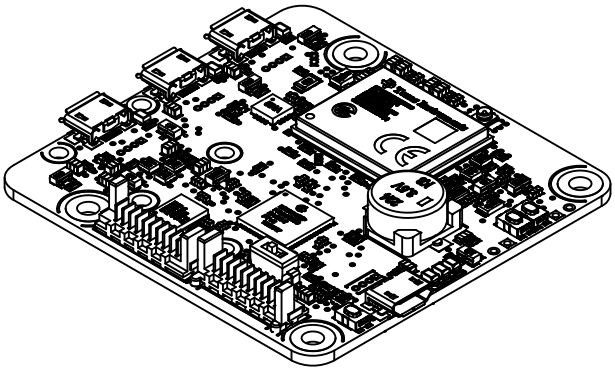
YoctoHub-Wireless-n

User's guide

Table of contents

1. Introduction

The YoctoHub-Wireless-n is a 60x58mm electronic module enabling you to control other Yoctopuce modules through a 2.4 GHz wireless network connection (802.11 b/g/n). Seen from the outside, this module behaves exactly like a standard computer running VirtualHub[1]: same interface, same functionalities.



The YoctoHub-Wireless-n

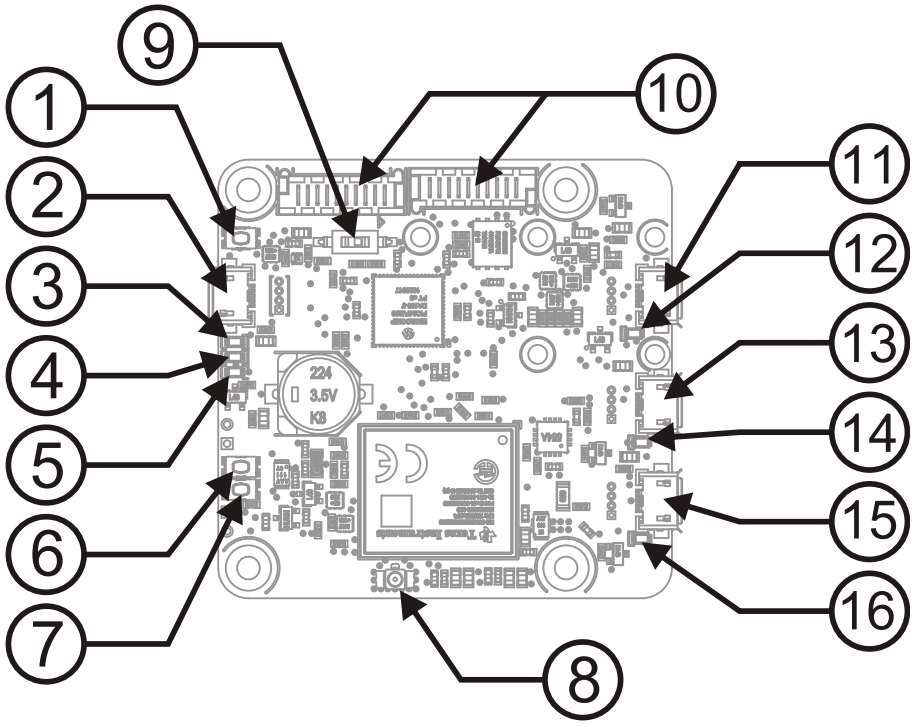
The YoctoHub-Wireless-n is designed to be easily deployed and to not require any specific maintenance. In the opposite to a mini-computer, it does not have a complex operating system. Some simple settings allow you to use it in many kinds of network environments. You can modify these settings manually or automatically through USB. Therefore, the YoctoHub-Wireless-n is much more suited to industrialization than a mini-computer. However, you cannot run additional software written by the user on the YoctoHub-Wireless-n.

The YoctoHub-Wireless-n is not a standard USB hub with network access. Although it uses USB cables, its down ports use a proprietary protocol, much simpler than USB. It is therefore not possible to control, or even to power, standard USB devices with a YoctoHub-Wireless-n.

Yoctopuce thanks you for buying this YoctoHub-Wireless-n and sincerely hopes that you will be satisfied with it. The Yoctopuce engineers have put a large amount of effort to ensure that your YoctoHub-Wireless-n is easy to install anywhere and easy to use in any circumstance. If you are nevertheless disappointed with this device, do not hesitate to contact Yoctopuce support[2].

[1] http://www.yoctopuce.com/EN/virtualhub.php
[2] support@yoctopuce.com

2. Presentation



1: Yocto-button
2: Control and power USB port
3: Yocto-led
4: Overload led
5: Network transfer led
6: Wake up button
7: Sleep button
8: Antenna connector
9: Sleep neutralization
10: Back connection
11: Down port 1
12: Down port 1 led
13: Down port 2
14: Down port 2 led
15: Down port 3
16: Down port 3 led

2.1. The YoctoHub-Wireless-n components

Serial number

Each Yocto-module has a unique serial number assigned to it at the factory. For YoctoHub-Wireless-n modules, this number starts with YHUBWLN4. The module can be software driven using this serial number. The serial number cannot be modified.

Logical name

The logical name is similar to the serial number: it is a supposedly unique character string which allows you to reference your module by software. However, in the opposite of the serial number, the logical name can be modified at will. The advantage is to enable you to build several copies of the same project without needing to modify the driving software. You only need to program the same logical name in each copy. Warning: the behavior of a project becomes unpredictable when it contains several modules with the same logical name and when the driving software tries to access one of these modules through its logical name. When leaving the factory, modules do not have an assigned logical name. It is yours to define.

Yocto-button

The Yocto-button has two functionalities. First, it can activate the Yocto-beacon mode (see below under Yocto-led). Second, if you plug in a Yocto-module while keeping this button pressed, you can then reprogram its firmware with a new version. Note that there is a simpler UI-based method to update the firmware, but this one works even if the firmware on the module is incomplete or corrupted.

Yocto-led

Normally, the Yocto-led is used to indicate that the module is working smoothly. The Yocto-led then emits a low blue light which varies slowly, mimicking breathing. The Yocto-led stops breathing when the module is not communicating any more, as for instance when powered by a USB hub which is disconnected from any active computer.

When you press the Yocto-button, the Yocto-led switches to Yocto-beacon mode. It starts flashing faster with a stronger light, in order to facilitate the localization of a module when you have several identical ones. It is indeed possible to trigger off the Yocto-beacon by software, as it is possible to detect by software that a Yocto-beacon is on.

The Yocto-led has a third functionality, which is less pleasant: when the internal software which controls the module encounters a fatal error, the Yocto-led starts emitting an SOS in morse [1]. If this happens, unplug and re-plug the module. If it happens again, check that the module contains the latest version of the firmware and, if it is the case, contact Yoctopuce support[2].

Power / Control port

This port allows you to power the YoctoHub-Wireless-n and the modules connected to it with a simple USB charger. This port also allows you to control the YoctoHub-Wireless-n by USB, exactly like you can do it with a classic Yoctopuce module. It is particularly useful when you want to configure the YoctoHub-Wireless-n without knowing its IP address.

Down ports

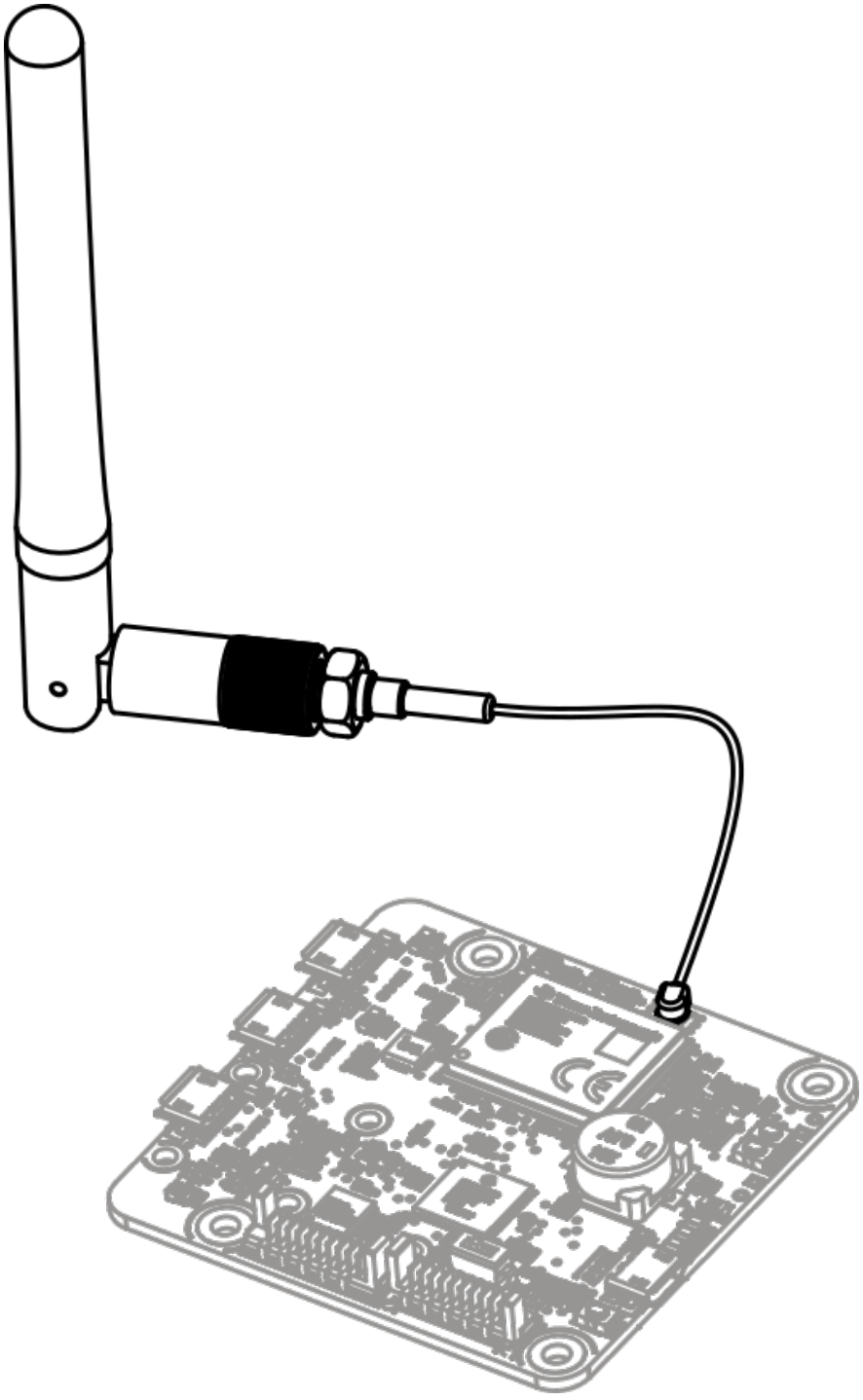
You can connect up to three Yoctopuce modules on these ports. They will then be available as if they were connected to a computer running VirtualHub. Note that the protocol used between the YoctoHub-Wireless-n and the USB modules is not USB but a lighter proprietary protocol. Therefore, the YoctoHub-Wireless-n cannot manage devices other than Yoctopuce devices. A standard USB hub does not work either[3]. If you want to connect more than three Yoctopuce modules, just connect one or more YoctoHub-Shield[4] to the back ports.

Warning: the USB connectors are simply soldered in surface and can be pulled out if the USB plug acts as a lever. In this case, if the tracks stayed in position, the connector can be soldered back with a good iron and flux to avoid bridges. Alternatively, you can solder a USB cable directly in the 1.27mm-spaced holes near the connector.

[1] short-short-short long-long-long short-short-short
[2] support@yoctopuce.com
[3] The Yoctopuce Micro-USB-Hub is a standard USB hub and does not work either.
[4] www.yoctopuce.com/FR/products/yoctohub-shield

Antenna connector

The YoctoHub-Wireless-n includes an ultra miniature coaxial antenna connector (UFL). Take care of the UFL connector. It is fragile and is not designed to support many connection/deconnection cycles. The YoctoHub-Wireless-n is sold with a small UFL cable to RP-SMA socket (reverse polarity SMA: threaded on the outside with a plug in the center) and a corresponding RP-SMA plug antenna (threaded on the inside, jack in the center). You can use another antenna of your choice, as long as it is designed for the 2.4 GHz frequency range and it has the correct connector. Beware of the different variants of SMA connectors: there are antennas for each of the four combinations SMA/RP-SMA and plug/socket. Only an RP-SMA plug antenna can be used with the provided antenna cable. Beware also that using a high-gain antenna may drive you to emit a signal stronger than the authorized norm in your country.



Antenna connection

If you intend to use the YoctoHub-Wireless-n in an enclosure without visible antenna, you can use a tiny PCB antenna that fits within the enclosure. We have successfully tested a Delock PCB antenna (article 86246[5]) with the YoctoHub-Wireless-n. This antenna can easily be purchased from many online stores, including from Yoctopuce.

Overload led

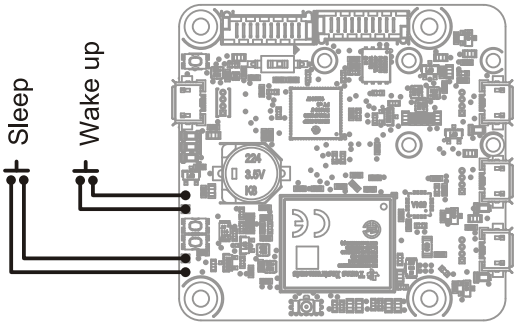
The YoctoHub-Wireless-n continuously monitors its power consumption. If it detects a global consumption of more that 2A, following an overload on one of the down ports for example, it automatically disables all the down ports and lights the overload led. To isolate the source of the issue, you can reactivate the ports one by one, monitoring the power consumption increase. Alternatively, if you know the source of the overload issue and know to have solved it, you can restart the YoctoHub-Wireless-n to enable all its ports at once.

Note that the overload led is a protection measure which can prevent overheating, but it is not a protection guarantee against shorts.

Sleep

Usually, the YoctoHub-Wireless-n consumes about 0.5 Watt, to which you must add the connected module consumption. But it is able to get into sleep to reduce its power consumption to a strict minimum, and to wake up at a precise time (or when an outside contact is closed). This functionality is very useful to build measuring installations working on a battery. When the YoctoHub-Wireless-n is in sleep mode, most of the electronics of the module as well as the connected Yoctopuce modules are switched off. This reduces the total consumption to 75 µW (15 µA).

Switching to sleep and waking up can be programmed based on a schedule, controlled by software, or controlled manually with two push buttons located on the YoctoHub-Wireless-n circuit. You can find there two pairs of contacts which enable you to shunt these two buttons.



Sleep and wake up buttons deviation.

The YoctoHub-Wireless-n includes a switch with which you can disable the sleep mode at the hardware level. This functionality is particularly useful when developing and debugging your project, as well as when updating the firmware.

[5] https://www.delock.com/produkte/1468_Antenna/86246/merkmale.html

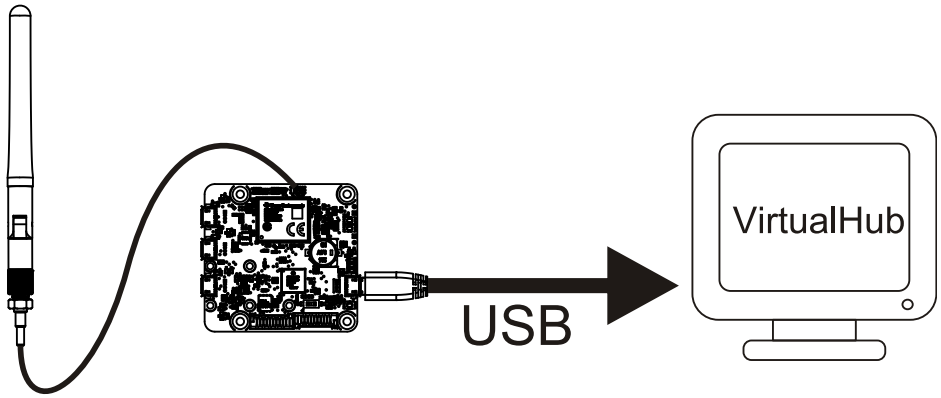
3. First steps

The aim of this chapter is to help you connect and configure your YoctoHub-Wireless-n for the first time.

3.1. Manual configuration

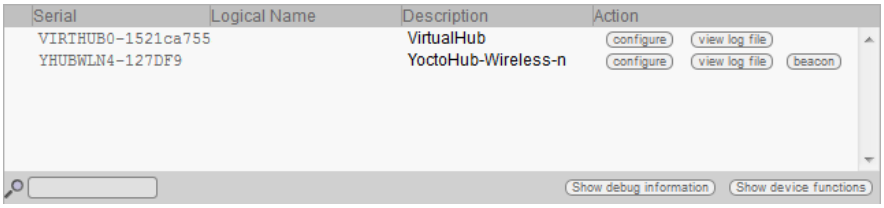
You can configure your YoctoHub-Wireless-n through its USB control port, by using VirtualHub[1].

Run VirtualHub on your preferred computer and connect it to the *power / control port* of the YoctoHub-Wireless-n. You need a USB A-MicroB cable.



Configuration: connecting your YoctoHub-Wireless-n by USB to a computer

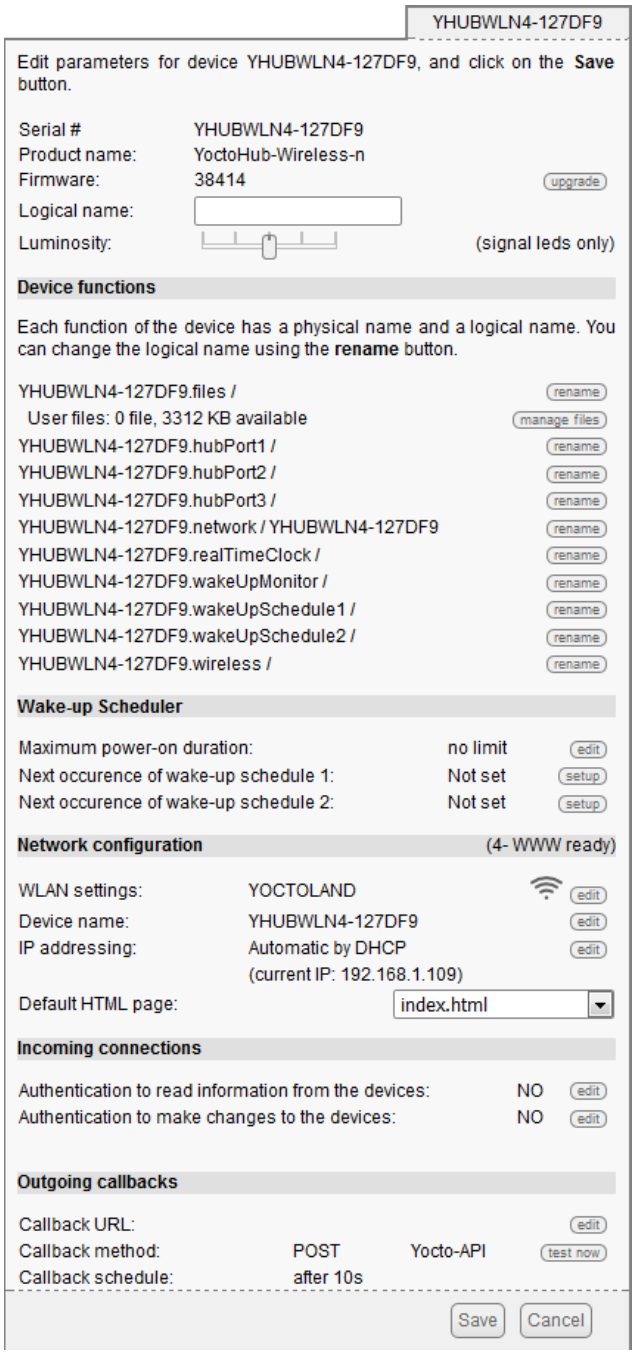
Launch your preferred browser on the URL of your VirtualHub. It usually is *http://127.0.0.1:4444*. You obtain the list of Yoctopuce modules connected by USB, among which your YoctoHub-Wireless-n.



List of Yoctopuce modules connected by USB to your computer, among which your YoctoHub-Wireless-n

Click on the **configure** button corresponding to your YoctoHub-Wireless-n. You obtain the module configuration window. This window contains a **Network configuration** section.

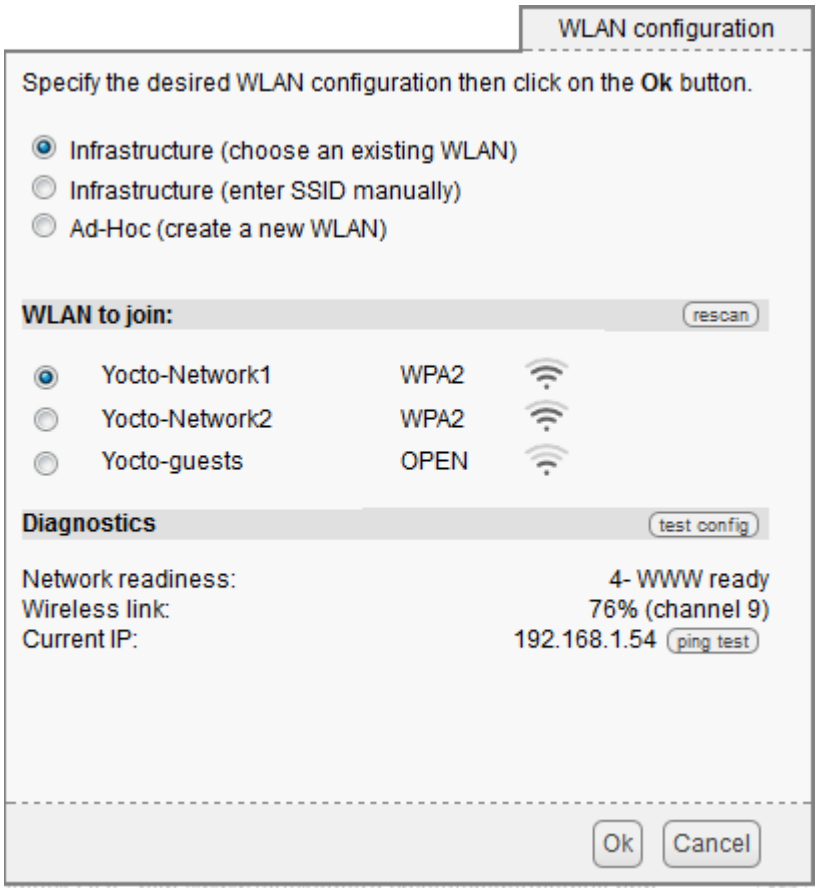
[1] http://www.yoctopuce.com/EN/virtualhub.php



YoctoHub-Wireless-n module configuration window

Connection to the wireless network

You must first configure your YoctoHub-Wireless-n to enable it to connect itself to your wifi network. To do so, click on the **edit** button corresponding to **WLAN settings** in the **Network configuration** section. The configuration window of the wireless network shows up:



Wireless network configuration window

You can then decide if you wish to connect your YoctoHub-Wireless-n to an existing network, or if you would rather manually enter the SSID of network you wish to use.

You can also configure the YoctoHub-Wireless-n for it to generate its own wireless network in *Software enabled Access Point* (SoftAP) mode. You can then connect a mobile device directly on the YoctoHub-Wireless-n without having to go through an infrastructure server (access point). However, be aware that the *SoftAP* mode has limitations compared to a real wifi network. In particular, in *SoftAP* mode, you cannot have more than four clients connected to the network at the same time.

