



# User's Manual

## PPC-090T-APL

Intel® Apollo Lake Processor

Compact Panel PC with 9" Resistive Touch Screen

PPC-090T-APL-N4-4G

PPC-090T-APL-N4-8G

PPC-090T-APL-N3-4G (Build to order)

PPC-090T-APL-N3-8G (Build to order)

(Revision 1.0A)

## REVISION

| DATE      | VERSION      | DESCRIPTION |
|-----------|--------------|-------------|
| 2019/8/29 | Version 1.0A | New Release |

ICOP TECHNOLOGY INC.

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This Manual is for the PPC-090T-APL series.

## SAFETY INFORMATION

- Read these Safety instructions carefully.
- Please carry the unit with both hands, handle carefully.
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Do not expose your Panel PC to rain or moisture in order to prevent shock and fire hazard.
- Input voltage +12VDC
- Operating temperature between 0~+60°C (+32~+140°F).
- Keep PPC-090T-APL away from humidity.
- When a M.2 2242 or 2.5" Hard Disk/SSD storage is the main operating system storage, please turn off power before inserting or removing. Do not open the cabinet to avoid electrical shock. Refer to your nearest dealer for qualified personnel servicing.
- Never touch un-insulated terminals or wire unless your power adaptor is disconnected.
- Locate your Panel PC as close as possible to the socket outline for easy access and to avoid force caused by entangling of your arms with surrounding cables from the Panel PC.
- USB connectors are not supplied with Limited Power Sources.
- If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.

### **WARNING!**



*DO NOT ATTEMPT TO OPEN OR TO DISASSEMBLE THE CHASSIS (ENCASING) OF THIS PRODUCT. PLEASE CONTACT YOUR DEALER FOR SERVICING FROM QUALIFIED TECHNICIAN.*

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# Ch. 1

## General Information

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## 1.1 Product Description

ICOP Technology Inc. is proudly going to release a brand new Panel PC, which offers fanless design, low power consumption, and IP65 front panel. The PPC-090T-APL is powered by Intel® Apollo Lake N4200/N3350 processor, and 4GB / 8GB SO-DIMM DDR3L module that handles processing more efficiently and provides faster performance. The project capacity touch panel with LED backlight TFT LCD increases operation convenience and visibility in outdoor environments. The ultra-compact and thin exterior design is perfect for the present demanding embedded and productive applications.

The new PPC-090T-APL inherited PPC series' smooth appearance and ultra-texture aluminum exterior design to make your industrial applications look more stylish. The versatile I/O ports, IP65 front panel, GIGA high-speed Ethernet etc. can fulfill fundamental functions. Our consistent advantages feature stable performance, extended working temperature support, low power consumption and fanless design. The expandable customize I/O ports can be accommodated connectivity requirements to industrial machine platforms and industrial automation equipment's needs.

The PPC-090T-APL supports Windows 10, Windows 10 IoT and Linux to meet ready-to-market demand and provide competitive advantages for customers.

## 1.2 Product Specifications

### CPU BOARD SPECIFICATIONS

|                 |                                                                                                                         |
|-----------------|-------------------------------------------------------------------------------------------------------------------------|
| CPU             | Intel® Apollo Lake N4200 (Quad core)<br>Intel® Apollo Lake N3350 ( <b>Dual core; Optional</b> )                         |
| Cache           | L2: 2MB Cache                                                                                                           |
| BIOS            | AMI BIOS                                                                                                                |
| Memory          | 4GB / 8GB DDR3L                                                                                                         |
| Display         | Intel® HD Graphics, HDMI 1.4 (As Dual Display)                                                                          |
| LAN             | Integrated 10/100/1000Mbps Ethernet x 1                                                                                 |
| Audio           | HD Audio-Realtek ALC662VD CODEC                                                                                         |
| Internal Drives | 2.5" SATA HDD/SSD Support (SATA III 6.0Gb/s)<br>M.2 Slot Support (M-Key, SATA Interface, 2242)                          |
| I/O             | HDMI x 1<br>RS232/422/485 (COM1) x 1<br>RS232 (COM2) x 1<br>USB3.0 x 2<br>USB2.0 x 1<br>RJ45 x 1<br>Audio-Out<br>Mic-In |

### MECHANICAL & ENVIRONMENT

|                       |                                            |
|-----------------------|--------------------------------------------|
| Power Requirement     | +12 VDC                                    |
| Power Adapter         | +12VDC@ 3.33A (40W)                        |
| Operating Temperature | 0~+60°C (+32~+140°F)                       |
| Storage Temperature   | -20~+70°C (-4~ +158°F)                     |
| Operating Humidity    | 0% ~ 90% Relative Humidity, Non-Condensing |



|               |                                           |
|---------------|-------------------------------------------|
| Dimensions    | 242.02x156.52x50.55mm (9.53"x6.12"x1.99") |
| Weight        | 1.50 Kg                                   |
| Protection    | IP65 Front Panel                          |
| Certification | CE / FCC / VCCI / Vibration/ Shock        |

## LCD SPECIFICATIONS

|                                 |                                |
|---------------------------------|--------------------------------|
| Display Type                    | 9" WSVGA TFT LCD               |
| Backlight Unit                  | LED                            |
| Display Resolution              | 1024(W) x 600(H)               |
| Brightness (cd/m <sup>2</sup> ) | 300 nits                       |
| Contrast Ratio                  | 500 : 1                        |
| Display Color                   | 262,144                        |
| Pixel Pitch (mm)                | 190.5 (H) x 189 (V)            |
| Viewing Angle                   | Vertical 120°, Horizontal 140° |
| Backlight Lifetime              | 18,000 hrs                     |

## TOUCHSCREEN

|                 |                         |
|-----------------|-------------------------|
| Type            | Analog Resistive        |
| Resolution      | Continuous              |
| Transmittance   | 80%                     |
| Controller      | USB interface           |
| Software Driver | Linux, Win10, Win10 IoT |
| Durability      | 1 million               |

## 1.3 Inspection standard for TFT-LCD Panel

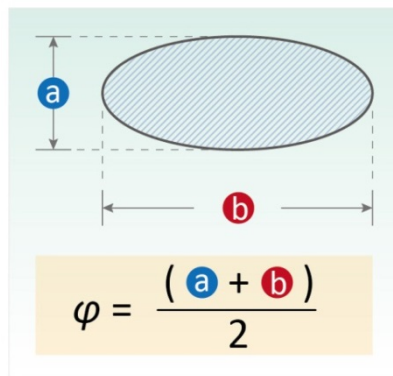
| DEFECT TYPE       |                            |                  | LIMIT                                                    |            |            |            |            | Note       |       |
|-------------------|----------------------------|------------------|----------------------------------------------------------|------------|------------|------------|------------|------------|-------|
| VISUAL DEFECT     | INTERNAL                   | SPOT             | $\varphi < 0.15\text{mm}$                                |            |            | Ignore     |            | Note1      |       |
|                   |                            |                  | $0.15\text{mm} \leq \varphi \leq 0.5\text{mm}$           |            |            | N ≤ 4      |            |            |       |
|                   |                            |                  | $0.5\text{mm} < \varphi$                                 |            |            | N=0        |            |            |       |
|                   |                            | FIBER            | $0.03\text{mm} < W \leq 0.1\text{mm}, L \leq 5\text{mm}$ |            |            | N ≤ 3      |            | Note1      |       |
|                   |                            |                  | $1.0\text{mm} < W, 1.5\text{mm} < L$                     |            |            | N=0        |            |            |       |
|                   |                            | POLARIZER BUBBLE | $\varphi < 0.15\text{mm}$                                |            |            | Ignore     |            | Note1      |       |
|                   |                            |                  | $0.15\text{mm} \leq \varphi \leq 0.5\text{mm}$           |            |            | N ≤ 2      |            |            |       |
|                   |                            |                  | $0.5\text{mm} < \varphi$                                 |            |            | N=0        |            |            |       |
|                   |                            | Mura             | It' OK if mura is slight visible through 6%ND filter     |            |            |            |            |            |       |
| ELECTRICAL DEFECT | BRIGHT DOT                 |                  | A Grade                                                  |            |            | B Grade    |            |            |       |
|                   |                            |                  | C Area                                                   | O Area     | Total      | C Area     | O Area     | Total      | Note3 |
|                   |                            |                  | N ≤ 0                                                    | N ≤ 2      | N ≤ 2      | N ≤ 2      | N ≤ 3      | N ≤ 5      | Note2 |
|                   | DARK DOT                   |                  | N ≤ 2                                                    | N ≤ 3      | N ≤ 3      | N ≤ 3      | N ≤ 5      | N ≤ 8      |       |
|                   | TOTAL DOT                  |                  | N ≤ 4                                                    |            |            | N ≤ 5      | N ≤ 6      | N ≤ 8      | Note2 |
|                   | TWO ADJACENT DOT           |                  | N ≤ 0                                                    | N ≤ 1 pair | N ≤ 1 pair | N ≤ 1 pair | N ≤ 1 pair | N ≤ 1 pair | Note4 |
|                   | THREE OR MORE ADJACENT DOT |                  | NOT ALLOWED                                              |            |            |            |            |            |       |
|                   | LINE DEFECT                |                  | NOT ALLOWED                                              |            |            |            |            |            |       |

(1) One pixel consists of 3 sub-pixels, including R, G, and B dot. (Sub-pixel = Dot)

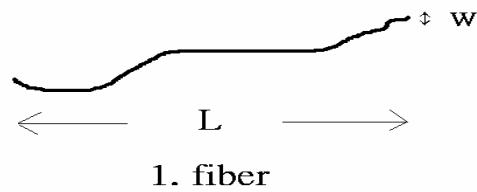
(2) Little bright Dot acceptable under 6% ND-Filter.

**(3) If require G0 grand (Total dot  $N \leq 0$ ), please contact region sales.**

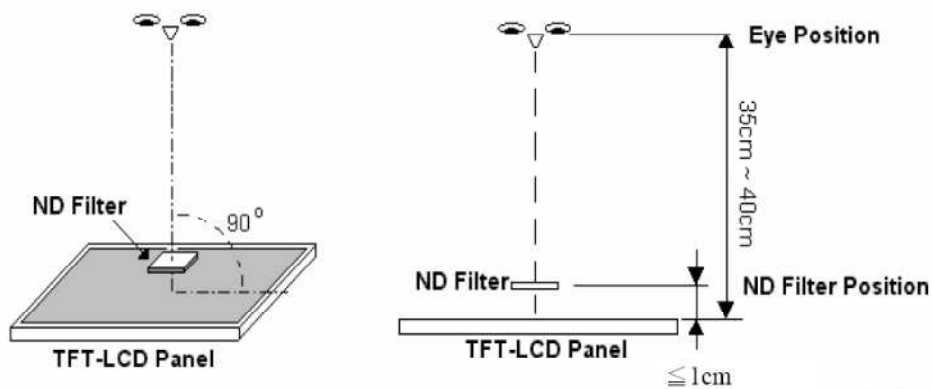
[ **Note 1** ] W: Width[mm]; L: Length[mm]; N: Number;  $\phi$ : Average Diameter.



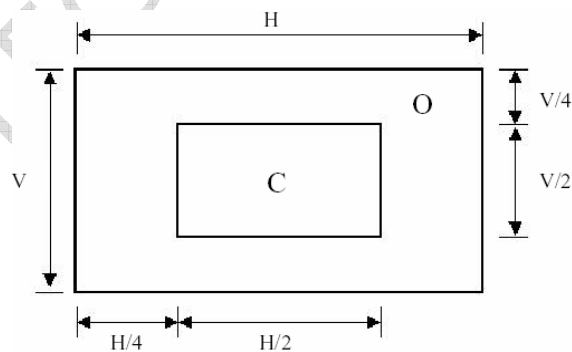
(a) White / Black Spot (b) Polarizer Bubble



[ **Note 2** ] Bright dot is defined through 6% transmission ND Filter as following.

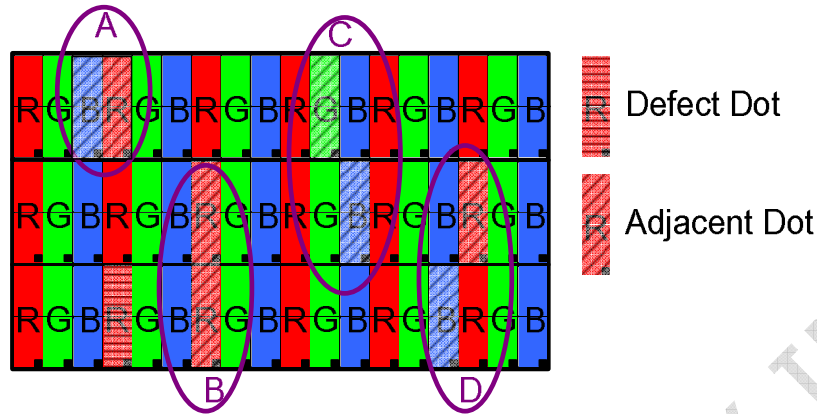


[ **Note 3** ] Display area



**C Area:** Center of display area **O Area:** Outer of display area

**[ Note 4 ]** Judge the defect dot and the adjacent dot as following. Allow below (as A, B, C and D status) adjacent defect dots, including bright and dark adjacent dot. And they will be counted 2 defect dots in total quantity.



The defects that are not defined above and considered to be problem shall be reviewed and discussed by both parties.

Defects on the Black Matrix, out of Display area, are not considered as a defect or counted.

