WIRELESS M-BUS EVALUATION KIT USER'S MANUAL

Code: 33000151

INTRODUCTION:

This kit has been developed to test the functionality and radio parameters of the Mipot WM-Bus transceiver 32001324. The kit comes complete with two demo boards each fitted with a pre-soldered 32001324 module, in order to easily set-up a radio communication between two nodes.

One of the 2 boards (called **A-board**) is connected to a host PC via USB interface, the other one (called **B-board**) can operate in **stand-alone** mode and allows for a simple demo of connectivity capabilities as for instance the temperature information and the turning on of a LED.

The units interface with the PC via USB cable, and can be configured using a GUI (requestable at www.mipot.com).

Two 2.54mm strips connected directly to the pins of the 32001324 module allow a fast hardware connection with external devices.

Different power supplies - including batteries - allow for great flexibility of use.

1. KIT CONTENTS

- 2 x Wireless M-Bus demo Board 32001315
- 4 x AA batteries
- 2 x SMA 868 MHz antennas
- 2 x USB cables

2. ABSOLUTE MAXIMUM RATINGS	
External power supply (M1 -3.3V)	+ 3.6 V
External power supply (M1 - 5÷12V)	+ 12 V
RF input (SMA connector)	+10 dBm
Storage temperature	-10 ÷ +55° C
Operating temperature	-10 ÷ +55° C

3. ELECTRICAL CHARACTERISTICS					
Parameter	*Min.*	*Typ.*	*Max.*	*Unit*	*Notes*
External supply voltage (M1 - 5÷12V)	5	-	12	Volt	
External supply voltage (M1 – 3.3V)	2.1	3.3	3.6	Volt	

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4. INTERFACE DESCRIPTION

Interface	Description	Notes
M1	External supply terminal block	
USB	USB connector (standard type B)	
RF	RF input/output (standard SMA female)	Connect a 50 ohm antenna or RF load.
S1	Power supply switch	Turn off external supplies before switching.
P1	P1 button	Not used.
SW	Dip-Switch	
RESET	Reset button for the on-board microcontroller	
LED TX	TX serial indicator LED	
LED RX	RX serial indicator LED	
LED 3.3V_VREG	3.3V Internally stabilized power supply indicator LED	It indicates the presence of the main power supply on the board if you select the power source from USB or from the 5 to 12V input. If you use the battery power or the 3.3 volts input it will remain off.
LED 3.3V_USB	USB port power supply indicator LED	It also indicated the correct operation of the USB-serial interface.
LED LD1	Demo LED	
LED LD2	On-board microcontroller active	
PIN STRIP	Pin for connecting to the WMBus module	For module pin characteristics refer to 32001324 datasheet.
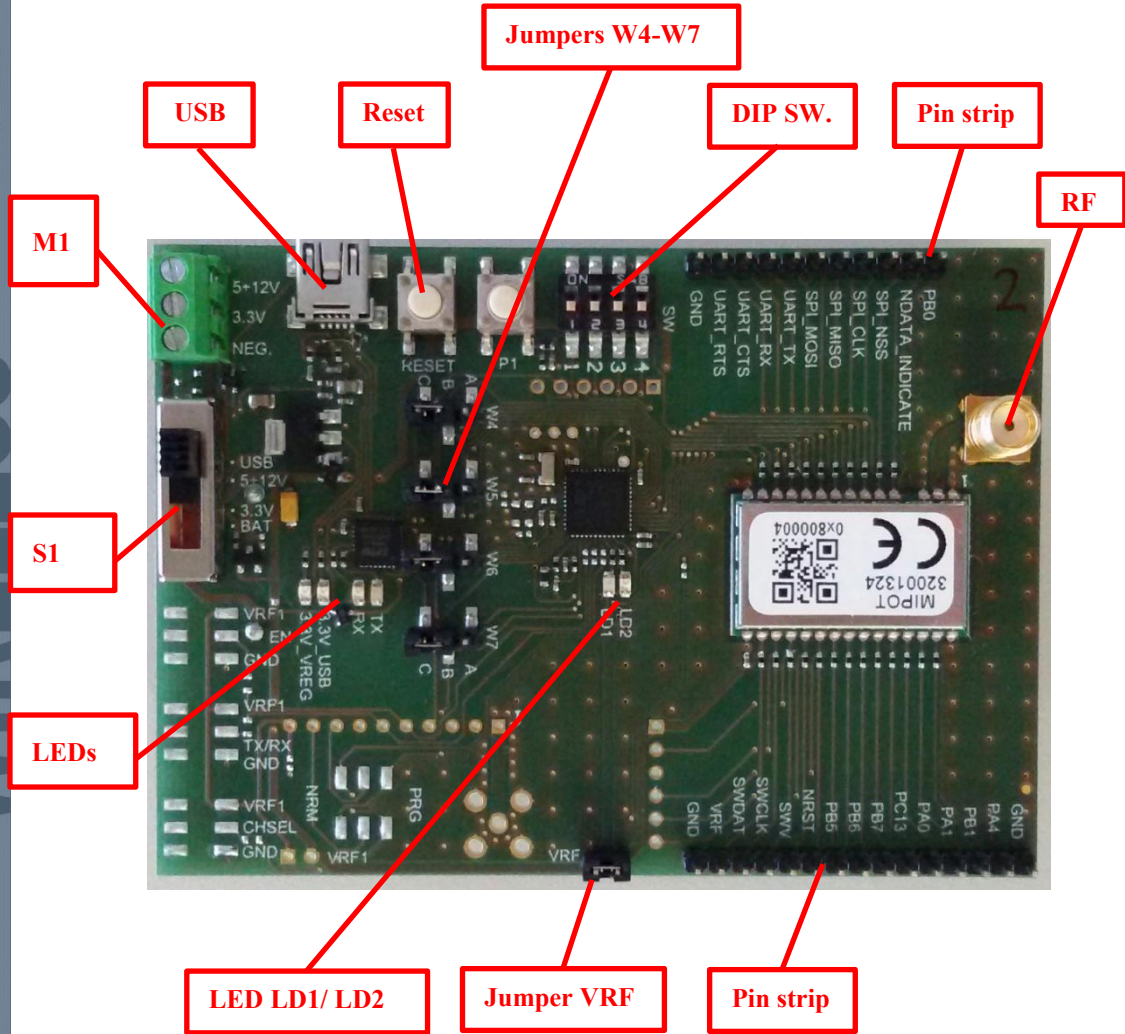
5. JUMPER FUNCTIONS

