



BlueEva+SR Evaluation Kit User Guide

1VV0301280 Rev. 5 – 2018-03-01

TELIT
TECHNICAL
DOCUMENTATION

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

NOTICE

While reasonable efforts have been made to assure the accuracy of this document, Telit assumes no liability resulting from any inaccuracies or omissions in this document, or from use of the information obtained herein. The information in this document has been carefully checked and is believed to be reliable. However, no responsibility is assumed for inaccuracies or omissions. Telit reserves the right to make changes to any products described herein and reserves the right to revise this document and to make changes from time to time in content hereof with no obligation to notify any person of revisions or changes. Telit does not assume any liability arising out of the application or use of any product, software, or circuit described herein; neither does it convey license under its patent rights or the rights of others.

It is possible that this publication may contain references to, or information about Telit products (machines and programs), programming, or services that are not announced in your country. Such references or information must not be construed to mean that Telit intends to announce such Telit products, programming, or services in your country.

COPYRIGHTS

This instruction manual and the Telit products described in this instruction manual may be, include or describe copyrighted Telit material, such as computer programs stored in semiconductor memories or other media. Laws in the Italy and other countries preserve for Telit and its licensors certain exclusive rights for copyrighted material, including the exclusive right to copy, reproduce in any form, distribute and make derivative works of the copyrighted material. Accordingly, any copyrighted material of Telit and its licensors contained herein or in the Telit products described in this instruction manual may not be copied, reproduced, distributed, merged or modified in any manner without the express written permission of Telit. Furthermore, the purchase of Telit products shall not be deemed to grant either directly or by implication, estoppel, or otherwise, any license under the copyrights, patents or patent applications of Telit, as arises by operation of law in the sale of a product.

COMPUTER SOFTWARE COPYRIGHTS

The Telit and 3rd Party supplied Software (SW) products described in this instruction manual may include copyrighted Telit and other 3rd Party supplied computer programs stored in semiconductor memories or other media. Laws in the Italy and other countries preserve for Telit and other 3rd Party supplied SW certain exclusive rights for copyrighted computer programs, including the exclusive right to copy or reproduce in any form the copyrighted computer program. Accordingly, any copyrighted Telit or other 3rd Party supplied SW computer programs contained in the Telit products described in this instruction manual may not be copied (reverse engineered) or reproduced in any manner without the express written permission of Telit or the 3rd Party SW supplier. Furthermore, the purchase of Telit products shall not be deemed to grant either directly or by implication, estoppel, or otherwise, any license under the copyrights, patents or patent applications of Telit or other 3rd Party supplied SW, except for the normal non-exclusive, royalty free license to use that arises by operation of law in the sale of a product.

USAGE AND DISCLOSURE RESTRICTIONS

I. License Agreements

The software described in this document is the property of Telit and its licensors. It is furnished by express license agreement only and may be used only in accordance with the terms of such an agreement.

II. Copyrighted Materials

Software and documentation are copyrighted materials. Making unauthorized copies is prohibited by law. No part of the software or documentation may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, without prior written permission of Telit.

III. High Risk Materials

Components, units, or third-party products used in the product described herein are NOT fault-tolerant and are NOT designed, manufactured, or intended for use as on-line control equipment in the following hazardous environments requiring fail-safe controls: the operation of Nuclear Facilities, Aircraft Navigation or Aircraft Communication Systems, Air Traffic Control, Life Support, or Weapons Systems (High Risk Activities"). Telit and its supplier(s) specifically disclaim any expressed or implied warranty of fitness for such High Risk Activities.

IV. Trademarks

TELIT and the Stylized T Logo are registered in Trademark Office. All other product or service names are the property of their respective owners.

V. Third Party Rights

The software may include Third Party Right software. In this case you agree to comply with all terms and conditions imposed on you in respect of such separate software. In addition to Third Party Terms, the disclaimer of warranty and limitation of liability provisions in this License shall apply to the Third Party Right software.

TELIT HEREBY DISCLAIMS ANY AND ALL WARRANTIES EXPRESS OR IMPLIED FROM ANY THIRD PARTIES REGARDING ANY SEPARATE FILES, ANY THIRD PARTY MATERIALS INCLUDED IN THE SOFTWARE, ANY THIRD PARTY MATERIALS FROM WHICH THE SOFTWARE IS DERIVED (COLLECTIVELY "OTHER CODE"), AND THE USE OF ANY OR ALL THE OTHER CODE IN CONNECTION WITH THE SOFTWARE, INCLUDING (WITHOUT LIMITATION) ANY WARRANTIES OF SATISFACTORY QUALITY OR FITNESS FOR A PARTICULAR PURPOSE.

NO THIRD PARTY LICENSORS OF OTHER CODE SHALL HAVE ANY LIABILITY FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS), HOWEVER CAUSED AND WHETHER MADE UNDER CONTRACT, TORT OR OTHER LEGAL THEORY, ARISING IN ANY WAY OUT OF THE USE OR DISTRIBUTION OF THE OTHER CODE OR THE EXERCISE OF ANY RIGHTS GRANTED UNDER EITHER OR BOTH THIS LICENSE AND THE LEGAL TERMS APPLICABLE TO ANY SEPARATE FILES, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

APPLICABILITY TABLE

PRODUCTS

- BLUEEVA+SR/AI

CONTENTS

NOTICE	2
COPYRIGHTS	2
COMPUTER SOFTWARE COPYRIGHTS	2
USAGE AND DISCLOSURE RESTRICTIONS	3
APPLICABILITY TABLE	4
CONTENTS	5
1. INTRODUCTION	7
1.1. Scope	7
1.2. Audience	7
1.3. Contact and Support Information	7
1.4. Text Conventions	8
1.5. Related Documents	8
2. PACKAGE CONTENT	9
3. HARDWARE	10
3.1. BlueMod+SR	10
3.2. Reset	10
3.3. USB Interface	10
3.4. LEDs	11
3.5. Connectors / Jumpers	11
3.5.1. Jumper J2	11
3.5.2. Jumper J3	11
3.5.3. Jumper J4	11
3.5.4. Jumper J5	12
3.5.5. Jumper J6	12
3.5.6. Connector X3	12
3.6. Current Measurement	12
3.7. How To Interface the UART Lines on TTL level	13
3.8. Default Configuration	14
4. SETUP	15
4.1. System Requirements	15
4.2. Startup	15
4.3. Installation of the BlueEva+SR USB Driver	16

5.	USAGE OF THE BLUEEVA+SR	17
5.1.	Configuration of Serial Port Profile (SPP).....	17
5.2.	Outgoing SPP Connection	21
5.3.	Incoming SPP Connection	23
5.4.	NFC Handover.....	27
5.4.1.	Configure the BlueEva+SR for NFC Handover	27
5.4.2.	Example to Demonstrate the NFC Handover	28
6.	FIRMWARE UPDATE	31
7.	DOCUMENT HISTORY	34

1. INTRODUCTION

1.1. Scope

This document describes the usage of the evaluation kit for the Bluetooth module BlueMod+SR.

1.2. Audience

This document is intended for Telit customers, especially system integrators, about to implement Bluetooth modules in their application.

1.3. Contact and Support Information

For general contact, technical support services, technical questions and report documentation errors contact Telit Technical Support at:

- TS-SRD@telit.com

Alternatively, use:

<https://www.telit.com/contact-us/>

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

<https://www.telit.com/>

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.

1.4. Text Conventions



Danger – This information **MUST** be followed or catastrophic equipment failure or bodily injury may occur.



Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.



Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.5. Related Documents

- [1] BlueMod+SR Hardware User Guide, 1VV0301276
- [2] BlueMod+SR AT Command Reference, 80507ST10752A
- [3] BlueMod+SR Software User Guide, 1VV0301278
- [4] BlueEva+SR Schematics
- [5] UICP UART Interface Control Protocol Specification, 30507ST10756A

2. PACKAGE CONTENT

The BlueEva+SR package contains the following components:

- 1 x BlueEva+SR board
- 1 x NFC board "NTAG12CEvalv1.0" incl. the corresponding flat ribbon cable
- 1 x USB cable
- 1 x Printed card with download instructions

3. HARDWARE

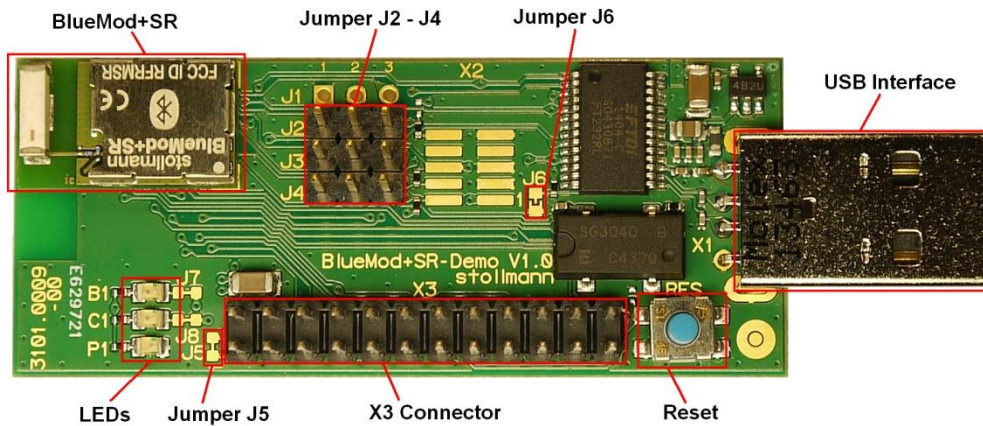


Figure 1: BlueEva+SR

3.1. BlueMod+SR

The BlueEva+SR is equipped with a BlueMod+SR Bluetooth module.

