



REMOTE CONTROLLER WITH FIVE FUNCTIONS

General Description

The TX2/RX2 are a pair of CMOS LSIs designed for remote controlled car applications. TX2

Is the transmitter and RX2 is the receiver. They provide five function key to control forward, Backward, Rightward, Leftward and Turbo motions. Beside, a combination of these five motions can be played.

RX2 Provide two high effective amplifiers and Enhance Signal Input recognition capacity to enhance remote control distance.

Major Core Features:

- Wide and low operating voltage range: 2.2V to 5.0V
- Typical oscillator frequency:
 - RF:128KHz.
 - IR :114KHz(Carrier Frequency:57KHz).
 - IR : 76KHz(Carrier Frequency:38KHz).
- Provide two transmissive interface(RF and IR)for different application.
- RX2 Provide two high effective amplifiers to enhance remote control distance.
- Enhance Signal Input recognition capacity for very weak signal.
- Auto Power-OFF function for TX2
- Low Standby current (TX2) and low operating current.(RX2).
- Oscillator with an external resistor.

Peripheral Features:

- 5-function remote controller controlling forward/ backward/ turbo/ right/ left.
- Few external components needed.

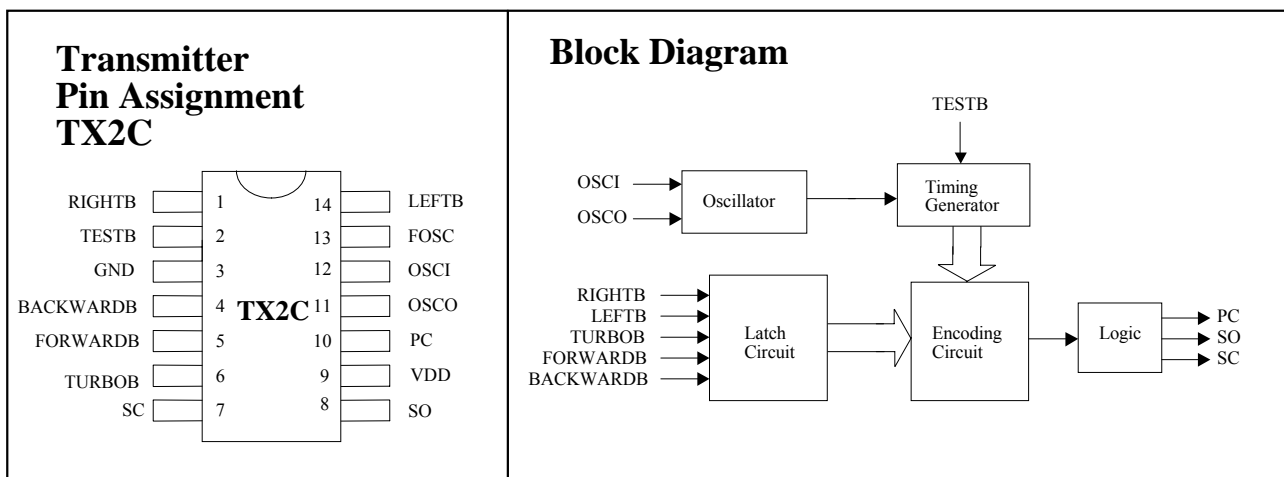
Application Field:

