 Operation description

Bluetooth

1. **Purpose:** The purpose of this document is to describe key component operations on Bluetooth.
2. Key components: CSR BlueCore 03- Multimedia BC352239A, Bluetooth Chip; S29AL008d90BFI020,Flash Chip；T7024-PGPM，2.4GHz LNA/PA；AS179-92, RF Switch; TC1185-3.0VCT713, LDO step-down converter; MDR741F, 2.45GHz RF Bandpass Filter.
3. **Operation Principle:** CSR BlueCore 03-MultiMedia BC352239A is radio and baseband IC for Bluetooth 2.4GHz systems. BC352239A 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 1.8V supply.
   Operation clock is provided by 16MHz oscillator.

Key Features

Radio

- External TX/RX terminals control with external PA; with external antenna switch.
-BIST minimizes production test time .NO external trimming is required in production
-Full RF reference designs available
-Bluetooth v2.0 Specification compliant

Transmitter

-8dBm RF transmit power with level control from the on-chip 6-bit DAC over a dynamic range> 30dB; external TX/RX terminals control with external PA; with external antenna switch.
- Class 2 and Class 3 support without the need for an external power amplifier or TX/RX switch
- Class 1 support using external power amplifier with RF power controlled by an internal 8-bit voltage DAC

Synthesizer

-Fully integrated synthesizer requires no external VCO. Varactor diode, resonator or loop filter.
-Compatible with crystals between 8 and 32MHz (in multiples of 250 kHz) or an external clock
-Accepts 7.68, 14.44, 15.36, 16.2, 16.8, 19.2, 19.44, 19.68, 19.8 and 38.4 MHz 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 and an integrated low power oscillator for ultra-low Park/Sniff/Hold mode power consumption

-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 8-bit DAC available to application

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

-L-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

-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

-Operational I^2-C^{TM} Compatible interface

Stereo Audio Codec

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

-Dual ADC and DAC for stereo audio

Bluetooth Stack

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

-Standard HCI (UART or USB)

-Fully embedded RFCOMM

-Customized builds with embedded application code

- **SPANSION'S S29AL008d90BFI020,Flas**h

  Single power supply operation

-2.7 to 3.6 volt read and write operations

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 K word, two 4Kword, one 16 K word, and fifteen 32 K word 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

Microchip's TC1185 LDO

-The TC1185 is a up to 150 mA, fixed-output voltage regulator designed to provide ultra low-dropout and low noise in lower powered applications. Using an optimized VIP™ (Vertically Integrated PNP) process, the TC1185 delivers unequalled performance in all specifications critical to low-powered designs:

Dropout Voltage: Typically 300 mV @ 150 mA load, and 7 mV @ 1 mA load.

Ground Pin Current: Typically 850 µA @ 150 mA load, and 75 µA @ 1 mA load.

Enhanced Stability: The TC1185 is stable with output capacitor ESR as low as 5 mΩ, which allows the use of ceramic capacitors on the output.

Sleep Mode: Less than 1 µA quiescent current when ON/ OFF pin is pulled low.

Smallest Possible Size: SOT-23 and micro SMD packages use absolute minimum board space.

Precision Output: 1% tolerance output voltages available (A grade).

Low Noise: By adding a 10 nF bypass capacitor, output noise can be reduced to 30 µV (typical).

Multiple voltage options, from 2.5V to 5.0V, are available as standard products. Consult factory for custom voltages.

   -Guaranteed 150 mA output current

   -Requires minimum external components

   -Stable with low-ESR output capacitor

   -<1 µA quiescent current when shut down

   -Low ground pin current at all loads

   -Output voltage accuracy 1% (A Grade)

-High peak current capability

-Wide supply voltage range (16V max)

-Low ZOUT: 0.3Ωtypical (10 Hz to 1 MHz)

MDR741F, 2.45GHz RF Bandpass Filter

-2.4GHz Multi-Layered Bandpass Filter for Blutooth

-Unbalance Impetance: 50 Ω Nominal

-Balance Impedances: Conjugate mache to BC03 series or Cambridge Silicon Radio Ltd.

-Center Frequency: 2400 MHz~2500 MHz

-Pass Band: 2400Mhz~2500 MHz: at 25℃

-Insertion Loss: 1.7 dB max (2400-2500MHz at 25 Deg.C)

2.0 dB max (2400-2500MHz at -40 up to +85 Deg.C)

-Ripple: 0.8 dB max (2400-2500MHz)

-Unbalance Port V.S.W.R: 2.0 max (2400-2500MHz)

-Attenuation: 25 dB min (at 1750MHz)

25 dB min (at 2100MHz)

22 dB min (at 4800-5000MHz)

■ T7024-PGPM，2.4GHz LNA/PA

-The T7024 is a monolithic SiGe Tx/Rx front-end IC with power amplifier, low-noise amplifier and T/R switch driver. It is especially designed for operation in TDMA systems like Bluetooth and WDCT.

Due to the ramp-control feature and a very low quiescent current, an external switch transistor for V is not required.

-Single 3-v Supply Voltage

-High Power-added Efficient Power Amplifier (Pout Typically 23 dBm)

-Ramp-controlled Output Power

-Low-noise Preamplifier (NF Typically 2.1 dB)

-Biasing for External PIN Diode T/R Switch

-Current-saving Standby Mode

-Few External Components

-Packages:

PSSO20

QFN20 with Extended Performance

■ AS179-92 RF, Switch

-The AS179-92 is an IC FET SPDT switch in a low-cost miniature SC-70 6-lead plastic package. The AS179-92 features low insertion loss and positive voltage operation with very low DC power consumption. This general-purpose switch can be used in a variety of telecommunications applications.

Applications

-General-purpose medium-power switches in telecommunication applications

-T/R switches in 802.11b, g WLAN BluetoothTM systems

Features

-P1 dB 30 dBm typical @ 3 V

-IP3 43 dBm typical @ 3 V

-Low insertion loss (0.3 dB @ 0.9 GHz)

-Low DC power consumption

-Ultraminiature SC-70 6-lead package

-PHEMT process

-Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC
J-STD-020

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