ZMOTION™ Detection Module II

ZMOTION™ ADVANTAGES

- Complete Motion Detection Solution
- Best-In-Class Motion Detection Performance
- Extremely Flexible Interface
- Adjustable To Meet Your Application Requirements

APPLICATIONS

- Unattended Vending and Kiosks
- Display Systems
- Home Appliances
- Lighting Control
- Power Management
- HVAC
- Access Control
- General-Purpose Proximity Sensing Applications

ZMOTION Detection Module II with Right Angle Connector (ZEPIR0BAS02MODG)

ZMOTION Detection Module II with Straight Connector (ZEPIR0BBS02MODG)

Overview

Zilog's ZMOTION™ Detection Module II (ZDM II) is a complete motion detection solution ideally suited for applications that need to detect human presence. It is an excellent solution for detecting people as they approach entrances, kiosks, product displays, vending machines, appliances and advertising displays.

The ZMOTION Detection Module II is a board-level product that combines the unique features of Zilog's Z8FS040 Motion Detection Microcontroller with a pyroelectric sensor and lens. The module is only 25.5 mm x 16.7 mm and can easily fit into many size-constrained applications.

ZDM II is simple to use. It can operate in a Hardware mode that simply activates an output signal when motion is detected, or it can operate in a Serial mode, allowing it to communicate to another processor in your system over an asynchronous interface (UART) when greater control over motion detection performance is required. In each mode, sensitivity and output activation time can be controlled to match application requirements. For applications that require ambient light sensing, an input supporting an external light sensor is provided; this input can be used to gate motion detection output.

Zilog's ZMOTION Detection Module II Evaluation Kit makes it quick and easy to integrate ZDM II into your own custom application.

The ZMOTION Detection Module II is a great way to reduce design effort and eliminate development risk for any device that needs motion detection capability.

Features

- Complete motion detection solution including pyroelectric sensor and clip-on lens
- Direct sensor interface and advanced software based motion detection algorithms provide superior sensitivity and stability
- Small form factor: only 25.5 mm x 16.7 mm (1" x 0.66")
- Circular 9.0 mm lens
- 8-pin interface connector with two orientations available (right-angle and straight)
- 95-degree detection pattern with adjustable range/sensitivity
- Simple hardware or advanced serial (UART) based configuration and interface
- Adjustable sensitivity and output activation time and support for Ambient Light Sensor input
- Serial mode includes unique Hyper Sense feature that automatically increases sensitivity after motion is detected
- SLEEP mode for low power applications
- Minimal components ensures high reliability (no electrolytic capacitors)
- Modify the application code to suite your own application requirements
- 2.7V to 3.6V operation from 0°C to 70°C

APPLICATIONS

Unattended Vending and Kiosks

- Reduce energy consumption by auto-dimming lights when people are not present
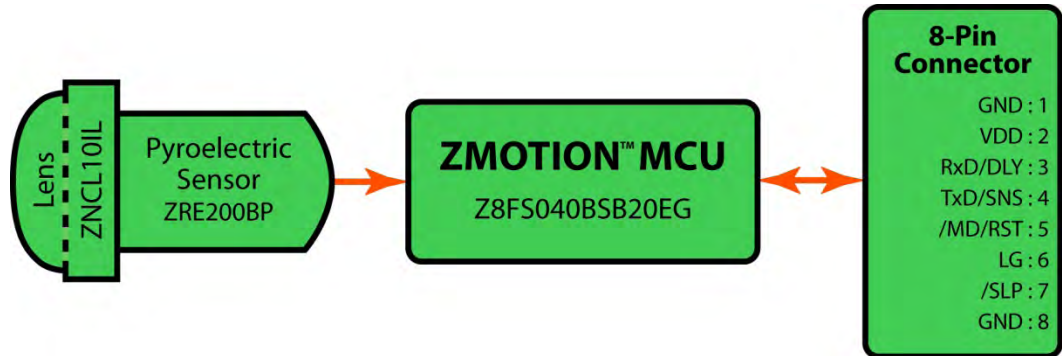- Attract customers when they come near
- Automated guidance

Display Systems

- Reduce energy consumption by turning display off when people are not present
- Automatically turn display on when people come near

Home Appliances

- Save energy by turning off large appliances when people are not present
- Ventilators
- Air purifiers
- Televisions

Block Diagram

ZMOTION™ Advantages

The ZRE200BP pyroelectric sensor, when combined with the ZNCL10IL lens, offers small size without sacrificing performance. The module is only 25.5 mm x 16.7 mm (a little over ½ square inch) with a 9mm lens so that it can easily fit into many size-constrained applications.

The signal from the pyroelectric sensor is sent directly to the ZMOTION MCU, providing it with a true, unaltered signal to allow the software running on the ZMOTION MCU to identify and ignore false trigger sources such as temperature drift, EMI, and ESD. The result is a more stable motion detector.

This direct interface also eliminates the need for external components, including op amps, comparators and large electrolytic capacitors, thereby improving reliability and ensuring the smallest possible form factor.

