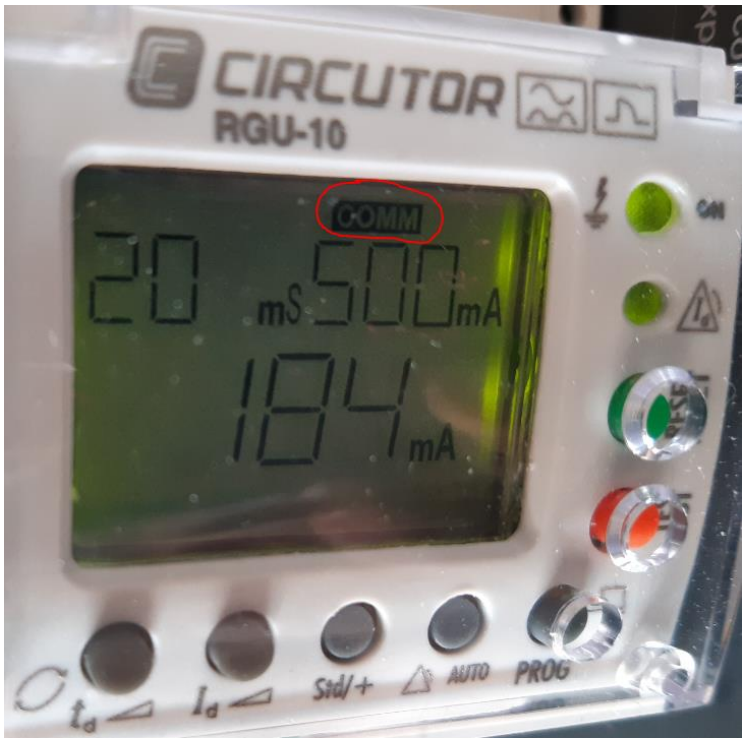
Dragino RS485 to LoRa test

Let’s test with this Modbus device

RGU10C Circutor



6.3.- COMANDOS MODBUS

Todas las direcciones del mapa Modbus están en Hexadecimal.

Tabla 12: Mapa de memoria Modbus.

Parámetro	Símbolo	Dirección	Lectura / Escritura	Valores	Unidades
Nº de periférico	PERI	0000	R/W	1 - 99	-
Velocidad de comunicación	bd	0001	R/W	2400-4800-9600-19200-38400-57600-115200	baudios
Tipo de paridad	PARI	0002	R/W	None - Odd - Even	-
Frecuencia de trabajo	FREC	0003	R/W	50 - 60	Hz
Corriente disparo Relé principal	Id	0004	R/W	0.03 - 0.1- 0.3 - 0.5 - 1 - 3 - 5 - 10	A
Tiempo de retardo Relé principal	td	0005	R/W	INS - SEL - 0.02 - 0.1 - 0.3 - 0.4 - 0.5 - 0.75 - 1 - 3 - 5 -10	s
Polaridad contactos Relé principal	Std/+	0006	R/W	Estándar - Positiva	-
Corriente disparo Prealarma	Id'	0007	R/W	OFF - 50 - 60 - 70 - 80	%
Tiempo de retardo Prealarma	td'	0008	R/W	0.02 - 0.1 - 0.2 - 0.3 - 0.4 - 0.5 - 0.75 -1 - 3 - 5 - 10	s
Polaridad contactos Prealarma	Std/+	0009	R/W	Estándar - Positiva	-
Reconexión prealarma	REC	000A	R/W	Manual - REC	-

Let’s read frequency on register 3

04 means read input registers

0003 is the address we read: Frequency

0002 is the byte number (2)

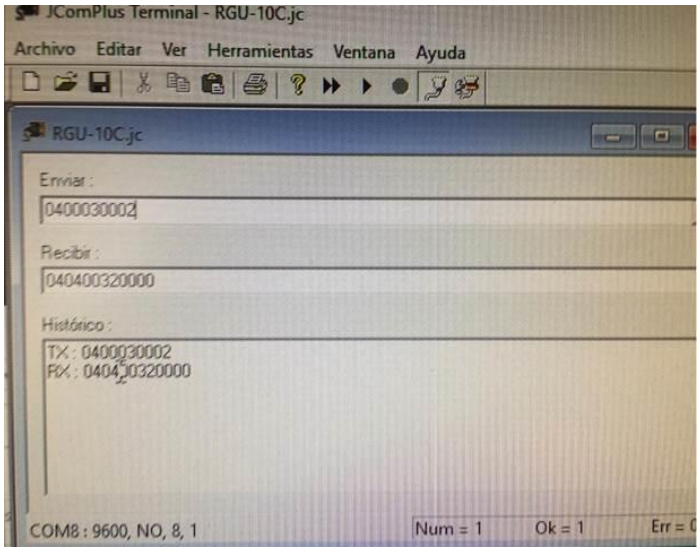
And this is the answer

04 means read input registers

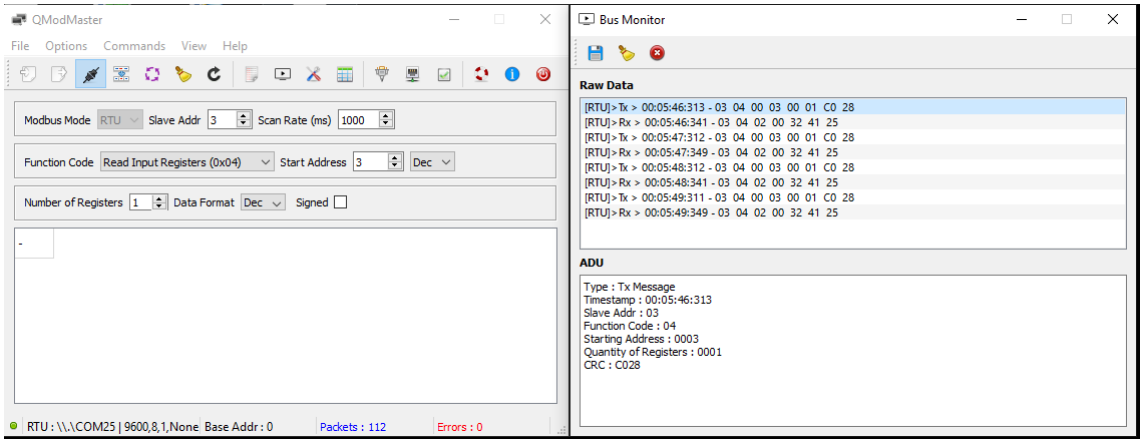
04 is the returned bytes amount, yes 00 32 00 00 (4 bytes)

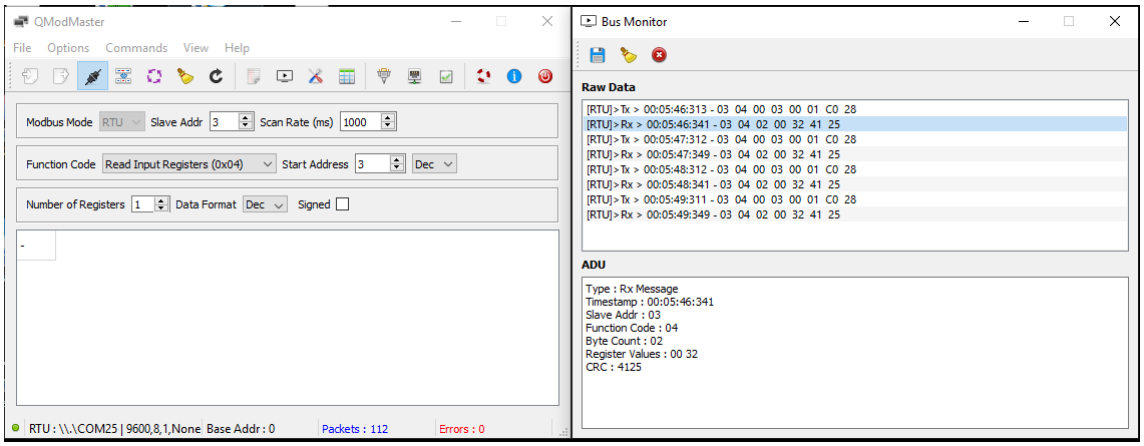
0032 is 50 in decimal, so the working frequency

