Utility meter Reading with CIRCUTOR ReadWatt and LoRaWAN Dragino RS485-BL

There are different methods to read the meter.

We will consider reading only impulses/time method. As you can see on the figure left.

The serial optical port IEC right is not considered here (K-LAX device).

First we test with the PC and qModMaster programm

Attention, pin 4 is B(-)

You have to power up the device Right pin (GND) Left pin Vdc

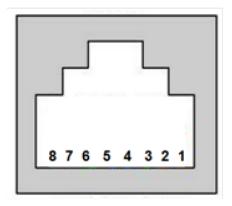| Device terminals	
1: GND	**5: B(-)**, RS-485
2: Rx, RS-232	**6:** GND
3: Tx, RS-232	**7:** Pulse output
4: A(+), RS-485	**8: Vdc**, Auxiliary power supply.

Figure 5: ReadWatt RJ45 Connector.

Default slave address is 10

9600 8N1

Table 4: Readwatt MODBUS variables.

Description	Address (Hexadecimal)	Size	Read/Write	Default value
Impulse register	0x0600	64 bits	Read	-
Counting register	0x0604	64 bits	Read	-

Bus Monitor

Raw Data

```
[RTU]>Tx > 15:53:10:161 - 0A  04  06  04  00  01  71  F8
[RTU]>Rx > 15:53:10:185 - 0A  04  02  00  00  1C  F1
[RTU]>Tx > 15:53:53:643 - 0A  04  06  04  00  04  B1  FB
[RTU]>Rx > 15:53:53:680 - 0A  04  08  00  00  00  00  00  00  00  00  01  29
```

ADU

```
Type : Tx Message
Timestamp : 15:53:53:643
Slave Addr : 0A
Function Code : 04
Starting Address : 0604
Quantity of Registers : 0004
CRC : B1FB
```

Bus Monitor

Raw Data

```
[RTU]>Tx > 15:53:10:161 - 0A  04  06  04  00  01  71  F8
[RTU]>Rx > 15:53:10:185 - 0A  04  02  00  00  1C  F1
[RTU]>Tx > 15:53:53:643 - 0A  04  06  04  00  04  B1  FB
[RTU]>Rx > 15:53:53:680 - 0A  04  08  00  00  00  00  00  00  00  00  01  29
```

ADU

```
Type : Rx Message
Timestamp : 15:53:53:680
Slave Addr : 0A
Function Code : 04
Byte Count : 08
Register Values : 00 00 00 00 00 00 00 00
CRC : 0129
```
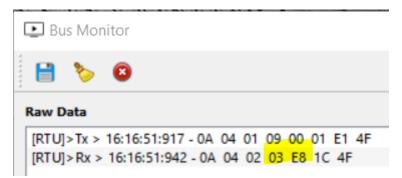
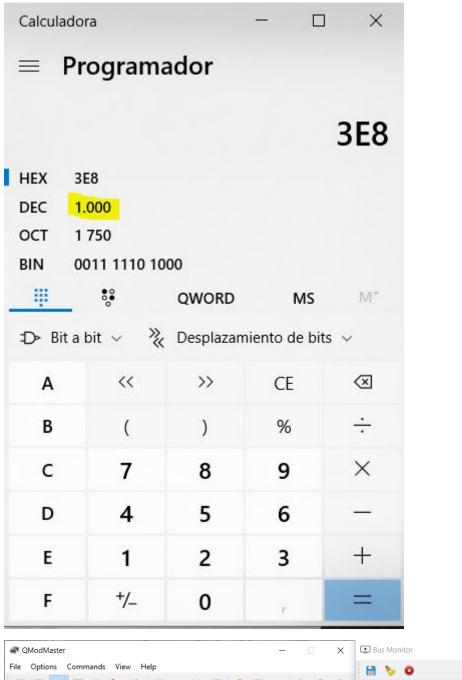To make tests we can change the ratio pulses-KWh

Default is 1000 pulses = 1kwh

Let's try with 1 pulse = 1kwh

Relationship between optical impulses and counting register	0x0109	16 bits	Read/Write	1000

By default we have

Bus Monitor

Raw Data

[RTU]>Tx > 16:16:51:917 - 0A 04 01 09 00 01 E1 4F
[RTU]>Rx > 16:16:51:942 - 0A 04 02 03 E8 1C 4F
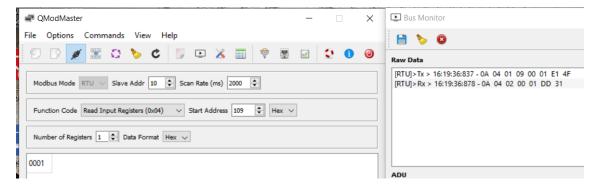
Let's check

It's counting

We see 4 impulses

Now we try with the LoRaWAN converter

The right command would be

AT+COMMAND1=0A 04 06 04 00 04,1

AT+DATACUT1=13,1,10+11

(Since AT+DATACUT1=13,1,4+5+6+7+8+9+10+11 is not allowed)

~

```
CMD1    = 0a 04 06 04 00 04 b1 fb
RETURN1 = 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Payload = 0d 43 01 00 00 00 00 00 00 00 00
```

But we have to connect the Dragino RS485-BL to the Circutor ReadWatt

And we have to setup the Dragino on TTS

AT+DEUI=?
a8 40 41 95 c1 82 c9 43
AT+APPKEY=?