3.2. Reset

The BlueEva+SR is equipped with a reset button. Pressing the reset button will trigger the BlueMod+SR module to perform a reset. The USB port is not influenced by the reset.

3.3. USB Interface

The BlueEva+SR provides an USB interface which is used to connect the evaluation board to the host and as power supply. The presence of the supply voltage is indicated by LED P1.

The USB interface is equipped with an FTDI USB to serial bridge, interfacing the serial port of the BlueMod+SR.

The serial port is a high-speed UART interface at CMOS levels and supports the following features:

- Transmission speed: 9,600 – 921,600 bps (asynchronous)
- Character representation: 8 bit, no parity, 1 stop bit (8N1)
- Hardware flow-control with RTS/CTS

For details please refer to the BlueMod+SR Hardware User Guide [1].

3.4. LEDs

The BlueEva+SR provides several LEDs for functional indication.

Interface	Position	Function
LEDs	P1	Indicates the presence of power supply voltage
	B1	Connected to IOB ⁽¹⁾
	C1	Connected to IOC ⁽¹⁾

⁽¹⁾ Function depending on firmware support

3.5. Connectors / Jumpers

3.5.1. Jumper J2

Jumper J2 provides the possibility to invoke the STM32 bootloader at start-up. This is required for firmware update.

J2 Position	Function
1-2	Normal operation mode at start-up
2-3	Invoke STM32 bootloader at start-up (BOOT0)

3.5.2. Jumper J3

Jumper J3 is used for either hangup or UICP functionality.

In hangup mode USB_DTR# is connected to GPIO[4]. An existing connection is terminated by DTR drop (high signal on USB_DTR#). ⁽²⁾

⁽²⁾ Function depending on firmware support

In UICP mode USB_DTR# is used as IUR-IN# signal. UICP is an advanced power management protocol. For further information about UICP please refer to the UICP UART Interface Control Protocol Specification [5].

J3 Position	Function
1-2	USB_DTR# connected to IUR-IN# for using UICP
2-3	USB_DTR# connected to GPIO[4]

3.5.3. Jumper J4

Jumper J4 provides the possibility for feeding the BlueMod+SR with an external 32.768 kHz slow clock. Using the external slow clock reduces the power consumption during power down modes. For demonstrating purposes an external low power oscillator is available on the BlueEva+SR.

J4 Position	Function
1-2	Use module internal slow clock
2-3	Use external 32.768 kHz slow clock (SLCK)

3.5.4. Jumper J5

Jumper J5 provides the possibility (by opening/cutting off the jumper) for current measurement of the BlueMod+SR.

3.5.5. Jumper J6

Jumper J6 provides the possibility to disable (by closing it with a soldering point) the USB to serial bridge.

3.5.6. Connector X3

Connector X3 is a 24 pin extension header exposing all module signals.

PU = PullUp, PD = PullDown, PP = PushPull

Pin Number	Signal	Type	Description
1	+3V3	O	Supply voltage output
2	+3V3-BT	I	Supply voltage to BlueMod+SR
3	GND		Ground
4	GND		Ground
5	GPIO[0]	I	GPIO
6	GPIO[1]	I	GPIO
7	GPIO[2]	I/O	IOC, user IO
8	GPIO[3]	I/O	IOB, user IO
9	GPIO[4]	I-PD	HANGUP
10	GPIO[5]	I/O	IOD, user IO
11	GPIO[6]	O-PP	Reserved
12	GPIO[7]	I-PD	GPIO
13	GPIO[8]	I/O	IOA, user IO
14	EXT-RES#	I/O-PU	User reset
15	UART-TXD	O-PP	IUR data OUT
16	UART-RXD	I-PD	IUR data IN
17	UART-CTS#	I-PD	Flow control / IUC
18	UART-RTS#	O-PP	Flow control / IUC
19	IUR-IN#	I-PD	UICP control
20	IUR-OUT#	O-PP	UICP control
21	BT-ACT	O	WLAN coexistence
22	BT-STAT	O	WLAN coexistence
23	WLAN-DNY	I-PD	WLAN coexistence
24	BT-PER	O	WLAN coexistence

3.6. Current Measurement

Current measurement of the BlueMod+SR can be performed by opening (cut off) jumper J5 and measuring the current between pin 1 and 2 of connector X3.

3.7. How To Interface the UART Lines on TTL level



If you want to access the UART lines directly it is important to disable the onboard USB to serial bridge by closing jumper J6 with a soldering point (set all outputs to TRISTATE).

Take note that it is required to connect the USB port to supply power to the FTDI.

All UART signals are available at connector X3 and can be connected to your application.

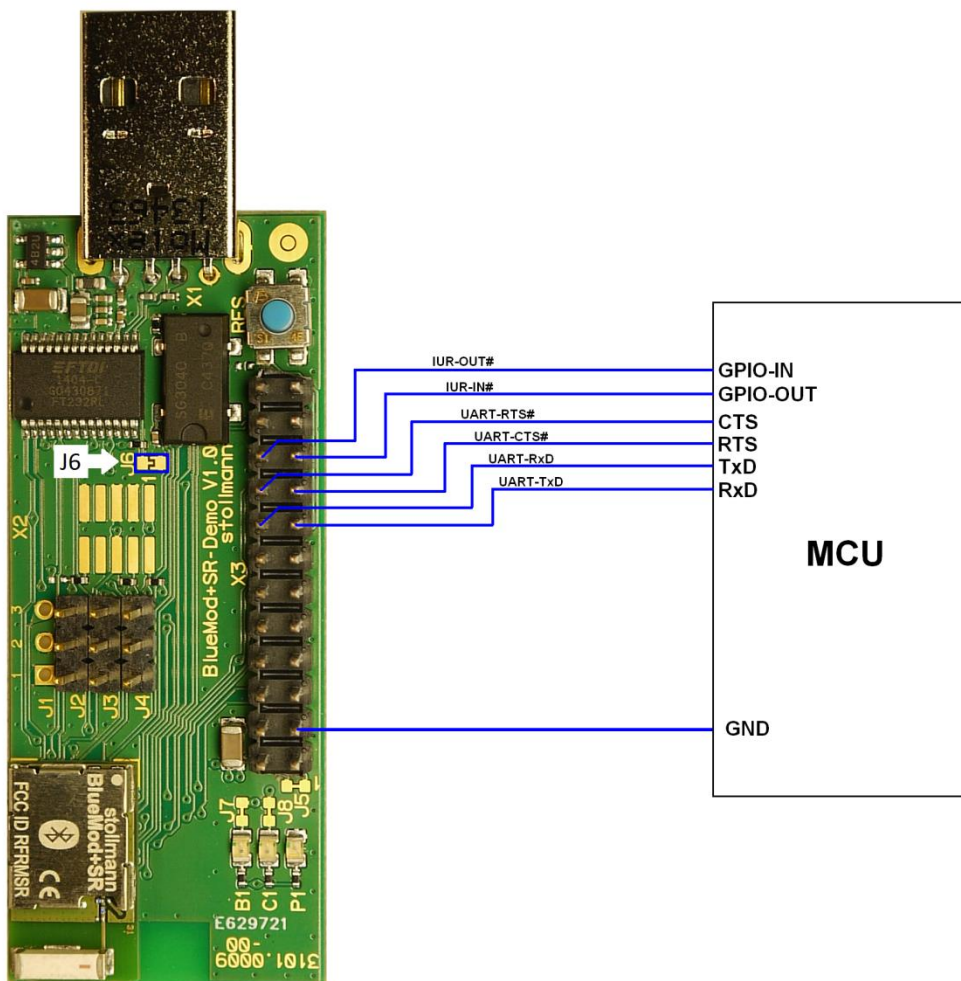


Figure 2: MCU connected to UART lines

3.8. Default Configuration

The BlueEva+SR is preconfigured as described below:

Jumper Number	Position	Function
J2	1-2	Normal operation mode at start-up
J3	2-3	USB_DTR# connected to GPIO[4]
J4	2-3	Use 32.768 kHz slow clock (SLCK)

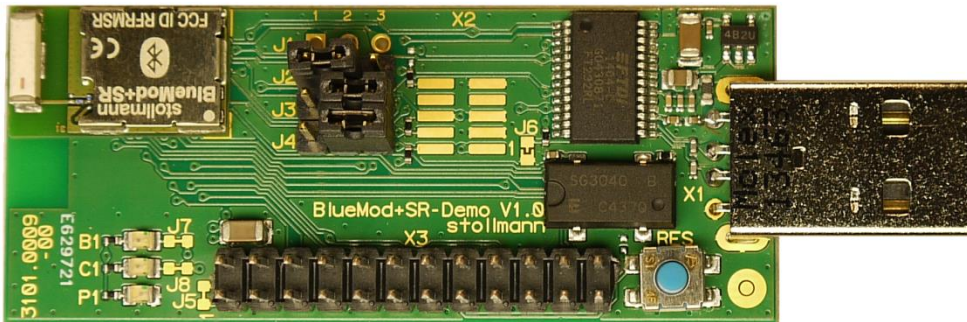


Figure 3: BlueEva+SR default configuration

4. SETUP

4.1. System Requirements

- PC with Windows® XP or higher
- 1 free USB port
- Adobe Acrobat® Reader for reading the documentation

4.2. Startup

To install the BlueEva+SR connect it as follows.

