

SHENZHEN HAIWANG SENEORS CONTROLS CO.,LTD

TEL: 0755-82867860 81170202 FAX: 0755-83867870

M7612

PIR CONTROLLER

GENERAL DESCRIPTION

The M7612 is a PIR (passive infra-red) controller , using analog mixing digital design technique and manufactures by CMOS Process which can either drive TRIAC or RELAY depending on user' s choice. With special noise immunity technique , M7612 is the most stable PIR controller you can find on the market. More than this , there are few components needed in its application circuit which can reduce material cost and increase competitive.

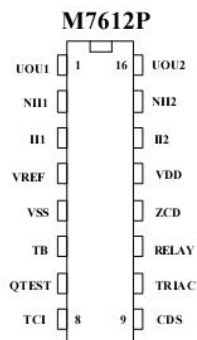
FEATURES

- High noise immunity.
- Drive either RELAY or TRIAC.
- Adjustable light on duration.
- TRIAC can be either shunt or serial connected.
- PIR input.
- CDS input.
- Auto change on / auto mode by bonding option.
- 16 pin DIP or SOP package.

APPLICATIONS

PIR light controller, Motion Detector, Alarm system, Auto-door bell.

PIN ASSIGNMENT



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PIN DESCRIPTION

| Pin No | Pin Name | Description |
|--------|----------|---|
| 1 | UOU1 | First stage OP amp output. |
| 2 | NII1 | First stage OP amp positive input. |
| 3 | II1 | First stage OP amp negative input. |
| 4 | VREF | Stable reference voltage. |
| 5 | VSS | System ground. |
| 6 | TB | Time base for: The delay time of receiving PIR signal to sent a pulse to trigger TRIAC or a high signal to trigger relay. The delay time = $R * C * 32$. The PIR signal patented and accepted only if the signal cycle greater than $R * C * 768$. When state of RELAY or TRIAC is changing form active into inactive mode. It takes more than $R * C * 4069$, then system is able to receive PIR signal again. $10K < R < 1M$ Ohm $100p F < C < 0.1uf$ (Reference Diagram 1) |
| 7 | QTEST | For testing only. |
| | | To set up the timing of how long TRIAC or RELAY is active. During the period , if the system receives the PIR signal , then it restarts counting the timing again. The flash cycle show the beginning of auto mode. |
| 8 | TCI | Note:width of TRIAC pulse = $R * C * 2$ Flash cycle: $R * C * 32768$ The range for R: $4.7K < R < 1M$ Ohm C: $100pF < C < 0.1uF$ (Reference Diagram 2) |
| 9 | CDS | Connected to a CDS for inhibiting RELAY or TRIAC being triggered. If TRIAC or RELAY has already being triggered by PIR signal and turned into active mode , then CDS can not inhibit PIR again. |
| 10 | TRAIC | To trigger TRIAC , active low. Sink current : 15 mA max. |
| 11 | RELAY | To drive relay , active hign. Sink current:10 mA max. Source current:10 mA max. |
| 12 | ZCD | Detect zero cross of AC line under remote mode function. |
| 13 | VDD | Operation voltage:5V , stand by current : 0.5 mA |
| 14 | II2 | 2 nd stage OP amp negative input. |
| 15 | NII2 | 2 nd stage OP amp positive input. |
| 16 | UOU2 | 2 nd stage OP amp output. |

