

SPR SDK

Quick Start Guide

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Abbreviations

Abbreviation	Description
SPR	Radiocrafts Software-Programmable RF Module
RIIoT	Radiocrafts Industrial Internet of Things

RIIoT Network Overview

The RIIoT network consists of some key elements

- The RC1880-SPR module
 - o The module that can be programmed with user application through the SPR Software Development Kit (SDK)
- The SPR SDK
 - o Software development kit with Application framework and tool for building and uploading end application to the RC1880-SPR module
- The RC1880-GPR module for use in the gateway/concentrator
 - o Support the concentrator of the gateway. Normally connected to a Linux gateway, but can also be controlled by MCU through a UART protocol
- The RIIoT Net Controller Linux middleware
 - o A middleware SW that can be used on a Linux gateway. Interfaces the RC1880-GPR module and supply user application a socket interface for controlling and sending/receiving data through the wireless network.

Below is an illustration of the different element and the documentation available

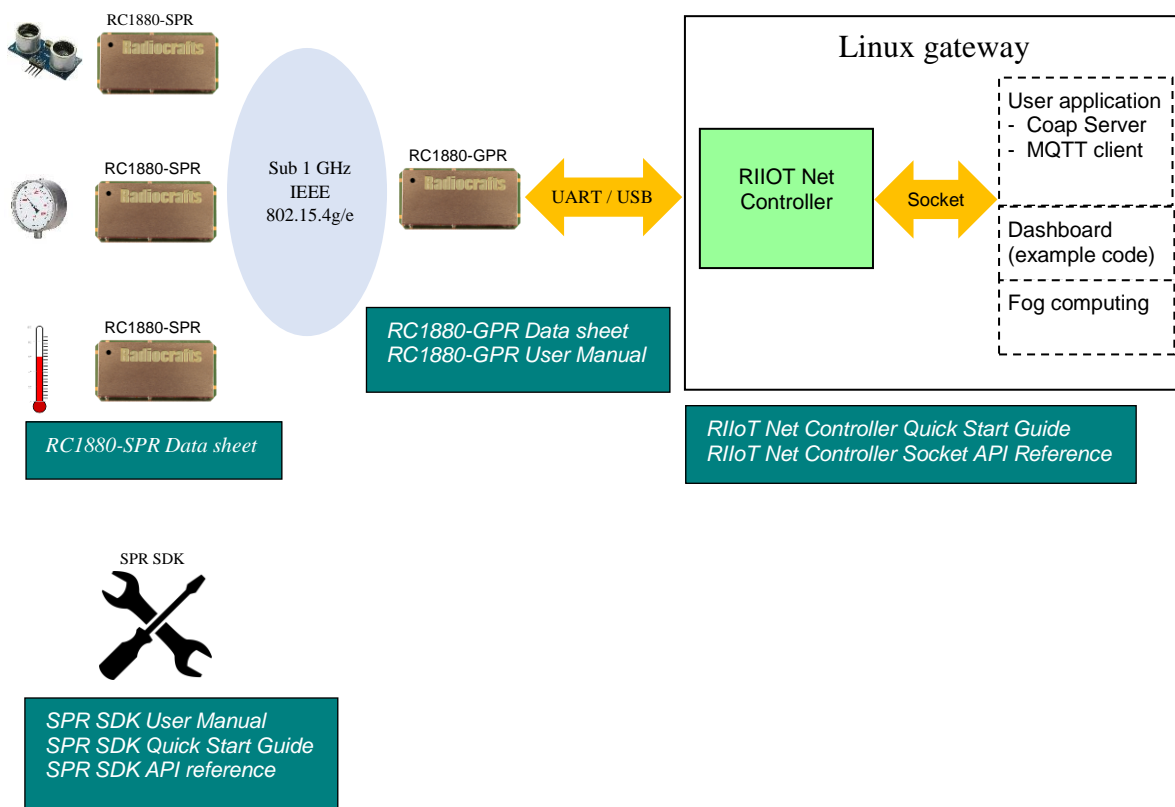


Figure 1. RIIoT network – system and documentation overview

1 Quick Start Introduction

Let's get started with developing your first application ("Hello World") on the Radiocrafts SPR (Software-Programmable RF module) application platform!

You need

- Windows PC
- RC1880-SPR Sensor Board
- Zip archive of SPR SDK

2 Windows Setup

2.1 Compiler

Install the TI ARM Compiler v18.1.3 LTS

<http://www.ti.com/tool/download/ARM-CGT-17>

Recommend installing under `C:/ti/ti-cgt-arm_18.1.3.LTS`

Note the directory where you installed it, because you will need to reference it later.

2.2 Setup Serial Terminal

Install a serial terminal if you don't have already. It will be handy to display print outputs from the application for debugging.

