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SMART DISPLAY MODULE SPECIFICATION

3.5 Inch Smart Display with TOUCH	
Model:	ET035SM01-VT
Version:	V1.2
Date:	2025-01-09

Customer Confirmation

Approved by	Notes

REVISION HISTORY

Revision	Date	Contents of Revision Change	Remark
V1.0	202401031	Preliminary release	
V1.1	20241118	Add more hardware details and link to specification	
V1.2	20250109	Update GitHub link	

TABLE of CONTENTS

1. Introduction

1.1 Features

Brief Info:

1) Button control: one is the reset button, the other is the boot button.
2) Backup IO: download ports and multiple IO leads to use on both sides of the periphery.
3) Power: DC 5V, 200mA

System

1) OS: RTOS
2) CPU: ESP32-S3 240Mhz
3) RAM: 8MB
4) Flash: 16MB
5) Interface: UART/USB
6) Support 2.4GHz Wi-Fi、BLE 5、BLE Mesh
7) Support Peripherals:
   GPIO, SPI, LCD interface, Camera interface, UART, I2C, I2S, remote control, pulse counter,LED PWM, full-speed USB 2.0 OTG, USB Serial/JTAG controller, MCPWM, SDIO host, GDMA, TWAI® controller (compatible with ISO 11898-1), ADC, touch sensor, temperature sensor, timers and watchdogs

For more information on ESP32-S3-WROOM-1, please refer to the following link: datasheet_en.pdf

Display

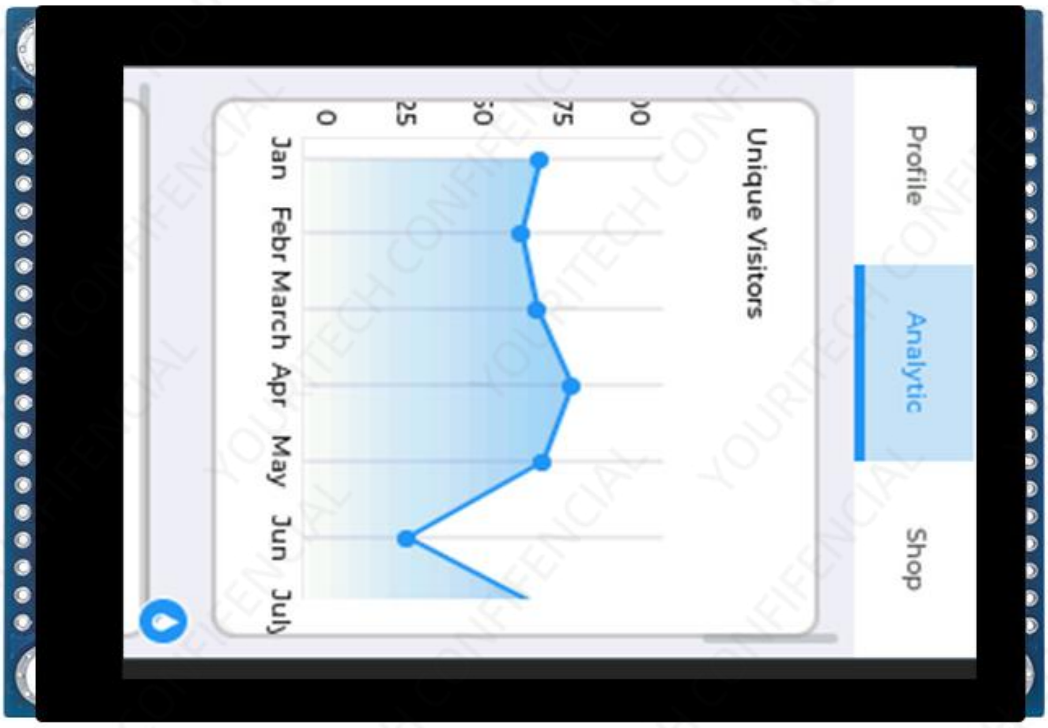
1) Size:3.5 Inch
2) Resolution: 240(W)*3(RGB)*320(H)
3) Mode: MCU 8/16BIT/SPI
4) Display mode：Normally Black
5) Driver IC： GC9307
6) Touch IC：CHSC6540
7) Pixel Density：119 PPI
8) Backlight Type：White LED
9) Brightness: 300 cd/m2