With Jcom



And in more Depth including CRC





Sys > 22:39:57:938 - Connecting to Serial Port [\\.\COM25]...OK

[RTU]>Tx > 22:40:05:301 - 03 04 00 03 00 01 C0 28

[RTU]>Rx > 22:40:05:326 - 03 04 02 00 32 41 25

[RTU]>Tx > 22:40:06:303 - 03 04 00 03 00 01 C0 28

[RTU]>Rx > 22:40:06:334 - 03 04 02 00 32 41 25

[RTU]>Tx > 22:40:07:304 - 03 04 00 03 00 01 C0 28

[RTU]>Rx > 22:40:07:342 - 03 04 02 00 32 41 25

[RTU]>Tx > 22:40:08:302 - 03 04 00 03 00 01 C0 28

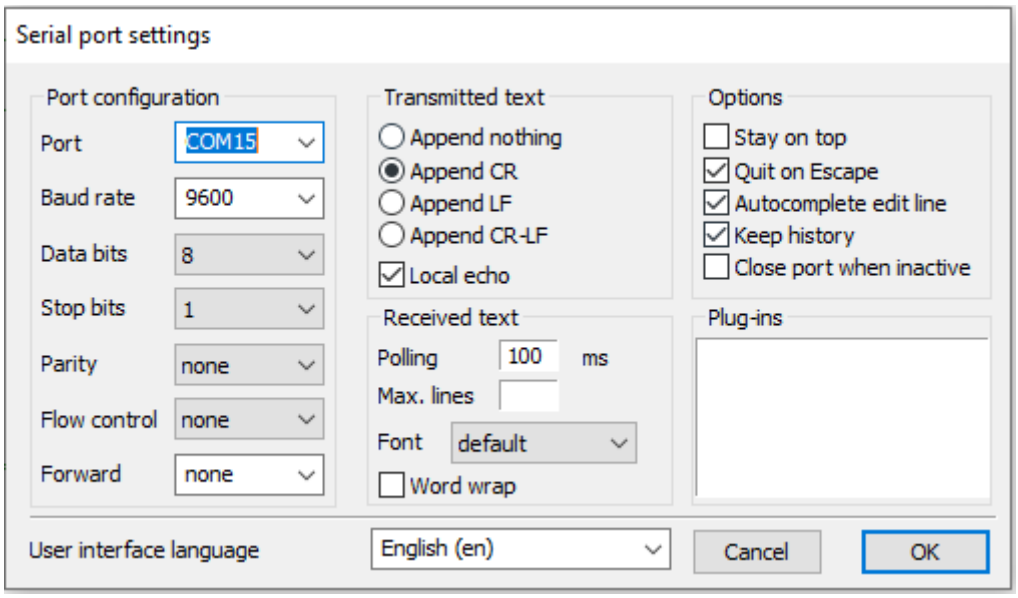
[RTU]>Rx > 22:40:08:333 - 03 04 02 00 32 41 25

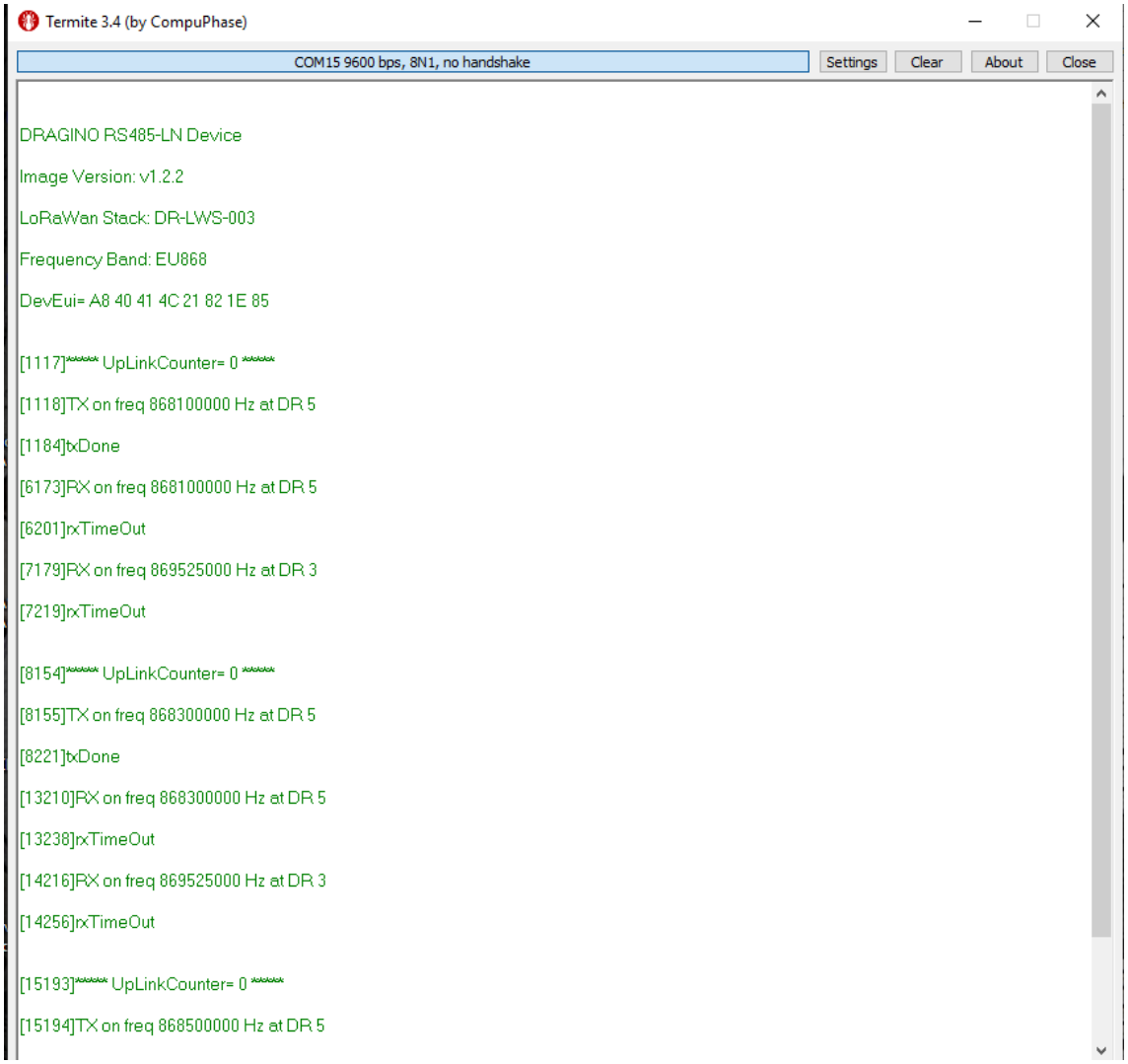
Now we try to enter this telegram on the Draguino RS485 to send the answer to TTN

Let’see the response from the Dragino device

Let’s connect the programming USB to TTL. This i sport 15

Let’s open Termite terminal





Now let’s try to send some AT commands

```
AT+BAUDR=9600

OK
```

```
AT+PARITY=0

OK
```

Yeah, it is alive!

