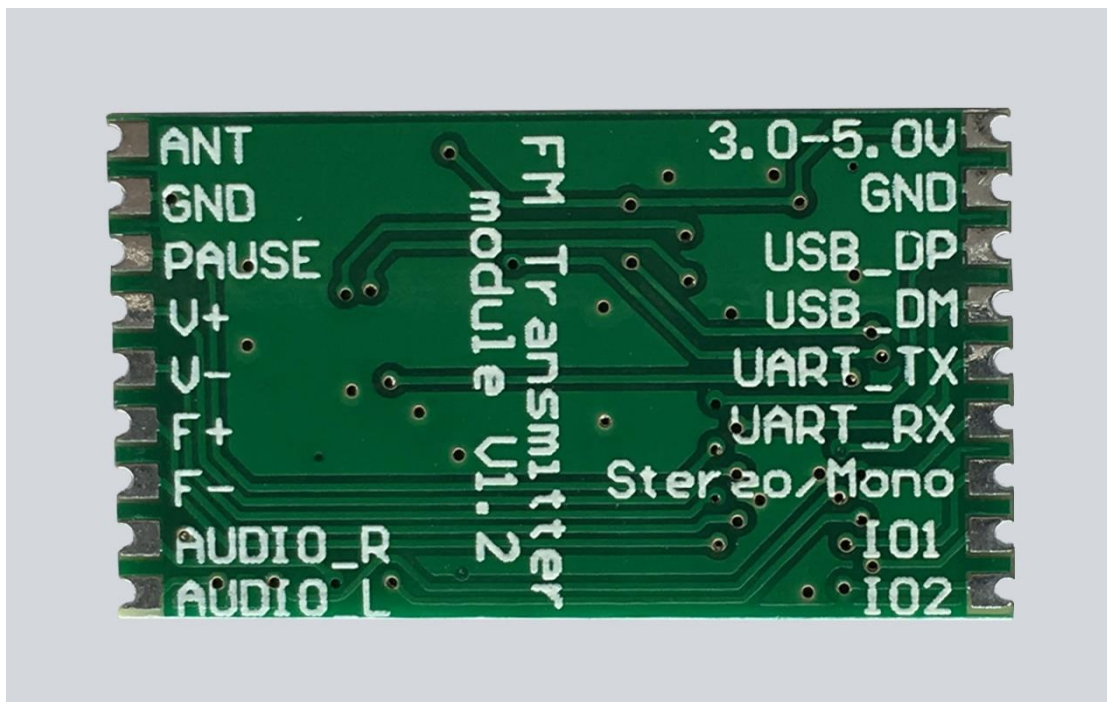
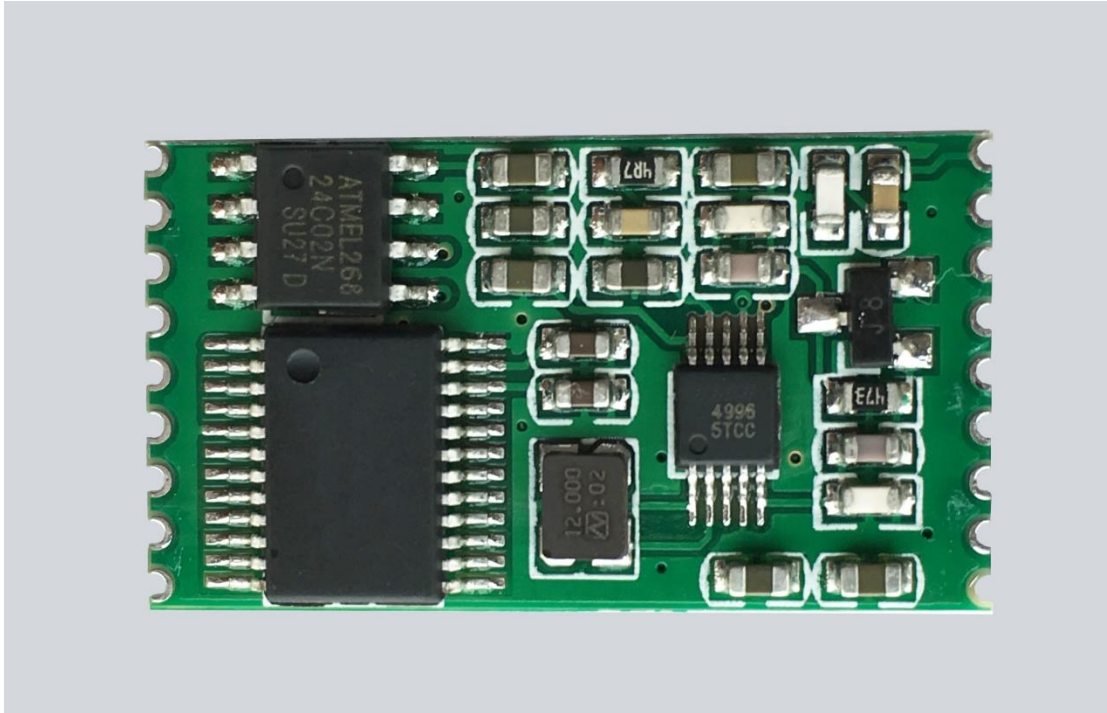


