

## **PTR9022**

### ***Multiprotocol ANT™/Bluetooth Low Energy System on Module Embedded Cortex™ M0 32 bit processor***

The PTR9022 ultra-low power Bluetooth Low Energy/ANT Proprietary Multi-protocol modules based on the nRF51422 from Nordic Semiconductor. The module with an ARM® Cortex™ M0 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 nRF51422
- Bluetooth Low Energy/ ANT Multi-protocol support
- Complete Bluetooth Low Energy stack/ANT solution
- ARM® Cortex™-M0 32 bit processor, 256 kB flash memory, 16 kB RAM
- 2.4 GHz transceiver, Max TX Power +4 dBm, -93 dBm sensitivity@BLE
- 31 General Purpose I/O, Configurable mapping Pins, Simple layout of external application
- Internal RC Oscillator 32.768 kHz(± 250 ppm).
- Flexible real-time counter and Two 16 bit and one 24 bit timers with counter mode
- AES Coprocessor, Random Number Generator ,Watchdog Timer ,Temperature sensor
- Rich set of Peripheral: ADC, SPI, 2-wire , and UART. Programmable Peripheral Interconnect(PPI)
- Internal RC Oscillator 32.768 kHz(± 250 ppm).
- Small size about 22.7mmx17.5mm x1.6mm with Antenna.

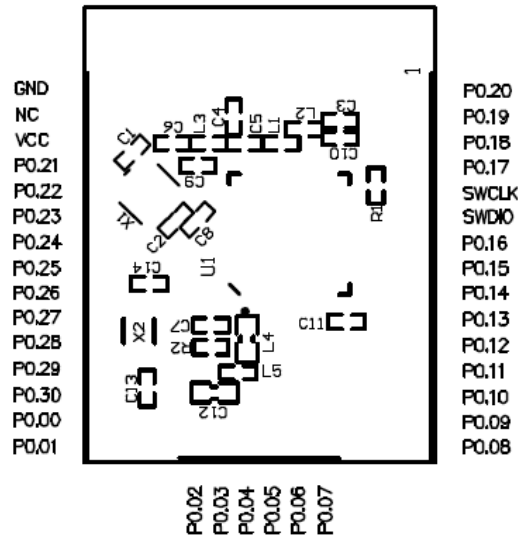
## Typical Applications:

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

## Quick Specifications:

Multiprotocol	
Version	Bluetooth 4.x and Higher/ANT
Security	AES-128
Radio	
Frequency	2.400GHz to 2.4835 GHz
Modulations	GFSK at 250Kbps, 1 Mbps, 2 Mbps data rates
Transmit power	MAX +4 dBm RF output
Receiver sensitivity	-93 dBm
Antenna	On board
Current Consumption	
TX @ +4 dBm	~16 mA
TX @ 0 dBm	~10.5 mA
TX @ -4 dBm	~8 mA
TX @ -16 dBm	~6 mA
TX @ -20 dBm	~5.5 mA
RX only @ 1 Mbps	~13 mA
MCU running @16MHz code from Flash	~4.4 mA
MCU running @16MHz code from RAM	~2.4 mA
SYSTEM ON	~2.3 uA
SYSTEM OFF	~420 nA
Operating conditions	
Power supply	1.9~3.6V
Operating temperature	-25~+85 °C

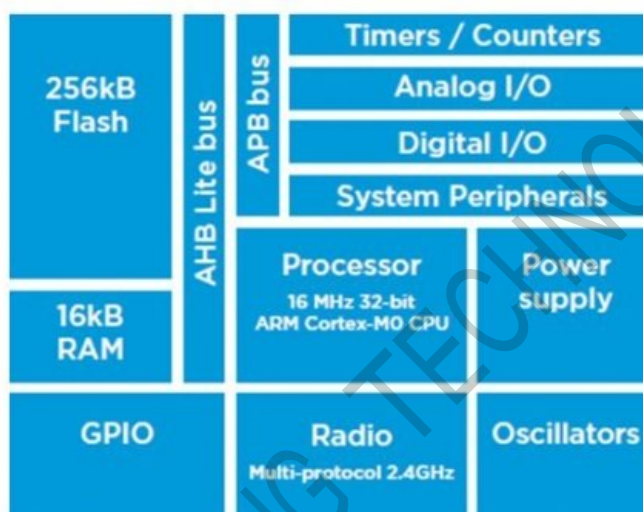
Pin Description (Top View) :



