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iOKE868 LoRaWAN®

AN031 - QuickStartGuide

Version 1.2

Document State

final

Date

October 2021

Document ID

4000/40140/0161

Revision history

Date	Version	Chapter	Description
15.10.2020	0.1	all	created
19.10.2020	1.0	all	reviewed
29.03.2021	1.1	General information	FTDI Chip will be disabled a few seconds after powering
14.10.2021	1.2	all	reviewed and updated

Content

General Information

Aim of this Document

The kit iOKE868 LoRaWAN consist of an optical reader head unit iO881A, an antenna with cable and an USB cable. The iO881A is partly compliant with IEC62056-21 (Mode A/B/C/D) and SML and can be magnetically attached to meters to read out the corresponding meter data. It uses LoRaWAN technology to transmit those meter data into the cloud. iO881A can filter certain OBIS (Object Identification System) figures from the data stream of the meter. It provides an integrated calendar function for configuration various events. Therefore iO881A needs a time base so that the calendar events are scheduled correctly. If the iO881A is connected with a LoRaWAN network, it tries to synchronize itself over this network after each start-up. In the normal use case it is assumed that the LoRaWAN network operator provides the network time and iO881A therefore can synchronize itself regularly. If LoRaWAN networks are used that do not support the "Get Network Time" command, a corresponding work-around must be configured. The configuration for both scenarios are describe within this document.

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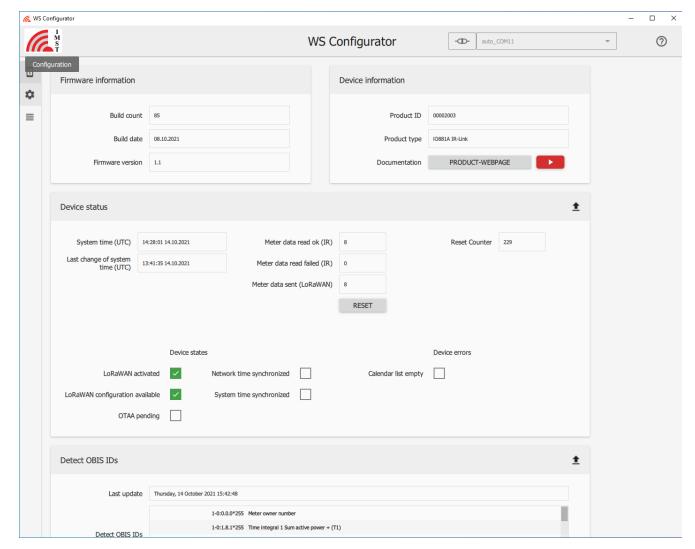
Configuration of iOKE868 LoRaWAN

The iO881A requires an initial configuration before usage. This configuration can be done by means of a PC-Tool called **WS-Configurator** which is connected via serial interface (USB) to the device.

In any case, the first step should be to connect the antenna cable to the corresponding u.fl connector of iO881A. Then use the USB cable to connect the iO881A with your laptop/PC.

> The USB interface is activated when devie is started for the first time. For further infomration please refer to the chapter **Automatic Power Saving** of the **User Manual**.

Place the optical reader head iO881A on the infrared interface of your meter. The iO881A usually clings magnetically in the right place. Nevertheless, make sure that the reading head is correctly attached. Choose a good position for the antenna, e.g. outside the cabinet if possible. Open the configuration tool "WS Configurator" on your laptop/PC. Within the configuration tool you have the three sections in the upper left corner:

1. "Device Information",
2. "Configuration" and
3. "Meter Values".

For further information on the "WS Configurator" please refer to the corresponding **WS Configurator User Manual**.

OBIS Values of the Meter

The first step should be to read out the infrared interface of your meter and analyse the provided OBIS values.

