ECA11-5LM User Manual



Chengdu Ebyte Electronic Technology Co.,Ltd.

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The test data obtained in this article are all obtained by Ebyte Laboratory testing, and the actual results may be slightly different.

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1. Product Overview

1.1.Product Introduction

Ebyte ECA11-5LM is a 5.5-inch MIPI capacitive touch screen series. This series of touch screens supports two resolutions. The corresponding relationship between model and resolution is shown in the following table:

model	ECA11-5LM1019C	ECA11-5LM0712C
Resolution	1080*1920	720*1280

The ECA11-5LM touch screen is connected to the single board computer through a 26 P 0.5mm pitch FPC cable. The module can be directly connected to a series of single board computer interfaces such as ECB30, ECB31, and ECB32. The corresponding routines of this touch screen are provided with the single board computer products, and users can test the touch screen on these single board computers.

Each screen is strictly tested before leaving the factory and can be used in products in batches.

1.2.Basic parameters

1、Display interface: 4-lane MIPI -DSI;

2、Touch interface: I2C (GT911);

3、Screen resolution: 1080*1920 / 720*1280;

4、Screen size: 5.5 inches;

5、Touch type: capacitive touch;

6、Touch points: 5 points;

7、Working temperature : -10 ℃ ~ 70 ℃ ;

8、Storage temperature: -20 ℃ ~ 70 ℃ ;

1.3.Electrical parameters

1、Power supply voltage: 5V;

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2、Connector: 26Pin, 0.5mm pitch, FPC bottom contact connector;

3、IO port level: 3.3V, 1.8V;

4、Power consumption: ECA11-5LM1019C is 1.488W, ECA11-5LM0712C is 1.512W (This data is measured when the power supply voltage is 5V. In actual application, the power consumption will vary slightly due to fluctuations in the power supply voltage.)

2. Instructions

2.1.Touch screen appearance display

The ECA11-5LM1019C touch screen is shown in the following figure:

