# 迅通科技

# *PTR9618*  *Bluetooth Low Energy 4.0 Module*
*Embedded Cortex™ M4F 32 bit processor*

The PTR9618 ultra-low power Bluetooth Low Energy/ANT/2.4GHz Proprietary Multi-protocol modules based on the nRF52832 from Nordic Semiconductor. The module with an ARM® Cortex™ M4F 32 bit processor, embedded 2.4GHz transceiver, and integrated antenna, provide a complete solution with no additional RF design, allowing faster time to market, while simplifying designs, reducing BOM costs, also reduce the burden of Regulatory approvals to enter the world market. Making you more quickly into the bluetooth smart application and remove the worries.

## Features



- ➢ System on Module(SOM) base on Nordic nRF52832

- ➢ Bluetooth Low Energy/ANT/2.4GHz Proprietary Multi-protocol support

- ➢ Complete Bluetooth Low Energy stack/profiles solution (Bluetooth 4.x and Higher)

- ➢ ARM® Cortex™-M4F 32 bit processor, 512 kB flash memory, 64 kB RAM

- ➢ 32 General Purpose I/O, Configurable mapping Pins, Simple layout of external application

- ➢ 12-bit/200KSPS ADC

- ➢ Three SPI Master/Slave (8 Mbps)

- ➢ Low power comparator, Temperature sensor, Random Number Generator

- ➢ Two 2-wire Master/Slave (I2C compatible)

- ➢ I2S audio interface, PDM audio interface

- ➢ UART (w/ CTS/RTS and DMA)

- ➢ 3x4-channel PWMs

- ➢ 20 channel CPU independent Programmable Peripheral Interconnect (PPI)

- ➢ Quadrature Demodulator (QDEC)

- ➢ 128-bit AES HW encryption

- ➢ 5 x 32bit Timers, 3 x 24bit Real Timer Counters (RTC), Watchdog Timer

- ➢ NFC-A tag interface for OOB pairing

- ➢ Internal RC Oscillator 32.768 kHz($\pm$ 250 ppm).

- ➢ No external components required

- ➢ Over-the-Air (OTA) firmware updates available

- ➢ Dimensions: 22.7mmx17.5mm x1.8mm with Antenna，1.27mm pin pitch.

## Typical Applications:

- - 2.4 GHz Bluetooth low energy systems
- - Proprietary 2.4 GHz systems
- - Sports and leisure equipment
- - Mobile phone accessories, Connected Appliances
- - Health Care and Medical
- - Consumer Electronics, Game pads
- - Human Interface Devices, Remote control
- - Building environment control / monitoring
- - RFID, Security Applications，Low-Power Sensors
- - Bluetooth Low Energy GateWay
- - iBeacons™, Eddystone™, Indoor navigation
- - Lighting Products
- - Fitness devices, Wearables

## Quick Specifications:

| Multi-protocol | |
|---|---|
| Version | Bluetooth 4.0 /ANT/2.4GHz Proprietar |
| Security | AES-128 |
| **Radio** | |
| Frequency | 2.402GHz to 2.480GHz |
| Modulations | GFSK at 1 Mbps, 2 Mbps data rates |
| Transmit power | +4 dBm |
| Receiver sensitivity | -96 dBm (BLE mode) |
| Antenna | Integrated |
| **Current Consumption** | |
| TX only @ +4 dBm, @ 3V, DC/DC enabled | 7.5 mA |
| TX only @ 0 dBm,　@ 3V, DC/DC enabled | 5.3 mA |
| TX only @ +4 dBm | 16.6 mA |
| TX only @ 0 dBm | 11.6 mA |
| RX only @ 1 Mbps @ 3V, DC/DC enabled | 5.4 mA |
| RX only @ 1 Mbps | 11.7 mA |
| CPU @ 64MHz from flash | 7.5 mA |
| CPU @ 64MHz from RAM | 6.7 mA |
| CPU @ 64MHz from flash @ 3V, DC/DC | 3.7 mA |
| CPU @ 64MHz from flash RAM @ 3V, DC/DC | 3.3 mA |
| System On | 1.2 µA |
| System Off | 0.7µA |
| Additional current for RAM retention | 20 nA / 4K block |
| **Operating conditions** | |
| Power supply | 1.7~3.6V |
| Operating temperature | -25~+85 °C |