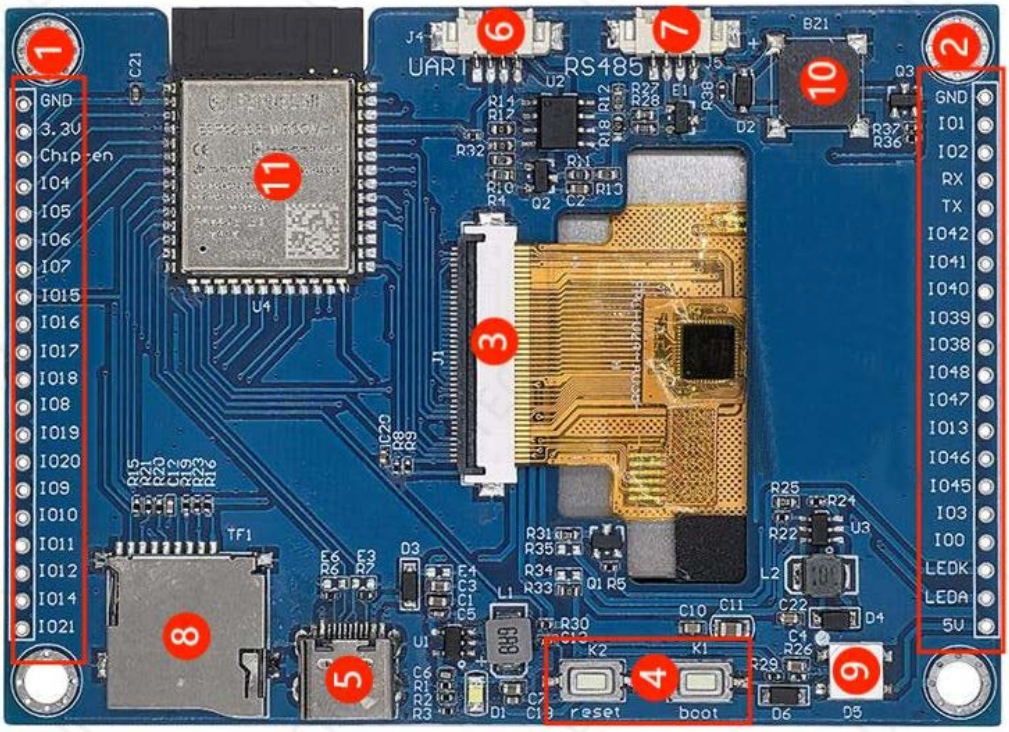
More information about Display can be found here: Display Specification.pdf

