TTS MODULE

SNR9816TTS

Ver: V1.0

catalog

1. Catalogue

SNR9816TTS exclusive speech synthesis algorithm is based on the development of a high fluency, high degree of natural beautiful voice voice synthesis module. This module scheme is based on a new generation of neural network algorithm, and selects high-quality female voice to meet the synthetic broadcast of various application scenarios.

The module is mainly in English, supports numbers, Chinese, and text coding supports GB2312. There is a significant improvement in excellent synthesis (intelligibility, clarity, naturalness, expressiveness, rhythm/pause, speed of speech, intonation, tone quality, timbre, comprehension).

With the professional PC testing TOOL (TTS TOOL) developed by our company, the module can receive the synthesized text through the serial port (UART), and directly synthesize the output voice broadcast.

In addition, when customers only use chip design, our company provides module schematic PCB and other information to help integrate into the integrated circuit board, if there is demand, please contact our business.

1. 1 Product Feature

The length and width of the module are 27x22mm, the thickness of the plate is 1.0mm, and the working voltage is 3.6~5V.

- **Good speaker**
  Female version

- **Support pure English ,Chinese and Chinese and English mixed reading synthesis**
  Realize the correct and smooth synthesis of Chinese polyphonics, numbers, values, date, time and English, play clearly without noise, and support real-time update broadcast

- **Coded Format**
  Support GB2312 encoding, up to 4K Bytes of synthesized text (no more than 2000 words in Chinese)

- **Support for multiple controls**
  Support volume, speech speed, intonation adjustment, pause synthesis, stop synthesis, restore synthesis function

- **Query working status**

  You can obtain the chip status by sending query commands

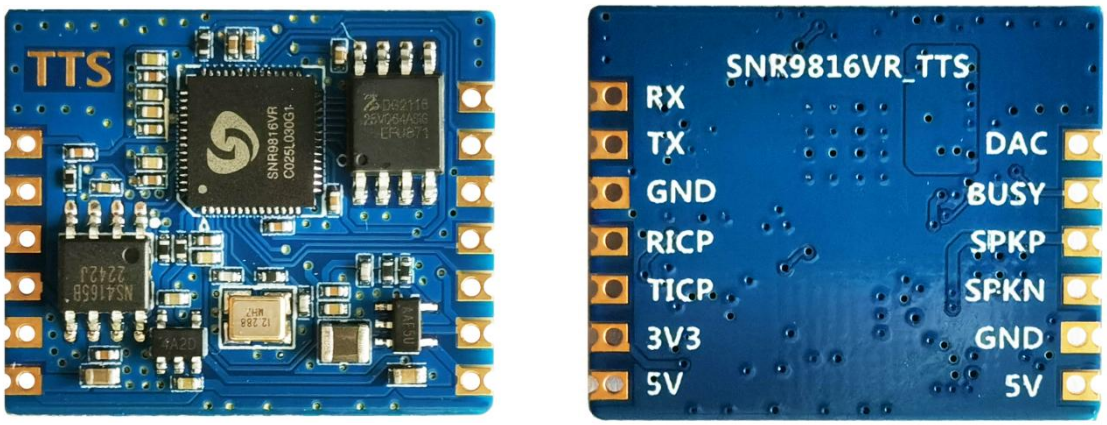
Applications: vehicle transportation equipment, vending machines, POS machines, intelligent instruments, attendance machines, etc.

2. Major Parameter

Operating Voltage	3.6-5.5V, typical 5V
I/O Interface Voltage	3.3V
Operating Current	Standby 40mA, broadcast maximum current 250mA
Speaker Output Oower	3.3W(4Ω speaker/VDD=5V) 5.4W(2Ω speaker/VDD=5V)
Control Interface	UART
UART BaudRate	115200bps
Measure	27*22mm
Operating Temperoture	-40℃~85℃
Storage Temperature	-40℃~100℃
Storage Humidity	0~5%RH

