Operation description

Bluetooth

1. **Purpose:** The purpose of this document is to describe key component operations on Bluetooth.
2. **Key components:** CSR BlueCore-02 Audio/Flash BC215159B, Bluetooth Single Chip, TI bq24010 Battery Charger, RT9167-18CB High Speed LDO Regulators,RT9541-SCE Battery over charge/over discharge Protector, FDC6305N MOSFET,AT24C16-10UI EEPROM.
3. **Operation Principle:** CSR BlueCore-02Audio/Flash BC215159B, Bluetooth Single Chip BlueCore2-Audio is a single chip radio and base band IC for Bluetooth 2.4GHz systems. The integrated mono audio CODEC allows for more compact designs and low power consumption for battery powered application. It is implemented in 0.18µm CMOS technology. When used with internal flash containing the CSR Bluetooth software stack, it provides a fully compliant Bluetooth system for voice communications.
   Operation at 1.8 V supply.
   Operation clock is provided by 16MHz oscillator.

Key Features

Radio

-Operation with common TX/RX terminals simplifies external matching circuitry and eliminates external antenna switch

-Extensive built-in self-test minimizes production test time

-No external trimming is required in production

-Full RF reference designs are available

Transmitter

-Up to +4dBm RF transmit power with level control from the on-chip 6-bit DAC over a dynamic range greater than 30dB

-Supports Class 2 and Class 3 radios without the need for an external power amplifier or TX/RX switch

Receiver

-Integrated channel filters

-Digital demodulator for improved sensitivity and co-channel rejection

-Digitized RSSI available in real time over the HCI interface

-Fast AGC for enhanced dynamic range

Synthesizer

-Fully integrated synthesizer, no external VCO varactor diode or resonator

-Compatible with crystals between 8 and 32MHz (in multiples of 250 kHz) or an external clock

Auxiliary Features

-Crystal oscillator with built-in digital trimming

-Power management includes digital shut down and wake up commands and an integrated low power oscillator for ultra-low Park/Sniff/Hold mode power consumption

-Devices can be used with an external Master oscillator and provides a clock request signal. To control external clock source.

-Uncommitted 8-bit ADC and 8-bit DAC are available to application programs

Baseband and software

-Internal 4M bit flash for complete system solution and application flexibility

-32kbyte on-chip RAM allows full speed Bluetooth data transfer, mixed voice and data, plus full 7 slaves Pico net operation

-Dedicated logic for forward error correction, header error control, access code correlation, demodulation, cyclic redundancy check, encryption bit-stream generation, whitening and transmit pulse shaping

-Transponders for A-law, μ-law and linear voice rom host and A-law, μ-law and CVSD voice over air

Physical Interfaces

-Synchronous serial interface up to 4MBaud

-UART interface with programmable Baud rate up to 1.5MBaud

-Full speed USB interface supports OHCI and UHCI host interfaces. Compliant with USB v2.0

-Synchronous bi-directional serial programmable audio interface

-Optional I2C Compatible interface

Bluetooth Stack Running on an Internal Micro-controller

CSR's Bluetooth Protocol Stack runs on-chip in a variety of configurations:

-Standard HCI (UART or USB)

-Fully embedded to RFCOMM

-Customer specific builds with embedded application code

Audio CODEC

-15-bit resolution with 8 kHz sampling frequency

-Designed for use in voice applications such as headsets and hands-free kits

-Integrated input/output amplifiers capable of driving a microphone and speaker with minimum external components

TI bq24010 single chip LI-ION charge management

The bq24010 is highly integrated Li-Ion and Li-pol linear charge management devices targeted at space limited portable application. The IC offer integrated powerFET and current sensor for up to 1A charge application, reverse blocking protection, high accuracy current and voltage regulation(+-5% accuracy), charge status, and charge termination, in a small package.

The bq24010 charge the battery in three phases: conditioning, constant current, constant voltage. Charge is terminated based on minimum current. An internal charge timer provides a backup safety feature for charge termination. The bq24010 automatically re-starts the charge if the battery voltage falls bellow an internal threshold. The bq24010 automatically enters sleep mode when Vcc supply is removed.

The bq24010 include temperature sensing input for detecting hot or cold battery pack; power good (PG) output indicating the presence of input power.