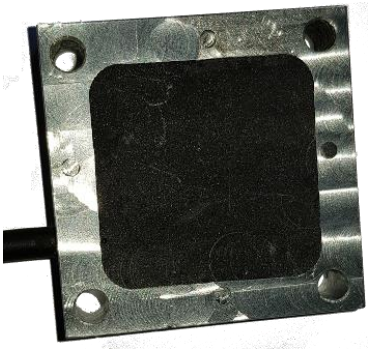
MEMS digital output motion sensor for IA Application

high-performance 3-axis accelerometer



Features

- Wide supply voltage, 5 V to 12 V
- Independent IO supply (1.8 V) and supply
- voltage compatible
- Ultra-low-power mode consomption
- down to 20 µA sleep
- Detect ±16g max on 3 axis
- Serial digital output interface (Option)
- Wifi connection AP
- Wifi connection Client WPA
- 14-bit data output
- Embedded temperature sensor
- 10000 g high shock survivability
- Low cunsommation < 1W
- Send Raw vibration
- Connexion to Azure/Aws/WebService

ECOPACK ® , RoHS and “Green” compliant

Applications

- Detect anomaly
- Detect anomaly on compute vibration industrial machine
- Dectect presence
- Logging vibration (AST01L)

The AST01 is an ultra-low-power high-performance three-axis linear accelerometer belonging to the “industry” family, with digital Wi-Fi or serial interface (5V/12V) standard output.

The AST01 has dynamically user-selectable full scales of ±16g and is capable of measuring accelerations with output data rates from 1 Hz to 5.3 kHz.

The AST01 is capable of capturing 10hz accelerations. The data does not have a direct or programmable interface for sending them to a big data system like azure, was or webservice.

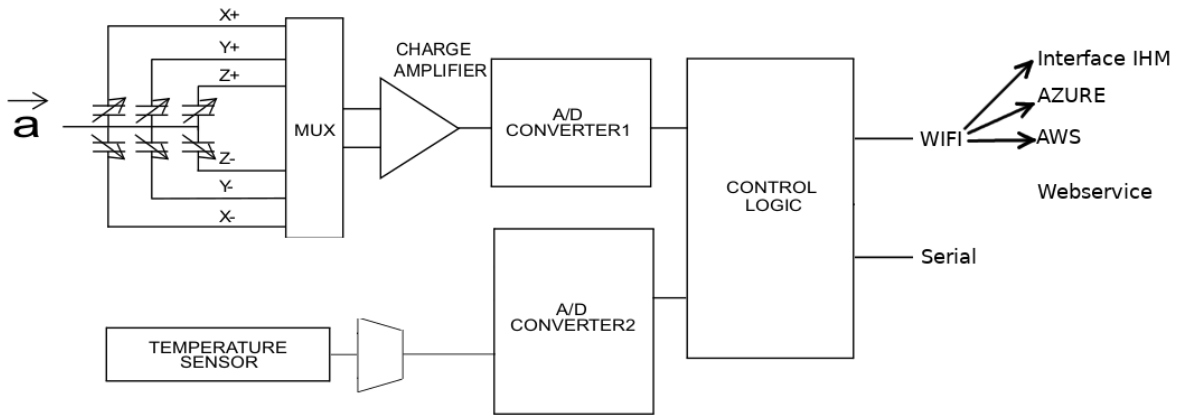
The AST01 includes 2 parameters in addition to temperature and in-door location via Wi-Fi triangulation.

The AST01 is available in 100mmx100mmx30mm aluminum and thin format. It is guaranteed to operate over an extended temperature range of -40 ° C to +85 ° C.

