

## SPECIFICATIONS

|                        |   |                                 |
|------------------------|---|---------------------------------|
| CUSTOMER               | : | _____                           |
| SAMPLE CODE            | : | SRA800480T030-ZHC               |
| MASS PRODUCTION CODE   | : | HRA800480T030-ZHC               |
| SAMPLE VERSION         | : | 01                              |
| SPECIFICATIONS EDITION | : | 002                             |
| DRAWING NO. (Ver.)     | : | LMD-HRA800480T030-ZHC (Ver.002) |
| PACKAGING NO. (Ver.)   | : | PKG-HRA800480T030-ZHC (Ver.001) |

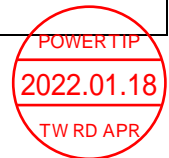
**Customer Approved**

**Date:**

| Approved          | Checked         | Designer         |
|-------------------|-----------------|------------------|
| 林裘中<br>Daniel Lin | 呂清溪<br>Marcs Lu | 王兆以<br>Hank Wang |

- Preliminary specification for design input
- Specification for sample approval



### POWERTIP TECH. CORP.

|   |  |  |
|---|--|--|
| <b>Headquarters:</b> No.8, 6 <sup>th</sup> Road, Taichung Industrial Park,<br>Taichung, Taiwan<br>台中市 407 工業區六路 8 號 | TEL: 886-4-2355-8168<br>FAX: 886-4-2355-8166 | E-mail: <a href="mailto:sales@powertip.com.tw">sales@powertip.com.tw</a><br>Http://www.powertip.com.tw |
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## **CONTENTS**

### **1. SPECIFICATIONS**

- 1.1 Features**
- 1.2 Mechanical Specifications**
- 1.3 Absolute Maximum Ratings**
- 1.4 DS Electrical Characteristics**
- 1.5 Optical Characteristics**

### **2. MODULE STRUCTURE**

- 2.1 Counter Drawing**
- 2.2 Interface Pins**
- 2.3 Interface Pin Description**

### **3. QUALITY ASSURANCE SYSTEM**

- 3.1 Quality Assurance Flow Chart**

### **4. RELIABILITY TEST**

- 4.1 Reliability Test Condition**

### **5. PRECAUTION RELATING PRODUCT HANDLING**

- 5.1 Safety**
- 5.2 Handling**
- 5.3 Storage**
- 5.4 Terms of Warranty**

### **APPENDIX**

- 1. Drawing**
- 2. Packaging Specifications**
- 3. Assembly Guide**

## 1. SPECIFICATIONS

### 1.1 Features

#### Hardware

|             |                  |   |
|-------------|------------------|---|
| CPU         | RISC Processor   | PX30 Quad-Core ARM Cortex-A35                         |
| Memory      | On Board RAM     | 2GB DDR3L SDRAM                                       |
|             | On Board ROM     | 8GB eMMC Flash  |
|             | External Storage | 1 × Micro SD (max. 32G)                               |
| Display     | Resolution       | 800 × 480 (RGB) DOTS                                  |
|             | LCD Type         | Full Viewing Angle, Normally Black, Transmissive type |
|             | Touch type       | Capacitive Touch Panel                                |
|             | Interface        | 24 Bits RGB interface                                 |
| I/O         | USB              | 1 × USB OTG<br>2 × USB1.1/2.0 Compliant Host          |
|             | Ethernet         | 10/100 Mbps   |
|             | Analog Audio     | 1 × Output<br>1 × Input                               |
|             | Wi-Fi            | IEEE 802.11 a/b/g/n/ac                                |
|             | Bluetooth        | 4.2   |
|             | Display          | 1 × RGB   |
|             | Serial           | 6 × UART (One for Debug Used)<br>3 × I2C<br>1 × SPI   |
| Power Input | DC               | 9V ~ 24V  |

#### Software

|    |          |                                 |
|----|----------|---------------------------------|
| OS | Embedded | Debian 9 (Linux kernel 4.4.194) |
|----|----------|---------------------------------|

## 1.2 Mechanical Specifications

| Item                        | Standard Value                    | Unit |
|-----------------------------|-----------------------------------|------|
| Outline Dimension (PCBA)    | 118.10(W) x 87.0(L) x 25.0(H) MAX | mm   |
| Outline Dimension (Display) | 131.0(W) x 90.5(L) x 4.99(H) MAX  | mm   |
| Active Area (Display)       | 108.0 (W) x 64.8(L)               | mm   |

## 1.3 Absolute Maximum Ratings

T<sub>a</sub> = 25°C

| Item                                    | Symbol          | Condition             | Min. | Max. | Unit |
|---|-----------------|-----------------------|------|------|------|
| Power Supply                            | V <sub>IN</sub> | -                     | -0.3 | 26.0 | V    |
| Operating Temperature (T <sub>s</sub> ) | T <sub>OP</sub> | -                     | 0    | 70   | °C   |
| Storage Temperature (T <sub>a</sub> )   | T <sub>OP</sub> | -                     | -30  | 80   | °C   |
| Humidity                                | H <sub>D</sub>  | T <sub>a</sub> =60 °C | 10   | 90   | %RH  |

The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the product may be permanently destroyed.

Note 1: T<sub>s</sub> is the temperature of panel's surface,

Note 2: T<sub>a</sub> is the ambient temperature of samples.

## 1.4 DC Electrical Characteristics

T<sub>a</sub> = 25°C

| Item                         | Symbol           | Condition             | Min.                   | Typ. | Max.                    | Unit |
|------------------------------|------------------|-----------------------|------------------------|------|-------------------------|------|
| Power Supply Voltage         | V <sub>IN</sub>  | -                     | 9                      | 12   | 24                      | V    |
| Power Supply Current         | I <sub>IN1</sub> | V <sub>IN</sub> = 12V | -                      | 0.22 | -                       | A    |
| IO High-Level input voltage  | V <sub>IH</sub>  | -                     | 0.7xV <sub>DD3V3</sub> | -    | V <sub>DD3V3</sub> +0.3 | V    |
| IO Low-Level input voltage   | V <sub>IL</sub>  | -                     | -0.3                   | -    | 0.3xV <sub>DD3V3</sub>  | V    |
| IO High-Level output voltage | V <sub>OH</sub>  | -                     | -                      | -    | 3.6                     | V    |
| IO Low-Level output voltage  | V <sub>OL</sub>  | -                     | -0.3                   | -    | -                       | V    |

Note 1: V<sub>IN</sub> is connected to 'J4' connector.

## 1.5 Optical Characteristics

Ta = 25 °C

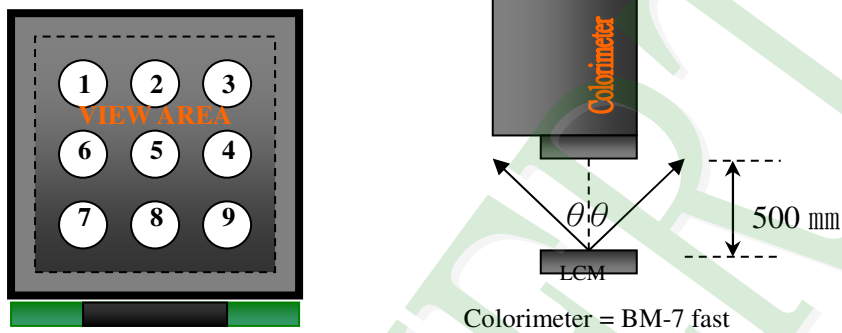
| Item  |        | Symbol      | Condition                                      | Min. | Typ.   | Max. | unit              | -      |
|---|--------|-------------|--|------|--------|------|-------------------|--------|
| Response time   | Tr+Tf  | 25 °C       | -  | -    | 37     | 56   | ms                | -      |
| Viewing angle   | Top    | $\theta Y+$ | CR $\geq$ 10                                   | -    | 80     | -    | Deg.              | Note 4 |
|   | Bottom | $\theta Y-$ |  | -    | 80     | -    |                   |        |
|   | Left   | $\theta X-$ |  | -    | 80     | -    |                   |        |
|   | Right  | $\theta X+$ |  | -    | 80     | -    |                   |        |
| Contrast ratio  |        | CR          |  | 500  | 650    | 800  | -                 | Note 3 |
| Color of CIE Coordinate<br>(With B/L & T/P)                 | White  | X           | (Ta = 25 °C)<br>$\theta X, \theta Y = 0^\circ$ | -    | (0.29) | -    | -                 | Note 1 |
|   |        | Y           |  | -    | (0.33) | -    |                   |        |
|   | Red    | X           |  | -    | (0.55) | -    |                   |        |
|   |        | Y           |  | -    | (0.33) | -    |                   |        |
|   | Green  | X           |  | -    | (0.34) | -    |                   |        |
|   |        | Y           |  | -    | (0.60) | -    |                   |        |
|   | Blue   | X           |  | -    | (0.14) | -    |                   |        |
|   |        | Y           |  | -    | (0.09) | -    |                   |        |
| Average Brightness<br>Pattern=white display<br>(With T/P)*1 |        | IV          | -  | 680  | 850    | -    | cd/m <sup>2</sup> | Note 1 |
| Uniformity<br>(With T/P)*2                                  |        | $\Delta B$  | -  | 70   | -      | -    | %                 | Note 1 |

Note 1:

\*1 :  $\Delta B = B(\min) / B(\max) * 100\%$

\*2 : Measurement Condition for Optical Characteristics:

- a: Environment:  $25 \pm 5^\circ\text{C}$  /  $60 \pm 20\%$  RH, no wind, dark room below 10 Lux at typical lamp current and typical operating frequency.
- b: Measurement Distance:  $500 \pm 50$  mm, ( $\theta = 0^\circ$ )
- c: Equipment: TOPCON BM-7 fast, (field  $1^\circ$ ), after 10 minutes operation.
- d: The uncertainty of the C.I.E coordinate measurement  $\pm 0.01$  , Average Brightness  $\pm 4\%$

