

## ■ DESCRIPTION :

RT1249/RT11250 series are infra-red(IR) remote control receiver utilizing CMOS technology, it can be used with RT1248. The RT1249 series are packaged in 16 pins(RT1249) and 24 pins(RT1250) DIP. This series are capable of controlling several functions, such as non-inverse/inverse select IR signal input format, and independent/dependent toggle signal output , etc.

## ■ FEATURES :

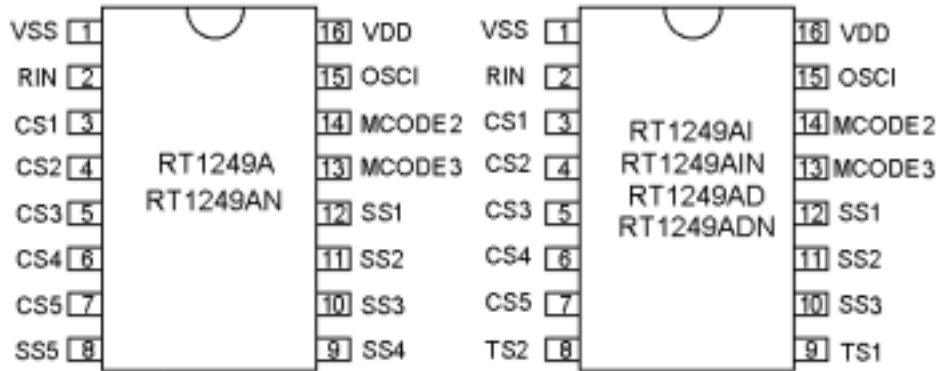
1. Operating Voltage : 2.2 5.0V.
2. Low power dissipation.
3. High noise immunity.
4. A oscillator can be constructed by connecting a RC circuit.  
(The frequency is 22KHz 54KHz)
5. Three kinds of output format are single-shot signal, continuous signal and toggle signal.
6. Able to output parallels multiple keying signals from the transmitter.  
(The maximum of RT1249 is 5 signals, and RT1250 is 6 signals.)

## ■ APPLICATIONS:

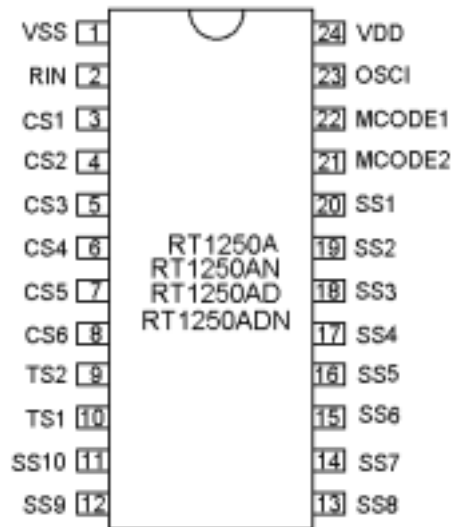
1. Audio equipment remote control.
2. Video compact disk (VCD) remote control.
3. Television (TV) remote control.
4. Videocassette recorder (VCR) remote control.
5. Other remote control system.

