TFT MODULE SPECIFICATION

RVT121HVSFWCA0-B

STM32 EMBEDDED 12.1" DISPLAY DATASHEET

Rev.1.2
2025-02-03

ITEM	CONTENTS	UNIT
LCD Type	TFT/Transmissive/Normally Black/IPS	/
Size	12.1	Inch
Viewing Direction	Free	/
Outside Dimensions (W x H x D)	299.90 x 181.66 x 18.89	mm
Active Area (W x H)	261.12 x 163.20	mm
Pixel Pitch (W x H)	0.204 x 0.204	mm
Resolution	1280 x 800	/
Brightness	850	cd/m^2
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	With Projected Capacitive Touch Panel	/
CTP Driver	ILI2511	/
Bonding Technology	Optical bonding	/
Weight	1222	g

Note 1. RoHS3 compliant

Note 2. LCM weight tolerance: ± 5%.

1. REVISION RECORD

REV NO.	REV DATE	CONTENTS	REMARKS
1.0	2024-03-20	Initial release	
1.1	2024-08-20	Updated the PCB laminate to 1.6, for details refer to changelog.	
1.2	2025-02-03	Drawing update	

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3. MODULE CLASSIFICATION INFORMATION

RV	T	121	H	V	S	F	W	C	A0	B
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.

NO.	PARAMETER	SYMBOL
1.	BRAND	RV – Riverdi
2.	PRODUCT TYPE	T – TFT Standard
3.	DISPLAY SIZE	121 – 12.1”
4.	MODEL SERIAL NO.	H – High Brightness, IPS TFT.
5.	RESOLUTION	V – 1280 x 800 px
6.	LCD+CONTROL BOARD	S –STM32 Embedded Display MCU STM32H757XIH6
7.	FRAME	F – With Mounting Metal Frame
8.	BACKLIGHT TYPE	W – LED White
9.	TOUCH PANEL	C – With Capacitive Touch Panel
10.	PCAP VERSION	A0 – aTouch
11.	BONDING TECHNOLOGY	B – optical bonding

4. ASSEMBLY GUIDE

4.1 Mounting frame

For dimensions 3.5”, 4.3”, 5.0”, 7.0”, 10.1” and 12.1”, the product with mounting frame version is available. Thanks to the four catches attached to the side, frame provides strong assembly to the surface by mounting element (like the screw, see Figure 1). The frames are specially designed to fit Riverdi products perfectly. The diameter of the mounting hole is 3.5mm.

