Guide to MCD® Jasmine

Wireless Audio Transceiver

（86-1000MHz）V1.0

Contents

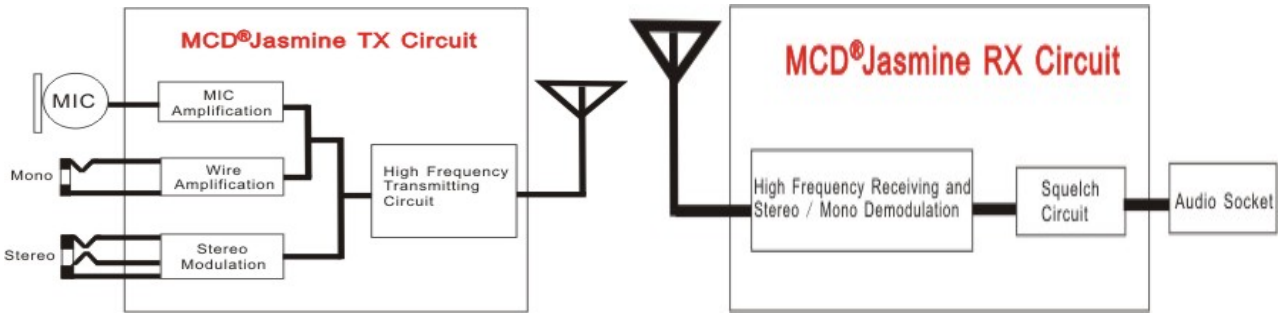
Version	Date	Remarks
V1.0	12/25/2009	The first edition

1 Description

MCD® Jasmine is a transceiver module of short-distance (200-300m in open space) wireless stereo or mono transmission, which integrates audio and RF circuits. It covers VHF and UHF frequency of 86-1000MHz. The receiver consists of high-frequency receiving, stereo demodulation, squelch circuit, MCU frequency control and other functions. The transmitter consists of high-frequency transmitting, audio amplification, stereo modulation, MCU frequency control and other functions. By adding only an external antenna, an audio socket, a DIP switch for frequency setting and an external MIC, the transceiver could be embedded in a variety of devices such as general amplifiers and lights.

Compared with another transceiver MCD® Silver Flower that also integrates RF and audio circuits, MCD® Jasmine reduces voice compressing and expanding circuits, whereas adds stereo circuit. Therefore, it sacrifices a little audio dynamic state and signal to noise ratio compared with MCD® Silver Flower. However, the cost is greatly reduced, meanwhile frequency response and distortion degree is improved. Please refer to *Comparison in Key Parameters* in the following table.

MCD® Jasmine is characterized by low cost, and it comes with audio circuit. Stereo RX size is 39.6×67.4×11.0mm, and mono RX size is 31.0X72.9X11.0mm. Both modules work at 4.2V with RSSI squelch circuit, and output audio directly by being connected to an amplifier. TX size is 17.5×60mm, working at 4.2V. It is equipped with MIC bias circuit and amplifying circuit, and voice, wire and stereo audio input could be selected. The transmitting power of TX audio is 10dBm, and the receiving sensitivity of RX is -108dBm@12dBSINAD. With a reasonably matched antenna, the transmission distance of MCD® Jasmine transceiver at 864MHz in open space is 180m, and the transmission distance across rooms is 25m, without staccato.



Application area：Wireless audio transmission with low cost and short-distance (300m in open space), such as amplifiers, lights of built-in speakers and teaching devices.

