



## Zilog's ZMOTION™ Intrusion Detection

### Zilog's ZMOTION™ Intrusion Detection Solution



#### A Superior Motion Detection Solution for Security-Related Applications

##### Overview

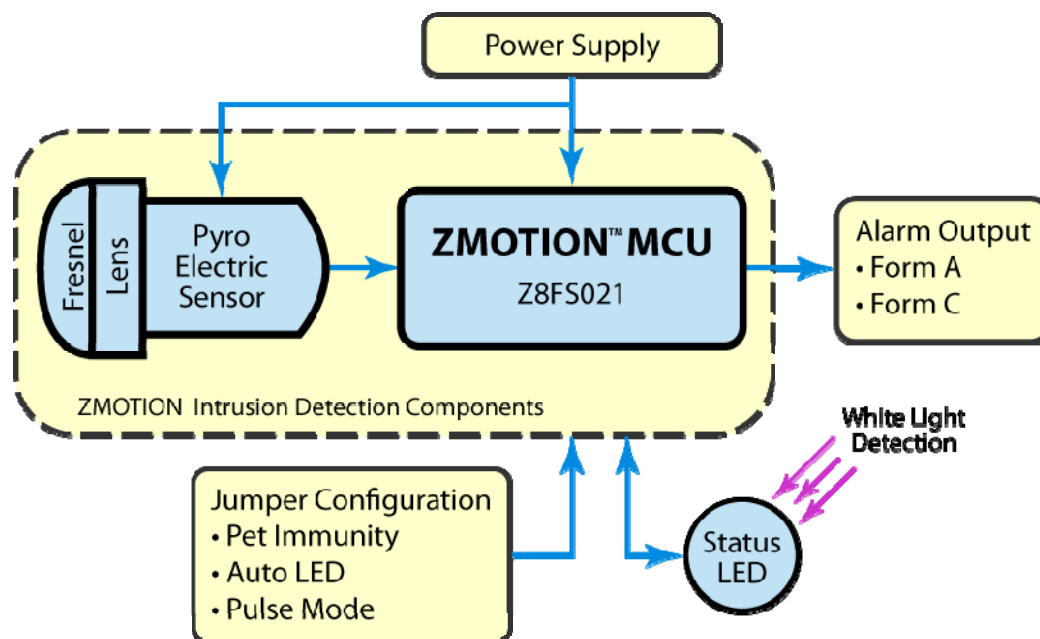
Zilog's ZMOTION Intrusion Detection Solution provides a dramatic improvement in both sensitivity and stability over traditional security-related motion detection designs. Like our other ZMOTION products, the Intrusion Detection Solution is an integrated and flexible solution for Passive Infrared (PIR)-based motion detection applications and includes a high-performance microcontroller with integrated motion-detection algorithms, plus it includes a selection of lenses and PIR sensors to fit a wide range of intrusion detection and security applications. With integrated functions such as White Light Detection and Pet Immunity, the ZMOTION Intrusion Detection Solution is the ideal solution for security applications in which highly stable intrusion detection capability is vital.

With Zilog's ZMOTION Intrusion Detection Solution, the system bill of materials is significantly reduced. The pyroelectric sensor is directly interfaced to the MCU eliminating external op-amps, electrolytic capacitors, and other components used in traditional designs. The new statistical processing algorithms provided by the PIR motion-detection engine also eliminate the need for a discrete temperature compensation circuit.

This all leads to a simpler and smaller circuit design, providing better reliability, sensitivity and stability than traditional designs.