Let’s connect our RGU10C to the RS485-LN

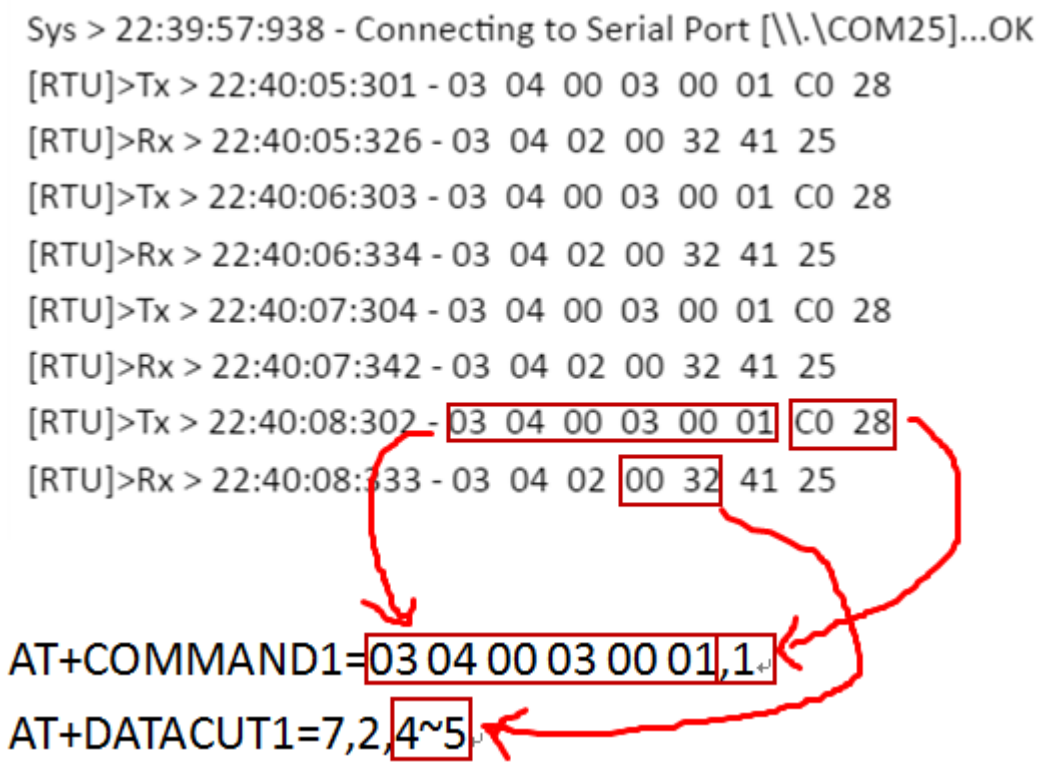
The AT+BAUDR command can set the baud rate;

The AT+PARITY command can set the data verification method;

The example given by your email, the corresponding configuration of the device:

AT+COMMAND1=03 04 00 03 00 01,1

AT+DATACUT1=7,2,4~5



Give the commands to program the transactions

The example given by your email, the corresponding configuration of the device:

AT+COMMAND1=03 04 00 03 00 01,1

AT+COMMAND1

AT+COMMANDx=xx xx xx xx xx xx xx xx xx xx xx xx,m

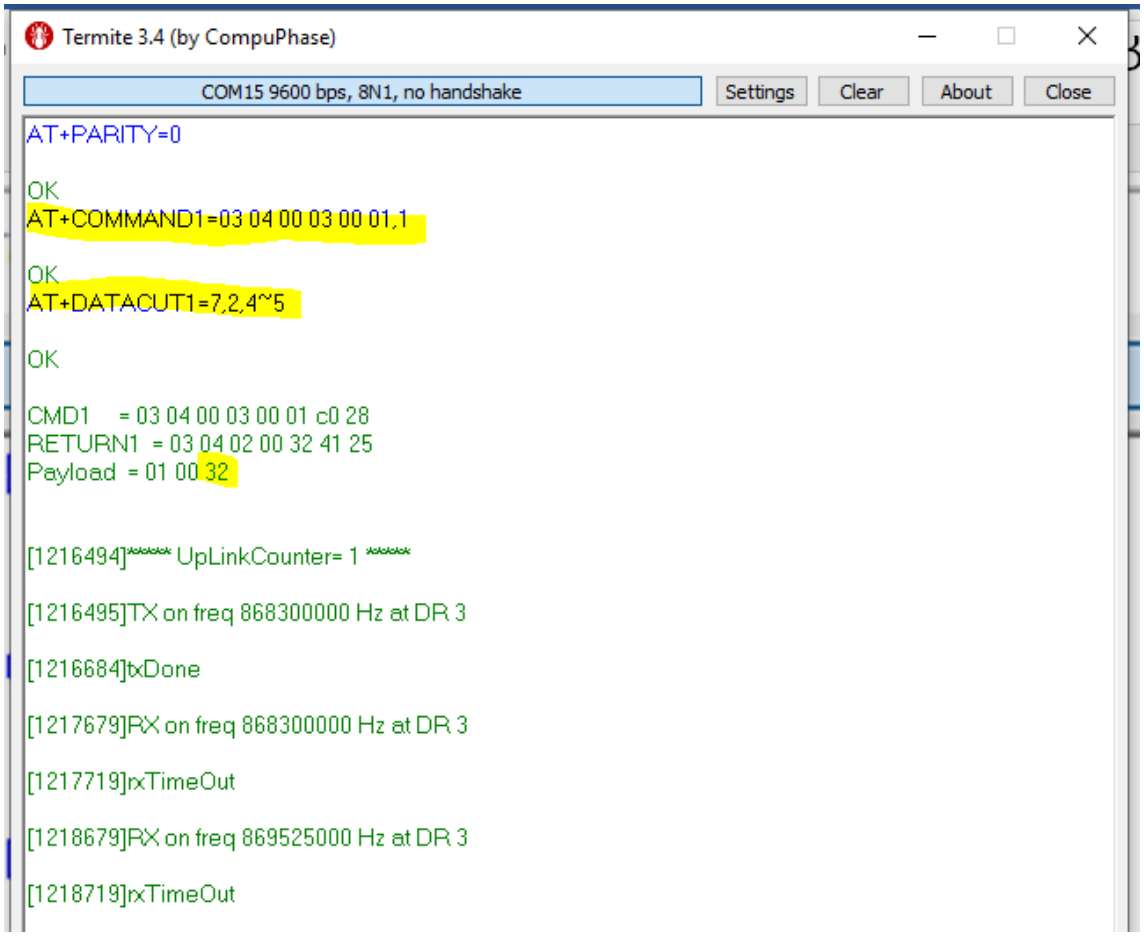
xx xx xx xx xx xx xx xx xx xx xx xx: The RS485 command to be sent

m: 0: no CRC, 1: add CRC-16/MODBUS in the end of this command

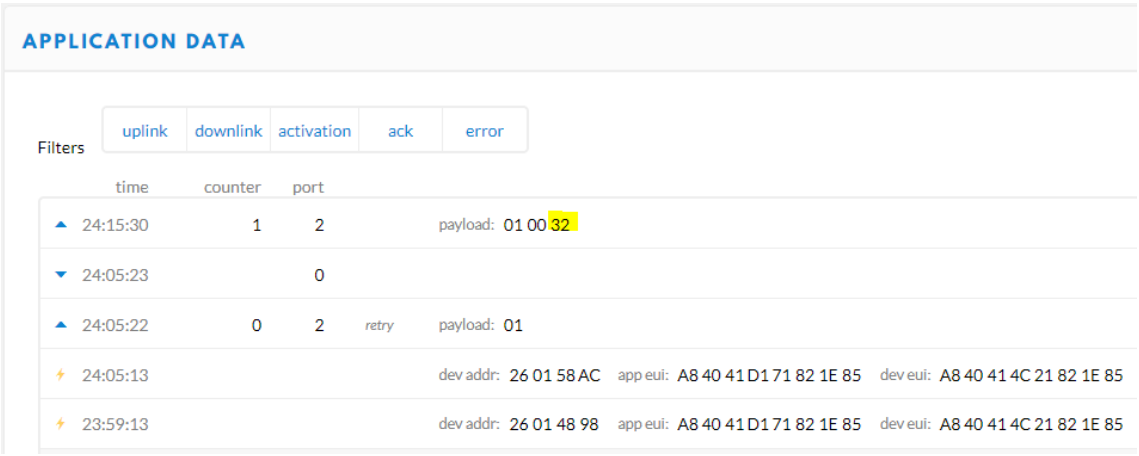
AT+DATACUT1=7,2,4~5

AT+DATACUTx=a,b,c

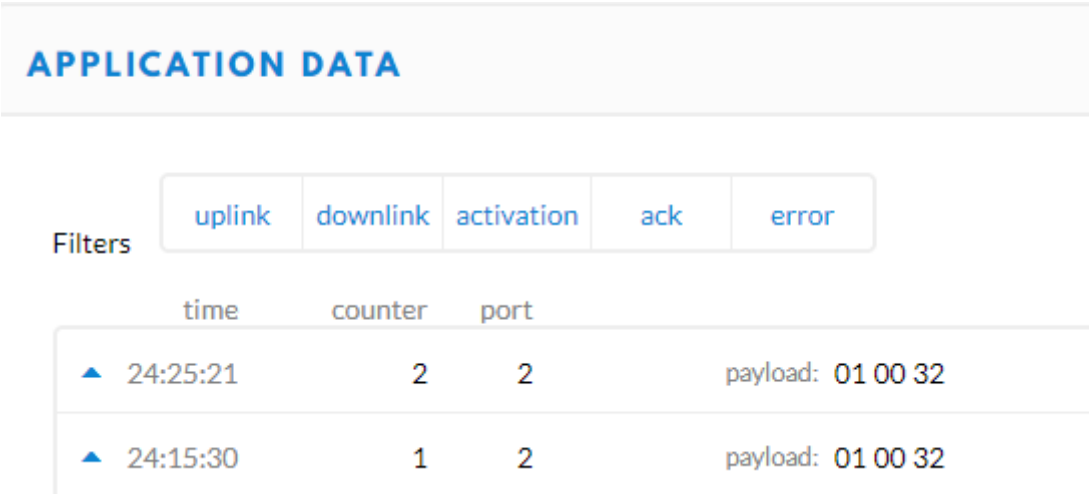
- a: length for the return of AT+COMMAND
- b:1: grab valid value by byte, max 6 bytes. 2: grab valid value by bytes section, max 3 sections.
- c: define the position for valid value.