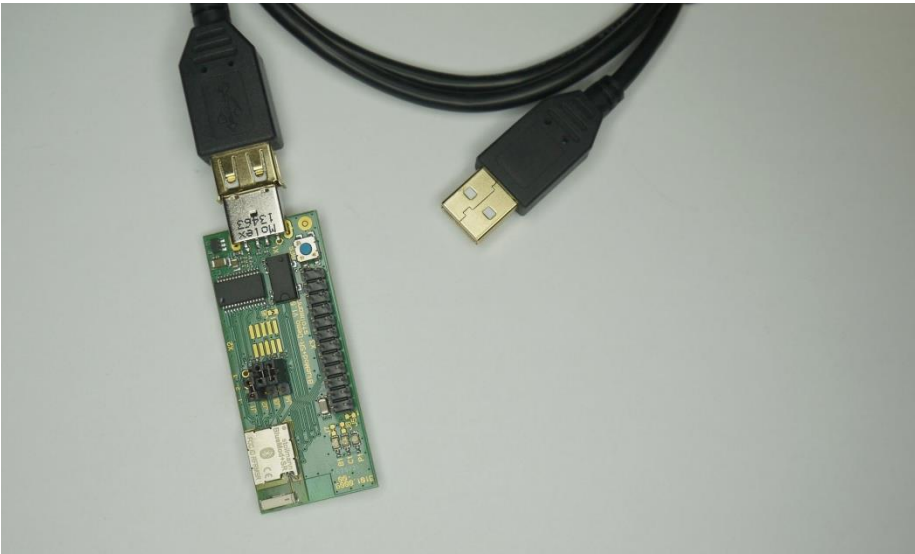


Figure 4: BlueEva+SR without connected NFC board

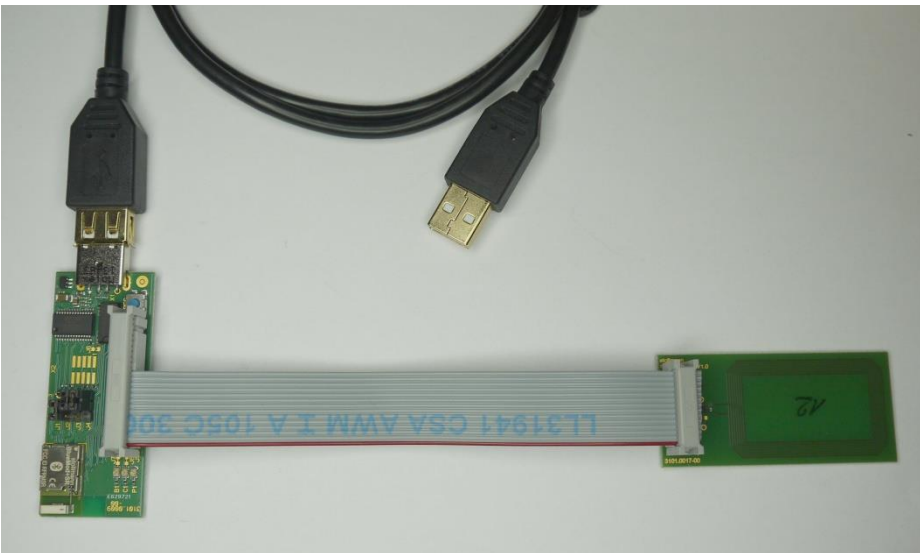


Figure 5: BlueEva+SR with connected NFC board

4.3. Installation of the BlueEva+SR USB Driver

If required download the latest FTDI VCP USB to UART driver from:

<http://www.ftdichip.com/Drivers/VCP.htm>

Connect the BlueEva+SR to a free USB port of a PC and install the USB device drivers by following the instructions of the Windows® Hardware Wizard using the downloaded FTDI VCP USB to UART driver.

The USB connection is used for power supply and for UART communication to a PC over a virtual COM port. This lets you use a terminal emulation program to perform the configuration or to control the Bluetooth connection.

You may use the Telit AT Controller (version 3.4.11 or higher) to communicate with the BlueEva+SR. The Telit AT Controller is available in the download zone.

5. USAGE OF THE BLUEEVA+SR

5.1. Configuration of Serial Port Profile (SPP)

If the BlueEva+SR is correctly connected to the PC, the Telit AT Controller (or any other terminal emulation program) can be used to read and modify the configuration settings.



Figure 6: Telit AT Controller main menu

As shipped by the factory, the BlueEva+SR works at 115,200 bps, using the 8N1 data format (8 data bits, no parity, 1 stop bit). Please configure the Telit AT Controller accordingly. Select the COM port the BlueEva+SR is connected to (COM6 in the example below).

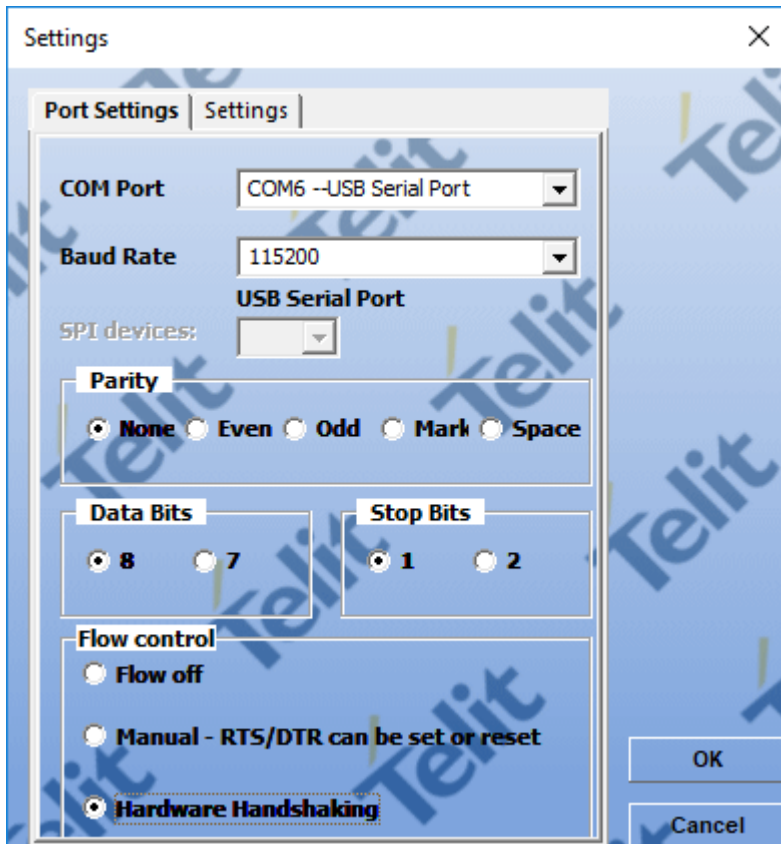


Figure 7: Telit AT Controller settings

Once you have successfully configured the Telit AT Controller press the “Connect” button to connect to the BlueEva+SR and receive the device information.



Figure 8: Telit AT Controller device information

Now you can start the AT Terminal to communicate with the BlueEva+SR using AT commands (e.g. set the local device name with `at+bname=test123`).

