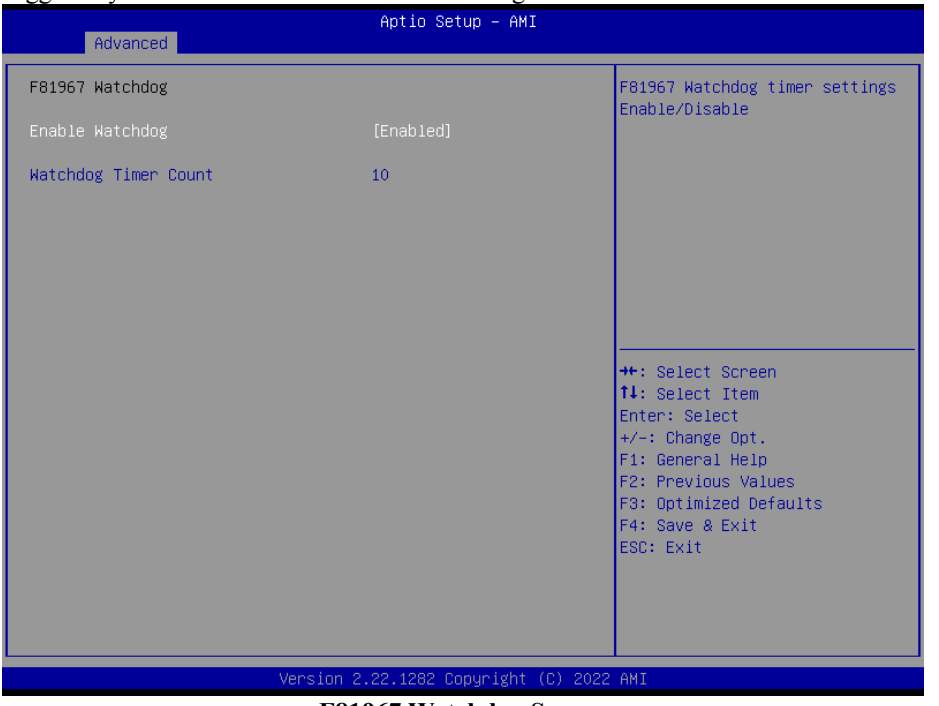
Smart Fan Mode Configuration Screen

BIOS Setting	Options	Description/Purpose
CPU Fan Smart Fan Control	- Manual Duty Mode - Auto Duty-Cycle Mode (Default)	Smart Fan Mode selection for CPU Fan.
Manual Duty Mode	Numeric (from 1 to 100)	Manual mode fan control, user can write expected duty cycle (PWM fan type) 1-100
Temperature 1~4	Numeric (from 1 to 100)	Auto fan speed control. Fan speed will follow different temperature by different duty cycle 1-100.
Duty Cycle 1~4	Numeric (from 1 to 100)	Auto fan speed control. Fan speed will follow different temperature by different duty cycle 1-100.

3.5.3.7 Advanced – F81967 Watchdog Configuration

Menu Path *Advanced > F81967 Watchdog Configuration*

If the system hangs or fails to respond, enable the F81967 watchdog function to trigger a system reset via the 255-level watchdog timer.

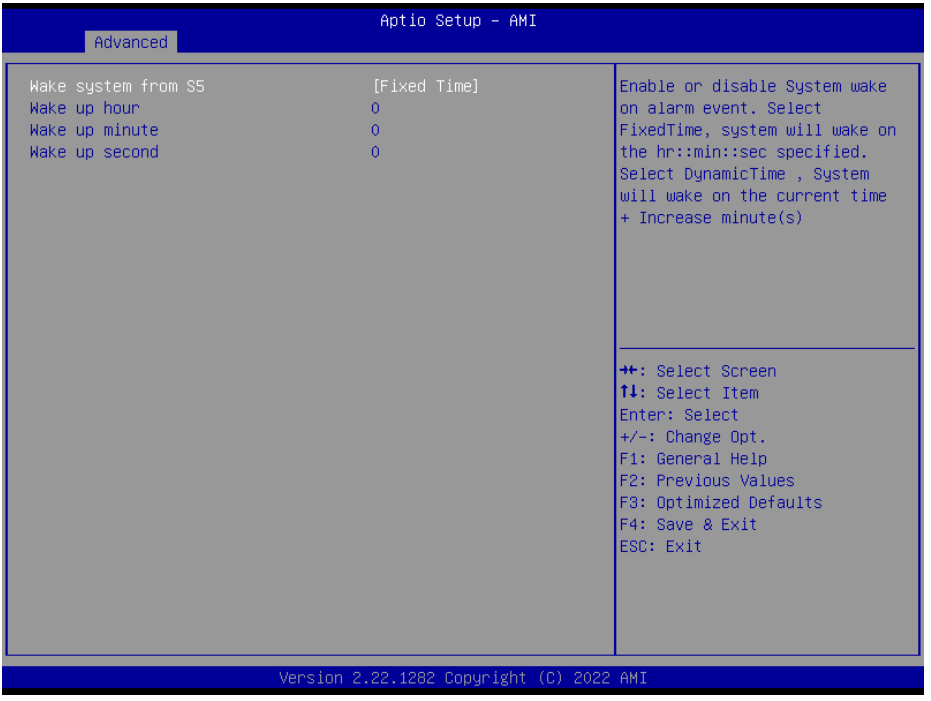


F81967 Watchdog Screen

BIOS Setting	Options	Description/Purpose
Enable WatchDog	- Enabled - Disabled (Default)	Enables/Disables Super I/O Watchdog timer settings.
Count for Timer (second)	Numeric (from 10 to 255)	The number of count for Timer.

3.5.3.8 Advanced – S5 RTC Wake Settings

Menu Path *Advanced > S5 RTC Wake Settings*



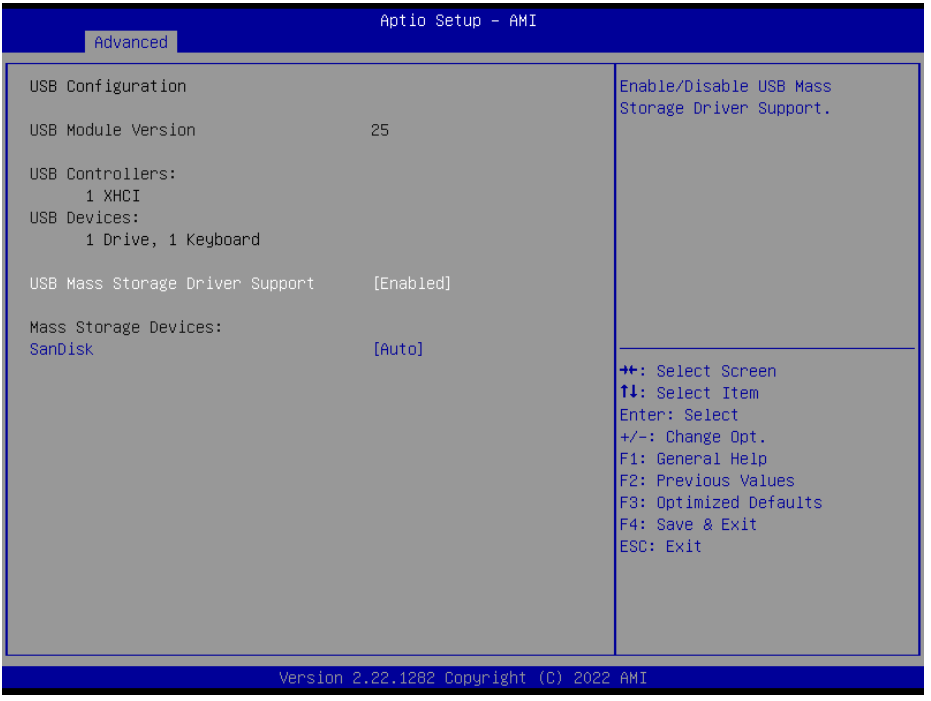
S5 RTC Wake Settings Screen

BIOS Setting	Options	Description/Purpose
Wake system from S5	- Disabled (Default) - Fixed Time - Dynamic Time	Enables or disables System wake on alarm event. • **Fixed Time:** The system will wake on the time (hr::min::sec) specified. • **Dynamic Time:** The system will wake on the current time + Increase minute(s).
Wake up hour	Numeric (from 0 to 23)	Enters **0-23** to set the wake-up hour, e.g.: enters 3 for 3 a.m. and 15 for 3 pm
Wake up minute	Numeric (from 0 to 59)	Enters **0-59** to set the wake-up minute.
Wake up second	Numeric (from 0 to 59)	Enters **0-59** to set the wake-up second.
Wake up minute increase	Numeric (from 1 to 5)	Enters **1-5** to set the increased minute(s) for dynamic wake-up time.

3.5.3.9 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

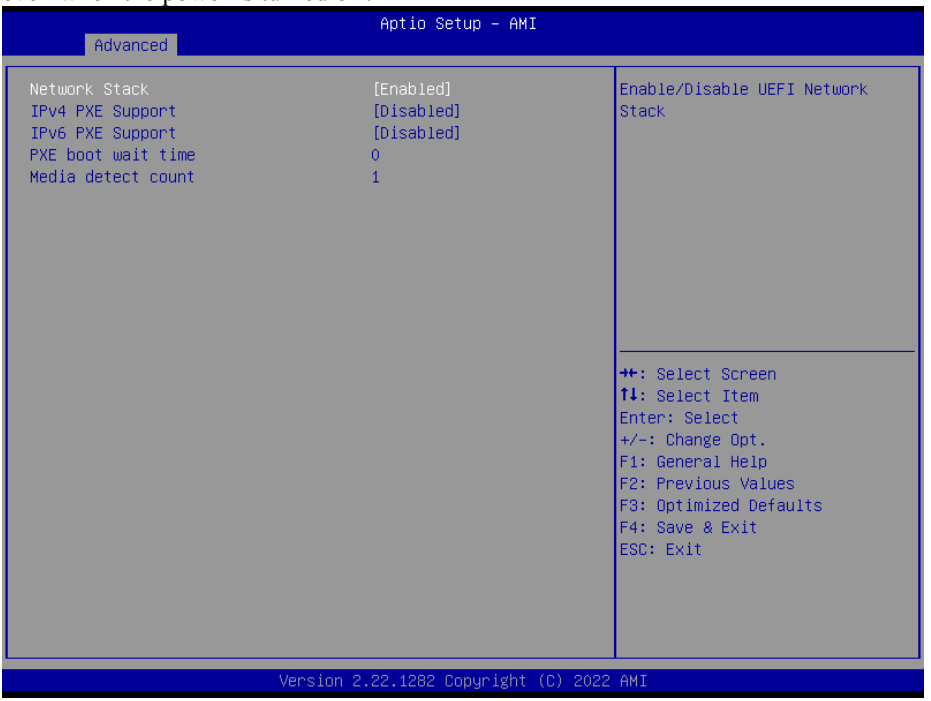
BIOS Setting	Options	Description/Purpose
USB Module Version	No changeable options	Displays USB module version.
USB Controllers	No changeable options	Displays number and type of USB controllers (if any).
USB Devices	No changeable options	Displays number and type of connected USB devices (if any).
USB Mass Storage Driver Support	- Disabled - Enabled (Default)	Enable/Disable 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 'CDROM', drives with no media will be emulated according to a drive type.

3.5.3.10 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.



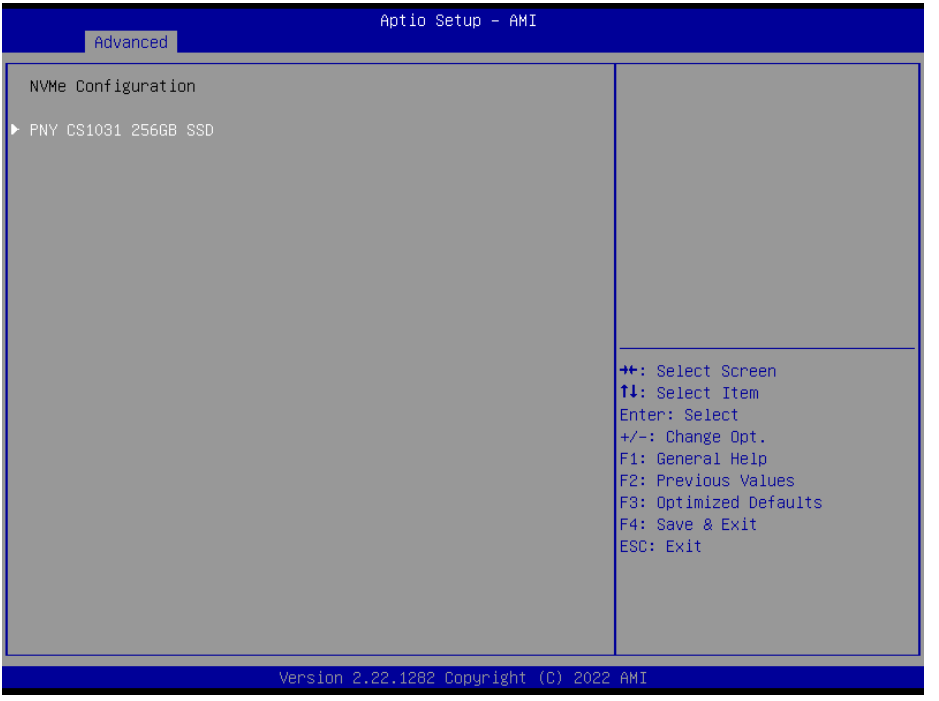
Network Stack Configuration Screen

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

BIOS Setting	Options	Description/Purpose
Ipv6 PXE Support	- Disabled (Default) - Enabled	Enables Ipv6 PXE Boot Support. If disabled, Ipv6 PXE boot option will not be created.
PXE boot wait time	Numeric (from 0 to 5)	Wait time to press ESC key to abort the PXE boot.
Media detect count	Numeric (from 1 to 50)	Numbers of times presence of media will be checked.

3.5.3.11 Advanced – NVMe Configuration

Menu Path *Advanced >NVMe Configuration*



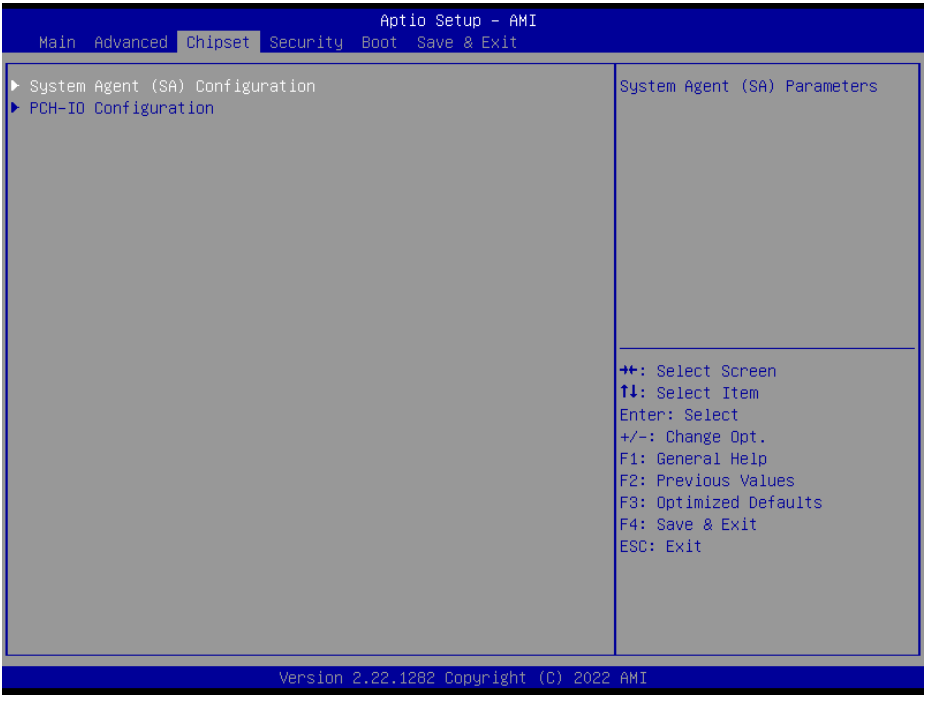
NVMe Configuration Screen

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

3.5.4 Chipset

Menu Path *Chipset*

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



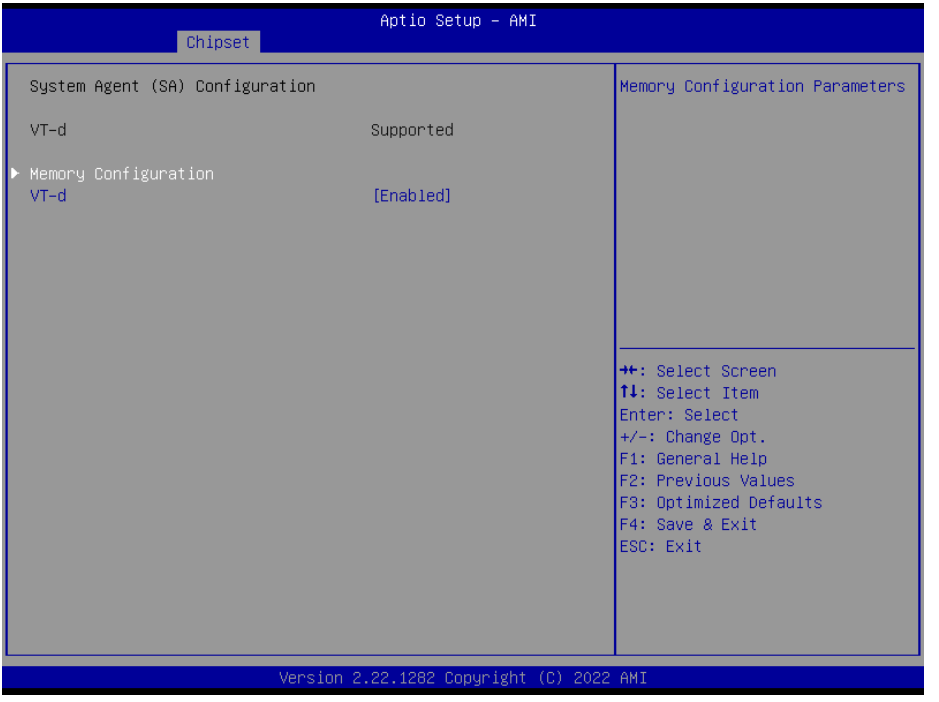
Chipset Screen

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

3.5.4.1 Chipset – System Agent (SA) Configuration

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

The **System Agent (SA) Configuration** allows displaying the DRAM information on the platform.

