SW User Guide

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BlueEva+B20/V4

User Guide

Release r02

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1 Introduction

This documentation describes the usage of the Bluetooth evaluation board BlueEva+B20 V4.

2 Package Contents

The BlueEva+B20 package contains the following components:

- 2 BlueEva+B20 boards
- 2 power supply, 5 VDC
- 2 serial cables, RS232
- 2 USB cables
- 1 SPI cable
- 10 additional jumpers
- BlueEva+B20 CD-ROM

3 Deployment

3.1 Startup

To deploy the BlueEva+B20, connect it as follows.
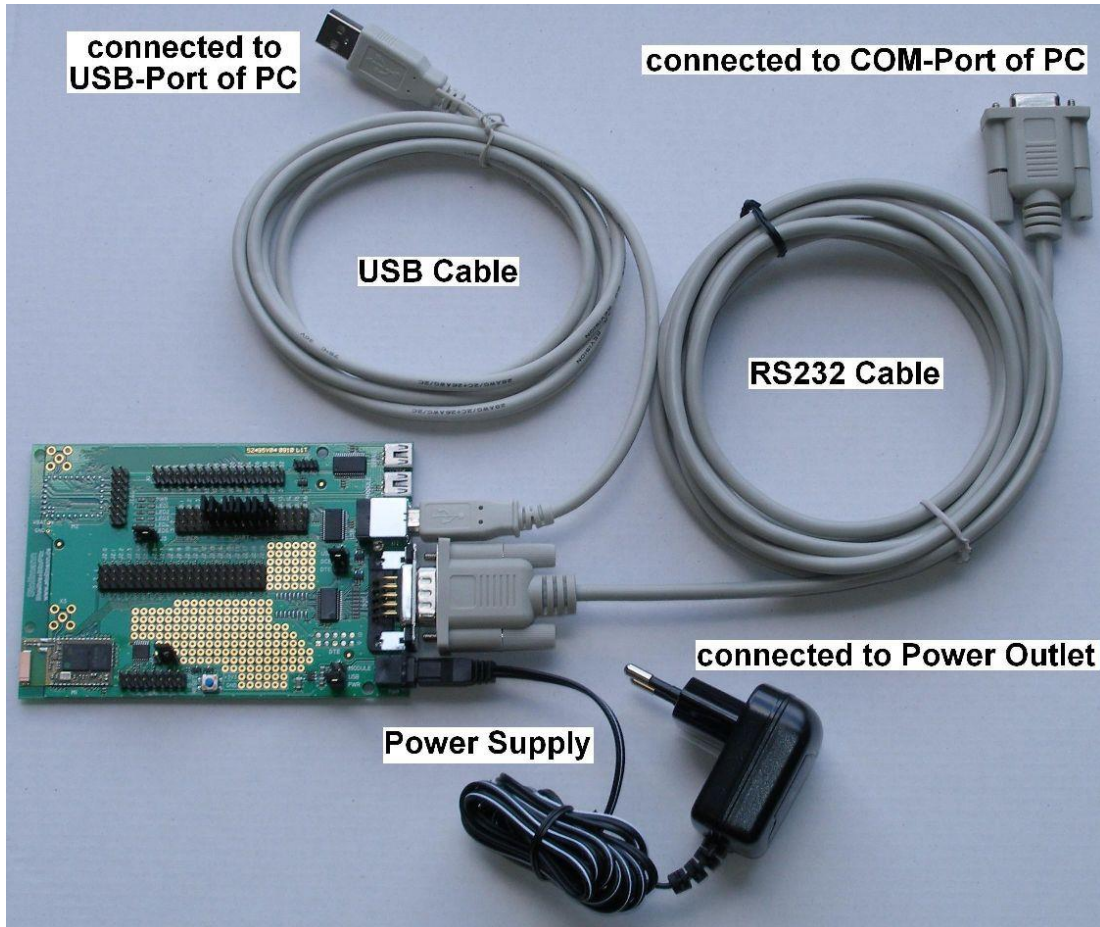
Figure 1: BlueEva+B20 with components and accessories as delivered

You may connect the RS232 connector to the COM port of a PC. This lets you use a terminal emulation program (such as TeraTerm included on the BlueEva+B20 CD) to perform the configuration or to control the Bluetooth connection.