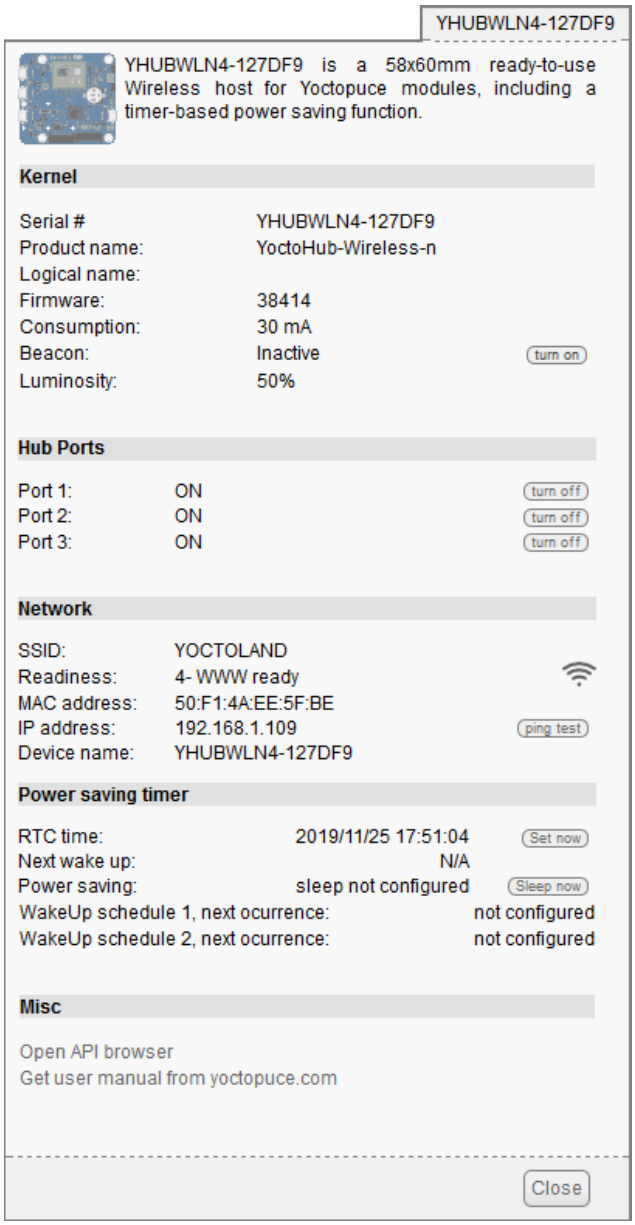
When you have set the wireless network parameters, and possibly tested them, you can click on the **OK** button to close this configuration window and go back to the main configuration window.

If needed, you can also configure which IP address must be assigned to the YoctoHub-Wireless-n. To do so, click on the **edit** button opposite to the **IP addressing** line in the main window.

You can then choose between a DHCP assigned IP address or a fixed IP address for your YoctoHub-Wireless-n module. The DHCP address is recommended in so much as this functionality is supported by most ADSL routers (its the default configuration). If you do not know what a DHCP server is but are used to connect machines on your network and to see them work without any problem, do not touch anything.

You can also choose the network name of your YoctoHub-Wireless-n. You can then access your YoctoHub-Wireless-n by using this name rather than its IP address. When the network part is configured, click on the *Save* button to save your changes and close the configuration window. These modifications are saved in the persistent memory of the YoctoHub-Wireless-n, they are kept even after the module has been powered off.

Click on the serial number corresponding to your YoctoHub-Wireless-n. This opens your module property window:



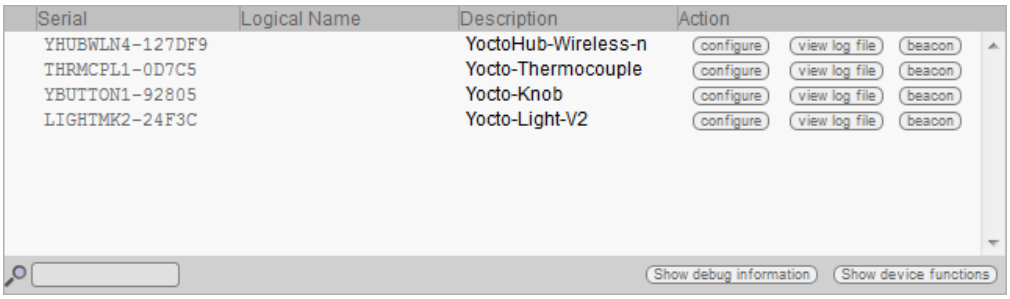
The YoctoHub-Wireless-n properties

This window contains a section indicating the state of the YoctoHub-Wireless-n network part. You can find there, among other things, the connection type and its current IP address. This section also provides the state of the network connection. Possible states are:

- 0- search for link: The module is searching for a connection with the network. If this state persists, the sought wifi network is most likely not in the neighborhood.
- 1- network exists: The sought wifi network was detected.
- 2- network linked: The YoctoHub-Wireless-n did connect to the network.
- 3- LAN ready: The local network is working (IP address obtained).
- 4- WWW ready: The module has checked Internet connectivity by connecting itself to a time server (NTP).

When you have checked that your module does indeed have a valid IP address, you can close the property window, stop your *VirtualHub*, and disconnect your USB cable. They are not needed anymore.

From now on, you can access your YoctoHub-Wireless-n by typing its IP address directly in the address field of your preferred browser. The module answers to the standard HTTP port, but also to the 4444 port used by the *VirtualHub*. If your module IP address is *192.168.0.10*, you can therefore access it with the *http://192.168.0.10* URL.



The YoctoHub-Wireless-n interface is identical to that of a VirtualHub.

If you have assigned a name to your YoctoHub-Wireless-n, you can also use this name on the local network. For example, if your have used the *yoctohub* network name, you can contact the module with the *http://yoctohub* URL under Windows and the *http://yoctohub.local* URL under Mac OS X and Linux. Note that this technique is limited to the subnet of the YoctoHub-Wireless-n. If you want to contact the module by name from another network, you must use a classic DNS infrastructure.

3.2. Automated configuration

You can industrialize the YoctoHub-Wireless-n network configuration. You can find in the following chapters of this documentation the description of the programming functions enabling you to read the Ethernet address (MAC address) of a module, and to configure all of its network parameters.

The network configuration functions are also available as command lines, using the `YNetwork` utility software available in the command line programming library [2].

After having set some parameters by software, make sure to call the `saveToFlash()` function to ensure that the new settings are saved permanently in the module flash memory.

3.3. Connections

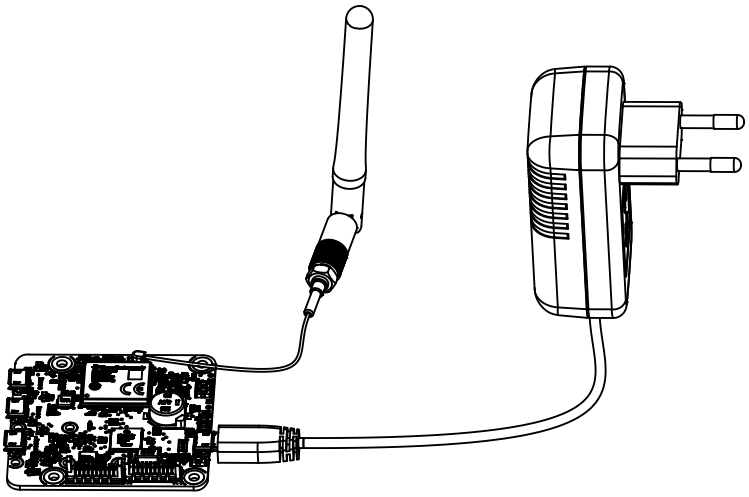
Power supply

The YoctoHub-Wireless-n must be powered by the USB control socket.

USB

Simply connect a USB charger in the *power / control port* port, but make sure that the charger provides enough electric power. The YoctoHub-Wireless-n consumes about 120mA, to which you must add the power consumption of each submodule. The YoctoHub-Wireless-n is designed to manage a maximum of 2A. Therefore, we recommend a USB charger able to deliver at least 2A. Moreover, you must make sure that the total power consumption of the set "hub + submodules" does not go above this limit.

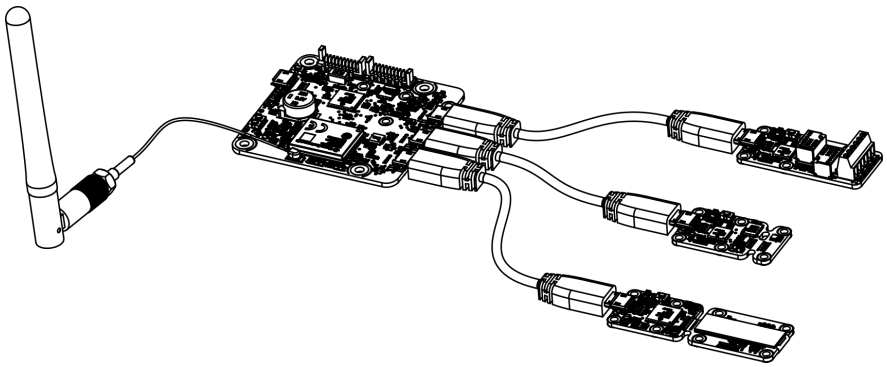
[2] http://www.yoctopuce.com/EN/libraries.php



The YoctoHub-Wireless-n can be powered by a regular USB charger

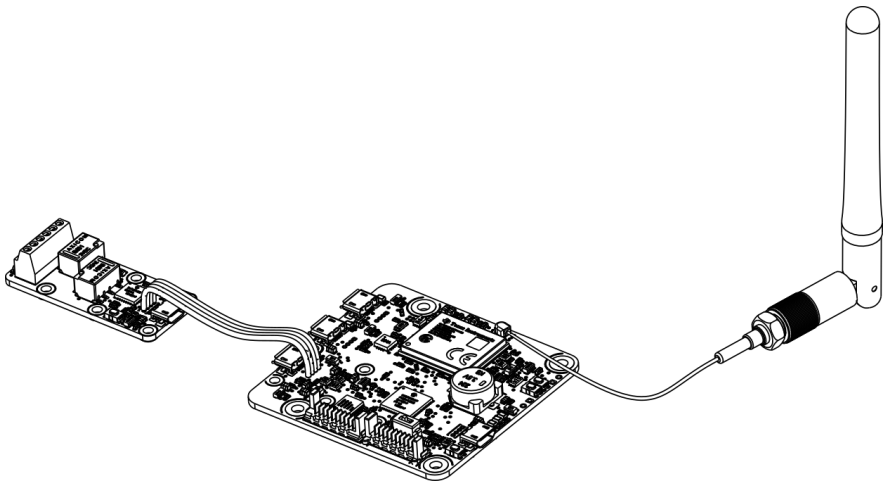
Sub-modules

The YoctoHub-Wireless-n is able to drive all the Yoctopuce modules of the *Yocto* range. These modules can be directly connected to the down ports. They are automatically detected. For this, you need Micro-B Micro-B USB cables. Whether you use OTG cables or not does not matter.



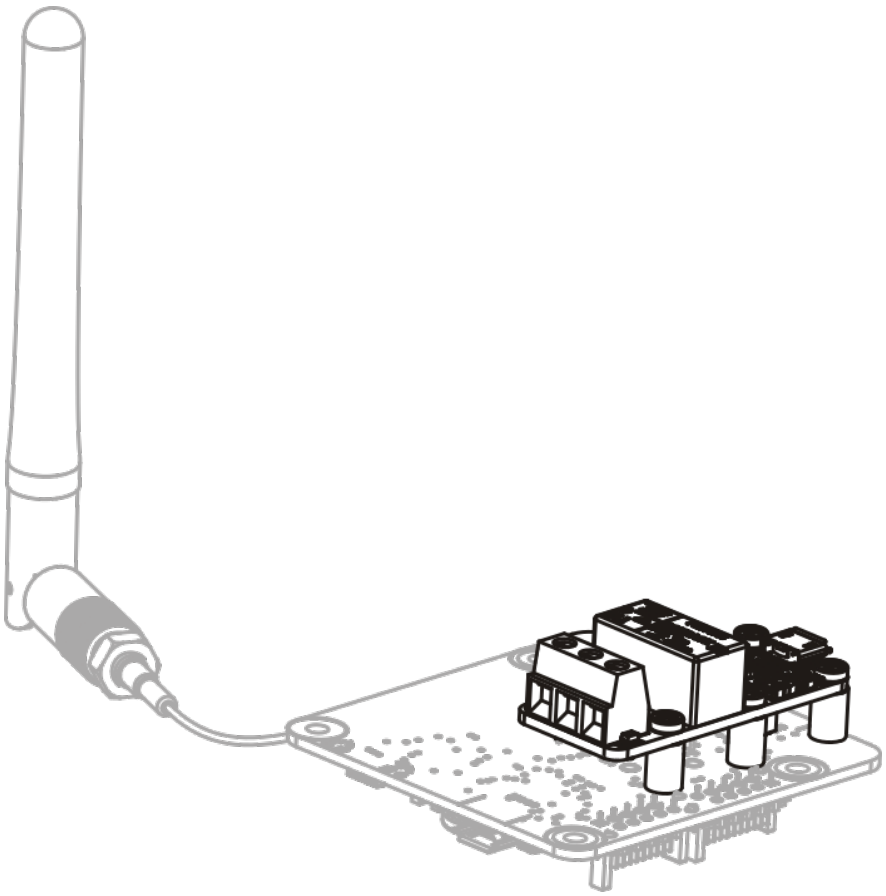
Connecting sub-modules with USB cables

Alternatively, you can connect your modules by directly soldering electric cables between the YoctoHub-Wireless-n and its sub-modules. Indeed, all the Yoctopuce modules have contacts designed for direct cabling. We recommend you to use solid coper ribbon cables, with a 1.27mm pitch. Solid copper ribbon cable is less supple than threaded cable but easier to solder. Pay particular attention to polarity: the YoctoHub-Wireless-n, like all modules in the Yoctopuce range, is not protected against polarity inversion. Such an inversion would likely destroy your devices. Make sure the positions of the square contacts on both sides of the cable correspond.



Sub-module connection with ribbon cable

The YoctoHub-Wireless-n is designed so that you can fix a single width module directly on top of it. To do so, you need screws, spacers[3], and a 1.27mm pitch connector[4]. You can thus transform your USB Yoctopuce module into a network module while keeping a very compact format.



Fixing a module directly on the hub

Beware, the YoctoHub-Wireless-n is designed to drive only Yoctopuce modules. Indeed, the protocol used between the YoctoHub-Wireless-n and the sub-modules is not USB but a much lighter proprietary protocol. If, by chance, you connect a device other than a Yoctopuce module on one of the YoctoHub-Wireless-n down ports, this port is automatically disabled to prevent damages to the device.

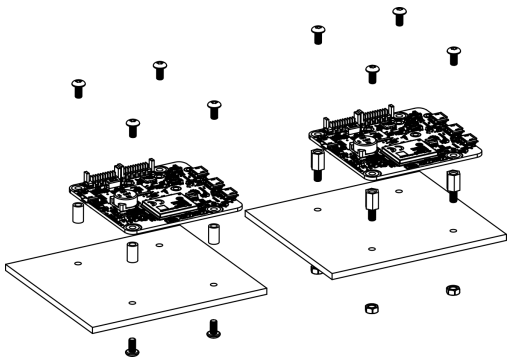
[3] http://www.yoctopuce.com/EN/products/accessories-and-connectors/fix-2-5mm
[4] http://www.yoctopuce.com/EN/products/accessories-and-connectors/board2board-127

4. Assembly

This chapter provides important information regarding the use of the YoctoHub-Wireless-n module in real-world situations. Make sure to read it carefully before going too far into your project if you want to avoid pitfalls.

4.1. Fixing

While developing your project, you can simply let the hub hang at the end of its cable. Check only that it does not come in contact with any conducting material (such as your tools). When your project is almost at an end, you need to find a way for your modules to stop moving around.



Examples of assembly on supports

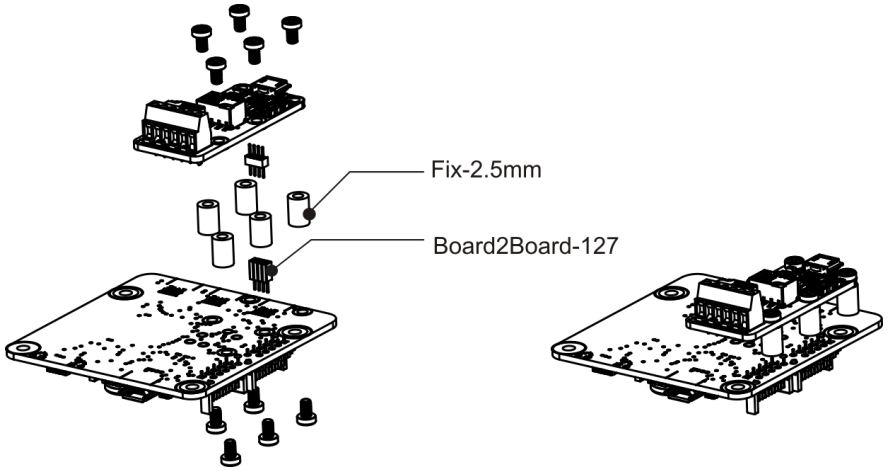
The YoctoHub-Wireless-n module contains 3mm assembly holes. You can use these holes for screws. The screw head diameter must not be larger than 8mm or the heads will damage the module circuits.

Make sure that the lower surface of the module is not in contact with the support. We recommend using spacers. You can fix the module in any position that suits you: however be aware that the YoctoHub-Wireless-n electronic components, in particular the network part, generate heat. You must not let this heat accumulate.

4.2. Fixing a sub-module

The YoctoHub-Wireless-n is designed so that you can screw a single width module directly on top of it. By single width, we mean modules with a 20mm width. All the single width modules have their 5 assembly holes and the USB socket in the same position. The sub-module can be assembled with screws and spacers. At the back of the YoctoHub-Wireless-n and sub-module USB connectors, there

are a set of 4 contacts enabling you to easily perform an electrical connection between the hub and the sub-module. If you do not feel sufficiently at ease with a soldering iron, you can also use a simple Micro-B Micro-B USB cable, OTG or not.



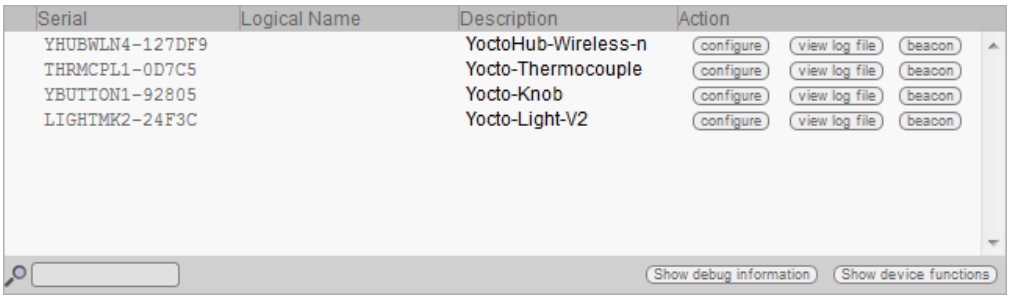
Fixing a module directly on the hub

Make sure to mount your module on the designed side, as illustrated above. The module 5 holes must correspond to the YoctoHub-Wireless-n 5 holes, and the square contact on the module must be connected to the square contact on the YoctoHub-Wireless-n down port. If you assemble a module on the other side or in another way, the connector polarity will be inverted and you risk to permanently damage your equipment.

All the accessories necessary to fix a module on your YoctoHub-Wireless-n are relatively usual. You can find them on the Yoctopuce web site, as on most web sites selling electronic equipment. However, beware: the head of the screws used to assemble the sub-module must have a maximum head diameter of 4.5mm, otherwise they could damage the electronic components.

5. Configuring and testing the modules

Once installed and configured, YoctoHub-Wireless-n allows you to test and configure your Yoctopuce modules. To do so, open you preferred web browser[1]. Open the Web UI of the YoctoHub-Wireless-n, as described in chapter "First steps". The list of all the modules connected on the hub should appear.



YoctoHub-Wireless-n web interface

At the bottom of the page, there are two buttons. The first button, **Show debug information**, enables you to display and then save all the information required to debug an issue linked to the YoctoHub-Wireless-n, that is:

- The list of all detected modules
- The value of all the parameters of all the modules (without passwords).
- The logs of all the modules.
- The list of all the files uploaded on the modules, but not their content.
- The content of potential YoctoHub-Wireless-n core dumps.

If you need to contact support, it is important to download this information and to send it with your request.

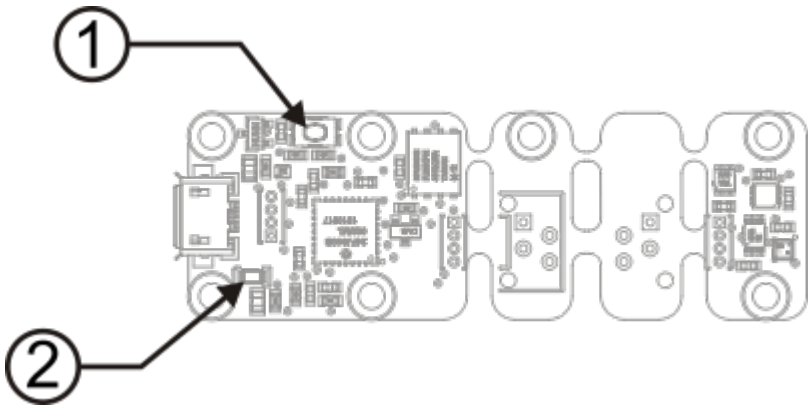
The second button, **Show device functions**, shows all the functions of the YoctoHub-Wireless-n and of each of the modules connected to the YoctoHub-Wireless-n.

5.1. Locating the modules

The main interface displays a line per connected module; if you have several modules of the same model, you can locate a specific module by clicking on the corresponding **beacon** button: it makes

[1] The YoctoHub-Wireless-n interface is regularly tested on Firefox, Chrome, Opera, and Brave. It probably also works on Safari.

the blue led of the module start blinking and displays a blue disk at the beginning of the corresponding line in the interface. Pressing the Yocto-button of a connected module has the same effect.

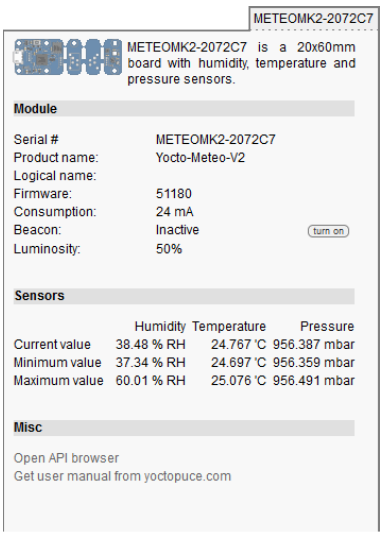


Yocto-button (1) and localization led (2) of the Yocto-Meteo-V2 module. These two elements are always placed in the same location, whatever the module.

5.2. Testing the modules

To test a module, simply click on the serial number of a module in the interface, a window specific to the module opens. This window generally allows you to activate the main functions of the module. Refer to the User's guide of the corresponding module for more details.

