



TFT MODULE SPECIFICATION

## **RVT121HVUFWN00**

HB, IPS, USB C 12.1" LCD TFT display datasheet

Rev. 1.0

2025-05-23

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**Riverdi Sp. z o.o.**

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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 182.80 x 13.46	mm
Active Area (W x H)	261.12 x 163.20	mm
Pixel Pitch (W x H)	0.1695 x 0.1695	mm
Resolution	1280 (RGB) x 800	/
Brightness	1000	cd/m <sup>2</sup>
Color Depth	16.7 M	/
Pixel Arrangement	RGB Vertical Stripe	/
Controller of the main board	LT7911D	/
Interface	USB-C	/
With/Without Touch	Without Touch Panel	/
Power Supply	USB-C (5.0V)	V
Weight	895	g

**Note 1.** RoHS3 compliant

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

## 1. REVISION RECORD

REV NO.	REV DATE	CONTENTS	REMARKS
1.0	2025-05-23	Initial release	

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### 3. MODULE CLASSIFICATION INFORMATION

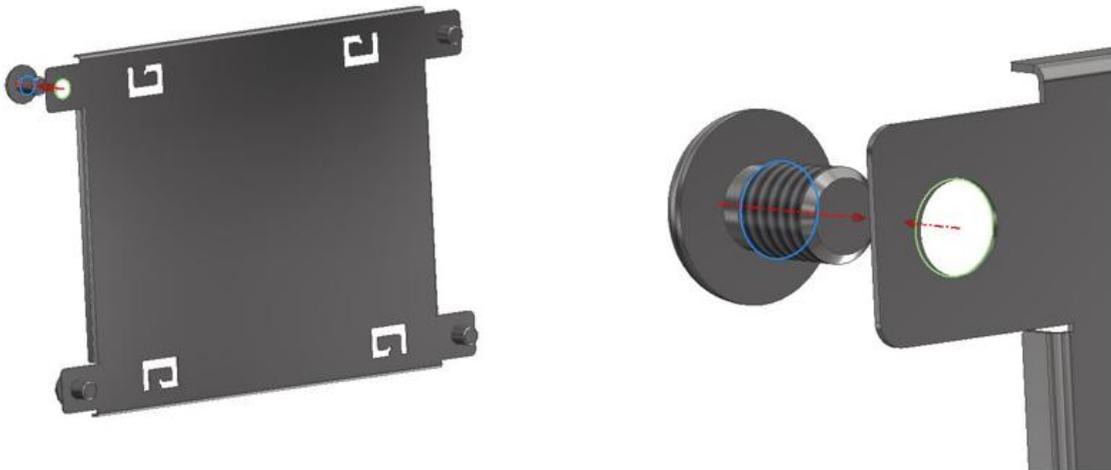
RV	T	121	H	V	U	F	W	N	00
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.

NO.	PARAMETER	SYMBOL
1.	BRAND	RV - Riverdi
2.	PRODUCT TYPE	T - TFT Standard
3.	DISPLAY SIZE	121 - 12.1"
4.	MODEL SERIAL NO.	H - High Brightness, IPS
5.	RESOLUTION	V - 1280 x 800 px
6.	INTERFACE	U - USB C
7.	FRAME	F - With Mounting Metal Frame
8.	BACKLIGHT TYPE	W - LED White
9.	TOUCH PANEL	N - Without touch panel
10.	VERSION	00 - version

