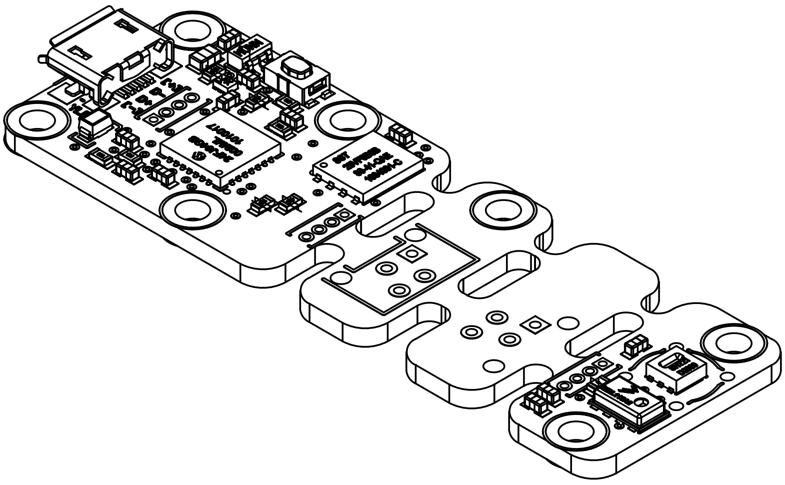
Yocto-Meteo

User's guide

Table of contents

1. Introduction

The Yocto-Meteo is a 60x20mm electronic module which allows you to measure, by USB, the temperature, the relative humidity, and the atmospheric pressure. Its typical accuracy is of 0.2°C for temperature, about 1.8% for the humidity rate, and 1mbar for the atmospheric pressure.



The Yocto-Meteo module

The Yocto-Meteo is not in itself a complete product. It is a component intended to be integrated into a solution used in laboratory equipments, or in industrial process-control equipments, or for similar applications in domestic and commercial environments. In order to use it, you must at least install it in a protective enclosure and connect it to a host computer.

Yoctopuce thanks you for buying this Yocto-Meteo and sincerely hopes that you will be satisfied with it. The Yoctopuce engineers have put a large amount of effort to ensure that your Yocto-Meteo is easy to install anywhere and easy to drive from a maximum of programming languages. If you are nevertheless disappointed with this module, or if you need additional information, do not hesitate to contact Yoctopuce support:

E-mail address:	support@yoctopuce.com
Web site:	www.yoctopuce.com
Postal address:	Chemin des Journaliers, 1
ZIP code, city:	1236 Cartigny
Country:	Switzerland

1.1. Safety Information

The Yocto-Meteo is designed to meet the requirements of IEC 61010-1:2010 safety standard. It does not create any serious hazards to the operator and surrounding area, even in single fault condition, as long as it is integrated and used according to the instructions contained in this documentation, and in this section in particular.

Protective enclosure

The Yocto-Meteo should not be used without a protective enclosure, because of the accessible bare electronic components. For optimal safety, it should be put into a non-metallic, non-inflammable enclosure, resistant to a mechanical stress level of 5 J. For instance, use a polycarbonate (e.g. LEXAN) enclosure rated IK08 with a IEC 60695-11-10 flammability rating of V-1 or better. Using a lower quality enclosure may require specific warnings for the operator and/or compromise conformity with the safety standard.

Maintenance

If a damage is observed on the electronic board or on the enclosure, it should be replaced in order to ensure continued safety of the equipment, and to prevent damaging other parts of the system due to overload that a short circuit could cause.

Identification

In order to ease the maintenance and the identification of risks during maintenance, you should affixate the water-resistant identification label provided together with the electronic board as close as possible to the device. If the device is put in a dedicated enclosure, the identification label should be affixated on the outside of the enclosure.

Application

The safety standard applied is intended to cover laboratory equipment, industrial process-control equipment and similar applications in residential or commercial environment. If you intend to use the Yocto-Meteo for another kind of application, you should check the safety regulations according to the standard applicable to your application.

In particular, the Yocto-Meteo is *not* certified for use in medical environments or for life-support applications.

Environment

The Yocto-Meteo is *not* certified for use in hazardous locations, explosive environments, or life-threatening applications. Environmental ratings are provided below.

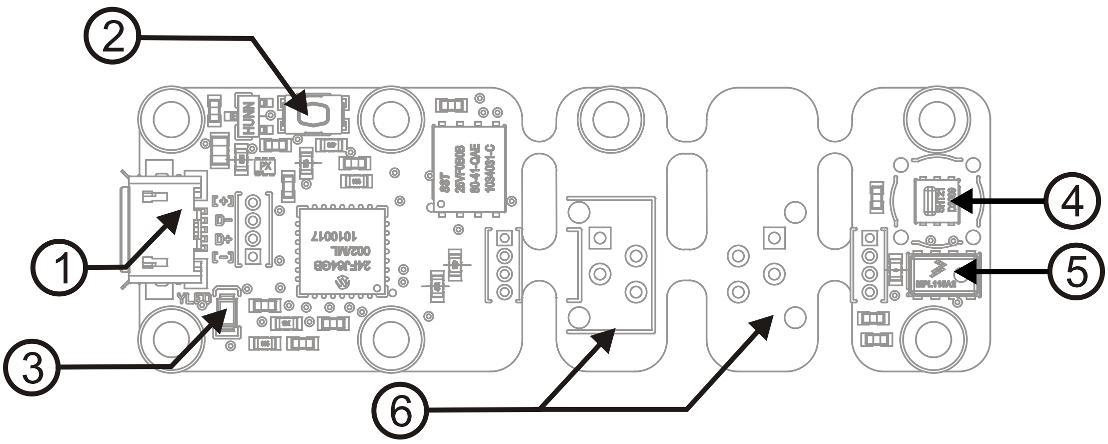
1.2. Environmental conditions

Yoctopuce devices have been designed for indoor use in a standard office or laboratory environment (IEC 60664 *pollution degree 2*): air pollution is expected to be limited and mainly non-conductive. Relative humidity is expected to be between 10% and 90% RH, non condensing. Use in environments with significant solid pollution or conductive pollution requires a protection from such pollution using an IP67 or IP68 enclosure. The products are designed for use up to altitude 2000m.

All Yoctopuce devices are warranted to perform according to their documentation and technical specifications under normal temperature conditions according to IEC61010-1, i.e. 5°C to 40°C. In addition, most devices can also be used on an extended temperature range, where some limitations may apply from case to case.

The extended operating temperature range for the Yocto-Meteo is -30...85°C. This temperature range has been determined based on components manufacturer recommendations, and on controlled environment tests performed during a limited duration (1h). If you plan to use the Yocto-Meteo in harsh environments for a long period of time, we strongly advise you to run extensive tests before going to production.

2. Presentation



1: Micro-B USB socket
2: Yocto-button
3: Yocto-led
4: Temperature and humidity sensor
5: Pressure sensor
6: Picoflex header slot

2.1. Common elements

All Yocto-modules share a number of common functionalities.

USB connector

Yoctopuce modules all come with a USB 2.0 micro-B socket. Warning: the USB connector is 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 using flux to avoid bridges. Alternatively, you can solder a USB cable directly in the 1.27mm-spaced holes near the connector.

If you plan to use a power source other then a standard USB host port to power the device through the USB connector, that power source must respect the assigned values of USB 2.0 specifications:

- **Voltage min.:** 4.75 V DC
- **Voltage max.:** 5.25 V DC
- **Over-current protection:** 5.0 A max.

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 in case of severely damaged firmware.

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].

Current sensor

Each Yocto-module is able to measure its own current consumption on the USB bus. Current supply on a USB bus being quite critical, this functionality can be of great help. You can only view the current consumption of a module by software.

Serial number

Each Yocto-module has a unique serial number assigned to it at the factory. For Yocto-Meteo modules, this number starts with METEOMK1. 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 benefit 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.

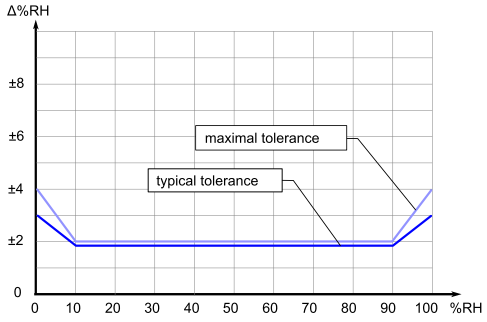
2.2. Specific elements

Humidity and temperature sensor

The SHT25 sensor[3] is produced by Sensirion. It is able to precisely measure both the temperature and the relative humidity. This sensor is relatively fragile, so make sure that no liquid or dust can come inside it, and never use solvent to clean it. For outside use, or in a dusty environment, using an SF2 filter is strongly recommended. If you intend to tropicalize your module, protect the sensor with care beforehand. You will find more details on the Sensirion web site[4].

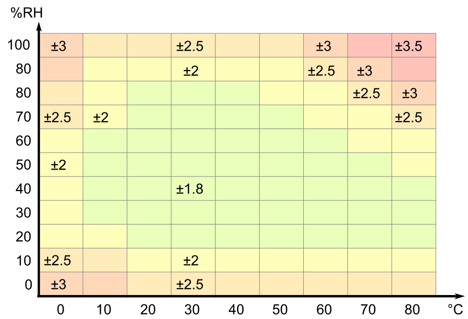
[1] short-short-short long-long-long short-short-short
[2] support@yoctopuce.com
[3] A previous version of the Yocto-Meteo (serial number < 133C0) was equipped with the slightly less accurate SHT21 sensor
[4] https://www.sensirion.com/fileadmin/user_upload/customers/sensirion/Dokumente/2_Humidity_Sensors/Sensirion_Humidity_Sensors_Handling_Instructions.pdf

The absolute accuracy of the humidity measure is 1.8% between 10% and 90% humidity (with a resolution of 0.1%). The maximal tolerance is documented in the graph below. The repeatability is 0.1 %RH.



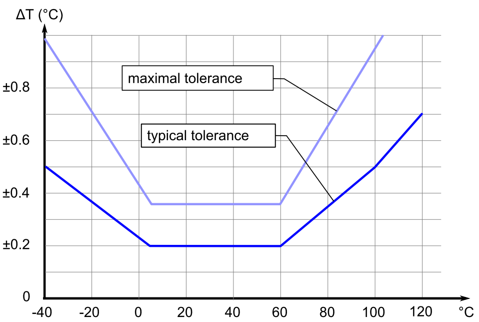
Tolerance of RH at 25°C for SHT25

The absolute accuracy of the humidity measure also depends from the ambiant temperature. The typical tolerance of the humidity measure over humidity and temperature is documented in the graph below:



Typical Tolerance of RH over T for SHT25

The absolute precision of the temperature measure is typically +/-0.2°C between 10°C and 60°C (resolution 0.01°C), or +/-0.4°C between -30°C and 90°C. The maximal tolerance is documented in the graph below. The repeatability is 0.1°C.

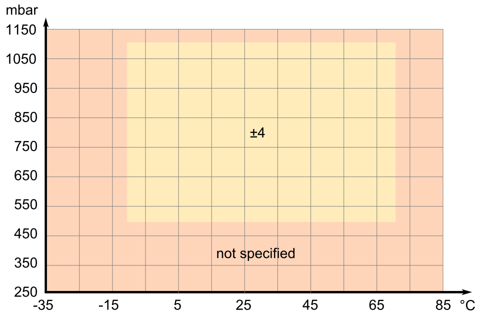


Tolerance of temperature for SHT25

Be aware that whatever the precision of the measure can be, it will only apply to the air in immediate vicinity of the sensor. When no air circulation can occur, or when the air temperature is under the influence of warming caused by the electronics, the measure will be biased. In order to obtain the best precision, you should move away the sensor part, as described in the chapter about about assembly and connections. If the sensor is left together with the electronics and used in vertical position, you should absolutely avoid the position with the USB connector on the bottom, because this would maximize the flow of warmed air from the device electronics to the temperature sensor.

Pressure sensor

The MPL3115A2 sensor[5] is produced by Freescale. It measures atmospheric pressure from 200 to 1100 mbar[6] with a 1 mbar relative accuracy (absolute accuracy is 4mbar in range -10...70°C, 500...1100 mbar). The resolution is 0.015mbar, which corresponds to an altitude variation of about 15 cm.



Absolute Accuracy in mbar over T for MPL3115A2

2.3. Optional accessories

The accessories below are not necessary to use the Yocto-Meteo module but might be useful depending on your project. These are mostly common products that you can buy from your favorite hacking store. To save you the tedious job of looking for them, most of them are also available on the Yoctopuce shop.

Screws and spacers

In order to mount the Yocto-Meteo module, you can put small screws in the 2.5mm assembly holes, with a screw head no larger than 4.5mm. The best way is to use threaded spacers, which you can then mount wherever you want. You can find more details on this topic in the chapter about assembly and connections.

Micro-USB hub

If you intend to put several Yoctopuce modules in a very small space, you can connect them directly to a micro-USB hub. Yoctopuce builds a USB hub particularly small for this purpose (down to 20mmx36mm), on which you can directly solder a USB cable instead of using a USB plug. For more details, see the micro-USB hub information sheet.

YoctoHub-Ethernet, YoctoHub-Wireless and YoctoHub-GSM

You can add network connectivity to your Yocto-Meteo, thanks to the YoctoHub-Ethernet, the YoctoHub-Wireless and the YoctoHub-GSM which provides repectiveley Ethernet, WiFi and GSM connectivity. All of them can drive up to three devices and behave exactly like a regular computer running a *VirtualHub*.

1.27mm (or 1.25mm) connectors

In case you wish to connect your Yocto-Meteo to a Micro-hub USB or a YoctoHub without using a bulky USB connector, you can use the four 1.27mm pads just behind the USB connector. There are two options.

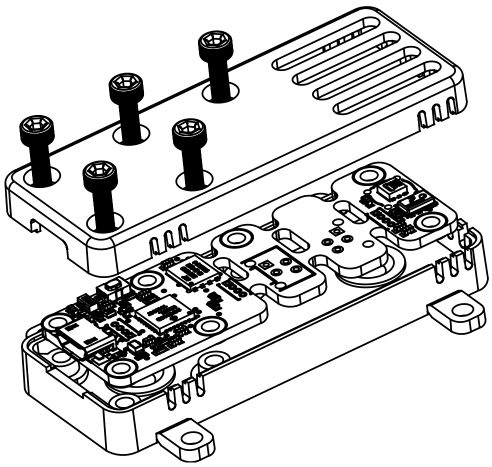
You can mount the Yocto-Meteo directly on the hub using screw and spacers, and connect it using 1.27mm board-to-board connectors. To prevent shortcuts, it is best to solder the female connector on the hub and the male connector on the Yocto-Meteo.

[5] A previous version of the Yocto-Meteo (serial number < 35000) was equipped with MPL115A2 sensor, which was less accurate.
[6] 1000 mbar = 1000 hPa = ~14.5 psi = ~29.53 inHg

You can also use a small 4-wires cable with a 1.27mm connector. 1.25mm works as well, it does not make a difference for 4 pins. This makes it possible to move the device a few inches away. Don't put it too far away if you use that type of cable, because as the cable is not shielded, it may cause undesirable electromagnetic emissions.

Enclosure

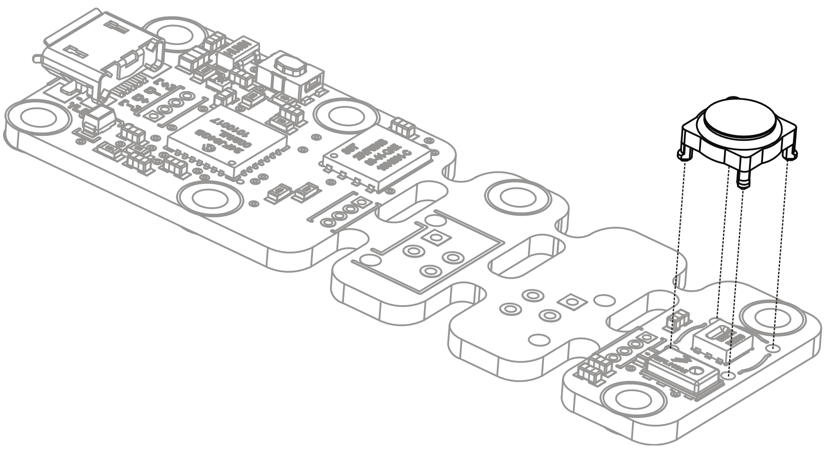
Your Yocto-Meteo has been designed to be installed as is in your project. Nevertheless, Yoctopuce sells enclosures specifically designed for Yoctopuce devices. These enclosures have removable mounting brackets and magnets allowing them to stick on ferromagnetic surfaces. More details are available on the Yoctopuce web site [7]. The suggested enclosure model for your Yocto-Meteo is the YoctoBox-Long-Thin-Black-Vents.



You can install your Yocto-Meteo in an optional enclosure

SF2 filter

If you wish to protect the humidity sensor which is quite fragile, there is a filter which you can clip on the module. This filter efficiently protects your precious sensor from dust and liquids. However, it creates a delay of about 30 seconds on the measures. As it is relatively expensive and not necessarily required, this filter is not provided with your Yocto-Meteo module. This filter is produced by Sensirion under the reference SF2 and is available from most component retailers which sell the SHT25 sensor, as well as from the Yoctopuce online shop.



You can protect the humidity sensor with a filter.

[7] http://www.yoctopuce.com/EN/products/category/enclosures

Picoflex connectors and flexible ribbon cable

If you intend to move the sensor away from the Yocto-Meteo module using a pluggable cable, you will need 4-wire ribbon cable of 1.27mm pitch, and Picoflex connectors.[8] You can find more details on this topic in the chapter about assembly and connections.

[8] Header Molex ref 90325-3004 or 90325-0004, available from most electronic components suppliers (www.mouser.com, www.digikey.com, www.farnell.com, www.distrelec.ch...). To be used with connectors ref 90327-3304 or 90327-0304.

3. First steps

By design, all Yoctopuce modules are driven the same way. Therefore, user's guides for all the modules of the range are very similar. If you have already carefully read through the user's guide of another Yoctopuce module, you can jump directly to the description of the module functions.

3.1. Prerequisites

In order to use your Yocto-Meteo module, you should have the following items at hand.

A computer

Yoctopuce modules are intended to be driven by a computer (or possibly an embedded microprocessor). You will write the control software yourself, according to your needs, using the information provided in this manual.

Yoctopuce provides software libraries to drive its modules for the following operating systems: Windows, macOS X, Linux, and Android. Yoctopuce modules do not require installing any specific system driver, as they leverage the standard HID driver[1] provided with every operating system.

Windows versions currently supported are: Windows XP, Windows 2003, Windows Vista, Windows 7, Windows 8 and Windows 10. Both 32 bit and 64 bit versions are supported. The programming library is also available for the Universal Windows Platform (UWP), which is supported by all flavors of Windows 10, including Windows 10 IoT. Yoctopuce is frequently testing its modules on Windows 7 and Windows 10.

MacOS versions currently supported are: Mac OS X 10.9 (Maverick), 10.10 (Yosemite), 10.11 (El Capitan), macOS 10.12 (Sierra), macOS 10.13 (High Sierra) and macOS 10.14 (Mojave). Yoctopuce is frequently testing its modules on macOS 10.14.

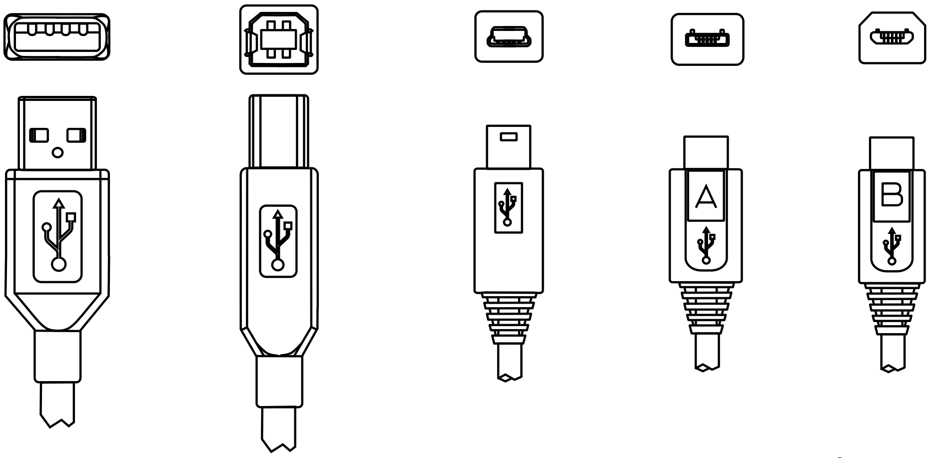
Linux kernels currently supported are the 2.6 branch, the 3.x branch and the 4.x branch. Other versions of the Linux kernel, and even other UNIX variants, are very likely to work as well, as Linux support is implemented through the standard **libusb** API. Yoctopuce is frequently testing its modules on Linux kernel 4.15 (Ubuntu 18.04 LTS).

Android versions currently supported are: Android 3.1 and later. Moreover, it is necessary for the tablet or phone to support the *Host* USB mode. Yoctopuce is frequently testing its modules on Android 7.x on a Samsung Galaxy A6 with the Java for Android library.

[1] The HID driver is the one that takes care of the mouse, the keyboard, etc.

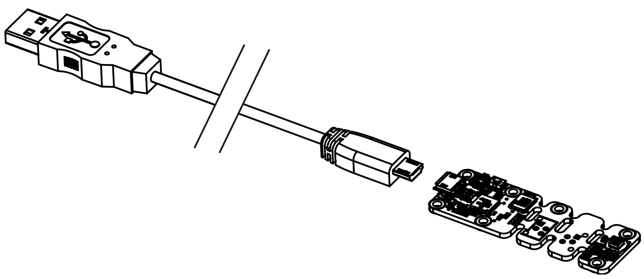
A USB 2.0 cable, type A-micro B

USB 2.0 connectors exist in three sizes: the "standard" size that you probably use to connect your printer, the very common mini size to connect small devices, and finally the micro size often used to connect mobile phones, as long as they do not exhibit an apple logo. All USB modules manufactured by Yoctopuce use micro size connectors.



The most common USB 2.0 connectors: A, B, Mini B, Micro A, Micro B[2]

To connect your Yocto-Meteo module to a computer, you need a USB 2.0 cable of type A-micro B. The price of this cable may vary a lot depending on the source, look for it under the name *USB 2.0 A to micro B Data cable*. Make sure not to buy a simple USB charging cable without data connectivity. The correct type of cable is available on the Yoctopuce shop.



You must plug in your Yocto-Meteo module with a USB 2.0 cable of type A - micro B

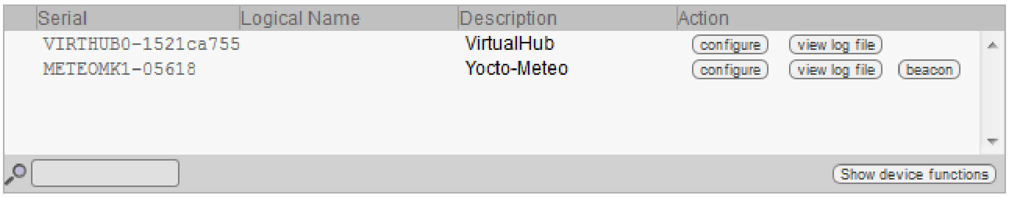
If you insert a USB hub between the computer and the Yocto-Meteo module, make sure to take into account the USB current limits. If you do not, be prepared to face unstable behaviors and unpredictable failures. You can find more details on this topic in the chapter about assembly and connections.

3.2. Testing USB connectivity

At this point, your Yocto-Meteo should be connected to your computer, which should have recognized it. It is time to make it work.

Go to the Yoctopuce web site and download the *Virtual Hub* software[3]. It is available for Windows, Linux, and Mac OS X. Normally, the Virtual Hub software serves as an abstraction layer for languages which cannot access the hardware layers of your computer. However, it also offers a succinct interface to configure your modules and to test their basic functions. You access this interface with a simple web browser[4]. Start the *Virtual Hub* software in a command line, open your preferred web browser and enter the URL *http://127.0.0.1:4444*. The list of the Yoctopuce modules connected to your computer is displayed.

[2] *Although they existed for some time, Mini A connectors are not available anymore http://www.usb.org/developers/Deprecation_Announcement_052507.pdf*
[3] www.yoctopuce.com/EN/virtualhub.php
[4] The interface is tested on Chrome, FireFox, Safari, Edge et IE 11.



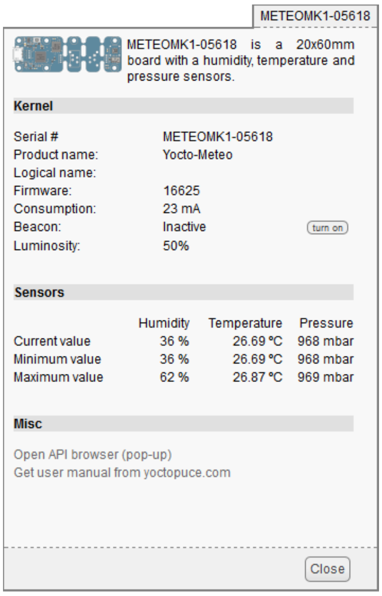
Module list as displayed in your web bowser

3.3. Localization

You can then physically localize each of the displayed modules by clicking on the **beacon** button. This puts the Yocto-led of the corresponding module in Yocto-beacon mode. It starts flashing, which allows you to easily localize it. The second effect is to display a little blue circle on the screen. You obtain the same behavior when pressing the Yocto-button of the module.

3.4. Test of the module

The first item to check is that your module is working well: click on the serial number corresponding to your module. This displays a window summarizing the properties of your Yocto-Meteo.

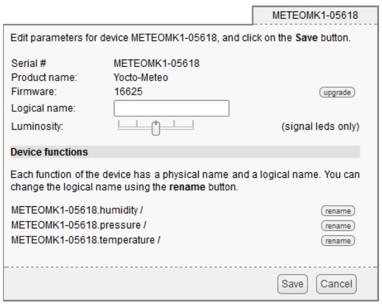


Properties of the Yocto-Meteo module

This window allows you, among other things, to play with your module to check that it is working properly. Indeed, humidity, pressure, and temperature values are displayed in real time.

3.5. Configuration

When, in the module list, you click on the **configure** button corresponding to your module, the configuration window is displayed.



Yocto-Meteo module configuration.

Firmware

The module firmware can easily be updated with the help of the interface. Firmware destined for Yoctopuce modules are available as .byn files and can be downloaded from the Yoctopuce web site.

To update a firmware, simply click on the **upgrade** button on the configuration window and follow the instructions. If the update fails for one reason or another, unplug and re-plug the module and start the update process again. This solves the issue in most cases. If the module was unplugged while it was being reprogrammed, it does probably not work anymore and is not listed in the interface. However, it is always possible to reprogram the module correctly by using the *Virtual Hub* software [5] in command line [6].

Logical name of the module

The logical name is a name that you choose, which allows you to access your module, in the same way a file name allows you to access its content. A logical name has a maximum length of 19 characters. Authorized characters are `A..Z`, `a..z`, `0..9`, `_`, and `-`. If you assign the same logical name to two modules connected to the same computer and you try to access one of them through this logical name, behavior is undetermined: you have no way of knowing which of the two modules answers.

Luminosity

This parameter allows you to act on the maximal intensity of the leds of the module. This enables you, if necessary, to make it a little more discreet, while limiting its power consumption. Note that this parameter acts on all the signposting leds of the module, including the Yocto-led. If you connect a module and no led turns on, it may mean that its luminosity was set to zero.

Logical names of functions

Each Yoctopuce module has a serial number and a logical name. In the same way, each function on each Yoctopuce module has a hardware name and a logical name, the latter can be freely chosen by the user. Using logical names for functions provides a greater flexibility when programming modules.

The Yocto-Meteo module possesses three functions: "humidity", "temperature", and "pressure". Simply click on the corresponding "rename" button to assign them a new logical name.

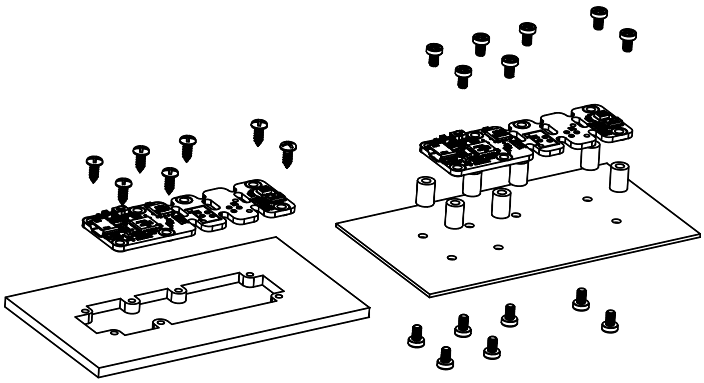
5 www.yoctopuce.com/EN/virtualhub.php
6 More information available in the virtual hub documentation

4. Assembly and connections

This chapter provides important information regarding the use of the Yocto-Meteo 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 module 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

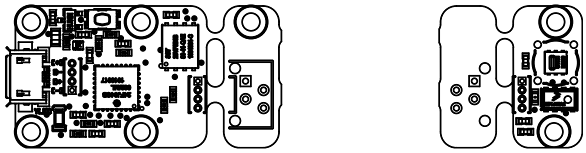
The Yocto-Meteo module contains 2.5mm assembly holes. You can use these holes for screws. The screw head diameter must not be larger than 4.5mm or they will damage the module circuits. Make sure that the lower surface of the module is not in contact with the support. We recommend using spacers, but other methods are possible. Nothing prevents you from fixing the module with a glue gun; it will not be good-looking, but it will hold.

If your intend to screw your module directly against a conducting part, for example a metallic frame, insert an isolating layer in between. Otherwise you are bound to induce a short circuit: there are naked pads under your module. Simple insulating tape should be enough.

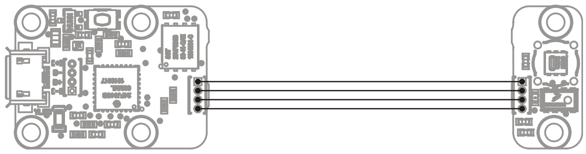
4.2. Moving the sensor away

The Yocto-Meteo module is designed so that you can split it into two parts, allowing you to move away the sensors from the command sub-module. You can split the module by simply breaking the circuit. However, you will obtain better results if you use a good pincer, or cutting pliers. When you have split the sub-modules, you can sandpaper the protruding parts without risk.

The Yocto-Meteo module is designed so that you can split it into two parts ...

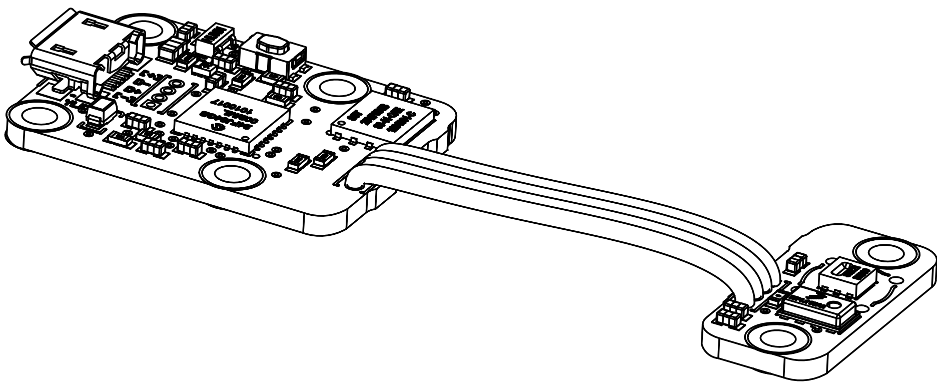


.. and you have two possibilities depending on the connection type you wish to use.



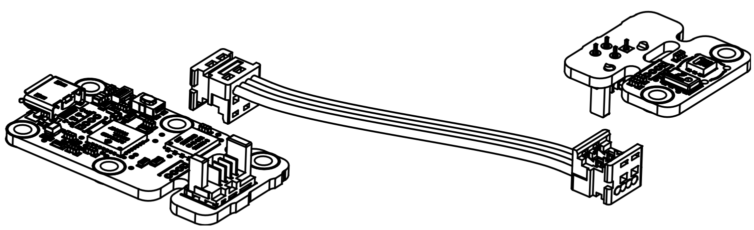
Wiring under the modules once separated.

Once the module is split into two, you must rewire the sub-modules. Several solutions are available. You can connect the sub-modules by soldering simple electric wires, but you will obtain a better result with 1.27 pitch ribbon cable. Consider using solid copper cables, rather than threaded ones: solid copper cables are somewhat less flexible, but much easier to solder.



Moving the sensors away with a simple ribbon cable.

You can also use a ribbon cable equipped with Picoflex connectors. You will obtain a slightly bigger system, but Picoflex headers are much easier to solder than ribbon cable. Moreover, the result can be disassembled.



Moving the sensors away with Picoflex connectors.

Make sure not to put the sensor part too close the main part: the heat emitted by the processor of the main part could influence your measures. Respect a distance of 3-4 centimeters.

Warning, divisible Yoctopuce modules very often have very similar connection systems. Nevertheless, sub-modules from different models are not all compatible. If you connect your Yocto-Meteo sub-module to another type of module such as a Yocto-Temperature for instance, it will not work, and you run a high risk of damaging your equipment.

4.3. USB power distribution

Although USB means *Universal Serial BUS*, USB devices are not physically organized as a flat bus but as a tree, using point-to-point connections. This has consequences on power distribution: to make it simple, every USB port must supply power to all devices directly or indirectly connected to it. And USB puts some limits.

In theory, a USB port provides 100mA, and may provide up to 500mA if available and requested by the device. In the case of a hub without external power supply, 100mA are available for the hub itself, and the hub should distribute no more than 100mA to each of its ports. This is it, and this is not much. In particular, it means that in theory, it is not possible to connect USB devices through two cascaded hubs without external power supply. In order to cascade hubs, it is necessary to use self-powered USB hubs, that provide a full 500mA to each subport.

In practice, USB would not have been as successful if it was really so picky about power distribution. As it happens, most USB hub manufacturers have been doing savings by not implementing current limitation on ports: they simply connect the computer power supply to every port, and declare themselves as *self-powered hub* even when they are taking all their power from the USB bus (in order to prevent any power consumption check in the operating system). This looks a bit dirty, but given the fact that computer USB ports are usually well protected by a hardware current limitation around 2000mA, it actually works in every day life, and seldom makes hardware damage.

What you should remember: if you connect Yoctopuce modules through one, or more, USB hub without external power supply, you have no safe-guard and you depend entirely on your computer manufacturer attention to provide as much current as possible on the USB ports, and to detect overloads before they lead to problems or to hardware damages. When modules are not provided enough current, they may work erratically and create unpredictable bugs. If you want to prevent any risk, do not cascade hubs without external power supply, and do not connect peripherals requiring more than 100mA behind a bus-powered hub.

In order to help you controlling and planning overall power consumption for your project, all Yoctopuce modules include a built-in current sensor that indicates (with 5mA precision) the consumption of the module on the USB bus.

Note also that the USB cable itself may also cause power supply issues, in particular when the wires are too thin or when the cable is too long [1]. Good cables are usually made using AWG 26 or AWG 28 wires for data lines and AWG 24 wires for power.

4.4. Electromagnetic compatibility (EMI)

Connection methods to integrate the Yocto-Meteo obviously have an impact on the system overall electromagnetic emissions, and therefore also impact the conformity with international standards.

When we perform reference measurements to validate the conformity of our products with IEC CISPR 11, we do not use any enclosure but connect the devices using a shielded USB cable, compliant with USB 2.0 specifications: the cable shield is connected to both connector shells, and the total resistance from shell to shell is under 0.6Ω. The USB cable length is 3m, in order to expose one meter horizontally, one meter vertically and keep the last meter close to the host computer within a ferrite bead.

If you use a non-shielded USB cable, or an improperly shielded cable, your system will work perfectly well but you may not remain in conformity with the emission standard. If you are building a system made of multiple devices connected using 1.27mm pitch connectors, or with a sensor moved away from the device CPU, you can generally recover the conformity by using a metallic enclosure acting as an external shield.

Still on the topic of electromagnetic compatibility, the maximum supported length of the USB cable is 3m. In addition to the voltage drop issue mentionned above, using longer wires would require to run extra tests to assert compatibility with the electromagnetic immunity standards.

[1] www.yoctopuce.com/EN/article/usb-cables-size-matters

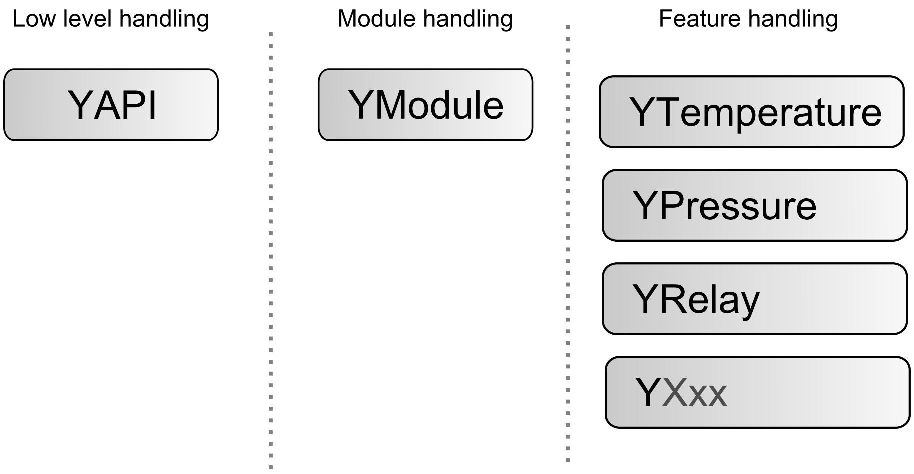
5. Programming, general concepts

The Yoctopuce API was designed to be at the same time simple to use and sufficiently generic for the concepts used to be valid for all the modules in the Yoctopuce range, and this in all the available programming languages. Therefore, when you have understood how to drive your Yocto-Meteo with your favorite programming language, learning to use another module, even with a different language, will most likely take you only a minimum of time.

5.1. Programming paradigm

The Yoctopuce API is object oriented. However, for simplicity's sake, only the basics of object programming were used. Even if you are not familiar with object programming, it is unlikely that this will be a hinderance for using Yoctopuce products. Note that you will never need to allocate or deallocate an object linked to the Yoctopuce API: it is automatically managed.

There is one class per Yoctopuce function type. The name of these classes always starts with a Y followed by the name of the function, for example *YTemperature*, *YRelay*, *YPressure*, etc.. There is also a *YModule* class, dedicated to managing the modules themselves, and finally there is the static YAPI class, that supervises the global workings of the API and manages low level communications.



Structure of the Yoctopuce API.

The YSensor class

Each Yoctopuce sensor function has its dedicated class: YTemperature to measure the temperature, YVoltage to measure a voltage, YRelay to drive a relay, etc. However there is a special class that can do more: YSensor.

The YSensor class is the parent class for all Yoctopuce sensors, and can provide access to any sensor, regardless of its type. It includes methods to access all common functions. This makes it easier to create applications that use many different sensors. Moreover, if you create an application based on YSensor, it will work with all Yoctopuce sensors, even those which do no yet exist.

Programmation

In the Yoctopuce API, priority was put on the ease of access to the module functions by offering the possibility to make abstractions of the modules implementing them. Therefore, it is quite possible to work with a set of functions without ever knowing exactly which module are hosting them at the hardware level. This tremendously simplifies programming projects with a large number of modules.

From the programming stand point, your Yocto-Meteo is viewed as a module hosting a given number of functions. In the API, these functions are objects which can be found independently, in several ways.

Access to the functions of a module

Access by logical name
Each function can be assigned an arbitrary and persistent logical name: this logical name is stored in the flash memory of the module, even if this module is disconnected. An object corresponding to an *Xxx* function to which a logical name has been assigned can then be directly found with this logical name and the *YXxx.FindXxx* method. Note however that a logical name must be unique among all the connected modules.

Access by enumeration
You can enumerate all the functions of the same type on all the connected modules with the help of the classic enumeration functions *FirstXxx* and *nextXxxx* available for each *YXxx* class.

Access by hardware name
Each module function has a hardware name, assigned at the factory and which cannot be modified. The functions of a module can also be found directly with this hardware name and the *YXxx.FindXxx* function of the corresponding class.

Difference between *Find* and *First*
The *YXxx.FindXxxx* and *YXxx.FirstXxxx* methods do not work exactly the same way. If there is no available module, *YXxx.FirstXxxx* returns a null value. On the opposite, even if there is no corresponding module, *YXxx.FindXxxx* returns a valid object, which is not online but which could become so if the corresponding module is later connected.

Function handling

When the object corresponding to a function is found, its methods are available in a classic way. Note that most of these subfunctions require the module hosting the function to be connected in order to be handled. This is generally not guaranteed, as a USB module can be disconnected after the control software has started. The *isOnline* method, available in all the classes, is then very helpful.

Access to the modules

Even if it is perfectly possible to build a complete project while making a total abstraction of which function is hosted on which module, the modules themselves are also accessible from the API. In fact, they can be handled in a way quite similar to the functions. They are assigned a serial number at the factory which allows you to find the corresponding object with *YModule.Find()*. You can also assign arbitrary logical names to the modules to make finding them easier. Finally, the *YModule* class contains the *YModule.FirstModule()* and *nextModule()* enumeration methods allowing you to list the connected modules.

Functions/Module interaction

From the API standpoint, the modules and their functions are strongly uncorrelated by design. Nevertheless, the API provides the possibility to go from one to the other. Thus, the *get_module()* method, available for each function class, allows you to find the object corresponding to the module hosting this function. Inversely, the *YModule* class provides several methods allowing you to enumerate the functions available on a module.

5.2. The Yocto-Meteo module

The Yocto-Meteo module provides one instance of the Humidity function, corresponding to the humidity sensor, one instance of the Pressure function corresponding to the pressure sensor, and one instance of the Temperature function, corresponding to the temperature sensor. The accuracy of the pressure sensor is 1 millibar, the accuracy of the humidity sensor is approximately 2 %RH, and the accuracy of the temperature sensor is 0.25 degrees Celsius.

module : Module

attribute	type	modifiable ?
productName	String	read-only
serialNumber	String	read-only
logicalName	String	modifiable
productId	Hexadecimal number	read-only
productRelease	Hexadecimal number	read-only
firmwareRelease	String	read-only
persistentSettings	Enumerated	modifiable
luminosity	0..100%	modifiable
beacon	On/Off	modifiable
upTime	Time	read-only
usbCurrent	Used current (mA)	read-only
rebootCountdown	Integer	modifiable
userVar	Integer	modifiable

humidity : Humidity

attribute	type	modifiable ?
logicalName	String	modifiable
advertisedValue	String	modifiable
unit	String	modifiable
currentValue	Fixed-point number	read-only
lowestValue	Fixed-point number	modifiable
highestValue	Fixed-point number	modifiable
currentRawValue	Fixed-point number	read-only
logFrequency	Frequency	modifiable
reportFrequency	Frequency	modifiable
advMode	Enumerated	modifiable
calibrationParam	Calibration parameters	modifiable
resolution	Fixed-point number	modifiable
sensorState	Integer	read-only
relHum	Fixed-point number	read-only
absHum	Fixed-point number	read-only

pressure : Pressure

attribute	type	modifiable ?
logicalName	String	modifiable
advertisedValue	String	modifiable
unit	String	read-only
currentValue	Fixed-point number	read-only
lowestValue	Fixed-point number	modifiable
highestValue	Fixed-point number	modifiable
currentRawValue	Fixed-point number	read-only

logFrequency	Frequency	modifiable
reportFrequency	Frequency	modifiable
advMode	Enumerated	modifiable
calibrationParam	Calibration parameters	modifiable
resolution	Fixed-point number	modifiable
sensorState	Integer	read-only

temperature : Temperature

attribute	type	modifiable ?
logicalName	String	modifiable
advertisedValue	String	modifiable
unit	String	modifiable
currentValue	Fixed-point number	read-only
lowestValue	Fixed-point number	modifiable
highestValue	Fixed-point number	modifiable
currentRawValue	Fixed-point number	read-only
logFrequency	Frequency	modifiable
reportFrequency	Frequency	modifiable
advMode	Enumerated	modifiable
calibrationParam	Calibration parameters	modifiable
resolution	Fixed-point number	modifiable
sensorState	Integer	read-only
sensorType	Enumerated	modifiable
signalValue	Fixed-point number	read-only
signalUnit	String	read-only
command	String	modifiable

dataLogger : DataLogger

attribute	type	modifiable ?
logicalName	String	modifiable
advertisedValue	String	modifiable
currentRunIndex	Integer	read-only
timeUTC	UTC time	modifiable
recording	Enumerated	modifiable
autoStart	On/Off	modifiable
beaconDriven	On/Off	modifiable
clearHistory	Boolean	modifiable

5.3. Module control interface

This interface is identical for all Yoctopuce USB modules. It can be used to control the module global parameters, and to enumerate the functions provided by each module.

productName

Character string containing the commercial name of the module, as set by the factory.

serialNumber

Character string containing the serial number, unique and programmed at the factory. For a Yocto-Meteo module, this serial number always starts with METEOMK1. You can use the serial number to access a given module by software.

logicalName

Character string containing the logical name of the module, initially empty. This attribute can be modified at will by the user. Once initialized to an non-empty value, it can be used to access a given module. If two modules with the same logical name are in the same project, there is no way to determine which one answers when one tries accessing by logical name. The logical name is limited to 19 characters among `A..Z`,`a..z`,`0..9`,`_`, and `-`.

productId

USB device identifier of the module, preprogrammed to 24 at the factory.

productRelease

Release number of the module hardware, preprogrammed at the factory.

firmwareRelease

Release version of the embedded firmware, changes each time the embedded software is updated.

persistentSettings

State of persistent module settings: loaded from flash memory, modified by the user or saved to flash memory.

luminosity

Lighting strength of the informative leds (e.g. the Yocto-Led) contained in the module. It is an integer value which varies between 0 (leds turned off) and 100 (maximum led intensity). The default value is 50. To change the strength of the module leds, or to turn them off completely, you only need to change this value.

beacon

Activity of the localization beacon of the module.

upTime

Time elapsed since the last time the module was powered on.

usbCurrent

Current consumed by the module on the USB bus, in milli-amps.

rebootCountdown

Countdown to use for triggering a reboot of the module.

userVar

32bit integer variable available for user storage.

5.4. Humidity function interface

The Yoctopuce class YHumidity allows you to read and configure Yoctopuce humidity sensors. It inherits from YSensor class the core functions to read measurements, to register callback functions, to access the autonomous datalogger.

logicalName

Character string containing the logical name of the humidity sensor, initially empty. This attribute can be modified at will by the user. Once initialized to an non-empty value, it can be used to access the humidity sensor directly. If two humidity sensors with the same logical name are used in the same project, there is no way to determine which one answers when one tries accessing by logical name. The logical name is limited to 19 characters among `A..Z`,`a..z`,`0..9`,`_`, and `-`.

advertisedValue

Short character string summarizing the current state of the humidity sensor, that is automatically advertised up to the parent hub. For a humidity sensor, the advertised value is the current value of the humidity.

unit
Short character string representing the measuring unit for the humidity.

currentValue
Current value of the humidity, in %RH, as a floating point number.

lowestValue
Minimal value of the humidity, in %RH, as a floating point number.

highestValue
Maximal value of the humidity, in %RH, as a floating point number.

currentRawValue
Uncalibrated, unrounded raw value returned by the sensor, as a floating point number.

logFrequency
Datalogger recording frequency, or "OFF" when measures should not be stored in the data logger flash memory.

reportFrequency
Timed value notification frequency, or "OFF" when timed value notifications are disabled for this function.

advMode
Measuring mode for the advertised value pushed to the parent hub.

calibrationParam
Extra calibration parameters (for instance to compensate for the effects of an enclosure), as an array of 16 bit words.

resolution
Measure resolution (i.e. precision of the numeric representation, not necessarily of the measure itself).

sensorState
Sensor health state (zero when a current measure is available).

relHum
Current relative humidity, in per cents.

absHum
Current absolute humidity, in grams per cubic meter of air.

5.5. Pressure function interface

The Yoctopuce class YPressure allows you to read and configure Yoctopuce pressure sensors. It inherits from YSensor class the core functions to read measurements, to register callback functions, to access the autonomous datalogger.

logicalName

Character string containing the logical name of the pressure sensor, initially empty. This attribute can be modified at will by the user. Once initialized to an non-empty value, it can be used to access the pressure sensor directly. If two pressure sensors with the same logical name are used in the same project, there is no way to determine which one answers when one tries accessing by logical name. The logical name is limited to 19 characters among `A..Z`,`a..z`,`0..9`,`_`, and `-`.

advertisedValue

Short character string summarizing the current state of the pressure sensor, that is automatically advertised up to the parent hub. For a pressure sensor, the advertised value is the current value of the pressure.

unit

Short character string representing the measuring unit for the pressure.

currentValue

Current value of the pressure, in millibar (hPa), as a floating point number.

lowestValue

Minimal value of the pressure, in millibar (hPa), as a floating point number.

highestValue

Maximal value of the pressure, in millibar (hPa), as a floating point number.

currentRawValue

Uncalibrated, unrounded raw value returned by the sensor, as a floating point number.

logFrequency

Datalogger recording frequency, or "OFF" when measures should not be stored in the data logger flash memory.

reportFrequency

Timed value notification frequency, or "OFF" when timed value notifications are disabled for this function.

advMode

Measuring mode for the advertised value pushed to the parent hub.

calibrationParam

Extra calibration parameters (for instance to compensate for the effects of an enclosure), as an array of 16 bit words.

resolution

Measure resolution (i.e. precision of the numeric representation, not necessarily of the measure itself).

sensorState

Sensor health state (zero when a current measure is available).

5.6. Temperature function interface

The Yoctopuce class YTemperature allows you to read and configure Yoctopuce temperature sensors. It inherits from YSensor class the core functions to read measurements, to register callback functions, to access the autonomous datalogger. This class adds the ability to configure some specific parameters for some sensors (connection type, temperature mapping table).

logicalName

Character string containing the logical name of the temperature sensor, initially empty. This attribute can be modified at will by the user. Once initialized to an non-empty value, it can be used to access the temperature sensor directly. If two temperature sensors with the same logical name are used in the same project, there is no way to determine which one answers when one tries accessing by logical name. The logical name is limited to 19 characters among `A..Z`,`a..z`,`0..9`,`_`, and `-`.

advertisedValue

Short character string summarizing the current state of the temperature sensor, that is automatically advertised up to the parent hub. For a temperature sensor, the advertised value is the current value of the temperature.

unit

Short character string representing the measuring unit for the temperature.

currentValue

Current value of the temperature, in Celsius, as a floating point number.

lowestValue

Minimal value of the temperature, in Celsius, as a floating point number.

highestValue

Maximal value of the temperature, in Celsius, as a floating point number.

currentRawValue

Uncalibrated, unrounded raw value returned by the sensor, as a floating point number.

logFrequency

Datalogger recording frequency, or "OFF" when measures should not be stored in the data logger flash memory.

reportFrequency

Timed value notification frequency, or "OFF" when timed value notifications are disabled for this function.

advMode

Measuring mode for the advertised value pushed to the parent hub.

calibrationParam

Extra calibration parameters (for instance to compensate for the effects of an enclosure), as an array of 16 bit words.

resolution

Measure resolution (i.e. precision of the numeric representation, not necessarily of the measure itself).

sensorState

Sensor health state (zero when a current measure is available).

sensorType

Thermal sensor type used in the device, this can be a digital sensor, a specific type for a thermocouple, a PT100 or a thermistor.

signalValue

Current value of the electrical signal measured by the sensor (except for digital sensors) as a floating point number.

signalUnit

Short character string representing the measuring unit of the electrical signal used by the sensor.

command

Magic attribute used to setup physical sensor parameters.

5.7. DataLogger function interface

Yoctopuce sensors include a non-volatile memory capable of storing ongoing measured data automatically, without requiring a permanent connection to a computer. The DataLogger function controls the global parameters of the internal data logger.

logicalName

Character string containing the logical name of the data logger, initially empty. This attribute can be modified at will by the user. Once initialized to an non-empty value, it can be used to access the data logger directly. If two data loggers with the same logical name are used in the same project, there is no way to determine which one answers when one tries accessing by logical name. The logical name is limited to 19 characters among `A..Z`,`a..z`,`0..9`,`_`, and `-`.

advertisedValue

Short character string summarizing the current state of the data logger, that is automatically advertised up to the parent hub. For a data logger, the advertised value is its recording state (ON or OFF).

currentRunIndex

Current run number, corresponding to the number of time the module was powered on with the dataLogger enabled at some point.

timeUTC

Current UTC time, in case it is desirable to bind an absolute time reference to the data stored by the data logger. This time must be set up by software.

recording

Activation state of the data logger. The data logger can be enabled and disabled at will, using this attribute, but its state on power on is determined by the **autoStart** persistent attribute. When the datalogger is enabled but not yet ready to record data, its state is set to PENDING.

autoStart

Automatic start of the data logger on power on. Setting this attribute ensures that the data logger is always turned on when the device is powered up, without need for a software command.

beaconDriven

Synchronize the sate of the localization beacon and the state of the data logger. If this attribute is set, it is possible to start the recording with the Yocto-button or the attribute `beacon` of the function YModule. In the same way, if the attribute `recording` is changed, the sate of the localization beacon is updated. Note: when this attribute is set the localization beacon pulses slower than usual.

clearHistory

Attribute that can be set to true to clear recorded data.

5.8. Programming, where to start?

At this point of the user's guide, you should know the main theoretical points of your Yocto-Meteo. It is now time to practice. You must download the Yoctopuce library for your favorite programming language from the Yoctopuce web site[1]. Then skip directly to the chapter corresponding to the chosen programming language.

All the examples described in this guide are available in the programming libraries. For some languages, the libraries also include some complete graphical applications, with their source code.

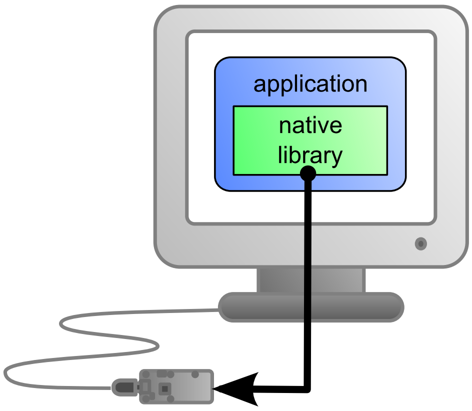
When you have mastered the basic programming of your module, you can turn to the chapter on advanced programming that describes some techniques that will help you make the most of your Yocto-Meteo.

5.9. What interface: Native, DLL or Service ?

There are several methods to control you Yoctopuce module by software.

Native control

In this case, the software driving your project is compiled directly with a library which provides control of the modules. Objectively, it is the simplest and most elegant solution for the end user. The end user then only needs to plug the USB cable and run your software for everything to work. Unfortunately, this method is not always available or even possible.



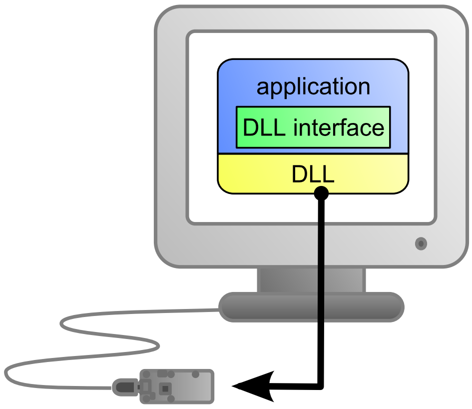
The application uses the native library to control the locally connected module

Native control by DLL

Here, the main part of the code controlling the modules is located in a DLL. The software is compiled with a small library which provides control of the DLL. It is the fastest method to code module support in a given language. Indeed, the "useful" part of the control code is located in the DLL which is the same for all languages: the effort to support a new language is limited to coding the small library which controls the DLL. From the end user stand point, there are few differences: one must simply

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

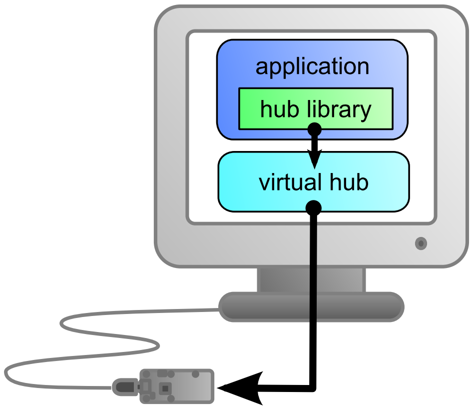
make sure that the DLL is installed on the end user's computer at the same time as the main software.



The application uses the DLL to natively control the locally connected module

Control by service

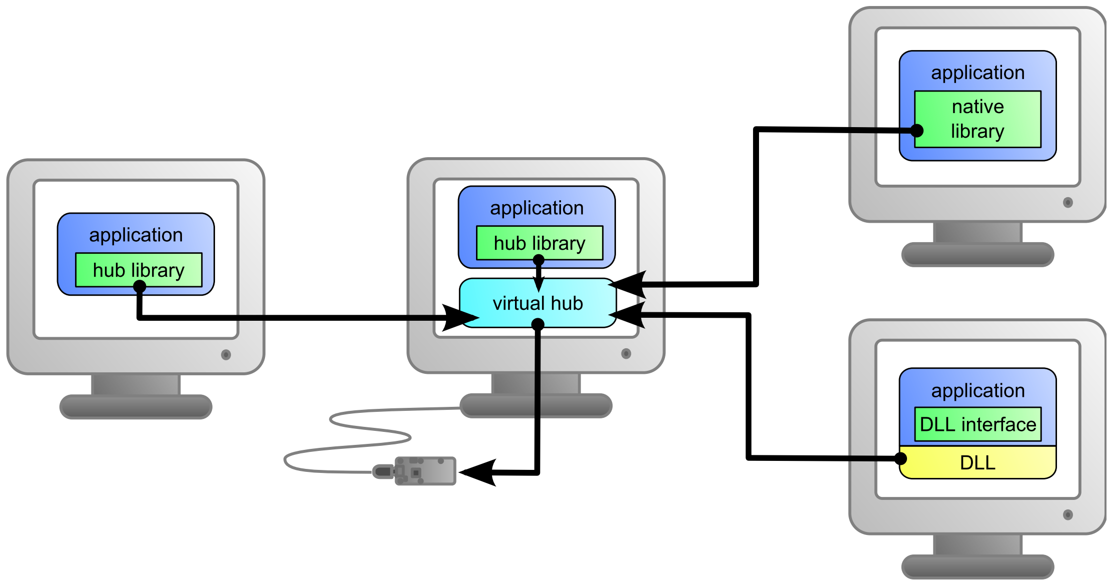
Some languages do simply not allow you to easily gain access to the hardware layers of the machine. It is the case for Javascript, for instance. To deal with this case, Yoctopuce provides a solution in the form of a small piece of software called *VirtualHub*[2]. It can access the modules, and your application only needs to use a library which offers all necessary functions to control the modules via this VirtualHub. The end users will have to start the VirtualHub before running the project control software itself, unless they decide to install the hub as a service/deamon, in which case the VirtualHub starts automatically when the machine starts up.



The application connects itself to the VirtualHub to gain access to the module

The service control method comes with a non-negligible advantage: the application does not need to run on the machine on which the modules are connected. The application can very well be located on another machine which connects itself to the service to drive the modules. Moreover, the native libraries and DLL mentioned above are also able to connect themselves remotely to one or several machines running VirtualHub.

[2] www.yoctopuce.com/EN/virtualhub.php



When a VirtualHub is used, the control application does not need to reside on the same machine as the module.

Whatever the selected programming language and the control paradigm used, programming itself stays strictly identical. From one language to another, functions bear exactly the same name, and have the same parameters. The only differences are linked to the constraints of the languages themselves.

Language	Native	Native with DLL	Virtual hub
C++	✔	✔	✔
Objective-C	✔	-	✔
Delphi	-	✔	✔
Python	-	✔	✔
VisualBasic .Net	-	✔	✔
C# .Net	-	✔	✔
C# UWP	✔	-	✔
EcmaScript / JavaScript	-	-	✔
PHP	-	-	✔
Java	-	✔	✔
Java for Android	✔	-	✔
Command line	✔	-	✔

Support methods for different languages

Limitations of the Yoctopuce libraries

Natives et DLL libraries have a technical limitation. On the same computer, you cannot concurrently run several applications accessing Yoctopuce devices directly. If you want to run several projects on the same computer, make sure your control applications use Yoctopuce devices through a *VirtualHub* software. The modification is trivial: it is just a matter of parameter change in the `yRegisterHub()` call.

5.10. Programming, where to start?

At this point of the user's guide, you should know the main theoretical points of your Yocto-Meteo. It is now time to practice. You must download the Yoctopuce library for your favorite programming language from the Yoctopuce web site[3]. Then skip directly to the chapter corresponding to the chosen programming language.

All the examples described in this guide are available in the programming libraries. For some languages, the libraries also include some complete graphical applications, with their source code.

When you have mastered the basic programming of your module, you can turn to the chapter on advanced programming that describes some techniques that will help you make the most of your Yocto-Meteo.

3 http://www.yoctopuce.com/EN/libraries.php

6. Using the Yocto-Meteo in command line

When you want to perform a punctual operation on your Yocto-Meteo, such as reading a value, assigning a logical name, and so on, you can obviously use the Virtual Hub, but there is a simpler, faster, and more efficient method: the command line API.

The command line API is a set of executables, one by type of functionality offered by the range of Yoctopuce products. These executables are provided pre-compiled for all the Yoctopuce officially supported platforms/OS. Naturally, the executable sources are also provided[1].

6.1. Installing

Download the command line API[2]. You do not need to run any setup, simply copy the executables corresponding to your platform/OS in a directory of your choice. You may add this directory to your PATH variable to be able to access these executables from anywhere. You are all set, you only need to connect your Yocto-Meteo, open a shell, and start working by typing for example:

```
C:\>YTemperature any get_currentValue
```

To use the command API on Linux, you need either have root privileges or to define an *udev* rule for your system. See the *Troubleshooting* chapter for more details.

6.2. Use: general description

All the command line API executables work on the same principle. They must be called the following way

```
C:\>Executable [options] [target] command [parameter]
```

`[options]` manage the global workings of the commands, they allow you, for instance, to pilot a module remotely through the network, or to force the module to save its configuration after executing the command.

`[target]` is the name of the module or of the function to which the command applies. Some very generic commands do not need a target. You can also use the aliases "*any*" and "*all*", or a list of names separated by comas without space.

[1] If you want to recompile the command line API, you also need the C++ API.
[2] http://www.yoctopuce.com/EN/libraries.php

`command` is the command you want to run. Almost all the functions available in the classic programming APIs are available as commands. You need to respect neither the case nor the underlined characters in the command name.

`[parameters]` logically are the parameters needed by the command.

At any time, the command line API executables can provide a rather detailed help. Use for instance:

```
C:\>executable /help
```

to know the list of available commands for a given command line API executable, or even:

```
C:\>executable command /help
```

to obtain a detailed description of the parameters of a command.

6.3. Control of the Humidity function

To control the Humidity function of your Yocto-Meteo, you need the YHumidity executable file.

For instance, you can launch:

```
C:\>YTemperature any get_currentValue
```

This example uses the "*any*" target to indicate that we want to work on the first Humidity function found among all those available on the connected Yoctopuce modules when running. This prevents you from having to know the exact names of your function and of your module.

But you can use logical names as well, as long as you have configured them beforehand. Let us imagine a Yocto-Meteo module with the *METEOMK1-123456* serial number which you have called "*MyModule*", and its humidity function which you have renamed "*MyFunction*". The five following calls are strictly equivalent (as long as *MyFunction* is defined only once, to avoid any ambiguity).

```
C:\>YHumidity METEOMK1-123456.humidity describe

C:\>YHumidity METEOMK1-123456.MyFunction describe

C:\>YHumidity MyModule.humidity describe

C:\>YHumidity MyModule.MyFunction describe

C:\>YHumidity MyFunction describe
```

To work on all the Humidity functions at the same time, use the "*all*" target.

```
C:\>YHumidity all describe
```

For more details on the possibilities of the `YHumidity` executable, use:

```
C:\>YHumidity /help
```

6.4. Control of the module part

Each module can be controlled in a similar way with the help of the `YModule` executable. For example, to obtain the list of all the connected modules, use:

```
C:\>YModule inventory
```

You can also use the following command to obtain an even more detailed list of the connected modules:

```
C:\>YModule all describe
```

Each xxx property of the module can be obtained thanks to a command of the get_xxxx() type, and the properties which are not read only can be modified with the set_xxx() command. For example:

```
C:\>YModule METEOMK1-12346 set_logicalName MonPremierModule

C:\>YModule METEOMK1-12346 get_logicalName
```

Changing the settings of the module

When you want to change the settings of a module, simply use the corresponding set_xxx command. However, this change happens only in the module RAM: if the module restarts, the changes are lost. To store them permanently, you must tell the module to save its current configuration in its nonvolatile memory. To do so, use the saveToFlash command. Inversely, it is possible to force the module to forget its current settings by using the revertFromFlash method. For example:

```
C:\>YModule METEOMK1-12346 set_logicalName MonPremierModule
C:\>YModule METEOMK1-12346 saveToFlash
```

Note that you can do the same thing in a single command with the -s option.

```
C:\>YModule -s  METEOMK1-12346 set_logicalName MonPremierModule
```

Warning: the number of write cycles of the nonvolatile memory of the module is limited. When this limit is reached, nothing guaranties that the saving process is performed correctly. This limit, linked to the technology employed by the module micro-processor, is located at about 100000 cycles. In short, you can use the saveToFlash() function only 100000 times in the life of the module. Make sure you do not call this function within a loop.

6.5. Limitations

The command line API has the same limitation than the other APIs: there can be only one application at a given time which can access the modules natively. By default, the command line API works in native mode.

You can easily work around this limitation by using a Virtual Hub: run the VirtualHub[3] on the concerned machine, and use the executables of the command line API with the -r option. For example, if you use:

```
C:\>YModule  inventory
```

you obtain a list of the modules connected by USB, using a native access. If another command which accesses the modules natively is already running, this does not work. But if you run a Virtual Hub, and you give your command in the form:

```
C:\>YModule -r 127.0.0.1 inventory
```

it works because the command is not executed natively anymore, but through the Virtual Hub. Note that the Virtual Hub counts as a native application.

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

7. Using Yocto-Meteo with JavaScript / EcmaScript

EcmaScript is the official name of the standardized version of the web-oriented programming language commonly referred to as *JavaScript*. This Yoctopuce library take advantages of advanced features introduced in EcmaScript 2017. It has therefore been named *Library for JavaScript / EcmaScript 2017* to differentiate it from the previous *Library for JavaScript*, now deprecated in favor of this new version.

This library provides access to Yoctopuce devices for modern JavaScript engines. It can be used within a browser as well as with Node.js. The library will automatically detect upon initialization whether the runtime environment is a browser or a Node.js virtual machine, and use the most appropriate system libraries accordingly.

Asynchronous communication with the devices is handled across the whole library using Promise objects, leveraging the new EcmaScript 2017 `async` / `await` non-blocking syntax for asynchronous I/O (see below). This syntax is now available out-of-the-box in most Javascript engines. No transpilation is needed: no Babel, no jspm, just plain Javascript. Here is your favorite engines minimum version needed to run this code. All of them are officially released at the time we write this document.

- Node.js v7.6 and later
- Firefox 52
- Opera 42 (incl. Android version)
- Chrome 55 (incl. Android version)
- Safari 10.1 (incl. iOS version)
- Android WebView 55
- Google V8 Javascript engine v5.5

If you need backward-compatibility with older releases, you can always run Babel to transpile your code and the library to older standards, as described a few paragraphs below.

We don't suggest using `jspm 0.17` anymore since that tool is still in Beta after 18 month, and having to use an extra tool to implement our library is pointless now that `async` / `await` are part of the standard.

7.1. Blocking I/O versus Asynchronous I/O in JavaScript

JavaScript is single-threaded by design. That means, if a program is actively waiting for the result of a network-based operation such as reading from a sensor, the whole program is blocked. In browser environments, this can even completely freeze the user interface. For this reason, the use of blocking I/O in JavaScript is strongly discouraged nowadays, and blocking network APIs are getting deprecated everywhere.

Instead of using parallel threads, JavaScript relies on asynchronous I/O to handle operations with a possible long timeout: whenever a long I/O call needs to be performed, it is only triggered and but then the code execution flow is terminated. The JavaScript engine is therefore free to handle other pending tasks, such as UI. Whenever the pending I/O call is completed, the system invokes a callback function with the result of the I/O call to resume execution of the original execution flow.

When used with plain callback functions, as pervasive in Node.js libraries, asynchronous I/O tend to produce code with poor readability, as the execution flow is broken into many disconnected callback functions. Fortunately, new methods have emerged recently to improve that situation. In particular, the use of *Promise* objects to abstract and work with asynchronous tasks helps a lot. Any function that makes a long I/O operation can return a *Promise*, which can be used by the caller to chain subsequent operations in the same flow. Promises are part of EcmaScript 2015 standard.

Promise objects are good, but what makes them even better is the new `async` / `await` keywords to handle asynchronous I/O:

- a function declared *async* will automatically encapsulate its result as a Promise
- within an *async* function, any function call prefixed with by *await* will chain the Promise returned by the function with a promise to resume execution of the caller
- any exception during the execution of an *async* function will automatically invoke the Promise failure continuation

Long story made short, *async* and *await* make it possible to write EcmaScript code with all benefits of asynchronous I/O, but without breaking the code flow. It is almost like multi-threaded execution, except that control switch between pending tasks only happens at places where the *await* keyword appears.

We have therefore chosen to write our new EcmaScript library using Promises and *async* functions, so that you can use the friendly *await* syntax. To keep it easy to remember, **all public methods** of the EcmaScript library **are *async***, i.e. return a Promise object, **except**:

- `GetTickCount()`, because returning a time stamp asynchronously does not make sense...
- `FindModule()`, `FirstModule()`, `nextModule()`, ... because device detection and enumeration always work on internal device lists handled in background, and does not require immediate asynchronous I/O.

7.2. Using Yoctopuce library for JavaScript / EcmaScript 2017

JavaScript is one of those languages which do not generally allow you to directly access the hardware layers of your computer. Therefore the library can only be used to access network-enabled devices (connected through a YoctoHub), or USB devices accessible through Yoctopuce TCP/IP to USB gateway, named *VirtualHub*.

Go to the Yoctopuce web site and download the following items:

- The Javascript / EcmaScript 2017 programming library[1]
- The VirtualHub software[2] for Windows, Mac OS X or Linux, depending on your OS

Extract the library files in a folder of your choice, you will find many of examples in it. Connect your modules and start the VirtualHub software. You do not need to install any driver.

Using the official Yoctopuce library for node.js

Start by installing the latest Node.js version (v7.6 or later) on your system. It is very easy. You can download it from the official web site: http://nodejs.org. Make sure to install it fully, including npm, and add it to the system path.

[1] www.yoctopuce.com/EN/libraries.php
[2] www.yoctopuce.com/EN/virtualhub.php

To give it a try, go into one of the example directory (for instance example_nodejs/Doc-Inventory). You will see that it include an application description file (package.json) and a source file (demo.js). To download and setup the libraries needed by this example, just run:

```
npm install
```

Once done, you can start the example file using:

```
node demo.js
```

Using a local copy of the Yoctopuce library with node.js

If for some reason you need to make changes to the Yoctopuce library, you can easily configure your project to use the local copy in the `lib/` subdirectory rather than the official npm package. In order to do so, simply type the following command in your project directory:

```
npm link ../../lib
```

Using the Yoctopuce library within a browser (HTML)

For HTML examples, it is even simpler: there is nothing to install. Each example is a single HTML file that you can open in a browser to try it. In this context, loading the Yoctopuce library is no different from any standard HTML script include tag.

Using the Yoctoluce library on older JavaScript engines

If you need to run this library on older JavaScript engines, you can use Babel[3] to transpile your code and the library into older JavaScript standards. To install Babel with typical settings, simply use:

```
npm instal -g babel-cli
npm instal babel-preset-env
```

You would typically ask Babel to put the transpiled files in another directory, named `compat` for instance. Your files and all files of the Yoctopuce library should be transpiled, as follow:

```
babel --presets env demo.js --out-dir compat/
babel --presets env ../../lib --out-dir compat/
```

Although this approach is based on node.js toolchain, it actually works as well for transpiling JavaScript files for use in a browser. The only thing that you cannot do so easily is transpiling JavaScript code embedded directly in an HTML page. You have to use an external script file for using EcmaScript 2017 syntax with Babel.

Babel has many smart features, such as a watch mode that will automatically refresh transpiled files whenever the source file is changed, but this is beyond the scope of this note. You will find more in Babel documentation.

Backward-compatibility with the old JavaScript library

This new library is not fully backward-compatible with the old JavaScript library, because there is no way to transparently map the old blocking API to the new asynchronous API. The method names however are the same, and old synchronous code can easily be made asynchronous just by adding the proper `await` keywords before the method calls. For instance, simply replace:

```
beaconState = module.get_beacon();
```

by

[3] http://babeljs.io

```
beaconState = await module.get_beacon();
```

Apart from a few exceptions, most `XXX_async` redundant methods have been removed as well, as they would have introduced confusion on the proper way of handling asynchronous behaviors. It is however very simple to get an *async* method to invoke a callback upon completion, using the returned Promise object. For instance, you can replace:

```
module.get_beacon_async(callback, myContext);
```

by

```
module.get_beacon().then(function(res) { callback(myContext, module, res); });
```

In some cases, it might be desirable to get a sensor value using a method identical to the old synchronous methods (without using Promises), even if it returns a slightly outdated cached value since I/O is not possible. For this purpose, the EcmaScript library introduce new classes called *synchronous proxies*. A synchronous proxy is an object that mirrors the most recent state of the connected class, but can be read using regular synchronous function calls. For instance, instead of writing:

```
async function logInfo(module)
{
    console.log('Name: '+await module.get_logicalName());
    console.log('Beacon: '+await module.get_beacon());
}

...
logInfo(myModule);
...
```

you can use:

```
function logInfoProxy(moduleSyncProxy)
{
    console.log('Name: '+moduleProxy.get_logicalName());
    console.log('Beacon: '+moduleProxy.get_beacon());
}

logInfoSync(await myModule.get_syncProxy());
```

You can also rewrite this last asynchronous call as:

```
myModule.get_syncProxy().then(logInfoProxy);
```

7.3. Control of the Humidity function

A few lines of code are enough to use a Yocto-Meteo. Here is the skeleton of a JavaScript code snippet to use the Humidity function.

```
// For Node.js, we use function require()
// For HTML, we would use &lt;script src="..."&gt;
require('yoctolib-es2017/yocto_api.js');
require('yoctolib-es2017/yocto_humidity.js');

// Get access to your device, through the VirtualHub running locally
await YAPI.RegisterHub('127.0.0.1');
var humidity = YHumidity.FindHumidity("METEOMK1-123456.humidity");

// Check that the module is online to handle hot-plug
if(await humidity.isOnline())
{
    // Use humidity.get_currentValue()
    [...]
```

```
}
```

Let us look at these lines in more details.

yocto_api and yocto_humidity import

These two import provide access to functions allowing you to manage Yoctopuce modules. `yocto_api` is always needed, `yocto_humidity` is necessary to manage modules containing a humidity sensor, such as Yocto-Meteo. Other imports can be useful in other cases, such as `YModule` which can let you enumerate any type of Yoctopuce device.

