RS10003 WiSeMCU™ Module

REDPINE SIGNALS®

Driving Wireless Convergence

PRODUCT BRIEF

RS10000

Redpine Signals WiSeMCU™ RS10003: Multi-protocol Wireless and Secure Microcontroller for the Internet of Things

Redpine Signals' RS10003 WiSeMCU™ device is the industry's first Wireless MCU with a multi-protocol wireless (Wi-Fi+Bluetooth+Zigbee) sub-system. It is a fully integrated module with an ultra-low-power ARM Cortex M4F microcontroller as an application processor, a built-in wireless subsystem, advanced security, power-management, frequency reference, RF power-amplifiers, diversity RF Front-end and passives. The WiSeMCU™ comes with an SDK to enable plug-and-play hardware and software development for the wireless Internet of things.

The ultra-low-power microcontroller subsystem in RS10003 integrates an ARM Cortex M4F processor with 128 KB of on-chip SRAM and 1MB of on-chip flash available for application development.A slew of peripherals including multiple USB Host, USB Slave, CAN, ADC, DAC, Quadrature Position/Revolution counter, Multi-function Serial interface supporting UART, LIN, SPI, I²C, comprehensive Multi-function timer, PWM, RTC etc satisfy the interfacing needs of most IoT devices.

The comprehensive wireless networking subsystem in RS10003 integrates 1x1 802.11n, advanced TCP/IP networking stack, Bluetooth4.0 solution with integrated application profiles and ZigBee for Home Automation and Smart Energy applications.

Application Subsystem Features:

- ARM Cortex-M4F processor, running at a frequency of up to 160 MHz
- IntegratedFloating Point Unit (FPU), Memory Protection Unit (MPU), Built-in Nested Vectored Interrupt Controller (NVIC), Non-maskable Interrupt (NMI) input
- Debug options: JATG and Embedded Trace Macrocells (ETM)
- 1MB on-chip flash program memory with flash accelerator and 32KB work flash memory
- 128 kB SRAM for code and data use
- USB2.0 (Function/Host) Full-Speed supported upto Max 6 EndPoint
- CAN Interface supports upto max two channels
- Upto 70 high speed general purpose I/O ports.
- Multi-function Serial Interface upto max eight channels(UART, CSIO(SPI), LIN, I²C)
- Base timer(Max Eight channels) supporting PWM, PPG, reload timer, PWC.
- Comprehensive Timers: Multi-function timer(MFT) upto max two units RTC,QPRC, Dual Timer, Watchdog Timer max upto two units
- Analog peripherals: 12-bit, 24-channel, Analog-to-Digital Converter (ADC)
- Security: Unique ID of the device (41 bit) is set
- Six low-power consumption modes, SLEEP, Timer, RTC, STOP, Deep Standby RTC, Deep Standby stop.
- 12-bit Digital to Analog (AD) suporting upto max two channels
- DMA Controller max upto 8 channels
- CRC (Cyclic Redundancy Check) Accelerator
- External interrupt input pin: Max upto 16 pins
- Low-Voltage Detector (LVD)

Wireless Subsystem Features:

- WLAN: Compliant to IEEE 802.11 a/b/g/n with dual band support.
- Bluetooth: Compliant to dual-mode Bluetooth V4.0
- ZigBee: Compliant to IEEE 802.15.4
- Supports both 20MHz and 40MHz bandwidth in WLAN.
- WLAN transmit power up to +18dBm and receiver with sensitivity of -97dBm.
- Support for Bluetooth Transmit power class-1 with integrated PA and high performance
- Bluetooth receiver with -94dBm Rx sensitivity.
- Support for multiple ZigBee output powers up to +15dBm with integrated PA and high performance ZigBee receiver with -102dBm Rx sensitivity.
- Dual external antenna (diversity supported).
- Embedded WLAN stack, ZigBee stack, BT stack and full-featuredTCP/IP network stack.
- Support for Embedded Wi-Fi Direct, Enterprise Security, Client mode and Access Point mode.
- Supports advanced security features: WPA/WPA2-Personal and Enterprise (EAP-TLS, EAP-FAST, EAP-TTLS, PEAP-MSCHAP-V2)
- BT profile support
- Zigbee Pro stack embedded.

