



# DATA SOUND - LABORATORIES -

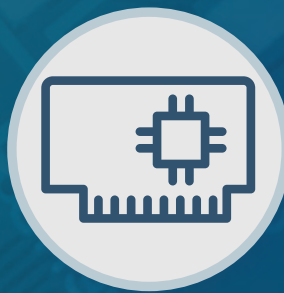
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## PRTD Panel PC Series with 9" TFT LCD

### ■ Model:

PRTD-090T-5A-N4F / PRTD-090T-8A-N4F

PRTD-090T-5A-B4F / PRTD-090T-8A-B4F

PRTD-090T-5A-N5F / PRTD-090T-8A-N5F

PRTD-090T-5A-B5F / PRTD-090T-8A-B5F

# User's Manual

(Revision 1.0A)



CE



FCC



VCCI



VIBRATION



IP 65



TOUCH



Wi-Fi



FANLESS

## Revision

| <i>Date</i> | <i>Version</i> | <i>Description</i> |
|-------------|----------------|--------------------|
| 2018/07/01  | Version 1.0    | Initial Release    |

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Manual No. IUMPRTD090-01 Ver.1.0A July, 2018

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## Safety Information

- Read these Safety instructions 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.
- Keep PRTD-090T away from humidity.
- 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.

**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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# 1. General Information

## 1.1 Product Description

PRTD-090T is an ultra-compact platform for the present demanding embedded and productive applications. It has RTD1195 Cortex-A7 ARM Dual Core which consumes only minimum power requirement when running at 1.2GHz, and DDR3 memory provides faster data transfer rate. By using 9" TFT LCD, PRTD-090T becomes the perfect choice for a limited budget. In additional, the integrated Gigabit Ethernet port supplies the communication capability which makes PRTD-090T can be more widely used when running Android 4.4.4 environments to become the perfect solution for system integration.

## 1.2 Product Specification

Table 1-1 Product Specification

| CPU Board Specifications |   |
|--------------------------|---|
| CPU                      | RTD1195-1.2GHz Cortex-A7 ARM Dual-Core  |
| Cache                    | L2: 512KB Cache   |
| Memory                   | 1GB/2GB DDR3 onboard  |
| Watchdog Timer           | Watchdog timer counter at a fixed 27MHz rate  |
| LAN                      | Integrated Gigabit Ethernet   |
| Audio                    | High Definition Audio   |
| Internal Drives          | 8GB of Flash onboard with Android 4.4.4<br>Pre-installed<br>Micro SD slot (Like a card reader only) |
| I/O                      | RS-232 x 1<br>USB port (Ver3.0) x 1<br>USB port (Ver2.0) x 1<br>RJ-45 Port x 1                      |
| Mechanical & Environment |   |
| Power Requirement        | Single Voltage +5VDC ( 5A )<br>Multi Voltage +8~+35VDC ( 8A )                                       |
| Power Consumption        | 10W (Max.)  |
| Operating Temperature    | 0 ~ +60°C ( 32 ~ +140°F ) /<br>-20~+70°C ( -4 ~ +158°F) <b>Optional (-I)</b>                        |
| Storage Temp.            | -30 ~ +70°C ( 14 ~ +158°F)  |
| Operating Humidity       | 0% ~ 90% relative humidity, non-condensing  |
| Dimensions               | 236.6 x 146 x 35mm (9.31 x 5.75 x 1.38 inches)  |

|                                 |                                     |
|---------------------------------|-------------------------------------|
| Weight                          | 755g                                |
| Front Panel Protection          | IP 65                               |
| Certification                   | CE / FCC / VCCI / Vibration / Shock |
| <b>LCD Specifications</b>       |                                     |
| Display Type                    | 9" 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°,<br>Horizontal 140°   |
| Backlight Lifetime              | 18,000 hrs                          |
| <b>Touchscreen</b>              |                                     |
| Type                            | Analog Resistive                    |
| Resolution                      | Continuous                          |
| Transmittance                   | 80%                                 |
| Controller                      | USB interface                       |
| Software Driver                 | Android                             |
| Durability                      | 1 million                           |



### 1.3 Inspection standard for TFT-LCD Panel

Table 1-2 Inspection Standard

| DEFECT TYPE                |                   | LIMIT  |                 | Note            |                 |                 |                 |              |
|----------------------------|-------------------|--|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|
| VISUAL DEFECT              | SPOT              | $\phi < 0.15\text{mm}$                                   | Ignore          | <b>Note1</b>    |                 |                 |                 |              |
|                            |                   | $0.15\text{mm} \leq \phi \leq 0.5\text{mm}$              | $N \leq 4$      |                 |                 |                 |                 |              |
|                            |                   | $0.5\text{mm} < \phi$                                    | $N=0$           |                 |                 |                 |                 |              |
|                            | INTERNAL FIBER    | $0.03\text{mm} < W \leq 0.1\text{mm}, L \leq 5\text{mm}$ | $N \leq 3$      | <b>Note1</b>    |                 |                 |                 |              |
|                            |                   | $1.0\text{mm} < W, 1.5\text{mm} < L$                     | $N=0$           |                 |                 |                 |                 |              |
|                            | POLARIZER BUBBLE  | $\phi < 0.15\text{mm}$                                   | Ignore          | <b>Note1</b>    |                 |                 |                 |              |
|                            |                   | $0.15\text{mm} \leq \phi \leq 0.5\text{mm}$              | $N \leq 2$      |                 |                 |                 |                 |              |
|                            |                   | $0.5\text{mm} < \phi$                                    | $N=0$           |                 |                 |                 |                 |              |
|                            | 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           |              |
| $N \leq 0$                 |                   |  | $N \leq 2$      | $N \leq 2$      | $N \leq 2$      | $N \leq 3$      | $N \leq 5$      | <b>Note2</b> |
| DARK DOT                   |                   | $N \leq 2$   | $N \leq 3$      | $N \leq 3$      | $N \leq 3$      | $N \leq 5$      | $N \leq 8$      |              |
| TOTAL DOT                  |                   | $N \leq 4$   |                 |                 | $N \leq 5$      | $N \leq 6$      | $N \leq 8$      | <b>Note2</b> |
| TWO ADJACENT DOT           |                   | $N \leq 0$   | $N \leq 1$ pair | $N \leq 1$ pair | $N \leq 1$ pair | $N \leq 1$ pair | $N \leq 1$ pair | <b>Note4</b> |
| THREE OR MORE ADJACENT DOT |                   | NOT ALLOWED  |                 |                 |                 |                 |                 |              |
| LINE DEFECT                | NOT ALLOWED       |  |                 |                 |                 |                 |                 |              |

