Wireless Technology to Control and Monitor

Anything from Anywhere™

Bringing the world of machines into the age of the Internet

SYNAPSE

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SYNAPSE Wireless Inc.

The Company

Synapse Wireless Inc. provides patented hardware and software technology that helps tie together devices for remote monitoring and control. To bring the world of machines into the age of the Internet, Synapse created SNAP®, a modern network architecture that provides embedded intelligence and wireless communication for connecting devices with other devices or people. Synapse's solution is not complicated to use. There is no setup required and application development is as easy as writing scripts. You do not have to understand network communication details, only what you want your application to do. The result is a superior and differentiated product with faster time to revenue.

SYNAPSE'S TECHNOLOGY INCLUDES:

- Synapse SNAP® that creates a low-power mesh network automatically
- Synapse Portal® for application development, network administration, data logging, and over-the-air code updates
- Synapse RF Engine® modules with node to node range of up to 6 miles
- Synapse SNAP® Connect, with TCP/IP interoperability, to translate between the Internet and the SNAP network

Future Electronics and Synapse Wireless have engaged in a unique Global Exclusive Partnership. Synapse's differentiated mesh network operating system, SNAP, offers Future the ability to provide its customers with a complete solution for embedded, module, software or custom designs. Due to SNAP's hardware and protocol-agnostic capabilities, Future has partnered Synapse with key semiconductor technologies and wireless protocols to form unique and scalable solutions for the low-power wireless market. Whether your design is embedded or module-based, 802.15.4 or WiFi-based, Synapse and Future Electronics have the easiest and quickest time-to-market solution for you.

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Embedded Designs
Synapse's **SNAP** network operating system
- the Wireless Standard for Embedded Design.

Home Area Network
SNAP Software making homes
smarter for a greener world.

Security
SNAP - a reliable, wireless solution helping
to save lives at Dallas-Fort Worth airport.

Inventory Tracking
Offering the U.S. Military maximum flexibility
for safe and accurate wireless inventory tracking.

Advanced Lighting Control
Lighting the future to intelligent, wireless
energy monitoring and control.

Solar Monitoring
Helping renewable energy systems become more efficient
through intelligent, wireless control and monitoring.

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Synapse's **SNAP** network operating system - the Wireless Standard for Embedded Design.

Synapse SNAP Software
Instant-on, multi-hop mesh network operating system

Synapse's technology, called SNAP, is unprecedented in the industry. SNAP is a mesh network operating system combined with an embedded Python interpreter (supporting standard XML-RPC protocol) for running application code.

Synapse's SNAP technology is an Internet-enabled, IEEE 802.15.4-based, auto-forming, multi-hop, mesh network operating system that is designed to run efficiently on cost-effective 8 and 32-bit microprocessors.

SNAP has a very small memory footprint, thereby leaving more space for user applications. The SNAP protocol can support up to 16 million nodes in a single network. Since these 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 English-like language called Python™. No embedded programming experience is required.

|	
With SNAP, All Devices Are Peers	Keep it simple—there's no need to stock special modules for certain roles in the network. You only have to configure the proper channel and network ID, and you have a working mesh. For connectivity to back-end systems (e.g. Synapse Portal or SNAP Connect), any device with a serial connection can function as a bridge.
Build Your Application	Odds are, your application doesn't fit precisely into a predefined "profile". With SNAP, you can start building your application immediately—one step at a time. First verify basic connectivity. Then, interactively build the functionality you need for your application. Optimize power consumption and throughput. SNAP puts you in control.
Wireless Serial or Remote Serial	SNAP provides transparent wireless serial capability right out of the box. Perfect for cable-replacement applications. Concurrent general-purpose I/O is available in this mode as always. Alternatively, you can handle serial data remotely – in the SNAP device itself. Uploaded application scripts have full access to the serial ports, and the powerful SNAPpy™ language makes handling serial data a SNAP!
Low-power MicroAmp Mesh	SNAP provides the capability to synchronize sleep periods across the mesh network under control of application scripts. A Sleepy Mesh® reference implementation is provided for immediate use as a drop-in solution. This open, script-based implementation provides the freedom to tailor performance to fit the specific power/latency tradeoffs your application demands.
Tools Required for Assembly…NONE!	Forget hardware probes, compilers, assemblers, etc. Portal™ is a free, interactive, wireless application development environment that runs on Windows or Linux. Users develop applications using a syntax-highlighted Python editor to create scripts for wirelessly downloading into SNAP nodes. Portal supports a real time view of your SNAP network, configuration and monitoring of your devices, a channel analyzer, data and event logging, and more.
Instant-On	A SNAP device only needs to be configured with the proper channel and network ID, and it's instantly capable of communicating with other SNAP nodes. There's no "join" phase to get on the network—this is a low-latency peer-to-peer system that is built for ease of development.
SNAPpy Scripting	The native message passing scheme in SNAP is remote procedure call (RPC), and the native language of these procedures is SNAPpy. SNAPpy is a subset of Python – a very powerful yet easy to learn general purpose language. The ability to invoke RPC functions universally in the network is key to SNAP's flexibility and performance. With RPC calls flowing effortlessly between SNAP nodes and back-end systems connected to a SNAP Connect, this is a powerful concept indeed.