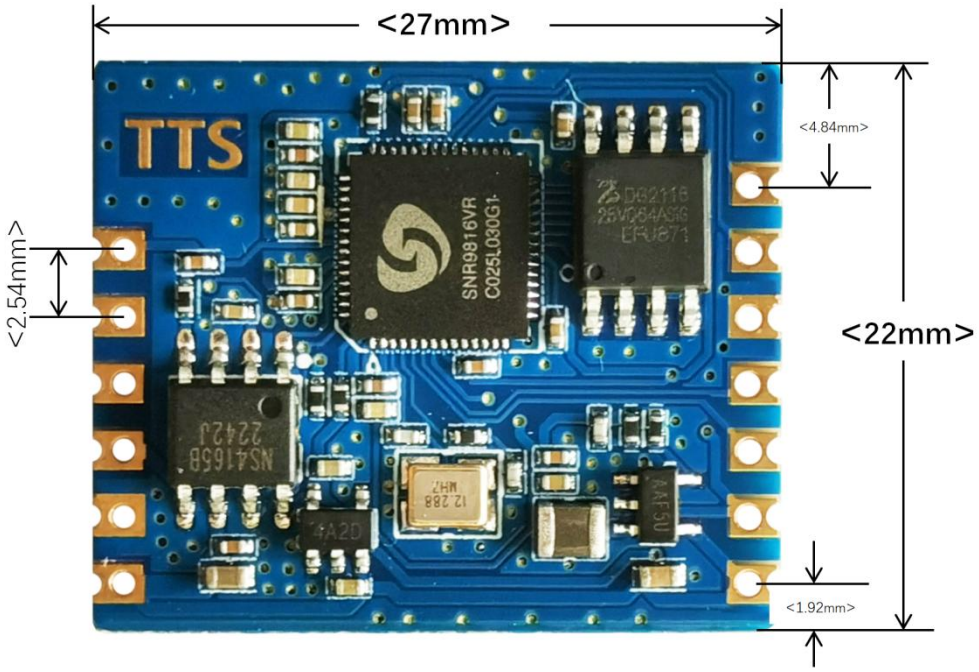
NOTE: The maximum current in the broadcast state can reach 250mA, according to the double margin in principle, it is necessary to provide a set of power supply with a driving capacity of 500mA for the module.

