Chipsmall

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

SMART WIRELESS COVERAGE FOR MILES AND MILES

The RM1xx series of modules offer a powerful, convenient solution for long-range Enterprise IoT (EIoT) deployments. Laird innovatively combines Bluetooth® v4.0 with LoRaWAN™, the emerging standard in Low Power Wide Area Networks (LPWAN) into one module. RM1xx modules aggregate and transmit data from Bluetooth® Smart (BLE) devices and sensors over LoRa® to gateways as far as 15 km (~10 miles) away. This bridges the personal area network to the wide area network in a unique way. The RM1xx is LoRa® Alliance and Bluetooth SIG certified and fully interoperable with any LoRaWAN™-adherent gateway.

- **Designed for the EIoT** – Innovative combination of BT™ v4.0 and LoRa® makes the RM1xx the bridge between Bluetooth Smart devices and a network that intelligently uses their data.
- **Ultra-low power usage schemes** – Allows years of use on a single battery.
- **Laird's unique *smart*BASIC language** – Makes it extremely easy to create event-driven, hostless applications. No toolchain required.
- **Upgradable firmware** – Prepare for the future with access to feature and security updates.
- **Compliant with FCC, CE regulations** – Available as the RM186 (CE) or RM191 (FCC).

Features at a Glance

AGGREGATE AND UTILIZE EIoT DATA
BLE + LoRa enables automated, intelligent monitoring and control of BLE devices, creating scenarios that were previously impossible.

BRIDGE TO LPWAN YOUR WAY
Combination of physical and wireless interfaces including: Bluetooth v4.0 (BLE Central), physical UART, SPI, I2C, GPIO, or ADC.

COMPREHENSIVE, MULTI-LAYER ENTERPRISE SECURITY
Robust security on either public or private LoRa networks, with three layers of keys and AES-128 encryption.

SPEED TO MARKET WITH *smart*BASIC
Easily write event-driven apps for any use case and run in the module. No toolchain required.

BASED ON AWARD-WINNING BL6x0 SERIES
Includes Whisper Mode for proximity pairing, low power BLE operation, and onboard microcontroller for hostless operation.

PERSONAL SUPPORT FROM DESIGN TO MANUFACTURE
Support works onsite with Laird engineering to speed your design to market.

Actual Size (25.4mm x 25.4mm)

Application Areas

Smart Metering and Remote Sensing

Industrial Automation/Monitoring and Control

Agricultural and Rural IoT/M2M Applications

Contact Sales -   Americas: +1 262 375 4400   Korea: +82 10 2622 3935
                   Europe: +44 1628 940 ext. 958   Hong Kong: +852 2923 0610

Interested in Laird's RM1xx modules?
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Key Specifications

Category	Feature	Specification
LoRa®	Specification	LoRa MAC Class A Specification
	RF Connector	U.FL
	Frequency	RM186 (Europe): 863 – 870 MHz RM191 (US): 902 – 928 MHz
	Max Tx Power	RM186 (Europe): 14 dBm ERP (2dBi dipole) RM191 (US): 15 dBm ERP (2dBi dipole)
	Receiver Sensitivity	Up to -135 dBm
	Modulation	LoRa – Chirp Spread Spectrum
	Data Rate	RM186 (Europe): 250 bps – 50 kbps RM191 (US): 980 bps – 21.9 kbps
Bluetooth® Low Energy	Specification	V4.0 –Bluetooth® Smart– Central mode
	Frequency	2.402 - 2.480 GHz
	Max Tx Power	+3 dBm radiated (via on-board chip antenna)
	Whisper Mode Tx Power	-55 dBm
	Link Budget	95 dB (@ 1 Mbps)
	Raw Data Rates	1 Mbps (over the air)
	Services	GATT Client Capability
Host Interfaces	Total	14 lines: UART (4), GPIO (14 max), SPI (3), I2C (2), ADC (4)
	UART Description	Tx, Rx, CTS, RTS lines. Default: 115200, N, ,8, 1. Baud from 1,200 to 921,600bps
Control Protocols		Any that can be implemented using the onboard *smart*BASIC
Encryption	AES	128 bit
Supply Voltage	Supply	1.8V – 3.6V; Internally regulated
Power	Current	Both Modules: Deep Sleep = < 1uA, BLE Tx – 10.5mA @ full power RM191: LoRa Transmit – 48mA @ 15 dBm LoRa + BLE Transmit – 58mA RM186: LoRa Transmit – 36mA @ 13.5 dBm LoRa + BLE Transmit – 46mA
Physical	Dimensions	25.4 mm x 25.4 mm x 3.15 mm
Environmental	Operating Temperature	-40° to +85°C
Approvals	FCC / IC	RM191 - Modular Approval: Part 15.247 & 15.249
	CE	RM186 - EN 300 220 & EN 300 328
	LoRa™ Alliance	LoRa Alliance Certified
	Bluetooth®	Bluetooth SIG Listed – Declaration ID # D030952