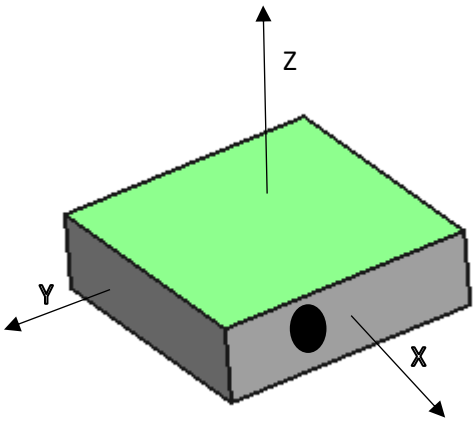
1 TABLE DES MATIERES

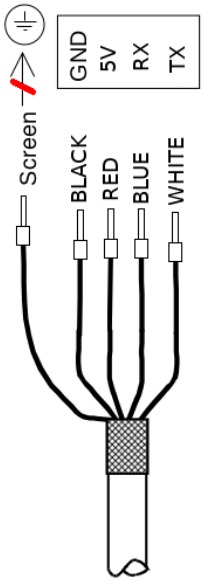
2 BLOCK DIAGRAM AND PIN DESCRIPTION

2.1 BLOCK DIAGRAM



2.2 PIN DESCRIPTION



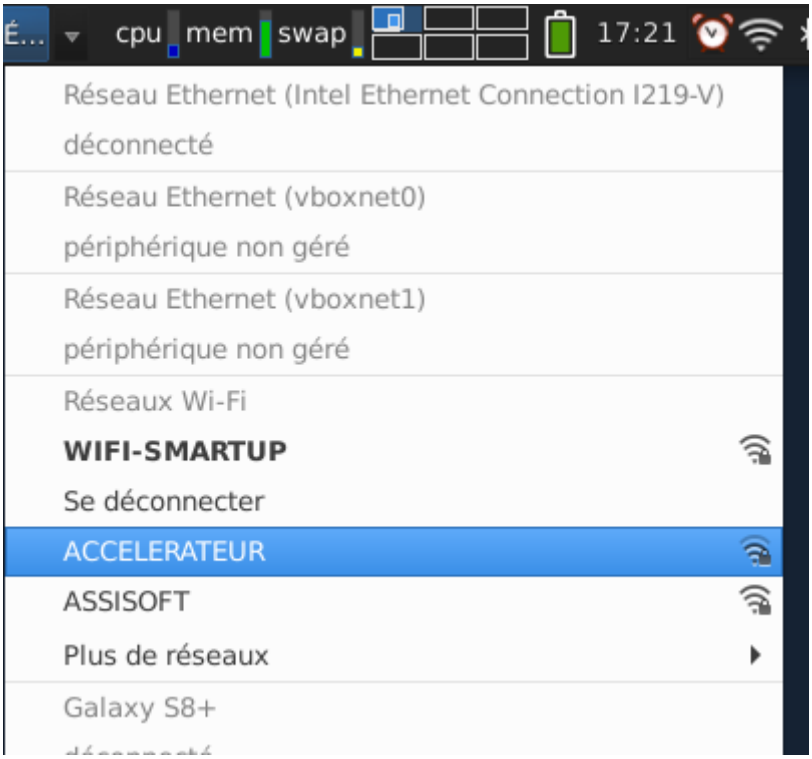


TX / RX pins are not used if we only use Wi-Fi

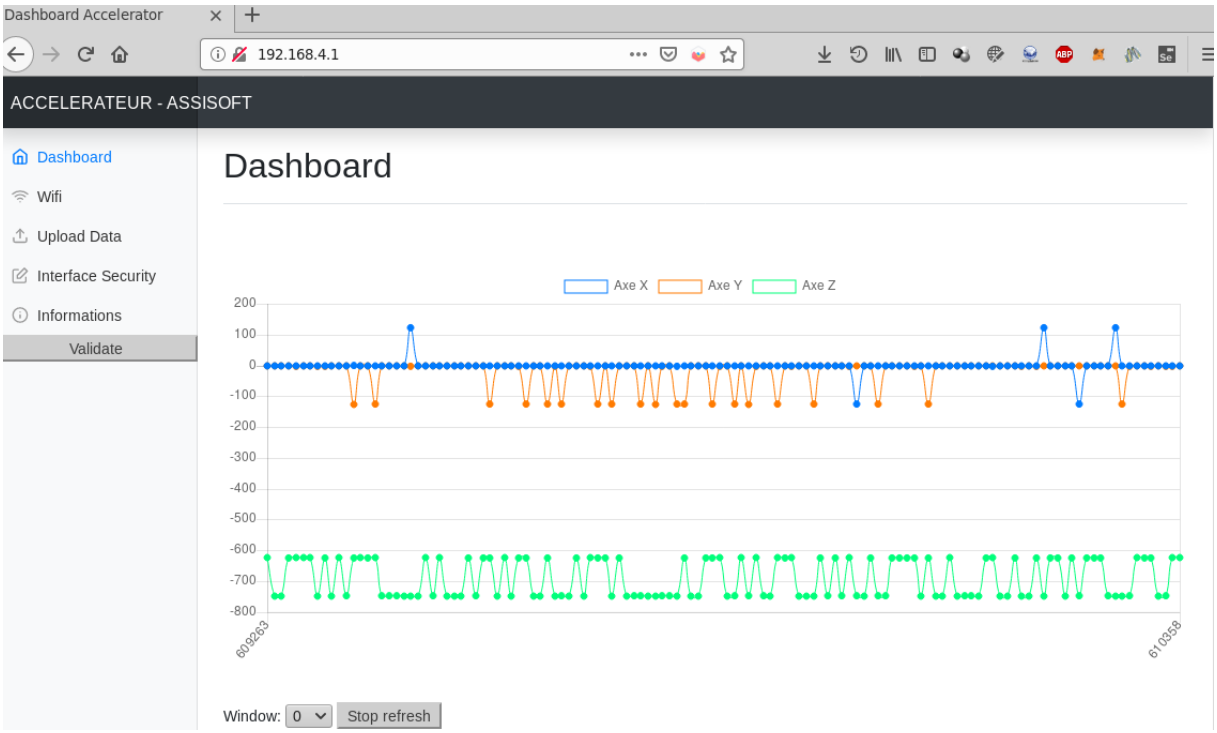
3 CONFIGURATION ACCELERATOR

3.1 START AST01

To start IOT, connect 5V and GND. Then, check out a windows, mac or Linux computer and looking for