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**Product
Datasheet**

Medical Grade ET104M8060-DC02 Datasheet V1.3

ISO9001:2015 Quality System Certification

Customer			
Keywords	M series, medical grade, 10.4 inch, 800*600, with configuration, LUA script, audio, AV input		
Model	ET104M8060-DC02		
Signature of Customer		Signature of Engineer	
Date		Date	



Version Record

Version	Date	Reason for modify	Page	Written by	Reviewed by
V1.0	2020/11/18	File creation	all		
V1.1	2021/05/19	CAD changes	P10		
V1.2	2021/12/22	CAD display area position, size modification	P3、 P10		
V1.3	2022/07/08	Add capacitive screen products: update parameters, update product photos, update dimensional drawings	P1-4		



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1. Hardware Introduction

This section mainly introduces some appearance reference diagrams, hardware configuration diagrams and tools required for debugging of the product.

1.1 Product appearance

The following is the appearance reference diagram of different models of this size, as shown in Figure 1-1, Figure 1-2, Figure 1-3.

Note: There is no modification of key structural processes or major adjustments in layout, only changes and iterations in product processes or reliability, and the company will not initiate external changes, and the specific physical objects received shall prevail.

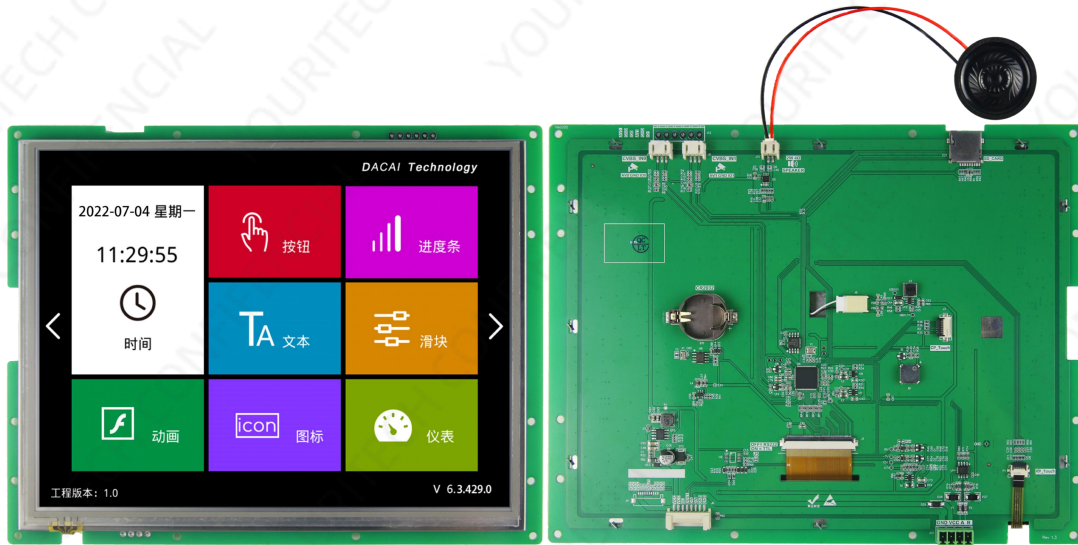


Figure 1-1 10.4 inch resistive touch reference diagram

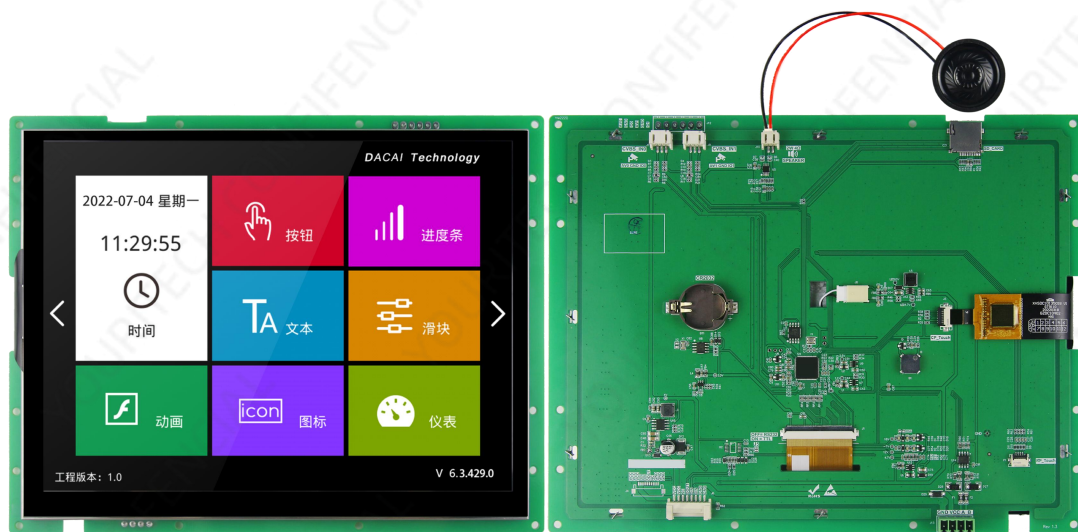


Figure 1-2 10.4-inch capacitive touch reference diagram



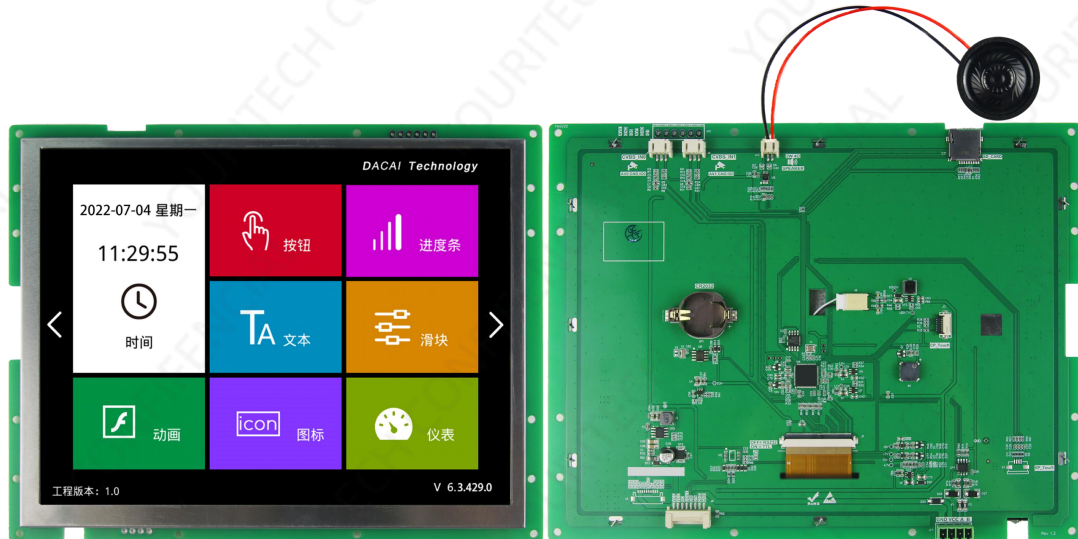


Figure 1-3 10.4-inch non-touch reference diagram

1.2 Hardware configuration

The following is a reference diagram of the hardware configuration of this size product, as shown in Figure 1-4.

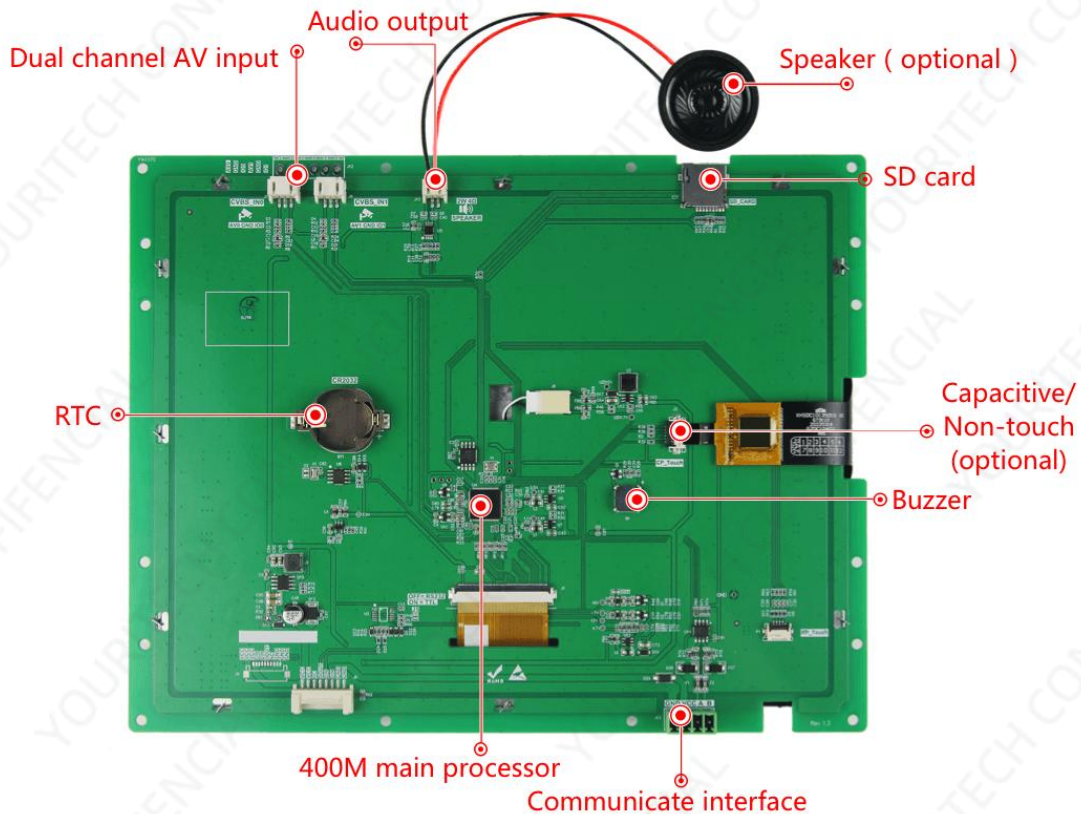


Figure 1-4 Hardware configuration



1.3 Debugging tool

The following is the reference diagram of the debugging tool of this product, illustrated by an example of a capacitive screen, as shown in Figure 1-4.

