



SW User Guide

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TELIT
TECHNICAL
DOCUMENTATION

BlueEva+S

Evaluation Kit User Guide

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Release r04

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1 Introduction

This documentation describes the usage of the evaluation board for the Telit Bluetooth module BlueMod+S.

The evaluation board is not a finished product and is intended for development and evaluation purposes in a laboratory environment only.

2 Package Content

The BlueEva+S package contains the following components:

- 1 x BlueEva+S board
- 1 x USB cable
- 1 x Battery CR2032
- 1 x Printed card with download instructions

3 Version Information

3.1 Version V1.0

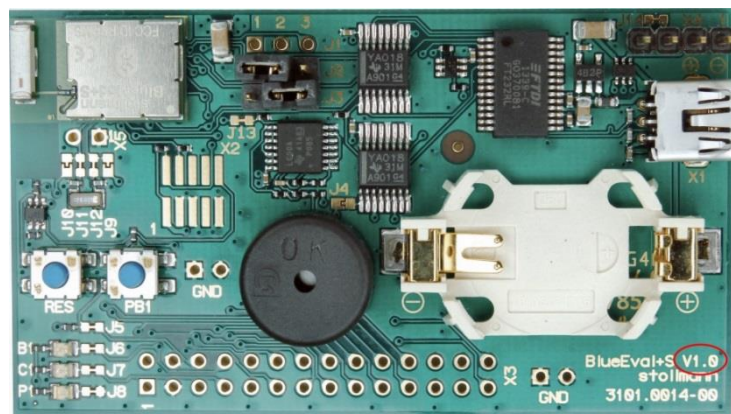


Figure 1: BlueEva+S Version 1.0

3.2 Version V2.0

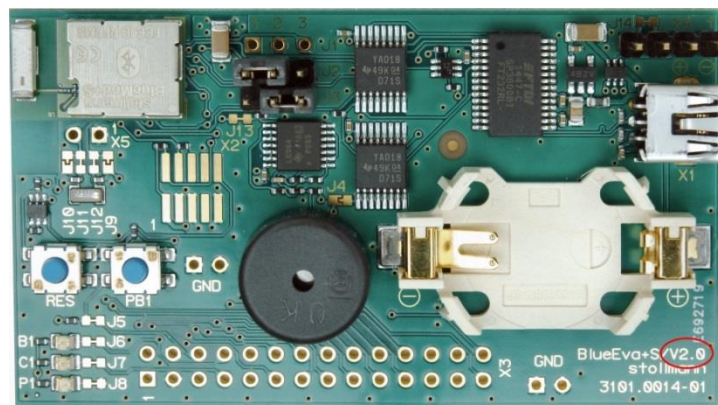


Figure 2: BlueEva+S Version 2.0

3.3 Differences

The BlueEva+S version can be identified by the board version identifier as indicated in Figure1 + 2.

Item	Version 1.0	Version 2.0
Connector X3	Connected to BlueMod+S module only when jumper J4 is closed	Permanently connected to BlueMod+S module
Battery operation	Battery current $\leq 2\text{mA}$ ⁽¹⁾	Battery current $\leq 10\mu\text{A}$ ⁽¹⁾

⁽¹⁾ LED P1 disabled (J8 = open), UICP = ON, USB not connected, UART not connected

