uxin Electronics YX5200 Voice Chip Chinese Manual V1.6

Overview

1.1 Introduction

YX5200 - 24SS is a serial chip to provide MP3 , the perfect integrated MP3 , WMV hard decoding. At the same time software support TF card driver, support FAT16 , FAT32 file system. Through a simple serial command to complete the playback of the specified music, and how to play music and other functions, without cumbersome the underlying operation, easy to use, stable and reliable is the biggest feature of this product. In addition, the module is also a deep customization product, designed for USB card reader, USB sound card, fixed voice playback field developed low-cost solution.

1.2 functions

Supports sampling rate (KHz): 8 / 11.025 / 12/16 / 22.05 / 24/32 / 44.1 / 48

2 , 24 -bit DAC output, dynamic range support 90dB , SNR support 85dB

3 , full support FAT16 , FAT32 file system, the largest support 32G TF card, support 32G U disk, 64M bytes NORFLASH

4 , a variety of control mode, parallel port control mode, serial port mode, AD button control mode

5 , broadcast broadcast function, you can pause the background music is playing

6 , the audio data by folder sort, up to 100 folders, every folder can be assigned 1000 songs

7 , 30 level adjustable, 10 EQ adjustable

1.3 Application

1 , car navigation voice broadcast

2 , road transport inspection, toll station voice prompts;

3 , the train station, bus station security check voice prompts;

4 , power, communications, financial business hall voice prompts;

5 , the vehicle into the channel verification voice prompts;

6 , public security border check channel voice prompts;

7 , multi-channel voice alarm or device operation to guide voice;

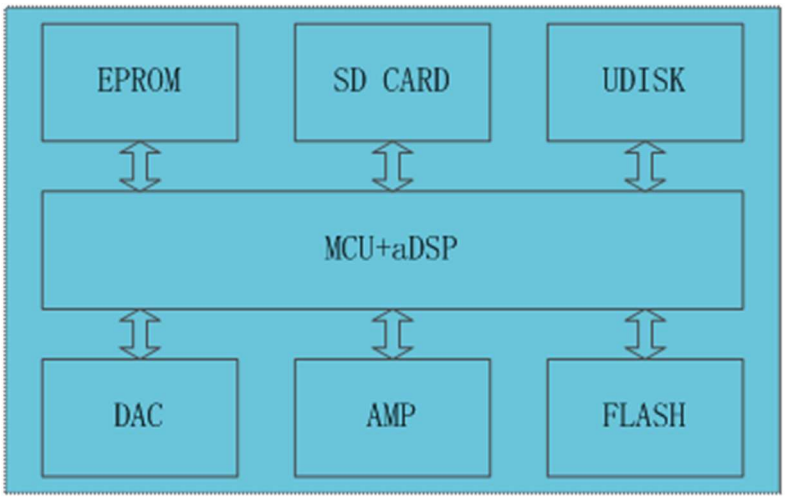
8 , electric sightseeing car safe driving voice notice;

9 , mechanical and electrical equipment failure automatic alarm;

10 , fire alarm alarm;

11 , automatic broadcast equipment, regular broadcast

Module instructions



Module selection is the SOC program, integrated a 16 -bit MCU , and a dedicated audio decoding aDSP , the use of hard decoding, more to ensure the stability of the system and sound quality. Small package size to meet the needs of other products embedded

2.1 hardware parameters

name	parameter
MP3 file format	1 , supports all bit rates 11172-3 and ISO13813-3 layer3 audio decoding
	2 , sample rate support (KHZ): 8 / 11.025 / 12/16 / 22.05 / 24/32 / 44.1 / 48
	3 , support Normal , Jazz , Classic , Pop , Rock and other sound effects
USB interface	2.0 standard
UART interface	Standard serial port, TTL level , baud rate can be set
Input voltage	5.0V-10V (preferably 9V)
Rated current	20ma [without U disk]
size	23 (long) * 20 (width) [Unit : mm]
Operating temperature	0 degrees to 70 degrees
humidity	5% to 95%

2.2 Pin Description

Pin number	Pin name	Functional description	Remarks
1	GND	First	Systematically
2	RX	UART serial data input	
3	TX	UART serial data output	
4	DACLout	The DAC outputs the left channel	
5	DACRout	The DAC outputs the right channel	

