



RN51s DataSheet

v1.1.0-en

Contents

1. Revision History	3
2. Overview	4
2.1. Key Features	5
2.2. Application	6
2.3. Block Diagram	7
3. Pin Assignments and Functions	8
4. Module Layout	10
5. Module Schematics	11
6. Module Reference	12

1. Revision History

Date	Version	Description
2017/01	1.0.0	First Release
2020/06	1.1.0	Add 3D Module Image

2. Overview

The RN51s module is based nRF51822 chip that is an ultra-low power 2.4 GHz wireless System on Chip (SoC) integrating the nRF51 Series 2.4 GHz transceiver, a 32 bit ARM® Cortex™-M0 CPU, flash memory, and analog and digital peripherals.

RN51s is a powerful, highly flexible multiprotocol SoC ideally suited for *Bluetooth®* low energy and 2.4GHz ultra low-power wireless applications. The RN51s is built around a 32-bit ARM® Cortex™ M0 CPU with 256kB/128kB flash + 16kB RAM for improved application performance. The embedded 2.4GHz transceiver supports both Bluetooth low energy and the Nordic Gazell 2.4 GHz protocol stack which is on air compatible with the nRF24L series products from Nordic Semiconductor.

RN51s incorporates a rich selection of analog and digital peripherals that can interact without CPU intervention through the Programmable Peripheral Interconnect (PPI) system. A flexible 31-pin GPIO mapping scheme allows I/O like serial interfaces, PWM and quadrature demodulator to be mapped to any device pin as dictated by PCB requirements. This enables complete design flexibility associated with pin-out location and function.

RN51s can support Bluetooth® low energy and a range of proprietary 2.4 GHz protocols, such as Gazell from Nordic Semiconductor.

Fully qualified Bluetooth low energy stacks for RN51s are implemented in the S100 series of SoftDevices.

