



Key Specifications

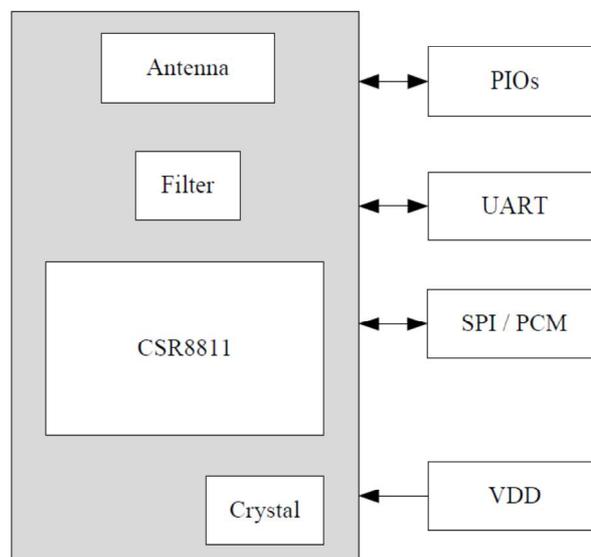
- Bluetooth® Certified 4.0 HCI module
- Dual Mode: Bluetooth and Bluetooth Low Energy (BLE)
- Draft Bluetooth Low Energy HID boot mode support
- Full-speed Bluetooth operation with full piconet and scatternet support
- Compatible with BT3.0-HS and BT4.0 (BLE)
- High speed UART interface
- Small form factor (12mm x7mm x1.50mm)
- Bluetooth, FCC and CE certified

Applications

- Phones
- Personal Navigation Devices (PNDs)
- Automotive
- Portable Media Players, Tablets
- M2M
- Bluetooth Low Energy (BLE)

Description

BC117 is a highly flexible, low power, small form factor Bluetooth Version 4.0 Certified HCI module. It comes preloaded with BlueCreation Melody software, and is ideal for developers who want to quickly and cost effectively integrate Bluetooth functionality into their products.





General Specifications

Specifications	Description
Bluetooth Standard	Bluetooth 2.1+EDR, Bluetooth 3.0-HS, Bluetooth 4.0 BLE
Interfaces	UART, PIO, SPI, PCM/I2S/SPDIF
Size	12mm x 7mm x 1.50mm
Weight	~0.24g

RF Specifications

Specifications	Description
Frequency Band	2,402G to 2,480G
Modulation	8 DPSK, PI/4 DQPSK, GFSK
Maximum Data Rate	3Mbps (typical 1.6Mbps)
Operating Range	20m to 30m
RF Sensitivity	0.1% BER at -86dBm
Transmit Power	7dBm



