

## UM100 Evaluation Kit Quick Start Guide

### 1. Introduction

This application note is a quick start guide on how to use BESPOON Evaluation Kit (EVK). An EVK is composed of 2 Evaluation Boards (EVB), 2 USB to micro-USB cables and 2 UWB antennas. Boards can be configured as an *anchor* or as a *tag*. For one setup, there is one anchor and one or more tags if you bought several EVK. Distances are measured between a tag and the anchor.

The following figure will be used later on to explain EVB functionalities.

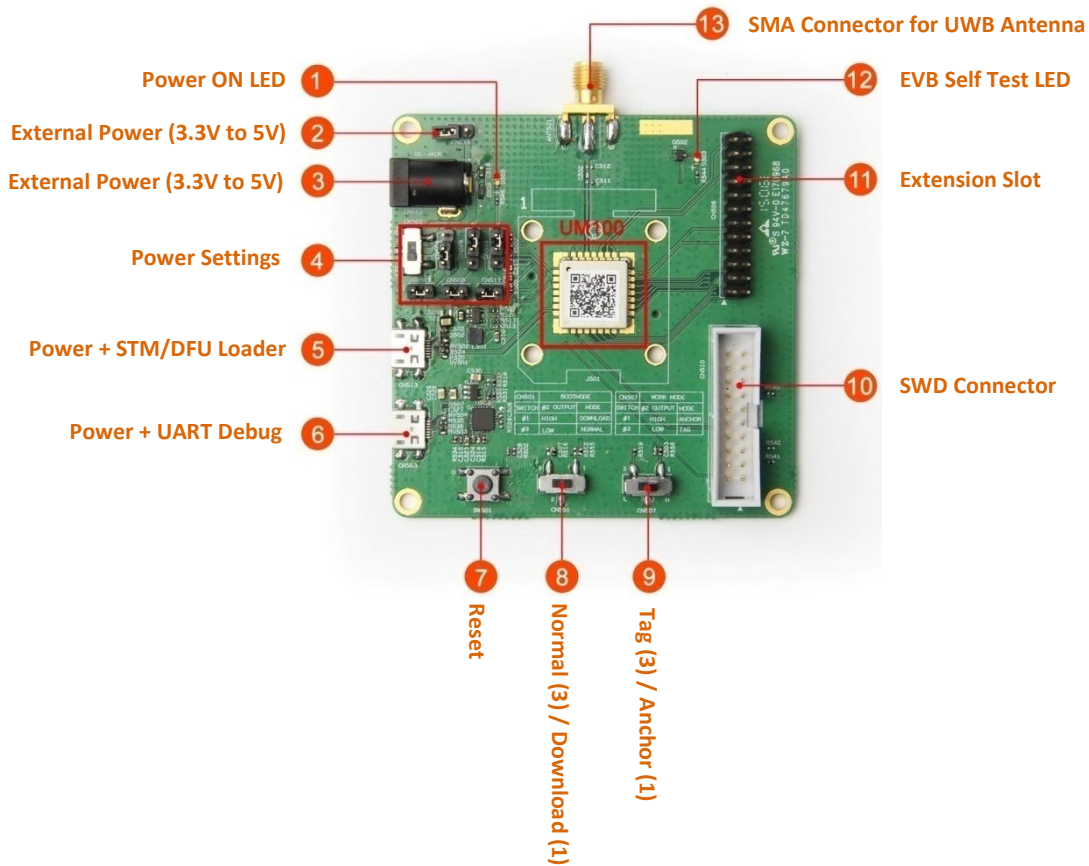


Figure 1 Interfaces and major functional parts on the EVB

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## 2. Anchor / Tag Configuration

A board can be configured as a tag or as an anchor using “**WORK MODE**” switch (Figure 1, N°9).

- Position #1 starts an **Anchor**.
- Position #3 starts a **Tag**.

You will need to configure one board in tag and the other one in anchor.

## 3. Boot Mode Configuration

An EVB can be started in 2 different mode using “**BOOT MODE**” switch (Figure 1, N°8).

- Position #1: **Download** mode, used for configuration and will be explained hereafter.
- Position #3: **Normal** mode, will start distance measurement software.