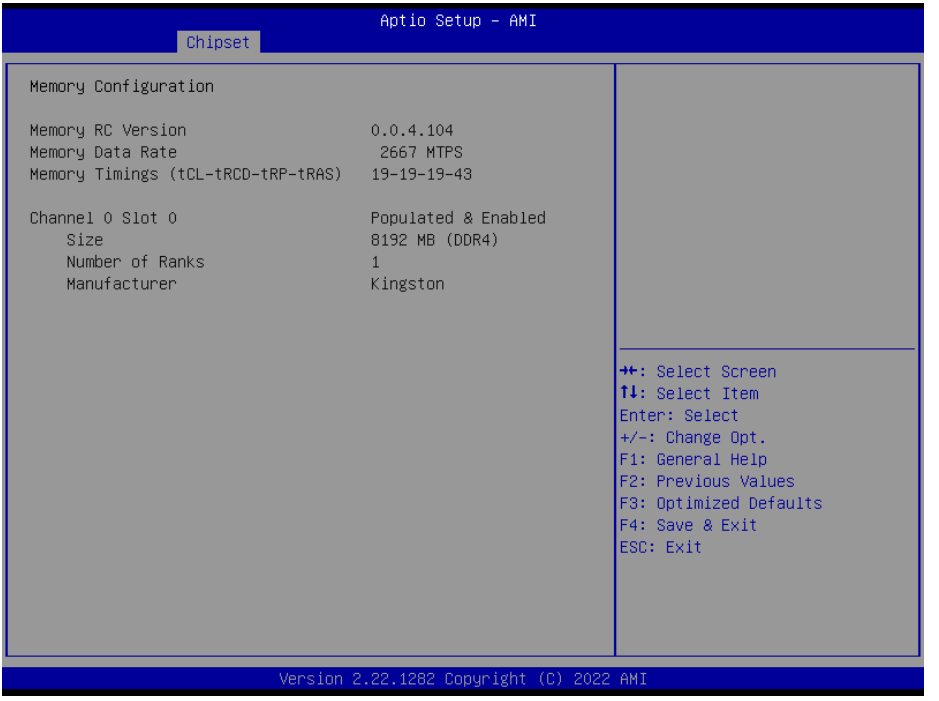


System Agent (SA) Configuration Screen

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

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

The **Memory Configuration** allows users to check for the information about the memory frequency, total memory, and memory timings.



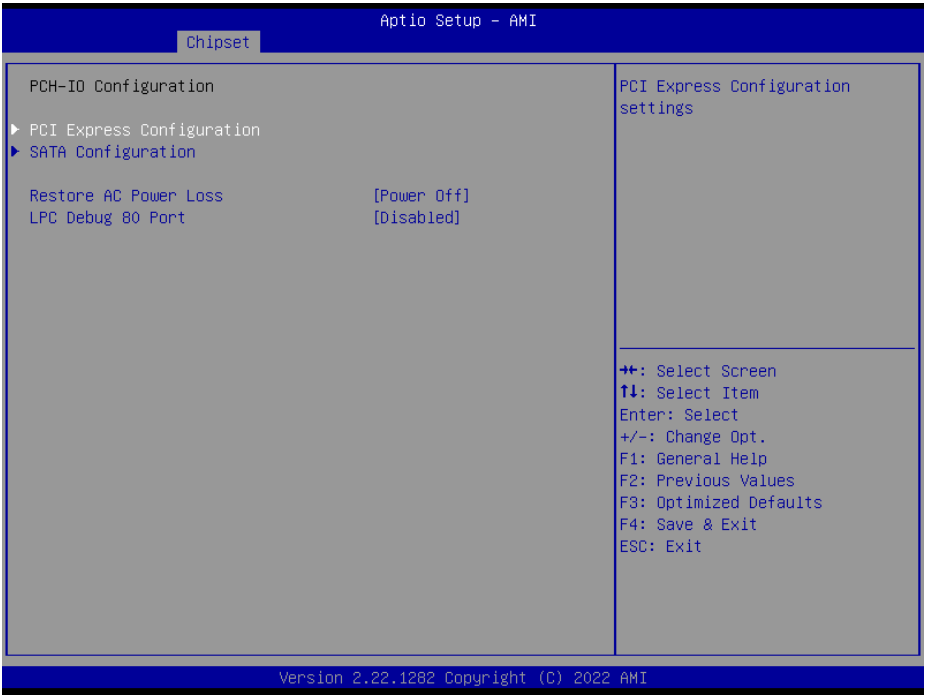
Memory Configuration Screen

BIOS Setting	Options	Description/Purpose
Memory RC Version	No changeable options	Displays the Memory RC Version.
Memory Data Rate	No changeable options	Displays the Frequency of Memory.
Memory Timing (tCL-tRCD-tRP-tRAS)	No changeable options	Displays the Timings of Memory.
Channel 0 Slot 0	No changeable options	Displays the Channel Slot Subtitle.
Size	No changeable options	Displays the Memory size in the slot.
Number of Ranks	No changeable options	Displays the Number of Ranks in the slot.
Manufacturer	No changeable options	Displays the DIMM Manufacturer name.

3.5.4.2 Chipset – PCH-IO Configuration

Menu Path *Chipset > PCH-IO Configuration*

The **PCH-IO** Configuration allows users to 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

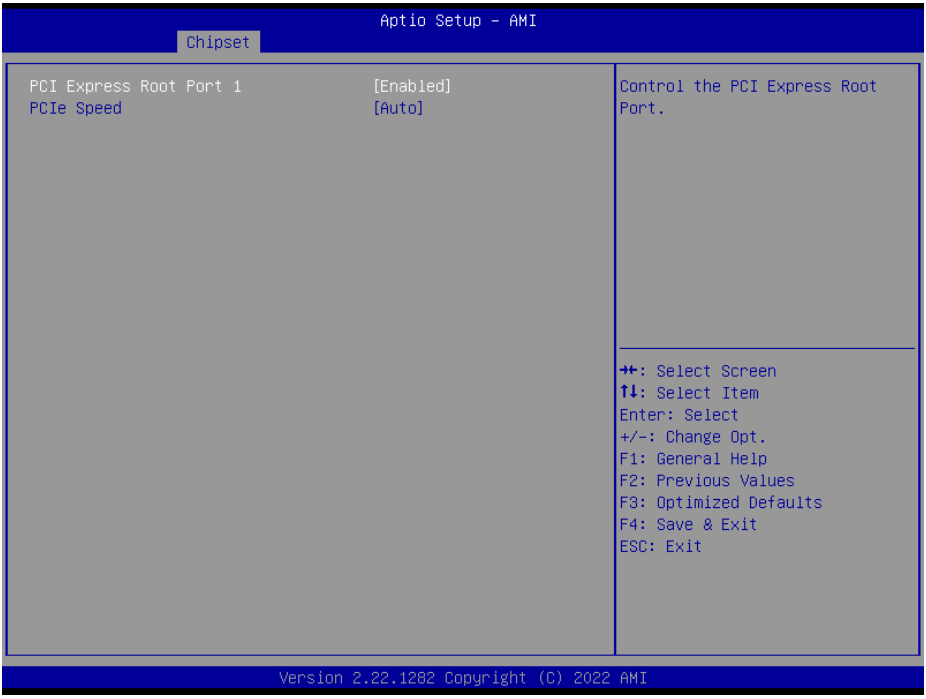
BIOS Setting	Options	Description/Purpose
PCI Express Configuration	Sub-Menu	PCI Express Configuration settings.
SATA Configuration	Sub-Menu	SATA Configuration settings.
Restore AC Power Loss	- Power On - Power Off (Default)	Specifies what state to go to when power is re-applied after a power failure (G3 state).
LPC Debug 80 Port	- Disabled (Default) - Enabled	Enables or Disables LPC Debug 80 Port.

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

PCI Express Configuration Screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port 1 (M.2 M_KEY)	Sub-Menu	PCI Express M.2 M_KEY settings.
PCI Express Root Port 5 (I225 LAN)	Sub-Menu	PCI Express I225 LAN settings.
PCI Express Root Port 7 (M.2 E_KEY)	Sub-Menu	PCI Express M.2 E_KEY settings.

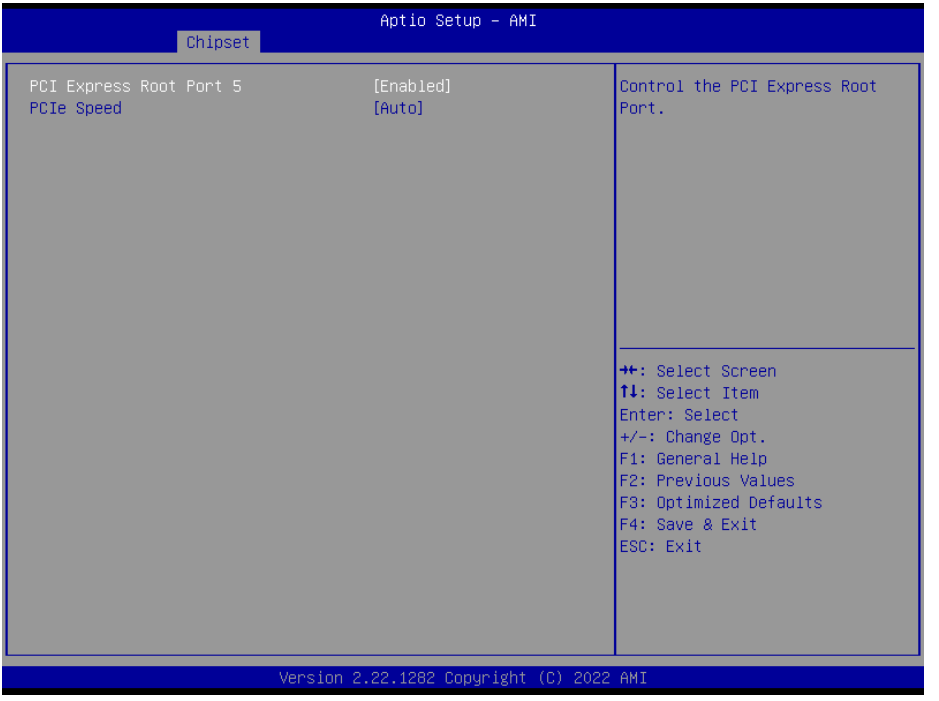
Menu Path *Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express Root Port 1 (M.2 M_KEY)*



PCI Express Root Port 1 (M.2 M_KEY) Screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port 1	- Disabled - Enabled (Default)	Enables or Disables the PCI Express Root Port.
PCIe Speed	- Auto (Default) - Gen1 - Gen2 - Gen3	Configures PCIe Speed.

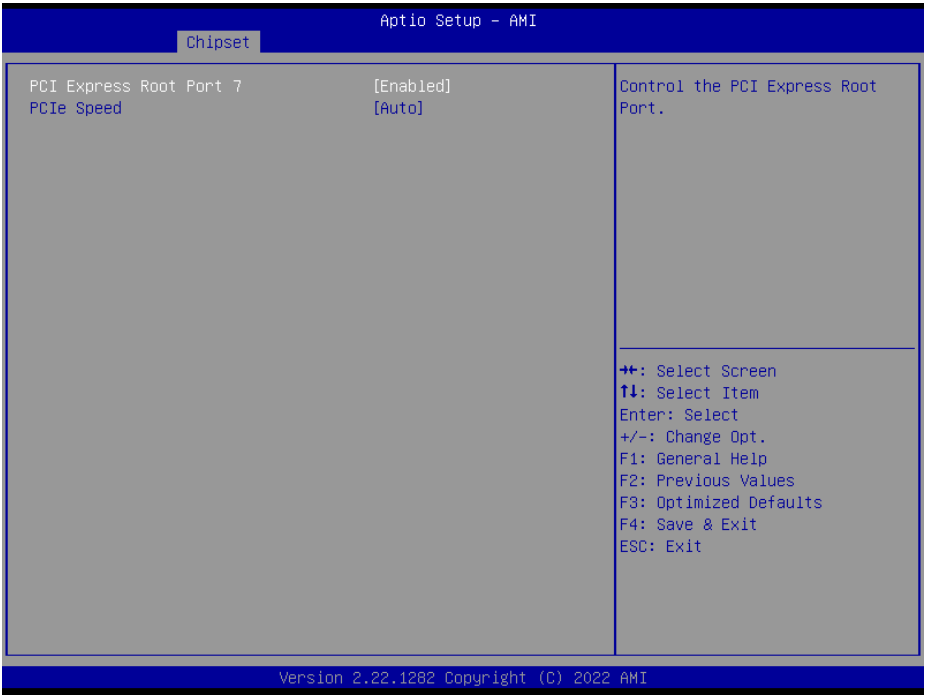
Menu Path *Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express Root Port 5 (I225 LAN)*



PCI Express Root Port 5 (I225 LAN) Screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port 5	- Disabled - Enabled (Default)	Enables or Disables the PCI Express Root Port.
PCIe Speed	- Auto (Default) - Gen1 - Gen2 - Gen3	Configures PCIe Speed.

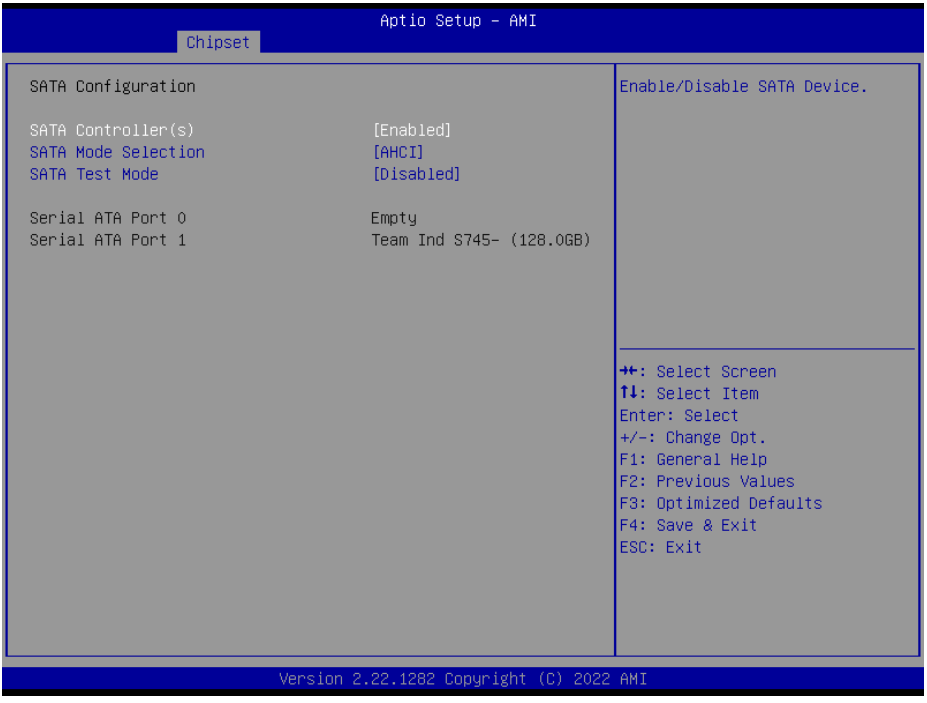
Menu Path *Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express Root Port 7 (M.2 E_KEY)*



PCI Express Root Port 7 (M.2 E_KEY) Screen

BIOS Setting	Options	Description/Purpose
PCI Express Root Port 7	- Disabled - Enabled (Default)	Enables or Disables the PCI Express Root Port.
PCIe Speed	- Auto (Default) - Gen1 - Gen2 - Gen3	Configures PCIe Speed.