#### ADVANTAGES OF THE ZMOTION INTRUSION DETECTION SOLUTION

- MCU, PIR SENSOR AND LENS SOLUTION
- MOTION DETECTION ALGORITHMS BUILT INTO MCU
- 2 KB FLASH FOR APPLICATION CODE
- OPTIMIZED DETECTION PERFORMANCE AND RELIABILITY
- SENSITIVITY CONTROL, RANGE CONTROL AND DIRECTIONALITY DETECTION
- ACCURATE FREQUENCY DISCRIMINATION AND PROGRAMMABLE PET IMMUNITY
- WHITE LIGHT DETECTION USING STATUS LED REDUCES SYSTEM COST (ELIMINATES CDS PHOTOCELL)
- WHITE LIGHT ANTI-JAM FEATURE AND PROGRAMMABLE SENSITIVITY
- PROGRAMMABLE TRANSIENT AND NOISE DETECTION
- BETTER STABILITY AND SENSITIVITY THAN TRADITIONAL DESIGNS
- NO TEMPERATURE COMPENSATION REQUIRED
- NO NEED TO DEVELOP COMPLEX MOTION DETECTION SOFTWARE
- SELECTION OF LENSES AVAILABLE WITH OPTIMIZED SETTINGS PROVIDED
- ZMOTION MCU AVAILABLE SEPARATELY TO USE WITH YOUR OWN LENS/PYRO
- DIRECT SENSOR INTERFACE ELIMINATES EXTERNAL COMPONENTS
- REDUCED BOM COSTS
- COMPLETE YOUR DESIGNS FASTER



## The ZMOTION MCU

### KEY FEATURES

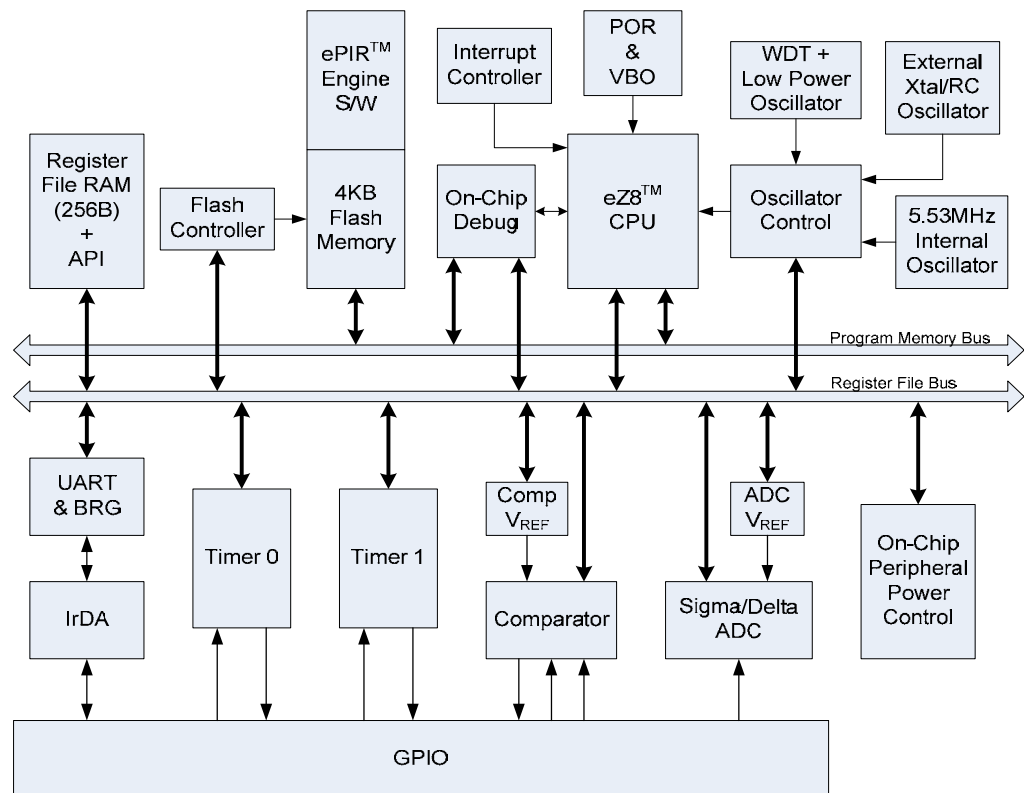
- ADVANCED STATISTICALLY-BASED MOTION DETECTION PROCESSING
- HYPERSENSE MODE FOR LIGHTING APPLICATIONS
- HIGH RESOLUTION SIGMA DELTA ADC
- LOW POWER MODES
- API PROVIDES FULL CONTROL AND STATUS OF MOTION DETECTION ENGINE
- WORLD-CLASS ZDS II DEVELOPMENT ENVIRONMENT

The ZMOTION Intrusion Detection Solution, based on Zilog's Z8FS021 MCU, combines the programmability and rich peripheral set of our Z8 Encore! XP family of In-Circuit Programmable Flash MCUs with built-in motion detection software algorithms to provide the functions necessary for PIR motion detection applications. These algorithms comprise the PIR Engine and run in the background while control and status of the Engine is accessed through a software Application Programmer Interface (API). These APIs allow designers to create their own application-specific software while taking advantage of Zilog's ZMOTION Motion Detection Technology. Additional API settings are provided to match PIR Engine operation to each lens and pyroelectric sensor combination.