3. External Dimension



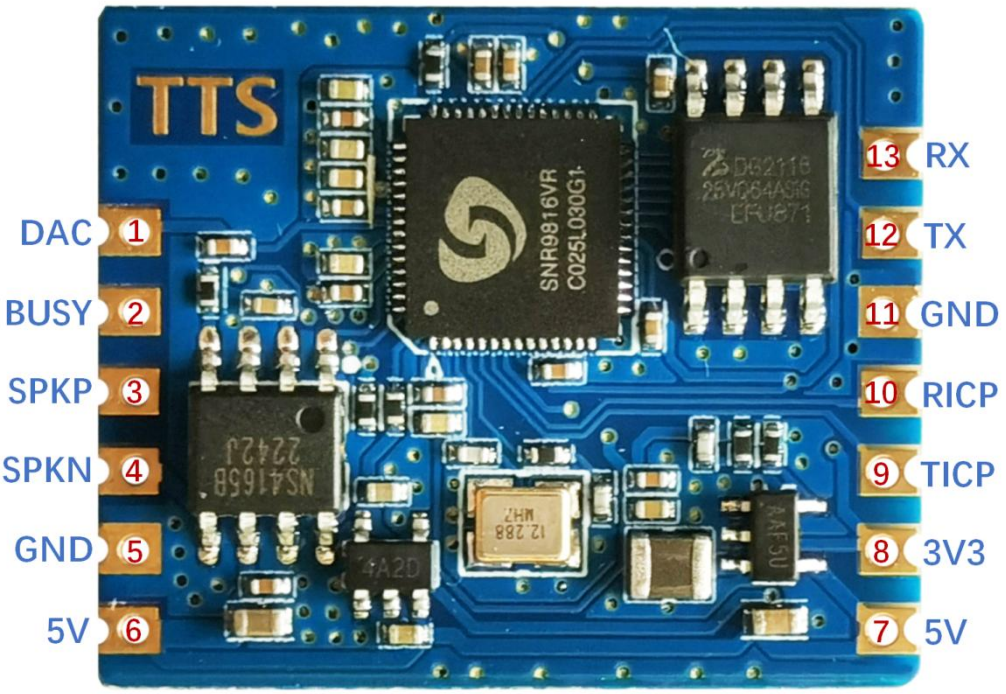
front back

Module appearance drawing



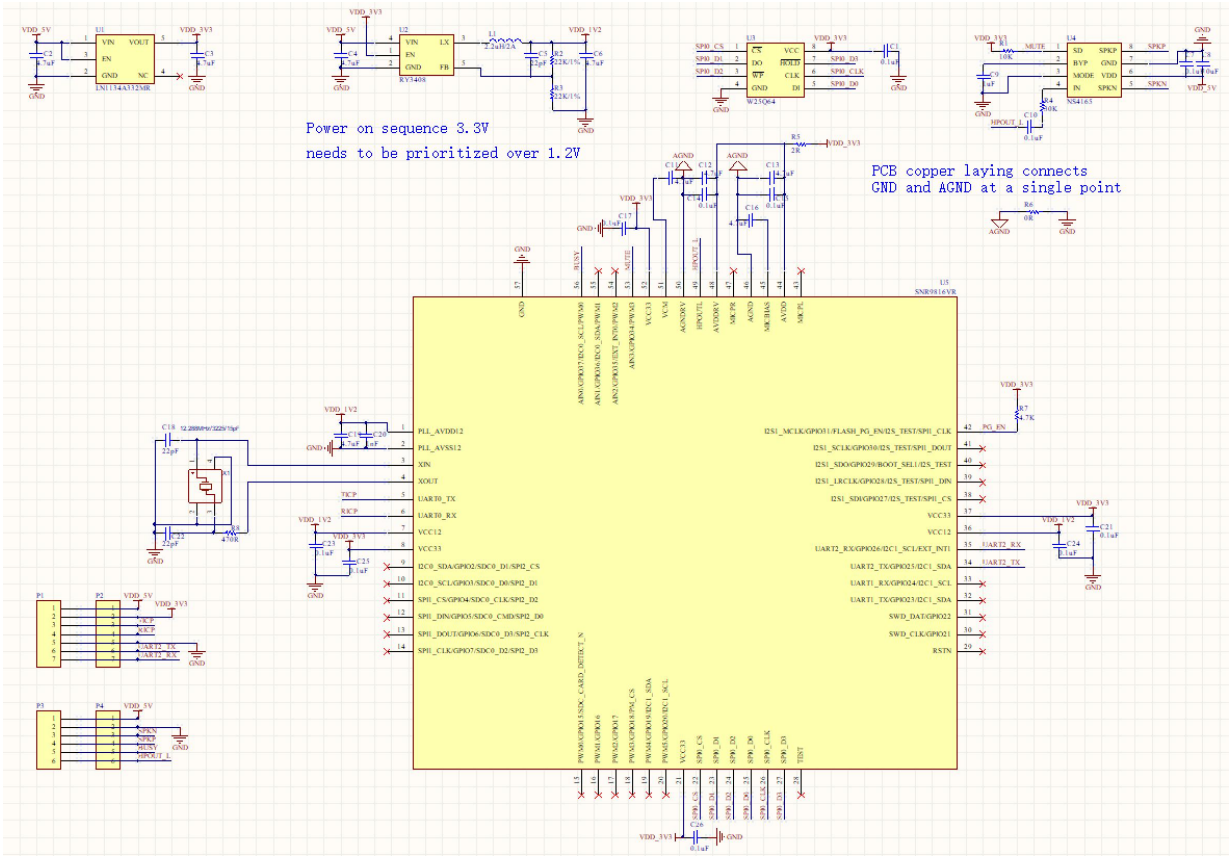
Module dimension drawing

4. Pin Definitions



No.	Name.	Type	IO-REG	Default power-on status	function definition
1	DAC	O	-	-	DAC channel audio output
2	BUSY	O	3.3V	-	reserved
3	SPKP	O	-	-	trumpet output
4	SPKP	O	-	-	trumpet output
5	GND	P	-	-	Power source (Power access recommended)
6	5V	P	-	-	5V power supply (recommended power supply access)
7	5V	P	-	-	5V power supply (Power supply not recommended)
8	3V3	P	-	-	3.3V power output, current does not exceed 10mA
9	TICP	-	-	-	reserved
10	RICP	-	-	-	reserved
11	GND	P	-	-	Power source (Power access not recommended)
12	RX	I	3.3V	High	UART RXD
13	TX	O	3.3V	High	UART TXD

5. Schematic Diagram

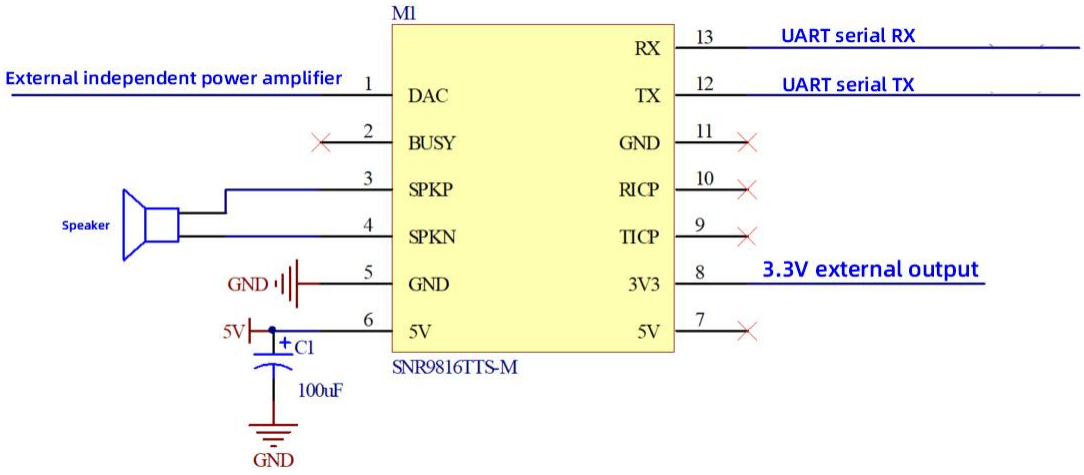


Module circuit diagram

6. Application Design Guide

6. 1 Application Circuit

The module application mode is as follows:



Application Mode

6. 2 Circuit design reference

1、The module provides 3.6 to 5.5V power supply. The typical 5V power supply requires a peak current of more than 500mA.

2、The module can work properly only with an external 5V power supply. It is recommended that the power supply enter the optimal position from pins 5 and 6 of the module

3、The module uses UART communication control and connects to pins 12 and 13 of the module.

4、All IO of this module board is typical 3.3V level.

5、For additional electrostatic protection, you can add ESD devices near the speaker and microphone sockets.

6、When designing the baseboard or mainboard of a module, place a capacitor with a capacity of no less than 100uF at the 5V power input of the module. Make sure that the SPK cable is as short and thick as possible. No other cable straddling is allowed in the cable area.

7、In order to ensure a good voice broadcast effect, it is recommended to use a speaker with a cavity, please contact our purchase.

6. 3 Serial communication protocol introduction

Serial port format: data bit 8bit, baud rate 115200 BPS, parity bit N, start bit 1bit, stop bit 1bit.

Data length: A maximum of 4000 bytes per transmission.