SNAP is available preinstalled on Synapse hardware products and modules for volume production use, and is also available for license to run directly on your embedded products.
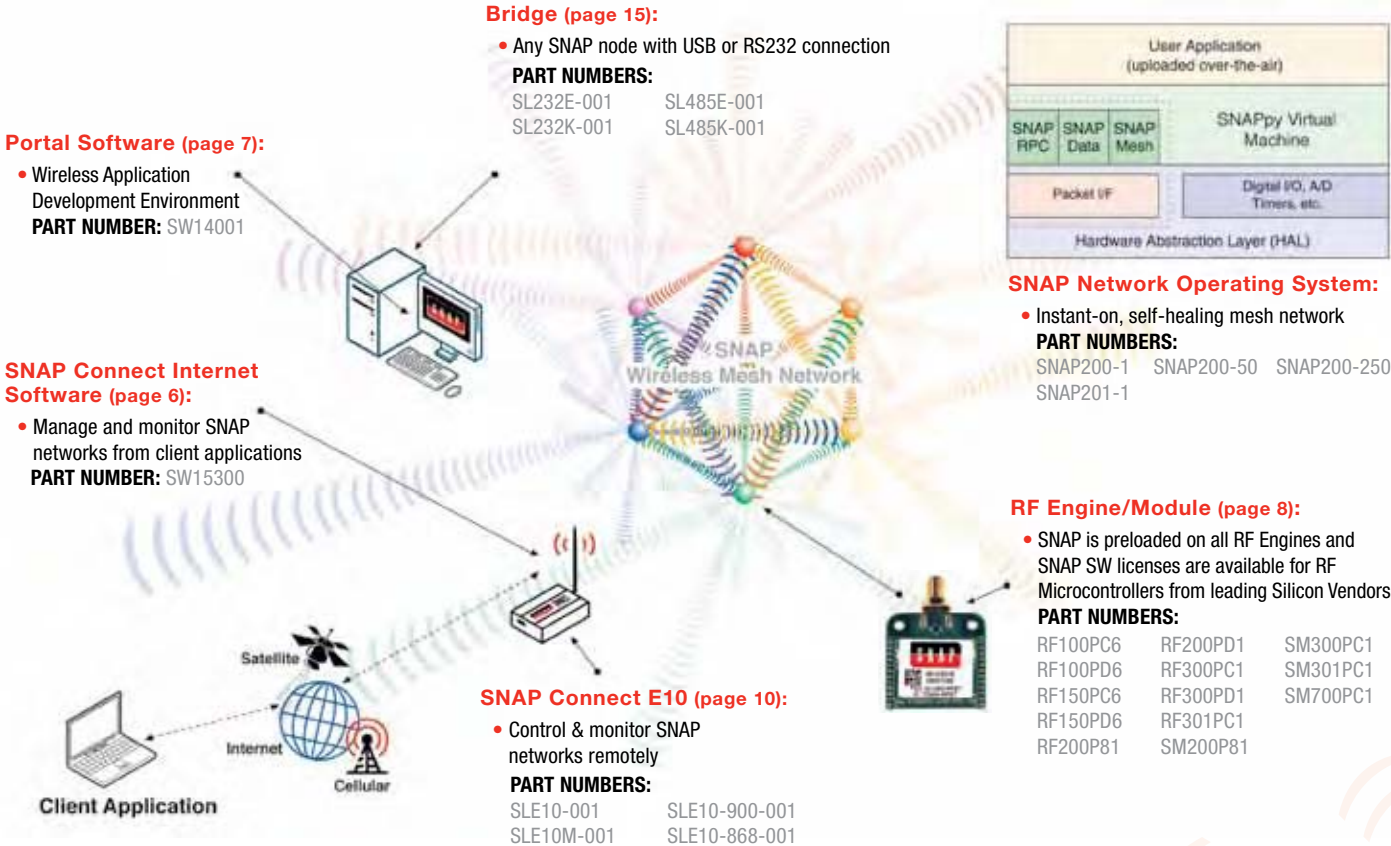
www.FutureElectronics.com/Synapse
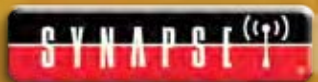
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SNAP Software

Synapse's **SNAP network operating system** supports battery-powered mesh (Sleepy Mesh®), AES encryption, over-the-air programming, and seamless connection to the Internet.

SNAP Features:

- Multi-hop Mesh
- Auto-forming
- Instant-On
- No Coordinator
- Peer-to-Peer
- 38.4K bps sustained throughput
- SNAPpy Application Scripts (Python)
- Over-the-air programming
- Remote Procedure Call Architecture
- Processor Independence
- Sleepy Mesh-battery operation on any device
- SNAPpy scripts are embedded
- Runs autonomously
- No central coordinator
- No single point of failure
- AES-128 encrypted version is available for applications requiring extra security

Bridge (page 15):
- Any SNAP node with USB or RS232 connection
  PART NUMBERS:
  SL232E-001   SL485E-001
  SL232K-001   SL485K-001

Portal Software (page 7):
- Wireless Application Development Environment
  PART NUMBER: SW14001

SNAP Connect Internet Software (page 6):
- Manage and monitor SNAP networks from client applications
  PART NUMBER: SW15300

SNAP Network Operating System:
- Instant-on, self-healing mesh network
  PART NUMBERS:
  SNAP200-1   SNAP200-50   SNAP200-250
  SNAP201-1

RF Engine/Module (page 8):
- SNAP is preloaded on all RF Engines and SNAP SW licenses are available for RF Microcontrollers from leading Silicon Vendors
  PART NUMBERS:

RF100PC6	RF200PD1	SM300PC1
RF100PD6	RF300PC1	SM301PC1
RF150PC6	RF300PD1	SM700PC1
RF150PD6	RF301PC1	
RF200P81	SM200P81	

SNAP Connect E10 (page 10):
- Control & monitor SNAP networks remotely
  PART NUMBERS:
  SLE10-001   SLE10-900-001
  SLE10M-001   SLE10-868-001

