

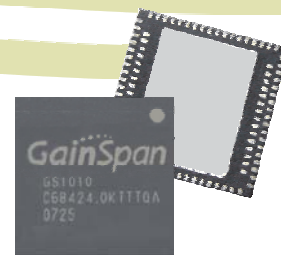


***Bringing Low-Power  
Wi-Fi Networks to Life***

# PRODUCT GUIDE

2008

- ▶ **Highly-integrated system-on-a-chip**
- ▶ **Ultra-low-power for years of battery life**
- ▶ **Utilizes the ubiquitous Wi-Fi infrastructure**
- ▶ **Comprehensive software solutions for a wide variety of applications**
- ▶ **A suite of easy-to-use development tools for OEMs**



## **PRODUCTS FOR LOW-POWER EMBEDDED APPLICATIONS:**

- ▶ **GS1010 SoC**
- ▶ **Evaluation Kit**
- ▶ **Software Development Kit**
- ▶ **GainSpan Management System**

# CORPORATE PROFILE

**G**AINSPAN IS located in Silicon Valley, near San Jose, California. GainSpan's company mission is to develop and deliver **ultra-low-power Wi-Fi®** solutions including system-on-a-chip (SoC) devices, software applications, and device management software that resides on the network.

GainSpan is an innovator in ultra-low-power Wi-Fi sensor networks and embedded designs that utilizes the widely-deployed Wi-Fi infrastructure while providing years of battery life for sensors and other connected devices. GainSpan's

highly-integrated semiconductor and comprehensive software solutions deliver the security, manageability, and convenience benefits of Wi-Fi along with 5-10 years of extended battery life needed for a wide variety of applications.

Enabling users to leverage low-power Wi-Fi for numerous applications including wireless, monitor, and control with years of battery life on a single AA battery makes GainSpan solutions unique in the market place. Our solutions represent a breakthrough in the world of wireless sensor networks.

GainSpan's GS1010 SoC is an ultra-low-power solution that leverages the widely-deployed Wi-Fi (IEEE 802.11) network. By utilizing this infrastructure, people can deploy sensor systems using standard tools and knowledge base, and seamlessly integrate with existing management systems, including enterprise network management systems, as well as existing SCADA industrial and building automation systems. Additionally, the chip's power management feature provides years of battery life and enables a new class of Wi-Fi products that opens the door to many new applications and usage models that cut costs, improve operational efficiencies, and provide the convenience needed to transform this market.

The GainSpan GS1010 SoC is truly a system-on-a-chip that supports a wide range of products and applications with an embedded 802.11 radio, two 32-bit ARM7 microcontrollers, a real-time clock (RTC), a power management unit, flash and SRAM memories, along with multiple I/Os and support for location awareness.

GainSpan's complete solution provides a suite of easy-to-use development tools for OEMs that makes development less time consuming and complicated, so products can get to market quickly.

***GainSpan Brings  
Wi-Fi Sensor Networks  
to Life!***

## APPLICATIONS

GainSpan semiconductor and software solutions are designed to flexibly support a broad range of applications and enable customers to easily tailor systems to their specific needs at a low total cost of ownership and high return on investment.

GainSpan solutions can be incorporated into products that may be used in:

- ▶ **Industrial motor monitoring**, to save energy and improve efficiencies
- ▶ **Buildings**, to save energy, improve indoor air quality, and safety
- ▶ **Food and drug manufacturers**, to monitor temperature of goods through their supply chain
- ▶ **Auto-manufacturing plants**, to track vehicles during production
- ▶ **Oil refineries**, to monitor system and locate staff during emergencies
- ▶ **Utilities**, to automatically read meters, monitor infrastructure equipment, and display in-home readings
- ▶ **Public metro areas**, to monitor street and traffic lights, and support emergency response services
- ▶ **Bridges**, to automatically verify the safety of these structures after an earthquake, allowing city infrastructures to quickly return to normal operation
- ▶ **Mining**, to accurately track real-time movements of miners
- ▶ **Data centers**, to monitor and control temperatures and energy usage
- ▶ **Hospitals**, to track and monitor patients, wheelchairs, diagnostic equipment, and staff awareness
- ▶ **Tags**, to track and monitor assets