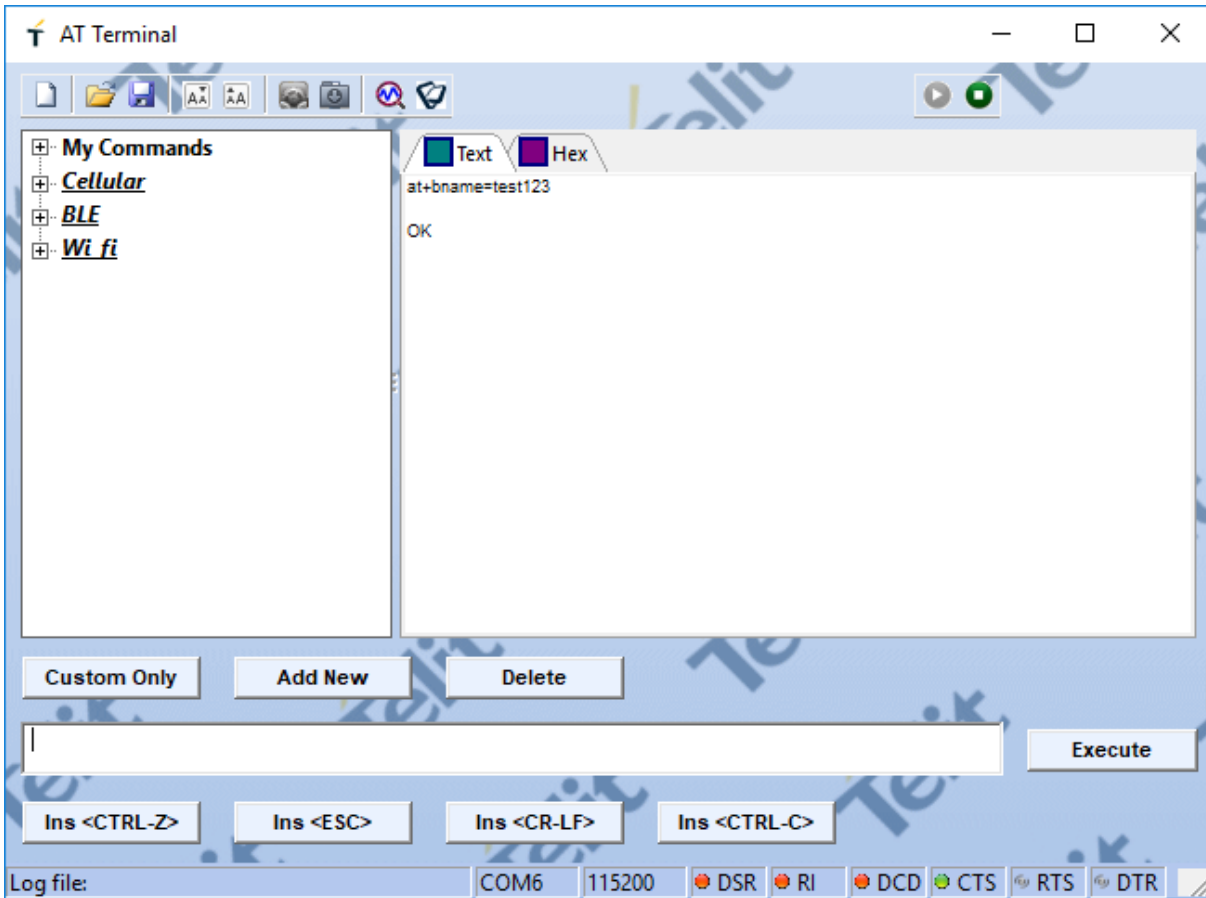


Figure 9: AT Terminal communication

For a more detailed description of the AT commands used for this purpose, please consult our BlueMod+SR AT Command Reference [2].

5.2. Outgoing SPP Connection

Open the AT Terminal and use the “ATD<Bluetooth address>” command to establish a SPP connection to a remote device.

The remote device can be another BlueEva+SR or any other Bluetooth device supporting SPP (for necessary configuration of the remote device please refers to the documentation of the remote device).

Enter the “ATD<Bluetooth address>” command and press the execute button.

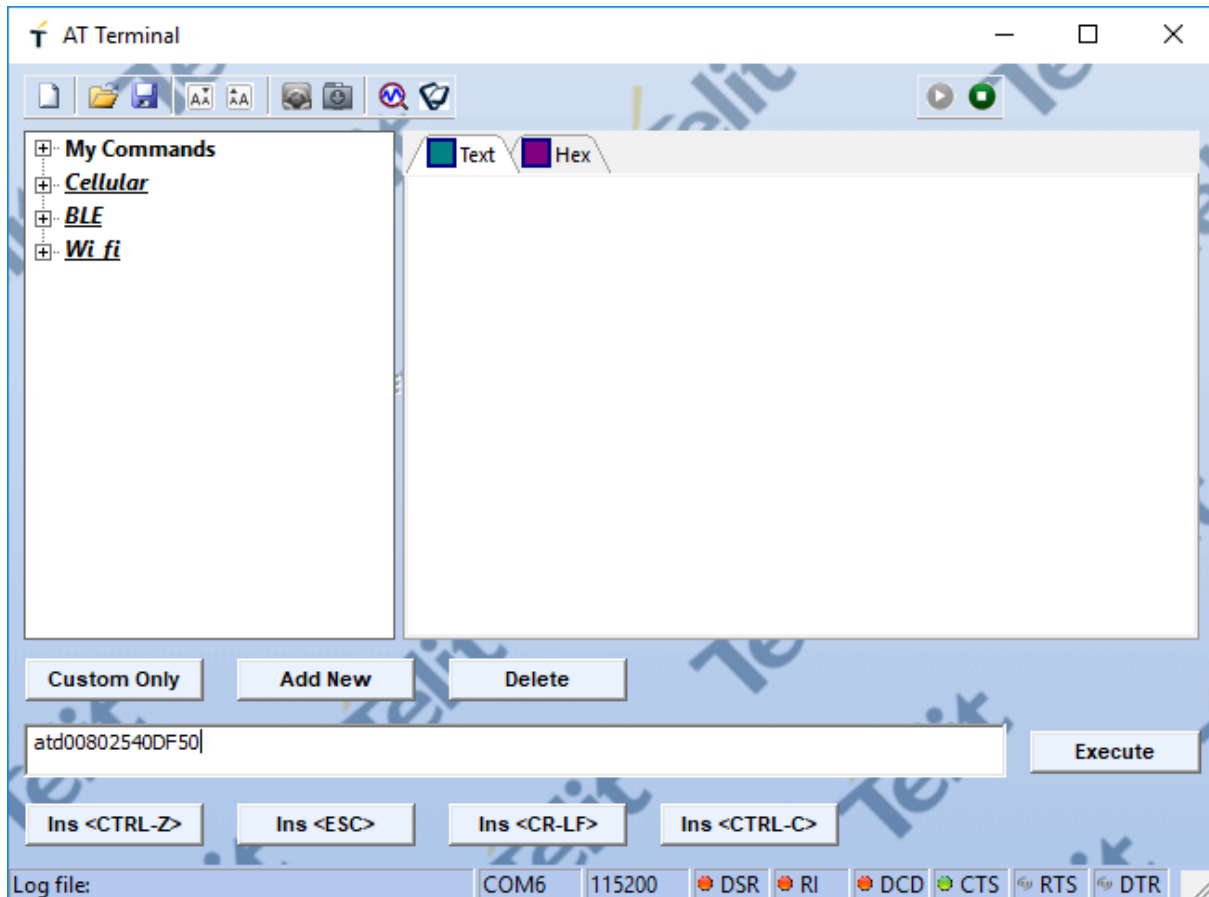


Figure 10: AT Terminal, enter ATD command

If the connection was established successfully, the BlueEva+SR will respond with a CONNECT message. You can now exchange data transparently between the BlueEva+SR and the remote device.

To terminate the Bluetooth connection, send “+++” and “ATH” command.

The BlueEva+SR will respond with a NO CARRIER message.