**[Note 5]**

According to the technical information from LCD manufacturer, the image retention may happen on LCD display if the static image is kept for a period of time without any change. ICOP will suggest customers not to have static image on LCD for over 4 hours without any image movement and also enable screensaver to avoid image sticking issue if LCD displays need to be kept on for a long time.

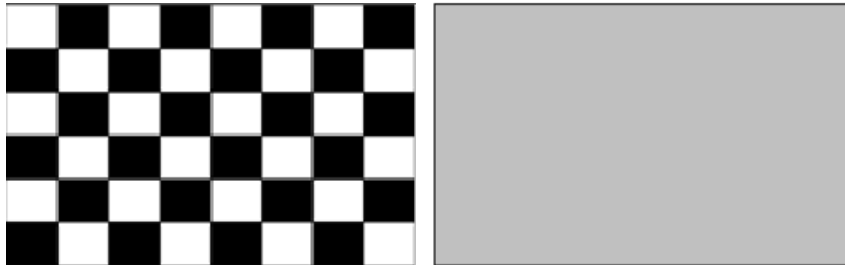
Some Image retention issue will disappear when LCD display is turned off for a period of time, but some image retention may be not reversible when LCD encounters screen burn.

The following is LCD manufacturer's test result for customers' reference.

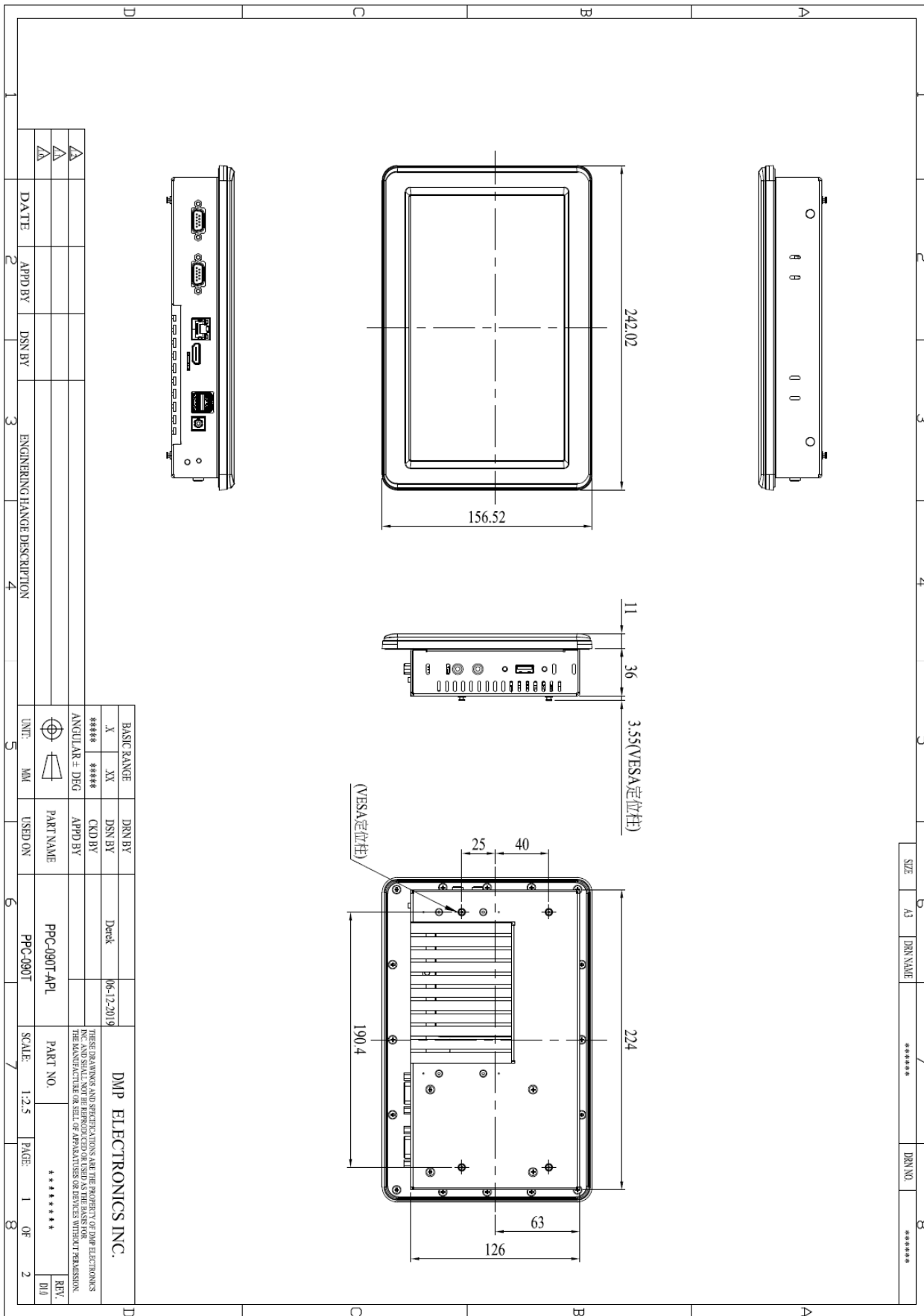
| TEST ITEMS                               | CONDITIONS                                | NOTE                          |
|------------------------------------------|-------------------------------------------|-------------------------------|
| High Temperature Operation               | 70°C ;240hrs                              |                               |
| High Temperature Storage                 | 80°C ; 240hrs                             |                               |
| High Temperature High Humidity Operation | 60°C ; 90%RH ;240hrs                      | No condensation               |
| Low Temperature Operation                | -20°C ; 240hrs                            | Backlight unit always turn on |
| Low Temperature Storage                  | -30°C ; 240hrs                            |                               |
| Thermal Shock                            | -30°C (0.5hr) ~ 80°C (0.5hr) ; 200 Cycles |                               |
| Image Sticking                           | 25°C ; 4hrs                               | <b>Note 5-1</b>               |
| MTBF                                     | 20,000Hrs                                 |                               |

**Note 5-1**

1. Condition of Image Sticking test :  $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ .
2. Operation with test pattern sustained for 4 hrs, then change to gray pattern immediately.
3. After 5 mins, the mura must be disappeared completely.



## 1.4 Product Dimensions

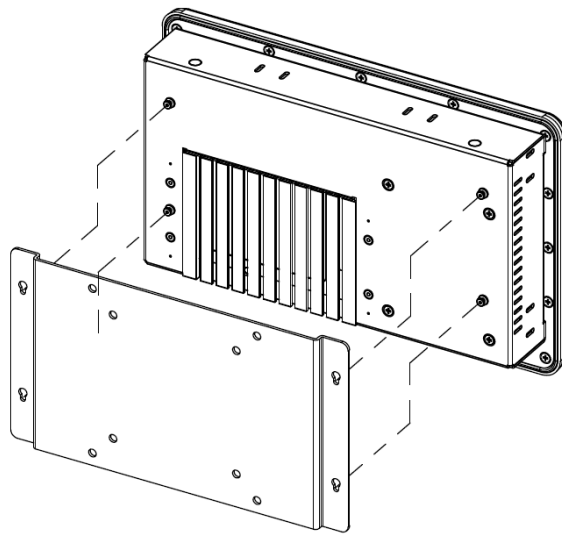


## 1.5 Mounting Instruction

### • 1.5.1 VESA Mounting

PPC-090T-APL series support VESA Mount that is an optional for ordering. Please contact your region sales for ordering.

Ordering part number: **VESA-MT-PPC-APL-SET**



1. Place VESA bracket and VESA-MT-PPC-APL-SET together.
2. Lock 4 screws and nuts on both of VESA bracket and VESA-MT-PPC-APL-SET.

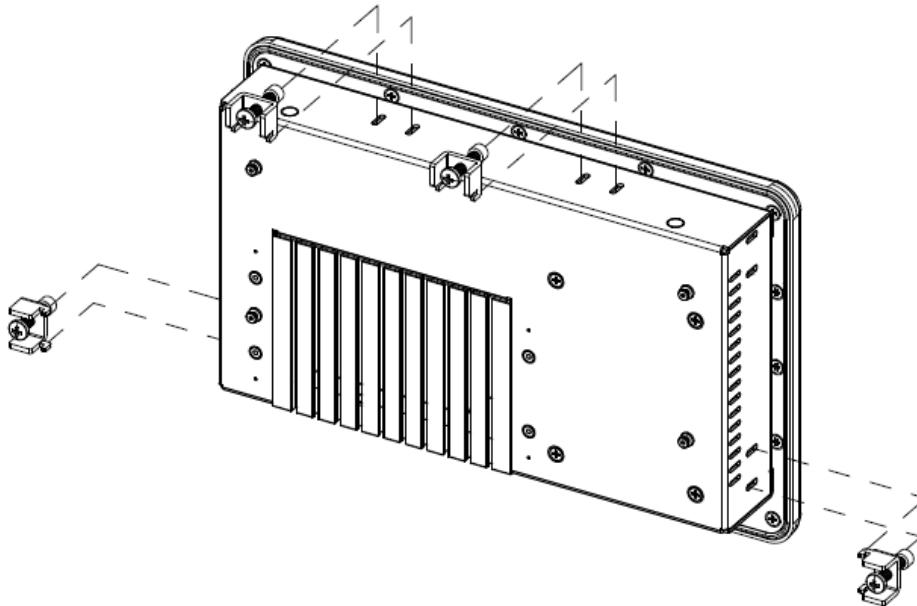


3. Hang PPC-090T-APL upon on both of VESA bracket and VESA-MT-PPC-APL-SET.



## • 1.5.2 Panel Mounting

PPC-090T-APL series support clamp mount kit, which includes 4pcs of clamp and screw in a bag of the package box. User can follow the instruction to do the panel mount as below.



1. Please refer the Section 1.4 to make a cutout hole on your mechanical or frame.  
**Please note that there is thickness limitation of the mounting wall for clamp mount installation. The suggestion of mounting wall thickness limitation is 20 mm.**
2. It has 4pcs of clamp and screw, and each clamp and screw is paired. Screws 4pcs of clamp and screw together respectively.
3. Place PPC in a cutout mechanical or frame, which mounts the panel to align the bottom of the panel housing with the bottom edge of the cutout. This way can help hold the panel steadily.
4. At the back side of the mounting wall, insert the clamp into the slide hole at the side bracket on the panel. Fit the screw on the clamp and screw on both of clamp and mounting wall. Please be careful and make sure that 6 clamps and screws have been lock tightly.



## 1.6 Ordering Information

| Product Code | LCD Size           | CPU Type  | RAM       |
|--------------|--------------------|-----------|-----------|
| PPC          | 090T               | <b>N4</b> | <b>4G</b> |
|              | 104T               | <b>N3</b> | <b>8G</b> |
|              | 150T               |           |           |
|              | <b>150P</b> (PCAP) |           |           |

### 1. Product Code : Code 1~3.

PPC : Panel PC Series.

### 2. LCD Size : Code 4~7.

090T : 9" LCD with Resistive touch screen.

104T : 10.4" LCD with Resistive touch screen.

150T : 15" LCD with Resistive touch screen.

150**P** : 15" LCD with **PCAP** touch screen.

### 3. CPU Type : Code 8~9.

N4: Intel Apollo Lake N4200.(Standard; Quad Core 6W)

N3: Intel Apollo Lake N3350. (Optional; Dual Core 6W)

### 4. RAM : Code 10~11.

4G : 4GB.    8 : 8GB.

**PS: Power adapter and cord must be showed separate because different county has different power cord. The unit price includes power adapter and cord as below.**

**POWER-12V3.33A-FSP**

**POWERCABLE-FSP-US / POWERCABLE-FSP-EU**

| PART NUMBER                              | DESCRIPTION                                                                               |
|------------------------------------------|-------------------------------------------------------------------------------------------|
| PPC-090T-APL-N4-4G                       | 9" Panel PC w/Intel Apollo Lake N4200/4GB DRAM<br>/3U/Giga LAN/2S/Touch/DC12V Power Input |
| PPC-090T-APL-N4-8G                       | 9" Panel PC w/Intel Apollo Lake N4200/8GB DRAM<br>/3U/Giga LAN/2S/Touch/DC12V Power Input |
| PPC-090T-APL-N3-4G (BTO)                 | 9" Panel PC w/Intel Apollo Lake N3350/4GB DRAM<br>/3U/Giga LAN/2S/Touch/DC12V Power Input |
| PPC-090T-APL-N3-8G (BTO)                 | 9" Panel PC w/Intel Apollo Lake N3350/8GB DRAM<br>/3U/Giga LAN/2S/Touch/DC12V Power Input |
| POWER-12V3.33A-FSP                       | AC – DC power adapter / DC12V @ 3.33A (AC 90 ~ 240V Input)                                |
| POWERCABLE-FSP-US<br>/ POWERCABLE-FSP-EU | US/Euro power cord for POWER-12V3.33A-FSP                                                 |
| VESA-MT-PPC-APL-SET                      | VESA mount bracket set                                                                    |

# Ch. 2

## System Installation

[2.1 CPU Board Outline](#)