It Works!



And even gets periodically each 10 minutes



APPLICATION DATA

Filters | uplink | downlink | activation | ack | error

time	counter	port	payload: 01 00 32
24:25:21	2	2	

Uplink

Payload

01 00 32

Fields

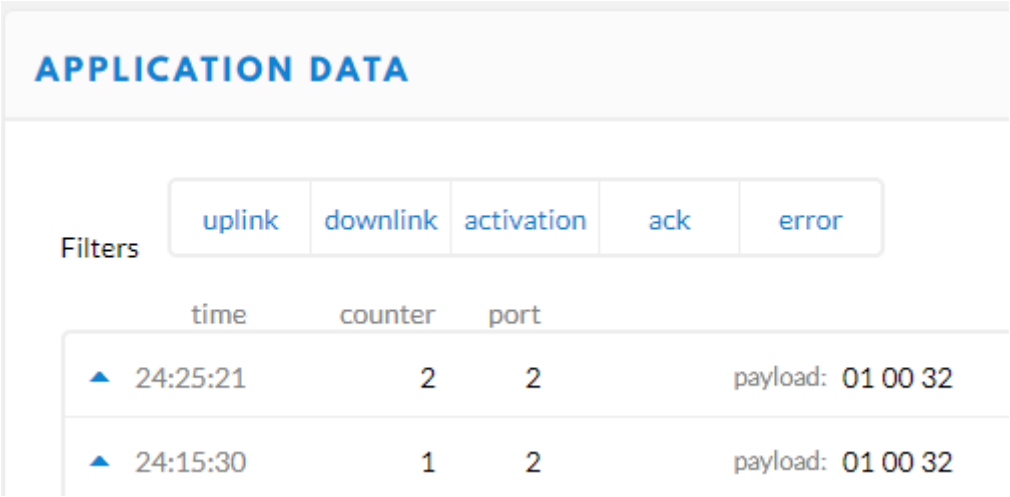
no fields

Metadata


```
{
  "time": "2020-09-18T22:25:21.206797562Z",
  "frequency": 868.3,
  "modulation": "LORA",
  "data_rate": "SF9BW125",
  "coding_rate": "4/5",
  "gateways": [
    {
      "gtw_id": "eui-b827ebfffe09b11d",
      "timestamp": 1327912652,
      "time": "",
      "channel": 1,
      "rssi": -71,
      "snr": 10.2
    }
  ]
}
```

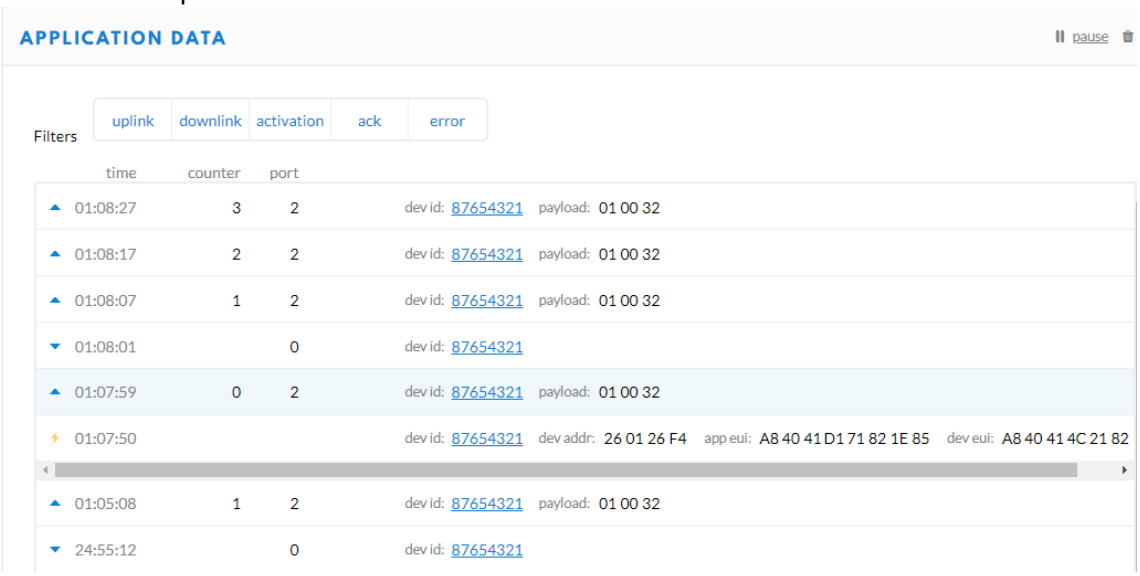

Estimated Airtime

103.424 ms



Now let's try to change the period from 60 seconds (default) to 10 seconds
From the program terminal

Nothing changes
We have to reset or power off and on the Dragino device
Not we have a periodo f 10 seconds



Let's seehow to change the programmed transmisión
Now we will try read on register 4 (This is the preset trip current)

From serial Terminal
AT+COMMAND1=03 04 00 04 00 01,1

Yes

```
AT+COMMAND1=03 04 00 04 00 01,1

OK

CMD1    = 03 04 00 04 00 01 71 e9
RETURN1  = 03 04 02 00 05 00 f3
Payload  = 01 00 05


[1169427]****** UpLinkCounter= 117 ******

[1169428]TX on freq 867100000 Hz at DR 5

[1169484]txDone

[1170473]RX on freq 867100000 Hz at DR 5

[1170501]rxTimeOut

[1171479]RX on freq 869525000 Hz at DR 3

[1171519]rxTimeOut
```

Yes now we get 5 corresponding to 3.0 A
Since the posible values are

Corriente disparo Relé principal	Id	0004	R/W	0.03 - 0.1- 0.3 - 0.5 - 1 - 3 - 5 - 10	A

Now we change the preset on the leak circuit breaker relay to 0.03 (30mA)
Yes, 0 is 30mA!

Finally we disconnect the RS485 cable from The leakage realy RGU10 and we get the following result

APPLICATION DATA

Filters: uplink | downlink | activation | ack | error

time	counter	port		
01:41:17	203	2	dev id: 87654321	payload: 01 00 00
01:41:10		0	dev id: 87654321	
01:41:08	201	2	dev id: 87654321	payload: 01 00 00
01:41:09		0	dev id: 87654321	
01:40:57	200	2	dev id: 87654321	payload: 01 00 00
01:40:55		0	dev id: 87654321	
01:40:53	199	2	dev id: 87654321	payload: 01 00 00
01:40:37	198	2	dev id: 87654321	payload: 01 00 00

Obvious since there is no one listening at address 3
But the payload is made of bytes 4 and 5

```
CMD1    = 03 04 00 04 00 01 71 e9
RETURN1  = 00 00 00 00 00 00 00
Payload  = 01 00 00


[1909002]***** UpLinkCounter= 192 *****

[1909003]TX on freq 868300000 Hz at DR 5

[1909059]txDone

[1910048]RX on freq 868300000 Hz at DR 5

[1910077]rxTimeOut

[1911054]RX on freq 869525000 Hz at DR 3

[1911094]rxTimeOut


CMD1    = 03 04 00 04 00 01 71 e9
RETURN1  = 00 00 00 00 00 00 00
Payload  = 01 00 00
```

