



# **HUB'O:**

## **GETTING STARTED**

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Embedded software is based on Nke Watteco proprietary drivers and applicative code and operates on the Contiki kernel from the SICS (Swedish Institute of Computer Science).

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## DOCUMENT HISTORY

Date	Revision	Modification Description
April 2018	1.0	Creation

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## 1 INTRODUCTION

Hub'O is the first private LoRaWAN network gateway designed by nke Watteco. Hub'O works in partnership with a distant server hosted or communicating with the applicative back-end of our client.

Now that you have received your gateway, you will be able to create your own LoRaWAN network and start working with it. This document is here to help you in the installation and the first configuration of Hub'O.

A last paragraph will describe how to correctly install on site a Hub'O gateway and LoRaWAN end-devices paired to it. It will be seen that thanks to its LCD screen, the installer can double check that the LoRaWAN end-devices are correctly paired to Hub'O and correctly communicates with it.



**FIGURE 1 - HUB'O GATEWAY**

## 2 HARDWARE SET-UP

When the LoRaWAN gateway is shipped, a power supply cable is mounted. However, the LoRaWAN antenna is not, in order to not be damaged during the journey.

Thus, the first thing to do is to mount the LoRaWAN antenna on the SMA connector (located at the Hub'O right side). Once the antenna correctly mounted, it can be folded to the top to get what can be seen on Figure 1.



FIGURE 2 - LORAWAN GATEWAY AT RECEPTION

The next step is to insert a 9V disposable battery inside the space provided for this inside the Hub'O gateway. To open casing, it is recommended to use a flathead screwdriver to "do lever" on one of the red squared area on Figure 2.

On the Figure 3 can be seen the space provided for the 9V disposable battery, please be careful to respect the polarity.