PIR CONTROLLER

DIAGRAM 1

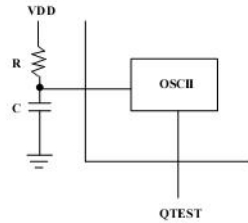
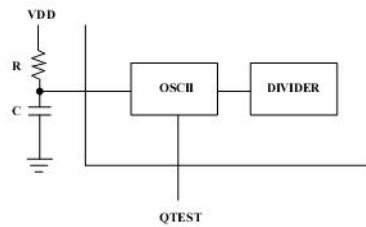
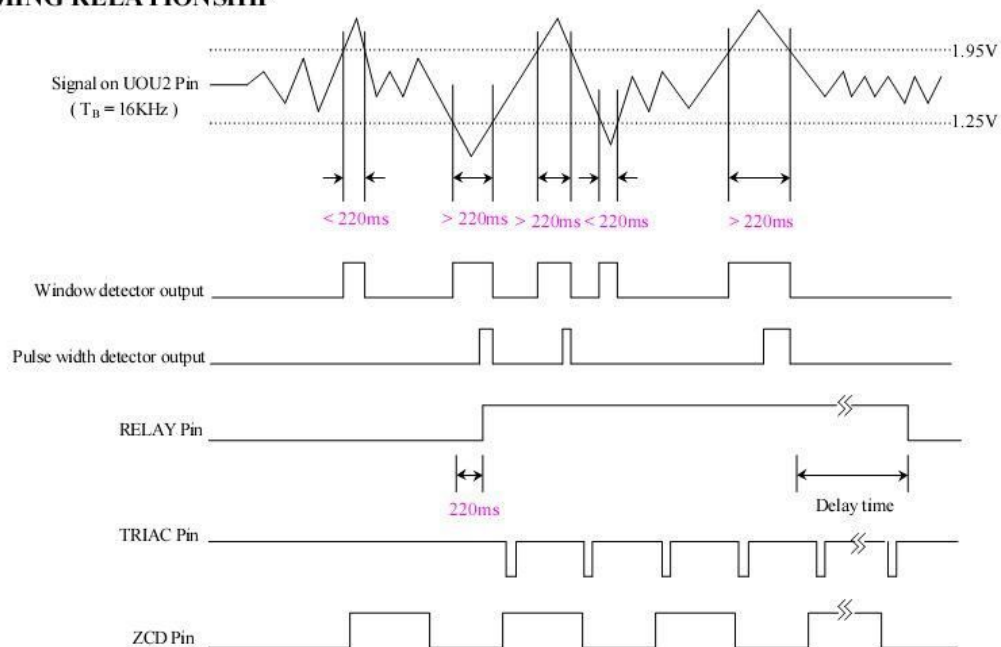