## 4. Power source & Antenna

An EVB can be powered ON using one of the 2 micro-USB port (Figure 1, N°5 & 6) or an external power source (Figure 1, N°2 & 3). You will also need to connect the provided UWB antenna to SMA interface (Figure 1, N°13).

## 5. USART Configuration & Distance Reading

Distances can be read from the board configured as **Anchor**. Plug the USB debug port of EVB (Figure 1, N°6) to your computer and configure a serial terminal (e.g. using Minicom on Ubuntu or TeraTerm on Windows) with following settings:

**Baud rate:** 115200 bauds

**Data:** 8 bits

**Parity:** None

**Stop bit:** 1

**Flow control:** none

As soon as an anchor and at least one tag is started the anchor will display following information:

**SRC:** *Source*, unique ID of the tag

**LQI:** *Line Quality Indicator*, represents signal strength in percent

**DIST:** *Distance*, measured between tag and the anchor in meter

```

ANCHOR STARTED
SRC 1d9 LQI 74% DIST 0.37h
SRC 1d9 LQI 74% DIST 0.52h
SRC 1d9 LQI 74% DIST 0.52h
SRC 1d9 LQI 75% DIST 0.37h
SRC 1d9 LQI 74% DIST 0.37h
SRC 1d9 LQI 71% DIST 0.52h
SRC 1d9 LQI 75% DIST 0.37h
SRC 1d9 LQI 74% DIST 0.37h
SRC 1d9 LQI 75% DIST 0.52h
SRC 1d9 LQI 73% DIST 0.37h
SRC 1d9 LQI 75% DIST 0.52h
TAG STARTED

```

Figure 2: Terminal output on Anchor (left) and Tag (right)

## 6. BeSpoon configuration software

EVB configuration is done with BeSpoon STM/DFU Loader, available in:

*/tools/bs\_loader\_stm\_distributed.exe*

This tool uses the dedicated micro-USB port (Figure 1, N°5) to update firmware and settings. You should also install STM32 ST-LINK Utility driver, available at:

[http://www.st.com/web/en/catalog/tools/FM147/SC1887/PF258168?s\\_searchtype=keyword#](http://www.st.com/web/en/catalog/tools/FM147/SC1887/PF258168?s_searchtype=keyword#)

NB: The first time you connect a device to your PC, the STM32 Bootloader driver will be installed automatically through Windows Update. This can take a long time.

The procedure for configuration is the same as for firmware upgrade:

- Set WORK MODE switch to DOWNLOAD
- Connect dedicated micro-USB port to your computer (Figure 1, N°5)
- Power ON or reset EVB (Figure 1, N°7)
- Launch DFU/STM Loader application

EVB will be detected as displayed below:

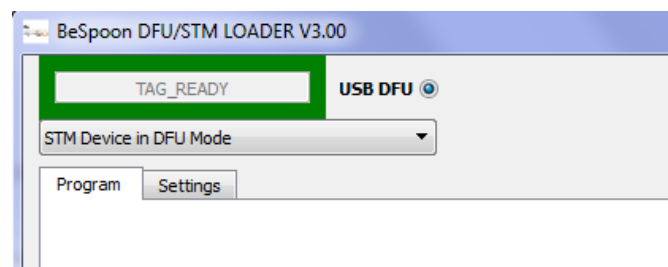


Figure 3: EVB discovered

First tab (*Program*) is used to update EVB firmware and second tab (*Settings*) is used to change current configuration. You should not change those settings if you don't understand them. Initial settings are reminded at the end of this document.

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## 7. Configure Multiple Tags

If you have **more than 2 evaluation boards** you can measure distance with multiple tags. You will need to configure **one board as Anchor, and the others as Tag** (3 maximum with initial configuration).

Then, you will have to change a setting for the 3 boards configured as Tag. Start one of them in DOWNLOAD mode as indicated before and launch BeSpoon DFU/STM Loader. Please note that you can configure only one board at a time. Under “Protocol Configuration” there is a parameter named “**First Rng Slot**”. There are 3 possible values: 3, 4 and 5. Each tag will need a **different value**. Once modified, click on *Update* button and validate popup. Put WORK MODE switch to NORMAL and reset EVB.