Comparison in key parameters between MCD® Jasmine and MCD® Silver Flower

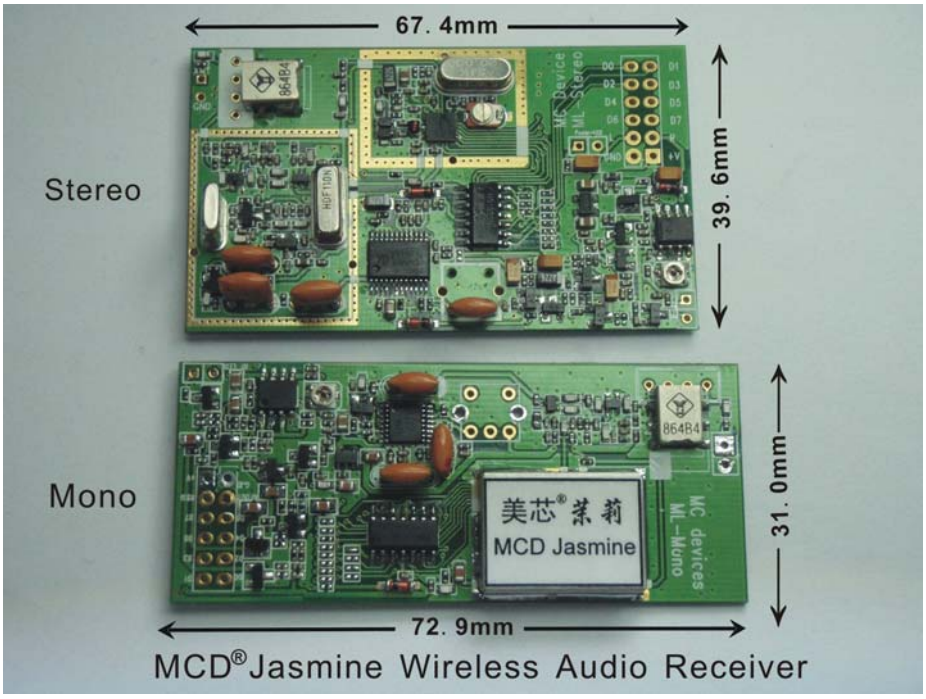
Name	Frequency response	Dynamic state of Audio	Signal/ noise ratio	Distortion	Voltage TX/RX	Current TX/RX
Jasmine	55Hz-22KHz	55dB	>57.5@45K frequency deviation 1KHz	<0.8%@45K frequency deviation 1KHz	4.2/4.2V	55/70mA
Silver Flower	50Hz-13KHz	100dB	>70@45K frequency deviation 1KHz	<1.0%@45K frequency deviation 1KHz	2.2/12V	100/85mA

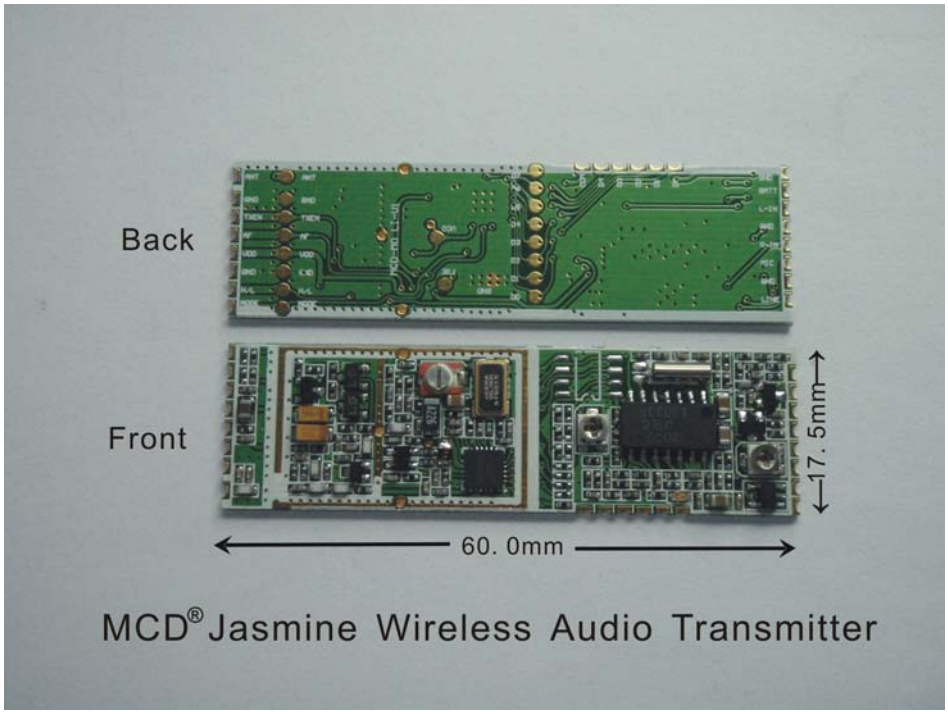
2 Module Function and Performance

2.1 Stereo and mono selection

- Mono voice or wire transmission. In the case of voice transmission, voice source is from sound object. In the case of wire transmission, sound source is from other devices such as MP3. A default frequency point is made by connecting power and antenna to transmitting panel (and also connecting MIC in the case of voice transmission). Mono receiving panel RX-M is used to receive.
- Stereo audio transmission. A default frequency point is made by connecting stereo signal, power and antenna to transmitting panel. Stereo receiving panel RX-S is used to receive.