Other

1) Operation Temperature：-20~70℃
2) Storage Temperature：-30~80℃

1.2 Appearance picture





The hardware marked above will be described one by number in 2

2. Product information

2.1 Interface Description

(1) External GPIO:J3

Symbol	Description	Current Usage
GND	Grounds	GND
3.3V	Power 3.3V	Power 3.3V
CHIP-EN	High: on, enables the chip Low: off, the chip powers off. Note: Do not leave the EN pin floating	Note: Do not leave the EN pin floating
GPIO4	RTC_GPIO4, GPIO4, TOUCH4, ADC1_CH3	TP-INT
GPIO5	RTC_GPIO5, GPIO5, TOUCH5, ADC1_CH4	Not used
GPIO6	RTC_GPIO6, GPIO6, TOUCH6, ADC1_CH5	Not used
GPIO7	RTC_GPIO7, GPIO7, TOUCH7, ADC1_CH6	Not used
GPIO15	RTC_GPIO15, GPIO15, U0RTS, ADC2_CH4, XTAL_32K_P	SD-D2
GPIO16	RTC_GPIO16, GPIO16, U0CTS, ADC2_CH5, XTAL_32K_N	SD-MISO
GPIO17	RTC_GPIO17, GPIO17, U1TXD, ADC2_CH6	SD-MOSI
GPIO18	RTC_GPIO18, GPIO18, U1RXD, ADC2_CH7, CLK_OUT3	SD-D1
GPIO8	RTC_GPIO8, GPIO8, TOUCH8, ADC1_CH7, SUBSPICS1	Not used
GPIO19	RTC_GPIO19, GPIO19, U1RTS, ADC2_CH8, CLK_OUT2, USB_D-	USB-DN
GPIO20	RTC_GPIO20, GPIO20, U1CTS, ADC2_CH9, CLK_OUT1, USB_D+	USB-DP
GPIO9	RTC_GPIO9, GPIO9, TOUCH9, ADC1_CH8, FSPIHD, SUBSPIHD	Not used
GPIO10	RTC_GPIO10, GPIO10, TOUCH10, ADC1_CH9, FSPICS0, FSPIIO4, SUBSPICS0	Not used
GPIO11	RTC_GPIO11, GPIO11, TOUCH11, ADC2_CH0, FSPID, FSPIIO5, SUBSPID	Not used
GPIO12	RTC_GPIO12, GPIO12, TOUCH12, ADC2_CH1, FSPICLK, FSPIIO6, SUBSPICLK	Not used
GPIO14	RTC_GPIO14, GPIO14, TOUCH14, ADC2_CH3, FSPIWP, FSPIDQS, SUBSPIWP	SD-SCLK
GPIO21	RTC_GPIO21, GPIO21	SD-D3

(2) External GPIO:J2

Symbol	Description	Current Usage
GND	Grounds	Grounds
GPIO1	RTC_GPIO1, GPIO1, TOUCH1, ADC1_CH0	TP-SDA
GPIO2	RTC_GPIO2, GPIO2, TOUCH2, ADC1_CH1	TP-RST
GPIO44	U0RXD, GPIO44, CLK_OUT2	UARTRX
GPIO43	U0TXD, GPIO43, CLK_OUT1	UARTTX
GPIO42	MTMS, GPIO42	LCD-CSB
GPIO41	MTDI, GPIO41, CLK_OUT1	LCD-RS
GPIO40	MTDO, GPIO40, CLK_OUT2	LCD-SCL
GPIO39	MTCK, GPIO39, CLK_OUT3, SUBSPICS1	LCD-RST
GPIO38	GPIO38, FSPIWP, SUBSPIWP	Not used
GPIO48	SPICLK_N_DIFF,GPIO48, SUBSPICLK_N_DIFF	LCD-M1
GPIO47	SPICLK_P_DIFF,GPIO47, SUBSPICLK_P_DIFF	LCD-M0
GPIO13	RTC_GPIO13, GPIO13, TOUCH13, ADC2_CH2, FSPIQ, FSPIIO7, SUBSPIQ	BL-EN
GPIO46	GPIO46	SDO
GPIO45	GPIO45	SDI
GPIO3	RTC_GPIO3, GPIO3, TOUCH3, ADC1_CH2	TP-SCL
GPIO0	RTC_GPIO0, GPIO0	RGB-LED
LEDK	BL-	BL-
LEDA	BL+	BL+
5V	Power 5V	5V

Note: (1) (2)

- A pin can be used for other purposes when it is not used at the same time
- You can also use an external gpio to drive other interface types, such as SPI interface, MCU interface, MIPI interface, etc., without using the Display interface provided by us
- If the Display interface is used but the SD is not used, then the SD pins are freely usable.

