

# SG-Link<sup>®</sup>-RGD-LXRS<sup>®</sup>

## Ruggedized Wireless 4 Channel Analog Sensor Node



SG-Link<sup>®</sup>-RGD-LXRS<sup>®</sup> - versatile, ruggedized four-channel analog sensor node with integrated triaxial accelerometer

LORD MicroStrain<sup>®</sup> LXRS<sup>®</sup> Wireless Sensor Networks enable simultaneous, high-speed sensing and data aggregation from scalable sensor networks. Our wireless sensing systems are ideal for sensor monitoring, data acquisition, performance analysis, and sensing response applications.

The **gateways** are the heart of the LORD MicroStrain wireless sensing system. They coordinate and maintain wireless transmissions across a network of distributed wireless sensor **nodes**. The LORD MicroStrain LXRS wireless communication protocol between LXRS nodes and gateways enable high-speed sampling,  $\pm 32$  microseconds node-to-node synchronization, and lossless data throughput under most operating conditions.

Users can easily program nodes for data logging, continuous, and periodic burst sampling with the **Node Commander<sup>®</sup>** software. The web-based **SensorCloud<sup>™</sup>** interface optimizes data aggregation, analysis, presentation, and alerts for gigabytes of sensor data from remote networks.

### Product Highlights

- Four analog input channels, integrated three-axis accelerometer, and an internal temperature sensor
- Integrated strain sensor signal conditioning, embedded processing, and environmentally hardened form factor ideal for permanently mounting over strain gauges
- Supports conventional bonded foil, piezoelectric-resistive, Wheatstone bridge, and modular Columbia Research Labs-type strain gauges
- Triaxial accelerometer utilizes MEMS technology and has a  $\pm 16 g$  range
- User-programmable sample rates up to 4096 Hz

### Features and Benefits

#### High Performance

- Lossless data throughput and node-to-node sampling synchronization of  $\pm 32 \mu s$  in LXRS-enabled modes
- High resolution data with 16-bit A/D converter
- Wireless range up to 2 km (800 m typical)

#### Ease of Use

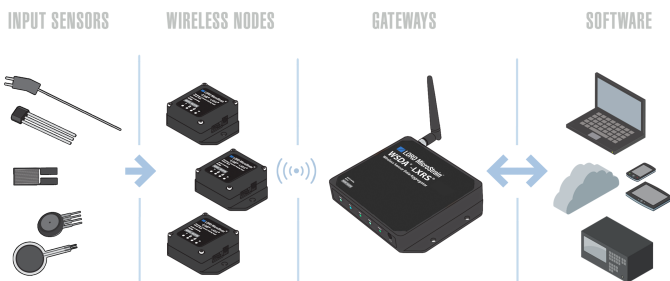
- Scalable networks for easy expansion
- Flex bonding cable and node form factor allow quick installation over existing strain gauges
- Low profile, ruggedized enclosure
- On-board shunt calibration

#### Cost Effective

- Reduction of costs associated with wiring
- Out-of-the box wireless sensing solution reduces development and deployment time.

### Applications

- Condition-based monitoring
- Experimental test and measurement
- Robotics and machine control
- Wireless flight testing of fixed and rotary wing aircraft

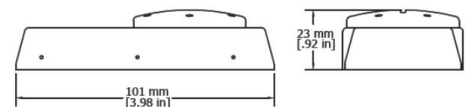
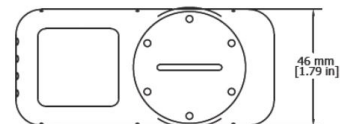
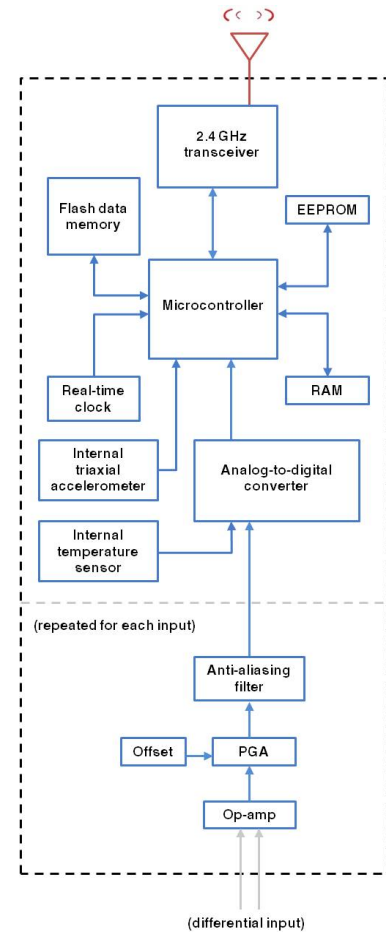