Pin	Name	Description	Note
Pin1	P0.20	Digital I/O	
Pin2	P0.19	Digital I/O	
Pin3	P0.18	Digital I/O	
Pin4	P0.17	Digital I/O	
Pin5	SWCLK	HW debug and flash programming I/O	
Pin6	SWDIO	HW debug and flash programming I/O	
Pin7	P0.16	Digital I/O	
Pin8	P0.15	Digital I/O	
Pin9	P0.14	Digital I/O	
Pin10	P0.13	Digital I/O	
Pin11	P0.12	Digital I/O	
Pin12	P0.11	Digital I/O	
Pin13	P0.10	Digital I/O	
Pin14	P0.09	Digital I/O	
Pin15	P0.08	Digital I/O	
Pin16	P0.07	Digital I/O	
Pin17	P0.06	Digital I/O	
Pin18	P0.05	Digital I/O	
Pin19	P0.04	Digital I/O	
Pin20	P0.03	Digital I/O	
Pin21	P0.02	Digital I/O	
Pin22	P0.01	Digital I/O	
Pin23	P0.00	Digital I/O	
Pin24	P0.30	Digital I/O	
Pin25	P0.29	Digital I/O	
Pin26	P0.28	Digital I/O	
Pin27	P0.27	Digital I/O	

Pin28	P0.26		Digital I/O	
Pin29	P0.25		Digital I/O	
Pin30	P0.24		Digital I/O	
Pin31	P0.23		Digital I/O	
Pin32	P0.22		Digital I/O	
Pin33	P0.21		Digital I/O	
Pin34	VCC		Power Supply	
Pin35	NC			
Pin36	GND		Ground	

### Block diagram:



### 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

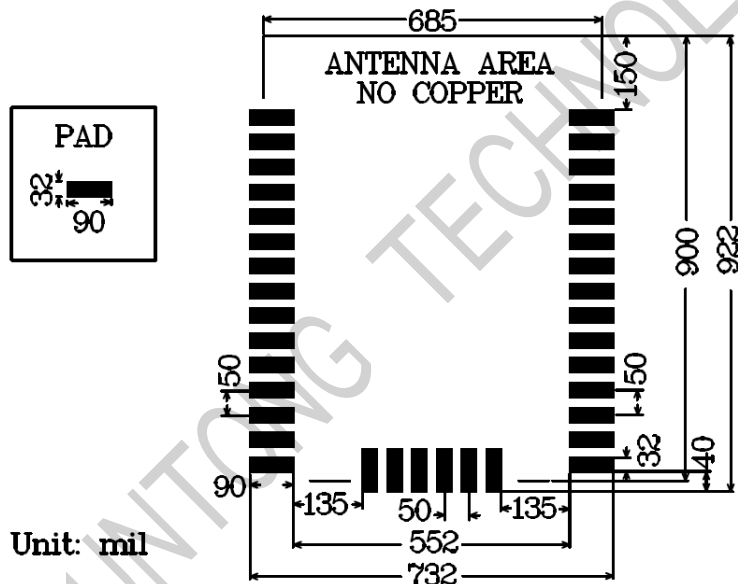
## HW debug and flash programming of Module:

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](http://www.segger.com).

## PCB Layout (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
PTR9022	Bluetooth Low Energy System on Module
PTR9022-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 <sub>CC_MAX</sub>	Voltage on supply pin	-0.3	3.9	V
V <sub>IO_MAX</sub>	Voltage on GPIO pins (V <sub>CC</sub> > 3.6V)	-0.3	3.9	V
V <sub>IO_MAX</sub>	Voltage on GPIO pins (V <sub>CC</sub> ≤ 3.6V)	-0.3	V <sub>CC</sub> + 0.3V	V
T <sub>S</sub>	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.

