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.

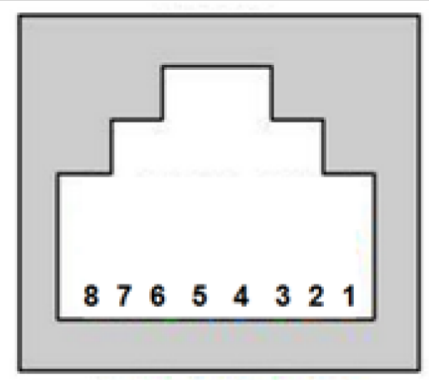


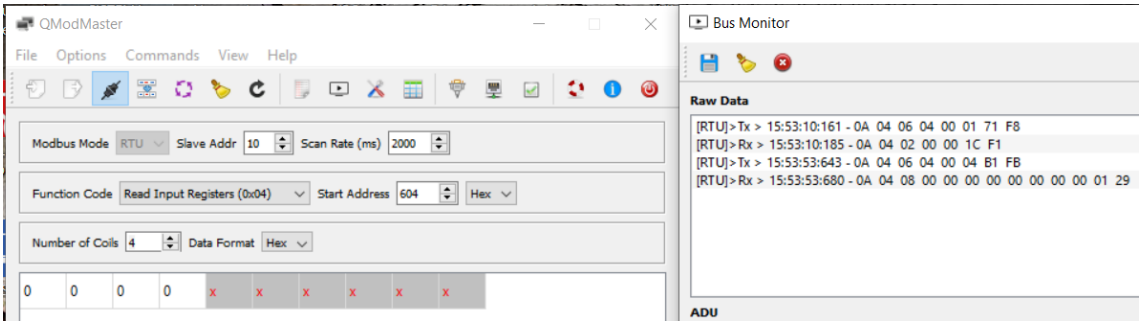
Figure 5: ReadWatt RJ45 Connector.

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

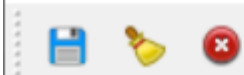
Raw Data

```
[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
```

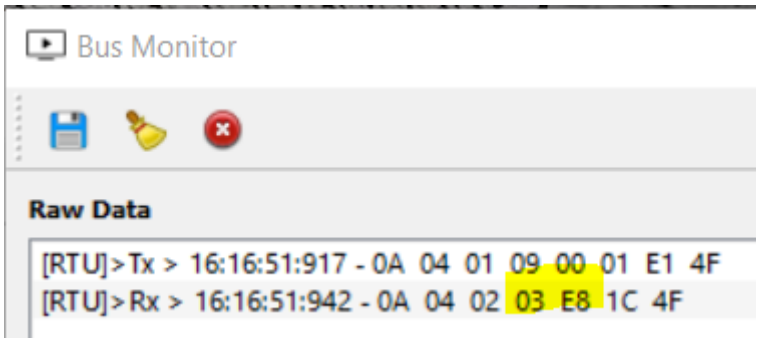
To make tests we can change the ratio pulses-KWh