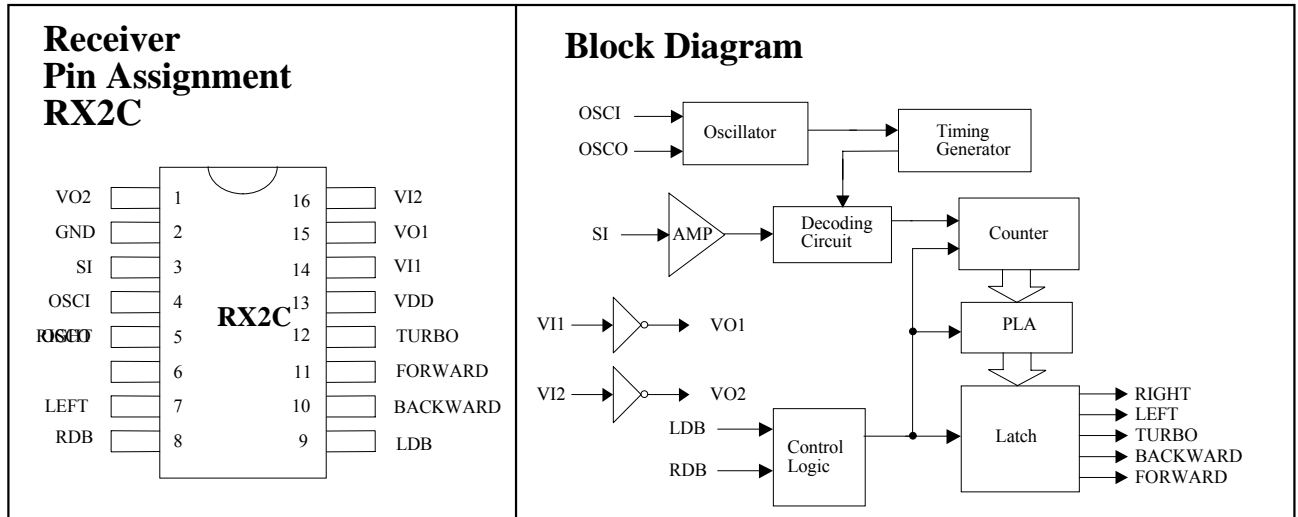
- remote controlled toy.
- remote electric appliance controller.

Special Features Description:

- TX2 auto Power OFF function:
When input key is pulled low, TX2 will wake up, SC and SO will continuously send out code in RF format (Non-Carrier) and IR format(Carrier). However when a complete code is sent out and the key is released, TX2 will automatically into powered off mode.
- TX2 IR transmission interface:
Built-in counter to generate 38KHz or 57KHz carrier frequency for Infrared applications.

Pin Assignment and Block Diagram:





Absolute Maximum Ratings

DC Supply Voltage.....0.3V to 5.0V
 Input/Output Voltage.....GND -0.2V to VDD + 0.2V
 Operating temperature.....-10°C to 60°C
 Storage Temperature.....-25°C to 125°C

Comments*

Never allow a stress to exceed the values listed under "Absolute Maximum Ratings", otherwise the device would suffer from a permanent damage. Nor is a stress at the listed value be allowed to persist over a period, since an extended exposure to the absolute maximum rating condition may also affect the reliability of the device, if not causing a damage thereof.



Electrical Characteristics

TX2

(VDD=4.5V, Fosc = 128KHz, TA=25°C, unless otherwise specified.)

| Parameter | Symbol | Min. | Typ. | Max. |
|------------------------|--------------------|-------|------|------|
| Operating Voltage | VDD | 2.2V | 4.5V | 5.0V |
| Operating Current | I _{dd} | - | - | 1mA |
| Stand-by Current | I _{stb} | - | - | 1μA |
| DC O/P Driving Current | I _{drive} | 3mA | - | - |
| AC O/P Driving Current | I _{drive} | 3mA | - | - |
| AC O/P Frequency | F _{audio} | 500Hz | - | 1KHz |

RX2

(VDD=4.5V, Fosc = 128KHz, TA=25°C, unless otherwise specified.)

| Parameter | Symbol | Min. | Typ. | Max. |
|--|------------------------|-------|------|-------|
| Operating Voltage | VDD | 2.2V | 4.5V | 5.0V |
| Operating Current | I _{dd} | - | - | 0.7mA |
| O/P Driving Current | I _{drive} | 0.6mA | - | - |
| O/P Sinking Current | I _{sink} | 0.6mA | - | - |
| Effect Decoding Frequency Variation | F _{tolerance} | -20% | - | 20% |