RN51s supports the SoftDevices below



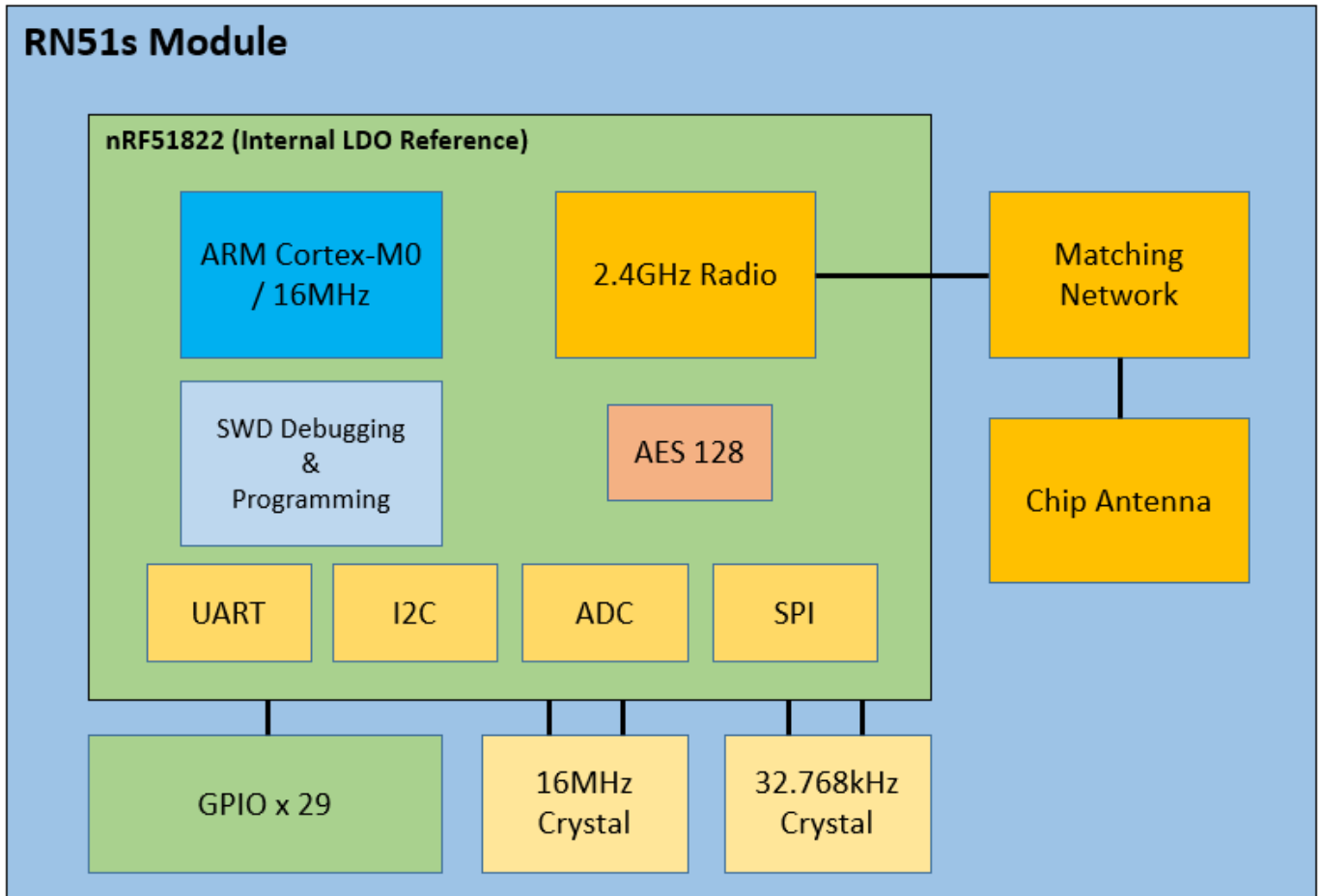
2.1. Key Features

- 2.4 GHz transceiver
 - -93 dBm sensitivity in Bluetooth® low energy mode
 - 250 kbps, 1 Mbps, 2 Mbps supported data rates
 - TX Power -20 to +4 dBm in 4 dB steps
 - TX Power -30 dBm Whisper mode
 - 13 mA peak RX, 10.5 mA peak TX (0 dBm)
 - 9.7 mA peak RX, 8 mA peak TX (0 dBm) with DC/DC
 - RSSI (1 dB resolution)
- ARM® Cortex™-M0 32 bit processor
 - Serial Wire Debug (SWD)
- S100 series SoftDevice ready
- Memory
 - 256 kB or 128 kB embedded flash program memory
 - 16 kB RAM
 - On-air compatibility with nRF24L series
- Flexible Power Management
- Supply voltage range 1.8 V to 3.6 V
- 8/9/10 bit ADC - 8 configurable channels
- 29 General Purpose I/O Pins
- One 32 bit and two 16 bit timers with counter mode
- SPI Master/Slave
- Two-wire Master (I2C compatible)
- UART (CTS/RTS)
- CPU independent Programmable Peripheral Interconnect (PPI)
- Quadrature Decoder (QDEC)
- AES HW encryption
- Real Timer Counter (RTC)

