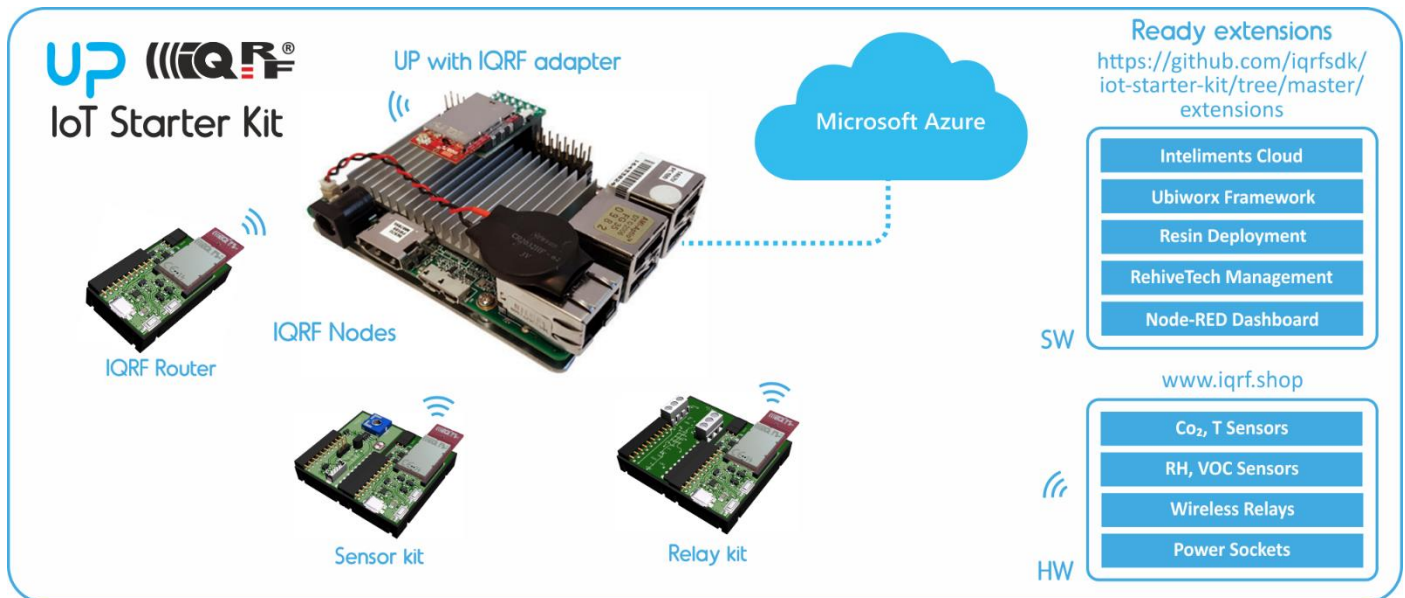


IoT Starter Kit User Guide

1. About

This development tool is prepared for quick development of your wireless IoT application.



Content

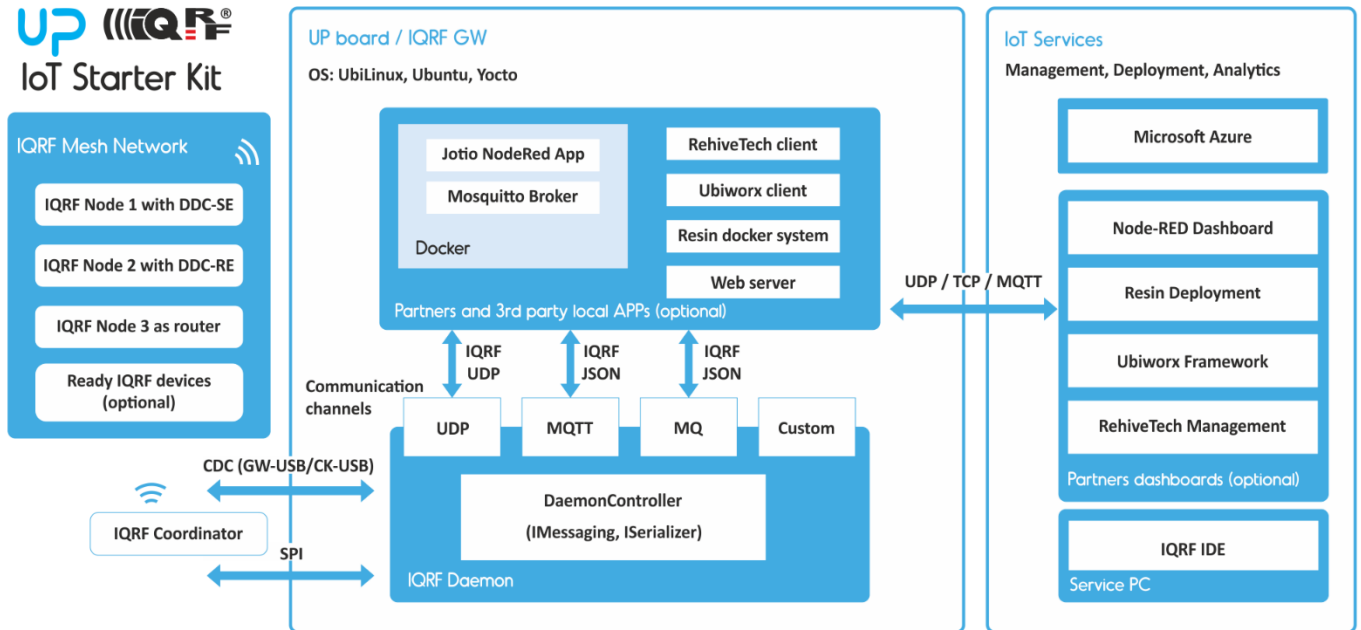
- **DS-IOT-01**
 - **IQRF set for wireless connectivity**
 - **Sensor kit** DDC-SE-01 is intended to measure **temperature, light intensity** and **voltage** selected by the potentiometer.
 - **Relay kit** DDC-RE-01 enables to switch connected equipment on/off using two relays inside.
 - These kits are controlled by **DPA commands** implemented in Custom DPA handlers delivered with the set. The handlers specify HWP identification (HWPID) to individual kits which allows their identification.
 - DS-IOT-01 devices can be connected via the adapter to the UP board and then to any cloud. The gateway as well as the cloud can be adapted for communication with IQRF devices utilizing their **HWPIDs**.
 - **Components**
 - 4 x DCTR-72DAT – IQRF transceiver
 - CK-USB-04A – IQRF programmer and debugger
 - 3 x DK-EVAL-04A – Universal portable development kit for TR modules
 - DDC-SE-01 – IQRF evaluation and development kit
 - DDC-RE-01 – IQRF evaluation and development kit
 - KON-RASP-01 – Adapter to connect IQRF transceiver to UP board
 - CAB-USBABMICRO – Micro USB cable 18.5 cm
 - USB flash drive – Software and documentation (including HWPs and Custom DPA handlers)
- **UP board 2GB + 32 GB eMMC memory**

