

## Overview

Cordio®-C50 radio IP is a complete self-contained radio sub-system supporting Bluetooth 5 and IEEE 802.15.4 protocols. The solution consists of the RF 2.4GHz transceiver, modem, protocol processing logic and along with link and MAC layer firmware.

The RF front end is delivered as a hard macro, the digital bits delivered as RTL, and MAC layer firmware as source code. The design is optimized for low-power end node IoT devices and enables designers who want a silicon proven and qualified/certified solution for reduced risk and reduced time to market. All solutions are available at TSMC 55nm LP/ULP and TSMC 40nm LP/ULP process nodes

### Complete Bluetooth 5 and 802.15.4 solution

- 2.4 GHz RF transceiver
- Modem, protocol processing logic
- Link layer and MAC firmware

### IP implementation

- TSMC 55nm LP/ULP
- TSMC 40nm LP/ULP
- Native sub 1-volt solution

### Bluetooth core specification 5

- 2400 – 2484 MHz
- GFSK modulation, FHSS
- Master and slave mode support
- Optional AES-128 encryption engine, ECC support

### IEEE 802.15.4 specification

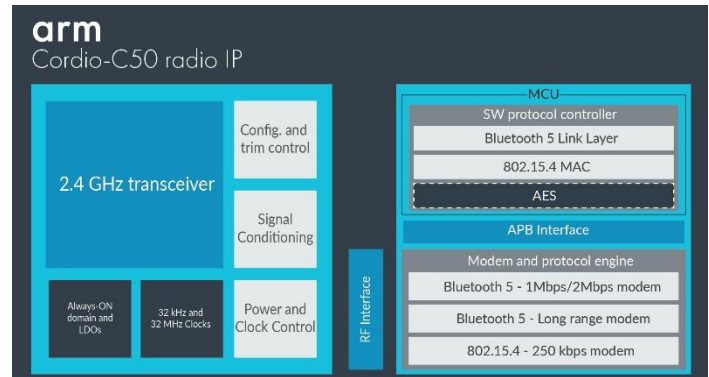
- 802.15.4-2005 version of MAC and PHY
- 2400 – 2484 MHz, O-QPSK PHY
- Optional AES-128 encryption engine

### Full featured link layer firmware

- Delivered as source code
- Optimized for energy and memory efficiency
- Supports single processor or dual-processor solutions

### System clock and power

- Low power 32 MHz and 32.768 kHz XTAL oscillators with internal RC modes
- Bypass option for 32 kHz clock available



### Implementation highlights

- RTL for modem and protocol processing logic
- Designed as an AMBA peripheral
- Link layer firmware available as source code
- Bluetooth qualified components
- Compatible with third party Zigbee and OpenThread stacks

### Standard features

- Bluetooth 5 2 Mbps support
- Coded PHY for longer range
- Bluetooth 5 advertising extensions
- LE channel selection
- MAC features to support Zigbee 3.0 and OpenThread

### Low external BOM count

- No external RF components (only crystal)
- Single antenna pin with integrated PA, LNA and RX/TX switch
- Integrated crystal oscillator load capacitors and integrated PLL filter

### Cordio software

- Bluetooth qualified link-layer firmware up to the HCI and 802.15.4 MAC layer firmware
- Smart multiplexing to switch between the two networks
- Flexible architecture to support different memories for firmware

### Design deliverables

- GDSII files for the RF front end
- RF transceiver integrated with pad ring for ease of integration and floor-planning
- RTL for modem and protocol processing logic
- Test vectors, timing and physical abstraction models
- Scripts for simulation and synthesis with Cadence tools
- Integration manual and release notes

### Support deliverables

- Evaluation kit: An Arm mbed™-enabled platform with a demonstration chip containing the Cordio-C50 radio IP, sample listing of OEM products
- Bluetooth qualified controller sub-system to ease Bluetooth listing of OEM products
- Zigbee/OpenThread compliant hardware platform through third party stacks
- Antenna design and PCB layout guidance
- Radio control tool, RF test guidance
- Production test & radio calibration algorithm

Arm Cordio radio IP specification	TSMC 40nm ULP
RX Sensitivity <sup>1</sup> (dBm) BLE (1Mbps)/802.15.4	-95.5/-102.5
Active Power Consumption <sup>2</sup> Rx/Tx	6.5/8.9 mW
Power Sleep <sup>2</sup>	500 nW
Native Voltage (nominal)	0.950V
Temperature Range	-40°C to 125°C
1) Estimated 2) Estimated RF Power consumption at 1V, Tx @ 0 dBm (Radio front end only)	

For more information: <http://www.arm.com/Cordio>



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