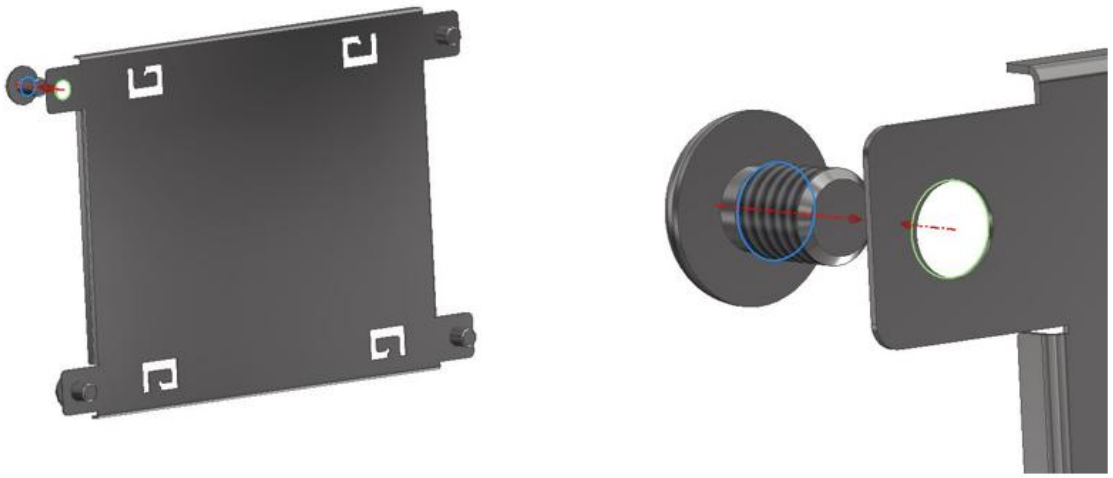
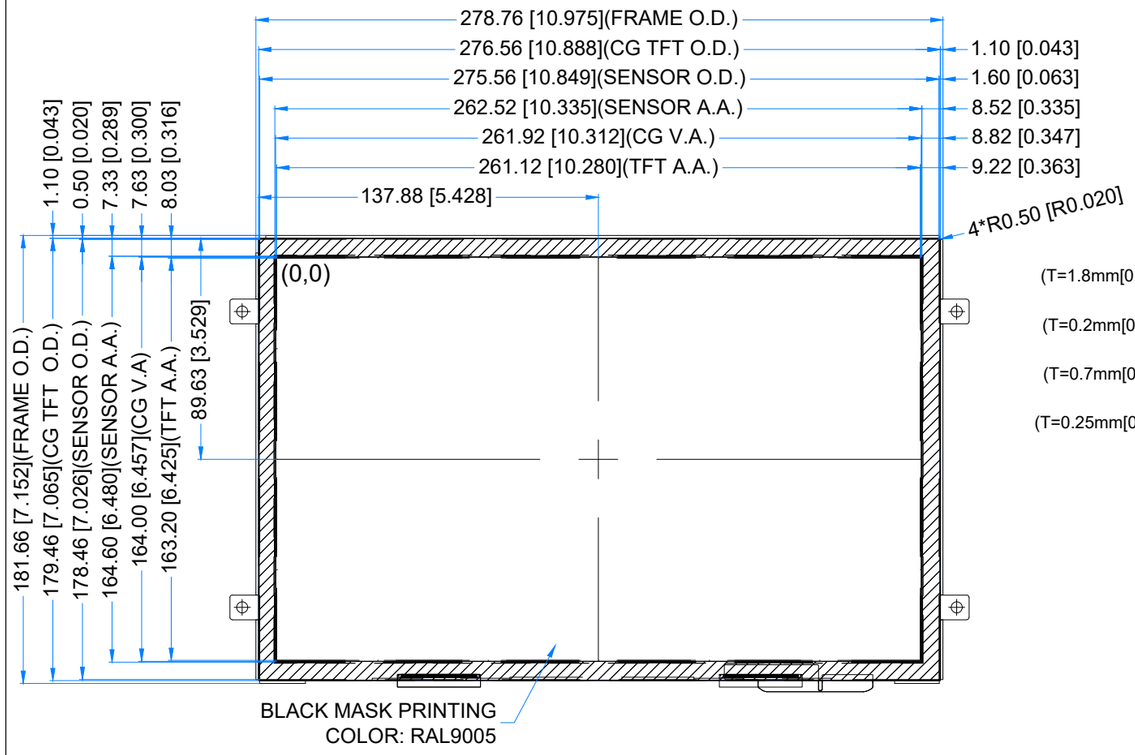
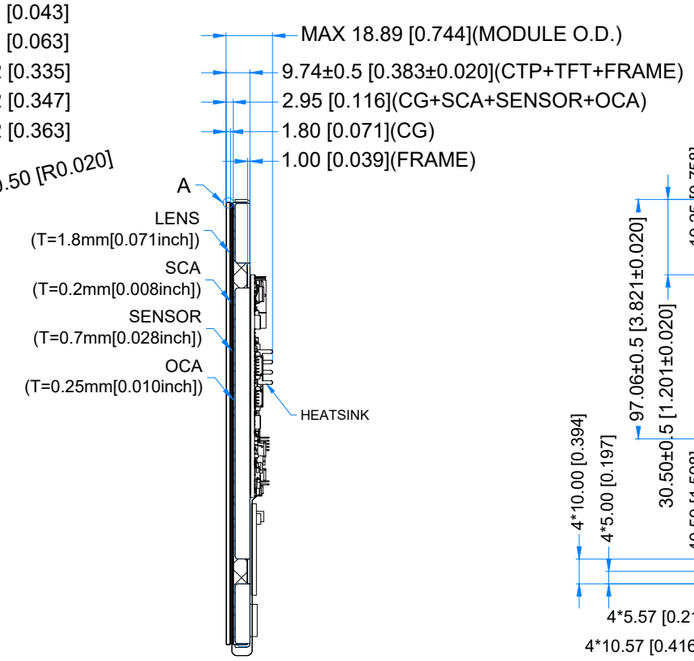
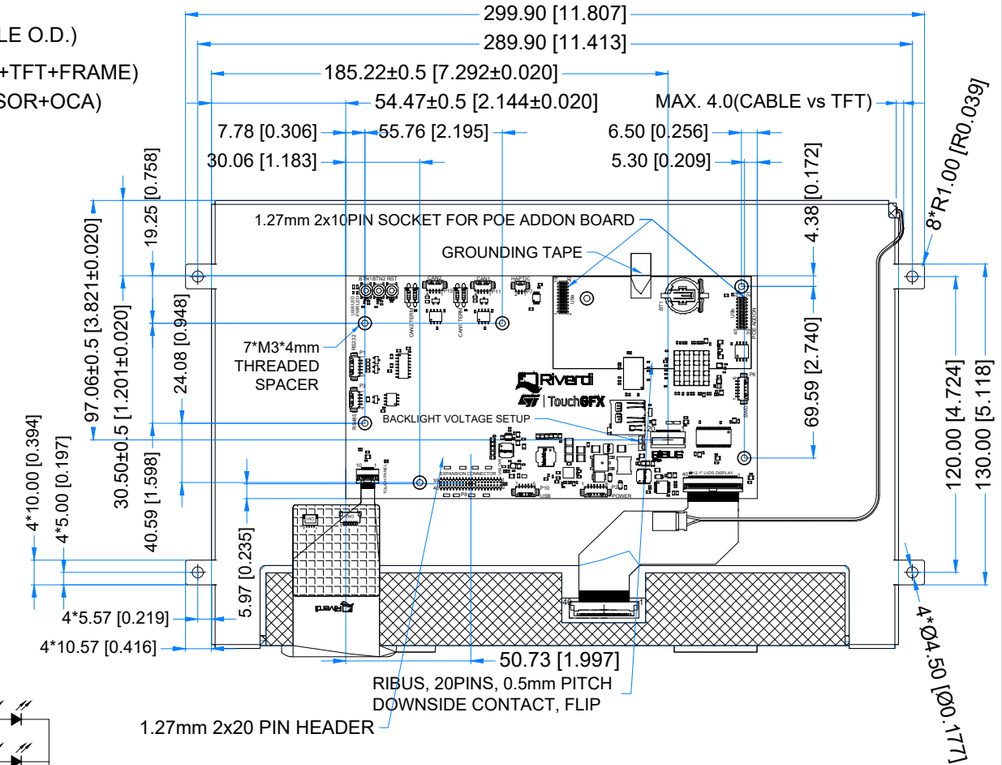