## 4. ASSEMBLY

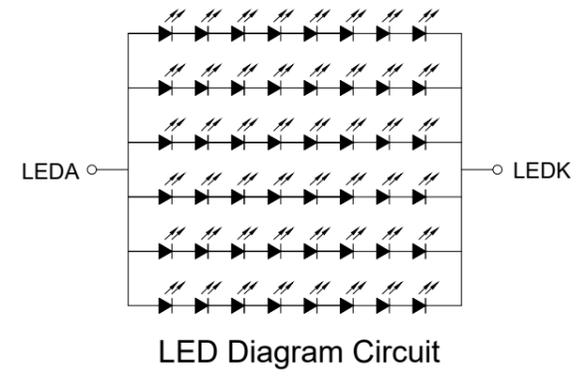
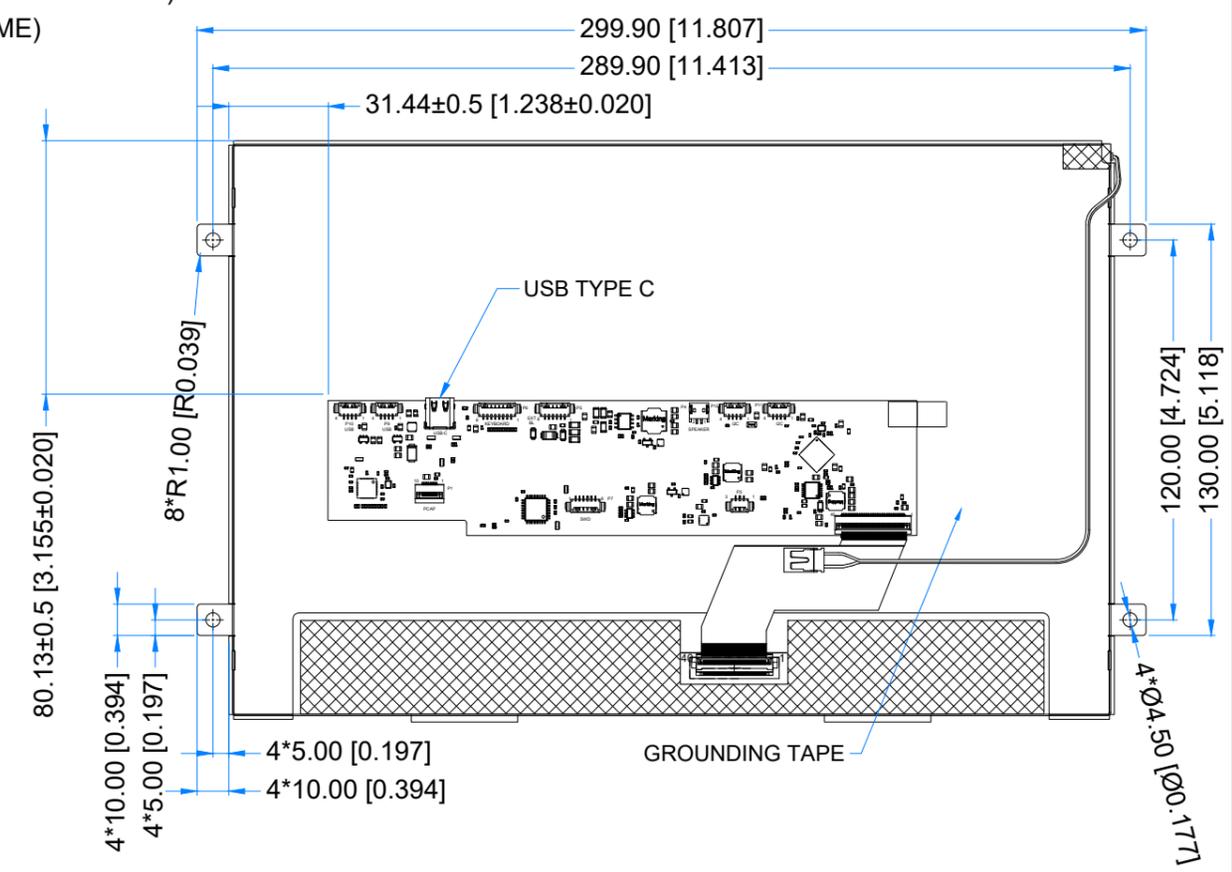