6	GPIO1	Universal input / output port	Reserved
7	ADKEY	AD button	24K pull up
8	USBDP	USB signal	
9	USBDM	USB signal	
10	VPOWER	Power supply side	Can not exceed 5.2V

Serial communication protocol

Serial port as a common communication in the control field, we have carried out the industrial level optimization, adding the frame of the check, re-issued, error handling and other measures to greatly enhance the stability and reliability of communication, and can be based on this Expand the more powerful RS485

The networking baud rate can be set by itself, the default is 9600

3.1 communication format

Support asynchronous serial communication mode , through the serial port to accept the host computer to send the command

Communication standard : 9600 bps
Data bits :1
Check Digit : None
Flow control : None

Format: $ S VER Len CMD Feedback Para1 Para2 Checksum $ O

<! [Endif]> <! [Endif]> <! [Endif]> <! [Endif]> <! [Endif]> <! [Endif]> <! [Endif]> <! [Endif]> <! [Endif]> <! [Endif]>

Start bit 0x7E		
	Each command feedback starts with $, ie 0x7E	
VER	version	Version Information
Len	Len after the number of bytes	The checksum is not counted
CMD	Command word	Indicates specific operations , such as play / pause and so on
Feedback	Command feedback	Whether the need for feedback , 1 feedback , 0 no feedback
Para1	Parameter 1	Query data high byte (such as song number)
Para2	Parameter 2	Query the data low byte
Checksum	Checksum	Accumulation and verification [excluding start bit $]
$ O	End bit	End bit 0xEF

For example, if we specify to play NORFLASH , we need to send : 7E 10 06 09 00 00 04 FF dd EF

The data length is 6, and the 6 bytes are [10 06 09 00 00 04] . Do not calculate start, end, and check.

3.2 communication instructions

1 , direct send instructions, do not need to return parameters

CMD Detailed Explanation (Instruction)	Corresponding function	Parameter (16 bits)
0x01	next track	
0x02	previous piece	
0x03	Specified track (NUM)	0-2999
0x04	Volume +	
0x05	Volume -	
0x06	Specify the volume	0-30
0x07	Specify EQ (0/1/2/3/4/5)	Normal / Pop / Rock / Jazz / Classic / Base
0x08	Specified playback mode (0/1/2/3)	Loop / folder loop / single loop / random
0x09	Specified device (0/1/2/3/4)	U / TF / AUX / SLEEP / FLASH
0x0A	Go to sleep - low power consumption	
0x0B	normal work	
0x0C	Module reset	
0x0D	Play	
0x0E	time out	
0x0F	Specify the folder to play	1-10 (need to set it yourself)

2 , query system parameters

CMD command details (query)	Corresponding function	Parameter (16 bits)
0x3C	STAY	
0x3D	STAY	
0x3E	STAY	
0x3F	Send initialization parameters	0 - 0x0F (the lower four bits represent a device)
0x40	Returns an error requesting a retransmission	

0x41	answer	
0x42	Query the current status	
0x43	Query the current volume	
0x44	Query the current EQ	
0x45	Query the current playback mode	
0x46	Query the current software version	
0x47	Check the total number of TF card files	
0x48	Query the total number of UDISKfiles	
0x49	Check the total number of FLASHfiles	
0x4A	Reserved	
0x4B	Query the current track of the TFcard	
0x4C	Query the current track of UDISK	
0x4D	Query the current track of FLASH	

3.3 The data returned by the module

The module will return data at the critical place. For the user to control the working status of the module

Module power on to initialize successful data

The module plays the data of the current track

The module successfully receives the ACK (response) returned by the instruction .

Module to receive a frame of data error [including data confiscation integrity, check the wrong two cases]

When the module is busy, the data is over and the module returns a busy command

U disk, TF card inserted and pulled out, there are data to return

3.3.1 Data returned by module power-up

(1) , the module power, need some time to initialize, this time is required according to U disk, TF card, flash and other equipment, the number of decisions, the general situation in 1.5 ~ 3S this time. If more than this time module initialization data has not been sent out, indicating that the module initialization error, please reset the module power supply, in addition to detect the hardware connection

(2) , the module initialization data includes online devices , such as sending 7E 10 06 3F 00 00 01 xx xx EF

DL = 0x01 Description During power-up, only the U disk is online. For other data, please refer to the following table , the relationship between each device is or

U disk - online	7E 10 06 3F 00 00 01 xx xx EF	There is a relationship

		between the devices
TF - online	7E 10 06 3F 00 00 02 xx xx EF	
PC - online	7E 10 06 3F 00 00 04 xx xx EF	
FLASH - online	7E 10 06 3F 00 00 08 xx xx EF	
U disk, TF - online	7E 10 06 3F 00 00 03 xx xx EF	

, The MCU must wait for the module to initialize the instruction before sending the corresponding control instructions, otherwise the command module will not be sent to deal with. But also affect the normal initialization module.

