

WIRELESS-TAG

# BLE MODULE SPECIFICATIONS

nRF51-04/DK

Bluetooth Low Energy® (BLE) module of nRF51-04 is the next generation BLE module released by SEMITRION electronics. The modules use nRF51822 from NORDIC as the controller chips. With its small form factor, low power, high economic Bluetooth radio, nRF51-04 can easily be added in your system and help to promote the design process.

nRF51822 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. nRF51822 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 nRF51822 are implemented in the S100 series of SoftDevices. The S100 series of SoftDevices are available for free and can be downloaded and installed on nRF51822 independent of your own application code.

## Key Features

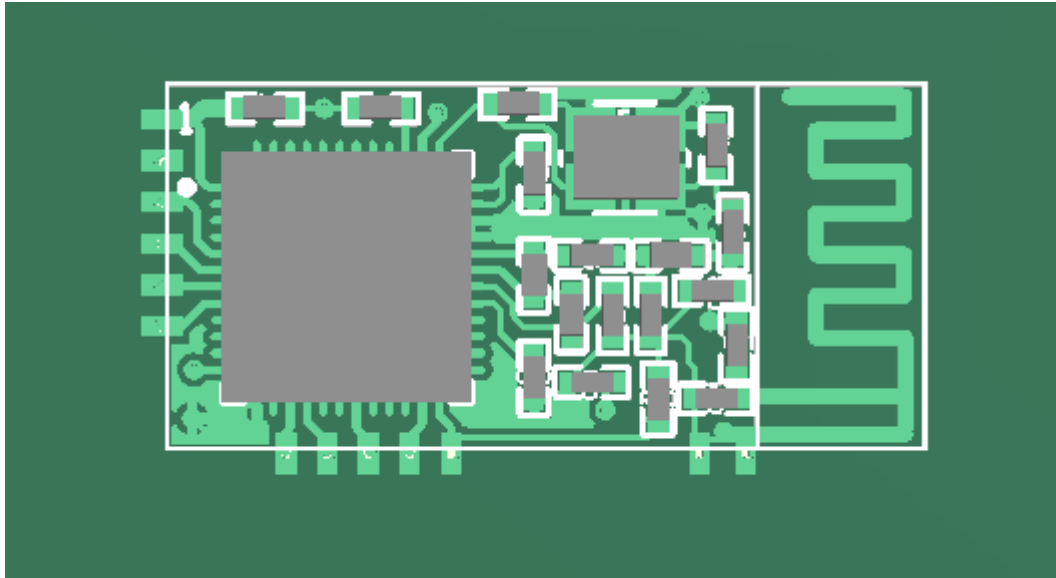
- 2.4 GHz transceiver
  - -93 dBm sensitivity in Bluetooth® low energy mode
  - 250 kbps, 1 Mbps, 2 Mbps supported data rates
  - TX Power -20 to +4 dBm in 4 dB steps
  - TX Power -30 dBm Whisper mode
  - 13 mA peak RX, 10.5 mA peak TX (0 dBm)
  - RSSI (1 dB resolution)
- ARM® Cortex™-M0 32 bit processor
  - 275  $\mu$ A/MHz running from flash memory
  - 150  $\mu$ A/MHz running from RAM
  - Serial Wire Debug (SWD)
- Memory
  - 256 kB or 128 kB embedded flash program memory
  - 16 kB RAM
- Flexible Power Management
  - Supply voltage range 1.8 V to 3.6 V
  - 2.5  $\mu$ s wake-up using 16 MHz RCOSC
  - 0.4  $\mu$ A @3V OFF mode
  - 0.5  $\mu$ A @3V in OFF mode + 1 region RAM retention
  - 2.3  $\mu$ A @3V ON mode, all blocks IDLE
- 8/9/10 bit ADC - 8 configurable channels
- 31 General Purpose I/O Pins
- One 32 bit and two 16 bit timers with counter mode
- SPI Master
- UART (CTS/RTS)
- Two-wire Master (I2C compatible)