Pin Description

TX2

| Pin No. | Designation | Description |
|---------|-------------|--|
| 1 | RIGHTB | The rightward function will be selected when this pin is connected to GND. |
| 2 | TESTB | This pin is used for testing purpose only. |
| 3 | GND | Negative power supply |
| 4 | BACKWARDB | The backward function will be selected when this pin is connected to GND. |
| 5 | FORWARDB | The forward function will be selected when this pin is connected to GND. |
| 6 | TURBOB | The turbo function will be selected when this pin is connected to GND. |
| 7 | SC | Output pin of the encoding signal with carrier frequency |
| 8 | SO | Output pin of the encoding signal without carrier frequency |
| 9 | VDD | Positive power supply |
| 10 | PC | Power control output pin |
| 11 | OSCO | Oscillator output pin |
| 12 | OSCI | Oscillator input pin |
| 13 | FOSC | This pin is used for testing purpose. |
| 14 | LEFTB | The leftward function will be selected when this pin is connected to GND. |

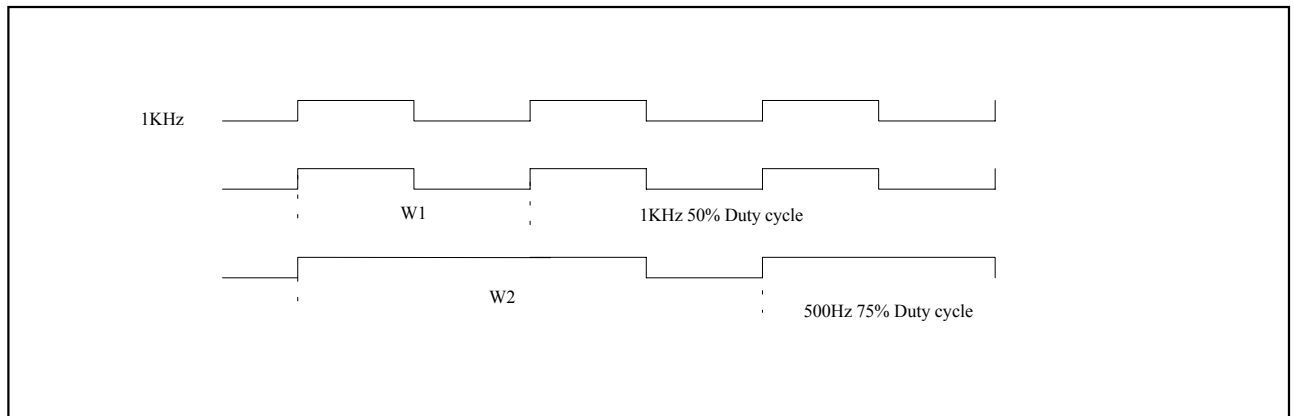
RX2

| Pin No. | Designation | Description |
|---------|-------------|---|
| 1 | VO2 | Inverter 2 output pin for power amplify |
| 2 | GND | Negative power supply |
| 3 | SI | Input pin of the encoding signal |
| 4 | OSCI | Oscillator input pin |
| 5 | OSCO | Oscillator output pin |
| 6 | RIGHT | Rightward output pin |
| 7 | LEFT | Leftward output pin |
| 8 | RDB | Rightward function is disabled when this pin is connected to GND. |
| 9 | LDB | Leftward function is disabled when this pin is connected to GND. |
| 10 | BACKWARD | Backward output pin |
| 11 | FORWARD | Forward output pin |
| 12 | TURBO | Turbo output pin |



| | | |
|----|-----|---|
| 13 | VDD | Positive power supply |
| 14 | VI1 | Inverter 1 input pin for power amplify |
| 15 | VO1 | Inverter 1 output pin for power amplify |
| 16 | VI2 | Inverter 2 input pin for power amplify |

