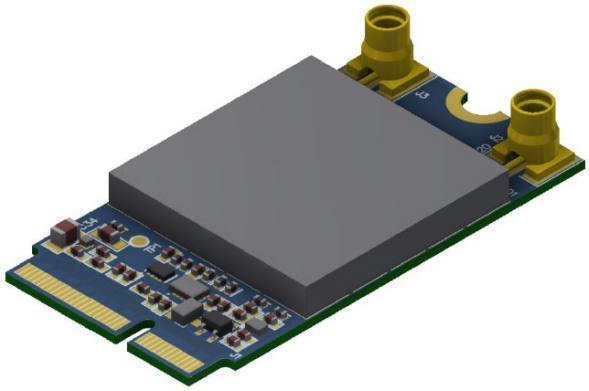

# Wabtec ASMB0876 Mini RF UHF Module Silabs Instructions



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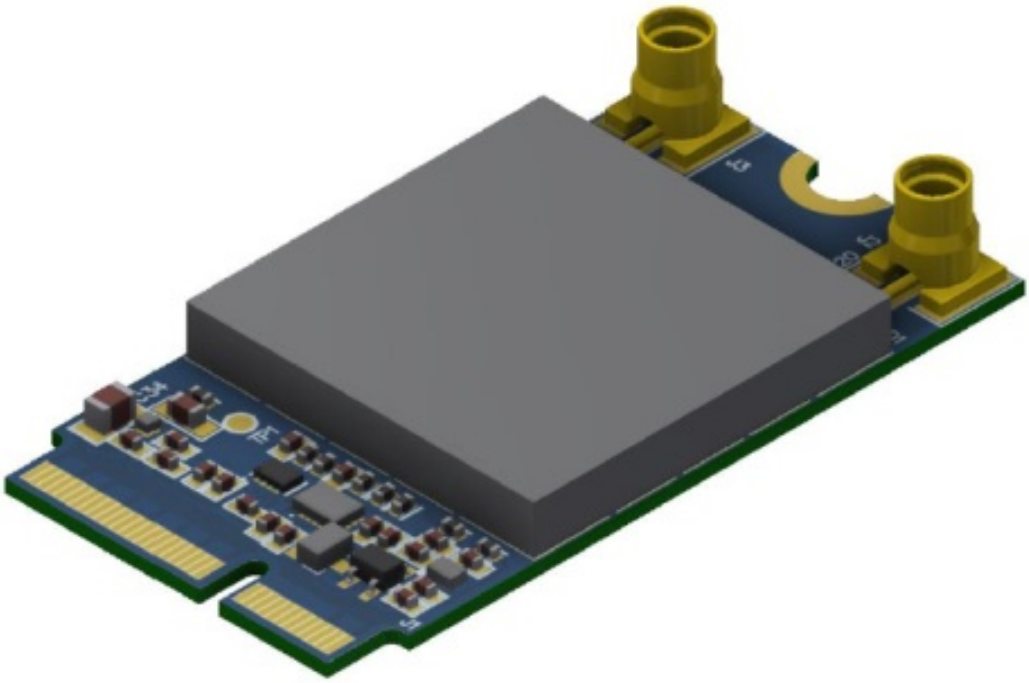
**Wabtec ASMB0876 Mini RF UHF Module Silabs**





## MANUFACTURER INFORMATION

### INTRODUCTION

The product or product family described under scope of this document will be henceforth referred to as DEVICE. This manual provides the information on the DEVICE, its variants, specifications, operation, maintenance, decommission and disposal.

## SAFETY INFORMATION

The safety section includes safety precautions which must be observed when working on items that appear throughout the manual. Examples of safety precautions and labels are outlined below:

- Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
- Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

- Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
- Indicates a potential for equipment damage.

## DISCLAIMER

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Industrea Mining Technology Pty Ltd is a registered business subsidiary of Wabtec Corporation

## GENERAL FEATURES

The ASMB0876 is a digitally controlled radio module implemented on an industry-standard M2.xx style circuit board. This module can use used in a host controller board to provide a short-range, power-limited UHF radio link for a variety of applications.

**Key features include:**

- Silabs Si4463 digitally controlled radio
- Power supply regulation/conditioning
- Serial interface
- Dual RF antennae ports under firmware control for antennae diversity

### ABBREVIATIONS

| ABBREVIATION | DESCRIPTION |
|---|---|
| V2V | Vehicle to Vehicle |
| N/C | Not Connected |

### SCOPE & SPECIFICATION

This user manual covers Mini RF UHF Module Silabs Radio Module, Model No.: ASMB0876.

| FEATURE | DETAIL |
|---|---|
| Operating Frequency Band | 869.40 – 869.650 MHz<br>902 – 928 MHz |
| Maximum Transmit Power | 20 dBm at MMCX Pins |
| Chipset | SiLabs Si4463 |
| Chipset Frequency Range | 142–1050 MHz |
| Modulation | 4GFSK |
| Antenna Type | Two MMCX antenna pins for antenna diversity |
| Antenna Gain | 902-928 MHz: Peak Gain +8 dBi max<br>869.40 – 869.650 MHz: Peak Gain +2.9 dBi max |
| Additional Mitigation Techniques | Listen Before Talk |
| Rated Voltage | 3.3 Vdc |
| Operating Temperature | -40°C to +75°C |
| Module Dimensions | 42 mm x 22 mm |

