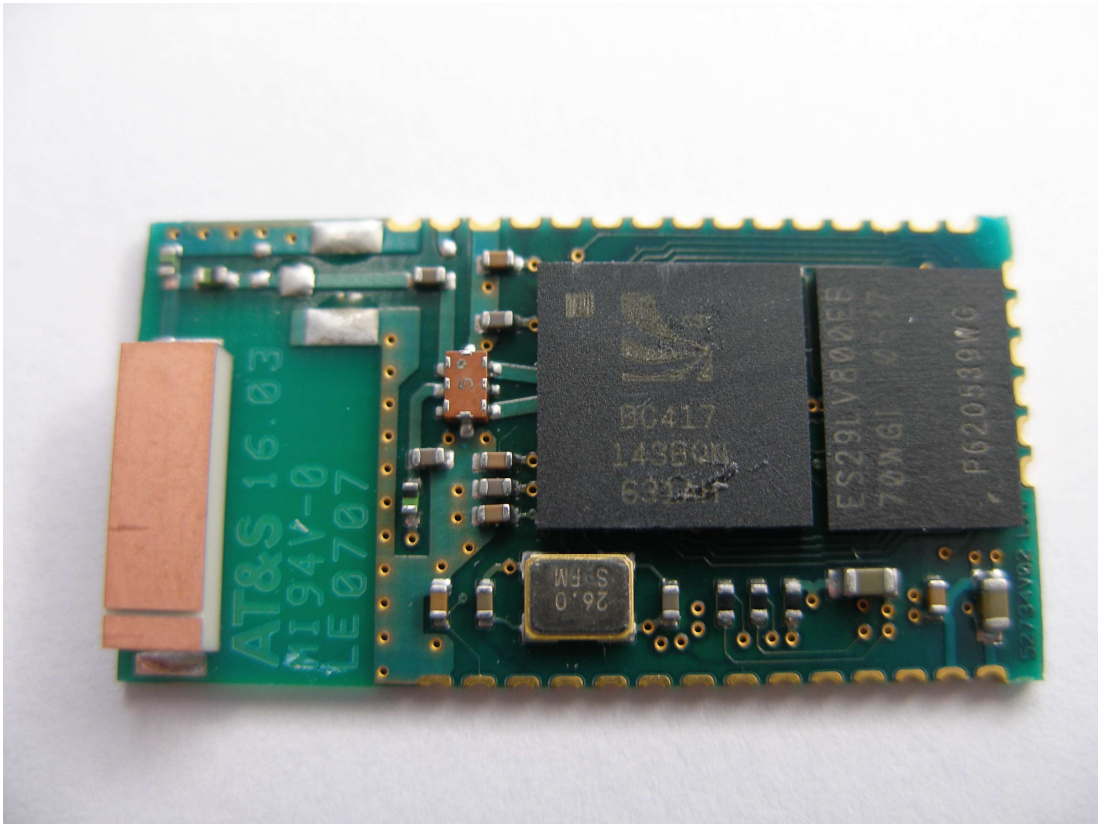
BlueMod+B20

Hardware reference



Note

This device was developed for the purpose of communication in an office environment. It is intended solely for our industrial clients for physical integration into their own technical products after careful examination by experienced technical personnel for its suitability for the intended purpose. The device was not developed for or intended for use in any specific customer application. The firmware of the device may have to be adapted to the specific intended modalities of use or even replaced by other firmware in order to ensure flawless function in the respective areas of application. Performance data (range, power requirements, etc.) may depend on the operating environment, the area of application, the configuration, and method of control, as well as on other conditions of use; these may deviate from the technical specifications, the Design Guide specifications, or other product documentation. The actual performance characteristics can be determined only by measurements subsequent to integration. Variations in the performance data of mass-produced devices may occur due to individual differences between such devices. Device samples were tested in a reference environment for compliance with the legal requirements applicable to the reference environment. No representation is made regarding the compliance with legal, regulatory, or other requirements in other environments. No representation can be made and no warranty can be assumed regarding the suitability of the device for a specific purpose as defined by our customers. Stollmann reserves the right to make changes to the hardware or firmware or to the specifications without prior notice or to replace the device with a successor model. Of course, any changes to the hardware or firmware of any devices for which we have entered into a supply agreement with our customers will be made only if, and only to the extent that, such changes can reasonably be expected to be acceptable to our customers. No general commitment will be made regarding periods of availability; these must be subject to individual agreement. All agreements are subject to our Terms and Conditions for Deliveries and Payments, a copy of which is available from Stollmann.

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Table of contents

1 Introduction

This Hardware Reference Guide documents how the BlueMod+B20 can be integrated into customer systems. It addresses developers of hardware environments for the BlueMod+B20. For detailed information about software interfaces refer to the software reference manual.

1.1 Feature Summary

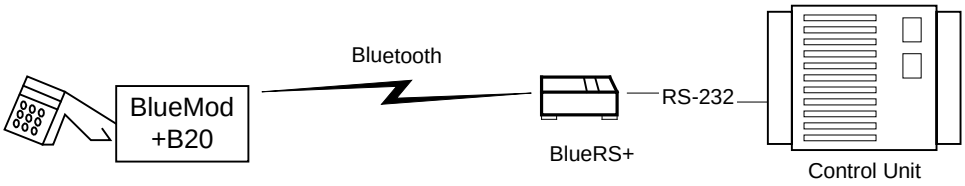
- Bluetooth specification V2.0+EDR (**E**nhanced **D**ata **R**ate)
- CSR BlueCore4-External inside
- Complete Co-location and Co-existence with 802.11 (AWMA, AFH and SFH)
- Fast Connection Setup
- RF output power class 2 with power control
- Supply Voltage 3.3V
- Internal crystal oscillator (16 MHz)
- Surface mount type: BlueMod+B20: 14.5 x 28.0 x 2.0 mm³
- Bluetooth enhanced data rate up to 2178kbps asymmetric
- Support for all Bluetooth power saving modes (Park, Sniff, Hold)
- µ-law, A-law and CVSD transcoders on SCO channel
- 13 or 16 bit linear, 8 bit µ-law or a-law PCM interface
- Full 8- to 128-bit encryption
- High sensitivity design (-81 dBm typ.)
- USB, UART and I^2C interface
- 11 digital + 2 analog IO's for individual usage by embedded software
- 16bit RISC core for embedded profiles or application software
- Power control
- Manufactured in conformance with RoHS

1.2 Applications

BlueMod+B20 can be used in different applications. Some typical are described in this chapter. For application requiring an external adapter please refer to other BlueRS+ versions from Stollmann.