# PRODUCTS

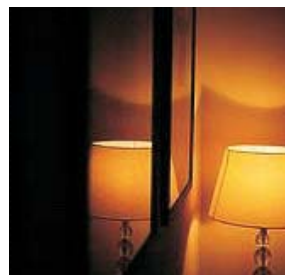
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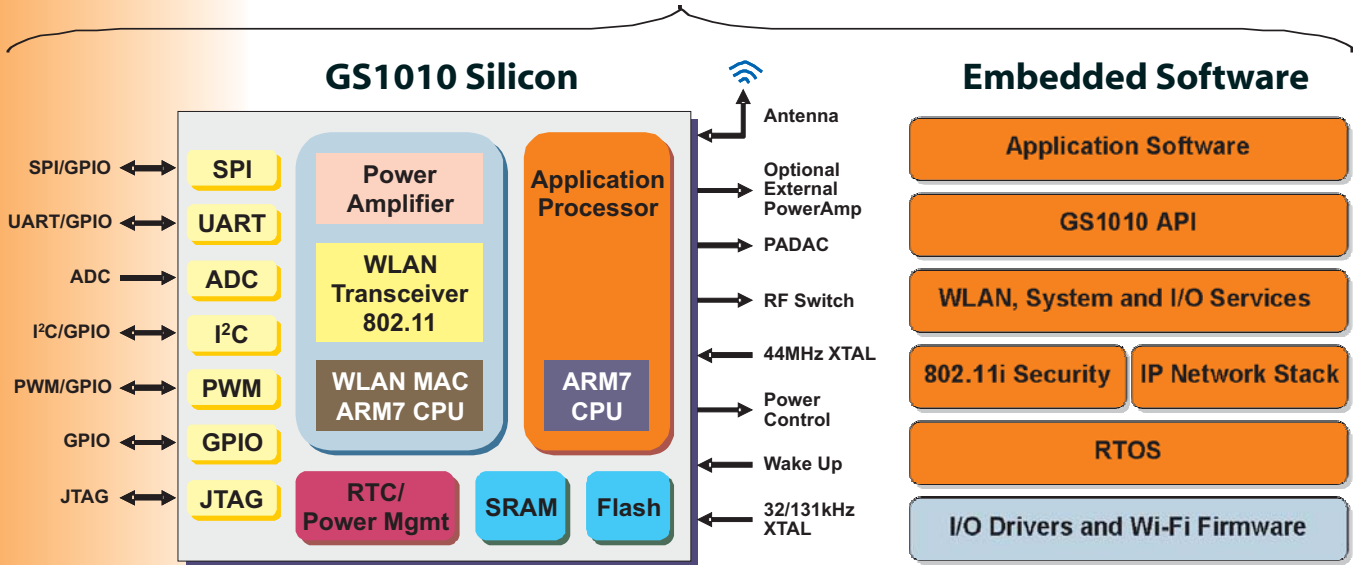
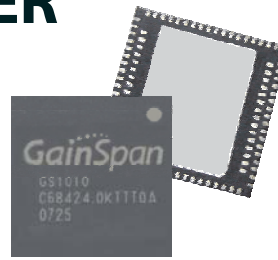
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## FOR A WIDE-RANGE OF APPLICATIONS



# GS1010 ULTRA-LOW-POWER WIRELESS SYSTEM-ON-CHIP



## GS1010 SPECIFICATIONS

- Wireless protocol:** IEEE 802.11b/g compatible
- Antenna ports:** Balanced 100Ω
- RF operating frequency:** 2.4 to 2.497GHz
- Application processor:** 32-bit ARM MCU operating @ 44MHz
- Power source:** 1.8V supply voltage
- RTC/watchdog timer:** Operates directly off battery voltage 1.2 to 3.6V. 32kHz clock oscillator. Programmable event timers for alarms.
- I/Os:** GPIO, I<sup>2</sup>C, UART, SPI, PWM, ADC
- Package:** 10mm x 10mm x 0.85mm, 102-pin dual row QFN
- Commercial temperature:** 0 to 70°C
- Extended temperature:** -40 to 85°C
- RoHS:** Compliant
- Software:** Firmware, embedded device drivers, RTOS, APIs, and application reference software
- Security (802.11i):** WPA2-PSK, AES encryption
- Standards:** IEEE 802.11, 802.11i/k/e/d, IEEE 1588

GainSpan's GS1010 is a highly-integrated, ultra-low-power wireless system-on-a-chip (SoC). The GS1010 SoC enables the building of wireless sensor nodes with battery life up to ten years. It includes a media access controller (MAC) and baseband processor, on-chip flash memory and SRAM, an applications processor, and a rich set of peripheral I/Os, all in a single, small footprint, 10mm x 10mm x 0.85mm QFN package.

The chip offers a highly-scalable, reliable, manageable, and secure wireless link to meet the growing demand of wireless sensor networks utilizing the broadly accepted IEEE 802.11 standards infrastructure.

GainSpan's GS1010 is the state-of-the-art component for your embedded Wi-Fi applications.

## FEATURES & BENEFITS

- ▶ Highly-integrated wireless SoC reduces system cost of implementing separate devices and lowers design complexity.
- ▶ Ultra-small form factor reduces board space.
- ▶ Lowers total cost of ownership (TCO) in network implementation and management.
- ▶ Seamlessly integrates with existing 802.11b/g infrastructure and utilizes the 802.11 security, manageability, ease-of-use, and quality of service.
- ▶ Enterprise-level security & reliability for sensor networks.
- ▶ Optimized for battery-powered applications with very low power consumption for many years of battery life.
- ▶ IEEE 1588 to provide precision clock synchronization over the network.
- ▶ Location awareness to enable tracing and monitoring of assets (TDOA and RSSI).
- ▶ Multiple I/Os provide flexibility in system design for easier integration.
- ▶ Firmware, device drivers, reference application software, APIs, and SDK to reduce development time of application software and enable faster time to market.

## GS1010 EMBEDDED SOFTWARE STACK

**Application software:** Customer sensor application software that runs on the application processor.

**Application programming interface (API):** GS1010 APIs reduces complexity and development time for the customer application software.

**I/O and WLAN services modules:** Runs on the application processor and enables customer sensor applications to interact with external sensors. Manages GS1010 system and WLAN parameters.

**Security supplicant (optional):** Runs on the application processor and provides enterprise-level 802.11i security (WPA2) service for key generation and authentication with server.

**Network stack:** Green Hills Software's network stack. Runs on the application processor and provides support for TCP/IP/ARP/ICMP/DHCP protocols.

**Real time operating system (RTOS):** Green Hills® Software's  $\mu$ VeLOsity RTOS runs on the application processor.

**I/O drivers, WLAN firmware:** Low-level drivers and WLAN firmware. Runs on the WLAN processor and provides the WLAN MAC+ baseband capabilities and supports over-the-air firmware update for ease of maintenance and future upgrades.

