General/Overview

- Zigbee and BLE to Wi-Fi bridge
- Thread Border Router
- External pluggable power supply connected via micro-USB
- 2 Status LEDs (White and Red) - configurable through software
- Dimensions: 65x59x20.5 (LxWxH)
- Power consumption: 400mA at 5V (worst case)

Detailed Specifications

- Wi-Fi (Dual band 1x1 802.11 a/b/g/n)
- Bluetooth 5.0 (Mesh and BLE)
- 802.15.4 radio (Zigbee and Thread capable)
- QCA4020 architecture which has 3 independent processors:

    1. ARM Cortex-M4F @ 128 MHz is the application/host processor. It runs the Qualcomm® networking stack as well as application code.

    2. ARM Cortex-M0 @ 64 MHz, which is utilized as the connectivity control processor for BLE and 802.15.4.

    3. XTENSA7 @ 130MHz which is a dedicated processor to run the Wi-Fi dual band function.

Benefits:

- Qualcomm Wi-Fi, BLE and 15.4 code has a known execution environment without generating competition for processor resources from customer code.

- The customer maintains flexibility to choose the operating system for their code.

- The execution environment of Qualcomm code is easier to separate from customer code from a security perspective.

- Built in security hardware and trusted code support.

Memory

The RapidConnect Bridge is a RAM based device, with dedicated space for Customer Applications. The device also supports Execute in Place (XiP) directly from its external flash with a speed penalty.

It is equipped with an external 32Mb SPI Flash that is used to:

- Store three versions of the firmware image simultaneously:
    - Existing image
    - Upgrade image
    - Factory reset image
- Store RAW data in a Flash File System
- Extend code space through Execute in Place (XIP).

In typical MCU terms customers will have the following available for their application, with vendor supplied libraries stored in a separate region :

- Flash - 296KB (expandable through XIP)
- RAM - 174 KB
- 'External Storage' - ~1MB
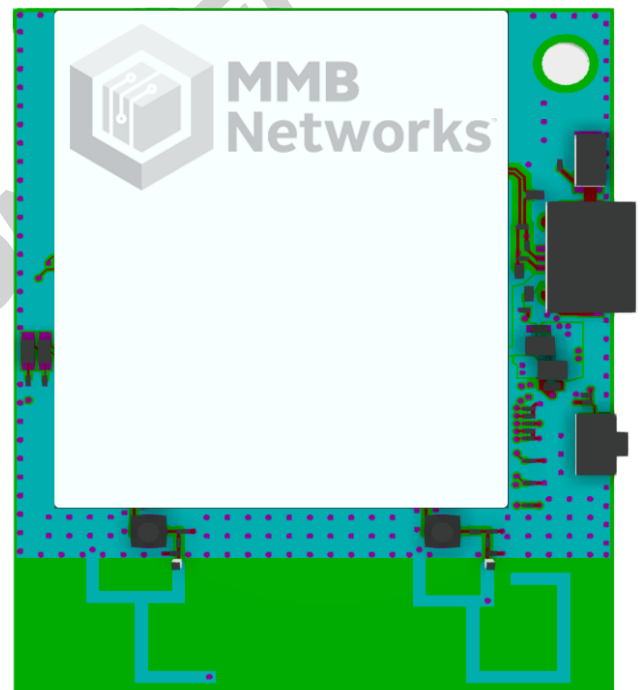
1. Electrical Specifications

1.1 Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply Voltage (VCC)	-0.3	6	V
Voltage on any GPIO	-0.3	3.6	V
RF Input Power		10	dBm
Ambient Operating Temperature	-40	85	°C
Storage Temperature	-50	150	°C

1.2 Recommended Operating Conditions

Parameter	Minimum	Maximum	Units
Supply Voltage	2.5	5.5	V
Temperature Range	-40	8.5	°C

1.3 DC Electrical Characteristics

Parameter	Test Condition	Minimum	Typical	Maximum	Units
Logic high voltage		2.4	3.3	3.6	V
Logic low voltage		-0.3	0	0.3	V
802.15.4 TX Current			189		mA
802.15.4 RX Current			38.3		mA
BLE TX	1Mbps		38.3		mA
	2Mbps		39		mA
BLE RX	1Mbps		38.3		mA
	2Mbps		38.7		mA
802.11b TX	CCK 11Mbps		205.7		mA
802.11b RX			79		mA
802.11g TX	64-QAM 54 Mbps		202.3		mA
802.11g RX			79		mA
802.11n TX	HT20 MCS0		203.7		mA
802.11n RX			79.3		mA

2. RF Specifications
2.1 Receiver Specifications
2.1.1 802.15.4

Parameter	Test Condition	Minimum	Typical	Maximum	Units
Frequency		2405		2480	MHz
Sensitivity	1% PER, 20 byte packet defined by IEEE 802.15.4-2003		-104.7		dBm

2.1.2 BLE

Parameter	Test Condition	Minimum	Typical	Maximum	Units
Frequency		2402		2480	MHz
Sensitivity	BLE 1M		-96.7		dBm
	BLE 2M		-95		dBm

