Wireless MCU and Synapse Solutions

www.silabs.com/synapse

WIRELESS MCU FEATURES

- 240 – 960 MHz continuous frequency coverage
- Configurable output power up to +20 dB
- Up to 141 dB link budget for extended communication ranges
- Optimized low power modes to support extended battery life
- Integrated microcontroller peripherals including 10-bit ADC, comparators, RTC, UART, SPI, I²C, PWM, and timers
- In-system programmable Flash memory

SYNAPSE SNAP PROTOCOL FEATURES

- Self-Forming – when a node is powered up, it is automatically integrated into the network
- Instant-On – when a node is powered up, it is fully operational in a fraction of a second without user interaction
- Self-Healing – if a node fails for any reason, other nodes automatically route signals around the failed node
- Any node can talk to any other node directly or via intermediate nodes
- Routes between nodes do not have to be pre-configured by the user
- No embedded programming required – easy to use Python scripting language used to define the application
- True peer-to-peer networking with freeform remote procedure calls (RPC)

SUB-GHz WIRELESS NETWORKING SOLUTION

Silicon Labs and Synapse Wireless have collaborated to provide a high performance, cost effective sub-GHz wireless networking solution. Combining the industry leading performance of the Silicon Labs Si1000 Wireless MCU with the Synapse Network Appliance Protocol (SNAP®) has resulted in the first sub-GHz single-chip SNAP solution. This provides an instant-on, multi-hop mesh network combined with an embedded Python interpreter for running user applications. Additional features include battery-powered mesh, encryption, over-the-air programming, and seamless connection to the Internet. This combination is truly wireless technology to control anything from anywhere.

APPLICATIONS

- Smart metering
- In-home utility monitoring
- Energy management
- Wireless security panels
- Wireless sensors
- Home and building automation
- Access control
- Medical systems
- Asset tracking

WIRELESS MESH NETWORK

Modem

Si1000 Wireless MCU

Internet

SNAP Wireless Mesh Network

Software

End User

**WIRELESS TECHNOLOGY SOLUTION**
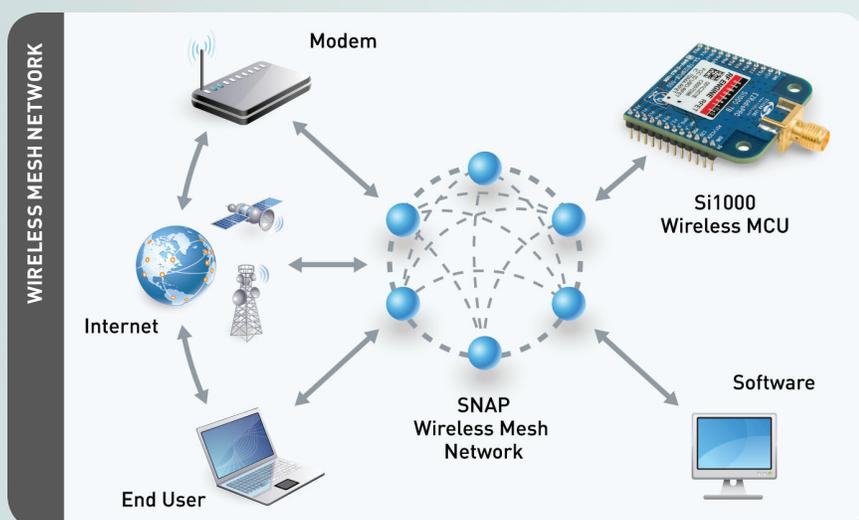
SILICON LABS

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Synapse SNAP

Synapse's SNAP technology is an Internet-enabled, auto-forming, multi-hop, mesh network, software solution that is designed to run efficiently on the Silicon Labs Si1000 wireless MCU. The SNAP protocol can support up to 16 million nodes in a single network. Since these networks are full mesh networks, there is no single point of failure: any node can talk directly to any other node that is in range and any node can talk indirectly to any other node via intermediate nodes. SNAP based networks are self-forming, instant-on, and self-healing. Users can interactively develop applications using a high-level scripting language called Python. No embedded programming experience is required.

