



RVT101HVSNNWN00

## STM32 EMBEDDED 10.1" DISPLAY DATASHEET

Rev.1.6  
2024-07-05

| ITEM                           | CONTENTS                            | UNIT              |
|--------------------------------|-------------------------------------|-------------------|
| LCD Type                       | TFT/Transmissive/Normally Black/IPS | /                 |
| Size                           | 10.1                                | Inch              |
| Viewing Direction              | Free                                | /                 |
| Outside Dimensions (W x H x D) | 229.46 x 149.10 x 13.65             | mm                |
| Active Area (W x H)            | 216.96 x 135.60                     | mm                |
| Pixel Pitch (W x H)            | 0.1695 x 0.1695                     | mm                |
| Resolution                     | 1280 x 800                          | /                 |
| Brightness                     | 1000                                | cd/m <sup>2</sup> |
| Color Depth                    | 16.7 M                              | /                 |
| Pixel Arrangement              | RGB Vertical Stripe                 | /                 |
| Driver IC of Board             | STM32H757XIH6                       | /                 |
| External SDRAM                 | 64Mbit (32-bit access)              | /                 |
| External Flash Memory          | 512Mbit                             | /                 |
| Supply Voltage for Module      | 6.0-48.0                            | V                 |
| With/Without Touch             | Without Touch Panel                 | /                 |
| Weight                         | 341                                 | g                 |

**Note 1.** RoHS3 compliant**Note 2.** LCM weight tolerance:  $\pm 5\%$ .

## 1. REVISION RECORD

| REV NO. | REV DATE   | CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                   | REMARKS |
|---------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1.0     | 2022-01-10 | Initial release                                                                                                                                                                                                                                                                                                                                                                                                            |         |
| 1.1     | 2022-02-14 | Update the absolute maximum rating of $V_{DD}$ to 0V-48.0V                                                                                                                                                                                                                                                                                                                                                                 |         |
| 1.2     | 2022-03-31 | Update RS485 and Haptic interfaces description                                                                                                                                                                                                                                                                                                                                                                             |         |
| 1.3     | 2022-07-08 | New version of PCB 101STM32H7_Rev1.3 <ul style="list-style-type: none"><li>Power connector(P2) is upgraded with 6 pins Molex connector</li><li>Coin cell holder for CR1220 is added</li><li>New method to set BLVDD SELECTOR</li><li>ESD protection around the expansion connector, P8</li><li>Glued heatsink on the MCU</li><li>Soldered 7*M3 thread on the PCB</li><li>User pushbuttons BTN1, BTN2 are enabled</li></ul> |         |
| 1.4     | 2023-02-03 | New version of PCB 101STM32H7_Rev1.4 <ul style="list-style-type: none"><li>MCU is switched from STM32H747XIH6 to STM32H757XIH6</li><li>The maximum supply voltage is increased to 48.0V and update the electrical parameters measurement</li><li>Boot mode of MCU is available</li><li>For SWD interface (P6), Pin 6, SWO, is muxed with SPI_SCLK of RiBUS</li></ul>                                                       |         |
| 1.5     | 2023-08-23 | Corrected the name of pin 31 on expansion connector to PI8                                                                                                                                                                                                                                                                                                                                                                 |         |
| 1.6     | 2024-07-05 | Updated the PCB laminate to 1.6, for details refer to changelog.                                                                                                                                                                                                                                                                                                                                                           |         |



## 2. CONTENTS

|                                                                |    |
|----------------------------------------------------------------|----|
| 1. REVISION RECORD.....                                        | 2  |
| 2. CONTENTS.....                                               | 3  |
| 3. MODULE CLASSIFICATION INFORMATION.....                      | 4  |
| 4. MODULE DRAWING.....                                         | 5  |
| 5. ABSOLUTE MAXIMUM RATINGS.....                               | 6  |
| 6. ELECTRICAL CHARACTERISTICS.....                             | 6  |
| 7. BACKLIGHT ELECTRICAL CHARACTERISTICS.....                   | 7  |
| 8. ELECTRO-OPTICAL CHARACTERISTICS.....                        | 7  |
| 9. BOARD INTERFACES AND CONNECTORS.....                        | 9  |
| 9.1 Power input connector.....                                 | 9  |
| 9.2 USB interface.....                                         | 10 |
| 9.3 RS485 interface.....                                       | 10 |
| 9.4 RS232 interface.....                                       | 10 |
| 9.5 2 x CAN FD interfaces.....                                 | 11 |
| 9.6 Haptic feedback connector.....                             | 11 |
| 9.7 SWD (Serial Wire Debug) connector.....                     | 11 |
| 9.8 RiBUS.....                                                 | 12 |
| 9.9 Expansion connector.....                                   | 13 |
| 9.10 Micro SD slot.....                                        | 14 |
| 9.11 2 x 20-pin, 1.27 mm pin sockets for POE Add-on Board..... | 14 |
| 9.12 Battery coin cell holder.....                             | 14 |
| 10. USER INTERFACES.....                                       | 15 |
| 10.1 3 x push buttons.....                                     | 15 |
| 10.2 3 x LEDs.....                                             | 15 |
| 11. DISPLAY SPECIFICATION.....                                 | 16 |
| 11.1 TFT resolution.....                                       | 16 |
| 11.2 Full TFT specification.....                               | 16 |
| 12. INSPECTION.....                                            | 16 |
| 12.1 Inspection condition.....                                 | 16 |
| 12.2 Inspection standard.....                                  | 17 |
| 13. RELIABILITY TEST.....                                      | 18 |
| 14. LEGAL INFORMATION.....                                     | 19 |