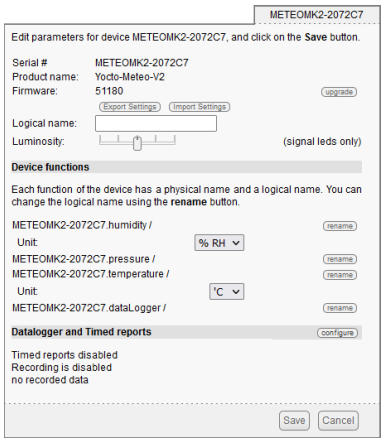
Usually, you do not need to have a version of the YoctoHub-Wireless-n more recent than the module that you want to test/configure: most elements specific to the module interfaces are stored in the firmware of the modules themselves. There are however a few exceptions, so if you encounter an error in the web interface of a module, check if an update of YoctoHub-Wireless-n is available and, if need be, install it. You may then need to reload the page in the browser with Shift-Reload, or to empty your browser cache, in order to force the update of the JavaScript code.



"Details" window of the Yocto-Meteo-V2 module

5.3. Configuring modules

You can configure a module by clicking on the corresponding **configure** button in the main interface. A window, specific to the module, then opens. This window allows you minimally to assign a logical name to the module and to update its firmware. Refer to the User's guide of the corresponding module for more details.



"Configuration" window of the Yocto-Meteo-V2 module

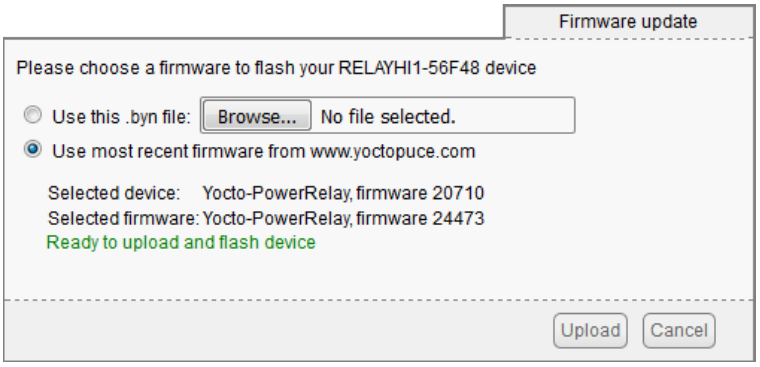
5.4. Upgrading firmware

The Yoctopuce modules are in fact real computers, they even contain a small web server. And, as all computers, it is possible to update their control software (firmware). New firmware for each module are regularly published, they generally allow you to add new features to the module, and/or to correct a hypothetical bug[2].

Recommended method

To update a module firmware, in the YoctoHub-Wireless-n interface, open the configuration window of the module that you want to update, then click on the **upgrade** button. If you simply click on the **Update** button, YoctoHub-Wireless-n uses the most recent version of the firmware published on the Yoctopuce web site and installs it.

YoctoHub-Wireless-n also allows you to chose a .byn file that you have downloaded previously from the Yoctopuce web site, for example to reinstall a previous version.



Firmware update window

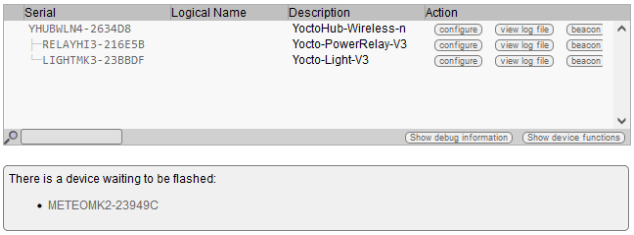
When you have clicked on the **Update** button, everything is automatic. YoctoHub-Wireless-n restarts the module in "update" mode, updates the firmware, then restarts the module in regular mode. The module configuration settings are preserved. Do not disconnect the module during the update process.

Alternative method

If a module update went wrong, in particular if the module was disconnected during the update process, there is a strong risk that it does not work anymore and that it does not appear in the module list. In this case, disconnect the module, wait a few seconds, and reconnect it while keeping the Yocto-button pressed. This starts the module in "update" mode. This working mode is protected against corruptions and should always be available. When the module is reconnected, request a

[2] Never trust people telling you that their software does not have bugs :-)

refresh of the module list in the YoctoHub-Wireless-n interface and your module should appear at the bottom of the interface. Click on it to update its firmware. This update method is a recovery method, it does not preserve the module settings.



The modules in "update" mode are listed in the interface

A regular update preserves the module configuration, while the alternative method with the Yocto-button resets the module with its factory settings. This means that you can also use this method to completely reinitialize a module.

With a command line or by programming

All the command line tools can update Yoctopuce modules thanks to the `downloadAndUpdate` command. The module selection mechanism works like for a traditional command. The [target] is the name of the module that you want to update. You can also use the "any" or "all" aliases, or even a name list, where the names are separated by commas, without spaces.

The following example, using the Yoctopuce command line library, automatically downloads the latest available firmware files and updates all the Yoctopuce modules connected by USB:

```
C:\>YModule all downloadAndUpdate
ok: Yocto-PowerRelay RELAYHI1-266C8(rev=15430) is up to date.
ok: 0 / 0 hubs in 0.000000s.
ok: 0 / 0 shields in 0.000000s.
ok: 1 / 1 devices in 0.130000s 0.130000s per device.
ok: All devices are now up to date.
C:\>
```

The next example installs the LIGHTMK3.51180.byn firmware, locally stored in C:\tmp\yfirmware folder, on the module with serial number LIGHTMK3-23BBDF. Firmware files are available for manual download from Yoctopuce web server.[3]

```
C:\>ymodule LIGHTMK3-23BBDF updateFirmware C:\tmp\yfirmware\LIGHTMK3.51180.byn
OK: LIGHTMK3-23BBDF.module.updateFirmware = 36% Wait for device.
OK: LIGHTMK3-23BBDF.module.updateFirmware = 50% Flash zone.
OK: LIGHTMK3-23BBDF.module.updateFirmware = 57% Flash zone.
OK: LIGHTMK3-23BBDF.module.updateFirmware = 64% Flash zone.
OK: LIGHTMK3-23BBDF.module.updateFirmware = 72% Flash zone.
OK: LIGHTMK3-23BBDF.module.updateFirmware = 73% Device info retrieved.
OK: LIGHTMK3-23BBDF.module.updateFirmware = 90% Firmware updated.
OK: LIGHTMK3-23BBDF.module.updateFirmware = 100% success.
OK: LIGHTMK3-23BBDF.module.updateFirmware = 100% Firmware Updated Successfully in: 14.305s.
```

By default, `downloadAndUpdate` performs only upgrades to a newer firmware, as the default setting of the optional second parameter `onlyNew` is true. If you want to downgrade your firmware to an older version, you must provide the older firmware as the first parameter and set the second parameter to false.

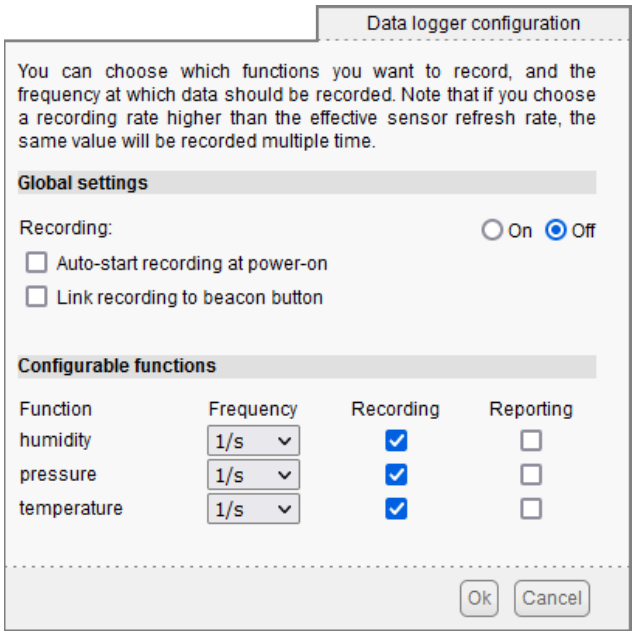
It is also possible to update your modules' firmware using the Yoctopuce programming library, in particular using `YModule.checkFirmware` and `YModule.updateFirmware` methods. For more information, please refer to the advanced programming chapters in the documentation for each module.

[3] www.yoctopuce.com/EN/firmwares.php

5.5. Accessing the sensor data logger

For all Yoctopuce sensors including a data logger, the configuration window contains a specific section enabling you to configure the recording and to modify the raw data saved in the data logger, module per module.

Click on the **configure** button of the **Datalogger and Timed reports** section:



Data logger configuration window

You can also install as a YoctoHub-Wireless-n plug-in the *Yocto-Visualization (for Web)* tool, which offers many more possibilities to visualize data as graphs, and to load a CSV file corresponding to all the connected sensors. For more details, read the section dedicated to the installation of *Yocto-Visualization (for Web)* at the end of this guide.

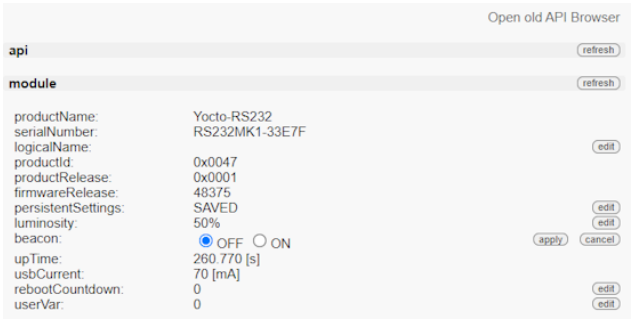
5.6. REST gateway

You can also use YoctoHub-Wireless-n as a REST gateway. This consists in sending to the module HTTP requests through YoctoHub-Wireless-n.

To test this feature, use the **Open API Browser** link available at the bottom of your module interface window, with a web browser:

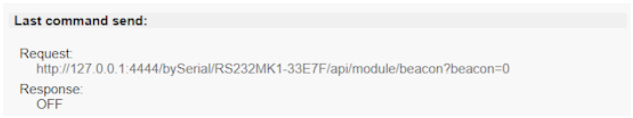
Link to open the REST interface

In the window that opens, you can modify each attribute of the module, using first the **edit** button and then the **apply** button to apply the changes:



Manually changing an attribute

After you have performed a modification, if you go to the very bottom of the page, you can see the HTTP request which was sent to apply the requested modification:



Corresponding HTTP request

You can thus easily discover how to access the essential functions of our modules with HTTP requests: it is the whole interest of the REST interface. If the semantics of an attribute escapes you, you can always find explanations in the module user's guide.

5.7. OpenMetrics gateway (Prometheus)

You can also use YoctoHub-Wireless-n as a data source for a Prometheus server, in order to centralize the measures from the Yoctopuce sensors in the same data base as the information on the state of IT infrastructures.

Prometheus data sources are called *exporters*: the idea is that each important system or service can make its vital data available to Prometheus, enabling the system administrator to collect and monitor them. Each *exporter* is an HTTP accessible URL, which provides data following the OpenMetrics standard: one measure per line, with conventions for naming and classifying, enabling system administrators to find their way among the hundreds of measures at disposal when configuring the dashboard.

YoctoHub-Wireless-n has the capacity to be a native OpenMetrics *exporter* through the REST interface. To obtain data in the OpenMetrics format, you simply need to load the `/api/services.om` URL of your YoctoHub-Wireless-n, that is `http://127.0.0.1:4444/api/services.om`. For example, if you access this URL when a few sensors are connected locally, you obtain something akin to this (we modified the presentation to make reading easier, but in reality each measure fits on a single line):

```
yocto_temperature_advertisedValue{
    productName="Yocto-Thermocouple",
    serialNumber="THRMCPL1-16397A",
    deviceName="insideProbes",
    functionId="temperature1"} 21.78
yocto_temperature_advertisedValue{
    productName="Yocto-PT100",
    serialNumber="PT100MK1-BA496",
    functionId="temperature"} 28.57
yocto_temperature_advertisedValue{
    productName="Yocto-RangeFinder",
    serialNumber="YRNGFND1-1D1567",
    deviceName="rf",
    functionId="temperature1",
    functionName="rfTemp"} 25.13
yocto_lightSensor_advertisedValue{
    productName="Yocto-RangeFinder",
    serialNumber="YRNGFND1-1D1567",
    deviceName="rf",
    functionId="lightSensor1"} 56
```

```
yocto_rangeFinder_advertisedValue{
    productName="Yocto-RangeFinder",
    serialNumber="YRNGFND1-1D1567",
    deviceName="rf",
    functionId="rangeFinder1"} 1456
# EOF
```

To tell Prometheus to collect these data directly from YoctoHub-Wireless-n, you must add to your `prometheus.yml` a file section of this type:

```
  - job_name: "yoctohub_sensors"
    scrape_interval: 60s
    metrics_path: "/api/services.om"
    static_configs:
      - targets: ['127.0.0.1:4444']
```

As our OpenMetrics exporter is embedded straight into the YoctoHub-Wireless-n REST interface, you can use it to obtain more detailed information for each sensor, using a URL pointing to a specific sensor. For example, if you connect a Yocto-Thermocouple to YoctoHub-Wireless-n and then you assign it the logical name *tcProbes*, when you access the `/byName/tcProbes/api.om` URL, you obtain something like:

```
yocto_module_luminosity{...,functionId="module",functionName="tcProbes"} 50
yocto_module_beacon{...,functionId="module",functionName="tcProbes"} 0
yocto_module_usbCurrent_mA{...,functionId="module",functionName="tcProbes"} 23
yocto_module_rebootCountdown{...,functionId="module",functionName="tcProbes"} 0
yocto_module_userVar{...,functionId="module",functionName="tcProbes"} 0
yocto_temperature_currentValue_degC{[...],functionName="heatSink"} 21.99
yocto_temperature_lowestValue_degC{[...],functionName="heatSink"} 20.51
yocto_temperature_highestValue_degC{[...],functionName="heatSink"} 22.25
yocto_temperature_currentRawValue_degC{[...],functionName="heatSink"} 21.988
yocto_temperature_signalValue_mV{[...],functionName="heatSink"} -0.162
yocto_temperature_signalValue_mV{[...],functionId="temperature2"} 999.999
yocto_dataLogger_currentRunIndex{[...],functionId="dataLogger"} 0
yocto_dataLogger_autoStart{[...],functionId="dataLogger"} 0
yocto_dataLogger_beaconDriven{[...],functionId="dataLogger"} 0
yocto_dataLogger_usage{[...],functionId="dataLogger"} 0
# EOF
```

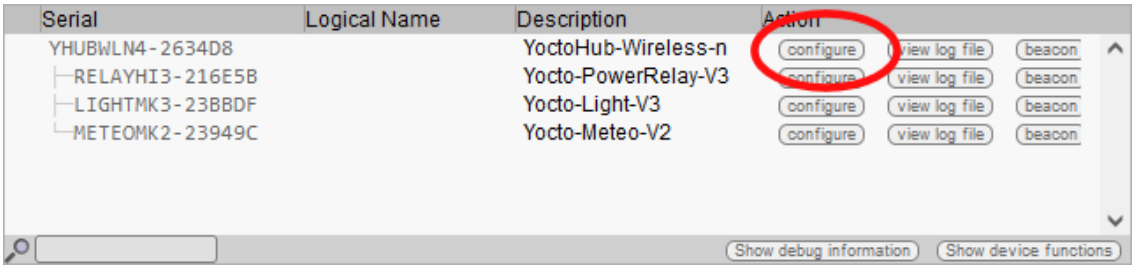
Thus, all the numerical attributes of the Yocto-Thermocouple are made available. You can therefore know the min/max values encountered, the voltage measured at the thermocouple terminal, and so on. Note also that in this case, the exported symbol includes the unit, as recommended by OpenMetrics. When the module detects that an input is not connected (like the `temperature2` function above), metrics that cannot be computed are automatically deleted from the export so that Prometheus reports them as missing, rather than keeping the latest measured value.

To obtain these additional data per sensor, simply add to the `prometheus.yml` file a new section, referencing the sensor either by its serial number (*bySerial*) or by its logical name (*byName*):

```
  - job_name: "thermocouple_probes"
    scrape_interval: 60s
    metrics_path: "/byName/tcProbes/api.om"
    static_configs:
      - targets: ['127.0.0.1:4444']
```

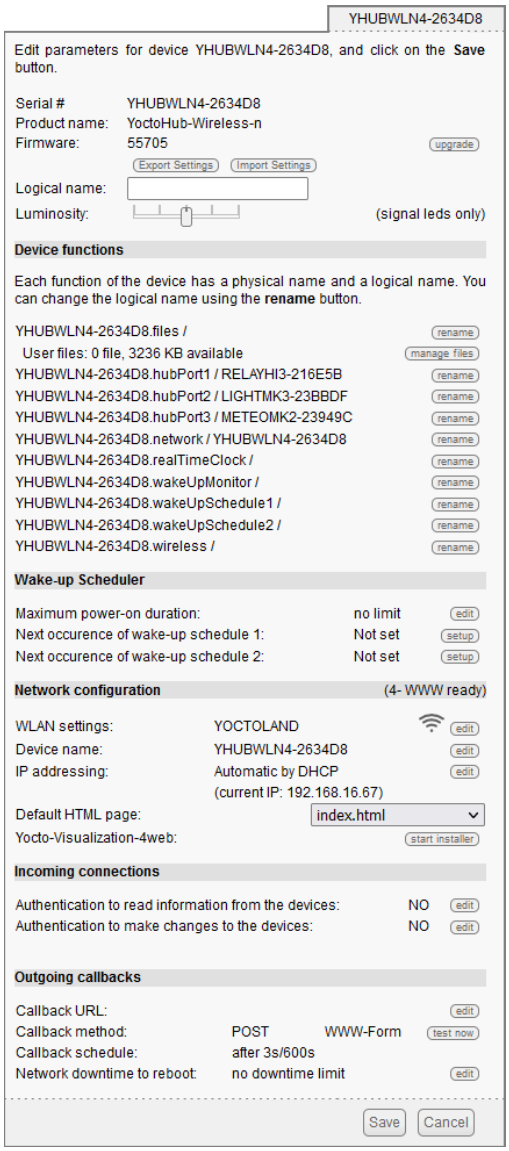
6. Access control

YoctoHub-Wireless-n is able to perform access control to protect your Yoctopuce devices. Click on the **Configure** button on the line matching YoctoHub-Wireless-n in the user interface.



*Click on the **configure** button on the first line*

This opens the configuration window for YoctoHub-Wireless-n



YoctoHub-Wireless-n configuration window

Access control can be configured from the **Incoming connections** section. There are two disctinct levels of access control

6.1. Admin access

The *admin* access locks write access to the Yoctopuce devices. When the admin password is set, only users using the admin login are allowed to configure the devices seen by YoctoHub-Wireless-n as they want to.

6.2. User access

The *user* access locks all use of the Yoctopuce devices. When set, the *user* password prevents any user from consulting any device properties without the proper credentials.

If you configure a *user* password only, without configuring an *admin* password, all the user must give a password to access the modules, but once they are authenticated, they can also edit module configurations.

If you configure both *user* and *admin* passwords, users logging in with the *user* login are not able to modify the configurations of the modules seen by YoctoHub-Wireless-n. *user* access enables access

in read-only mode, that is only to consult the state of the modules. Only users using the *admin* login can change the configuration of the modules.

If you configure an *admin* access, without configuring a *user* access, users are still able to read your devices values without any password, but they wont be able to change any device setting. Only the users knowing the *admin* password can change module configurations.

6.3. Access control and API

Warning: access control has an impact on Yoctopuce API behavior when trying to connect to YoctoHub-Wireless-n with access control enabled. With Yoctopuce API, access control is handled at the `RegisterHub()` level. You need to provide the YoctoHub-Wireless-n address as follow: *login:password@adresse:port*, here is an exemple:

```
yRegisterHub("admin:mypass@127.0.0.1:4444",errmsg);
```

7. Outgoing connections

YoctoHub-Wireless-n is able to connect to external services to communicate the status of the modules connected to it.

YoctoHub-Wireless-n knows how to post its data in the format accepted by some third-party cloud services, such as

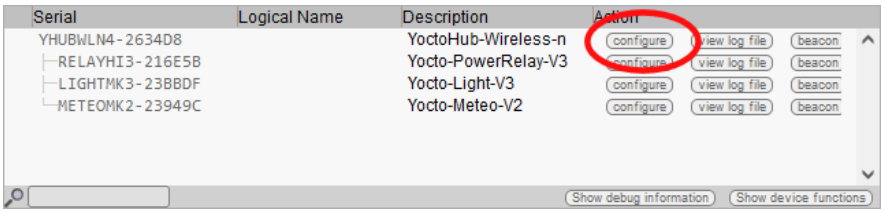
- Emoncms
- InfluxDB (versions 1.0 et 2.0)
- PRTG
- Valarm.net

YoctoHub-Wireless-n can also connect to external services using advanced protocols that allow further interaction with the Yoctopuce devices, but which will require a little more knowledge to take advantage of them:

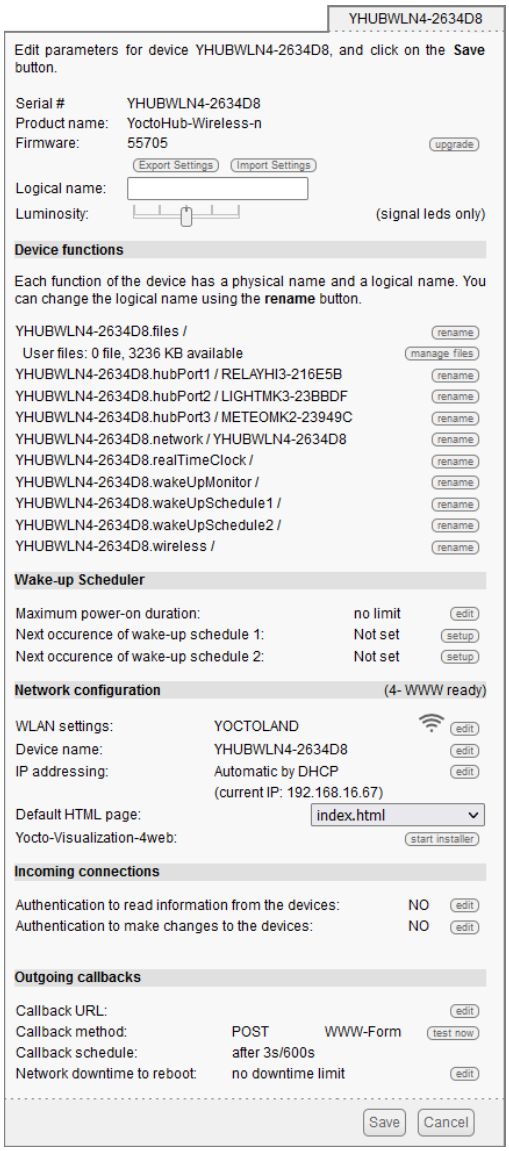
- MQTT
- Yocto-API

7.1. Configuration

To use this feature, just click on the **configure** button located on the line matching YoctoHub-Wireless-n on the interface. Then look for the **Outgoing calback** section and click on the **edit** button.



*Just click on the corresponding **configure***



*Then edit the **Outgoing callbacks** section.*

The callback configuration window shows up. This window allows you to define how YoctoHub-Wireless-n interacts with an external web site. Several interaction types are at your disposal.

