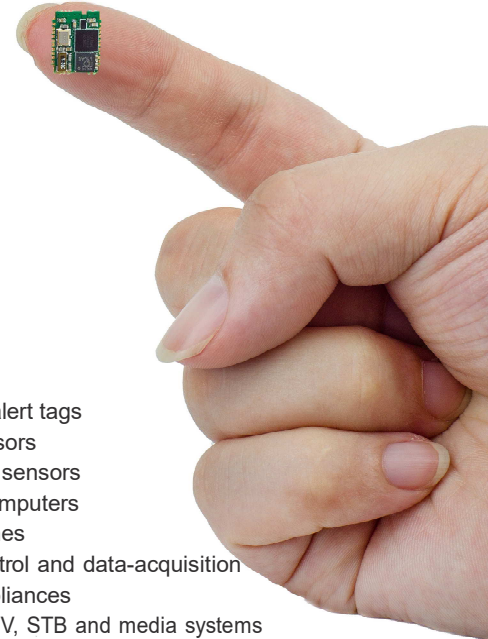# nRF51-M0 Module

Multi-protocol Bluetooth Smart and 2.4GHz proprietary ultra-small module with Accelerometer.

OHTCOM
www.ohtcom.com

## ULP and Ultra-small wireless module

The nRF51-M0 module is a powerful multi-protocol module solution for ULP wireless applications. It incorporates Nordic's latest best-in-class performance radio transceiver, an ARM Cortex M0 CPU and 256 flash + 16kB RAM memory.

Integrated an ultra-low power accelerometer, LIS3DH, which is a high performance three axes linear accelerometer, with digital I2C/SPI serial interface standard output.

User defined outside 2.4Ghz antenna leaves the biggest flexibility to the customer for matching different application, like high power long distance and short distance application.

APPLICATIONS

- Wearables
- Beacons
- Appcessories
- Computer peripherals
- Proximity and security alert tags
- Sports- and fitness sensors
- Healthcare and lifestyle sensors
- Game controllers for computers
- Toys and Electronic games
- Domestic/Industrial control and data-acquisition
- Intelligent domestic appliances
- CE remote controls for TV, STB and media systems
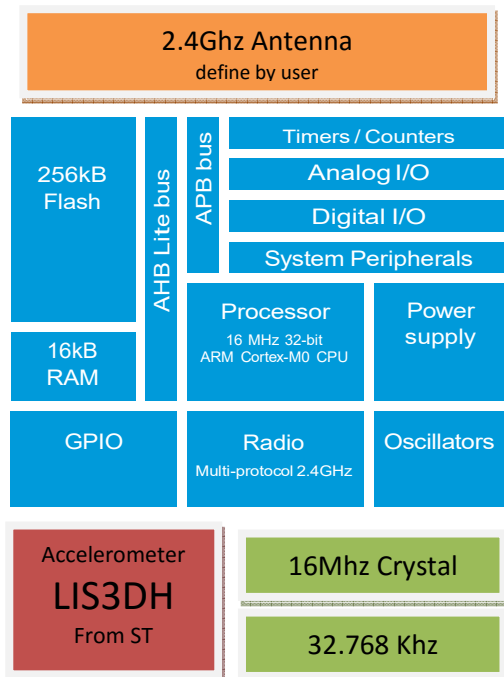
KEY FEATURES

- Software stacks available as downloads
- Multi-protocol 2.4GHz radio
- 32-bit ARM Cortex M0 processor
- 256 flash + 16kB RAM
- Fully on-air compatible with nRF24L-series
- Programmable output power from +4dBm to -20dBm
- RSSI
- RAM mapped FIFOs using EasyDMA
- Dynamic on air payload length up to 256 Bytes
- Flexible and configurable 10 pin GPIO
- Integrated an ultra-low power accelerometer, LIS3DH
- SMT available for fast manufacturing
- Full set of digital interfaces including: SPI/2-wire/UART
- 3 X 8-bit ADC
- 128-bit AES ECB/CCM/AAR co-processor
- Low cost external crystal 16MHz ± 40ppm
- Ultra-low-power 32kHz crystal and RC oscillators
- Wide supply voltage range (1.8 V to 3.6 V)
- Package options: 8.5 X 10.5 mm

Block diagram

| 2.4Ghz Antenna |
| define by user |

256kB Flash	AHB Lite bus	APB bus	Timers / Counters
			Analog I/O
			Digital I/O
			System Peripherals
16kB RAM		Processor 16 MHz 32-bit ARM Cortex-M0 CPU	Power supply
GPIO		Radio Multi-protocol 2.4GHz	Oscillators

| Accelerometer LIS3DH From ST | 16Mhz Crystal |
| | 32.768 Khz |

Accelerometer connection

The LIS3DH can be connected by I2C or SPI interface. Make sure the P0.03 is high and P0.01 is not float, when you connect it by I2C interface.