3.3.2 The data returned after the track is played back

U disk to play the first song	7E 10 06 3C 00 00 01 xx xx EF	U disk play first song finished
U disk to play the first two songs	7E 10 06 3C 00 00 02 xx xx EF	U disk play the second song is completed
TF card played the first song	7E 10 06 3D 00 00 01 xx xx EF	TF card to play the first song is completed
TF card played the first two songs	7E 10 06 3D 00 00 02 xx xx EF	TF card to play the secondsong is completed
FLASH played the first song	7E 10 06 3E 00 00 01 xx xx EF	FLASH Play 1 song finished
FLASH played the first two songs	7E 10 06 3E 00 00 02 xx xx EF	FLASH play the second song is completed

Fight a lot of trigger-type playback needs, our module correction to play a song automatically enter the pause state. If the user needs such an application. Just specify the track to play. In this way, the track is automatically paused and the command is waiting

In addition we specialize in opening up an IO as a status indication for decoding and pausing. See page 6 , GPIO1

, The playback status is output high

, Playback pause status, output low. Module sleep state. Is also low

Competition for continuous playback applications, can be achieved so. If the U disk to play after the first song is completed, will return

7E 10 06 3C 00 00 01 xx xx EF

3C ---- that is the U disk command

00 01 ---- Indicates the finished track.

If the external MCU receives this command. Please wait 100ms first. And then send the playback command [7E 10 06 0D 00 00 00 FF DD EF] . Because the module will first initialize the next track information. In this case, you can do the module continuous playback.

If the current play the first song, after playing, the track pointer will automatically point to the second, if you send " play the next song " command, the module will play the third, please know the user. In addition, if the module after playing the last song, the playback pointer will

automatically jump to the first, pause.

5 , specify the device, the module's playback pointer will point to the device root directory of the first track, and enter the pause state. Waiting for the user to select the instructions.

3.3.3 Module Answer the returned data

FLASH played the first song	7E 10 06 3E 00 00 01 xx xx EF	FLASH Play 1 song finished

(1) , in order to strengthen the stability between data communication, we increase the response processing, ACKB byte is set to need to reply to reply. The advantage of doing so is to ensure that each communication has a handshake signal, received a response that the MCU sends the data, the module has been successfully received, immediately processed.

(2) , for the general application, the customer can freely choose, without this response processing is also possible.

3.3.4 Module error The returned data

The module is busy	7E 10 06 40 00 00 00 xx xx EF	
One frame of data is not received	7E 10 06 40 00 00 01 xx xx EF	
Verification error	7E 10 06 40 00 00 02 xx xx EF	

(1) , in order to strengthen the stability of data communication, we have increased the data error handling mechanism. The module receives data that does not conform to the format, and the information is fed back

(2) , in the case of relatively harsh environment, it is strongly recommended that customers deal with this order. If the application environment in general, you can not deal with.

(3) , the module returns busy, basically the module power on the initialization time will return, because the module needs to initialize the file system

3.3.5 Device Insertion Pull out the message

U disk inserted	7E 10 06 3A 00 00 01 xx xx EF	
TF inserted	7E 10 06 3A 00 00 02 xx xx EF	
PC inserted	7E 10 06 3A 00 00 04 xx xx EF	Use this command to contact technical support
U disk pull out	7E 10 06 3B 00 00 01 xx xx EF	
TF pull out	7E 10 06 3B 00 00 02 xx xx EF	
PC pull out	7E 10 06 3B 00 00 04 xx xx EF	Use this command to contact technical support

(1) , for the flexibility of the module, we especially increased the device to insert, pull out the instruction feedback. The user knows the working status of the module.

(2) , when the device is inserted, we will play the first track below the root directory of the device. As audition, if the user does not need this feature, you can receive the equipment inserted in the serial port message, wait 100ms . Send the command to play the pause.