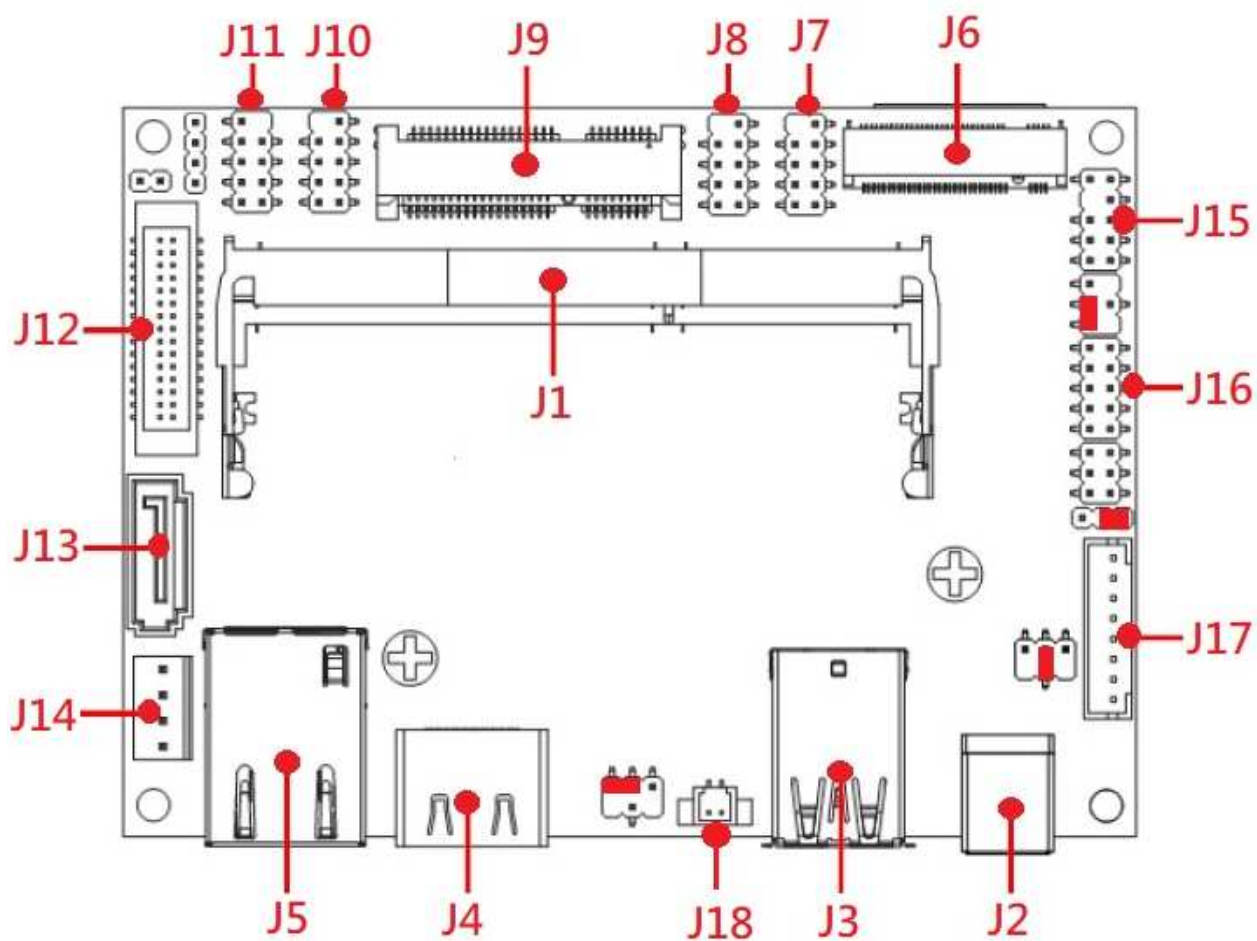
[2.2 Connector Summary](#)

[2.3 Connector Pin Assignments](#)

[2.4 External I/O Overview](#)

[2.5 External I/O Pin Assignment](#)

## 2.1 CPU Board Outline



PPC APL CPU Board

## 2.2 Connector Summary

| No. | Description                   | Type of Connections              | Pin #   |
|-----|-------------------------------|----------------------------------|---------|
| J1  | DDR3L SO-DIMM Slot            | External SO-DIMM Slot            | 204-pin |
| J2  | Power DC Jack                 | External Power DC Jack Connector | 2-pin   |
| J3  | USB3.0 x 2                    | External Dual USB3.0 Connector   | 18-pin  |
| J4  | HDMI                          | External HDMI Connector          | 19-pin  |
| J5  | GIGA Ethernet                 | External RJ45 Connector          | 8-pin   |
| J6  | M.2 SATA (M-Key)              | External M.2 SATA Connector      | 75-pin  |
| J7  | <b>COM1</b> (RS232/422/485)   | 2.0mm 9-pin pin header           | 9-pin   |
| J8  | <b>COM2</b> (RS232)           | 2.0mm 9-pin pin header           | 9-pin   |
| J9  | Mini-PCle                     | External Mini-PCle Connector     | 52-pin  |
| J10 | Front Panel Header            | 2.0mm 9-pin pin header           | 9-pin   |
| J11 | USB2.0 x 2                    | 2.0mm 9-pin pin header           | 9-pin   |
| J12 | LVDS                          | 1.25mm 30-pin box header         | 30-pin  |
| J13 | SATAIII Slot                  | External SATA Slot               | 7-pin   |
| J14 | SATA Power Output             | 2.54mm 4-pin pin header          | 4-pin   |
| J15 | Audio Header                  | 2.0mm 9-pin pin header           | 9-pin   |
| J16 | GPIO Header <b>(Reserved)</b> | 2.0mm 10-pin pin header          | 10-pin  |
| J17 | Inverter                      | 2.0mm 8-pin box header           | 8-pin   |
| J18 | RTC Battery Header            | 1.25mm 2-pin box header          | 2-pin   |

## 2.3 Connector Pin Assignments

### J2: Power DC Jack

| Pin # | Signal Name      |
|-------|------------------|
| 1     | +12V Power Input |
| 2     | GND              |

### J7: COM1 (RS232/422/485)

| Pin # | Signal Name                | Pin # | Signal Name |
|-------|----------------------------|-------|-------------|
| 1     | DCD1<br>/422TX-<br>/RS485- | 2     | DSR1        |
| 3     | RXD1<br>/422TX+<br>/RS485+ | 4     | RTS1        |
| 5     | TXD1/422RX+                | 6     | CTS1        |
| 7     | DTR1/422RX-                | 8     | RI1         |
| 9     | GND                        |       |             |

### J8: COM2 (RS232)

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | DCD2        | 2     | DSR2        |
| 3     | RXD2        | 4     | RTS2        |
| 5     | TXD2        | 6     | CTS2        |
| 7     | DTR2        | 8     | RI2         |
| 9     | GND         |       |             |

### J10: Front Panel Header

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | HDDLED+     | 2     | PWRLED+     |
| 3     | HDDLED-     | 4     | PWRLED-     |
| 5     | GND         | 6     | PWRBT       |
| 7     | RSTSW       | 8     | GND         |
| 9     | VCC         |       |             |

### J11: USB2.0 x 2

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | VCC         | 2     | VCC         |
| 3     | USB2_D1-    | 4     | USB2_D2-    |
| 5     | USB2_D1+    | 6     | USB2_D2+    |
| 7     | GND         | 8     | GND         |
|       |             | 10    | NC          |

### J12: LVDS

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | LVDSB_D3-   | 2     | LVDSB_D3+   |
| 3     | LVDSB_CLK-  | 4     | LVDSB_CLK+  |
| 5     | LVDSB_D2-   | 6     | LVDSB_D2+   |
| 7     | LVDSB_D1-   | 8     | LVDSB_D1+   |
| 9     | LVDSB_D0-   | 10    | LVDSB_D0+   |
| 11    | NC/DDC_DAT  | 12    | NC/DDC_CLK  |
| 13    | GND         | 14    | GND         |
| 15    | GND         | 16    | GND         |
| 17    | LVDSA_D3+   | 18    | LVDSA_D3-   |
| 19    | LVDSA_CLK+  | 20    | LVDSA_CLK-  |
| 21    | LVDSA_D2+   | 22    | LVDSA_D2-   |
| 23    | LVDSA_D1+   | 24    | LVDSA_D1-   |
| 25    | LVDSA_D0+   | 26    | LVDSA_D0-   |
| 27    | LCD_VDD     | 28    | LCD_VDD     |
| 29    | LCD_VDD     | 30    | LCD_VDD     |

**J14: SATA Power Output**

| Pin # | Signal Name |
|-------|-------------|
| 1     | +5V         |
| 2     | GND         |
| 3     | GND         |
| 4     | +12V        |

**J18: RTC Battery Header**

| Pin # | Signal Name |
|-------|-------------|
| 1     | GND         |
| 2     | VBAT        |

**J15: Audio Header**

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | MIC_L       | 2     | AUDIO_GND   |
| 3     | MIC_R       | 4     | AUDIO_JD    |
| 5     | LINEOUT2_R  | 6     | MIC_JD      |
| 7     | SENSE_FB    |       |             |
| 9     | LINEOUT2_L  | 10    | LINE2_JD    |

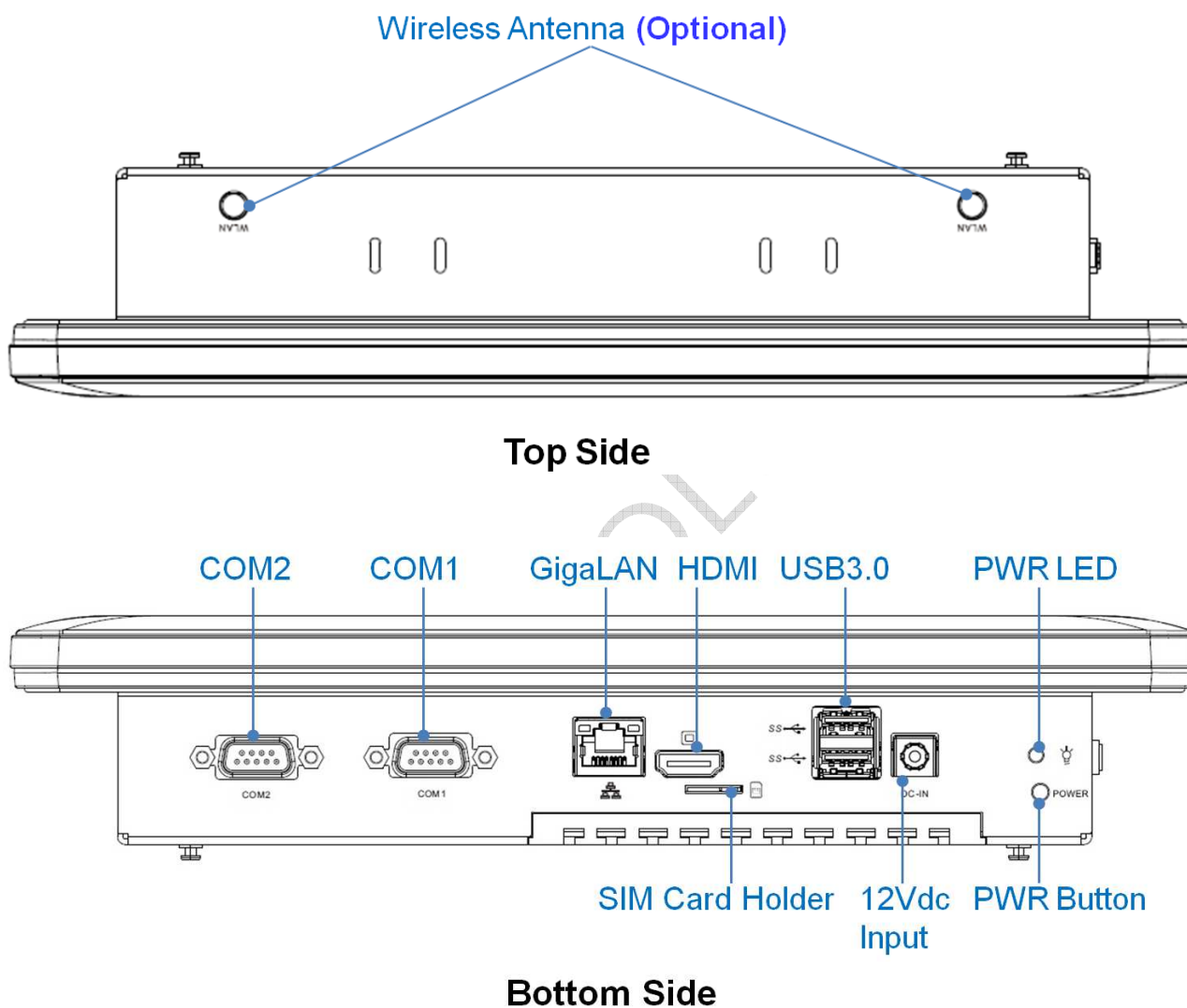
**J16: GPIO (Reserved)**

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | GPIO80      | 2     | GPIO81      |
| 3     | GPIO82      | 4     | GPIO83      |
| 5     | GPIO84      | 6     | GPIO85      |
| 7     | GPIO86      | 8     | GPIO87      |
| 9     | GND         | 10    | VCC         |

**J17: Inverter**

| Pin # | Signal Name       |
|-------|-------------------|
| 1     | Backlight_Enable  |
| 2     | Backlight_PWM     |
| 3     | Backlight LED VCC |
| 4     | Backlight LED VCC |
| 5     | GND               |
| 6     | GND               |
| 7     | Backlight UP SW   |
| 8     | Backlight DN SW   |