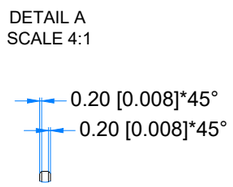
Figure 1. Mounting frame

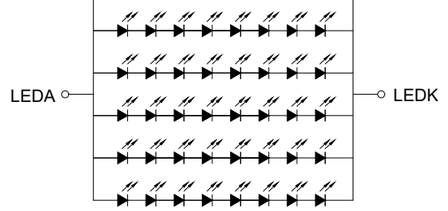
Revision:	Changes:	Date:
1.0	Initial Case	2024.03.18
1.1	PCB Position Update	2024.08.19
1.2	Changed the CG VA dimension	2025.02.03











LED Diagram Circuit

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
P13	62131021021	62200213421 (JUMPER)

LCD NOTES:
1. LCD TYPE: TRANSMISSIVE, NORMALLY BLACK, IPS
2. RESOLUTION: 1280x800
3. VIEWING ANGLE: FREE
4. SURFACE LUMINANCE: 850 cd/m^2
5. MCU ON THE BOARD: STM32H757XIH6
6. EXTERNAL FLASH MEMORY SIZE:512Mbit
7. EXTERNAL SDRAM SIZE:64Mbit (32-bit access)
8. SUPPLY VOLTAGE FOR MODULE: 6.0V - 48.0V

TP NOTES:
1. TP STRUCTURE: G+G
2. CG THICKNESS: 1.80mm
3. SURFACE HARDNESS: 6H
4. DRIVER IC: ILI2511
5. INTERFACE: CONNECTED TO MCU VIA I2C