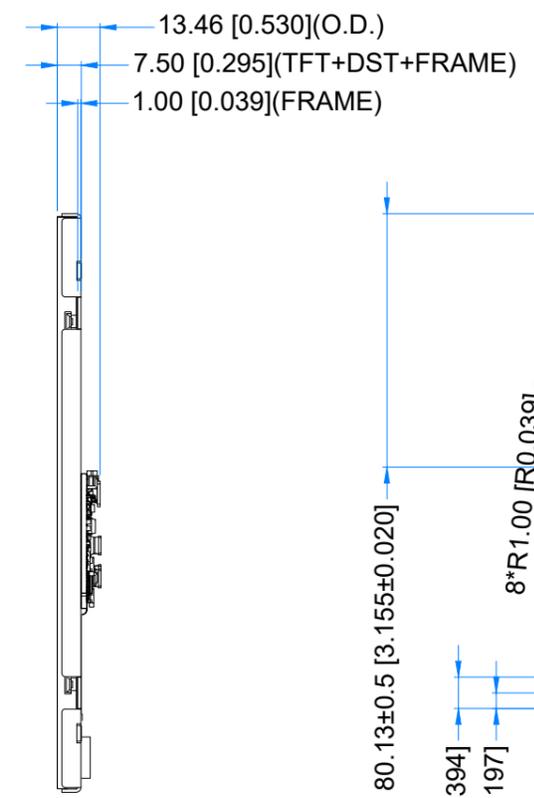
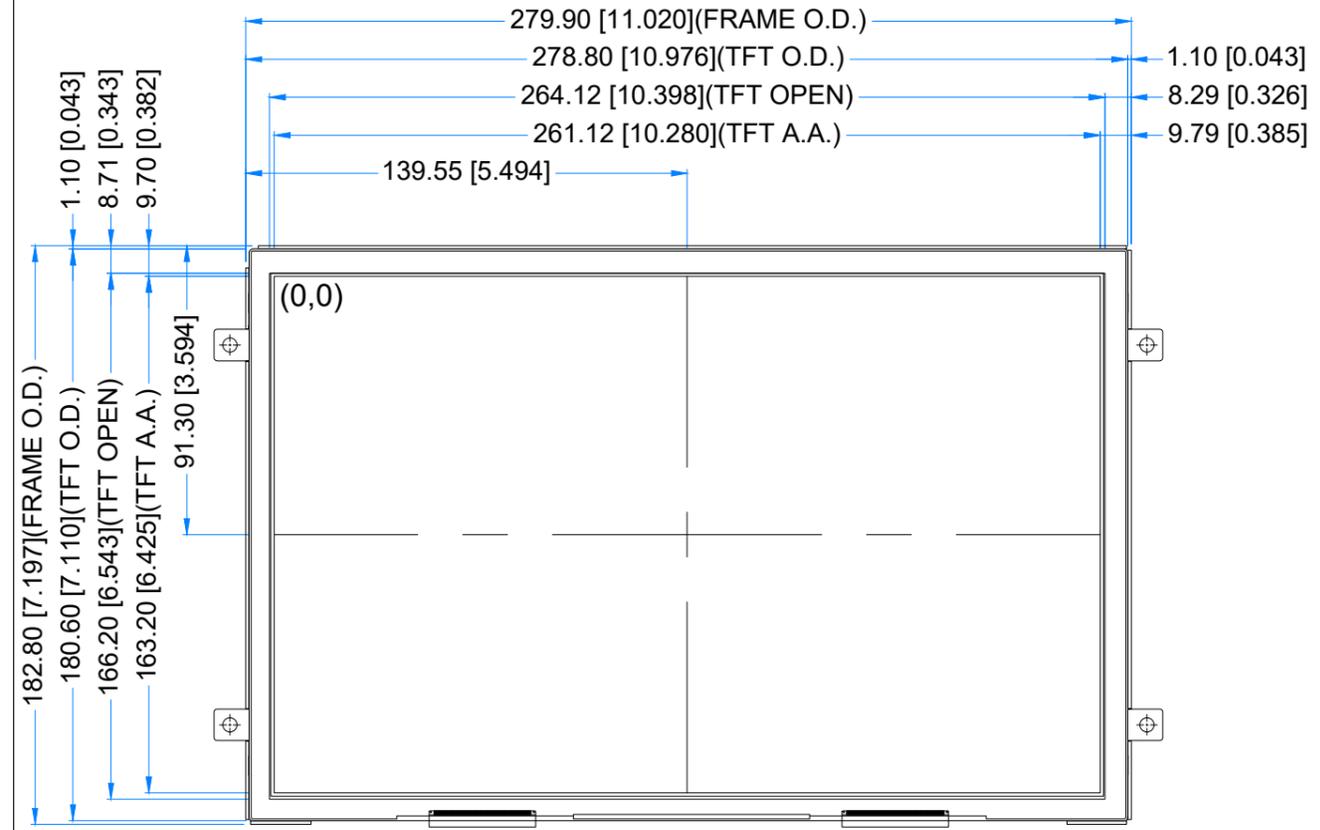
### 4.1 Mounting Frame