Jumper	Description	Notes
W4	Jumper UART RX (module)	B-C: connects the module to the serial interface (USB) A-B: connects the on-board microcontroller to the serial interface (USB) No connection: stand-alone module
W5	Jumper UART CTS (module)	B-C: connects the module to the serial interface (USB) A-B: connects the on-board microcontroller to the serial interface (USB) No connection: stand-alone module
W6	Jumper UART TX (module)	B-C: connects the module to the serial interface (USB) A-B: connects the on-board microcontroller to the serial interface (USB) No connection: stand-alone module
W7	Jumper UART RTS (module)	B-C: connects the module to the serial interface (USB) A-B: connects the on-board microcontroller to the serial interface (USB) No connection: stand-alone module
VRF	Module power supply jumper	In series with 32001324 module power supply. Permits the insertion of a milliammeter to measure the current consumption of the 32001324 module.

6. DEVICE POWER SUPPLY

The board can be power-supplied in 4 ways:
- by 2 AA batteries 1.5V (battery holder on the back of the board)
- through **USB** connector
- via external power terminal board **M1**. The latter has three inputs:
  - **Neg.**: is the power supply common negative
  - **3.3V**: connect this input to a 3.3V stabilized power supply
  - **5÷12V**: connect this input to a 5V to 12V power supply

The power supply selection is done via **S1** slide switch which has 4 positions:
- **USB**: in this position the power supply of the board is derived from **USB** connector
- **5÷12_V**: in this position the power supply is drawn from terminal **5÷12V** of **M1**
- **5÷12_V**: in this position the power supply is drawn from terminal **3.3V** of **M1**
- **BAT**: in this position the power supply is drawn from **AA** batteries.

Note: turn off the external supplies before moving the switch

Note: 3.3V_VREG LED indicates the presence of the main 3.3V power supply on the board when the latter is supplied via USB or external **5÷12V** terminal board (it indicates the proper operation of the internal voltage regulator). The LED remains off when the board is fed via batteries or **3.3V** terminal board.

Note: when you connect the USB cable all the circuit connected with USB interface are fed even if another power supply source is selected. This is indicated by the **3.3V_USB** LED
Since the power supplies are independent it is possible to supply the device with any of the external sources or the batteries even if the USB cable is connected.

