

<MultiBEE User Manual>

MultiBEE is a multi-function processor that uses TI's cc2530 and TIMAC protocol to enable wireless zigbee communication.

MultiBEE device uses Analog Input, Digital Input, and Digital Output.

MultiBEE device can be used as a standalone device, or a network can be configured with MultiBEE host to collect information from each device as a host.

MultiBEE device responds with RF when receiving communication, and responds with UART when receiving communication.

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1. Network setting 1: When using 1 host and multiple devices

ID generation: 4-digit HOST ID and 2-digit Device ID

- 1) Plug the MultiBEE host into the USB port of the PC.
- 2) Send @setid777700# using a serial communication program.
(host ID:7777, Device ID:00)
- 3) Plug the MultiBEE device into the USB port of the PC.
- 4) Send @setid777701# using a serial communication program
- 5) Plug the MultiBEE device to be used additionally into the USB port of the PC.
- 6) Send @setid777702# using a serial communication program
- 7) Repeat steps 5) and 6) above for the MultiBEE device to be used additionally, and set a different number.

Ex) 777703, 777704, 777705
- 8) If you send @info# via serial communication, you can find out the set communication channel number (2 digits), HOST ID (4 digits), and Device ID (2 digits).
- 9) If you send @reset# via serial communication, it will restart.

2. Network Setting 2: When using 1 host and 1 device

No setup is required. By default, the host is set to 777700 and the device is set to 777701.

If necessary, you can change it by following the Network Setting 1 method above.

If there is another host within 100m, you must change the HOST ID.

3. Network Setting 3: When using only 1 device

1) Plug the MultiBEE device into the USB port of the PC.

2) Send @setid000000# using the serial communication program.

4. MultiBEE device function setting

Work Mode setting It operates in 8 modes from 000 to 111 using a 3-pin switch.

5. Operation test A (when using host+device)

1) Plug the MultiBEE host into the USB port of the PC.

2) Apply power to the MultiBEE device. (You can also plug it into the USB port of the PC.)

3) Check the serial port number of the MultiBEE host plugged into the USB port of the PC.

4) If you send @infoXX# via serial communication, you can find out the set

communication channel number (2 digits), HOST ID (4 digits), and Device ID (2 digits). Reply)

infoXX(YY)0B111C03: YY is the number of characters (hexadecimal)

If failed, infoXX(YY)noAnswer

5) AnalogRead: Send @arXX# to the above serial port using a serial communication program

XX is the unique number of the device

Data from each of the 4 analog input ports of the MultiBEE device comes in as 4 digits.

Reply) arXX(YY)0123012301230123: YY is the number of characters (hexadecimal)

6) DigitalRead: Send @drXX# to the above serial port using a serial communication program

Digital input values of the 11 terminals of the MultiBEE device come in as 0 or 1.

Reply)drXX(YY)11111111111: YY is the number of characters (hexadecimal)

7)DigitalWrite: Send @dwXXZabcd# to the above serial port using a serial communication program

Z: Enter n to turn on, f to turn off.

abcd: List the terminal numbers you want to turn on/off among 11 from 1 to B.

Check the above write result on the corresponding channel of the MultiBEE device.

Reply)dw(YY)Zabcd: YY is the number of characters (hexadecimal)

6. Operation Test B (when using only the device)

1) Plug the MultiBEE device into the USB port of the PC.

2) Check the serial port number of the MultiBEE device plugged into the USB port of the PC.

3) The following is the same as the operation test A above.

However, XX is omitted.

When responding, XX will be replaced with 00.

FCC Information to User

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.

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

IMPORTANT NOTE:

FCC RF Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 0 cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

OEM INTEGRATION INSTRUCTIONS:

This device is intended only for OEM integrators under the following conditions:

The module must be installed in the host equipment such that 0 cm is maintained between the antenna and users, and the transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the internal on-board antenna that has been originally tested and certified with this module. External antennas are not supported. As long as these 3 conditions above are met, further transmitter test will not be required.

However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.). The end-product may need Verification testing, Declaration of Conformity testing, a Permissive Class II Change or new Certification. Please involve a FCC certification specialist in order to determine what will be exactly applicable for the end-product.

Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization. In such cases, please involve a FCC certification specialist in order to determine if a Permissive Class II Change or new Certification is required.

Upgrade Firmware:

The software provided for firmware upgrade will not be capable to affect any RF parameters as certified for the FCC for this module, in order to prevent compliance issues.

End product labeling:

This transmitter module is authorized only for use in device where the antenna may be installed such that 0 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following:

► **Contains FCC ID: 2BQKZ-MULTIBEE**

- This Module has been tested and should be used with below antennas:

Antenna Type	Peak Gain (dBi)	Part Name
PCB Pattern Antenna	5.3	AN043

Information that must be placed in the end user manual:

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.