4 Hardware

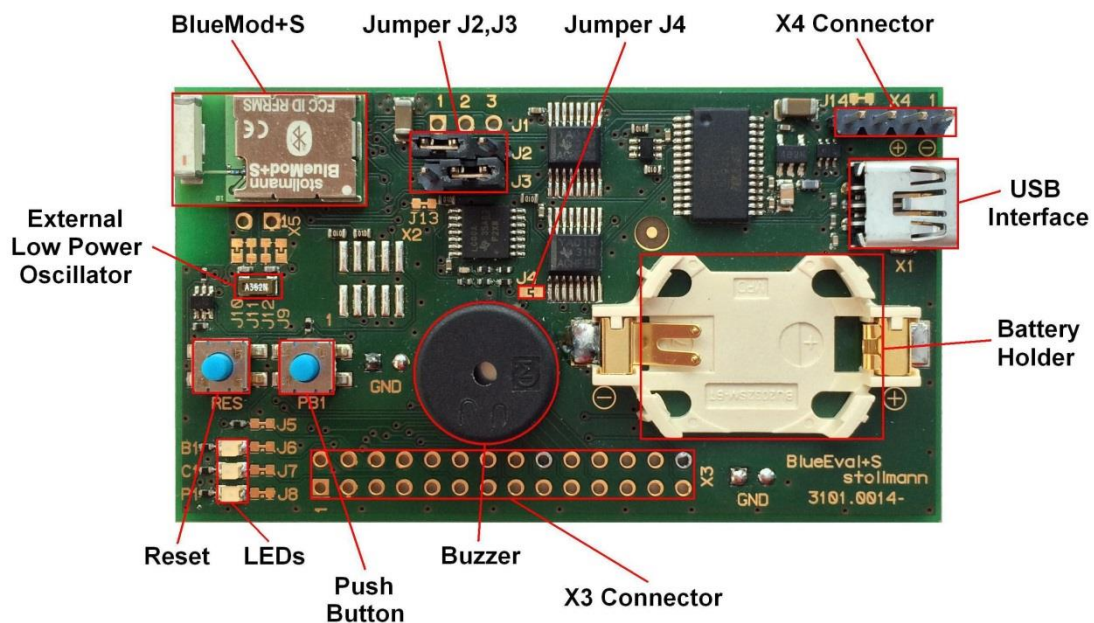


Figure 3: BlueEva+S

4.1 BlueMod+S

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

4.2 Reset

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

4.3 USB Interface

The BlueEva+S provides an USB interface which is used to connect the evaluation board to the host and as power supply.

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

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 (active low)

For details please refer to the *BlueMod+S Hardware Reference*.

4.4 LEDs

The BlueEva+S provides several LEDs for functional indication.

Interface	Position	Function
LEDs	P1	Indicates the presence of power supply voltage
	B1	Connected to GPIO[3] ⁽¹⁾
	C1	Connected to GPIO[2] ⁽¹⁾

⁽¹⁾ Function depending on firmware support

4.5 External Low Power Oscillator

The BlueEva+S provides an external low power crystal. This is connected to the BlueMod+S by default. For using alternatively low power oscillator sources refer to the schematics and the *BlueMod+S Hardware Reference*.

4.6 Connectors / Jumpers

4.6.1 Jumper J2

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

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

4.6.2 Jumper J3

Jumper J3 is used for either hangup or UICP functionality.

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

In UICP mode 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*.

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

4.6.3 Jumper J4

Jumper J4 provides the possibility to disable (by closing it with a soldering point) the USB to serial bridge. With a closed jumper J4, the in- and outputs of the FTDI chip are disconnected. Therefore the modules serial port can be controlled via Connector X3 (see chapter 4.11).

When using BlueEva+S V2.0, be sure to connect a serial interface via connector X3 only when jumper J4 is closed. Otherwise the serial interface and the USB to serial bridge will collide.

4.6.4 Connector X3

Connector X3 is a 28 pin extension header exposing all module signals.

Pin Number	Signal	Type	Description
1	+3V0	PWR	Supply voltage output
2	+3V0	PWR	Supply voltage output
3	GND	PWR	Ground
4	GND	PWR	Ground
5	GPIO[0]	I	GPIO
6	GPIO[1]	I	GPIO
7	GPIO[2]	I/O	LED C1, user IO
8	GPIO[3]	I/O	LED B1, user IO
9	GPIO[4]	I-PD	HANGUP
10	GPIO[5]	I/O	IOD, user IO
11	GPIO[6]	I-DIS	GPIO
12	GPIO[7]	I-DIS	GPIO
13	GPIO[8]	I/O	IOA, user IO
14	GPIO[9]	I-DIS	Leave open ⁽¹⁾
15	GPIO[10]	I-DIS	Leave open ⁽¹⁾
16	GPIO[11]	I-DIS	Leave open ⁽¹⁾
17	GPIO[12]	I-DIS	Leave open ⁽¹⁾
18	GPIO[13]	I-DIS	Leave open ⁽¹⁾
19	GPIO[14]	I-DIS	Leave open ⁽¹⁾
20	PO26_AIN0		See schematic ⁽¹⁾
21	PO27_AIN1		See schematic ⁽¹⁾
22	EXT-RES#	I-PU	User reset
23	UART-TXD ⁽²⁾	O-PP	IUR data OUT
24	UART-RXD ⁽²⁾	I	IUR data IN
25	UART-CTS# ⁽²⁾	I	Flow control / IUC
26	UART-RTS# ⁽²⁾	O-PP	Flow control / IUC
27	IUR-IN# ⁽²⁾	I	UICP control
28	IUR-OUT# ⁽²⁾	O-PP	UICP control

PU = PullUp, PD = PullDown, PP = PushPull, I-DIS = InputBufferDisconnected

⁽¹⁾ Function depending on firmware support

⁽²⁾ BlueEva+S V1.0: Disconnected from module, when jumper J4 is open

4.6.5 Connector X4

Connector X4 provides the possibility to measure the supply current of the BlueMod+S and to power the evaluation board with an external power supply.