2.2. Application

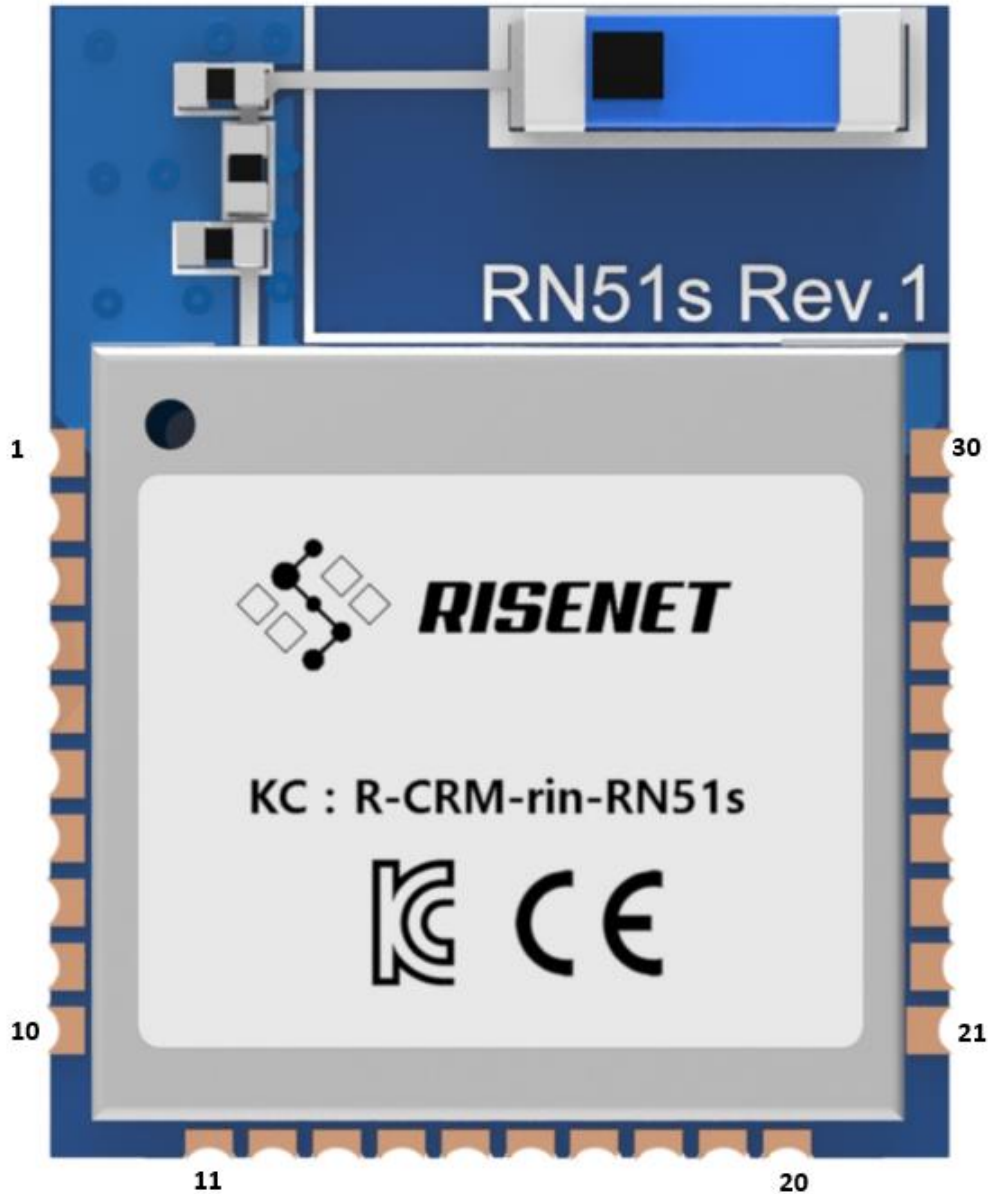
- Internet of Things (IoT)
 - Home automation
 - Sensor networks
 - Building automation
 - Industrial
 - Retail
- Computer peripherals and I/O devices
 - Mouse
 - Keyboard
 - Multi-touch trackpad
- Interactive entertainment devices
 - Remote control
 - Gaming controller
- Beacons
- Personal Area Networks
 - Health/fitness sensor and monitor devices
 - Medical devices
 - Key-fobs + wrist watches
- Remote control toys
- Wireless Mesh Network

2.3. Block Diagram



The RN51s module includes a matching network for chip antenna and antenna matching and an external 32.768kHz crystal.

