

**RCR6C**

Preliminary

CMOS IC

**REMOTE CONTROLLER WITH
SEVEN FUNCTIONS****■ DESCRIPTION**

The UTC **RCR6C** is a CMOS LSI and designed as receiver that complement to UTC RCT6 for remote controlled car applications. It provide seven control keys controlling the motions, which are forward, backward, rightward, leftward, two function keys, and the turbo function, of the remote controlled car.

UTC **RCR6C** have Forward (Backward) combined with the turbo application. During normal operation without Turbo, Forward (Backward) output from UTC RCT6 sends a 60Hz signal. When Forward (Backward) and Turbo are both in effect, the output signal becomes completely high.

■ FEATURES

- * Operating voltage range: 2.4V~4.5V
- * RCR6C-A built-in 3.6V ZENER
RCR6C-B built-in 4.2V ZENER
RCR6C-C built-in 5.0V ZENER
- * Few external components needed
- * 7-function remote controller controlling Forward/ Backward/ Turbo/
Right-turn/ Left turn/ two function keys
- * Complement to UTC RCT6.

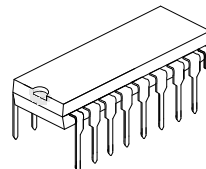
■ ORDERING INFORMATION

Order Number		Package	Packing
Lead Free	Halogen Free		
RCR6CL-x-D18-T	RCR6CG-x-D18-T	DIP-18	Tube
RCR6CL-x-D20-T	RCR6CG-x-D20-T	DIP-20	Tube

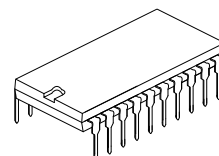
RCR6CL-x-D18-T

- (1) Packing Type
- (2) Package Type
- (3) Rank
- (4) Lead Plating

- (1) T: Tube
- (2) D18: DIP-18, D20: DIP-20
- (3) x: refer to I_{OPR}
- (4) L: Lead Free Plating, G: Halogen Free