Audio Specifications

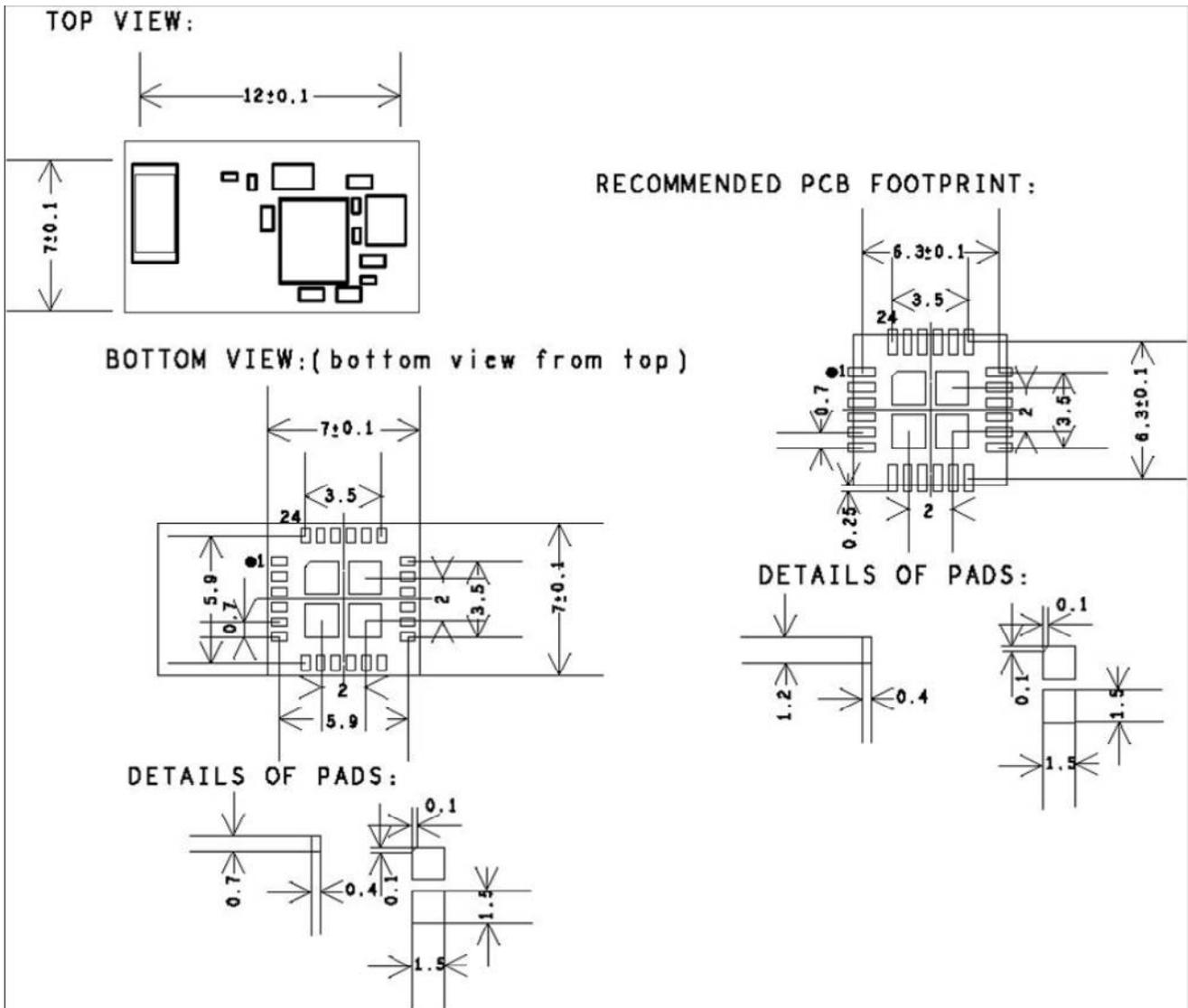
Specifications	Description
PCM Interface	13 and 16 bits linear, 8 bit μ law or A-Low formats
PCM Sample Rate	8 Ksps
DAC SNR	96dB
Stereo Separation	-87.7dB

Electric Specifications

Specifications	Description
Supply Voltage	2.3V to 4.8V DC
Maximum Current	100mA
Operating Temperature	-40°C to 85°C

