SMART DISPLAY MODULE SPECIFICATION

1.3 Inch Smart Knob Display with Wi-Fi /BLE	
Model:	UEDX24240013-MD50E
Version:	V3.3
Date:	2024-11-18

Customer Confirmation 客户确认

Approved by	Notes

REVISION HISTORY

Revision	Date	Contents of Revision Change	Remark
V1.0	20221223	Preliminary release	
V2.0	20240218	Change to English version	
V3.0	20240730	Add schemata, GitHub project links, and environment configuration links	
V3.1	20240805	Upgrade mechanical drawing	
V3.2	202408012	Add GitHub links to required libraries for Arduino	
V3.3	20241118	Add more hardware details and link to LCD specification	

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1. Introduction

1.1 Features

Brief Info:

1) Outline Dimension: ϕ 50 Round
2) Interaction Method: Rotate and Press
3) Shell Color: Black/White/Silver/Customized
4) Power: DC 5V, 100mA

System

1) OS: RTOS
2) CPU: ESP32-C3 160Mhz
3) RAM: 400KB
4) Flash: 4MB
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-C3, please refer to the following link:datasheet_en.pdf

Display

1) Size: 1.3 Inch
2) Resolution: 240*240
3) Mode: IPS
4) Pixel Arrangement：RGB Vertical Stripe
5) Interface Mode：4 Wire SPI
6) Driver IC：GC9A01
7) Brightness: 300 cd/m^2
8) Pixel Density：261 PPI
9) Touch: without

More information about Display can be found here:display datasheet

Other

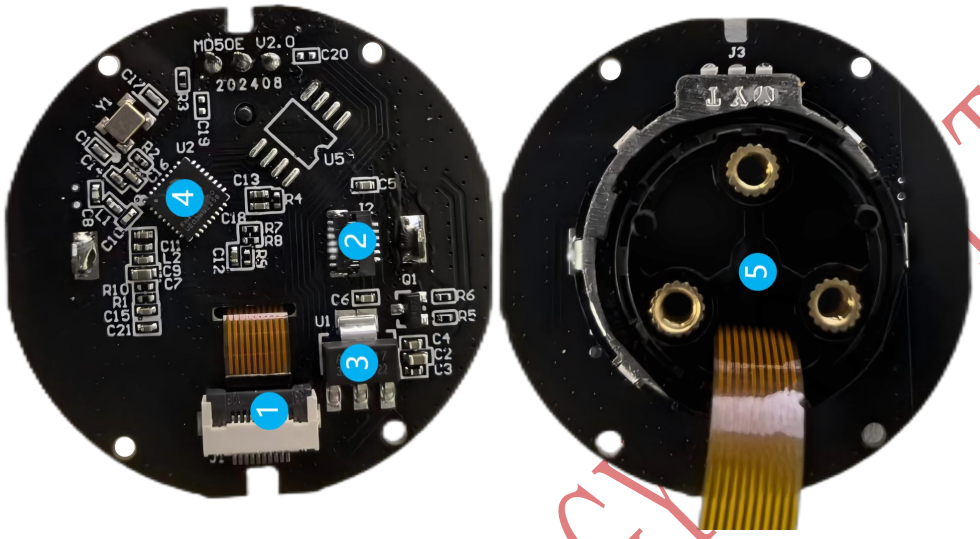
1) Operation Temperature：-20~70℃
2) Storage Temperature：-30~80℃

1.2 Appearance picture

2. Product information

2.1 Interface Description

Mainboard:



① **USB power supply and burning interface**

Pin NO.	Symbol	Description	Voltage Range	Remarks
1	VCC	Power 5V	5V	
2	ADC	GPIO3, ADC IO	0-3.3V	
3	GND	Grounds	0V	
4	NC	NC	-	
5	NC	NC	-	
6	RX	UART Receive	0-3.3V	
7	TX	UART Transmit	0-3.3V	
8	RST	Reset signal, do not connect if not in use	0-3.3V	
9	USB-DP	USB D+	3.3V	
10	USB-DN	USB D-	3.3V	

