

## 3 FUNCTION DECODER FOR REMOTE CONTROLLER

### DESCRIPTION

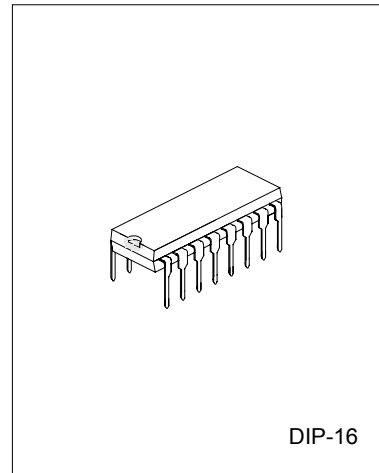
The UTC RCR03 is CMOS LST designed for the remote controlled toy. The received signal is amplified by the three-stage amplifier, and then the appropriate amplified signal is sampled, fault-tolerantly checked and decoded to control the actions of the remotecontrolled toy. There is an oscillator in the RCR03. By adding an external resistor conveniently, the oscillator will be constructed. The oscillator frequency can be adjusted by the external resistor. Pressing the ON/OFF button can control the output level of the PC pin.

The UTC RCR03, the auto-power-off function is achieved by an internal counter. When the RCR03 is powered on the counter is reset and begin to count. Any received encoding signal also reset the counter. The PC output pin will keep on a high level until the counter counts up to about 6 minutes. The PC output is used to control on/off state of the external power supply.

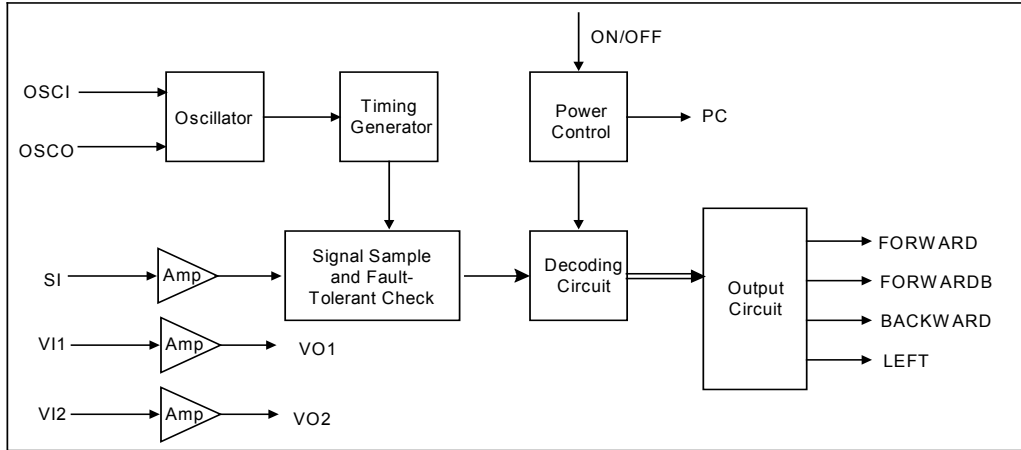
The UTC RCR03 have four output pins corresponding with the three actions: Forward, Backward and Left.

### FEATURES

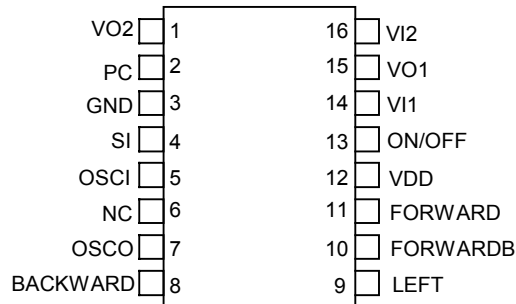
- \* Operating power-supply voltage range: 2.5 to 5.5V
- \* Manual-power-on/off with ON/OFF button
- \* One output pin used for external power control
- \* On-chip oscillator with an external resistor
- \* On-chip reversing amplifiers
- \* Low operating current
- \* Few external components needed
- \* Four output pins for three function
- \* Manual Power on/off function



RCR03 LOCK DIAGRAM



PRODUCT PIN CONFIGURATION AND DESCRIPTION



PIN NO.	PIN NAME	DESCRIPTION
1	VO2	Output pin for the amplifier 2
2	PC	Power control output pin
3	GND	Negative power supply
4	SI	Input pin of the encoding signal
5	OSCI	Oscillator input pin
6	NC	No Connection
7	OSCO	Oscillator output pin
8	BACKWARD	Backward output pin
9	LEFT	Left output pin
10	FORWARDB	Reversing output of the forward pin
11	FORWARD	Forward output pin
12	VDD	Positive power supply
13	ON/OFF	Input pin used to control the output level of the PC
14	VI1	Input pin for the amplifier 1
15	VO1	Output pin for the amplifier 1
16	VI2	Input pin for the amplifier 2

