

USER'S MANUAL

PA-6980 Series

POS System Powered by

Intel® 6th / 7th Gen. Core™ ,

Pentium® , Celeron® Processor

PA-6980 Series M6

PA-6980 Series POS System

With LCD / Touchscreen

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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 if battery is incorrectly replaced. Replace 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. And therefore we strongly recommend that qualified engineers can open and disassemble the system. The LCD and Touchscreen are easily breakable, please handle them with extra care.

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INTRODUCTION

CHAPTER

1

This chapter gives you the information for the PA-6980. It also outlines the system specifications.

The following sections are included:

- About This Manual
- POS System Illustration
 - Panel PC
 - Normal Stand
 - Printer Stand
 - Rear I/O View
- System Specifications
- Safety Precautions

Experienced users can jump to chapter 2 on page 2-1 for a quick start.

1-1. ABOUT THIS MANUAL

Thank you for purchasing our PA-6980 Series System. The PA-6980 is an updated system designed to be comparable with the highest performance of IBM AT personal computers. The PA-6980 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 four chapters and two 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 motherboard components and their function. You will learn how to set the jumper and configure the system to meet your own needs.

Chapter 3 Software Utilities

This chapter contains helpful information for proper installations of the Intel Utility, VGA Utility, LAN Utility, Sound Utility, Touch Screen Utility and Fingerprint Utility (Optional).

Chapter 4 AMI BIOS Setup

This chapter indicates you how to change the BIOS configurations.

Appendix A System Assembly

This appendix gives you the exploded diagrams and part numbers of the PA-6980.

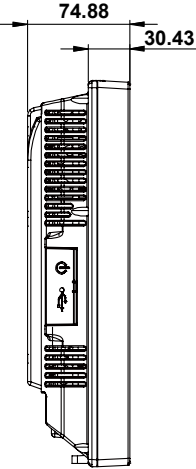
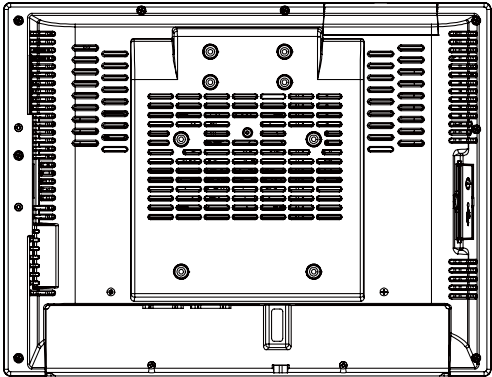
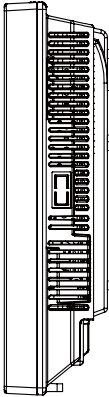
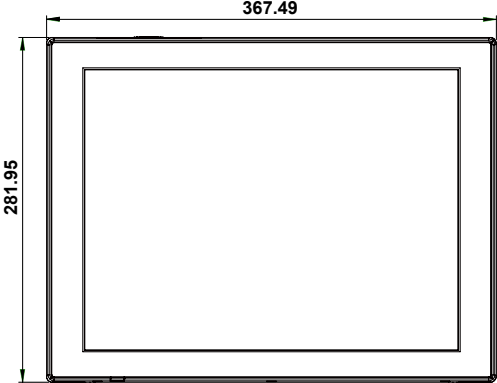
Appendix B Technical Summary

This appendix gives you the information about the allocation maps for the system resources, Watchdog Timer Configuration, and Flash BIOS Update.

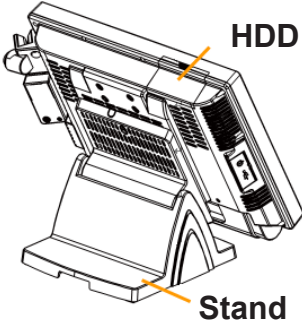
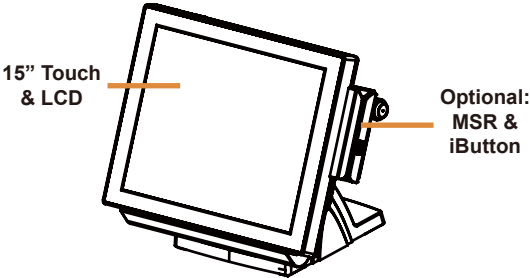
1-2. POS SYSTEM ILLUSTRATION

Unit: mm

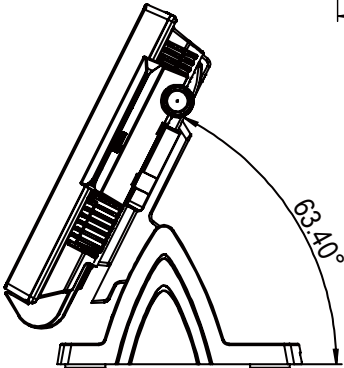
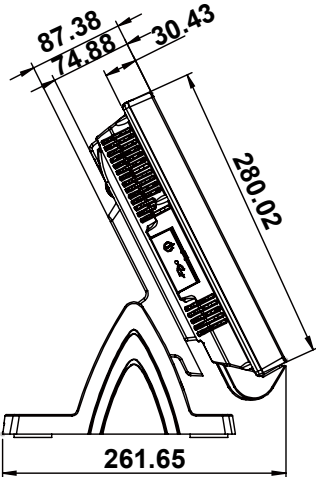
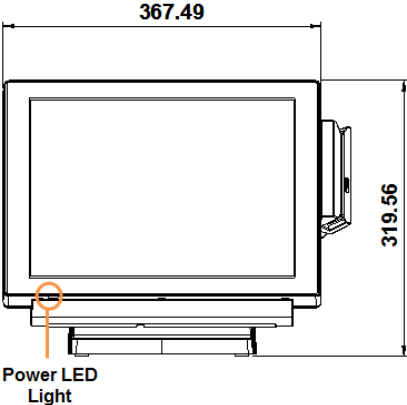
1-2-1. Panel PC



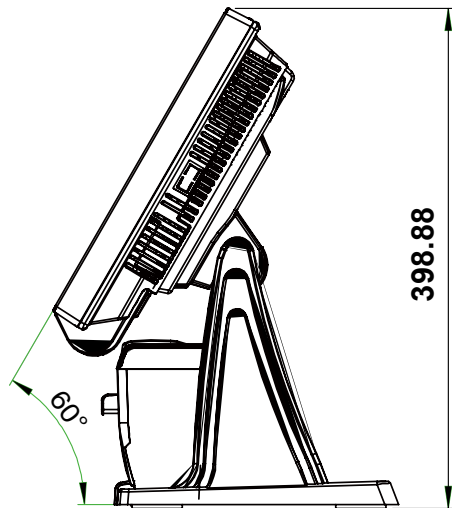
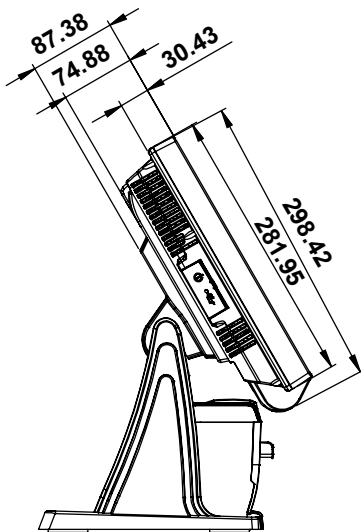
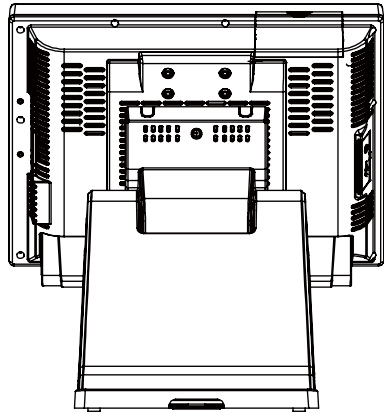
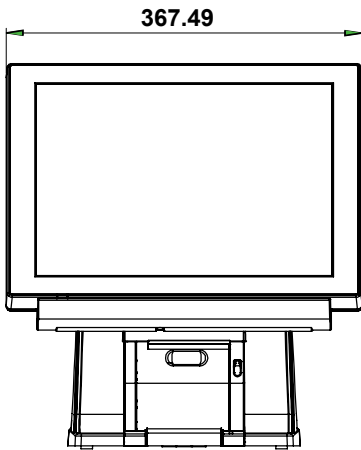
1-2-2. Normal Stand

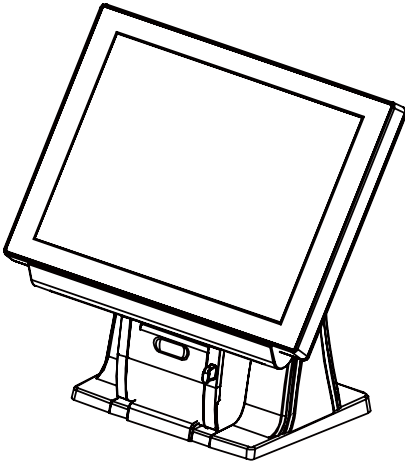


Adjustable angle 0-68 degree



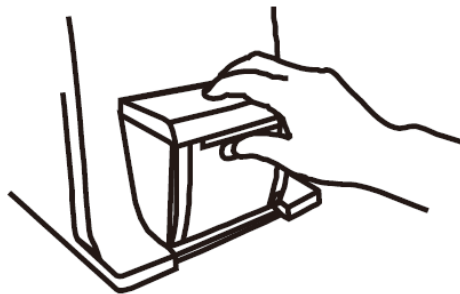
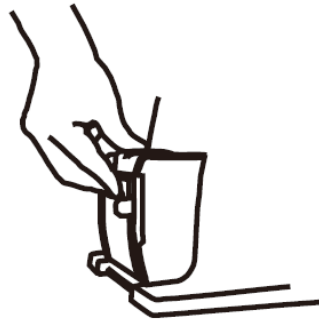
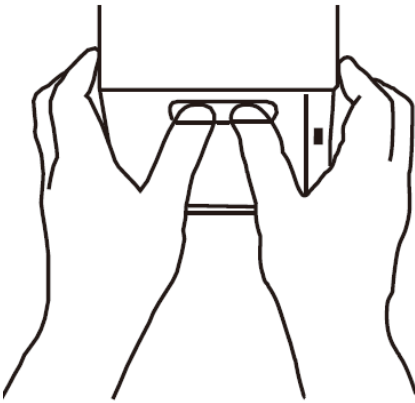
1-2-3. Printer Stand



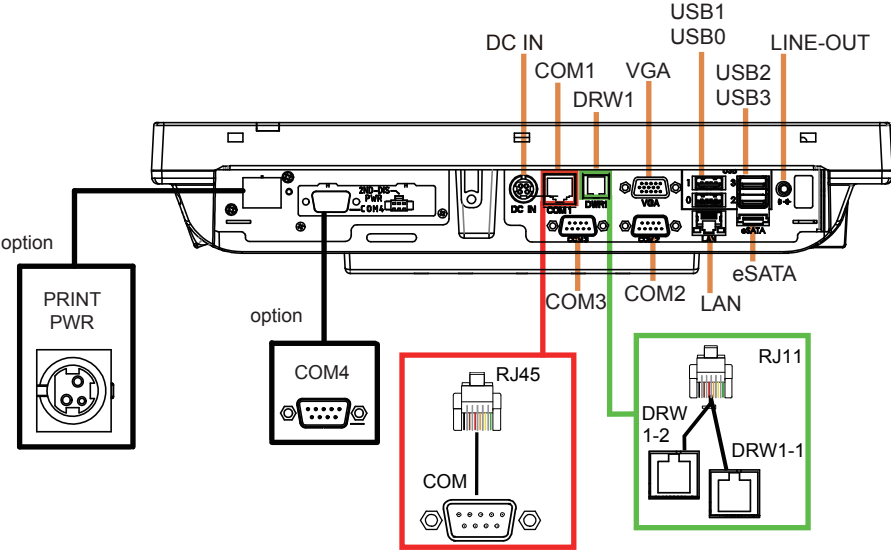


Caution:

Please refer to the picture below to close the printer door properly.



1-2-4. Rear I/O View



1-3. SYSTEM SPECIFICATIONS

MAINBOARD (PB-6980)

System

CPU support	6 th Gen Skylake	7 th Gen Kabylake
Core Logic	Intel® H110 Chipset	
Memory	2 x DDR4 SO-DIMM slot (up to 32GB)	
Network	10/100/1000Mbps Base-T Fast Ethernet	
OS Support	<ul style="list-style-type: none"> • Windows 7 Pro for Embedded Systems • Windows Embedded POSReady 7 • Windows Embedded 8.1 Industry Pro • Windows 10 IOT Enterprise • Windows 10 IOT Enterprise for Retail or Thin Client 	<ul style="list-style-type: none"> • Windows 10 • Windows 10 IOT Enterprise • Windows 10 IOT Enterprise for Retail or Thin Client
BIOS	AMI SPI BIOS, 8Mbits with VGA BIOS	
Power Supply	120 Watt power inside	
System Weight	6.6 kg (POS), 5.3 kg (PPC)	
Dimension (W x H x D)	<ul style="list-style-type: none"> • 367.49 x 281.95 x 303.04mm (Normal Stand POS) • 367.49 x 281.95 x 205.08mm (Printer Stand POS) • 367.49 x 281.95 x 74.88mm (PPC) 	
Certificate	FCC/CE	

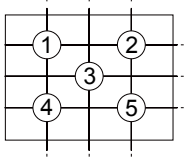
I/O Ports

USB	<ul style="list-style-type: none"> • 2 x USB 2.0 ports • 2 x USB 3.0 ports
eSATA (external SATA)	<ul style="list-style-type: none"> • 1 x eSATA port
Serial Port	<ul style="list-style-type: none"> • 3 x DB-9 (COM 2/3/4(option)) • 1 x RJ-45 (COM1) • +5V/12V selectable
LAN	1 x RJ-45
VGA	1 x DB-15 VGA Interface
Cash Drawer	1 x RJ-11 (+12V/+24V selectable, default: +12V)
DC IN	1 x 4-pin DC Power Jack
Line-Out	1 x phone jack

Storage

HDD	1 x 2.5" SATA HDD
SSD	1 x 2.5" SATA SSD (Optional)

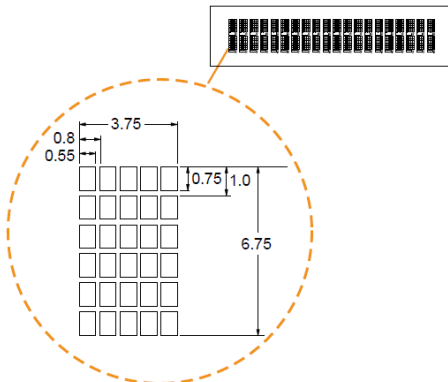
Display

15" TFT XGA LCD	Max. Resolution: 1024 x 768 Signal Interface: LVDS (18/24bit)
Touchscreen	5-wire Analog resistive or Projected Capacitive
Brightness 	<ul style="list-style-type: none"> • Resistive Touchscreen: Minimum 160 cd/m² • Projected Capacitive Touchscreen: Minimum 180 cd/m²
Tilt Angle	<ul style="list-style-type: none"> • 0-68 degree with normal stand • 0-50 degree with printer stand

Environment

Operating Temperature	0°C ~35°C (32°F ~95°F)
Storage Temperature	-20°C ~60°C (-4°F ~140°F)
Humidity	20%~90%

Optional Accessories

Printer	2" or 3" easy loading thermal printer with Auto cutter
MSR & iButton	JIS-I or II, ISO Track1+2+3 (PS/2 interface)
2 nd Display	<ul style="list-style-type: none"> • 8" LCD (Resolution: 800 x 600) • 10.4" LCD (Resolution: 800 x 600) • 15" LCD (Resolution: 1024 x 768)
Customer Display	<ul style="list-style-type: none"> • Interface: RS-232C Baud Rate: 9600/19200 bps Placement: 20 columns and 2 lines, each column is 5 x 7 dots  <ul style="list-style-type: none"> • Standard Code CP-437, Katakana, CP-737, CP-850, CP-852, CP-857, CP-860, CP-862, CP-863, CP-865, CP-866, CP-1250, CP-1251, CP-1252, CP-1253, CP-1254, CP-1255, CP-1257 • International Characters USA, FRANCE, GERMANY, UK, DENMARK I, SWDEN, ITALY, SPAIN I, JAPAN, NORWAY, DENMARK II, SPAIN II, LATIN, KOREA, RUSSIA, SLAVONIC

Printer	<p>2" or 3" easy loading thermal printer with auto-cutter Printer:</p> <table border="1"> <thead> <tr> <th>Items</th> <th>Specifications</th> </tr> </thead> <tbody> <tr> <td>Printing method</td> <td>Thermal dot line printing</td> </tr> <tr> <td>Printing accuracy</td> <td>1mm /5M</td> </tr> <tr> <td>Paper feed pitch</td> <td>0.0625 mm</td> </tr> <tr> <td>Maximum Paper-Roll thickness</td> <td>80mm</td> </tr> <tr> <td>Total dots per line & Printable dots per line</td> <td>2inch 432 dots; 3inch 576 dots</td> </tr> <tr> <td>Maximum print speed</td> <td>2inch 200 mm/s; 3inch 170 mm/s</td> </tr> <tr> <td>Print width</td> <td>2inch 54 mm; 3inch 72mm</td> </tr> <tr> <td>Paper width</td> <td>2inch 58 +/-1 mm; 3inch 80 +/-1 mm</td> </tr> </tbody> </table> 	Items	Specifications	Printing method	Thermal dot line printing	Printing accuracy	1mm /5M	Paper feed pitch	0.0625 mm	Maximum Paper-Roll thickness	80mm	Total dots per line & Printable dots per line	2inch 432 dots; 3inch 576 dots	Maximum print speed	2inch 200 mm/s; 3inch 170 mm/s	Print width	2inch 54 mm; 3inch 72mm	Paper width	2inch 58 +/-1 mm; 3inch 80 +/-1 mm
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Print width	2inch 54 mm; 3inch 72mm																		
Paper width	2inch 58 +/-1 mm; 3inch 80 +/-1 mm																		

	Auto-cutter:	
	Items	Specifications
	Paper cutting method	Slide cutting
	Type of paper cutting	Full cut and Partial cut (1.5 ± 0.5 mm tab left at the center)
	Paper curling tendency	Fixed blade side and Movable blade side
	Minimum paper core diameter	φ8 mm (paper thickness: 75μm or thin) φ18 (paper thickness: thicker than 75μm)
	Minimum paper cutting length	10 mm
	Cutting processing time	Approx. 0.5 s/cycle
	Cutting frequency	1 cut/2 s max.
		<ul style="list-style-type: none"> • Standard Code CP-437, CP-850, CP-857, CP-737, CP-852, CP-860, CP-862, CP-863, CP-865, CP-866, CP-1250, CP-1251, CP-1252, CP-1253, CP-1254, CP-1257, Katakana • KANJI JAPANESE (SHIFT-JIS) Code, TRADITIONAL CHINESE Code • International Characters USA, FRANCE, GERMANY, UK, DENMARK I, SWDEN, ITALY, SPAIN I, JAPAN, NORWAY, DENMARK II, SPAIN II, LATIN AMERICA, KOREA, RUSSIA, SLAVONIC
Fingerprint	8-bit grayscale reader	

1-4. SAFETY PRECAUTIONS

The following messages are safety reminders on how to protect your systems from damages, and extending the life cycle of the system.

1. Check the Line Voltage

- (1) 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

- (1) Place your PA-6980 on a sturdy, level surface. Be sure to allow enough space around the system to have easy access needs.
- (2) Avoid installing your PA-6980 Series POS system in extremely hot or cold places.
- (3) Avoid exposure to sunlight for a long period of time (for example, in a closed car in summer time. Also avoid the system from any heating device.). Or do not use the PA-6980 when it has been left outdoors in a cold winter day.
- (4) Bear in mind that the operating ambient temperature is between 0°C and 35°C (32°F and 95°F).
- (5) Avoid moving the system rapidly from a hot place to a cold place, and vice versa, because condensation may occur inside the system.
- (6) Protect your PA-6980 against strong vibrations, which may cause hard disk failure.
- (7) Do not place the system too close to any radio-active device. Radio-active device may cause signal interference.
- (8) Always shut down the operating system before turning off the power.

3. Handling

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

4. Good Care

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

SYSTEM CONFIGURATION

CHAPTER

2

Helpful information that describes the jumper and connector settings, and component locations.

The following sections are included:

- Jumper & Connector Quick Reference Table
- Main Board Component Locations
- Main Board Configuration and Jumper settings
- Main Board Connector Pin Assignments
- Printer Board Component Locations & Pin Assignment
- Setting Printer Board Connectors and Jumpers
 - PDAC-3100
 - MB3010C
 - MB-1011 & MB-1013
- Setting VFD Board Connectors and Jumpers

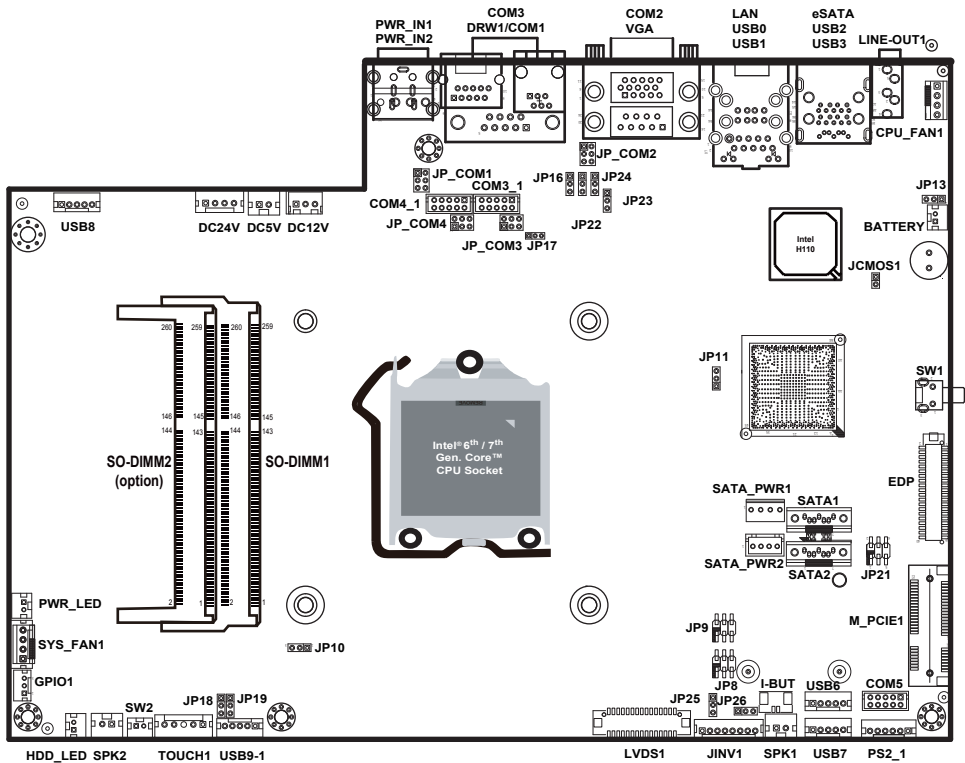
2-1. JUMPER & CONNECTOR QUICK REFERENCE TABLE

JUMPER / CONNECTOR	NAME
COM Port and VGA Connector	COM1, COM_VGA (COM2 + VGA Port) COM3, COM4 (Option), COM3_1, COM4_1, COM5
COM Port RI and Voltage Selection	JP_COM1, JP_COM2, JP_COM3, JP_COM4
i-Button Connector	I-BUT
i-Button Function Selection	JP22, JP23, JP24
LAN & USB Port	LAN, USB0, USB1
Internal USB 2.0 Connector	USB6, USB7, USB8, USB9-1, USB4_1
USB 3.0 Connector	USB2, USB3, eSATA
Cash Drawer Connector	DRW1
Cash Drawer Selection	JP17
Cash Drawer Power Selection	JP16
2nd Display Power Port	2nd DIS PWR
Printer Power Port (Option)	PRINT PWR (option)
LED Connector	PWR_LED, HDD_LED (option)
System / CPU Fan Connector	SYS_FAN1, CPU_FAN1
Power Input Connector	PWR_IN1, PWR_IN2
Power Connector	DC24V, DC12V, DC5V
Power Switch Connector	SW1 (option), SW2
External Speaker Connector	SPK1, SPK2 (option)
Speaker Selection	JP13
Inverter Connector	JINV1
LVDS Connector	LVDS1
LVDS Power Selection	JP25
LVDS Backlight Type Selection	JP26
MSR/Card Reader Connector	PS2_1
SATA & SATA Power Connector	SATA1, SATA2 (option), SATA_PWR1, SATA_PWR2 (option)
Touch Panel Connector	TOUCH1
Touch Panel and USB9-1 Selection	JP18, JP19
LVDS Output Resolution Selection	JP8, JP9
Mini-PCIe/mSATA Connector	M_PCIE1, M_PCIE2 (option)

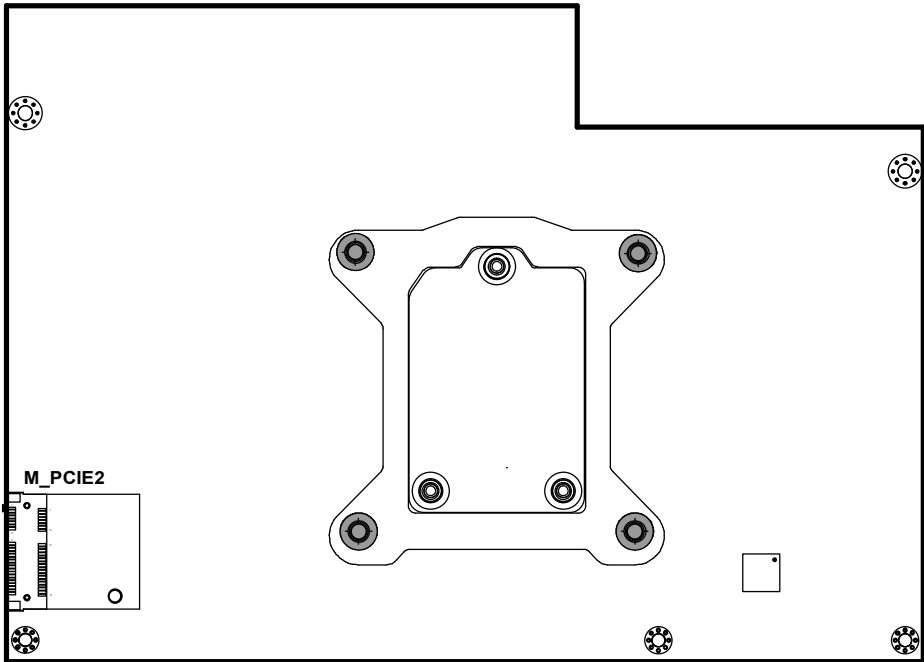
JUMPER / CONNECTOR	NAME
Mini-PCIe and USB6 Selection	JP21
EDP Connector (option)	EDP
Configuration / Recovery Selection	JP11
VCCIO / REFIN Selection	JP10
Clear CMOS Data Selection	JCMOS1
General Purpose Input / Output (GPIO) Connector	GPIO1
Audio Jack	LINE-OUT1

2-2. MAIN BOARD COMPONENT LOCATIONS

M/B: PB-6980



PB-6980 Front Connector, Jumper and Component Locations



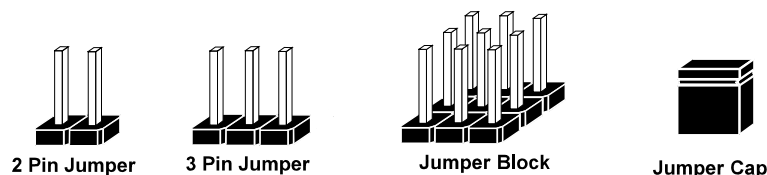
PB-6980 Rear Connector, Jumper and Component Locations

2-3. HOW TO SET THE 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, and by using a small plastic "cap", also known as the jumper cap (with a metal contact inside), you are able to connect the pins. So you can set-up your hardware configuration by "opening" or "closing" pins.

Jumpers can be combined into sets that 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 AND CAPS

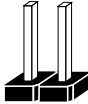


If a jumper has three pins for example, labelled PIN1, PIN2, and PIN3. You can connect PIN1 & PIN2 to create one setting and shorting. You can either connect PIN2 & PIN3 to create another setting. The same jumper diagrams are applied all through this manual. The figure below shows what the manual diagrams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

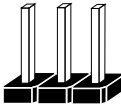
JUMPER DIAGRAMS



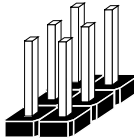
Jumper Cap looks like this



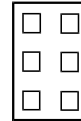
2 pin Jumper looks like this



3 pin Jumper looks like this



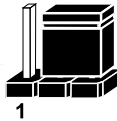
Jumper Block looks like this



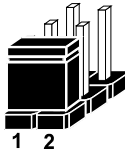
JUMPER SETTINGS



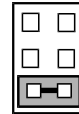
2 pin Jumper closed(enabled)
looks like this



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



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



2-4. MAIN BOARD CONNECTORS AND JUMPERS

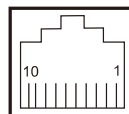
2-4-1. COM PORT & VGA CONNECTOR

There are multiple COM ports enhanced in this board namely: COM1, COM_VGA (COM2+VGA Port), COM3, COM3_1, COM4 (option), COM4_1 and COM5.

COM1: COM1 Connector

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM1_DCDJ_I	6	COM1_DSRJ_I
2	COM1_RX_I	7	COM1_RTSJ_I
3	COM1_TX_I	8	COM1_CTSJ_I
4	COM1_DTRJ_I	9	COM1_RI_SEL
5	GND	10	NC

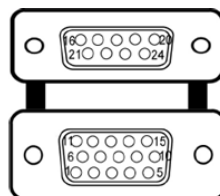


COM1

COM_VGA: COM2 & D-Sub 15-pin VGA Connector

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	RED	13	HSYNC
2	GREEN	14	VSYNC
3	BLUE	15	DDCA CLK
4	NC	16	DCD2
5	GND	17	RXD2
6	GND	18	TXD2
7	GND	19	DTR2
8	GND	20	GND
9	+5V	21	DSR2
10	GND	22	RTS2
11	NC	23	CTS2
12	DDCA DATA	24	RI/+5V/+12V selectable

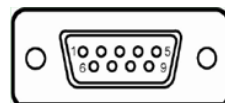


**COM2/
VGA**

COM3/COM4 (Option): COM3, COM4 Connector

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM3_DCDJ_I	6	COM3_DSRJ_I
2	COM3_RX_I	7	COM3_RTSJ_I
3	COM3_TX_I	8	COM3_CTSJ_I
4	COM3_DTRJ_I	9	RI / +5V / +12V selectable
5	GND	-	-



**COM3/
COM4
(Option)**

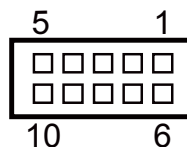
COM3 and COM3_1 can't be used simultaneously.

COM4 and COM4_1 can't be used simultaneously.

COM3_1: COM3_1 Connector

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM3_DCDJ_I	6	COM3_DSRJ_I
2	COM3_RX_I	7	COM3_RTSJ_I
3	COM3_TX_I	8	COM3_CTSJ_I
4	COM3_DTRJ_I	9	COM3_RI_SEL
5	GND	10	NC

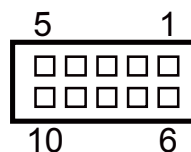


COM3_1

COM4_1: COM4_1 Connector

The pin assignments are as follows:

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_SEL
5	GND	10	NC

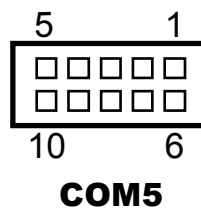


COM4_1

COM5: COM5 Connector

The pin assignments are as follows:

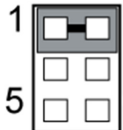
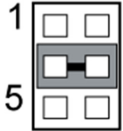
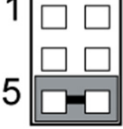
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	COM5_DCDJ_I	6	COM5_DSRJ_I
2	COM5_RX_I	7	COM5_RTSJ_I
3	COM5_TX_I	8	COM5_CTSJ_I
4	COM5_DTRJ_I	9	COM5_RI_SEL
5	GND	10	NC



2-4-2. COM PORT RI & VOLTAGE SELECTION

JP_COM1 , JP_COM2, JP_COM3, JP_COM4: COM Port RI & Voltage Selection, pin-headers on board. The voltage of COM1, COM2, COM3 and COM4 is made to control by the jumpers on board.

The jumper settings are as follows:

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
RI	1-2	
VCC12	3-4	
VCC	5-6	

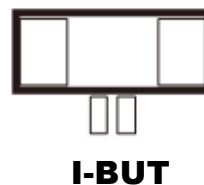
Note: Manufacturing Default is **RI**.

2-4-3. i-BUTTON CONNECTOR

I-BUT: i-Button Connector

The pin assignments are as follows:



PIN	ASSIGNMENT
1	COM3_DTR_R_I
2	COM3_RXD_R_I



2-4-4. i-BUTTON FUNCTION SELECTION

JP22, JP23, JP24: i-Button Function Selection

The jumper settings are as follows:

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
COM2	1-2	 JP22/JP23/JP24
i-Button*	2-3	 JP22/JP23/JP24

Note: Manufacturing Default is COM2.

*When these jumpers are set as 'i-Button', the COM3_1 connector will not function.

2-4-5. LAN & USB PORT

LAN & USB0, USB1 Connector

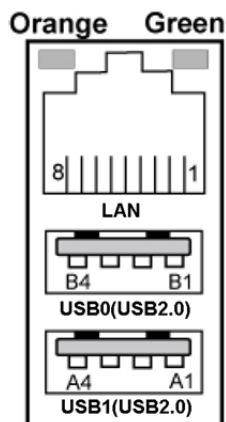
The pin assignments are as follows:

USB0 and USB1: USB 2.0 Connector, USB Type A ports

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	VCC5	B1	VCC5
A2	USB0-	B2	USB1-
A3	USB0+	B3	USB1+
A4	GND	B4	GND

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

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	LAN1_MDI0_DP	5	LAN1_MDI2_DP
2	LAN1_MDI0_DN	6	LAN1_MDI2_DN
3	LAN1_MDI1_DP	7	LAN1_MDI3_DP
4	LAN1_MDI1_DN	8	LAN1_MDI3_DN



**LAN/
USB0/
USB1**

Left Side LAN LED Indicator

Orange Color Blinking	LAN Message Active
Off	No LAN Message Active

Right Side LAN LED Indicator

Green Color On	10/100Mbps LAN Speed Indicator
Orange Color On	Giga LAN Speed Indicator
Off	No LAN switch / hub connected

2-4-6. Internal USB 2.0 CONNECTOR

USB6, USB7, USB9-1: Internal USB 2.0 connector

The pin assignments are as follows:

PIN	ASSIGNMENT
1	5V (Maximum current: 0.5A)
2	D-
3	D+
4	GND
5	GND

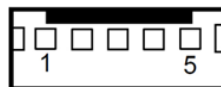
Note:

USB6 signal is shared from "MINI-PCIE" port.

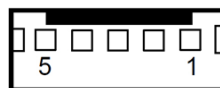
USB6 could be functioned when JP21 are set 1-3, 2-4 [short].

USB9-1 signal is shared from "MINI-PCIE" port.

USB9-1 could be functioned when JP18, JP19 are set 1-2 [short].



**USB6/
USB7**



USB9-1

2-4-7. USB 3.0 CONNECTOR

USB2: USB 3.0 connector

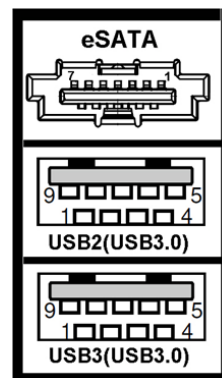
The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC5	6	RX2_DP
2	USBP3N	7	GND
3	USBP3P	8	TX3_DN
4	GND	9	TX3_DP
5	RX2_DN	10	-

USB3: USB 3.0 connector

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC5	6	BP_RX_DP
2	USBP4N	7	GND
3	USBP4P	8	BP_TX_DN
4	GND	9	BP_TX_DP
5	BP_RX_DN	10	-



**USB2/
USB3**

eSATA (external SATA): a combo eSATA/USB 3.0 connector

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	5	SATA_RXN_2_C
2	SATA_TXP_2_C	6	SATA_RXP_2_C
3	SATA_TXN_2_C	7	GND
4	GND	-	-

eSATA (external Serial Advanced Technology Attachment) is a 7-wire/7-pin technology. The maximum cable length is 6 1/2 feet (2 meters). eSATA and SATA have the same number of wires/pins and their signal formats are the same

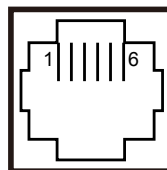
2-4-8.CASH DRAWER CONNECTOR

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

DRW1 is used by default.

The pin assignments are as follows:

PIN	ASSIGNMENT
1	DRW2 Sense
2	GPIO1 / DRW1
3	DRW1 Sense
4	12V/24V (Max. current 1A)
5	GPIO2 / DRW2
6	GND

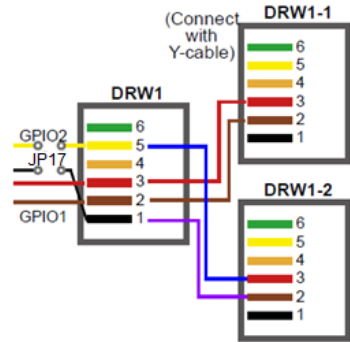


DRW1

2-4-9. CASH DRAWER SELECTION



JP17: DRW1, DRW1-1, DRW1-2
 DRW1 port is used by default. You can add a second port via either of the methods below:

Method 1:
 DRW1 includes two groups of GPIO pins. The second group is normally unused but can be enabled by the jumper. Set the pin header jumper JP17 as 1-2 connected if necessary.

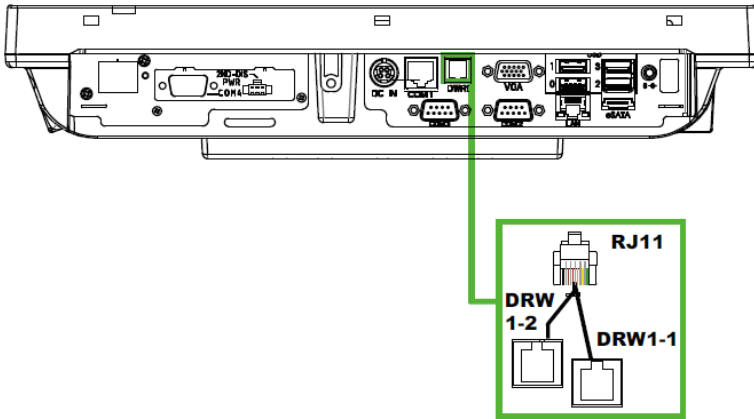


Method 2:
 You can split DRW1 into two channels of DRW1-1 & DRW1-2 using the Y-Cable (option).

JP17: Cash Drawer 2 Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
Casher Drawer 2	1-2	 <p>JP17</p>
Casher Drawer1	2-3	 <p>JP17</p>

Note: Manufacturing Default is Cash Drawer 1.



Step 3.

DRW1, DRW1-1, DRW1-2 shares the same power source.
(Default: 12V).

SIO Address	
Cash drawer 1	LDN 06, 0x91 bit 4
Cash drawer 2	LDN 06, 0x91 bit 5

Cash Drawer Configuration

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

Configuration Sequence

To program [F81866](#) configuration registers, the following configuration sequence must be followed:

- (1) Enter the extended function mode
- (2) Configure the configuration registers
- (3) Exit the extended function mode

(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. 0x06) 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

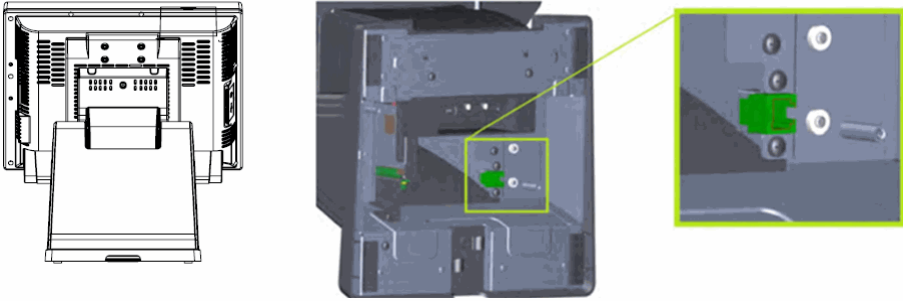
To exit the Extended Function Mode, [writing 0xAA to the EFER](#) is required. Once the chip exits the Extended Function Mode, it is in the normal running mode and is ready to enter the configuration mode.

Code example for open the cash drawer 1

```
;----- 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  
dec dx  
;----- Open the Cash drawer 1 -----  
mov al, 91h  
out dx, al  
inc dx  
mov al, 04h  
out dx, al  
;----- Exit the extended function mode -----  
dec dx  
mov al, 0aah  
out dx, al
```

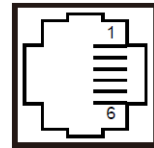
Note:

The DRW2 Port can function only when the optional "Printer Kit" is installed on PA-6980. The DRW2 signals from the printer board (MB-1030, MB-1011, MB-1013, PDAC-3100) can be controlled via relevant commands. The DRW2 port is located at the bottom of the Printer Stand connected with a cable (optional) as shown below:



Printer Stand Bottom View

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	4	+24V
2	Drawer Open	5	NC
3	Drawer Sense	6	GND





DRW2

Control Codes	Hexadecimal Codes	Function
<DLE EOT>	10 04	Real-time status transmission
<DLE DC4>	10 14	Real-time output of the specified pulse

2-4-10. CASH DRAWER POWER SELECTION

JP16: Cash Drawer Power Selection

The jumper settings are as follows:

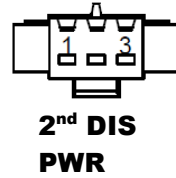
SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
24V	1-2	 JP16
12V	2-3	 JP16

Note: Manufacturing Default is 12V.

2-4-11. 2nd Display Power Port

2nd DIS PWR: DC12V power supply for 2nd display.

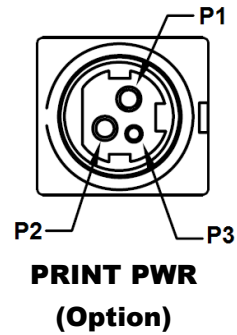
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC12	3	VCC12
2	GND	-	-



2-4-12. Printer Power Port (Option)

PRINT PWR: DC24V power supply for the stand-printer.

PIN	ASSIGNMENT
P1	GND
P2	+24V
P3	NA

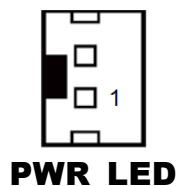


2-4-13. LED CONNECTOR

PWR_LED: Power indication LED Connector

The pin assignments are as follows:

PIN	ASSIGNMENT
1	VCC5
2	GND

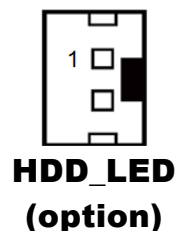


PWR_LED

HDD_LED (option): HDD indication LED Connector

The pin assignments are as follows:

PIN	ASSIGNMENT
1	VCC3_3
2	PCH_SATA_LED_N



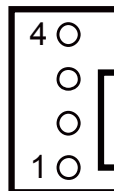
**HDD_LED
(option)**

2-4-14. SYSTEM / CPU FAN CONNECTOR

SYS_FAN1: System Fan Connector 1

The pin assignments are as follows:

PIN	ASSIGNMENT
1	GND
2	VCC12
3	SYS_FANIN
4	SYS_FANOUT



SYS_FAN1

CPU_FAN1: CPU Fan Connector 1

PIN	ASSIGNMENT
1	GND
2	VCC12
3	CPU_FANIN
4	CPU_FANOUT



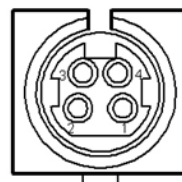
CPU_FAN1

2-4-15. POWER INPUT CONNECTOR

PWR_IN1: Power Input Connector 1

The pin assignments are as follows:

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

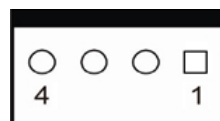


PWR_IN1

PWR_IN2: Power Input Connector 2

The pin assignments are as follows:

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



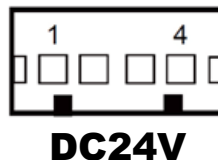
PWR_IN2

2-4-16. POWER CONNECTOR

DC24V: Power for Thermal Printer Connector

The pin assignments are as follows:

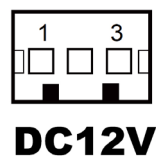
PIN	ASSIGNMENT
1	24VIN
2	24VIN
3	GND
4	GND



DC12V: DC 12Voltage Provider Connector

The pin assignments are as follows:

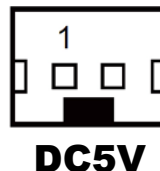
PIN	ASSIGNMENT
1	VCC12_GT
2	NC
3	GND



DC5V: DC 5Voltage Provider Connector

The pin assignments are as follows:

PIN	ASSIGNMENT
1	V_5P0_A
2	GND

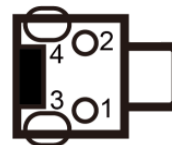


2-4-17. POWER SWITCH CONNECTOR

SW1: Power Switch Connector 1

The pin assignments are as follows:

PIN	ASSIGNMENT
1	GND
2	LPC_PWRBTNJ
3	GND
4	GND

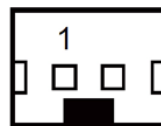


SW1
(option)

SW2: Power Switch Connector 2

The pin assignments are as follows:

PIN	ASSIGNMENT
1	LPC_PWRBTNJ
2	GND



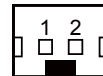
SW2

2-4-18. EXTERNAL SPEAKER CONNECTOR

SPK1: External Speaker Connector

The pin assignments are as follows:

PIN	ASSIGNMENT
1	HD_FRONT-OUT1-R
2	HD_FRONT-OUT1-L



**SPK1/
SPK2
(option)**

SPK2: External Speaker Connector



The pin assignments are as follows:

PIN	ASSIGNMENT
1	HD_FRONT-OUT2-R
2	HD_FRONT-OUT2-L

2-4-19. SPEAKER SELECTION

JP13: SPK1/SPK2 Selection

The jumper settings are as follows:

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
SPK1&SPK2	1-2	 JP13
Only SPK1	Open	 JP13

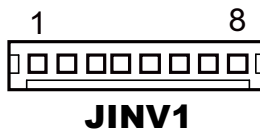
Note: Manufacturing Default is **SPK1&SPK2**.

2-4-20. INVERTER CONNECTOR

JINV1: Inverter Connector

The pin assignments are as follows:

PIN	ASSIGNMENT
1	GND
2	VCC12
3	VCC12
4	VCC12
5	GND
6	LED_PWM
7	GND
8	PANLE_BKLTEN



2-4-21. LVDS CONNECTOR

LVDS1: LVDS Connector

The pin assignments are as follows:

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

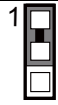



LVDS1

2-4-22. LVDS POWER SELECTION

JP25: LVDS Power Selection

The jumper settings are as follows:



SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
3.3V	1-2	 <p>JP25</p>
5V	2-3	 <p>JP25</p>

Note: Manufacturing Default is 3.3V.

2-4-23. LVDS BACKLIGHT TYPE SELECTION

JP26: LVDS Backlight Type Selection

The jumper settings are as follows:

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
3.3V	1-2	 JP26
5V	2-3	 JP26

Note: Manufacturing Default is 3.3V.

2-4-24. MSR/CARD READER CONNECTOR

PS2_1: MSR/Card Reader Connector

The pin assignments are as follows:

PIN	ASSIGNMENT
1	KCLK_KB (Output)
2	KCLK_C (Input)
3	KDAT_C (Input)
4	KDAT_KB (Output)
5	+5V
6	GND



PS2_1

2-4-25. SATA & SATA POWER CONNECTOR

SATA1, SATA2 (option): Serial ATA Connectors

The pin assignments are as follows:

PIN	ASSIGNMENT
1	G1
2	TX+
3	TX-
4	G2
5	RX-
6	RX+
7	G3



**SATA1/
SATA2
(option)**

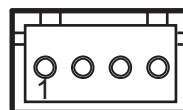
SATA_PWR1, SATA_PWR 2 (option): Serial ATA Power Connectors

The pin assignments are as follows:

PIN	ASSIGNMENT
1	VCC
2	GND
3	GND
4	VCC12



SATA_PWR1



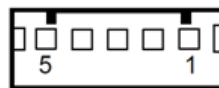
**SATA_PWR2
(option)**

2-4-26. TOUCH PANEL CONNECTOR

TOUCH1: Touch Panel Connector

The pin assignments are as follows:

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





TOUCH1

2-4-27. TOUCH PANEL & USB9-1 SELECTION

JP18, JP19: Touch Panel and USB9-1 Selection

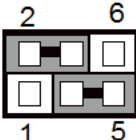
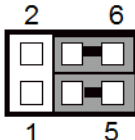
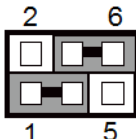
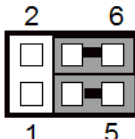
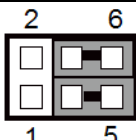
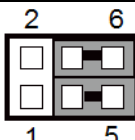
The jumper settings are as follows:

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
USB9-1 Connector (Capacitor Panel Selection)	1-2	 <p>JP18/JP19</p>
TOUCH1 (Resistor Panel Selection)	2-3	 <p>JP18/JP19</p>

Note: Manufacturing Default is **TOUCH1**.