GENERAL NOTES:
1. OPERATING TEMPERATURE: -20°C ~ 70°C
2. STORAGE TEMPERATURE: -30°C ~ 80°C
3. WITHOUT INDIVIDUAL TOLERANCE: ±0.3mm[0.012inch]
4. TOLERANCE OF PCB PLACEMENT: ±0.5mm[0.020inch]
5. RoHS3 COMPLIANT

PN: RVT121HVSFWCA0-B				Riverdi
SN:				
DRAWN:	M.Suchocki	2025.02.03	1:2.49	
CHECKED:	M.Wierzbowski	2025.02.03	[mm]	
APPR:			ISO A3	P. 1 of 1

6. 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_{OP}	-20	70	°C	
Storage Temperature	T_{ST}	-30	80	°C	
Storage Humidity (@ 25 ± 5°C)	H_{ST}	10	-	% RH	
Operating Ambient Humidity (@ 25 ± 5°C)	H_{OP}	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.

7. 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_{IH}	2.0	-	3.3	V	
Input Voltage “L” Level	V_{IL}	0	-	0.8	V	

PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
Current Drawn from VDD_IN @6.0V	POWER ‘ENABLE’ = ‘0’	I_{VDD_IN}		7		uA
Current Drawn from VDD_IN @12.0V				15		
Current Drawn from VDD_IN @24.0V				40		
Current Drawn from VDD_IN @36.0V				60		
Current Drawn from VDD_IN @48.0V				90		
Current Drawn from VDD_IN @6.0V	POWER ‘ENABLE’ = ‘1’	I_{VDD_IN}	450	1180	2220	mA
Current Drawn from VDD_IN @12.0V			270	660	1150	
Current Drawn from VDD_IN @24.0V			145	340	580	
Current Drawn from VDD_IN @36.0V			110	240	400	
Current Drawn from VDD_IN @48.0V			90	190	310	

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%.
Test condition: Ambient temp 25 °C PCAP is on Active mode

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8. 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.

9. ELECTRO-OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	RMK	NOTE
Response Time	Tr+Tf	θ=0° ⌀=0° Ta=25 °C	-	25	35	ms	FIG 2.	4
Contrast Ratio	Cr		800	1000	-	---	FIG 3.	1
Luminance Uniformity	δ WHITE		-	75	-	%		3
Surface Luminance	Lv		-	850	-	cd/m²		2
Viewing Angle Range	θ	⌀ = 90°	75	85	-	deg	FIG 4.	6
		⌀ = 270°	75	85	-	deg		
		⌀ = 0°	75	85	-	deg		
		⌀ = 180°	75	85	-	deg		
CIE (x, y) Chromaticity	Rx	θ=0° ⌀=0° Ta=25 °C	0.22	0.26	0.30	-	FIG 3.	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 3.

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

Note 2. Surface luminance is the LCD surface from the surface with all pixels displaying white. For more information see Figure 3.

Lv = Average Surface Luminance with all white pixels (P1, P2, P3, P4, P5)

Note 3. The uniformity in surface luminance δ 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 3.

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

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 2. 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. 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 4.

Note 7. Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80). For response time testing, the testing data is based on BM-7A. Instruments for Contrast Ratio, Surface Luminance, Luminance Uniformity, Chromaticity the test data is based on SR-3A.

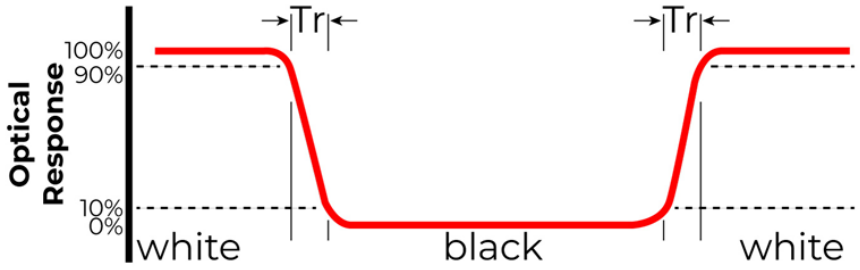
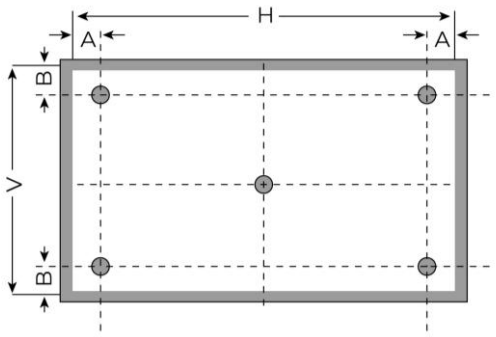


Figure 2. The definition of response time



A: 5mm

B: 5mm

H, V: Active Area

Light spot size ∅=5mm, 500mm distance from the LCD surface to detector lens.