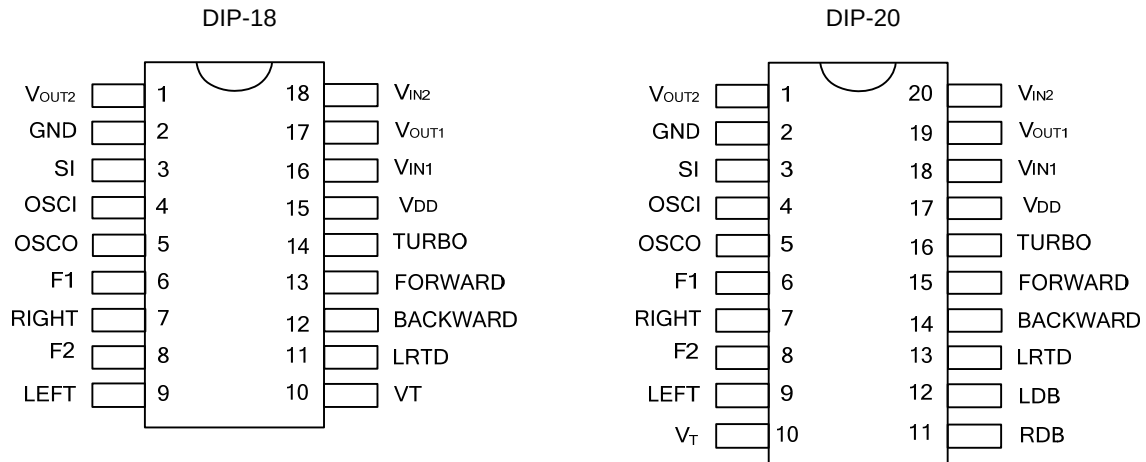


DIP-18



DIP-20

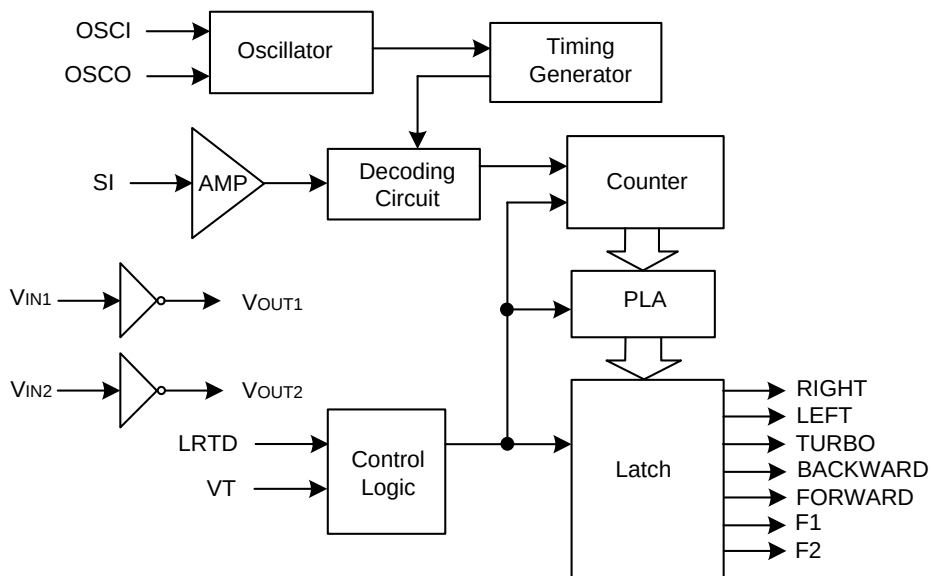
■ PIN CONFIGURATIONS



■ PIN DESCRIPTION

PIN NO.		PIN NAME	DESCRIPTION
DIP-18	DIP-20		
1	1	V _{OUT2}	Inverter 2 output pin for power amplify
2	2	GND	Negative power supply
3	3	SI	Input pin of the encoding signal
4	4	OSCI	Oscillator input pin
5	5	OSCO	Oscillator output pin
6	6	F1	F1 function output pin
7	7	RIGHT	Rightward output pin
8	8	F2	F2 function output pin
9	9	LEFT	Leftward output pin
10	10	V _T	Auto Shut-OFF input pin If V _T voltage exceeds 1.4V, all outputs shut off automatically.
	11	RDB	With Pull-up resistor, rightward function disabled if this pin connected to GND
	12	LDB	With Pull-up resistor, leftward function disabled if this pin connected to GND
11	13	LRTD	If connect gnd ,Left/right+ turbo is disable
12	14	BACKWARD	Backward output pin
13	15	FORWARD	Forward output pin
14	16	TURBO	TURBO output pin
15	17	V _{DD}	Positive power supply
16	18	V _{IN1}	Inverter 1 input pin for signal amplify
17	19	V _{OUT1}	Inverter 1 output pin for signal amplify
18	20	V _{IN2}	Inverter 2 input pin for signal amplify

■ BLOCK DIAGRAM



Input Condition	O/P Condition		
	Forward	Backward	Turbo
Forward	=60Hz	Low	Low
Backward	Low	=60Hz	Low
Forward + turbo	=high	Low	=high
Backward + turbo	Low	=high	=high

Note: An Auto Shut-Off mechanism is built-in according to Toy Safety Requirement and effective during over-current situation in motor driver. The active high input applying to this Auto Shut-Off pin will turn off the motor. (V_T pin, when unused, has to be connected to ground. The transfer point =1.4V)

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
DC Supply Voltage	V_{DD}	2.4~4.5	V
Input/Output Voltage		GND-0.2~ $V_{DD}+0.2$	V
Operating Temperature	T_{OPR}	-10~+60	℃
Storage Temperature	T_{STG}	-25~+125	℃

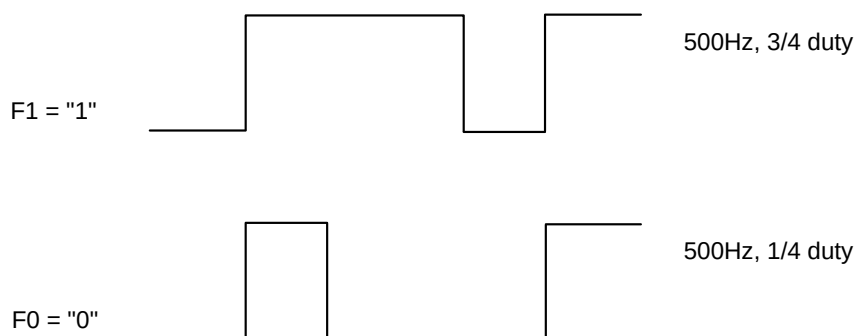
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$, $V_{DD}=4.0\text{V}$, $F_{OSC}=128\text{KHz}$, unless otherwise specified.)

Direct Driving: No connect a resistance between POWER and IC's V_{DD} pin.