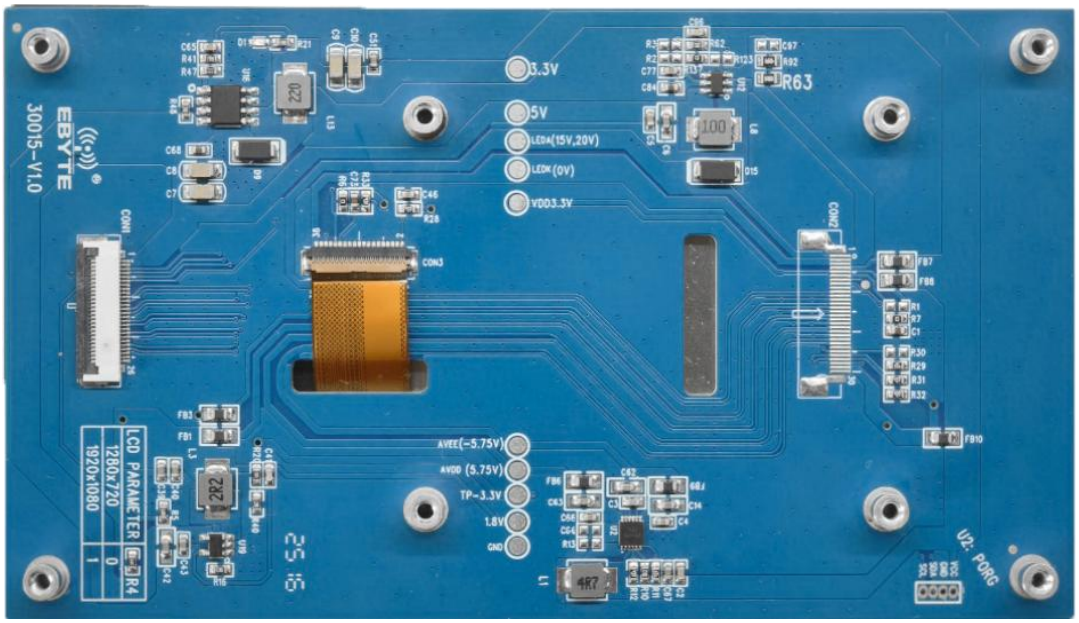


EC

ECA11-5LM1019C touch screen front view

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EC

ECA11-5LM1019C touch screen back view

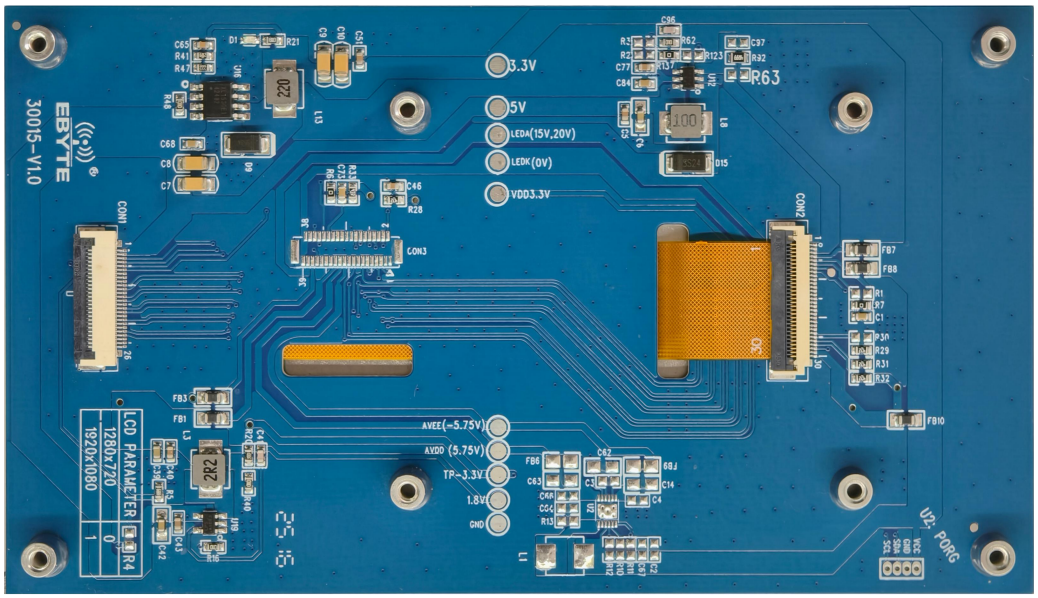
ECA11-5LM0712C touch screen is shown in the following figure:



ECA11-5LM0712C touch screen front view

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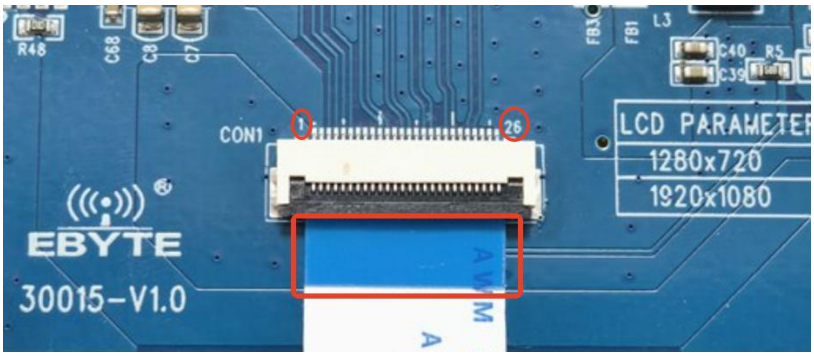


ECA11-5LM0712C touch screen back view

2.2.Touch screen pin description

ECA11-5LM touch screen is connected to the single-board computer via a 26- pin FPC cable , and pin numbers 1 and 26 are marked by PCB silkscreen.

When installing the cable, please make sure that the blue side faces upwards, as shown in the following figure:



ECA11-5LM touch screen connector diagram

The detailed description of the pins is shown in the following table:

ECA11-5LM touch screen pin sequence table

Pin Number	Pin Name	illustrate	IO level
1	VCC5	Power supply 5V	5V
2	VCC5	Power supply 5V	5V
3	CT_INT	Touch interrupt signal pin	3.3V