- Quadrature Decoder (QDEC)
- AES HW encryption
- Real Timer Counter (RTC)
- 16 MHz crystal
- Balun
- AES HW encryption
- Package variants
  - nRF51-04, 18.5 x9.1 mm

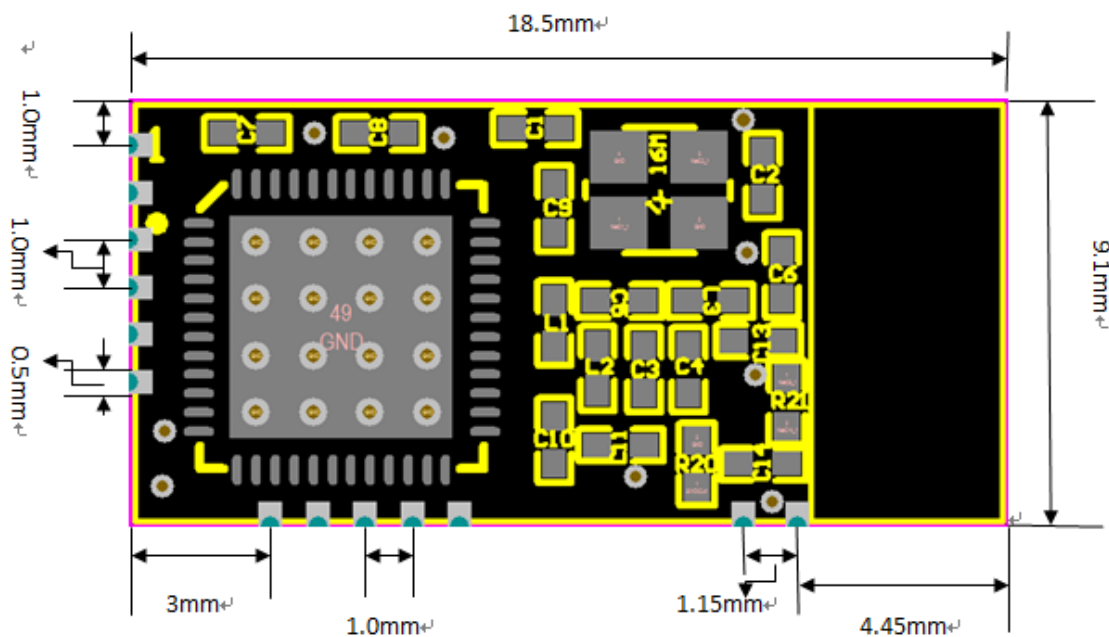
## Applications

- Computer peripherals and I/O devices
  - Mouse
  - Keyboard
  - Multi-touch track pad
- Interactive entertainment devices
  - Remote control
  - 3D Glasses
  - Gaming controller
- Personal Area Networks
  - Health/fitness sensor and monitor devices
  - Medical devices
  - Key-fobs + wrist watch
- Remote control toys

