VERGE AERO

VA-A-10049 Module

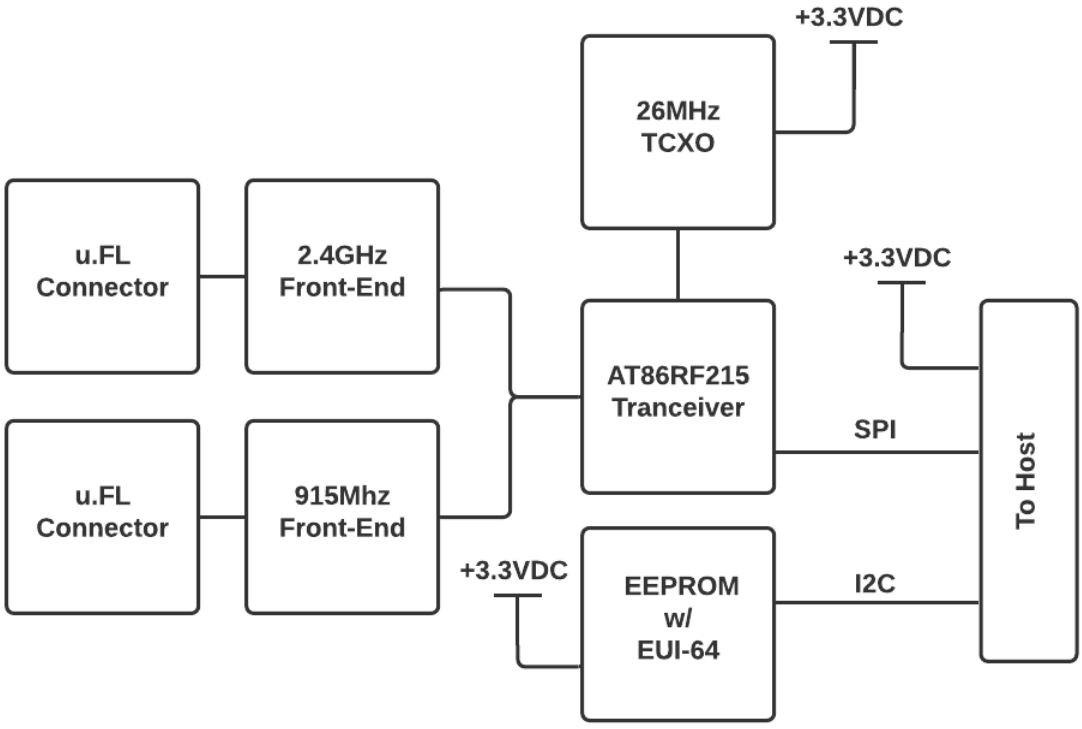
User Manual

Version: rev1.0

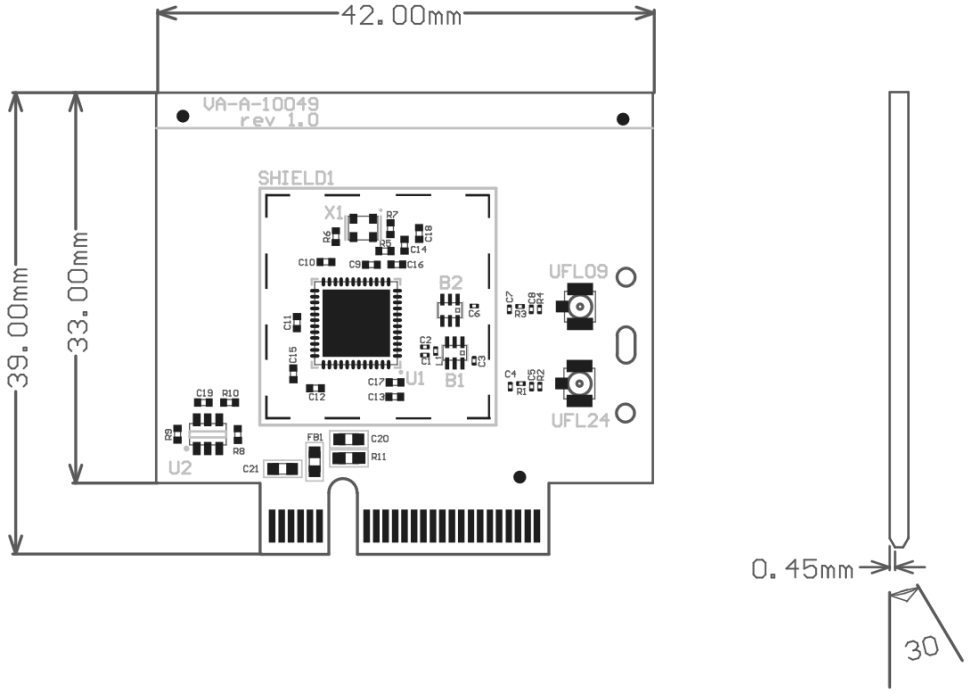
Contents

Overview

The VA-A-10049 module is a low-power 915MHz and 2.4GHz transceiver. The module uses a dual-band Atmel AT86RF215 baseband module which supports modulation schemes compatible with IEEE 802.15.4 (SUN-PHY). The module also features an on-board 2Kbit I2C EEPROM that provides non-volatile memory for radio parameter storage as well as provides a pre-programmed globally unique 64-bit address used for node identification. The VA-A-10049 module deploys a card-edge based connection, described below, for power and digital communications with a host. Compliant antennas can be connected to both of the bands via on-board u.FL connectors.



