



HST501/HSR502

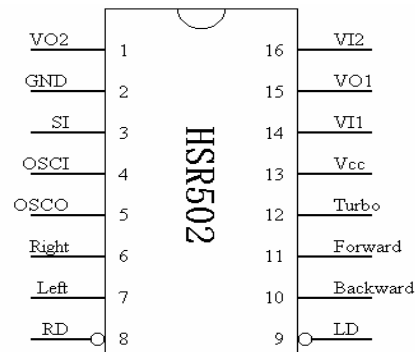
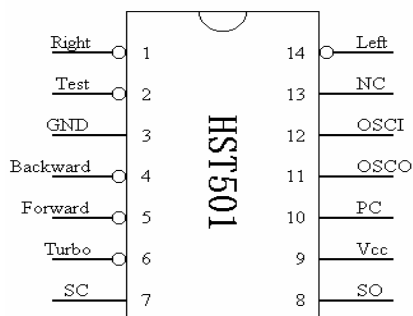
General Description

HST501 and HSR502 are a chip pair of the Remote Control Transmitter and Receiver, processed with CMOS technology. The HST501/HSR502 has five independent control functions: i.e. Forward, Backward, Left, Right, Turbo, and their combinations.

Features

1. Wide operating power-supply voltage : 2.0V-5.0V
2. Low stand-by current, button-press wake-up (501)
3. External power controllable (501)
4. Infrared & wireless code outputs (501)
5. On-chip oscillator with an external resistor
6. Three-stage amplifier and fault-tolerant checking (502)
7. Low operating current
8. Few external components needed

Pin Configuration



Pin Description

HST501

Pin No.	Pin Name	Description	I/O
1	Right	Rightward function selected if connected to GND, with Pull-up resistor	I
2	Test	For testing mode, with Pull-up resistor.	I
3	GND	Negative power supply	
4	Backward	Backward function selected if connected to GND, with Pull-up resistor	I
5	Forward	Forward function selected if connected to GND, with Pull-up resistor	I
6	Turbo	Turbo function selected if connected to GND, with Pull-up resistor	I
7	SC	Output with carrier frequency, for infrared remote	O



		control	
8	SO	Output without carrier frequency, for wireless remote control	O
9	Vcc	Positive power supply	
10	PC	Power control output pin	O
11	OSCO	Oscillator output pin	O
12	OSCI	Oscillator input pin	I
13	NC	Disconnected or connected to power supply	
14	Left	Leftward function selected if connected to GND, with Pull-up resistor	I

HSR502

Pin No.	Pin Name	Description	I/O
1	VO2	Amplifier 2 output pin	O
2	GND	Negative power supply	
3	SI	Input pin for the encoding signal	I
4	OSCI	Oscillator input pin	I
5	OSCO	Oscillator output pin	O
6	Right	Rightward output pin	O
7	Left	Leftward output pin	O
8	RD	Rightward function disabled if connected to GND, with Pull-up resistor	I
9	LD	Leftward function disabled if connected to GND, with Pull-up resistor	I
10	Backward	Backward output pin	O
11	Forward	Forward output pin	O
12	Turbo	Turbo output pin	O
13	Vcc	Positive power supply	
14	VI1	Amplifier 1 input pin	I
15	VO1	Amplifier 1 output pin	O
16	VI2	Amplifier 2 input pin	I

Maximum Ratings

Description	Parameters	Range	Units
Operating Voltage	Vdd	-0.5~6.0	V
Input/Output Voltage	Vin, Vout	Vss-0.5~Vdd+0.5	V
Power Dissipation	Pd	500	mW
Operating Temperature	Tamb	-10~+40	°C
Storage Temperature	Tstg	-25~+85	°C



DC Electrical Characteristics

HST501

Parameter	Description		Test Condition	Min.	Type	Max.	Unit
Vcc	Operating Voltage			2.5	4.0	5.0	V
Icc	Supply Current		Output unloaded			100	uA
Istb	Stand-by Current		OFF state			5	uA
Vil	Input Low Voltage		Logic LOW level			0.8	V
Vih	Input High Voltage		Logic HIGH level	3.0			V
Iil	Input Low Current Pin1,4,5,6,14		Vil=0,ON state			-60	uA
Iih	Input High Current Pin1,4,5,6,14		Vih=4V, ON state			10	uA
Ii	Input Current Pin12		Vih=0~4V, ON state			± 10	uA
Iol	Output Low Current		Vout=0.5V	150			uA
Ioh	Output High Current	Pin7,8,10	Vout=3.5V	-1.0			mA
		Pin11		500			uA