SNAP Software Selector Table

Part #	Product Type	Description
SNAP200-1	Software	Software: SNAP Internet-enabled auto-forming multi-hop mesh network (1 license)
SNAP200-50	Software	Software: SNAP Internet-enabled auto-forming multi-hop mesh network (50 licenses)
SNAP200-250	Software	Software: SNAP Internet-enabled auto-forming multi-hop mesh network (250 licenses)
SNAP201-1	Software	Software: SNAP Internet-enabled auto-forming multi-hop mesh network for MC13224V MCU
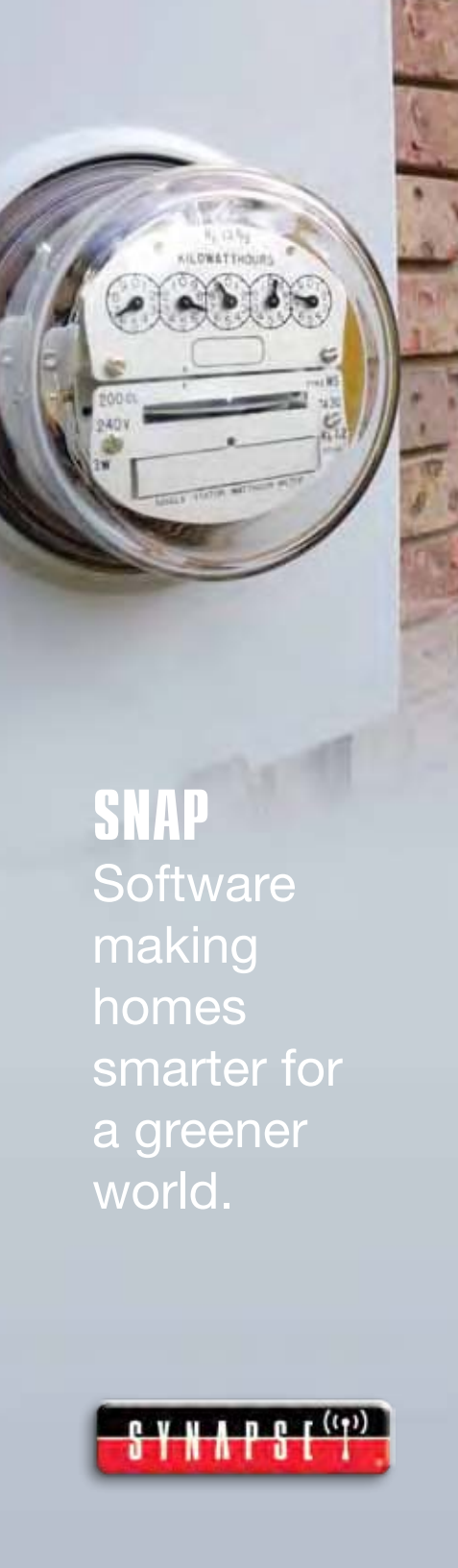
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SNAP Connect Internet Software
The fastest way to connect your app to SNAP

Synapse's SNAP Connect provides a seamless interface between devices on a wireless SNAP network and client applications. Hosted either locally (co-resident with application program) or across the Internet, your application is a full participant in the SNAP network.

Each application connected to SNAP Connect has a unique address and can both send and receive Remote Procedure Calls (RPC). Because SNAP is designed from the ground up with native RPC support, interaction between your application program and embedded wireless devices is simple and incredibly fast!

Typical SNAP Connect Application
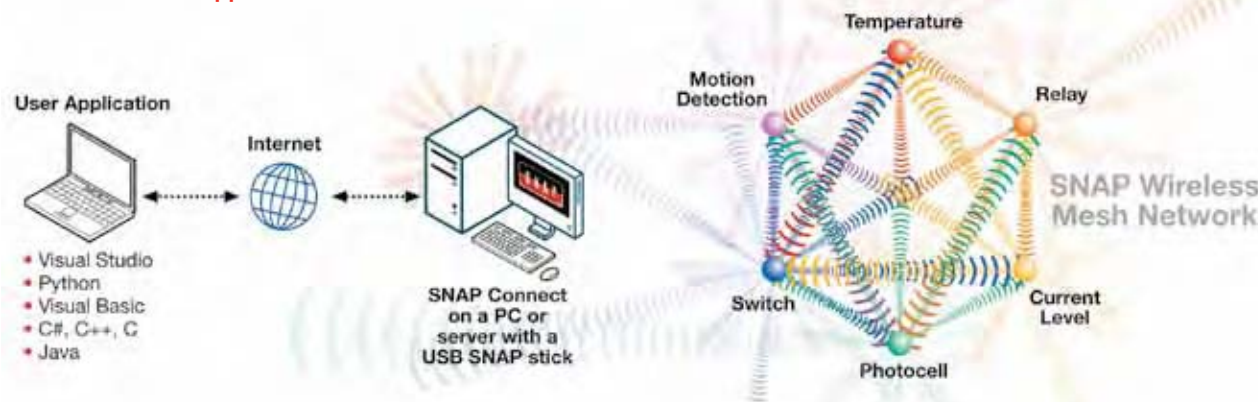
SNAP CONNECT PROVIDES YOU WITH:

- A complete developers' environment
  - ✓ Full document of the SNAP Connect API
  - ✓ Detailed configuration options
  - ✓ Includes executable examples in Python, Visual Basic, and C# (Java, C++ and C examples are available on Synapse's support forum: forums.synapse-wireless.com)

- Control and monitor a SNAP network from 3rd party client applications
  - ✓ Supports all popular programming languages and operating systems

- Supports remote administration of SNAP network using Portal
  - ✓ Portal can connect to your SNAP Connect over any TCP/IP network

- Any TCP/IP system can join a SNAP network
  - ✓ Selectable HTTP port for client connections
  - ✓ SNAP Connect host connects to any SNAP device via USB or RS232 port

- Client applications use standard XML-RPC protocol over HTTP
  - ✓ Uses established Internet standard and time-tested libraries
  - ✓ Your application is a peer on the SNAP network
  - ✓ Simply call remote (RPC) functions in your embedded wireless devices
  - ✓ Remote wireless devices can directly call (RPC) functions in your app

SNAP Connect Software Selector Table	Part #	Product Type	Description
	SW15300	Software	SNAP Connect Internet Software For PC, Linux, Mac (1 license)

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SNAP
Software making homes smarter for a greener world.