Wireless Simplicity, Hardwired Reliability<sup>™</sup>

# SG-Link®-RGD-LXRS® Ruggedized Wireless 4 Channel Analog Sensor Node

## Specifications

General	
Sensor input channels	Differential analog, 4 channels
Integrated sensors	Triaxial MEMS accelerometer, 3 channels Internal temperature, 1 channel
Data storage capacity	2 M bytes (up to 1,000,000 data points, data type dependent)
Analog Input Channels	
Measurement range	Differential: full-bridge, $\geq 350 \Omega$ (factory configurable)
Accuracy and resolution	$\pm 0.1\%$ full scale typical, 16 bit resolution
Anti-aliasing filter bandwidth	Single-pole Butterworth -3 dB cutoff @ 250 Hz
Bridge excitation voltage	+2.7 V dc, 50 mA total for all channels (pulsed @ sample rates $\leq 16$ Hz to conserve power)
Measurement gain and offset	User-selectable in software on differential channels, gain values from 31 to 595
Integrated Accelerometer Channels	
Measurement range	$\pm 16 g$
Accuracy and resolution	$\pm 4 mg$ , 13 bit resolution
Integrated Temperature Channel	
Measurement range	-40 °C to 85 °C
Accuracy and resolution	$\pm 2$ °C (at 25 °C) typical, 16 bit resolution
Sampling	
Sampling modes	Synchronized, low duty cycle, datalogging
Sampling rates	<b>Continuous sampling:</b> 1 sample/hour to 512 Hz <b>Periodic burst sampling:</b> 32 Hz to 4096 Hz <b>Datalogging:</b> 32 Hz to 4096 Hz
Sample rate stability	$\pm 3$ ppm
Network capacity	Up to 2000 nodes per RF channel (and per gateway) Refer to the system bandwidth calculator: <a href="http://www.microstrain.com/configure-your-system">http://www.microstrain.com/configure-your-system</a>
Synchronization between nodes	$\pm 32 \mu\text{sec}$
Operating Parameters	
Wireless communication range	Outdoor/line-of-sight: 2 km (ideal) *, 800 m (typical)** Indoor/obstructions: 50 m (typical)**
Radio frequency (RF) transceiver carrier	2.405 to 2.470 GHz direct sequence spread spectrum over 14 channels, license free worldwide, radiated power programmable from 0 dBm (1 mW) to 16 dBm (39 mW); low power option available for use outside the U.S.- limited to 10dBm (10mW)
RF communication protocol	IEEE 802.15.4
Power source	Replaceable 3.6 V dc, 1.7 Ah Tadiran TL-5935 Lithium 1/6 D-cell battery
Power consumption	960 $\mu\text{A}$ (3.46 mW) with 3 channels @ 32 Hz, continuous 10.6 mA (38.16 mW) with 3 channels @ 256 Hz, continuous 4.0 mA (14.4 mW) with 1 channel @ 256 Hz, continuous
Operating temperature	-40 °C to +85 °C
Acceleration limit	500 g standard (high g option available)
Physical Specifications	
Dimensions	101 mm x 46 mm x 26 mm
Weight	150 g (including battery)
EMI/EMC rating	MIL-STD-461F
Enclosure material	Clear polycarbonate
Integration	
Compatible gateways	All WSDA® base stations and gateways
Compatible sensors	Bridge type analog sensors
Connectors	Flex cable terminal/solder pads (flex cable included)
Shunt calibration	Internal shunt calibration resistor 499 K $\Omega$ , differential channels
Software	SensorCloud™, SensorConnect™, Node Commander®, Windows XP/Vista/7
Software development kit (SDK)	Data communications protocol available with EEPROM maps and sample code (OS and computing platform independent) <a href="http://www.microstrain.com/wireless/sdk">http://www.microstrain.com/wireless/sdk</a>
Regulatory compliance	FCC (U.S.), IC (Canada), ROHS



\*Measured with antennas elevated, no obstructions, and no RF interferers.

\*\*Actual range varies depending on conditions such as obstructions, RF interference, antenna height, & antenna orientation.

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