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**Product
Datasheet**

Automotive-grade IoT ET103BA1972-DC/C Data Sheet V1.0

ISO9001:2015 Quality System Certification

Customer			
Keywords	Automotive-grade IoT series, 10.3 inch, 1920*720, with configuration, audio and video, -40 to 85°C, Ethernet		
Model	ET103BA1972-DC/C		
Signature of Customer		Signature of Engineer	
Date		Date	



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Catalog

1. Hardware Introduction	4
1.1 Product appearance	4
1.2 Hardware configuration	4
1.3 Debugging tool	5
2. Product Specifications	6
3. Reliability Test	9
3.1 ESD Test	9
3.1.1 Executive Standard	9
3.1.2 Environment Test	9
3.1.3 Test data	10
3.2 High and Low Temperature Aging Test	10
3.2.1 Test environment	10
3.2.2 Test data	11
3.3 Group Pulse Test	11
3.3.1 Execution standards	11
3.3.2 Test environment	11
3.3.3 Test data	12
3.4 Radiation test	12
3.4.1 Execution standards	12
3.4.2 Test environment	12
3.4.3 Test data	10
4. Product Size	14
5. RS232 and TTL level translation	15
6. Packaging and Physical Dimensions	16
7. Product Architecture	17
8. Develop Software	18
8.1 What is a Virtual TFT Simulation	19
8.2 Keil is bound to debug with the virtual TFT simulation	20
9. Disclaimer	21



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 a reference drawing of the appearance of different models of this size, as shown in Figure 1-1, Figure 1-2.

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 10.3-inch capacitive touch reference diagram

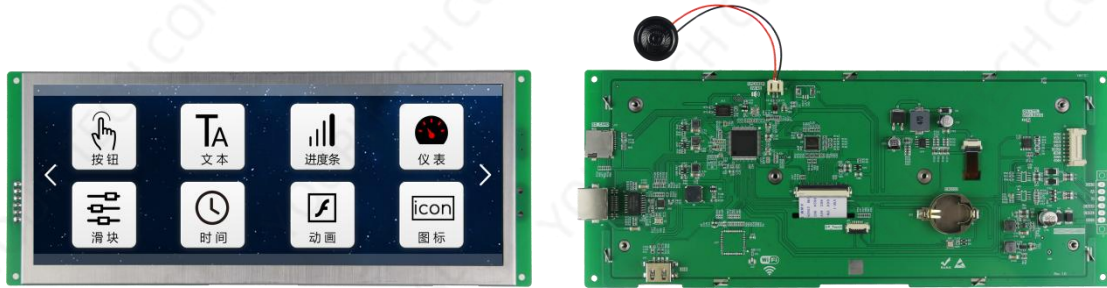


Figure 1-2 10.3-inch non-touch reference diagram

1.2 Hardware configuration

The following is a reference diagram of the hardware configuration of the product, taking the capacitive touch product as an example, as shown in Figure 1-3.