Pin Number	Signal
1	GND
2	ext. PWR
3	+3V0
4	+3V0-BT

4.7 Current Measurement

Current measurement can be performed by opening (cut off) jumper J14 and measuring the current drawn by BlueMod+S between pin 3 and 4 of connector X4. The currents drawn by other peripherals on BlueEva+S are not included in this measurement.

For measuring the minimum current, the serial interface must be disconnected from the module. This can be achieved by disconnecting the USB plug and powering the board via external or battery supply or by closing solder jumper J4.

4.8 Power Supply

The three power sources are decoupled from each other by diodes connected in series. The presence of the supply voltage is indicated by LED P1.

4.8.1 USB Power Supply

V_{BUS} of the USB connector X1 directly powers the USB to serial converter and via a voltage regulator the rest of the circuitry.

4.8.2 External Power Supply

Pin 1 and 2 of connector X4 provides the possibility to connect an external power supply (see *BlueMod+S Hardware Reference*).

4.8.3 Battery Holder

The battery holder provides the possibility to run the BlueEva+S without external power (via USB or external power supply) by using a 3V coin cell battery CR2032. Opening jumper J8 will disconnect the power LED P1 and thus save 1.8mA of battery current. For safety reasons there should be permanently connected no other power supply, when a battery is inserted.

4.9 Buzzer

The Buzzer can be used to generate alarm and other audible signals.

4.10 Push Button

The Push Button can be used as input for human interaction.

4.11 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 J4 with a soldering point.

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

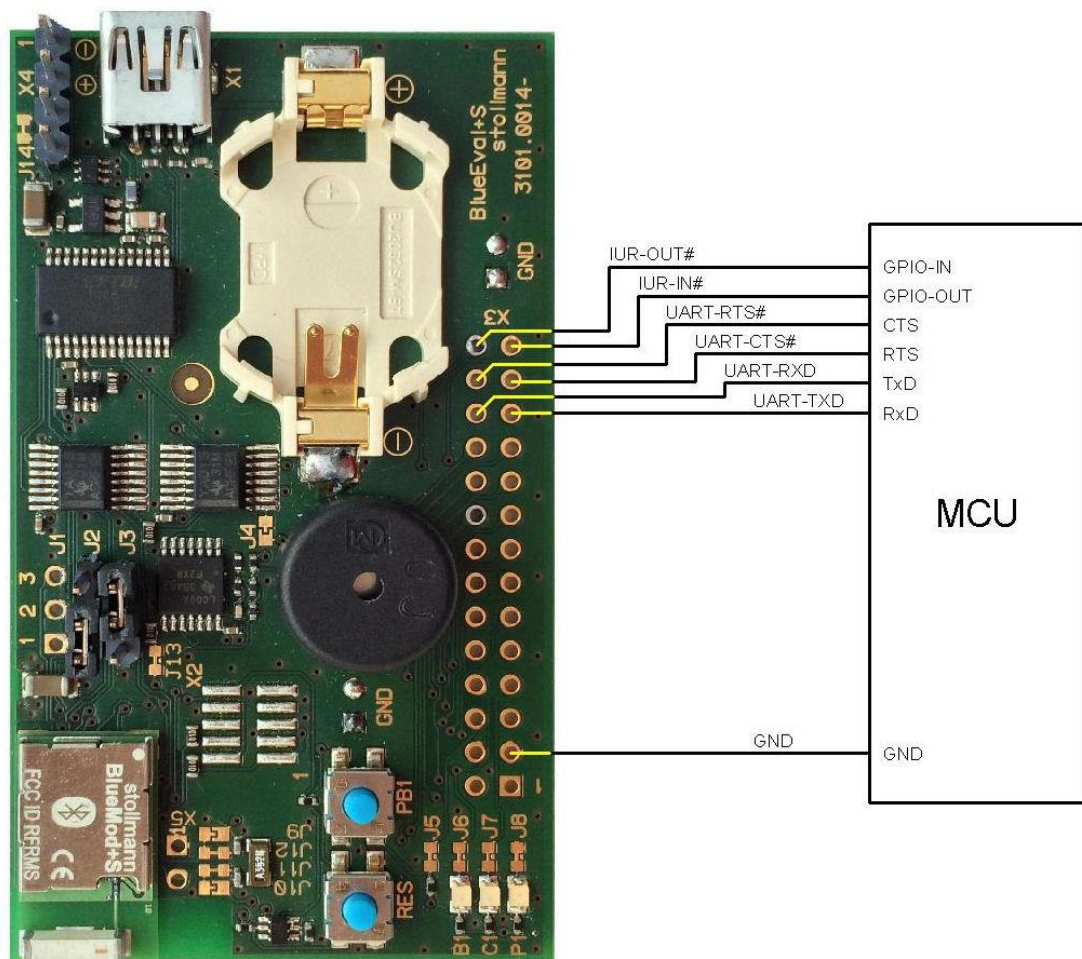


Figure 4: MCU connected to UART lines

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4.12 Default Configuration

The BlueEva+S is preconfigured as described below:

Jumper Number	Position	Function
J2	1-2	Normal operation mode at start-up
J3	2-3	DTR# connected to GPIO[4] (Hangup Mode)

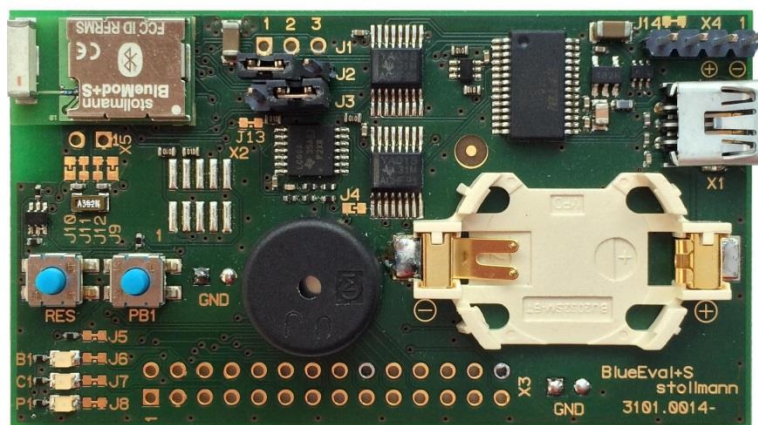


Figure 5: BlueEva+S default configuration

5 Setup

5.1 System Requirements

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

5.2 Startup

To install the BlueEva+S connect it as follows.



Figure 6: BlueEva+S as delivered

5.3 Installation of the BlueEva+S USB Driver

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

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

Connect the BlueEva+S 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 download the TeraTerm terminal program from our web site:

<http://www.stollmann.de/en/support/downloads/tools.html>

6 Usage of the BlueEva+S

6.1 Configuration of the BlueEva+S

If the BlueEva+S is correctly connected to the PC, a terminal emulation program can be used to read and modify the configuration settings.

For a more detailed description of the AT commands used for this purpose, please consult our *BlueMod+S AT Command Reference*.

As shipped by the factory, the BlueEva+S works at 115,200 bps, using the 8N1 data format (8 data bits, no parity, 1 stop bit). Please configure your terminal emulation program accordingly. Select the COM port the BlueEva+S is connected to (COM22 in the example below).

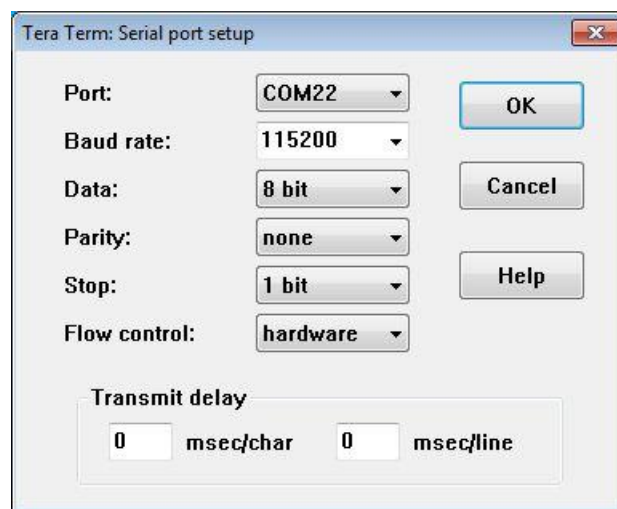


Figure 7: COM port configuration with TeraTerm

Once you have successfully configured the terminal emulation program, issuing the “AT” command without parameters should prompt the BlueEva+S to return OK.

Now you can readout information about the type of the connected device using the “ATI” command.

In the next step, you should issue the “ATI99” command to determine the firmware version installed and check to see whether that is the most recent version.

Finally, you should use the “AT+BOAD” command to determine the Bluetooth address of the BlueEva+S. The Bluetooth address is unique, letting you identify the correct device for each Bluetooth address.