Note: device is protected against polarity inversion

7. GUI

The Graphical User Interface (GUI) is requestable from Mipot Spa.

We define:
- **"A-board" the board connected with PC**
- **"B-board" the standalone board**

User can:
- **Connect both boards to PC with same settings (2 x A-board) and set up a point to point communication**
- **use one board connected to PC (A-board) and the other as stand-alone (B-board).**

For using the GUI you must:
- Set the jumpers on for the USB communication (set **W4-W7 on A-B**) on both boards
- **Close VRF jumper** (or connect milliammeter in its place).
- **Set the dip switch DIP1 = ON on A-Board**
- **Set the dip switch DIP1 = ON or OFF on B-Board according to desired test (see below).**
- Connect the A-board(s) to PC and turn it on.
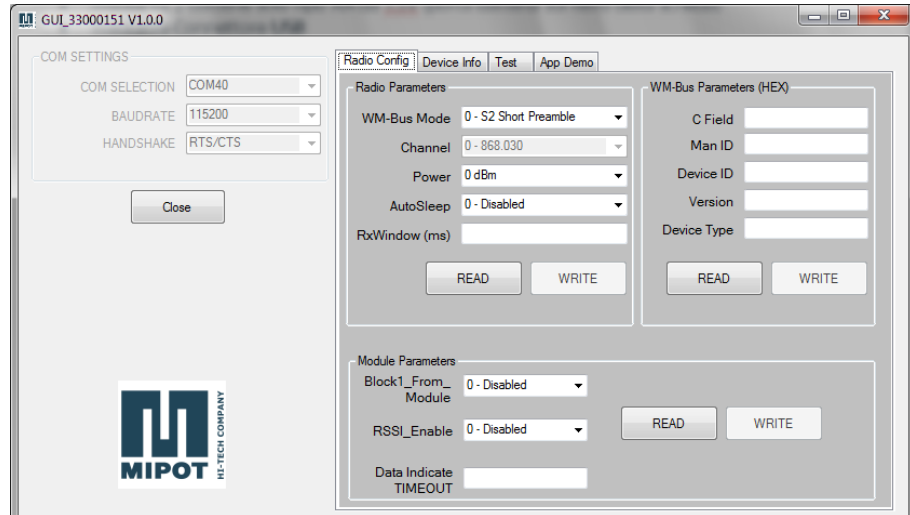- Run the program GUI_33000151.exe. At startup a screen is displayed as the following:

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- Select the COM port through "COM SELECTION" tab.
- Set "BAUDRATE" to 115200 and "HANDSHAKE" to RTS/CTS
- Click on "Open" button. The tabs on the right window become editable.
- Click on the "READ" button to check if the module is connected:
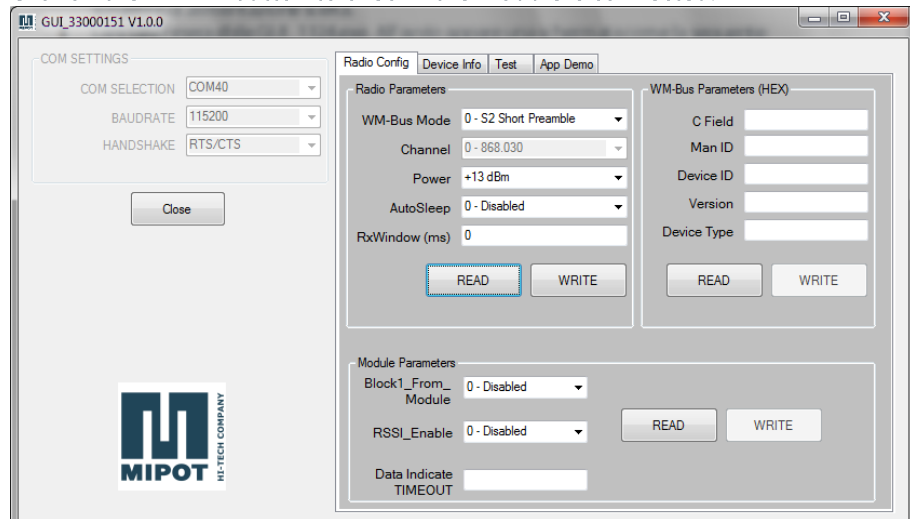
- If the module is connected, the module configuration parameters are displayed, the "WRITE " button is also activated and you can change the parameters (for details of each parameter, refer to the datasheet of the module 32001324):
  - o Radio Parameters:
    - WM-Bus Mode: selects the WM-Bus mode
    - Channel: selects the channel (if the mode is channelized)
    - Power: selects the RF transmission power (between 0 and +13 dBm)
    - Autosleep: eanble/diasble autosleep function
      - Warning: if autosleep is enable the module won't wake up from remote. You must connect NSS to GND.
    - RxWindow: sets the reception window after a transmission (applicable only if AutoSleep is enabled)
  - o WM-Bus Parameters (HEX):
    - C Field: default 44
    - Man ID: default 0000
    - Device ID: default 00000000
    - Version: default 00
    - Device Type: default 00
  - o Module Parameters:
    - Block1_From_Module: refer to 32001324 datasheet
    - RSSI_Enable: enables or disables the RSSI indication of the received frame in the UART communication
    - Data Indicate TIMEOUT: refer to 32001324 datasheet
- If you click on "Device Info" tab, the following screen is displayed:
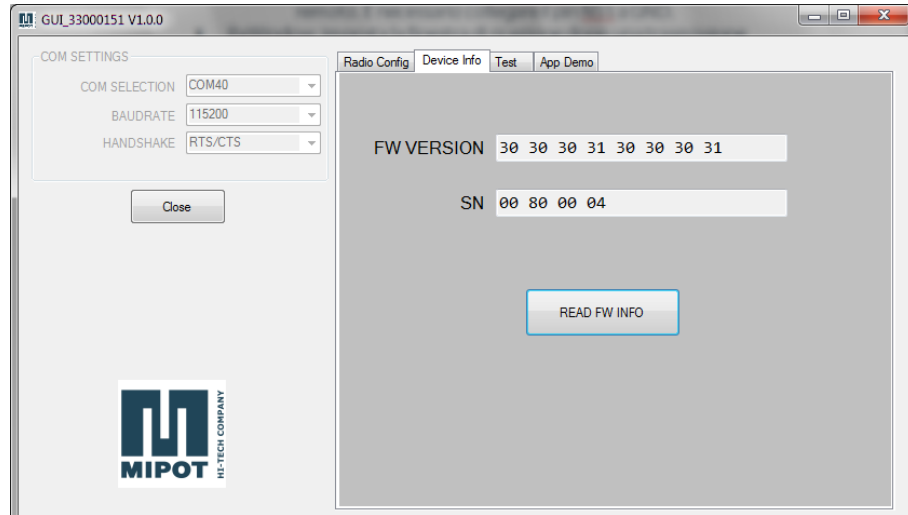
If you click on the buttons you can access to the related information.

