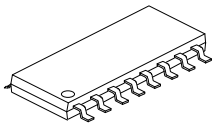
PIR INFRARED REMOTE CONTROL CIRCUIT



SOP-16

■ DESCRIPTION

The M3000 is a passive infra-red controller using analog mixing digital design technique and is manufactured by CMOS process.

The M3000 needs only few external components in application circuit. It can be applied in controller of light, electric switching, burglar alarm, and so on.

■ FEATURES

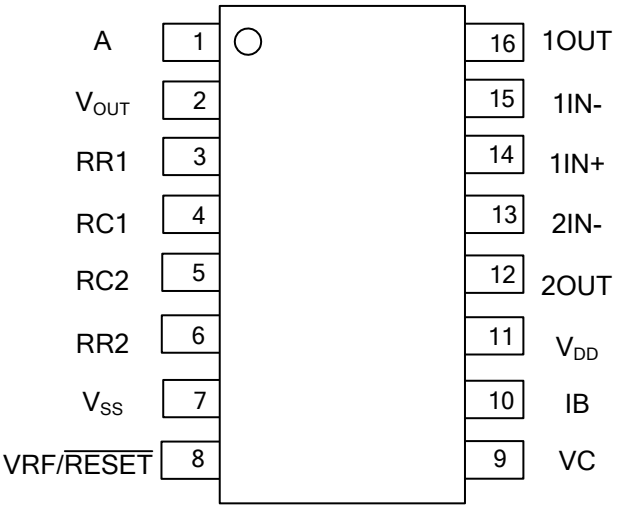
* Low Power CMOS Technology
* CMOS High Input Impedance Operational Amplifiers
* Bi-Directional Level Detector / Excellent noise Immunity
* Built-in Power up Disable & Output Pulse Control Logic
* Dual Mode : Retriggerable & Non-Retriggerable

■ ORDERING INFORMATION

Ordering Number	Package	Packing
M3000G-S16-R	SOP-16	Tape Reel

M3000G-S16-R (1) Packing Type (2) Package Type (3) Halogen Free	(1) R: Tape Reel (2) S16: SOP-16 (3) G: Halogen Free

