

LORAWAN PLC NETWORK

PLC M221 as LoRaWAN Node



Let's apply a Modbus to LoRaWAN converter like RS485-BL or RS485-LN

Using a RJ45 patchcord with free wires for the serial Modbus RTU port.

Blue A+

White B-

Configuring PLC Modbus settings

- ✓ Mensajes
- MyController (TM221CE40T)
 - Entradas digitales
 - Salidas digitales
 - Entradas analógicas
 - Contadores muy rápidos
 - Generadores de pulsos
 - Bus de E/S
- ETH1
 - Modbus TCP
 - Adaptador Ethernet/IP
- SL1 (línea serie)
 - Modbus



Configuración de línea serie

Ajustes de protocolo

Protocolo Modbus

Configuración de línea serie

Velocidad de transmisión 19200

Paridad Ninguna

Bits de datos 8

Bits de parada 1

Medio físico

- ☒ RS-485
☐ RS-232

Polarización No

Propiedades

✓ Mensajes

MyController (TM221CE40T)

Entradas digitales

Salidas digitales

Entradas analógicas

Contadores muy rápidos

Generadores de pulsos

Bus de E/S

ETH1

Modbus TCP

Adaptador Ethernet/IP

SL1 (línea serie)

Modbus

Configuración

+

-

🗑️

Modbus

Configuración del dispositivo

Dispositivo: Ninguno

Comando Init:

Ajustes de protocolo

Modo de transmisión: ☒ RTU ☐ ASCII

Direccionamiento: ☒ Esclavo ☐ Maestra Dirección [de 1 a 247]: 1

Timeout de respuesta (x 100 ms): 10

Tiempo entre tramas (ms): 10

Reading %MW0 with M221

Let's have some value in %MW0

Configuración

Programación

Visualización

Puesta en funcionamiento

Enviar

Función de restauración

Descargar datos ajenos al programa

Copia de seguridad

IL > LD

LD > IL

-

+

🗨️

T

DEC

1 - Nuevo POU

Comentario

✓ LD

Rung0

Time base of 1 s...

