DS815 DETAILED SPECIFICATION
BILL DIPOALA
1/11/00

The DS815 Dual PIR/Microwave motion detector. The DS815 uses the same PCB and uP code as the DS820i. The DS815 is a 15' non-pet immune detector targeted towards the commercial market. The enclosure design is unique to this product (#38317 and #38318) and uses the non-pet lens #37100. Please refer to the general / marketing product specification for additional product details.

+5V Regulator

The 5V regulator (U1) consists of an LM2931 voltage regulator. RV1 protects the voltage regulator from harmful voltage spikes. A 15uF tantalum capacitor is used for temperature stability.

PIR Amplifier

The PIR amplifier utilizes one half of the LM324 (U3). The DET is DC coupled to the first amp stage. The gain of the first amp is determined by the ratio of R10 to R11. The bandwidth of the first stage is limited by the values of C11 and C12, or .2 to 23 Hz. The gain of the second stage is determined by the ratio of R13 to R15. The bandwidth is limited by C13 and C14, or .2 to 16 Hz. The amplified signal is coupled to one of the analog inputs of the microprocessor (U4) where signal processing is performed. The temperature compensation function has been disabled in order to reduce cost.

Microwave Subsystem

The MW subsystem utilizes a Stripline Microwave Transceiver. The transmitter consists of a FET oscillator (Q99) biased through R99. The frequency of oscillation is determined by the electrical/physical properties of the ceramic resonator Y99. Fine-tuning of the transmitter is accomplished by adjusting the position of the tuning screw located in the back of the plastic black shield. The transmitter drive pulse is generated by microprocessor U4. The drive pulses are applied to Q99 via Q1, and are 20 microseconds on time, and 1 millisecond off time. The receiver incorporates a balanced mixer design consisting of two diodes present in D99. Equal amounts of RF energy are applied to each diode, one from the transmitter and one from the receiver section. This balancing of the RF energy should produce a nominal pulse voltage on the IF output (MW2) of 0Vp, and should always be less than +/- 0.15Vp. The IF output is fed to a sample-and-hold circuit Q7 via AC coupling cap C6. The sample pulse is generated by the microprocessor and should be 10 microseconds long and centered in the middle of the drive pulse. U3-3 and U3-4 then amplify the Doppler signal. The MW range is factory adjusted by potentiometer R28. This amplified signal is fed into one of the four analog inputs of the microprocessor where the rest of the signal processing is done (see software spec.).

Microprocessor Functions

See DS835i Microprocessor Specification.

DS820i, DS835i TECHNICAL DESCRIPTION
BILL DIPOALA
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The DS820i and DS835i are Dual PIR/Microwave motion detectors. The only difference between the two units is the coverage of the units; the DS820 (20 ft. by 20 ft.), the DS835 (35 ft. by 35 ft.). The coverage is determined by the value of the passive infrared detector's gain resistor, R10.

+5V Regulator

The 5V regulator (U1) consists of an LM2931 voltage regulator. The power coming from the terminal strip is rectified through D1 to prevent reverse power damage to U1. RV1 protects the voltage regulator from harmful voltage spikes. The UNREG line is used to drive all high current loads through emitter followers to prevent noise spikes from entering the amplifiers.

PIR Amplifier

The PIR amplifier utilizes one half of the LM324 (U3). The DET is DC coupled to the first amp stage.). The gain of the first amp is determined by the ratio of R10 to R11. The bandwidth of the first stage is limited by the values of C11 and C12, or .2 to 23 Hz. The gain of the second stage is determined by the ratio of R13 to R15. The bandwidth is limited by C13 and C14, or .2 to 16 Hz. The amplified signal is coupled to one of the analog inputs of the microprocessor (U4) where signal processing is performed.

Microwave Subsystem

The MW subsystem utilizes a Stripline Microwave Transceiver. The transmitter consists of a FET oscillator (Q99) biased through R99. The frequency of oscillation is determined by the electrical/physical properties of the ceramic resonator Y99. Fine tuning of the transmitter is accomplished by adjusting the position of the tuning screw located in the back of the plastic black shield. The transmitter drive pulse is generated by microprocessor U4. The drive pulses are applied to Q99 via Q1, and are 20 microseconds on-time, and 1 millisecond off-time. The receiver incorporates a balanced mixer design consisting of two diodes present in D99. Equal amounts of RF energy are applied to each diode, one from the transmitter and one from the receiver section. This balancing of the RF energy should produce a nominal pulse voltage on the IF output (MW2) of 0Vp, and should always be less than +/- 0.15Vp. The IF output is fed to a sample-and-hold circuit Q7 via AC coupling cap C6. The sample pulse is generated by the microprocessor and should be 10 microseconds long and centered in the middle of the drive pulse. The Doppler signal is then amplified by U3-3 with the amplified signal fed to microprocessor pin 18 for self-test and anti-mask functions. The signal is also fed to the second amplifier stage U3-4. The MW range is adjusted by potentiometer R28. This amplified signal is fed into one of the four analog inputs of the microprocessor where the rest of the signal processing is done (see software spec.).

Microprocessor Functions

See DS820 Microprocessor Specification.