DIAGRAM 2

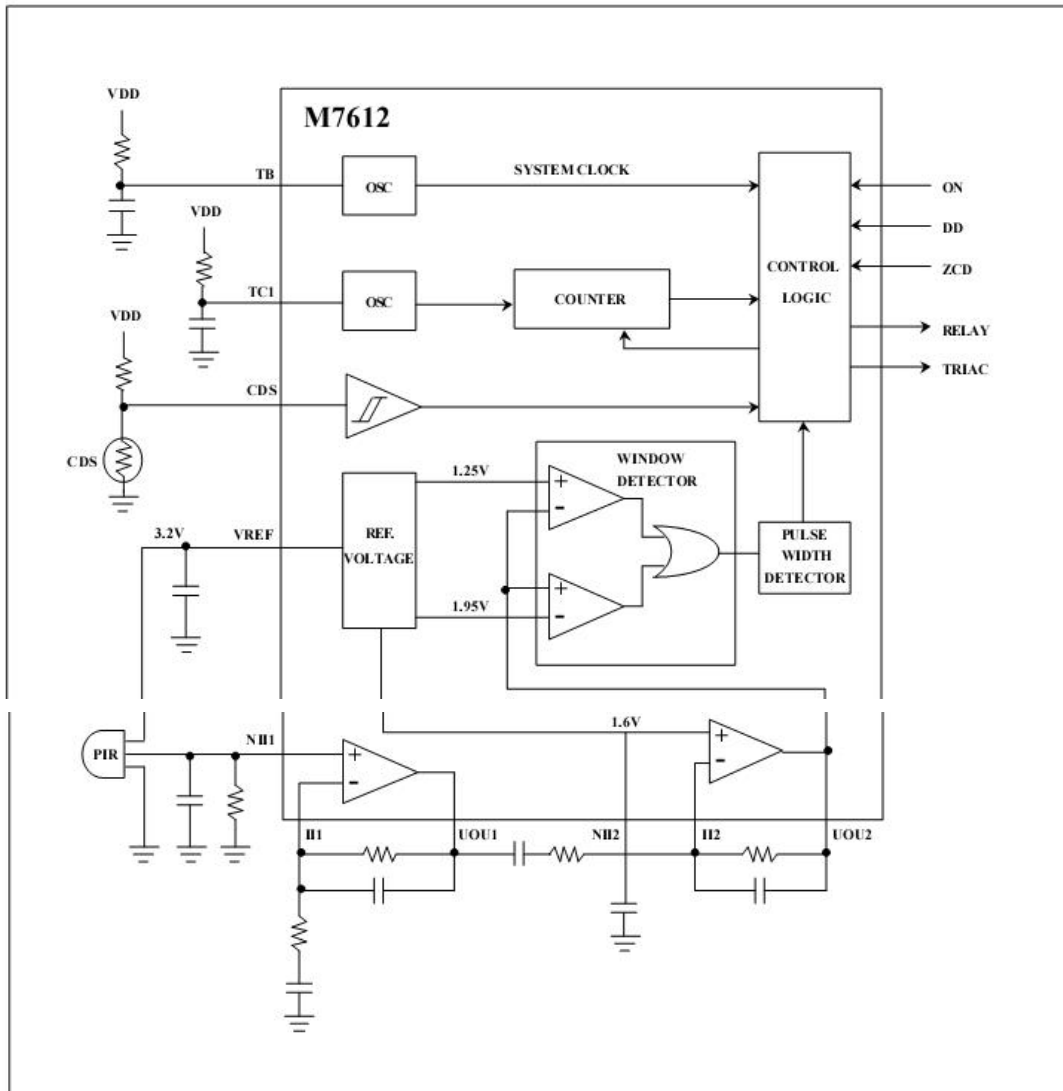


TIMING RELATIONSHIP



PIR CONTROLLER

BLOCK DIAGRAM



PIR CONTROLLER

ABSOLUTE MAXIMUM RATING

(TA=25°C)

| Parameter | Sym. | Rating | Unit |
|--|-------------------|-------------|------|
| Power Supply V_{DD} With Respect to V_{SS} | $V_{DD} - V_{SS}$ | 5.6 | V |
| Voltage On Any Pin | | -0.3 to 5.6 | V |
| Operating Temperature | Top | -20 to 70 | °C |
| Storage Temperature | | -65 to 150 | °C |