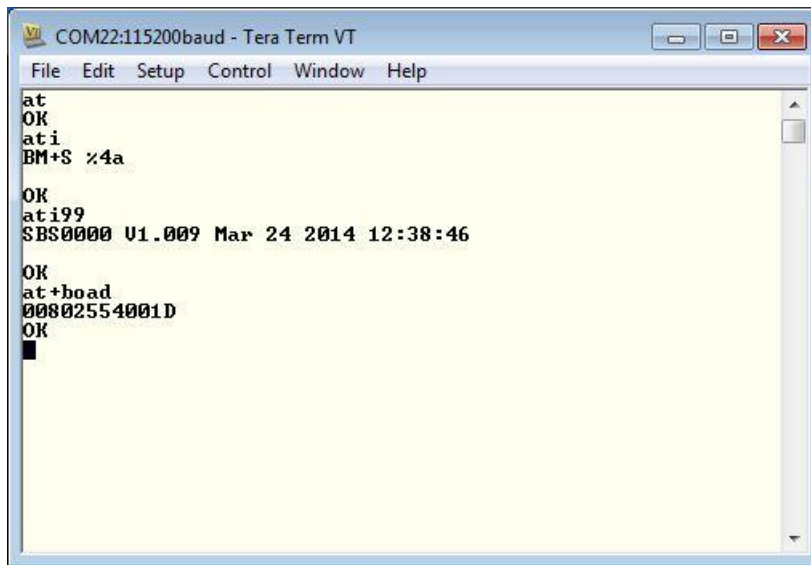


Figure 8: Reading some BlueEva+S settings with TeraTerm

6.2 Connection with Telit “Terminal IO Utility” App

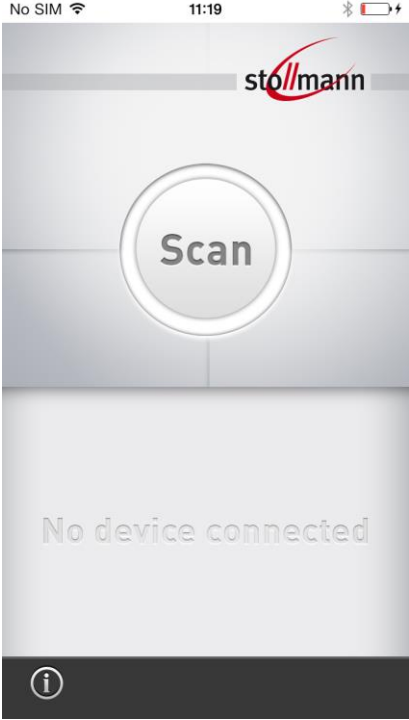
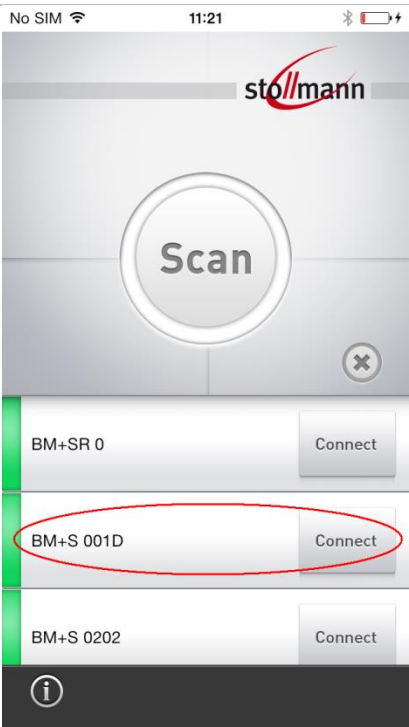
Telit provides the "Terminal IO Utility" App for iPhone which can be used to establish a Bluetooth Low Energy connection from the iPhone to the BlueEva+S.

The following QR-Code provides the link to download the "Terminal IO Utility".

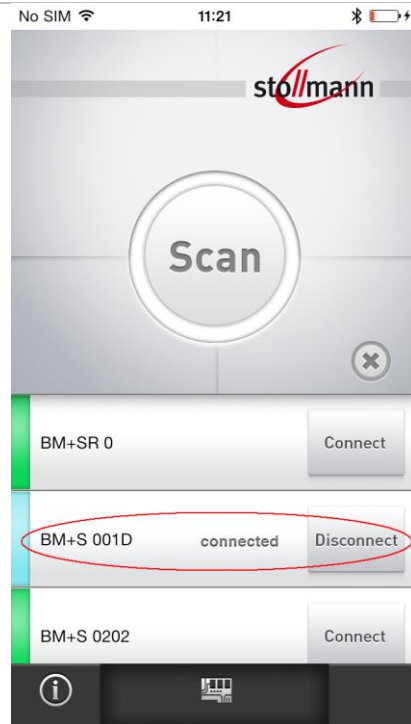


The “Terminal IO Utility” App allows the user to connect to Terminal I/O peripheral devices and exchange data providing a simple terminal emulation.

