UNISONIC TECHNOLOGIES CO., LTD

RCT6

CMOS IC

REMOTE CONTROLLER WITH SEVEN FUNCTIONS

■ **DESCRIPTION**

The UTC **RCT6** is a pair of CMOS LSIs designed for remote controlled car applications. The UTC **RCT6** have seven control keys controlling the motions (i.e. forward, backward, rightward, leftward, two function keys, and the turbo function) of the remote controlled car. UTC **RCT6** have Forward (Backward) combined with the turbo application. The UTC **RCT6** is the sending electric circuit.
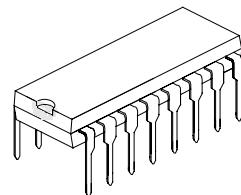
■ **FEATURES**

* Operating voltage range: 2.0V ~ 5.0V
* Very low Stand-by current
* Few external components needed
* 7-function remote controller controlling Forward/Backward/Turbo/
 Right-turn/Left turn/two function keys

DIP-16

*Pb-free plating product number: RCT6L

■ **ORDERING INFORMATION**

Order Number		Package	Packing
Normal	Lead Free Plating		
RCT6-D16-T	RCT6L-D16-T	DIP-16	Tube

RCT6L-D16-T

(1) Packing Type
(2) Package Type
(3) Lead Plating

(1) T: Tube
(2) D16: DIP-16
(3) L: Lead Free Plating Blank: Pb/Sn

■ PIN CONFIGURATIONS

RIGHTB	1		16	LEFIB
TESTB	2		15	FIB
GND	3		14	OSIC
BACKWARDB	4		13	OSCO
FORWARDB	5		12	PC
TURBOB	6		11	V$_{DD}$
SC	7		10	SO
NC	8		9	F2B
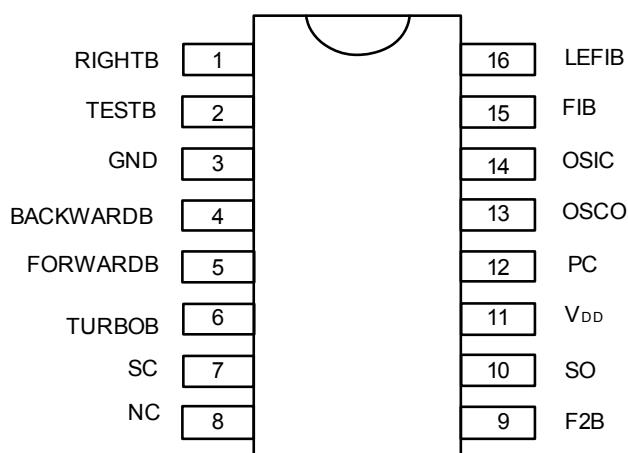
■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	RIGHTB	The rightward function will be selected when this pin is connected to GND
2	NC	No Connection
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	NC	No connection
9	F2B	F2 function select
10	SO	Output pin of the encoding signal without carrier frequency
11	V$_{DD}$	Positive power supply
12	PC	Power control output pin
13	OSCO	Oscillator output pin
14	OSCI	Oscillator input pin
15	F1B	F1 function select
16	LEFTB	The leftward function will be selected when this pin is connected to GND.