At power-on, the pyroelectric sensor requires time to stabilize before motion detection can occur. The ZMOTION MCU monitors the direct signal from the pyroelectric sensor to determine when it has achieved stability and, as a result, the required power-on stabilization time is minimized.

The unique motion detection software in the ZMOTION MCU does not require external temperature compensation, which results in improved stability and eliminates the need for a discrete temperature sensor.

Customize the ZMOTION Application Software

Because the ZMOTION Detection Module II is based on the ZMOTION MCU, the application software implementing the Hardware and Serial mode functions can be modified to meet your specific requirements, or you can even create your own from scratch. All application source code is available with a reference design kit that ships complete with debugging tools and IDE.

APPLICATIONS

Lighting Control

- Conveniently turn lights on automatically
- Reduce energy consumption by automatically turning off lights when people are not in the room
- Lights do not turn on when ambient light is sufficiently high
- Adjustable delay from 1 second to 128 minutes

Access Control

- Sense when someone approaches a controlled entry door
- Automatically unlock the door from one side while maintaining access control on the other
- Eliminates need for readers on both sides of the door

Operation

Hardware Interface Mode

- Sensitivity, output timing and ambient light threshold are controlled by the voltage present on the 3 configuration pins (SNS, DLY and LG)
- Sleep mode is entered by driving /SLP low
- Digital output on /MD pin is activated when motion is detected

Serial Interface Mode

- Advanced configuration and status via serial interface
- /MD, LG and /SLP remain functional
- The serial interface (RXD and TXD) operates at: 9600 bps, no parity, 8 data bits and 1 stop bit
- Provides access to additional features:
    - o Wider selection of activation times, sensitivity and range
    - o Low frequency rejection
    - o Directional detection
    - o HyperSense mode
    - o Programmable ambient light threshold

Detection Pattern

The ZMOTION™ Detection Module lens provides a typical range of 7m with a 95 degree angle. The actual distance is dependent on the sensitivity setting and ambient temperature.
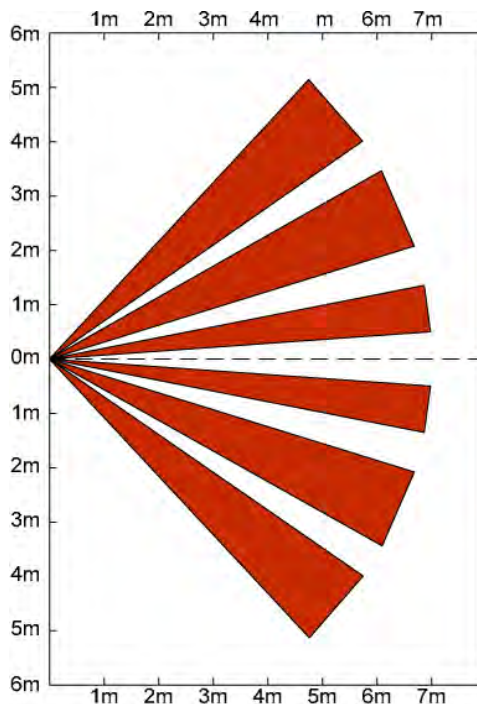
APPLICATIONS

Power Management

- Control power to any publicly accessed device based on activity in addition to time of day

HVAC

- Automatically turn room heating sources on an off based on occupancy
- Turn air conditioners on and off when people enter and leave a room
- Reduce power consumption of air purifiers and fans by turning them on only when people are in the room

Electrical Characteristics

Item		Minimum	Typical	Maximum
Operating Voltage		2.7V	3.3V	3.6V
Operating Current			8.9mA	
Sleep Mode Current			450 µA	
/MD Output Drive				25mA
/MD Output Duration (Active Low)		Programmable Hardware Mode: 2s–15min. Programmable Serial Mode: 1s–128min.		
Stabilization Time		Minimum 15 seconds (Dynamic)		
Coverage	Angle		95°	
	Range		7m	
Dimensions		25.5mm × 16.7mm × 9.5mm		
Temperature Range		0°C		+70°C

Ordering Information

Order the ZMOTION Detection Module II from your local Zilog distributor using the part numbers listed below. For more information, or to download product collateral and software, please visit us at www.zilog.com.

Part Number	Description
ZEPIR1BAS01MODG	ZMOTION™ Detection Module II (Right-Angle Connector)
ZEPIR1BBS01MODG	ZMOTION™ Detection Module II (Straight Connector)
ZEPIR000103KITG	ZMOTION™ Detection Module II Evaluation Kit
ZEPIR000103ZRDG	ZMOTION™ Detection Module II Reference Design

Documentation

The collateral referenced below is a sample of the documentation available for the ZMOTION™ Detection Module II. For a complete listing of all available application notes, product specifications, user manuals, and sample libraries, please visit us at www.zilog.com.

Document Number	Description
PS0305	ZMOTION Detection Module II Product Specification
UM0260	ZMOTION Detection Module II Evaluation Kit User Manual
RD0026	ZMOTION™ Detection Module II Reference Design
RD0026-SC01	ZMOTION™ Detection Module II Source Code

Warning: DO NOT USE THIS PRODUCT IN LIFE SUPPORT SYSTEMS.

ENGINEERING NOTES