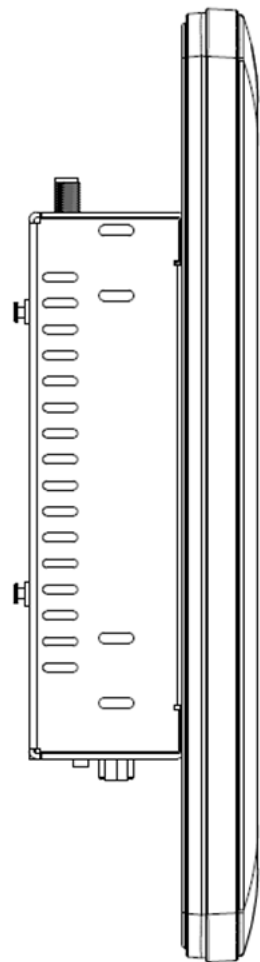
## 2.4 External I/O Overview



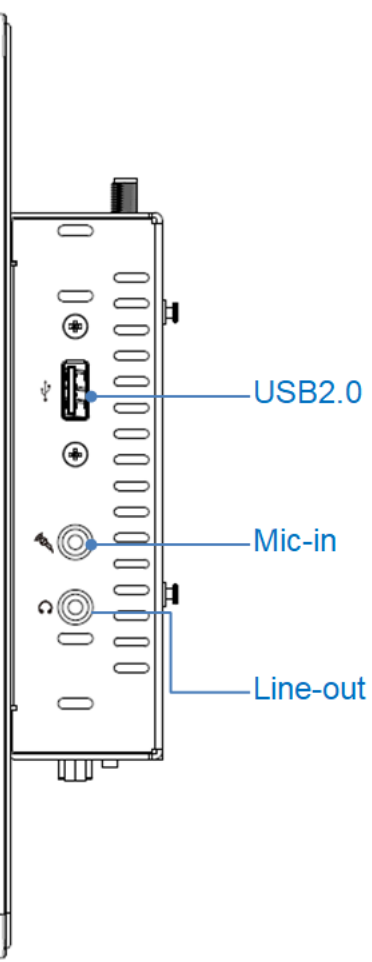
**NOTE:** COM1 RS232/422/485 is selected by BIOS setting. Please refer the section, 4.6 to set the function in the BIOS setup.



**Left Side**

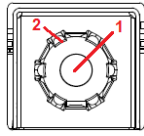


**Right Side**



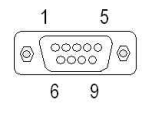
## 2.5 External I/O Pin Assignment

### Power DC Jack (12Vdc Input)

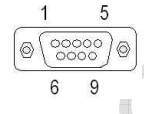
|  | Pin # | Signal Name |
|-----------------------------------------------------------------------------------|-------|-------------|
|                                                                                   | 1     | +12Vdc      |
|                                                                                   | 2     | GND         |

### COM1 (RS232/422/485)

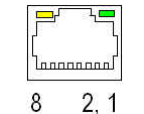
(Change mode by BIOS Setup)

|  | Pin # | Signal Name                | Pin # | Signal Name                |
|------------------------------------------------------------------------------------|-------|----------------------------|-------|----------------------------|
|                                                                                    | 1     | DCD1<br>/422TX-<br>/RS485- | 2     | RXD1<br>/422TX+<br>/RS485+ |
|                                                                                    | 3     | TXD1<br>/422RX+            | 4     | DTR1<br>/422RX-            |
|                                                                                    | 5     | GND                        | 6     | DSR1                       |
|                                                                                    | 7     | RTS1                       | 8     | CTS1                       |
|                                                                                    | 9     | RI1                        |       |                            |

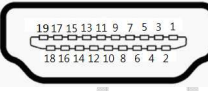
### COM2 (RS232)

|  | Pin # | Signal Name | Pin # | Signal Name |
|-------------------------------------------------------------------------------------|-------|-------------|-------|-------------|
|                                                                                     | 1     | DCD2        | 2     | RXD2        |
|                                                                                     | 3     | TXD2        | 4     | DTR2        |
|                                                                                     | 5     | GND         | 6     | DSR2        |
|                                                                                     | 7     | RTS2        | 8     | CTS2        |
|                                                                                     | 9     | RI2         |       |             |

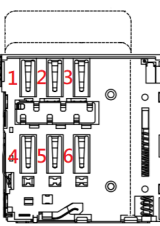
### GigaLAN

|  | Pin # | Signal Name | Pin # | Signal Name |
|-------------------------------------------------------------------------------------|-------|-------------|-------|-------------|
|                                                                                     | 1     | TP0+        | 2     | TP0-        |
|                                                                                     | 3     | TP1+        | 4     | TP2+        |
|                                                                                     | 5     | TP2-        | 6     | TP1-        |
|                                                                                     | 7     | TP3+        | 8     | TP3-        |

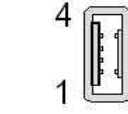
### HDMI

|  | Pin # | Signal Name       |
|------------------------------------------------------------------------------------|-------|-------------------|
|                                                                                    | 1     | TMDS_Data2+       |
|                                                                                    | 2     | TMDS_Data2_Shield |
|                                                                                    | 3     | TMDS_Data2-       |
|                                                                                    | 4     | TMDS_Data1+       |
|                                                                                    | 5     | TMDS_Data1_Shield |
|                                                                                    | 6     | TMDS_Data1-       |
|                                                                                    | 7     | TMDS_Data0+       |
|                                                                                    | 8     | TMDS_Data0_Shield |
|                                                                                    | 9     | TMDS_Data0-       |
|                                                                                    | 10    | TMDS_CLK+         |
|                                                                                    | 11    | TMDS_CLK_Shield   |
|                                                                                    | 12    | TMDS_CLK-         |
|                                                                                    | 13    | CEC               |
|                                                                                    | 14    | Reserved          |
|                                                                                    | 15    | SCL               |
|                                                                                    | 16    | SDA               |
|                                                                                    | 17    | DDC/CEC_GND       |
|                                                                                    | 18    | +5V Power         |
|                                                                                    | 19    | Hop_Plug_Detect   |

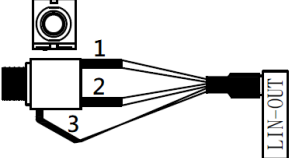
### SIM Card Holder (Micro SIM Card Support)

|  | Pin # | Signal Name | Pin # | Signal Name |
|-------------------------------------------------------------------------------------|-------|-------------|-------|-------------|
|                                                                                     | 1     | SIM-VCC     | 2     | SIM-RST     |
|                                                                                     | 3     | SIM-CLK     | 4     | GND         |
|                                                                                     | 5     | SIM-VPP     | 6     | SIM-IO      |
|                                                                                     |       |             |       |             |

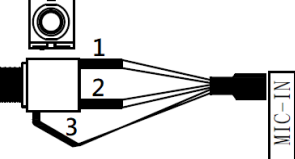
### USB2.0

|  | Pin # | Signal Name |
|-------------------------------------------------------------------------------------|-------|-------------|
|                                                                                     | 1     | VCC         |
|                                                                                     | 2     | USB0-       |
|                                                                                     | 3     | USB0+       |
|                                                                                     | 4     | GND         |

### Line-Out

|  | Pin # | Signal Name |
|-----------------------------------------------------------------------------------|-------|-------------|
|                                                                                   | 1     | LINEOUT2-L  |
|                                                                                   | 2     | LINEOUT2-R  |
|                                                                                   | 3     | AUDIO_GND   |

### Mic-in

|  | Pin # | Signal Name |
|-----------------------------------------------------------------------------------|-------|-------------|
|                                                                                   | 1     | MIC-L       |
|                                                                                   | 2     | MIC-R       |
|                                                                                   | 3     | AUDIO_GND   |

# Ch. 3

## Hardware Installation

PPC-090T-APL supports various kinds of storages for industrial application, divided into M.2 2242 SATA (M-Key) and 2.5" SATAIII HDD/SSD.

[3.1 Installing the M.2 2242 SATA](#)

[3.2 Installing the 2.5" SATA HDD/SSD](#)

[3.3 Installing the Mini-PCle Module](#)

[3.4 Installing the Micro SIM Card \(Must include 3G/4G Mini-PCle Module in advance\)](#)

## 3.1 Installing the M.2 2242 SATA

### [SPEC]

Standard M.2 2242 form factor

22 x 42 x 3.2 mm

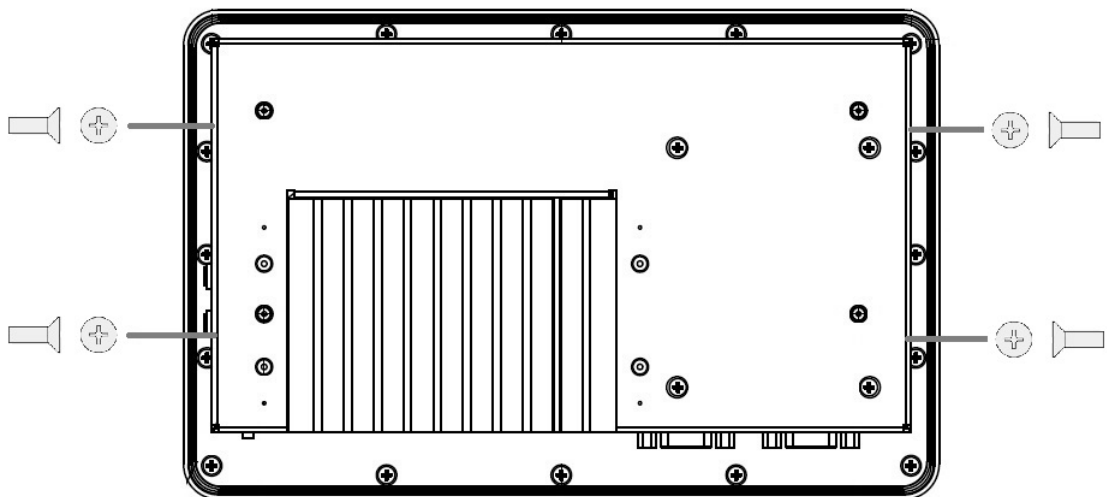


### [M.2 2242 SATA LIST]

| P/N           | MLC | Operating Temperature |
|---------------|-----|-----------------------|
| IM242S-8G-M   | V   | 0°C ~ +70°C           |
| IM242S-16G-M  | V   | 0°C ~ +70°C           |
| IM242S-32G-M  | V   | 0°C ~ +70°C           |
| IM242S-64G-M  | V   | 0°C ~ +70°C           |
| IM242S-128G-M | V   | 0°C ~ +70°C           |
| IM242S-256G-M | V   | 0°C ~ +70°C           |

### [STEP]

1. Remove the 4 screws as the image below.



2. Pull up rear cover carefully, which LCD, Backlight and Touch cables inside the rear cover and please be careful to open it.



3. Remove the screw of M.2 Slot.



4. Plug M.2 2242 Storage on M.2 Slot and lock the screw.



5. Take the rear cover back and lock 4 screws.



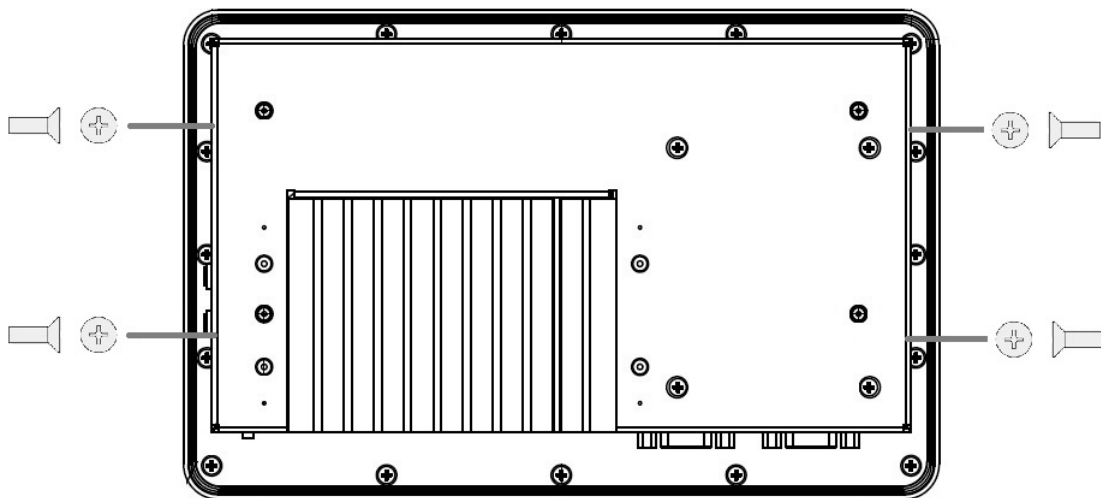
## 3.2 Installing the 2.5" SATA HDD/SDD

### [STEP]

1. Find the bag of screws from inside of the package box, and prepare those 4 screws in advance.



2. Remove the 4 screws as the image below.



3. Pull up rear cover carefully, which LCD, Backlight and Touch cables inside the



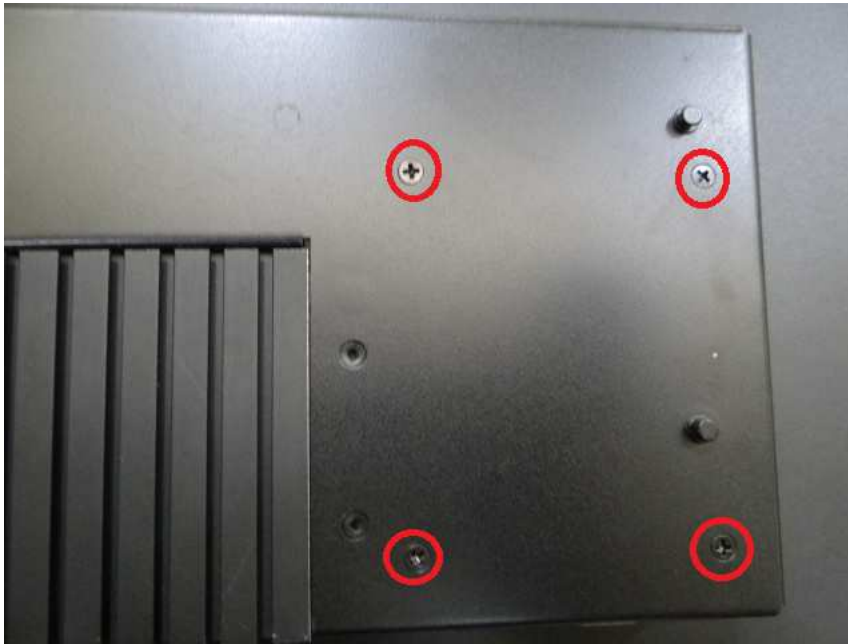
rear cover and please be careful to open it.