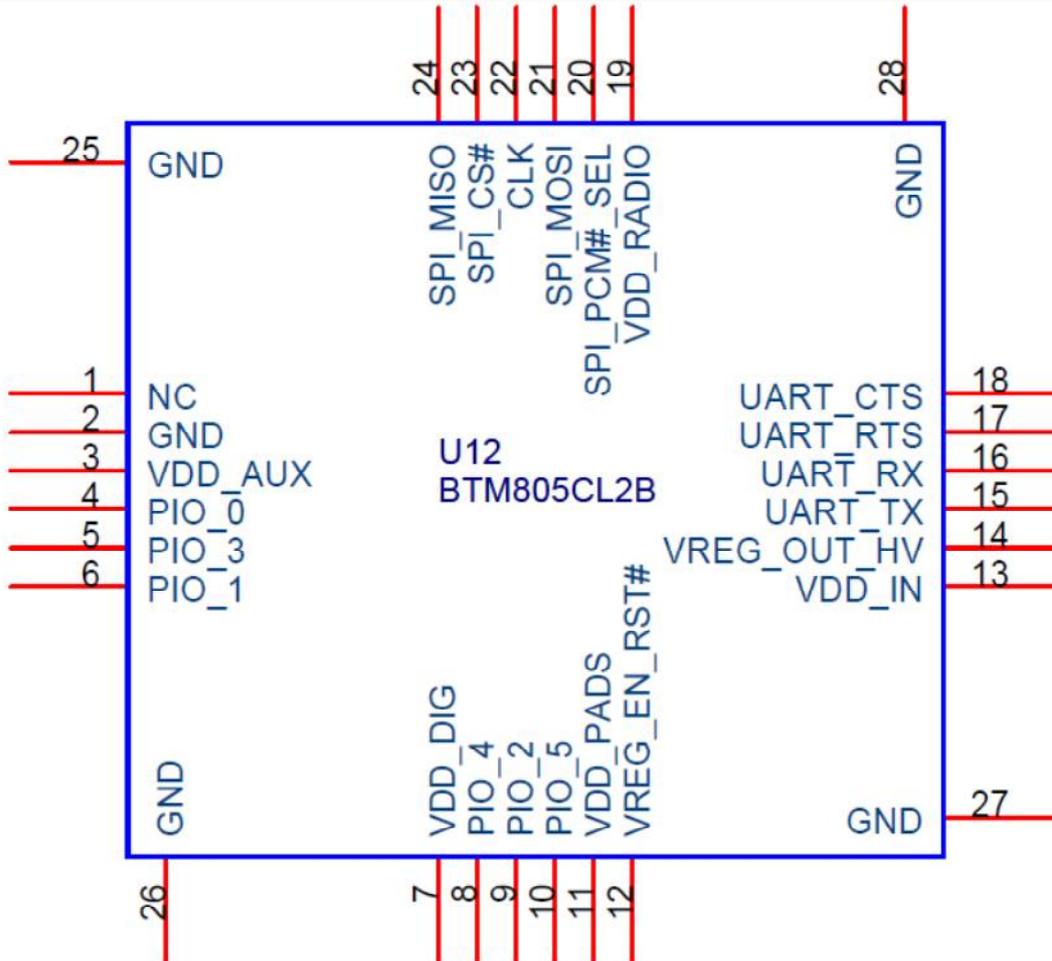


Module Footprint





Pin Configuration





PIN Description

No	Pin Name	Pin Type	Pin Description
1	NC	-	Not in use
2	GND	GND	Common Ground
3	VDD_AUX	Analogue Regulator decoupler	2.2uF cap connect to this pin
4	PIO_0	Bi-directional	Programmable input/output line
5	PIO_3	Bi-directional	Programmable input/output line
6	PIO_1	Bi-directional	Programmable input/output line
7	VDD_DIG	Digital Regulator decoupler	2.2uF cap connect to this pin
8	PIO_4	Bi-directional	Programmable input/output line
9	PIO_2	Bi-directional	Programmable input/output line
10	PIO_5	Bi-directional	Programmable input/output line
11	VDD_PADS	VDD	Positive supply for all other digital I/O ports including PIO[6.0] and both PCMs
12	VREG_EN RST#	Input with strong internal pull down	3. Active low reset; 4. Take high to enable internal regulators
13	VDD_IN	Power supply	Input to internal high-voltage regulator
14	VREG_OUT_HV	Analogue regulator output	Out from internal high-voltage regulator and input to low-voltage regulators
15	UART_TX	Bi-directional, tristate, with weak internal pull up	UART data output, active high
16	UART_RX	Input with weak internal pull up	UART data input, active high
17	UART_RTS	Bi-directional input, with weak internal pull up	UART request to send, active low
18	UART_CTS	Input, with weak internal pull up	UART clear to send, active low
19	VDD_RADIO	Power supply decoupler	Connect a 2.2uF caps on this pin
20	SPI_PCM#_SEL	Input with internal pull down	SPI/PCM selection High - SPI is selected Low - PCM is selected
21	PCM_IN/ SPI_MOSI/ PIO[21]	Input, tri-state, with weak internal pull-down	PCM synchronous data input SPI data input Programmable input/output line
22	PCM_CLK/ SPI_CLK/	Bi-directional, tri-state, with weak internal pull-down.	PCM synchronous data clock SPI clock