The connector specifications is 10PIN 0.5mm pitch

② **Display Interface:**

Pin No.	Symbol	I/O	Description
1	VCC	P	Power supply for analog circuits
2	GND	P	Power Ground
3	VDDIO	P	Power supply for backlight cathode
4	GND	P	Power Ground
5	SPI_CS	I	Chip select pin for SPI interface
6	SPI_CLK	I	Clock select pin for SPI interface
7	SPI-MOSI	I/O	Data select pin for SPI interface
8	DCX	I	D/C select pin for SPI interface
9	RESET	I	The signal will reset the LCM, Signal is active low.
10	GND	P	Power Ground
11	TE	O	Tearing effect outputsignal. If not used, please let this pin open
12	LEDK	P	Power supply for backlight cathode
13	LEDA	P	Power supply for backlight anode

③ **AMS1117-3.3**

AMS1117-3.3 is a forward low voltage drop regulator with an output voltage of 3.3V

④ **Main Control Chip: ESP32C3**

Dual-core processor, up to 160MHz operating frequency

⑤ **Encoder and button:The combination implements the control of the screen interface**

Encoder:

Encoder model: EC28

Operating length: 15mm

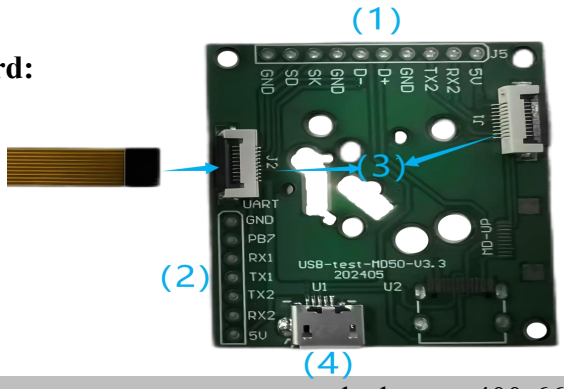
positioning torque: 7±5mN • m

Positioning number: 30

Button:

Button model: 6x6 silent switch

USB adapter board:



(1) Reserve IO: J5

Pin Name	Symbol	Description	Voltage Range	Remarks
5V	VCC	Power 5V	5V	
RX2	NC	NC	-	
TX2	NC	NC	-	
GND	NC	NC	-	
D+	USB D+	USB D+	3.3V	
D-	USB D-	USB D-	3.3V	
GND	GND	GND	-	
SK	NC	NC	-	
SD	NC	NC	-	
GND	GND	GND	0V	

(2) Reserve Interface: UART

Pin Name	Symbol	Description	Voltage Range	Remarks
GND	GND	Power 5V	-	
PB7	ADC	GPIO3, ADC IO	-	Not Used
RX1	RX	UART Receive	-	
TX1	TX	UART Transmit	-	
TX2	NC	NC	-	
RX2	NC	NC	-	
5V	VCC	Power 5V	5V	

(3) 10PIN-FPC J2: reference 2.1 Hardware Description:Mainboard/USB power supply and burning interface

(4) USB: Used for powering and burning code

2.2 Display Information

Item	Specification	Unit	Remark
Pixel Driving element	IPS TFT	-	-
Screen Size	1.28	Inch	Diagonal
Resolution	240(W)*3(RGB)*240(H)	Dots	-
Interface	4 Wire SPI	-	-
Module Power Consumption	0.278	Watt	Typ.
Active Area	32.4（⌀ ）	mm	-
Pixel pitch (W*H)	0.135(W)*0.135(H)	mm	-
Module Size (W*H*D)	45.5(W)*45.5(H)*2.69(D)	mm	-
Luminance	200	cd/m^2	Typ.
Viewing Direction	All	O'clock	-
Display Color	65K	Colors	16 Bits

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	50	100	150	mA
	VCC= +5V,backlight off	-	50	-	mA
Recommended power supply:5V 1A DC					