Ordering Information

Part Number	Description	Availability
RM186-SM	Intelligent LoRa/BLE Module (868MHz LoRa for Europe) featuring *smart*BASIC	End of May 2016
RM191-SM	Intelligent LoRa/BLE Module (915MHz LoRa for US/Canada) featuring *smart*BASIC	End of May 2016
DVK-RM186-SM	Development Kit for LoRa/BLE Module (868MHz LoRa for Europe)	End of May 2016
DVK-RM191-SM	Development Kit for LoRa/BLE Module (915MHz LoRa for US/Canada)	End of May 2016

Did You Know?

LSR, a Laird Business, is a leader in Wireless Product Development, offering true end-to-end solutions through its array of services and technical expertise.

LSR a Laird Business

Design Services
- RF Hardware and Antenna Design
- Software/Firmware Development
- Mobile App / Cloud Development
- Industrial Design
- Mechanical Engineering

EMC Testing & Certification
- On-Site FCC/IC/CE/Giteki/RCM EMC Certification
- Wireless and Antenna Testing
- EMC Emissions Testing
- International Testing Services

To learn more about LSR visit: www.lsr.com

What is LoRa®?

The **Enterprise Internet of Things (EIoT)** is a massive network of connected devices and sensors that is taking shape as new technologies bring connectivity to unprecedented applications. By 2020, ABI research predicts **40.9 billion wireless devices** will be connected, like smart meters, street lights, security sensors, industrial controls, and more. However, an infrastructure must be in place to enable the EIoT to thrive in remote areas. While current networks (like cellular) were made for very different applications with other requirements and priorities, **Low Power Wide Area Networking (LPWAN)** solutions are emerging to specifically address these EIoT applications.

Low Power Wide Area Networking (LPWAN) is not a specific technology, but rather a category of technologies. It provides wireless connectivity to extremely power conscious devices in networks that can blanket everything from large facilities to entire cities. This means **enabling data acquisition, providing useful controls, and generating logistical insights and actionable data.** Devices that were once impractical to connect are being designed into real world systems that were mere dreams just years ago. But these devices all need a robust, reliable wireless infrastructure built on specific technologies to manage and interconnect them.

Many protocols and technologies exist in this space, trying to solve this challenge in unique ways with different strengths and weaknesses. The most promising and flexible is **LoRa®**, developed by the LoRa® Alliance and powered by LoRa® chipsets from Semtech. The LoRa® Alliance is a non-profit collection of companies that aims to standardize LPWAN worldwide via LoRa® technology. Version 1.0 of the LoRa® specification was released in June 2015, providing a technology with a **remarkable balance when it comes to cost of deployment, flexibility, and performance**. Its core strengths make it an ideal LPWAN offering for EIoT that eliminates many costs and challenges associated with provisioning such a network.