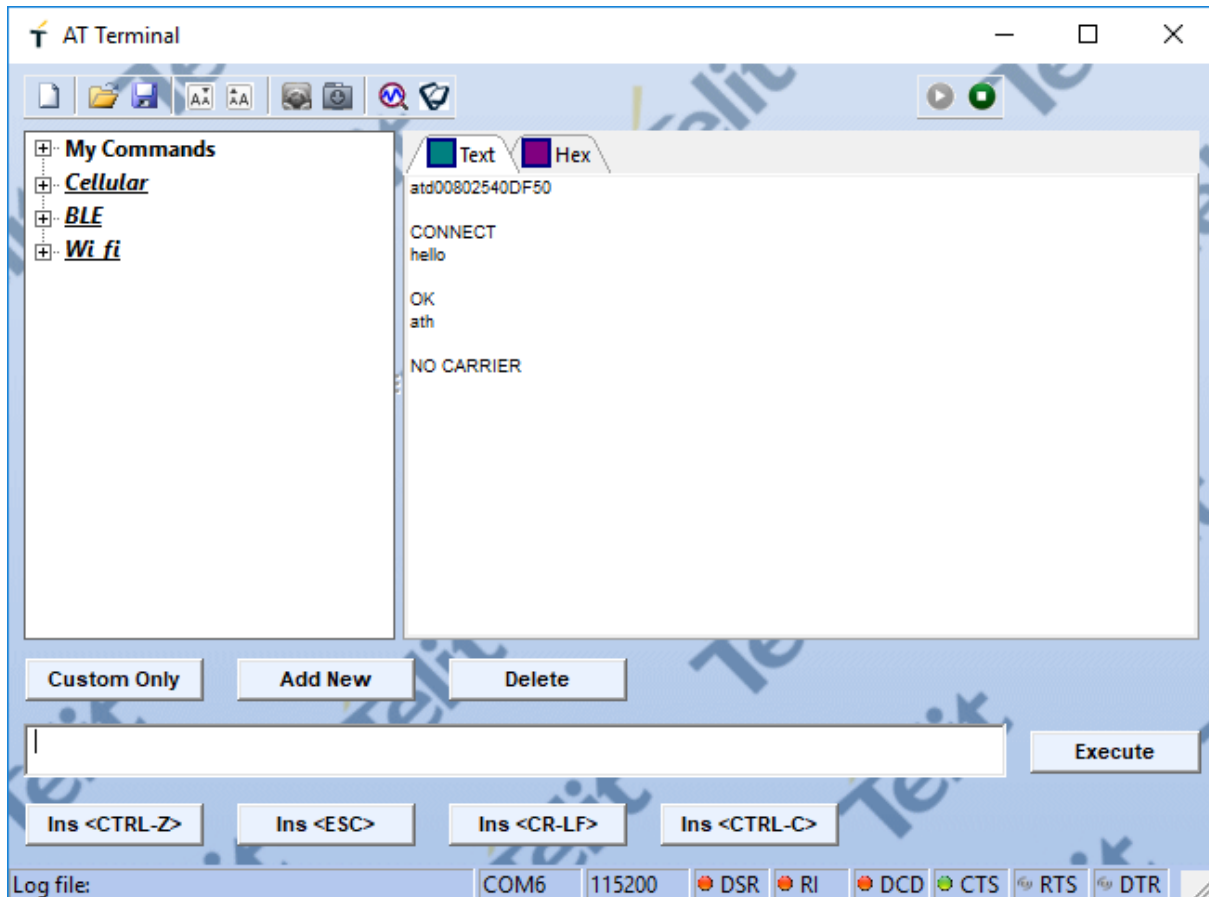
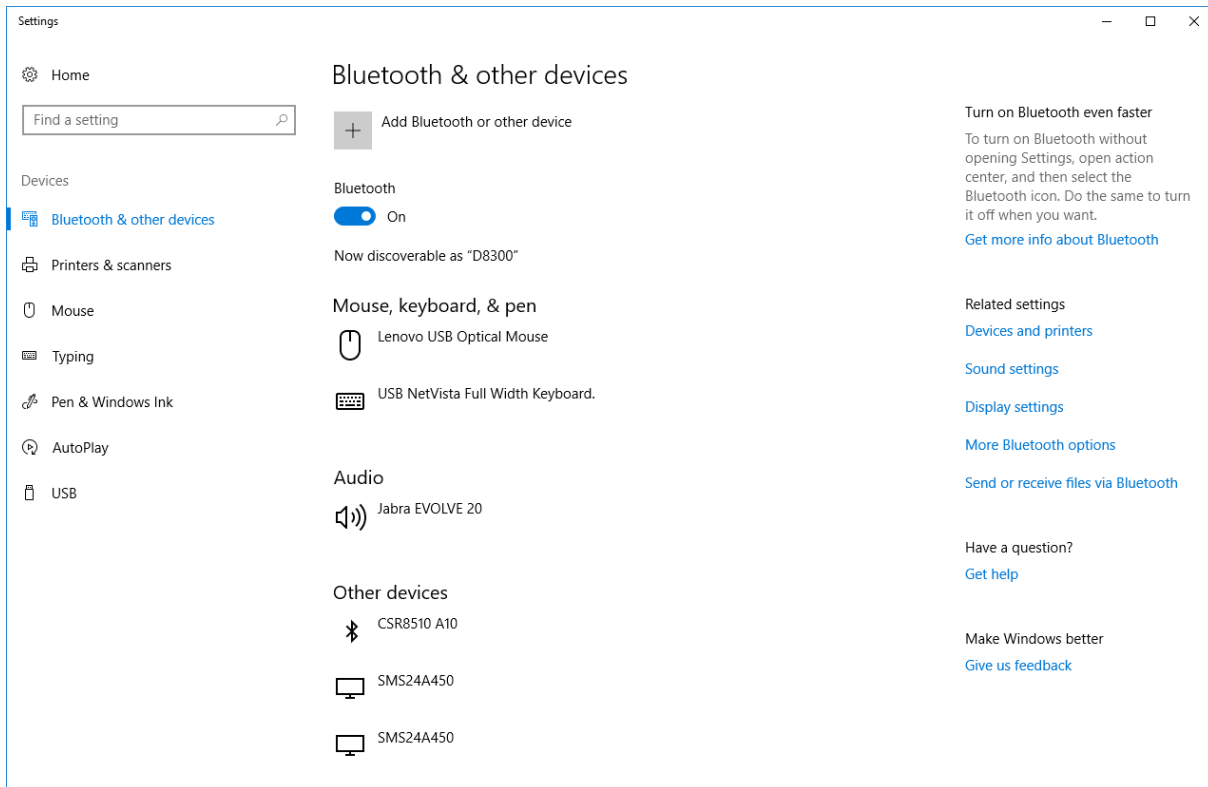


Figure 11: AT Terminal, connection establishment, data exchange, disconnect

5.3. Incoming SPP Connection

The example below describes how to setup a SPP connection from the Windows 10 Bluetooth stack to the BlueEva+SR.

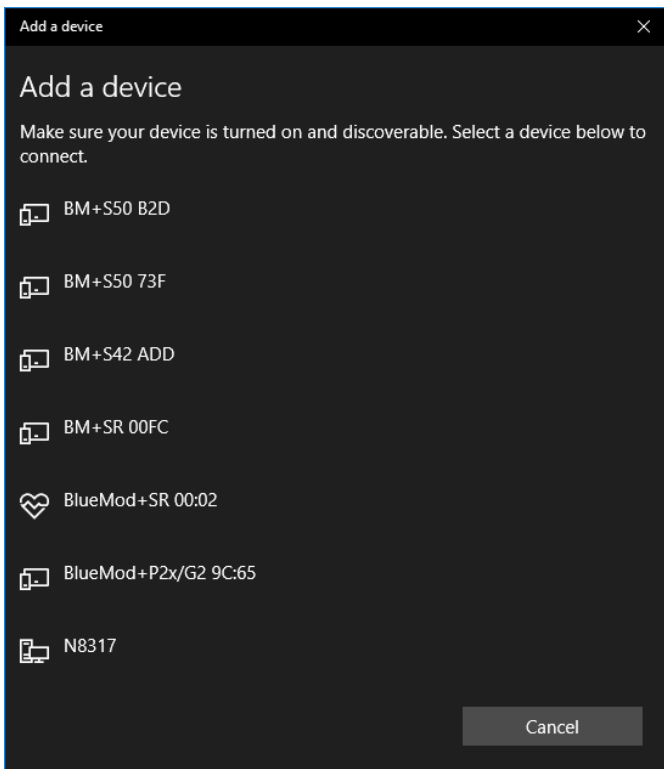
Open the Bluetooth control panel and click the “Add Bluetooth or other device” button.



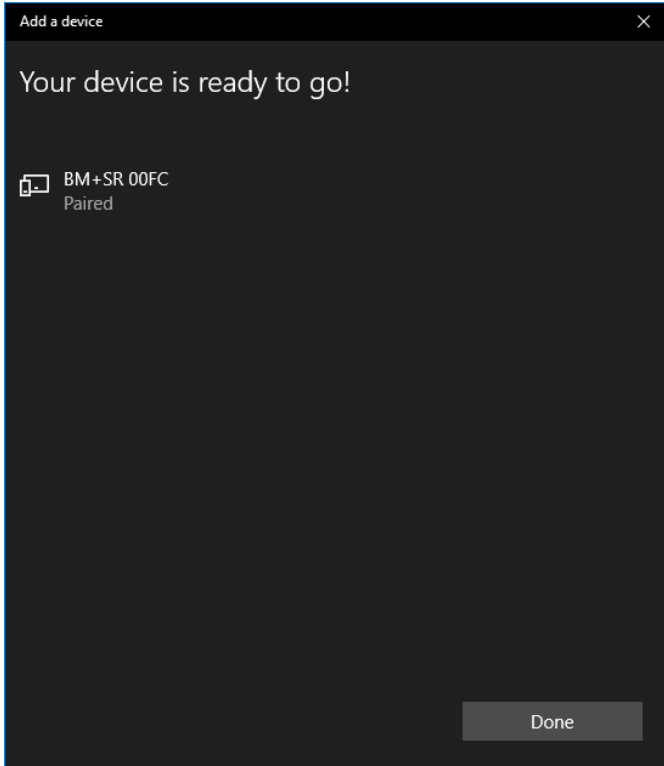
Click “Bluetooth”.