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SYNAPSE Portal Software Tool
Wireless Application Development Environment

Synapse's Portal is an interactive, wireless application development environment that runs on Windows, Linux or Mac (beta). Users develop applications using a syntax-highlighted Python editor to create scripts to wirelessly download into SNAP nodes. Portal supports a fast, real time view of your SNAP network, configuration and monitoring of your devices, a channel analyzer, data and event logging, and more.

Portal takes you beyond traditional network commissioning tools by giving you an end-to-end view into your wireless application. It gives you complete access to all functions in every node on your SNAP network. Portal provides email logging of user-defined events and remote devices can access the full power of the PC – opening up the potential for virtually unlimited application functionality.

As a bridge between the SNAP network and the PC, Portal provides a simple and flexible Python-based interface. Remote nodes can invoke Python functions in Portal using built-in SNAPpy RPC calls.

- Portal detects and automatically connects to a SNAP bridge device.
- Integrated Script Editor is a full featured, syntax-highlighted tool for creating and modifying SNAPpy scripts. Portal supports external editors too – the choice is yours.
- Upload new application functionality over the air – the ultimate fast development cycle.
- Configurable Node Views allow easy management, even with thousands of devices.
- Portal's Script Scheduler allows recurring calendar-time events to be controlled from a central management location.
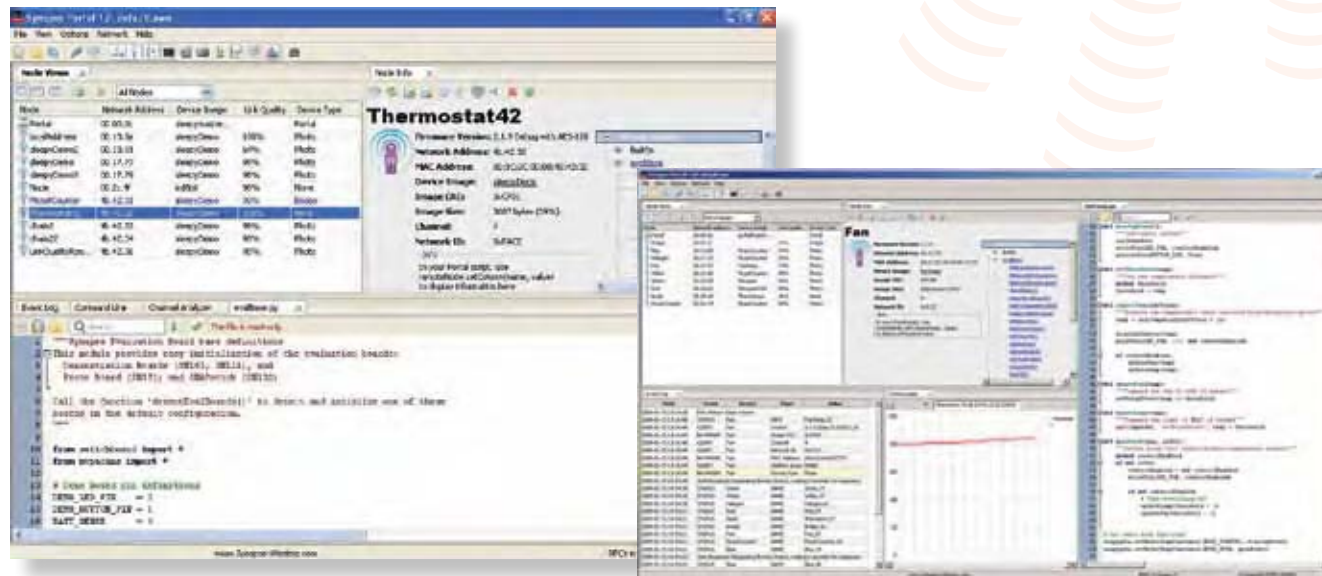
Portal Features:

- Portal Software is provided free of charge with any hardware purchase or is for sale for redistribution.
- Comprehensive administration tool for SNAP networks w/ node configuration editor
- Participates as a full-fledged peer on the network
- Invoke (RPC) script functions on any device in the network
- Quick and easy interface for modifying and uploading scripts
- Syntax-highlighted Python editor for developing SNAPpy scripts
- Event Log with timestamps and filtering
- Automatically scans for Synapse USB and RS-232 devices
- Intercepts STDOUT of selected remote devices for easy development / debug
- Runtime error detection highlights the line of script code where the error occurs
- Channel analyzer to find ideal channel for network
- Channel scanner to detect new or un-configured nodes

Portal Software Selector Table	Part #	Product Type	Description
	SW14001	Software	Portal Software SNAP Application Development Environment for PC, Linux, Mac (1 license) for redistribution.

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SYNAPSE RF Engines
IEEE 802.15.4 RF Modules

Synapse provides reliable RF Engines® that support a range of frequencies and bandwidths. These small, low-power, transceiver modules, running from sub-GHz to 2.4GHz, have a long range and the lowest power consumption in the industry.

In addition to power amps to increase the transmit power, we also use receive amps to provide 10 dBm additional link margin. They are also very careful to ensure that the maximum RF energy gets to the antenna instead of being wasted with poor antenna matching.

Synapse's modules offer a broad range of computing performance. From the entry level 8051 CPU all the way up to an ARM7 CPU, you have plenty of options regarding compute speed as well as available memory sizes.

Each module comes with basic encryption built in so

that you can prevent casual attacks on the network and all modules have AES-128 encryption available.

And of course, all of our modules come with Synapse's SNAP, an award-winning, wireless mesh network operating system that is instant-on, self-healing, multi-hopping and supports over-the-air programming. The network is formed and managed for you automatically, and can even support wireless connectivity to Internet. SNAP provides an on-board Python interpreter for ease in writing applications, and the software development environment, Portal, is provided at no cost to developers.