2-4-28. LVDS OUTPUT RESOLUTION SELECTION

JP8 & JP9: LVDS Output Resolution Selection

SELECTION	JUMPTER SETTING	JUMPER ILLUSTRATION	
1024x768 (24 bit)	JP8(3-5) JP8(2-4) JP9(3-5) JP9(4-6)	 <p>JP8</p>	 <p>JP9</p>
1024x768 (18 bit)	JP8(1-3) JP8(4-6) JP9(3-5) JP9(4-6)	 <p>JP8</p>	 <p>JP9</p>
800x600 (18 bit)	JP8(3-5) JP8(4-6) JP9(3-5) JP9(4-6)	 <p>JP8</p>	 <p>JP9</p>

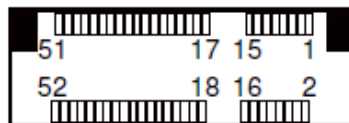
2-4-29. Mini-PCle/mSATA CONNECTOR

M_PCIE1, M_PCIE2 (option):

MINI PCIE/mSATA Connector

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	WAKE#	27	GND
2	+3.3V	28	+1.5V
3	Reserved	29	GND
4	GND	30	SMB_CLK
5	Reserved	31	PETn2
6	+1.5V	32	SMB_DATA
7	CLKREQ#	33	PETp2
8	Reserved	34	GND
9	GND	35	GND
10	Reserved	36	USB D-
11	REFCLK1-	37	GND
12	Reserved	38	USB D+
13	REFCLK1+	39	+3.3V
14	Reserved	40	GND
15	GND	41	+3.3V
16	Reserved	42	Reserved
17	Reserved	43	GND
18	GND	44	Reserved
19	Reserved	45	NC
20	Reserved	46	Reserved
21	GND	47	NC
22	PERST#	48	+1.5V
23	PERn0	49	NC
24	+3.3SB	50	GND
25	PERp0	51	Reserved
26	GND	52	+3.3V

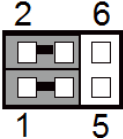
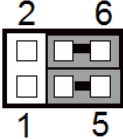


M_PCIE1/ M_PCIE2 (option)

2-4-30. Mini-PCle and USB6 Selection

JP21: Mini-PCle and USB6 Selection

The selection is as follows:

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
USB signal to USB6 wafer	1-3, 2-4	 <p>2 6 1 5 JP21</p>
USB signal to mini-PCle (Disabled)	3-5, 4-6	 <p>2 6 1 5 JP21</p>

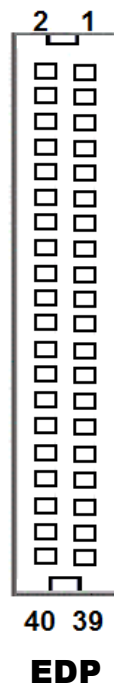
Note: Manufacturing Default is **USB signal to mini-PCle (Disabled)**.

2-4-31. Embedded Display Port (EDP) CONNECTOR (option)

EDP: EDP Connector

The pin assignments are as follows:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	NC	21	VCC3_3
2	GND	22	NC
3	EDP_TX3_DN	23	GND
4	EDP_TX3_DP	24	GND
5	GND	25	GND
6	EDP_TX2_DN	26	GND
7	EDP_TX2_DP	27	EDP_LVDS_HPD
8	GND	28	GND
9	EDP_TX1_DN	29	GND
10	EDP_TX1_DP	30	GND
11	GND	31	GND
12	EDP_TX0_DN	32	EDP_BKLTEN
13	EDP_TX0_DP	33	EDP_BKLTCTL
14	GND	34	NC
15	EDP_AUX_DP_C	35	NC
16	EDP_AUX_DN_C	36	VCC12
17	GND	37	VCC12
18	VCC3_3	38	VCC12
19	VCC3_3	39	VCC12
20	VCC3_3	40	NC






eDP (Embedded DisplayPort) was developed to be used specifically in embedded display applications, such as Notebook and Notepad PCs. eDP is based on the VESA DisplayPort Standard. It aims to define a standardized display panel interface for internal connections; e.g., graphics cards to notebook display panels. It has advanced power-saving features including seamless refresh rate switching. It has become the new mainstream display panel interface for LCD panels with the realized higher resolution.

2-4-32. CONFIGURATION / RECOVERY SELECTION

JP11: Configuration / Recovery Selection




The jumper settings are as follows:

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
Normal	1-2	 JP11
Configure	2-3	 JP11
Recovery	Open	 JP11

2-4-33. VCCIO / REFIN SELECTION

JP10: VCCIO / Refine Selection



The jumper settings are as follows:

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
1.0V	1-2	 JP10
0.95V	2-3	 JP10
1.0V	Open	 JP10

Note: Manufacturing Default is **1.0V**.

2-4-34. CLEAR CMOS DATA SELECTION

JCMOS1: Clear CMOS Data Selection

SELECTION	JUMPTER SETTING	JUMPER ILLUSTRATION
Normal	Open	 JCMOS1
Clear CMOS Data	1-2	 JCMOS1

Note 1: Manufacturing Default is **Normal**.

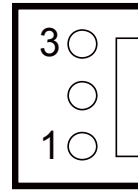
Note 2: To clear CMOS data, users must power off the computer and set the jumper to “Clear CMOS Data” as shown above. After five to six seconds, set the jumper back to “NC” and power on the computer.

2-4-35. GPIO CONNECTOR

GPIO1: General Purpose Input / Output Connector

The pin assignments are as follows:

PIN	ASSIGNMENT
1	3.3V(Maximum current: 0.5A)
2	GND
3	GPIO



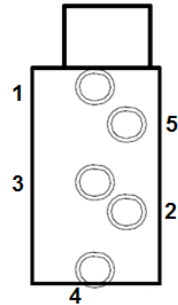
GPIO1

2-4-36. AUDIO JACK

LINE-OUT1: External audio phone jack port

The pin assignments are as follows:

PIN	ASSIGNMENT
1	HD_GND
2	LINE-OUT-R
3	NC
4	VCC_AUD
5	LINE-OUT-L



LINE-OUT1

Printer Board Component Locations & Pin Assignment

2-5. Printer Board: PDAC-3100 (option)

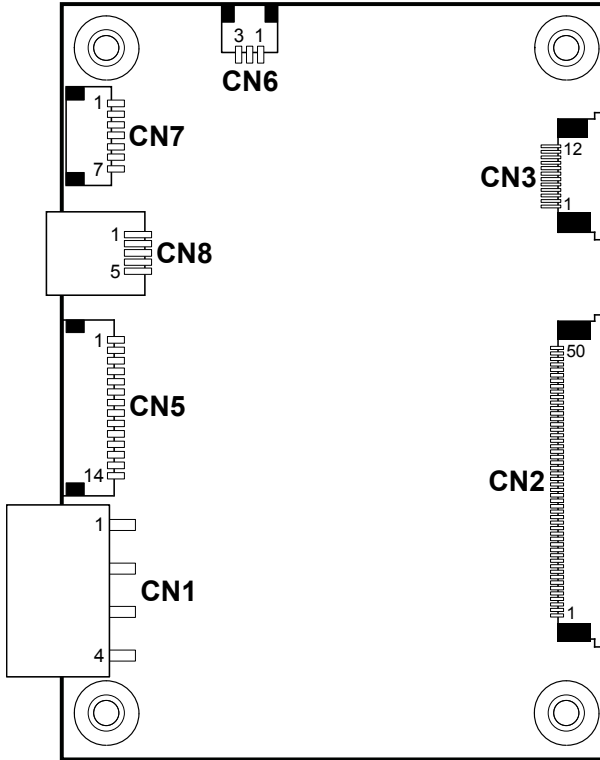


Figure 2-1. PDAC-3100 Printer Board Component Locations

Jumper & Connector Quick Reference Table

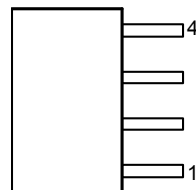
Jumper / Connector	NAME
Power Supply Connector	CN1
RS-232 Interface Connector	CN7
Auto-Cutter Connector	CN3
USB Connector	CN8
Thermal Head/Motor/Sensor Connector	CN2
Terminal Assignment Connector	CN5

Setting Printer Board Connectors and Jumpers: PDAC-3100

2-5-1. Power Supply Connector

CN1: Power supply wafer

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

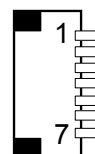


CN1

2-5-2. RS-232 Interface Connector

CN7: RS-232 interface connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	TXD	5	DTR
2	RXD	6	DSR
3	RTS	7	GND
4	CTS	-	-

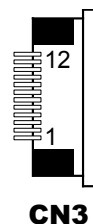


CN7

2-5-3. Auto-Cutter Connector

CN3: Auto-cutter wafer

PIN	ASSIGNMENT	FUNCTION
1	NC	Unused
2	Vcs	Power supply of the Home position sensor
3	GND	GND of the Home position sensor
4	CUTS	Signal of the Home position sensor
5	2B-1	Auto-cutter motor drive signal
6	2B-2	Auto-cutter motor drive signal
7	2A-1	Auto-cutter motor drive signal
8	2A-2	Auto-cutter motor drive signal
9	1B-1	Auto-cutter motor drive signal
10	1B-2	Auto-cutter motor drive signal
11	1A-1	Auto-cutter motor drive signal
12	1A-2	Auto-cutter motor drive signal

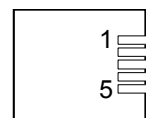


CN3

2-5-4. USB Connector

CN8: USB Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	Vbus	4	NC
2	D-	5	GND
3	D+	-	-

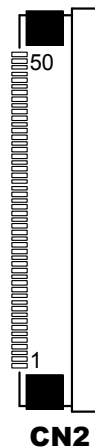


CN8

2-5-5. Thermal Head/Motor/Sensor Connector

CN2: Thermal head/motor/sensor connector

PIN	ASSIGNMENT	FUNCTION
1	24V	Head drive power
2	24V	Head drive power
3	24V	Head drive power
4	24V	Head drive power
5	24V	Head drive power
6	24V	Head drive power
7	DAT	Print data output
8	CLK	Synchronizing signal for print data transfer
9	GND	Head GND
10	GND	Head GND
11	GND	Head GND
12	GND	Head GND
13	GND	Head GND
14	GND	Head GND
15	NC	Unused
16	DST4	Head strobe signal
17	DST3	Head strobe signal
18	3.3V	Logic Power
19	GND	Thermistor GND
20	GND	Thermistor GND
21	TH	Thermistor signal
22	NC	Unused
23	DST2	Head strobe signal
24	DST1	Head strobe signal
25	GND	Head GND
26	GND	Head GND
27	GND	Head GND
28	GND	Head GND
29	GND	Head GND

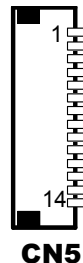


PIN	ASSIGNMENT	FUNCTION
30	GND	Head GND
31	LATCH	Print data latch
32	24V	Head drive power
33	24V	Head drive power
34	24V	Head drive power
35	24V	Head drive power
36	24V	Head drive power
37	24V	Head drive power
38	NC	Unused
39	PS	Signal of the out-of-paper sensor
40	Vps	Power supply of the out-of-paper sensor
41	GND	GND of the platen position/ out-of-paper sensor
42	HS	Signal of the platen position sensor
43	NC	Unused
44	FG	Frame GND
45	FG	Frame GND
46	NC	Unused
47	2A	Motor drive signal
48	1B	Motor drive signal
49	1A	Motor drive signal
50	2B	Motor drive signal

2-5-6. Terminal Assignment Connector

CN5: Terminal assignment connector

PIN	ASSIGNMENT	FUNCTION
1	FEED	Feed signal
2	RESET	Reset signal
3	GND	GND
4	ST1	Status signal
5	ST2	Status signal
6	ST3	Status signal
7	ST4	Status signal
8	GND	GND
9	DRS	Drawer sensor signal
10	DSW	Drawer switch signal
11	Vdu	Drive terminal for the drawer (Vp side)
12	GNDdu	Drive terminal for the drawer (GND side)
13	GND	GND
14	NC	Unused



2-6. Printer Board: MB-1030 series (option)

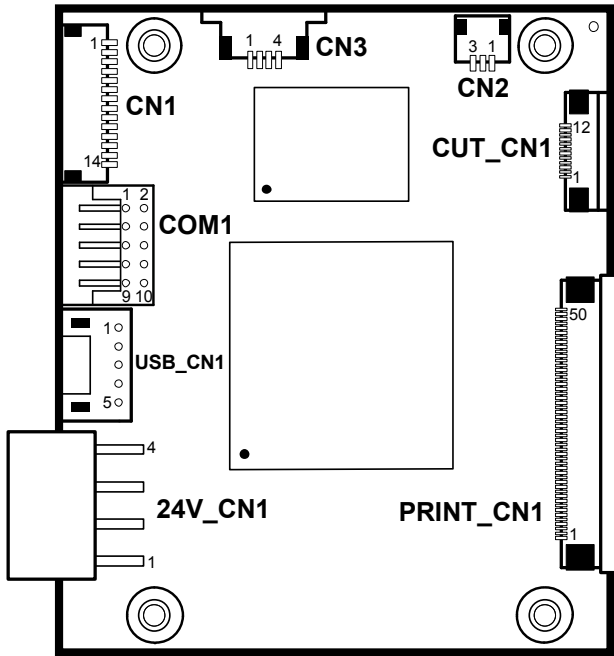


Figure 2-2. MB-1030 Printer Board Component Locations

Jumper & Connector Quick Reference Table

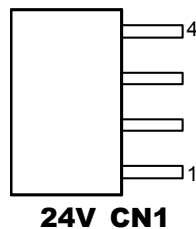
Jumper / Connector	NAME
Power Supply Connector	24V_CN1
RS-232 Interface Connector	COM1
Thermal Head/Motor/Sensor Connector	PRINT_CN1
Auto-Cutter Connector	CUT_CN1
Paper-Near-END Sensor Connector	CN2
USB Interface Connector	USB_CN1
Terminal Assignment Connector	CN1

Setting Printer Board Connectors and Jumpers: MB-3010

2-6-1. Power Supply Connector

24V_CN1: Power Supply Wafer

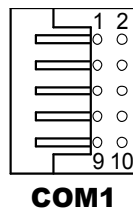
PIN	ASSIGNMENT
1	GND
2	GND
3	+24V
4	+24V



2-6-2. RS-232 Interface Connector

COM1: RS-232 Interface Connector

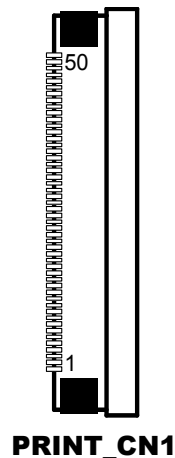
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	NC	6	DSR /CTS
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR /RTS	9	NC
5	GND	10	NC



2-6-3. Thermal Head/Motor/Sensor Connector

PRINT_CN1: Thermal head/motor/sensor connector

PIN	ASSIGNMENT	FUNCTION
1	24V	Head drive power
2	24V	Head drive power
3	24V	Head drive power
4	24V	Head drive power
5	24V	Head drive power
6	24V	Head drive power
7	DAT	Print data output
8	CLK	Synchronizing signal for print data transfer
9	GND	Head GND
10	GND	Head GND
11	GND	Head GND
12	GND	Head GND
13	GND	Head GND
14	GND	Head GND
15	NC	Unused
16	DST4	Head strobe signal
17	DST3	Head strobe signal
18	3.3V	Logic Power
19	GND	Thermistor GND
20	GND	Thermistor GND
21	TH	Thermistor signal
22	NC	Unused
23	DST2	Head strobe signal
24	DST1	Head strobe signal
25	GND	Head GND
26	GND	Head GND
27	GND	Head GND
28	GND	Head GND
29	GND	Head GND

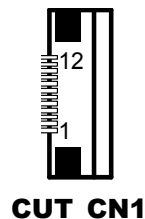


PIN	ASSIGNMENT	FUNCTION
30	GND	Head GND
31	LATCH	Print data latch
32	24V	Head drive power
33	24V	Head drive power
34	24V	Head drive power
35	24V	Head drive power
36	24V	Head drive power
37	24V	Head drive power
38	NC	Unused
39	PS	Signal of the out-of-paper sensor
40	Vps	Power supply of the out-of-paper sensor
41	GND	GND of the platen position/ out-of-paper sensor
42	HS	Signal of the platen position sensor
43	NC	Unused
44	FG	Frame GND
45	FG	Frame GND
46	NC	Unused
47	2A	Motor drive signal
48	1B	Motor drive signal
49	1A	Motor drive signal
50	2B	Motor drive signal

2-6-4. Auto-Cutter Connector

CUT_CN1: Auto-cutter Connector

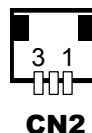
PIN	ASSIGNMENT	FUNCTION
1	NC	Unused
2	Vcs	Power supply of the Home position sensor
3	GND	GND of the Home position sensor
4	CUTS	Signal of the Home position sensor
5	2B-1	Auto-cutter motor drive signal
6	2B-2	Auto-cutter motor drive signal
7	2A-1	Auto-cutter motor drive signal
8	2A-2	Auto-cutter motor drive signal
9	1B-1	Auto-cutter motor drive signal
10	1B-2	Auto-cutter motor drive signal
11	1A-1	Auto-cutter motor drive signal
12	1A-2	Auto-cutter motor drive signal



2-6-5. Paper-Near-END Sensor Connector

CN2: Paper-near-end sensor connector

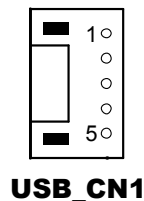
PIN	ASSIGNMENT	FUNCTION
1	Vns	Power supply of the near end sensor
2	NS	Signal of the near end sensor
3	GND	GND of the near end sensor



2-6-6. USB Interface Connector

USB_CN1: USB interface connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	Vbus	4	GND
2	D-	5	GND
3	D+	-	-



USB_CN1

2-6-7. Terminal Assignment Connector

CN1: Terminal assignment connector

PIN	ASSIGNMENT	FUNCTION
1	FEED	Feed signal
2	RESET	Reset signal
3	GND	GND
4	ST1	Status signal
5	ST2	Status signal
6	ST3	Status signal
7	ST4	Status signal
8	GND	GND
9	DRS	Drawer sensor signal
10	DSW	Drawer switch signal
11	Vdu	Drive terminal for the drawer (Vp side)
12	GNDdu	Drive terminal for the drawer (GND side)
13	GND	GND
14	NC	Unused



CN1

2-7. Printer Board: MB-1011 & MB-1013 (option)

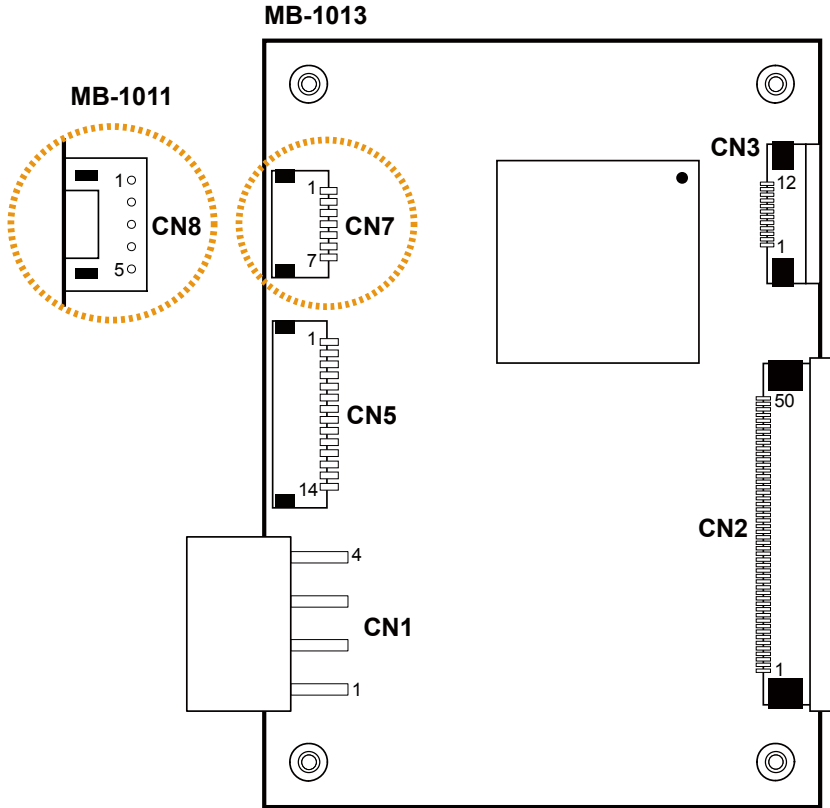


Figure 2-3. MB-1011 & MB-1013 Printer Board Component Locations

Jumper & Connector Quick Reference Table

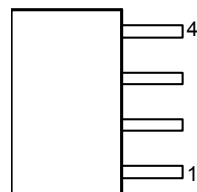
Jumper / Connector	NAME
Power Supply Connector	CN1
RS-232 Interface Connector	CN7
Auto-Cutter Connector	CN3
Thermal Head/Motor/Sensor Connector	CN2
Terminal Assignment Connector	CN5
USB Interface Connector	CN8

Setting Printer Board Connectors and Jumpers: MB-1011 & MB-1013

2-7-1. Power Supply Connector

CN1: Power supply wafer

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

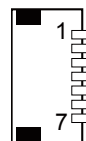


CN1

2-7-2. RS-232 Interface Connector

CN7: RS-232 interface connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	TXD	5	DTR
2	RXD	6	DSR
3	RTS	7	GND
4	CTS	-	-

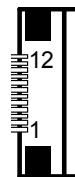


CN7

2-7-3. Auto-Cutter Connector

CN3: Auto-cutter Connector

PIN	ASSIGNMENT	FUNCTION
1	NC	Unused
2	Vcs	Power supply of the Home position sensor
3	GND	GND of the Home position sensor
4	CUTS	Signal of the Home position sensor
5	2B-1	Auto-cutter motor drive signal
6	2B-2	Auto-cutter motor drive signal
7	2A-1	Auto-cutter motor drive signal
8	2A-2	Auto-cutter motor drive signal
9	1B-1	Auto-cutter motor drive signal
10	1B-2	Auto-cutter motor drive signal
11	1A-1	Auto-cutter motor drive signal
12	1A-2	Auto-cutter motor drive signal

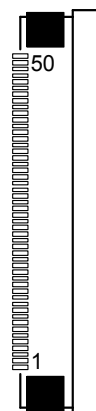


CN3

2-7-4. Thermal Head/Motor/Sensor Connector

CN2: Thermal head/motor/sensor connector

PIN	ASSIGNMENT	FUNCTION
1	24V	Head drive power
2	24V	Head drive power
3	24V	Head drive power
4	24V	Head drive power
5	24V	Head drive power
6	24V	Head drive power
7	DAT	Print data output
8	CLK	Synchronizing signal for print data transfer
9	GND	Head GND
10	GND	Head GND



CN2

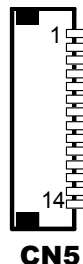
PIN	ASSIGNMENT	FUNCTION
11	GND	Head GND
12	GND	Head GND
13	GND	Head GND
14	GND	Head GND
15	NC	Unused
16	DST4	Head strobe signal
17	DST3	Head strobe signal
18	3.3V	Logic Power
19	GND	Thermistor GND
20	GND	Thermistor GND
21	TH	Thermistor signal
22	NC	Unused
23	DST2	Head strobe signal
24	DST1	Head strobe signal
25	GND	Head GND
26	GND	Head GND
27	GND	Head GND
28	GND	Head GND
29	GND	Head GND
30	GND	Head GND
31	LATCH	Print data latch
32	24V	Head drive power
33	24V	Head drive power
34	24V	Head drive power
35	24V	Head drive power
36	24V	Head drive power
37	24V	Head drive power
38	NC	Unused
39	PS	Signal of the out-of-paper sensor
40	Vps	Power supply of the out-of-paper sensor
41	GND	GND of the platen position/ out-of-paper sensor

PIN	ASSIGNMENT	FUNCTION
42	HS	Signal of the platen position sensor
43	NC	Unused
44	FG	Frame GND
45	FG	Frame GND
46	NC	Unused
47	2A	Motor drive signal
48	1B	Motor drive signal
49	1A	Motor drive signal
50	2B	Motor drive signal

2-7-5. Terminal Assignment Connector

CN5: Terminal assignment connector

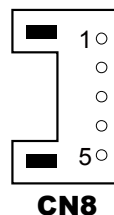
PIN	ASSIGNMENT	FUNCTION
1	FEED	Feed signal
2	RESET	Reset signal
3	GND	GND
4	ST1	Status signal
5	ST2	Status signal
6	ST3	Status signal
7	ST4	Status signal
8	GND	GND
9	DRS	Drawer sensor signal
10	DSW	Drawer switch signal
11	Vdu	Drive terminal for the drawer (Vp side)
12	GNDdu	Drive terminal for the drawer (GND side)
13	GND	GND
14	NC	Unused



2-7-6. USB Interface Connector

CN8: USB interface connector

PIN	ASSIGNMENT
1	Vbus
2	D-
3	D+
4	GND
5	GND



VFD Board Component Locations & Pin Assignment

2-8. VFD Board: MB-4103, LD720 (option)

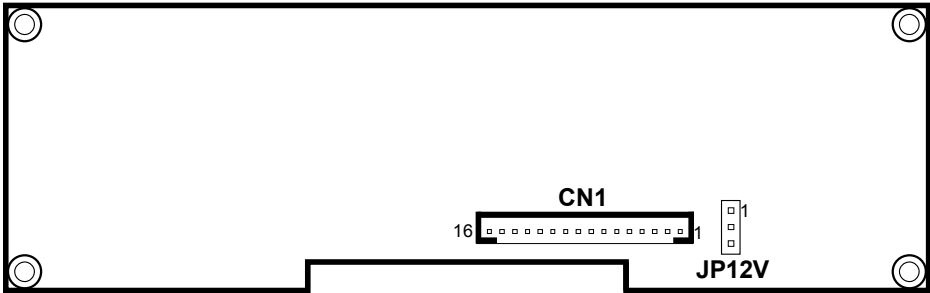


Figure 2-4. MB-4103 & LD720 VFD Board Component Locations



Jumper & Connector Quick Reference Table

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

Setting MB-4103 & LD720 VFD Board Connectors and Jumpers

2-8-1. Power Switch Selection

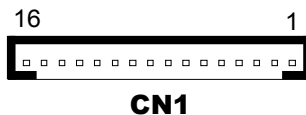
JP12V: Power Switch Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
OFF	1-2	 <p style="text-align: center;">JP12V</p>
ON (Default)	2-3	 <p style="text-align: center;">JP12V</p>

2-8-2. RS-232 Serial Interface Connector

CN1: RS-232 serial interface wafer

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	9	NC
2	TXD	10	NC
3	RXD	11	NC
4	DTR	12	NC
5	DSR	13	NC
6	RTS	14	NC
7	CTS	15	NC
8	+12V/+5V	16	NC



MSR Board Component Locations & Pin Assignment

2-9. MSR Board: ID TECH (option)

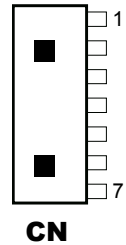


ID-TECH MSR Board Component Locations

2-9-1. Main Connector

CN:

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	Chassis Ground	5	K-CLK (Computer connections)
2	P-CLK (Keyboard connections)	6	K-DATA (Computer connections)
3	P-DATA (Keyboard connections)	7	GND
4	+5V Vcc	-	-



2-10. MSR Board: MB-3012 (option)

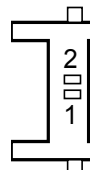


Figure 2-5. MB-3012 MSR Board Component Locations

2-10-1. Information Button Reader

I_BUTTON1: Information button reader

PIN	ASSIGNMENT
1	I_B1
2	GND



I_BUTTON1

2-10-2. Output Connector

IO1: Output wafer

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	CLK_KB	7	RX_MSR
2	CLK_PC	8	TX_MSR
3	DATA_KB	9	GND
4	DATA_PC	10	USB_D+_R
5	+5V	11	USB_D-_R
6	CHASSIS GND	12	GND



IO1

SOFTWARE UTILITIES

CHAPTER
3

This chapter provides the detailed information users need to install driver utilities for the system.

The following sections are included:

- Driver
 - Intel® Chipset Software Installation Utility
 - VGA Driver Utility
 - LAN Driver Utility
 - Sound Driver Utility
 - Touch Screen Driver Utility
- Embedded Peripheral Devices
 - Printer
 - VFD
 - MSR
- API

3-1. DRIVER

3-1-1. INTRODUCTION

Enclosed with the PA-6980 Series package is our driver utilities, which comes in a DVD-ROM disc. See the following table for driver locations.

FILE NAME (Assume that DVD-ROM drive is D:)	PURPOSE
<ul style="list-style-type: none"> ▪ D:\Driver\Platform\Win7 (32/64-bit)\Main Chip ▪ D:\Driver\Platform\Win8.1 (64-bit)\Main Chip ▪ D:\Driver\Platform\Win10 (64-bit)\Main Chip 	Intel® Chipset Software Installation Utility
<ul style="list-style-type: none"> ▪ D:\Driver\Platform\ Win7 (32/64-bit)\ME ▪ D:\Driver\Platform\ Win8.1 (64-bit)\ME ▪ D:\Driver\Platform\ Win10 (64-bit)\ME 	Intel® Management Engine Driver Installation
<ul style="list-style-type: none"> ▪ D:\Driver\Platform\ Win7(32/64-bit)\KMDF 	Intel® Kernel-Mode Driver Framework Driver Installation
<ul style="list-style-type: none"> ▪ D:\Driver\Platform\ Win7 (32/64-bit)\VGA ▪ D:\Driver\Platform\ Win8.1(64-bit)\VGA ▪ D:\Driver\Platform\ Win10 (64-bit)\VGA 	Intel® HD Graphics 530 Driver installation
<ul style="list-style-type: none"> ▪ D:\Driver\Platform\ Win7 (32/64-bit)\LAN ▪ D:\Driver\Platform\ Win8.1 (64-bit)\LAN ▪ D:\Driver\Platform\ Win10 (64-bit)\LAN 	Intel® Ethernet connection I219-V for LAN Driver Installation
<ul style="list-style-type: none"> ▪ D:\Driver\Platform\ Win7 (32/64-bit)\Sound ▪ D:\Driver\Platform\ Win8.1 (64-bit)\Sound ▪ D:\Driver\Platform\ Win10 (64-bit)\Sound 	Realtek® ALC888S for Sound Driver Installation
<ul style="list-style-type: none"> ▪ D:\Driver\Device\Platform\ Win7(32/64-bit)\USB3.0 	For USB3.0 Driver Installation
<ul style="list-style-type: none"> ▪ D:\Driver\Device 	Driver installation for Touch screen , wireless devices, MSR, Printer ,etc.
<ul style="list-style-type: none"> ▪ D:\Driver\FLASH 	Driver installation for BIOS update utility (AMI)

Note: 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 7 (32/64-bit), Windows 8.1/10 (64-bit only) series, and it should be installed right after the OS installation. Please follow the steps below:

1. Connect the USB DVD-ROM device to PA-6980 and insert the driver disk inside.
2. Enter the “Main Chip” folder where the Chipset driver is located (depending on your OS platform).
3. Click **Setup.exe** file for driver installation.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart the PA-6980 for the changes to take effect.

3-1-3. VGA DRIVER UTILITY

The VGA interface embedded with the PA-6980 series can support a wide range of display types. You can have dual displays via CRT and LVDS interfaces work simultaneously.

Installation of VGA Driver

To install the VGA Driver, follow the steps below:

1. Connect the USB DVD-ROM device to PA-6980 and insert the driver disk inside.
2. Enter the “VGA” folder where the VGA driver is located (depending on your OS platform).
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-6980 for the changes to take effect.

3-1-4. LAN DRIVER UTILITY

The PA-6980 Series is enhanced with LAN function that can support various network adapters. Installation platform for the LAN driver is listed as follows:

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-6980 and insert the driver disk inside.
2. Enter the “LAN” folder where the LAN driver is located (depending on your OS platform).
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-6980 for the changes to take effect.

3-1-5. SOUND DRIVER UTILITY

The sound function enhanced in this system is fully compatible with Windows 7 (32/64-bit), Windows 8.1/10 (64-bit only) series. Below you will find the content of the Sound driver.

Installation of Sound Driver

To install the Sound Driver, refer to the readme.txt file on the driver disc (:\Sound\Realtek\Readme.txt).

1. Connect the USB DVD-ROM device to PA-6980 and insert the driver disk inside.
2. Enter the “Sound” folder where the Sound driver is located (depending on your OS platform).
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-6980 for the changes to take effect.

3-1-6. TOUCH SCREEN DRIVER UTILITY

The touch screen driver utility can only be installed on a Windows platform (Windows 7 (32/64-bit), Windows 8.1/10 (64-bit only) series), and it should be installed right after the OS installation.

Installation of Touch Screen Driver

To install the Touch Screen Driver, follow the steps below:

1. Connect the USB DVD-ROM device to PA-6980 and insert the driver disk inside.
2. Enter the “Device/Touchscreen” folder where the Touch Screen 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-6980 for the changes to take effect.

3-1-7. Fingerprint Driver Utility (Optional)

The fingerprint driver utility can only be installed on a Windows platform, and it should be installed right after the OS installation is completed.

Installing Fingerprint Driver

To install the fingerprint driver, follow the steps below:

1. Connect the USB DVD-ROM device to PA-6980 and insert the driver disk.
2. Open the “Device\Embedded Finger Printer” folder where the fingerprint 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 PA-6980 for the changes to take effect.

3-2 PERIPHERAL DEVICES

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

3-2-1 Printer Board: MB-1030

3-2-1-1 Commands

1. Printer Registry Operation

Registry Name	Default Data	Notes
BaudRate	115200	-
BitLength	8	-
Parity	N	-
Stop	1	-

2. Command List

Standard Commands

Command	RA	RB	Command	RA	RB	Command	RA	RB
HT		V	ESC D		V	GS /	V	V
LF	V	V	ESC E	V	V	GS :		
FF		V	ESC G		V	GS B	V	V
CR	V	V	ESC J	V	V	GS H	V	V
CAN		V	ESC L		V	GS I	V	V
DLE EOT	V	V	ESC M	V	V	GS L	V	V
DLE ENQ		V	ESC c 4		V	GS P	V	V
DLE DC4	V	V	ESC c 5		V	GS V	V	V
ESC FF		V	ESC d	V	V	GS W		V
ESC SP	V	V	ESC p	V	V	GS \		
ESC !	V	V	ESC t	V	V	GS ^		
ESC \$	V	V	ESC {	V	V	GS a	V	V
ESC %			FS g 1			GS b		
ESC &			FS g 2			GS f	V	V
ESC *		V	FS p	V	V	GS h	V	V
ESC	V	V	FS q	V	V	GS k	V	V
ESC 2	V	V	GS !	V	V	GS r	V	V
ESC 3	V	V	GS \$		V	GS v 0	V	V
ESC =	V	V	GS *	V	V	GS w	V	V
ESC ?			GS (A	V	V			
ESC @	V	V	GS (K		V			

Kanji Control Commands

Command	MB-1030 RA	MB-1030 RB
FS !	V	V
FS &	V	V
FS		V
FS .	V	V
FS 2		
FS C		
FS S		V
FS W		V

Other Commands

Command	MB-1030 RA	MB-1030 RB
ESC i	V	V
ESC m	V	V
DC2 ;		V
GS p 1		V

COMMAND LIST**Standard Commands**

Control Codes	Hexadecimal Codes	Function	Standard Mode	Page Mode
<HT>	09	Horizontal tab	V	V
<LF>	0A	Print and line feed	V	V
<FF>	0C	Print and recover to standard mode (in page mode)	Ignored	V
<CR>	0D	Print and carriage return	V	V
<CAN>	18	Cancel print data in page mode	Ignored	V
<DLE EOT>	10 04	Real-time status transmission	V	V
<DLE ENQ>	10 05	Real-time request to printer	V	V
<DLE DC4>	10 14	Real-time output of specified pulse	V	V
<ESC FF>	1B 0C	Print data in page mode	Ignored	V
<ESC SP>	1B 20	Set right-side character spacing	V	V
<ESC !>	1B 21	Select print mode(s)	V	V
<ESC \$>	1B 24	Set absolute print position.	V	V
<ESC *>	1B 2A	Select bit image mode	V	V
<ESC ->	1B 2D	Turn underline mode on/off.	V	V
<ESC 2>	1B 32	Select default line spacing	V	V
<ESC 3>	1B 33	Set line spacing	V	V
<ESC =>	1B 3D	Select peripheral device	V	V
<ESC @>	1B 40	Initialize printer	V	V
<ESC D>	1B 44	Set horizontal tab position	V	V
<ESC E>	1B 45	Turn emphasized mode on/off	V	V
<ESC G>	1B 47	Turn double-strike mode on/off	V	V
<ESC J>	1B 4A	Print and feed paper	V	V
<ESC L>	1B 4C	Select page mode	☉	Ignored
<ESC M >	1B 4D	Select character font	V	V
<ESC R>	1B 52	Select an international character set	V	V
<ESC S>	1B 53	Select standard mode	Ignored	V
<ESC T>	1B 54	Select print direction in page mode	▲	V
<ESC V>	1B 56	Turn 90 degree clockwise rotation mode on/off	V	▲
<ESC W>	1B 57	Set printing area in page mode	▲	V
<ESC \>	1B 5C	Set relative print position	V	V
<ESC a>	1B 61	Select justification	☉	▲
<ESC c 3>	1B 63 33	Select paper sensor(s) to output paper-end	V	V

Control Codes	Hexadecimal Codes	Function	Standard Mode	Page Mode
		signals		
<ESC c 4>	1B 63 34	Select paper sensor(s) to stop printing	V	V
<ESC c 5>	1B 63 35	Enable/disable panel buttons	V	V
<ESC d>	1B 64	Print and feed n lines	V	V
<ESC i>	1B 69	Full cut	V	Disabled
<ESC m>	1B 6D	Partial cut	V	Disabled
<ESC p>	1B 70	General pulse	V	V
<ESC t>	1B 74	Select character code table	V	V
<ESC {>	1B 7B	Turn upside-down printing mode on/off	☉	▲
<FS p>	1C 70	Print NV bit image	V	Disabled
<FS q>	1C 71	Define NV bit image	☉	Disabled
<GS !>	1D 21	Select character size		V
<GS \$>	1D 24	Set absolute vertical print position in page mode	Ignored	V
<GS *>	1D 2A	Define download bit images	V	V
<GS (A>	1D 28 41	Execute test print	V	Disabled
<GS (K>	1D 28 4B	Set print density	V	Disabled
<GS />	1D 2F	Print download bit image	•	V
<GS B>	1D 42	Turn white/black reverse printing mode on/off	V	V
<GS H>	1D 48	Select printing position of HRI characters	V	V
<GS I>	1D 49	Transmit printer ID	V	Disabled
<GS L>	1D 4C	Set left margin	☉	Disabled
<GS P>	1D 50	Set basic calculated pitch	V	V
<GS V>	1D 56	Cut paper	☉	V
<GS W>	1D 57	Set printing area width	☉	▲
<GS \>	1D 5C	Set relative vertical print position in page mode	Ignored	
<GS a>	1D 61	Enable/disable Automatic Status Back (ASB)	V	V
<GS f>	1D 66	Select font for HRI characters	V	V
<GS h>	1D 68	Set bar code height	V	V
<GS k>	1D 6B	Print bar code	•	V
<GS r>	1D 72	Transmit status	V	V
<GS v 0>	1D 76 30	Print raster bit image	•	Disabled
<GS w>	1D 77	Set bar code width	V	V

Two-dimensional Bar Code Commands

Control Codes	Hexadecimal Code	Function	Standard Mode	Page Mode
<DC2 ;>	12 3B	Specifies a module size of QR Code and Data Matrix	√	√
<GS p 1>	1D 70 01	Prints QR Code data based on the specified contents	√	√

Kanji Control Commands

(when the Japanese, Simplified Chinese, Traditional Chinese, or Korean model is used.)

Control Codes	Hexadecimal Codes	Function	Standard Mode	Page Mode
<FS !>	1C 21	Set print mode(s) for Kanji characters	√	√
<FS &>	1C 26	Select Kanji character mode	√	√
<FS ->	1C 2D	Turn underline mode on/off for Kanji characters	√	√
<FS .>	1C 2E	Cancel Kanji character mode	√	√
<FS S>	1C 53	Set Kanji character spacing	√	√
<FS W>	1C 57	Turn quadruple-size mode on/off for Kanji characters	√	√

Command classification

Executing : Printer executes the command which does not affect the following data.

Setting: Printer uses flags to make settings, and those settings affect the following data.

○: Enabled.

⊙: Enabled only when the command is set at the beginning of a line.

●: Enabled only when data is not present in the printer buffer.

▲: Only value setting is possible.

Disabled: Parameters are processed as printable data.

Ignored: All command codes including parameters are ignored and nothing is executed.

COMMAND DETAILS**STANDARD COMMAND DETAILS****HT**

[Name]	Horizontal tab
[Format]	ASCII HT Hex. 09 Decimal 9
[Range]	N/A
[Description]	<p>Moves print position to next horizontal tab position.</p> <ul style="list-style-type: none"> ● This command is ignored if the next tab is not set. ● If the next tab position exceeds the print region, the print position is moved to [print region + 1]. ● The horizontal tab position is set by ESC D (Set/cancel horizontal tab position). ● When the print position is at the [print region + 1] position and this command is received, the current line buffer full is printed and a horizontal tab is executed from the top of the next line. ● The initial value of the horizontal tab position is every 8 characters of Font A (the 9th, 17th, 25th positions, etc.)

LF

[Name]	Print and line feed
[Format]	ASCII LF Hex. 0A Decimal 10
[Range]	N/A
[Description]	<p>Prints the data in the print buffer and performs a line feed based on the set line feed amount.</p> <ul style="list-style-type: none"> ● After execution, makes the top of the line the next print starting position.

FF

[Name]	Print and recover to standard mode (in page mode)
[Format]	ASCII FF Hex. 0C Decimal 12
[Range]	N/A
[Description]	<p>Prints all buffered data to the print region collectively, and then recovers to the standard mode.</p> <ul style="list-style-type: none"> ● All buffer data is deleted after printing. ● The print area set by ESC W (Set print region in page mode) is reset to the default setting. ● No paper cut is executed. ● Sets the print position to the beginning of the next line after execution. ● This command is enabled only in page mode.

CR

[Name]	Print and carriage return
[Format]	ASCII CR Hex. 0D Decimal 13
[Range]	N/A
[Description]	<p>When an automatic line feed is enabled, this command functions in the same way as LF (print and line feed). When the automatic line feed is disabled, this command is ignored.</p> <ul style="list-style-type: none"> ● This command is ignored with serial interface models. ● Sets the print position to the beginning of the next line after execution.

CAN

[Name]	Cancel print data in page mode
[Format]	ASCII CAN Hex. 18 Decimal 24
[Range]	N/A
[Description]	<p>Deletes all print data in the currently set print region in page mode.</p> <ul style="list-style-type: none"> ● This command is enabled only in page mode. ● Portions included in the currently set print region are also deleted, even if previously set print region data.

DLE EOT n

[Name]	Real-time status transmission.																																																																																																																																																	
[Format]	ASCII OLE EOT n Hex. 10 04 n Decimal 16 4 n																																																																																																																																																	
[Range]	$1 \leq n \leq 4$																																																																																																																																																	
[Description]	<p>Transmits the selected printer status specified by n in real time, according to the following parameters: n = 1 : Transmit printer status. n = 2 : Transmit off-line status. n = 3 : Transmit error status. n = 4 : Transmit paper roll sensor status.</p> <p>n = 1 : Printer status.</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>On / Off</th> <th>Hex</th> <th>Decimal</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Off</td> <td>00</td> <td>0</td> <td>Not used. Fixed to Off.</td> </tr> <tr> <td>1</td> <td>On</td> <td>02</td> <td>2</td> <td>Not used. Fixed to On.</td> </tr> <tr> <td rowspan="2">2</td> <td>Off</td> <td>00</td> <td>0</td> <td>Drawer open/close signal is LOW.</td> </tr> <tr> <td>On</td> <td>04</td> <td>4</td> <td>Drawer open/close signal is HIGH.</td> </tr> <tr> <td rowspan="2">3</td> <td>Off</td> <td>00</td> <td>0</td> <td>On-line.</td> </tr> <tr> <td>On</td> <td>08</td> <td>8</td> <td>Off-line.</td> </tr> <tr> <td>4</td> <td>On</td> <td>10</td> <td>16</td> <td>Not used. Fixed to On.</td> </tr> <tr> <td>5</td> <td>Off</td> <td>00</td> <td>0</td> <td>Not used. Fixed to Off.</td> </tr> <tr> <td>6</td> <td>Off</td> <td>00</td> <td>0</td> <td>Not used. Fixed to Off.</td> </tr> <tr> <td>7</td> <td>Off</td> <td>00</td> <td>0</td> <td>Not used. Fixed to Off.</td> </tr> </tbody> </table> <p>n = 2 : Off-line status.</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>On / Off</th> <th>Hex</th> <th>Decimal</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Off</td> <td>00</td> <td>0</td> <td>Not used. Fixed to Off.</td> </tr> <tr> <td>1</td> <td>On</td> <td>02</td> <td>2</td> <td>Not used. Fixed to On.</td> </tr> <tr> <td rowspan="2">2</td> <td>Off</td> <td>00</td> <td>0</td> <td>Cover is closed.</td> </tr> <tr> <td>On</td> <td>04</td> <td>4</td> <td>Cover is open.</td> </tr> <tr> <td>3</td> <td>Off</td> <td>00</td> <td>0</td> <td>Not used. Fixed to Off.</td> </tr> <tr> <td>4</td> <td>On</td> <td>10</td> <td>16</td> <td>Not used. Fixed to On.</td> </tr> <tr> <td rowspan="2">5</td> <td>Off</td> <td>00</td> <td>0</td> <td>No paper-end stop.</td> </tr> <tr> <td>On</td> <td>20</td> <td>32</td> <td>Printing stops due to paper end.</td> </tr> <tr> <td rowspan="2">6</td> <td>Off</td> <td>00</td> <td>0</td> <td>No error.</td> </tr> <tr> <td>On</td> <td>40</td> <td>64</td> <td>Error occurs.</td> </tr> <tr> <td>7</td> <td>Off</td> <td>00</td> <td>0</td> <td>Not used. Fixed to Off.</td> </tr> </tbody> </table> <p>n = 3 : Error status</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>On / Off</th> <th>Hex</th> <th>Decimal</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Off</td> <td>00</td> <td>0</td> <td>Not used. Fixed to Off.</td> </tr> <tr> <td>1</td> <td>On</td> <td>02</td> <td>2</td> <td>Not used. Fixed to On.</td> </tr> <tr> <td>2</td> <td>Off</td> <td>00</td> <td>0</td> <td>Not used. Fixed to Off.</td> </tr> <tr> <td>3</td> <td>Off</td> <td>00</td> <td>0</td> <td>Not used. Fixed to Off.</td> </tr> <tr> <td>4</td> <td>On</td> <td>10</td> <td>16</td> <td>Not used. Fixed to On.</td> </tr> <tr> <td>5</td> <td>Off</td> <td>00</td> <td>0</td> <td>Not used. Fixed to Off.</td> </tr> </tbody> </table>	Bit	On / Off	Hex	Decimal	Function	0	Off	00	0	Not used. Fixed to Off.	1	On	02	2	Not used. Fixed to On.	2	Off	00	0	Drawer open/close signal is LOW.	On	04	4	Drawer open/close signal is HIGH.	3	Off	00	0	On-line.	On	08	8	Off-line.	4	On	10	16	Not used. Fixed to On.	5	Off	00	0	Not used. Fixed to Off.	6	Off	00	0	Not used. Fixed to Off.	7	Off	00	0	Not used. Fixed to Off.	Bit	On / Off	Hex	Decimal	Function	0	Off	00	0	Not used. Fixed to Off.	1	On	02	2	Not used. Fixed to On.	2	Off	00	0	Cover is closed.	On	04	4	Cover is open.	3	Off	00	0	Not used. Fixed to Off.	4	On	10	16	Not used. Fixed to On.	5	Off	00	0	No paper-end stop.	On	20	32	Printing stops due to paper end.	6	Off	00	0	No error.	On	40	64	Error occurs.	7	Off	00	0	Not used. Fixed to Off.	Bit	On / Off	Hex	Decimal	Function	0	Off	00	0	Not used. Fixed to Off.	1	On	02	2	Not used. Fixed to On.	2	Off	00	0	Not used. Fixed to Off.	3	Off	00	0	Not used. Fixed to Off.	4	On	10	16	Not used. Fixed to On.	5	Off	00	0	Not used. Fixed to Off.
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6	Off	00	0	Not used. Fixed to Off.
7	Off	00	0	Not used. Fixed to Off.
n = 4 : Continuous paper sensor status.				
Bit	On / Off	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	Off	02	2	Not used. Fixed to On.
2	Off	00	0	No paper-near-end stop.
	On	04	4	Printing stops due to paper near end.
3	Off	00	0	No paper-near-end stop.
	On	08	8	Printing stops due to paper near end.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	No paper-end stop.
	On	20	32	Printing stops due to paper end.
6	Off	00	0	No paper-end stop.
	On	40	64	Printing stops due to paper end.
7	Off	00	0	Not used. Fixed to Off.