Datasheet

	PIO[24]		Programmable input/output line
23	PCM_SYNC/ SPI_CS#/ PIO[23]	Bi-directional, tri-state, with weak internal pull-down.	PCM synchronous data sync SPI chip select, active low Programmable input/output line
24	PCM_OUT/ SPI_MISO/ PIO[22]	Output, tri-state, with weak internal pull-down.	PCM synchronous data output SPI data output Programmable input/output line
25	GND	GND	Common Ground
26	GND	GND	Common Ground
27	GND	GND	Common Ground
28	GND	GND	Common Ground

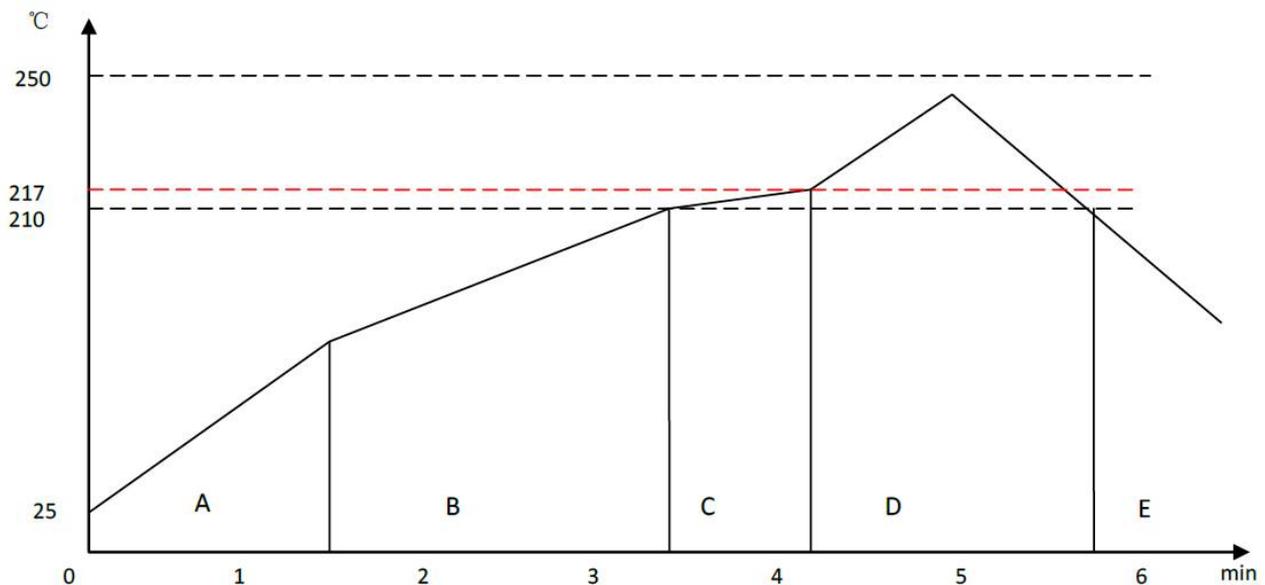
Notes

- PIO_X are bidirectional with weak pull down
- Reset Input is with strong pull-up
- USB data positive with selectable internal 1.5kΩ pull up resistor
- UART are Bidirectional with weak pull up
- PCM_OUT, IN, SYNC and CLK can be used as SPI_MISO, MOSI, CSB and CLK respectively. SPI-PCM# high switches SPI/PCM lines to SPI, low switches to PCM/PIO use



Solder Reflow Profile

The solder profile is described below.



