

**Discontinued Product**

MSL9362RS

(4 CHANNELS PROPORTIONAL R/C TRANSMITTER)

MSL9363RS

(4 CHANNELS PROPORTIONAL R/C RECEIVER)

M S L 9 3 6 2 R S

(4 channels proportional R/C transmitter)

MSL 9362 RS is the IC for digital proportional radio control system's transmitter and generates max. 4 channels proportional signal.

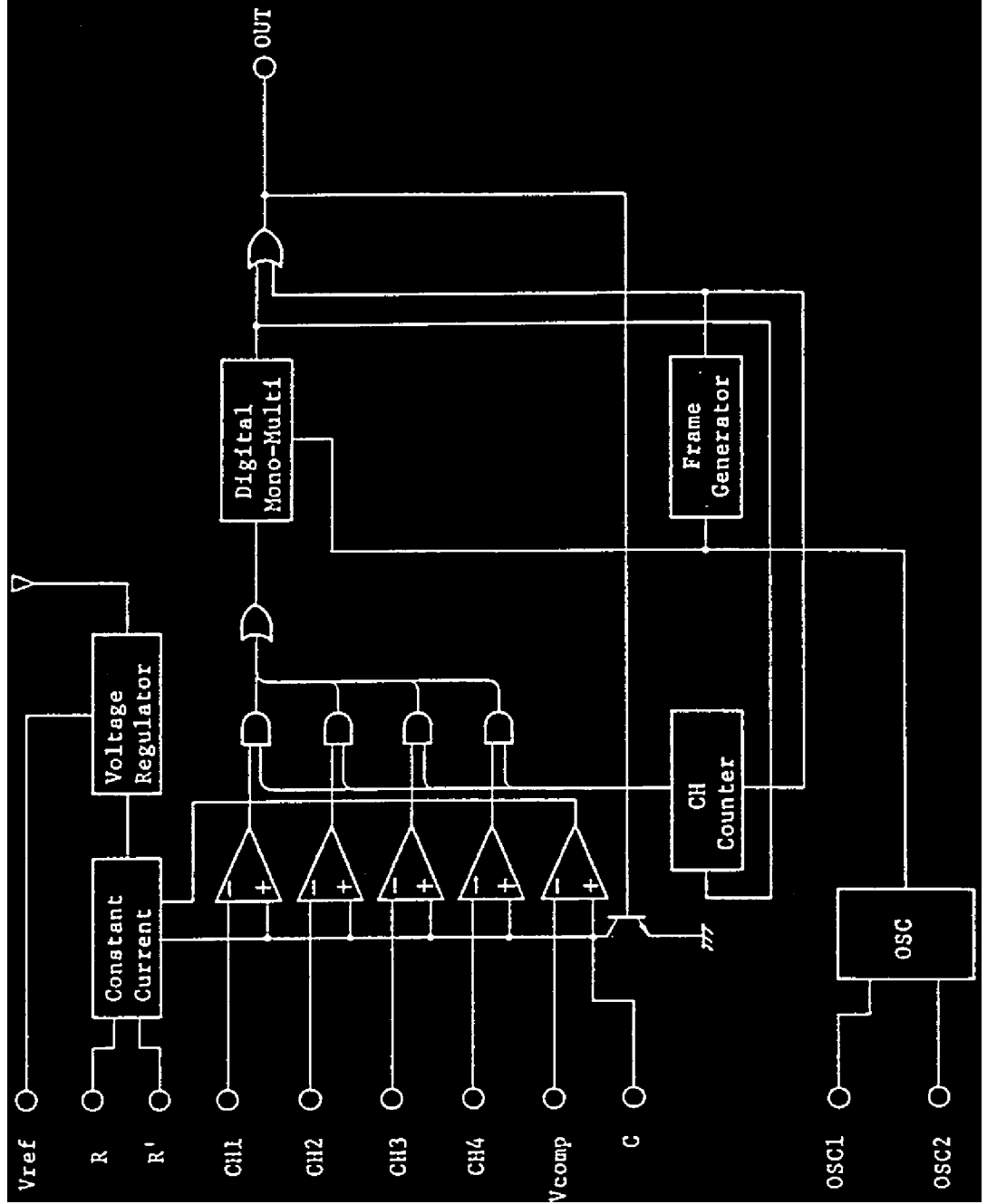
MSL 9362 RS includes voltage regulator and oscillator and gets stable output signal for voltage fluctuation, because these standard levels generate each signals.

