

# Bluetooth Microwave Occupancy Sensor Module (BTM-RDR-A)

## User's Manual and Design-in Guide

## Introduction

The Douglas Lighting Controls **Bluetooth**® Microwave Occupancy Sensor Module (BTM-RDR-A) provides automated individual and group control of light fixtures using onboard sensors and Bluetooth technology. The BTM-RDR-A integrates directly in a light fixture and uses a 5.8GHz microwave sensor to detect motion within its field of view to control operation of the fixture. The BTM-RDR-A is powered by the fixture Dim-to-Off enabled LED driver and controls it through a 0-10V interface.

An integrated ambient light sensor can be used to inhibit operation of the fixture if there is sufficient ambient light available during motion/occupancy, thereby providing energy savings.

The BTM-RDR-A is easily configured for standalone or grouped operation with other devices in the Douglas Bluetooth product ecosystem using the Douglas Lighting Controls BTCC mobile application for iOS devices.

The BTM-RDR-A supports emergency fixture operation according to UL Standard 924, and is recognized for use in LED fixtures according to UL Standard 8750.

The BTM-RDR-A meets ASHRAE 90.1 and Title 24 Code requirements as part of a lighting control system based on the Douglas Lighting Controls Bluetooth product ecosystem.

Typical applications: Fixture integrated applications where the occupancy sensor is occluded from area occupants, e.g. in vapor tight fixtures in damp locations.

## Design Features

- Bluetooth Mesh wireless technology
- 5.8GHz motion detection sensor radar technology
  - Not impacted by non-metallic obstructions between occupants and the sensor
  - Motion detect disable to limit WiFi interference
- Ambient light detection fixture inhibit
- Mid-height installation up to 7m
- 0-10V dimming control
- Compatible with Dim-to-Off LED drivers
- Occupancy Modes: Occupancy, Vacancy, Partial ON, Partial OFF
- Single module design for surface mount connection to a fixture LED panel
- Deck level commissioning using iOS mobile device