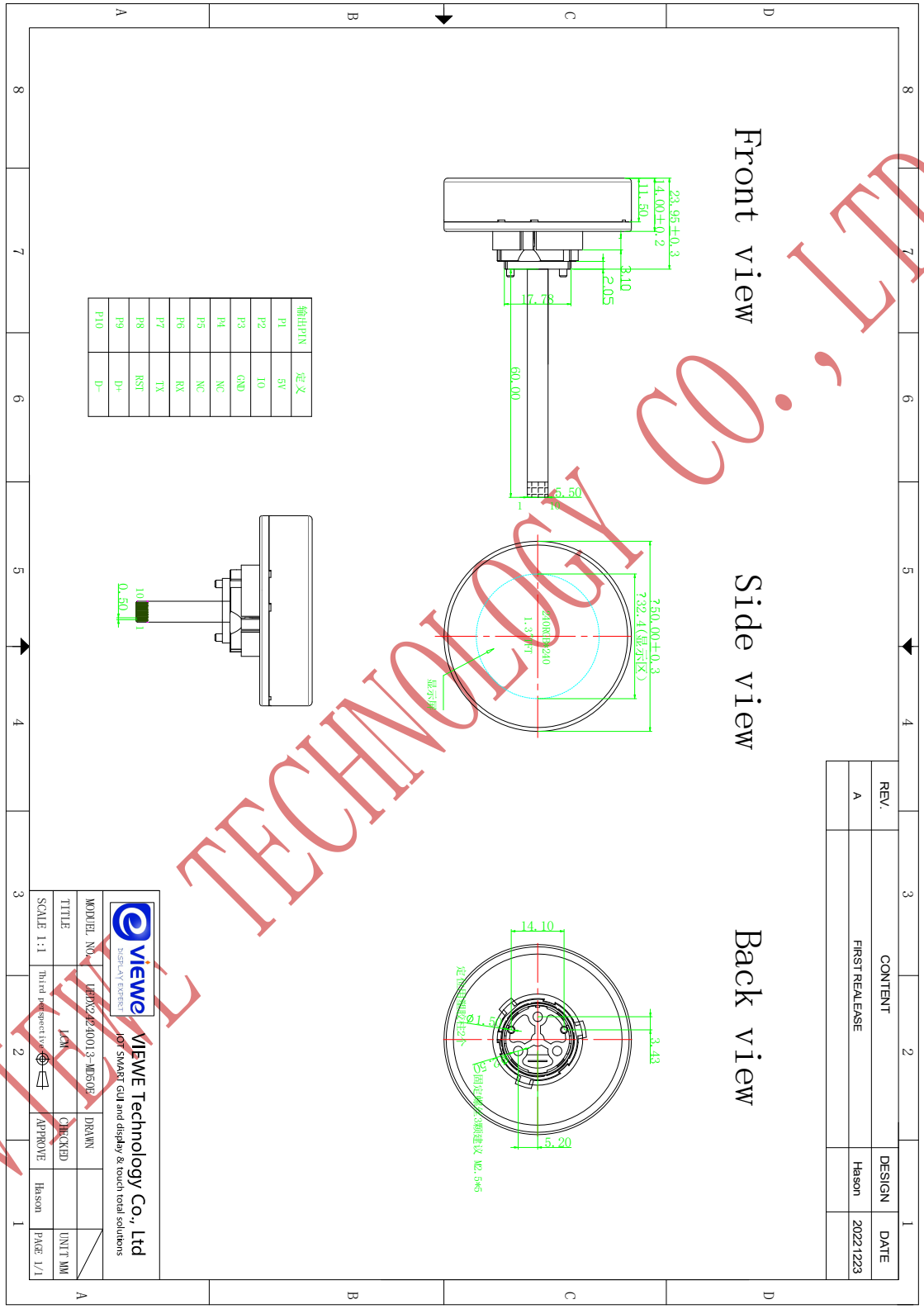
2.4 Reliability Test

Item	Conditions	Min	Typ	Max	Unit
Working Temperature	60%RH at 5V voltage	-20	25	70	C
Storage Temperature	---	-30	25	85	C
Working Humidity	25°C	10%	60%	90%	RH
ESD	---	Contact: ±4KV Air: ±8KV			KV