S8_TB15

%S6

True

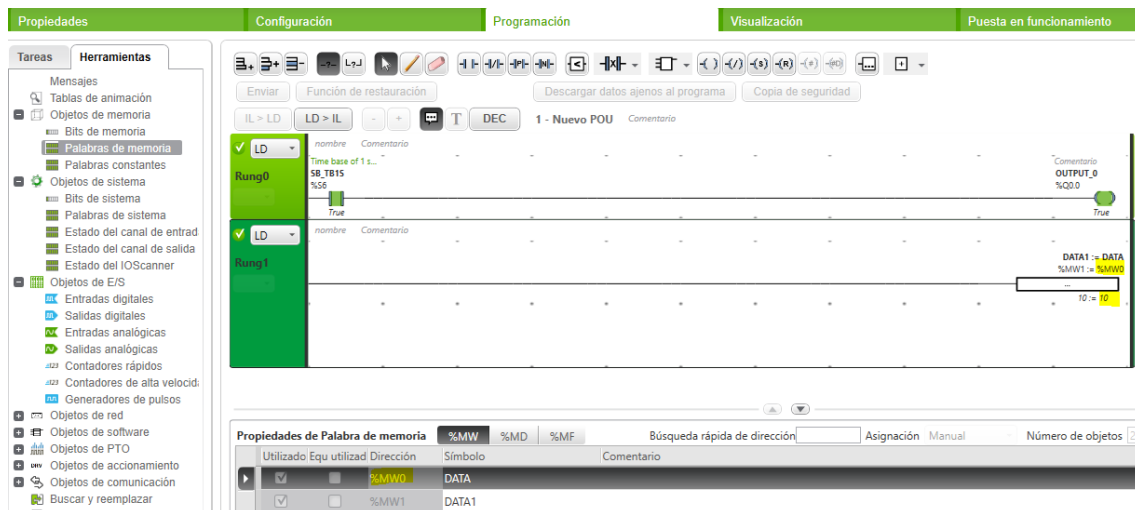
✓ LD

Rung1

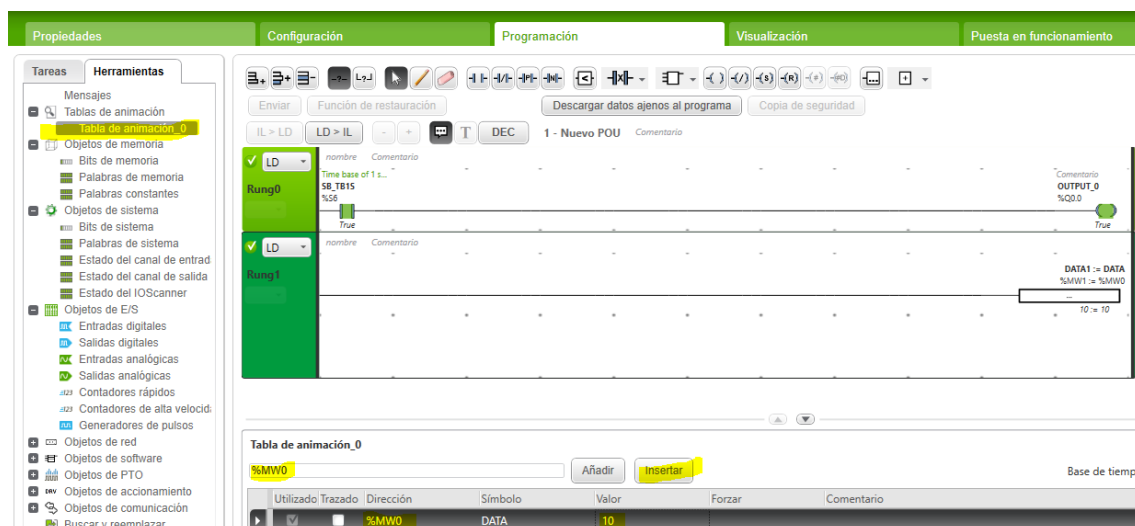
DATA1 := DATA

%MW1 := %MW0

10 := 10

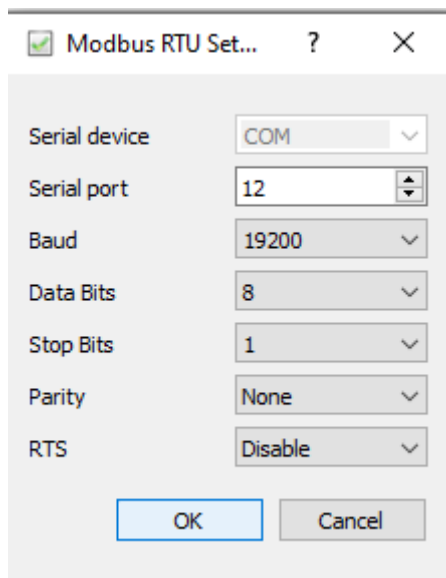


For example inserting the value of %MW0 with animation tables



Let's read with Qmod Master

With this settings



QModMaster

File Options Commands View Help

Modbus Mode RTU Slave Addr 1 Scan Rate (ms) 2000

Function Code Read Holding Registers (0x03) Start Address 0 Dec

Number of Registers 1 Data Format Dec Signed

10

RTU : \\.\COM12 | 19200,8,1,None Base Addr : 0 Packets : 16 Errors : 0

Bus Monitor

Raw Data

[RTU]>Tx > 18:48:16:286 - 01 03 00 00 00 01 84 0A
[RTU]>Rx > 18:48:16:305 - 01 03 02 00 0A 38 43

ADU

Type : Tx Message
Timestamp : 18:48:16:286
Slave Addr : 01
Function Code : 03
Starting Address : 0000
Quantity of Registers : 0001
CRC : 840A

