

User Manual

BC5MMFP(B,C) Class2 Bluetooth Module

(This module is limited to OEM Installation only)

Features

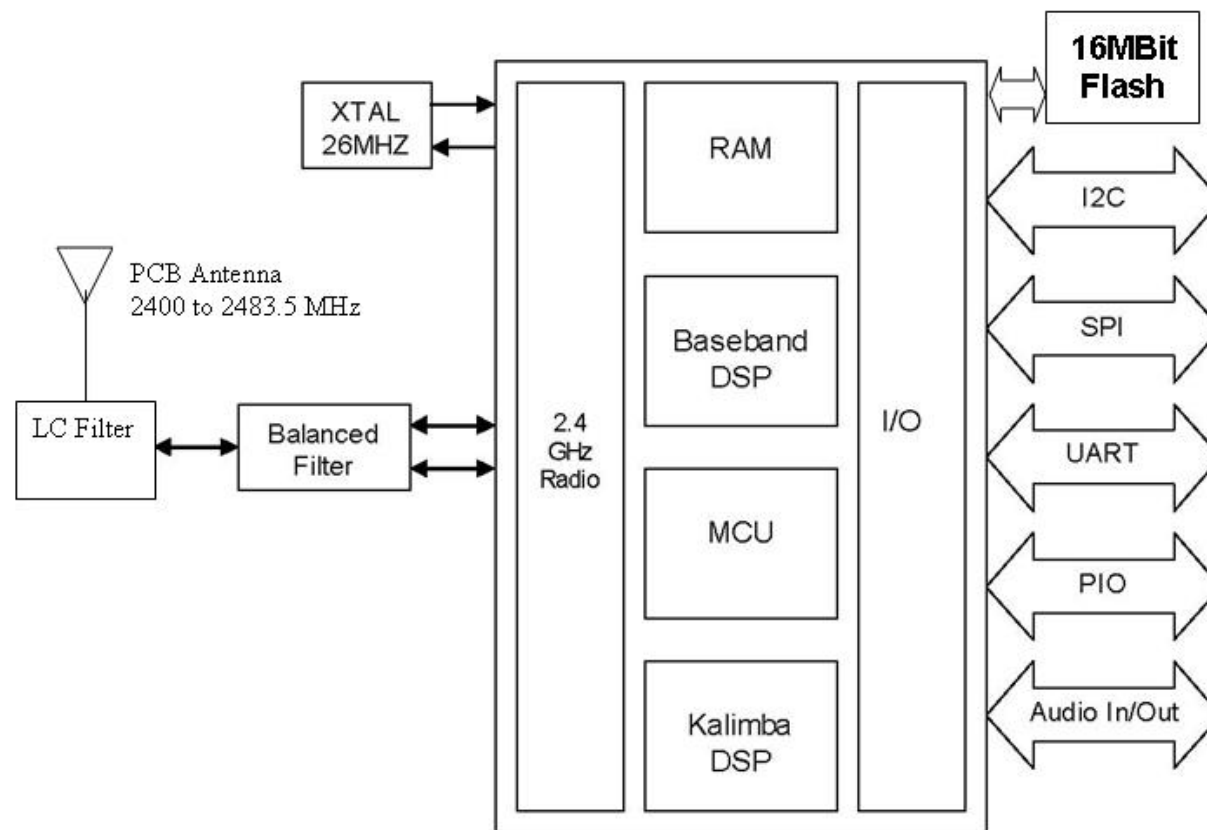
- Class 2 module with printed PCB antenna
- 8Mbit (optional 16Mbit) Flash
- Fully Qualified Bluetooth 2.1 + EDR
- CSR BC5MM-EXT chip
- Low current consumption
- 3.3V operation
- High quality 95db SNR on DAC playback
- PCM digital audio input/output (BC5MMFPC only)
- Support single/dual-mic input
- Interface: PIOs, UART, SPI for programming
- Built-in DSP Co-Processor for audio signal processing
- Support of noise and echo cancellation
- Configurable 5-band EQ
- 802.11 Co-existence
- A2DP, AVRCP, HSP, HFP profile support
- Optional iAP, SPP profile support for app communication
- Optional AAC, MP3 direct streaming and SRS WoWHD
- Optional NFC pairing support
- RoHS compliant
- Dimension: 34.0 x 12.0 x 2.2 mm