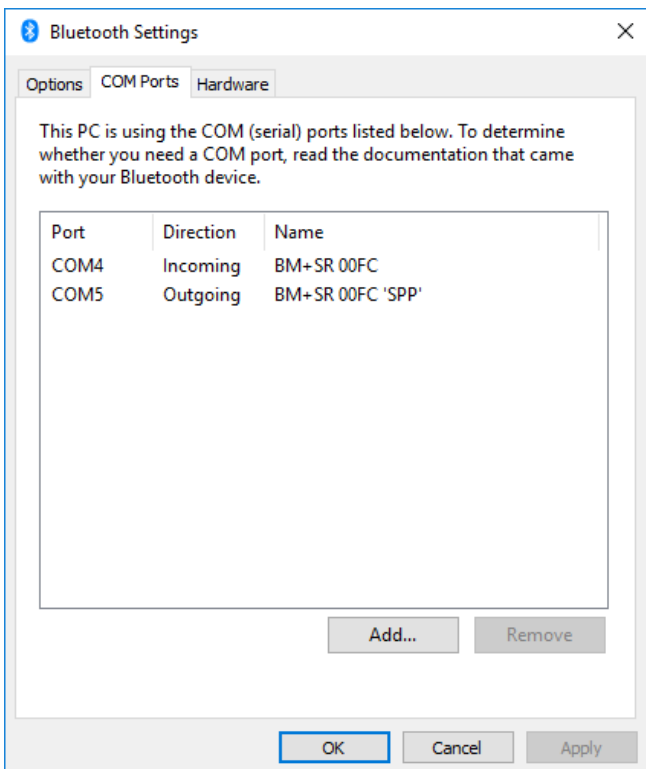
Wait until the search is completed and check if your BlueEva+SR device was found. Click on the device (BM+SR 00FC in the example below).



After successful pairing (Just Works by using the default configuration) the BlueEva+SR is connected to your computer. Click “Done” to complete the installation.



In the Bluetooth Settings under the “COM Ports” tab you will find the available COM port of the BlueEva+SR for an outgoing SPP connection (COM5 in the example below).



Start the Telit AT Terminal and open the COM port where the BlueEva+SR is connected to (COM6 in the example below).

Start another instance of the Telit AT Terminal and open the COM port of the Windows 10 Bluetooth stack which uses the “BM+SR 00FC ‘SPP’” connection to the BlueEva+SR (COM5 in the example below).

When opening this COM port an incoming SPP connection to the BlueEva+SR is initiated and the BlueEva+SR respond with a RING message. In case the automatic call acceptance is activated (this is the default value), the BlueEva+SR will immediately accept the incoming call and respond with a CONNECT message.

Now you can exchange data between your PC and the BlueEva+SR.

When closing COM5 the Bluetooth connection is terminated. The BlueEva+SR respond with a NO CARRIER message.

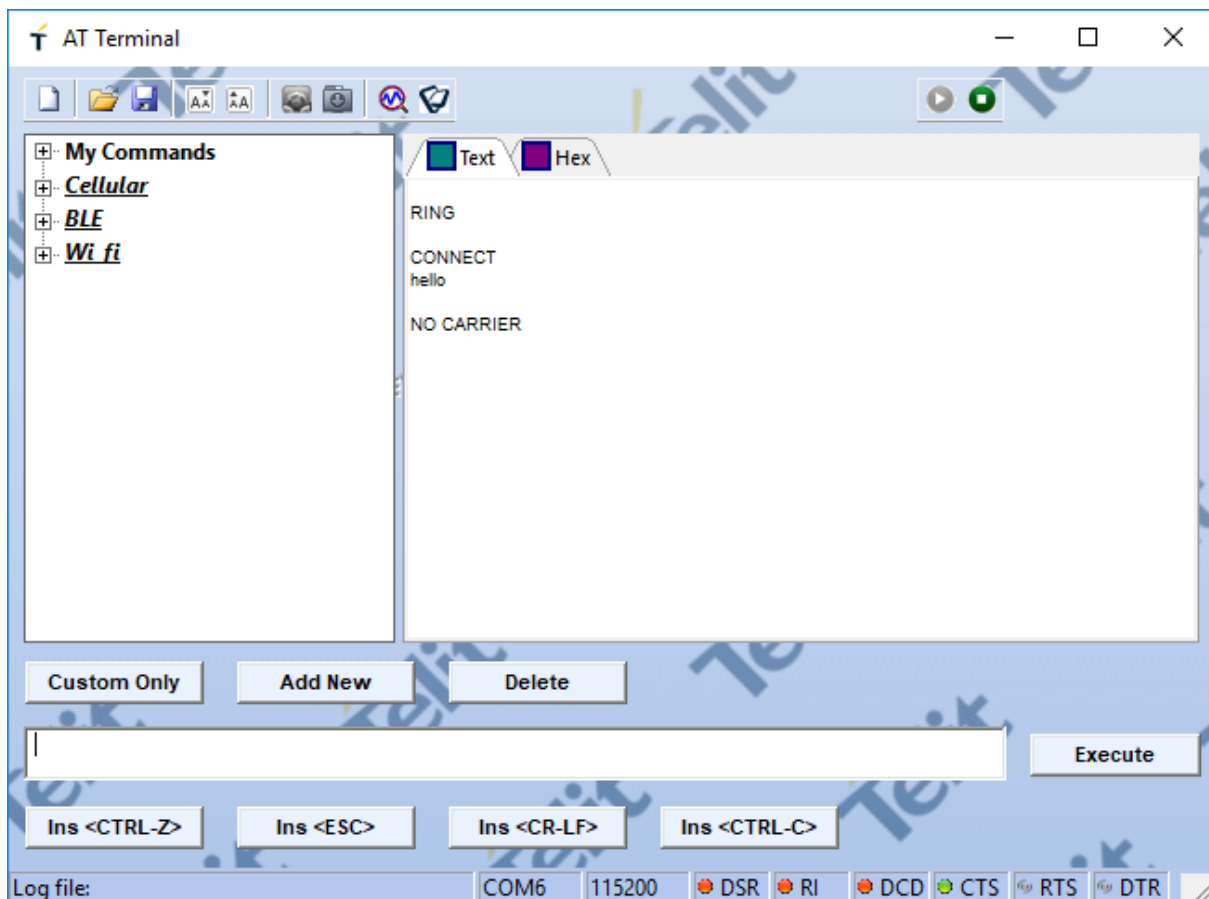


Figure 12: AT Terminal, incoming SPP connection from Windows 10 Bluetooth stack

5.4. NFC Handover

This chapter shows how to simplify the Bluetooth pairing via NFC by using the BlueEva+SR and the NFC Utility app for NFC enabled Android devices.

Requirements regarding the smartphone:

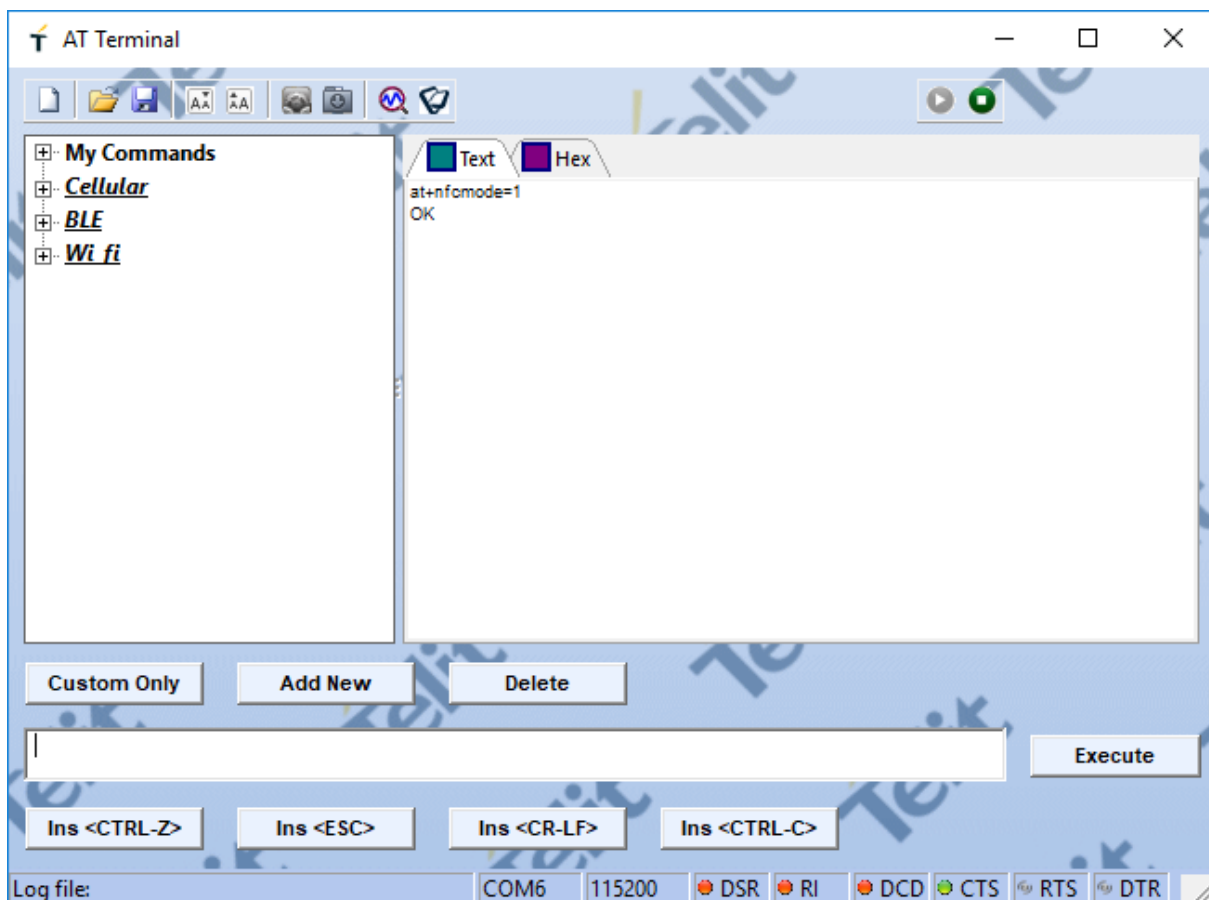
- Android 4.1 or higher
- NFC supported
- Bluetooth and NFC activated
- “Telit NFC Utility” app installed
- “Bluetooth Chat” app installed