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4	CT_SCL	Touch clock signal pin	3.3V
5	CT_SDA	Touch data/address signal pin	3.3V
6	CT_RST	Touch reset signal pin	3.3V
7	LCD_BL	Screen backlight pin	3.3V
8	LCD_ID	Screen ID pin	1.8V
9	GND	Grounding	0V
10	MIPI_DP1	MIPI DSI channel 1 differential positive signal	1.8V
11	MIPI_DN1	MIPI DSI channel 1 differential negative signal	1.8V
12	GND	Grounding	0V
13	MIPI_CLKP	MIPI DSI clock differential positive signal	1.8V
14	MIPI_CLKN	MIPI DSI clock differential negative signal	1.8V
15	GND	Grounding	0V
16	MIPI_DP0	MIPI DSI channel 0 differential positive signal	1.8V
17	MIPI_DN0	MIPI DSI channel 0 differential negative signal	1.8V
18	GND	Grounding	0V
19	MIPI_DP2	MIPI DSI channel 2 differential positive signal	1.8V
20	MIPI_DN2	MIPI DSI channel 2 differential negative signal	1.8V
21	GND	Grounding	0V
22	MIPI_DP3	MIPI DSI channel 3 differential positive signal	1.8V
23	MIPI_DN3	MIPI DSI channel 3 differential negative signal	1.8V
24	GND	Grounding	0V
25	MIPI_RESET	Screen reset signal	1.8V
26	GND	Grounding	0V

2.3.Model Identification

determines whether the connected device is ECA11-5LM1019C or ECA11-5LM0712C by identifying the LCD_ID voltage .

ECA11-5LM1019C soldered to R4, LCD_ID voltage is 0.6V.

ECA11-5LM0712C does not solder R4, LCD_ID voltage is 0V.

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The corresponding markings on the PCB are shown in the figure below:



PCB resolution logo

2.4.Backlight adjustment

LCD_BL in the ECA11-5LM touch screen signal line is the backlight brightness PWM adjustment signal.

2.5KHz to 1MHz can significantly reduce audible noise when dimming. The average current of the backlight LED is proportional to the duty cycle of the PWM signal.

2.5.Driver Support

Provide screen driver support for Linux environment with the single board computer product, in the single board computer cloud storage development material 03_images. The following text will provide parameter configuration information for 1080P and 720P screens.

2.5.1. MIPI DSI-1080 * 1920 Device Tree Related Parameters

MIPI DSI-1080*1920 Equipment tree related parameter table

Device tree parameters	value	illustrate
panel-init-sequence	-	The screen initialization parameters are provided by the screen manufacturer, please refer to the device tree for details
dsi,lanes	<4>	MIPI Number of channels
clock-frequency	<75000000>	Debugging reference values
hactive	<1080>	Resolution
vactive	<1920>	Vertical Resolution
hfront-porch	<48>	Rear shoulder within visual range
hsync-len	<8>	Synchronization pulse width
hback-porch	<52>	Front shoulder with visible range
vfront-porch	<16>	Frame visual back shoulder
vsync-len	<6>	short burst

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vback-porch	<15>	Frame visible front shoulder
hsync-active	<0>	Line synchronization signal
vsync-active	<0>	field sync signal
de-active	<0>	de signal
pixelclk-active	<0>	clk signal

panel-init-sequence （Hex）Configuration Rule Table

command type	Delay	Length	Register address	Data
0x05：Single byte data	00：delay 0ms 05：delay 5ms c8：delay 200ms	01	The screen register initialization parameters provided by the screen manufacturer, where each line represents a string of command words. The register address and write data can refer to the screen chip manual.	
0x15：double byte data		02		
0x39：multibyte data		04		