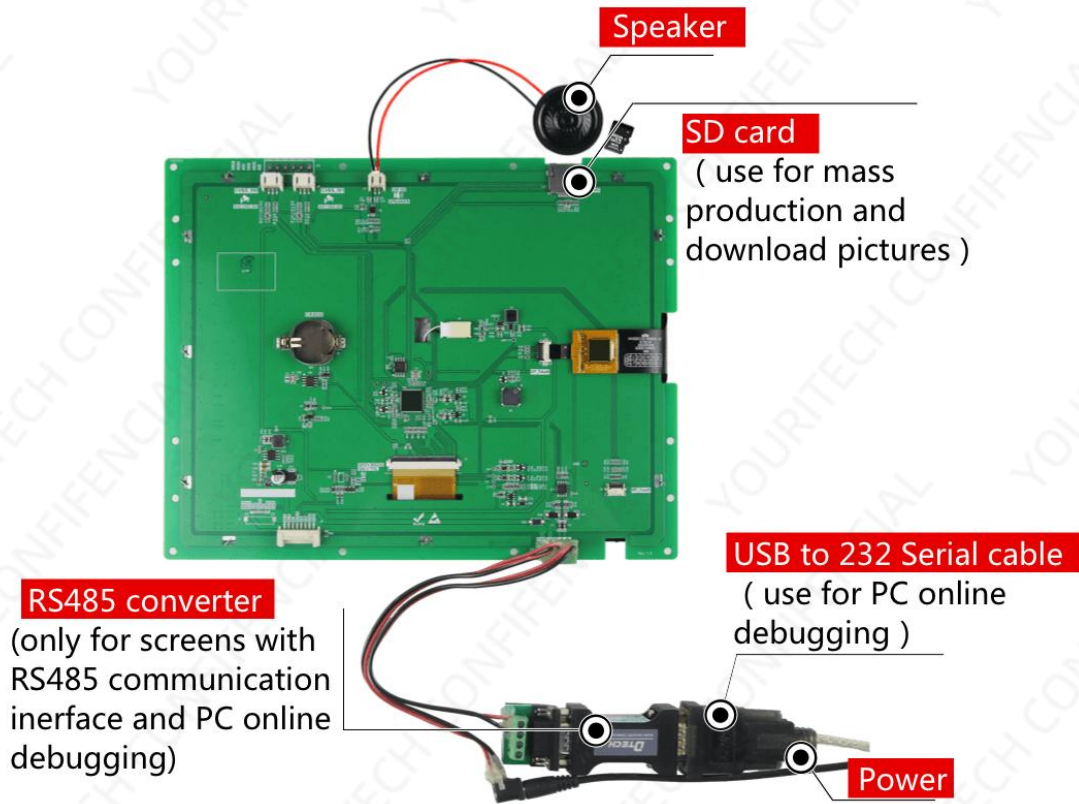


Figure 1-5 Debugging tool diagram



2. Product Specifications

◆ Product parameters	
Model description	ET104M8060-DC02T (RS485, Resistive touch) ET104M8060-DC02C (RS485, Capacitive touch) ET104M8060-DC02(RS485, No touch)
Product Series	M series, medical grade
Core processor	400M SOC processor
Operating system	No operating system, power on and running
Protocol type	The default YOURITECH configuration instruction set, the host computer can be configured to run MODBUS RTU, XGUS protocol
Scripting language	Version 5.3 LUA script, the screen can run user-written logic, protocol and algorithm functions
Size	10.4 inch
Resolution	800*600
Installation orientation	Supports 0, 90, 180 and 270 degree rotation installation display
Storage space	128Mbit
Font	Built-in vector font, edge anti-aliasing, support any size ASCII, GBK, GB2312, UNICODE (global language) font library, can also customize any computer font display
Image Storage	Support JPEG, PNG (semi-transparent/full transparency) compression, support any size picture storage. The accumulation can store about 145 full-screen images (calculated according to the size of 100KB/sheet, BMP format is not recommended). The image compression ratio is different, and this value fluctuates up or down
Color	65K color, 16-bit RGB
Voltage	4.5-30V
Power Consumption	Darkens backlight, no horn: 1.3W
	Darkens backlight, with horn: 2.5W
	Brightens backlight, no horn: 5.7W
	Brightens backlight, with horn: 7.2W
Communication Method	RS485
Communicate Baud-rate	RS485: 1200~115200bps, typical baud rate: 9600bps
Communication Connector Specifications	2EDG3.81-4P
Image Local Download	SD card, serial port, U disk (need to be customized)
Firmware Local/Remote Upgrade	Insert SD card to upgrade locally / support remote serial port of user motherboard to upgrade screen firmware
Picture Remote Upgrade	Support users to remotely use their motherboard serial port to upgrade screen-related picture projects, font libraries, configuration files, etc.
Real-time clock (RTC)	Support clock, timer, countdown and other functions



Screen Active Display Area (AA)	Length*width = 211.5mm*158.7mm
Product Size (L*W*H)	247.9mm*193.8mm*22.6mm (MAX, include TP)
Supporting Host Computer Software	VisualTFT®
Operating temperature	-20~+70℃
Storage temperature	-30~+80℃
AV input	Support P or N CVBS camera signal input with resolution below 720*576, can be displayed in any window size, and can be displayed with superimposed controls
AV input connector specifications	PH2.0-3P
Audio playback	MP3 audio format (speaker 4 Ω 2W, mono), sharing storage space with pictures. If the sample rate of MP3 format is 128kbps, it occupies 0.92MB/minute of storage
Audio connector specifications	PH2.0-2P
Video Playback	MP4 video format, sharing storage space with pictures. If a video file with a resolution of 800*600, a video bitrate of 3000Kbps, an audio bitrate of 166Kbps, and a frame rate of 25Hz occupies 21.9MB/min
Three-Conformal Paint Process	None (optional)

