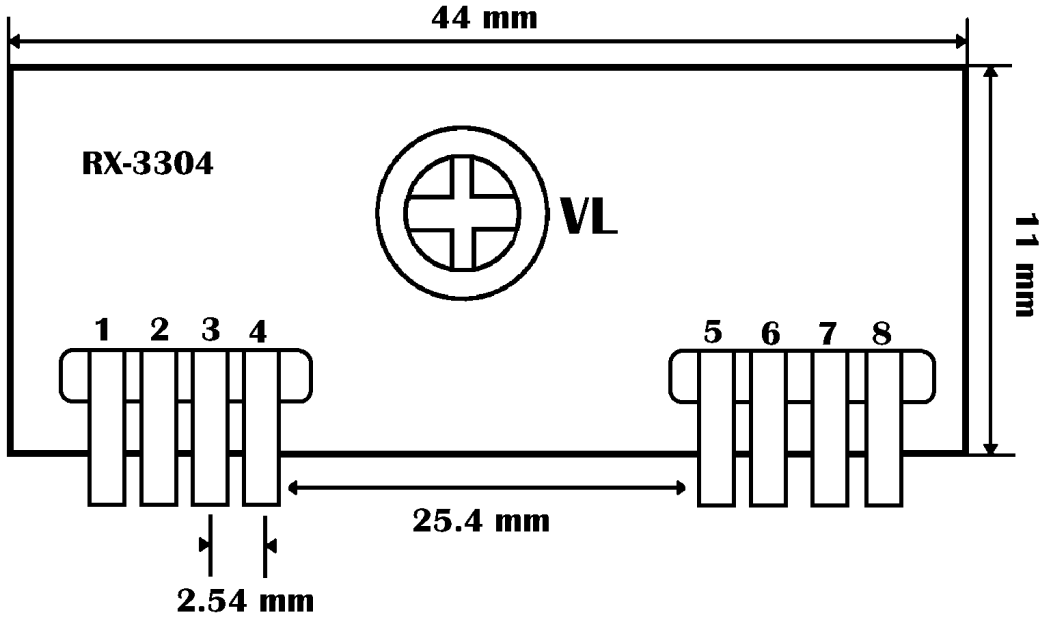
RX-1 Receiver Module Manual

1. Introduction:

This is the radio frequency receiver module, which can facilitate the OEM designers to design their remote control applications in remote control in the quickest way. The circuit is designed with SMD components and the module size is small enough to be able to be fitted in almost any application.

« Super-regenerative Version W/O Decoder (AM): RX-3304

AM: Amplitude Modulation



Pin Definition:

PIN 1: GND
PIN 2: Digital Output
PIN 3: Linear Output (For Testing)
PIN 4: VCC (5V DC)
PIN 5: VCC (5V DC)
PIN 6: GND
PIN 7: GND
PIN 8: ANT

Dimension of RX-3304: 44 mm X 11 mm

w Specification Table:

Model	SR mode	POWER	Data Rate (bps)	SENSITIVITY dBm	POWER CONSUMPTION (mA)	Modulation	Band Width
RX-3304	SR	+5V DC	300~5K	- 100	2.70	AM	12MHZ

Notes:

SR: Super-Regenerative; AM: Amplitude Modulation

2. Functionality Difference:

Above RF module does not include the decoder IC, thus you have to either add the decoder IC in your circuit or implement the decoder software in micro controller by yourself. Both Fixed Code Decoder and Rolling Code Decoder choices are available for your design:

There are 2 major application types involved:

2.1 For fixed code application:

You may use Holtek Decoder IC – HT-12D with this receiver for Fixed Code Decoding. Some of the drawbacks of using a Fixed Code Decoder are as follows:

- A maximum of 256 combinations only can be achieved.
- HT-12D outputs are latched and not momentary.
- You may need additional circuit to incorporate momentary functions, if required.

2.2 For rolling code application:

For rolling code application you can use Microchip – Keeloq - HCS 301 Encoder IC (8 Pin) in the transmitter and HCS 512 Decoder IC in the receiver. However, HCS 512 being expensive, you can get the rolling code algorithm programmed in other low cost microcontrollers. In this approach, an EEPROM is strongly recommended so that the system' s important parameters can be stored even after power off.

On the PCB layout of your control board, be very careful in the following point so that no data loss can happen:

During PCB layout stage, be sure that the ground of the CPU and the external reset IC and the nonvolatile EEPROM should go to one common point first and then go to the power ground. Keep the ground line as short as possible. It is important to test if data loss happens using power noise simulator before starting the mass production. Note that transmitter codes are normally stored in the non-volatile EEPROM memory. If power loss happens, then this means that the transmitter codes are lost from the memory and the user has to relearn the transmitter again. This is the key checkpoint before approving a design.

Check with our Sales People for your requirements of Fixed Code Encoder / Decoders or Rolling Code Encoder / Decoders or Software Decoders and Low Cost Wireless Development kits and Antenna. We can supply these to you.

3. APPLICATIONS:

- Automotive remote entry systems
- Automotive alarm systems
- Gate and garage door openers
- Wireless Data Transmission
- Electronic door locks
- Burglar alarm systems

4. Noise Immunization

This RF receiver is sensitive to RF noise in the pass band because the desired transmitter signals are at very low power levels. Some common noise sources are microprocessors, brush-type motors and high-speed logic circuits. If the rise time and fall time of the clock in a microprocessor are fast enough to produce harmonics in the frequency range of the receiver input and the harmonics fall within the pass band of the receiver, then special care must be taken to reduce the level of the harmonic at the antenna port of the receiver.

Based on above analysis, the following actions have to be taken:

A. Microprocessor choice:
Choose those microprocessors which has lowest rise time and lowest fall time, if available.
B. Brush-type motor choice:
Choose those brush-type motors, which has spark suppression built in or better not to use such type of motors.
C. Logic circuits choice:
High-speed logic circuits generate noise similar to microprocessors. Thus better to choose those circuits with the lowest rise time and the lowest fall time, if available.
D. Place the receiver and its antenna as far from the noise source as possible.
E. During PCB layout, keep line lengths at a minimum that carry high-speed logic signals or supply brush type motors. Such lines work like antennas that radiate the unwanted noise.
F. If possible, enclose the noise source in a grounded metal box and use RF-decoupling on the input/output lines.
G. It is advisable to use separate voltage regulator for the RF receiver. If the same voltage regulator has to be used for cost purpose, then a decoupler circuit is recommended so that high frequency noise can be screened.
H. The ground path from the receiver module should go directly to the power ground, in between, no other ground paths can join in, otherwise, noise will be introduced in and receiver function will be greatly influenced.

5. Recommended Antenna

Suitable antennas are required to the success of low-power wireless application. There are some key points on applying the antennas:
A, Antenna should be placed on the outside of the product. And try to place the antenna on the top of the product.
B. Antenna can' t be placed inside a metal case because of its shielding effect.
C. Antenna design involves expensive test equipments such as vector network analyzer and calibrated test antenna. Unless you have access to these equipments, the use to an antenna consultant is recommended.
D. In most indoor locations, dead spots can be found where reception is difficult. These dead spots are due to multiple transmission paths existing between two points because of reflections off metal objects such as steel beams or metal doors. They happen when the path lengths effectively differs by an odd half-wavelength. This explains the phenomenon when you find that at some locations the reception effect is very poor, but beyond that the reception becomes normal.
E. 50-Ohm antenna is recommended for the best matching.
F. For 433.92MHz application, antenna length = 17 cm.