## Block diagram:
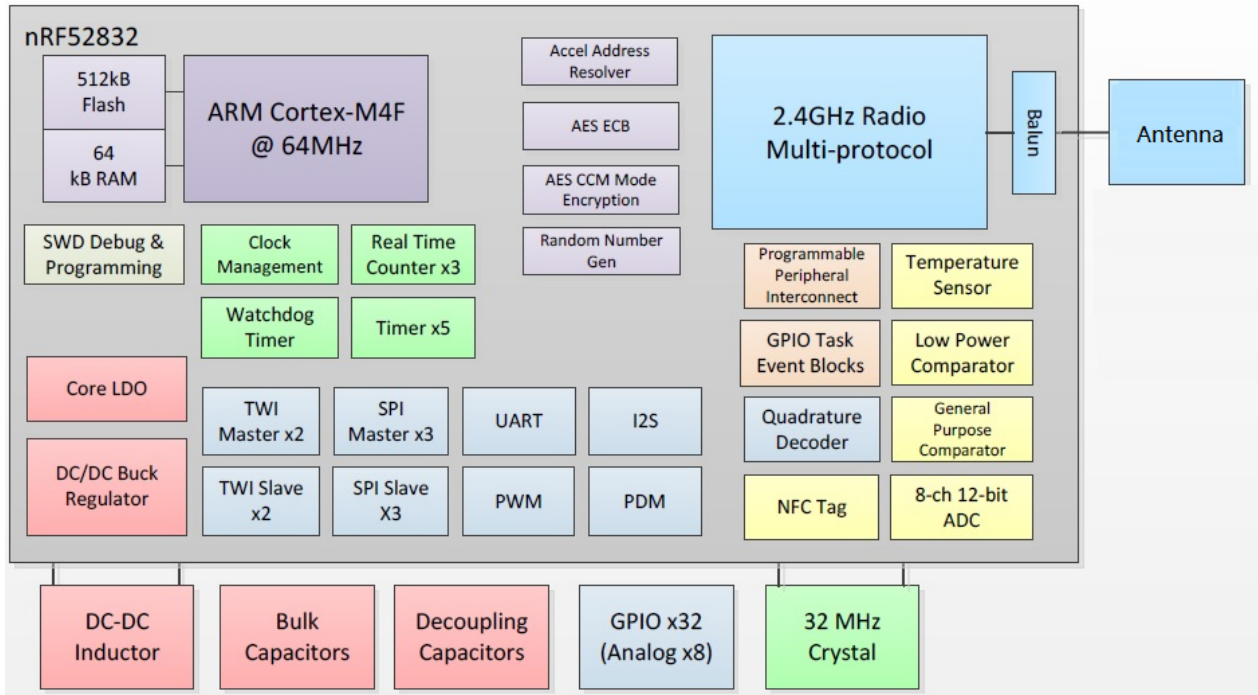


## Pin Description of Module（Top View）:
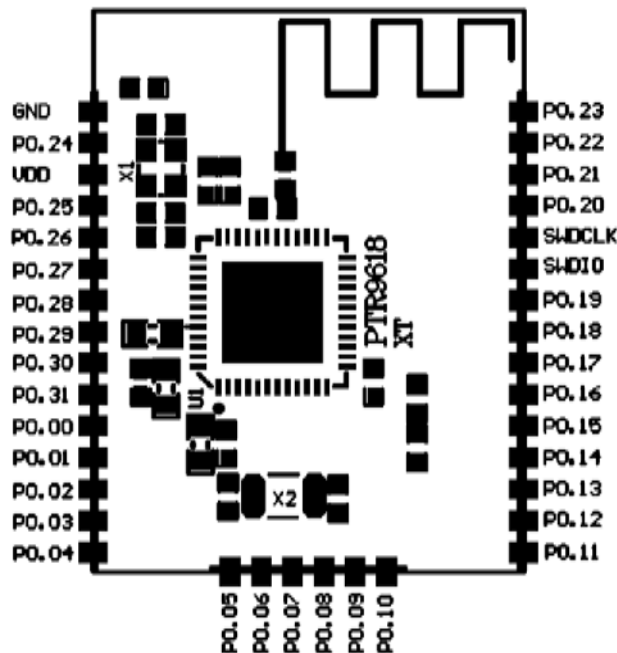


| Pin | Name | Description | Note |
|------|-------|--------------|------|
| Pin1 | P0.23 | Digital I/O | |
| Pin2 | P0.22 | Digital I/O | |
| Pin3 | P0.21 | Digital I/O | Configurable as pin reset. |

| Pin4 | P0.20 | Digital I/O | |
|---|---|---|---|
| Pin5 | SWDCLK | HW debug and flash programming I/O | |
| Pin6 | SWDIO | HW debug and flash programming I/O | |
| Pin7 | P0.19 | Digital I/O | |
| Pin8 | P0.18 | Digital I/O | |
| Pin9 | P0.17 | Digital I/O | |
| Pin10 | P0.16 | Digital I/O | |
| Pin11 | P0.15 | Digital I/O | |
| Pin12 | P0.14 | Digital I/O | |
| Pin13 | P0.13 | Digital I/O | |
| Pin14 | P0.12 | Digital I/O | |
| Pin15 | P0.11 | Digital I/O | |
| Pin16 | P0.10 | Digital I/O | |
| Pin17 | P0.09 | Digital I/O | |
| Pin18 | P0.08 | Digital I/O | |
| Pin19 | P0.07 | Digital I/O | |
| Pin20 | P0.06 | Digital I/O | |
| Pin21 | P0.05 | Digital I/O | |
| Pin22 | P0.04 | Digital I/O | |
| Pin23 | P0.03 | Digital I/O | |
| Pin24 | P0.02 | Digital I/O | |
| Pin25 | P0.01 | Digital I/O | |
| Pin26 | P0.00 | Digital I/O | |
| Pin27 | P0.31 | Digital I/O | |
| Pin28 | P0.30 | Digital I/O | |
| Pin29 | P0.29 | Digital I/O | |
| Pin30 | P0.28 | Digital I/O | |
| Pin31 | P0.27 | Digital I/O | |
| Pin32 | P0.26 | Digital I/O | |
| Pin33 | P0.25 | Digital I/O | |
| Pin34 | VCC | Power Supply | |
| Pin35 | P0.24 | Digital I/O | |
| Pin36 | GND | Ground | |

Note:    An internal 4.7μF bulk capacitor has been included on the module. For those application that with heavy GPIO usage and/or current draw, it is good design practice to add additional bulk capacitance as required for your application.