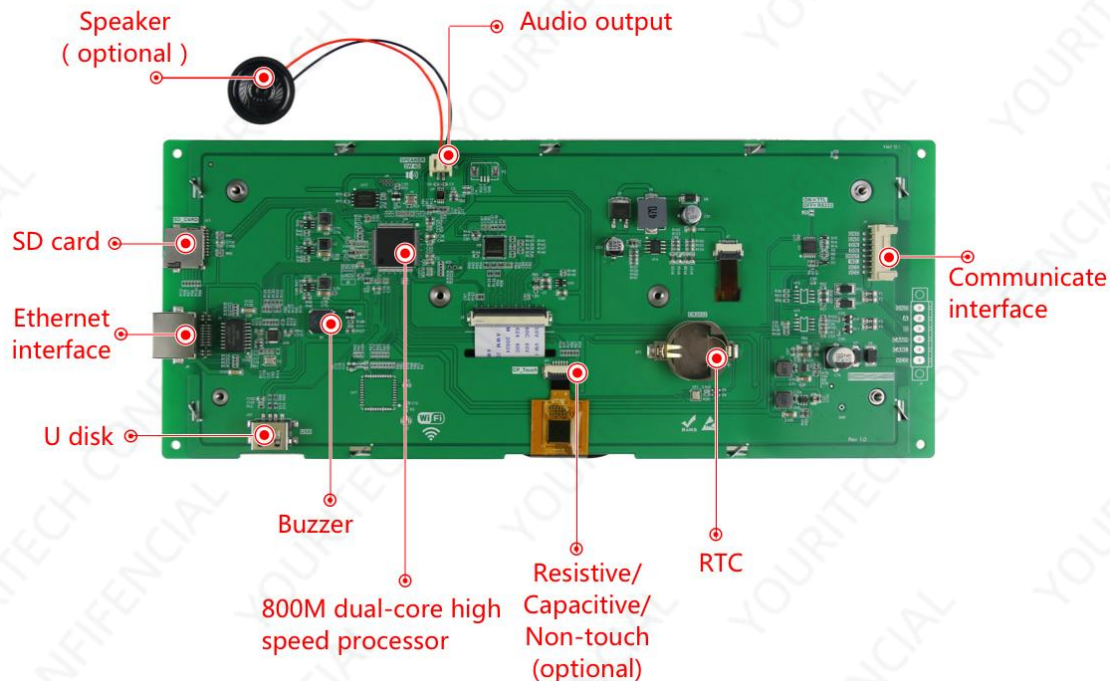


Figure 1-3 Hardware configuration

1.3 Debugging tool

The following is a reference diagram of the debugging tool for this product, as shown in Figure 1-4.

