

# Arm Cordio-E154 radio IP

## Complete 802.15.4 solution

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

## IP Implementation

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

## IEEE 802.15.4 specification

- 802.15.4-2006 version of MAC and PHY
- 2400 – 2484 MHz, O-QPSK PHY
- Optional AES-128 encryption engine

## Full featured link layer firmware

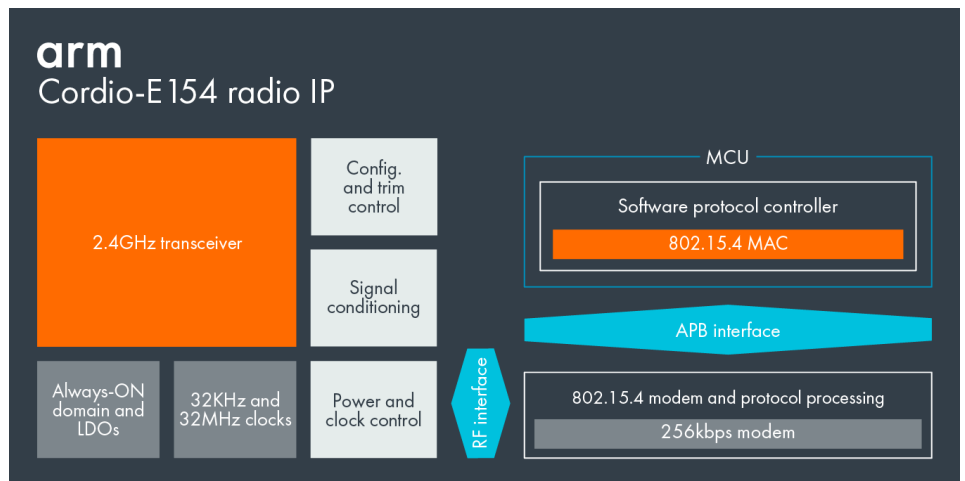
- Delivered as source code
- Optimized for energy and memory efficiency
- Supports single processor or dual-processor solutions
- Arm AMBA® APB peripheral device

## 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

## Overview

Arm® Cordio®-E154 radio IP is a complete self-contained radio subsystem supporting the IEEE 802.15.4 protocol available at TSMC 55nm LP/ULP, TSMC 40nm LP/ULP and UMC 55nm ULP process nodes. The solution consists of the RF 2.4GHz transceiver, modem, protocol processing logic along with 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.



## Implementation highlights

- RTL for modem and protocol processing logic
- Designed as an AMBA peripheral
- Link layer firmware available as source code
- Zigbee/Thread compliant platform

## Low external BOM count

- 11 external components
- Single antenna pin with integrated PA, LNA and RX/TX switch
- Integrated crystal oscillator load capacitors and integrated PLL filter

## Standard features

- MAC features to support Zigbee 3.0 and Thread
  - Scan
  - Data send and receive
  - Data poll
  - Association and disassociation
  - MAC security

## Cordio software

- 802.15.4 MAC layer firmware
- 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 benches, 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-E154 radio IP, sample
- Zigbee/Thread compliant hardware platform through third party stacks
- Reference design, PCB layout and antenna guidance
- Radio control tool, RF test guidance
- Production test & radio calibration algorithm

### Arm Cordio-E154 radio IP specification

Radio standard	2.4 GHz standard-compliant 802.15.4 IP platform
Native voltage	950 mV (nominal)
TX power	-21 dBm up to 5 dBm
Sensitivity	-101 dBm
Power consumption	Active RX: 6.7mW @1V Active TX: 7.2mW @1V Sleep mode: 500nW @1V
Temperature range	-40°C to 90°C

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