

Project: Dual technology microwave / p.i.r motion detector.
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Sponsor: Visonic L.T.D
Year: 2000/2001

Introduction

Development of motion detector with two technologies of motion detection: any object (including human body) emits infra red radiation depending on the object temperature. We can sense this radiation with special pyro-electric sensor (P.I.R) from a distance.

Using the “Doppler effect “ by which a moving object in a microwave field changes the doppler frequency, we build a receiver / transmitter microwave unit, transmit a signal receive a signal and compare them . The P.I.R and MW technologies, when combined in a single detector, complement each other to assure the most reliable detection and immunity to false alarms.

FEATURES

- Cylindrical optics improves detection and false alarm immunity.
- Programmable motion event counter (1or2 events).
- Simple-to-use, two-position vertical adjustment
- TEST input to enable/disable the walk test LED remotely (per new European standard)
- Open collector trouble output
- Anti-masking protection
- White light protection.
- DRO-stabilized MW microstrip technology.
- **MW Motion Simulator** simulates the effect of a human body moving in the MW field (for MW self-test - patent pending).
- Range control for adjusting the MW coverage
- **True Motion Recognition™ (TMR)** algorithm (patented) distinguishes between the true motion of a human body and other disturbances, which invariably cause false alarms.
- Sealed chamber protects the pyroelectric element from insects.
- PIR self-test by applying a short heat pulse.
- Free terminal for connecting an E.O.L. resistor

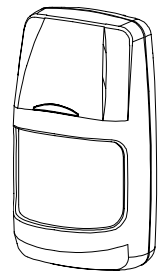


Figure 1. General View

Specifications

Input Voltage: 9 to 16 VDC

Current Drain :About 28 mA at 12 VDC

Detector :Low noise dual-element pyroelectric Sensor

Tripping Indication :LED flashes green for up to 5 seconds

Motion Event Verification Counter :Selectable, 1 or 2 events

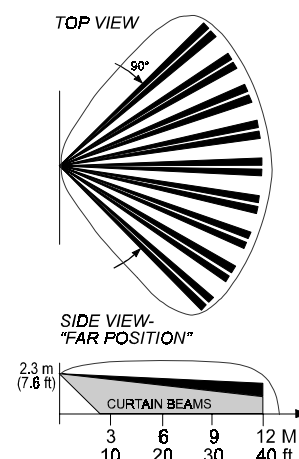


Figure 2. Coverage Pattern

Lens Data:

No. of Beams: 36 in two layers (curtain beams in bottom layer)

Max. Coverage: 15 x 15 m / 90° field of view

Vertical Adjustment :FAR and NEAR, by sliding the circuit board along a two-position scale.

MW SECTION

Oscillator :Microstrip DRO-stabilized Doppler module

Frequency:2.45 GHz

Detection Range :Adjustable from 20% to 100% (3 m to 15 m)

Tripping Indication :LED glows green for up to 5 seconds

ALARM, TAMPER & TROUBLE DATA

Alarm Indication :LED glows red for 1.3 to 5 seconds if both detectors trip

Relay Contacts :N.C., rated at 0.1 A resistive / 30 VDC; 18 Ω resistor in series with contacts

Alarm Duration: 1.3 to 5 seconds

Tamper Switch: N.C., rated at 50 mA resistive / 30 VDC

Trouble Output :Open collector, 100 mA max., with 18Ω resistor in series .

Masking Detection Delay :About 60 seconds

Trouble/ Masking Indication :LED alternately flashes green and red and TRB output pulls LOW until the detector is reset.

