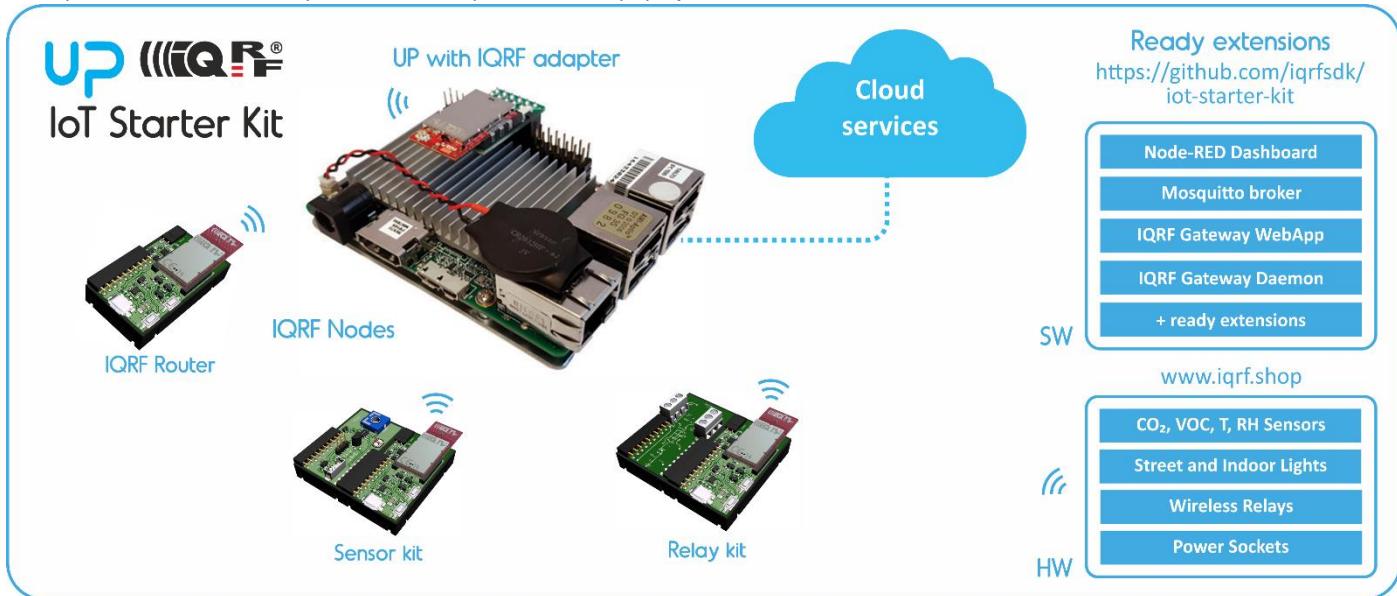


IoT Starter Kit Datasheet & User Guide

1. About

The purpose of the IoT Starter Kit is to enable you to build your complete IoT solution from sensors and actuators, through a gateway up to different clouds and mobile apps just in a matter of a couple of hours. Afterwards, you will be able to extend your network with ready IQRF interoperable devices and use your solution for proof-of-concept projects.



Content

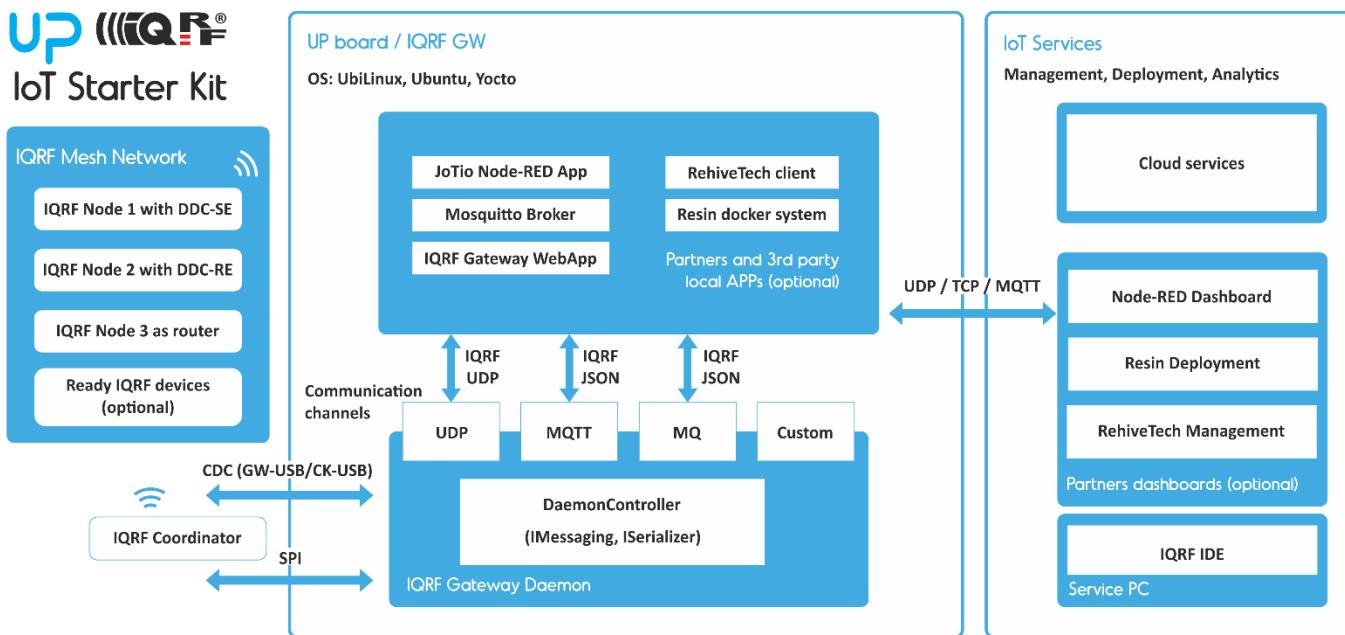
- **DS-IOT-01**
 - **IQRF set for wireless connectivity**
 - Sensor kit DDC-SE-01 is intended to measure **temperature**, **light intensity** and **voltage** selected by the potentiometer.
 - Relay kit DDC-RE-01 enables to switch connected equipment on/off using two relays inside.
 - These kits are controlled 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 the documentation on <https://github.com/iqrfsdk/iot-starter-kit>.