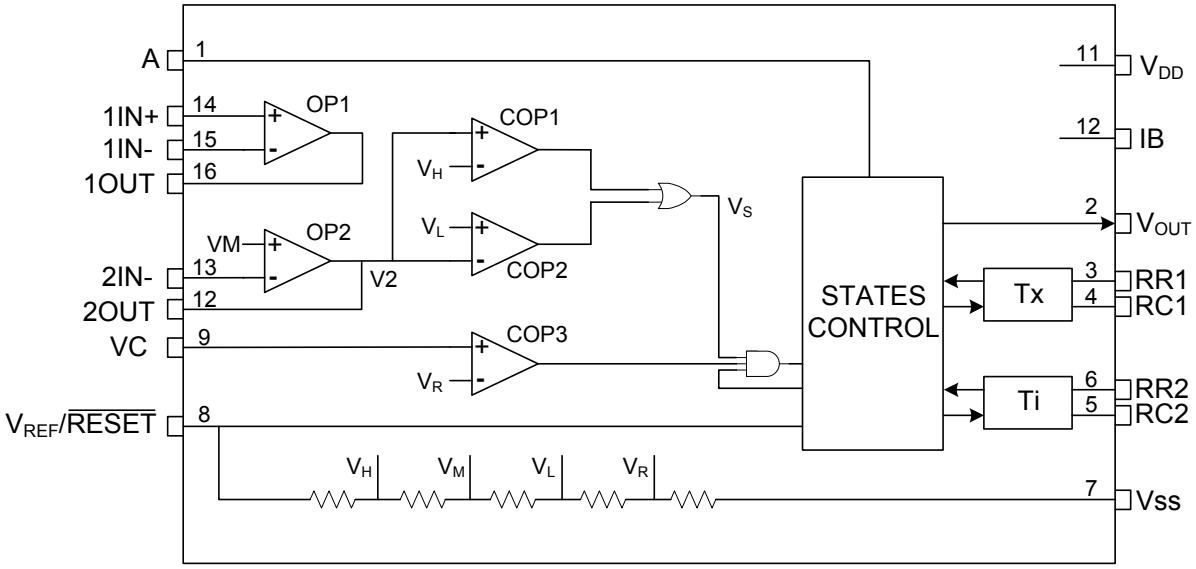
■ PIN CONFIGURATIONS



■ PIN DESCRIPTIONS

PIN NO.	PIN NAME	I/O	PIN DESCRIPTION
1	A	I	Retriggerable & non-retriggerable mode select
2	V_{OUT}	O	Detector output pin (active high)
3	RR1		Output pulse width control (Tx)
4	RC1		Output pulse width control (Tx)
5	RC2		Trigger inhibit control (Ti)
6	RR2		Trigger inhibit control (Ti)
7	V_{SS}		Ground
8	VRF	I	RESET & voltage reference input (normally high. Low=reset)
9	VC	I	Trigger disable input (VC>0.2Vdd=enable; VC<0.2Vdd=disable)
10	IB		Op-amp input bias current setting
11	V_{DD}		Supply voltage
12	2OUT	O	2^{nd} stage Op-amp output
13	2IN-	I	2^{nd} stage Op-amp inverting input
14	1IN+	I	1^{st} stage Op-amp non-inverting input
15	1IN-	I	1^{st} stage Op-amp inverting input
16	1OUT	O	1^{st} stage Op-amp output

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

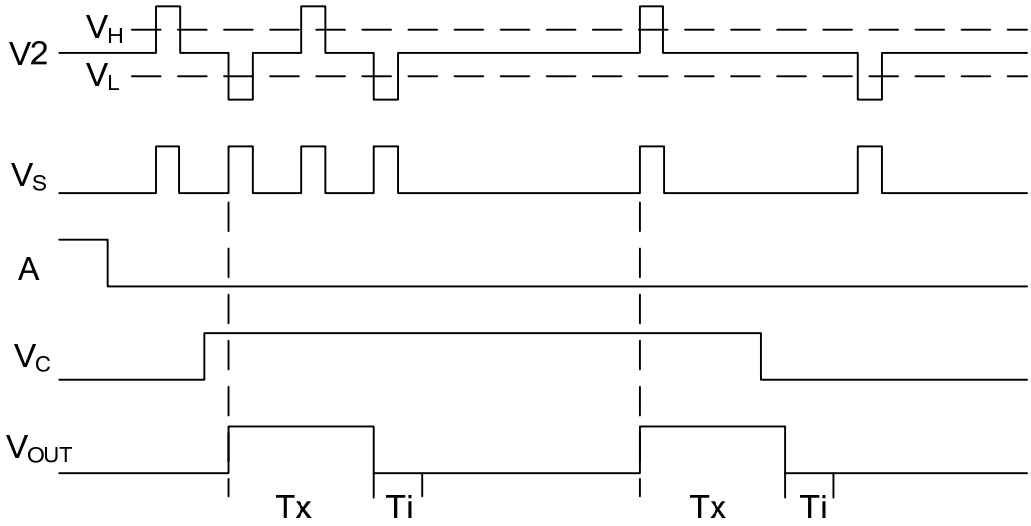
PARAMETER	SYMBOL	RATINGS	UNIT
DC Supply Voltage	V_{DD}	-0.3~6.0	V
Input/ Output Voltage	V_{IN} /V_{OUT}	V_{SS}-0.3~V_{DD}+0.3	V
Max. Output Current (V_{DD}=5.0V)	I_{OUT}	10	mA
Operating Temperature	T_{OPR}	-20~+70	°C
Storage Temperature	T_{STG}	-40~+125	°C