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



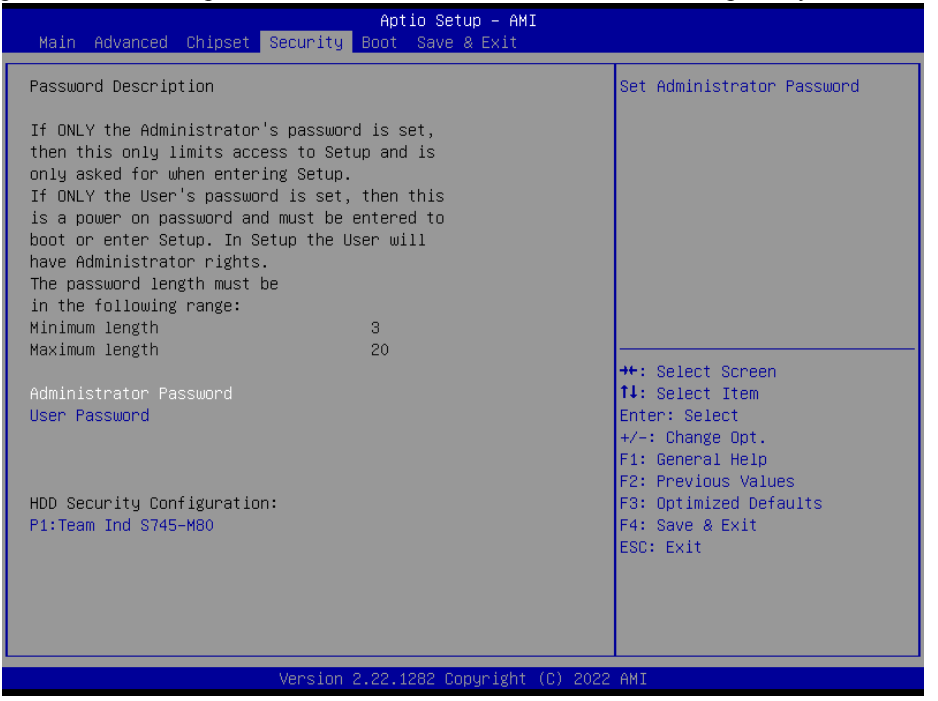
SATA Configuration Screen

BIOS Setting	Options	Description/Purpose
SATA Controller(s)	- Enabled (Default) - Disabled	Enables or Disables SATA Device.
SATA Mode Selection	- AHCI (Default)	Determines how SATA controller(s) operate.
SATA Test Mode	- Enabled - Disabled (Default)	Enables/Disables SATA Test Mode. (For test only)
Serial ATA Port 0~1	No changeable options	Displays the SATA device's name.

3.5.5 Security

Menu Path *Security*

From the **Security** menu, you are allowed to configure or change 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. Heed that a user password does not provide access to most of the features in the Setup utility.



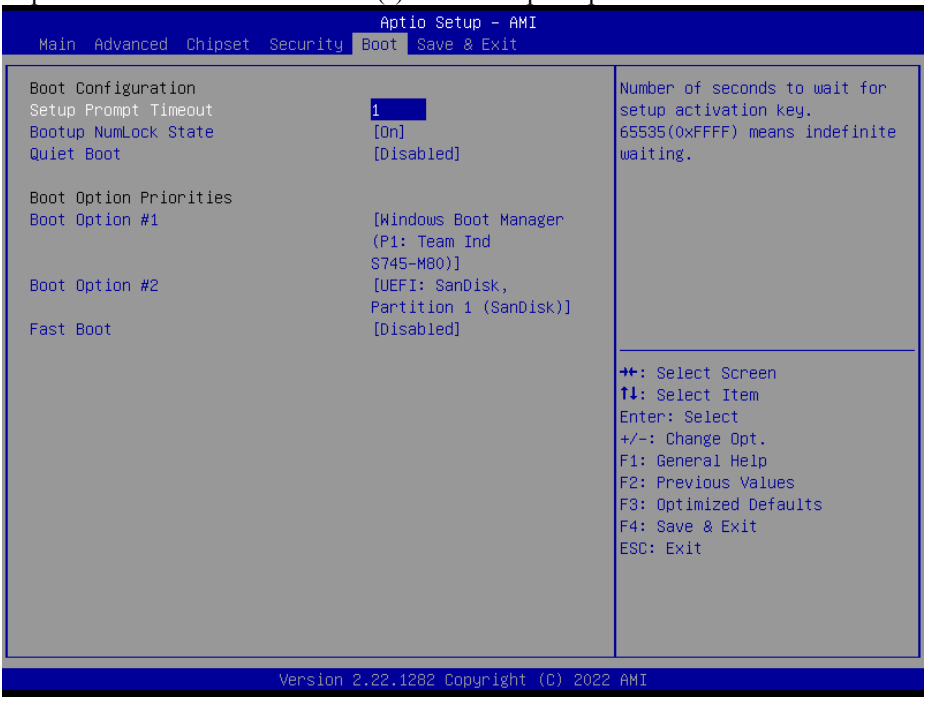
Security Menu Screen

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	Enters sub-menu with option to enabled password protected HDD/SSD (if supported by SATA device).

3.5.6 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, selecting the boot sequence from the available device(s) and BBS option priorities.



Boot Menu Screen

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

3.5.7 Save & Exit

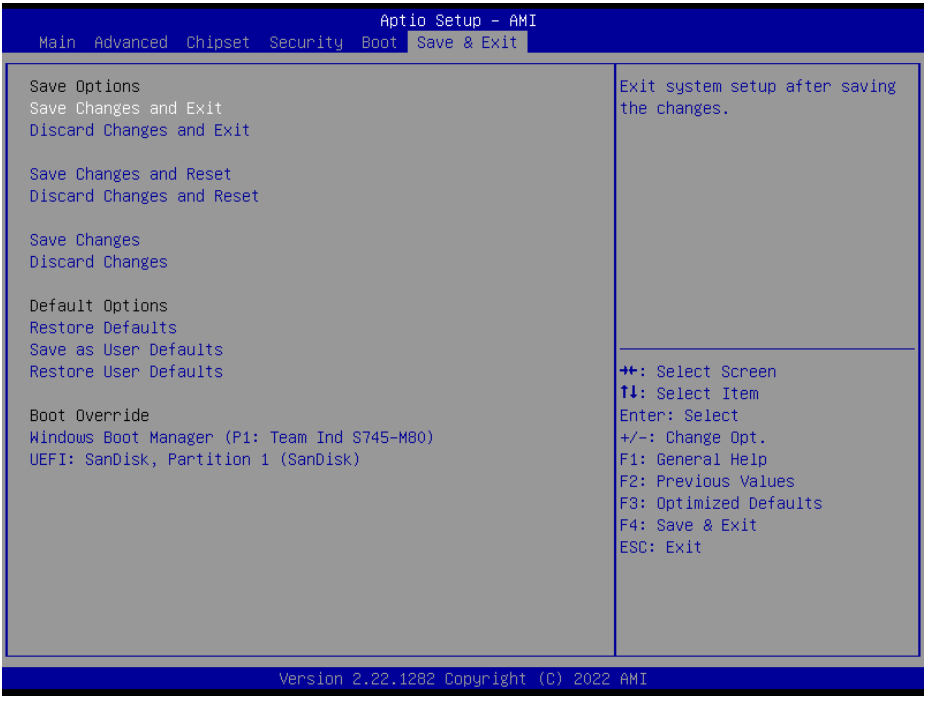
Menu Path *Save & Exit*

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 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 Menu Screen

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

Appendix A System Diagrams

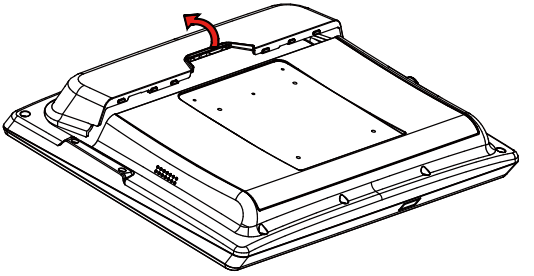
This appendix includes the exploded diagrams and part numbers of the PA-J581 system components. The following topics are included:

- **Easy Maintenance**
  - HDD Tray Disassembly
  - 2nd Display Module Assembly
  - VFD Module Assembly
  - MSR Module Assembly
  - i-Button Module Assembly
  - Fingerprint Module Assembly
  - Connecting 60W and 90W Power Adapter

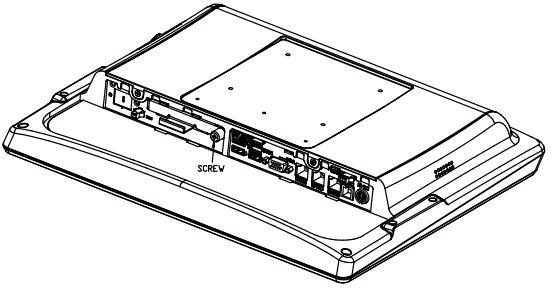
- **System Exploded Diagrams**
  - Front Cover Assembly Exploded Diagrams
  - Rear Cover Assembly Exploded Diagrams
  - LCD Case Assembly Exploded Diagram
  - Exploded Diagram for Panel PC HDD Assembly
  - LCD Assembly Exploded Diagrams
  - Main Board Assembly Exploded Diagram
  - LCD Holder Assembly Exploded Diagrams
  - Barcode Scanner Kit Exploded Diagram
  - I/O Ports Cover Assembly Exploded Diagram
  - HDD Module Exploded Diagram
  - AL Cover Module and CPU Heat Sink Exploded Diagram

HDD Tray Disassembly

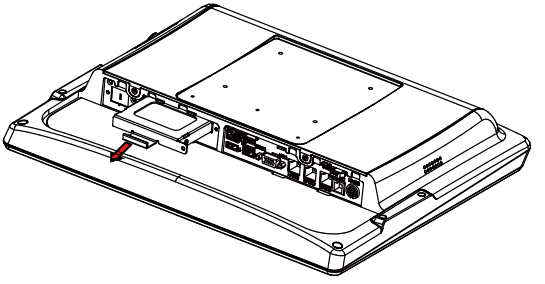
Step1: Rotata the cable cover



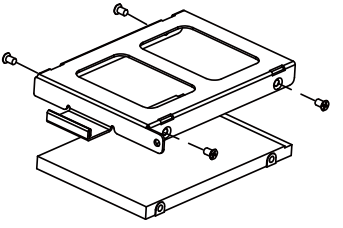
Step2: Unassemble the screw



Step3: Pull out HDD Tray.

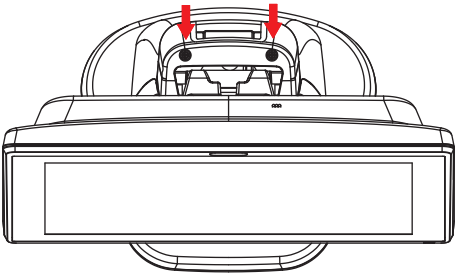


Step4: Unassemble the HDD fixing screw and take off the HDD tray.

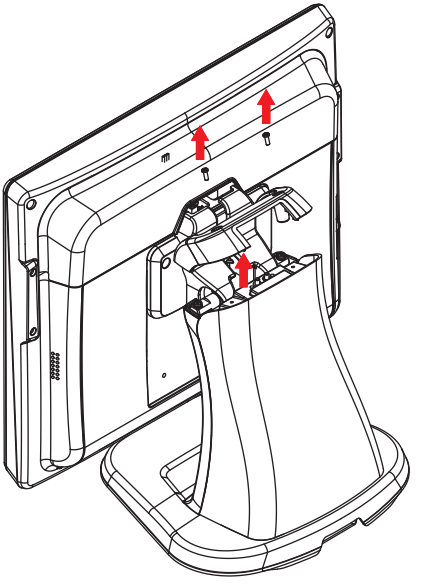


2nd Display Module Assembly

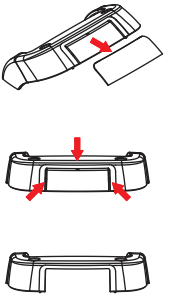
Step 1. Locate the two screw fastened on Stand Top Cover as shown.



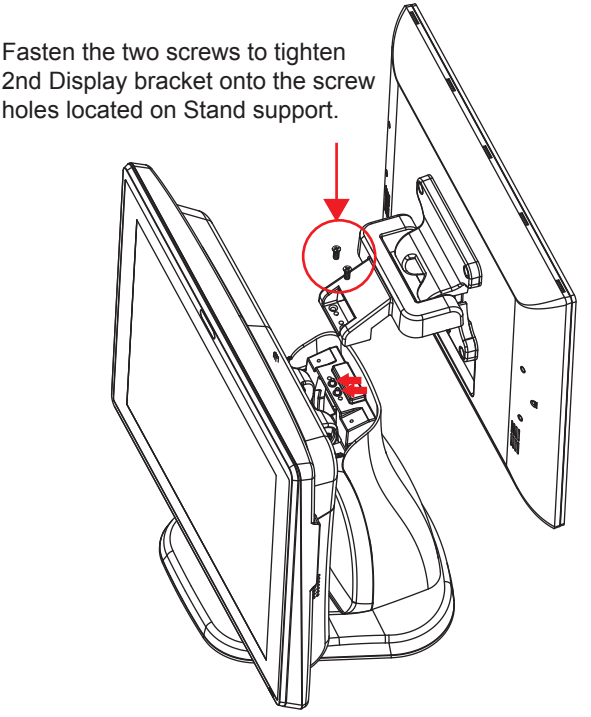
Step 2. Unfasten the two screws as shown and remove Stand Top Cover.



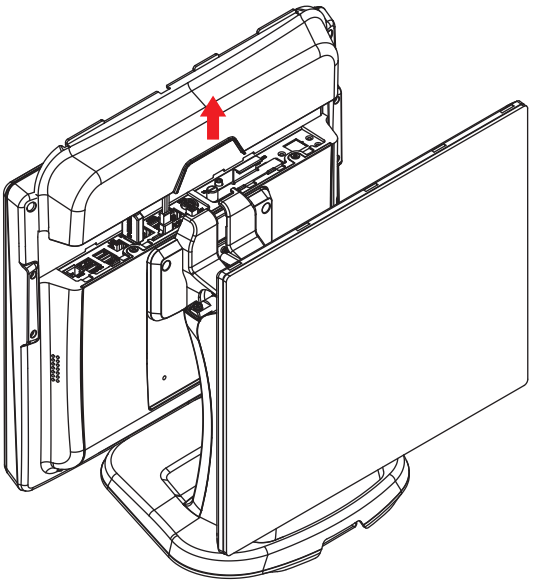
Step 3. From the detached Stand Top Cover, remove the Nameplate as shown and remove the 3 pieces of Rib as illustrated below:



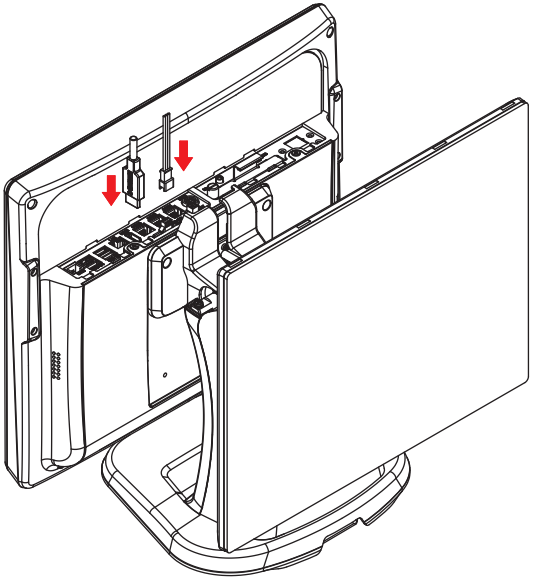
Step 4. Align the screw holes of 2nd Display Bracket with the screw holes on Stand Support pole and fasten the two screws as shown to tighten 2nd Display unit onto the Stand Support pole tightly.