## GS1010 EMBEDDED SOFTWARE

The GS1010's embedded software provides a comprehensive, customizable solution that reduces the complexity of developing wireless sensor nodes for use in many different applications.

The software encapsulates the low-level hardware details into a well-defined Application Programming Interface (API) and demo application software which programmers can use to build target applications for their solution.

The software stack consists of the I/O drivers and firmware that runs on the WLAN. The rest of the components run on the application processor.

## ORDERING INFO

Part Number	Item
GS1010	GS1010 IC Device



# GS1010 EVALUATION KIT

**G**ainSpan's GS1010 Evaluation Kit offers a quick and easy way to evaluate the capabilities of GainSpan's GS1010 ultra-low-power wireless system-on-chip (SoC) and embedded platform software for Wi-Fi networks. The Kit includes a temperature, light, signal strength, and battery level sensors that display the incoming data on the GainSpan GUI.

The GS1010 SoC is a highly-integrated device that contains an 802.11 radio, media access controller (MAC) and baseband processor, on-chip flash memory and SRAM, an application processor, and a rich set of peripheral I/Os, all in a single small-footprint package. GainSpan's platform software, embedded in the GS1010 device, provides a complete wireless sensor node software solution that is highly power efficient, extending battery life to several years.

GainSpan's silicon and software solution offers a highly-scalable, reliable, manageable, and secure wireless link to meet the growing demand of wireless sensor networks utilizing the ubiquitous Wi-Fi network infrastructure.

The GS1010 Evaluation Kit facilitates the quick evaluation of GainSpan's unique wireless sensor technology for use in a board range of applications in industrial, commercial, residential, health care, metro, and other markets.

## FEATURES & BENEFITS

### IEEE 802.11 Wi-Fi network solution:

- ▶ Lowers total cost of ownership (TCO) in network implementation and management
- ▶ Seamlessly integrates with ubiquitous Wi-Fi infrastructure for ease-of-use and reliability
- ▶ Leverages 802.11 wireless security, manageability, and quality of service features

### Ultra-lower-power operation:

- ▶ Extends battery life to several years
- ▶ Enables use of low-cost battery

### GS1010 System-on-a-Chip (SoC) and embedded sensor node software:

- ▶ Complete silicon and software solution enables faster time-to-market
- ▶ Ultra-small form factor reduces board space
- ▶ Device drivers and APIs reduce customers' application software development time and cost

### Demo application software for Windows:

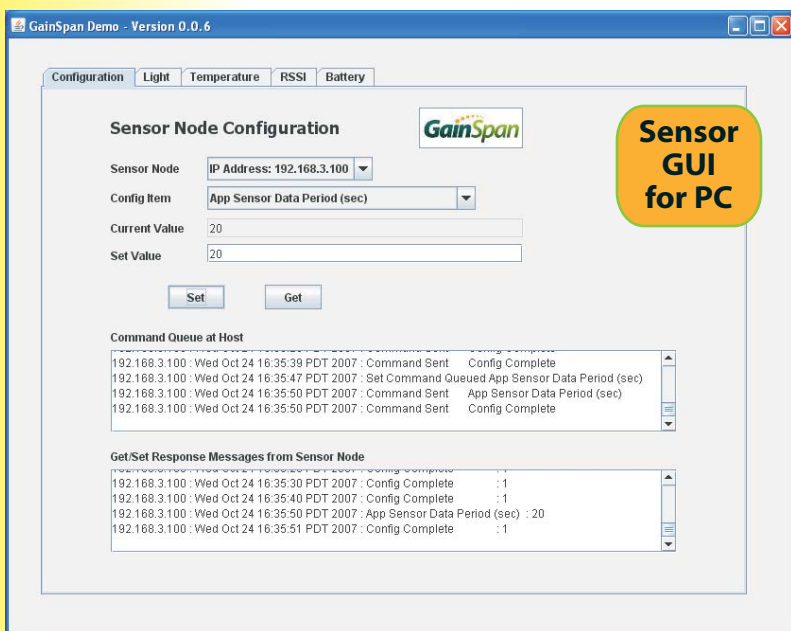
- ▶ Sensor configuration
- ▶ Sensor data display
- ▶ Sensor firmware updates
- ▶ Enables quick and easy demonstration and evaluation of wireless sensor node solutions using GainSpan silicon and software technology

### Wi-Fi access point included in Evaluation Kit:

- ▶ Enables quick and easy setup of wireless sensor network for demonstration and evaluation

### USB-to-serial cable included in Evaluation Kit:

- ▶ Enables easy configuration from a PC host



**Sensor GUI for PC**

# GS1010 EVALUATION KIT



## GS1010 REFERENCE BOARD SPECIFICATIONS

- Wireless protocol:** IEEE 802.11b/g compatible
- RF output power (typical):** 9dBm with integrated power amplifier
- RF operating frequency:** 2.4 to 2.497GHz
- Antenna:** 2.45GHz, 50Ω monopole with SMA connector
- Sensors:** Temperature, light, battery voltage, and signal strength
- I/O ports:** 6-pin serial UART interface, 15540 compatible. Cable to connect to host PC USB port included.
- Power source:** 3.6V, 2100mAh lithium AA battery (included)
- Dimensions:** 2.36 in. x 1.39 in. x 1.04 in. or 6.0 cm x 3.5 cm x 2.6 cm