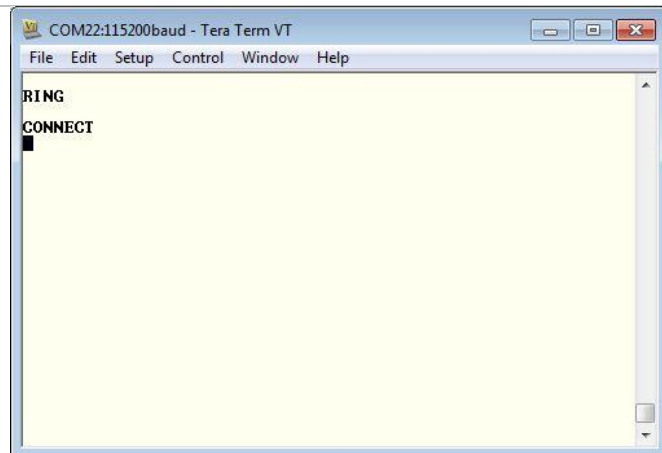
Please find an example below:

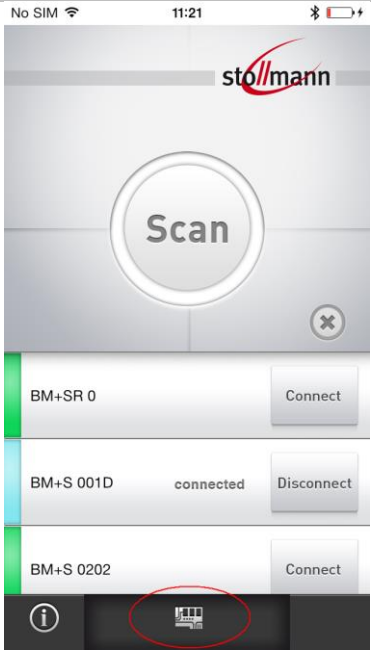

<p>Press the “Scan” button to search for available Terminal I/O peripheral devices.</p>	 <p>The screenshot shows the Stollmann app interface. At the top, the status bar indicates 'No SIM', signal strength, time '11:19', and battery level. The app header features the 'stollmann' logo. A large circular button labeled 'Scan' is centered on the screen. Below it, the text 'No device connected' is displayed in a light gray font. At the bottom, there is a black bar with a white information icon (i).</p>
<p>Check if your BlueEva+S device (BM+S xxxx) is found and press the “Connect” button to establish the connection to the BlueEva+S.</p>	 <p>The screenshot shows the Stollmann app interface after a scan. The status bar is the same. The 'Scan' button is still present. Below it, a list of discovered devices is shown. Each device entry consists of a green vertical bar, the device ID, and a 'Connect' button. The device 'BM+S 001D' is highlighted with a red oval. The other devices listed are 'BM+SR 0' and 'BM+S 0202'. At the bottom, there is a black bar with a white information icon (i).</p>

The first connection attempt will last some seconds. If the connection attempt succeeded the device status is changed to “connected”.



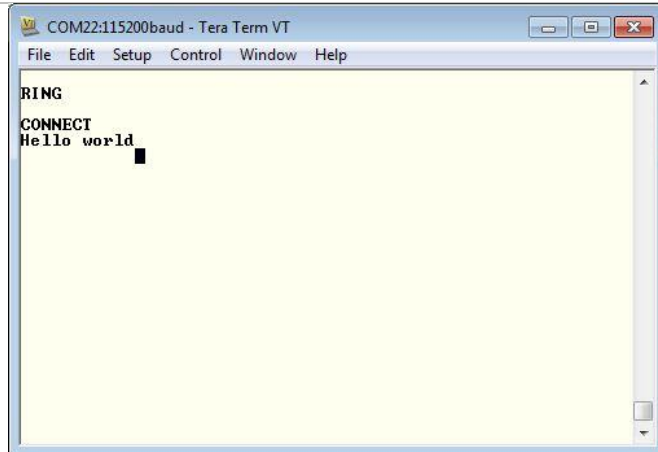
The BlueEva+S is sending a RING message followed by a CONNECT message at the serial port.