■ DC ELECTRICAL CHARACTERISTICS (T_A =+25°C,unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
DC Supply Voltage	V_{DD}			3		5	V
Average Supply Current	I_{DD}	No Load	V_{DD}=3V			50	μA
			V_{DD}=5V			100	
Op-Amp Input Offset Voltage	V_{OS}	V_{DD}=5V				50	mV
Op-Amp Input Offset Current	I_{OS}	V_{DD}=5V				50	nA
Op-Amp Gain	A_{VO}	V_{DD}=5V, R_L=1.5MΩ		60			dB
Op-Amp Common Mode Rejection Ration	CMRR	V_{DD}=5V, R_L=1.5MΩ		60			dB
Op-Amp HIGH Level Output Voltage	V_{YH}	V_{DD}=5V, R_L=500KΩ connect to 1/2V_{DD}		4.25			V
Op-Amp LOW Level Output Voltage	V_{YL}					0.75	V
V_C High Level Input Voltage	V_{RH}	V_{RF}=V_{DD}=5V		1.1			V
V_C Low Level Input Voltage	V_{RL}					0.9	V
V_{OUT} High Level Output Voltage	V_{OH}	V_{DD}=5V, I_{OH}=0.5mA		4			V
V_{OUT} Low Level Output Voltage	V_{OL}	V_{DD}=5V, I_{OH}=0.1mA				0.4	V
Pin A High Level Input Voltage	V_{AH}	V_{DD}=5V		3.5			V
Pin A Low Level Input Voltage	V_{AL}	V_{DD}=5V				1.5	V

■ FUNCTIONAL DESCRIPTIONS

1. Re-Triggerable Mode



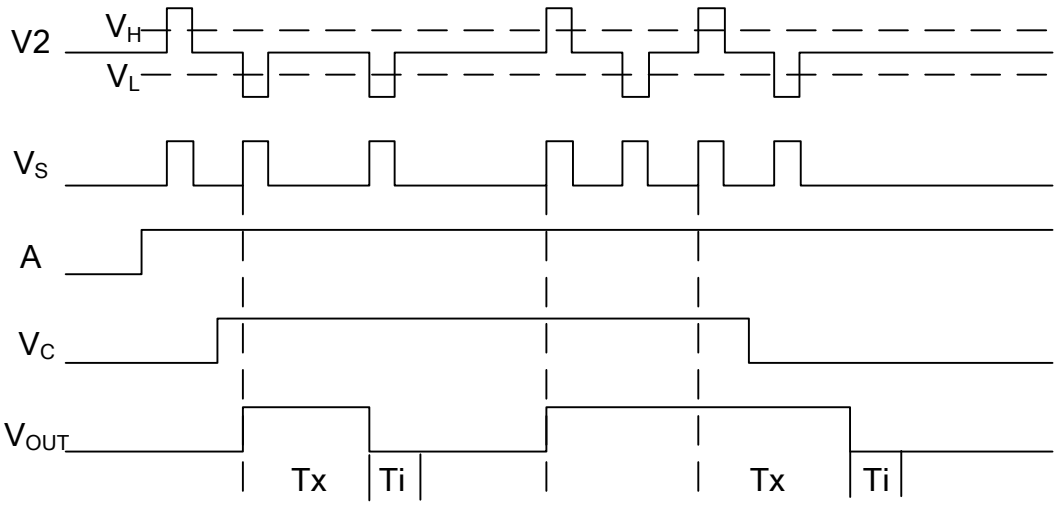
Re-Triggerable Waveform

Operational amplifier OP1 composed sensor signal pre-processing circuit. The amplified signal coupled to the operational amplifier OP2, and elevated DC level to VM (≈0.5VDD), The output signal V2 input to Bi-directional level detector(COP1&COP2), detected the effective signal Vs. As the VH≈0.7VDD, VL≈0.3VDD, while VDD=5V, it is immune to the ±1V noise interference and can improve system reliability.

COP3 is a condition comparator. When the input voltage Vc<VR(≈0.2VDD), COP3 output is low, it disabled the Vs transmission to State Control circuit; When Vc>VR, COP3 output is high, chip access to extension time period.

When pin A connect to "0", any change of V2 have been ignored until the end of Tx period, which called non-retriggerable mode. When the Tx period ended, Vo jump back to the low level, chip access to the lock period Ti. During the Ti period, any changes of V2 can not make Vo jumping to valid state (high level), it can inhibit a variety of interference when the load changed.