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

The USB connection may be used as an alternative to the 5 VDC mains adapter.

3.2 Installation of BlueEva+B20 USB Driver

Connect the BlueEva+B20 to a PC USB port and install the FTDI VCP USB to UART driver (included on the BlueEva+B20 CD or download at

http://www.ftdichip.com/Drivers/VCP.htm).

3.3 Configuration

If the BlueEva+B20 is correctly connected to the COM port of 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+B2x AT Command Reference.*

As shipped by the factory, the BlueEva+B20 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.
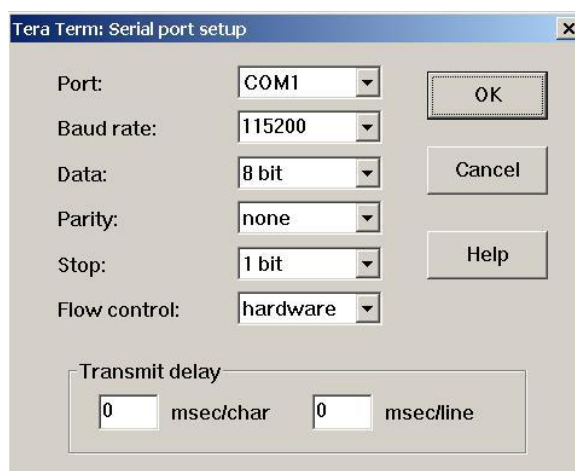

Figure 2: COM port configuration with TeraTerm

Once you have successfully configured the emulation program, issuing the "AT" command without parameters should prompt the BlueEva+B20 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 "ATI4" command to determine the Bluetooth address of the BlueEva+B20 and note it down. The Bluetooth address is unique, letting you identify the correct device for each Bluetooth address.
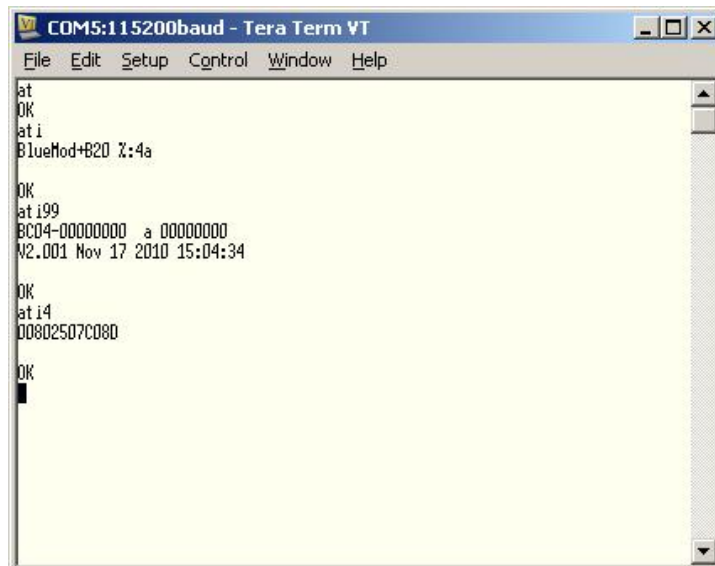

Figure 3: Reading some BlueEva+B20 settings with TeraTerm

3.3.1 Establishing a Bluetooth Connection between two BlueEva+B20 using the Serial Port Profile (SPP)

First of all, determine the Bluetooth addresses of the two BlueEva+B20. To do so, connect each of the BlueEva+B20 to the COM port of the PC and readout the Bluetooth address using the "ATI4" command as described in Chapter 3.3, *Configuration*.

You can either use a single PC with 2 COM ports or two separate PCs with one COM ports each.

