X-Band Doppler Motion Detector Units
Model Numbers MDU2750

Key Features
- Low Cost
- High Sensitivity
- High Stability
- Patch Antenna
- Small and Flat Profile
- Rugged, reliable construction
- Low Power consumption
- RoHS compliant
- Meets EN 300 440 v1.6.1 & FCC 15.245

Applications
- Intrusion Alarms (Room, Vehicle)
- Automatic Door Openers
- Speed Measurement
- Collision Avoidance
- Traffic Control
- Presence Sensing

The Microwave Solutions MDU2750 Motion Detector Unit is an X-Band microwave transceiver that utilises the Doppler shift phenomenon to "sense" motion.

The unit, contained in a cast metal housing, features a dielectric resonator stabilised FET oscillator, which provides stable operation over a broad temperature range in either CW or low duty cycle pulse mode and a balanced mixer for enhanced sensitivity and reliability.

Operation
The basic principle of operation consists of detecting the frequency shift between a transmitted and a received signal reflected back from a moving object within the field of view of the unit.

The unit produces a low level output signal which can be amplified and processed to provide an audible or visual alarm signal and employs low cost surface mount manufacturing techniques which are field proven as being rugged and reliable.

Available Modules

<table>
<thead>
<tr>
<th>Model</th>
<th>Country</th>
<th>Frequency</th>
<th>Comments</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDU2750</td>
<td>UK</td>
<td>10.587 GHz</td>
<td>Meets RE Directive</td>
<td>C920101</td>
</tr>
<tr>
<td>MDU2750</td>
<td>Belgium, Holland, Italy</td>
<td>10.525 GHz</td>
<td>Meets RE Directive</td>
<td>C920102</td>
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<tr>
<td>MDU2750</td>
<td>USA</td>
<td>10.525 GHz</td>
<td>FCC Grant ROO-MDU2750</td>
<td>C920102</td>
</tr>
</tbody>
</table>


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**Model Numbers MDU2750**

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### Electrical Characteristics

**Transmitter**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>See table over</td>
</tr>
<tr>
<td>Frequency Setting Accuracy</td>
<td>3 MHz</td>
</tr>
<tr>
<td>Power Output (Min.)</td>
<td>10 dBm EIRP</td>
</tr>
<tr>
<td>Operating Voltage</td>
<td>+5 V ± 0.25 V</td>
</tr>
<tr>
<td>Operating Current (CW)</td>
<td>45mA (max)</td>
</tr>
<tr>
<td>Harmonic Emissions</td>
<td>&lt;30dBm</td>
</tr>
</tbody>
</table>

**Pulse Mode Operation**

- Average Current (5% DC): 2 mA typ.
- Pulse Width (Min.): 5 µs
- Duty Cycle (Min): 1%

**Receiver (Bandwidth DC ~ 3KHz)**

- Sensitivity (for a 10 dB S/N ratio): -86 dBm
- Noise (measured in a 3Hz to 80Hz bandwidth): < 10 µV

**Antenna:** standard

- Gain: 8 dBi
- -3 dB Beamwidth: 72°
- E Plane: 72°
- H Plane: 36°

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### Mechanical Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>16 g</td>
</tr>
<tr>
<td>Tab Connections</td>
<td>0.1&quot; spacing</td>
</tr>
<tr>
<td>Metallisation</td>
<td>Sn+Ni+Cu</td>
</tr>
<tr>
<td></td>
<td>JEDEC JESD97 (e2)</td>
</tr>
</tbody>
</table>

### Environmental Characteristics

**RoHS Compliant**

- Power/Temp. Coefficient (over operating temp. range): 3 dB
- Frequency/Temp. Coefficient (over operating temp. range): 5 MHz
- Operating Temperature: -20° C to +55° C
- Storage Temperature: -40° C to +80° C

**NOTES**

- Detection range is dependent on size and reflectivity of target and S/N ratio. Doppler shift at 10.525GHz is 70 Hz per m/s target velocity.
- Unit functions over -30° C to +70° C, but performance may be degraded above +55° C

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**Coverage Pattern**

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