7.2. HTTP Callbacks to 3rd-party services

YoctoHub-Wireless-n is able to post on external servers the values of the Yoctopuce sensors at regular intervals and/or whenever a value changes significantly. This feature allows you to store your measures and draw graphs without writing a single line of code.

Yoctopuce is in no way affiliated with these third-party services and can therefore neither guarantee their continuity nor propose improvements to these services.

Emoncms

Emoncms is an open-source Cloud service enabling you to post Yoctopuce sensor data and then to visualize them. You can also install your own local server.

The parameters that you must provide are the Emoncms API key, the node number that you want to use, as well as the address of the Emoncms server if you use a local server.

You can personalize the names linked to the measures posted on Emoncms. For more details, see the section "Names associated with posted values" below.

InfluxDB 1.0 and 2.0

InfluxDB is an open-source database specifically dedicated to storing temporal series of measures and events. Note that only local installations are supported. Indeed, the *InfluxDB Cloud* service is not supported as it requires an SSL connection.

Parameters for version 1.0 of InfluxDB are the address of the server and the name of the database.

Version 2.0 of InfluxDB uses a different API and Yoctopuce needs three parameters (`organization`, `bucket`, and `token`) as well as the server address.

You can personalize the names linked to the measures posted on InfluxDB. For more details, see the section "Names associated with posted values" below.

PRTG

PRTG is a commercial solution designed to supervise systems and applications. You can store measures and obtain graphs from your sensors with this service.

The required parameters are the address of the PRTG server and the `token` enabling the identification of YoctoHub-Wireless-n.

You can personalize the names linked to the measures posted on PRTG. For more details, see the section "Names associated with posted values" below.

Valarm.net

Valarm is a professional cloud service that allows you to record data from Yoctopuce sensors but also allows you more elaborate functions such as the possibility to geolocate measures or to configure Yoctopuce modules remotely.

The only required parameter is a `Routing code` to identify YoctoHub-Wireless-n.

7.3. Callbacks to an MQTT broker

MQTT is an Internet of Things protocol that allows sensors and actuators to communicate with each other via a central server called an *MQTT broker*. MQTT is particularly used in home automation, where it can federate many technologies to make them accessible to a central control system such as *Home Assistant*.

The basic parameters to provide for the MQTT callback configuration are the MQTT broker address, client ID, *root_topic* as well as authentication parameters. Note that encapsulation of the MQTT protocol in an SSL connection is not supported, which precludes its use with services like AWS IoT Core.

When an MQTT callback is active, YoctoHub-Wireless-n is able to publish messages with the status of sensors and actuators, and receive command and configuration messages, allowing the central control system to fully interact with the devices.

The rest of this section describes in detail the supported MQTT messages. It will only be of interest to developers who want to build their own integration with Yoctopuce modules via MQTT. If you are just going to use *Home Assistant*, you can skip this section and thanks to the *MQTT Discovery* mechanism, your devices should automatically appear in *Home Assistant*.

Common format of all messages

The *topic* of all messages starts with a common part, which identifies the Yoctopuce module and the particular function of this module concerned by the message. It has the following structure:

root_topic*/*deviceName*/*functionName

The *root_topic* can be freely configured, for example to the `yoctopuce` value. If you connect several hubs to the same MQTT *broker*, you can either use the same *root_topic* for all of them or a

different topic per hub. Using a separate *root_topic* is recommended if you send a lot of commands to a hub via MQTT.

deviceName is the logical name you gave to the designated Yoctopuce module. If no logical name has been configured, the serial number of the module is used instead of the logical name (e.g. `METEOMK2-012345`).

functionName is the logical name you gave to the designated function. If no logical name has been configured, the function identifier is used (for example `genericSensor1`).

The advantage of using logical names rather than hardware names in the *topic* root is that you can identify modules and functions by their role and you don't have to explicitly tell the hardware ID of each module to the MQTT client that has to interact with these modules. The disadvantage is that if you decide to change the logical name of your modules or functions without thinking about it, the MQTT *topics* used must be changed accordingly.

Topic /api: complete state of the function

Under `root_topic/deviceName/functionName/api`, each function publishes a JSON structure describing the complete state of the function, including all attributes. In this JSON encoding,

- booleans are represented by 0 and 1
- enumerated types are represented by numeric constants
- real numbers such as measures are represented as integers, after multiplication by 65536. They must therefore be divided by 65536.0 to obtain the actual value.

This message is issued when one of the following conditions occurs

- when the connection between the hub and the MQTT broker is established
- every five minutes
- after a change in the module configuration
- in response to the reception of a command by this function
- for the *module* function, when the *beacon* is activated or deactivated

Base topic: current state

Under `root_topic/deviceName/functionName`, each function publishes a textual summary of its status. This is not JSON but a simple string, corresponding to the value of the *advertisedValue* attribute of the function. For example, for a sensor, it corresponds to the current value of the sensor, while for a relay it corresponds to the letter A or B depending on the switching state.

This message is issued when one of the following conditions occurs

- when the connection between the hub and the MQTT broker is established
- every five minutes
- every time the *advertisedValue* attribute changes

To avoid overloading the MQTT broker with changes in the current values of the sensors, it is possible to globally disable the sending of current value messages for the sensors only, in the MQTT configuration.

Topics /avg, /min, /max: average and extreme values

Under `root_topic/deviceName/functionName/avg`, the sensor functions (subclasses of *Sensor*) periodically publish the average value observed during the previous time interval directly as a real number.

Under `root_topic/deviceName/functionName/min`, the minimum value observed during the previous time interval.

Under `root_topic/deviceName/functionName/max`, the maximum value observed during the previous time interval.

These messages are the direct equivalent of the *timed reports* documented in the user's guide of these modules. The time interval must have been previously configured in the *reportFrequency* attribute. Otherwise, these messages are not sent.

Topics /set/attributeName: command sending and configuration

Under *root_topic/deviceName/functionName/set/attributeName*, it is possible to send messages to modify the attributes of functions, in order to change a function state or configuration. The value of the message corresponds to the new desired value, as is. The format is identical to the one used for the REST gateway of YoctoHub-Wireless-n (see the REST gateway section of this guide).

For example, we could switch a relay by sending a message to the *topic*

```
yoctopuce/PumpRelay/relay1/set/state
```

with value 1.

We could also trigger a 1500ms pulse on the same relay by sending a message to the *topic*

```
yoctopuce/PumpRelay/relay1/set/pulseTimer
```

with value 1500.

To receive commands and configuration changes via MQTT, you must have explicitly enabled it in the MQTT configuration on the Yoctopuce hub. For safety, the basic behavior of the MQTT mode remains read-only.

Topic /rdy: availability status

Under `root_topic/deviceName/module/rdy`, the module function publishes a binary indication of the availability status of the device. The value is 1 when the module is online, and 0 when it is offline.

This message is published by the hub for its own module when one of the following conditions occurs

- when the hub establishes a connection with the MQTT broker
- when the hub disconnects from the MQTT broker

This message is published for devices other than the hub when one of the following conditions occurs

- when establishing the hub connection with the MQTT broker
- when a device is connected to the hub
- when a device is disconnected from the hub

To determine if a module is really reachable, it is therefore necessary to check its own `/rdy` topic, to know if it has been disconnected, and the `/rdy` topic of the hub, to know if the MQTT connection is active.

MQTT discovery

In addition, special messages are published under the topic `homeassistant/` just after the connection of the hub with the MQTT broker is established, and repeated every 5 minutes, to allow the automatic detection of the proposed features, thanks to the *MQTT discovery* mechanism supported by Home Assistant and openHab.

7.4. Yocto-API callbacks

Yocto-API callbacks use a specific protocol defined by Yoctopuce, which allows a very advanced interaction with the Yoctopuce modules. Using languages such as PHP, TypeScript, JavaScript or Java, they allow the programmer of the web service to directly use the functions of the Yoctopuce programming library to interact with the modules that connect via HTTP callback. This allows you in particular to control from a public web site Yoctopuce modules installed behind a private ADSL

router.You can for example switch the output of a relay depending on the value of a sensor, while keeping the complete control of the system on a web server.

Yoctopuce provides a free application that exploits to the maximum the possibilities of the Yocto-API callback on a PHP server: VirtualHub for Web. This web application allows you to interact remotely with modules that connect periodically via a Yocto-API callback. More information about VirtualHub for Web is available on the Yoctopuce blog [1].

In Yocto-API or Yocto-API-JZON callback mode, you can choose between the "HTTP" and "WebSocket" protocols.

Yocto-API callbacks in WebSocket mode

The communication flow in a standard HTTP request is extremely simple: the client sends a request, and then listens for the server reply. It is not a real conversation, rather just a question and an answer. The HTTP client cannot respond to what the server says without restarting a new separate communication.

However there is a provision in the HTTP 1.1 standard for the client to request an upgrade of the communication protocol. One such protocol upgrade widely supported is called WebSockets and is defined in RFC 6455. This upgrade transforms the simple text-based request/reply link into a bidirectional messaging link, that can send arbitrary data in both direction.

Upgrading an HTTP connection to WebSockets requires that both sides support the upgrade. YoctoHub-Wireless-n and programming libraries do support it. But in order to upgrade an HTTP callback connection into a WebSocket callback, you also need to ensure that your web server supports WebSocket connection upgrade. This is well supported on Java and Node.JS. This is however not the case currently for PHP implementation on Apache.

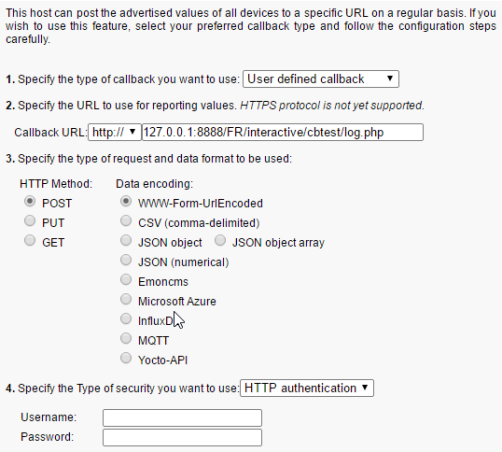
WebSockets provide access to a number of advanced features of Yoctopuce API that were unavailable in HTTP callback mode:

- a WebSocket callback can browse and retrieve data from any Yoctopuce sensor built-in data logger.
- a WebSocket callback can use bidirectional communication functions with serial devices, for instance to execute MODBUS queries over a Yocto-RS485.
- a WebSocket callback can use value change callbacks and timed report callbacks to receive real-time and averaged measures from sensors.
- a WebSocket callback can keep long connections between a hub and a server, and handle interactive behaviors, since API calls are made in real time.
- a WebSocket callback can even perform a remote firmware upgrade.

7.5. User defined HTTP callbacks

If none of the other options for HTTP callback configuration suits your needs, you can try specifying how the data should be sent yourself. User defined callback allows you to customize the way YoctoHub-Wireless-n sends information to the server. Note that only HTTP protocol is supported (no HTTPS).

[1] https://www.yoctopuce.com/EN/article/new-a-virtualhub-that-works-through-the-web



The callback configuration window

If you want to secure access to your callback script, you can setup a standard HTTP authentication on the web server. YoctoHub-Wireless-n knows how to handle standard HTTP authentication schemes: simply provide the user and and password fields needed to access the URL. Both "Basic" and "Digest" authentication are supported. However, "Digest" authentication is highly recommended, since it uses a challenge mechanism that avoids sending the password itself over the Internet, and prevents replays.

As an example, here is a PHP script enabling you to visualize in the debug window the content of the data posted by a user-defined HTTP callback in POST and WWW-Form-UrlEncoded mode.

```
<?php
  Print(Date('H:i:s')."\r\n");
  foreach ($_POST as $key => $value) {
      Print("$key=$value\r\n");
  }
?>
```

You can personalize the names linked to the measures posted by a user-defined HTTP callback. For more details, see the section "Names associated with posted values" below.

7.6. Names associated with posted values

With the exception of Yocto-API callbacks which give access to all the information about the Yoctopuce modules, callbacks are designed to transmit only the most important information to the server, associating each value with a name that makes it easy to link it to its origin.

Basic behavior

Standard behavior is to transmit the value of the `advertisedValue` attribute for each function present on the Yoctopuce modules. The automatically associated name for each value follows this logic:

1. If the function has been given a logical name:

```
FUNCTION_LOGICAL_NAME = VALUE
```

2. If the module has been given a logical name, but not the function:

```
MODULE_NAME.HARDWARE_NAME = VALUE
```

3. If no logical name was set:

```
SERIAL_NUMBER.HARDWARE_NAME = VALUE
```

The easiest way to customize the names associated with the values is to configure the desired name as the logical name of the function, or otherwise as the logical name of the module itself.

Here is an example of data posted by a user-defined HTTP callback in POST mode and *JSON (numerical)* format for a system with a Yocto-Watt where each function has an explicit logical name (for example `VoltageDC`) and a Yocto-Meteo-V2 where the module itself was assigned the `Ambient` logical name:

```
{"timestamp":1678276738,
"CurrentAC":0
,"CurrentDC":0
,"VoltageAC":0
,"VoltageDC":0
,"Power":0
,"Ambient.temperature":22.17
,"Ambient.pressure":949.36
,"Ambient.humidity":30
}
```

Advanced customization with a file

If you wish to further customize the format of the transmitted data, to specifically select which attribute of which module should be sent under which name, or to add contextual information, it is also possible, but it is a little more complicated. To do so, you need to create a template file defining the exact format of the data to be sent. The content and the name of this file is specific to each type of HTTP callback, and each case is explained individually below.

The common point to all the template files is that their content is sent as is to the server, with the exception of expressions included between *backquotes* (or *backticks*, character `, ASCII code 96) which are evaluated by the REST gateway of YoctoHub-Wireless-n (see the REST gateway section of this guide). For example, if the template file contains the text:

```
{ "origin": "`/api/module/productName`" }
```

then the content actually posted is

```
{ "origin": "YoctoHub-Wireless-n" }
```

Customization file for Emoncms

The basic format used by YoctoHub-Wireless-n for Emoncms has the form below. Note that the data is transmitted in the URL, therefore in a single line, but it has been put here on several lines to make it easier to read.

```
time=1678277614
&json={
  "CurrentAC":0,
  "CurrentDC":0,
  "VoltageAC":0,
  "VoltageDC":0,
  "Power":0,
  "Ambient.temperature":22.28,
  "Ambient.pressure":949.54,
  "Ambient.humidity":29.7
}
```

To customize the format of the data sent to Emoncms, you need to create a format template file on YoctoHub-Wireless-n with the name `EMONCMS_cb.fmt`.

This file should be a single line, with no carriage returns, and start with a string of type `&json=`. For example, to post only the absolute and relative humidity, you could use (without carriage return!):

```
&json={
  "absoluteHumidity"=`/byName/Ambient/api/humidity/absHum`,
  "relativeHumidity"=`/byName/Ambient/api/humidity/relHum`
}
```

Customization file for InfluxDB

The basic format used by YoctoHub-Wireless-n for InfluxDB has the format shown below. It associates all the values to a *yoctopuce* measure base and adds a *name* tag with the network name of YoctoHub-Wireless-n and an *ip* tag with its IP address. Then each value is posted in a field whose name follows the basic convention described above. The data is transmitted by a CSV POST, in a single line, but it has been put here on several lines to facilitate reading.

```
yoctopuce,name=VIRTHUB0-12345678,ip=192.168.1.10
  CurrentAC=0,CurrentDC=0,VoltageAC=0,VoltageDC=0,Power=0,
  Ambient_temperature=22.5,Ambient_pressure=948.63,Ambient_humidity=29.4
  1678281649
```

To customize the format of the data sent to InfluxDB, you must create on YoctoHub-Wireless-n a format template file with the `INFLUXDB_cb.fmt` (version 1.0) or `INFLUXDB_V2_cb.fmt` (version 2.0) name.

This file can have several lines if you wish, which allows you to use different tags for different measures, or even to split measures over several databases.

For example, to post for absolute humidity and relative humidity , but with distinct tags, you could use the following format file:

```
humidity,type=relative,location=Library relHum=`/byName/Ambient/api/humidity/relHum`
humidity,type=absolute,location=Library absHum=`/byName/Ambient/api/humidity/absHum`
```

Note: InfluxDB servers accept carriage return only in the UNIX format (character `\n`, also called LF). If you edit the file on a Windows machine, take care to use a text editor able to not add the Windows carriage return (`\r\n`, also called CR LF).

Customization file for PRTG

The basic format used by YoctoHub-Wireless-n for PRTG has the format below. It posts each value to a channel whose name follows the basic convention described earlier. The data is transmitted by a CSV POST, in a single line, but here they have been put on several lines to facilitate reading.

```
{"prtg":{"result":[
{"channel":"CurrentAC","value":"0","float":"1","DecimalMode":"All"}
,{"channel":"CurrentDC","value":"0","float":"1","DecimalMode":"All"}
,{"channel":"VoltageAC","value":"0","float":"1","DecimalMode":"All"}
,{"channel":"VoltageDC","value":"0","float":"1","DecimalMode":"All"}
,{"channel":"Power","value":"0","float":"1","DecimalMode":"All"}
,{"channel":"Ambient.temperature","value":"22.48","float":"1","DecimalMode":"All"}
,{"channel":"Ambient.pressure","value":"948.68","float":"1","DecimalMode":"All"}
,{"channel":"Ambient.humidity","value":"29.7","float":"1","DecimalMode":"All"}
]}}
```

To customize the format of the data sent to PRTG, you must create a format template file on YoctoHub-Wireless-n with the `PRTG_cb.fmt` name.

This file must have at least the same first line and last line as the example above. However, the description of the channels can be completely customized.

For example, to post absolute humidity and relative humidity simultaneously, but in two distinct channels, you could use the following format file:

```
{"prtg":{"result":[
{"channel":"relHum","value":"`/byName/Ambient/api/humidity/relHum`",
  "float":"1","DecimalMode":"All"},
{"channel":"absHum","value":"`/byName/Ambient/api/humidity/absHum`",
  "float":"1","DecimalMode":"All"}
]}}
```

7.7. Scheduling callbacks

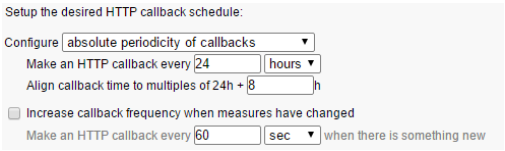
The callback scheduling section is present for all types of callbacks. It is the last section containing fields to be filled.

A first callback is always made just a few seconds after YoctoHub-Wireless-n starts up. Subsequent callbacks are made according to the scheduling settings, which determine the callback frequency.

You can select between two planning methods: either by configuring the time interval between two subsequent callbacks, or by specifying an absolute periodicity, to obtain callbacks at fixed times. You can specify the interval between callbacks in seconds, minutes, or hours.

The `interval between subsequent callbacks` option allows you to specify the delay between each callback. That is, if you configure an interval of 5 minutes, YoctoHub-Wireless-n waits 5 minutes before triggering the next callback. If the first callback is triggered at 12:03, the next one is executed at 12:08, and so on.

The `absolute periodicity of callbacks` option allows you to configure callbacks at a fixed time. That is, the callback is triggered every multiple of the configured delay. For example a delay of 5 minutes triggers callbacks at 8h00, 8h05, 8h10, and so on. Note that in this mode, it is also possible to specify an offset from the configured delay. For example with a 24 hour delay, it is possible to use an offset of 8h to trigger the callback every day at 8h in the morning.



The callback scheduling parameters

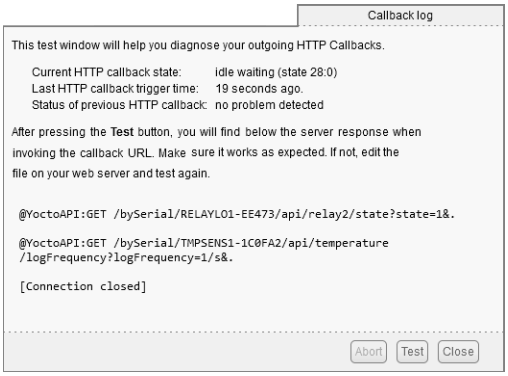
You can explicitly select if you want the callback frequency to vary when no new measure is detected. This enables you to lower the minimal transmission frequency to lower the quantity of data sent over the network if nothing is happening.

Be aware that if you setup many hubs to each make an callback at the same time, you may create a load peak on your web server. So make sure to use an offset parameter to balance load over time.

7.8. Tests

In order to help you debug the process, YoctoHub-Wireless-n can show you the answers to the callback sent by the web server. In the callback configuration window, click on the **test** button when all required fields are filled to open the test window.

The window shows you the actual state of the callback system to enable you to see, for example if a callback is currently running on the web server. In any case, while this window is open, no HTTP callback is automatically triggered. You can trigger callbacks manually by pressing on the **Test** button. Once triggered, the window displays the information returned by the web service, as in the example below:



The result of the test callback with a Yocto-PowerRelay and a Yocto-Temperature

If the result meets your expectations, close the debug window and then click on the **OK** button.

7.9. Spontaneous connections

On top of the connections linked to outgoing callbacks described in the sections above, YoctoHub-Wireless-n occasionally tries to establish outgoing connections. These connections are the following:

- DHCP connection: If the hub's IP address is configured to be assigned by DHCP, the YoctoHub-Wireless-n makes periodic connections to the DHCP server specified in the hub configuration. If this connection cannot be made, the hub is assigned a default IP address.
- DNS connection: whenever YoctoHub-Wireless-n needs to connect to an external server, it makes a connection to a DNS server to obtain the IP address corresponding to the name of the server it is about to contact. If these DNS connections cannot be made, the default NTP server cannot be contacted and HTTP callbacks only work if they are defined by an explicit IP address.
- NTP connection: to keep its internal clock synchronized, the hub regularly connects to an NTP server. You can change the address of this server by modifying the "*ntpServer*" option in the "*network*" function. If these NTP connections cannot be made, the hub's internal clock starts to drift.
- SSDP and Multicast DNS: the YoctoHub-Wireless-n periodically performs SSDP and Multicast DNS announcements to notify its presence on the network. These connections can be disabled by modifying the "*discoverable*" attribute of the "*network*" function.
- Installing Yocto-Visualization (for web): When the user initiates the installation of Yocto-Visualization (for web) from the YoctoHub-Wireless-n interface, the hub automatically downloads the most recent installation file from www.yoctopuce.com
- Version test: every time the property or configuration window of a module is opened, YoctoHub-Wireless-n makes a request to www.yoctopuce.com to check if the module firmware is up to date. This query contains only the serial number of the module and is used to tell the user if a new firmware is available.
- Firmware download: Each time the firmware update window is opened, YoctoHub-Wireless-n makes a request to www.yoctopuce.com to retrieve the most recent firmware. This connection saves the user from having to download the latest firmware manually.

Note that the last two connections are in fact established by the web browser displaying the YoctoHub-Wireless-n user interface. Moreover, these connections are purely optional, if they cannot be established, the application continues to function normally.