5.4.1. Configure the BlueEva+SR for NFC Handover

From the packaging the NFC board is already connected to the flat ribbon cable. Please plug the other side of the flat ribbon cable onto the BlueEva+SR connector X3 (take out the connector assignment from the picture Figure 5).

Then connect the BlueEva+SR to a free USB port on your PC and open the AT Terminal. The serial port settings are the same as described in chapter 5.1.

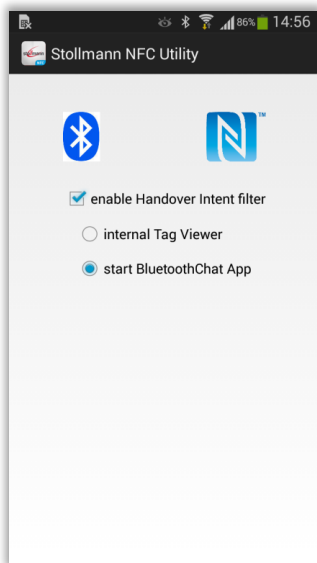
Enable the NFC Handover functionality by using the following AT command:



The BlueMod+SR firmware specific behavior of the NFC Handover is described in the document BlueMod+SR Software User Guide [3].

5.4.2. Example to Demonstrate the NFC Handover

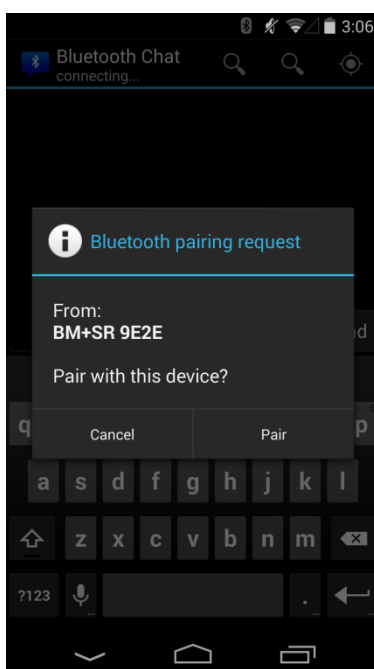
- Start the “NFC Utility” app on the smartphone and configure it as follows:



The “NFC Utility” app detects the NDEF activity onto the smartphone and can start a predefined (depend on the intent filter) application.

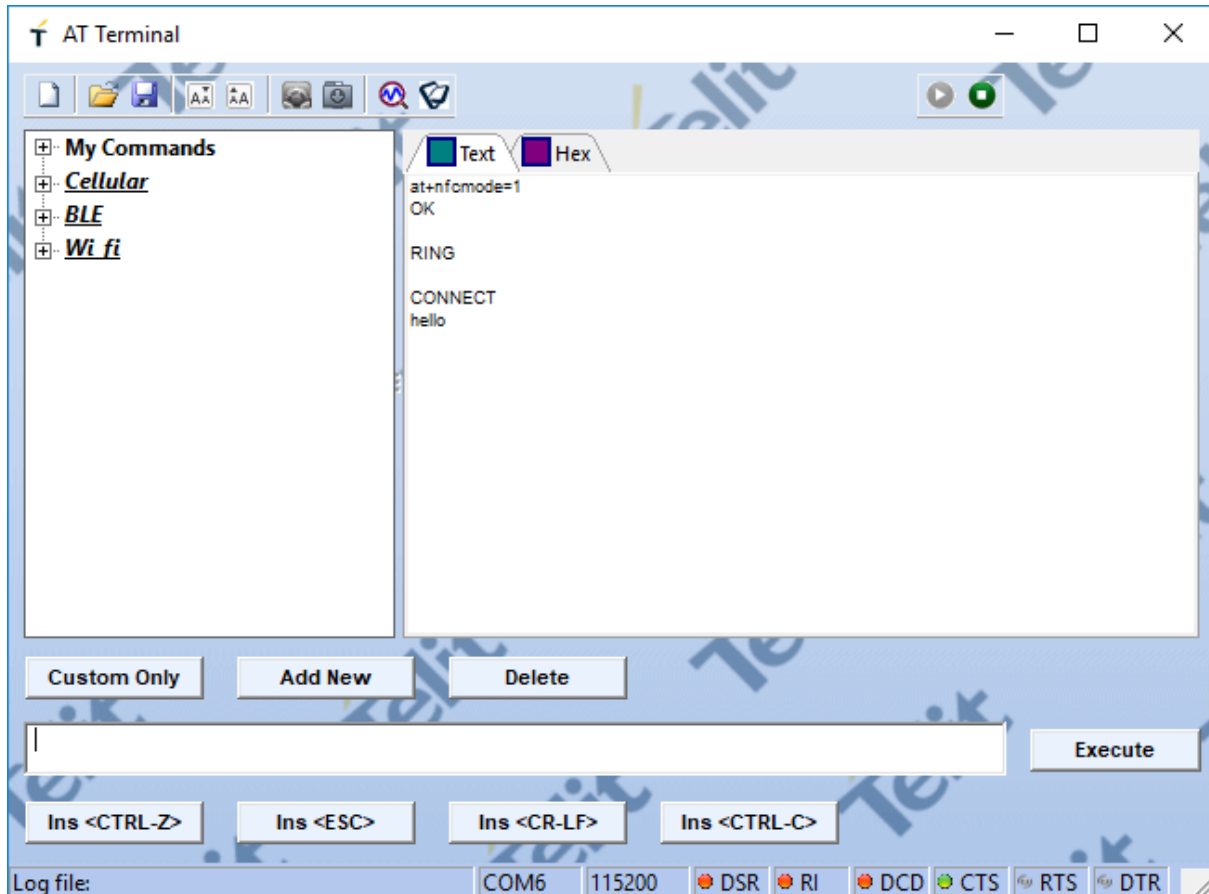
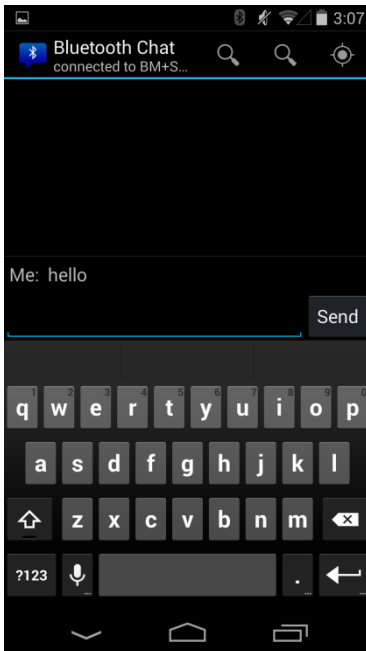
In the current configuration the “Bluetooth Chat” app will be started and initiate a Bluetooth SPP connection to the Bluetooth address given from the NDEF tag.

- Move the smartphone over the NFC board. The Bluetooth address will be read out from the tag and the smartphone initiates a Bluetooth pairing request to the device of the given Bluetooth address.
- The Android operating system initiates a Bluetooth pairing request and the message “Bluetooth pairing request” will appear. Continue with “Pair” to accept the Bluetooth pairing request scenario.



- After the pairing process ended successfully the “NFC Utility” app will start the “Bluetooth Chat” app and initiate the Bluetooth connection to the BlueMod+SR.
- Now data can be exchanged between the smartphone and the BlueMod+SR.

In the following example the text “hello” was sent from the “Bluetooth Chat” app to the BlueMod+SR.