■ **PIN CONFIGURATION :**

1. RT1249:



2. RT1250:



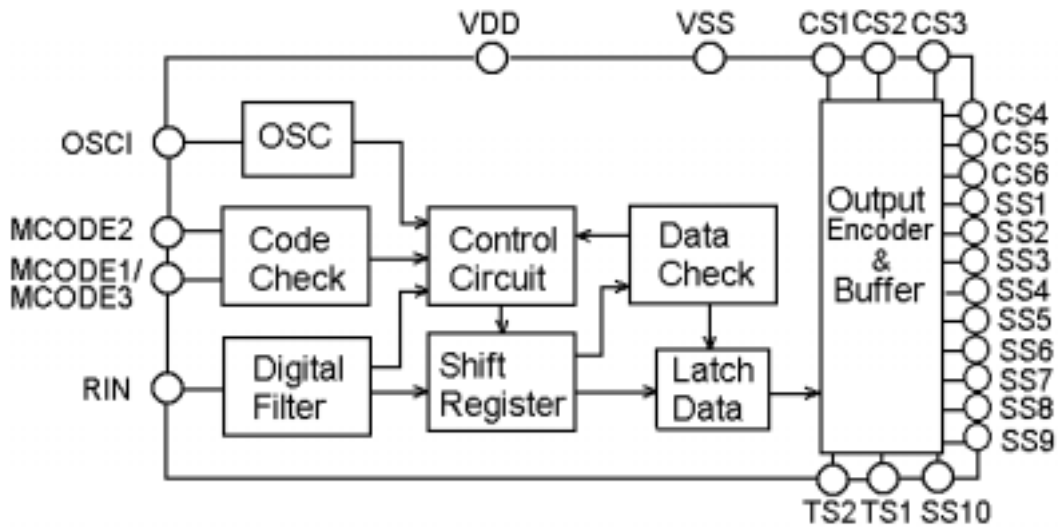
[Note]:Production number and parameter description :

Production number	Description
RT1249A/RT1250A	Advanced version
RT1249AN/RT1250AN	Advanced version , inverted RIN input
RT1249AI	Advanced version , independent toggle output
RT1249AIN	Advanced version , inverted RIN input , independent toggle output
RT1249AD/RT1250AD	Advanced version , dependent toggle output
RT1249ADN/RT1250ADN	Advanced version , inverted RIN input , dependent toggle output

■ PIN DESCRIPTION :

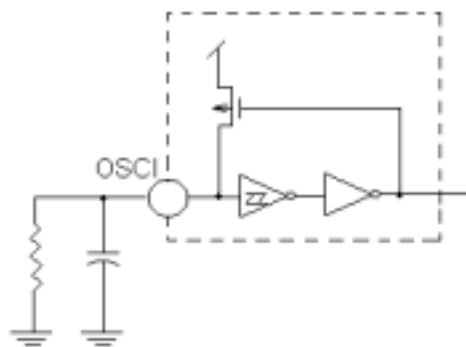
PIN NAME	PIN NO.			I/O	Description
	RT1249A RT1249AN	RT1249AI RT1249AIN RT1249AD RT1249ADN	RT1250A RT1250AN RT1250AD RT1250ADN		
VSS	1	1	1	I	Negative power supply.
RIN	2	2	2	I	Receiver Input.
CS1 CS5	3 7	3 7	3 7	O	Continuous signal output. If the proper signal is received, the output signal is held at 'H' level. (After key is released, this output will be 'L' level after 160ms)
CS6	-	-	8		
TS2	-	8	9	O	Toggle signal output. When receiving signal is inputted, TS1/TS2 will change its state. (From "H" level to "L" level or from "L" level to "H" level).
TS1		9	10		
SS1 SS3	10 12	10 12	18 20	O	Single-shot signal output. When receiving signal is inputted, These output will be at 'H' level only a fixed duration of time(about 107ms), then it will return to 'L' level.
SS4	9	-	17		
SS5	8	-	16		
SS6 SS10	-	-	11 15		
MCODE1	-	-	22	I	Match code input. Transmitter code is compared with a code set at these terminals. If the code matched, input is accepted.
MCODE3	13	13	-		
MCODE2	14	14	21		
OSCI	15	15	23	I/O	OSC input/output. A capacitor and a resistor are connected between this terminal and VSS. (User can change the frequency between 22KHz and 54KHz.)
VDD	16	16	24	I	Positive power supply.

■ **BLOCK DIAGRAM:**



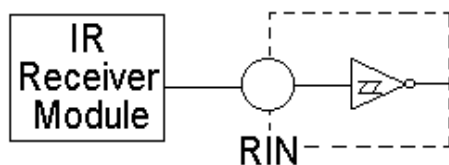
■ **FUNCTIONAL DESCRIPTION :**

1. **Oscillation Circuit :**



- (1) A capacitor and resistor are connected between this terminal and VSS to be a oscillator.
- (2) The user can change the frequency, but the frequency must be during 25KHz 54KHz.