Variable Speed drive and Dragino RS485 to Lora for Monitoring

Salicru CV30 VFD

Now we want to read the speed of a VFD
Our VFD i son address 1
9600 bauds
No Parity, 8 bits, 1 stop bit: N,8,1
Reading the speed on register:

Velocidad de operación	3005H	Rango: 0~65535 RPM	R

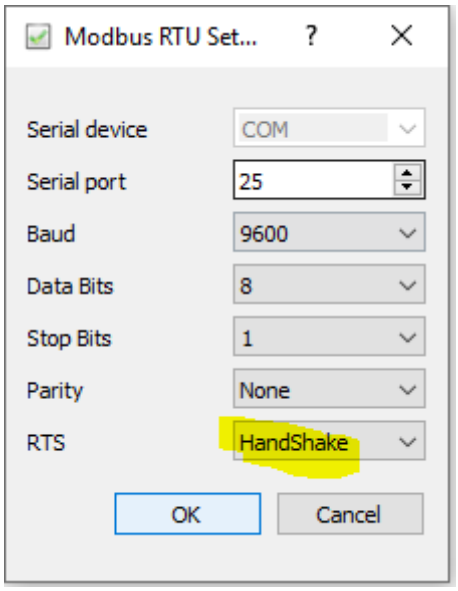
Parameter 12293 in decimal is 3005 in Hex

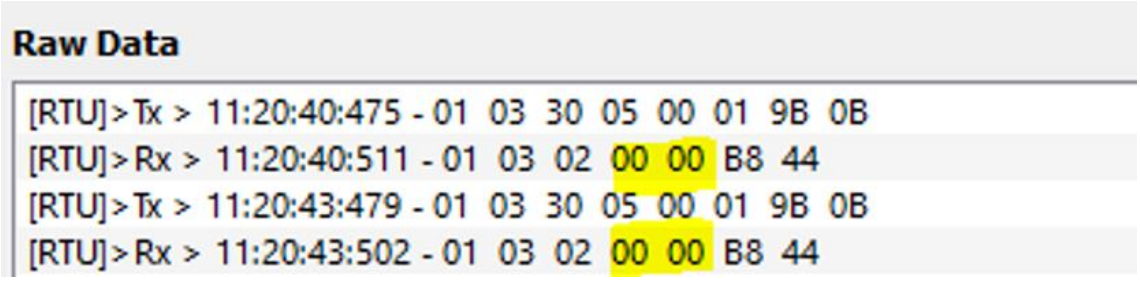
First we try with qModMaster terminal, in order to find out the right parameters

Connecting the VFD to the computer with a RS-485 to USB converter

Yes, we have the VFD stopped, with 0 speed as we see here 00 00 RPM

If yo do not set the RTS to Handshake you will get an error



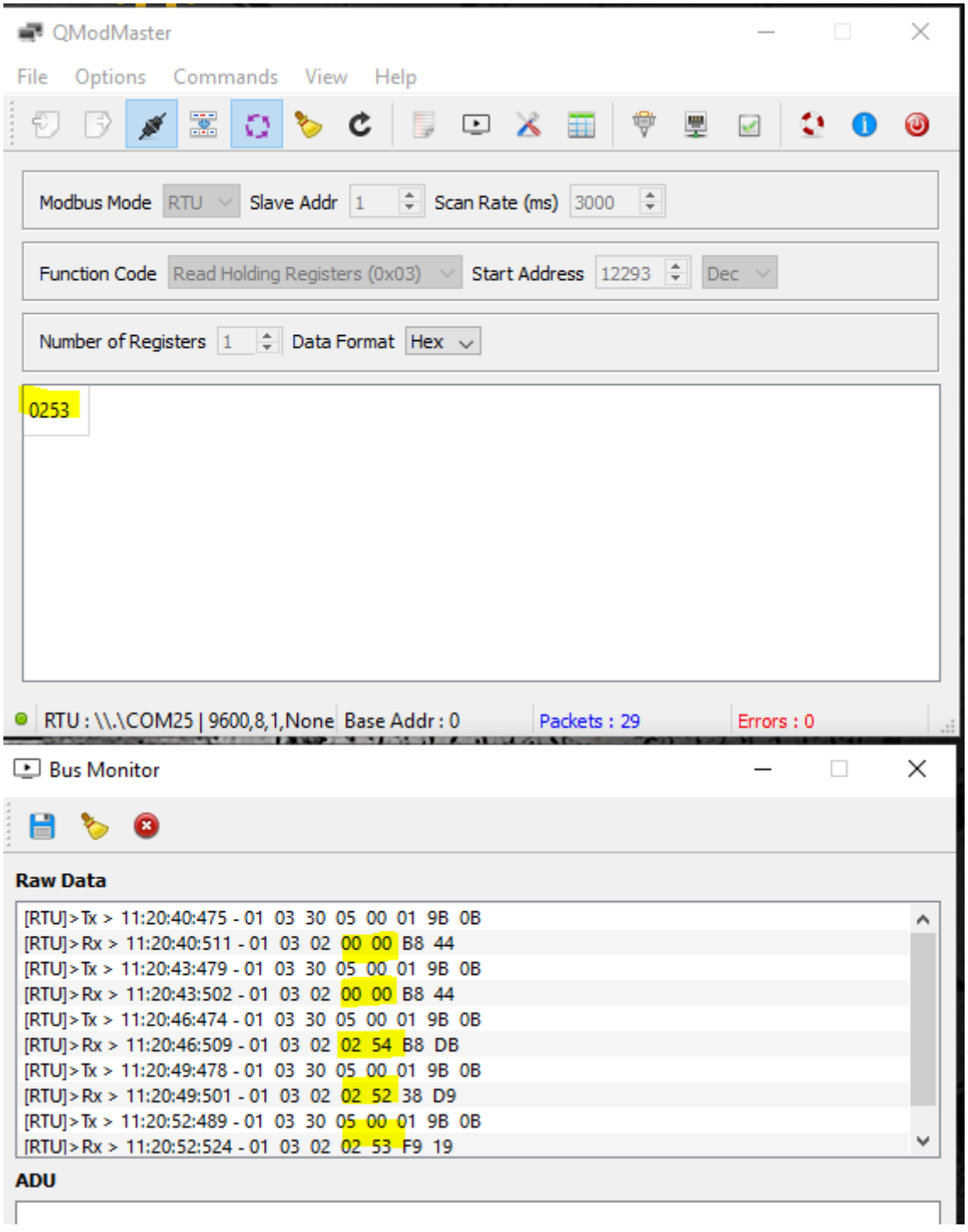


The we start the motor manually with a digital input on the drive (speed is controlled by Modbus)

We see

595 RPM (0253 Hex)

It Works!



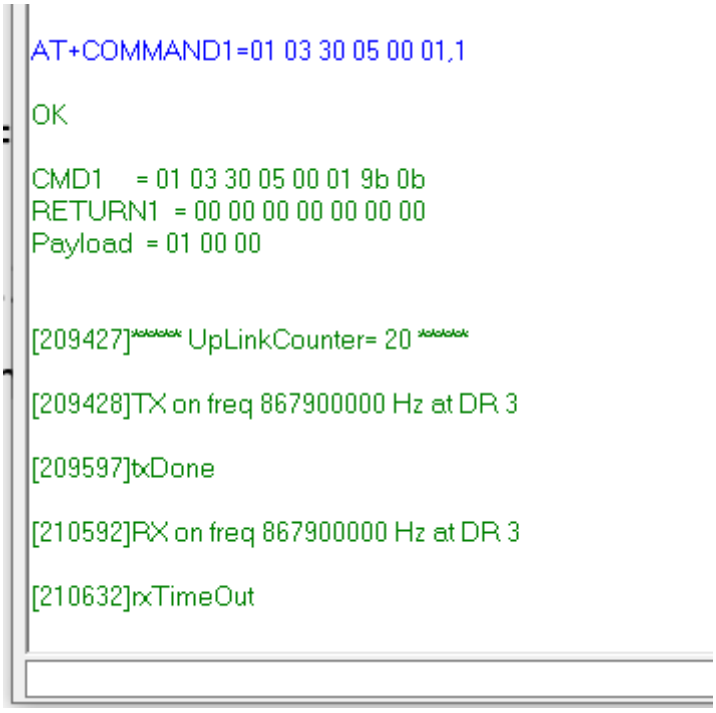
So now we know the right command to programm to The Dragino RS-485 transactions