Bit Format



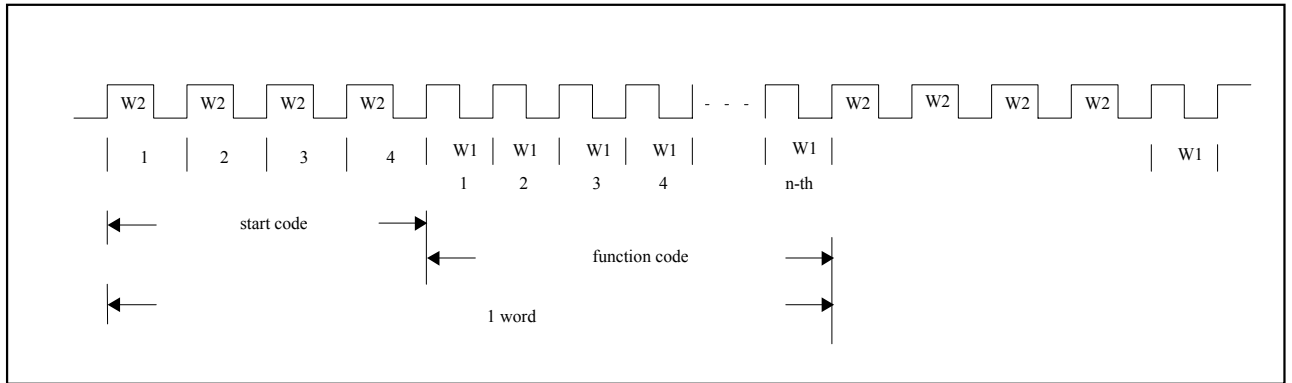
Data Format

W2 W2 W2 W2 (n) x W1 W2 W2 W2 W2 (n) x W1 W2 W2 W2 W2

| Number of Function Codes (n) W1 | Function Key | Decode Result |
|---------------------------------|-------------------------|------------------|
| 4 | | End Code |
| 10 | Forward | Forward |
| 16 | Forward & Turbo | Forward |
| 22 | Turbo | Turbo |
| 28 | Turbo & Forward & Left | Forward & Left |
| 34 | Turbo & Forward & Right | Forward & Right |
| 40 | Backward | Backward |
| 46 | Backward & Right | Backward & Right |

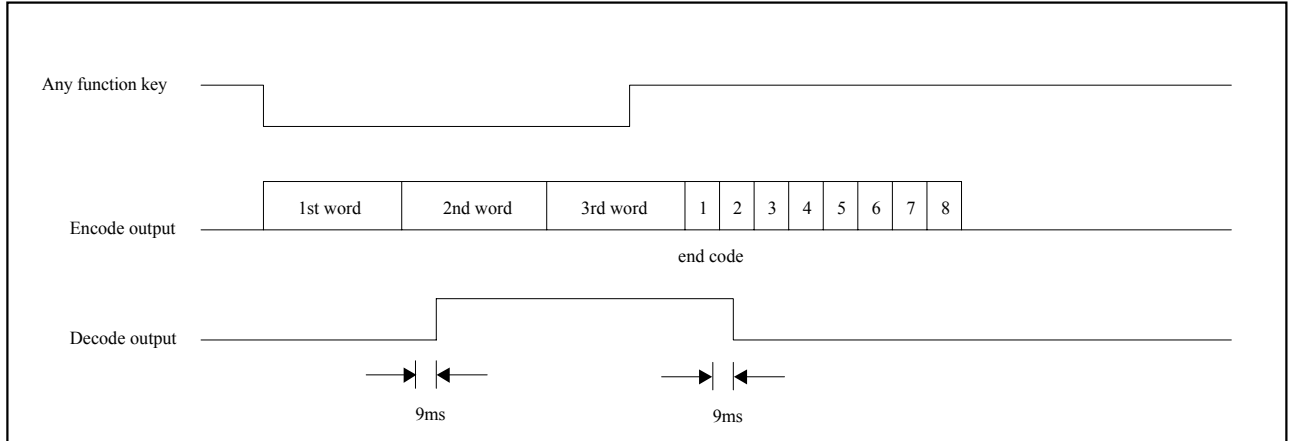


| | | |
|----|-----------------|-----------------|
| 52 | Backward & Left | Backward & Left |
| 58 | Left | Left |
| 64 | Right | Right |