SNAP
- a reliable, wireless solution helping save lives at Dallas-Fort Worth airport.

RF Engine/Module Selector Table

Part #	Product Type	Description
RF100PC6	Module	RF Engine, 250Kbps, 2.4GHz, F-Antenna, Amplified
RF100PD6	Module	RF Engine, 250Kbps, 2.4GHz, RP-SMA-Antenna, Amplified
RF150PC6	Module	RF Engine, 250Kbps 2.4GHz, F-Antenna, AES Security Amplified
RF150PD6	Module	RF Engine, 250Kbps, 2.4GHz, RPSMA-Antenna, AES Security Amplified
RF200P81	Module	RF Engine, 250Kbps - 2Mbps, 2.4GHz, RP-SMA Antenna, Amplified
RF200PD1	Module	RF Engine, 250Kbps - 2Mpbs, 2.4 GHz, Chip-Antenna
RF300PC1	Module	RF Engine, 250Kbps, 915Mhz, Chip Antenna, Amplified
RF300PD1	Module	RF Engine, 250Kbps, 915Mhz, RP-SMA-Antenna, Amplified
RF301PC1	Module	RF Engine, 250Kbps, 868MHz, F-Antenna, Amplified
SM200P81	Module	Surface Mount, RF Engine Up to 2Mbps, 2.4GHz, Chip Antenna
SM300PC1	Module	Surface Mount RF Engine, 250Kbps, 915Mhz, Chip Antenna, Amplified
SM301PC1	Module	Surface Mount RF Engine, 250Kbps, 868Mhz, Chip Antenna, Amplified
SM700PC1	Module	Surface Mount ARM7 RF Engine, 250Kbps, 2.4GHz, F-Antenna, Amplified

For more technical details, see SNAP Hardware Technical Manual on the SYNAPSE Customer Forum: forums.synapse-wireless.com

www.FutureElectronics.com/Synapse

IEEE 802.15.4 RF Engine Specifications :

Synapse SNAP Modules	THROUGH-HOLE MODULES							SURFACE-MOUNT MODULES			
	RF100PC6	RF100PD6	RF200P81	RF200PD1	RF300PC1	RF300PD1	RF301PC1	SM300PC1	SM301PC1	SM700PC1	SM200P81
Prototype Availability	Now	Now	Q2 2011	Q4 2010	Q2 2011	Q1 2011	Q2 2011	Q2 2011	Q2 2011	Q1 2011	Q2 2011
Production Availability	Now	Now	Q2 2011	Q4 2011	Q2 2011	Q1 2011	Q2 2011	Q2 2011	Q2 2011	Q1 2011	Q2 2011
SNAP Mark™	11,400	11,400	39,240	39,240	3,952	3,952	3,952	3,952	3,952	50,000	39,240
User Application Scripts Uploadable Over-the-Air	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Core SNAP Network Upgradeable Over-the-Air	No	No	No	No	No	No	No	No	No	Yes	No
Frequency Band	2.4 GHz	2.4 GHz	2.4 GHz	2.4 GHz	915 MHz	915 MHz	868 MHz	915 MHz	868 MHz	2.4 GHz	2.4 GHz
Raw Bandwidth	250Kbps	250Kbps	Up to 2Mbps	Up to 2Mbps	150Kbps	150Kbps	150Kbps	150Kbps	150Kbps	250Kbps	Up to 2 Mbps
Memory Size	60K	60K	128K	128K	196K	196K	196K	64K	64K	128K	128K
RAM Size	4K	4K	16K	16K	4K	4K	4K	4K	4K	96K	16K
Antenna	F	RP-SMA External	Chip	RP-SMA External	Chip	RP-SMA External	Chip	Chip	Chip	F	Chip
Receive Amp	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Transmit Amp	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Processor Size	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit	8-bit	32-bit	8 bit
Size	33.86mm x 33.86mm	33.86mm x 33.86mm	33.86mm x 33.86mm	33.86mm x 33.86mm	33.86mm x 33.86mm	33.86mm x 33.86mm	33.86mm x 33.86mm	29.8mm x 19mm	29.8mm x 19mm	25mm x 36mm	29.8mm x 19mm
RF100 Pin Compatible	Yes	Yes	Yes	Yes	Yes	see Datasheet	Yes	No	No	No	No
Distance (Open Field)	2.5 miles	3 miles	1500 ft	3 miles	1 mile	6 miles	1 mile	1 mile	1 mile	1.5 miles	1 mile
Temperature Range	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C
Certifications	FCC,IC	FCC,IC	FCC,IC	FCC,IC	FCC,IC	FCC,IC	CE	FCC,IC	CE	FCC,CE,IC	FCC,IC
I/O Pins	19	19	20	20	19	15	19	19	19	46	33
A/D Pins	8	8	8	7	12	12	12	16	16	8	8
A/D Bits	10	10	10	10	10	10	10	10	10	12	10
Memory available for applications	15K	15K	75K	75K	128K	128K	128K	128K	128K	45K	75K
Basic encryption	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
AES encryption	RF150PC6	RF150PD6	Included	Included	Included	Included	Included	Included	Included	Included	Included

RF100P86 users should migrate to RF100PC6 or RF200P81.
Specifications subject to change without notice - confirm that data is current.
Customized modules with different antenna types or amplifications can be made. Contact your local Future Electronics representative to inquire about customization.

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SNAP Connect E10 Gateway
## Embedded SNAP Connect Appliance

The **SNAP® Connect E10 Gateway** is a rugged, powerful, embedded connectivity appliance built to interface directly with SNAP mesh networks. The E10 can collect data from SNAP devices for centralized storage, database processing or application monitoring, making it extremely easy to view or control devices over the Internet. The E10 bridges SNAP networks across TCP/IP, without requiring firewall configuration or policy exceptions.