2.2 Shape and size of the module





Notes：The highest part of MCD® Jasmine receiver is 11mm, and that of MCD® Jasmine transmitter 5.5mm.

2.3 Main function

2.3.1 Main function of receiver:

- 32 different frequency points for selection
- Two modules: stereo and mono modulation and demodulation
- Squelch function
- Wide voltage input range: 4.2V-9.0V

2.3.2 Main function of transmitter:

- 32 different frequency points for selection
- Stereo modulation and transmission
- Modulation and transmission of wiring input
- MIC direct voice transmission
- Direct antenna output of selectable power 1dBm/12dBm
- Wide voltage input range: 4.2V-9.0V

2.4 Technical parameter

2.4.1 Technical parameter of MCD® Jasmine receiver (RX) ：

- Frequency range：a certain block of 10~30MHz within 86~1000Mhz
- Channel spacing：400KHz
- Frequency stability：+/-10PPM
- Operating voltage：DC4.2V~9V
- Operating current：mono <40 mA；stereo <70mA
- Antenna input impedance：50ohm
- Audio output range：about 110mV
- 12dB SINAD sensitivity：typical value -107dBm
- Demodulation distortion：<1%(1KHz)
- RX frequency response：mono 50Hz~20KHz；stereo 50Hz~15KHz
- Signal to noise ratio： typical value 56dB（75KHz modulation degree）

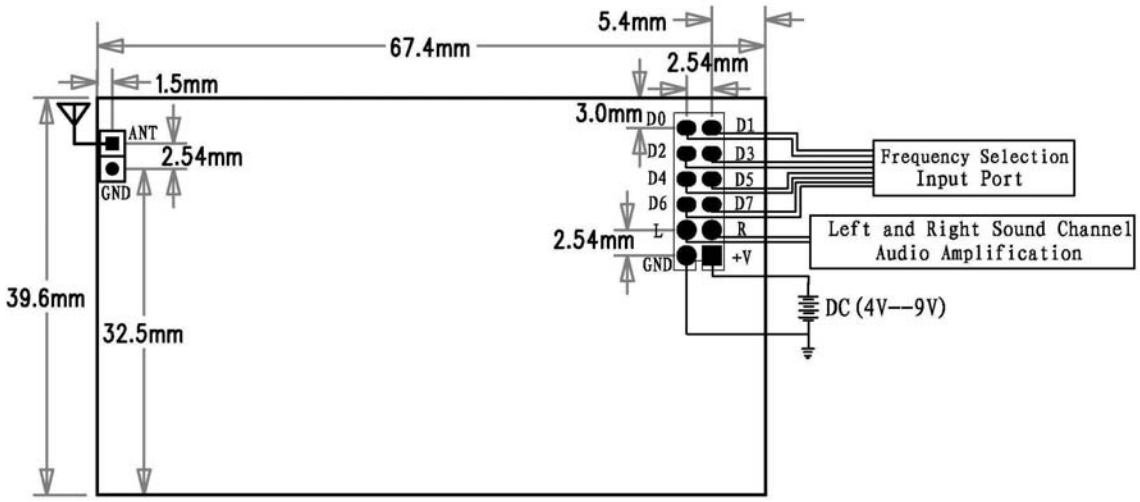
2.4.2 Technical parameter of MCD® Jasmine transmitter (TX) ：

- Frequency range：a certain block of 10~30MHz within 86~1000MHz
- Channel spacing：300-1000KHz or any spacing
- Frequency stability：+/-10PPM
- Operating voltage：DC4.2V~9.0V
- Operating current：<55 mA@4.2V
- Antenna output impedance：50ohm
- Audio input impedance：600ohm
- Transmitting output power：high power >10dBm，low power >0dBm
- Modulation distortion：< 1.0%(1KHz)