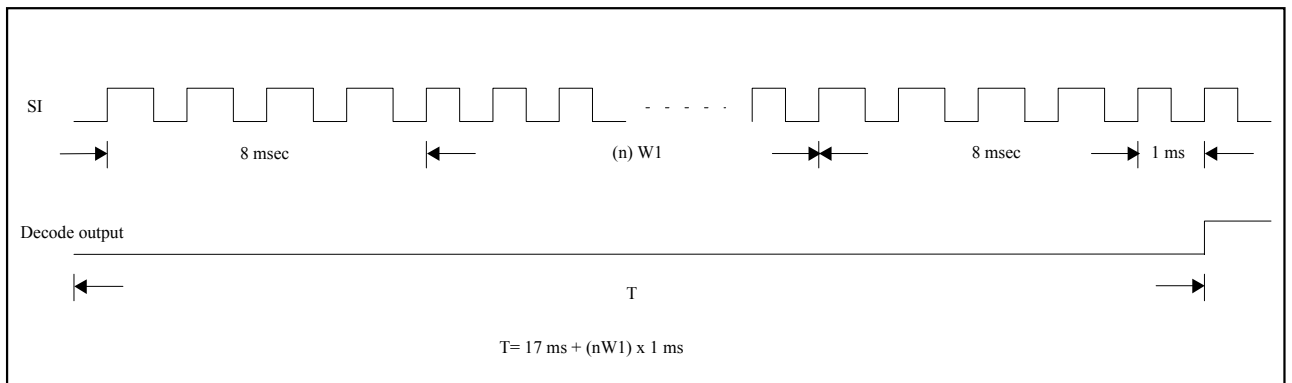


Encode/Decode Timing

(A)

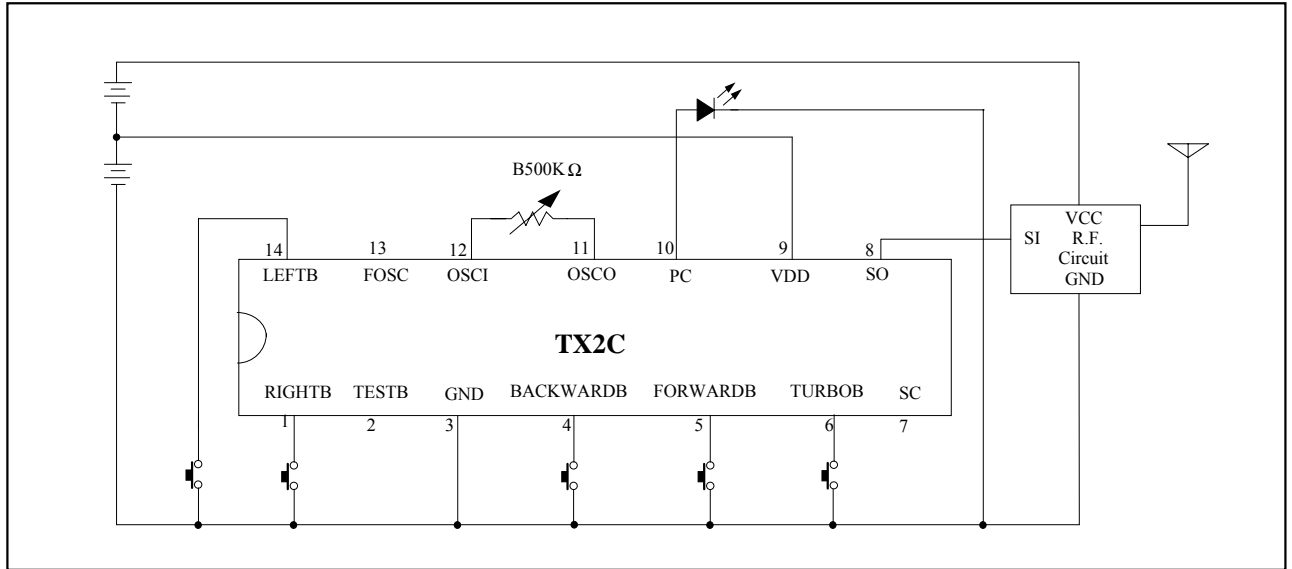


(B)