The Kit comes complete with all the hardware and software necessary to quickly set up a wireless sensor network for monitoring temperature and light data. It includes the *GSDemo* software for displaying incoming data for:

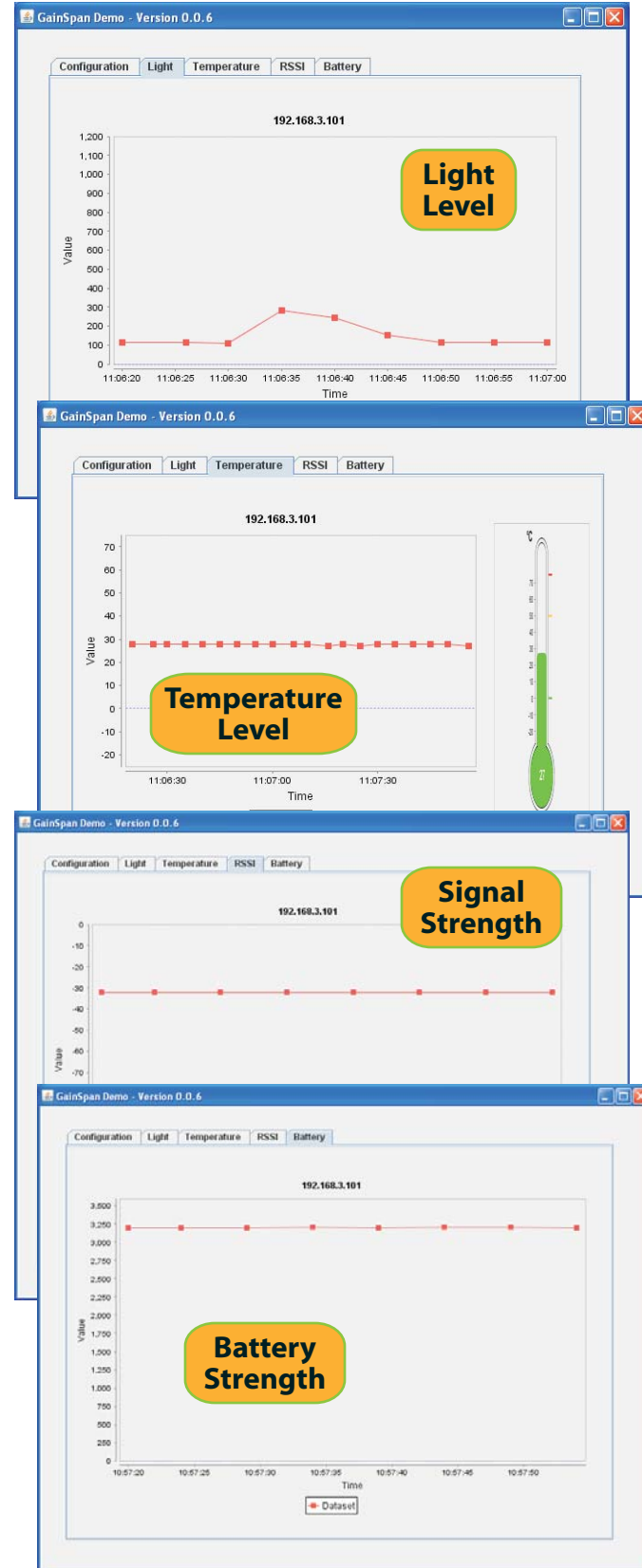
- ▶ Light
- ▶ Temperature
- ▶ Node signal strength
- ▶ Battery voltage level

## EVALUATION KIT CONTENTS

- ▶ One temperature and light Reference Board with an antenna and 3.6V AA lithium battery
- ▶ One USB-to-serial cable for node provisioning and configuration
- ▶ One pocket-sized 802.11b/g access point
- ▶ One USB memory stick with GainSpan software and documentation

## ORDERING INFO

Part Number	Item
GS1010-EVAL-TLS	Evaluation Kit
GS1010-EVAL-103	Evaluation Kit Starter Bundle (with 3 Reference Boards)
GS1010-EVAL-105	Evaluation Kit Starter Bundle (with 5 Reference Boards)
GS1010-EVAL-110	Evaluation Kit 10-node Bundle (with 10 Reference Boards)
GS1010-REF-TLS	Reference Board (additional sensor node for use with Evaluation Kit only)



# GS1010 SOFTWARE DEVELOPMENT KIT

## A complete platform for developing applications for the GS1010 wireless system-on-a-chip

The GainSpan GS1010 Software Development Kit (SDK) supports rapid development of hardware and application software for Wi-Fi sensors based on GainSpan's GS1010 ultra-low-power wireless system-on-a-chip (SoC).

The GS1010 is a highly-integrated, ultra-low-power wireless system-on-a-chip (SoC) that contains an 802.11 radio, media access controller (MAC) and baseband processor, on-chip flash memory and SRAM, an application

processor, and a rich set of peripheral I/Os, all in a single small-footprint package.

GainSpan's platform software, embedded in the GS1010 SoC, provides a complete wireless sensor node software solution that is highly power-efficient, extending battery life to several years.