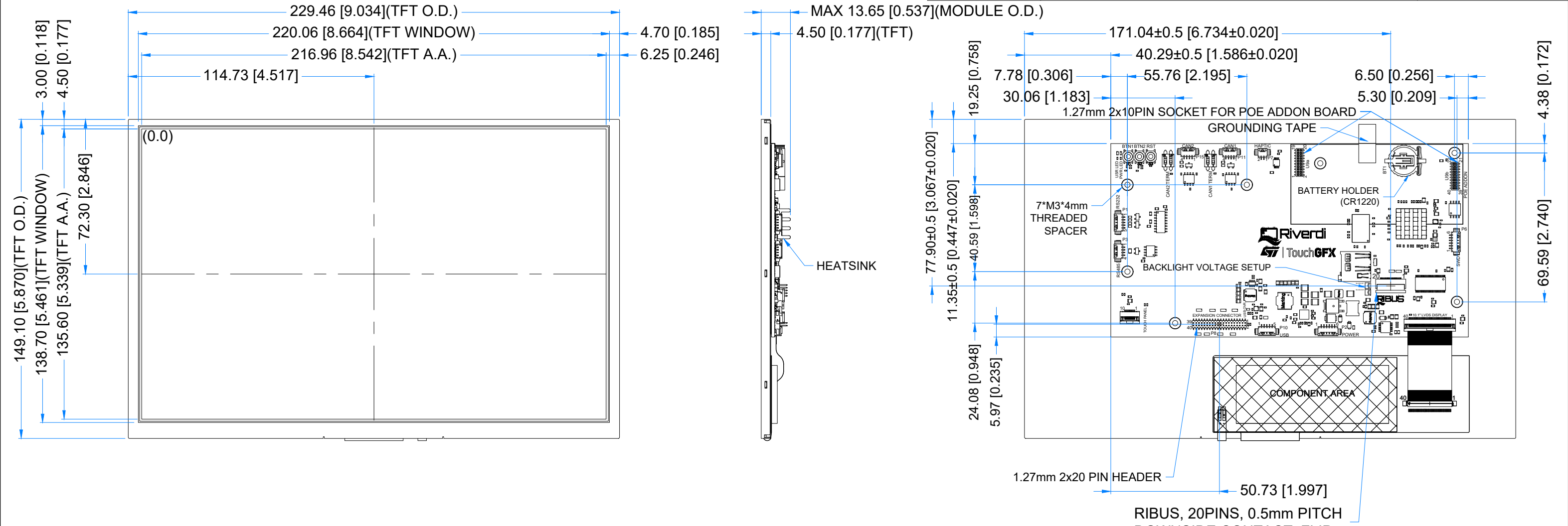


### 3. MODULE CLASSIFICATION INFORMATION

| RV | T  | 101 | H  | V  | S  | N  | W  | N  | 00  |
|----|----|-----|----|----|----|----|----|----|-----|
| 1. | 2. | 3.  | 4. | 5. | 6. | 7. | 8. | 9. | 10. |

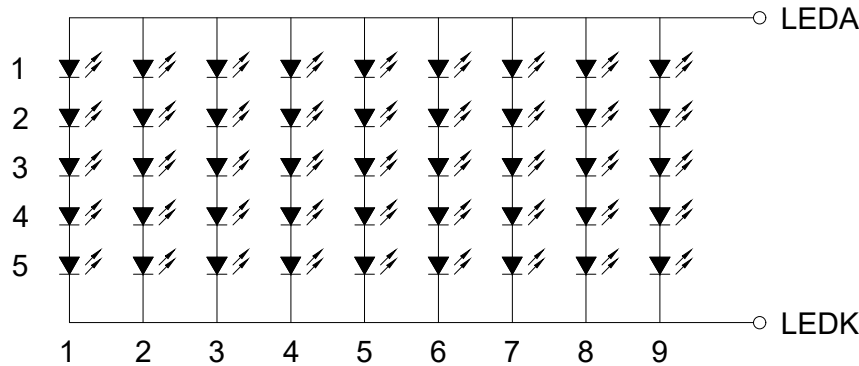
| NO. | PARAMETER         | SYMBOL                                         |
|-----|-------------------|------------------------------------------------|
| 1.  | BRAND             | RV – Riverdi                                   |
| 2.  | PRODUCT TYPE      | T – TFT Standard                               |
| 3.  | DISPLAY SIZE      | 101 – 10.1"                                    |
| 4.  | MODEL SERIAL NO.  | H – High Brightness, IPS TFT.                  |
| 5.  | RESOLUTION        | V – 1280 x 800 px                              |
| 6.  | LCD+CONTROL BOARD | S –STM32 Embedded Display<br>MCU STM32H757XIH6 |
| 7.  | FRAME             | N – Without Mounting Metal Frame               |
| 8.  | BACKLIGHT TYPE    | W – LED White                                  |
| 9.  | TOUCH PANEL       | N – Without Touch Panel                        |
| 10. | VERSION           | 00 – (00-99)                                   |

| Revision: | Changes:                             | Date:      |
|-----------|--------------------------------------|------------|
| 1.0       | Initial Case                         | 2022.01.11 |
| 1.1       | PCB Update And Adding Grounding Tape | 2022.07.06 |
| 1.2       | PCB Update - 101STM32H7_Rev1.4       | 2023.03.06 |
| 1.3       | PCB Update - 101STM32H7_Rev1.6       | 2024.07.05 |



| 1.25 MM MOLEX CONNECTORS |            |            |
|--------------------------|------------|------------|
| NO.                      | TYPE       | MATE WITH  |
| P1 (RS232)               | 53261-0571 | 51021-0500 |
| P2 (POWER)               | 53261-0671 | 51021-0600 |
| P3 (RS485)               | 53261-0471 | 51021-0400 |
| P6 (SWD)                 | 53261-0671 | 51021-0600 |
| P7 (HAPTIC)              | 53261-0271 | 51021-0200 |
| P10 (USB)                | 53261-0571 | 51021-0500 |
| P11 (CAN1)               | 53261-0471 | 51021-0400 |
| P15 (CAN2)               | 53261-0471 | 51021-0400 |

| 1.27MM PIN HEADER AND SOCKET |                |                               |
|------------------------------|----------------|-------------------------------|
| NO.                          | TYPE           | MATE WITH                     |
| P8                           | CH51402M100-0P | CBC1402D100 OR CBC1402M100-2P |
| U9a & U9b                    | PBHTD20SPP-JL  | CH51202V100 OR CH51202M100-0P |



|                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                             |                        |        |                                                                                       |        |                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------|---------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------|
| <b>LCD NOTES:</b><br>1. LCD TYPE: TRANSMISSIVE, NORMALLY BLACK, IPS<br>2. RESOLUTION: 1280x800<br>3. VIEWING ANGLE: FREE<br>4. SURFACE LUMINANCE: 1000cd/m^2<br>5. MCU ON THE BOARD: STM32H757XIH6<br>6. EXTERNAL FLASH MEMORY SIZE:512Mbit<br>7. EXTERNAL SDRAM SIZE:64Mbit (32-bit access)<br>8. SUPPLY VOLTAGE FOR MODULE: 6.0V - 48.0V | <b>GENERAL NOTES:</b><br>1. ZERO BAD PIXELS FOR TFT<br>2. OPERATING TEMPERATURE: -20°C ~ 70°C<br>3. STORAGE TEMPERATURE: -30°C ~ 80°C<br>4. WITHOUT INDIVIDUAL TOLERANCE:<br>±0.3mm[0.012inch]<br>5. TOLERANCE OF PCB PLACEMENT:<br>±0.5mm[0.020inch]<br>6. RoHS3 COMPLIANT |                        |        |  |        |                                                                                       |
|                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                             | PN: RVT101HVSNWN00     |        |                                                                                       |        |                                                                                       |
|                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                             | SN:                    |        |                                                                                       |        |                                                                                       |
|                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                             | DRAWN: M.Natywa        |        | 2024.07.05                                                                            | 1:1.76 |  |
|                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                             | CHECKED: M.Wierzbowski |        | 2024.07.05                                                                            | [mm]   |                                                                                       |
| APPR: T.Soldat                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                             | 2024.07.05             | ISO A3 | P. 1 of 1                                                                             |        |                                                                                       |

