



PIR CONTROLLER  
FOR DC/AC APPLICATIONS

## DESCRIPTION

The M7620 integrated circuit combines all required functions for a single chip Passive Infra Red (PIR) light controller. It is designed for load switching with a transistor or a relay in 3 wire AC and DC systems.

A conventional PIR sensor connects directly to the PIR input. The pull-down resistor and DC decoupling circuitry are integrated on chip.

The PIR signal is converted to a 15 bit digital value. External potentiometers or resistors are used to set the operating parameters for sensitivity, on-time, CDS sensor. The corresponding voltage levels are converted to digital values with a 4 bit resolution all signal processing is performed digitally.

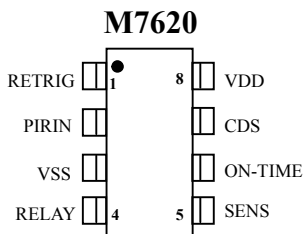
## FEATURES

- Digital signal processing
- Adjustable PIR sensitivity
- Adjustable output turn-on time
- Retrigger/Non-retrigger function
- RELAY output
- SOP-8 package

## APPLICATIONS

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

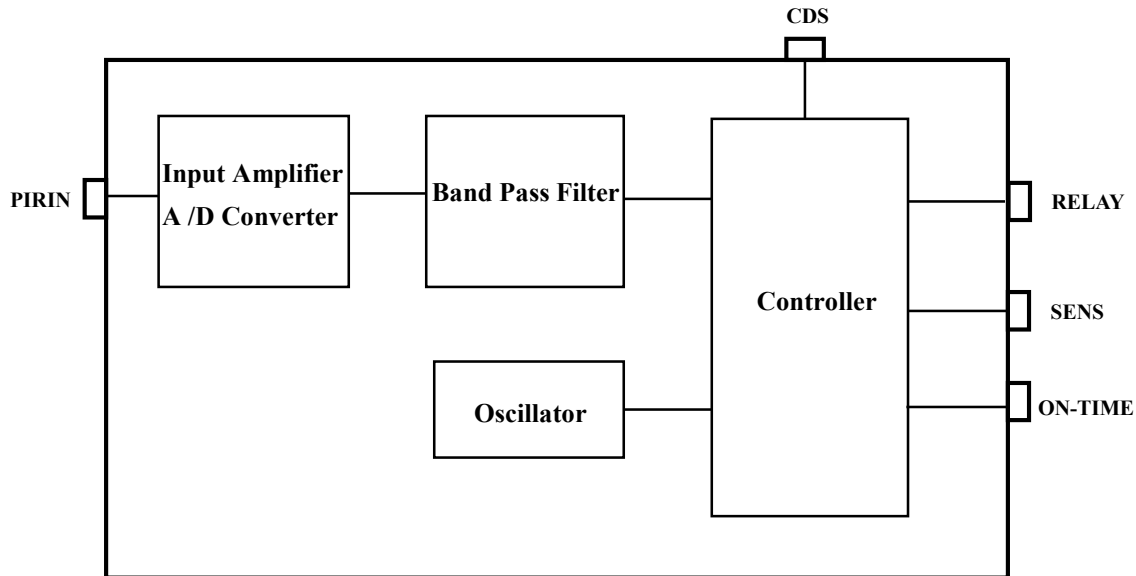
## PIN ASSIGNMENT





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BLOCK DIAGRAM



PIN DESCRIPTION

| Pin No. | Name    | I/O | Description   |
|---------|---------|-----|---|
| 1       | RETRIG  | I   | Retrigger mode select input.<br>VDD or floating : As long as movement is detected within the on-time, the light will remain on.<br>VSS : The light will first switch off, before it can be switched on again. |
| 2       | PIRIN   | I   | PIR sensor input  |
| 3       | VSS     |     | Ground  |
| 4       | RELAY   | O   | Relay output pin  |
| 5       | SENS    | I   | Sensitivity threshold adjustment ° Sets the sensitivity threshold required to generate a trigger condition. Refer to <a href="#">Tble1</a>  |
| 6       | ON-TIME | I   | Light on-time adjustment. Refer to <a href="#">Tble1</a>  |
| 7       | CDS     | I   | Connect to the CDS voltage divider for daytime/night auto detecting,<br>VDD : Enable switching of the light<br>VSS : Disable switching of the light   |
| 8       | VDD     | —   | Positive power supply   |



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**FUNCTION DESCRIPTION**

**Power-up Mode**

After the device powers on it first enters a warm-up period. The light is switched on for the selected on-time duration. The CDS input is ignored on power-up, to allow the user to verify the installation during daylight conditions.