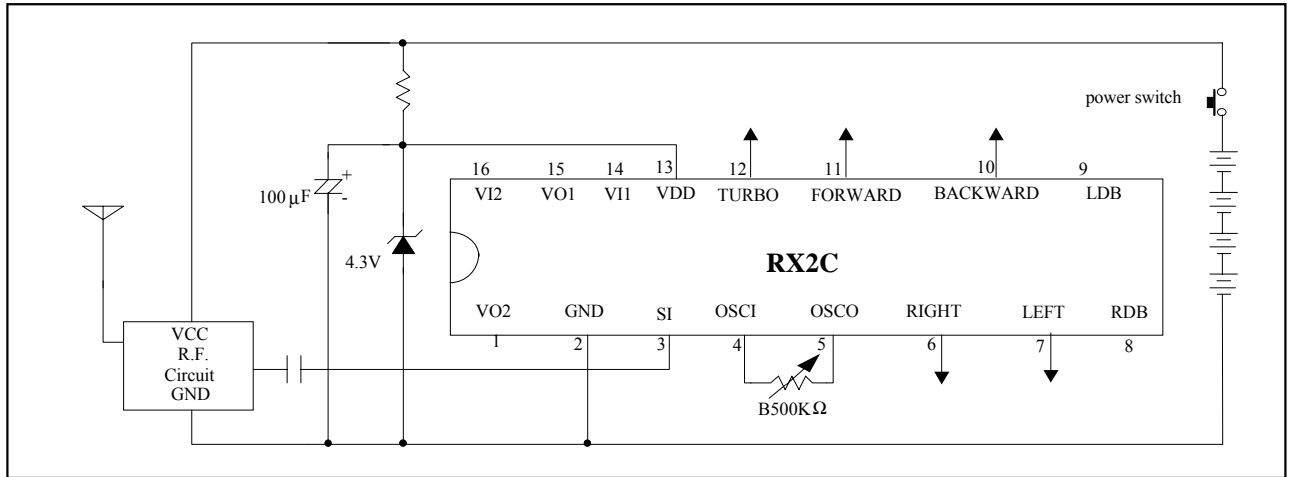


Typical Application Circuit

Transmitter (TX2 Fosc ≈ 128 KHz)

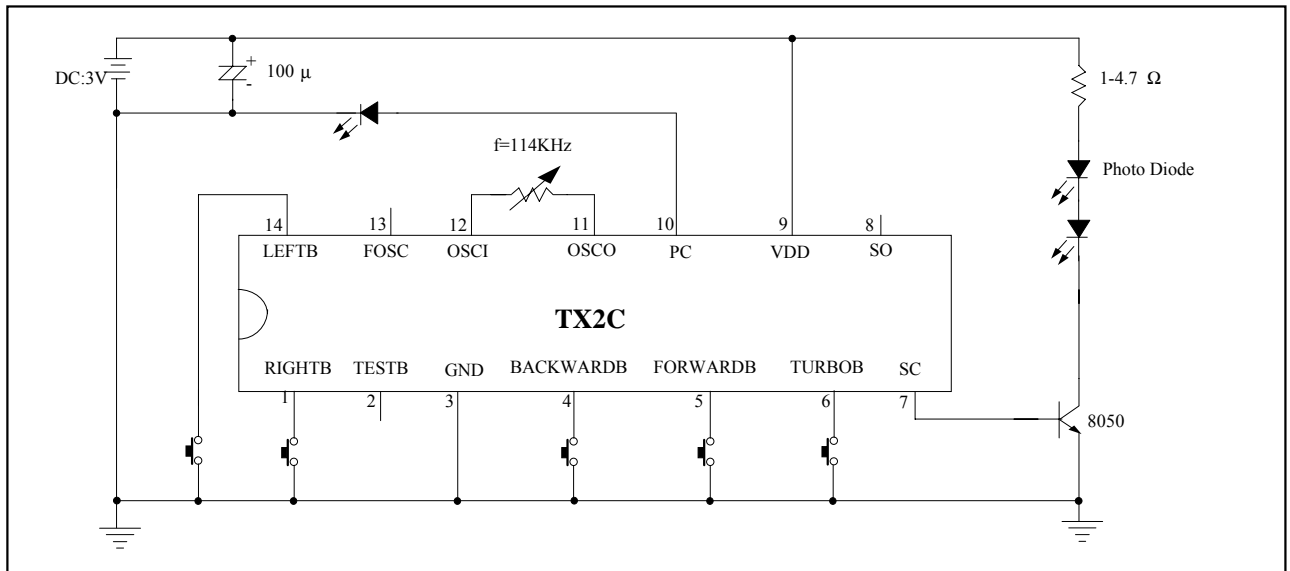


Receiver (RX2 Fosc ≈ 128 KHz)