## 5. ABSOLUTE MAXIMUM RATINGS

| PARAMETER                               | SYMBOL          | MIN  | MAX  | UNIT | NOTE      |
|-----------------------------------------|-----------------|------|------|------|-----------|
| Supply Voltage for Module               | VDD             | 0    | 60.0 | V    | Note 1    |
| Digital I/O signals Voltage             | -               | -0.5 | 3.3  |      | Note 1, 2 |
| Operating Temperature                   | T <sub>OP</sub> | -20  | 70   | °C   |           |
| Storage Temperature                     | T <sub>ST</sub> | -30  | 80   | °C   |           |
| Storage Humidity (@ 25 ± 5°C)           | H <sub>ST</sub> | 10   | -    | % RH |           |
| Operating Ambient Humidity (@ 25 ± 5°C) | H <sub>OP</sub> | 10   | -    | % RH |           |

**Note 1.** Exceeding maximum values may cause improper operation or permanent damage to the unit.

**Note 2.** Most of the GPIOs have the 5.0 V tolerant input voltage, please refer to the datasheet of STM32H757XIH6 for more details.

## 6. ELECTRICAL CHARACTERISTICS

| PARAMETER                 | SYMBOL          | MIN | TYP  | MAX    | UNIT | NOTE   |
|---------------------------|-----------------|-----|------|--------|------|--------|
| Supply Voltage for Module | VDD_IN          | 6.0 | 12.0 | 48.0   | V    |        |
| Power Enable Voltage      | VEN             | 0   | -    | VDD_IN | V    | Note 1 |
| Input Voltage "H" Level   | V <sub>IH</sub> | 2.0 | -    | 3.3    | V    |        |
| Input Voltage "L" Level   | V <sub>IL</sub> | 0   | -    | 0.8    | V    |        |

| PARAMETER                        | CONDITION               | SYMBOL              | MIN | TYP | MAX  | UNIT |
|----------------------------------|-------------------------|---------------------|-----|-----|------|------|
| Current Drawn from VDD_IN @6.0V  | POWER<br>'ENABLE' = '0' | I <sub>VDD_IN</sub> | 60  |     |      | uA   |
| Current Drawn from VDD_IN @12.0V |                         |                     | 155 |     |      |      |
| Current Drawn from VDD_IN @24.0V |                         |                     | 395 |     |      |      |
| Current Drawn from VDD_IN @36.0V |                         |                     | 640 |     |      |      |
| Current Drawn from VDD_IN @48.0V |                         |                     | 880 |     |      |      |
| Current Drawn from VDD_IN @6.0V  | POWER<br>'ENABLE' = '1' | I <sub>VDD_IN</sub> | 351 | 844 | 1490 | mA   |
| Current Drawn from VDD_IN @12.0V |                         |                     | 190 | 420 | 710  |      |
| Current Drawn from VDD_IN @24.0V |                         |                     | 104 | 223 | 365  |      |
| Current Drawn from VDD_IN @36.0V |                         |                     | 73  | 159 | 255  |      |
| Current Drawn from VDD_IN @48.0V |                         |                     | 59  | 126 | 200  |      |

**Note 1.** POWER 'ENABLE' refers to pin 4, 'ENABLE' of the power input connector(P2).

POWER 'ENABLE' = '1' is when EN pin is floating or shorted to VDD\_IN.

POWER 'ENABLE' = '0' is when EN pin is shorted to GND.

By default, POWER 'ENABLE' is set to "1".

**Note 2.** MIN current was measured with BL brightness set to 1%,  
TYP current was measured with BL brightness set to 50%,  
MAX current was measured with BL brightness set to 100%.



## 7. BACKLIGHT ELECTRICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP    | MAX | UNIT  | NOTE   |
|-----------|--------|-----|--------|-----|-------|--------|
| Lifetime  | -      | -   | 50,000 | -   | hours | Note 1 |

**Note 1.** Operating life means the period in which the LED brightness goes down to 50% of the initial brightness. Typical operating lifetime is the estimated parameter.

## 8. ELECTRO-OPTICAL CHARACTERISTICS

| ITEM                    | SYMBOL            | CONDITION                                                    | MIN  | TYP  | MAX  | UNIT              | RMK    | NOTE |
|-------------------------|-------------------|--------------------------------------------------------------|------|------|------|-------------------|--------|------|
| Response Time           | Tr+Tf             | $\theta=0^\circ$<br>$\phi=0^\circ$<br>$T_a=25^\circ\text{C}$ | -    | 25   | 35   | ms                | FIG 1. | 4    |
| Contrast Ratio          | Cr                |                                                              | 800  | 1000 | -    | ---               | FIG 2. | 1    |
| Luminance Uniformity    | $\delta$<br>WHITE |                                                              | -    | 75   | -    | %                 | FIG 2. | 3    |
| Surface Luminance       | Lv                |                                                              | -    | 1000 | -    | cd/m <sup>2</sup> | FIG 2. | 2    |
| Viewing Angle Range     | $\theta$          | $\phi = 90^\circ$                                            | 75   | 85   | -    | deg               | FIG 3. | 6    |
|                         |                   | $\phi = 270^\circ$                                           | 75   | 85   | -    | deg               | FIG 3. |      |
|                         |                   | $\phi = 0^\circ$                                             | 75   | 85   | -    | deg               | FIG 3. |      |
|                         |                   | $\phi = 180^\circ$                                           | 75   | 85   | -    | deg               | FIG 3. |      |
| CIE (x, y) Chromaticity | Rx                | $\theta=0^\circ$<br>$\phi=0^\circ$<br>$T_a=25^\circ\text{C}$ | 0.22 | 0.26 | 0.30 | -                 | FIG 2. | 5    |
|                         | Ry                |                                                              | 0.20 | 0.24 | 0.28 | -                 |        |      |
|                         | Gx                |                                                              | 0.34 | 0.38 | 0.42 | -                 |        |      |
|                         | Gy                |                                                              | 0.50 | 0.54 | 0.58 | -                 |        |      |
|                         | Bx                |                                                              | 0.10 | 0.14 | 0.18 | -                 |        |      |
|                         | By                |                                                              | 0.09 | 0.13 | 0.17 | -                 |        |      |
|                         | Wx                |                                                              | 0.28 | 0.32 | 0.36 | -                 |        |      |
|                         | Wy                |                                                              | 0.29 | 0.33 | 0.37 | -                 |        |      |

**Note 1.** Contrast Ratio (CR) is defined mathematically as below, for more information see Figure 2.

$$\text{Contrast Ratio} = \frac{\text{Average Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}{\text{Average Surface Luminance with all black pixels (P1, P2, P3, P4, P5)}}$$

**Note 2.** Surface luminance is the LCD surface from the surface with all pixels displaying white. For more information see Figure 2.

$$L_v = \text{Average Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}$$

**Note 3.** The uniformity in surface luminance  $\delta$  WHITE is determined by measuring luminance at each test position 1 through 5, and then dividing the minimum luminance of 5 points luminance by maximum luminance of 5 points luminance. For more information see Figure 2.

$$\delta \text{ WHITE} = \frac{\text{Minimum Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}{\text{Maximum Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}$$

**Note 4.** Response time is the time required for the display to transition from white to black (Rise Time, Tr) and from black to white (Decay Time, Tf). For additional information see Figure 1. The test equipment is BM-7A.