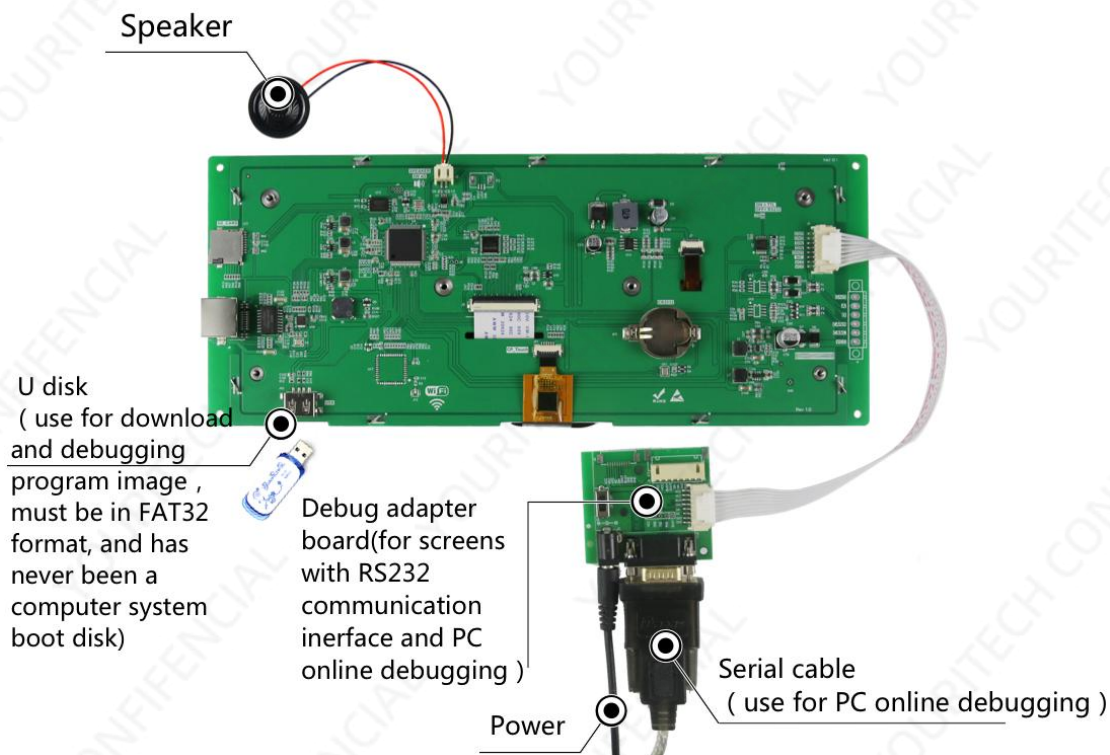


Figure 1-4 Debugging tools



2. Product Specifications

◆ Product parameters	
Model description	ET103BA1972-DC/C(Capacitive touch, Ethernet, RS232)
Product Series	Automotive-grade IoT type
Core Processor*	800MHz 32-bit dual-core processor
Operating system	Embedded real-time operating system
Protocol type	The default large color configuration instruction set, the host computer can be configured to run MODBUS RTU, XGUS protocol
Size	10.3 inch
Resolution	1920*720
Installation orientation	Supports 0, 90, 180 and 270 angle rotation installation display
Storage space	1Gbit
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	It supports JPEG and PNG (transflective/fully translucent) compression, supports image storage of any size, and supports functions such as image rotation, enlargement, and reduction. Approximately 272 full-screen images can be stored cumulatively (calculated based on the size of 480KB per image, BMP format is not recommended). Depending on the image compression ratio, this value will fluctuate up and down
Color	65Kcolor, 16-bit RGB
Voltage	12-40V(error±0.2V)
Power consumption	Darkest backlight, No horn: 3.0W
	Darkest backlight, With horn: 6.8W
	Brightest backlight, No horn: 12.3W
	Brightest backlight, With horn: 16.9W
Communication method	RS232/TTL (factory default level 232)
Communicate Baud-rate	RS232:1200~921600bps, typical baud rate: 115200 bps
Communication Connector Specifications	HY2.0-8P
Image download	SD card/USB flash drive/UART (USB flash drive must be in FAT32 format and has never been used as a computer system boot disk)
Real-time clock (RTC)	Support countdown, timer, year, month and day and other time display
Screen Active Display Area (AA)	Length*width = 243.6mm*91.4mm
Product Size (L*W*H)	Length*width*height = 283.0mm*116.0mm*31.1mm
Supporting Host Computer Software	VisualTFT®



AV input	Not support
Sound playback	MP3 audio format (speaker 4Ω2W, mono), sharing storage space with pictures. If the sampling rate is 128kbps, 0.95MB/min of storage is occupied
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*480, a video bitrate of 2400Kbps, an audio bitrate of 166Kbps, and a frame rate of 25Hz occupies 17.8MB/min
Ethernet interface	Ethernet protocols are supported
CAN interface	CAN bus protocol is supported
WIFI	Not support
Three-conformal paint process	None (optional)
◆ Product Core Competitiveness	
Learning Cycle	30 minutes to familiarize yourself with the development environment, 3 days to complete the HMI design
Program debugging	The host computer integrates a "virtual serial port screen", which does not need to be connected to the hardware, and Keil IDE is directly bound to it for debugging
Startup time	It can be displayed when powered on
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	Support data logging control content export to U disk
Boot LOGO replacement	Support U disk insertion and replacement
Remote upgrade	Support screen engineering pictures, firmware, user MCU firmware remote upgrade (need to bring WIFI or support Ethernet models)
Information push	Support cloud push video or advertising display, or mobile APP and screen communication display (need to bring WIFI or support Ethernet model)
Multi-language capabilities	Factory preset up to 10 global languages of any country, one-click switch of the required language, without the need for multiple sets of UI
Logical operation processing	The LUA script parser is embedded in the host computer, and users can customize various complex logical relationships and protocols on the screen, meeting 99.9% of the product function requirements of customers
Reliability	Products are tested for high and low temperature, ESD, group pulse and radiation by industry standards
Life Cycle	Using traditional YOURITECH processors, non-stop goods for many years
◆ LCD Display	
Display Type	Hancai's original automotive-grade LCD screen
Backlight Tube	LED



Brightness (cd/m ²)	1000
Backlight Life (h)	>20,000
Contrast Ratio	1400:1
Visual Angle (L/R/T/B)	85/85/85/85

◆ Touch panel (optional)

Touch Type	Capacitive touch screen
Touch mode	Point, swipe touch
Light transmittance	More than 90%
Number of touches	The theory is infinite, and the touch life is related to the working environment (dust, humidity)

◆ Environment & Certification

Operating Temperature	-20~+70°C
Storage Temperature	-30~+80°C
Vibration test	10 to 25Hz(X,Y,Z direction 2G 30 minutes)
Certification	ROHS、CE certification (EMI class:EN55022 ClassB standard)

◆ Customized services

Customization fee	One-time signing of 1000PCS contract, can be exempted from customization fee
Communication interface	External communication interfaces such as parallel bus, Zigbee or WIFI can be customized
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, reduce the difficulty of user development
Art services	Can provide picture art and product structure design services
Other	Customized on demand, to meet all the needs of users



3. Reliability Test

All serial port screens of YOURITECH 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 3-1.