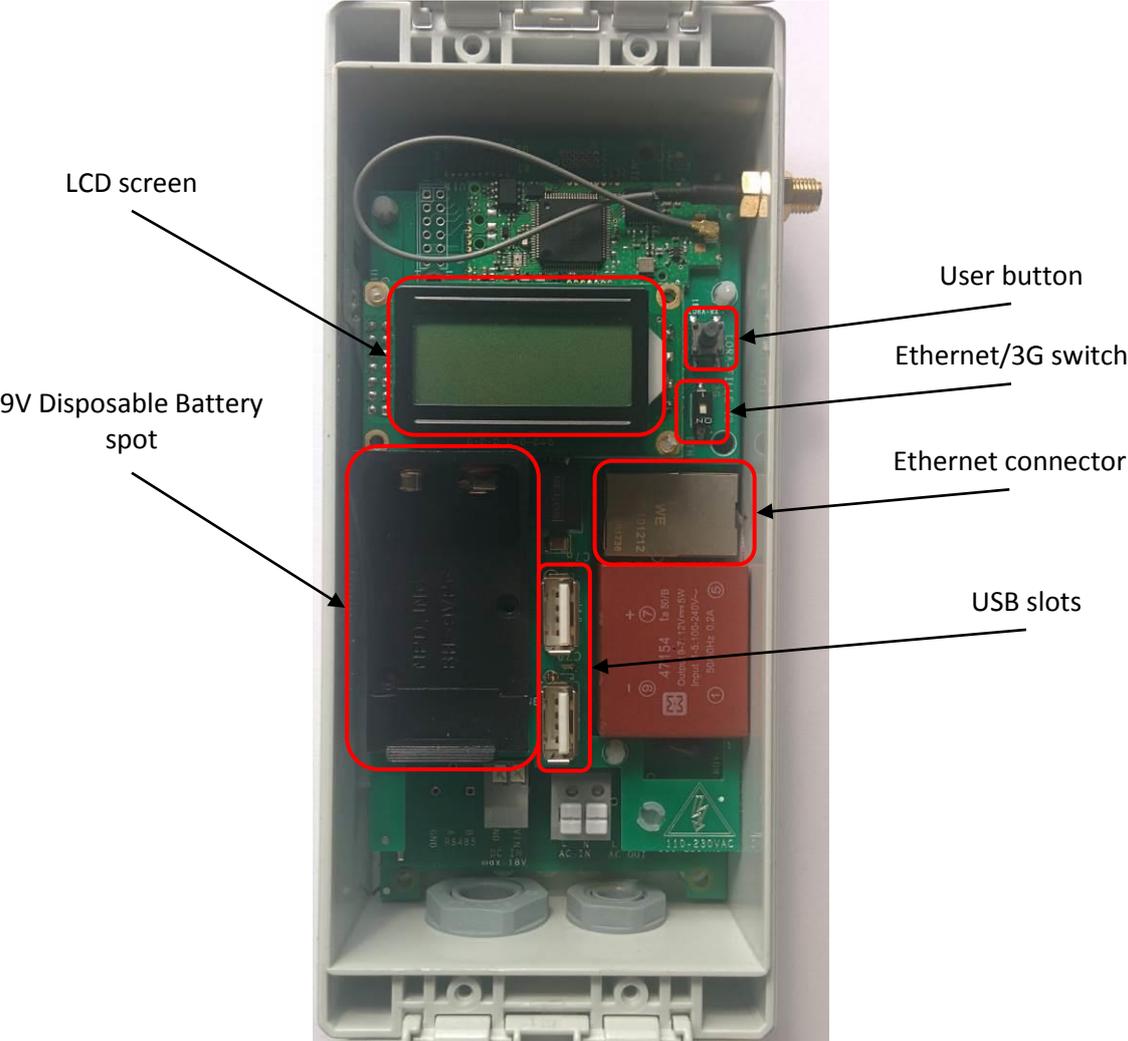


FIGURE 3 - INSIDE THE HUB'O GATEWAY

Now, your Hub'O is ready to be switched "ON", so connect it to a power source and go to the next paragraph.

### 3 FIRST CONFIGURATION

The next step in the Hub'O installation is to correctly configure it. In order to do that, a configuration file can be filled with the right parameters and can be uploaded on the Hub'O Gateway thanks to one of its USB slot (cf. Figure 3).

Here below, can be seen the steps to correctly create a configuration file and upload it to the Hub'O gateway.

#### 3.1 CONFIGURATION FILE CREATION

Hub'O configuration file is a .json file, interpreted by the gateway to set its different parameters.

In this configuration file, the gateway can be configured to use DHCP or a fixed IP address, the 2G/3G parameters can be set if needed, the SNTP server address can be set, and, of course, all the parameters used by the application: the distant server address, the data directory to upload file, the configuration directory to get the files, the data upload period, etc.

In order to have an exhaustive description of this file and how to complete it, please see the document named "*Hub'O\_Server\_Exchanges\_Description\_1\_1.pdf*", on paragraph **§5.2 Hub'O Configuration file**.

Once your creation file created, you can rename it as follow: **c\_010\_0000.json**.

#### 3.2 SIGNATURE FILE CREATION

For security reasons, to upload a new configuration file on Hub'O gateway, it is necessary to generate a signature file first. Indeed, Hub'O will check for this signature file before taking into account the configuration file.

To generate this signature, please use the "**make-cfg**" tools in command line. This tool is available in the repertory "**exe\_win32**" inside the make-cfg zip file.

The command line to use is the following:

```
make-cfg.exe --file c_010_0000.json
```

FIGURE 4 - CREATING THE SIGNATURE FILE

If everything went well, a new file named "c\_010.manifest" should appears in the same directory as make-cfg.exe and c\_010\_0000.json.

### 3.3 UPLOAD ON HUB'O

To upload the new configuration on the gateway, copy the configuration file "c\_010\_0000.json" and its signature "c\_010.manifest" on the root of a USB stick.

Then plug the USB stick on one of the Hub'O USB slots. Wait approximately 15 seconds and then take back the USB stick, Hub'O is now configured as you wanted.

## 4 CONNECTION TO THE NETWORK

Once Hub'O correctly configured, it can be connected physically to the Ethernet or 2G/3G network. Thus, you can connect an Ethernet cable to the gateway or you can insert the SIM card on the available slot, if it is not already done.

Check that the Ethernet/3G switch is at the right position for what you need. This switch can be seen on the Figure 3, at the right of the LCD screen and under the user button.