The Flash in-circuit programming capability of the Z8FS021 MCU allows for faster development time, more flexible manufacturing and firmware changes in the field.

As with all of Zilog's ZMOTION Motion Detection products, the ZMOTION Intrusion Detection MCU provides optimized configuration parameters for each lens/sensor combination to ensure the best possible performance while significantly reducing development risk and minimizing time to market.

### ZMOTION MCU Block Diagram



## ZMOTION Intrusion Detection Feature Set

### APPLICATIONS

- WIDE AREA INTRUSION DETECTOR
  - CORRIDOR, CURTAIN & VERTICAL BARRIER MOTION DETECTORS
  - DUAL MODE LIGHTING/INTRUSION DETECTOR
  - SECURE ACCESS CONTROL
  - STAND-ALONE ALARM SYSTEMS
- Optimized assemblage of MCU, Lens, and PIR Sensor
  - High-performance eZ8® MCU core
  - 2 KB in-circuit programmable Flash available for application code
  - Single-pin debug with unlimited breakpoints
  - Internal precision oscillator running at 5.53 MHz
  - External oscillator operating up to 20 MHz
  - Sigma Delta ADC with up to 6 channels single ended or 3 channels differential available
  - On-chip analog comparator with independent programmable reference voltage
  - Full-duplex UART with dedicated BRG
  - Two 16-bit timers with input capture, output compare, and PWM capability (11 modes total)
  - Watchdog timer (WDT) with dedicated internal oscillator
  - 6 to 25 I/O pins depending upon package
  - 2.7 V to 3.6 V operating voltage with extended operating temperature range  $-40^{\circ}\text{C}$  to  $+105^{\circ}\text{C}$
  - PIR software engine controlled and monitored through software API registers
  - Select from an assortment of lenses and pyroelectric sensors to best fit your application
  - Optimized API settings provided for each lens and pyroelectric sensor combination
  - Create your own API settings to match your own lens
  - Sensitivity control, range control, and directionality detection
  - Hypersense detection mode for occupancy sensing
  - Low power modes

### Ordering Information

The ZMOTION Intrusion Detection Solution is comprised of a ZMOTION MCU, Lens, and Pyroelectric sensor. Construct your part number based on the specific combination of MCU, Lens, and Pyroelectric sensor you wish to order. There are four fields in the part number that determine this combination; the ZMOTION MCU is also available separately.

Order the ZMOTION Intrusion Detection Solution from Zilog® using the following guide.

Position:	1	2	3	4	5	6	7	8	9	10	11	12	13
Field	Z	M	O	T	MCU	MCU Package	Lens	PIR	G				
										User-Defined Options			

For complete ordering information, please refer to the ZMOTION Intrusion Detection Product Specification (PS0288).

For more information about Zilog's motion detection products, ordering or product collateral, please consult your local Zilog distributor or representative. You can find sales office locations and the most current product information on our website; please visit us at [www.zilog.com](http://www.zilog.com).

## ZMOTION MCU Option

Our MCU option provides you with a simple silicon-and-software solution.

ZMOTION Intrusion Detection MCU Part Number	Flash Memory	GP I/O	ADC Channels	Package	MCU Field	MCU Package Field
Z8FS021xSB20EG	2 KB	5	3	8-pin SOIC	1A	SB
Z8FS021xHH20EG	2 KB	16	4	20-pin SSOP	1A	HH
Z8FS021xHJ20EG	2 KB	22	6	28-pin SSOP	1A	HJ

Order the ZMOTION MCU separately using part numbers from the above table.