4. Plug SATA cable upon 2.5" SATA HDD/SSD and take it in the box.



5. Lock the screws on the both of rear cover and 2.5" HDD/SSD.

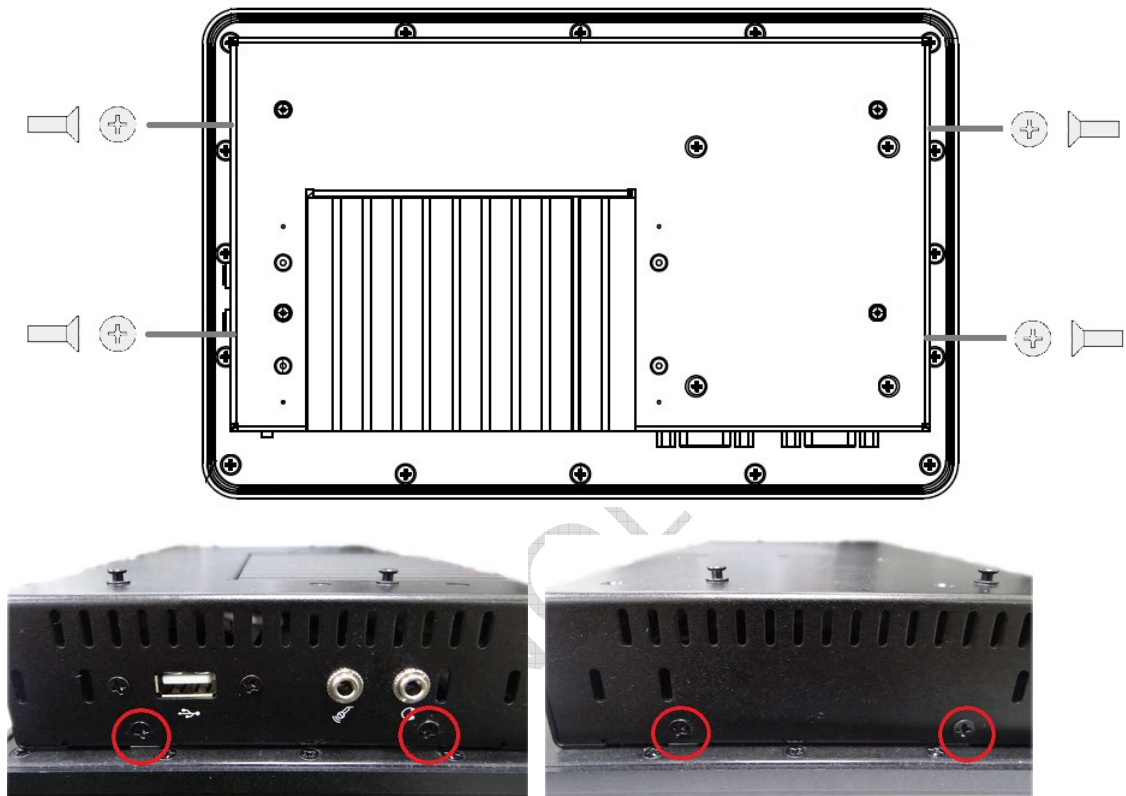


6. Take the rear cover back and lock 4 screws.

### 3.3 Installing the Mini-PCle Module

#### [STEP]

1. Remove the 4 screws as the image below.



2. Pull up rear cover carefully, which LCD, Backlight and Touch cables inside the rear cover and please be careful to open it.



3. Remove the screw of Mini-PCle Slot.

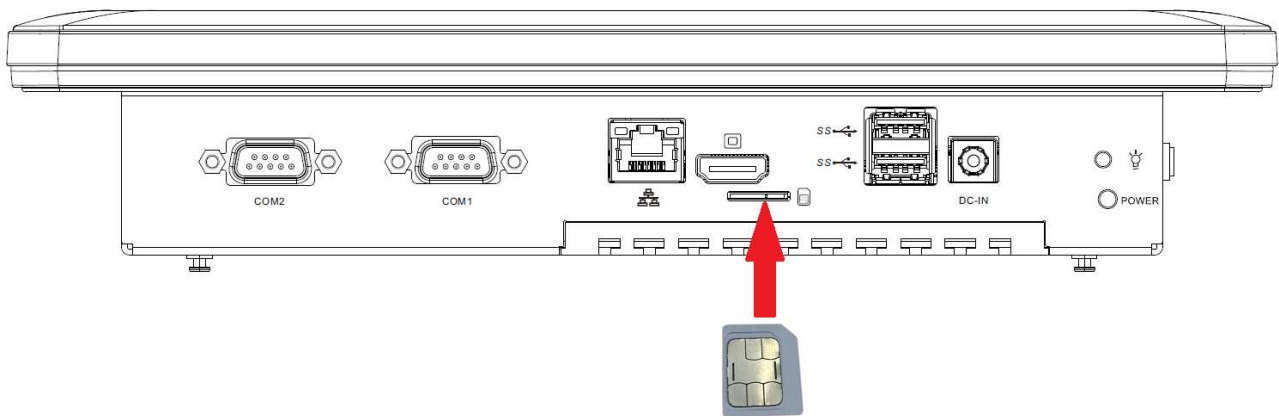


4. Plug Mini-PCle Module upon the slot and lock the screws.
5. Take the rear cover back and lock 4 screws.

### 3.4 Installing the Micro SIM Card (Must include 3G/4G Mini-PCle Module in advance)

#### [STEP]

1. Please refer the section, 3.3 to install 3G/4G Mini-PCle Module in advance.
2. Plug Micro SIM Card on the slot.



# Ch. 4

## Drivers and BIOS Instruction

[4.1 Operating System Support and Drivers](#)

[4.2 BIOS Hot Key](#)

[4.3 BIOS COM1 Setting \(RS232/RS422/RS485\)](#)

[4.4 BIOS COM2 Setting \(Change Settings\)](#)

[4.5 BIOS AT Mode Setting \(Support Auto-Power On Function\)](#)

[4.6 BIOS Serial Port Console Redirection](#)

[4.7 BIOS Load Default Setting](#)

## 4.1 Operating System Support and Drivers

The PPC-090T-APL provides the Win10 drivers for Normal Win10 and Win10 IoT Enterprise.

Please get the drivers from ICOP technical support URL:

[https://www.icop.com.tw/download\\_resource/PPC-090T-N4200?tags=18,81,34,35,38,39,64,65&selected=35](https://www.icop.com.tw/download_resource/PPC-090T-N4200?tags=18,81,34,35,38,39,64,65&selected=35)

For Linux, most Linux distributions support Intel® Apollo Lake Processor and user can install Linux upon PPC-090T-APL directly. Please contact your region sales for technical support if you have any question.



## 4.2 BIOS Hot Key

After power on, it supports BIOS hot key as below.



Press < **Del** > to enter the AMI BIOS setup



Press < **F7** > to enter Popup Menu

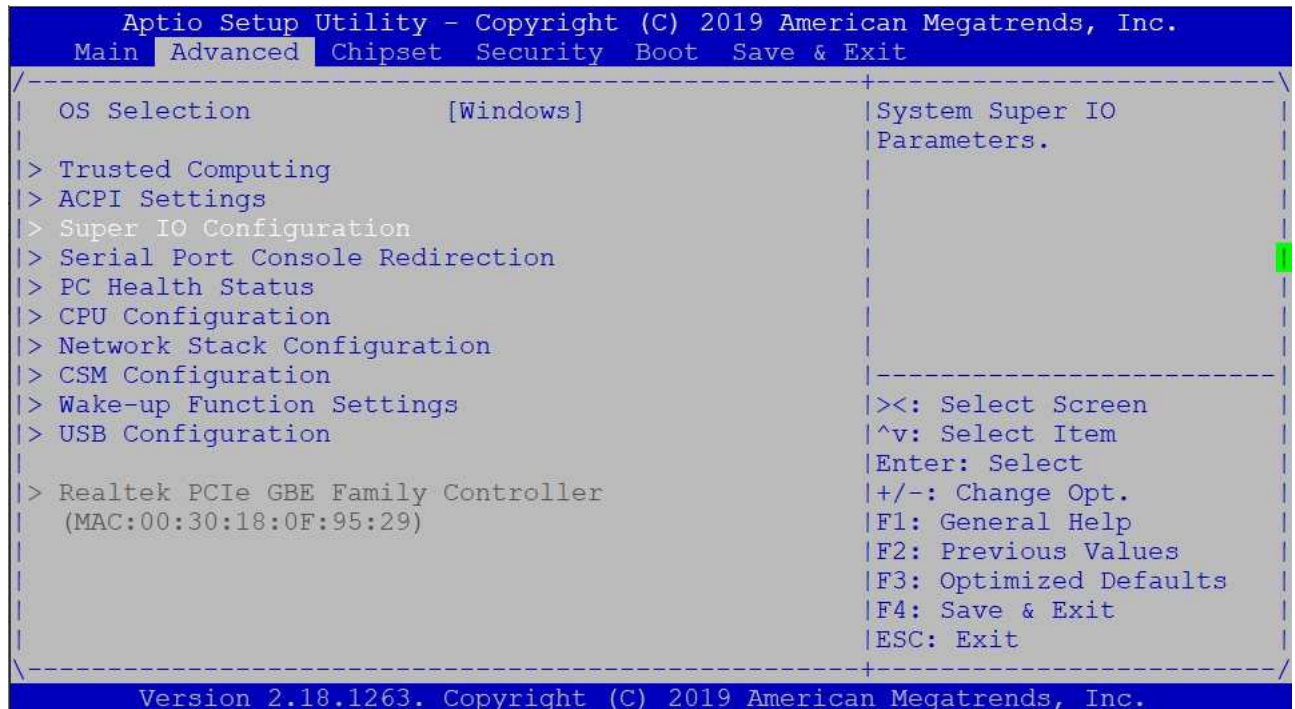
---



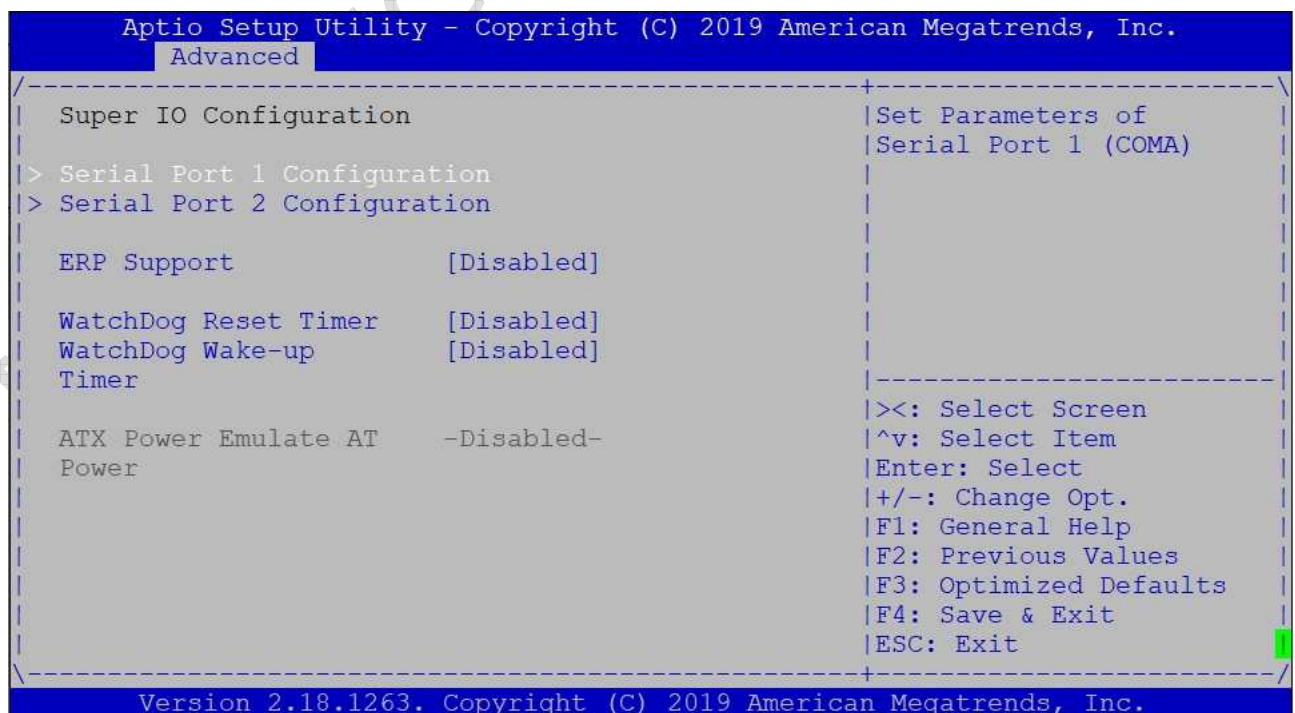
## 4.3 BIOS COM1 Setting (RS232/422/485)

COM1 can be set to be RS232/422/485 function. Please refer the instruction as below.