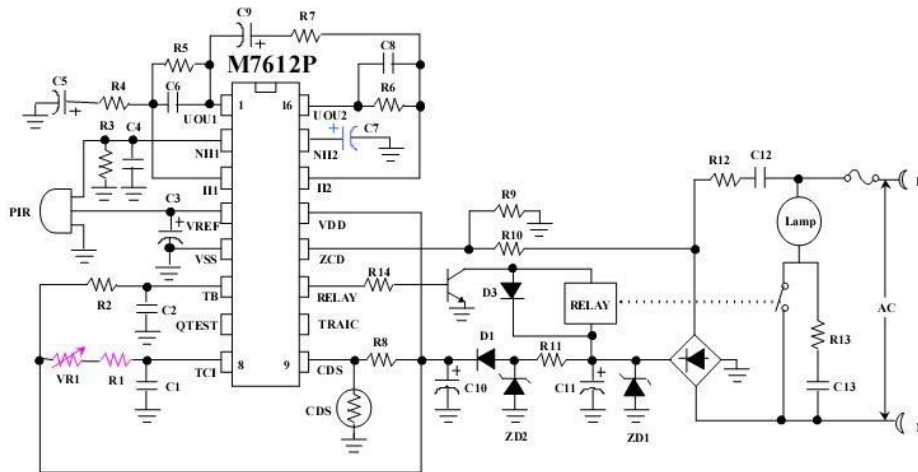
ELECTRICAL CHARACTERISTICS

| Characteristics | Sym. | Min. | Typ. | Max. | Unit | Conditions |
|--|---------------|------|------|------|------|-------------------------------|
| Supply Voltage | V_{DD} | 4.2 | 5 | 5.5 | V | |
| Stand by Current | I_{ST} | 0.9 | 1.0 | 1.2 | mA | |
| Operating Current | I_{DD} | 1.8 | — | 2.5 | mA | 1.8mA , TRIAC / 2.5mA , RELAY |
| Stable Voltage | V_{REF} | 3.0 | 3.2 | 3.4 | V | $V_{DD} > 4.2V$ |
| Source Current of V_{REF} | I_{REF} | 200 | — | — | uA | |
| Ripple of V_{REF} | | — | — | 0.5 | mV | |
| Input and Output Regulation of V_{REF} | | — | — | 0.3% | | |
| Time Base Operating Frequency | F_{TB} | 15 | 16 | 17 | KHz | |
| CDS Operating Trigger | V_{T+} | 1.3 | 1.7 | 2.1 | V | |
| CDS Operating Trigger | V_{T-} | 0.6 | 0.9 | 1.1 | V | |
| CDS Source Current | I_{CDS} | 2.6 | 3.5 | 4.4 | uA | |
| CDS Output Source Current | I_{SOURCE} | 9 | 10.4 | 17.4 | mA | |
| CDS Output Sink Current | I_{SINK} | 11.6 | 13 | 21 | mA | |
| Timer Duration of Out 1 | T_{OUT1} | 10 | — | 1300 | SEC | C=0.01uF , R=4.7K-1M |
| | | 0.1 | — | 13 | | C=100pF , R=4.7K-1M |
| Relay Source Current | I_{RS} | — | — | 10 | mA | |
| Relay Sink Current | I_{RSINK} | — | — | 10 | mA | |
| Relay Operating Voltage | V_{RO} | 13.1 | — | 18.8 | V | |
| TRIAC Sink Current | I_{TSINK} | — | — | 15 | mA | |
| TRIAC Source Current | $I_{TSOURCE}$ | — | — | 50 | uA | |

PIR CONTROLLER

ELECTRICAL CHARACTERISTICS

RELAY APPLICATION



| | | | |
|-----|------------------|-----|------------|
| C1 | 0.01uF | VR1 | 1M |
| C2 | 100pF | R1 | 4.7K |
| C3 | 100uF | R2 | 620K |
| C4 | 0.01uF | R3 | 47K |
| C5 | 33uF | R4 | 15K |
| C6 | 0.1uF | R5 | 820K |
| C7 | 47uF | R6 | 560K |
| C8 | 0.047uF | R7 | 15K |
| C9 | 47uF | R8 | 51K |
| C10 | 100uF/10V | R9 | 470K |
| C11 | 220uF/25V | R10 | 1M |
| C12 | 0.47uF/400~600V | R11 | 2.4K |
| C13 | 0.047uF/400~600V | R12 | 47ohm 1/2W |

| | |
|-----|-------------|
| R13 | 100ohm 1/2W |
| R14 | 5.6K |
| D1 | 1N4001 |
| D3 | 1N4148 |
| ZD1 | 12V |
| ZD2 | 5.6V |

M7612 TCI PIN The relation of capacity,resistance and delay time

| capacity | resistance | frequency | delay time(second) |
|----------|------------|-----------|--------------------|
| 103 | 4.7K | 40KHz | 10 |
| 103 | 10K | 20KHz | 16 |
| 103 | 20K | 10KHz | 28 |
| 103 | 100K | 2KHz | 130 |
| 103 | 200K | 0.8KHz | 260 |
| 103 | 1M | 0.2KHz | 1300 |

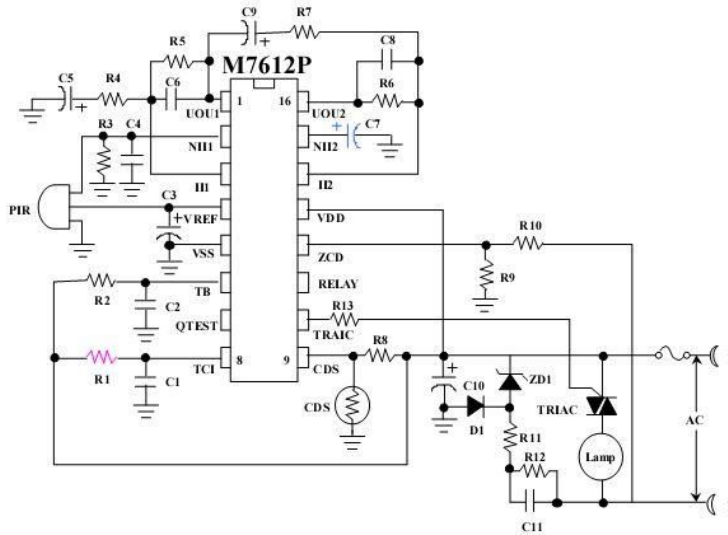
Note :

- (1) To adjust delay time , change VR1 value. (VR1=1M , delay time is about 10 sec)
- (2) For different CDS , R8 value should be adjusted.