Measurement instrument is SR-3A

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

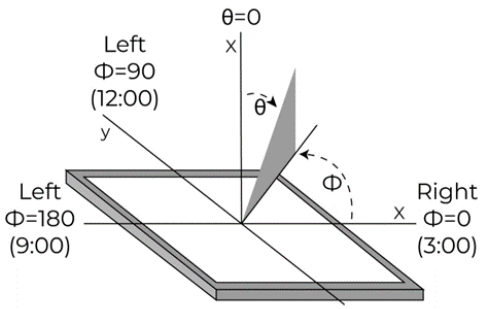
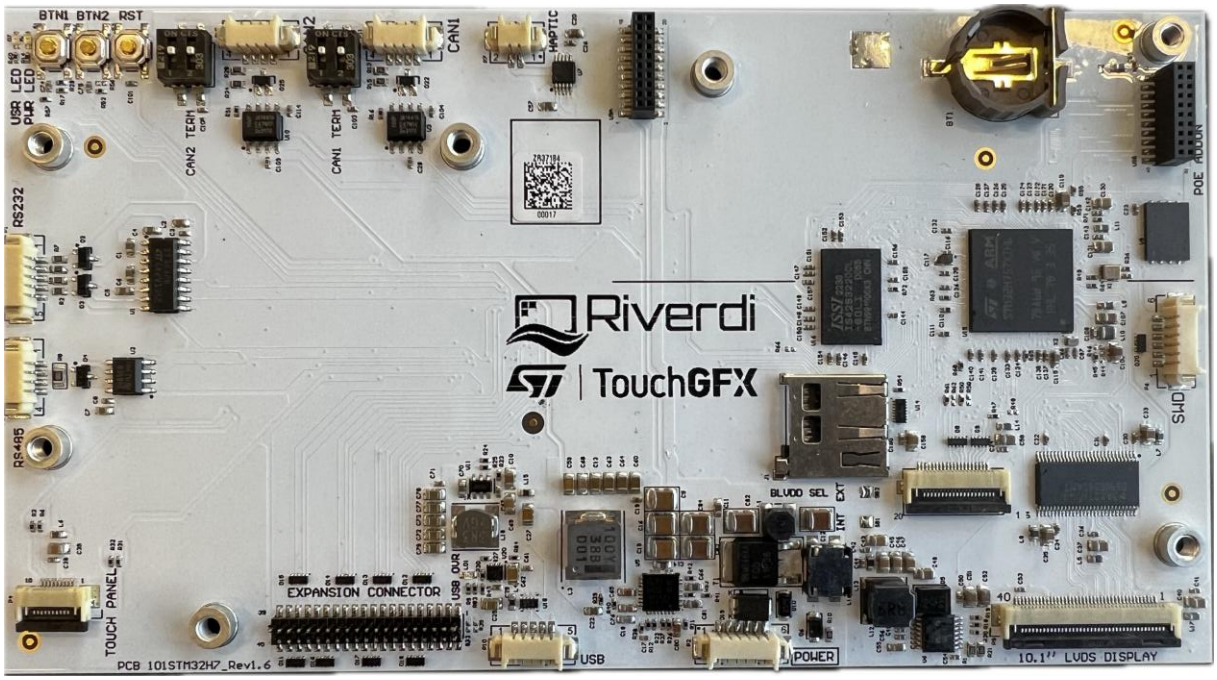


Figure 4. The definition of viewing angle

10. BOARD INTERFACES AND CONNECTORS



10.1 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 check chapter **10.8** 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.

10.2 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

10.3 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

10.4 RS232 interface

The 1.25mm, 5-pin Molex connector labeled as “RS232’ (P1) 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

10.5 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 – 48.0V	

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.