YAPI.RegisterHub

The `RegisterHub` method allows you to indicate on which machine the Yoctopuce modules are located, more precisely on which machine the VirtualHub software is running. In our case, the `127.0.0.1:4444` address indicates the local machine, port `4444` (the standard port used by Yoctopuce). You can very well modify this address, and enter the address of another machine on which the VirtualHub software is running, or of a YoctoHub. If the host cannot be reached, this function will trigger an exception.

YHumidity.FindHumidity

The `FindHumidity` method allows you to find a humidity sensor from the serial number of the module on which it resides and from its function name. You can also use logical names, as long as you have initialized them. Let us imagine a Yocto-Meteo module with serial number *METEOMK1-123456* which you have named "*MyModule*", and for which you have given the *humidity* function the name "*MyFunction*". The following five calls are strictly equivalent, as long as "*MyFunction*" is defined only once.

```
humidity = YHumidity.FindHumidity("METEOMK1-123456.humidity")
humidity = YHumidity.FindHumidity("METEOMK1-123456.MaFonction")
humidity = YHumidity.FindHumidity("MonModule.humidity")
humidity = YHumidity.FindHumidity("MonModule.MaFonction")
humidity = YHumidity.FindHumidity("MaFonction")
```

`YHumidity.FindHumidity` returns an object which you can then use at will to control the humidity sensor.

isOnline

The `isOnline()` method of the object returned by `FindHumidity` allows you to know if the corresponding module is present and in working order.

get_currentValue

The `get_currentValue()` method of the object returned by `YHumidity.FindHumidity` provides the value of relative humidity currently measured by the sensor. The value returned is a floating number, equal to the current %RH.

YTemperature.FindTemperature and YPressure.FindPressure

Functions `YTemperature.FindTemperature` and `YPressure.FindPressure` allow you to work with both temperature et and pressure measures. You can handle them just as `YHumidity.FindHumidity`.

A real example, for Node.js

Open a command window (a terminal, a shell...) and go into the directory **example_nodejs/Doc-GettingStarted-Yocto-Meteo** within Yoctopuce library for JavaScript / EcmaScript 2017. In there, you will find a file named `demo.js` with the sample code below, which uses the functions explained above, but this time used with all side materials needed to make it work nicely as a small demo.

If your Yocto-Meteo is not connected on the host running the browser, replace in the example the address `127.0.0.1` by the IP address of the host on which the Yocto-Meteo is connected and where you run the VirtualHub.

```
"use strict";

require('yoctolib-es2017/yocto_api.js');
require('yoctolib-es2017/yocto_temperature.js');
require('yoctolib-es2017/yocto_humidity.js');
require('yoctolib-es2017/yocto_pressure.js');

let temp, hum, pres;

async function startDemo()
{
    await YAPI.LogUnhandledPromiseRejections();
    await YAPI.DisableExceptions();

    // Setup the API to use the VirtualHub on local machine
    let errmsg = new YErrorMsg();
    if(await YAPI.RegisterHub('127.0.0.1', errmsg) != YAPI.SUCCESS) {
        console.log('Cannot contact VirtualHub on 127.0.0.1: '+errmsg.msg);
        return;
    }

    // Select specified device, or use first available one
    let serial = process.argv[process.argv.length-1];
    if(serial[8] != '-') {
        // by default use any connected module suitable for the demo
        let anysensor = YHumidity.FirstHumidity();
        if(anysensor) {
            let module = await anysensor.module();
            serial = await module.get_serialNumber();
        } else {
            console.log('No matching sensor connected, check cable !');
            return;
        }
    }
    console.log('Using device '+serial);
    temp = YTemperature.FindTemperature(serial+".temperature");
    hum  = YHumidity.FindHumidity(serial+".humidity");
    pres = YPressure.FindPressure(serial+".pressure");

    refresh();
}

async function refresh()
{
    if (await hum.isOnline()) {
        console.log('Temperature : '+(await temp.get_currentValue()) + (await temp.get_unit
()));
        console.log('Humidity    : '+(await hum.get_currentValue()) + (await hum.get_unit()
));
        console.log('Pressure    : '+(await pres.get_currentValue()) + (await pres.get_unit
()));
    } else {
        console.log('Module not connected');
    }
    setTimeout(refresh, 500);
}

startDemo();
```

As explained at the beginning of this chapter, you need to have Node.js v7.6 or later installed to try this example. When done, you can type the following two commands to automatically download and install the dependencies for building this example:

```
npm install
```

You can the start the sample code within Node.js using the following command, replacing the [...] by the arguments that you want to pass to the demo code:

```
node demo.js [...]
```

Same example, but this time running in a browser

If you want to see how to use the library within a browser rather than with Node.js, switch to the directory **example_html/Doc-GettingStarted-Yocto-Meteo**. You will find there a single HTML file, with a JavaScript section similar to the code above, but with a few changes since it has to interact through an HTML page rather than through the JavaScript console.

```
<!DOCTYPE html>
<html>
<head>
  <meta charset="UTF-8">
  <title>Hello World</title>
  <script src="../../lib/yocto_api.js"></script>
  <script src="../../lib/yocto_temperature.js"></script>
  <script src="../../lib/yocto_humidity.js"></script>
  <script src="../../lib/yocto_pressure.js"></script>
  <script>
    async function startDemo()
    {
      await YAPI.LogUnhandledPromiseRejections();
      await YAPI.DisableExceptions();

      // Setup the API to use the VirtualHub on local machine
      let errmsg = new YErrorMsg();
      if(await YAPI.RegisterHub('127.0.0.1', errmsg) != YAPI.SUCCESS) {
      alert('Cannot contact VirtualHub on 127.0.0.1: '+errmsg.msg);
    }
      refresh();
    }

    async function refresh()
    {
      let serial = document.getElementById('serial').value;
      if(serial == '') {
        // by default use any connected module suitable for the demo
        let anysensor = YHumidity.FirstHumidity();
        if(anysensor) {
          let module = await anysensor.module();
          serial = await module.get_serialNumber();
          document.getElementById('serial').value = serial;
        }
      }
      let temp = YTemperature.FindTemperature(serial+".temperature");
      let hum  = YHumidity.FindHumidity(serial+".humidity");
      let pres = YPressure.FindPressure(serial+".pressure");

      if (await hum.isOnline()) {
      document.getElementById('msg').value = '';
      document.getElementById("temp").value = (await temp.get_currentValue()) + (await
temp.get_unit());
      document.getElementById("hum").value  = (await hum.get_currentValue()) + (await
hum.get_unit());
      document.getElementById("pres").value = (await pres.get_currentValue()) + (await
pres.get_unit());
    } else {
      document.getElementById('msg').value = 'Module not connected';
    }
      setTimeout(refresh, 500);
    }

    startDemo();
  </script>
</head>
<body>
Module to use: <input id='serial'>
<input id='msg' style='color:red;border:none;' readonly><br>
temperature : <input id='temp' readonly><br>
humidity : <input id='hum' readonly><br>
pressure : <input id='pres' readonly><br>
</body>
</html>
```

No installation is needed to run this example, all you have to do is open the HTML file using a web browser,

7.4. Control of the module part

Each module can be controlled in a similar manner, you can find below a simple sample program displaying the main parameters of the module and enabling you to activate the localization beacon.

```
"use strict";

require('yoctolib-es2017/yocto_api.js');

async function startDemo(args)
{
    await YAPI.LogUnhandledPromiseRejections();

    // Setup the API to use the VirtualHub on local machine
    let errmsg = new YErrorMsg();
    if(await YAPI.RegisterHub('127.0.0.1', errmsg) != YAPI.SUCCESS) {
        console.log('Cannot contact VirtualHub on 127.0.0.1: '+errmsg.msg);
        return;
    }

    // Select the relay to use
    let module = YModule.FindModule(args[0]);
    if(await module.isOnline()) {
        if(args.length > 1) {
            if(args[1] == 'ON') {
                await module.set_beacon(YModule.BEACON_ON);
            } else {
                await module.set_beacon(YModule.BEACON_OFF);
            }
        }
        console.log('serial:       '+await module.get_serialNumber());
        console.log('logical name: '+await module.get_logicalName());
        console.log('luminosity:   '+await module.get_luminosity()+'%');
        console.log('beacon:       '+(await module.get_beacon()==YModule.BEACON_ON
?'ON':'OFF'));
        console.log('upTime:       '+parseInt(await module.get_upTime()/1000)+' sec');
        console.log('USB current:  '+await module.get_usbCurrent()+' mA');
        console.log('logs:');
        console.log(await module.get_lastLogs());
    } else {
        console.log("Module not connected (check identification and USB cable)\n");
    }
    await YAPI.FreeAPI();
}

if(process.argv.length < 2) {
    console.log("usage: node demo.js <serial or logicalname> [ ON | OFF ]");
} else {
    startDemo(process.argv.slice(2));
}
```

Each property `xxx` of the module can be read thanks to a method of type `get_xxxx()`, and properties which are not read-only can be modified with the help of the `set_xxx()` method. For more details regarding the used functions, refer to the API chapters.

Changing the module settings

When you want to modify the settings of a module, you only need to call the corresponding `set_xxx()` function. However, this modification is performed only in the random access memory (RAM) of the module: if the module is restarted, the modifications are lost. To memorize them persistently, it is necessary to ask the module to save its current configuration in its permanent memory. To do so, use the `saveToFlash()` method. Inversely, it is possible to force the module to forget its current settings by using the `revertFromFlash()` method. The short example below allows you to modify the logical name of a module.

```
"use strict";

require('yoctolib-es2017/yocto_api.js');

async function startDemo(args)
{
    await YAPI.LogUnhandledPromiseRejections();
```

```
    // Setup the API to use the VirtualHub on local machine
    let errmsg = new YErrorMsg();
    if(await YAPI.RegisterHub('127.0.0.1', errmsg) != YAPI.SUCCESS) {
        console.log('Cannot contact VirtualHub on 127.0.0.1: '+errmsg.msg);
        return;
    }

    // Select the relay to use
    let module = YModule.FindModule(args[0]);
    if(await module.isOnline()) {
        if(args.length > 1) {
            let newname = args[1];
            if (!await YAPI.CheckLogicalName(newname)) {
                console.log("Invalid name (" + newname + ")");
                process.exit(1);
            }
            await module.set_logicalName(newname);
            await module.saveToFlash();
        }
        console.log('Current name: '+await module.get_logicalName());
    } else {
        console.log("Module not connected (check identification and USB cable)\n");
    }
    await YAPI.FreeAPI();
}

if(process.argv.length < 2) {
    console.log("usage: node demo.js <serial> [newLogicalName]");
} else {
    startDemo(process.argv.slice(2));
}
```

Warning: the number of write cycles of the nonvolatile memory of the module is limited. When this limit is reached, nothing guaranties that the saving process is performed correctly. This limit, linked to the technology employed by the module micro-processor, is located at about 100000 cycles. In short, you can use the `saveToFlash()` function only 100000 times in the life of the module. Make sure you do not call this function within a loop.

Listing the modules

Obtaining the list of the connected modules is performed with the `YModule.FirstModule()` function which returns the first module found. Then, you only need to call the `nextModule()` function of this object to find the following modules, and this as long as the returned value is not `null`. Below a short example listing the connected modules.

```
"use strict";

require('yoctolib-es2017/yocto_api.js');

async function startDemo()
{
    await YAPI.LogUnhandledPromiseRejections();
    await YAPI.DisableExceptions();

    // Setup the API to use the VirtualHub on local machine
    let errmsg = new YErrorMsg();
    if (await YAPI.RegisterHub('127.0.0.1', errmsg) != YAPI.SUCCESS) {
        console.log('Cannot contact VirtualHub on 127.0.0.1');
        return;
    }
    refresh();
}

async function refresh()
{
    try {
        let errmsg = new YErrorMsg();
        await YAPI.UpdateDeviceList(errmsg);

        let module = YModule.FirstModule();
        while(module) {
            let line = await module.get_serialNumber();
            line += '(' + (await module.get_productName()) + ')';
```

```
            console.log(line);
            module = module.nextModule();
        }
        setTimeout(refresh, 500);
    } catch(e) {
        console.log(e);
    }
}

try {
    startDemo();
} catch(e) {
    console.log(e);
}
```

7.5. Error handling

When you implement a program which must interact with USB modules, you cannot disregard error handling. Inevitably, there will be a time when a user will have unplugged the device, either before running the software, or even while the software is running. The Yoctopuce library is designed to help you support this kind of behavior, but your code must nevertheless be conceived to interpret in the best possible way the errors indicated by the library.

The simplest way to work around the problem is the one used in the short examples provided in this chapter: before accessing a module, check that it is online with the `isOnline` function, and then hope that it will stay so during the fraction of a second necessary for the following code lines to run. This method is not perfect, but it can be sufficient in some cases. You must however be aware that you cannot completely exclude an error which would occur after the call to `isOnline` and which could crash the software. The only way to prevent this is to implement one of the two error handling techniques described below.

The method recommended by most programming languages for unpredictable error handling is the use of exceptions. By default, it is the behavior of the Yoctopuce library. If an error happens while you try to access a module, the library throws an exception. In this case, there are three possibilities:

- If your code catches the exception and handles it, everything goes well.
- If your program is running in debug mode, you can relatively easily determine where the problem happened and view the explanatory message linked to the exception.
- Otherwise... the exception makes your program crash, bang!

As this latest situation is not the most desirable, the Yoctopuce library offers another possibility for error handling, allowing you to create a robust program without needing to catch exceptions at every line of code. You simply need to call the `YAPI.DisableExceptions()` function to commute the library to a mode where exceptions for all the functions are systematically replaced by specific return values, which can be tested by the caller when necessary. For each function, the name of each return value in case of error is systematically documented in the library reference. The name always follows the same logic: a `get_state()` method returns a `Y_STATE_INVALID` value, a `get_currentValue` method returns a `Y_CURRENTVALUE_INVALID` value, and so on. In any case, the returned value is of the expected type and is not a null pointer which would risk crashing your program. At worst, if you display the value without testing it, it will be outside the expected bounds for the returned value. In the case of functions which do not normally return information, the return value is `YAPI_SUCCESS` if everything went well, and a different error code in case of failure.

When you work without exceptions, you can obtain an error code and an error message explaining the source of the error. You can request them from the object which returned the error, calling the `errType()` and `errMessage()` methods. Their returned values contain the same information as in the exceptions when they are active.

8. Using Yocto-Meteo with PHP

PHP is, like Javascript, an atypical language when interfacing with hardware is at stakes. Nevertheless, using PHP with Yoctopuce modules provides you with the opportunity to very easily create web sites which are able to interact with their physical environment, and this is not available to every web server. This technique has a direct application in home automation: a few Yoctopuce modules, a PHP server, and you can interact with your home from anywhere on the planet, as long as you have an internet connection.

PHP is one of those languages which do not allow you to directly access the hardware layers of your computer. Therefore you need to run a virtual hub on the machine on which your modules are connected.

To start your tests with PHP, you need a PHP 5.3 (or more) server[1], preferably locally on you machine. If you wish to use the PHP server of your internet provider, it is possible, but you will probably need to configure your ADSL router for it to accept and forward TCP request on the 4444 port.

8.1. Getting ready

Go to the Yoctopuce web site and download the following items:

- The PHP programming library[2]
- The VirtualHub software[3] for Windows, Mac OS X, or Linux, depending on your OS

Decompress the library files in a folder of your choice accessible to your web server, connect your modules, run the VirtualHub software, and you are ready to start your first tests. You do not need to install any driver.

8.2. Control of the Humidity function

A few lines of code are enough to use a Yocto-Meteo. Here is the skeleton of a PHP code snipplet to use the Humidity function.

```
include('yocto_api.php');
include('yocto_humidity.php');
```

[1] A couple of free PHP servers: easyPHP for Windows, MAMP for Mac OS X.
[2] www.yoctopuce.com/EN/libraries.php
[3] www.yoctopuce.com/EN/virtualhub.php

```
// Get access to your device, through the VirtualHub running locally
yRegisterHub('http://127.0.0.1:4444/',$errmsg);
$humidity = yFindHumidity("METEOMK1-123456.humidity");

// Check that the module is online to handle hot-plug
if(humidity->isOnline())
{
    // Use humidity->get_currentValue(), ...
}
```

Let's look at these lines in more details.

yocto_api.php and yocto_humidity.php

These two PHP includes provides access to the functions allowing you to manage Yoctopuce modules. `yocto_api.php` must always be included, `yocto_humidity.php` is necessary to manage modules containing a humidity sensor, such as Yocto-Meteo.

yRegisterHub

The `yRegisterHub` function allows you to indicate on which machine the Yoctopuce modules are located, more precisely on which machine the VirtualHub software is running. In our case, the `127.0.0.1:4444` address indicates the local machine, port `4444` (the standard port used by Yoctopuce). You can very well modify this address, and enter the address of another machine on which the VirtualHub software is running.

yFindHumidity

The `yFindHumidity` function allows you to find a humidity sensor from the serial number of the module on which it resides and from its function name. You can use logical names as well, as long as you have initialized them. Let us imagine a Yocto-Meteo module with serial number *METEOMK1-123456* which you have named "*MyModule*", and for which you have given the *humidity* function the name "*MyFunction*". The following five calls are strictly equivalent, as long as "*MyFunction*" is defined only once.

```
$humidity = yFindHumidity("METEOMK1-123456.humidity");
$humidity = yFindHumidity("METEOMK1-123456.MyFunction");
$humidity = yFindHumidity("MyModule.humidity");
$humidity = yFindHumidity("MyModule.MyFunction");
$humidity = yFindHumidity("MyFunction");
```

`yFindHumidity` returns an object which you can then use at will to control the humidity sensor.

isOnline

The `isOnline()` method of the object returned by `yFindHumidity` allows you to know if the corresponding module is present and in working order.

get_currentValue

The `get_currentValue()` method of the object returned by `yFindHumidity` provides the value of relative humidity currently measured by the sensor. The value returned is a floating number, equal to the current %RH.

yFindTemperature and yFindPressure

Functions `yFindTemperature` and `yFindPressure` allow you to work with both temperature et and pressure measures. You can handle them just as `yFindHumidity`.

A real example

Open your preferred text editor[4], copy the code sample below, save it with the Yoctopuce library files in a location which is accessible to you web server, then use your preferred web browser to access

[4] If you do not have a text editor, use Notepad rather than Microsoft Word.

this page. The code is also provided in the directory **Examples/Doc-GettingStarted-Yocto-Meteo** of the Yoctopuce library.

In this example, you will recognize the functions explained above, but this time used with all side materials needed to make it work nicely as a small demo.

```
<HTML>
<HEAD>
 <TITLE> Hello World</TITLE>
</HEAD>
<BODY>
<?php
  include('yocto_api.php');
  include('yocto_humidity.php');
  include('yocto_pressure.php');
  include('yocto_temperature.php');

  // Use explicit error handling rather than exceptions
  yDisableExceptions();

  // Setup the API to use the VirtualHub on local machine
  if(yRegisterHub('http://127.0.0.1:4444/',$errmsg) != YAPI_SUCCESS) {
      die("Cannot contact VirtualHub on 127.0.0.1");
  }

  @$serial = $_GET['serial'];
  if ($serial != '') {
      // Check if a specified module is available online
      $press = yFindPressure("$serial.pressure");
      if (!$press->isOnline()) {
          die("Module not connected (check serial and USB cable)");
      }
  } else {
      // or use any connected module suitable for the demo
      $press = yFirstPressure();
      if(is_null($press)) {
          die("No module connected (check USB cable)");
      } else {
          $serial = $press->module()->get_serialnumber();
      }
  }
  Print("Module to use: <input name='serial' value='$serial'><br>");

  // Get humidity and temperature as well
  $hum  = yFindHumidity("$serial.humidity");
  $temp = yFindTemperature("$serial.temperature");

  $hvalue = $hum->get_currentValue();
  $pvalue = $press->get_currentValue();
  $tvalue = $temp->get_currentValue();
  Print("Temperature: $tvalue Â°C<br>");
  Print("Humidity: $hvalue %RH<br>");
  Print("Pressure: $pvalue hPa<br>");
  yFreeAPI();

  // trigger auto-refresh after one second
  Print("<script language='javascript1.5' type='text/JavaScript'>\n");
  Print("setTimeout('window.location.reload()',1000);");
  Print("</script>\n");
?>
</BODY>
</HTML>
```

8.3. Control of the module part

Each module can be controlled in a similar manner, you can find below a simple sample program displaying the main parameters of the module and enabling you to activate the localization beacon.

```
<HTML>
<HEAD>
 <TITLE>Module Control</TITLE>
</HEAD>
```

```
<BODY>
<FORM method='get'>
<?php
  include('yocto_api.php');

  // Use explicit error handling rather than exceptions
  yDisableExceptions();

  // Setup the API to use the VirtualHub on local machine
  if(yRegisterHub('http://127.0.0.1:4444/',$errmsg) != YAPI_SUCCESS) {
      die("Cannot contact VirtualHub on 127.0.0.1 : ".$errmsg);
  }

  @$serial = $_GET['serial'];
  if ($serial != '') {
      // Check if a specified module is available online
      $module = yFindModule("$serial");
      if (!$module->isOnline()) {
          die("Module not connected (check serial and USB cable)");
      }
  } else {
      // or use any connected module suitable for the demo
      $module = yFirstModule();
      if($module) { // skip VirtualHub
          $module = $module->nextModule();
      }
      if(is_null($module)) {
          die("No module connected (check USB cable)");
      } else {
          $serial = $module->get_serialnumber();
      }
  }
  Print("Module to use: <input name='serial' value='$serial'><br>");

  if (isset($_GET['beacon'])) {
      if ($_GET['beacon']=='ON')
          $module->set_beacon(Y_BEACON_ON);
      else
          $module->set_beacon(Y_BEACON_OFF);
  }
  printf('serial: %s<br>',$module->get_serialNumber());
  printf('logical name: %s<br>',$module->get_logicalName());
  printf('luminosity: %s<br>',$module->get_luminosity());
  print('beacon: ');
  if($module->get_beacon() == Y_BEACON_ON) {
      printf("<input type='radio' name='beacon' value='ON' checked>ON ");
      printf("<input type='radio' name='beacon' value='OFF'>OFF<br>");
  } else {
      printf("<input type='radio' name='beacon' value='ON'>ON ");
      printf("<input type='radio' name='beacon' value='OFF' checked>OFF<br>");
  }
  printf('upTime: %s sec<br>',intVal($module->get_upTime()/1000));
  printf('USB current: %smA<br>',$module->get_usbCurrent());
  printf('logs:<br><pre>%s</pre>',$module->get_lastLogs());
  yFreeAPI();
?>
<input type='submit' value='refresh'>
</FORM>
</BODY>
</HTML>
```

Each property `xxx` of the module can be read thanks to a method of type `get_xxxx()`, and properties which are not read-only can be modified with the help of the `set_xxx()` method. For more details regarding the used functions, refer to the API chapters.

Changing the module settings

When you want to modify the settings of a module, you only need to call the corresponding `set_xxx()` function. However, this modification is performed only in the random access memory (RAM) of the module: if the module is restarted, the modifications are lost. To memorize them persistently, it is necessary to ask the module to save its current configuration in its permanent memory. To do so, use the `saveToFlash()` method. Inversely, it is possible to force the module to forget its current settings by using the `revertFromFlash()` method. The short example below allows you to modify the logical name of a module.

```
<HTML>
<HEAD>
 <TITLE>save settings</TITLE>
<BODY>
<FORM method='get'>
<?php
  include('yocto_api.php');

  // Use explicit error handling rather than exceptions
  yDisableExceptions();

  // Setup the API to use the VirtualHub on local machine
  if(yRegisterHub('http://127.0.0.1:4444/',$errmsg) != YAPI_SUCCESS) {
      die("Cannot contact VirtualHub on 127.0.0.1");
  }

  @$serial = $_GET['serial'];
  if ($serial != '') {
      // Check if a specified module is available online
      $module = yFindModule("$serial");
      if (!$module->isOnline()) {
          die("Module not connected (check serial and USB cable)");
      }
  } else {
      // or use any connected module suitable for the demo
      $module = yFirstModule();
      if($module) { // skip VirtualHub
          $module = $module->nextModule();
      }
      if(is_null($module)) {
          die("No module connected (check USB cable)");
      } else {
          $serial = $module->get_serialnumber();
      }
  }
  Print("Module to use: <input name='serial' value='$serial'><br>");

  if (isset($_GET['newname'])){
      $newname = $_GET['newname'];
      if (!yCheckLogicalName($newname))
          die('Invalid name');
      $module->set_logicalName($newname);
      $module->saveToFlash();
  }
  printf("Current name: %s<br>", $module->get_logicalName());
  print("New name: <input name='newname' value='' maxlength=19><br>");
  yFreeAPI();
?>
<input type='submit'>
</FORM>
</BODY>
</HTML>
```

Warning: the number of write cycles of the nonvolatile memory of the module is limited. When this limit is reached, nothing guaranties that the saving process is performed correctly. This limit, linked to the technology employed by the module micro-processor, is located at about 100000 cycles. In short, you can use the `saveToFlash()` function only 100000 times in the life of the module. Make sure you do not call this function within a loop.

Listing the modules

Obtaining the list of the connected modules is performed with the `yFirstModule()` function which returns the first module found. Then, you only need to call the `nextModule()` function of this object to find the following modules, and this as long as the returned value is not `NULL`. Below a short example listing the connected modules.

```
<HTML>
<HEAD>
 <TITLE>inventory</TITLE>
</HEAD>
<BODY>
<H1>Device list</H1>
<TT>
<?php
```

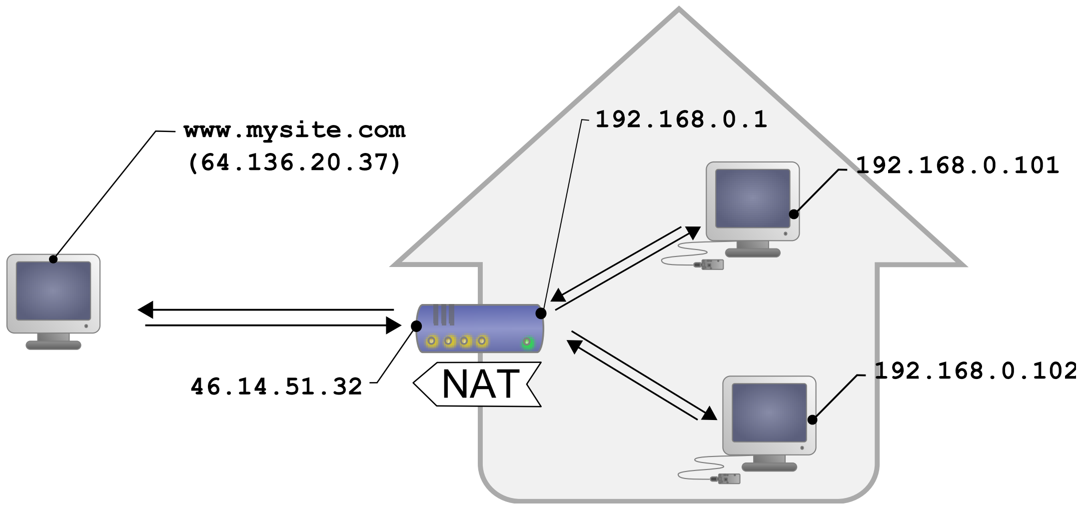
```
    include('yocto_api.php');
    yRegisterHub("http://127.0.0.1:4444/");
    $module   = yFirstModule();
    while (!is_null($module)) {
        printf("%s (%s)<br>", $module->get_serialNumber(),
               $module->get_productName());
        $module=$module->nextModule();
    }
    yFreeAPI();
?>
</TT>
</BODY>
</HTML>
```

8.4. HTTP callback API and NAT filters

The PHP library is able to work in a specific mode called *HTTP callback Yocto-API*. With this mode, you can control Yoctopuce devices installed behind a NAT filter, such as a DSL router for example, and this without needing to open a port. The typical application is to control Yoctopuce devices, located on a private network, from a public web site.

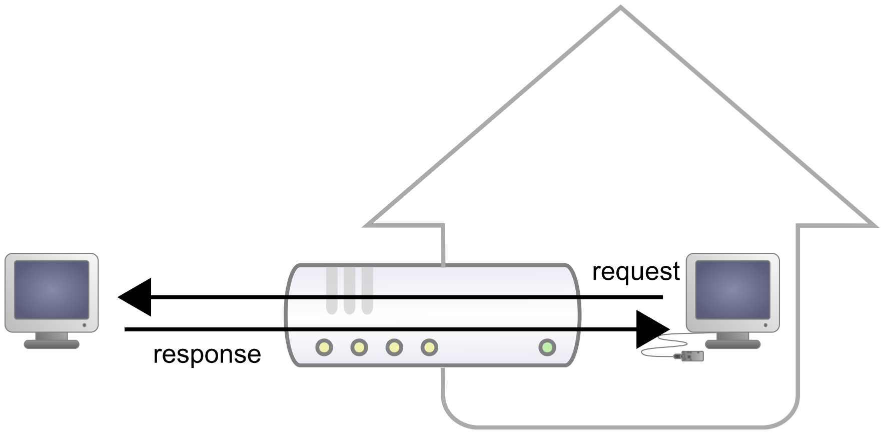
The NAT filter: advantages and disadvantages

A DSL router which translates network addresses (NAT) works somewhat like a private phone switchboard (a PBX): internal extensions can call each other and call the outside; but seen from the outside, there is only one official phone number, that of the switchboard itself. You cannot reach the internal extensions from the outside.

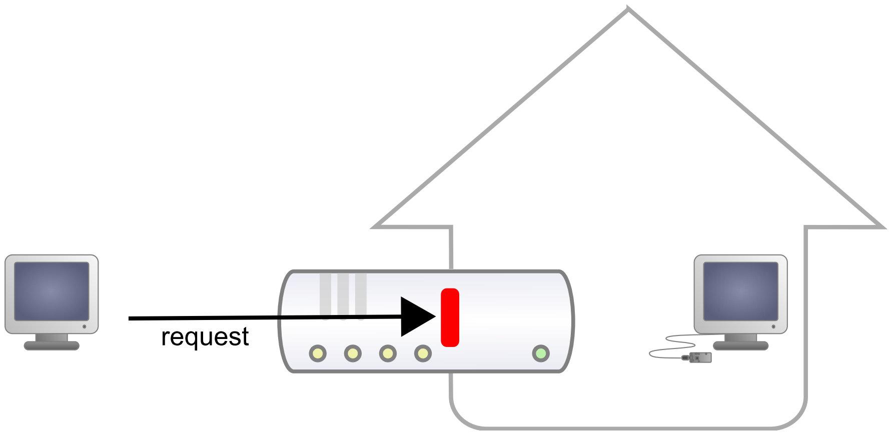


Typical DSL configuration: LAN machines are isolated from the outside by the DSL router

Transposed to the network, we have the following: appliances connected to your home automation network can communicate with one another using a local IP address (of the 192.168.xxx.yyy type), and contact Internet servers through their public address. However, seen from the outside, you have only one official IP address, assigned to the DSL router only, and you cannot reach your network appliances directly from the outside. It is rather restrictive, but it is a relatively efficient protection against intrusions.



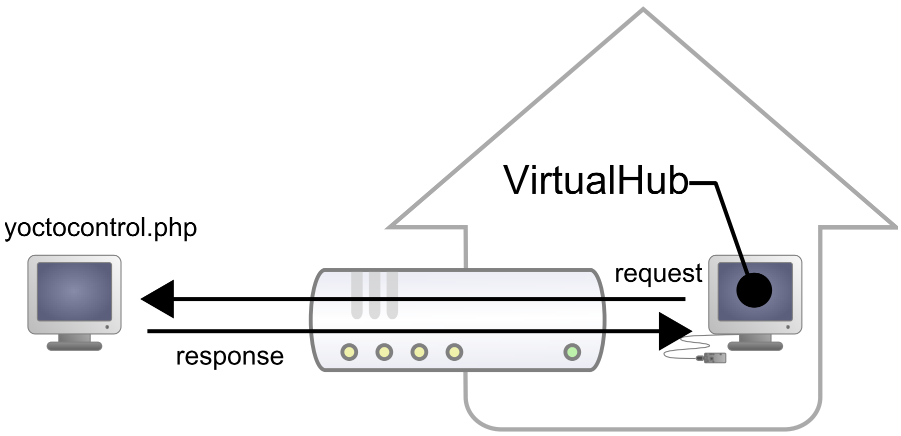
Responses from request from LAN machines are routed.



But requests from the outside are blocked.

Seeing Internet without being seen provides an enormous security advantage. However, this signifies that you cannot, a priori, set up your own web server at home to control a home automation installation from the outside. A solution to this problem, advised by numerous home automation system dealers, consists in providing outside visibility to your home automation server itself, by adding a routing rule in the NAT configuration of the DSL router. The issue of this solution is that it exposes the home automation server to external attacks.

The HTTP callback API solves this issue without having to modify the DSL router configuration. The module control script is located on an external site, and it is the *VirtualHub* which is in charge of calling it a regular intervals.



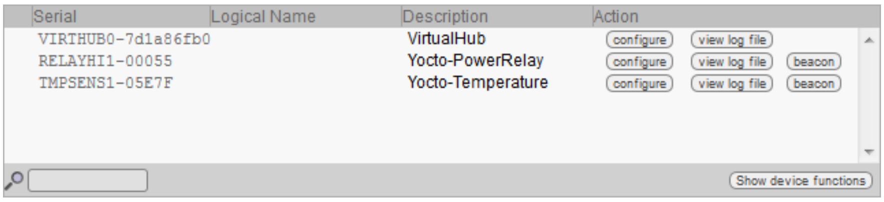
The HTTP callback API uses the VirtualHub which initiates the requests.

Configuration

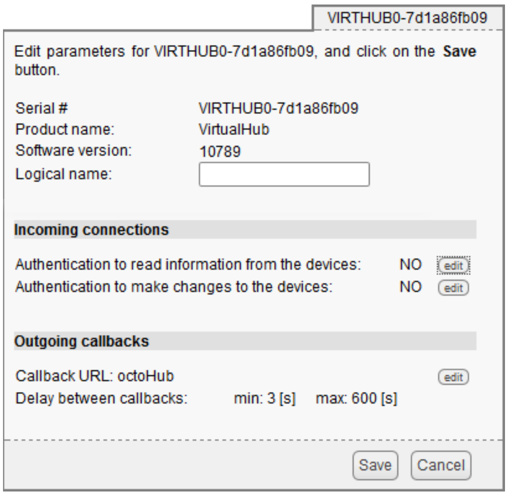
The callback API thus uses the *VirtualHub* as a gateway. All the communications are initiated by the *VirtualHub*. They are thus outgoing communications and therefore perfectly authorized by the DSL router.

You must configure the *VirtualHub* so that it calls the PHP script on a regular basis. To do so:

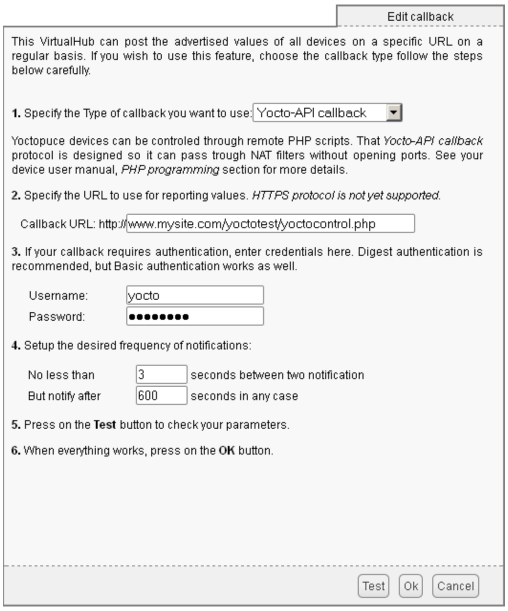
1. Launch a *VirtualHub*
2. Access its interface, usually 127.0.0.1:4444
3. Click on the **configure** button of the line corresponding to the *VirtualHub* itself
4. Click on the **edit** button of the **Outgoing callbacks** section



Click on the "configure" button on the first line



Click on the "edit" button of the "Outgoing callbacks" section



And select "Yocto-API callback".

You then only need to define the URL of the PHP script and, if need be, the user name and password to access this URL. Supported authentication methods are *basic* and *digest*. The second method is safer than the first one because it does not allow transfer of the password on the network.

Usage

From the programmer standpoint, the only difference is at the level of the *yRegisterHub* function call. Instead of using an IP address, you must use the *callback* string (or *http://callback* which is equivalent).

```
include("yocto_api.php");
yRegisterHub("callback");
```

The remainder of the code stays strictly identical. On the *VirtualHub* interface, at the bottom of the configuration window for the HTTP callback API , there is a button allowing you to test the call to the PHP script.

Be aware that the PHP script controlling the modules remotely through the HTTP callback API can be called only by the *VirtualHub*. Indeed, it requires the information posted by the *VirtualHub* to function. To code a web site which controls Yoctopuce modules interactively, you must create a user interface which stores in a file or in a database the actions to be performed on the Yoctopuce modules. These actions are then read and run by the control script.

Common issues

For the HTTP callback API to work, the PHP option *allow_url_fopen* must be set. Some web site hosts do not set it by default. The problem then manifests itself with the following error:

```
error: URL file-access is disabled in the server configuration
```

To set this option, you must create, in the repertory where the control PHP script is located, an *.htaccess* file containing the following line:

```
php_flag "allow_url_fopen" "On"
```

Depending on the security policies of the host, it is sometimes impossible to authorize this option at the root of the web site, or even to install PHP scripts receiving data from a POST HTTP. In this case, place the PHP script in a subdirectory.

Limitations

This method that allows you to go through NAT filters cheaply has nevertheless a price. Communications being initiated by the *VirtualHub* at a more or less regular interval, reaction time to an event is clearly longer than if the Yoctopuce modules were driven directly. You can configure the reaction time in the specific window of the *VirtualHub*, but it is at least of a few seconds in the best case.

The *HTTP callback Yocto-API* mode is currently available in PHP, EcmaScript (Node.JS) and Java only.

8.5. Error handling

When you implement a program which must interact with USB modules, you cannot disregard error handling. Inevitably, there will be a time when a user will have unplugged the device, either before running the software, or even while the software is running. The Yoctopuce library is designed to help you support this kind of behavior, but your code must nevertheless be conceived to interpret in the best possible way the errors indicated by the library.

The simplest way to work around the problem is the one used in the short examples provided in this chapter: before accessing a module, check that it is online with the `isOnline` function, and then hope that it will stay so during the fraction of a second necessary for the following code lines to run. This method is not perfect, but it can be sufficient in some cases. You must however be aware that you cannot completely exclude an error which would occur after the call to `isOnline` and which could crash the software. The only way to prevent this is to implement one of the two error handling techniques described below.

The method recommended by most programming languages for unpredictable error handling is the use of exceptions. By default, it is the behavior of the Yoctopuce library. If an error happens while you try to access a module, the library throws an exception. In this case, there are three possibilities:

- If your code catches the exception and handles it, everything goes well.
- If your program is running in debug mode, you can relatively easily determine where the problem happened and view the explanatory message linked to the exception.
- Otherwise... the exception makes your program crash, bang!

As this latest situation is not the most desirable, the Yoctopuce library offers another possibility for error handling, allowing you to create a robust program without needing to catch exceptions at every line of code. You simply need to call the `YAPI.DisableExceptions()` function to commute the library to a mode where exceptions for all the functions are systematically replaced by specific return values, which can be tested by the caller when necessary. For each function, the name of each return value in case of error is systematically documented in the library reference. The name always follows the same logic: a `get_state()` method returns a `Y_STATE_INVALID` value, a `get_currentValue` method returns a `Y_CURRENTVALUE_INVALID` value, and so on. In any case, the returned value is of the expected type and is not a null pointer which would risk crashing your program. At worst, if you display the value without testing it, it will be outside the expected bounds for the returned value. In the case of functions which do not normally return information, the return value is `YAPI_SUCCESS` if everything went well, and a different error code in case of failure.

When you work without exceptions, you can obtain an error code and an error message explaining the source of the error. You can request them from the object which returned the error, calling the `errType()` and `errMessage()` methods. Their returned values contain the same information as in the exceptions when they are active.

9. Using Yocto-Meteo with C++

C++ is not the simplest language to master. However, if you take care to limit yourself to its essential functionalities, this language can very well be used for short programs quickly coded, and it has the advantage of being easily ported from one operating system to another. Under Windows, all the examples and the project models are tested with Microsoft Visual Studio 2010 Express, freely available on the Microsoft web site[1]. Under Mac OS X, all the examples and project models are tested with XCode 4, available on the App Store. Moreover, under Max OS X and under Linux, you can compile the examples using a command line with GCC using the provided `GNUmakefile`. In the same manner under Windows, a `Makefile` allows you to compile examples using a command line, fully knowing the compilation and linking arguments.

Yoctopuce C++ libraries[2] are integrally provided as source files. A section of the low-level library is written in pure C, but you should not need to interact directly with it: everything was done to ensure the simplest possible interaction from C++. The library is naturally also available as binary files, so that you can link it directly if you prefer.

You will soon notice that the C++ API defines many functions which return objects. You do not need to deallocate these objects yourself, the API does it automatically at the end of the application.

In order to keep them simple, all the examples provided in this documentation are console applications. Naturally, the libraries function in a strictly identical manner if you integrate them in an application with a graphical interface. You will find in the last section of this chapter all the information needed to create a wholly new project linked with the Yoctopuce libraries.

9.1. Control of the Humidity function

A few lines of code are enough to use a Yocto-Meteo. Here is the skeleton of a C++ code snipplet to use the Humidity function.

```
#include "yocto_api.h"
#include "yocto_humidity.h"

[...]
String  errmsg;
YHumidity *humidity;

// Get access to your device, connected locally on USB for instance
yRegisterHub("usb", errmsg);
humidity = yFindHumidity("METEOMK1-123456.humidity");
```

[1] http://www.microsoft.com/visualstudio/en-us/products/2010-editions/visual-cpp-express
[2] www.yoctopuce.com/EN/libraries.php

```
// Hot-plug is easy: just check that the device is online
if(humidity->isOnline())
{
    // Use humidity->get_currentValue(), ...
}
```

Let's look at these lines in more details.

yocto_api.h et yocto_humidity.h

These two include files provide access to the functions allowing you to manage Yoctopuce modules. `yocto_api.h` must always be used, `yocto_humidity.h` is necessary to manage modules containing a humidity sensor, such as Yocto-Meteo.

yRegisterHub

The `yRegisterHub` function initializes the Yoctopuce API and indicates where the modules should be looked for. When used with the parameter `"usb"`, it will use the modules locally connected to the computer running the library. If the initialization does not succeed, this function returns a value different from `YAPI_SUCCESS` and `errmsg` contains the error message.

yFindHumidity

The `yFindHumidity` function allows you to find a humidity sensor from the serial number of the module on which it resides and from its function name. You can use logical names as well, as long as you have initialized them. Let us imagine a Yocto-Meteo module with serial number *METEOMK1-123456* which you have named "*MyModule*", and for which you have given the *humidity* function the name "*MyFunction*". The following five calls are strictly equivalent, as long as "*MyFunction*" is defined only once.

```
YHumidity *humidity = yFindHumidity("METEOMK1-123456.humidity");
YHumidity *humidity = yFindHumidity("METEOMK1-123456.MyFunction");
YHumidity *humidity = yFindHumidity("MyModule.humidity");
YHumidity *humidity = yFindHumidity("MyModule.MyFunction");
YHumidity *humidity = yFindHumidity("MyFunction");
```

`yFindHumidity` returns an object which you can then use at will to control the humidity sensor.

isOnline

The `isOnline()` method of the object returned by `yFindHumidity` allows you to know if the corresponding module is present and in working order.

get_currentValue

The `get_currentValue()` method of the object returned by `yFindHumidity` provides the value of relative humidity currently measured by the sensor. The value returned is a floating number, equal to the current %RH.

yFindTemperature and yFindPressure

Functions `yFindTemperature` and `yFindPressure` allow you to work with both temperature et and pressure measures. You can handle them just as `yFindHumidity`.

A real example

Launch your C++ environment and open the corresponding sample project provided in the directory **Examples/Doc-GettingStarted-Yocto-Meteo** of the Yoctopuce library. If you prefer to work with your favorite text editor, open the file `main.cpp`, and type `make` to build the example when you are done.

In this example, you will recognize the functions explained above, but this time used with all side materials needed to make it work nicely as a small demo.

```
#include "yocto_api.h"
#include "yocto_humidity.h"
#include "yocto_temperature.h"
#include "yocto_pressure.h"
#include <iostream>
#include <stdlib.h>

using namespace std;

static void usage(void)
{
  cout << "usage: demo <serial_number> " << endl;
  cout << "       demo <logical_name>" << endl;
  cout << "       demo any" << endl;
  u64 now = yGetTickCount();
  while (yGetTickCount() - now < 3000) {
    // wait 3 sec to show the message
  }
  exit(1);
}

int main(int argc, const char * argv[])
{
  string errmsg, target;
  YHumidity    *hsensor;
  YTemperature *tsensor;
  YPressure    *psensor;

  if (argc < 2) {
    usage();
  }
  target = (string) argv[1];

  // Setup the API to use local USB devices
  if (yRegisterHub("usb", errmsg) != YAPI_SUCCESS) {
    cerr << "RegisterHub error: " << errmsg << endl;
    return 1;
  }

  if (target == "any") {
    hsensor = yFirstHumidity();
    tsensor = yFirstTemperature();
    psensor = yFirstPressure();
    if (hsensor == NULL || tsensor == NULL || psensor == NULL) {
      cout << "No module connected (check USB cable)" << endl;
      return 1;
    }
  } else {
    hsensor = yFindHumidity(target + ".humidity");
    tsensor = yFindTemperature(target + ".temperature");
    psensor = yFindPressure(target + ".pressure");
  }

  if (!hsensor->isOnline()) {
    cout << "Module not connected (check identification and USB cable)";
    return 1;
  }

  while (hsensor->isOnline()) {
    cout << "Current humidity: " << hsensor->get_currentValue() << " %RH" << endl;
    cout << "Current temperature: " << tsensor->get_currentValue() << " C" << endl;
    cout << "Current pressure: " << psensor->get_currentValue() << " hPa" << endl;
    cout << "  (press Ctrl-C to exit)" << endl;
    ySleep(1000, errmsg);
  };
  yFreeAPI();

  return 0;
}
```

9.2. Control of the module part

Each module can be controlled in a similar manner, you can find below a simple sample program displaying the main parameters of the module and enabling you to activate the localization beacon.

```
#include <iostream>
#include <stdlib.h>

#include "yocto_api.h"

using namespace std;

static void usage(const char *exe)
{
  cout << "usage: " << exe << " <serial or logical name> [ON/OFF]" << endl;
  exit(1);
}


int main(int argc, const char * argv[])
{
  string      errmsg;

  // Setup the API to use local USB devices
  if(yRegisterHub("usb", errmsg) != YAPI_SUCCESS) {
    cerr << "RegisterHub error: " << errmsg << endl;
    return 1;
  }

  if(argc < 2)
    usage(argv[0]);

  YModule *module = yFindModule(argv[1]);  // use serial or logical name

  if (module->isOnline()) {
    if (argc > 2) {
      if (string(argv[2]) == "ON")
        module->set_beacon(Y_BEACON_ON);
      else
        module->set_beacon(Y_BEACON_OFF);
    }
    cout << "serial:       " << module->get_serialNumber() << endl;
    cout << "logical name: " << module->get_logicalName() << endl;
    cout << "luminosity:   " << module->get_luminosity() << endl;
    cout << "beacon:       ";
    if (module->get_beacon() == Y_BEACON_ON)
      cout << "ON" << endl;
    else
      cout << "OFF" << endl;
    cout << "upTime:       " << module->get_upTime() / 1000 << " sec" << endl;
    cout << "USB current:  " << module->get_usbCurrent() << " mA" << endl;
    cout << "Logs:" << endl << module->get_lastLogs() << endl;
  } else {
    cout << argv[1] << " not connected (check identification and USB cable)"
         << endl;
  }
  yFreeAPI();
  return 0;
}
```

Each property `xxx` of the module can be read thanks to a method of type `get_xxxx()`, and properties which are not read-only can be modified with the help of the `set_xxx()` method. For more details regarding the used functions, refer to the API chapters.

Changing the module settings

When you want to modify the settings of a module, you only need to call the corresponding `set_xxx()` function. However, this modification is performed only in the random access memory (RAM) of the module: if the module is restarted, the modifications are lost. To memorize them persistently, it is necessary to ask the module to save its current configuration in its permanent memory. To do so, use the `saveToFlash()` method. Inversely, it is possible to force the module to forget its current settings by using the `revertFromFlash()` method. The short example below allows you to modify the logical name of a module.

```
#include <iostream>
#include <stdlib.h>

#include "yocto_api.h"
```

```
using namespace std;

static void usage(const char *exe)
{
  cerr << "usage: " << exe << " <serial> <newLogicalName>" << endl;
  exit(1);
}

int main(int argc, const char * argv[])
{
  string      errmsg;

  // Setup the API to use local USB devices
  if(yRegisterHub("usb", errmsg) != YAPI_SUCCESS) {
    cerr << "RegisterHub error: " << errmsg << endl;
    return 1;
  }

  if(argc < 2)
    usage(argv[0]);

  YModule *module = yFindModule(argv[1]);  // use serial or logical name

  if (module->isOnline()) {
    if (argc >= 3) {
      string newname =  argv[2];
      if (!yCheckLogicalName(newname)) {
        cerr << "Invalid name (" << newname << ")" << endl;
        usage(argv[0]);
      }
      module->set_logicalName(newname);
      module->saveToFlash();
    }
    cout << "Current name: " << module->get_logicalName() << endl;
  } else {
    cout << argv[1] << " not connected (check identification and USB cable)"
         << endl;
  }
  yFreeAPI();
  return 0;
}
```

Warning: the number of write cycles of the nonvolatile memory of the module is limited. When this limit is reached, nothing guaranties that the saving process is performed correctly. This limit, linked to the technology employed by the module micro-processor, is located at about 100000 cycles. In short, you can use the `saveToFlash()` function only 100000 times in the life of the module. Make sure you do not call this function within a loop.

Listing the modules

Obtaining the list of the connected modules is performed with the `yFirstModule()` function which returns the first module found. Then, you only need to call the `nextModule()` function of this object to find the following modules, and this as long as the returned value is not `NULL`. Below a short example listing the connected modules.

```
#include <iostream>

#include "yocto_api.h"

using namespace std;

int main(int argc, const char * argv[])
{
  string      errmsg;

  // Setup the API to use local USB devices
  if(YAPI::RegisterHub("usb", errmsg) != YAPI_SUCCESS) {
    cerr << "RegisterHub error: " << errmsg << endl;
    return 1;
  }

  cout << "Device list: " << endl;

  YModule *module = YModule::FirstModule();
```

```
  while (module != NULL) {
    cout << module->get_serialNumber() << " ";
    cout << module->get_productName()  << endl;
    module = module->nextModule();
  }
  yFreeAPI();
  return 0;
}
```

9.3. Error handling

When you implement a program which must interact with USB modules, you cannot disregard error handling. Inevitably, there will be a time when a user will have unplugged the device, either before running the software, or even while the software is running. The Yoctopuce library is designed to help you support this kind of behavior, but your code must nevertheless be conceived to interpret in the best possible way the errors indicated by the library.

The simplest way to work around the problem is the one used in the short examples provided in this chapter: before accessing a module, check that it is online with the `isOnline` function, and then hope that it will stay so during the fraction of a second necessary for the following code lines to run. This method is not perfect, but it can be sufficient in some cases. You must however be aware that you cannot completely exclude an error which would occur after the call to `isOnline` and which could crash the software. The only way to prevent this is to implement one of the two error handling techniques described below.

The method recommended by most programming languages for unpredictable error handling is the use of exceptions. By default, it is the behavior of the Yoctopuce library. If an error happens while you try to access a module, the library throws an exception. In this case, there are three possibilities:

- If your code catches the exception and handles it, everything goes well.
- If your program is running in debug mode, you can relatively easily determine where the problem happened and view the explanatory message linked to the exception.
- Otherwise... the exception makes your program crash, bang!

As this latest situation is not the most desirable, the Yoctopuce library offers another possibility for error handling, allowing you to create a robust program without needing to catch exceptions at every line of code. You simply need to call the `YAPI.DisableExceptions()` function to commute the library to a mode where exceptions for all the functions are systematically replaced by specific return values, which can be tested by the caller when necessary. For each function, the name of each return value in case of error is systematically documented in the library reference. The name always follows the same logic: a `get_state()` method returns a `Y_STATE_INVALID` value, a `get_currentValue` method returns a `Y_CURRENTVALUE_INVALID` value, and so on. In any case, the returned value is of the expected type and is not a null pointer which would risk crashing your program. At worst, if you display the value without testing it, it will be outside the expected bounds for the returned value. In the case of functions which do not normally return information, the return value is `YAPI_SUCCESS` if everything went well, and a different error code in case of failure.

When you work without exceptions, you can obtain an error code and an error message explaining the source of the error. You can request them from the object which returned the error, calling the `errType()` and `errMessage()` methods. Their returned values contain the same information as in the exceptions when they are active.

9.4. Integration variants for the C++ Yoctopuce library

Depending on your needs and on your preferences, you can integrate the library into your projects in several distinct manners. This section explains how to implement the different options.

Integration in source format

Integrating all the sources of the library into your projects has several advantages:

- It guaranties the respect of the compilation conventions of your project (32/64 bits, inclusion of debugging symbols, unicode or ASCII characters, etc.);
- It facilitates debugging if you are looking for the cause of a problem linked to the Yoctopuce library;
- It reduces the dependencies on third party components, for example in the case where you would need to recompile this project for another architecture in many years;
- It does not require the installation of a dynamic library specific to Yoctopuce on the final system, everything is in the executable.

To integrate the source code, the easiest way is to simply include the `Sources` directory of your Yoctopuce library into your **IncludePath**, and to add all the files of this directory (including the sub-directory `yapi`) to your project.

For your project to build correctly, you need to link with your project the prerequisite system libraries, that is:

- For Windows: the libraries are added automatically
- For Mac OS X: **IOKit.framework** and **CoreFoundation.framework**
- For Linux: **libm**, **libpthread**, **libusb1.0**, and **libstdc++**

Integration as a static library

Integration of the Yoctopuce library as a static library is a simpler manner to build a small executable which uses Yoctopuce modules. You can quickly compile the program with a single command. You do not need to install a dynamic library specific to Yoctopuce, everything is in the executable.

To integrate the static Yoctopuce library to your project, you must include the `Sources` directory of the Yoctopuce library into your **IncludePath**, and add the sub-directory `Binaries/...` corresponding to your operating system into your **libPath**.

Then, for you project to build correctly, you need to link with your project the Yoctopuce library and the prerequisite system libraries:

- For Windows: **yocto-static.lib**
- For Mac OS X: **libyocto-static.a**, **IOKit.framework**, and **CoreFoundation.framework**
- For Linux: **libyocto-static.a**, **libm**, **libpthread**, **libusb1.0**, and **libstdc++**.

Note, under Linux, if you wish to compile in command line with GCC, it is generally advisable to link system libraries as dynamic libraries, rather than as static ones. To mix static and dynamic libraries on the same command line, you must pass the following arguments:

```
gcc (...) -Wl,-Bstatic -lyocto-static -Wl,-Bdynamic -lm -lpthread -lusb-1.0 -lstdc++
```

Integration as a dynamic library

Integration of the Yoctopuce library as a dynamic library allows you to produce an executable smaller than with the two previous methods, and to possibly update this library, if a patch reveals itself necessary, without needing to recompile the source code of the application. On the other hand, it is an integration mode which systematically requires you to copy the dynamic library on the target machine where the application will run (**yocto.dll** for Windows, **libyocto.so.1.0.1** for Mac OS X and Linux).

To integrate the dynamic Yoctopuce library to your project, you must include the `Sources` directory of the Yoctopuce library into your **IncludePath**, and add the sub-directory `Binaries/...` corresponding to your operating system into your **LibPath**.

Then, for you project to build correctly, you need to link with your project the dynamic Yoctopuce library and the prerequisite system libraries:

- For Windows: **yocto.lib**
- For Mac OS X: **libyocto**, **IOKit.framework**, and **CoreFoundation.framework**
- For Linux: **libyocto**, **libm**, **libpthread**, **libusb1.0**, and **libstdc++**.

With GCC, the command line to compile is simply:

```
gcc (...) -lyocto -lm -lpthread -lusb-1.0 -lstdc++
```

10. Using Yocto-Meteo with Objective-C

Objective-C is language of choice for programming on Mac OS X, due to its integration with the Cocoa framework. In order to use the Objective-C library, you need XCode version 4.2 (earlier versions will not work), available freely when you run Lion. If you are still under Snow Leopard, you need to be registered as Apple developer to be able to download XCode 4.2. The Yoctopuce library is ARC compatible. You can therefore implement your projects either using the traditional *retain / release* method, or using the *Automatic Reference Counting*.

Yoctopuce Objective-C libraries[1] are integrally provided as source files. A section of the low-level library is written in pure C, but you should not need to interact directly with it: everything was done to ensure the simplest possible interaction from Objective-C.

You will soon notice that the Objective-C API defines many functions which return objects. You do not need to deallocate these objects yourself, the API does it automatically at the end of the application.

In order to keep them simple, all the examples provided in this documentation are console applications. Naturally, the libraries function in a strictly identical manner if you integrate them in an application with a graphical interface. You can find on Yoctopuce blog a detailed example[2] with video shots showing how to integrate the library into your projects.

10.1. Control of the Humidity function

Launch Xcode 4.2 and open the corresponding sample project provided in the directory **Examples/Doc-GettingStarted-Yocto-Meteo** of the Yoctopuce library.

```
#import <Foundation/Foundation.h>
#import "yocto_api.h"
#import "yocto_humidity.h"
#import "yocto_temperature.h"
#import "yocto_pressure.h"

static void usage(void)
{
  NSLog(@"usage: demo <serial_number> ");
  NSLog(@"       demo <logical_name>");
  NSLog(@"       demo any                 (use any discovered device)");
  exit(1);
}
```

[1] www.yoctopuce.com/EN/libraries.php
[2] www.yoctopuce.com/EN/article/new-objective-c-library-for-mac-os-x

```
int main(int argc, const char * argv[])
{
  NSError *error;

  if (argc < 2) {
    usage();
  }

  @autoreleasepool {
    // Setup the API to use local USB devices
    if([YAPI RegisterHub:@"usb": &error] != YAPI_SUCCESS) {
      NSLog(@"RegisterHub error: %@", [error localizedDescription]);
      return 1;
    }

    NSString *target = [NSString stringWithUTF8String:argv[1]];
    YHumidity    *hsensor;
    YTemperature *tsensor;
    YPressure    *psensor;

    if([target isEqualToString:@"any"]) {
      hsensor = [YHumidity FirstHumidity];
      tsensor = [YTemperature FirstTemperature];
      psensor = [YPressure FirstPressure];
      if (hsensor == NULL || tsensor == NULL || psensor == NULL) {
        NSLog(@"No module connected (check USB cable)");
        return 1;
      }
    } else {
      hsensor = [YHumidity FindHumidity:[target stringByAppendingString:@".humidity"]];
      tsensor = [YTemperature FindTemperature:[target
stringByAppendingString:@".temperature"]];
      psensor = [YPressure FindPressure:[target stringByAppendingString:@".pressure"]];
    }
    while(1) {
      if(![hsensor isOnline]) {
        NSLog(@"Module not connected (check identification and USB cable)\n");
        break;
      }
      NSLog(@"Current humidity:    %f %%RH\n", [hsensor get_currentValue]);
      NSLog(@"Current temperature: %f C\n",    [tsensor get_currentValue]);
      NSLog(@"Current pressure:    %f hPa\n",  [psensor get_currentValue]);

      NSLog(@"  (press Ctrl-C to exit)\n");
      [YAPI Sleep:1000:NULL];
    }
    [YAPI FreeAPI];
  }

  return 0;
}
```

There are only a few really important lines in this example. We will look at them in details.

yocto_api.h et yocto_humidity.h

These two import files provide access to the functions allowing you to manage Yoctopuce modules. `yocto_api.h` must always be used, `yocto_humidity.h` is necessary to manage modules containing a humidity sensor, such as Yocto-Meteo.

[YAPI RegisterHub]

The `[YAPI RegisterHub]` function initializes the Yoctopuce API and indicates where the modules should be looked for. When used with the parameter `@"usb"`, it will use the modules locally connected to the computer running the library. If the initialization does not succeed, this function returns a value different from `YAPI_SUCCESS` and `errmsg` contains the error message.

[Humidity FindHumidity]

The `[Humidity FindHumidity]` function allows you to find a humidity sensor from the serial number of the module on which it resides and from its function name. You can use logical names as well, as long as you have initialized them. Let us imagine a Yocto-Meteo module with serial number

METEOMK1-123456 which you have named "*MyModule*", and for which you have given the *humidity* function the name "*MyFunction*". The following five calls are strictly equivalent, as long as "*MyFunction*" is defined only once.

```
YHumidity *humidity = [Humidity FindHumidity:@"METEOMK1-123456.humidity"];
YHumidity *humidity = [Humidity FindHumidity:@"METEOMK1-123456.MyFunction"];
YHumidity *humidity = [Humidity FindHumidity:@"MyModule.humidity"];
YHumidity *humidity = [Humidity FindHumidity:@"MyModule.MyFunction"];
YHumidity *humidity = [Humidity FindHumidity:@"MyFunction"];
```

`[Humidity FindHumidity]` returns an object which you can then use at will to control the humidity sensor.

isOnline

The `isOnline` method of the object returned by `[Humidity FindHumidity]` allows you to know if the corresponding module is present and in working order.

get_currentValue

The `get_currentValue()` method of the object returned by `YHumidity.FindHumidity` provides the value of relative humidity currently measured by the sensor. The value returned is a floating number, equal to the current %RH.

YTemperature.FindTemperature and YPressure.FindPressure

Functions `YTemperature.FindTemperature` and `YPressure.FindPressure` allow you to work with both temperature et and pressure measures. You can handle them just as `YHumidity.FindHumidity`.

10.2. Control of the module part

Each module can be controlled in a similar manner, you can find below a simple sample program displaying the main parameters of the module and enabling you to activate the localization beacon.

```
#import <Foundation/Foundation.h>
#import "yocto_api.h"

static void usage(const char *exe)
{
  NSLog(@"usage: %s <serial or logical name> [ON/OFF]\n", exe);
  exit(1);
}


int main (int argc, const char * argv[])
{
  NSError *error;

  @autoreleasepool {
    // Setup the API to use local USB devices
    if([YAPI RegisterHub:@"usb": &error] != YAPI_SUCCESS) {
      NSLog(@"RegisterHub error: %@", [error localizedDescription]);
      return 1;
    }
    if(argc < 2)
      usage(argv[0]);
    NSString *serial_or_name = [NSString stringWithUTF8String:argv[1]];
    // use serial or logical name
    YModule *module = [YModule FindModule:serial_or_name];
    if ([module isOnline]) {
      if (argc > 2) {
        if (strcmp(argv[2], "ON") == 0)
          [module setBeacon:Y_BEACON_ON];
        else
          [module setBeacon:Y_BEACON_OFF];
      }
      NSLog(@"serial:       %@\n", [module serialNumber]);
      NSLog(@"logical name: %@\n", [module logicalName]);
      NSLog(@"luminosity:   %d\n", [module luminosity]);
```

```
      NSLog(@"beacon:       ");
      if ([module beacon] == Y_BEACON_ON)
        NSLog(@"ON\n");
      else
        NSLog(@"OFF\n");
      NSLog(@"upTime:       %ld sec\n", [module upTime] / 1000);
      NSLog(@"USB current:  %d mA\n",  [module usbCurrent]);
      NSLog(@"logs:  %@\n",  [module get_lastLogs]);
    } else {
      NSLog(@"%@ not connected (check identification and USB cable)\n",
            serial_or_name);
    }
    [YAPI FreeAPI];
  }
  return 0;
}
```

Each property `xxx` of the module can be read thanks to a method of type `get_xxxx`, and properties which are not read-only can be modified with the help of the `set_xxx:` method. For more details regarding the used functions, refer to the API chapters.

Changing the module settings

When you want to modify the settings of a module, you only need to call the corresponding `set_xxx:` function. However, this modification is performed only in the random access memory (RAM) of the module: if the module is restarted, the modifications are lost. To memorize them persistently, it is necessary to ask the module to save its current configuration in its permanent memory. To do so, use the `saveToFlash` method. Inversely, it is possible to force the module to forget its current settings by using the `revertFromFlash` method. The short example below allows you to modify the logical name of a module.

```
#import <Foundation/Foundation.h>
#import "yocto_api.h"

static void usage(const char *exe)
{
  NSLog(@"usage: %s <serial> <newLogicalName>\n", exe);
  exit(1);
}


int main (int argc, const char * argv[])
{
  NSError *error;

  @autoreleasepool {
    // Setup the API to use local USB devices
    if([YAPI RegisterHub:@"usb" :&error] != YAPI_SUCCESS) {
      NSLog(@"RegisterHub error: %@", [error localizedDescription]);
      return 1;
    }

    if(argc < 2)
      usage(argv[0]);

    NSString *serial_or_name = [NSString stringWithUTF8String:argv[1]];
    // use serial or logical name
    YModule *module = [YModule FindModule:serial_or_name];

    if (module.isOnline) {
      if (argc >= 3) {
        NSString *newname =  [NSString stringWithUTF8String:argv[2]];
        if (![YAPI CheckLogicalName:newname]) {
          NSLog(@"Invalid name (%@)\n", newname);
          usage(argv[0]);
        }
        module.logicalName = newname;
        [module saveToFlash];
      }
      NSLog(@"Current name: %@\n", module.logicalName);
    } else {
      NSLog(@"%@ not connected (check identification and USB cable)\n",
            serial_or_name);
    }
```

```
    [YAPI FreeAPI];
  }
  return 0;
}
```

Warning: the number of write cycles of the nonvolatile memory of the module is limited. When this limit is reached, nothing guaranties that the saving process is performed correctly. This limit, linked to the technology employed by the module micro-processor, is located at about 100000 cycles. In short, you can use the `saveToFlash` function only 100000 times in the life of the module. Make sure you do not call this function within a loop.

Listing the modules

Obtaining the list of the connected modules is performed with the `yFirstModule()` function which returns the first module found. Then, you only need to call the `nextModule()` function of this object to find the following modules, and this as long as the returned value is not `NULL`. Below a short example listing the connected modules.

```
#import <Foundation/Foundation.h>
#import "yocto_api.h"

int main (int argc, const char * argv[])
{
  NSError *error;

  @autoreleasepool {
    // Setup the API to use local USB devices
    if([YAPI RegisterHub:@"usb" :&error] != YAPI_SUCCESS) {
      NSLog(@"RegisterHub error: %@\n", [error localizedDescription]);
      return 1;
    }

    NSLog(@"Device list:\n");

    YModule *module = [YModule FirstModule];
    while (module != nil) {
      NSLog(@"%@ %@", module.serialNumber, module.productName);
      module = [module nextModule];
    }
    [YAPI FreeAPI];
  }
  return 0;
}
```

10.3. Error handling

When you implement a program which must interact with USB modules, you cannot disregard error handling. Inevitably, there will be a time when a user will have unplugged the device, either before running the software, or even while the software is running. The Yoctopuce library is designed to help you support this kind of behavior, but your code must nevertheless be conceived to interpret in the best possible way the errors indicated by the library.

The simplest way to work around the problem is the one used in the short examples provided in this chapter: before accessing a module, check that it is online with the `isOnline` function, and then hope that it will stay so during the fraction of a second necessary for the following code lines to run. This method is not perfect, but it can be sufficient in some cases. You must however be aware that you cannot completely exclude an error which would occur after the call to `isOnline` and which could crash the software. The only way to prevent this is to implement one of the two error handling techniques described below.

The method recommended by most programming languages for unpredictable error handling is the use of exceptions. By default, it is the behavior of the Yoctopuce library. If an error happens while you try to access a module, the library throws an exception. In this case, there are three possibilities:

- If your code catches the exception and handles it, everything goes well.
- If your program is running in debug mode, you can relatively easily determine where the problem happened and view the explanatory message linked to the exception.
- Otherwise... the exception makes your program crash, bang!

As this latest situation is not the most desirable, the Yoctopuce library offers another possibility for error handling, allowing you to create a robust program without needing to catch exceptions at every line of code. You simply need to call the `YAPI.DisableExceptions()` function to commute the library to a mode where exceptions for all the functions are systematically replaced by specific return values, which can be tested by the caller when necessary. For each function, the name of each return value in case of error is systematically documented in the library reference. The name always follows the same logic: a `get_state()` method returns a `Y_STATE_INVALID` value, a `get_currentValue` method returns a `Y_CURRENTVALUE_INVALID` value, and so on. In any case, the returned value is of the expected type and is not a null pointer which would risk crashing your program. At worst, if you display the value without testing it, it will be outside the expected bounds for the returned value. In the case of functions which do not normally return information, the return value is `YAPI_SUCCESS` if everything went well, and a different error code in case of failure.

When you work without exceptions, you can obtain an error code and an error message explaining the source of the error. You can request them from the object which returned the error, calling the `errType()` and `errMessage()` methods. Their returned values contain the same information as in the exceptions when they are active.

11. Using Yocto-Meteo with Visual Basic .NET

VisualBasic has long been the most favored entrance path to the Microsoft world. Therefore, we had to provide our library for this language, even if the new trend is shifting to C#. All the examples and the project models are tested with Microsoft VisualBasic 2010 Express, freely available on the Microsoft web site[1].

11.1. Installation

Download the Visual Basic Yoctopuce library from the Yoctopuce web site[2]. There is no setup program, simply copy the content of the zip file into the directory of your choice. You mostly need the content of the `Sources` directory. The other directories contain the documentation and a few sample programs. All sample projects are Visual Basic 2010, projects, if you are using a previous version, you may have to recreate the projects structure from scratch.

11.2. Using the Yoctopuce API in a Visual Basic project

The Visual Basic.NET Yoctopuce library is composed of a DLL and of source files in Visual Basic. The DLL is not a .NET DLL, but a classic DLL, written in C, which manages the low level communications with the modules[3]. The source files in Visual Basic manage the high level part of the API. Therefore, your need both this DLL and the .vb files of the `sources` directory to create a project managing Yoctopuce modules.

Configuring a Visual Basic project

The following indications are provided for Visual Studio Express 2010, but the process is similar for other versions. Start by creating your project. Then, on the *Solution Explorer* panel, right click on your project, and select "Add" and then "Add an existing item".

A file selection window opens. Select the `yocto_api.vb` file and the files corresponding to the functions of the Yoctopuce modules that your project is going to manage. If in doubt, select all the files.

You then have the choice between simply adding these files to your project, or to add them as links (the **Add** button is in fact a scroll-down menu). In the first case, Visual Studio copies the selected files into your project. In the second case, Visual Studio simply keeps a link on the original files. We recommend you to use links, which makes updates of the library much easier.

---

1 http://www.microsoft.com/visualstudio/en-us/products/2010-editions/visual-basic-express
2 www.yoctopuce.com/EN/libraries.php
3 The sources of this DLL are available in the C++ API

Then add in the same manner the `yapi.dll` DLL, located in the `Sources/dll` directory[4]. Then, from the **Solution Explorer** window, right click on the DLL, select **Properties** and in the **Properties** panel, set the **Copy to output folder** to **always**. You are now ready to use your Yoctopuce modules from Visual Studio.

In order to keep them simple, all the examples provided in this documentation are console applications. Naturally, the libraries function in a strictly identical manner if you integrate them in an application with a graphical interface.

11.3. Control of the Humidity function

A few lines of code are enough to use a Yocto-Meteo. Here is the skeleton of a Visual Basic code snipplet to use the Humidity function.

```
[...]
Dim errmsg As String errmsg
Dim humidity As YHumidity

REM Get access to your device, connected locally on USB for instance
yRegisterHub("usb", errmsg)
humidity = yFindHumidity("METEOMK1-123456.humidity")

REM Hot-plug is easy: just check that the device is online
If (humidity.isOnline()) Then
   REM Use humidity.get_currentValue(), ...
End If
```

Let's look at these lines in more details.

yRegisterHub

The `yRegisterHub` function initializes the Yoctopuce API and indicates where the modules should be looked for. When used with the parameter `"usb"`, it will use the modules locally connected to the computer running the library. If the initialization does not succeed, this function returns a value different from `YAPI_SUCCESS` and `errmsg` contains the error message.

yFindHumidity

The `yFindHumidity` function allows you to find a humidity sensor from the serial number of the module on which it resides and from its function name. You can use logical names as well, as long as you have initialized them. Let us imagine a Yocto-Meteo module with serial number *METEOMK1-123456* which you have named "*MyModule*", and for which you have given the *humidity* function the name "*MyFunction*". The following five calls are strictly equivalent, as long as "*MyFunction*" is defined only once.

```
humidity = yFindHumidity("METEOMK1-123456.humidity")
humidity = yFindHumidity("METEOMK1-123456.MyFunction")
humidity = yFindHumidity("MyModule.humidity")
humidity = yFindHumidity("MyModule.MyFunction")
humidity = yFindHumidity("MyFunction")
```

`yFindHumidity` returns an object which you can then use at will to control the humidity sensor.

isOnline

The `isOnline()` method of the object returned by `yFindHumidity` allows you to know if the corresponding module is present and in working order.

get_currentValue

The `get_currentValue()` method of the object returned by `yFindHumidity` provides the value of relative humidity currently measured by the sensor. The value returned is a floating number, equal to the current %RH.