**Note 5.** CIE (x, y) chromaticity, the x, y value is determined by measuring luminance at each test position 1 through 5, and then calculating the average value.

**Note 6.** Viewing angle is the angle at which the contrast ratio is greater than 2. For TFT module the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to LCD surface. For more information see Figure 3.

**Note 7.** For viewing angle and response time testing, the testing data is based on Autronic-Melchers's ConoScope series. Instruments for Contrast Ratio, Surface Luminance, Luminance Uniformity, CIE the test data is based on TOPCON's BM-5 photo detector.

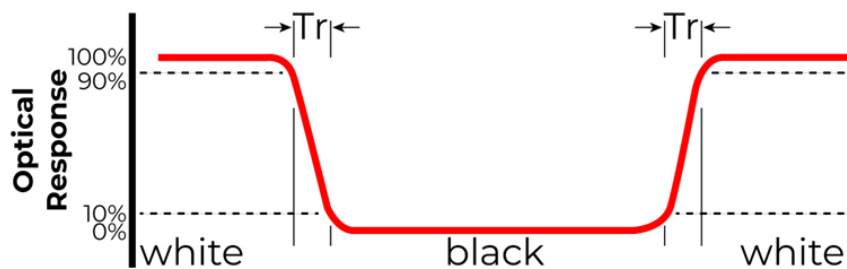


Figure 2. The definition of response time

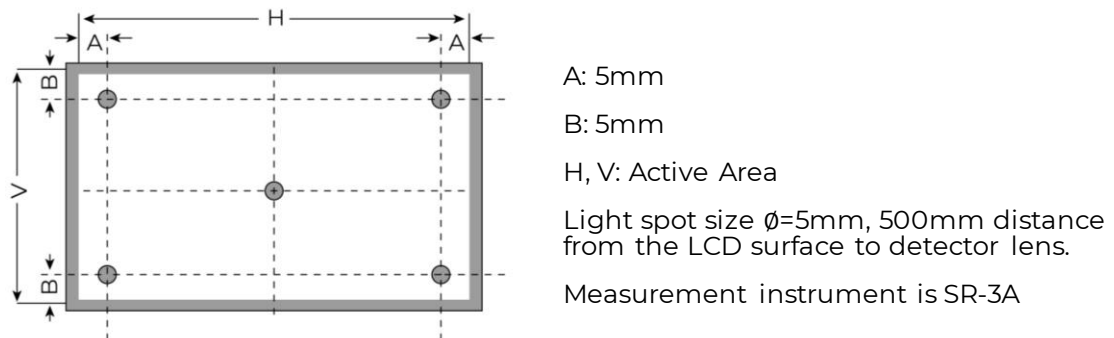


Figure 3. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity

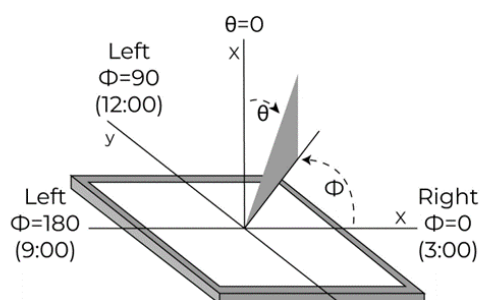
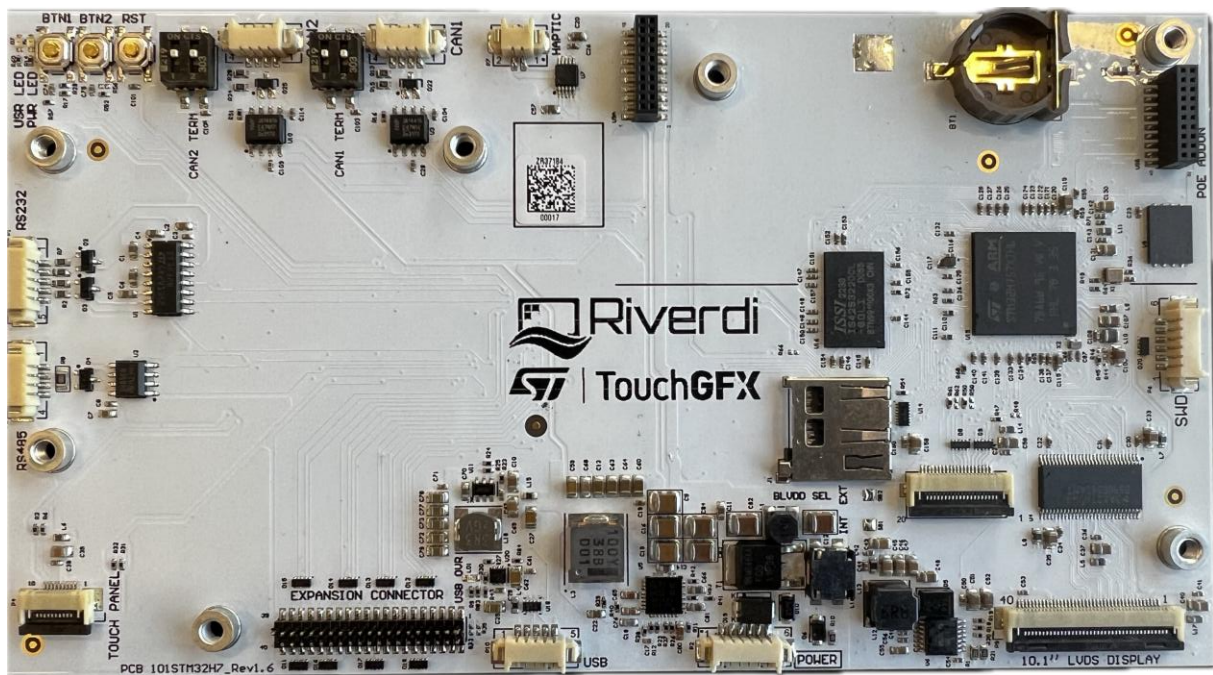


Figure 4. The definition of viewing angle

## 9. BOARD INTERFACES AND CONNECTORS



### 9.1 Power input connector

The 1.25mm, 6-pin Molex connector labeled as “POWER’ (P2) is power input connector.