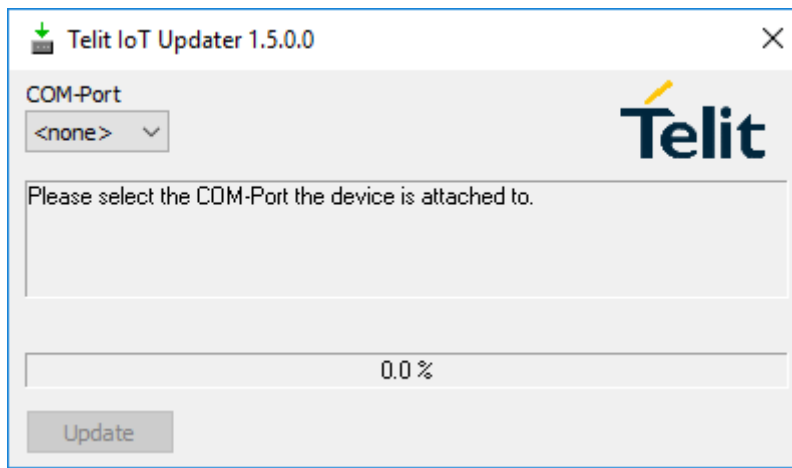
For further information regarding NFC Handover please refer to the BlueMod+SR Software User Guide [3].

6. FIRMWARE UPDATE

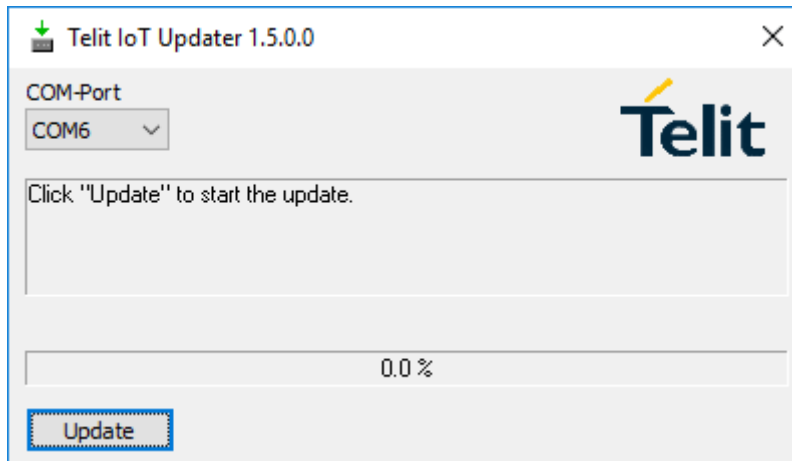
The firmware of the BlueEva+SR can be updated via the local UART interface by using the Telit IoT Updater tool. The file name of the executable program consists of version and patch information.

Please follow the instructions below for updating the firmware:

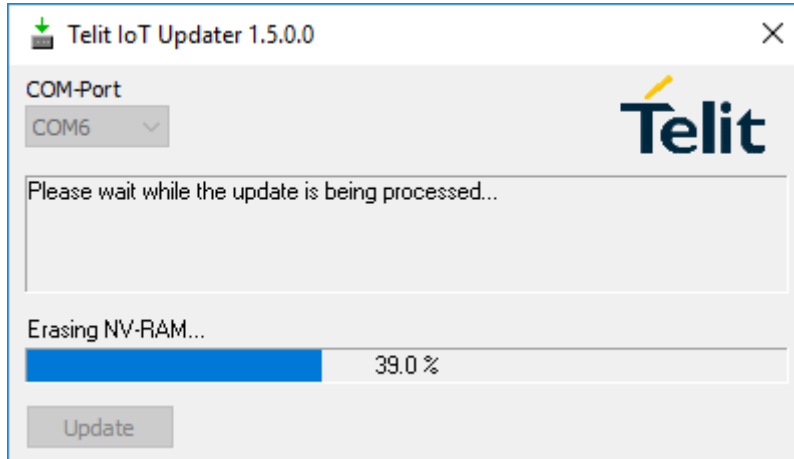
- Configure jumper J2 to position 2-3 to activate the bootloader at start-up.
- Connect the BlueEva+SR to the USB port of a PC (make sure the FTDI VCP USB to UART driver is already installed). If the BlueEva+SR is already connected to the PC perform a reset using the reset button.
- Start the SR_V1_xxx_FWupdate.exe program.



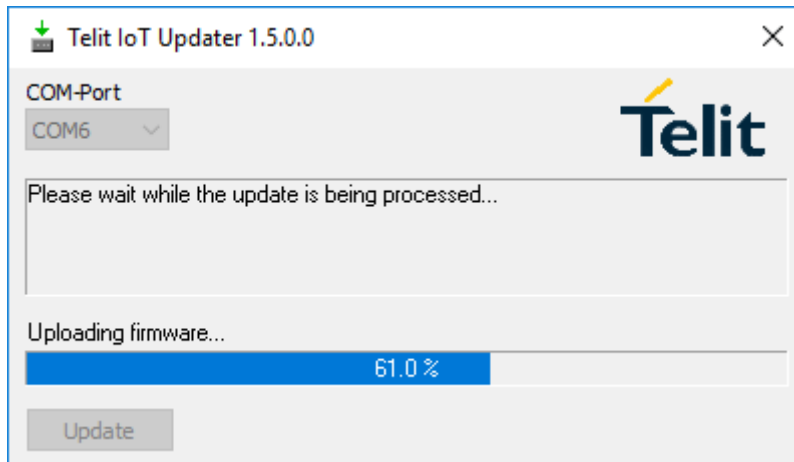
- Select the COM port the BlueEva+SR is connected to and press the “Update” button.



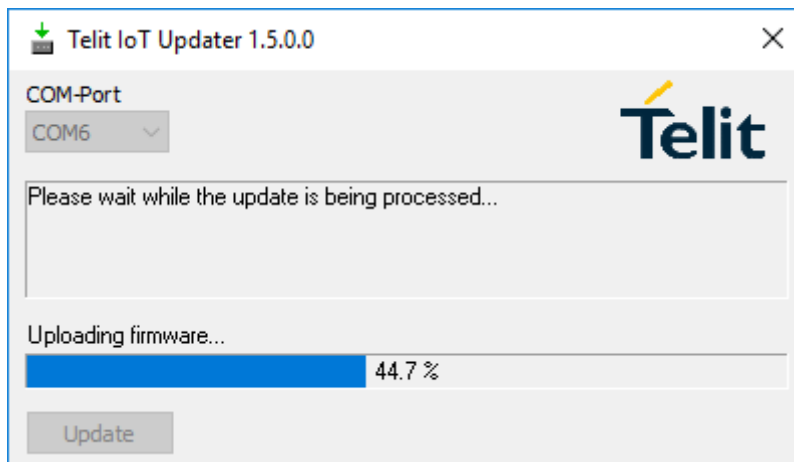
- First the NV-RAM will be erased.



- Second the firmware will be uploaded.



- After the update is completed click the "Finish" button.



- To set back the BlueEva+SR into normal operation mode, move jumper J2 to position 1-2 again and perform a reset.
- Send the AT&F command to set the factory default values.



Do not disconnect the device while the update is in progress, otherwise the update will fail and has to be repeated. In case it is not possible to update the module please contact the Telit support (<mailto:ts-srd@telit.com>).

7. DOCUMENT HISTORY

Revision	Date	Changes
r01	2013-03-21	First issue
r02	2013-12-03	Added description how to access the UART lines
r03	2015-01-26	Pictures updated because of the assembled X3 connector, Added new chapter "NFC Handover"
r04	2016-05-26	Telit cover page added
r5	2018-03-01	Replaced TeraTerm by Telit AT Controller Replaced BlueMod+SR Updater by IoT Updater Changed Incoming SPP Connection example to Windows 10



SUPPORT INQUIRIES

Link to www.telit.com and contact our technical support team for any questions related to technical issues.

www.telit.com



Telit Communications S.p.A.
Via Stazione di Prosecco, 5/B
I-34010 Sgonico (Trieste), Italy

Telit Wireless Solutions Inc.
3131 RDU Center Drive, Suite 135
Morrisville, NC 27560, USA

Telit Wireless Solutions Ltd.
10 Habarzel St.
Tel Aviv 69710, Israel

Telit IoT Platforms LLC
5300 Broken Sound Blvd, Suite 150
Boca Raton, FL 33487, USA

Telit Wireless Solutions Co., Ltd.
8th Fl., Shinyoung Securities Bld.
6, Gukjegeumyung-ro8-gil, Yeongdeungpo-gu
Seoul, 150-884, Korea

Telit Wireless Solutions
Tecnologia e Servicos Ltda
Avenida Paulista, 1776, Room 10.C
01310-921 São Paulo, Brazil

Telit reserves all rights to this document and the information contained herein. Products, names, logos and designs described herein may in whole or in part be subject to intellectual property rights. The information contained herein is provided "as is". No warranty of any kind, either express or implied, is made in relation to the accuracy, reliability, fitness for a particular purpose or content of this document. This document may be revised by Telit at any time. For most recent documents, please visit www.telit.com

Copyright © 2016, Telit