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	2025.04.11



**LCM NOTES:**

1. LCD TYPE: TRANSMISSIVE, NORMALLY BLACK, IPS
2. RESOLUTION: 1280x800
3. VIEWING ANGLE: FREE
4. SURFACE LUMINANCE: 1000cd/m<sup>2</sup>
5. CONTROLLER IC OF MAIN BOARD: LT7911D
6. VIDEO INTERFACE: USB-C
7. POWER SUPPLY: USB-C

**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. RoHS3 COMPLIANT

PN: RVT121HVUFWN00			
SN:			
DRAWN: M.Suchocki	2025.04.11	1:2.23	
CHECKED: M.Wierzbowski	2025.04.11	[mm]	
APPR:		ISO A3	

## 6. ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Supply Voltage for Module	V <sub>DD</sub>	-0.5	5.5	V
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.** The above are maximum values. If exceeded, they may cause permanent damage to the unit.

## 7. ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Supply Voltage for Module	V <sub>DD</sub>	4.7	5.0	5.3	V	

PARAMETER	SYMBOL	BL 0%	BL 50%	BL 100%	UNIT	NOTE
Current drawn from V <sub>DD</sub> @5.0V	I <sub>VDD</sub>	354	1563	2550	mA	Note 1

**Note 1.**

BL 0%, current was measured with BL brightness set to 0%,  
 BL 50%, current was measured with BL brightness set to 50%,  
 BL 100%, current was measured with BL brightness set to 100%.

Values of current may vary due to type of used cable.

## 8. BACKLIGHT ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Backlight Power Consumption	WBL	-	5,76	-	W	
Lifetime	-	-	50,000	-	hours	Note 1

**Note 1.** Unless specified, the ambient temperature  $T_a = 25^\circ\text{C}$

**Note 2.** The recommended operating conditions refer to a range in which operation of this product is guaranteed. The operation cannot be guaranteed if the absolute maximum values exceed.

**Note 3.** If LED is driven by high current, high ambient temperature and humidity condition, the lifetime of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating lifetime is estimated data.

## 9. ELECTRO-OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	RMK	NOTE
Response Time	Tr+Tf	$\theta=0^\circ$ $\phi=0^\circ$ Ta=25 °C	-	25	35	ms	FIG 1.	4, 7
Contrast Ratio	Cr		-	800	1000	---	FIG 2.	1, 7
Surface Luminance	Lv		-	1000	-	cd/m <sup>2</sup>		2, 7
Viewing Angle Range	$\theta$	$\phi = 90^\circ$ $\phi = 270^\circ$ $\phi = 0^\circ$ $\phi = 180^\circ$	75	85	-	deg	FIG 3.	6
			75	85	-	deg		
			75	85	-	deg		
			75	85	-	deg		
CIE (x, y) Chromaticity	Rx	$\theta=0^\circ$ $\phi=0^\circ$ Ta=25 °C	0.22	0.26	0.30	-	FIG 2.	5,7
	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 make average value.

**Note 6.** For TFT module, viewing angle is the angle at which the contrast ratio is greater 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.** 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.