And this is:

AT+COMMAND1=01 03 30 05 00 01,1

AT+DATACUT1=7,2,4~5 (But this was already programmed on the Dragino so we do not need to resend this AT command)

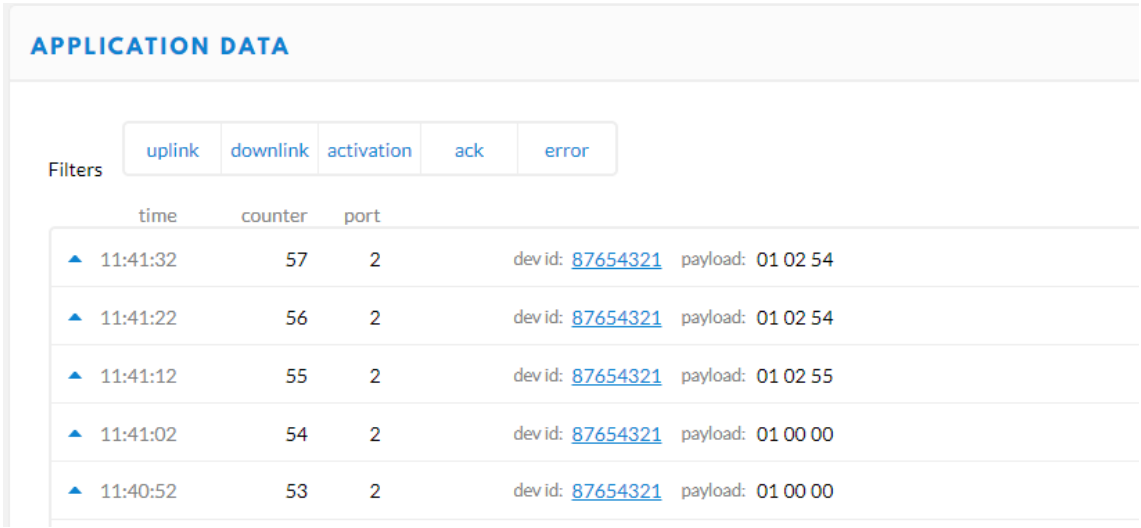
Yes, we have already programmed the Dragion, but the reponse is still 000000000 since we have not connected the VFD to the Dragino



Let's connect the VFD to Dragino RS-485-LN

Voilà,

First drive stopped, and the drive started at speed 02 54 in Hex (595 RPM in decimal)



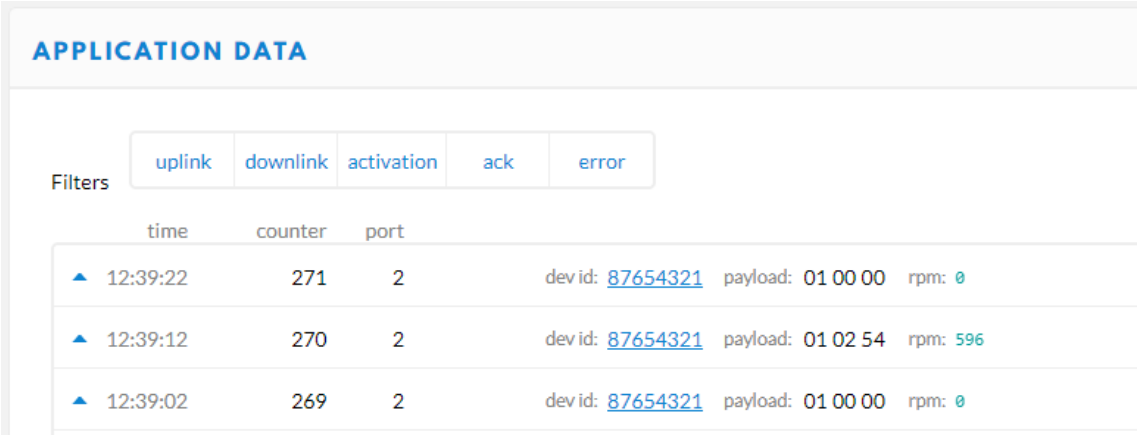
```
CMD1    = 01 03 30 05 00 01 9b 0b
RETURN1  = 01 03 02 00 00 b8 44
Payload  = 01 00 00


[429427]****** UpLinkCounter= 42 ******

[429428]TX on freq 868300000 Hz at DR 3

[429597]txDone

[430592]RX on freq 868300000 Hz at DR 3

[430632]rxTimeOut

[431592]RX on freq 869525000 Hz at DR 3

[431632]rxTimeOut


CMD1    = 01 03 30 05 00 01 9b 0b
RETURN1  = 01 03 02 02 54 b8 db
Payload  = 01 02 54
```

APPLICATION DATA

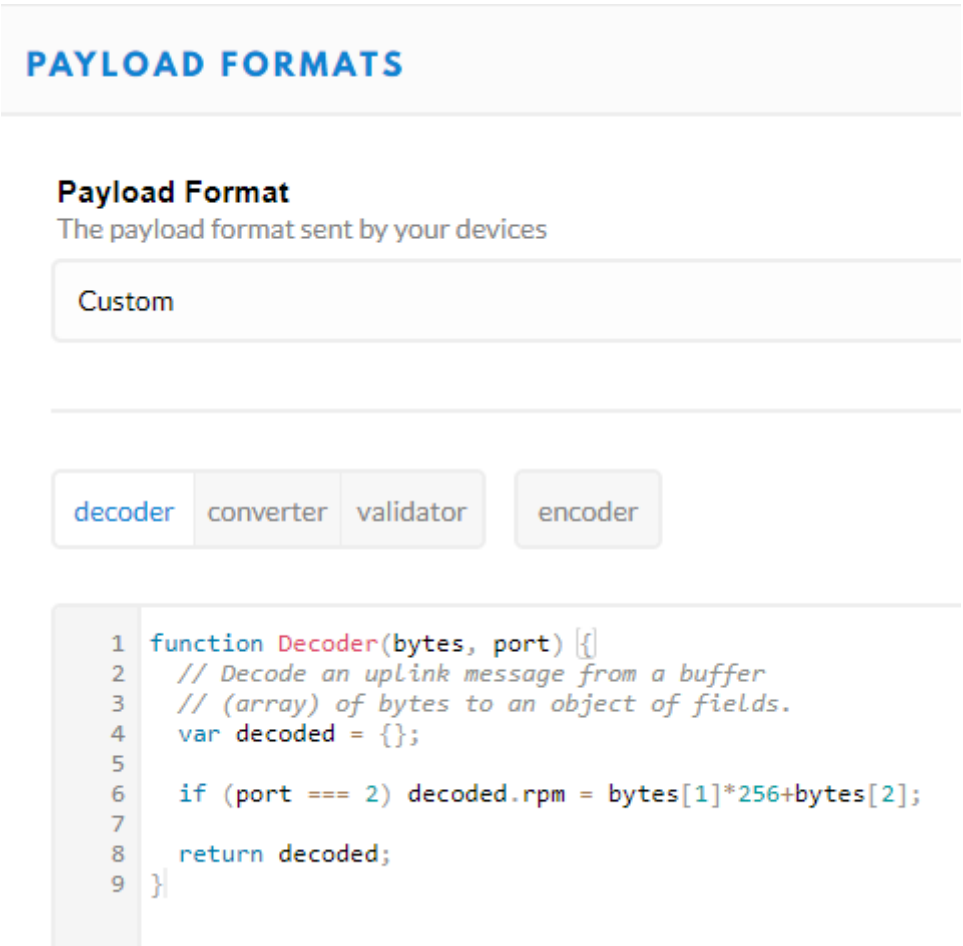
Filters: uplink | downlink | activation | ack | error

time	counter	port		
11:41:32	57	2	dev id: 87654321	payload: 01 02 54
11:41:22	56	2	dev id: 87654321	payload: 01 02 54
11:41:12	55	2	dev id: 87654321	payload: 01 02 55
11:41:02	54	2	dev id: 87654321	payload: 01 00 00
11:40:52	53	2	dev id: 87654321	payload: 01 00 00