2.1.3 WIFI

Parameter	Test Condition	Minimum	Typical	Maximum	Units
Frequency		2412		2462	MHz
Sensitivity	802.11b 1Mbps		-92.8		dBm
	802.11b 11Mbps		-88		dBm
	802.11g 6Mbps		-92.3		dBm
	802.11g 54Mbps		-75.3		dBm
	802.11n HT20 MCS0		-90.5		dBm
	802.11n HT20 MCS7		-71		dBm

2.2 Transmit Power

Parameter	Test Condition	Minimum	Typical	Maximum	Units
802.15.4 output power at highest power setting, general limit			22.3		dBm
BLE output power at highest power setting, general limit	1Mbps or 2Mbps		2.6		dBm
802.11b output power at highest power setting, general limit	11Mbps		17.5		dBm
802.11g, output power at highest power setting, general limit	54Mbps		17.7		dBm
802.11n, output power at highest power setting, general limit	MCS7		17.6		dBm

3. Mechanical Specifications
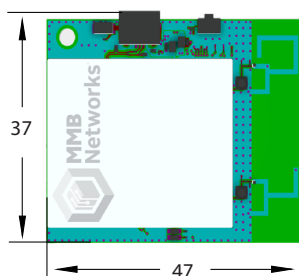
(All measurements in millimetres, not to scale)

4. Regulatory Approvals

4.1 Federal Communications Commission (FCC - US)

4.1.1 Approved Antennae
There are two PCB trace antennas onboard with gains -0.68 dBi for the single band antenna and 0.86 dBi for the dual band antenna.

4.1.2 FCC Notice
The BRD10 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.

To comply with FCC RF Exposure requirements, users of this device must ensure that the module be installed and/or configured to operate with a separation distance of 20cm or more from all persons.

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 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.

4.1.3 Modular Approval
The BRD10 device meets the requirements for modular transmitter approval as detailed in the §15.212 Modular transmitters rules. It should be noted that:

"While the applicant for a device into which an authorized module is installed is not required to obtain a new authorization for the module, this does not preclude the possibility that some other form of authorization or testing may be required for the device (e.g., a WLAN into which an authorized module is installed must still be authorized as a PC peripheral, subject to the appropriate equipment authorization)."

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

NOTE:
This module is intended for an OEM integrator. The OEM integrator is responsible for the compliance to all the rules that apply to the product into which this certified RF module is integrated. Additional testing and certification may be necessary when multiple modules are used.
A 20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for a population/ uncontrolled environment can be satisfied. Further RF exposure shall be re-evaluated to the scenario of portable, and collocated use.

USER MANUAL OF THE END PRODUCT:
In the user manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied.
The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

4.1.4 Labeling Requirements

The user of this device is responsible for meeting the FCC labeling requirements. A clearly visible label on the exterior enclosure of an incorporating device must list the MMB Research Inc. FCC ID "XFF-BRD10" and the FCC Notice above (section 4.1.2). The exterior label should use the wording "Contains" or "Contains Transmitter Module". For example:

Contains FCC ID: XFF-BRD10
or
Contains Transmitter Module FCC ID: XFF-BRD10

Any similar wording that expresses the same meaning may be used. If the labelling area is smaller than the palm of the hand, then additional FCC part 15.19 statement is required to be available in the user's manual:

This device complies with Part 15 of 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.

If the labelling area is larger than the palm of the hand, then the following FCC part 15.19 statement has to also be available on the label:

This device complies with Part 15 of 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.

4.2 Innovation, Science, and Economic Development Canada (ISED)

4.2.1 Approved Antennae

This radio transmitter IC: 8365A-BRD10 has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Antenna Type	Manufacturer	Model	Maximum Gain (dBi)	Nominal Impedance (Ω)
PCB Trace	MMB Networks	PCB trace antenna	-0.68	50
Dual Band PCB Trace	MMB Networks	PCB trace antenna	0.86	50

4.2.2 IC Notice

This device complies with ISED licence-exempt RSS standard(s).

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, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

4.2.3 Labeling Requirements

The host device shall be properly labelled to identify the modules within the host device. The ISED certification label of a module shall be clearly visible at all times when installed in the host device, otherwise the host device must be labelled to display the ISED certification number of the module, preceded by the words "Contains transmitter module", or the word "Contains", or similar wording expressing the same meaning, as follows:

Contains transmitter module IC: 8365A-BRD10

Contient le émetteur radio IC: 8365A-BRD10

Or

Contains IC: 8365A-BRD10

Contient IC: 8365A-BRD10

4.2.4 Additional Notice

This module is intended for an OEM integrator. The OEM integrator is responsible for the compliance to all the rules that apply to the product into which this certified RF module is integrated. Additional testing and certification may be necessary when multiple modules are used.

A 20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for a population/ uncontrolled environment can be satisfied. Further RF exposure shall be re-evaluated to the scenario of portable, and collocated use.

4.3 RoHS Compliance

The BRD10 devices do not contain any substances in excess of the maximum concentration allowed by Directive 2002/95/EC. The module is RoHS compliant.

4.4 FCC & IC Compliance

In the event that conditions as described in the manual cannot be met, then the FCC and ISED authorizations are no longer considered valid and the FCC ID and IC certification number cannot be used on the final product. In these circumstances, the integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC and ISED authorization.