There is an internal reverse polarity protection which ensures that the device is not damaged if the power supply polarity is reversed.

| NO. | PIN    | DESCRIPTION                   | NOTE   |
|-----|--------|-------------------------------|--------|
| 1   | VDD_IN | Power supply input; 6.0-48.0V | Note 1 |
| 2   | VDD_IN | Power supply input; 6.0-48.0V |        |
| 3   | VDD_IN | Power supply input; 6.0-48.0V |        |
| 4   | ENABLE | Enable/ Disable power supply  | Note 2 |
| 5   | GND    | Ground                        |        |
| 6   | GND    | Ground                        |        |

**Note 1.** STM32 Embedded Display allows to directly connect one additional display to the system. There is RiBUS connector on the board where you can connect any of intelligent display from Riverdi based on EVE4 (BT817Q). However, please note that it may change power supply requirement and please see chapter **9.8** for detailed info.

**Note 2.** Pin “ENABLE” is internally pulled up to VDD\_IN. To enable the device, please keep EN pin floating or short it to pin” VDD\_IN”. To disable the device, short EN pin to GND.

**Note 3.** Matched Riverdi power supply cable: RVA-0106M-1.25FF-1



## 9.2 USB interface

The 1.25mm, 5-pin Molex connector labeled as "USB" (P10) is USB interface.

| NO. | PIN     | DESCRIPTION                     | NOTE   |
|-----|---------|---------------------------------|--------|
| 1   | VCC_USB | Power supply                    | Note 1 |
| 2   | D-      | USB data-                       |        |
| 3   | D+      | USB data+                       |        |
| 4   | ID      | USB OTG ID; Host /Device detect | Note 2 |
| 5   | GND     | Ground                          |        |

**Note 1.** The maximum current drawn from VCC\_USB is 500mA.

Pin PG3 of the MCU is dedicated to detecting USB over-current or short-circuit conditions. If a USB over-current or short-circuit condition occurs, the LED 'USB OVR' will emit.

Please note that Pin PG3 of MCU is shared by both USB over-current (connected through R50 by default) and RiBUS GPIO.0 (connected through R58, which is not mounted by default.)

**Note 2.** Configuration of the USB Host/Device mode:

**Host Mode:** Pin 4 (ID) should be connected to GND.

In this mode, it can provide +5V output voltage to the connected USB device and Max output current 500 mA.

**Device Mode:** Pin 4 (ID) should be not connected (floating).

**Note 3.** Matched Riverdi cable accessory: RVA-0105M-1.25FF

## 9.3 RS485 interface

The 1.25mm, 4-pin Molex connector labeled as "RS485" (P3) is RS485 interface.

| NO. | PIN    | DESCRIPTION                                                  | NOTE   |
|-----|--------|--------------------------------------------------------------|--------|
| 1   | VDD_IN | Power supply input; 6.0-48.0V                                | Note 2 |
| 2   | A      | Non-inverting receiver input and non-inverting driver output |        |
| 3   | B      | Inverting receiver input and inverting driver output         |        |
| 4   | GND    | Ground                                                       |        |

**Note 1.** Matched Riverdi cable accessory: RVA-0104M-1.25FF

**Note 2.** VDD\_IN is internally connected with Power connector

## 9.4 RS232 interface

The 1.25mm, 5-pin Molex connector labeled as "RS232" is RS232 interface.

| NO. | PIN | DESCRIPTION     | NOTE |
|-----|-----|-----------------|------|
| 1   | RTS | Request to send |      |
| 2   | CTS | Clear to send   |      |
| 3   | TXD | Transmit Data   |      |
| 4   | RXD | Receive Data    |      |
| 5   | GND | Ground          |      |

**Note.** Matched Riverdi cable accessory: RVA-0105M-1.25FF



## 9.5 2 x CAN FD interfaces

The main board supports 2 channels of the CANFD (Control Area Network Flexible Data-Rate) communication bus, based on the high-speed (2.5-8.0Mbps) CAN transceiver.

2 pcs of 1.25mm, 4-pin Molex connectors labeled as “CAN1” (P11) and “CAN2” (P15) are respectively interfaces of CAN FD1 and CAN FD2.

| NO. | PIN    | DESCRIPTION                      | NOTE |
|-----|--------|----------------------------------|------|
| 1   | GND    | Ground                           |      |
| 2   | CAN_L  | CAN Low-Level Voltage            |      |
| 3   | CAN_H  | CAN High-Level Voltage           |      |
| 4   | VDD_IN | Power supply input; 6.0 – 48.0 V |      |

**Note 1.** Matched Riverdi cable accessory: RVA-0104M-1.25FF

**Note 2.** To enable the Wake-Up functionality of the CAN FD1 transceiver (TCAN1044A-Q1), a 0-ohm resistor (R66, size 0402) needs to be mounted to connect the RXD pin of the CAN FD1 transceiver to the PI8 pin of the MCU.

Please note that pin 31 of the expansion connector should not be used, as it is also connected to the PI8 pin of the MCU.

Additionally, the standby pin of CAN FD1 transceiver is connected to the PB1 pin of the MCU.

## 9.6 Haptic feedback connector

The 1.25mm, 2-pin Molex connector labeled as “HAPTIC” (P7) is haptic feedback connector.

Haptic feedback P7 is used to connect with the haptic motor directly.

| NO. | PIN  | DESCRIPTION                                | NOTE   |
|-----|------|--------------------------------------------|--------|
| 1   | OUT- | Negative haptic driver differential output | Note 1 |
| 2   | OUT+ | Positive haptic driver differential output |        |

**Note 1.** The haptic driver DRV2605L is controlled directly by I2C protocol.

**Note 2.** Matched Riverdi cable accessory: RVA-0102M-1.25FF

## 9.7 SWD (Serial Wire Debug) connector

The 1.25mm, 6-pin Molex connector labeled as “SWD” (P6) is SWD interface, which is used for programing the MCU on board.

| NO. | PIN       | DESCRIPTION                         | NOTE   |
|-----|-----------|-------------------------------------|--------|
| 1   | VCC_+3.3V | Power input                         |        |
| 2   | SW_CLK    | Serial wire clock                   |        |
| 3   | GND       | Ground                              |        |
| 4   | SW_DIO    | Serial wire debug data input/output |        |
| 5   | RST       | Reset; Active low                   |        |
| 6   | SWO       | Serial wire trace output            | Note 2 |

**Note 1.** Riverdi ST-LINK/V2 SWD programing cable: RVA-SWD-06M-C100

**Note 2.** SWO is muxed with SPI\_SCLK of RiBUS. By default, SWO is disconnected.

To enable it, please remove R47 and short R48.