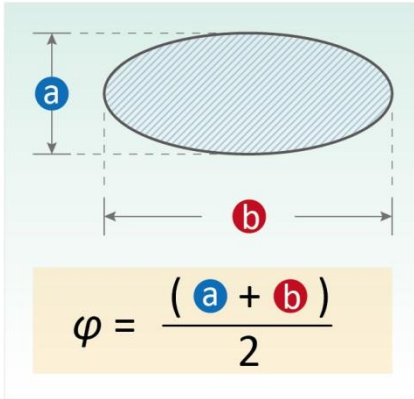
(1) One pixel consists of 3 sub-pixels, including R, G, and B dot.

(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.



1. White / Black Spot
2. Polarizer Bubble

Fig 1-1

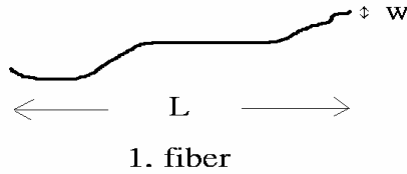


Fig 1-2

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

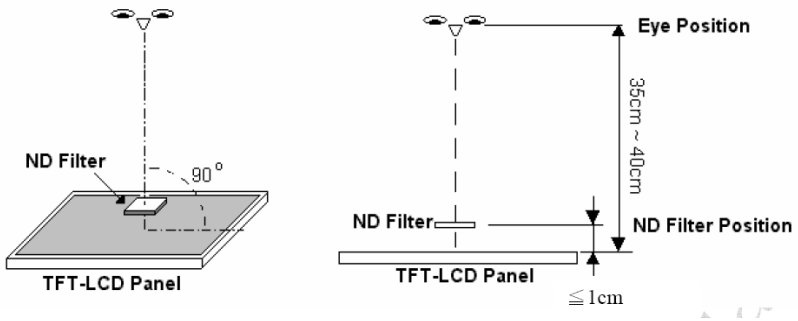
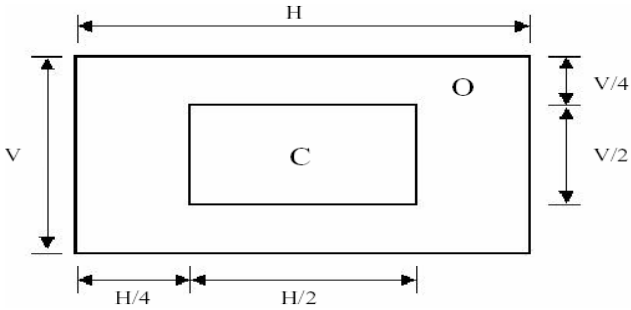