DLE ENQ n

[Name]	Real-time request to printer.
[Format]	ASCII DLE ENQ n Hex. 10 05 n Decimal 16 5 n
[Range]	1 ≤ n ≤ 2
[Description]	Responds to requests n specifications from the host in real-time. n specifications are below. n = 1: Recover from the error and start printing from the line where the error occurred. n = 2: Recover from error after clearing the reception buffer and print buffer. This command is enabled even when the printer specification is disabled by ESC = (select peripheral devices).

DLE DC4 n m t

[Name]	Real-time output of specified pulse.
[Format]	ASCII DLE DC4 n m t Hex. 10 14 n m t Decimal 16 20 n m t
[Range]	n = 1 m = 0,1 1 ≤ t ≤ 8
[Description]	This outputs a signal specified by t to the connector pin specified by m. m = 0: #2 Pin of the drawer kick connector m = 1: #5 Pin of the drawer kick connector

	On time is set to t x 100 msec; Off time is set to t x 100 msec.
--	--

ESC FF

[Name]	Print data in page mode.
[Format]	ASCII ESC FF Hex. 1B 0C Decimal 27 12
[Range]	N/A
[Description]	Prints all buffered data in the print area collectively in page mode. <ul style="list-style-type: none"> ● This command is enabled only in page mode. ● Holds the following information after printing. <ol style="list-style-type: none"> a. Expanded data b. Character print direction selection in page mode (ESC T) c. Set print region (ESC W) in the page mode. d. Character expansion position

ESC SP n

[Name]	Set right-side character spacing.
[Format]	ASCII ESC SP n Hex. 1B 20 n Decimal 27 32 n
[Range]	$0 \leq n \leq 255$ Initial Value n = 0
[Description]	This command sets the size of space to right of character. Right space = n x [horizontal motion units].

ESC ! n

[Name]	Select print mode(s).																																																																	
[Format]	ASCII ESC ! n Hex. 1B 21 n Decimal 27 33 n																																																																	
[Range]	0 ≤ n ≤ 255 Initial Value n = 0																																																																	
[Description]	<p>This command selects print mode(s) with bits having following meanings.</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>On / Off</th> <th>Hex</th> <th>Decimal</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td rowspan="2">0</td> <td>Off</td> <td>00</td> <td>0</td> <td>Character font A selected.</td> </tr> <tr> <td>On</td> <td>01</td> <td>1</td> <td>Character font B selected.</td> </tr> <tr> <td>1</td> <td>Off</td> <td>00</td> <td>0</td> <td>Not used. Fixed to Off.</td> </tr> <tr> <td>2</td> <td>Off</td> <td>00</td> <td>0</td> <td>Not used. Fixed to Off.</td> </tr> <tr> <td rowspan="2">3</td> <td>Off</td> <td>00</td> <td>0</td> <td>Emphasized mode not selected.</td> </tr> <tr> <td>On</td> <td>08</td> <td>8</td> <td>Emphasized mode selected.</td> </tr> <tr> <td rowspan="2">4</td> <td>Off</td> <td>00</td> <td>0</td> <td>Double-height mode not selected</td> </tr> <tr> <td>On</td> <td>10</td> <td>16</td> <td>Double-height mode selected</td> </tr> <tr> <td rowspan="2">5</td> <td>Off</td> <td>00</td> <td>0</td> <td>Double-width mode not selected.</td> </tr> <tr> <td>On</td> <td>20</td> <td>32</td> <td>Double-width mode selected.</td> </tr> <tr> <td>6</td> <td>Off</td> <td>00</td> <td>0</td> <td>Not used. Fixed to Off.</td> </tr> <tr> <td rowspan="2">7</td> <td>Off</td> <td>00</td> <td>0</td> <td>Underline mode not selected.</td> </tr> <tr> <td>On</td> <td>80</td> <td>128</td> <td>Underline mode selected.</td> </tr> </tbody> </table>	Bit	On / Off	Hex	Decimal	Function	0	Off	00	0	Character font A selected.	On	01	1	Character font B selected.	1	Off	00	0	Not used. Fixed to Off.	2	Off	00	0	Not used. Fixed to Off.	3	Off	00	0	Emphasized mode not selected.	On	08	8	Emphasized mode selected.	4	Off	00	0	Double-height mode not selected	On	10	16	Double-height mode selected	5	Off	00	0	Double-width mode not selected.	On	20	32	Double-width mode selected.	6	Off	00	0	Not used. Fixed to Off.	7	Off	00	0	Underline mode not selected.	On	80	128	Underline mode selected.
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ESC \$ nL nH

[Name]	Set absolute print position.
[Format]	ASCII ESC \$ nL nH Hex. 1B 24 nL nH Decimal 27 36 nL nH
[Range]	0 ≤ (nL + nH x 256) ≤ 65535 (0 ≤ nH ≤ 255, 0 ≤ nL ≤ 255)
[Description]	This command specifies the next print starting position in reference to the left edge of the print area. The printing start position is calculated using (nL + nH x 256) x (vertical or horizontal motion units). Specifications exceeding the print range are ignored.

ESC * m nL nH d1...dk

[Name]	Select bit image mode					
[Format]	ASCII ESC * m nL nH d1...dk Hex. 1B 2A m nL nH d1...dk Decimal 27 42 m nL nH d1...dk					
[Range]	m = 0,1,32,33 0 ≤ nL ≤ 255 0 ≤ nH ≤ 3 0 ≤ d ≤ 255					
[Description]	Selects a bit-image mode in mode <i>m</i> for the number of dots specified by <i>nL</i> and <i>nH</i> . m = 1,33 : (nL+nH×256)<576 (3 inch);(nL+nH×256)<432 (2 inch). m = 0,32 : (nL+nH×256)<288 (3 inch);(nL+nH×256)<216 (2 inch).					
	m	Mode	Number of Vert. Dir. Dots	Density of Vert. Dir. Dots	Density of Hor. Dir. Dots	Data Count (k)
	0	8 dot single density	8	67 DPI	101 DPI	nL+nH×256
	1	8 dot double density	8	67 DPI	203 DPI	nL+nH×256
	32	24 dot single density	24	203 DPI	101 DPI	(nL+nH×256) ×3
	33	24 dot double density	24	203 DPI	203 DPI	(nL+nH×256) ×3

ESC - n

[Name]	Turn underline mode on/off.					
[Format]	ASCII ESC - n Hex. 1B 2D n Decimal 27 45 n					
[Range]	0 ≤ n ≤ 2 Initial Value n = 0					
[Description]	This command enables the print data following it to be printer out underlined. The underline mode varied depending on the following values of n:					
	n	Function				
	0	Turns off underline mode				
	1	Turns on underline mode, set at 1-dot thick				
	2	Turns on underline mode, set at 2-dot thick				

ESC 2

[Name]	Select default line spacing.
[Format]	ASCII ESC 2 Hex. 1B 32 Decimal 27 50
[Range]	N/A
[Description]	This command sets the default line spacing The default line spacing is approximately 4.25 mm, which is equivalent to 34 dots.

ESC 3 n

[Name]	Set line spacing.
[Format]	ASCII ESC 3 n Hex. 1B 33 n Decimal 27 51 n
[Range]	$0 \leq n \leq 255$ Initial Value n = 34
[Description]	This command sets the line spacing using a following rule. Line spacing = n x (vertical or horizontal motion units)

ESC = n

[Name]	Select peripheral device.																																				
[Format]	ASCII ESC = n Hex. 1B 3D n Decimal 27 61 n																																				
[Range]	$0 \leq n \leq 255$ Initial Value n = 1																																				
[Description]	<p>Selects the peripheral device for which the data is effective from the host computer.</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>Function</th> <th>"0"</th> <th>"1"</th> </tr> </thead> <tbody> <tr> <td>7</td> <td>Undefined</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>Undefined</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>Undefined</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>Undefined</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>Undefined</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>Undefined</td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>Undefined</td> <td></td> <td></td> </tr> <tr> <td>0</td> <td>Printer</td> <td>Invalid</td> <td>Valid</td> </tr> </tbody> </table>	Bit	Function	"0"	"1"	7	Undefined			6	Undefined			5	Undefined			4	Undefined			3	Undefined			2	Undefined			1	Undefined			0	Printer	Invalid	Valid
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ESC @

[Name]	Initialize printer.
[Format]	ASCII ESC @ Hex. 1B 40 Decimal 27 64
[Range]	N/A
[Description]	Clears data from the print buffer and sets the printer to its default settings.

ESC D n1...nk NUL

[Name]	Set horizontal tab position
[Format]	ASCII ESC D n1...nk NUL Hex. 1B 44 n1...nk NUL Decimal 27 68 n1...nk NUL
[Range]	$1 \leq n \leq 255$ $0 \leq k \leq 32$
[Description]	Sets horizontal tab position <ul style="list-style-type: none"> • n specifies the column number for setting a horizontal tab position from the left margin or the beginning of the line. • k indicates the number of horizontal tab positions to be set.

ESC E n

[Name]	Turn emphasized mode on / off.
[Format]	ASCII ESC E n Hex. 1B 45 n Decimal 27 69 n
[Range]	$0 \leq n \leq 255$ Initial Value n = 0
[Description]	This command turns emphasized mode on or off by toggling the least significant bit of n as followings: When the LSB of n is 0, the emphasized mode is turned off. When the LSB of n is 1, the emphasized mode is turned on.

ESC G n

[Name]	Turn double-strike mode on/off.
[Format]	ASCII ESC G n Hex. 1B 47 n Decimal 27 71 n
[Range]	$0 \leq n \leq 255$ Initial Value n = 0
[Description]	<p>Specifies or cancels double printing.</p> <p> Cancels double printing when n = <*****0>B.</p> <p> Specifies double printing when n = <*****1>B.</p> <ul style="list-style-type: none"> ● n is effective only when it is the lowest bit. ● This printer is not capable of double printing, so the print is the same as when using emphasized printing. ● This command is enabled for ANK characters

ESC J n

[Name]	Print and feed paper.
[Format]	ASCII ESC J n Hex. 1B 4A n Decimal 27 74 n
[Range]	$0 \leq n \leq 255$
[Description]	<p>This command prints the data in the print buffer and feeds the paper [n X vertical motion unit].</p> <ul style="list-style-type: none"> ● Sets the print position to the beginning of the next line after printing. ● In standard mode, the printer uses the vertical motion unit (y). ● In page mode, this command functions as follows, depending on the starting position of the printable area: <ul style="list-style-type: none"> (1) When the starting position is set to the upper left or lower right of the printable area using ESC T, the vertical motion unit (y) is used. (2) When the starting position is set to the upper right or lower left of the printable area using ESC T, the horizontal motion unit (x) is used. ● The maximum line spacing is 150mm {5.9 inches }. When the setting value exceeds the maximum, it is converted to the maximum automatically.

ESC L

[Name]	Select page mode
[Format]	ASCII ESC L Hex. 1B 4C Decimal 27 76
[Range]	N/A
[Description]	<ul style="list-style-type: none"> ● Enabled only when input with the top of line. ● Invalid when input by page mode. ● Returns to standard mode after the following commands are issued. <ul style="list-style-type: none"> a. FF (Print and recover to page mode) b. ESC S (Select standard mode) ● Character expansion position has the starting point specified by ESC T (Character print direction selection in page mode) in the printing region designated by the ESC W (Set print region in the page mode) command. ● This command switches the settings for the following commands the values of which can be set independently in standard mode and page mode to those for page mode <ul style="list-style-type: none"> a. Set space amount: ESC SP, FS S b. Set line feed amount: ESC 2, ESC 3 ● The following commands are enabled only when in page mode. <ul style="list-style-type: none"> a. ESC V : Specify/cancel character 90 degree clockwise rotation b. ESC a : Position alignment c. ESC { : Specify/cancel upside-down printing d. GS W : Set print region width ● The following command is ignored in page mode. <ul style="list-style-type: none"> a. GS (A : Test print ● The following commands are invalid in page mode. <ul style="list-style-type: none"> a. FS p : Print NV bit image b. FS q : Define NV bit image c. GS v 0 : Print raster bit images d. GS L : Set left margin ● Recover to standard mode using ESC @ (initialize printer).

ESC M n

[Name]	Select character font.						
[Format]	ASCII ESC M n Hex. 1B 4D n Decimal 27 77 n						
[Range]	n = 0, 1 Initial Value n = 0						
[Description]	This command selects ANK character fonts using n as follows: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>n</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Character font A selected</td> </tr> <tr> <td>1</td> <td>Character font B selected</td> </tr> </tbody> </table>	n	Function	0	Character font A selected	1	Character font B selected
n	Function						
0	Character font A selected						
1	Character font B selected						

ESC R n

[Name]	Select an international character set.																																				
[Format]	ASCII ESC R n Hex. 1B 52 n Decimal 27 82 n																																				
[Range]	$0 \leq n \leq 16$ Initial Value n = 0																																				
[Description]	This command specifies international characters according to n values. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>n</th> <th>Character Set</th> </tr> </thead> <tbody> <tr><td>0</td><td>USA</td></tr> <tr><td>1</td><td>France</td></tr> <tr><td>2</td><td>Germany</td></tr> <tr><td>3</td><td>UK</td></tr> <tr><td>4</td><td>Denmark I</td></tr> <tr><td>5</td><td>Sweden</td></tr> <tr><td>6</td><td>Italy</td></tr> <tr><td>7</td><td>Spain</td></tr> <tr><td>8</td><td>Japan</td></tr> <tr><td>9</td><td>Norway</td></tr> <tr><td>10</td><td>Denmark II</td></tr> <tr><td>11</td><td>Spain II</td></tr> <tr><td>12</td><td>Latin America</td></tr> <tr><td>13</td><td>Korea</td></tr> <tr><td>14</td><td>Russia</td></tr> <tr><td>15</td><td>Slavonic</td></tr> <tr><td>16</td><td>User Define</td></tr> </tbody> </table>	n	Character Set	0	USA	1	France	2	Germany	3	UK	4	Denmark I	5	Sweden	6	Italy	7	Spain	8	Japan	9	Norway	10	Denmark II	11	Spain II	12	Latin America	13	Korea	14	Russia	15	Slavonic	16	User Define
n	Character Set																																				
0	USA																																				
1	France																																				
2	Germany																																				
3	UK																																				
4	Denmark I																																				
5	Sweden																																				
6	Italy																																				
7	Spain																																				
8	Japan																																				
9	Norway																																				
10	Denmark II																																				
11	Spain II																																				
12	Latin America																																				
13	Korea																																				
14	Russia																																				
15	Slavonic																																				
16	User Define																																				

ESC S

[Name]	Select standard mode
[Format]	ASCII ESC S Hex. 1B 53 Decimal 27 83
[Range]	N/A
[Description]	<ul style="list-style-type: none"> ● Valid only when input by page mode. ● All buffer data in page mode is deleted. ● Sets the print position to the beginning of the next line after execution. ● The print area set by ESC W (Set print region in page mode) is reset to the default setting. ● This command switches the settings for the following commands the values of which can be set independently in standard mode and page mode to those for standard mode <ul style="list-style-type: none"> a. ESC SP :Set character right space amount b. FS S :Set Chinese character space amount c. ESC 2 :Set default line spacing d. ESC 3 :Set line spacing ● The following commands are effective only when in standard mode. <ul style="list-style-type: none"> a. ESC W :Set print region in page mode b. ESC T :Select character print direction in page mode ● The following commands are ignored in standard mode. <ul style="list-style-type: none"> a. GS \$:Specify absolute position for character vertical direction in page mode. b. GS \ :Specify relative position for character vertical direction in page mode. ● Standard mode is selected when the power is turned on or when the printer is reset or initialized (ESC @).

ESC T n

[Name]	Select print direction in page mode.															
[Format]	ASCII ESC T n Hex. 1B 54 n Decimal 27 84 n															
[Range]	0 ≤ n ≤ 3, 48 ≤ n ≤ 51 Initial Value n = 0															
[Description]	<p>Selects the character printing direction and starting point in page mode.</p> <table border="1"> <thead> <tr> <th>n</th> <th>Print Direction</th> <th>Starting Point</th> </tr> </thead> <tbody> <tr> <td>0, 48</td> <td>Left to Right</td> <td>Upper Left (A in the figure below)</td> </tr> <tr> <td>1, 49</td> <td>Bottom to Top</td> <td>Lower Left (B in the figure below)</td> </tr> <tr> <td>2, 50</td> <td>Right to Left</td> <td>Lower Right (C in the figure below)</td> </tr> <tr> <td>3, 51</td> <td>Top to Bottom</td> <td>Upper Right (D in the figure below)</td> </tr> </tbody> </table>	n	Print Direction	Starting Point	0, 48	Left to Right	Upper Left (A in the figure below)	1, 49	Bottom to Top	Lower Left (B in the figure below)	2, 50	Right to Left	Lower Right (C in the figure below)	3, 51	Top to Bottom	Upper Right (D in the figure below)
n	Print Direction	Starting Point														
0, 48	Left to Right	Upper Left (A in the figure below)														
1, 49	Bottom to Top	Lower Left (B in the figure below)														
2, 50	Right to Left	Lower Right (C in the figure below)														
3, 51	Top to Bottom	Upper Right (D in the figure below)														

ESC V n

[Name]	Turn 90 degree clockwise rotation mode on/off						
[Format]	ASCII ESC V n Hex. 1B 56 n Decimal 27 86 n						
[Range]	0 ≤ n ≤ 1, 48 ≤ n ≤ 49 Initial Value n = 0						
[Description]	<p>Specifies or cancels character 90 degree clockwise rotation.</p> <table border="1"> <thead> <tr> <th>n</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0, 48</td> <td>Turns off 90 degree <input type="checkbox"/> clockwise rotation mode</td> </tr> <tr> <td>1, 49</td> <td>Turns on 90 degree <input type="checkbox"/> clockwise rotation mode</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Underlines are not applied to characters rotated 90 degrees clockwise even when ESC !, ESC - or FS - commands are given. • If 90 degree clockwise rotation is specified, double-wide and double-tall commands in the 90 rotation mode enlarges characters in the opposite directions to double-wide and double-tall commands. • This command only affects printing in standard mode. • In page mode, this command is only effective for the setting. • This command is effective for ANK and Chinese characters. 	n	Function	0, 48	Turns off 90 degree <input type="checkbox"/> clockwise rotation mode	1, 49	Turns on 90 degree <input type="checkbox"/> clockwise rotation mode
n	Function						
0, 48	Turns off 90 degree <input type="checkbox"/> clockwise rotation mode						
1, 49	Turns on 90 degree <input type="checkbox"/> clockwise rotation mode						

ESC W xL xH yL yH dxL dxH dyL dyH

[Name]	Set printing area in page mode
[Format]	ASCII ESC W xL xH yL yH dxL dxH dyL dyH Hex. 1B 57 xL xH yL yH dxL dxH dyL dyH Decimal 27 87 xL xH yL yH dxL dxH dyL dyH
[Range]	0 ≤ xL, xH, yL, yH, dxL, dxH, dyL, dyH ≤ 255 However, this excludes dxL = dxH = 0 or dyL = dyH = 0 Initial Value xL = xH = yL = yH = 0
[Description]	<p>Sets the print region position and size.</p> <ul style="list-style-type: none"> ● Horizontal direction starting point [(xL + xH x 256) x basic calculated pitch] ● Vertical direction starting point [(yL + yH x 256) x basic calculated pitch] ● Horizontal direction length [(dxL + dxH x 256) basic calculated pitch] ● Vertical direction length = [(dyL + dyH x 256) basic calculated pitch] ● (X+Dx-1)<576 (3 inch, basic calculated pitch=1);(X+Dx-1)<432 (2 inch, basic calculated pitch=1) ● (Y+Dy-1)<768 (basic calculated pitch=1); ● If (horizontal starting position + printing area width) exceeds the printable area, the printing area width is automatically set to (horizontal printable area - horizontal starting position). ● If (vertical starting position + printing area height) exceeds the printable area, the printing area height is automatically set to (vertical printable area - vertical starting position). <div data-bbox="449 894 997 1223" style="text-align: center;"> </div>

ESC \ nL nH

[Name]	Set relative print position.
[Format]	ASCII ESC \ nL nH Hex. 1B 5C nL nH Decimal 27 92 nL nH
[Range]	$0 \leq (nL + nH \times 256) \leq 65535$ ($0 \leq nL \leq 255, 0 \leq nH \leq 255$)
[Description]	Specifies the next print starting position with a relative position based on the current position. This sets the position from the current position to [(nL + nH x 256) x basic calculated pitch] for the next print starting position. <ul style="list-style-type: none"> ● Specifications exceeding the print range are ignored..

ESC a n

[Name]	Select justification.								
[Format]	ASCII ESC a n Hex. 1B 61 n Decimal 27 97 n								
[Range]	$0 \leq n \leq 2$ Initial Value n = 0								
[Description]	This command specifies position alignment for all data in one line in standard mode, using n as follows: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>n</th> <th>Alignment</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Left alignment</td> </tr> <tr> <td>1</td> <td>Center alignment</td> </tr> <tr> <td>2</td> <td>Right alignment</td> </tr> </tbody> </table> <p>This command has no effect in page mode.</p>	n	Alignment	0	Left alignment	1	Center alignment	2	Right alignment
n	Alignment								
0	Left alignment								
1	Center alignment								
2	Right alignment								

ESC c 3 n

[Name]	Select paper sensor(s) to output paper-end signals.			
[Format]	ASCII	ESC	c	3 n
	Hex.	1B	63	33 n
	Decimal	27	99	51 n
[Range]	Specification: $0 \leq n \leq 3$ Initial Value n = 0			
[Description]	Selects paper out detector that outputs a paper out signal when paper has run out.			
	Bit	Function	"0"	"1"
	7	Undefined		
	6	Undefined		
	5	Undefined		
	4	Undefined		
	3	Undefined		
	2	Undefined		
	1	Paper roll near end detector	Invalid	Valid
	0	Paper roll near end detector	Invalid	Valid

ESC c 4 n

[Name]	Select paper sensor(s) to stop printing.			
[Format]	ASCII	ESC	c	4 n
	Hex.	1B	63	34 n
	Decimal	27	99	52 n
[Range]	Specification: $0 \leq n \leq 3$ Initial Value n = 0			
[Description]	Selects the paper out detector to stop printing when paper has run out.			
	Bit	Function	"0"	"1"
	7	Undefined		
	6	Undefined		
	5	Undefined		
	4	Undefined		
	3	Undefined		
	2	Undefined		
	1	Paper roll near end detector	Invalid	Valid
	0	Paper roll near end detector	Invalid	Valid

ESC c 5 n

[Name]	Enable/disable panel buttons
[Format]	ASCII ESC c 5 n Hex. 1B 63 35 n Decimal 27 99 53 n
[Range]	Specification: $0 \leq n \leq 255$ Initial Value n = 0
[Description]	Toggles the panel switches between enabled and disabled. <ul style="list-style-type: none"> • Enables panel switches when n = <*****0>B. • Disables panel switches when n = <*****1>B. • n is effective only when it is the lowest bit. • When disabled, all panel switches are disabled.

ESC d n

[Name]	Print and feed n lines
[Format]	ASCII ESC d n Hex. 1B 64 n Decimal 27 100 n
[Range]	$0 \leq n \leq 255$
[Description]	Prints the data in the print buffer and performs a paper feed of n lines. <ul style="list-style-type: none"> • Sets the print position to the beginning of the next line after printing. • Paper is fed approximately 150 mm if the [n x basic calculated pitch] exceeds approximately 150 mm (5.9 inches).

ESC i

[Name]	Full cut.
[Format]	ASCII ESC i Hex. 1B 69 Decimal 27 105
[Range]	N/A
[Description]	This command executes a full cut of the paper in standard mode

ESC m

[Name]	Partial cut.
[Format]	ASCII ESC m Hex. 1B 6D Decimal 27 109
[Range]	N/A
[Description]	This command executes a partial cut of the paper with one point uncut in standard mode.

ESC p m t1 t2

[Name]	General pulse.						
[Format]	ASCII ESC p m t1 t2 Hex. 1B 70 m t1 t2 Decimal 27 112 m t1 t2						
[Range]	$0 \leq m \leq 1, 48 \leq m \leq 49$ $0 \leq t1 \leq 255$ $0 \leq t2 \leq 255$						
[Description]	<p>This outputs a signal specified by t1 and t2 to the connector pin specified by m. Drawer kick on time is set to t1 x 2 ms; off time is set to t2 x 2 ms.</p> <table border="1"> <thead> <tr> <th>m</th> <th>Connector Pin</th> </tr> </thead> <tbody> <tr> <td>0, 48</td> <td>Drawer kick connector pin #2</td> </tr> <tr> <td>1, 49</td> <td>Drawer kick connector pin #5</td> </tr> </tbody> </table> <p>The diagram shows a horizontal line representing a signal. A pulse starts at a point, rises to a high level, and remains high for a duration labeled 't1'. After the pulse ends, there is a delay period labeled 't2' before the signal returns to the low level.</p>	m	Connector Pin	0, 48	Drawer kick connector pin #2	1, 49	Drawer kick connector pin #5
m	Connector Pin						
0, 48	Drawer kick connector pin #2						
1, 49	Drawer kick connector pin #5						

ESC t n

[Name]	Select character code table.																				
[Format]	ASCII ESC t n Hex. 1B 74 n Decimal 27 116 n																				
[Range]	$0 \leq n \leq 8$ Initial Value n = 0																				
[Description]	<p>Select page n of the character code table.</p> <table border="1"> <thead> <tr> <th>n</th> <th>Character set</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>CP-437</td> </tr> <tr> <td>1</td> <td>Katakana</td> </tr> <tr> <td>2</td> <td>CP-850</td> </tr> <tr> <td>3</td> <td>CP-852</td> </tr> <tr> <td>4</td> <td>CP-860</td> </tr> <tr> <td>5</td> <td>CP-863</td> </tr> <tr> <td>6</td> <td>CP-865</td> </tr> <tr> <td>7</td> <td>CP-1252</td> </tr> <tr> <td>8</td> <td>User Define</td> </tr> </tbody> </table>	n	Character set	0	CP-437	1	Katakana	2	CP-850	3	CP-852	4	CP-860	5	CP-863	6	CP-865	7	CP-1252	8	User Define
n	Character set																				
0	CP-437																				
1	Katakana																				
2	CP-850																				
3	CP-852																				
4	CP-860																				
5	CP-863																				
6	CP-865																				
7	CP-1252																				
8	User Define																				

ESC { n

[Name]	Turns upside-down printing mode on/off.									
[Format]	ASCII	ESC	{	n						
	Hex.	1B	7B	n						
	Decimal	27	123	n						
[Range]	0 ≤ n ≤ 255 Initial Value n = 0									
[Description]	<p>Specifies or cancels upside-down printing.</p> <ul style="list-style-type: none"> ● Cancels upside-down printing when n = <*****0>H. ● Specifies upside-down printing when n = <*****1>H. ● n is effective only when it is the lowest bit. ● This command is effective only when input at the top of the line when standard mode is being used. ● This command has no effect in page mode. In page mode, this command is only effective for the setting. ● Upside-down printing rotates line data 180 degrees. <table border="1" data-bbox="478 638 933 741"> <thead> <tr> <th>n</th> <th>Upside-down mode</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Turned off</td> </tr> <tr> <td>1</td> <td>Turned on</td> </tr> </tbody> </table>				n	Upside-down mode	0	Turned off	1	Turned on
n	Upside-down mode									
0	Turned off									
1	Turned on									

FS p n m

[Name]	Print NV bit image.													
[Format]	ASCII	FS	p	n m										
	Hex.	1C	70	n m										
	Decimal	28	112	n m										
[Range]	1 ≤ n ≤ 255 0 ≤ m ≤ 3, 48 ≤ m ≤ 51													
[Description]	<p>Prints NV bit image n using mode m.</p> <table border="1" data-bbox="478 1043 933 1211"> <thead> <tr> <th>m</th> <th>Mode</th> </tr> </thead> <tbody> <tr> <td>0, 48</td> <td>Normal</td> </tr> <tr> <td>1, 49</td> <td>Double-width</td> </tr> <tr> <td>2, 50</td> <td>Double-height</td> </tr> <tr> <td>3, 51</td> <td>Quadruple</td> </tr> </tbody> </table> <ul style="list-style-type: none"> ● n specifies the NV bit image number. ● m specifies the bit-image mode. ● NV bit image is a bit image defined in non-volatile memory by FS q and printed by this command. ● This command is ignored when the specified NV bit image n is undefined. 				m	Mode	0, 48	Normal	1, 49	Double-width	2, 50	Double-height	3, 51	Quadruple
m	Mode													
0, 48	Normal													
1, 49	Double-width													
2, 50	Double-height													
3, 51	Quadruple													

FS q n [xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n

[Name]	Define NV bit image.
[Format]	ASCII FS q n [xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n Hex. 1C 71 n [xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n Decimal 28 113 n [xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n
[Range]	$1 \leq n \leq 255$ $1 \leq (xL + xH \times 256) \leq 54$ ($0 \leq xL \leq 54, xH=0$) for 2 inch $1 \leq (xL + xH \times 256) \leq 72$ ($0 \leq xL \leq 72, xH=0$) for 3 inch $1 \leq (yL + yH \times 256) \leq 96$ ($0 \leq yL \leq 96, yH=0$) $0 \leq d \leq 255$ $k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$
[Description]	<p>Defines the specified NV bit image.</p> <ul style="list-style-type: none"> • n specifies the number of NV bit images to define. • xL and xH specify the horizontal direction for one NV bit image $(xL + xH \times 256) \times 8$ dots. • yL and yH specify the vertical direction for one NV bit image $(yL + yH \times 256) \times 8$ dots. <p>For xL = 64, xH = 0, yL = 96, yH = 0 $(xL+xH \times 256) \times 8 \text{ dot} = 512 \text{ dots}$</p> <p>$(yL+yH \times 256) \times 8 \text{ dot} = 768 \text{ dots}$</p>

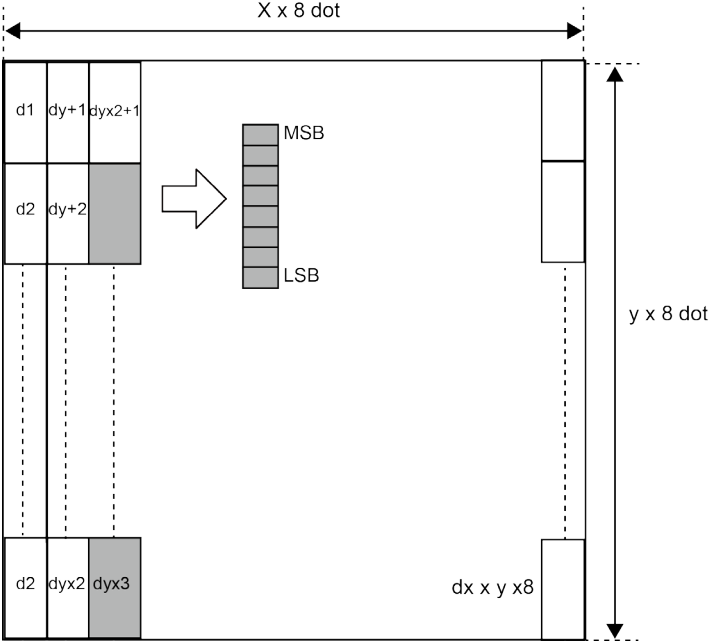
GS ! n

[Name]	Select character size.																																																																					
[Format]	<table> <tr> <td>ASCII</td> <td>GS</td> <td>!</td> <td>n</td> </tr> <tr> <td>Hex.</td> <td>1D</td> <td>21</td> <td>n</td> </tr> <tr> <td>Decimal</td> <td>29</td> <td>33</td> <td>n</td> </tr> </table>	ASCII	GS	!	n	Hex.	1D	21	n	Decimal	29	33	n																																																									
ASCII	GS	!	n																																																																			
Hex.	1D	21	n																																																																			
Decimal	29	33	n																																																																			
[Range]	<p>$0 \leq n \leq 255$ $(1 \leq \text{Vertical enlargement} \leq 8, 1 \leq \text{Horizontal enlargement} \leq 8)$ Initial Value $n = 0$</p>																																																																					
[Description]	<p>This command selects the character height and width using bits 0 to 3, and bits 4 to 7 respectively as follows:</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>Function</th> <th>Setting</th> </tr> </thead> <tbody> <tr> <td>0</td> <td rowspan="4">Specifies the number of times normal font size in the vertical direction</td> <td rowspan="4">Refer to Table 2 [Enlarged in vertical direction]</td> </tr> <tr> <td>1</td> </tr> <tr> <td>2</td> </tr> <tr> <td>3</td> </tr> <tr> <td>4</td> <td rowspan="4">Specifies the number of times normal font size in the horizontal direction</td> <td rowspan="4">Refer to Table 1 [Enlarged in horizontal direction]</td> </tr> <tr> <td>5</td> </tr> <tr> <td>6</td> </tr> <tr> <td>7</td> </tr> </tbody> </table> <p>Table 1 [Enlarged in horizontal direction]</p> <table border="1"> <thead> <tr> <th>Hex</th> <th>Decimal</th> <th>Enlargement</th> </tr> </thead> <tbody> <tr> <td>00</td> <td>0</td> <td>1 time(standard)</td> </tr> <tr> <td>10</td> <td>16</td> <td>2 times</td> </tr> <tr> <td>20</td> <td>32</td> <td>3 times</td> </tr> <tr> <td>30</td> <td>48</td> <td>4 times</td> </tr> <tr> <td>40</td> <td>64</td> <td>5 times</td> </tr> <tr> <td>50</td> <td>80</td> <td>6 times</td> </tr> <tr> <td>60</td> <td>96</td> <td>7 times</td> </tr> <tr> <td>70</td> <td>112</td> <td>8 times</td> </tr> </tbody> </table> <p>Table 2 [Enlarged in vertical direction]</p> <table border="1"> <thead> <tr> <th>Hex</th> <th>Decimal</th> <th>Enlargement</th> </tr> </thead> <tbody> <tr> <td>00</td> <td>0</td> <td>1 time(standard)</td> </tr> <tr> <td>01</td> <td>1</td> <td>2 times</td> </tr> <tr> <td>02</td> <td>2</td> <td>3 times</td> </tr> <tr> <td>03</td> <td>3</td> <td>4 times</td> </tr> <tr> <td>04</td> <td>4</td> <td>5 times</td> </tr> <tr> <td>05</td> <td>5</td> <td>6 times</td> </tr> <tr> <td>06</td> <td>6</td> <td>7 times</td> </tr> <tr> <td>07</td> <td>7</td> <td>8 times</td> </tr> </tbody> </table>	Bit	Function	Setting	0	Specifies the number of times normal font size in the vertical direction	Refer to Table 2 [Enlarged in vertical direction]	1	2	3	4	Specifies the number of times normal font size in the horizontal direction	Refer to Table 1 [Enlarged in horizontal direction]	5	6	7	Hex	Decimal	Enlargement	00	0	1 time(standard)	10	16	2 times	20	32	3 times	30	48	4 times	40	64	5 times	50	80	6 times	60	96	7 times	70	112	8 times	Hex	Decimal	Enlargement	00	0	1 time(standard)	01	1	2 times	02	2	3 times	03	3	4 times	04	4	5 times	05	5	6 times	06	6	7 times	07	7	8 times
Bit	Function	Setting																																																																				
0	Specifies the number of times normal font size in the vertical direction	Refer to Table 2 [Enlarged in vertical direction]																																																																				
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00	0	1 time(standard)																																																																				
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40	64	5 times																																																																				
50	80	6 times																																																																				
60	96	7 times																																																																				
70	112	8 times																																																																				
Hex	Decimal	Enlargement																																																																				
00	0	1 time(standard)																																																																				
01	1	2 times																																																																				
02	2	3 times																																																																				
03	3	4 times																																																																				
04	4	5 times																																																																				
05	5	6 times																																																																				
06	6	7 times																																																																				
07	7	8 times																																																																				

GS \$ nL nH

[Name]	Set absolute vertical print position in page mode
[Format]	ASCII GS \$ nL nH Hex. 1D 24 nL nH Decimal 29 36 nL nH
[Range]	$0 \leq nL \leq 255, 0 \leq nH \leq 255,$
[Description]	<p>Specifies the character vertical direction position for the data expansion starting position using the absolute position based on the starting point in page mode. The position of the character vertical direction for the next data expansion starting position is the position specified by $[(nL + nH \times 256) \times \text{basic calculated pitch}]$ from the starting point.</p> <ul style="list-style-type: none"> ● When not in page mode, this command is ignored. ● Specifications for absolute positions that exceed the specified print range are ignored.

GS * X Y [d1...d(X x Y x 8)]

[Name]	Define download bit images.
[Format]	ASCII GS * X Y [d1...d(X x Y x 8)] Hex. 1D 2A X Y [d1...d(X x Y x 8)] Decimal 29 42 X Y [d1...d(X x Y x 8)]
[Range]	$1 \leq X \leq 54$ (for 2 inch) $1 \leq X \leq 72$ (for 3 inch) $1 \leq Y \leq 96$ $0 \leq d \leq 255$
[Description]	<p>Defines the download bit image of the number of dots specified by X and Y.</p> <ul style="list-style-type: none"> • X specifies the number of bytes in the horizontal direction. • Y specifies the number of bytes in the vertical direction. • Horizontal direction dot count is X x 8 dots; Vertical direction dot count is Y x 8 dots • d indicates the bit-image data. Bits that correspond to the dots to print are 1, and the bits that correspond to the dots that are not printed are 0. 

GS (A pL pH n m

[Name]	Execute test print.														
[Format]	ASCII GS (A pL pH n m Hex. 1D 28 41 pL pH n m Decimal 29 40 65 pL pH n m														
[Range]	{pL+ (pH×256) } = 2 (pL = 2,pH = 0) 0 ≤ n ≤ 2 , 48 ≤ n ≤ 50 2 ≤ m ≤ 3 , 50 ≤ m ≤ 51														
[Description]	<p>Executes the specified test print. The following command is ignored in page mode.</p> <p>Specifies the parameter count following pL and pH in (pL + (pH x 256)) bytes. n specifies the paper to be tested.</p> <table border="1"> <tr> <td>n</td> <td>Paper Type</td> </tr> <tr> <td>0 , 48</td> <td>Basic sheet (paper roll)</td> </tr> <tr> <td>1 , 49</td> <td>Paper Roll</td> </tr> <tr> <td>2 , 50</td> <td></td> </tr> </table> <p>m specifies a test pattern..</p> <table border="1"> <tr> <td>m</td> <td>Type of Test Print</td> </tr> <tr> <td>2 , 50</td> <td>Printer Status (Self Print)</td> </tr> <tr> <td>3 , 51</td> <td>Rolling Pattern Print</td> </tr> </table>	n	Paper Type	0 , 48	Basic sheet (paper roll)	1 , 49	Paper Roll	2 , 50		m	Type of Test Print	2 , 50	Printer Status (Self Print)	3 , 51	Rolling Pattern Print
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0 , 48	Basic sheet (paper roll)														
1 , 49	Paper Roll														
2 , 50															
m	Type of Test Print														
2 , 50	Printer Status (Self Print)														
3 , 51	Rolling Pattern Print														

GS (K pL pH n m

[Name]	Set print density.																												
[Format]	ASCII GS (A pL pH n m Hex. 1D 28 4B pL pH n m Decimal 29 40 75 pL pH n m																												
[Range]	{pL+ (pH×256) } = 2 (pL = 2,pH = 0) n = 49 250 ≤ m ≤ 255, 0 ≤ m ≤ 6 Initial Value m = 0																												
[Description]	Sets print density <table border="1"> <thead> <tr> <th>m</th> <th>Print Density</th> </tr> </thead> <tbody> <tr><td>250</td><td>0.7</td></tr> <tr><td>251</td><td>0.7</td></tr> <tr><td>252</td><td>0.8</td></tr> <tr><td>253</td><td>0.8</td></tr> <tr><td>254</td><td>0.9</td></tr> <tr><td>255</td><td>0.9</td></tr> <tr><td>0</td><td>1.0</td></tr> <tr><td>1</td><td>1.1</td></tr> <tr><td>2</td><td>1.1</td></tr> <tr><td>3</td><td>1.2</td></tr> <tr><td>4</td><td>1.2</td></tr> <tr><td>5</td><td>1.3</td></tr> <tr><td>6</td><td>1.3</td></tr> </tbody> </table>	m	Print Density	250	0.7	251	0.7	252	0.8	253	0.8	254	0.9	255	0.9	0	1.0	1	1.1	2	1.1	3	1.2	4	1.2	5	1.3	6	1.3
m	Print Density																												
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4	1.2																												
5	1.3																												
6	1.3																												

GS / m

[Name]	Print downloaded bit image.
[Format]	ASCII GS / m Hex. 1D 2F m Decimal 29 47 m
[Range]	0 ≤ m ≤ 3, 48 ≤ m ≤ 51

[Description]	This command prints the downloaded bit image defined by GS * according to the mode denoted by m.			
	m	Mode	Vertical dot density(DPI)	Horizontal dot density(DPI)
	0 , 48	Normal	203	203
	1 , 49	Double-width	203	101
	2 , 50	Double-height	101	203
3 , 51	Quadruple	101	101	

GS B n

[Name]	Turn white/black reverse printing mode on/off
[Format]	ASCII GS B n Hex. 1D 42 n Decimal 29 66 n
[Range]	0 ≤ n ≤ 255 Initial Value n = 0
[Description]	<p>Specifies or cancels black and white inverted printing.</p> <ul style="list-style-type: none"> ● Cancels black and white inverted printing when n = <*****0>B. ● Specifies black and white inverted printing when n = <*****1>B. ● n is effective only when it is the lowest bit. ● Internal characters and download characters are targeted for black and white inverted printing. ● This command is effective for ANK and Chinese characters.

GS H n

[Name]	Select printing position of HRI characters.										
[Format]	ASCII GS H n Hex. 1D 48 n Decimal 29 72 n										
[Range]	0 ≤ n ≤ 3, 48 ≤ n ≤ 51 Initial Value n = 0										
[Description]	<p>Selects the printing position of HRI characters when printing bar codes.</p> <table border="1"> <tr> <th>m</th> <th>Printing Position</th> </tr> <tr> <td>0, 48</td> <td>No print</td> </tr> <tr> <td>1, 49</td> <td>Above bar code</td> </tr> <tr> <td>2, 50</td> <td>Below bar code</td> </tr> <tr> <td>3, 51</td> <td>Above and below bar code(both)</td> </tr> </table>	m	Printing Position	0, 48	No print	1, 49	Above bar code	2, 50	Below bar code	3, 51	Above and below bar code(both)
m	Printing Position										
0, 48	No print										
1, 49	Above bar code										
2, 50	Below bar code										
3, 51	Above and below bar code(both)										

GS I n

[Name]	Transmit printer ID.																												
[Format]	ASCII	GS I n																											
	Hex.	1D 49 n																											
	Decimal	29 73 n																											
[Range]	$1 \leq n \leq 3, 49 \leq n \leq 51, 65 \leq n \leq 69$																												
[Description]	Transmits the printer ID specified by <i>n</i> as follows: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>n</th> <th>Printer ID Type</th> <th>Specifications</th> </tr> </thead> <tbody> <tr> <td>1, 49</td> <td>Model ID</td> <td>MB-1030 or MP-1060</td> </tr> <tr> <td>2, 50</td> <td>Type ID</td> <td>1030-XX or 1060-XX</td> </tr> <tr> <td>3, 51</td> <td>ROM Version ID</td> <td>Depends on the ROM version</td> </tr> <tr> <td>65</td> <td>Firmware Version</td> <td>Depends on the firmware version</td> </tr> <tr> <td>66</td> <td>Manufacturer Name</td> <td>MB-1030 System or MP-1060 System</td> </tr> <tr> <td>67</td> <td>Model Name</td> <td>MB-1030 or MP-1060</td> </tr> <tr> <td>68</td> <td>Serial Number</td> <td>Depends on the serial number</td> </tr> <tr> <td>69</td> <td>Chinese Character Types</td> <td> Taiwan Language Characters: TW_BIG5 Japanese Language Characters: JP_SJIS Chinese Language Characters: CN_GB2312 Korean Language Characters: KO_EUC-KR </td> </tr> </tbody> </table>		n	Printer ID Type	Specifications	1, 49	Model ID	MB-1030 or MP-1060	2, 50	Type ID	1030-XX or 1060-XX	3, 51	ROM Version ID	Depends on the ROM version	65	Firmware Version	Depends on the firmware version	66	Manufacturer Name	MB-1030 System or MP-1060 System	67	Model Name	MB-1030 or MP-1060	68	Serial Number	Depends on the serial number	69	Chinese Character Types	Taiwan Language Characters: TW_BIG5 Japanese Language Characters: JP_SJIS Chinese Language Characters: CN_GB2312 Korean Language Characters: KO_EUC-KR
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GS L nL nH

[Name]	Set left margin.
[Format]	ASCII GS L nL nH
	Hex. 1D 4C nL nH
	Decimal 29 76 nL nH
[Range]	$0 \leq nL \leq 255, 0 \leq nH \leq 255$ Initial Value (nL + nH x 256)=0 (nL=0, nH=0)
[Description]	nL and nH set the specified left margin. The left margin is [(nL + nH x 256) x basic calculated pitch]. <div style="text-align: center;"> </div>

GS P x y

[Name]	Set basic calculated pitch.
[Format]	ASCII GS P x y Hex. 1D 50 x y Decimal 29 80 x y
[Range]	0 ≤ x ≤ 255 0 ≤ y ≤ 255 Initial Value x = 203, y = 203: EPSON targeted model print head 203 DPI
[Description]	Sets the horizontal basic calculated pitch to approximately 25.4/xmm [(1/x) inch], and the vertical basic calculated pitch to approximately 25.4/y (1/y) inch. x = 0: Returns the horizontal basic calculated pitch to its default value. y = 0: Returns the vertical basic calculated pitch to its default value.

GS V m

[Name]	Cut paper.										
[Format]	ASCII GS V m (n) Hex. 1D 56 m (n) Decimal 29 86 m (n)										
[Range]	m = 0,1,48,49,65,66 0 ≤ n ≤ 255										
[Description]	Executes specified paper cut. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>m</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0 , 48</td> <td>Full cut</td> </tr> <tr> <td>1 , 49</td> <td>Partial cut (one point uncut)</td> </tr> <tr> <td>65</td> <td>Feeds paper to (cutting position + [n x basic calculated pitch]) and performs a full cut</td> </tr> <tr> <td>66</td> <td>Feeds paper to (cutting position + [n x basic calculated pitch]) and performs a partial cut (one point uncut)</td> </tr> </tbody> </table>	m	Function	0 , 48	Full cut	1 , 49	Partial cut (one point uncut)	65	Feeds paper to (cutting position + [n x basic calculated pitch]) and performs a full cut	66	Feeds paper to (cutting position + [n x basic calculated pitch]) and performs a partial cut (one point uncut)
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66	Feeds paper to (cutting position + [n x basic calculated pitch]) and performs a partial cut (one point uncut)										

GS W nL nH

[Name]	Set printing area width.
[Format]	ASCII GS W nL nH Hex. 1D 57 nL nH Decimal 29 87 nL nH
[Range]	$0 \leq nL \leq 255, 0 \leq nH \leq 255$
[Description]	<ul style="list-style-type: none"> • Sets the print region width specified by nL and nH. • Print region width is $[(nL + nH \times 256) \times \text{basic calculated pitch}]$. • $[(nL + nH \times 256) \times \text{basic calculated pitch}] \geq 24$. <p>The diagram illustrates the print region width. It shows a horizontal line with a double-headed arrow labeled 'Print Region Width' spanning the entire width. Below this, a smaller double-headed arrow labeled 'Printable region' is shown, starting from a vertical dashed line labeled 'Left margin' and ending at another vertical dashed line. A shaded rectangular area is positioned within the 'Printable region'.</p>

GS \ nL nH

[Name]	Set relative vertical print position in page mode.
[Format]	ASCII GS \ nL nH Hex. 1D 5C nL nH Decimal 29 92 nL nH
[Range]	$0 \leq nL \leq 255$ $0 \leq nH \leq 255$
[Description]	<p>Specifies the character vertical direction position for the data expansion starting position using the relative position based on the current point in page mode. This sets the position moved from the current position to $[(nL + nH \times 256) \times \text{basic calculated pitch}]$ for the next data expanding starting position.</p> <ul style="list-style-type: none"> • When not in page mode, this command is ignored.