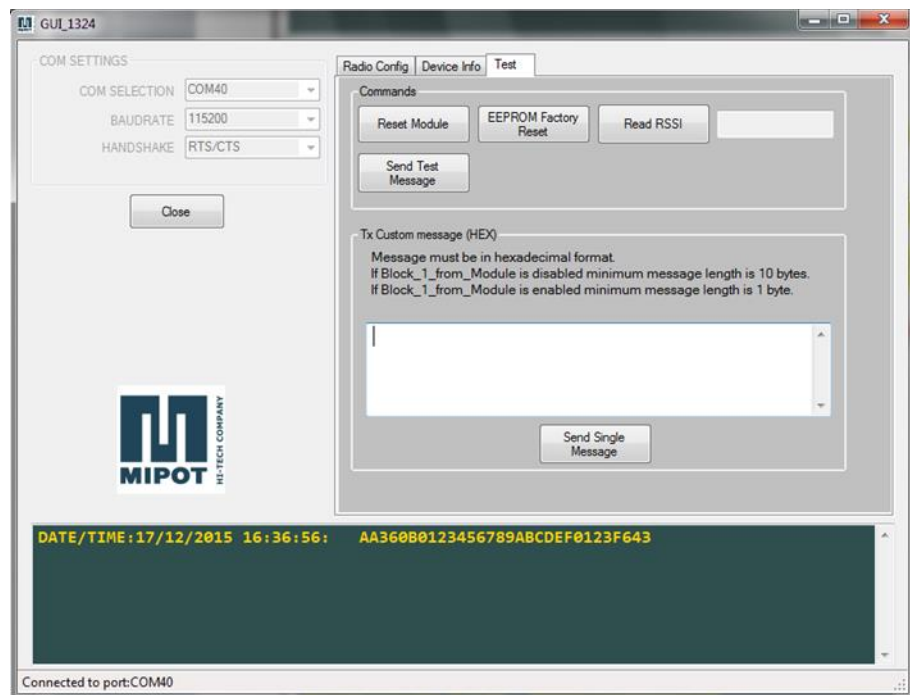- If you click on the "Test" tab the following screen is displayed:
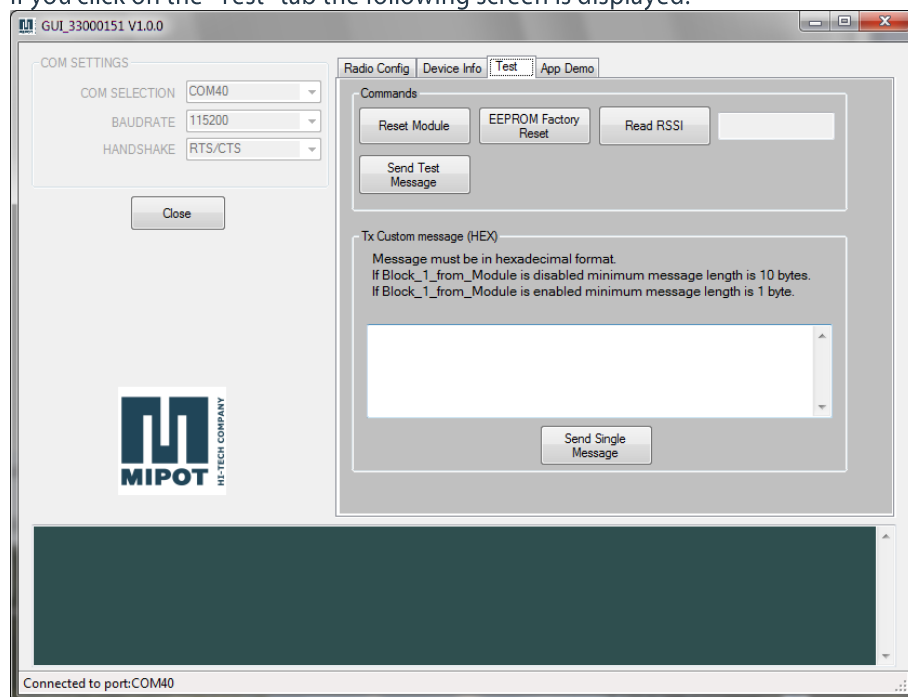
- o "Reset Module" button: resets the 32001324 module
- o "EEPROM Factory Reset" button: resets the factory default on the 32001324 module
- o "Read RSSI" button: gives the RSSI value of the last received frame
- o "Send Test Message" button: sends a test message via radio
- o "Send Custom Message" button in the "TX Custom Message (HEX)" window:
  It transmits via radio the text entered in the white box. The text must be in hexadecimal format and have the length specified in the description.