2. **Receiving Signal Input Circuit:**



- (1) The IR receiver module must demodulation the IR signal at first stage.
- (2) We used a Schmit trigger to Higher the noise immunity
- (3) There are two kinds of IR receiver module demodulation signals (non-inversing and inversing),so we use bounding options to choice the

non-inversing/inversing input format.

■ **Code comparison:**

1. The connection of matching Code of RT1248/RT1249 and RT1248/RT1250 are different.

(1) The relation of matching code between RT1248 and RT1249:

RT1249		RT1248		
MCODE2	MCODE3	S1	S2	S3
GND	GND	Diode	NC	NC
GND	NC	Diode	NC	Diode
NC	GND	Diode	Diode	NC
NC	NC	Diode	Diode	Diode

(2) The relation of matching code between RT1248 and RT1250:

RT1250		RT1248		
MCODE1	MCODE2	S1	S2	S3
GND	GND	NC	NC	Diode
GND	NC	NC	Diode	Diode
NC	GND	Diode	NC	Diode
NC	NC	Diode	Diode	Diode

[Note]:①NC: This is a floating pin for RT1248.

This is a floating or connecting a capacitor between this pin terminal and VSS.

②GND: Connect to VSS.

③Diode: To connect a diode between this terminal (for RT1248) and MCODE.

④S1,S2,S3 are the pin names of RT1248.

## (2)Receiving signal check:

The receiving signal check is used to check 2 cycle transmitting signals sent from the transmitter to determine if it is a normal signal.



### The receiving signal check step:

#### Step1. Receiving the data :

It will receive the first 12-bit data, and the data is stored in 10-bit shift register.

#### Step2. Match code check :

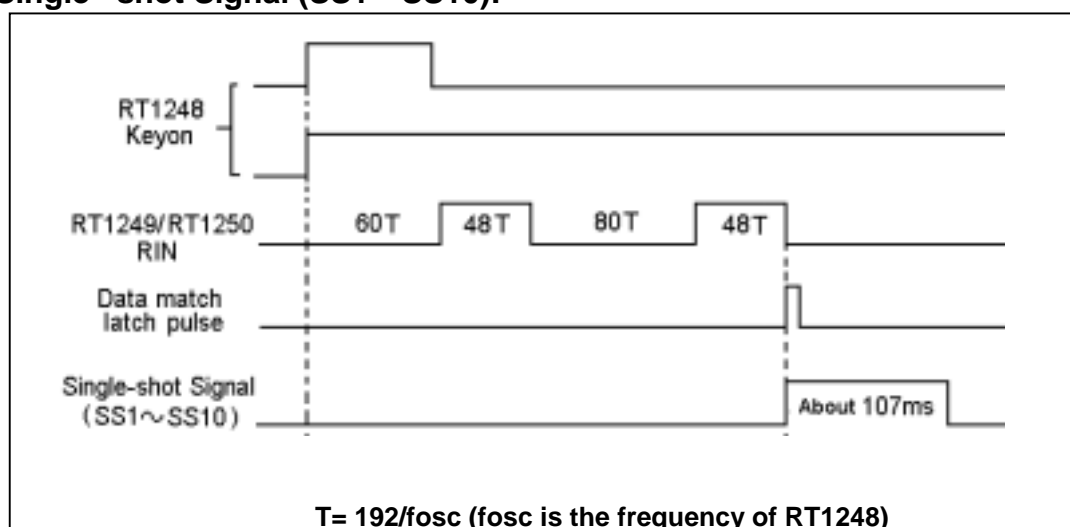
When the data is sent to the 10-bit shift register, the 3-bit match code will be pushed out the shift register. We will compare the 3-bit match-code with the RT1249/RT1250 external match code.

#### Step3. Other Data check :

The 10-bit shift register will store the last 10 bits data, and when the second cycle data are set into the 10-bit shift register, the first cycle data (the last 10-bit) will be pushed out the shift register. And we will compare the first cycle data with the second cycle data. If the two cycle data are the same data, it will provide a data match latch pulse to latch the data.