[4] Remember to change the filter of the selection window, otherwise the DLL will not show.

yFindTemperature and yFindPressure

Functions `yFindTemperature` and `yFindPressure` allow you to work with both temperature et and pressure measures. You can handle them just as `yFindHumidity`.

A real example

Launch Microsoft VisualBasic and open the corresponding sample project provided in the directory **Examples/Doc-GettingStarted-Yocto-Meteo** of the Yoctopuce library.

In this example, you will recognize the functions explained above, but this time used with all side materials needed to make it work nicely as a small demo.

```
Module Module1

  Private Sub Usage()
    Dim execname = System.AppDomain.CurrentDomain.FriendlyName
    Console.WriteLine("Usage:")
    Console.WriteLine(execname + " <serial_number>")
    Console.WriteLine(execname + " <logical_name>")
    Console.WriteLine(execname + " any  ")
    System.Threading.Thread.Sleep(2500)

    End
  End Sub

  Sub Main()
    Dim argv() As String = System.Environment.GetCommandLineArgs()
    Dim errmsg As String = ""
    Dim target As String
    Dim hsensor As YHumidity
    Dim tsensor As YTemperature
    Dim psensor As YPressure

    If argv.Length < 2 Then Usage()

    target = argv(1)

    REM Setup the API to use local USB devices
    If (yRegisterHub("usb", errmsg) <> YAPI_SUCCESS) Then
      Console.WriteLine("RegisterHub error: " + errmsg)
      End
    End If

    If target = "any" Then
      hsensor = yFirstHumidity()
      tsensor = yFirstTemperature()
      psensor = yFirstPressure()

      If hsensor Is Nothing Or tsensor Is Nothing Or psensor Is Nothing Then
        Console.WriteLine("No module connected (check USB cable) ")
        End
      End If
    Else
      hsensor = yFindHumidity(target + ".humidity")
      tsensor = yFindTemperature(target + ".temperature")
      psensor = yFindPressure(target + ".pressure")
    End If

    While (True)
      If Not (hsensor.isOnline()) Then
        Console.WriteLine("Module not connected (check identification and USB cable)")
        End
      End If
      Console.WriteLine("Current humidity:    " + Str(hsensor.get_currentValue()) _
                        + " %RH")
      Console.WriteLine("Current temperature: " + Str(tsensor.get_currentValue()) _
                        + " Â°C")
      Console.WriteLine("Current pressure:    " + Str(psensor.get_currentValue()) _
                        + " hPa")
      Console.WriteLine("  (press Ctrl-C to exit)")
      ySleep(1000, errmsg)
    End While
    yFreeAPI()

  End Sub
```

```
End Module
```

11.4. Control of the module part

Each module can be controlled in a similar manner, you can find below a simple sample program displaying the main parameters of the module and enabling you to activate the localization beacon.

```
Imports System.IO
Imports System.Environment

Module Module1

  Sub usage()
    Console.WriteLine("usage: demo <serial or logical name> [ON/OFF]")
    End
  End Sub

  Sub Main()
    Dim argv() As String = System.Environment.GetCommandLineArgs()
    Dim errmsg As String = ""
    Dim m As ymodule

    If (yRegisterHub("usb", errmsg) <> YAPI_SUCCESS) Then
      Console.WriteLine("RegisterHub error:" + errmsg)
      End
    End If

    If argv.Length < 2 Then usage()

    m = yFindModule(argv(1)) REM use serial or logical name
    If (m.isOnline()) Then
      If argv.Length > 2 Then
        If argv(2) = "ON" Then m.set_beacon(Y_BEACON_ON)
        If argv(2) = "OFF" Then m.set_beacon(Y_BEACON_OFF)
      End If
      Console.WriteLine("serial:       " + m.get_serialNumber())
      Console.WriteLine("logical name: " + m.get_logicalName())
      Console.WriteLine("luminosity:   " + Str(m.get_luminosity()))
      Console.Write("beacon:       ")
      If (m.get_beacon() = Y_BEACON_ON) Then
        Console.WriteLine("ON")
      Else
        Console.WriteLine("OFF")
      End If
      Console.WriteLine("upTime:       " + Str(m.get_upTime() / 1000) + " sec")
      Console.WriteLine("USB current:  " + Str(m.get_usbCurrent()) + " mA")
      Console.WriteLine("Logs:")
      Console.WriteLine(m.get_lastLogs())
    Else
      Console.WriteLine(argv(1) + " not connected (check identification and USB cable)")
    End If
    yFreeAPI()
  End Sub

End Module
```

Each property `xxx` of the module can be read thanks to a method of type `get_xxxx()`, and properties which are not read-only can be modified with the help of the `set_xxx()` method. For more details regarding the used functions, refer to the API chapters.

Changing the module settings

When you want to modify the settings of a module, you only need to call the corresponding `set_xxx()` function. However, this modification is performed only in the random access memory (RAM) of the module: if the module is restarted, the modifications are lost. To memorize them persistently, it is necessary to ask the module to save its current configuration in its permanent memory. To do so, use the `saveToFlash()` method. Inversely, it is possible to force the module to forget its current settings by using the `revertFromFlash()` method. The short example below allows you to modify the logical name of a module.

```
Module Module1


  Sub usage()

    Console.WriteLine("usage: demo <serial or logical name> <new logical name>")
    End
  End Sub

  Sub Main()
    Dim argv() As String = System.Environment.GetCommandLineArgs()
    Dim errmsg As String = ""
    Dim newname As String
    Dim m As YModule

    If (argv.Length <> 3) Then usage()

    REM Setup the API to use local USB devices
    If yRegisterHub("usb", errmsg) <> YAPI_SUCCESS Then
      Console.WriteLine("RegisterHub error: " + errmsg)
      End
    End If

    m = yFindModule(argv(1)) REM use serial or logical name
    If m.isOnline() Then
      newname = argv(2)
      If (Not yCheckLogicalName(newname)) Then
        Console.WriteLine("Invalid name (" + newname + ")")
        End
      End If
      m.set_logicalName(newname)
      m.saveToFlash() REM do not forget this
      Console.Write("Module: serial= " + m.get_serialNumber)
      Console.Write(" / name= " + m.get_logicalName())
    Else
      Console.Write("not connected (check identification and USB cable")
    End If
    yFreeAPI()

  End Sub

End Module
```

Warning: the number of write cycles of the nonvolatile memory of the module is limited. When this limit is reached, nothing guaranties that the saving process is performed correctly. This limit, linked to the technology employed by the module micro-processor, is located at about 100000 cycles. In short, you can use the `saveToFlash()` function only 100000 times in the life of the module. Make sure you do not call this function within a loop.

Listing the modules

Obtaining the list of the connected modules is performed with the `yFirstModule()` function which returns the first module found. Then, you only need to call the `nextModule()` function of this object to find the following modules, and this as long as the returned value is not `Nothing`. Below a short example listing the connected modules.

```
Module Module1

  Sub Main()
    Dim M As ymodule
    Dim errmsg As String = ""

    REM Setup the API to use local USB devices
    If yRegisterHub("usb", errmsg) <> YAPI_SUCCESS Then
      Console.WriteLine("RegisterHub error: " + errmsg)
      End
    End If

    Console.WriteLine("Device list")
    M = yFirstModule()
```

```
    While M IsNot Nothing
      Console.WriteLine(M.get_serialNumber() + " (" + M.get_productName() + ")")
      M = M.nextModule()
    End While
    yFreeAPI()
  End Sub

End Module
```

11.5. Error handling

When you implement a program which must interact with USB modules, you cannot disregard error handling. Inevitably, there will be a time when a user will have unplugged the device, either before running the software, or even while the software is running. The Yoctopuce library is designed to help you support this kind of behavior, but your code must nevertheless be conceived to interpret in the best possible way the errors indicated by the library.

The simplest way to work around the problem is the one used in the short examples provided in this chapter: before accessing a module, check that it is online with the `isOnline` function, and then hope that it will stay so during the fraction of a second necessary for the following code lines to run. This method is not perfect, but it can be sufficient in some cases. You must however be aware that you cannot completely exclude an error which would occur after the call to `isOnline` and which could crash the software. The only way to prevent this is to implement one of the two error handling techniques described below.

The method recommended by most programming languages for unpredictable error handling is the use of exceptions. By default, it is the behavior of the Yoctopuce library. If an error happens while you try to access a module, the library throws an exception. In this case, there are three possibilities:

- If your code catches the exception and handles it, everything goes well.
- If your program is running in debug mode, you can relatively easily determine where the problem happened and view the explanatory message linked to the exception.
- Otherwise... the exception makes your program crash, bang!

As this latest situation is not the most desirable, the Yoctopuce library offers another possibility for error handling, allowing you to create a robust program without needing to catch exceptions at every line of code. You simply need to call the `YAPI.DisableExceptions()` function to commute the library to a mode where exceptions for all the functions are systematically replaced by specific return values, which can be tested by the caller when necessary. For each function, the name of each return value in case of error is systematically documented in the library reference. The name always follows the same logic: a `get_state()` method returns a `Y_STATE_INVALID` value, a `get_currentValue` method returns a `Y_CURRENTVALUE_INVALID` value, and so on. In any case, the returned value is of the expected type and is not a null pointer which would risk crashing your program. At worst, if you display the value without testing it, it will be outside the expected bounds for the returned value. In the case of functions which do not normally return information, the return value is `YAPI_SUCCESS` if everything went well, and a different error code in case of failure.

When you work without exceptions, you can obtain an error code and an error message explaining the source of the error. You can request them from the object which returned the error, calling the `errType()` and `errMessage()` methods. Their returned values contain the same information as in the exceptions when they are active.

12. Using Yocto-Meteo with C#

C# (pronounced C-Sharp) is an object-oriented programming language promoted by Microsoft, it is somewhat similar to Java. Like Visual-Basic and Delphi, it allows you to create Windows applications quite easily. All the examples and the project models are tested with Microsoft C# 2010 Express, freely available on the Microsoft web site[1].

Our programming library is also compatible with *Mono*, the open source version of C# that also works on Linux and MacOS. You will find on our web site various articles that describe how to configure Mono to use our library.

12.1. Installation

Download the Visual C# Yoctopuce library from the Yoctopuce web site[2]. There is no setup program, simply copy the content of the zip file into the directory of your choice. You mostly need the content of the `Sources` directory. The other directories contain the documentation and a few sample programs. All sample projects are Visual C# 2010, projects, if you are using a previous version, you may have to recreate the projects structure from scratch.

12.2. Using the Yoctopuce API in a Visual C# project

The Visual C#.NET Yoctopuce library is composed of a DLL and of source files in Visual C#. The DLL is not a .NET DLL, but a classic DLL, written in C, which manages the low level communications with the modules[3]. The source files in Visual C# manage the high level part of the API. Therefore, your need both this DLL and the .cs files of the `sources` directory to create a project managing Yoctopuce modules.

Configuring a Visual C# project

The following indications are provided for Visual Studio Express 2010, but the process is similar for other versions. Start by creating your project. Then, on the *Solution Explorer* panel, right click on your project, and select "Add" and then "Add an existing item".

A file selection window opens. Select the `yocto_api.cs` file and the files corresponding to the functions of the Yoctopuce modules that your project is going to manage. If in doubt, select all the files.

1 http://www.microsoft.com/visualstudio/en-us/products/2010-editions/visual-csharp-express
2 www.yoctopuce.com/EN/libraries.php
3 The sources of this DLL are available in the C++ API

You then have the choice between simply adding these files to your project, or to add them as links (the **Add** button is in fact a scroll-down menu). In the first case, Visual Studio copies the selected files into your project. In the second case, Visual Studio simply keeps a link on the original files. We recommend you to use links, which makes updates of the library much easier.

Then add in the same manner the `yapi.dll` DLL, located in the `Sources/dll` directory[4]. Then, from the **Solution Explorer** window, right click on the DLL, select **Properties** and in the **Properties** panel, set the **Copy to output folder** to **always**. You are now ready to use your Yoctopuce modules from Visual Studio.

In order to keep them simple, all the examples provided in this documentation are console applications. Naturally, the libraries function in a strictly identical manner if you integrate them in an application with a graphical interface.

12.3. Control of the Humidity function

A few lines of code are enough to use a Yocto-Meteo. Here is the skeleton of a C# code snipplet to use the Humidity function.

```
[...]
string errmsg ="";
YHumidity humidity;

// Get access to your device, connected locally on USB for instance
YAPI.RegisterHub("usb", errmsg);
humidity = YHumidity.FindHumidity("METEOMK1-123456.humidity");

// Hot-plug is easy: just check that the device is online
if (humidity.isOnline())
 {  // Use humidity.get_currentValue(); ...
 }
```

Let's look at these lines in more details.

YAPI.RegisterHub

The `YAPI.RegisterHub` function initializes the Yoctopuce API and indicates where the modules should be looked for. When used with the parameter `"usb"`, it will use the modules locally connected to the computer running the library. If the initialization does not succeed, this function returns a value different from `YAPI.SUCCESS` and `errmsg` contains the error message.

YHumidity.FindHumidity

The `YHumidity.FindHumidity` function allows you to find a humidity sensor from the serial number of the module on which it resides and from its function name. You can use logical names as well, as long as you have initialized them. Let us imagine a Yocto-Meteo module with serial number *METEOMK1-123456* which you have named "*MyModule*", and for which you have given the *humidity* function the name "*MyFunction*". The following five calls are strictly equivalent, as long as "*MyFunction*" is defined only once.

```
humidity = YHumidity.FindHumidity("METEOMK1-123456.humidity");
humidity = YHumidity.FindHumidity("METEOMK1-123456.MyFunction");
humidity = YHumidity.FindHumidity("MyModule.humidity");
humidity = YHumidity.FindHumidity("MyModule.MyFunction");
humidity = YHumidity.FindHumidity("MyFunction");
```

`YHumidity.FindHumidity` returns an object which you can then use at will to control the humidity sensor.

isOnline

The `isOnline()` method of the object returned by `YHumidity.FindHumidity` allows you to know if the corresponding module is present and in working order.

[4] Remember to change the filter of the selection window, otherwise the DLL will not show.

get_currentValue

The `get_currentValue()` method of the object returned by `YHumidity.FindHumidity` provides the value of relative humidity currently measured by the sensor. The value returned is a floating number, equal to the current %RH.

YTemperature.FindTemperature and YPressure.FindPressure

Functions `YTemperature.FindTemperature` and `YPressure.FindPressure` allow you to work with both temperature et and pressure measures. You can handle them just as `YHumidity.FindHumidity`.

A real example

Launch Microsoft Visual C# and open the corresponding sample project provided in the directory **Examples/Doc-GettingStarted-Yocto-Meteo** of the Yoctopuce library.

In this example, you will recognize the functions explained above, but this time used with all side materials needed to make it work nicely as a small demo.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

namespace ConsoleApplication1
{
  class Program
  {
    static void usage()
    {
      string execname = System.AppDomain.CurrentDomain.FriendlyName;
      Console.WriteLine(execname + " <serial_number>");
      Console.WriteLine(execname + " <logical_name>");
      Console.WriteLine(execname + " any  ");
      System.Threading.Thread.Sleep(2500);
      Environment.Exit(0);
    }

    static void Main(string[] args)
    {
      string errmsg = "";
      string target;

      YHumidity hsensor;
      YTemperature tsensor;
      YPressure psensor;

      if (args.Length < 1) usage();
      target = args[0].ToUpper();

      // Setup the API to use local USB devices
      if (YAPI.RegisterHub("usb", ref errmsg) != YAPI.SUCCESS) {
        Console.WriteLine("RegisterHub error: " + errmsg);
        Environment.Exit(0);
      }

      if (target == "ANY") {
        hsensor = YHumidity.FirstHumidity();
        tsensor = YTemperature.FirstTemperature();
        psensor = YPressure.FirstPressure();

        if ((hsensor == null) || (tsensor == null) || (psensor == null)) {
          Console.WriteLine("No module connected (check USB cable) ");
          Environment.Exit(0);
        }
      } else {
        hsensor = YHumidity.FindHumidity(target + ".humidity");
        tsensor = YTemperature.FindTemperature(target + ".temperature");
        psensor = YPressure.FindPressure(target + ".pressure");
      }

      if (!hsensor.isOnline()) {
        Console.WriteLine("Module not connected");
```

```
          Console.WriteLine("check identification and USB cable");
          Environment.Exit(0);
        }
        while (hsensor.isOnline()) {
          Console.WriteLine("Current humidity:    " + hsensor.get_currentValue().ToString()
                            + " %RH");
          Console.WriteLine("Current temperature: " + tsensor.get_currentValue().ToString()
                            + " Â°C");
          Console.WriteLine("Current pressure:    " + psensor.get_currentValue().ToString()
                            + " hPa");
          Console.WriteLine("  (press Ctrl-C to exit)");

          YAPI.Sleep(1000, ref errmsg);
        }
        YAPI.FreeAPI();
      }
    }
}
```

12.4. Control of the module part

Each module can be controlled in a similar manner, you can find below a simple sample program displaying the main parameters of the module and enabling you to activate the localization beacon.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;


namespace ConsoleApplication1
{
  class Program
  {
    static void usage()
    {
      string execname = System.AppDomain.CurrentDomain.FriendlyName;
      Console.WriteLine("Usage:");
      Console.WriteLine(execname + " <serial or logical name> [ON/OFF]");
      System.Threading.Thread.Sleep(2500);
      Environment.Exit(0);
    }

    static void Main(string[] args)
    {
      YModule m;
      string errmsg = "";

      if (YAPI.RegisterHub("usb", ref errmsg) !=  YAPI.SUCCESS) {
        Console.WriteLine("RegisterHub error: " + errmsg);
        Environment.Exit(0);
      }


      if (args.Length < 1)  usage();

      m = YModule.FindModule(args[0]); // use serial or logical name

      if (m.isOnline()) {
        if (args.Length >= 2) {
          if (args[1].ToUpper() == "ON") {
            m.set_beacon(YModule.BEACON_ON);
          }
          if (args[1].ToUpper() == "OFF") {
            m.set_beacon(YModule.BEACON_OFF);
          }
        }

        Console.WriteLine("serial:       " + m.get_serialNumber());
        Console.WriteLine("logical name: " + m.get_logicalName());
        Console.WriteLine("luminosity:   " + m.get_luminosity().ToString());
        Console.Write("beacon:       ");
        if (m.get_beacon() == YModule.BEACON_ON)
          Console.WriteLine("ON");
```

```
        else
          Console.WriteLine("OFF");
        Console.WriteLine("upTime:       " + (m.get_upTime() / 1000 ).ToString() + " sec");
        Console.WriteLine("USB current:  " + m.get_usbCurrent().ToString() + " mA");
        Console.WriteLine("Logs:\r\n" + m.get_lastLogs());

      } else {
        Console.WriteLine(args[0] + " not connected (check identification and USB cable)");
      }
      YAPI.FreeAPI();
    }
  }
}
```

Each property xxx of the module can be read thanks to a method of type `YModule.get_xxxx()`, and properties which are not read-only can be modified with the help of the `YModule.set_xxx()` method. For more details regarding the used functions, refer to the API chapters.

Changing the module settings

When you want to modify the settings of a module, you only need to call the corresponding `YModule.set_xxx()` function. However, this modification is performed only in the random access memory (RAM) of the module: if the module is restarted, the modifications are lost. To memorize them persistently, it is necessary to ask the module to save its current configuration in its permanent memory. To do so, use the `YModule.saveToFlash()` method. Inversely, it is possible to force the module to forget its current settings by using the `YModule.revertFromFlash()` method. The short example below allows you to modify the logical name of a module.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

namespace ConsoleApplication1
{
  class Program
  {
    static void usage()
    {
      string execname = System.AppDomain.CurrentDomain.FriendlyName;
      Console.WriteLine("Usage:");
      Console.WriteLine("usage: demo <serial or logical name> <new logical name>");
      System.Threading.Thread.Sleep(2500);
      Environment.Exit(0);
    }

    static void Main(string[] args)
    {
      YModule m;
      string errmsg = "";
      string newname;

      if (args.Length != 2) usage();

      if (YAPI.RegisterHub("usb", ref errmsg) !=  YAPI.SUCCESS) {
        Console.WriteLine("RegisterHub error: " + errmsg);
        Environment.Exit(0);
      }

      m = YModule.FindModule(args[0]); // use serial or logical name

      if (m.isOnline()) {
        newname = args[1];
        if (!YAPI.CheckLogicalName(newname)) {
          Console.WriteLine("Invalid name (" + newname + ")");
          Environment.Exit(0);
        }

        m.set_logicalName(newname);
        m.saveToFlash(); // do not forget this

        Console.Write("Module: serial= " + m.get_serialNumber());
        Console.WriteLine(" / name= " + m.get_logicalName());
      } else {
```

```
        Console.Write("not connected (check identification and USB cable");
      }
      YAPI.FreeAPI();
    }
  }
}
```

Warning: the number of write cycles of the nonvolatile memory of the module is limited. When this limit is reached, nothing guaranties that the saving process is performed correctly. This limit, linked to the technology employed by the module micro-processor, is located at about 100000 cycles. In short, you can use the `YModule.saveToFlash()` function only 100000 times in the life of the module. Make sure you do not call this function within a loop.

Listing the modules

Obtaining the list of the connected modules is performed with the `YModule.yFirstModule()` function which returns the first module found. Then, you only need to call the `nextModule()` function of this object to find the following modules, and this as long as the returned value is not `null`. Below a short example listing the connected modules.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

namespace ConsoleApplication1
{
  class Program
  {
    static void Main(string[] args)
    {
      YModule m;
      string errmsg = "";

      if (YAPI.RegisterHub("usb", ref errmsg) !=  YAPI.SUCCESS) {
        Console.WriteLine("RegisterHub error: " + errmsg);
        Environment.Exit(0);
      }

      Console.WriteLine("Device list");
      m = YModule.FirstModule();
      while (m != null) {
        Console.WriteLine(m.get_serialNumber() + " (" + m.get_productName() + ")");
        m = m.nextModule();
      }
      YAPI.FreeAPI();
    }
  }
}
```

12.5. Error handling

When you implement a program which must interact with USB modules, you cannot disregard error handling. Inevitably, there will be a time when a user will have unplugged the device, either before running the software, or even while the software is running. The Yoctopuce library is designed to help you support this kind of behavior, but your code must nevertheless be conceived to interpret in the best possible way the errors indicated by the library.

The simplest way to work around the problem is the one used in the short examples provided in this chapter: before accessing a module, check that it is online with the `isOnline` function, and then hope that it will stay so during the fraction of a second necessary for the following code lines to run. This method is not perfect, but it can be sufficient in some cases. You must however be aware that you cannot completely exclude an error which would occur after the call to `isOnline` and which could crash the software. The only way to prevent this is to implement one of the two error handling techniques described below.

The method recommended by most programming languages for unpredictable error handling is the use of exceptions. By default, it is the behavior of the Yoctopuce library. If an error happens while you try to access a module, the library throws an exception. In this case, there are three possibilities:

- If your code catches the exception and handles it, everything goes well.
- If your program is running in debug mode, you can relatively easily determine where the problem happened and view the explanatory message linked to the exception.
- Otherwise... the exception makes your program crash, bang!

As this latest situation is not the most desirable, the Yoctopuce library offers another possibility for error handling, allowing you to create a robust program without needing to catch exceptions at every line of code. You simply need to call the `YAPI.DisableExceptions()` function to commute the library to a mode where exceptions for all the functions are systematically replaced by specific return values, which can be tested by the caller when necessary. For each function, the name of each return value in case of error is systematically documented in the library reference. The name always follows the same logic: a `get_state()` method returns a `Y_STATE_INVALID` value, a `get_currentValue` method returns a `Y_CURRENTVALUE_INVALID` value, and so on. In any case, the returned value is of the expected type and is not a null pointer which would risk crashing your program. At worst, if you display the value without testing it, it will be outside the expected bounds for the returned value. In the case of functions which do not normally return information, the return value is `YAPI_SUCCESS` if everything went well, and a different error code in case of failure.

When you work without exceptions, you can obtain an error code and an error message explaining the source of the error. You can request them from the object which returned the error, calling the `errType()` and `errMessage()` methods. Their returned values contain the same information as in the exceptions when they are active.

13. Using the Yocto-Meteo with Universal Windows Platform

Universal Windows Platform (UWP) is not a language per say, but a software platform created by Microsoft. This platform allows you to run a new type of applications: the universal Windows applications. These applications can work on all machines running under Windows 10. This includes computers, tablets, smart phones, XBox One, and also Windows IoT Core.

The Yoctopuce UWP library allows you to use Yoctopuce modules in a universal Windows application and is written in C# in its entirety. You can add it to a Visual Studio 2017[1] project.

13.1. Blocking and asynchronous functions

The Universal Windows Platform does not use the Win32 API but only the Windows Runtime API which is available on all the versions of Windows 10 and for any architecture. Thanks to this library, you can use UWP on all the Windows 10 versions, including Windows 10 IoT Core.

However, using the new UWP API has some consequences: the Windows Runtime API to access the USB ports is asynchronous, and therefore the Yoctopuce library must be asynchronous as well. Concretely, the asynchronous methods do not return a result directly but a `Task` or `Task<>` object and the result can be obtained later. Fortunately, the C# language, version 6, supports the `async` and `await` keywords, which simplifies using these functions enormously. You can thus use asynchronous functions in the same way as traditional functions as long as you respect the following two rules:

- The method is declared as asynchronous with the `async` keyword
- The `await` keyword is added when calling an asynchronous function

Example:

```
async Task<int> MyFunction(int  val)
{
    // do some long computation
    ...
    return result;
}

int res = await MyFunction(1234);
```

[1] https://www.visualstudio.com/vs/cordova/vs/

Our library follows these two rules and can therefore use the `await` notation.

For you not to have to wonder wether a function is asynchronous or not, there is the following convention: **all the public methods** of the UWP library **are asynchronous**, that is that you must call them with the `await` keyword, **except**:

- `GetTickCount()`, because measuring time in an asynchronous manner does not make a lot of sense...
- `FindModule()`, `FirstModule()`, `nextModule()`, ... because detecting and enumerating modules is performed as a background task on internal structures which are managed transparently. It is therefore not necessary to use blocking functions while going though the lists of modules.

13.2. Installation

Download the Yoctopuce library for $LANG$ from the Yoctopuce web site[2]. There is no installation software, simply copy the content of the zip file in a directory of your choice. You essentially need the content of the `Sources` directory. The other directories contain documentation and a few sample programs. Sample projects are Visual Studio 2017 projects. Visual Studio 2017 is available on the Microsoft web site[3].

13.3. Using the Yoctopuce API in a Visual Studio project

Start by creating your project. Then, from the **Solution Explorer** panel right click on your project and select **Add** then **Existing element** .

A file chooser opens: select all the files in the library `Sources` directory.

You then have the choice between simply adding the files to your project or adding them as a link (the **Add** button is actually a drop-down menu). In the first case, Visual Studio copies the selected files into your project. In the second case, Visual Studio simply creates a link to the original files. We recommend to use links, as a potential library update is thus much easier.

The Package.appxmanifest file

By default a Universal Windows application doesn't have access rights to the USB ports. If you want to access USB devices, you must imperatively declare it in the `Package.appxmanifest` file.

Unfortunately, the edition window of this file doesn't allow this operation and you must modify the `Package.appxmanifest` file by hand. In the "Solution Explorer" panel, right click on the `Package.appxmanifest` and select "View Code".

In this XML file, we must add a `DeviceCapability` node in the `Capabilities` node. This node must have a "Name" attribute with a "humaninterfacedevice" value.

Inside this node, you must declare all the modules that can be used. Concretely, for each module, you must add a "Device" node with an "Id" attribute, which has for value a character string "vidpid:`USB_VENDORID USB_DEVICE_ID`". The Yoctopuce `USB_VENDORID` is 24e0 and you can find the `USB_DEVICE_ID` of each Yoctopuce device in the documentation in the "Characteristics" section. Finally, the "Device" node must contain a "Function" node with the "Type" attribute with a value of "usage:ff00 0001".

For the Yocto-Meteo, here is what you must add in the "Capabilities" node:

```
<DeviceCapability Name="humaninterfacedevice">
    <!-- Yocto-Meteo -->
    <Device Id="vidpid:24e0 0018">
      <Function Type="usage:ff00 0001" />
```

[2] www.yoctopuce.com/EN/libraries.php
[3] https://www.visualstudio.com/downloads/

```
    </Device>
  </DeviceCapability>
```

Unfortunately, it's not possible to write a rule authorizing all Yoctopuce modules. Therefore, you must imperatively add each module that you want to use.

13.4. Control of the Humidity function

A few lines of code are enough to use a Yocto-Meteo. Here is the skeleton of a C# code snippet to use the Humidity function.

```
[...]

await YAPI.RegisterHub("usb");
humidity = YHumidity.FindHumidity("METEOMK1-123456.humidity");

//To manage hot-plug, we check that the module is here
if (await humidity.isOnline()) {
        //Use humidity.get_currentValue()
     ...
}

[...]
```

Let us look at these lines in more details.

YAPI.RegisterHub

The `YAPI.RegisterHub` function initializes the Yoctopuce API and indicates where the modules should be looked for. The parameter is the address of the virtual hub able to see the devices. If the string "usb" is passed as parameter, the API works with modules locally connected to the machine. If the initialization does not succeed, an exception is thrown.

YHumidity.FindHumidity

The `YHumidity.FindHumidity` function allows you to find a humidity sensor from the serial number of the module on which it resides and from its function name. You can use logical names as well, as long as you have initialized them. Let us imagine a Yocto-Meteo module with serial number *METEOMK1-123456* which you have named "*MyModule*", and for which you have given the *humidity* function the name "*MyFunction*". The following five calls are strictly equivalent, as long as "*MyFunction*" is defined only once.

```
humidity = YHumidity.FindHumidity("METEOMK1-123456.humidity");
humidity = YHumidity.FindHumidity("METEOMK1-123456.MaFonction");
humidity = YHumidity.FindHumidity("MonModule.humidity");
humidity = YHumidity.FindHumidity("MonModule.MaFonction");
humidity = YHumidity.FindHumidity("MaFonction");
```

`YHumidity.FindHumidity` returns an object which you can then use at will to control the humidity sensor.

isOnline

The `isOnline()` method of the object returned by `YHumidity.FindHumidity` allows you to know if the corresponding module is present and in working order.

get_currentValue

The `get_currentValue()` method of the object returned by `YHumidity.FindHumidity` provides the value of relative humidity currently measured by the sensor. The value returned is a floating number, equal to the current %RH.

YTemperature.FindTemperature and YPressure.FindPressure

Functions `YTemperature.FindTemperature` and `YPressure.FindPressure` allow you to work with both temperature et and pressure measures. You can handle them just as `YHumidity.FindHumidity`.

13.5. A real example

Launch Visual Studio and open the corresponding project provided in the directory **Examples/Doc-GettingStarted-Yocto-Meteo** of the Yoctopuce library.

Visual Studio projects contain numerous files, and most of them are not linked to the use of the Yoctopuce library. To simplify reading the code, we regrouped all the code that uses the library in the `Demo` class, located in the `demo.cs` file. Properties of this class correspond to the different fields displayed on the screen, and the `Run()` method contains the code which is run when the "Start" button is pushed.

In this example, you can recognize the functions explained above, but this time used with all the side materials needed to make it work nicely as a small demo.

```
using System;
using System.Diagnostics;
using System.Threading.Tasks;
using Windows.UI.Xaml.Controls;
using com.yoctopuce.YoctoAPI;

namespace Demo
{
  public class Demo : DemoBase
  {
    public string HubURL { get; set; }
    public string Target { get; set; }

    public override async Task<int> Run()
    {
      try {
        await YAPI.RegisterHub(HubURL);

        YHumidity hsensor;
        YTemperature tsensor;
        YPressure psensor;

        if (Target.ToLower() == "any") {
          hsensor = YHumidity.FirstHumidity();
          tsensor = YTemperature.FirstTemperature();
          psensor = YPressure.FirstPressure();

          if ((hsensor == null) || (tsensor == null) || (psensor == null)) {
            WriteLine("No module connected (check USB cable) ");
            return -1;
          }
        } else {
          hsensor = YHumidity.FindHumidity(Target + ".humidity");
          tsensor = YTemperature.FindTemperature(Target + ".temperature");
          psensor = YPressure.FindPressure(Target + ".pressure");
        }

        while (await hsensor.isOnline()) {
          WriteLine("Humidity:    " + await hsensor.get_currentValue() + " %RH");
          WriteLine("Temperature: " + await tsensor.get_currentValue() + " Â°C");
          WriteLine("Pressure:    " + await psensor.get_currentValue() + " hPa");
          await YAPI.Sleep(1000);
        }

        WriteLine("Module not connected (check identification and USB cable)");
      } catch (YAPI_Exception ex) {
        WriteLine("error: " + ex.Message);
      }

      YAPI.FreeAPI();
      return 0;
    }
```

```
  }
}
```

13.6. Control of the module part

Each module can be controlled in a similar manner, you can find below a simple sample program displaying the main parameters of the module and enabling you to activate the localization beacon.

```
using System;
using System.Diagnostics;
using System.Threading.Tasks;
using Windows.UI.Xaml.Controls;
using com.yoctopuce.YoctoAPI;

namespace Demo
{
  public class Demo : DemoBase
  {

    public string HubURL { get; set; }
    public string Target { get; set; }
    public bool Beacon { get; set; }

    public override async Task<int> Run()
    {
      YModule m;
      string errmsg = "";

      if (await YAPI.RegisterHub(HubURL) != YAPI.SUCCESS) {
        WriteLine("RegisterHub error: " + errmsg);
        return -1;
      }
      m = YModule.FindModule(Target + ".module"); // use serial or logical name
      if (await m.isOnline()) {
        if (Beacon) {
          await m.set_beacon(YModule.BEACON_ON);
        } else {
          await m.set_beacon(YModule.BEACON_OFF);
        }

        WriteLine("serial: " + await m.get_serialNumber());
        WriteLine("logical name: " + await m.get_logicalName());
        WriteLine("luminosity: " + await m.get_luminosity());
        Write("beacon: ");
        if (await m.get_beacon() == YModule.BEACON_ON)
          WriteLine("ON");
        else
          WriteLine("OFF");
        WriteLine("upTime: " + (await m.get_upTime() / 1000) + " sec");
        WriteLine("USB current: " + await m.get_usbCurrent() + " mA");
        WriteLine("Logs:\r\n" + await m.get_lastLogs());
      } else {
        WriteLine(Target + " not connected  on" + HubURL +
                  "(check identification and USB cable)");
      }
      YAPI.FreeAPI();
      return 0;
    }
  }
}
```

Each property `xxx` of the module can be read thanks to a method of type `YModule.get_xxxx()`, and properties which are not read-only can be modified with the help of the `YModule.set_xxx()` method. For more details regarding the used functions, refer to the API chapters.

Changing the module settings

When you want to modify the settings of a module, you only need to call the corresponding `YModule.set_xxx()` function. However, this modification is performed only in the random access memory (RAM) of the module: if the module is restarted, the modifications are lost. To memorize them persistently, it is necessary to ask the module to save its current configuration in its permanent memory. To do so, use the `YModule.saveToFlash()` method. Inversely, it is possible to force the module to forget its current settings by using the `YModule.revertFromFlash()` method. The short example below allows you to modify the logical name of a module.

```
using System;
using System.Diagnostics;
using System.Threading.Tasks;
using Windows.UI.Xaml.Controls;
using com.yoctopuce.YoctoAPI;

namespace Demo
{
  public class Demo : DemoBase
  {

    public string HubURL { get; set; }
    public string Target { get; set; }
    public string LogicalName { get; set; }

    public override async Task<int> Run()
    {
      try {
        YModule m;

        await YAPI.RegisterHub(HubURL);

        m = YModule.FindModule(Target); // use serial or logical name
        if (await m.isOnline()) {
          if (!YAPI.CheckLogicalName(LogicalName)) {
            WriteLine("Invalid name (" + LogicalName + ")");
            return -1;
          }

          await m.set_logicalName(LogicalName);
          await m.saveToFlash(); // do not forget this
          Write("Module: serial= " + await m.get_serialNumber());
          WriteLine(" / name= " + await m.get_logicalName());
        } else {
          Write("not connected (check identification and USB cable");
        }
      } catch (YAPI_Exception ex) {
        WriteLine("RegisterHub error: " + ex.Message);
      }
      YAPI.FreeAPI();
      return 0;
    }
  }
}
```

Warning: the number of write cycles of the nonvolatile memory of the module is limited. When this limit is reached, nothing guaranties that the saving process is performed correctly. This limit, linked to the technology employed by the module micro-processor, is located at about 100000 cycles. In short, you can use the `YModule.saveToFlash()` function only 100000 times in the life of the module. Make sure you do not call this function within a loop.

Listing the modules

Obtaining the list of the connected modules is performed with the `YModule.yFirstModule()` function which returns the first module found. Then, you only need to call the `nextModule()` function of this object to find the following modules, and this as long as the returned value is not `null`. Below a short example listing the connected modules.

```
using System;
using System.Diagnostics;
using System.Threading.Tasks;
using Windows.UI.Xaml.Controls;
using com.yoctopuce.YoctoAPI;

namespace Demo
{
  public class Demo : DemoBase
  {
    public string HubURL { get; set; }

    public override async Task<int> Run()
```

```
    {
      YModule m;
      try {
        await YAPI.RegisterHub(HubURL);

        WriteLine("Device list");
        m = YModule.FirstModule();
        while (m != null) {
          WriteLine(await m.get_serialNumber()
                    + " (" + await m.get_productName() + ")");
          m = m.nextModule();
        }
      } catch (YAPI_Exception ex) {
        WriteLine("Error:" + ex.Message);
      }
      YAPI.FreeAPI();
      return 0;
    }
  }
}
```

13.7. Error handling

When you implement a program which must interact with USB modules, you cannot disregard error handling. Inevitably, there will be a time when a user will have unplugged the device, either before running the software, or even while the software is running. The Yoctopuce library is designed to help you support this kind of behavior, but your code must nevertheless be conceived to interpret in the best possible way the errors indicated by the library.

The simplest way to work around the problem is the one used in the short examples provided in this chapter: before accessing a module, check that it is online with the `isOnline` function, and then hope that it will stay so during the fraction of a second necessary for the following code lines to run. This method is not perfect, but it can be sufficient in some cases. You must however be aware that you cannot completely exclude an error which would occur after the call to `isOnline` and which could crash the software.

In the Universal Windows Platform library, error handling is implemented with exceptions. You must therefore intercept and correctly handle these exceptions if you want to have a reliable project which does not crash as soon as you disconnect a module.

Library thrown exceptions are always of the YAPI_Exception type, so you can easily separate them from other exceptions in a `try{...} catch{...}` block.

Example:

```
try {
        ....
} catch (YAPI_Exception ex) {
        Debug.WriteLine("Exception from Yoctopuce lib:" + ex.Message);
} catch (Exception ex) {
        Debug.WriteLine("Other exceptions :" + ex.Message);
}
```

14. Using Yocto-Meteo with Delphi

Delphi is a descendent of Turbo-Pascal. Originally, Delphi was produced by Borland, Embarcadero now edits it. The strength of this language resides in its ease of use, as anyone with some notions of the Pascal language can develop a Windows application in next to no time. Its only disadvantage is to cost something[1].

Delphi libraries are provided not as VCL components, but directly as source files. These files are compatible with most Delphi versions.[2]

To keep them simple, all the examples provided in this documentation are console applications. Obviously, the libraries work in a strictly identical way with VCL applications.

You will soon notice that the Delphi API defines many functions which return objects. You do not need to deallocate these objects yourself, the API does it automatically at the end of the application.

14.1. Preparation

Go to the Yoctopuce web site and download the Yoctopuce Delphi libraries[3]. Uncompress everything in a directory of your choice, add the subdirectory *sources* in the list of directories of Delphi libraries.[4]

By default, the Yoctopuce Delphi library uses the *yapi.dll* DLL, all the applications you will create with Delphi must have access to this DLL. The simplest way to ensure this is to make sure *yapi.dll* is located in the same directory as the executable file of your application.

14.2. Control of the Humidity function

Launch your Delphi environment, copy the yapi.dll DLL in a directory, create a new console application in the same directory, and copy-paste the piece of code below:

```
program helloworld;
{$APPTYPE CONSOLE}
uses
  SysUtils,
  Windows,
  yocto_api,
  yocto_humidity,
```

[1] Actually, Borland provided free versions (for personal use) of Delphi 2006 and 2007. Look for them on the Internet, you may still be able to download them.
[2] Delphi libraries are regularly tested with Delphi 5 and Delphi XE2.
[3] www.yoctopuce.com/EN/libraries.php
[4] Use the **Tools / Environment options** menu.

```
  yocto_temperature,
  yocto_pressure;

Procedure  Usage();
  var
   exe : string;

  begin
    exe:= ExtractFileName(paramstr(0));
    WriteLn(exe+' <serial_number>');
    WriteLn(exe+' <logical_name>');
    WriteLn(exe+' any');
    sleep(2500);
    halt;
  End;

var
  hsensor       : TYHumidity;
  tsensor       : TYTemperature;
  psensor       : TYPressure;
  m             : TYModule;
  errmsg,serial : string;
  done          : boolean;

begin
   if (paramcount<1) then usage();

  // Setup the API to use local USB devices
  if yRegisterHub('usb', errmsg)<>YAPI_SUCCESS then
  begin
    Write('RegisterHub error: '+errmsg);
    exit;
  end;

  if paramstr(1)='any' then
    begin
      // lets try to find the first available humidity sensor
      hsensor := yFirstHumidity();
      if hsensor=nil then
         begin
           writeln('No module connected (check USB cable)');
           halt;
         end
       end
   else
  // or the one specified on command line
  hsensor:= YFindHumidity(paramstr(1)+'.humidity');

  // make sure it is online
  if  not hsensor.isOnline() then
    begin
      writeln('No module connected (check USB cable)');
      halt;
    end;

  // lets find the parent module so we can get the other sensors
  m :=  hsensor.get_module();
  serial :=  m.get_serialNumber();

  // retreive all sensor present on the yocto-meteo
  hsensor := yFindHumidity(serial+'.humidity');
  tsensor := yFindTemperature(serial+'.temperature');
  psensor := yFindPressure(serial+'.pressure');

  // let's poll
  done := false;
  repeat
    if (hsensor.isOnline()) then
     begin
       Writeln('Curr humidity:    '+FloatToStr(hsensor.get_currentValue())+' %RH');
       Writeln('Curr temperature: '+FloatToStr(tsensor.get_currentValue())+' deg C');
       Writeln('Curr pressure:    '+FloatToStr(psensor.get_currentValue())+' hPa');
       Writeln('    (press Ctrl-C to exit)');
       Writeln('');
       Sleep(1000);
     end
    else
     begin
```

```
      Writeln('Module not connected (check identification and USB cable)');
      done := true;
    end;
  until done;
  yFreeAPI();

end.
```

There are only a few really important lines in this sample example. We will look at them in details.

yocto_api and yocto_humidity

These two units provide access to the functions allowing you to manage Yoctopuce modules. `yocto_api` must always be used, `yocto_humidity` is necessary to manage modules containing a humidity sensor, such as Yocto-Meteo.

yRegisterHub

The `yRegisterHub` function initializes the Yoctopuce API and specifies where the modules should be looked for. When used with the parameter `'usb'`, it will use the modules locally connected to the computer running the library. If the initialization does not succeed, this function returns a value different from `YAPI_SUCCESS` and `errmsg` contains the error message.

yFindHumidity

The `yFindHumidity` function allows you to find a humidity sensor from the serial number of the module on which it resides and from its function name. You can also use logical names, as long as you have initialized them. Let us imagine a Yocto-Meteo module with serial number *METEOMK1-123456* which you have named "*MyModule*", and for which you have given the *humidity* function the name "*MyFunction*". The following five calls are strictly equivalent, as long as "*MyFunction*" is defined only once.

```
humidity := yFindHumidity("METEOMK1-123456.humidity");
humidity := yFindHumidity("METEOMK1-123456.MyFunction");
humidity := yFindHumidity("MyModule.humidity");
humidity := yFindHumidity("MyModule.MyFunction");
humidity := yFindHumidity("MyFunction");
```

`yFindHumidity` returns an object which you can then use at will to control the humidity sensor.

isOnline

The `isOnline()` method of the object returned by `yFindHumidity` allows you to know if the corresponding module is present and in working order.

get_currentValue

The `get_currentValue()` method of the object returned by `yFindHumidity` provides the value of relative humidity currently measured by the sensor. The value returned is a floating number, equal to the current %RH.

yFindTemperature and yFindPressure

Functions `yFindTemperature` and `yFindPressure` allow you to work with both temperature et and pressure measures. You can handle them just as `yFindHumidity`.

14.3. Control of the module part

Each module can be controlled in a similar manner, you can find below a simple sample program displaying the main parameters of the module and enabling you to activate the localization beacon.

```
program modulecontrol;
{$APPTYPE CONSOLE}
uses
  SysUtils,
  yocto_api;
```

```
const
  serial = 'METEOMK1-123456'; // use serial number or logical name

procedure refresh(module:Tymodule) ;
  begin
    if (module.isOnline())  then
     begin
       Writeln('');
       Writeln('Serial       : ' + module.get_serialNumber());
       Writeln('Logical name : ' + module.get_logicalName());
       Writeln('Luminosity   : ' + intToStr(module.get_luminosity()));
       Write('Beacon    :');
       if  (module.get_beacon()=Y_BEACON_ON) then Writeln('on')
                                             else Writeln('off');
       Writeln('uptime       : ' + intToStr(module.get_upTime() div 1000)+'s');
       Writeln('USB current  : ' + intToStr(module.get_usbCurrent())+'mA');
       Writeln('Logs         : ');
       Writeln(module.get_lastlogs());
       Writeln('');
       Writeln('r : refresh / b:beacon ON / space : beacon off');
     end
    else Writeln('Module not connected (check identification and USB cable)');
  end;


procedure beacon(module:Tymodule;state:integer);
  begin
    module.set_beacon(state);
    refresh(module);
  end;

var
  module : TYModule;
  c      : char;
  errmsg : string;

begin
  // Setup the API to use local USB devices
  if yRegisterHub('usb', errmsg)<>YAPI_SUCCESS then
  begin
    Write('RegisterHub error: '+errmsg);
    exit;
  end;

  module := yFindModule(serial);
  refresh(module);

  repeat
    read(c);
    case c of
     'r': refresh(module);
     'b': beacon(module,Y_BEACON_ON);
     ' ': beacon(module,Y_BEACON_OFF);
    end;
  until  c = 'x';
  yFreeAPI();
end.
```

Each property `xxx` of the module can be read thanks to a method of type `get_xxxx()`, and properties which are not read-only can be modified with the help of the `set_xxx()` method. For more details regarding the used functions, refer to the API chapters.

Changing the module settings

When you want to modify the settings of a module, you only need to call the corresponding `set_xxx()` function. However, this modification is performed only in the random access memory (RAM) of the module: if the module is restarted, the modifications are lost. To memorize them persistently, it is necessary to ask the module to save its current configuration in its permanent memory. To do so, use the `saveToFlash()` method. Inversely, it is possible to force the module to forget its current settings by using the `revertFromFlash()` method. The short example below allows you to modify the logical name of a module.

```
program savesettings;
{$APPTYPE CONSOLE}
```

```
uses
  SysUtils,
  yocto_api;

const
  serial = 'METEOMK1-123456'; // use serial number or logical name

var
  module  : TYModule;
  errmsg  : string;
  newname : string;

begin
  // Setup the API to use local USB devices
  if yRegisterHub('usb', errmsg)<>YAPI_SUCCESS then
  begin
    Write('RegisterHub error: '+errmsg);
    exit;
  end;

  module := yFindModule(serial);
  if (not(module.isOnline)) then
   begin
     writeln('Module not connected (check identification and USB cable)');
     exit;
   end;

  Writeln('Current logical name : '+module.get_logicalName());
  Write('Enter new name : ');
  Readln(newname);
  if (not(yCheckLogicalName(newname))) then
   begin
     Writeln('invalid logical name');
     exit;
   end;
  module.set_logicalName(newname);
  module.saveToFlash();
  yFreeAPI();
  Writeln('logical name is now : '+module.get_logicalName());
end.
```

Warning: the number of write cycles of the nonvolatile memory of the module is limited. When this limit is reached, nothing guaranties that the saving process is performed correctly. This limit, linked to the technology employed by the module micro-processor, is located at about 100000 cycles. In short, you can use the `saveToFlash()` function only 100000 times in the life of the module. Make sure you do not call this function within a loop.

Listing the modules

Obtaining the list of the connected modules is performed with the `yFirstModule()` function which returns the first module found. Then, you only need to call the `nextModule()` function of this object to find the following modules, and this as long as the returned value is not `nil`. Below a short example listing the connected modules.

```
program inventory;
{$APPTYPE CONSOLE}
uses
  SysUtils,
  yocto_api;

var
  module : TYModule;
  errmsg : string;

begin
  // Setup the API to use local USB devices
  if yRegisterHub('usb', errmsg)<>YAPI_SUCCESS then
  begin
    Write('RegisterHub error: '+errmsg);
    exit;
  end;

  Writeln('Device list');
```

```
  module := yFirstModule();
  while module<>nil  do
   begin
     Writeln( module.get_serialNumber()+' ('+module.get_productName()+')');
     module := module.nextModule();
   end;
  yFreeAPI();

end.
```

14.4. Error handling

When you implement a program which must interact with USB modules, you cannot disregard error handling. Inevitably, there will be a time when a user will have unplugged the device, either before running the software, or even while the software is running. The Yoctopuce library is designed to help you support this kind of behavior, but your code must nevertheless be conceived to interpret in the best possible way the errors indicated by the library.

The simplest way to work around the problem is the one used in the short examples provided in this chapter: before accessing a module, check that it is online with the `isOnline` function, and then hope that it will stay so during the fraction of a second necessary for the following code lines to run. This method is not perfect, but it can be sufficient in some cases. You must however be aware that you cannot completely exclude an error which would occur after the call to `isOnline` and which could crash the software. The only way to prevent this is to implement one of the two error handling techniques described below.

The method recommended by most programming languages for unpredictable error handling is the use of exceptions. By default, it is the behavior of the Yoctopuce library. If an error happens while you try to access a module, the library throws an exception. In this case, there are three possibilities:

- If your code catches the exception and handles it, everything goes well.
- If your program is running in debug mode, you can relatively easily determine where the problem happened and view the explanatory message linked to the exception.
- Otherwise... the exception makes your program crash, bang!

As this latest situation is not the most desirable, the Yoctopuce library offers another possibility for error handling, allowing you to create a robust program without needing to catch exceptions at every line of code. You simply need to call the `YAPI.DisableExceptions()` function to commute the library to a mode where exceptions for all the functions are systematically replaced by specific return values, which can be tested by the caller when necessary. For each function, the name of each return value in case of error is systematically documented in the library reference. The name always follows the same logic: a `get_state()` method returns a `Y_STATE_INVALID` value, a `get_currentValue` method returns a `Y_CURRENTVALUE_INVALID` value, and so on. In any case, the returned value is of the expected type and is not a null pointer which would risk crashing your program. At worst, if you display the value without testing it, it will be outside the expected bounds for the returned value. In the case of functions which do not normally return information, the return value is `YAPI_SUCCESS` if everything went well, and a different error code in case of failure.

When you work without exceptions, you can obtain an error code and an error message explaining the source of the error. You can request them from the object which returned the error, calling the `errType()` and `errMessage()` methods. Their returned values contain the same information as in the exceptions when they are active.

15. Using the Yocto-Meteo with Python

Python is an interpreted object oriented language developed by Guido van Rossum. Among its advantages is the fact that it is free, and the fact that it is available for most platforms, Windows as well as UNIX. It is an ideal language to write small scripts on a napkin. The Yoctopuce library is compatible with Python 2.6+ and 3+. It works under Windows, Mac OS X, and Linux, Intel as well as ARM. The library was tested with Python 2.6 and Python 3.2. Python interpreters are available on the Python web site[1].

15.1. Source files

The Yoctopuce library classes[2] for Python that you will use are provided as source files. Copy all the content of the *Sources* directory in the directory of your choice and add this directory to the *PYTHONPATH* environment variable. If you use an IDE to program in Python, refer to its documentation to configure it so that it automatically finds the API source files.

15.2. Dynamic library

A section of the low-level library is written in C, but you should not need to interact directly with it: it is provided as a DLL under Windows, as a *.so* files under UNIX, and as a *.dylib* file under Mac OS X. Everything was done to ensure the simplest possible interaction from Python: the distinct versions of the dynamic library corresponding to the distinct operating systems and architectures are stored in the *cdll* directory. The API automatically loads the correct file during its initialization. You should not have to worry about it.

If you ever need to recompile the dynamic library, its complete source code is located in the Yoctopuce C++ library.

In order to keep them simple, all the examples provided in this documentation are console applications. Naturally, the libraries function in a strictly identical manner if you integrate them in an application with a graphical interface.

15.3. Control of the Humidity function

A few lines of code are enough to use a Yocto-Meteo. Here is the skeleton of a Python code snipplet to use the Humidity function.

1 http://www.python.org/download/
2 www.yoctopuce.com/EN/libraries.php

```
[...]

errmsg=YRefParam()
#Get access to your device, connected locally on USB for instance
YAPI.RegisterHub("usb",errmsg)
humidity = YHumidity.FindHumidity("METEOMK1-123456.humidity")

# Hot-plug is easy: just check that the device is online
if humidity.isOnline():
    #Use humidity.get_currentValue()
    ...

[...]
```

Let's look at these lines in more details.

YAPI.RegisterHub

The `yAPI.RegisterHub` function initializes the Yoctopuce API and indicates where the modules should be looked for. When used with the parameter `"usb"`, it will use the modules locally connected to the computer running the library. If the initialization does not succeed, this function returns a value different from `YAPI.SUCCESS` and `errmsg` contains the error message.

YHumidity.FindHumidity

The `YHumidity.FindHumidity` function allows you to find a humidity sensor from the serial number of the module on which it resides and from its function name. You can use logical names as well, as long as you have initialized them. Let us imagine a Yocto-Meteo module with serial number *METEOMK1-123456* which you have named "*MyModule*", and for which you have given the *humidity* function the name "*MyFunction*". The following five calls are strictly equivalent, as long as "*MyFunction*" is defined only once.

```
humidity = YHumidity.FindHumidity("METEOMK1-123456.humidity")
humidity = YHumidity.FindHumidity("METEOMK1-123456.MyFunction")
humidity = YHumidity.FindHumidity("MyModule.humidity")
humidity = YHumidity.FindHumidity("MyModule.MyFunction")
humidity = YHumidity.FindHumidity("MyFunction")
```

`YHumidity.FindHumidity` returns an object which you can then use at will to control the humidity sensor.

isOnline

The `isOnline()` method of the object returned by `YHumidity.FindHumidity` allows you to know if the corresponding module is present and in working order.

get_currentValue

The `get_currentValue()` method of the object returned by `YHumidity.FindHumidity` provides the value of relative humidity currently measured by the sensor. The value returned is a floating number, equal to the current %RH.

YTemperature.FindTemperature and YPressure.FindPressure

Functions `YTemperature.FindTemperature` and `YPressure.FindPressure` allow you to work with both temperature et and pressure measures. You can handle them just as `YHumidity.FindHumidity`.

A real example

Launch Python and open the corresponding sample script provided in the directory **Examples/Doc-GettingStarted-Yocto-Meteo** of the Yoctopuce library.

In this example, you will recognize the functions explained above, but this time used with all side materials needed to make it work nicely as a small demo.

```
#!/usr/bin/python
# -*- coding: utf-8 -*-
import os, sys

from yocto_api import *
from yocto_humidity import *
from yocto_temperature import *
from yocto_pressure import *


def usage():
    scriptname = os.path.basename(sys.argv[0])
    print("Usage:")
    print(scriptname + ' <serial_number>')
    print(scriptname + ' <logical_name>')
    print(scriptname + ' any  ')
    sys.exit()


def die(msg):
    sys.exit(msg + ' (check USB cable)')


errmsg = YRefParam()

if len(sys.argv) < 2:
    usage()

target = sys.argv[1]

# Setup the API to use local USB devices
if YAPI.RegisterHub("usb", errmsg) != YAPI.SUCCESS:
    sys.exit("init error" + errmsg.value)

if target == 'any':
    # retreive any humidity sensor
    sensor = YHumidity.FirstHumidity()
    if sensor is None:
        die('No module connected')
    m = sensor.get_module()
    target = m.get_serialNumber()

else:
    m = YModule.FindModule(target)

if not m.isOnline():
    die('device not connected')

humSensor = YHumidity.FindHumidity(target + '.humidity')
pressSensor = YPressure.FindPressure(target + '.pressure')
tempSensor = YTemperature.FindTemperature(target + '.temperature')

while m.isOnline():
    print('%2.1f' % tempSensor.get_currentValue() + "Â°C   " +
          "%4.0f" % pressSensor.get_currentValue() + "mb  " +
          "%4.0f" % humSensor.get_currentValue() + "% (Ctrl-c to stop)  ")
    YAPI.Sleep(1000)
YAPI.FreeAPI()
```

15.4. Control of the module part

Each module can be controlled in a similar manner, you can find below a simple sample program displaying the main parameters of the module and enabling you to activate the localization beacon.

```
#!/usr/bin/python
# -*- coding: utf-8 -*-
import os, sys

from yocto_api import *


def usage():
    sys.exit("usage: demo <serial or logical name> [ON/OFF]")
```

```
errmsg = YRefParam()
if YAPI.RegisterHub("usb", errmsg) != YAPI.SUCCESS:
    sys.exit("RegisterHub error: " + str(errmsg))

if len(sys.argv) < 2:
    usage()

m = YModule.FindModule(sys.argv[1])  # # use serial or logical name

if m.isOnline():
    if len(sys.argv) > 2:
        if sys.argv[2].upper() == "ON":
            m.set_beacon(YModule.BEACON_ON)
        if sys.argv[2].upper() == "OFF":
            m.set_beacon(YModule.BEACON_OFF)

    print("serial:       " + m.get_serialNumber())
    print("logical name: " + m.get_logicalName())
    print("luminosity:   " + str(m.get_luminosity()))
    if m.get_beacon() == YModule.BEACON_ON:
        print("beacon:       ON")
    else:
        print("beacon:       OFF")
    print("upTime:       " + str(m.get_upTime() / 1000) + " sec")
    print("USB current:  " + str(m.get_usbCurrent()) + " mA")
    print("logs:\n" + m.get_lastLogs())
else:
    print(sys.argv[1] + " not connected (check identification and USB cable)")
YAPI.FreeAPI()
```

Each property `xxx` of the module can be read thanks to a method of type `YModule.get_xxxx()`, and properties which are not read-only can be modified with the help of the `YModule.set_xxx()` method. For more details regarding the used functions, refer to the API chapters.

Changing the module settings

When you want to modify the settings of a module, you only need to call the corresponding `YModule.set_xxx()` function. However, this modification is performed only in the random access memory (RAM) of the module: if the module is restarted, the modifications are lost. To memorize them persistently, it is necessary to ask the module to save its current configuration in its permanent memory. To do so, use the `YModule.saveToFlash()` method. Inversely, it is possible to force the module to forget its current settings by using the `YModule.revertFromFlash()` method. The short example below allows you to modify the logical name of a module.

```
#!/usr/bin/python
# -*- coding: utf-8 -*-
import os, sys

from yocto_api import *


def usage():
    sys.exit("usage: demo <serial or logical name> <new logical name>")


if len(sys.argv) != 3:
    usage()

errmsg = YRefParam()
if YAPI.RegisterHub("usb", errmsg) != YAPI.SUCCESS:
    sys.exit("RegisterHub error: " + str(errmsg))

m = YModule.FindModule(sys.argv[1])  # use serial or logical name
if m.isOnline():
    newname = sys.argv[2]
    if not YAPI.CheckLogicalName(newname):
        sys.exit("Invalid name (" + newname + ")")
    m.set_logicalName(newname)
    m.saveToFlash()  # do not forget this
    print("Module: serial= " + m.get_serialNumber() + " / name= " + m.get_logicalName())
else:
    sys.exit("not connected (check identification and USB cable")
YAPI.FreeAPI()
```

Warning: the number of write cycles of the nonvolatile memory of the module is limited. When this limit is reached, nothing guaranties that the saving process is performed correctly. This limit, linked to the technology employed by the module micro-processor, is located at about 100000 cycles. In short, you can use the `YModule.saveToFlash()` function only 100000 times in the life of the module. Make sure you do not call this function within a loop.

Listing the modules

Obtaining the list of the connected modules is performed with the `YModule.yFirstModule()` function which returns the first module found. Then, you only need to call the `nextModule()` function of this object to find the following modules, and this as long as the returned value is not `null`. Below a short example listing the connected modules.

```
#!/usr/bin/python
# -*- coding: utf-8 -*-
import os, sys


from yocto_api import *

errmsg = YRefParam()

# Setup the API to use local USB devices
if YAPI.RegisterHub("usb", errmsg) != YAPI.SUCCESS:
    sys.exit("init error" + str(errmsg))

print('Device list')

module = YModule.FirstModule()
while module is not None:
    print(module.get_serialNumber() + ' (' + module.get_productName() + ')')
    module = module.nextModule()
YAPI.FreeAPI()
```

15.5. Error handling

When you implement a program which must interact with USB modules, you cannot disregard error handling. Inevitably, there will be a time when a user will have unplugged the device, either before running the software, or even while the software is running. The Yoctopuce library is designed to help you support this kind of behavior, but your code must nevertheless be conceived to interpret in the best possible way the errors indicated by the library.

The simplest way to work around the problem is the one used in the short examples provided in this chapter: before accessing a module, check that it is online with the `isOnline` function, and then hope that it will stay so during the fraction of a second necessary for the following code lines to run. This method is not perfect, but it can be sufficient in some cases. You must however be aware that you cannot completely exclude an error which would occur after the call to `isOnline` and which could crash the software. The only way to prevent this is to implement one of the two error handling techniques described below.

The method recommended by most programming languages for unpredictable error handling is the use of exceptions. By default, it is the behavior of the Yoctopuce library. If an error happens while you try to access a module, the library throws an exception. In this case, there are three possibilities:

- If your code catches the exception and handles it, everything goes well.
- If your program is running in debug mode, you can relatively easily determine where the problem happened and view the explanatory message linked to the exception.
- Otherwise... the exception makes your program crash, bang!

As this latest situation is not the most desirable, the Yoctopuce library offers another possibility for error handling, allowing you to create a robust program without needing to catch exceptions at every line of code. You simply need to call the `YAPI.DisableExceptions()` function to commute the library to a mode where exceptions for all the functions are systematically replaced by specific return values, which can be tested by the caller when necessary. For each function, the name of each return value in case of error is systematically documented in the library reference. The name always follows the same logic: a `get_state()` method returns a `Y_STATE_INVALID` value, a `get_currentValue` method returns a `Y_CURRENTVALUE_INVALID` value, and so on. In any case, the returned value is of the expected type and is not a null pointer which would risk crashing your program. At worst, if you display the value without testing it, it will be outside the expected bounds for the returned value. In the case of functions which do not normally return information, the return value is `YAPI_SUCCESS` if everything went well, and a different error code in case of failure.

When you work without exceptions, you can obtain an error code and an error message explaining the source of the error. You can request them from the object which returned the error, calling the `errType()` and `errMessage()` methods. Their returned values contain the same information as in the exceptions when they are active.

16. Using the Yocto-Meteo with Java

Java is an object oriented language created by Sun Microsystem. Beside being free, its main strength is its portability. Unfortunately, this portability has an excruciating price. In Java, hardware abstraction is so high that it is almost impossible to work directly with the hardware. Therefore, the Yoctopuce API does not support native mode in regular Java. The Java API needs a Virtual Hub to communicate with Yoctopuce devices.

16.1. Getting ready

Go to the Yoctopuce web site and download the following items:

- The Java programming library[1]
- The VirtualHub software[2] for Windows, Mac OS X or Linux, depending on your OS

The library is available as source files as well as a *jar* file. Decompress the library files in a folder of your choice, connect your modules, run the VirtualHub software, and you are ready to start your first tests. You do not need to install any driver.

In order to keep them simple, all the examples provided in this documentation are console applications. Naturally, the libraries function in a strictly identical manner if you integrate them in an application with a graphical interface.

16.2. Control of the Humidity function

A few lines of code are enough to use a Yocto-Meteo. Here is the skeleton of a Java code snippet to use the Humidity function.

```
[...]

// Get access to your device, connected locally on USB for instance
YAPI.RegisterHub("127.0.0.1");
humidity = YHumidity.FindHumidity("METEOMK1-123456.humidity");

// Hot-plug is easy: just check that the device is online
if (humidity.isOnline())
{
    // Use humidity.get_currentValue()
    [...]
```

[1] www.yoctopuce.com/EN/libraries.php
[2] www.yoctopuce.com/EN/virtualhub.php

```
}

[...]
```

Let us look at these lines in more details.

YAPI.RegisterHub

The `yAPI.RegisterHub` function initializes the Yoctopuce API and indicates where the modules should be looked for. The parameter is the address of the Virtual Hub able to see the devices. If the initialization does not succeed, an exception is thrown.

YHumidity.FindHumidity

The `YHumidity.FindHumidity` function allows you to find a humidity sensor from the serial number of the module on which it resides and from its function name. You can use logical names as well, as long as you have initialized them. Let us imagine a Yocto-Meteo module with serial number *METEOMK1-123456* which you have named "*MyModule*", and for which you have given the *humidity* function the name "*MyFunction*". The following five calls are strictly equivalent, as long as "*MyFunction*" is defined only once.

```
humidity = YHumidity.FindHumidity("METEOMK1-123456.humidity")
humidity = YHumidity.FindHumidity("METEOMK1-123456.MyFunction")
humidity = YHumidity.FindHumidity("MyModule.humidity")
humidity = YHumidity.FindHumidity("MyModule.MyFunction")
humidity = YHumidity.FindHumidity("MyFunction")
```

`YHumidity.FindHumidity` returns an object which you can then use at will to control the humidity sensor.

isOnline

The `isOnline()` method of the object returned by `YHumidity.FindHumidity` allows you to know if the corresponding module is present and in working order.

get_currentValue

The `get_currentValue()` method of the object returned by `YHumidity.FindHumidity` provides the value of relative humidity currently measured by the sensor. The value returned is a floating number, equal to the current %RH.

YTemperature.FindTemperature and YPressure.FindPressure

Functions `YTemperature.FindTemperature` and `YPressure.FindPressure` allow you to work with both temperature et and pressure measures. You can handle them just as `YHumidity.FindHumidity`.

A real example

Launch you Java environment and open the corresponding sample project provided in the directory **Examples/Doc-GettingStarted-Yocto-Meteo** of the Yoctopuce library.

In this example, you will recognize the functions explained above, but this time used with all the side materials needed to make it work nicely as a small demo.

```
import com.yoctopuce.YoctoAPI.*;

public class Demo {

    public static void main(String[] args)
    {
        try {
            // setup the API to use local VirtualHub
            YAPI.RegisterHub("127.0.0.1");
        } catch (YAPI_Exception ex) {
            System.out.println("Cannot contact VirtualHub on 127.0.0.1 (" +
ex.getLocalizedMessage() + ")");
            System.out.println("Ensure that the VirtualHub application is running");
```

```
            System.exit(1);
        }

        YHumidity hsensor;
        YTemperature tsensor;
        YPressure psensor;

        if (args.length == 0) {
            hsensor = YHumidity.FirstHumidity();
            tsensor = YTemperature.FirstTemperature();
            psensor = YPressure.FirstPressure();
            if (hsensor == null || tsensor == null || psensor == null) {
                System.out.println("No module connected (check USB cable)");
                System.exit(1);
            }
        } else {
            hsensor = YHumidity.FindHumidity(args[0] + ".humidity");
            tsensor = YTemperature.FindTemperature(args[0] + ".temperature");
            psensor = YPressure.FindPressure(args[0] + ".pressure");
        }

        while (true) {
            try {
                System.out.println("Current humidity: " + hsensor.get_currentValue() + "
%RH");
                System.out.println("Current temperature: " + tsensor.get_currentValue() + "
Â°C");
                System.out.println("Current pressure: " + psensor.get_currentValue() + "
hPa");
                System.out.println("  (press Ctrl-C to exit)");
                YAPI.Sleep(1000);
            } catch (YAPI_Exception ex) {
                System.out.println("Module not connected (check identification and USB
cable)");
                break;
            }
        }
        YAPI.FreeAPI();
    }
}
```

16.3. Control of the module part

Each module can be controlled in a similar manner, you can find below a simple sample program displaying the main parameters of the module and enabling you to activate the localization beacon.

```
import com.yoctopuce.YoctoAPI.*;
import java.util.logging.Level;
import java.util.logging.Logger;

public class Demo {

    public static void main(String[] args)
    {
        try {
            // setup the API to use local VirtualHub
            YAPI.RegisterHub("127.0.0.1");
        } catch (YAPI_Exception ex) {
            System.out.println("Cannot contact VirtualHub on 127.0.0.1 (" +
ex.getLocalizedMessage() + ")");
            System.out.println("Ensure that the VirtualHub application is running");
            System.exit(1);
        }
        System.out.println("usage: demo [serial or logical name] [ON/OFF]");

        YModule module;
        if (args.length == 0) {
            module = YModule.FirstModule();
            if (module == null) {
                System.out.println("No module connected (check USB cable)");
                System.exit(1);
            }
```

```
        } else {
            module = YModule.FindModule(args[0]);  // use serial or logical name
        }

        try {
            if (args.length > 1) {
                if (args[1].equalsIgnoreCase("ON")) {
                    module.setBeacon(YModule.BEACON_ON);
                } else {
                    module.setBeacon(YModule.BEACON_OFF);
                }
            }
            System.out.println("serial:       " + module.get_serialNumber());
            System.out.println("logical name: " + module.get_logicalName());
            System.out.println("luminosity:   " + module.get_luminosity());
            if (module.get_beacon() == YModule.BEACON_ON) {
                System.out.println("beacon:       ON");
            } else {
                System.out.println("beacon:       OFF");
            }
            System.out.println("upTime:       " + module.get_upTime() / 1000 + " sec");
            System.out.println("USB current:  " + module.get_usbCurrent() + " mA");
            System.out.println("logs:\n" + module.get_lastLogs());
        } catch (YAPI_Exception ex) {
            System.out.println(args[1] + " not connected (check identification and USB
cable)");
        }
        YAPI.FreeAPI();
    }
}
```

Each property `xxx` of the module can be read thanks to a method of type `YModule.get_xxxx()`, and properties which are not read-only can be modified with the help of the `YModule.set_xxx()` method. For more details regarding the used functions, refer to the API chapters.

Changing the module settings

When you want to modify the settings of a module, you only need to call the corresponding `YModule.set_xxx()` function. However, this modification is performed only in the random access memory (RAM) of the module: if the module is restarted, the modifications are lost. To memorize them persistently, it is necessary to ask the module to save its current configuration in its permanent memory. To do so, use the `YModule.saveToFlash()` method. Inversely, it is possible to force the module to forget its current settings by using the `YModule.revertFromFlash()` method. The short example below allows you to modify the logical name of a module.

```
import com.yoctopuce.YoctoAPI.*;

public class Demo {

    public static void main(String[] args)
    {
        try {
            // setup the API to use local VirtualHub
            YAPI.RegisterHub("127.0.0.1");
        } catch (YAPI_Exception ex) {
            System.out.println("Cannot contact VirtualHub on 127.0.0.1 (" +
ex.getLocalizedMessage() + ")");
            System.out.println("Ensure that the VirtualHub application is running");
            System.exit(1);
        }

        if (args.length != 2) {
            System.out.println("usage: demo <serial or logical name> <new logical name>");
            System.exit(1);
        }

        YModule m;
        String newname;

        m = YModule.FindModule(args[0]); // use serial or logical name

        try {
            newname = args[1];
            if (!YAPI.CheckLogicalName(newname))
```

```
                {
                    System.out.println("Invalid name (" + newname + ")");
                    System.exit(1);
                }

                m.set_logicalName(newname);
                m.saveToFlash(); // do not forget this

                System.out.println("Module: serial= " + m.get_serialNumber());
                System.out.println(" / name= " + m.get_logicalName());
            } catch (YAPI_Exception ex) {
                System.out.println("Module " + args[0] + "not connected (check identification
and USB cable)");
                System.out.println(ex.getMessage());
                System.exit(1);
            }

            YAPI.FreeAPI();
        }
}
```

Warning: the number of write cycles of the nonvolatile memory of the module is limited. When this limit is reached, nothing guaranties that the saving process is performed correctly. This limit, linked to the technology employed by the module micro-processor, is located at about 100000 cycles. In short, you can use the `YModule.saveToFlash()` function only 100000 times in the life of the module. Make sure you do not call this function within a loop.

Listing the modules

Obtaining the list of the connected modules is performed with the `YModule.yFirstModule()` function which returns the first module found. Then, you only need to call the `nextModule()` function of this object to find the following modules, and this as long as the returned value is not `null`. Below a short example listing the connected modules.

```
import com.yoctopuce.YoctoAPI.*;

public class Demo {

    public static void main(String[] args)
    {
        try {
            // setup the API to use local VirtualHub
            YAPI.RegisterHub("127.0.0.1");
        } catch (YAPI_Exception ex) {
            System.out.println("Cannot contact VirtualHub on 127.0.0.1 (" +
ex.getLocalizedMessage() + ")");
            System.out.println("Ensure that the VirtualHub application is running");
            System.exit(1);
        }

        System.out.println("Device list");
        YModule module = YModule.FirstModule();
        while (module != null) {
            try {
                System.out.println(module.get_serialNumber() + " (" +
module.get_productName() + ")");
            } catch (YAPI_Exception ex) {
                break;
            }
            module = module.nextModule();
        }
        YAPI.FreeAPI();
    }
}
```

16.4. Error handling

When you implement a program which must interact with USB modules, you cannot disregard error handling. Inevitably, there will be a time when a user will have unplugged the device, either before running the software, or even while the software is running. The Yoctopuce library is designed to help you support this kind of behavior, but your code must nevertheless be conceived to interpret in the best possible way the errors indicated by the library.

