



UL-RPI1S2R2

UrsaLeo RPi

The UrsaLeo RPi IoT Evaluation Kit is designed to serve as a starting point for connecting sensors to Google Cloud Platform. When assembled and powered on, data from nine different environmental and motion sensors is immediately sent to Google Cloud where it can be viewed and processed using UrsaLeo Cloud Console.

This product is designed to work with the Google Cloud - be sure you can access the said cloud before purchase

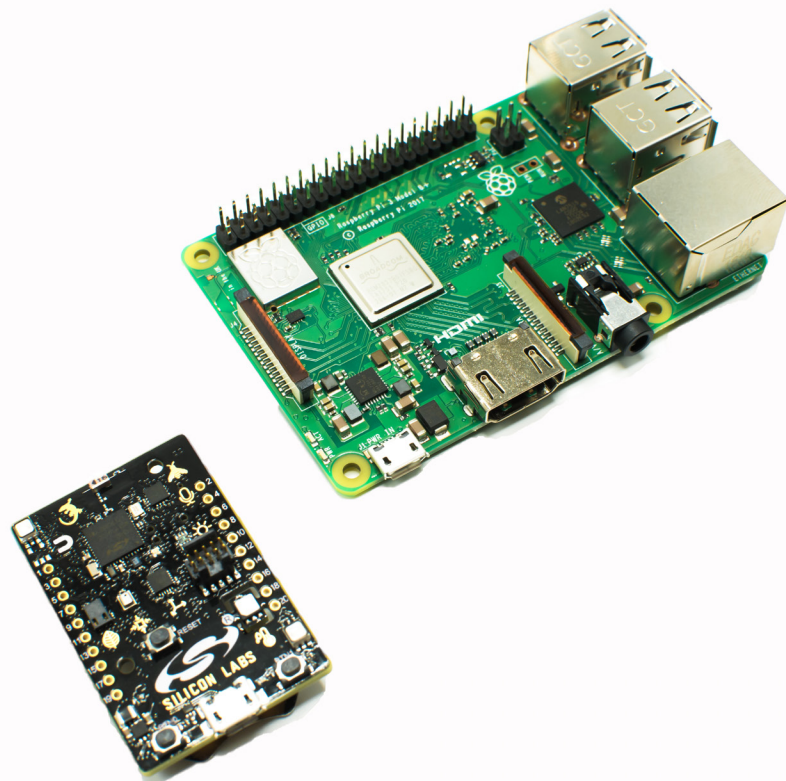
Kit contents

- [Raspberry Pi v3B+ single board computer](#)
- [Silicon Labs Thunderboard 2 sensor board](#)
- Strontronics universal power supply for Raspberry PI
- 16GB uSD card preconfigured with Yocto Linux and UrsaLeo Gateway demonstration application

Getting started

The kit is simple to assemble - follow instructions at www.ursaleo.com/gettingstarted.

First step is to create an UrsaLeo Cloud account that links the Gateway to Google Cloud Platform. Once that is done, the development kit is ready for power-on. UrsaLeo RPi comes pre-loaded with Yocto Linux and the UrsaLeo Gateway demonstration application. Please download the latest image from the UrsaLeo website and follow the instructions to update the application to the latest version. Note that Over-the-Air updates are coming soon, at which point the Gateway will receive further updates without needing to manually flash the device.





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Overview

Once a cloud account has been created using UrsaLeo Cloud Console, the Gateway is ready to connect to Google Cloud and start sending sensor data for display, processing and triggering actions. The sensor board can be powered using a USB cable (recommended) connected to the Gateway or from a coin cell battery. Note: power consumption of the Silicon Labs TB2 means a coin cell will only last one to two days. Once powered on, the Gateway will boot and connect to the sensor board using Bluetooth Low Energy and begin transmitting data to Google Cloud through a wired or wireless internet connection.

Wired Ethernet

Connect an Ethernet cable to either ethernet ports - only DHCP is supported at this time. Both hot and cold plug is supported. Also - please note if WiFi AND wired Ethernet are connected at the same time, unpredictable behaviour can result. At power-on, the Gateway will retrieve the time and date, establish a connection to Google Cloud, and begin sampling the sensors and transmitting data. Readings will start appearing in the UrsaLeo Cloud Console a few seconds later.

Setting up WiFi

The Gateway supports WiFi Protected Access (WPA) and WiFi Protected Access II (WPA2) 802.11 wireless authentication and encryption stan-

dards. Detailed instructions for configuring wireless access is available (www.ursaleo.com/gettingstarted/). Only wired or wireless access is supported. Once configured the Gateway automatically establishes a connection to Google Cloud and begins sampling the sensors and transmitting data. Readings will start appearing in the UrsaLeo Cloud Console a few seconds later. Please note - captive networks or networks that require a login are not supported at this time.

LED debug

UrsaLeo can provide an LED debug board that can be used to indicate the status of the Gateway.

The following LED conditions are available in code version 1.3

- LED 1 on - system clock has updated time / date from NTP server
- LED 2 on - data is being received from the Thunderboard
- LED 3 on - MQTT link is established with Google Cloud
- LED 4,5,6 are reserved for future use or for developers
- All LEDs off - clean shutdown, power can safely be removed

Thunderboard reset

The Thunderboard stops advertising after 30 seconds (before the Gateway finishes booting for example). It is good practice to press the small black reset button on the TB2 after boot-up and at regular intervals.



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Over the Air (OTA) updates

Future software releases will be delivered over the air (OTA). This is important to keep the Linux security patches up to date and the Gateway running smoothly.

Next steps

Once sensor data is flowing from the Gateway and up to Google Cloud, users can start to customize the code for their specific needs. We support requests on our website to:

- Add new sensors to the code base
- Migrate the code to custom hardware using the UrsaLeo SDK + our support
- Support volume manufacturing with UUID and serial numbers to connect to the Google cloud

Gateway specifications (Raspberry Pi 3 Model B+)

- Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC @ 1.4GHz
- 1GB LPDDR2 SDRAM
- 2.4GHz and 5GHz IEEE 802.11.b/g/n/ac wireless LAN, Bluetooth 4.2, BLE
- Gigabit Ethernet over USB 2.0 (maximum throughput 300 Mbps)
- Extended 40-pin GPIO header
- Full-size HDMI
- 4 USB 2.0 ports
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touchscreen display
- 4-pole stereo output and composite video port

- Micro SD port for loading your operating system and storing data
- 5V/2.5A DC power input
- Power-over-Ethernet (PoE) support (requires separate PoE HAT)

Sensor specifications (Silicon Labs Thunderboard Sense 2)

- Relative Humidity and Temperature Sensor Si7021
- UV and Ambient Light Sensor Si1133
- Pressure Sensor BMP280
- Indoor Air Quality and Gas Sensor CCS811
- 6-axis Inertial Sensor ICM-20648
- Digital Microphone ICS-43434
- High brightness LEDs
- Hall-effect Sensor Si7210 (not currently supported)