



IMST GmbH

Carl-Friedrich-Gauß-Str. 2-4, D-47475 Kamp-Lintfort

iOKE868 LoRaWAN®

AN033 - Data visualization with TTN and TagoIO

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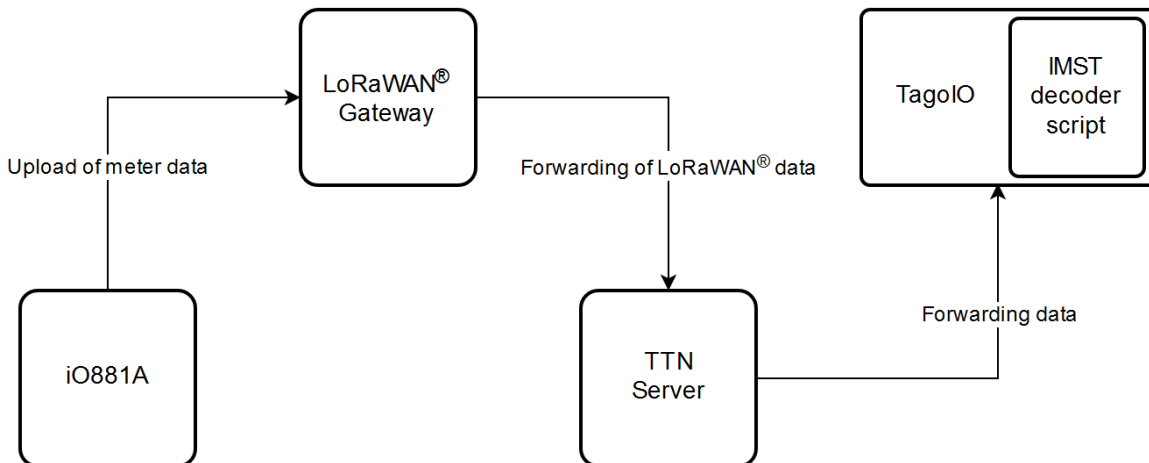
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General Information AN033

Aim of this Document

This is a simple guide on how the iO881A works with The Things Network (TTN) console and how the data of the iO881A can be easily visualized in TagoIO.



TTN is a LoRaWAN® network server platform. It offers an open network of LoRaWAN gateways and an open source concept to manage devices and applications.

TagoIO is a cloud platform for decoding and visualization.

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TTN

For using TTN an account must be created firstly. That can be done at <https://www.thethingsnetwork.org/get-started>.

The [overview page](#) can be used to find out whether a gateway is available in the area of the iO881A. If no gateway is available nearby, an own one should be set up. The IMST Lite Gateway is recommended as hardware.

Instructions for registering a gateway at TTN are available at <https://www.thethingsindustries.com/docs/gateways/adding-gateways/>.

Before an end device can be created in TTN, the corresponding application must first be added, if not yet available. An explanation for that can be found at <https://www.thethingsindustries.com/docs/integrations/adding-applications/>.

As the last step in TTN, the end device has to be registered and that is how it works <https://www.thethingsindustries.com/docs/devices/adding-devices/>.

Finally you have to [configure](#) the iO881A accordingly for TTN (app eui & keys).

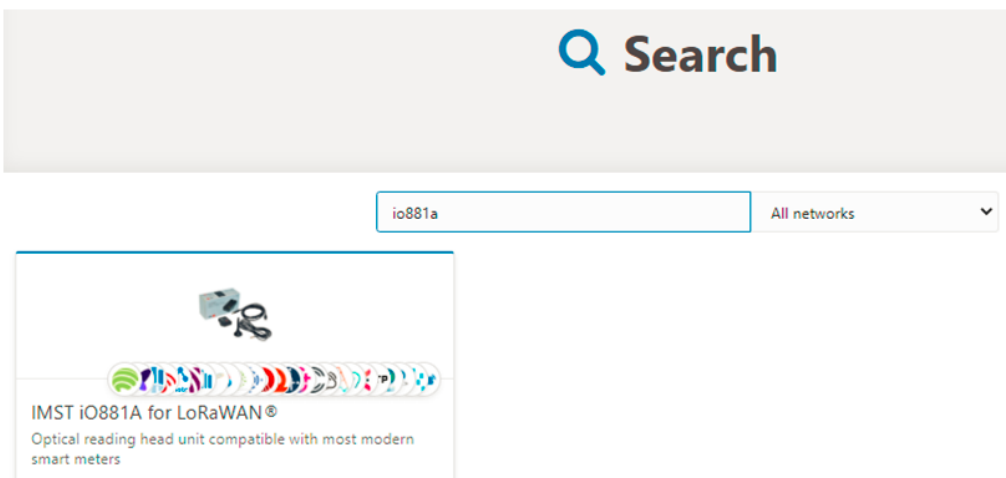
TagoIO

For working with TagoIO an account must also be created first. Signing up for free can be done at <https://admin.tago.io/signup>.