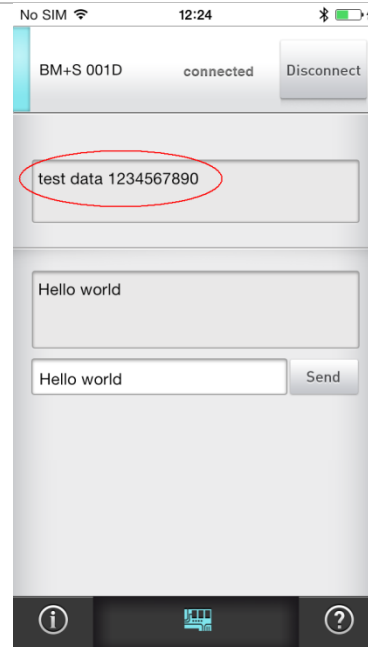
<p>For transmitting data to the BlueEva+S click on the icon at the bottom of the page.</p>	 <p>The screenshot shows the Stollmann app interface. At the top, there's a status bar with 'No SIM', signal strength, time '11:21', and battery level. Below the status bar is the 'stollmann' logo. A large circular button labeled 'Scan' is in the center. Below it, there's a list of devices: 'BM+SR 0' with a 'Connect' button, 'BM+S 001D' with 'connected' status and a 'Disconnect' button, and 'BM+S 0202' with a 'Connect' button. At the bottom, there's a navigation bar with three icons: an information icon, a 'Send' icon (circled in red), and a help icon.</p>
<p>Enter data in the corresponding field and press the “Send” button.</p>	 <p>The screenshot shows the Stollmann app interface with a text input field containing 'Hello world' and a 'Send' button. The 'Send' button is circled in red. The status bar at the top shows 'No SIM', signal strength, time '12:21', and battery level. Below the status bar, there's a list of devices: 'BM+S 001D' with 'connected' status and a 'Disconnect' button. Below the list, there are two empty text input fields. At the bottom, there's a navigation bar with three icons: an information icon, a 'Send' icon (circled in red), and a help icon.</p>

The BlueEva+S is receiving the sent data.

To send data from the BlueEva+S to the iPhone just enter the data in the terminal emulation program (data are not echoed in the example).



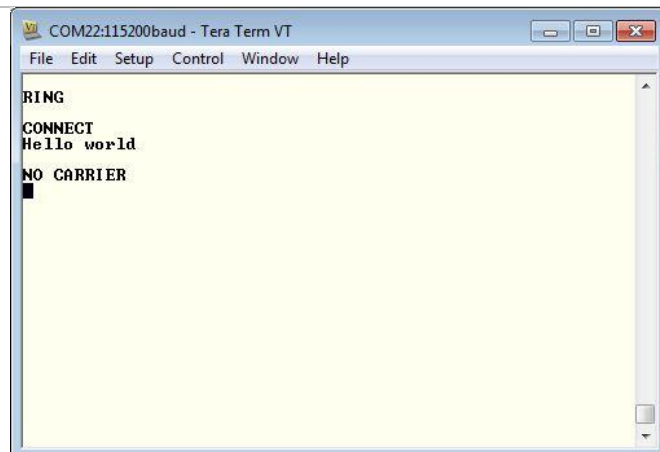
The “Terminal IO Utility” app on the iPhone is receiving the data.



To terminate the connection
press the “Disconnect” button.



After the connection is
terminated the BlueEva+S is
sending a NO CARRIER
message.