Screen initialization parameter device tree：

```
    panel-init-sequence-one = [
    39 00 04 B9 FF 83 99
    15 00 02 D2 77
    15 00 02 CC 04
    39 00 10 B1 02 04 74 94 01 32 33 11 11 AB 4D 56 73 02 02
    39 00 10 B2 00 80 80 AE 05 07 5A 11 00 00 10 1E 70 03 D4
    39 00 2D B4 00 FF 02 C0 02 C0 00 00 08 00 04 06 00 32 04 0A 08 21 03 01 00 0F B8 8B 02 C0 02 C0 00
 00 08 00 04 06 00 32 04 0A 08 01 00 0F B8 01
    39 05 22 D3 00 00 00 00 00 00 06 00 00 10 04 00 04 00 00 00 00 00 00 00 00 00 00 01 00 05 05 07 00 00
 00 05 40
    39 05 21 D5 18 18 19 19 18 18 21 20 01 00 07 06 05 04 03 02 18 18 18 18 18 18 2F 2F 30 30 31 31 18 18
 18 18
    39 05 21 D6 18 18 19 19 40 40 20 21 02 03 04 05 06 07 00 01 40 40 40 40 40 40 2F 2F 30 30 31 31 40 40
 40 40
    39 00 11 D8 A2 AA 02 A0 A2 A8 02 A0 B0 00 00 00 B0 00 00 00
    15 00 02 BD 01
    39 00 11 D8 B0 00 00 00 B0 00 00 00 E2 AA 03 F0 E2 AA 03 F0
    15 00 02 BD 02
    39 00 09 D8 E2 AA 03 F0 E2 AA 03 F0
    15 00 02 BD 00
    39 00 03 B6 8D 8D
    39 05 37 E0 00 0E 19 13 2E 39 48 44 4D 57 5F 66 6C 76 7F 85 8A 95 9A A4 9B AB B0 5C 58 64 77 00 0
E 19 13 2E 39 48 44 4D 57 5F 66 6C 76 7F 85 8A 95 9A A4 9B AB B0 5C 58 64 77
    05 c8 01 11
    05 ff 01 29
    ];
```

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2.5.2. MIPI DSI-720 * 1280 Device Tree Related Parameters

MIPI DSI-720*1280 Equipment tree related parameter table

Device tree parameters	value	illustrate
panel-init-sequence	-	The screen initialization parameters are provided by the screen manufacturer, please refer to the device tree for details
dsi,lanes	<4>	MIPI Number of channels
clock-frequency	<65000000>	htotal * vtotal * fps = clock-frequency
hactive	<720>	Resolution
vactive	<1280>	Vertical Resolution
hfront-porch	<48>	Rear shoulder within visual range
hsync-len	<8>	Synchronization pulse width
hback-porch	<52>	Front shoulder with visible range
vfront-porch	<16>	Frame visual back shoulder
vsync-len	<6>	short burst
vback-porch	<15>	Frame visible front shoulder
hsync-active	<0>	Line synchronization signal
vsync-active	<0>	field sync signal
de-active	<0>	de signal
pixelclk-active	<0>	clk signal

panel-init-sequence （Hex）Configuration Rule Table

command type	Delay	Length	Register address	Data
0x05：Single byte data	00：delay 0ms 05：delay 5ms c8：delay 200ms	01	The screen register initialization parameters provided by the screen manufacturer, where each line represents a string of command words. The register address and write data can refer to the screen chip manual.	
0x15：double byte data		02		
0x39：multibyte data		04		

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Screen initialization parameter device tree：

```
panel-init-sequence-zero = [
        39 00 04 B9 FF 83 94
        15 00 02 36 01
        39 00 07 BA 63 03 68 6B B2 C0
        39 00 0B B1 48 12 72 09 32 54 71 71 57 47
        39 00 07 B2 00 80 64 0C 0D 2F
        39 00 16 B4 73 74 73 74 73 74 01 0C 86 75 00 3F 73 74 73 74 73 74 01 0C 86
        39 00 03 B6 6E 6E
        39 00 22 D3 00 00 07 07 40 07 0C 00 08 10 08 00 08 54 15 0A 05 0A 02 15 06 05
06 47 44 0A 0A 4B 10 07 07 0C 40
        39 00 2D D5 1C 1C 1D 1D 00 01 02 03 04 05 06 07 08 09 0A 0B 24 25 18 18 26
27 18 18 18 18 18 18 18 18 18 18 18 18 18 18 18 18 20 21 18 18 18 18
        39 00 2D D6 1C 1C 1D 1D 07 06 05 04 03 02 01 00 0B 0A 09 08 21 20 18 18 27
26 18 18 18 18 18 18 18 18 18 18 18 18 18 18 18 18 25 24 18 18 18 18
        39 00 3B E0 00 0A 15 1B 1E 21 24 22 47 56 65 66 6E 82 88 8B 9A 9D 98 A8 B9 5D 5C 61 66 6A 6F
 7F 7F 00 0A 15 1B 1E 21 24 22 47 56 65 65 6E 81 87 8B 98 9D 99 A8 BA 5D 5D
 62 67 6B 72 7F 7F
        39 00 03 C0 1F 31
        15 00 02 CC 03
        15 00 02 D4 02
        15 00 02 BD 02
        39 00 0D D8 FF FF FF FF FF FF FF FF FF FF FF FF
        15 00 02 BD 00
        15 00 02 BD 01
        15 00 02 B1 00
        15 00 02 BD 00
        39 00 08 BF 40 81 50 00 1A FC 01
        15 00 02 C6 ED
        05 64 01 11
        05 78 01 29
        ];
```