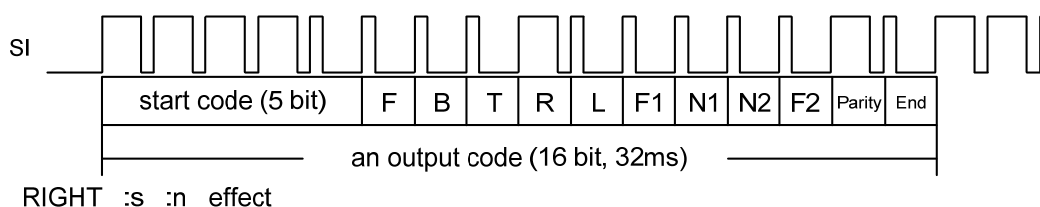
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	V_{OPR}		2.4	4.0	4.5	V
Supply Current	I_{DD}	Unload	RCR6C-A		15	mA
			RCR6C-B		0.6	
			RCR6C-C		0.5	
O/P Driving Current	I_{DRIVE}	$V_{OH}=0.7V$	5.0			mA
O/P Driving Current (F1, F2)	I_{DRIVE}	$V_{OH}=0.7V$	5.0			mA
Effect Decoding (Frequency Variation)	$F_{TOLERANCE}$		-50		50	%
Oscillator Frequency	F_{OSC}			128		KHz
Oscillator Frequency Tolerance	$F_{tolerance}$	UTC RCT6 FOSC=128KHz	-20		+20	%

■ DATA FORMAT



■ CODING METHOD

The data string that UTC **RCR6C** receiver is below:



Data string: start code + data code + parity code + end code

- start code = F1 F1 F1 F1 F0

- data code =

F	B	T	R	L	F1	N	N	F2
---	---	---	---	---	----	---	---	----

F = Forward

B = Backward

T = Turbo

R = Right

L = Left

F1 = Function 1

F2 = Function 2 N = No used code

F、B、T、R、L、F1、N、N、F2 all can have two data format, "F1" or "F0",

"F1" means the function is in effect, and "F0" means not.

- parity code = for parity check

- end code = for (latch data)

* Data code can be any combination of F, B, T, R, L, F1, F2, except for F & B, and R & L

■ OUTPUT TABLES

FUNCTION	OUTPUT STATUS						
	F	B	T	R	L	F1	F2
FORWARD	Z						
LEFT+FORWARD	Z				H		
RIGHT+FORWARD	Z			H			
TURBO			H				
TURBO+FORWARD	H		H				
TURBO+LEFT+FORWARD	H		H		H		
TURBO+RIGHT+FORWARD	H		H	H			
BACKWARD		Z					
BACKWARD+RIGHT		Z		H			
BACKWARD+LEFT		Z			H		
TURBO+BACKWARD		H	H				
TURBO+BACKWARD+RIGHT		H	H	H			
TURBO+BACKWARD+LEFT		H	H		H		
LEFT					H		
RIGHT				H			
FUNCTION1						H	
FORWARD+FUNCTION1	Z					H	
FORWARD+TURBO+FUNCTION1	H		H			H	
TURBO+FUNCTION1			H			H	
BACKWARD+FUNCTION1		Z				H	
BACKWARD+TURBO+FUNCTION1		H	H			H	
LEFT+FORWARD+FUNCTION1	Z				H	H	
RIGHT+FORWARD+FUNCTION1	Z			H		H	
LEFT+BACKWARD+FUNCTION1		Z			H	H	
RIGHT+BACKWARD+FUNCTION1		Z		H		H	
LEFT+FUNCTION1					H	H	
RIGHT+FUNCTION1				H		H	
FUNCTION2							H
FORWARD+FUNCTION2	Z						H
FORWARD+TURBO+FUNCTION2	H		H				H
TURBO+FUNCTION2			H				H
BACKWARD+FUNCTION2		Z					H
BACKWARD+TURBO+FUNCTION2		H	H				H
LEFT+FORWARD+FUNCTION2	Z				H		H
RIGHT+FORWARD+FUNCTION2	Z			H			H
LEFT+BACKWARD+FUNCTION2		Z			H		H
RIGHT+BACKWARD+FUNCTION2		Z		H			H
LEFT+FUNCTION2					H		H
RIGHT+FUNCTION2				H			H

H = high level, Z = 60Hz flash, Blank=L

Thus, from the table, we can see that there are more than 50 states of function combinations from 7 control keys.