nRF51-04 module



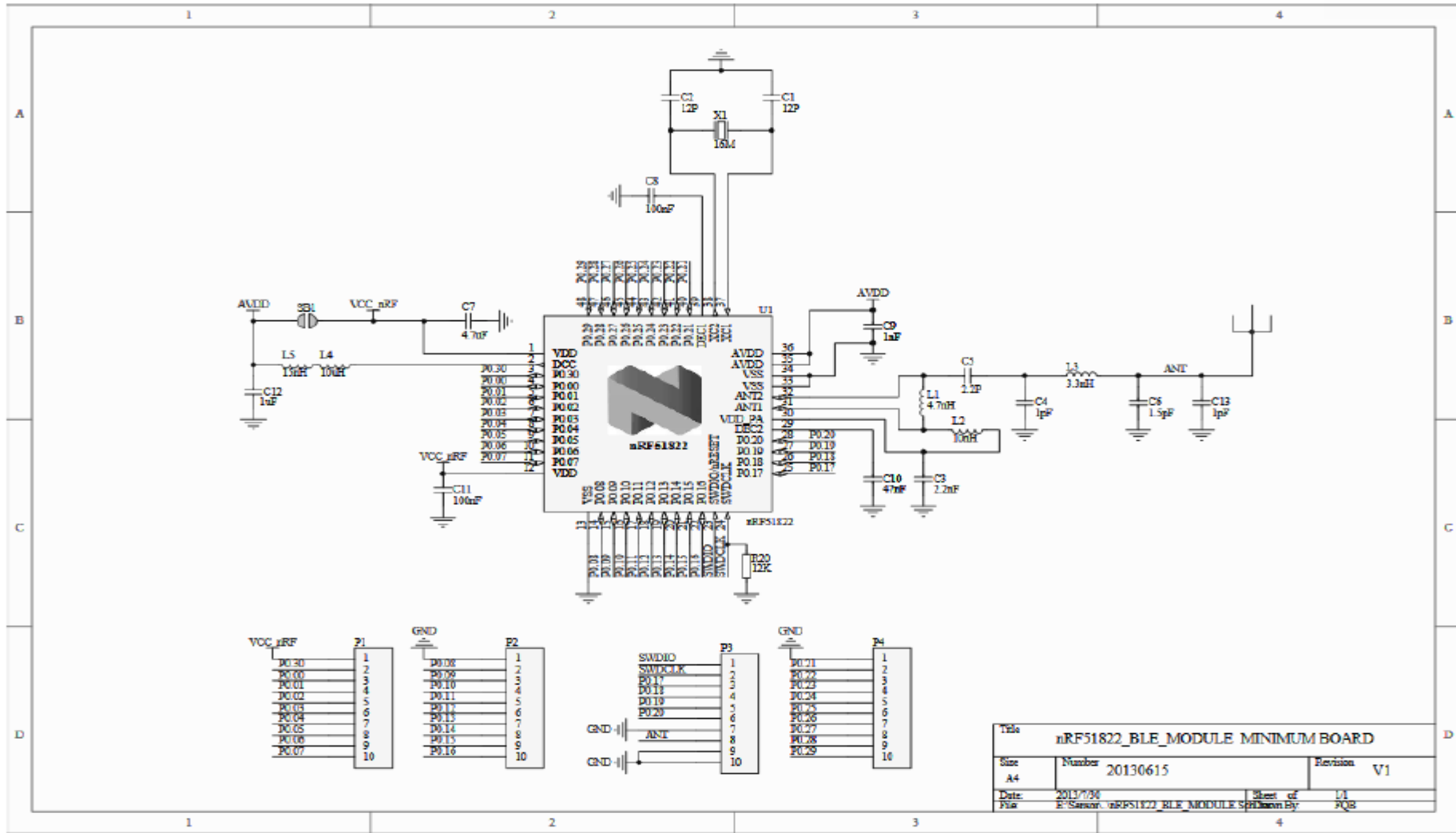
Mechanical drawings



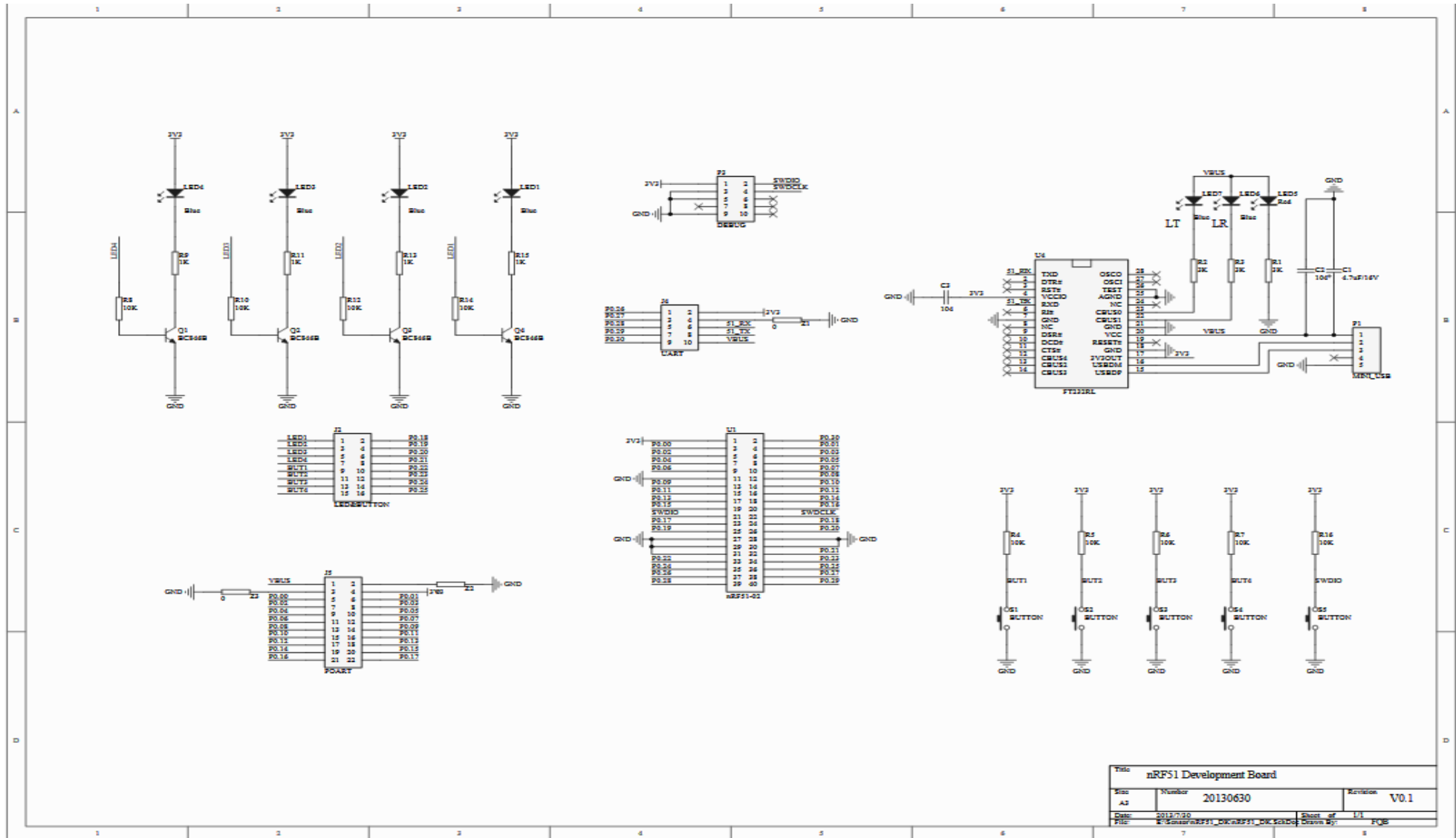
Pin assignment

No.	Name	Function description	No.	Name	Function description
1	VCC	DC2.5V~3.6V	21	SWDIO	System reset (active low). Also HW debug
				RST	and flash programming I/O
2	P0.30	General purpose I/O pin	22	SWDCLK	HW debug and flash programming I/O
3	P0.00	General purpose I/O pin	23	P0.17	General purpose I/O pin
	AREF0	ADC Reference voltage			
4	P0.01	General purpose I/O pin	24	P0.18	General purpose I/O pin
	AIN2	ADC input 2			
5	P0.02	General purpose I/O pin	25	P0.19	General purpose I/O pin
	AIN3	ADC input 3			