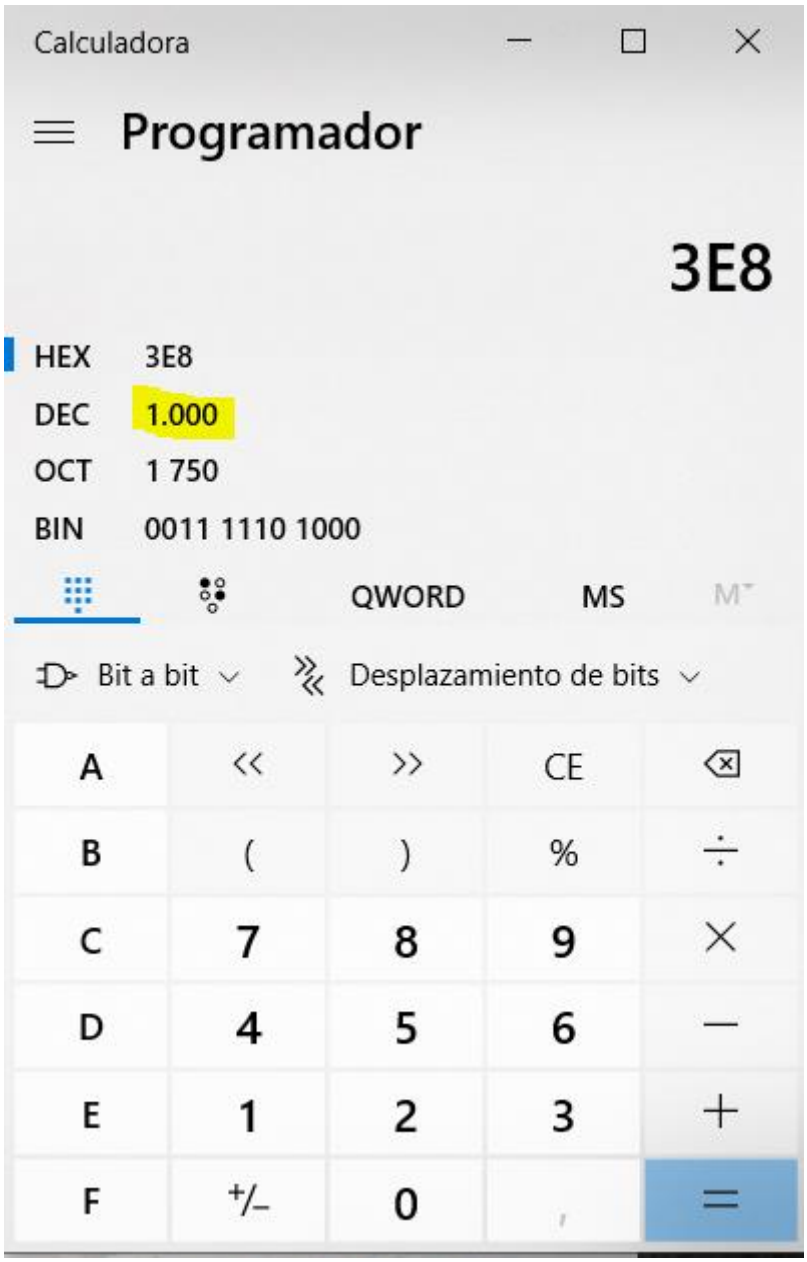
Default is 1000 pulses = 1kwh

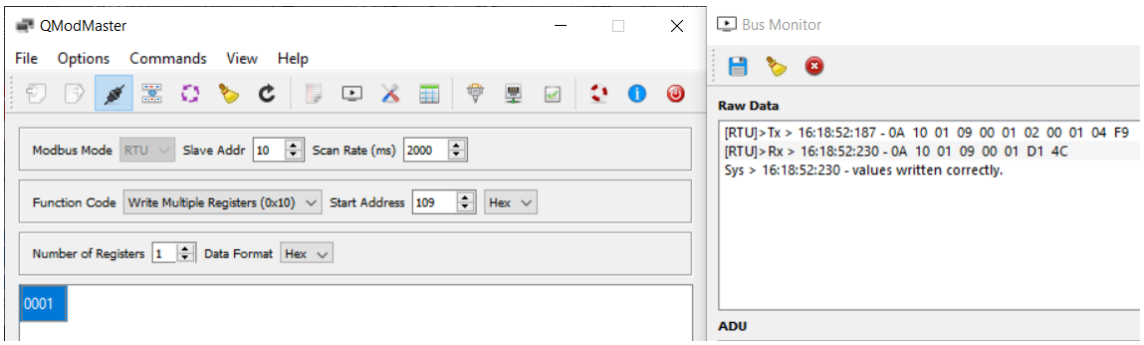
Let’s try with 1 pulse = 1kwh

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

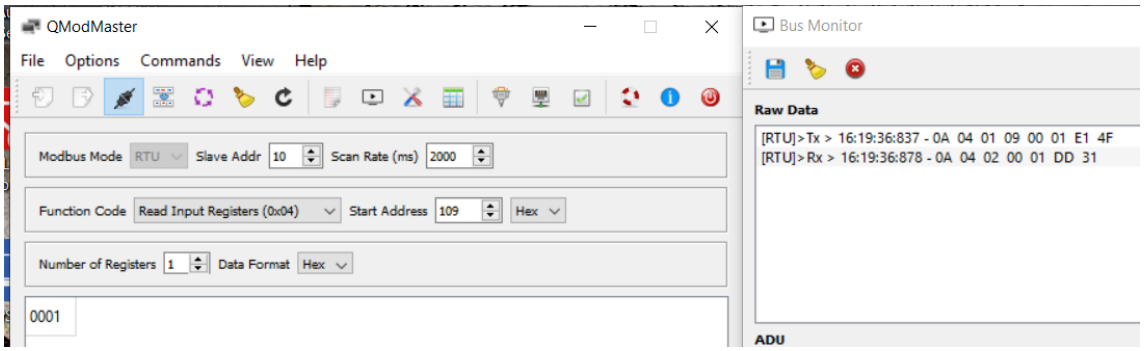
By default we have



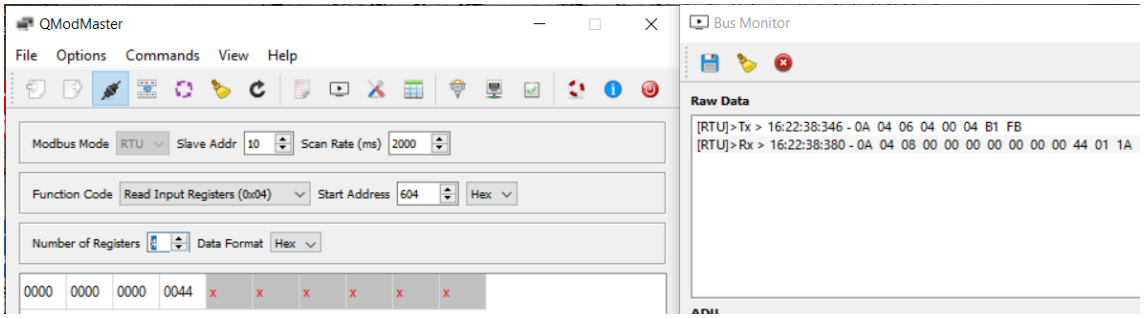

Calculadora
Programador
3E8
HEX 3E8
DEC 1.000
OCT 1 750
BIN 0011 1110 1000
QWORD
MS
Bit a bit
Desplazamiento de bits
A
B
C
D
E
F
CE
7
8
9
4
5
6
1
2
3
0


QModMaster
File Options Commands View Help
Modbus Mode RTU Slave Addr 10 Scan Rate (ms) 2000
Function Code Write Multiple Registers (0x10) Start Address 109 Hex
Number of Registers 1 Data Format Hex
0001
Bus Monitor
Raw Data
[RTU]>Tx > 16:18:52:187 - 0A 10 01 09 00 01 02 00 01 04 F9
[RTU]>Rx > 16:18:52:230 - 0A 10 01 09 00 01 D1 4C
Sys > 16:18:52:230 - values written correctly.
ADU