Now you can establish a connection from one BlueEva+B20 to another by issuing the "ATD<Bluetooth_Address>" command.
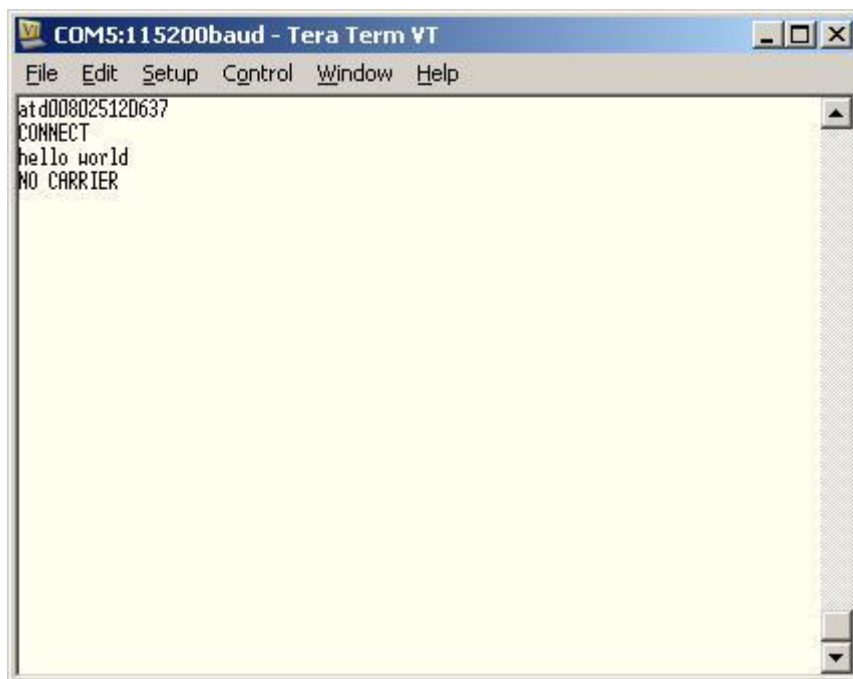

Figure 4: Establishing a Bluetooth connection between two BlueEva+B20

If the connection was established successfully, the originating BlueEva+B20 will issue the message CONNECT. You can now send data transparently between the two BlueEva+B20.

To terminate the Bluetooth connection, click "Disconnect" in the terminal emulation program.

3.3.2 Automatically Establishing a Bluetooth Connection between two BlueEva+B20 Using "Auto Connect"

It is possible to configure the BlueEva+B20 to automatically establish a Bluetooth connection to a second (remote) device without having to take control manually.

This requires that you store the Bluetooth address of the remote device on the BlueEva+B20.

To do so, use the "S330" and "S404" parameter. For more detailed information about this parameter, please consult our *BlueMod+B2x AT Command Reference*.
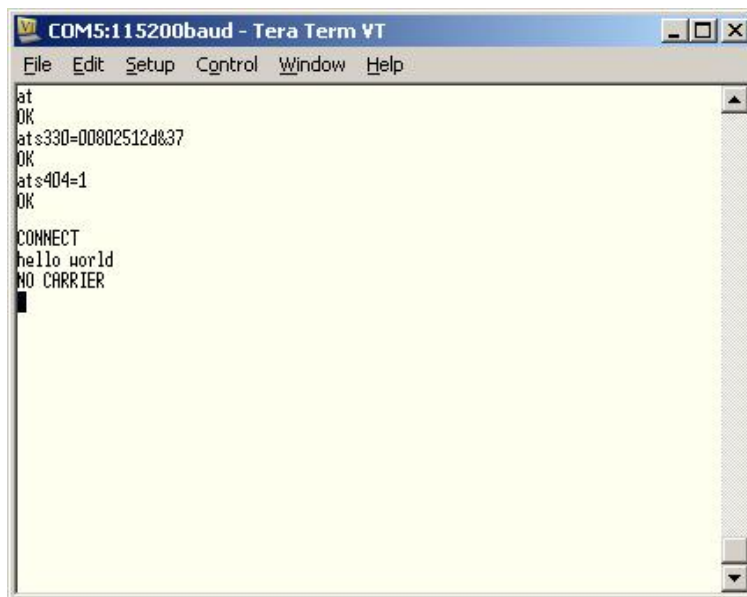
Figure 5: Establishing a Bluetooth connection with Auto Connect

Next you must turn off the BlueEva+B20.

Once the BlueEva+B20 has been turned back on, it will attempt to automatically establish a Bluetooth connection to the remote device, which in our example is the second BlueEva+B20.

