

### 1. Introduction

HB190 microwave motion sensor is a X-Band Bi-Static Doppler transceiver module that makes use of Doppler Effect Principle to detect motion. These modules are designed for movement detection, like intruder alarms, occupancy modules and other innovative ideas.

The module consists of Dielectric Resonator Oscillator (DRO), microwave mixer and Dipole antenna (see Diagram A).

This User Manual highlights some important points when designing-in HB190 module.

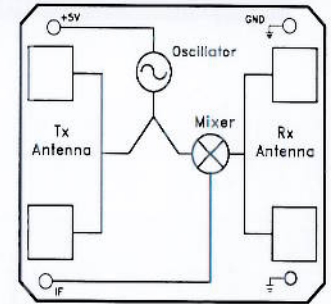


Diagram A: Block Diagram

### 2. Mounting

Terminal Pins can be used to connect the terminals (+5V, IF, GND) to amplifier circuits as well as mounting support. Other mounting methods may be used.

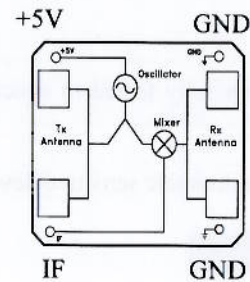
Wave-soldering the module onto PCBA is possible but processes have to be evaluated to prevent deterioration. No-cleaning process is recommended.

Caution must be taken to avoid applying pressure or stresses to the chassis of the module as it may cause performance deterioration.

### 3. Power Supply & Connection

The module operates at +5Vdc for Continuous wave (CW) operation.

The connections are shown in the diagram on the right.

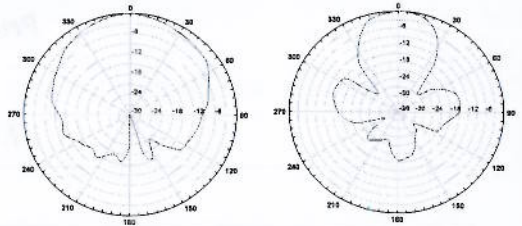


### 4. Radiation Pattern

The module is to be mounted with the patch antennas facing the desired detection zone.

The user may adjust the orientation of the module to get the best coverage.

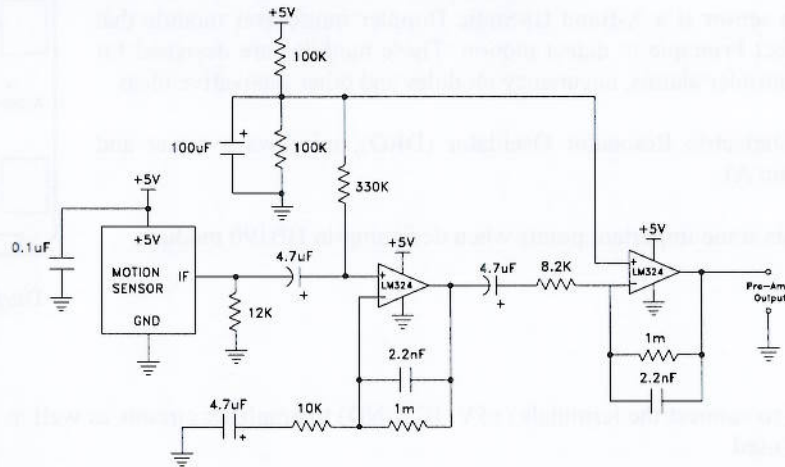
The radiation patterns of the antenna are shown in the diagram on the right.



### 5. Output Signals

**Doppler shift** - Doppler shift is the output from IF terminal when movement is detected. The magnitude of the Doppler Shift is proportional to reflection of transmitted energy and is in the range of microvolts ( $\mu\text{V}$ ). A high gain low frequency amplifier is usually connected to the IF terminal in order to amplify the Doppler shift to a process able level. Frequency of Doppler shift is proportional to velocity of motion. Typical human walking generates Doppler shift below 100 Hz.

### 6. Reference Amplifier Circuit Design (CW operation)



### 7. Radiation Safety

Microwave radiation from the module is well below established safety standards for general public environment, like ANSI C95.1-1991 of USA and NRPB-G11 of United Kingdom.

### 8. Handling

The module has been fully tested to specifications. Upon opening, tighten or loosen the chassis will cause performance deterioration.

The module is an electrostatic sensitive device (ESD). Precautions shall be observed for handling and assembly.

### 9. Product Support

Please contact our product support engineers in the factory for technical assistance whenever necessary.

**Product Support (Microwave Sensors)**

**Tel: (65) 6568 7414**

**Fax: (65) 6567 6370**

**E-mail: agilsense@stee.stengg.com**

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications to ST Electronics equipment not expressly approved by ST Electronics could void the user authority to operate the equipment.