IoTSSC LAB #3

COMBINING MULTIPLE SENSORS*

*Manual based on updated ARM University Program 2014 material and mbed-cli documentation.

OVERVIEW

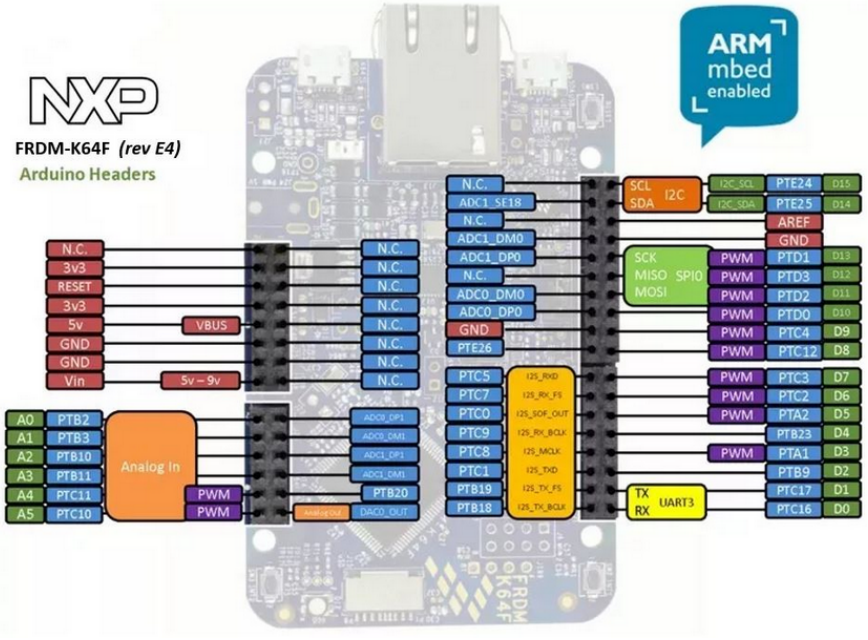
In this lab, you will further practice the configuration of an on-board peripheral using the I^2C communication standard and take readings from multiple sensors on the same device. We will add an additional shield to the board and incorporate a Multichannel Gas Sensor, taking data readings from both this sensor and other connected sensors on the I^2C bus.

IMPLEMENTATION DETAILS

HARDWARE

FRDM-K64F

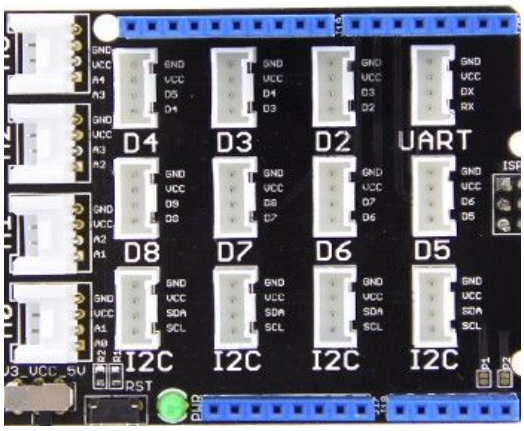
The FRDM-K64F board pin descriptions are shown below:



Note that the pin names used for the mbed API are those outlined in **dark green.**

GROVE - BASE SHIELD V2 AND MULTICHANNEL GAS SENSOR

The Grove Base shield V2 is used to easily interface with multiple I²C devices. The shield is slotted on-top of the attached IMU Shield.



The Multichannel Gas Sensor pins and sensor are shown below:

Pin Label	Description
GND	Connect to ground
VCC	Power supply: 3.3V – 5V
SDA	I2C data
SCL	I2C clock

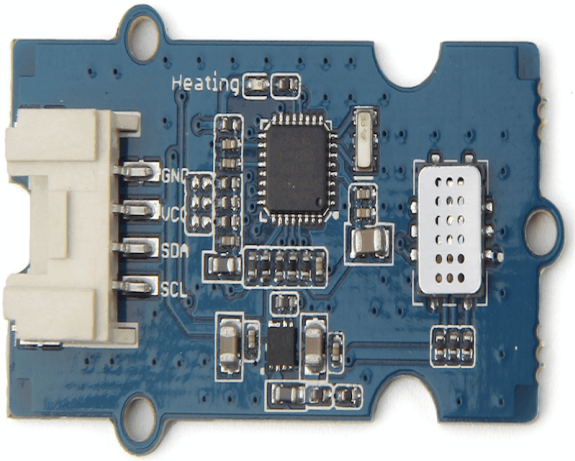


Illustration 1: Grove - Multichannel Gas Sensor

In order to connect the sensor to the base shield we must wire the I²C channels together.

Note that any of the I²C connecters on the shield will be suitable; with the shield interfacing with the I²C SCL and SDA pins (D15 and D14) on the board below.

SOFTWARE

USING THE EXISTING PROJECT

Last time we were working on the accelerometer with the IMU shield. This will be the starting point of this lab – working with the same codebase and hardware configuration. Remember, we are working in a Conda virtual environment. The sequence of commands to get you started would look like this:

```
$ conda activate iotssc
(iotssc) $ cd i2c-exercise
```

If you do not have a functional `main.cpp` file from the last lab you can copy the one provided with these instructions, i.e. copy this file to the project folder.

ADD THE MULTICHANNEL GAS SENSOR LIBRARY TO THE PROJECT

In order to interface with the gas sensor on the shield we can use the reference library found here. The library can be added to the project with the following command:

```
(iotssc) $ mbed add
https://os.mbed.com/users/edamame22/code/MiCS6814_GasSensor/
```

YOUR APPLICATION CODE

In this lab, you need to perform the following tasks:

- Read the MiCS6814_GasSensor library to understand how to initialize and read from the sensor
- Complete the code to read from the gas sensor and print the results to the terminal
- Test the gas sensor library combined with the accelerometer library. Does the resulting code work? Explain why with reference to the accelerometer and gas sensor libraries.