**PIN CONFIGURATION AND FUNCTION**

| PIN | SIGNAL | TYPE |
|---|---|---|
| 74 | Vsupply (+3.3V) | PWR |
| 72 | Vsupply (+3.3V) | PWR |
| 70 | VIO | PWR |
| 68 | VSTDBY | PWR |
| 66 | PWREN/#SDN | CMOS |
| 64 | RESERVED-DBG | N/C |
| 62 | I2C-BUSEN | CMOS |
| 60 | I2C-SCA | CMOS-OD |
| 58 | I2C-SDA | CMOS-OD |
| 56 | ID-CATEGORY | Passive |
| 54 | ID-VARIANT | Passive |
| 52 | #RESET | CMOS-OD |
| 50 | CLK32K | CMOS |

| PIN | SIGNAL | TYPE |
|---|---|---|
| 75 | GND | PWR |
| 73 | RESERVED | N/C |
| 71 | RESERVED | N/C |
| 69 | GND | PWR |
| 67 | RESERVED | N/C |
| 65 | RESERVED | N/C |
| 63 | GND | PWR |
| 61 | RESERVED | N/C |
| 59 | RESERVED | N/C |
| 57 | GND | PWR |
| 55 | RESERVED | N/C |
| 53 | RESERVED | N/C |
| 51 | GND | PWR |

| | | | | | | |
|---|---|---|---|---|---|---|
| 48 | RESERVED | N/C | | 49 | RESERVED | N/C |
| 46 | RESERVED | N/C | | 47 | RESERVED | N/C |
| 44 | RF_COEX | CMOS-OD | | 45 | GND | PWR |
| 42 | SYNC OUT | CMOS | | 43 | RESERVED | N/C |
| 40 | SYNC IN | CMOS | | 41 | RESERVED | N/C |
| 38 | UART-DTR | CMOS | | 39 | GND | PWR |
| 36 | UART-RTS | CMOS | | 37 | RESERVED | N/C |
| 34 | UART-CTS | CMOS | | 35 | RESERVED | N/C |
| 32 | UART-TXD | CMOS | | 33 | GND | PWR |
| 30 | MECH E KEY | | | 31 | MECH E KEY | |
| 28 | MECH E KEY | | | 29 | MECH E KEY | |
| 26 | MECH E KEY | | | 27 | MECH E KEY | |
| 24 | MECH E KEY | | | 25 | MECH E KEY | |
| 22 | UART-RXD | CMOS | | 23 | RESERVED | N/C |
| 20 | UART-DSR | CMOS | | 21 | RESERVED | N/C |
| 18 | GND | PWR | | 19 | RESERVED | N/C |
| 16 | WAKE/#LPMODE | CMOS | | 17 | RESERVED | N/C |
| 14 | SPI-MOSI | CMOS | | 15 | RESERVED | N/C |
| 12 | SPI-MISO | CMOS(HiZ) | | 13 | RESERVED | N/C |
| 10 | SPI#SS | CMOS | | 11 | RESERVED | N/C |
| 8 | SPI-SCK | CMOS | | 9 | RESERVED | N/C |
| 6 | #IRQ | CMOS-OD | | 7 | GND | PWR |
| 4 | RESERVED | N/C | | 5 | RESERVED | N/C |
| 2 | RESERVED | N/C | | 3 | RESERVED | N/C |
| | | | | 1 | GND | PWR |

## APPROVED ACCESSORIES LIST

The below table outlines the accessories that are approved for operation with this Module:
For V2V Radio operation, this module has been tested and approved for use with the antenna listed below. The module may be integrated with other antennas of the same type and antenna gains of less than or equal than the approved.

**For 902-928 MHz frequency band:**

| ANTENNA PART NO. | FREQUENCY | ANTENNA TYPE | PEAK GAIN |
|---|---|---|---|
| PROD1196 | 865-930MHz | Omni-directional | +2.9 dBi Max |
| EA2-0287-N01SP-050 | 860-930 MHz | Omni-directional | +8 dBi Max |
| MISC1626 | 915 MHz | Monopole Type | +2 dBi Max |

**For 869.400-869.650 MHz frequency band:**

| ANTENNA PART NO. | FREQUENCY | ANTENNA TYPE | PEAK GAIN |
|---|---|---|---|
| PROD1196 | 865-930MHz | Omni-directional | +2.9 dBi Max |
| MISC1625 | 824-2170 MHz | Monopole Type | +1.9 dBi Max |

#### WARNINGS

- Keep this Integration Manual for later reference.
- Do not leave this Module in an uncontrolled environment where the storage temperature is below-40°C (-40°F) or above 85°C (176°F). This may damage the DEVICE.
- Do not operate this Module outside specified temperature range. Refer to specification table for further information.