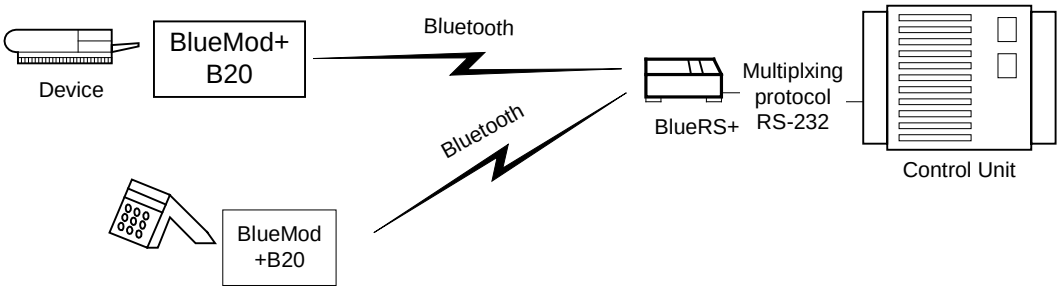
1.2.1 Cable Replacement Serial Point-to-point

To establish a cable replacement between two devices with a serial interface, BlueMod+B20 can be used.



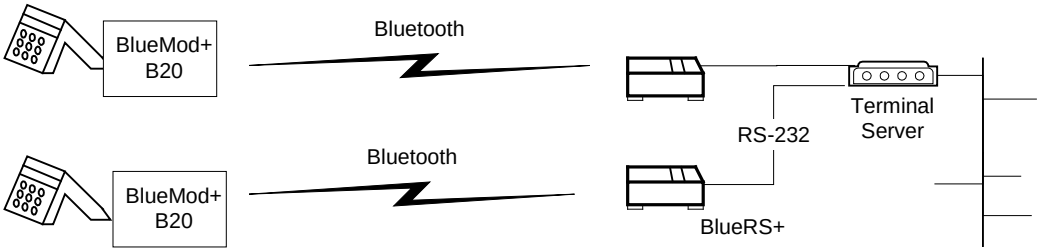
1.2.2 Cable Replacement Multipoint

Since several devices may be connected with a master device via Bluetooth, several end devices can also be multiplexed via Bluetooth. This adaptation is shown below for a desktop device.



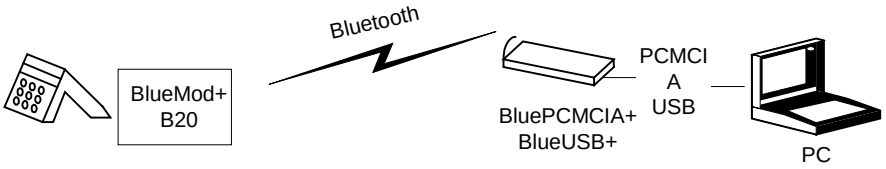
In order to handle multiple links a multiplexing protocol is required for the communication between devices, the BlueRS+ and the host. The BlueRS+ has to be adapted to the routing scheme of the protocol to transmit the data in an appropriate way. This includes Bluetooth connection control (i.e. are the Bluetooth links permanently active or only on demand) and data distribution (i.e. are all data from the host to be forwarded to all devices or only depending on the address header; are data from the devices are transmitted to the host transparently or is an address header to be added). In case you have a multipoint application please contact Stollmann for specific support.

1.2.3 Terminal Server



1.2.4 PC Client

BlueMod+B20 as Bluetooth Client can establish connections with other Bluetooth interfaces, e.g. in PCs.



2 Block Diagram

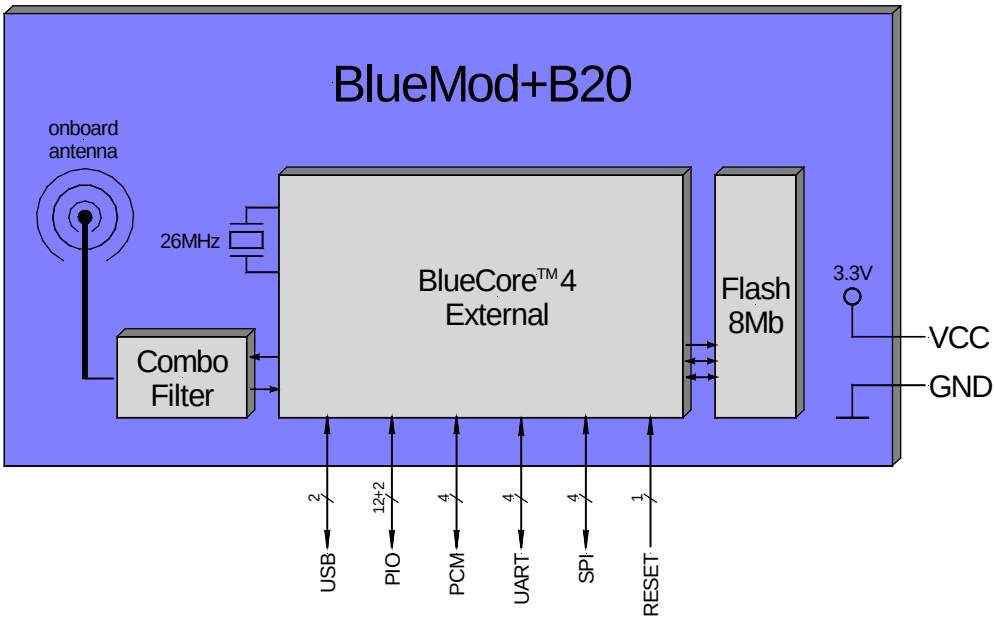


Figure: BlueMod+B20 block diagram

3 Application Interface

3.1 Power Supply

The BlueMod+B20 requires a power supply with the following characteristics:
3.3V ± 0.1V low noise (≤10mV) >80mA peak

Due to the technological requirements and the pulsed radio transmission the supply needs to be fed by an ultra fast (response time ≤20µs) linear regulator placed as close as possible to the VSUP pin (22). Functionality has been verified with the following types: TOREX: XC6204x332xx or XC6401xx42xx
It is also recommended to place a low ESR capacitor with at least 10µF as close as possible to the VSUP pin (22).
NOTE: *You must ensure that during operation the supply voltage never drops below 3.0 V. Otherwise the flash contents (firmware and/or configuration data) can get lost.*

3.2 Reset

The BlueMod+B20 is equipped with circuitry for generating Power Down Reset from the internal core voltage. A reset is generated when the core voltage falls below typically 1.5V and is released when it rises above typically 1.6V.

Via Pin 31 an external reset is generated by holding RESET# at ≤ 0.3V for ≥ 5ms.

It is strongly recommended to use external Power ON Reset circuitry, which holds RESET# at ≤ 0.3V for ≥ 5ms after VSUP has stabilized in the recommended voltage range.

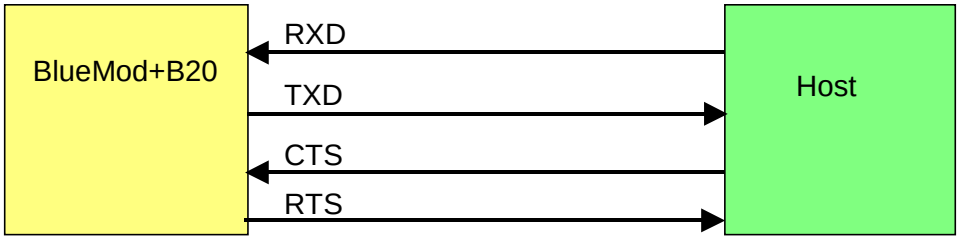
The following table shows the pin states of BlueMod+B20 on reset.

