

# FM Frequency Modulation Receiver

## 1. Introduction

This FM stereo digital radio circuit board module has built-in DSP digital noise processing. When there is no signal, it will automatically mute and get rid of the noise of the traditional FM radio.

## 2. Parameter

NO.	Parameter	Value
1	Output power	500mW (drive earphone), 3Wx2 (drive horn)
2	Frequency range	50Hz-18KHz
3	Receiving frequency range	87.0MHz-108.0MHz
4	Equivalent noise	Greater than 30dB
5	Power supply voltage	3.0V-5.0V
6	Power supply current	1000mA at maximum volume, 60mA at minimum volume (for reference only)
7	Sound track	Stereo

## 3. Using attention:

1>. The power supply voltage is strictly prohibited to exceed the power supply voltage range of this module.

2>. Do not touch the back part of the module when working, so as not to affect the normal work of this module or cause the short-circuit burn module.

## 4. Feature

1>. Advanced digital audio signal processing technology (DSP) and FM phase-locked loop modulation (PLL) make the sound quality more realistic, more stable performance, and long working frequency without deviation.

2>. LCD display is more intuitive and accurate, with extremely low power consumption and minimal noise interference.

3>. 30 digital volume adjustment, with buttons, easy to operate.

4>. Automatically storage data before power off.

5>. Automatic switch of speaker/headphone output.

6>. Quartz crystal steady frequency, temperature change reception frequency, no longer drift.

7>. It uses professional audio DSP to analyze and process the audio signal, and automatically mute when there is no signal or weak signal.

8>. It uses incremental digital rotary encoder to adjust the volume and frequency, using the feel is good, positioning accuracy, stable and durable, 360 ° rotating without blind Angle.

9> Support serial communication control, available computer or MCU and other devices with serial ports to control all functions of the module.

## 5. Instruction

1>. Power supply

Module corresponding port (marked on PCB board).

“-” and “+” are the anode and cathode of the power (battery). The power supply is recommended for battery or other stabilized power supply. You cannot use a power supply without filter (such as mobile phone charger, mobile power supply, and other switching power supply), otherwise the interference caused by power supply will affect the normal work of this module. The normal working voltage of this module is 3.0-5.0V, not exceeding this range. At the maximum volume of the module, the maximum power supply current is around 1A, which requires the battery to output enough current.

## 2>. Antenna

The FM\_ANT port is used to connect the FM antenna. To better receive the FM signal, it is recommended to extend the antenna with a length of 75cm.

## 3>. Headset/speaker output

This module is with 3WX2 channel audio amplifier. If the horn is needed, access the speaker port. It is recommended to use 4 Ω / 3 w speakers. If the headset is inserted, the audio will automatically switch to the headphone channel, and the speaker channel will be closed automatically.

## 4>. Volume

Turn the VOL encoder to adjust the volume, while the LCD screen

displays the volume series.

#### 5>. Frequency regulation

Turn the FRE encoder to adjust the reception frequency, while the LCD screen displays the current frequency, and press the encoder handle to the mute/non-mute switch.

#### 6>. Mute

Press the VOL knob to switch the mute/non-mute button down.

#### 7>. AMCAP switch

Long press the FRE knob to switch on or off the AMCAP, the LCD display subtitle ON means to turn on the AMCAP, and OFF means to turn off the AMCAP.

#### 8>. AMCAP threshold adjustment( when the AMCAP switch on)

Short press the FRE knob to AMCAP threshold adjustment interface, you can adjust the movement threshold of the AMCAP according to the specific usage situation. The adjustment range is 0-20. The higher the value is, the higher the threshold is, the easier the weak signal is to be silent. Vice versa.

#### 9>. Serial port (without serial port control)

The module reserved TTL level serial port control interface. TTL serial port and this module communication need to connect the module's UART\_RX, UART\_TX and GND (the corresponding position of PCB is marked). You can use the external MCU or the computer serial port to

send the command control module related functions. Note: because the computer serial port is not TTL level, connect the computer communication, it is necessary to connect the RS323 level to TTL power leveling device or the USB TTL level serial port module to communicate with this module. This operation requires professionals.

### 10>. User Settings

This module can set the backlight state according to the user's specific usage. When the power is off, press the FRE button to turn on, and the B0 indicates that the backlight is always bright. B0 indicates that the backlight is closed for 20 seconds, and the setting is effective after the restart. Change the Settings state to repeat this step to switch. The backlight has no operation for 20 seconds.

### 11>. Stereo /mono switch terminal.

Stereo/mono terminals are used to set the FM receiving mode of the module. This terminal is suspended for Stereo reception mode, and it is a single channel receiving mode.

## 6. FM with squelch receiver module AT instruction:

Baud rate: 38400 TTL level

No.	Name	Example	Instruction	Range	Return position
1	Set current frequency point	AT+FRE=875	current frequency point is 87.5MHz	870-1080 MHz	Current frequency point/ERR

2	Frequency point-0.1MHZ	AT+FRED			Current frequency point
3	Frequency point+0.1MHZ	AT+FREU			Current frequency point
4	Pause paly/Contiune play	AT+PAUS			PLAY/PAUS/ERR
5	Set volume	AT+VOL=15	Current volume is 15	00-30	VOL value/ERR
6	VOL-	AT+VOLD	VOL-1		VOL value/ERR
7	VOL+	AT+VOLU	VOL+1		VOL value/ERR
8	Set backlight time(S). 00 means light off; 01 means normally on	AT+BANK=10	Backlight is 10s light off	00-99	BANK value/ERR
9	Turn on and off DSP squelch	AT+SN=1	Turn on squelch	0(off)-1 (on)	SN_OFF/ SN_ON
10	Set squelch threshold	AT+SN_THR=10	Set squelch threshold is 10	00-20	SN_THR value/ERR (Set it when SN_ON)
11	Factory data reset	AT+CR	Factory data reset:		OK

			<p>1:VOL=30 //                  2:SN_OFF //                  Turn off DSP                  squelch                  3:SNTHR =10 //                  reset squelch                  threshold is 10                  4:FRE=875 //                  Frequency is                  87.5MHZ                  BANK=20//                  Backlight delay                  20s</p>	
12	Returns the current state of the module	AT+RET		<p>VOL=10 //                  volume 10.                  FRE=875 // the                  frequency is                  87.5MHZ.                  PLAY/PAUS//                  static state.                  BANK_OFF                  (BANK_ON) //                  backlight time (1                  normally open, 0                  constant, or                  delay X s)</p>