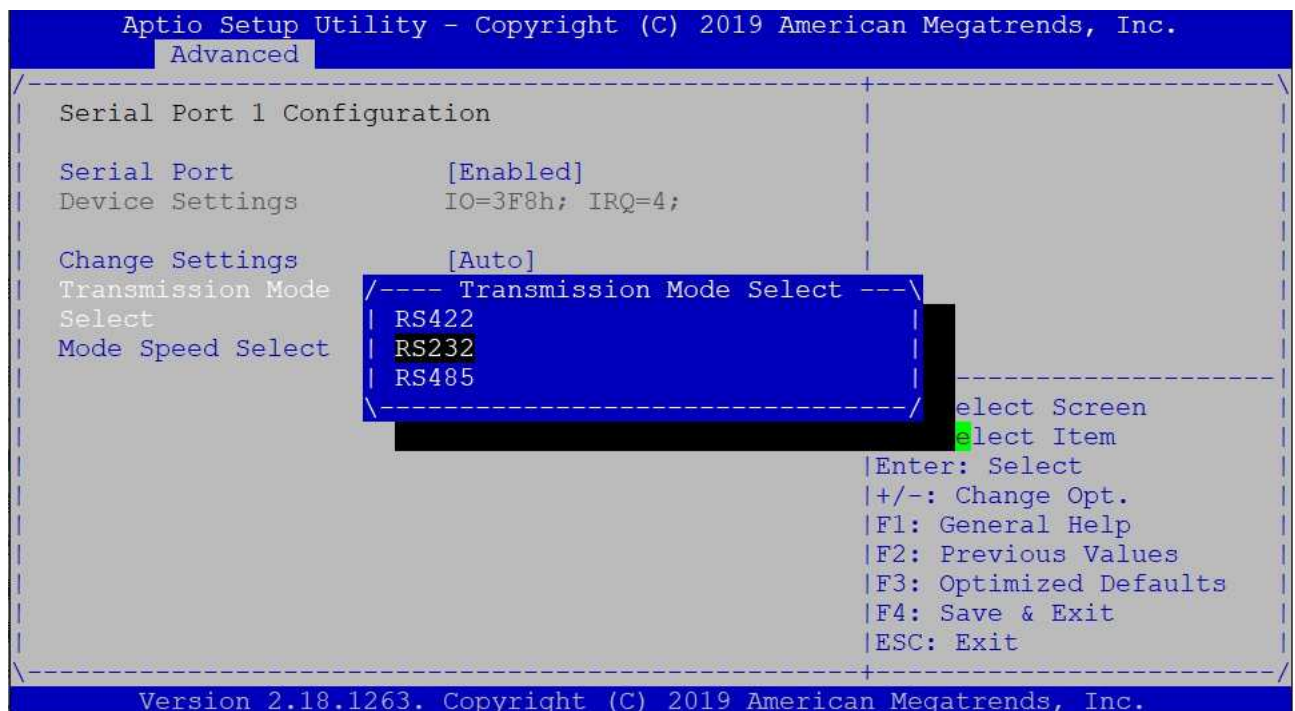
(1) In the BIOS Setup, please go to “Advanced” and “Super IO Configuration”.



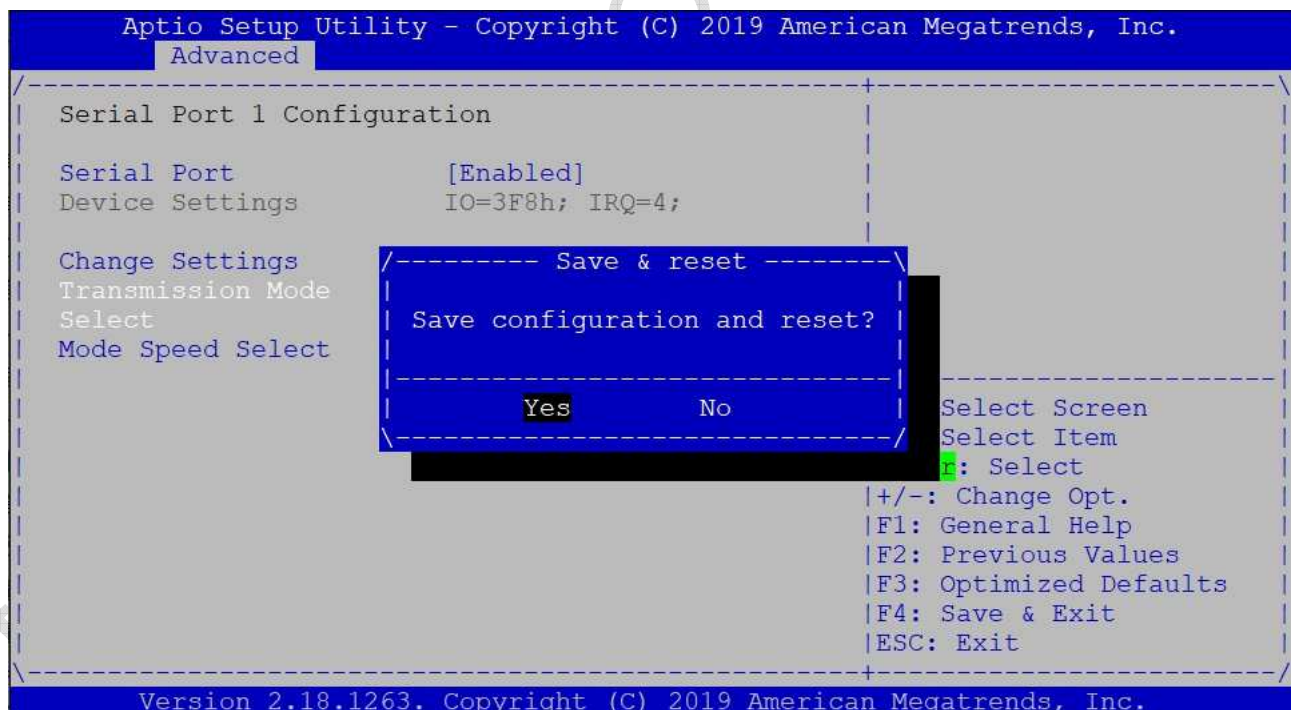
(2) Go to “Serial Port 1 Configuration”.



(3) Go to Transmission Mode and set RS232/422/485 function.



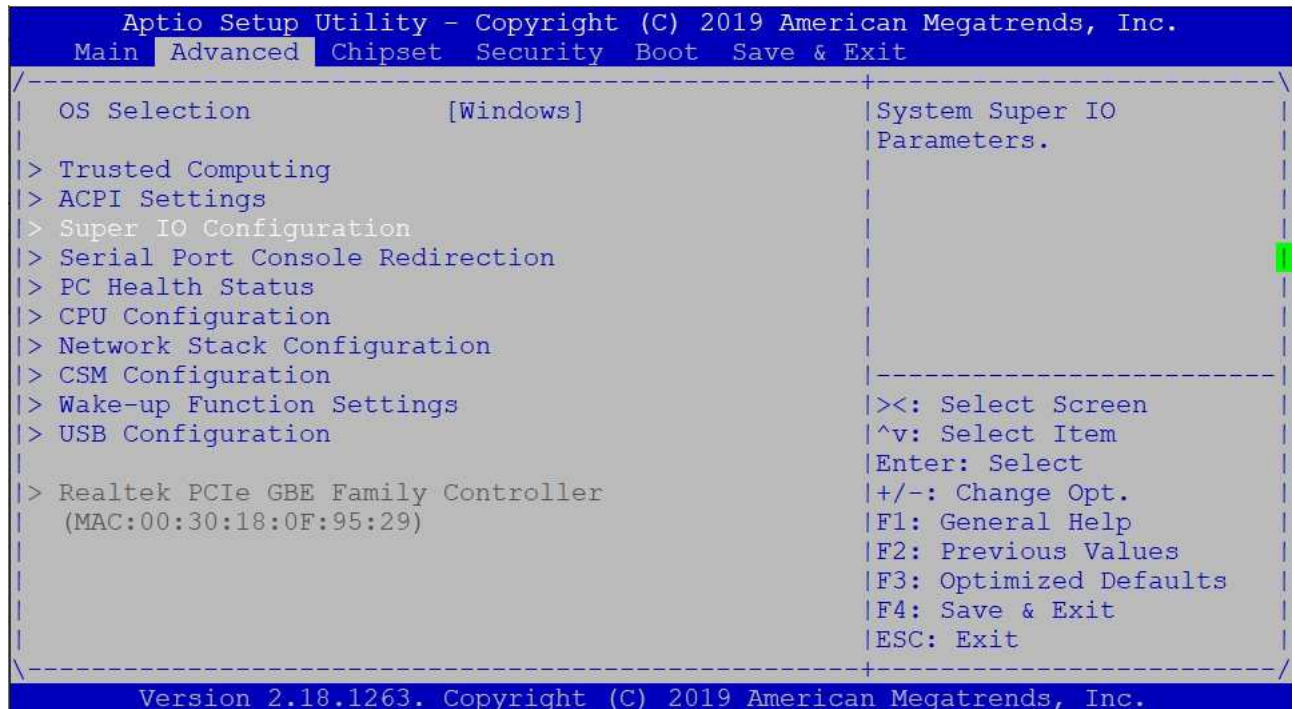
(4) After setting, please press "F4" key to save & exit.



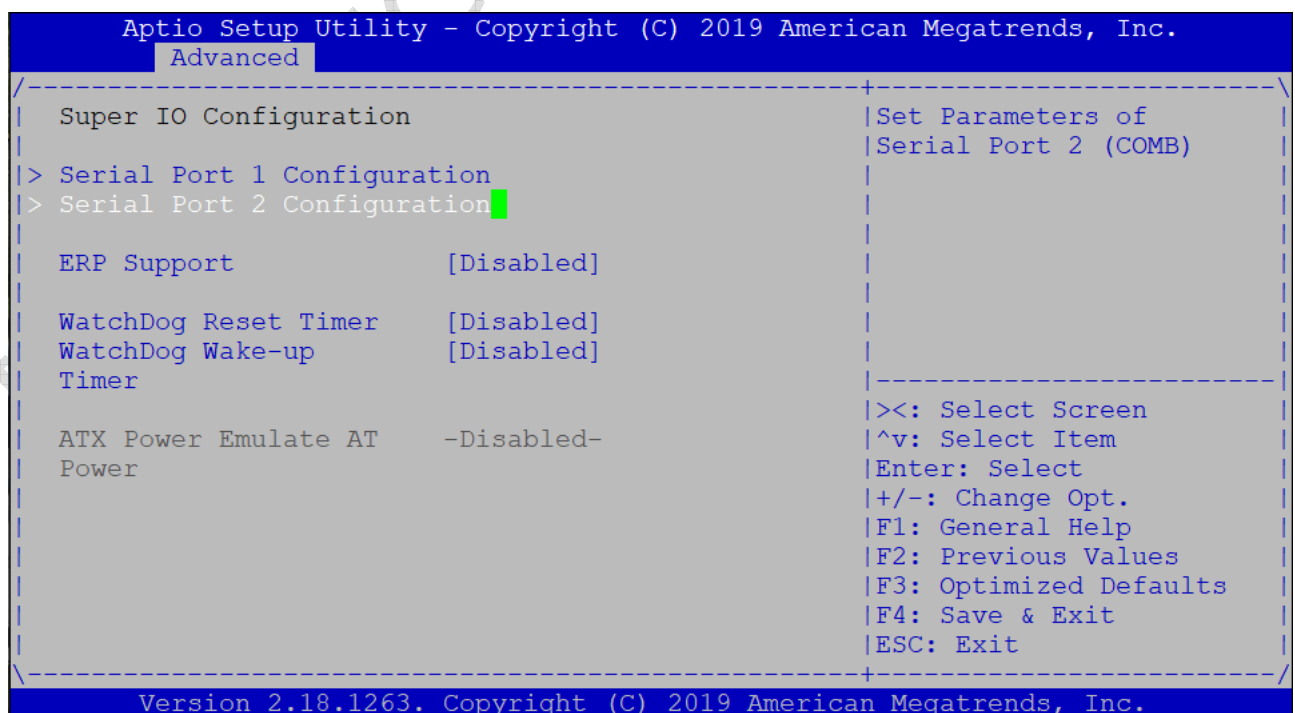
## 4.4 BIOS COM2 Setting (Change Settings)

COM2 can be changed settings as below.

(1) In the BIOS Setup, please go to “Advanced” and “Super IO Configuration”.