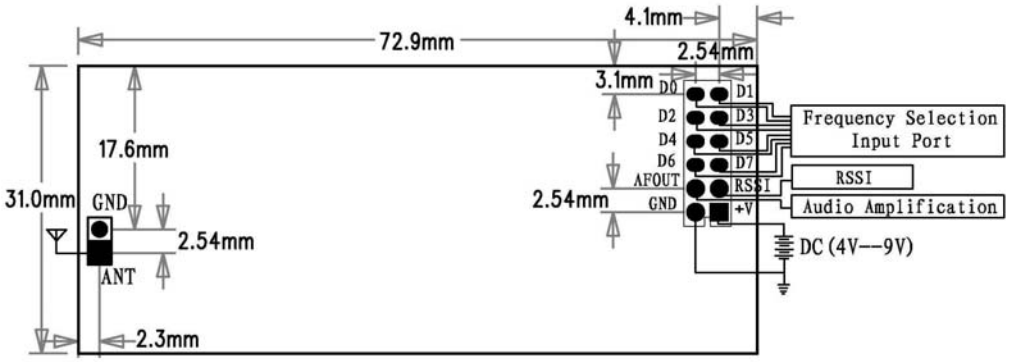
3 Wiring Mode

3.1 Wiring mode of receiver (RX)：

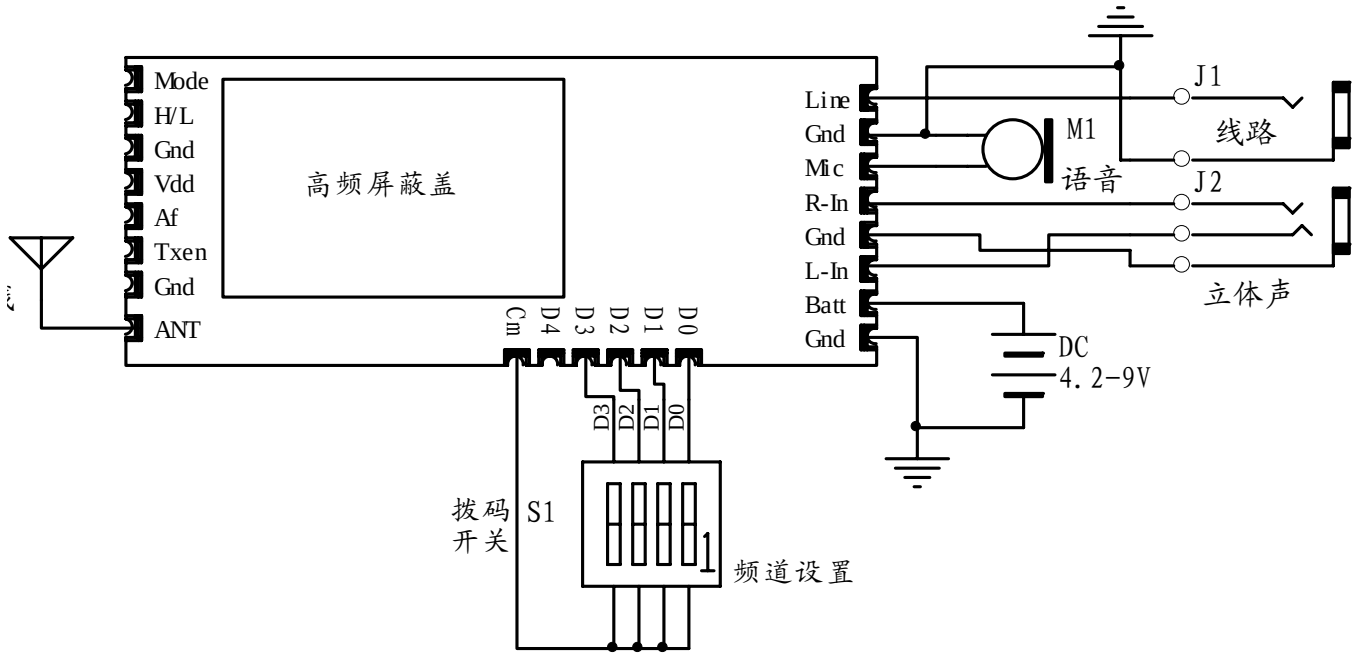
Wiring mode of stereo

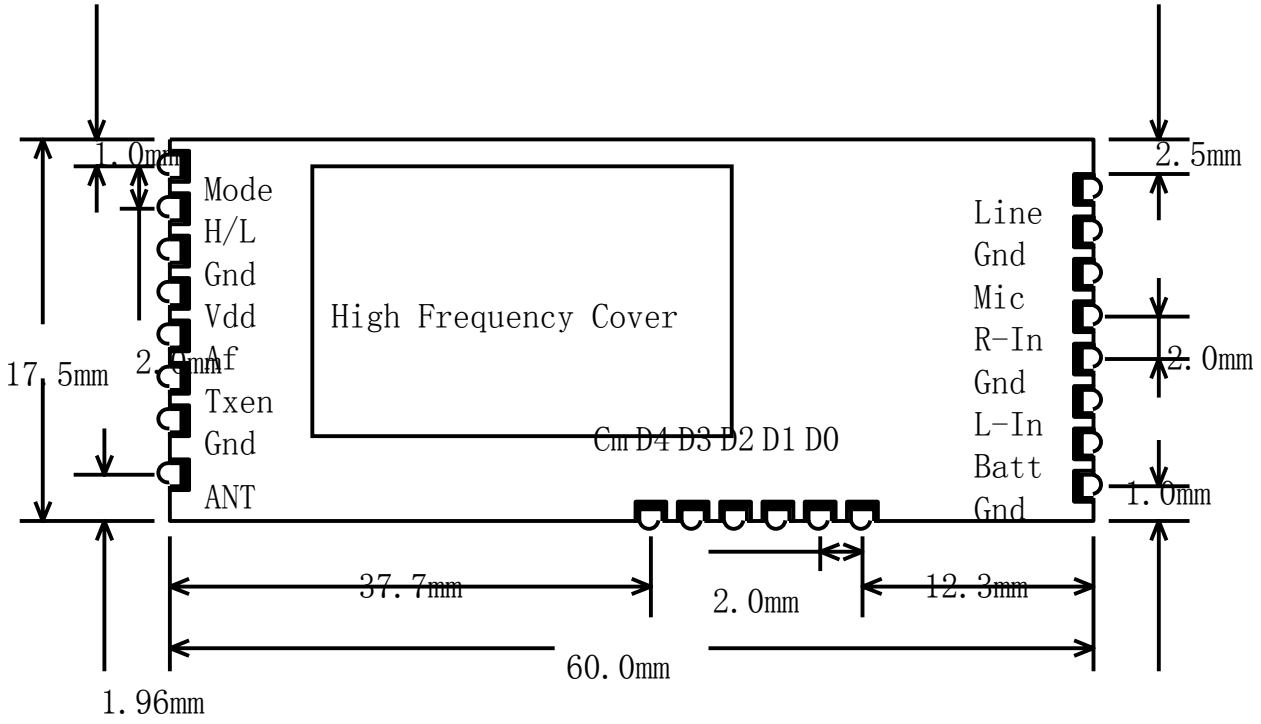


Wiring mode of mono



3.2 Wiring mode of transmitter：





3.3 Pin description:

Name	Interface	Pin	Function	Description
RX	Selection interface of frequency points	D7-D3	8th - 4th ROM control bit input. When control bit is suspended, the logic level is low. When control bit is connected to VDD, the logic level is high.	DIP switch may be added to select frequency points, and specific frequency points may be set by MCU software in module or be set by using customers' own MCU to control D0-D3 interface software programming.
		D2/CLK	3rd ROM control pin. CLK is clock input of MCU serial data. Data is input to 18-bit shift register of serial interface at rising edge of clock.	
		D1/DATA	2nd ROM control bit. DATA is input of MCU serial data. The lowest bit is input first, and the last two bits are group identification codes.	
		D0/EN	1st ROM control bit. EN is enable input.	