Figure 3-1 Reliability Test Equipment

3.1 ESD Test

3.1.1 Executive Standard

Executive Standard	IEC 61000-4-2
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3.1.2 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 inFigure 3-2. Observe whether if the screen have reset or restarted,or abnormal display.





Figure 3-2 ESD test diagram

3.1.3 Test data

Product Model	Discharge type	Humidity	Test result
ET103BA1972-DC/C	contact	±9KV	No restart, no abnormal display, normal function
	contact	/	Occasional reset and restart, no abnormal display, normal function
	air	±9KV	No restart, no abnormal display, normal function
	air	/	Occasional reset and restart, no abnormal display, normal function
ET103BA1972-DC/C	contact	±9KV	No restart, no abnormal display, normal function
	contact	/	Occasional reset and restart, no abnormal display, normal function
	air	±9KV	No restart, no abnormal display, normal function
	air	/	Occasional reset and restart, no abnormal display, normal function
<i>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</i>			

3.2 High and Low Temperature Aging Test

3.2.1 Test environment

Test ambient temperature: -20~+70°C

Test ambient humidity: 60%±3%RH

Test process: Place the product in the high and low temperature test box at an angle as shown in Figure 3-3. 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 3-3 High and low temperature aging test diagram

3.2.2 Test data

Product Model	Temperature	Humidity	Test results
ET103BA1972-DC/C	High temperature (85℃)	60%	No reboot, no abnormal display, normal function
	Low temperature (-40℃)	60%	No reboot, no abnormal display, normal function
	Alternating high and low temperature (-40~85℃)	60%	No reboot, no abnormal display, normal function

3.3 Group Pulse Test

3.3.1 Execution standards

Execution standards	IEC 61000-4-4
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3.3.2 Test environment

Test ambient temperature: 25℃

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 inFigure 3-4. During the test, observe whether the screen resets, displays abnormally, or touches, abnormalities and other phenomena.





Figure 3-4 Group pulse test diagram

3.3.3 Test data

Product Model	Test Standard			Test Result
ET103BA1972-DC/C	National standard 4			No restart, normal communication, normal function
	Voltage (KV)	Frequency (KHZ)	Time (S)	
	4.0	100	120	

3.4 Radiation test

3.4.1 Execution standards

Execution standards	EN55022 ClassB
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3.4.2 Test environment

The radiation testing laboratory environment is shown in Figure 3-5.

