

Range Extender Node: Intermediary Range Extender & Network Expander

Wireless Sensor Accessories

Phase IV Data Sheet Leap Sensors® Range Extender Node

Applications

- **Building automation:** improves signal transmission through multiple walls and floors
- **Hospital monitoring:** improves transmission distance through large clinics.
- **Storage monitoring:** range extending for large square footage facilities.
- **Heavy industrial monitoring:** improves transmission range in noise heavy environments.

Special Features

- Powered with a 120V wall transformer so that it is always listening.
- Internal battery backup for short-term power outages.
- Transmission range of 1,500 ft. in open air.
- Self-configuring to optimize transmission signal strength and network efficiency.
- Expands a sensor network's size capabilities by 32 devices
- Can act as a parent or child device, allowing multiple Range Extenders to act in series OR in parallel.
- Factory-preconfigured transceiver nodes pair with new or existing gateway for simple integration – up and running in 5 minutes.
- LED indicators on transceiver node for power, network connection, gateway connection, and database connection status.

Description & Product Highlights

Phase IV's Leap Sensors range extender acts as an intermediary node in the Leap Sensors wireless sensor system. Each individual sensor node actively does a combination of signal strength optimization and radio traffic optimization across a network of range extenders and gateways, as opposed to simply optimizing signal strength. In addition, the range extender and sensor nodes will actively optimize this connectivity if a gateway, sensor node, or range extender is moved or disabled.

The Leap Sensors range extender is also an inexpensive and effective way of expanding the maximum amount of connected sensors on a single network. Each range extender can connect to 32 individual Leap Sensors transceiver nodes devices, expanding the network size by 31 sensors for each connected range extender.

The Leap Sensors system is intended primarily for the purpose of performing industrial sensor measurements.



Range Extender Node Model

Network optimization & flexibility

Each range extender node leverages Thread protocol to be configurable to meet any need. The Range Extender is programmed along with the Leap Sensors transceiver nodes to constantly search for low noise channels, optimize signal strength, and optimize network traffic, with no user configuration required.

Ease of implementation

All Leap range extender nodes come pre-configured and paired with selected Leap Sensors gateways for quick and simple integration into an existing system, or to function in a new stand-alone system. Transceiver nodes automatically pair with the range extender, so no configuration is required by the user to optimize transmission range and signal quality.

Real-time data viewing and alerts

All Leap Sensors range extender nodes stream data to Leap Sensors gateway devices at configurable intervals. This data is accessible and viewable in real time. In addition to real-time viewing and graphing of sensor parameters, alerts based on any sensor condition are configurable, and can be sent via phone call, email, or text for instant communication of a sensor reaching an alert condition.

Leap Sensors® Range Extender Node		
Wall Power Specifications		
Battery Back-up Power	2 X AA alkaline batteries, 5700 mAh	
Power Adaptor	5 VDC, 1500 mW max	
Barrel Jack	2.5 mm ID barrel connector (5 VDC - 3A AC/DC converter included)	
Back-up Battery Power Specifications		
Backup Battery Life	4 - 8 weeks at maximum transmission load*	
Power / Current Consumption	Typical Operating Current: 6mA - 30mA (depending on sensors) Typical Transmit Current: 9mA @ 0dBm and 80mA @ 20 dBm RX Current: 11 mA	
Wireless Specifications		
Wireless Transmission Range	Industrial Environments**	Open-Air**
	500 ft	1,500 ft
Node Connectivity Bandwidth	32 Leap Sensors Edge Nodes can connect to each Range Extender Node.	
RF Transmission Power	User configurable 0-20 dBm, factory configured to 20 dBm***	
RF Communication Protocol	Internet Protocol based thread, IPV6LoWPAN, IEEE 802.15.4	
RF Frequency and Modulation	2.4 GHz (16 Channels), DSSS provides higher noise and interference resistance)	
Data Security	AES 128-bit encryption with secure join and key exchange (J-PAKE)	
Other Features		
Operating Temp.	- 40 °C to 60 °C, -40 °C to 120 °C available – special order	
Gateway Compatibility	Compatible with all Leap Sensors® wireless gateways	
Sensor Compatibility	Compatible with all Leap Sensors® wireless nodes	
Firmware	Over-the-air upgradeable via web interface	
Gateway Communication	Send and receive (data & acknowledgements from child nodes), & (updates & device configuration from parent gateways).	
LED Power Switch	Recessed in the enclosure to prevent accidental power cycling. On-switch is recessed. Off-switch flush with surface. Immediately resets transceiver node when turned off. Integrated green and red LED indicate wireless connection status at power-up.	
Internal Memory	110,000 time-stamped device readings stored on transceiver node if gateway does not acknowledge writing data to database.	
Enclosure & Hardware Specifications		
Dimensions	113 mm x 80 mm x 60 mm****	
Weight	355g typical for complete transceiver node	
Material	Polycarbonate (UL-94 and 120C rated)	
Ingress Protection	IP68 enclosure. IP67 glands, cables, switch.	
Node Antenna	Internal antenna (typical). External antenna (optional).	