In case of use of MSL 9363 RS for the receiver IC, CH3 and CH4 can be used as ON/OFF signals.

Features:

- . I<sup>2</sup>L structure
- . MAX. 4 channels digital proportional signal. (or 2 CH proportional + 2 CH ON/OFF signal.)
- . Easy adjustment.
- . Stable for voltage fluctuations.

Block Diagram



## PIN CONFIGURATIONS

## 1. Device

 $I^2L$ 

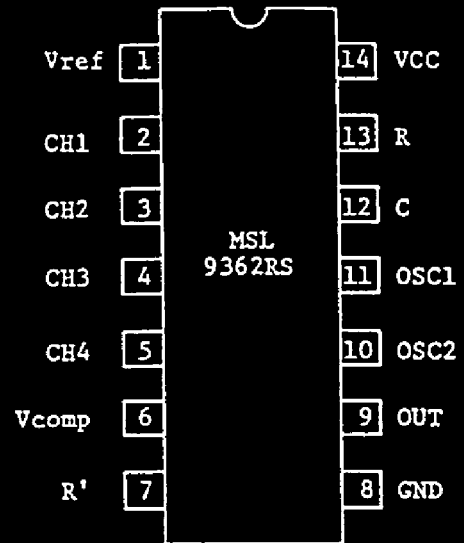
## 2. Package

14 Pins Molded DIP

## 3. Supply Voltage Range

6V ~ 13V

## 4. Operating Temperature Range

 $-15^{\circ}\text{C} \sim +70^{\circ}\text{C}$ 

## Absolute Maximum Ratings

PARAMETER		CONDITIONS	RATINGS	UNIT
Supply Voltage	$V_{CC}$	$T_a = 25^{\circ}\text{C}$	15	V
Input Voltage	$V_{in}$	$T_a = 25^{\circ}\text{C}^{*1}$	10	V
Output Current	$I_{OUT}$	$T_a = 25^{\circ}\text{C}^{*2}$	30	mA
	$I_{ref}$	$T_a = 25^{\circ}\text{C}^{*3}$	-30	mA
Power Dissipation	$P_D$	$T_a = 25^{\circ}\text{C}$	200	mW
Storage Temperature	$T_{stg}$	—	$-55 \sim +150$	$^{\circ}\text{C}$

\*1 : CH1 ~ CH4

\*2 : OUT

\*3 :  $V_{ref}$

Electrical Characteristics (Ta = -10 ~ +60°C, TYP: Ta=25°C)

PARAMETER		CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage	V <sub>IN</sub>	*1	0	—	V <sub>ref</sub>	V
Input Current	I <sub>IL</sub>	V <sub>CC</sub> =13V, V <sub>IN</sub> =0 *1	—	-1	-3	μA
Output Voltage	V <sub>ref</sub>	V <sub>CC</sub> =7~13V, I <sub>ref</sub> =5mA *2	—	3.8	—	V
Output Current	I <sub>ref</sub>	V <sub>CC</sub> =7~13V, V <sub>ref</sub> =3.8V	5	—	—	mA
Logical "0" Output Voltage	V <sub>OL</sub>	V <sub>CC</sub> =7~13V, I <sub>o</sub> =15mA *3	—	0.25	0.4	V
Logical "0" Output Current	I <sub>OL</sub>	V <sub>CC</sub> =7~13V, V <sub>o</sub> =0.4V *3	15	—	—	mA
Output Leakage Current	I <sub>LO</sub>	V <sub>CC</sub> =13V, V <sub>o</sub> =5V	—	—	10	μA
Supply Current	I <sub>CC</sub>	V <sub>CC</sub> =9V, V <sub>ref</sub> =Open	—	6.5	8.5	mA

\*1 : CH1 ~ CH4

\*2 : V<sub>ref</sub>

\*3 : OUT

## Terminal explanation

## \* OSC 1 (11 pin), OSC 2 (10 pin)

Resistor (Ro) and capacitor (Co) connected to OSC 1 and 2 decide oscillator frequency which decides flame and pulse-width.