Fig 1-3

**[Note 3]**

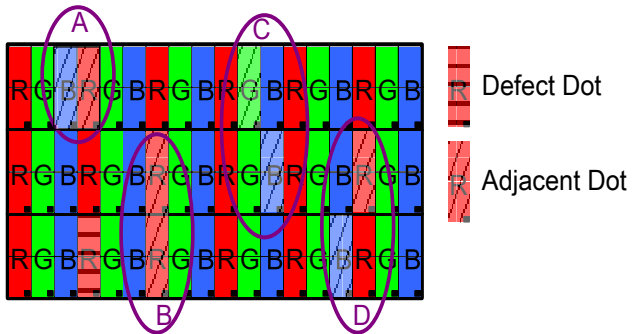


C Area: Center of display area

O Area: Outer of display area

**[Note 4]**

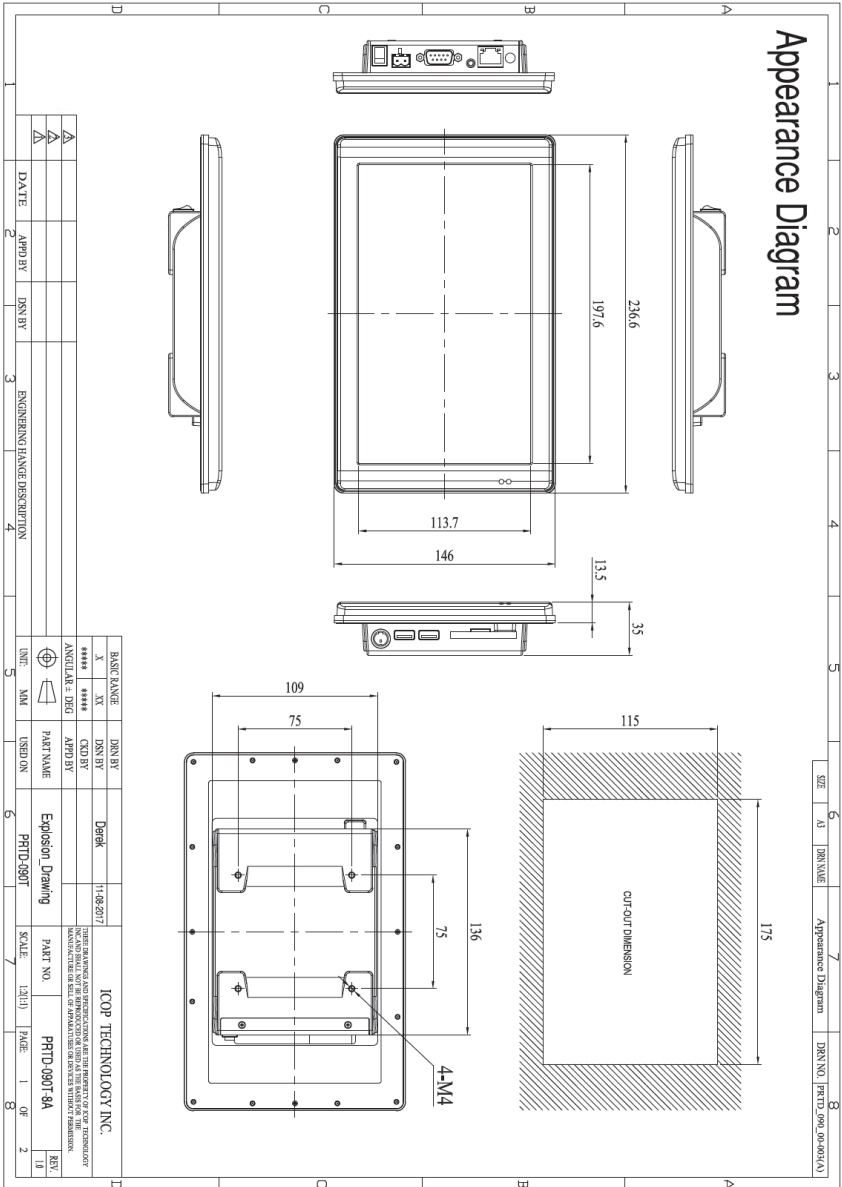
Judge defect dot and adjacent dot as following. Allow below (as A, B, C and D status) adjacent defect dots, including bright and dart adjacent dot. And they will be counted 2 defect dots in total quantity.



- (1) 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.

# 1.4 Product Dimension



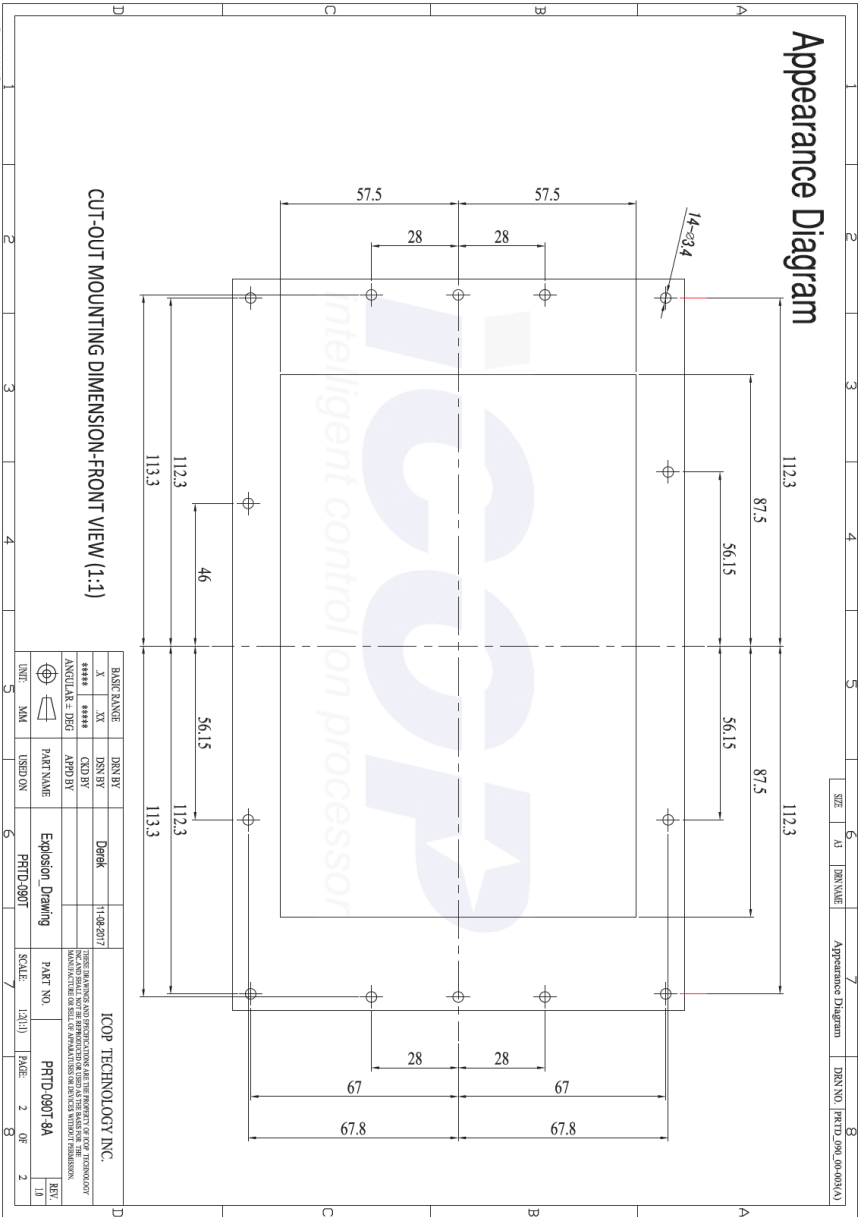
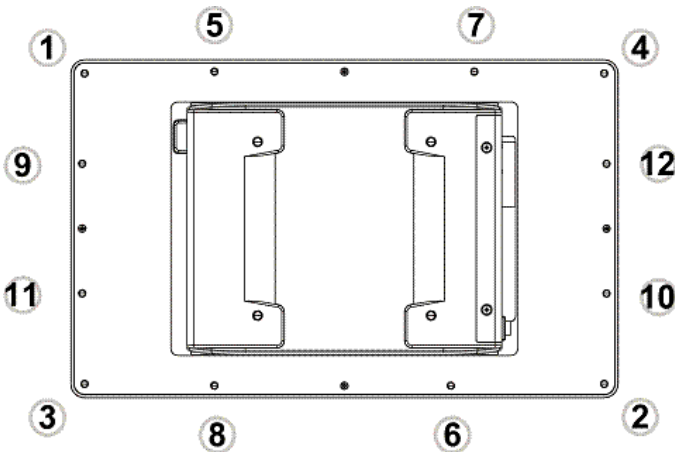
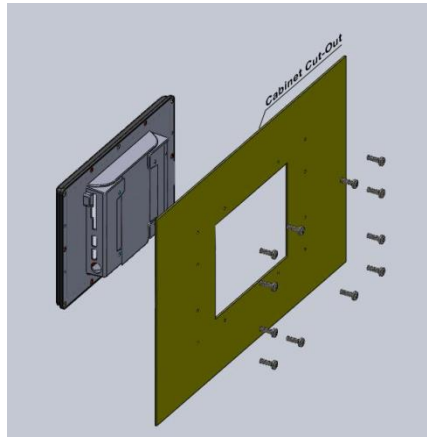