- Under "Device Information->Detect OBIS IDs" (see last picture above) you can read out the OBIS value send by your meter. When
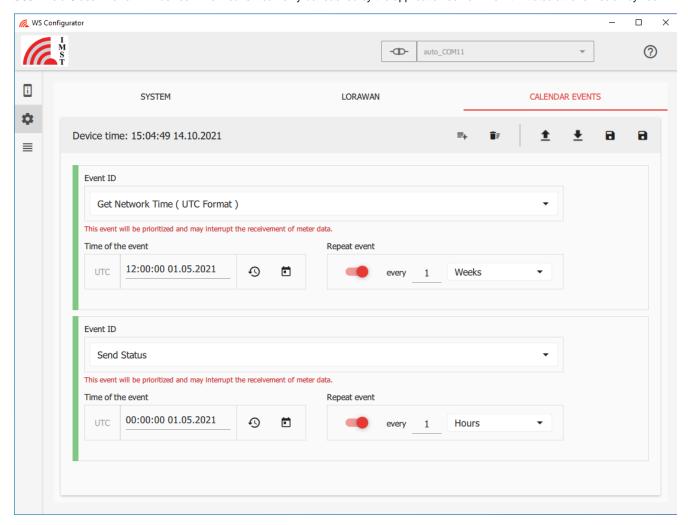
you configure possible read out events within the calendar later on you can choose between those OBIS IDs for filtering purpose. For more information on the meter's infrared interface, please contact your meter-operator or your grid-operator.
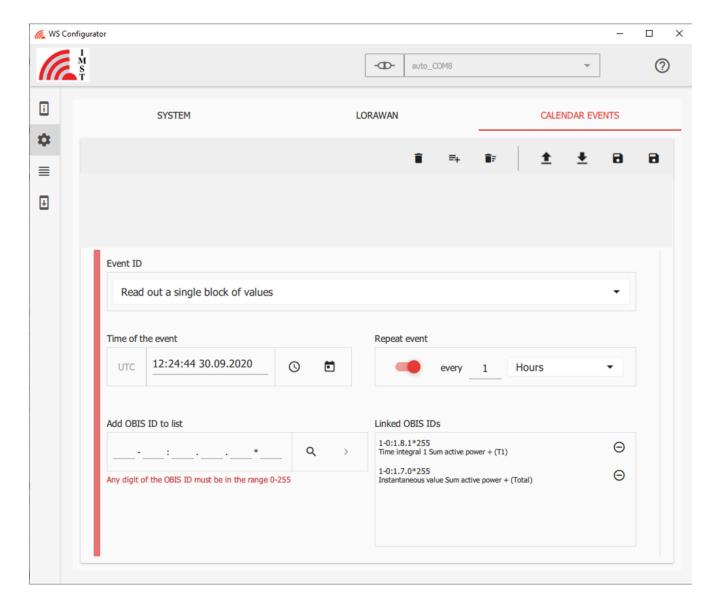
How to Start with Get Network Time supported by the LoRaWAN Network Operator

Configure Calendar Events

In this use case we assume that the iO881A gets the time from the LoRaWAN network on request. Therefore it makes sense to configure the "Get Network Time Event" regularly (e.g. repetition once a week). This event is used to keep the iO881A synchronized in time (UTC time) to allow the correct executing of possible calendar events. Furthermore it is recommended to configure the "Send Status Event" regularly. The iO881A is a ClassA LoRaWAN device. This means it can only be reached by the application server when it initiates a transmission by itself.

- The first specified event is the "Get Network Time" event (marked with green color), see picture above. It is repeated once per week starting from 12:00:00 at 1st of May 2020.
- The second specified event is the "Send Status" event (marked with green color), see picture above. It is repeated once per hour starting from 00:00:00 at 1st of May 2020.
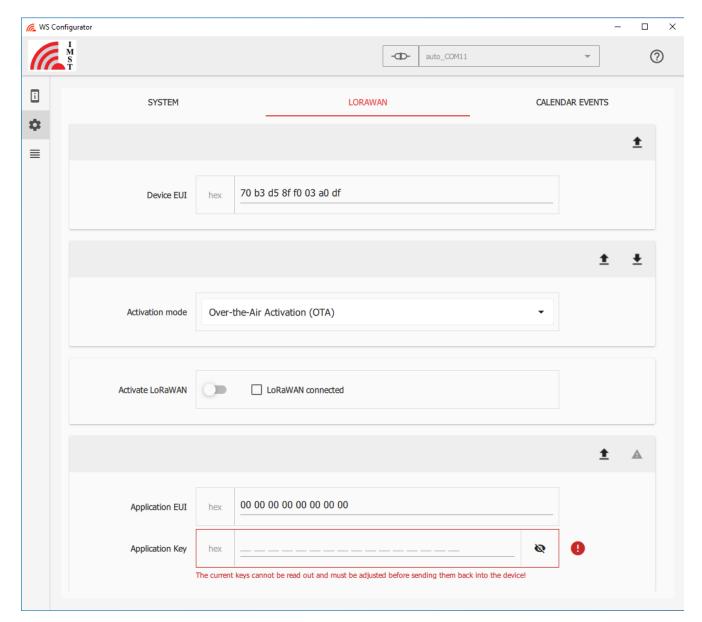
- The third event is the "Read out a single block of value" event (marked with red color), see picture above. It is scheduled starting from the 30th of September 2020 12:24:44 a clock and is repeated one per hour. From this start time, the iO881A wakes up every hour, opens the infrared interface to the meter device, reads the corresponding meter parameter and filters out the two configured OBIS key figures (within thsi example the "Time integral 1 Sum active power" and the "instantaneous value Sum active power"). The OBIS key figures can be selected from a drop down list of posssible OBIS key figures by clicking on the "lense" symbole. The selected OBIS figures are then filtered out of the meter data and sent via the LoRaWAN network.