Pin Name	State: BlueMod+B20
PIO[11:0]	Input with weak pull down
PCM_OUT	Output tri-stated with weak pull down
PCM_IN	Input with weak pull down
PCM_SYNC	Input with weak pull down
PCM_CLK	Input with weak pull down
UART_TX	Output tri-stated with weak pull up
UART_RX	Input with weak pull down
UART_RTS#	Output tri-stated with weak pull up
UART_CTS#	Input with weak pull down
USB_DP	Input with weak pull down
USB_DN	Input with weak pull down
SPI_CS#	Input with weak pull up
SPI_CLK	Input with weak pull down
SPI_MOSI	Input with weak pull down
SPI_MISO	Output tri-stated with weak pull down
AIO[2:0]	Output, driving low
RESET#	Input with weak pull up

3.3 Serial Interface

The interface functionally corresponds to V.24 / RS-232 but has TTL-level.

- Transmission speeds 1200 – 2764800 bps (asynchronous)
- Character representation: 8 Bit, even/odd/no Parity, 1 or 2 stop bits
- hardware flow-control with UART_RTS and UART_CTS (active low)

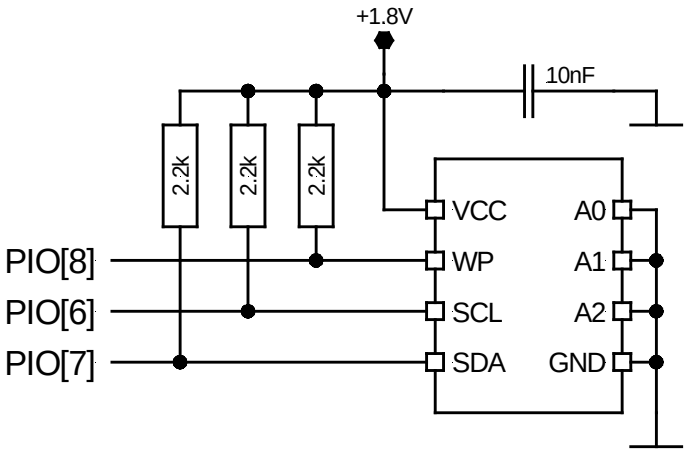


3.4 PIO Interface

It is possible to use the programmable digital I/Os PIO[0:11] and the programmable analog I/Os AIO[0:1] on the BlueMod+B20. Their behavior has to be defined project specific in the firmware.

3.5 I²C Interface

PIO[8:6] can be used to form a master I²C interface. The interface is formed using software to drive these lines. Therefore, it is suited only to relatively slow functions i.e. EEPROM.



Example EEPROM connection

BluMod+B20 interfaces directly to EEPROM devices including the following:

- Atmel AT24Cxxx
- Catalyst CAT24WCxxx
- Fairchild FM24Cxxx
- Microchip 24AAxxx
- Philips PCF8582C-2, PCF8594C-2, PCF8598C-2
- Seiko 24Cxx, 24CSxx
- Rohm BR24Cxx
- ST M24C32, M24C64, M24128-B, M24256-B,M24512

3.6 Bluetooth radio Interface

The BlueMod+B20 presents an integrated ceramic antenna.

It is highly recommended that you follow the design rule given in the Stollmann Application Note on Antenna design [2].

3.7 PCM Interface

PCM or Pulse Code Modulation is a sampling technique for digitising analogue signals.

The PCM interface for voice applications is provided via the PCM_OUT, PCM_IN, PCM_CLK and PCM_SYNC pins.

The PCM interface can act as master or as slave device.

In master mode, clock frequencies of 128kHz, 256kHz or 512kHz can be generated, when using the internal 4MHz clock. In slave mode, clock frequencies up to 2048kHz are accepted.

The Frame Clock is 8kHz. Long and Short Frame Sync are supported.

BlueMod+B20 interfaces directly to PCM audio devices including the following:

- Qualcom MSM3000 series and MSM5000 series CDMA base band devices
- OKI MSM7705 four channel A-law and µ-law codec
- Motorola MC145481 8-bit A-law and µ-law codec
- Motorola MC145483 13-bit linear codec
- STW 5093 5094 14-bit linear codec

3.8 USB Interface

3.8.1 D+, D-

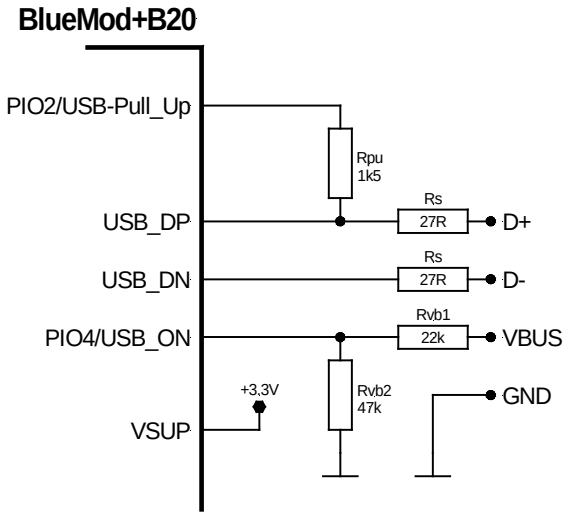
The BlueMod+B20 contains a full speed USB version 1.1 compliant interface capable of directly driving a USB cable. The BlueMod+B20 operates as a USB peripheral and responds to requests from a USB master host controller.

3.8.2 USB Pull-Up Resistor

In self powered mode a 1.5KΩ pull up resistor needs to be connected between PIO2 and the USB D+ line. This pulls the USB D+ line high when the BlueMod+B20 is ready for enumeration, signalling to the host controller that the BlueMod+B20 is a full speed (12Mbps) USB device.
In bus powered mode an internal pull up resistor can be used. For details see SW description.

3.8.3 USB Self-Powered Mode

In USB self-powered mode, the BlueMod+B20 is powered from its own power supply and not from the USB Vbus line. In order to detect when the USB Vbus line is powered up, the USB Vbus line is monitored by PIO4 through a voltage divider .