6.3.1 Composite text

Support any English characters text synthesis. Text encoding supports GB2312, and the amount of synthesized text does not exceed 4K bytes at a time

head byte(1byte)	data length(2byte)	command word(1byte)	coding parameter(1byte)	Text /GB2312 encoding (N byte)
0XFD	0X--(high 8 bits), 0X--(low 8 bits) Length = command word + encoding parameter + text	0X01	0X01	Text: English; GB2312 Code： 0X--,0X--，……

Message status feedback:

【0x41】Indicates that a correct command frame is received；

For example, synthesize "Thank you " as follows:

head byte(1byte)	data length(2byte)	command word(1byte)	coding parameter(1byte)	Text /GB2312 encoding (8 byte)
0XFD	0X00 0X0A	0X01	0X01	Text：Thank you； GB2312 encoding： 0xFD 0x00 0x0B 0x01 0x01 0x54 0x68 0x61 0x6E 0x6B 0x20 0x79 0x6F 0x75

6.3.2 control command

- Querying chip status

send data	instruction
0XFD 0X00 0X01 0X21	Before each send, check the working status of the chip first, must be in the idle state, can send new synthetic text

Communication status feedback:

【0x4E】Busy state;

【0x4F】Indicate idle state;

■ Pause synthesis

send data	instruction
0XFD 0X00 0X01 0X03	Pause TTS compositing (can continue playing later)

Communication status feedback

【0x41】Indicates that a correct command frame is received

■ Continuous synthesis

send data	instruction
0XFD 0X00 0X01 0X04	Continue the composition of TTS (resume after pause)

Communication status feedback

【0x41】Indicates that a correct command frame is received

■ Stop synthesis

send data	instruction
0XFD 0X00 0X01 0X02	Stop TTS compositing (stop playback)

Communication status feedback:

【0x41】Indicates that a correct command frame is received

6.3.3 Support 10 level volume, 10 level speech speed, 10 level intonation adjustment

Volume: [v0]-[v9], the volume increases from small to large. The default value is the middle value

Speaking speed: [s0]-[s9], speaking speed from fast to slow, the default is the middle normal speaking speed

Intonation: [t0]-[t9], intonation from low to high, default to the middle normal intonation

■ volume adjustment

head byte(1byte)	data length(2byte)	command word(1byte)	coding parameter(1byte)	Text /GB2312 encoding (N byte)
0XFD	0X00 0X06	0X01	0X01	Text：[v0]~ [v9]； GB2312 encoding： [v0]：0X5B 0X76 0X30 0X5D …… [v9]：0X5B 0X76 0X39 0X5D

Communication status feedback:

【0x41】Indicates that a correct command frame is received

- Speed adjustment

head byte(1byte)	data length(2byte)	command word(1byte)	coding parameter(1byte)	Text /GB2312 encoding (N byte)
0XFD	0X00 0X06	0X01	0X01	Text：[s0]~ [s9]； GB2312 encoding： [s0]：0X5B 0X73 0X30 0X5D …… [s9]：0X5B 0X73 0X30 0X5D

- Intonation adjustment

head byte(1byte)	data length(2byte)	command word(1byte)	coding parameter(1byte)	Text /GB2312 encoding (N byte)
0XFD	0X00 0X06	0X01	0X01	Text：[t0]~ [t9]； GB2312 encoding： [t0]：0X5B 0X74 0X30 0X5D …… [t9]：0X5B 0X74 0X39 0X5D

6.3.4 Built-in prompt sound

Supports 15 prompt sound effects, including: ring tone 5; 5 message prompt tones; Five warning tones

the tinkle of bells	ring_1	ring_2	ring_3	ring_4	ring_5
message alert tone	message_1	message_2	message_3	message_4	message_5
Admonitory volume settings	alert_1	alert_2	alert_3	alert_4	alert_5

■ Ringing tone playback

head byte(1byte)	data length(2byte)	command word(1byte)	coding parameter(1byte)	Text /GB2312 encoding (N byte)
0XFD	0X00 0X08	0X01	0X01	Text：ring_1~ ring_5； GB2312 encoding： ring_1：0X72 0X69 0X6E 0X67 0X5F 0X31 ..... ring_5：0X72 0X69 0X6E 0X67 0X5F 0X35

Communication status feedback:

【0x41】Indicates that a correct command frame is received

■ A message prompt tone is played

head byte(1byte)	data length(2byte)	command word(1byte)	coding parameter(1byte)	Text /GB2312 encoding (N byte)
0XFD	0X00 0X0B	0X01	0X01	text：message_1~ message_5； GB2312 encoding： message_1：0X6D 0X65 0X73 0X73 0X61 0X67 0X65 0X5F 0X31 ..... message_5：0X6D 0X65 0X73 0X73 0X61 0X67 0X65 0X5F 0X35

Communication status feedback:

【0x41】Indicates that a correct command frame is received.