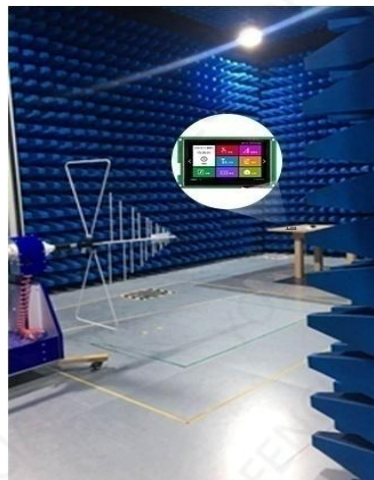


Figure 3-5 Radiation test chart



3.4.3 Test data

1. Radiation test data in the horizontal direction, as shown in Figure 3-6.

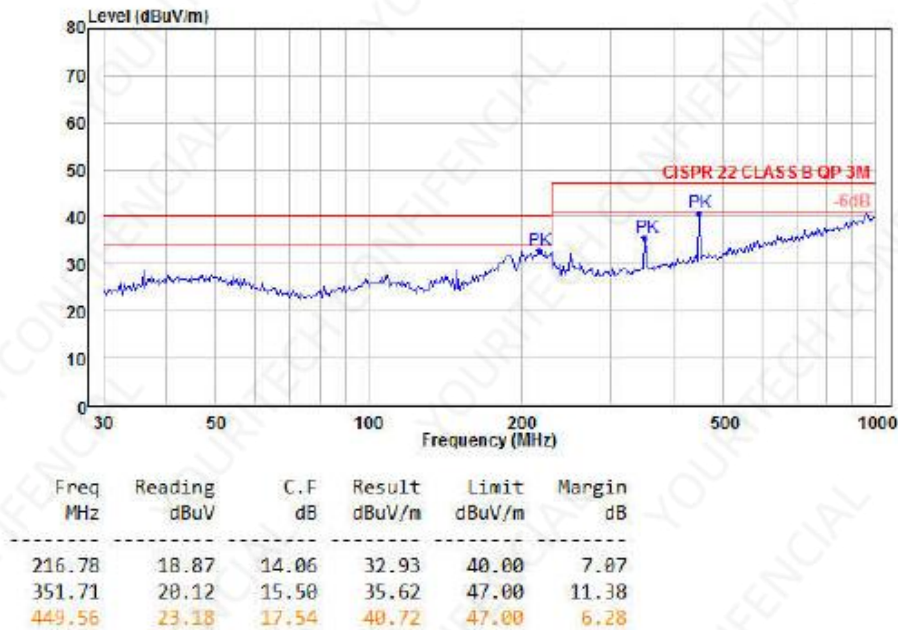


Figure 3-6: Radiation test horizontal

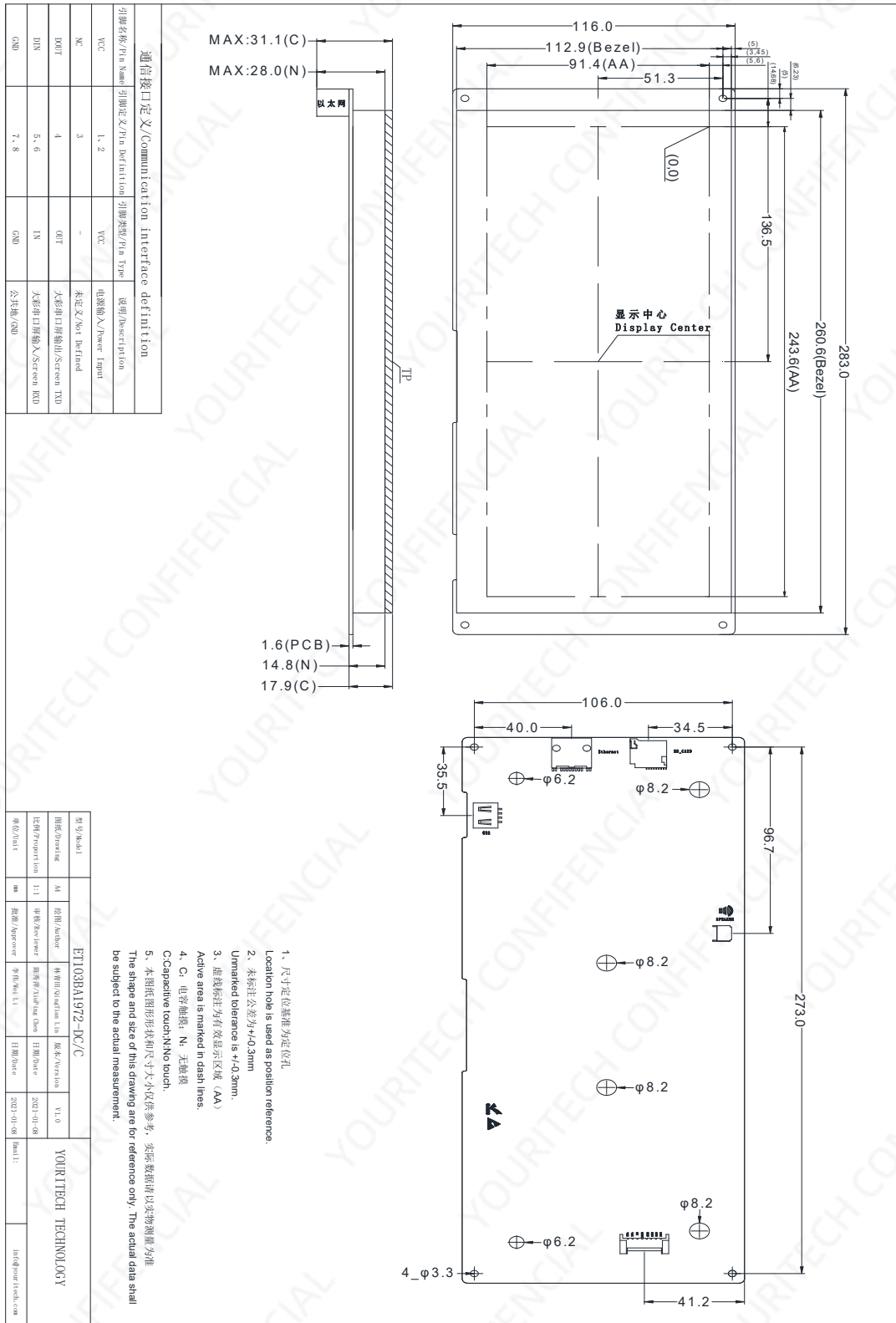
2. Radiation test data in the vertical direction, as shown in Figure 3-7.