GS a n

[Name]	Enable/disable Automatic Status Back (ASB).				
[Format]	ASCII	GS	a	n	
	Hex.	1D	61	n	
	Decimal	29	97	n	
[Range]	0 ≤ n ≤ 255 Initial Value n = 0				
[Description]	Selects the statuses that are targeted for transmission with the automatic status function (ASB: Automatic Status Back).				
	Bits	Statuses Targeted for ASB	“0”	“1”	
	7	Undefined	---	---	
	6	Undefined	---	---	
	5	Undefined	---	---	
	4	Undefined	---	---	
	3	Continuous Paper Detector	Invalid	Valid	
	2	Error	Invalid	Valid	
	1	ONLINE/OFFLINE Status	Invalid	Valid	
	0	Drawer kick connector pin #3	Invalid	Valid	
	The printer information transmitted is comprised of 4 bytes as follows: First byte(printer information)				
	Bit	Off/On	Hex	Decimal	Function
	7	Off	00	0	Not used. Fixed to Off
	6	Off	00	0	Paper is not being fed by the paper feed button
		On	40	64	Paper is being fed by the paper feed button
5	Off	00	0	Cover is close	
	On	20	32	Cover is open	
4	On	10	16	Not used. Fixed to On	
3	Off	00	0	On-line	
	On	08	8	Off-line	
2	Off	00	0	Drawer kick-out connector pin 3 is LOW	
	On	04	4	Drawer kick-out connector pin 3 is HIGH	
1	Off	00	0	Not used. Fixed to Off	
0	Off	00	0	Not used. Fixed to Off	

Second byte (printer information)

Bit	Off/On	Hex	Decimal	Function
7	Off	00	0	Not used. Fixed to Off
6	Off	00	0	Not used. Fixed to Off
5	Off	00	0	Not used. Fixed to Off
4	Off	00	0	Not used. Fixed to Off
3	On	08	8	Not used. Fixed to Off
2	On	04	4	Not used. Fixed to Off
1	On	02	2	Not used. Fixed to Off
0	On	01	1	Not used. Fixed to Off

Third byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Function
7	Off	00	0	Not used. Fixed to Off
6	Off	00	0	Not used. Fixed to Off
5	Off	00	0	Not used. Fixed to Off
4	On	00	0	Not used. Fixed to Off
2,3	Off	00	0	Paper end sensor: paper present
	On	0C	12	Paper end sensor: no paper present
0,1	Off	00	0	Paper near end sensor: paper adequate
	On	03	3	Paper near end sensor: paper near end

Fourth byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Function
7	Off	00	0	Not used. Fixed to Off
6	Off	00	0	Black mark sensor status
5	Off	00	0	Not used. Fixed to Off
4	Off	00	0	Not used. Fixed to Off
3	On	08	8	Not used. Fixed to On
2	On	04	4	Not used. Fixed to On
1	On	02	2	Not used. Fixed to On
0	On	01	1	Not used. Fixed to On

GS f n

[Name]	Select font for HRI characters.	
[Format]	ASCII GS f n Hex. 1D 66 n Decimal 29 102 n	
[Range]	n = 0,1,48,49 Initial Value n = 0	
[Description]	Selects the HRI character font when printing bar codes.	
	n	Font
	0, 48	Selects Font A (12 x 24).
	1, 49	Selects Font B (9 x 17).

GS h n

[Name]	Set bar code height.	
[Format]	ASCII GS h n Hex. 1D 68 n Decimal 29 104 n	
[Range]	1 ≤ n ≤ 255 Initial Value n = 162	
[Description]	Sets bar code height to n dots.	

GS k m d1 ... dk NUL.

GS k m n d1 ... dk

[Name]	Print bar code.																																																																								
[Format]	<p>1. ASCII GS k m d1...dk NUL Hex. 1D 6B m d1...dk NUL Decimal 29 107 m d1...dk NUL</p> <p>2. ASCII GS k m n d1... dk Hex. 1D 6B m n d1... dk Decimal 29 107 m n d1... dk</p>																																																																								
[Range]	<p>1. $0 \leq m \leq 6$ The definition region of k and d differ according to the bar code type.</p> <p>2. $65 \leq m \leq 73$ The definition region of n and d differ according to the bar code type.</p>																																																																								
[Description]	<p>Selects the bar code type and prints bar codes.</p> <p>1:</p> <table border="1"> <thead> <tr> <th>m</th> <th>Bar Code Type</th> <th>Defined region of k</th> <th>Defined region of d</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>UPC-A</td> <td>$11 \leq k \leq 12$</td> <td>$48 \leq d \leq 57$</td> </tr> <tr> <td>1</td> <td>UPC-E</td> <td>$11 \leq k \leq 12$</td> <td>$48 \leq d \leq 57$</td> </tr> <tr> <td>2</td> <td>JAN13 (EAN13)</td> <td>$12 \leq k \leq 13$</td> <td>$48 \leq d \leq 57$</td> </tr> <tr> <td>3</td> <td>JAN8 (EAN8)</td> <td>$7 \leq k \leq 8$</td> <td>$48 \leq d \leq 57$</td> </tr> <tr> <td>4</td> <td>CODE39</td> <td>$1 \leq k \leq 255$</td> <td>$48 \leq d \leq 57, 65 \leq d \leq 90, 32, 36, 37, 43, 45, 46, 47$</td> </tr> <tr> <td>5</td> <td>ITF</td> <td>$2 \leq k \leq 254$ (However, This is an even number.)</td> <td>$48 \leq d \leq 57$</td> </tr> <tr> <td>6</td> <td>CODABAR</td> <td>$1 \leq k \leq 255$</td> <td>$48 \leq d \leq 57, 65 \leq d \leq 68, 36, 43, 45, 46, 47, 58$</td> </tr> </tbody> </table> <p>2:</p> <table border="1"> <thead> <tr> <th>m</th> <th>Bar Code Type</th> <th>Defined region of n</th> <th>Defined region of d</th> </tr> </thead> <tbody> <tr> <td>65</td> <td>UPC-A</td> <td>$11 \leq n \leq 12$</td> <td>$48 \leq d \leq 57$</td> </tr> <tr> <td>66</td> <td>UPC-E</td> <td>$11 \leq n \leq 12$</td> <td>$48 \leq d \leq 57$</td> </tr> <tr> <td>67</td> <td>JAN13 (EAN13)</td> <td>$12 \leq n \leq 13$</td> <td>$48 \leq d \leq 57$</td> </tr> <tr> <td>68</td> <td>JAN8 (EAN8)</td> <td>$7 \leq n \leq 8$</td> <td>$48 \leq d \leq 57$</td> </tr> <tr> <td>69</td> <td>CODE39</td> <td>$1 \leq n \leq 255$</td> <td>$48 \leq d \leq 57, 65 \leq d \leq 90, 32, 36, 37, 43, 45, 46, 47$</td> </tr> <tr> <td>70</td> <td>ITF</td> <td>$2 \leq n \leq 254$ (However, this is an even number.)</td> <td>$48 \leq d \leq 57$</td> </tr> <tr> <td>71</td> <td>CODABAR</td> <td>$1 \leq n \leq 255$</td> <td>$48 \leq d \leq 57, 65 \leq d \leq 68, 36, 43, 45, 46, 47, 58$</td> </tr> <tr> <td>72</td> <td>CODE93</td> <td>$1 \leq n \leq 255$</td> <td>$0 \leq d \leq 127$</td> </tr> <tr> <td>73</td> <td>CODE128</td> <td>$2 \leq n \leq 255$</td> <td>$0 \leq d \leq 127$</td> </tr> </tbody> </table>	m	Bar Code Type	Defined region of k	Defined region of d	0	UPC-A	$11 \leq k \leq 12$	$48 \leq d \leq 57$	1	UPC-E	$11 \leq k \leq 12$	$48 \leq d \leq 57$	2	JAN13 (EAN13)	$12 \leq k \leq 13$	$48 \leq d \leq 57$	3	JAN8 (EAN8)	$7 \leq k \leq 8$	$48 \leq d \leq 57$	4	CODE39	$1 \leq k \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 90, 32, 36, 37, 43, 45, 46, 47$	5	ITF	$2 \leq k \leq 254$ (However, This is an even number.)	$48 \leq d \leq 57$	6	CODABAR	$1 \leq k \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 68, 36, 43, 45, 46, 47, 58$	m	Bar Code Type	Defined region of n	Defined region of d	65	UPC-A	$11 \leq n \leq 12$	$48 \leq d \leq 57$	66	UPC-E	$11 \leq n \leq 12$	$48 \leq d \leq 57$	67	JAN13 (EAN13)	$12 \leq n \leq 13$	$48 \leq d \leq 57$	68	JAN8 (EAN8)	$7 \leq n \leq 8$	$48 \leq d \leq 57$	69	CODE39	$1 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 90, 32, 36, 37, 43, 45, 46, 47$	70	ITF	$2 \leq n \leq 254$ (However, this is an even number.)	$48 \leq d \leq 57$	71	CODABAR	$1 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 68, 36, 43, 45, 46, 47, 58$	72	CODE93	$1 \leq n \leq 255$	$0 \leq d \leq 127$	73	CODE128	$2 \leq n \leq 255$	$0 \leq d \leq 127$
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71	CODABAR	$1 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 68, 36, 43, 45, 46, 47, 58$																																																																						
72	CODE93	$1 \leq n \leq 255$	$0 \leq d \leq 127$																																																																						
73	CODE128	$2 \leq n \leq 255$	$0 \leq d \leq 127$																																																																						

GS r n

[Name]	Transmit status.																																																																										
[Format]	ASCII	GS	r n																																																																								
	Hex.	1D	72 n																																																																								
	Decimal	29	114 n																																																																								
[Range]	n = 1, 2, 49, 50																																																																										
[Description]	<p>Sends the specified status. Detector Status (n=1,49)</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>Status</th> <th>"0"</th> <th>"1"</th> </tr> </thead> <tbody> <tr> <td>7</td> <td>Fixed at 0</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>Undefined</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>Undefined</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>Fixed at 0</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>Paper roll end detector</td> <td>Has Paper</td> <td>Paper out</td> </tr> <tr> <td>2</td> <td>Paper roll end detector</td> <td>Has Paper</td> <td>Paper out</td> </tr> <tr> <td>1</td> <td>Paper roll near end detector</td> <td>Has Paper</td> <td>Paper out</td> </tr> <tr> <td>0</td> <td>Paper roll near end detector</td> <td>Has Paper</td> <td>Paper out</td> </tr> </tbody> </table> <p>Drawer Kick Connector Status (n=2,50)</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>Status</th> <th>"0"</th> <th>"1"</th> </tr> </thead> <tbody> <tr> <td>7</td> <td>Fixed at 0</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>Undefined</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>Undefined</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>Fixed at 0</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>Undefined</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>Undefined</td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>Undefined</td> <td></td> <td></td> </tr> <tr> <td>0</td> <td>Drawer kick connector pin #3</td> <td>"L"</td> <td>"H"</td> </tr> </tbody> </table>			Bit	Status	"0"	"1"	7	Fixed at 0			6	Undefined			5	Undefined			4	Fixed at 0			3	Paper roll end detector	Has Paper	Paper out	2	Paper roll end detector	Has Paper	Paper out	1	Paper roll near end detector	Has Paper	Paper out	0	Paper roll near end detector	Has Paper	Paper out	Bit	Status	"0"	"1"	7	Fixed at 0			6	Undefined			5	Undefined			4	Fixed at 0			3	Undefined			2	Undefined			1	Undefined			0	Drawer kick connector pin #3	"L"	"H"
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GS v 0 m xL xH yL yH d1 ... dk

[Name]	Print raster bit image.																		
[Format]	ASCII	GS	v	0 m xL xH yL yH d1...dk															
	Hex.	1D	76	30 m xL xH yL yH d1...dk															
	Decimal	29	118	48 m xL xH yL yH d1...dk															
[Range]	m = 0, m = 48 0 ≤ xL ≤ 54(for 2 inch) 0 ≤ xL ≤ 72(for 3 inch) 0 ≤ xH ≤ 0 0 ≤ yL ≤ 255 0 ≤ yH ≤ 3 0 ≤ d ≤ 255 $k = (xL+xH \times 256) \times (yL+yH \times 256)$ However, k ≠ 0																		
[Description]	Prints raster method bit images using mode m.																		
	<table border="1"> <thead> <tr> <th>m</th> <th>Mode</th> <th>Density of Vert. Dir. Dots</th> <th>Density of Hor. Dir. Dots</th> </tr> </thead> <tbody> <tr> <td>0, 48</td> <td>Normal Mode</td> <td>203 DPI</td> <td>203 DPI</td> </tr> </tbody> </table>				m	Mode	Density of Vert. Dir. Dots	Density of Hor. Dir. Dots	0, 48	Normal Mode	203 DPI	203 DPI							
	m	Mode	Density of Vert. Dir. Dots	Density of Hor. Dir. Dots															
0, 48	Normal Mode	203 DPI	203 DPI																
<ul style="list-style-type: none"> • xL and xH specify the horizontal direction data count for one bit image (xL + xH x 256) in bytes. • yL and yH specify the vertical direction data count for one bit image (yL + yH x 256) in bytes. <p>[Ex.:] When $xL + xH \times 256 = 64$ $(xL+xH \times 256) \times 8 \text{dot} = 512 \text{ dot}$</p> <p style="text-align: center;"> <table border="1" style="display: inline-table;"> <tr> <td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> </tr> <tr> <td colspan="4" style="text-align: center;">MSB</td> <td colspan="4" style="text-align: center;">LSB</td> </tr> </table> </p>				7	6	5	4	3	2	1	0	MSB				LSB			
7	6	5	4	3	2	1	0												
MSB				LSB															

GS w n

[Name]	Set bar code width.		
[Format]	ASCII	GS	w n
	Hex.	1D 77	n
	Decimal	29 119	n
[Range]	1 ≤ n ≤ 6 Initial Value n = 2		
[Description]	Sets the bar code horizontal size.		
	n	Multi-level Bar Code Module Width [mm]	Binary Level Bar Code
			Fine Element Width[mm]
	1	0.141	0.141 0.423
	2	0.282	0.282 0.706
	3	0.423	0.423 1.129
	4	0.564	0.564 1.411
	5	0.706	0.706 1.834
	6	0.847	0.847 2.258

TWO-DIMENSIONAL BAR CODE COMMAND DETAILS

DC2 ; n

[Name]	QR Code Module Size Set		
[Format]	ASCII	DC ;	n
	Hex.	12 3B	n
	Decimal	18 59	n
[Range]	2 ≤ n ≤ 16 Initial Value n = 2		
[Description]	Specifies a module size of QR Code and Data Matrix. n: The number of dots for one side of the module size.		

GS p 1

[Name]	QR Code Print																		
[Format]	<p>ASCII GS p 1 model e v mode nl nh [data] Hex. 1D 70 01 model e v mode nl nh [data] Decimal 29 112 01 model e v mode nl nh [data]</p>																		
[Range]	<p>model=01, 02 e=4Ch, 4Dh, 51h, 48h 0, 1 ≤ v ≤ 40 mode=4Eh, 41h, 42h, 4Bh, 4Dh 1 ≤ nh×256+nl ≤ 7089</p>																		
[Description]	<p>Prints QR Code data based on the specified contents. model: Specifies a model e: Selects an error correction level. 'L' (4CH), 'M' (4DH), 'Q' (51H), 'H' (48H) v: =0: Automatic selection (A version is automatically selected depending on the number of input data.) 1 ≤ v ≤ 40 Fixed version (up to 14 for model-1) mode: Specifies a mode of data.</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Mode</th> <th>Hexadecimal</th> <th>Mode</th> </tr> </thead> <tbody> <tr> <td>N</td> <td>4E</td> <td>Numerical mode</td> </tr> <tr> <td>A</td> <td>41</td> <td>Alphanumeric mode</td> </tr> <tr> <td>B</td> <td>42</td> <td>8-bit byte mode</td> </tr> <tr> <td>K</td> <td>4B</td> <td>Kanji mode</td> </tr> <tr> <td>M</td> <td>4D</td> <td>Mixed mode</td> </tr> </tbody> </table> <p>nl, nh: Specifies the number of data. Data: Kanji data of the QR Code data should be set by Shift JIS code.</p>	Mode	Hexadecimal	Mode	N	4E	Numerical mode	A	41	Alphanumeric mode	B	42	8-bit byte mode	K	4B	Kanji mode	M	4D	Mixed mode
Mode	Hexadecimal	Mode																	
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K	4B	Kanji mode																	
M	4D	Mixed mode																	

KANJI CONTROL COMMAND DETAILS**FS ! n**

[Name]	Set print mode(s) for Kanji characters.			
[Format]	ASCII	FS	!	n
	Hex.	1C	21	n
	Decimal	28	33	n
[Range]	0 ≤ n ≤ 255 Initial Value n = 0			
[Description]	Batch specifies the Kanji character print mode.			
	Bit	Function	"0"	"1"
	7	Underline	Off	On
	6	Undefined		
	5	Undefined		
	4	Undefined		
	3	Double tall expanded	Off	On
	2	Expanded wide	Off	On
	1	Undefined		
	0	Undefined		

FS &

[Name]	Select Kanji character mode.			
[Format]	ASCII	FS	&	
	Hex.	1C	26	
	Decimal	28	38	
[Range]	N/A			
[Description]	Specifies Kanji character mode.			

FS - n

[Name]	Turn underline mode on/off for Kanji characters										
[Format]	ASCII	FS	- n								
	Hex.	1C	2D n								
	Decimal	28	45 n								
[Range]	0 ≤ n ≤ 2, 48 ≤ n ≤ 50										
[Description]	Specifies or cancels Kanji character underlines. <table border="1" data-bbox="338 361 960 555"> <thead> <tr> <th>n</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>0,48</td> <td>Cancels Kanji character underline</td> </tr> <tr> <td>1,49</td> <td>Sets to one-dot width Kanji character underline and specifies Kanji character underlines.</td> </tr> <tr> <td>2,50</td> <td>Sets to two-dot width Kanji character underline and cancels Kanji character underlines.</td> </tr> </tbody> </table>			n	Function	0,48	Cancels Kanji character underline	1,49	Sets to one-dot width Kanji character underline and specifies Kanji character underlines.	2,50	Sets to two-dot width Kanji character underline and cancels Kanji character underlines.
n	Function										
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2,50	Sets to two-dot width Kanji character underline and cancels Kanji character underlines.										

FS .

[Name]	Cancel Kanji character mode.		
[Format]	ASCII	FS	.
	Hex.	1C	2E
	Decimal	28	46
[Range]	N/A		
[Description]	Cancels Kanji character mode.		

FS S n1 n2

[Name]	Set Kanji character spacing
[Format]	ASCII FS S n1 n2 Hex. 1C 53 n1 n2 Decimal 28 83 n1 n2
[Range]	$0 \leq n1 \leq 255, 0 \leq n2 \leq 255$ Initial Value n1 = 0, n2=0
[Description]	Sets the Kanji character space amount and right space amount. <ul style="list-style-type: none"> ● Left space amount: n1 x (basic calculated pitch) ● Right space amount: n2 x (basic calculated pitch)

FS W n

[Name]	Turn quadruple-size mode on/off for Kanji characters.
[Format]	ASCII FS W n Hex. 1C 57 n Decimal 28 87 n
[Range]	$0 \leq n \leq 255$ Initial Value n = 0
[Description]	Specifies or cancels quadruple size Kanji character. <ul style="list-style-type: none"> ● Cancels quadruple size when n = <*****0>B. ● Specifies quadruple size when n = <*****1>B. ● n is effective only when it is the lowest bit.

OPOS Printer Driver

The **MB1030_OposSetup.exe** program sets up the registry information of MSRHK reader for OPOS program uses.

1. Installation

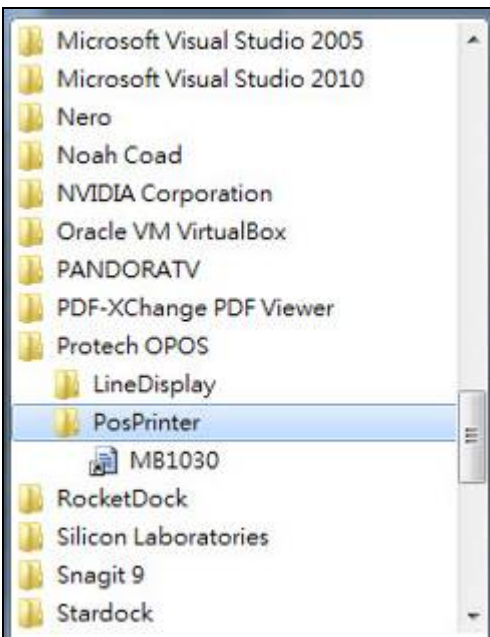
The steps below guide you to install the **MB1030_OposSetup** program.

- Run the setup file **MB1030_OposSetup.exe** located in the Software folder of the CD.
- This setup also installs the **MB1030** program.
- Follow the wizard instructions to complete the installation.

2. Launching the Program

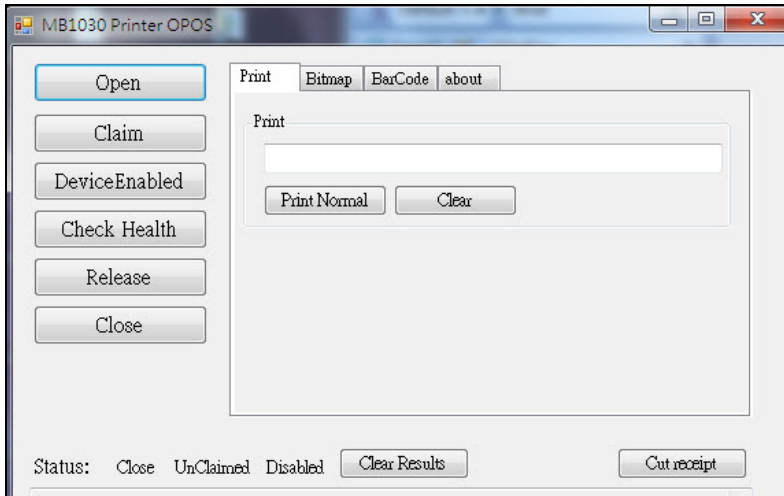
Follow the steps below to load the **MB1030** program:

- Click the *POSPrinter* folder from the path: *Start\Programs\Protech OPOS*.
- Click **MB1030** to launch the program.



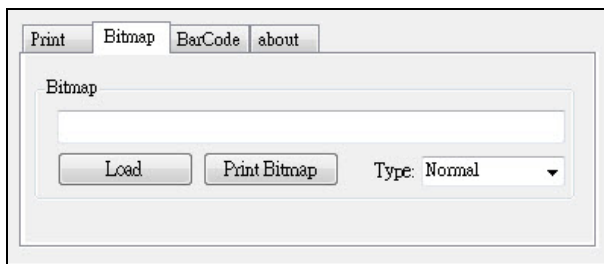
3. OPOS Control Object of MB1030 Program

a.) Print tab buttons:



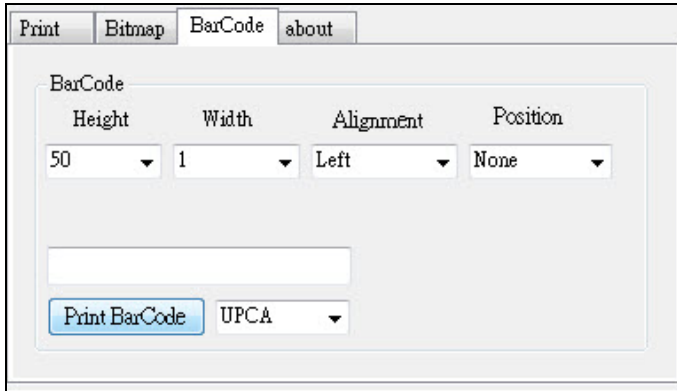
Button/Item	Description
Printer Normal	Print the string.

b.) Bitmap tab buttons/items:



Button/Item	Description
Load	Load bitmap file.
Print Bitmap	Print bitmap file.
Type	Normal or Rotate 108°.

c.) BarCode tab buttons/items:



Button/Item	Description
Print BarCode	Print the barcode. Supported barcode types: UPCA, UPCE, EAN8, EAN13, ITF, Codabar, Code39, Code93, Code128
Alignment	Left, center or right
Position	Print barcode number (None, Above or Below)

4. MB1030 type

Key Name	Type	Default Value	Note
BaudRate	String	115200	UART Baud Rate (default)
BitLength	String	8	UART Data Bit (default)
Parity	String	0	UART Parity Bit (default)
Port	String	COM4	UART Port (default)
Stop	String	1	UART Stop Bit (default)

5. OPOS APIs Support List

	Category Type	Name	Mutability	OPOS APG Version	Printer .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	Supported
Properties	common long	OpenResult	Read only	1.5	Supported
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	CapCharacterSet	Read only	1.1	Not Applicable
Properties	specific bool	CapConcurrentJrnRec	Read only	1.0	Not Applicable
Properties	specific bool	CapConcurrentJrnSlp	Read only	1.0	Not Applicable
Properties	specific bool	CapCoverSensor	Read only	1.0	Not Applicable
Properties	specific bool	CapTransaction	Read only	1.1	Not Applicable
Properties	specific bool	CapJrnPresent	Read only	1.0	Not Applicable
Properties	specific bool	CapJrn2Color	Read only	1.0	Not Applicable
Properties	specific bool	CapJrnBold	Read only	1.0	Not Applicable
Properties	specific long	CapJrnCartridgeSensor	Read only	1.5	Not Applicable
Properties	specific long	CapJrnColor	Read only	1.5	Not Applicable

	Category Type	Name	Mutability	OPOS APG Version	Printer .SO
Properties	specific long	CapJrnDhigh	Read only	1.0	Not Applicable
Properties	specific long	CapJrnDwide	Read only	1.0	Not Applicable
Properties	specific long	CapJrnDwideDhigh	Read only	1.0	Not Applicable
Properties	specific long	CapJrnEmptySensor	Read only	1.0	Not Applicable
Properties	specific long	CapJrnItalic	Read only	1.0	Not Applicable
Properties	specific long	CapJrnNearEndSensor	Read only	1.0	Not Applicable
Properties	specific bool	CapJrnUnderline	Read only	1.0	Not Applicable
Properties	specific bool	CapRecPresent	Read only	1.0	Not Applicable
Properties	specific bool	CapRec2Color	Read only	1.0	Not Applicable
Properties	specific bool	CapRecBarCode	Read only	1.0	Not Applicable
Properties	specific bool	CapRecBitmap	Read only	1.0	Not Applicable
Properties	specific bool	CapRecBold	Read only	1.0	Not Applicable
Properties	specific long	CapRecCartridgeSensor	Read only	1.5	Not Applicable
Properties	specific long	CapRecColor	Read only	1.5	Not Applicable
Properties	specific bool	CapRecDhigh	Read only	1.0	Not Applicable
Properties	Specific bool	CapRecDwide	Read only	1.0	Not Applicable
Properties	specific bool	CapRecDwideDhigh	Read only	1.0	Not Applicable
Properties	specific bool	CapRecEmptySensor	Read only	1.0	Not Applicable
Properties	specific bool	CapRecItalic	Read only	1.0	Not Applicable
Properties	specific bool	CapRecLeft90	Read only	1.0	Not Applicable
Properties	specific bool	CapRecMarkFeed	Read only	1.5	Not Applicable
Properties	specific bool	CapRecNearEndSensor	Read only	1.0	Not Applicable
Properties	specific bool	CapRecPapercut	Read only	1.0	Not Applicable
Properties	specific bool	CapRecRight90	Read only	1.0	Not Applicable
Properties	specific bool	CapRecRotate180	Read only	1.0	Not Applicable
Properties	specific bool	CapRecStamp	Read only	1.0	Not Applicable
Properties	specific bool	CapRecUnderline	Read only	1.0	Not Applicable
Properties	specific bool	CapSlpPresent	Read only	1.0	Not Applicable
Properties	specific bool	CapSlpFullslip	Read only	1.0	Not Applicable
Properties	specific bool	CapSlp2Color	Read only	1.0	Not Applicable
Properties	specific bool	CapSlpBarCode	Read only	1.0	Not Applicable
Properties	specific bool	CapSlpBitmap	Read only	1.0	Not Applicable
Properties	specific bool	CapSlpBold	Read only	1.0	Not Applicable
Properties	specific bool	CapSlpBothSidesPrint	Read only	1.5	Not Applicable
Properties	specific long	CapSlpCartridgeSensor	Read only	1.5	Not Applicable
Properties	specific long	CapSlpColor	Read only	1.5	Not Applicable
Properties	specific bool	CapSlpDhigh	Read only	1.0	Not Applicable
Properties	specific bool	CapSlpDwide	Read only	1.0	Not Applicable

	Category Type	Name	Mutability	OPOS APG Version	Printer .SO
Properties	specific bool	CapSlpDwideDhigh	Read only	1.0	Not Applicable
Properties	specific bool	CapSlpEmptySensor	Read only	1.0	Not Applicable
Properties	specific bool	CapSlpItalic	Read only	1.0	Not Applicable
Properties	specific bool	CapSlpLeft90	Read only	1.0	Not Applicable
Properties	specific bool	CapSlpNearEndSensor	Read only	1.0	Not Applicable
Properties	specific bool	CapSlpRight90	Read only	1.0	Not Applicable
Properties	specific bool	CapSlpRotate180	Read only	1.0	Not Applicable
Properties	specific bool	CapSlpUnderline	Read only	1.0	Not Applicable
Properties	specific bool	AsyncMode	R/W	1.0	Not Applicable
Properties	specific long	CartridgeNotify	R/W	1.5	Not Applicable
Properties	specific long	CharacterSet	R/W	1.0	Not Applicable
Properties	specific string	CharacterSetList	Read only	1.0	Not Applicable
Properties	specific bool	CoverOpen	Read only	1.0	Not Applicable
Properties	specific long	ErrorLevel	Read only	1.1	Not Applicable
Properties	specific long	ErrorStation	Read only	1.0	Not Applicable
Properties	specific string	ErrorString	Read only	1.1	Not Applicable
Properties	specific string	FontTypefaceList	Read only	1.1	Not Applicable
Properties	specific bool	FlagWhenIdle	R/W	1.0	Not Applicable
Properties	specific long	MapMode	R/W	1.0	Not Applicable
Properties	specific long	RotateSpecial	R/W	1.1	Not Applicable
Properties	specific long	JrnLineChars	R/W	1.0	Not Applicable
Properties	specific string	JrnLineCharsList	Read only	1.0	Not Applicable
Properties	specific long	JrnLineHeight	R/W	1.0	Not Applicable
Properties	specific long	JrnLineSpacing	R/W	1.0	Not Applicable
Properties	specific long	JrnLineWidth	Read only	1.0	Not Applicable
Properties	specific bool	JrnLetterQuality	R/W	1.0	Not Applicable
Properties	specific bool	JrnEmpty	Read only	1.0	Not Applicable
Properties	specific bool	JrnNearEnd	Read only	1.0	Not Applicable
Properties	specific long	JrnCartridgeState	Read only	1.5	Not Applicable
Properties	specific long	JrnCurrentCartridge	R/W	1.5	Not Applicable
Properties	specific long	RecLineChars	R/W	1.0	Not Applicable
Properties	specific string	RecLineCharsList	Read only	1.0	Not Applicable

	Category Type	Name	Mutability	OPOS APG Version	Printer .SO
Properties	specific long	RecLineHeight	R/W	1.0	Not Applicable
Properties	specific long	RecLineSpacing	R/W	1.0	Not Applicable
Properties	specific long	RecLineWidth	Read only	1.0	Not Applicable
Properties	specific bool	RecLetterQuality	R/W	1.0	Not Applicable
Properties	specific bool	RecEmpty	Read only	1.0	Not Applicable
Properties	specific bool	RecNearEnd	Read only	1.0	Not Applicable
Properties	specific long	RecSidewaysMaxLines	Read only	1.0	Not Applicable
Properties	specific long	RecSidewaysMaxChars	Read only	1.0	Not Applicable
Properties	specific long	RecLinesToPaperCut	Read only	1.0	Not Applicable
Properties	specific string	RecBarCodeRotationList	Read only	1.1	Not Applicable
Properties	specific long	RecCartridgeState	Read only	1.5	Not Applicable
Properties	specific long	RecCurrentCartridge	R/W	1.5	Not Applicable
Properties	specific long	SlpLineChars	R/W	1.0	Not Applicable
Properties	specific string	SlpLineCharsList	Read only	1.0	Not Applicable
Properties	specific long	SlpLineHeight	R/W	1.0	Not Applicable
Properties	specific long	SlpLineSpacing	R/W	1.0	Not Applicable
Properties	specific long	SlpLineWidth	Read only	1.0	Not Applicable
Properties	specific bool	SlpLetterQuality	R/W	1.0	Not Applicable
Properties	specific bool	SlpEmpty	Read only	1.0	Not Applicable
Properties	specific bool	SlpNearEnd	Read only	1.0	Not Applicable
Properties	specific long	SlpSidewaysMaxLines	Read only	1.0	Not Applicable
Properties	specific long	SlpSidewaysMaxChars	Read only	1.0	Not Applicable
Properties	specific long	SlpMaxLines	Read only	1.0	Not Applicable
Properties	specific long	SlpLinesNearEndToEnd	Read only	1.0	Not Applicable
Properties	specific string	SlpBarCodeRotationList	Read only	1.1	Not Applicable
Properties	specific long	SlpPrintSide	Read only	1.5	Not Applicable
Properties	specific long	SlpCartridgeState	Read only	1.5	Not Applicable
Properties	specific long	SlpCurrentCartridge	R/W	1.5	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	Supported
Methods	common	ClearInput	-	1.0	Not Applicable
Methods	common	ClearOutput	-	1.0	Not Applicable
Methods	common	DirectIO	-	1.0	Not Applicable
Methods	specific	PrintNormal	-	1.0	Supported

	Category Type	Name	Mutability	OPOS APG Version	Printer .SO
Methods	specific	PrintTwoNormal	-	1.0	Not Applicable
Methods	specific	PrintImmediate	-	1.0	Not Applicable
Methods	specific	BeginInsertion	-	1.0	Not Applicable
Methods	specific	EndInsertion	-	1.0	Not Applicable
Methods	specific	BeginRemoval	-	1.0	Not Applicable
Methods	specific	EndRemoval	-	1.0	Not Applicable
Methods	specific	CutPaper	-	1.0	Supported
Methods	specific	RotatePrint	-	1.0	Supported (only 180)
Methods	specific	PrintBarCode	-	1.0	Supported
Methods	specific	PrintBitmap	-	1.0	Supported
Methods	specific	TransactionPrint	-	1.1	Not Applicable
Methods	specific	ValidateData	-	1.1	Not Applicable
Methods	specific	SetBitmap	-	1.0	Not Applicable
Methods	specific	SetLogo	-	1.0	Not Applicable
Methods	specific	ChangePrintSide	-	1.5	Not Applicable
Methods	specific	MarkFeed	-	1.5	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	-	1.0	Not Applicable

3-2-2 VFD: MB-4003 (RS-232)**3-2-2-1 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	COM1	-
Stop	1	-

2. OPOS VFD Service Object and Method Relations

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

3-2-2-2 OPOS Driver

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

1. Installation

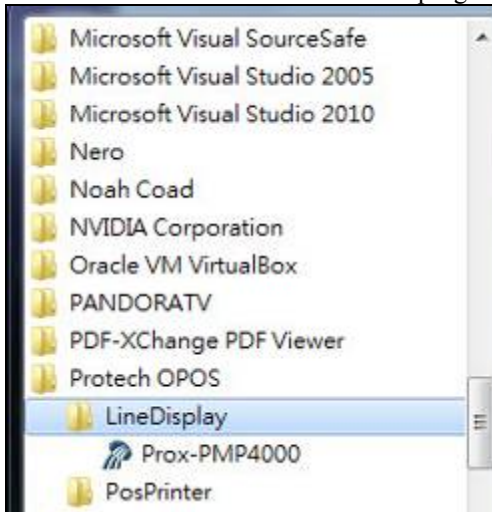
The steps below guide you to install the **MB4000_OposSetup** program.

- 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

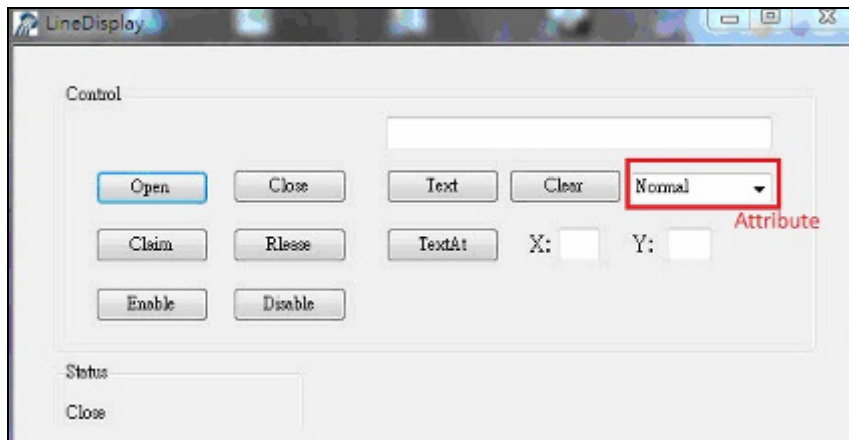
The steps below guide you to load the **Prox-PMP4000** program.

- 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	<ul style="list-style-type: none"> • 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. MB4003 type

Key Name	Type	Default Value	Note
BaudRate	String	9600	UART Baud Rate (default)
BitLength	String	8	UART Data Bit (default)
Parity	String	0	UART Parity Bit (default)
Port	String	COM1	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
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

	Category Type	Name	Mutability	OPOS APG Version	VFD .SO
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
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

	Category Type	Name	Mutability	OPOS APG Version	VFD .SO
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

3-2-3 MSR: MB-3012 (PS/2)

3-2-3-1 OPOS Driver

The **MB301X_OposSetup.exe** program sets up the registry information of the MSR reader for OPOS programming use.

1. Installation

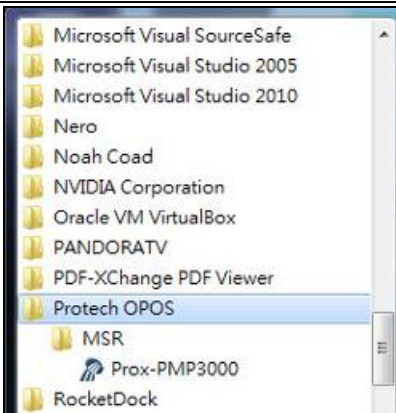
The steps below guide you to install the **MB301X_OposSetup** program.

- Run the **OPOSMSR_Setup.exe** setup file.
- This setup also installs the Prox-PMP3000 program.
- Follow the wizard instructions to complete the installation.

2. Launching the Program

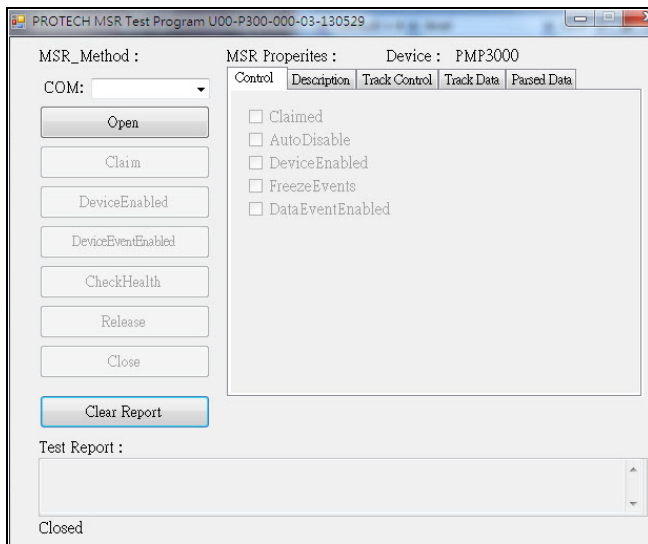
The steps below guide you to load the **Prox-PMP3000** program.

- Click the *MSR* folder from the path: *Start/Programs/Protech OPOS*.
- Click **Prox-PMP3000** to launch the program.



3. Configuration of **Prox-PMP3000** program

a.) Main screen & Control tab items:



Button/Item	Description
COM	Select the COM port number from the drop-down list. (only for UART/USB interface).
AutoDisable	(check box) Check to disable the device automatically when data is received.
FreezeEvents	(check box) Enable to trigger FreezeEvents , and the application will not allow events to be delivered.

b.) Description tab: S.O and C.O information

Control	Description	Track Control	Track Data	Parsed Data
DeviceControlDescription :				
OPOS MSR Control 1,6.000 [Public, by CRM/RCS-Dayton]				
DeviceControlVersion :				
1006000				
DeviceServiceDescription :				
PROTECH OPOS MSR Service Object				
DeviceServiceVersion :				
1007550				
PhysicalDeviceDescription :				
PROTECH OPOS MSR				
PhysicalDeviceName :				
OPOS.PMP3000MSR.SO				

c.) Track Control tab items

Control	Description	Track Control	Track Data	Parsed Data
<input checked="" type="checkbox"/>	DecodeData	ErrorReportingType :		
<input checked="" type="checkbox"/>	ParseDecodeData	CARD		
<input type="checkbox"/>	TransmitSentinels	TracksToRead :		
		Tracks123		

Button/Item	Description
DecodeData	Set decode data properties applicable.
ParseDecodeData	Set parse decode data properties
TransmitSentinels	Set transmit-sentinels properties
ErrorReporting Type	Card, track
TracksToRead	Track1, track2, track3, tracks12, tracks13, tracks14, tracks23, tracks24, tracks34, tracks123, tracks124, tracks134, tracks234, tracks1234 (Tracks4 is not applicable).

d.) Track Data tab items

Control	Description	Track Control	Track Data	Parsed Data
Track1Data :	<input type="text"/>			
Track1DiscretionaryData :	<input type="text"/>			
Track2Data :	<input type="text"/>			
Track2DiscretionaryData :	<input type="text"/>			
Track3Data :	<input type="text"/>			
Track4Data :	<input type="text"/>			

Button/Item	Description
TracksData	(Row) Display the data of all tracks (Track4 is not applicable).

e.) Parsed Data tab items

Control	Description	Track Control	Track Data	Parsed Data
AccountNumber :	<input type="text"/>			
ExpirationDate :	<input type="text"/>			
FirstName :	<input type="text"/>			
MiddleInitial :	<input type="text"/>			
Surname :	<input type="text"/>			
Title :	<input type="text"/>			
Suffix :	<input type="text"/>			
ServiceCode :	<input type="text"/>			

Button/Item	Description
Parsed Data	Display special properties.

4. MB301X type (RS232/PS2)

Key Name	Type	Default Value	Note
default	string	PMP3000	OPOS S.O Link

5. OPOS APIs support List

	Category Type	Name	Mutability	OPOS APG Version	VFD .SO
Properties	common bool	AutoDisable	R/W	1.2	Supported
Properties	common long	BinaryConversion	R/W	1.2	Not Applicable
Properties	common long	CapPowerReporting	Read only	1.3	Supported
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	Supported
Properties	common bool	DataEventEnabled	R/W	1.0	Supported
Properties	common bool	DeviceEnabled	R/W	1.0	Supported
Properties	common bool	FreezeEvents	R/W	1.0	Supported
Properties	common long	OpenResult	Read only	1.5	Supported
Properties	common long	OutputID	Read only	1.0	Not Applicable
Properties	common long	PowerNotify	R/W	1.3	Not Applicable
Properties	common long	PowerState	Read only	1.3	Not Applicable
Properties	common long	ResultCode	Read only	1.0	Supported
Properties	common long	ResultCodeExtended	Read only	1.0	Supported
Properties	common long	State	Read only	1.0	Not Applicable
Properties	common string	ControlObject Description	Read only	1.0	Not Applicable
Properties	common long	ControlObjectVersion	Read only	1.0	Not Applicable
Properties	common string	ServiceObject Description	Read only	1.0	Supported
Properties	common long	ServiceObjectVersion	Read only	1.0	Not Applicable
Properties	common string	DeviceDescription	Read only	1.0	Supported
Properties	common string	DeviceName	Read only	1.0	Supported
Properties	specific bool	CapISO	Read only	1.0	Supported
Properties	specific bool	CapJISOOne	Read only	1.0	Supported
Properties	specific bool	CapJISTwo	Read only	1.0	Supported
Properties	specific bool	CapTransmitSentinels	Read only	1.5	Supported
Properties	specific long	TracksToRead	R/W	1.0	Supported

	Category Type	Name	Mutability	OPOS APG Version	VFD .SO
Properties	specific bool	DecodeData	R/W	1.0	Not Applicable
Properties	specific bool	ParseDecodeData	R/W	1.0	Supported
Properties	specific long	ErrorReportType	R/W	1.2	Not Applicable
Properties	specific string	Track1Data	Read only	1.0	Supported
Properties	specific string	Track2Data	Read only	1.0	Supported
Properties	specific string	Track3Data	Read only	1.0	Supported
Properties	specific string	Track4Data	Read only	1.5	Not Applicable
Properties	specific string	AccountNumber	Read only	1.0	Supported
Properties	specific string	ExpirationDate	Read only	1.0	Supported
Properties	specific string	Title	Read only	1.0	Supported
Properties	specific string	FirstName	Read only	1.0	Supported
Properties	specific string	MiddleInitial	Read only	1.0	Supported
Properties	specific string	Surname	Read only	1.0	Supported
Properties	specific string	Suffix	Read only	1.0	Supported
Properties	specific string	ServiceCode	Read only	1.0	Supported
Properties	specific binary	Track1 DiscretionaryData	Read only	1.0	Supported
Properties	specific binary	Track2 DiscretionaryData	Read only	1.0	Supported
Properties	specific bool	TransmitSentinels	R/W	1.5	Supported
Methods	common	Open	-	1.0	Supported
Methods	common	Close	-	1.0	Supported
Methods	common	Claim	-	1.0	Supported
Methods	common	ClaimDevice	-	1.5	Supported
Methods	common	Release	-	1.0	Supported
Methods	common	ReleaseDevice	-	1.5	Supported
Methods	common	CheckHealth	-	1.0	Not Applicable
Methods	common	ClearInput	-	1.0	Supported
Methods	common	ClearOutput	-	1.0	Not Applicable
Methods	common	DirectIO	-	1.0	Not Applicable
Events	common	DataEvent	-	1.0	Supported
Events	common	DirectIOEvent	-	1.0	Not Applicable
Events	common	ErrorEvent	-	1.0	Not Applicable
Events	common	OutputCompleteEvent	-	1.0	Not Applicable
Events	common	StatusUpdateEvent	-	1.0	Not Applicable

3-2-4 MSR: GIGA-TMS MJR243 (RS-232)**3-2-4-1 Commands List**

1. MSR Registry Operation

Registry Path: [HKEY_LOCAL_MACHINE\SOFTWARE\OLEforRetail\ServiceOPOS\MSR\MJR243]

Registry Name	Default Data	Notes
CapISO	1	Capability for reading ISO track data
CapJISOne	1	(reserved)
CapJISTwo	1	(reserved)
CapTransmitSentinels	1	Capability for reading Transmit Sentinels
Debug	0	Enable the tracing and create a log file
Description	GIGATMS MSR POS	Description for SO driver
DeviceName	MJR243	Device Name for CO open
FileName	(NULL)	(reserved)
HardwareProvider	0	(reserved)
Model	MJR243	Device model name
Parity	None	Parity for the communication port
Port	COM4	COM Port
Protocol	Hardware	Communication Control
Baudrate	19200	RS-232 baudrate

2. OPOS MSR Service Object and Method Relations

Method	Status of support by the driver	Notes
Open	○	-
Close	○	-
Claim	○	-
ClaimDevice	○	-
Release	○	-
ReleaseDevice	○	-
ClearInput	○	-
ClearInputProperties	○	-
DataEvent	○	-
Claimed	○	Read only
DataCount	○	Read only
DataEventEnabled	○	R/W
DeviceEnabled	○	R/W
FreezeEvents	○	R/W
OpenResult	○	Read only
ResultCode	○	Read only
ResultCodeExtended	○	Read only
State	○	Read only
ControlObjectDescription	○	Read only
ControlObjectVersion	○	Read only
ServiceObjectDescription	○	Read only
ServiceObjectVersion	○	Read only
DeviceDescription	○	Read only
DeviceName	○	Read only
CapISO	○	Read only
CapTransmitSentinels	○	Read only
AccountNumber	○	Read only
DecodeData	○	R/W
ExpirationDate	○	Read only
FirstName	○	Read only
MiddleInitial	○	Read Only
ParseDecodeData	○	R/W
ServiceCode	○	Read Only
Suffix	○	Read Only
Surname	○	Read Only
Title	○	Read Only

Method	Status of support by the driver	Notes
Track1Data	○	Read Only
Track1DiscretionaryData	○	Read Only
Track2Data	○	Read Only
Track2DiscretionaryData	○	Read Only
Track3Data	○	Read Only
TracksToRead	○	R/W
TransmitSentinels	○	R/W

3-2-4-2 OPOS MSR Register

The **OPOS MSR Register** program sets up the registry information of MSRHK reader for OPOS program usage.

