Product Overview

The Blue Moon product provides a Bluetooth communication interface to any product that can support a Cardbus type PCMCIA interface. The product is a standard card having the standard connector and footprint and being 15mm longer to accommodate an antenna within the same profile. The Cardbus electrical and functional interface is compliant with Cardbus Standard 7.1.

Bluetooth Transceiver

The Blue Moon uses the Cambridge Silicon Radio (CSR) chipset embedded in their Class 2 reference design. This uses the CSR BlueCore 01 device and associated Flash ROM with an external Low Noise Amplifier in the receive path. All frequencies are derived from a 16MHz crystal connected to the BC01 device.
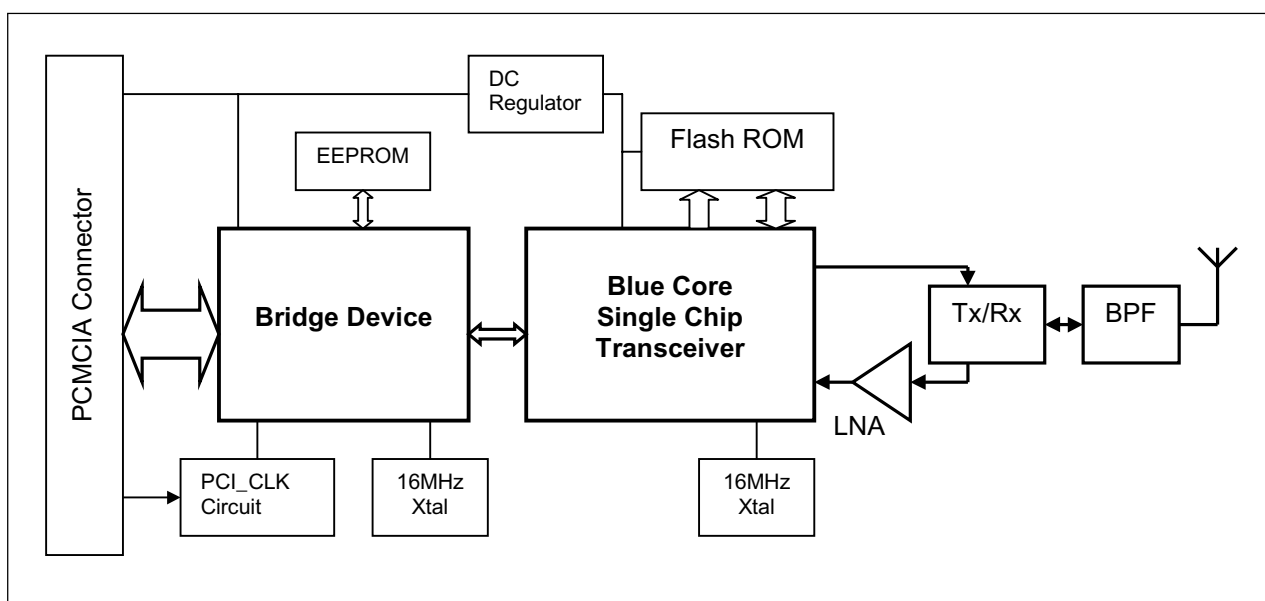

Figure 1: Block Diagram

The BlueCore device (BC01) incorporates a RISC core for baseband processing with an integrated Receiver and Transmitter operating at 2.4GHz. Data for transmission is formatted and modulated onto the carrier within the BC01 device. The balanced transmitter output produced directly by the BC01 device is converted to an unbalanced feed via an external discrete balun before feeding to a Transmit/Receive (Tx-Rx) switch. The Tx-Rx switch ensures that the transmit power is not applied to the receiver input.

On the antenna side, the output of the switch is fed to a bandpass filter characterized for the ISM band used for Bluetooth transmissions. The bandpass filter is a 50ohm type that allows straightforward matching to the antenna. The antenna is a PIFA (Printed Inverted-F Antenna) designed into the copper laminate of the PCB material.

In the receive path, the signal from the antenna is filtered, as for the transmitter and passed through the Tx-Rx switch to a Low Noise Amplifier (LNA). The LNA provides 15dB amplification to the signal before applying to the BC01 device. Further amplification, down conversion and demodulation is performed in the BC01 device.

The Flash ROM holds the firmware used by the BC01 to implement the lower level layers of the Bluetooth protocol. The Flash ROM also holds parametric data set defined during design and manufacturing to adjust / align the transmitter and receiver for optimum performance. The parametric data includes offsets applied to ensure the transmit and receive frequency are within specification and to define the power levels used, among other parameters.

The system receiver has input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shifts frequencies in synchronization with the transmitted signals.

The Blue Moon implementation of the Bluetooth protocol is partitioned such that lower level layers are implemented on the BC01 and the higher levels in an application running on the Host. The communication protocol between the host and BC01 uses BCSP, a bespoke protocol from CSR, similar to the Bluetooth H4 protocol but allowing greater tolerance to data loss.

Host Interface
The host communicates with the Blue Moon via a PCMCIA Cardbus interface. The OX16CB950 bridge device handles the Cardbus interface requirements and translates between the parallel data for the host and the serial data stream required by the BC01 using a UART operating at 921.6kbps. Flow control for the UART is in-band using X-On/X-Off standard characters within the data transmission. The UART requires PCI_CLK to be running so to comply with Cardbus Standard 7.1 an external circuit is used to control CCLKRUNL.

The EEPROM attached to the Bridge Device contains default data that is loaded into RAM on reset to configure the Bridge Device for use. This default data contains the Cardbus Information Structure (CIS) including Vendor Id and Device Id parameters set for the Blue Moon product.

Power Requirements
Blue Moon operates from the standard 3.3volt supply available through from the PCMCIA interface. This supply is further regulated for use by the Bluetooth transceiver.