Figure 3-7: Radiation test vertical



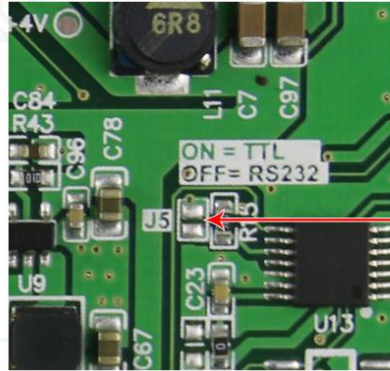
4. Product Size



5. RS232 and TTL level translation

Most products support RS232 and TTL level translation. As shown in Figure 5 -1, when J5 is disconnected, the serial port is at the RS232 level, and when J5 is shorted, the serial port is at the TTL level.

Note: TTL levels support 3.3V CMOS and 5V TTL.



Disconnect: 232 level
Short-circuit: TTL level

Figure 5-1 Schematic diagram of RS232 and TTL conversion



6. Packaging and Physical Dimensions

Unit weight					
Net weight (KG)	0.70				
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	478*340*275	1	13	13	9.1

Note: Total weight does not include accessory weight



7. Product Architecture

The industrial serial port screen launched by YOURITECH is a serial display terminal integrating TFT display driver, picture fontstorage, GUI operation, RTC, audio and video, WIFI 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.

The IoT serial screen processor adopts a 32-bit dual-core high-speed processor with a main frequency of 400MHz, which integrates DDR memory, video H264 decoding, audio MP3 decoding, JPEG picture decoding and other functions, and the system architecture is shown in Figure 7 -1.