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

IQRF Gateway 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.com

UP board (<http://up-shop.org/up-boards/19-up-board-2gb-32gb-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

1. IQRF Network

2. IQRF Gateway

3. Possible extensions

Sources

- **IQRF SDK Github repository:** <https://github.com/iqrfsdk/iot-starter-kit> (installation guideline)
- **Tutorial videos** on YouTube
https://www.youtube.com/watch?v=BMoUT_1_rDc&list=PLEQy1I01En9-9F0rGflWxIWcnwvgtvVW
- **IQRF technology** website: <http://www.iqrf.org>
- **Product page:** <http://www.iqrfalliance.org/product/iot-starter-kit>

Guidelines

Follow the latest instructions here: <https://github.com/iqrfsdk/iot-starter-kit/blob/master/INSTALL.md>.

Part1: IQRF Network

- Use the **DS-IOT-01** set which is the part of your **IoT Starter Kit**.
- Download the **startup-package** from <https://www.iqrf.org/support/download> and install the last version of the **IQRF IDE**. In the startup package in the *Examples/DPA/IoT-Starter-Kit-01* folder, you will find the *IoT-StarterKit-01-demo* file. You click on it and the IQRF IDE with all necessary files will be launched.
- Watch the **tutorial video** about **IQRF** and follow instructions here to simplify building your basic IQRF network.
 - **IoT Starter Kit, Part 1: IQRF Network**
<https://youtu.be/zOjRGo4Zlyo?list=PLEQy1I01En9-9F0rGflWxIWcnwvgtvVW>
- **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.
- 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.
- **Note:** After UP board installation and IQRF Gateway Daemon configuration you can use **UDP** channel to connect IQRF IDE to UP board. The gateway must be in the network which is accessible 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**
<https://youtu.be/xyCJ9Cp2OWs?list=PLEQy1I01En9-9F0rGflWxIWcnwvgtvVW>

Part 2: IQRF Gateway

- Follow instructions here: <https://github.com/iqrfsdk/iot-starter-kit/blob/master/install/GW-SbS-INSTALL.md>
- Connect IQRF adapter centrally on the UP board pins and put in the IQRF transceiver which is the IQRF network coordinator.



- Install Ubilinux and update it (<https://up-community.org/wiki/Ubilinux>)
- Install MQTT broker and confirm it is running
- Install IQRF Gateway Daemon and confirm it is running
- Install IQRF Gateway WebApp and confirm it is running (<http://localhost>)
- Configure IQRF SPI interface
- Restart IQRF Gateway Daemon
- Install Node.js
- Install Node-RED and start it
- Add Node-RED dashboard
- Run IoT-Starter-Kit flow
- Allow Node-RED to run after reboot and confirm Node-RED is running
- Check Node-RED dashboard (<http://localhost:1880/ui>)
- Check Node-RED flow (<http://localhost:1880>)
- Test the functionality (e.g. blink coordinator LEDR from the IQRF Gateway WebApp)

Part 3: Possible extensions

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

We highlight here the remote management system which could be very useful if you have gateway installed far away from your office. There are also many other applications and partners who add new features during the time.

Remote management system from RehiveTech

- RehiveTech Management System is an ecosystem used for remote monitoring and maintenance of IoT gateways and embedded devices in general. Gateway with the client software installed reports required data to the cloud and allows to monitor not only itself but also the elements of a sensor network that are connected to the device. IQRF wireless technology is also supported and offers an advanced management of IQRF nodes. The solution enables operators to address most of the necessary operating interventions remotely using web interface available for any type of device (computer, tablet or smartphone). This works not only for one gateway but the system is primarily designed for management of a group of devices (e.g. in case of the need to update multiple devices simultaneously).
- <https://github.com/iqrfsdk/iot-starter-kit/tree/master/extensions/rehivetech.com>