1. Installation

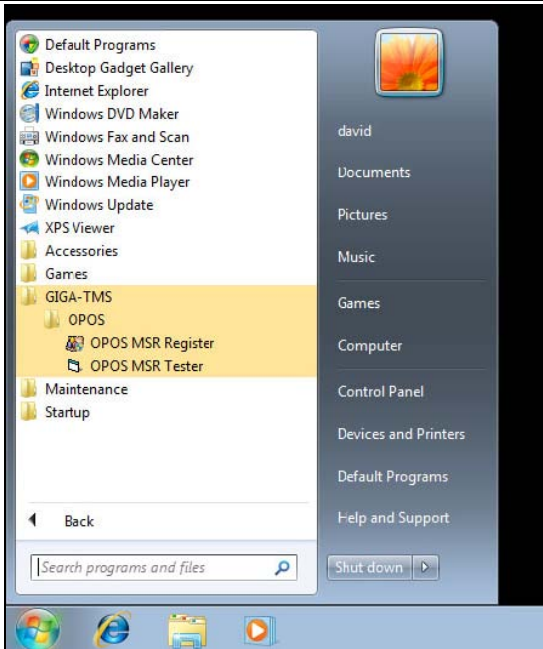
The steps below guides you how to install the **OPOS MSR Register** program.

- Insert the setup CD
- Run the setup file **OPOSMSR_Setup.exe** located in the Software folder of the CD.
- This setup also installs the **OPOS MSR Tester** program.
- Follow the wizard instructions to complete the installation.

2. Launching the Program

The steps below guides you how to load the **OPOS MSR Register** program.

- Click the *OPOS* folder from the path: *Start/Programs/GIGA-TMS*.
- Click **OPOS MSR Register** to launch the program.



3. Configuration of OPOS MSR Register program

a.) Main screen buttons/items:



Button/Item	Description
Control Object	(Check box) Register the OPOSMSR.ocx common control object driver. The item needs to be checked to run the OPOS MSR Tester program.
Service Object	(Left pane) The Service Object driver types. So far only four driver types are supported. Each driver type supports specific MSR readers. Please refer to the OPOS MSR Service Object and Method Relations section for details.
Service Object	(Right pane) The registered MSR with the specified device name.
Reg→	Create a new device name for the selected MSR.
← Unreg	Remove the selected device name from the registry.
Exit	Quit the program.

b.) Follow the steps below to register the MSRHK OPOS information:

Step 1: Select an item in the **Service Object** List box from the left pane. Make sure the correct item is selected.

Step 2: Click **Reg→** button

Step 3: In the **OPOS MSR Setting** screen, enter the device name and click **OK**.

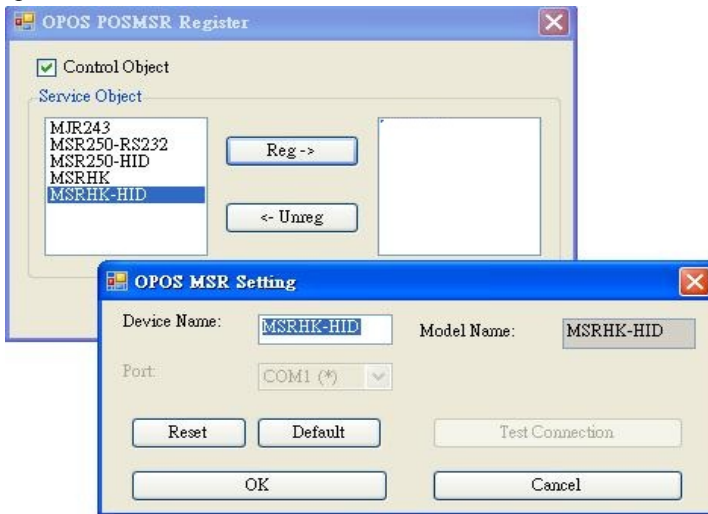
c.) Example 1. MAGTEK USB HID



d.) Example 2. PROMAG MSR/MJR PART-NO, Keyboard mode.



e.) Example 3. PROGRAM MSR PART-NO, HID mode.



If your system doesn't have any other common control driver, click the Control Object check box.

Note: To run the **OPOPS MSR Tester** program, the Control Object must be checked.

4. MJR243 type

Key Name	Type	Default Value	Note
CapISO	string	1	Capability for reading ISO track data
CapJISOne	string	1	(reserved)
CapJISTwo	string	1	(reserved)
CapTransmitSentinels	string	1	Capability for reading Transmit Sentinels
Debug	string	0	Enable the tracing and create a log file.
Description	string	GIGATMS MSR POS	Description for SO driver
DeviceName	string	MJR243	Device Name for CO open
FileName	string	(NULL)	(reserved)
HardwareProvider	string	0	(reserved)
Model	string	MJR243	Device model name
Parity	string	None	Parity for the communication port

Key Name	Type	Default Value	Note
Port	string	COM4	COM Port Number
Protocol	string	Hardware	Communication Control
Baudrate	string	19200	RS-232 baudrate

5. OPOS APIs support list

	Category Type	Name	Mutability	OPOS APG Version	MSR .SO
Properties	common bool	AutoDisable	R/W	1.2	Not Applicable
Properties	common long	BinaryConversion	R/W	1.2	Not Applicable
Properties	common bool	CapCompare FirmwareVersion	Read only	1.9	Not Applicable
Properties	common long	CapPowerReporting	Read only	1.3	Not Applicable
Properties	common bool	CapStatisticsReporting	Read only	1.8	Not Applicable
Properties	common bool	CapUpdateFirmware	Read only	1.9	Not Applicable
Properties	common bool	CapUpdateStatistics	Read only	1.8	Not Applicable
Properties	common string	CheckHealthText	Read only	1.0	Not Applicable
Properties	common bool	Claimed	Read only	1.0	Supported
Properties	common long	DataCount	Read only	1.2	Supported
Properties	common bool	DataEventEnabled	R/W	1.0	Supported
Properties	common bool	DeviceEnabled	R/W	1.0	Supported
Properties	common bool	FreezeEvents	R/W	1.0	Supported
Properties	common long	OpenResult	Read only	1.5	Supported
Properties	common long	OutputID	Read only	1.0	Not Applicable
Properties	common long	PowerNotify	R/W	1.3	Not Applicable
Properties	common long	PowerState	Read only	1.3	Not Applicable
Properties	common long	ResultCode	Read only	1.0	Supported
Properties	common long	ResultCodeExtended	Read only	1.0	Supported
Properties	common long	State	Read only	1.0	Supported
Properties	common string	ControlObject Description	Read only	1.0	Supported
Properties	common long	ControlObjectVersion	Read only	1.0	Supported
Properties	common string	ServiceObject Description	Read only	1.0	Supported
Properties	common long	ServiceObjectVersion	Read only	1.0	Supported
Properties	common string	DeviceDescription	Read only	1.0	Supported
Properties	common string	DeviceName	Read only	1.0	Supported

	Category Type	Name	Mutability	OPOS APG Version	MSR .SO
Properties	specific bool	CapISO	Read only	1.0	Supported
Properties	specific bool	CapJISOne	Read only	1.0	Not Applicable
Properties	specific bool	CapJISTwo	Read only	1.0	Not Applicable
Properties	specific bool	CapTransmit Sentinels	Read only	1.5	Supported
Properties	specific long	CapWriteTracks	Read only	1.1	Not Applicable
Properties	specific string	AccountNumber	Read only	1.0	Supported
Properties	specific bool	DecodeData	R/W	1.0	Supported
Properties	specific long	EncodingMaxLength	Read only	1.1	Not Applicable
Properties	specific long	ErrorReportType	R/W	1.2	Not Applicable
Properties	specific string	ExpirationDate	Read only	1.0	Supported
Properties	specific string	FirstName	Read only	1.0	Supported
Properties	specific string	MiddleInitial	Read only	1.0	Supported
Properties	specific bool	ParseDecodeData	R/W	1.0	Supported
Properties	specific string	ServiceCode	Read only	1.0	Supported
Properties	specific string	Suffix	Read only	1.0	Supported
Properties	specific string	Surname	Read only	1.0	Supported
Properties	specific string	Title	Read only	1.0	Supported
Properties	specific binary	Track1Data	Read only	1.0	Supported
Properties	specific binary	Track1 DiscretionaryData	Read only	1.0	Supported
Properties	specific binary	Track2Data	Read only	1.0	Supported
Properties	specific binary	Track2 DiscretionaryData	-	1.0	Supported
Properties	specific binary	Track3Data	Read only	1.0	Supported
Properties	specific binary	Track4Data	Read only	1.5	Not Applicable
Properties	specific long	TracksToRead	R/W	1	Supported
Properties	specific long	TracksToWrite	R/W	1.1	Not Applicable
Properties	specific bool	TransmitSentinels	R/W	1.5	Supported
Methods	common	Open	-	1	Supported
Methods	common	Close	-	1	Supported
Methods	common	Claim	-	1	Supported
Methods	common	ClaimDevice	-	1.5	Supported
Methods	common	Release	-	1	Supported
Methods	common	ReleaseDevice	-	1.5	Supported

	Category Type	Name	Mutability	OPOS APG Version	MSR .SO
Methods	common	CheckHealth	-	1	Not Applicable
Methods	common	ClearInput	-	1	Supported
Methods	common	ClearInput Properties	-	1.1	Supported
Methods	common	ClearOutput	-	1	Not Applicable
Methods	common	DirectIO	-	1	Not Applicable
Methods	common	Compare FirmwareVersion	-	1.9	Not Applicable
Methods	common	ResetStatistics	-	1.8	Not Applicable
Methods	common	RetrieveStatistics	-	1.8	Not Applicable
Methods	common	UpdateFirmware	-	1.9	Not Applicable
Methods	common	UpdateStatistics	-	1.8	Not Applicable
Events	common	DataEvent	-	1.0	Supported
Events	common	DirectIOEvent	-	1.0	Not Applicable
Events	common	ErrorEvent	-	1.0	Not Applicable
Events	common	OutputCompleteEvent	-	1.0	Not Applicable
Events	common	StatusUpdateEvent	-	1.0	Not Applicable

3-2-4-3 OPOS MSR Tester

The **OPOS MSR Tester** program is used to get the track data of the MSRHK reader via the OPOS driver. Before running the program, make sure the device name registry information for MSRHK reader has been created by OPOS MSR Register program.

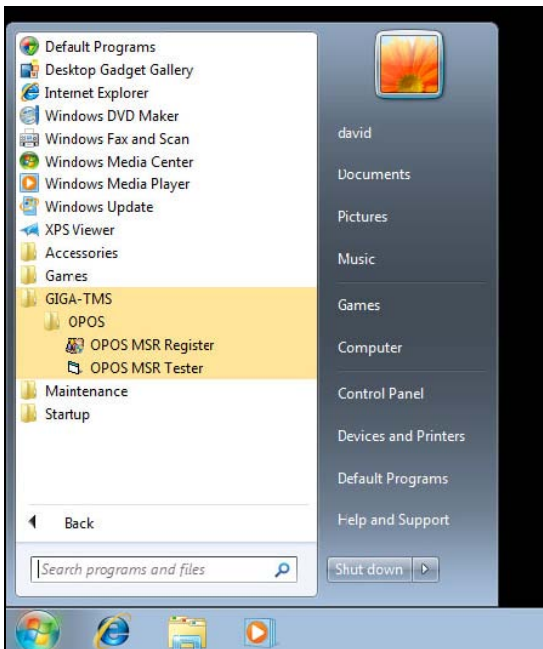
1. Installation

The installation of **OPOS MSR Tester** program goes together with OPOS MSR Register program.

2. Launching the Program

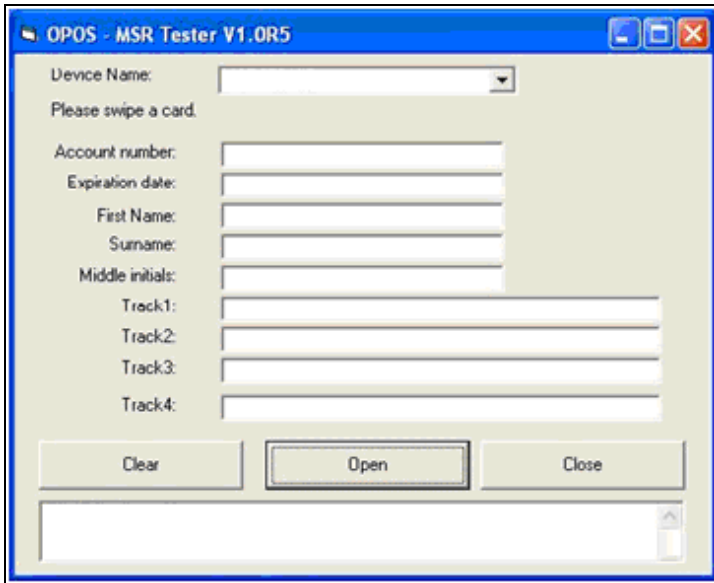
The steps below guide you to load the **OPOS MSR Tester** program.

- Click the *OPOS* folder from the path: *Start\Programs\GIGA-TMS*.
- Click **OPOS MSR Tester** to launch the program.



3. Configuration for OPOS MSR Tester Program

a.) Main screen buttons/items:



Button/Item	Description
Device Name	(Combo box) Enter the device name that will be loaded to the program.
Track Data	(Text boxes) Show the raw and parsed track data.
Clear	(Button) Clear all the track data in the text boxes.
Open	(Button) Open the OPOS driver and ready to get track data.
Close	(Button) Close the OPOS driver.
Message	(Text box) Display the result message of running the OPOS driver.

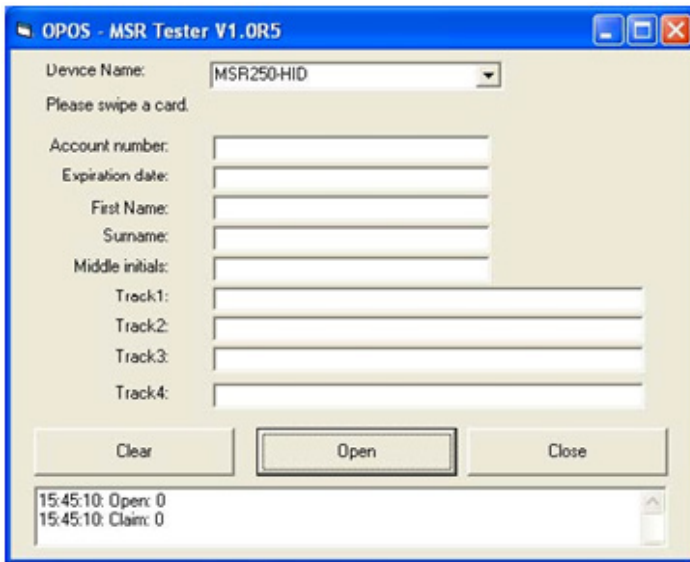
b.) To get the track data using OPOS driver, follow the steps below:

Step 1: Enter the **Device Name**.

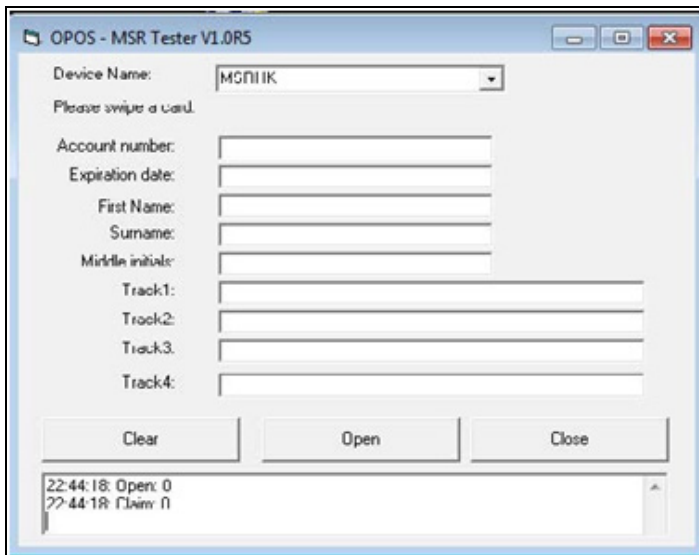
Step 2: Click **Open** button.

Step 3: Swipe the card to get the track data.

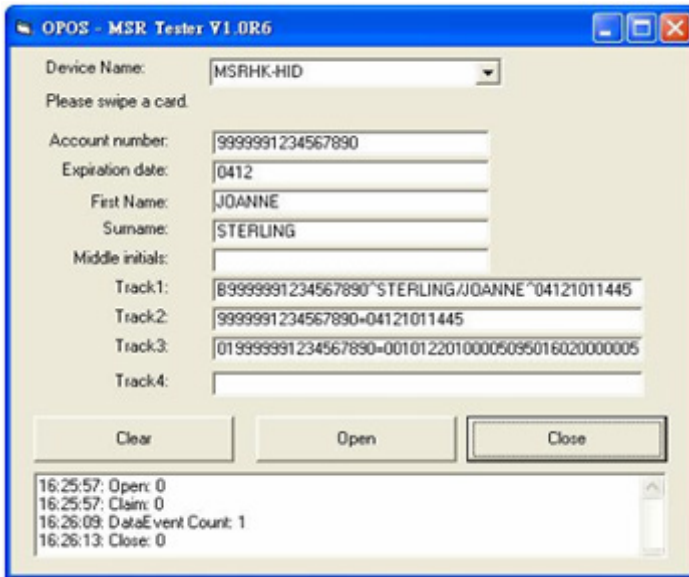
c.) Example 1. MAGTEK USB HID.



d.) Example 2. PROMAG MSR/MJR PART-NO, Keyboard mode



e.) Example 3. PROMAG MSR PART-NO, HID mode



3-3 API

3-3-1 API Package Content

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

Function DLL			
Directory	Function	File Name	Description
ProxAPI standard\	Cash Drawer	Cash Drawer.dll	Driver to control Cash Drawer
	WDT	Watchdog.dll	Driver to control Watchdog
	Hardware Monitor	Hardware Monitor.dll	Driver to read hardware data
	multilangXML.dll		Driver to open XML file
	Initial.xml		XML file to initiate the API Package
	ProxAP.exe		API program executable file
	XML Files\Model Name*\Initial.xml		XML file for each model
	Version.ini		Version Information

Sample Program		
Directory	Contents / File Name	Description
DEMO PROJECT\	DEMO PROJECT\GPIO Sample Code	C# VB6 VB.net Source Code
	DEMO PROJECT\Digital Sample Code	C# VB6 VB.net Source Code
	DEMO PROJECT\Watchdog Sample Code	C# VB6 VB.net MFC Source Code

3-3-2 API Procedure

Take **VB2005 .NET** for example. Follow the instructions below to perform the API procedure:

Step 1. Declare a function. You may create a module in your project and fill in the function.

Example: Cash drawer

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

Step 2. Create a button to call API Function.

a.) 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
```

b.) 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 Method

```

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 Digital_Set Lib "Digital.dll"(ByVal hex_value As Short) As  
Long
```

```
Declare Function Digital_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
```

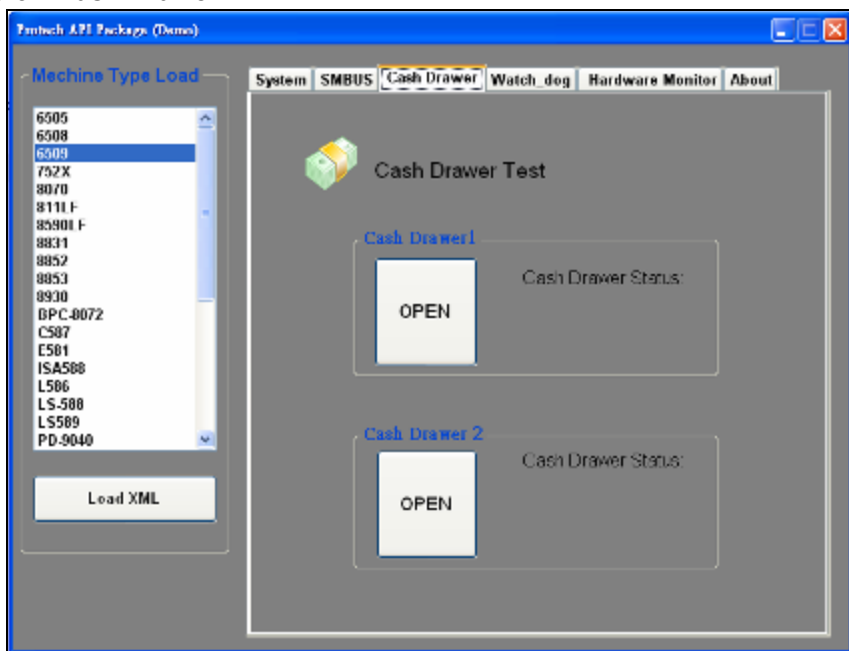
VB 6 external function:

```
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
```

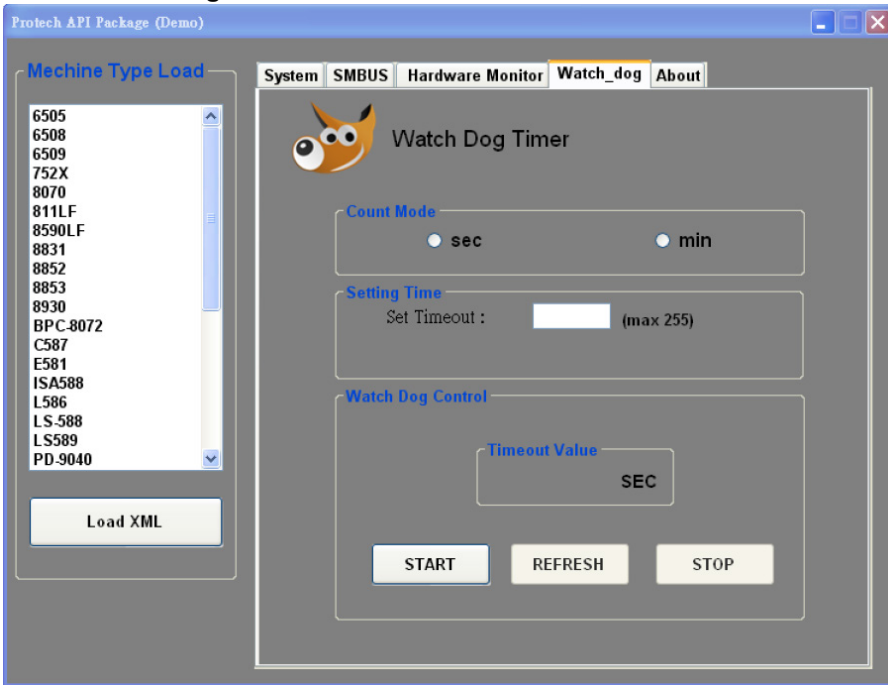
Note: VB.net short = integer VB6

3-3-3 Cash Drawer



Button/Item	Description
OPEN (button)	Tap to open the cash drawer.
Cash Drawer Status	<p>Cash drawer status will be displayed after OPEN is tapped.</p> <ul style="list-style-type: none"> • Cash Drawer is closed when the following picture is shown: <div style="text-align: center; border: 1px solid black; padding: 5px; margin: 10px 0;"> Cash Drawer Status: Close </div> • Cash Drawer is opened when the following picture is shown: <div style="text-align: center; border: 1px solid black; padding: 5px; margin: 10px 0;"> Cash Drawer Status: Open </div>

3-3-4 Watchdog



Button/Item	Description
Count Mode (radio button)	Select second or minute as the time unit of the watchdog timer.
Setting Time	Set the timeout for the watchdog timer. (Maximum value: 255 seconds or minutes)
Watch Dog Control	<ul style="list-style-type: none"> • 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.

3-4 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:

API Function		DLL	
Cash Drawer	CashDrawerOpen GetCashDrawerStatus	multilangXML.dll	CashDrawer.dll
Watchdog (WD)	Watchdog_Set Watchdog_Stop Watchdog_SetMinSec Watchdog_Recount		WatchDog.dll
Hardware Monitor	HMWVvoltage_Get HMWTemperature_Get HMWFanSpeed_Get		Hardware Monitor.dll

Cash Drawer Function

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

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

AMI

BIOS SETUP

CHAPTER

4

This chapter shows how to set up the AMI BIOS.

The following sections are included:

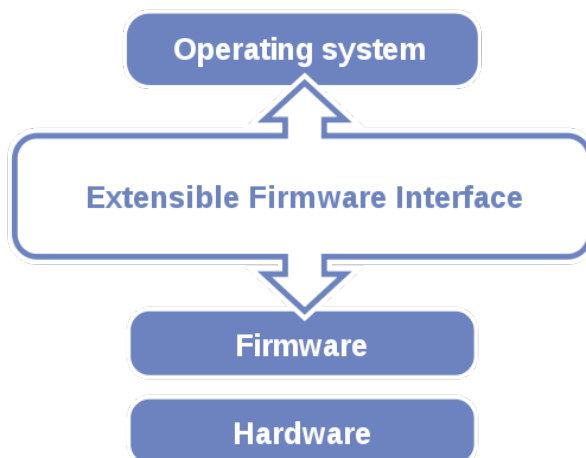
- Introduction
- Entering Setup Utility
- Main
- Advanced
- Chipset
- Security
- Boot
- Save & Exit

4-1. INTRODUCTION

The system PA-6980 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 the operating system and platform firmware. The interface consists of data tables that contain platform-related information, boot service calls, and runtime service calls that are available to the operating system and its loader. These elements have combined to provide a standard environment for booting the operating system and running pre-boot applications.

The diagram below shows the Extensible Firmware Interface's location in the software stack.



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

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

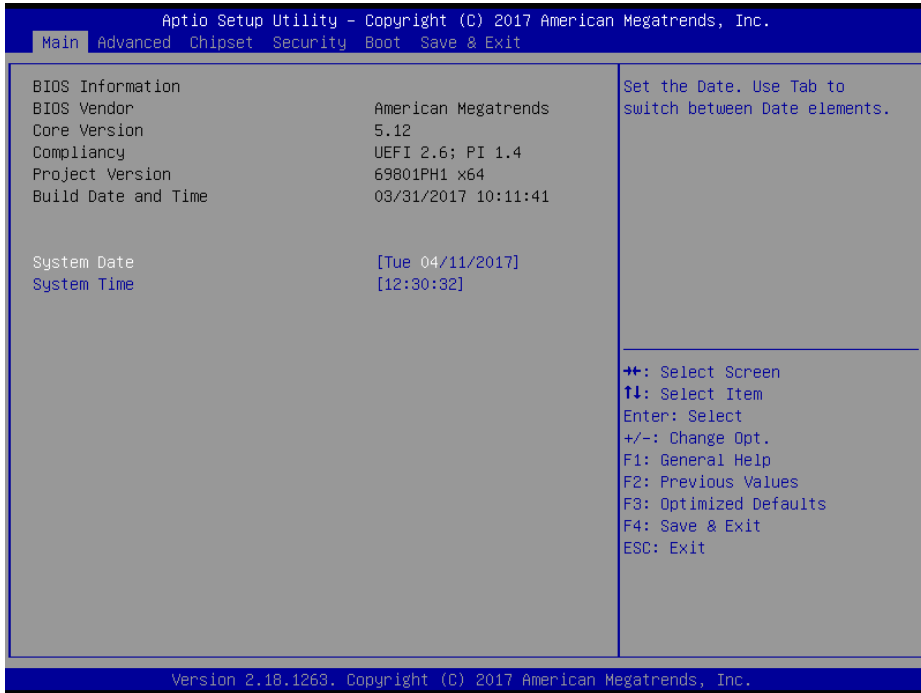
4-2. ENTERING SETUP UTILITY

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



POST Screen

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



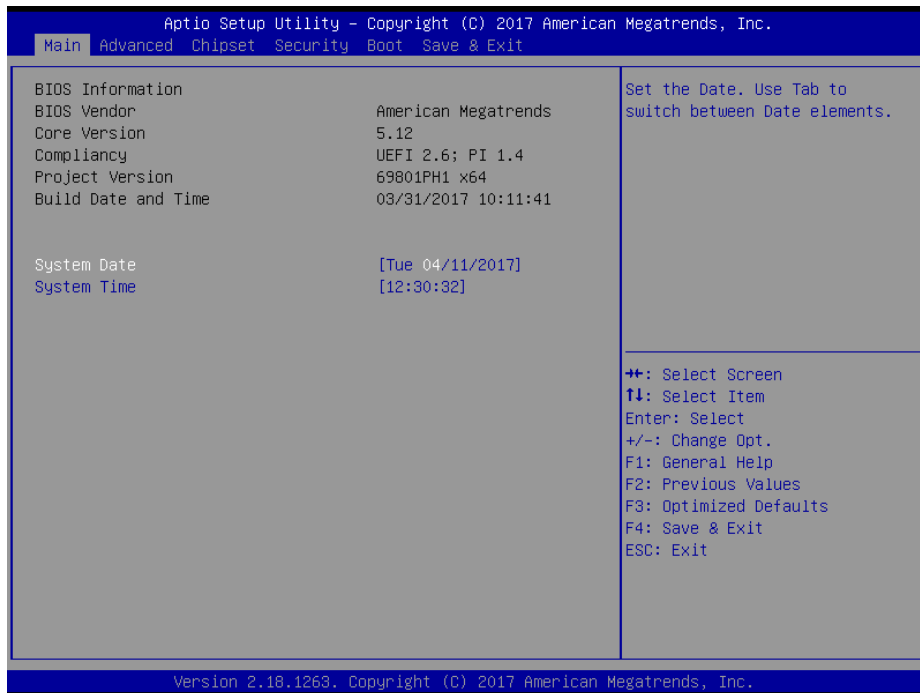
BIOS Setup Menu Initialization Screen

You may move the cursor by 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.

4-3. MAIN

Menu Path *Main*

Use <↑> or <↓> arrow keys to highlight the item and key in the value you want in each item. This menu provides basic system configurations, such as system date and time.



Main Screen

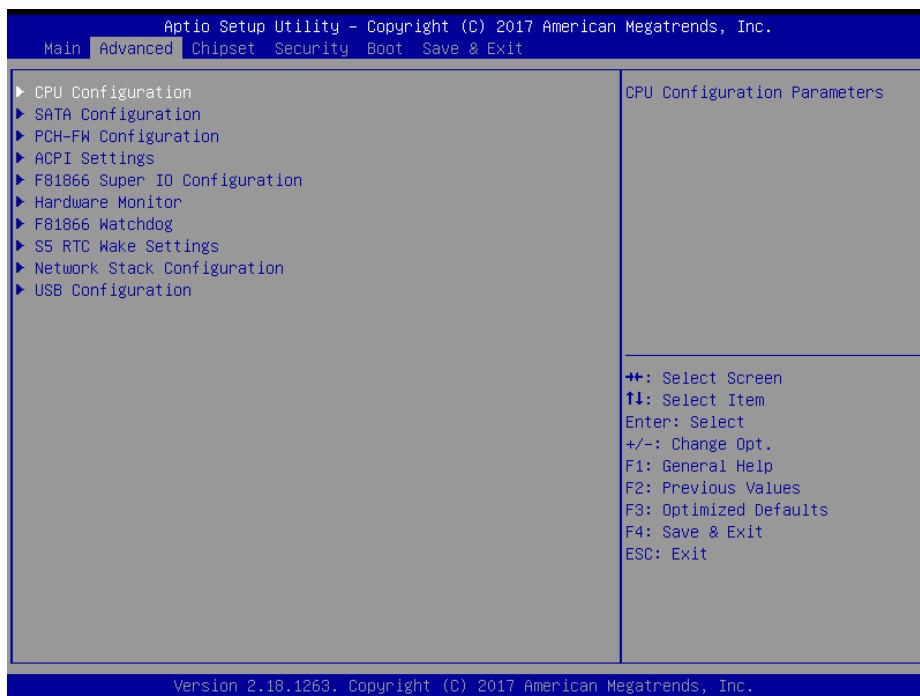
BIOS Setting	Options	Description/Purpose
BIOS Vendor	No changeable options	Displays the name of the BIOS vendor.
Core Version	No changeable options	Displays the current BIOS core version.
Compliancy	No changeable options	Displays the current UEFI version.
Project Version	No changeable options	Displays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

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

4-4. ADVANCED

Menu Path *Advanced*

This menu provides advanced configurations such as sub-menus of CPU Configuration, SATA Configuration, PCH-FW Configuration, ACPI Settings, F81866 Super I/O Configuration, Hardware Health Configuration, F81866 Watchdog, S5 RTC Wake Settings, Network Stack Configuration and USB Configuration.



Advanced Menu Screen

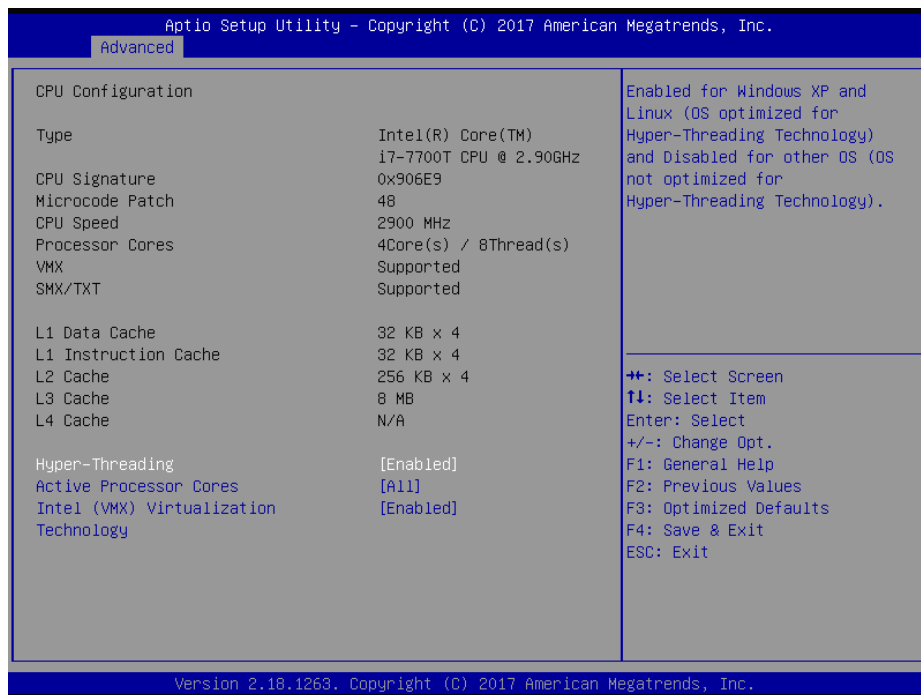
BIOS Setting	Options	Description/Purpose
CPU Configuration	Sub-Menu	CPU Configuration Parameters.
SATA Configuration	Sub-Menu	SATA Device Options Settings.
PCH-FW Configuration	Sub-Menu	Management Engine Technology Parameters.

BIOS Setting	Options	Description/Purpose
ACPI Settings	Sub-Menu	System ACPI Parameters.
F81866 Super IO Configuration	Sub-Menu	System Super I/O Chip Parameters.
Hardware Monitor	Sub-Menu	Monitor hardware status.
F81866 Watchdog	Sub-Menu	F81866 Watchdog Parameters.
S5 RTC Wake Settings	Sub-Menu	S5 RTC Wake Settings.
Network Stack Configuration	Sub-Menu	Network Stack Settings.
USB Configuration	Sub-Menu	USB Configuration Parameters.

4-4-1. Advanced – CPU Configuration

Menu Path *Advanced > CPU Configuration*

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



CPU Configuration Screen

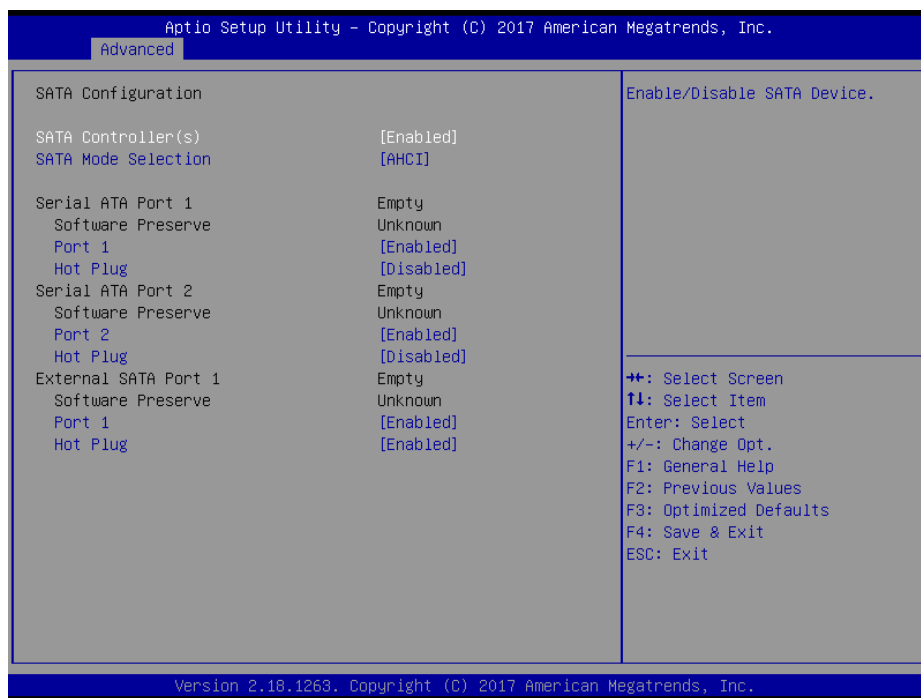
BIOS Setting	Options	Description/Purpose
Type	No changeable options	Displays CPU Model.
CPU Signature	No changeable options	Displays CPU Signature.
Microcode Patch	No changeable options	CPU Microcode Patch Revision.
CPU Speed	No changeable options	Displays the CPU Speed.
Processor Cores	No changeable options	Displays the number of cores of the processor.
VMX	No changeable options	Reports if Intel VT-x Technology is supported by the processor.

BIOS Setting	Options	Description/Purpose
		Previously codenamed "Vanderpool", VT-x represents Intel's technology for virtualization on the x86 platform. Utilizing Vanderpool Technology (VT), a VMM (Virtual Machine Monitor) can utilize the additional hardware capabilities.
SMX/TXT	No changeable options	Reports if Intel Secure Mode Extensions Technology is supported by the processor.
L1 Data Cache	No changeable options	Displays L1 Data Cache size.
L1 Instruction Cache	No changeable options	Displays L1 Instruction Cache size.
L2 Cache	No changeable options	Displays L2 Cache size.
L3 Cache	No changeable options	Displays L3 Cache size.
L4 Cache	No changeable options	Displays L4 Cache size
Hyper-threading	- Disabled - Enabled	When disabled, only one thread per enabled core is enabled.
Active Processor Cores	- All - 1 to n (depend on CPU)	Number of cores to enable in each processor package.
Intel (VMX) Virtualization Technology	- Disabled - Enabled	When enabled, a VMM (Virtual Machine Monitor) can utilize the additional hardware capabilities provided by Vanderpool Technology (VT).

4-4-2. Advanced – SATA Configuration (AHCI Mode)

Menu Path *Advanced > SATA Configuration*

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



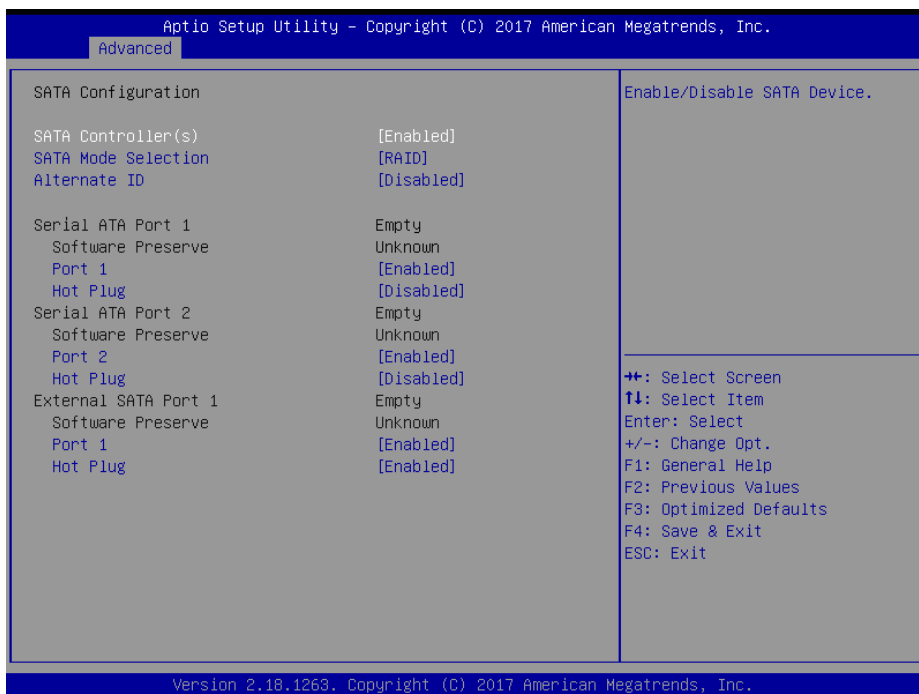
SATA Configuration Screen

BIOS Setting	Options	Description/Purpose
SATA Controller(s)	- Disabled - Enabled	Enables or Disables SATA Device.
SATA Mode Selection	- AHCI - RAID	Determines how SATA controller(s) operate.
Serial ATA Port 1 – 2,	No changeable options	Displays the SATA device's name.

BIOS Setting	Options	Description/Purpose
External SATA Port 1		
Software Preserve	No changeable options	Indicates whether the connected SATA device supports Software Setting Preservation (SSP).
Port 1 - 2	- Disabled - Enabled	Enables or Disables SATA Port 1 or 2 Device.
Hot Plug	- Disabled - Enabled	Enables or Disables Hot Plug function to designate a SATA port device as hot-pluggable.

Menu Path *Advanced > SATA Configuration (RAID for Q170 only)*

The following screen indicates the functions available when the SATA controller is enabled and the RAID mode is specified.



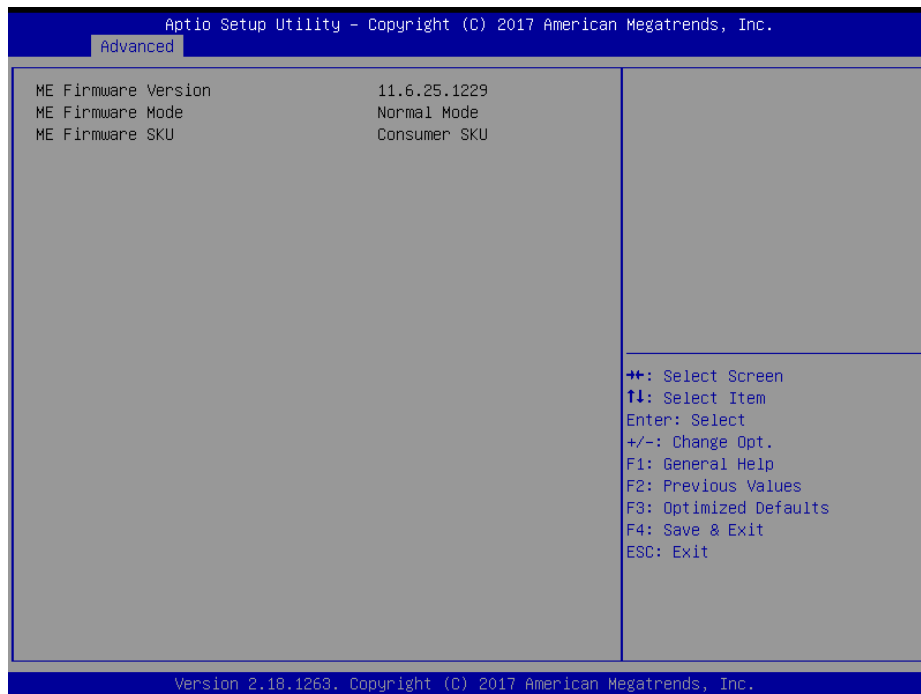
SATA Configuration Screen (RAID, for Q170 only)

BIOS Setting	Options	Description/Purpose
SATA Controller(s)	- Disabled - Enabled	Enables or Disables SATA device.
SATA Mode Selection	- AHCI - RAID	Determines how SATA controller(s) operate.
Alternate ID	- Disabled - Enabled	Reports the alternate device ID of SATA Controller.
Serial ATA Port 1 – 2, External SATA Port 1	No changeable options	Displays the SATA device's name.
Software Preserve	No changeable options	Indicates whether or not a connected device supports Software Setting

BIOS Setting	Options	Description/Purpose
		Preservation (SSP).
Port 1 - 2	- Disabled - Enabled	Enables or Disables SATA Port 1 or 2 device.
Hot Plug	- Disabled - Enabled	Enables or Disables Hot Plug function to designate a SATA port device as hot-pluggable.

4-4-3. Advanced – PCH-FW Configuration

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



PCH-FW Configuration Screen

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

4-4-4. Advanced – ACPI Settings

Menu Path *Advanced > ACPI Settings*

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



ACPI Settings Screen

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

4-4-5. Advanced – F81866 Super IO Configuration

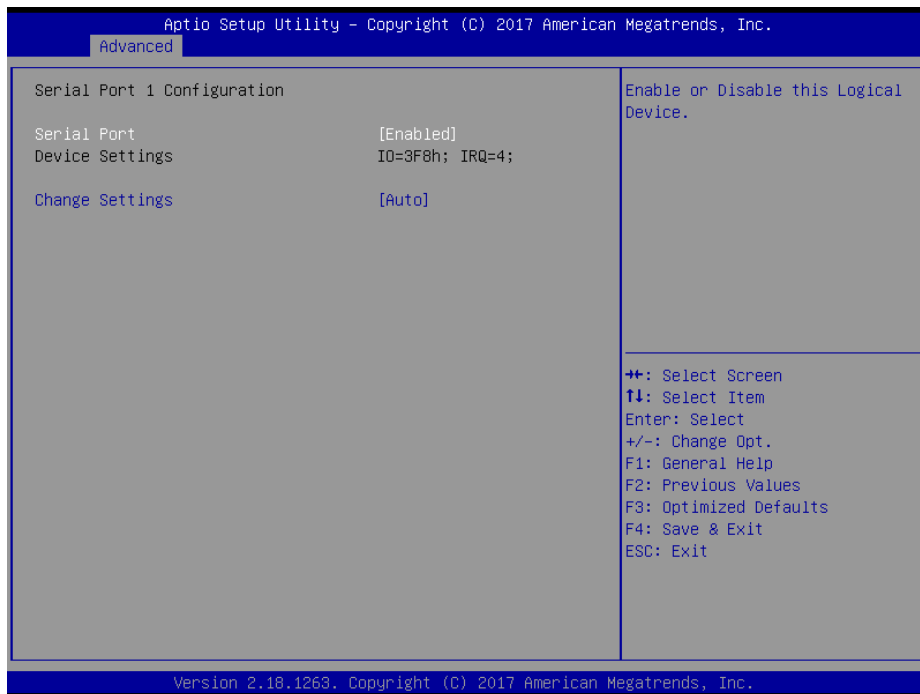
Menu Path *Advanced > F81866 Super IO Configuration*



F81866 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).
Serial Port 5 Configuration	Sub-menu	Sets parameters of Serial Port 5 (COME).

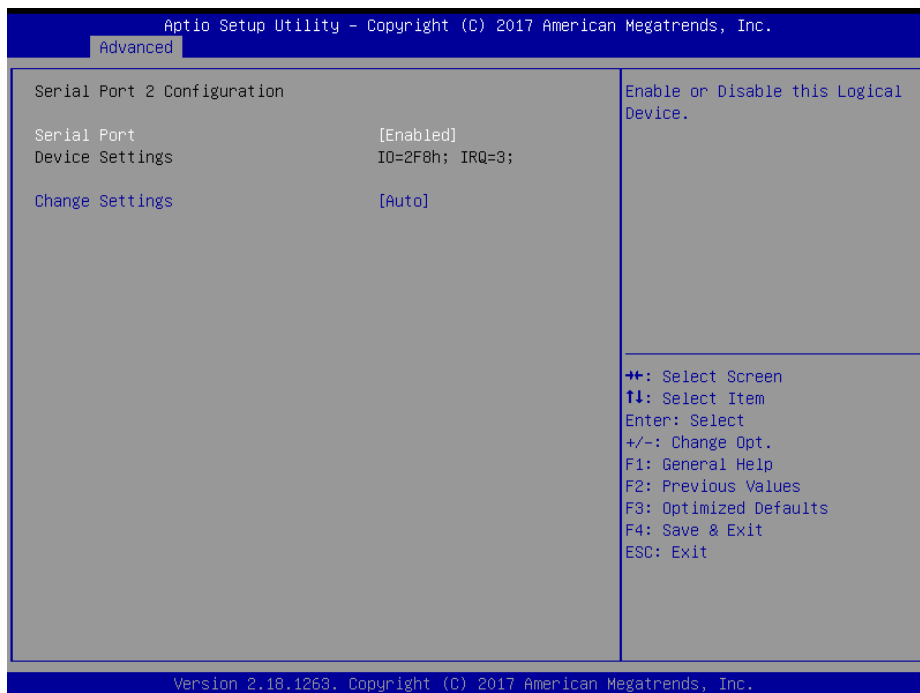
Menu Path *Advanced > F81866 Super IO Configuration > Serial Port 1 Configuration*



Serial Port 1 Configuration Screen

BIOS Setting	Options	Description/Purpose
Serial Port	- Disabled - Enabled	Enables or Disables Serial Port 1.
Device settings	No changeable options	Displays the current settings of Serial Port 1.
Change Settings	- Auto - IO=3F8h; IRQ=4; - IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; - 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 settings for Serial Port 1.

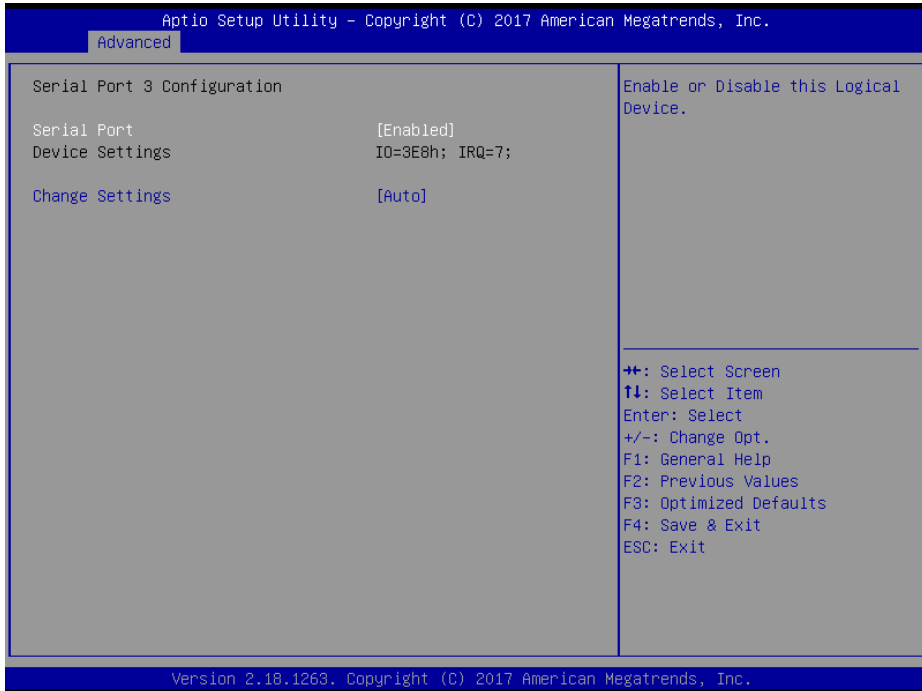
Menu Path *Advanced > F81866 Super IO Configuration > Serial Port 2 Configuration*



Serial Port 2 Configuration Screen

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

Menu Path *Advanced > F81866 Super IO Configuration > Serial Port 3 Configuration*



Serial Port 3 Configuration Screen

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

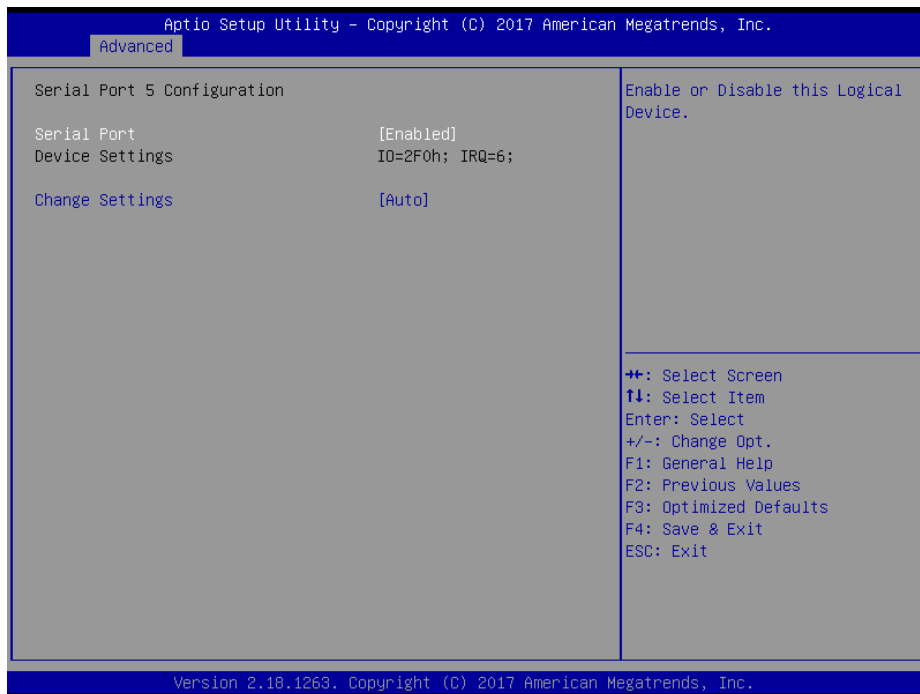
Menu Path *Advanced > F81866 Super IO Configuration > Serial Port 4 Configuration*



Serial Port 4 Configuration Screen

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

Menu Path *Advanced > F81866 Super IO Configuration > Serial Port 5 Configuration*



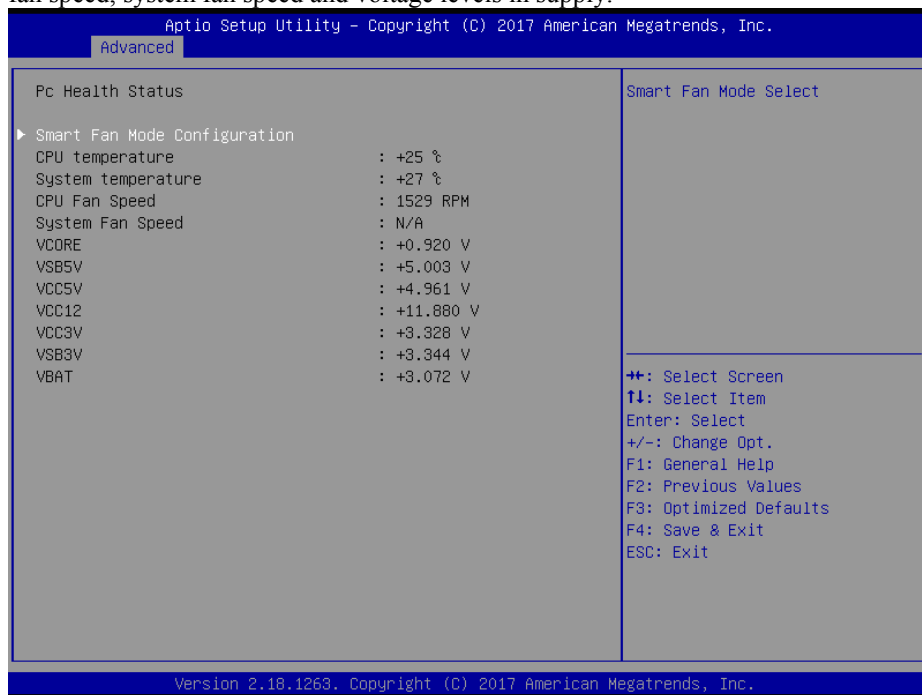
Serial Port 5 Configuration Screen

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

4-4-6. 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, system 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	Display CPU Fan speed.
System Fan Speed	No changeable options	Display System Fan speed
VCORE	No changeable options	Detects and displays the VCORE CPU

BIOS Setting	Options	Description/Purpose
VSB5V	No changeable options	voltage. Detects and displays VSB5V voltage.
VCC5V	No changeable options	Detects and displays 5V voltage.
VCC12	No changeable options	Detects and displays 12V voltage.
VCC3V	No changeable options	Detects and displays 3V voltage.
VSB3V	No changeable options	Detects and displays the voltage level of VSB3V in supply.
VBAT	No changeable options	Detects and displays the battery voltage.

4-4-6-1. Advanced – Smart Fan Mode Configuration

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



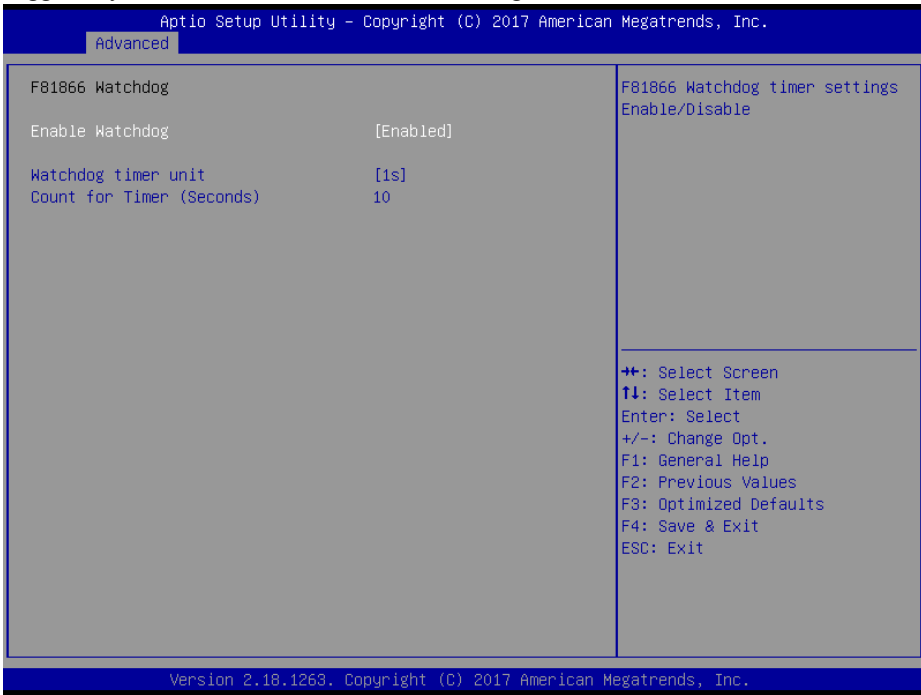
Smart Fan Mode Configuration Screen

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

4-4-7. Advanced – F81866 Watchdog Configuration

Menu Path *Advanced > F81866 Watchdog*

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



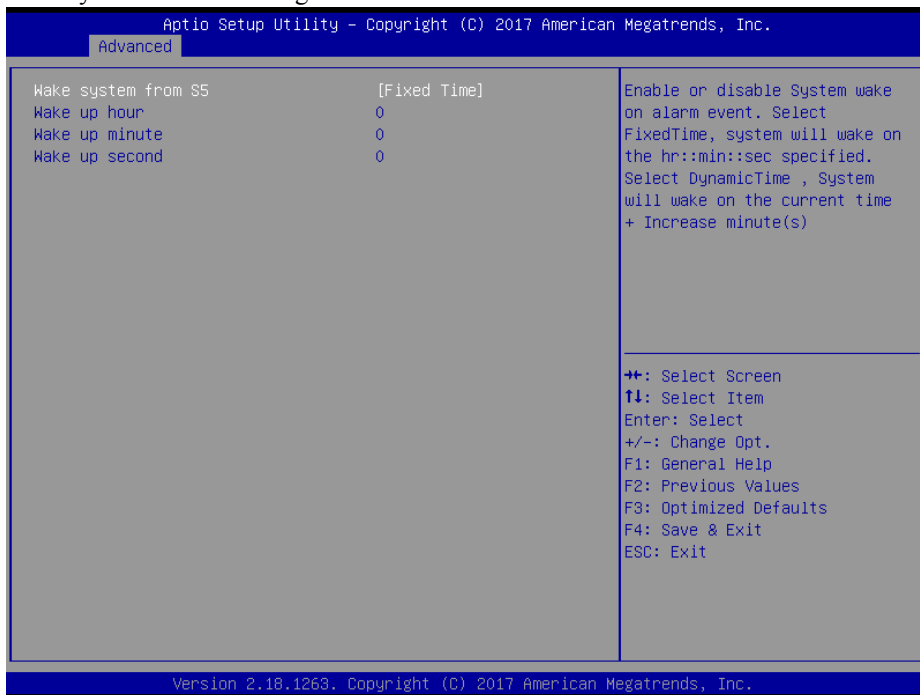
F81866 Watchdog Configuration Screen

BIOS Setting	Options	Description/Purpose
Enable Watchdog	- Enabled - Disabled	Enables/Disables F81866 Watchdog timer settings.
Watchdog timer unit	- 1s - 60s	Selects 1s (second) or 60s (minute) as the time unit of Watchdog timer.
Count for Timer (Seconds)	Numeric (from 1 to 255)	Sets the timeout for Watchdog timer. (Max. value: 255 seconds or minutes)

4-4-8. Advanced – S5 RTC Wake Settings

Menu Path *Advanced > S5 RTC Wake Settings*

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



S5 RTC Wake Settings Screen

BIOS Setting	Options	Description/Purpose
Wake system from S5	- Disabled - Fixed Time - Dynamic Time	Enables or disables System wake on alarm event. <ul style="list-style-type: none"> • 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 am. and 15 for 3 pm.

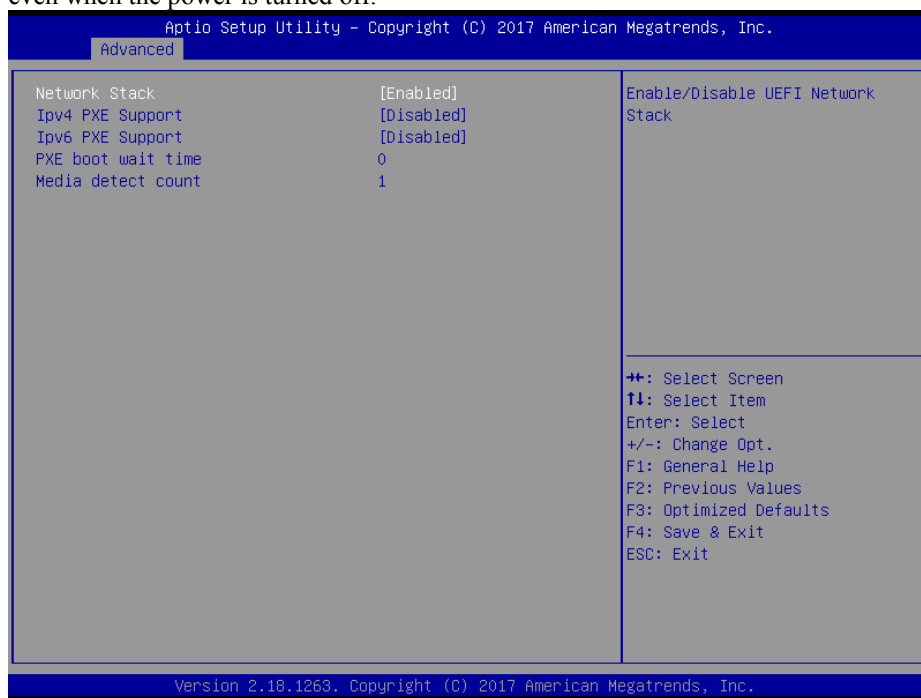
BIOS Setting	Options	Description/Purpose
Wake up minute	Numeric (from 0 to 59)	Enters 0-59 to set the wake-up minute.
Wake up second	Numeric (from 0 to 59)	Enters 0-59 to set the wake-up second.
Wake up minute increase	Numeric (from 1 to 5)	Enters 1-5 to set the increased minute(s) for dynamic wake-up time.

4-4-9. Advanced – Network Stack Configuration

Menu Path *Advanced > Network Stack Configuration*

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

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



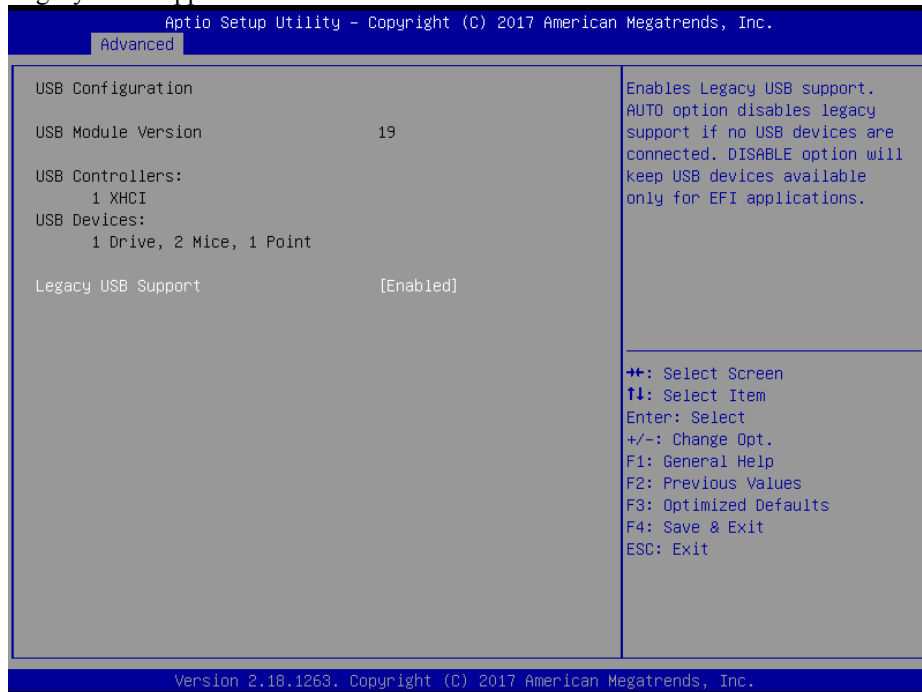
Network Stack Configuration Screen

BIOS Setting	Options	Description/Purpose
Network Stack	- Disabled - Enabled	Enables or Disables UEFI Network Stack.
Ipv4 PXE Support	- Disabled - Enabled	Enables IPv4 PXE Boot Support. If disabled, IPv4 PXE boot option will not be created.
Ipv6 PXE Support	- Disabled - Enabled	Enables IPv6 PXE Boot Support. If disabled, IPv6 PXE boot option will not be created.
PXE boot wait time	Numeric (from 0 to 5)	Number of seconds to wait for PXE boot to abort after the Esc key is pressed.
Media detect count	Numeric (from 1 to 50)	Number of times that the media presence will be checked.

4-4-10. Advanced – USB Configuration

Menu Path *Advanced > USB Configuration*

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



USB Configuration Screen

BIOS Setting	Options	Description/Purpose
Legacy USB Support	- Disabled - Enabled - Auto	Sets to "Enabled" if you want to use USB device in the legacy operating system.

4-5. CHIPSET

Menu Path *Chipset*

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



Chipset Screen

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

4-5-1. Chipset – System Agent (SA) Configuration

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

The **System Agent Configuration** allows users to configure graphics settings and displays the DRAM information on the platform.



System Agent (SA) Configuration Screen

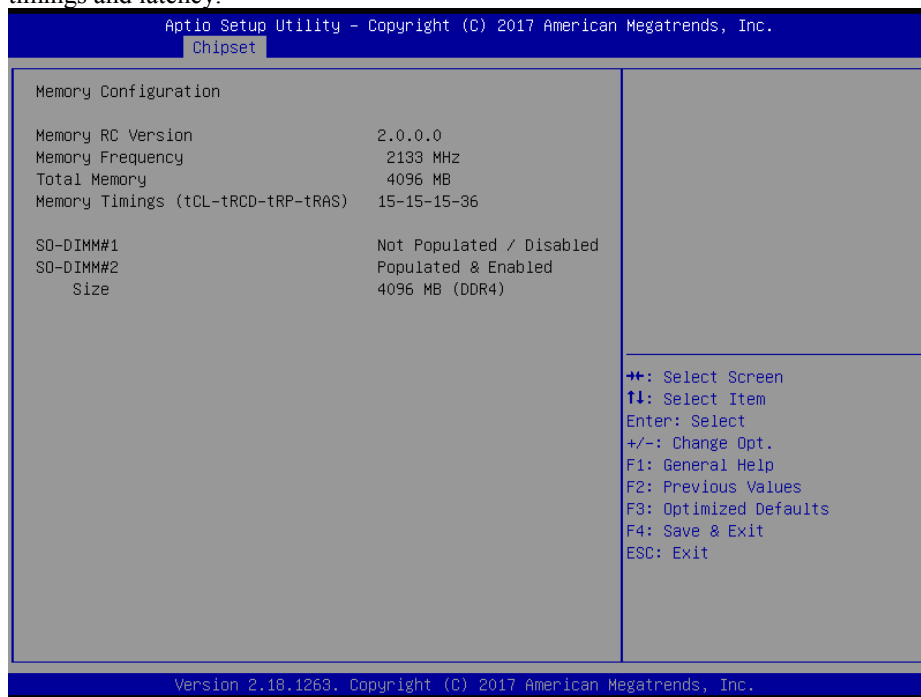
BIOS Setting	Options	Description/Purpose
SA PCIe Code Version	No changeable options	Displays the SA PCIe Code Version.
VT-d	No changeable options	Indicates whether Intel's VT-d (Virtualization Technology for Directed I/O) capability is supported. VT-d extends Intel's Virtualization Technology (VT) roadmap by providing hardware assists for virtualization solution, and helps end users improve security and reliability of the systems and also improves performance of

BIOS Setting	Options	Description/Purpose
		I/O devices in virtualized environment.
VT-d	- Disabled - Enabled	Enables or Disables VT-d function.
Memory Configuration	Sub-menu	Displays the DRAM information on the platform.
Graphics Configuration	Sub-menu	Configures Graphics Settings.

4-5-1-2. Chipset – Memory Configuration

Menu Path *Chipset > Memory Configuration*

The **Memory Configuration** allows users to check for the information about the memory frequency, total DRAM size, SO-DIMM#1, 2 size, and memory (RAM) timings and latency.



Memory Configuration Screen

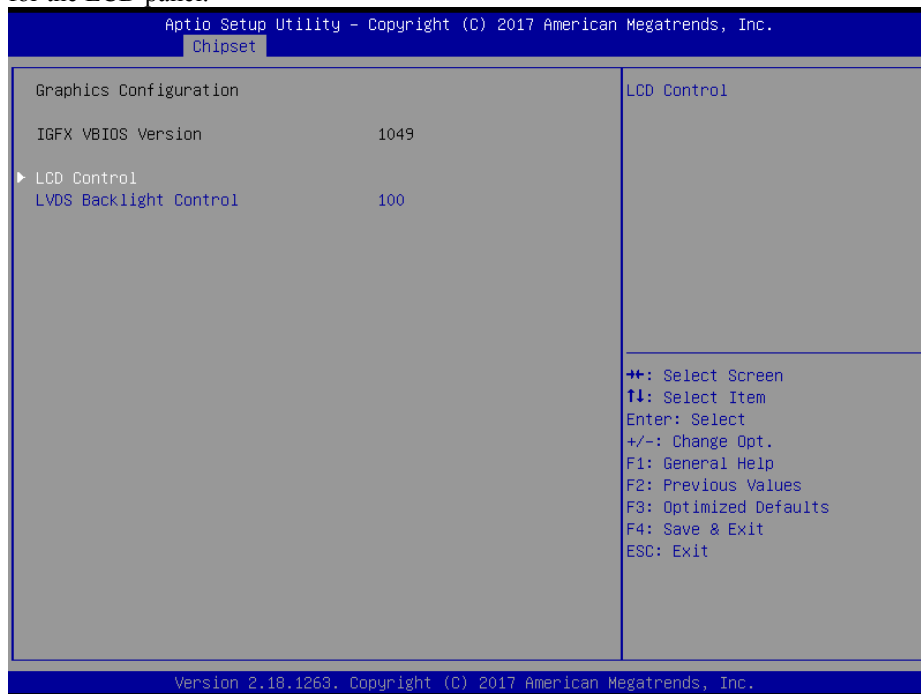
BIOS Setting	Options	Description/Purpose
Memory RC Version	No changeable options	Displays the Memory RC Version.
Memory Frequency	No changeable options	Displays the Frequency of Memory.
Total Memory	No changeable options	Displays the total system memory.
Memory Timings (tCL-tRCD-tRP-tRAS)	No changeable options	Displays the Memory (RAM) timings and latency. <ul style="list-style-type: none"> • CAS Latency (tCL) - This is the most

BIOS Setting	Options	Description/Purpose
		<p>important memory timing. CAS stands for Column Address Strobe. If a row has already been selected, it tells us how many clock cycles we'll have to wait for a result (after sending a column address to the RAM controller).</p> <ul style="list-style-type: none"> • Row Address (RAS) to Column Address (CAS) Delay (tRCD) - Once we send the memory controller a row address, we'll have to wait this many cycles before accessing one of the row's columns. So, if a row hasn't been selected, this means we'll have to wait tRCD + tCL cycles to get our result from the RAM. • Row Precharge Time (tRP) - If we already have a row selected, we'll have to wait this number of cycles before selecting a different row. This means it will take tRP + tRCD + tCL cycles to access the data in a different row. • Row Active Time (tRAS) - This is the minimum number of cycles that a row has to be active for to ensure we'll have enough time to access the information that's in it. This usually needs to be greater than or equal to the sum of the previous three latencies (tRAS = tCL + tRCD + tRP).
SO-DIMM#1	No changeable options	Displays the status of SO-DIMM#1.
Size	No changeable options	Displays the size of SO-DIMM#1.
SO-DIMM#2	No changeable options	Displays the status of SO-DIMM#2.
Size	No changeable options	Displays the size of SO-DIMM#2.

4-5-1-3. Chipset – Graphics Configuration

Menu Path *Chipset > Graphics Configuration*

The **Graphics Configuration** allows users to adjust the LVDS backlight brightness for the LCD panel.



Graphics Configuration Screen

BIOS Setting	Options	Description/Purpose
IGFX VBIOS Version	No changeable options	Displays the IGFX VBIOS Version.
LCD Control	Sub-menu	LCD Control sub-menu.
LVDS Backlight Control	Numeric (from 10 to 100)	Allows users to adjust the backlight of the LCD panel brightness ranging from 10 to 100 in scale.

Menu Path *Chipset > Graphics Configuration > LCD Control*

The **LCD Control** allows users to select the primary and secondary display device.



LCD Control Screen

BIOS Setting	Options	Description/Purpose
Primary IGFX Boot Display	- VBIOS default - VGA - LVDS	Selects Primary Display device.
Secondary IGFX Boot Display	- Disabled - VGA - LVDS	Selects Secondary Display device.

4-5-2. 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

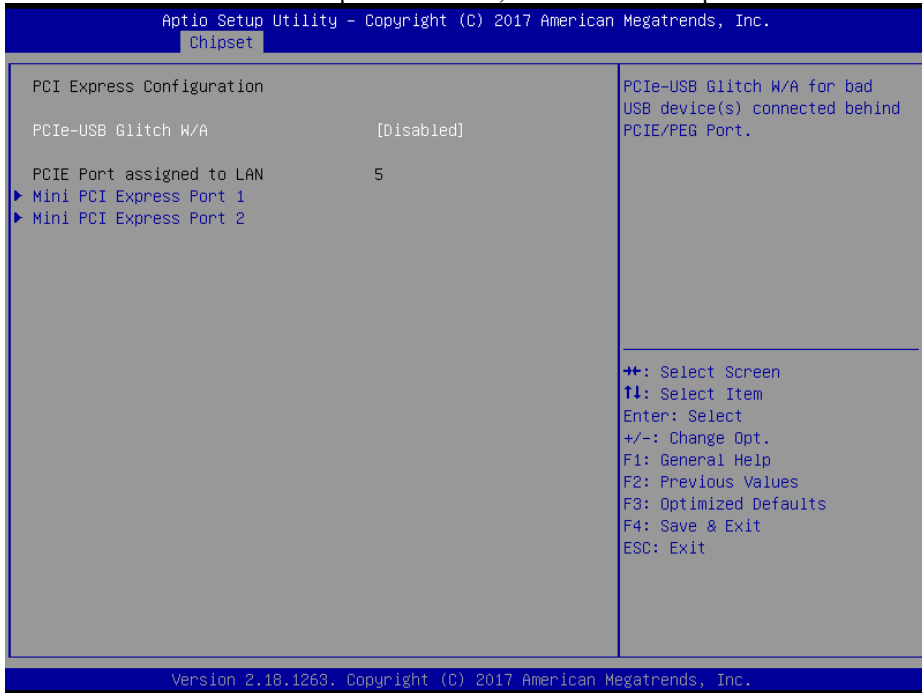
BIOS Setting	Options	Description/Purpose
Intel PCH RC Version	No changeable options	Displays the Intel PCH RC Version.
Intel PCH SKU Name	No changeable options	Displays the Intel PCH SKU Name.
Intel PCH Rev ID	No changeable options	Displays the Intel PCH Revision ID.
PCI Express Configuration	Sub-menu	PCI Express Configuration settings.

BIOS Setting	Options	Description/Purpose
PCH LAN Controller	- Disabled - Enabled	Enables or Disables onboard NIC.
Wake On LAN	- Disabled - Enabled	Enables or Disables integrated LAN to wake up the system.
State After G3	- Power On - Power Off	Specifies the Power On/Off state that the system will go to when the power is re-applied following a power failure (G3 state).

4-5-2-1. Chipset – PCI Express Configuration

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

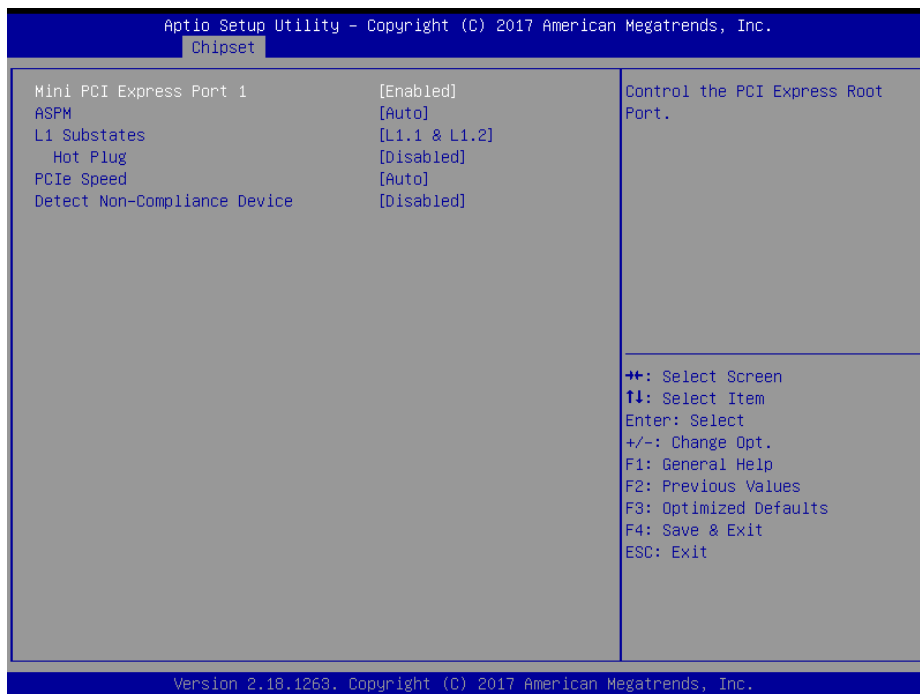
The **PCI Express Configuration** allows users to configure PCI Express slots, enable/disable the Mini PCI Express Ports 1-2, and set their bus speeds.



PCI Express Configuration Screen

BIOS Setting	Options	Description/Purpose
PCIe-USB Glitch W/A	- Disabled - Enabled	Provides the workaround to increase compatibility on bad USB device(s) connected behind PCIE/PEG Port.
PCIE Port assigned to LAN	No changeable options	Displays which PCIE Port assigned to LAN.
Mini PCI Express Port 1	Sub-menu	Mini PCI Express Port 1 settings.
Mini PCI Express Port 2	Sub-menu	Mini PCI Express Port 2 settings.

Menu Path *Chipset > PCH-IO Configuration > PCI Express Configuration > Mini PCI Express Port 1*

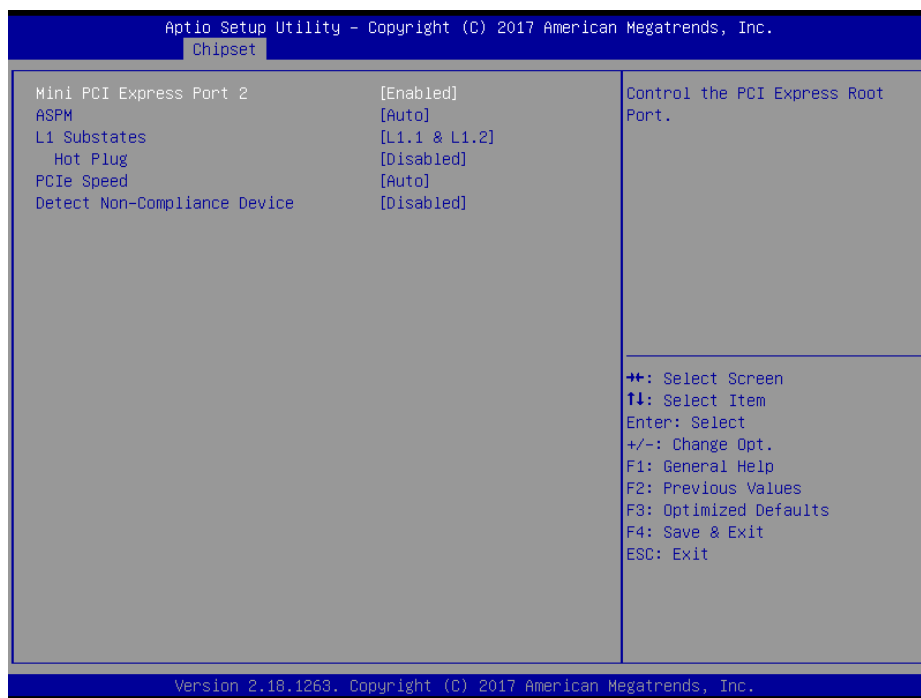


Mini PCI Express Port 1 Configuration Screen

BIOS Setting	Options	Description/Purpose
Mini PCI Express Port 1	- Disabled - Enabled	Controls the PCI Express Root Port.
ASPM	- Disabled - L0s - L1 - L0sL1 - Auto	Sets the ASPM (Active-State Power Management) Level. The option allows users to set lower power mode that activates when the bus is not being used.
L1 Substates	- Disabled - L1.1 - L1.2 - L1.1 & L1.2	Selects PCI Express L1 Substates settings.
Hot Plug	- Disabled - Enabled	Enables or Disables Hot Plug function to designate PCI Express port 1 device as hot-pluggable.

BIOS Setting	Options	Description/Purpose
PCIe Speed	- Auto - Gen1 - Gen2 - Gen3	Selects the speed of PCI Express Port 1.
Detect Non-Compliance Device	- Disabled - Enabled	Detects a Non-Compliance PCI Express device that is connected to the PCI Express port. If enabled, it will take more time during POST.

Menu Path *Chipset > PCH-IO Configuration > PCI Express Configuration > Mini PCI Express Port 2*



Mini PCI Express Port 2 Configuration Screen

BIOS Setting	Options	Description/Purpose
Mini PCI Express Port 2	- Disabled - Enabled	Controls the PCI Express Root Port.
ASPM	- Disabled - L0s - L1 - L0sL1 - Auto	Controls PCIe Active State Power Management settings. The option allows users to set lower power mode that activates when the bus is not being used.
L1 Substates	- Disabled - L1.1 - L1.2 - L1.1 & L1.2	PCI Express L1 Substates settings.
Hot Plug	- Disabled - Enabled	Enables or Disables Hot Plug function to designate PCI Express port 2 device as hot-pluggable.
PCIe Speed	- Auto - Gen1 - Gen2 - Gen3	Selects the speed for PCI Express Port 2.
Detect Non-Compliance Device	- Disabled - Enabled	Detects a Non-Compliance PCI Express device that is connected to the PCI Express port. If enabled, it will take more time during POST.

4-6. SECURITY

Menu Path	Security
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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.



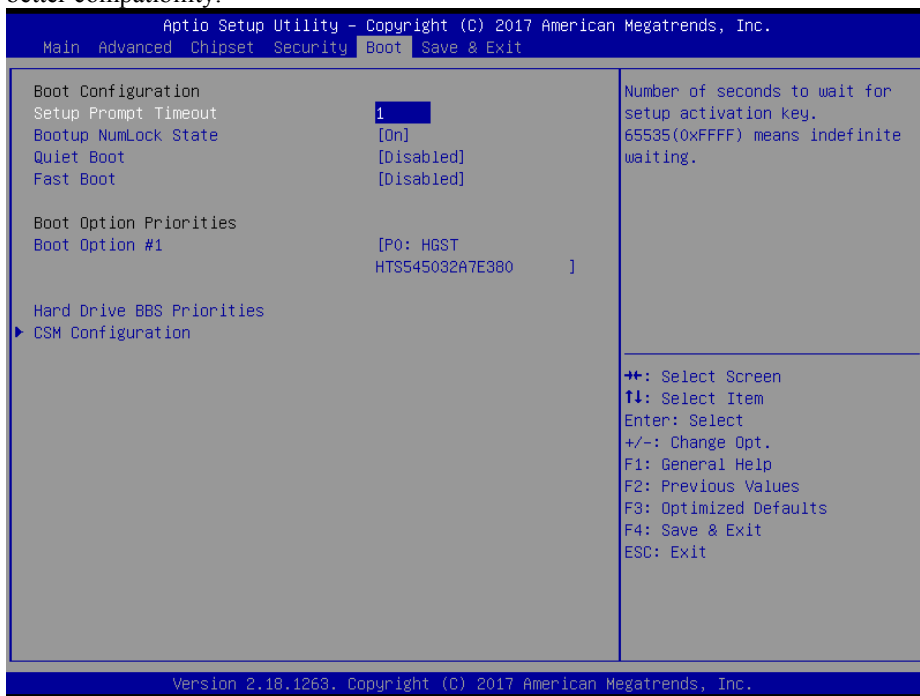
Security Screen

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.

4-7. 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, and setting CSM (Compatibility Support Module) configuration parameters to support legacy BIOS operation systems, various VGA, bootable devices and add-on devices for achieving better compatibility.



Boot Screen

BIOS Setting	Options	Description/Purpose
Setup Prompt Timeout	Numeric (from 1 to 65535)	Number of seconds to wait for setup activation key.
Bootup NumLock State	- On - Off	Specifies the NumLock state after the system is powered on. <ul style="list-style-type: none"> • On: Enables the NumLock function automatically after the system is powered on. • Off: Disables the NumLock function after the system is powered on.
Quiet Boot	- Disabled - Enabled	Enables or Disables Quiet Boot options. When this option is set to "Disabled", BIOS will display normal POST messages.
Fast Boot	- Disabled - Enabled	Enables or Disables Fast Boot option. It allows users to reduce the system startup time and start up the system in a fast manner.
Boot Option #1~#n	- [Drive(s)] - Disabled	Allows users to choose the boot sequence from the available device(s). Note that in the menu displayed, you will only see the device with the highest priority for a specific boot device type.
Hard Drive BBS Priorities	Sub-Menu	Defines the boot order for all the hard drives connected to the system, e.g. SATA, USB drive.
CSM Configuration	Sub-Menu	CSM configuration: Enable/Disable, Option ROM execution settings, etc.

4-7-1. Boot – Hard Drive BBS Priorities

Menu Path *Boot > Hard Drive BBS Priorities*

Select **Hard Drive BBS Priorities** from the **Boot** menu to configure the boot sequence and priority of the available drives.