If the connection was established successfully, the originating BlueEva+B20 will issue the CONNECT message. You can now send data transparently between the two BlueEva+B20.

To terminate the Auto Connect mode, you will have to turn off the remote device and wait for the NO CARRIER message on the originating BlueEva+B20.

Now you can load the factory defaults of the module using the AT&F command.

4   Hardware

Figure 6: BlueEva+B20

4.1   Bluetooth Modules

The BlueEva+B20 is populated with a BlueMod+B20 Bluetooth module.

4.2   Power Supply

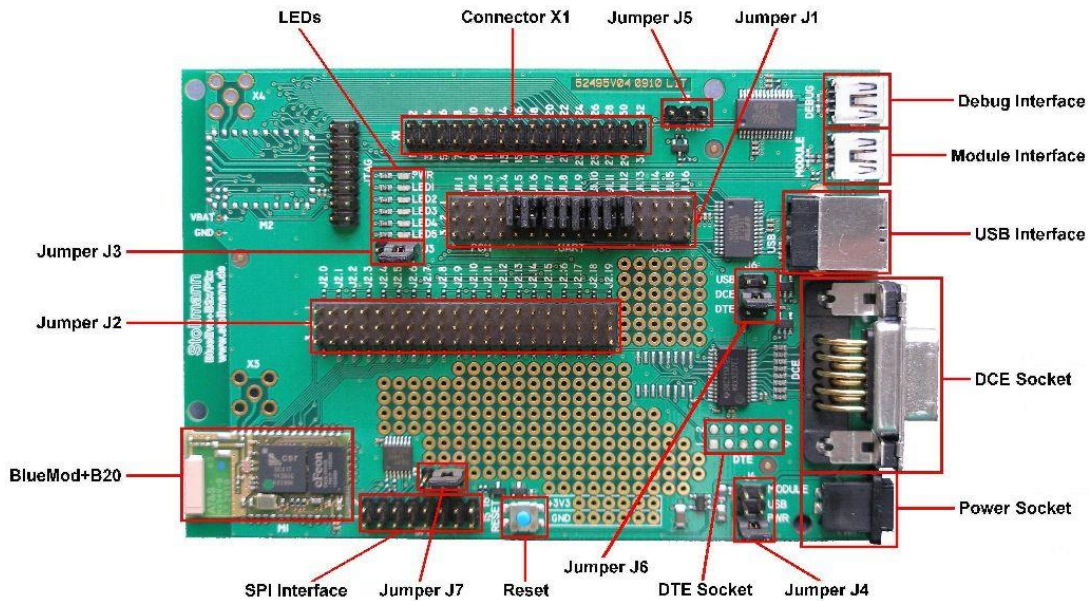There are two variants of supplying power to BlueEva+B20:

- +5VDC ±10% from external power supply connector.

- +5VDC ±10% from USB VBUS.

The power source can be selected by jumper J4.

The presence of the power supply voltage is indicated by the power LED.

4.3 Reset

The BlueEva+B20 is equipped with a reset button. Pressing the reset button will trigger the BlueMod+B20 module to perform a reset. The USB port is not influenced from the reset.

4.4 USB Interface

The BlueEva+B20 provides a USB interface which is used to connect the evaluation board to the host. The USB interface is equipped with a FTDI USB to serial bridge interfacing the serial port of the BlueMod+B20.

4.5 Serial Interface

The BlueEva+B20 provides a serial interface which is used to connect a communication device for transmitting data or a PC for controlling the BlueEva+B20. The serial interface corresponds to the V.24/RS-232 standard and supports the following features:

Transmission speed: 1,200–230,400 bps (asynchronous)

Character representation: 8 bit, even/odd/no parity, 1 or 2 stop bits

Hardware flow control with RTS/CTS

The BlueEva+B20 can be used in DTE or DCE mode. This requires a special setting in the firmware. The selection between the D-SUB socket (DCE) and the pins for the DTE interface is made by jumper J6.