The flexibility of an open, Linux-based design provides a wide range of *supported connectivity options*, such as Wi-Fi, cellular modems and flash drives, using the built-in Ethernet and USB 2.0 host ports.

Full Linux services are also available to administrators and natively hosted applications.

BENEFITS AT A GLANCE:
- Control & monitor SNAP networks remotely
- Supports LAN & WAN remote administration using Synapse Portal (free download)
- Includes SNAP Connect Software & License
- Linux OS Services fully accessible
- 32-bit, RISC architecture, CPU running at 400MHz
- 256 MB Flash, expandable through external USB drives
- 64 MB RAM
- RP-SMA external antenna
- Synapse RF Engine, 2.4GHz, IEEE 802.15.4
- 10/100 Mb Ethernet & USB 2.0 ports
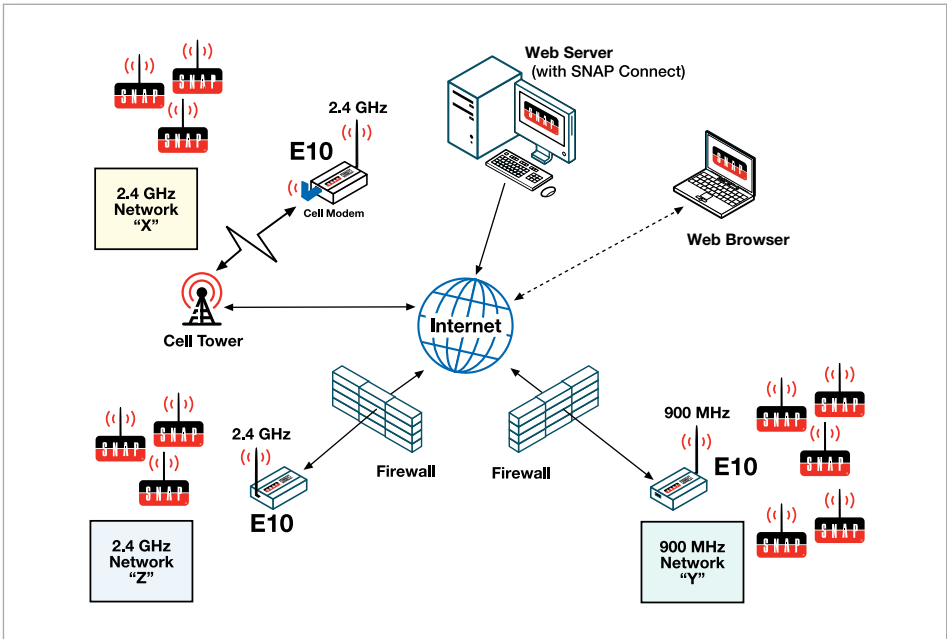
The **SNAP CONNECT E10 APPLIANCE** connects SNAP networks to the Internet using built-in Ethernet or USB Cell modem or Wi-Fi adapter. Shown here, the web browser can monitor and control three remote SNAP networks in real time.

Offering the U.S. Military maximum flexibility for safe & accurate wireless inventory tracking.

	Part #	Product Type	Description
E10 Gateway Selector Table	SLE10-001	Standard Product	SNAP Connect E10 Internet gateway, 2.4GHz
	SLE10M-001	Standard Product	SNAP Connect E10 Internet gateway, 2.4GHz - 2Mb w/AES
	SLE10-900-001	Standard Product	SNAP Connect E10 Internet gateway, 900MHz
	SLE10-868-001	Standard Product	SNAP Connect E10 Internet gateway, 868MHz

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SYNAPSE Evaluation Tools

EK2100 & EK2500

The EK2100 & EK2500 give you the out-of-the-box experience of an Instant-On mesh network and the full power of our RF Engine hardware, SNAP network firmware, and Portal desktop software. Plug in the SNAP Stick, power up the ProtoBoard, and immediately you'll get a sense of the speed and simplicity of SNAP networking. Install the Synapse Portal software on your Windows PC (2K, XP, Vista), and experience how easy it is to program your own applications – no need to spend time and money on complex development tools and programming languages.

The **EK2100 Starter Kit** is designed to guide the user through a basic SNAP network setup and a series of application demonstrations.

EK2100 Starter Kit

- 30-day unconditional guarantee
- Quality backed by 1-year warranty
- SNAP – Instant-On mesh network operating system
- Complete starter kit, hardware and software – device to desktop
- Everything you need to interactively prototype your application

- Portal Software – wireless application development environment
- Hands-on tutorial steps you through the basics of hardware interfacing
- Step-by-step User Guide

INCLUDES:
All neccessary firmware, Synapse SNAP® Stick, one proto board with a RF100 module on board, cables and battery.

Synapse won the eg3's Spring 2008 editor's choice for its next-generation mesh wireless network products - the Synapse SNAP product line.

The **EK2500 Network Evaluation Kit** offers the easiest way to experience the full power of Synapse RF Engine hardware, SNAP network operating system and Portal desktop software.

- Interactively control & monitor all nodes on the network.
- Modify device behavior (embedded scripts) wirelessly.
- Design, test, verify and deploy your application in record time.

EK2500 Network Evaluation Kit
Hardware (SNAP Nodes)

2 Demo Boards with RF module on each
1 SN171-ProtoBoard with RF100 module

EK2500 SNAP Nodes come pre-loaded with SNAP, including a sample application ready-to-run out of the box, in a full mesh network.

The evaluation kit includes Portal, Synapse's revolutionary wireless application development environment. This easy-to-use graphical interface provides everything you need for end-to-end control of your SNAP network.

