Circuit Description

Bluetooth

1. **Purpose:** The purpose of this document is to describe key component operations on Bluetooth.
2. Key components: CSR BlueCore 05- Multimedia BC57E687A, Bluetooth Chip; S29AL008D70BFI020,Flash Chip ;TC1185-3.0VCT713, LDO step-down converter; DBF81F106, RF Balance Filter.
3. **Operation Principle:** CSR BlueCore 05- Multimedia BC57E687A, is radio and baseband IC for Bluetooth 2.4GHz systems. BC57E687A interfaces to 8Mbit of external Flash memory. When used with the CSR Bluetooth software stack, it provides a fully compliant Bluetooth system to v2.0 of the specification for data and voice communications. Operation at 1.5V and 1.8V supply.
   Operation clock is provided by 26MHz oscillator.

Key Features

■ **BlueCore 05-Multimedia BC57E687A**

Radio

- common TX/RX terminals simplifies external matching; eliminates external antenna switch
- BIST minimizes production test time.
- Antenna matching and filtering within the IC

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

Receiver

-Integrated channel filters

-Digital demodulator for improved sensitivity and co-channel rejection

-Real time digitised RSSI available on HCI interface

-Fast AGC for enhanced dynamic range

Synthesizer

-Fully integrated synthesiser 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

- User space on processor for customer applications
- 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
- Clock request output to control an external clock
- On-chip regulators:1.5V output from 1.8V to 2.7V input and 1.8V output from 2.7V to 4.5V input
- Power-on-reset cell detects low supply voltage
- 10-bit ADC and 8-bit DAC available to applications
- On-chip charger for lithium ion/polymer batteries

Baseband and software

- Internal 16Mbit Flash
- Internal 48Kbyte RAM, allows full speed data transfer, mixed voice/data and full piconet support
- Logic for forward error correction, header error control, access code correlation, CRC, demodulation, encryption bit stream generation, whitening and transmit pulse shaping
- Transponders for A-law, μ-law and linear voice from host and A-law, μ-law and CVSD voice over air

Physical Interfaces

- Serial peripheral interface up to 4Mbits/s data rate
- Optional I2C compatible interface(master/slave)
- Two UART interfaces with programmable data rate up to 3Mbits/s with an optional bypass mode
- Full speed USB v1.1 interface
- Bi-directional serial programmable audio interface supporting PCM, I2S and SPDIF formats
- Two LED drivers with faders

Stereo Audio Codec

- 16-bit internal stereo CODEC
- Dual ADC and DAC for stereo audio
- Integrated amplifiers for driving 16 ohm speakers; no need for external components

-Support for single-ended speaker termination and line output

- Integrated low-noise microphone bias

- Standard sample rates of 8KHz,11.025KHz,16KHz,22.05KHz,33KHz,44.1Khz and 48KHz(DAC only)

Bluetooth Stack

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

- Standard HCI (UART or USB)
- Complete stack and application running on chip
- Audio CODEC and echo-noise suppression or customer-specific algorithms running on the DSP

■ **S29AL008D70BFI020,Flas**h

Single power supply operation

-2.7 to 3.6 volt read and write operations for battery powered applications

Manufactured on 200nm process technology

-Compatible with 0.32um and 230nm Am29LV160 devices

Flexible sector architecture

-One 16 Kbyte, two 8 Kbyte, one 32 Kbyte, and fifteen 64 Kbyte sectors(byte mode)

-One 8 Kword, two 4Kword,one 16 Kword, and fifteen 32 Kword sectors(word mode)

-Supports full chip erase

-Sector Protection features

-A hardware method of locking a sector to prevent any program or erase operations within that sector

-Sectors can be locked in-system or via programming equipment

-Temporary Sector Unprotect feature allows code changes in previously locked sectors

Ultra low power consumption (typical values at 5MHz)

-200 nA Automatic Sleep mode current

-200 nA standby mode current

-7 mA read current

-15 mA program/erase current

TC1185-3.0VCT713 LDO

The TC1185-3.0VCT713 are high accuracy CMOS upgrades for older(bipolar) low dropout regulators such as the LP2980. Designed specifically for battery-operated systems, the devices' CMOS construction eliminates wasted ground current, significantly extending battery life. Total supply current is typically 50uA at full load.

-Extremely Low Supply Current(50uA, Typ)

-Very Low Dropout Voltage

-High Output Voltage Accuracy

-Stand or Custom Output Voltages
-Power Saving Shutdown Mode
-Reference Bypass Input for Ultra Low-Noise Operation
-Over Current and Over Temperature Protection
-Space-Saving 5-Pin SOT-23A Package
-Pin Compatible Upgrades for Bipolar Regulators

DBF81F106, RF　Balance Filter

-2.4Ghz Multi-Layered Dielectr Balance Filter for Blutooth
-Unbalance Impetance: 50Ω　Nominal
Balance Impetance:Conjugate mache to BC02 serises or Camridge Silicon Radio Ltd.
-Center Frequency :2400Mhz~2500Mhz
-Pass Band:3.0db MAX(2400Mhz~2500Mhz: at 25℃)
-Insertion Loss:3.3dbMAX(2400Mhz~2500Mhz:-40~+85 ℃)
3.4dbMAX(2400Mhz~2500Mhz:+85~+105℃)
1.0 MAX (2400-2500MHz)
-Ripple:2.0MAX
-Unbalance Port V.S.W.R:48db MIN(880~960Mhz)
-Amplitude balance:175-185 deg. (2400-2500MHz)

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