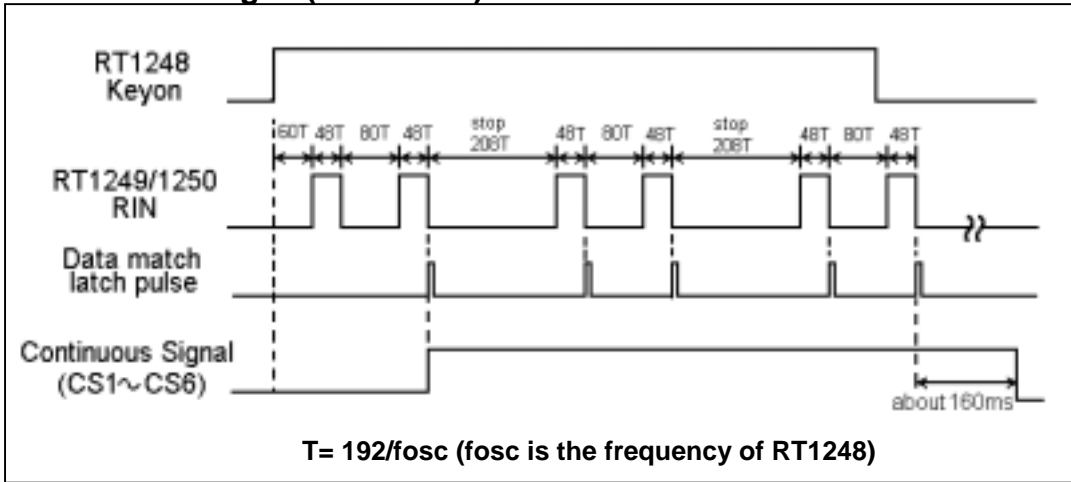
## ■ Output format:

### 1. Single –shot Signal (SS1 ~ SS10):



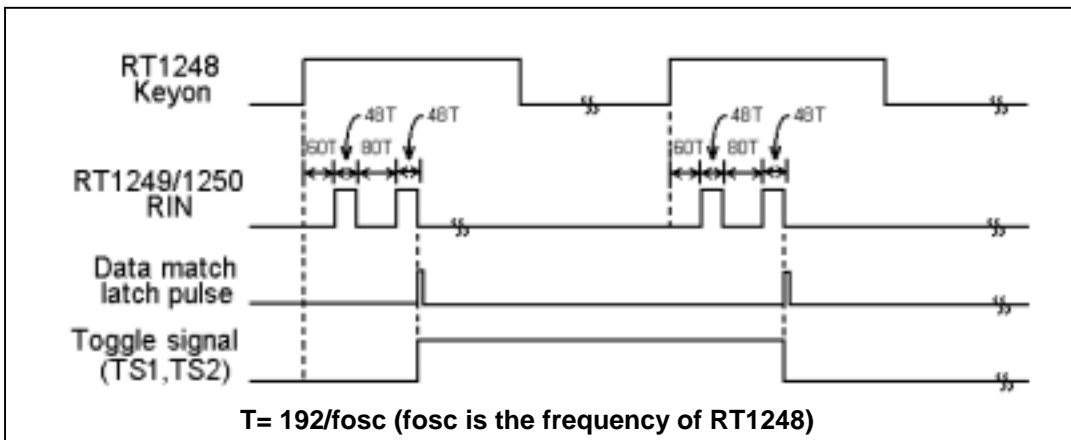
After we push the KEY7 KEY16 of RT1248, RT1249/RT1250 (SS1 SS10) will generate a single pulse output.