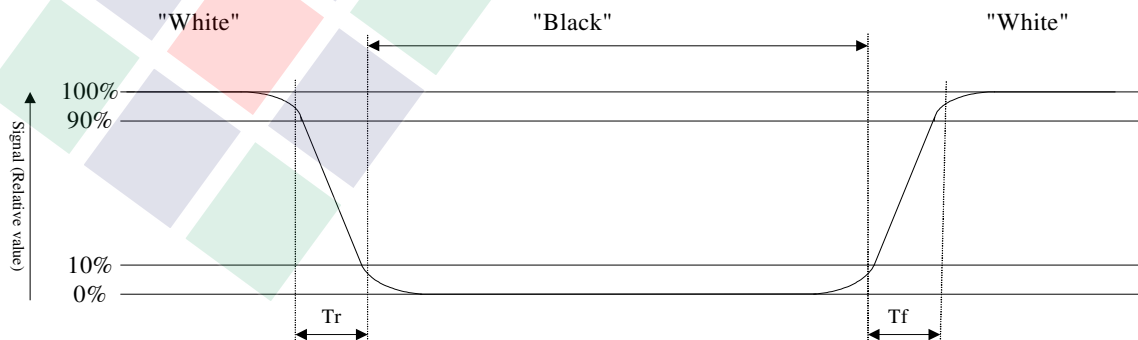


To be measured at the center area of panel with a viewing cone of  $1^\circ$  by Topcon luminance meter BM-7, after 10 minutes operation (module)

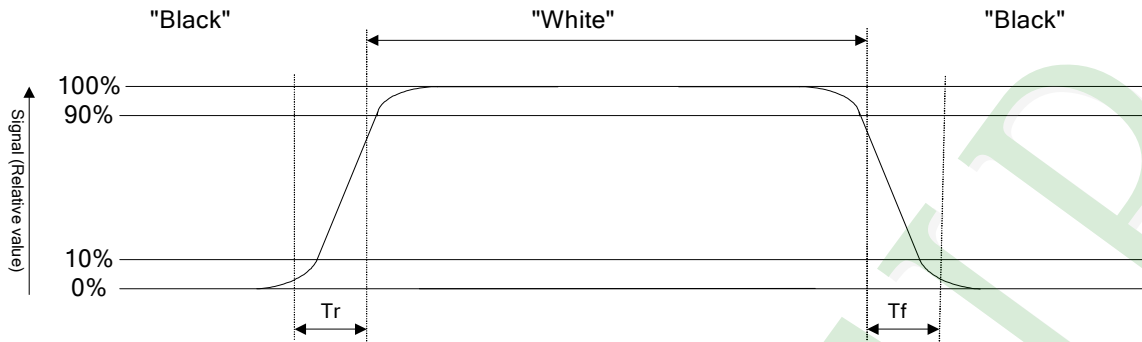
Note2: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from "black" to "white" (falling time) and from "white" to "black" (rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:  
Normally White



### Normally Black



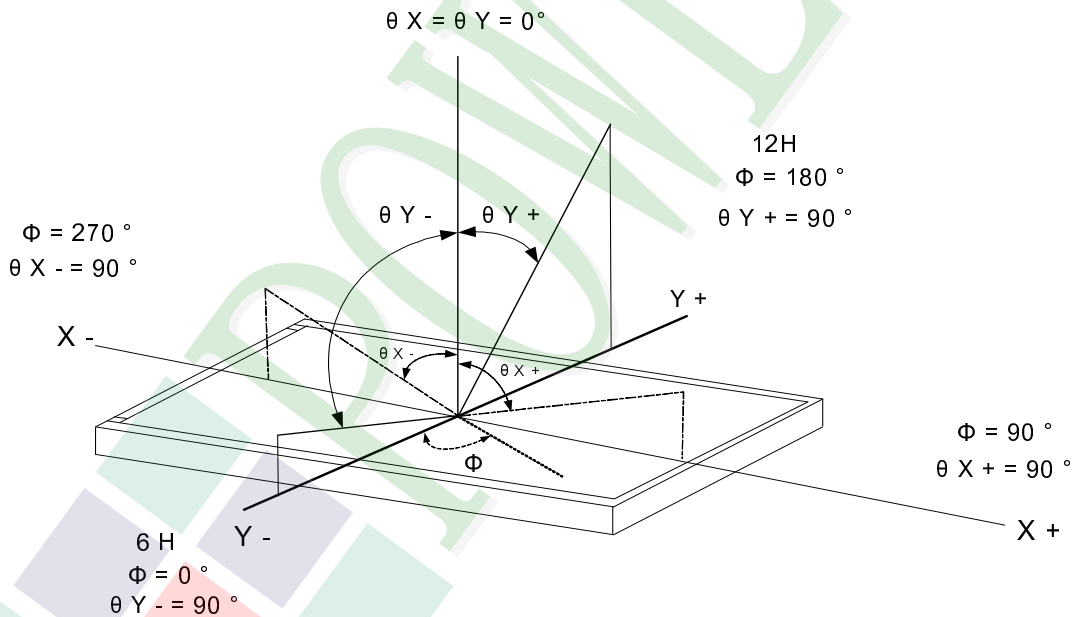
Note3: Definition of contrast ratio:

Contrast Ratio is calculated with the following formula:

$$\text{Contrast Ratio (C.R.)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

Note4: Definition of viewing angle:

Refer to figure as below:





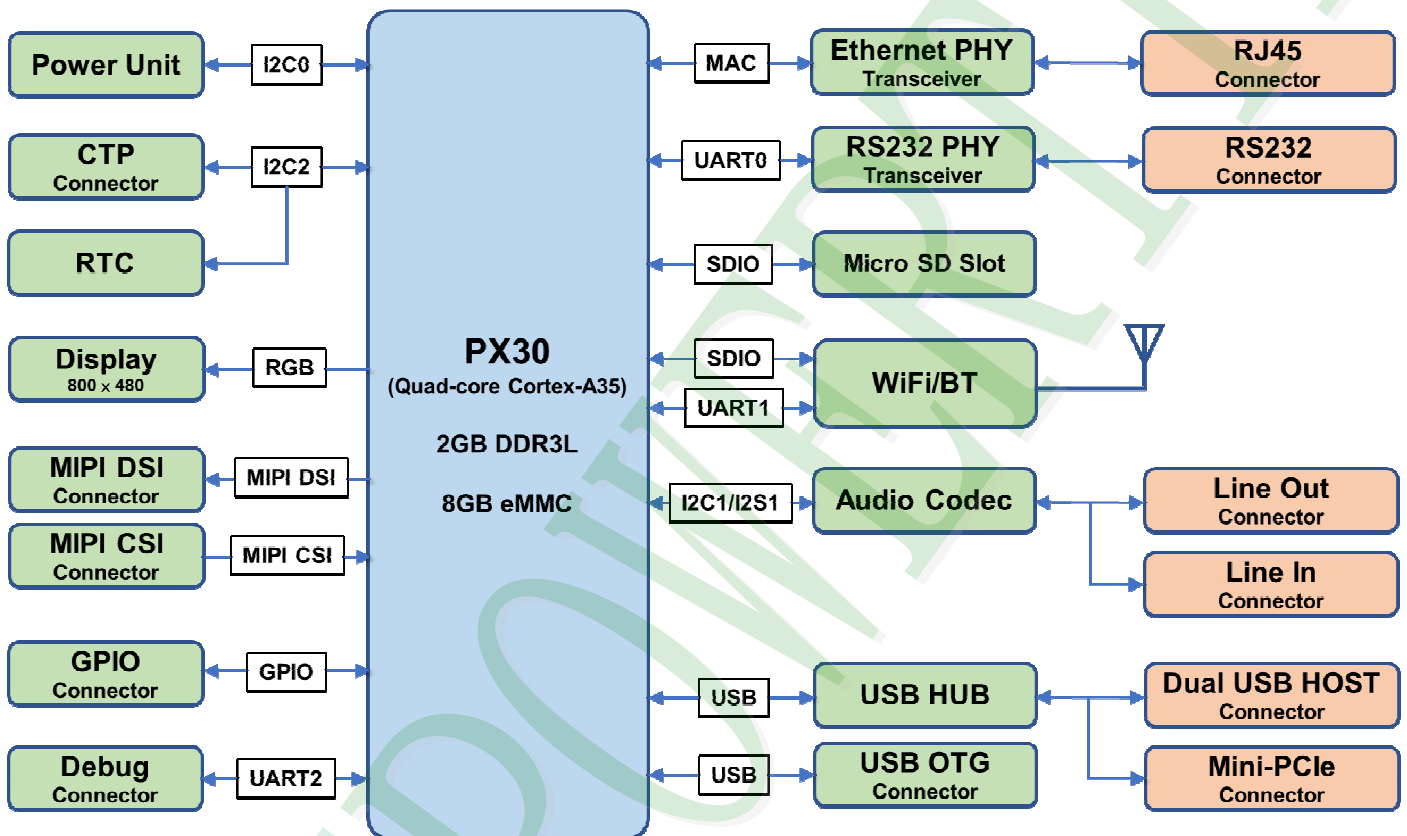
## 2. MODULE STRUCTURE

### 2.1 Counter Drawing

#### 2.1.1 LCM Mechanical Diagram

\* See Appendix

#### 2.1.2 Block Diagram



## 5.2 Interface Pins

| Symbol | DESCRIPTION  | NOTE                  |
|--------|--|-----------------------|
| J1     | SODIMM 204 PIN   |                       |
| J2     | Boot Mode Control  |                       |
| J3     | RTC Power Supply (Pitch 1.25mm)                                  |                       |
| J4     | System Power Supply  |                       |
| J5     | Audio Signal Input (Pitch 1.25mm)                                |                       |
| J6     | Antenna connector  |                       |
| J7     | HDMI   | No function, not used |
| J8     | Expansion  |                       |
| J9     | Pitch 0.5mm 30pin connector bottom contact)                      |                       |
| J11    | CTP Interface (Pitch 1.25mm 6pin)                                |                       |
| J12    | CTP Interface (Pitch 0.5mm 6pin connector bottom contact)        |                       |
| J13    | RGB Interface (Pitch 0.5mm 50pin connector bottom contact)       |                       |
| J14    | LVDS, MIPI DSI Interface (Pitch 2.0mm, 2x20pin)                  |                       |
| J15    | RGB Interface (Pitch 2.0mm, 2x20pin)                             |                       |
| J16    | Backlight Power (Pitch 2.0mm 6pin)                               |                       |
| J17    | USB CTP  |                       |
| J18    | MicroSD Card   |                       |
| J19    | USB 2.0 Device Mini USB  |                       |
| J20    | USB 1.1/2.0 Host USB Port A Type                                 |                       |
| J22    | Mini PCIe  |                       |
| J23    | Power Output (Pitch 1.25mm)                                      |                       |
| J25    | Debug (Pitch 1.25mm, 4pin)                                       |                       |
| J26    | RS232 (Pitch 2.0mm, 2x5pin)                                      |                       |
| J27    | UART0  | No function, not used |
| J29    | GPIO (Pitch 2.0mm, 2x10pin)                                      |                       |
| J30    | MIPI CSI (Pitch 0.5mm 30pin connector bottom contact)            |                       |
| J31    | Pitch 0.5mm 24pin connector bottom contact                       |                       |
| J34    | Ethernet RJ45  |                       |
| BAT1   | Battery Slot (CR1220)  |                       |
| JP1    | Boot Mode Switch   |                       |
| CN2    | Audio Signal Output (Standard Earphone Jack $\varnothing$ 3.5mm) |                       |
| SW1    | Reset System   |                       |
| SW2    | PMIC Power On  |                       |
| SW3    | ADC2 Key In  |                       |

## 2.3 Interface Pin Description

### J1 --- SODIMM 204 PIN

### J2 --- Boot Mode Control

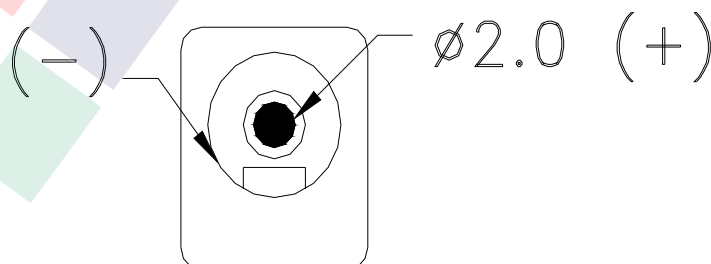
| Pin No. | Symbol                   | Type | DESCRIPTION               |
|---------|--------------------------|------|---------------------------|
| 1       | PWEN                     | IO   | Power Enable              |
| 2       | BOOT_MODE0               | P    | External RTC Power Supply |
| 3       | BTN_RSTIN_n              | IO   | Reset System              |
| 4       | V <sub>SUHTDOWN3V3</sub> | P    | +3.3V Output (shutdown)   |
| 5       | PMIC_PWRON               | IO   | PMIC (RK809), Power On    |
| 6       | GND                      | P    | Ground                    |

### J3 --- RTC Power Supply (Pitch 1.25mm)

| Pin No. | Symbol           | Type | DESCRIPTION               |
|---------|------------------|------|---------------------------|
| 1       | GND              | P    | Ground                    |
| 2       | V <sub>BAT</sub> | P    | External RTC Power Supply |

### J4 --- System Power Supply

| Pin No. | Symbol          | Type | DESCRIPTION               |
|---------|-----------------|------|---------------------------|
| +       | V <sub>IN</sub> | P    | DC Power Supply of System |
| -       | GND             | P    | Ground                    |



**J5 --- Audio Signal Input (Pitch 1.25mm)**

| Pin No. | Symbol  | Type | DESCRIPTION                 |
|---------|---------|------|-----------------------------|
| 1       | LINEINL | A    | Line-in Left Channel Input  |
| 2       | LINEINR | A    | Line-in Right Channel Input |
| 3       | GND     | P    | Ground                      |
| 4       | GND     | P    | Ground                      |

**J6 --- Antenna connector**

| Pin No. | Symbol | Type | DESCRIPTION |
|---------|--------|------|-------------|
| 1       | S      | IO   | Data signal |
| 2       | G      | P    | Ground      |
| 3       | G      | P    | Ground      |

**J7 --- HDMI (No function, not used)**
**J8 --- Expansion**

| Pin No. | Symbol                   | Type | DESCRIPTION             |
|---------|--------------------------|------|-------------------------|
| 1       | V <sub>SHUTDOWN3V3</sub> | P    | +3.3V Output (shutdown) |
| 2       | PWEN                     | IO   | Power Enable            |
| 3       | I2C1_SCL                 | IO   | I2C1 Serial Clock       |
| 4       | I2C1_SDA                 | IO   | I2C1 Serial Data        |
| 5       | EFM_INIT1_EXTBTN         | -    | Reserved                |
| 6       | NC                       | -    | Not Connection          |
| 7       | EFM_URX                  | -    | Reserved                |
| 8       | EFM_C2CK/RST             | -    | Reserved                |
| 9       | EFM_C2D/P20              | -    | Reserved                |
| 10      | GND                      | P    | Ground                  |

**J9 – Pitch 0.5mm 30pin connector bottom contact)**

| Function | Symbol              | Type | DESCRIPTION                           | J9   |
|----------|---------------------|------|---------------------------------------|--|
| Power    | V <sub>LCD3V3</sub> | P    | +3.3V Power Supply for Display Module | 3,4  |
|          | V <sub>DD3V3</sub>  | P    | +3.3V Output                          | 7  |
|          | V <sub>DD5V</sub>   | P    | +5.0V Output                          | 1,2  |
|          | GND                 | P    | Ground                                | 6,8,13,15,18,<br>21,24,27,30               |
| Other    | I2C2_SDA            | IO   | I2C Port2 Serial Data                 | 9  |
|          | I2C2_SCL            | IO   | I2C Port2 Serial Clock                | 10   |
|          | CTP_RST             | O    | CTP Reset Signal                      | 11   |
|          | CTP_INT             | I    | CTP Interrupt Signal                  | 12   |
|          | NC                  | -    | Not connection                        | 5,14,16,17,<br>19,29,22,23,<br>25,26,28,29 |

**J11 --- CTP Interface (Pitch 1.25mm 6pin)**

| Pin No. | Symbol             | Type | DESCRIPTION            |
|---------|--------------------|------|------------------------|
| 1       | GND                | P    | Ground                 |
| 2       | I2C2_SDA           | IO   | I2C Port2 Serial Data  |
| 3       | I2C2_SCL           | IO   | I2C Port2 Serial Clock |
| 4       | CTP_INT            | I    | CTP Interrupt Signal   |
| 5       | CTP_RST            | O    | CTP Reset Signal       |
| 6       | V <sub>DD3V3</sub> | P    | +3.3V                  |

**J12 --- CTP Interface (Pitch 0.5mm 6pin connector bottom contact)**

| Pin No. | Symbol             | Type | DESCRIPTION            |
|---------|--------------------|------|------------------------|
| 1       | GND                | P    | Ground                 |
| 2       | V <sub>DD3V3</sub> | P    | +3.3V                  |
| 3       | I2C2_SCL           | IO   | I2C Port2 Serial Clock |

| Pin No. | Symbol   | Type | DESCRIPTION           |
|---------|----------|------|-----------------------|
| 4       | I2C2_SDA | IO   | I2C Port2 Serial Data |
| 5       | CTP_INT  | I    | CTP Interrupt Signal  |
| 6       | CTP_RST  | O    | CTP Reset Signal      |

### Display Interface --- RGB

(J13 – Pitch 0.5mm 50pin connector bottom contact, J15 – Pitch 2.0mm, 2x20pin)

| Function      | Symbol                 | Type | DESCRIPTION                           | J13                                       | J15                      |
|---------------|------------------------|------|---------------------------------------|---|--------------------------|
| Power         | V <sub>LCDC3V3</sub>   | P    | +3.3V power supply for Display module | 2,3                                       | 1,2,3                    |
|               | V <sub>DD5V</sub>      | P    | +5.0V Output                          | 4,5                                       | 39                       |
|               | GND                    | P    | Ground.                               | 1,7,12,17,22,<br>27,32,37,40,<br>42,44,50 | 4,5,6,13,14,<br>19,20,40 |
| RGB<br>Signal | LCDC_D0                | IO   | LCDC data 0 (Blue 0)                  | 28  | 8                        |
|               | LCDC_D1                |      | LCDC data 1 (Blue 1)                  | 29  | 7                        |
|               | LCDC_D2                |      | LCDC data 2 (Blue 2)                  | 30  | 10                       |
|               | LCDC_D3                |      | LCDC data 3 (Blue 3)                  | 31  | 9                        |
|               | LCDC_D4                |      | LCDC data 4 (Blue 4)                  | 33  | 12                       |
|               | LCDC_D5                |      | LCDC data 5 (Blue 5)                  | 34  | 11                       |
|               | LCDC_D6                |      | LCDC data 6 (Blue 6)                  | 35  | 18                       |
|               | LCDC_D7                |      | LCDC data 7 (Blue 7)                  | 36  | 17                       |
|               | LCDC_D8                |      | LCDC data 8 (Green 0)                 | 18  | 22                       |
|               | LCDC_D9                |      | LCDC data 9 (Green 1)                 | 19  | 21                       |
|               | LCDC_D10               |      | LCDC data 10 (Green 2)                | 20  | 16                       |
|               | LCDC_D11               |      | LCDC data 11 (Green 3)                | 21  | 15                       |
|               | LCDC_D12               |      | LCDC data 12 (Green 4)                | 23  | 24                       |
|               | LCDC_D13               |      | LCDC data 13 (Green 5)                | 24  | 23                       |
|               | LCDC_D14               |      | LCDC data 14 (Green 6)                | 25  | 26                       |
| LCDC_D15      | LCDC data 15 (Green 7) | 26   | 25                                    |   |                          |