4.6 SPI Interface

The BlueEva+B20 is equipped with a SPI interface for configuration, flashing firmware and debugging purposes. Please use the SPI cable delivered with your BlueEva+B20 to access the SPI interface.
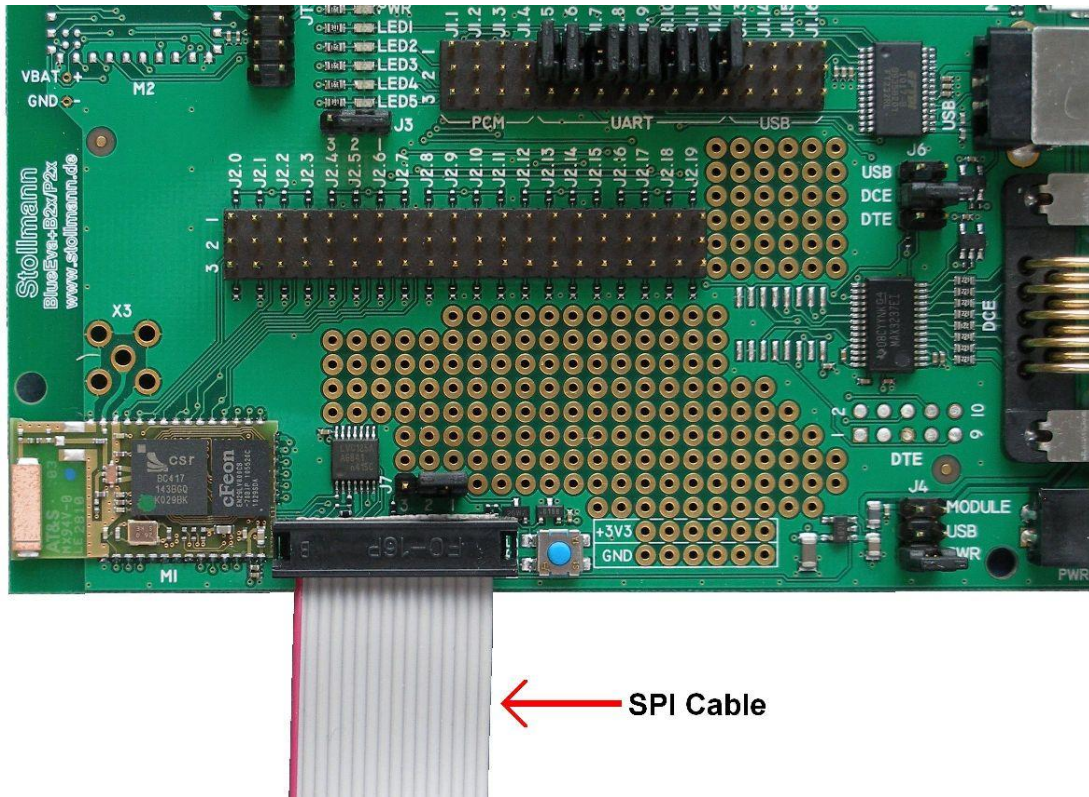
Figure 7: SPI interface cable

4.7 LEDs

The BlueEva+B20 provides several LEDs for functional indication or to use for free disposal.

Interface	Position	Function
LEDs	PWR	Indicates the presence of power supply voltage
	LED1	Attached to PIO2 via J1.16/2-3
	LED2	Attached to PIO7 via J1.4/2-3
	LED3	Attached to PIO8 via J1.3/2-3
	LED4	Attached to PIO9 via J1.2/2-3
	LED5	Attached to PIO10 via J1.1/2-3

4.8 Connectors/Jumpers

4.8.1 Jumper J1 – Signal Routing

Jumper J1 is used for signal routing.