Afterwards, Hub'O is correctly configured and can starts its exchanges with the distant server.

## 5 EXCHANGES WITH THE DISTANT SERVER

In order to have a complete understanding on how Hub'O exchanges with the distant server and what these exchanges are for, please read the document named:

- *"Hub'O\_Server\_Exchanges\_Description\_1\_1.pdf"*

## 6 INSTALLING HUB'O WITH END-DEVICES ON SITE

Once all the steps listed before completed, the distant server can send the list of allowed end-devices to Hub'O (for more information about this exchange, please read the pdf document explaining that: "[Hub'O\\_Server\\_Exchanges\\_Description\\_1\\_1.pdf](#)").

### 6.1 INSTALLATION

When the end-devices list is received by Hub'O, the corresponding end-devices can be installed on site and can be turned on.

Depending on which end-device is used, either a led will flashes or a "bip" will be emitted from the sensor. The association process will be run between the end-device, Hub'O and the distant server (for more details, please see "[Hub'O\\_Server\\_Exchanges\\_Description\\_1\\_1.pdf](#)").

To have more details about nke Watteco end-devices association status, please see our support website: <http://support.nke-watteco.com/>

Once all the end-devices installed on site, a control can be done on Hub'O, thanks to the user menu. Indeed, Hub'O is able to display the list of all paired end-devices, together with a rating about the RF link.

To access this list, please press the user button (next to the LCD screen), until the Figure 5 screen appears.

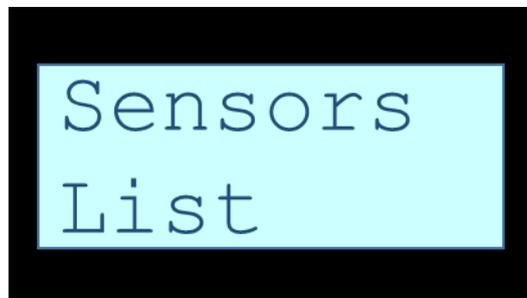


FIGURE 5 - END-DEVICE LIST SUBMENU

When this message appears on the screen, press again the user button for more than 1 second. Then, you will access to the list, starting with the first sensor (an example is given on the figure 6 here below).

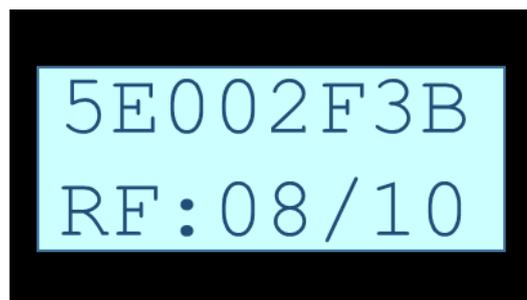


FIGURE 6 - EXAMPLE OF AN END-DEVICE DISPLAY

For each end-device, on the first line can be seen the last 4 bytes of the end-device devEUI. On the second line, can be seen the last RSSI level, converted to a rating on 10.

To go to the next end-device, please press shortly the user button. Each time a press is detected, the next end-device is displayed. When the last end-device is displayed, on the next press, Hub'O will loop back to the first one. To get out of the list, please wait for 30 seconds without pressing the button.

To have more informations about Hub'O IHM, please refers to the IHM description document:

- *"Description\_IHM\_Hub\_O\_V1\_2.pdf"*

### 6.2 FIRST END-DEVICE CONFIGURATION

By default, nke Watteco devices are configure to send "unconfirmed" frames to the LoRaWAN network, in order to be compatible with all the private/public existing networks.

However, inside a LoraWAN network managed by Hub'O, it is strongly advised to set this configuration to "confirmed" frames.

In order to do that, the distant server should send an end-device configuration file to Hub'O after each new association on the network. To configure the end-device to send "confirmed" frames, the following frame needs to be sent on FPort **125: 1105800400000801**.

For more details about end-devices configurations with Hub'O, please see:

- *"Hub'O\_Server\_Exchanges\_Description\_1\_1.pdf"*

For more details about the frame allowing to configure the type of message send by the nke Watteco end-devices, please refers to: <http://support.nke-watteco.com/lorawan-cluster/#Messagetype>