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
DC Input Voltage	$V_{IN}$	-0.5 ~ +6.5	V
Supply Voltage to Ground Potential(Inputs &V <sub>DD</sub> Only)		-0.5 ~ +6.5	V
Supply Voltage to Ground Potential(Outputs &D/O Only)		-0.5 ~ +6.5	V
DC Output Current	$I_o$	20	mA
Power Dissipation	$P_D$	500	mW
Ambient Temperature With Power Applied	$T_A$	-10 to +40	°C
Storage Temperature	$T_{STG}$	-25 to +85	°C

DC ELECTRICAL CHARACTERISTICS (Over the operating rating,  $T_A = -10^{\circ}\text{C} \sim +40^{\circ}\text{C}$ ,  $V_{DD} = 4.0\text{V} \pm 10\%$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Operating Voltage	$V_{DD}$		2.5	4.0	5.5	V
Supply Current	$I_{DD}$	*			3.0	mA
Standby Current	$I_{STB}$	*			20	$\mu\text{A}$
Input Current	$I_{IN}$	For ON/OFF pin			60	$\mu\text{A}$
Input Low Voltage	$V_{IL}$	Guaranteed Logic Low Level			0.5	V
Input High Voltage	$V_{IH}$	Guaranteed Logic High Level			$V_{DD}-0.5$	V
Output High Voltage	$V_{OH}$	$I_{OUT}=200\mu\text{A}$			$V_{DD}-0.5$	V
Output High Current	$I_{OH}$	$V_{OUT}=1.4\text{V}$	-1.5			mA
Output Low Voltage	$V_{OL}$	$I_{OUT}=500\mu\text{A}$			0.5	V
Output Low Current	$I_{OL}$	$V_{OUT}=0.5\text{V}$	500			$\mu\text{A}$

Note\*: Output unload:  $2.2\text{M}\Omega$  feedback resistors for the two reversing amplifiers;  $470\text{k}\Omega$  external resistor for the on-chip oscillator.

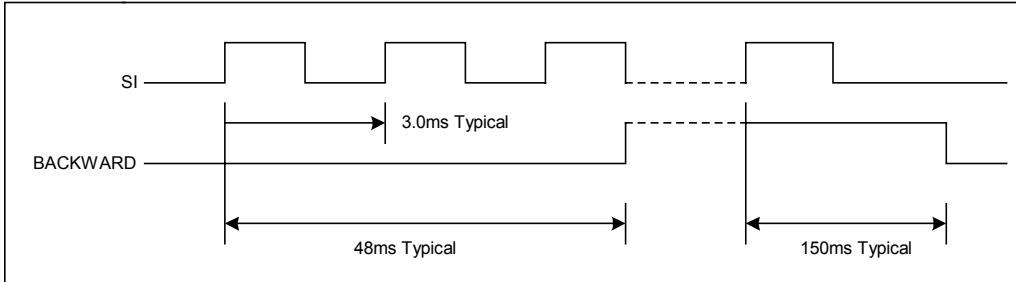
AC ELECTRICAL CHARACTERISTICS (Over the operating rating,  $T_A = -10^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$ ,  $V_{DD} = 4.0\text{V} \pm 10\%$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Oscillator Frequency	$F_{osc}$	$T_A=25^{\circ}\text{C}, R=470\text{K}\Omega$	70	88	106	KHz
Frequency of received backward code	$F_{BACK}$	$F_{osc}=88\text{KHz}$	200		400	Hz
Frequency of received forward code	$F_{FOR}$	$F_{osc}=88\text{KHz}$	0.8		1.2	KHz
Frequency of received left code	$F_{LEFT}$	$F_{osc}=88\text{KHz}$	2.4		3.6	KHz
SI Pin V <sub>pp</sub> Receive Sensitivity	$V_{SI}$	Guaranteed EffectiveDecoding	300			mV
Time of Auto-Power-Off	$T_{OFF}^*$	$F_{osc}=70$ to $106\text{KHz}$	4.8	6	7.2	min.

Note\*: when adjust the external oscillator resistor, the auto-power-off time will vary relevantly. Effect decoding frequency variation, Typical  $\pm 20\%$ .