| Function   | Symbol   | Type | DESCRIPTION   | J13                              | J15         |
|------------|----------|------|---|----------------------------------|-------------|
| RGB Signal | LCDC_D16 | IO   | LCDC data 16 (Red 0)  | 8                                | 28          |
|            | LCDC_D17 |      | LCDC data 17 (Red 1)  | 9                                | 27          |
|            | LCDC_D18 |      | LCDC data 18 (Red 2)  | 10                               | 30          |
|            | LCDC_D19 |      | LCDC data 19 (Red 3)  | 11                               | 29          |
|            | LCDC_D20 |      | LCDC data 20 (Red 4)  | 13                               | 32          |
|            | LCDC_D21 |      | LCDC data 21 (Red 5)  | 14                               | 31          |
|            | LCDC_D22 |      | LCDC data 22 (Red 6)  | 15                               | 34          |
|            | LCDC_D23 |      | LCDC data 23 (Red 7)  | 16                               | 33          |
| Others     | NC       | -    | Not Connection  | 13,14,18,19,38,39,41,43,45,46,47 | 35,36,37,38 |
|            | DISP_CTL | O    | Display On/Off Signal, '1' = On, '0' = Off  | 48                               | -           |
|            | DISP_RST | O    | Display reset signal by RC circuit, connect a 10K ohm resistor to V <sub>DD3V3</sub> and a 100nF capacitor to GND | 49                               | -           |
|            | DISP_PWM | O    | Backlight PWM Control Signal  | 6                                | -           |

### Display Interface --- LVDS, MIPI DSI (J14 – Pitch 2.0mm, 2x20pin)

| Function    | Symbol              | Type | DESCRIPTION                           | J14                           |
|-------------|---------------------|------|---------------------------------------|-------------------------------|
| Power       | V <sub>LCD3V3</sub> | P    | +3.3V power supply for Display module | 1,2,3                         |
|             | V <sub>DD5V</sub>   | P    | +5.0V Output                          | 39                            |
|             | GND                 | P    | Ground                                | 4,5,6,13,14,19,20,22,31,32,40 |
| LVDS Signal | LVDS0_TX0_N         | DS   | LVDS Chanel 0 Data 0 Negative         | 7                             |
|             | LVDS0_TX0_P         |      | LVDS Chanel 0 Data 0 Positive         | 8                             |
|             | LVDS0_TX1_N         |      | LVDS Chanel 0 Data 1 Negative         | 9                             |
|             | LVDS0_TX1_P         |      | LVDS Chanel 0 Data 1 Positive         | 10                            |
|             | LVDS0_TX2_N         |      | LVDS Chanel 0 Data 2 Negative         | 11                            |
|             | LVDS0_TX2_P         |      | LVDS Chanel 0 Data 2 Positive         | 12                            |

| Function           | Symbol        | Type | DESCRIPTION                        | J14                                      |
|--------------------|---------------|------|------------------------------------|--|
| LVDS<br>Signal     | LVDS0_TX3_N   | DS   | LVDS Chanel 0 Data 3 Negative      | 17                                       |
|                    | LVDS0_TX3_P   |      | LVDS Chanel 0 Data 3 Positive      | 18                                       |
|                    | LVDS0_CLK_N   |      | LVDS Chanel 0 Clock Negative       | 15                                       |
|                    | LVDS0_CLK_P   |      | LVDS Chanel 0 Clock Positive       | 16                                       |
| MIPI DSI<br>Signal | MIPI_TX_D0_N  | DS   | MIPI DSI Data 0 Negative           | 7  |
|                    | MIPI_TX_D0_P  |      | MIPI DSI Data 0 Positive           | 8  |
|                    | MIPI_TX_D1_N  |      | MIPI DSI Data 1 Negative           | 9  |
|                    | MIPI_TX_D1_P  |      | MIPI DSI Data 1 Positive           | 10                                       |
|                    | MIPI_TX_D2_N  |      | MIPI DSI Data 2 Negative           | 11                                       |
|                    | MIPI_TX_D2_P  |      | MIPI DSI Data 2 Positive           | 12                                       |
|                    | MIPI_TX_D3_N  |      | MIPI DSI Data 3 Negative           | 17                                       |
|                    | MIPI_TX_D3_P  |      | MIPI DSI Data 3 Positive           | 18                                       |
|                    | MIPI_TX_CLK_N |      | MIPI DSI Clock Negative            | 15                                       |
|                    | MIPI_TX_CLK_P |      | MIPI DSI Clock Positive            | 16                                       |
| Other              | CTP_INT       | IO   | Touch panel & Touch key interrupt  | 36                                       |
|                    | CTP_RST       |      | Touch panel reset                  | 38                                       |
|                    | I2C2_SCL      | IO   | I2C serial port 2, for touch panel | 35                                       |
|                    | I2C2_SDA      |      | I2C serial port 2, for touch panel | 37                                       |
|                    | NC            | -    | Not Connection                     | 21,23,24,25,<br>26,27,28,29,<br>30,33,34 |

### J16 --- Backlight Power (Pitch 2.0mm 6pin)

| Pin No. | Symbol   | Type | DESCRIPTION                                     |
|---------|----------|------|---|
| 1       | VBLOUT   | P    | VBLOUT is connected to V <sub>IN</sub> directly |
| 2       | VBLOUT   | P    | VBLOUT is connected to V <sub>IN</sub> directly |
| 3       | GPIO0_A1 | IO   | General-Purpose I/O                             |
| 4       | PWM2     | O    | PWM signal output for backlight                 |
| 5       | GND      | P    | Ground  |
| 6       | GND      | P    | Ground  |



**J17 --- USB CTP**

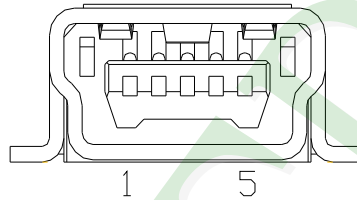
| Pin No. | Symbol            | Type | DESCRIPTION     |
|---------|-------------------|------|-----------------|
| 1       | V <sub>DD5V</sub> | P    | +5.0V Output    |
| 2       | D-                | DS   | Data - (Data M) |
| 3       | D+                | DS   | Data + (Data P) |
| 4       | GND               | P    | Ground          |
| 5       | GND               | P    | Ground          |

**J18 --- MicroSD Card**

| Pin No. | Symbol             | Type | DESCRIPTION        |
|---------|--------------------|------|--------------------|
| 1       | SD2_DATA2          | IO   | SD2 data signal 2  |
| 2       | SD2_DATA3          | IO   | SD2 data signal 3  |
| 3       | SD2_CMD            | IO   | SD2 command signal |
| 4       | V <sub>DD3V3</sub> | P    | +3.3V Output       |
| 5       | SD2_CLK            | IO   | SD2 clock signal   |
| 6       | GND                | P    | Ground             |
| 7       | SD2_DATA0          | IO   | SD2 data signal 0  |
| 8       | SD2_DATA1          | IO   | SD2 data signal 1  |
| 9       | SD2_CD             | IO   | SD2 card detection |
| 10      | GND                | P    | Ground             |
| 11      | GND                | P    | Ground             |
| 12      | GND                | P    | Ground             |
| 13      | GND                | P    | Ground             |
| 14      | NC                 | -    | Not Connection     |

### J19 --- USB 2.0 Device Mini USB

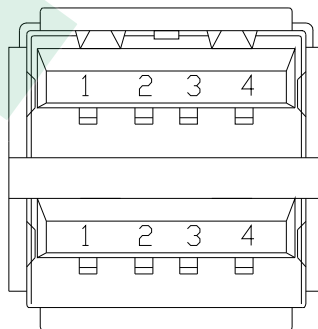
| Pin No. | Symbol             | Type | DESCRIPTION            |
|---------|--------------------|------|------------------------|
| 1       | V <sub>USB5V</sub> | P    | +5.0V USB Power Supply |
| 2       | D-                 | DS   | Data – (Data M)        |
| 3       | D+                 | DS   | Data + (Data P)        |
| 4       | ID                 | -    | USB ID                 |
| 5       | GND                | P    | Ground                 |



### J20 --- USB 1.1/2.0 Host USB Port A Type

#### Upper & Bottom

| Pin No. | Symbol            | Type | DESCRIPTION     |
|---------|-------------------|------|-----------------|
| 1       | V <sub>DD5V</sub> | P    | +5.0V Output    |
| 2       | D-                | DS   | Data – (Data M) |
| 3       | D+                | DS   | Data + (Data P) |
| 4       | GND               | P    | Ground          |