■ Warning tone play

head byte(1byte)	data length(2byte)	command word(1byte)	coding parameter(1byte)	Text /GB2312 encoding (N byte)
0XFD	0X00 0X09	0X01	0X01	text：alert_1~ alert_5； GB2312 encoding： alert_1：0X61 0X6C 0X65 0X72 0X74 0X5F 0X31 ..... alert_5：0X61 0X6C 0X65 0X72 0X74 0X5F 0X35

6.4 Text annotation method

In order to ensure the TTS synthesis effect, the following provides a set of annotation methods, users can achieve the desired synthesis effect through the annotation method, and repair the deficiency in the naturalness and fluency of the synthesis.

6.4.1 Text analysis function

Intelligent analysis of common punctuation marks, common polyphonics, numbers. Support common English units (lowercase), special number pronunciation. Single sentence without pause punctuation sentences longer than 50 words will automatically cut out.

6.4.2 Text markup function

Support text marking, can mark polysyllabic pronunciation, number pronunciation, short pause.

Short stop marking mode:

[w0], Specify the location for a short pause

Example: Welcome to [w0] our speech synthesis series solutions.

6.5 Circuit design

When it is necessary to design the circuit directly on the circuit board, without the use of modules, please refer to Chapter 5 schematic. For schematic diagram and PCB source file (AD format), please contact us.

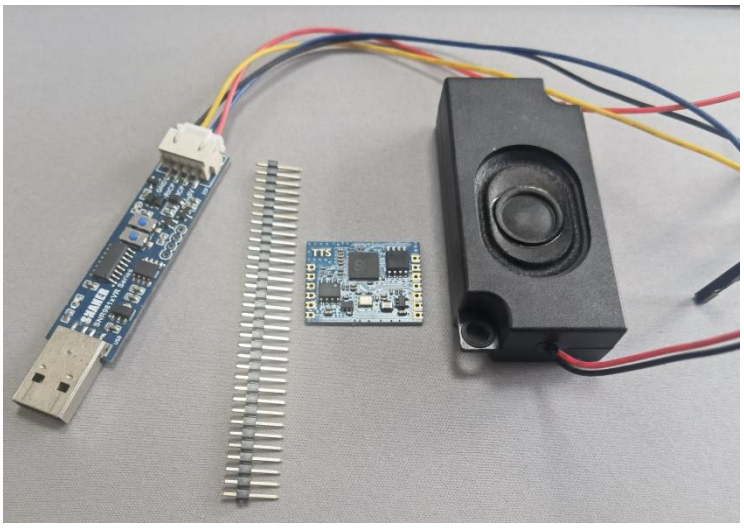
6.6 Matters need attention

- The module can be mounted flat against the circuit board.
- When the IO of the external MCU is 5V, it is recommended to string a 2K resistor between the RX pin of the module and the TX pin of the MCU.