The simplest way to work around the problem is the one used in the short examples provided in this chapter: before accessing a module, check that it is online with the `isOnline` function, and then hope that it will stay so during the fraction of a second necessary for the following code lines to run. This method is not perfect, but it can be sufficient in some cases. You must however be aware that you cannot completely exclude an error which would occur after the call to `isOnline` and which could crash the software.

In the Java API, error handling is implemented with exceptions. Therefore you must catch and handle correctly all exceptions that might be thrown by the API if you do not want your software to crash as soon as you unplug a device.

17. Using the Yocto-Meteo with Android

To tell the truth, Android is not a programming language, it is an operating system developed by Google for mobile appliances such as smart phones and tablets. But it so happens that under Android everything is programmed with the same programming language: Java. Nevertheless, the programming paradigms and the possibilities to access the hardware are slightly different from classical Java, and this justifies a separate chapter on Android programming.

17.1. Native access and VirtualHub

In the opposite to the classical Java API, the Java for Android API can access USB modules natively. However, as there is no VirtualHub running under Android, it is not possible to remotely control Yoctopuce modules connected to a machine under Android. Naturally, the Java for Android API remains perfectly able to connect itself to a VirtualHub running on another OS.

17.2. Getting ready

Go to the Yoctopuce web site and download the Java for Android programming library[1]. The library is available as source files, and also as a jar file. Connect your modules, decompress the library files in the directory of your choice, and configure your Android programming environment so that it can find them.

To keep them simple, all the examples provided in this documentation are snippets of Android applications. You must integrate them in your own Android applications to make them work. However, your can find complete applications in the examples provided with the Java for Android library.

17.3. Compatibility

In an ideal world, you would only need to have a smart phone running under Android to be able to make Yoctopuce modules work. Unfortunately, it is not quite so in the real world. A machine running under Android must fulfil to a few requirements to be able to manage Yoctopuce USB modules natively.

[1] www.yoctopuce.com/EN/libraries.php

Android 4.x

Android 4.0 (api 14) and following are officially supported. Theoretically, support of USB *host* functions since Android 3.1. But be aware that the Yoctopuce Java for Android API is regularly tested only from Android 4 onwards.

USB *host* support

Naturally, not only must your machine have a USB port, this port must also be able to run in *host* mode. In *host* mode, the machine literally takes control of the devices which are connected to it. The USB ports of a desktop computer, for example, work in *host* mode. The opposite of the *host* mode is the *device* mode. USB keys, for instance, work in *device* mode: they must be controlled by a *host*. Some USB ports are able to work in both modes, they are *OTG* (*On The Go*) ports. It so happens that many mobile devices can only work in *device* mode: they are designed to be connected to a charger or a desktop computer, and nothing else. It is therefore highly recommended to pay careful attention to the technical specifications of a product working under Android before hoping to make Yoctopuce modules work with it.

Unfortunately, having a correct version of Android and USB ports working in *host* mode is not enough to guaranty that Yoctopuce modules will work well under Android. Indeed, some manufacturers configure their Android image so that devices other than keyboard and mass storage are ignored, and this configuration is hard to detect. As things currently stand, the best way to know if a given Android machine works with Yoctopuce modules consists in trying.

Supported hardware

The library is tested and validated on the following machines:

- Samsung Galaxy S3
- Samsung Galaxy Note 2
- Google Nexus 5
- Google Nexus 7
- Acer Iconia Tab A200
- Asus Tranformer Pad TF300T
- Kurio 7

If your Android machine is not able to control Yoctopuce modules natively, you still have the possibility to remotely control modules driven by a VirtualHub on another OS, or a YoctoHub [2].

17.4. Activating the USB port under Android

By default, Android does not allow an application to access the devices connected to the USB port. To enable your application to interact with a Yoctopuce module directly connected on your tablet on a USB port, a few additional steps are required. If you intend to interact only with modules connected on another machine through the network, you can ignore this section.

In your `AndroidManifest.xml`, you must declare using the "USB Host" functionality by adding the `<uses-feature android:name="android.hardware.usb.host" />` tag in the `manifest` section.

```
<manifest ...>
    ...
    <uses-feature android:name="android.hardware.usb.host" />;
    ...
</manifest>
```

When first accessing a Yoctopuce module, Android opens a window to inform the user that the application is going to access the connected module. The user can deny or authorize access to the device. If the user authorizes the access, the application can access the connected device as long as

[2] Yoctohubs are a plug and play way to add network connectivity to your Yoctopuce devices. more info on http://www.yoctopuce.com/EN/products/category/extensions-and-networking

it stays connected. To enable the Yoctopuce library to correctly manage these authorizations, your must provide a pointer on the application context by calling the EnableUSBHost method of the YAPI class before the first USB access. This function takes as arguments an object of the `android.content.Context` class (or of a subclass). As the Activity class is a subclass of `Context`, it is simpler to call `YAPI.EnableUSBHost(this);` in the method `onCreate` of your application. If the object passed as parameter is not of the correct type, a `YAPI_Exception` exception is generated.

```
...
@Override
public void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    try {
            // Pass the application Context to the Yoctopuce Library
        YAPI.EnableUSBHost(this);
        } catch (YAPI_Exception e) {
            Log.e("Yocto",e.getLocalizedMessage());
        }
}
...
```

Autorun

It is possible to register your application as a default application for a USB module. In this case, as soon as a module is connected to the system, the application is automatically launched. You must add *<action android:name="android.hardware.usb.action.USB_DEVICE_ATTACHED"/>* in the section *<intent-filter>* of the main activity. The section *<activity>* must have a pointer to an XML file containing the list of USB modules which can run the application.

```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    ...
    <uses-feature android:name="android.hardware.usb.host" />
    ...
    <application ... >
        <activity
            android:name=".MainActivity" >
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <action android:name="android.hardware.usb.action.USB_DEVICE_ATTACHED" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>

            <meta-data
                android:name="android.hardware.usb.action.USB_DEVICE_ATTACHED"
                android:resource="@xml/device_filter" />
        </activity>
    </application>

</manifest>
```

The XML file containing the list of modules allowed to run the application must be saved in the res/xml directory. This file contains a list of USB *vendorId* and *deviceID* in decimal. The following example runs the application as soon as a Yocto-Relay or a YoctoPowerRelay is connected. You can find the vendorID and the deviceID of Yoctopuce modules in the characteristics section of the documentation.

```
<?xml version="1.0" encoding="utf-8"?>

<resources>
    <usb-device vendor-id="9440" product-id="12" />
    <usb-device vendor-id="9440" product-id="13" />
</resources>
```

17.5. Control of the Humidity function

A few lines of code are enough to use a Yocto-Meteo. Here is the skeleton of a Java code snippet to use the Humidity function.

```
[...]

// Retrieving the object representing the module (connected here locally by USB)
YAPI.EnableUSBHost(this);
YAPI.RegisterHub("usb");
humidity = YHumidity.FindHumidity("METEOMK1-123456.humidity");

// Hot-plug is easy: just check that the device is online
if (humidity.isOnline())
   { //Use humidity.get_currentValue()
     ...
   }

[...]
```

Let us look at these lines in more details.

YAPI.EnableUSBHost

The `YAPI.EnableUSBHost` function initializes the API with the Context of the current application. This function takes as argument an object of the `android.content.Context` class (or of a subclass). If you intend to connect your application only to other machines through the network, this function is facultative.

YAPI.RegisterHub

The `yAPI.RegisterHub` function initializes the Yoctopuce API and indicates where the modules should be looked for. The parameter is the address of the virtual hub able to see the devices. If the string "usb" is passed as parameter, the API works with modules locally connected to the machine. If the initialization does not succeed, an exception is thrown.

YHumidity.FindHumidity

The `YHumidity.FindHumidity` function allows you to find a humidity sensor from the serial number of the module on which it resides and from its function name. You can use logical names as well, as long as you have initialized them. Let us imagine a Yocto-Meteo module with serial number *METEOMK1-123456* which you have named "*MyModule*", and for which you have given the *humidity* function the name "*MyFunction*". The following five calls are strictly equivalent, as long as "*MyFunction*" is defined only once.

```
humidity = YHumidity.FindHumidity("METEOMK1-123456.humidity")
humidity = YHumidity.FindHumidity("METEOMK1-123456.MyFunction")
humidity = YHumidity.FindHumidity("MyModule.humidity")
humidity = YHumidity.FindHumidity("MyModule.MyFunction")
humidity = YHumidity.FindHumidity("MyFunction")
```

`YHumidity.FindHumidity` returns an object which you can then use at will to control the humidity sensor.

isOnline

The `isOnline()` method of the object returned by `YHumidity.FindHumidity` allows you to know if the corresponding module is present and in working order.

get_currentValue

The `get_currentValue()` method of the object returned by `YHumidity.FindHumidity` provides the value of relative humidity currently measured by the sensor. The value returned is a floating number, equal to the current %RH.

YTemperature.FindTemperature and YPressure.FindPressure

Functions `YTemperature.FindTemperature` and `YPressure.FindPressure` allow you to work with both temperature et and pressure measures. You can handle them just as `YHumidity.FindHumidity`.

A real example

Launch you Java environment and open the corresponding sample project provided in the directory **Examples//Doc-Examples** of the Yoctopuce library.

In this example, you can recognize the functions explained above, but this time used with all the side materials needed to make it work nicely as a small demo.

```
package com.yoctopuce.doc_examples;

import android.app.Activity;
import android.os.Bundle;
import android.os.Handler;
import android.view.View;
import android.widget.AdapterView;
import android.widget.AdapterView.OnItemSelectedListener;
import android.widget.ArrayAdapter;
import android.widget.Spinner;
import android.widget.TextView;

import com.yoctopuce.YoctoAPI.YAPI;
import com.yoctopuce.YoctoAPI.YAPI_Exception;
import com.yoctopuce.YoctoAPI.YHumidity;
import com.yoctopuce.YoctoAPI.YModule;
import com.yoctopuce.YoctoAPI.YPressure;
import com.yoctopuce.YoctoAPI.YTemperature;

public class GettingStarted_Yocto_Meteo extends Activity implements OnItemSelectedListener
{

    private ArrayAdapter<String> aa;
    private String serial = "";
    private Handler handler = null;

    @Override
    public void onCreate(Bundle savedInstanceState)
    {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.gettingstarted_yocto_meteo);
        Spinner my_spin = (Spinner) findViewById(R.id.spinner1);
        my_spin.setOnItemSelectedListener(this);
        aa = new ArrayAdapter<String>(this, android.R.layout.simple_spinner_item);
        aa.setDropDownViewResource(android.R.layout.simple_spinner_dropdown_item);
        my_spin.setAdapter(aa);
        handler = new Handler();
    }

    @Override
    protected void onStart()
    {
        super.onStart();
        try {
            aa.clear();
            YAPI.EnableUSBHost(this);
            YAPI.RegisterHub("usb");
            YModule module = YModule.FirstModule();
            while (module != null) {
                if (module.get_productName().equals("Yocto-Meteo")) {
                    String serial = module.get_serialNumber();
                    aa.add(serial);
                }
                module = module.nextModule();
            }
        } catch (YAPI_Exception e) {
            e.printStackTrace();
        }
        aa.notifyDataSetChanged();
        handler.postDelayed(r, 500);
    }
```

```
    @Override
    protected void onStop()
    {
        super.onStop();
        handler.removeCallbacks(r);
        YAPI.FreeAPI();
    }

    @Override
    public void onItemSelected(AdapterView<?> parent, View view, int pos, long id)
    {
        serial = parent.getItemAtPosition(pos).toString();
    }

    @Override
    public void onNothingSelected(AdapterView<?> arg0)
    {
    }

    final Runnable r = new Runnable()
    {
        public void run()
        {
            if (serial != null) {
                YTemperature temp_sensor = YTemperature.FindTemperature(serial);
                try {
                    TextView view = (TextView) findViewById(R.id.tempfield);
                    view.setText(String.format("%.1f %s", temp_sensor.getCurrentValue(),
temp_sensor.getUnit()));
                } catch (YAPI_Exception e) {
                    e.printStackTrace();

                }
                YHumidity hum_sensor = YHumidity.FindHumidity(serial);
                try {
                    TextView view = (TextView) findViewById(R.id.humfield);
                    view.setText(String.format("%.1f %s", hum_sensor.getCurrentValue(),
hum_sensor.getUnit()));
                } catch (YAPI_Exception e) {
                    e.printStackTrace();

                }
                YPressure pres_sensor = YPressure.FindPressure(serial);
                try {
                    TextView view = (TextView) findViewById(R.id.presfield);
                    view.setText(String.format("%.1f %s", pres_sensor.getCurrentValue(),
pres_sensor.getUnit()));
                } catch (YAPI_Exception e) {
                    e.printStackTrace();

                }
            }
            handler.postDelayed(this, 1000);
        }
    };

}
```

17.6. Control of the module part

Each module can be controlled in a similar manner, you can find below a simple sample program displaying the main parameters of the module and enabling you to activate the localization beacon.

```
package com.yoctopuce.doc_examples;

import android.app.Activity;
import android.os.Bundle;
import android.view.View;
import android.widget.AdapterView;
import android.widget.AdapterView.OnItemSelectedListener;
import android.widget.ArrayAdapter;
import android.widget.Spinner;
```

```
import android.widget.Switch;
import android.widget.TextView;

import com.yoctopuce.YoctoAPI.YAPI;
import com.yoctopuce.YoctoAPI.YAPI_Exception;
import com.yoctopuce.YoctoAPI.YModule;

public class ModuleControl extends Activity implements OnItemSelectedListener
{

    private ArrayAdapter<String> aa;
    private YModule module = null;

    @Override
    public void onCreate(Bundle savedInstanceState)
    {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.modulecontrol);
        Spinner my_spin = (Spinner) findViewById(R.id.spinner1);
        my_spin.setOnItemSelectedListener(this);
        aa = new ArrayAdapter<String>(this, android.R.layout.simple_spinner_item);
        aa.setDropDownViewResource(android.R.layout.simple_spinner_dropdown_item);
        my_spin.setAdapter(aa);
    }

    @Override
    protected void onStart()
    {
        super.onStart();

        try {
            aa.clear();
            YAPI.EnableUSBHost(this);
            YAPI.RegisterHub("usb");
            YModule r = YModule.FirstModule();
            while (r != null) {
                String hwid = r.get_hardwareId();
                aa.add(hwid);
                r = r.nextModule();
            }
        } catch (YAPI_Exception e) {
            e.printStackTrace();
        }
        // refresh Spinner with detected relay
        aa.notifyDataSetChanged();
    }

    @Override
    protected void onStop()
    {
        super.onStop();
        YAPI.FreeAPI();
    }

    private void DisplayModuleInfo()
    {
        TextView field;
        if (module == null)
            return;
        try {
            field = (TextView) findViewById(R.id.serialfield);
            field.setText(module.getSerialNumber());
            field = (TextView) findViewById(R.id.logicalnamefield);
            field.setText(module.getLogicalName());
            field = (TextView) findViewById(R.id.luminosityfield);
            field.setText(String.format("%d%%", module.getLuminosity()));
            field = (TextView) findViewById(R.id.uptimefield);
            field.setText(module.getUpTime() / 1000 + " sec");
            field = (TextView) findViewById(R.id.usbcurrentfield);
            field.setText(module.getUsbCurrent() + " mA");
            Switch sw = (Switch) findViewById(R.id.beaconswitch);
            sw.setChecked(module.getBeacon() == YModule.BEACON_ON);
            field = (TextView) findViewById(R.id.logs);
            field.setText(module.get_lastLogs());

        } catch (YAPI_Exception e) {
            e.printStackTrace();
        }
```

```
    }

    @Override
    public void onItemSelected(AdapterView<?> parent, View view, int pos, long id)
    {
        String hwid = parent.getItemAtPosition(pos).toString();
        module = YModule.FindModule(hwid);
        DisplayModuleInfo();
    }

    @Override
    public void onNothingSelected(AdapterView<?> arg0)
    {
    }

    public void refreshInfo(View view)
    {
        DisplayModuleInfo();
    }

    public void toggleBeacon(View view)
    {
        if (module == null)
            return;
        boolean on = ((Switch) view).isChecked();

        try {
            if (on) {
                module.setBeacon(YModule.BEACON_ON);
            } else {
                module.setBeacon(YModule.BEACON_OFF);
            }
        } catch (YAPI_Exception e) {
            e.printStackTrace();
        }
    }
}
```

Each property `xxx` of the module can be read thanks to a method of type `YModule.get_xxxx()`, and properties which are not read-only can be modified with the help of the `YModule.set_xxx()` method. For more details regarding the used functions, refer to the API chapters.

Changing the module settings

When you want to modify the settings of a module, you only need to call the corresponding `YModule.set_xxx()` function. However, this modification is performed only in the random access memory (RAM) of the module: if the module is restarted, the modifications are lost. To memorize them persistently, it is necessary to ask the module to save its current configuration in its permanent memory. To do so, use the `YModule.saveToFlash()` method. Inversely, it is possible to force the module to forget its current settings by using the `YModule.revertFromFlash()` method. The short example below allows you to modify the logical name of a module.

```
package com.yoctopuce.doc_examples;

import android.app.Activity;
import android.os.Bundle;
import android.view.View;
import android.widget.AdapterView;
import android.widget.AdapterView.OnItemSelectedListener;
import android.widget.ArrayAdapter;
import android.widget.EditText;
import android.widget.Spinner;
import android.widget.TextView;
import android.widget.Toast;

import com.yoctopuce.YoctoAPI.YAPI;
import com.yoctopuce.YoctoAPI.YAPI_Exception;
import com.yoctopuce.YoctoAPI.YModule;

public class SaveSettings extends Activity implements OnItemSelectedListener
{

    private ArrayAdapter<String> aa;
    private YModule module = null;
```

```
@Override
public void onCreate(Bundle savedInstanceState)
{
    super.onCreate(savedInstanceState);
    setContentView(R.layout.savesettings);
    Spinner my_spin = (Spinner) findViewById(R.id.spinner1);
    my_spin.setOnItemSelectedListener(this);
    aa = new ArrayAdapter<String>(this, android.R.layout.simple_spinner_item);
    aa.setDropDownViewResource(android.R.layout.simple_spinner_dropdown_item);
    my_spin.setAdapter(aa);
}

@Override
protected void onStart()
{
    super.onStart();

    try {
        aa.clear();
        YAPI.EnableUSBHost(this);
        YAPI.RegisterHub("usb");
        YModule r = YModule.FirstModule();
        while (r != null) {
            String hwid = r.get_hardwareId();
            aa.add(hwid);
            r = r.nextModule();
        }
    } catch (YAPI_Exception e) {
        e.printStackTrace();
    }
    // refresh Spinner with detected relay
    aa.notifyDataSetChanged();
}

@Override
protected void onStop()
{
    super.onStop();
    YAPI.FreeAPI();
}

private void DisplayModuleInfo()
{
    TextView field;
    if (module == null)
        return;
    try {
        YAPI.UpdateDeviceList();// fixme
        field = (TextView) findViewById(R.id.logicalnamefield);
        field.setText(module.getLogicalName());
    } catch (YAPI_Exception e) {
        e.printStackTrace();
    }
}

@Override
public void onItemSelected(AdapterView<?> parent, View view, int pos, long id)
{
    String hwid = parent.getItemAtPosition(pos).toString();
    module = YModule.FindModule(hwid);
    DisplayModuleInfo();
}

@Override
public void onNothingSelected(AdapterView<?> arg0)
{
}

public void saveName(View view)
{
    if (module == null)
        return;

    EditText edit = (EditText) findViewById(R.id.newname);
    String newname = edit.getText().toString();
    try {
        if (!YAPI.CheckLogicalName(newname)) {
```

```
                Toast.makeText(getApplicationContext(), "Invalid name (" + newname + ")",
Toast.LENGTH_LONG).show();
                return;
            }
            module.set_logicalName(newname);
            module.saveToFlash(); // do not forget this
            edit.setText("");
        } catch (YAPI_Exception ex) {
            ex.printStackTrace();
        }
        DisplayModuleInfo();
    }

}
```

Warning: the number of write cycles of the nonvolatile memory of the module is limited. When this limit is reached, nothing guaranties that the saving process is performed correctly. This limit, linked to the technology employed by the module micro-processor, is located at about 100000 cycles. In short, you can use the `YModule.saveToFlash()` function only 100000 times in the life of the module. Make sure you do not call this function within a loop.

Listing the modules

Obtaining the list of the connected modules is performed with the `YModule.yFirstModule()` function which returns the first module found. Then, you only need to call the `nextModule()` function of this object to find the following modules, and this as long as the returned value is not `null`. Below a short example listing the connected modules.

```
package com.yoctopuce.doc_examples;

import android.app.Activity;
import android.os.Bundle;
import android.util.TypedValue;
import android.view.View;
import android.widget.LinearLayout;
import android.widget.TextView;

import com.yoctopuce.YoctoAPI.YAPI;
import com.yoctopuce.YoctoAPI.YAPI_Exception;
import com.yoctopuce.YoctoAPI.YModule;

public class Inventory extends Activity
{

    @Override
    public void onCreate(Bundle savedInstanceState)
    {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.inventory);
    }

    public void refreshInventory(View view)
    {
        LinearLayout layout = (LinearLayout) findViewById(R.id.inventoryList);
        layout.removeAllViews();

        try {
            YAPI.UpdateDeviceList();
            YModule module = YModule.FirstModule();
            while (module != null) {
                String line = module.get_serialNumber() + " (" + module.get_productName() +
")";
                TextView tx = new TextView(this);
                tx.setText(line);
                tx.setTextSize(TypedValue.COMPLEX_UNIT_SP, 20);
                layout.addView(tx);
                module = module.nextModule();
            }
        } catch (YAPI_Exception e) {
            e.printStackTrace();
        }
    }

    @Override
```

```
    protected void onStart()
    {
        super.onStart();
        try {
            YAPI.EnableUSBHost(this);
            YAPI.RegisterHub("usb");
        } catch (YAPI_Exception e) {
            e.printStackTrace();
        }
        refreshInventory(null);
    }

    @Override
    protected void onStop()
    {
        super.onStop();
        YAPI.FreeAPI();
    }

}
```

17.7. Error handling

When you implement a program which must interact with USB modules, you cannot disregard error handling. Inevitably, there will be a time when a user will have unplugged the device, either before running the software, or even while the software is running. The Yoctopuce library is designed to help you support this kind of behavior, but your code must nevertheless be conceived to interpret in the best possible way the errors indicated by the library.

The simplest way to work around the problem is the one used in the short examples provided in this chapter: before accessing a module, check that it is online with the `isOnline` function, and then hope that it will stay so during the fraction of a second necessary for the following code lines to run. This method is not perfect, but it can be sufficient in some cases. You must however be aware that you cannot completely exclude an error which would occur after the call to `isOnline` and which could crash the software.

In the Java API for Android, error handling is implemented with exceptions. Therefore you must catch and handle correctly all exceptions that might be thrown by the API if you do not want your software to crash soon as you unplug a device.

18. Advanced programming

The preceding chapters have introduced, in each available language, the basic programming functions which can be used with your Yocto-Meteo module. This chapter presents in a more generic manner a more advanced use of your module. Examples are provided in the language which is the most popular among Yoctopuce customers, that is C#. Nevertheless, you can find complete examples illustrating the concepts presented here in the programming libraries of each language.

To remain as concise as possible, examples provided in this chapter do not perform any error handling. Do not copy them "as is" in a production application.

18.1. Event programming

The methods to manage Yoctopuce modules which we presented to you in preceding chapters were polling functions, consisting in permanently asking the API if something had changed. While easy to understand, this programming technique is not the most efficient, nor the most reactive. Therefore, the Yoctopuce programming API also provides an event programming model. This technique consists in asking the API to signal by itself the important changes as soon as they are detected. Each time a key parameter is modified, the API calls a callback function which you have defined in advance.

Detecting module arrival and departure

Hot-plug management is important when you work with USB modules because, sooner or later, you will have to connect or disconnect a module when your application is running. The API is designed to manage module unexpected arrival or departure in a transparent way. But your application must take this into account if it wants to avoid pretending to use a disconnected module.

Event programming is particularly useful to detect module connection/disconnection. Indeed, it is simpler to be told of new connections rather than to have to permanently list the connected modules to deduce which ones just arrived and which ones left. To be warned as soon as a module is connected, you need three pieces of code.

The callback
The callback is the function which is called each time a new Yoctopuce module is connected. It takes as parameter the relevant module.

```
 static void deviceArrival(YModule m)
{
  Console.WriteLine("New module  : " + m.get_serialNumber());
}
```

Initialization
You must then tell the API that it must call the callback when a new module is connected.

```
YAPI.RegisterDeviceArrivalCallback(deviceArrival);
```

Note that if modules are already connected when the callback is registered, the callback is called for each of the already connected modules.

Triggering callbacks
A classis issue of callback programming is that these callbacks can be triggered at any time, including at times when the main program is not ready to receive them. This can have undesired side effects, such as dead-locks and other race conditions. Therefore, in the Yoctopuce API, module arrival/departure callbacks are called only when the `UpdateDeviceList()` function is running. You only need to call `UpdateDeviceList()` at regular intervals from a timer or from a specific thread to precisely control when the calls to these callbacks happen:

```
// waiting loop managing callbacks
while (true)
{
    // module arrival / departure callback
    YAPI.UpdateDeviceList(ref errmsg);
    // non active waiting time managing other callbacks
    YAPI.Sleep(500, ref errmsg);
}
```

In a similar way, it is possible to have a callback when a module is disconnected. You can find a complete example implemented in your favorite programming language in the *Examples/Prog-EventBased* directory of the corresponding library.

Be aware that in most programming languages, callbacks must be global procedures, and not methods. If you wish for the callback to call the method of an object, define your callback as a global procedure which then calls your method.

Detecting a modification in the value of a sensor

The Yoctopuce API also provides a callback system allowing you to be notified automatically with the value of any sensor, either when the value has changed in a significant way or periodically at a preset frequency. The code necessary to do so is rather similar to the code used to detect when a new module has been connected.

This technique is useful in particular if you want to detect very quick value changes (within a few milliseconds), as it is much more efficient than reading repeatedly the sensor value and therefore gives better performances.

Callback invocation
To enable a better control, value change callbacks are only called when the `YAPI.Sleep()` and `YAPI.HandleEvents()` functions are running. Therefore, you must call one of these functions at a regular interval, either from a timer or from a parallel thread.

```
while (true)
{
  // inactive waiting loop allowing you to trigger
  // value change callbacks
  YAPI.Sleep(500, ref errmsg);
}
```

In programming environments where only the interface thread is allowed to interact with the user, it is often appropriate to call `YAPI.HandleEvents()` from this thread.

The value change callback

This type of callback is called when a temperature sensor changes in a significant way. It takes as parameter the relevant function and the new value, as a character string.[1]

```
static void valueChangeCallback(YTemperature fct, string value)
{
  Console.WriteLine(fct.get_hardwareId() + "=" + value);
}
```

In most programming languages, callbacks are global procedures, not methods. If you wish for the callback to call a method of an object, define your callback as a global procedure which then calls your method. If you need to keep a reference to your object, you can store it directly in the YTemperature object using function `set_userData`. You can then retrieve it in the global callback procedure using `get_userData`.

Setting up a value change callback

The callback is set up for a given Temperature function with the help of the `registerValueCallback` method. The following example sets up a callback for the first available Temperature function.

```
YTemperature f = YTemperature.FirstTemperature();
f.registerValueCallback(temperatureChangeCallBack)
```

Note that each module function can thus have its own distinct callback. By the way, if you like to work with value change callbacks, you will appreciate the fact that value change callbacks are not limited to sensors, but are also available for all Yoctopuce devices (for instance, you can also receive a callback any time a relay state changes).

The timed report callback

This type of callback is automatically called at a predefined time interval. The callback frequency can be configured individually for each sensor, with frequencies going from hundred calls per seconds down to one call per hour. The callback takes as parameter the relevant function and the measured value, as an `YMeasure` object. Contrarily to the value change callback that only receives the latest value, an `YMeasure` object provides both minimal, maximal and average values since the timed report callback. Moreover, the measure includes precise timestamps, which makes it possible to use timed reports for a time-based graph even when not handled immediately.

```
static void periodicCallback(YTemperature fct, YMeasure measure)
{
  Console.WriteLine(fct.get_hardwareId() + "=" +
                    measure.get_averageValue());
}
```

Setting up a timed report callback

The callback is set up for a given Temperature function with the help of the `registerTimedReportCallback` method. The callback will only be invoked once a callback frequency as been set using `set_reportFrequency` (which defaults to timed report callback turned off). The frequency is specified as a string (same as for the data logger), by specifying the number of calls per second (/s), per minute (/m) or per hour (/h). The maximal frequency is 100 times per second (i.e. "100/s"), and the minimal frequency is 1 time per hour (i.e. "1/h"). When the frequency is higher than or equal to 1/s, the measure represents an instant value. When the frequency is below, the measure will include distinct minimal, maximal and average values based on a sampling performed automatically by the device.

The following example sets up a timed report callback 4 times per minute for t he first available Temperature function.

[1] The value passed as parameter is the same as the value returned by the `get_advertisedValue()` method.

```
YTemperature f = YTemperature.FirstTemperature();
f.set_reportFrequency("4/m");
f.registerTimedReportCallback(periodicCallback);
```

As for value change callbacks, each module function can thus have its own distinct timed report callback.

Generic callback functions

It is sometimes desirable to use the same callback function for various types of sensors (e.g. for a generic sensor graphing application). This is possible by defining the callback for an object of class `YSensor` rather than `YTemperature`. Thus, the same callback function will be usable with any subclass of `YSensor` (and in particular with `YTemperature`). With the callback function, you can use the method `get_unt()` to get the physical unit of the sensor, if you need to display it.

A complete example

You can find a complete example implemented in your favorite programming language in the *Examples/Prog-EventBased* directory of the corresponding library.

18.2. The data logger

Your Yocto-Meteo is equipped with a data logger able to store non-stop the measures performed by the module. The maximal frequency is 100 times per second (i.e. "100/s"), and the minimal frequency is 1 time per hour (i.e. "1/h"). When the frequency is higher than or equal to 1/s, the measure represents an instant value. When the frequency is below, the measure will include distinct minimal, maximal and average values based on a sampling performed automatically by the device.

The data logger flash memory can store about 500'000 instant measures, or 125'000 averaged measures. When the memory is about to be saturated, the oldest measures are automatically erased.

Make sure not to leave the data logger running at high speed unless really needed: the flash memory can only stand a limited number of erase cycles (typically 100'000 cycles). When running at full speed, the datalogger can burn more than 100 cycles per day ! Also be aware that it is useless to record measures at a frequency higher than the refresh frequency of the physical sensor itself.

Starting/stopping the datalogger

The data logger can be started with the `set_recording()` method.

```
YDataLogger l = YDataLogger.FirstDataLogger();
l.set_recording(YDataLogger.RECORDING_ON);
```

It is possible to make the data recording start automatically as soon as the module is powered on.

```
YDataLogger l = YDataLogger.FirstDataLogger();
l.set_autoStart(YDataLogger.AUTOSTART_ON);
l.get_module().saveToFlash();  // do not forget to save the setting
```

Note: Yoctopuce modules do not need an active USB connection to work: they start working as soon as they are powered on. The Yocto-Meteo can store data without necessarily being connected to a computer: you only need to activate the automatic start of the data logger and to power on the module with a simple USB charger.

Erasing the memory

The memory of the data logger can be erased with the `forgetAllDataStreams()` function. Be aware that erasing cannot be undone.

```
YDataLogger l = YDataLogger.FirstDataLogger();
l.forgetAllDataStreams();
```

Choosing the logging frequency

The logging frequency can be set up individually for each sensor, using the method `set_logFrequency()`. The frequency is specified as a string (same as for timed report callbacks), by specifying the number of calls per second (/s), per minute (/m) or per hour (/h). The default value is "1/s".

The following example configures the logging frequency at 15 measures per minute for the first sensor found, whatever its type:

```
YSensor sensor = YSensor.FirstSensor();
sensor.set_logFrequency("15/m");
```

To avoid wasting flash memory, it is possible to disable logging for specified functions. In order to do so, simply use the value "OFF":

```
sensor.set_logFrequency("OFF");
```

Limitation: The Yocto-Meteo cannot use a different frequency for timed-report callbacks and for recording data into the datalogger. You can disable either of them individually, but if you enable both timed-report callbacks and logging for a given function, the two will work at the same frequency.

Retrieving the data

To load recorded measures from the Yocto-Meteo flash memory, you must call the `get_recordedData()` method of the desired sensor, and specify the time interval for which you want to retrieve measures. The time interval is given by the start and stop UNIX timestamp. You can also specify 0 if you don't want any start or stop limit.

The `get_recordedData()` method does not return directly am array of measured values, since in some cases it would cause a huge load that could affect the responsiveness of the application. Instead, this function will return an `YDataSet` object that can be used to retrieve immediately an overview of the measured data (summary), and then to load progressively the details when desired.

Here are the main methods used to retrieve recorded measures:

1. **dataset = sensor.get_recordedData(0,0)**: select the desired time interval
2. **dataset.loadMore()**: load data from the device, progressively
3. **dataset.get_summary()**: get a single measure summarizing the full time interval
4. **dataset.get_preview()**: get an array of measures representing a condensed version of the whole set of measures on the selected time interval (reduced by a factor of approx. 200)
5. **dataset.get_measures()**: get an array with all detailled measures (that grows while `loadMore` is being called repeteadly)

Measures are instances of `YMeasure` [2]. They store simultaneously the minimal, average and maximal value at a given time, that you can retrieve using methods **get_minValue()**, **get_averageValue()** and **get_maxValue()** respectively. Here is a small example that uses the functions above:

```
// We will retrieve all measures, without time limit
YDataSet dataset = sensor.get_recordedData(0, 0);

// First call to loadMore() loads the summary/preview
dataset.loadMore();
YMeasure summary = dataset.get_summary();
string timeFmt = "dd MMM yyyy hh:mm:ss,fff";
string logFmt = "from {0} to {1} : average={2:0.00}{3}";
Console.WriteLine(String.Format(logFmt,
    summary.get_startTimeUTC_asDateTime().ToString(timeFmt),
    summary.get_endTimeUTC_asDateTime().ToString(timeFmt),
    summary.get_averageValue(), sensor.get_unit()));
```

[2] The `YMeasure` objects used by the data logger are exactly the same kind as those passed as argument to the timed report callbacks.

```
// Next calls to loadMore() will retrieve measures
Console.WriteLine("loading details");
int progress;
do {
    Console.Write(".");
    progress = dataset.loadMore();
} while(progress < 100);

// All measures have now been loaded
List<YMeasure> details = dataset.get_measures();
foreach (YMeasure m in details) {
    Console.WriteLine(String.Format(logFmt,
        m.get_startTimeUTC_asDateTime().ToString(timeFmt),
        m.get_endTimeUTC_asDateTime().ToString(timeFmt),
        m.get_averageValue(), sensor.get_unit()));
}
```

You will find a complete example demonstrating how to retrieve data from the logger for each programming language directly in the Yoctopuce library. The example can be found in directory *Examples/Prog-DataLogger*.

Timestamp

As the Yocto-Meteo does not have a battery, it cannot guess alone the current time when powered on. Nevertheless, the Yocto-Meteo will automatically try to adjust its real-time reference using the host to which it is connected, in order to properly attach a timestamp to each measure in the datalogger:

- When the Yocto-Meteo is connected to a computer running either the VirtualHub or any application using the Yoctopuce library, it will automatically receive the time from this computer.
- When the Yocto-Meteo is connected to a YoctoHub-Ethernet, it will get the time that the YoctoHub has obtained from the network (using a server from `pool.ntp.org`)
- When the Yocto-Meteo is connected to a YoctoHub-Wireless, it will get the time provided by the YoctoHub based on its internal battery-powered real-time clock, which was itself configured either from the network or from a computer
- When the Yocto-Meteo is connected to an Android mobile device, it will get the time from the mobile device as long as an app using the Yoctopuce library is launched.

When none of these conditions applies (for instance if the module is simply connected to an USB charger), the Yocto-Meteo will do its best effort to attach a reasonable timestamp to the measures, using the timestamp found on the latest recorded measures. It is therefore possible to "preset to the real time" an autonomous Yocto-Meteo by connecting it to an Android mobile phone, starting the data logger, then connecting the device alone on an USB charger. Nevertheless, be aware that without external time source, the internal clock of the Yocto-Meteo might be be subject to a clock skew (theoretically up to 0.3%).

18.3. Sensor calibration

Your Yocto-Meteo module is equipped with a digital sensor calibrated at the factory. The values it returns are supposed to be reasonably correct in most cases. There are, however, situations where external conditions can impact the measures.

The Yoctopuce API provides the mean to re-caliber the values measured by your Yocto-Meteo. You are not going to modify the hardware settings of the module, but rather to transform afterwards the measures taken by the sensor. This transformation is controlled by parameters stored in the flash memory of the module, making it specific for each module. This re-calibration is therefore a fully software matter and remains perfectly reversible.

Before deciding to re-calibrate your Yocto-Meteo module, make sure you have well understood the phenomena which impact the measures of your module, and that the differences between true values and measured values do not result from a incorrect use or an inadequate location of the module.

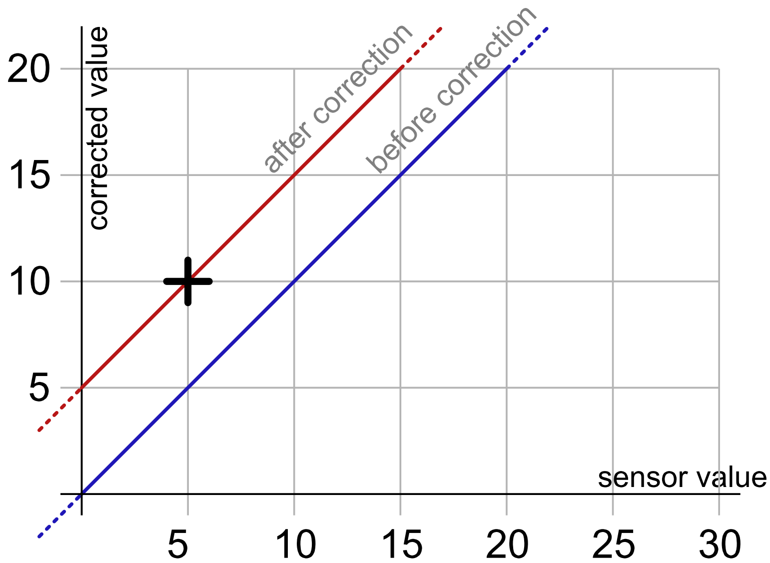
The Yoctopuce modules support two types of calibration. On the one hand, a linear interpolation based on 1 to 5 reference points, which can be performed directly inside the Yocto-Meteo. On the other hand, the API supports an external arbitrary calibration, implemented with callbacks.

1 to 5 point linear interpolation

These transformations are performed directly inside the Yocto-Meteo which means that you only have to store the calibration points in the module flash memory, and all the correction computations are done in a perfectly transparent manner: The function `get_currentValue()` returns the corrected value while the function `get_currentRawValue()` keeps returning the value before the correction.

Calibration points are simply *(Raw_value, Corrected_value)* couples. Let us look at the impact of the number of calibration points on the corrections.

1 point correction
The 1 point correction only adds a shift to the measures. For example, if you provide the calibration point *(a, b)*, all the measured values are corrected by adding to them *b-a*, so that when the value read on the sensor is *a*, the temperature function returns *b*.

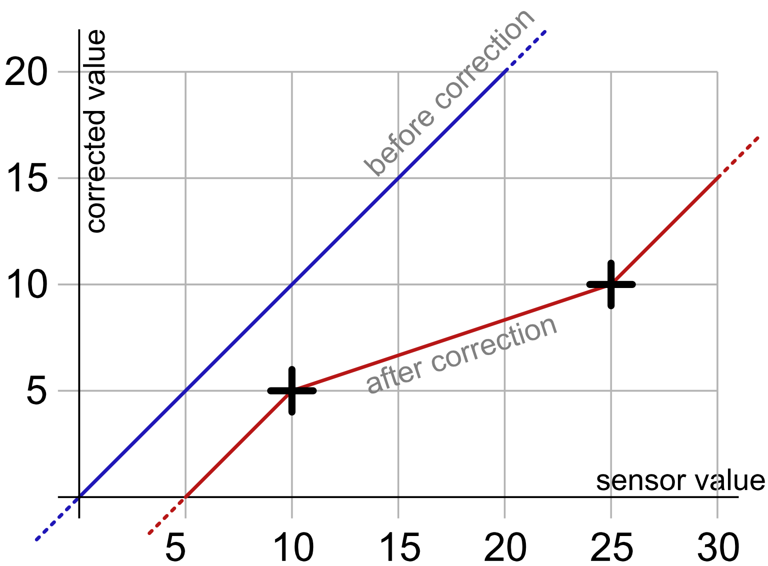


Measure correction with 1 calibration point, here (5,10)

The application is very simple: you only need to call the *calibrateFromPoints()* method of the function you wish to correct. The following code applies the correction illustrated on the graph above to the first temperature function found. Note the call to the *saveToFlash* method of the module hosting the function, so that the module does not forget the calibration as soon as it is disconnected.

```
Double[] ValuesBefore = {5};
Double[] ValuesAfter  = {10};
YTemperature f = YTemperature.FirstTemperature();
f.calibrateFromPoints(ValuesBefore, ValuesAfter);
f.get_module().saveToFlash();
```

2 point correction
2 point correction allows you to perform both a shift and a multiplication by a given factor between two points. If you provide the two points (a, b) and (c, d), the function result is multiplied *(d-b)/(c-a)* in the [a, c] range and shifted, so that when the value read by the sensor is *a* or *c*, the temperature function returns respectively *b* and *d*. Outside of the [a, c] range, the values are simply shifted, so as to preserve the continuity of the measures: an increase of 1 on the value read by the sensor induces an increase of 1 on the returned value.



Measure correction with the two calibration points (10,5) and (25,10).

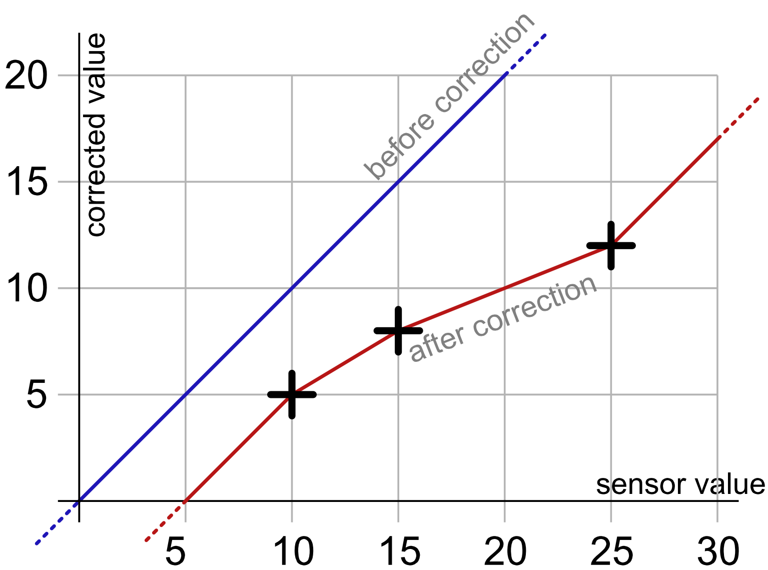
The code allowing you to program this calibration is very similar to the preceding code example.

```
Double[] ValuesBefore = {10,25};
Double[] ValuesAfter  = {5,10};
YTemperature f = YTemperature.FirstTemperature();
f.calibrateFromPoints(ValuesBefore, ValuesAfter);
f.get_module().saveToFlash();
```

Note that the values before correction must be sorted in a strictly ascending order, otherwise they are simply ignored.

3 to 5 point correction

3 to 5 point corrections are only a generalization of the 2 point method, allowing you to create up to 4 correction ranges for an increased precision. These ranges cannot be disjoint.



Correction example with 3 calibration points

Back to normal

To cancel the effect of a calibration on a function, call the *calibrateFromPoints()* method with two empty arrays.

```
Double[] ValuesBefore = {};
Double[] ValuesAfter  = {};
YTemperature f = YTemperature.FirstTemperature();
```

```
f.calibrateFromPoints(ValuesBefore, ValuesAfter);
f.get_module().saveToFlash();
```

You will find, in the *Examples\Prog-Calibration* directory of the Delphi, VB, and C# libraries, an application allowing you to test the effects of the 1 to 5 point calibration.

Limitations

Due to storage and processing limitations of real values within Yoctopuce sensors, raw values and corrected values must conform to a few numeric consraints:

- Only 3 decimals are taken into account (i.e. resolution is 0.001)
- The lowest allowed value is -2'100'000
- The highest allowed value is +2'100'000

Arbitrary interpolation

It is also possible to compute the interpolation instead of letting the module do it, in order to calculate a spline interpolation, for instance. To do so, you only need to store a callback in the API. This callback must specify the number of calibration points it is expecting.

```
public static double CustomInterpolation3Points(double rawValue, int calibType,
                  int[] parameters, double[] beforeValues, double[] afterValues)
  {  double result;
     // the value to be corrected is rawValue
     // calibration points are in beforeValues and afterValues
     result = ....    // interpolation of your choice
     return result;
   }
YAPI.RegisterCalibrationHandler(3, CustomInterpolation3Points);
```

Note that these interpolation callbacks are global, and not specific to each function. Thus, each time someone requests a value from a module which contains in its flash memory the correct number of calibration points, the corresponding callback is called to correct the value before returning it, enabling thus a perfectly transparent measure correction.

19. Firmware Update

There are multiples way to update the firmware of a Yoctopuce module..

19.1. The VirtualHub or the YoctoHub

It is possible to update the firmware directly from the web interface of the VirtualHub or the YoctoHub. The configuration panel of the module has an "upgrade" button to start a wizard that will guide you through the firmware update procedure.

In case the firmware update fails for any reason, and the module does no start anymore, simply unplug the module then plug it back while maintaining the *Yocto-button* down. The module will boot in "firmware update" mode and will appear in the VirtualHub interface below the module list.

19.2. The command line library

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.

```
C:\>Executable [options] [target] command [parameters]
```

The following example 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:\>
```

19.3. The Android application Yocto-Firmware

You can update your module firmware from your Android phone or tablet with the Yocto-Firmware application. This application lists all the Yoctopuce modules connected by USB and checks if a more recent firmware is available on www.yoctopuce.com. If a more recent firmware is available, you can update the module. The application is responsible for downloading and installing the new firmware while preserving the module parameters.

Please note: while the firmware is being updated, the module restarts several times. Android interprets a USB device reboot as a disconnection and reconnection of the USB device and asks the authorization to use the USB port again. The user must click on *OK* for the update process to end successfully.

19.4. Updating the firmware with the programming library

If you need to integrate firmware updates in your application, the libraries offer you an API to update your modules.[1]

Saving and restoring parameters

The `get_allSettings()` method returns a binary buffer enabling you to save a module persistent parameters. This function is very useful to save the network configuration of a YoctoHub for example.

```
YWireless wireless = YWireless.FindWireless("reference");
YModule m = wireless.get_module();
byte[] default_config =  m.get_allSettings();
saveFile("default.bin", default_config);
...
```

You can then apply these parameters to other modules with the `set_allSettings()` method.

```
byte[] default_config = loadFile("default.bin");
YModule m = YModule.FirstModule();
while (m != null) {
  if (m.get_productName() == "YoctoHub-Wireless") {
    m.set_allSettings(default_config);
  }
  m = m.next();
}
```

Finding the correct firmware

The first step to update a Yoctopuce module is to find which firmware you must use. The `checkFirmware(path, onlynew)` method of the YModule object does exactly this. The method checks that the firmware given as argument (`path`) is compatible with the module. If the `onlynew` parameter is set, this method checks that the firmware is more recent than the version currently used by the module. When the file is not compatible (or if the file is older than the installed version), this method returns an empty string. In the opposite, if the file is valid, the method returns a file access path.

The following piece of code checks that the `c:\tmp\METEOMK1.17328.byn` is compatible with the module stored in the *m* variable .

```
YModule m = YModule.FirstModule();
...
...
string path = "c:\\tmp\METEOMK1.17328.byn";
string newfirm = m.checkFirmware(path, false);
if (newfirm != "") {
  Console.WriteLine("firmware " + newfirm + " is compatible");
}
...
```

[1] The JavaScript, Node.js, and PHP libraries do not yet allow you to update the modules. These functions will be available in a next build.

The argument can be a directory (instead of a file). In this case, the method checks all the files of the directory recursively and returns the most recent compatible firmware. The following piece of code checks whether there is a more recent firmware in the `c:\tmp\` directory.

```
YModule m = YModule.FirstModule();
...
...
string path = "c:\\tmp";
string newfirm = m.checkFirmware(path, true);
if (newfirm != "") {
  Console.WriteLine("firmware " + newfirm + " is compatible and newer");
}
...
```

You can also give the "www.yoctopuce.com" string as argument to check whether there is a more recent published firmware on Yoctopuce's web site. In this case, the method returns the firmware URL. You can use this URL to download the firmware on your disk or use this URL when updating the firmware (see below). Obviously, this possibility works only if your machine is connected to Internet.

```
YModule m = YModule.FirstModule();
...
...
string url = m.checkFirmware("www.yoctopuce.com", true);
if (url != "") {
  Console.WriteLine("new firmware is available at " + url );
}
...
```

Updating the firmware

A firmware update can take several minutes. That is why the update process is run as a background task and is driven by the user code thanks to the `YFirmwareUdpate` class.

To update a Yoctopuce module, you must obtain an instance of the `YFirmwareUdpate` class with the `updateFirmware` method of a YModule object. The only parameter of this method is the *path* of the firmware that you want to install. This method does not immediately start the update, but returns a `YFirmwareUdpate` object configured to update the module.

```
string newfirm = m.checkFirmware("www.yoctopuce.com", true);
.....
YFirmwareUpdate fw_update = m.updateFirmware(newfirm);
```

The `startUpdate()` method starts the update as a background task. This background task automatically takes care of

1. saving the module parameters
2. restarting the module in "update" mode
3. updating the firmware
4. starting the module with the new firmware version
5. restoring the parameters

The `get_progress()` and `get_progressMessage()` methods enable you to follow the progression of the update. `get_progress()` returns the progression as a percentage (100 = update complete). `get_progressMessage()` returns a character string describing the current operation (deleting, writing, rebooting, ...). If the `get_progress` method returns a negative value, the update process failed. In this case, the `get_progressMessage()` returns an error message.

The following piece of code starts the update and displays the progress on the standard output.

```
YFirmwareUpdate fw_update = m.updateFirmware(newfirm);
....
int status = fw_update.startUpdate();
while (status < 100 && status >= 0) {
```

```
  int newstatus = fw_update.get_progress();
  if (newstatus != status) {
    Console.WriteLine(status + "% "
      + fw_update.get_progressMessage());
  }
  YAPI.Sleep(500, ref errmsg);
  status = newstatus;
}

if (status < 0) {
  Console.WriteLine("Firmware Update failed: "
    + fw_update.get_progressMessage());
} else {
  Console.WriteLine("Firmware Updated Successfully!");
}
```

An Android characteristic

You can update a module firmware using the Android library. However, for modules connected by USB, Android asks the user to authorize the application to access the USB port.

During firmware update, the module restarts several times. Android interprets a USB device reboot as a disconnection and a reconnection to the USB port, and prevents all USB access as long as the user has not closed the pop-up window. The use has to click on *OK* for the update process to continue correctly. **You cannot update a module connected by USB to an Android device without having the user interacting with the device.**

19.5. The "update" mode

If you want to erase all the parameters of a module or if your module does not start correctly anymore, you can install a firmware from the "update" mode.

To force the module to work in "update" mode, disconnect it, wait a few seconds, and reconnect it while maintaining the *Yocto-button* down. This will restart the module in "update" mode. This update mode is protected against corruptions and is always available.

In this mode, the module is not detected by the YModule objects anymore. To obtain the list of connected modules in "update" mode, you must use the `YAPI.GetAllBootLoaders()` function. This function returns a character string array with the serial numbers of the modules in "update" mode.

```
List<string> allBootLoader = YAPI.GetAllBootLoaders();
```

The update process is identical to the standard case (see the preceding section), but you must manually instantiate the `YFirmwareUpdate` object instead of calling `module.updateFirmware()`. The constructor takes as argument three parameters: the module serial number, the path of the firmware to be installed, and a byte array with the parameters to be restored at the end of the update (or `null` to restore default parameters).

```
YFirmwareUpdateupdate fw_update;
fw_update = new YFirmwareUpdate(allBootLoader[0], newfirm, null);
int status = fw_update.startUpdate();
.....
```

20. Using with unsupported languages

Yoctopuce modules can be driven from most common programming languages. New languages are regularly added, depending on the interest expressed by Yoctopuce product users. Nevertheless, some languages are not, and will never be, supported by Yoctopuce. There can be several reasons for this: compilers which are not available anymore, unadapted environments, etc.

However, there are alternative methods to access Yoctopuce modules from an unsupported programming language.

20.1. Command line

The easiest method to drive Yoctopuce modules from an unsupported programming language is to use the command line API through system calls. The command line API is in fact made of a group of small executables which are easy to call. Their output is also easy to analyze. As most programming languages allow you to make system calls, the issue is solved with a few lines of code.

However, if the command line API is the easiest solution, it is neither the fastest nor the most efficient. For each call, the executable must initialize its own API and make an inventory of USB connected modules. This requires about one second per call.

20.2. VirtualHub and HTTP GET

The *VirtualHub* is available on almost all current platforms. It is generally used as a gateway to provide access to Yoctopuce modules from languages which prevent direct access to hardware layers of a computer (JavaScript, PHP, Java, ...).

In fact, the *VirtualHub* is a small web server able to route HTTP requests to Yoctopuce modules. This means that if you can make an HTTP request from your programming language, you can drive Yoctopuce modules, even if this language is not officially supported.

REST interface

At a low level, the modules are driven through a REST API. Thus, to control a module, you only need to perform appropriate requests on the *VirtualHub*. By default, the *VirtualHub* HTTP port is 4444.

An important advantage of this technique is that preliminary tests are very easy to implement. You only need a *VirtualHub* and a simple web browser. If you copy the following URL in your preferred browser, while the *VirtualHub* is running, you obtain the list of the connected modules.

```
http://127.0.0.1:4444/api/services/whitePages.txt
```

Note that the result is displayed as text, but if you request *whitePages.xml*, you obtain an XML result. Likewise, *whitePages.json* allows you to obtain a JSON result. The *html* extension even allows you to display a rough interface where you can modify values in real time. The whole REST API is available in these different formats.

Driving a module through the REST interface

Each Yoctopuce module has its own REST interface, available in several variants. Let us imagine a Yocto-Meteo with the *METEOMK1-12345* serial number and the *myModule* logical name. The following URL allows you to know the state of the module.

```
http://127.0.0.1:4444/bySerial/METEOMK1-12345/api/module.txt
```

You can naturally also use the module logical name rather than its serial number.

```
http://127.0.0.1:4444/byName/myModule/api/module.txt
```

To retrieve the value of a module property, simply add the name of the property below *module*. For example, if you want to know the signposting led luminosity, send the following request:

```
http://127.0.0.1:4444/bySerial/METEOMK1-12345/api/module/luminosity
```

To change the value of a property, modify the corresponding attribute. Thus, to modify the luminosity, send the following request:

```
http://127.0.0.1:4444/bySerial/METEOMK1-12345/api/module?luminosity=100
```

Driving the module functions through the REST interface

The module functions can be manipulated in the same way. To know the state of the temperature function, build the following URL:

```
http://127.0.0.1:4444/bySerial/METEOMK1-12345/api/temperature.txt
```

Note that if you can use logical names for the modules instead of their serial number, you cannot use logical names for functions. Only hardware names are authorized to access functions.

You can retrieve a module function attribute in a way rather similar to that used with the modules. For example:

```
http://127.0.0.1:4444/bySerial/METEOMK1-12345/api/temperature/logicalName
```

Rather logically, attributes can be modified in the same manner.

```
http://127.0.0.1:4444/bySerial/METEOMK1-12345/api/temperature?logicalName=myFunction
```

You can find the list of available attributes for your Yocto-Meteo at the beginning of the *Programming* chapter.

Accessing Yoctopuce data logger through the REST interface

This section only applies to devices with a built-in data logger.

The preview of all recorded data streams can be retrieved in JSON format using the following URL:

```
http://127.0.0.1:4444/bySerial/METEOMK1-12345/dataLogger.json
```

Individual measures for any given stream can be obtained by appending the desired function identifier as well as start time of the stream:

```
http://127.0.0.1:4444/bySerial/METEOMK1-12345/dataLogger.json?id=temperature&utc=1389801080
```

20.3. Using dynamic libraries

The low level Yoctopuce API is available under several formats of dynamic libraries written in C. The sources are available with the C++ API. If you use one of these low level libraries, you do not need the *VirtualHub* anymore.

Filename	Platform
libyapi.dylib	Max OS X
libyapi-amd64.so	Linux Intel (64 bits)
libyapi-armel.so	Linux ARM EL
libyapi-armhf.so	Linux ARM HL
libyapi-i386.so	Linux Intel (32 bits)
yapi64.dll	Windows (64 bits)
yapi.dll	Windows (32 bits)

These dynamic libraries contain all the functions necessary to completely rebuild the whole high level API in any language able to integrate these libraries. This chapter nevertheless restrains itself to describing basic use of the modules.

Driving a module

The three essential functions of the low level API are the following:

```
int yapiInitAPI(int connection_type, char *errmsg);
int yapiUpdateDeviceList(int forceupdate, char *errmsg);
int yapiHTTPRequest(char *device, char *request, char* buffer,int buffsize,int *fullsize,
char *errmsg);
```

The *yapiInitAPI* function initializes the API and must be called once at the beginning of the program. For a USB type connection, the *connection_type* parameter takes value 1. The *errmsg* parameter must point to a 255 character buffer to retrieve a potential error message. This pointer can also point to *null*. The function returns a negative integer in case of error, zero otherwise.

The *yapiUpdateDeviceList* manages the inventory of connected Yoctopuce modules. It must be called at least once. To manage hot plug and detect potential newly connected modules, this function must be called at regular intervals. The *forceupdate* parameter must take value 1 to force a hardware scan. The *errmsg* parameter must point to a 255 character buffer to retrieve a potential error message. This pointer can also point to *null*. The function returns a negative integer in case of error, zero otherwise.

Finally, the *yapiHTTPRequest* function sends HTTP requests to the module REST API. The *device* parameter contains the serial number or the logical name of the module which you want to reach. The *request* parameter contains the full HTTP request (including terminal line breaks). *buffer* points to a character buffer long enough to contain the answer. *buffsize* is the size of the buffer. *fullsize* is a pointer to an integer to which will be assigned the actual size of the answer. The *errmsg* parameter must point to a 255 character buffer to retrieve a potential error message. This pointer can also point to *null*. The function returns a negative integer in case of error, zero otherwise.

The format of the requests is the same as the one described in the *VirtualHub et HTTP GET* section. All the character strings used by the API are strings made of 8-bit characters: Unicode and UTF8 are not supported.

The resutlt returned in the buffer variable respects the HTTP protocol. It therefore includes an HTTP header. This header ends with two empty lines, that is a sequence of four ASCII characters 13, 10, 13, 10.

Here is a sample program written in pascal using the *yapi.dll* DLL to read and then update the luminosity of a module.

```
// Dll functions import
function  yapiInitAPI(mode:integer;
                      errmsg : pansichar):integer;cdecl;
                      external 'yapi.dll' name 'yapiInitAPI';
function  yapiUpdateDeviceList(force:integer;errmsg : pansichar):integer;cdecl;
                      external 'yapi.dll' name 'yapiUpdateDeviceList';
function  yapiHTTPRequest(device:pansichar;url:pansichar; buffer:pansichar;
                      buffsize:integer;var fullsize:integer;
                      errmsg : pansichar):integer;cdecl;
                      external 'yapi.dll' name 'yapiHTTPRequest';

var
 errmsgBuffer  : array [0..256] of ansichar;
 dataBuffer    : array [0..1024] of ansichar;
 errmsg,data   : pansichar;
 fullsize,p    : integer;

const
  serial      = 'METEOMK1-12345';
  getValue = 'GET /api/module/luminosity HTTP/1.1'#13#10#13#10;
  setValue = 'GET /api/module?luminosity=100 HTTP/1.1'#13#10#13#10;

begin
  errmsg  :=  @errmsgBuffer;
  data    :=  @dataBuffer;
  // API  initialization
  if(yapiInitAPI(1,errmsg)<0) then
   begin
    writeln(errmsg);
    halt;
  end;

  // forces a device inventory
  if( yapiUpdateDeviceList(1,errmsg)<0) then
    begin
     writeln(errmsg);
     halt;
   end;

  // requests the  module luminosity
  if (yapiHTTPRequest(serial,getValue,data,sizeof(dataBuffer),fullsize,errmsg)<0) then
   begin
     writeln(errmsg);
     halt;
   end;

  // searches for the HTTP header end
  p := pos(#13#10#13#10,data);

  // displays the response minus the HTTP header
  writeln(copy(data,p+4,length(data)-p-3));

  // changes the luminosity
  if (yapiHTTPRequest(serial,setValue,data,sizeof(dataBuffer),fullsize,errmsg)<0) then
   begin
     writeln(errmsg);
     halt;
   end;

end.
```

Module inventory

To perform an inventory of Yoctopuce modules, you need two functions from the dynamic library:

```
int yapiGetAllDevices(int *buffer,int maxsize,int *neededsize,char *errmsg);
int yapiGetDeviceInfo(int devdesc,yDeviceSt *infos, char *errmsg);
```

The *yapiGetAllDevices* function retrieves the list of all connected modules as a list of handles. *buffer* points to a 32-bit integer array which contains the returned handles. *maxsize* is the size in bytes of the buffer. To *neededsize* is assigned the necessary size to store all the handles. From this, you can deduce either the number of connected modules or that the input buffer is too small. The *errmsg* parameter must point to a 255 character buffer to retrieve a potential error message. This pointer can also point to *null*. The function returns a negative integer in case of error, zero otherwise.

The *yapiGetDeviceInfo* function retrieves the information related to a module from its handle. *devdesc* is a 32-bit integer representing the module and which was obtained through *yapiGetAllDevices*. *infos* points to a data structure in which the result is stored. This data structure has the following format:

Name	Type	Size (bytes)	Description
vendorid	int	4	Yoctopuce USB ID
deviceid	int	4	Module USB ID
devrelease	int	4	Module version
nbinbterfaces	int	4	Number of USB interfaces used by the module
manufacturer	char[]	20	Yoctopuce (null terminated)
productname	char[]	28	Model (null terminated)
serial	char[]	20	Serial number (null terminated)
logicalname	char[]	20	Logical name (null terminated)
firmware	char[]	22	Firmware version (null terminated)
beacon	byte	1	Beacon state (0/1)

The *errmsg* parameter must point to a 255 character buffer to retrieve a potential error message.

Here is a sample program written in pascal using the *yapi.dll* DLL to list the connected modules.