Upper

Bottom

## J22 --- Mini PCIe

| Function           | Symbol             | Type | DESCRIPTION                           | J22  |
|--------------------|--------------------|------|---------------------------------------|--|
| Power              | V <sub>DD1V5</sub> | P    | +3.3V Power Supply for Display Module | 6,28,48  |
|                    | V <sub>DD3V3</sub> | P    | +3.3V Output                          | 2,20,24,<br>39,41,42,<br>44,46,52  |
|                    | GND                | P    | Ground                                | 4,9,15,18<br>21,26,27,<br>29,34,35,<br>37,40,43,50                           |
| USB data<br>Signal | D-                 | DS   | Data – (Data M)                       | 36   |
|                    | D+                 | DS   | Data + (Data P)                       | 38   |
| Other              | I2C0_SDA_PMIC      | IO   | I2C Port0 Serial Data                 | 32   |
|                    | I2C0_SCL_PMIC      | IO   | I2C Port0 Serial Clock                | 30   |
|                    | NC                 | -    | Not connection                        | 1,3,5,7,8,<br>10,11,12,13,<br>14,16,17,19,<br>22,23,25,31,<br>33,45,47,49,51 |

## J23 --- Power Output (Pitch 1.25mm)

| Pin No. | Symbol            | Type | DESCRIPTION  |
|---------|-------------------|------|--------------|
| 1       | V <sub>DD5V</sub> | P    | +5.0V Output |
| 2       | V <sub>DD5V</sub> | P    | +5.0V Output |
| 3       | GND               | P    | Ground       |
| 4       | GND               | P    | Ground       |

## J25 --- Debug (Pitch 1.25mm, 4pin)

| Pin No. | Symbol             | Type | DESCRIPTION                              |
|---------|--------------------|------|--|
| 1       | V <sub>DD3V3</sub> | P    | +3.3V Output                             |
| 2       | UART2_TX_M1        | IO   | UART2_M1 Transmitter Signal (3.3V Level) |
| 3       | UART2_RX_M1        | IO   | UART2_M1 Receiver Signal (3.3V Level)    |
| 4       | GND                | P    | Ground                                   |

**J26 --- RS232 (Pitch 2.0mm, 2x5pin)**

| Pin No. | Symbol             | Type | DESCRIPTION                                       |
|---------|--------------------|------|---|
| 1       | NC                 | -    | Not Connection                                    |
| 2       | RS232_RXD          | I    | RS232 Receiver Signal (UART0, RS232 level)        |
| 3       | RS232_TXD          | O    | RS232 Transmitter Signal (UART0, RS232 level)     |
| 4       | V <sub>DD3V3</sub> | P    | +3.3V Output                                      |
| 5       | GND                | P    | Ground  |
| 6       | NC                 | -    | Not Connection                                    |
| 7       | RS232_RTS          | O    | RS232 Request to Send Signal (UART0, RS232 level) |
| 8       | RS232_CTS          | I    | RS232 Clear to Send Signal (UART0, RS232 level)   |
| 9       | NC                 | -    | Not Connection                                    |
| 10      | GND                | P    | Ground  |

**J27 --- UART0 (No function, not used)**
**J29 --- GPIO (Pitch 2.0mm, 2x10pin)**

| Pin No. | Symbol             | Type | DESCRIPTION       |
|---------|--------------------|------|-------------------|
| 1       | V <sub>DD3V3</sub> | P    | +3.3V Output      |
| 2       | V <sub>DD5V</sub>  | P    | +5.0V Output      |
| 3       | GND                | P    | Ground            |
| 4       | GND                | P    | Ground            |
| 5       | NC                 | -    | Not Connection    |
| 6       | NC                 | -    | Not Connection    |
| 7       | NC                 | -    | Not Connection    |
| 8       | I2C1_SCL           | IO   | I2C1 serial clock |
| 9       | NC                 | -    | Not Connection    |
| 10      | I2C1_SDA           | IO   | I2C1 serial Data  |

| Pin No. | Symbol   | Type | DESCRIPTION                  |
|---------|----------|------|------------------------------|
| 11      | NC       | -    | Not Connection               |
| 12      | SPI0_CSN | IO   | SPI Chip Select Signal       |
| 13      | NC       | -    | Not Connection               |
| 14      | SPI0_CLK | IO   | SPI0 Serial Clock Signal     |
| 15      | NC       | -    | Not Connection               |
| 16      | SPI0_RXD | IO   | SPI0 Receiver Data Signal    |
| 17      | NC       | -    | Not Connection               |
| 18      | SPI0_TXD | IO   | SPI0 Transmitter Data Signal |
| 19      | GND      | P    | Ground                       |
| 20      | GND      | P    | Ground                       |

**Camera Interface --- MIPI CSI  
(J30 – Pitch 0.5mm 30pin connector bottom contact)**

| Function           | Symbol             | Type | DESCRIPTION                   | J30                      |
|--------------------|--------------------|------|-------------------------------|--------------------------|
| Power              | V <sub>DD5V</sub>  | P    | +5.0V Output                  | 1                        |
|                    | V <sub>DD1V8</sub> | P    | I/O voltage for Camera module | 4                        |
|                    | GND                | P    | Ground                        | 6,8,13,15,18,21,24,27,30 |
| MIPI CSI<br>Signal | MIPI_C_CLK_N       | DS   | MIPI CSI Clock Negative       | 26                       |
|                    | MIPI_C_CLK_P       |      | MIPI CSI Clock Positive       | 25                       |
|                    | MIPI_C_D0_N        |      | MIPI CSI Data 0 Negative      | 29                       |
|                    | MIPI_C_D0_P        |      | MIPI CSI Data 0 Positive      | 28                       |
|                    | MIPI_C_D1_N        |      | MIPI CSI Data 1 Negative      | 23                       |
|                    | MIPI_C_D1_P        |      | MIPI CSI Data 1 Positive      | 22                       |
|                    | MIPI_C_D2_N        |      | MIPI CSI Data 2 Negative      | 20                       |
|                    | MIPI_C_D2_P        |      | MIPI CSI Data 2 Positive      | 19                       |
|                    | MIPI_C_D3_N        |      | MIPI CSI Data 3 Negative      | 17                       |
|                    | MIPI_C_D3_P        |      | MIPI CSI Data 3 Positive      | 16                       |

| Function | Symbol   | Type | DESCRIPTION  | J30        |
|----------|----------|------|--|------------|
| Other    | CAM_SDA  | IO   | I2C Por1 Serial Data (1.8V Level)                  | 9          |
|          | CAM_SCL  | IO   | I2C Port1 Serial Clock (1.8V Level)                | 10         |
|          | GPIO2_B0 | IO   | General-Purpose I/O for Camera module (1.8V Level) | 12         |
|          | CSI_CLKO | O    | Clock output to Camera module (1.8V Level)         | 14         |
|          | NC       | -    | Not Connection                                     | 2,3,5,7,11 |

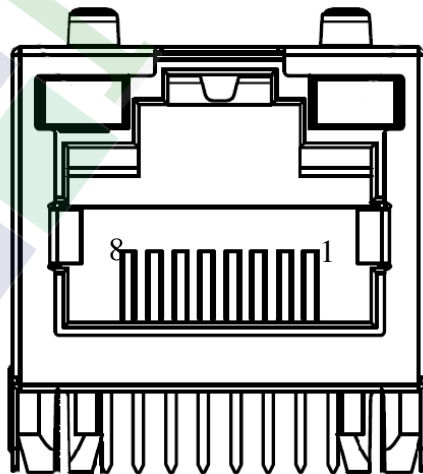
### J31 – Pitch 0.5mm 24pin connector bottom contact

| Pin No. | Symbol         | Type | DESCRIPTION                                 |
|---------|----------------|------|---|
| 1       | GND            | P    | Ground                                      |
| 2       | GND            | P    | Ground                                      |
| 3       | NC             | -    | Not Connection                              |
| 4       | CIF_CLKO       | O    | Clock output to Camera module               |
| 5       | NC             | -    | Not Connection                              |
| 6       | NC             | -    | Not Connection                              |
| 7       | NC             | -    | Not Connection                              |
| 8       | NC             | -    | Not Connection                              |
| 9       | NC             | -    | Not Connection                              |
| 10      | NC             | -    | Not Connection                              |
| 11      | RK809_HPL      | O    | RK809 Left channel output of the headphone  |
| 12      | RK809_HPR      | O    | RK809 Right channel output of the headphone |
| 13      | RK809_HPSNS    | I    | RK809 reference ground for the headphone    |
| 14      | RK809_SPKN_OUT | O    | RK809 positive speaker driver output        |
| 15      | RK809_SPKP_OUT | O    | RK809 positive speaker driver output        |
| 16      | RK809_MIC1_IN  | I    | RK809 negative input of the microphone      |
| 17      | RK809_MIC2_IN  | I    | RK809 positive input of the microphone      |
| 18      | ADC1_HP_HOOK   | IO   | ADC key                                     |

| Pin No. | Symbol            | Type | DESCRIPTION       |
|---------|-------------------|------|-------------------|
| 19      | I2C1_SCL          | IO   | I2C1 Serial Clock |
| 20      | I2C1_SDA          | IO   | I2C1 Serial Data  |
| 21      | GND               | P    | Ground            |
| 22      | V <sub>DD5V</sub> | P    | +5.0V Output      |
| 23      | V <sub>DD5V</sub> | P    | +5.0V Output      |
| 24      | V <sub>DD5V</sub> | P    | +5.0V Output      |

### J34 --- Ethernet RJ45

| Pin No. | Symbol | Type | DESCRIPTION           |
|---------|--------|------|-----------------------|
| 1       | TX_D1+ | DS   | Transmit Data +       |
| 2       | TX_D1- | DS   | Transmit Data -       |
| 3       | RX_D2+ | DS   | Receive Data +        |
| 4       | BI_D3+ | DS   | Bi-directional Data + |
| 5       | BI_D3- | DS   | Bi-directional Data - |
| 6       | RX_D2- | DS   | Receive Data -        |
| 7       | BI_D4+ | DS   | Bi-directional Data + |
| 8       | BI_D4- | DS   | Bi-directional Data - |