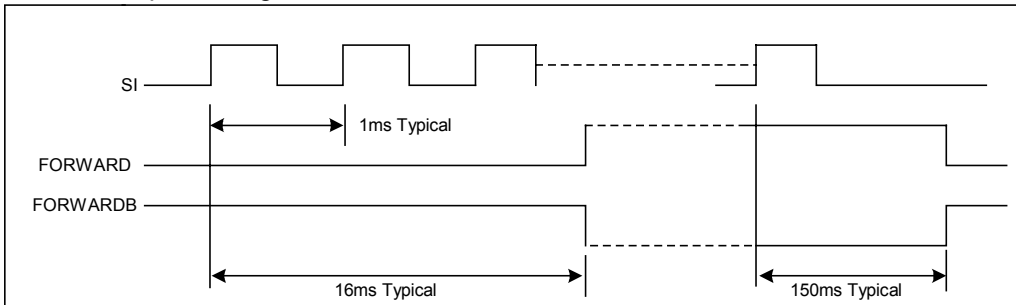
OUTPUT TIMING

Backward Output Timing



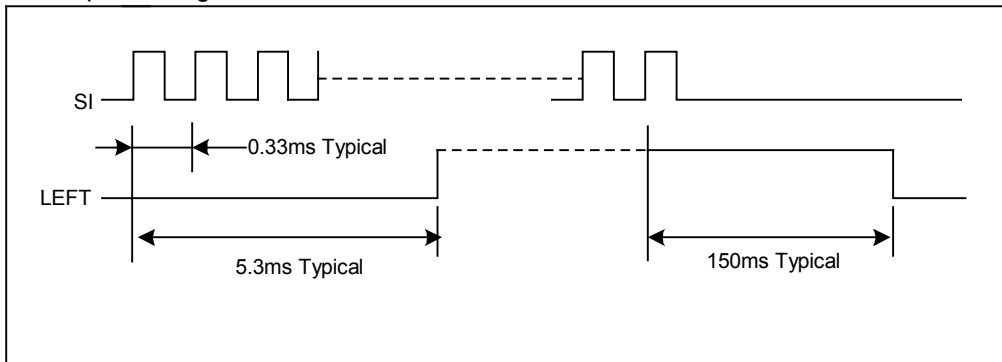
wave 1

Forward Output Timing



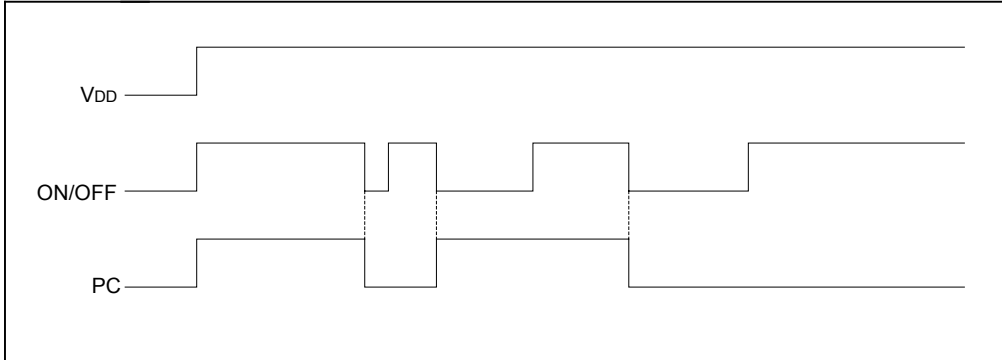
wave 2

Left Output Timing



wave 3

PC Output Timing



wave 4

TEST CIRCUIT

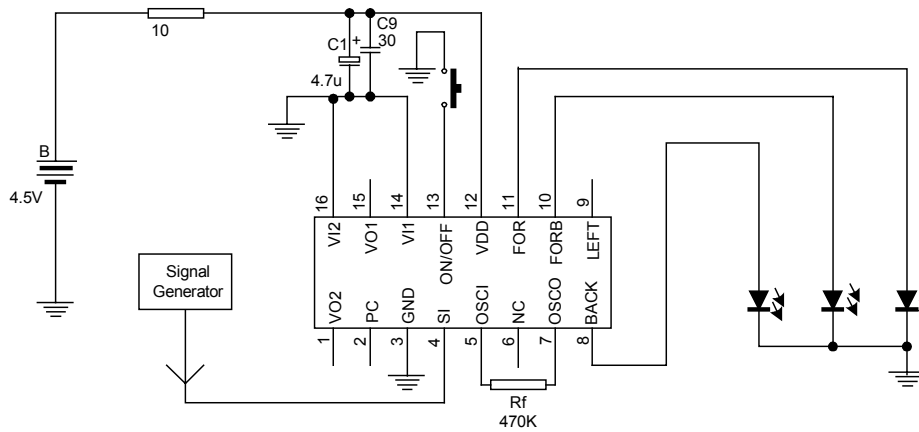


Figure 1  
 \*Forward Signal F=1kHz  
 \*Backward Signal F=340Hz  
 \*Left Signal F=3kHz









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