

## About us

SPARK Microsystems offers a unique & innovative wireless transceiver technology that achieves **40x better energy efficiency, 60x lower latency, and 10x more data throughput** as compared to BLE.

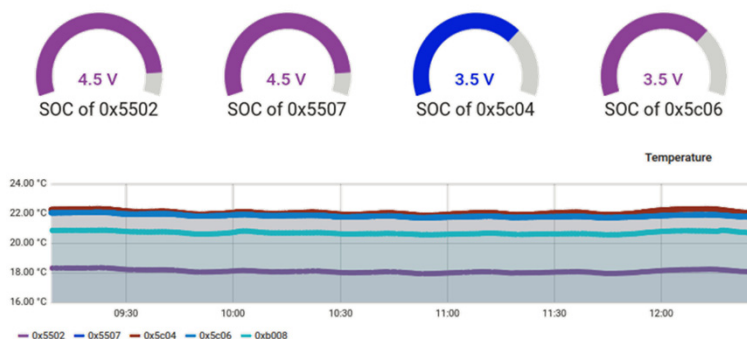
The SPARK ultra-wideband (UWB) transceiver does not interfere with other radios such as WiFi, BLE, Zigbee, Z-Wave, or cellular. It also provides very high quality of service connectivity.

## About the UWB IoT Network

The SPARK battery-less IoT sensor network contains integrated short-range wireless nodes built for self-sustaining and long-life operation. Each node features ultra-low power consumption to allow data transfers through a compact energy harvester. The data rate is adapted to the amount of available power to further optimize communications in low light conditions. A coin cell option is also available to provide years of life for an environmental sensor.

## Central Hub Display

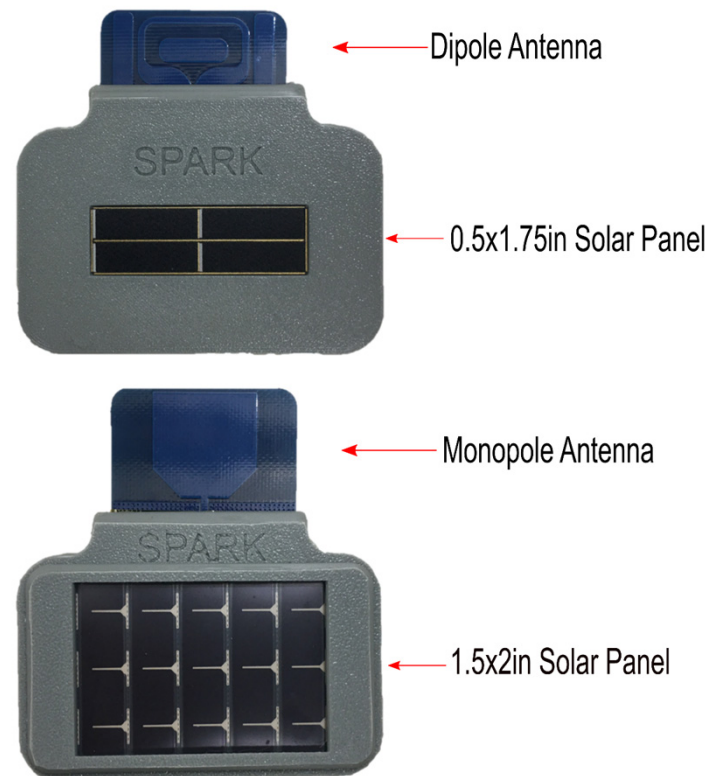
All nodes on SPARK's star network communicate with a central hub where payload data is collected and processed. Types of data currently include node voltage, temperature, humidity, and pressure. Nodes are automatically detected, and the data is plotted over time.