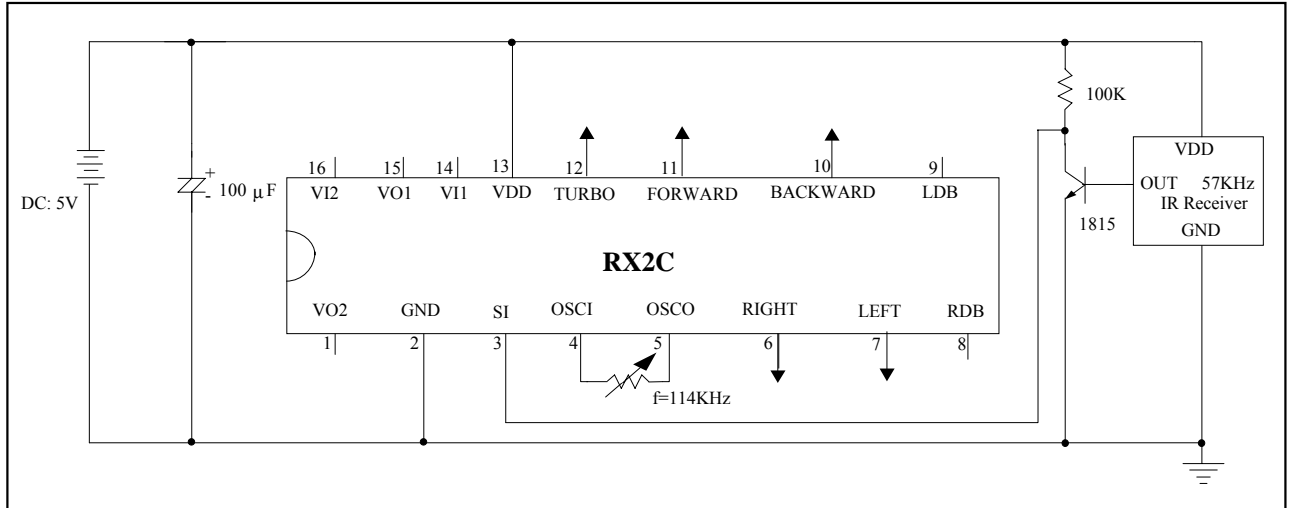


Infrared Application Circuit

Transmitter (TX2 Fosc ≈ 114 KHz)