The GS1010 Software Development Kit includes all the hardware required to quickly and easily develop application software for the GS1010 SoC. The SDK includes:

- ▶ A GS1010-based development board powered by either a single AA battery or a DC power adapter
- ▶ A pocket-sized 802.11 b/g access point
- ▶ A daughter-board with sensors for temperature, humidity, light, pressure, and a two-axis accelerometer
- ▶ Source code for the GainSpan embedded software including I/O drivers and APIs
- ▶ Reference application software



This flexible platform for customer application code development offers headers for attaching custom sensors

and connectors for debugging and software download. It allows developers to build and test custom applications and set breakpoints for debug in a real-time environment. The complete development environment includes Green Hills Software's:

- ▶ *Slingshot* hardware debugging interface
- ▶ *MULTI Integrated Development Environment* featuring the industry's most powerful and proven toolset for developing embedded software with maximum performance and minimum code size

The GS1010 Software Development Kit is a professional development platform that enables in-depth software and hardware design and debug.

### GS1010 DEVELOPMENT BOARD SPECIFICATIONS

- Wireless protocol:** IEEE 802.11 b/g compatible
- RF output power (typical):** 9dBm with integrated power amplifier
- RF operating frequency:** 2.4 to 2.497GHz
- Antenna:** 2.45GHz, 50Ω monopole with SMA connector
- Sensors on Crossbow MTS400CA daughter board:**
  - ▶ Temperature/humidity
  - ▶ Pressure
  - ▶ Light
  - ▶ Two-axis accelerometer
- Power source:** 3.6V, 2100mAh lithium AA battery (included) or 3.6V, 1A wall-mount DC power adapter
- Dimensions:** 5.875 in. x 3.925 in. x 1.125 in. or 14.9 cm x 10.0 cm x 2.9 cm



# GAINSPAN EMBEDDED SENSOR NODE SOFTWARE

The GainSpan Embedded Sensor Node Software is a complete platform for developing applications for the GS1010 wireless system-on-a-chip (SoC). It simplifies and speeds up customer software development and deployment efforts. It provides all the building blocks needed for a complete wireless sensor node solution.

The Software includes a comprehensive, yet simple, set of APIs that abstracts the hardware complexity, and embedded software that optimizes power management, system management and configuration, security, IPv4 network, and SNMP stack for a complete

## GS1010 EMBEDDED SOFTWARE FEATURES & BENEFITS

**Wireless capability (802.11):** Wireless firmware that provides 802.11b/g compatible MAC/PHY and baseband functionality. Allows device to connect to the widely-deployed Wi-Fi infrastructure, reducing cost of deployment.

**GS1010 APIs:** Comprehensive set of APIs that help reduce complexity and enables faster time-to-market and deployment. Saves as much as 12-18 man-months of development effort.

**Power management:** Optimized power management enables years-long battery life. Simple APIs that enable fast low-power state transitions for easy code development.

**Network management:** SNMP manager used for communication of management and data packets through UDP/IP. Simple API that reduces complexity of developing network management features.

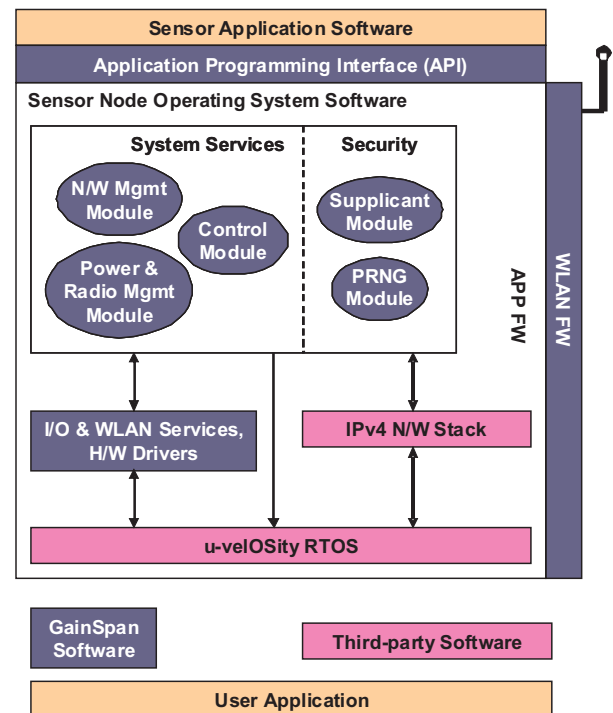
**I/O services and drivers:** Enables sensor applications to interact with external sensors. Simplifies customer application development.

**Security:** Provides enterprise-level 802.11i security service (WPA2-PSK) for key generation and authentication (EAP-FAST) with server. Does not require customer to spend development time on security.

**Network stack:** Green Hills Software's IPv4 network stack that supports TCP/IP/ARP/ICMP/DHCP protocols. Provides customer with a full IP functionality on a sensor node.

**Real time operating system:** Green Hills Software's *μVelOSity Real Time Operating System* (RTOS) which provides fast boot up times, small size, multi-tasking functionality, real-time response via interrupts and timers. Provides customers with design flexibility.

**Application software:** GainSpan's reference sensor application (temperature, light, pressure, accelerometer) provides examples that can be easily modified to fit customer applications, thus speeding up product development.



system solution for Wi-Fi sensors based on GainSpan's GS1010 SoC.

The GainSpan Embedded Software consists of wireless LAN firmware (WLAN FW) and application firmware (APP FW). Each runs on a dedicated ARM7 core within the device. The WLAN FW is provided in binary format, while the APP FW comes in linkable object and source format.