**BAT1 --- Battery Slot (CR1220)**

| Pin No. | Symbol           | Type | DESCRIPTION           |
|---------|------------------|------|-----------------------|
| 1       | V <sub>BAT</sub> | P    | External Power Supply |
| 2       | GND              | P    | Ground                |

**JP1 --- Boot Mode Switch**

| Pin No. | Symbol     | Type | DESCRIPTION    |
|---------|------------|------|----------------|
| 1       | GND        | P    | Ground         |
| 2       | NC         | -    | Not Connection |
| 3       | GND        | P    | Ground         |
| 4       | BOOT_MODE0 | IO   | Boot Mode 0    |

**CN2 --- Audio Signal Output**

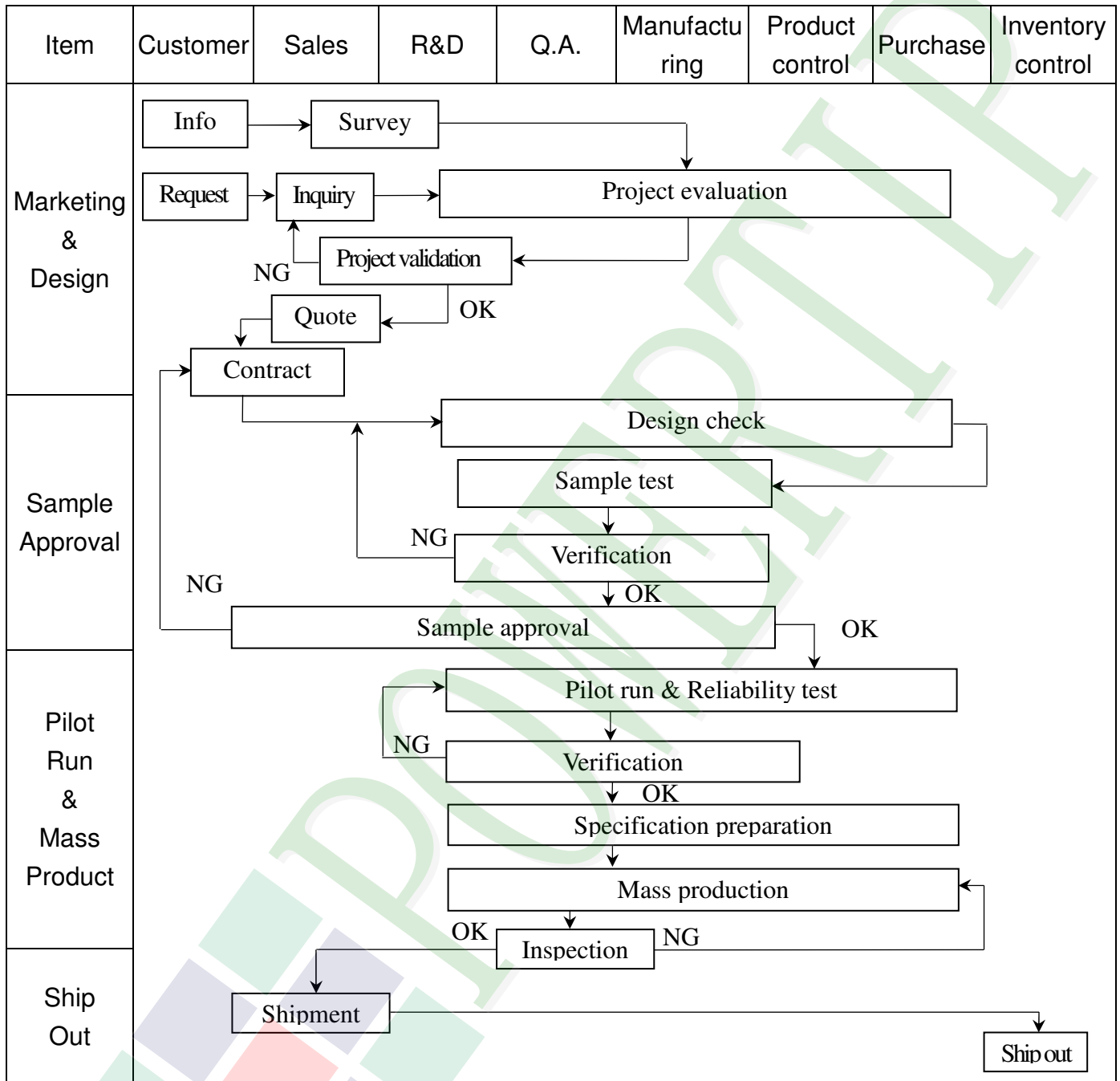
Standard Earphone Jack  $\varphi$ 3.5mm.

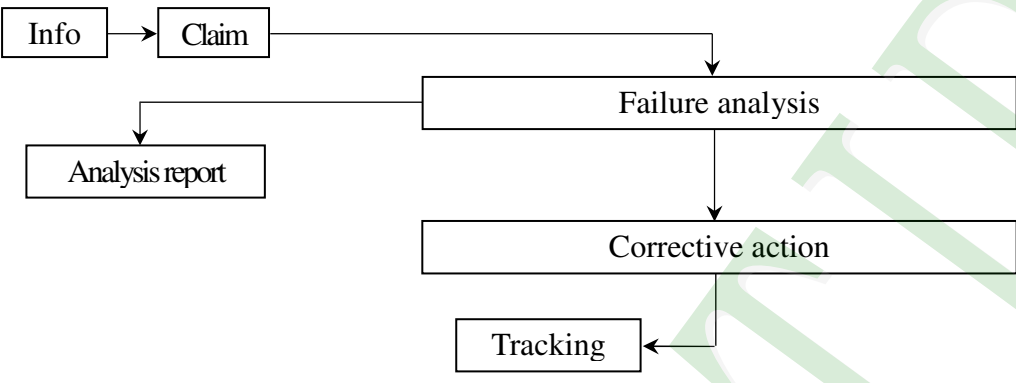
**SW1 --- Reset System**
**SW2 --- PMIC Power On**
**SW3 --- ADC2 Key In**



### 3. QUALITY ASSURANCE SYSTEM

#### 3.1 Quality Assurance Flow Chart



| Item          | Customer  | Sales | R&D | Q.A. | Manufacturing   | Product control | Purchase | Inventory control |
|---------------|---|-------|-----|------|---|-----------------|----------|-------------------|
| Sales Service |  <pre> graph TD     Info[Info] --&gt; Claim[Claim]     Claim --&gt; Failure[Failure analysis]     Failure --&gt; Report[Analysis report]     Failure --&gt; Action[Corrective action]     Action --&gt; Tracking[Tracking]           </pre> |       |     |      |   |                 |          |                   |
| Q.A Activity  | 1. ISO 9001 Maintenance Activities<br>3. Equipment calibration<br>5. Standardization Management   |       |     |      | 2. Process improvement proposal<br>4. Education and Training Activities |                 |          |                   |

## 4. RELIABILITY TEST

### 4.1 Reliability Test Condition

| NO.                 | TEST ITEM                                     | TEST CONDITION  |                     |                  |          |     |             |    |            |    |          |    |
|---------------------|---|---|---------------------|------------------|----------|-----|-------------|----|------------|----|----------|----|
| 1                   | High Temperature Storage Test                 | Keep in $+80 \pm 2^\circ\text{C}$ 96 hrs.<br>Surrounding temperature, then storage at normal condition 4 hrs.   |                     |                  |          |     |             |    |            |    |          |    |
| 2                   | Low Temperature Storage Test                  | Keep in $-30 \pm 2^\circ\text{C}$ 96 hrs.<br>Surrounding temperature, then storage at normal condition 4 hrs.   |                     |                  |          |     |             |    |            |    |          |    |
| 3                   | High Temperature / High Humidity Storage Test | Keep in $+60^\circ\text{C} / 90\%$ R.H duration for 96 hrs<br>Surrounding temperature, then storage at normal condition 4 hrs.<br>(Excluding the polarizer)   |                     |                  |          |     |             |    |            |    |          |    |
| 4                   | Temperature Cycling Storage Test              | $  \begin{array}{ccccccc}  -30^\circ\text{C} & \rightarrow & +25^\circ\text{C} & \rightarrow & +80^\circ\text{C} & \rightarrow & +25^\circ\text{C} \\  (30\text{mins}) & & (5\text{mins}) & & (30\text{mins}) & & (5\text{mins}) \\  \leftarrow & & & & & & \rightarrow \\  & & & & \text{10 Cycle} & &   \end{array}  $ Surrounding temperature, then storage at normal condition 4 hrs. |                     |                  |          |     |             |    |            |    |          |    |
| 5                   | Vibration Test (Packaged)                     | <ol style="list-style-type: none"> <li>Sine wave 10~55 Hz frequency (1 min)</li> <li>The amplitude of vibration: 1.5 mm</li> <li>Each direction (X, Y, Z) duration for 2 hrs.</li> </ol>  |                     |                  |          |     |             |    |            |    |          |    |
| 6                   | Drop Test (Packaged)                          | <table border="1"> <thead> <tr> <th>Packing Weight (Kg)</th> <th>Drop Height (cm)</th> </tr> </thead> <tbody> <tr> <td>0 ~ 45.4</td> <td>122</td> </tr> <tr> <td>45.4 ~ 90.8</td> <td>76</td> </tr> <tr> <td>90.8 ~ 454</td> <td>61</td> </tr> <tr> <td>Over 454</td> <td>46</td> </tr> </tbody> </table> <p>Drop direction: 1 corner / 3 edges / 6 sides each 1 times</p>                | Packing Weight (Kg) | Drop Height (cm) | 0 ~ 45.4 | 122 | 45.4 ~ 90.8 | 76 | 90.8 ~ 454 | 61 | Over 454 | 46 |
| Packing Weight (Kg) | Drop Height (cm)                              |   |                     |                  |          |     |             |    |            |    |          |    |
| 0 ~ 45.4            | 122   |   |                     |                  |          |     |             |    |            |    |          |    |
| 45.4 ~ 90.8         | 76  |   |                     |                  |          |     |             |    |            |    |          |    |
| 90.8 ~ 454          | 61  |   |                     |                  |          |     |             |    |            |    |          |    |
| Over 454            | 46  |   |                     |                  |          |     |             |    |            |    |          |    |