(3) Display Interface

Pin No.	Symbol	I/O	Description
1	XL/CTP-SCL	I	I2C clock signals for CTP; Option XL for RTP
2	YU/CTP-SDA	I	I2C data signal for CTP,Option YU for RTP

3	XR/CTP-RST	I	The signal will reset the CTP,Signal is active low, Option XR for RTP
4	YD/CTP-INT	I/O	Interrupt signals for CTP,Option YD for RTP
5	GND	P	Power Ground
6	IOVCC	P	Power supply for I/O system
7	VCI	P	Power supply for analog circuits
8	TE	O	Tearing effect signal is used to synchronize MCU to frame memory
9	SPI_CS/MCU_CS	I	Chip selection pin. Low-active
10	SPI_SCL/MCU_RS	I	Display data/command selection pin in MCU interface In SPI mode, this pin is used as SCL
11	SPI_RS/MCU_WR	I	Write enable in MCU parallel interface RS=1 display data or parameter;RS=0 register index / command
12	MCU_RD	I	Read enable in 8080 MCU parallel interface. Low-active.
13	SPI_SDA	I/O	Serial communication data input and output, internal pull low.
14	SPI_SDO	O	SPI interface output pin
15	RESET	I	The signal will reset the LCM, Signal is active low.
16	GND	P	Power Ground
17-32	DB0-DB15	I/O	data bus for MCU
33	LED-A	P	Power supply for backlight anode
34-36	LED-K	P	Power supply for backlight cathode
37	GND	P	Power Ground
38	IM0	I	The MCU interface mode select.
39	IM1	I	The MCU interface mode select.
40	IM2	I	The MCU interface mode select.

The choice of IM is as follows: 1 means pull up, and 0 means pull down

IM2IM1IM0: 110-2.4inch 111-3.5inch 101-3.9/4.3inch

(4) button:

The following picture shows the boot button on the left and the reset button on the right.

(5) Power:

The following figure is the schematic diagram of USB. USB is used for power and download.

(6) UART:

a hardware communication protocol that enables asynchronous serial communication between devices, allowing for the transmission and reception of data using two wires: one for transmitting (TX) and one for receiving (RX).

(7) RS485:

a standard for serial communication that allows for long-distance data transmission and multi-point connections, using differential signaling to improve noise immunity and enabling communication over distances up to 1,200 meters at speeds of up to 10 Mbps.

(8) SD:

A port or slot for inserting an SD card, usually for storing data

(9) RGB LCD:

Can emit red, green, blue three colors of light, and through different combinations to produce a variety of colors

(10) Passive Buzzer:

An external circuit is required to generate a driving signal (usually a square wave) to sound

(11) Main Control Chip: ESP32S3

Dual-core processor, up to 240MHz operating frequency

2.2 Display Information

Item	Specification	Unit	Remark
Pixel Driving element	IPS TFT	-	
Screen Size	3.5	Inch	-
Resolution	240(W)*3(RGB)*320(H)	Dots	-
Interface	MCU 8/16BIT/SPI	-	-
Module Power Consumption	0.507	Watt	Typ.
Active Area	51.27(W)*68.36(H)	mm	Typ.
Pixel pitch (W*H)	0.213*0.213	mm	Typ.
Module Size (W*H*D)	65.31(W)*86.51(H)*3.39(D)	mm	Typ.
Luminance	300	cd/m^2	Typ.
Viewing Direction	All	O'clock	-
Display Color	262K	Colors	18bits

2.3 Voltage & Current

Item	Conditions	Min	Typ	Max	Unit
Power Voltage	DC	4. 0	5.0	5.5	V
Operation Current	VCC= +5V, Maximum backlight current	-	200	-	mA
	VCC= +5V,backlight off	-	100	-	mA
Recommended power supply:5V 1A DC					