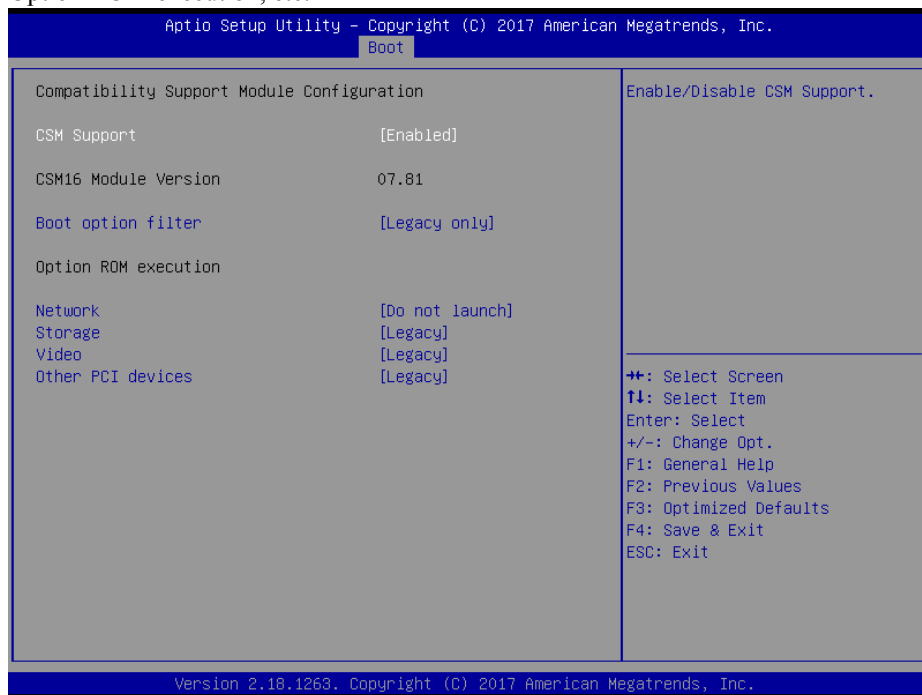
Hard Drive BBS Priorities Screen

BIOS Setting	Options	Description/Purpose
Boot Option #1~#n	- [Drive(s)] - Enabled	Allows users to set the priority of all the drives connected to the system or another bootable USB storage. Press Enter to enter the sub-menu and press <↑> or <↓> arrow keys to select the device. Another way is to press <+> or <-> to move the selected device up/down in the priority list.

4-7-2. Boot – CSM Configuration

Menu Path *Boot > CSM Configuration*

The **CSM Configuration** provides advanced CSM (Compatibility Support Module) configurations such as Enable/Disable CSM Support, Boot option filter, configure Option ROM execution, etc.



CSM Configuration Screen

BIOS Setting	Options	Description/Purpose
CSM Support	- Disabled - Enabled	Enables or Disables CSM Support.
CSM16 Module	No changeable options	Displays the CSM 16 Module version.

BIOS Setting	Options	Description/Purpose
Boot option filter	- UEFI and Legacy - Legacy only - UEFI only	This option controls Legacy/UEFI ROMs priority.
Network	- Do not launch - UEFI - Legacy	Controls the execution of UEFI and Legacy PXE Option ROM.
Storage	- Do not launch - UEFI - Legacy	Controls the execution of UEFI and Legacy Storage Option ROM.
Video	- Do not launch - UEFI - Legacy	Controls the execution of UEFI and Legacy Video Option ROM.
Other PCI devices	- Do not launch - UEFI - Legacy	Determines Option ROM execution policy for devices other than Network, Storage or Video.

4-8. SAVE & EXIT

Menu Path	<i>Save & Exit</i>
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Save Changed BIOS Settings

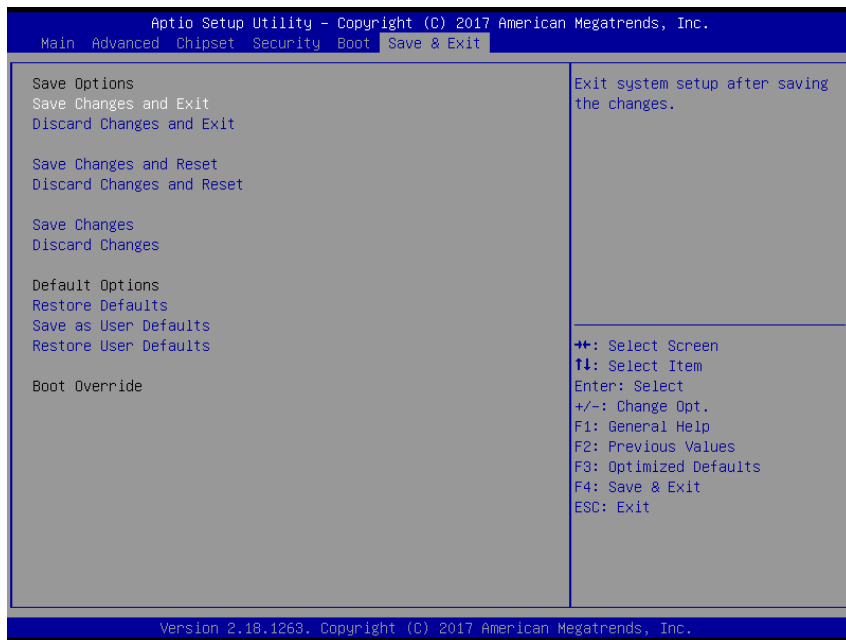
To save and validate the changed BIOS settings, select **Save Changes** from the **Save & Exit** menu, or you can select **Save Changes and Exit** to validate the changes and then exit the system. You can also simply press **F4** at any time to save the BIOS changes.

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 cancel the changed settings and restore the factory BIOS defaults.

Load User Defaults

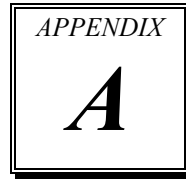
You may simply press **F3** at any time to load the **Optimized Values** which resets all BIOS settings to the factory defaults.



Save & Exit Screen

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

SYSTEM ASSEMBLY



This appendix contains exploded diagrams and part numbers of the 5-wire analog resistive touch panel and projected capacitive touch panel for PA-6980 system.

The following sections are included:

- Easy Maintenance
 - Hard Drive
 - Back Cover
 - CPU and Memory

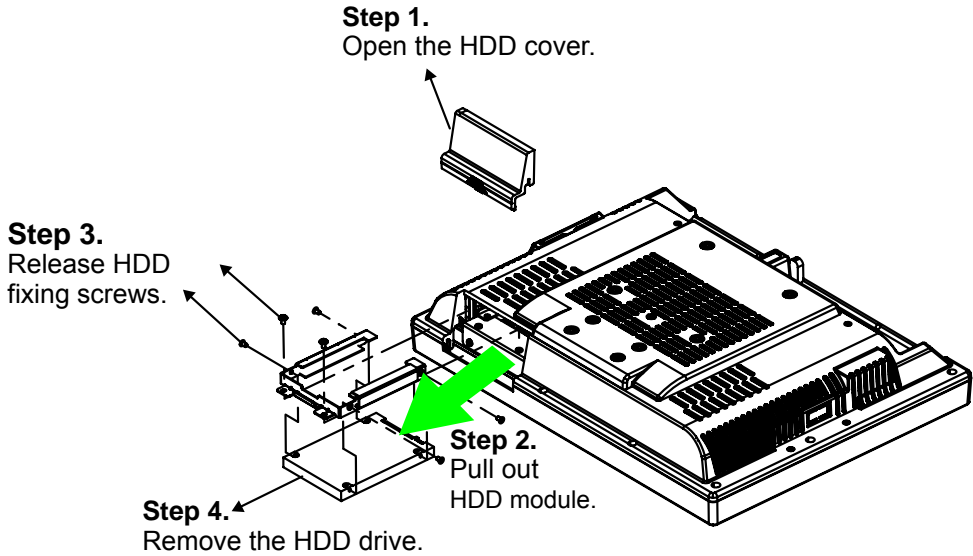
- Exploded Diagram for Panel PC
 - **Exploded Diagrams for 5-wire Analog Resistive Touch Panel:**
 - Exploded Diagram for PA-6980 POS Open & Close
 - Exploded Diagram for PA-6980 POS Stand
 - Exploded Diagram for PA-6980 120W Power Adapter
 - Exploded Diagram for PA-6980 PPC Open & Close
 - Exploded Diagram for PA-6980 Mainboard
 - Exploded Diagram for PA-6980 LCD Holder
 - Exploded Diagram for PA-6980 LCD Assembly
 - Exploded Diagram for PA-6980 Touch Panel Assembly
 - Exploded Diagram for PA-6980 HDD Module
 - Exploded Diagram for PA-6980 Metal Back Cover
 - Exploded Diagram for PA-6980 2.5" SATA HDD Module

Exploded Diagrams for Projected Capacitive Touch Panel:

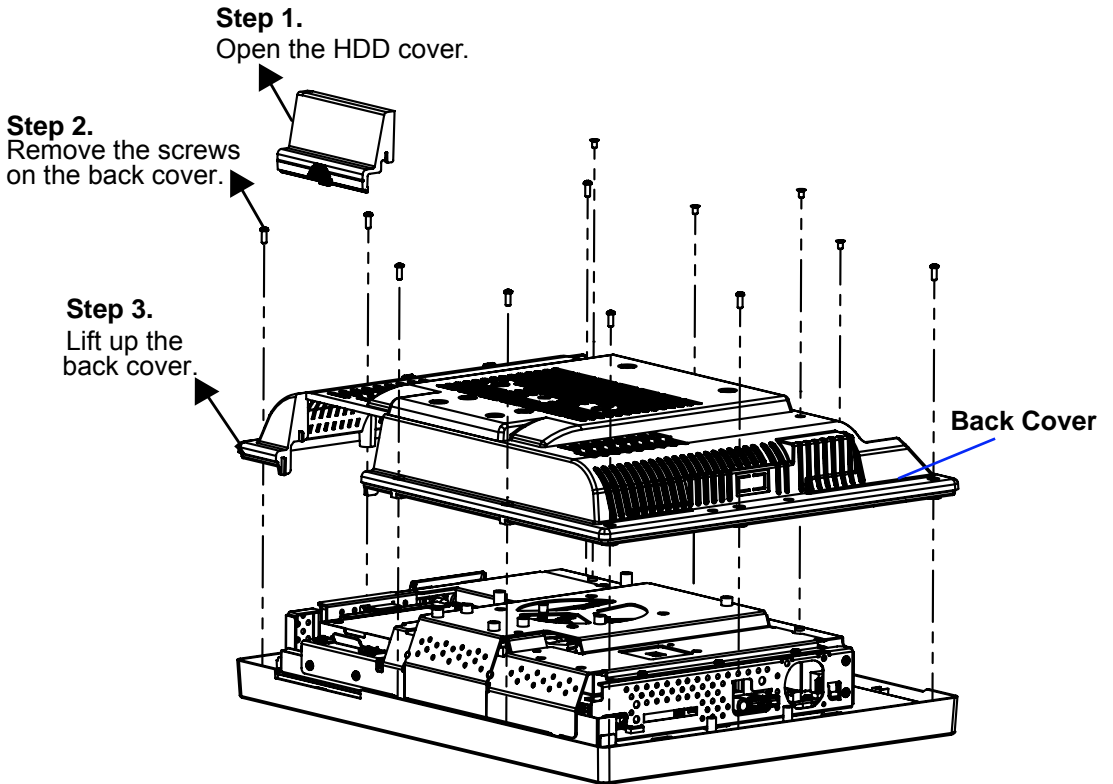
- Exploded Diagram for PA-6980 POS Open & Close
 - Exploded Diagram for PA-6980 POS Stand
 - Exploded Diagram for PA-6980 120W Power Adapter
 - Exploded Diagram for PA-6980 PPC Open & Close
 - Exploded Diagram for PA-6980 Mainboard
 - Exploded Diagram for PA-6980 LCD Holder
 - Exploded Diagram for PA-6980 LCD Assembly
 - Exploded Diagram for PA-6980 Touch Panel Assembly
 - Exploded Diagram for PA-6980 HDD Module
 - Exploded Diagram for PA-6980 Metal Back Cover
 - Exploded Diagram for PA-6980 2.5" SATA HDD Module
-
- Exploded Diagram for PA-6980 Printer Module
 - Exploded Diagram for PA-6980 MSR Module
 - Exploded Diagram for PA-6980 2nd Display
 - Exploded Diagram for PA-6980 VFD Module

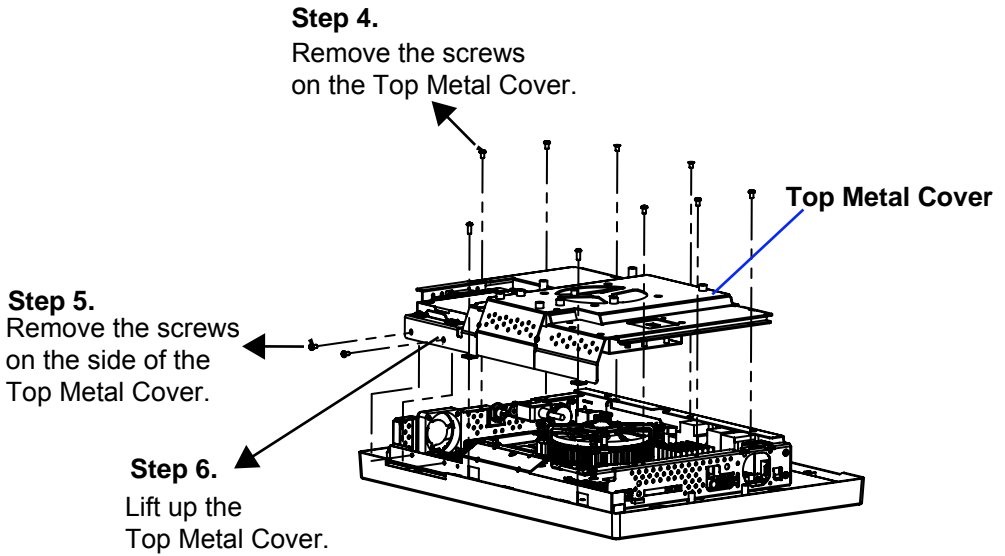
Easy Maintenance

HDD

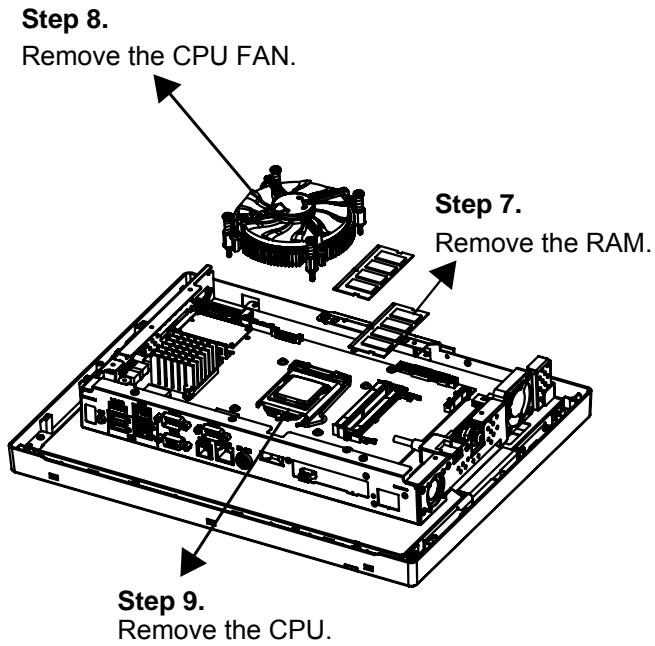


Back Cover



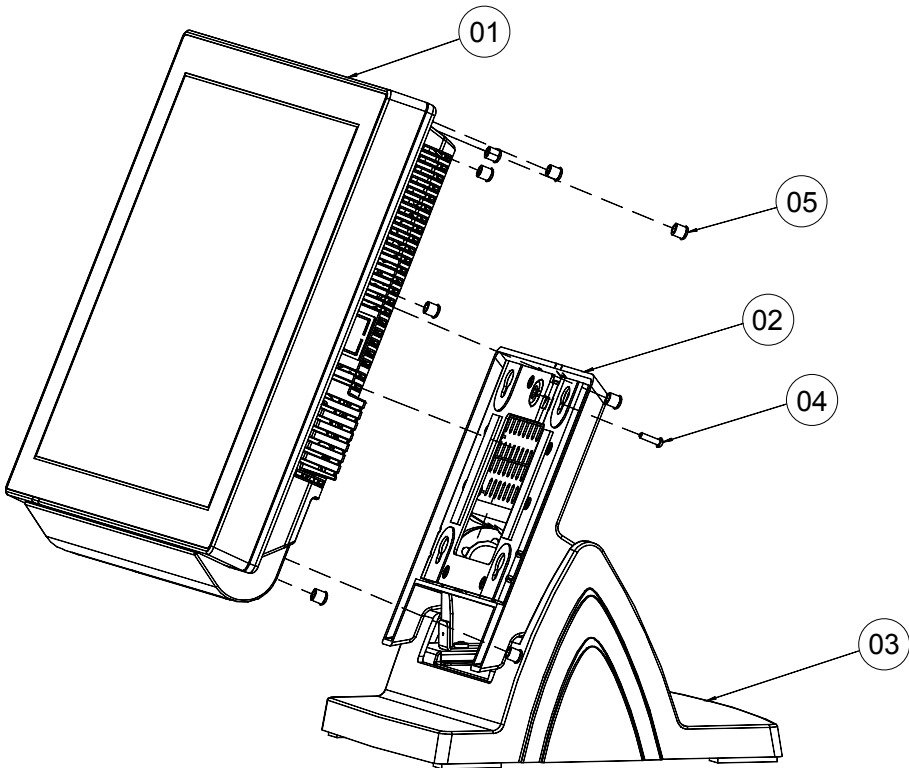


CPU and Memory



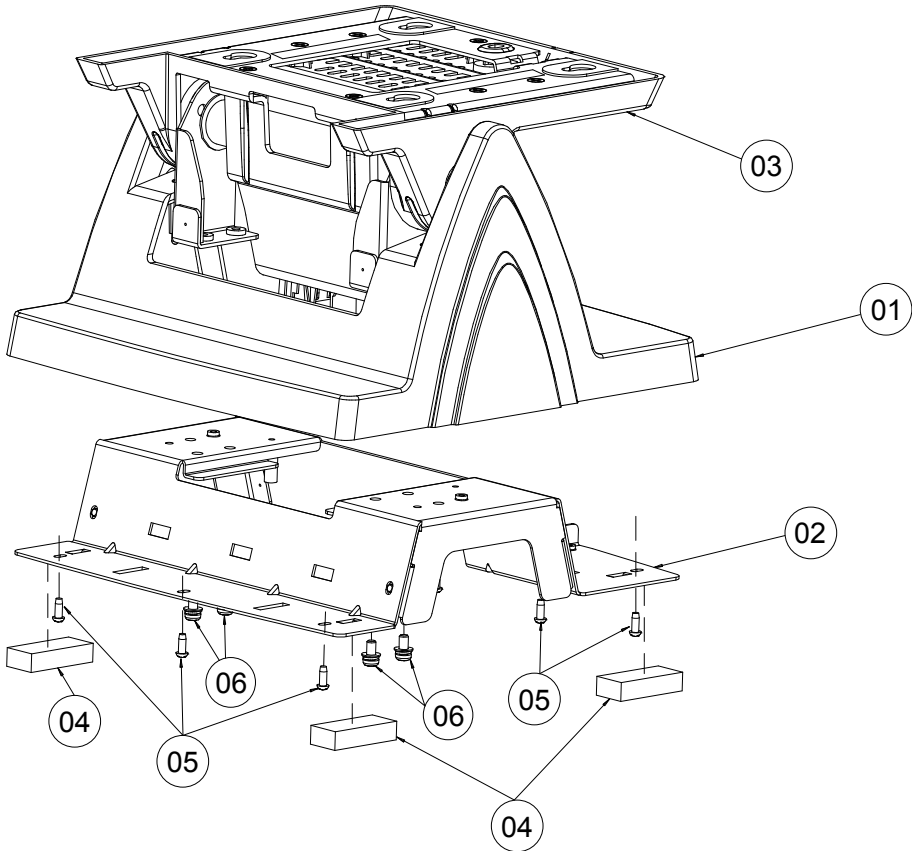
Projected Resistive Touch Screen

EXPLODED DIAGRAM FOR PA-6980 POS OPEN & CLOSE



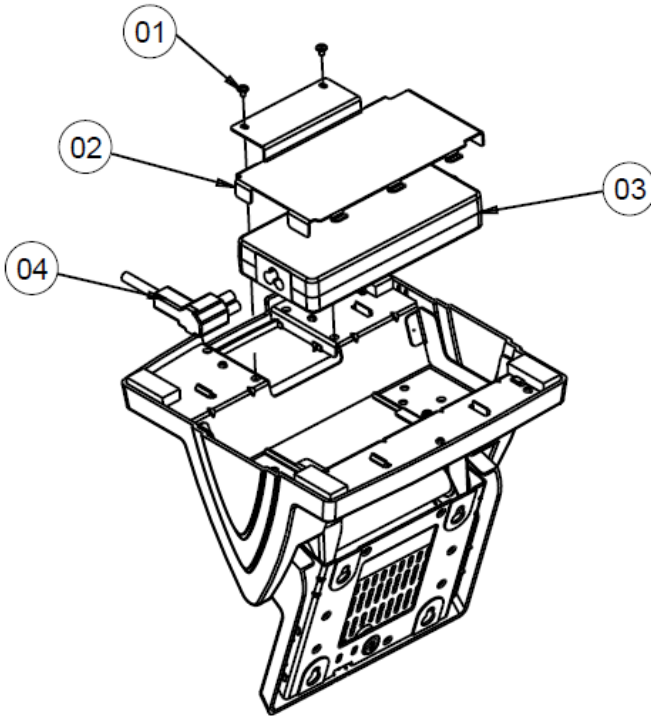
No.	Part Name	Part No.	Qty
1	PA-6980_PPC_MODULE	-----	1
2	POS-6920_ROTATE_MODULE	-----	1
3	POS-6920_STAND_MODULE	-----	1
4	RW_SCREW_M3_L15mm	22-235-30015011	1
5	SCREW HOLE RUBBER(Black)	30-062-01100197	8

EXPLODED DIAGRAM FOR PA-6980 STAND



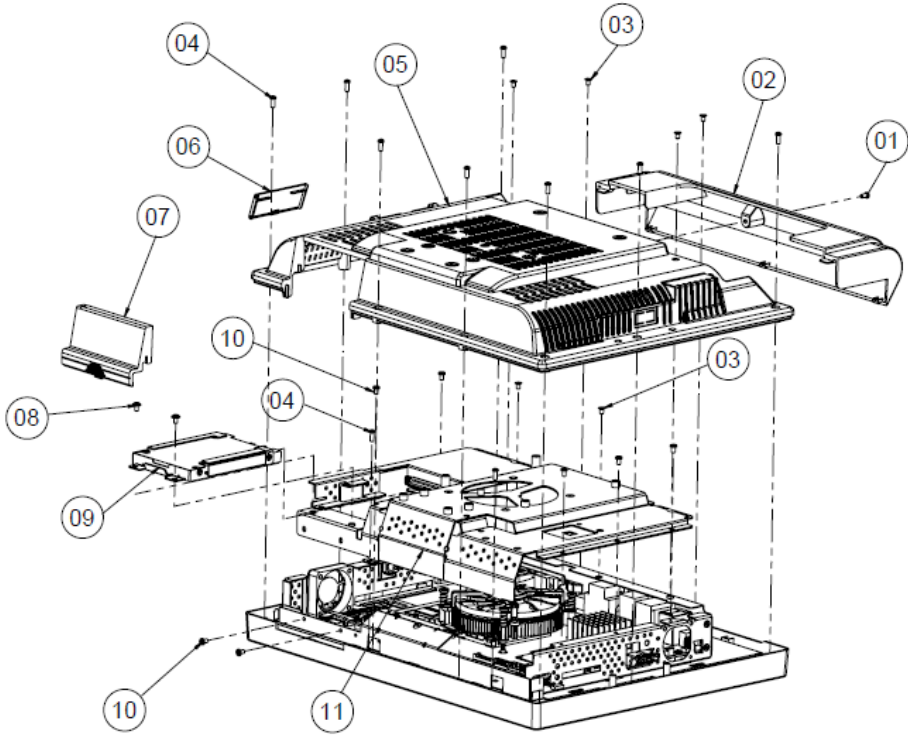
No.	Part Name	Part No.	Qty
1	POS-6920-STAND-COVER	30-002-28710226	1
2	POS-6920-STAND-BASE	80-032-03001226	1
3	POS-6920_ROTATE_MODULE	-----	1
4	RUBBER FOOT	30-004-01600000	4
5	TAPPING_SCREW_T3_L8mm	22-122-30080011	9
6	R_S_SCREW_M4_L8mm	22-232-40008211	4

EXPLODED DIAGRAM FOR PA-6980 120W Power Adapter



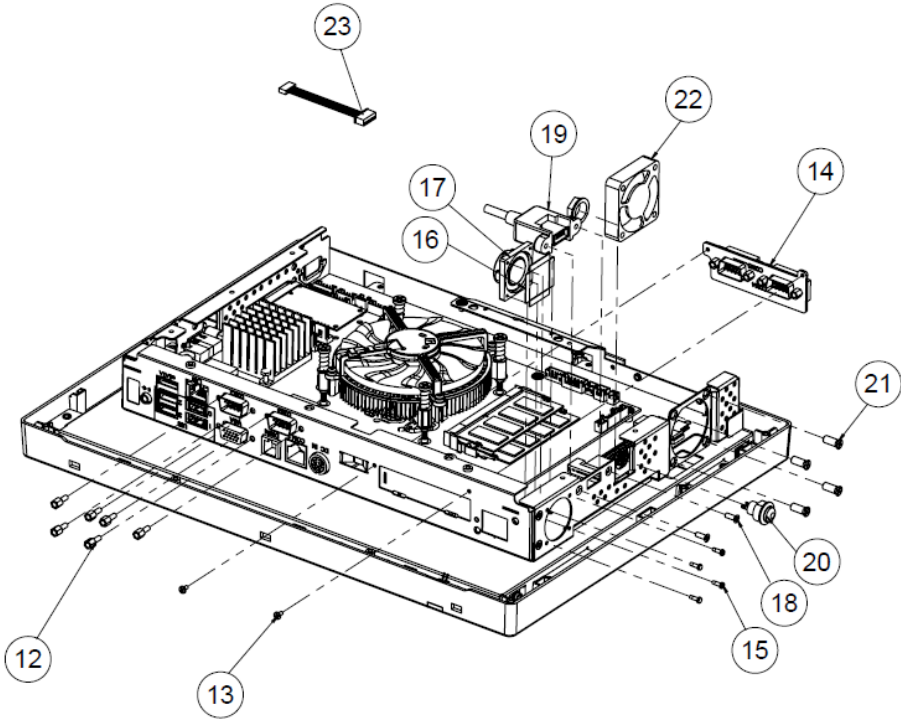
No.	Name	P/N No.	Q'ty
1	M3_L5_W_Ni	22-242-30005311	2
2	PA6920 POWER HOLDER 120W	20-029-03001226	1
3	120W Adapter	52-002-02900101	1
4	AC Cable	See Order	1

EXPLODED DIAGRAM FOR PA-6980 PPC Open and Close



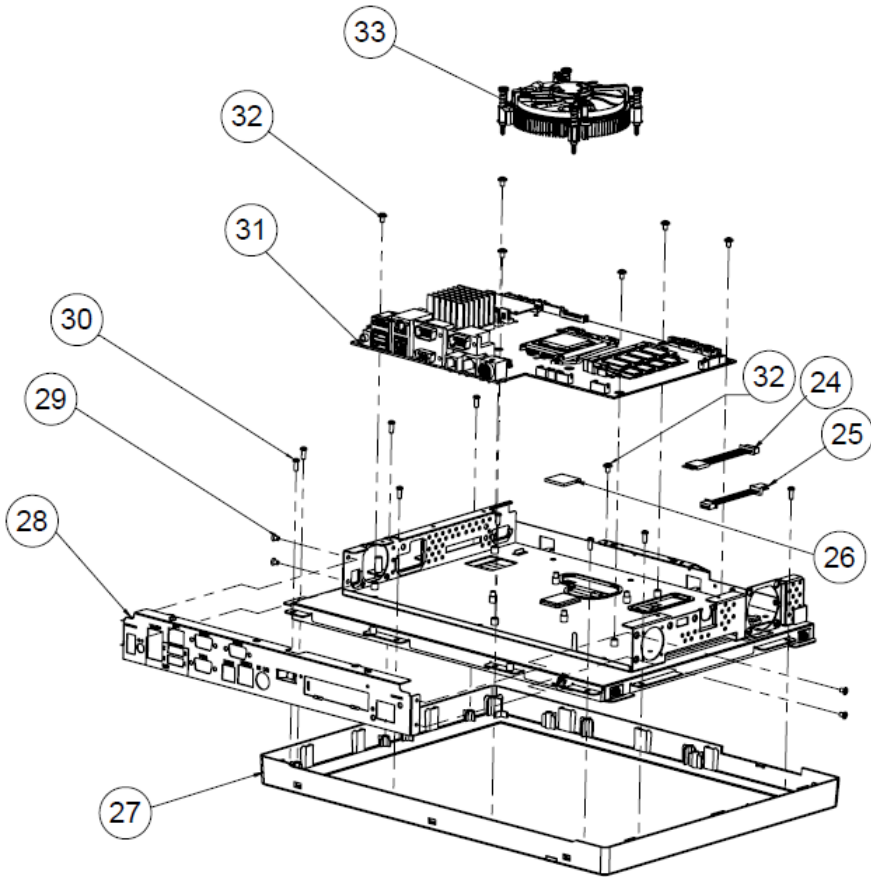
NO.	Name	PART NO.	Q'ty
1	M3_L6_I_B	82-275-30006018	1
2	POS-6920_Cable_cover	30-002-28310226	1
3	M3_L5_F_B	22-215-30005011	4
4	T3_L8_R_B	22-122-30080011	10
5	PA-6970_Back_cover	30-002-28110253	1
6	PA-6970_switch_cover	30-002-28510226	1
7	PA-6970_HDD_cover	30-002-28210253	1
8	M3_L5_W_Ni	22-242-30005311	2
9	PA-6980_HDD_UNIT		1
10	M5_L5_R_Ni	22-230-30005811	7
11	PA-6980_Metal_Back_UNIT		1

EXPLODED DIAGRAM FOR PA-6980 MAIN BOARD



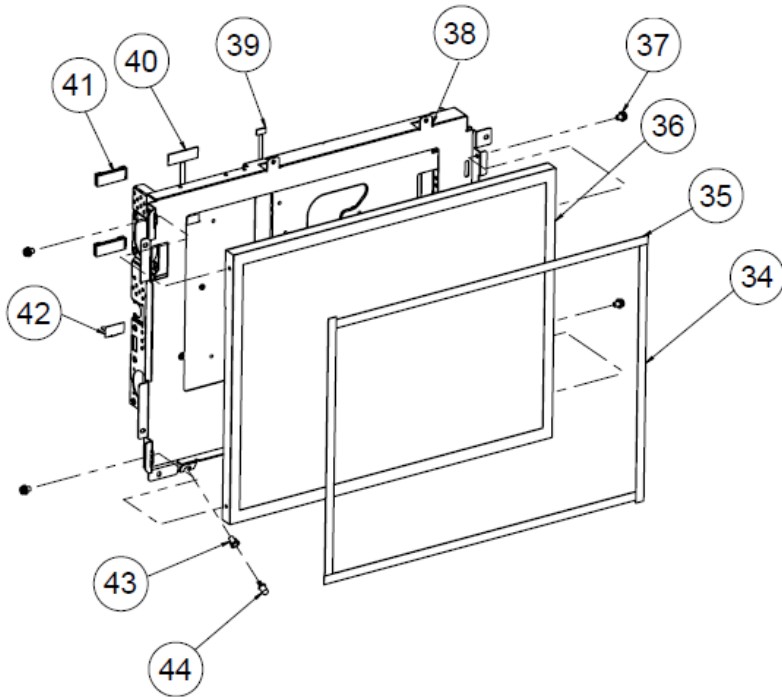
NO.	Name	PART NO.	Q'ty
12	No.4_UNC_L5_H6.8_BOSS	22-692-40048051	6
13	M2_L4_I_Ni	22-272-20004011	2
14	Option I/O	See Order	1
15	T2_L6_R_Ni	22-412-20060011	4
16	PORON_19.5x4x0.5	90-013-15200226	4
17	PA-6970_speaker	13-500-08280418	1
18	No.4_L8_F_B	22-315-40008019	2
19	PA-6980-USB_cable	27-006-37702111	1
20	PA-6980_switch_cable	27-019-24203071	1
21	T4.4_L11_F_Bt_Ni	22-212-46011011	4
22	40x40x10.5_fan	21-004-04040371	1
23	MSR ID-TECH(PS2) CABLE	27-014-27411074	1

EXPLODED DIAGRAM FOR PA-6980 LCD HOLDER



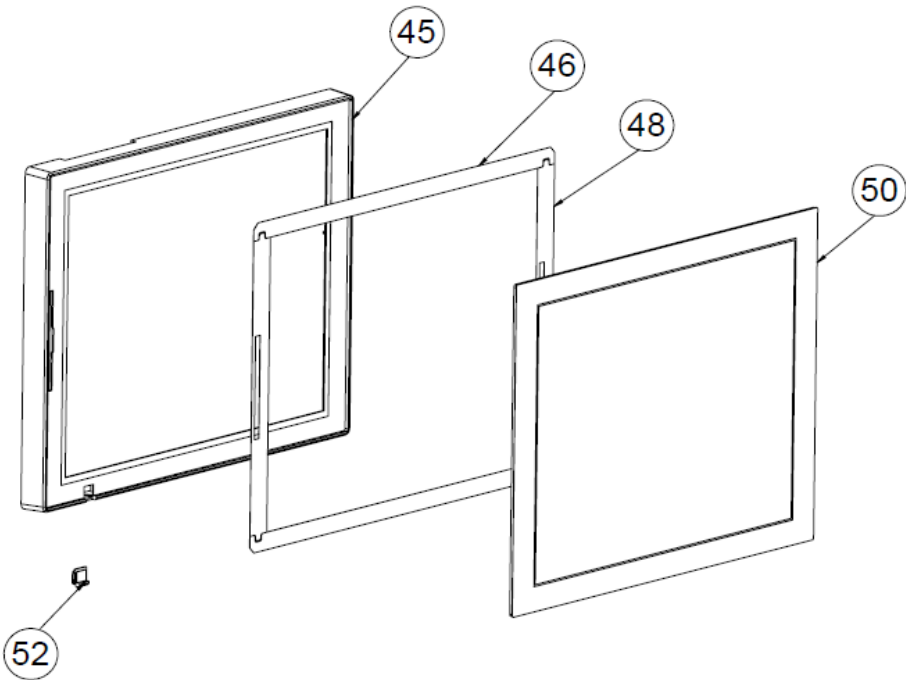
NO.	Name	PART NO.	Q'ty
24	TOUCH_EXTENDED CABLE	27-043-37703071	1
25	FAN_EXTENDED CABLE	27-043-37701071	1
26	thermal_pad	21-006-82020004	1
27	PA-6980_Front_UNIT		1
28	PA-6980_I/O_Plate	20-005-03001377	1
29	M3_L5_F_B	22-215-30005011	4
30	T3_L8_R_B	22-122-30080011	9
31	PB-6980RA		1
32	M3_L5_W_Ni	22-242-30005311	7
33	CPU cooler	21-003-19696001	1

EXPLODED DIAGRAM FOR PA-6980 LCD ASSEMBLY



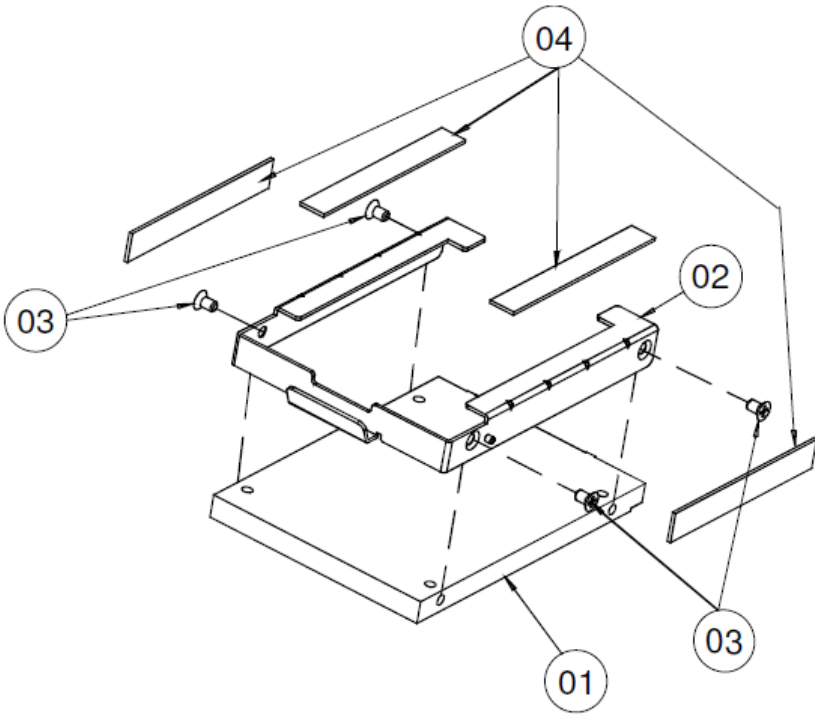
NO.	Name	PART NO.	Q'ty
34	PORON_314.9x8x0.5(cut->242)	30-013-24100000	2
35	PORON_314.9x8x0.5(cut->316)	30-013-24100000	2
36	15" LCD panel	52-351-03015021	1
37	M3_L6_R+S+W_Ni	22-232-30060211	4
38	POS6980-LCD_holder	20-029-03001377	1
39	panel_led_cable	27-055-37703071	1
40	PA-6980_lvds_cable	27-020-37704111	1
41	Cable clip(fcm-25snqw)	90-042-04200000	2
42	Led_holder(CLED-1)	30-014-04100009	1
43	PA-6980_led_cable	27-018-24707071	1

EXPLODED DIAGRAM FOR PA-6980 TOUCH PANEL ASSEMBLY



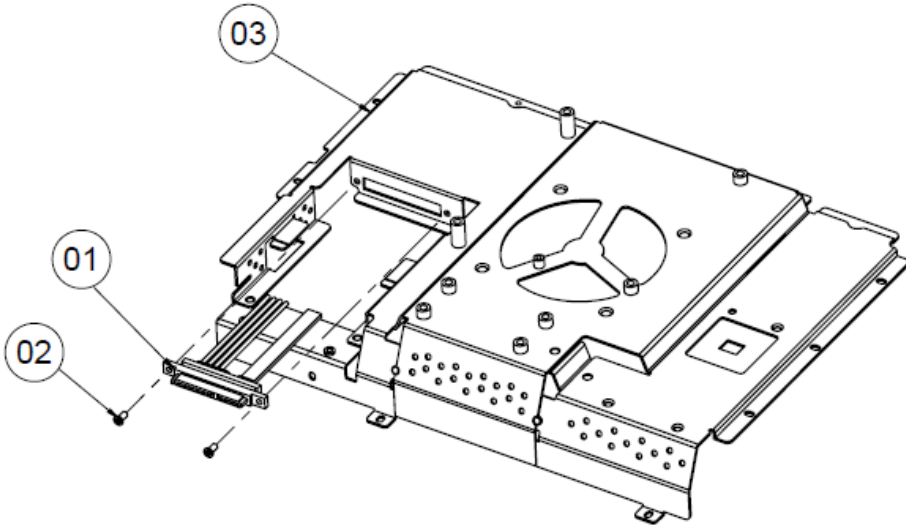
NO.	COMPONENT NAME	PART NO.	QTY.	REMARK
44	PA-6980_lcd_fron_cover	30-002-28110377	1	
45	DOUDLE_COATED_TAPE_A (For ELO)	94-026-04901220	2	For ELO
	DOUDLE_COATED_TAPE_B (For Abon)	94-026-05001220		For Abon
47	DOUDLE_COATED_TAPE_B (For ELO)	94-026-04902220	2	For ELO
	DOUDLE_COATED_TAPE_B (For Abon)	94-026-05002220		For Abon
49	15" Flat resistive touch(ELO)	52-380-00114701	1	ELO Touch
	15" Flat resistive touch(Abon)	52-380-00200114		Abon Touch
51	PA-6920_led_lens	30-021-02130269	1	

EXPLODED DIAGRAM FOR PA-6980 HDD MODULE



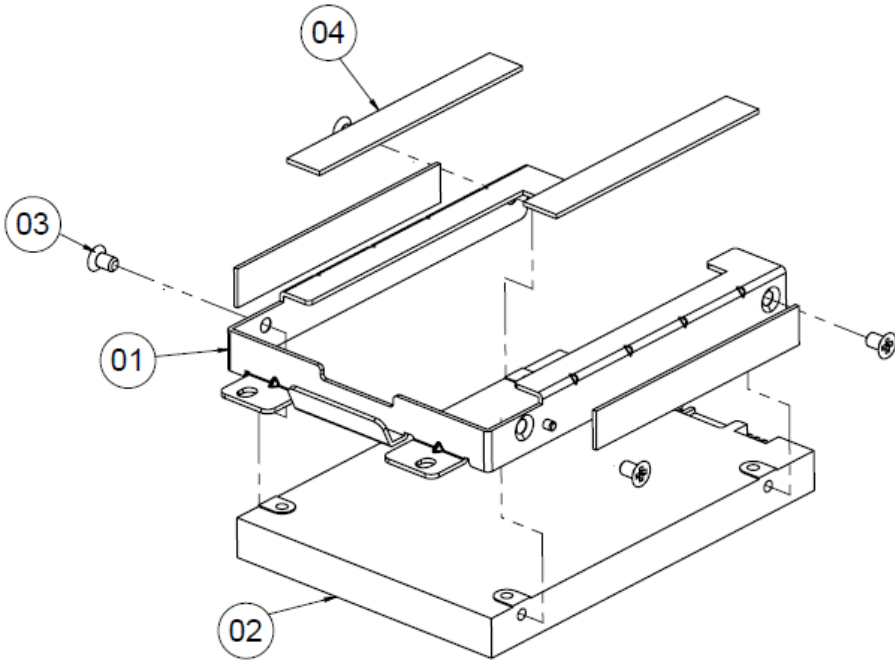
No.	Part Name	Part No.	Qty
1	320GB 2.5" SATA II HDD(option)	52-451-20110105	1
2	PA-6151 HDD_TRAY	80-054-03001226	1
3	F_SCREW,M3.0X0.5PX5mm	22-215-30005011	4
4	HDD CHASSIC EVA (63x9x1mm)	90-013-15100226	4

EXPLODED DIAGRAM FOR PA-6980 METAL BACK COVER



NO.	COMPONENT NAME	PART NO.	Q'ty
1	pa-6980_sata_cable	27-008-32609081	1
2	M3_L6_I_B	82-275-30006018	2
3	PA-6980_Metal_back_cover	20-004-03001377	1

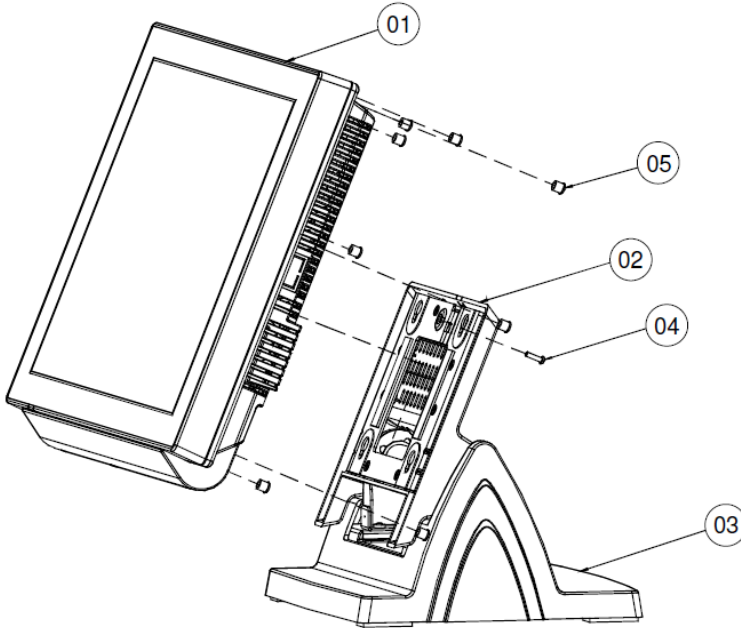
EXPLODED DIAGRAM FOR PA-6980 2.5" SATA HDD



NO.	COMPONENT NAME	PART NO.	Q'ty
1	HDD_track	80-054-03001226	1
2	2.5" Sata HDD	See Order	1
3	M3_L5_F_B	22-215-30005011	4
4	PORON_63X9X1t	90-013-15100226	4

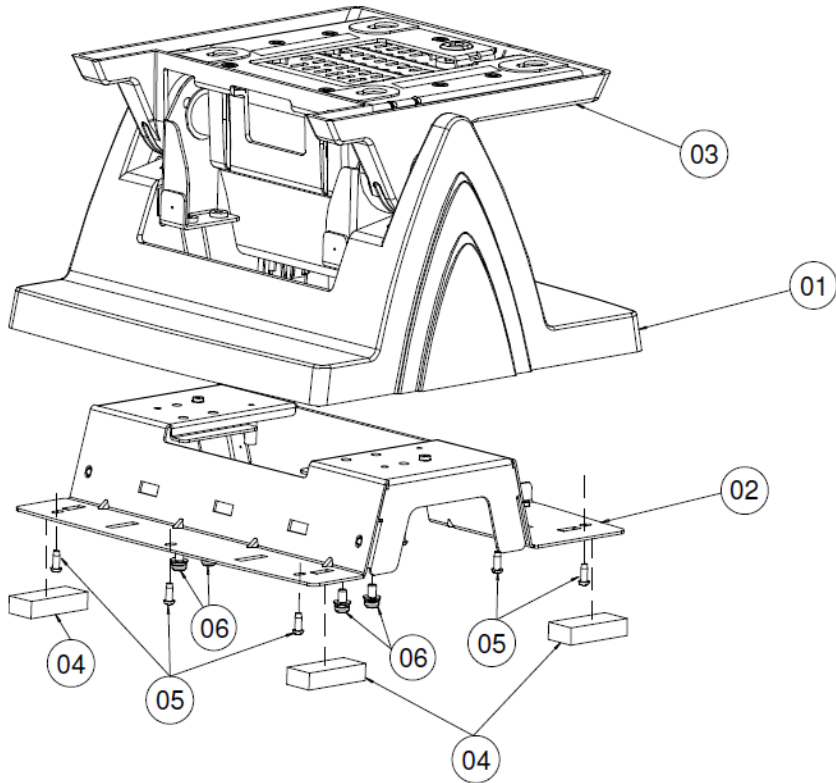
Projected Capacitive Touch Screen

EXPLODED DIAGRAM FOR PA-6980 POS OPEN & CLOSE



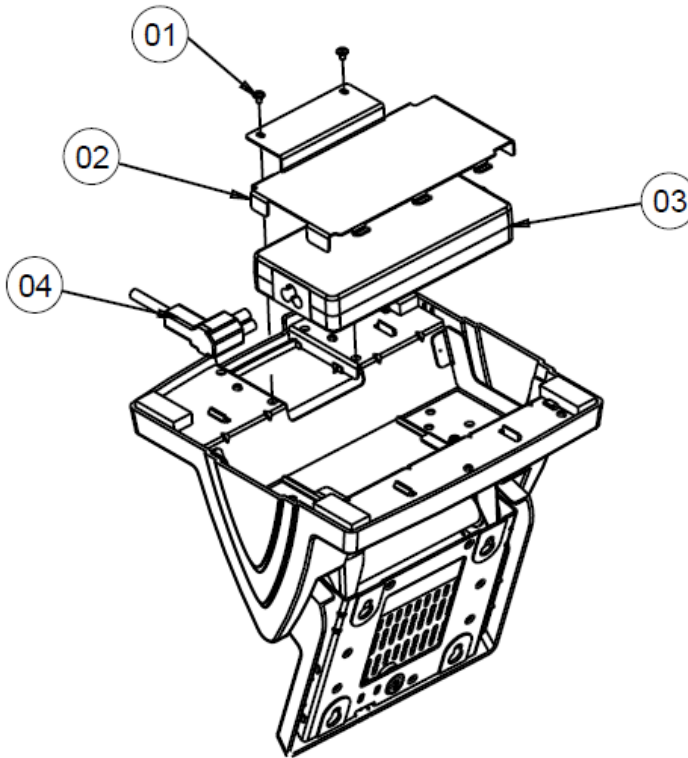
No.	Part Name	Part No.	Qty
1	PA-6980_PPC_MODULE	-----	1
2	POS-6920_ROTATE_MODULE	-----	1
3	POS-6920_STAND_MODULE	-----	1
4	RW_SCREW_M3_L15mm	22-235-30015011	1
5	SCREW HOLE RUBBER(Black)	30-062-01100197	8

EXPLODED DIAGRAM FOR PA-6980 POS STAND



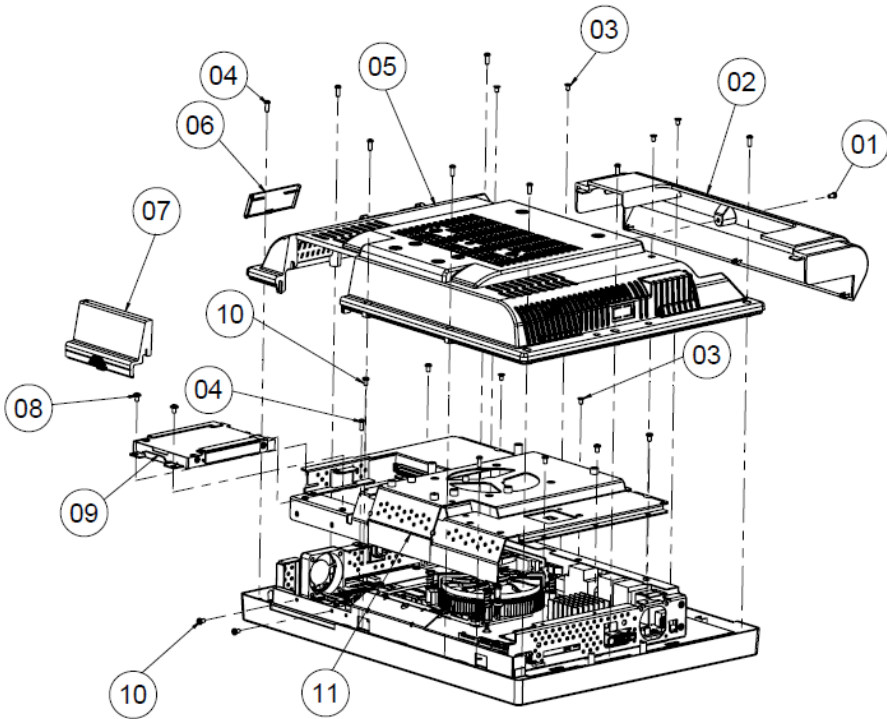
No.	Part Name	Part No.	Qty
1	POS-6920-STAND-COVER	30-002-28710226	1
2	POS-6920-STAND-BASE	20-032-03001226	1
3	POS-6920_ROTATE_MODULE	-----	1
4	RUBBER FOOT	30-004-01600000	4
5	TAPPING_SCREW_T3_L8mm	22-122-30080011	9
6	R_S_SCREW_M4_L8mm	22-232-40008211	4

EXPLODED DIAGRAM FOR PA-6980 120W POWER ADAPTER



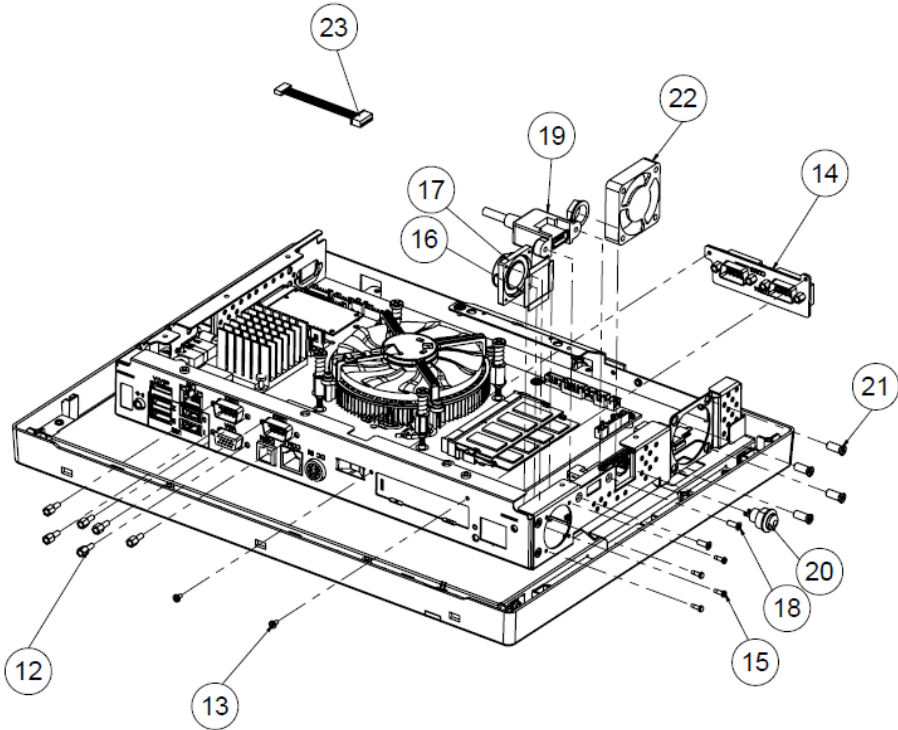
No.	Name	P/N No.	Q'ty
1	M3_L5_W_Ni	22-242-30005311	2
2	PA6920 POWER HOLDER 120W	20-029-03001226	1
3	120W Adapter	52-002-02900101	1
4	AC Cable	See Order	1

EXPLODED DIAGRAM FOR PA-6980 PPC OPEN & CLOSE



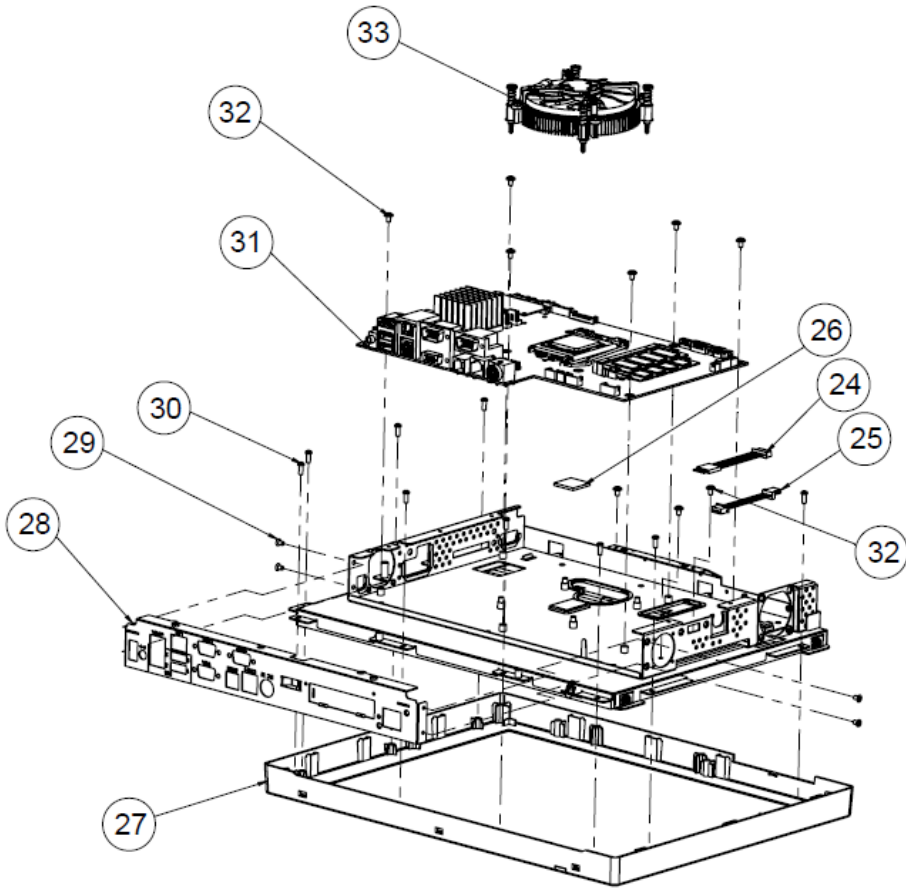
NO.	Name	PART NO.	Q'ty
1	M3_L6_I_B	82-275-30006018	1
2	POS-6920_Cable_cover	30-002-28310226	1
3	M3_L5_F_B	22-215-30005011	4
4	T3_L8_R_B	22-122-30080011	10
5	PA-6970_Back_cover	30-002-28110253	1
6	PA-6970_switch_cover	30-002-28510226	1
7	PA-6970_HDD_cover	30-002-28210253	1
8	M3_L5_W_Ni	22-242-30005311	2
9	PA-6980_HDD_UNIT		1
10	M5_L5_R_Ni	22-230-30005811	7
11	PA-6980_Metal_Back_UNIT		1

EXPLODED DIAGRAM FOR PA-6980 MAINBOARD



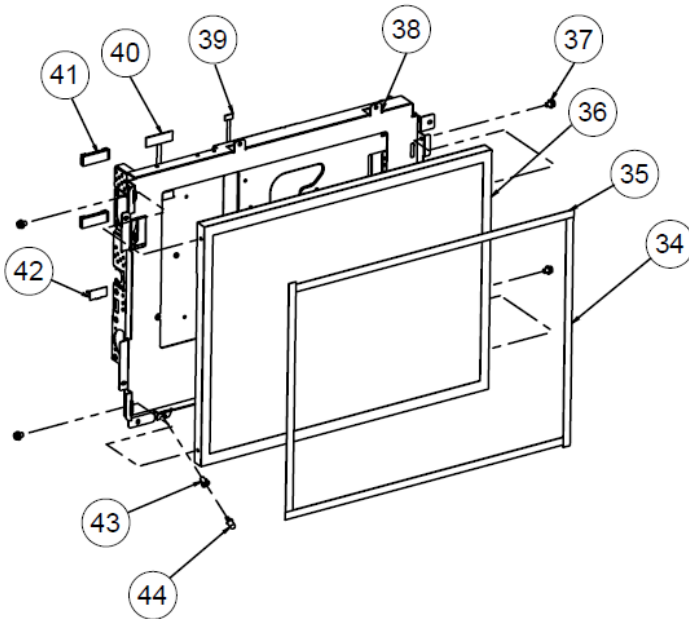
NO.	Name	PART NO.	Q'ty
12	No.4_UNC_L5_H6.8_BOSS	22-692-40048051	6
13	M2_L4_I_Ni	22-272-20004011	2
14	Option I/O	See Order	1
15	T2_L6_R_Ni	22-412-20060011	4
16	PORON_19.5x4x0.5	90-013-15200226	4
17	PA-6970_speaker	13-500-08280418	1
18	No.4_L8_F_B	22-315-40008019	2
19	PA-6980-USB_cable	27-006-37702111	1
20	PA-6980_switch_cable	27-019-24203071	1
21	T4.4_L11_F_Bt_Ni	22-212-46011011	4
22	40x40x10.5_fan	21-004-04040371	1
23	MSR ID-TECH(PS2) CABLE	27-014-27411074	1

EXPLODED DIAGRAM FOR PA-6980 LCD HOLDER



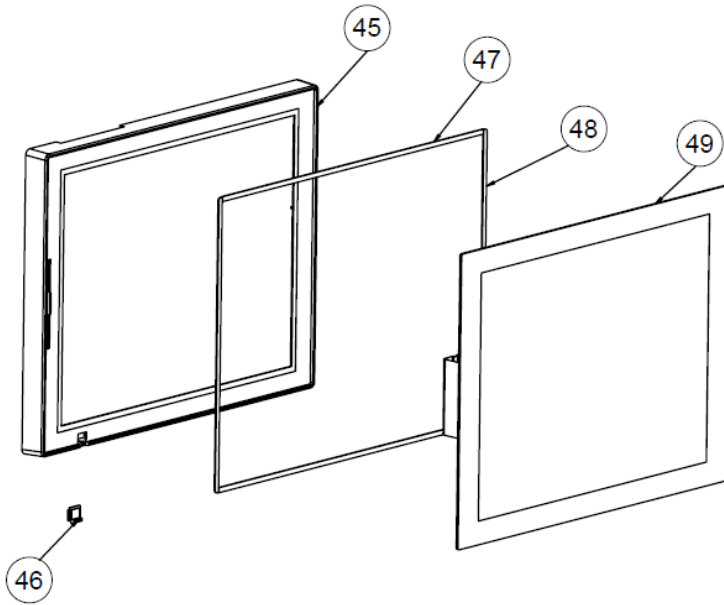
NO.	Name	PART NO.	Q'ty
24	TOUCH_EXTENDED CABLE	27-043-37703071	1
25	FAN_EXTENDED CABLE	27-043-37701071	1
26	thermal_pad	21-006-82020004	1
27	PA-6980_Front_UNIT		1
28	PA-6980_I/O_Plate	20-005-03001377	1
29	M3_L5_F_B	22-215-30005011	4
30	T3_L8_R_B	22-122-30080011	9
31	PB-6980RA		1
32	M3_L5_W_NI	22-242-30005311	9
33	CPU cooler	21-003-19696001	1

EXPLODED DIAGRAM FOR PA-6980 LCD ASSEMBLY



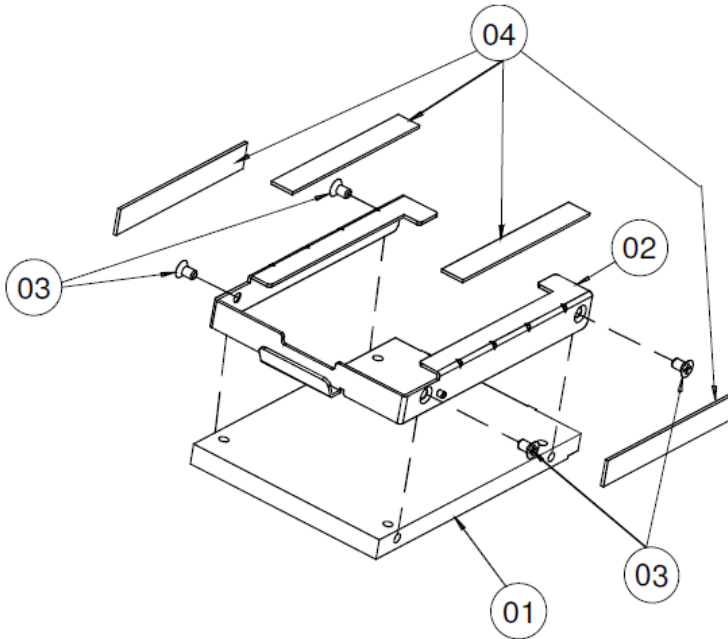
NO.	Name	PART NO.	Q'ty
34	PORON_314.9x8x0.5(cut->242)	30-013-24100000	2
35	PORON_314.9x8x0.5(cut->316)	30-013-24100000	2
36	15" LCD panel	52-351-03015021	1
37	M3_L6_R+S+W_Ni	22-232-30060211	4
38	POS6980-LCD_holder	20-029-03001377	1
39	panel_led_cable	27-055-37703071	1
40	PA-6980_lvds_cable	27-020-37704111	1
41	Cable clip(fcm-25snqw)	90-042-04200000	2
42	Led_holder(CLED-1)	30-014-04100009	1
43	PA-6980_led_cable	27-018-24707071	1

EXPLODED DIAGRAM FOR PA-6980 TOUCH PANEL ASSEMBLY



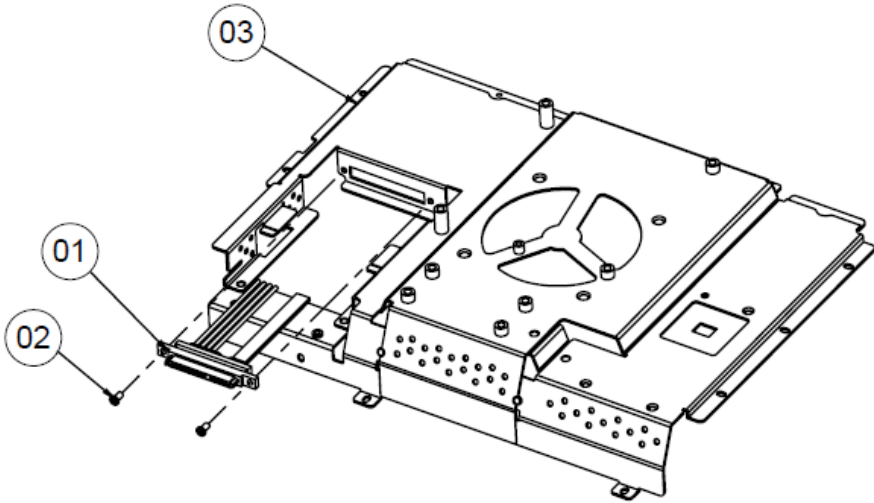
NO.	COMPONENT NAME	PART NO.	Q'ty
45	PA-6980_lcd_fron_cover	30-002-28110377	1
46	PA-6920_led_lens	30-021-02130269	1
47	DOUBLE_TAPE_349.3x4.5x1.1t	94-026-05001220	2
48	DOUBLE_TAPE_272.8x4.5x1.1t	94-026-05002220	2
49	15" Flat_Capacitive_Touch	52-380-00150522	1

EXPLODED DIAGRAM FOR PA-6980 HDD MODULE



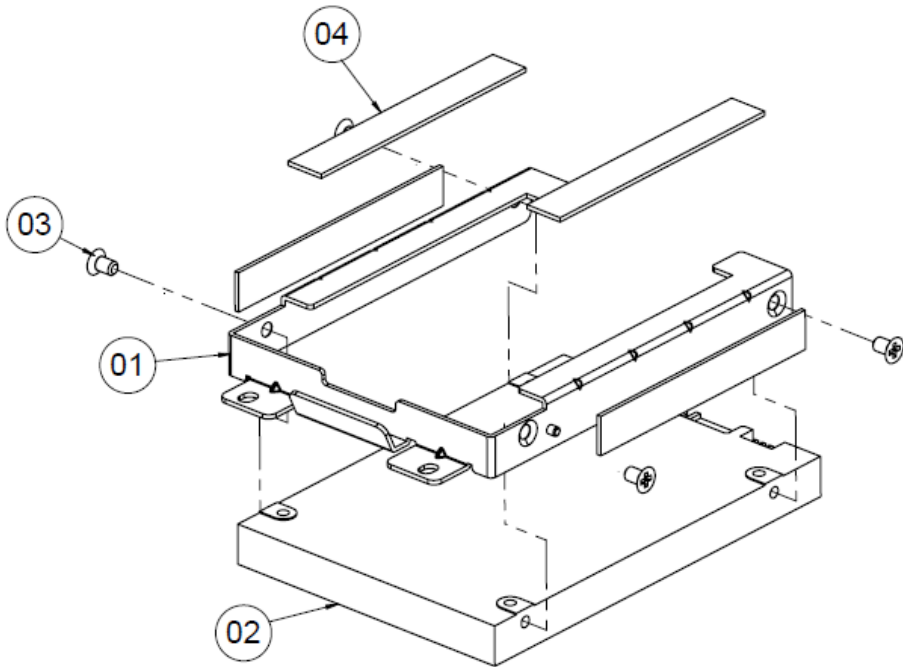
No.	Part Name	Part No.	Qty
1	320GB 2.5" SATA II HDD (option)	52-451-20110105	1
2	PA-6151 HDD_TRAY	80-054-03001226	1
3	F_SCREW,M3.0X0.5PX5mm	22-215-30005011	4
4	HDD CHASSIC EVA (63x9x1mm)	90-013-15100226	4

EXPLODED DIAGRAM FOR PA-6980 METAL BACK COVER



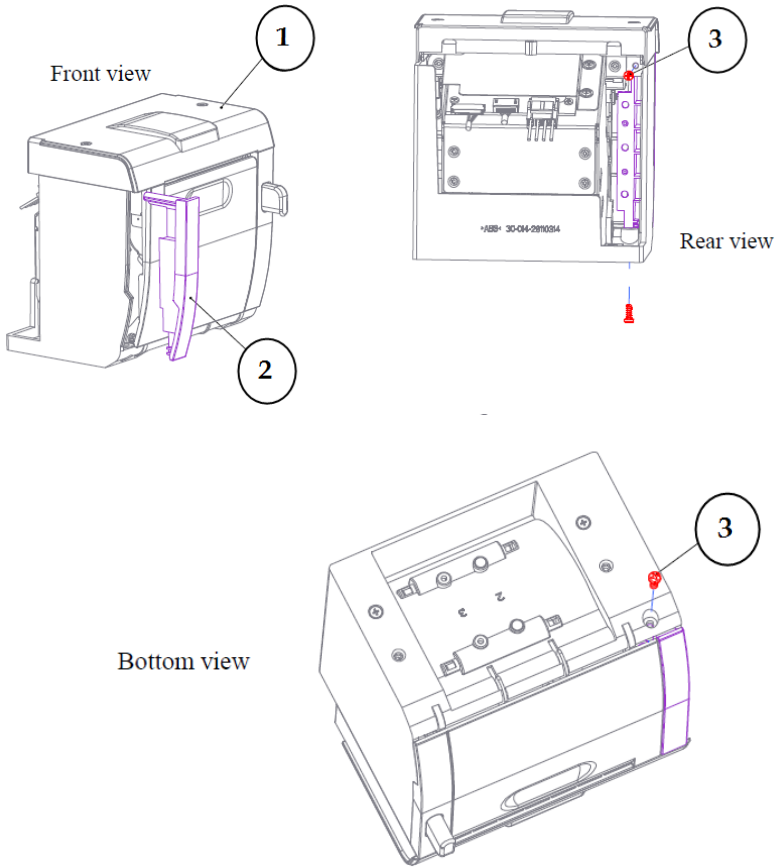
NO.	COMPONENT NAME	PART NO.	Q'ty
1	pa-6980_sata_cable	27-008-32609081	1
2	M3_L6_I_B	82-275-30006018	2
3	PA-6980_Metal_back_cover	20-004-03001377	1

EXPLODED DIAGRAM FOR PA-6980 2.5" SATA HDD



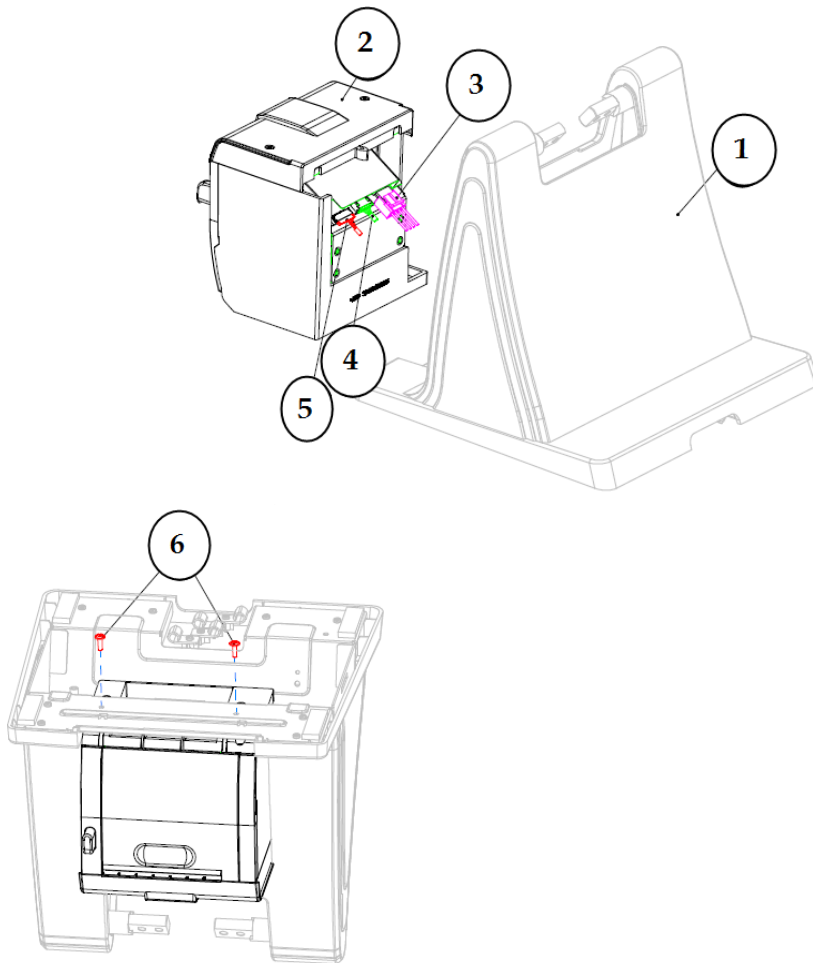
NO.	COMPONENT NAME	PART NO.	Q'ty
1	HDD_track	80-054-03001226	1
2	2.5" Sata HDD	See Order	1
3	M3_L5_F_B	22-215-30005011	4
4	PORON_63X9X1t	90-013-15100226	4

EXPLODED DIAGRAM FOR RPINTER MODULE



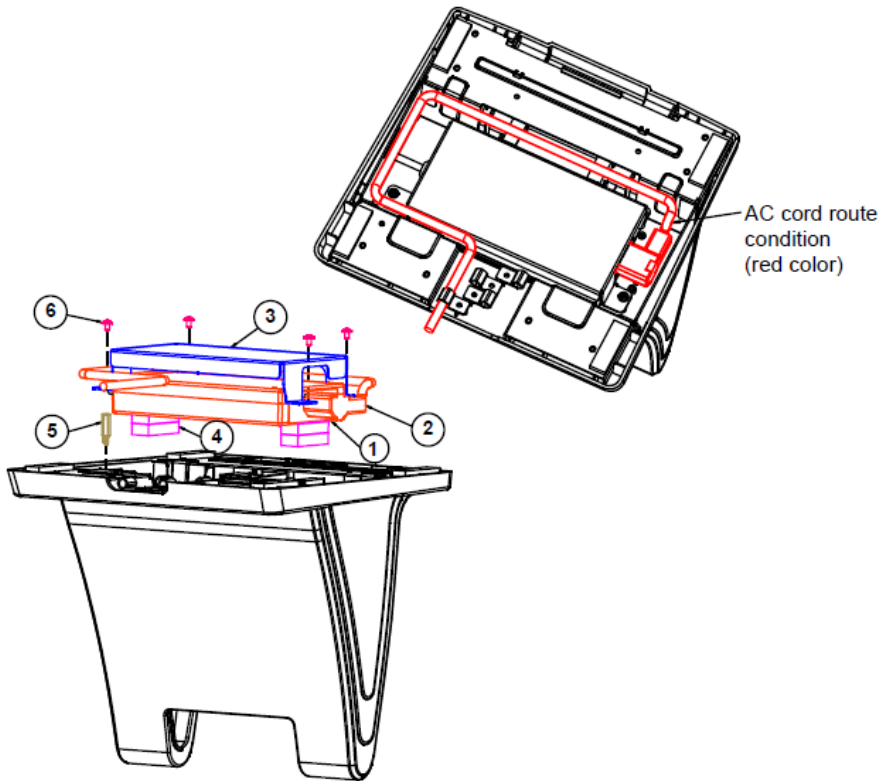
Item	Qty	Part Name	Part No.
1	1	Printer Module	xx-xxx-xxxxxxxx
2	1	STAND HDD COVER	30-002-02110314
3	2	SCREW/T3.0x8mm	22-122-3008001 1

Thermal Printer



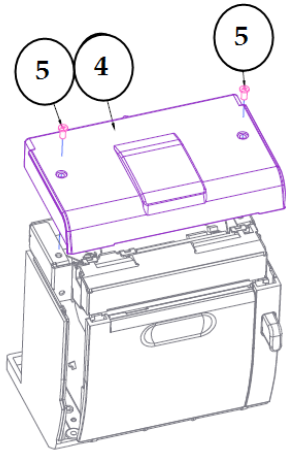
Appendix A System Assembly

Item	Qty	Part Name	Part No.	Note
1	1	HDD-SOCKET_ASSEMBLY	xx-xxx-xxxxxxx	
2	1	Printer Module_wih_HDD Cover	xx-xxx-xxxxxxx	
3	1	PRINT POWER CABLE	27-012-31409071	
4	1	PRINT FOR USB CABLE	27-006-31409111	
	0	PRINT FOR USB CABLE	27-006-31409112	
	0	PRINT FOR COM CABLE	27-051-31408111	
	0	PRINT FOR COM CABLE	27-051-31408113	
	0	PRINT FOR COM CABLE	27-051-31408112	
5	1	Cash Drawer cable	27-026-16505111	Option
6	2	SCREW/M3x0.5Px10mm	22-232-30010311	

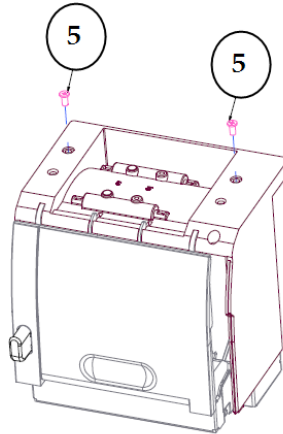


Item	Q'ty	Part Name	Part No.	Note
1	1	Adpator_120W(LABEL 6)	52-002-02900101	New part
2	1	AC_CORD	N/A	New part
3	1	ADAPTOR HOLDER_120 W	20-029-03004314	New part
4	4	RUBBER	30-004-01600000	New part
5	1	HEX_BOSS SCREW	22-290-30015051	New part
6	4	M3.0 SCREW	22-242-30005311	New part

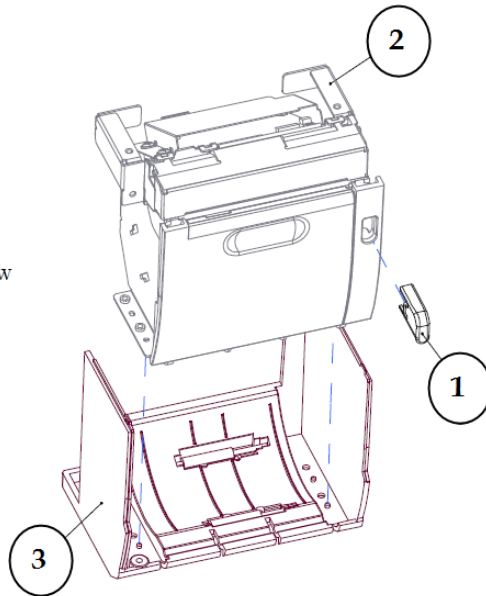
Top view



Bottom view

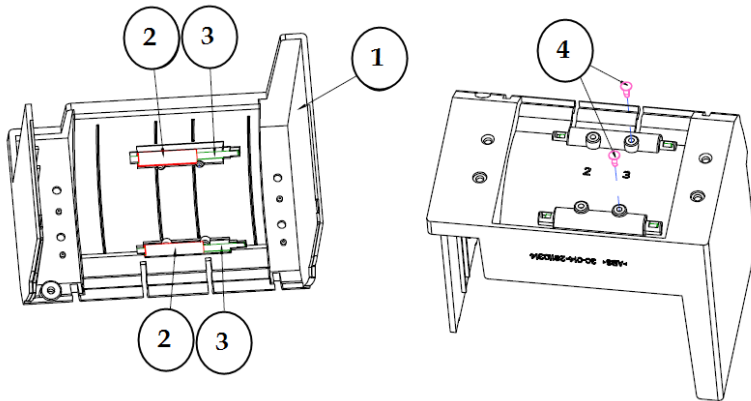


Separation view



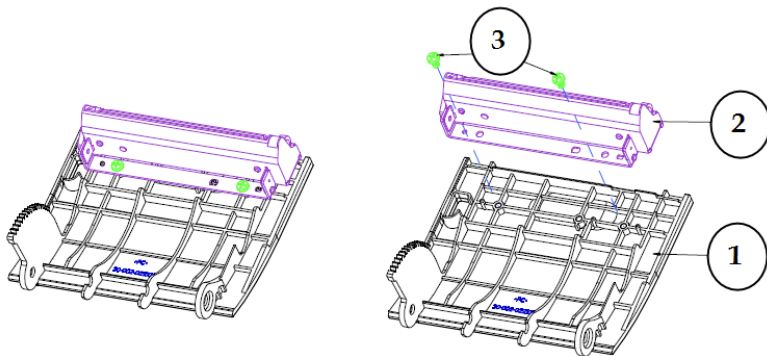
Item	Qty	Part Name	Part No.
1	1	Printer Door Switch	30-007-28110314
2	1	Printer Holder Assembly	xx-xxx-xxxxxxx
3	1	Housing Assembly	xx-xxx-xxxxxxx
4	4	SCREW/M3x0.5Px6mm	82-275-30006018
5	1	Stand Printer Cover	30-002-28310314

3 Inch Printer



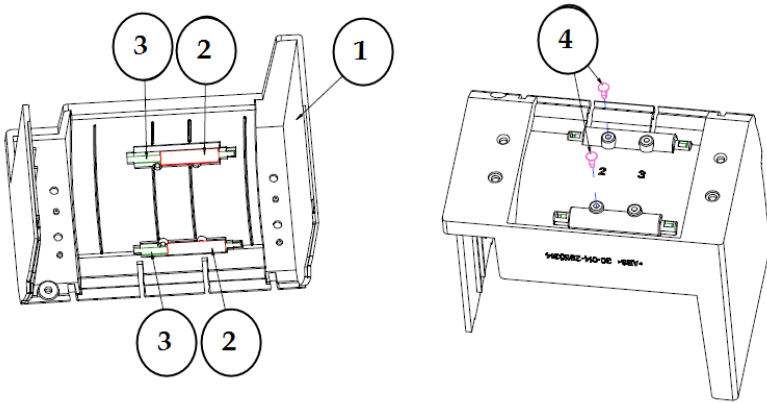
Item	Qty	Part Name	Part No.
1	1	Stand Printer Housing	30-014-28110314
2	2	SPACER SUPPORT(\varnothing 6x25mm)	30-041-04100165
3	2	ROLLER PIN	20-045-19012199
4	2	CANOE CLIP\varnothing2.9mm	90-042-04100000

Item	Part Name	Part No.	Qty
1	Printer Holder	80-029-03004314	1
2	Printer Board	17-122-10301028	1
	Printer Board	52-370-06310008	0
	Printer Board	17-160-10011023	0
3	SCREW/M2x0.4Px4mm	22-272-20004011	8
4	PRINTER-PCB-MYLAR	90-056-02100314	1
5	SCREW/M3x0.5Px5mm	22-242-30005311	4
6	3" Printer (Main body)	52-701-03017003	1
7	Front Cover Assembly	xx-xxx-xxxxxxx	1
8	PAPER COVER PIN	20-004-10011165	1
9	ROTRAY DAMPER(15gf-cm)	90-022-09100314	1



Item	Qty	Part Name	Part No.
1	1	STAND PRINTER COVER_F	30-002-02210314
2	1	3" Printer (Main body)	52-701-03017003
3	2	SCREW/T3.0x5mm	22-121-30005011

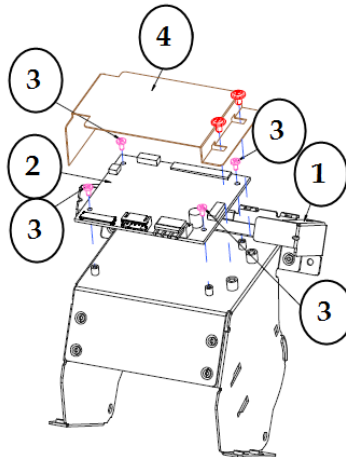
2 Inch Printer



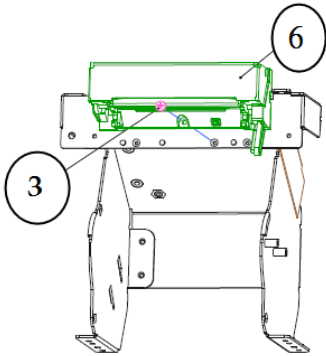
Item	Qty	Part Name	Part No.
1	1	Stand Printer Housing	30-014-28110314
2	2	SPACER SUPPORT (Ø6x25mm)	30-041-04100165
3	2	ROLLER PIN	20-045-19012199
4	2	CANOE CLIP Ø 2.9mm	90-042-04100000

2 Inch Printer Assembly

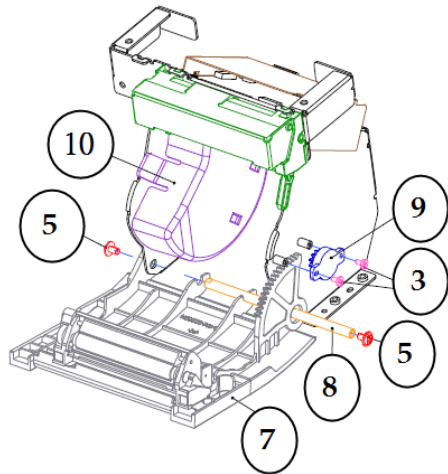
Step 1:



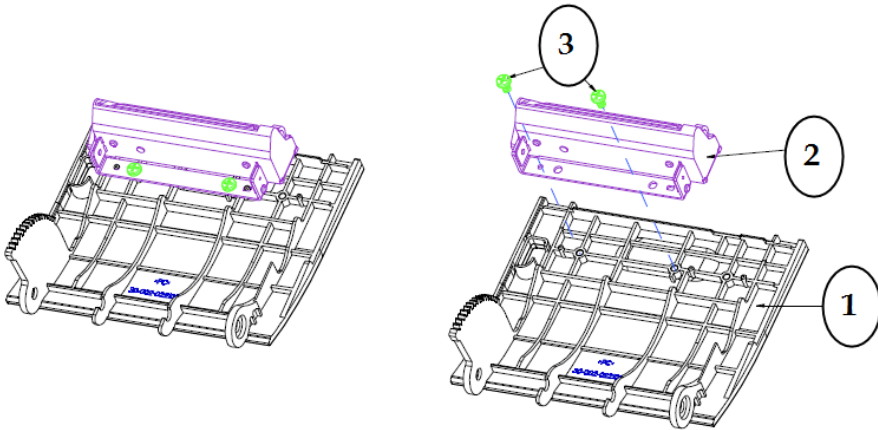
Step 2:



Step 3:

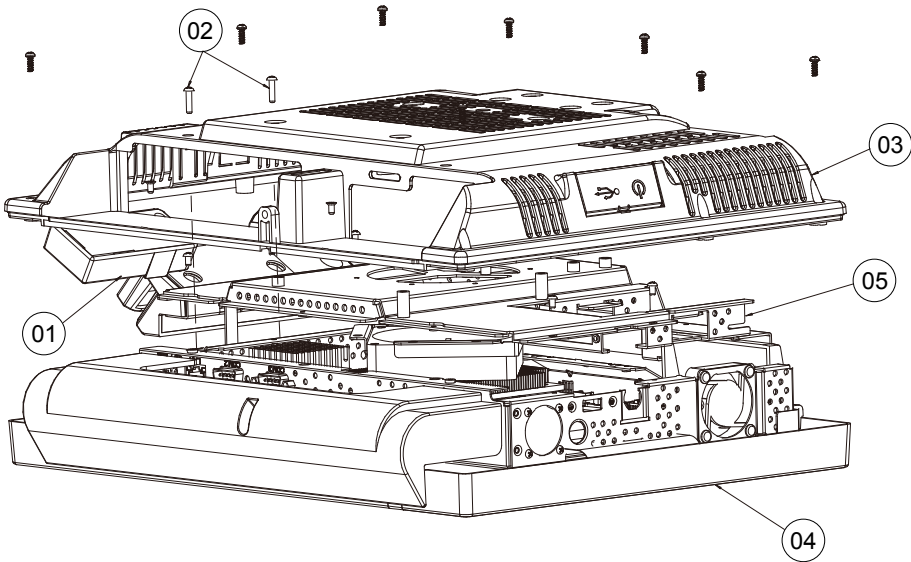


Item	Part Name	Part No.	Qty
1	Printer Holder	80-029-03004314	1
2	Printer Board	PDAC3100-D1	1
	Printer Board	MB-1030RB/RC	0
	Printer Board	MB-1011(3)RC	0
3	SCREW/M2x0.4Px4mm	22-272-20004011	7
4	PRINTER-PCB-MYLAR	90-056-02100314	1
5	SCREW/M3x0.5Px5mm	22-242-30005311	4
6	2" Printer (Main body)	52-701-01020003	1
7	Front Cover Assembly	xx-xxx-xxxxxxx	1
8	PAPER COVER PIN	20-004-10011165	1
9	ROTRAY DAMPER(15gf-cm)	90-022-09100314	1
10	2 inch PAPER BLOCK	30-061-28110242	1



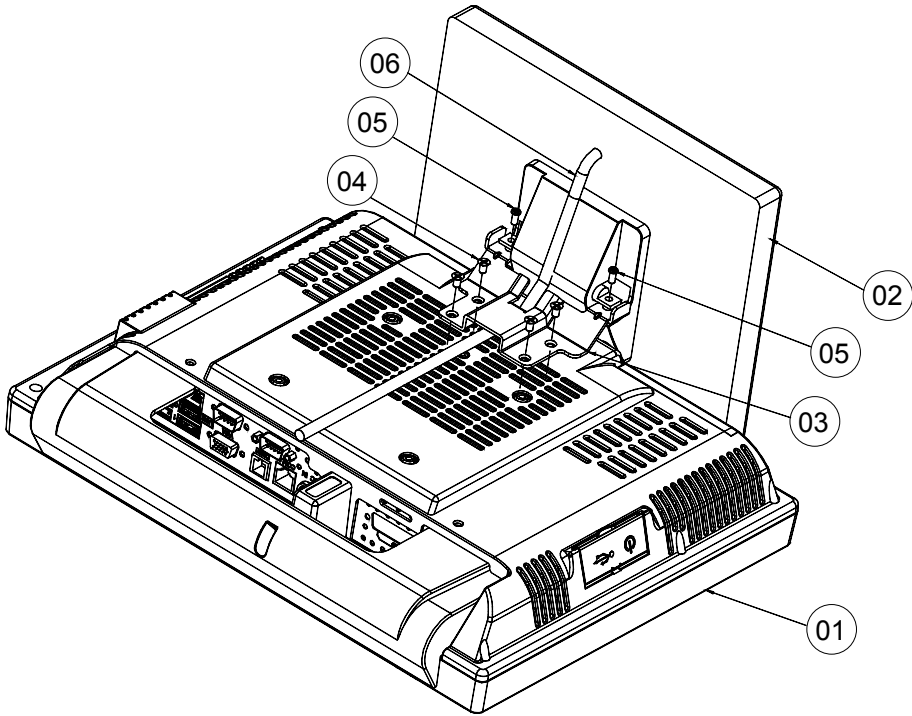
Item	Qty	Part Name	Part No.
1	1	STAND PRINTER COVER_F	30-002-02210314
2	1	2" Printer (Main body)	52-701-01020003
3	2	SCREW/T3.0x5mm	22-121-3000501 1

EXPLODED DIAGRAM FOR PA-6980 MSR MODULE



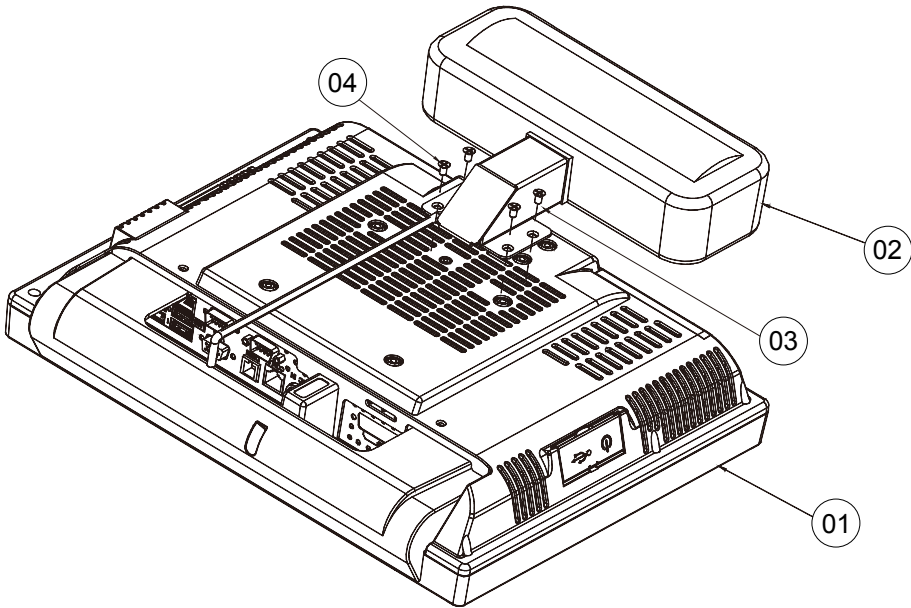
No.	Part Name	Part No.	Qty
1	MSR_FINGER_MODUL_ASSY	PA-6970RZ-31B	1
2	R_SCREW_M3_L14.0mm	22-232-30014011	2
3	PA-6970 BACK_COVER	30-002-28110253	1
4	MAIN_MODULE_ASSY	-----	1
5	TOP_METAL_MODULE_ASSY	-----	1

EXPLODED DIAGRAM FOR PA-6980 2ND DISPLAY



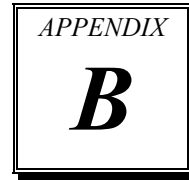
No.	Part Name	Part No.	Qty
1	PA-6970_PPC	-----	1
2	2ND_DISPLAY(8'')	52-380-06080316	1
	2ND_DISPLAY(10.4')	52-380-01104216	1
3	2ND_DIS_SUPPORT_BRACKET	80-006-03061226	1
4	F_SCREW_M4_L8mm	22-215-40008711	4
5	R_SCREW_M4_L8mm	22-245-40008011	2
6	POWER CABLE	27-012-24710111	1

EXPLODED DIAGRAM FOR PA-6980 VFD MODULE



No.	Part Name	Part No.	Qty
1	PA-6970_PPC	-----	1
2	VFD_DISPLAY	52-901-24001703	1
3	VFD_SUPPORT_BRACKET	80-006-03062226	1
4	F_SCREW_M4_L8mm	22-215-40008711	4

TECHNICAL SUMMARY

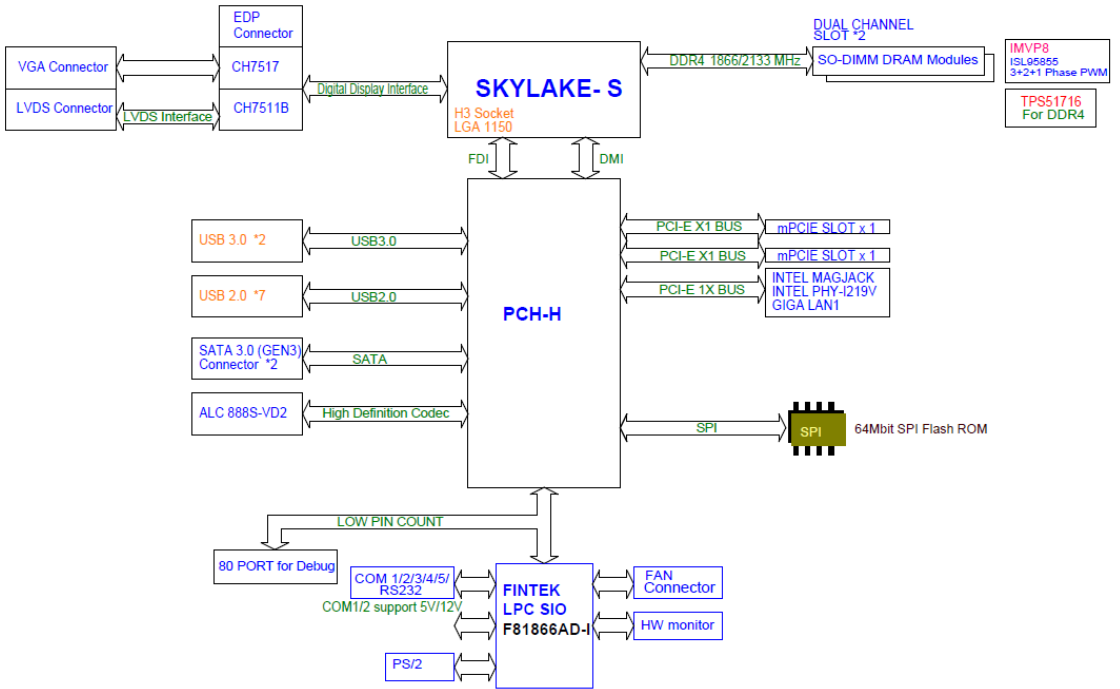


This appendix will give you a brief introduction of the allocation maps for the system resources.

The following sections are included:

- Block Diagram
- Interrupt Map
- I / O Map
- Memory Map
- Watchdog Timer Configuration
- Flash BIOS Update

BLOCK DIAGRAM



INTERRUPT MAP

IRQ	ASSIGNMENT
IRQ 0	System timer
IRQ 1	Standard PS/2 Keyboard
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 6	Communications Port (COM5)
IRQ 7	Communications Port (COM3)
IRQ 8	System CMOS/real time clock
IRQ 10	Communications Port (COM4)
IRQ 11	Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123
IRQ 11	Intel(R) 100 Series/C230 Series Chipset Family Thermal subsystem - A131
IRQ 13	Numeric data processor
IRQ 14	Motherboard resources
IRQ 16	Standard AHCI 1.0 Serial ATA Controller
IRQ 16	High Definition Audio Controller
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	ASSIGNMENT
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 117	Microsoft ACPI-Compliant System

IRQ	ASSIGNMENT
IRQ 118	Microsoft ACPI-Compliant System
IRQ 119	Microsoft ACPI-Compliant System
IRQ 120	Microsoft ACPI-Compliant System
IRQ 121	Microsoft ACPI-Compliant System
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	ASSIGNMENT
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 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	ASSIGNMENT
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 189	Microsoft ACPI-Compliant System
IRQ 190	Microsoft ACPI-Compliant System
IRQ 4294967294	Intel(R) Ethernet Connection (2) I219-V
IRQ 4294967292	Intel(R) USB 3.0 eXtensible Host Controller
IRQ 4294967293	Intel(R) HD Graphics 510
IRQ 4294967291	Intel(R) Management Engine Interface

Note: These resource information were gathered using Windows 7 (the IRQ could be assigned differently depending on OS)

I/O MAP

I/O MAP	ASSIGNMENT
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x0000F090-0x0000F097	Standard AHCI 1.0 Serial ATA Controller
0x0000F080-0x0000F083	Standard AHCI 1.0 Serial ATA Controller
0x0000F060-0x0000F07F	Standard AHCI 1.0 Serial ATA Controller
0x000002F0-0x000002F7	Communications Port (COM5)
0x00000000-0x00000CF7	PCI bus
0x00000D00-0x0000FFFF	PCI bus
0x00000070-0x00000077	System CMOS/real time clock
0x00000070-0x00000077	Motherboard resources
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A20-0x00000A2F	Motherboard resources
0x0000F040-0x0000F05F	Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123
0x0000002E-0x0000002F	Motherboard resources
0x0000004E-0x0000004F	Motherboard resources
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources

I/O MAP	ASSIGNMENT
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x00001800-0x000018FE	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
0x0000FF00-0x0000FFFE	Motherboard resources
0x00000800-0x0000087F	Motherboard resources
0x00001854-0x00001857	Motherboard resources
0x000000F0-0x000000F0	Numeric data processo
0x0000F000-0x0000F03F	Intel(R) HD Graphics 510
0x000003B0-0x000003BB	Intel(R) HD Graphics 510
0x000003C0-0x000003DF	Intel(R) HD Graphics 510
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller
0x0000003C-0x0000003D	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A4-0x000000A5	Programmable interrupt controller

I/O MAP	ASSIGNMENT
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer

Memory MAP

MEMORY MAP	ASSIGNMENT
0xFED00000-0xFED003FF	High precision event timer
0xDF048000-0xDF049FFF	Standard AHCI 1.0 Serial ATA Controller
0xDF04C000-0xDF04C0FF	Standard AHCI 1.0 Serial ATA Controller
0xDF04B000-0xDF04B7FF	Standard AHCI 1.0 Serial ATA Controller
0xDF040000-0xDF043FFF	High Definition Audio Controller
0xDF020000-0xDF02FFFF	High Definition Audio Controller
0xA0000-0xBFFFF	PCI bus
0xA0000-0xBFFFF	Intel(R) HD Graphics 510
0x90000000-0xDFFFFFFF	PCI bus
0xFD000000-0xFE7FFFFF	PCI bus
0xFD000000-0xFE7FFFFF	Motherboard resources
0xDF044000-0xDF047FFF	Intel(R) 100 Series/C230 Series Chipset Family PMC - A121
0xFED10000-0xFED17FFF	Motherboard resources
0xFED18000-0xFED18FFF	Motherboard resources
0xFED19000-0xFED19FFF	Motherboard resources
0xE0000000-0xEFFFFFFF	Motherboard resources
0xFED20000-0xFED3FFFF	Motherboard resources
0xFED90000-0xFED93FFF	Motherboard resources
0xFED45000-0xFED8FFFF	Motherboard resources
0xFF000000-0xFFFFFFFF	Motherboard resources
0xFF000000-0xFFFFFFFF	Intel(R) 82802 Firmware Hub Device
0xFEE00000-0xFEEFFFFF	Motherboard resources
0xDFFE0000-0xDFFFFFFF	Motherboard resources
0xDF04A000-0xDF04A0FF	Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123

MEMORY MAP	ASSIGNMENT
0xFDAF0000-0xFDAFFFFFFF	Motherboard resources
0xFDAE0000-0xFDAEFFFFFF	Motherboard resources
0xFDAC0000-0xFDACFFFFF	Motherboard resources
0xDF000000-0xDF01FFFFF	Intel(R) Ethernet Connection I219-V
0xDF030000-0xDF03FFFFF	Intel(R) USB 3.0 eXtensible Host Controller
0xFDAD0000-0xFDADFFFFF	Motherboard resources
0xFDB00000-0xFDBFFFFFFF	Motherboard resources
0xFE000000-0xFE01FFFFF	Motherboard resources
0xFE036000-0xFE03BFFFF	Motherboard resources
0xFE03D000-0xFE3FFFFFFF	Motherboard resources
0xFE410000-0xFE7FFFFFFF	Motherboard resources
0xDE000000-0xDEFFFFFFF	Intel(R) HD Graphics 510
0xC0000000-0xCFFFFFFF	Intel(R) HD Graphics 510
0xDF04E000-0xDF04EFFFF	Intel(R) 100 Series/C230 Series Chipset Family Thermal subsystem - A131
0xFE40F000-0xFE40FFFFF	Intel(R) Management Engine Interface

WATCHDOG TIMER CONFIGURATION

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

Configuration Sequence

To program F81866 configuration registers, the following configuration sequence must be followed:

- (1) Enter the extended function mode.
- (2) Configure the configuration registers.
- (3) Exit the extended function mode.

(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 watchdog timer

Enable watchdog timer and set timeout interval to 30 seconds.

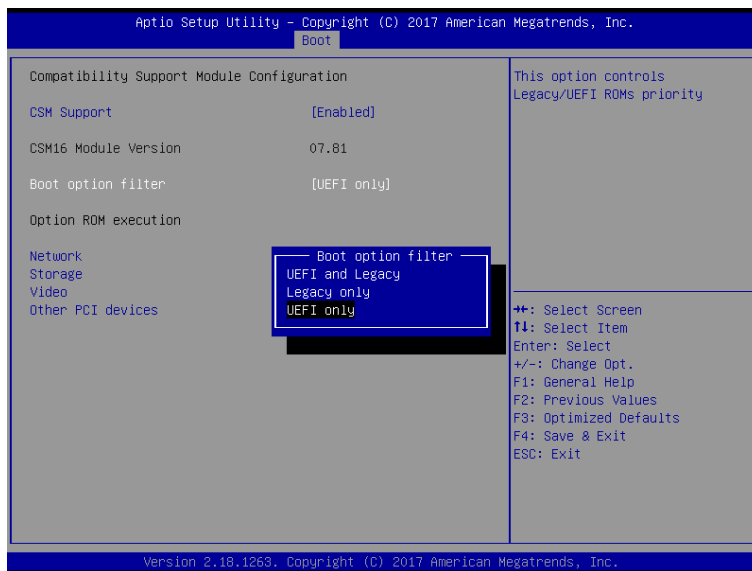
```
;----- Enter to extended function mode -----
mov     dx,    2eh
mov     al,    87h
out     dx,    al
out     dx,    al
;----- Select Logical Device 7 of watchdog timer -----
mov     al,    07h
out     dx,    al
inc     dx
mov     al,    07h
out     dx,    al
;-----Enable Watch dog feature -----
mov     al,    030h
out     dx,    al
inc     dx
mov     al,    01h
out     dx,    al
;----- Enable Watch PME-----
dec     dx
mov     al,    0FAh
out     dx,    al
inc     dx
in      al,    dx
and     al,    51h
out     dx,    al
;----- Set second as counting unit -----
dec     dx
mov     al,    0F5h
out     dx,    al
inc     dx
in      al,    dx
and     al,    30h
out     dx,    al
;----- Set timeout interval as 30seconds and start counting -----
dec     dx
mov     al,    0F6h
```