2.6.Module touch screen introduction

2.6.1. GT911 Introduction

ECA11-5LM module uses GOODIX 's GT911 as the driver IC for the capacitive touch screen. The driver IC is connected to the outside through 4 wires of the module, namely: / RSTB (CT_RST), INT (CT_INT), I2C_SDA (CT_SDA), and I2C_SCL (CT_SCL).

The touch screen/ RSTB pin is the reset signal of GT911, which is valid at low level. During initialization, this pin can be used to control GT911 to reset the pin to enter normal working mode.

The touch screen INT pin is the touch interrupt output pin of GT911. When GT911 detects a valid touch point, this pin will output a pulse signal to remind the external MCU to read the touch point data.

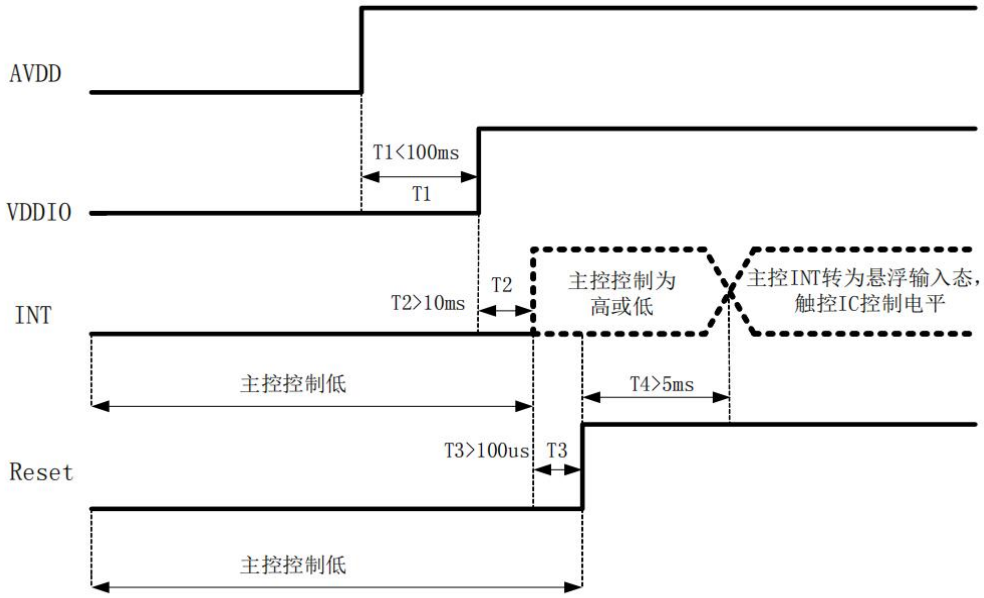
The touch screen I2C_SDA and I2C_SCL pins are the IIC communication pins of GT911. Through these two pins, the external MCU can communicate with GT911 through IIC .

GT911 uses standard IIC communication with a maximum communication rate of 400KHz. The module sets the IIC communication address of GT911 to (0x28/0x29) or (0xBA/0xBB).

