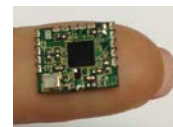# PTR5528 Bluetooth Low Energy 4.0 Module
Fingertip-size Bluetooth Low Energy System on Module
Embedded Cortex™ M0 32 bit processor

The PTR5528 ultra-low power Bluetooth Low Energy/2.4GHz Proprietary Multi-protocol modules based on the nRF51822 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 nRF51822

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

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

➢ ARM® Cortex™-M0 32 bit processor, 256 kB flash memory, 16 kB RAM

➢ 2.4 GHz transceiver， Max TX Power +4dBm， -93 dBm sensitivity@BLE

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

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

➢ Ultra small fingertip size, about 11.5mmx9mmx1.5mm 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:

Bluetooth	
Version	Bluetooth 4.x and Higher
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 (BLE mode)
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 of Module（Top View）:
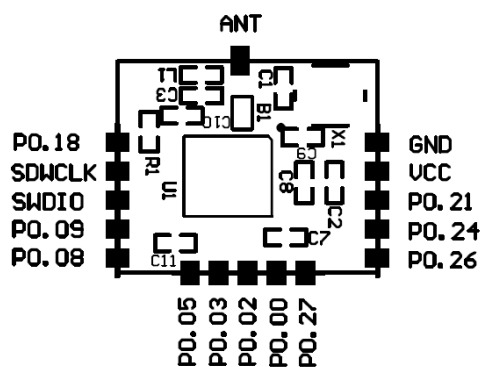
Pin No.	Name	Description	Note
1	P0.18	I/O	
2	SWCLK	Debug and flash programming	
3	SWDIO	Debug and flash programming	
4	P0.09	I/O	
5	P0.08	I/O	
6	P0.05	I/O	ADC IN 6
7	P0.03	I/O	ADC IN 4
8	P0.02	I/O	ADC IN 3
9	P0.00	I/O	
10	P0.27	I/O	ADC IN 1
11	P0.26	I/O	ADC IN 0
12	P0.24	I/O	
13	P0.21	I/O	
14	VCC	Power Suply（1.9～3.6V）	
15	GND	Power Ground	
16	ANT	EXT ANTENNA	Can connect to ext antenna if need.

Block diagram:
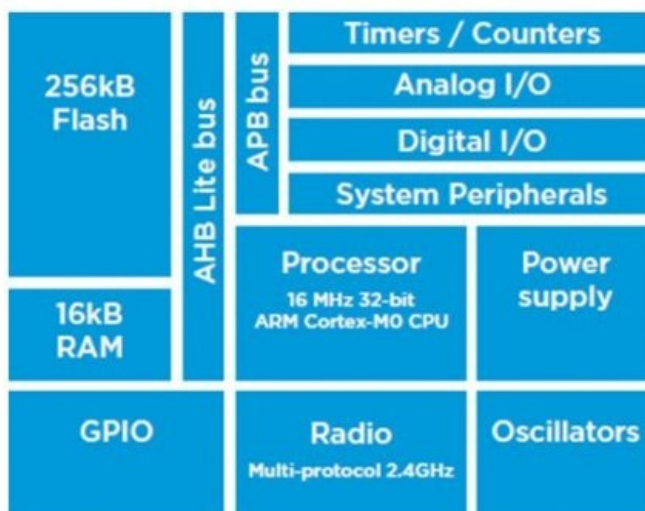
General Purpose I/O:

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.

PCB Layout（TOP VIEW）：
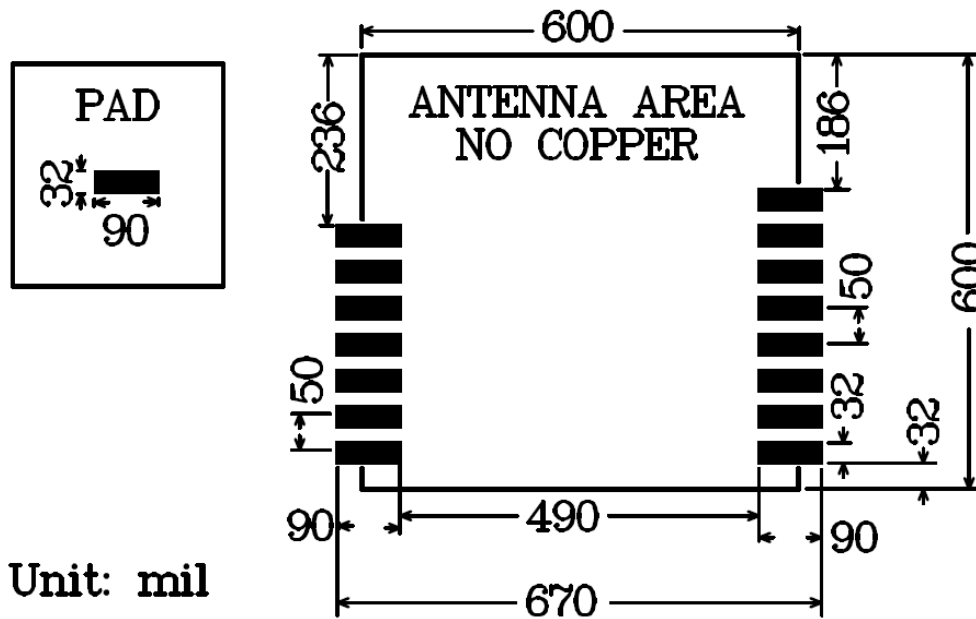
Recommended RF Layout & Ground Plane:

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.
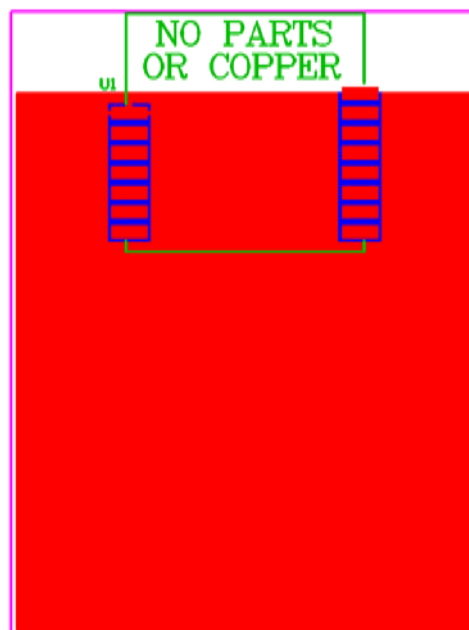
Ordering Information:

Part Number	Description
PTR5528	Bluetooth Low Energy System on Module
PTR5528-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.