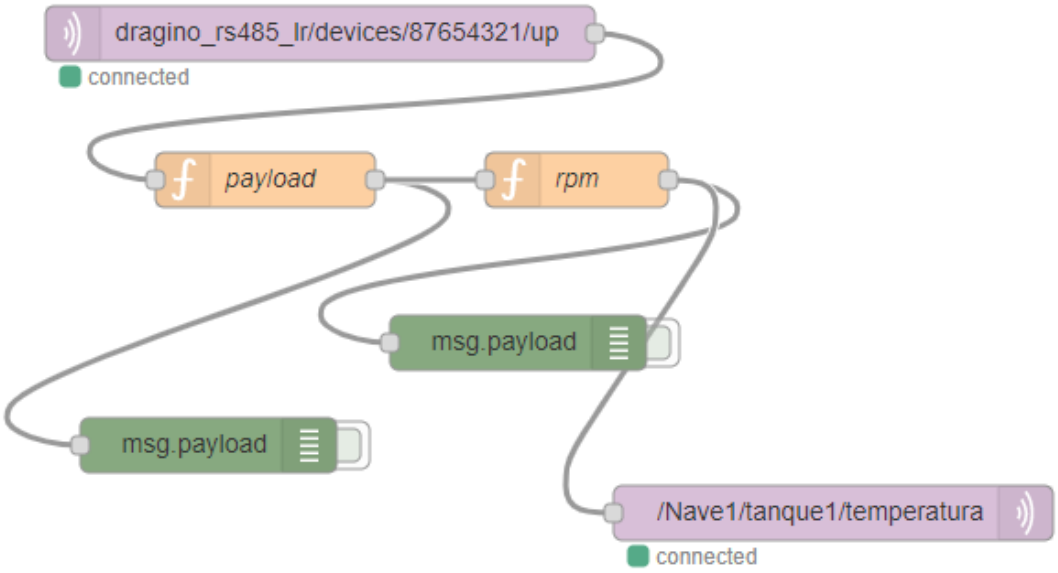
But let’s decode the payload since it is in Hex