- In the following example we can see the radio transmission of a message: on the line below (green petrol box) you can see the transmission command and the response form on the serial line.
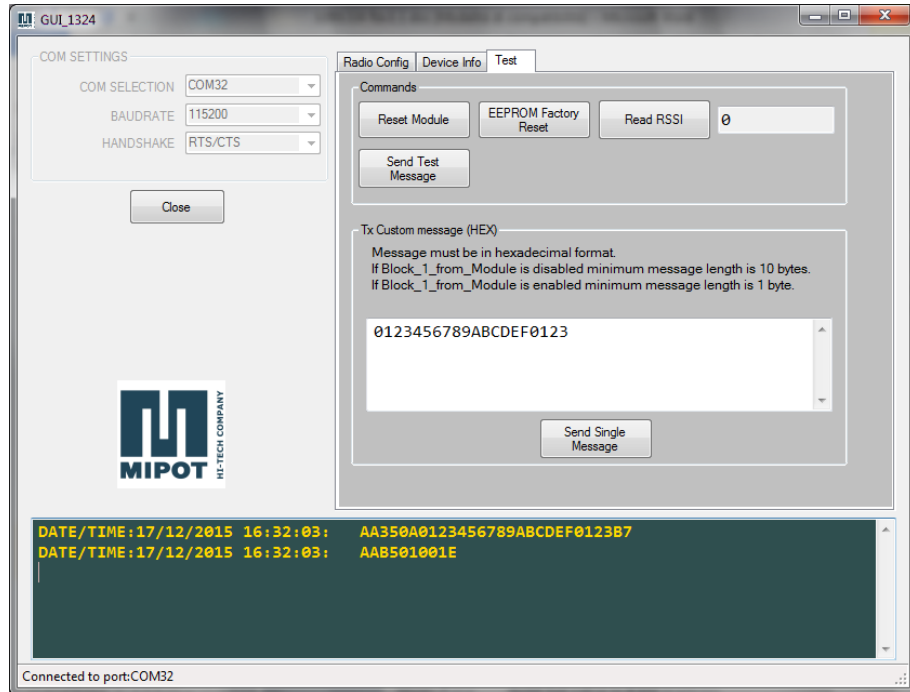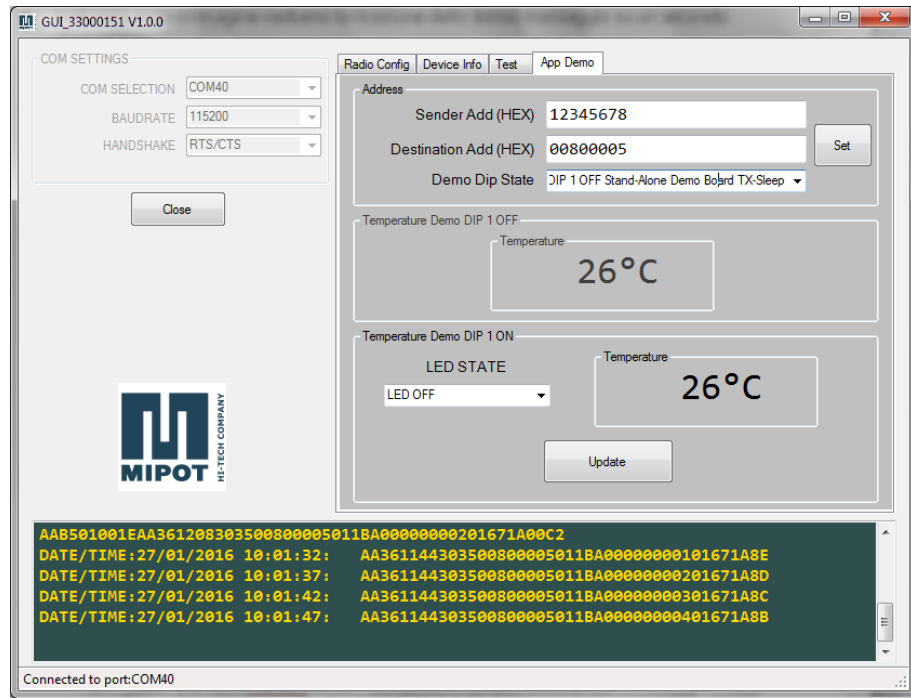

- In the following image you can see the reception of the same message on a second device (configured as A-board):

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- If you click on the "App Demo" tab the following screen is displayed:

- o Address:
    - Sender Add (HEX): A-board address
    - Destination Add (HEX): B-board address
    - Demo Dip State: select according to the state of DIP1 of the DIP SWITCH on the B-board:
        - DIP1 = OFF: the B-board transmits autonomously the temperature then enters sleep state, every 5 seconds. It is not possible to send commands from A-board to B-board, but only receive.
        - DIP1 = ON: the B-board is always ON and in reception, so it is possible to send and receive commands from A-board to B-board, such as turning on the LED and receive temperature information.
        NOTE: after changing the state of the DIP SWITCH, reset the onboard microcontroller by pushing the RESET button.
  - o Temperature Demo DIP 1 OFF:
    - Temperature: shows the measured temperature on the B-board if DIP1 = OFF is selected. The information is sent from the B-board every 5 seconds and cannot be required by the A-board (the B-board is never in reception)
  - o Temperature Demo DIP 1 ON:
    - LED STATE: It allows you to set the state (ON / OFF) of the LD2 (green) LED on the B-board. The setting is made by clicking "UPDATE" (see below)
    - Temperature: shows the temperature measured on the B-board card in the event that DIP1 = ON is selected. The information is sent from the B-board upon request of the A-board card (when UPDATE ispressed)
    - UPDATE: sends a W-MBUS formatted command containing the information of the LED. The B-board responds with the information of the temperature.

NOTE: The application described in the "App Demo" has merely illustrative purposes and does not reflect the standard W-MBUS application layer.