Zone A: Preheat: This raises the temperature at a controlled rate, typically 0.5 - 2C/s. This will preheat the component to 120°C to 150°C to distribute the heat uniformly to the PCB.

Zone B: Equilibrium1: In this zone, the flux becomes soft and uniformly spreads solder particles over the PCB board, preventing re-oxidisation. The recommended temperature for this zone is 150°C to 200°C for 60s to 120s.

Zone C: Equilibrium2: This is optional and in order to resolve the upright component issue. Temperature is 210°C to 217°C for 20s to 30s.

Zone D: Reflow zone: The temperature should be high enough to avoid wetting but low enough to avoid component deterioration. The recommended peak temperature is 230°C to 250°C. The soldering time should be 30s to 90s when the temperature is above 217°C.

Zone E: Cooling: The cooling rate should be fast to keep the solder grains small which will give a longer lasting joint. A typical cooling rate is 4°C/s.



Regulatory Certifications

BC117 is delivered with FCC, CE, IC and Bluetooth SIG certifications. This allows for integrating the module in to an end product without the need to obtain subsequent and separate approvals from these regulatory agencies. This is valid in the case no other intentional or un-intentional radiator components are incorporated into the product. Without these certifications, an end product cannot be marketed in the relevant regions.

United States - FCC

- In case no other intentional or un-intentional radiator is incorporated, the BC117's FCC certification allows users to integrate the module into products without the need to obtain subsequent and separate approval.
- The BC117 was approved as "intentional transmitter radio module" by the United States' Federal Communications Commission (FCC) with accordance to CFR47 Telecommunications Part 15, Subpart C, section 212. This certification is applicable in all the states in the United States.
- The certification allows products to be listed in the NRTL (National Recognized Test Laboratory) as appointed by OSHA (Occupational Safety and Health Administration).

Labelling

- The BC117 has been labelled with its own FCC ID number. In order to extend the certification granted to the BC117, its FCC ID number must be displayed on the finished product in which the module is integrated. The following wording should be used "Contains Transmitter Module FCC ID: SSSBC117-X" or "Contains FCC ID: SSSBC117-X".
- The user-manual for any product in which the BC117 is integrated in must include the following statements:

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.



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To satisfy FCC RF Exposure requirements for mobile and base station transmission devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at closer than this distance is not recommended. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

For further information regarding the FCC certification requirements please review the following websites:

Federal Communications Commission (FCC):
<http://www.fcc.gov>

FCC Office of Engineering and Technology (OET) Laboratory Division Knowledge Database (KDB):
<http://apps.fcc.gov/oetcf/kdb/index.cfm>



Datasheet

Europe - CE and RoHS Marking



- In case no other intentional or un-intentional radiator is incorporated, the BC117's CE marking certification allows users to integrate the module into products without the need to obtain subsequent and separate CE approval.
- The BC117 has been tested and granted approval as R&TTE Directive product under the 1999/5/EC Essential Requirements for Health and Safety (Article (3.1(a)), Electromagnetic Compatibility, (EMC) (Article 3.1(b)), and Radio (Article 3.2). A Notified Body Opinion has been issued.
- The BC117 has also been tested and granted approval under the directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2002/95/EC (commonly referred to as the Restriction of Hazardous Substances Directive or RoHS). This certification ensures the module is environmental safe and free from hazardous substances (including Lead).
- Both certifications are applicable in all the 27 countries of the European Economic Area.

Labelling and Documentation

- Products complying with all relevant essential requirements shall bear the CE conformity marking accompanied by the identification number XXX-XXX
- The RoHS certification does not dictate any specific product labelling. However, we recommend marking the product with a "RoHS Compliant" statement.
- R&TTE Directive requires a manufacturer to establish technical documentation. It must be kept by the manufacturer or his authorised representative in the EU for at least 10 years after the last product has been manufactured. The documentation must cover:
 - a general description of the product,
 - conceptual design and manufacturing drawings and schemes of components, sub-assemblies, circuits and other design documentation,
 - descriptions and explanations necessary for the understanding of said drawings and schemes and the operation of the product,
 - a list of the standards referred to in Article 5, applied in full or in part, and descriptions and explanations of the solutions adopted to meet the essential requirements of the Directive where such standards
 - results of design calculations made, examinations carried out, etc.,
 - test reports.