## 5. PRECAUTION RELATING PRODUCT HANDLING

### 5.1 SAFETY

- 5.1.1 If the LCD panel breaks, be careful not to get the liquid crystal to touch your skin.
- 5.1.2 If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

### 5.2 HANDLING

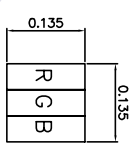
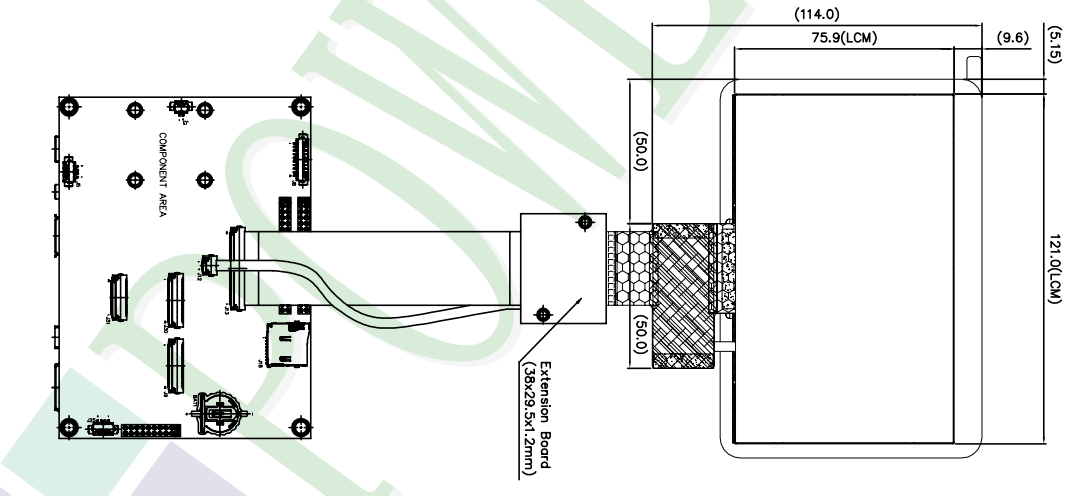
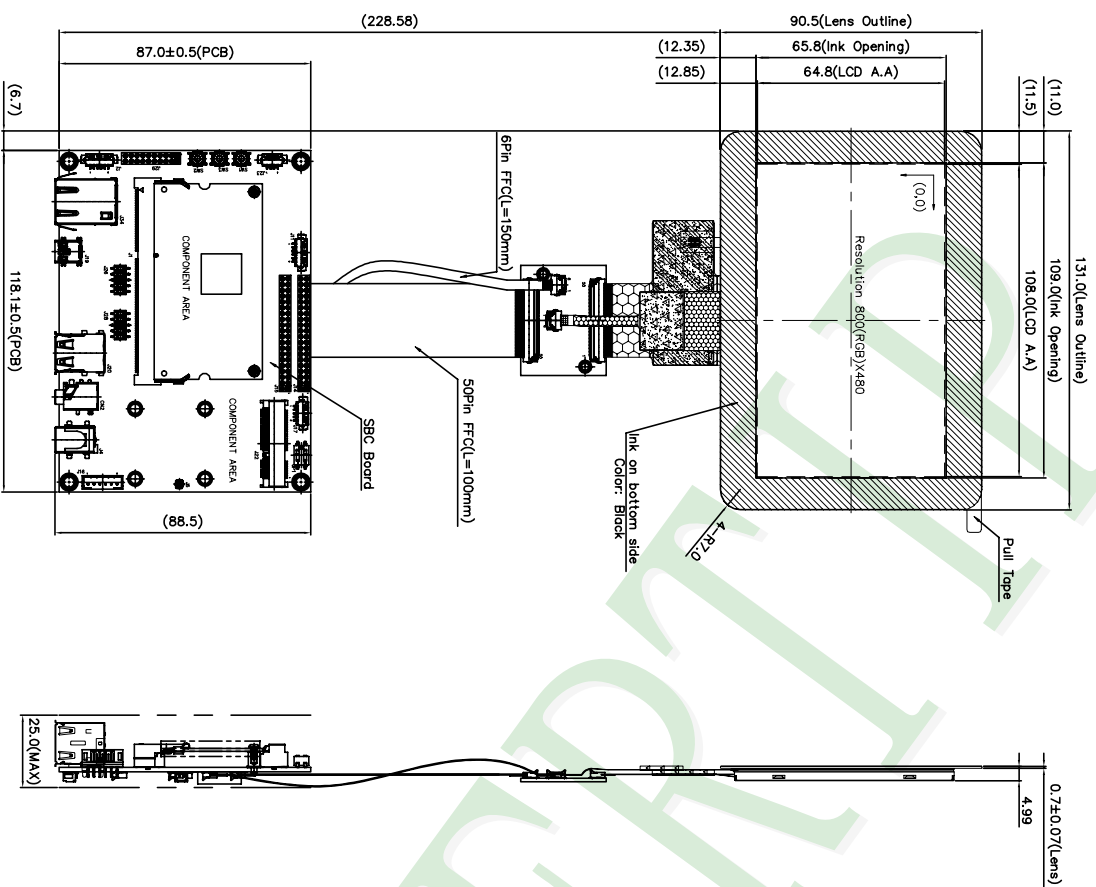
- 5.2.1 Avoid any strong mechanical shock which can break the glass.
- 5.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module, be sure to ground your body and any electrical equipment you may be using.
- 5.2.3 Do not remove the panel or frame from the module.
- 5.2.4 The polarizing plate of the display is very fragile. So, please handle it very carefully, do not touch, push or rub the exposed polarizing with anything harder than an HB pencil lead (glass, tweezers, etc.)
- 5.2.5 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- 5.2.6 Do not touch the display area with bare hands, this will stain the display area.
- 5.2.7 Do not use ketonic solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.
- 5.2.8 To control temperature and time of soldering is  $320 \pm 10^{\circ}\text{C}$  and 3 ~ 5 sec.
- 5.2.9 To avoid liquid (include organic solvent) stained on LCM.
- 5.2.10 Caution! (LCM products with Capacitive Touch Panel)  
Strong EMI-sources such as switch-mode power supplies (SPS) can lead to touch malfunction (e.g., ghost-touches). Therefore, the touch needs to be thoroughly tested inside the target application.
- 5.2.11 CAUTION: Continuously displaying same static image will result in high possibility of image sticking/image burn-in effect due to TFT panel characteristic.
- 5.2.12 Double-sided tape designed to be attached with the customer's mechanical device, please follow up the rules and regulations published by the original manufacturer of double-side tape for the attachment operation.

### 5.3 STORAGE

- 5.3.1 Store the panel or module in a dark place where the temperature is  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  and the humidity is below 65% RH.
- 5.3.2 Do not place the module near organics solvents or corrosive gases.
- 5.3.3 Do not crush, shake, or jolt the module.

### 5.4 TERMS OF WARRANTY

- 5.4.1 Applicable warrant period  
The period is within thirteen months since the date of shipping out under normal using and storage conditions.
- 5.4.2 Unaccepted responsibility  
This product has been manufactured to your company's specification as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment, we cannot take responsibility if the product is used in nuclear power control equipment, aerospace equipment, fire and security systems or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required.



NOTES:  
 1. LCD TYPE: TFT LCD  
 2. LCD DISPLAY: Normally Black / TRANSMISSIVE  
 3. VIEW DIRECTION: Full Viewing Angle  
 4. The tolerance unless classified ±0.3mm

|     |                       |         |            |
|-----|-----------------------|---------|------------|
| 007 |                       |         |            |
| 006 |                       |         |            |
| 005 |                       |         |            |
| 004 |                       |         |            |
| 003 |                       |         |            |
| 002 | REMOVE J7 - J10 - J27 | Nini    | 2021/12/14 |
| 001 | NEW DRAWING           | Nini    | 2021/04/13 |
| REV | REV BY                | REVISER | DATE       |

|               |                       |
|---------------|-----------------------|
| PART NO:      | HRA800480T030-ZHC     |
| DRAWING NAME: | LMD-HRA800480T030-ZHC |
| TITLE:        | LCD MODULE DRAWING    |

|         |            |
|---------|------------|
| Design  | Nini Chen  |
| Check   | Mares Lu   |
| Approve | Daniel Lin |

|  |            |           |          |
|--|------------|-----------|----------|
| 久正光电股份有限公司<br>POWER TIP TECHNOLOGY CORPORATION |            |           |          |
| Unit   | MM         |           |          |
| Scale  | FIT        |           |          |
| Page   | 1/2        |           |          |
| Surface  | Material   | Thickness | Quantity |
| (3)  | 1 ~ 4      | 4 ~ 16    | -        |
|  | 16 ~ 63    | 63 ~ 250  | -        |
|  | 250 ~ 1000 | -         | -        |



# LCM包裝規格書

## LCM Packaging Specifications

|         |        |         |
|---------|--------|---------|
| Approve | Check  | Contact |
| Marcus  | Bright | Nini    |