2. Non-Retriggerable mode

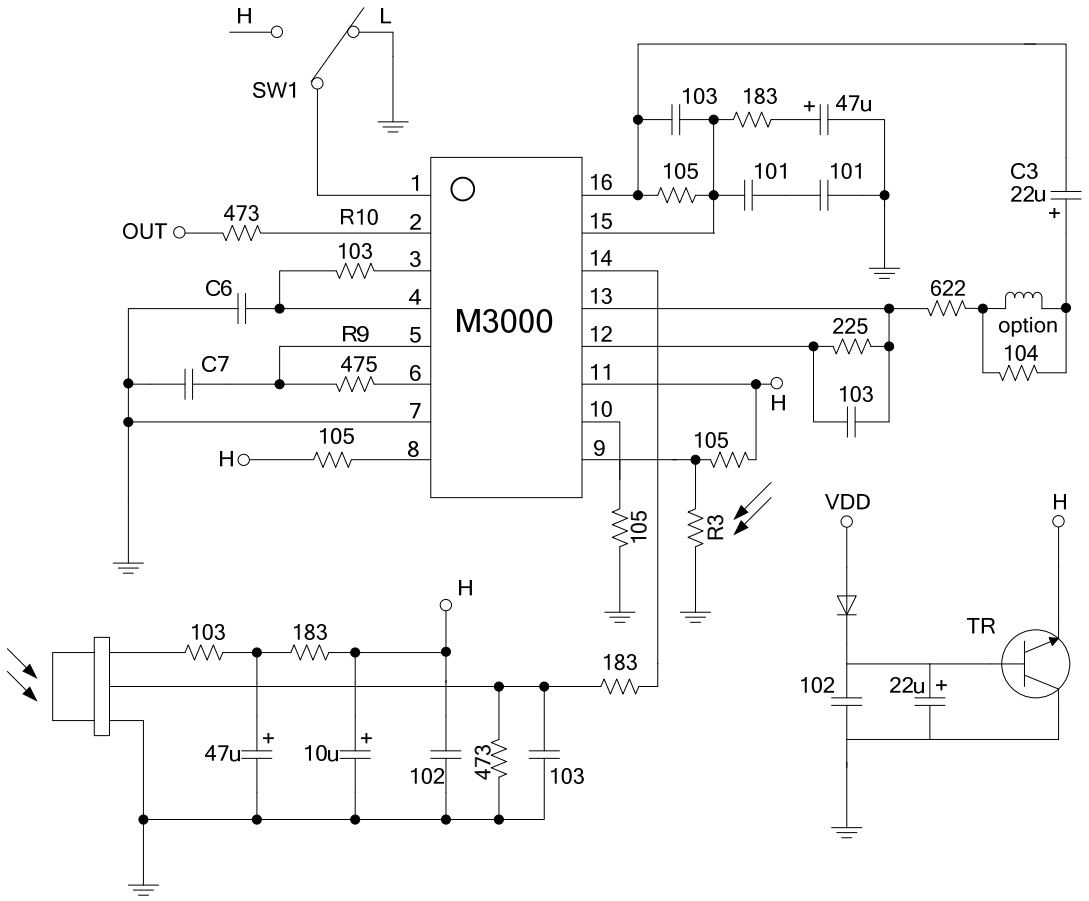


Non-Retriggerable Waveform

During the time of Vc="0", A="0"， signal Vs can not trigger Vo to a valid state; When Vc="1", A="1", Vs can repeatable trigger Vo to the valid state, and keep the state in Tx period.

In the Tx period, if Vs jump to "1", then Vo extend to an another Tx; if Vs keep "1" state, Vo maintains the valid state; if Vs keep "0 "state, after the period of Tx, Vo change to invalid state, and in the Ti time, any change of Vs can not trigger Vo to a valid state.

■ TYPICAL APPLICATIONS CIRCUIT



NOTE: R3 is a light dependent resistor which has low resistance under strong ambient light. This cause the detector to be operational only when the detection area is sufficient dark.