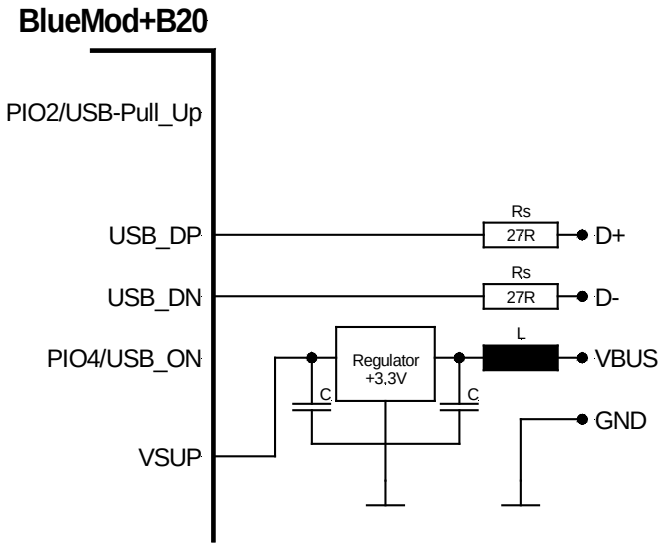


Connections in self powered mode

3.8.4 USB Bus-Powered Mode

In USB bus-powered mode, the BlueMod+B20 is powered from the USB Vbus line by means of a Low Drop Out (LDO) Voltage Regulator. When choosing the LDO Voltage Regulator for supplying the +3.3V power to the BlueMod+B20, some factors that need to be considered are:

- The voltage specification for the USB Vbus line is +4.75V to +5.25V.
- The total current required (average and peak) for the design.
- The voltage regulator's drop out voltage vs. output current.
- The voltage regulator's power dissipation over the operating temperature range.
- Filtering requirements on the USB Vbus line to attenuate noise above the voltage regulator's bandwidth.
- The suspend state current draw.



Connections in bus powered mode

3.9 Serial Peripheral Interface

BlueMod+B20 uses a 16-bit-data and16-bit-address **S**erial **P**eripheral **I**nterface (SPI). This interface is used for configuration, firmware flash and debug purposes only.

3.9.1 SPI Interface Cable

SPI Signal Name	B20 Pin	LPT Sub-D 25 Pin
MISO	30	10
MOSI	27	8
CLK	28	9
CS#	29	2
XAP_RESET	31	16
GND	2,21,34,35	18 to 25

4 Pin Description

4.1 Pin Numbering

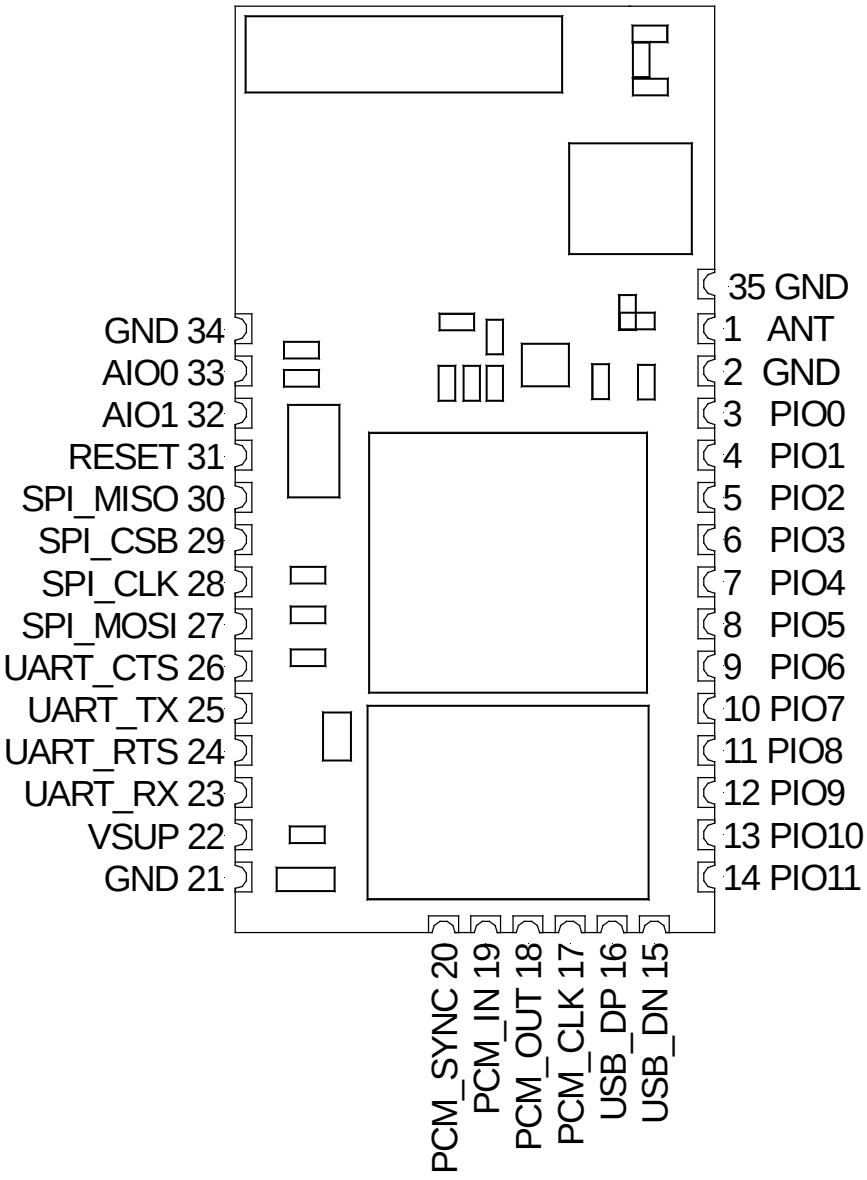


Figure 4.1 BlueMod+B20 Pin Numbering

4.2 Pin Description

4.2.1 General Pin Description

No	Pin Name	Dir	ac-tive	BlueMod+B20 usage
1	NC			Not Connected
2	GND	-	-	Ground
3	PIO0/RXEN	I/O	H	PIO/Control output for external LNA
4	PIO1/TXEN	I/O	H	PIO/Control output for ext. PA (class1)
5	PIO2/USB_Pull_Up	I/O	H	PIO/USB pull up in self powered mode
6	PIO3/USB_Wake_Up	I/O	H	PIO/USB output, to wake up PC when in USB mode
7	PIO4/USB_ON	I/O	H	PIO/USB input, VBUS detect in self powered mode
8	PIO5/USB_Detach	I/O	H	PIO/USB input, detaches from USB
9	PIO6/SCL	I/O	-	PIO/ I^2C Serial Clock
10	PIO7/SDA	I/O	-	PIO/ I^2C Serial data
11	PIO8/WP	I/O	-	PIO/ I^2C Write Protect
12	PIO9	I/O	-	PIO
13	PIO10	I/O	-	PIO
14	PIO11	I/O	-	PIO
15	USB_DN	I/O	-	USB Data-
16	USB_DP	I/O	-	USB Data+
17	PCM_CLK	I/O	-	PCM Bit clock
18	PCM_OUT	O	-	PCM Data Output
19	PCM_IN	I	-	PCM Data Input
20	PCM_SYNC	I/O	-	PCM Frame Sync
21	GND	-	-	Ground
22	VSUP	-	-	3.3V Supply Voltage
23	UART_RX	I	-	UART Asynchronous Receive Data
24	UART_RTS#	O	L	UART Request To Send
25	UART_TX	O	-	UART Asynchronous Transmit Data
26	UART_CTS#	I	L	UART Clear To Send
27	SPI_MOSI	I	-	Synchronous Peripheral Interface Data Master Out – Slave In
28	SPI_CLK	I	-	Synchronous Peripheral Interface Clock
29	SPI_CS#	I	L	Synchronous Peripheral Interface Chip Select
30	SPI_MISO	O	-	Synchronous Peripheral Interface Data Master In- Slave Out
31	RESET#	I	L	Module Reset
32	AIO0	I/O	-	Analogue Input/Output
33	AIO1	I/O	-	Analogue Input/Output
34	GND	-	-	Ground
35	GND	-	-	Ground

