

DZ-ZB-DMB02 Evaluation Board

User's Manual

Introduction

The DiZiC DZ-ZB-USB Dongle allows you to quickly add wireless networking capabilities to your Laptop or PC. Plug the Dongle to a USB port and get instant access to Zigbee or 802.15.4 proprietary networks management. This tool let you easily configure diagnostic and monitor local networks.

Additionally application code can be developed, tested and updated any time through the pre-installed boot loader.



USB Dongle

Key Features

- 2.4 GHz CSS transceiver
- 32-bit ARM® Cortex-M3 processor
- 128 kB flash, 8kB RAM memory
- AES128 encryption accelerator
- Two configurable LEDs

Upgradable Software

- Re-programming through USB

RF Performances

- Rx sensitivity (- 100 dBm)
- Tx output power level (+8 dBm)

Target Applications

- Smart Energy
- Building automation and control (HVAC)
- Home automation and control
- Security and monitoring
- AMR/AMI
- Medical
- General ZigBee wireless sensor networking
- Wireless hand-held terminals
- Industry telemetry /automatic data collection
- Temperature and humidity control systems

Table of Content

Notice:	3
FCC Warning:	3
IC Warning:	3
1. Getting Started.....	4
1.1. Connecting the Board	4
1.2. Application GUI based testing	5
1.2.1. Evaluation board control interface	5
1.2.2. Module basic setups	6
1.2.3. Module transmitter and receiver tests	6
1.3. Windows Terminal based testing	7
1.3.1. Transmitter Test	7
1.3.2. Receiver Test	8
APPENDIX	9
A. Software Configuration	9
A.1. Installing FTDI USB Device Driver.....	9
A.2. About Tera Term	9
A.2.1. Configuring Tera Term	9
A.3. Binary file re-programming	9
Copyrights	10
Document Information	10
Revision History.....	10
About DiZiC.....	10

Table of Figures

Fig. 1 Typical test and development setup	4
Fig. 2 Main dialog box evaluation board selection	5
Fig. 3 Module RF selection control panel	5
Fig. 4 RF setup control panel options for a standard module	6
Fig. 5 RF setup control panel options for a +20dBm module	6
Fig. 6 Transmitter and receiver control panel section	6
Fig. 7 Tera Term successful connection to the evaluation board.....	7

Notice:

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

FCC Warning:

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

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

The USB Dongle must be installed and operated at a distance no closer than 8 inches (20 cm) from the user.

FCC: 15.21 "Changes or modifications are not expressly approved by the manufacturer could void the user's authority to operate the equipment."

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

IC Warning:

This device complies with Industry Canada license-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."

1. Getting Started

This *User's Manual* guides you with step by step instructions to let you quickly enjoy wireless communication tests and application development.

1.1. Connecting the Board

To power the dongle simply connect it to a computer USB port. Plugging the dongle, the first time will trigger a Windows driver installation. A Windows Dialog Box "Found New Hardware Wizard" will pop up. Driver installation instructions are provided in the "Installing FTDI USB Device Driver" Appendix.



Fig. 1 Typical test and development setup

Once the driver is installed you can start to use the GUI software we provide. This is fast and intuitive or you can write low level commands in using a Windows Terminal application. This could be interesting if someone wants to do some automated testing. The hardware is pre-programmed with a working firmware. The code can be re-programmed anytime through the USB connector. Go to the corresponding Appendix section.

1.2. Application GUI based testing

The GUI application let you control up to 2 USB dongle simultaneously. You need first to select the board type (DZ-ZB-USB) you want test and choose the associated com port (com port can be refreshed with **Scan VCPs**). Once the first device is connected you can open a second one.

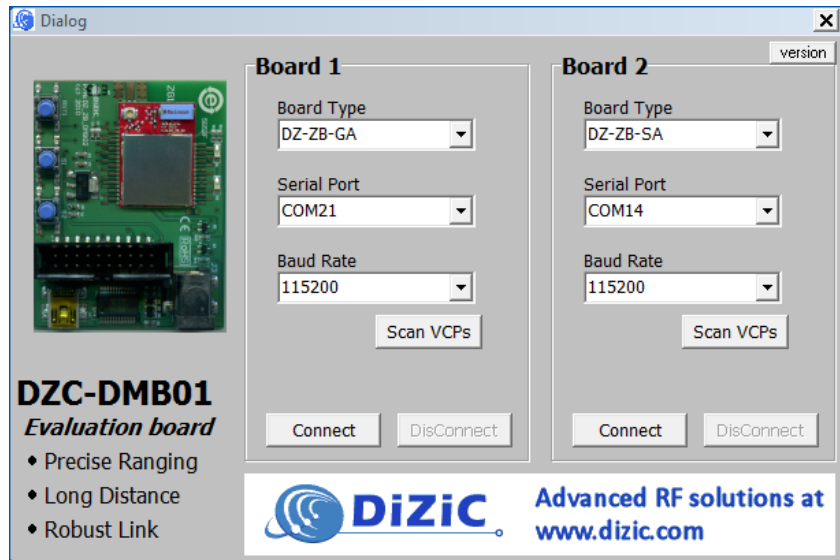


Fig. 2 Main dialog box evaluation board selection

Note: Windows 7 will require running the Application with Administrator rights.

