Introduction

FM_RADIO_SN is a full-featured digital FM FM radio with a full-featured, high-sensitivity, high-sensitivity FM radio receiver board, an on-board integrated high-sensitivity radio chip, DSP audio signal processing module, audio power amplifier, LCD display and other functional circuits.

1.The characteristics and advantages

The radio board has the following characteristics:

1: The use of advanced digital audio signal processing technology (DSP) and phase-locked loop (PLL) demodulation technology to make the sound more realistic, more stable performance.

2: LCD display intuitive and accurate, with very low power consumption and minimal noise interference.

3: all digital control, easy to operate at the same time make the product more stable and durable.

4: built-in DSP digital squelch processor, no signal automatically mute, get rid of the traditional FM radio trouble sand sound.

5:30 level digital volume adjustment range.

6: support serial communication control, available computer or MCU with TTL serial device instead of button remote control module of all the features.

7: independent Stereo / mono control, with greater environmental adaptability.

8: unique static signal output terminal, can be extended to control the external device through the static signal.

Third, specifications and parameters

1: limit parameter

  Parameter minimum value reference value maximum unit

Operating temperature -20 25 +70 ℃

Storage temperature -30 25 +80 ° C

Operating voltage 3.0 5.0 5.5 V

IO voltage -0.3 5.5 V

RF input voltage 0.3 V

2.The choice of peripheral devices

(1): power supply

  <1>: FM radio is a radio-sensitive equipment, from the nearby interference may affect the reception of the radio, such as the nearby microwave ovens, high-frequency welding, or high-power motors are likely to interfere with the normal work and reception of the radio effect.

<2>: Module power input port (marked DC3.0-5.0V on PCB) -, + Connect the negative and positive of the power supply (battery or power supply separately) (Please check the power supply voltage and polarity before powering Error and then power on).

<3>: power supply voltage requirements between 3.0V-5.0V voltage, the maximum current of 2A or more, the output ripple to be small.

<4>: power recommended with lithium battery or power frequency transformer rectifier filter after the regulator obtained. Can not use without switching power supply, such as mobile phone charger, rechargeable treasure. First, this type of power switch conversion process will produce a lot of high-frequency interference, a direct impact on the radio receiver, the second is the mobile phone charger, charging Po's output voltage is often higher than the module's operating voltage 5V, long-term work easy to burn Bad module. It is not recommended from the computer's USB power supply, because the computer USB supply current is limited, the module in the large volume of the working current up to 1A or more, long-term work will make the computer USB power supply part of the damage or protection, and from the computer USB power supply which contains the computer work in the process of a variety of high-frequency interference, will affect the radio effect.

(2): loudspeaker

  <1>: It is recommended to use a pair of 4Ω / 3W or 4Ω / 5W speakers to achieve the best efficiency of the amplifier output.

  <2>: SP_L then the left channel speaker, SP_R then the right channel speaker, SP + / SP- respectively, corresponding to the speaker of the positive and negative.

  <3>: If you want to drive the headset, then directly with the headset 3.5mm plug into the board can be the audio seat, insert the headset, the amplifier output will automatically shut down.

<1>: The antenna is mainly responsible for receiving the radio waves from the space. According to the selection rules of the antenna, the length of the antenna is as close as possible to the 1/4 wavelength of the receiving frequency. For example, to receive the 100 MHz station, the ideal length of the antenna is L = Frequency) / 4 = 300000000/100000000 = 75cm.

<2>: It is recommended to use 75 cm long FM radio dedicated rod antenna.

3: Key operation instructions

(1): volume adjustment

V-key: short press volume - long press continuous -

V + key: short press the volume +, long press continuous +

(2): frequency adjustment

CH mode:

F-key: short press the channel -, long press up search

F + key: short press the channel +, long press down to search Taiwan

FRE mode:

F-key: short press frequency -0.1MHz, long press frequency continuous -1MHz

F + key: short press frequency + 0.1MHz, long press frequency + 1MHz

(3): mute / play

PAUSE key: short press the silent / play, long press the whole band automatically search and save the radio (CH mode is valid).