Jumper Number	Function	
	Position 1-2	Position 2-3
J1.1	GPIO10 - PCM_OUT	GPIO10 - LED5
J1.2	GPIO9 - PCM_CLK	GPIO9 - LED4
J1.3	GPIO8 - PCM_IN	GPIO8 - LED3
J1.4	GPIO7 - PCM_SYNC	GPIO7 - LED2
J1.5	GPIO6 - RI	GPIO6 - RI
J1.6	GPIO5 - DSR output	GPIO14 - DSR output
J1.7	GPIO4 - DTR input	GPIO13 - DTR input
J1.8	GPIO3 - DCD	GPIO15 - DCD
J1.9	Module RTS to V.28 level shifter	-
J1.10	Module TXD to V.28 level shifter	-
J1.11	Module RXD to V.28 level shifter	-
J1.12	Module CTS to V.28 level shifter	-
J1.13	-	-
J1.14	-	-
J1.15	USB_ON – GPIO3 (BlueMod+P25/G2)	USB_ON – GPIO4 (BlueMod+B20)
J1.16	GPIO2 – USB Pull-up	GPIO - LED1

4.8.2 Jumper J2 – GPIO Input

All pins 1 of jumper J2 are connected to +3V3 supply voltage with a resistor of 330Ω and all pins 3 of jumper J2 are connected to GND with a resistor of 330Ω. When using the GPIOs or AIOs as inputs, this arrangement allows to place jumpers in position 1-2 to generate a HIGH and to place jumpers in position 2-3 to generate a LOW input. When using the GPIOs or AIOs as outputs, pin 2 will be used to access the signal.

Jumper Number	Description
J2.0	GPIO0
J2.1	GPIO1
J2.2	GPIO2
J2.3	GPIO3
J2.4	GPIO4
J2.5	GPIO5
J2.6	GPIO6
J2.7	GPIO7
J2.8	GPIO8
J2.9	GPIO9
J2.10	GPIO10
J2.11	GPIO11
J2.12	GPIO12
J2.13	GPIO13
J2.14	GPIO14
J2.15	GPIO15
J2.16	GPIO16
J2.17	GPIO17
J2.18	AIO0
J2.19	AIO1

4.8.3 Jumper J3 – Power Consumption

Jumper J3 is reserved for module power consumption measurement to use for BlueMod+B20. Remove jumper from position 1-2 to take measurements.

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4.8.4 Jumper J4 – Power Source

The power source can be selected by jumper J4.

Jumper	Position	Function
J4	Module	Reserved
	USB	The module is powered via the USB interface
	PWR	Power from power socket

The presence of the power supply voltage is indicated by the PWR LED.

4.8.5 Jumper J5 – Ground Connection

This jumper provides 3 pins with ground connection (0V) for measuring.

4.8.6 Jumper J6 – Module Serial Interface Activation

Jumper J6 is used to activate the different serial interfaces.

Jumper	Position	Function
J6	USB	Activates the USB to serial bridge connected to USB
	DCE	The V.28 level shifter and the interface on the DCE socket is activated.
	DTE	Reserved

4.8.7 Jumper J7 – Reset Button

Jumper J7 is used for module reset button. Remove jumper from position 1-2 to ignore reset button.

4.8.8 Connector X1

Connector X1 is an extension header, all module signals are accessible on this header.

Pin Number	Signal	Dir.	Description
1	+3V3	O	Supply Voltage Output
2	GND	-	Ground
3	Not used	-	Do not connect
4	AIO1	I/O	Analogue Input/Output
5	AIO0	I/O	Analogue Input/Output
6	RESET#	I/O	Reset Input/Output (active LOW)
7	PCM_OUT	O	PCM Data Output
8	PCM_CLK	I/O	PCM Clock (Slave = I, Master = O)
9	PCM_IN	I	PCM Data Input
10	PCM_SYNC	I/O	PCM Frame Sync (Slave = I, Master = O)
11	Not used	-	Do not connect
12	Not used	-	Do not connect
13	Not used	-	Do not connect
14	Not used	-	Do not connect
15	GPIO11	I/O	Digital Input/Output
16	GPIO10	I/O	Digital Input/Output
17	GPIO9	I/O	Digital Input/Output
18	GPIO8	I/O	Digital Input/Output
19	GPIO7	I/O	Digital Input/Output
20	GPIO6	I/O	Digital Input/Output
21	GPIO5	I/O	Digital Input/Output
22	GPIO4	I/O	Digital Input/Output
23	GPIO3	I/O	Digital Input/Output
24	GPIO2	I/O	Digital Input/Output
25	GPIO1	I/O	Digital Input/Output
26	GPIO0	I/O	Digital Input/Output
27	UART_RTS	O	Request To Send
28	UART_TX	O	UART Transmit Data
29	UART_RX	I	UART Receive Data
30	UART_CTS	I	UART Clear To Send
31	+3V3	O	Supply Voltage Output
32	GND	-	Ground

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4.8.9 Debug Interface

This interface is reserved for later usage.

