UL-NXP1S2R2
UrsaLeo UltraLite

The UrsaLeo UltraLite is a development kit designed to serve as a starting point for connecting static sensors to the Google Cloud. When assembled and powered on, data from ten sensors is immediately sent to a Google Cloud account where it can be viewed and processed

Kit contents

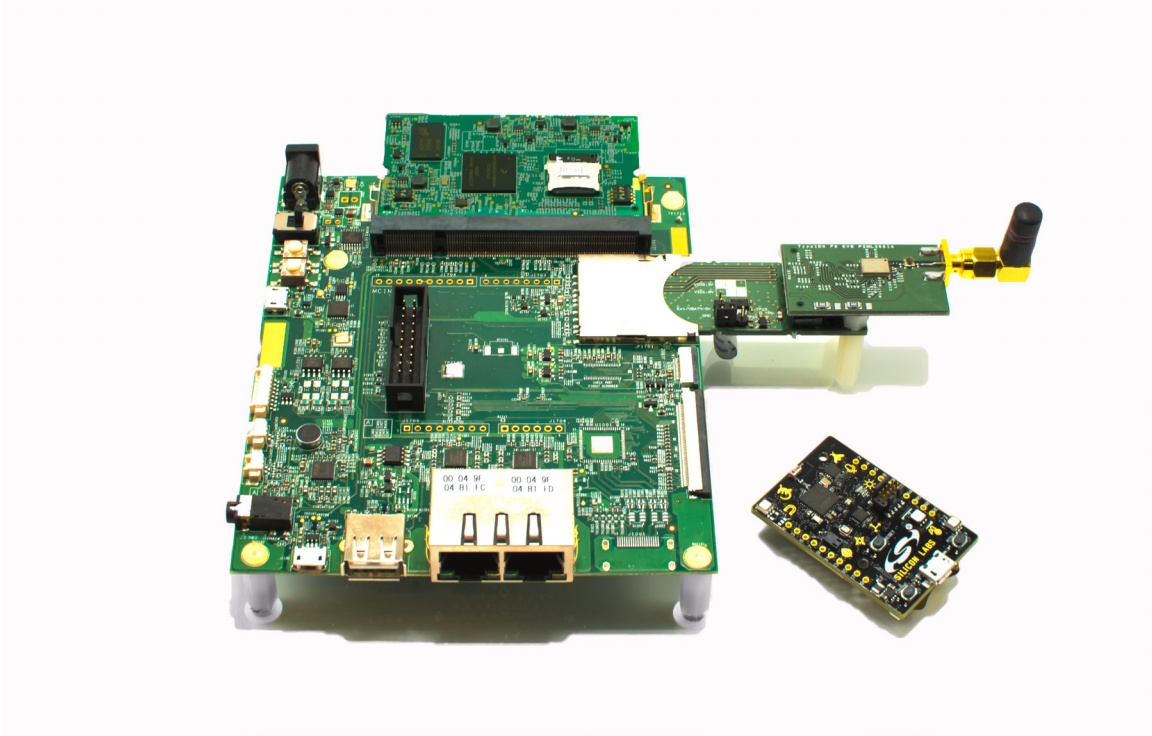
- iMX6UL development kit form NXP modified with additional LED's for debug
- Silicon Labs Thunderboard 2 sensor board
- Murata WiFi / BLE combo development board
- Power cables for UK, Europe and US operation and two USB cables

Getting started

The kit is simple to assemble - follow instructions at www.ursaleo.com/gettingstarted. The first step is to create a Google cloud account that is 'listening' for this specific kit. Once that is done the development kit is ready for power-on. We also recommend viewing the NXP video on working with the iMX6UL development platform.

Overview

Once a cloud account has been created on the UrsaLeo website, the kit is ready to connect to the Google cloud and start sending sensor data for display, processing and triggering actions. The sensor board can be powered using a USB cable (recommended) or from a coin cell battery. Note: the power consumption of the



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SiLabs TB2 means a coin cell will only last one or two days.
Once the kit is assembled, power-on will cause the kit to boot, start receiving data from the sensor board over a BLE connection and transmitting that data to the Google cloud through wired or wireless internet connection.

Wired Ethernet
Connect a Ethernet cable to the either ethernet port - 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 behavior can result.

On power-on the board will retrieve a time / date, establish a connection to Google Cloud and begin transmitting data. Data should start appearing in the Google Cloud about thirty seconds after power on.

(Please note this process will be replaced by a web utility from SW v 1.4)

Setting up WiFi
1) Power down the NXP board . Remove the micro SD card and place in a reader for the PC/laptop
2) The PC/Laptop should see the micro SD card with at least one readable partition. Platform specific notes:
a) On Windows, only one partition (drive letter) is expected to appear. This is the place to place the file described in the next step.
b) On Linux, two partitions will appear. One is much smaller then the other. It will only contain a few files. This is the FAT partition and is the place to place the file described in the next step.
3) In the partition identified above, create a text file named “wpa_supplicant.conf”. This text file ideally should have Unix style line endings. The text file should contain:

```
---------------------------------
ctrl_interface=/var/run/wpa_supplicant
ctrl_interface_group=0
update_config=1

network=

{ scan_ssid=1 ssid=”TP-LINK_CAE8” psk=”49510782” }
---------------------------------
```

Change the ssid to the name of the network to connect to. In the example above, the network is TP-LINK_CAE8.

Change the psk to point to the password for the network. In the example above, the password is 49510782.

4) Unmount the SD card and place into the NXP board.

5) When the board is powered up again, the code will check for the wpa_supplicant.conf file. This will be installed and the system automatically rebooted.

Notes:
1) For more details, look at the Linux man page wpa_supplicant.conf. Available via search engine or a Linux box.

2) Only the basic WPA2 PSK is cur-

rently supported. Other setups may work but is untested.

3) Only 1 network connection is supported on the unit. If the WiFi network is configured AND is present, a wired ethernet should NOT be plugged in.

4) Due to the extra reboot, the Thunderboard may goto sleep before the software runs. This can be recovered by pressing reset on the Thunderboard.

Power up / power down
Power up is initiated simply by sliding the power switch to on - a green LED next to the switch will illuminate. Power down is initiated by pressing the white shutdown button (the button furthest from the power supply). Power down takes a few seconds and device is ready for unplugging when all LEDs are not illuminated.

LED debug
UrsaLeo provides a LED debug board that can be used to see the status of the Raspberry Pi. The following LED conditions are in code version 1.1

- Clean shutdown - when all the LEDs are off, power can be removed safely
- LED 1 lit - time has been acquired from the network
- LED 2 lit - data is being received from the Thunderboard
- LED 3 lit - MQTT link is established to Google Cloud
- LED 4,5,6 are reserved for future use or for developers

Thunderboard reset
The Thunderboard goes to sleep quite quickly (before the NXP board will finish booting for example). It is good practice to press the small black reset button on the TB2 after boot-up and at regular intervals (once daily at least).

Over the Air (OTA) updates
Future software releases (after version 1.1) will be delivered OTA. This is important to keep the Linux security patches up to date and will be released roughly in sync with new versions of Linux (Yocto version)

Next steps
Once data is going from the sensor board, to the NXP board and up to the 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 SDK + our support
- Support volume manufacturing with UUID and serial numbers to connect to the Google cloud