4.2.2 Application Specific Pin Description

4.2.2.1 SPP Pin Configuration

No	Pin Name	Dir	active	BlueMod+B20 SPP configuration usage
1	NC			Not Connected
2	GND	-	-	Ground
3	PIO0 or RXEN	I/O	H	PIO/Control output for external LNA
4	PIO1 or TXEN	I/O	H	PIO/Control output for ext. PA (class1)
5	LED1#	O	L	Status LED 1
6	DCD#	I/O	L	Data Carrier Detect Input in DTE mode; Output in DCE mode
7	RTC-IN#	I	L	DSR – Data Set Ready in DTE mode; DTR – Data Terminal Ready in DCE mode
8	RTC-OUT#	O	L	DSR – Data Set Ready in DCE mode; DTR – Data Terminal Ready in DTE mode
9	RI# or SCL[1]	I/O	-	RING Input in DTE mode; Output in DCE mode or I^2C Serial Clock
10	SDA [1]	I/O	-	I^2C Serial Data
11	WP [1]	O	-	I^2C Write Protect
12	LED2#	O	L	Status LED 2
13	reserved			
14	reserved			
21	GND	-	-	Ground
22	VSUP	-	-	3.3V Supply Voltage
23	UART_RX	I	-	UART Asynchronous Receive Data
24	UART_RTS#	O	L	UART Request To Send
25	UART_TX	O	-	UART Asynchronous Transmit Data
26	UART_CTS#	I	L	UART Clear To Send
31	RESET#	I	L	Module Reset
34	GND	-	-	Ground
35	GND	-	-	Ground

For USB, PCM, SPI and Analog IO pins see 4.2.1 General Pin Description, these pins are not used in SPP configuration.

[1] subject to firmware support, contact Stollmann for current status.

5 Electrical Characteristics

5.1 Absolute Maximum Ratings

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Electrical Requirements” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Item	Symbol	Absolute Maximum Ratings	Unit
Supply voltage	V_{SUP}	-0.4 to +3.7	V
Voltage on any pin	V_{Pin}	GND -0.3 to VSUP +0.4	V

5.2 Electrical Requirements

VSUP = 3.3V, T_{amb} = 25℃ if nothing else stated

Item	Condition	Limit			Unit
		Min	Typ	Max	
Frequency Range		2400		2483.5	MHz
Load impedance	Measured with network analyzer in the frequency range at antenna pin		50		Ohm
Output return loss	Receive Mode to 50Ω load Transmit Mode to 50Ω load	-10 -10			dBm
Supply voltage VSUP	The typical voltage is recommended VSUP at voltage pin	2.8	3.3	3.6	Vdc
Ripple on Vcc	Ripple frequency ≤10MHz			10	mVrms

5.3 Environmental Requirements

Item	Symbol	Absolute Maximum Ratings	Unit
Storage temperature range	T_{stg}	-40 to +105	℃
Operating temperature range	T_{op}	-40 to +85	℃

5.4 Digital I/O

VSUP = 3.3V, T_{amb} = 25℃

Symbol	Item	Condition	Limit		Unit
			Min	Max	
V_{IL}	Low-Level Input Voltage		-	0.8	V
V_{IH}	High-Level Input Voltage		0.7xVSUP	-	V
V_{OL}	Low-Level Output Voltage	I_{OL} = 4mA	-	0.2	V
V_{OH}	High-Level Output Voltage	I_{OH} = -4mA	VSUP-0.2	-	V
I_{OL}	Low -Level Output Current	V_{OL} = 0.55V	-	4	mA
I_{OH}	High-Level Output Current	V_{OH} = 2.3V /100k PU V_{OH} = 2.3V /10k PU	-	-4	mA

5.5 AIO-Interface

VSUP = 3.3V, T_{amb} = 25℃

Item	Limit			Unit
	Min	Typ	Max	
Resolution	-	-	8	Bits
Input voltage range	0		1.7	V
Accuracy	-1		1	LSB
Offset	-1		1	LSB
Gain error	-0.8		0.8	%
Input bandwidth		100		kHz
Conversion time	-	2.5	-	µs
Sample rate			700	Samples/s

5.6 USB-Interface

VSUP = 3.3V, T_{amb} = 25℃

Item			Unit
	Min	Max	
Input logic level low	-	0.3xVSUP	V
Input logic level high	0.7xVSUP	-	V
Output logic level low)*	0	0.2	V
Output logic level high)*	2.8	VSUP	V

)* connected to correctly terminated USB cable

5.7 Power consumption and power down modes

5.7.1 HCI Configuration

tbd

5.7.2 SPP Configuration

The following values are approximate power consumption values in the different states:

VSUP = 3.3V, T_{amb} = 25℃

Condition	Device Role		Unit
	Master	Slave	
Idle, all functions available, no Bluetooth link	7- 25		mA
Bluetooth connected, no data traffic	5	21	mA
Bluetooth connected, data traffic 115 kbit/s	22	29	mA
Device in reset	0,06		mA

5.8 RF performance

Vcc = 3.3V , T_{amb} = +20℃, 50 Ω antenna

Receiver	Frequency [GHz]	Limit			BT	Unit
		Min	Typ	Max	Spec	
Sensitivity at 0.1% BER	2.402	-83	-81	-78	≤-70	dBm
	2.441	-83	-81	-78		
	2.480	-83	-81	-78		
Maximum received signal at 0.1% BER		-20	-	-	≥-20	dBm

