Pyroelectric Infrared (PIR) Motion Sensor Evaluation Kit

Kit Number CY3236A-PIRMOTION

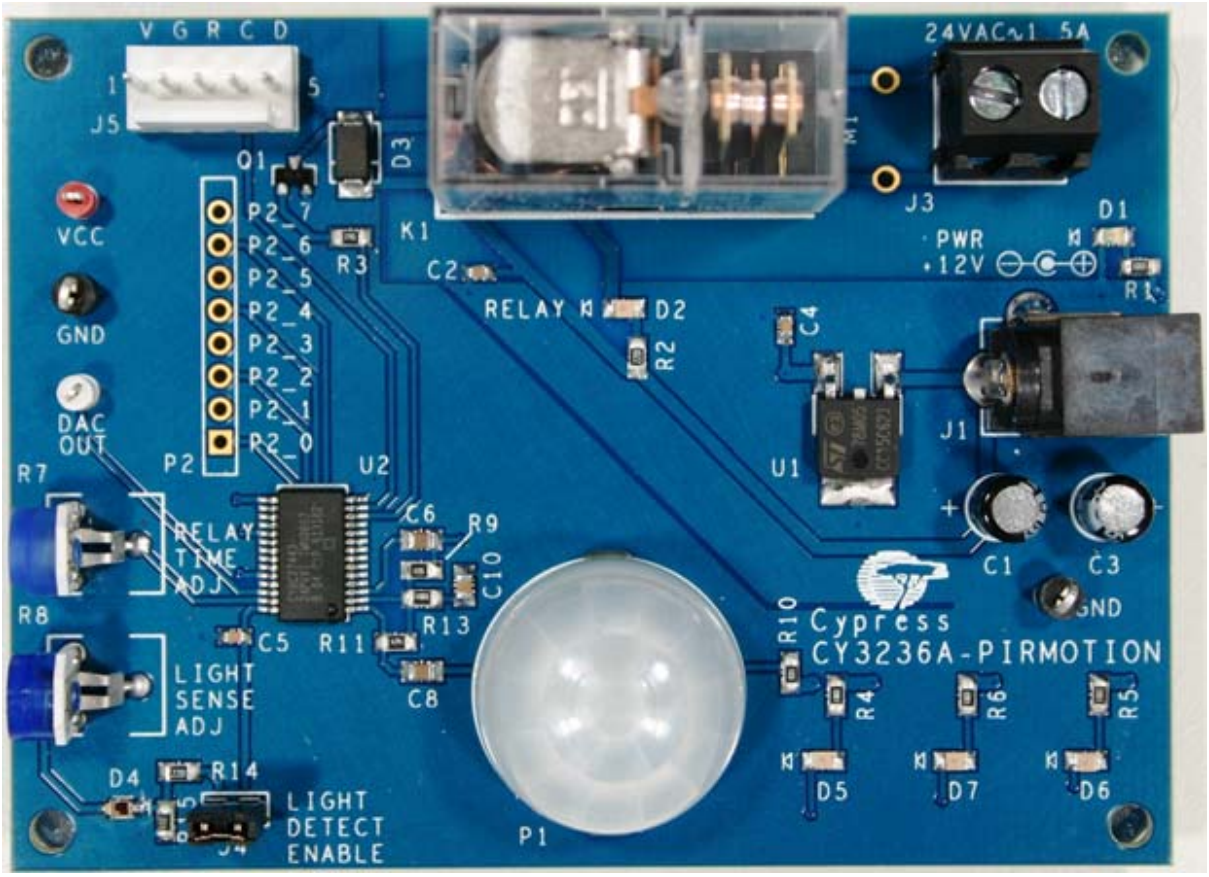
CY3236A-PIRMOTION PIR Motion Sensor Evaluation Kit

Pictured Below

- CY3236A-PIRMOTION Board

Not Pictured

- One 12V Power Supply
- PSoC Designer and Programmer CD-ROM
- Design Files CD-ROM