Best Balance of LPWAN Characteristics and Features

Generally, LPWAN technologies (and therefore the choice of an EIoT solution) can be thought of in terms of three primary characteristics: **power consumption, range, and cost**. LPWAN is meant to provide connectivity over long ranges utilizing minimal power, but figures vary among competing solutions. LoRa® provides an attractive balance between the highest and lowest of LPWAN data rates, providing a theoretical **~21.9 kbps** that more than exceeds the requirements of the vast majority of LPWAN applications with overhead to spare (for example, this is nearly 40 times the maximum data rate of SIGFOX). Likewise, **when compared to LTE-M cellular solutions, LoRa® provides the same or greater range and is much less expensive**. In a large and competitive field of LPWAN options, LoRa® provides the surest path to success.

	SIGFOX	LoRa®	*LTE-M (Cellular)*
Data Rate	< 0.1 kbps [1]	~21.9 kbps	< 150 kbps [1]
Cost of Module			
Range	< 13 km [1]	Up to 15 km	< 15 km [1]
Ongoing Costs	Paid Subscription Model	Paid Subscription OR Free / Independent	Paid Subscription Model

1. Nokia Networks. "LTE-M – Optimizing LTE for the Internet of Things." Retrieved 11 Feb 2016.

Reduce or Eliminate Dependence on a Network Carrier

Where other competing solutions require you connect through existing gateways maintained by carriers for a fee, LoRa® uniquely allows you to connect to either **an open (public) network or to your own closed (private) network**. No other current LPWAN solution offers this self-contained, full-ownership option. Owning the complete infrastructure means not relying on a provider to continue supporting your LPWAN offering, mitigating risk when entering the EIoT space. This model has the triple advantage of **eliminating reliance on a third party provider, eliminating monthly subscription costs**, and **total end-to-end data control,** providing the smartest path forward into LPWAN networks at a time of competing solutions and providers.

Meets and Exceeds EIoT Requirements

LoRa®'s features and specifications make it an ideal EIoT solution, balancing throughput and range to optimize both while using minimal power. **LoRa® Class A** nodes like the RM1xx achieve either a **maximum range (Up to 15 km, around 10 miles)**, a **maximum data rate (~21.9 kbps)** or a balance of each as is required by the application. Class A LoRa® nodes are very power conscious, only enabling their **extremely efficient 10 mA RF receivers** briefly after transmitting, ideal for battery-operated remote devices. All LoRa® nodes and gateways are interoperable and can be certified with the LoRa® Alliance, ensuring your device can migrate to any desired network hassle-free.

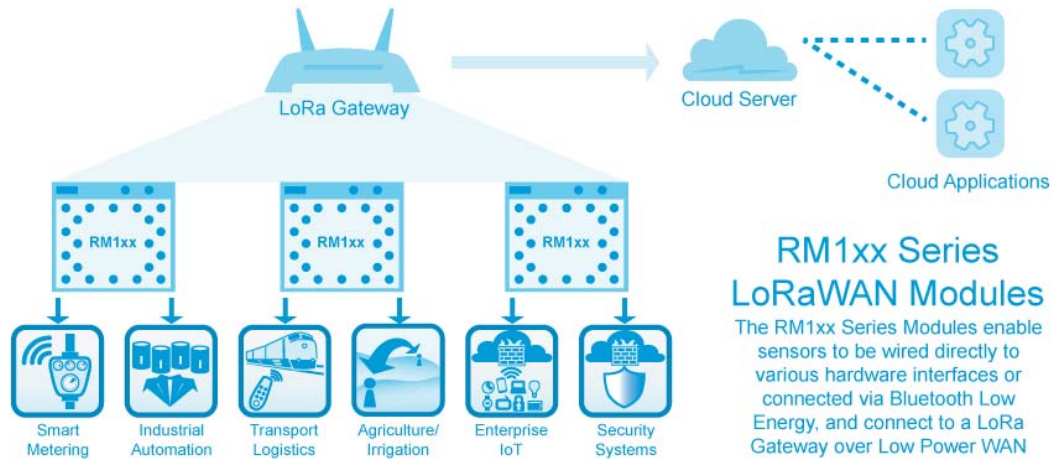## Enterprise Security for Sensitive Applications