For configuration of further calendar events please refer to the "WS-Configurator Manual".

Configure the LoRaWAN Credentials

Both, ABP and OTAA are supported by iO881A. We recommend using the OTAA process for joining the LoRaWAN network. Therefore configure the corresponding "Application EUI" and "Application Key" and write both into the iO881A. The keys are normally generated when creating a device on your LoRaWAN network account. Within the "WS Configurator" keys can only be written into the device. A read out of keys is not possible due to security reasons. So, it is recommend to document the keys separately.

Now a first test if the network can be reached by iO881A can be started. Therefore start the activation of the LoRaWAN stack by moving the slide switch to the right side. iO881A than starts the joining procedure. You can check either on the network server side if the corresponding "Join Requests" are received by the network server or observe the LED signalling of iO881A.

The following table outlines additional LED usage during firmware activities:

Activity	LED Pattern
Startup	Off
LoRaWAN® activation	Red, continuously blinking
LoRaWAN® activation successful	Green 2 x
LoRaWAN® network time synchronization	Red, continuously blinking
LoRaWAN® network time synchronization successful	Green 2 x
Power saving in sleep mode	Off

Table : Firmware activities an LED signals

Now you can close the "WS Configurator", unplug the USB cable from your laptop. Connect the USB cable of the iOKE868 to your preferred

power supply (USB battery pack or USB power plug). Observe the LED signalling of the iO881A during start up, refer to the table above.

How to Start with Get Network Time <u>not</u> supported by the LoRaWAN Network Operator

If your network operator does not support the "Get Network Time" command the synchronization of the iOKE868 can be done as follow.
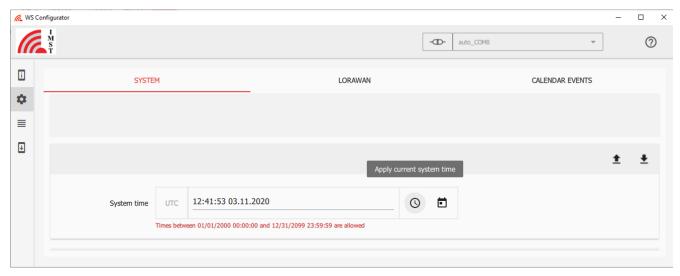
Configure Calendar Events

It is still recommended to configure the "Send Status Event" regularly due to the ClassA nature of the device. For configuration of further calendar events please refer to the "WS-Configurator Manual".

If your network operator really does not support the "Get Network Time Event" it makes still sense to use this calendar event regularly. The firmware has implemented a fall back mechanism. In case of no response from the network operator the firmware transmits an "Get Time Request" application command via LoRaWANon application level, thus to the connected Application Server which might be able to answer this request. This is in the responsibility of the Application Server operator. If you are really sure that neither you Network Operator nor your Application Server answers the "Time Request Commands" the configuration of those events does not make sense. Then the device must use the time base from last the synchronization with the laptop/PC. This is done at the end of the configuration session.

Configure the LoRaWAN Credentials

Both, ABP and OTAA are supported by iO881A. We recommend using the OTAA process for joining the LoRaWAN network. Therefore configure the corresponding "Application EUI" and "Application Key" and write both into the iO881A.The keys are normally generated when creating a device on your LoRaWAN network account. Within the "WS Configurator" Keys can only be written into the device. A read out of keys is not possible due to security reasons. So, it is recommend to document the keys separately. Now you can test if the network can be reached by iO881A. Therefore start the activation of the LoRaWAN Stack. iO881A than starts the joining procedure. You can check on the network server side if the corresponding Join Requests are received by the network server or observe the LED signalling of iO881A. You can expect that the synchronization due to the Get Network Time Events on Network and Application level will fail and therefore after a successful activation (2 x green) the red LED will be blinking for a longer period (e.g. few minutes).

Before you now just close the "WS Configurator", the missing time synchronization must be compensated. To do this, under the "Configuration-> System" menu, the laptop/PC time can be converted into UTC time and can be written in the non volatile memory of iO881A.

Now you can close the "WS Configurator", unplug the USB cable from your laptop/PC. Please connect the USB cable of iOKE868 <u>immediately</u> to your preferred power supply (USB battery pack or USB power plug). The UTC time from the non volatile memory is used during start up of iO881A to set the time. Observe the LED signalling of the iO881A. You can expect that the time synchronization will fail and therefore after a successful activation (2 x green) the red LED will be blinking for a longer period (e.g. few minutes).

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