◆ Product Core Competitiveness	
Learning Cycle	30 minutes to familiarize with the development environment, 3 days to complete the HMI design
Program Debugging	The host computer integrates a "TFT Simulate", which does not need to be connected to the hardware, and Keil IDE is directly bound to it for debugging
Startup Time	Run at power-on, no system load time
Configure Controls	It has a variety of configuration controls such as multi-language, button, text, drop-down menu, progress bar, slider, meter, animation, QR code, curve, historical curve, data record, circular progress bar, sprite slide control and so on
System Keyboard	Built-in virtual number, character keyboard, support Chinese and English input methods, customize keyboard
Data Logging	Supports exporting data logging control content to SD card
Layer Technology	The system has multiple built-in display layers for faster switching
Multi-Language Capabilities	Factory preset up to 15 languages of any country in the world, one-click switch of the required language, without the need for multiple sets of UI
Logical Operation Processing	The LUA script compiler is embedded in the host computer, and users can customize various complex logic relationships and protocols on the screen, meeting 99.9% of the product function requirements of customers
Remote Upgrade	Support remote serial port to upgrade screen firmware, project files, specified pictures, configuration files and font libraries
Life Cycle	Using traditional YOURITECH processors, non-stop goods for many years



◆ LCD	
Display type	TFTLCD
Backlight Tube	LED
Brightness (cd/m ²)	400
Backlight Life (h)	>20,000
Contrast Ratio	600:1
Visual Angle (L/R/T/B)	70/70/50/60

◆ Touch panel (resistor, capacitor optional)	
Touch Type	Capacitive touch screen
Capacitive Screen Touch Mode	Point, swipe touch
Capacitive Screen Light Transmittance	More than 90%
Capacitive Screen Touch Times	The number of capacitive screen touches is theoretically infinite, and the touch life is related to the working environment (dust, humidity)
Capacitor cover plate customization	Capacitive cover plate customization "glass cover + capacitive touch" integrated lamination service can be customized according to the size of user drawings
Touch Type	Resistive touch screen
Resistive screen touch mode	Point, swipe touch
Resistive screen light transmittance	More than 80%
Number of times the resistive screen touches	The same pixel, the number of single points is more than 1 million times

◆ Customized Services	
Custom Fee	Sign a 1000PCS contract at one time, and some can be exempted from customization fees
Hardware Circuitry	Customizable PCB size, circuit thickness, add user circuit, military-grade temperature display, etc.
Software Customization	Customize special instructions or controls according to user needs to reduce user development difficulty
Art Services	Can provide picture art and product structure design services
Other	Customized on demand to meet all user needs



MAX:22.6(T/C)
MAX:20.9(N)

247.9
239.1
230.2(Bezel)
211.5(A.A)
119.4
89.7
177.4(Bezel)
158.7(A.A)
193.8
185.6
(4.1)
(10.4)
(4.7)
(3.1)
(13.7)
(0.0)
显示中心
Display Center

20.9(N)
11.6(N)
1.6(PCB)
13.3(T/C)

82.1
98.5
63.7
48.5
82.6
74.4
50.1
25.6
27.5
86.5
20.9
25.3
16.0±0.0

AV Input
SPEAKER
SD CARD

1、尺寸定位基准为定位孔。
2、未标注公差为+/-0.3mm。
3、T_i 电阻触摸；C_i 电容触摸；N_i 无触摸。
4、虚线标注为有效显示区域。
5、本图纸图形形状和尺寸仅供参考，实际数据请以实物测量为准。
The shape and size of this drawing are for reference only. The actual data shall be subject to the actual measurement.

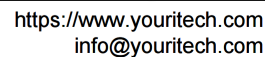
通信接口定义/Communication interface definition

引脚名称/Pin Name	引脚定义/Pin Definition	引脚类型/Pin Type	说明/Description
AVD	1	IN	公共地(GND)
GND	2	GND	未定义/Not Defined
IO0	3	-	未定义/Not Defined
AV1	1	IN	音频输入/音频输入1 (AV Signal Input)
GND	2	GND	公共地(GND)
IO1	3	-	未定义/Not Defined

AV接口定义/AV Interface Definition

引脚名称/Pin Name	引脚定义/Pin Definition	引脚类型/Pin Type	说明/Description
AVD	1	IN	公共地(GND)
GND	2	GND	未定义/Not Defined
IO0	3	-	未定义/Not Defined
AV1	1	IN	音频输入/音频输入1 (AV Signal Input)
GND	2	GND	公共地(GND)
IO1	3	-	未定义/Not Defined

型号/Model: EFT1048060-EX02
品牌/Brand: M
制造商/Manufacturer: 深圳市友尔科技有限公司
零件号/Part No.:
版本/Version: V1.2
日期/Date: 2022-07-11
有效期/Valid: 2022-07-11
YUERTECH TECHNOLOGY
Info@yuer-tech.com



4. Pin Definition

Number	Definition	Description	Reference Diagram
1	GND	Power ground	
2	VCC	Power supply	
3	A	RS485 data A side	
4	B	RS485 data B side	



5. Reliability Test

All serial port screens of YOURITECH Technology have carried out a series of process reliability tests before mass production: high and low temperature, ESD, pulse burst, radiation, touch life and other tests to ensure product quality, as shown in Figure 5-1.



Figure 5-1 Reliability Test Equipment

5.1 ESD Test

5.1.1 Execution standards

Execution Standards

IEC 61000-4-2

5.1.2 Environment Test

Test ambient temperature: 25°C

Test ambient humidity: 50%

Test process: Place the product on the test stand, lay down on the serial port screen buckle and the display area in order to make contact and air discharge as shown in Figure 5-2. Observe whether if the screen have reset or restarted, or abnormal display.