Fig 1-4 Product Dimension

## 1.5 Panel Mounting Instruction

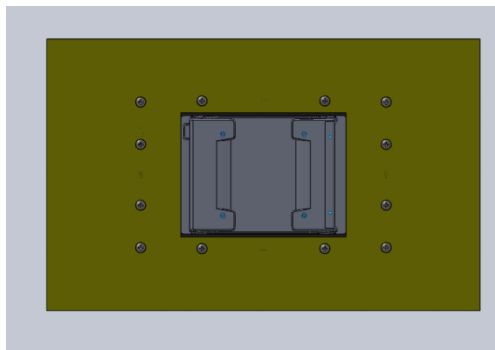
1. Cut a mounting hole in the panel. (Refer to PRTD-090T Dimensions on page 7) (Note 1)
2. Check and remove the twelve M3 screws in a diagonal pattern as image below if necessary.
3. Place PRTD-090T face-down on a clean, flat surface.
4. Slide the panel cutout around the back of PRTD-090T, until the panel rests directly on the gasket. Make sure the screw holes align with the screw holes on PRTD-090T.
5. The screw size is M3\*L (L=wall thickness + 6.0mm) (Note 2)
6. Insert all twelve M3 screws into the screw holes. (Note 2)
7. Finger-tighten the M3 screws. Finish tightening the M3 screws in a diagonal pattern using an M3 screw driver (see the image as below); maximum torque 1.18Nm (12 kgf-cm).





**Note 1:**

It is strongly recommended that a professional machine shop cut the mounting hole in the panel.



**Note 2:**

The length for all twelve M3 screws will be according to the thickness of mounting panel. For example: The length of standard M3 screws for PRTD-090T is 6mm. If the thickness of your mounting panel is 3mm and washer thickness is 1mm, you have to use 10mm M3 screw.

## 1.6 Ordering Information

| Product Code | LCD Size | DC-Input Type | BT&WLAN          | DRAM    | Flash onboard | Wide Temp.     |
|--------------|----------|---------------|------------------|---------|---------------|----------------|
| PRTD         | 057T     | 5A (DC5V)     | N (No BT&WLAN)   | 4 (1GB) | F (8GB-MLC)   | I (Wide Temp.) |
|              | 090T     | 8A (DC8~35V)  | B (With BT&WLAN) | 5 (2GB) |               |                |