2.4 Reliability Test

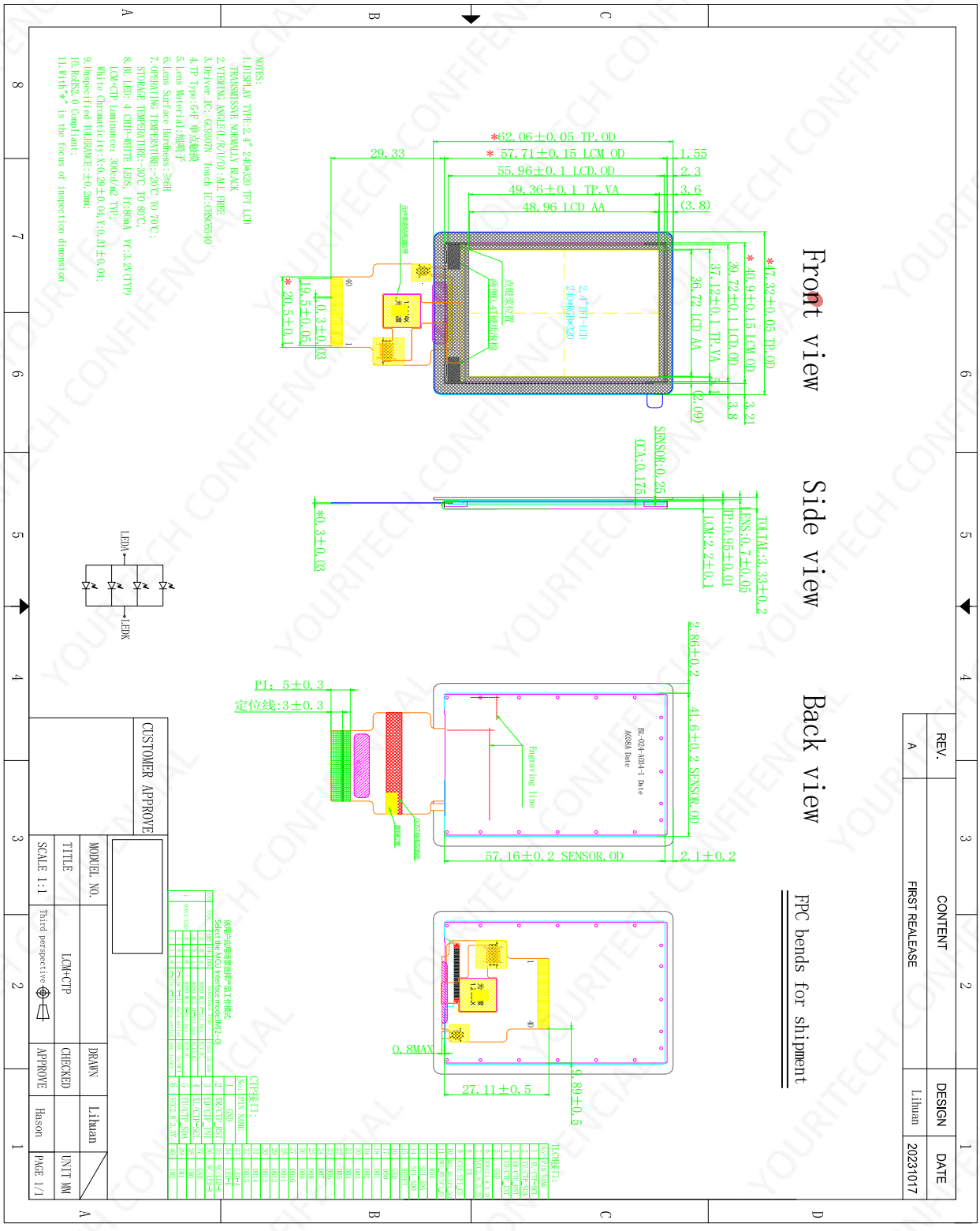
Item	Conditions	Min	Typ	Max	Unit
Working Temperature	60%RH at 5V voltage	-20	25	70	C
Storage Temperature	---	-30	25	80	C
Working Humidity	25°C	10%	60%	90%	RH
ESD	---	Contact: ±4KV Air: ±8KV			KV