GT911 The power-on sequence is shown in the figure below:

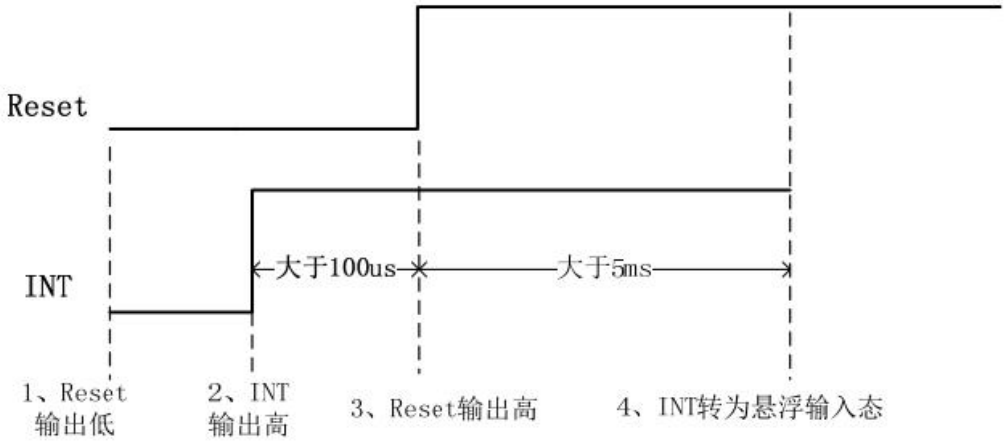
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GT911 power-on timing diagram

GT911 Set the 0x28/0x29 address timing as shown below:

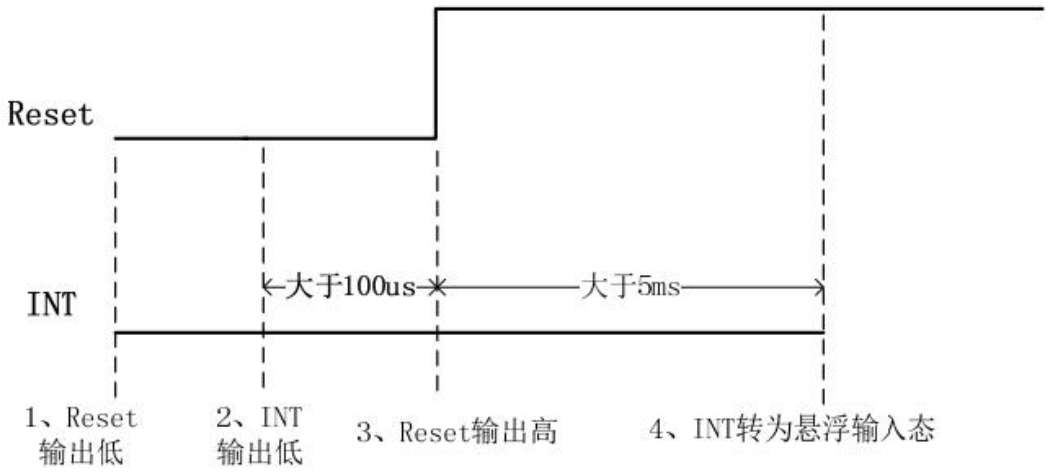


GT911 setting 0x28/0x29 address timing diagram

GT911 Set the 0xBA/0xBB address timing as shown below:

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GT911 setting 0xBA/0xBB address timing diagram

GT911 IIC The communication writing process is shown in the figure below:

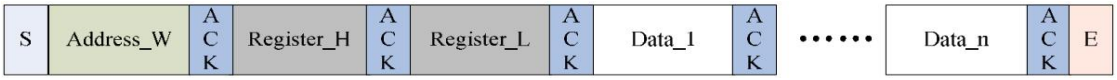
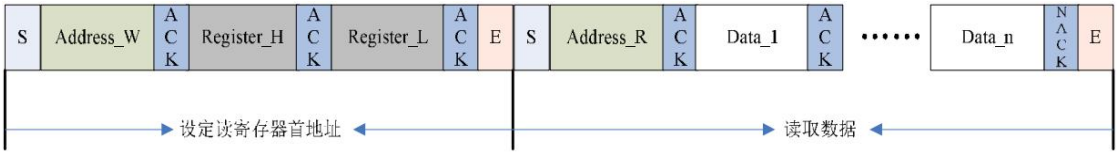


Figure 2.3.1.1 GT911 IIC Communication writing process

GT911 IIC The communication reading process is shown in the figure below:



GT911 IIC Communication reading flow chart

For detailed description of the touch chip, please refer to Goodix Technology's GT911 official manual "GT911_Datasheet.pdf".