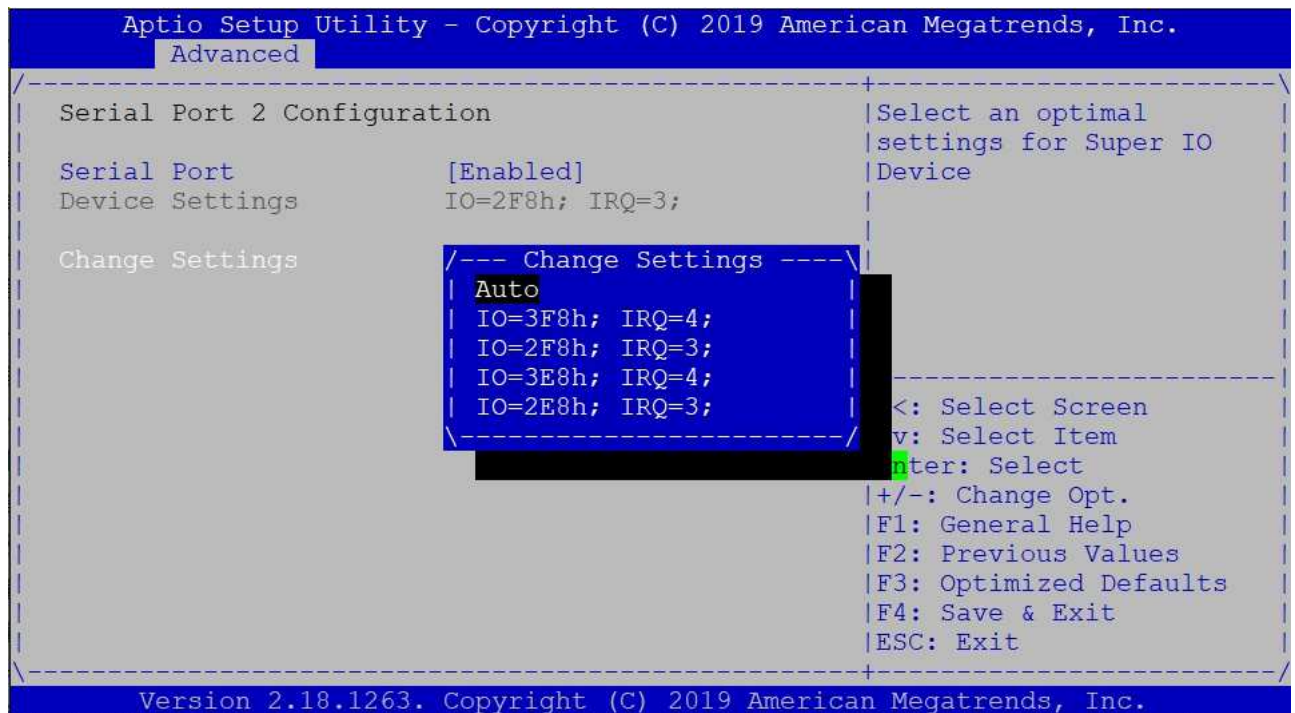


(2) Go to “Serial Port 2 Configuration”.

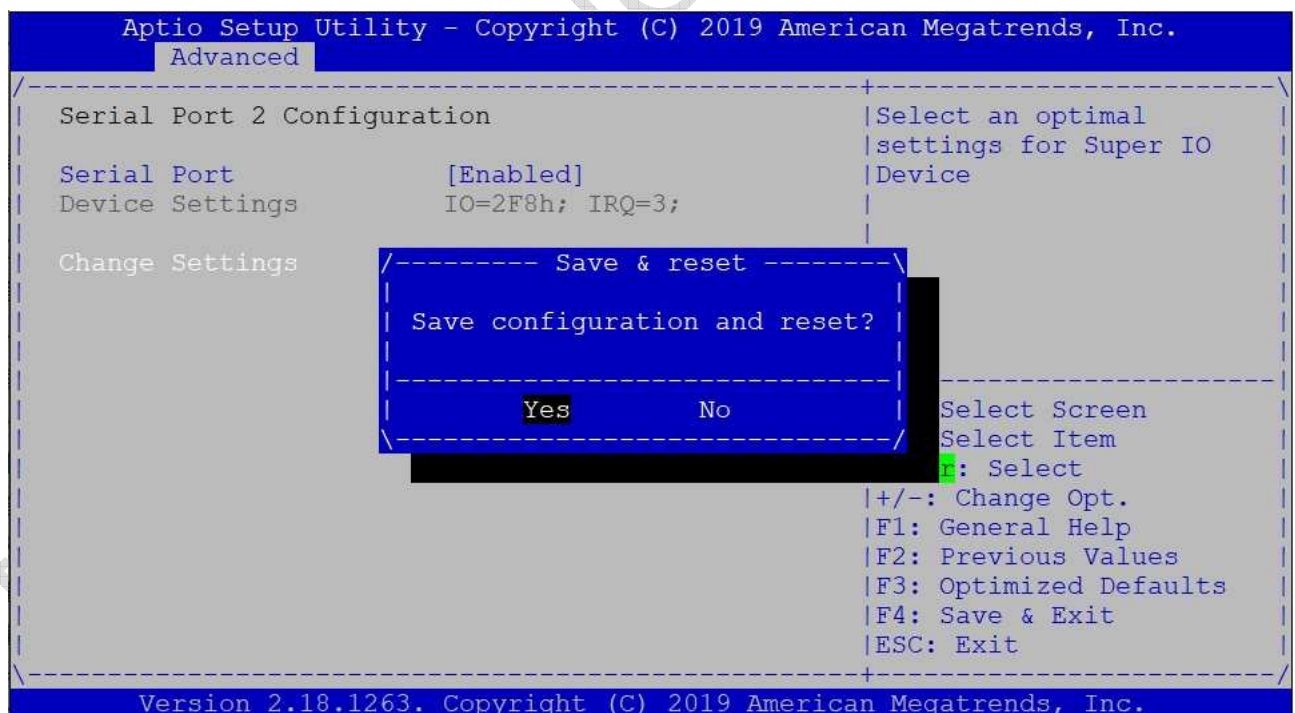




- (3) Go to “Change Settings” and set IO address and IRQ if you want to have the default, IO=2F8h and IRQ=3.



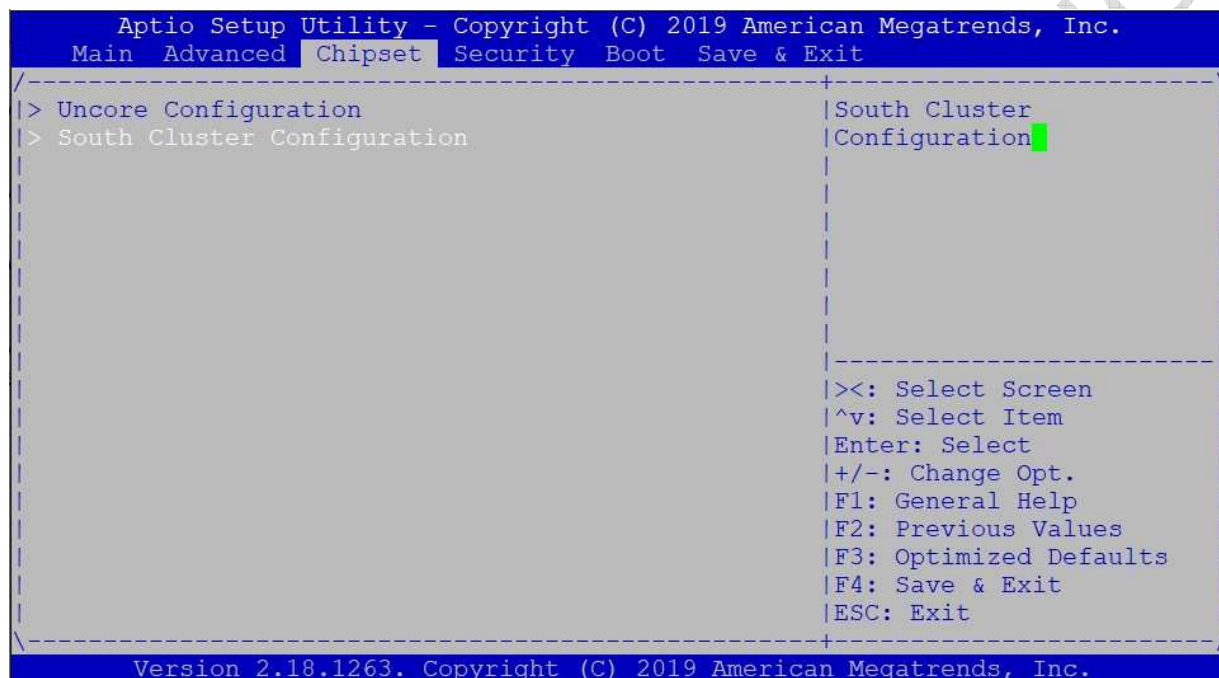
- (4) After setting, please press “F4” key to save & exit.



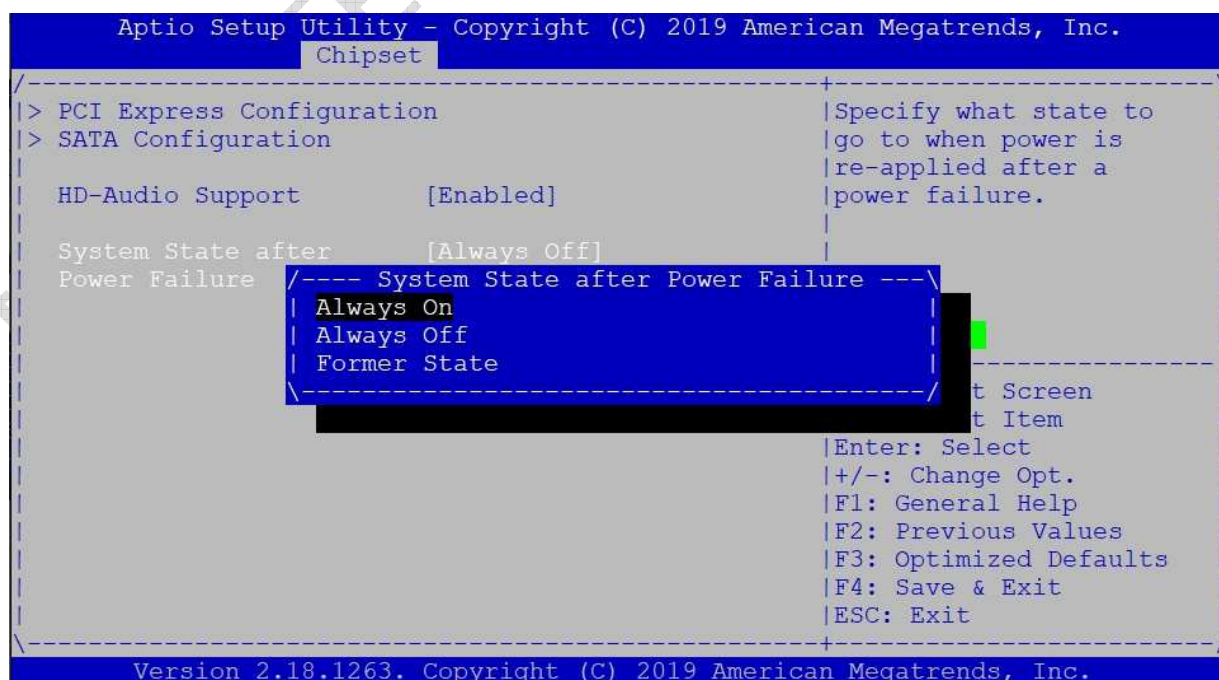
## 4.5 BIOS AT Mode Setting (Support Auto-Power On Function)

PPC-090T-APL supports “Auto-Power On function”, user doesn’t need to press “power button” for system power on and just needs to plug power source input and system will be power on automatically.

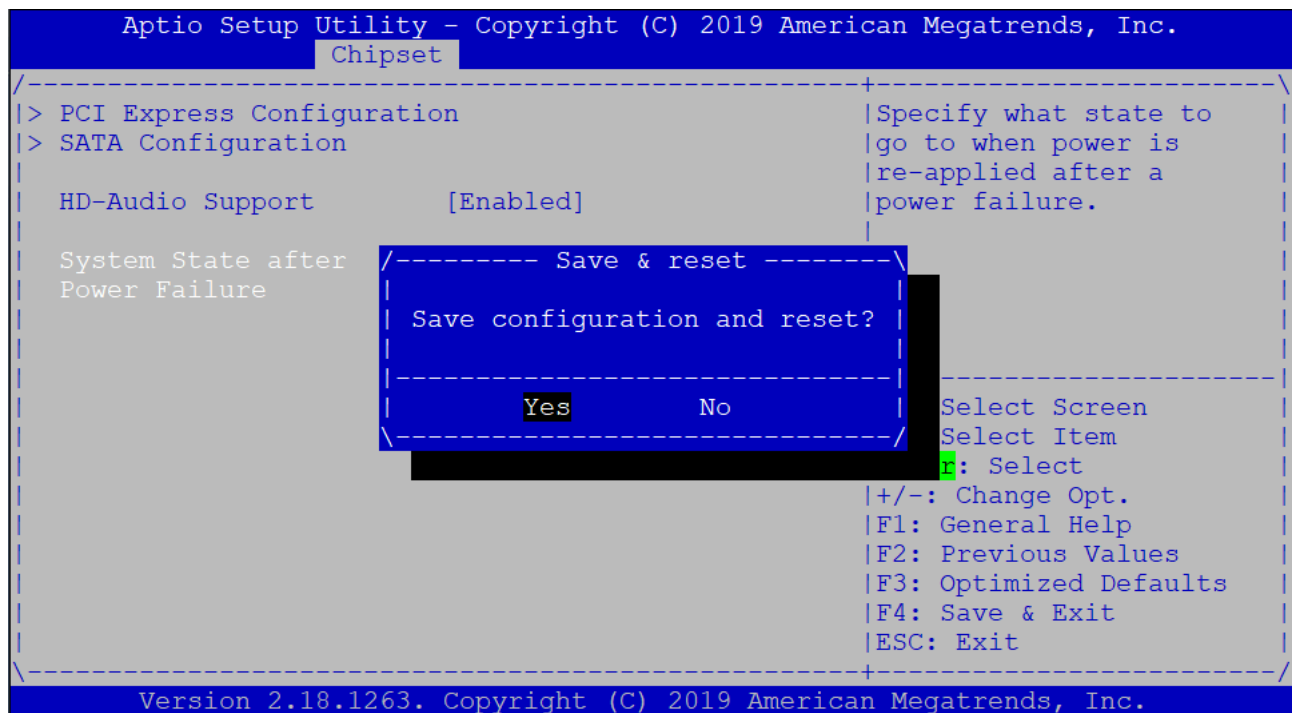
(1) In the BIOS Setup, please go to “Chipset” and “South Cluster Configuration”.