3.4 serial port instructions in detail

Here we have a detailed description of the key places :

Specify the track to play [You must specify the device before you can specify the track]

Specifies the volume to play

Specifies the device to play
Specify folder to play [to customize this function based on user]
Flash stored in the fixed test voice
3.4.1 Specify song playback instructions
We give the instructions to support the specified track play, the song selection range of 0 ~ 2999. In fact, can support more, because the file system involved in the reasons to support too many songs, will lead to slow system operation, the general The application does not need to support so many files. If the customer has an unconventional application, please communicate with us beforehand.
(1) , for example, select the first song to play, the serial transmission part 7E 10 06 03 00 00 01 FF E6 EF
7E --- start command
10 --- version information
06 --- Data length (not including check)
03 --- stands for product number
00 --- need to answer [0x01: need to answer, 0x00: do not need to return to answer]
00 --- High byte of track [DH]
01 --- the low byte of the track [DL], here represents the first song to play
FF --- check the high byte
E6 --- check the low byte
EF --- end command
(2) , for the election, if you choose the first 100 , first 100 will be converted to hexadecimal , the default is double byte , it is 0x0064 .
DH = 0x00 ; DL = 0x64
(3) , if you choose the first 1000 to play, first 1000 will be converted to hexadecimal , the default is double byte , it is 0x03E8
DH = 0x03 ; DL = 0xE8
(4) , and other operations can be analogy, because in the embedded field using hexadecimal is the most convenient operation.
3.4.2 Specify the volume playback command
(1) , our system power default volume of 30 , if you want to set the volume, then send the corresponding instructions directly
(2) , for example, specify the volume is 15 , the serial port to send the command : 7E 10 06 06 00 00 0F FF D5 EF
(3) , DH = 0x00; DL = 0x0F , 15 is converted to hexadecimal to 0x000F . You can refer to the description of the playback track section
3.4.3 Specify the playback device
(1) , our module default is to support four types of playback devices , only the device can specify the device to play online
Whether the device is online, our software will automatically detect, no user relationship. , Look at the table below, select the appropriate command to send
(3) , after specifying the device. The module will automatically enter the pause state, waiting for the user to specify the track playback. Initialize file information from the specified device to the module. It takes about 200ms . Please wait 200ms before sending the specified track

instructions.

Specifies the playback device -disk	7E 10 06 09 00 00 01 xx xx EF	Xx xx : stands for validation
Specifies the playback device - TF card	7E 10 06 09 00 00 02 xx xx EF	
Specifies the playback device- AUX	7E 10 06 09 00 00 03 xx xx EF	
Specifies the playback device -FLASH	7E 10 06 09 00 00 04 xx xx EF	
Specifies the playback device -SLEEP	7E 10 06 09 00 00 05 xx xx EF	

3.4.4 Specify the folder to play

(1) , specify the folder play is our expansion function, the default folder named "1", "2" this way because our module does not support the Chinese name of the folder name recognition, in order to system stability Sex and song switching speed of each folder under the maximum maximum support of 255 songs , up to 10 folders to support the classification, if the customer has special requirements, need to follow the English name to classify, we can also be achieved, but the name can only Is " GUSHI ", " ERGE " and other English name.

(2) , for example, specify the "100" song of the "1" folder , the command sent by the serial port is : 7E 10 06 0F 00 01 64 FF 70 EF

DH: on behalf of the folder name , the default support 10 files , that is, 1 to 10 named

DL: on behalf of the track , the default up to 255 songs, that is 0x00 ~ 0xFF

Please refer to the above track setting rules for the settings of the tracks.

3.4.5 Fixed voice information stored in FLASH

Track number	Track name	Track number	Track name
1	0.mp3	2	1.mp3
3	2.mp3	4	3.mp3
5	4.mp3	6	5.mp3
7	6.mp3	8	7.mp3
9	8.mp3	10	9.mp3
11	10 da da female .mp3	12	11Mp3 ringtones .mp3
13	The Bund 18th	14	13 home .wav
15	14 had to love .wav	16	

Note : It contains MP3 , WAV format audio files . Are without any compressed audio files

Reference circuit

For the application of the module, we provide a detailed design reference, so you can get started faster to experience the power of the module