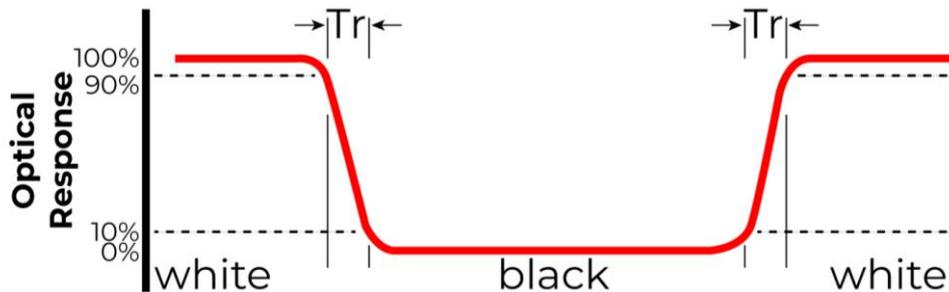


Figure 2. The definition of response time

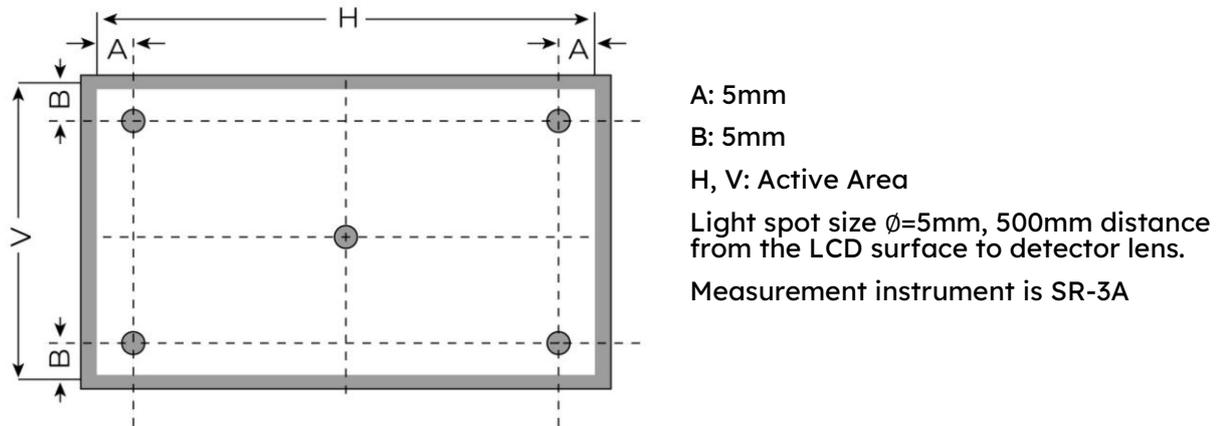


Figure 3. Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity

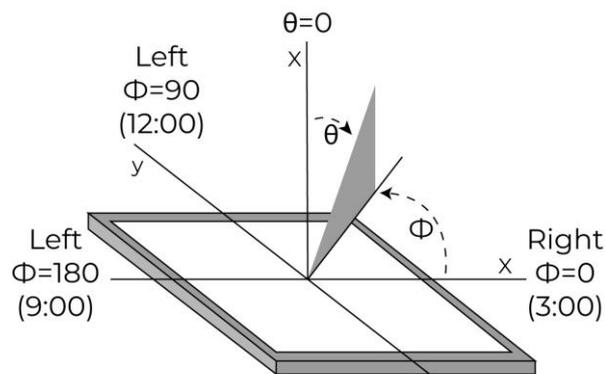
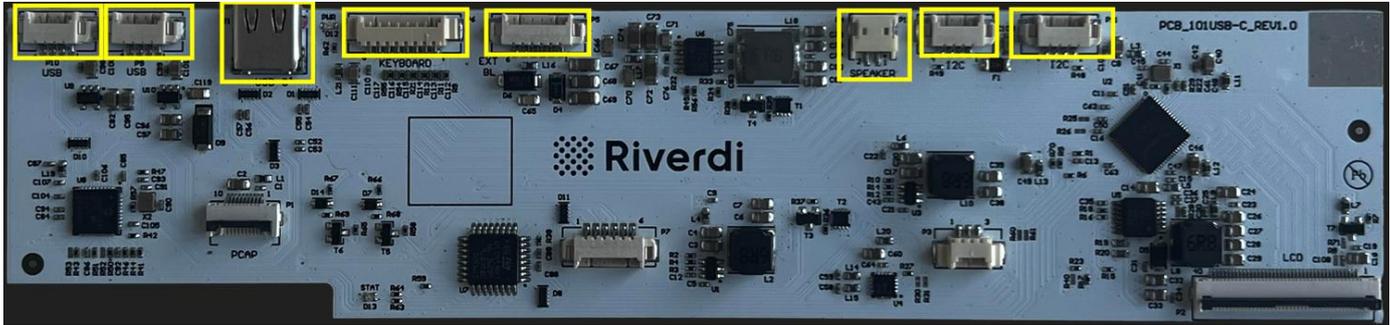


Figure 4. The definition of viewing angle

# 10. INTERFACES DESCRIPTION

## 10.1 PCB overview



NAME	CONNECTOR	DESCRIPTION	NOTE
<b>P9, P10</b>	USB	USB molex	
<b>VIDEO/ TOUCH PANEL</b>	USB-C	Video interface/Touch panel interface	
<b>P6</b>	External keyboard connector	Molex 53261-0871 or alternative; Horizontal, 1.25mm pitch; 8 pins. The connector is reserved for external keyboard.	
<b>P5</b>	Backlight PWM & Power	Molex 53261-0671 or alternative; Horizontal, 1.25mm pitch; 6 pins. The unit realizes the function of digital dimming. This connector enables to control backlight PWM externally. Alternative power supply.	
<b>P4</b>	Speaker	Speaker molex	
<b>P11, P12</b>	I2C	I2C molex	

Note 1. External keyboards are optional, not included in the standard kit.