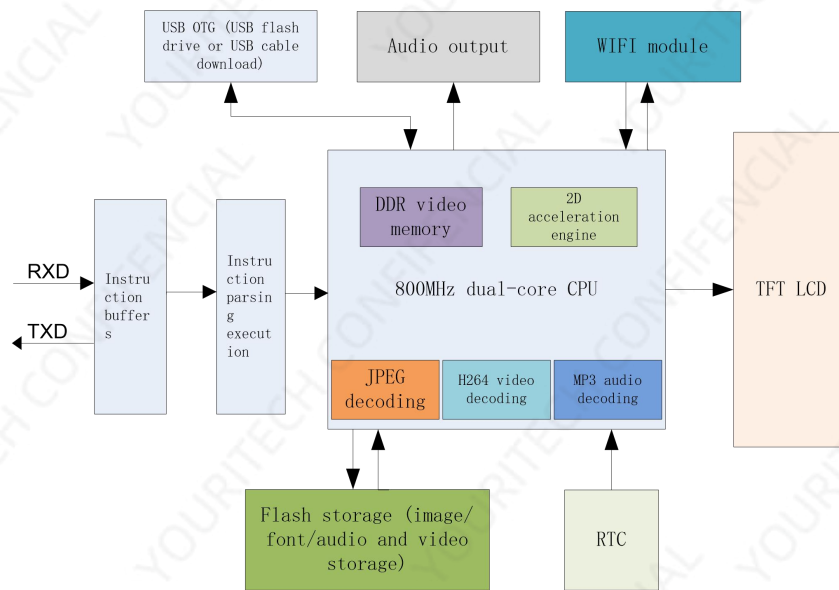


Figure 7 -1 Internal structure diagram of IoT serial port screen

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

1. Dedicated 32-bit high-speed processor optimized for picture display, with 2D acceleration engine, JPEG picture hardware decoding, H.264 video hardware decoding, MP3 audio hardware decoding, so that the display can cooperate with various special effects, and the display effect is smooth and gorgeous.

2. Embedded embedded real-time operating system, continuous 24*365h hours of uninterrupted power can work reliably, no garbage redundant files.



8. 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 8 -1.

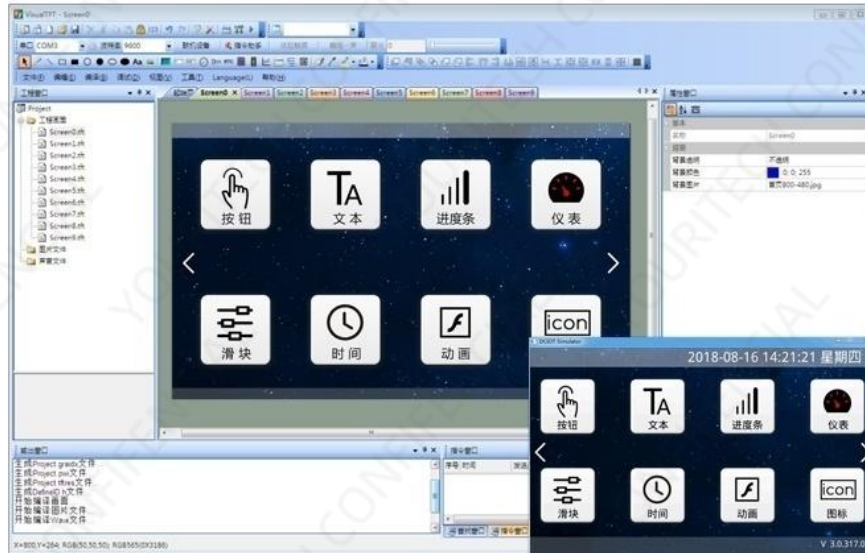


Figure 8 -1 Main interface of VisualTFT

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 project 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.

8.1 What is a Virtual TFT Simulation

"Virtual TFT simulation" is the first domestic exclusive serial port screen emulator developed by Guangzhou YOURITECH. 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 8-2. Once the developer has debugged it, the real hardware does not need to be debugged.



Figure 8 -2 Online debugging of the serial port of the user single-chip microcomputer and the "virtual TFT simulation"

8.2 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 8-3. 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.

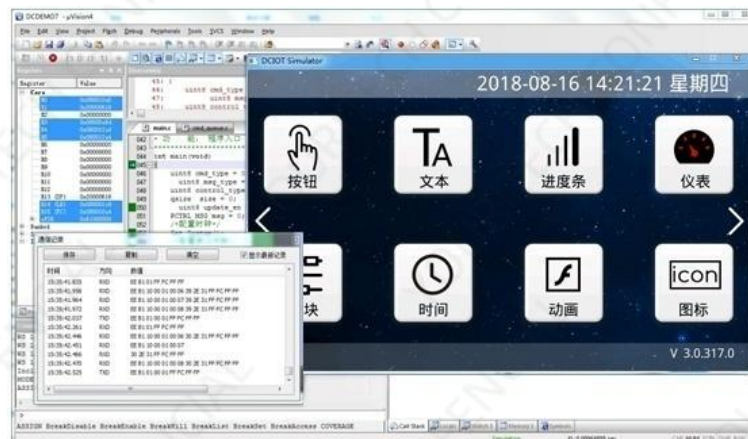


Figure 8-3 The Keil development environment is bound to the virtual serial port screen for debugging



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.



9. Disclaimer

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