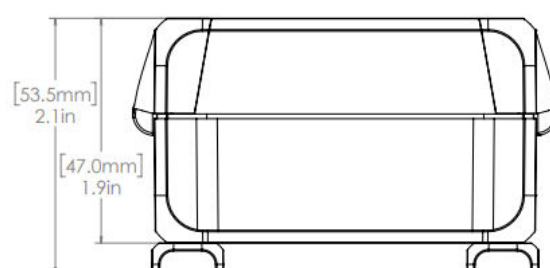
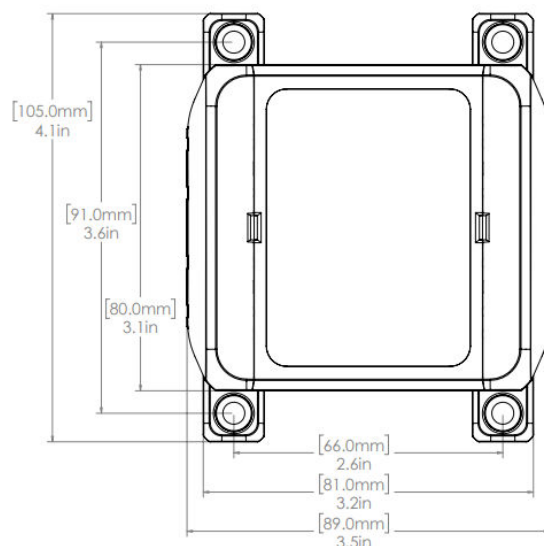
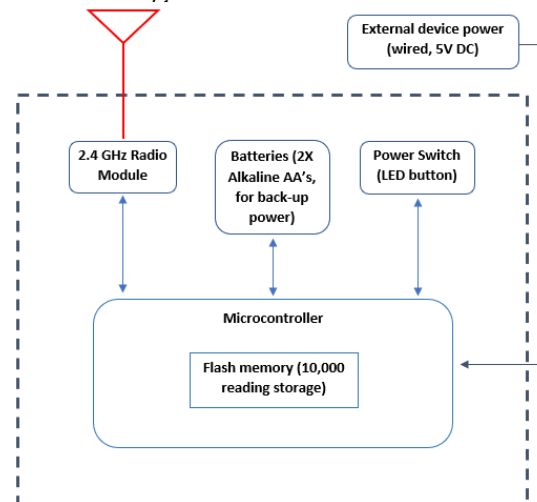
*Battery life will depend entirely on data throughput; specifications are experimental results.

** Transmission ranges vary with environmental conditions. Reported values are test averages.

*** Transmission power requirements are governed regionally.

****Enclosure dimensions and weights vary, see specific sensor system datasheets for dimensions.

[Inbound sensor data from other device nodes, and outbound signal-boosted transmissions to other Range Extenders or Gateways]





Range Extender Features Legend	
1	Range Extender Node
2	Internal Chip Antenna (3000' Maximum Transmission Range)
3	5V DC Power Converter
4	2.5 mm Barrel Jack
5	Diagnostic LED Power Switch