\*  $V_{ref}$  (1 pin), CH1 ~ CH4 (2 ~ 5 pin)

$V_{ref}$  terminal makes output very stable voltage (-3.8 V) for source voltage, which becomes input data of CH1 ~ CH4 by the voltage dividing of variable resistor or fixed resistor.

## \* C (12 pin), R (13 pin)

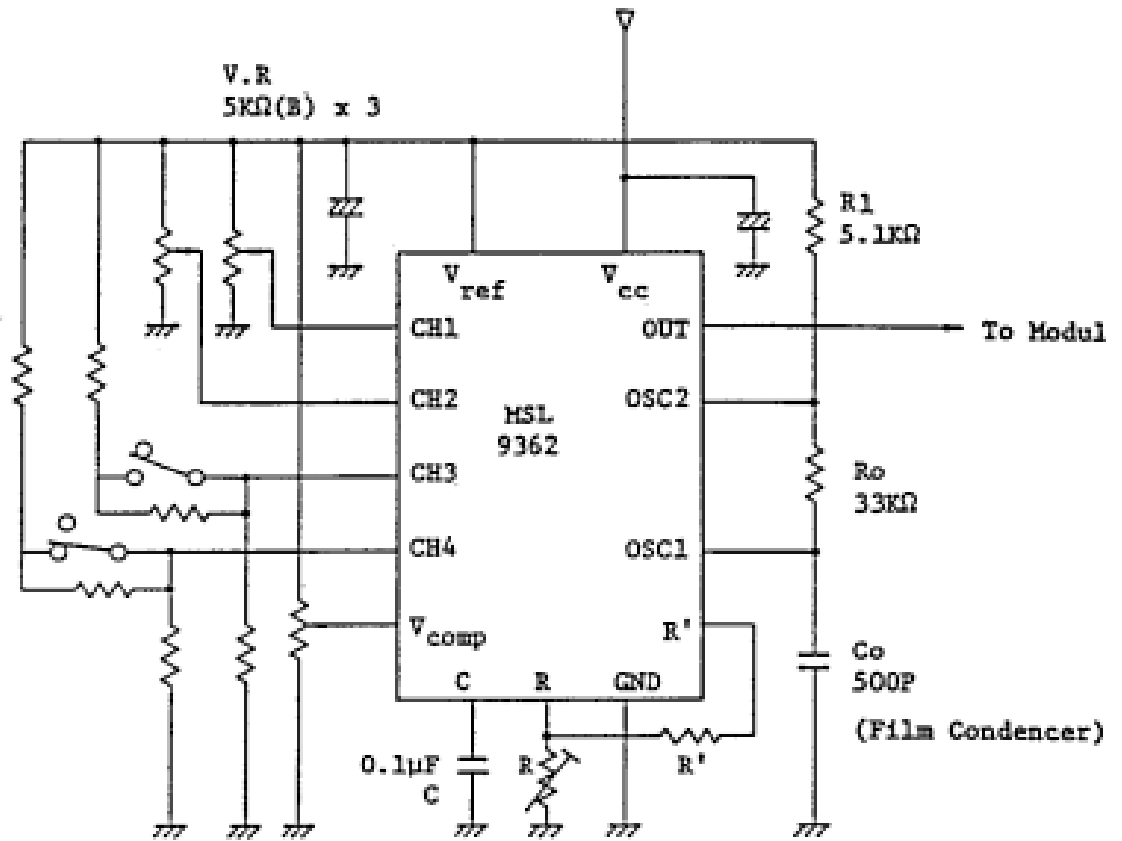
According to adjustment of capacitor (C) and resistor (R) connected to C and R terminals, you can correspond the stick's motion of transmitter to the pulse repeat of output pulse.