INCLUDES:
- SNAP Network operating system
- Portal which includes a variety of sample applications demonstrating the power of Synapse's embedded Python engine, SNAPpy
- Step-by-step User's Guide with all required cables, power supplies and connectors

Evaluation Tool Selector Table

Part #	Product Type	Description
EK2100	Starter Kit	Starter Kit for SNAP Mesh Networking 802.15.4 Low-power
EK2500	Evaluation Kit	Network Evaluation Kit for SNAP Mesh Networking 802.15.4 Low-power
EK2550	Evaluation Kit	Network Evaluation Kit for SNAP Mesh Networking 802.15.4 Low-power with AES 128

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Lighting
the future to
intelligent,
wireless
energy
monitoring
and control.

Synapse Internet-Controlled Wireless Lighting System
Deploy and remotely manage LED Lighting locally or over the Internet.

Through simple Plug & Play products, Synapse offers a complete, reliable and easy to install wirelessly controlled lighting and energy management system for indoor and outdoor applications. The Synapse Wireless Lighting System is an integrated set of products that are reliably networked leveraging the SNAP Network Operating System. All of these products can easily be installed into your existing or new lighting and energy management system and become instantly operational – no predetermined routing or complex network programming is needed. It simply works.

Product Roadmap

Part #		Description	
LP001-001		**SNAP DIM-10** for dimming and full on/off for 1-10 fixtures	Q1 2011
LP500-001 (North America)		**SNAP DMX** replaces cabling between controllers and lights - 96 channels	Now
LP501-001 (Worldwide)		**SNAP DMX** replaces cabling between controllers and lights - 96 channels	Q2 2011
LP511-001 (Worldwide)		**SNAP DMX Pro** replaces cabling between controllers and lights - 512 channels, RDM	Q2 2011
LP400-001		**Web-based Software** to remotely control or monitor the luminaires via the Internet, includes LP410-001	Q1 2011
LP410-001		**SNAP Connect E10** creates a transparent gateway between any SNAP network and the Internet	Q1 2011
LP300-001		**SNAP Remote** for handheld, wireless, color touch-screen remote control	Q2 2011
LP301-001		**SNAP Switch** for wireless lighting control via a wall-mount dimmer switch	Q2 2011
LP201-002		**SNAP LightSense** for wireless detection of ambient lighting conditions	Q2 2011
EK2400		**SNAPLighting.com Evaluation Kit including E10 Gateway**	Q1 2011

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Anything from Anywhere™

## Control and Monitor Anywhere in the World

Flexible and informative web-based GUI enables secure access to the lighting system from any Internet connection allowing remote control of any individual or group of luminaires. The GUI also enables the creation and modification of pre-programmed schedules or scenes.

Flexible Control and Monitoring System:

SCALABLE SYSTEM

Once your SNAP network is installed to manage and control your lighting system, it is easy to extend the network to add monitoring and control for in-roof solar energy panels, HVAC systems, parking lights and many more functions throughout the facility. The SNAP operating system forms a true peer-to-peer mesh network, allowing no single points of failure, and unlimited expansion for intelligent, secure, flexible and cost-saving control.
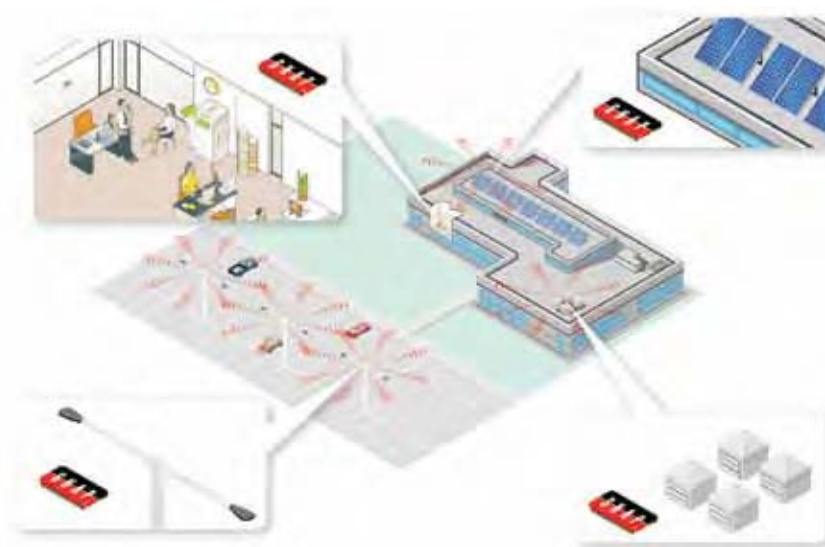
Wireless Lighting System Features

Flexibility
- Based on the Synapse SNAP Network Operating System
- Internet enabled for mobile or desktop access
- Easy to integrate into new or existing lighting installations

Security
- Secure login for specific users and locations

Map-based Navigation
- Map visual for country, state, city, etc. with text list of available locations
- List of recently visited locations, search dialog and zoom-and-pan tool

Floor Plan-based Interface
- Individual floor-plans can be uploaded
- Zone and fixture locations can be selected, customized and updated
- Create and modify scenes and schedules
- Navigation tree allows hierarchical selection of managed entities

Energy Management
- Measure and monitor heat, current, voltage
- View real-time or historical energy consumption

Manual Light Control
- Remotely access individual zones and fixtures for manual control, including On/Off, Dimming and Color
- Temporary override of scenes and scheduled events

Automated Control
- Motion controlled or timed dimming
- Automated adjustment to ambient light
- Zone control and failure detection

www.FutureLightingSolutions.com

FUTURE Lighting Solutions

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SNAP DMX – Wireless Lighting Control
Eliminates Cables • Fast Setup • Robust

Reliable. Long Distance. Wireless DMX.
When you need to connect DMX devices on stage, across the building or across the campus, SNAP DMX wireless adapters make it easy and cost-effective.

Wirelessly Connect DMX Devices
SNAP DMX products easily and reliably replace expensive cabling between controllers, lights and other DMX devices without modification to existing equipment. The flexible terminal block is compatible with 3-Pin or 5-Pin DMX connections. Each unit autodetects its role, operating as either a transmitter or receiver – so there's only one model to stock. Combine multiple SNAP DMX units to span up to 16 Universes with up to 96 DMX channels for SNAP DMX, and up to 512 channels (and RDM support) for SNAP DMX Pro.