# FM Transmitter Module User Manual

V1.0.1



## **1 Introduction**

### **1.1: Overview**

This product is based on the FM-band-launched surface-mount wireless product module, the product form to meet the needs of large-scale production, performance to meet the general specifications of the FM transmitter, the volume to meet the needs of portable equipment market, can be easily embedded as a functional module .

### **1.2: Features**

This module is a surface-mount FM wireless module that can be used in various FM transmitting devices. It can not only work independently in the key operation mode, but also can support the frequency and volume of the serial AT command operation control module. Embedded into your system, the module is controlled by your system via serial commands.

The main features are as follows:

#### **<1> interface**

- 1: the interface in the form of stamp holes, 1.6mm pitch
- 2: A TTL serial interface for commanding the frequency and volume of the module
- 3: 5 buttons for the key control module frequency and volume
- 4: A USB interface for connecting a PC as an audio input source for USB Audio
- 5: Stand-alone Stereo / Mono switching port, used to set the FM transmitter modulation (stereo or mono)

#### **<2> Wireless**

- 1: support all FM transmit frequency range 76.0MHz-108.0MHz
- 3: The minimum frequency step is 0.1MHz
- 4: Built-in 75uS pre-emphasis
- 5: 63dB stereo signal to noise ratio, 0.05% total harmonic distortion

### <3> Others

1: support power-off memory, power and save the volume and frequency information, the next power-up without having to re-set, power can work.

2: to provide PC-side frequency setting tool (software), easy to modify the module's launch frequency and volume.

### 1.3 Specifications

	project	parameter
Wireless section	Frequency Range	76.0-108.0MHz
	Minimum frequency adjustment range	0.1MHz
	Output Power	100mW
	Antenna interface	75cm telescopic antenna or compatible antenna
	RF modulation	FM
	Pre-emphasis	75uS
	Carrier frequency deviation	$\pm 0.02$ MHz
Hardware part	Interface Type	UART/USB Audio/Audio/GPIO
	Interface Rate	UART : 115200
	Operating Voltage	3.0-5.0V
	Working current	35mA
	Operating temperature	-20-+70°C
	Storage temperature	-55-+125°C
	Working humidity	5%-90%(无凝结)
	Dimensions	25*14*2.5mm

## 2: hardware design

### 2.1 hardware interface

The pinout of the module is shown in Figure 1-1, and the pinout is shown in Table 1-1



Figure 1-1 Stamp hole pin order

Table 1-1 Stamp hole pin description

Pin	Description	Direction	Description
1	3.0-5.0V	P	Power input, the voltage range of 3.0-5.0V or less
2	GND	G	Ground
3	USB_DP	I	USB AUDIO D+
4	USB_DM	I	USB AUDIO D-
5	UART_TX	O	Serial sending end
6	UART_RX	I	Serial receiver
7	Stereo/Mono	I	Grounding: Mono modulation, floating: Stereo modulation
8	IO1	I/O	Reserved
9	IO1	I/O	Reserved