For a communication between TTN and TagoIO, an integration must be set up at TTN side and an authorization must be set up at TagoIO side. Please follow the instructions given on <https://docs.tago.io/en/articles/218-authorization> and <https://docs.tago.io/en/articles/102-the-things-network-lorawan>.

Next, the device, which was created at TTN must be added within TagoIO. A corresponding [connector](#) was created for the iO881A in TagoIO. This connector comes with a payload parser, which breaks down the received, non-segmented payload into its individual values.

On adding the device, choose the corresponding connector 'IMST iO881A for LoRaWAN®'. It can be easily found through the search input:



A device name must be assigned and the Device EUI must be entered:



Details

Visualize details of your connector & network, and set a name for your device.

Connector
IMST iO881A for LoRaWAN®

Network – Documentation
LoRaWAN TTN

Device name
your IMST iO881A for LoRaWAN® device

Main information

Set the main information of your device.

Device EUI Scan Qr Code
FE-DC-BA-98-76-54-32-10

Description

Learn how this device works, and what its capabilities are.

The iOKE868 LoRaWAN® optical reading head unit leverages the long range and low power consumption of LoRa® to provide real-time data monitoring of energy consumption and secure connectivity to the LoRaWAN® IoT network. It is compatible with most modern smart meters (compliant with IEC62056-21 and SML messages). The optical reader head iO881A is equipped with an u.fl antenna connector and can be powered through the USB interface with an external power supply or with batteries. The optical unit can be attached magnetically to the smart meter to read out the infrared interface, extract the desired values and transfer those to the LoRaWAN® network periodically. The collected data is available for further analysis of real time and previous consumption. The user friendly configuration tool offers an easy way to modify the radio-, calendar- and filter-settings at any time. All those benefits turn into a far greater and more detailed feedback regarding energy use and more efficient management of resources.

Key Features

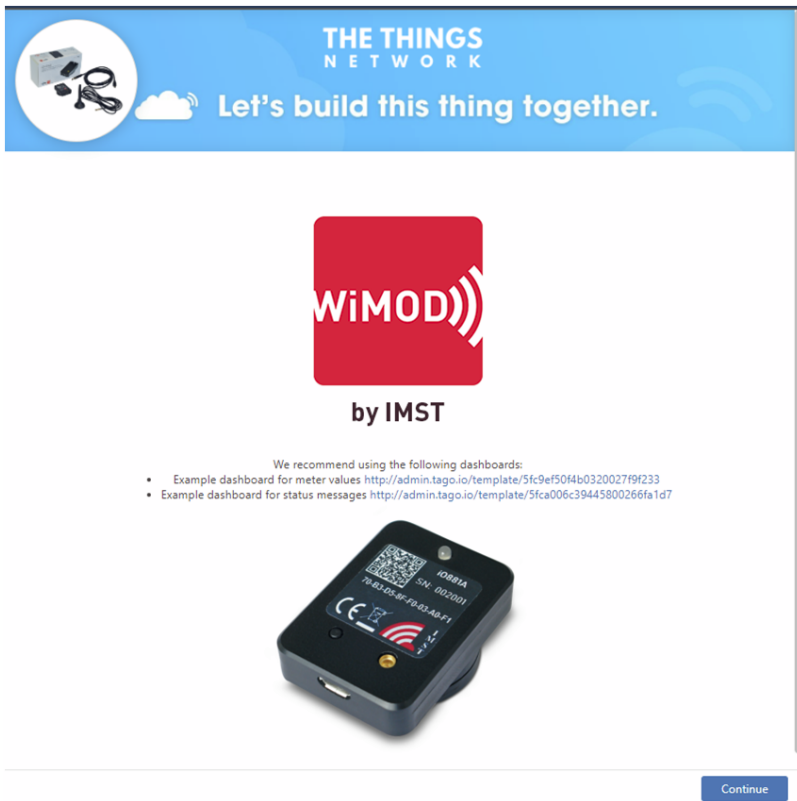
- EU868 LoRaWAN® Compliant (v.1.0.2)
- LoRaWAN® Activation: ABP and OTAA
- Dual colored status LED, push button
- Flexible configuration via PC-tool
- Optional direct mode (infrared to local USB interface)

Advantages

- LoRa® modulation with range of up to 10 km (LoS)
- Cloud based readout of supported meters
- Online visualization of power consumption
- Calendar function for time dependent settings

Cancel Create my Device

The successful creation is signaled and two suggestions for *dashboards*, which can also be found later in the device overview, are given:



The screenshot shows a configuration screen for a device in the Tago.io ecosystem. At the top, there is a blue banner with the 'THE THINGS NETWORK' logo and the text 'Let's build this thing together.' Below this, the device logo 'WiMOD' is displayed in a red square, followed by 'by IMST'. A recommendation section titled 'We recommend using the following dashboards:' lists two example dashboard URLs. Below the text is an image of the physical WiMOD device, a small black rectangular module with a QR code and technical specifications. At the bottom right of the screen is a 'Continue' button.