Here is a table summarizing the exact parameters of these connections:

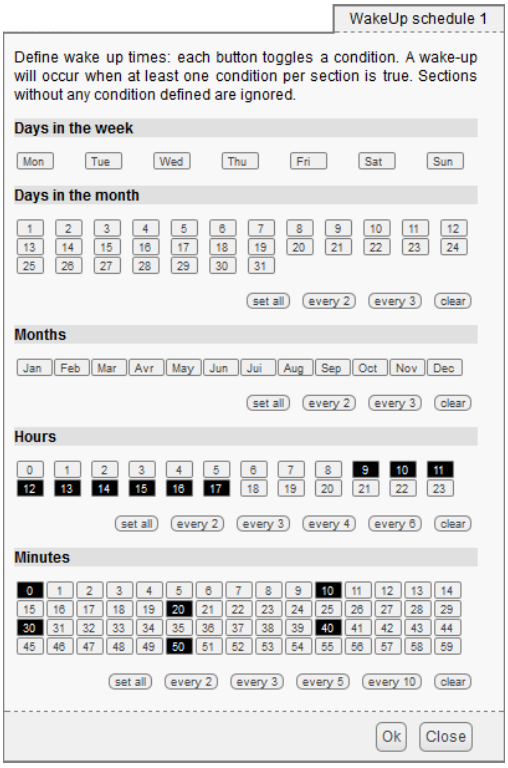
Justification	Protocol Port	Target address	How to disable
Dynamic IP adress	DHCP UDP 67	broadcast	configuring a static IP address
Name resolution	DNS UDP 53	configured DNS server	configuring the IP address of the NTP server and defining callbacks by IP address
Updating the clock	NTP UDP 123	1.yoctopuce.pool.ntp.org or configured server	setting the NTP server to 255.255.255.255
Discovery	SSDP UDP 1900	multicast 239.255.255.250	disabling `discoverable`
Discovery	MDNS UDP 5353	multicast 224.0.0.251	disabling `discoverable`
Installing YV4web	HTTP TCP 80	www.yoctopuce.com	do not use the quick link on the web interface
Version test	HTTPS TCP 443	www.yoctopuce.com	do not use the YoctoHub-Wireless-n web interface
Downloading firmware	HTTPS TCP 443	www.yoctopuce.com	do not update through the web interface

8. Sleep mode

The YoctoHub-Wireless-n includes a real time clock (RTC) powered by a super capacitor. This capacitor charges itself automatically when the module is powered. But it is able to keep time without any power for several days. This RTC is used to drive a sleep and wake up system to save power. You can configure the sleep system manually through an interface or drive it through software.

8.1. Manual configuration of the wake ups

You can manually configure the wake up conditions by connecting yourself on the interface of the YoctoHub-Wireless-n. In the **Wake-up scheduler** section of the main configuration window, click on the setup button corresponding to one of the "wakeup-schedule". This opens a window enabling you to schedule more or less regular wake ups. Select the boxes corresponding to the wanted occurrences. Empty sections are ignored.



Wake up configuration window: here every 10 minutes between 9h and 17h.

Likewise, you can configure directly in the YoctoHub-Wireless-n interface the maximal wake up duration, after which the module automatically goes back to sleep. If your YoctoHub-Wireless-n is running on batteries, this ensures they do not empty even if no explicit sleep command is received.

8.2. Configuring the wake up system by software

At the programming interface level, the wake up system is implemented with two types of functions: the *wakeUpMonitor* function and the *wakeUpSchedule* function.

wakeUpMonitor

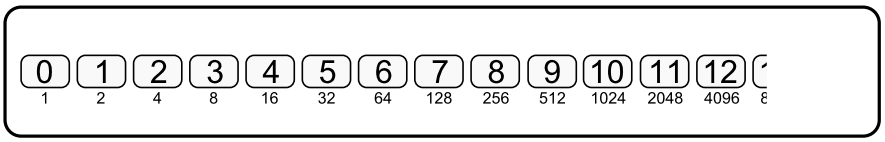
The *wakeUpMonitor* function manages wake ups and sleep periods, proper. It provides all the instant managing functionalities : instant wake up, instant sleep, computing the date of the next wake up, and so on...

The *wakeUpMonitor* function enables you also to define the maximum duration during which the YoctoHub-Wireless-n stays awake before automatically going back to sleep.

wakeUpSchedule

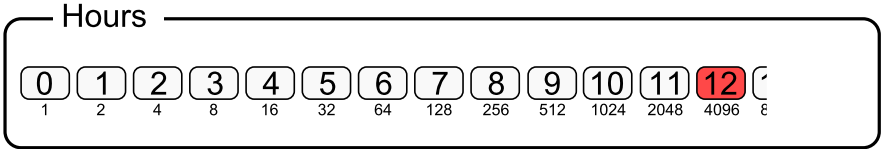
The *wakeUpSchedule* function enables you to program a wake up condition followed by a possible sleep. It includes five variables enabling you to define correspondences on minutes, hours, days of the week, days of the month, and months. These variables are integers where each bit defines a correspondence. Schematically, each set of minutes, hours, and days is represented as a set of boxes with each a coefficient which is a power of two, exactly like in the corresponding interface of the YoctoHub-Wireless-n.

For example, bit 0 for the hours corresponds to hour zero, bit 1 corresponds to hour 1, bit 2 to hour 2, and so on.



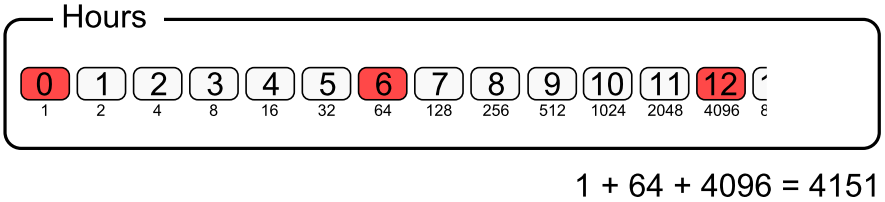
To each box is assigned a power of two

Thus, to program the YoctoHub-Wireless-n for it to wake up every day at noon, you must set bit 12 to 1, which corresponds to the value 2^12 = 4096.



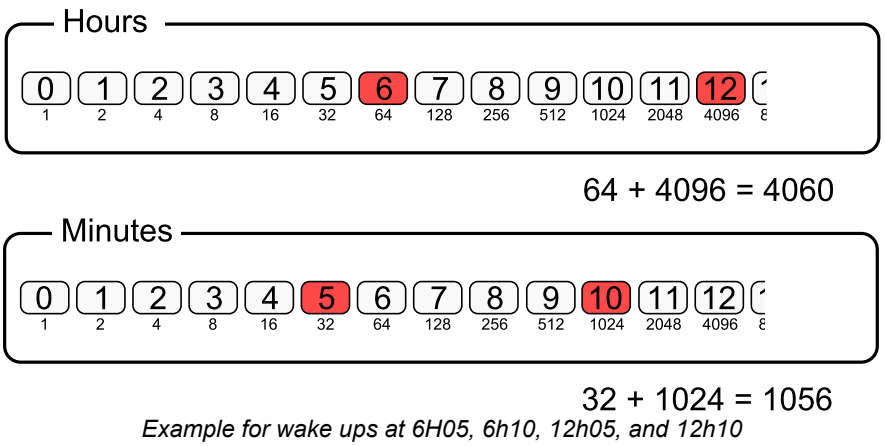
Example for a wake up at 12h

For the module to wake up at 0 hour, 6 hours, and 12 hours, you must set the 0, 6, and 12 bits to 1, which corresponds to the value 2^0 +2^6 +2^12 = 1 + 64 + 4096 = 4161



Example for wake ups at 0, 6, and 12h

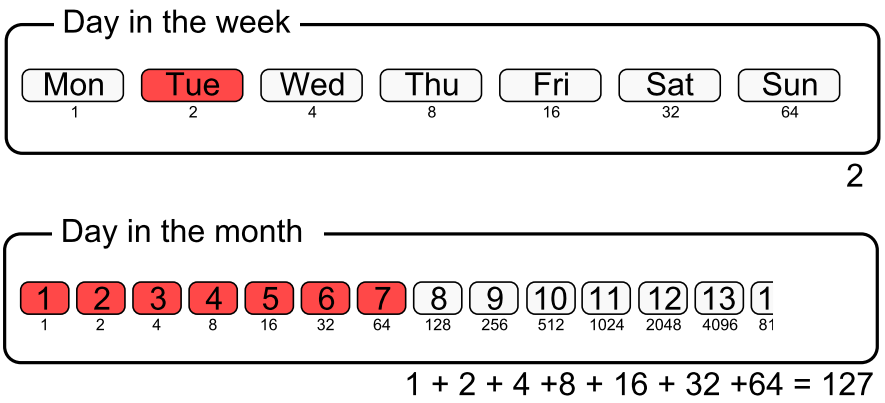
Variables can be combined. For a wake up to happen every day at 6h05, 6h10, 12h05, and 12h10, you must set the hours to 2^6 + 2^12 = 4060, minutes to 2^5 and 2^10 = 1056. Variables remaining at the zero value are ignored.



Example for wake ups at 6H05, 6h10, 12h05, and 12h10

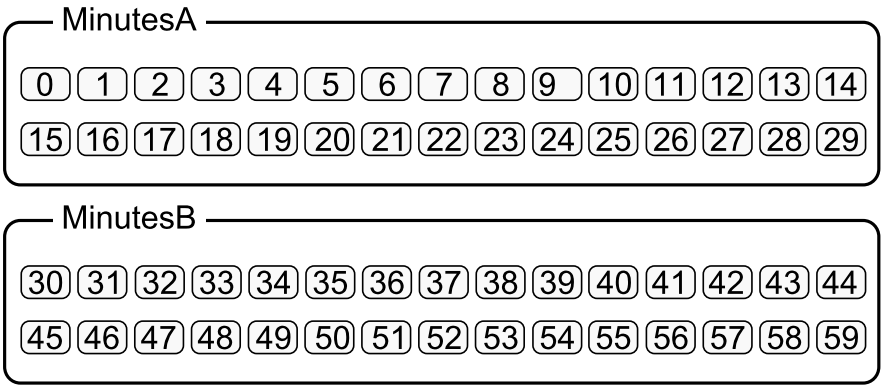
Note that if you want to program a wake up at 6h05 and 12h10, but not at 6h10 and 12h05, you need to use two distinct *wakeUpSchedule* functions.

This paradigm allows you to schedule complex wake ups. Thus, to program a wake up every first Tuesday of the month, you must set to 1 bit 1 of the days of the week and the first seven bits of the days of the month.



Example for a wake up every first Tuesday of the month

Some programming languages, among which JavaScript, do not support 64 bit integers. This is an issue for encoding minutes. Therefore, minutes are available both through a 64 bit integer *minutes* and two 32 bit integers *minutesA* and *minutesB*. These 32 bit integers are supposed to be available in any current programming language.



Minutes are also available in the shape of two 32 bit integers

The *wakeUpSchedule* function includes an additional variable to define the duration, in seconds, during which the module stays awake after a wake up. If this variable is set to zero, the modules stays awake.

The YoctoHub-Wireless-n includes two *wakeUpSchedule* functions, enabling you to program up to two independent wake up types.

9. Personalizing the web interface

Your YoctoHub-Wireless-n contains a small embedded file system, allowing it to store personalized files for its own use. You can manipulate the file system thanks to the *yocto_files* library. You can store there the files you want to. If need be, you can store a web application enabling you to manage modules connected to your YoctoHub-Wireless-n.

9.1. Using the file system

Interactive use

The YoctoHub-Wireless-n web interface provides a succinct interface to manipulate the content of the file system: simply click the *configuration* button corresponding to your module in the hub interface, then the *manage files* button. The files are listed and you can view them, erase them, or add new ones (downloads).

Because of its small size, the file system does not have an explicit concept of directories. You can nevertheless use the slash sign "/" inside file names to sort them as if they were in directories.

Programmed use

Use the *yocto_files* library to manage the file system. Basic functions are available:

- *upload* creates a new file on the module, with a content that you provide;
- *get_list* lists the files on the module, including their content size and CRC32;
- *download* retrieves in a variable the content of a file present on the module;
- *remove* erases a file from the module;
- *format* resets the file system to an empty, not fragmented state.

A piece of software using a well designed file system should always start by making sure that all the files necessary for its working are available on the module and, if needed, upload them on the module. We can thus transparently manage software updates and application deployment on new modules. To make file versions easier to detect, the *get_list* method returns for each file a 32 bit signature called CRC (Cyclic Redundancy Check) which identifies in a reliable manner the file content. Thus, if the file CRC corresponds, there is less than one chance over 4 billions that the content is not the correct one. You can even compute in advance in your software the CRC of the content you want, and therefore check it without having to download the files. The CRC function used by the Yoctopuce file system is the same as Ethernet, Gzip, PNG, etc. Its characteristic value for the nine character string "123456789" is 0xCBF43926.

HTTP use

You can access the files that your have downloaded on your YoctoHub-Wireless-n by HTTP at the root of the module (at the same level as the REST API). This allows you to load personalized HTML and Javascript interface pages, for example. You cannot, however, replace the content of a file preloaded on the module, you can only add new ones.

UI and optimisation

Since you can store files on the hub file system, you can easily build a web application to control the devices connected to the hub and store it directly on the hub. This is a very convenient way to build system remote controlled by tablets or smart phones. However the web server embedded in the hub have limited connectivity capabilities: only a few number of sockets can be opened at the same time. Since most web browsers tend to open as many connection as they can to load all elements in a web page, this might lead to very long loading time. To prevent this, try to keep your UI pages as compact as possible by embedding the javascript, CSS code and if possible, images in base64 code.

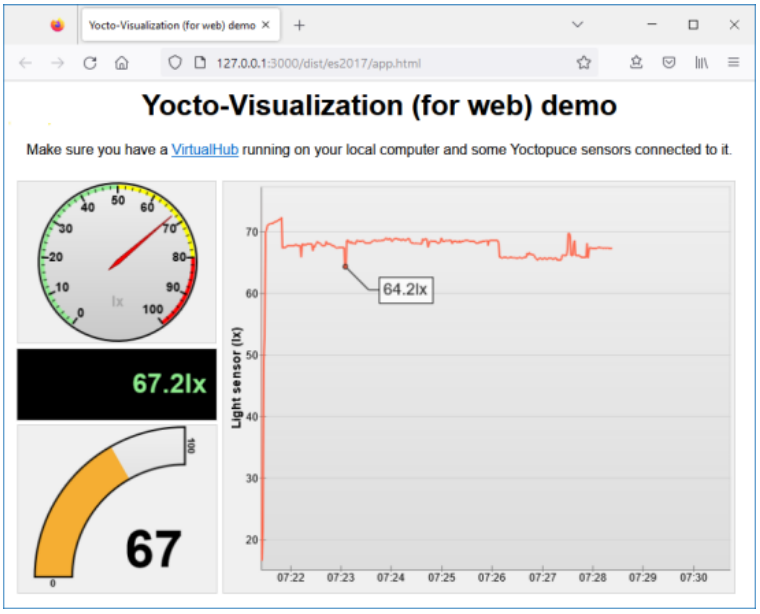
9.2. Limitations

The file system embedded on your YoctoHub-Wireless-n has some technical limitations:

- Its maximal storage space is 3.5Mo, allocated in blocks enabling to store up to about 800 files.
- Erasing a file does not necessarily immediately free all the space used by the file. The non freed space is completely reused if you create a new file with the same name, but not necessarily if you create files with a distinct name each time. For this reason, it is not recommended to automatically create files with distinct names.
- You can recover the complete non freed space with the *format* command which frees all the files.
- Each firmware update implicitly provokes a complete reformatting of the file system.
- As all flash memories, the memory used to store the files has a life of about 100'000 erasing cycles. It is enough, but it is not infinite. Make sure that you do not write and erase files uselessly and very quickly in a loop, or you may destroy your module.

10. Installing Yocto-Visualization (for web)

Yocto-Visualization (for web) is a small web application that allows you to easily visualize the values measured by Yoctopuce sensors.

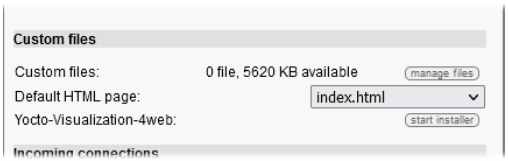


Yocto-Visualization (for web) interface

You can install Yocto-Visualization (for web) as a YoctoHub-Wireless-n plug-in, directly through the YoctoHub-Wireless-n web configuration interface.

To install Yocto-Visualization (for web) from the YoctoHub-Wireless-n web interface

1. In the YoctoHub-Wireless-n interface, open the YoctoHub-Wireless-n configuration window by clicking on **configure**.
2. In the **Network configuration** section, opposite to `Yocto-Visualization-4web`, click on **start installer**.
3. Then you only need to follow the steps by clicking on **Next** repeatedly and then on **OK**. Simply make sure that in the port is present only once in the **Hub address** field.



*The **Network configuration** section from the YoctoHub-Wireless-n configuration window*

To use Yocto-Visualization (for web), please refer to the blog posts on the Yoctopuce web site.

11. Programming

11.1. Accessing connected modules

The YoctoHub-Wireless-n behaves itself exactly like a computer running VirtualHub. The only difference between a program using the Yoctopuce API with modules in native USB and the same program with Yoctopuce modules connected to a YoctoHub-Wireless-n is located at the level of the *registerHub* function call. To use USB modules connected natively, the *registerHub* parameter is *usb*. To use modules connected to a YoctoHub-Wireless-n, you must simply replace this parameter by the IP address of the YoctoHub-Wireless-n. For instance, in Delphi:

```
YAPI.RegisterHub("usb",errmsg);
```

becomes

```
YAPI.RegisterHub("192.168.0.10",errmsg); // The hub IP address is 192.168.0.10
```

11.2. Controlling the YoctoHub-Wireless-n

From the programming API standpoint, the YoctoHub-Wireless-n is a module like any other. You can perfectly manage it from the Yoctopuce API. To do so, you need the following classes:

Module

This class, shared by all Yoctopuce modules, enables you to control the module itself. You can drive the Yocto-led, know the USB power consumption of the YoctoHub-Wireless-n, and so on.

Wireless

This class enables you to control the YoctoHub-Wireless-n wireless network configuration, in particular the SSID and the access key of the wireless network.

Network

This class enables you to manage the network part of the YoctoHub-Wireless-n. You can control the link state, read the MAC address, change the YoctoHub-Wireless-n IP address, know the power consumption on PoE, and so on.

Hub

This class provides the connection status between the programming library and the YoctoHubs or VirtualHubs that have been registered.

HubPort

This class enables you to manage the hub part. You can enable or disable the YoctoHub-Wireless-n ports, you can also know which module is connected to which port.

Files

This class enables you to access files stored in the flash memory of the YoctoHub-Wireless-n. The YoctoHub-Wireless-n contains a small file system which allows you to store, for example, a web application controlling the modules connected to the YoctoHub-Wireless-n.

WakeUpMonitor

This class enables you to monitor the sleep mode of the YoctoHub-Wireless-n.

WakeUpSchedule

This class enables you to schedule one or several wake ups for the YoctoHub-Wireless-n.

You can find some examples on how to drive the YoctoHub-Wireless-n by software in the Yoctopuce programming libraries, available free of charge on the Yoctopuce web site.

12. High-level API Reference

This chapter summarizes the high-level API functions to drive your YoctoHub-Wireless-n. Syntax and exact type names may vary from one language to another, but, unless otherwise stated, all the functions are available in every language. For detailed information regarding the types of arguments and return values for a given language, refer to the definition file for this language (`yocto_api.*` as well as the other `yocto_*` files that define the function interfaces).

For languages which support exceptions, all of these functions throw exceptions in case of error by default, rather than returning the documented error value for each function. This is by design, to facilitate debugging. It is however possible to disable the use of exceptions using the `yDisableExceptions()` function, in case you prefer to work with functions that return error values.

This chapter does not explain Yoctopuce programming concepts, in order to stay as concise as possible. You will find more details in the documentation of the devices you plan to connect to your YoctoHub-Wireless-n.

12.1. Class YWireless

Wireless LAN interface control interface, available for instance in the YoctoHub-Wireless, the YoctoHub-Wireless-SR, the YoctoHub-Wireless-g or the YoctoHub-Wireless-n

The YWireless class provides control over wireless network parameters and status for devices that are wireless-enabled. Note that TCP/IP parameters are configured separately, using class `YNetwork`.

In order to use the functions described here, you should include:

js	**<script type='text/javascript' src='yocto_wireless.js'></script>**
cpp	**#include "yocto_wireless.h"**
m	**#import "yocto_wireless.h"**
pas	**uses yocto_wireless;**
vb	**yocto_wireless.vb**
cs	**yocto_wireless.cs**
java	**import com.yoctopuce.YoctoAPI.YWireless;**
uwp	**import com.yoctopuce.YoctoAPI.YWireless;**
py	**from yocto_wireless import ***
php	**require_once('yocto_wireless.php');**
ts	**in HTML: import { YWireless } from '../../dist/esm/yocto_wireless.js';** **in Node.js: import { YWireless } from 'yoctolib-cjs/yocto_wireless.js';**
es	**in HTML: <script src="../../lib/yocto_wireless.js"></script>** **in node.js: require('yoctolib-es2017/yocto_wireless.js');**
dnp	**import YoctoProxyAPI.YWirelessProxy**
cp	**#include "yocto_wireless_proxy.h"**
vi	**YWireless.vi**
ml	**import YoctoProxyAPI.YWirelessProxy**

Global functions

YWireless.FindWireless(func)

Retrieves a wireless LAN interface for a given identifier.

cpp m pas vb cs java uwp py php ts es dnp

YWireless.FindWirelessInContext(yctx, func)

Retrieves a wireless LAN interface for a given identifier in a YAPI context.

java uwp ts es

YWireless.FirstWireless()

Starts the enumeration of wireless LAN interfaces currently accessible.

cpp m pas vb cs java uwp py php ts es

YWireless.FirstWirelessInContext(yctx)

Starts the enumeration of wireless LAN interfaces currently accessible.

java uwp ts es

YWireless.GetSimilarFunctions()

Enumerates all functions of type Wireless available on the devices currently reachable by the library, and returns their unique hardware ID.

dnp

`YWireless` properties

wireless→AdvertisedValue *[read-only]*

Short string representing the current state of the function.

dnp

wireless→FriendlyName *[read-only]*

Global identifier of the function in the format `MODULE_NAME.FUNCTION_NAME`.

dnp

wireless→FunctionId *[read-only]*

Hardware identifier of the wireless LAN interface, without reference to the module.

dnp

wireless→HardwareId *[read-only]*

Unique hardware identifier of the function in the form `SERIAL.FUNCTIONID`.

dnp

wireless→IsOnline *[read-only]*

Checks if the function is currently reachable.

dnp

wireless→LinkQuality *[read-only]*

Link quality, expressed in percent.

dnp

wireless→LogicalName *[writable]*

Logical name of the function.

dnp

wireless→SerialNumber *[read-only]*

Serial number of the module, as set by the factory.

dnp

wireless→Ssid *[read-only]*

Wireless network name (SSID).

dnp

`YWireless` methods

wireless→adhocNetwork(ssid, securityKey)

Changes the configuration of the wireless lan interface to create an ad-hoc wireless network, without using an access point.

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→clearCache()

Invalidates the cache.

cpp m pas vb cs java py php ts es

wireless→describe()

Returns a short text that describes unambiguously the instance of the wireless LAN interface in the form `TYPE(NAME)=SERIAL.FUNCTIONID`.

cpp m pas vb cs java py php ts es

wireless→get_advertisedValue()

Returns the current value of the wireless LAN interface (no more than 6 characters).