```
// device description structure
type yDeviceSt = packed record
   vendorid        : word;
   deviceid        : word;
   devrelease      : word;
   nbinbterfaces   : word;
   manufacturer    : array [0..19] of ansichar;
   productname     : array [0..27] of ansichar;
   serial          : array [0..19] of ansichar;
   logicalname     : array [0..19] of ansichar;
   firmware        : array [0..21] of ansichar;
   beacon          : byte;
 end;

// Dll function import
function  yapiInitAPI(mode:integer;
                      errmsg : pansichar):integer;cdecl;
                      external 'yapi.dll' name 'yapiInitAPI';

function  yapiUpdateDeviceList(force:integer;errmsg : pansichar):integer;cdecl;
                      external 'yapi.dll' name 'yapiUpdateDeviceList';

function  yapiGetAllDevices( buffer:pointer;
                             maxsize:integer;
                             var neededsize:integer;
                             errmsg : pansichar):integer; cdecl;
                             external 'yapi.dll' name 'yapiGetAllDevices';

function  apiGetDeviceInfo(d:integer; var infos:yDeviceSt;
                             errmsg : pansichar):integer;  cdecl;
                             external 'yapi.dll' name 'yapiGetDeviceInfo';


var
 errmsgBuffer  : array [0..256] of ansichar;
 dataBuffer    : array [0..127] of integer;   // max of 128 USB devices
 errmsg,data   : pansichar;
 neededsize,i  : integer;
 devinfos      : yDeviceSt;

begin
  errmsg  :=  @errmsgBuffer;

  // API  initialization
  if(yapiInitAPI(1,errmsg)<0) then
   begin
    writeln(errmsg);
```

```
    halt;
  end;

   // forces a device inventory
  if( yapiUpdateDeviceList(1,errmsg)<0) then
    begin
     writeln(errmsg);
     halt;
   end;

  // loads all device handles into dataBuffer
  if yapiGetAllDevices(@dataBuffer,sizeof(dataBuffer),neededsize,errmsg)<0 then
    begin
     writeln(errmsg);
     halt;
    end;

  // gets device info from each handle
  for i:=0 to  neededsize div sizeof(integer)-1 do
   begin
     if (apiGetDeviceInfo(dataBuffer[i], devinfos, errmsg)<0) then
       begin
         writeln(errmsg);
         halt;
       end;
     writeln(pansichar(@devinfos.serial)+' ('+pansichar(@devinfos.productname)+')');
   end;

end.
```

VB6 and yapi.dll

Each entry point from the yapi.dll is duplicated. You will find one regular C-decl version and one Visual Basic 6 compatible version, prefixed with *vb6_*.

20.4. Porting the high level library

As all the sources of the Yoctopuce API are fully provided, you can very well port the whole API in the language of your choice. Note, however, that a large portion of the API source code is automatically generated.

Therefore, it is not necessary for you to port the complete API. You only need to port the *yocto_api* file and one file corresponding to a function, for example *yocto_relay*. After a little additional work, Yoctopuce is then able to generate all other files. Therefore, we highly recommend that you contact Yoctopuce support before undertaking to port the Yoctopuce library in another language. Collaborative work is advantageous to both parties.

21. High-level API Reference

This chapter summarizes the high-level API functions to drive your Yocto-Meteo. 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 repeat the programming concepts described earlier, in order to stay as concise as possible. In case of doubt, do not hesitate to go back to the chapter describing in details all configurable attributes.

21.1. General functions

These general functions should be used to initialize and configure the Yoctopuce library. In most cases, a simple call to function `yRegisterHub()` should be enough. The module-specific functions `yFind...()` or `yFirst...()` should then be used to retrieve an object that provides interaction with the module.

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

js	<script type='text/javascript' src='yocto_api.js'></script>
cpp	#include "yocto_api.h"
m	#import "yocto_api.h"
pas	uses yocto_api;
vb	yocto_api.vb
cs	yocto_api.cs
java	import com.yoctopuce.YoctoAPI.YModule;
uwp	import com.yoctopuce.YoctoAPI.YModule;
py	from yocto_api import *
php	require_once('yocto_api.php');
es	in HTML: <script src="../../lib/yocto_api.js"></script> in node.js: require('yoctolib-es2017/yocto_api.js');

Global functions
yCheckLogicalName(name) Checks if a given string is valid as logical name for a module or a function.
yClearHTTPCallbackCacheDir(bool_removeFiles) Disables the HTTP callback cache.
yDisableExceptions() Disables the use of exceptions to report runtime errors.
yEnableExceptions() Re-enables the use of exceptions for runtime error handling.
yEnableUSBHost(osContext) This function is used only on Android.
yFreeAPI() Frees dynamically allocated memory blocks used by the Yoctopuce library.
yGetAPIVersion() Returns the version identifier for the Yoctopuce library in use.
yGetCacheValidity() Returns the validity period of the data loaded by the library.
yGetDeviceListValidity() Returns the time between each forced enumeration of the YoctoHub used.
yGetTickCount() Returns the current value of a monotone millisecond-based time counter.
yHandleEvents(errmsg) Maintains the device-to-library communication channel.
yInitAPI(mode, errmsg) Initializes the Yoctopuce programming library explicitly.
yPreregisterHub(url, errmsg)

Fault-tolerant alternative to `RegisterHub()`.

yRegisterDeviceArrivalCallback(arrivalCallback)
Register a callback function, to be called each time a device is plugged.

yRegisterDeviceRemovalCallback(removalCallback)
Register a callback function, to be called each time a device is unplugged.

yRegisterHub(url, errmsg)
Setup the Yoctopuce library to use modules connected on a given machine.

yRegisterHubDiscoveryCallback(hubDiscoveryCallback)
Register a callback function, to be called each time an Network Hub send an SSDP message.

yRegisterHubWebsocketCallback(ws, errmsg, authpwd)
Variant to `RegisterHub()` used to initialize Yoctopuce API on an existing Websocket session, as happens for incoming websocket callbacks.

yRegisterLogFunction(logfun)
Registers a log callback function.

ySelectArchitecture(arch)
Select the architecture or the library to be loaded to access to USB.

ySetCacheValidity(cacheValidityMs)
Change the validity period of the data loaded by the library.

ySetDelegate(object)
(Objective-C only) Register an object that must follow the protocol `YDeviceHotPlug`.

ySetDeviceListValidity(deviceListValidity)
Change the time between each forced enumeration of the YoctoHub used.

ySetHTTPCallbackCacheDir(str_directory)
Enables the HTTP callback cache.

ySetTimeout(callback, ms_timeout, args)
Invoke the specified callback function after a given timeout.

ySetUSBPacketAckMs(pktAckDelay)
Enables the acknowledge of every USB packet received by the Yoctopuce library.

ySleep(ms_duration, errmsg)
Pauses the execution flow for a specified duration.

yTestHub(url, mstimeout, errmsg)
Test if the hub is reachable.

yTriggerHubDiscovery(errmsg)
Force a hub discovery, if a callback as been registered with `yRegisterHubDiscoveryCallback` it will be called for each net work hub that will respond to the discovery.

yUnregisterHub(url)
Setup the Yoctopuce library to no more use modules connected on a previously registered machine with RegisterHub.

yUpdateDeviceList(errmsg)
Triggers a (re)detection of connected Yoctopuce modules.

yUpdateDeviceList_async(callback, context)
Triggers a (re)detection of connected Yoctopuce modules.

YAPI.CheckLogicalName() yCheckLogicalName() — YAPI

Checks if a given string is valid as logical name for a module or a function.

js	function **yCheckLogicalName**(**name**)
cpp	bool **yCheckLogicalName**(const string& **name**)
m	+(BOOL) **CheckLogicalName** :(NSString *) **name**
pas	function **yCheckLogicalName**(**name**: string): boolean
vb	function **yCheckLogicalName**(ByVal **name** As String) As Boolean
cs	bool **CheckLogicalName**(string **name**)
java	boolean **CheckLogicalName**(String **name**)
uwp	bool **CheckLogicalName**(string **name**)
py	def **CheckLogicalName**(**name**)
php	function **yCheckLogicalName**(**$name**)
es	function **CheckLogicalName**(**name**)

A valid logical name has a maximum of 19 characters, all among `A..Z`, `a..z`, `0..9`, `_`, and `-`. If you try to configure a logical name with an incorrect string, the invalid characters are ignored.

Parameters :

name a string containing the name to check.

Returns :

`true` if the name is valid, `false` otherwise.

YAPI.ClearHTTPCallbackCacheDir() yClearHTTPCallbackCacheDir() — YAPI

Disables the HTTP callback cache.

php function **yClearHTTPCallbackCacheDir**(**$bool_removeFiles**)

This method disables the HTTP callback cache, and can additionally cleanup the cache directory.

Parameters :

bool_removeFiles True to clear the content of the cache.

Returns :

nothing.

YAPI.DisableExceptions() yDisableExceptions() YAPI

Disables the use of exceptions to report runtime errors.

js	function **yDisableExceptions**( )
cpp	void **yDisableExceptions**( )
m	+(void) **DisableExceptions**
pas	procedure **yDisableExceptions**( )
vb	procedure **yDisableExceptions**( )
cs	void **DisableExceptions**( )
uwp	void **DisableExceptions**( )
py	def **DisableExceptions**( )
php	function **yDisableExceptions**( )
es	function **DisableExceptions**( )

When exceptions are disabled, every function returns a specific error value which depends on its type and which is documented in this reference manual.

YAPI.EnableExceptions() yEnableExceptions() YAPI

Re-enables the use of exceptions for runtime error handling.

js	function **yEnableExceptions**( )
cpp	void **yEnableExceptions**( )
m	+(void) **EnableExceptions**
pas	procedure **yEnableExceptions**( )
vb	procedure **yEnableExceptions**( )
cs	void **EnableExceptions**( )
uwp	void **EnableExceptions**( )
py	def **EnableExceptions**( )
php	function **yEnableExceptions**( )
es	function **EnableExceptions**( )

Be aware than when exceptions are enabled, every function that fails triggers an exception. If the exception is not caught by the user code, it either fires the debugger or aborts (i.e. crash) the program. On failure, throws an exception or returns a negative error code.

YAPI.EnableUSBHost() yEnableUSBHost() YAPI

This function is used only on Android.

`java` void **EnableUSBHost**(Object **osContext**)

Before calling `yRegisterHub("usb")` you need to activate the USB host port of the system. This function takes as argument, an object of class android.content.Context (or any subclass). It is not necessary to call this function to reach modules through the network.

Parameters :

osContext an object of class android.content.Context (or any subclass).

YAPI.FreeAPI() yFreeAPI() YAPI

Frees dynamically allocated memory blocks used by the Yoctopuce library.

js	function **yFreeAPI**( )
cpp	void **yFreeAPI**( )
m	+(void) **FreeAPI**
pas	procedure **yFreeAPI**( )
vb	procedure **yFreeAPI**( )
cs	void **FreeAPI**( )
java	void **FreeAPI**( )
uwp	void **FreeAPI**( )
py	def **FreeAPI**( )
php	function **yFreeAPI**( )
es	function **FreeAPI**( )

It is generally not required to call this function, unless you want to free all dynamically allocated memory blocks in order to track a memory leak for instance. You should not call any other library function after calling `yFreeAPI()`, or your program will crash.

YAPI.GetAPIVersion() yGetAPIVersion() — YAPI

Returns the version identifier for the Yoctopuce library in use.

js	function **yGetAPIVersion**( )
cpp	string **yGetAPIVersion**( )
m	+(NSString*) **GetAPIVersion**
pas	function **yGetAPIVersion**( ): string
vb	function **yGetAPIVersion**( ) As String
cs	String **GetAPIVersion**( )
java	String **GetAPIVersion**( )
uwp	string **GetAPIVersion**( )
py	def **GetAPIVersion**( )
php	function **yGetAPIVersion**( )
es	function **GetAPIVersion**( )

The version is a string in the form `"Major.Minor.Build"`, for instance `"1.01.5535"`. For languages using an external DLL (for instance C#, VisualBasic or Delphi), the character string includes as well the DLL version, for instance `"1.01.5535 (1.01.5439)"`.

If you want to verify in your code that the library version is compatible with the version that you have used during development, verify that the major number is strictly equal and that the minor number is greater or equal. The build number is not relevant with respect to the library compatibility.

Returns :
a character string describing the library version.

YAPI.GetCacheValidity() yGetCacheValidity() — YAPI

Returns the validity period of the data loaded by the library.

cpp	static u64 **yGetCacheValidity**( )
m	+(u64) **GetCacheValidity**
pas	function **yGetCacheValidity**( ): u64
vb	function **yGetCacheValidity**( ) As Long
cs	ulong **GetCacheValidity**( )
java	long **GetCacheValidity**( )
uwp	Task<ulong> **GetCacheValidity**( )
py	def **GetCacheValidity**( )
php	function **yGetCacheValidity**( )
es	function **GetCacheValidity**( )

This method returns the cache validity of all attributes module functions. Note: This function must be called after `yInitAPI` .

Returns :
an integer corresponding to the validity attributed to the loaded function parameters, in milliseconds

YAPI.GetDeviceListValidity() yGetDeviceListValidity() YAPI

Returns the time between each forced enumeration of the YoctoHub used.

cpp	static int **yGetDeviceListValidity**( )
m	+(int) **GetDeviceListValidity**
pas	function **yGetDeviceListValidity**( ): LongInt
vb	function **yGetDeviceListValidity**( ) As Integer
cs	int **GetDeviceListValidity**( )
java	int **GetDeviceListValidity**( )
uwp	Task<int> **GetDeviceListValidity**( )
py	def **GetDeviceListValidity**( )
php	function **yGetDeviceListValidity**( )
es	function **GetDeviceListValidity**( )

Note: This function must be called after `yInitAPI`.

Returns :
the number of seconds between each enumeration.

YAPI.GetTickCount() yGetTickCount() YAPI

Returns the current value of a monotone millisecond-based time counter.

js	function **yGetTickCount**( )
cpp	u64 **yGetTickCount**( )
m	+(u64) **GetTickCount**
pas	function **yGetTickCount**( ): u64
vb	function **yGetTickCount**( ) As Long
cs	ulong **GetTickCount**( )
java	long **GetTickCount**( )
uwp	ulong **GetTickCount**( )
py	def **GetTickCount**( )
php	function **yGetTickCount**( )
es	function **GetTickCount**( )

This counter can be used to compute delays in relation with Yoctopuce devices, which also uses the millisecond as timebase.

Returns :
a long integer corresponding to the millisecond counter.

YAPI.HandleEvents() yHandleEvents() — YAPI

Maintains the device-to-library communication channel.

js	function **yHandleEvents**(**errmsg**)
cpp	YRETCODE **yHandleEvents**(string& **errmsg**)
m	+(YRETCODE) **HandleEvents** :(NSError**) **errmsg**
pas	function **yHandleEvents**(var **errmsg**: string): integer
vb	function **yHandleEvents**(ByRef **errmsg** As String) As YRETCODE
cs	YRETCODE **HandleEvents**(ref string **errmsg**)
java	int **HandleEvents**( )
uwp	Task<int> **HandleEvents**( )
py	def **HandleEvents**(**errmsg**=None)
php	function **yHandleEvents**(**&$errmsg**)
es	function **HandleEvents**(**errmsg**)

If your program includes significant loops, you may want to include a call to this function to make sure that the library takes care of the information pushed by the modules on the communication channels. This is not strictly necessary, but it may improve the reactivity of the library for the following commands.

This function may signal an error in case there is a communication problem while contacting a module.

Parameters :

errmsg a string passed by reference to receive any error message.

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

YAPI.InitAPI() yInitAPI() YAPI

Initializes the Yoctopuce programming library explicitly.

js	function **yInitAPI**(**mode**, **errmsg**)
cpp	YRETCODE **yInitAPI**(int **mode**, string& **errmsg**)
m	+(YRETCODE) **InitAPI** :(int) **mode** :(NSError**) **errmsg**
pas	function **yInitAPI**(**mode**: integer, var **errmsg**: string): integer
vb	function **yInitAPI**(ByVal **mode** As Integer, ByRef **errmsg** As String) As Integer
cs	int **InitAPI**(int **mode**, ref string **errmsg**)
java	int **InitAPI**(int **mode**)
uwp	Task<int> **InitAPI**(int **mode**)
py	def **InitAPI**(**mode**, **errmsg**=None)
php	function **yInitAPI**(**$mode**, **&$errmsg**)
es	function **InitAPI**(**mode**, **errmsg**)

It is not strictly needed to call `yInitAPI()`, as the library is automatically initialized when calling `yRegisterHub()` for the first time.

When `Y_DETECT_NONE` is used as detection `mode`, you must explicitly use `yRegisterHub()` to point the API to the VirtualHub on which your devices are connected before trying to access them.

Parameters :

mode an integer corresponding to the type of automatic device detection to use. Possible values are `Y_DETECT_NONE`, `Y_DETECT_USB`, `Y_DETECT_NET`, and `Y_DETECT_ALL`.

errmsg a string passed by reference to receive any error message.

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

YAPI.PreregisterHub() yPreregisterHub()

YAPI

Fault-tolerant alternative to `RegisterHub()`.

js	function **yPreregisterHub**(**url**, **errmsg**)
cpp	YRETCODE **yPreregisterHub**(const string& **url**, string& **errmsg**)
m	+(YRETCODE) **PreregisterHub** :(NSString *) **url** :(NSError**) **errmsg**
pas	function **yPreregisterHub**(**url**: string, var **errmsg**: string): integer
vb	function **yPreregisterHub**(ByVal **url** As String, ByRef **errmsg** As String) As Integer
cs	int **PreregisterHub**(string **url**, ref string **errmsg**)
java	int **PreregisterHub**(String **url**)
uwp	Task<int> **PreregisterHub**(string **url**)
py	def **PreregisterHub**(**url**, **errmsg**=None)
php	function **yPreregisterHub**(**$url**, **&$errmsg**)
es	function **PreregisterHub**(**url**, **errmsg**)

This function has the same purpose and same arguments as `RegisterHub()`, but does not trigger an error when the selected hub is not available at the time of the function call. This makes it possible to register a network hub independently of the current connectivity, and to try to contact it only when a device is actively needed.

Parameters :

url a string containing either **"usb"**,**"callback"** or the root URL of the hub to monitor

errmsg a string passed by reference to receive any error message.

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

YAPI.RegisterDeviceArrivalCallback() yRegisterDeviceArrivalCallback() YAPI

Register a callback function, to be called each time a device is plugged.

js	function **yRegisterDeviceArrivalCallback**(**arrivalCallback**)
cpp	void **yRegisterDeviceArrivalCallback**(yDeviceUpdateCallback **arrivalCallback**)
m	+(void) **RegisterDeviceArrivalCallback** :(yDeviceUpdateCallback) **arrivalCallback**
pas	procedure **yRegisterDeviceArrivalCallback**(**arrivalCallback**: yDeviceUpdateFunc)
vb	procedure **yRegisterDeviceArrivalCallback**(ByVal **arrivalCallback** As yDeviceUpdateFunc)
cs	void **RegisterDeviceArrivalCallback**(yDeviceUpdateFunc **arrivalCallback**)
java	void **RegisterDeviceArrivalCallback**(DeviceArrivalCallback **arrivalCallback**)
uwp	void **RegisterDeviceArrivalCallback**(DeviceUpdateHandler **arrivalCallback**)
py	def **RegisterDeviceArrivalCallback**(**arrivalCallback**)
php	function **yRegisterDeviceArrivalCallback**(**$arrivalCallback**)
es	function **RegisterDeviceArrivalCallback**(**arrivalCallback**)

This callback will be invoked while `yUpdateDeviceList` is running. You will have to call this function on a regular basis.

Parameters :

arrivalCallback a procedure taking a `YModule` parameter, or `null`

YAPI.RegisterDeviceRemovalCallback() yRegisterDeviceRemovalCallback() YAPI

Register a callback function, to be called each time a device is unplugged.

js	function **yRegisterDeviceRemovalCallback**(**removalCallback**)
cpp	void **yRegisterDeviceRemovalCallback**(yDeviceUpdateCallback **removalCallback**)
m	+(void) **RegisterDeviceRemovalCallback** :(yDeviceUpdateCallback) **removalCallback**
pas	procedure **yRegisterDeviceRemovalCallback**(**removalCallback**: yDeviceUpdateFunc)
vb	procedure **yRegisterDeviceRemovalCallback**(ByVal **removalCallback** As yDeviceUpdateFunc)
cs	void **RegisterDeviceRemovalCallback**(yDeviceUpdateFunc **removalCallback**)
java	void **RegisterDeviceRemovalCallback**(DeviceRemovalCallback **removalCallback**)
uwp	void **RegisterDeviceRemovalCallback**(DeviceUpdateHandler **removalCallback**)
py	def **RegisterDeviceRemovalCallback**(**removalCallback**)
php	function **yRegisterDeviceRemovalCallback**(**$removalCallback**)
es	function **RegisterDeviceRemovalCallback**(**removalCallback**)

This callback will be invoked while `yUpdateDeviceList` is running. You will have to call this function on a regular basis.

Parameters :

removalCallback a procedure taking a `YModule` parameter, or `null`

YAPI.RegisterHub() yRegisterHub() — YAPI

Setup the Yoctopuce library to use modules connected on a given machine.

js	function **yRegisterHub**(**url**, **errmsg**)
cpp	YRETCODE **yRegisterHub**(const string& **url**, string& **errmsg**)
m	+(YRETCODE) **RegisterHub** :(NSString *) **url** :(NSError**) **errmsg**
pas	function **yRegisterHub**(**url**: string, var **errmsg**: string): integer
vb	function **yRegisterHub**(ByVal **url** As String, ByRef **errmsg** As String) As Integer
cs	int **RegisterHub**(string **url**, ref string **errmsg**)
java	int **RegisterHub**(String **url**)
uwp	Task<int> **RegisterHub**(string **url**)
py	def **RegisterHub**(**url**, **errmsg**=None)
php	function **yRegisterHub**(**$url**, **&$errmsg**)
es	function **RegisterHub**(**url**, **errmsg**)

The parameter will determine how the API will work. Use the following values:

usb: When the **usb** keyword is used, the API will work with devices connected directly to the USB bus. Some programming languages such a Javascript, PHP, and Java don't provide direct access to USB hardware, so **usb** will not work with these. In this case, use a VirtualHub or a networked YoctoHub (see below).

x.x.x.x or ***hostname***: The API will use the devices connected to the host with the given IP address or hostname. That host can be a regular computer running a VirtualHub, or a networked YoctoHub such as YoctoHub-Ethernet or YoctoHub-Wireless. If you want to use the VirtualHub running on you local computer, use the IP address 127.0.0.1.

callback: that keyword make the API run in "*HTTP Callback*" mode. This a special mode allowing to take control of Yoctopuce devices through a NAT filter when using a VirtualHub or a networked YoctoHub. You only need to configure your hub to call your server script on a regular basis. This mode is currently available for PHP and Node.JS only.

Be aware that only one application can use direct USB access at a given time on a machine. Multiple access would cause conflicts while trying to access the USB modules. In particular, this means that you must stop the VirtualHub software before starting an application that uses direct USB access. The workaround for this limitation is to setup the library to use the VirtualHub rather than direct USB access.

If access control has been activated on the hub, virtual or not, you want to reach, the URL parameter should look like:

```
http://username:password@address:port
```

You can call *RegisterHub* several times to connect to several machines.

Parameters :

- **url** a string containing either **"usb"**,**"callback"** or the root URL of the hub to monitor
- **errmsg** a string passed by reference to receive any error message.

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

YAPI.RegisterHubDiscoveryCallback() yRegisterHubDiscoveryCallback() — YAPI

Register a callback function, to be called each time an Network Hub send an SSDP message.

cpp	void **yRegisterHubDiscoveryCallback**(YHubDiscoveryCallback **hubDiscoveryCallback**)
m	+(void) **RegisterHubDiscoveryCallback** : (YHubDiscoveryCallback) **hubDiscoveryCallback**
pas	procedure **yRegisterHubDiscoveryCallback**(**hubDiscoveryCallback**: YHubDiscoveryCallback)
vb	procedure **yRegisterHubDiscoveryCallback**(ByVal **hubDiscoveryCallback** As YHubDiscoveryCallback)
cs	void **RegisterHubDiscoveryCallback**(YHubDiscoveryCallback **hubDiscoveryCallback**)
java	void **RegisterHubDiscoveryCallback**(HubDiscoveryCallback **hubDiscoveryCallback**)
uwp	Task **RegisterHubDiscoveryCallback**(HubDiscoveryHandler **hubDiscoveryCallback**)
py	def **RegisterHubDiscoveryCallback**(**hubDiscoveryCallback**)

The callback has two string parameter, the first one contain the serial number of the hub and the second contain the URL of the network hub (this URL can be passed to RegisterHub). This callback will be invoked while yUpdateDeviceList is running. You will have to call this function on a regular basis.

Parameters :

hubDiscoveryCallback a procedure taking two string parameter, the serial

YAPI.RegisterHubWebsocketCallback() yRegisterHubWebsocketCallback() — YAPI

Variant to `RegisterHub()` used to initialize Yoctopuce API on an existing Websocket session, as happens for incoming websocket callbacks.

Parameters :

- **ws** node WebSocket object for the incoming websocket callback connection
- **errmsg** a string passed by reference to receive any error message.
- **authpwd** the optional authentication password, required only authentication is configured on the calling hub.

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

YAPI.RegisterLogFunction() yRegisterLogFunction() — YAPI

Registers a log callback function.

cpp	void **yRegisterLogFunction**(yLogFunction **logfun**)
m	+(void) **RegisterLogFunction** :(yLogCallback) **logfun**
pas	procedure **yRegisterLogFunction**(**logfun**: yLogFunc)
vb	procedure **yRegisterLogFunction**(ByVal **logfun** As yLogFunc)
cs	void **RegisterLogFunction**(yLogFunc **logfun**)
java	void **RegisterLogFunction**(LogCallback **logfun**)
uwp	void **RegisterLogFunction**(LogHandler **logfun**)
py	def **RegisterLogFunction**(**logfun**)

This callback will be called each time the API have something to say. Quite useful to debug the API.

Parameters :

logfun a procedure taking a string parameter, or `null`

YAPI.SelectArchitecture() ySelectArchitecture() — YAPI

Select the architecture or the library to be loaded to access to USB.

```
py  def SelectArchitecture( arch)
```

By default, the Python library automatically detects the appropriate library to use. However, for Linux ARM, it not possible to reliably distinguish between a Hard Float (armhf) and a Soft Float (armel) install. For in this case, it is therefore recommended to manually select the proper architecture by calling `SelectArchitecture()` before any other call to the library.

Parameters :

arch A string containing the architecture to use. Possibles value are: `"armhf"`,`"armel"`, `"i386"`,`"x86_64"`,`"32bit"`, `"64bit"`

Returns :

nothing.

On failure, throws an exception.

YAPI.SetCacheValidity() ySetCacheValidity() YAPI

Change the validity period of the data loaded by the library.

cpp	static void **ySetCacheValidity**(u64 **cacheValidityMs**)
m	+(void) **SetCacheValidity** : (u64) **cacheValidityMs**
pas	procedure **ySetCacheValidity**(**cacheValidityMs**: u64)
vb	procedure **ySetCacheValidity**( )
cs	void **SetCacheValidity**(ulong **cacheValidityMs**)
java	void **SetCacheValidity**(long **cacheValidityMs**)
uwp	Task **SetCacheValidity**(ulong **cacheValidityMs**)
py	def **SetCacheValidity**(**cacheValidityMs**)
php	function **ySetCacheValidity**(**$cacheValidityMs**)
es	function **SetCacheValidity**(**cacheValidityMs**)

By default, when accessing a module, all the attributes of the module functions are automatically kept in cache for the standard duration (5 ms). This method can be used to change this standard duration, for example in order to reduce network or USB traffic. This parameter does not affect value change callbacks Note: This function must be called after `yInitAPI`.

Parameters :

cacheValidityMs an integer corresponding to the validity attributed to the loaded function parameters, in milliseconds.

YAPI.SetDelegate() ySetDelegate() — YAPI

(Objective-C only) Register an object that must follow the protocol `YDeviceHotPlug`.

m	+(void) **SetDelegate** :(id) **object**

The methods `yDeviceArrival` and `yDeviceRemoval` will be invoked while `yUpdateDeviceList` is running. You will have to call this function on a regular basis.

Parameters :

object an object that must follow the protocol `YAPIDelegate`, or `nil`

YAPI.SetDeviceListValidity() ySetDeviceListValidity() YAPI

Change the time between each forced enumeration of the YoctoHub used.

cpp	static void **ySetDeviceListValidity**(int **deviceListValidity**)
m	+(void) **SetDeviceListValidity** : (int) **deviceListValidity**
pas	procedure **ySetDeviceListValidity**(**deviceListValidity**: LongInt)
vb	procedure **ySetDeviceListValidity**( )
cs	void **SetDeviceListValidity**(int **deviceListValidity**)
java	void **SetDeviceListValidity**(int **deviceListValidity**)
uwp	Task **SetDeviceListValidity**(int **deviceListValidity**)
py	def **SetDeviceListValidity**(**deviceListValidity**)
php	function **ySetDeviceListValidity**(**$deviceListValidity**)
es	function **SetDeviceListValidity**(**deviceListValidity**)

By default, the library performs a complete enumeration every 10 seconds. To reduce network traffic it is possible to increase this delay. This is particularly useful when a YoctoHub is connected to a GSM network where the traffic is charged. This setting does not affect modules connected by USB, nor the operation of arrival/removal callbacks. Note: This function must be called after `yInitAPI`.

Parameters :

deviceListValidity number of seconds between each enumeration.

YAPI.SetHTTPCallbackCacheDir() ySetHTTPCallbackCacheDir() — YAPI

Enables the HTTP callback cache.

```
php  function ySetHTTPCallbackCacheDir( $str_directory)
```

When enabled, this cache reduces the quantity of data sent to the PHP script by 50% to 70%. To enable this cache, the method `ySetHTTPCallbackCacheDir()` must be called before any call to `yRegisterHub()`. This method takes in parameter the path of the directory used for saving data between each callback. This folder must exist and the PHP script needs to have write access to it. It is recommended to use a folder that is not published on the Web server since the library will save some data of Yoctopuce devices into this folder.

Note: This feature is supported by YoctoHub and VirtualHub since version 27750.

Parameters :

str_directory the path of the folder that will be used as cache.

Returns :

nothing.

On failure, throws an exception.

YAPI.SetTimeout() ySetTimeout() — YAPI

Invoke the specified callback function after a given timeout.

js	function **ySetTimeout**(**callback**, **ms_timeout**, **args**)
es	function **SetTimeout**(**callback**, **ms_timeout**, **args**)

This function behaves more or less like Javascript `setTimeout`, but during the waiting time, it will call `yHandleEvents` and `yUpdateDeviceList` periodically, in order to keep the API up-to-date with current devices.

Parameters :

callback the function to call after the timeout occurs. On Microsoft Internet Explorer, the callback must be provided as a string to be evaluated.

ms_timeout an integer corresponding to the duration of the timeout, in milliseconds.

args additional arguments to be passed to the callback function can be provided, if needed (not supported on Microsoft Internet Explorer).

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

YAPI.SetUSBPacketAckMs() ySetUSBPacketAckMs() YAPI

Enables the acknowledge of every USB packet received by the Yoctopuce library.

```
java  void SetUSBPacketAckMs( int pktAckDelay)
```

This function allows the library to run on Android phones that tend to loose USB packets. By default, this feature is disabled because it doubles the number of packets sent and slows down the API considerably. Therefore, the acknowledge of incoming USB packets should only be enabled on phones or tablets that loose USB packets. A delay of 50 milliseconds is generally enough. In case of doubt, contact Yoctopuce support. To disable USB packets acknowledge, call this function with the value 0. Note: this feature is only available on Android.

Parameters :

pktAckDelay then number of milliseconds before the module

YAPI.Sleep() ySleep() YAPI

Pauses the execution flow for a specified duration.

js	function **ySleep**(**ms_duration**, **errmsg**)
cpp	YRETCODE **ySleep**(unsigned **ms_duration**, string& **errmsg**)
m	+(YRETCODE) **Sleep** :(unsigned) **ms_duration** :(NSError **) **errmsg**
pas	function **ySleep**(**ms_duration**: integer, var **errmsg**: string): integer
vb	function **ySleep**(ByVal **ms_duration** As Integer, ByRef **errmsg** As String) As Integer
cs	int **Sleep**(int **ms_duration**, ref string **errmsg**)
java	int **Sleep**(long **ms_duration**)
uwp	Task<int> **Sleep**(ulong **ms_duration**)
py	def **Sleep**(**ms_duration**, **errmsg**=None)
php	function **ySleep**(**$ms_duration**, **&$errmsg**)
es	function **Sleep**(**ms_duration**, **errmsg**)

This function implements a passive waiting loop, meaning that it does not consume CPU cycles significantly. The processor is left available for other threads and processes. During the pause, the library nevertheless reads from time to time information from the Yoctopuce modules by calling `yHandleEvents()`, in order to stay up-to-date.

This function may signal an error in case there is a communication problem while contacting a module.

Parameters :

ms_duration an integer corresponding to the duration of the pause, in milliseconds.

errmsg a string passed by reference to receive any error message.

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

YAPI.TestHub() yTestHub() — YAPI

Test if the hub is reachable.

cpp	YRETCODE **yTestHub**(const string& **url**, int **mstimeout**, string& **errmsg**)
m	+(YRETCODE) **TestHub** : (NSString*) **url** : (int) **mstimeout** : (NSError**) **errmsg**
pas	function **yTestHub**(**url**: string, **mstimeout**: integer, var **errmsg**: string): integer
vb	function **yTestHub**(ByVal **url** As String, ByVal **mstimeout** As Integer, ByRef **errmsg** As String) As Integer
cs	int **TestHub**(string **url**, int **mstimeout**, ref string **errmsg**)
java	int **TestHub**(String **url**, int **mstimeout**)
uwp	Task<int> **TestHub**(string **url**, uint **mstimeout**)
py	def **TestHub**(**url**, **mstimeout**, **errmsg**=None)
php	function **yTestHub**(**$url**, **$mstimeout**, **&$errmsg**)
es	function **TestHub**(**url**, **mstimeout**, **errmsg**)

This method do not register the hub, it only test if the hub is usable. The url parameter follow the same convention as the `RegisterHub` method. This method is useful to verify the authentication parameters for a hub. It is possible to force this method to return after mstimeout milliseconds.

Parameters :

url	a string containing either **"usb"**,**"callback"** or the root URL of the hub to monitor
mstimeout	the number of millisecond available to test the connection.
errmsg	a string passed by reference to receive any error message.

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure returns a negative error code.

YAPI.TriggerHubDiscovery() yTriggerHubDiscovery() — YAPI

Force a hub discovery, if a callback as been registered with `yRegisterHubDiscoveryCallback` it will be called for each net work hub that will respond to the discovery.

cpp	YRETCODE **yTriggerHubDiscovery**(string& **errmsg**)
m	+(YRETCODE) **TriggerHubDiscovery** : (NSError**) **errmsg**
pas	function **yTriggerHubDiscovery**(var **errmsg**: string): integer
vb	function **yTriggerHubDiscovery**(ByRef **errmsg** As String) As Integer
cs	int **TriggerHubDiscovery**(ref string **errmsg**)
java	int **TriggerHubDiscovery**( )
uwp	Task<int> **TriggerHubDiscovery**( )
py	def **TriggerHubDiscovery**(**errmsg**=None)

Parameters :

errmsg a string passed by reference to receive any error message.

Returns :

`YAPI_SUCCESS` when the call succeeds. On failure, throws an exception or returns a negative error code.

YAPI.UnregisterHub() yUnregisterHub()

YAPI

Setup the Yoctopuce library to no more use modules connected on a previously registered machine with RegisterHub.

js	function **yUnregisterHub**(**url**)
cpp	void **yUnregisterHub**(const string& **url**)
m	+(void) **UnregisterHub** :(NSString *) **url**
pas	procedure **yUnregisterHub**(**url**: string)
vb	procedure **yUnregisterHub**(ByVal **url** As String)
cs	void **UnregisterHub**(string **url**)
java	void **UnregisterHub**(String **url**)
uwp	Task **UnregisterHub**(string **url**)
py	def **UnregisterHub**(**url**)
php	function **yUnregisterHub**(**$url**)
es	function **UnregisterHub**(**url**)

Parameters :

url a string containing either **"usb"** or the

YAPI.UpdateDeviceList()
yUpdateDeviceList()

YAPI

Triggers a (re)detection of connected Yoctopuce modules.

js	function **yUpdateDeviceList**(**errmsg**)
cpp	YRETCODE **yUpdateDeviceList**(string& **errmsg**)
m	+(YRETCODE) **UpdateDeviceList** :(NSError**) **errmsg**
pas	function **yUpdateDeviceList**(var **errmsg**: string): integer
vb	function **yUpdateDeviceList**(ByRef **errmsg** As String) As YRETCODE
cs	YRETCODE **UpdateDeviceList**(ref string **errmsg**)
java	int **UpdateDeviceList**( )
uwp	Task<int> **UpdateDeviceList**( )
py	def **UpdateDeviceList**(**errmsg**=None)
php	function **yUpdateDeviceList**(**&$errmsg**)
es	function **UpdateDeviceList**(**errmsg**)

The library searches the machines or USB ports previously registered using `yRegisterHub()`, and invokes any user-defined callback function in case a change in the list of connected devices is detected.

This function can be called as frequently as desired to refresh the device list and to make the application aware of hot-plug events.

Parameters :

errmsg a string passed by reference to receive any error message.

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

YAPI.UpdateDeviceList_async() yUpdateDeviceList_async()

YAPI

Triggers a (re)detection of connected Yoctopuce modules.

```
js  function yUpdateDeviceList_async( callback, context)
```

The library searches the machines or USB ports previously registered using `yRegisterHub()`, and invokes any user-defined callback function in case a change in the list of connected devices is detected.

This function can be called as frequently as desired to refresh the device list and to make the application aware of hot-plug events.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking Firefox Javascript VM that does not implement context switching during blocking I/O calls.

Parameters :

- **callback** callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the result code (`YAPI_SUCCESS` if the operation completes successfully) and the error message.
- **context** caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

21.2. Module control interface

This interface is identical for all Yoctopuce USB modules. It can be used to control the module global parameters, and to enumerate the functions provided by each module.

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

js	<script type='text/javascript' src='yocto_api.js'></script>
cpp	#include "yocto_api.h"
m	#import "yocto_api.h"
pas	uses yocto_api;
vb	yocto_api.vb
cs	yocto_api.cs
java	import com.yoctopuce.YoctoAPI.YModule;
uwp	import com.yoctopuce.YoctoAPI.YModule;
py	from yocto_api import *
php	require_once('yocto_api.php');
es	in HTML: <script src="../../lib/yocto_api.js"></script> in node.js: require('yoctolib-es2017/yocto_api.js');

Global functions
yFindModule(func) Allows you to find a module from its serial number or from its logical name.
yFindModuleInContext(yctx, func) Retrieves a module for a given identifier in a YAPI context.
yFirstModule() Starts the enumeration of modules currently accessible.
YModule methods
module→checkFirmware(path, onlynew) Tests whether the byn file is valid for this module.
module→clearCache() Invalidates the cache.
module→describe() Returns a descriptive text that identifies the module.
module→download(pathname) Downloads the specified built-in file and returns a binary buffer with its content.
module→functionBaseType(functionIndex) Retrieves the base type of the *n*th function on the module.
module→functionCount() Returns the number of functions (beside the "module" interface) available on the module.
module→functionId(functionIndex) Retrieves the hardware identifier of the *n*th function on the module.
module→functionName(functionIndex) Retrieves the logical name of the *n*th function on the module.
module→functionType(functionIndex) Retrieves the type of the *n*th function on the module.
module→functionValue(functionIndex) Retrieves the advertised value of the *n*th function on the module.

module→get_allSettings()
Returns all the settings and uploaded files of the module.

module→get_beacon()
Returns the state of the localization beacon.

module→get_errorMessage()
Returns the error message of the latest error with this module object.

module→get_errorType()
Returns the numerical error code of the latest error with this module object.

module→get_firmwareRelease()
Returns the version of the firmware embedded in the module.

module→get_functionIds(funType)
Retrieve all hardware identifier that match the type passed in argument.

module→get_hardwareId()
Returns the unique hardware identifier of the module.

module→get_icon2d()
Returns the icon of the module.

module→get_lastLogs()
Returns a string with last logs of the module.

module→get_logicalName()
Returns the logical name of the module.

module→get_luminosity()
Returns the luminosity of the module informative leds (from 0 to 100).

module→get_parentHub()
Returns the serial number of the YoctoHub on which this module is connected.

module→get_persistentSettings()
Returns the current state of persistent module settings.

module→get_productId()
Returns the USB device identifier of the module.

module→get_productName()
Returns the commercial name of the module, as set by the factory.

module→get_productRelease()
Returns the hardware release version of the module.

module→get_rebootCountdown()
Returns the remaining number of seconds before the module restarts, or zero when no reboot has been scheduled.

module→get_serialNumber()
Returns the serial number of the module, as set by the factory.

module→get_subDevices()
Returns a list of all the modules that are plugged into the current module.

module→get_upTime()
Returns the number of milliseconds spent since the module was powered on.

module→get_url()
Returns the URL used to access the module.

module→get_usbCurrent()
Returns the current consumed by the module on the USB bus, in milli-amps.

module→get_userData()

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

module→get_userVar()

Returns the value previously stored in this attribute.

module→hasFunction(funcId)

Tests if the device includes a specific function.

module→isOnline()

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

module→isOnline_async(callback, context)

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

module→load(msValidity)

Preloads the module cache with a specified validity duration.

module→load_async(msValidity, callback, context)

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

module→log(text)

Adds a text message to the device logs.

module→nextModule()

Continues the module enumeration started using `yFirstModule()`.

module→reboot(secBeforeReboot)

Schedules a simple module reboot after the given number of seconds.

module→registerBeaconCallback(callback)

Register a callback function, to be called when the localization beacon of the module has been changed.

module→registerConfigChangeCallback(callback)

Register a callback function, to be called when a persistent settings in a device configuration has been changed (e.g.

module→registerLogCallback(callback)

Registers a device log callback function.

module→revertFromFlash()

Reloads the settings stored in the nonvolatile memory, as when the module is powered on.

module→saveToFlash()

Saves current settings in the nonvolatile memory of the module.

module→set_allSettings(settings)

Restores all the settings of the device.

module→set_allSettingsAndFiles(settings)

Restores all the settings and uploaded files to the module.

module→set_beacon(newval)

Turns on or off the module localization beacon.

module→set_logicalName(newval)

Changes the logical name of the module.

module→set_luminosity(newval)

Changes the luminosity of the module informative leds.

module→set_userData(data)

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

module→set_userVar(newval)

Stores a 32 bit value in the device RAM.

module→triggerConfigChangeCallback()

Triggers a configuration change callback, to check if they are supported or not.

module→triggerFirmwareUpdate(secBeforeReboot)

Schedules a module reboot into special firmware update mode.

module→updateFirmware(path)

Prepares a firmware update of the module.

module→updateFirmwareEx(path, force)

Prepares a firmware update of the module.

module→wait_async(callback, context)

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

YModule.FindModule() yFindModule() — YModule

Allows you to find a module from its serial number or from its logical name.

js	function **yFindModule**(**func**)
cpp	YModule* **yFindModule**(string **func**)
m	+(YModule*) **FindModule** : (NSString*) **func**
pas	function **yFindModule**(**func**: string): TYModule
vb	function **yFindModule**(ByVal **func** As String) As YModule
cs	YModule **FindModule**(string **func**)
java	YModule **FindModule**(String **func**)
uwp	YModule **FindModule**(string **func**)
py	def **FindModule**(**func**)
php	function **yFindModule**(**$func**)
es	function **FindModule**(**func**)

This function does not require that the module is online at the time it is invoked. The returned object is nevertheless valid. Use the method `YModule.isOnline()` to test if the module is indeed online at a given time. In case of ambiguity when looking for a module by logical name, no error is notified: the first instance found is returned. The search is performed first by hardware name, then by logical name.

If a call to this object's is_online() method returns FALSE although you are certain that the device is plugged, make sure that you did call registerHub() at application initialization time.

Parameters :

func a string containing either the serial number or the logical name of the desired module

Returns :

a `YModule` object allowing you to drive the module or get additional information on the module.

YModule.FindModuleInContext() yFindModuleInContext() — YModule

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

java	YModule **FindModuleInContext**(YAPIContext **yctx**, String **func**)
uwp	YModule **FindModuleInContext**(YAPIContext **yctx**, string **func**)
es	function **FindModuleInContext**(**yctx**, **func**)

The identifier can be specified using several formats:

- FunctionLogicalName
- ModuleSerialNumber.FunctionIdentifier
- ModuleSerialNumber.FunctionLogicalName
- ModuleLogicalName.FunctionIdentifier
- ModuleLogicalName.FunctionLogicalName

This function does not require that the module is online at the time it is invoked. The returned object is nevertheless valid. Use the method `YModule.isOnline()` to test if the module is indeed online at a given time. In case of ambiguity when looking for a module by logical name, no error is notified: the first instance found is returned. The search is performed first by hardware name, then by logical name.

Parameters :

yctx a YAPI context

func a string that uniquely characterizes the module

Returns :

a `YModule` object allowing you to drive the module.

YModule.FirstModule() yFirstModule()

YModule

Starts the enumeration of modules currently accessible.

js	function **yFirstModule**( )
cpp	YModule* **yFirstModule**( )
m	+(YModule*) **FirstModule**
pas	function **yFirstModule**( ): TYModule
vb	function **yFirstModule**( ) As YModule
cs	YModule **FirstModule**( )
java	YModule **FirstModule**( )
uwp	YModule **FirstModule**( )
py	def **FirstModule**( )
php	function **yFirstModule**( )
es	function **FirstModule**( )

Use the method `YModule.nextModule()` to iterate on the next modules.

Returns :

a pointer to a `YModule` object, corresponding to the first module currently online, or a `null` pointer if there are none.

module→checkFirmware() YModule

Tests whether the byn file is valid for this module.

js	function **checkFirmware**(**path**, **onlynew**)
cpp	string **checkFirmware**(string **path**, bool **onlynew**)
m	-(NSString*) **checkFirmware** : (NSString*) **path** : (bool) **onlynew**
pas	function **checkFirmware**(**path**: string, **onlynew**: boolean): string
vb	function **checkFirmware**( ) As String
cs	string **checkFirmware**(string **path**, bool **onlynew**)
java	String **checkFirmware**(String **path**, boolean **onlynew**)
uwp	Task<string> **checkFirmware**(string **path**, bool **onlynew**)
py	def **checkFirmware**(**path**, **onlynew**)
php	function **checkFirmware**(**$path**, **$onlynew**)
es	function **checkFirmware**(**path**, **onlynew**)
cmd	YModule **target** **checkFirmware** **path** **onlynew**

This method is useful to test if the module needs to be updated. It is possible to pass a directory as argument instead of a file. In this case, this method returns the path of the most recent appropriate `.byn` file. If the parameter `onlynew` is true, the function discards firmwares that are older or equal to the installed firmware.

Parameters :

path the path of a byn file or a directory that contains byn files

onlynew returns only files that are strictly newer

Returns :

the path of the byn file to use or a empty string if no byn files matches the requirement

On failure, throws an exception or returns a string that start with "error:".

module→clearCache() YModule

Invalidates the cache.

js	function **clearCache**( )
cpp	void **clearCache**( )
m	-(void) **clearCache**
pas	procedure **clearCache**( )
vb	procedure **clearCache**( )
cs	void **clearCache**( )
java	void **clearCache**( )
py	def **clearCache**( )
php	function **clearCache**( )
es	function **clearCache**( )

Invalidates the cache of the module attributes. Forces the next call to get_xxx() or loadxxx() to use values that come from the device.

module→describe() YModule

Returns a descriptive text that identifies the module.

js	function **describe**( )
cpp	string **describe**( )
m	-(NSString*) **describe**
pas	function **describe**( ): string
vb	function **describe**( ) As String
cs	string **describe**( )
java	String **describe**( )
py	def **describe**( )
php	function **describe**( )
es	function **describe**( )

The text may include either the logical name or the serial number of the module.

Returns :
a string that describes the module

module→download() YModule

Downloads the specified built-in file and returns a binary buffer with its content.

js	function **download**(**pathname**)
cpp	string **download**(string **pathname**)
m	-(NSMutableData*) **download** : (NSString*) **pathname**
pas	function **download**(**pathname**: string): TByteArray
vb	function **download**( ) As Byte
cs	byte[] **download**(string **pathname**)
java	byte[] **download**(String **pathname**)
uwp	Task<byte[]> **download**(string **pathname**)
py	def **download**(**pathname**)
php	function **download**(**$pathname**)
es	function **download**(**pathname**)
cmd	YModule **target download pathname**

Parameters :

pathname name of the new file to load

Returns :

a binary buffer with the file content

On failure, throws an exception or returns `YAPI_INVALID_STRING`.

module→functionBaseType() YModule

Retrieves the base type of the *n*th function on the module.

js	function **functionBaseType**(**functionIndex**)
cpp	string **functionBaseType**(int **functionIndex**)
pas	function **functionBaseType**(**functionIndex**: integer): string
vb	function **functionBaseType**(ByVal **functionIndex** As Integer) As String
cs	string **functionBaseType**(int **functionIndex**)
java	String **functionBaseType**(int **functionIndex**)
py	def **functionBaseType**(**functionIndex**)
php	function **functionBaseType**(**$functionIndex**)
es	function **functionBaseType**(**functionIndex**)

For instance, the base type of all measuring functions is "Sensor".

Parameters :

functionIndex the index of the function for which the information is desired, starting at 0 for the first function.

Returns :

a string corresponding to the base type of the function

On failure, throws an exception or returns an empty string.

module→functionCount() YModule

Returns the number of functions (beside the "module" interface) available on the module.

js	function **functionCount**( )
cpp	int **functionCount**( )
m	-(int) **functionCount**
pas	function **functionCount**( ): integer
vb	function **functionCount**( ) As Integer
cs	int **functionCount**( )
java	int **functionCount**( )
py	def **functionCount**( )
php	function **functionCount**( )
es	function **functionCount**( )

Returns :
the number of functions on the module

On failure, throws an exception or returns a negative error code.

module→functionId() YModule

Retrieves the hardware identifier of the *n*th function on the module.

js	function **functionId**(**functionIndex**)
cpp	string **functionId**(int **functionIndex**)
m	-(NSString*) **functionId** : (int) **functionIndex**
pas	function **functionId**(**functionIndex**: integer): string
vb	function **functionId**(ByVal **functionIndex** As Integer) As String
cs	string **functionId**(int **functionIndex**)
java	String **functionId**(int **functionIndex**)
py	def **functionId**(**functionIndex**)
php	function **functionId**(**$functionIndex**)
es	function **functionId**(**functionIndex**)

Parameters :

functionIndex the index of the function for which the information is desired, starting at 0 for the first function.

Returns :

a string corresponding to the unambiguous hardware identifier of the requested module function

On failure, throws an exception or returns an empty string.

module→functionName() YModule

Retrieves the logical name of the *n*th function on the module.

js	function **functionName**(**functionIndex**)
cpp	string **functionName**(int **functionIndex**)
m	-(NSString*) **functionName** : (int) **functionIndex**
pas	function **functionName**(**functionIndex**: integer): string
vb	function **functionName**(ByVal **functionIndex** As Integer) As String
cs	string **functionName**(int **functionIndex**)
java	String **functionName**(int **functionIndex**)
py	def **functionName**(**functionIndex**)
php	function **functionName**(**$functionIndex**)
es	function **functionName**(**functionIndex**)

Parameters :

functionIndex the index of the function for which the information is desired, starting at 0 for the first function.

Returns :

a string corresponding to the logical name of the requested module function

On failure, throws an exception or returns an empty string.

module→functionType() YModule

Retrieves the type of the *n*th function on the module.

js	function **functionType**(**functionIndex**)
cpp	string **functionType**(int **functionIndex**)
pas	function **functionType**(**functionIndex**: integer): string
vb	function **functionType**(ByVal **functionIndex** As Integer) As String
cs	string **functionType**(int **functionIndex**)
java	String **functionType**(int **functionIndex**)
py	def **functionType**(**functionIndex**)
php	function **functionType**(**$functionIndex**)
es	function **functionType**(**functionIndex**)

Parameters :

functionIndex the index of the function for which the information is desired, starting at 0 for the first function.

Returns :

a string corresponding to the type of the function

On failure, throws an exception or returns an empty string.

module→functionValue() YModule

Retrieves the advertised value of the *n*th function on the module.

js	function **functionValue**(**functionIndex**)
cpp	string **functionValue**(int **functionIndex**)
m	-(NSString*) **functionValue** : (int) **functionIndex**
pas	function **functionValue**(**functionIndex**: integer): string
vb	function **functionValue**(ByVal **functionIndex** As Integer) As String
cs	string **functionValue**(int **functionIndex**)
java	String **functionValue**(int **functionIndex**)
py	def **functionValue**(**functionIndex**)
php	function **functionValue**(**$functionIndex**)
es	function **functionValue**(**functionIndex**)

Parameters :

functionIndex the index of the function for which the information is desired, starting at 0 for the first function.

Returns :

a short string (up to 6 characters) corresponding to the advertised value of the requested module function

On failure, throws an exception or returns an empty string.

module→get_allSettings() module→allSettings()

YModule

Returns all the settings and uploaded files of the module.

js	function **get_allSettings**( )
cpp	string **get_allSettings**( )
m	-(NSMutableData*) allSettings
pas	function **get_allSettings**( ): TByteArray
vb	function **get_allSettings**( ) As Byte
cs	byte[] **get_allSettings**( )
java	byte[] **get_allSettings**( )
uwp	Task<byte[]> **get_allSettings**( )
py	def **get_allSettings**( )
php	function **get_allSettings**( )
es	function **get_allSettings**( )
cmd	YModule **target** **get_allSettings**

Useful to backup all the logical names, calibrations parameters, and uploaded files of a device.

Returns :
a binary buffer with all the settings.

On failure, throws an exception or returns an binary object of size 0.

module→get_beacon()
module→beacon()

YModule

Returns the state of the localization beacon.

js	function **get_beacon**( )
cpp	Y_BEACON_enum **get_beacon**( )
m	-(Y_BEACON_enum) beacon
pas	function **get_beacon**( ): Integer
vb	function **get_beacon**( ) As Integer
cs	int **get_beacon**( )
java	int **get_beacon**( )
uwp	Task<int> **get_beacon**( )
py	def **get_beacon**( )
php	function **get_beacon**( )
es	function **get_beacon**( )
cmd	YModule **target** **get_beacon**

Returns :

either `Y_BEACON_OFF` or `Y_BEACON_ON`, according to the state of the localization beacon

On failure, throws an exception or returns `Y_BEACON_INVALID`.

module→get_errorMessage() module→errorMessage() YModule

Returns the error message of the latest error with this module object.

js	function **get_errorMessage**( )
cpp	string **get_errorMessage**( )
m	-(NSString*) errorMessage
pas	function **get_errorMessage**( ): string
vb	function **get_errorMessage**( ) As String
cs	string **get_errorMessage**( )
java	String **get_errorMessage**( )
py	def **get_errorMessage**( )
php	function **get_errorMessage**( )
es	function **get_errorMessage**( )

This method is mostly useful when using the Yoctopuce library with exceptions disabled.

Returns :
a string corresponding to the latest error message that occured while using this module object

module→get_errorType() module→errorType()

YModule

Returns the numerical error code of the latest error with this module object.

js	function **get_errorType**( )
cpp	YRETCODE **get_errorType**( )
pas	function **get_errorType**( ): YRETCODE
vb	function **get_errorType**( ) As YRETCODE
cs	YRETCODE **get_errorType**( )
java	int **get_errorType**( )
py	def **get_errorType**( )
php	function **get_errorType**( )
es	function **get_errorType**( )

This method is mostly useful when using the Yoctopuce library with exceptions disabled.

Returns :

a number corresponding to the code of the latest error that occurred while using this module object

module→get_firmwareRelease() module→firmwareRelease()

YModule

Returns the version of the firmware embedded in the module.

js	function **get_firmwareRelease**( )
cpp	string **get_firmwareRelease**( )
m	-(NSString*) firmwareRelease
pas	function **get_firmwareRelease**( ): string
vb	function **get_firmwareRelease**( ) As String
cs	string **get_firmwareRelease**( )
java	String **get_firmwareRelease**( )
uwp	Task<string> **get_firmwareRelease**( )
py	def **get_firmwareRelease**( )
php	function **get_firmwareRelease**( )
es	function **get_firmwareRelease**( )
cmd	YModule **target** **get_firmwareRelease**

Returns :

a string corresponding to the version of the firmware embedded in the module

On failure, throws an exception or returns `Y_FIRMWARERELEASE_INVALID`.

module→get_functionIds() module→functionIds() YModule

Retrieve all hardware identifier that match the type passed in argument.

js	function **get_functionIds**(**funType**)
cpp	vector<string> **get_functionIds**(string **funType**)
m	-(NSMutableArray*) functionIds : (NSString*) **funType**
pas	function **get_functionIds**(**funType**: string): TStringArray
vb	function **get_functionIds**( ) As List
cs	List<string> **get_functionIds**(string **funType**)
java	ArrayList<String> **get_functionIds**(String **funType**)
uwp	Task<List<string>> **get_functionIds**(string **funType**)
py	def **get_functionIds**(**funType**)
php	function **get_functionIds**(**$funType**)
es	function **get_functionIds**(**funType**)
cmd	YModule **target** **get_functionIds** **funType**

Parameters :

funType The type of function (Relay, LightSensor, Voltage,...)

Returns :

an array of strings.

module→get_hardwareId()
module→hardwareId()

YModule

Returns the unique hardware identifier of the module.

js	function **get_hardwareId**( )
cpp	string **get_hardwareId**( )
m	-(NSString*) hardwareId
vb	function **get_hardwareId**( ) As String
cs	string **get_hardwareId**( )
java	String **get_hardwareId**( )
py	def **get_hardwareId**( )
php	function **get_hardwareId**( )
es	function **get_hardwareId**( )

The unique hardware identifier is made of the device serial number followed by string ".module".

Returns :
a string that uniquely identifies the module

module→get_icon2d() module→icon2d() YModule

Returns the icon of the module.

js	function **get_icon2d**( )
cpp	string **get_icon2d**( )
m	-(NSMutableData*) icon2d
pas	function **get_icon2d**( ): TByteArray
vb	function **get_icon2d**( ) As Byte
cs	byte[] **get_icon2d**( )
java	byte[] **get_icon2d**( )
uwp	Task<byte[]> **get_icon2d**( )
py	def **get_icon2d**( )
php	function **get_icon2d**( )
es	function **get_icon2d**( )
cmd	YModule **target get_icon2d**

The icon is a PNG image and does not exceeds 1536 bytes.

Returns :

a binary buffer with module icon, in png format. On failure, throws an exception or returns `YAPI_INVALID_STRING`.

module→get_lastLogs() module→lastLogs()

YModule

Returns a string with last logs of the module.

js	function **get_lastLogs**( )
cpp	string **get_lastLogs**( )
m	-(NSString*) lastLogs
pas	function **get_lastLogs**( ): string
vb	function **get_lastLogs**( ) As String
cs	string **get_lastLogs**( )
java	String **get_lastLogs**( )
uwp	Task<string> **get_lastLogs**( )
py	def **get_lastLogs**( )
php	function **get_lastLogs**( )
es	function **get_lastLogs**( )
cmd	YModule **target** **get_lastLogs**

This method return only logs that are still in the module.

Returns :

a string with last logs of the module. On failure, throws an exception or returns `YAPI_INVALID_STRING`.

module→get_logicalName()
module→logicalName()

YModule

Returns the logical name of the module.

js	function **get_logicalName**( )
cpp	string **get_logicalName**( )
m	-(NSString*) logicalName
pas	function **get_logicalName**( ): string
vb	function **get_logicalName**( ) As String
cs	string **get_logicalName**( )
java	String **get_logicalName**( )
uwp	Task<string> **get_logicalName**( )
py	def **get_logicalName**( )
php	function **get_logicalName**( )
es	function **get_logicalName**( )
cmd	YModule **target** **get_logicalName**

Returns :
a string corresponding to the logical name of the module

On failure, throws an exception or returns `Y_LOGICALNAME_INVALID`.

module→get_luminosity() module→luminosity() YModule

Returns the luminosity of the module informative leds (from 0 to 100).

js	function **get_luminosity**( )
cpp	int **get_luminosity**( )
m	-(int) luminosity
pas	function **get_luminosity**( ): LongInt
vb	function **get_luminosity**( ) As Integer
cs	int **get_luminosity**( )
java	int **get_luminosity**( )
uwp	Task<int> **get_luminosity**( )
py	def **get_luminosity**( )
php	function **get_luminosity**( )
es	function **get_luminosity**( )
cmd	YModule **target** **get_luminosity**

Returns :
an integer corresponding to the luminosity of the module informative leds (from 0 to 100)

On failure, throws an exception or returns `Y_LUMINOSITY_INVALID`.

module→get_parentHub() module→parentHub() YModule

Returns the serial number of the YoctoHub on which this module is connected.

js	function **get_parentHub**( )
cpp	string **get_parentHub**( )
m	-(NSString*) parentHub
pas	function **get_parentHub**( ): string
vb	function **get_parentHub**( ) As String
cs	string **get_parentHub**( )
java	String **get_parentHub**( )
uwp	Task<string> **get_parentHub**( )
py	def **get_parentHub**( )
php	function **get_parentHub**( )
es	function **get_parentHub**( )
cmd	YModule **target** **get_parentHub**

If the module is connected by USB, or if the module is the root YoctoHub, an empty string is returned.

Returns :
a string with the serial number of the YoctoHub or an empty string

module→get_persistentSettings()
module→persistentSettings()

YModule

Returns the current state of persistent module settings.

js	function **get_persistentSettings**( )
cpp	Y_PERSISTENTSETTINGS_enum **get_persistentSettings**( )
m	-(Y_PERSISTENTSETTINGS_enum) persistentSettings
pas	function **get_persistentSettings**( ): Integer
vb	function **get_persistentSettings**( ) As Integer
cs	int **get_persistentSettings**( )
java	int **get_persistentSettings**( )
uwp	Task<int> **get_persistentSettings**( )
py	def **get_persistentSettings**( )
php	function **get_persistentSettings**( )
es	function **get_persistentSettings**( )
cmd	YModule **target** **get_persistentSettings**

Returns :

a value among `Y_PERSISTENTSETTINGS_LOADED`, `Y_PERSISTENTSETTINGS_SAVED` and `Y_PERSISTENTSETTINGS_MODIFIED` corresponding to the current state of persistent module settings

On failure, throws an exception or returns `Y_PERSISTENTSETTINGS_INVALID`.

module→get_productId() module→productId()

YModule

Returns the USB device identifier of the module.

js	function **get_productId**( )
cpp	int **get_productId**( )
m	-(int) productId
pas	function **get_productId**( ): LongInt
vb	function **get_productId**( ) As Integer
cs	int **get_productId**( )
java	int **get_productId**( )
uwp	Task<int> **get_productId**( )
py	def **get_productId**( )
php	function **get_productId**( )
es	function **get_productId**( )
cmd	YModule **target** **get_productId**

Returns :

an integer corresponding to the USB device identifier of the module

On failure, throws an exception or returns `Y_PRODUCTID_INVALID`.

module→get_productName() module→productName()

YModule

Returns the commercial name of the module, as set by the factory.

js	function **get_productName**( )
cpp	string **get_productName**( )
m	-(NSString*) productName
pas	function **get_productName**( ): string
vb	function **get_productName**( ) As String
cs	string **get_productName**( )
java	String **get_productName**( )
uwp	Task<string> **get_productName**( )
py	def **get_productName**( )
php	function **get_productName**( )
es	function **get_productName**( )
cmd	YModule **target** **get_productName**

Returns :
a string corresponding to the commercial name of the module, as set by the factory

On failure, throws an exception or returns `Y_PRODUCTNAME_INVALID`.

module→get_productRelease() module→productRelease() YModule

Returns the hardware release version of the module.

js	function **get_productRelease**( )
cpp	int **get_productRelease**( )
m	-(int) productRelease
pas	function **get_productRelease**( ): LongInt
vb	function **get_productRelease**( ) As Integer
cs	int **get_productRelease**( )
java	int **get_productRelease**( )
uwp	Task<int> **get_productRelease**( )
py	def **get_productRelease**( )
php	function **get_productRelease**( )
es	function **get_productRelease**( )
cmd	YModule **target** **get_productRelease**

Returns :
an integer corresponding to the hardware release version of the module

On failure, throws an exception or returns `Y_PRODUCTRELEASE_INVALID`.

module→get_rebootCountdown() module→rebootCountdown() YModule

Returns the remaining number of seconds before the module restarts, or zero when no reboot has been scheduled.

js	function **get_rebootCountdown**( )
cpp	int **get_rebootCountdown**( )
m	-(int) rebootCountdown
pas	function **get_rebootCountdown**( ): LongInt
vb	function **get_rebootCountdown**( ) As Integer
cs	int **get_rebootCountdown**( )
java	int **get_rebootCountdown**( )
uwp	Task<int> **get_rebootCountdown**( )
py	def **get_rebootCountdown**( )
php	function **get_rebootCountdown**( )
es	function **get_rebootCountdown**( )
cmd	YModule **target** **get_rebootCountdown**

Returns :
an integer corresponding to the remaining number of seconds before the module restarts, or zero when no reboot has been scheduled

On failure, throws an exception or returns `Y_REBOOTCOUNTDOWN_INVALID`.

module→get_serialNumber() module→serialNumber()

YModule

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

js	function **get_serialNumber**( )
cpp	string **get_serialNumber**( )
m	-(NSString*) serialNumber
pas	function **get_serialNumber**( ): string
vb	function **get_serialNumber**( ) As String
cs	string **get_serialNumber**( )
java	String **get_serialNumber**( )
uwp	Task<string> **get_serialNumber**( )
py	def **get_serialNumber**( )
php	function **get_serialNumber**( )
es	function **get_serialNumber**( )
cmd	YModule **target** **get_serialNumber**

Returns :
a string corresponding to the serial number of the module, as set by the factory

On failure, throws an exception or returns `Y_SERIALNUMBER_INVALID`.

module→get_subDevices()
module→subDevices()

YModule

Returns a list of all the modules that are plugged into the current module.

js	function **get_subDevices**( )
cpp	vector<string> **get_subDevices**( )
m	-(NSMutableArray*) subDevices
pas	function **get_subDevices**( ): TStringArray
vb	function **get_subDevices**( ) As List
cs	List<string> **get_subDevices**( )
java	ArrayList<String> **get_subDevices**( )
uwp	Task<List<string>> **get_subDevices**( )
py	def **get_subDevices**( )
php	function **get_subDevices**( )
es	function **get_subDevices**( )
cmd	YModule **target** **get_subDevices**

This method only makes sense when called for a YoctoHub/VirtualHub. Otherwise, an empty array will be returned.

Returns :
an array of strings containing the sub modules.

module→get_upTime() module→upTime()

YModule

Returns the number of milliseconds spent since the module was powered on.

js	function **get_upTime**( )
cpp	s64 **get_upTime**( )
m	-(s64) upTime
pas	function **get_upTime**( ): int64
vb	function **get_upTime**( ) As Long
cs	long **get_upTime**( )
java	long **get_upTime**( )
uwp	Task<long> **get_upTime**( )
py	def **get_upTime**( )
php	function **get_upTime**( )
es	function **get_upTime**( )
cmd	YModule **target** **get_upTime**

Returns :
an integer corresponding to the number of milliseconds spent since the module was powered on

On failure, throws an exception or returns `Y_UPTIME_INVALID`.

module→get_url() module→url()

YModule

Returns the URL used to access the module.

js	function **get_url**( )
cpp	string **get_url**( )
m	-(NSString*) url
pas	function **get_url**( ): string
vb	function **get_url**( ) As String
cs	string **get_url**( )
java	String **get_url**( )
uwp	Task<string> **get_url**( )
py	def **get_url**( )
php	function **get_url**( )
es	function **get_url**( )
cmd	YModule **target** **get_url**

If the module is connected by USB, the string 'usb' is returned.

Returns :
a string with the URL of the module.

module→get_usbCurrent()
module→usbCurrent()

YModule

Returns the current consumed by the module on the USB bus, in milli-amps.

js	function **get_usbCurrent**( )
cpp	int **get_usbCurrent**( )
m	-(int) usbCurrent
pas	function **get_usbCurrent**( ): LongInt
vb	function **get_usbCurrent**( ) As Integer
cs	int **get_usbCurrent**( )
java	int **get_usbCurrent**( )
uwp	Task<int> **get_usbCurrent**( )
py	def **get_usbCurrent**( )
php	function **get_usbCurrent**( )
es	function **get_usbCurrent**( )
cmd	YModule **target** **get_usbCurrent**

Returns :

an integer corresponding to the current consumed by the module on the USB bus, in milli-amps

On failure, throws an exception or returns `Y_USBCURRENT_INVALID`.

module→get_userData() module→userData()

YModule

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

js	function **get_userData**( )
cpp	void * **get_userData**( )
m	-(id) userData
pas	function **get_userData**( ): Tobject
vb	function **get_userData**( ) As Object
cs	object **get_userData**( )
java	Object **get_userData**( )
py	def **get_userData**( )
php	function **get_userData**( )
es	function **get_userData**( )

This attribute is never touched directly by the API, and is at disposal of the caller to store a context.

Returns :
the object stored previously by the caller.

module→get_userVar() module→userVar()

YModule

Returns the value previously stored in this attribute.

js	function **get_userVar**( )
cpp	int **get_userVar**( )
m	-(int) userVar
pas	function **get_userVar**( ): LongInt
vb	function **get_userVar**( ) As Integer
cs	int **get_userVar**( )
java	int **get_userVar**( )
uwp	Task<int> **get_userVar**( )
py	def **get_userVar**( )
php	function **get_userVar**( )
es	function **get_userVar**( )
cmd	YModule **target** **get_userVar**

On startup and after a device reboot, the value is always reset to zero.

Returns :
an integer corresponding to the value previously stored in this attribute

On failure, throws an exception or returns `Y_USERVAR_INVALID`.

module→hasFunction() YModule

Tests if the device includes a specific function.

js	function **hasFunction**(**funcId**)
cpp	bool **hasFunction**(string **funcId**)
m	-(bool) **hasFunction** : (NSString*) **funcId**
pas	function **hasFunction**(**funcId**: string): boolean
vb	function **hasFunction**( ) As Boolean
cs	bool **hasFunction**(string **funcId**)
java	boolean **hasFunction**(String **funcId**)
uwp	Task<bool> **hasFunction**(string **funcId**)
py	def **hasFunction**(**funcId**)
php	function **hasFunction**(**$funcId**)
es	function **hasFunction**(**funcId**)
cmd	YModule **target** **hasFunction** **funcId**

This method takes a function identifier and returns a boolean.

Parameters :

funcId the requested function identifier

Returns :

true if the device has the function identifier

module→isOnline() YModule

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

js	function **isOnline**( )
cpp	bool **isOnline**( )
m	-(BOOL) **isOnline**
pas	function **isOnline**( ): boolean
vb	function **isOnline**( ) As Boolean
cs	bool **isOnline**( )
java	boolean **isOnline**( )
py	def **isOnline**( )
php	function **isOnline**( )
es	function **isOnline**( )

If there are valid cached values for the module, that have not yet expired, the device is considered reachable. No exception is raised if there is an error while trying to contact the requested module.

Returns :
`true` if the module can be reached, and `false` otherwise

module→isOnline_async() YModule

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