## General Purpose I/O:

The general purpose I/O is organized as one port enabling access and control of the 32 available GPIO pins through one port. Each GPIO can be accessed individually with the following user configurable features:

➢ Input/output direction
➢ Output drive strength

➢ Internal pull-up and pull-down resistors

➢ Wake-up from high or low level triggers on all pins

➢ Trigger interrupt on all pins

➢ All pins can be used by the PPI task/event system; the maximum number of pins that can be interfaced through the PPI at the same time is limited by the number of GPIOTE channels

➢ All pins can be individually configured to carry serial interface or quadrature demodulator signals

## Hardware RESET:

There is on-chip power-on reset circuitry, But can still be used in external reset mode, in this case, GPIO pin P0.21 as an external hardware reset pin. In order to utilize P0.21 as a hardware reset, the UICR registers PSELRESET[0] and PSELRESET[1] must be set alike, to the value of 0x7FFFFF15. When P0.21 is programmed as RESET, the internal pull-up is automatically enabled.

## HW debug and flash programming of Module :

The Module support the two pin Serial Wire Debug (SWD) interface and offers flexible and powerful mechanism for non-intrusive debugging of program code. Breakpoints, single stepping, and instruction trace capture of code execution flow are part of this support.

| Pin | Flash Program interface |
| --- | --- |
| SWDIO | Debug and flash programming I/O |
| SWCLK | Debug and flash programming I/O |

This is the hardware debug and flash programming of module, J-Link Lite support, please refer www.segger.com.

