



## BC830RPA Class 2 Bluetooth Module

### Features

- Class 2 module with printed PCB antenna
- 64Kbit EEPROM
- Fully Qualified Bluetooth v4.0
- CSR BC8630 ROM chip
- Low current consumption
- Supports 1.8v, 3.3V I/O operations.
- Supports Li-ion battery with maximum 500mA charging current.
- High quality 95db SNR on DAC playback
- Supports USB audio
- Supports single/dual-mic input
- Interface: PIOs, UART, SPI (for programming)
- Built-in DSP Co-Processor for audio signal processing
- Supports of noise and echo cancellation
- Configurable 5-band EQ
- 802.11 Co-existence
- A2DP and AVRCP profiles support<sup>(1)</sup>
- SBC, AAC, and MP3 decoder support for direct streaming
- Optional NFC pairing supports
- RoHS compliant
- Dimension: 31.1 x 12.0 x 2.2 mm



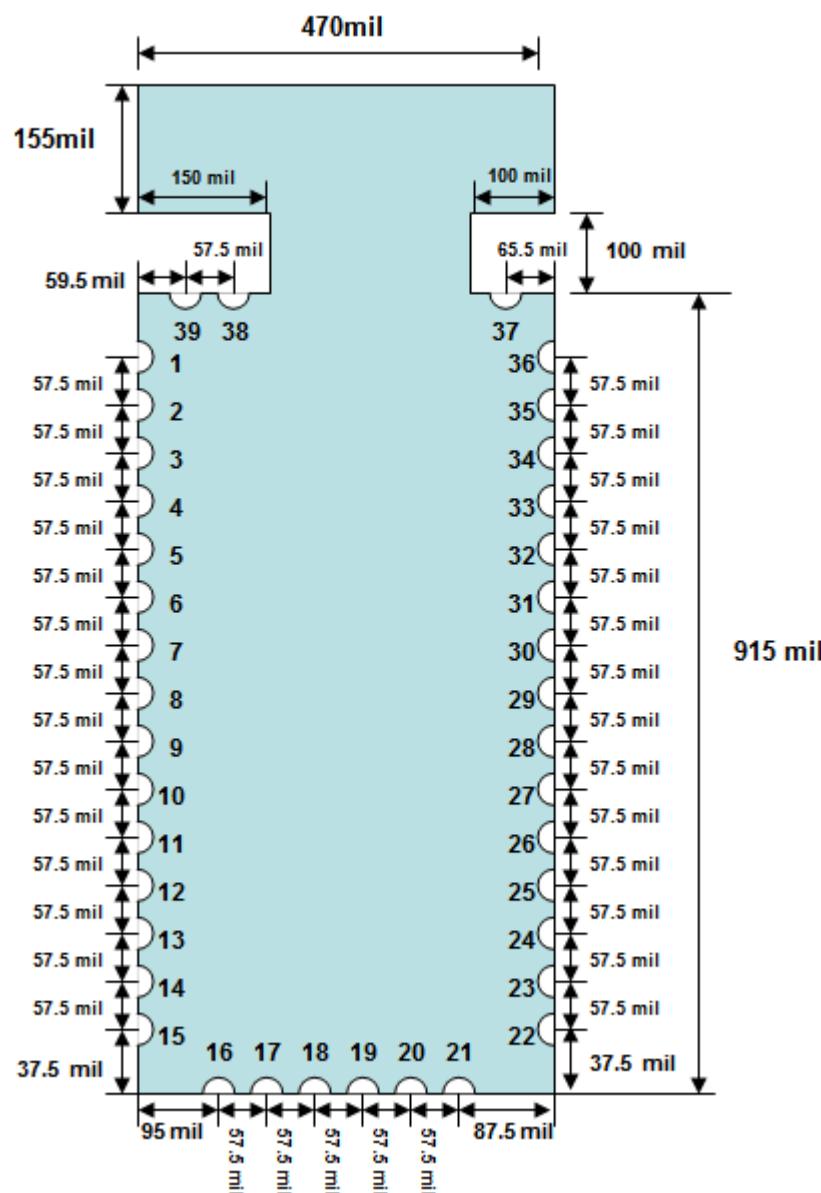
Notes :

(1) : HFP v1.6 profile is supported in BC835RPA

### Applications

- High Quality Mono/Stereo Wireless Headsets
- Wireless Speakers
- Home-theater Sound Bar
- Bluetooth-Enabled Wireless Gateways

## **Module Outline and Pin Assignments**



PIN	NAME	TYPE	FUNCTION
1	GND	GND	Ground
2	Line_in_LP/ Mic-AP	Analog Input	Left channel +ve audio line in. (Also serves as Mic 1 +ve input in BC835RPA)
3	Line_in_LN/ Mic-AN	Analog Input	Left channel -ve audio line in. (Also serves as Mic 1 -ve input in BC835RPA)
4	SPK_LN	Analog Output	Left channel differential -ve audio output
5	SPK_LP	Analog Output	Left channel differential +ve audio output
6	SPK_RP	Analog Output	Right channel differential -ve audio output
7	SPK_RP	Analog Output	Right channel differential +ve audio output
8	PIO13	Bi-directional	Programmable Input/Output line.
9	VPAD	Power	1.8v / 3.3v power supply for all PIOs, UART port, on module EEPROM and SPI programming ports.
10	Line_in_RP/ Mic-BP	Analog Input	Right channel +ve audio line in. (Also serves as Mic 2 +ve input in BC835RPA)
11	Line_in_RN/ Mic-BN	Analog Input	Right channel -ve audio line in. (Also serves as Mic 2 -ve input in BC835RPA)
12	GND	GND	Ground
13	PIO17	Bi-directional	Programmable Input/Output line.
14	PIO18	Bi-directional	Programmable Input/Output line.
15	PIO6	Bi-directional	Programmable Input/Output line.
16	GND	GND	Ground
17	UART_TX	CMOS Output	UART port data transmit output
18	UART_RX	CMOS Input	UART port data receive output
19	SPI_PCMB	CMOS Input	SPI programming port enable (high active).
20	LED0	Open Drain	LED output
21	LED1	Open Drain	LED output
22	GND	GND	Ground
23	RESETB	CMOS input	Reset if low. Input debounced so must be low for >5ms to cause a reset