```
js  function isOnline_async( callback, context)
```

If there are valid cached values for the module, that have not yet expired, the device is considered reachable. No exception is raised if there is an error while trying to contact the requested module.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking Firefox Javascript VM that does not implement context switching during blocking I/O calls.

Parameters :

callback callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the receiving module object and the boolean result

context caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

module→load() YModule

Preloads the module cache with a specified validity duration.

js	function **load**(**msValidity**)
cpp	YRETCODE **load**(int **msValidity**)
m	-(YRETCODE) **load** : (u64) **msValidity**
pas	function **load**(**msValidity**: u64): YRETCODE
vb	function **load**(ByVal **msValidity** As Long) As YRETCODE
cs	YRETCODE **load**(ulong **msValidity**)
java	int **load**(long **msValidity**)
py	def **load**(**msValidity**)
php	function **load**(**$msValidity**)
es	function **load**(**msValidity**)

By default, whenever accessing a device, all module attributes are kept in cache for the standard duration (5 ms). This method can be used to temporarily mark the cache as valid for a longer period, in order to reduce network traffic for instance.

Parameters :

msValidity an integer corresponding to the validity attributed to the loaded module parameters, in milliseconds

Returns :

YAPI_SUCCESS when the call succeeds.

On failure, throws an exception or returns a negative error code.

module→load_async() YModule

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

js function **load_async**(**msValidity**, **callback**, **context**)

By default, whenever accessing a device, all module attributes are kept in cache for the standard duration (5 ms). This method can be used to temporarily mark the cache as valid for a longer period, in order to reduce network traffic for instance.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking Firefox javascript VM that does not implement context switching during blocking I/O calls. See the documentation section on asynchronous Javascript calls for more details.

Parameters :

msValidity an integer corresponding to the validity of the loaded module parameters, in milliseconds

callback callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the receiving module object and the error code (or `YAPI_SUCCESS`)

context caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

module→log() YModule

Adds a text message to the device logs.

js	function **log**(**text**)
cpp	int **log**(string **text**)
m	-(int) **log** : (NSString*) **text**
pas	function **log**(**text**: string): LongInt
vb	function **log**( ) As Integer
cs	int **log**(string **text**)
java	int **log**(String **text**)
uwp	Task<int> **log**(string **text**)
py	def **log**(**text**)
php	function **log**(**$text**)
es	function **log**(**text**)
cmd	YModule **target** **log** **text**

This function is useful in particular to trace the execution of HTTP callbacks. If a newline is desired after the message, it must be included in the string.

Parameters :

text the string to append to the logs.

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

module→nextModule() YModule

Continues the module enumeration started using `yFirstModule()`.

js	function **nextModule**( )
cpp	YModule * **nextModule**( )
m	-(YModule*) **nextModule**
pas	function **nextModule**( ): TYModule
vb	function **nextModule**( ) As YModule
cs	YModule **nextModule**( )
java	YModule **nextModule**( )
uwp	YModule **nextModule**( )
py	def **nextModule**( )
php	function **nextModule**( )
es	function **nextModule**( )

Returns :

a pointer to a `YModule` object, corresponding to the next module found, or a `null` pointer if there are no more modules to enumerate.

module→reboot() YModule

Schedules a simple module reboot after the given number of seconds.

js	function **reboot**(**secBeforeReboot**)
cpp	int **reboot**(int **secBeforeReboot**)
m	-(int) **reboot** : (int) **secBeforeReboot**
pas	function **reboot**(**secBeforeReboot**: LongInt): LongInt
vb	function **reboot**( ) As Integer
cs	int **reboot**(int **secBeforeReboot**)
java	int **reboot**(int **secBeforeReboot**)
uwp	Task<int> **reboot**(int **secBeforeReboot**)
py	def **reboot**(**secBeforeReboot**)
php	function **reboot**(**$secBeforeReboot**)
es	function **reboot**(**secBeforeReboot**)
cmd	YModule **target reboot secBeforeReboot**

Parameters :

secBeforeReboot number of seconds before rebooting

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

module→registerBeaconCallback() YModule

Register a callback function, to be called when the localization beacon of the module has been changed.

js	function **registerBeaconCallback**(**callback**)
cpp	int **registerBeaconCallback**(YModuleBeaconCallback **callback**)
m	-(int) **registerBeaconCallback** : (YModuleBeaconCallback) **callback**
pas	function **registerBeaconCallback**(**callback**: TYModuleBeaconCallback): LongInt
vb	function **registerBeaconCallback**( ) As Integer
cs	int **registerBeaconCallback**(BeaconCallback **callback**)
java	int **registerBeaconCallback**(BeaconCallback **callback**)
uwp	Task<int> **registerBeaconCallback**(BeaconCallback **callback**)
py	def **registerBeaconCallback**(**callback**)
php	function **registerBeaconCallback**(**$callback**)
es	function **registerBeaconCallback**(**callback**)

The callback function should take two arguments: the YModule object of which the beacon has changed, and an integer describing the new beacon state.

Parameters :

callback The callback function to call, or `null` to unregister a

module→registerConfigChangeCallback() YModule

Register a callback function, to be called when a persistent settings in a device configuration has been changed (e.g.

js	function **registerConfigChangeCallback**(**callback**)
cpp	int **registerConfigChangeCallback**(YModuleConfigChangeCallback **callback**)
m	-(int) **registerConfigChangeCallback** : (YModuleConfigChangeCallback) **callback**
pas	function **registerConfigChangeCallback**(**callback**: TYModuleConfigChangeCallback): LongInt
vb	function **registerConfigChangeCallback**( ) As Integer
cs	int **registerConfigChangeCallback**(ConfigChangeCallback **callback**)
java	int **registerConfigChangeCallback**(ConfigChangeCallback **callback**)
uwp	Task<int> **registerConfigChangeCallback**(ConfigChangeCallback **callback**)
py	def **registerConfigChangeCallback**(**callback**)
php	function **registerConfigChangeCallback**(**$callback**)
es	function **registerConfigChangeCallback**(**callback**)

change of unit, etc).

Parameters :

callback a procedure taking a YModule parameter, or `null`

module→registerLogCallback() YModule

Registers a device log callback function.

cpp	void **registerLogCallback**(YModuleLogCallback **callback**)
m	-(void) **registerLogCallback** : (YModuleLogCallback) **callback**
vb	function **registerLogCallback**(ByVal **callback** As YModuleLogCallback) As Integer
cs	int **registerLogCallback**(LogCallback **callback**)
java	void **registerLogCallback**(LogCallback **callback**)
py	def **registerLogCallback**(**callback**)

This callback will be called each time that a module sends a new log message. Mostly useful to debug a Yoctopuce module.

Parameters :

callback the callback function to call, or a null pointer. The callback function should take two arguments: the module object that emitted the log message, and the character string containing the log.

module→revertFromFlash() YModule

Reloads the settings stored in the nonvolatile memory, as when the module is powered on.

js	function **revertFromFlash**( )
cpp	int **revertFromFlash**( )
m	-(int) **revertFromFlash**
pas	function **revertFromFlash**( ): LongInt
vb	function **revertFromFlash**( ) As Integer
cs	int **revertFromFlash**( )
java	int **revertFromFlash**( )
uwp	Task<int> **revertFromFlash**( )
py	def **revertFromFlash**( )
php	function **revertFromFlash**( )
es	function **revertFromFlash**( )
cmd	YModule **target** **revertFromFlash**

Returns :
`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

module→saveToFlash() YModule

Saves current settings in the nonvolatile memory of the module.

js	function **saveToFlash**( )
cpp	int **saveToFlash**( )
m	-(int) **saveToFlash**
pas	function **saveToFlash**( ): LongInt
vb	function **saveToFlash**( ) As Integer
cs	int **saveToFlash**( )
java	int **saveToFlash**( )
uwp	Task<int> **saveToFlash**( )
py	def **saveToFlash**( )
php	function **saveToFlash**( )
es	function **saveToFlash**( )
cmd	YModule **target** **saveToFlash**

Warning: the number of allowed save operations during a module life is limited (about 100000 cycles). Do not call this function within a loop.

Returns :
YAPI_SUCCESS when the call succeeds.

On failure, throws an exception or returns a negative error code.

module→set_allSettings() module→setAllSettings()

YModule

Restores all the settings of the device.

js	function **set_allSettings**(**settings**)
cpp	int **set_allSettings**(string **settings**)
m	-(int) setAllSettings : (NSData*) **settings**
pas	function **set_allSettings**(**settings**: TByteArray): LongInt
vb	procedure **set_allSettings**( )
cs	int **set_allSettings**( )
java	int **set_allSettings**(byte[] **settings**)
uwp	Task<int> **set_allSettings**( )
py	def **set_allSettings**(**settings**)
php	function **set_allSettings**(**$settings**)
es	function **set_allSettings**(**settings**)
cmd	YModule **target** **set_allSettings** **settings**

Useful to restore all the logical names and calibrations parameters of a module from a backup.Remember to call the `saveToFlash()` method of the module if the modifications must be kept.

Parameters :

settings a binary buffer with all the settings.

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

module→set_allSettingsAndFiles()
module→setAllSettingsAndFiles()

YModule

Restores all the settings and uploaded files to the module.

js	function **set_allSettingsAndFiles**(**settings**)
cpp	int **set_allSettingsAndFiles**(string **settings**)
m	-(int) setAllSettingsAndFiles : (NSData*) **settings**
pas	function **set_allSettingsAndFiles**(**settings**: TByteArray): LongInt
vb	procedure **set_allSettingsAndFiles**( )
cs	int **set_allSettingsAndFiles**( )
java	int **set_allSettingsAndFiles**(byte[] **settings**)
uwp	Task<int> **set_allSettingsAndFiles**( )
py	def **set_allSettingsAndFiles**(**settings**)
php	function **set_allSettingsAndFiles**(**$settings**)
es	function **set_allSettingsAndFiles**(**settings**)
cmd	YModule **target** **set_allSettingsAndFiles** **settings**

This method is useful to restore all the logical names and calibrations parameters, uploaded files etc. of a device from a backup. Remember to call the `saveToFlash()` method of the module if the modifications must be kept.

Parameters :

settings a binary buffer with all the settings.

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

module→set_beacon() module→setBeacon()

YModule

Turns on or off the module localization beacon.

js	function **set_beacon**(**newval**)
cpp	int **set_beacon**(Y_BEACON_enum **newval**)
m	-(int) setBeacon : (Y_BEACON_enum) **newval**
pas	function **set_beacon**(**newval**: Integer): integer
vb	function **set_beacon**(ByVal **newval** As Integer) As Integer
cs	int **set_beacon**(int **newval**)
java	int **set_beacon**(int **newval**)
uwp	Task<int> **set_beacon**(int **newval**)
py	def **set_beacon**(**newval**)
php	function **set_beacon**(**$newval**)
es	function **set_beacon**(**newval**)
cmd	YModule **target set_beacon newval**

Parameters :

newval either Y_BEACON_OFF or Y_BEACON_ON

Returns :

YAPI_SUCCESS if the call succeeds.

On failure, throws an exception or returns a negative error code.

module→set_logicalName() module→setLogicalName() YModule

Changes the logical name of the module.

js	function **set_logicalName**(**newval**)
cpp	int **set_logicalName**(const string& **newval**)
m	-(int) setLogicalName : (NSString*) **newval**
pas	function **set_logicalName**(**newval**: string): integer
vb	function **set_logicalName**(ByVal **newval** As String) As Integer
cs	int **set_logicalName**(string **newval**)
java	int **set_logicalName**(String **newval**)
uwp	Task<int> **set_logicalName**(string **newval**)
py	def **set_logicalName**(**newval**)
php	function **set_logicalName**(**$newval**)
es	function **set_logicalName**(**newval**)
cmd	YModule **target** **set_logicalName** **newval**

You can use `yCheckLogicalName()` prior to this call to make sure that your parameter is valid. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Parameters :
newval a string corresponding to the logical name of the module

Returns :
`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

module→set_luminosity()
module→setLuminosity() — YModule

Changes the luminosity of the module informative leds.

js	function **set_luminosity**(**newval**)
cpp	int **set_luminosity**(int **newval**)
m	-(int) setLuminosity : (int) **newval**
pas	function **set_luminosity**(**newval**: LongInt): integer
vb	function **set_luminosity**(ByVal **newval** As Integer) As Integer
cs	int **set_luminosity**(int **newval**)
java	int **set_luminosity**(int **newval**)
uwp	Task<int> **set_luminosity**(int **newval**)
py	def **set_luminosity**(**newval**)
php	function **set_luminosity**(**$newval**)
es	function **set_luminosity**(**newval**)
cmd	YModule **target** **set_luminosity** **newval**

The parameter is a value between 0 and 100. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Parameters :

newval an integer corresponding to the luminosity of the module informative leds

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

module→set_userData()
module→setUserData()

YModule

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

js	function **set_userData**(**data**)
cpp	void **set_userData**(void* **data**)
m	-(void) setUserData : (id) **data**
pas	procedure **set_userData**(**data**: Tobject)
vb	procedure **set_userData**(ByVal **data** As Object)
cs	void **set_userData**(object **data**)
java	void **set_userData**(Object **data**)
py	def **set_userData**(**data**)
php	function **set_userData**(**$data**)
es	function **set_userData**(**data**)

This attribute is never touched by the API, and is at disposal of the caller to store a context.

Parameters :

data any kind of object to be stored

module→set_userVar()
module→setUserVar()

YModule

Stores a 32 bit value in the device RAM.

js	function **set_userVar**(**newval**)
cpp	int **set_userVar**(int **newval**)
m	-(int) setUserVar : (int) **newval**
pas	function **set_userVar**(**newval**: LongInt): integer
vb	function **set_userVar**(ByVal **newval** As Integer) As Integer
cs	int **set_userVar**(int **newval**)
java	int **set_userVar**(int **newval**)
uwp	Task<int> **set_userVar**(int **newval**)
py	def **set_userVar**(**newval**)
php	function **set_userVar**(**$newval**)
es	function **set_userVar**(**newval**)
cmd	YModule **target set_userVar newval**

This attribute is at programmer disposal, should he need to store a state variable. On startup and after a device reboot, the value is always reset to zero.

Parameters :

newval an integer

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

module→triggerConfigChangeCallback() YModule

Triggers a configuration change callback, to check if they are supported or not.

js	function **triggerConfigChangeCallback**( )
cpp	int **triggerConfigChangeCallback**( )
m	-(int) **triggerConfigChangeCallback**
pas	function **triggerConfigChangeCallback**( ): LongInt
vb	function **triggerConfigChangeCallback**( ) As Integer
cs	int **triggerConfigChangeCallback**( )
java	int **triggerConfigChangeCallback**( )
uwp	Task<int> **triggerConfigChangeCallback**( )
py	def **triggerConfigChangeCallback**( )
php	function **triggerConfigChangeCallback**( )
es	function **triggerConfigChangeCallback**( )
cmd	YModule **target** **triggerConfigChangeCallback**

module→triggerFirmwareUpdate() YModule

Schedules a module reboot into special firmware update mode.

js	function **triggerFirmwareUpdate**(**secBeforeReboot**)
cpp	int **triggerFirmwareUpdate**(int **secBeforeReboot**)
m	-(int) **triggerFirmwareUpdate** : (int) **secBeforeReboot**
pas	function **triggerFirmwareUpdate**(**secBeforeReboot**: LongInt): LongInt
vb	function **triggerFirmwareUpdate**( ) As Integer
cs	int **triggerFirmwareUpdate**(int **secBeforeReboot**)
java	int **triggerFirmwareUpdate**(int **secBeforeReboot**)
uwp	Task<int> **triggerFirmwareUpdate**(int **secBeforeReboot**)
py	def **triggerFirmwareUpdate**(**secBeforeReboot**)
php	function **triggerFirmwareUpdate**(**$secBeforeReboot**)
es	function **triggerFirmwareUpdate**(**secBeforeReboot**)
cmd	YModule **target** **triggerFirmwareUpdate** **secBeforeReboot**

Parameters :

secBeforeReboot number of seconds before rebooting

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

module→updateFirmware() YModule

Prepares a firmware update of the module.

js	function **updateFirmware**(**path**)
cpp	YFirmwareUpdate **updateFirmware**(string **path**)
m	-(YFirmwareUpdate*) **updateFirmware** : (NSString*) **path**
pas	function **updateFirmware**(**path**: string): TYFirmwareUpdate
vb	function **updateFirmware**( ) As YFirmwareUpdate
cs	YFirmwareUpdate **updateFirmware**(string **path**)
java	YFirmwareUpdate **updateFirmware**(String **path**)
uwp	Task<YFirmwareUpdate> **updateFirmware**(string **path**)
py	def **updateFirmware**(**path**)
php	function **updateFirmware**(**$path**)
es	function **updateFirmware**(**path**)
cmd	YModule **target** **updateFirmware** **path**

This method returns a `YFirmwareUpdate` object which handles the firmware update process.

Parameters :

path the path of the `.byn` file to use.

Returns :

a `YFirmwareUpdate` object or NULL on error.

module→updateFirmwareEx() YModule

Prepares a firmware update of the module.

js	function **updateFirmwareEx**(**path**, **force**)
cpp	YFirmwareUpdate **updateFirmwareEx**(string **path**, bool **force**)
m	-(YFirmwareUpdate*) **updateFirmwareEx** : (NSString*) **path** : (bool) **force**
pas	function **updateFirmwareEx**(**path**: string, **force**: boolean): TYFirmwareUpdate
vb	function **updateFirmwareEx**( ) As YFirmwareUpdate
cs	YFirmwareUpdate **updateFirmwareEx**(string **path**, bool **force**)
java	YFirmwareUpdate **updateFirmwareEx**(String **path**, boolean **force**)
uwp	Task<YFirmwareUpdate> **updateFirmwareEx**(string **path**, bool **force**)
py	def **updateFirmwareEx**(**path**, **force**)
php	function **updateFirmwareEx**(**$path**, **$force**)
es	function **updateFirmwareEx**(**path**, **force**)
cmd	YModule **target** **updateFirmwareEx** **path** **force**

This method returns a `YFirmwareUpdate` object which handles the firmware update process.

Parameters :

path the path of the `.byn` file to use.

force true to force the firmware update even if some prerequisites appear not to be met

Returns :

a `YFirmwareUpdate` object or NULL on error.

module→wait_async() YModule

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

js	function **wait_async**(**callback**, **context**)
es	function **wait_async**(**callback**, **context**)

The callback function can therefore freely issue synchronous or asynchronous commands, without risking to block the Javascript VM.

Parameters :

callback callback function that is invoked when all pending commands on the module are completed. The callback function receives two arguments: the caller-specific context object and the receiving function object.

context caller-specific object that is passed as-is to the callback function

Returns :

nothing.

21.3. Humidity function interface

The Yoctopuce class YHumidity allows you to read and configure Yoctopuce humidity sensors. It inherits from YSensor class the core functions to read measurements, to register callback functions, to access the autonomous datalogger.

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

es	in HTML: <script src="../../lib/yocto_humidity.js"></script> in node.js: require('yoctolib-es2017/yocto_humidity.js');
js	<script type='text/javascript' src='yocto_humidity.js'></script>
cpp	#include "yocto_humidity.h"
m	#import "yocto_humidity.h"
pas	uses yocto_humidity;
vb	yocto_humidity.vb
cs	yocto_humidity.cs
java	import com.yoctopuce.YoctoAPI.YHumidity;
uwp	import com.yoctopuce.YoctoAPI.YHumidity;
py	from yocto_humidity import *
php	require_once('yocto_humidity.php');

Global functions

yFindHumidity(func)

Retrieves a humidity sensor for a given identifier.

yFindHumidityInContext(yctx, func)

Retrieves a humidity sensor for a given identifier in a YAPI context.

yFirstHumidity()

Starts the enumeration of humidity sensors currently accessible.

yFirstHumidityInContext(yctx)

Starts the enumeration of humidity sensors currently accessible.

`YHumidity` methods

humidity→calibrateFromPoints(rawValues, refValues)

Configures error correction data points, in particular to compensate for a possible perturbation of the measure caused by an enclosure.

humidity→clearCache()

Invalidates the cache.

humidity→describe()

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

humidity→get_absHum()

Returns the current absolute humidity, in grams per cubic meter of air.

humidity→get_advMode()

Returns the measuring mode used for the advertised value pushed to the parent hub.

humidity→get_advertisedValue()

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

humidity→get_currentRawValue()

Returns the uncalibrated, unrounded raw value returned by the sensor, in %RH, as a floating point number.

humidity→get_currentValue()

Returns the current value of the humidity, in %RH, as a floating point number.

humidity→get_dataLogger()

Returns the YDatalogger object of the device hosting the sensor.

humidity→get_errorMessage()

Returns the error message of the latest error with the humidity sensor.

humidity→get_errorType()

Returns the numerical error code of the latest error with the humidity sensor.

humidity→get_friendlyName()

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

humidity→get_functionDescriptor()

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

humidity→get_functionId()

Returns the hardware identifier of the humidity sensor, without reference to the module.

humidity→get_hardwareId()

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

humidity→get_highestValue()

Returns the maximal value observed for the humidity since the device was started.

humidity→get_logFrequency()

Returns the datalogger recording frequency for this function, or "OFF" when measures are not stored in the data logger flash memory.

humidity→get_logicalName()

Returns the logical name of the humidity sensor.

humidity→get_lowestValue()

Returns the minimal value observed for the humidity since the device was started.

humidity→get_module()

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

humidity→get_module_async(**callback**, **context**)

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

humidity→get_recordedData(**startTime**, **endTime**)

Retrieves a DataSet object holding historical data for this sensor, for a specified time interval.

humidity→get_relHum()

Returns the current relative humidity, in per cents.

humidity→get_reportFrequency()

Returns the timed value notification frequency, or "OFF" if timed value notifications are disabled for this function.

humidity→get_resolution()

Returns the resolution of the measured values.

humidity→get_sensorState()

Returns the sensor health state code, which is zero when there is an up-to-date measure available or a positive code if the sensor is not able to provide a measure right now.

humidity→get_unit()

Returns the measuring unit for the humidity.

humidity→get_userData()

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

humidity→isOnline()

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

humidity→isOnline_async(callback, context)

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

humidity→isSensorReady()

Checks if the sensor is currently able to provide an up-to-date measure.

humidity→load(msValidity)

Preloads the humidity sensor cache with a specified validity duration.

humidity→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.

humidity→loadCalibrationPoints(rawValues, refValues)

Retrieves error correction data points previously entered using the method `calibrateFromPoints`.

humidity→load_async(msValidity, callback, context)

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

humidity→muteValueCallbacks()

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

humidity→nextHumidity()

Continues the enumeration of humidity sensors started using `yFirstHumidity()`.

humidity→registerTimedReportCallback(callback)

Registers the callback function that is invoked on every periodic timed notification.

humidity→registerValueCallback(callback)

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

humidity→set_advMode(newval)

Changes the measuring mode used for the advertised value pushed to the parent hub.

humidity→set_highestValue(newval)

Changes the recorded maximal value observed.

humidity→set_logFrequency(newval)

Changes the datalogger recording frequency for this function.

humidity→set_logicalName(newval)

Changes the logical name of the humidity sensor.

humidity→set_lowestValue(newval)

Changes the recorded minimal value observed.

humidity→set_reportFrequency(newval)

Changes the timed value notification frequency for this function.

humidity→set_resolution(newval)

Changes the resolution of the measured physical values.

humidity→set_unit(newval)

Changes the primary unit for measuring humidity.

humidity→set_userData(data)

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

humidity→startDataLogger()

Starts the data logger on the device.

humidity→stopDataLogger()

Stops the datalogger on the device.

humidity→unmuteValueCallbacks()

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

humidity→wait_async(callback, context)

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

YHumidity.FindHumidity() yFindHumidity()

YHumidity

Retrieves a humidity sensor for a given identifier.

js	function **yFindHumidity**(**func**)
cpp	YHumidity* **yFindHumidity**(string **func**)
m	+(YHumidity*) **FindHumidity** : (NSString*) **func**
pas	function **yFindHumidity**(**func**: string): TYHumidity
vb	function **yFindHumidity**(ByVal **func** As String) As YHumidity
cs	YHumidity **FindHumidity**(string **func**)
java	YHumidity **FindHumidity**(String **func**)
uwp	YHumidity **FindHumidity**(string **func**)
py	def **FindHumidity**(**func**)
php	function **yFindHumidity**(**$func**)
es	function **FindHumidity**(**func**)

The identifier can be specified using several formats:

- FunctionLogicalName
- ModuleSerialNumber.FunctionIdentifier
- ModuleSerialNumber.FunctionLogicalName
- ModuleLogicalName.FunctionIdentifier
- ModuleLogicalName.FunctionLogicalName

This function does not require that the humidity sensor is online at the time it is invoked. The returned object is nevertheless valid. Use the method `YHumidity.isOnline()` to test if the humidity sensor is indeed online at a given time. In case of ambiguity when looking for a humidity sensor by logical name, no error is notified: the first instance found is returned. The search is performed first by hardware name, then by logical name.

If a call to this object's is_online() method returns FALSE although you are certain that the matching device is plugged, make sure that you did call registerHub() at application initialization time.

Parameters :

func a string that uniquely characterizes the humidity sensor

Returns :

a `YHumidity` object allowing you to drive the humidity sensor.

YHumidity.FindHumidityInContext() yFindHumidityInContext() — YHumidity

Retrieves a humidity sensor for a given identifier in a YAPI context.

java	YHumidity **FindHumidityInContext**(YAPIContext **yctx**, String **func**)
uwp	YHumidity **FindHumidityInContext**(YAPIContext **yctx**, string **func**)
es	function **FindHumidityInContext**(**yctx**, **func**)

The identifier can be specified using several formats:

- FunctionLogicalName
- ModuleSerialNumber.FunctionIdentifier
- ModuleSerialNumber.FunctionLogicalName
- ModuleLogicalName.FunctionIdentifier
- ModuleLogicalName.FunctionLogicalName

This function does not require that the humidity sensor is online at the time it is invoked. The returned object is nevertheless valid. Use the method `YHumidity.isOnline()` to test if the humidity sensor is indeed online at a given time. In case of ambiguity when looking for a humidity sensor by logical name, no error is notified: the first instance found is returned. The search is performed first by hardware name, then by logical name.

Parameters :

yctx a YAPI context

func a string that uniquely characterizes the humidity sensor

Returns :

a `YHumidity` object allowing you to drive the humidity sensor.

YHumidity.FirstHumidity() yFirstHumidity()

YHumidity

Starts the enumeration of humidity sensors currently accessible.

js	function **yFirstHumidity**( )
cpp	YHumidity* **yFirstHumidity**( )
m	+(YHumidity*) **FirstHumidity**
pas	function **yFirstHumidity**( ): TYHumidity
vb	function **yFirstHumidity**( ) As YHumidity
cs	YHumidity **FirstHumidity**( )
java	YHumidity **FirstHumidity**( )
uwp	YHumidity **FirstHumidity**( )
py	def **FirstHumidity**( )
php	function **yFirstHumidity**( )
es	function **FirstHumidity**( )

Use the method `YHumidity.nextHumidity()` to iterate on next humidity sensors.

Returns :

a pointer to a `YHumidity` object, corresponding to the first humidity sensor currently online, or a `null` pointer if there are none.

YHumidity.FirstHumidityInContext() yFirstHumidityInContext()

YHumidity

Starts the enumeration of humidity sensors currently accessible.

```
java  YHumidity FirstHumidityInContext( YAPIContext yctx)
uwp   YHumidity FirstHumidityInContext( YAPIContext yctx)
es    function FirstHumidityInContext( yctx)
```

Use the method `YHumidity.nextHumidity()` to iterate on next humidity sensors.

Parameters :

yctx a YAPI context.

Returns :

a pointer to a `YHumidity` object, corresponding to the first humidity sensor currently online, or a `null` pointer if there are none.

humidity→calibrateFromPoints() YHumidity

Configures error correction data points, in particular to compensate for a possible perturbation of the measure caused by an enclosure.

js	function **calibrateFromPoints**(**rawValues**, **refValues**)
cpp	int **calibrateFromPoints**(vector<double> **rawValues**, vector<double> **refValues**)
m	-(int) **calibrateFromPoints** : (NSMutableArray*) **rawValues** : (NSMutableArray*) **refValues**
pas	function **calibrateFromPoints**(**rawValues**: TDoubleArray, **refValues**: TDoubleArray): LongInt
vb	procedure **calibrateFromPoints**( )
cs	int **calibrateFromPoints**(List<double> **rawValues**, List<double> **refValues**)
java	int **calibrateFromPoints**(ArrayList<Double> **rawValues**, ArrayList<Double> **refValues**)
uwp	Task<int> **calibrateFromPoints**(List<double> **rawValues**, List<double> **refValues**)
py	def **calibrateFromPoints**(**rawValues**, **refValues**)
php	function **calibrateFromPoints**(**$rawValues**, **$refValues**)
es	function **calibrateFromPoints**(**rawValues**, **refValues**)
cmd	YHumidity **target calibrateFromPoints rawValues refValues**

It is possible to configure up to five correction points. Correction points must be provided in ascending order, and be in the range of the sensor. The device will automatically perform a linear interpolation of the error correction between specified points. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

For more information on advanced capabilities to refine the calibration of sensors, please contact support@yoctopuce.com.

Parameters :

rawValues array of floating point numbers, corresponding to the raw values returned by the sensor for the correction points.

refValues array of floating point numbers, corresponding to the corrected values for the correction points.

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

humidity→clearCache() YHumidity

Invalidates the cache.

js	function **clearCache**( )
cpp	void **clearCache**( )
m	-(void) **clearCache**
pas	procedure **clearCache**( )
vb	procedure **clearCache**( )
cs	void **clearCache**( )
java	void **clearCache**( )
py	def **clearCache**( )
php	function **clearCache**( )
es	function **clearCache**( )

Invalidates the cache of the humidity sensor attributes. Forces the next call to get_xxx() or loadxxx() to use values that come from the device.

humidity→describe() YHumidity

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

js	function **describe**( )
cpp	string **describe**( )
m	-(NSString*) **describe**
pas	function **describe**( ): string
vb	function **describe**( ) As String
cs	string **describe**( )
java	String **describe**( )
py	def **describe**( )
php	function **describe**( )
es	function **describe**( )

More precisely, `TYPE` is the type of the function, `NAME` it the name used for the first access to the function, `SERIAL` is the serial number of the module if the module is connected or `"unresolved"`, and `FUNCTIONID` is the hardware identifier of the function if the module is connected. For example, this method returns `Relay(MyCustomName.relay1)=RELAYLO1-123456.relay1` if the module is already connected or `Relay(BadCustomeName.relay1)=unresolved` if the module has not yet been connected. This method does not trigger any USB or TCP transaction and can therefore be used in a debugger.

Returns :

a string that describes the humidity sensor (ex: `Relay(MyCustomName.relay1)=RELAYLO1-123456.relay1`)

humidity→get_absHum()
humidity→absHum()

YHumidity

Returns the current absolute humidity, in grams per cubic meter of air.

js	function **get_absHum**( )
cpp	double **get_absHum**( )
m	-(double) absHum
pas	function **get_absHum**( ): double
vb	function **get_absHum**( ) As Double
cs	double **get_absHum**( )
java	double **get_absHum**( )
uwp	Task<double> **get_absHum**( )
py	def **get_absHum**( )
php	function **get_absHum**( )
es	function **get_absHum**( )
cmd	YHumidity **target** **get_absHum**

Returns :

a floating point number corresponding to the current absolute humidity, in grams per cubic meter of air

On failure, throws an exception or returns `Y_ABSHUM_INVALID`.

humidity→get_advMode()
humidity→advMode()

YHumidity

Returns the measuring mode used for the advertised value pushed to the parent hub.

js	function **get_advMode**( )
cpp	Y_ADVMODE_enum **get_advMode**( )
m	-(Y_ADVMODE_enum) advMode
pas	function **get_advMode**( ): Integer
vb	function **get_advMode**( ) As Integer
cs	int **get_advMode**( )
java	int **get_advMode**( )
uwp	Task<int> **get_advMode**( )
py	def **get_advMode**( )
php	function **get_advMode**( )
es	function **get_advMode**( )
cmd	YHumidity **target** **get_advMode**

Returns :

a value among Y_ADVMODE_IMMEDIATE, Y_ADVMODE_PERIOD_AVG, Y_ADVMODE_PERIOD_MIN and Y_ADVMODE_PERIOD_MAX corresponding to the measuring mode used for the advertised value pushed to the parent hub

On failure, throws an exception or returns Y_ADVMODE_INVALID.

humidity→get_advertisedValue() humidity→advertisedValue() YHumidity

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

js	function **get_advertisedValue**( )
cpp	string **get_advertisedValue**( )
m	-(NSString*) advertisedValue
pas	function **get_advertisedValue**( ): string
vb	function **get_advertisedValue**( ) As String
cs	string **get_advertisedValue**( )
java	String **get_advertisedValue**( )
uwp	Task<string> **get_advertisedValue**( )
py	def **get_advertisedValue**( )
php	function **get_advertisedValue**( )
es	function **get_advertisedValue**( )
cmd	YHumidity **target** **get_advertisedValue**

Returns :
a string corresponding to the current value of the humidity sensor (no more than 6 characters).

On failure, throws an exception or returns `Y_ADVERTISEDVALUE_INVALID`.

humidity→get_currentRawValue() humidity→currentRawValue() YHumidity

Returns the uncalibrated, unrounded raw value returned by the sensor, in %RH, as a floating point number.

js	function **get_currentRawValue**( )
cpp	double **get_currentRawValue**( )
m	-(double) currentRawValue
pas	function **get_currentRawValue**( ): double
vb	function **get_currentRawValue**( ) As Double
cs	double **get_currentRawValue**( )
java	double **get_currentRawValue**( )
uwp	Task<double> **get_currentRawValue**( )
py	def **get_currentRawValue**( )
php	function **get_currentRawValue**( )
es	function **get_currentRawValue**( )
cmd	YHumidity **target get_currentRawValue**

Returns :
a floating point number corresponding to the uncalibrated, unrounded raw value returned by the sensor, in %RH, as a floating point number

On failure, throws an exception or returns `Y_CURRENTRAWVALUE_INVALID`.

humidity→get_currentValue()
humidity→currentValue() YHumidity

Returns the current value of the humidity, in %RH, as a floating point number.

js	function **get_currentValue**( )
cpp	double **get_currentValue**( )
m	-(double) currentValue
pas	function **get_currentValue**( ): double
vb	function **get_currentValue**( ) As Double
cs	double **get_currentValue**( )
java	double **get_currentValue**( )
uwp	Task<double> **get_currentValue**( )
py	def **get_currentValue**( )
php	function **get_currentValue**( )
es	function **get_currentValue**( )
cmd	YHumidity **target** **get_currentValue**

Returns :
a floating point number corresponding to the current value of the humidity, in %RH, as a floating point number

On failure, throws an exception or returns `Y_CURRENTVALUE_INVALID`.

humidity→get_dataLogger()
humidity→dataLogger()

YHumidity

Returns the YDatalogger object of the device hosting the sensor.

js	function **get_dataLogger**( )
cpp	YDataLogger* **get_dataLogger**( )
m	-(YDataLogger*) dataLogger
pas	function **get_dataLogger**( ): TYDataLogger
vb	function **get_dataLogger**( ) As YDataLogger
cs	YDataLogger **get_dataLogger**( )
java	YDataLogger **get_dataLogger**( )
uwp	Task<YDataLogger> **get_dataLogger**( )
py	def **get_dataLogger**( )
php	function **get_dataLogger**( )
es	function **get_dataLogger**( )

This method returns an object of class YDatalogger that can control global parameters of the data logger. The returned object should not be freed.

Returns :
an YDataLogger object or null on error.

humidity→get_errorMessage()
humidity→errorMessage()

YHumidity

Returns the error message of the latest error with the humidity sensor.

js	function **get_errorMessage**( )
cpp	string **get_errorMessage**( )
m	-(NSString*) errorMessage
pas	function **get_errorMessage**( ): string
vb	function **get_errorMessage**( ) As String
cs	string **get_errorMessage**( )
java	String **get_errorMessage**( )
py	def **get_errorMessage**( )
php	function **get_errorMessage**( )
es	function **get_errorMessage**( )

This method is mostly useful when using the Yoctopuce library with exceptions disabled.

Returns :
a string corresponding to the latest error message that occured while using the humidity sensor object

humidity→get_errorType() humidity→errorType() YHumidity

Returns the numerical error code of the latest error with the humidity sensor.

js	function **get_errorType**( )
cpp	YRETCODE **get_errorType**( )
pas	function **get_errorType**( ): YRETCODE
vb	function **get_errorType**( ) As YRETCODE
cs	YRETCODE **get_errorType**( )
java	int **get_errorType**( )
py	def **get_errorType**( )
php	function **get_errorType**( )
es	function **get_errorType**( )

This method is mostly useful when using the Yoctopuce library with exceptions disabled.

Returns :
a number corresponding to the code of the latest error that occurred while using the humidity sensor object

humidity→get_friendlyName() humidity→friendlyName()

YHumidity

Returns a global identifier of the humidity sensor in the format MODULE_NAME.FUNCTION_NAME.

js	function **get_friendlyName**( )
cpp	string **get_friendlyName**( )
m	-(NSString*) friendlyName
cs	string **get_friendlyName**( )
java	String **get_friendlyName**( )
py	def **get_friendlyName**( )
php	function **get_friendlyName**( )
es	function **get_friendlyName**( )

The returned string uses the logical names of the module and of the humidity sensor if they are defined, otherwise the serial number of the module and the hardware identifier of the humidity sensor (for example: MyCustomName.relay1)

Returns :

a string that uniquely identifies the humidity sensor using logical names (ex: MyCustomName.relay1)

On failure, throws an exception or returns Y_FRIENDLYNAME_INVALID.

humidity→get_functionDescriptor() humidity→functionDescriptor()

YHumidity

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

js	function **get_functionDescriptor**( )
cpp	YFUN_DESCR **get_functionDescriptor**( )
m	-(YFUN_DESCR) functionDescriptor
pas	function **get_functionDescriptor**( ): YFUN_DESCR
vb	function **get_functionDescriptor**( ) As YFUN_DESCR
cs	YFUN_DESCR **get_functionDescriptor**( )
java	String **get_functionDescriptor**( )
py	def **get_functionDescriptor**( )
php	function **get_functionDescriptor**( )
es	function **get_functionDescriptor**( )

This identifier can be used to test if two instances of YFunction reference the same physical function on the same physical device.

Returns :
an identifier of type YFUN_DESCR.

If the function has never been contacted, the returned value is Y_FUNCTIONDESCRIPTOR_INVALID.

humidity→get_functionId() humidity→functionId()

YHumidity

Returns the hardware identifier of the humidity sensor, without reference to the module.

js	function **get_functionId**( )
cpp	string **get_functionId**( )
m	-(NSString*) functionId
vb	function **get_functionId**( ) As String
cs	string **get_functionId**( )
java	String **get_functionId**( )
py	def **get_functionId**( )
php	function **get_functionId**( )
es	function **get_functionId**( )

For example `relay1`

Returns :

a string that identifies the humidity sensor (ex: `relay1`)

On failure, throws an exception or returns `Y_FUNCTIONID_INVALID`.

humidity→get_hardwareId()
humidity→hardwareId()

YHumidity

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

js	function **get_hardwareId**( )
cpp	string **get_hardwareId**( )
m	-(NSString*) hardwareId
vb	function **get_hardwareId**( ) As String
cs	string **get_hardwareId**( )
java	String **get_hardwareId**( )
py	def **get_hardwareId**( )
php	function **get_hardwareId**( )
es	function **get_hardwareId**( )

The unique hardware identifier is composed of the device serial number and of the hardware identifier of the humidity sensor (for example `RELAYLO1-123456.relay1`).

Returns :
a string that uniquely identifies the humidity sensor (ex: `RELAYLO1-123456.relay1`)

On failure, throws an exception or returns `Y_HARDWAREID_INVALID`.

humidity→get_highestValue()
humidity→highestValue() YHumidity

Returns the maximal value observed for the humidity since the device was started.

js	function **get_highestValue**( )
cpp	double **get_highestValue**( )
m	-(double) highestValue
pas	function **get_highestValue**( ): double
vb	function **get_highestValue**( ) As Double
cs	double **get_highestValue**( )
java	double **get_highestValue**( )
uwp	Task<double> **get_highestValue**( )
py	def **get_highestValue**( )
php	function **get_highestValue**( )
es	function **get_highestValue**( )
cmd	YHumidity **target** **get_highestValue**

Can be reset to an arbitrary value thanks to set_highestValue().

Returns :
a floating point number corresponding to the maximal value observed for the humidity since the device was started

On failure, throws an exception or returns `Y_HIGHESTVALUE_INVALID`.

humidity→get_logFrequency() humidity→logFrequency() YHumidity

Returns the datalogger recording frequency for this function, or "OFF" when measures are not stored in the data logger flash memory.

js	function **get_logFrequency**( )
cpp	string **get_logFrequency**( )
m	-(NSString*) logFrequency
pas	function **get_logFrequency**( ): string
vb	function **get_logFrequency**( ) As String
cs	string **get_logFrequency**( )
java	String **get_logFrequency**( )
uwp	Task<string> **get_logFrequency**( )
py	def **get_logFrequency**( )
php	function **get_logFrequency**( )
es	function **get_logFrequency**( )
cmd	YHumidity **target** **get_logFrequency**

Returns :
a string corresponding to the datalogger recording frequency for this function, or "OFF" when measures are not stored in the data logger flash memory

On failure, throws an exception or returns `Y_LOGFREQUENCY_INVALID`.

humidity→get_logicalName() humidity→logicalName()

YHumidity

Returns the logical name of the humidity sensor.

js	function **get_logicalName**( )
cpp	string **get_logicalName**( )
m	-(NSString*) logicalName
pas	function **get_logicalName**( ): string
vb	function **get_logicalName**( ) As String
cs	string **get_logicalName**( )
java	String **get_logicalName**( )
uwp	Task<string> **get_logicalName**( )
py	def **get_logicalName**( )
php	function **get_logicalName**( )
es	function **get_logicalName**( )
cmd	YHumidity **target** **get_logicalName**

Returns :
a string corresponding to the logical name of the humidity sensor.

On failure, throws an exception or returns `Y_LOGICALNAME_INVALID`.

humidity→get_lowestValue() humidity→lowestValue() YHumidity

Returns the minimal value observed for the humidity since the device was started.

js	function **get_lowestValue**( )
cpp	double **get_lowestValue**( )
m	-(double) lowestValue
pas	function **get_lowestValue**( ): double
vb	function **get_lowestValue**( ) As Double
cs	double **get_lowestValue**( )
java	double **get_lowestValue**( )
uwp	Task<double> **get_lowestValue**( )
py	def **get_lowestValue**( )
php	function **get_lowestValue**( )
es	function **get_lowestValue**( )
cmd	YHumidity **target** **get_lowestValue**

Can be reset to an arbitrary value thanks to set_lowestValue().

Returns :
a floating point number corresponding to the minimal value observed for the humidity since the device was started

On failure, throws an exception or returns `Y_LOWESTVALUE_INVALID`.

humidity→get_module() humidity→module()

YHumidity

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

js	function **get_module**( )
cpp	YModule * **get_module**( )
m	-(YModule*) module
pas	function **get_module**( ): TYModule
vb	function **get_module**( ) As YModule
cs	YModule **get_module**( )
java	YModule **get_module**( )
py	def **get_module**( )
php	function **get_module**( )
es	function **get_module**( )

If the function cannot be located on any module, the returned instance of `YModule` is not shown as on-line.

Returns :
an instance of `YModule`

humidity→get_module_async() humidity→module_async()

YHumidity

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

```
js  function get_module_async( callback, context)
```

If the function cannot be located on any module, the returned `YModule` object does not show as on-line.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking Firefox javascript VM that does not implement context switching during blocking I/O calls. See the documentation section on asynchronous Javascript calls for more details.

Parameters :

callback callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the receiving function object and the requested `YModule` object

context caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

humidity→get_recordedData() humidity→recordedData() YHumidity

Retrieves a DataSet object holding historical data for this sensor, for a specified time interval.

js	function **get_recordedData**(**startTime**, **endTime**)
cpp	YDataSet **get_recordedData**(s64 **startTime**, s64 **endTime**)
m	-(YDataSet*) recordedData : (s64) **startTime** : (s64) **endTime**
pas	function **get_recordedData**(**startTime**: int64, **endTime**: int64): TYDataSet
vb	function **get_recordedData**( ) As YDataSet
cs	YDataSet **get_recordedData**(long **startTime**, long **endTime**)
java	YDataSet **get_recordedData**(long **startTime**, long **endTime**)
uwp	Task<YDataSet> **get_recordedData**(long **startTime**, long **endTime**)
py	def **get_recordedData**(**startTime**, **endTime**)
php	function **get_recordedData**(**$startTime**, **$endTime**)
es	function **get_recordedData**(**startTime**, **endTime**)
cmd	YHumidity **target get_recordedData startTime endTime**

The measures will be retrieved from the data logger, which must have been turned on at the desired time. See the documentation of the DataSet class for information on how to get an overview of the recorded data, and how to load progressively a large set of measures from the data logger.

This function only works if the device uses a recent firmware, as DataSet objects are not supported by firmwares older than version 13000.

Parameters :

startTime the start of the desired measure time interval, as a Unix timestamp, i.e. the number of seconds since January 1, 1970 UTC. The special value 0 can be used to include any meaasure, without initial limit.

endTime the end of the desired measure time interval, as a Unix timestamp, i.e. the number of seconds since January 1, 1970 UTC. The special value 0 can be used to include any meaasure, without ending limit.

Returns :

an instance of YDataSet, providing access to historical data. Past measures can be loaded progressively using methods from the YDataSet object.

humidity→get_relHum() humidity→relHum()

YHumidity

Returns the current relative humidity, in per cents.

js	function **get_relHum**( )
cpp	double **get_relHum**( )
m	-(double) relHum
pas	function **get_relHum**( ): double
vb	function **get_relHum**( ) As Double
cs	double **get_relHum**( )
java	double **get_relHum**( )
uwp	Task<double> **get_relHum**( )
py	def **get_relHum**( )
php	function **get_relHum**( )
es	function **get_relHum**( )
cmd	YHumidity **target** **get_relHum**

Returns :

a floating point number corresponding to the current relative humidity, in per cents

On failure, throws an exception or returns `Y_RELHUM_INVALID`.

humidity→get_reportFrequency() humidity→reportFrequency() YHumidity

Returns the timed value notification frequency, or "OFF" if timed value notifications are disabled for this function.

js	function **get_reportFrequency**( )
cpp	string **get_reportFrequency**( )
m	-(NSString*) reportFrequency
pas	function **get_reportFrequency**( ): string
vb	function **get_reportFrequency**( ) As String
cs	string **get_reportFrequency**( )
java	String **get_reportFrequency**( )
uwp	Task<string> **get_reportFrequency**( )
py	def **get_reportFrequency**( )
php	function **get_reportFrequency**( )
es	function **get_reportFrequency**( )
cmd	YHumidity **target** **get_reportFrequency**

Returns :

a string corresponding to the timed value notification frequency, or "OFF" if timed value notifications are disabled for this function

On failure, throws an exception or returns `Y_REPORTFREQUENCY_INVALID`.

humidity→get_resolution()
humidity→resolution()

YHumidity

Returns the resolution of the measured values.

js	function **get_resolution**( )
cpp	double **get_resolution**( )
m	-(double) resolution
pas	function **get_resolution**( ): double
vb	function **get_resolution**( ) As Double
cs	double **get_resolution**( )
java	double **get_resolution**( )
uwp	Task<double> **get_resolution**( )
py	def **get_resolution**( )
php	function **get_resolution**( )
es	function **get_resolution**( )
cmd	YHumidity **target** **get_resolution**

The resolution corresponds to the numerical precision of the measures, which is not always the same as the actual precision of the sensor.

Returns :
a floating point number corresponding to the resolution of the measured values

On failure, throws an exception or returns `Y_RESOLUTION_INVALID`.

humidity→get_sensorState()
humidity→sensorState()

YHumidity

Returns the sensor health state code, which is zero when there is an up-to-date measure available or a positive code if the sensor is not able to provide a measure right now.

js	function **get_sensorState**( )
cpp	int **get_sensorState**( )
m	-(int) sensorState
pas	function **get_sensorState**( ): LongInt
vb	function **get_sensorState**( ) As Integer
cs	int **get_sensorState**( )
java	int **get_sensorState**( )
uwp	Task<int> **get_sensorState**( )
py	def **get_sensorState**( )
php	function **get_sensorState**( )
es	function **get_sensorState**( )
cmd	YHumidity **target** **get_sensorState**

Returns :

an integer corresponding to the sensor health state code, which is zero when there is an up-to-date measure available or a positive code if the sensor is not able to provide a measure right now

On failure, throws an exception or returns `Y_SENSORSTATE_INVALID`.

humidity→get_unit()
humidity→unit()

YHumidity

Returns the measuring unit for the humidity.

js	function **get_unit**( )
cpp	string **get_unit**( )
m	-(NSString*) unit
pas	function **get_unit**( ): string
vb	function **get_unit**( ) As String
cs	string **get_unit**( )
java	String **get_unit**( )
uwp	Task<string> **get_unit**( )
py	def **get_unit**( )
php	function **get_unit**( )
es	function **get_unit**( )
cmd	YHumidity **target** **get_unit**

Returns :
a string corresponding to the measuring unit for the humidity

On failure, throws an exception or returns `Y_UNIT_INVALID`.

humidity→get_userData() humidity→userData()

YHumidity

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

js	function **get_userData**( )
cpp	void * **get_userData**( )
m	-(id) userData
pas	function **get_userData**( ): Tobject
vb	function **get_userData**( ) As Object
cs	object **get_userData**( )
java	Object **get_userData**( )
py	def **get_userData**( )
php	function **get_userData**( )
es	function **get_userData**( )

This attribute is never touched directly by the API, and is at disposal of the caller to store a context.

Returns :
the object stored previously by the caller.

humidity→isOnline() YHumidity

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

js	function **isOnline**( )
cpp	bool **isOnline**( )
m	-(BOOL) **isOnline**
pas	function **isOnline**( ): boolean
vb	function **isOnline**( ) As Boolean
cs	bool **isOnline**( )
java	boolean **isOnline**( )
py	def **isOnline**( )
php	function **isOnline**( )
es	function **isOnline**( )

If there is a cached value for the humidity sensor in cache, that has not yet expired, the device is considered reachable. No exception is raised if there is an error while trying to contact the device hosting the humidity sensor.

Returns :
`true` if the humidity sensor can be reached, and `false` otherwise

humidity→isOnline_async() YHumidity

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

```
js  function isOnline_async( callback, context)
```

If there is a cached value for the humidity sensor in cache, that has not yet expired, the device is considered reachable. No exception is raised if there is an error while trying to contact the device hosting the requested function.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking the Javascript virtual machine.

Parameters :

callback callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the receiving function object and the boolean result

context caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

humidity→isSensorReady() YHumidity

Checks if the sensor is currently able to provide an up-to-date measure.

`cmd` YHumidity **target** **isSensorReady**

Returns false if the device is unreachable, or if the sensor does not have a current measure to transmit. No exception is raised if there is an error while trying to contact the device hosting $THEFUNCTION$.

Returns :
`true` if the sensor can provide an up-to-date measure, and `false` otherwise

humidity→load() YHumidity

Preloads the humidity sensor cache with a specified validity duration.

js	function **load**(**msValidity**)
cpp	YRETCODE **load**(int **msValidity**)
m	-(YRETCODE) **load** : (u64) **msValidity**
pas	function **load**(**msValidity**: u64): YRETCODE
vb	function **load**(ByVal **msValidity** As Long) As YRETCODE
cs	YRETCODE **load**(ulong **msValidity**)
java	int **load**(long **msValidity**)
py	def **load**(**msValidity**)
php	function **load**(**$msValidity**)
es	function **load**(**msValidity**)

By default, whenever accessing a device, all function attributes are kept in cache for the standard duration (5 ms). This method can be used to temporarily mark the cache as valid for a longer period, in order to reduce network traffic for instance.

Parameters :

msValidity an integer corresponding to the validity attributed to the loaded function parameters, in milliseconds

Returns :

YAPI_SUCCESS when the call succeeds.

On failure, throws an exception or returns a negative error code.

humidity→loadAttribute() YHumidity

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

js	function **loadAttribute**(**attrName**)
cpp	string **loadAttribute**(string **attrName**)
m	-(NSString*) **loadAttribute** : (NSString*) **attrName**
pas	function **loadAttribute**(**attrName**: string): string
vb	function **loadAttribute**( ) As String
cs	string **loadAttribute**(string **attrName**)
java	String **loadAttribute**(String **attrName**)
uwp	Task<string> **loadAttribute**(string **attrName**)
py	def **loadAttribute**(**attrName**)
php	function **loadAttribute**(**$attrName**)
es	function **loadAttribute**(**attrName**)

Parameters :

attrName the name of the requested attribute

Returns :

a string with the value of the the attribute

On failure, throws an exception or returns an empty string.

humidity→loadCalibrationPoints() YHumidity

Retrieves error correction data points previously entered using the method `calibrateFromPoints`.

js	function **loadCalibrationPoints**(**rawValues**, **refValues**)
cpp	int **loadCalibrationPoints**(vector<double>& **rawValues**, vector<double>& **refValues**)
m	-(int) **loadCalibrationPoints** : (NSMutableArray*) **rawValues** : (NSMutableArray*) **refValues**
pas	function **loadCalibrationPoints**(var **rawValues**: TDoubleArray, var **refValues**: TDoubleArray): LongInt
vb	procedure **loadCalibrationPoints**( )
cs	int **loadCalibrationPoints**(List<double> **rawValues**, List<double> **refValues**)
java	int **loadCalibrationPoints**(ArrayList<Double> **rawValues**, ArrayList<Double> **refValues**)
uwp	Task<int> **loadCalibrationPoints**(List<double> **rawValues**, List<double> **refValues**)
py	def **loadCalibrationPoints**(**rawValues**, **refValues**)
php	function **loadCalibrationPoints**(**&$rawValues**, **&$refValues**)
es	function **loadCalibrationPoints**(**rawValues**, **refValues**)
cmd	YHumidity **target** **loadCalibrationPoints** **rawValues** **refValues**

Parameters :

rawValues array of floating point numbers, that will be filled by the function with the raw sensor values for the correction points.

refValues array of floating point numbers, that will be filled by the function with the desired values for the correction points.

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

humidity→load_async() YHumidity

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

```
js function load_async( msValidity, callback, context)
```

By default, whenever accessing a device, all function attributes are kept in cache for the standard duration (5 ms). This method can be used to temporarily mark the cache as valid for a longer period, in order to reduce network trafic for instance.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking the Javascript virtual machine.

Parameters :

msValidity an integer corresponding to the validity of the loaded function parameters, in milliseconds

callback callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the receiving function object and the error code (or `YAPI_SUCCESS`)

context caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

humidity→muteValueCallbacks() YHumidity

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

js	function **muteValueCallbacks**( )
cpp	int **muteValueCallbacks**( )
m	-(int) **muteValueCallbacks**
pas	function **muteValueCallbacks**( ): LongInt
vb	function **muteValueCallbacks**( ) As Integer
cs	int **muteValueCallbacks**( )
java	int **muteValueCallbacks**( )
uwp	Task<int> **muteValueCallbacks**( )
py	def **muteValueCallbacks**( )
php	function **muteValueCallbacks**( )
es	function **muteValueCallbacks**( )
cmd	YHumidity **target** **muteValueCallbacks**

You can use this function to save bandwidth and CPU on computers with limited resources, or to prevent unwanted invocations of the HTTP callback. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Returns :
`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

humidity→nextHumidity() YHumidity

Continues the enumeration of humidity sensors started using `yFirstHumidity()`.

js	function **nextHumidity**( )
cpp	YHumidity * **nextHumidity**( )
m	-(YHumidity*) **nextHumidity**
pas	function **nextHumidity**( ): TYHumidity
vb	function **nextHumidity**( ) As YHumidity
cs	YHumidity **nextHumidity**( )
java	YHumidity **nextHumidity**( )
uwp	YHumidity **nextHumidity**( )
py	def **nextHumidity**( )
php	function **nextHumidity**( )
es	function **nextHumidity**( )

Returns :

a pointer to a `YHumidity` object, corresponding to a humidity sensor currently online, or a `null` pointer if there are no more humidity sensors to enumerate.

humidity→registerTimedReportCallback() YHumidity

Registers the callback function that is invoked on every periodic timed notification.

js	function **registerTimedReportCallback**(**callback**)
cpp	int **registerTimedReportCallback**(YHumidityTimedReportCallback **callback**)
m	-(int) **registerTimedReportCallback** : (YHumidityTimedReportCallback) **callback**
pas	function **registerTimedReportCallback**(**callback**: TYHumidityTimedReportCallback): LongInt
vb	function **registerTimedReportCallback**( ) As Integer
cs	int **registerTimedReportCallback**(TimedReportCallback **callback**)
java	int **registerTimedReportCallback**(TimedReportCallback **callback**)
uwp	Task<int> **registerTimedReportCallback**(TimedReportCallback **callback**)
py	def **registerTimedReportCallback**(**callback**)
php	function **registerTimedReportCallback**(**$callback**)
es	function **registerTimedReportCallback**(**callback**)

The callback is invoked only during the execution of `ySleep` or `yHandleEvents`. This provides control over the time when the callback is triggered. For good responsiveness, remember to call one of these two functions periodically. To unregister a callback, pass a null pointer as argument.

Parameters :

callback the callback function to call, or a null pointer. The callback function should take two arguments: the function object of which the value has changed, and an YMeasure object describing the new advertised value.

humidity→registerValueCallback() YHumidity

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

js	function **registerValueCallback**(**callback**)
cpp	int **registerValueCallback**(YHumidityValueCallback **callback**)
m	-(int) **registerValueCallback** : (YHumidityValueCallback) **callback**
pas	function **registerValueCallback**(**callback**: TYHumidityValueCallback): LongInt
vb	function **registerValueCallback**( ) As Integer
cs	int **registerValueCallback**(ValueCallback **callback**)
java	int **registerValueCallback**(UpdateCallback **callback**)
uwp	Task<int> **registerValueCallback**(ValueCallback **callback**)
py	def **registerValueCallback**(**callback**)
php	function **registerValueCallback**(**$callback**)
es	function **registerValueCallback**(**callback**)

The callback is invoked only during the execution of `ySleep` or `yHandleEvents`. This provides control over the time when the callback is triggered. For good responsiveness, remember to call one of these two functions periodically. To unregister a callback, pass a null pointer as argument.

Parameters :

callback the callback function to call, or a null pointer. The callback function should take two arguments: the function object of which the value has changed, and the character string describing the new advertised value.

humidity→set_advMode() humidity→setAdvMode() YHumidity

Changes the measuring mode used for the advertised value pushed to the parent hub.

js	function **set_advMode**(**newval**)
cpp	int **set_advMode**(Y_ADVMODE_enum **newval**)
m	-(int) setAdvMode : (Y_ADVMODE_enum) **newval**
pas	function **set_advMode**(**newval**: Integer): integer
vb	function **set_advMode**(ByVal **newval** As Integer) As Integer
cs	int **set_advMode**(int **newval**)
java	int **set_advMode**(int **newval**)
uwp	Task<int> **set_advMode**(int **newval**)
py	def **set_advMode**(**newval**)
php	function **set_advMode**(**$newval**)
es	function **set_advMode**(**newval**)
cmd	YHumidity **target set_advMode newval**

Parameters :

newval a value among Y_ADVMODE_IMMEDIATE, Y_ADVMODE_PERIOD_AVG, Y_ADVMODE_PERIOD_MIN and Y_ADVMODE_PERIOD_MAX corresponding to the measuring mode used for the advertised value pushed to the parent hub

Returns :

YAPI_SUCCESS if the call succeeds.

On failure, throws an exception or returns a negative error code.

humidity→set_highestValue() humidity→setHighestValue()

YHumidity

Changes the recorded maximal value observed.

js	function **set_highestValue**(**newval**)
cpp	int **set_highestValue**(double **newval**)
m	-(int) setHighestValue : (double) **newval**
pas	function **set_highestValue**(**newval**: double): integer
vb	function **set_highestValue**(ByVal **newval** As Double) As Integer
cs	int **set_highestValue**(double **newval**)
java	int **set_highestValue**(double **newval**)
uwp	Task<int> **set_highestValue**(double **newval**)
py	def **set_highestValue**(**newval**)
php	function **set_highestValue**(**$newval**)
es	function **set_highestValue**(**newval**)
cmd	YHumidity **target** **set_highestValue** **newval**

Can be used to reset the value returned by get_lowestValue().

Parameters :

newval a floating point number corresponding to the recorded maximal value observed

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

humidity→set_logFrequency() humidity→setLogFrequency() YHumidity

Changes the datalogger recording frequency for this function.

js	function **set_logFrequency**(**newval**)
cpp	int **set_logFrequency**(const string& **newval**)
m	-(int) setLogFrequency : (NSString*) **newval**
pas	function **set_logFrequency**(**newval**: string): integer
vb	function **set_logFrequency**(ByVal **newval** As String) As Integer
cs	int **set_logFrequency**(string **newval**)
java	int **set_logFrequency**(String **newval**)
uwp	Task<int> **set_logFrequency**(string **newval**)
py	def **set_logFrequency**(**newval**)
php	function **set_logFrequency**(**$newval**)
es	function **set_logFrequency**(**newval**)
cmd	YHumidity **target set_logFrequency newval**

The frequency can be specified as samples per second, as sample per minute (for instance "15/m") or in samples per hour (eg. "4/h"). To disable recording for this function, use the value "OFF".

Parameters :

newval a string corresponding to the datalogger recording frequency for this function

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

humidity→set_logicalName()
humidity→setLogicalName()

YHumidity

Changes the logical name of the humidity sensor.

js	function **set_logicalName**(**newval**)
cpp	int **set_logicalName**(const string& **newval**)
m	-(int) setLogicalName : (NSString*) **newval**
pas	function **set_logicalName**(**newval**: string): integer
vb	function **set_logicalName**(ByVal **newval** As String) As Integer
cs	int **set_logicalName**(string **newval**)
java	int **set_logicalName**(String **newval**)
uwp	Task<int> **set_logicalName**(string **newval**)
py	def **set_logicalName**(**newval**)
php	function **set_logicalName**(**$newval**)
es	function **set_logicalName**(**newval**)
cmd	YHumidity **target** **set_logicalName** **newval**

You can use `yCheckLogicalName()` prior to this call to make sure that your parameter is valid. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Parameters :

newval a string corresponding to the logical name of the humidity sensor.

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

humidity→set_lowestValue()
humidity→setLowestValue()

YHumidity

Changes the recorded minimal value observed.

js	function **set_lowestValue**(**newval**)
cpp	int **set_lowestValue**(double **newval**)
m	-(int) setLowestValue : (double) **newval**
pas	function **set_lowestValue**(**newval**: double): integer
vb	function **set_lowestValue**(ByVal **newval** As Double) As Integer
cs	int **set_lowestValue**(double **newval**)
java	int **set_lowestValue**(double **newval**)
uwp	Task<int> **set_lowestValue**(double **newval**)
py	def **set_lowestValue**(**newval**)
php	function **set_lowestValue**(**$newval**)
es	function **set_lowestValue**(**newval**)
cmd	YHumidity **target** **set_lowestValue** **newval**

Can be used to reset the value returned by get_lowestValue().

Parameters :

newval a floating point number corresponding to the recorded minimal value observed

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

humidity→set_reportFrequency()
humidity→setReportFrequency()

YHumidity

Changes the timed value notification frequency for this function.

js	function **set_reportFrequency**(**newval**)
cpp	int **set_reportFrequency**(const string& **newval**)
m	-(int) setReportFrequency : (NSString*) **newval**
pas	function **set_reportFrequency**(**newval**: string): integer
vb	function **set_reportFrequency**(ByVal **newval** As String) As Integer
cs	int **set_reportFrequency**(string **newval**)
java	int **set_reportFrequency**(String **newval**)
uwp	Task<int> **set_reportFrequency**(string **newval**)
py	def **set_reportFrequency**(**newval**)
php	function **set_reportFrequency**(**$newval**)
es	function **set_reportFrequency**(**newval**)
cmd	YHumidity **target** **set_reportFrequency** **newval**

The frequency can be specified as samples per second, as sample per minute (for instance "15/m") or in samples per hour (eg. "4/h"). To disable timed value notifications for this function, use the value "OFF".

Parameters :

newval a string corresponding to the timed value notification frequency for this function

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

humidity→set_resolution() humidity→setResolution()

YHumidity

Changes the resolution of the measured physical values.

js	function **set_resolution**(**newval**)
cpp	int **set_resolution**(double **newval**)
m	-(int) setResolution : (double) **newval**
pas	function **set_resolution**(**newval**: double): integer
vb	function **set_resolution**(ByVal **newval** As Double) As Integer
cs	int **set_resolution**(double **newval**)
java	int **set_resolution**(double **newval**)
uwp	Task<int> **set_resolution**(double **newval**)
py	def **set_resolution**(**newval**)
php	function **set_resolution**(**$newval**)
es	function **set_resolution**(**newval**)
cmd	YHumidity **target set_resolution newval**

The resolution corresponds to the numerical precision when displaying value. It does not change the precision of the measure itself.

Parameters :

newval a floating point number corresponding to the resolution of the measured physical values

Returns :

YAPI_SUCCESS if the call succeeds.

On failure, throws an exception or returns a negative error code.

humidity→set_unit() humidity→setUnit() YHumidity

Changes the primary unit for measuring humidity.

js	function **set_unit**(**newval**)
cpp	int **set_unit**(const string& **newval**)
m	-(int) setUnit : (NSString*) **newval**
pas	function **set_unit**(**newval**: string): integer
vb	function **set_unit**(ByVal **newval** As String) As Integer
cs	int **set_unit**(string **newval**)
java	int **set_unit**(String **newval**)
uwp	Task<int> **set_unit**(string **newval**)
py	def **set_unit**(**newval**)
php	function **set_unit**(**$newval**)
es	function **set_unit**(**newval**)
cmd	YHumidity **target set_unit newval**

That unit is a string. If that strings starts with the letter 'g', the primary measured value is the absolute humidity, in g/m3. Otherwise, the primary measured value will be the relative humidity (RH), in per cents.

Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Parameters :

newval a string corresponding to the primary unit for measuring humidity

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

humidity→set_userData() humidity→setUserData()

YHumidity

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

js	function **set_userData**(**data**)
cpp	void **set_userData**(void* **data**)
m	-(void) setUserData : (id) **data**
pas	procedure **set_userData**(**data**: Tobject)
vb	procedure **set_userData**(ByVal **data** As Object)
cs	void **set_userData**(object **data**)
java	void **set_userData**(Object **data**)
py	def **set_userData**(**data**)
php	function **set_userData**(**$data**)
es	function **set_userData**(**data**)

This attribute is never touched by the API, and is at disposal of the caller to store a context.

Parameters :

data any kind of object to be stored

humidity→startDataLogger() YHumidity

Starts the data logger on the device.

js	function **startDataLogger**( )
cpp	int **startDataLogger**( )
m	-(int) **startDataLogger**
pas	function **startDataLogger**( ): LongInt
vb	function **startDataLogger**( ) As Integer
cs	int **startDataLogger**( )
java	int **startDataLogger**( )
uwp	Task<int> **startDataLogger**( )
py	def **startDataLogger**( )
php	function **startDataLogger**( )
es	function **startDataLogger**( )
cmd	YHumidity **target** **startDataLogger**

Note that the data logger will only save the measures on this sensor if the logFrequency is not set to "OFF".

Returns :
`YAPI_SUCCESS` if the call succeeds.

humidity→stopDataLogger() YHumidity

Stops the datalogger on the device.

js	function **stopDataLogger**( )
cpp	int **stopDataLogger**( )
m	-(int) **stopDataLogger**
pas	function **stopDataLogger**( ): LongInt
vb	function **stopDataLogger**( ) As Integer
cs	int **stopDataLogger**( )
java	int **stopDataLogger**( )
uwp	Task<int> **stopDataLogger**( )
py	def **stopDataLogger**( )
php	function **stopDataLogger**( )
es	function **stopDataLogger**( )
cmd	YHumidity **target** **stopDataLogger**

Returns :
`YAPI_SUCCESS` if the call succeeds.

humidity→unmuteValueCallbacks() YHumidity

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

js	function **unmuteValueCallbacks**( )
cpp	int **unmuteValueCallbacks**( )
m	-(int) **unmuteValueCallbacks**
pas	function **unmuteValueCallbacks**( ): LongInt
vb	function **unmuteValueCallbacks**( ) As Integer
cs	int **unmuteValueCallbacks**( )
java	int **unmuteValueCallbacks**( )
uwp	Task<int> **unmuteValueCallbacks**( )
py	def **unmuteValueCallbacks**( )
php	function **unmuteValueCallbacks**( )
es	function **unmuteValueCallbacks**( )
cmd	YHumidity **target** **unmuteValueCallbacks**

This function reverts the effect of a previous call to `muteValueCallbacks()`. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Returns :
`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

humidity→wait_async() YHumidity

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

js	function **wait_async**(**callback**, **context**)
es	function **wait_async**(**callback**, **context**)

The callback function can therefore freely issue synchronous or asynchronous commands, without risking to block the Javascript VM.

Parameters :

callback callback function that is invoked when all pending commands on the module are completed. The callback function receives two arguments: the caller-specific context object and the receiving function object.

context caller-specific object that is passed as-is to the callback function

Returns :

nothing.

21.4. Pressure function interface

The Yoctopuce class YPressure allows you to read and configure Yoctopuce pressure sensors. It inherits from YSensor class the core functions to read measurements, to register callback functions, to access the autonomous datalogger.

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

es	in HTML: <script src="../../lib/yocto_pressure.js"></script> in node.js: require('yoctolib-es2017/yocto_pressure.js');
js	<script type='text/javascript' src='yocto_pressure.js'></script>
cpp	#include "yocto_pressure.h"
m	#import "yocto_pressure.h"
pas	uses yocto_pressure;
vb	yocto_pressure.vb
cs	yocto_pressure.cs
java	import com.yoctopuce.YoctoAPI.YPressure;
uwp	import com.yoctopuce.YoctoAPI.YPressure;
py	from yocto_pressure import *
php	require_once('yocto_pressure.php');

Global functions

yFindPressure(func)

Retrieves a pressure sensor for a given identifier.

yFindPressureInContext(yctx, func)

Retrieves a pressure sensor for a given identifier in a YAPI context.

yFirstPressure()

Starts the enumeration of pressure sensors currently accessible.

yFirstPressureInContext(yctx)

Starts the enumeration of pressure sensors currently accessible.

YPressure methods

pressure→calibrateFromPoints(rawValues, refValues)

Configures error correction data points, in particular to compensate for a possible perturbation of the measure caused by an enclosure.

pressure→clearCache()

Invalidates the cache.

pressure→describe()

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

pressure→get_advMode()

Returns the measuring mode used for the advertised value pushed to the parent hub.

pressure→get_advertisedValue()

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

pressure→get_currentRawValue()

Returns the uncalibrated, unrounded raw value returned by the sensor, in millibar (hPa), as a floating point number.

pressure→get_currentValue()

Returns the current value of the pressure, in millibar (hPa), as a floating point number.

pressure→get_dataLogger()

Returns the YDatalogger object of the device hosting the sensor.

pressure→get_errorMessage()

Returns the error message of the latest error with the pressure sensor.

pressure→get_errorType()

Returns the numerical error code of the latest error with the pressure sensor.

pressure→get_friendlyName()

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

pressure→get_functionDescriptor()

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

pressure→get_functionId()

Returns the hardware identifier of the pressure sensor, without reference to the module.

pressure→get_hardwareId()

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

pressure→get_highestValue()

Returns the maximal value observed for the pressure since the device was started.

pressure→get_logFrequency()

Returns the datalogger recording frequency for this function, or "OFF" when measures are not stored in the data logger flash memory.

pressure→get_logicalName()

Returns the logical name of the pressure sensor.

pressure→get_lowestValue()

Returns the minimal value observed for the pressure since the device was started.

pressure→get_module()

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

pressure→get_module_async(callback, context)

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

pressure→get_recordedData(startTime, endTime)

Retrieves a DataSet object holding historical data for this sensor, for a specified time interval.

pressure→get_reportFrequency()

Returns the timed value notification frequency, or "OFF" if timed value notifications are disabled for this function.

pressure→get_resolution()

Returns the resolution of the measured values.

pressure→get_sensorState()

Returns the sensor health state code, which is zero when there is an up-to-date measure available or a positive code if the sensor is not able to provide a measure right now.

pressure→get_unit()

Returns the measuring unit for the pressure.

pressure→get_userData()

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

pressure→isOnline()

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

pressure→isOnline_async(callback, context)

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

pressure→isSensorReady()

Checks if the sensor is currently able to provide an up-to-date measure.

pressure→load(msValidity)

Preloads the pressure sensor cache with a specified validity duration.

pressure→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.

pressure→loadCalibrationPoints(rawValues, refValues)

Retrieves error correction data points previously entered using the method `calibrateFromPoints`.

pressure→load_async(msValidity, callback, context)

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

pressure→muteValueCallbacks()

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

pressure→nextPressure()

Continues the enumeration of pressure sensors started using `yFirstPressure()`.

pressure→registerTimedReportCallback(callback)

Registers the callback function that is invoked on every periodic timed notification.

pressure→registerValueCallback(callback)

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

pressure→set_advMode(newval)

Changes the measuring mode used for the advertised value pushed to the parent hub.

pressure→set_highestValue(newval)

Changes the recorded maximal value observed.

pressure→set_logFrequency(newval)

Changes the datalogger recording frequency for this function.

pressure→set_logicalName(newval)

Changes the logical name of the pressure sensor.

pressure→set_lowestValue(newval)

Changes the recorded minimal value observed.

pressure→set_reportFrequency(newval)

Changes the timed value notification frequency for this function.

pressure→set_resolution(newval)

Changes the resolution of the measured physical values.

pressure→set_userData(data)

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

pressure→startDataLogger()

Starts the data logger on the device.

pressure→stopDataLogger()

Stops the datalogger on the device.

pressure→unmuteValueCallbacks()

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

pressure→wait_async(callback, context)

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

YPressure.FindPressure() yFindPressure() — YPressure

Retrieves a pressure sensor for a given identifier.

js	function **yFindPressure**(**func**)
cpp	YPressure* **yFindPressure**(string **func**)
m	+(YPressure*) **FindPressure** : (NSString*) **func**
pas	function **yFindPressure**(**func**: string): TYPressure
vb	function **yFindPressure**(ByVal **func** As String) As YPressure
cs	YPressure **FindPressure**(string **func**)
java	YPressure **FindPressure**(String **func**)
uwp	YPressure **FindPressure**(string **func**)
py	def **FindPressure**(**func**)
php	function **yFindPressure**(**$func**)
es	function **FindPressure**(**func**)

The identifier can be specified using several formats:

- FunctionLogicalName
- ModuleSerialNumber.FunctionIdentifier
- ModuleSerialNumber.FunctionLogicalName
- ModuleLogicalName.FunctionIdentifier
- ModuleLogicalName.FunctionLogicalName

This function does not require that the pressure sensor is online at the time it is invoked. The returned object is nevertheless valid. Use the method `YPressure.isOnline()` to test if the pressure sensor is indeed online at a given time. In case of ambiguity when looking for a pressure sensor by logical name, no error is notified: the first instance found is returned. The search is performed first by hardware name, then by logical name.

If a call to this object's is_online() method returns FALSE although you are certain that the matching device is plugged, make sure that you did call registerHub() at application initialization time.

Parameters :

func a string that uniquely characterizes the pressure sensor

Returns :

a `YPressure` object allowing you to drive the pressure sensor.

YPressure.FindPressureInContext() yFindPressureInContext() — YPressure

Retrieves a pressure sensor for a given identifier in a YAPI context.

java	YPressure **FindPressureInContext**(YAPIContext **yctx**, String **func**)
uwp	YPressure **FindPressureInContext**(YAPIContext **yctx**, string **func**)
es	function **FindPressureInContext**(**yctx**, **func**)

The identifier can be specified using several formats:

- FunctionLogicalName
- ModuleSerialNumber.FunctionIdentifier
- ModuleSerialNumber.FunctionLogicalName
- ModuleLogicalName.FunctionIdentifier
- ModuleLogicalName.FunctionLogicalName

This function does not require that the pressure sensor is online at the time it is invoked. The returned object is nevertheless valid. Use the method `YPressure.isOnline()` to test if the pressure sensor is indeed online at a given time. In case of ambiguity when looking for a pressure sensor by logical name, no error is notified: the first instance found is returned. The search is performed first by hardware name, then by logical name.

Parameters :

yctx a YAPI context

func a string that uniquely characterizes the pressure sensor

Returns :

a `YPressure` object allowing you to drive the pressure sensor.

YPressure.FirstPressure() yFirstPressure() — YPressure

Starts the enumeration of pressure sensors currently accessible.

js	function **yFirstPressure**( )
cpp	YPressure* **yFirstPressure**( )
m	+(YPressure*) **FirstPressure**
pas	function **yFirstPressure**( ): TYPressure
vb	function **yFirstPressure**( ) As YPressure
cs	YPressure **FirstPressure**( )
java	YPressure **FirstPressure**( )
uwp	YPressure **FirstPressure**( )
py	def **FirstPressure**( )
php	function **yFirstPressure**( )
es	function **FirstPressure**( )

Use the method `YPressure.nextPressure()` to iterate on next pressure sensors.

Returns :
a pointer to a `YPressure` object, corresponding to the first pressure sensor currently online, or a `null` pointer if there are none.

YPressure.FirstPressureInContext() yFirstPressureInContext() YPressure

Starts the enumeration of pressure sensors currently accessible.

java	YPressure **FirstPressureInContext**(YAPIContext **yctx**)
uwp	YPressure **FirstPressureInContext**(YAPIContext **yctx**)
es	function **FirstPressureInContext**(**yctx**)

Use the method `YPressure.nextPressure()` to iterate on next pressure sensors.

Parameters :

yctx a YAPI context.

Returns :

a pointer to a `YPressure` object, corresponding to the first pressure sensor currently online, or a `null` pointer if there are none.

pressure→calibrateFromPoints() YPressure

Configures error correction data points, in particular to compensate for a possible perturbation of the measure caused by an enclosure.

js	function **calibrateFromPoints**(**rawValues**, **refValues**)
cpp	int **calibrateFromPoints**(vector<double> **rawValues**, vector<double> **refValues**)
m	-(int) **calibrateFromPoints** : (NSMutableArray*) **rawValues** : (NSMutableArray*) **refValues**
pas	function **calibrateFromPoints**(**rawValues**: TDoubleArray, **refValues**: TDoubleArray): LongInt
vb	procedure **calibrateFromPoints**( )
cs	int **calibrateFromPoints**(List<double> **rawValues**, List<double> **refValues**)
java	int **calibrateFromPoints**(ArrayList<Double> **rawValues**, ArrayList<Double> **refValues**)
uwp	Task<int> **calibrateFromPoints**(List<double> **rawValues**, List<double> **refValues**)
py	def **calibrateFromPoints**(**rawValues**, **refValues**)
php	function **calibrateFromPoints**(**$rawValues**, **$refValues**)
es	function **calibrateFromPoints**(**rawValues**, **refValues**)
cmd	YPressure **target calibrateFromPoints rawValues refValues**

It is possible to configure up to five correction points. Correction points must be provided in ascending order, and be in the range of the sensor. The device will automatically perform a linear interpolation of the error correction between specified points. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

For more information on advanced capabilities to refine the calibration of sensors, please contact support@yoctopuce.com.

Parameters :

rawValues array of floating point numbers, corresponding to the raw values returned by the sensor for the correction points.

refValues array of floating point numbers, corresponding to the corrected values for the correction points.

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

pressure→clearCache() YPressure

Invalidates the cache.

js	function **clearCache**( )
cpp	void **clearCache**( )
m	-(void) **clearCache**
pas	procedure **clearCache**( )
vb	procedure **clearCache**( )
cs	void **clearCache**( )
java	void **clearCache**( )
py	def **clearCache**( )
php	function **clearCache**( )
es	function **clearCache**( )

Invalidates the cache of the pressure sensor attributes. Forces the next call to get_xxx() or loadxxx() to use values that come from the device.

pressure→describe() YPressure

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

js	function **describe**( )
cpp	string **describe**( )
m	-(NSString*) **describe**
pas	function **describe**( ): string
vb	function **describe**( ) As String
cs	string **describe**( )
java	String **describe**( )
py	def **describe**( )
php	function **describe**( )
es	function **describe**( )

More precisely, TYPE is the type of the function, NAME it the name used for the first access to the function, SERIAL is the serial number of the module if the module is connected or "unresolved", and FUNCTIONID is the hardware identifier of the function if the module is connected. For example, this method returns Relay(MyCustomName.relay1)=RELAYLO1-123456.relay1 if the module is already connected or Relay(BadCustomeName.relay1)=unresolved if the module has not yet been connected. This method does not trigger any USB or TCP transaction and can therefore be used in a debugger.

Returns :
a string that describes the pressure sensor (ex: Relay(MyCustomName.relay1)=RELAYLO1-123456.relay1)

pressure→get_advMode() pressure→advMode()

YPressure

Returns the measuring mode used for the advertised value pushed to the parent hub.

js	function **get_advMode**( )
cpp	Y_ADVMODE_enum **get_advMode**( )
m	-(Y_ADVMODE_enum) advMode
pas	function **get_advMode**( ): Integer
vb	function **get_advMode**( ) As Integer
cs	int **get_advMode**( )
java	int **get_advMode**( )
uwp	Task<int> **get_advMode**( )
py	def **get_advMode**( )
php	function **get_advMode**( )
es	function **get_advMode**( )
cmd	YPressure **target** **get_advMode**

Returns :

a value among Y_ADVMODE_IMMEDIATE, Y_ADVMODE_PERIOD_AVG, Y_ADVMODE_PERIOD_MIN and Y_ADVMODE_PERIOD_MAX corresponding to the measuring mode used for the advertised value pushed to the parent hub

On failure, throws an exception or returns Y_ADVMODE_INVALID.

pressure→get_advertisedValue()
pressure→advertisedValue() — YPressure

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

js	function **get_advertisedValue**( )
cpp	string **get_advertisedValue**( )
m	-(NSString*) advertisedValue
pas	function **get_advertisedValue**( ): string
vb	function **get_advertisedValue**( ) As String
cs	string **get_advertisedValue**( )
java	String **get_advertisedValue**( )
uwp	Task<string> **get_advertisedValue**( )
py	def **get_advertisedValue**( )
php	function **get_advertisedValue**( )
es	function **get_advertisedValue**( )
cmd	YPressure **target** **get_advertisedValue**

Returns :
a string corresponding to the current value of the pressure sensor (no more than 6 characters).

On failure, throws an exception or returns `Y_ADVERTISEDVALUE_INVALID`.

pressure→get_currentRawValue() pressure→currentRawValue() YPressure

Returns the uncalibrated, unrounded raw value returned by the sensor, in millibar (hPa), as a floating point number.

js	function **get_currentRawValue**( )
cpp	double **get_currentRawValue**( )
m	-(double) currentRawValue
pas	function **get_currentRawValue**( ): double
vb	function **get_currentRawValue**( ) As Double
cs	double **get_currentRawValue**( )
java	double **get_currentRawValue**( )
uwp	Task<double> **get_currentRawValue**( )
py	def **get_currentRawValue**( )
php	function **get_currentRawValue**( )
es	function **get_currentRawValue**( )
cmd	YPressure **target** **get_currentRawValue**

Returns :
a floating point number corresponding to the uncalibrated, unrounded raw value returned by the sensor, in millibar (hPa), as a floating point number

On failure, throws an exception or returns `Y_CURRENTRAWVALUE_INVALID`.

pressure→get_currentValue() pressure→currentValue()

YPressure

Returns the current value of the pressure, in millibar (hPa), as a floating point number.

js	function **get_currentValue**( )
cpp	double **get_currentValue**( )
m	-(double) currentValue
pas	function **get_currentValue**( ): double
vb	function **get_currentValue**( ) As Double
cs	double **get_currentValue**( )
java	double **get_currentValue**( )
uwp	Task<double> **get_currentValue**( )
py	def **get_currentValue**( )
php	function **get_currentValue**( )
es	function **get_currentValue**( )
cmd	YPressure **target** **get_currentValue**

Returns :
a floating point number corresponding to the current value of the pressure, in millibar (hPa), as a floating point number

On failure, throws an exception or returns `Y_CURRENTVALUE_INVALID`.

pressure→get_dataLogger()
pressure→dataLogger()

YPressure

Returns the YDatalogger object of the device hosting the sensor.

js	function **get_dataLogger**( )
cpp	YDataLogger* **get_dataLogger**( )
m	-(YDataLogger*) dataLogger
pas	function **get_dataLogger**( ): TYDataLogger
vb	function **get_dataLogger**( ) As YDataLogger
cs	YDataLogger **get_dataLogger**( )
java	YDataLogger **get_dataLogger**( )
uwp	Task<YDataLogger> **get_dataLogger**( )
py	def **get_dataLogger**( )
php	function **get_dataLogger**( )
es	function **get_dataLogger**( )

This method returns an object of class YDatalogger that can control global parameters of the data logger. The returned object should not be freed.

Returns :
an YDataLogger object or null on error.

pressure→get_errorMessage()
pressure→errorMessage()

YPressure

Returns the error message of the latest error with the pressure sensor.

js	function **get_errorMessage**( )
cpp	string **get_errorMessage**( )
m	-(NSString*) errorMessage
pas	function **get_errorMessage**( ): string
vb	function **get_errorMessage**( ) As String
cs	string **get_errorMessage**( )
java	String **get_errorMessage**( )
py	def **get_errorMessage**( )
php	function **get_errorMessage**( )
es	function **get_errorMessage**( )

This method is mostly useful when using the Yoctopuce library with exceptions disabled.

Returns :
a string corresponding to the latest error message that occured while using the pressure sensor object

pressure→get_errorType()
pressure→errorType()

YPressure

Returns the numerical error code of the latest error with the pressure sensor.

js	function **get_errorType**( )
cpp	YRETCODE **get_errorType**( )
pas	function **get_errorType**( ): YRETCODE
vb	function **get_errorType**( ) As YRETCODE
cs	YRETCODE **get_errorType**( )
java	int **get_errorType**( )
py	def **get_errorType**( )
php	function **get_errorType**( )
es	function **get_errorType**( )

This method is mostly useful when using the Yoctopuce library with exceptions disabled.

Returns :

a number corresponding to the code of the latest error that occurred while using the pressure sensor object

pressure→get_friendlyName() pressure→friendlyName()

YPressure

Returns a global identifier of the pressure sensor in the format MODULE_NAME.FUNCTION_NAME.

js	function **get_friendlyName**( )
cpp	string **get_friendlyName**( )
m	-(NSString*) friendlyName
cs	string **get_friendlyName**( )
java	String **get_friendlyName**( )
py	def **get_friendlyName**( )
php	function **get_friendlyName**( )
es	function **get_friendlyName**( )

The returned string uses the logical names of the module and of the pressure sensor if they are defined, otherwise the serial number of the module and the hardware identifier of the pressure sensor (for example: `MyCustomName.relay1`)

Returns :

a string that uniquely identifies the pressure sensor using logical names (ex: `MyCustomName.relay1`)

On failure, throws an exception or returns `Y_FRIENDLYNAME_INVALID`.

pressure→get_functionDescriptor()
pressure→functionDescriptor()

YPressure

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

js	function **get_functionDescriptor**( )
cpp	YFUN_DESCR **get_functionDescriptor**( )
m	-(YFUN_DESCR) functionDescriptor
pas	function **get_functionDescriptor**( ): YFUN_DESCR
vb	function **get_functionDescriptor**( ) As YFUN_DESCR
cs	YFUN_DESCR **get_functionDescriptor**( )
java	String **get_functionDescriptor**( )
py	def **get_functionDescriptor**( )
php	function **get_functionDescriptor**( )
es	function **get_functionDescriptor**( )

This identifier can be used to test if two instances of YFunction reference the same physical function on the same physical device.

Returns :

an identifier of type YFUN_DESCR.

If the function has never been contacted, the returned value is Y_FUNCTIONDESCRIPTOR_INVALID.

pressure→get_functionId() pressure→functionId() YPressure

Returns the hardware identifier of the pressure sensor, without reference to the module.

js	function **get_functionId**( )
cpp	string **get_functionId**( )
m	-(NSString*) functionId
vb	function **get_functionId**( ) As String
cs	string **get_functionId**( )
java	String **get_functionId**( )
py	def **get_functionId**( )
php	function **get_functionId**( )
es	function **get_functionId**( )

For example `relay1`

Returns :
a string that identifies the pressure sensor (ex: `relay1`)

On failure, throws an exception or returns `Y_FUNCTIONID_INVALID`.

pressure→get_hardwareId()
pressure→hardwareId()

YPressure

Returns the unique hardware identifier of the pressure sensor in the form SERIAL.FUNCTIONID.

js	function **get_hardwareId**( )
cpp	string **get_hardwareId**( )
m	-(NSString*) hardwareId
vb	function **get_hardwareId**( ) As String
cs	string **get_hardwareId**( )
java	String **get_hardwareId**( )
py	def **get_hardwareId**( )
php	function **get_hardwareId**( )
es	function **get_hardwareId**( )

The unique hardware identifier is composed of the device serial number and of the hardware identifier of the pressure sensor (for example RELAYLO1-123456.relay1).

Returns :

a string that uniquely identifies the pressure sensor (ex: RELAYLO1-123456.relay1)

On failure, throws an exception or returns Y_HARDWAREID_INVALID.

pressure→get_highestValue() pressure→highestValue() YPressure

Returns the maximal value observed for the pressure since the device was started.

js	function **get_highestValue**( )
cpp	double **get_highestValue**( )
m	-(double) highestValue
pas	function **get_highestValue**( ): double
vb	function **get_highestValue**( ) As Double
cs	double **get_highestValue**( )
java	double **get_highestValue**( )
uwp	Task<double> **get_highestValue**( )
py	def **get_highestValue**( )
php	function **get_highestValue**( )
es	function **get_highestValue**( )
cmd	YPressure **target get_highestValue**

Can be reset to an arbitrary value thanks to set_highestValue().

Returns :
a floating point number corresponding to the maximal value observed for the pressure since the device was started

On failure, throws an exception or returns `Y_HIGHESTVALUE_INVALID`.

pressure→get_logFrequency()
pressure→logFrequency() — YPressure

Returns the datalogger recording frequency for this function, or "OFF" when measures are not stored in the data logger flash memory.

js	function **get_logFrequency**( )
cpp	string **get_logFrequency**( )
m	-(NSString*) logFrequency
pas	function **get_logFrequency**( ): string
vb	function **get_logFrequency**( ) As String
cs	string **get_logFrequency**( )
java	String **get_logFrequency**( )
uwp	Task<string> **get_logFrequency**( )
py	def **get_logFrequency**( )
php	function **get_logFrequency**( )
es	function **get_logFrequency**( )
cmd	YPressure **target** **get_logFrequency**

Returns :
a string corresponding to the datalogger recording frequency for this function, or "OFF" when measures are not stored in the data logger flash memory

On failure, throws an exception or returns `Y_LOGFREQUENCY_INVALID`.

pressure→get_logicalName()
pressure→logicalName() YPressure

Returns the logical name of the pressure sensor.

js	function **get_logicalName**( )
cpp	string **get_logicalName**( )
m	-(NSString*) logicalName
pas	function **get_logicalName**( ): string
vb	function **get_logicalName**( ) As String
cs	string **get_logicalName**( )
java	String **get_logicalName**( )
uwp	Task<string> **get_logicalName**( )
py	def **get_logicalName**( )
php	function **get_logicalName**( )
es	function **get_logicalName**( )
cmd	YPressure **target** **get_logicalName**

Returns :
a string corresponding to the logical name of the pressure sensor.

On failure, throws an exception or returns `Y_LOGICALNAME_INVALID`.

pressure→get_lowestValue() pressure→lowestValue()

YPressure

Returns the minimal value observed for the pressure since the device was started.

js	function **get_lowestValue**( )
cpp	double **get_lowestValue**( )
m	-(double) lowestValue
pas	function **get_lowestValue**( ): double
vb	function **get_lowestValue**( ) As Double
cs	double **get_lowestValue**( )
java	double **get_lowestValue**( )
uwp	Task<double> **get_lowestValue**( )
py	def **get_lowestValue**( )
php	function **get_lowestValue**( )
es	function **get_lowestValue**( )
cmd	YPressure **target** **get_lowestValue**

Can be reset to an arbitrary value thanks to set_lowestValue().

Returns :

a floating point number corresponding to the minimal value observed for the pressure since the device was started

On failure, throws an exception or returns `Y_LOWESTVALUE_INVALID`.

pressure→get_module()
pressure→module()

YPressure

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

js	function **get_module**( )
cpp	YModule * **get_module**( )
m	-(YModule*) module
pas	function **get_module**( ): TYModule
vb	function **get_module**( ) As YModule
cs	YModule **get_module**( )
java	YModule **get_module**( )
py	def **get_module**( )
php	function **get_module**( )
es	function **get_module**( )

If the function cannot be located on any module, the returned instance of `YModule` is not shown as on-line.

Returns :
an instance of `YModule`

pressure→get_module_async() pressure→module_async()

YPressure

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

```
js    function get_module_async( callback, context)
```

If the function cannot be located on any module, the returned `YModule` object does not show as on-line.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking Firefox javascript VM that does not implement context switching during blocking I/O calls. See the documentation section on asynchronous Javascript calls for more details.

Parameters :

callback callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the receiving function object and the requested `YModule` object

context caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

pressure→get_recordedData() pressure→recordedData() YPressure

Retrieves a DataSet object holding historical data for this sensor, for a specified time interval.