PIR CONTROLLER

TRIAC APPLICATION

(A)



| | | | |
|-----|----------------|-----|-------------|
| C1 | 0.01uF | R1 | 見附表 |
| C2 | 100pF | R2 | 620KΩ |
| C3 | 100uF | R3 | 47KΩ |
| C4 | 0.01uF | R4 | 15KΩ |
| C5 | 33uF | R5 | 820KΩ |
| C6 | 0.1uF | R6 | 560KΩ |
| C7 | 47uF | R7 | 15KΩ |
| C8 | 0.047uF | R8 | 51KΩ |
| C9 | 47uF | R9 | 470KΩ |
| C10 | 100uF/10V | R10 | 1MΩ |
| C11 | 0.1uF/400~600V | R11 | 47 ohm 1/2W |
| D1 | 1N4004 | R12 | 100K |
| ZD1 | 5.6V | R13 | 330 ohm |

M7612 TCI PIN The relation of capacity, resistance and delay time

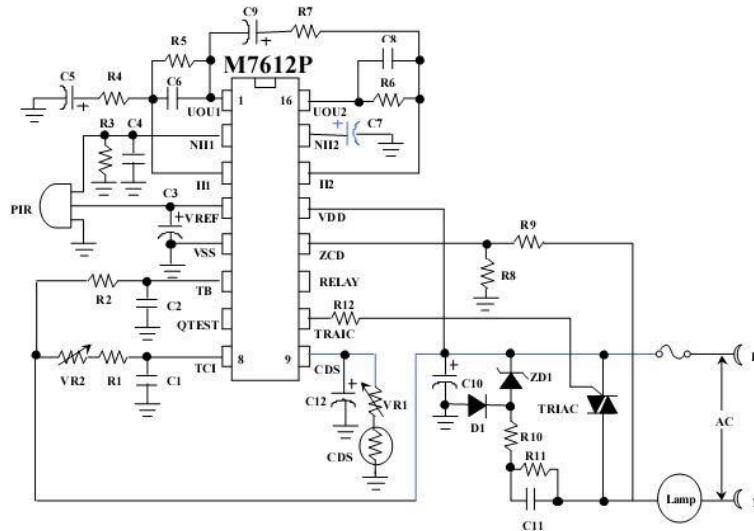
| capacity | resistance | frequency | delay time(second) |
|----------|------------|-----------|--------------------|
| 103 | 4.7K | 40KHz | 10 |
| 103 | 10K | 20KHz | 16 |
| 103 | 20K | 10KHz | 28 |
| 103 | 100K | 2KHz | 130 |
| 103 | 200K | 0.8KHz | 260 |
| 103 | 1M | 0.2KHz | 1300 |

Note :

- (1) To adjust delay time , change R1 value. (Delay time is about 10 sec)
- (2) For different CDS , R8 value should be adjusted.

PIR CONTROLLER

(B) 應用二



| | | | |
|-----|-------------------|-----|------------|
| C1 | 0.01uF | VR1 | 1MΩ |
| C2 | 100pF | VR2 | 1MΩ |
| C3 | 100uF / 16V | R1 | 4.7KΩ |
| C4 | 0.01uF | R2 | 620KΩ |
| C5 | 220uF / 10V | R3 | 47KΩ |
| C6 | 0.1uF | R4 | 47KΩ |
| C7 | 22uF / 16V | R5 | 220KΩ |
| C8 | 683 pF | R6 | 470KΩ |
| C9 | 47uF / 16V | R7 | 56KΩ |
| C10 | 470uF / 16V | R8 | 800KΩ |
| C11 | 0.15uF / 400~600V | R9 | 720KΩ |
| C12 | 1uF / 50V | R10 | 47ohm 1/2W |
| D1 | 1N4007 | R11 | 100KΩ |
| ZD1 | 6.2V | R12 | 100 ohm |