The 40 Pin I/O connector, the USB 3.0 OTG, the Gigabit Ethernet, the HDMI and more other features make it a perfect solution for different domains and products like Robotics, Drone, Machine Vision, Smart Home, Education, Digital Signage, Intelligent Cars, Internet Of Things. The compatibility with Linux, Android, and all the Windows 10 distributions give you great flexibility, scalability and quick time to market.

 - **Consists of:**
 - Intel® Atom™ x5 Z8350 Processor 64 bit - up to 1.92GHz
 - Intel® HD 400 Graphics ,12 EU GEN 8, up to 500MHz Support DX*11.1/12, Open GL*4.2, Open CL*1.2 OGL ES3.0, H.264, HEVC(decode), VP8
 - 2GB DDR3L system memory, 32GB eMMC storage capacity
 - 4 x USB2.0 external connector, 2 x USB2.0 port (pin header), USB 3.0 port (OTG)
 - 1 x Gb Ethernet (full speed) RJ-45

- HDMI video output
- DSI / eDP display interface
- MIPI-CSI camera interface
- 5V DC-in @ 3A 5.5/2.1mm jack power input
- Power supply

2. Architecture



UP board is connected to the IQRF network via SPI interface (adapter) or via CDC interface (GW-USB/CK-USB).

You can find installation steps in documentation on <https://github.com/iqrfsdk/iot-starter-kit>.

There is the IQRF Daemon prepared for easy communication between IQRF network and other platforms. Follow the steps to install it to UP.

IQRF Daemon has several communication channels (UDP, MQTT, MQ) allowing it to be easily connected to 3rd party local or remote services and applications (e.g. Microsoft Azure, Node-RED Dashboard, remote control from RehiveTech etc.).

You can also connect to your IQRF network ready HW extensions as sensors and actuators.