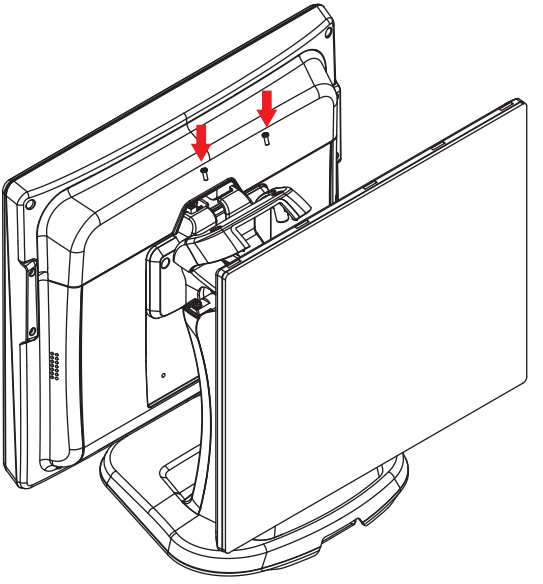
Step 5. Remove I/O ports cover as shown:



Step 6. Insert HDMI cable and 2nd Display Power Cable.

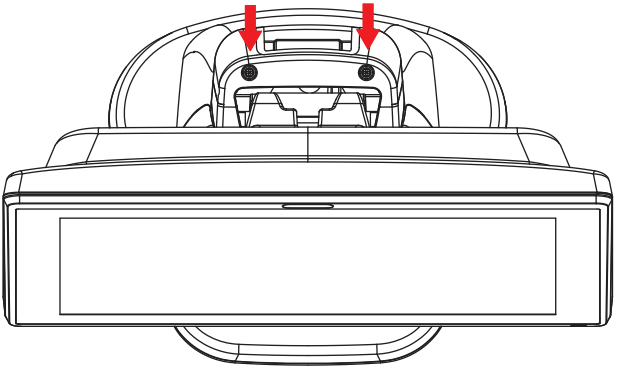


Step 7. Install back rear I/O ports cover and fasten back the two screws to secure Stand Top Cover onto the system and complete.

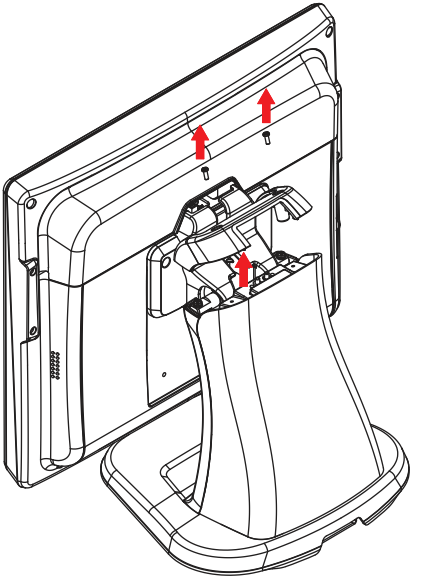


VFD Module Assembly

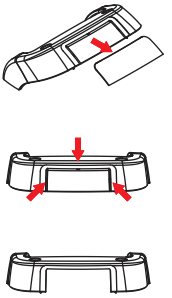
Step 1. Locate the two screw fastened on Stand Top Cover as shown.



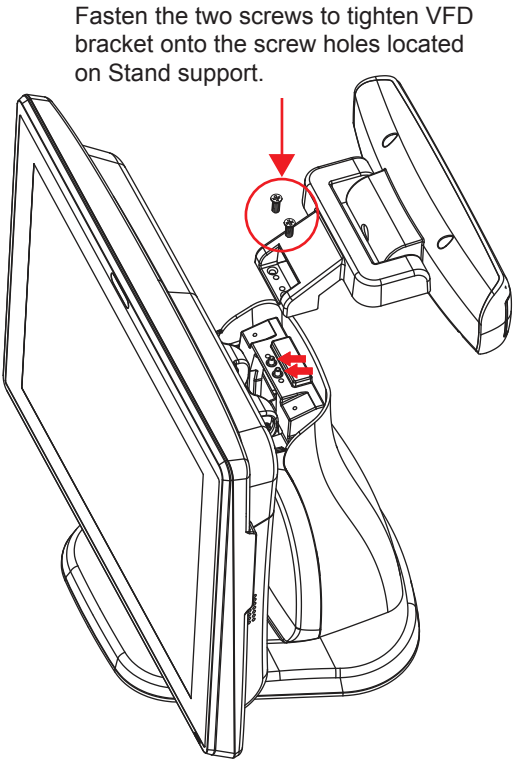
Step 2. Unfasten the two screws as shown and remove Stand Top Cover.



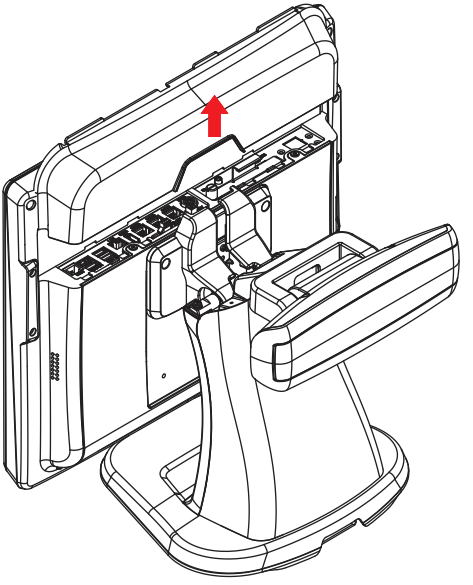
Step 3. From the detached Stand Top Cover, remove the Nameplate as shown and remove the 3 pieces of Rib as illustrated below:



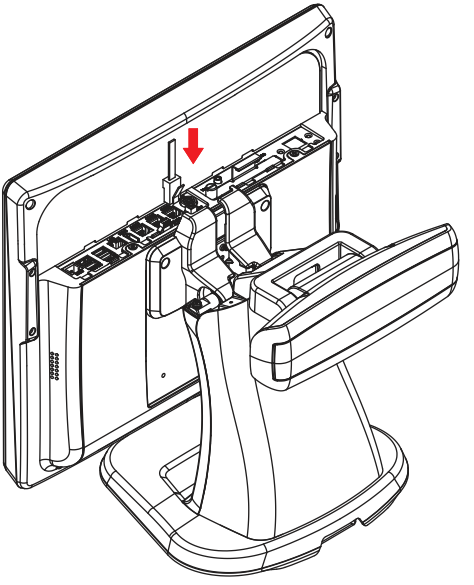
Step 4. Align the screw holes of VFD Bracket with the screw holes on Stand Support pole and fasten the two screws as shown to tighten VFD unit onto the Stand Support pole tightly.



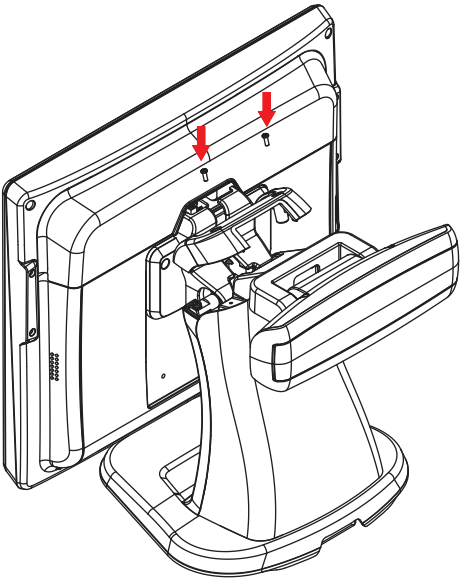
Step 5. Remove rear I/O ports cover as shown:



Step 6. Insert VFD Cable into COM port.

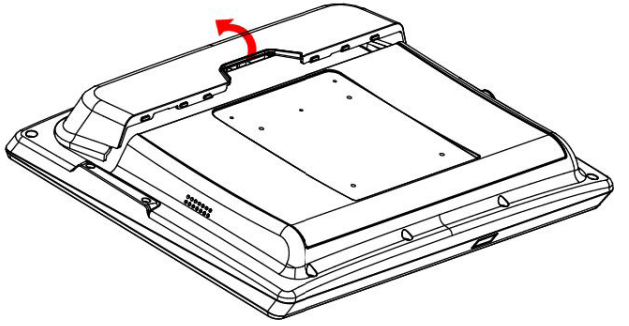


Step 7. Install back rear I/O ports cover and fasten back the two screws to secure Stand Top Cover onto the system and complete.

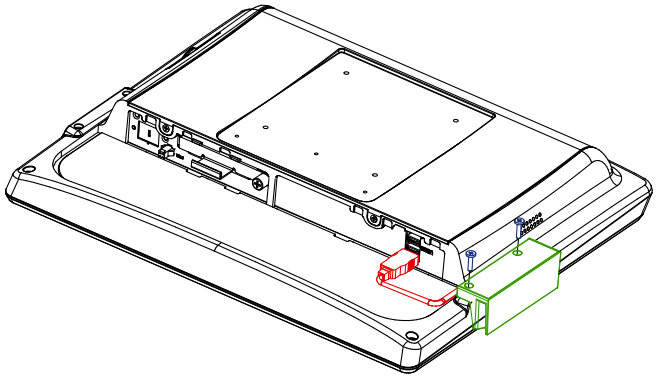


MSR Module Assembly

Step 1: Rotate the cable cover.

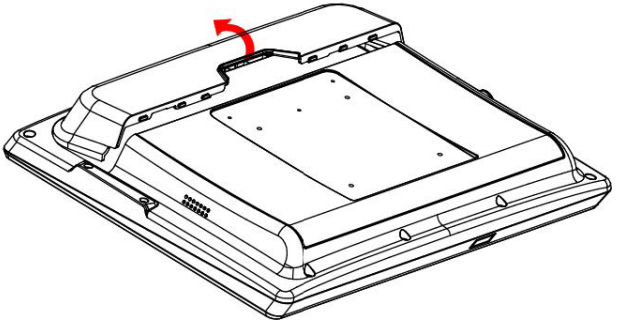


Step 2. Fix MSR module by 2 screws and insert the connector into USB port.

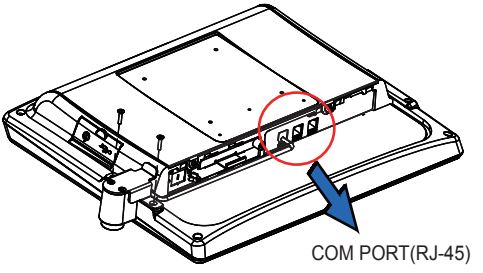


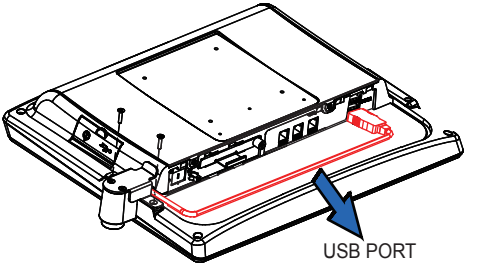
i-Button Module Assembly

Step 1: Rotate the cable cover.



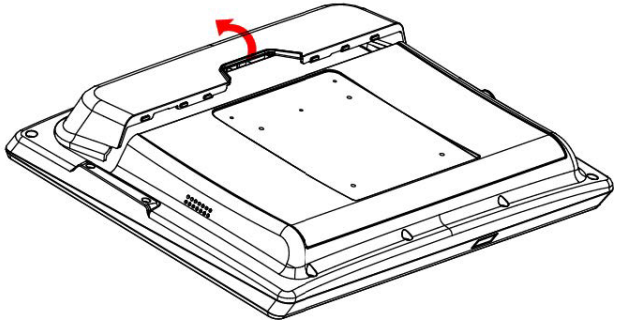
Step 2. Fix i-Button module by 2 screws and insert the connector into I/O port (USB, COM).



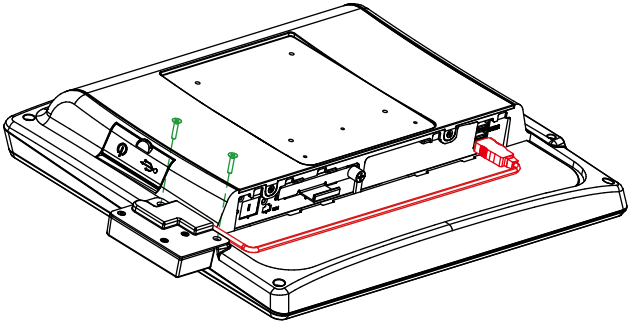


Fingerprint Module Assembly

Step 1: Rotate the cable cover.

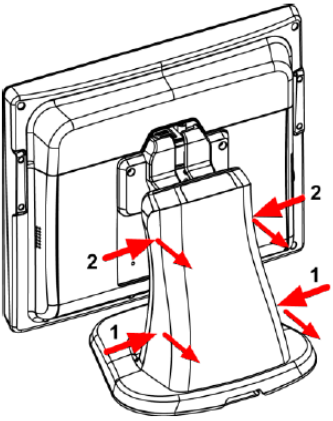


Step 2. Fix Fingerprint module by 2 screws and insert the connector into USB port.

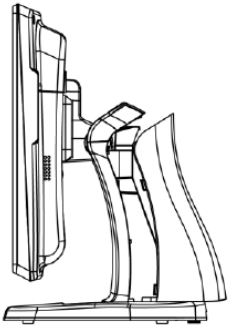


Connecting 60W Power Adapter

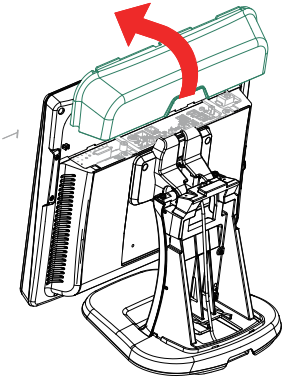
Step 1. Open rear cover.



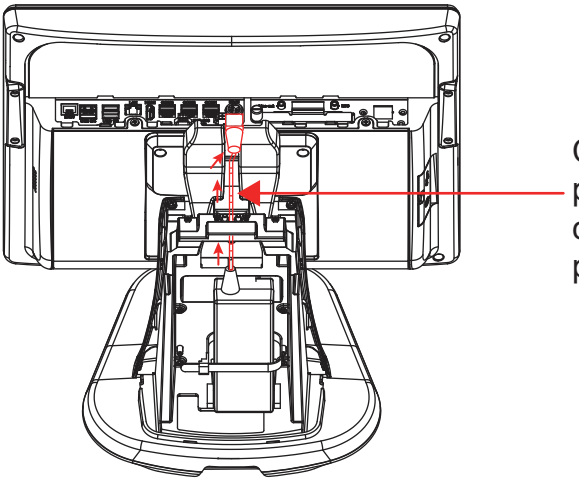
1. Press both bottom side of rear cover simultaneously.
2. Press the both up side of rear cover simultaneously.



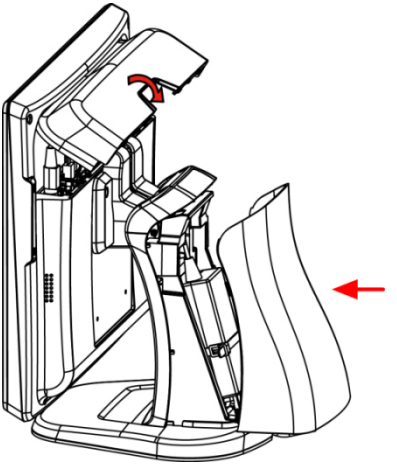
Step 2. Remove cable cover as shown:



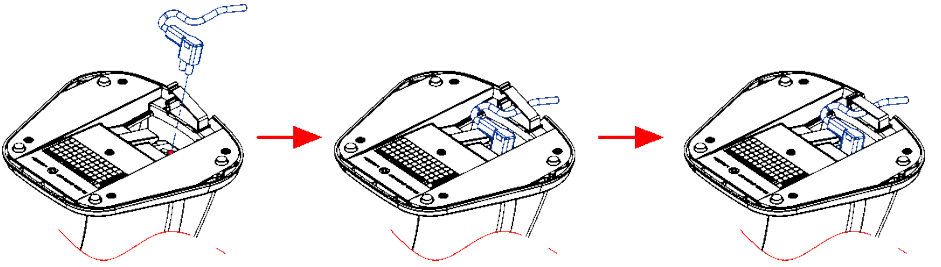
Step 3. Plug in power DIN cable and cabling Adapter cable through wire hole of stand and plug in **DC-IN** connector.