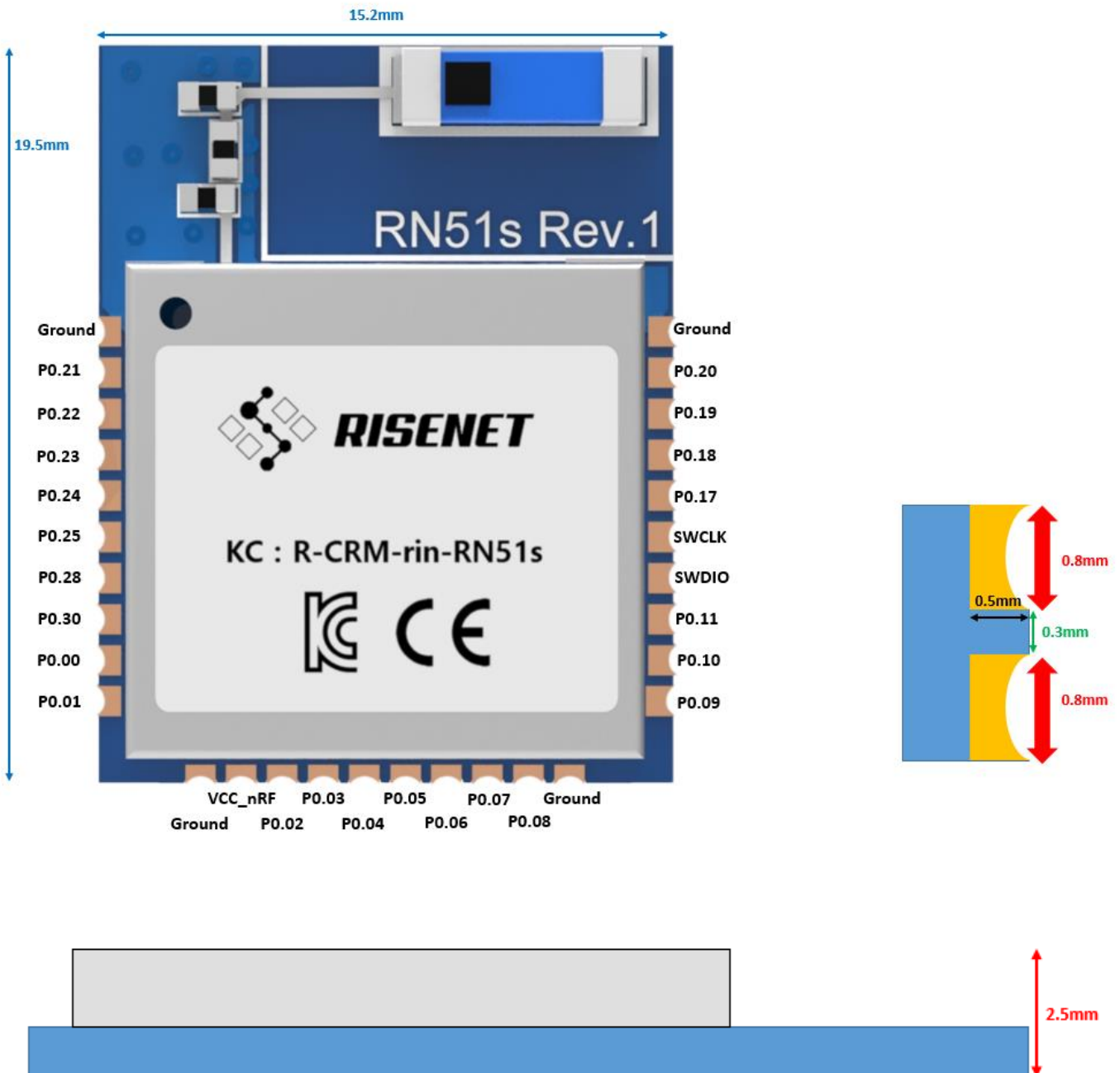
3. Pin Assignments and Functions



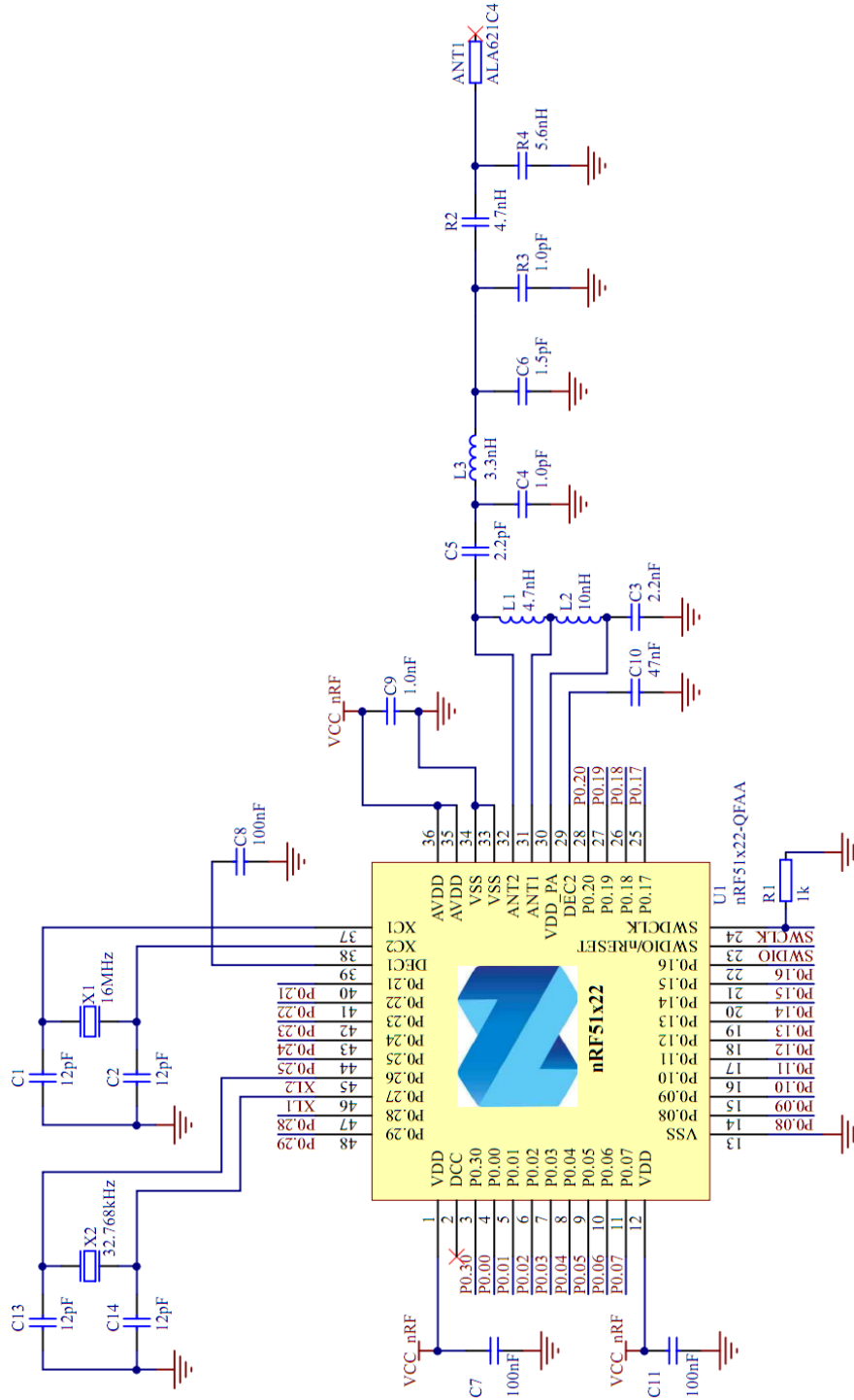
Pin	Pin Name	Pin Function	Description
1	GND	Power	Ground (0 V).
2	P0.21	Digital I/O	General purpose I/O pin.
3	P0.22	Digital I/O	General purpose I/O pin.
4	P0.23	Digital I/O	General purpose I/O pin.
5	P0.24	Digital I/O	General purpose I/O pin.