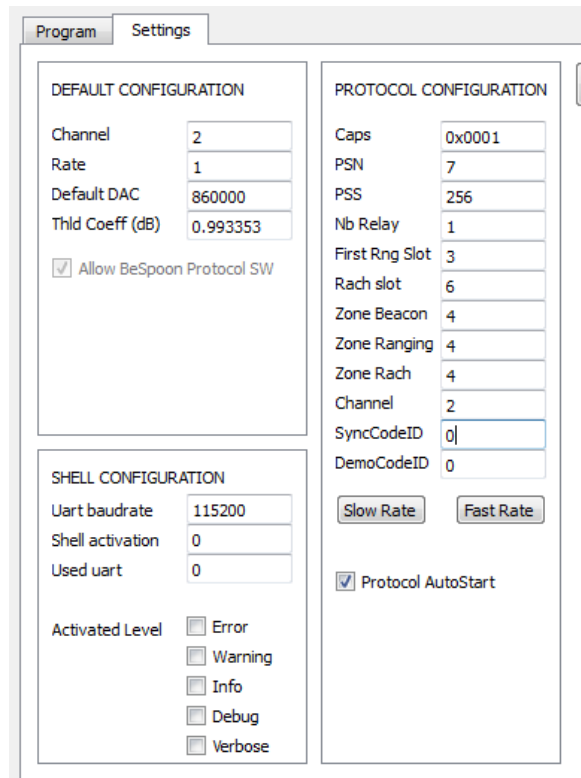
## 8. UWB Settings

Some parameters can be easily changed using BeSpoon STM/DFU Loader. In *Settings* tab, under *Protocol Configuration* you can change following parameters:

- **Channel:** UWB channels, from 1 to 4.
- **Zone Beacon, Ranging and Rach:** You can change UWB frame duration with those settings. They should be equal, from 2 to 4. Please note that this will have an impact on maximum system range, with better results in zone 4 and lowest in zone 2. Each device of a setup has to use the same zone to work together.
- **SyncCodeID and DemoCodeID:** If you wish to run multiple setup (e.g. 1 tag ranging with 1 anchor and another tag ranging with another anchor) you can change those values. They should be equal, from 0 to 3, and be the same for each device of one setup.
- If you are familiar with protocol superframe configuration and plan to change rate (PSN / PSS / Relays) please keep in mind that you will need to raise UART baudrate. At 115200 bps EVB does not have enough time to display distances and will not work properly. BeSpoon recommends using 921600 bps in case of rate higher than 10Hz. This setting can be changed in BeSpoon DFU/STM Loader, under SHELL CONFIGURATION.

## 9. Initial EVB configuration

If you wish to go back to initial configuration please use following settings in BeSpoon DFU/STM Loader:



The screenshot shows the 'Settings' window of the BeSpoon DFU/STM Loader. It is divided into three main sections: DEFAULT CONFIGURATION, SHELL CONFIGURATION, and PROTOCOL CONFIGURATION.

Section	Parameter	Value
DEFAULT CONFIGURATION	Channel	2
	Rate	1
	Default DAC	860000
	Thld Coeff (dB)	0.993353
	Allow BeSpoon Protocol SW	<input checked="" type="checkbox"/>
SHELL CONFIGURATION	Uart baudrate	115200
	Shell activation	0
	Used uart	0
	Activated Level	<input type="checkbox"/> Error <input type="checkbox"/> Warning <input type="checkbox"/> Info <input type="checkbox"/> Debug <input type="checkbox"/> Verbose
	PROTOCOL CONFIGURATION	Caps
PSN		7
PSS		256
Nb Relay		1
First Rng Slot		3
Rach slot		6
Zone Beacon		4
Zone Ranging		4
Zone Rach		4
Channel		2
SyncCodeID	0	
DemoCodeID	0	
Buttons	Slow Rate, Fast Rate	
Protocol AutoStart	<input checked="" type="checkbox"/>	

Figure 4: Initial Settings

## 10. CONTACT INFORMATION

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Please visit the BeSpoon Technical Support web page and register to submit a technical support request:

<http://www.spoonphone.com/forum/>