4.8.10 Module Interface

This interface is reserved for later usage.

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4.9 Default Configuration

The BlueEva+B20 is preconfigured to DCE mode, using serial control lines and external power supply. The jumpers are configured as described below:

Jumper Number	Position	Function
J1.5	1-2	Module RI
J1.6	1-2	Module DSR
J1.7	1-2	Module DTR
J1.8	1-2	Module DCD
J1.9	1-2	Module RTS
J1.10	1-2	Module TXD
J1.11	1-2	Module RXD
J1.12	1-2	Module CTS
J3	1-2	Module power consumption
J4	PWR	Power from power socket
J6	DCE	UART interface from DCE interface
J7	1-2	Reset button
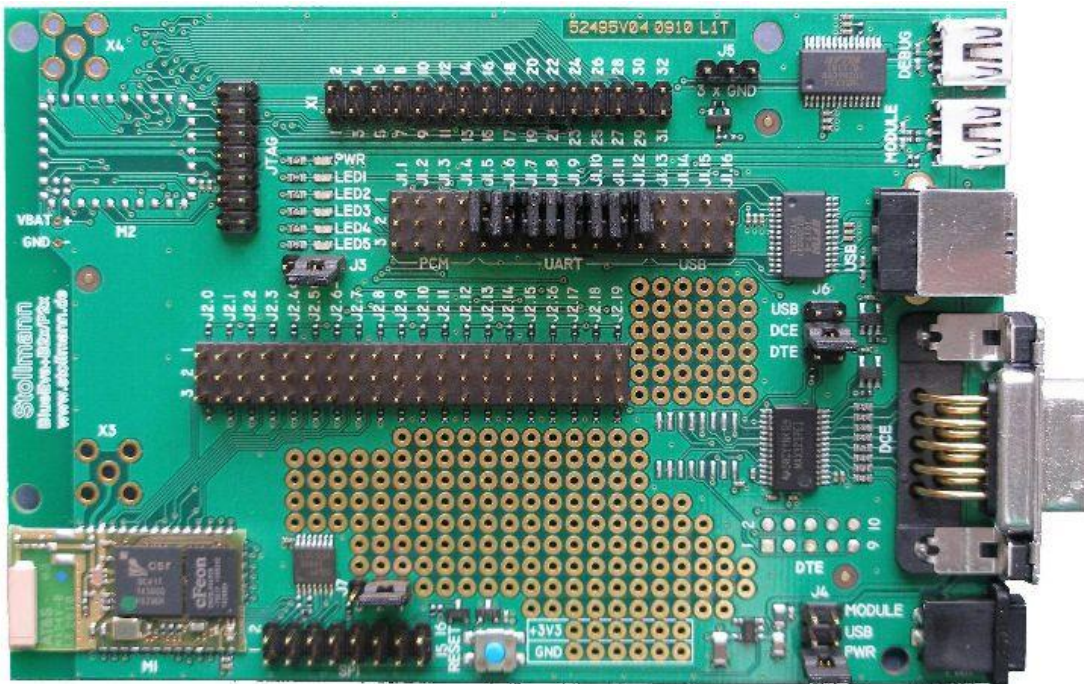
Figure 8: BlueEva+B20 default configuration

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5 Software

The BlueEva+B20 uses CSR-based serial Bluetooth modules with CSR HCI software and Stollmann profiles. The supported profile is Serial Port Profile (SPP).

The BlueEva+B20 is controlled by AT commands. For a detailed description about the AT commands please refer to the appropriate *BlueMod+B2x AT Command Reference*.

For upgrading the firmware of the BlueEva+B20 please refer to the application note *B0801 B20 Firmware Upgrade*.

6 Restrictions

This version does not support DTE mode.

7 History

Version	Release Date	By	Change description
r01	15.07.2011	MB	First release
r02	25.05.2016	BG	Telit cover page added

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