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→get_channel()

Returns the 802.11 channel currently used, or 0 when the selected network has not been found.

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→get_detectedWlans()

Returns a list of YWlanRecord objects that describe detected Wireless networks.

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→get_errorMessage()

Returns the error message of the latest error with the wireless LAN interface.

cpp m pas vb cs java py php ts es

wireless→get_errorType()

Returns the numerical error code of the latest error with the wireless LAN interface.

cpp m pas vb cs java py php ts es

wireless→get_friendlyName()

Returns a global identifier of the wireless LAN interface in the format MODULE_NAME.FUNCTION_NAME.

cpp m cs java py php ts es dnp

wireless→get_functionDescriptor()

Returns a unique identifier of type YFUN_DESCR corresponding to the function.

cpp m pas vb cs java py php ts es

wireless→get_functionId()

Returns the hardware identifier of the wireless LAN interface, without reference to the module.

cpp m vb cs java py php ts es dnp

wireless→get_hardwareId()

Returns the unique hardware identifier of the wireless LAN interface in the form SERIAL.FUNCTIONID.

cpp m vb cs java py php ts es dnp

wireless→get_linkQuality()

Returns the link quality, expressed in percent.

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→get_logicalName()

Returns the logical name of the wireless LAN interface.

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→get_message()

Returns the latest status message from the wireless interface.

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→get_module()

Gets the YModule object for the device on which the function is located.

cpp m pas vb cs java py php ts es dnp

wireless→get_module_async(callback, context)

Gets the YModule object for the device on which the function is located (asynchronous version).

wireless→get_security()

Returns the security algorithm used by the selected wireless network.

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→get_serialNumber()

Returns the serial number of the module, as set by the factory.

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→get_ssid()

Returns the wireless network name (SSID).

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→get_userData()

Returns the value of the userData attribute, as previously stored using method `set_userData`.

cpp m pas vb cs java py php ts es

wireless→get_wlanState()

Returns the current state of the wireless interface.

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→isOnline()

Checks if the wireless LAN interface is currently reachable, without raising any error.

cpp m pas vb cs java py php ts es dnp

wireless→isOnline_async(callback, context)

Checks if the wireless LAN interface is currently reachable, without raising any error (asynchronous version).

wireless→isReadOnly()

Indicates whether changes to the function are prohibited or allowed.

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→joinNetwork(ssid, securityKey)

Changes the configuration of the wireless lan interface to connect to an existing access point (infrastructure mode).

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→load(msValidity)

Preloads the wireless LAN interface cache with a specified validity duration.

cpp m pas vb cs java py php ts es

wireless→loadAttribute(attrName)

Returns the current value of a single function attribute, as a text string, as quickly as possible but without using the cached value.

cpp m pas vb cs java uwp py php ts es dnp

wireless→load_async(msValidity, callback, context)

Preloads the wireless LAN interface cache with a specified validity duration (asynchronous version).

wireless→muteValueCallbacks()

Disables the propagation of every new advertised value to the parent hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→nextWireless()

Continues the enumeration of wireless LAN interfaces started using `yFirstWireless()`.

cpp m pas vb cs java uwp py php ts es

wireless→registerValueCallback(callback)

Registers the callback function that is invoked on every change of advertised value.

cpp m pas vb cs java uwp py php ts es

wireless→set_logicalName(newval)

Changes the logical name of the wireless LAN interface.

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→set_userData(data)

Stores a user context provided as argument in the userData attribute of the function.

cpp m pas vb cs java py php ts es

wireless→softAPNetwork(ssid, securityKey)

Changes the configuration of the wireless lan interface to create a new wireless network by emulating a WiFi access point (Soft AP).

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→startWlanScan()

Triggers a scan of the wireless frequency and builds the list of available networks.

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→unmuteValueCallbacks()

Re-enables the propagation of every new advertised value to the parent hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

wireless→wait_async(callback, context)

Waits for all pending asynchronous commands on the module to complete, and invoke the user-provided callback function.

ts es

12.2. Class YNetwork

Network interface control interface, available for instance in the YoctoHub-Ethernet, the YoctoHub-GSM-4G, the YoctoHub-Wireless-SR or the YoctoHub-Wireless-n

`YNetwork` objects provide access to TCP/IP parameters of Yoctopuce devices that include a built-in network interface.

In order to use the functions described here, you should include:

es	**in HTML: <script src="../../lib/yocto_network.js"></script>** **in node.js: require('yoctolib-es2017/yocto_network.js');**
js	**<script type='text/javascript' src='yocto_network.js'></script>**
cpp	**#include "yocto_network.h"**
m	**#import "yocto_network.h"**
pas	**uses yocto_network;**
vb	**yocto_network.vb**
cs	**yocto_network.cs**
java	**import com.yoctopuce.YoctoAPI.YNetwork;**
uwp	**import com.yoctopuce.YoctoAPI.YNetwork;**
py	**from yocto_network import ***
php	**require_once('yocto_network.php');**
ts	**in HTML: import { YNetwork } from '../../dist/esm/yocto_network.js';** **in Node.js: import { YNetwork } from 'yoctolib-cjs/yocto_network.js';**
dnp	**import YoctoProxyAPI.YNetworkProxy**
cp	**#include "yocto_network_proxy.h"**
vi	**YNetwork.vi**
ml	**import YoctoProxyAPI.YNetworkProxy**

Global functions

YNetwork.FindNetwork(func)

Retrieves a network interface for a given identifier.

cpp m pas vb cs java uwp py php ts es dnp

YNetwork.FindNetworkInContext(yctx, func)

Retrieves a network interface for a given identifier in a YAPI context.

java uwp ts es

YNetwork.FirstNetwork()

Starts the enumeration of network interfaces currently accessible.

cpp m pas vb cs java uwp py php ts es

YNetwork.FirstNetworkInContext(yctx)

Starts the enumeration of network interfaces currently accessible.

java uwp ts es

YNetwork.GetSimilarFunctions()

Enumerates all functions of type Network available on the devices currently reachable by the library, and returns their unique hardware ID.

dnp

YNetwork properties

network→AdminPassword *[writable]*

Hash string if a password has been set for user "admin", or an empty string otherwise.

dnp

network→AdvertisedValue *[read-only]*

Short string representing the current state of the function.

dnp

network→CallbackCredentials *[writable]*

Hashed version of the notification callback credentials if set, or an empty string otherwise.

dnp

network→CallbackEncoding *[writable]*

Encoding standard to use for representing notification values.

dnp

network→CallbackInitialDelay *[writable]*

Initial waiting time before first callback notifications, in seconds.

dnp

network→CallbackMaxDelay *[writable]*

Waiting time between two HTTP callbacks when there is nothing new.

dnp

network→CallbackMethod *[writable]*

HTTP method used to notify callbacks for significant state changes.

dnp

network→CallbackMinDelay *[writable]*

Minimum waiting time between two HTTP callbacks, in seconds.

dnp

network→CallbackSchedule *[writable]*

HTTP callback schedule strategy, as a text string.

dnp

network→CallbackTemplate *[writable]*

Activation state of the custom template file to customize callback format.

dnp

network→CallbackUrl *[writable]*

Callback URL to notify of significant state changes.

dnp

network→DefaultPage *[writable]*

HTML page to serve for the URL "/"" of the hub.

dnp

network→Discoverable *[writable]*

Activation state of the multicast announce protocols to allow easy discovery of the module in the network neighborhood (uPnP/Bonjour protocol).

dnp

network→FriendlyName *[read-only]*

Global identifier of the function in the format `MODULE_NAME.FUNCTION_NAME`.

dnp

network→FunctionId *[read-only]*

Hardware identifier of the network interface, without reference to the module.

dnp

network→HardwareId *[read-only]*

Unique hardware identifier of the function in the form `SERIAL.FUNCTIONID`.

dnp

network→HttpPort *[writable]*

TCP port used to serve the hub web UI.

dnp

network→IpAddress *[read-only]*

IP address currently in use by the device.

dnp

network→IsOnline *[read-only]*

Checks if the function is currently reachable.

dnp

network→LogicalName *[writable]*

Logical name of the function.

dnp

network→MacAddress *[read-only]*

MAC address of the network interface.

dnp

network→NtpServer *[writable]*

IP address of the NTP server to be used by the device.

dnp

network→PrimaryDNS *[writable]*

IP address of the primary name server to be used by the module.

dnp

network→Readiness *[read-only]*

Current established working mode of the network interface.

dnp

network→SecondaryDNS *[writable]*

IP address of the secondary name server to be used by the module.

dnp

network→SerialNumber *[read-only]*

Serial number of the module, as set by the factory.

dnp

network→UserPassword *[writable]*

Hash string if a password has been set for "user" user, or an empty string otherwise.

dnp

network→WwwWatchdogDelay *[writable]*

Allowed downtime of the WWW link (in seconds) before triggering an automated reboot to try to recover Internet connectivity.

dnp

YNetwork methods

network→callbackLogin(username, password)

Connects to the notification callback and saves the credentials required to log into it.

cpp m pas vb cs java py php ts es dnp cmd

network→clearCache()

Invalidates the cache.

cpp m pas vb cs java py php ts es

network→describe()

Returns a short text that describes unambiguously the instance of the network interface in the form TYPE(NAME)=SERIAL.FUNCTIONID.

cpp m pas vb cs java py php ts es

network→get_adminPassword()

Returns a hash string if a password has been set for user "admin", or an empty string otherwise.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_advertisedValue()

Returns the current value of the network interface (no more than 6 characters).

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_callbackCredentials()

Returns a hashed version of the notification callback credentials if set, or an empty string otherwise.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_callbackEncoding()

Returns the encoding standard to use for representing notification values.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_callbackInitialDelay()

Returns the initial waiting time before first callback notifications, in seconds.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_callbackMaxDelay()

Returns the waiting time between two HTTP callbacks when there is nothing new.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_callbackMethod()

Returns the HTTP method used to notify callbacks for significant state changes.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_callbackMinDelay()

Returns the minimum waiting time between two HTTP callbacks, in seconds.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_callbackSchedule()

Returns the HTTP callback schedule strategy, as a text string.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_callbackTemplate()

Returns the activation state of the custom template file to customize callback format.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_callbackUrl()

Returns the callback URL to notify of significant state changes.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_currentDNS()

Returns the IP address of the DNS server currently used by the device.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_defaultPage()

Returns the HTML page to serve for the URL "/"" of the hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_discoverable()

Returns the activation state of the multicast announce protocols to allow easy discovery of the module in the network neighborhood (uPnP/Bonjour protocol).

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_errorMessage()

Returns the error message of the latest error with the network interface.

cpp m pas vb cs java py php ts es

network→get_errorType()

Returns the numerical error code of the latest error with the network interface.

cpp m pas vb cs java py php ts es

network→get_friendlyName()

Returns a global identifier of the network interface in the format `MODULE_NAME.FUNCTION_NAME`.

cpp m cs java py php ts es dnp

network→get_functionDescriptor()

Returns a unique identifier of type `YFUN_DESCR` corresponding to the function.

cpp m pas vb cs java py php ts es

network→get_functionId()

Returns the hardware identifier of the network interface, without reference to the module.

cpp m vb cs java py php ts es dnp

network→get_hardwareId()

Returns the unique hardware identifier of the network interface in the form `SERIAL.FUNCTIONID`.

cpp m vb cs java py php ts es dnp

network→get_httpPort()

Returns the TCP port used to serve the hub web UI.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_ipAddress()

Returns the IP address currently in use by the device.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_ipConfig()

Returns the IP configuration of the network interface.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_logicalName()

Returns the logical name of the network interface.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_macAddress()

Returns the MAC address of the network interface.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_module()

Gets the `YModule` object for the device on which the function is located.

cpp m pas vb cs java py php ts es dnp

network→get_module_async(callback, context)

Gets the `YModule` object for the device on which the function is located (asynchronous version).

network→get_ntpServer()

Returns the IP address of the NTP server to be used by the device.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_poeCurrent()

Returns the current consumed by the module from Power-over-Ethernet (PoE), in milliamps.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_primaryDNS()

Returns the IP address of the primary name server to be used by the module.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_readiness()

Returns the current established working mode of the network interface.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_router()

Returns the IP address of the router on the device subnet (default gateway).

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_secondaryDNS()

Returns the IP address of the secondary name server to be used by the module.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_serialNumber()

Returns the serial number of the module, as set by the factory.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_subnetMask()

Returns the subnet mask currently used by the device.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_userData()

Returns the value of the userData attribute, as previously stored using method `set_userData`.

cpp m pas vb cs java py php ts es

network→get_userPassword()

Returns a hash string if a password has been set for "user" user, or an empty string otherwise.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→get_wwwWatchdogDelay()

Returns the allowed downtime of the WWW link (in seconds) before triggering an automated reboot to try to recover Internet connectivity.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→isOnline()

Checks if the network interface is currently reachable, without raising any error.

cpp m pas vb cs java py php ts es dnp

network→isOnline_async(callback, context)

Checks if the network interface is currently reachable, without raising any error (asynchronous version).

network→isReadOnly()

Indicates whether changes to the function are prohibited or allowed.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→load(msValidity)

Preloads the network interface cache with a specified validity duration.

cpp m pas vb cs java py php ts es

network→loadAttribute(attrName)

Returns the current value of a single function attribute, as a text string, as quickly as possible but without using the cached value.

cpp m pas vb cs java uwp py php ts es dnp

network→load_async(msValidity, callback, context)

Preloads the network interface cache with a specified validity duration (asynchronous version).

network→muteValueCallbacks()

Disables the propagation of every new advertised value to the parent hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→nextNetwork()

Continues the enumeration of network interfaces started using `yFirstNetwork()`.

cpp m pas vb cs java uwp py php ts es

network→ping(host)

Pings host to test the network connectivity.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→registerValueCallback(callback)

Registers the callback function that is invoked on every change of advertised value.

cpp m pas vb cs java uwp py php ts es

network→set_adminPassword(newval)

Changes the password for the "admin" user.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_callbackCredentials(newval)

Changes the credentials required to connect to the callback address.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_callbackEncoding(newval)

Changes the encoding standard to use for representing notification values.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_callbackInitialDelay(newval)

Changes the initial waiting time before first callback notifications, in seconds.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_callbackMaxDelay(newval)

Changes the waiting time between two HTTP callbacks when there is nothing new.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_callbackMethod(newval)

Changes the HTTP method used to notify callbacks for significant state changes.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_callbackMinDelay(newval)

Changes the minimum waiting time between two HTTP callbacks, in seconds.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_callbackSchedule(newval)

Changes the HTTP callback schedule strategy, as a text string.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_callbackTemplate(newval)

Enable the use of a template file to customize callbacks format.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_callbackUrl(newval)

Changes the callback URL to notify significant state changes.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_defaultPage(newval)

Changes the default HTML page returned by the hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_discoverable(newval)

Changes the activation state of the multicast announce protocols to allow easy discovery of the module in the network neighborhood (uPnP/Bonjour protocol).

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_httpPort(newval)

Changes the the TCP port used to serve the hub web UI.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_logicalName(newval)

Changes the logical name of the network interface.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_ntpServer(newval)

Changes the IP address of the NTP server to be used by the module.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_periodicCallbackSchedule(interval, offset)

Setup periodic HTTP callbacks (simplified function).

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_primaryDNS(newval)

Changes the IP address of the primary name server to be used by the module.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_secondaryDNS(newval)

Changes the IP address of the secondary name server to be used by the module.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_userData(data)

Stores a user context provided as argument in the userData attribute of the function.

cpp m pas vb cs java py php ts es

network→set_userPassword(newval)

Changes the password for the "user" user.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→set_wwwWatchdogDelay(newval)

Changes the allowed downtime of the WWW link (in seconds) before triggering an automated reboot to try to recover Internet connectivity.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→triggerCallback()

Trigger an HTTP callback quickly.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→unmuteValueCallbacks()

Re-enables the propagation of every new advertised value to the parent hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→useDHCP(fallbackIpAddr, fallbackSubnetMaskLen, fallbackRouter)

Changes the configuration of the network interface to enable the use of an IP address received from a DHCP server.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→useDHCPauto()

Changes the configuration of the network interface to enable the use of an IP address received from a DHCP server.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→useStaticIP(ipAddress, subnetMaskLen, router)

Changes the configuration of the network interface to use a static IP address.

cpp m pas vb cs java uwp py php ts es dnp cmd

network→wait_async(callback, context)

Waits for all pending asynchronous commands on the module to complete, and invoke the user-provided callback function.

ts es

12.3. Class YHub

In order to use the functions described here, you should include:

js	**<script type='text/javascript' src='yocto_module.js'></script>**
cpp	**#include "yocto_module.h"**
m	**#import "yocto_module.h"**
pas	**uses yocto_module;**
vb	**yocto_module.vb**
cs	**yocto_module.cs**
java	**import com.yoctopuce.YoctoAPI.YHub;**
uwp	**import com.yoctopuce.YoctoAPI.YHub;**
py	**from yocto_module import ***
php	**require_once('yocto_module.php');**
ts	**in HTML: import { YHub } from '../../dist/esm/yocto_module.js';** **in Node.js: import { YHub } from 'yoctolib-cjs/yocto_module.js';**
es	**in HTML: <script src="../../lib/yocto_module.js"></script>** **in node.js: require('yoctolib-es2017/yocto_module.js');**
dnp	**import YoctoProxyAPI.YHubProxy**
cp	**#include "yocto_module_proxy.h"**
ml	**import YoctoProxyAPI.YHubProxy**

Global functions

YHub.FirstHubInUse()

Starts the enumeration of hubs currently in use by the API.

cpp m vb cs java uwp py php ts es dnp

YHub.FirstHubInUseInContext(yctx)

Starts the enumeration of hubs currently in use by the API in a given YAPI context.

java uwp ts es

YHub methods

hub→get_connectionUrl()

Returns the URL currently in use to communicate with this hub.

cpp m pas vb cs java uwp py php ts es dnp

hub→get_errorMessage()

Returns the error message of the latest error with the hub.

cpp m pas vb cs java uwp py php ts es dnp

hub→get_errorType()

Returns the numerical error code of the latest error with the hub.

cpp m pas vb cs java uwp py php ts es dnp

hub→get_knownUrls()

Returns all known URLs that have been used to register this hub.

cpp m pas vb cs java uwp py php ts es dnp

hub→get_networkTimeout()

Returns the network connection delay for this hub.

cpp m pas vb cs java uwp py php ts es dnp

hub→get_registeredUrl()

Returns the URL that has been used first to register this hub.

cpp m pas vb cs java uwp py php ts es dnp

hub→get_serialNumber()

Returns the hub serial number, if the hub was already connected once.

cpp m pas vb cs java uwp py php ts es dnp

hub→get_userData()

Returns the value of the userData attribute, as previously stored using method `set_userData`.

cpp m pas vb cs java uwp py php ts es

hub→isInUse()

Tells if this hub is still registered within the API.

cpp m pas vb cs java uwp py php ts es dnp

hub→isOnline()

Tells if there is an active communication channel with this hub.

cpp m pas vb cs java uwp py php ts es dnp

hub→isReadOnly()

Tells if write access on this hub is blocked.

cpp m pas vb cs java uwp py php ts es dnp

hub→nextHubInUse()

Continues the module enumeration started using `YHub.FirstHubInUse()`.

cpp m pas vb cs java uwp py php ts es dnp

hub→set_networkTimeout(networkMsTimeout)

Modifies tthe network connection delay for this hub.

cpp m pas vb cs java uwp py php ts es dnp

hub→set_userData(data)

Stores a user context provided as argument in the userData attribute of the function.

cpp m pas vb cs java uwp py php ts es

12.4. Class YHubPort

YoctoHub slave port control interface, available for instance in the YoctoHub-Ethernet, the YoctoHub-GSM-4G, the YoctoHub-Shield or the YoctoHub-Wireless-n

The `YHubPort` class provides control over the power supply for slave ports on a YoctoHub. It provide information about the device connected to it. The logical name of a YHubPort is always automatically set to the unique serial number of the Yoctopuce device connected to it.