HSR502

Parameter	Description		Test Condition	Min.	Type	Max.	Unit
Vcc	Operating Voltage			2.5	4.0	5.0	V
Icc	Supply Current		Output unloaded			1	mA
Istb	Stand-by Current		OFF state			10	uA
Vil	Input Low Voltage		Logic LOW level			0.8	V
Vih	Input High Voltage		Logic HIGH level	3.0			V
Iil	Input Low Current	Pin3,8,9	Vil=0V, ON state			-60	uA
Iih	Input High Current	Pin3	Vih=4V, ON state			60	uA
		Pin8,9				10	uA
Ii	Input Current	Pin14,16	Vih=0~4V, ON state			± 10	uA
Iol	Output Low Current	Pin1,15	Vout=0.5V	200			uA
		Pin5		500			uA
		Pin6,7,10,11,12		1			mA
Ioh	Output Low Current	Pin1,15	Vout=3.5V	-200			uA
		Pin5		-500			uA
		Pin6,7,10,11,12	Vout=2.5V	-600			uA



AC Electrical Characteristics

HST501

Parameter	Description	Test Condition	Min.	Type	Max.	Unit
Fosc	Oscillator Frequency	T=25℃, R=200K	102	128	154	KHz
Fmax-Fmin	Oscillator Frequency Fluctuation	T=25℃, Vcc=2.5~5V			15	KHz
Tfun	Cycle Time of Function Code	Fosc=102~154KHz	0.8	1	1.2	ms
Tsta	Cycle Time of Start Code		1.6	2	2.4	ms
Fcsc	Carrier Frequency		51	64	77	KHz

HSR502

Parameter	Description	Test Condition	Min.	Type	Max.	Unit
Fosc	Oscillator Frequency	T=25℃, R=200K	102	128	154	KHz
Fmax-Fmin	Oscillator Frequency Fluctuation	T=25℃, Vcc=2.5~5V			15	KHz
Vsi	Input Voltage Peak Value	Effective Decoding	300			mV
Tfun	Cycle Time of Function Code	Fosc=128KHz	0.75	1	1.25	ms
Tsta	Cycle Time of Start Code		1.5	2	2.5	ms

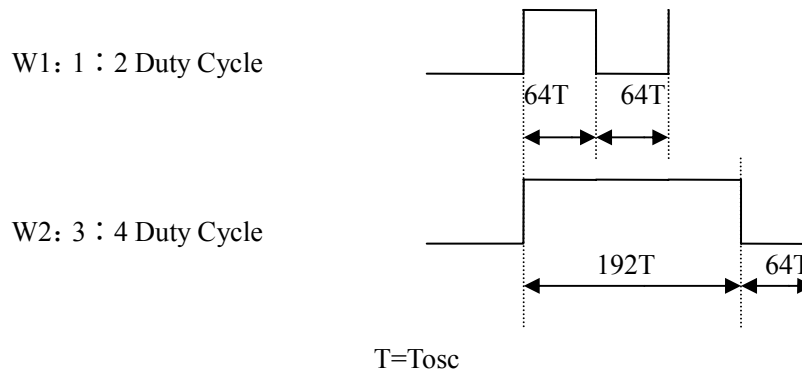
Note: Operating Condition: 0℃~70℃, Vcc=4V;

The relative error between the frequencies of the two on-chip oscillators in HST501 和 HSR502 must be less than $\pm 25\%$.