(2) Set “System State after Power Failure” to be “Always On”.



(3) After setting, please press “F4” key to save & exit.



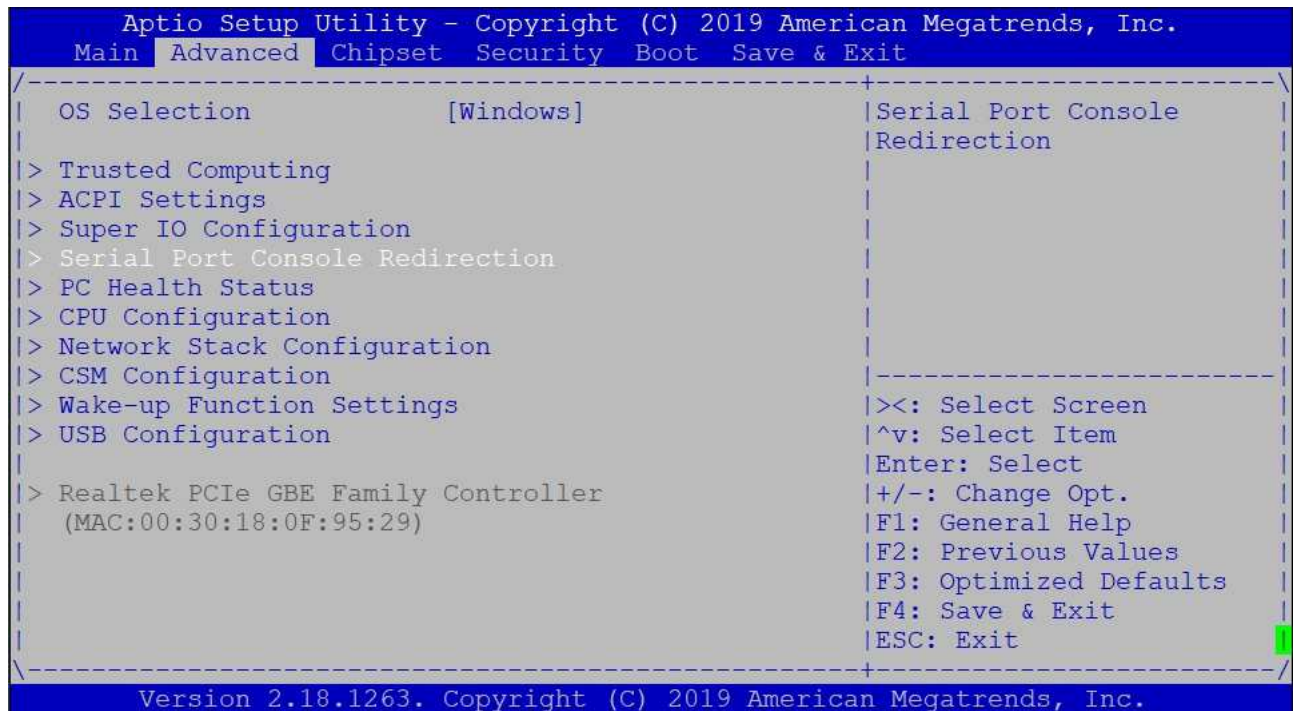
**Note:**

After system shut down by operating system, PPC-090T-APL will be power-off. For next booting up, user just needs to re-plug power adapter or power reset again, while system will be boot-up automatically.

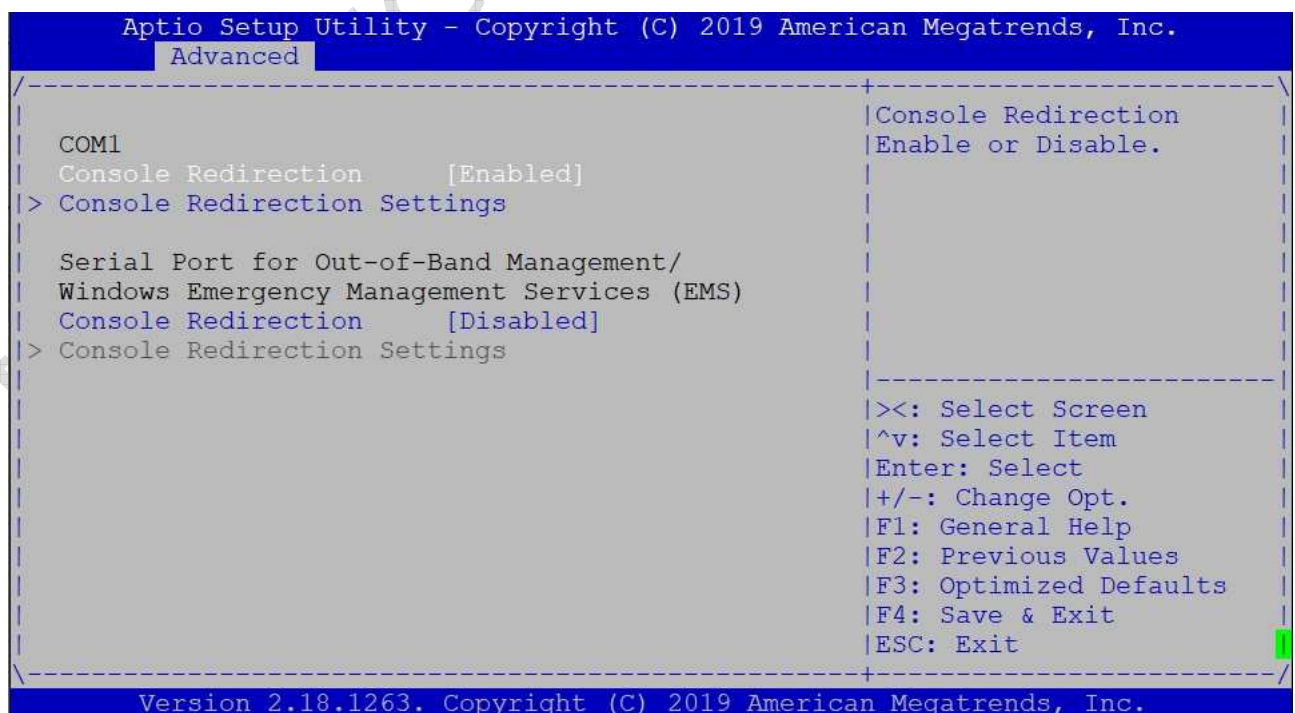
## 4.6 BIOS Serial Port Console Redirection

PPC-090T-APL supports Serial Port Console Redirection as below.

(1) Go to “Advanced” and “Serial Port Console Redirection”.



(2) Set “Console Redirection” to be “Enabled”.





(3) Set “Terminal Type” to “VT100+”.

Emulation: [ANSI]: Extended ASCII char set; [VT100]: ASCII char set;

[VT100+]: Extended VT100 to support color, function keys, etc.;

[VT-UTF8]: Uses UTF8 encoding to map Unicode chars onto 1 or more Bytes.

```
Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
Advanced
-----
COM1
Console Redirection Settings
Terminal Type          [VT100+]
Bits per second        [115200]
Data Bits              [8]
Parity                 [None]
Stop Bits              [1]
Flow Control           [None]
VT-UTF8 Combo Key      [Enabled]
Support
Recorder Mode          [Disabled]
Resolution 100x31      [Disabled]
Legacy OS              [80x24]
Redirection
Resolution
Putty KeyPad           [VT100]
-----
^|Emulation: ANSI:
*|Extended ASCII char
*|set. VT100: ASCII char
*|set. VT100+: Extends
*|VT100 to support color,
*|function keys, etc.
*|VT-UTF8: Uses UTF8
*|encoding to map Unicode
*|
*|-----
*|><: Select Screen
*|^v: Select Item
*|Enter: Select
*|+/-: Change Opt.
*|F1: General Help
*|F2: Previous Values
+|F3: Optimized Defaults
v|F4: Save & Exit
|ESC: Exit
-----
Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

(4) After setting, please press “F4” key to save & exit.

```
Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
Advanced
-----
COM1
Console Redirection Settings
Terminal Type          [VT100+]
Bits per second        [115200]
Data Bits              [8]
Parity                 [None]
Stop Bits              [1]
Flow Control           [None]
VT-UTF8 Combo Key      [Enabled]
Support
Recorder Mode          [Disabled]
Resolution 100x31      [Disabled]
Legacy OS              [80x24]
Redirection
Resolution
Putty KeyPad           [VT100]
-----
^|Emulation: ANSI:
*|Extended ASCII char
*|set. VT100: ASCII char
*|set. VT100+: Extends
*|VT100 to support color,
*|function keys, etc.
*|VT-UTF8: Uses UTF8
*|encoding to map Unicode
*|
*|-----
*|><: Select Screen
*|^v: Select Item
*|Enter: Select
*|+/-: Change Opt.
*|F1: General Help
*|F2: Previous Values
+|F3: Optimized Defaults
v|F4: Save & Exit
|ESC: Exit
-----
Version 2.18.1263. Copyright (C) 2019 American Megatrends, Inc.
```

Save & reset

Save configuration and reset?

Yes No

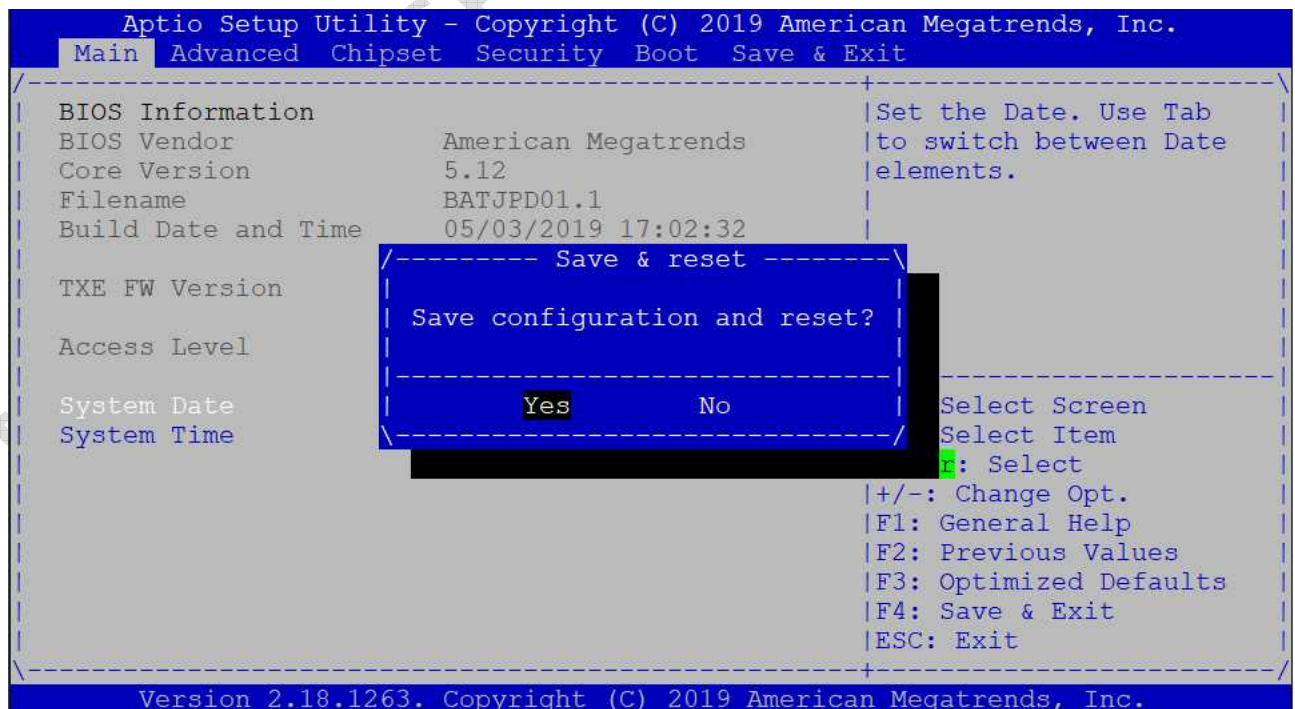


## 4.7 BIOS Load Default Setting

(1) Press “F3” key to load optimized defaults.



(2) After setting, please press “F4” key to save & exit.



# Warranty

This product is warranted to be in good working order for a period of one year from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster. Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, originality to use this product. Vendor will not be liable for any claim made by any other related party. Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

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