AT+APPEUI=?

Let's try to feed the ReradWatt from the Dragino Device.
The 5V output is disabled by default, lets change with this command
AT+5VT=5000

3.8 Switch Jumper

Switch Jumper	Feature
SW1	ISP position: Upgrade firmware via UART
	Flash position: Configure device, check running status.
SW2	5V position: set to compatible with 5v I/O.
	3.3v position: set to compatible with 3.3v I/O.,

+3.3V: is always ON

+5V: Only open before every sampling. The time is by default, it is AT+5VT=0.   Max open time.
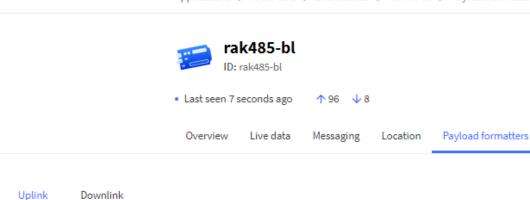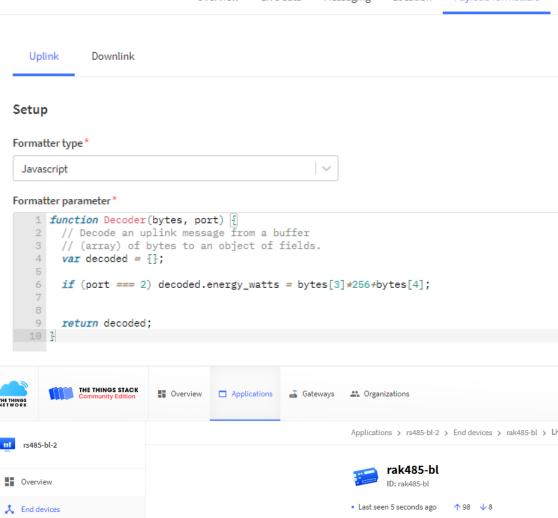
5000 ms.

Yes, it Works!
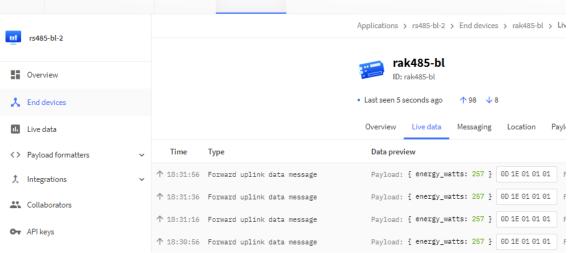
```
AT+DATACUT1=13,1,10+11

OK
[1698975]RX on freq 868500000 Hz at DR 5
[1699003]rxTimeOut
[1699981]RX on freq 869525000 Hz at DR 3
[1700021]rxTimeOut

CMD1    = 0a 04 06 04 00 04 b1 fb
RETURN1 = 0a 04 08 00 00 00 00 00 00 01 01 c1 79
Payload = 0d 20 01 01 01
```

This is the cumulated energy in KWh

Let's adjust the payload decoder

rak485-bl

ID: rak485-bl

• Last seen 7 seconds ago   ↑ 96   ↓ 8

Overview   Live data   Messaging   Location   **Payload formatters**

Uplink   Downlink

Setup

Formatter type *

Javascript

Formatter parameter *

```javascript
function Decoder(bytes, port) {
  // Decode an uplink message from a buffer
  // (array) of bytes to an object of fields.
  var decoded = {};

  if (port === 2) decoded.energy_watts = bytes[3]*256+bytes[4];


  return decoded;
}
```

THE THINGS STACK Community Edition   Overview   Applications   Gateways   Organizations

THE THINGS NETWORK

rs485-bl-2

Overview

End devices

Live data

Payload formatters   ⌄

Integrations   ⌄

Collaborators

API keys

rak485-bl

ID: rak485-bl

• Last seen 5 seconds ago   ↑ 98   ↓ 8

Overview   Live data   Messaging   Location   Payl

Time	Type	Data preview
↑ 18:31:56	Forward uplink data message	Payload: { energy_watts: 257 } 0D 1E 01 01 01 F
↑ 18:31:36	Forward uplink data message	Payload: { energy_watts: 257 } 0D 1E 01 01 01 F
↑ 18:31:16	Forward uplink data message	Payload: { energy_watts: 257 } 0D 1E 01 01 01 F
↑ 18:30:56	Forward uplink data message	Payload: { energy_watts: 257 } 0D 1E 01 01 01 F

Payload: { energy_watts: 257 }   0D 1E 01 01 01

Payload: { energy_watts: 257 }   0D 1E 01 01 01

Payload: { energy_watts: 257 }   0D 1E 01 01 01

Payload: { energy_watts: 257 }   0D 1E 01 01 01

Payload: { energy_watts: 257 }   0D 1E 01 01 01

Let's try to switch on a known load to see how energy increases

That's all! Stay tuned