10.6 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

10.7 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.

10.8 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. QSPI mode: SPI data line 2	Note 3
12	GPIO.2/IO.3	SPI Single/Dual mode: General purpose IO1. 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.

Note 3. 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'

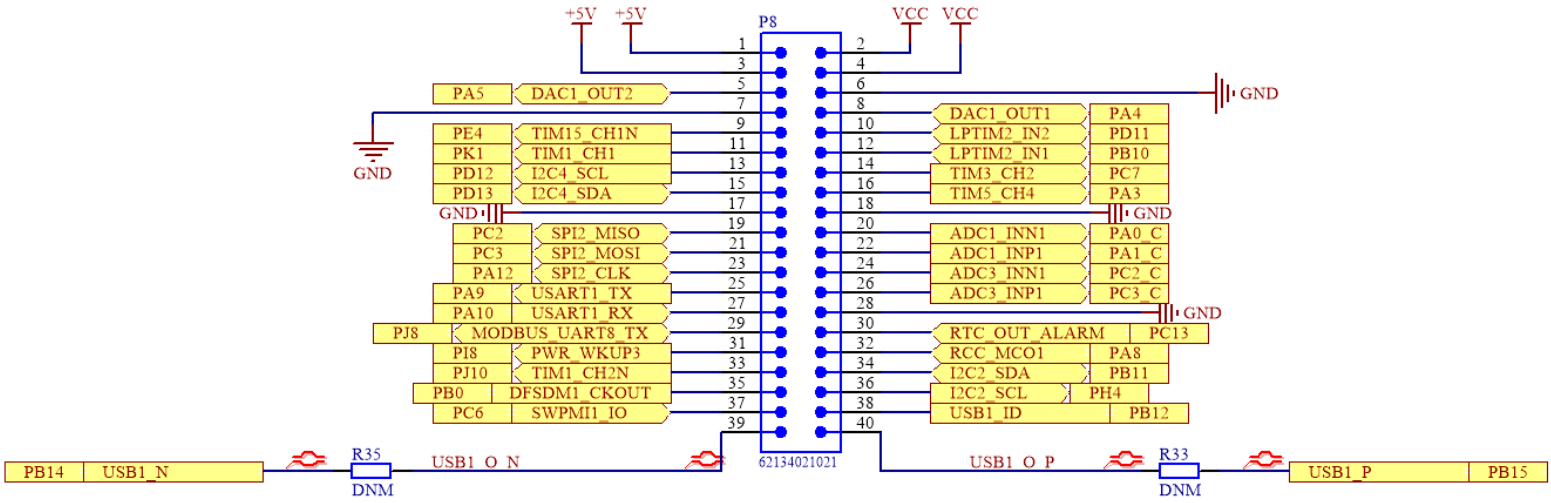
10.9 Expansion connector

The main board has one 1.27mm, 40 pins expansion pin header which is labeled as “EXPANSION CONNECTOR’ (P8).

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 I²C
- 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	P18	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 11.1.

10.10 Micro SD slot

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

10.11 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.

10.12 Battery coin cell holder

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

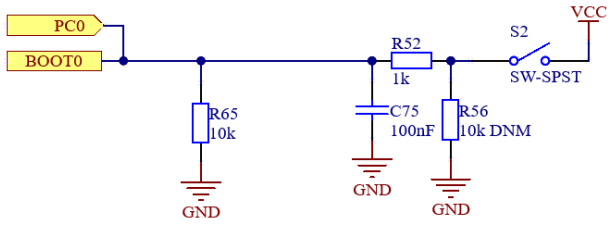
The BT1 is connected to the VBAT pin of STM32H757XIH6, which allows to retain the content of the backup registers and RAM after power down, and to keep running RTC when the VDD is turned off and unplugged.

11. USER INTERFACES

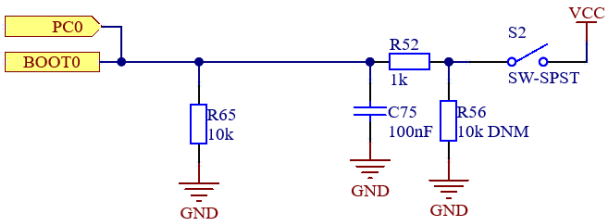
11.1 3 x push buttons

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

- 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.