The WLAN FW contains:

- ▶ An 802.11 MAC/PHY and baseband driver functionality

The APP FW contains:

- ▶ About 60 APIs for managing and configuring/communicating with the device
- ▶ An IPv4 network and SNMP management stack (TCP/IP/ARP/DHCP)
- ▶ 802.11i security (WPA2-PSK) and EAP-FAST authentication
- ▶ Low-footprint, reliable, and fast RTOS
- ▶ System services for control, power, and network management functionality
- ▶ I/O drivers to interact with external devices

## GAINSPAN EMBEDDED SENSOR NODE SOFTWARE

### GS1010 EMBEDDED SOFTWARE MODULES

**Drivers and WLAN firmware:** Provides WLAN MAC and base-band capabilities. Supports over-the-air firmware update for ease of maintenance and future upgrades.

**System services modules:** SNMP manager for interoperability, device configuration, and power management functions.

**I/O services modules:** Enables sensor applications to interact with external sensors.

**Supplicant (optional):** Provides enterprise-level 802.11i security service for key generation and authentication with server.

**GS1010 APIs:** Reduces complexity and development time for customer application software.

**Network stack:** Third-party network stack that supports TCP/IP/ARP/ICMP/DHCP protocols.

**Real time operating system:** Greens Hills Software's *μVelOSity Real Time Operating System* (RTOS) provides interrupts and timers.

**Application software:** Customer sensor application software and *GSDemo* application.

### GS1010 APIs

The GS1010 APIs abstract all the hardware complexity into simple and clear APIs that reduce development time and help improve product maintainability. GainSpan has developed APIs to cover most of the hardware features of the device.

Refer to the *GS1010 Application Programmers Guide* for the latest list of APIs and detailed descriptions of each API and its usage.

### GS1010 EMBEDDED SOFTWARE API GROUPS

The table below describes the functions supported by each API group provided with the GS1010 Embedded

Software. There are currently 58 APIs included with the package. APIs are updated and added as new features are requested by customers.

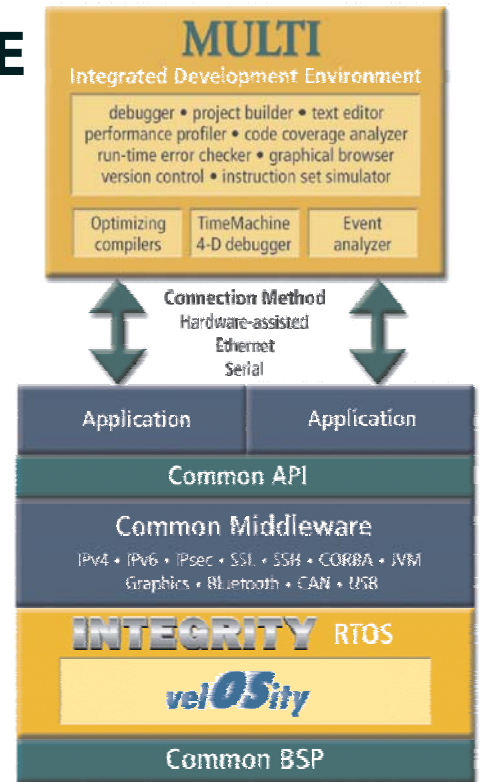
API Group	Number of APIs	Description
Peripherals	26	Provides read, write, and control for all the SPI, UART, I <sup>2</sup> C, ADC, GPIO, and PWM I/Os on the device. Allows customer to easily develop code for reading external sensors or communicating with external devices.
Flash	2	Supports read and write configuration parameters from flash memory.
RTC	1	Ability to read the real time clock.
Power management	5	Ability to put the device into low-power state.
Network management and socket services	3	Perform configuration, link-up, or firmware update and send UDP or TCP packets.
Timers	3	Start, stop, and control of timers.
System services	9	Services to enable watch dog timers, scanning for access points, and setting parameters for WLAN activities.
IEEE 1588 (TSYNC)	9	Get a more granular timestamp by setting start, stop, and reading timers per IEEE 1588.

# GREEN HILLS® SOFTWARE MULTI IDE



Green Hills Software's *MULTI* Integrated Development Environment (IDE) includes the industry's most powerful and proven tools for developing embedded software with maximum reliability, maximum performance, and minimum code size. With the *MULTI*'s sophisticated capabilities, you can develop, debug, and optimize code more quickly, significantly reducing both development cost and time.

*MULTI* is provided as part of the GS1010 Software Development Kit.



# GREEN HILLS SOFTWARE SLINGSHOT

Green Hills Software's *Slingshot* is an advanced hardware debug device that enables the *MULTI* debugger to load, control, debug, and test a target system without the need for prior board initialization, an RTOS, or even a ROM monitor.

Combined with the *MULTI* Integrated Development Environment, *Slingshot* supports:

- ▶ Source-level debugging
- ▶ Real-time event viewing
- ▶ Application run-time error checking
- ▶ Memory lead detection

*Slingshot* is provided as part of the GS1010 Software Development Kit.



## ORDERING INFO

<i>Part Number</i>	<i>Item</i>
GS1010-SDK	Software Development Kit <i>Comes complete with one Development Board, Embedded Sensor Node Software, a wireless access point, a Green Hills Software's MULTI IDE, a Green Hills Software's Slingshot, one-year Development Support &amp; Maintenance, a development license for GainSpan Software, power supply, and cables.</i>
GS1010-SDK-SUPP	Development Support & Maintenance – 1 Year
GS1010-SDK-BRD	Development Board <i>Replacement board only.</i>

# GAINSPAN MANAGEMENT SYSTEM

## An optimized software solution for sensor networks

Managing a battery-powered sensor node in a wireless sensor network presents a significant challenge for today's enterprise networks as the wireless sensor nodes spend most of their time with their radios turned off to conserve battery life. Today's enterprise networks expect an "always available" interface from the wireless sensor networks and their individual sensor nodes. The GainSpan Management System (GMS) software was developed to address this challenge.