6	P0.03	General purpose I/O pin	26	P0.20	General purpose I/O pin
	AIN4	ADC input 4			
7	P0.04	General purpose I/O pin	27	GND	Ground (0 V)
	AIN5	ADC input 5			
8	P0.05	General purpose I/O pin	28	ANTEN	2.4G antenna
	AIN6	ADC input 6			
9	P0.06	General purpose I/O pin	29	GND	Ground (0 V)
	AIN7	ADC input 7			
	AREF1	ADC Reference voltage			
10	P0.07	General purpose I/O pin	30	GND	Ground (0 V)
11	GND	Ground (0 V)	31	GND	Ground (0 V)
12	P0.08	General purpose I/O pin	32	P0.21	General purpose I/O pin
13	P0.09	General purpose I/O pin	33	P0.22	General purpose I/O pin
14	P0.10	General purpose I/O pin	34	P0.23	General purpose I/O pin
15	P0.11	General purpose I/O pin	35	P0.24	General purpose I/O pin
16	P0.12	General purpose I/O pin	36	P0.25	General purpose I/O pin
17	P0.13	General purpose I/O pin	37	P0.26	General purpose I/O pin
				AIN0	ADC input 0
				XL2	Connection for 32.768 kHz crystal
18	P0.14	General purpose I/O pin	38	P0.27	General purpose I/O pin
				AIN1	ADC input 1
				XL1	Connection for 32.768 kHz crystal or external 32.768 kHz clock reference
19	P0.15	General purpose I/O pin	39	P0.28	General purpose I/O pin
20	P0.16	General purpose I/O pin	40	P0.29	General purpose I/O pin

Schematics



nRF51-04



nRF51-DK

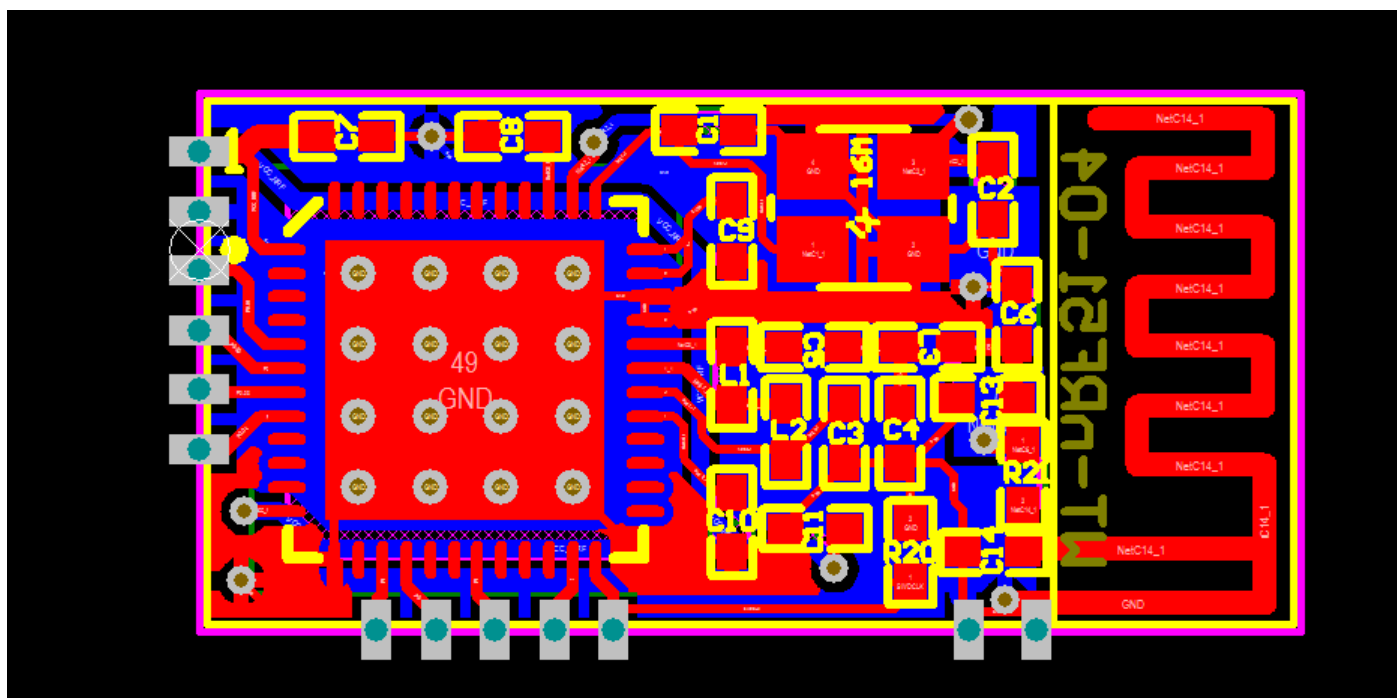
## Development Board Introduction (nRF51-DK)