Central Hub Data Display

## Specifications

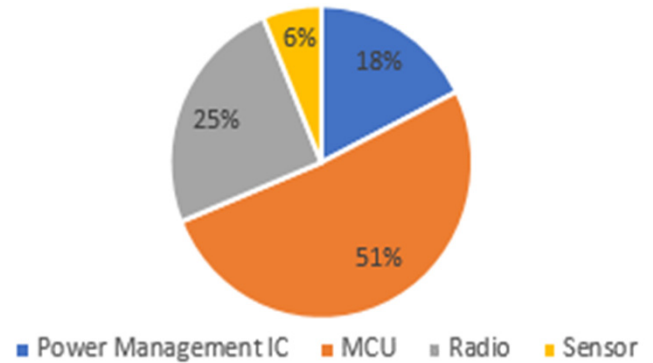
- SPARK RF modules used in a star network
- ARM Cortex-M4 MCU on each node
- Capable of low data streaming for energy efficient operation
- 10  $\mu$ W operation with a BME280 sensor
- Operating voltages from 0.8 V to 5 V
- Amorphous solar cells
- Solar panel to charge capacitive banks
- Capacitive bank variants
  - Small: 10x0.22  $\mu$ F ceramic capacitors
  - Large: 1x0.22 F supercapacitor
- Monopole and dipole antenna configurations
- USB interface for programming and gateway access



## IoT Key Benefits

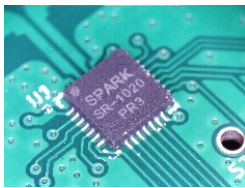
- **Ultra-low Power**
  - Battery-less Operation with 10  $\mu$ W power consumption
  - Large and small capacitive bank configurations
  - Solar panel to charge capacitive banks
- **Ultra-short latency**
  - 50  $\mu$ s airtime for 1 kb
  - Scalable data rate up to 10 Mbps
- Support for several thousand nodes in a small area of 100 m<sup>2</sup>
- Ultra-low power and ultra-short latency allow for efficient mesh networks
- Data communications can be combined with time-of-flight ranging function supported by the SPARK transceiver to enable spatially aware sensor nodes

Battery-less sensor mode demo power distribution at 10  $\mu$ W

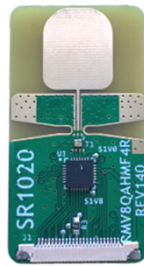


## SPARK Transceiver Specifications

- Dynamically reconfigurable UWB spectrum with up to 3 GHz of bandwidth
  - SR1010: 3.1 – 5.75 GHz band
  - SR1020: 6 – 9.5 GHz band
  - Up to 10 dBm peak TX power
- Ultra-short latency: 50  $\mu$ s airtime for 1 kb
- High quality of service
  - Capable of 3 ms audio latency for uncompressed 48 kSps 16-bit stereo audio streaming
- Scalable data rate up to 10 Mbps
- Time of flight-based distance measurement capability
  - 30 cm line of sight accuracy from 0.5 to 100 m
- Ultra-low power consumption
  - Down to 0.25 nJ/bit TX energy efficiency and 1.15 nJ/bit RX energy efficiency
  - Sub-mW TX at 3.1 Mbps and sub-mW RX at 0.8 Mbps
  - Energy efficient operation down to a few kbps
  - 55 nA hibernate, 750 nA deep sleep (w/ synch)
  - 1.7 to 3.6 V supply
- Coexistence and non-interference with BLE / WiFi (2.4 & 5 GHz) and cellular
- 50 m range @ 5.5 Mbps; 100 m range @ 600 Kbps
- Low power/cost timing using a 32.768 kHz XTAL
- Industrial operating range: -40 to +85°C
- Compact 4 x 4 mm 28 pin QFN package
- SPI Interface



SR1020 chip



SR1020 module with monopole antenna

## About SPARK Microsystems

SPARK Microsystems is a fabless semiconductor company that is leading the way towards ultra-low power wireless communications for the Internet of Things revolution. With its patented technologies, SPARK Microsystems is bringing to market a high performance wireless transceiver that allows for orders of magnitude improved power consumption and latency while providing higher data rates than competing technologies. For more information, please visit [www.SPARKmicro.com](http://www.SPARKmicro.com).

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