### 1. Product Code : Code 1~3 ◦

PRTD : PRTD Series ◦

### 2. LCD Size : Code 4~7 ◦

057T : 5.7" LCD with touchscreen ◦

090T : 9" LCD with touchscreen ◦

### 3. DC-Input Type : Code 8~9 ◦

5A : Audio Line-out and Singal DC5V Power Input ◦

8A : Audio Line-out and Support DC8~35 Power Input ◦

### 4. BT&WLAN : Code 10 ◦

N : No BT&WLAN ◦

B : With BT&WLAN ◦

### 5. DRAM Onboard : Code 11 ◦

4 : 1GB ◦

5 : 2GB ◦

### 6. Flash Onboard : Code 12 ◦

F : 8GB ◦

### 7. Wide Temp. : Code 13 ◦

I : Support Wide Temp. -20~+70°C ◦ **(Optional)**

**(Standard version doesn't need to show this item.)**



Table 1-3 Ordering Information

| PART NUMBER      | DESCRIPTION   |
|------------------|---|
| PRTD-090T-5A-N4F | 9" Panel PC w/1GB DDR3<br>/ 8GB eMMC / USB2.0 / USB3.0 / Line-Out / LAN / COM / MicroSD /<br>Power Adapter                      |
| PRTD-090T-8A-N4F | 9" Panel PC w/1GB DDR3<br>/ 8GB eMMC / USB2.0 / USB3.0 / Line-Out / LAN / COM / MicroSD /<br>8-35 DC Support                    |
| PRTD-090T-5A-N5F | 9" Panel PC w/2GB DDR3<br>/ 8GB eMMC / USB2.0 / USB3.0 / Line-Out / LAN / COM / MicroSD /<br>Power Adapter                      |
| PRTD-090T-8A-N5F | 9" Panel PC w/2GB DDR3<br>/ 8GB eMMC / USB2.0 / USB3.0 / Line-Out / LAN / COM / MicroSD /<br>8-35 DC Support                    |
| PRTD-090T-5A-B4F | 9" Panel PC w/1GB DDR3<br>/ 8GB eMMC / USB2.0 / USB3.0 / Line-Out / LAN / COM / MicroSD /<br>Bluetooth & WLAN / Power Adapter   |
| PRTD-090T-8A-B4F | 9" Panel PC w/1GB DDR3<br>/ 8GB eMMC / USB2.0 / USB3.0 / Line-Out / LAN / COM / MicroSD /<br>Bluetooth & WLAN / 8-35 DC Support |
| PRTD-090T-5A-B5F | 9" Panel PC w/2GB DDR3<br>/ 8GB eMMC / USB2.0 / USB3.0 / Line-Out / LAN / COM / MicroSD /<br>Bluetooth & WLAN / Power Adapter   |
| PRTD-090T-8A-B5F | 9" Panel PC w/2GB DDR3<br>/ 8GB eMMC / USB2.0 / USB3.0 / Line-Out / LAN / COM / MicroSD /<br>Bluetooth & WLAN / 8-35 DC Support |

## 1.7 Packing List

Table 1-4 Packing List

| PART NUMBER      | PACKAGE          |  |
|------------------|------------------|--|
| PRTD-090T-5A-N4F | PRTD-090T-5A-N4F | Power-20W-3PIN-X & PowerHead-US/EU                         |
| PRTD-090T-8A-N4F | PRTD-090T-8A-N4F |  |
| PRTD-090T-5A-N5F | PRTD-090T-5A-N5F | Power-20W-3PIN-X & PowerHead-US/EU                         |
| PRTD-090T-8A-N5F | PRTD-090T-8A-N5F |  |
| PRTD-090T-5A-B4F | PRTD-090T-5A-B4F | Power-20W-3PIN-X & PowerHead-US/EU<br>WIRELESS-ANTENNA-157 |
| PRTD-090T-8A-B4F | PRTD-090T-8A-B4F | WIRELESS-ANTENNA-157                                       |
| PRTD-090T-5A-B5F | PRTD-090T-5A-B5F | Power-20W-3PIN-X & PowerHead-US/EU<br>WIRELESS-ANTENNA-157 |
| PRTD-090T-8A-B5F | PRTD-090T-8A-B5F | WIRELESS-ANTENNA-157                                       |

## 2. System Installation

### 2.1 CPU Board Outline

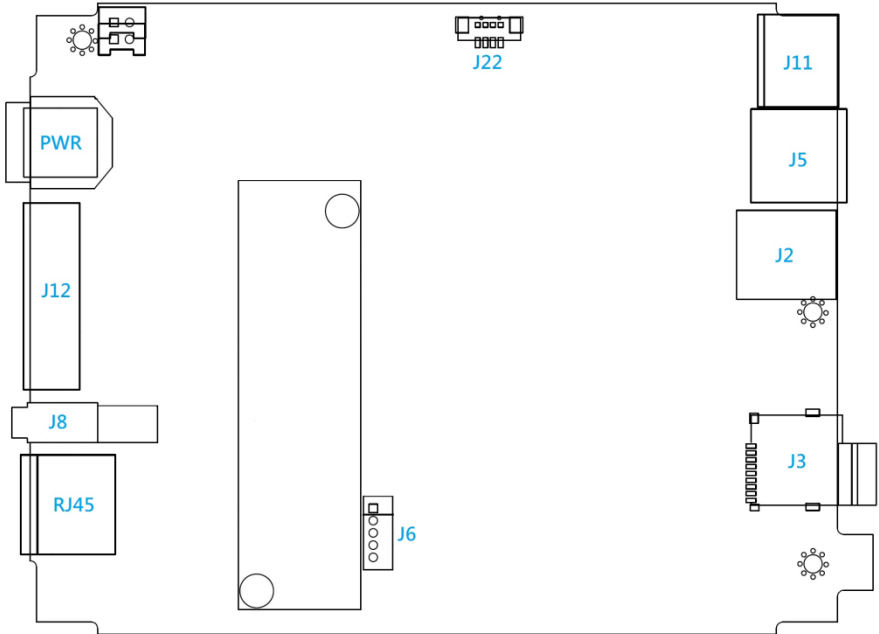


Fig 2-1 PRTD CPU Board

## 2.2 Connector Summary

Table 2-1 Summary Table

| Nbr  | Description   | Type of Connections           | Pin nbrs. |
|------|---|-------------------------------|-----------|
| J2   | USB 3.0   | External USB 3.0 Connector    | 9-pin     |
| J3   | Micro SD Card Socket                                  | Micro SD socket               | 9-pin     |
| J5   | USB 2.0   | External USB 2.0 Connector    | 6-pin     |
| J6   | USB 2.0<br>(For Touch Controller)                     | 2.0mm 5-pin wafer             | 5-pin     |
| J8   | Audio Line-Out  | 1.25mm Phone Jack             | 5-pin     |
| J11  | Software Programming<br>Port <b>(Reserved)</b>        | External Mini DIN Socket      | 6-pin     |
| J12  | COM1 (RS232)  | External D-Sub Male Connector | 9-pin     |
| J22  | I2C<br>(For External Garmmar<br>Firmware Programming) | 1.25mm 4-pin wafer            | 4-pin     |
| RJ45 | Ethernet  | External RJ45 Connector       | 8-pin     |
| PWR  | Power Connector (5A)                                  | External Mini DIN Socket      | 3-pin     |
| PWR  | Power Connector (8A)                                  | External Power Plug           | 2-pin     |