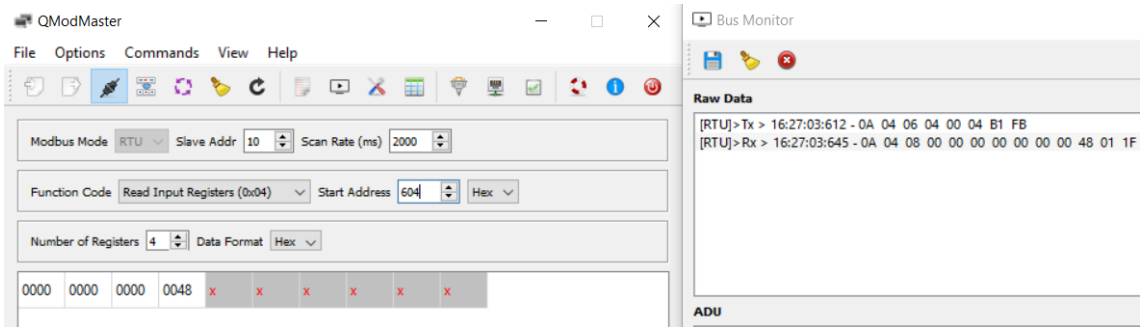
Let’s check



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
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 01 01 c1 79
Payload  = 0d 20 01 01 01
```

This is the cumulated energy in KWh

Let's adjust the payload decoder

Applications › rs485-bl-2 › End devices › rak485-bl › Payload formatters ›

rak485-bl

ID: rak485-bl

• Last seen 7 seconds ago ↑ 96 ↓ 8

Overview | Live data | Messaging | Location | Payload formatters

Uplink | Downlink

Setup

Formatter type *

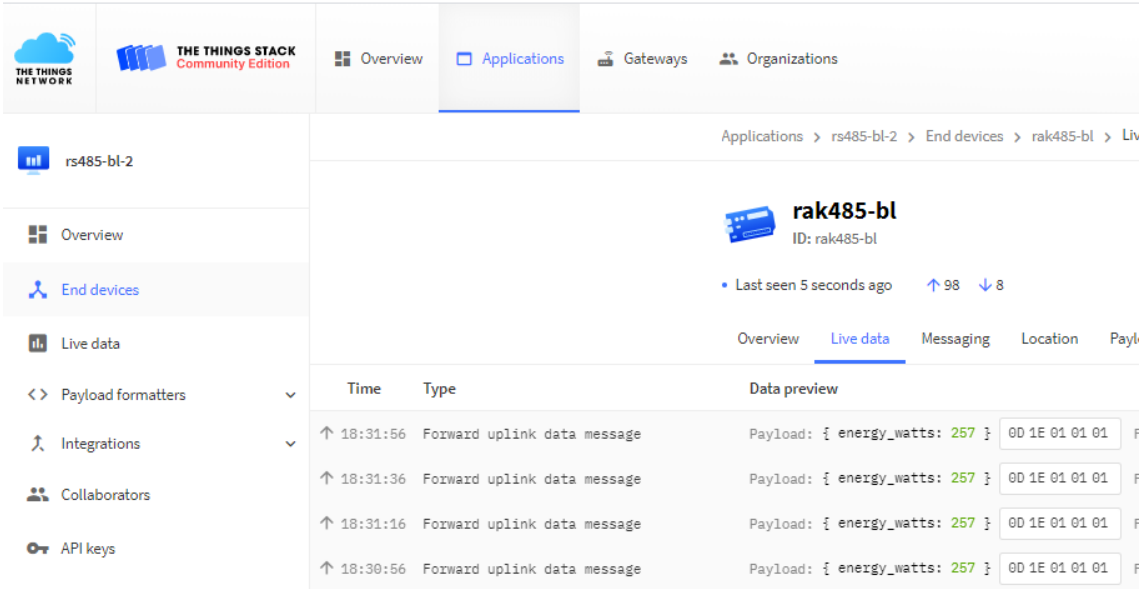
Javascript

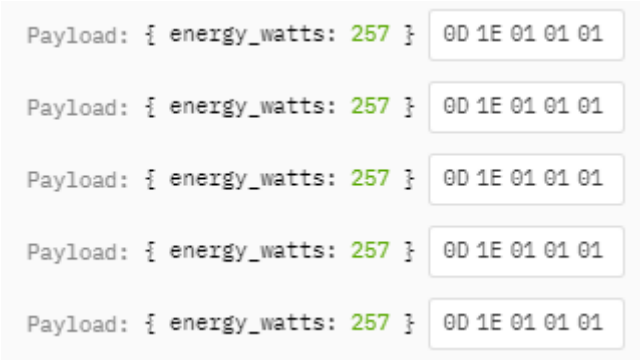
Formatter parameter *

```
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;
}
```





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

You can find updates here

https://github.com/xavierflorensa/CIRUTOR-ReadWatt-utility-energy-meter-thru-LoRaWAN

That’s all! Stay tuned