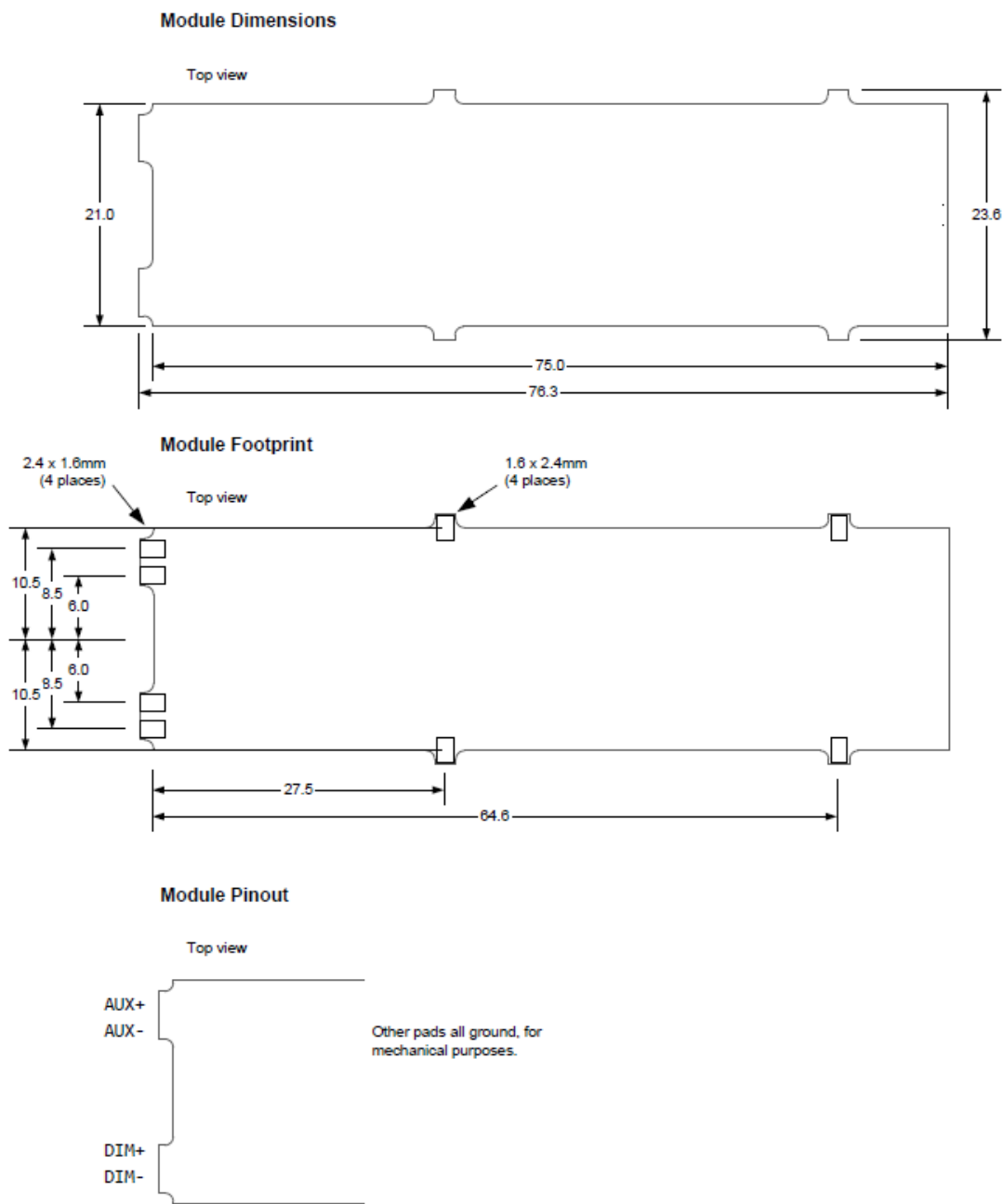
## Specifications

Name	Bluetooth Microwave Occupancy Sensor Module
Mounting	Surface Mount (SMT) Soldering to LED panel
Connections	4 SMT connections:12 VDC/GND; 0-10V dimming control
Input Rating	12 VDC, 50mA
Dimming	0-10V dimming interface; 25mA sink current
Wireless Range	15m nominal; 35m clear line of sight Distance varies based on location and environment Additional devices may be required at time of commissioning for network integrity
Occupancy Detection	Maximum 7m mounting height; Maximum sensing radius ~5-6m at ~3-5m height
Environment	Stationary, non-vibrating Non-condensing humidity Operating Temperature: -30C to 80C Storage Temperature: -40C to 80C
Certifications	UL924 Listed UL8750 Recognized

## Dimensions

The BTM-RDR-A is a single sided PCB module that contains 4 circuit connections on the left side (see Module Pinout diagram below) for 12VDC input and 0-10V dimming control. The 12VDC input pads are referred to as AUX+ and AUX-. The 0-10V dimming pins are referred to as DIM+ and DIM-. Internal to the BTM-RDR-A module the AUX- and DIM- are connected together to the onboard GND.

The BTM-RDR-A module also has 4 pads (2 top, 2 bottom) for securing the module to the host PCB. These pads also are connected to the module's onboard GND.



## Installation/Mounting

The BTM-RDR-A is designed to be surface-mount soldered to the LED PCB of a lighting fixture and therefore does not require any wiring connections to the fixture. Please refer to the Dimensions section of this document for the size, SMT footprint, and pinout for the module. The module can be hand-soldered to the LED PCB or it can be reflow soldered at the same time as the rest of the components on the fixture LED PCB.

## ESD Handling

The BTM-RDR-A module contains highly sensitive electronic circuitry and is an Electro Static Discharge Sensitive (ESDS) device. At all times the BTM-RDR-A modules should be handled using proper ESD protection measures. Failure to observe these recommendations can result in severe damage to the module.

