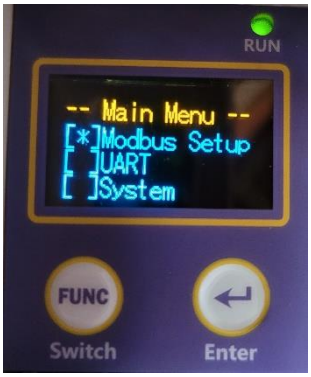
ALWAYS CONNECT THE ANTENNA BEFORE POWERING UP THE LORA MODULE

FUNC – The function button once pressed for 2 seconds opens the main Menu, you can then continue to press the FUNC button to select the below options.



– Main Menu—

[Modbus Setup] – Use this to set the Modbus address from 1-32 - Once the address is set press the FUNC button and then enter button to reboot. You can leave at Default Address 0

[UART] – Press enter button to select the serial baud rate, 1200, 2400, 4800 or 9600.
Press the FUNC button to Set the Serial Parity, None, odd, Even and then press enter button to reboot or FUNC button to cancel.

[System] – Select Mode, LoRa Radio, LoRa PMAC or LoRa WAN.
LoRa Radio - Long Range Radio and is mainly targeted for M2M and IoT networks. This technology will enable public or multi-tenant networks to connect a number of applications running on the same network.
LoRa PMAC - Basic LoRa connection example, sending and receiving data. In *LoRa-MAC* mode the LoRaWAN layer is bypassed and the radio is used directly.
LoRa WAN - Low-power, wide-area networking protocol built on top of the LoRa radio modulation technique.

[LoRa Radio] – LoRa Radio info Tx Per Len 8, Rx Per Len 8 and TX Power 12dBm

[PPTM] – Poll Idle - select the digit you are wanting to change using the FUNC button and adjust the value using the enter button. **Default 900 Sec**

Interval Min - select the digit you are wanting to change using the FUNC button and adjust the value using the enter button. **Default 5 Sec**

Interval Max - select the digit you are wanting to change using the FUNC button and adjust the value using the enter button. **Default 30 Sec**

[Data Rate] **Low Speed SF9 (Default)**, Mid Speed SF8 and High Speed SF7. Larger Spreading factors mean larger processing gain, and so a signal modulated with a larger spreading factor can be received with less errors compared to a signal with a lower spreading factor, and therefore travel a longer distance. For example, a signal modulated with the SF9 can travel a longer distance than a signal modulated with the SF7.

[Frequency] **Default 04331000000 (Hz)**

[Relay Set] **Default Power up state [Off]**

[Contactor Set] **Normal Open Default** / Normal Closed

[Reset Factory] Reset to factory setting

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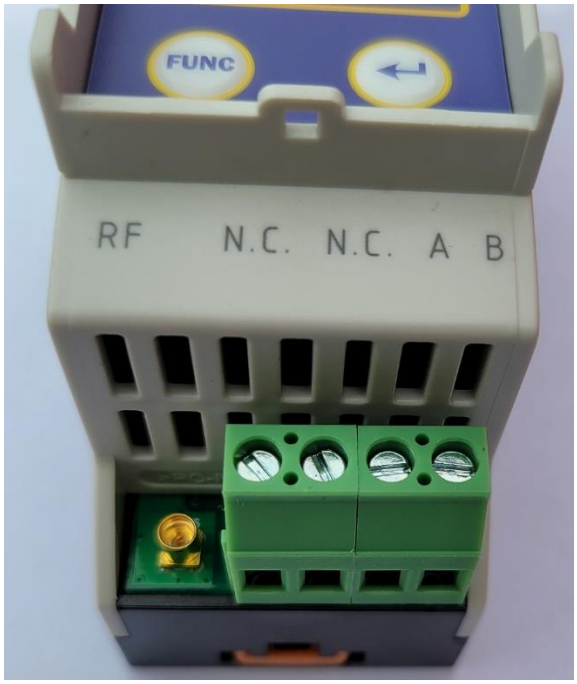
[Reboot] –	Press enter button, then press enter button to reboot or FUNC button to cancel.
[About] –	Information about the firmware, will look something like CC32LR-REV.B – 1.5.1 – Mar 2 2022

Terminal Connections

Top far left L = Live 240VAC Brown Wire
Top left N = Neutral 0VAC Blue Wire



Bottom far Right B = Modbus RS485 Data B (-)
Bottom Right A = Modbus RS485 Data A (+)

RF = Antenna connection, push fit

Setting LoRa Radio mode.