Recommendations:

- [Putty](#), simple and basic
- [YAT](#), "Yet Another Terminal", more feature rich

3 Setup RC1880 board

Modify the power jumper (P10) to connect **VCC** with **VCC_PC**.

Connect the board to PC using USB.(Port marked **USB-PC**)

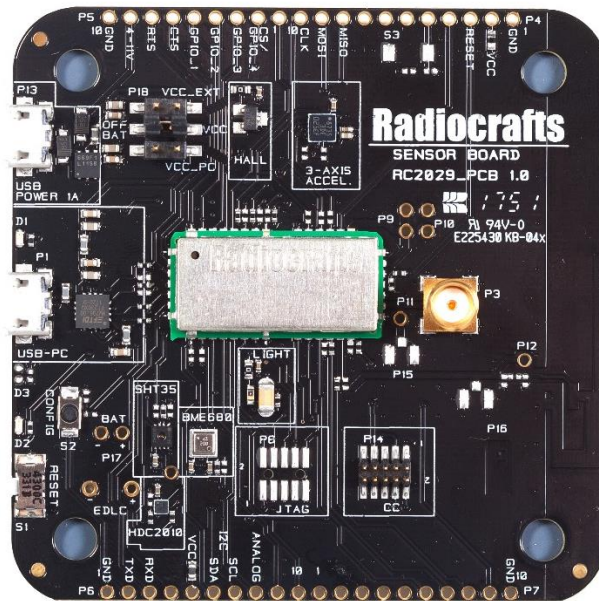


Figure 2: RC1880-SPR Sensor Board setup

4 Setup SPR SDK

If you haven't already, unzip the SPR SDK zip archive to a local folder.

4.1 Configure Build Options

In the root folder of the SDK, open the file `user_build_options.ini` and you will see the following:

```
# Build options you can modify

# Name of your application. It affects the name of the generated image
NAME = spr_app

# App Version, Major.Minor.Patch
VERSION_MAJOR = 0
VERSION_MINOR = 1
VERSION_PATCH = 0

# Your source file(s)
SOURCE_FILES = app.c

# Path of where you installed the TI ARM Compiler
TI_ARMCOMPILER_INSTALL_DIR = C:/ti/ti-cgt-arm_18.1.3.LTS

# If set to Yes, then the app image will be encrypted using the key from the image key
file.
# Note: image key must be flashed to module before flashing the encrypted app.
# If set to No, then image is unencrypted
IMAGE_ENCRYPTION = No

# If uncommented, generated image will be encrypted using the 16-byte key in the file
IMAGE_KEY_FILE = image_encryption_key.txt
```

```
# File with the 16-byte network key that can be flashed into the module
NETWORK_KEY_FILE = network_key.txt

# The serial port that connects to the module for development and testing.
# If unsure, open Device Manager to find the right port.
MODULE_COM_PORT = COM11
```

Modify the value for `TI_ARMCOMPILER_INSTALL_DIR` to the directory where you installed the compiler.

OK, you are ready to build your first app!

5 Build Your App

We will build a simple app that prints "Hello World!" when it starts.

5.1 Modify the code

In the root folder of the SDK, open the file `app.c`, and you will see this:

```
#include "spr_app.h"

void Setup()
{
    Debug.println("Hello World!");
}
```

You can leave the code as it is, or modify the print statement.

Save the file.

6 Compile and Build

Double-click `build.bat`

A command window will show up to run the compiling and linking script.

Wait until it displays "Press any key to continue...", then press any key to close the window.

In the folder, you will now see `spr_app.bin`, the binary image that can be flashed to the module through the serial port.

6.1 Flash the App

In `user_build_options.ini`, Modify the value for `MODULE_COM_PORT` to the serial port name that the module is connected to on your windows. You can find it in Device Manager in Control Panel.

In the SDK folder, double-click the batch script `flash_app.bat`. A command prompt shows up.

Trigger the module into bootloader mode by holding down the CONFIG button while pressing the RESET button. Press enter in the command prompt, and wait for the flashing to complete.

7 Test the App

Open a serial terminal program.

Open the COM Port for RC1880 board, using baud rate of 115200.

Press the Reset button on the RC1880 board.

On the serial terminal, you should see "Hello World!"

Congratulations. You have built your first app.

You can proceed further on how to build more sophisticated apps that connect to sensors, actuators with edge intelligence.

8 Run different example Apps

Included in the SDK there are several examples and tutorial that can be downloaded on RC1880-SPR.

They can be found in folder \examples\

The application “demo_temperature_humidity_sensor” is the one preloaded on the Sensor Boards delivered with our RIOT Development Kit.

9 Revision History

Revision	Date	Changes
0.8	July 23, 2018	Draft for release
0.9	October 18, 2018	Updated to use bootloader for flashing the application
1.0	November 14, 2018	Updated for release

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