3. HW providers

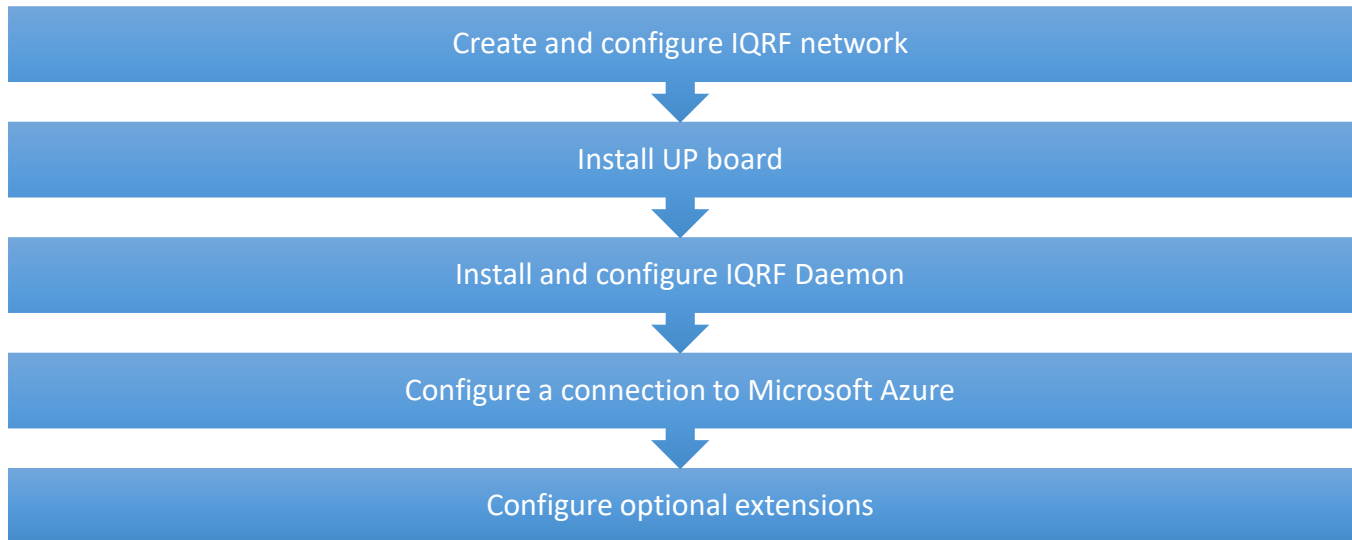
DS-IOT-01 (<http://www.iqrf.org/products/development-tools/development-sets/iot-starterkit-01>)

IQRF Tech s.r.o., Prumyslova 1275, 506 01 Jicin, Czech Republic, EU
Tel: +420 493 538 125, www.iqrf.tech

UP board (<http://up-shop.org/up-boards/19-up-board-2gb-32-gb-emmc-memory.html>)

Aaeon Europe BV, Ekkersrijt 4002, 5692 DA ,SON, the Netherlands
Registration number 814153653, info@aaeon.eu, www.up-board.org

4. Installation steps



Sources

- **Tutorial videos** on YouTube <https://www.youtube.com/playlist?list=PLEQy1I01En98-Q68fH50l-yitoeV48zKU>
- **IQRF technology** website: <http://www.iqrf.org>
- **IQRF SDK Github repository**: <https://github.com/iqrfsdk/iot-starter-kit>
- **Product page**: <http://www.iqrfalliance.org/product/iot-starter-kit>

Guidelines

Create and configure IQRF network

Open the DS-IOT-01 set which is the part of your IoT Starter Kit.

- Download **Startup package** containing IQRF IDE application and all needed files: <http://www.iqrf.org/support/how-to-start>.
- Watch **tutorial videos** about **IQRF** to simplify building your basic IQRF network.
 - **How to upgrade IQRF OS**
 - **How to make a network with IQRF OS 4.0**
- **Build your IQRF network** consisting of one IQRF coordinator and three IQRF nodes. The first node serves for sensor data receiving, the second node serves for relays control and the third node serves as an IQRF router for IQRF network extension.
- Watch **tutorial** video about Custom DPA Handlers.
 - **Custom DPA Handlers for IoT Starter Kit**
- Use these special **Custom DPA Handler** files to customize a behavior of IQRF transceivers (the first one for sensor kit to receive sensor data, the second one for relay control).
- Watch **tutorial** video about Macros.
 - **Macros for IoT Starter Kit**
- Use **macros** for the IoT Starter Kit for reading sensor data from the sensor kit (temperature, light intensity, voltage) and switching relays on/off.
- **Test** if you receive sensor data from the sensor kit and control relays on the relay kit.
- After UP board installation and IQRF Daemon configuration use **UDP** channel to connect IQRF IDE to UP board. The gateway must be in the accessible network from your computer. Fill in the IP address of the gateway and select *User gateway* in IQRF IDE. Then check if the communication is functional – refresh the network information of the coordinator and send some DPA command from the terminal.
 - **How to connect IQRF IDE through UDP to UP**

Install UP board

Follow the instructions on <https://github.com/iqrfsdk/iot-starter-kit/tree/master/core/aaeon.com> to install Ubilinux.

Connect IQRF adapter centrally on the UP board pins and put in the IQRF transceiver which is the IQRF network coordinator.



Install and configure IQRF Daemon

- Follow the actual instructions here: <https://github.com/iqrfsdk/iqrf-daemon>.
- Watch tutorial video about installing and configuring IQRF Daemon.
 - **IQRF Daemon for IoT Starter Kit**

Configure a connection to Microsoft Azure

- Login to the Microsoft Azure (portal.azure.com) with already created e-mail account.
- *Note: you have to enter your credit card information to receive 1-year developer subscription worth 25\$ per month for free.*
- You, as a developer, can create one free IoT Hub.
- Watch videos about configuring and setting all needed services.
 - **How to control IQRF network through Microsoft Azure**
 - **How to process data from IQRF network in Microsoft Azure**
- Advanced data processing is possible with using other advanced tools in Microsoft Azure cloud.

Configure optional extensions

<https://github.com/iqrfsdk/iot-starter-kit/tree/master/extensions>