\*  $V_{comp}$  (6 pin)

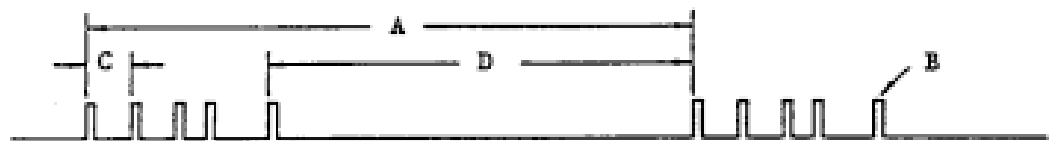
Adjustment of the input voltage to  $V_{comp}$  decides the neutral position of output pulse.

APPLICATION EXAMPLE

2 Channels Proportional + 2 Channels ON/OFF



Output wave form

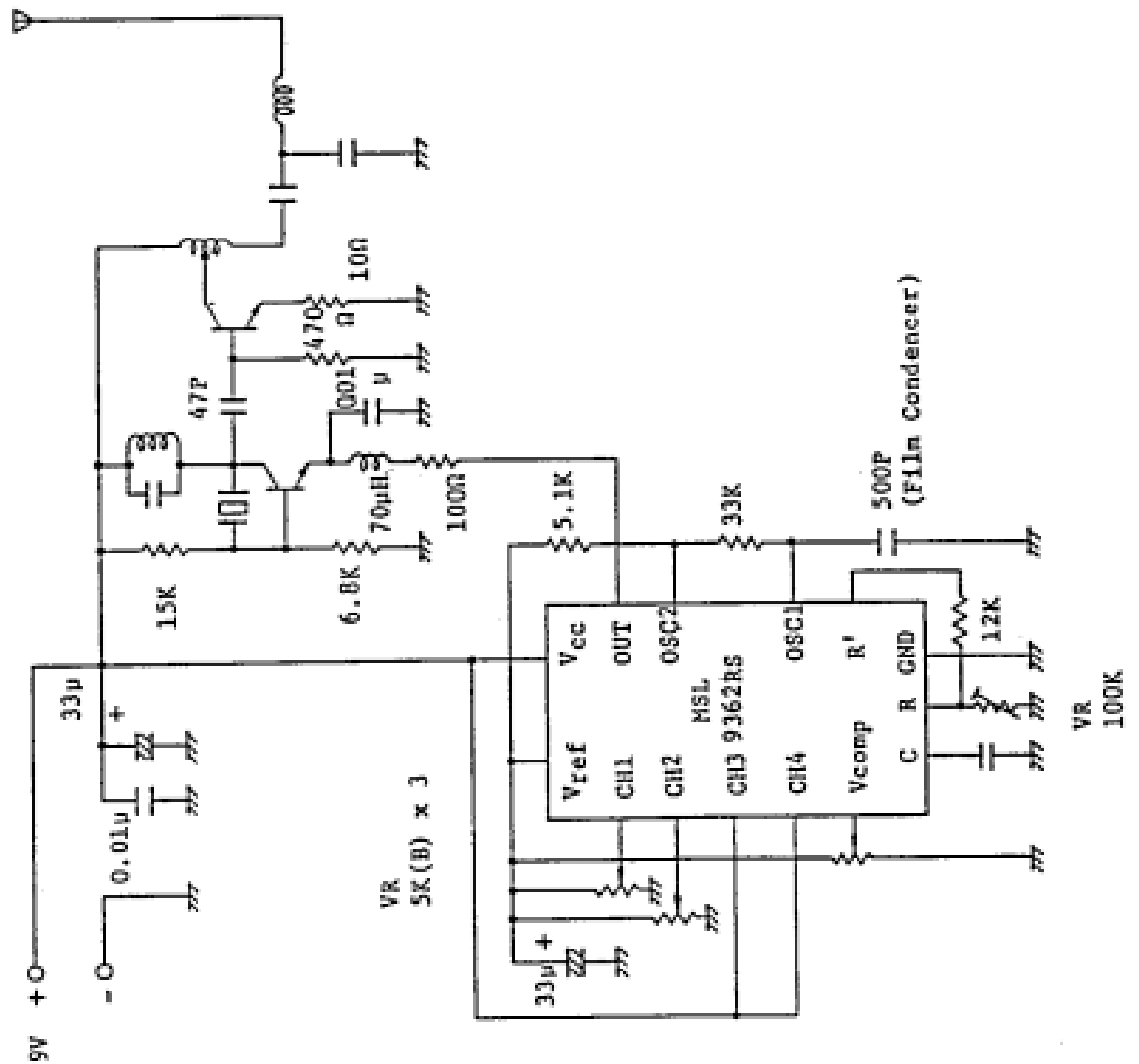


OSC Freq. f(KHz)	Frame A (ms)	Pulse Width B (us)	Pulse Repeat C (ms)	Synchronous period D (ms)
80	16	200	<3	>4
60	20	250	<4	>4