## 10.2 USB interface (P9, P10)

PIN	SYMBOL	DESCRIPTION
<b>1</b>	VBUS	Power supply, 5.0V
<b>2</b>	USB_N	USB_D-
<b>3</b>	USB_P	USB_D+
<b>4</b>	GND	Ground

## 10.3 Video/Touch panel interface – USB-C

PIN	SYMBOL	DESCRIPTION
<b>A4/B4</b>	VBUSA/VBUSB	Power supply, 5.0V
<b>A9/B9</b>	VBUSA/VBUSB	Power supply, 5.0V
<b>A2/B2</b>	SSTXP1/SSTXP2	Super speed differential pair transmit positive
<b>A3/B3</b>	SSTXN1/SSTXN2	Super speed differential pair transmit negative
<b>A5/B5</b>	CC1/CC2	Configuration channel
<b>A6/B6</b>	DP1/DP2	Differential pair positive
<b>A7/B7</b>	DN1/DN2	Differential pair negative
<b>A8/B8</b>	SBU1/SBU2	Sideband use
<b>A10/B10</b>	SSRXN2/SSRXN1	Super speed differential pair receive positive
<b>A11/B11</b>	SSRXP2/SSRXP1	Super speed differential pair receive positive
<b>A1/B1</b>	GND	Ground
<b>A12/B12</b>	GND	Ground

**Note 1.** All the signals in Touch panel connector are in accordance with USB-C standard.

**Note 2.** Matched Riverdi cable accessory: USB-A 2.0 TO USB-C CABLE

## 10.4 External keyboard – P6

PIN	SYMBOL	DESCRIPTION
1	INP1	Brightness level rise
2	INP2	Brigthness level decrease
3	INP3	Switch Input 3 – reserved, not used
4	INP4	Switch Input 4 – reserved, not used
5	INP5	Switch Input 5 – reserved, not used
6	INP6	Switch Input 6 – reserved, not used
7	GND	Ground
8	VCC	Power supply, 3.3V

**Note.** External keyboard is by default to change backlight brightness level.

## 10.5 Backlight PWM & Power – P5

PIN	SYMBOL	DESCRIPTION	NOTE
1	GND	Ground	
2	GND	Ground	
3	EXT_DIMM	External dimming	Note 1, 3
4	EXT_EN	External dimming enable	Note 3
5	VIN2	Power supply, 6-36V	Note 2
6	VIN2	Power supply, 6-36V	Note 2

**Note 1.** PWM frequency range: 1kHz - 5kHz.

100% PWM duty cycle corresponds to maximum brightness

0% PWM duty cycle corresponds to minimum brightness

**Note 2.** Matched Riverdi cable accessory: RVA-0106M-1.25FF-1.

**Note 3.** Notice

$V_L < 1.2V$  = active low

$V_H > 2.4V \dots 36V$  = active high

Socket used for external power supply.

## 10.6 Speaker – P4

PIN	SYMBOL	DESCRIPTION	NOTE
1	OUTP	Speaker coil „+” terminal	
2	OUTN	Speaker coil „-” terminal	

**Note.** Max available power for connected speaker 3W (4Ω).

## 10.7 I2C – P11, P12

PIN	SYMBOL	DESCRIPTION	NOTE
1	VBUS	Power supply, 5.0V	
2	SCL	Serial clock	
3	SDA	Serial data	
4	GND	Ground	

# 11. DISPLAY SPECIFICATION

The TFT of the module applies Riverdi high brightness, IPS, 12.1” LVDS: RVT121HVLFWN00

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

For detailed information, please refer to datasheet of display.