7. Method Of Application

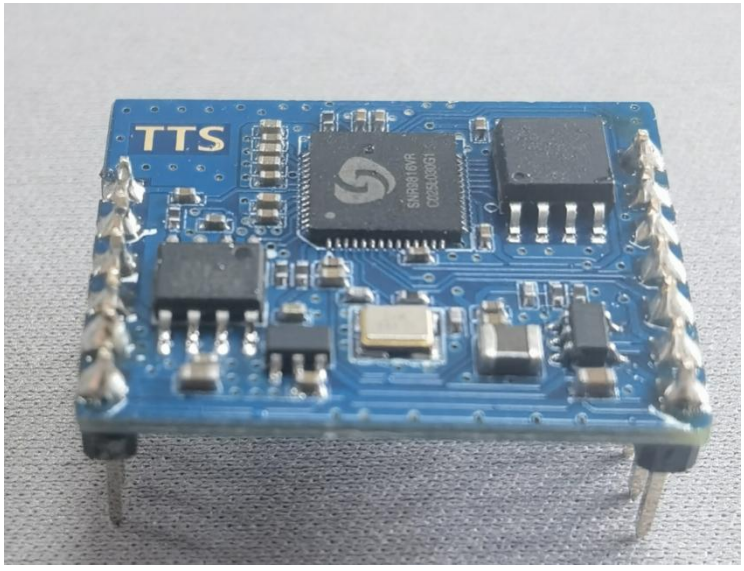
7.1 Hardware Connection

- ✓ To prepare for the test, please prepare the TTS module, USB to TTL serial port module, 2.54mm row pins, and horn in advance, as shown below: :



process flow diagram

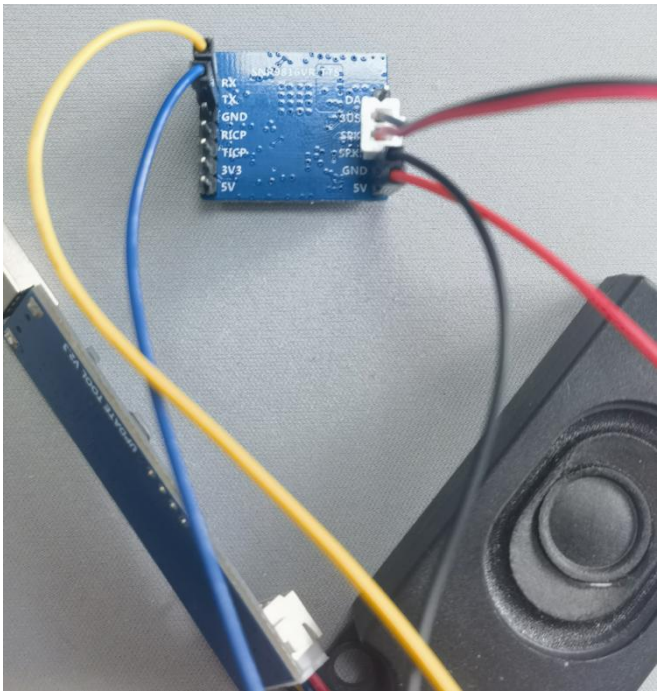
- ✓ Next, weld the module and the row pins, and weld the pins on both sides of the module, as shown in the figure below