				When EN is at high level, the data saved in shift register is loaded in latch distinguished by group identification code.	
	Power interface	+V		Positive pole of power	DC:4.2V-9.0V
		GND		Power ground	Power ground
	Audio output interface	mono	AFOUT	Audio output	The module is equipped with squelch function, and squelch valve value may be set by adjusting adjustable impedance in module.
		stereo	L	Audio output of left sound channel	As above
			R	Audio output of right sound channel	As above
	Signal intensity indication interface	mono	RSSI	RF signal intensity indication	Output analog voltage. The stronger the RF signal is, the higher the voltage will be.
		stereo	---	----	----
TX	Expanded function output	Mode（used for external MCU）		ROM and MCU mode selection bit. CMOS input. When MODE pin is at low level, the module works in ROM mode. When MODE pin is at high level, the module works in MCU control mode.	It could be set in module according to customers' requirements
		H/L（used for external MCU）		High-low power selection pin. When H/L is 1, ANT power is 1±1dBm；when H/L is 0, ANT power is 12±1dBm。	It could be set in module according to customers' requirements
		Gnd		Power ground input	Power ground input

		Vdd	Test port	Test port
		Af	Test port	Test port
		TXEN（used for external MCU）	Transmitting power enable control port. When it is controlled by low level, amplifier is turned off. When it is controlled by high level, ANT output rating power is 12±1dBm。	It could be set in module according to customers' requirements.
	Channel setting	D0	32 channels for selection	32 channels could be selected by D0-D4 and common port CM.
		D1		
		D2		
		D3		
		D4		
		CM		
	Audio input	Mic	MIC voice signal input	Mono voice signal input
		Gnd		
		Line	Line wire input	
		Gnd		Mono wire signal input
		R-In	Double channel stereo signal input	Double-channel stereo signal input
		Gnd		
		L-In		
	Power interface	Batt	Positive pole of power	4.2V-9.0V
		Gnd	Power ground	Power ground
	Antenna interface	ANT	RF output	50ohm antenna output port
		Gnd	Power ground	Power ground

4 FAQs

4.1 By using MCD® Jasmine, could electrical consumption products pass China's 3C, the United States' FCC and

EC's CE certification?

A: Whether electrical consumption products could pass EMC/EMI of a variety of certifications mainly depends on RF design. The Jasmine module is made by fully considering the influence of EMC/EMI. If other parts of electrical consumption products are designed reasonably, such as power and audio circuits, they could pass a variety of relevant certifications.

4.2 How to match antenna?

A：The performance of antenna has great effect on transmitting distance. The antenna length could be calculated by 1/4 wavelength. For example, current frequency point is 800MHz, then the antenna length is: L=(C/f)/4=（$3.0*10^8$ /$800*10^6$ ）/4=9.375cm. The value is not accurate, and the antenna length should be regulated based on test result. In the formula, C: light speed $3.0*10^8$ m/s; f: current frequency; Unit: Hz.

4.3 Could MCD® Jasmine work at -30°C?

A: If MCD® Jasmine is to be used at -30°C, general crystal should be replaced by temperature compensation crystal, and built-in fixed frequency points of MC Devices PLL should be adopted.

4.4 Could volume regulation switch be added?

A: Yes, it could be added outside the module.

4.5 How to get 4-12V power of the receiver?

A: Customers should supply the receiver with stable power source DC 4-12V.

4.6 The operating frequency of MCD® Jasmine is 86-1000 MHz, could each module work within this range?

A: Each finished module works in a certain block of 10-30MHz within 86-1000MHz.

4.7 Is frequency range possible to be wider than 30 MHz?

A: In theory, bandwidth is 10% of operating frequency. However, restricted by filter ±15MHz, requirements of sensitivity and external band inhibition, the bandwidth is hard to exceed 30 MHz.

4.8 Could frequency be arbitrarily changed by using MCD® Jasmine?

A: Yes, yet it should be changed within a certain range the module permits（10-30MHz）.

4.9 Could the size of TX and RX module be modified according to customers' requirement?

A: Yes. There is no extra charge if circuit structure is not modified, only circuit shape is enlarged. There is extra charge if size is reduced by re-designing circuit.

4.10 What is the operating temperature of the module?

A: The module works between -30°C and +85 °C.

4.11 How to do if over 16 frequency points are necessary?

A: The design needs to be improved by adding LCD screen and setting keys to regulate more frequency points and more functions.

4.12 How to select MCD® Jasmine stereo and mono?

A: The cost of stereo is a little higher than that of mono, with frequency response of mono module 50Hz-20 KHz, and that of stereo 50Hz-15 KHz. If stereo transceiving is unnecessary, mono module is recommended.

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