1.2.1. Evaluation board control interface

Once a board is connected a new dialog box opens. A quick check in the bottom right corner let identify if you the module type that has been selected.

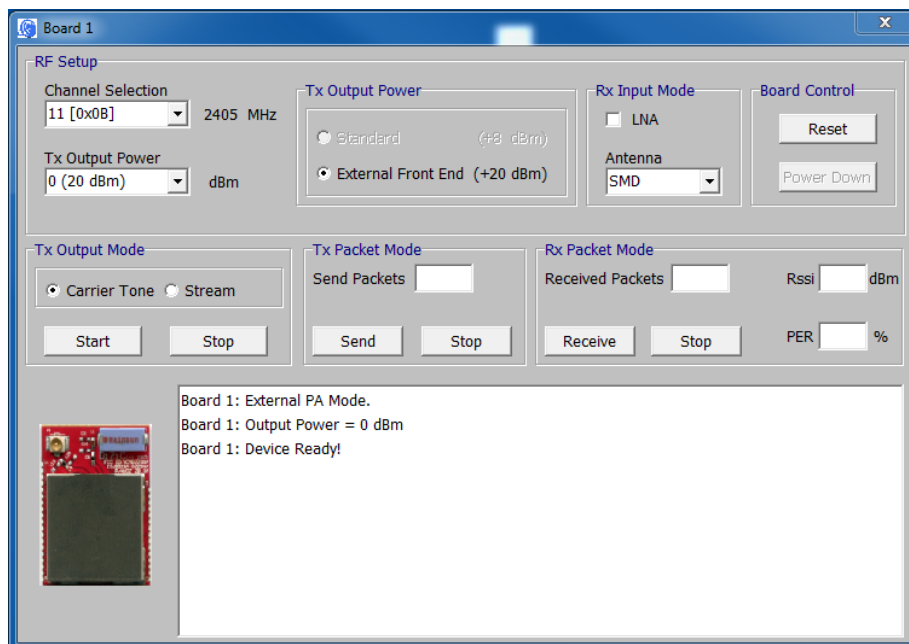


Fig. 3 Module RF selection control panel

1.2.2. Module basic setups

The module channel, power level, LNA and antenna type can be selected (some options only available on some specific module type).



The RF Setup control panel for a standard module includes the following sections:

- Channel Selection:** A dropdown menu showing '11 [0x0B]' and a frequency of '2405 MHz'.
- Tx Output Power:** A dropdown menu showing '0 (0 dBm)' and a unit of 'dBm'.
- Tx Output Power (Radio Buttons):** Two options: 'Standard (+8 dBm)' (selected) and 'External Front End (+20 dBm)'.
- Rx Input Mode:** A checkbox for 'LNA' (unchecked) and an 'Antenna' dropdown menu showing 'SMD'.
- Board Control:** Two buttons: 'Reset' and 'Power Down'.

Fig. 4 RF setup control panel options for a standard module




The RF Setup control panel for a +20dBm module includes the following sections:

- Channel Selection:** A dropdown menu showing '11 [0x0B]' and a frequency of '2405 MHz'.
- Tx Output Power:** A dropdown menu showing '0 (20 dBm)' and a unit of 'dBm'.
- Tx Output Power (Radio Buttons):** Two options: 'Standard (+8 dBm)' (unchecked) and 'External Front End (+20 dBm)' (selected).
- Rx Input Mode:** A checkbox for 'LNA' (unchecked) and an 'Antenna' dropdown menu showing 'SMD'.
- Board Control:** Two buttons: 'Reset' and 'Power Down'.

Fig. 5 RF setup control panel options for a +20dBm module

1.2.3. Module transmitter and receiver tests

The application software let you quickly evaluate the RF module performances. Basic signals can be generated like a continuous wave (Carrier Tone); data packet can be transmitted or received.



The Transmitter and receiver control panel section includes the following sections:

- Tx Output Mode:** Two radio buttons: 'Carrier Tone' (selected) and 'Stream'. Below are 'Start' and 'Stop' buttons.
- Tx Packet Mode:** A 'Send Packets' input field, 'Send' and 'Stop' buttons.
- Rx Packet Mode:** A 'Received Packets' input field, 'Receive' and 'Stop' buttons.
- Metrics:** 'Rssi' input field with 'dBm' unit, and 'PER' input field with '%' unit.

Fig. 6 Transmitter and receiver control panel section

1.3. Windows Terminal based testing

A Windows terminal emulation software needs to be used (like Tera Term see Appendix for setup) to run inline type of commands. When Tera Term is running press the Reset push button and then press “Enter” on the PC keyboard to get a response from the USB dongle.