the SSID "ACCELERATOR". The password for SSID is « ASSISOFT » by default



On your computer, open browser like Firefox and open http://192.168.4.1/. The password of interface is “admin” and password is “assisoft”.

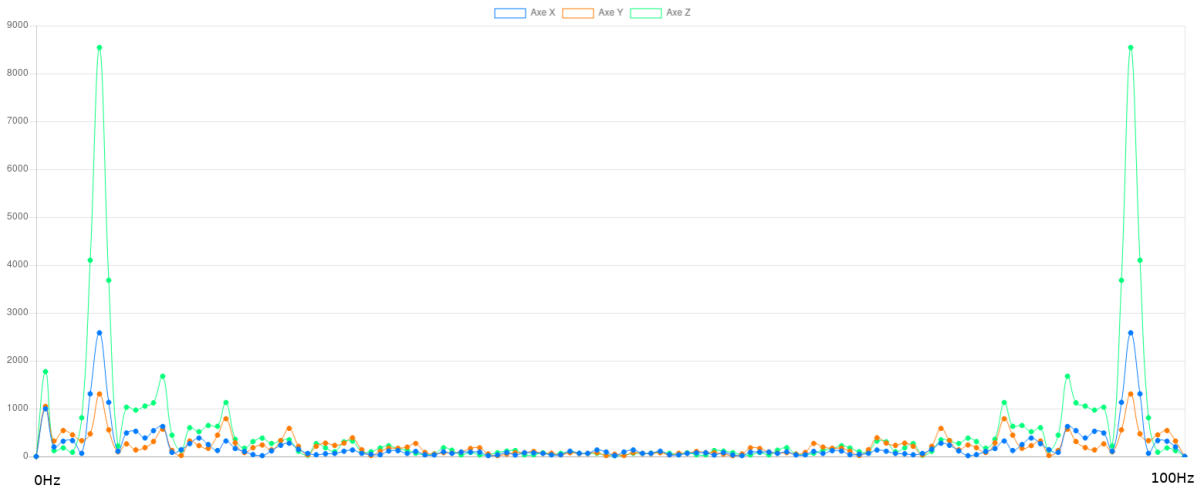


The page consists of a selection menu on the right and a dashboard on the right. The first graph corresponds to the raw record on the accelerator. this graph will refresh every second automatically.