Applications

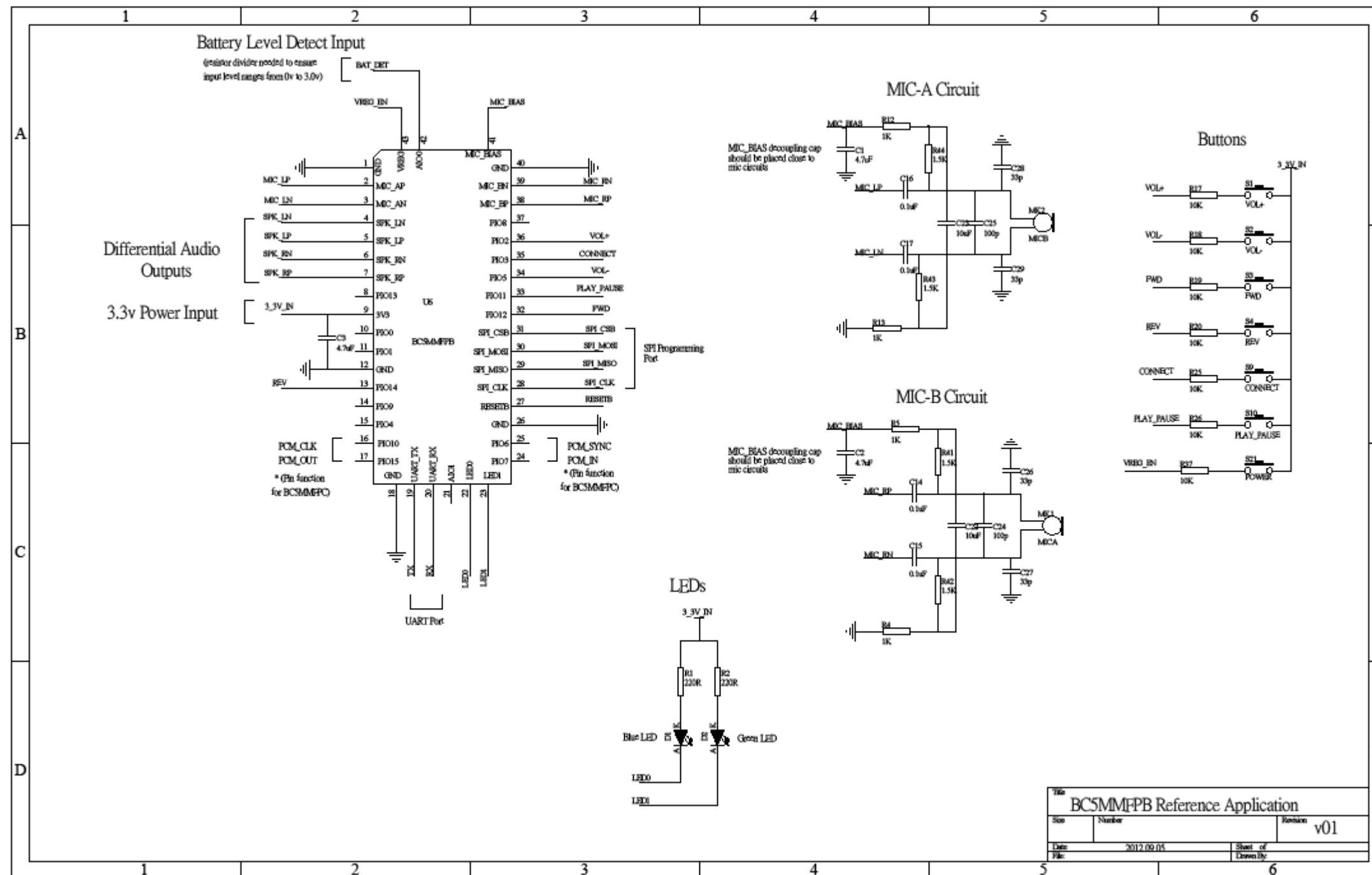
- High Quality Mono/Stereo Wireless Headsets
- Hands-Free Car Kits
- Wireless Speakers
- Home-theater Sound Bar
- Bluetooth-Enabled Wireless Gateways

Block Diagram



BC5MMFPB(C) is a Class 2 Bluetooth sub-system using BlueCore5 –Multimedia Ext Flash chipset from leading Bluetooth chipset supplier Cambridge Silicon Radio. It interfaces to a 8/16 MBit parallel Flash. The software stack running on the BlueCore5 MM Ext chipset is fully compliant to Bluetooth Specification v2.1 + EDR. BC5MMRPB(C) also has necessary balun and bandpass filters to interface with a build-in PCB antenna, which forms a very cost effective radio subsystem.

Applications Example



The above schematic shows a typical application of BC5MMFPB (C) module. Double click on the diagram to see the detail drawings.

Power supply

The whole module shall be supplied with a clean 3.3v at its 3V3 power port (pin #9). A coupling capacitor should be placed as close to this pin as possible. All others PIO pins (including VREG), SPI programming port and UART port will run at 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.

PCM Interface (BC5MMFPC only)

The audio PCM interface supports continuous transmission and reception of PCM encoded audio data over Bluetooth. PCM is a standard method used to digitise audio, particularly voice, for transmission over digital communication channels. Through ts PCM interface, BlueCore5- Multimedia External has hardware support for continual transmission and reception of PCM data, so reducing processor overhead. BlueCore5- Multimedia External offers a bidirectional digital audio interface that routes directly into the baseband layer of the on-chip firmware. It does not pass through the HCI protocol layer.