Figure 5-2 ESD test diagram

5.1.3 Test data

Product Model	Discharge type	Humidity	Test result
ET104M8060-DC02T	contact	±7KV	No restart, no abnormal display, normal function
	contact	±8KV	Accidental reset and restart, no abnormal display, normal function
	air	±14KV	No restart, no abnormal display, normal function
	air	±15KV	Accidental reset and restart, no abnormal display, normal function
ET104M8060-DC02C	contact	±7KV	No restart, no abnormal display, normal function
	contact	±8KV	Accidental reset and restart, no abnormal display, normal function
	air	±14KV	No restart, no abnormal display, normal function
	air	±15KV	Accidental reset and restart, no abnormal display, normal function
ET104M8060-DC02	contact	±7KV	No restart, no abnormal display, normal function
	contact	±8KV	Accidental reset and restart, no abnormal display, normal function
	air	±14KV	No restart, no abnormal display, normal function
	air	±15KV	Accidental reset and restart, no abnormal display, normal function

Note: The current test is the product exposed test, the actual product assembly machine, keep the screen and the machine well grounded, or the surface of the touch board is protected by PVC or cover, the ESD performance index of the whole machine will be higher



5.2 High and Low Temperature Aging Test

5.2.1 Test the environment

Test ambient temperature: $-20\sim+70^{\circ}\text{C}$

Test ambient humidity: $60\%\pm 3\%\text{RH}$

Test process: Place the product in the high and low temperature test box at an angle as shown in Figure 5-3. Pass the 72H high temperature, low temperature and high and low temperature alternating change aging test. Observe whether the screen resets and restarts during the test and after the test. Abnormalities, abnormal functions, etc.



Figure 5-3 High and low temperature aging test diagram

5.2.2 Test data

Product Model	Temperature	Humidity	Test results
ET104M8060-DC02T ET104M8060-DC02C ET104M8060-DC02	High temperature (70°C)	60%	No reboot, no abnormal display, normal function
	Low temperature (-20°C)	60%	No reboot, no abnormal display, normal function
	Alternating high and low temperature ($-20\sim 70^{\circ}\text{C}$)	60%	No reboot, no abnormal display, normal function



5.3 Group Pulse Test

5.3.1 Execution standards

Executive Standard

IEC 61000-4-4

5.3.2 Test environment

Test ambient temperature: 25°C

Test ambient humidity: 50%

Test process: Place the product on the test stand, and power the screen through the power supply after the pulse group generator is coupled to the pulse group, as shown in Figure 5-4. During the test, observe whether the screen resets, displays abnormally, or touches, abnormalities and other phenomena.



Figure 5-4 Group pulse test diagram

5.3.3 Test Data

Product Model	Test Standard			Test Result
ET104M8060-DC02T ET104M8060-DC02C ET104M8060-DC02	National standard 4			No restart, normal communication, normal function
	Voltage (KV)	Frequency (KHZ)	Time (S)	
	4.0	100	120	

5.4 Radiation testing

5.4.1 Execution standards

Execution standards

EN55022 ClassB

5.4.2 Test environment

The radiation test laboratory environment is shown in Figure 5-5.





Figure 5-5 Radiation test chart

5.4.3 Test data

The resistance model and non-touch model in this product meet the radiation test standards, and the test data are as follows:

1. Radiation test horizontal test data, shown in Figure 5-6.

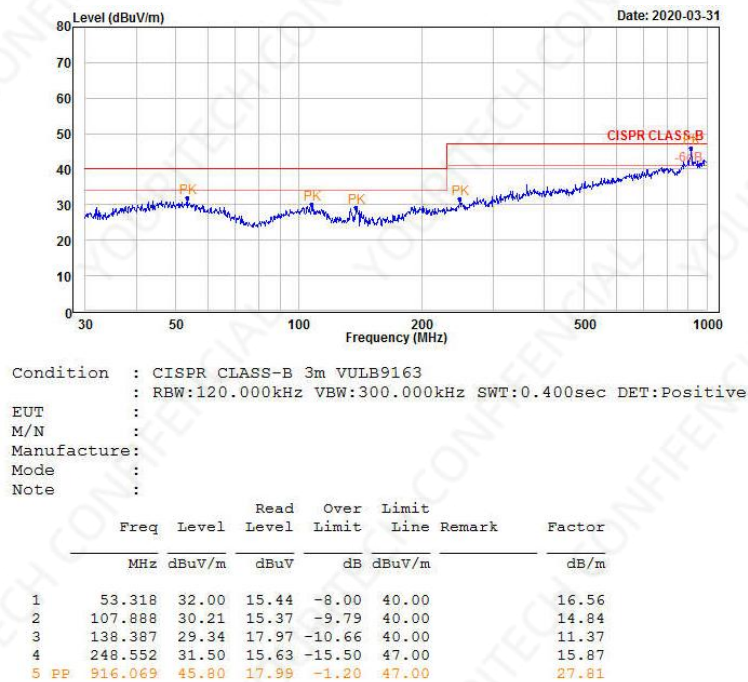


Figure 5-6: Horizontal direction of the radiation test

2. Radiation test vertical test data, shown in Figure 5-7.



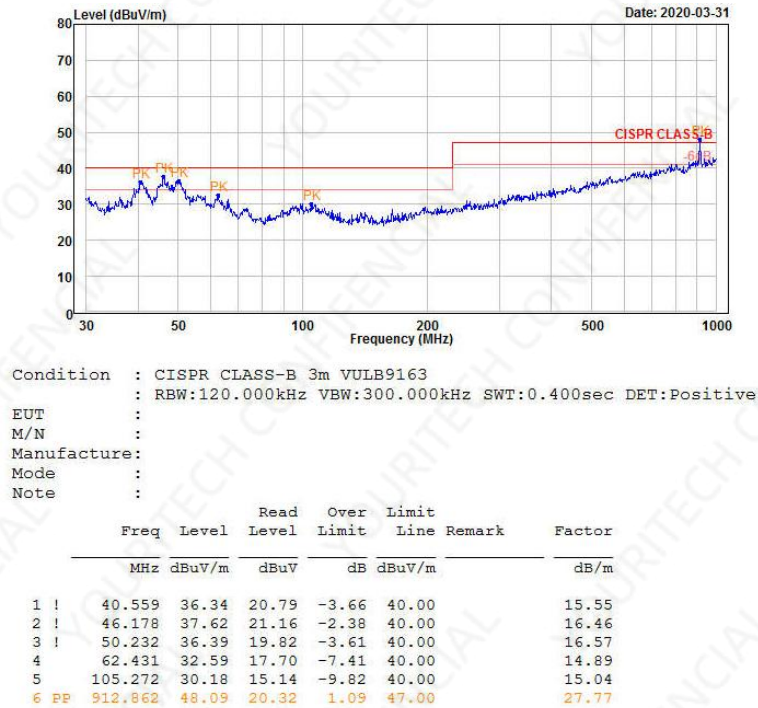


Figure 5-7 Radiation test vertical



6. Protocol Configuration

Most of the serial port screens launched by YOURITECH Technology default to the YOURITECH configuration instruction set, and users can run MODBUS RTU, XGUS and other protocols through the host computer configuration.

Open the VisualTFT host computer software, click [Tools] in the menu bar → [Protocol and Variable Settings], as shown in Figure 6 -1, enter the protocol configuration interface, and users can choose to enable the corresponding protocol according to their own needs, as shown in Figure 6-2.

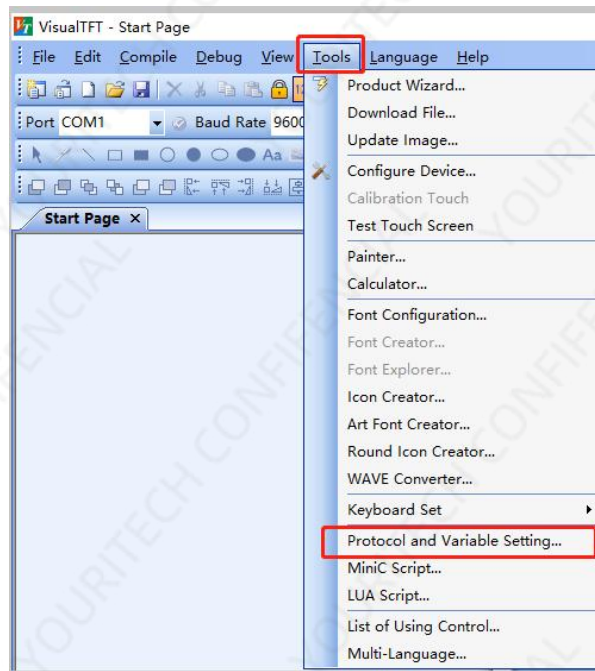


Figure 6-1 Protocol and variable settings

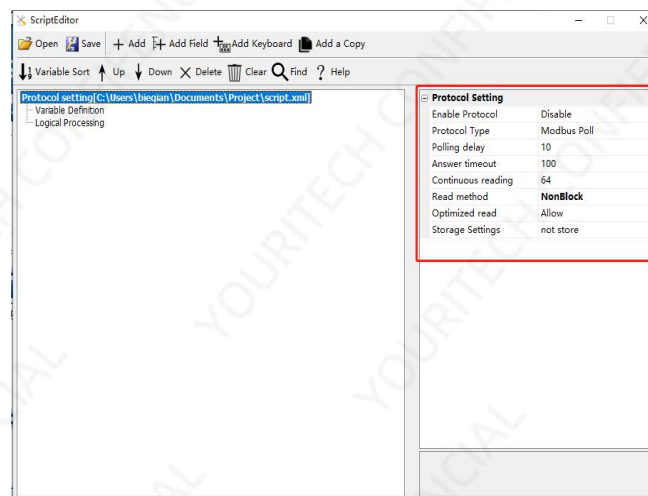


Figure 6-2 Protocol configuration interface



7. LUA Script Configuration

The serial port screens of S-type, M-type and IoT series launched by YOURITECH Technology all support LUA language scripts. The serial port screen provides a wealth of LUA script API and callback interface, users can directly set and obtain the running status of all configuration controls by calling the API interface, combined with the written logic processing, the screen can complete the predetermined action without the participation of the external MCU, reducing the data communication between the MCU and the screen.

LUA is a lightweight scripting language with simpler syntax logic than C, and developers can get started directly. The LUA language comes with a well-functioning mathematical function library, string processing, JSON and other libraries, and has function support for common mathematical operations, such as square, sine cosine, and absolute value; Due to the high main frequency of the screen itself, all complex algorithms are processed by the screen, which greatly reduces the execution overhead of the user's MCU.

To write the LUA script of the project in the VisualTFT software, you can click [Tools] → [LUA Script Programming] in the menu bar to open it, as shown in Figure 7-1, and enter the LUA scripting interface, as shown in Figure 7-2.