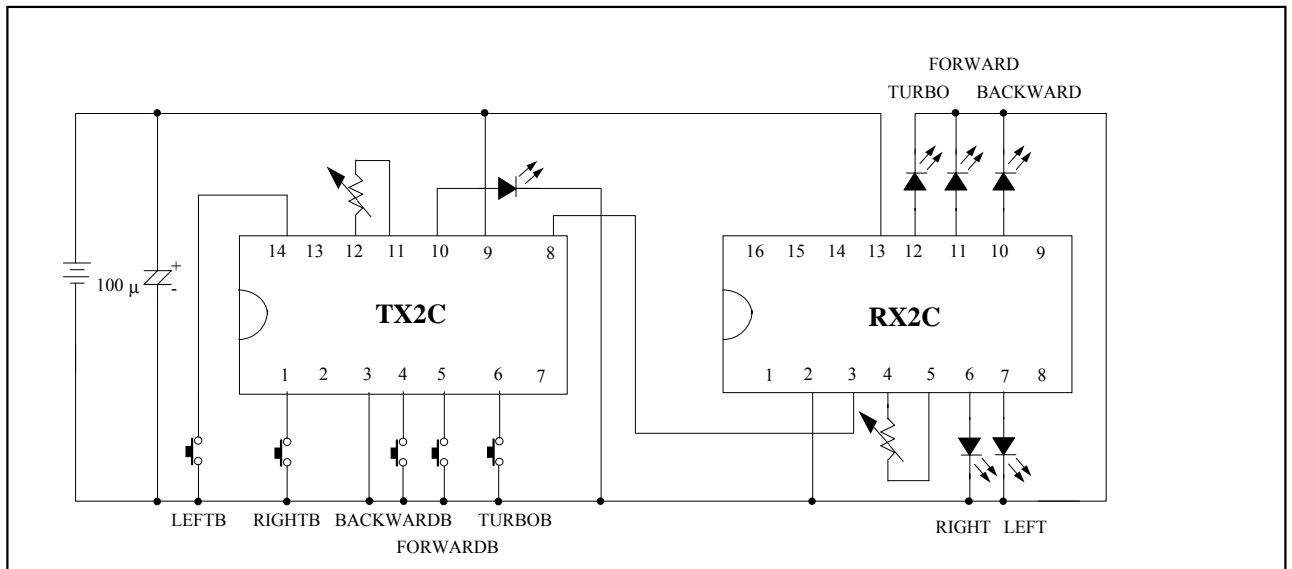


Receiver(RX2 Fosc \approx 114KHz)



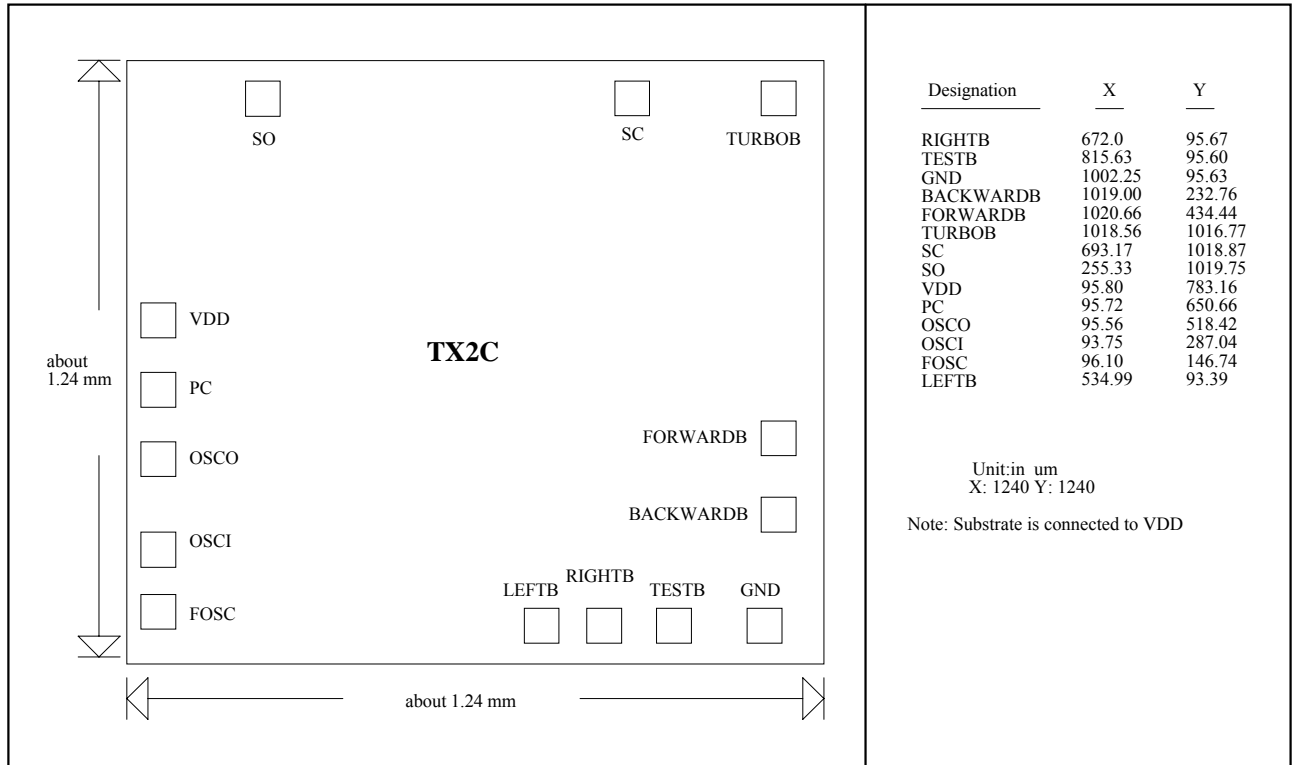
Testing Circuit

Fosc for TX2 \approx Fosc, RX2 \approx 128 KHz



Bonding Diagram

TX2



RX2