This is the payload decoder



How to send the speed values to a mobile phone with “IoT On Off “ App

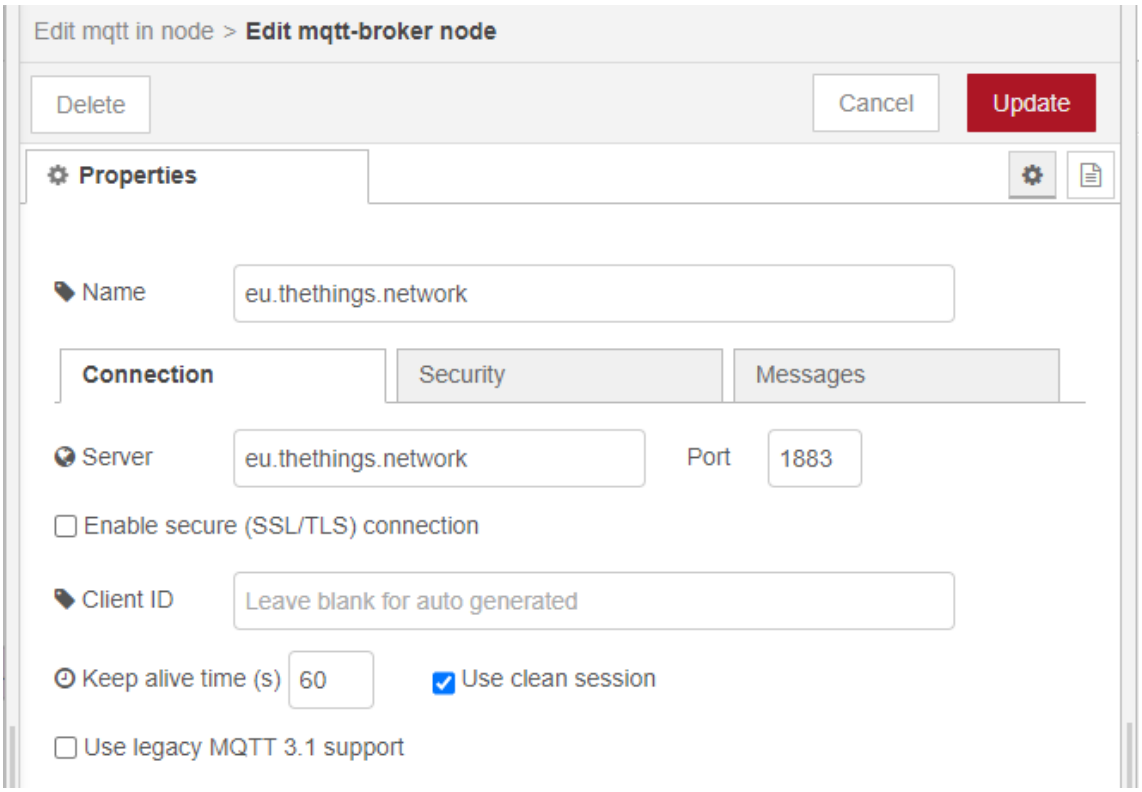


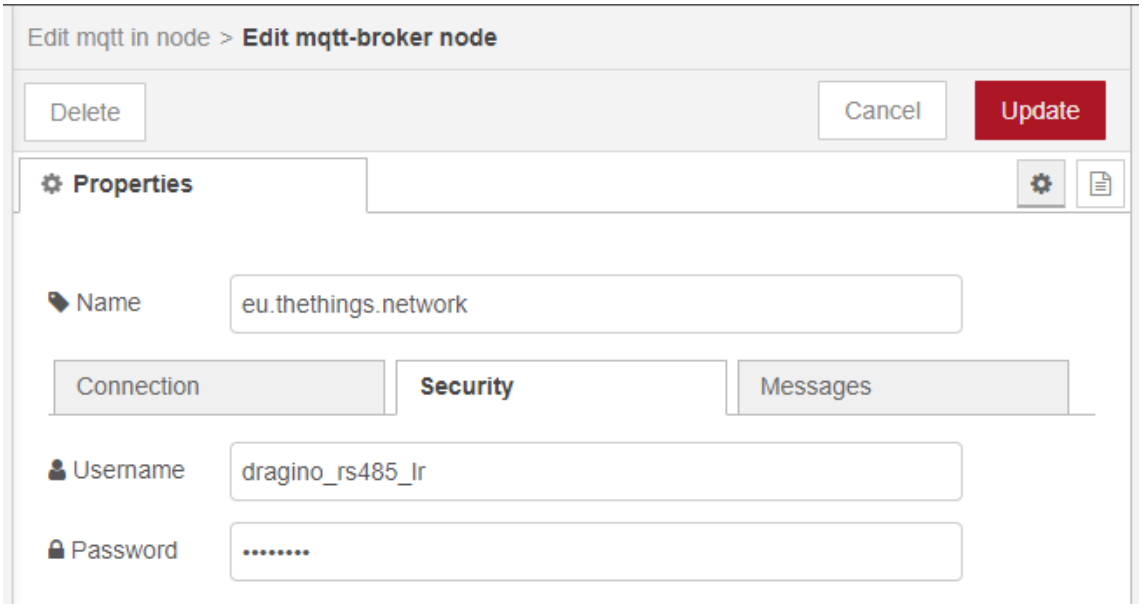
Edit mqtt in node

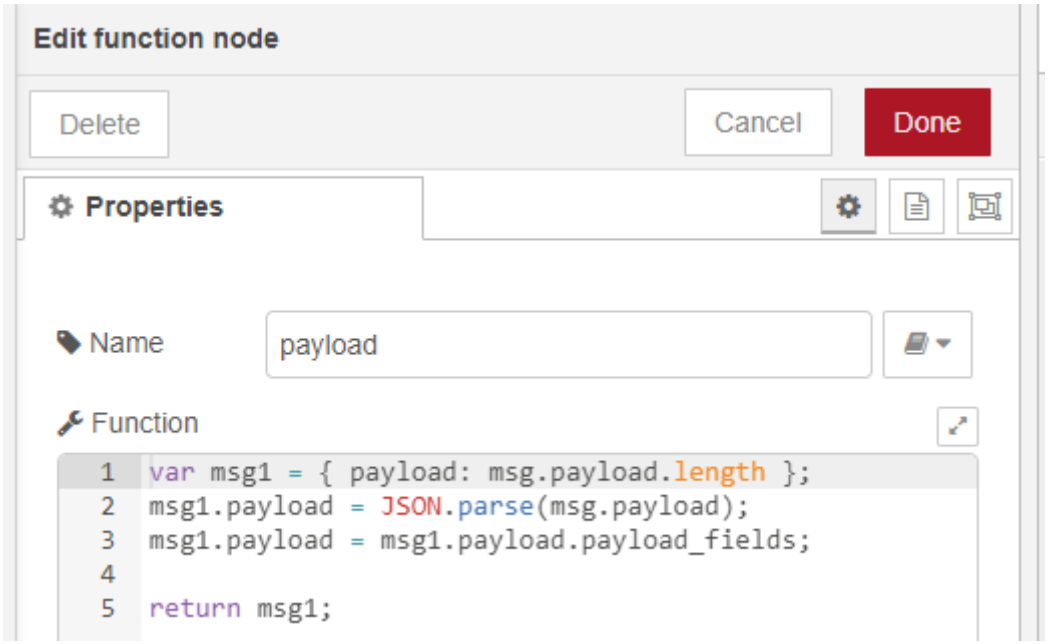
Delete | Cancel | Done

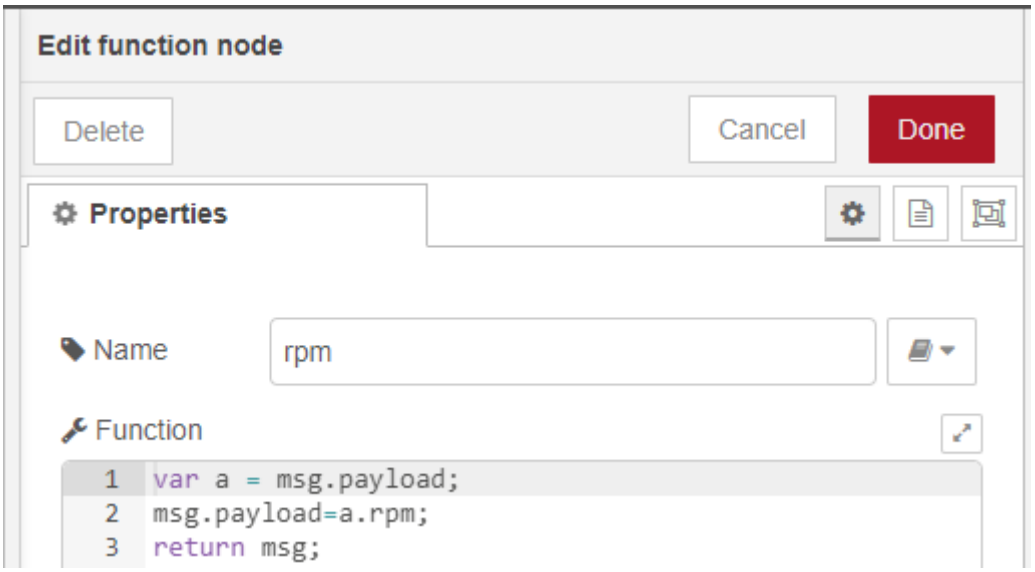
Properties

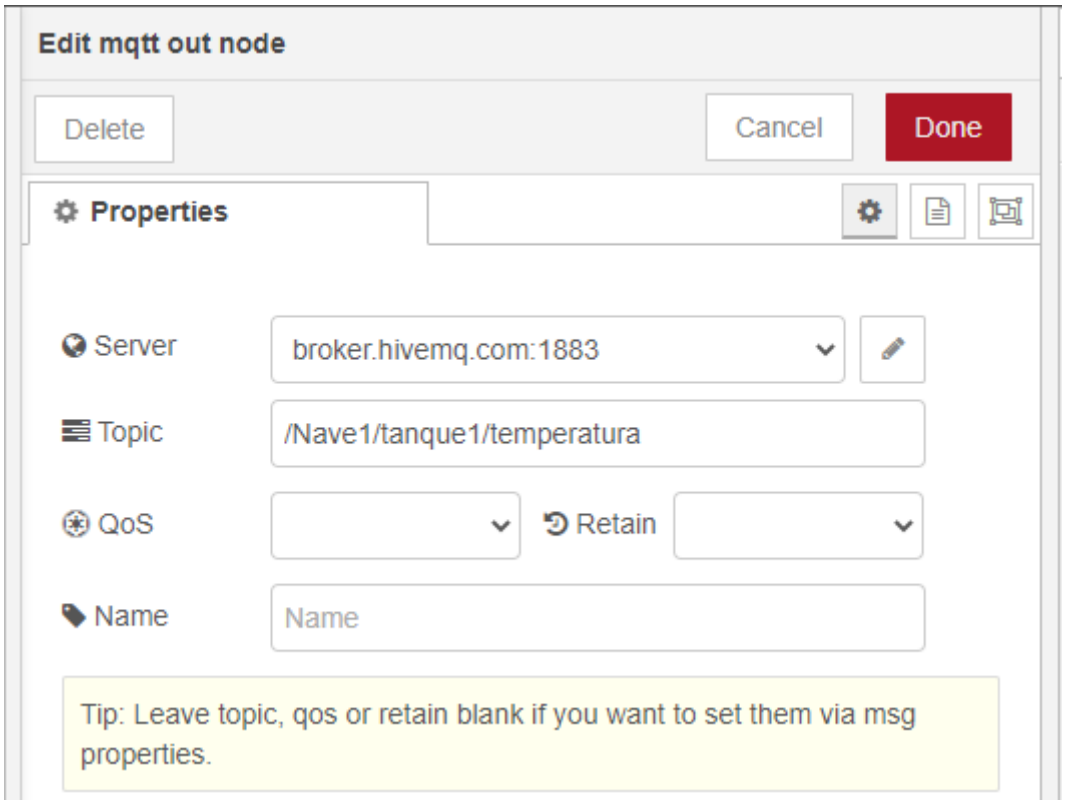
Server	eu.thethings.network
Topic	dragino_rs485_lr/devices/87654321/up
QoS	2
Output	auto-detect (string or buffer)
Name	Name


Edit mqtt in node > Edit mqtt-broker node
Delete
Cancel
Update
Properties
Name
eu.thethings.network
Connection
Security
Messages
Server
eu.thethings.network
Port
1883
Enable secure (SSL/TLS) connection
Client ID
Leave blank for auto generated
Keep alive time (s)
60
Use clean session
Use legacy MQTT 3.1 support


Edit mqtt in node > Edit mqtt-broker node
Delete
Cancel
Update
Properties
Name
eu.thethings.network
Connection
Security
Messages
Username
dragino_rs485_lr
Password
••••••••


Edit function node
Delete
Cancel
Done
Properties
Name
payload
Function
1 var msg1 = { payload: msg.payload.length };
2 msg1.payload = JSON.parse(msg.payload);
3 msg1.payload = msg1.payload.payload_fields;
4
5 return msg1;


Edit function node
Delete
Cancel
Done
Properties
Name
rpm
Function
1 var a = msg.payload;
2 msg.payload=a.rpm;
3 return msg;



You can find the Node-RED code here:

https://github.com/xavierflorensa/Salicru-VFD-Dragino-RS485-to-LoRaWAN-to-IOT-OnOff-App-Node-RED-flow

How to change the speed from TTN downlink message injection

Configure AT+COMMANDx or AT+DATACUTx AF MM NN LL XX XX XX XX YY	AF	Dynamic

Type Code 0xAF

0xAF downlink command can be used to set AT+COMMANDx or AT+DATACUTx.

Note: if user use AT+COMMANDx to add a new command, he also need to send AT+DATACUTx downlink.

Format: AF MM NN LL XX XX XX XX YY

Where:

- MM: the ATCOMMAND or AT+DATACUT to be set. Value from 01 ~ 0F,
- NN: 0: no CRC; 1: add CRC-16/MODBUS ; 2: set the AT+DATACUT value.
- LL: The length of AT+COMMAND or AT+DATACUT command
- XX XX XX XX: AT+COMMAND or AT+DATACUT command
- YY: If YY=0, RS485-LN will execute the downlink command without uplink; if YY=1, RS485-LN will execute an uplink after got this command.

Example:

AF 03 01 06 0A 05 00 04 00 01 00: Same as AT+COMMAND3=0A 05 00 04 00 01,1

How to change the speed from a mobile phone