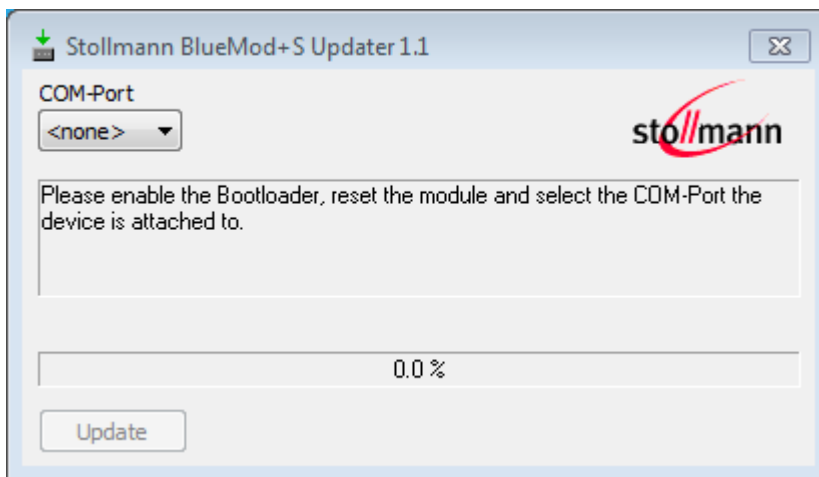


7 Firmware Update

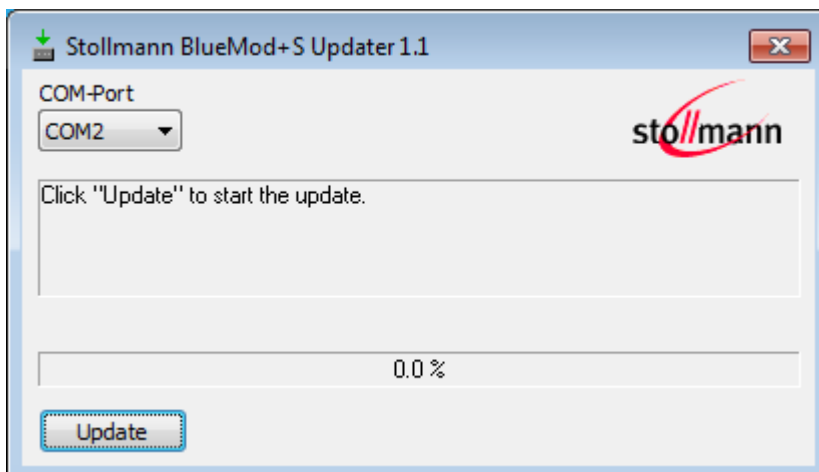
The firmware of the BlueEva+S can be updated by using the BlueMod+S Updater. The file name of the executable program consists of version and patch information.

Please follow the instructions below for updating the firmware:

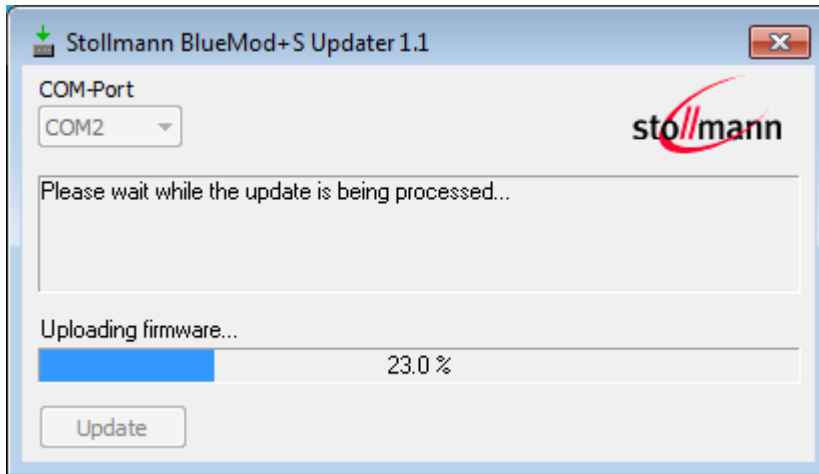
- Configure jumper J2 to position 2-3 to activate the bootloader at start-up.
- Connect the BlueEva+S to the USB port of a PC (make sure the FTDI VCP USB to UART driver is already installed). If the BlueEva+S is already connected to the PC perform a reset using the reset button.
- Start the *BM+S_v1_xxx_FWupdate.exe* program.



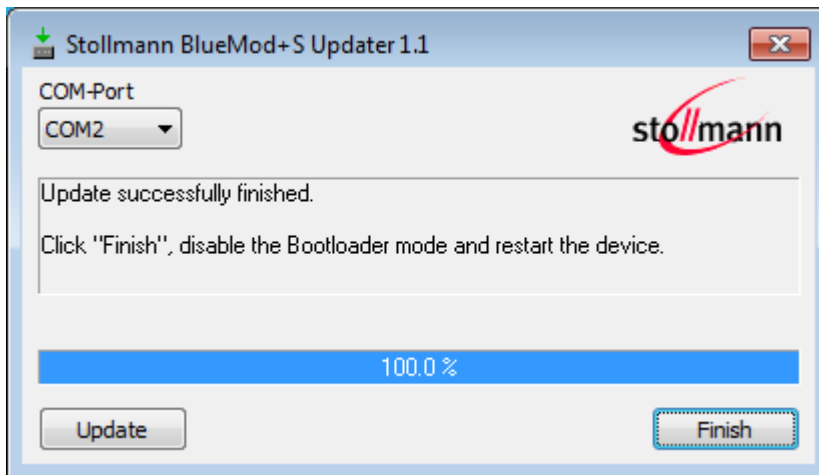
- Select the COM port the BlueEva+S is connected to and press the “Update” button.



- The firmware will be uploaded.



- After the update is completed click the “Finish” button.



- To set back the BlueEva+S 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.

Note:

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 (e-mail: ts-srd@telit.com).

8 History

Version	Release Date	By	Change description
r01	02.04.2014	TA	Initial version
r02	11.09.2014	TA	Added chapter Firmware Update Revised description of Current Measurement
r03	17.04.2015	GJ	Adapted to V2.0
r04	24.05.2016	BG	Telit cover page added.

Telit Wireless Solutions GmbH
Mendelssohnstraße 15 D
22761 Hamburg
Germany

Phone: +49 (0)40 890 88-0
Fax: +49 (0)40 890 88-444
E-mail: ts-srd@telit.com
www.telit.com



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

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

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

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

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

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