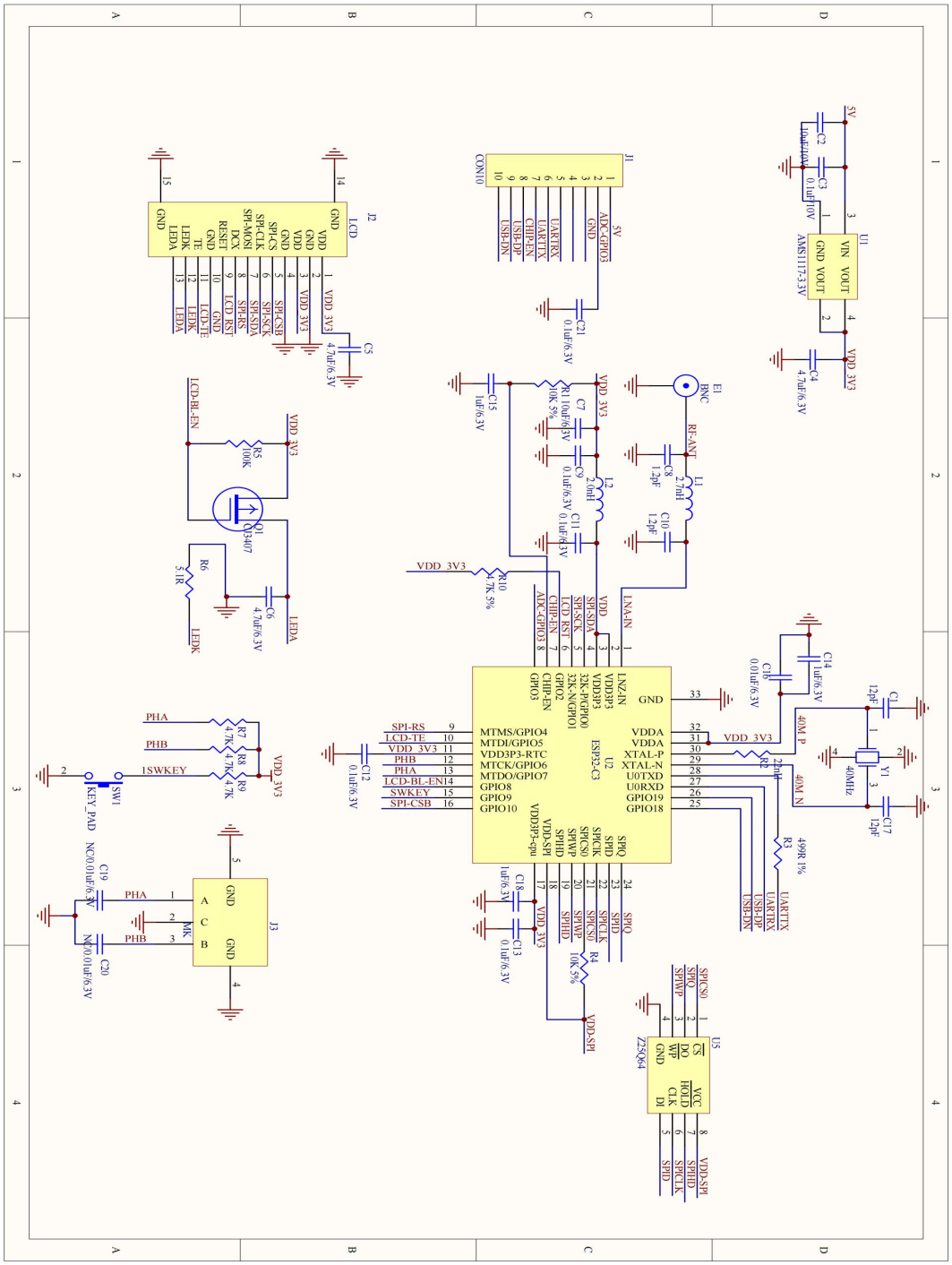
2.5 Related software

Software name	Version	Software associated configuration	Development environment configuration link
Arduino IDE	2.0.17 (esp32)	1. Board: ESP32C3 Dev Module 2. CPU Frequency: 160MHz (WiFi) 3. Flash Frequency: 80MHz 4. Flash Mode: QIO 80MHz 5. Flash Size: 4MB (32Mb) 6. Partition Scheme: Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS) 7. PSRAM:NO 8. Programmer: Esptool	ESP32-Arduino config (github.com)
ESP-IDF	5.1.1 5.2.2	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



4. Schematic



5. Related downloads

5.1 Arduino and IDF relevant information

https://github.com/VIEWESMART/UEDX24240013-MD50ESP32_1.3inch-Knob

5.2 Libraries required for Arduino

https://github.com/VIEWESMART/UEDX24240013-MD50ESP32_1.3inch-Knob/tree/main/Libraries