Under this graph we have put a combo that allows you to zoom in on 1 second and a start/stop button that stops the refresh graphs.

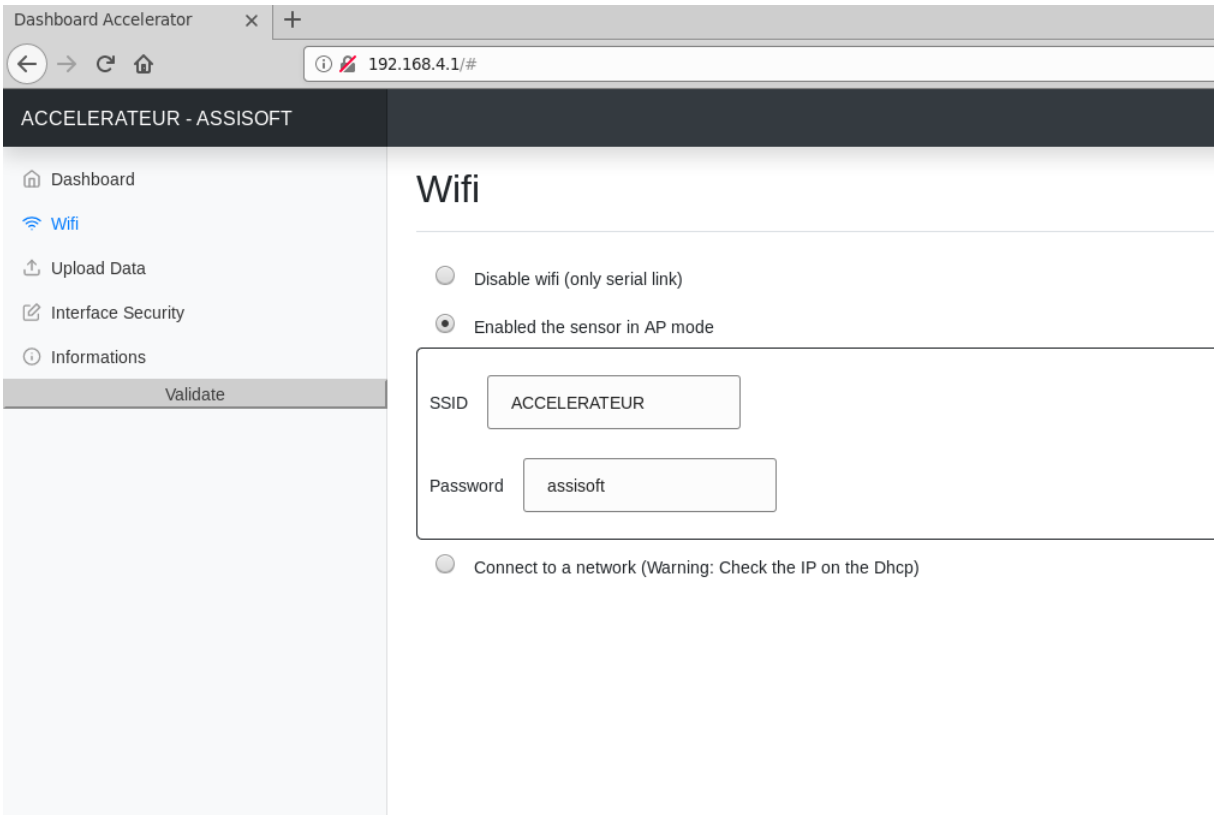
The combo is composed of number that corresponds to the history of 10 before.

Under this menu, we find a new graph that corresponds to the FFT spectral analysis.



3.2 ACCELERATOR WIFI PARAMETER

Click on wifi into dashboard



There are 3 possibilities to configure, the Wi-Fi.

- The Wi-Fi is set up in AP, computers or tablet connects to the dedicated Wi-Fi to retrieve information. It's used to do tests on an industrial set.
- We can connect to the corporate network with WPA / WPA2 / Personal.
- You can also disable the Wi-Fi if you use the RS232 serial link.

Note : The chipset is intended to work with WPA2 / Enterprise but the functionality is not implemented.