Specifications



Specification	Value
Module Dimensions (mm)	42 x 39 x 7
Weight (g)	7.08
Supply Voltage (V)	Min: 1.8 Nominal: 3.3 Max: 3.6
Required Current (mA)	100
Standby Current (mA)	< 1

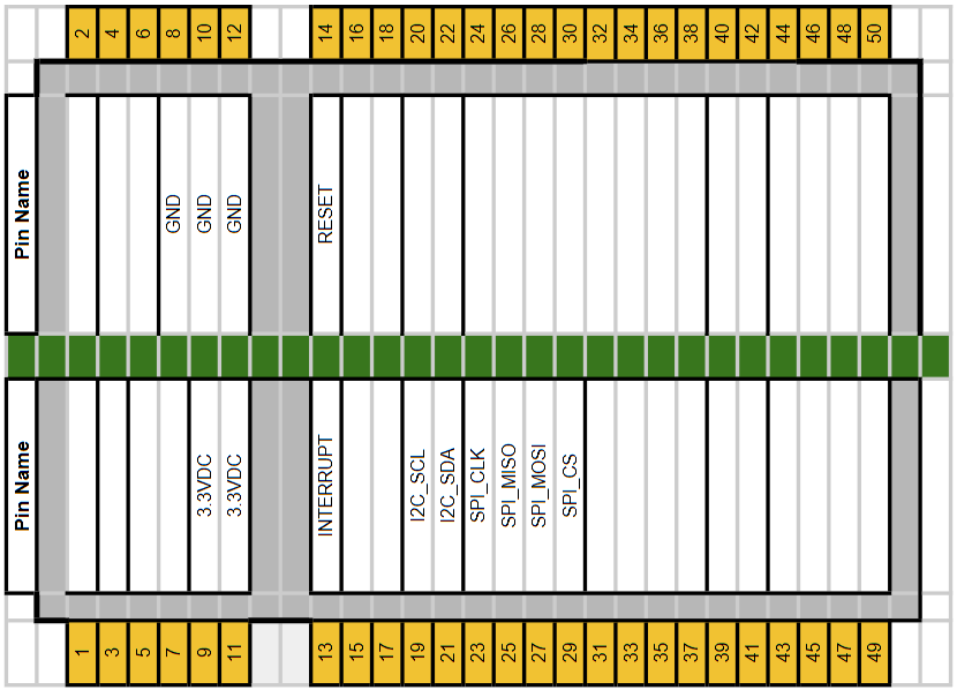
Integration

The VA-A-10049 module is designed to be plugged directly into a Samtec HSEC8-125-01-L-DV-A-K-TR card-edge connector, assuming a valid pin matrix. An integrating system must provide a regulated +3.3VDC rail capable of supply up to 100mA of current. The system must include a host controller capable of communicating with the AT86RF215 radio over an SPI bus, and must be capable of communicating with the 24AA025E64 EEPROM over I2C.

- +3.3VDC, 100mA supply
- Host controller
    - SPI Bus
    - I2C Bus

The host controller must run proprietary software written and distributed by Verge Inc. and its affiliates for controlling the transceiver.