11.2 3 x LEDs

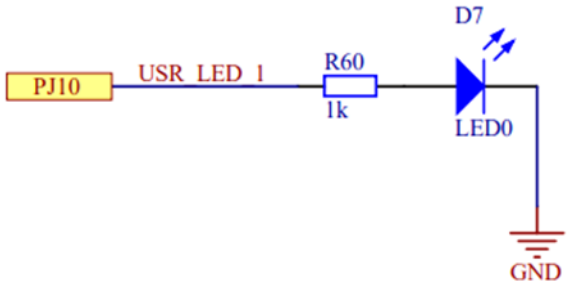
1 x LED, labeled as ‘PWR LED’, emits green light when the modules is powered.

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.



12. DISPLAY SEPCIFICATION

12.1 TFT resolution

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

12.2 Full TFT specification

For detailed information on the display, please refer to datasheet of display RVT121HVLFWCA0-B.

13. CAPACITIVE TOUCH SCREEN PANEL SPECIFICATIONS

13.1 Mechanical characteristics

DESCRIPTION	SPECIFICATION	REMARK
Touch Panel Size	12.1 inch	aTouch
Outline Dimension of CTP	275.56 mm x 178.46 mm	
Product Thickness	2.95 mm	
Glass Thickness	1.8 mm	
CTP View Area	260.52 mm x 162.60 mm	
Sensor Active Area	262.52mm x 164.60 mm	
Surface Hardness	6H	

13.2 Electrical characteristics

DESCRIPTION	SPECIFICATION	REMARK
Linearity	+/- 1.5mm	
Controller	ILI2511	
Resolution	1280 x 800	

14. INSPECTION

Standard acceptance/rejection criteria for TFT module

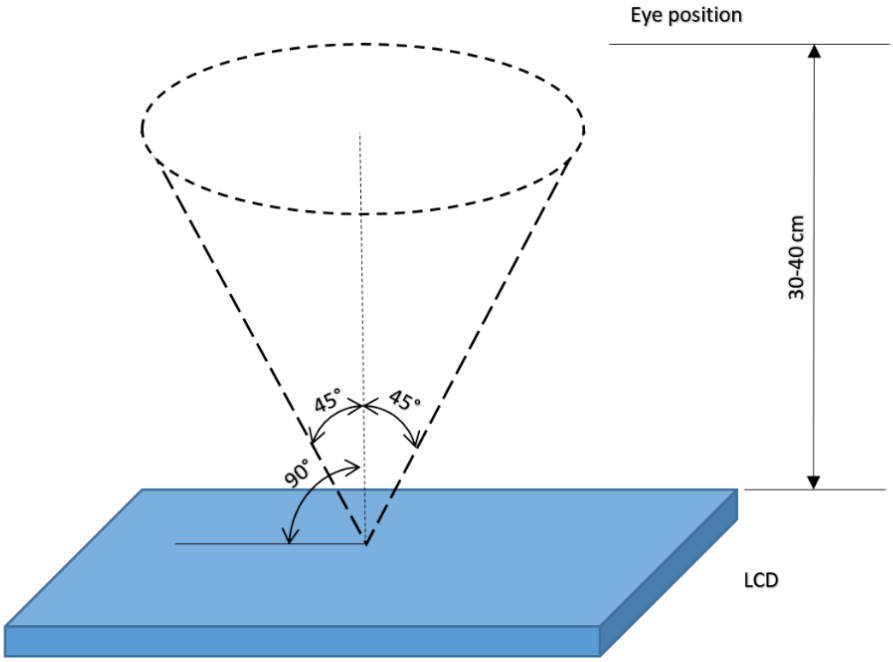
14.1 Inspection condition

Ambient conditions:

- Temperature: 25 ± 2°C
- Humidity: (60 ± 10) %RH
- Illumination: Single fluorescent lamp non-directive (300 to 700 lux)

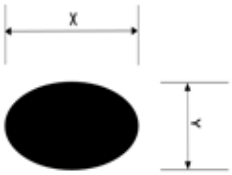
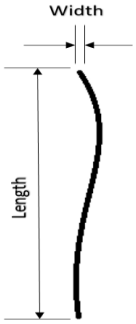
Viewing distance: 35 ± 5cm between inspector bare eye and LCD.