## Pyroelectric Sensor Options

Choose from the three PIR Sensors available depending on your application requirements. Not all sensors are suitable for all lenses.

Part Number	Description	PIR Field
RE200B-P	Basic Dual Element	0A

Contact Zilog for additional Pyroelectric sensor options

## Lens Options

A selection of matched lens and pyroelectric sensors are available to meet a variety of applications. The Lens and Pyro fields in the table below correspond to Zilog part numbers; please see Ordering Information, above.

Description	Typical Applications	Lens Fields	PIR Fields	Pyro Sensor
<b>Wide Angle Array</b> WA 1.2 GI 12 V4 <ul style="list-style-type: none"> <li>• 42.6 mm x 61.0 mm flat Fresnel</li> <li>• 30.5 mm (1.2") focal length</li> <li>• 88° detection area</li> <li>• 18 meter range</li> </ul>	Corner wall mount 18 meter motion detector	0E	0A	RE200B-P
<b>Long Range Array</b> LR 1.2 GI 12 V3 <ul style="list-style-type: none"> <li>• 42.6 mm x 61.0 mm flat Fresnel</li> <li>• 30.5 mm (1.2") focal length</li> <li>• Narrow detection area</li> <li>• 30 meter range</li> </ul>	Wall mount corridor and curtain-type motion detectors	0F	0A	RE200B-P
<b>Vertical Barrier Array</b> VB 1.2 GI V1 <ul style="list-style-type: none"> <li>• 42.6 mm x 61.0 mm flat Fresnel</li> <li>• 30.5 mm (1.2") focal length</li> <li>• Narrow detection width (5.6°)</li> <li>• 15 meter range</li> </ul>	Curtain- and vertical barrier-type motion detectors	0G	0A	RE200B-P

Please contact Zilog for additional Lens options.

## Documentation

For a complete listing of all available application notes, data sheets, user manuals, and sample libraries, please visit us at [www.zilog.com](http://www.zilog.com).

Document Number	Description
PS0288	ZMOTION Intrusion Detection Product Specification
PS0286	ZMOTION Lens and Pyroelectric Sensor Product Specification
PS0228	Z8 Encore! XP F08xA Series Product Specification
WP0017	A New PIR Motion Detector Architecture White Paper
UM0233	ZMOTION Intrusion Detection Development Kit User Manual
QS0078	ZMOTION Intrusion Detection Development Kit Quick Start Guide
RD0001	ZMOTION Intrusion Reference Design

## Development and Evaluation Tools

To aid in the evaluation and development of you ZMOTION Intrusion based product, Zilog provides a selection of tools and reference designs. For more information about the following products, please visit us at [www.zilog.com](http://www.zilog.com).

Product Name	Part Number	Description
ZMOTION Intrusion Detection Development Kit	ZMOTIONS200ZCOG	Development Kit for the ZMOTION Intrusion Detection Solution Kit includes Development board, lens holder and lenses, ZDS II IDE and USB Smart (Debug) Cable
ZMOTION Intrusion Reference Design	ZMOTIONS200ZRDG	Complete Intrusion Motion Detection design including WA, LR and VB lens types. Features include white light detection, 12kg/30kg selectable pet immunity, anti-mask demo and Auto-LED. Independently verified to meet EN-50131 compliance requirements.

## Related Products

Zilog carries a number of motion detection products to suit your application requirements. For more information about the following products, please visit us at [www.zilog.com](http://www.zilog.com).

Product Name	Part Number	Description
ZMOTION Detection & Control Development Kit	ZMOTIONL100ZCOG	Development Kit for the ZMOTION Detection & Control Family
ZMOTION Detection Module	ZEPIROAAS02MODG	Low-profile motion detection module
ZMOTION Detection Module Development Kit	ZEPIR000102ZCOG	Development Kit for the ZMOTION Detection Module



## Warning: DO NOT USE IN LIFE SUPPORT

### LIFE SUPPORT POLICY

ZILOG'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS PRIOR WRITTEN APPROVAL OF THE PRESIDENT AND GENERAL COUNSEL OF ZILOG CORPORATION.

### As used herein

Life support devices or systems are devices which (a) are intended for surgical implant into the body, or (b) support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in a significant injury to the user. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness.

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