3.3 UPDATE DATA PARAMETER

3.3.1 Data accelerator

The accelerator can use several providers:

- Azure
- Aws
- Web Service internal

The more you learn about providers the more the refresh will be long to transfer. The information will be long into the big data. We advise you not to select a provider.

Sent data is JSON format which split:

- acceAbs : Argument at 1 when the acceleration is absent, it is activated when the sensor is blown
- beginAnalysis : Timestamp since the start of component ignition
- endAnalysis : Timestamp since the send of component ignition. The TS end -the TS begin to find the delta and the frequency of sampling
- dataRTx : Array of Raw data of the accelerometer X axis in mg
- dataRTy : Array of Raw data of the accelerometer Y axis in mg
- dataRTz : Array of Raw data of the accelerometer Z axis in mg
- freqx : Array of FFT X axis
- freqy : Array of FFT Y axis
- freqz : Array of FFT Z axis

The size of array is always same.

Example :

```
{
        acceAbs         0,
        beginAnalysis   25349,
        endAnalysis     26484,
        dataRTx         [ 20, 50 ,41, 52, …],
        dataRTy         [ 51, 55 ,88, …],
        dataRTz         [ 580, 1520, 685,…],
        freqx   […],
        freqy   […],
        freqz   […]
}
```

The data can send into blockchain with a level alert (option)

You can enable vibration object location.

3.3.2 Alert blockchain

L'iot can't send alert into blockchain like Ethereum.

There are 2 fields to fill in:

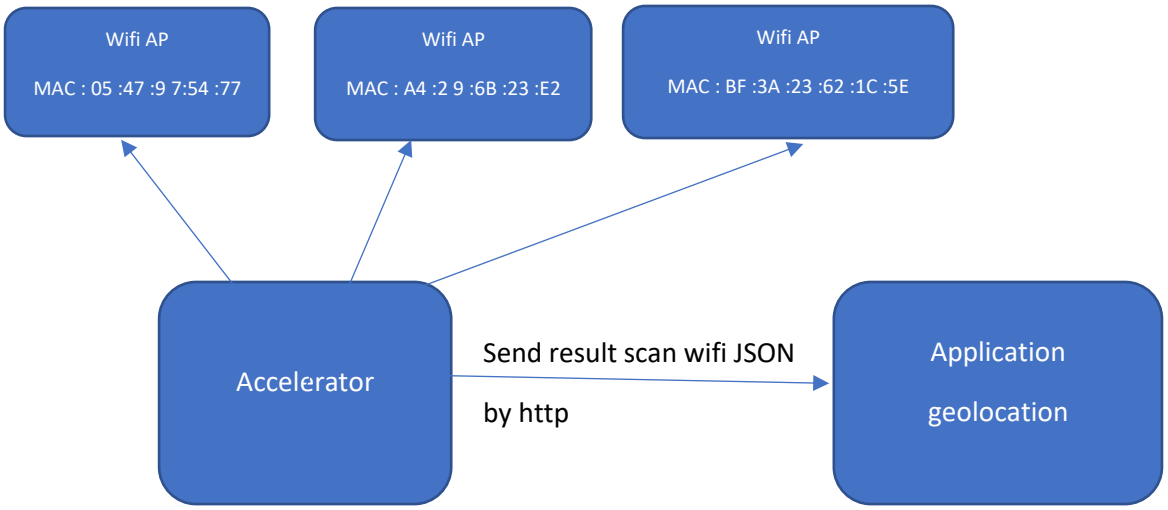
- The SC address field is a hex code where is the smart contract
- The Accelerometer Alert field will populate the alert threshold. The fields in mG.

The form informs you the published address of the IOT, which will publish the alert. Do not forget to provoke IOT's public assault on Gas. Otherwise no transcation can be done.

3.3.3 Geolocation

Geolocation makes it possible to know where IOT is in an environment IN DOOR via a triangulation of AP WIFI.

For this you need to bring the geolocation application of ASSISOFT (contact us).