**2.Continuous Signal(CS1 CS6):**



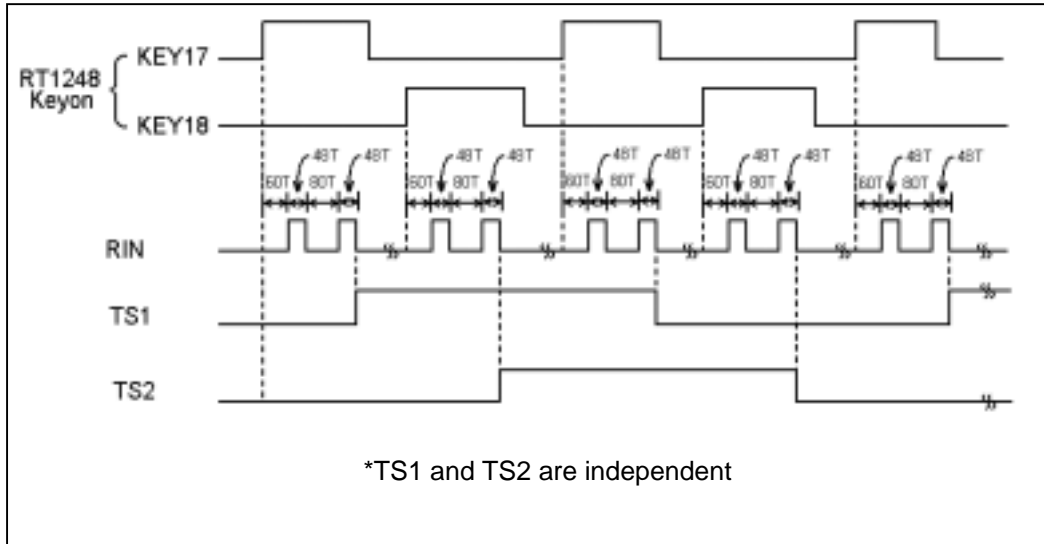
After we push the KEY1 KEY6 of RT1248.The RT1249/RT1250 (CS1 CS6)output will from 'L' level to 'H' level. If we release the key of RT1248, the RT1249/RT1250 (CS1 CS6)output will keep at 'H' level about 160ms.(We calculate the 160ms after the two cycle data is received complicity.)

**2..Toggle Signal(TS1 TS2):**

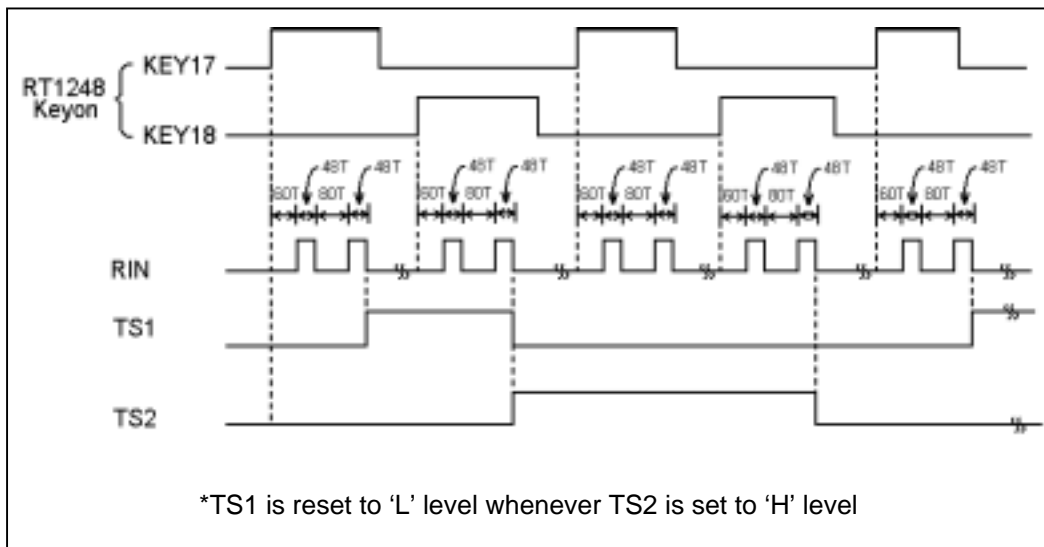


After we push the KEY17, KEY18 of RT1248.The RT1249/RT1250 (TS1 , TS2)output will from 'L' to 'H' level, and the RT1249/RT1250 (TS1 , TS2)output will keep at 'H' level, until we push the same key of RT1248 again, the RT1249/RT1250 (TS1 , TS2)output will from 'H' level to 'L' level.