M7612 TCI PIN The relation of capacity, resistance and delay time

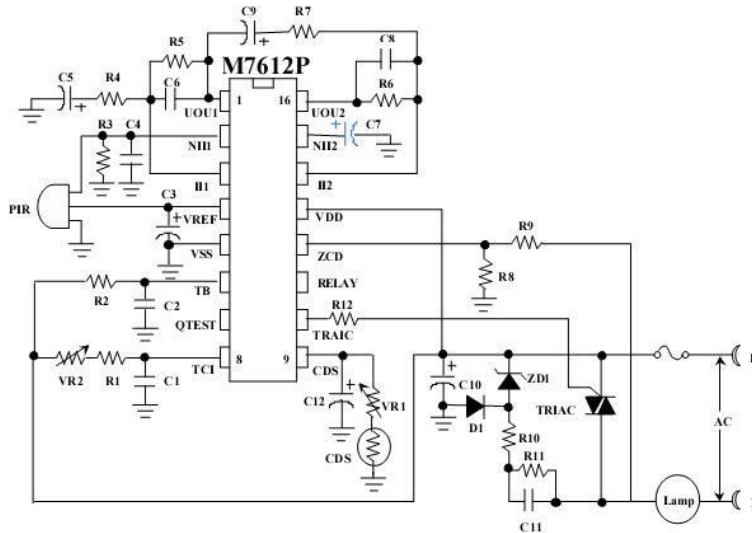
| capacity | resistance | frequency | delay time(second) |
|----------|------------|-----------|--------------------|
| 103 | 4.7K | 40KHz | 10 |
| 103 | 10K | 20KHz | 16 |
| 103 | 20K | 10KHz | 28 |
| 103 | 100K | 2KHz | 130 |
| 103 | 200K | 0.8KHz | 260 |
| 103 | 1M | 0.2KHz | 1300 |

Note :

- (1) To adjust delay time , change VR2 value. (VR2=1M , delay time is about 10 sec)
- (2) For different CDS , VR1 value should be adjusted.
- (3) Distance = 4m.

PIR CONTROLLER

(C) 應用三



| | | | |
|-----|-------------------|-----|-------------|
| C1 | 0.01uF | VR1 | 1MΩ |
| C2 | 100pF | VR2 | 1MΩ |
| C3 | 100uF / 16V | R1 | 4.7KΩ |
| C4 | 0.01uF | R2 | 620KΩ |
| C5 | 33uF / 16V | R3 | 47KΩ |
| C6 | 0.033uF | R4 | 15KΩ |
| C7 | 22uF / 16V | R5 | 820KΩ |
| C8 | 0.033uF | R6 | 820KΩ |
| C9 | 33uF / 16V | R7 | 15KΩ |
| C10 | 470uF / 16V | R8 | 800KΩ |
| C11 | 0.33uF / 400~600V | R9 | 720KΩ |
| C12 | 1uF / 50V | R10 | 47 ohm 1/2W |
| D1 | 1N4007 | R11 | 100KΩ |
| ZD1 | 6.2V | R12 | 100 ohm |

M7612 TCI PIN The relation of capacity, resistance and delay time

| capacity | resistance | frequency | delay time(second) |
|----------|------------|-----------|--------------------|
| 103 | 4.7K | 40KHz | 10 |
| 103 | 10K | 20KHz | 16 |
| 103 | 20K | 10KHz | 28 |
| 103 | 100K | 2KHz | 130 |
| 103 | 200K | 0.8KHz | 260 |
| 103 | 1M | 0.2KHz | 1300 |

Note

- (1) To adjust delay time, change VR2 value. (VR2=1M, delay time is about 10 sec)
- (2) For different CDS, VR1 value should be adjusted.
- (3) Distance = 8m.

* All specs and applications shown above subject to change without prior notice.