## Reflow Soldering

The recommended reflow profile is as follows.

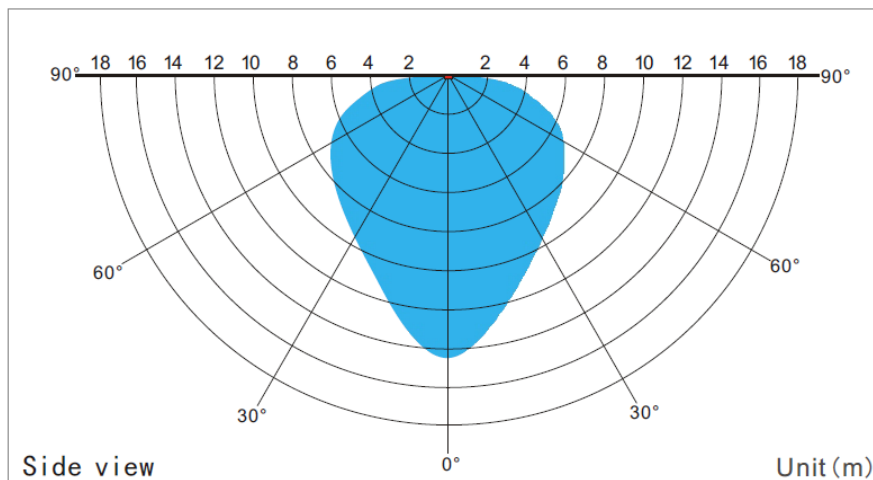
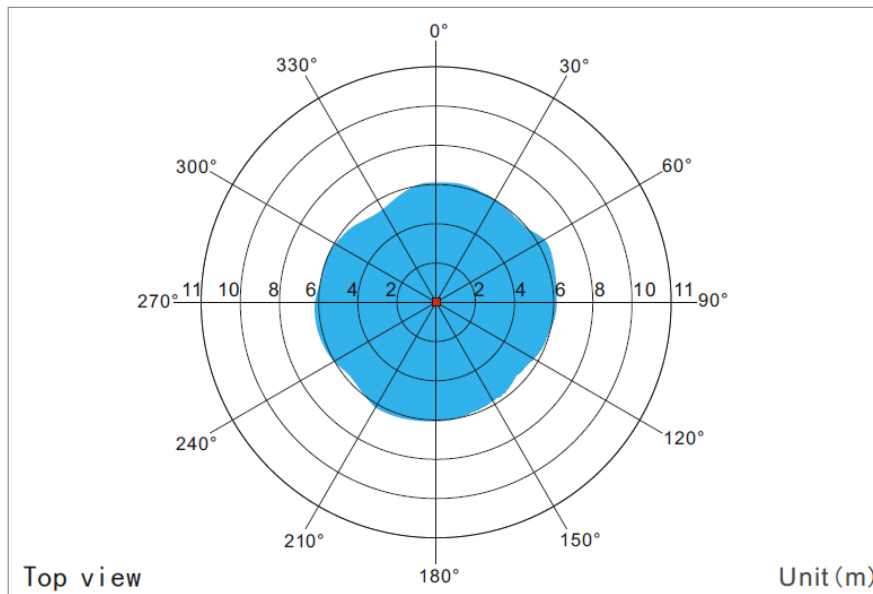
Parameter Values	
Ramp Up Rate (from $T_{\text{soakmax}}$ to $T_{\text{peak}}$ )	3°C/sec max
Minimum Soak Temperature	150°C
Maximum Soak Temperature	200°C
Soak Time	60-120 sec
$T_{\text{liquidus}}$	217°C
Time above TL	60-150 sec
$T_{\text{peak}}$	250°C
Time within 5°C of $T_{\text{peak}}$	20-30 sec
Time from 25°C to $T_{\text{peak}}$	8 min max
Ramp down Rate	6°C/sec max

## Occupancy/Motion-Detection Coverage

The BTM-RDR-A module contains a 5.8GHz microwave radar motion sensor capable of detecting motion through non-metallic obstacles making it suitable for applications such as mounting behind a sealed diffusing lens of a light fixture. The charts below represent the approximate detection area of the motion sensor.