[Note]:The relationship between TS1 and TS2 is shown in the diagram below:  
**1.Independent:**



**2.Dependent:**





■ Code table:

Key No.	RT1248 DATA BITS									FUNCTION OF INSTRUCTION (RT1249/1250)	
	H0	P1	P2	D1	D2	D3	D4	D5	D6		
	S1	S2	S3	K1	K2	K3	K4	K5	K6		
KEY1	1	0	0	1	0	0	0	0	0	Continuous Signal	CS1
KEY2	1	0	0	0	1	0	0	0	0	Continuous Signal	CS2
KEY3	1	0	0	0	0	1	0	0	0	Continuous Signal	CS3
KEY4	1	0	0	0	0	0	1	0	0	Continuous Signal	CS4
KEY5	1	0	0	0	0	0	0	1	0	Continuous Signal	CS5
KEY6	1	0	0	0	0	0	0	0	1	Continuous Signal	CS6
KEY7	0	1	0	1	0	0	0	0	0	Single-shot Signal	SS1
KEY8	0	1	0	0	1	0	0	0	0	Single-shot Signal	SS2
KEY9	0	1	0	0	0	1	0	0	0	Single-shot Signal	SS3
KEY10	0	1	0	0	0	0	1	0	0	Single-shot Signal	SS4
KEY11	0	1	0	0	0	0	0	1	0	Single-shot Signal	SS5
KEY12	0	1	0	0	0	0	0	0	1	Single-shot Signal	SS6
KEY13	0	0	1	1	0	0	0	0	0	Single-shot Signal	SS7
KEY14	0	0	1	0	1	0	0	0	0	Single-shot Signal	SS8
KEY15	0	0	1	0	0	1	0	0	0	Single-shot Signal	SS9
KEY16	0	0	1	0	0	0	1	0	0	Single-shot Signal	SS10
KEY17	0	0	1	0	0	0	0	1	0	Toggle Signal	TS1
KEY18	0	0	1	0	0	0	0	0	1	Toggle Signal	TS2

**[Note]:**

- (1) The "Key No." of the table is the key number of RT1248.
- (2) RT1250 serials (RT1250A/AN/AD/AND) can use 18 keys.
- (3) RT1249A/AN can use KEY1 KEY5 and KEY7 KEY11.
- (4) RT1249/AI/AIN/AD/AND can use KEY1 KEY5,KEY7 KEY9 and KEY17 ,KEY18.

■ **Maximum Rating:**

(Temp=25 )

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	$V_{DD}$	5.5	V
Input/Output Voltage	$V_{IO}$	$V_{SS}-0.3$ to $V_{DD}+0.3$	V
Power Dissipation	$P_D$	200	mW
Operating Temperature	$T_{OP}$	0~+70	
Storage Temperature	$T_{EST}$	-40~+125	

■ **Electrical Characteristics**

(Unless otherwise specified,  $V_{DD}= 5V$  and Temp=25 )

CHARACTERISTICS	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Supply Voltage	$V_{DD}$	All Function Operations	2.2	-	5.0	V
Operating Supply Current	$I_{DD}$	Key on without Load	-	-	1.0	mA
RC oscillation Frequency	$f_{OSC}$	$V_{DD}=4.5 \quad 5.5V$ Temp=0 70	22	33	54	KHz
Output source current	$I_{OH}$	$V_O=4V$	-	-	-1.0	mA
Output sink current	$I_{OL}$	$V_O=1V$	1.0	-	-	mA
Pull-up Resistor	$R_{UP}$		100	200	400	K
RIN Input Circuit Threshold Voltage	$V_{IN}$		2.0	2.5	3.0	V
RIN Input Hysteretic Voltage	$V_{IHS}$		-	0.6	-	V

## ■ APPLICATION CIRCUIT