## 12. INSPECTION

Standard acceptance/rejection criteria for TFT module

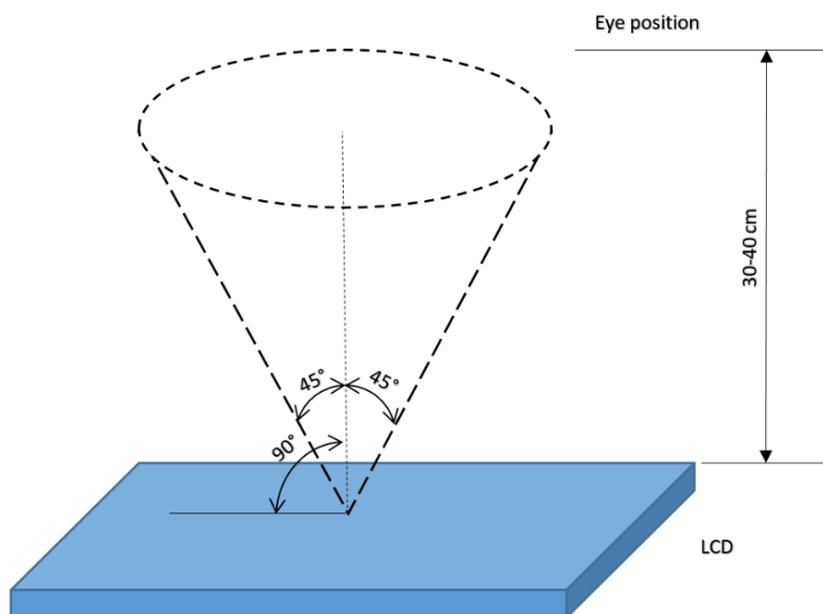
### 12.1 Inspection condition

Ambient conditions:

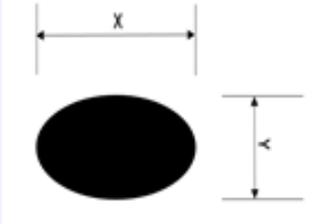
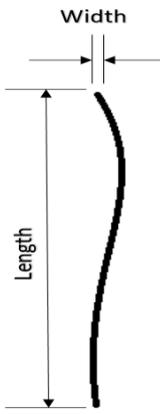
- Temperature:  $25 \pm 2^\circ\text{C}$
- Humidity:  $(60 \pm 10) \%RH$
- Illumination: Single fluorescent lamp non-directive (300 to 700 lux)

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

ITEM	CRITERION	
Black spots, white spots, light leakage, Foreign Particle (round Type)	<div style="text-align: center;">  </div> <p style="text-align: center;"><math>D = (x+y)/2</math></p> <p style="text-align: center;">Spots density: 10 mm</p>	
	Size = 12.1"	
	Average Diameter	Qualified Qty
	$D \leq 0.2$ mm	Ignored
	$0.2 \text{ mm} < D \leq 0.3$ mm	$N \leq 4$
$0.5 \text{ mm} < D$	Not allowed	
LCD black spots, white spots, light leakage (line Type)	<div style="text-align: center;">  </div> <p style="text-align: center;">Spots density: 10 mm</p>	
	Size = 12.1"	
	Length	Width Qualified Qty
	-	$W \leq 0.05$ Ignored
	$L \leq 5.0$	$0.05 < W \leq 0.1$ $N \leq 3$
$5.0 < L$	$0.10 < W$ $5.0 < L$ Not allowed	
Bright/Dark Dots	Size = 12.1"	
	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 $\geq 5.0''$	
	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	

## 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	40°C, 90%RH, 120Hrs	
6	Thermal Cycling Test (No operation)	-20°C for 30min, 70°C 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.** The device is kept at room temperature for 2 hours prior to starting the test

## 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.

This is not a standalone product. It was designed as an electronic component. It needs integration with a whole system to be fully functional.

Riverdi grants the guarantee for the proper operation of the goods for a period of 12 months from the date of possession of the goods. If in a consequence of this guaranteed execution the customer has received the defects-free item as replacement for the defective item, the effectiveness period of this guarantee shall start anew from the moment the customer receives the defects-free item.

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Our dedicated support team is just a message away.

Contact us at

[contact@riverdi.com](mailto:contact@riverdi.com)

We're here to ensure your project's success, every step of the way!