■ **BLOCK DIAGRAM**
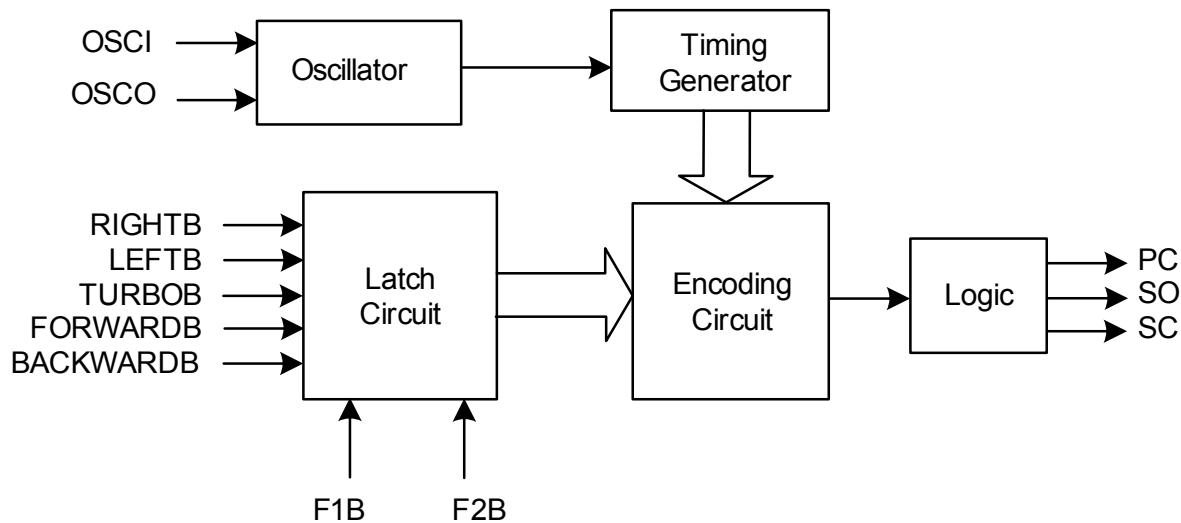
Input Condition	O/P Condition		
	Forward	Backward	Turbo
Forward	⊓⊓⊓⊓= 60Hz	Low	Low
Backward	Low	⊓⊓⊓= 60Hz	Low
Forward + turbo	⌐‾‾ = high	Low	⌐‾‾ = high
Backward + turbo	Low	⌐‾‾ = high	⌐‾‾ = high

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)

RCT6

■ **ABSOLUTE MAXIMUM RATINGS**

| PARAMETER	SYMBOL	RATINGS	UNIT
DC Supply Voltage	V_{DD}	2.0 ~ 5.0	V
Input/Output Voltage		GND -0.2 ~ V_{DD} + 0.2	V
Operating Temperature	T_{OPR}	-20 ~ +85	℃
Storage Temperature	T_{STG}	-40 ~ +150	℃

Note 1.Absolute maximum ratings and operation rating recommended 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.

2.The device is guaranteed to meet performance specification within 0℃~+70℃ operating temperature range and assured by design from -20℃~+85℃.

■ **ELECTRICAL CHARACTERISTICS** (V_{DD}=4V, Ta=25℃, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	V_{OPR}		3	4	5	V
Operating Current	I_{OPR}	Unload			0.6	mA
Stand-by Current	I_{STN-BY}	Full load			1	μA
SO O/P Driving Current (RF)	I_{DRSO}	V_{OH} = 0.7V		10		mA
AC O/P Frequency	F_{AUDIO}			500		Hz
Oscillator Frequency	F_{OSC}	R_{OSC}=130KΩ		128		KHz

■ **DATA FORMAT**

F1 = "1"   500Hz, 3/4 duty

F0 = "0"   500Hz, 1/4 duty
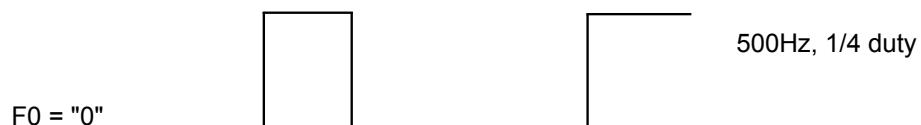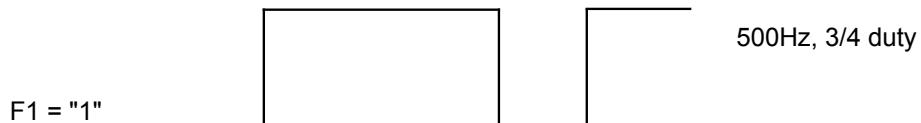
■ **CODING METHOD**

The data string that UTC **RCT6** receives is below:

| start code (5 bit) | F | B | T | R | L | F1 | N1 | N2 | F2 | Parity | End |

an output code (16 bit, 32ms)