Transmitter	Limit			BT	Unit
	Min	Typ	Max	Spec	
RF transmit power 50 Ω load, at antenna	1	5	-	-6 to +4	dBm
RF power control range	25	35	-	≥16	dB
RF power range control resolution	-	0.5	1.2	-	dB
20 dB bandwidth for modulated carrier	-	.79	1.0	≤1.0	MHz
Initial carrier frequency tolerance	-75	0	+75	≤ ±75	kHz
Carrier frequency drift (packet DH1)	-	8	25	≤ ±25	kHz
Drift Rate	-	7	20	≤20	kHz/50 µs
$\Delta f1_{avg}$ “Maximum Modulation”	140	163	175	≥140 to ≤175	kHz
$\Delta f2_{avg}$ “Minimum Modulation”	115	154	-	≥ 115	kHz
C/I co-channel	tbd	-	0	≤ 11	dB
Adjacent channel selectivity C/I f = f_0 ± 1MHz	tbd	-	0	≤ 0	dB
Adjacent channel selectivity C/I f = f_0 ± 2MHz	tbd	-	0	≤ -30	dB
Adjacent channel selectivity C/I f ≥ f_0 +3MHz	tbd	-	0	≤ -40	dB
Adjacent channel selectivity C/I f ≤ f_0 - 3MHz	tbd	-	0	≤ -40	dB
Adjacent channel selectivity C/I f = f_{image}	tbd	-	0	≤ -9	dB
Adjacent channel Transmit power f = f_0 ± 2MHz	-	-35	-20	≤ -20	dBc
Adjacent channel Transmit power f = f_0 ± 3MHz	-	-45	-40	≤ -40	dBc

Note: The tests were made to the Bluetooth regulation, with the BER limit of 0,1%. With the output limits given as a minimum value, there was no bit error failure and the test was pass. Therefore the maximum values were not measured.

5.9 Power-up time

The time until the BlueMod+B20 is able to accept link requests or serial data is about tbd seconds after power-up.