**Trigger Condition**

The SENS threshold (refer to table 1) is multiplied, When the filtered PIR signal exceeds this threshold, a trigger condition occurs.

**Conditions for Switching the Light ON**

If a trigger condition occurs and the CDS input is high, the light will be switched on.

The light and the relay will remain on for the duration set by the ON-TIME input.

| Pin Voltage / VDD                                     | On time  | SENS Distance |
|---|----------|---------------|
| $(13/32) \times VDD \leq V_{in} < (15/32) \times VDD$ | 38.4 min |               |
| $(11/32) \times VDD \leq V_{in} < (13/32) \times VDD$ | 19.2 min |               |
| $(9/32) \times VDD \leq V_{in} < (11/32) \times VDD$  | 9.6 min  |               |
| $(7/32) \times VDD \leq V_{in} < (9/32) \times VDD$   | 4.8 min  |               |
| $(5/32) \times VDD \leq V_{in} < (7/32) \times VDD$   | 2.4 min  |               |
| $(3/32) \times VDD \leq V_{in} < (5/32) \times VDD$   | 72 sec   |               |
| $(1/32) \times VDD \leq V_{in} < (3/32) \times VDD$   | 36 sec   |               |
| $0 \leq V_{in} < (1/32) \times VDD$                   | 9 sec    |               |

**Table 1 : On-time, SENS distance**



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**ABSOLUTE MAXIMUM RATING**

( TA = 25°C )

| Parameter             | Sym. | Min. | Max. | Unit | Remarks |
|-----------------------|------|------|------|------|---------|
| Operating Voltage     | VDD  | -0.3 | 5    | V    |         |
| Voltage On Any Pin    |      | -100 | 100  | mA   |         |
| Operating Temperature |      | -25  | 70   | °C   |         |
| Storage temperature   | Tst  | -45  | 125  | °C   |         |

**ELECTRICAL CHARACTERISTICS**

( TA = 25°C , VDD=4.4V )

| Characteristics  | Sym.             | Min. | Typ. | Max. | Unit | Conditions                  |
|--|------------------|------|------|------|------|-----------------------------|
| <b>Operating Voltage</b>                                 |                  |      |      |      |      |                             |
| Supply voltage   | VDD              | 3.3  | 4.4  | 5.0  | V    |                             |
| Supply current   | IDD              | —    | —    | 200  | μA   | VDD=4.4V (outputs unloaded) |
| <b>Oscillator and Filter</b>                             |                  |      |      |      |      |                             |
| LPF cutoff frequency                                     |                  | —    | 5    | —    | Hz   |                             |
| HPF cutoff frequency                                     |                  | —    | 0.3  | —    | Hz   |                             |
| Clock frequency  | F <sub>CLK</sub> | —    | 64   | —    | KHz  |                             |
| <b>Analog Inputs</b>                                     |                  |      |      |      |      |                             |
| Input leakage current ( ON-TIME 、 SENS )                 |                  | -1   | —    | 1    | μA   |                             |
| PIRIN resistance to VSS                                  |                  | —    | 70   | —    | KΩ   |                             |
| PIRIN input AC voltage                                   |                  | —    | —    | 50   | mV   | Peak-to-Peak                |
| PIRIN input DC voltage                                   |                  | 0.2  | —    | 1.5  | V    |                             |
| <b>Digital Inputs, Schmitt Triggers ( RETRIG 、 CDS )</b> |                  |      |      |      |      |                             |
| Input low voltage  | V <sub>IL</sub>  | 80   | —    | —    | %VDD |                             |
| Input high voltage                                       | V <sub>IH</sub>  | —    | —    | 20   | %VDD |                             |
| Pull up current on RETRIG                                |                  | —    | 70   | —    | μA   | input to VSS                |
| Leakage current on CDS                                   |                  | —    | —    | ±1   | μA   | input to VSS or VDD         |
| <b>Digital Outputs</b>                                   |                  |      |      |      |      |                             |
| Relay Source Current                                     | I <sub>RS</sub>  | —    | —    | 10   | mA   |                             |