RIGHT :s :n effect
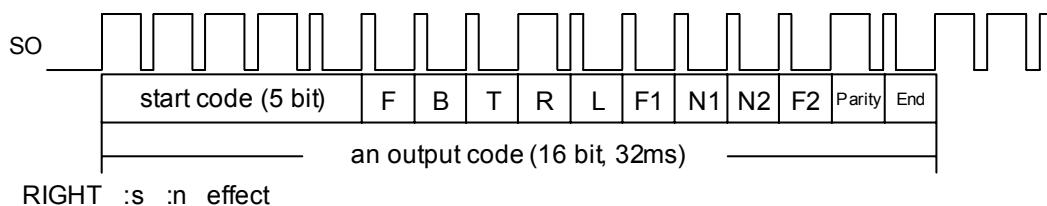
Data string: start code + data code + parity code + end code

- 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 date 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			
TRUBO + BACKWARD + LEFT		H	H		H		
LEFT					H		
RIGHT				H			
FUNCTION 1						H	
FORWARD + FUNCTION 1	Z					H	
FORWARD + TURBO + FUNCTION 1	H		H			H	
TURBO + FUNCTION 1			H			H	
BACKWARD + FUNCTION 1		Z				H	
BACKWARD + TURBO + FUNCTION 1		H	H			H	
LEFT + FORWARD + FUNCTION 1	Z				H	H	
RIGHT + FORWARD + FUNCTION 1	Z			H		H	
LEFT + BACKWARD + FUNCTION 1		Z			H	H	
RIGHT + BACKWARD + FUNCTION 1		Z		H		H	
LEFT + FUNCTION 1					H	H	
RIGHT + FUNCTION 1				H		H	
FUNCTION 2							H
FORWARD + FUNCTION 2	Z						H
FORWARD + TURBO + FUNCTION 2	H		H				H
TURBO + FUNCTION 2			H				H
BACKWARD + FUNCTION 2		Z					H
BACKWARD + TURBO + FUNCTION 2		H	H				H
LEFT + FORWARD + FUNCTION 2	Z				H		H
RIGHT + FORWARD + FUNCTION 2	Z			H			H
LEFT + BACKWARD + FUNCTION 2		Z			H		H
RIGHT + BACKWARD + FUNCTION 2		Z		H			H
LEFT + FUNCTION 2					H		H
RIGHT + FUNCTION 2				H			H

Blank = F0

H = high level, Z = 60Hz flash

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

■ **TYPICAL APPLICATION CIRCUIT (FOR REFERENCE ONLY)**

Transmitter (UTC RCT6 Fosc ≅ 128KHz)
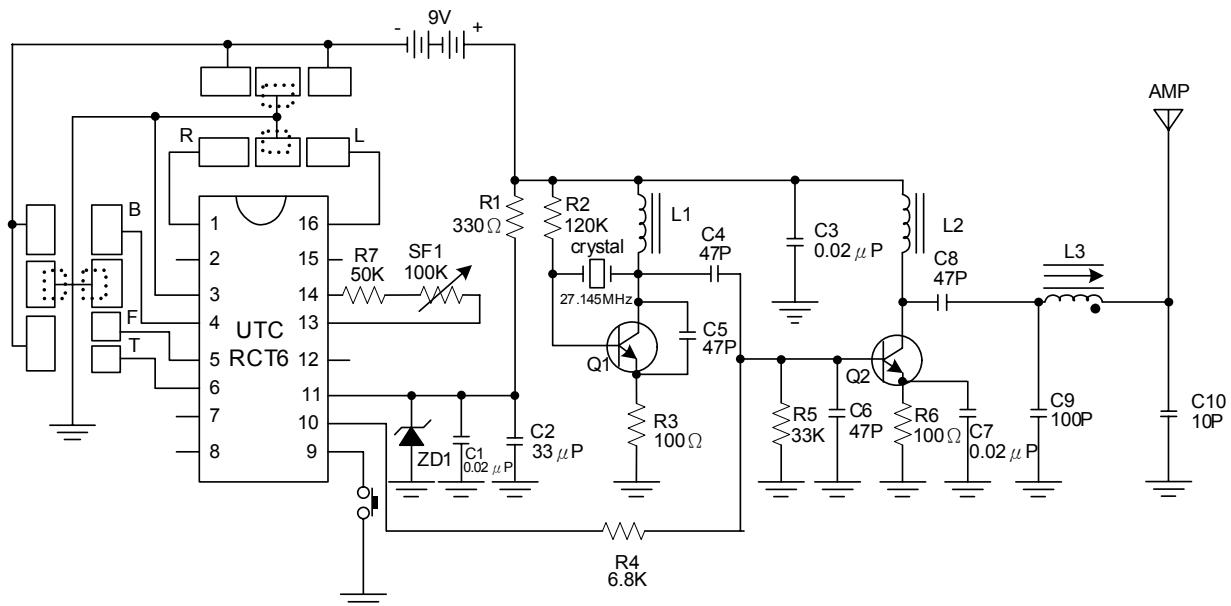
■ **TEST CIRCUIT**