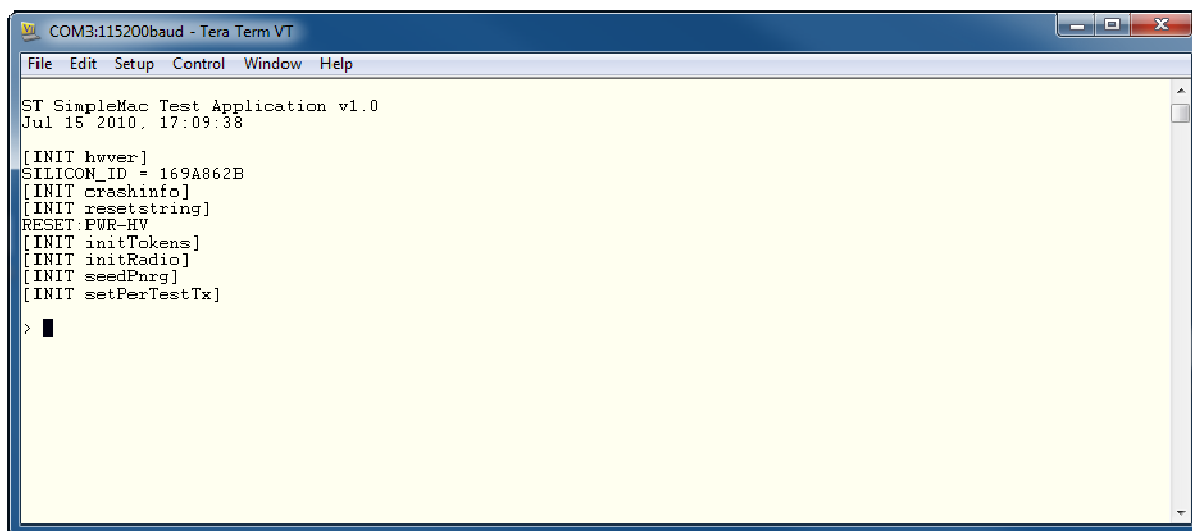


Fig. 7 Tera Term successful connection to the evaluation board

1.3.1. Transmitter Test

The following example applies to the USB dongle. Please refer to the module specific datasheet before starting to operate it.

Command	Comment
setTxPowMode 0 0	// Put the STM32W RF path in normal PA mode
setChannel 0xB	//select the first channel 11 (0xB)
setTxPower -4	//set the out power of the STM32W to -4dBm
Tx 10	//transmits 16bytes (0x10)

1.3.2. Receiver Test

The following command set puts the module in receiving mode. Number of packet received, Signal strength indicator (RSSI) and packet error rate (PER) can be analyzed.

Command	Comment
setTxPowMode 0 0	// Put the STM32W RF path in External PA mode
setChannel 0xB	//select the first channel 11 (0xB)
Rx	//wait for packets
e	//character 'e' exits the rx test mode

APPENDIX

A. Software Configuration

A.1. Installing FTDI USB Device Driver

FTDI provides USB to RS232 Serial port converter. The driver can be downloaded from FTDI at www.ftdichip.com under [Drivers](#) section.

Installation guide are available at <http://www.ftdichip.com/Support/Documents/InstallGuides.htm>

Driver installation under Windows 7.

Driver installation under Windows XP.

A.2. About Tera Term

Tera Term is a free open source Windows terminal emulator. It provides an easy way to communicate with the DZ-ZB-DMB02 Demo Board in using the Virtual COM port feature.

Tera Term can be downloaded at www.logmett.com under [Download](#) section.

A.2.1. Configuring Tera Term

1. Launch **Tera Term**
 2. Open the serial configuration dialog box under **Setup > Serial port...**
 3. Select the following options:
 - **Port:** Choose the COM port associated to DZUSB01 demo board
 - **Baud rate:** 115200
 - **Parity:** none
 - **Data:** 8 bit
 - **Stop:** 1 bit
 - **Flow-control:** none
- Click **OK**.

A.3. Binary file re-programming

The stm32w_flasher utility allows you to download a binary file in the DZ-ZBDMB02 evaluation board through the USB connector. To download a binary image, follow these steps:

1. **Connect** the USB dongle a PC USB port.
2. Make sure **only one board** is connected to the PC during programming.
3. **Open** a DOS Shell.
4. Go to the **stm32w_flasher** folder.
5. Enter the following command: `stm32w_flasher -p auto-r -f fwguitestv1.s37`

For more detailed information thanks to refer to STMicroelectronics: UM0978 Using the Simple MAC nodetest application.



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03/10/2011	0.1	Initial version

About DiZiC

DiZiC develops and manufactures ready-to-use OEM radio modules, PC accessories and gateways targeted for metering, telemetry and security applications with deployments in consumer, commercial or heavy industry devices. Our very talented team of RF experts helps us to offer best in class products. DiZiC delivers quality, reliability and performances at an affordable price.