The 8-bit ADC is come from LIS3DH, which is great helpful to reduce the complexity of the software.
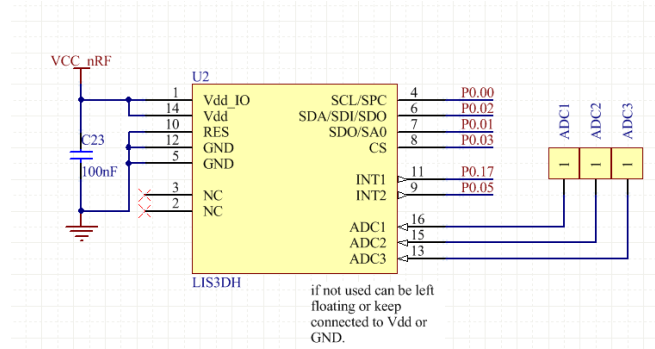
Flexible and configurable GPIOs

The nRF51-M0 module have 10 Flexible and configurable GPIOs, it means you can make every single GPIO as every function that it can be. Only needed is to set them through the software.
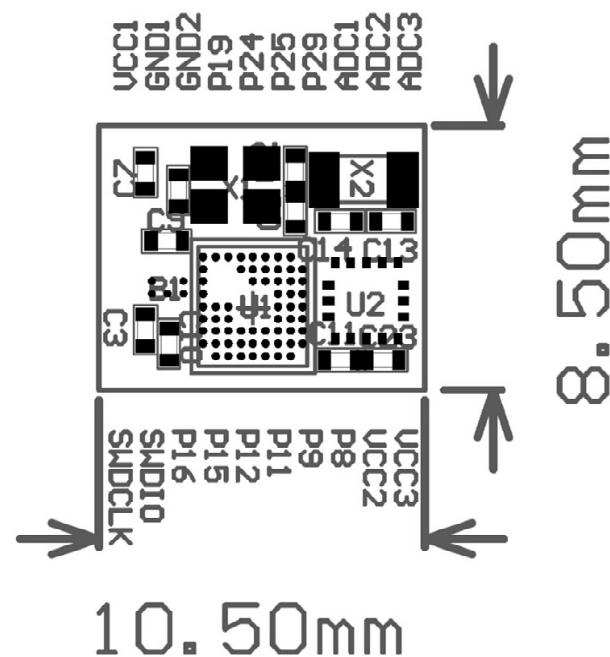
User defined 2.4Ghz antenna

The customer can define the 2.4Ghz antenna by themselves to meet different requirement of the wireless translate distance. Whether large-size PCB antenna or Ultra small ceramic chip antenna is suitable for this module.

nRF51822 compatible protocol stacks

S110	*Bluetooth* Smart peripheral stack
S120	*Bluetooth* Smart 8-link central stack
S130	*Bluetooth* Smart concurrent central/peripheral/ observer/broadcaster stack

SPECIFICATIONS

Frequency band	2.4GHz ISM (2.40000 – 2.4835GHz)
On-air data rate	250 kbps, 1 Mbps or 2 Mbps
Modulation	GFSK
Output power	Programmable: +4 to -20dBm in 4dB steps
Sensitivity	-93dBm *Bluetooth* low energy -96dBm at 250kb -90dBm at 1Mbs -85dBm at 2Mbs
Radio current consumption LDO at 1.8V	16mA – TX at +4dBM output power 10.5mA – TX at 0dBm output power 13mA – RX at 1Mbs
Radio current consumption DC-DC at 3V	10.5mA – TX at +4dBm output power 8.1mA – TX at 0dBm output power 9.5mA – RX at 1Mbs
Microcontroller	32-bit ARM Cortex M0
Program Memory	256/128kB Flash
RAM	16kB
Oscillators	16MHz crystal oscillator 16MHz RC oscillator 32kHz crystal oscillator 32kHz RC oscillator (±250 ppm)
System current consumption	420nA – No RAM retention 530nA - 8k RAM retention 2µA – All peripherals in IDLE mode
Hardware Security	128-bit AES ECB/CCM/AAR co-processor
GPIO	31 configurable
Digital I/O	X2 Hardware SPI master 2X 2-wire master UART Quadrature demodulator
Peripherals	RNG Temperature sensor RTC
PPI	16-channel
Voltage regulator	LDO (1.8 to 3.6V),
Timers/counters	2 x 16 bit, 1 x 24bit, 2 x 24bit, RTC
Package options	10.5 X 8.5 mm
Accelerometer	LIS3DH with 8-bit ADC

Where to buy:
sales@ohtcom.com

Contact us:
info@ohtcom.com

Web site:
www.ohtcom.com

Technical forum:
www.ohtcom.com/forum

Please feel free to contact us.