533	24	300	<4	>4

A : B = 80 : 1

APPLICATION EXAMPLE FOR TOY

R/C Transmitter (2 channels Proportional)





MSL 9363 RS

(4 channels proportional R/C receiver)

MSL 9363 RS is the IC for digital proportional radio control system's receiver and generates max. 4 channels proportional outputs.

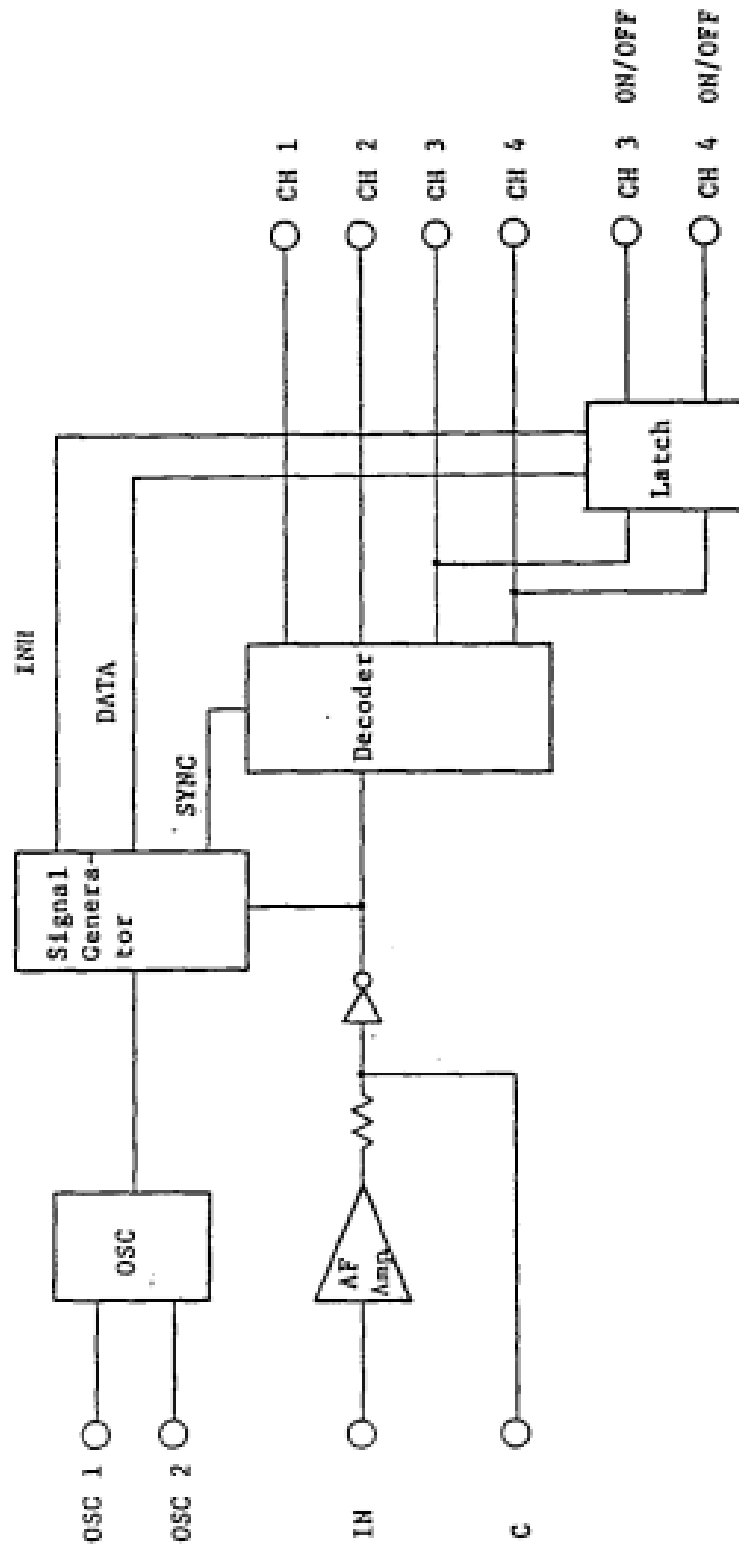
CH3 and CH4 generates ON/OFF outputs as same as proportional outputs.