## 2.3 Connector Pin Assignments

### J2: USB 3.0

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | VCC         | 2     | D-          |
| 3     | D+          | 4     | GND         |
| 5     | SSRX-       | 6     | SSRX+       |
| 7     | GND         | 8     | SSTX-       |
| 9     | SSTX+       |       |             |

### J6: USB 2.0 (For Touch Controller)

| Pin # | Signal Name |
|-------|-------------|
| 1     | VCC         |
| 2     | USBD3-      |
| 3     | USBD3+      |
| 4     | GND         |
| 5     | GND         |

### J3: Micro SD Card Socket

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | DAT2        | 2     | DAT3        |
| 3     | CMD         | 4     | VDD         |
| 5     | CLK         | 6     | VSS         |
| 7     | DAT0        | 8     | DAT1        |

### J8: Audio Line-Out

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | AMUTE       | 2     | AOR         |
| 3     | AOL         | 4     | AOL         |

### J5: USB 2.0

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | VCC         | 2     | USBD1-      |
| 3     | USBD1+      | 4     | GND         |
| 5     | GND         | 6     | GND         |

### J11: Software Programming Port **(Reserved)**

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | TXD0        | 2     | RXD0        |
| 3     | GND         | 4     | N/C         |
| 5     | N/C         | 6     | N/C         |

### J12: COM1 (RS232)

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | N/C         | 2     | RXD1        |
| 3     | TXD1        | 4     | N/C         |
| 5     | GND         | 6     | N/C         |
| 7     | RTS1        | 8     | CTS1        |
| 9     | N/C         |       |             |

### PWR: Power Connector (5A)

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

### J22: I2C (For External Gamma Firmware Programming)

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | VCC         | 2     | GND         |
| 3     | I2C_SCL     | 4     | I2C_SDA     |

### PWR: Power Connector (8A)

| Pin # | Signal Name |
|-------|-------------|
| 1     | + 8 ~ 35V   |
| 2     | GND         |

### RJ45

| Pin # | Signal Name | Pin # | Signal Name |
|-------|-------------|-------|-------------|
| 1     | BI_DA+      | 2     | BI_DA-      |
| 3     | BI_DB+      | 4     | BI_DC+      |
| 5     | BI_DC-      | 6     | BI_DB-      |
| 7     | BI_DD+      | 8     | BI_DD-      |

## 2.4 External I/O Overview

{ PRTD-090T-8A }



Fig 2-2 PRTD-090T-8A I/O overview

{ PRTD-090T-5A }




Fig 2-3 PRTD-090T-5A I/O overview

**{Note}**

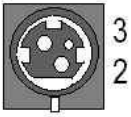
1. WLAN is optional
2. COM1 is RS232 signals only
3. MicroSD Socket likes a reader for data wrting/reading only

## 2.5 External I/O Pin Assignment

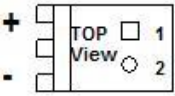
### Power Switch

|  | Pin # | Status |
|---|-------|--------|
|   |       | ON     |
|   | O     | OFF    |


### Power Connector (5A)

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

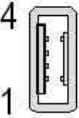
### Power Connector (8A)

|  | Pin # | Signal Name |
|---|-------|-------------|
|   | 1     | +8 ~ 35V    |
|   | 2     | GND         |


### Audio Line-Out

|  | Pin # | Signal Name |
|---|-------|-------------|
|   | 1     | GND         |
|   | 2     | LOUTL       |
|   | 3     | Open Touch  |
|   | 4     | Open Touch  |
|   | 5     | VREFOUT     |

### USB 2.0 Port

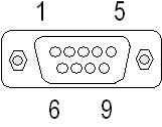
|  | Pin # | Signal Name |
|---|-------|-------------|
|   | 1     | VCC         |
|   | 2     | USB0-       |
|   | 3     | USB0+       |
|   | 4     | GND         |
|   | 5     | GGND        |
| 6   | GGND  |             |

### USB 3.0 Port

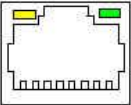
|  | Pin # | Signal Name |
|--|-------|-------------|
|  | 1     | VCC         |
|  | 2     | D-          |
|  | 3     | D+          |
|  | 4     | GND         |
|  | 5     | SSRX-       |
|  | 6     | SSRX+       |
|  | 7     | GND         |
|  | 8     | SSTX-       |
| 9  | SSTX+ |             |



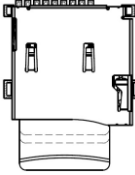
## COM1 RS232

|  | Pin # | Signal Name | Pin # | Signal Name |
|---|-------|-------------|-------|-------------|
|   | 1     | N/C         | 2     | RXD1        |
|   | 3     | TXD1        | 4     | N/C         |
|   | 5     | GND         | 6     | N/C         |
|   | 7     | RTS1        | 8     | CTS1        |
|   | 9     | N/C         |       |             |

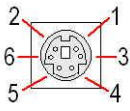
## RJ45

|  | Pin # | Signal Name | Pin # | Signal Name |
|---|-------|-------------|-------|-------------|
|   | 1     | BI_DA+      | 2     | BI_DA-      |
|   | 3     | BI_DB+      | 4     | BI_DC+      |
|   | 5     | BI_DC-      | 6     | BI_DB-      |
|   | 7     | BI_DD+      | 8     | BI_DD-      |