24	SPI_CLK	CMOS Input	Serial Peripheral Interface Clock
25	SPI_MISO	CMOS Output	Serial Peripheral Interface Data Output
26	SPI_MOSI	CMOS Input	Serial Peripheral Interface Data Input
27	SPI_CSB	CMOS Input	Chip Select For Synchronous Serial Interface active low
28	V18_OUT	Power Output	1.8v output from module
29	PIO21	Bi-directional	Programmable Input/Output line.
30	USB_DN	Bi-directional	USB port D-
31	USB_DP	Bi-directional	USB port D+
32	CHG-EXT	Analog Output	External charging control output.
33	VBAT_SENSE	Analog Input	Battery level sensing input.
34	VBAT	Power input	Power input.
35	VCHG	Power Input	5V charging input.
36	AGND	Analog Ground	Audio analog ground
37	MIC_Bias	Analog Output	Mic circuit bias control.
38	AIO0	Analog Input	Auxiliary ADC input.
39	VREG	CMOS Input	Power up control input.

The above schematic shows a typical application of BC830RPA module with PIOs running at 1.8v.

### Power supply

The whole module shall be powered by a single cell 3.7v Li-ion rechargeable battery (VBAT, pin#34). A coupling capacitor of 2.2uF should be placed as close to this pin as possible. The module will output 1.8v at VPAD (pin #28). All PIO pins, SPI programming port and UART port will run on this power rail.

### Differential Audio Outputs

The output stage digital circuitry converts the signal from 16-bit per sample, linear PCM of variable sampling frequency to bit stream, which is fed into the analogue output circuitry. The output stage circuit comprises a DAC with gain setting and class AB output stage amplifier. The output is available as a differential signal between SPK\_LN and SPK\_LP for the left channel, as the schematic shows, and between SPK\_RN and SPK\_RP for the right channel. The output stage is capable of driving a speaker directly when its impedance is at least 8Ω.

### UART Port

BC830RPA has a standard UART serial interface that provides a simple mechanism for communicating with other serial devices using the RS232 protocol. A typical application will be connecting to an external HCI host. When BC830RPA is connected to another digital device, RX and TX transfer data between the 2 devices. UART configuration parameters, such as baud rate and packet format, are set by configuration of the BC8630 ROM chip.

To communicate with the UART at its maximum data rate using a standard PC, an accelerated serial port adapter card is required for the PC.

Possible UART Settings

Parameter	Possible values	
Baud rate	Minimum	1200 baud ( $\leq 2\%$ Error)
	Maximum	9600 baud ( $\leq 1\%$ Error)
Parity	None, Odd or Even	
Number of stop bits	1 or 2	
Bits per byte	8	

### SPI Programming Port

The SPI is used to program and configure the ROM firmware inside BC8630 chip. It is required in production. Ensure the 4 SPI signals are brought out to either test points or a header. Note that these four signals will run on the 1.8v power rail.

### LED Drivers

BC830RPA includes 2 pads dedicated to driving LED indicators. Both terminals can be controlled by firmware. The terminals are open-drain outputs, so the LED must be connected from a positive supply rail to the pad in series with a current limiting resistor. It is recommended that the LED pad, LED[0] or LED[1] pins, operate with a pad voltage below 0.5V. In this case, the pad is like a resistor, R<sub>ON</sub>. The resistance together with the external series resistor sets the current in the LED.

### Buttons

The example application has assigned the following functions to each PIO pins:

PIN	NAME	Function	Descriptions
13	PIO17	REV	Select previous song, fast rewind.
29	PIO18	FWD	Select next song, fast forward
14	PIO21	PLAY_PAUSE	Play / pause toggle
18	PIO6	VOL-	Volume decrease
15	PIO13	VOL+	Volume increase
39	VREG	VREG_EN	Power on, sleep mode

### Battery and Charging

The whole circuit is running with single cell 3.7v Li-ion battery connecting to the VBAT terminal. VBAT\_SENSE is shorted to this terminal for battery level detection. 5V charging input coming from the micro USB port is connected to the VCHG terminal. In typical headset application, a maximum of 150mA charging current can be supported with internal charging. However, external components can be added to boost the charging current to 500mA if needed. Note that a decoupling capacitor of 2.2uF should be connected to VCHG.

## Host Information

This module was defined to be used for specific host only. The designated host for this module was:  
Company: GT-tronics HK Ltd.  
Address: B202, Tonic Industrial Center, 19 Lam Hing Street, Kowloon Bay, Hong Kong  
Host Model Name: Bluetooth Audio Receiver  
Host brand name: N/A

## **FCC RF Exposure Requirement**

*This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

*Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.*

*NOTE: 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.

### *FCC Radiation Exposure Statement*

*This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.*

*If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: Contains Transmitter Module FCC ID: B4OBC86XRPX or Contains FCC ID: B4OBC86XRPX*

*when the module is installed inside another device, the user manual of this device must contain below warning statements:*

*1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:*

- (1) This device may not cause harmful interference.*
- (2) This device must accept any interference received, including interference that may cause undesired operation.*

*2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.*

*The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.*