Hardware on BlueCore5- Multimedia External allows the data to be sent to and received from a SCO connection. Up to 3 SCO connections can be supported by the PCM interface at any one time. BlueCore5- Multimedia External can operate as the PCM interface master generating PCM_SYNC and PCM_CLK or as a PCM interface slave accepting externally generated PCM_SYNC and PCM_CLK. BlueCore5- Multimedia External is compatible with various clock formats, including Long Frame Sync, Short Frame Sync and GCI timing environments.

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: BTSPK
Host brand name: GT-tronics

UART Port

BC5MMFPB (C) has a standard UART serial interface that provides a simple mechanism for communicating with other serial devices using the RS232 protocol. When BC5MMFPB (C) 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 using BlueCore5- Multimedia External firmware.

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 (≤2%Error)
	Maximum	9600 baud (≤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 configuration, and debug the BlueCore5- Multimedia External. 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 are run at 3.3v power rail.

Mic Inputs

The microphone bias, MIC_BIAS, derives its power from the 3V3 power port and requires a 4.7μF capacitor on its output. The MIC_BIAS is like any voltage regulator and requires a minimum load to maintain regulation. The MIC_BIAS maintains regulation within the limits 0.200mA to 1.230mA. The input impedance at MIC_A_N, MIC_A_P, MIC_B_N and MIC_B_P is typically 6.0kΩ.

LED Drivers

BC5MMFPB (C) 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, RON . 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	PIO14	REV	Select previous song, fast rewind.
32	PIO12	FWD	Select next song, fast forward
33	PIO11	PLAY_PAUSE	Play / pause toggle
34	PIO5	VOL-	Volume increase
35	PIO3	CONNECT	Switch to next connected device
36	PIO2	VOL+	Volume decrease
42	AIO(0)	BAT_DET	Battery level detection
43	VREG	VREG_EN	Power on, sleep mode

FCC RF Exposure Requirement

1. At least 20cm separation distance between the antenna and the user’s body must be maintained at all times. And must not transmit simultaneously with any other antenna or transmitter, except in accordance with FCC multi transmitter product procedures.
2. To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed 0dBi in the 2.4G band.
3. A user manual with the end product must clearly indicate the operating requirements and conditions that must be observed to ensure compliance with current FCC RF exposure guidelines.

Please be noticed following information and instructions should be placed in the end-user’s operating manual

The Module has been granted as limited modular approval for mobile applications. This Module must be installed in the designated host as specified in this manual.

1. Separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations.
2. The Module and its antenna must not be co-located or operating in conjunction with any other transmitter or antenna within a host device. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.
3. A label must be affixed to the outside of the end product into which the module is incorporated, with a statement similar to the following: For BC5MMFPB, BC5MMFPC: This device contains FCC ID: B4OBC5MMFPX.
4. The module shall be in non-detachable construction protection into the finished products, so that the end-user has to destroy the module while remove or install it.
5. This module is to be installed only in mobile or fixed applications. According to FCC part 2.1091(b) definition of mobile and fixed devices is:.

Mobile device:

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter’s radiating structure(s) and the body of the user or nearby persons. In this context, the term “fixed location” means that the device is physically secured at one location and is not able to be easily moved to another location.

Portable device:

For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

6. Separate approval is required for all other operating configurations, including portable configurations with respect to FCC Part 2.1093 and different antenna configurations.
7. A certified modular has the option to use a permanently affixed label, or an electronic label. For a permanently affixed label, the module must be labelled with an FCC ID: B4OBC5MMFPX. The OEM manual must provide clear instructions explaining to the OEM the labelling requirements, options and OEM user manual instructions that are required

For a host using a this FCC certified modular with a standard fixed label, if (1) the module's FCC ID is not visible when installed in the host, or (2) if the host is marketed so that end users do not have straightforward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module:

“Contains Transmitter Module FCC ID: B4OBC5MMFPX” or “Contains FCC ID: B4OBC5MMFPX” must be used. The host OEM user manual must also contain clear instructions on how end users can find and/or access the module and the FCC ID.

8. Host product is required to comply with all applicable FCC equipment authorizations regulations, requirements and equipment functions not associated with the transmitter module portion. compliance must be demonstrated to regulations for other transmitter components within the host product; to requirements for unintentional radiators (Part 15B). To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. If a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Since this may depend on the details of how the module is integrated with the host, we suggest the host device to recertify part 15B to ensure complete compliance with FCC requirement: Part 2 Subpart J Equipment Authorization Procedures , KDB784748 D01 v07, and KDB 997198 about importation of radio frequency devices into the United States.

FCC Certification Requirement:

The end product with an embedded Module may also need to pass the FCC Part 15 unintentional emission testing requirements and be properly authorized per FCC Part 15.

Note: If this module is intended for use in a portable device, you are responsible for separate approval to satisfy the SAR requirements of FCC Part 2.1093.

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 made to this equipment not expressly approved by GT-tronics HK Ltd. may void the FCC authorization to operate this equipment.

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