MSL 9363 RS includes stable oscillator circuit and the clock pulse controls internal signals, so this IC is stable for voltage fluctuation.

Features:

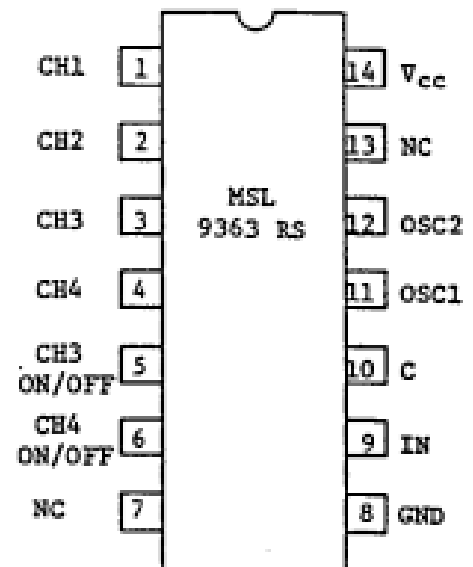
- \* I<sup>2</sup>L structure
- \* Stable for voltage fluctuation
- \* Easy adjustment
- \* MAX. 4 channel proportional outputs and MAX. 2 channel ON/OFF outputs can be get.
- \* Include AF Amp. in input.
- \* Possible to compose low pass filter in input.
- \* Synchronous clock.

BLOCK DIAGRAM



## PIN CONFIGURATION

1. Device  
I<sup>2</sup>L
2. Package  
14 Pins Mold DIP
3. Supply Voltage Range  
4V ~ 8V
4. Operating Temperature Range  
-15°C ~ +70°C



## Absolute Maximum Ratings

PARAMETER		CONDITIONS	RATINGS	UNIT
Supply Voltage	V <sub>CC</sub>	T <sub>a</sub> = 25°C	15	V
Input Voltage	V <sub>IN</sub>	T <sub>a</sub> = 25°C <sup>*1</sup>	-7 ~ +10	V
Output Current	I <sub>O</sub>	T <sub>a</sub> = 25°C <sup>*2</sup>	-30 ~ +30	mA
Power Dissipation	P <sub>D</sub>	T <sub>a</sub> = 25°C	200	mW
Storage Temperature	T <sub>stg</sub>	—	-55 ~ +150	°C