Stitch welding diagram

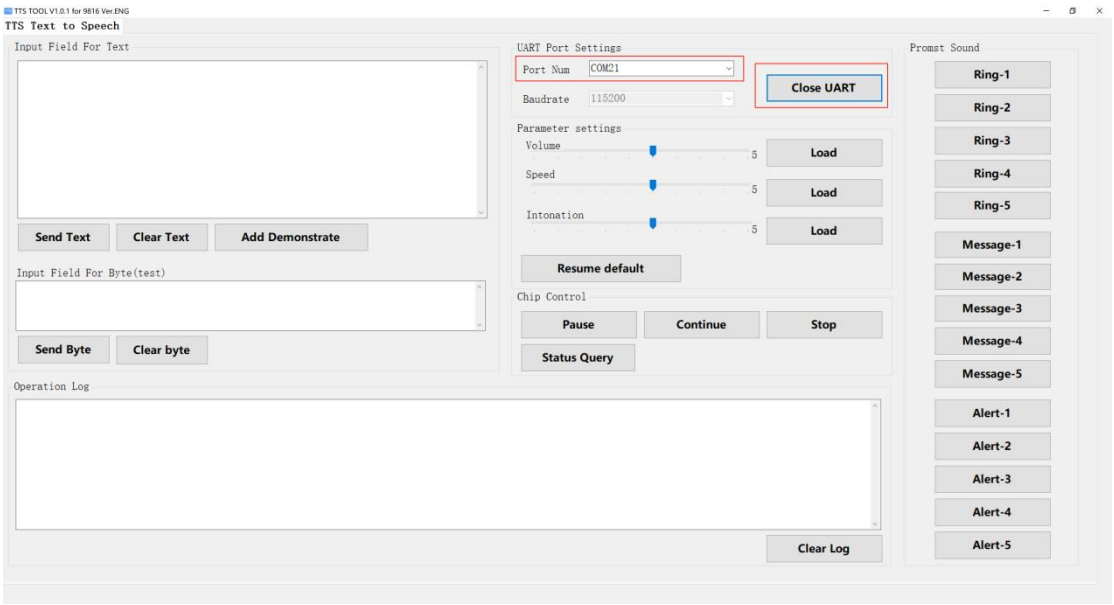
7.2 Power-on test

✓ Connect the 5V power supply (pins 5 and 6), TX/RX(pins 12 and 13), and horn (pins 3 and 4) to the corresponding pins, as shown below



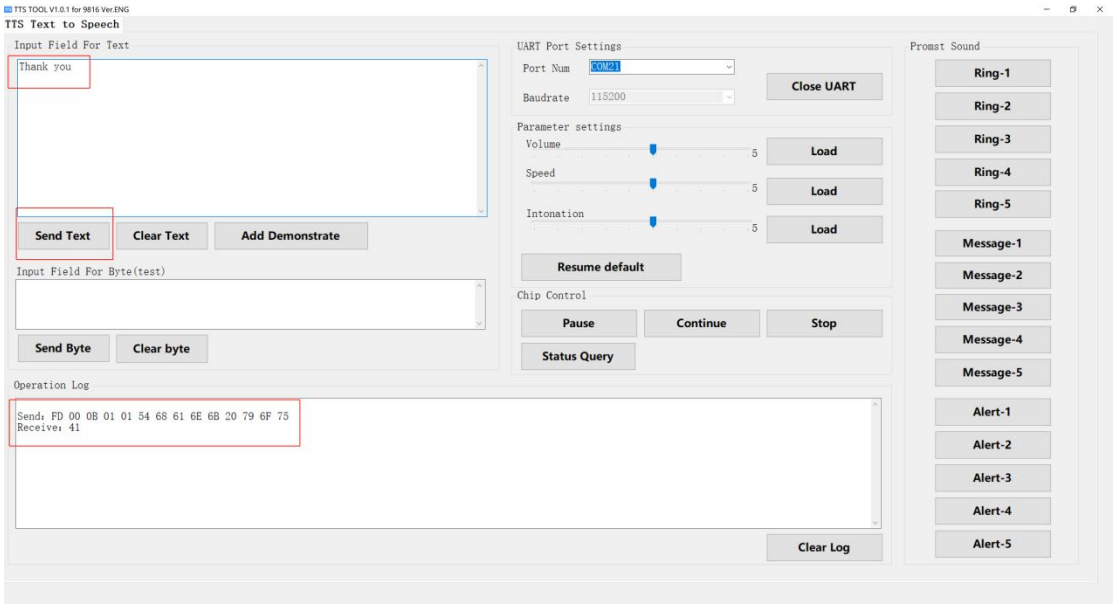
Connection diagram

✓ Connect the USB to TTL serial port module to the computer, open our TTS host computer (TTS TOOL), select the correct serial port number (select according to the actual situation), and click the "Open serial port" button, as shown below



upper computer

- ✓ Enter "Thank you" in the text input box, click the "Send text" button, and the module will sound "Thank you", indicating that the work is normal, as shown below



test pattern

8. The link of purchase

Modules can be purchased from the link below:

https://www.aliexpress.us/item/3256805873669541.html?gatewayAdapt=glo2usa4itemAdapt

9. Business Relation

For technical support, business docking and other services, please scan and add wechat QR code to contact:

Business Relation	account number	link
FaceBook	Snanertoys	https://www.facebook.com/profile.php?id=100082034667544
Instagram	Snanertoys	
Skype	Snanertoys	https://join.skype.com/invite/JlwGWrobetd9
Twitter	@Snanertoys	https://twitter.com/Snanertoys?s=09