Step 4. Close all covers and lock screws.



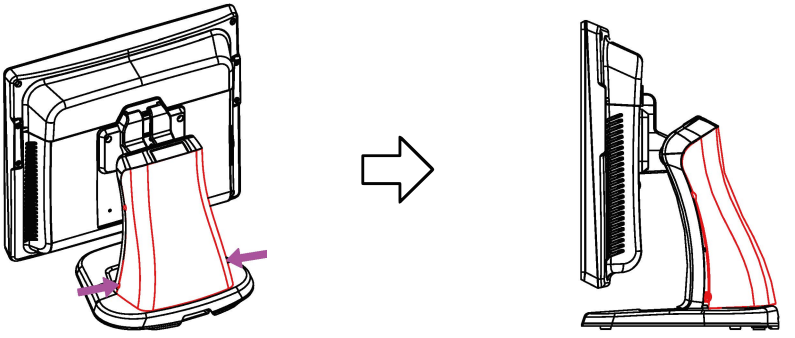
Step 5. Plug power cable in.



Connecting 90W Power Adapter

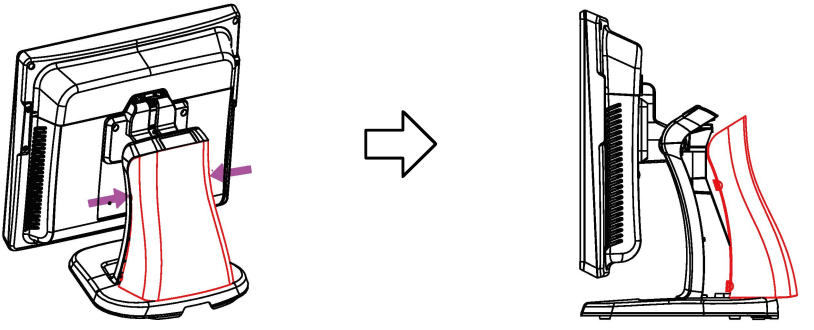
Please follow the instructions below to connect 60W power adapter into the **DC In** port of PA-J580 system.

Step 1: Press on the lower part of Stand rear cover from both sides as shown below:



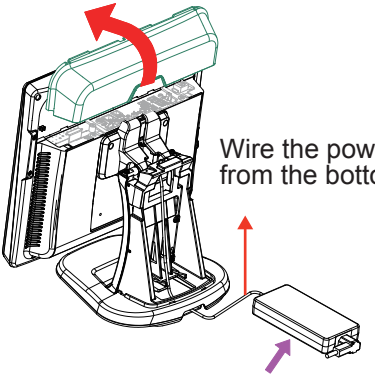
The lower part of Stand rear cover opens slightly.

Step 2: Press on the upper part of Stand rear cover from both sides as shown below:

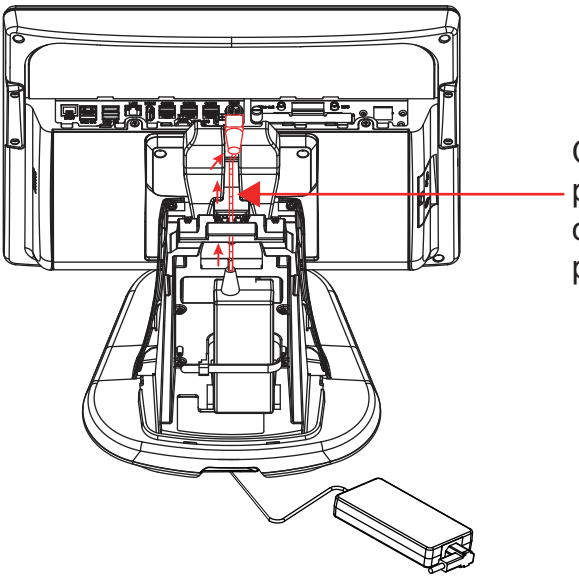


The Stand rear cover is then set apart from the system.

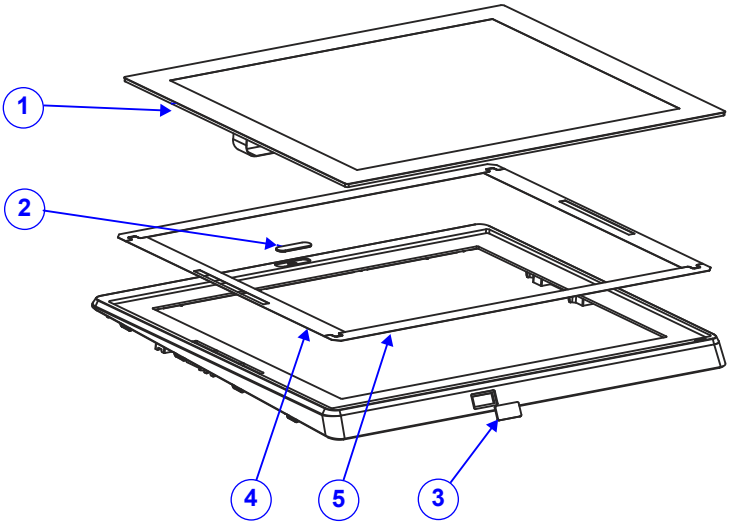
Step 3: Rotate to remove the cable cover, and then wire the power adapter cable from the bottom into Stand.



Step 4: Wire the power adapter cable through the wire hole of Stand properly and plug the power adapter connector into **DC-IN** port to complete.

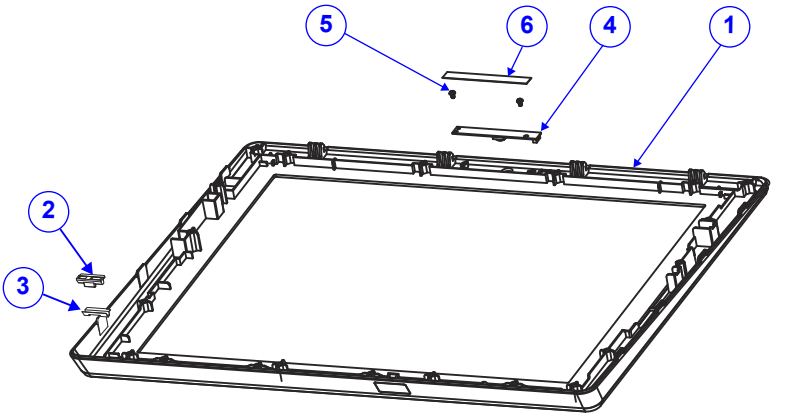


Front Cover Module Assembly Exploded Diagram (1) (Flat Resistive Touch Panel)



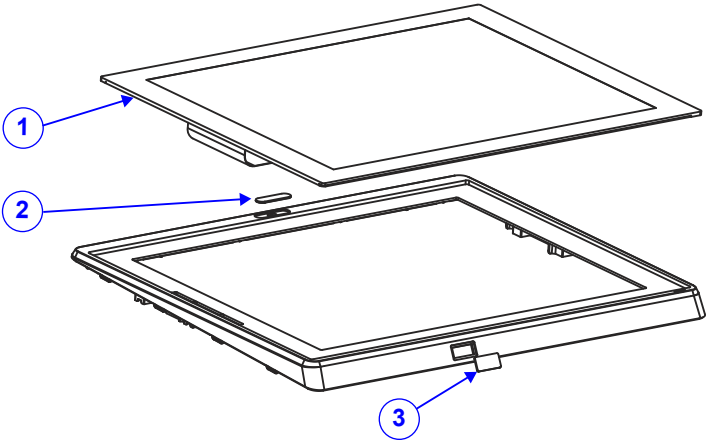
No.	Component Name	P/N No.	Q'ty
1	15" Flat Resistive Touch Panel	52-380-00062401	1
2	MP-4815 Camera Lens	90-021-10250393	1
3	MH-5100 Barcode Lens (Black)	30-021-02230378	1
4	PA-3251 Double Coated Tape B	94-026-04902220	2
5	PA-3251 Double Coated Tape A	94-026-04901220	2

Front Cover Module Assembly Exploded Diagram (2)



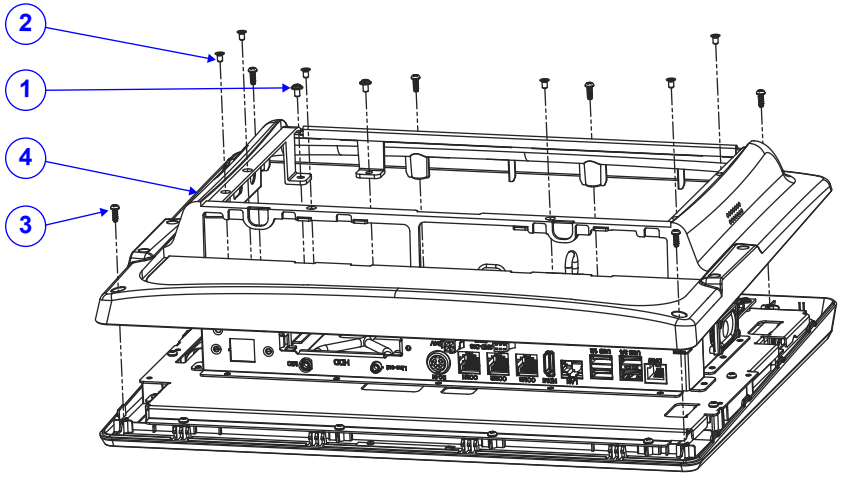
No.	Component Name	P/N No.	Q'ty
1	PA-5822 Front Cover (Black)	30-002-28112407	1
2	PA-5822 LED Lens (Transparency)	90-021-02130407	1
3	PA-5822 LED Lens Tape	94-026-05901407	1
4	2.0M CMOS Web Camera Module with USB 2.0 Interface	52-151-08202728	1
5	Pan Head Screw #1/T2.0x3mm	22-122-20003011	2
6	PA-5822 Conductive Copper Foil Tape (60x9x0.1mm)	30-050-52100407	1

Front Cover Module Assembly Exploded Diagram (3) (Projected Capacitive Touch Panel)



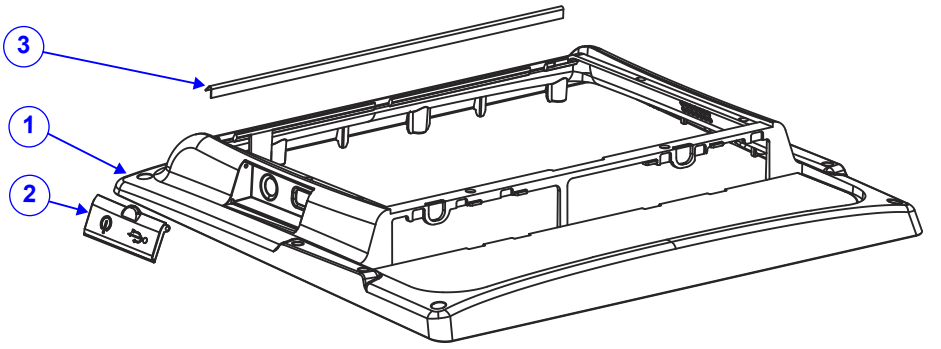
No.	Component Name	P/N No.	Q'ty
1	15" Projected Capacitive Touch Panel	52-380-00543901	1
2	MP-4815 Camera Lens	90-021-10250393	1
3	MH-5100 Barcode Lens(Black)	30-021-02230378	1

Rear Cover Assembly Exploded Diagram (1)



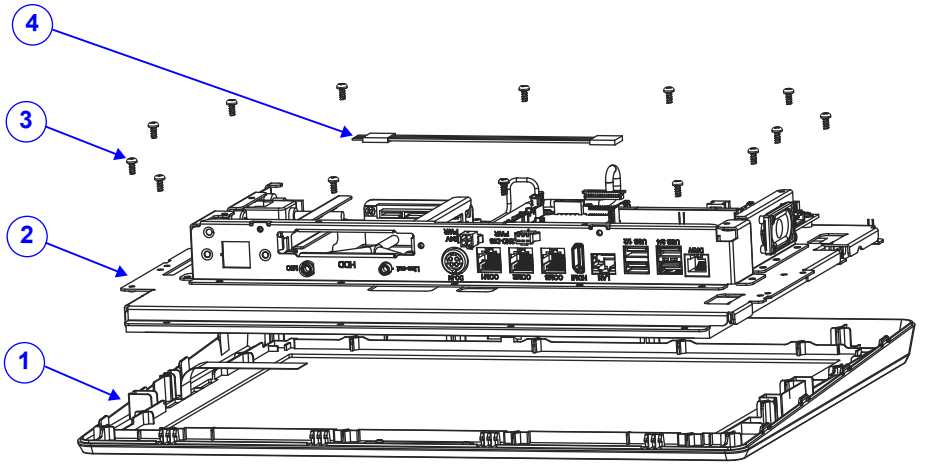
No.	Component Name	P/N No.	Q'ty
1	Round Washer Head Screw M3x0.5Px5mm	22-242-30005311	2
2	Flat Head Screw #2 / M3x0.5Px5mm	22-215-30005011	6
3	Pan Head Screw #2 / T3.0x8mm (Black)	22-122-30080011	6
4	Rear Cover Assembly	N/A	1

Rear Cover Assembly Exploded Diagram (2)



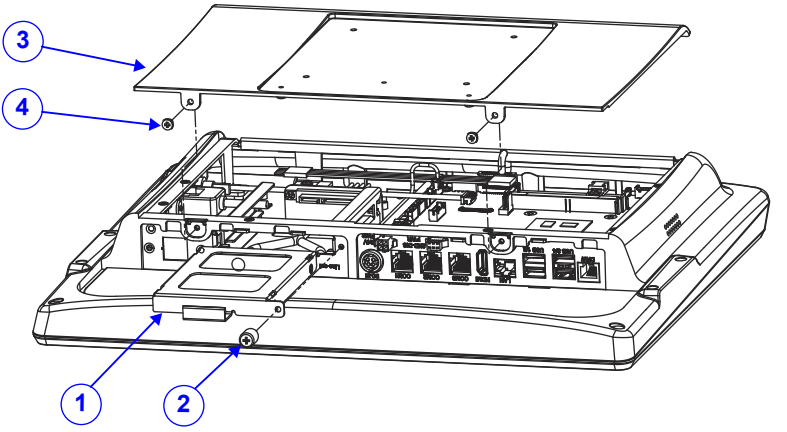
No.	Component Name	P/N No.	Q'ty
1	PA-5822 Rear Cover (Black)	30-002-28116407	1
2	PA-5822 USB Cover (Black)	30-002-28118407	1
3	PA-6722 EVA 1 (365x5x0.5mm)	90-013-15100353	1

LCD Case Assembly Exploded Diagram



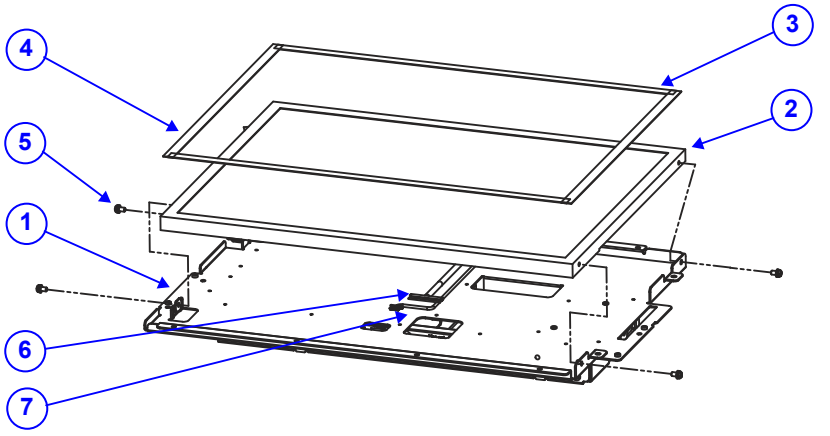
No.	Component Name	P/N No.	Q'ty
1	Front Cover Assembly	N/A	1
2	LCD Case Assembly	N/A	1
3	Pan Head Screw T3.0x6mm	22-132-30060011	14
4	PA-5822 R-Touch (ELO) Extend Cable (5p to 5p)L=350mm	27-043-40707071	1