```
out    dx,  al
inc    dx
mov    al,  1Eh
out    dx,  al
;-----Exit the extended function mode -----
dec    dx
mov    al,  0AAh
out    dx,  al
```

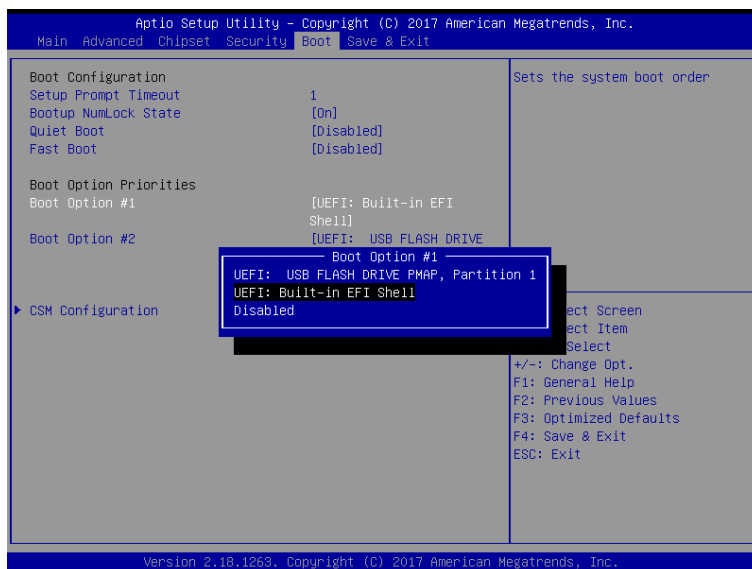
Flash BIOS Update

I. Before System BIOS Update

1. Prepare a USB media (e.g. USB storage device) to save the required files for BIOS update.
2. Download and save the BIOS file (e.g. 69801PH1.bin) to the storage device.
3. Copy AMI flash utility – AFUEFIx64.exe (v5.09.01) into the storage device. The utility and BIOS file should be saved to the same path.
4. Make sure the target system can first boot to the EFI shell environment.
 - (1) Connect the bootable USB device.
 - (2) Turn on the computer and press <ESC> or key during boot to enter BIOS Setup.
 - (3) System will go into the BIOS setup menu.
 - (4) Select **[Boot]** menu and enter into **[CSM Configuration]** menu.
 - (5) Select **[Boot option filter]** to **[UEFI Only]** and press <F4> key to save configuration and restart the system.



- (6) Press <ESC> or to enter into BIOS setup menu again.
- (7) Select **[Boot]** menu and set **[UEFI: Built-in EFI Shell]** to be the 1st boot device.
- (8) Press <F4> key to save configuration and restart the system to boot into EFI Shell environment.



II. AFUEFIx64 Command for System BIOS Update

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

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

You 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: Do not check ROM ID

II. BIOS Update Procedure

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

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

2. Type "**AFUEFIx64 6980xxxx.bin /p /b /n /x**" and press enter to start the flash procedure.
(Note that **xxxx** means the BIOS revision part, e.g. 1PH1...)
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 completed, the following messages will be shown as follows:

```
fs0:\afuefix64> afuefix64 69801PH1.bin /p /b /n /x  
+-----+  
|                AMI Firmware Update Utility v5.09.01.1317                |  
|      Copyright (C) 2017 American Megatrends Inc. All Rights Reserved.      |  
+-----+  
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 the system with new BIOS now.
6. The BIOS Update procedure 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.



American
Megatrends

Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
BIOS Date: 03/31/2017 10:11:41 Ver: 69801PH1
Press or <ESC> to enter setup.