The GMS server software runs on any platform with Linux OS and logically sits between an enterprise network management system (NMS) or an industrial control system and a wireless sensor network (WSN) based on GainSpan's system-on-a-chip (SoC) wireless sensor nodes. The GMS is always available to network management systems to manage and control the WSN and its individual wireless sensor nodes.

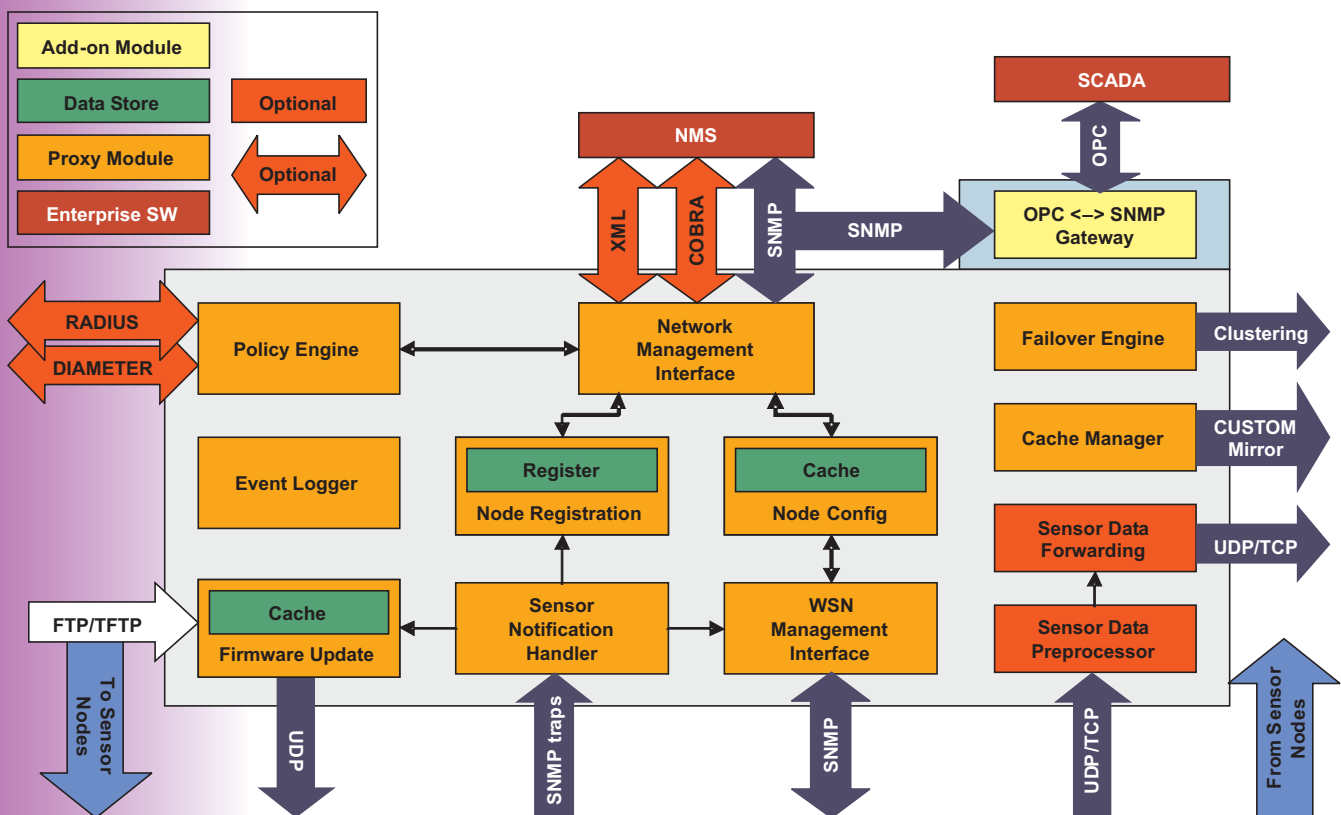
The GMS server intelligently aggregates management and control requests and responses from the enterprise management systems and communicates with the sensor nodes to actively listen for configuration mes-

sages or firmware updates whenever they come on. This enables the wireless sensor nodes to be seamlessly deployed in current enterprise networks without degrading the battery life of the sensor nodes. The key to maximizing each sensor node's battery life is by ensuring that the GMS can communicate with the sensor network with minimal network hops.

In addition, the GMS manages both node configuration and firmware updates for a deployed network of wireless sensor nodes. GMS uses policies to determine which firmware and configuration changes to send to which nodes. To maximize node battery life, GMS uses a reliable and power-efficient over-the-air protocol.

The GMS is designed from the bottom up to be a fault tolerant system on the industrial or enterprise network. Built-in clustering and cache mirroring features facilitate seamless failover in the event of any detected fault.

Although typically used for management and control functions, the GMS can optionally be also placed in the data path. The GMS can then perform data pre-processing functions such as aggregating data from multiple





## GAINSPAN MANAGEMENT SYSTEM FUNCTIONAL DESCRIPTION

The list below describes the functionality of each module of the GainSpan Management System.

**Node registration:** Keeps track of the status and availability of wireless sensor nodes.

**Policy engine:** Management of individual sensor nodes, classes of nodes, or groups of nodes, based on administrator-configured policies. These policies may be set via the NMS or by AAA servers using RADIUS or DIAMETER.