Exploded Diagram for Panel PC HDD Assembly



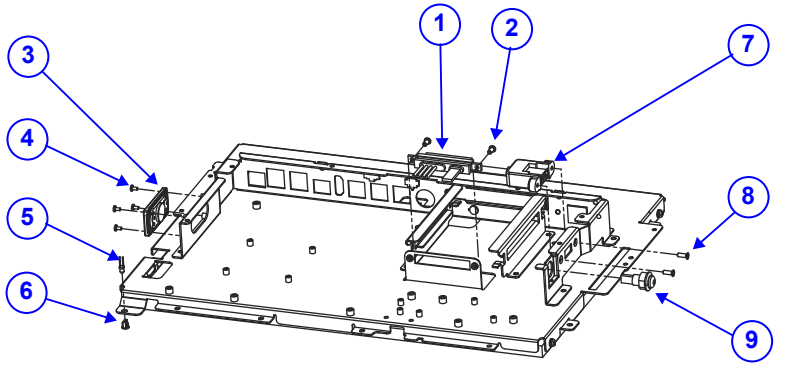
No.	Component Name	P/N No.	Q'ty
1	HDD Assembly	N/A	1
2	Handel Head Screw M3x0.5Px7.7L, H=10mm	22-282-30008031	1
3	AL Cover Assembly	N/A	1
4	Fillister Head Screw #2 / M3x0.5Px6mm	22-275-30006011	2

LCD Assembly Exploded Diagrams (1)



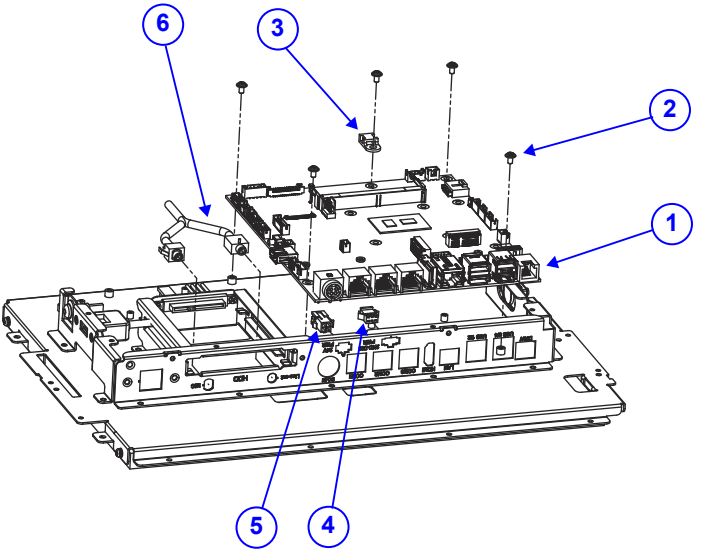
No.	Component Name	P/N No.	Q'ty
1	PA-J581 LCD Holder (w/Plate)(Zn)	20-029-03021528	1
2	15" LCD panel (LED backlight), 300nits, XGA(1024x768)	52-351-03150321	1
3	Poron Sponge (341.9x8x1mm)	90-013-24400000	2
4	Poron Sponge (341.9x8x1mm)	90-013-24400000	2
5	Round Head With Spring Washer Screw M3x0.5Px6mm	22-232-30060211	4
6	PA-5880 LVDS Cable (20p to 30p) L=240mm	27-020-43405111	1
7	BE-0821R LED Backlight Panel (G150XG03_V5) Cable (5p to 6p) L=300mm	27-055-21606111	1

LCD Assembly Exploded Diagrams (2)



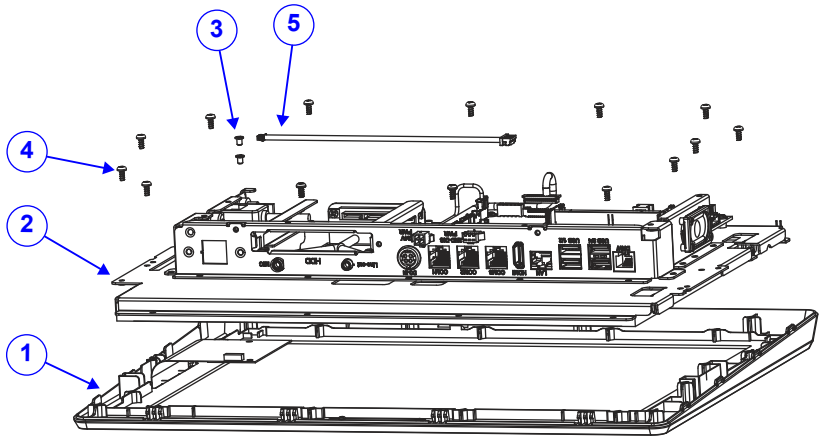
No.	Component Name	P/N No.	Q'ty
1	SATA HDD & Power Cable (SATA F7+15 to SATAF7+2F/P2.5/TIN) L=400mm+400mm	27-008-52808081	1
2	Fillister Head Screw #2/M3x0.5Px6mm	82-275-30006018	2
3	PA-6222/6225 Speaker Cable L=250mm	27-021-33505071	1
4	Fillister Head Screw #1/M2x0.4Px4mm	22-272-20004011	4
5	PA-6922 Power LED Cable L=320mm(Green)	27-018-26906071	1
6	PS-3100 LED Housing (Black)	30-014-04100165	1
7	PA-5822 1-Port USB Cable L=190mm	27-006-40704111	1
8	Flat Head Screw #2 / UNC-No.4-40, L=8mm, FLAT=1.0mm	22-315-40008019	2
9	PA-7225 Power Switch Cable L=390mm	27-019-32108071	1

Main Board Assembly Exploded Diagram



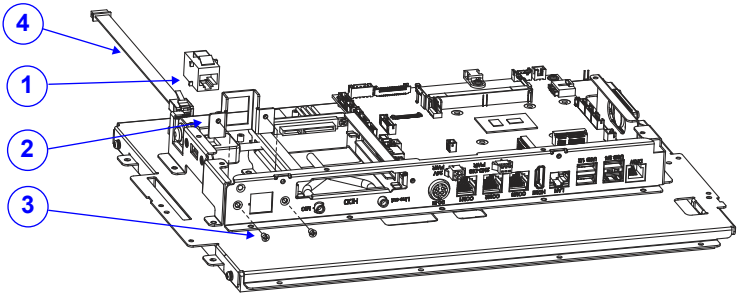
No.	Component Name	P/N No.	Q'ty
1	PB-J581 Board	N/A	1
2	Round Washer Head Screw M3x0.5Px5mm	22-242-30005311	5
3	Cable Saddle	90-023-04204000	1
4	DC 12V Cable (3F/P2.5 to 3F/P2.0) L=200mm	27-012-49704071	1
5	DC OUT 24V Printer Cable (4F/P2.5 to 4F/P3.0) L=100mm	27-012-50302111	1
6	MIC & Line Out Cable ((3.5mm(F) x2 to 10F/P2.0) L=350mm+350mm	27-028-48807111	1

LCD Holder Assembly Exploded Diagram (1)



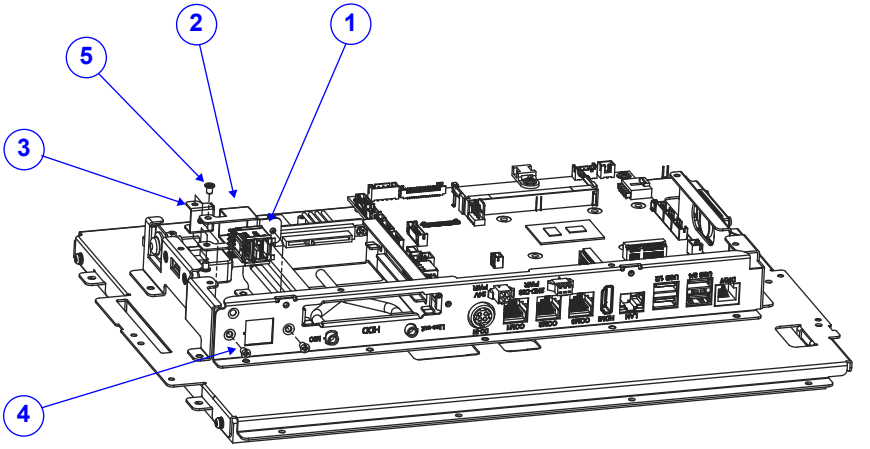
No.	Component Name	P/N No.	Q'ty
1	Front Cover Assembly	N/A	1
2	LCD Case Assembly	N/A	1
3	Fillister Head Screw #2 / M3x0.5Px4mm	82-272-30004018	2
4	Pan Head Screw T3.0x6mm	22-132-30060011	14
5	P-CAP Touch for USB Cable (4F/P1.25 to 5F/P2.0) L=300mm	27-016-50306111	1

LCD Holder Assembly Exploded Diagram (2)



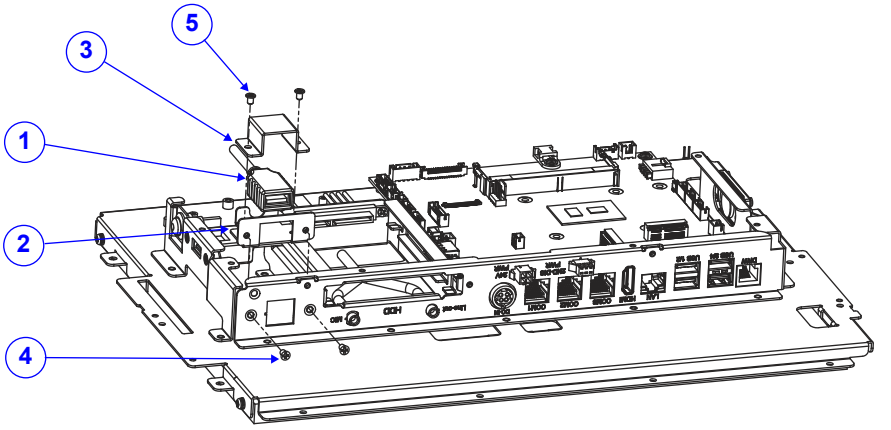
No.	Component Name	P/N No.	Q'ty
1	10P10C Modular Coupler Jack shielded	10-085-10012035	1
2	PA-J581 Modular Coupler Jack (w/Plate) (Zn)	80-206-03021528	1
3	Flat Head Screw #2 / ϕ 5/M3x0.5Px5mm	22-212-30005311	2
4	PA-5880 RJ50 to COM4 Cable L=200mm	27-051-43404031	1

LCD Holder Assembly Exploded Diagrams (3)



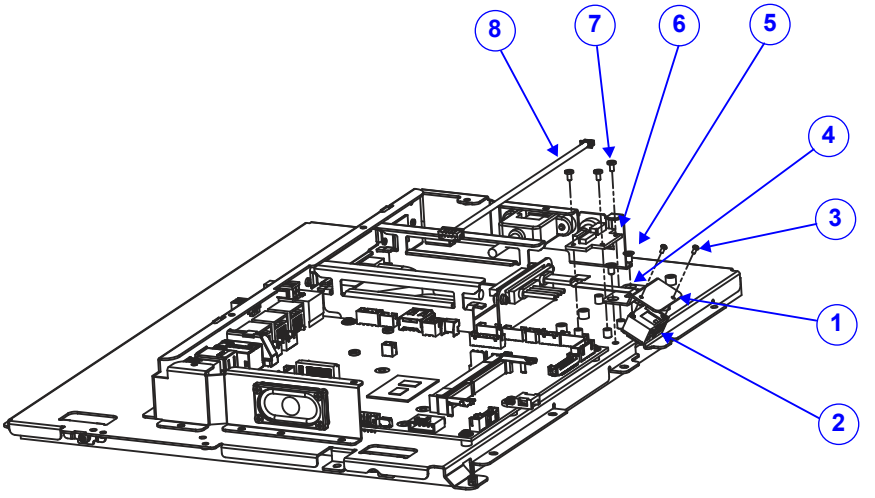
No.	Component Name	P/N No.	Q'ty
1	24V Power USB Cable (USB + Power to 5F/P2.0+4F/P2.5) (Red) L=300mm+350mm	27-006-49707112	1
2	PA-J581 Power USB Holder(w/Plate)(Zn)	80-229-03021528	1
3	PA-J581 Power USB Bracket (w/Plate)(Zn)	80-206-03022528	1
4	Flat Head Screw #2 / ϕ 5/M3x0.5Px5mm	22-212-30005311	2
5	Fillister Head Screw #2 / M3x0.5Px4mm	82-272-30004018	2

LCD Holder Assembly Exploded Diagrams (4)



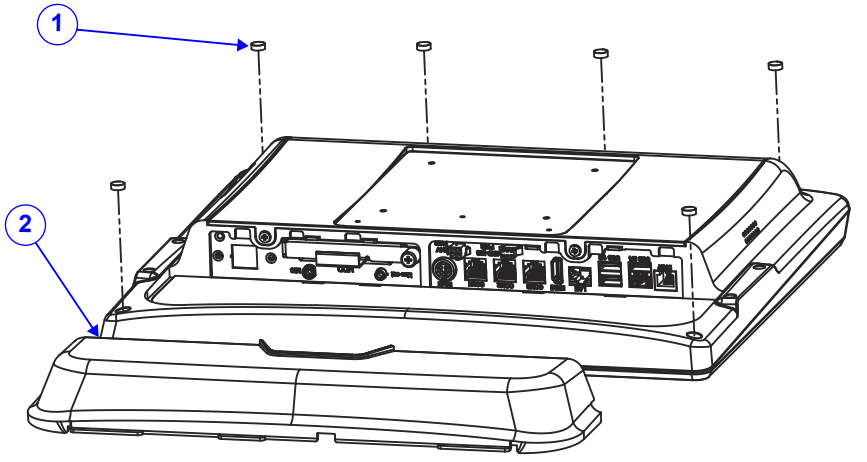
No.	Component Name	P/N No.	Q'ty
1	KF-7130 MZR Passport Reader USB Cable (Type A to 5p) L=380mm	27-006-36008111	1
2	PA-J581 USB Bracket (w/Plate)(Zn)	80-206-03023528	1
3	PA-J581 USB Holder (w/Plate)(Zn)	80-229-03022528	1
4	Flat Head Screw #2 / ϕ 5/M3x0.5Px5mm	22-212-30005311	2
5	Fillister Head Screw #2 / M3x0.5Px4mm	82-272-30004018	2

Barcode Scanner Kit Exploded Diagram



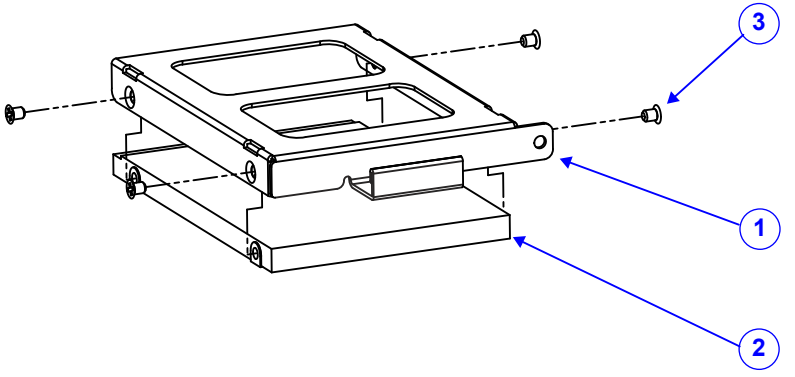
No.	Component Name	P/N No.	Q'ty
1	PA-5822 Barcode Plate	80-005-03001407	1
2	2D Scan Engine	52-820-32960113	1
3	Pan Head Screw M1.6x0.35Px3mm	22-222-16003015	2
4	FPC Cable Pitch=0.5mm Pin=12 L=85mm	27-000-51402091	1
5	Flat Head Screw #2 / M3x0.5Px5mm	22-215-30005011	2
6	DC/DC Converter Board for NLS-EM3096V2 2D Scan Engine	52-152-22000364	1
7	Fillister Head Screw #1/M2x0.4Px4mm	22-272-20004011	3
8	2D Scanner Cable (5F/P2.0/TIN to 5F/P1.25/TIN) L=350mm	27-055-52807111	1