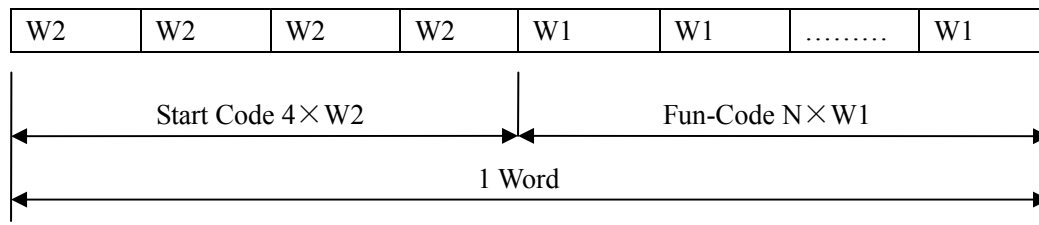


Code Format

(A) Bit Format



(B) Word Format



(C) Frame Format

word1	word2	word3		End Code
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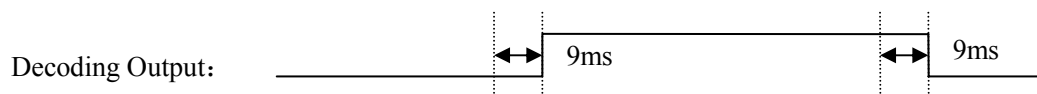
Function Button	Number of Function Codes (N)	Decoding Result
	4	end code
forward	10	forward
forward+turbo	16	forward
turbo	22	turbo
forward+turbo+left	28	forward+left
forward+turbo+right	34	forward+right
backward	40	backward
backward+right	46	backward+right
backward+left	52	backward+left
left	58	left
right	64	right

Decoding

Encoding Output:	any function word1	...	any function wordx	End Code
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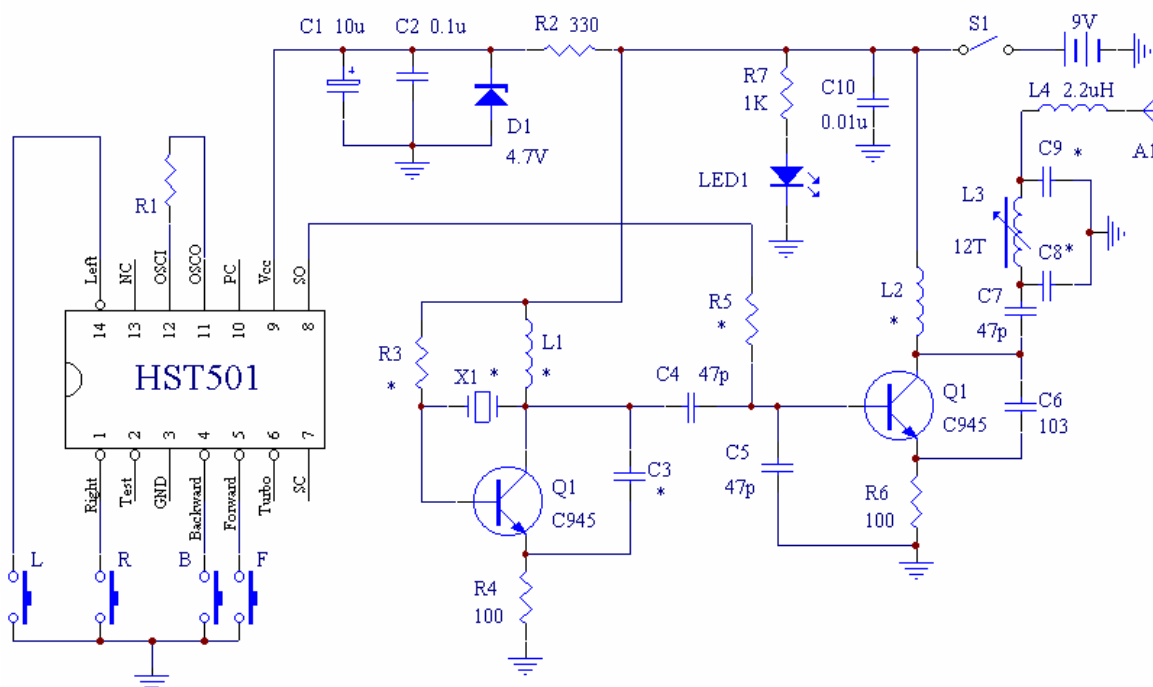
Timing



Application Circuits

HST501

Frequency	C3 *	C8 *	C9 *	R3 *	R5 *	L1 *	L2 *	X1 *
27MHz	47p	180p	47p	120K	15K	2.2uH	2.2uH	27.145MHz
49MHz	22p	100p	30p	68K	22K	1uH	1uH	49.860MHz





HSR502

Frequency	C1 *	C2 *	C3 *	C4 *	Q1 *	R1 *	R2 *	L1 *	L2 *
27MHz	10p	47p	47p	3300p	C1815-Y	150K	680	7T	8.2uH
49MHz	5p	25p	10p	2200p	C380-O	180K	820	5T	3.3uH