## Micro SD Card Socket (Like Card Reader Only)

|  | Pin # | Signal Name |
|---|-------|-------------|
|   | 1     | DAT2        |
|   | 2     | DAT3        |
|   | 3     | CMD         |
|   | 4     | VDD         |
|   | 5     | CLK         |
|   | 6     | VSS         |
|   | 7     | DAT0        |
| 8   | DAT1  |             |


## Software Programming Port **(Reserved)**

|  | Pin # | Signal Name |
|---|-------|-------------|
|   | 1     | TXD0        |
|   | 2     | RXD0        |
|   | 3     | GND         |
|   | 4     | N/C         |
|   | 5     | N/C         |
|   | 6     | N/C         |

### Power LED

|  | LED Color | State    |
|---|-----------|----------|
|   | Blue      | Power On |

### SD Card Detect LED

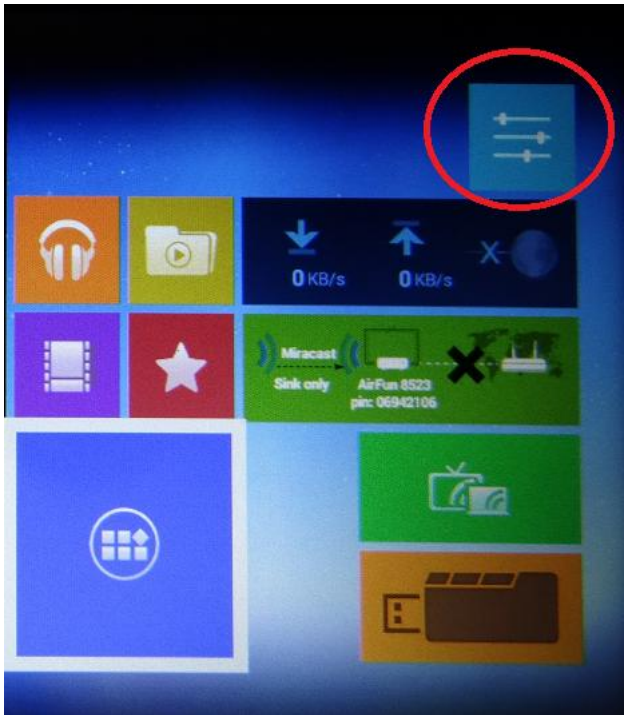
|  | LED Color   | State  |
|---|-------------|--|
|   | Green Flash | Flash LED once when SD Card is plugged-in and detected |

# 3.Android Settings

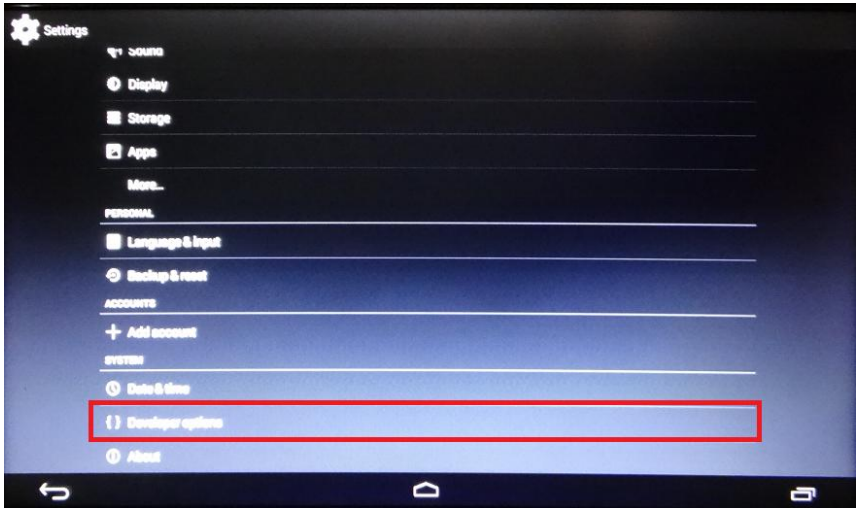
## 3.1 Enable LED backlight-off function

**(Best recommend for saving LCD life time solution.)**

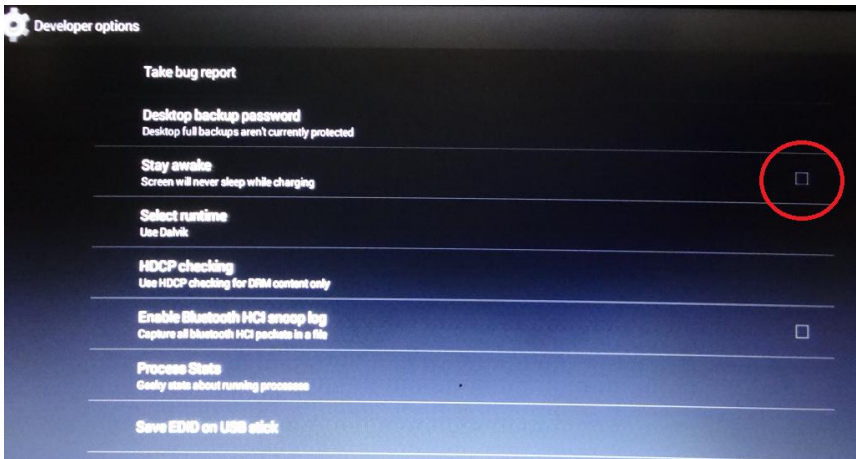
**Step1:** Choose settings icon.