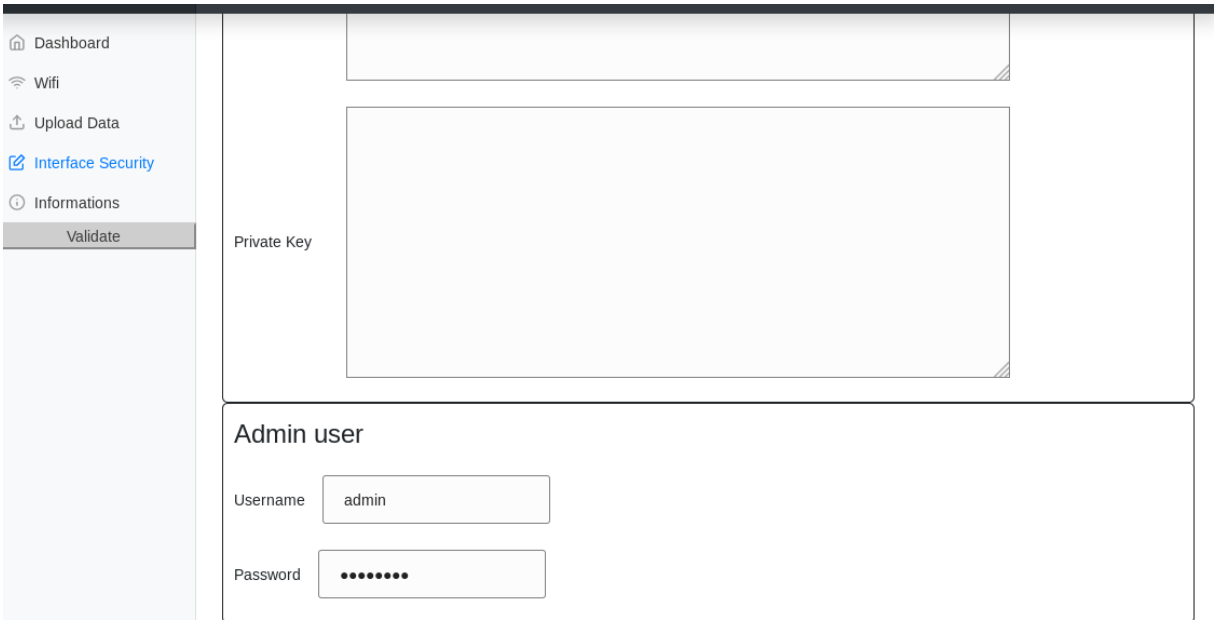


3.3.4 Certificats secure

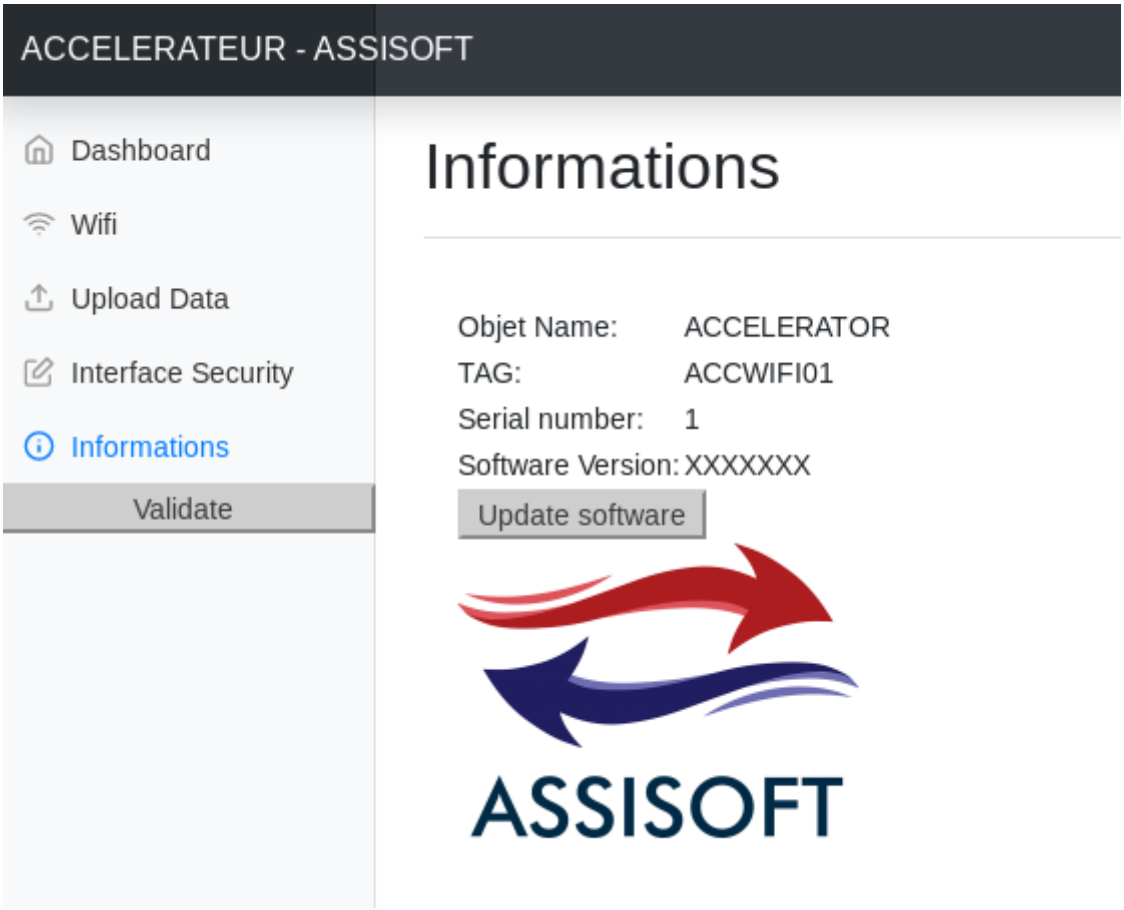
This field will contain all https certificates of aws, webservice, azure and geolocation application.