I/O Ports Cover Assembly Exploded Diagram



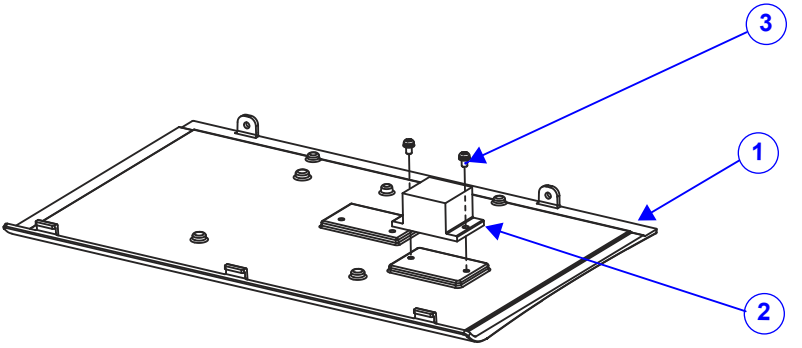
No.	Component Name	P/N No.	Q'ty
1	Rubber Foot (Φ8x3mm)(Black) (2pcs/set)	90-004-01600000	6
2	PA-5822 IO Cover (Black)	30-002-28114407	1

HDD Module Exploded Diagram



No.	Component Name	P/N No.	Q'ty
1	PA-5822 HDD Tray	80-054-03001407	1
2	HDD	N/A	1
3	Flat Head Screw #2 / M3x0.5Px4mm	22-215-30004311	4

AL Cover Module and CPU Heatsink Exploded Diagram



No.	Component Name	P/N No.	Q'ty
1	PA-J581 AL Cover (w/Paint)(Black)	20-004-01061528	1
2	PA-J581 Heatsink Block (41x26x20.4mm)	21-002-14126001	1
3	Round Head With Spring Washer Screw M3x0.5Px6mm	22-232-30060211	2

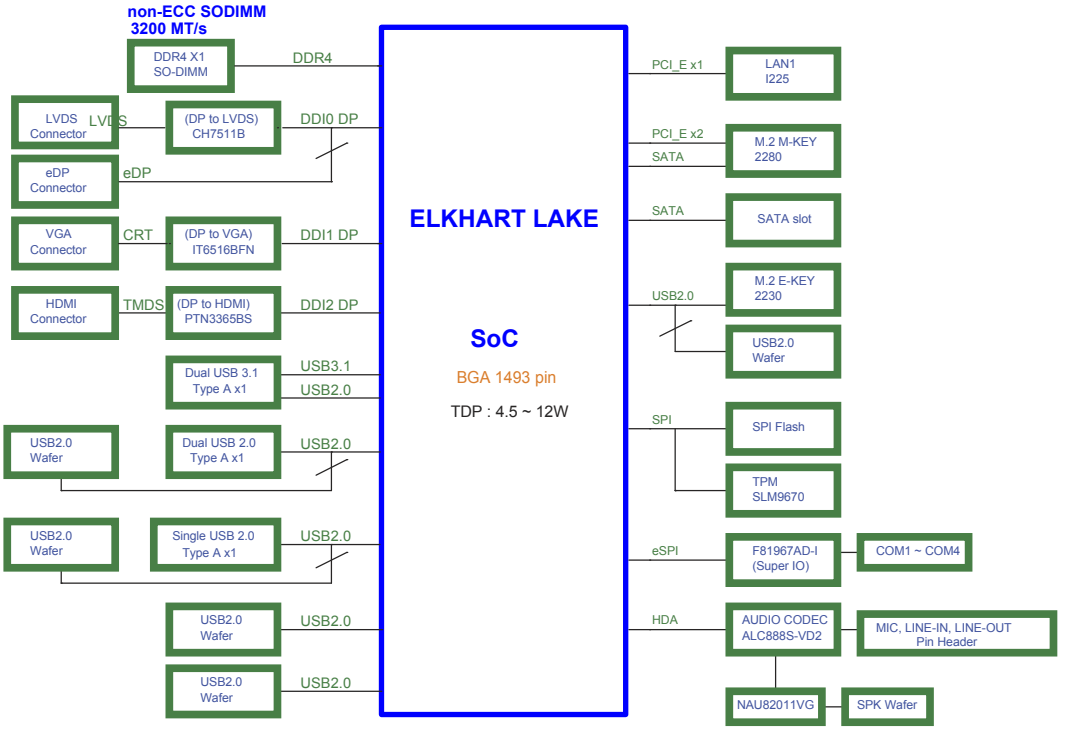
Appendix B Technical Summary

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

The following topics are included:

- Block Diagram
- Interrupt Map
- I/O Map
- Memory Map
- Configuring WatchDog Timer
- Flash BIOS Update

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 14	Motherboard resources
IRQ 16	High Definition Audio Controller
IRQ 54	Microsoft ACPI-Compliant System
IRQ 55	Microsoft ACPI-Compliant System
IRQ 56	Microsoft ACPI-Compliant System
IRQ 57	Microsoft ACPI-Compliant System
IRQ 58	Microsoft ACPI-Compliant System
IRQ 59	Microsoft ACPI-Compliant System
IRQ 60	Microsoft ACPI-Compliant System
IRQ 61	Microsoft ACPI-Compliant System
IRQ 62	Microsoft ACPI-Compliant System
IRQ 63	Microsoft ACPI-Compliant System
IRQ 64	Microsoft ACPI-Compliant System
IRQ 65	Microsoft ACPI-Compliant System
IRQ 66	Microsoft ACPI-Compliant System
IRQ 67	Microsoft ACPI-Compliant System
IRQ 68	Microsoft ACPI-Compliant System
IRQ 69	Microsoft ACPI-Compliant System
IRQ 70	Microsoft ACPI-Compliant System
IRQ 71	Microsoft ACPI-Compliant System
IRQ 72	Microsoft ACPI-Compliant System
IRQ 73	Microsoft ACPI-Compliant System
IRQ 74	Microsoft ACPI-Compliant System
IRQ 75	Microsoft ACPI-Compliant System
IRQ 76	Microsoft ACPI-Compliant System
IRQ 77	Microsoft ACPI-Compliant System
IRQ 78	Microsoft ACPI-Compliant System
IRQ 79	Microsoft ACPI-Compliant System
IRQ 80	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
IRQ 81	Microsoft ACPI-Compliant System
IRQ 82	Microsoft ACPI-Compliant System
IRQ 83	Microsoft ACPI-Compliant System
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
IRQ 96	Microsoft ACPI-Compliant System
IRQ 97	Microsoft ACPI-Compliant System
IRQ 98	Microsoft ACPI-Compliant System
IRQ 99	Microsoft ACPI-Compliant System
IRQ 100	Microsoft ACPI-Compliant System
IRQ 101	Microsoft ACPI-Compliant System
IRQ 102	Microsoft ACPI-Compliant System
IRQ 103	Microsoft ACPI-Compliant System
IRQ 104	Microsoft ACPI-Compliant System
IRQ 105	Microsoft ACPI-Compliant System
IRQ 106	Microsoft ACPI-Compliant System
IRQ 107	Microsoft ACPI-Compliant System
IRQ 108	Microsoft ACPI-Compliant System
IRQ 109	Microsoft ACPI-Compliant System
IRQ 110	Microsoft ACPI-Compliant System
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	ASSIGNMENT
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 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
IRQ 132	Microsoft ACPI-Compliant System
IRQ 133	Microsoft ACPI-Compliant System
IRQ 134	Microsoft ACPI-Compliant System
IRQ 135	Microsoft ACPI-Compliant System
IRQ 136	Microsoft ACPI-Compliant System
IRQ 137	Microsoft ACPI-Compliant System
IRQ 138	Microsoft ACPI-Compliant System
IRQ 139	Microsoft ACPI-Compliant System
IRQ 140	Microsoft ACPI-Compliant System
IRQ 141	Microsoft ACPI-Compliant System
IRQ 142	Microsoft ACPI-Compliant System
IRQ 143	Microsoft ACPI-Compliant System
IRQ 144	Microsoft ACPI-Compliant System
IRQ 145	Microsoft ACPI-Compliant System
IRQ 146	Microsoft ACPI-Compliant System
IRQ 147	Microsoft ACPI-Compliant System
IRQ 148	Microsoft ACPI-Compliant System
IRQ 149	Microsoft ACPI-Compliant System
IRQ 150	Microsoft ACPI-Compliant System
IRQ 151	Microsoft ACPI-Compliant System
IRQ 152	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
IRQ 153	Microsoft ACPI-Compliant System
IRQ 154	Microsoft ACPI-Compliant System
IRQ 155	Microsoft ACPI-Compliant System
IRQ 156	Microsoft ACPI-Compliant System
IRQ 157	Microsoft ACPI-Compliant System
IRQ 158	Microsoft ACPI-Compliant System
IRQ 159	Microsoft ACPI-Compliant System
IRQ 160	Microsoft ACPI-Compliant System
IRQ 161	Microsoft ACPI-Compliant System
IRQ 162	Microsoft ACPI-Compliant System
IRQ 163	Microsoft ACPI-Compliant System
IRQ 164	Microsoft ACPI-Compliant System
IRQ 165	Microsoft ACPI-Compliant System
IRQ 166	Microsoft ACPI-Compliant System
IRQ 167	Microsoft ACPI-Compliant System
IRQ 168	Microsoft ACPI-Compliant System
IRQ 169	Microsoft ACPI-Compliant System
IRQ 170	Microsoft ACPI-Compliant System
IRQ 171	Microsoft ACPI-Compliant System
IRQ 172	Microsoft ACPI-Compliant System
IRQ 173	Microsoft ACPI-Compliant System
IRQ 174	Microsoft ACPI-Compliant System
IRQ 175	Microsoft ACPI-Compliant System
IRQ 176	Microsoft ACPI-Compliant System
IRQ 177	Microsoft ACPI-Compliant System
IRQ 178	Microsoft ACPI-Compliant System
IRQ 179	Microsoft ACPI-Compliant System
IRQ 180	Microsoft ACPI-Compliant System
IRQ 181	Microsoft ACPI-Compliant System
IRQ 182	Microsoft ACPI-Compliant System
IRQ 183	Microsoft ACPI-Compliant System
IRQ 184	Microsoft ACPI-Compliant System
IRQ 185	Microsoft ACPI-Compliant System
IRQ 186	Microsoft ACPI-Compliant System
IRQ 187	Microsoft ACPI-Compliant System
IRQ 188	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
IRQ 189	Microsoft ACPI-Compliant System
IRQ 190	Microsoft ACPI-Compliant System
IRQ 191	Microsoft ACPI-Compliant System
IRQ 192	Microsoft ACPI-Compliant System
IRQ 193	Microsoft ACPI-Compliant System
IRQ 194	Microsoft ACPI-Compliant System
IRQ 195	Microsoft ACPI-Compliant System
IRQ 196	Microsoft ACPI-Compliant System
IRQ 197	Microsoft ACPI-Compliant System
IRQ 198	Microsoft ACPI-Compliant System
IRQ 199	Microsoft ACPI-Compliant System
IRQ 200	Microsoft ACPI-Compliant System
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
IRQ 257	Microsoft ACPI-Compliant System
IRQ 258	Microsoft ACPI-Compliant System
IRQ 259	Microsoft ACPI-Compliant System
IRQ 260	Microsoft ACPI-Compliant System
IRQ 261	Microsoft ACPI-Compliant System
IRQ 262	Microsoft ACPI-Compliant System
IRQ 263	Microsoft ACPI-Compliant System
IRQ 264	Microsoft ACPI-Compliant System
IRQ 265	Microsoft ACPI-Compliant System
IRQ 266	Microsoft ACPI-Compliant System
IRQ 267	Microsoft ACPI-Compliant System
IRQ 268	Microsoft ACPI-Compliant System
IRQ 269	Microsoft ACPI-Compliant System
IRQ 270	Microsoft ACPI-Compliant System
IRQ 271	Microsoft ACPI-Compliant System
IRQ 272	Microsoft ACPI-Compliant System
IRQ 273	Microsoft ACPI-Compliant System
IRQ 274	Microsoft ACPI-Compliant System
IRQ 275	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
IRQ 276	Microsoft ACPI-Compliant System
IRQ 277	Microsoft ACPI-Compliant System
IRQ 278	Microsoft ACPI-Compliant System
IRQ 279	Microsoft ACPI-Compliant System
IRQ 280	Microsoft ACPI-Compliant System
IRQ 281	Microsoft ACPI-Compliant System
IRQ 282	Microsoft ACPI-Compliant System
IRQ 283	Microsoft ACPI-Compliant System
IRQ 284	Microsoft ACPI-Compliant System
IRQ 285	Microsoft ACPI-Compliant System
IRQ 286	Microsoft ACPI-Compliant System
IRQ 287	Microsoft ACPI-Compliant System
IRQ 288	Microsoft ACPI-Compliant System
IRQ 289	Microsoft ACPI-Compliant System
IRQ 290	Microsoft ACPI-Compliant System
IRQ 291	Microsoft ACPI-Compliant System
IRQ 292	Microsoft ACPI-Compliant System
IRQ 293	Microsoft ACPI-Compliant System
IRQ 294	Microsoft ACPI-Compliant System
IRQ 295	Microsoft ACPI-Compliant System
IRQ 296	Microsoft ACPI-Compliant System
IRQ 297	Microsoft ACPI-Compliant System
IRQ 298	Microsoft ACPI-Compliant System
IRQ 299	Microsoft ACPI-Compliant System
IRQ 300	Microsoft ACPI-Compliant System
IRQ 301	Microsoft ACPI-Compliant System
IRQ 302	Microsoft ACPI-Compliant System
IRQ 303	Microsoft ACPI-Compliant System
IRQ 304	Microsoft ACPI-Compliant System
IRQ 305	Microsoft ACPI-Compliant System
IRQ 306	Microsoft ACPI-Compliant System
IRQ 307	Microsoft ACPI-Compliant System
IRQ 308	Microsoft ACPI-Compliant System
IRQ 309	Microsoft ACPI-Compliant System
IRQ 310	Microsoft ACPI-Compliant System
IRQ 311	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
IRQ 312	Microsoft ACPI-Compliant System
IRQ 313	Microsoft ACPI-Compliant System
IRQ 314	Microsoft ACPI-Compliant System
IRQ 315	Microsoft ACPI-Compliant System
IRQ 316	Microsoft ACPI-Compliant System
IRQ 317	Microsoft ACPI-Compliant System
IRQ 318	Microsoft ACPI-Compliant System
IRQ 319	Microsoft ACPI-Compliant System
IRQ 320	Microsoft ACPI-Compliant System
IRQ 321	Microsoft ACPI-Compliant System
IRQ 322	Microsoft ACPI-Compliant System
IRQ 323	Microsoft ACPI-Compliant System
IRQ 324	Microsoft ACPI-Compliant System
IRQ 325	Microsoft ACPI-Compliant System
IRQ 326	Microsoft ACPI-Compliant System
IRQ 327	Microsoft ACPI-Compliant System
IRQ 328	Microsoft ACPI-Compliant System
IRQ 329	Microsoft ACPI-Compliant System
IRQ 330	Microsoft ACPI-Compliant System
IRQ 331	Microsoft ACPI-Compliant System
IRQ 332	Microsoft ACPI-Compliant System
IRQ 333	Microsoft ACPI-Compliant System
IRQ 334	Microsoft ACPI-Compliant System
IRQ 335	Microsoft ACPI-Compliant System
IRQ 336	Microsoft ACPI-Compliant System
IRQ 337	Microsoft ACPI-Compliant System
IRQ 338	Microsoft ACPI-Compliant System
IRQ 339	Microsoft ACPI-Compliant System
IRQ 340	Microsoft ACPI-Compliant System
IRQ 341	Microsoft ACPI-Compliant System
IRQ 342	Microsoft ACPI-Compliant System
IRQ 343	Microsoft ACPI-Compliant System
IRQ 344	Microsoft ACPI-Compliant System
IRQ 345	Microsoft ACPI-Compliant System
IRQ 346	Microsoft ACPI-Compliant System
IRQ 347	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
IRQ 348	Microsoft ACPI-Compliant System
IRQ 349	Microsoft ACPI-Compliant System
IRQ 350	Microsoft ACPI-Compliant System
IRQ 351	Microsoft ACPI-Compliant System
IRQ 352	Microsoft ACPI-Compliant System
IRQ 353	Microsoft ACPI-Compliant System
IRQ 354	Microsoft ACPI-Compliant System
IRQ 355	Microsoft ACPI-Compliant System
IRQ 356	Microsoft ACPI-Compliant System
IRQ 357	Microsoft ACPI-Compliant System
IRQ 358	Microsoft ACPI-Compliant System
IRQ 359	Microsoft ACPI-Compliant System
IRQ 360	Microsoft ACPI-Compliant System
IRQ 361	Microsoft ACPI-Compliant System
IRQ 362	Microsoft ACPI-Compliant System
IRQ 363	Microsoft ACPI-Compliant System
IRQ 364	Microsoft ACPI-Compliant System
IRQ 365	Microsoft ACPI-Compliant System
IRQ 366	Microsoft ACPI-Compliant System
IRQ 367	Microsoft ACPI-Compliant System
IRQ 368	Microsoft ACPI-Compliant System
IRQ 369	Microsoft ACPI-Compliant System
IRQ 370	Microsoft ACPI-Compliant System
IRQ 371	Microsoft ACPI-Compliant System
IRQ 372	Microsoft ACPI-Compliant System
IRQ 373	Microsoft ACPI-Compliant System
IRQ 374	Microsoft ACPI-Compliant System
IRQ 375	Microsoft ACPI-Compliant System
IRQ 376	Microsoft ACPI-Compliant System
IRQ 377	Microsoft ACPI-Compliant System
IRQ 378	Microsoft ACPI-Compliant System
IRQ 379	Microsoft ACPI-Compliant System
IRQ 380	Microsoft ACPI-Compliant System
IRQ 381	Microsoft ACPI-Compliant System
IRQ 382	Microsoft ACPI-Compliant System
IRQ 383	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
IRQ 384	Microsoft ACPI-Compliant System
IRQ 385	Microsoft ACPI-Compliant System
IRQ 386	Microsoft ACPI-Compliant System
IRQ 387	Microsoft ACPI-Compliant System
IRQ 388	Microsoft ACPI-Compliant System
IRQ 389	Microsoft ACPI-Compliant System
IRQ 390	Microsoft ACPI-Compliant System
IRQ 391	Microsoft ACPI-Compliant System
IRQ 392	Microsoft ACPI-Compliant System
IRQ 393	Microsoft ACPI-Compliant System
IRQ 394	Microsoft ACPI-Compliant System
IRQ 395	Microsoft ACPI-Compliant System
IRQ 396	Microsoft ACPI-Compliant System
IRQ 397	Microsoft ACPI-Compliant System
IRQ 398	Microsoft ACPI-Compliant System
IRQ 399	Microsoft ACPI-Compliant System
IRQ 400	Microsoft ACPI-Compliant System
IRQ 401	Microsoft ACPI-Compliant System
IRQ 402	Microsoft ACPI-Compliant System
IRQ 403	Microsoft ACPI-Compliant System
IRQ 404	Microsoft ACPI-Compliant System
IRQ 405	Microsoft ACPI-Compliant System
IRQ 406	Microsoft ACPI-Compliant System
IRQ 407	Microsoft ACPI-Compliant System
IRQ 408	Microsoft ACPI-Compliant System
IRQ 409	Microsoft ACPI-Compliant System
IRQ 410	Microsoft ACPI-Compliant System
IRQ 411	Microsoft ACPI-Compliant System
IRQ 412	Microsoft ACPI-Compliant System
IRQ 413	Microsoft ACPI-Compliant System
IRQ 414	Microsoft ACPI-Compliant System
IRQ 415	Microsoft ACPI-Compliant System
IRQ 416	Microsoft ACPI-Compliant System
IRQ 417	Microsoft ACPI-Compliant System
IRQ 418	Microsoft ACPI-Compliant System
IRQ 419	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
IRQ 420	Microsoft ACPI-Compliant System
IRQ 421	Microsoft ACPI-Compliant System
IRQ 422	Microsoft ACPI-Compliant System
IRQ 423	Microsoft ACPI-Compliant System
IRQ 424	Microsoft ACPI-Compliant System
IRQ 425	Microsoft ACPI-Compliant System
IRQ 426	Microsoft ACPI-Compliant System
IRQ 427	Microsoft ACPI-Compliant System
IRQ 428	Microsoft ACPI-Compliant System
IRQ 429	Microsoft ACPI-Compliant System
IRQ 430	Microsoft ACPI-Compliant System
IRQ 431	Microsoft ACPI-Compliant System
IRQ 432	Microsoft ACPI-Compliant System
IRQ 433	Microsoft ACPI-Compliant System
IRQ 434	Microsoft ACPI-Compliant System
IRQ 435	Microsoft ACPI-Compliant System
IRQ 436	Microsoft ACPI-Compliant System
IRQ 437	Microsoft ACPI-Compliant System
IRQ 438	Microsoft ACPI-Compliant System
IRQ 439	Microsoft ACPI-Compliant System
IRQ 440	Microsoft ACPI-Compliant System
IRQ 441	Microsoft ACPI-Compliant System
IRQ 442	Microsoft ACPI-Compliant System
IRQ 443	Microsoft ACPI-Compliant System
IRQ 444	Microsoft ACPI-Compliant System
IRQ 445	Microsoft ACPI-Compliant System
IRQ 446	Microsoft ACPI-Compliant System
IRQ 447	Microsoft ACPI-Compliant System
IRQ 448	Microsoft ACPI-Compliant System
IRQ 449	Microsoft ACPI-Compliant System
IRQ 450	Microsoft ACPI-Compliant System
IRQ 451	Microsoft ACPI-Compliant System
IRQ 452	Microsoft ACPI-Compliant System
IRQ 453	Microsoft ACPI-Compliant System
IRQ 454	Microsoft ACPI-Compliant System
IRQ 455	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
IRQ 456	Microsoft ACPI-Compliant System
IRQ 457	Microsoft ACPI-Compliant System
IRQ 458	Microsoft ACPI-Compliant System
IRQ 459	Microsoft ACPI-Compliant System
IRQ 460	Microsoft ACPI-Compliant System
IRQ 461	Microsoft ACPI-Compliant System
IRQ 462	Microsoft ACPI-Compliant System
IRQ 463	Microsoft ACPI-Compliant System
IRQ 464	Microsoft ACPI-Compliant System
IRQ 465	Microsoft ACPI-Compliant System
IRQ 466	Microsoft ACPI-Compliant System
IRQ 467	Microsoft ACPI-Compliant System
IRQ 468	Microsoft ACPI-Compliant System
IRQ 469	Microsoft ACPI-Compliant System
IRQ 470	Microsoft ACPI-Compliant System
IRQ 471	Microsoft ACPI-Compliant System
IRQ 472	Microsoft ACPI-Compliant System
IRQ 473	Microsoft ACPI-Compliant System
IRQ 474	Microsoft ACPI-Compliant System
IRQ 475	Microsoft ACPI-Compliant System
IRQ 476	Microsoft ACPI-Compliant System
IRQ 477	Microsoft ACPI-Compliant System
IRQ 478	Microsoft ACPI-Compliant System
IRQ 479	Microsoft ACPI-Compliant System
IRQ 480	Microsoft ACPI-Compliant System
IRQ 481	Microsoft ACPI-Compliant System
IRQ 482	Microsoft ACPI-Compliant System
IRQ 483	Microsoft ACPI-Compliant System
IRQ 484	Microsoft ACPI-Compliant System
IRQ 485	Microsoft ACPI-Compliant System
IRQ 486	Microsoft ACPI-Compliant System
IRQ 487	Microsoft ACPI-Compliant System
IRQ 488	Microsoft ACPI-Compliant System
IRQ 489	Microsoft ACPI-Compliant System
IRQ 490	Microsoft ACPI-Compliant System
IRQ 491	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
IRQ 492	Microsoft ACPI-Compliant System
IRQ 493	Microsoft ACPI-Compliant System
IRQ 494	Microsoft ACPI-Compliant System
IRQ 495	Microsoft ACPI-Compliant System
IRQ 496	Microsoft ACPI-Compliant System
IRQ 497	Microsoft ACPI-Compliant System
IRQ 498	Microsoft ACPI-Compliant System
IRQ 499	Microsoft ACPI-Compliant System
IRQ 500	Microsoft ACPI-Compliant System
IRQ 501	Microsoft ACPI-Compliant System
IRQ 502	Microsoft ACPI-Compliant System
IRQ 503	Microsoft ACPI-Compliant System
IRQ 504	Microsoft ACPI-Compliant System
IRQ 505	Microsoft ACPI-Compliant System
IRQ 506	Microsoft ACPI-Compliant System
IRQ 507	Microsoft ACPI-Compliant System
IRQ 508	Microsoft ACPI-Compliant System
IRQ 509	Microsoft ACPI-Compliant System
IRQ 510	Microsoft ACPI-Compliant System
IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967286	Intel(R) Management Engine Interface #1
IRQ 4294967287	Intel(R) Ethernet Controller (3) I225-LM
IRQ 4294967288	Intel(R) Ethernet Controller (3) I225-LM
IRQ 4294967289	Intel(R) Ethernet Controller (3) I225-LM
IRQ 4294967290	Intel(R) Ethernet Controller (3) I225-LM
IRQ 4294967291	Intel(R) Ethernet Controller (3) I225-LM
IRQ 4294967292	Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 4294967293	Intel(R) UHD Graphics
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	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
0x000000BC-0x000000BD	Programmable interrupt controller
0x000002E8-0x000002EF	Communications Port (COM4)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000003F8-0x000003FF	Communications Port (COM1)