6 Mechanical Characteristics

6.1 Dimensions

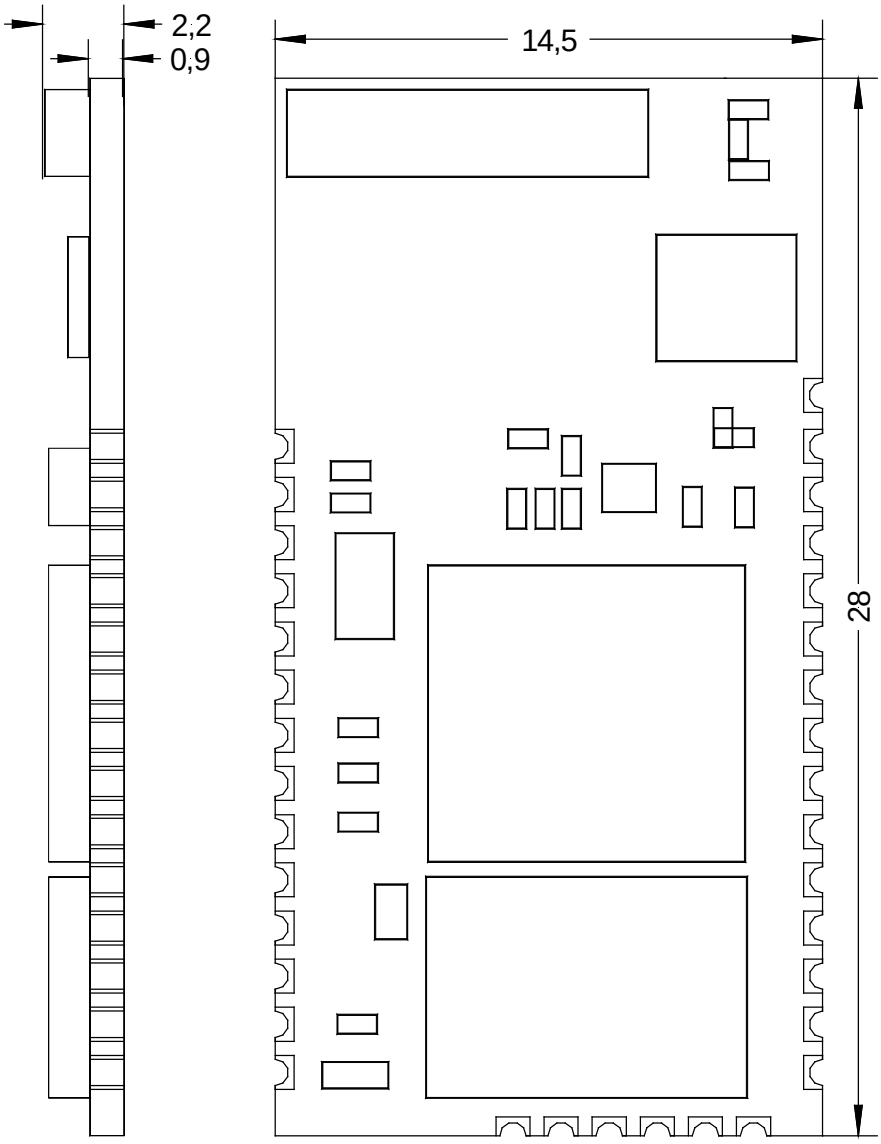


Figure 6.1 BlueMod+B20 dimensions

6.2 Recommended Land Pattern

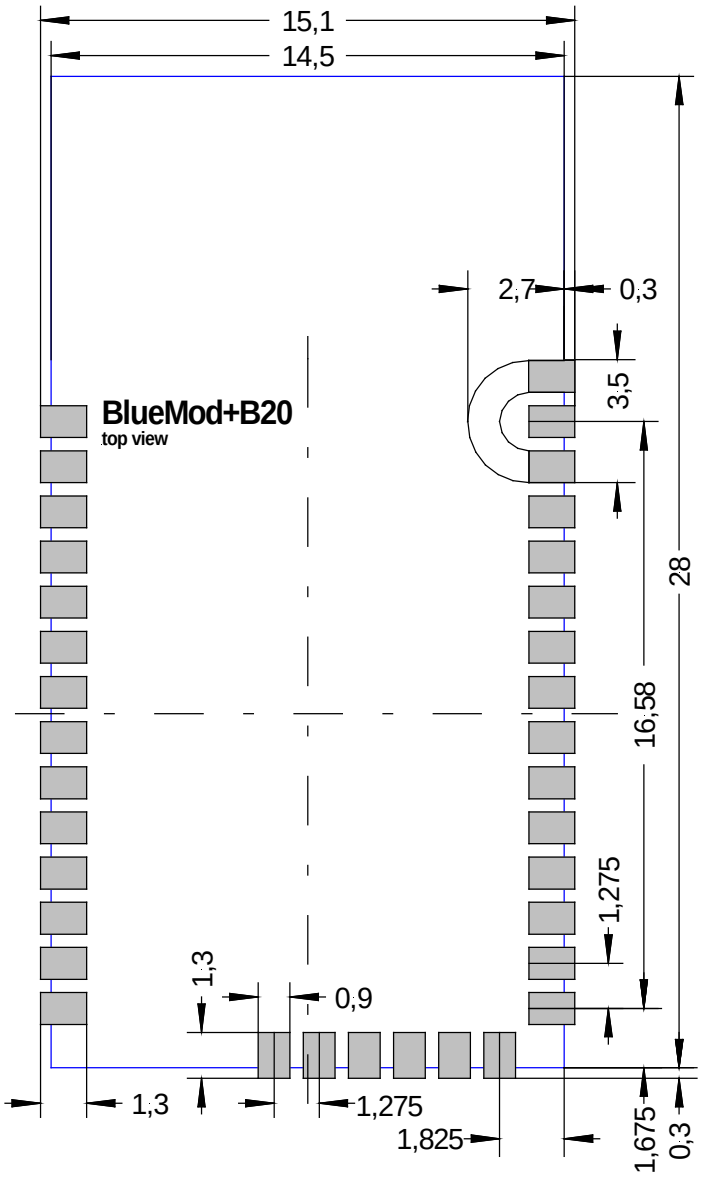
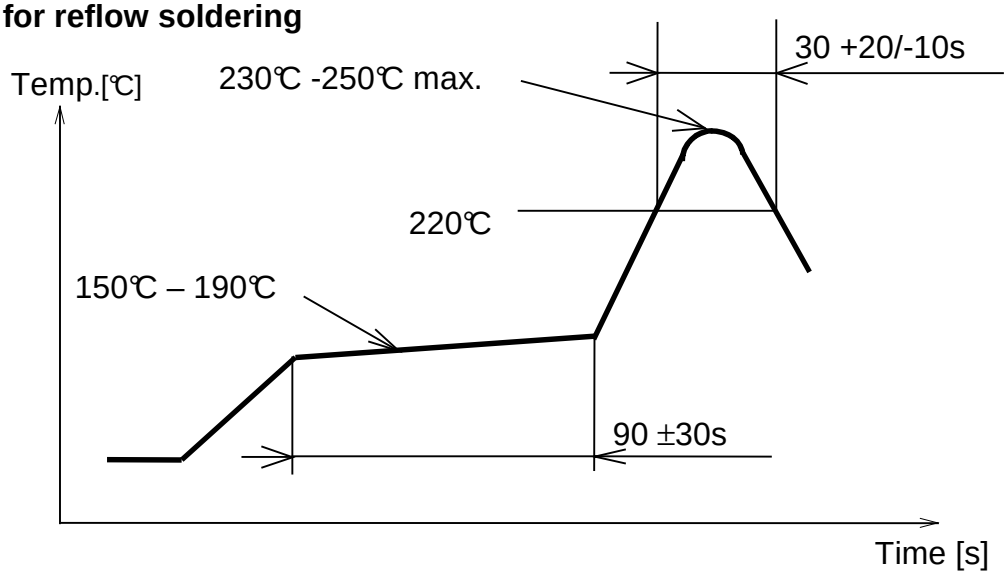


Figure 6.2 BlueMod+B20 land pattern

6.3 Re-flow Temperature-Time Profile

The data here is given only for guidance on solder and has to be adopted to your process and other re-flow parameters for example the used solder paste. The paste manufacturer provides a re-flow profile recommendation for his product.

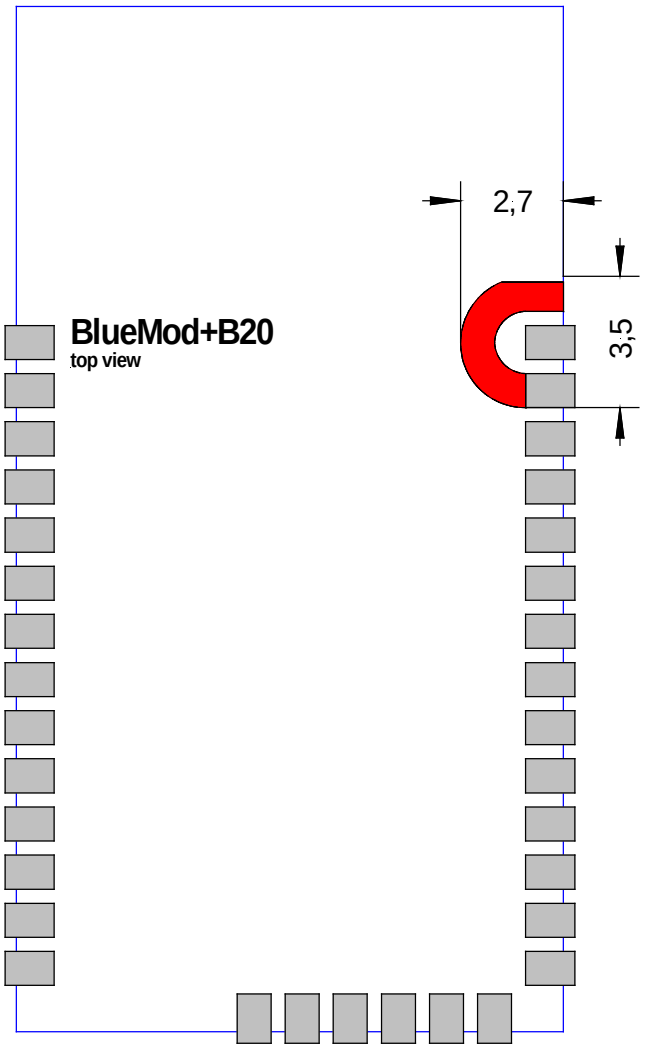
Our used temp. profile for reflow soldering



Opposite side re-flow is prohibited due to module weight.
Devices will withstand the specified profile and will withstand up to 2 re-flows to a maximum temperature of 260℃.

6.4 Restricted Area

The mother board should have no bare conductors or vias in this restricted area, because it is not covered by stop mask print.



6.5 Housing Guidelines

The individual case must be checked to decide whether a specific housing is suitable for the use of the internal antenna. A plastic housing must at least fulfill the following requirements:

- Non-conductive material, non-RF-blocking plastics
- No metallic coating
- ABS is suggested

7 Safety Guidelines

8 Regulatory Information

8.1 Declaration of conformity

8.1.1 FCC Compliance

8.1.1.1 FCC Statement

This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada.

Operation is subject to the following two conditions:

(1) this device my not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

8.1.1.2 Caution

Warning: Changes or modifications made to this equipment not expressly approved by Stollmann Entwicklungs und Vertriebs may void the FCC authorization to operate this equipment.

8.1.1.3 FCC Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

The radiated output power of BlueMod+B20 is far below the FCC radio frequency exposure limits. Nevertheless, the BlueMod+B20 shall be used in such a manner, that the potential for human contact during normal operation is minimized.

8.1.1.4 RF-exposure Statement

The radiated output power of BlueMod+B20 is far below the FCC radio frequency exposure limits. Nevertheless, the BlueMod+B20 shall be used in such a manner that the potential for human body contact during normal operation is minimized.

Any notification to the end user of installation or removal instructions about the integrated radio module is **not** allowed.