3.4 SECURE INTERFACE

This tab makes it possible to secure the interface by activating https via the certificate and the private key.



3.5 INFORMATIONS



4 SERIAL CONNEXION

The serial connection is based on a simple AT protocol with rate 115200bit/s. Il y a 8 commands :

- The ping command
- The raw data recovery command
- The command to retrieve data analyzed in FFT
- The command that starts sends the continuous data
- The command that stops sending the continuous data
- The command that starts sending continuously analyzed data
- Stop command sends continuously analyzed data to FFT
- The command to reactivate the WIFI

Please find the AT commands below

4.1 AT ?

Command of ping, Accelerator responds « ACCELERATEUR »

4.2 AT+startContinuous

Accelerator responds « OK ». Then it sends continuously on serial line 2 commands

TIME, ACC, END. The line time has2 arguments START and END in Millis since the ignition of the accelerator. Then it sends ACC with 3 arguments X, Y, Z in mg. The line that contains end marks the end of the send.

Example :

```
AT+startContinous
TIME 558 15888
ACC 78 150 585
ACC 150 420 250
ACC 1147 780 0
…
END
TIME 16850  2408
ACC 78 150 585
ACC 150 420 250
ACC 1147 780 0
…
END
```

4.3 AT+stopContinuous

Accelerator responds « OK ». Then it stops continuously on serial.

4.4 AT+ startAnalysis

Accelerator responds « OK ». Then it sends continuously on serial line 2 commands

TIME, ANA, END. The line time has2 arguments START and END in Millis since the ignition of the accelerator. Then it sends ACC with 3 arguments X, Y, Z in mg. The line that contains end marks the end of the send.

Example :

```
AT+startAnalysis
TIME 558 15888
ANA  0 10 10
ANA 150 420 250
ANA 10 20 30
…
END
```

4.5 AT+ STOPANALYSIS

Accelerator responds « OK ». Then it stops continuously on serial.

4.6 AT+GETDATA

Send directly data like continuously format.

4.7 AT+GETANALYSIS

Send directly data like continuously format.

4.8 AT+SETWIFI

Active Wi-Fi : WIFI AP or WIFI WPA. This command has 3 arguments :

Mode Wi-Fi : 0 for Ap Wi-Fi or 1 for Wi-Fi WPA

SSID : Create or connect network SSID

Password : The passphrase of SSID

Example :

```
AT+setWifi 1 ACCELERATOR ASSISOFT
OK
```

5 CONTACT

contact@assisoft.fr
ASSISOFT
CCI SMARTUP
215 Route de paris
27000 EVREUX
France