I/O	ASSIGNMENT
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000680-0x0000069F	Motherboard resources
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A20-0x00000A2F	Motherboard resources
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x0000164E-0x0000164F	Motherboard resources
0x00001800-0x000018FE	Motherboard resources
0x00001854-0x00001857	Motherboard resources
0x00002000-0x000020FE	Motherboard resources
0x00003000-0x00003FFF	Intel(R) PCI Express Root Port #0 - 4B38
0x00004000-0x0000403F	Intel(R) UHD Graphics
0x00004060-0x0000407F	Standard SATA AHCI Controller
0x00004080-0x00004083	Standard SATA AHCI Controller
0x00004090-0x00004097	Standard SATA AHCI Controller
0x0000EFA0-0x0000EFBF	Intel(R) SMBus Controller - 4B23

Memory Map

MEMORY MAP	ASSIGNMENT
0xFEC80000-0xFECFFFFF	Motherboard resources
0xFEDA0000-0xFEDA0FFF	Motherboard resources
0xFEDA1000-0xFEDA1FFF	Motherboard resources
0xC0000000-0xCFFFFFFF	Motherboard resources
0xFED20000-0xFED7FFFF	Motherboard resources
0xFED90000-0xFED93FFF	Motherboard resources
0xFED45000-0xFED8FFFF	Motherboard resources
0xFEE00000-0xFEEFFFFF	Motherboard resources
0xFFEFC000-0xFFEFFFFF	High Definition Audio Controller
0xFFF00000-0xFFFFFFFF	High Definition Audio Controller
0x80600000-0x807FFFFF	Intel(R) PCI Express Root Port #4 - 4B3C
0x80600000-0x807FFFFF	Intel(R) Ethernet Controller (3) I225-LM
0xFED00000-0xFED003FF	High precision event timer
0x0000-0x9FFFFF	Intel(R) PCI Express Root Port #0 - 4B38
0xFE010000-0xFE010FFF	Intel(R) SPI (flash) Controller - 4B24
0xFD000000-0xFD68FFFF	Motherboard resources
0xFD6F0000-0xFDFFFFFF	Motherboard resources

MEMORY MAP	ASSIGNMENT
0xFE000000-0xFE01FFFF	Motherboard resources
0xFE200000-0xFE7FFFFF	Motherboard resources
0xFF000000-0xFFFFFFFF	Motherboard resources
0xFD6B0000-0xFD6CFFFF	Motherboard resources
0xFD6B0000-0xFD6CFFFF	Motherboard resources
0x80800000-0x80801FFF	Standard SATA AHCI Controller
0x80803000-0x808030FF	Standard SATA AHCI Controller
0x80802000-0x808027FF	Standard SATA AHCI Controller
0x2100000-0x210FFFF	Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft)
0x80700000-0x80703FFF	Intel(R) Ethernet Controller (3) I225-LM
0xFED40000-0xFED44FFF	Trusted Platform Module 2.0
0x2118000-0x21180FF	Intel(R) SMBus Controller - 4B23
0xFFEFB000-0xFFEFBFFF	Intel(R) Management Engine Interface #1
0x1000000-0x1FFFFFF	Intel(R) UHD Graphics
0x0000-0xFFFFFFF	Intel(R) UHD Graphics
0xFD6E0000-0xFD6EFFFF	Motherboard resources
0xFD6D0000-0xFD6DFFFF	Motherboard resources
0xFD6A0000-0xFD6AFFFF	Motherboard resources
0xFD690000-0xFD69FFFF	Motherboard resources
0xA0000-0xBFFFF	PCI Express Root Complex
0xE0000-0xE3FFF	PCI Express Root Complex
0xE4000-0xE7FFF	PCI Express Root Complex
0xE8000-0xEBFFF	PCI Express Root Complex
0xEC000-0xEFFFF	PCI Express Root Complex
0xF0000-0xFFFFF	PCI Express Root Complex
0x7FC00000-0x805FFFFF	Intel(R) PCI Express Root Port #0 - 4B38
0x7FC00000-0x805FFFFF	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 F81967 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

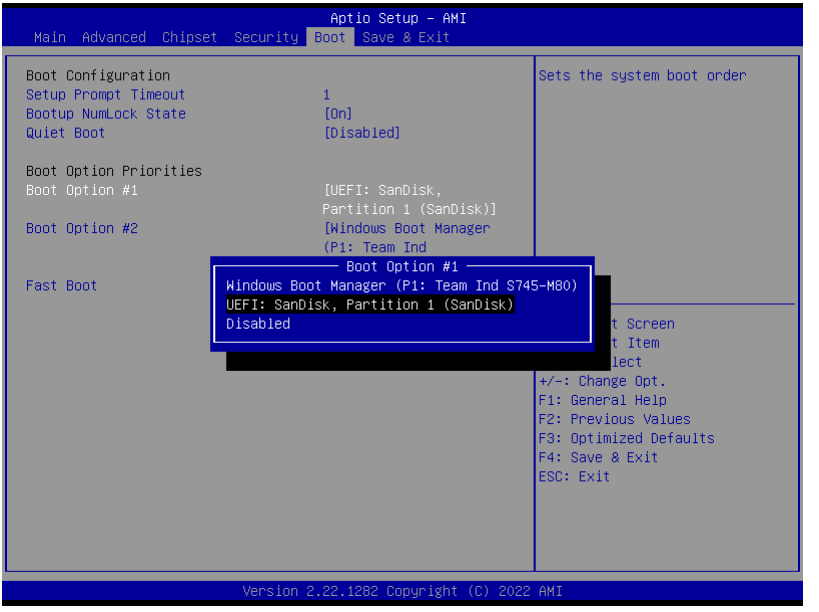
1 Prepare a bootable media (e.g. USB storage device) which can boot system to EFI Shell.
Note: Copy UEFI Shell into the storage device under specific directory path. (/efi/boot/bootx64.efi)

2 Download and save the BIOS file (e.g. J5810PX1.bin) to the storage device.

3 Copy AMI flash utility – AfuEfix64.efi (v5.14.01.0015) into bootable device.

4 Make sure the target system can first boot to the bootable device.

(1) Connect the USB storage device.
(2) Turn on the computer and press **<ESC>** or **<DEL>** key during boot to enter BIOS Setup.
(3) Select **[Boot]** menu and set the USB bootable device to be the 1st boot device.
(4) Press **<F4>** key to save configuration and exit the BIOS setup menu.



II. AFUEFI 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 see all the definition of each control options. The recommended options for BIOS ROM update include following parameters:

/P: Program main BIOS image.
/B: Program Boot Block.
/N: Program NVRAM.
/X: Don't check ROM ID.
/R1: Keep SMBIOS Type1 data.

III. BIOS Update Procedure

1. Use the bootable USB storage to boot up system into the EFI Shell.
2. Type "**AfuEfix64 J501xxxx.bin /p /b /n /x /r1**" and press enter to start the flash procedure. (xxxx means the BIOS revision part, e.g. 0PM1…)
3. During the update procedure, you will see the BIOS update process status and its percentage. Beware! Do not turn off system power or reset your computer if the whole procedure are not complete yet, or it may crash the BIOS ROM and make system unable to boot up next time.
4. After BIOS update procedures is complete, the messages should be like the figure shown below.

```
Shell> fs0:

fs0:\> AFUEFIx64 J5810PX1.bin /p /b /n /x /r1
+--------------------------------------------------------------------+
|              AMI Firmware Update Utility v5.14.01.0015             |
|    Copyright (C) 1985-2020, 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.