In order to use the functions described here, you should include:

es	**in HTML: <script src="../../lib/yocto_hubport.js"></script>** **in node.js: require('yoctolib-es2017/yocto_hubport.js');**
js	**<script type='text/javascript' src='yocto_hubport.js'></script>**
cpp	**#include "yocto_hubport.h"**
m	**#import "yocto_hubport.h"**
pas	**uses yocto_hubport;**
vb	**yocto_hubport.vb**
cs	**yocto_hubport.cs**
java	**import com.yoctopuce.YoctoAPI.YHubPort;**
uwp	**import com.yoctopuce.YoctoAPI.YHubPort;**
py	**from yocto_hubport import ***
php	**require_once('yocto_hubport.php');**
ts	**in HTML: import { YHubPort } from '../../dist/esm/yocto_hubport.js';** **in Node.js: import { YHubPort } from 'yoctolib-cjs/yocto_hubport.js';**
dnp	**import YoctoProxyAPI.YHubPortProxy**
cp	**#include "yocto_hubport_proxy.h"**
vi	**YHubPort.vi**
ml	**import YoctoProxyAPI.YHubPortProxy**

Global functions

YHubPort.FindHubPort(func)

Retrieves a YoctoHub slave port for a given identifier.

cpp m pas vb cs java uwp py php ts es dnp

YHubPort.FindHubPortInContext(yctx, func)

Retrieves a YoctoHub slave port for a given identifier in a YAPI context.

java uwp ts es

YHubPort.FirstHubPort()

Starts the enumeration of YoctoHub slave ports currently accessible.

cpp m pas vb cs java uwp py php ts es

YHubPort.FirstHubPortInContext(yctx)

Starts the enumeration of YoctoHub slave ports currently accessible.

java uwp ts es

YHubPort.GetSimilarFunctions()

Enumerates all functions of type HubPort available on the devices currently reachable by the library, and returns their unique hardware ID.

dnp

`YHubPort` properties

hubport→AdvertisedValue *[read-only]*

Short string representing the current state of the function.

dnp

hubport→Enabled *[writable]*

True if the YoctoHub port is powered, false otherwise.

dnp

hubport→FriendlyName *[read-only]*

Global identifier of the function in the format `MODULE_NAME.FUNCTION_NAME`.

dnp

hubport→FunctionId *[read-only]*

Hardware identifier of the YoctoHub slave port, without reference to the module.

dnp

hubport→HardwareId *[read-only]*

Unique hardware identifier of the function in the form `SERIAL.FUNCTIONID`.

dnp

hubport→IsOnline *[read-only]*

Checks if the function is currently reachable.

dnp

hubport→LogicalName *[writable]*

Logical name of the function.

dnp

hubport→PortState *[read-only]*

Current state of the YoctoHub port.

dnp

hubport→SerialNumber *[read-only]*

Serial number of the module, as set by the factory.

dnp

`YHubPort` methods

hubport→clearCache()

Invalidates the cache.

cpp m pas vb cs java py php ts es

hubport→describe()

Returns a short text that describes unambiguously the instance of the YoctoHub slave port in the form `TYPE(NAME)=SERIAL.FUNCTIONID`.

cpp m pas vb cs java py php ts es

hubport→get_advertisedValue()

Returns the current value of the YoctoHub slave port (no more than 6 characters).

cpp m pas vb cs java uwp py php ts es dnp cmd

hubport→get_baudRate()

Returns the current baud rate used by this YoctoHub port, in kbps.

cpp m pas vb cs java uwp py php ts es dnp cmd

hubport→get_enabled()

Returns true if the YoctoHub port is powered, false otherwise.

cpp m pas vb cs java uwp py php ts es dnp cmd

hubport→get_errorMessage()

Returns the error message of the latest error with the YoctoHub slave port.

cpp m pas vb cs java py php ts es

hubport→get_errorType()

Returns the numerical error code of the latest error with the YoctoHub slave port.

cpp m pas vb cs java py php ts es

hubport→get_friendlyName()

Returns a global identifier of the YoctoHub slave port in the format `MODULE_NAME.FUNCTION_NAME`.

cpp m cs java py php ts es dnp

hubport→get_functionDescriptor()

Returns a unique identifier of type `YFUN_DESCR` corresponding to the function.

cpp m pas vb cs java py php ts es

hubport→get_functionId()

Returns the hardware identifier of the YoctoHub slave port, without reference to the module.

cpp m vb cs java py php ts es dnp

hubport→get_hardwareId()

Returns the unique hardware identifier of the YoctoHub slave port in the form `SERIAL.FUNCTIONID`.

cpp m vb cs java py php ts es dnp

hubport→get_logicalName()

Returns the logical name of the YoctoHub slave port.

cpp m pas vb cs java uwp py php ts es dnp cmd

hubport→get_module()

Gets the `YModule` object for the device on which the function is located.

cpp m pas vb cs java py php ts es dnp

hubport→get_module_async(callback, context)

Gets the `YModule` object for the device on which the function is located (asynchronous version).

hubport→get_portState()

Returns the current state of the YoctoHub port.

cpp m pas vb cs java uwp py php ts es dnp cmd

hubport→get_serialNumber()

Returns the serial number of the module, as set by the factory.

cpp m pas vb cs java uwp py php ts es dnp cmd

hubport→get_userData()

Returns the value of the userData attribute, as previously stored using method `set_userData`.

cpp m pas vb cs java py php ts es

hubport→isOnline()

Checks if the YoctoHub slave port is currently reachable, without raising any error.

cpp m pas vb cs java py php ts es dnp

hubport→isOnline_async(callback, context)

Checks if the YoctoHub slave port is currently reachable, without raising any error (asynchronous version).

hubport→isReadOnly()

Indicates whether changes to the function are prohibited or allowed.

cpp m pas vb cs java uwp py php ts es dnp cmd

hubport→load(msValidity)

Preloads the YoctoHub slave port cache with a specified validity duration.

cpp m pas vb cs java py php ts es

hubport→loadAttribute(attrName)

Returns the current value of a single function attribute, as a text string, as quickly as possible but without using the cached value.

cpp m pas vb cs java uwp py php ts es dnp

hubport→load_async(msValidity, callback, context)

Preloads the YoctoHub slave port cache with a specified validity duration (asynchronous version).

hubport→muteValueCallbacks()

Disables the propagation of every new advertised value to the parent hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

hubport→nextHubPort()

Continues the enumeration of YoctoHub slave ports started using `yFirstHubPort()`.

cpp m pas vb cs java uwp py php ts es

hubport→registerValueCallback(callback)

Registers the callback function that is invoked on every change of advertised value.

cpp m pas vb cs java uwp py php ts es

hubport→set_enabled(newval)

Changes the activation of the YoctoHub port.

cpp m pas vb cs java uwp py php ts es dnp cmd

hubport→set_logicalName(newval)

Changes the logical name of the YoctoHub slave port.

cpp m pas vb cs java uwp py php ts es dnp cmd

hubport→set_userData(data)

Stores a user context provided as argument in the userData attribute of the function.

cpp m pas vb cs java py php ts es

hubport→unmuteValueCallbacks()

Re-enables the propagation of every new advertised value to the parent hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

hubport→wait_async(callback, context)

Waits for all pending asynchronous commands on the module to complete, and invoke the user-provided callback function.

ts es

12.5. Class YFiles

Filesystem control interface, available for instance in the Yocto-Color-V2, the Yocto-SPI, the YoctoHub-Ethernet or the YoctoHub-GSM-4G

The YFiles class is used to access the filesystem embedded on some Yoctopuce devices. This filesystem makes it possible for instance to design a custom web UI (for networked devices) or to add fonts (on display devices).

In order to use the functions described here, you should include:

js	**<script type='text/javascript' src='yocto_files.js'></script>**
cpp	**#include "yocto_files.h"**
m	**#import "yocto_files.h"**
pas	**uses yocto_files;**
vb	**yocto_files.vb**
cs	**yocto_files.cs**
java	**import com.yoctopuce.YoctoAPI.YFiles;**
uwp	**import com.yoctopuce.YoctoAPI.YFiles;**
py	**from yocto_files import ***
php	**require_once('yocto_files.php');**
ts	**in HTML: import { YFiles } from '../../dist/esm/yocto_files.js';** **in Node.js: import { YFiles } from 'yoctolib-cjs/yocto_files.js';**
es	**in HTML: <script src="../../lib/yocto_files.js"></script>** **in node.js: require('yoctolib-es2017/yocto_files.js');**
dnp	**import YoctoProxyAPI.YFilesProxy**
cp	**#include "yocto_files_proxy.h"**
vi	**YFiles.vi**
ml	**import YoctoProxyAPI.YFilesProxy**

Global functions

YFiles.FindFiles(func)

Retrieves a filesystem for a given identifier.

cpp m pas vb cs java uwp py php ts es dnp

YFiles.FindFilesInContext(yctx, func)

Retrieves a filesystem for a given identifier in a YAPI context.

java uwp ts es

YFiles.FirstFiles()

Starts the enumeration of filesystems currently accessible.

cpp m pas vb cs java uwp py php ts es

YFiles.FirstFilesInContext(yctx)

Starts the enumeration of filesystems currently accessible.

java uwp ts es

YFiles.GetSimilarFunctions()

Enumerates all functions of type Files available on the devices currently reachable by the library, and returns their unique hardware ID.

dnp

YFiles properties

files→AdvertisedValue *[read-only]*

Short string representing the current state of the function.

dnp

files→FilesCount *[read-only]*

Number of files currently loaded in the filesystem.

dnp

files→FriendlyName *[read-only]*

Global identifier of the function in the format `MODULE_NAME.FUNCTION_NAME`.

dnp

files→FunctionId *[read-only]*

Hardware identifier of the filesystem, without reference to the module.

dnp

files→HardwareId *[read-only]*

Unique hardware identifier of the function in the form `SERIAL.FUNCTIONID`.

dnp

files→IsOnline *[read-only]*

Checks if the function is currently reachable.

dnp

files→LogicalName *[writable]*

Logical name of the function.

dnp

files→SerialNumber *[read-only]*

Serial number of the module, as set by the factory.

dnp

YFiles methods

files→clearCache()

Invalidates the cache.

cpp m pas vb cs java py php ts es

files→describe()

Returns a short text that describes unambiguously the instance of the filesystem in the form `TYPE(NAME)=SERIAL.FUNCTIONID`.

cpp m pas vb cs java py php ts es

files→download(pathname)

Downloads the requested file and returns a binary buffer with its content.

cpp m pas vb cs java uwp py php ts es dnp cmd

files→download_async(pathname, callback, context)

Downloads the requested file and returns a binary buffer with its content.

files→fileExist(filename)

Test if a file exist on the filesystem of the module.

cpp m pas vb cs java uwp py php ts es dnp cmd

files→format_fs()

Reinitialize the filesystem to its clean, unfragmented, empty state.

cpp m pas vb cs java uwp py php ts es dnp cmd

files→get_advertisedValue()

Returns the current value of the filesystem (no more than 6 characters).

cpp m pas vb cs java uwp py php ts es dnp cmd

files→get_errorMessage()

Returns the error message of the latest error with the filesystem.

cpp m pas vb cs java py php ts es

files→get_errorType()

Returns the numerical error code of the latest error with the filesystem.

cpp m pas vb cs java py php ts es

files→get_filesCount()

Returns the number of files currently loaded in the filesystem.

cpp m pas vb cs java uwp py php ts es dnp cmd

files→get_freeSpace()

Returns the free space for uploading new files to the filesystem, in bytes.

cpp m pas vb cs java uwp py php ts es dnp cmd

files→get_friendlyName()

Returns a global identifier of the filesystem in the format `MODULE_NAME.FUNCTION_NAME`.

cpp m cs java py php ts es dnp

files→get_functionDescriptor()

Returns a unique identifier of type `YFUN_DESCR` corresponding to the function.

cpp m pas vb cs java py php ts es

files→get_functionId()

Returns the hardware identifier of the filesystem, without reference to the module.

cpp m vb cs java py php ts es dnp

files→get_hardwareId()

Returns the unique hardware identifier of the filesystem in the form `SERIAL.FUNCTIONID`.

cpp m vb cs java py php ts es dnp

files→get_list(pattern)

Returns a list of YFileRecord objects that describe files currently loaded in the filesystem.

cpp m pas vb cs java uwp py php ts es dnp cmd

files→get_logicalName()

Returns the logical name of the filesystem.

cpp m pas vb cs java uwp py php ts es dnp cmd

files→get_module()

Gets the `YModule` object for the device on which the function is located.

cpp m pas vb cs java py php ts es dnp

files→get_module_async(callback, context)

Gets the `YModule` object for the device on which the function is located (asynchronous version).

files→get_serialNumber()

Returns the serial number of the module, as set by the factory.

cpp m pas vb cs java uwp py php ts es dnp cmd

files→get_userData()

Returns the value of the userData attribute, as previously stored using method `set_userData`.

cpp m pas vb cs java py php ts es

files→isOnline()

Checks if the filesystem is currently reachable, without raising any error.

cpp m pas vb cs java py php ts es dnp

files→isOnline_async(callback, context)

Checks if the filesystem is currently reachable, without raising any error (asynchronous version).

files→isReadOnly()

Indicates whether changes to the function are prohibited or allowed.

cpp m pas vb cs java uwp py php ts es dnp cmd

files→load(msValidity)

Preloads the filesystem cache with a specified validity duration.

cpp m pas vb cs java py php ts es

files→loadAttribute(attrName)

Returns the current value of a single function attribute, as a text string, as quickly as possible but without using the cached value.

cpp m pas vb cs java uwp py php ts es dnp

files→load_async(msValidity, callback, context)

Preloads the filesystem cache with a specified validity duration (asynchronous version).

files→muteValueCallbacks()

Disables the propagation of every new advertised value to the parent hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

files→nextFiles()

Continues the enumeration of filesystems started using `yFirstFiles()`.

cpp m pas vb cs java uwp py php ts es

files→registerValueCallback(callback)

Registers the callback function that is invoked on every change of advertised value.

cpp m pas vb cs java uwp py php ts es

files→remove(pathname)

Deletes a file, given by its full path name, from the filesystem.

cpp m pas vb cs java uwp py php ts es dnp cmd

files→set_logicalName(newval)

Changes the logical name of the filesystem.

cpp m pas vb cs java uwp py php ts es dnp cmd

files→set_userData(data)

Stores a user context provided as argument in the userData attribute of the function.

cpp m pas vb cs java py php ts es

files→unmuteValueCallbacks()

Re-enables the propagation of every new advertised value to the parent hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

files→upload(pathname, content)

Uploads a file to the filesystem, to the specified full path name.

cpp m pas vb cs java uwp py php ts es dnp cmd

files→wait_async(callback, context)

Waits for all pending asynchronous commands on the module to complete, and invoke the user-provided callback function.

ts es

12.6. Class YRealTimeClock

Real-time clock control interface, available for instance in the YoctoHub-GSM-4G, the YoctoHub-Wireless-SR, the YoctoHub-Wireless-g or the YoctoHub-Wireless-n

The `YRealTimeClock` class provide access to the embedded real-time clock available on some Yoctopuce devices. It can provide current date and time, even after a power outage lasting several days. It is the base for automated wake-up functions provided by the WakeUpScheduler. The current time may represent a local time as well as an UTC time, but no automatic time change will occur to account for daylight saving time.

In order to use the functions described here, you should include:

es	**in HTML: <script src="../../lib/yocto_realtimeclock.js"></script>** **in node.js: require('yoctolib-es2017/yocto_realtimeclock.js');**
js	**<script type='text/javascript' src='yocto_realtimeclock.js'></script>**
cpp	**#include "yocto_realtimeclock.h"**
m	**#import "yocto_realtimeclock.h"**
pas	**uses yocto_realtimeclock;**
vb	**yocto_realtimeclock.vb**
cs	**yocto_realtimeclock.cs**
java	**import com.yoctopuce.YoctoAPI.YRealTimeClock;**
uwp	**import com.yoctopuce.YoctoAPI.YRealTimeClock;**
py	**from yocto_realtimeclock import ***
php	**require_once('yocto_realtimeclock.php');**
ts	**in HTML: import { YRealTimeClock } from '../../dist/esm/yocto_realtimeclock.js';** **in Node.js: import { YRealTimeClock } from 'yoctolib-cjs/yocto_realtimeclock.js';**
dnp	**import YoctoProxyAPI.YRealTimeClockProxy**
cp	**#include "yocto_realtimeclock_proxy.h"**
vi	**YRealTimeClock.vi**
ml	**import YoctoProxyAPI.YRealTimeClockProxy**

Global functions

YRealTimeClock.FindRealTimeClock(func)

Retrieves a real-time clock for a given identifier.

cpp m pas vb cs java uwp py php ts es dnp

YRealTimeClock.FindRealTimeClockInContext(yctx, func)

Retrieves a real-time clock for a given identifier in a YAPI context.

java uwp ts es

YRealTimeClock.FirstRealTimeClock()

Starts the enumeration of real-time clocks currently accessible.

cpp m pas vb cs java uwp py php ts es

YRealTimeClock.FirstRealTimeClockInContext(yctx)

Starts the enumeration of real-time clocks currently accessible.

java uwp ts es

YRealTimeClock.GetSimilarFunctions()

Enumerates all functions of type RealTimeClock available on the devices currently reachable by the library, and returns their unique hardware ID.

dnp

YRealTimeClock properties

realtimeclock→AdvertisedValue *[read-only]*

Short string representing the current state of the function.

dnp

realtimeclock→DisableHostSync *[writable]*

True if the automatic clock synchronization with host has been disabled, and false otherwise.

dnp

realtimeclock→FriendlyName *[read-only]*

Global identifier of the function in the format MODULE_NAME.FUNCTION_NAME.

dnp

realtimeclock→FunctionId *[read-only]*

Hardware identifier of the real-time clock, without reference to the module.

dnp

realtimeclock→HardwareId *[read-only]*

Unique hardware identifier of the function in the form SERIAL.FUNCTIONID.

dnp

realtimeclock→IsOnline *[read-only]*

Checks if the function is currently reachable.

dnp

realtimeclock→LogicalName *[writable]*

Logical name of the function.

dnp

realtimeclock→SerialNumber *[read-only]*

Serial number of the module, as set by the factory.

dnp

realtimeclock→UtcOffset *[writable]*

Number of seconds between current time and UTC time (time zone).

dnp

YRealTimeClock methods

realtimeclock→clearCache()

Invalidates the cache.

cpp m pas vb cs java py php ts es

realtimeclock→describe()

Returns a short text that describes unambiguously the instance of the real-time clock in the form TYPE(NAME)=SERIAL.FUNCTIONID.

cpp m pas vb cs java py php ts es

realtimeclock→get_advertisedValue()

Returns the current value of the real-time clock (no more than 6 characters).

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→get_dateTime()

Returns the current time in the form "YYYY/MM/DD hh:mm:ss".

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→get_disableHostSync()

Returns true if the automatic clock synchronization with host has been disabled, and false otherwise.

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→get_errorMessage()

Returns the error message of the latest error with the real-time clock.

cpp m pas vb cs java py php ts es

realtimeclock→get_errorType()

Returns the numerical error code of the latest error with the real-time clock.

cpp m pas vb cs java py php ts es

realtimeclock→get_friendlyName()

Returns a global identifier of the real-time clock in the format `MODULE_NAME.FUNCTION_NAME`.

cpp m cs java py php ts es dnp

realtimeclock→get_functionDescriptor()

Returns a unique identifier of type `YFUN_DESCR` corresponding to the function.

cpp m pas vb cs java py php ts es

realtimeclock→get_functionId()

Returns the hardware identifier of the real-time clock, without reference to the module.

cpp m vb cs java py php ts es dnp

realtimeclock→get_hardwareId()

Returns the unique hardware identifier of the real-time clock in the form `SERIAL.FUNCTIONID`.

cpp m vb cs java py php ts es dnp

realtimeclock→get_logicalName()

Returns the logical name of the real-time clock.

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→get_module()

Gets the `YModule` object for the device on which the function is located.

cpp m pas vb cs java py php ts es dnp

realtimeclock→get_module_async(callback, context)

Gets the `YModule` object for the device on which the function is located (asynchronous version).

realtimeclock→get_serialNumber()

Returns the serial number of the module, as set by the factory.

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→get_timeSet()

Returns true if the clock has been set, and false otherwise.

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→get_unixTime()

Returns the current time in Unix format (number of elapsed seconds since Jan 1st, 1970).

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→get_userData()

Returns the value of the userData attribute, as previously stored using method `set_userData`.

cpp m pas vb cs java py php ts es

realtimeclock→get_utcOffset()

Returns the number of seconds between current time and UTC time (time zone).

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→isOnline()

Checks if the real-time clock is currently reachable, without raising any error.

cpp m pas vb cs java py php ts es dnp

realtimeclock→isOnline_async(callback, context)

Checks if the real-time clock is currently reachable, without raising any error (asynchronous version).

realtimeclock→isReadOnly()

Indicates whether changes to the function are prohibited or allowed.

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→load(msValidity)

Preloads the real-time clock cache with a specified validity duration.

cpp m pas vb cs java py php ts es

realtimeclock→loadAttribute(attrName)

Returns the current value of a single function attribute, as a text string, as quickly as possible but without using the cached value.

cpp m pas vb cs java uwp py php ts es dnp

realtimeclock→load_async(msValidity, callback, context)

Preloads the real-time clock cache with a specified validity duration (asynchronous version).

realtimeclock→muteValueCallbacks()

Disables the propagation of every new advertised value to the parent hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→nextRealTimeClock()

Continues the enumeration of real-time clocks started using `yFirstRealTimeClock()`.

cpp m pas vb cs java uwp py php ts es

realtimeclock→registerValueCallback(callback)

Registers the callback function that is invoked on every change of advertised value.

cpp m pas vb cs java uwp py php ts es

realtimeclock→set_disableHostSync(newval)

Changes the automatic clock synchronization with host working state.

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→set_logicalName(newval)

Changes the logical name of the real-time clock.

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→set_unixTime(newval)

Changes the current time.

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→set_userData(data)

Stores a user context provided as argument in the userData attribute of the function.

cpp m pas vb cs java py php ts es

realtimeclock→set_utcOffset(newval)

Changes the number of seconds between current time and UTC time (time zone).

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→unmuteValueCallbacks()

Re-enables the propagation of every new advertised value to the parent hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

realtimeclock→wait_async(callback, context)

Waits for all pending asynchronous commands on the module to complete, and invoke the user-provided callback function.

ts es

12.7. Class YWakeUpMonitor

Wake-up monitor control interface, available for instance in the YoctoHub-GSM-4G, the YoctoHub-Wireless-SR, the YoctoHub-Wireless-g or the YoctoHub-Wireless-n

The `YWakeUpMonitor` class handles globally all wake-up sources, as well as automated sleep mode.

In order to use the functions described here, you should include:

es	**in HTML: <script src="../../lib/yocto_wakeupmonitor.js"></script>** **in node.js: require('yoctolib-es2017/yocto_wakeupmonitor.js');**
js	**<script type='text/javascript' src='yocto_wakeupmonitor.js'></script>**
cpp	**#include "yocto_wakeupmonitor.h"**
m	**#import "yocto_wakeupmonitor.h"**
pas	**uses yocto_wakeupmonitor;**
vb	**yocto_wakeupmonitor.vb**
cs	**yocto_wakeupmonitor.cs**
java	**import com.yoctopuce.YoctoAPI.YWakeUpMonitor;**
uwp	**import com.yoctopuce.YoctoAPI.YWakeUpMonitor;**
py	**from yocto_wakeupmonitor import ***
php	**require_once('yocto_wakeupmonitor.php');**
ts	**in HTML: import { YWakeUpMonitor } from '../../dist/esm/yocto_wakeupmonitor.js';** **in Node.js: import { YWakeUpMonitor } from 'yoctolib-cjs/yocto_wakeupmonitor.js';**
dnp	**import YoctoProxyAPI.YWakeUpMonitorProxy**
cp	**#include "yocto_wakeupmonitor_proxy.h"**
vi	**YWakeUpMonitor.vi**
ml	**import YoctoProxyAPI.YWakeUpMonitorProxy**

Global functions

YWakeUpMonitor.FindWakeUpMonitor(func)

Retrieves a wake-up monitor for a given identifier.

cpp m pas vb cs java uwp py php ts es dnp

YWakeUpMonitor.FindWakeUpMonitorInContext(yctx, func)

Retrieves a wake-up monitor for a given identifier in a YAPI context.

java uwp ts es

YWakeUpMonitor.FirstWakeUpMonitor()

Starts the enumeration of wake-up monitors currently accessible.

cpp m pas vb cs java uwp py php ts es

YWakeUpMonitor.FirstWakeUpMonitorInContext(yctx)

Starts the enumeration of wake-up monitors currently accessible.

java uwp ts es

YWakeUpMonitor.GetSimilarFunctions()

Enumerates all functions of type WakeUpMonitor available on the devices currently reachable by the library, and returns their unique hardware ID.

dnp

`YWakeUpMonitor` properties

wakeupmonitor→AdvertisedValue *[read-only]*

Short string representing the current state of the function.

dnp

wakeupmonitor→FriendlyName *[read-only]*

Global identifier of the function in the format MODULE_NAME.FUNCTION_NAME.

dnp

wakeupmonitor→FunctionId *[read-only]*

Hardware identifier of the wake-up monitor, without reference to the module.

dnp

wakeupmonitor→HardwareId *[read-only]*

Unique hardware identifier of the function in the form SERIAL.FUNCTIONID.

dnp

wakeupmonitor→IsOnline *[read-only]*

Checks if the function is currently reachable.

dnp

wakeupmonitor→LogicalName *[writable]*

Logical name of the function.

dnp

wakeupmonitor→NextWakeUp *[writable]*

Next scheduled wake up date/time (UNIX format).

dnp

wakeupmonitor→PowerDuration *[writable]*

Maximal wake up time (in seconds) before automatically going to sleep.

dnp

wakeupmonitor→SerialNumber *[read-only]*

Serial number of the module, as set by the factory.

dnp

YWakeUpMonitor methods

wakeupmonitor→clearCache()

Invalidates the cache.

cpp m pas vb cs java py php ts es

wakeupmonitor→describe()

Returns a short text that describes unambiguously the instance of the wake-up monitor in the form TYPE(NAME)=SERIAL.FUNCTIONID.

cpp m pas vb cs java py php ts es

wakeupmonitor→get_advertisedValue()

Returns the current value of the wake-up monitor (no more than 6 characters).