Power supply

- 3.0-3.6V

Package and Operating Temperature

- Module size: 21mm x 15mm
- Industrial Grade -40ºC to +85ºC

Module Specifications

Network Standard Support	IEEE 802.11 a/b/g/j, 802.11n, 802.11d/e/i/w, 802.1X, 802.11k/r/v, Bluetooth v2.1 EDR, v3.0 + HS, v4.0 802.15.4-2006 (2.4GHz)
Data Rates	802.11n: from 6.5 Mbps to 150 Mbps (MCS 0-7) 802.11b: from 1 Mbps to 11 Mbps Bluetooth: 1, 2, 3Mbps 802.15.4-2006: 250Kbps
Modulation Techniques	OFDM with BPSK, QPSK, 16-QAM, 64-QAM and 256-QAM 802.11b with CCK and DSSS Bluetooth: GFSK, DQPSK, 8DPSK 802.15.4-2006: DSSS
802.11n Advanced Features	1-SS, 40MHz bandwidth, Greenfield Preamble, Short-GI, 1 spatial stream STBC, RIFS, A-MSDU, A-MPDU, Aggregation with Block-ack, A-MSDU inside A-MPDU, PSMP, MTBA, Fragmentation and Virtual AP support
Bluetooth Advanced Features	Scatternet, Adaptive Frequency Hopping, Interlaced scanning, 15 active slaves in proprietary mode, hold, sniff and park modes
ZigBee Advanced Features	CCM* security, orphan scanning, coordinator realignment, mesh routing
Wi-Fi modes	Embedded Wi-Fi client, Access point, Wi-Fi Direct
Bluetooth Modes	Master, slave, scatternet
Zigbee Modes	Zigbee Coordinator, Router, End device
Network Protocols	TCP, UDP, DHCP, ARP, IGMP, DNS client. Integrated web server, ZigBee and BT Stack.
QoS	WMM and WMM Power Save Support
MCU Peripherals/Interfaces	I2C, LIN, CAN, USB2.0, I2S, CSIO(SPI), UART, GPIO, JTAG, ADC, DAC Timers, PWM,PPG, RTC, MFT, WDT CSV, LVD, CRC, DMA, EXTINT, QPRC
Supply Voltage	3.0-3.6V
Operating Temperature	Industrial Grade -40ºC to +85ºC
Tx Power(+/-2 dBm)	Wi-Fi: 18 dBm for 802.11b CCK 18 dBm for 802.11g/n OFDM Bluetooth: 15dBm ZigBee: 15dBm
Rx Power (+/-1 dBm)	Wi-Fi: 1 Mbps -97 dBm 54 Mbps -75 dBm MCS7: -72 dBm Bluetooth: -94 dBm ZigBee: 250 Kbps -102 dBm
Software and Regulatory WMM,Certification Support	WiFi Alliance (802.11bgn, WPA, WPA2 Personal and Enterprise, WMM-PS, WPS, Wi-Fi Direct™, Voice-Personal, Protected management frames), Cisco CCX v5†, Zigbee Certification Bluetooth Qualification, FIPS 140-2, World-Wide Regulatory Compliance (FCC, IC, CE, ETSI, TELEC)

21mm x 15mm Module

Applications

- Home Automation - Displays/Thermostats
- Home Appliances – Smart Meters
- Security Systems – IP Network Sensor Nodes
- Wi-Fi- BT Gateway, WiFi-ZB Gateway
- Portable fitness & health monitoring
- Fleet management and asset tracking
- Wireless Headsets and speakers
- Other M2M applications
- Medical Devices
- Gaming Consoles
- Intelligent Sensing
- Wearables
- Industrial monitoring and control

Evaluation Package

The evaluation package comprises WiSeMCU module based board, accompanied by SDK and source code for peripheral interfaces, API library and hardware and software documentation. For details on availability please contact sales

Device Ordering Information

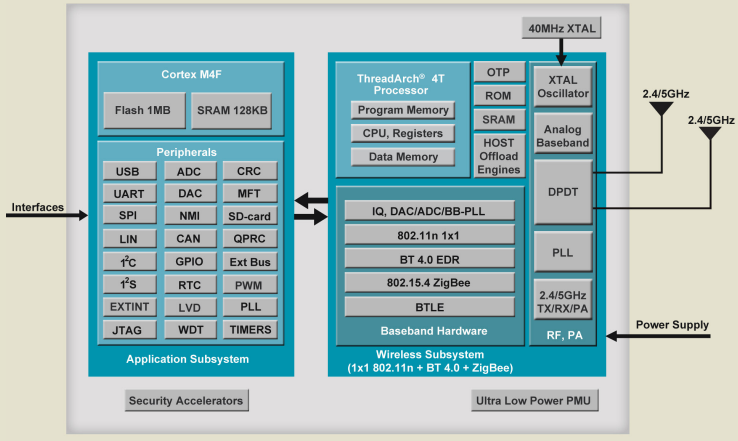
The device numbering is based on the following naming convention. All the devices are labeled as RS10003-XYZ-D0M Where

RS10003 - X Y Z - D 0 M

- D = "D" for Dual band (2.4/5 GHz)
- 0 = "0" for no antenna package
- M = "M" for WiseMCU

- X = "N" with Wi-Fi, "0" without Wi-Fi
- Y = "B" with BT, "0" without BT
- Z = "Z" with ZigBee, "0" without ZigBee

System Block Diagram



†: These features are not supported by current software releases. Contact Redpine Signals sales (sales@redpinesignals.com) for details.

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