

Operation description

Bluetooth

1. **Purpose:** The purpose of this document is to describe key component operations on Bluetooth.
2. **Key components:** BlueCore3-Multimedia External is a single chip radio and base band IC for Bluetooth 2.4GHz systems. BC352239A interfaces to 8Mbit of external Flash memory and WM8731 of external Stereo Audio CODEC. When used with the CSR Bluetooth software stack, it provides a fully compliant Bluetooth system to v1.2 of the specification for data and voice communications.
3. **Operation Principle:**
Low power 1.8v operation
Operation clock is provided by 12MHz oscillator.

Key Features

Radio

- Common TX/RX terminal simplifies external matching; eliminates external antenna switch
- BIST minimizes production test time. No external trimming is required in production
- Full RF reference designs available
- Bluetooth v1.2 Specification compliant

Transmitter

- +6dBm RF transmit power with level control from on-chip 6-bit DAC over a dynamic range >30dB
- Class 2 and Class 3 support without the need for an external power amplifier or TX/RX switch
- Class1 support using external power amplifier, with RF power controlled by an internal 8-bit DAC

Receiver

- Integrated channel filters
- Digital demodulator for improved sensitivity and co-channel rejection
- Real time digitized RSSI available on HCI interface
- Fast AGC for enhanced dynamic range

Synthesizer

- Fully integrated synthesizer requires no external VCO, varactor diode, resonator or loop filter
- Compatible with crystals between 8 and 32MHz (in multiples of 250kHz) or an

external clock

- Accepts 7.68, 14.44, 15.36, 16.2, 16.8, 19.2, 19.44, 19.68, 19.8 and 38.4MHz TCXO frequencies for GSM and CDMA devices with sinusoidal or logic level signals

Auxiliary Features

- Crystal oscillator with built-in digital trimming
- Power management includes digital shut down and wake up commands with an integrated low power oscillator for ultra-low power Park/Sniff/Hold mode
- Clock request. Output to control an external clock
- On-chip linear regulator; 1.8V output from a 2.2-4.2V input
- Power-on-reset cell detects low supply voltage
- Arbitrary power supply sequencing permitted
- 8-bit ADC and DAC available to applications

Package Options

- 120-ball VFBGA, 7 x 7 x 1mm, 0.5mm pitch

Kalimba DSP

- DSP co-processor, 32MIPs, 24-bit fixed point DSP core
- Single cycle MAC; 24 x 24-bit multiply and 56-bit accumulator
- 32-bit instruction word, dual 24-bit data memory
- 4Kword program memory, 2 x 8Kword data memory
- Flexible interfaces to BlueCore3 subsystem

Baseband and software

- External 8Mbit Flash for complete system solution
- Internal 32Kbyte RAM, allows full speed data transfer, mixed voice and data, and full piconet operation
- Logic for forward error correction, header error control, access code correlation, CRC, demodulation, encryption bit stream generation, whitening and transmit pulse shaping
- Transcoders for A-law, μ -law and linear voice from host and A-law, μ -law and CVSD voice over air

Physical Interfaces

- Synchronous serial interface up to 4Mbaud for system debugging
- UART interface with programmable baud rate up to 1.5Mbaud with an optional bypass mode
- Full speed USB v1.1 interface supports OHCI and UHCI host interfaces

- Bi-directional serial programmable audio interface supporting PCM, I2S and SPDIF formats
- Optional I2C. Compatible interface

Stereo Audio CODEC

- Stereo 24-bit multi-bit sigma delta ADCS and DACS are used with over sampling digital interpolation and decimation filters.
- Digital audio input word lengths from 16-32 bits and sampling rates from 8 KHz to 96 KHz are supported.

Bluetooth Stack

CSR.s Bluetooth Protocol Stack runs on the on-chip MCU in a variety of configurations:

- Standard HCI (UART or USB)
- Fully embedded RFCOMM
- Customized builds with embedded application code