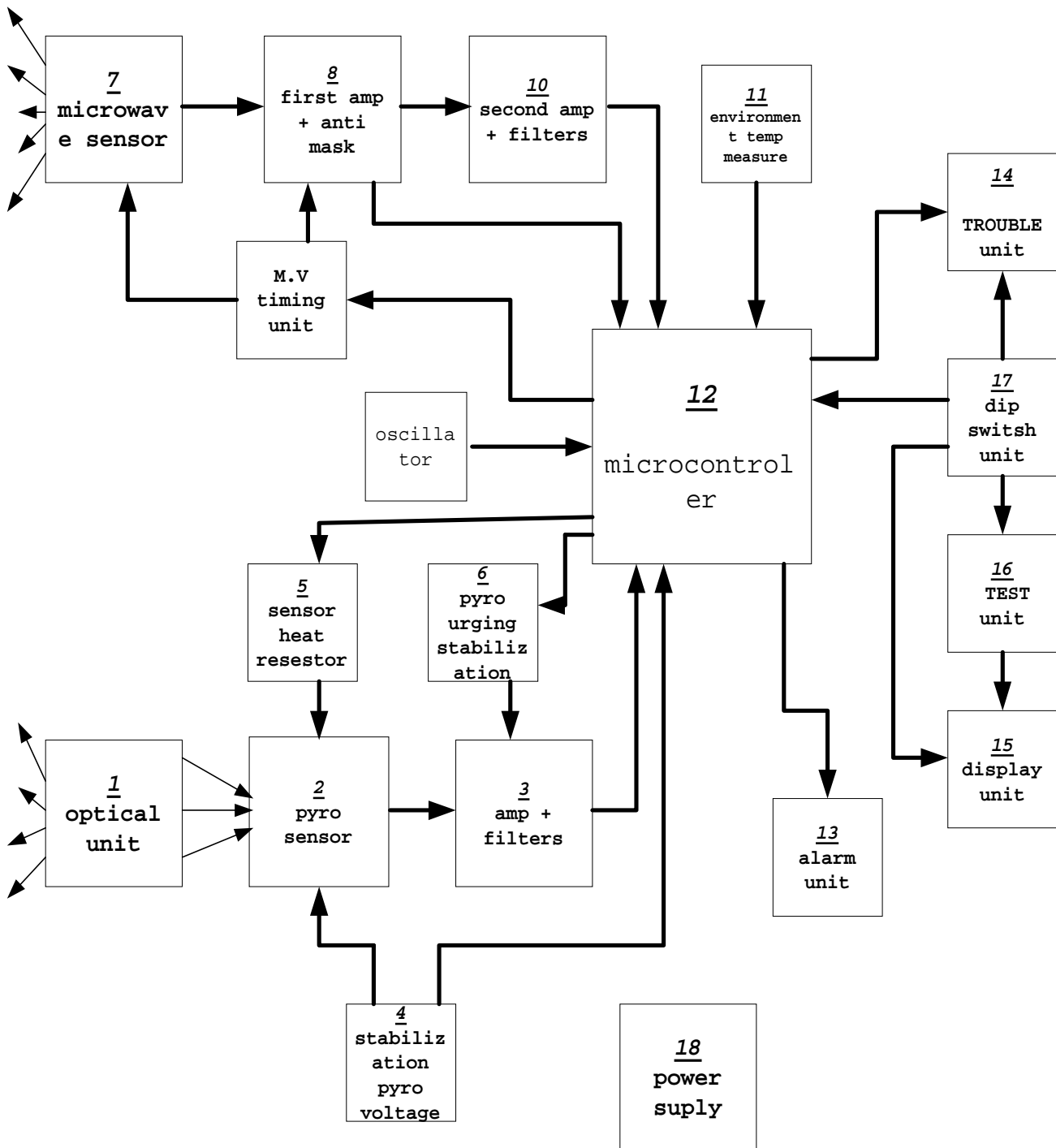
ENVIRONMENTAL

RFI Protection: 30< V/m up to 1000 MHz.

Operating Temperatures: -10 °C to 50°C (14°F to 122°F)

Storage Temperatures: -20 °C to 60°C (-4°F to 140°F)

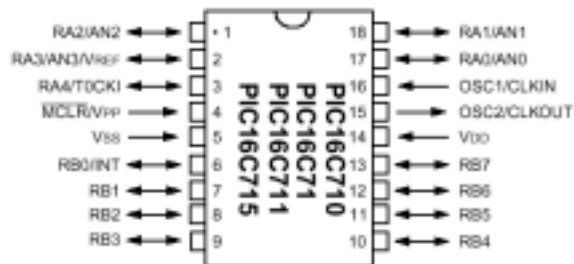
General Description



Block diagram

The detector is microcomputer controlled that receive signals from the P.I.R unit and the MW unit, and with a special algorithm process the signals to determine the motion detection. In addition there is an algorithm that perform a self-testing based on a simulation of human body movement to assure that the detector operates properly, and if not a trouble alert is initiated.

The microcomputer in use is pic16lc711 from Microchip ,8 bit CMOS microcontroller with A/D converter,8 levels of stack, 1K of program memory, 13 I/O pins , 4 interrupt sources.



Pin diagram

Each sensor output goes to amplifier unit to fit is low signal to the microcontroller . The microcontroller control all the units in the detector . We can see that in the block diagram .



detector