CY3236A-PIRMOTION Evaluation Board

Welcome to the CY3236A-PIRMOTION Evaluation Kit

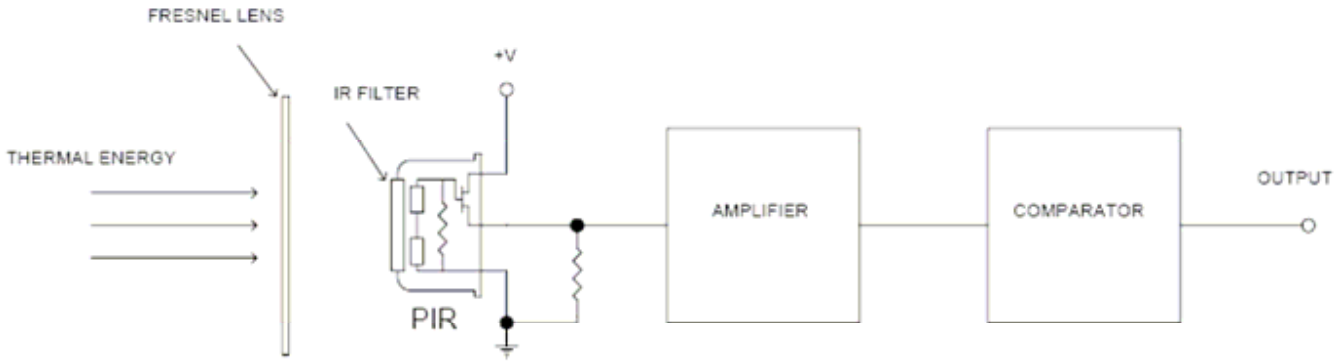
Thank you for your interest in Cypress' CY3236A-PIRMOTION Pyroelectric Infrared Sensor Evaluation Kit. This kit allows you to quickly familiarize yourself with the PIR board and firmware. Below you will find information regarding the theory of infrared sensing, as well as some simple kit setup instructions to get you on your way to using the PIR board. PDF versions of the User Guide and datasheets for the major parts, along with schematics, firmware and other design files can be found on the CD-ROM titled "Pyroelectric Infrared Sensor Evaluation Kit" included with this kit. You must have Adobe Acrobat reader installed on your PC to view PDF documents.

Theory of Infrared Light Sensing

The theory behind infrared sensing involves the conversion of these infrared light rays to usable analog and digital signals, which can then be processed using a microcontroller. In the case of this kit, a Cypress CY8C27443 PSoC is used as the microcontroller. See the CY8C27443 datasheet included on the Design Files CD-ROM of this kit.

The human body radiates a certain amount of infrared light undetectable to the human eye. The length of these rays is in the realm of 10µm. Using a Pyroelectric Infrared (PIR) sensor like the one manufactured by Glolab Corp., along with the help of a PSoC microcontroller, these light rays can be converted to an electric charge. This charge can in turn, be amplified and filtered to produce a digital signal capable of controlling other hardware such as turning on/off a light, opening or unlocking a door, or activating an alarm.

Below is a block diagram showing the internal circuitry of the Glolab PIR325 PIR device along with the external circuitry used in this kit.



The sensor itself consists of a crystalline material that generates an electric charge when exposed to heat from infrared radiation. This charge gets buffered by an internal FET whose output can then be fed into a two stage amplifier and a series of filters to condition the signal. See the PIR325 datasheet included on the Design Files CD-ROM for more information.

Setting Up the Board

The CY3236A-PIRMOTION board is pre-programmed with firmware designed around the CY8C27443 PSoC device. The board is made to be a stand-alone board, which only requires a 12V power supply included with the kit. To begin using the board, simply provide power using the 12V adapter at the power jack, J1.

Using the Board

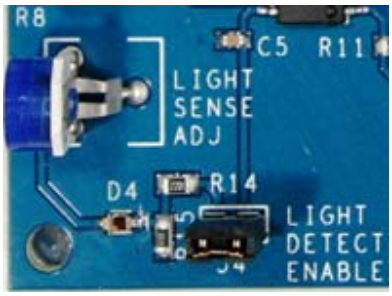
The board has been designed with several hardware features to provide the user with some flexibility. These features include:

1. **Fresnel Lens** – The PIR sensor is covered by a Fresnel Lens, which is used to direct infrared rays from various angles, toward the PIR sensor. Note: The Fresnel Lens is loosely attached to the board. This is not a manufacturing issue, but rather a means from allowing removal of the lens for viewing the PIR sensor.

2. **AC Terminal Block** – A terminal block is included on the board providing a point for connecting an external hardware device to be controlled by the relay. Such a device might include a small watt light bulb.

3. **Relay Time Adjust** – The length of time the relay is active can be adjusted using the potentiometer, R7. Turn the potentiometer counter-clockwise to increase the relay-on time. Turn it clockwise to decrease the relay-on time. Relay on is indicated by LED, D2.

4. **Ambient Light Detection** – The board also contains an ambient light detector in the form of a phototransistor. This feature can be enabled by shunting header J4. When enabled, the responsiveness of the board to ambient light can be adjusted using the potentiometer, R8. To increase the sensitivity to light, turn the potentiometer clockwise. To decrease the sensitivity to light, turn the potentiometer counter-clockwise. Note: Adjusting ambient light detection "does not" adjust the sensitivity of the PIR sensor. Enabling ambient light detection forces the firmware to have the presence of ambient light override the infrared detection of the PIR. Thus, the relay will respond to infrared light based on the amount of ambient light present.



Additional Information

Cypress has published two application notes that discuss infrared sensing using PIR methods. Both of these app notes are included on the Design Files CD of this kit. They are AN2105 and AN2414. These app notes are similar, however the firmware implementation is different between the two. Either of these can be used as a reference when designing your own PIR sensor application.

Also included are the schematic for the CY3236A-PIRMOTION board as well as the artwork files used to manufacture the board. The board bill of materials is included calling out all of the components used on the board. The physical appearance of some of the components on the board may not be identical to those pictured in the documentation. However, their functionality remains the same.

Firmware for this kit is included on the Design Files CD. However, programming the board is not necessary as the firmware has been preprogrammed. If you would like to be able to program the board after making changes to the firmware, you can purchase the CY3210-MiniProg1 kit from the Cypress online store.

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