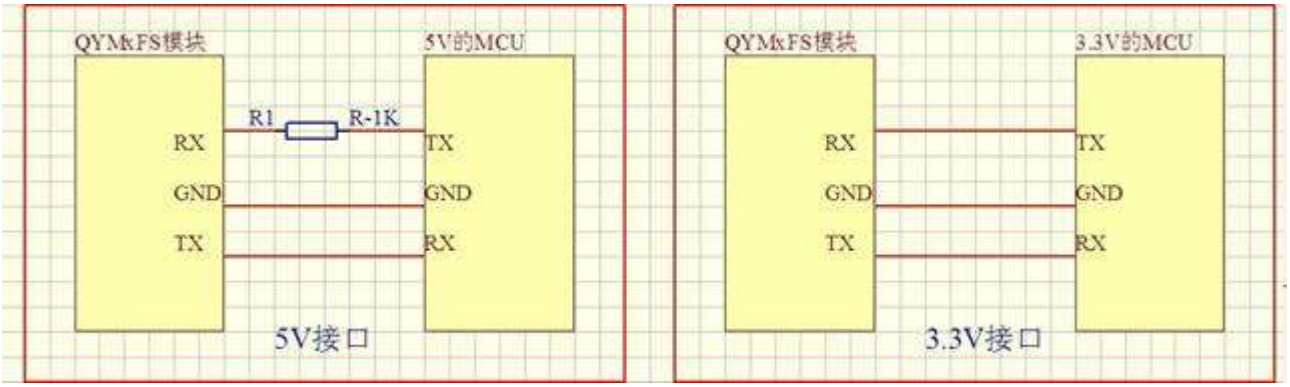
Serial communication interface, the default baud rate 9600 , can be modified according to customer requirements

External AD button interface circuit , the button function can be customized according to

customer demand

External mono amplifier reference circuit

4.1 serial interface



<! [Endif]>

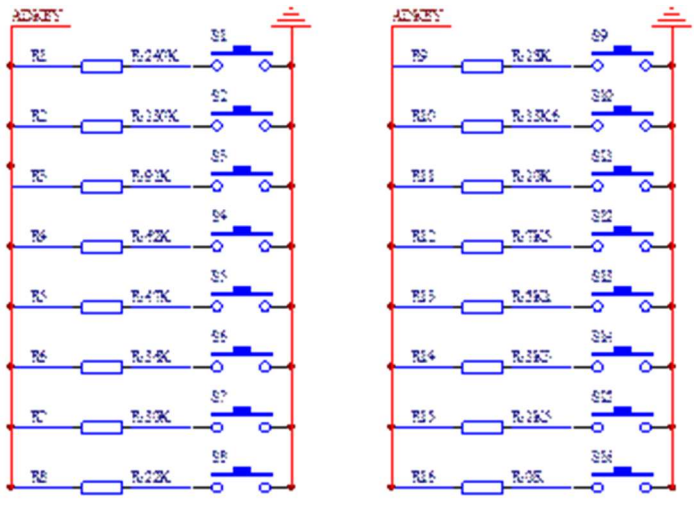
The module's serial port is 3.3V TTL level, so the default interface level is 3.3V . If the system is 5V . Then it is recommended in the serial port

The docking interface is connected in series with a 1K resistor. This is sufficient to meet the general requirements, if applied to strong electromagnetic interference occasions, please refer to "Note" note. Module in the 5Vand 3.3V systems are normal test, all normal. Are in the use of direct connection, and no string 1K resistance.

4.2 key interface

Module we use the AD button way to replace the traditional matrix keyboard connection, the benefits of doing so is to take full advantage of the MCU more and more powerful AD function. The design is simple and not simple, our module default configuration 16 key resistance distribution, if used in strong electromagnetic interference or strong, capacitive load of the occasion, please refer to our "precautions".

