Bluetooth® Low Energy Wireless Solution
Multi-hop Communication of Sensor Data

Light

Relay

Illuminance sensor

HEMS controller

Relay

Relay

Light
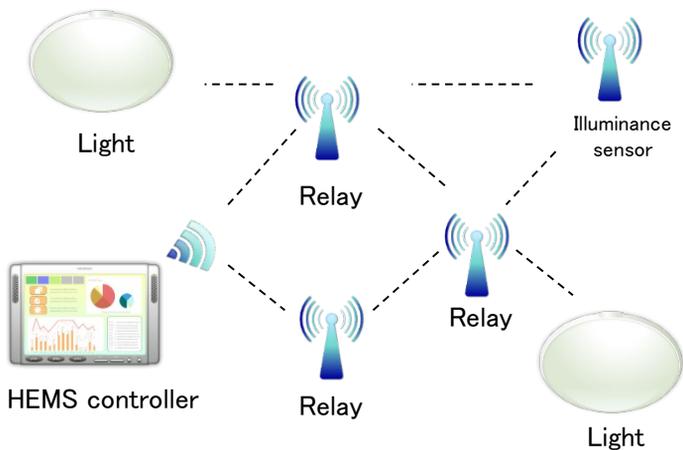
Demand is growing for sensor device networks where various home appliances scattered in a wide area are controlled via relays to ensure comfortable life.

In recent years, an increasing number of customers have adopted Bluetooth Low Energy devices that operate on low power consumption as easy-to-install wireless sensor devices.

Our Bluetooth Low Energy microcontroller "RL78/G1D" allows a simple mesh network to be built using a sample of the beacon-based multi-hop communication function.

Benefits

❭ Low-power wireless microcontroller

RL78/G1D is perfect for low power operation of end devices like sensors.
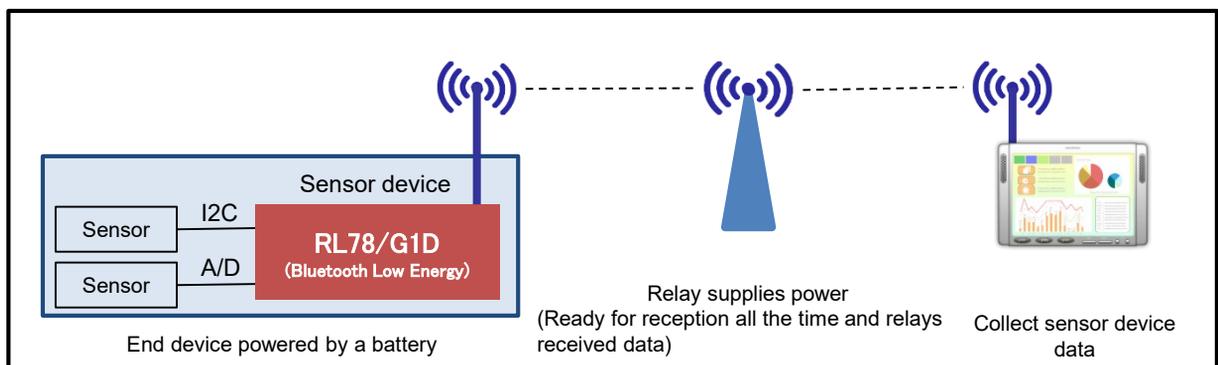
❭ Easy PoC implementation and commercialization

ID settings can be configured individually with ease and readily tested using the on-chip emulator of the microcontroller.

❭ Simple mesh network

A mesh network can be built in a simple manner using a beacon-based flooding technique that does not require route specification.

Application example

Sensor device

Sensor — I2C

Sensor — A/D

RL78/G1D
(Bluetooth Low Energy)

End device powered by a battery

Relay supplies power
(Ready for reception all the time and relays received data)
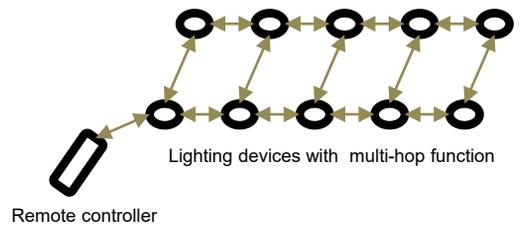
Collect sensor device data

Bluetooth is a registered trademark of Bluetooth SIG, Inc. of the U.S.

Application products

Device control and management in offices and other locations based on events received from devices (remote controller, etc.).

Data	Use
Notifications from remote controllers and other devices	Remote control and linked operation
Events regularly sent from devices	Management of device operation

Lighting devices with multi-hop function

Remote controller

Based on sensor device data, the office environment and the usage condition of devices are managed and the device operations are optimized according to the environment.

Data	Use
Temperature sensor	Optimized operation of air conditioners and other devices
Lighting sensor	Centralized management based on whether lights are off
Motion sensor	Management of the usage condition of rooms

Sensor devices with multi-hop function

Collector

Surveillance monitor
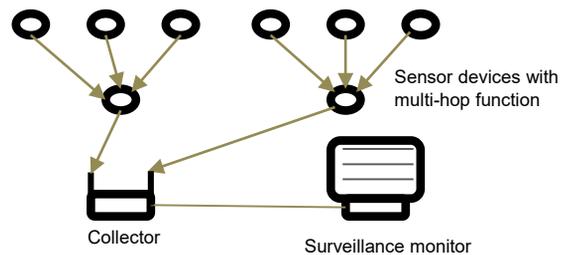
Recommended devices

Block	Semiconductor	Recommended component	Features and others
Control microcontroller	Microcontroller	RL78/G1D group(R5F11A)	Built-in Bluetooth Low Energy
	Module	RL78/G1D module (RY7011A0000DZ00)	Equipped with RL78/G1D, built-in antenna and RF crystal oscillator, consumer-use applications

Related application notes/sample code

Name	Document No.
RL78/G1D Beacon Stack Multi-Hop Feature (without Security)	R01AN4375
RL78/G1D Beacon Stack Multi-Hop Feature (with Security)	R01AN4466

Evaluation board

Name	Model name
RTK0EN0001D01001BZ (RL78/G1D evaluation board) The module mounted on the evaluation board can be replaced with the Bluetooth® Low Energy-enabled embedded radio module (RM-110-RFB-2) manufactured by NAITO DENSEI MACHIDA MFG. Co., Ltd.	RTK0EN0001D01001BZ
Bluetooth® Low Energy-enabled embedded radio module (RM-110-RFB-2) (Equipped with an RL78/G1D module, which can be used to replace the module mounted on the RL78/G1D evaluation board.)	RM-110-RFB-2 (Manufactured by NAITO DENSEI MACHIDA MFG. Co., Ltd.)

Module Evaluation Board (Parts Number:RM-110-RFB-2) (with terminal holes having a pitch of 2.54 mm) Mountable on a breadboard. Sold by Naito Densei Machida Mfg. for early evaluation and development.

Mountable on the RL78/G1D Evaluation Board (RTKOEN0001D01001BZ). Easily debuggable.

For details, go to:
https://www.renesas.com/solutions/bluetooth

■Refer to "http://www.renesas.com" for information on the latest and detailed sales offices.