Datasheet

- Test reports must include the following table containing the BC117 tests:

Certification	Standards	Article	Laboratory	Report Number	Date
Safety	EN 60950-1:2006+A11:2009+A1:2010	(3.1(a))			
Health	EN 50371:2002-03				
EMC	EN 301 489-1 V1.8.1 (2008-04); EN 301 489-17 V2.1.1 (2009-05)	(3.1(b))			
Radio	EN 300 328 V1.7.1 (2006-10)	(3.2)			

- For further labelling and CE marking requirements please review the R&TTE Compliance Association Technical Guidance: <http://rtteca.com/>

For further information regarding the R&TTE certification requirements please review the following websites:

Radio and Telecommunications Terminal Equipment (R&TTE):
http://ec.europa.eu/enterprise/rtte/index_en.htm

European Conference of Postal and Telecommunications Administrations (CEPT):
<http://www.cept.org>

European Telecommunications Standards Institute (ETSI):
<http://www.etsi.org>

European Radio Communications Office (ERO):
<http://www.ero.dk>



Datasheet

Canada - IC



- In case no other intentional or un-intentional radiator is incorporated, the BC117's IC certification allows users to integrate the module into products without the need to obtain subsequent and separate approval.
- The BC117 has been tested and granted approval under Industry Canada (IC) Radio Standards Specification (RSS) RSS-210, RSSGen and ICES-003. This certification is applicable in Canada.

Labelling and Documentation

- The BC117 has been labelled with its own IC ID number. In order to extend the certification granted to the BC117, its CE ID number must be displayed on the finished product in which the module is integrated. The following wording should be used "Contains Transmitter Module IC: XXX"
- The user-manual for any product in which the BC117 is integrated in must include the following statements:

This device complies with Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante

- For further labelling and IC marking requirements please review the Industry Canada website: <http://www.ic.gc.ca/>



Datasheet

Bluetooth Qualification Program (BQP)



- In case no other non-certified Bluetooth components are incorporated, the BC117's BQP marking certification allows users to integrate the module into products without the need to obtain subsequent and separate approval.
- The BC117 has been approved by the Bluetooth Qualification Body (BQB) to use the Bluetooth trademark and to offer official Bluetooth functionality. The approval according to the V4.0B Bluetooth specification confirms that the module complies with the Bluetooth specification and will successfully operate with other products supporting the same profile. BQP certification also ensures that the module has gone through safety assessment. This certification was granted through a combination of product performance testing and interoperability testing. This certification applies globally.

Labelling

- Products complying with all relevant requirements are allowed to bear the official Bluetooth logo

For further information regarding the BQP certification requirements please review the following websites:

Bluetooth Special Interest Group:
<https://www.bluetooth.org/apps/content/>

Notes:

- Changes or modifications that are made to the module circuitry can hinder the certification
- Installers must comply with all of the instructions provided by the certification agency, which indicate installation and/or operating conditions necessary for compliance
- It is important to note that the finished product is required to comply with all applicable authorizations regulations and requirement that is not associated with the BC117 module, including non-intentional transmitting modules and other intentionally transmitting modules.
- The previous section represents BlueCreation interpretation of the salient issues of the certifications. For full details of the certification please refer to the local agencies' websites. Where there is any difference between this document and the local agencies' website, the subsequent should be followed.
- At the time of writing this document FCC, CE and BQP certification were still processed by the relevant authorities.



Ordering Information

Part number BC117

Order number	Description
BC117	Class2 Bluetooth 4.0 Module with integrated chip Antenna

General Notes

- BlueCreation's products are not authorised for use in life-support or safety-critical applications. Use in such applications is done at the sole discretion of the customer. BlueCreation will not warrant the use of its devices in such applications.
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