USB Controller Interface
Every SNAP DMX device supports an industry standard USB interface for PC-based controller software, and is compatible with many 3rd party software controllers and tools.

Wireless Secure DMX512-A
* Cable not included.

Application Example: Media/Entertainment Lighting Control

A pair of SNAP DMX wireless adapters can replace a cable up to 3 miles (Line of Sight)
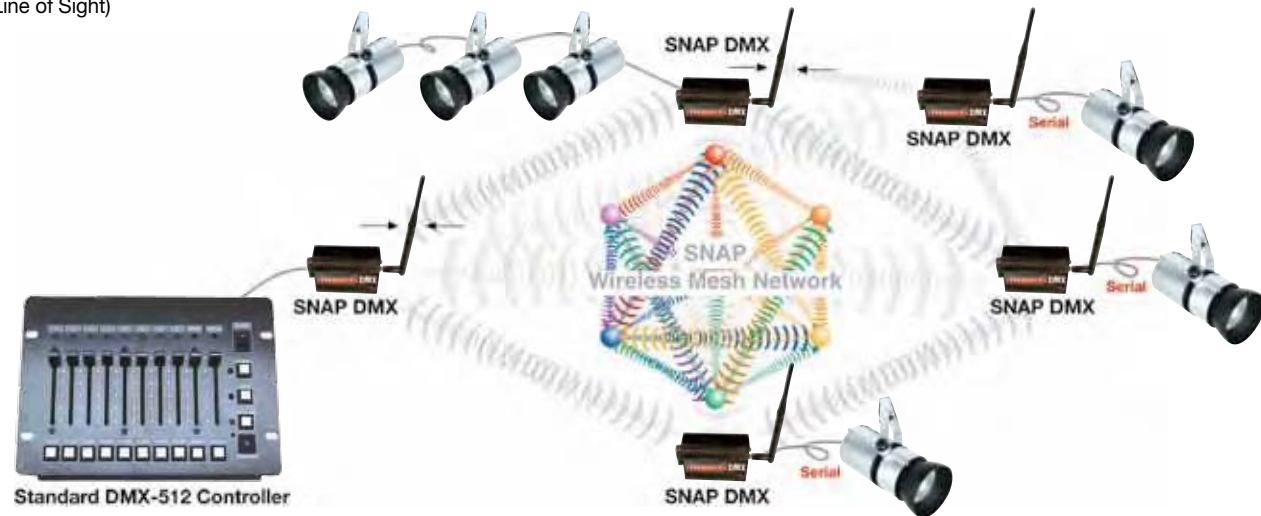
SNAP DMX Part Selector Table	Part #	Description
	LP500-001 (North America)	**SNAP DMX** replaces cabling between controllers and lights - 96 channels
	LP501-001 (Worldwide)	**SNAP DMX** replaces cabling between controllers and lights - 96 channels
	LP511-001 (Worldwide)	**SNAP DMX Pro** replaces cabling between controllers and lights - 512 channels, RDM

www.FutureLightingSolutions.com

Helping renewable energy systems become more efficient through intelligent, wireless control and monitoring.

Anything from Anywhere™

SNAP LINK Serial Wireless Adapters

High Performance Wireless RS-232 and RS-485/422 Cable Replacement Devices

The SNAP® Link family of robust, mesh networking, serial wireless adapters makes it easy and quick to connect RS-232 and RS-485/422 devices, increasing distance beyond physical wire constraints while reducing installation time and cost, ongoing maintenance costs and line noise problems. Units are powered by USB or an external AC adapter included with the product.

SNAP Link Features:

- SNAP - Instant-On, Self-Healing Mesh Network
- RS-232 version has a DB-9 port with full hardware flow control
- RS-485/422 supports two and four wire, half & full duplex
- Up to 3 mile range (line of sight)
- Spread Spectrum (DSSS) technology surmounts noisy environments
- Supports wireless ModBus
- LEDs show signal strength & data transmission activity
- Supports one-to-one and one-to-many relationship configurations
- -40 to 85 ˚C operating temperature, industrial use
- RP-SMA antenna connection on RS-232 and RS-485/422 models
- Mini-B USB port for easy connection to PCs (no serial-to-USB adapter required)
- Supports custom applications with embedded Python and free tools from Synapse
- Control and monitor SNAP nodes across the Internet with SNAP Connect (sold separately)
- Available with AES-128 encryption for added security

TWO FORM FACTORS AVAILABLE:
- SNAP Link RS-232 (external antenna)
- SNAP Link RS-485/422 (external antenna)

BENEFITS:
- Highest bandwidth & longest distance in the industry (2 Mbps, 3 miles)
- Most reliable, robust mesh network
- Easiest setup and quickest configuration in the industry

The SNAP Link EasySet software applet (right) is an easy-to-use configuration tool that streamlines the setup and configuration of SNAP Link wireless adapters. SNAP Link EasySet provides visual indicators and easy-to-change configuration parameters such as baud rate, channel and network ID, data bits, parity, stop bits, flow control and more. SNAP Link EasySet is a visually intuitive tool for defining and configuring the SNAP Link products.

SNAP Link Product Selector Table

Part #	Product Type	Description
SL232K-001	SNAP Link	SNAP Link 232, 250kbps, 2.4GHz, Single Serial Adapter
SL485K-001	SNAP Link	SNAP Link 485, 250kbps, 2.4GHz, Single Serial Adapter
SL232E-001	SNAP Link World Wide	SNAP Link 485, 250kbps, 868MHz, Single Serial Adapter
SL485E-001	SNAP Link World Wide	SNAP Link 232, 250kbps, 868MHz, Single Serial Adapter

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