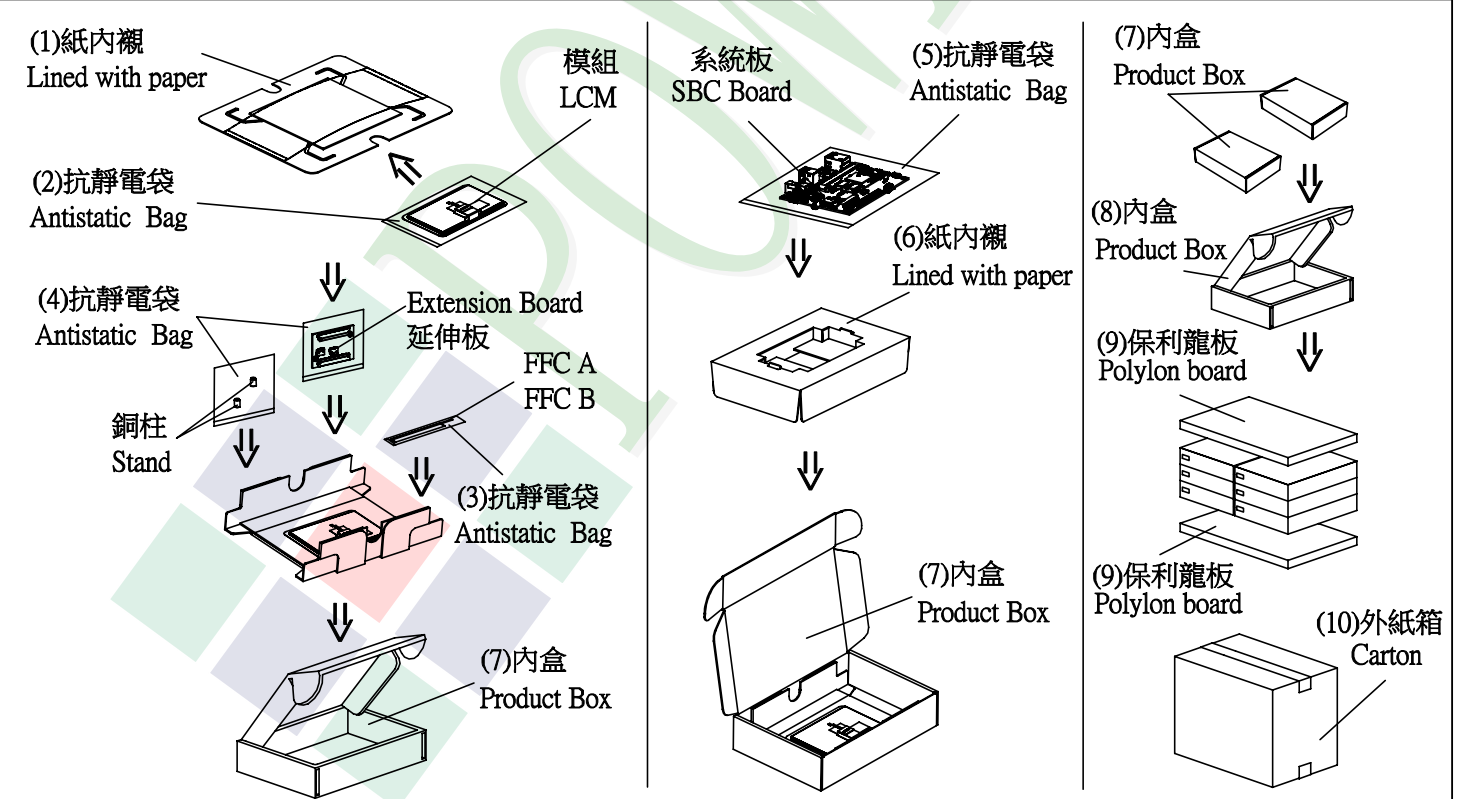
### 1. 包裝材料規格表 (Packaging Material) : (per carton)

| No. | Item                    | Model            | Dimensions (mm)   | 1Pcs Weight | Quantity | Total Weight |
|-----|-------------------------|------------------|-------------------|-------------|----------|--------------|
| 1   | 模組 (LCM)                | PH800480T030-ZHC | 131 X 90.5 X 4.99 | 0.0867      | 12       | 1.0404       |
| 2   | 紙內襯 (1)Lined with paper | BX00000000132    | 347 X 262         | 0.07        | 12       | 0.84         |
| 3   | 抗靜電袋(2)Antistatic Bag   | BAG240170ARABA   | 170 X 240         | 0.005       | 12       | 0.06         |
| 4   | 線材 50Pin L=100mm(FFC A) | CB00000000165    | 25.5 X 100        | 0.009       | 12       | 0.108        |
| 5   | 線材 6Pin L=150mm(FFC B)  | CB00000000160    | 3.5 X 150         | 0.001       | 12       | 0.012        |
| 6   | 抗靜電袋(3)Antistatic Bag   | BAG0000000004    | 80 X 300          | 0.0005      | 12       | 0.006        |
| 7   | 延伸板(Extension Board)    | —————            | 38 X 29.5X3.2     | 0.0042      | 12       | 0.05         |
| 8   | 銅柱(Stand)               | OTSPACER00024    | φ 4.5X 6.7        | 0.0007      | 24       | 0.0168       |
| 9   | 抗靜電袋(4)Antistatic Bag   | BAG0000000052    | 85 X 50           | 0.0005      | 24       | 0.012        |
| 10  | 系統板(SBC Board)          | —————            | 87 X 118.1X21.5   | 0.082       | 12       | 0.984        |
| 11  | 抗靜電袋(5)Antistatic Bag   | BAG150120ARABA   | 150 X 120         | 0.0021      | 12       | 0.0252       |
| 12  | 紙內襯 (6)Lined with paper | BX00000000133    | 342 X 257         | 0.043       | 12       | 0.516        |
| 13  | 內盒(7)Product Box        | BX00000000131    | 258 X 175 X 58    | 0.11        | 12       | 1.32         |
| 14  | 內盒(8)Product Box        | BX36627063ABBA   | 383 X 270 X 66    | 0.2         | 6        | 1.2          |
| 15  | 保利龍板(9)Polylon board    | OTPLB00PL08ABA   | 550 X 393 X 20    | 0.0284      | 2        | 0.0568       |
| 16  | 外紙箱(10)Carton           | BX57041027CCBA   | 570 X 410 X 265   | 1.4208      | 1        | 1.4208       |

2. 一 整箱總重量 (Total LCD Weight in carton) : 7.68 Kg±10%

3. 單箱數量規格表 (Packaging Specifications and Quantity) :

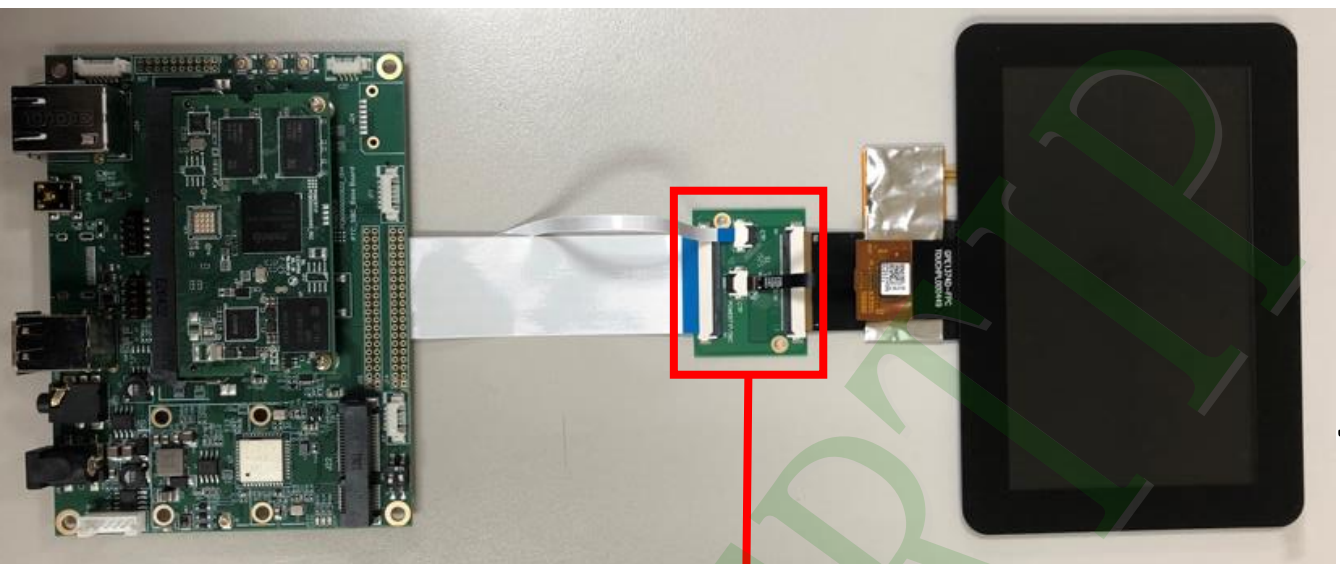
|   |   |                   |   |   |    |
|---|---|-------------------|---|---|----|
| (1)LCM quantity per small box : no per lined with paper   | 1 | x no of small box | 1 | = | 1  |
| (2)Total LCM quantity in big box : quantity per small box | 1 | x no of big boxes | 2 | = | 2  |
| (3)Total LCM quantity in carton : quantity per big box    | 2 | x no of cartons   | 6 | = | 12 |



### 特 記 事 項 (REMARK)

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# HRA800480T030-ZHC Assembly Guide(TOP)





# HRA800480T030-ZHC Assembly Guide(BOTTOM)