(4): Auto squelch threshold (threshold) setting

While the long press F- / F + key for 2 seconds to enter the automatic squelch threshold adjustment interface, the user can be based on the specific use of the situation to adjust the automatic squelch action threshold, adjust the range of t00-t20, the higher the threshold the higher threshold The signal is more likely to be muted, the smaller the threshold the lower the weak signal is not easy to be muted. The general adjustment between t02-t05 can, t = 00 to turn off the automatic static function.

<5>: Backlight settings

Press the PAUSE button to turn off the power and continue to keep the long press, LCD display "HI" interface and then display "B1" that the backlight has been set to steady mode. Display "B0" means that the backlight has been set to power saving mode, power saving mode without any key operation 20s backlight automatically off. After setting up, you need to power off again. Change the setting state to repeat this step to switch (factory default is B0 is the backlight power saving mode).

<6>: CH / FRE mode switch

While the long press VOL- / VOL + knob for 2 seconds, LCD display CH said switch to the search storage mode, display FRE that switch to manually set the frequency mode. CH mode F- / F + key for the channel +/- function, FRE mode F + / F- key for the frequency +/- function.

4: External terminal description

<1>: Headset (audio output) terminal

Headset (audio output) terminal is used to connect the headset or as an audio signal output connected to an external audio power amplifier, using a standard 3.5mm stereo audio seat. When the audio terminal is inserted, the audio seat is pin-to-ground short, and the microcontroller automatically switches to the audio output mode when the signal is detected, that is, the output of the onboard

power amplifier is turned off and the output of the DAC is adjusted to reach the headphone Drive the standard of external power amplifier.

<2>: Amplifier output terminal

   This module board integrates 3Wx2 amplifier, can directly drive two 3W speakers

   SP_L corresponding port connected to the left channel speaker, SP_R corresponding port then the right channel speaker, which SP + / SP- is the positive and negative speaker.

<3>: Stereo / mono switch terminal

   The Stereo / mono terminal is used to set the FM receive mode of the module. This terminal is left in the stereo reception mode. This terminal is in mono reception mode.

Description:

Set the purpose of Stereo / mono switch : As the stereo decoding and monaural decoding principle is different, decoding the stereo signal occupied by a wide band, the signal quality requirements are relatively high. So when listening to relatively weak stereo broadcast, the signal to noise ratio will be very low, will produce more noise at the end. This allows the circuit to be changed to a mono receive state to increase the signal-to-noise ratio of the output signal. Mono mode, although there is no stereo effect, but the noise is relatively small, but to listen better. In other words, this switch is used in the case of weak signals to improve the radio signal to noise ratio, switch to the mono, you can make the radio in the case of weak signal sound more clear, so the high-end FM stereo radio are reserved Stereo / mono switch to achieve greater environmental adaptability.

<4>: 87.0 / 76.0 (campus radio frequency band setting)

   The 87.0 / 76.0 terminal is used to set whether the module will open the campus broadcast band mode. This terminal will be turned off to turn off the campus broadcast mode (band range 87.0-108.0MHz). This terminal is open to the campus broadcast mode (band range is 76.0-108.0MHz).

<5>: SN_OUT (static signal output terminal)

   The purpose of setting this terminal is to reserve an external application that may require a static signal to trigger the output of the terminal when the module's static function is turned on. Internal static action when the output high, no action output low. Note that the output capacity of this terminal is 3.3V / 20mA.

<6>: External antenna terminal

FM_ANT terminal for the FM radio antenna signal input terminal, the antenna signal from the input. It can be connected to an external FM rod antenna via a short wire.

<7>: UART terminal

UART terminal for connecting the TTL serial port, you can through the computer's serial port (need to USB to TTL serial cable), single-chip or other controller TTL serial port to connect with the module, through the serial command to control the function of the module can replace the button operation , Or remote control (the specific serial control, please refer to the "serial operation manual").