SNAP Portal

No embedded programming experience is required to develop applications and deploy them "over-the-air" to physical SNAP nodes. The SNAP portal gives you an end-to-end view of your wireless application. As the gateway between the SNAP network and the PC, Portal provides a simple and flexible Python based interface.

SNAPconnect®

The SNAPconnect® interface provides a seamless interface between low-power nodes on a SNAP network and TCP/IP-based applications. Whether local or across the Internet, the application is a full participant in the SNAP network. SNAPconnect loads onto any PC or server and runs as a background process. Customers can develop their PC application on any major platform (Windows, Linux, OSX) using their choice of programming language (e.g. Visual Basic, C, C++, C#, Java, Python).

WIRELESS NETWORK OVERVIEW

User Application (uploaded over-the-air)

| SNAP RPC | SNAP Data | SNAP Mesh | SNAPpy Virtual Machine |

Packet I/F

Digital I/O, A/D Timers, etc.

Hardware Abstraction Layer (HAL)

Si1000 Wireless MCU
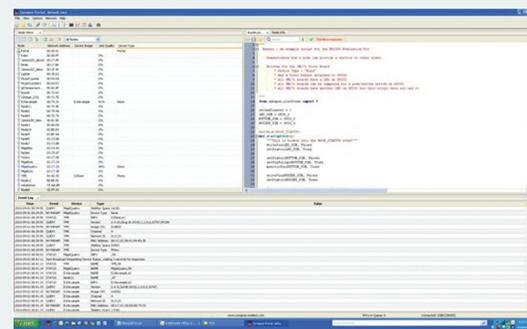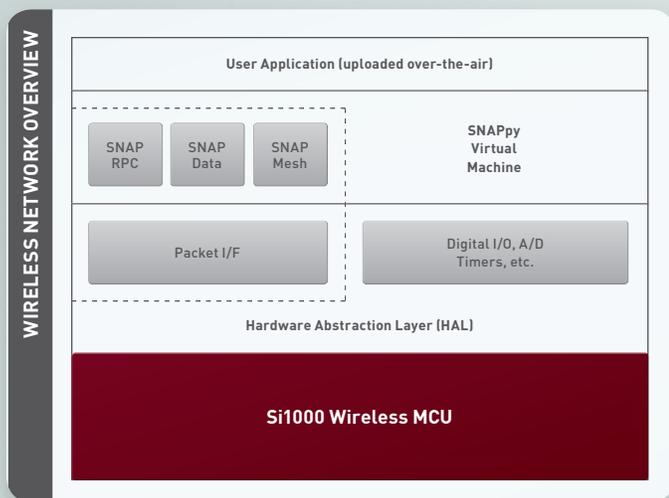
EXTENDED VIEW OF WIRELESS APPLICATION

Development Tools*

| PART NUMBER	DESCRIPTION	PRICE
SiSNAP915DK	Synapse Network Development Kit, Si1000, +20 dBm, 915 MHz	$199
SiSNAP868DK	Synapse Network Development Kit, Si1002, +13 dBm, 868 MHz	$199
SiSNAP915EK	Stand-alone 915 MHz module with antenna	$49
SiSNAP868EK	Stand-alone 868 MHz module with antenna	$49

*Full development tool description can be found at: www.silabs.com/synapse

NETWORK DEVELOPMENT KIT

SNAP Enabled Wireless MCUs*

PART NUMBER	FREQUENCY RANGE (MHz)	OUTPUT POWER RANGE (dBm)	SENSITIVITY (dBm) (2.0 KBPS) (FSK)	SENSITIVITY (dBm) (4.8 KBPS) (OOK)	RX CURRENT (mA)	TX CURRENT (mA) 0 dBm	+11 dBm	+13 dBm	+20 dBm	PACKAGE
Si1000-CSA2-GM	915	+1 to +20	-121	-110	18.5	—	35	—	85	QFN42 (5 mm x 7 mm)
Si1002-CSB2-GM	868	-8 to +13	-121	-110	18.5	18	—	30	—	QFN42 (5 mm x 7 mm)

*These are stand-alone wireless MCUs pre-programmed with SNAP

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