

# Operation description

## Bluetooth

1. **Purpose:** The purpose of this document is to describe key component operations on Bluetooth.
2. **Key components:** CSR BlueCore 02 External BC212015B, Bluetooth Single Chip, AMD AM29LV400B(or AM29LV800B), Flash Memory, XC6204B182MR, XC6204B332MR High Speed LDO Regulators, PA2423L POWER AMPLIFIER, XM2400LB-PM0601 LOW NOISE AMPLIFIER, HWS-314 RF SWITCH.
3. **Operation Principle:** CSR BlueCore 02 External BC212015B, Bluetooth Single Chip BlueCore2-External is a single chip radio and baseband IC for Bluetooth 2.4GHz systems. It is implemented in 0.18 $\mu$ m CMOS technology. When used with external flash containing the CSR Bluetooth software stack, it provides a fully compliant Bluetooth system for data and voice communications.  
Operation at 2.7 ~ 3.3V 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
- Support Class 1 radio with an external power amplifier (PA2423L) up to 21mW provided by a power control terminal controlled by an internal 8-bit voltage DAC and an external RF TX/RX switch (HWS-314)

### Receiver

- Support Class1 radio with an external low noise amplifier (XM2400LB-PM0601)
- 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 250KHz) 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**

- External 8Mbit 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,  $\mu$ -law and linear voice from host and A-law,  $\mu$ -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 v1.1
- Synchronous bi-directional serial programmable audio interface
- Operational I-CTM 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, thus reducing host CPU load

### **AMD AM29LV400B(AM29LV800B), Flash Memory**

The Am29LV400B is a 4(8) Mbit, 3.0 volt-only Flash memory organized as 524,288

(1,048,576)bytes or 262,144(524,288) words. The devices are offered in 48-ball FBGA. The word-wide data (x16) appears on DQ15-DQ0; the byte-wide (x8) data appears on DQ7-DQ0. This device is designed to be programmed in-system using only a single 3.0 volt VCC supply. No Vpp is required for write or erase operations. The device can also be programmed in standard EEPROM programmers.

### **XC6204B182MR, High Speed LDO Regulators**

The XC6204 series are highly precise, low noise, positive voltage LDO regulators **Maximum Output Current:** 150mA manufactured using CMOS processes. The series achieves high ripple rejection **Dropout Voltage:** 200mV (IOUT = 100mA) and low dropout and consists of a standard voltage source, an error correction, **Maximum Operation Voltage:** 10V current limiter and a phase compensation circuit plus a driver transistor. **Output Voltage Range:** 1.8V - 6.0V in 50mV increments Output voltage is selectable in 50mV increments within a range of 1.8V ~ 6.0V. **Highly Accurate:** ±2% the series is also compatible with low ESR ceramic capacitors which give added **Low Power Consumption:** TYP 70µA output stability. This stability can be maintained even during load fluctuations due **Standby Current:** less than 0.1µA to the excellent transient response of the series. **High ripple Rejection:** 70dB (10kHz) The Current limiter's feedback circuit also operates as a short protect for the output **Low Output Noise:** 30µVrms current limiter and the output pin. **Operating Temperature Range:** -40 ~ +85 The CE function enables the output to be turned off, resulting in greatly reduced **Low ESR Capacitor Compatible:** Ceramic capacitor power consumption.