\*1 : IN

\*2 : CH1 ~ CH4

## Electrical Characteristics (Ta=-10~+60°C, TYP: Ta=25°C)

PARAMETER		CONDITIONS	MIN	TYP	MAX	UNIT
Logical "1" Input Voltage	$V_{IH}$	$V_{CC} = 4V$	1.5	—	—	V
Logical "0" Input Voltage	$V_{IL}$	$V_{CC} = 4V$	—	—	0.5	V
Logical "1" Input Current	$I_{IH}$	$V_{CC}=7V, V_{IH}=7V$	0.1	—	1.0	mA
Logical "0" Input Current	$I_{IL}$	$V_{CC}=7V, V_{IL}=1V$	—	—	-5.0	$\mu A$
Logical "1" Output Voltage	$V_{OH}$	$V_{CC}=4V, I_{OH}=-5mA$	1.5	—	—	V
Logical "0" Output Voltage	$V_{OL}$	$V_{CC}=4V, I_{OL}=5mA$	—	0.25	0.4	V
Logical "1" Output Current	$I_{OH}$	$V_{CC} = 4V$	-8	—	-30	mA
Output Leakage Current	$I_{LO}$	$V_{CC}=7V, V_O=5V$	—	—	10	$\mu A$
Supply Current	$I_{CC}$	$V_{CC} = 6V$	—	16	21	mA

## Terminal explanation

- \* CH1 ~ CH4 (1 pin ~ 4 pin)

Output terminal of proportional signals.

- \* CH3 ON/OFF (5 pin), CH4 ON/OFF (6 pin)

Output terminals of ON/OFF signals.

Remarks: CH3 and CH4 make output proportional signals from 3 pin and 4 pin and make ON/OFF signals from 5 pin and 6 pin at the same time.

- \* OSC 1 (11 pin), OSC 2 (12 pin)

Resistor ( $R_0$ ) and capacitor ( $C_0$ ) connected to OSC 1 and OSC 2 decide the frequency of internal oscillator.

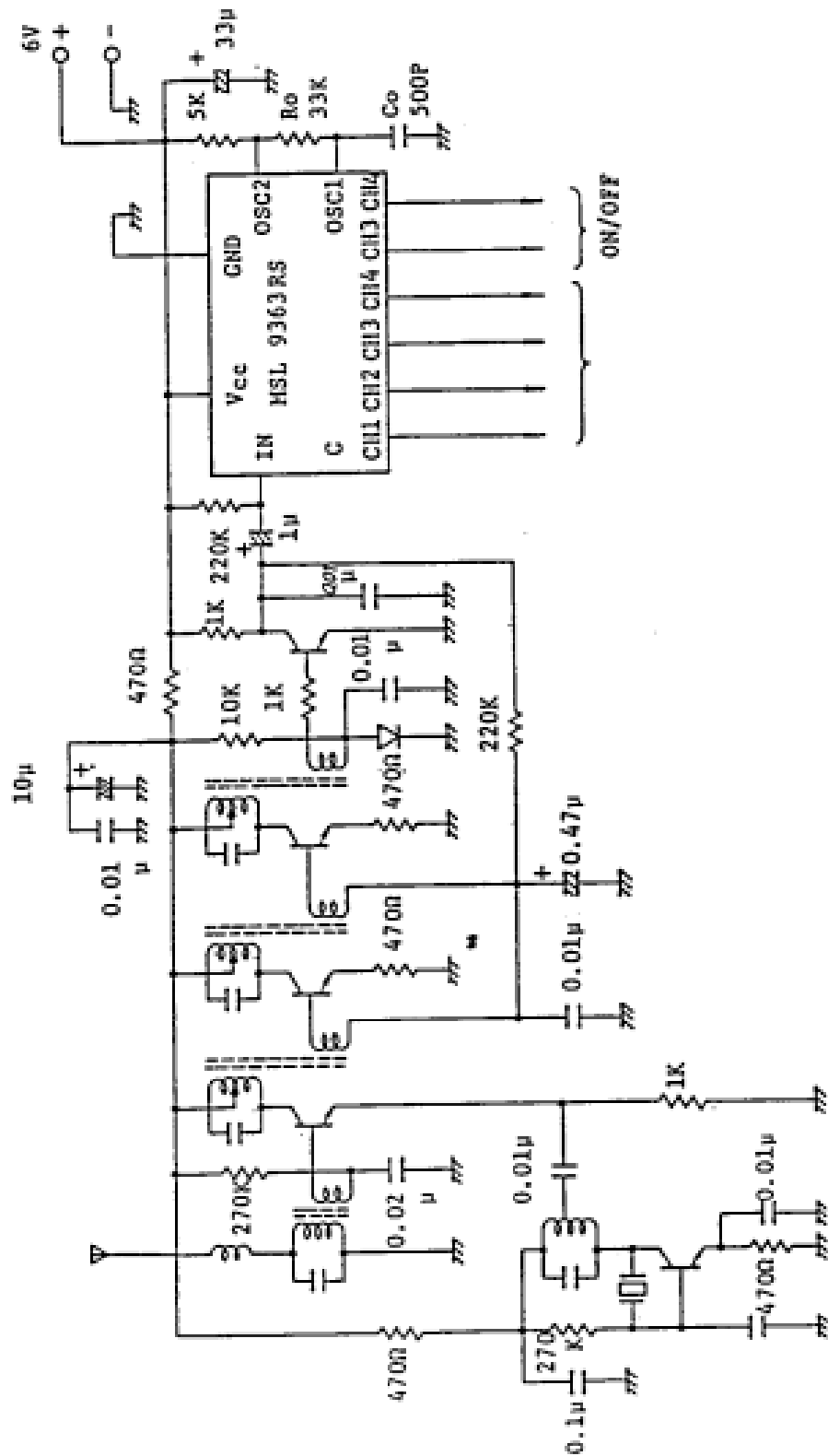
When you use MSL 9362 RS in the transmitter, resistor ( $R_0$ ) and capacitor ( $C_0$ ) are used as same value as MSL 9362 RS oscillator circuit, for the purpose of synchronizing with the transmitter.