**Step2:** Choose “Developer options”.



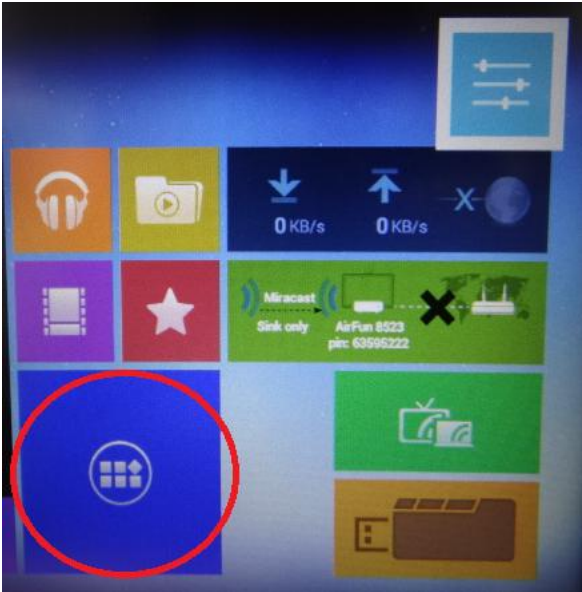
**Step3:** Disable “Stay awake” function.



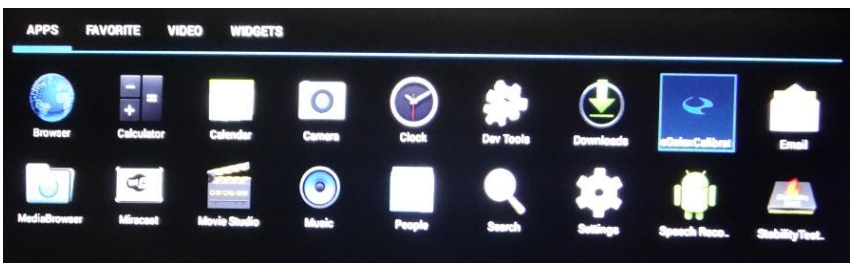
**Step4:** System will disable LED backlight if no any active over 1 min.

### 3.2 Touch calibration

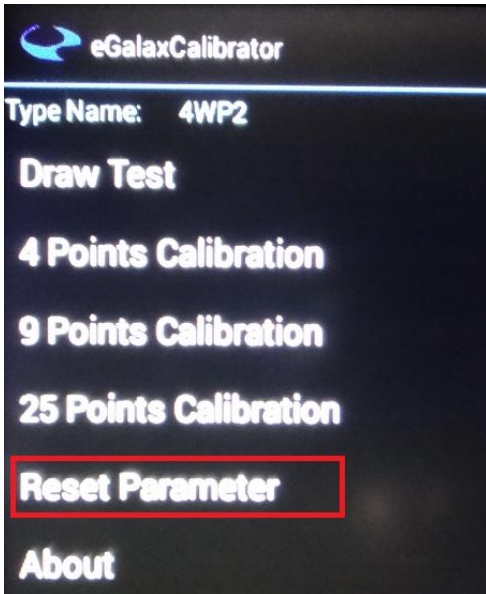
**Step1:** Choose all apps icon.



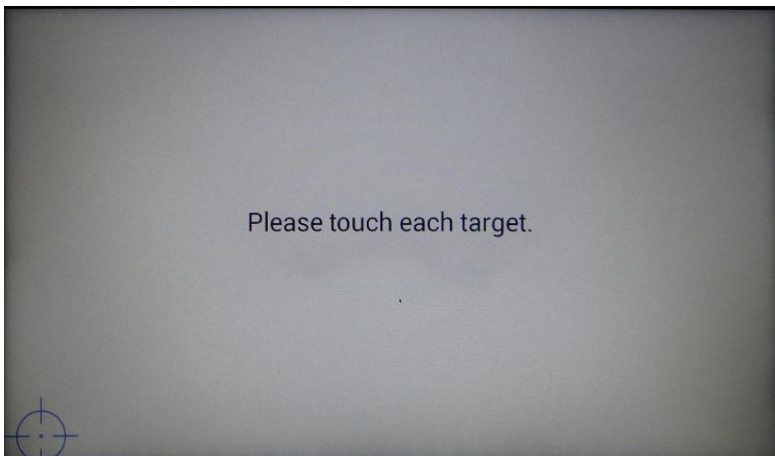
**Step2:** Choose “eGalaxCalibrator”.



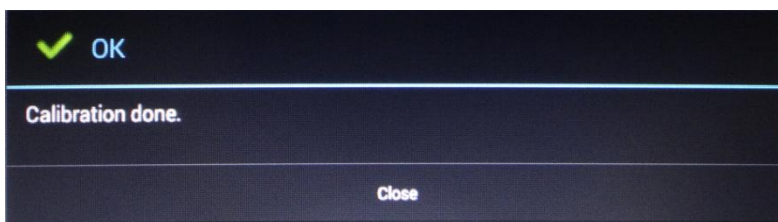
**Step3:** Choose "Reset Parameter".



**Step4:** Start to reset parameter and do the 4 points calibration.



**Step5:** After finish, please close this program.



**Note:**

User also can download calibration program as below link and copy this file to a USB storage (FAT32), and then plug USB storage on PRTD and install this APK file directly.

[ftp://ppc:ppc@ftp.icop.com.tw/PRTD/090T/APP/Touch/eGalaxCalibrator\\_v0.11-release-HideBar-usb.apk](ftp://ppc:ppc@ftp.icop.com.tw/PRTD/090T/APP/Touch/eGalaxCalibrator_v0.11-release-HideBar-usb.apk)

## 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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