1. Steps from factory setting to set LoRa Radio mode for RS485 communication via LoRa with None parity.
2. Press FUNC button for 2 seconds.
3. Then press FUNC button twice to select system
4. Press enter button, then press enter button again to select LoRa radio
5. Press FUNC button (takes you back to menu – [system])
6. Press FUNC button 8 times to [Reboot] and then press enter button to reboot.
7. No requirement to set the MODBUS addresses, you can leave at Default 0.
8. If you need to set parity from None to Even (some electrical meters use even parity) then in the menu go to the UART section, after selecting the Baud rate, press FUNC button and use the enter button to select the parity value to Even, press FUNC and enter to reboot.
9. LoRa Radio is the most common setting when communicating via MODBUS RS485.
10. Used for taking electrical meter data, GivEnergy Battery communication and any MODBUS communication from 1 LoRa unit to another LoRa unit.

CR= Code Rate
CR setting of 4/5 indicates that with every four bits of data, one bit of correction code will be added.

The band width is 125 Khz (BW125K)

Setting LoRa PMAC mode.

1. Steps from factory setting to set LoRa Radio mode for RS485 communication via LoRa.
2. Press FUNC button for 2 seconds.
3. Then press FUNC button twice to select system
4. Press enter button, then press enter button twice to select LoRa PMAC
5. Press FUNC button (takes you back to menu – [system])
6. Press FUNC button 8 times to [Reboot] and then press enter button to reboot.
7. Then you will have another menu subitem called [Channel]
8. Press the FUNC button twice so you have the * in the Channel selection and press enter button.

9. Select the channel you want from 1 to 32 channels by pressing the enter button.
10. Then Press the FUNC button to escape out and then FUNC button until you have the * in the reboot menu.
11. Press the enter button and enter again to reboot.

Once rebooted you main front screen will look like this if you have choosen channel 1.

Make sure you set up the other LoRa modules to match the same channel number.

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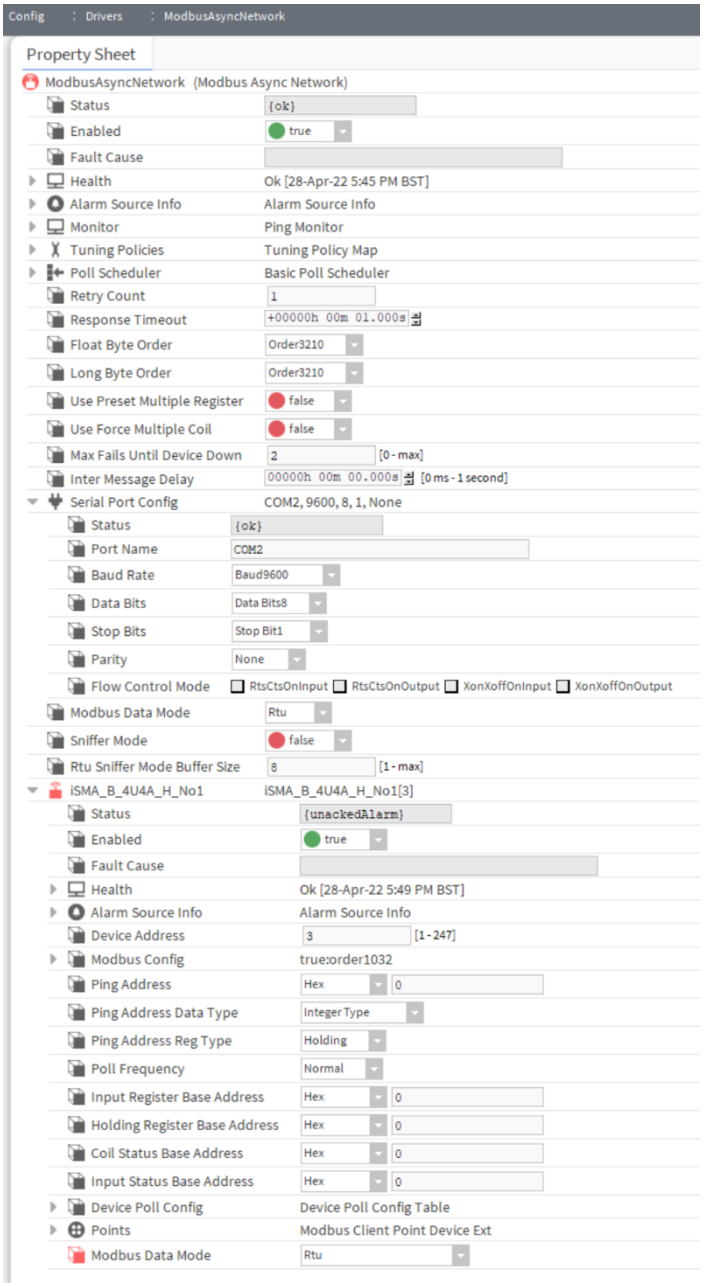
Communication to iSMA MODBUS IO Module in LoRa Radio mode.

