

### **IMST GmbH**

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# iOKE868 LoRaWAN®

AN031 - QuickStartGuide

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### Content

- General InformationConfiguration of iOKE868 LoRaWANCopy of Copyright



## General Information

#### Aim of this Document

The kit iOKE868 LoRaWAN consist of an optical reader head unit iO881A, an antenna withj cable and an USB cable. The iO881A is partly compliant with IEC62056-21 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.

It is recommended to press the Push Button on the iO881A while connecting the USB-interface. This leads to an activated HCI (Host Controller Interface) interface, independent from any firmware settings of the iO881A. To save power the iO881A is able to switch off this interface.

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

- "Device Information",
- "Configuration" and
- "Meter Values".

候 WS	Configurator					-	D X
(	M S T			-CD- auto_	COM8	~	0
: ✿ 	Device Information Configuration <sup>t</sup> Meter Values <sup>e</sup> Firmware version	73 21.10.2020 1.0		Product ID Product type	00002099 IOKE-868		
	Detect OBIS IDs						±
	Last update	Tuesday, 3 November 2020 13:42:34					
	Detect OBIS IDs	129-129:199.130.3*255 1-0:0.0.0*255 1-0:1.8.1*255 1-0:96.5.5*255	Manufacturer ID Meter owner number Time integral 1 Sum active power + (T1 Status	)			
	Device status						±
	System time (UTC) 12 Last change of system time (UTC) 12	::42:27 03.11.2020 ::40:35 03.11.2020	Meter data read ok (IR) Meter data read failed (IR) Meter data sent (LoRaWAN)	1347 0 1232 RESET	Reset Counter	41	
	LoRaWAN activated Calendar list empty	d 🗹 Network time synchro	onized 🗹 LoRaWAN d	available	OTAA pending		

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" 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.

### 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.

候 WS Configura	tor						-	□ ×
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=				•	=+		<b>•</b> 0	
Ŧ								
	Event ID							
	Send	Status					•	
	This event	will be prioritized and may interrupt	the receivement.of n	neter data.				
	Time of t	he event		Repeat event				
	UTC	12:00:00 30.09.2020	© <b></b>	-	every	Days	•	
	Event ID							
	Get M	Network Time ( UTC Format	)				-	
	This event	will be prioritized and may interrupt	the receivement.of n	neter data.				
	Time of the event Repeat event							
	UTC	00:00:00 30.09.2020	© 🖻	-	every	Weeks	•	

- The first specified event is the "Send Status" event (marked with green color), see picture above. It is repeated once per day at 12:00:00 starting from the 30th of September 2020.
- ٠ The second event is the "Get Netzwork Time" event (marked with green color), see picture above. It is repeated once per week at 00:00:00 starting from the 30th of September 2020.



候 WS Configurat	tor					-	
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Ŧ							
	Event ID						
	Read out a single block of values			-			
	The fillenet						
	Time of the event	~ <b>1</b>	Repeat event				
		0		every 1	Hours	•	
	Add OBIS ID to list		Linked OBIS II	Ds			
				Sum active power + (	T1)	Θ	
				1-0:1.7.0*255 Instantaneous value Sum active power + (Total)			

• 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 (Time integral 1 Sum active power and instantaneous value Sum active power). Those OBIS figures are then 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. 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 issued. Therefore start the activation of the LoRaWAN stack. 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.

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

The following table outlines additional LED usage during firmware activities:

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. 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.

候 WS	Configurator	-	
	M S T		0
i	SYSTEM LORAWAN CALENDAR EVENTS		
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Ŧ	Apply current system time	ŧ	ŧ
	System time UTC 12:41:53 03.11.2020 System time 12:41:53 03.11.2020 System time 12:41:53 03.11.2020		
			_

Now you can close the "WS Configurator", unplug the USB cable from your laptop/PC. Please connect the USB cable of iOKE868 immediatel y 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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