■ NOTE

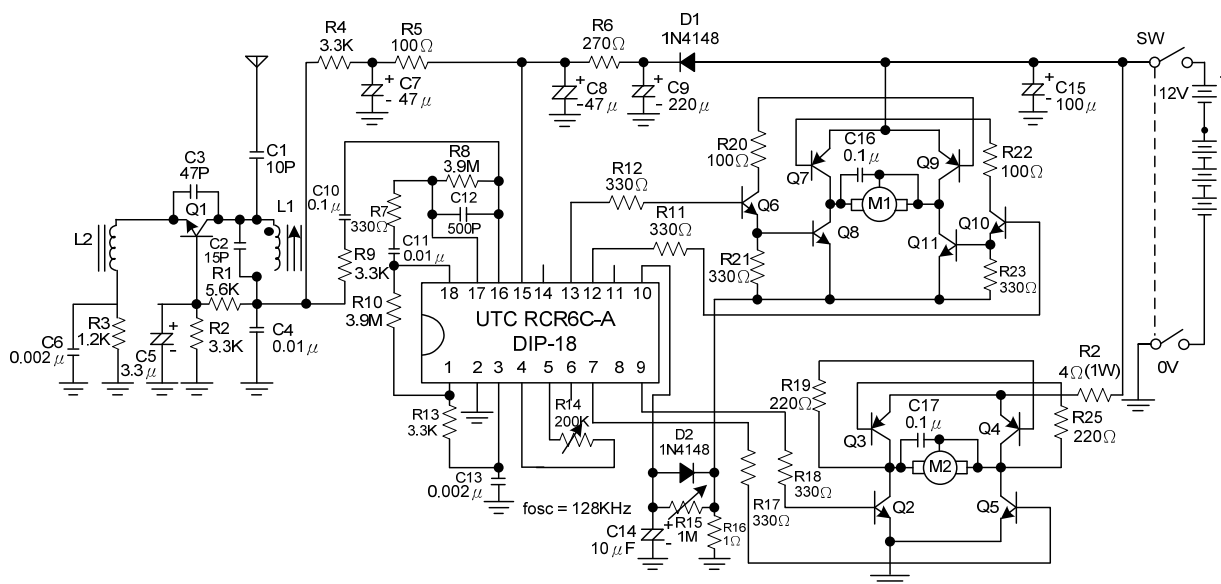
(1) LRTD pin functions as an option pin for LEFT/RIGHT turbo disable.

"LRTD"	Key selected	Output Function
HIGH (OPEN)	FORWARD + LEFT (RIGHT) + TURBO	FORWARD + LEFT (RIGHT) + TURBO
LOW	FORWARD + LEFT (RIGHT) + TURBO	FORWARD + LEFT (RIGHT)

(2) The UTC **RCR6C** have built in a zener diode, so you must add a resistance between POWER and IC's V_{DD} pin, like the R6 of UTC **RCR6C** application circuit.

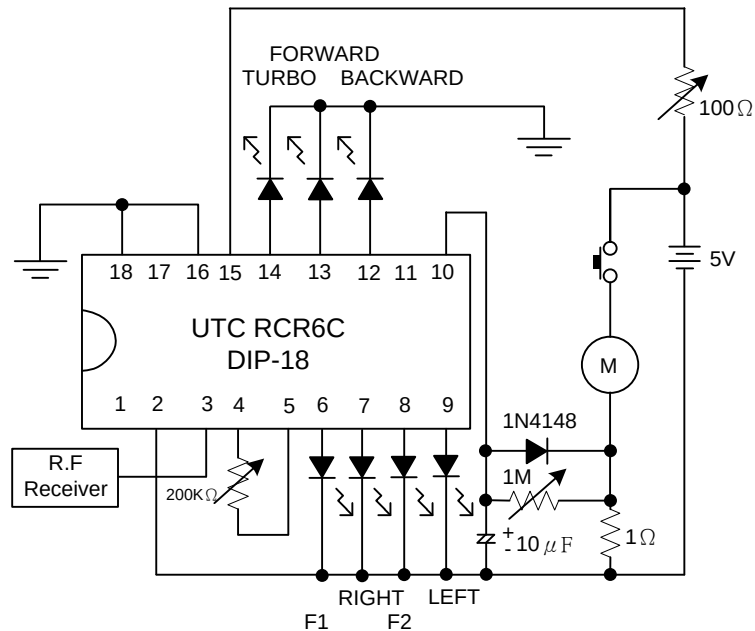
TYPICAL APPLICATION CIRCUIT (FOR REFERENCE ONLY)

Receiver (UTC **RCR6C DIP-18** $f_{osc} \cong 128\text{KHz}$)

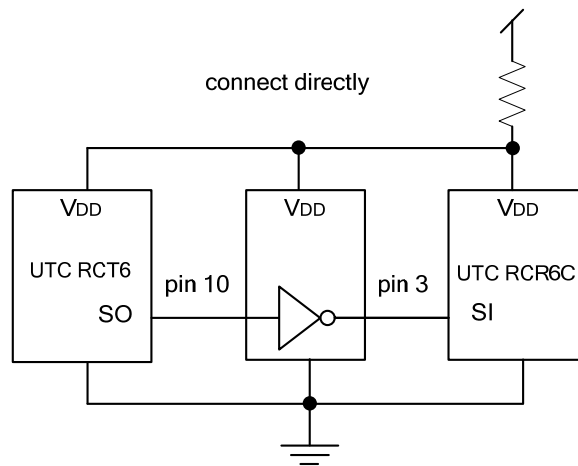


■ TEST CIRCUIT

Fosc for UTC **RCR6C** $\cong$ 128KHz



UTC RCT6 output pin (SO) has an inverted phase with UTC **RCR6C** input (SI). If UTC RCT6 is connected without using a R_F module, an inverter has to be inserted between this 2 pins.



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