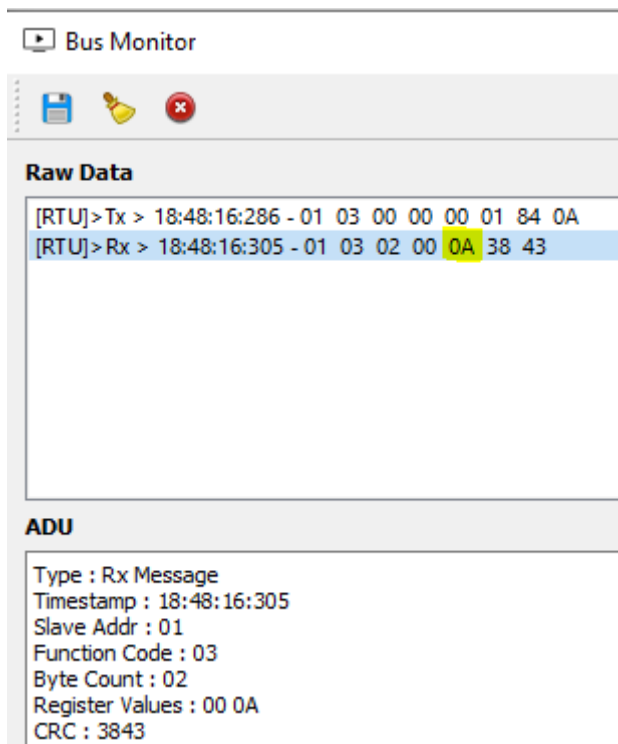
Bus Monitor

Raw Data

[RTU]>Tx > 18:48:16:286 - 01 03 00 00 00 01 84 0A
[RTU]>Rx > 18:48:16:305 - 01 03 02 00 0A 38 43

ADU

Type : Tx Message
Timestamp : 18:48:16:286
Slave Addr : 01
Function Code : 03
Starting Address : 0000
Quantity of Registers : 0001
CRC : 840A



So the right values for the Dragino RS485-BL will be:

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

AT+DATACUT1=7,1,4+5

Let's setup the Dragino on TTS

DevEui= A8 40 41 95 C1 82 C9 43

AT+DEUI=?

AT+APPKEY=?

AT+APPEUI=?

1. Select the end device

Brand *

Dragino Technology Co.,...

Model *

RS485-BL

Hardware Ver. *

Unknown ...

Firmware Ver. *

1.0

Profile (Region) *

EU_863_870



RS485-BL

MAC V1.0.3, PHY V1.0.3 REV A, Over the air activation (OTAA), Class A

LoRaWAN RS485/UART Converter -- WaterProof Battery Powered

[Product website](#)

2. Enter registration data

Frequency plan ⓘ *

Europe 863-870 MHz (SF9 for RX2 - recommended)

AppEUI ⓘ *

A0 00 00 00 00 00 01 01 00

DevEUI ⓘ *

A8 40 41 95 C1 82 C9 43


AppKey ⓘ *

Let's change the period of messages

```
AT+TDC=?  
600000  
OK
```

To 10 seconds

```
AT+TDC=10000  
OK
```



rs485-bl

ID: rs485-bl

Last seen 9 seconds ago

↑ 3 ↓ 1

Overview

Live data

Messaging

Location

Payload formatters

Claiming

General settings

Time	Type	Data preview
↑ 20:51:13	Forward uplink data message	MAC payload: 0D 48 01 FPort: 2 SNR: 8.75 RSSI: -29 Bandwidth: 125000
↑ 20:51:03	Forward uplink data message	MAC payload: 0D 4F 01 FPort: 2 SNR: 11.25 RSSI: -29 Bandwidth: 125000
↑ 20:50:53	Forward uplink data message	MAC payload: 0D 4A 01 FPort: 2 SNR: 11.75 RSSI: -30 Bandwidth: 125000
↑ 20:50:45	Forward uplink data message	MAC payload: 0D 54 01 FPort: 2 SNR: 8.25 RSSI: -30 Bandwidth: 125000

AT+BAUDR=?

9600

OK

AT+PARITY=?