- \* C (10 pin)

When capacitor is connected between this terminal and GND, low-pass filter can be formed with the included resistor.

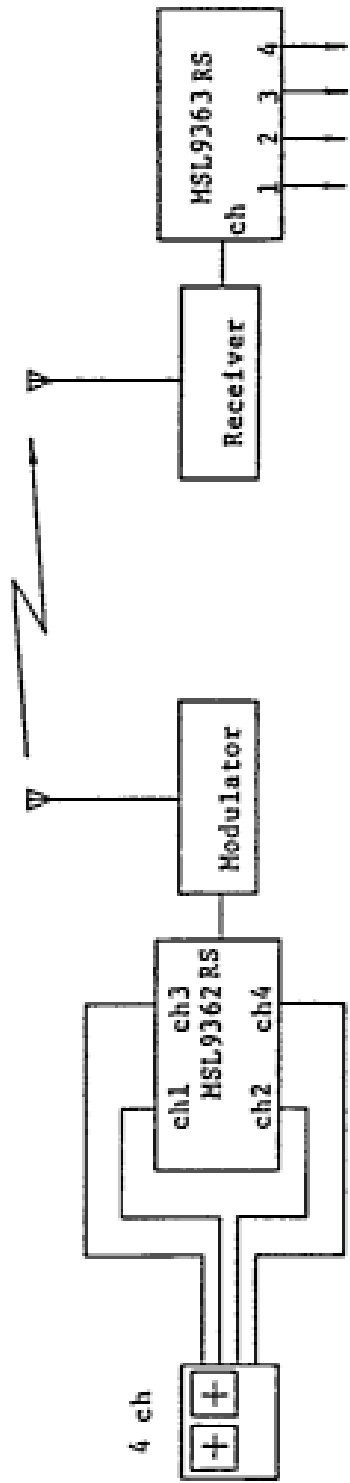
TYPICAL APPLICATION

R/C Receiver



MSL 9362RS, MSL 9363RS  
R/C SYSTEM BLOCK DIAGRAMS

4 Channels Proportional



2 Channels Proportional x 2