## PCB Footprint （Top View）:
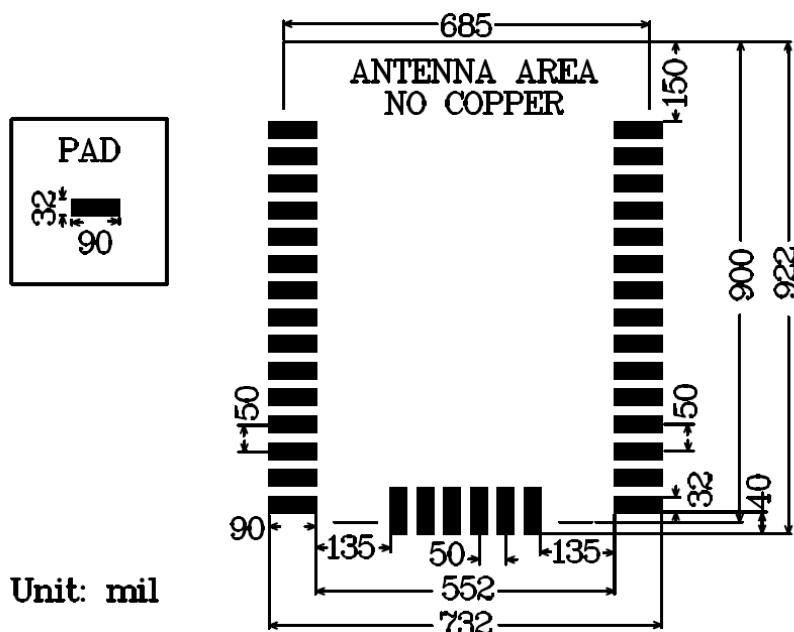
## Recommended RF Layout & Ground Plane:

The module integrated antenna requires a suitable ground plane to radiate effectively. The area under and extending out from the antenna portion of the module should be kept clear of copper and other metal. The module should be placed at the edge of the PCB with the antenna edge facing out. Reducing the ground plane will reduce the effective radiated power.
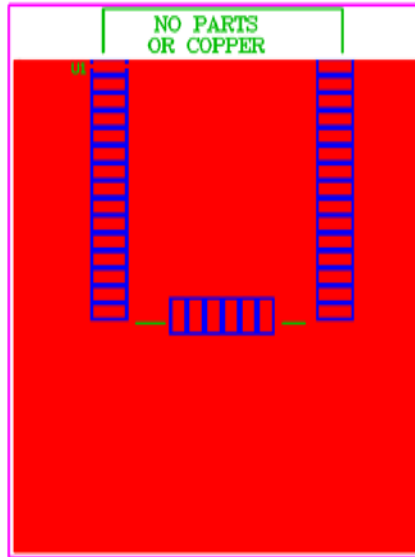


## Ordering Information:

| Part Number | Description |
|---|---|
| PTR9618 | Bluetooth Low Energy System on Module |
| PTR9618-EVB | Evaluation boards for module，with key, LED, I/O extend，sock for coin cell battery. |

## Absolute Maximum Ratings:

| Symbol | Parameter | Min. | Max. | Unit |
|---|---|---|---|---|
| $V_{CC\_MAX}$ | Voltage on supply pin | -0.3 | 3.9 | V |
| $V_{IO\_MAX}$ | Voltage on GPIO pins ($V_{CC}$ > 3.6V) | -0.3 | 3.9 | V |
| $V_{IO\_MAX}$ | Voltage on GPIO pins ($V_{CC}$ ≤ 3.6V) | -0.3 | $V_{CC}$ + 0.3V | V |
| $T_S$ | Storage Temperature Range | -40 | 125 | °C |

## Important Notice:

■ **Reserves the right to make corrections, modifications, and/or improvements to the product and/or its specifications at any time without notice.**

■ **Assumes no liability for the user's product and/or applications.**

■ **Products are not authorized for use in safety-critical applications, including but not limited to life-support applications.**

## ATTENTION!

Electrostatic Sensitive Device

Observe Precaution for handling.