### Resources:

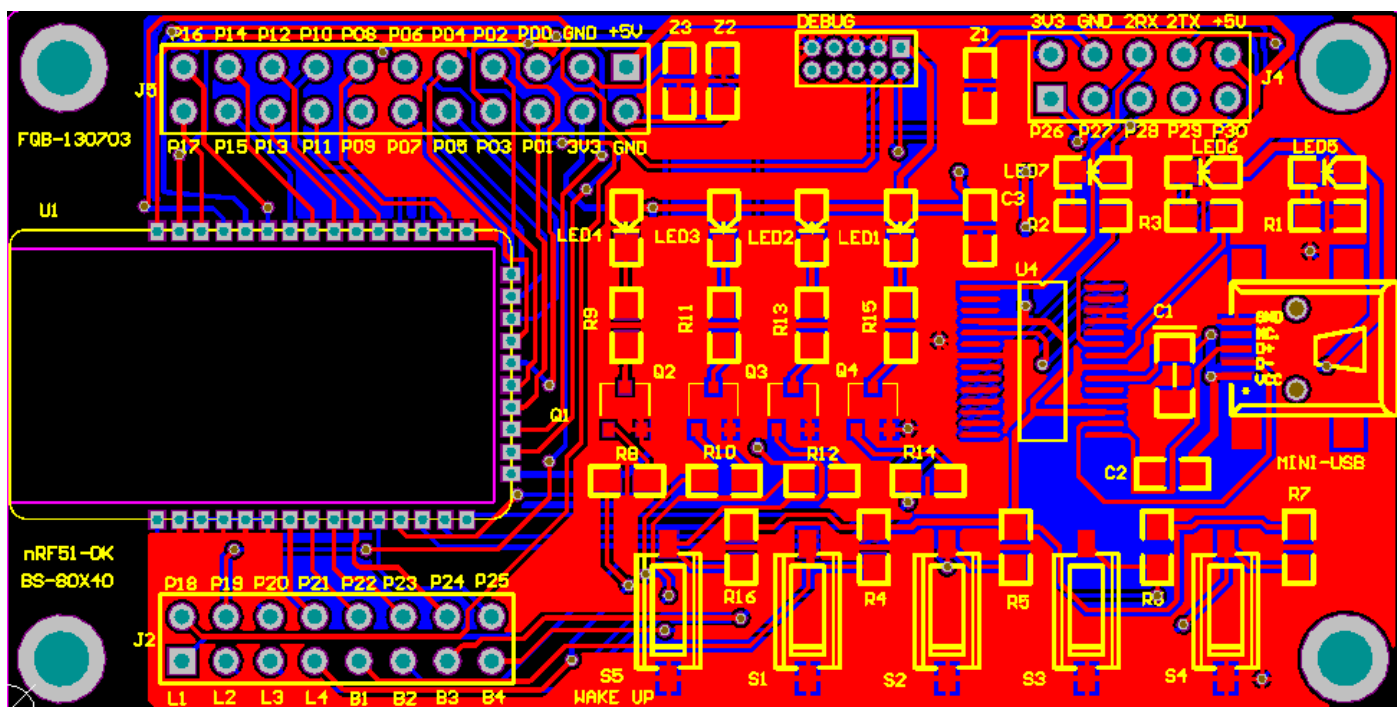
- 4 LEDs
- 4 Buttons
- Wakeup buttons
- Debug interface
- RS232-USB interface (FT232)
- All leading feet in 2.54mm
- USB powered



nRF51-DK functional blocks



nRF51-04



nRF51-DK



Reflow soldering reference