10	AUDIO_L	I	Left channel audio input
11	AUDIO_R	I	Right channel audio input
12	F-	I	External Key Frequency -
13	F+	I	External key frequency +
14	V-	I	External key volume -
15	V+	I	External key volume +
16	PAUSE	I	External key pause
17	GND	G	Ground
18	ANT	I	External antenna (75cm rod antenna)

**2.2 Schematic design reference**

Schematic design reference as shown in Figure 1-2:

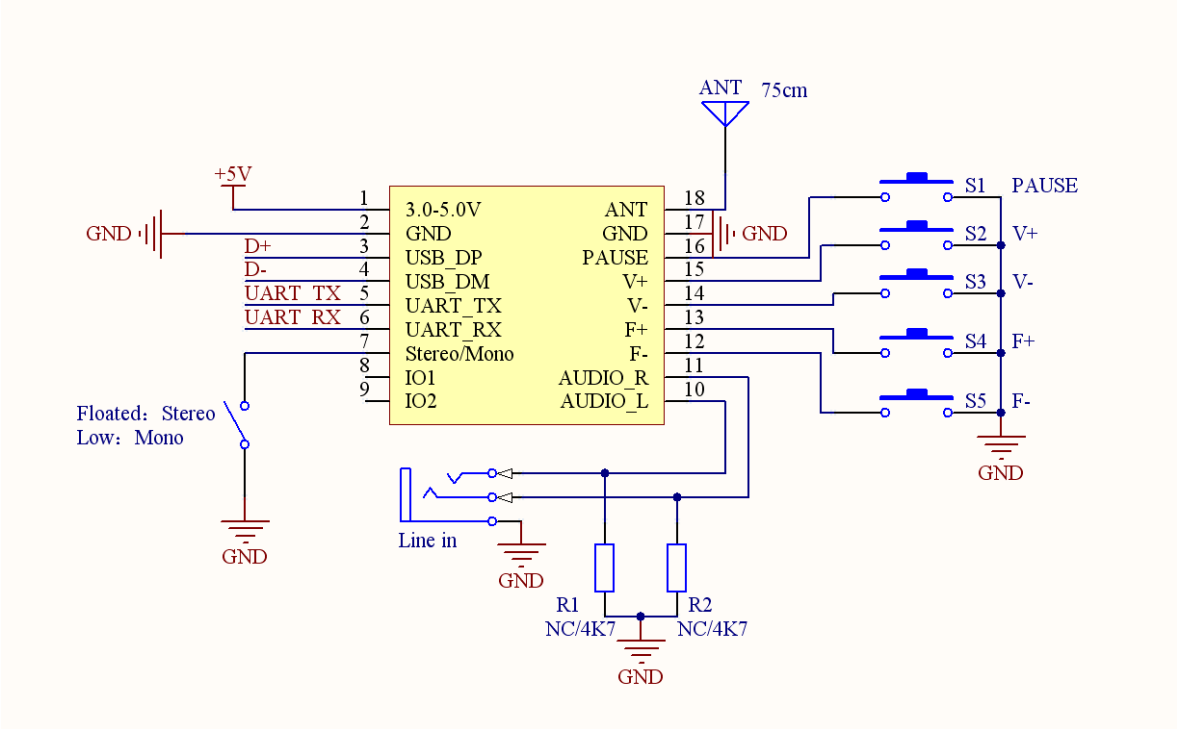


Figure 1-2 Schematic Design Reference

Note: R1, R2 is optional, the purpose is to have some smart devices have plug-in detection, not connected may not have audio output. For devices without the LINE IN insertion detection function, R1 and R2 may not be connected.

### 3: Serial command interface

#### 3.1 serial communication port design

1: This module supports TTL serial interface with baud rate of 38400bps

2: The AT command begins with AT and ends with a line break (\r\n).