2.5 Related software

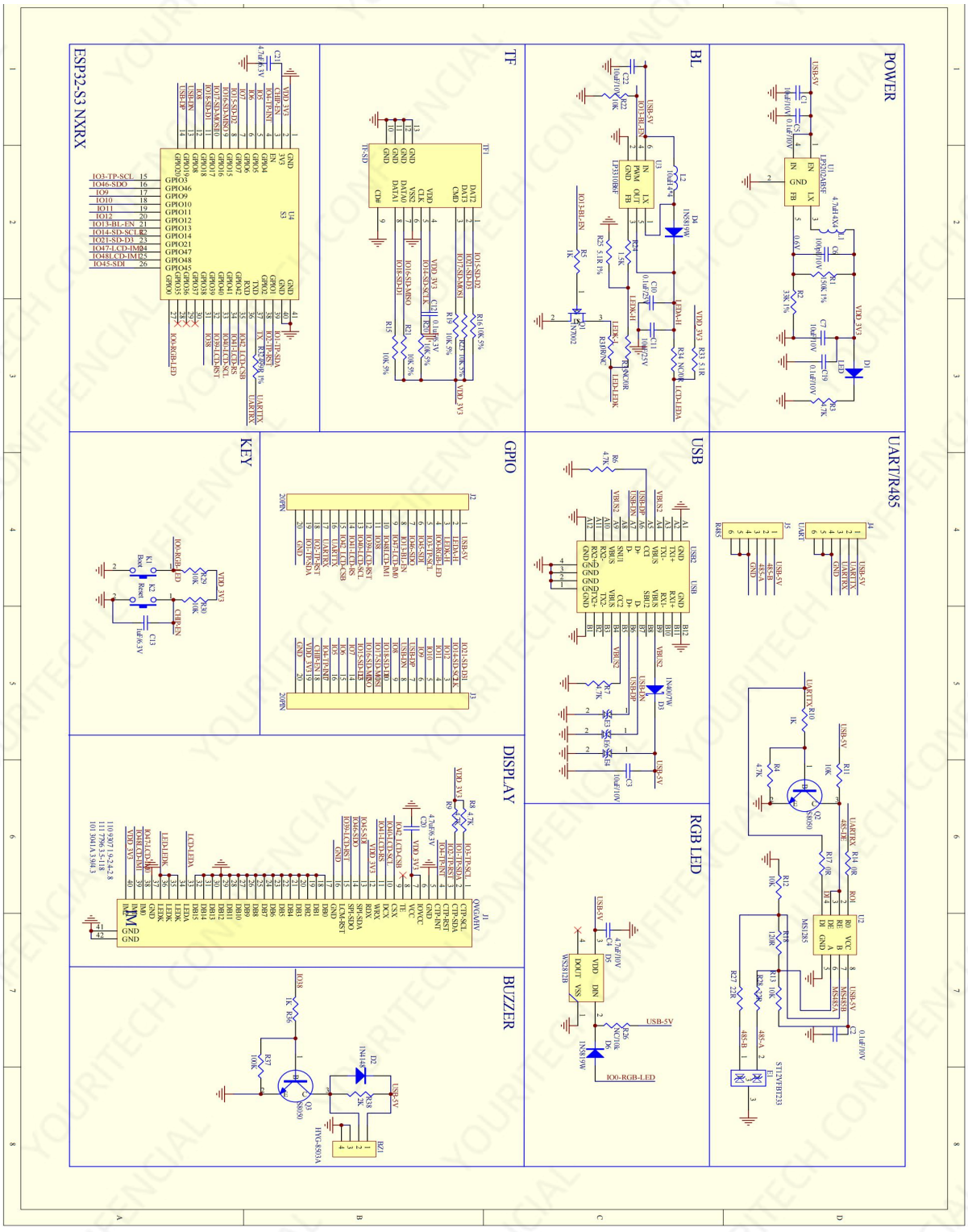
Software name	Version	Software associated configuration	Development environment configuration link
Arduino IDE	esp32 (3.0.0-3.0.4)	1. Board: ESP32S3 Dev Module 2. CPU Frequency: 240MHz (WiFi) 3. Flash Frequency: NO 4. Flash Mode: QIO 80MHz 5. Flash Size: 16MB (128Mb) 6. Partition Scheme: Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS) 7. PSRAM: OPI PSRAM 8. Programmer: Esptool	ESP32-Arduino config (github.com)
ESP-IDF	5.1.1 5.2.2 5.3	Once configured, no configuration is required （If you have any problem with the configuration, please contact us, we will help you）	ESP-IDF config (github.com)

3. MECHANICAL DRAWING

3.1Display



4. Schematic


POWER
BL
TF
ESP32-S3 NXRX
UART/RS485
USB
RGB LED
GPIO
KEY
DISPLAY
BUZZER