6	P0.25	Digital I/O	General purpose I/O pin.
7	P0.28	Digital I/O	General purpose I/O pin.
8	P0.30	Digital I/O	General purpose I/O pin.
9	P0.00 AREF0	Digital I/O Analog Input	General purpose I/O pin. ADC/LPCOMP reference input 0.
10	P0.01 AIN2	Digital I/O Analog Input	General purpose I/O pin. ADC/LPCOMP input 2.
11	GND	Power	Ground (0 V).
12	VDD	Power	Power supply.
13	P0.02 AIN3	Digital I/O Analog Input	General purpose I/O pin. ADC/LPCOMP input 3.
14	P0.03 AIN4	Digital I/O Analog Input	General purpose I/O pin. ADC/LPCOMP input 4.
15	P0.04 AIN5	Digital I/O Analog Input	General purpose I/O pin. ADC/LPCOMP input 5.
16	P0.05 AIN6	Digital I/O Analog Input	General purpose I/O pin. ADC/LPCOMP input 6.
17	P0.06 AIN7 AREF1	Digital I/O Analog Input Analog Input	General purpose I/O pin. ADC/LPCOMP input 7. ADC/LPCOMP reference input 1.
18	P0.07	Digital I/O	General purpose I/O pin.
19	P0.08	Digital I/O	General purpose I/O pin.
20	GND	Power	Ground (0 V).
21	P0.09	Digital I/O	General purpose I/O pin.
22	P0.10	Digital I/O	General purpose I/O pin.
23	P0.11	Digital I/O	General purpose I/O pin.
24	SWDIO/nRESET	Digital I/O	System reset (active low). Hardware debug and flash programming I/O.
25	SWDCLK	Digital Input	Hardware debug and flash programming I/O.
26	P0.17	Digital I/O	General purpose I/O pin.
27	P0.18	Digital I/O	General purpose I/O pin.
28	P0.19	Digital I/O	General purpose I/O pin.
29	P0.20	Digital I/O	General purpose I/O pin.
30	GND	Power	Ground (0 V).
31	P0.12	Digital I/O	General purpose I/O pin.
32	P0.13	Digital I/O	General purpose I/O pin.
33	P0.14	Digital I/O	General purpose I/O pin.
34	P0.15	Digital I/O	General purpose I/O pin.
35	P0.16	Digital I/O	General purpose I/O pin.
36	P0.29	Digital I/O	General purpose I/O pin.

4. Module Layout



5. Module Schematics



6. Module Reference