#### 3.2 Serial command

<1>: Set the transmission frequency

**AT+FRE=DAT\r\n**

Description: where DAT is the frequency to be set 760-1080, respectively, corresponding to the frequency of 76.0MHz-108.0MHz (for taking into account the operation Streamline, so the transceiver is to enlarge 10 times to deal with to remove the fractional part to deal with).

return value:

Frequency input correct Return: FRE = DAT (ie return to the current frequency)

Frequency input error: ERR

Example: To set the current frequency to 87.5MHz is sent

**AT+FRE=875\r\n**

After the module receives the command will return: FRE = 875, that has been successfully set the module to 87.5MHz was launched.

<2>: Transmitting frequency + 0.1MHz

**AT+FREDr\r\n**

<3>: The transmission frequency is -0.1MHz

**AT+FREDr\r\n**

<4>: Sets the volume

**AT+VOL=DAT\r\n**

Description: where DAT is the volume to be set, which is in the range of 00-30

return value:

Frequency input correct Return: VOL=DAT (ie return to the current volume) Frequency

input error: ERR

Example: To set the current frequency to 20 to send

**AT+VOL=20\r\n**

After receiving the command, the module will return: VOL = 20, which indicates that the volume of the module has been set successfully

<5>: Volume +1

**AT+VOLU\r\n**

<6>: Volume-1

`AT+VOLD\r\n`

<7>: Pause

`AT+PAUSE\r\n`

<8>: Turns off transmission

`AT+SEND_OFF\r\n`

<9>: Turns on emission

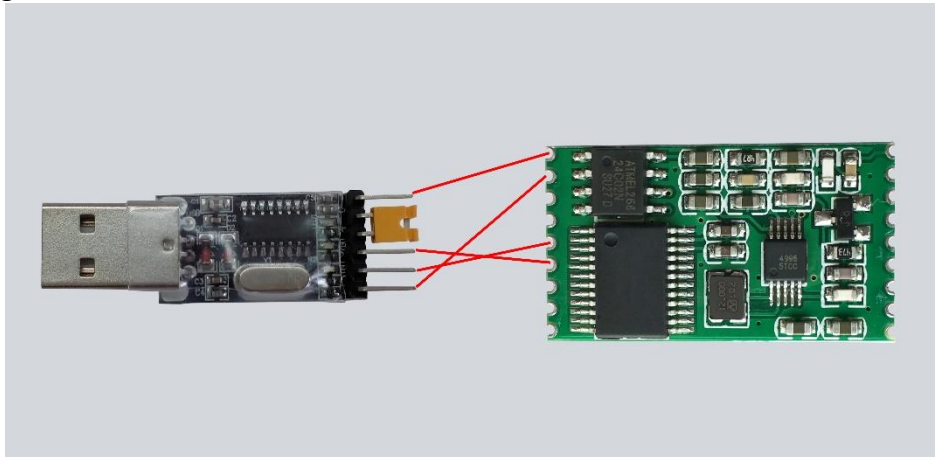
`AT+SEND_ON\r\n`

<10>: Returns the status

`AT+RET\r\n`

#### 4: serial configuration tool to use

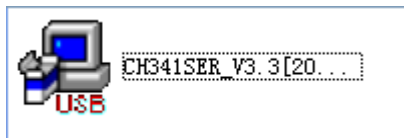
4.1: Connection between FM transmitter module and TTL to serial interface module. Please follow the diagram below to connect the FM transmitter module with the USB to TTL module.



#### 4.2 USB to TTL module driver installation

To XP system, for example, other systems are similar:

<1>: Install CH341SER\_V3.3USB to serial port module driver folder inside CH341SER\_V3.3 [2012-02] .EXE



The following window pops up to install



wait. ....