8.1.1.5 Labeling requirements for the End Product

Any End Product integrating the BlueMod+B20 must be labelled with at least the following information:

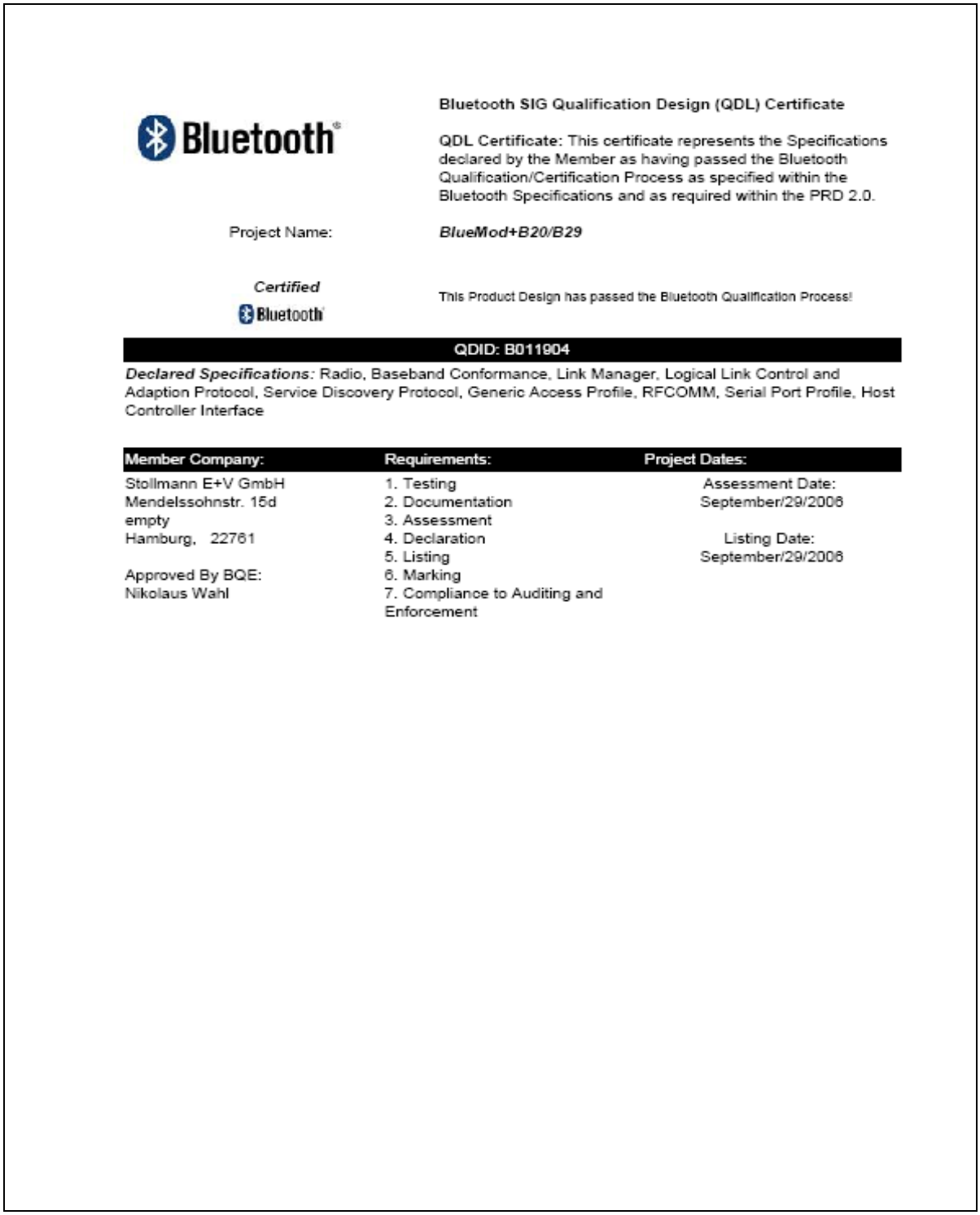
This device contains transmitter with FCC-ID: RFR-B2029

8.2 Bluetooth Qualification

The BlueMod+B20 is a qualified design according to the Bluetooth Qualification Program Reference Document (PRD) V2.0. The Qualified Design ID (QDID) is:

B011904

For further information about marking requirements of your product attention should be paid the Bluetooth Product Marking Guide at
https://programs.bluetooth.org/Download/Marking_Guide_20060601.pdf



Bluetooth SIG Qualification Design (QDL) Certificate

QDL Certificate: This certificate represents the Specifications declared by the Member as having passed the Bluetooth Qualification/Certification Process as specified within the Bluetooth Specifications and as required within the PRD 2.0.

Project Name: *BlueMod+B20/B29*

Certified Bluetooth

This Product Design has passed the Bluetooth Qualification Process!

QDID: B011904

Declared Specifications: Radio, Baseband Conformance, Link Manager, Logical Link Control and Adaption Protocol, Service Discovery Protocol, Generic Access Profile, RFCOMM, Serial Port Profile, Host Controller Interface

Member Company:	Requirements:	Project Dates:
Stollmann E+V GmbH Mendelssohnstr. 15d empty Hamburg, 22761 Approved By BQE: Nikolaus Wahl	1. Testing 2. Documentation 3. Assessment 4. Declaration 5. Listing 6. Marking 7. Compliance to Auditing and Enforcement	Assessment Date: September/29/2006 Listing Date: September/29/2006

Figure 8.1 Qualification Design Certificate

8.3 RoHS Declaration

Declaration of environmental compatibility for supplied products:

Hereby we declare to our best present knowledge based on declaration of our suppliers that this product do not contain by now the following substances which are banned by Directive 2002/95/EC (RoHS) or if contain a maximum concentration of 0,1% by weight in homogeneous materials for

Lead and lead compounds

Mercury and mercury compounds

Chromium (VI)

PBB (polybrominated biphenyl) category

PBDE (polybrominated biphenyl ether) category

And a maximum concentration of 0,01% by weight in homogeneous materials for

Cadmium and cadmium compounds

9 Related Documents

[1] CSR BlueCore4-External_Databook_BC417143B-db-001Pf.pdf

[2] Stollmann: AppNote_B0601_Antenna_Design_V1_0.pdf

10 Ordering Information

BlueMod+B20 is available in the following variants:

Name	Antenna	Article No.
BlueMod+B20/AI/SPP	Internal	52621
BlueMod+B20/AP/SPP	External	52741

11 Life Support Policy

This Stollmann product is not designed for use in life support appliances, devices, or systems where malfunction can reasonably be expected to result in a significant personal injury to the user, or as a critical component in any life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness. Stollmann customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Stollmann for any damages resulting.

12 History

Version	Release Date	By	Change description
0.50	17.05.2006	GJ	Correction: RESET# is active LOW active LOW signal names end with # sign
0.60	23.05.2006	GJ	Correction: AIO pinning
0.70	30.08.2006	BG/ JW	first combined version BlueMod+B20/Bluemod+B29
0.90	06.03.2007	FH/ AA	B29 removed,
1.00	12.03.2007	JW	Enhanced 8.2 Bluetooth Qualification First non preliminary version
1.01	28.03.2007	JJ	Ergänzungen Cetecom, Foto aktualsiert