```
js    function get_recordedData( startTime, endTime)
cpp   YDataSet get_recordedData( s64 startTime, s64 endTime)
m     -(YDataSet*) recordedData : (s64) startTime
                                : (s64) endTime
pas   function get_recordedData( startTime: int64, endTime: int64): TYDataSet
vb    function get_recordedData( ) As YDataSet
cs    YDataSet get_recordedData( long startTime, long endTime)
java  YDataSet get_recordedData( long startTime, long endTime)
uwp   Task<YDataSet> get_recordedData( long startTime, long endTime)
py    def get_recordedData( startTime, endTime)
php   function get_recordedData( $startTime, $endTime)
es    function get_recordedData( startTime, endTime)
cmd   YPressure target get_recordedData startTime endTime
```

The measures will be retrieved from the data logger, which must have been turned on at the desired time. See the documentation of the DataSet class for information on how to get an overview of the recorded data, and how to load progressively a large set of measures from the data logger.

This function only works if the device uses a recent firmware, as DataSet objects are not supported by firmwares older than version 13000.

Parameters :

startTime the start of the desired measure time interval, as a Unix timestamp, i.e. the number of seconds since January 1, 1970 UTC. The special value 0 can be used to include any meaasure, without initial limit.

endTime the end of the desired measure time interval, as a Unix timestamp, i.e. the number of seconds since January 1, 1970 UTC. The special value 0 can be used to include any meaasure, without ending limit.

Returns :

an instance of YDataSet, providing access to historical data. Past measures can be loaded progressively using methods from the YDataSet object.

pressure→get_reportFrequency() pressure→reportFrequency()

YPressure

Returns the timed value notification frequency, or "OFF" if timed value notifications are disabled for this function.

js	function **get_reportFrequency**( )
cpp	string **get_reportFrequency**( )
m	-(NSString*) reportFrequency
pas	function **get_reportFrequency**( ): string
vb	function **get_reportFrequency**( ) As String
cs	string **get_reportFrequency**( )
java	String **get_reportFrequency**( )
uwp	Task<string> **get_reportFrequency**( )
py	def **get_reportFrequency**( )
php	function **get_reportFrequency**( )
es	function **get_reportFrequency**( )
cmd	YPressure **target** **get_reportFrequency**

Returns :

a string corresponding to the timed value notification frequency, or "OFF" if timed value notifications are disabled for this function

On failure, throws an exception or returns `Y_REPORTFREQUENCY_INVALID`.

pressure→get_resolution() pressure→resolution() YPressure

Returns the resolution of the measured values.

js	function **get_resolution**( )
cpp	double **get_resolution**( )
m	-(double) resolution
pas	function **get_resolution**( ): double
vb	function **get_resolution**( ) As Double
cs	double **get_resolution**( )
java	double **get_resolution**( )
uwp	Task<double> **get_resolution**( )
py	def **get_resolution**( )
php	function **get_resolution**( )
es	function **get_resolution**( )
cmd	YPressure **target** **get_resolution**

The resolution corresponds to the numerical precision of the measures, which is not always the same as the actual precision of the sensor.

Returns :
a floating point number corresponding to the resolution of the measured values

On failure, throws an exception or returns `Y_RESOLUTION_INVALID`.

pressure→get_sensorState() pressure→sensorState()

YPressure

Returns the sensor health state code, which is zero when there is an up-to-date measure available or a positive code if the sensor is not able to provide a measure right now.

js	function **get_sensorState**( )
cpp	int **get_sensorState**( )
m	-(int) sensorState
pas	function **get_sensorState**( ): LongInt
vb	function **get_sensorState**( ) As Integer
cs	int **get_sensorState**( )
java	int **get_sensorState**( )
uwp	Task<int> **get_sensorState**( )
py	def **get_sensorState**( )
php	function **get_sensorState**( )
es	function **get_sensorState**( )
cmd	YPressure **target get_sensorState**

Returns :

an integer corresponding to the sensor health state code, which is zero when there is an up-to-date measure available or a positive code if the sensor is not able to provide a measure right now

On failure, throws an exception or returns `Y_SENSORSTATE_INVALID`.

pressure→get_unit()
pressure→unit()

YPressure

Returns the measuring unit for the pressure.

js	function **get_unit**( )
cpp	string **get_unit**( )
m	-(NSString*) unit
pas	function **get_unit**( ): string
vb	function **get_unit**( ) As String
cs	string **get_unit**( )
java	String **get_unit**( )
uwp	Task<string> **get_unit**( )
py	def **get_unit**( )
php	function **get_unit**( )
es	function **get_unit**( )
cmd	YPressure **target** **get_unit**

Returns :
a string corresponding to the measuring unit for the pressure

On failure, throws an exception or returns `Y_UNIT_INVALID`.

pressure→get_userData() pressure→userData()

YPressure

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

js	function **get_userData**( )
cpp	void * **get_userData**( )
m	-(id) userData
pas	function **get_userData**( ): Tobject
vb	function **get_userData**( ) As Object
cs	object **get_userData**( )
java	Object **get_userData**( )
py	def **get_userData**( )
php	function **get_userData**( )
es	function **get_userData**( )

This attribute is never touched directly by the API, and is at disposal of the caller to store a context.

Returns :
the object stored previously by the caller.

pressure→isOnline() YPressure

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

js	function **isOnline**( )
cpp	bool **isOnline**( )
m	-(BOOL) **isOnline**
pas	function **isOnline**( ): boolean
vb	function **isOnline**( ) As Boolean
cs	bool **isOnline**( )
java	boolean **isOnline**( )
py	def **isOnline**( )
php	function **isOnline**( )
es	function **isOnline**( )

If there is a cached value for the pressure sensor in cache, that has not yet expired, the device is considered reachable. No exception is raised if there is an error while trying to contact the device hosting the pressure sensor.

Returns :
`true` if the pressure sensor can be reached, and `false` otherwise

pressure→isOnline_async() YPressure

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

```
js  function isOnline_async( callback, context)
```

If there is a cached value for the pressure sensor in cache, that has not yet expired, the device is considered reachable. No exception is raised if there is an error while trying to contact the device hosting the requested function.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking the Javascript virtual machine.

Parameters :

callback callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the receiving function object and the boolean result

context caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

pressure→isSensorReady() YPressure

Checks if the sensor is currently able to provide an up-to-date measure.

`cmd` YPressure **target** **isSensorReady**

Returns false if the device is unreachable, or if the sensor does not have a current measure to transmit. No exception is raised if there is an error while trying to contact the device hosting $THEFUNCTION$.

Returns :
`true` if the sensor can provide an up-to-date measure, and `false` otherwise

pressure→load() YPressure

Preloads the pressure sensor cache with a specified validity duration.

js	function **load**(**msValidity**)
cpp	YRETCODE **load**(int **msValidity**)
m	-(YRETCODE) **load** : (u64) **msValidity**
pas	function **load**(**msValidity**: u64): YRETCODE
vb	function **load**(ByVal **msValidity** As Long) As YRETCODE
cs	YRETCODE **load**(ulong **msValidity**)
java	int **load**(long **msValidity**)
py	def **load**(**msValidity**)
php	function **load**(**$msValidity**)
es	function **load**(**msValidity**)

By default, whenever accessing a device, all function attributes are kept in cache for the standard duration (5 ms). This method can be used to temporarily mark the cache as valid for a longer period, in order to reduce network traffic for instance.

Parameters :

msValidity an integer corresponding to the validity attributed to the loaded function parameters, in milliseconds

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

pressure→loadAttribute() YPressure

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

js	function **loadAttribute**(**attrName**)
cpp	string **loadAttribute**(string **attrName**)
m	-(NSString*) **loadAttribute** : (NSString*) **attrName**
pas	function **loadAttribute**(**attrName**: string): string
vb	function **loadAttribute**( ) As String
cs	string **loadAttribute**(string **attrName**)
java	String **loadAttribute**(String **attrName**)
uwp	Task<string> **loadAttribute**(string **attrName**)
py	def **loadAttribute**(**attrName**)
php	function **loadAttribute**(**$attrName**)
es	function **loadAttribute**(**attrName**)

Parameters :

attrName the name of the requested attribute

Returns :

a string with the value of the the attribute

On failure, throws an exception or returns an empty string.

pressure→loadCalibrationPoints() YPressure

Retrieves error correction data points previously entered using the method calibrateFromPoints.

js	function **loadCalibrationPoints**(**rawValues**, **refValues**)
cpp	int **loadCalibrationPoints**(vector<double>& **rawValues**, vector<double>& **refValues**)
m	-(int) **loadCalibrationPoints** : (NSMutableArray*) **rawValues** : (NSMutableArray*) **refValues**
pas	function **loadCalibrationPoints**(var **rawValues**: TDoubleArray, var **refValues**: TDoubleArray): LongInt
vb	procedure **loadCalibrationPoints**( )
cs	int **loadCalibrationPoints**(List<double> **rawValues**, List<double> **refValues**)
java	int **loadCalibrationPoints**(ArrayList<Double> **rawValues**, ArrayList<Double> **refValues**)
uwp	Task<int> **loadCalibrationPoints**(List<double> **rawValues**, List<double> **refValues**)
py	def **loadCalibrationPoints**(**rawValues**, **refValues**)
php	function **loadCalibrationPoints**(**&$rawValues**, **&$refValues**)
es	function **loadCalibrationPoints**(**rawValues**, **refValues**)
cmd	YPressure **target loadCalibrationPoints rawValues refValues**

Parameters :

rawValues array of floating point numbers, that will be filled by the function with the raw sensor values for the correction points.

refValues array of floating point numbers, that will be filled by the function with the desired values for the correction points.

Returns :

YAPI_SUCCESS if the call succeeds.

On failure, throws an exception or returns a negative error code.

pressure→load_async() YPressure

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

```
js function load_async( msValidity, callback, context)
```

By default, whenever accessing a device, all function attributes are kept in cache for the standard duration (5 ms). This method can be used to temporarily mark the cache as valid for a longer period, in order to reduce network trafic for instance.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking the Javascript virtual machine.

Parameters :

msValidity an integer corresponding to the validity of the loaded function parameters, in milliseconds

callback callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the receiving function object and the error code (or `YAPI_SUCCESS`)

context caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

pressure→muteValueCallbacks() YPressure

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

js	function **muteValueCallbacks**( )
cpp	int **muteValueCallbacks**( )
m	-(int) **muteValueCallbacks**
pas	function **muteValueCallbacks**( ): LongInt
vb	function **muteValueCallbacks**( ) As Integer
cs	int **muteValueCallbacks**( )
java	int **muteValueCallbacks**( )
uwp	Task<int> **muteValueCallbacks**( )
py	def **muteValueCallbacks**( )
php	function **muteValueCallbacks**( )
es	function **muteValueCallbacks**( )
cmd	YPressure **target** **muteValueCallbacks**

You can use this function to save bandwidth and CPU on computers with limited resources, or to prevent unwanted invocations of the HTTP callback. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Returns :
`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

pressure→nextPressure() YPressure

Continues the enumeration of pressure sensors started using `yFirstPressure()`.

js	function **nextPressure**( )
cpp	YPressure * **nextPressure**( )
m	-(YPressure*) **nextPressure**
pas	function **nextPressure**( ): TYPressure
vb	function **nextPressure**( ) As YPressure
cs	YPressure **nextPressure**( )
java	YPressure **nextPressure**( )
uwp	YPressure **nextPressure**( )
py	def **nextPressure**( )
php	function **nextPressure**( )
es	function **nextPressure**( )

Returns :

a pointer to a `YPressure` object, corresponding to a pressure sensor currently online, or a `null` pointer if there are no more pressure sensors to enumerate.

pressure→registerTimedReportCallback() YPressure

Registers the callback function that is invoked on every periodic timed notification.

js	function **registerTimedReportCallback**(**callback**)
cpp	int **registerTimedReportCallback**(YPressureTimedReportCallback **callback**)
m	-(int) **registerTimedReportCallback** : (YPressureTimedReportCallback) **callback**
pas	function **registerTimedReportCallback**(**callback**: TYPressureTimedReportCallback): LongInt
vb	function **registerTimedReportCallback**( ) As Integer
cs	int **registerTimedReportCallback**(TimedReportCallback **callback**)
java	int **registerTimedReportCallback**(TimedReportCallback **callback**)
uwp	Task<int> **registerTimedReportCallback**(TimedReportCallback **callback**)
py	def **registerTimedReportCallback**(**callback**)
php	function **registerTimedReportCallback**(**$callback**)
es	function **registerTimedReportCallback**(**callback**)

The callback is invoked only during the execution of `ySleep` or `yHandleEvents`. This provides control over the time when the callback is triggered. For good responsiveness, remember to call one of these two functions periodically. To unregister a callback, pass a null pointer as argument.

Parameters :

callback the callback function to call, or a null pointer. The callback function should take two arguments: the function object of which the value has changed, and an YMeasure object describing the new advertised value.

pressure→registerValueCallback() YPressure

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

js	function **registerValueCallback**(**callback**)
cpp	int **registerValueCallback**(YPressureValueCallback **callback**)
m	-(int) **registerValueCallback** : (YPressureValueCallback) **callback**
pas	function **registerValueCallback**(**callback**: TYPressureValueCallback): LongInt
vb	function **registerValueCallback**( ) As Integer
cs	int **registerValueCallback**(ValueCallback **callback**)
java	int **registerValueCallback**(UpdateCallback **callback**)
uwp	Task<int> **registerValueCallback**(ValueCallback **callback**)
py	def **registerValueCallback**(**callback**)
php	function **registerValueCallback**(**$callback**)
es	function **registerValueCallback**(**callback**)

The callback is invoked only during the execution of `ySleep` or `yHandleEvents`. This provides control over the time when the callback is triggered. For good responsiveness, remember to call one of these two functions periodically. To unregister a callback, pass a null pointer as argument.

Parameters :

callback the callback function to call, or a null pointer. The callback function should take two arguments: the function object of which the value has changed, and the character string describing the new advertised value.

pressure→set_advMode()
pressure→setAdvMode()

YPressure

Changes the measuring mode used for the advertised value pushed to the parent hub.

js	function **set_advMode**(**newval**)
cpp	int **set_advMode**(Y_ADVMODE_enum **newval**)
m	-(int) setAdvMode : (Y_ADVMODE_enum) **newval**
pas	function **set_advMode**(**newval**: Integer): integer
vb	function **set_advMode**(ByVal **newval** As Integer) As Integer
cs	int **set_advMode**(int **newval**)
java	int **set_advMode**(int **newval**)
uwp	Task<int> **set_advMode**(int **newval**)
py	def **set_advMode**(**newval**)
php	function **set_advMode**(**$newval**)
es	function **set_advMode**(**newval**)
cmd	YPressure **target set_advMode newval**

Parameters :

newval a value among Y_ADVMODE_IMMEDIATE, Y_ADVMODE_PERIOD_AVG, Y_ADVMODE_PERIOD_MIN and Y_ADVMODE_PERIOD_MAX corresponding to the measuring mode used for the advertised value pushed to the parent hub

Returns :

YAPI_SUCCESS if the call succeeds.

On failure, throws an exception or returns a negative error code.

pressure→set_highestValue() pressure→setHighestValue()

YPressure

Changes the recorded maximal value observed.

js	function **set_highestValue**(**newval**)
cpp	int **set_highestValue**(double **newval**)
m	-(int) setHighestValue : (double) **newval**
pas	function **set_highestValue**(**newval**: double): integer
vb	function **set_highestValue**(ByVal **newval** As Double) As Integer
cs	int **set_highestValue**(double **newval**)
java	int **set_highestValue**(double **newval**)
uwp	Task<int> **set_highestValue**(double **newval**)
py	def **set_highestValue**(**newval**)
php	function **set_highestValue**(**$newval**)
es	function **set_highestValue**(**newval**)
cmd	YPressure **target** **set_highestValue** **newval**

Can be used to reset the value returned by get_lowestValue().

Parameters :

newval a floating point number corresponding to the recorded maximal value observed

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

pressure→set_logFrequency() pressure→setLogFrequency() YPressure

Changes the datalogger recording frequency for this function.

js	function **set_logFrequency**(**newval**)
cpp	int **set_logFrequency**(const string& **newval**)
m	-(int) setLogFrequency : (NSString*) **newval**
pas	function **set_logFrequency**(**newval**: string): integer
vb	function **set_logFrequency**(ByVal **newval** As String) As Integer
cs	int **set_logFrequency**(string **newval**)
java	int **set_logFrequency**(String **newval**)
uwp	Task<int> **set_logFrequency**(string **newval**)
py	def **set_logFrequency**(**newval**)
php	function **set_logFrequency**(**$newval**)
es	function **set_logFrequency**(**newval**)
cmd	YPressure **target** **set_logFrequency** **newval**

The frequency can be specified as samples per second, as sample per minute (for instance "15/m") or in samples per hour (eg. "4/h"). To disable recording for this function, use the value "OFF".

Parameters :

newval a string corresponding to the datalogger recording frequency for this function

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

pressure→set_logicalName()
pressure→setLogicalName() — YPressure

Changes the logical name of the pressure sensor.

js	function **set_logicalName**(**newval**)
cpp	int **set_logicalName**(const string& **newval**)
m	-(int) setLogicalName : (NSString*) **newval**
pas	function **set_logicalName**(**newval**: string): integer
vb	function **set_logicalName**(ByVal **newval** As String) As Integer
cs	int **set_logicalName**(string **newval**)
java	int **set_logicalName**(String **newval**)
uwp	Task<int> **set_logicalName**(string **newval**)
py	def **set_logicalName**(**newval**)
php	function **set_logicalName**(**$newval**)
es	function **set_logicalName**(**newval**)
cmd	YPressure **target** **set_logicalName** **newval**

You can use `yCheckLogicalName()` prior to this call to make sure that your parameter is valid. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Parameters :

newval a string corresponding to the logical name of the pressure sensor.

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

pressure→set_lowestValue()
pressure→setLowestValue()

YPressure

Changes the recorded minimal value observed.

js	function **set_lowestValue**(**newval**)
cpp	int **set_lowestValue**(double **newval**)
m	-(int) setLowestValue : (double) **newval**
pas	function **set_lowestValue**(**newval**: double): integer
vb	function **set_lowestValue**(ByVal **newval** As Double) As Integer
cs	int **set_lowestValue**(double **newval**)
java	int **set_lowestValue**(double **newval**)
uwp	Task<int> **set_lowestValue**(double **newval**)
py	def **set_lowestValue**(**newval**)
php	function **set_lowestValue**(**$newval**)
es	function **set_lowestValue**(**newval**)
cmd	YPressure **target** **set_lowestValue** **newval**

Can be used to reset the value returned by get_lowestValue().

Parameters :

newval a floating point number corresponding to the recorded minimal value observed

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

pressure→set_reportFrequency()
pressure→setReportFrequency()

YPressure

Changes the timed value notification frequency for this function.

js	function **set_reportFrequency**(**newval**)
cpp	int **set_reportFrequency**(const string& **newval**)
m	-(int) setReportFrequency : (NSString*) **newval**
pas	function **set_reportFrequency**(**newval**: string): integer
vb	function **set_reportFrequency**(ByVal **newval** As String) As Integer
cs	int **set_reportFrequency**(string **newval**)
java	int **set_reportFrequency**(String **newval**)
uwp	Task<int> **set_reportFrequency**(string **newval**)
py	def **set_reportFrequency**(**newval**)
php	function **set_reportFrequency**(**$newval**)
es	function **set_reportFrequency**(**newval**)
cmd	YPressure **target set_reportFrequency newval**

The frequency can be specified as samples per second, as sample per minute (for instance "15/m") or in samples per hour (eg. "4/h"). To disable timed value notifications for this function, use the value "OFF".

Parameters :

newval a string corresponding to the timed value notification frequency for this function

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

pressure→set_resolution()
pressure→setResolution()

YPressure

Changes the resolution of the measured physical values.

js	function **set_resolution**(**newval**)
cpp	int **set_resolution**(double **newval**)
m	-(int) setResolution : (double) **newval**
pas	function **set_resolution**(**newval**: double): integer
vb	function **set_resolution**(ByVal **newval** As Double) As Integer
cs	int **set_resolution**(double **newval**)
java	int **set_resolution**(double **newval**)
uwp	Task<int> **set_resolution**(double **newval**)
py	def **set_resolution**(**newval**)
php	function **set_resolution**(**$newval**)
es	function **set_resolution**(**newval**)
cmd	YPressure **target set_resolution newval**

The resolution corresponds to the numerical precision when displaying value. It does not change the precision of the measure itself.

Parameters :

newval a floating point number corresponding to the resolution of the measured physical values

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

pressure→set_userData() pressure→setUserData() YPressure

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

js	function **set_userData**(**data**)
cpp	void **set_userData**(void* **data**)
m	-(void) setUserData : (id) **data**
pas	procedure **set_userData**(**data**: Tobject)
vb	procedure **set_userData**(ByVal **data** As Object)
cs	void **set_userData**(object **data**)
java	void **set_userData**(Object **data**)
py	def **set_userData**(**data**)
php	function **set_userData**(**$data**)
es	function **set_userData**(**data**)

This attribute is never touched by the API, and is at disposal of the caller to store a context.

Parameters :

data any kind of object to be stored

pressure→startDataLogger() YPressure

Starts the data logger on the device.

js	function **startDataLogger**( )
cpp	int **startDataLogger**( )
m	-(int) **startDataLogger**
pas	function **startDataLogger**( ): LongInt
vb	function **startDataLogger**( ) As Integer
cs	int **startDataLogger**( )
java	int **startDataLogger**( )
uwp	Task<int> **startDataLogger**( )
py	def **startDataLogger**( )
php	function **startDataLogger**( )
es	function **startDataLogger**( )
cmd	YPressure **target** **startDataLogger**

Note that the data logger will only save the measures on this sensor if the logFrequency is not set to "OFF".

Returns :
`YAPI_SUCCESS` if the call succeeds.

pressure→stopDataLogger() YPressure

Stops the datalogger on the device.

js	function **stopDataLogger**( )
cpp	int **stopDataLogger**( )
m	-(int) **stopDataLogger**
pas	function **stopDataLogger**( ): LongInt
vb	function **stopDataLogger**( ) As Integer
cs	int **stopDataLogger**( )
java	int **stopDataLogger**( )
uwp	Task<int> **stopDataLogger**( )
py	def **stopDataLogger**( )
php	function **stopDataLogger**( )
es	function **stopDataLogger**( )
cmd	YPressure **target** **stopDataLogger**

Returns :
YAPI_SUCCESS if the call succeeds.

pressure→unmuteValueCallbacks() YPressure

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

js	function **unmuteValueCallbacks**( )
cpp	int **unmuteValueCallbacks**( )
m	-(int) **unmuteValueCallbacks**
pas	function **unmuteValueCallbacks**( ): LongInt
vb	function **unmuteValueCallbacks**( ) As Integer
cs	int **unmuteValueCallbacks**( )
java	int **unmuteValueCallbacks**( )
uwp	Task<int> **unmuteValueCallbacks**( )
py	def **unmuteValueCallbacks**( )
php	function **unmuteValueCallbacks**( )
es	function **unmuteValueCallbacks**( )
cmd	YPressure **target** **unmuteValueCallbacks**

This function reverts the effect of a previous call to `muteValueCallbacks()`. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Returns :
`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

pressure→wait_async() YPressure

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

js	function **wait_async**(**callback**, **context**)
es	function **wait_async**(**callback**, **context**)

The callback function can therefore freely issue synchronous or asynchronous commands, without risking to block the Javascript VM.

Parameters :

callback callback function that is invoked when all pending commands on the module are completed. The callback function receives two arguments: the caller-specific context object and the receiving function object.

context caller-specific object that is passed as-is to the callback function

Returns :

nothing.

21.5. Temperature function interface

The Yoctopuce class YTemperature allows you to read and configure Yoctopuce temperature sensors. It inherits from YSensor class the core functions to read measurements, to register callback functions, to access the autonomous datalogger. This class adds the ability to configure some specific parameters for some sensors (connection type, temperature mapping table).

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

es	in HTML: <script src="../../lib/yocto_temperature.js"></script> in node.js: require('yoctolib-es2017/yocto_temperature.js');
js	<script type='text/javascript' src='yocto_temperature.js'></script>
cpp	#include "yocto_temperature.h"
m	#import "yocto_temperature.h"
pas	uses yocto_temperature;
vb	yocto_temperature.vb
cs	yocto_temperature.cs
java	import com.yoctopuce.YoctoAPI.YTemperature;
uwp	import com.yoctopuce.YoctoAPI.YTemperature;
py	from yocto_temperature import *
php	require_once('yocto_temperature.php');

Global functions

yFindTemperature(func)
Retrieves a temperature sensor for a given identifier.

yFindTemperatureInContext(yctx, func)
Retrieves a temperature sensor for a given identifier in a YAPI context.

yFirstTemperature()
Starts the enumeration of temperature sensors currently accessible.

yFirstTemperatureInContext(yctx)
Starts the enumeration of temperature sensors currently accessible.

`YTemperature` methods

temperature→calibrateFromPoints(rawValues, refValues)
Configures error correction data points, in particular to compensate for a possible perturbation of the measure caused by an enclosure.

temperature→clearCache()
Invalidates the cache.

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

temperature→get_advMode()
Returns the measuring mode used for the advertised value pushed to the parent hub.

temperature→get_advertisedValue()
Returns the current value of the temperature sensor (no more than 6 characters).

temperature→get_currentRawValue()
Returns the uncalibrated, unrounded raw value returned by the sensor, in Celsius, as a floating point number.

temperature→get_currentValue()
Returns the current value of the temperature, in Celsius, as a floating point number.

temperature→get_dataLogger()

Returns the YDatalogger object of the device hosting the sensor.

temperature→get_errorMessage()

Returns the error message of the latest error with the temperature sensor.

temperature→get_errorType()

Returns the numerical error code of the latest error with the temperature sensor.

temperature→get_friendlyName()

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

temperature→get_functionDescriptor()

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

temperature→get_functionId()

Returns the hardware identifier of the temperature sensor, without reference to the module.

temperature→get_hardwareId()

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

temperature→get_highestValue()

Returns the maximal value observed for the temperature since the device was started.

temperature→get_logFrequency()

Returns the datalogger recording frequency for this function, or "OFF" when measures are not stored in the data logger flash memory.

temperature→get_logicalName()

Returns the logical name of the temperature sensor.

temperature→get_lowestValue()

Returns the minimal value observed for the temperature since the device was started.

temperature→get_module()

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

temperature→get_module_async(callback, context)

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

temperature→get_recordedData(startTime, endTime)

Retrieves a DataSet object holding historical data for this sensor, for a specified time interval.

temperature→get_reportFrequency()

Returns the timed value notification frequency, or "OFF" if timed value notifications are disabled for this function.

temperature→get_resolution()

Returns the resolution of the measured values.

temperature→get_sensorState()

Returns the sensor health state code, which is zero when there is an up-to-date measure available or a positive code if the sensor is not able to provide a measure right now.

temperature→get_sensorType()

Returns the temperature sensor type.

temperature→get_signalUnit()

Returns the measuring unit of the electrical signal used by the sensor.

temperature→get_signalValue()

Returns the current value of the electrical signal measured by the sensor.

temperature→get_unit()

Returns the measuring unit for the temperature.

temperature→get_userData()

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

temperature→isOnline()

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

temperature→isOnline_async(callback, context)

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

temperature→isSensorReady()

Checks if the sensor is currently able to provide an up-to-date measure.

temperature→load(msValidity)

Preloads the temperature sensor cache with a specified validity duration.

temperature→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.

temperature→loadCalibrationPoints(rawValues, refValues)

Retrieves error correction data points previously entered using the method `calibrateFromPoints`.

temperature→loadThermistorResponseTable(tempValues, resValues)

Retrieves the thermistor response table previously configured using the `set_thermistorResponseTable` function.

temperature→load_async(msValidity, callback, context)

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

temperature→muteValueCallbacks()

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

temperature→nextTemperature()

Continues the enumeration of temperature sensors started using `yFirstTemperature()`.

temperature→registerTimedReportCallback(callback)

Registers the callback function that is invoked on every periodic timed notification.

temperature→registerValueCallback(callback)

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

temperature→set_advMode(newval)

Changes the measuring mode used for the advertised value pushed to the parent hub.

temperature→set_highestValue(newval)

Changes the recorded maximal value observed.

temperature→set_logFrequency(newval)

Changes the datalogger recording frequency for this function.

temperature→set_logicalName(newval)

Changes the logical name of the temperature sensor.

temperature→set_lowestValue(newval)

Changes the recorded minimal value observed.

temperature→set_ntcParameters(res25, beta)

Configures NTC thermistor parameters in order to properly compute the temperature from the measured resistance.

temperature→set_reportFrequency(newval)

Changes the timed value notification frequency for this function.

temperature→set_resolution(newval)

Changes the resolution of the measured physical values.

temperature→set_sensorType(newval)

Changes the temperature sensor type.

temperature→set_thermistorResponseTable(tempValues, resValues)

Records a thermistor response table, in order to interpolate the temperature from the measured resistance.

temperature→set_unit(newval)

Changes the measuring unit for the measured temperature.

temperature→set_userData(data)

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

temperature→startDataLogger()

Starts the data logger on the device.

temperature→stopDataLogger()

Stops the datalogger on the device.

temperature→unmuteValueCallbacks()

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

temperature→wait_async(callback, context)

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

YTemperature.FindTemperature() yFindTemperature() — YTemperature

Retrieves a temperature sensor for a given identifier.

js	function **yFindTemperature**(**func**)
cpp	YTemperature* **yFindTemperature**(string **func**)
m	+(YTemperature*) **FindTemperature** : (NSString*) **func**
pas	function **yFindTemperature**(**func**: string): TYTemperature
vb	function **yFindTemperature**(ByVal **func** As String) As YTemperature
cs	YTemperature **FindTemperature**(string **func**)
java	YTemperature **FindTemperature**(String **func**)
uwp	YTemperature **FindTemperature**(string **func**)
py	def **FindTemperature**(**func**)
php	function **yFindTemperature**(**$func**)
es	function **FindTemperature**(**func**)

The identifier can be specified using several formats:

- FunctionLogicalName
- ModuleSerialNumber.FunctionIdentifier
- ModuleSerialNumber.FunctionLogicalName
- ModuleLogicalName.FunctionIdentifier
- ModuleLogicalName.FunctionLogicalName

This function does not require that the temperature sensor is online at the time it is invoked. The returned object is nevertheless valid. Use the method `YTemperature.isOnline()` to test if the temperature sensor is indeed online at a given time. In case of ambiguity when looking for a temperature sensor by logical name, no error is notified: the first instance found is returned. The search is performed first by hardware name, then by logical name.

If a call to this object's is_online() method returns FALSE although you are certain that the matching device is plugged, make sure that you did call registerHub() at application initialization time.

Parameters :

func a string that uniquely characterizes the temperature sensor

Returns :

a `YTemperature` object allowing you to drive the temperature sensor.

YTemperature.FindTemperatureInContext() yFindTemperatureInContext() — YTemperature

Retrieves a temperature sensor for a given identifier in a YAPI context.

```
java  YTemperature FindTemperatureInContext( YAPIContext yctx,
                                              String func)
uwp   YTemperature FindTemperatureInContext( YAPIContext yctx,
                                              string func)
es    function FindTemperatureInContext( yctx, func)
```

The identifier can be specified using several formats:

- FunctionLogicalName
- ModuleSerialNumber.FunctionIdentifier
- ModuleSerialNumber.FunctionLogicalName
- ModuleLogicalName.FunctionIdentifier
- ModuleLogicalName.FunctionLogicalName

This function does not require that the temperature sensor is online at the time it is invoked. The returned object is nevertheless valid. Use the method `YTemperature.isOnline()` to test if the temperature sensor is indeed online at a given time. In case of ambiguity when looking for a temperature sensor by logical name, no error is notified: the first instance found is returned. The search is performed first by hardware name, then by logical name.

Parameters :

yctx a YAPI context

func a string that uniquely characterizes the temperature sensor

Returns :

a `YTemperature` object allowing you to drive the temperature sensor.

YTemperature.FirstTemperature() yFirstTemperature() — YTemperature

Starts the enumeration of temperature sensors currently accessible.

js	function **yFirstTemperature**( )
cpp	YTemperature* **yFirstTemperature**( )
m	+(YTemperature*) **FirstTemperature**
pas	function **yFirstTemperature**( ): TYTemperature
vb	function **yFirstTemperature**( ) As YTemperature
cs	YTemperature **FirstTemperature**( )
java	YTemperature **FirstTemperature**( )
uwp	YTemperature **FirstTemperature**( )
py	def **FirstTemperature**( )
php	function **yFirstTemperature**( )
es	function **FirstTemperature**( )

Use the method `YTemperature.nextTemperature()` to iterate on next temperature sensors.

Returns :
a pointer to a `YTemperature` object, corresponding to the first temperature sensor currently online, or a `null` pointer if there are none.

YTemperature.FirstTemperatureInContext() yFirstTemperatureInContext() — YTemperature

Starts the enumeration of temperature sensors currently accessible.

java	YTemperature **FirstTemperatureInContext**(YAPIContext **yctx**)
uwp	YTemperature **FirstTemperatureInContext**(YAPIContext **yctx**)
es	function **FirstTemperatureInContext**(**yctx**)

Use the method `YTemperature.nextTemperature()` to iterate on next temperature sensors.

Parameters :

yctx a YAPI context.

Returns :

a pointer to a `YTemperature` object, corresponding to the first temperature sensor currently online, or a `null` pointer if there are none.

temperature→calibrateFromPoints() YTemperature

Configures error correction data points, in particular to compensate for a possible perturbation of the measure caused by an enclosure.

js	function **calibrateFromPoints**(**rawValues**, **refValues**)
cpp	int **calibrateFromPoints**(vector<double> **rawValues**, vector<double> **refValues**)
m	-(int) **calibrateFromPoints** : (NSMutableArray*) **rawValues** : (NSMutableArray*) **refValues**
pas	function **calibrateFromPoints**(**rawValues**: TDoubleArray, **refValues**: TDoubleArray): LongInt
vb	procedure **calibrateFromPoints**( )
cs	int **calibrateFromPoints**(List<double> **rawValues**, List<double> **refValues**)
java	int **calibrateFromPoints**(ArrayList<Double> **rawValues**, ArrayList<Double> **refValues**)
uwp	Task<int> **calibrateFromPoints**(List<double> **rawValues**, List<double> **refValues**)
py	def **calibrateFromPoints**(**rawValues**, **refValues**)
php	function **calibrateFromPoints**(**$rawValues**, **$refValues**)
es	function **calibrateFromPoints**(**rawValues**, **refValues**)
cmd	YTemperature **target** **calibrateFromPoints** **rawValues** **refValues**

It is possible to configure up to five correction points. Correction points must be provided in ascending order, and be in the range of the sensor. The device will automatically perform a linear interpolation of the error correction between specified points. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

For more information on advanced capabilities to refine the calibration of sensors, please contact support@yoctopuce.com.

Parameters :

rawValues array of floating point numbers, corresponding to the raw values returned by the sensor for the correction points.

refValues array of floating point numbers, corresponding to the corrected values for the correction points.

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→clearCache() YTemperature

Invalidates the cache.

js	function **clearCache**( )
cpp	void **clearCache**( )
m	-(void) **clearCache**
pas	procedure **clearCache**( )
vb	procedure **clearCache**( )
cs	void **clearCache**( )
java	void **clearCache**( )
py	def **clearCache**( )
php	function **clearCache**( )
es	function **clearCache**( )

Invalidates the cache of the temperature sensor attributes. Forces the next call to get_xxx() or loadxxx() to use values that come from the device.

temperature→describe() YTemperature

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

js	function **describe**( )
cpp	string **describe**( )
m	-(NSString*) **describe**
pas	function **describe**( ): string
vb	function **describe**( ) As String
cs	string **describe**( )
java	String **describe**( )
py	def **describe**( )
php	function **describe**( )
es	function **describe**( )

More precisely, `TYPE` is the type of the function, `NAME` it the name used for the first access to the function, `SERIAL` is the serial number of the module if the module is connected or `"unresolved"`, and `FUNCTIONID` is the hardware identifier of the function if the module is connected. For example, this method returns `Relay(MyCustomName.relay1)=RELAYLO1-123456.relay1` if the module is already connected or `Relay(BadCustomeName.relay1)=unresolved` if the module has not yet been connected. This method does not trigger any USB or TCP transaction and can therefore be used in a debugger.

Returns :
a string that describes the temperature sensor (ex: `Relay(MyCustomName.relay1)=RELAYLO1-123456.relay1`)

temperature→get_advMode() temperature→advMode() YTemperature

Returns the measuring mode used for the advertised value pushed to the parent hub.

js	function **get_advMode**( )
cpp	Y_ADVMODE_enum **get_advMode**( )
m	-(Y_ADVMODE_enum) advMode
pas	function **get_advMode**( ): Integer
vb	function **get_advMode**( ) As Integer
cs	int **get_advMode**( )
java	int **get_advMode**( )
uwp	Task<int> **get_advMode**( )
py	def **get_advMode**( )
php	function **get_advMode**( )
es	function **get_advMode**( )
cmd	YTemperature **target** **get_advMode**

Returns :

a value among Y_ADVMODE_IMMEDIATE, Y_ADVMODE_PERIOD_AVG, Y_ADVMODE_PERIOD_MIN and Y_ADVMODE_PERIOD_MAX corresponding to the measuring mode used for the advertised value pushed to the parent hub

On failure, throws an exception or returns Y_ADVMODE_INVALID.

temperature→get_advertisedValue() temperature→advertisedValue()

YTemperature

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

js	function **get_advertisedValue**( )
cpp	string **get_advertisedValue**( )
m	-(NSString*) advertisedValue
pas	function **get_advertisedValue**( ): string
vb	function **get_advertisedValue**( ) As String
cs	string **get_advertisedValue**( )
java	String **get_advertisedValue**( )
uwp	Task<string> **get_advertisedValue**( )
py	def **get_advertisedValue**( )
php	function **get_advertisedValue**( )
es	function **get_advertisedValue**( )
cmd	YTemperature **target** **get_advertisedValue**

Returns :

a string corresponding to the current value of the temperature sensor (no more than 6 characters).

On failure, throws an exception or returns `Y_ADVERTISEDVALUE_INVALID`.

temperature→get_currentRawValue()
temperature→currentRawValue()

YTemperature

Returns the uncalibrated, unrounded raw value returned by the sensor, in Celsius, as a floating point number.

js	function **get_currentRawValue**( )
cpp	double **get_currentRawValue**( )
m	-(double) currentRawValue
pas	function **get_currentRawValue**( ): double
vb	function **get_currentRawValue**( ) As Double
cs	double **get_currentRawValue**( )
java	double **get_currentRawValue**( )
uwp	Task<double> **get_currentRawValue**( )
py	def **get_currentRawValue**( )
php	function **get_currentRawValue**( )
es	function **get_currentRawValue**( )
cmd	YTemperature **target** **get_currentRawValue**

Returns :

a floating point number corresponding to the uncalibrated, unrounded raw value returned by the sensor, in Celsius, as a floating point number

On failure, throws an exception or returns `Y_CURRENTRAWVALUE_INVALID`.

temperature→get_currentValue() temperature→currentValue()

YTemperature

Returns the current value of the temperature, in Celsius, as a floating point number.

js	function **get_currentValue**( )
cpp	double **get_currentValue**( )
m	-(double) currentValue
pas	function **get_currentValue**( ): double
vb	function **get_currentValue**( ) As Double
cs	double **get_currentValue**( )
java	double **get_currentValue**( )
uwp	Task<double> **get_currentValue**( )
py	def **get_currentValue**( )
php	function **get_currentValue**( )
es	function **get_currentValue**( )
cmd	YTemperature **target** **get_currentValue**

Returns :

a floating point number corresponding to the current value of the temperature, in Celsius, as a floating point number

On failure, throws an exception or returns `Y_CURRENTVALUE_INVALID`.

temperature→get_dataLogger() temperature→dataLogger()

YTemperature

Returns the YDatalogger object of the device hosting the sensor.

js	function **get_dataLogger**( )
cpp	YDataLogger* **get_dataLogger**( )
m	-(YDataLogger*) dataLogger
pas	function **get_dataLogger**( ): TYDataLogger
vb	function **get_dataLogger**( ) As YDataLogger
cs	YDataLogger **get_dataLogger**( )
java	YDataLogger **get_dataLogger**( )
uwp	Task<YDataLogger> **get_dataLogger**( )
py	def **get_dataLogger**( )
php	function **get_dataLogger**( )
es	function **get_dataLogger**( )

This method returns an object of class YDatalogger that can control global parameters of the data logger. The returned object should not be freed.

Returns :
an YDataLogger object or null on error.

temperature→get_errorMessage() temperature→errorMessage()

YTemperature

Returns the error message of the latest error with the temperature sensor.

js	function **get_errorMessage**( )
cpp	string **get_errorMessage**( )
m	-(NSString*) errorMessage
pas	function **get_errorMessage**( ): string
vb	function **get_errorMessage**( ) As String
cs	string **get_errorMessage**( )
java	String **get_errorMessage**( )
py	def **get_errorMessage**( )
php	function **get_errorMessage**( )
es	function **get_errorMessage**( )

This method is mostly useful when using the Yoctopuce library with exceptions disabled.

Returns :
a string corresponding to the latest error message that occured while using the temperature sensor object

temperature→get_errorType() temperature→errorType()

YTemperature

Returns the numerical error code of the latest error with the temperature sensor.

js	function **get_errorType**( )
cpp	YRETCODE **get_errorType**( )
pas	function **get_errorType**( ): YRETCODE
vb	function **get_errorType**( ) As YRETCODE
cs	YRETCODE **get_errorType**( )
java	int **get_errorType**( )
py	def **get_errorType**( )
php	function **get_errorType**( )
es	function **get_errorType**( )

This method is mostly useful when using the Yoctopuce library with exceptions disabled.

Returns :

a number corresponding to the code of the latest error that occurred while using the temperature sensor object

temperature→get_friendlyName() temperature→friendlyName()

YTemperature

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

js	function **get_friendlyName**( )
cpp	string **get_friendlyName**( )
m	-(NSString*) friendlyName
cs	string **get_friendlyName**( )
java	String **get_friendlyName**( )
py	def **get_friendlyName**( )
php	function **get_friendlyName**( )
es	function **get_friendlyName**( )

The returned string uses the logical names of the module and of the temperature sensor if they are defined, otherwise the serial number of the module and the hardware identifier of the temperature sensor (for example: `MyCustomName.relay1`)

Returns :

a string that uniquely identifies the temperature sensor using logical names (ex: `MyCustomName.relay1`)

On failure, throws an exception or returns `Y_FRIENDLYNAME_INVALID`.

temperature→get_functionDescriptor() temperature→functionDescriptor()

YTemperature

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

js	function **get_functionDescriptor**( )
cpp	YFUN_DESCR **get_functionDescriptor**( )
m	-(YFUN_DESCR) functionDescriptor
pas	function **get_functionDescriptor**( ): YFUN_DESCR
vb	function **get_functionDescriptor**( ) As YFUN_DESCR
cs	YFUN_DESCR **get_functionDescriptor**( )
java	String **get_functionDescriptor**( )
py	def **get_functionDescriptor**( )
php	function **get_functionDescriptor**( )
es	function **get_functionDescriptor**( )

This identifier can be used to test if two instances of YFunction reference the same physical function on the same physical device.

Returns :

an identifier of type YFUN_DESCR.

If the function has never been contacted, the returned value is Y_FUNCTIONDESCRIPTOR_INVALID.

temperature→get_functionId() temperature→functionId()

YTemperature

Returns the hardware identifier of the temperature sensor, without reference to the module.

js	function **get_functionId**( )
cpp	string **get_functionId**( )
m	-(NSString*) functionId
vb	function **get_functionId**( ) As String
cs	string **get_functionId**( )
java	String **get_functionId**( )
py	def **get_functionId**( )
php	function **get_functionId**( )
es	function **get_functionId**( )

For example `relay1`

Returns :
a string that identifies the temperature sensor (ex: `relay1`)

On failure, throws an exception or returns `Y_FUNCTIONID_INVALID`.

temperature→get_hardwareId() temperature→hardwareId()

YTemperature

Returns the unique hardware identifier of the temperature sensor in the form SERIAL.FUNCTIONID.

js	function **get_hardwareId**( )
cpp	string **get_hardwareId**( )
m	-(NSString*) hardwareId
vb	function **get_hardwareId**( ) As String
cs	string **get_hardwareId**( )
java	String **get_hardwareId**( )
py	def **get_hardwareId**( )
php	function **get_hardwareId**( )
es	function **get_hardwareId**( )

The unique hardware identifier is composed of the device serial number and of the hardware identifier of the temperature sensor (for example RELAYLO1-123456.relay1).

Returns :

a string that uniquely identifies the temperature sensor (ex: RELAYLO1-123456.relay1)

On failure, throws an exception or returns Y_HARDWAREID_INVALID.

temperature→get_highestValue()
temperature→highestValue()

YTemperature

Returns the maximal value observed for the temperature since the device was started.

js	function **get_highestValue**( )
cpp	double **get_highestValue**( )
m	-(double) highestValue
pas	function **get_highestValue**( ): double
vb	function **get_highestValue**( ) As Double
cs	double **get_highestValue**( )
java	double **get_highestValue**( )
uwp	Task<double> **get_highestValue**( )
py	def **get_highestValue**( )
php	function **get_highestValue**( )
es	function **get_highestValue**( )
cmd	YTemperature **target** **get_highestValue**

Can be reset to an arbitrary value thanks to set_highestValue().

Returns :

a floating point number corresponding to the maximal value observed for the temperature since the device was started

On failure, throws an exception or returns `Y_HIGHESTVALUE_INVALID`.

temperature→get_logFrequency()
temperature→logFrequency()

YTemperature

Returns the datalogger recording frequency for this function, or "OFF" when measures are not stored in the data logger flash memory.

js	function **get_logFrequency**( )
cpp	string **get_logFrequency**( )
m	-(NSString*) logFrequency
pas	function **get_logFrequency**( ): string
vb	function **get_logFrequency**( ) As String
cs	string **get_logFrequency**( )
java	String **get_logFrequency**( )
uwp	Task<string> **get_logFrequency**( )
py	def **get_logFrequency**( )
php	function **get_logFrequency**( )
es	function **get_logFrequency**( )
cmd	YTemperature **target** **get_logFrequency**

Returns :

a string corresponding to the datalogger recording frequency for this function, or "OFF" when measures are not stored in the data logger flash memory

On failure, throws an exception or returns `Y_LOGFREQUENCY_INVALID`.

temperature→get_logicalName() temperature→logicalName() YTemperature

Returns the logical name of the temperature sensor.

js	function **get_logicalName**( )
cpp	string **get_logicalName**( )
m	-(NSString*) logicalName
pas	function **get_logicalName**( ): string
vb	function **get_logicalName**( ) As String
cs	string **get_logicalName**( )
java	String **get_logicalName**( )
uwp	Task<string> **get_logicalName**( )
py	def **get_logicalName**( )
php	function **get_logicalName**( )
es	function **get_logicalName**( )
cmd	YTemperature **target** **get_logicalName**

Returns :
a string corresponding to the logical name of the temperature sensor.

On failure, throws an exception or returns `Y_LOGICALNAME_INVALID`.

temperature→get_lowestValue()
temperature→lowestValue()

YTemperature

Returns the minimal value observed for the temperature since the device was started.

js	function **get_lowestValue**( )
cpp	double **get_lowestValue**( )
m	-(double) lowestValue
pas	function **get_lowestValue**( ): double
vb	function **get_lowestValue**( ) As Double
cs	double **get_lowestValue**( )
java	double **get_lowestValue**( )
uwp	Task<double> **get_lowestValue**( )
py	def **get_lowestValue**( )
php	function **get_lowestValue**( )
es	function **get_lowestValue**( )
cmd	YTemperature **target** **get_lowestValue**

Can be reset to an arbitrary value thanks to set_lowestValue().

Returns :

a floating point number corresponding to the minimal value observed for the temperature since the device was started

On failure, throws an exception or returns `Y_LOWESTVALUE_INVALID`.

temperature→get_module()
temperature→module()

YTemperature

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

js	function **get_module**( )
cpp	YModule * **get_module**( )
m	-(YModule*) module
pas	function **get_module**( ): TYModule
vb	function **get_module**( ) As YModule
cs	YModule **get_module**( )
java	YModule **get_module**( )
py	def **get_module**( )
php	function **get_module**( )
es	function **get_module**( )

If the function cannot be located on any module, the returned instance of `YModule` is not shown as on-line.

Returns :
an instance of `YModule`

temperature→get_module_async() temperature→module_async()

YTemperature

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

js function **get_module_async**(**callback**, **context**)

If the function cannot be located on any module, the returned YModule object does not show as on-line.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking Firefox javascript VM that does not implement context switching during blocking I/O calls. See the documentation section on asynchronous Javascript calls for more details.

Parameters :

callback callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the receiving function object and the requested YModule object

context caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

temperature→get_recordedData() temperature→recordedData()

YTemperature

Retrieves a DataSet object holding historical data for this sensor, for a specified time interval.

js	function **get_recordedData**(**startTime**, **endTime**)
cpp	YDataSet **get_recordedData**(s64 **startTime**, s64 **endTime**)
m	-(YDataSet*) recordedData : (s64) **startTime** : (s64) **endTime**
pas	function **get_recordedData**(**startTime**: int64, **endTime**: int64): TYDataSet
vb	function **get_recordedData**( ) As YDataSet
cs	YDataSet **get_recordedData**(long **startTime**, long **endTime**)
java	YDataSet **get_recordedData**(long **startTime**, long **endTime**)
uwp	Task<YDataSet> **get_recordedData**(long **startTime**, long **endTime**)
py	def **get_recordedData**(**startTime**, **endTime**)
php	function **get_recordedData**(**$startTime**, **$endTime**)
es	function **get_recordedData**(**startTime**, **endTime**)
cmd	YTemperature **target get_recordedData startTime endTime**

The measures will be retrieved from the data logger, which must have been turned on at the desired time. See the documentation of the DataSet class for information on how to get an overview of the recorded data, and how to load progressively a large set of measures from the data logger.

This function only works if the device uses a recent firmware, as DataSet objects are not supported by firmwares older than version 13000.

Parameters :

startTime the start of the desired measure time interval, as a Unix timestamp, i.e. the number of seconds since January 1, 1970 UTC. The special value 0 can be used to include any meaasure, without initial limit.

endTime the end of the desired measure time interval, as a Unix timestamp, i.e. the number of seconds since January 1, 1970 UTC. The special value 0 can be used to include any meaasure, without ending limit.

Returns :

an instance of YDataSet, providing access to historical data. Past measures can be loaded progressively using methods from the YDataSet object.

temperature→get_reportFrequency() temperature→reportFrequency()

YTemperature

Returns the timed value notification frequency, or "OFF" if timed value notifications are disabled for this function.

js	function **get_reportFrequency**( )
cpp	string **get_reportFrequency**( )
m	-(NSString*) reportFrequency
pas	function **get_reportFrequency**( ): string
vb	function **get_reportFrequency**( ) As String
cs	string **get_reportFrequency**( )
java	String **get_reportFrequency**( )
uwp	Task<string> **get_reportFrequency**( )
py	def **get_reportFrequency**( )
php	function **get_reportFrequency**( )
es	function **get_reportFrequency**( )
cmd	YTemperature **target** **get_reportFrequency**

Returns :

a string corresponding to the timed value notification frequency, or "OFF" if timed value notifications are disabled for this function

On failure, throws an exception or returns `Y_REPORTFREQUENCY_INVALID`.

temperature→get_resolution()
temperature→resolution()

YTemperature

Returns the resolution of the measured values.

js	function **get_resolution**( )
cpp	double **get_resolution**( )
m	-(double) resolution
pas	function **get_resolution**( ): double
vb	function **get_resolution**( ) As Double
cs	double **get_resolution**( )
java	double **get_resolution**( )
uwp	Task<double> **get_resolution**( )
py	def **get_resolution**( )
php	function **get_resolution**( )
es	function **get_resolution**( )
cmd	YTemperature **target** **get_resolution**

The resolution corresponds to the numerical precision of the measures, which is not always the same as the actual precision of the sensor.

Returns :

a floating point number corresponding to the resolution of the measured values

On failure, throws an exception or returns `Y_RESOLUTION_INVALID`.

temperature→get_sensorState() temperature→sensorState()

YTemperature

Returns the sensor health state code, which is zero when there is an up-to-date measure available or a positive code if the sensor is not able to provide a measure right now.

js	function **get_sensorState**( )
cpp	int **get_sensorState**( )
m	-(int) sensorState
pas	function **get_sensorState**( ): LongInt
vb	function **get_sensorState**( ) As Integer
cs	int **get_sensorState**( )
java	int **get_sensorState**( )
uwp	Task<int> **get_sensorState**( )
py	def **get_sensorState**( )
php	function **get_sensorState**( )
es	function **get_sensorState**( )
cmd	YTemperature **target** **get_sensorState**

Returns :

an integer corresponding to the sensor health state code, which is zero when there is an up-to-date measure available or a positive code if the sensor is not able to provide a measure right now

On failure, throws an exception or returns `Y_SENSORSTATE_INVALID`.

temperature→get_sensorType() temperature→sensorType()

YTemperature

Returns the temperature sensor type.

js	function **get_sensorType**( )
cpp	Y_SENSORTYPE_enum **get_sensorType**( )
m	-(Y_SENSORTYPE_enum) sensorType
pas	function **get_sensorType**( ): Integer
vb	function **get_sensorType**( ) As Integer
cs	int **get_sensorType**( )
java	int **get_sensorType**( )
uwp	Task<int> **get_sensorType**( )
py	def **get_sensorType**( )
php	function **get_sensorType**( )
es	function **get_sensorType**( )
cmd	YTemperature **target** **get_sensorType**

Returns :

a value among Y_SENSORTYPE_DIGITAL, Y_SENSORTYPE_TYPE_K, Y_SENSORTYPE_TYPE_E, Y_SENSORTYPE_TYPE_J, Y_SENSORTYPE_TYPE_N, Y_SENSORTYPE_TYPE_R, Y_SENSORTYPE_TYPE_S, Y_SENSORTYPE_TYPE_T, Y_SENSORTYPE_PT100_4WIRES, Y_SENSORTYPE_PT100_3WIRES, Y_SENSORTYPE_PT100_2WIRES, Y_SENSORTYPE_RES_OHM, Y_SENSORTYPE_RES_NTC, Y_SENSORTYPE_RES_LINEAR and Y_SENSORTYPE_RES_INTERNAL corresponding to the temperature sensor type

On failure, throws an exception or returns Y_SENSORTYPE_INVALID.

temperature→get_signalUnit()
temperature→signalUnit()

YTemperature

Returns the measuring unit of the electrical signal used by the sensor.

js	function **get_signalUnit**( )
cpp	string **get_signalUnit**( )
m	-(NSString*) signalUnit
pas	function **get_signalUnit**( ): string
vb	function **get_signalUnit**( ) As String
cs	string **get_signalUnit**( )
java	String **get_signalUnit**( )
uwp	Task<string> **get_signalUnit**( )
py	def **get_signalUnit**( )
php	function **get_signalUnit**( )
es	function **get_signalUnit**( )
cmd	YTemperature **target** **get_signalUnit**

Returns :
a string corresponding to the measuring unit of the electrical signal used by the sensor

On failure, throws an exception or returns `Y_SIGNALUNIT_INVALID`.

temperature→get_signalValue()
temperature→signalValue()

YTemperature

Returns the current value of the electrical signal measured by the sensor.

js	function **get_signalValue**( )
cpp	double **get_signalValue**( )
m	-(double) signalValue
pas	function **get_signalValue**( ): double
vb	function **get_signalValue**( ) As Double
cs	double **get_signalValue**( )
java	double **get_signalValue**( )
uwp	Task<double> **get_signalValue**( )
py	def **get_signalValue**( )
php	function **get_signalValue**( )
es	function **get_signalValue**( )
cmd	YTemperature **target** **get_signalValue**

Returns :

a floating point number corresponding to the current value of the electrical signal measured by the sensor

On failure, throws an exception or returns `Y_SIGNALVALUE_INVALID`.

temperature→get_unit()
temperature→unit()

YTemperature

Returns the measuring unit for the temperature.

js	function **get_unit**( )
cpp	string **get_unit**( )
m	-(NSString*) unit
pas	function **get_unit**( ): string
vb	function **get_unit**( ) As String
cs	string **get_unit**( )
java	String **get_unit**( )
uwp	Task<string> **get_unit**( )
py	def **get_unit**( )
php	function **get_unit**( )
es	function **get_unit**( )
cmd	YTemperature **target** **get_unit**

Returns :
a string corresponding to the measuring unit for the temperature

On failure, throws an exception or returns `Y_UNIT_INVALID`.

temperature→get_userData() temperature→userData()

YTemperature

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

js	function **get_userData**( )
cpp	void * **get_userData**( )
m	-(id) userData
pas	function **get_userData**( ): Tobject
vb	function **get_userData**( ) As Object
cs	object **get_userData**( )
java	Object **get_userData**( )
py	def **get_userData**( )
php	function **get_userData**( )
es	function **get_userData**( )

This attribute is never touched directly by the API, and is at disposal of the caller to store a context.

Returns :
the object stored previously by the caller.

temperature→isOnline() YTemperature

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

js	function **isOnline**( )
cpp	bool **isOnline**( )
m	-(BOOL) **isOnline**
pas	function **isOnline**( ): boolean
vb	function **isOnline**( ) As Boolean
cs	bool **isOnline**( )
java	boolean **isOnline**( )
py	def **isOnline**( )
php	function **isOnline**( )
es	function **isOnline**( )

If there is a cached value for the temperature sensor in cache, that has not yet expired, the device is considered reachable. No exception is raised if there is an error while trying to contact the device hosting the temperature sensor.

Returns :
`true` if the temperature sensor can be reached, and `false` otherwise

temperature→isOnline_async() YTemperature

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

```
js  function isOnline_async( callback, context)
```

If there is a cached value for the temperature sensor in cache, that has not yet expired, the device is considered reachable. No exception is raised if there is an error while trying to contact the device hosting the requested function.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking the Javascript virtual machine.

Parameters :

callback callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the receiving function object and the boolean result

context caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

temperature→isSensorReady() YTemperature

Checks if the sensor is currently able to provide an up-to-date measure.

