NEC Infrared Codec Module (ver1.0)
(YS-IRTM)

NEC Transmit and Decode Module

38KHz Infrared Encoding

38KHz Infrared Decoding

New Product

Microcontroller Serial Port control with simple computer control operation and transmission distance of over 10 meters.

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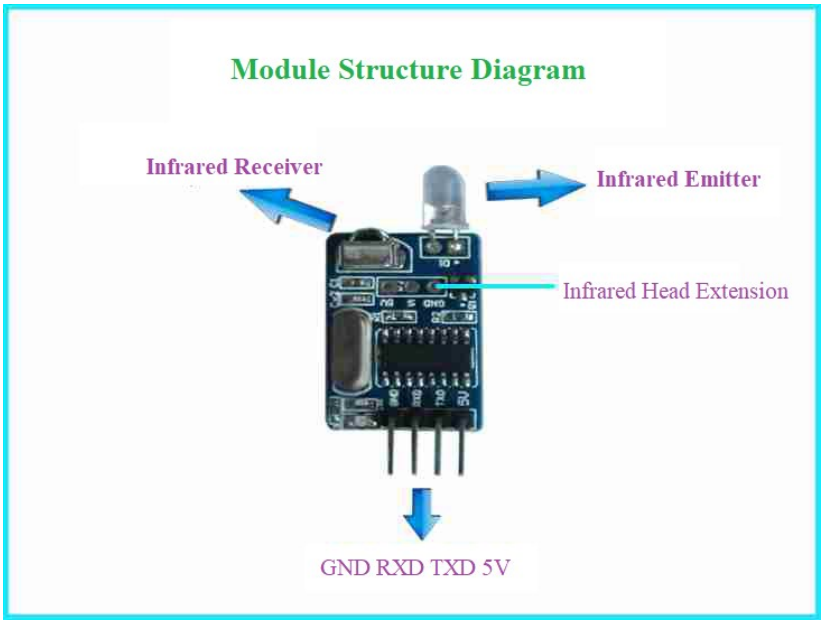
English language translation from original manual written in Simplified Chinese, by Vijay Kanth. April 2018

1. Introduction to the module structure



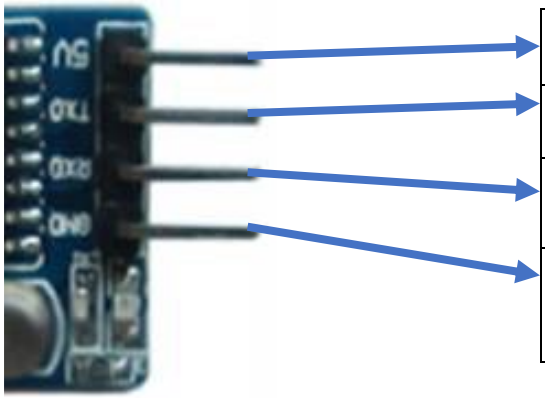
The following are the details of the structure described and labelled above:

1. Infrared Emitter:
Used to emit infrared signals at a wavelength of 940nm at 38KHz frequency.

2. Infrared Receiver:
Used to receive infrared signals and decode using the microcontroller.

3. Infrared Head Extension:
This interface is an extension of the infrared transmitter head and can connect multiple infrared transmitter heads (often called infrared transmitter modules) for placement in different positions to achieve multi-directional transmission.

4. UART Microcontroller Serial Communication Interface:
This port is a single-chip serial port (TTL), Its default serial communication baud rate is set to 9600bps. The details of the interface is as following:



5V	power supply positive
TXD	data receiving port
RXD	data transmission port
GND	Negative power supply (ground)

2. The communication protocol

1. Transmission instructions:

Address	Operating position	Data Bit 1	Data Bit 2	Data Bit 3
A1(FA)	XX	XX	XX	XX

Details:
Address - A1 is the default address (can be changed). FA is a universal address (Not changeable).
Operating position bit - The data in this bit is used to set the current working state as per the details below:

F1	This is to set Infrared emitter to 'transmit' status
F2	This sets the 'modify serial port communication address' state
F3	This sets the 'modify baud rate' state

Data bits - This data bit is the data content corresponding to different states:

Operating position	Data bit 1	Data bit 2	Data bit 3
F1	User code high	User code low	Command code
F2	**01-FF**	Data bit 1 represents the address value that needs to be modified	
F3	**01-04**	Check the following baud rate range	

Representative serial number	Baud rate value
01	4800bps
02	9600bps
03	19200bps
04	57600bps

2. Operation feedback:

F1	Successful transmission
F2	Serial address modification succeeded
F3	The baud rate is set successfully
No return indicates that the command received an error and the operation could not be completed. Correct the instructions and try again.	

3. Decoding Information Output:
The NEC infrared signal is encoded by a 16-bit user code (divided into high and low 8 bits), Send one command code followed by another command code and finally the inverse code. E.g. "user code 1 + user code 2 + command code + command code + inverse code"

For a decoding operation, aim the remote controller at the infrared receiving head and press the button to be decoded. This can then be passed to the serial debugging assistant for signal decoding.
If you observe the decoded result, the output would be "user code 1 + user code 2+ Command code of three digits. You only need to send these three bits when encoding for transmission.