Viewing Angle: U/D: 45°/45°, L/R: 45°/45°



14.2 Inspection standard

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

<table>
<tr><th>ITEM</th><th colspan="4">CRITERION</th></tr>
<tr><td rowspan="5">Black spots, white spots, light leakage, Foreign Particle (round Type)</td><td rowspan="5"> 
D=(x+y)/2
Spots density: 10 mm</td><td colspan="3">Size =12.1”</td></tr>
<tr><td colspan="2">Average Diameter</td><td>Qualified Qty</td></tr>
<tr><td colspan="2">D ≤ 0.2 mm</td><td>Ignored</td></tr>
<tr><td colspan="2">0.2 mm < D ≤ 0.3 mm</td><td>N≤5</td></tr>
<tr><td colspan="2">0.5mm < D</td><td>Not allowed</td></tr>
<tr><td rowspan="5">LCD black spots, white spots, light leakage (line Type)</td><td rowspan="5"> 

Spots density: 10 mm</td><td colspan="3">Size =12.1”</td></tr>
<tr><td>Length</td><td>Width</td><td>Qualified Qty</td></tr>
<tr><td>-</td><td>W ≤ 0.05</td><td>Ignored</td></tr>
<tr><td>L ≤ 5.0</td><td>0.05< W ≤ 0.1</td><td>N ≤ 3</td></tr>
<tr><td>5.0 < L</td><td>0.10< W
5.0 < L</td><td>N = 0</td></tr>
<tr><td rowspan="6">Bright/Dark Dots</td><td colspan="3">Size = 12.1”</td></tr>
<tr><td>Item</td><td colspan="2">Qualified Qty</td></tr>
<tr><td>Bright dots</td><td colspan="2">0</td></tr>
<tr><td>Dark dots</td><td colspan="2">0</td></tr>
<tr><td>Cluster Bright Dots or Dark Dots</td><td colspan="2">0</td></tr>
<tr><td>Total Bright and Dark Dots</td><td colspan="2">0</td></tr>
<tr><td rowspan="7">Clear spots</td><td colspan="3">Size = 12.1”</td></tr>
<tr><td>Average Diameter</td><td colspan="2">Qualified Qty</td></tr>
<tr><td>D < 0.2 mm</td><td colspan="2">Ignored</td></tr>
<tr><td>0.2 mm < D < 0.3 mm</td><td colspan="2">4</td></tr>
<tr><td>0.3 mm < D < 0.5 mm</td><td colspan="2">2</td></tr>
<tr><td>0.5 mm < D</td><td colspan="2">0</td></tr>
<tr><td colspan="3">Spots density: 10 mm</td></tr>
<tr><td rowspan="5">Touch panel spot</td><td colspan="3">Size = 12.1"</td></tr>
<tr><td>Average Diameter</td><td colspan="2">Qualified Qty</td></tr>
<tr><td>D < 0.25 mm</td><td colspan="2">Ignored</td></tr>
<tr><td>0.25 mm < D < 0.5 mm</td><td colspan="2">N≤5</td></tr>
<tr><td>0.5 mm < D</td><td colspan="2">0</td></tr>
<tr><td rowspan="5">Touch panel White line Scratch</td><td colspan="3">Size ≥ 5"</td></tr>
<tr><td>Length</td><td>Width</td><td>Qualified Qty</td></tr>
<tr><td>-</td><td>W < 0.03</td><td>Ignored</td></tr>
<tr><td>L < 5.0</td><td>0.03 < W < 0.05</td><td>N≤5</td></tr>
<tr><td>-</td><td>0.05 < W</td><td>0</td></tr>
</table>

15. 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℃, 90%RH, 120Hrs	
6	Thermal Cycling Test (No operation)	-20℃ for 30min, 70℃ for 30 min. 100 cycles. Then test at room temperature after 1 hour	Note 2
7	Vibration Test	Frequency: 10 ÷ 55 Hz. Stroke: 1.5 mm. Sweep: 10Hz ÷ 55Hz ÷ 10 Hz. 2 hours for each direction of X, Y, Z (Total 6 hours)	

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.

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Therefore, Riverdi display modules are not CE marked.

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