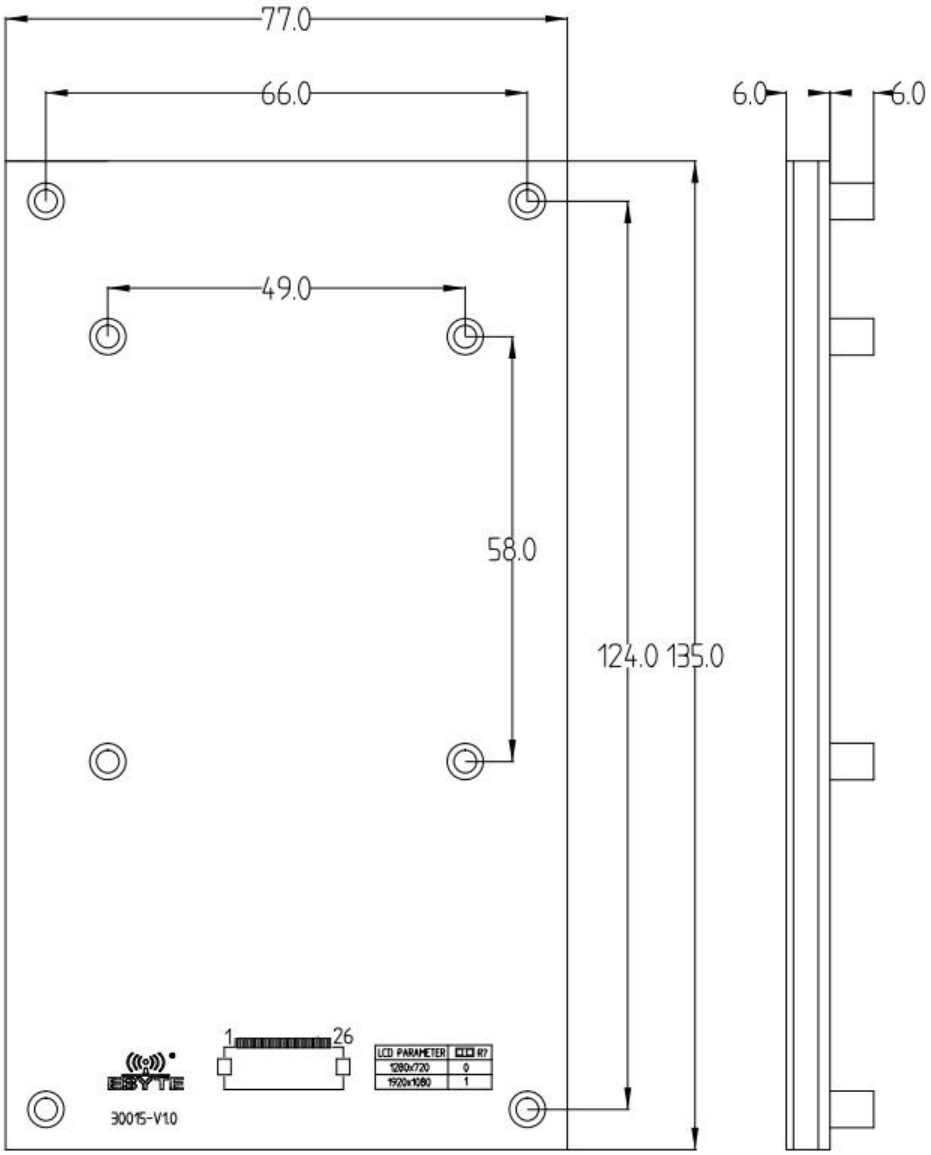
3. Structural dimensions

See the figure below for structural dimensions (unit: mm).

The mounting hole size is M2.5.

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Touch screen structure dimensions

4. Reference Documentation

- GT911_Datasheet.pdf
- HX8394-F (720P)_ Datasheet.pdf
- HX8399-C (1080P)_ Datasheet.pdf
- LP3322_Datasheet.pdf

5. Revision Notes

Revision Notes Table

Version	Modifications	Modification time	prepared by	Proofreading	Approval
V1.0	First Draft	25-05-13	LqCy	Wlq	WFX

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