Although the sensor has the ability to detect large motion at relatively long range, the maximum mounting height recommended to provide a broad cone of coverage is 7 meters and the maximum radius of the cone of coverage is approximately 5-6 meters.

The sensitivity of the motion sensor can be adjusted using the mobile commissioning application in order to reduce the possibility of false triggers when maximum range detection is not required. See the section below on Commissioning.



## Commissioning

The BTM-RDR-A module is part of Douglas Lighting Controls Bluetooth lighting control ecosystem and therefore interoperates with other Douglas Bluetooth products such as fixture controllers, other occupancy and daylight sensors, and switches. The BTM-RDR-A also can be integrated with Douglas Lighting Controls Dialog lighting control solution through Douglas Lighting Controls' BT-GTWY-A Bluetooth-Dialog gateway and a Dialog WLC-4150 Lighting Control Unit (LCU).

The BTM-RDR-A is configured using the Douglas Lighting Controls BTCC Bluetooth commissioning application available for iOS mobile devices through the Apple Store. The BTCC application is used to:

- group the BTM-RDR-A with other devices in a common area,
- enable occupancy detection
- set occupancy range sensitivity
- set the occupancy mode (Occupancy, Vacancy, Partial ON, Partial OFF),
- set occupancy timeout,
- set the Zone of operation within the area including minimum and maximum lighting trim levels,
- enable photo inhibit operation and set photo inhibit levels,
- enable response to Daylight Harvesting from other daylight sensors,
- enable emergency power support,
- enable dimming level reporting to an LCU, and
- enable iBeacon transmission and adjust related iBeacon parameters for location services.

See the Douglas Lighting Controls BTCC Field Manual available on the Douglas Lighting Controls website for a description of how to use the application to commission and configure the BTM-RDR-A module.

## FCC and ISED Regulatory Statements

### FCC Part 15

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. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### FCC Guidelines for Human Exposure

Douglas Lighting Control products comply with FCC radiation exposure limits set forth for an uncontrolled environment. The equipment should be installed and operated with a minimum distance of 20cm between the radiator and all persons.

### Industry Canada Notifications

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

1. This device may not cause interference; and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage;
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

### IMPORTANT NOTE: Radiation Exposure Statement

Douglas Lighting Controls products comply with IC radiation exposure limits set forth for an uncontrolled environment. Douglas Lighting Controls products should be installed and operated with a minimum distance of 20cm between the antenna of the radiator and all persons.

### NOTE IMPORTANTE: Déclaration d'exposition aux radiations

Produits Douglas Lighting Controls sont conformes aux limites IC d'exposition aux rayonnements définies pour un environnement non contrôlé. Produits Douglas Lighting Controls doivent être installés et utilisés avec distance minimum de 20cm entre le radiateur et votre corps.

PMN: BTM-RDR-A

## RF Rules

The BTM-RDR-A complies with FCC Title 47 Part 15 Subpart C for Intentional Radiators and IC RSS-247 Issue 2.

## Additional Testing

The BTM-RDR-A is only authorized for the specific RF rules specified above. It is the OEM's responsibility for compliance to any other FCC or IC rules that apply to the host product not covered by the BTM-RDR-A module certification.

## Conditions for Use

The BTM-RDR-A is intended only for the use described in this document, as a control device for commercial LED light fixtures. Modification to the module in any way is not authorized.

Particularly the BTM-RDR-A must be used with the included Bluetooth antenna.

## OEM Labeling

The BTM-RDR-A has been tested to the FCC and Industry Canada rules specified above. The OEM is responsible for ensuring the host product is labelled on the exterior with the following:

Contains FCC ID: 2AV38-BTMRDRA

Contains IC: 25994-BTMRDRA