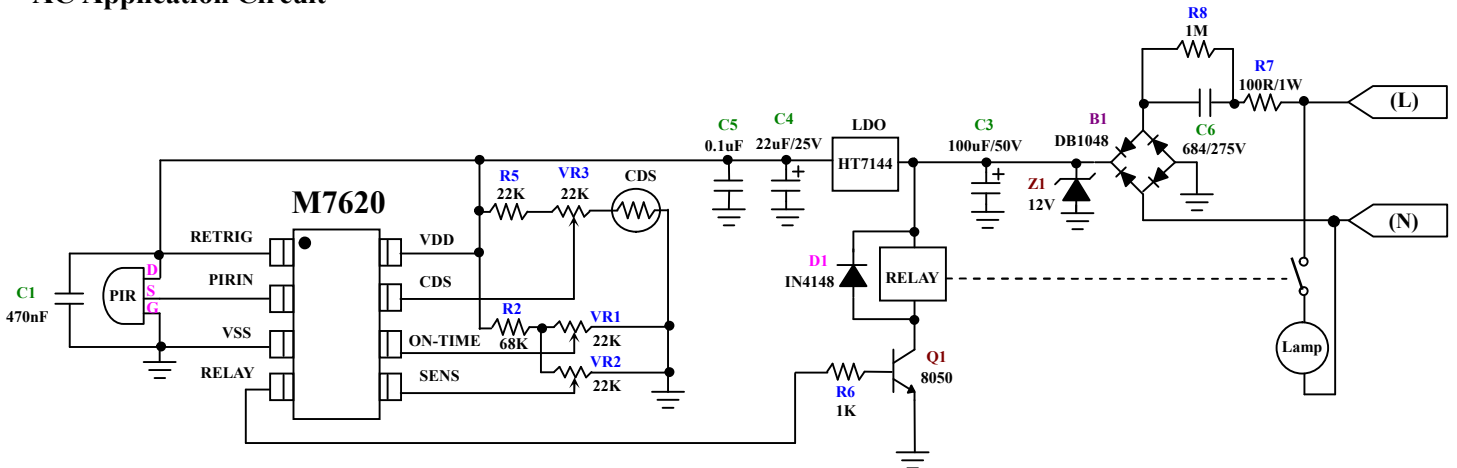


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M7620

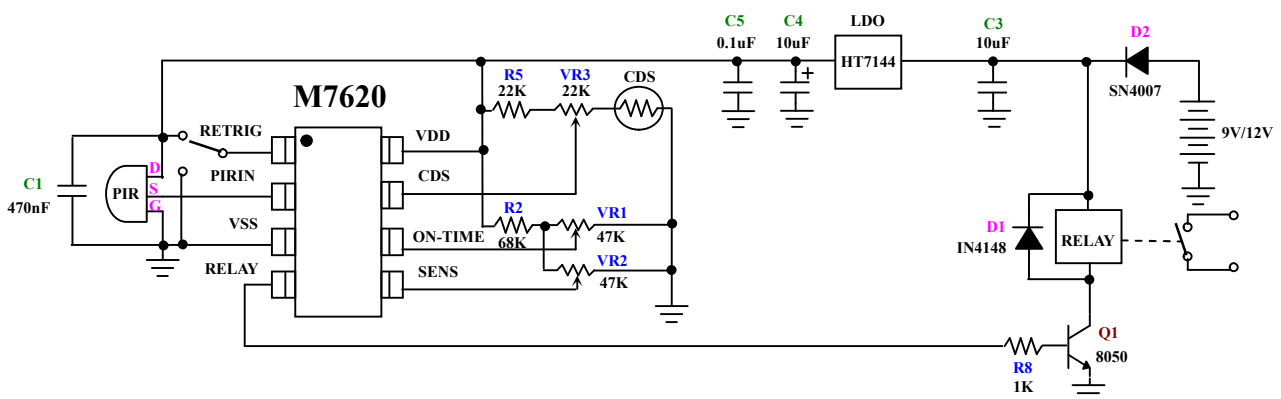
APPLICATION CIRCUIT

AC Application Circuit



RETRIG = VDD : Retrigger  
= VSS : Non-Retrigger

DC Application Circuit



RETRIG = VDD : Retrigger  
= VSS : Non-Retrigger

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



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PACKAGE OUTLINE