**WSN management interface:** Wireless sensor nodes periodically open short configuration windows. The GMS uses SNMP to perform management and control functions during this time.

**Network management interface:** An SNMP interface to enterprise NMS for sensor node and network management and control. This interface is also used to manage and control the GMS itself. Optionally, this interface can also support XML or CORBA.

**Node configuration:** Caches current node configurations. Also manages configuration change requests from NMS and due to policy changes. During the node configuration window, this applies any required changes to the node and updates the cache.

**Sensor notification handler:** Nodes send SNMP traps to send unsolicited alarm and status conditions, to open the configuration window, and during the firmware update procedure. This module handles and routes these traps appropriately.

**Sensor data preprocessor:** This optional and highly-configurable module provides collection, processing, and reporting of sensor node data and statistics.

**Sensor data forwarding:** This optional module forwards received sensor data to one or more network data servers.

**Firmware update:** Accepts new sensor node firmware images from the FTP. These images are stored and used to update the sensor nodes per an appropriate configuration policy using a reliable and power-efficient protocol.

**Failover engine and cache manager:** These modules work together to provide fault tolerance. A secondary GMS detects the failure of the primary and automatically takes over, providing seamless failover with no downtime.

**OPC-to-SNMP gateway module:** Add-on module which translate from non-SNMP protocols to SNMP, e.g., from a SCADA system using OPC.

**Logging:** Events and transactions are logged to provide network fault diagnostics and performance tuning.

sensors or calculating statistics on data from individual sensors.

The GMS uses standards-based SNMP, XML, and CORBA interfaces to integrate seamlessly with existing enterprise systems. Integration with other legacy management and control systems (such as a SCADA system using OPC) only requires a simple add-on gateway module.

### FEATURES & BENEFITS

- ▶ Provides “always up” sensor network interface to Network Management System (NMS)
- ▶ Maximizes sensor node battery life

- ▶ Standards-based (SNMP) wireless sensor network and wireless sensor node configuration
- ▶ Integrates with existing enterprise NMS, PLC, or industrial control systems
- ▶ Manages field firmware upgrades of wireless sensor nodes
- ▶ Aggregates, pre-processes, and summarizes collected sensor data
- ▶ Supports fault tolerant deployment
- ▶ Supports standard network protocols
  - Node interface: IPv4, UDP, TCP, SNMPv1
  - NMS interface: SNMPv1/v3
  - Remote firmware upgrade: FTP

### ORDERING INFO

<i>Part Number</i>	<i>Item</i>
GS-GMS-SW-SRC	GainSpan Management System – Source Code
GS-GMS-SUPP	GainSpan Management System – Source Code Maintenance – 1 Year

For more information, please contact GainSpan.

# SUMMARY PRODUCTS LIST

## GS1010 ULTRA-LOW-POWER WIRELESS SYSTEM-ON-CHIP

<i>Part Number</i>	<i>Item</i>
GS1010	GS1010 IC Device

## GS1010 EVALUATION KIT

<i>Part Number</i>	<i>Item</i>
GS1010-EVAL-TLS	Evaluation Kit
GS1010-EVAL-103	Evaluation Kit Starter Bundle (with 3 Reference Boards)
GS1010-EVAL-105	Evaluation Kit Starter Bundle (with 5 Reference Boards)
GS1010-EVAL-110	Evaluation Kit 10-node Bundle (with 10 Reference Boards)
GS1010-REF-TLS	Reference Board (additional sensor node for use with Evaluation Kit only)

## GS1010 SOFTWARE DEVELOPMENT KIT

<i>Part Number</i>	<i>Item</i>
GS1010-SDK	Software Development Kit <i>Comes complete with one Development Board, Embedded Sensor Node Software, a wireless access point, a Green Hills Software's MULTI IDE, a Green Hills Software's Slingshot, one-year Development Support &amp; Maintenance, a development license for GainSpan Software, power supply, and cables.</i>
GS1010-SDK-SUPP	Development Support & Maintenance – 1 Year
GS1010-SDK-BRD	Development Board <i>Replacement board only.</i>

## GAINSPAN MANAGEMENT SYSTEM

<i>Part Number</i>	<i>Item</i>
GS-GMS-SW-SRC	GainSpan Management System – Source Code
GS-GMS-SUPP	GainSpan Management System – Source Code Maintenance – 1 Year

*For more information, please contact GainSpan.*

# NOTES

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GainSpan is headquartered in Silicon Valley, near San Jose, California, with offices in Bangalore, India.

**G**AINSPAN REPRESENTS a breakthrough in the world of embedded Wi-Fi sensor networks capable of monitoring, controlling, and managing processes, from the factory floor to the city streets, delivering remarkable cost and energy savings, increased efficiency, and added convenience.

Thanks to a total solution, incorporating GainSpan's innovative combination of silicon and software products, you'll be leveraging more of today's expanding Wi-Fi network infrastructure.

### **MORE THAN TECHNOLOGY – A TOTAL SOLUTION**

GainSpan thinking goes well beyond superior product design. Our total solution includes semiconductors and software that operate with standard 802.11 wireless networks.

The technology incorporates a highly integrated "system on a chip" and a comprehensive suite of software, featuring intelligent power management that enables sensors and other devices to operate for years on a single AA-size battery. Together, the chip and software solution is designed to speed OEM time-to-market and reduce development costs, delivering a better return on investment.

No other company combines the low battery consumption, Wi-Fi friendliness, and complete solution available from GainSpan.

For more information on GainSpan and our solutions, please contact us at:

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