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→get_errorMessage()

Returns the error message of the latest error with the wake-up monitor.

cpp m pas vb cs java py php ts es

wakeupmonitor→get_errorType()

Returns the numerical error code of the latest error with the wake-up monitor.

cpp m pas vb cs java py php ts es

wakeupmonitor→get_friendlyName()

Returns a global identifier of the wake-up monitor in the format MODULE_NAME.FUNCTION_NAME.

cpp m cs java py php ts es dnp

wakeupmonitor→get_functionDescriptor()

Returns a unique identifier of type YFUN_DESCR corresponding to the function.

cpp m pas vb cs java py php ts es

wakeupmonitor→get_functionId()

Returns the hardware identifier of the wake-up monitor, without reference to the module.

cpp m vb cs java py php ts es dnp

wakeupmonitor→get_hardwareId()

Returns the unique hardware identifier of the wake-up monitor in the form SERIAL.FUNCTIONID.

cpp m vb cs java py php ts es dnp

wakeupmonitor→get_logicalName()

Returns the logical name of the wake-up monitor.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→get_module()

Gets the YModule object for the device on which the function is located.

cpp m pas vb cs java py php ts es dnp

wakeupmonitor→get_module_async(callback, context)

Gets the YModule object for the device on which the function is located (asynchronous version).

wakeupmonitor→get_nextWakeUp()

Returns the next scheduled wake up date/time (UNIX format).

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→get_powerDuration()

Returns the maximal wake up time (in seconds) before automatically going to sleep.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→get_serialNumber()

Returns the serial number of the module, as set by the factory.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→get_sleepCountdown()

Returns the delay before the next sleep period.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→get_userData()

Returns the value of the userData attribute, as previously stored using method set_userData.

cpp m pas vb cs java py php ts es

wakeupmonitor→get_wakeUpReason()

Returns the latest wake up reason.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→get_wakeUpState()

Returns the current state of the monitor.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→isOnline()

Checks if the wake-up monitor is currently reachable, without raising any error.

cpp m pas vb cs java py php ts es dnp

wakeupmonitor→isOnline_async(callback, context)

Checks if the wake-up monitor is currently reachable, without raising any error (asynchronous version).

wakeupmonitor→isReadOnly()

Indicates whether changes to the function are prohibited or allowed.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→load(msValidity)

Preloads the wake-up monitor cache with a specified validity duration.

cpp m pas vb cs java py php ts es

wakeupmonitor→loadAttribute(attrName)

Returns the current value of a single function attribute, as a text string, as quickly as possible but without using the cached value.

cpp m pas vb cs java uwp py php ts es dnp

wakeupmonitor→load_async(msValidity, callback, context)

Preloads the wake-up monitor cache with a specified validity duration (asynchronous version).

wakeupmonitor→muteValueCallbacks()

Disables the propagation of every new advertised value to the parent hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→nextWakeUpMonitor()

Continues the enumeration of wake-up monitors started using `yFirstWakeUpMonitor()`.

cpp m pas vb cs java uwp py php ts es

wakeupmonitor→registerValueCallback(callback)

Registers the callback function that is invoked on every change of advertised value.

cpp m pas vb cs java uwp py php ts es

wakeupmonitor→resetSleepCountDown()

Resets the sleep countdown.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→set_logicalName(newval)

Changes the logical name of the wake-up monitor.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→set_nextWakeUp(newval)

Changes the days of the week when a wake up must take place.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→set_powerDuration(newval)

Changes the maximal wake up time (seconds) before automatically going to sleep.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→set_sleepCountdown(newval)

Changes the delay before the next sleep period.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→set_userData(data)

Stores a user context provided as argument in the userData attribute of the function.

cpp m pas vb cs java py php ts es

wakeupmonitor→sleep(secBeforeSleep)

Goes to sleep until the next wake up condition is met, the RTC time must have been set before calling this function.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→sleepFor(secUntilWakeUp, secBeforeSleep)

Goes to sleep for a specific duration or until the next wake up condition is met, the RTC time must have been set before calling this function.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→sleepUntil(wakeUpTime, secBeforeSleep)

Go to sleep until a specific date is reached or until the next wake up condition is met, the RTC time must have been set before calling this function.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→unmuteValueCallbacks()

Re-enables the propagation of every new advertised value to the parent hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupmonitor→wait_async(callback, context)

Waits for all pending asynchronous commands on the module to complete, and invoke the user-provided callback function.

ts es

wakeupmonitor→wakeUp()

Forces a wake up.

cpp m pas vb cs java uwp py php ts es dnp cmd

12.8. Class YWakeUpSchedule

Wake up schedule control interface, available for instance in the YoctoHub-GSM-4G, the YoctoHub-Wireless-SR, the YoctoHub-Wireless-g or the YoctoHub-Wireless-n

The `YWakeUpSchedule` class implements a wake up condition. The wake up time is specified as a set of months and/or days and/or hours and/or minutes when the wake up should happen.

In order to use the functions described here, you should include:

es	**in HTML: <script src="../../lib/yocto_wakeupschedule.js"></script>** **in node.js: require('yoctolib-es2017/yocto_wakeupschedule.js');**
js	**<script type='text/javascript' src='yocto_wakeupschedule.js'></script>**
cpp	**#include "yocto_wakeupschedule.h"**
m	**#import "yocto_wakeupschedule.h"**
pas	**uses yocto_wakeupschedule;**
vb	**yocto_wakeupschedule.vb**
cs	**yocto_wakeupschedule.cs**
java	**import com.yoctopuce.YoctoAPI.YWakeUpSchedule;**
uwp	**import com.yoctopuce.YoctoAPI.YWakeUpSchedule;**
py	**from yocto_wakeupschedule import ***
php	**require_once('yocto_wakeupschedule.php');**
ts	**in HTML: import { YWakeUpSchedule } from '../../dist/esm/yocto_wakeupschedule.js';** **in Node.js: import { YWakeUpSchedule } from 'yoctolib-cjs/yocto_wakeupschedule.js';**
dnp	**import YoctoProxyAPI.YWakeUpScheduleProxy**
cp	**#include "yocto_wakeupschedule_proxy.h"**
vi	**YWakeUpSchedule.vi**
ml	**import YoctoProxyAPI.YWakeUpScheduleProxy**

Global functions

YWakeUpSchedule.FindWakeUpSchedule(func)

Retrieves a wake up schedule for a given identifier.

cpp m pas vb cs java uwp py php ts es dnp

YWakeUpSchedule.FindWakeUpScheduleInContext(yctx, func)

Retrieves a wake up schedule for a given identifier in a YAPI context.

java uwp ts es

YWakeUpSchedule.FirstWakeUpSchedule()

Starts the enumeration of wake up schedules currently accessible.

cpp m pas vb cs java uwp py php ts es

YWakeUpSchedule.FirstWakeUpScheduleInContext(yctx)

Starts the enumeration of wake up schedules currently accessible.

java uwp ts es

YWakeUpSchedule.GetSimilarFunctions()

Enumerates all functions of type WakeUpSchedule available on the devices currently reachable by the library, and returns their unique hardware ID.

dnp

YWakeUpSchedule properties

wakeupschedule→AdvertisedValue ***[read-only]***

Short string representing the current state of the function.

dnp

wakeupschedule→FriendlyName *[read-only]*

Global identifier of the function in the format `MODULE_NAME.FUNCTION_NAME`.

dnp

wakeupschedule→FunctionId *[read-only]*

Hardware identifier of the wake up schedule, without reference to the module.

dnp

wakeupschedule→HardwareId *[read-only]*

Unique hardware identifier of the function in the form `SERIAL.FUNCTIONID`.

dnp

wakeupschedule→Hours *[writable]*

Hours scheduled for wake up.

dnp

wakeupschedule→IsOnline *[read-only]*

Checks if the function is currently reachable.

dnp

wakeupschedule→LogicalName *[writable]*

Logical name of the function.

dnp

wakeupschedule→MinutesA *[writable]*

Minutes in the 00-29 interval of each hour scheduled for wake up.

dnp

wakeupschedule→MinutesB *[writable]*

Minutes in the 30-59 interval of each hour scheduled for wake up.

dnp

wakeupschedule→MonthDays *[writable]*

Days of the month scheduled for wake up.

dnp

wakeupschedule→Months *[writable]*

Months scheduled for wake up.

dnp

wakeupschedule→NextOccurence *[read-only]*

Date/time (seconds) of the next wake up occurrence.

dnp

wakeupschedule→SecondsBefore *[writable]*

Number of seconds to anticipate wake-up time to allow the system to power-up.

dnp

wakeupschedule→SerialNumber *[read-only]*

Serial number of the module, as set by the factory.

dnp

wakeupschedule→WeekDays *[writable]*

Days of the week scheduled for wake up.

dnp

YWakeUpSchedule methods

wakeupschedule→clearCache()

Invalidates the cache.

cpp m pas vb cs java py php ts es

wakeupschedule→describe()

Returns a short text that describes unambiguously the instance of the wake up schedule in the form TYPE(NAME)=SERIAL.FUNCTIONID.

cpp m pas vb cs java py php ts es

wakeupschedule→get_advertisedValue()

Returns the current value of the wake up schedule (no more than 6 characters).

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→get_errorMessage()

Returns the error message of the latest error with the wake up schedule.

cpp m pas vb cs java py php ts es

wakeupschedule→get_errorType()

Returns the numerical error code of the latest error with the wake up schedule.

cpp m pas vb cs java py php ts es

wakeupschedule→get_friendlyName()

Returns a global identifier of the wake up schedule in the format MODULE_NAME.FUNCTION_NAME.

cpp m cs java py php ts es dnp

wakeupschedule→get_functionDescriptor()

Returns a unique identifier of type YFUN_DESCR corresponding to the function.

cpp m pas vb cs java py php ts es

wakeupschedule→get_functionId()

Returns the hardware identifier of the wake up schedule, without reference to the module.

cpp m vb cs java py php ts es dnp

wakeupschedule→get_hardwareId()

Returns the unique hardware identifier of the wake up schedule in the form SERIAL.FUNCTIONID.

cpp m vb cs java py php ts es dnp

wakeupschedule→get_hours()

Returns the hours scheduled for wake up.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→get_logicalName()

Returns the logical name of the wake up schedule.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→get_minutes()

Returns all the minutes of each hour that are scheduled for wake up.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→get_minutesA()

Returns the minutes in the 00-29 interval of each hour scheduled for wake up.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→get_minutesB()

Returns the minutes in the 30-59 interval of each hour scheduled for wake up.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→get_module()

Gets the `YModule` object for the device on which the function is located.

cpp m pas vb cs java py php ts es dnp

wakeupschedule→get_module_async(callback, context)

Gets the `YModule` object for the device on which the function is located (asynchronous version).

wakeupschedule→get_monthDays()

Returns the days of the month scheduled for wake up.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→get_months()

Returns the months scheduled for wake up.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→get_nextOccurence()

Returns the date/time (seconds) of the next wake up occurrence.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→get_secondsBefore()

Returns the number of seconds to anticipate wake-up time to allow the system to power-up.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→get_serialNumber()

Returns the serial number of the module, as set by the factory.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→get_userData()

Returns the value of the userData attribute, as previously stored using method `set_userData`.

cpp m pas vb cs java py php ts es

wakeupschedule→get_weekDays()

Returns the days of the week scheduled for wake up.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→isOnline()

Checks if the wake up schedule is currently reachable, without raising any error.

cpp m pas vb cs java py php ts es dnp

wakeupschedule→isOnline_async(callback, context)

Checks if the wake up schedule is currently reachable, without raising any error (asynchronous version).

wakeupschedule→isReadOnly()

Indicates whether changes to the function are prohibited or allowed.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→load(msValidity)

Preloads the wake up schedule cache with a specified validity duration.

cpp m pas vb cs java py php ts es

wakeupschedule→loadAttribute(attrName)

Returns the current value of a single function attribute, as a text string, as quickly as possible but without using the cached value.

cpp m pas vb cs java uwp py php ts es dnp

wakeupschedule→load_async(msValidity, callback, context)

Preloads the wake up schedule cache with a specified validity duration (asynchronous version).

wakeupschedule→muteValueCallbacks()

Disables the propagation of every new advertised value to the parent hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→nextWakeUpSchedule()

Continues the enumeration of wake up schedules started using `yFirstWakeUpSchedule()`.

cpp m pas vb cs java uwp py php ts es

wakeupschedule→registerValueCallback(callback)

Registers the callback function that is invoked on every change of advertised value.

cpp m pas vb cs java uwp py php ts es

wakeupschedule→set_hours(newval)

Changes the hours when a wake up must take place.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→set_logicalName(newval)

Changes the logical name of the wake up schedule.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→set_minutes(bitmap)

Changes all the minutes where a wake up must take place.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→set_minutesA(newval)

Changes the minutes in the 00-29 interval when a wake up must take place.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→set_minutesB(newval)

Changes the minutes in the 30-59 interval when a wake up must take place.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→set_monthDays(newval)

Changes the days of the month when a wake up must take place.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→set_months(newval)

Changes the months when a wake up must take place.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→set_secondsBefore(newval)

Changes the number of seconds to anticipate wake-up time to allow the system to power-up.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→set_userData(data)

Stores a user context provided as argument in the userData attribute of the function.

cpp m pas vb cs java py php ts es

wakeupschedule→set_weekDays(newval)

Changes the days of the week when a wake up must take place.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→unmuteValueCallbacks()

Re-enables the propagation of every new advertised value to the parent hub.

cpp m pas vb cs java uwp py php ts es dnp cmd

wakeupschedule→wait_async(callback, context)

Waits for all pending asynchronous commands on the module to complete, and invoke the user-provided callback function.

ts es

13. Troubleshooting

13.1. Where to start?

If it is the first time that you use a Yoctopuce module and you do not really know where to start, have a look at the Yoctopuce blog. There is a section dedicated to beginners [1].

13.2. Programming examples don't seem to work

Most of Yoctopuce API programming examples are command line programs and require some parameters to work properly. You have to start them from your operating system command prompt, or configure your IDE to run them with the proper parameters. [2].

13.3. Linux and USB

To work correctly under Linux, the library needs to have write access to all the Yoctopuce USB peripherals. However, by default under Linux, USB privileges of the non-root users are limited to read access. To avoid having to run the library as root, you need to create a new *udev* rule to authorize one or several users to have write access to the Yoctopuce peripherals.

To add a new *udev* rule to your installation, you must add a file with a name following the "`##-arbitraryName.rules`" format, in the "`/etc/udev/rules.d`" directory. When the system is starting, *udev* reads all the files with a "`.rules`" extension in this directory, respecting the alphabetical order (for example, the "`51-custom.rules`" file is interpreted AFTER the "`50-udev-default.rules`" file).

The "`50-udev-default`" file contains the system default *udev* rules. To modify the default behavior, you therefore need to create a file with a name that starts with a number larger than 50, that will override the system default rules. Note that to add a rule, you need a root access on the system.

In the `udev_conf` directory of the VirtualHub for Linux[3] archive, there are two rule examples which you can use as a basis.

[1] see: http://www.yoctopuce.com/EN/blog_by_categories/for-the-beginners
[2] see: http://www.yoctopuce.com/EN/article/about-programming-examples
[3] http://www.yoctopuce.com/FR/virtualhub.php

Example 1: 51-yoctopuce.rules

This rule provides all the users with read and write access to the Yoctopuce USB devices. Access rights for all other devices are not modified. If this scenario suits you, you only need to copy the "`51-yoctopuce_all.rules`" file into the "`/etc/udev/rules.d`" directory and to restart your system.

```
# udev rules to allow write access to all users
# for Yoctopuce USB devices
SUBSYSTEM=="usb", ATTR{idVendor}=="24e0", MODE="0666"
```

Example 2: 51-yoctopuce_group.rules

This rule authorizes the "yoctogroup" group to have read and write access to Yoctopuce USB peripherals. Access rights for all other peripherals are not modified. If this scenario suits you, you only need to copy the "`51-yoctopuce_group.rules`" file into the "`/etc/udev/rules.d`" directory and restart your system.

```
# udev rules to allow write access to all users of "yoctogroup"
# for Yoctopuce USB devices
SUBSYSTEM=="usb", ATTR{idVendor}=="24e0", MODE="0664", GROUP="yoctogroup"
```

13.4. ARM Platforms: HF and EL

There are two main flavors of executable on ARM: HF (Hard Float) binaries, and EL (EABI Little Endian) binaries. These two families are not compatible at all. The compatibility of a given ARM platform with of one of these two families depends on the hardware and on the OS build. ArmHL and ArmEL compatibility problems are quite difficult to detect. Most of the time, the OS itself is unable to make a difference between an HF and an EL executable and will return meaningless messages when you try to use the wrong type of binary.

All pre-compiled Yoctopuce binaries are provided in both formats, as two separate ArmHF et ArmEL executables. If you do not know what family your ARM platform belongs to, just try one executable from each family.

13.5. Powered module but invisible for the OS

If your YoctoHub-Wireless-n is connected by USB, if its blue led is on, but if the operating system cannot see the module, check that you are using a true USB cable with data wires, and not a charging cable. Charging cables have only power wires.

13.6. Another process named xxx is already using yAPI

If when initializing the Yoctopuce API, you obtain the "*Another process named xxx is already using yAPI*" error message, it means that another application is already using Yoctopuce USB modules. On a single machine only one process can access Yoctopuce modules by USB at a time. You can easily work around this limitation by using VirtualHub and the network mode [4].

13.7. Disconnections, erratic behavior

If your YoctoHub-Wireless-n behaves erratically and/or disconnects itself from the USB bus without apparent reason, check that it is correctly powered. Avoid cables with a length above 2 meters. If needed, insert a powered USB hub [5] [6].

[4] see: http://www.yoctopuce.com/EN/article/error-message-another-process-is-already-using-yapi
[5] see: http://www.yoctopuce.com/EN/article/usb-cables-size-matters
[6] see: http://www.yoctopuce.com/EN/article/how-many-usb-devices-can-you-connect

13.8. After a failed firmware update, the device stopped working

If a firmware update of your YoctoHub-Wireless-n fails, it is possible that the module is no longer working. If this is the case, plug in your module while holding down the Yocto-Button. The Yocto-LED should light up brightly and remain steady. Release the button. Your YoctoHub-Wireless-n should then appear at the bottom of the VirtualHub user interface as a module waiting to be flashed. This operation also reverts the module to its factory configuration.

13.9. Registering VirtualHub disconnects another instance

If, when performing a call to RegisterHub() with a VirtualHub address, another previously registered VirtualHub disconnects, make sure the machine running these VirtualHubs do not have the same *Hostname*. Same *Hostname* can happen very easily when the operating system is installed from a monolithic image, Raspberry Pi are the best example. The Yoctopuce API uses serial numbers to communicate with devices and VirtualHub serial numbers are created on the fly based the *hostname* of the machine running VirtualHub.

13.10. Dropped commands

If, after sending a bunch of commands to a Yoctopuce device, you are under the impression that the last ones have been ignored, a typical example is a quick and dirty program meant to configure a device, make sure you used a YAPI.FreeAPI() at the end of the program. Commands are sent to Yoctopuce modules asynchronously thanks to a background thread. When the main program terminates, that thread is killed no matter if some command are left to be sent. However API.FreeAPI () waits until there is no more command to send before freeing the API resources and returning.

13.11. Can't contact sub devices by USB

The point of the YoctoHub-Wireless-n is to provide network access to connected sub-devices, it does not behave like a common USB hub. The YoctoHub-Wireless-n's USB port is just meant for power and Hub configuration. Access to sub device is only possible through a network connection.

13.12. Network Readiness stuck at 3- LAN ready

Check your outbound Internet connectivity and make sure you don't have an invalid callback set in the YoctoHub-Wireless-n configuration

13.13. Damaged device

Yoctopuce strives to reduce the production of electronic waste. If you believe that your YoctoHub-Wireless-n is not working anymore, start by contacting Yoctopuce support by e-mail to diagnose the failure. Even if you know that the device was damaged by mistake, Yoctopuce engineers might be able to repair it, and thus avoid creating electronic waste.

Waste Electrical and Electronic Equipment (WEEE) If you really want to get rid of your YoctoHub-Wireless-n, do not throw it away in a trash bin but bring it to your local WEEE recycling point. In this way, it will be disposed properly by a specialized WEEE recycling center.

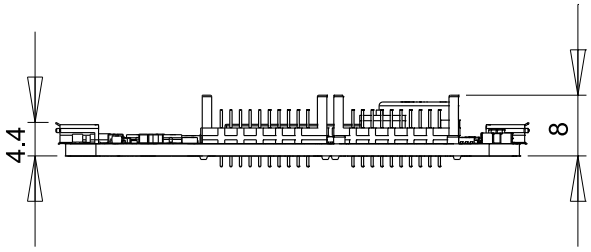
14. Characteristics

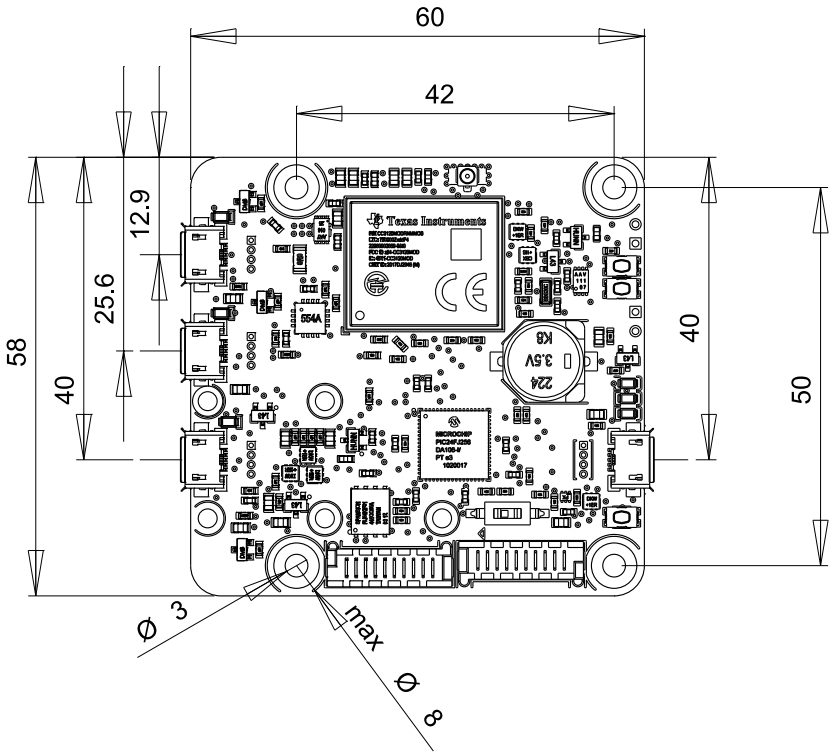
You can find below a summary of the main technical characteristics of your YoctoHub-Wireless-n module.

Product ID	YHUBWLN4
Hardware release†	
USB connector	micro-B
Thickness	8.1 mm
Width	58 mm
Length	60 mm
Weight	32 g
Protection class, according to IEC 61140	class III
Normal operating temperature	5...40 °C
Extended operating temperature‡	-30...85 °C
USB consumption	120 mA
RoHS compliance	RoHS III (2011/65/UE+2015/863)
USB Vendor ID	0x24E0
USB Device ID	0x0091
Suggested enclosure	YoctoBox-HubWlan-Transp
Harmonized tariff code	9032.9000
Made in	Switzerland

† These specifications are for the current hardware revision. Specifications for earlier revisions may differ.

‡ The extended temperature range is defined based on components specifications and has been tested during a limited duration (1h). When using the device in harsh environments for a long period of time, we strongly advise to run extensive tests before going to production.





All dimensions are in mm
Toutes les dimensions sont en mm

YoctoHub-Wireless-N

A4

Scal
1:1
Echelle