Fosc for UTC RCT6 ≅ 128KHz
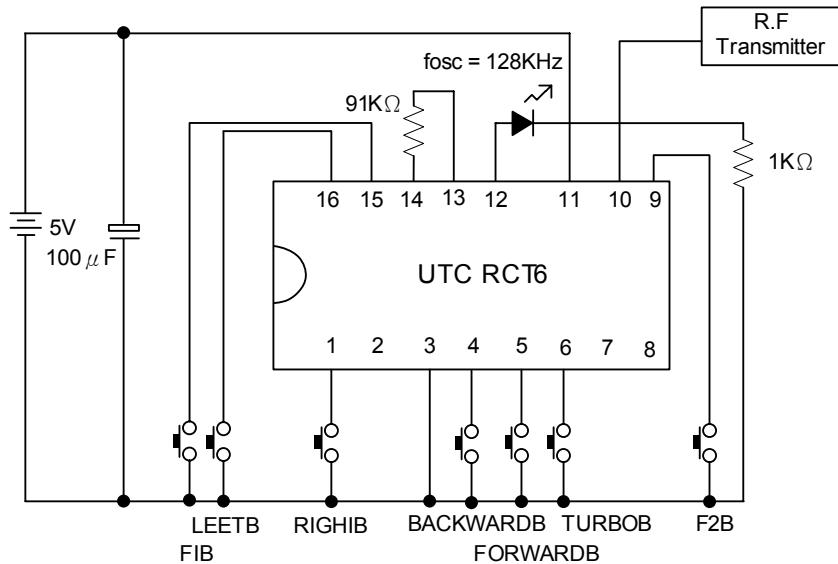
UTC **RCT6** output pin (SO) has an inverted phase with UTC **RCR6C** input (SI). If UTC **RCT6** is connected without using a R_F module, an inverter has to be inserted between this 2 pins.
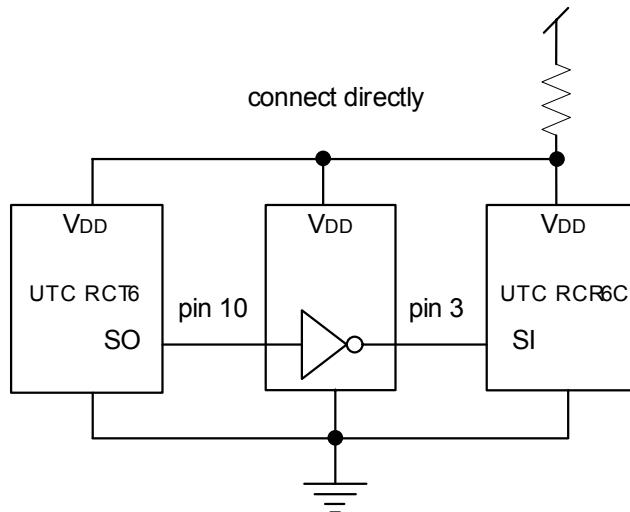
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