(1) , refer to the schematic



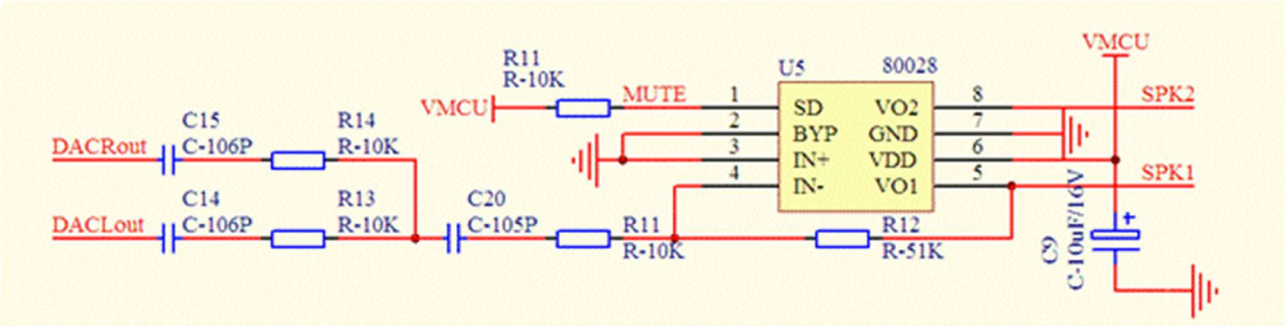
<! [Endif]>

(2) , 16 key function assignment table

Resistance	dog	Press	According to not loose	Lift up
00-240K	9		V +	

01-130K	8		V-	
02-91K	7	Loudspeaker		
03-62K	6	Loudspeaker off		
04-47K	5	Play the device to switch		
05-36K	4	EQ switch		
06-30K	3	Folder 10		
07-22K	2	Folder 9		
08-18K	1	Folder 8		
09-13K6	0	Folder 7		
10-10K	Play mode	Folder 6		
11-7K5	Operating mode	Folder 5		
12-5K1	next track	Folder 4		
13-3K3	previous piece	Folder 3		
14-1K5	time out	Folder 2		
15-0R	U / SD	Folder 1		
Note : empty for no function				

4.3 external mono amplifier



<! [Endif]>

Here we use the amplifier is 8002 , the specific parameters, please refer to the IC datasheet . Applied to the general situation is enough, if the pursuit of higher sound quality, please customers to find the right amplifier.

Precautions

IO input characteristics						
symbol	parameter	Minimal	typical	maximum	unit	Test Conditions
VIL	Low-Level Input Voltage	-0.3	-	0.3 * VDD	V	VDD = 3.3V
VIH	High-Level Input Voltage	0.7VDD	-	VDD + 0.3	V	VDD = 3.3V

IO output characteristics						
symbol	parameter	Minimal	typical	maximum	unit	Test Conditions
VOL	Low-Level Output Voltage	-	-	0.33	V	VDD = 3.3V
VOH	High-Level Output Voltage	2.7	-	-	V	VDD = 3.3V

1 , the module interface are 3.3V TTL level, so the design of the hardware circuit, please pay attention to the level of conversion problems.

Also in the strong interference environment, please pay attention to some of the electromagnetic compatibility protection measures, GPIO optocoupler isolation, increase TVS, etc.

2 , ADKEY key values are in accordance with the general use of the environment, if the strong or capacitive load environment, please pay attention to the module power supply, it is recommended to use a separate isolation power supply, coupled with the magnetic beads and inductance on the power supply Filter, be sure to ensure that the input power is as stable and clean as possible. If it is not guaranteed, please contact us to reduce the number of keys and redefine the wider voltage distribution.

3 , serial communication, in the general use of the environment, pay attention to a good level conversion can be. If strong interference with the environment, or long-distance RS485 applications, then please pay attention to the signal isolation, in strict accordance with the industrial standard design of communication circuits. Can contact us, we provide design reference

Disclaimer

Develop prerequisites

QY series products will provide as much as possible the development of templates, drivers and their application documentation to facilitate the user but also requires users to familiar with their own design products used by the hardware platform and the relevant C language knowledge

EMI and EMC

QY series module mechanical structure determines its EMI performance must be different from the integrated circuit design. QY series of EMI to meet the vast majority of applications, the user if the special requirements, must consult with us in advance .

QY series module EMC performance and user floor design is closely related, especially the power circuit, I / O isolation, reset the circuit, the user must fully consider the design of the above factors. We will strive to improve the QY series of electromagnetic compatibility features, but not the final application of the product EMC performance to provide any guarantee .

Modify the power of the document

Yue Xin Electronics reserves the right to modify the relevant documents of the YX series at any time without prior notice

ESD ESD protection

QY series of components built-in ESD protection circuit, but in the use of harsh environment, it is recommended that users in the design of the floor to provide ESD protection measures, especially power and IO design to ensure the stable operation of the product, install QY series of products To ensure safety, please accumulate static electricity on the body, such as wearing a reliable grounding of the static ring, touch the ground access to the water pipe