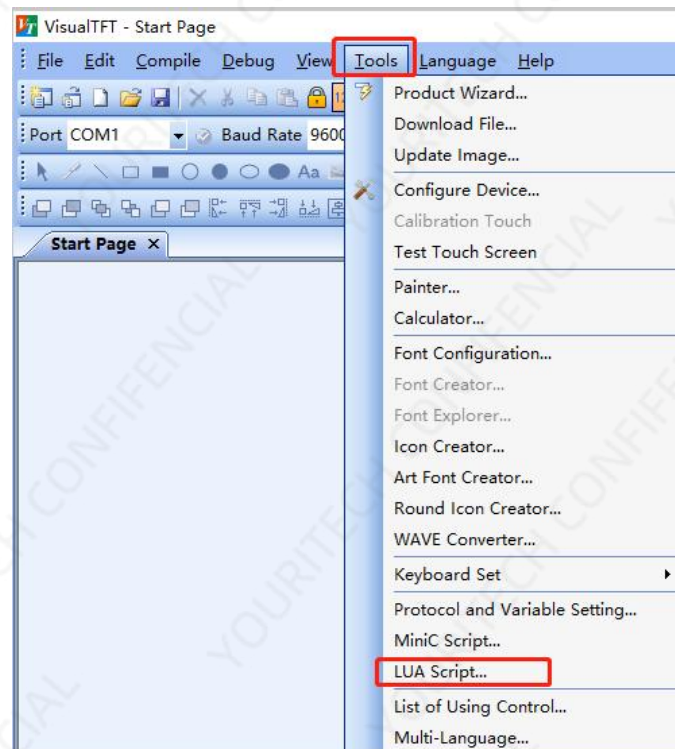


Figure 7-1 LUA script programming



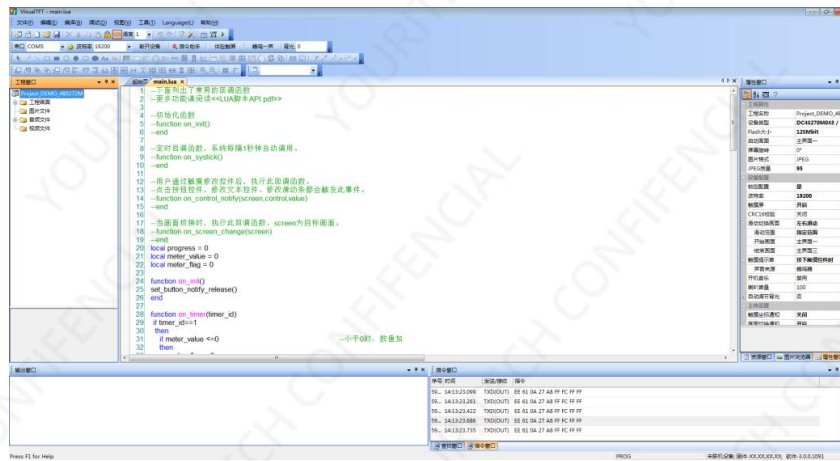


Figure 7-2 Lua scripting interface



8. Packaging and Physical Dimensions

Unit weight					
Net weight (KG)	0.76				
Packaging standard and total weight					
Box model	Box size (length * width * height, unit mm)	Number of layers	Quantity (PCS)/layer	Total quantity (pieces)	Total weight(KG)
Box 1	357*257*90	1	10	10	9.13
Box 2	478*340*275	1	25	25	21.75

Note: The total weight does not include the weight of the accessory; The above weight information is an estimated weight for reference only, and the actual weight is subject to the actual weight.



9. Product Architecture

The industrial serial port screen launched by YOURITECH Technology is a serial display terminal integrating TFT display driver, picture font storage, GUI operation, audio playback and various configuration controls. The user microcomputer only needs to send and receive the corresponding serial port instructions to easily realize the display of text, pictures and curves.

M series serial screen processor adopts 32-bit 400M SOC processor, which integrates SDR memory and JPEG picture decoding and other functions, and the system architecture is shown in Figure 9 -1.

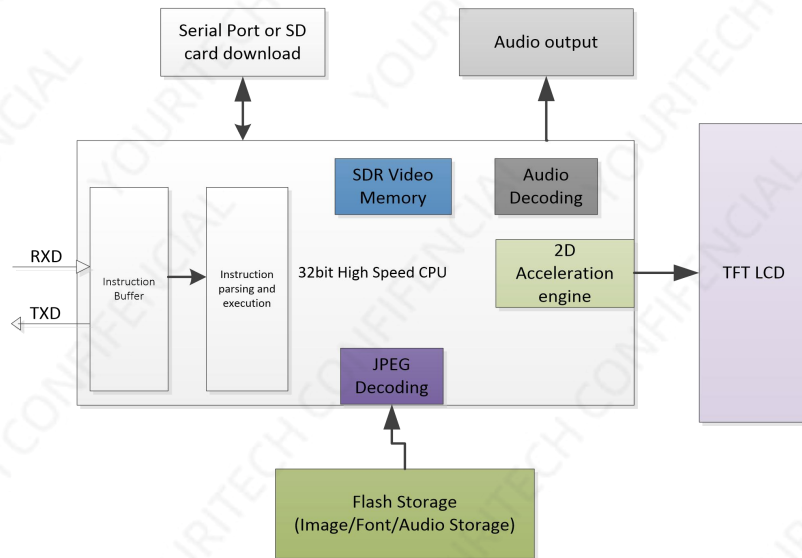


Figure 9-1 M series serial port screen internal structure diagram

The main advantages of choosing a high-performance 32-bit dual-core processor architecture are:

1. A dedicated 32-bit 400M SOC processor optimized for picture display, with a 2D acceleration engine and JPEG picture hardware decoding, so that the display can be combined with various special effects, and the display effect is smooth and gorgeous.
2. No operating system, continuous 24*365h hours of uninterrupted power can work reliably, no garbage redundant files.



10. Develop Software

VisualTFT is a serial port screen development and debugging software independently developed by YOURITECH, integrating the first "Virtual TFT Simulator" simulator in China, which is free for life. After the user creates a new project, import the designed art pictures, and then configure the buttons and other controls in each screen, simulate correctly, and finally download the entire project to the serial port screen. The software interface is shown in Figure 10-1.

