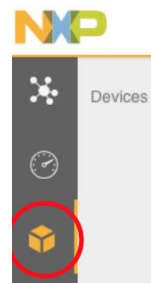# NXP Rapid IoT Prototyping Kit

Getting Started

1) What makes the Rapid IoT Prototyping Kit (RIPK) unique is that it is fully assembled and works right out of the box. There are a number of videos available to help you get started.

    a) Unboxing

    b) Getting Started - Device Overview

    c) You will need a NXP account (https://rapid-iot-studio.nxp.com/).

2) Once you are logged into your account, go into your NXP studio and click on the devices tab:

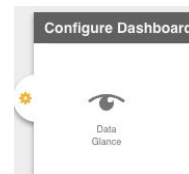   a) Click the register button in the top right to register and provision your new device.

b) Once your device is provisioned, click the dashboard button (speedometer icon) above the device button to configure your display.

c) Start by clicking the configuration button on the right of the screen.
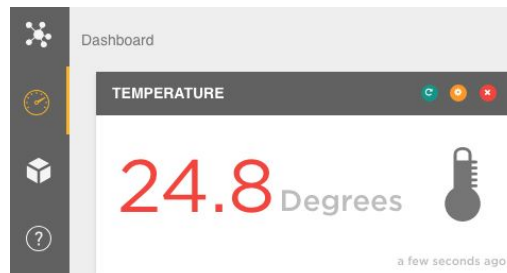
d) Then click the Data Glance button

e) Click the Widget configuration button

f) Give your data glance a Title, Unit, Icon, Color.

g) Finally select your device, choose temperature and click the check mark.

3) Congratulations! You now have a connected IoT device!

4) Experiment with adding more data glances to check out other sensors on the device.

Planning your Project

Capabilities of the Rapid IoT Prototyping Kit

- Temperature
- Humidity
- Ambient Light
- Pressure
- Air Quality
- Motion Detection

- - All three directions
- Acceleration Detection
    - - All three directions
- Magnetic Field Detection (Hint: the RIPK box has a hidden magnet)
    - - All three directions
- Tap Counter

Project Requirements

Your project must use at least one of the sensors in the RIPK to measure and move data to the cloud (in this case your NXP account).

Examples of potential projects
- Measure the temperature (and plot of the change) of a room in your building over time.
- Record the humidity of a room before, during and after running a shower.
- Measure the acceleration your backpack throughout the day.
- Measure air quality when traveling through different parts of a city.
- Detect how many times a door is opened.

Project Proposal
- One page describing
    - Purpose / Goal
        - Describe what you will know at the end of a successful project.
    - Methodology
        - Describe what data will you be capturing and how your will capture it.
    - Location
        - Describe where will you be capturing data.
    - Timeframe
        - Over what period of time will you be capturing data.
    - Required Materials
        - What materials will you need. (List should include the RIPK).

Instructor Materials

Internet of Things Overview

The Internet of Things (IoT) is the network of devices such as vehicles, and home appliances that contain electronics, software, actuators, and connectivity which allows these things to connect, interact and exchange data [Wikipedia]. McKinsey Global Institute estimates IoT could have an annual economic impact of $11,000,000,000,000 (11 Trillion dollars) by 2025 and yet the subject rarely brought up in secondary school lessons plans.

What makes the NXP Rapid IoT Prototyping Kit unique?

Many Internet of Things projects require the design and assembly of a device for measuring data and transmitting it to the cloud (or some device connected to the cloud). Learning the exact protocols for communicating with the sensor itself can be complex and unique for each sensor. The NXP Rapid IoT Prototyping Kit does not require any assembly or soldering, comes with over a dozen built-in sensors and is trivial to connect to the Internet via a smartphone.

Student Learning Objectives

Students will be able to explain:
- What is IoT?
- What is unique about the NXP Rapid IoT Prototype Kit (RIPK).

Students will be able to build an IoT project that uses the RIPK.
Students will be able to explain what data they collected and its value.

Student Project

Students will design and deploy an IoT device to measure some real-world data.

Required Materials

- NXP Rapid IoT Prototyping Kit - You can obtain a Kitfrom NXP either directly or from a distributor.
- A smart phone with Bluetooth.
- First 4 pages of this document given to the students.
- Access to the internet and an email address to create an NXP account.

Project Assessment Scoring Rubric

	High Pass	Pass	Redo
Project Choice	Designing a project that is not listed in the examples above	Using one of the examples above.	No proposed project
Data	More than one date stream	One Data stream	No data collected
Data analysis	- Use of multiple dashboard widget types (glance,graph, meter) - Some non-obvious insight into the resulting data.	One type of databoard widget	No dashboard display
Extra credit	Use of the NXP IDE for custom programming		

Project Notes:
- Since the NXP Rapid IoT device has limited battery power, you may want to consider using a cell phone power bank to increase the amount of time your project can be in the field.
- Once your device is ready to deploy, remember to turn off the back lighting. This will greatly extend the battery life of your device.

Reference & Resources

Links:
- IoT
    - https://www.mckinsey.com/~/media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/the%20internet%20of%20things%20the%20value%20of%20digitizing%20the%20physical%20world/the-internet-of-things-mapping-the-value-beyond-the-hype.ashx

- Purchase

- https://www.nxp.com/support/developer-resources/rapid-prototyping/nxp-rapid-iot-prototyping-kit:IOT-PROTOTYPING?
- https://www.digikey.com/product-detail/en/nxp-semiconductors/SLN-RPK-NODE/568-13832-ND/8135173
- Videos
  - Unboxing: https://www.youtube.com/watch?v=NDpT8SezdrA&feature=youtu.be
  - Getting started:
    https://www.nxp.com/support/developer-resources/rapid-prototyping/nxp-rapid-iot-prototyping-kit:IOT-PROTOTYPING?tab=In-Depth_Tab