In addition to **AES-128 security**, LoRa® employs a scheme **of device, application, and network security keys** to authenticate end nodes and secure their traffic. This three-level approach ensures that only trusted devices can interface with your device and its application. The end result is public and private networks with heightened intelligence and the ability to screen and authorize just the nodes you want to participate on your network. LoRa® offers the kind of robust security that EIoT networks demand as the emergent wave of connected devices approaches.

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                 Europe: +44 1628 940 ext. 958   Hong Kong: +852 2923 0610

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LoRa® Structure

LoRa® nodes are arranged in a star topology, with a gateway (server) connected to many nodes (clients) in range. The client bridges to a LoRa® gateway, which sends data sent over the internet for storage, access, and processing. Because LoRa® is bidirectional, data can also be pushed down to the client, triggering actions based on insights from the cloud or for administrative purposes.
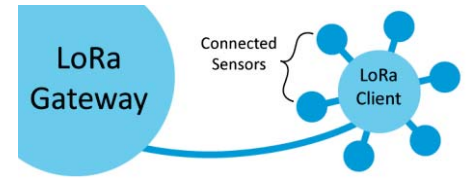
Laird's RM1xx series modules take the structure of LoRa® to the next level. The RM1xx is the first LoRa® module that also contains Bluetooth® Smart (Bluetooth v4.0 or BLE). This creates a more powerful and flexible star of stars topology in which the RM1xx module acts as a bridge between the Personal Area Network of Bluetooth v4.0 and the Wide Area Network of LoRa®. This means BLE devices, which regularly have a range of a few meters, can communicate for miles with the RM1xx, enabling a massive array of new applications.

RM1xx Series LoRaWAN Modules

The RM1xx Series Modules enable sensors to be wired directly to various hardware interfaces or connected via Bluetooth Low Energy, and connect to a LoRa Gateway over Low Power WAN

LoRa® Is an Ideal Protocol for Countless EIoT Applications

Smart, Central Metering

The RM1xx is ideal for smart metering. It may be connected to a residential utility meter and transmit usage data to a LoRa® gateway within 10 miles. Low-volume data means low data rates and batteries that last years without replacement. Usage data may further be routed to cloud storage and applications for processing, billing, analytics, and insight.

Remote Security Monitoring

The RM1xx excels with home security devices like door, window, and motions sensors. An RM1xx-powered home security system can broadcast its status regularly to a monitoring station via a LoRa® gateway. As many as eight peripherals can be connected to the system via Bluetooth Smart, creating a hub of smart BLE home sensors.

Industrial Automation

Sensor data can provide deep insights needed to maintain efficiency and productivity, especially in manufacturing. Sensors can monitor and report output vs. targets, downtime vs. uptime, and other critical metrics from the floor across an entire facility with LoRa®. A LoRa® network blankets an entire facility and gathers intelligence with ease.

Municipal Assets Management

Cities and towns can take control over street lights, traffic signals and more with LoRa®. Data from signals and sensors can be collected over LoRa® and used to improve traffic patterns. Damaged devices can call for repairs. Tracking assets that are spread across large areas requires a full-scale network. LoRa® makes this network easy to build and maintain.

The RM1xx series LoRa® + Bluetooth® v4.0 modules uniquely bring Bluetooth® Smart (BLE) and LoRa® together, enabling exciting new applications for the Enterprise Internet of Things. The RM1xx series builds on the flexibility, security, stability, and efficiency of LoRa® to provide the most innovative, powerful, easy to use LoRa® module available. And with *smart*BASIC, Laird dramatically simplifies your application development to reduce your time to market. Visit http://www.lairdtech.com/products/rm1xx-lora-modules to learn more.