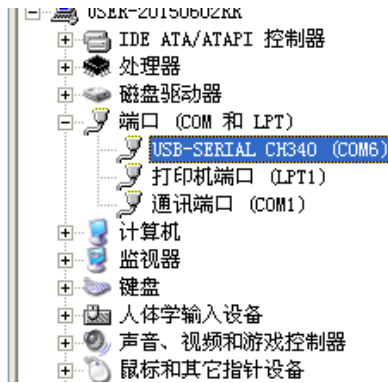
Successful installation



Insert the USB to serial module, waiting for the driver automatically installed. After the automatic installation is complete.

Open the Device Manager, see the USB to TTL serial number of the module, I am here is COM6.





### 4.3: Serial Port Configuration Tool Usage

Install the serial port tools. Directly open the folder of the installation project by default installed on it, the process is slightly.

<1>: Open the serial configuration tool (the installation process is abbreviated):



Select our USB to TTL module port, COM6 and then click to open the serial port, you can set the module inside the tool frequency and volume, of course, you can not use this tool to set, in other ways by sending AT commands can also have the same Effect. This tool is only for learning and reference.

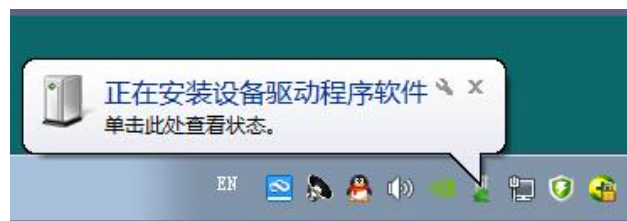


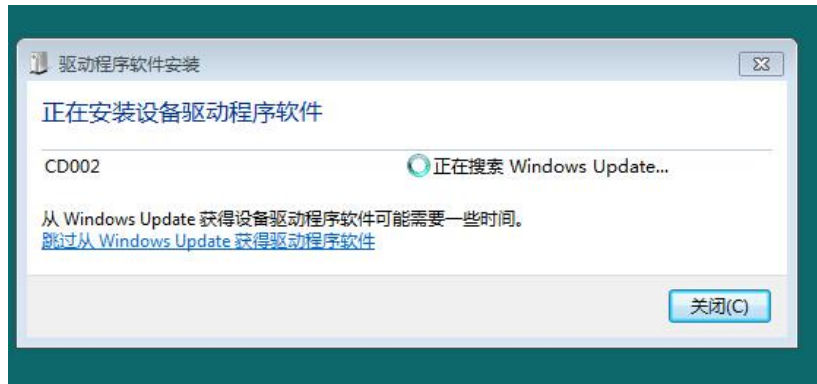
## 5: USB Audio connection

Note: Due to USBPC mode, there is continuous data transfer between module and computer.

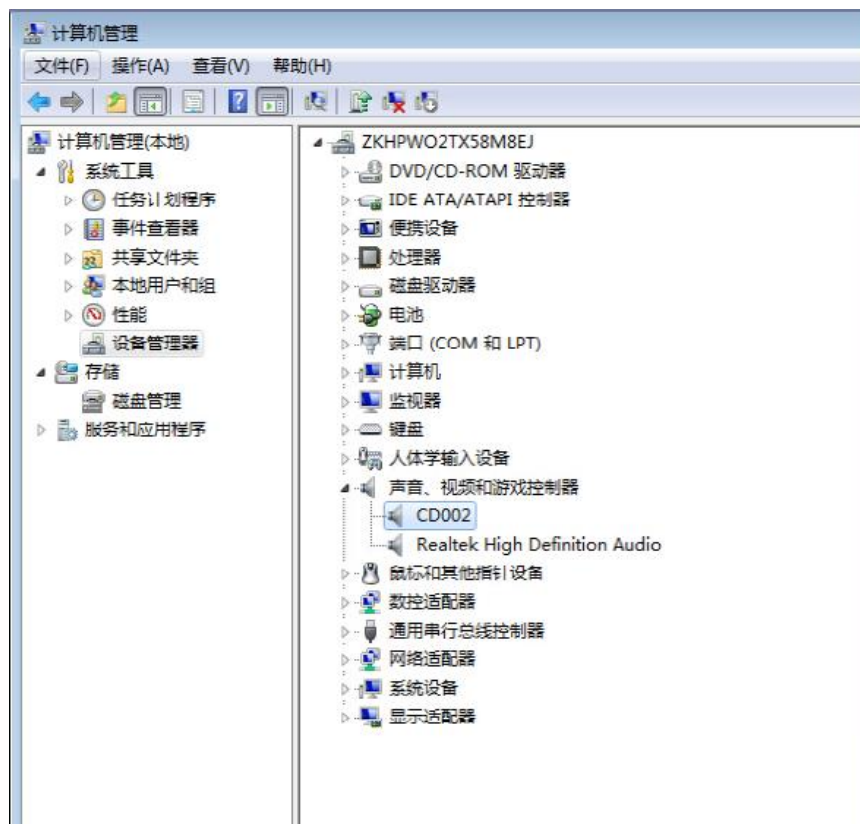
WIN7 system configuration is as follows:

1: Connect the FM transmitter to the PC via the USB cable, the system will recognize the FM transmitter as a CD002 device, and automatically install the driver





2: After installing the driver, in the device manager inside the sound controller will see more of a CD002 audio equipment



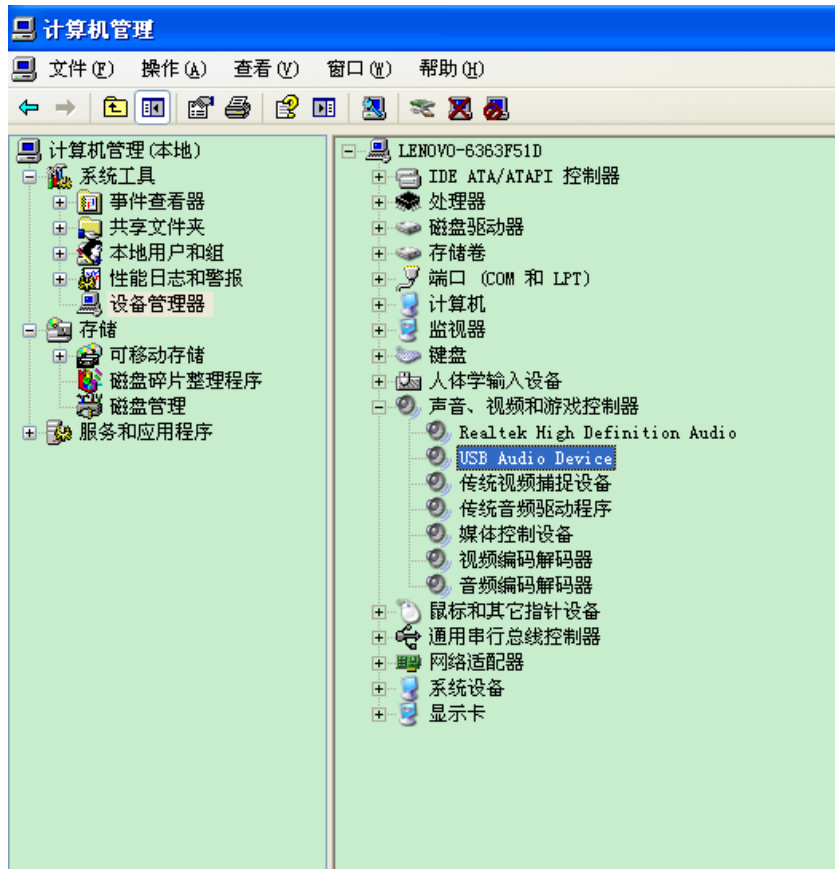
2: In the volume control options set inside CD002 for the playback device can be used!

(At this time open the computer audio player to play music can be heard in the radio side, if silent, pay attention to the transmitter side volume and the player side volume is small).