```
cmd YTemperature target isSensorReady
```

Returns false if the device is unreachable, or if the sensor does not have a current measure to transmit. No exception is raised if there is an error while trying to contact the device hosting $THEFUNCTION$.

Returns :
`true` if the sensor can provide an up-to-date measure, and `false` otherwise

temperature→load() YTemperature

Preloads the temperature sensor cache with a specified validity duration.

js	function **load**(**msValidity**)
cpp	YRETCODE **load**(int **msValidity**)
m	-(YRETCODE) **load** : (u64) **msValidity**
pas	function **load**(**msValidity**: u64): YRETCODE
vb	function **load**(ByVal **msValidity** As Long) As YRETCODE
cs	YRETCODE **load**(ulong **msValidity**)
java	int **load**(long **msValidity**)
py	def **load**(**msValidity**)
php	function **load**(**$msValidity**)
es	function **load**(**msValidity**)

By default, whenever accessing a device, all function attributes are kept in cache for the standard duration (5 ms). This method can be used to temporarily mark the cache as valid for a longer period, in order to reduce network traffic for instance.

Parameters :

msValidity an integer corresponding to the validity attributed to the loaded function parameters, in milliseconds

Returns :

YAPI_SUCCESS when the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→loadAttribute() YTemperature

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

js	function **loadAttribute**(**attrName**)
cpp	string **loadAttribute**(string **attrName**)
m	-(NSString*) **loadAttribute** : (NSString*) **attrName**
pas	function **loadAttribute**(**attrName**: string): string
vb	function **loadAttribute**( ) As String
cs	string **loadAttribute**(string **attrName**)
java	String **loadAttribute**(String **attrName**)
uwp	Task<string> **loadAttribute**(string **attrName**)
py	def **loadAttribute**(**attrName**)
php	function **loadAttribute**(**$attrName**)
es	function **loadAttribute**(**attrName**)

Parameters :

attrName the name of the requested attribute

Returns :

a string with the value of the the attribute

On failure, throws an exception or returns an empty string.

temperature→loadCalibrationPoints() YTemperature

Retrieves error correction data points previously entered using the method `calibrateFromPoints`.

js	function **loadCalibrationPoints**(**rawValues**, **refValues**)
cpp	int **loadCalibrationPoints**(vector<double>& **rawValues**, vector<double>& **refValues**)
m	-(int) **loadCalibrationPoints** : (NSMutableArray*) **rawValues** : (NSMutableArray*) **refValues**
pas	function **loadCalibrationPoints**(var **rawValues**: TDoubleArray, var **refValues**: TDoubleArray): LongInt
vb	procedure **loadCalibrationPoints**( )
cs	int **loadCalibrationPoints**(List<double> **rawValues**, List<double> **refValues**)
java	int **loadCalibrationPoints**(ArrayList<Double> **rawValues**, ArrayList<Double> **refValues**)
uwp	Task<int> **loadCalibrationPoints**(List<double> **rawValues**, List<double> **refValues**)
py	def **loadCalibrationPoints**(**rawValues**, **refValues**)
php	function **loadCalibrationPoints**(**&$rawValues**, **&$refValues**)
es	function **loadCalibrationPoints**(**rawValues**, **refValues**)
cmd	YTemperature **target loadCalibrationPoints rawValues refValues**

Parameters :

rawValues array of floating point numbers, that will be filled by the function with the raw sensor values for the correction points.

refValues array of floating point numbers, that will be filled by the function with the desired values for the correction points.

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→loadThermistorResponseTable() YTemperature

Retrieves the thermistor response table previously configured using the set_thermistorResponseTable function.

js	function **loadThermistorResponseTable**(**tempValues**, **resValues**)
cpp	int **loadThermistorResponseTable**(vector<double>& **tempValues**, vector<double>& **resValues**)
m	-(int) **loadThermistorResponseTable** : (NSMutableArray*) **tempValues** : (NSMutableArray*) **resValues**
pas	function **loadThermistorResponseTable**(var **tempValues**: TDoubleArray, var **resValues**: TDoubleArray): LongInt
vb	procedure **loadThermistorResponseTable**( )
cs	int **loadThermistorResponseTable**(List<double> **tempValues**, List<double> **resValues**)
java	int **loadThermistorResponseTable**(ArrayList<Double> **tempValues**, ArrayList<Double> **resValues**)
uwp	Task<int> **loadThermistorResponseTable**(List<double> **tempValues**, List<double> **resValues**)
py	def **loadThermistorResponseTable**(**tempValues**, **resValues**)
php	function **loadThermistorResponseTable**(**&$tempValues**, **&$resValues**)
es	function **loadThermistorResponseTable**(**tempValues**, **resValues**)
cmd	YTemperature **target loadThermistorResponseTable tempValues resValues**

This function can only be used with a temperature sensor based on thermistors.

Parameters :

tempValues array of floating point numbers, that is filled by the function with all temperatures (in degrees Celcius) for which the resistance of the thermistor is specified.

resValues array of floating point numbers, that is filled by the function with the value (in Ohms) for each of the temperature included in the first argument, index by index.

Returns :

YAPI_SUCCESS if the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→load_async() YTemperature

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

```
js function load_async( msValidity, callback, context)
```

By default, whenever accessing a device, all function attributes are kept in cache for the standard duration (5 ms). This method can be used to temporarily mark the cache as valid for a longer period, in order to reduce network trafic for instance.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking the Javascript virtual machine.

Parameters :

msValidity an integer corresponding to the validity of the loaded function parameters, in milliseconds

callback callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the receiving function object and the error code (or `YAPI_SUCCESS`)

context caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

temperature→muteValueCallbacks() YTemperature

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

js	function **muteValueCallbacks**( )
cpp	int **muteValueCallbacks**( )
m	-(int) **muteValueCallbacks**
pas	function **muteValueCallbacks**( ): LongInt
vb	function **muteValueCallbacks**( ) As Integer
cs	int **muteValueCallbacks**( )
java	int **muteValueCallbacks**( )
uwp	Task<int> **muteValueCallbacks**( )
py	def **muteValueCallbacks**( )
php	function **muteValueCallbacks**( )
es	function **muteValueCallbacks**( )
cmd	YTemperature **target** **muteValueCallbacks**

You can use this function to save bandwidth and CPU on computers with limited resources, or to prevent unwanted invocations of the HTTP callback. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Returns :
`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→nextTemperature() YTemperature

Continues the enumeration of temperature sensors started using `yFirstTemperature()`.

js	function **nextTemperature**( )
cpp	YTemperature * **nextTemperature**( )
m	-(YTemperature*) **nextTemperature**
pas	function **nextTemperature**( ): TYTemperature
vb	function **nextTemperature**( ) As YTemperature
cs	YTemperature **nextTemperature**( )
java	YTemperature **nextTemperature**( )
uwp	YTemperature **nextTemperature**( )
py	def **nextTemperature**( )
php	function **nextTemperature**( )
es	function **nextTemperature**( )

Returns :

a pointer to a `YTemperature` object, corresponding to a temperature sensor currently online, or a `null` pointer if there are no more temperature sensors to enumerate.

temperature→registerTimedReportCallback() YTemperature

Registers the callback function that is invoked on every periodic timed notification.

js	function **registerTimedReportCallback**(**callback**)
cpp	int **registerTimedReportCallback**(YTemperatureTimedReportCallback **callback**)
m	-(int) **registerTimedReportCallback** : (YTemperatureTimedReportCallback) **callback**
pas	function **registerTimedReportCallback**(**callback**: TYTemperatureTimedReportCallback): LongInt
vb	function **registerTimedReportCallback**( ) As Integer
cs	int **registerTimedReportCallback**(TimedReportCallback **callback**)
java	int **registerTimedReportCallback**(TimedReportCallback **callback**)
uwp	Task<int> **registerTimedReportCallback**(TimedReportCallback **callback**)
py	def **registerTimedReportCallback**(**callback**)
php	function **registerTimedReportCallback**(**$callback**)
es	function **registerTimedReportCallback**(**callback**)

The callback is invoked only during the execution of `ySleep` or `yHandleEvents`. This provides control over the time when the callback is triggered. For good responsiveness, remember to call one of these two functions periodically. To unregister a callback, pass a null pointer as argument.

Parameters :

callback the callback function to call, or a null pointer. The callback function should take two arguments: the function object of which the value has changed, and an YMeasure object describing the new advertised value.

temperature→registerValueCallback() YTemperature

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

js	function **registerValueCallback**(**callback**)
cpp	int **registerValueCallback**(YTemperatureValueCallback **callback**)
m	-(int) **registerValueCallback** : (YTemperatureValueCallback) **callback**
pas	function **registerValueCallback**(**callback**: TYTemperatureValueCallback): LongInt
vb	function **registerValueCallback**( ) As Integer
cs	int **registerValueCallback**(ValueCallback **callback**)
java	int **registerValueCallback**(UpdateCallback **callback**)
uwp	Task<int> **registerValueCallback**(ValueCallback **callback**)
py	def **registerValueCallback**(**callback**)
php	function **registerValueCallback**(**$callback**)
es	function **registerValueCallback**(**callback**)

The callback is invoked only during the execution of `ySleep` or `yHandleEvents`. This provides control over the time when the callback is triggered. For good responsiveness, remember to call one of these two functions periodically. To unregister a callback, pass a null pointer as argument.

Parameters :

callback the callback function to call, or a null pointer. The callback function should take two arguments: the function object of which the value has changed, and the character string describing the new advertised value.

temperature→set_advMode()
temperature→setAdvMode()

YTemperature

Changes the measuring mode used for the advertised value pushed to the parent hub.

js	function **set_advMode**(**newval**)
cpp	int **set_advMode**(Y_ADVMODE_enum **newval**)
m	-(int) setAdvMode : (Y_ADVMODE_enum) **newval**
pas	function **set_advMode**(**newval**: Integer): integer
vb	function **set_advMode**(ByVal **newval** As Integer) As Integer
cs	int **set_advMode**(int **newval**)
java	int **set_advMode**(int **newval**)
uwp	Task<int> **set_advMode**(int **newval**)
py	def **set_advMode**(**newval**)
php	function **set_advMode**(**$newval**)
es	function **set_advMode**(**newval**)
cmd	YTemperature **target** **set_advMode** **newval**

Parameters :

newval a value among Y_ADVMODE_IMMEDIATE, Y_ADVMODE_PERIOD_AVG, Y_ADVMODE_PERIOD_MIN and Y_ADVMODE_PERIOD_MAX corresponding to the measuring mode used for the advertised value pushed to the parent hub

Returns :

YAPI_SUCCESS if the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→set_highestValue()
temperature→setHighestValue()

YTemperature

Changes the recorded maximal value observed.

js	function **set_highestValue**(**newval**)
cpp	int **set_highestValue**(double **newval**)
m	-(int) setHighestValue : (double) **newval**
pas	function **set_highestValue**(**newval**: double): integer
vb	function **set_highestValue**(ByVal **newval** As Double) As Integer
cs	int **set_highestValue**(double **newval**)
java	int **set_highestValue**(double **newval**)
uwp	Task<int> **set_highestValue**(double **newval**)
py	def **set_highestValue**(**newval**)
php	function **set_highestValue**(**$newval**)
es	function **set_highestValue**(**newval**)
cmd	YTemperature **target** **set_highestValue** **newval**

Can be used to reset the value returned by get_lowestValue().

Parameters :

newval a floating point number corresponding to the recorded maximal value observed

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→set_logFrequency()
temperature→setLogFrequency()

YTemperature

Changes the datalogger recording frequency for this function.

js	function **set_logFrequency**(**newval**)
cpp	int **set_logFrequency**(const string& **newval**)
m	-(int) setLogFrequency : (NSString*) **newval**
pas	function **set_logFrequency**(**newval**: string): integer
vb	function **set_logFrequency**(ByVal **newval** As String) As Integer
cs	int **set_logFrequency**(string **newval**)
java	int **set_logFrequency**(String **newval**)
uwp	Task<int> **set_logFrequency**(string **newval**)
py	def **set_logFrequency**(**newval**)
php	function **set_logFrequency**(**$newval**)
es	function **set_logFrequency**(**newval**)
cmd	YTemperature **target** **set_logFrequency** **newval**

The frequency can be specified as samples per second, as sample per minute (for instance "15/m") or in samples per hour (eg. "4/h"). To disable recording for this function, use the value "OFF".

Parameters :

newval a string corresponding to the datalogger recording frequency for this function

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→set_logicalName()
temperature→setLogicalName()

YTemperature

Changes the logical name of the temperature sensor.

js	function **set_logicalName**(**newval**)
cpp	int **set_logicalName**(const string& **newval**)
m	-(int) setLogicalName : (NSString*) **newval**
pas	function **set_logicalName**(**newval**: string): integer
vb	function **set_logicalName**(ByVal **newval** As String) As Integer
cs	int **set_logicalName**(string **newval**)
java	int **set_logicalName**(String **newval**)
uwp	Task<int> **set_logicalName**(string **newval**)
py	def **set_logicalName**(**newval**)
php	function **set_logicalName**(**$newval**)
es	function **set_logicalName**(**newval**)
cmd	YTemperature **target** **set_logicalName** **newval**

You can use `yCheckLogicalName()` prior to this call to make sure that your parameter is valid. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Parameters :

newval a string corresponding to the logical name of the temperature sensor.

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→set_lowestValue()
temperature→setLowestValue() YTemperature

Changes the recorded minimal value observed.

js	function **set_lowestValue**(**newval**)
cpp	int **set_lowestValue**(double **newval**)
m	-(int) setLowestValue : (double) **newval**
pas	function **set_lowestValue**(**newval**: double): integer
vb	function **set_lowestValue**(ByVal **newval** As Double) As Integer
cs	int **set_lowestValue**(double **newval**)
java	int **set_lowestValue**(double **newval**)
uwp	Task<int> **set_lowestValue**(double **newval**)
py	def **set_lowestValue**(**newval**)
php	function **set_lowestValue**(**$newval**)
es	function **set_lowestValue**(**newval**)
cmd	YTemperature **target** **set_lowestValue** **newval**

Can be used to reset the value returned by get_lowestValue().

Parameters :

newval a floating point number corresponding to the recorded minimal value observed

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→set_ntcParameters() temperature→setNtcParameters()

YTemperature

Configures NTC thermistor parameters in order to properly compute the temperature from the measured resistance.

js	function **set_ntcParameters**(**res25**, **beta**)
cpp	int **set_ntcParameters**(double **res25**, double **beta**)
m	-(int) setNtcParameters : (double) **res25** : (double) **beta**
pas	function **set_ntcParameters**(**res25**: double, **beta**: double): LongInt
vb	function **set_ntcParameters**( ) As Integer
cs	int **set_ntcParameters**(double **res25**, double **beta**)
java	int **set_ntcParameters**(double **res25**, double **beta**)
uwp	Task<int> **set_ntcParameters**(double **res25**, double **beta**)
py	def **set_ntcParameters**(**res25**, **beta**)
php	function **set_ntcParameters**(**$res25**, **$beta**)
es	function **set_ntcParameters**(**res25**, **beta**)
cmd	YTemperature **target** **set_ntcParameters** **res25** **beta**

For increased precision, you can enter a complete mapping table using set_thermistorResponseTable. This function can only be used with a temperature sensor based on thermistors.

Parameters :

res25 thermistor resistance at 25 degrees Celsius

beta Beta value

Returns :

YAPI_SUCCESS if the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→set_reportFrequency()
temperature→setReportFrequency()

YTemperature

Changes the timed value notification frequency for this function.

js	function **set_reportFrequency**(**newval**)
cpp	int **set_reportFrequency**(const string& **newval**)
m	-(int) setReportFrequency : (NSString*) **newval**
pas	function **set_reportFrequency**(**newval**: string): integer
vb	function **set_reportFrequency**(ByVal **newval** As String) As Integer
cs	int **set_reportFrequency**(string **newval**)
java	int **set_reportFrequency**(String **newval**)
uwp	Task<int> **set_reportFrequency**(string **newval**)
py	def **set_reportFrequency**(**newval**)
php	function **set_reportFrequency**(**$newval**)
es	function **set_reportFrequency**(**newval**)
cmd	YTemperature **target set_reportFrequency newval**

The frequency can be specified as samples per second, as sample per minute (for instance "15/m") or in samples per hour (eg. "4/h"). To disable timed value notifications for this function, use the value "OFF".

Parameters :

newval a string corresponding to the timed value notification frequency for this function

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→set_resolution() temperature→setResolution() YTemperature

Changes the resolution of the measured physical values.

js	function **set_resolution**(**newval**)
cpp	int **set_resolution**(double **newval**)
m	-(int) setResolution : (double) **newval**
pas	function **set_resolution**(**newval**: double): integer
vb	function **set_resolution**(ByVal **newval** As Double) As Integer
cs	int **set_resolution**(double **newval**)
java	int **set_resolution**(double **newval**)
uwp	Task<int> **set_resolution**(double **newval**)
py	def **set_resolution**(**newval**)
php	function **set_resolution**(**$newval**)
es	function **set_resolution**(**newval**)
cmd	YTemperature **target** **set_resolution** **newval**

The resolution corresponds to the numerical precision when displaying value. It does not change the precision of the measure itself.

Parameters :

newval a floating point number corresponding to the resolution of the measured physical values

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→set_sensorType() temperature→setSensorType() YTemperature

Changes the temperature sensor type.

js	function **set_sensorType**(**newval**)
cpp	int **set_sensorType**(Y_SENSORTYPE_enum **newval**)
m	-(int) setSensorType : (Y_SENSORTYPE_enum) **newval**
pas	function **set_sensorType**(**newval**: Integer): integer
vb	function **set_sensorType**(ByVal **newval** As Integer) As Integer
cs	int **set_sensorType**(int **newval**)
java	int **set_sensorType**(int **newval**)
uwp	Task<int> **set_sensorType**(int **newval**)
py	def **set_sensorType**(**newval**)
php	function **set_sensorType**(**$newval**)
es	function **set_sensorType**(**newval**)
cmd	YTemperature **target set_sensorType newval**

This function is used to define the type of thermocouple (K,E...) used with the device. It has no effect if module is using a digital sensor or a thermistor. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Parameters :

newval a value among Y_SENSORTYPE_DIGITAL, Y_SENSORTYPE_TYPE_K, Y_SENSORTYPE_TYPE_E, Y_SENSORTYPE_TYPE_J, Y_SENSORTYPE_TYPE_N, Y_SENSORTYPE_TYPE_R, Y_SENSORTYPE_TYPE_S, Y_SENSORTYPE_TYPE_T, Y_SENSORTYPE_PT100_4WIRES, Y_SENSORTYPE_PT100_3WIRES, Y_SENSORTYPE_PT100_2WIRES, Y_SENSORTYPE_RES_OHM, Y_SENSORTYPE_RES_NTC, Y_SENSORTYPE_RES_LINEAR and Y_SENSORTYPE_RES_INTERNAL corresponding to the temperature sensor type

Returns :

YAPI_SUCCESS if the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→set_thermistorResponseTable() temperature→setThermistorResponseTable() — YTemperature

Records a thermistor response table, in order to interpolate the temperature from the measured resistance.

js	function **set_thermistorResponseTable**(**tempValues**, **resValues**)
cpp	int **set_thermistorResponseTable**(vector<double> **tempValues**, vector<double> **resValues**)
m	-(int) setThermistorResponseTable : (NSMutableArray*) **tempValues** : (NSMutableArray*) **resValues**
pas	function **set_thermistorResponseTable**(**tempValues**: TDoubleArray, **resValues**: TDoubleArray): LongInt
vb	procedure **set_thermistorResponseTable**( )
cs	int **set_thermistorResponseTable**(List<double> **tempValues**, List<double> **resValues**)
java	int **set_thermistorResponseTable**(ArrayList<Double> **tempValues**, ArrayList<Double> **resValues**)
uwp	Task<int> **set_thermistorResponseTable**(List<double> **tempValues**, List<double> **resValues**)
py	def **set_thermistorResponseTable**(**tempValues**, **resValues**)
php	function **set_thermistorResponseTable**(**$tempValues**, **$resValues**)
es	function **set_thermistorResponseTable**(**tempValues**, **resValues**)
cmd	YTemperature **target** **set_thermistorResponseTable** **tempValues** **resValues**

This function can only be used with a temperature sensor based on thermistors.

Parameters :

tempValues array of floating point numbers, corresponding to all temperatures (in degrees Celcius) for which the resistance of the thermistor is specified.

resValues array of floating point numbers, corresponding to the resistance values (in Ohms) for each of the temperature included in the first argument, index by index.

Returns :

YAPI_SUCCESS if the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→set_unit()
temperature→setUnit()

YTemperature

Changes the measuring unit for the measured temperature.

js	function **set_unit**(**newval**)
cpp	int **set_unit**(const string& **newval**)
m	-(int) setUnit : (NSString*) **newval**
pas	function **set_unit**(**newval**: string): integer
vb	function **set_unit**(ByVal **newval** As String) As Integer
cs	int **set_unit**(string **newval**)
java	int **set_unit**(String **newval**)
uwp	Task<int> **set_unit**(string **newval**)
py	def **set_unit**(**newval**)
php	function **set_unit**(**$newval**)
es	function **set_unit**(**newval**)
cmd	YTemperature **target set_unit newval**

That unit is a string. If that strings end with the letter F all temperatures values will returned in Fahrenheit degrees. If that String ends with the letter K all values will be returned in Kelvin degrees. If that string ends with the letter C all values will be returned in Celsius degrees. If the string ends with any other character the change will be ignored. Remember to call the `saveToFlash()` method of the module if the modification must be kept. WARNING: if a specific calibration is defined for the temperature function, a unit system change will probably break it.

Parameters :

newval a string corresponding to the measuring unit for the measured temperature

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→set_userData() temperature→setUserData()

YTemperature

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

js	function **set_userData**(**data**)
cpp	void **set_userData**(void* **data**)
m	-(void) setUserData : (id) **data**
pas	procedure **set_userData**(**data**: Tobject)
vb	procedure **set_userData**(ByVal **data** As Object)
cs	void **set_userData**(object **data**)
java	void **set_userData**(Object **data**)
py	def **set_userData**(**data**)
php	function **set_userData**(**$data**)
es	function **set_userData**(**data**)

This attribute is never touched by the API, and is at disposal of the caller to store a context.

Parameters :

data any kind of object to be stored

temperature→startDataLogger() YTemperature

Starts the data logger on the device.

js	function **startDataLogger**( )
cpp	int **startDataLogger**( )
m	-(int) **startDataLogger**
pas	function **startDataLogger**( ): LongInt
vb	function **startDataLogger**( ) As Integer
cs	int **startDataLogger**( )
java	int **startDataLogger**( )
uwp	Task<int> **startDataLogger**( )
py	def **startDataLogger**( )
php	function **startDataLogger**( )
es	function **startDataLogger**( )
cmd	YTemperature **target** **startDataLogger**

Note that the data logger will only save the measures on this sensor if the logFrequency is not set to "OFF".

Returns :
`YAPI_SUCCESS` if the call succeeds.

temperature→stopDataLogger() YTemperature

Stops the datalogger on the device.

js	function **stopDataLogger**( )
cpp	int **stopDataLogger**( )
m	-(int) **stopDataLogger**
pas	function **stopDataLogger**( ): LongInt
vb	function **stopDataLogger**( ) As Integer
cs	int **stopDataLogger**( )
java	int **stopDataLogger**( )
uwp	Task<int> **stopDataLogger**( )
py	def **stopDataLogger**( )
php	function **stopDataLogger**( )
es	function **stopDataLogger**( )
cmd	YTemperature **target** **stopDataLogger**

Returns :
`YAPI_SUCCESS` if the call succeeds.

temperature→unmuteValueCallbacks() YTemperature

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

js	function **unmuteValueCallbacks**( )
cpp	int **unmuteValueCallbacks**( )
m	-(int) **unmuteValueCallbacks**
pas	function **unmuteValueCallbacks**( ): LongInt
vb	function **unmuteValueCallbacks**( ) As Integer
cs	int **unmuteValueCallbacks**( )
java	int **unmuteValueCallbacks**( )
uwp	Task<int> **unmuteValueCallbacks**( )
py	def **unmuteValueCallbacks**( )
php	function **unmuteValueCallbacks**( )
es	function **unmuteValueCallbacks**( )
cmd	YTemperature **target** **unmuteValueCallbacks**

This function reverts the effect of a previous call to `muteValueCallbacks()`. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Returns :
`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

temperature→wait_async() YTemperature

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

js	function **wait_async**(**callback**, **context**)
es	function **wait_async**(**callback**, **context**)

The callback function can therefore freely issue synchronous or asynchronous commands, without risking to block the Javascript VM.

Parameters :

callback callback function that is invoked when all pending commands on the module are completed. The callback function receives two arguments: the caller-specific context object and the receiving function object.

context caller-specific object that is passed as-is to the callback function

Returns :

nothing.

21.6. DataLogger function interface

Yoctopuce sensors include a non-volatile memory capable of storing ongoing measured data automatically, without requiring a permanent connection to a computer. The DataLogger function controls the global parameters of the internal data logger.

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

js	<script type='text/javascript' src='yocto_api.js'></script>
cpp	#include "yocto_api.h"
m	#import "yocto_api.h"
pas	uses yocto_api;
vb	yocto_api.vb
cs	yocto_api.cs
java	import com.yoctopuce.YoctoAPI.YModule;
uwp	import com.yoctopuce.YoctoAPI.YModule;
py	from yocto_api import *
php	require_once('yocto_api.php');
es	in HTML: <script src="../../lib/yocto_api.js"></script> in node.js: require('yoctolib-es2017/yocto_api.js');

Global functions
yFindDataLogger(func) Retrieves a data logger for a given identifier.
yFindDataLoggerInContext(yctx, func) Retrieves a data logger for a given identifier in a YAPI context.
yFirstDataLogger() Starts the enumeration of data loggers currently accessible.
yFirstDataLoggerInContext(yctx) Starts the enumeration of data loggers currently accessible.
`YDataLogger` methods
datalogger→clearCache() Invalidates the cache.
datalogger→describe() Returns a short text that describes unambiguously the instance of the data logger in the form `TYPE(NAME)=SERIAL.FUNCTIONID`.
datalogger→forgetAllDataStreams() Clears the data logger memory and discards all recorded data streams.
datalogger→get_advertisedValue() Returns the current value of the data logger (no more than 6 characters).
datalogger→get_autoStart() Returns the default activation state of the data logger on power up.
datalogger→get_beaconDriven() Returns true if the data logger is synchronised with the localization beacon.
datalogger→get_currentRunIndex() Returns the current run number, corresponding to the number of times the module was powered on with the dataLogger enabled at some point.
datalogger→get_dataSets()

Returns a list of YDataSet objects that can be used to retrieve all measures stored by the data logger.

datalogger→get_dataStreams(v)

Builds a list of all data streams hold by the data logger (legacy method).

datalogger→get_errorMessage()

Returns the error message of the latest error with the data logger.

datalogger→get_errorType()

Returns the numerical error code of the latest error with the data logger.

datalogger→get_friendlyName()

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

datalogger→get_functionDescriptor()

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

datalogger→get_functionId()

Returns the hardware identifier of the data logger, without reference to the module.

datalogger→get_hardwareId()

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

datalogger→get_logicalName()

Returns the logical name of the data logger.

datalogger→get_module()

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

datalogger→get_module_async(callback, context)

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

datalogger→get_recording()

Returns the current activation state of the data logger.

datalogger→get_timeUTC()

Returns the Unix timestamp for current UTC time, if known.

datalogger→get_userData()

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

datalogger→isOnline()

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

datalogger→isOnline_async(callback, context)

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

datalogger→load(msValidity)

Preloads the data logger cache with a specified validity duration.

datalogger→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.

datalogger→load_async(msValidity, callback, context)

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

datalogger→muteValueCallbacks()

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

datalogger→nextDataLogger()

Continues the enumeration of data loggers started using `yFirstDataLogger()`.

datalogger→registerValueCallback(callback)

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

datalogger→set_autoStart(newval)

Changes the default activation state of the data logger on power up.

datalogger→set_beaconDriven(newval)

Changes the type of synchronisation of the data logger.

datalogger→set_logicalName(newval)

Changes the logical name of the data logger.

datalogger→set_recording(newval)

Changes the activation state of the data logger to start/stop recording data.

datalogger→set_timeUTC(newval)

Changes the current UTC time reference used for recorded data.

datalogger→set_userData(data)

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

datalogger→unmuteValueCallbacks()

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

datalogger→wait_async(callback, context)

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

YDataLogger.FindDataLogger() yFindDataLogger() — YDataLogger

Retrieves a data logger for a given identifier.

js	function **yFindDataLogger**(**func**)
cpp	YDataLogger* **yFindDataLogger**(string **func**)
m	+(YDataLogger*) **FindDataLogger** : (NSString*) **func**
pas	function **yFindDataLogger**(**func**: string): TYDataLogger
vb	function **yFindDataLogger**(ByVal **func** As String) As YDataLogger
cs	YDataLogger **FindDataLogger**(string **func**)
java	YDataLogger **FindDataLogger**(String **func**)
uwp	YDataLogger **FindDataLogger**(string **func**)
py	def **FindDataLogger**(**func**)
php	function **yFindDataLogger**(**$func**)
es	function **FindDataLogger**(**func**)

The identifier can be specified using several formats:

- FunctionLogicalName
- ModuleSerialNumber.FunctionIdentifier
- ModuleSerialNumber.FunctionLogicalName
- ModuleLogicalName.FunctionIdentifier
- ModuleLogicalName.FunctionLogicalName

This function does not require that the data logger is online at the time it is invoked. The returned object is nevertheless valid. Use the method `YDataLogger.isOnline()` to test if the data logger is indeed online at a given time. In case of ambiguity when looking for a data logger by logical name, no error is notified: the first instance found is returned. The search is performed first by hardware name, then by logical name.

If a call to this object's is_online() method returns FALSE although you are certain that the matching device is plugged, make sure that you did call registerHub() at application initialization time.

Parameters :

func a string that uniquely characterizes the data logger

Returns :

a `YDataLogger` object allowing you to drive the data logger.

YDataLogger.FindDataLoggerInContext() yFindDataLoggerInContext()

YDataLogger

Retrieves a data logger for a given identifier in a YAPI context.

```
java  YDataLogger FindDataLoggerInContext( YAPIContext yctx,
                                          String func)
uwp   YDataLogger FindDataLoggerInContext( YAPIContext yctx,
                                          string func)
es    function FindDataLoggerInContext( yctx, func)
```

The identifier can be specified using several formats:

- FunctionLogicalName
- ModuleSerialNumber.FunctionIdentifier
- ModuleSerialNumber.FunctionLogicalName
- ModuleLogicalName.FunctionIdentifier
- ModuleLogicalName.FunctionLogicalName

This function does not require that the data logger is online at the time it is invoked. The returned object is nevertheless valid. Use the method `YDataLogger.isOnline()` to test if the data logger is indeed online at a given time. In case of ambiguity when looking for a data logger by logical name, no error is notified: the first instance found is returned. The search is performed first by hardware name, then by logical name.

Parameters :

yctx a YAPI context

func a string that uniquely characterizes the data logger

Returns :

a `YDataLogger` object allowing you to drive the data logger.

YDataLogger.FirstDataLogger() yFirstDataLogger() YDataLogger

Starts the enumeration of data loggers currently accessible.

js	function **yFirstDataLogger**( )
cpp	YDataLogger* **yFirstDataLogger**( )
m	+(YDataLogger*) **FirstDataLogger**
pas	function **yFirstDataLogger**( ): TYDataLogger
vb	function **yFirstDataLogger**( ) As YDataLogger
cs	YDataLogger **FirstDataLogger**( )
java	YDataLogger **FirstDataLogger**( )
uwp	YDataLogger **FirstDataLogger**( )
py	def **FirstDataLogger**( )
php	function **yFirstDataLogger**( )
es	function **FirstDataLogger**( )

Use the method `YDataLogger.nextDataLogger()` to iterate on next data loggers.

Returns :
a pointer to a `YDataLogger` object, corresponding to the first data logger currently online, or a `null` pointer if there are none.

YDataLogger.FirstDataLoggerInContext() yFirstDataLoggerInContext() YDataLogger

Starts the enumeration of data loggers currently accessible.

java	YDataLogger **FirstDataLoggerInContext**(YAPIContext **yctx**)
uwp	YDataLogger **FirstDataLoggerInContext**(YAPIContext **yctx**)
es	function **FirstDataLoggerInContext**(**yctx**)

Use the method `YDataLogger.nextDataLogger()` to iterate on next data loggers.

Parameters :

yctx a YAPI context.

Returns :

a pointer to a `YDataLogger` object, corresponding to the first data logger currently online, or a `null` pointer if there are none.

datalogger→clearCache() YDataLogger

Invalidates the cache.

js	function **clearCache**( )
cpp	void **clearCache**( )
m	-(void) **clearCache**
pas	procedure **clearCache**( )
vb	procedure **clearCache**( )
cs	void **clearCache**( )
java	void **clearCache**( )
py	def **clearCache**( )
php	function **clearCache**( )
es	function **clearCache**( )

Invalidates the cache of the data logger attributes. Forces the next call to get_xxx() or loadxxx() to use values that come from the device.

datalogger→describe() YDataLogger

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

js	function **describe**( )
cpp	string **describe**( )
m	-(NSString*) **describe**
pas	function **describe**( ): string
vb	function **describe**( ) As String
cs	string **describe**( )
java	String **describe**( )
py	def **describe**( )
php	function **describe**( )
es	function **describe**( )

More precisely, `TYPE` is the type of the function, `NAME` it the name used for the first access to the function, `SERIAL` is the serial number of the module if the module is connected or `"unresolved"`, and `FUNCTIONID` is the hardware identifier of the function if the module is connected. For example, this method returns `Relay(MyCustomName.relay1)=RELAYLO1-123456.relay1` if the module is already connected or `Relay(BadCustomeName.relay1)=unresolved` if the module has not yet been connected. This method does not trigger any USB or TCP transaction and can therefore be used in a debugger.

Returns :
a string that describes the data logger (ex: `Relay(MyCustomName.relay1)=RELAYLO1-123456.relay1`)

datalogger→forgetAllDataStreams() YDataLogger

Clears the data logger memory and discards all recorded data streams.

js	function **forgetAllDataStreams**( )
cpp	int **forgetAllDataStreams**( )
m	-(int) **forgetAllDataStreams**
pas	function **forgetAllDataStreams**( ): LongInt
vb	function **forgetAllDataStreams**( ) As Integer
cs	int **forgetAllDataStreams**( )
java	int **forgetAllDataStreams**( )
uwp	Task<int> **forgetAllDataStreams**( )
py	def **forgetAllDataStreams**( )
php	function **forgetAllDataStreams**( )
es	function **forgetAllDataStreams**( )
cmd	YDataLogger **target** **forgetAllDataStreams**

This method also resets the current run index to zero.

Returns :
`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

datalogger→get_advertisedValue() datalogger→advertisedValue()

YDataLogger

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

js	function **get_advertisedValue**( )
cpp	string **get_advertisedValue**( )
m	-(NSString*) advertisedValue
pas	function **get_advertisedValue**( ): string
vb	function **get_advertisedValue**( ) As String
cs	string **get_advertisedValue**( )
java	String **get_advertisedValue**( )
uwp	Task<string> **get_advertisedValue**( )
py	def **get_advertisedValue**( )
php	function **get_advertisedValue**( )
es	function **get_advertisedValue**( )
cmd	YDataLogger **target** **get_advertisedValue**

Returns :

a string corresponding to the current value of the data logger (no more than 6 characters).

On failure, throws an exception or returns `Y_ADVERTISEDVALUE_INVALID`.

datalogger→get_autoStart()
datalogger→autoStart()

YDataLogger

Returns the default activation state of the data logger on power up.

js	function **get_autoStart**( )
cpp	Y_AUTOSTART_enum **get_autoStart**( )
m	-(Y_AUTOSTART_enum) autoStart
pas	function **get_autoStart**( ): Integer
vb	function **get_autoStart**( ) As Integer
cs	int **get_autoStart**( )
java	int **get_autoStart**( )
uwp	Task<int> **get_autoStart**( )
py	def **get_autoStart**( )
php	function **get_autoStart**( )
es	function **get_autoStart**( )
cmd	YDataLogger **target** **get_autoStart**

Returns :

either Y_AUTOSTART_OFF or Y_AUTOSTART_ON, according to the default activation state of the data logger on power up

On failure, throws an exception or returns Y_AUTOSTART_INVALID.

datalogger→get_beaconDriven()
datalogger→beaconDriven()

YDataLogger

Returns true if the data logger is synchronised with the localization beacon.

js	function **get_beaconDriven**( )
cpp	Y_BEACONDRIVEN_enum **get_beaconDriven**( )
m	-(Y_BEACONDRIVEN_enum) beaconDriven
pas	function **get_beaconDriven**( ): Integer
vb	function **get_beaconDriven**( ) As Integer
cs	int **get_beaconDriven**( )
java	int **get_beaconDriven**( )
uwp	Task<int> **get_beaconDriven**( )
py	def **get_beaconDriven**( )
php	function **get_beaconDriven**( )
es	function **get_beaconDriven**( )
cmd	YDataLogger **target** **get_beaconDriven**

Returns :

either `Y_BEACONDRIVEN_OFF` or `Y_BEACONDRIVEN_ON`, according to true if the data logger is synchronised with the localization beacon

On failure, throws an exception or returns `Y_BEACONDRIVEN_INVALID`.

datalogger→get_currentRunIndex()
datalogger→currentRunIndex()

YDataLogger

Returns the current run number, corresponding to the number of times the module was powered on with the dataLogger enabled at some point.

js	function **get_currentRunIndex**( )
cpp	int **get_currentRunIndex**( )
m	-(int) currentRunIndex
pas	function **get_currentRunIndex**( ): LongInt
vb	function **get_currentRunIndex**( ) As Integer
cs	int **get_currentRunIndex**( )
java	int **get_currentRunIndex**( )
uwp	Task<int> **get_currentRunIndex**( )
py	def **get_currentRunIndex**( )
php	function **get_currentRunIndex**( )
es	function **get_currentRunIndex**( )
cmd	YDataLogger **target** **get_currentRunIndex**

Returns :

an integer corresponding to the current run number, corresponding to the number of times the module was powered on with the dataLogger enabled at some point

On failure, throws an exception or returns `Y_CURRENTRUNINDEX_INVALID`.

datalogger→get_dataSets() datalogger→dataSets() YDataLogger

Returns a list of YDataSet objects that can be used to retrieve all measures stored by the data logger.

js	function **get_dataSets**( )
cpp	vector<YDataSet> **get_dataSets**( )
m	-(NSMutableArray*) dataSets
pas	function **get_dataSets**( ): TYDataSetArray
vb	function **get_dataSets**( ) As List
cs	List<YDataSet> **get_dataSets**( )
java	ArrayList<YDataSet> **get_dataSets**( )
uwp	Task<List<YDataSet>> **get_dataSets**( )
py	def **get_dataSets**( )
php	function **get_dataSets**( )
es	function **get_dataSets**( )
cmd	YDataLogger **target** **get_dataSets**

This function only works if the device uses a recent firmware, as YDataSet objects are not supported by firmwares older than version 13000.

Returns :
a list of YDataSet object.

On failure, throws an exception or returns an empty list.

datalogger→get_dataStreams()
datalogger→dataStreams()

YDataLogger

Builds a list of all data streams hold by the data logger (legacy method).

js	function **get_dataStreams**(**v**)
cpp	int **get_dataStreams**( )
m	-(int) dataStreams : (NSArray**) **v**
pas	function **get_dataStreams**(**v**: Tlist): integer
vb	procedure **get_dataStreams**(ByVal **v** As List)
cs	int **get_dataStreams**(List<YDataStream> **v**)
java	int **get_dataStreams**(ArrayList<YDataStream> **v**)
py	def **get_dataStreams**(**v**)
php	function **get_dataStreams**(**&$v**)
es	function **get_dataStreams**(**v**)

The caller must pass by reference an empty array to hold YDataStream objects, and the function fills it with objects describing available data sequences.

This is the old way to retrieve data from the DataLogger. For new applications, you should rather use `get_dataSets()` method, or call directly `get_recordedData()` on the sensor object.

Parameters :

v an array of YDataStream objects to be filled in

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

datalogger→get_errorMessage()
datalogger→errorMessage()

YDataLogger

Returns the error message of the latest error with the data logger.

js	function **get_errorMessage**( )
cpp	string **get_errorMessage**( )
m	-(NSString*) errorMessage
pas	function **get_errorMessage**( ): string
vb	function **get_errorMessage**( ) As String
cs	string **get_errorMessage**( )
java	String **get_errorMessage**( )
py	def **get_errorMessage**( )
php	function **get_errorMessage**( )
es	function **get_errorMessage**( )

This method is mostly useful when using the Yoctopuce library with exceptions disabled.

Returns :

a string corresponding to the latest error message that occured while using the data logger object

datalogger→get_errorType()
datalogger→errorType()

YDataLogger

Returns the numerical error code of the latest error with the data logger.

js	function **get_errorType**( )
cpp	YRETCODE **get_errorType**( )
pas	function **get_errorType**( ): YRETCODE
vb	function **get_errorType**( ) As YRETCODE
cs	YRETCODE **get_errorType**( )
java	int **get_errorType**( )
py	def **get_errorType**( )
php	function **get_errorType**( )
es	function **get_errorType**( )

This method is mostly useful when using the Yoctopuce library with exceptions disabled.

Returns :
a number corresponding to the code of the latest error that occurred while using the data logger object

datalogger→get_friendlyName() datalogger→friendlyName()

YDataLogger

Returns a global identifier of the data logger in the format MODULE_NAME.FUNCTION_NAME.

js	function **get_friendlyName**( )
cpp	string **get_friendlyName**( )
m	-(NSString*) friendlyName
cs	string **get_friendlyName**( )
java	String **get_friendlyName**( )
py	def **get_friendlyName**( )
php	function **get_friendlyName**( )
es	function **get_friendlyName**( )

The returned string uses the logical names of the module and of the data logger if they are defined, otherwise the serial number of the module and the hardware identifier of the data logger (for example: MyCustomName.relay1)

Returns :

a string that uniquely identifies the data logger using logical names (ex: MyCustomName.relay1)

On failure, throws an exception or returns Y_FRIENDLYNAME_INVALID.

datalogger→get_functionDescriptor()
datalogger→functionDescriptor()

YDataLogger

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

js	function **get_functionDescriptor**( )
cpp	YFUN_DESCR **get_functionDescriptor**( )
m	-(YFUN_DESCR) functionDescriptor
pas	function **get_functionDescriptor**( ): YFUN_DESCR
vb	function **get_functionDescriptor**( ) As YFUN_DESCR
cs	YFUN_DESCR **get_functionDescriptor**( )
java	String **get_functionDescriptor**( )
py	def **get_functionDescriptor**( )
php	function **get_functionDescriptor**( )
es	function **get_functionDescriptor**( )

This identifier can be used to test if two instances of YFunction reference the same physical function on the same physical device.

Returns :

an identifier of type YFUN_DESCR.

If the function has never been contacted, the returned value is Y_FUNCTIONDESCRIPTOR_INVALID.

datalogger→get_functionId() datalogger→functionId()

YDataLogger

Returns the hardware identifier of the data logger, without reference to the module.

js	function **get_functionId**( )
cpp	string **get_functionId**( )
m	-(NSString*) functionId
vb	function **get_functionId**( ) As String
cs	string **get_functionId**( )
java	String **get_functionId**( )
py	def **get_functionId**( )
php	function **get_functionId**( )
es	function **get_functionId**( )

For example `relay1`

Returns :

a string that identifies the data logger (ex: `relay1`)

On failure, throws an exception or returns `Y_FUNCTIONID_INVALID`.

datalogger→get_hardwareId()
datalogger→hardwareId()

YDataLogger

Returns the unique hardware identifier of the data logger in the form SERIAL.FUNCTIONID.

js	function **get_hardwareId**( )
cpp	string **get_hardwareId**( )
m	-(NSString*) hardwareId
vb	function **get_hardwareId**( ) As String
cs	string **get_hardwareId**( )
java	String **get_hardwareId**( )
py	def **get_hardwareId**( )
php	function **get_hardwareId**( )
es	function **get_hardwareId**( )

The unique hardware identifier is composed of the device serial number and of the hardware identifier of the data logger (for example RELAYLO1-123456.relay1).

Returns :
a string that uniquely identifies the data logger (ex: RELAYLO1-123456.relay1)

On failure, throws an exception or returns Y_HARDWAREID_INVALID.

datalogger→get_logicalName() datalogger→logicalName()

YDataLogger

Returns the logical name of the data logger.

js	function **get_logicalName**( )
cpp	string **get_logicalName**( )
m	-(NSString*) logicalName
pas	function **get_logicalName**( ): string
vb	function **get_logicalName**( ) As String
cs	string **get_logicalName**( )
java	String **get_logicalName**( )
uwp	Task<string> **get_logicalName**( )
py	def **get_logicalName**( )
php	function **get_logicalName**( )
es	function **get_logicalName**( )
cmd	YDataLogger **target** **get_logicalName**

Returns :
a string corresponding to the logical name of the data logger.

On failure, throws an exception or returns `Y_LOGICALNAME_INVALID`.

datalogger→get_module()
datalogger→module()

YDataLogger

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

js	function **get_module**( )
cpp	YModule * **get_module**( )
m	-(YModule*) module
pas	function **get_module**( ): TYModule
vb	function **get_module**( ) As YModule
cs	YModule **get_module**( )
java	YModule **get_module**( )
py	def **get_module**( )
php	function **get_module**( )
es	function **get_module**( )

If the function cannot be located on any module, the returned instance of `YModule` is not shown as on-line.

Returns :
an instance of `YModule`

datalogger→get_module_async() datalogger→module_async() YDataLogger

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

```
js function get_module_async( callback, context)
```

If the function cannot be located on any module, the returned YModule object does not show as on-line.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking Firefox javascript VM that does not implement context switching during blocking I/O calls. See the documentation section on asynchronous Javascript calls for more details.

Parameters :

callback callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the receiving function object and the requested YModule object

context caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

datalogger→get_recording() datalogger→recording()

YDataLogger

Returns the current activation state of the data logger.

js	function **get_recording**( )
cpp	Y_RECORDING_enum **get_recording**( )
m	-(Y_RECORDING_enum) recording
pas	function **get_recording**( ): Integer
vb	function **get_recording**( ) As Integer
cs	int **get_recording**( )
java	int **get_recording**( )
uwp	Task<int> **get_recording**( )
py	def **get_recording**( )
php	function **get_recording**( )
es	function **get_recording**( )
cmd	YDataLogger **target** **get_recording**

Returns :

a value among `Y_RECORDING_OFF`, `Y_RECORDING_ON` and `Y_RECORDING_PENDING` corresponding to the current activation state of the data logger

On failure, throws an exception or returns `Y_RECORDING_INVALID`.

datalogger→get_timeUTC() datalogger→timeUTC() YDataLogger

Returns the Unix timestamp for current UTC time, if known.

js	function **get_timeUTC**( )
cpp	s64 **get_timeUTC**( )
m	-(s64) timeUTC
pas	function **get_timeUTC**( ): int64
vb	function **get_timeUTC**( ) As Long
cs	long **get_timeUTC**( )
java	long **get_timeUTC**( )
uwp	Task<long> **get_timeUTC**( )
py	def **get_timeUTC**( )
php	function **get_timeUTC**( )
es	function **get_timeUTC**( )
cmd	YDataLogger **target** **get_timeUTC**

Returns :
an integer corresponding to the Unix timestamp for current UTC time, if known

On failure, throws an exception or returns `Y_TIMEUTC_INVALID`.

datalogger→get_userData()
datalogger→userData()

YDataLogger

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

js	function **get_userData**( )
cpp	void * **get_userData**( )
m	-(id) userData
pas	function **get_userData**( ): Tobject
vb	function **get_userData**( ) As Object
cs	object **get_userData**( )
java	Object **get_userData**( )
py	def **get_userData**( )
php	function **get_userData**( )
es	function **get_userData**( )

This attribute is never touched directly by the API, and is at disposal of the caller to store a context.

Returns :
the object stored previously by the caller.

datalogger→isOnline() YDataLogger

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

js	function **isOnline**( )
cpp	bool **isOnline**( )
m	-(BOOL) **isOnline**
pas	function **isOnline**( ): boolean
vb	function **isOnline**( ) As Boolean
cs	bool **isOnline**( )
java	boolean **isOnline**( )
py	def **isOnline**( )
php	function **isOnline**( )
es	function **isOnline**( )

If there is a cached value for the data logger in cache, that has not yet expired, the device is considered reachable. No exception is raised if there is an error while trying to contact the device hosting the data logger.

Returns :
`true` if the data logger can be reached, and `false` otherwise

datalogger→isOnline_async() YDataLogger

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

js function **isOnline_async**(**callback**, **context**)

If there is a cached value for the data logger in cache, that has not yet expired, the device is considered reachable. No exception is raised if there is an error while trying to contact the device hosting the requested function.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking the Javascript virtual machine.

Parameters :

callback callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the receiving function object and the boolean result

context caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

datalogger→load() YDataLogger

Preloads the data logger cache with a specified validity duration.

js	function **load**(**msValidity**)
cpp	YRETCODE **load**(int **msValidity**)
m	-(YRETCODE) **load** : (u64) **msValidity**
pas	function **load**(**msValidity**: u64): YRETCODE
vb	function **load**(ByVal **msValidity** As Long) As YRETCODE
cs	YRETCODE **load**(ulong **msValidity**)
java	int **load**(long **msValidity**)
py	def **load**(**msValidity**)
php	function **load**(**$msValidity**)
es	function **load**(**msValidity**)

By default, whenever accessing a device, all function attributes are kept in cache for the standard duration (5 ms). This method can be used to temporarily mark the cache as valid for a longer period, in order to reduce network traffic for instance.

Parameters :

msValidity an integer corresponding to the validity attributed to the loaded function parameters, in milliseconds

Returns :

`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

datalogger→loadAttribute() YDataLogger

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

js	function **loadAttribute**(**attrName**)
cpp	string **loadAttribute**(string **attrName**)
m	-(NSString*) **loadAttribute** : (NSString*) **attrName**
pas	function **loadAttribute**(**attrName**: string): string
vb	function **loadAttribute**( ) As String
cs	string **loadAttribute**(string **attrName**)
java	String **loadAttribute**(String **attrName**)
uwp	Task<string> **loadAttribute**(string **attrName**)
py	def **loadAttribute**(**attrName**)
php	function **loadAttribute**(**$attrName**)
es	function **loadAttribute**(**attrName**)

Parameters :

attrName the name of the requested attribute

Returns :

a string with the value of the the attribute

On failure, throws an exception or returns an empty string.

datalogger→load_async() YDataLogger

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

```
js function load_async( msValidity, callback, context)
```

By default, whenever accessing a device, all function attributes are kept in cache for the standard duration (5 ms). This method can be used to temporarily mark the cache as valid for a longer period, in order to reduce network trafic for instance.

This asynchronous version exists only in Javascript. It uses a callback instead of a return value in order to avoid blocking the Javascript virtual machine.

Parameters :

- **msValidity** an integer corresponding to the validity of the loaded function parameters, in milliseconds
- **callback** callback function that is invoked when the result is known. The callback function receives three arguments: the caller-specific context object, the receiving function object and the error code (or `YAPI_SUCCESS`)
- **context** caller-specific object that is passed as-is to the callback function

Returns :

nothing : the result is provided to the callback.

datalogger→muteValueCallbacks() YDataLogger

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

js	function **muteValueCallbacks**( )
cpp	int **muteValueCallbacks**( )
m	-(int) **muteValueCallbacks**
pas	function **muteValueCallbacks**( ): LongInt
vb	function **muteValueCallbacks**( ) As Integer
cs	int **muteValueCallbacks**( )
java	int **muteValueCallbacks**( )
uwp	Task<int> **muteValueCallbacks**( )
py	def **muteValueCallbacks**( )
php	function **muteValueCallbacks**( )
es	function **muteValueCallbacks**( )
cmd	YDataLogger **target** **muteValueCallbacks**

You can use this function to save bandwidth and CPU on computers with limited resources, or to prevent unwanted invocations of the HTTP callback. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Returns :
`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

datalogger→nextDataLogger() YDataLogger

Continues the enumeration of data loggers started using `yFirstDataLogger()`.

js	function **nextDataLogger**( )
cpp	YDataLogger * **nextDataLogger**( )
m	-(YDataLogger*) **nextDataLogger**
pas	function **nextDataLogger**( ): TYDataLogger
vb	function **nextDataLogger**( ) As YDataLogger
cs	YDataLogger **nextDataLogger**( )
java	YDataLogger **nextDataLogger**( )
uwp	YDataLogger **nextDataLogger**( )
py	def **nextDataLogger**( )
php	function **nextDataLogger**( )
es	function **nextDataLogger**( )

Returns :

a pointer to a `YDataLogger` object, corresponding to a data logger currently online, or a `null` pointer if there are no more data loggers to enumerate.

datalogger→registerValueCallback() YDataLogger

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

js	function **registerValueCallback**(**callback**)
cpp	int **registerValueCallback**(YDataLoggerValueCallback **callback**)
m	-(int) **registerValueCallback** : (YDataLoggerValueCallback) **callback**
pas	function **registerValueCallback**(**callback**: TYDataLoggerValueCallback): LongInt
vb	function **registerValueCallback**( ) As Integer
cs	int **registerValueCallback**(ValueCallback **callback**)
java	int **registerValueCallback**(UpdateCallback **callback**)
uwp	Task<int> **registerValueCallback**(ValueCallback **callback**)
py	def **registerValueCallback**(**callback**)
php	function **registerValueCallback**(**$callback**)
es	function **registerValueCallback**(**callback**)

The callback is invoked only during the execution of `ySleep` or `yHandleEvents`. This provides control over the time when the callback is triggered. For good responsiveness, remember to call one of these two functions periodically. To unregister a callback, pass a null pointer as argument.

Parameters :

callback the callback function to call, or a null pointer. The callback function should take two arguments: the function object of which the value has changed, and the character string describing the new advertised value.

datalogger→set_autoStart()
datalogger→setAutoStart()

YDataLogger

Changes the default activation state of the data logger on power up.

js	function **set_autoStart**(**newval**)
cpp	int **set_autoStart**(Y_AUTOSTART_enum **newval**)
m	-(int) setAutoStart : (Y_AUTOSTART_enum) **newval**
pas	function **set_autoStart**(**newval**: Integer): integer
vb	function **set_autoStart**(ByVal **newval** As Integer) As Integer
cs	int **set_autoStart**(int **newval**)
java	int **set_autoStart**(int **newval**)
uwp	Task<int> **set_autoStart**(int **newval**)
py	def **set_autoStart**(**newval**)
php	function **set_autoStart**(**$newval**)
es	function **set_autoStart**(**newval**)
cmd	YDataLogger **target** **set_autoStart** **newval**

Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Parameters :

newval either `Y_AUTOSTART_OFF` or `Y_AUTOSTART_ON`, according to the default activation state of the data logger on power up

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

datalogger→set_beaconDriven() datalogger→setBeaconDriven() YDataLogger

Changes the type of synchronisation of the data logger.

js	function **set_beaconDriven**(**newval**)
cpp	int **set_beaconDriven**(Y_BEACONDRIVEN_enum **newval**)
m	-(int) setBeaconDriven : (Y_BEACONDRIVEN_enum) **newval**
pas	function **set_beaconDriven**(**newval**: Integer): integer
vb	function **set_beaconDriven**(ByVal **newval** As Integer) As Integer
cs	int **set_beaconDriven**(int **newval**)
java	int **set_beaconDriven**(int **newval**)
uwp	Task<int> **set_beaconDriven**(int **newval**)
py	def **set_beaconDriven**(**newval**)
php	function **set_beaconDriven**(**$newval**)
es	function **set_beaconDriven**(**newval**)
cmd	YDataLogger **target** **set_beaconDriven** **newval**

Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Parameters :

newval either `Y_BEACONDRIVEN_OFF` or `Y_BEACONDRIVEN_ON`, according to the type of synchronisation of the data logger

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

datalogger→set_logicalName()
datalogger→setLogicalName() YDataLogger

Changes the logical name of the data logger.

js	function **set_logicalName**(**newval**)
cpp	int **set_logicalName**(const string& **newval**)
m	-(int) setLogicalName : (NSString*) **newval**
pas	function **set_logicalName**(**newval**: string): integer
vb	function **set_logicalName**(ByVal **newval** As String) As Integer
cs	int **set_logicalName**(string **newval**)
java	int **set_logicalName**(String **newval**)
uwp	Task<int> **set_logicalName**(string **newval**)
py	def **set_logicalName**(**newval**)
php	function **set_logicalName**(**$newval**)
es	function **set_logicalName**(**newval**)
cmd	YDataLogger **target** **set_logicalName** **newval**

You can use `yCheckLogicalName()` prior to this call to make sure that your parameter is valid. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Parameters :

newval a string corresponding to the logical name of the data logger.

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

datalogger→set_recording() datalogger→setRecording()

YDataLogger

Changes the activation state of the data logger to start/stop recording data.

js	function **set_recording**(**newval**)
cpp	int **set_recording**(Y_RECORDING_enum **newval**)
m	-(int) setRecording : (Y_RECORDING_enum) **newval**
pas	function **set_recording**(**newval**: Integer): integer
vb	function **set_recording**(ByVal **newval** As Integer) As Integer
cs	int **set_recording**(int **newval**)
java	int **set_recording**(int **newval**)
uwp	Task<int> **set_recording**(int **newval**)
py	def **set_recording**(**newval**)
php	function **set_recording**(**$newval**)
es	function **set_recording**(**newval**)
cmd	YDataLogger **target** **set_recording** **newval**

Parameters :

newval a value among Y_RECORDING_OFF, Y_RECORDING_ON and Y_RECORDING_PENDING corresponding to the activation state of the data logger to start/stop recording data

Returns :

YAPI_SUCCESS if the call succeeds.

On failure, throws an exception or returns a negative error code.

datalogger→set_timeUTC()
datalogger→setTimeUTC()

YDataLogger

Changes the current UTC time reference used for recorded data.

js	function **set_timeUTC**(**newval**)
cpp	int **set_timeUTC**(s64 **newval**)
m	-(int) setTimeUTC : (s64) **newval**
pas	function **set_timeUTC**(**newval**: int64): integer
vb	function **set_timeUTC**(ByVal **newval** As Long) As Integer
cs	int **set_timeUTC**(long **newval**)
java	int **set_timeUTC**(long **newval**)
uwp	Task<int> **set_timeUTC**(long **newval**)
py	def **set_timeUTC**(**newval**)
php	function **set_timeUTC**(**$newval**)
es	function **set_timeUTC**(**newval**)
cmd	YDataLogger **target set_timeUTC newval**

Parameters :

newval an integer corresponding to the current UTC time reference used for recorded data

Returns :

`YAPI_SUCCESS` if the call succeeds.

On failure, throws an exception or returns a negative error code.

datalogger→set_userData()
datalogger→setUserData()

YDataLogger

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

js	function **set_userData**(**data**)
cpp	void **set_userData**(void* **data**)
m	-(void) setUserData : (id) **data**
pas	procedure **set_userData**(**data**: Tobject)
vb	procedure **set_userData**(ByVal **data** As Object)
cs	void **set_userData**(object **data**)
java	void **set_userData**(Object **data**)
py	def **set_userData**(**data**)
php	function **set_userData**(**$data**)
es	function **set_userData**(**data**)

This attribute is never touched by the API, and is at disposal of the caller to store a context.

Parameters :

data any kind of object to be stored

datalogger→unmuteValueCallbacks() YDataLogger

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

js	function **unmuteValueCallbacks**( )
cpp	int **unmuteValueCallbacks**( )
m	-(int) **unmuteValueCallbacks**
pas	function **unmuteValueCallbacks**( ): LongInt
vb	function **unmuteValueCallbacks**( ) As Integer
cs	int **unmuteValueCallbacks**( )
java	int **unmuteValueCallbacks**( )
uwp	Task<int> **unmuteValueCallbacks**( )
py	def **unmuteValueCallbacks**( )
php	function **unmuteValueCallbacks**( )
es	function **unmuteValueCallbacks**( )
cmd	YDataLogger **target** **unmuteValueCallbacks**

This function reverts the effect of a previous call to `muteValueCallbacks()`. Remember to call the `saveToFlash()` method of the module if the modification must be kept.

Returns :
`YAPI_SUCCESS` when the call succeeds.

On failure, throws an exception or returns a negative error code.

datalogger→wait_async() YDataLogger

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

js	function **wait_async**(**callback**, **context**)
es	function **wait_async**(**callback**, **context**)

The callback function can therefore freely issue synchronous or asynchronous commands, without risking to block the Javascript VM.

Parameters :

callback callback function that is invoked when all pending commands on the module are completed. The callback function receives two arguments: the caller-specific context object and the receiving function object.

context caller-specific object that is passed as-is to the callback function

Returns :

nothing.

21.7. Recorded data sequence

YDataSet objects make it possible to retrieve a set of recorded measures for a given sensor and a specified time interval. They can be used to load data points with a progress report. When the YDataSet object is instantiated by the `get_recordedData()` function, no data is yet loaded from the module. It is only when the `loadMore()` method is called over and over than data will be effectively loaded from the dataLogger.

A preview of available measures is available using the function `get_preview()` as soon as `loadMore()` has been called once. Measures themselves are available using function `get_measures()` when loaded by subsequent calls to `loadMore()`.

This class can only be used on devices that use a recent firmware, as YDataSet objects are not supported by firmwares older than version 13000.

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

js	<script type='text/javascript' src='yocto_api.js'></script>
cpp	#include "yocto_api.h"
m	#import "yocto_api.h"
pas	uses yocto_api;
vb	yocto_api.vb
cs	yocto_api.cs
java	import com.yoctopuce.YoctoAPI.YModule;
uwp	import com.yoctopuce.YoctoAPI.YModule;
py	from yocto_api import *
php	require_once('yocto_api.php');
es	in HTML: <script src="../../lib/yocto_api.js"></script> in node.js: require('yoctolib-es2017/yocto_api.js');

`YDataSet` methods

dataset→get_endTimeUTC()
Returns the end time of the dataset, relative to the Jan 1, 1970.

dataset→get_functionId()
Returns the hardware identifier of the function that performed the measure, without reference to the module.

dataset→get_hardwareId()
Returns the unique hardware identifier of the function who performed the measures, in the form `SERIAL.FUNCTIONID`.

dataset→get_measures()
Returns all measured values currently available for this DataSet, as a list of YMeasure objects.

dataset→get_measuresAt(measure)
Returns the detailed set of measures for the time interval corresponding to a given condensed measures previously returned by `get_preview()`.

dataset→get_preview()
Returns a condensed version of the measures that can retrieved in this YDataSet, as a list of YMeasure objects.

dataset→get_progress()
Returns the progress of the downloads of the measures from the data logger, on a scale from 0 to 100.

dataset→get_startTimeUTC()
Returns the start time of the dataset, relative to the Jan 1, 1970.

dataset→get_summary()

Returns an YMeasure object which summarizes the whole DataSet.

dataset→get_unit()

Returns the measuring unit for the measured value.

dataset→loadMore()

Loads the the next block of measures from the dataLogger, and updates the progress indicator.

dataset→loadMore_async(callback, context)

Loads the the next block of measures from the dataLogger asynchronously.

dataset→get_endTimeUTC() dataset→endTimeUTC()

YDataSet

Returns the end time of the dataset, relative to the Jan 1, 1970.

js	function **get_endTimeUTC**( )
cpp	s64 **get_endTimeUTC**( )
m	-(s64) endTimeUTC
pas	function **get_endTimeUTC**( ): int64
vb	function **get_endTimeUTC**( ) As Long
cs	long **get_endTimeUTC**( )
java	long **get_endTimeUTC**( )
uwp	Task<long> **get_endTimeUTC**( )
py	def **get_endTimeUTC**( )
php	function **get_endTimeUTC**( )
es	function **get_endTimeUTC**( )

When the YDataSet is created, the end time is the value passed in parameter to the `get_dataSet()` function. After the very first call to `loadMore()`, the end time is updated to reflect the timestamp of the last measure actually found in the dataLogger within the specified range.

Returns :

an unsigned number corresponding to the number of seconds between the Jan 1, 1970 and the end of this data set (i.e. Unix time representation of the absolute time).

dataset→get_functionId() dataset→functionId()

YDataSet

Returns the hardware identifier of the function that performed the measure, without reference to the module.

js	function **get_functionId**( )
cpp	string **get_functionId**( )
m	-(NSString*) functionId
pas	function **get_functionId**( ): string
vb	function **get_functionId**( ) As String
cs	string **get_functionId**( )
java	String **get_functionId**( )
uwp	Task<string> **get_functionId**( )
py	def **get_functionId**( )
php	function **get_functionId**( )
es	function **get_functionId**( )

For example `temperature1`.

Returns :
a string that identifies the function (ex: `temperature1`)

dataset→get_hardwareId() dataset→hardwareId() YDataSet

Returns the unique hardware identifier of the function who performed the measures, in the form SERIAL.FUNCTIONID.

js	function **get_hardwareId**( )
cpp	string **get_hardwareId**( )
m	-(NSString*) hardwareId
pas	function **get_hardwareId**( ): string
vb	function **get_hardwareId**( ) As String
cs	string **get_hardwareId**( )
java	String **get_hardwareId**( )
uwp	Task<string> **get_hardwareId**( )
py	def **get_hardwareId**( )
php	function **get_hardwareId**( )
es	function **get_hardwareId**( )

The unique hardware identifier is composed of the device serial number and of the hardware identifier of the function (for example THRMCPL1-123456.temperature1)

Returns :
a string that uniquely identifies the function (ex: THRMCPL1-123456.temperature1)

On failure, throws an exception or returns Y_HARDWAREID_INVALID.

dataset→get_measures() dataset→measures() YDataSet

Returns all measured values currently available for this DataSet, as a list of YMeasure objects.

js	function **get_measures**( )
cpp	vector<YMeasure> **get_measures**( )
m	-(NSMutableArray*) measures
pas	function **get_measures**( ): TYMeasureArray
vb	function **get_measures**( ) As List
cs	List<YMeasure> **get_measures**( )
java	ArrayList<YMeasure> **get_measures**( )
uwp	Task<List<YMeasure>> **get_measures**( )
py	def **get_measures**( )
php	function **get_measures**( )
es	function **get_measures**( )

Each item includes: - the start of the measure time interval - the end of the measure time interval - the minimal value observed during the time interval - the average value observed during the time interval - the maximal value observed during the time interval

Before calling this method, you should call `loadMore()` to load data from the device. You may have to call loadMore() several time until all rows are loaded, but you can start looking at available data rows before the load is complete.

The oldest measures are always loaded first, and the most recent measures will be loaded last. As a result, timestamps are normally sorted in ascending order within the measure table, unless there was an unexpected adjustment of the datalogger UTC clock.

Returns :
a table of records, where each record depicts the measured value for a given time interval

On failure, throws an exception or returns an empty array.

dataset→get_measuresAt() dataset→measuresAt()

YDataSet

Returns the detailed set of measures for the time interval corresponding to a given condensed measures previously returned by `get_preview()`.

js	function **get_measuresAt**(**measure**)
cpp	vector<YMeasure> **get_measuresAt**(YMeasure **measure**)
m	-(NSMutableArray*) measuresAt : (YMeasure*) **measure**
pas	function **get_measuresAt**(**measure**: TYMeasure): TYMeasureArray
vb	function **get_measuresAt**( ) As List
cs	List<YMeasure> **get_measuresAt**(YMeasure **measure**)
java	ArrayList<YMeasure> **get_measuresAt**(YMeasure **measure**)
uwp	Task<List<YMeasure>> **get_measuresAt**(YMeasure **measure**)
py	def **get_measuresAt**(**measure**)
php	function **get_measuresAt**(**$measure**)
es	function **get_measuresAt**(**measure**)

The result is provided as a list of YMeasure objects.

Parameters :

measure condensed measure from the list previously returned by `get_preview()`.

Returns :

a table of records, where each record depicts the measured values during a time interval

On failure, throws an exception or returns an empty array.

dataset→get_preview() dataset→preview() YDataSet

Returns a condensed version of the measures that can retrieved in this YDataSet, as a list of YMeasure objects.

js	function **get_preview**( )
cpp	vector<YMeasure> **get_preview**( )
m	-(NSMutableArray*) preview
pas	function **get_preview**( ): TYMeasureArray
vb	function **get_preview**( ) As List
cs	List<YMeasure> **get_preview**( )
java	ArrayList<YMeasure> **get_preview**( )
uwp	Task<List<YMeasure>> **get_preview**( )
py	def **get_preview**( )
php	function **get_preview**( )
es	function **get_preview**( )

Each item includes: - the start of a time interval - the end of a time interval - the minimal value observed during the time interval - the average value observed during the time interval - the maximal value observed during the time interval

This preview is available as soon as `loadMore()` has been called for the first time.

Returns :
a table of records, where each record depicts the measured values during a time interval

On failure, throws an exception or returns an empty array.

dataset→get_progress() dataset→progress() YDataSet

Returns the progress of the downloads of the measures from the data logger, on a scale from 0 to 100.

js	function **get_progress**( )
cpp	int **get_progress**( )
m	-(int) progress
pas	function **get_progress**( ): LongInt
vb	function **get_progress**( ) As Integer
cs	int **get_progress**( )
java	int **get_progress**( )
uwp	Task<int> **get_progress**( )
py	def **get_progress**( )
php	function **get_progress**( )
es	function **get_progress**( )

When the object is instantiated by `get_dataSet`, the progress is zero. Each time `loadMore()` is invoked, the progress is updated, to reach the value 100 only once all measures have been loaded.

Returns :
an integer in the range 0 to 100 (percentage of completion).

dataset→get_startTimeUTC()
dataset→startTimeUTC()

YDataSet

Returns the start time of the dataset, relative to the Jan 1, 1970.

js	function **get_startTimeUTC**( )
cpp	s64 **get_startTimeUTC**( )
m	-(s64) startTimeUTC
pas	function **get_startTimeUTC**( ): int64
vb	function **get_startTimeUTC**( ) As Long
cs	long **get_startTimeUTC**( )
java	long **get_startTimeUTC**( )
uwp	Task<long> **get_startTimeUTC**( )
py	def **get_startTimeUTC**( )
php	function **get_startTimeUTC**( )
es	function **get_startTimeUTC**( )

When the YDataSet is created, the start time is the value passed in parameter to the `get_dataSet()` function. After the very first call to `loadMore()`, the start time is updated to reflect the timestamp of the first measure actually found in the dataLogger within the specified range.

Returns :

an unsigned number corresponding to the number of seconds between the Jan 1, 1970 and the beginning of this data set (i.e. Unix time representation of the absolute time).

dataset→get_summary() dataset→summary()

YDataSet

Returns an YMeasure object which summarizes the whole DataSet.

js	function **get_summary**( )
cpp	YMeasure **get_summary**( )
m	-(YMeasure*) summary
pas	function **get_summary**( ): TYMeasure
vb	function **get_summary**( ) As YMeasure
cs	YMeasure **get_summary**( )
java	YMeasure **get_summary**( )
uwp	Task<YMeasure> **get_summary**( )
py	def **get_summary**( )
php	function **get_summary**( )
es	function **get_summary**( )

In includes the following information: - the start of a time interval - the end of a time interval - the minimal value observed during the time interval - the average value observed during the time interval - the maximal value observed during the time interval

This summary is available as soon as `loadMore()` has been called for the first time.

Returns :
an YMeasure object

dataset→get_unit()
dataset→unit()

YDataSet

Returns the measuring unit for the measured value.

js	function **get_unit**( )
cpp	string **get_unit**( )
m	-(NSString*) unit
pas	function **get_unit**( ): string
vb	function **get_unit**( ) As String
cs	string **get_unit**( )
java	String **get_unit**( )
uwp	Task<string> **get_unit**( )
py	def **get_unit**( )
php	function **get_unit**( )
es	function **get_unit**( )

Returns :
a string that represents a physical unit.

On failure, throws an exception or returns `Y_UNIT_INVALID`.

dataset→loadMore() YDataSet

Loads the the next block of measures from the dataLogger, and updates the progress indicator.

js	function **loadMore**( )
cpp	int **loadMore**( )
m	-(int) **loadMore**
pas	function **loadMore**( ): LongInt
vb	function **loadMore**( ) As Integer
cs	int **loadMore**( )
java	int **loadMore**( )
uwp	Task<int> **loadMore**( )
py	def **loadMore**( )
php	function **loadMore**( )
es	function **loadMore**( )

Returns :
an integer in the range 0 to 100 (percentage of completion), or a negative error code in case of failure.

On failure, throws an exception or returns a negative error code.

dataset→loadMore_async() YDataSet

Loads the the next block of measures from the dataLogger asynchronously.

js function **loadMore_async**(**callback**, **context**)

Parameters :

callback callback function that is invoked when the w The callback function receives three arguments: - the user-specific context object - the YDataSet object whose loadMore_async was invoked - the load result: either the progress indicator (0...100), or a negative error code in case of failure.

context user-specific object that is passed as-is to the callback function

Returns :

nothing.

21.8. Measured value

YMeasure objects are used within the API to represent a value measured at a specified time. These objects are used in particular in conjunction with the YDataSet class.

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

js	<script type='text/javascript' src='yocto_api.js'></script>
cpp	#include "yocto_api.h"
m	#import "yocto_api.h"
pas	uses yocto_api;
vb	yocto_api.vb
cs	yocto_api.cs
java	import com.yoctopuce.YoctoAPI.YModule;
uwp	import com.yoctopuce.YoctoAPI.YModule;
py	from yocto_api import *
php	require_once('yocto_api.php');
es	in HTML: <script src="../../lib/yocto_api.js"></script> in node.js: require('yoctolib-es2017/yocto_api.js');

YMeasure methods
measure→get_averageValue() Returns the average value observed during the time interval covered by this measure.
measure→get_endTimeUTC() Returns the end time of the measure, relative to the Jan 1, 1970 UTC (Unix timestamp).
measure→get_maxValue() Returns the largest value observed during the time interval covered by this measure.
measure→get_minValue() Returns the smallest value observed during the time interval covered by this measure.
measure→get_startTimeUTC() Returns the start time of the measure, relative to the Jan 1, 1970 UTC (Unix timestamp).

measure→get_averageValue()
measure→averageValue()

YMeasure

Returns the average value observed during the time interval covered by this measure.

js	function **get_averageValue**( )
cpp	double **get_averageValue**( )
m	-(double) averageValue
pas	function **get_averageValue**( ): double
vb	function **get_averageValue**( ) As Double
cs	double **get_averageValue**( )
java	double **get_averageValue**( )
uwp	double **get_averageValue**( )
py	def **get_averageValue**( )
php	function **get_averageValue**( )
es	function **get_averageValue**( )

Returns :
a floating-point number corresponding to the average value observed.

measure→get_endTimeUTC()
measure→endTimeUTC()

YMeasure

Returns the end time of the measure, relative to the Jan 1, 1970 UTC (Unix timestamp).

js	function **get_endTimeUTC**( )
cpp	double **get_endTimeUTC**( )
m	-(double) endTimeUTC
pas	function **get_endTimeUTC**( ): double
vb	function **get_endTimeUTC**( ) As Double
cs	double **get_endTimeUTC**( )
java	double **get_endTimeUTC**( )
uwp	double **get_endTimeUTC**( )
py	def **get_endTimeUTC**( )
php	function **get_endTimeUTC**( )
es	function **get_endTimeUTC**( )

When the recording rate is higher than 1 sample per second, the timestamp may have a fractional part.

Returns :

an floating point number corresponding to the number of seconds between the Jan 1, 1970 UTC and the end of this measure.

measure→get_maxValue()
measure→maxValue()

YMeasure

Returns the largest value observed during the time interval covered by this measure.

js	function **get_maxValue**( )
cpp	double **get_maxValue**( )
m	-(double) maxValue
pas	function **get_maxValue**( ): double
vb	function **get_maxValue**( ) As Double
cs	double **get_maxValue**( )
java	double **get_maxValue**( )
uwp	double **get_maxValue**( )
py	def **get_maxValue**( )
php	function **get_maxValue**( )
es	function **get_maxValue**( )

Returns :
a floating-point number corresponding to the largest value observed.

measure→get_minValue()
measure→minValue()

YMeasure

Returns the smallest value observed during the time interval covered by this measure.

js	function **get_minValue**( )
cpp	double **get_minValue**( )
m	-(double) minValue
pas	function **get_minValue**( ): double
vb	function **get_minValue**( ) As Double
cs	double **get_minValue**( )
java	double **get_minValue**( )
uwp	double **get_minValue**( )
py	def **get_minValue**( )
php	function **get_minValue**( )
es	function **get_minValue**( )

Returns :

a floating-point number corresponding to the smallest value observed.

measure→get_startTimeUTC()
measure→startTimeUTC()

YMeasure

Returns the start time of the measure, relative to the Jan 1, 1970 UTC (Unix timestamp).

js	function **get_startTimeUTC**( )
cpp	double **get_startTimeUTC**( )
m	-(double) startTimeUTC
pas	function **get_startTimeUTC**( ): double
vb	function **get_startTimeUTC**( ) As Double
cs	double **get_startTimeUTC**( )
java	double **get_startTimeUTC**( )
uwp	double **get_startTimeUTC**( )
py	def **get_startTimeUTC**( )
php	function **get_startTimeUTC**( )
es	function **get_startTimeUTC**( )

When the recording rate is higher then 1 sample per second, the timestamp may have a fractional part.

Returns :
an floating point number corresponding to the number of seconds between the Jan 1, 1970 UTC and the beginning of this measure.

22. Troubleshooting

22.1. 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].

22.2. 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 operationg system command prompt, or configure your IDE to run them with the proper parameters. [2].

22.3. Linux and USB

To work correctly under Linux, the 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 *VirtualHub* 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 peripherals. Access rights for all other peripherals 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"
```

22.4. 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.

22.5. Powered module but invisible for the OS

If your Yocto-Meteo 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.

22.6. 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 a VirtualHub and the network mode [4].

22.7. Disconnections, erratic behavior

If you Yocto-Meteo 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

22.8. Damaged device

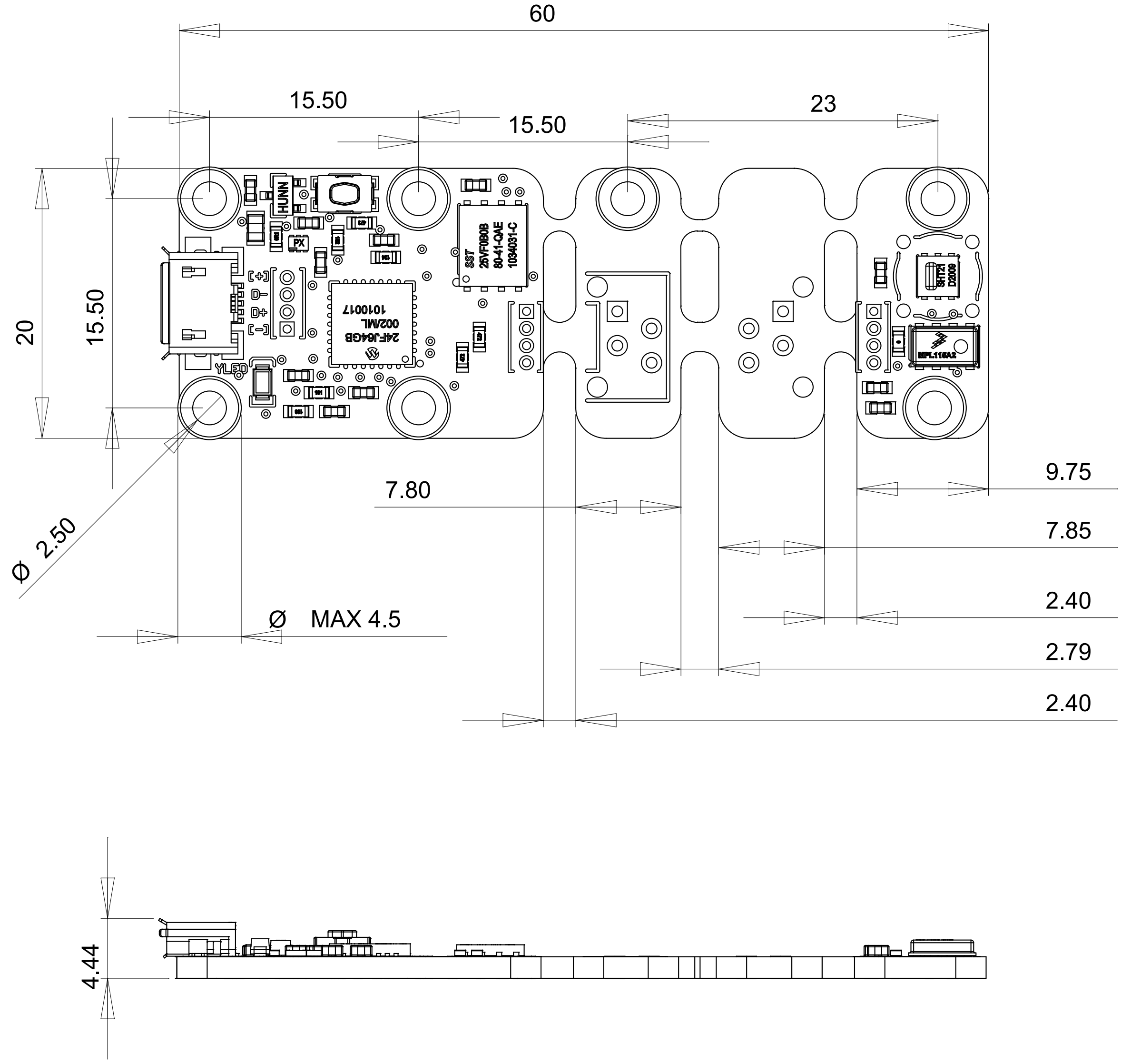
Yoctopuce strives to reduce the production of electronic waste. If you believe that your Yocto-Meteo is not working anymore, start by contacting Yoctopuce support by e-mail to diagnose the failure. Even if you know that the device was damaged by mistake, Yoctopuce engineers might be able to repair it, and thus avoid creating electronic waste.

Waste Electrical and Electronic Equipment (WEEE) If you really want to get rid of your Yocto-Meteo, 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.

23. Characteristics

You can find below a summary of the main technical characteristics of your Yocto-Meteo module.

USB connector	micro-B
Width	20 mm
Length	60 mm
Weight	4 g
Sensor	SHT25 (Sensirion), MPL3115A2 (Freescale)
Refresh rate	1 Hz
Range(H)	0..100 %
Measure range (P)	200..1100 mbar
Range (T)	-40..125 °C
Accuracy (H)	1.8 %
Accuracy (P rel)	1 mbar
Accuracy (T)	0.2 °C
IEC protection class	class III
Normal operating temperature	5...40 °C
Extended operating temperature	-30...85 °C
Supported Operating Systems	Windows (PC + IoT), Linux (Intel + ARM), macOS, Android
Drivers	no driver needed
API / SDK / Libraries	C++, Objective-C, C#, VB.NET, UWP, Delphi, Python, Java, Android
API / SDK / Libraries (TCP only)	Javascript, Node.js, PHP
RoHS	Yes
USB Vendor ID	0x24E0
USB Device ID	0x0018
Suggested enclosure	YoctoBox-Long-Thin-Black-Vents
Cables and enclosures	available separately



All dimensions are in mm
Toutes les dimensions sont en mm

Yocto-Meteo

A4

Scale
3:1
Echelle