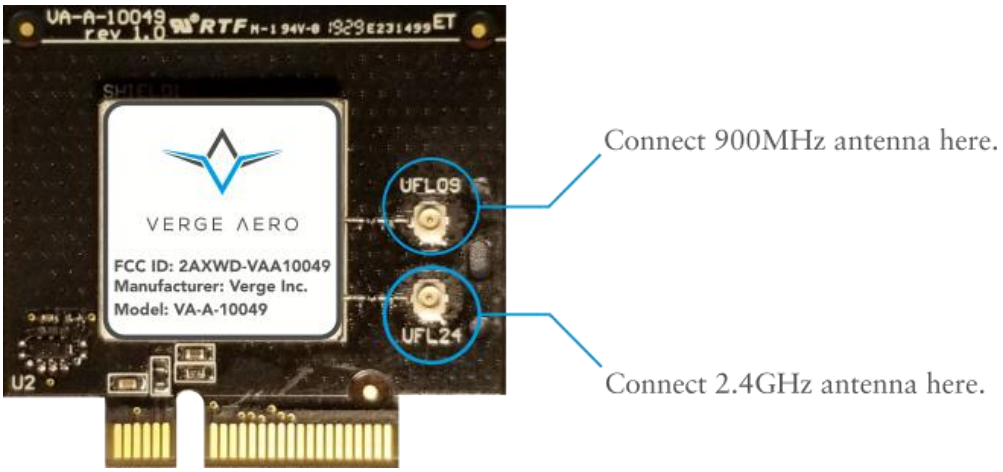
Pinout



Connection	Pin Number(s)	Type	Description
3.3VDC	9, 11	Power	Positive Supply Rail
GND	8, 10, 12	Power	Supply Ground
RESET	14	Input	Pull down to reset module. Module has built-in 100kOhm pull-up
INTERRUPT	13	Output	AT86RF215 IRQ output
I2C_SCL	19	Input	24AA025E64 I2C clock input
I2C_SDA	21	Input/Output	24AA025E64 I2C data line
SPI_CLK	23	Input	AT86RF215 SPI interface clock input
SPI_MISO	25	Output	AT86RF215 SPI Interface module output
SPI_MOSI	27	Input	AT86RF215 SPI Interface module input
SPI_CS	29	Input	AT86RF215 SPI Interface module select

Antenna Selection

The VA-A-10049 module allows system integrators to choose an appropriate antenna for their application. The module exposes two u.FL connectors for connecting the external antennas to each band as shown below.



The VA-A-10049 module is authorized for use with a 900MHz antenna with a stated gain of up to 8dBi, and a 2.4GHz antenna with a stated gain of up to 14dBi. System integrators are responsible for ensuring that the gain of the selected antenna, in all directions, does not exceed those limits.

Band	Maximum Antenna Gain (dBi)
915MHz	8
2.4GHz	14

Regulatory Testing and Configuration

If the VA-A-10049 module is implemented into a host system that needs secondary certifications, host software can be enabled to provide the following set of commands. These commands allow the radio to be put into different continuous transmission or reception states to verify the end device does not emit spurious emissions caused by the VA-A-10049.

Test Description	Command
915MHz Band Low Channel Continuous Transmit	`sh $CTX_915_LO`
915MHz Band Mid Channel Continuous Transmit	`sh $CTX_915_MID`
915MHz Band High Channel Continuous Transmit	`sh $CTX_915_HI`
2.4GHz Band Low Channel Continuous Transmit	`sh $CTX_2400_LO`
2.4GHz Band Mid Channel Continuous Transmit	`sh $CTX_2400_MID`
2.4GHz Band High Channel Continuous Transmit	`sh $CTX_2400_HI`
Unintentional Radiation Test	`sh $CTX_STOP`

Regulatory Statements

FCC Compliance Statement
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.

Note: This product 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 product 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 product 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.

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

FCC Radiation Exposure Statement
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance.

FCC Modular Usage Statement
Note 1: This module certified complies with RF exposure requirements under mobile or fixed condition; this module is to be installed only in mobile or fixed applications.
A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement. A fixed device is defined as a device is physically secured at one location and is not able to be easily moved to another location.

Note 2: Host product manufacturers must provide in their user manual the required RF exposure information for mobile & fixed usage of this module. Host product manufacturers must use the following RF exposure statement in their user manual "This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm

between the radiator and all persons. This transmitter must not be co-location or operating in conjunction with any other antenna or transmitter."

Note 3: Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user shall have no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products.

Note 4: Additional testing and certification may be necessary when multiple modules are used.

Note 5: The module was tested and found compliant to the applicable FCC rule/s with a 900MHz antenna with a stated gain of 8dBi and a 2.4GHz antenna with a stated gain of 14dBi; end-users shall not connect or operate the module with antennas with gains value higher than 8dBi for operation at 900MHz or 14dBi for operation at 2.4GHz.

Note 6: To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Supplier's Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the part 15B unintentional radiator requirements. Since this may depend on the details of how the module is integrated with the host, the manufacturer shall provide guidance to the host manufacturer for compliance with the part 15B requirements.

Note 7: The FCC ID label on the final system must be labeled with "Contains FCC ID: 2AXWD-VAA10049" or "Contains transmitter module FCC ID: 2AXWD-VAA10049".

Note 8: The FCC rule/s for this module are CFR 47 Part 15 Subpart C.

Note 9: This modular transmitter is only FCC authorized for the specific rule parts listed on its grant. The host product manufacturer is responsible for any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product will require part 15B compliance when the modular transmitter is installed.

Note 10: This modular transmitter implements modular shielding with holes that are significantly smaller than the wavelength of the radiation that is being blocked. The host product manufacturer may require additional shielding and must perform verification testing under part 15B to ensure no unintended coupling of radiated emissions is occurring in the end host device.

Revision History

Revision	Date	Description
rev 1.0	3/31/21	Initial Release