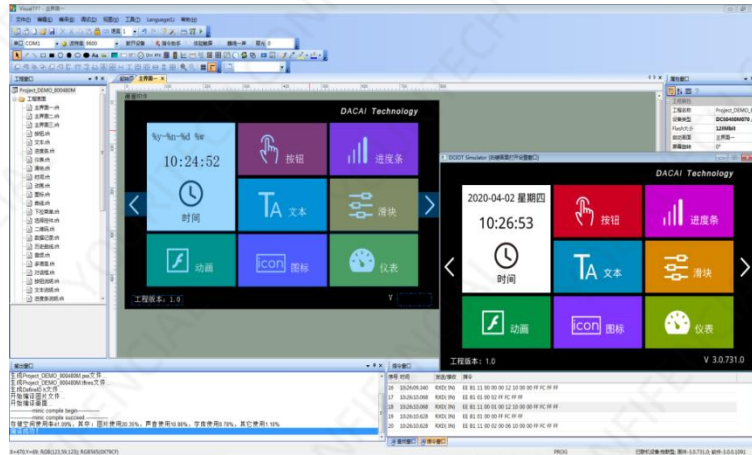


Figure 10-1 Main interface of VisualTFT

Any user only needs 3 steps to complete complex HMI design within 30 minutes.

1. Prepare art assets

Arrange for artists to design the pictures required for the product, such as the boot screen, text background, button icon, and prompt box.

2. Use the supporting VisualTFT software for screen editing, scripting, control configuration and image download.

First, using the supporting host computer VisualTFT software, the pre-designed art pictures are arranged and configured for interface, and then the "virtual serial port screen" is run for simulation, and finally the entire project can be downloaded to the internal memory of the serial port screen through SD/UART (depending on the hardware configuration of different models). PC software assigns a unique ID number to each screen, picture, and control in the project. Users can also write the required logic control and algorithms through the script editor embedded in the host computer to reduce the communication frequency between the screen and the motherboard.

3. The user's single-chip microcomputer monitors and sends the corresponding serial port command control screen display.

After the project is downloaded to the screen, once a button is pressed on the screen, the user's MCU serial port will receive the button ID information or coordinate value uploaded on the screen. By parsing the ID number, the user can obtain the screen position and functional attributes of the current button, so that the relevant peripheral device actions or screen update display can be controlled.

For non-touch products, the user micro-controller does not need to listen to the information uploaded by the button ID, but only needs to send relevant instructions for screen switching and



text picture display.

10.1 What is Virtual TFT Simulation

"Virtual TFT simulation" is the first domestic exclusive serial port screen emulator developed by YOURITECH Technology . After the user installs the VisualTFT software of the host computer, it can be run and used. The simulation results of the virtual serial port screen are exactly the same as the real serial port screen. Therefore, there is no need to purchase hardware during the pre-development evaluation, and it can communicate with each other through its own single-chip RS232 serial port, and click on the button will immediately upload the button control information, as shown in Figure 10-2. Once the developer has debugged it, the real hardware does not need to be debugged.



Figure 10-2 Online debugging of the serial port of the user single-chip microcomputer and the "virtual TFT simulation"

10.2 Keil is bound to debug with the virtual TFT simulation

In order to further improve the development efficiency, users can also bind Debug debugging with the "virtual TFT simulation" through the Keil development environment. When the program is single-step debugging, all running results can be presented on the "virtual TFT simulation", which greatly saves the engineer's development time, as shown in Figure 10-3. Once the project interface is changed, users no longer need to re-download pictures to the serial port screen, and all pre-project evaluations can be completed based on the PC.

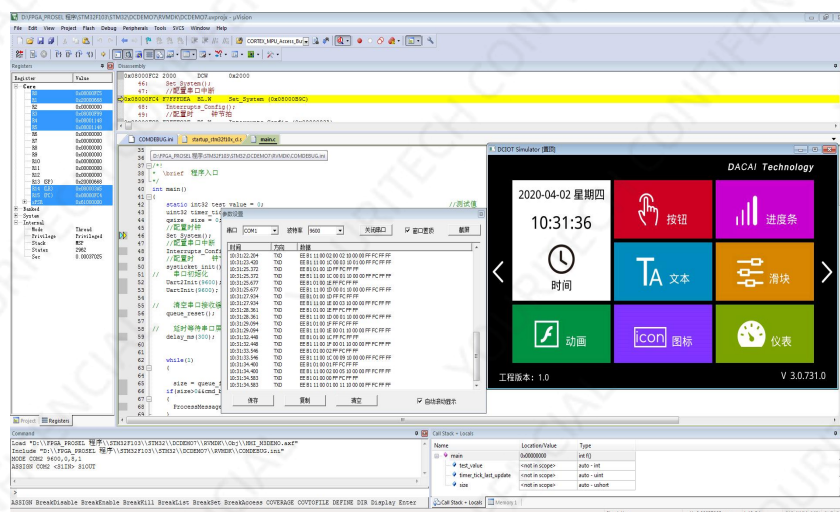


Figure 10-3 The Keil development environment is bound to the virtual TFT simulation for debugging



Note: The debugging of the virtual TFT simulation needs keil software support, in the debug process, enter dirvtreg in the command serial port, you need to list SxIN (according to the single-chip microcomputer, x may represent 0, 1, 2), if there is a list of representatives keil has virtualized the serial port of the single-chip microcomputer to the register, so that it can be used.



11. Disclaimer

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