## GENERAL INFORMATION

### INTEGRATION

Module Integration should be in accordance with the procedures defined by Digital Mining Technology and only performed by the manufacturer or authorized representative. Host equipment must be configured to the modulation schemes and implement LBT to comply with the modular approval listed in Sec. 2.3 and adhere to all local regulations appropriate for automotive Installations in the end-user geographic region.

## MAINTENANCE

This equipment is not intended to be maintained by the end user. Opening the enclosure should not be attempted, will void any warranty and could compromise the safe operation of the unit.
No user-serviceable parts.
Contact your local authorized representative for service arrangements.

## DECOMMISSION AND DISPOSAL

Disposal of electronics should be done in accordance with local regulations.

Power should be disconnected before decommissioning.
The unit must not be treated as general waste. By ensuring that this product is disposed of correctly, you will be helping to prevent potentially negative consequences for the environment and human health which could otherwise be caused by incorrect handling of this product.
Waste Disposal Method: Recycling is encouraged. Dispose of in accordance with local, state and federal laws and regulations.
USA: Dispose of in accordance with local, state and federal laws and regulations.
Canada: Dispose of in accordance with local, state and federal laws and regulations.

EC: Dispose of in accordance with relevant EC Directives.

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- www.probebattery.co.za

## PRODUCT APPROVALS AND REGULATORY INFORMATION

ASMB0876 module have modular approval and comply with FCC Part 15 and Canada Innovation, Science and Economic Development Canada (ISED) RSS-247 and RSS-Gen.

| | |
|---|---|
| FCC ID: | YIY-ASMB0876 |
| IC: | 8903A-ASMB0876 |

**caution:** Modifications to this product without written consent from the manufacturer or its designated authorized representatives could void the user's authority to operate the equipment.

## DECLARATION OF CONFORMITY 47 CFR § 2.1077 COMPLIANCE INFORMATION

We, Industrea Mining Technology Pty Ltd, T/A Digital Mining Technology, at 3 Co-Wyn Close, Fountaindale, NSW, 2258, Australia declare under our sole responsibility the products:

| | |
|---|---|
| Trade Name: | Digital Mining Technology |
| Model Number: | ASMB0876 |
| Product Name | Mini RF UHF Module Silabs |
| FCC ID: | YIY-ASMB0876 |
| Responsible Party: | Digital Mining<br>2901 East Lake Road Erie, PA, 16531 (814) 875-2234 |

**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.

## FCC INTERFERENCE STATEMENT FOR CLASS B DEVICES

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

A shielded type Ethernet cord is required to meet FCC Class B emission limits and prevent interference to the nearby radio and television reception.
This device and its antenna(s) must not be co-located or operate in conjunction with any other antenna or transmitter.
The antenna is considered an integral system component. Use of any antenna other than those specified in the installation manual or supplied with the product may void the product's compliance.

**FCC RADIATION EXPOSURE STATEMENT**
To comply with FCC RF exposure limits for general population / uncontrolled exposure, the antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

## INDUSTRY CANADA COMPLIANT

This Class B digital apparatus complies with Canadian ICES-003. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment

**CONCERNING RADIO TRANSMITTERS**

This device complies with Industry Canada's licence-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 that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

**INDUSTRY CANADA – RADIATION EXPOSURE STATEMENT**

To comply with Industry Canada RF exposure limits for general population / uncontrolled exposure, the antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

**AUSTRALIAN RADIO COMMUNICATIONS EQUIPMENT – RADIATION EXPOSURE STATEMENT**
The equipment complies with the Radiocommunications (Electromagnetic Radiation – Human Exposure) Standard 2014 for General Public Exposure, Non-Aware User, for a Compliance Level 2 Radiocommunications Equipment, when the minimum safety distance is adhered to, and shall bear the RCM.

## DOCUMENT REVISION

| DOCUMENT NO | REVISION |
|---|---|
| ASMB0876-HARWARE INTEGRATION MANUAL-R1 | Original document |
| ASMB0876-HARWARE INTEGRATION MANUAL-R2 | Sec 2.1: Replaced Software design radio to Digitally controlled radio |
| | |
| | |
| | |
| | |
| | |

## DOCUMENT SIGN OFF

| DOCUMENT REVISION NO. | |
|---|---|
| **POSITION** | **Certification Engineer** |
| **DATE** | CREATED: By P C Shivalingam at 8:45 pm, Jan 28, 2022 |
| | |
| **POSITION** | **Design Engineering** |
| **DATE** | REVIEWED: By Peter O'Donnell at 4:27 pm, Jan 31, 2022 |
| | |
| **POSITION** | **Engineering Manager** |
| **DATE** | APPROVED: By Steve Clifton at 3:39 pm, Feb 01, 2022 |

## Documents / Resources

| | |
|---|---|
|   | Wabtec ASMB0876 Mini RF UHF Module Silabs [pdf] Instructions<br>ASMB0876, YIY-ASMB0876, YIYASMB0876, ASMB0876 Mini RF UHF Module Silabs, ASMB0876, Mini RF UHF Module Silabs |

## References

- Inicio – Cominsa
- Home - Intecs Teknikatama Industri
- Renewable Energy - Inverters & Batteries | Probe Group
- Homepage | Wabtec Corporation