0

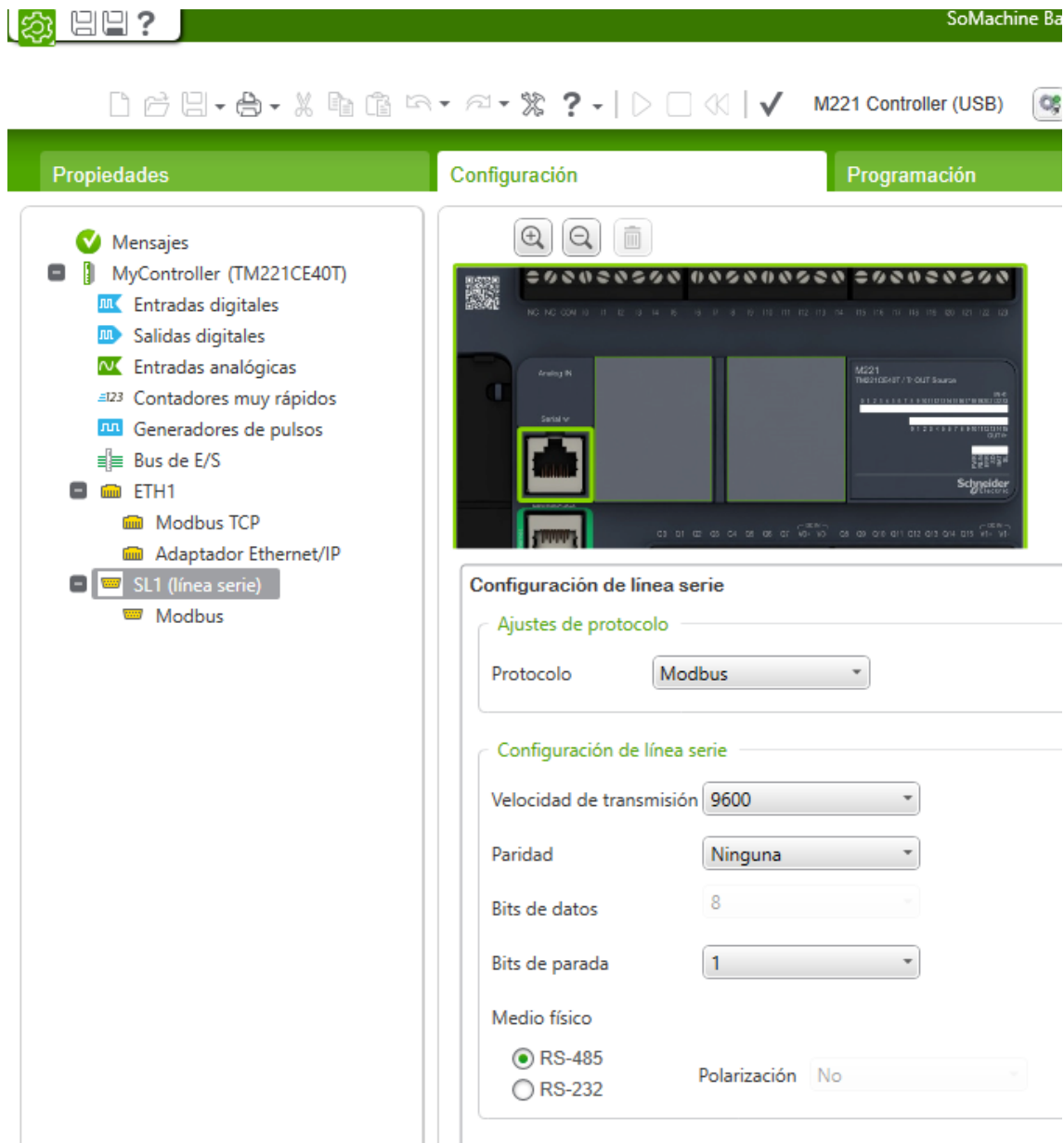
OK

AT+STOPBIT=?

0

OK

Let's change the PLC serial speed to 9600 so it is the default value from Dragino



You can find the PLC code here


<https://github.com/xavierflorensa/Schneider-M221-as-LoRaWAN-node>

We test now with Dragino RS485-LR

It Works

```
CMD1 = 01 03 00 00 00 01 84 0a
RETURN1 = 01 03 02 00 0a 38 43
Payload = 01 00 0a
```

Applications > smartlinkto-lora > End devices > smartlink > Live data






smartlink
 ID: smartlink

• Last seen 2 seconds ago ↑ 38 ↓ 1

Overview **Live data** Messaging Location Payload formatters Claiming General settings

Time	Type	Data preview
↑ 22:40:38	Forward uplink data message	Payload: { breaker_status: 10, remote_status: "NaN" } 01 00 0A FPo
↑ 22:40:16	Forward uplink data message	Payload: { breaker_status: 10, remote_status: "NaN" } 01 00 0A FPo
↑ 22:40:06	Forward uplink data message	Payload: { breaker_status: 10, remote_status: "NaN" } 01 00 0A FPo
↑ 22:39:56	Forward uplink data message	Payload: { breaker_status: 10, remote_status: "NaN" } 01 00 0A FPo

Let's change payload decoder

 Overview
  **Applications**
  Gateways
  Organizations

Applications > smartlinkto-lora > Live data

Time	Entity ID	Type	Data preview
↑ 22:42:27	smartlink	Forward uplink data message	Payload: { plc_mw0: 10 } 01 00 0A FP
↑ 22:42:16	smartlink	Forward uplink data message	Payload: { plc_mw0: 10 } 01 00 0A FP

Now you can get these data thru mqtt by Edge computing on the receiver PLC and inject per Modbus to it.