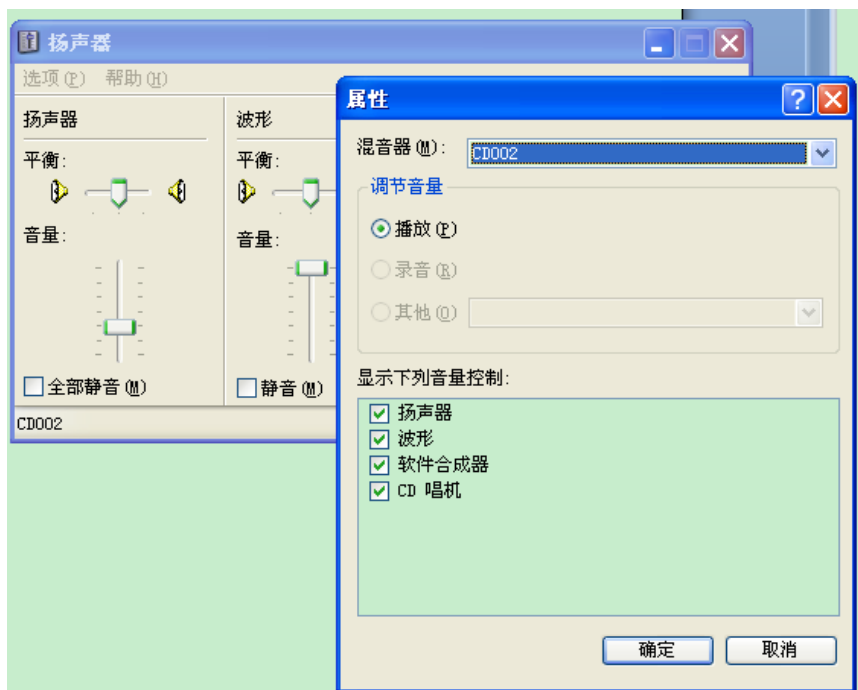


WINXP system configuration is as follows:

1: Connect the FM transmitter and the computer through the USB cable. The system will recognize the device that the FM transmitter is CD002, and install the driver automatically. After installing the driver, you can see more USB Audio Device in the device manager.

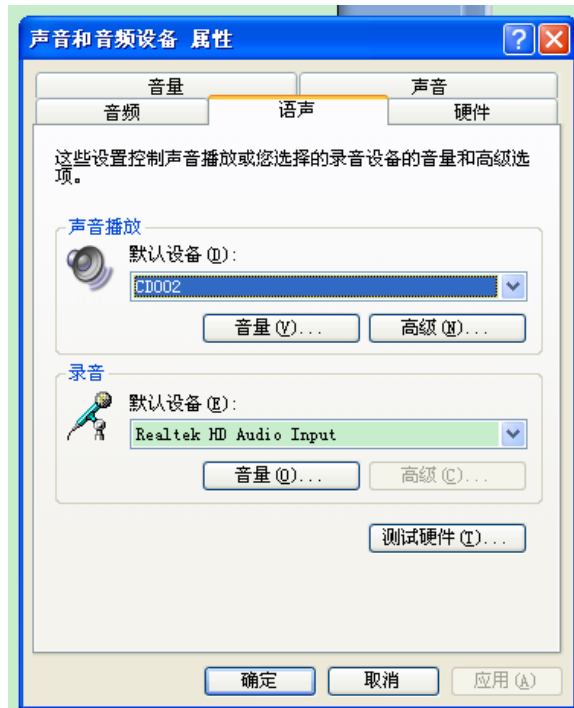


2: Under Volume Control, go to Speakers => Options => Properties and select Mixer as CD002.



2: In the volume of sound and equipment properties, select CD002 as the default playback device can be used!

(At this time open the computer audio player to play music can be heard in the radio side, if silent, pay attention to the transmitter side volume and the player side volume is small).



Individual computer operating system due to optimization problems may not be part of the USB driver can install a "drive life", open the driver's life software interface search does not properly install the peripheral driver automatically install the driver can be.



Refer to the steps above until the CD002 icon appears on the sound controller on the device manager