4. Examples

To transmit an IR code of 1C 2F 33 use:
{A1,F1,1C,2F,33}

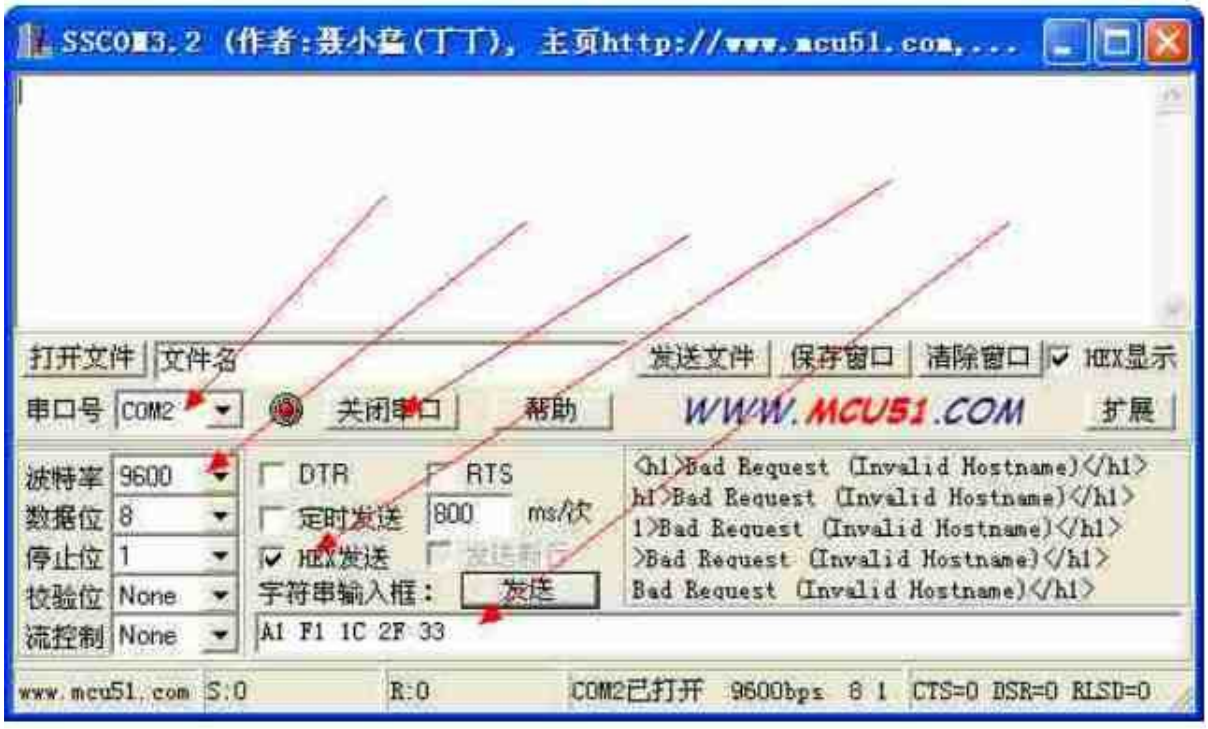
The A1 bit is the address, the F1 is to set the status to ‘transmit’, then the next three are the actual codes to send in succession.

To modify the serial communication address to ‘0xA5’ use:
{A1,F2,A5,00,00}

Note the use of ‘00’ in the last two bits when not in use.

To modify the baud rate to 9600bps (corresponding to the serial number 2) use:
{A1,F3,02,00,00}

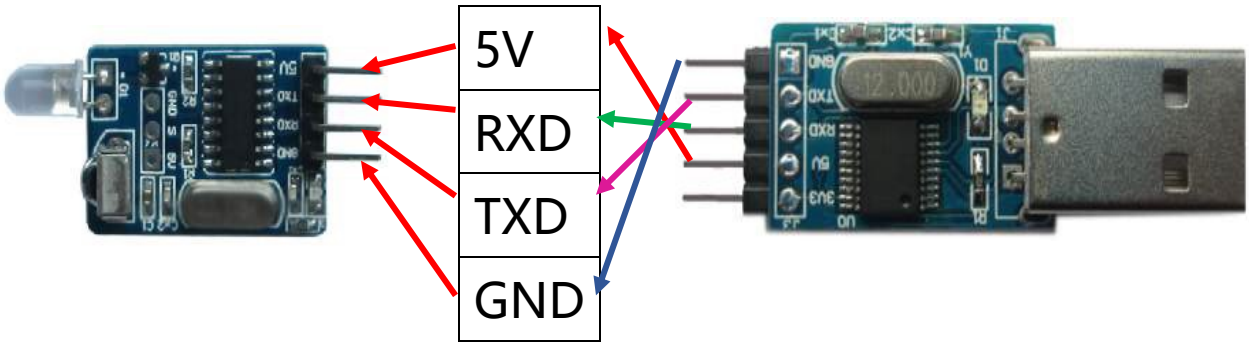
The SSCOM software interface is as follows: (note the red arrows)



3. The circuit connections

The connection method of this module is mainly over serial (TTL level) connection:
(Note: The device must be provided with a 5v DC power supply)

1. Usage with a USB to TTL link:



2. Microcontroller connection:

From the above figure, we can clearly see that TXD and RXD need to be cross-connected so we are in serial communication with other MCUs.
So, TXD of this device should connect to RXD of the USB to TTL device and vice-versa.

4. Other instructions

1. Restore factory settings:

Damage caused by incorrect addressing or baud rate settings can be fixed by restoring factory default settings. To restore factory settings, use the following instructions. The default parameter is: Serial address A1 (and FA), and baud rate 9600bps.

(1): Connect a 5V power supply and **remove** the GND wire.
(2): Connect the IC pin shown by the red arrow in the following figure to the negative terminal of the power supply (GND) for **TWO** seconds only and release.
(3): Restore Operation should be completed.

2. SCM program update problem:

This module does not have any program code by default. Please do not use the onboard microcontroller to download the program. Otherwise it will make the program and the unit unusable requiring the unit to be returned for a fresh restore.