## 9.8 RiBUS

Any size of the Riverdi EVE4 series display can be connected through RiBUS to act as a slave module to the mainboard.

| NO. | PIN         | DESCRIPTION                                                              | NOTE   |
|-----|-------------|--------------------------------------------------------------------------|--------|
| 1   | VCC_+3.3V   | Supply voltage for module; TYP3.3V                                       |        |
| 2   | GND         | Ground                                                                   |        |
| 3   | SPI_SCLK    | SPI SCK signal                                                           |        |
| 4   | MISO/ IO.1  | SPI MISO signal / SPI Quad mode: SPI data line 1                         |        |
| 5   | MOSI/ IO.0  | SPI MOSI signal / SPI Quad mode: SPI data line 0                         |        |
| 6   | CS          | SPI chips select signal                                                  |        |
| 7   | INT         | Interrupt signal from device to the system, Active Low                   |        |
| 8   | RST/PD      | Reset / Power down signal, Active Low,                                   |        |
| 9   | GPIO.0      | GPIO.0                                                                   | Note 2 |
| 10  | DISP_AUDIO  | Display audio in/out                                                     |        |
| 11  | GPIO.1/IO.2 | SPI Single/Dual mode: General purpose IO0.<br>QSPI mode: SPI data line 2 | Note 3 |
| 12  | GPIO.2/IO.3 | SPI Single/Dual mode: General purpose IO1.<br>QSPI mode: SPI data line 3 |        |
| 13  | NC          | Not connected                                                            |        |
| 14  | NC          | Not connected                                                            |        |
| 15  | NC          | Not connected                                                            |        |
| 16  | NC          | Not connected                                                            |        |
| 17  | BLVDD       | Supply voltage for backlight                                             | Note 4 |
| 18  | BLVDD       | Supply voltage for backlight                                             |        |
| 19  | BLGND       | Backlight Ground, internally connected to GND                            |        |
| 20  | BLGND       | Backlight Ground, internally connected to GND                            |        |

**Note 1.** Matched Riverdi FFC accessory for RiBUS: FFC0520150

**Note 2.** Pin PG3 of MCU is shared by both USB over-current (connected through R50 by default) and RiBUS GPIO.0 (connected through R58, which is not mounted by default.) To use RiBUS GPIO.0, please mount a 0-ohm, size 0402 resistor on R58 and remove R50.

**Note3.** Pin PG7 of MCU is shared by both touch panel reset pin (connected through R61 by default) and RiBUS GPIO.1 (connected through R62, which is not mounted by default.) To use RiBUS GPIO.1, please mount a 0-ohm, size 0402 resistor on R62 and remove R61.

**Note 4.** If any of the Riverdi EVE4 display series (3.5", 4.3", 5.0", or 7.0") is connected through RiBUS, the power supply voltage VDD\_IN should be between 6.0V-48.0V. To set up the backlight voltage (BLVDD) at 5.0V, short the pads of the solder bridge labeled 'BLVDD INT'.

If any of the Riverdi EVE4 10.1" display series is connected through RiBUS, the power supply voltage VDD\_IN must range between 7.0V-14.0V. To set up the backlight voltage (BLVDD) between 7.0V-14.0V, short the pads of the solder bridge labeled 'BLVDD EXT'

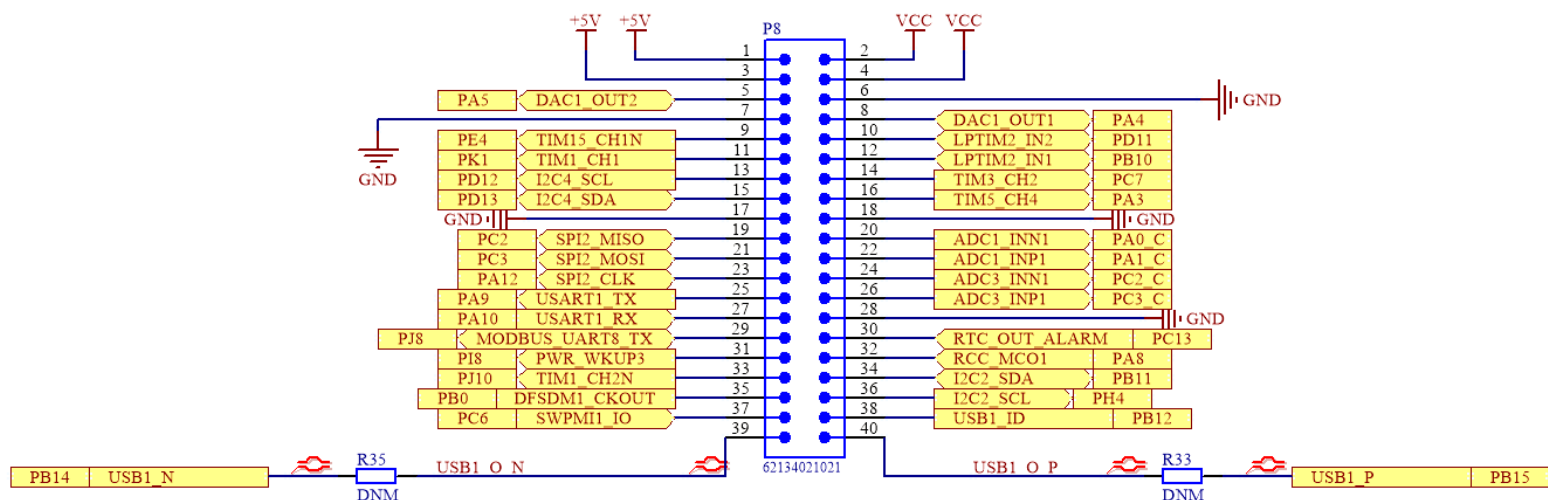
## 9.9 Expansion connector

The main board has one 1.27mm, 40-pin expansion pin header which is labeled as "EXPANSION CONNECTOR",

It provides direct access to below GPIOs of MCU STM32H757XIH6, which make it possible to easily extend a daughterboard for a specific application.