THE THINGS NETWORK
Let's build this thing together.

WiMOD
by IMST

We recommend using the following dashboards:

- Example dashboard for meter values <http://admin.tago.io/template/5fc9ef504b0320027f9f233>
- Example dashboard for status messages <http://admin.tago.io/template/5fca006c39445800266fa1d7>

Continue

The subsequent note about generating an authorization can be ignored, because this should already have been carried out according to these instructions.

The newly created device and its information are available in the device overview. All packets received by TTN should now be forwarded to the TagoIO device and can be found in the 'Live Inspector'.

The screenshot shows a web interface for configuring an IMST IoT81A device. The page title is "your IMST IoT81A for LoRaWAN® device" and it is marked as "Active". The navigation tabs include "General Information", "Emulator", "Payload Parser", "Live Inspector", "Configuration Parameters", "Tags", and "More".

General Information

- Name:** your IMST IoT81A for LoRaWAN® device
- Bucket:** your IMST IoT81A for LoRaWAN® device
- Token & Serial Number:**
 - Token Name: Token #2
 - Device EUI: 00-00-00-00-00-00-00
 - Generate button
 - Default: FE-dc-ba-98-76-54-32-10

Network: LoRaWAN TTN


Connector: IMST IoT81A for LoRaWAN®

We recommend using the following dashboards:

- Example dashboard for meter values: <http://admin.tago.io/template/5fc9ef50f4b0320027f9f233>
- Example dashboard for status messages: <http://admin.tago.io/template/5fca006c39445800266fa1d7>

More information about this IoT81A can be found here:

- wireless-solutions.de
- shop.imst.de



Using our example dashboards is recommended to try out displaying the data:

- Example dashboard for meter values
<http://admin.tago.io/template/5fc9ef50f4b0320027f9f233>
- Example dashboard for status messages
<http://admin.tago.io/template/5fca006c39445800266fa1d7>

For inserting a dashboard into an account, the corresponding link has to be clicked or the url has to be copied into the browser.



Example Dashboard for Meter Data Message of iO881A



Get Dashboard Template



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To associate the dashboard to the corresponding device, choose the name of the device from the drop-down list.

Associate your devices



This dashboard requires a device.

You can associate the required device with a device you already have.

your IMST iO881A for LoRaWAN® device

Device *

 X

Didn't find your device? [Click here](#) to create a new one.

I'll do it later

Confirm association

In the 'OBIS Values Example' tab of the 'iO881A_OBIS_Values_Dashboard' the graph and the table are designed for displaying the values of the OBIS ID '1_0_1_8_0_255'. This can be changed in the edit mode.

The dashboard is available and will display already received values and all following ones.

iO881A Configuration

The following documents are recommended for adjusting settings of the iO881A:

- iOKE868_LoRaWAN_AN031_QuickStartGuide
- iOKE868_LoRaWAN_UserManual
- WSConfigurator_UserManual_iO881A

Within LoRaWAN the possible maximum payload size of a LoRaWAN packet depends on the used data rate (spreading factor) during the transmission of the packet. Furthermore, within LoRaWAN an ADR (Adaptive Data Rate) algorithm is used. When a packet is transmitted as a confirmed data packet an adaptation of the data rate after the transmission of the packet can appear. This change in data rate might have an immediate impact on the possible maximum payload size that can be used within a LoRaWAN packet. Due to the nature of the application data to be transmitted, it might be necessary to spread larger application data into several LoRaWAN packets. So, uploaded application data might be segmented depending on the payload length and used data rate (maximum allowed payload size of a LoRaWAN packet). Those sequences of LoRaWAN packets must be reassembled to complete application data on the receiving side again. In general application packets consisting of less than 36 bytes are not segmented during LoRaWAN transmission.

The reassembling of packets is not possible with the payload parser included in the connector of TagoIO.

However, in addition to parsing non-segmented payloads, the IMST payload parser also offers the option of parsing the first packet of segmented transmission. In this case an corresponding warning message is generated by the parser within the 'Live Inspector' view.

An interpretation of a segmented payload should be possible for the following lengths depending on the data rate:

	DataRate	Payload Size
0	LoRa: SF12 / 125 kHz	36
1	LoRa: SF11 / 125 kHz	36
2	LoRa: SF10 / 125 kHz	36
3	LoRa: SF9 / 125 kHz	100
4	LoRa: SF8 / 125 kHz	207
5	LoRa: SF7 / 125 kHz	207
6	LoRa: SF7 / 250 kHz	207
7	FSK: 50 kbps	207

For all settings in the table above the given payload sizes can be 15 bytes larger, if the device does not have to send any further MAC commands within the same packet. In the case, that all raw data fit into one packet, a second message is always sent, which signals the end of segmentation - this should contain byte 0x81.

With an increasing number of OBIS IDs to be transmitted in one event, the payload length and thus the probability of segmentation also increases. Therefore it is recommended that only one OBIS ID is configured in one event. Different events should be selected for the transmission of several OBIS IDs, which should not overlap in time.