- 2 x I<sup>2</sup>C
- 1 x UART
- 1 x USART
- 1 x SPI
- 1 x USB
- 7 x PWMs
- 2 x DACs (Digital-to-analog)
- 2 x ADCs (Analog-to-digital)

Each of the GPIO pins can be configured by software as output (push-pull or open-drain, with or without pull-up or pull-down), as input (floating, with or without pull-up or pull-down) or as peripheral alternate function. Most of the GPIO pins are shared with digital or analog alternate functions. Please refer to the datasheet of MCU STM32H757XIH6 for more details.



| I/O/P | PIN NAME | NO. | NO. | PIN NAME  | I/O/P |
|-------|----------|-----|-----|-----------|-------|
| P     | VCC_+5V  | 1   | 2   | VCC_+3.3V | P     |
| P     | VCC_+5V  | 3   | 4   | VCC_+3.3V | P     |
| I/O   | PA5      | 5   | 6   | GND       | P     |
| P     | GND      | 7   | 8   | PA4       | I/O   |
| I/O   | PE4      | 9   | 10  | PD11      | I/O   |
| I/O   | PK1      | 11  | 12  | PB10      | I/O   |
| I/O   | PD12     | 13  | 14  | PC7       | I/O   |
| I/O   | PD13     | 15  | 16  | PA3       | I/O   |
| P     | GND      | 17  | 18  | GND       | P     |
| I/O   | PC2      | 19  | 20  | PA0_C     | I/O   |
| I/O   | PC3      | 21  | 22  | PA1_C     | I/O   |
| I/O   | PA12     | 23  | 24  | PC2_C     | I/O   |



|     |      |    |    |       |     |
|-----|------|----|----|-------|-----|
| I/O | PA9  | 25 | 26 | PC3_C | I/O |
| I/O | PA10 | 27 | 28 | GND   | P   |
| I/O | PJ8  | 29 | 30 | PC13  | I/O |
| I/O | PI8  | 31 | 32 | PA8   | I/O |
| I/O | PJ10 | 33 | 34 | PB11  | I/O |
| I/O | PB0  | 35 | 36 | PH4   | I/O |
| I/O | PC6  | 37 | 38 | PB12  | I/O |
| I/O | PB14 | 39 | 40 | PB15  | I/O |

**Note 1.** The total output current  $I_{@5.0V}$  from pin 1 and pin3 is maximum 1A.

The total output current  $I_{@3.3V}$  from pin 2 and pin 4 is maximum 500mA.

**Note 2.** The 'USR LED' is connected to pin 33, PJ10, of the expansion connector.

By default, the resistor R60, (0402, 1k ohms) is soldered. Please remove R60 to use GPIO channel PJ10.

**Note 3.** Push button BTN1(S1) is connected to pin 37, PC6 of expansion connector.

To use GPIO channel PC6, R57 should be removed.

Please refer to the schematic of chapter subchapter 10.1.

## 9.10 Micro SD slot

The mainboard is equipped with Micro-SD slot, which supports all types of Micro SD cards.

## 9.11 2 x 20-pin, 1.27 mm pin sockets for POE Add-on Board

The 2 x 20-pin, 1.27 mm, pin sockets, labeled as U9a and U9b, are used to connect the Riverdi POE Add-on Board.

The Riverdi POE Add-on Board features 10/100M Ethernet Port with Power-Over-Ethernet enabled. It allows you to power the module through the Ethernet port.

**Note.** The Riverdi POE Add-on Board is offered as an accessory.

## 9.12 Battery coin cell holder

The battery coin cell, labeled as BT1, is suitable for CR1220 (Ø12.5 x 2.0mm) Coin Cell Batteries.

The BT1 is connected to the VBAT pin of STM32H757XIH6, which allows to retain the content of the backup registers, SDRAM, and to keep running RTC when the VDD is turned off and unplugged.

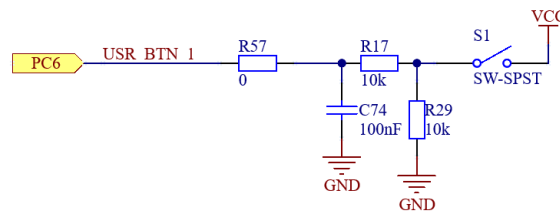
## 10. USER INTERFACES

### 10.1 3 x push buttons

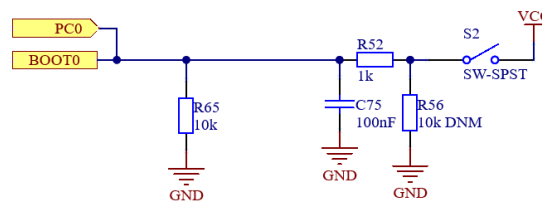
Push button labeled as “RST” is used to “RESET” the module.

Another 2 push buttons labeled as BTN1, BTN2 are for user’s development.

- BTN1(S1) is connected to pin 37, PC6, of the expansion connector. To use GPIO channel PC6 on expansion connector, R57 (0402, 0 ohm) should be removed.



- BTN2(S2) is connected to both PC0 and BOOT0 of MCU.



### 10.2 3 x LEDs

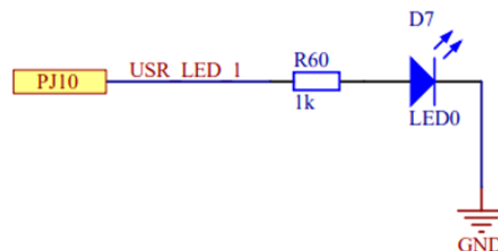
1 x LED, labeled as ‘PWR LED’, emits green light when the modules is powered.

1 x LED, labeled as ‘USB OVR’, emits red light when VCC\_USB pin overcurrent occurs.

1 x LED, labeled as ‘USR LED’, is for user’s development.

- The ‘USR LED’ is connected to pin 33, PJ10, of the expansion connector.

By default, the resistor R60, (0402, 1k ohms) is soldered. Please remove R60 to use GPIO channel PJ10.



## 11. DISPLAY SEPCIFICATION

### 11.1 TFT resolution

The supported resolution of the display in this module is 1280\*800.

### 11.2 Full TFT specification

For detailed information on the display, please refer to datasheet of display RVT101HVLNWN00.

## 12. INSPECTION

Standard acceptance/rejection criteria for TFT module

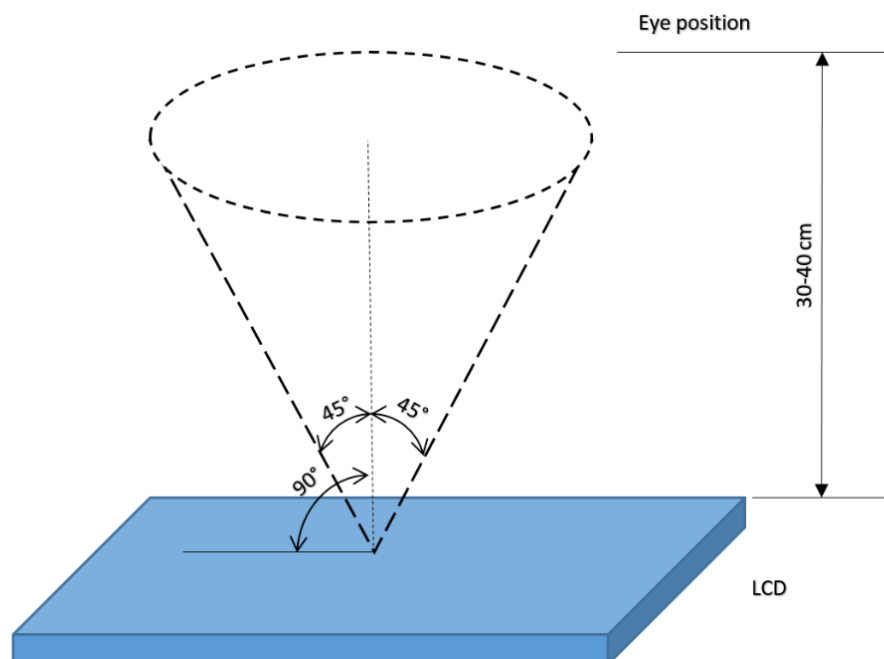
### 12.1 Inspection condition

Ambient conditions:

- Temperature:  $25 \pm 2^{\circ}\text{C}$
- Humidity:  $(60 \pm 10) \% \text{RH}$
- Illumination: Single fluorescent lamp non-directive (300 to 700 lux)

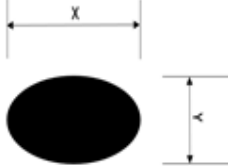
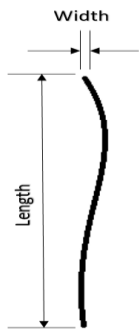
Viewing distance:  $35 \pm 5\text{cm}$  between inspector bare eye and LCD.

Viewing Angle: U/D:  $45^{\circ}/45^{\circ}$ , L/R:  $45^{\circ}/45^{\circ}$



## 12.2 Inspection standard

The LCD TFT has zero bad pixels. Please refer the item "Bright/Dark dots".

| ITEM                                                                               |                                                                                                                            | CRITERION           |                    |               |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------|---------------|
| Black spots,<br>white spots,<br>light leakage,<br>Foreign Particle<br>(round Type) | <br><br>D=(x+y)/2<br>Spots density: 10 mm | Size =10.1"         |                    |               |
|                                                                                    |                                                                                                                            | Average Diameter    |                    | Qualified Qty |
|                                                                                    |                                                                                                                            | D ≤ 0.2 mm          |                    | Ignored       |
|                                                                                    |                                                                                                                            | 0.2 mm < D ≤ 0.3 mm |                    | N≤4           |
|                                                                                    |                                                                                                                            | 0.5mm < D           |                    | N = 0         |
| LCD black spots,<br>white spots,<br>light leakage<br>(line Type)                   | <br><br>Spots density: 10 mm             | Size =10.1"         |                    |               |
|                                                                                    |                                                                                                                            | Length              | Width              | Qualified Qty |
|                                                                                    |                                                                                                                            | -                   | W ≤ 0.05           | Ignored       |
|                                                                                    |                                                                                                                            | L ≤ 5.0             | 0.05< W ≤ 0.1      | N ≤ 3         |
|                                                                                    |                                                                                                                            | 5.0 < L             | 0.10< W<br>5.0 < L | N = 0         |
| Bright/Dark<br>Dots                                                                | Size =10.1"                                                                                                                |                     |                    |               |
|                                                                                    | Item                                                                                                                       |                     | Qualified Qty      |               |
|                                                                                    | Bright dots                                                                                                                |                     | 0                  |               |
|                                                                                    | Dark dots                                                                                                                  |                     | 0                  |               |
|                                                                                    | Cluster Bright Dots or Dark Dots                                                                                           |                     | 0                  |               |
|                                                                                    | Total Bright and Dark Dots                                                                                                 |                     | 0                  |               |
| Clear spots                                                                        | Size ≥ 5"                                                                                                                  |                     |                    |               |
|                                                                                    | Average Diameter                                                                                                           |                     | Qualified Qty      |               |
|                                                                                    | D < 0.2 mm                                                                                                                 |                     | Ignored            |               |
|                                                                                    | 0.2 mm < D < 0.3 mm                                                                                                        |                     | 4                  |               |
|                                                                                    | 0.3 mm < D < 0.5 mm                                                                                                        |                     | 2                  |               |
|                                                                                    | 0.5 mm < D                                                                                                                 |                     | 0                  |               |
|                                                                                    | Spots density: 10 mm                                                                                                       |                     |                    |               |
| Touch panel<br>spot                                                                | Size ≥ 5"                                                                                                                  |                     |                    |               |
|                                                                                    | Average Diameter                                                                                                           |                     | Qualified Qty      |               |
|                                                                                    | D < 0.25 mm                                                                                                                |                     | Ignored            |               |
|                                                                                    | 0.25 mm < D < 0.5 mm                                                                                                       |                     | 4                  |               |
|                                                                                    | 0.5 mm < D                                                                                                                 |                     | 0                  |               |
| Touch panel<br>White line<br>Scratch                                               | Size ≥ 5"                                                                                                                  |                     |                    |               |
|                                                                                    | Length                                                                                                                     | Width               | Qualified Qty      |               |
|                                                                                    | -                                                                                                                          | W < 0.03            | Ignored            |               |
|                                                                                    | L < 5.0                                                                                                                    | 0.03 < W < 0.05     | 2                  |               |
|                                                                                    | -                                                                                                                          | 0.05 < W            | 0                  |               |

### 13. RELIABILITY TEST

| NO. | TEST ITEM                           | TEST CONDITION                                                                                                                       | NOTE   |
|-----|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------|
| 1   | High Temperature Storage            | 80°C/120 hours                                                                                                                       | Note 1 |
| 2   | Low Temperature Storage             | -30°C/120 hours                                                                                                                      |        |
| 3   | High Temperature Operating          | 70 °C /120 hours                                                                                                                     |        |
| 4   | Low Temperature Operating           | -20°C/120 hours                                                                                                                      |        |
| 5   | High Temperature and High Humidity  | Humidity 40°C, 90%RH, 120Hrs                                                                                                         |        |
| 6   | Thermal Cycling Test (No operation) | -20°C for 30min, 70°C for 30 min.<br>100 cycles. Then test at room temperature after 1 hour                                          | Note 2 |
| 7   | Vibration Test                      | Frequency: 10 ÷ 55 Hz.<br>Stroke: 1.5 mm.<br>Sweep: 10Hz ÷ 55Hz ÷ 10 Hz.<br>2 hours for each direction of X, Y, Z<br>(Total 6 hours) |        |
| 8   | Package Drop Test                   | Height: 60 cm<br>1 corner, 3 edges, 6 surfaces                                                                                       |        |

**Note 1.** Sample quantity for each test item is 5 ÷ 10 pcs.

**Note 2.** Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.



## 14. LEGAL INFORMATION

CE marking is usually obligatory only for a complete end product. Riverdi display modules are semi-finished goods which are used as inputs to become part of the finished products.

Therefore, Riverdi display modules are not CE marked.

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