I. The iSMA 4U4A Modbus RS485 Input/Output module is set at 9600 baud and address 3. This has a temperature sensor attached to UI1 and G0 (Ground)

II. The 1st LoRa Module is connected to the iSMA 4U4A to the RS485 MODBUS is set to LoRa Radio with Modbus address 2 (Can be default 0) and 9600 baud, see below picture.



III. The 2nd Lora Module is connected to the iSMA MAC36-NL controller on COM2 and MODBUS is set to LoRa Radio with Modbus address 1 (Can be default 0) and 9600 baud.

The temperature sensor value along with other MODBUS values is transmitted via the 1st LoRa radio network address 2 (Can be default 0), allowing wireless communication to the iSMA 4U4A module address 3. Two-way communication available, if I activate 10VDC from the MAC36-NL controller (2nd LoRa radio device address 1 (Can be default 0) for the 4U4A output these changes on the iSMA 4U4A connected to the 1st Lora Radio module address 2 (Can be default 0).

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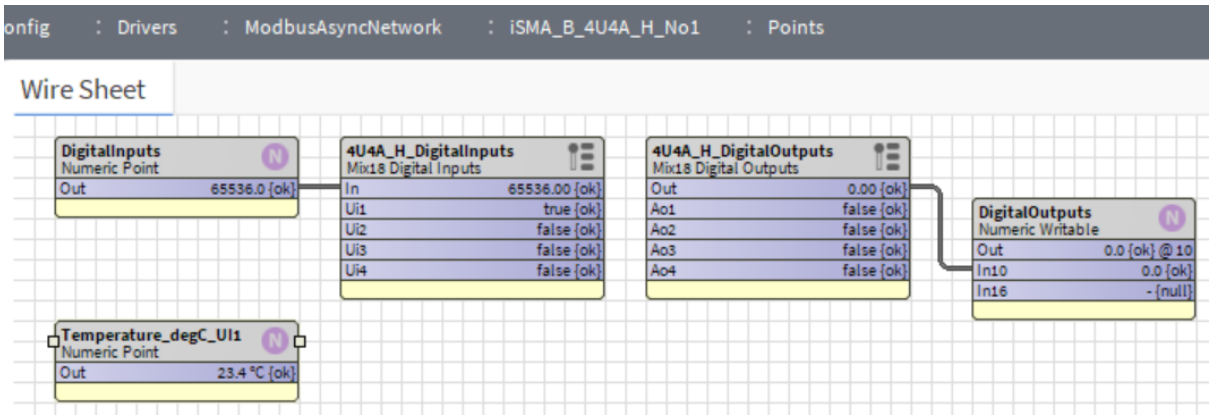
Snapshot of the controller wire sheet, showing temperature from the iSMA 4U4A module.



The 2nd Lora Module (Address 1 - Can be default 0), below is connected to the MAC36 COM2 via the RS485, see picture.

MAC36 NL Controller RS485 + to LoRa Radio A (Green Wire)

MAC36 NL Controller RS485 - to LoRa Radio B (White Wire)

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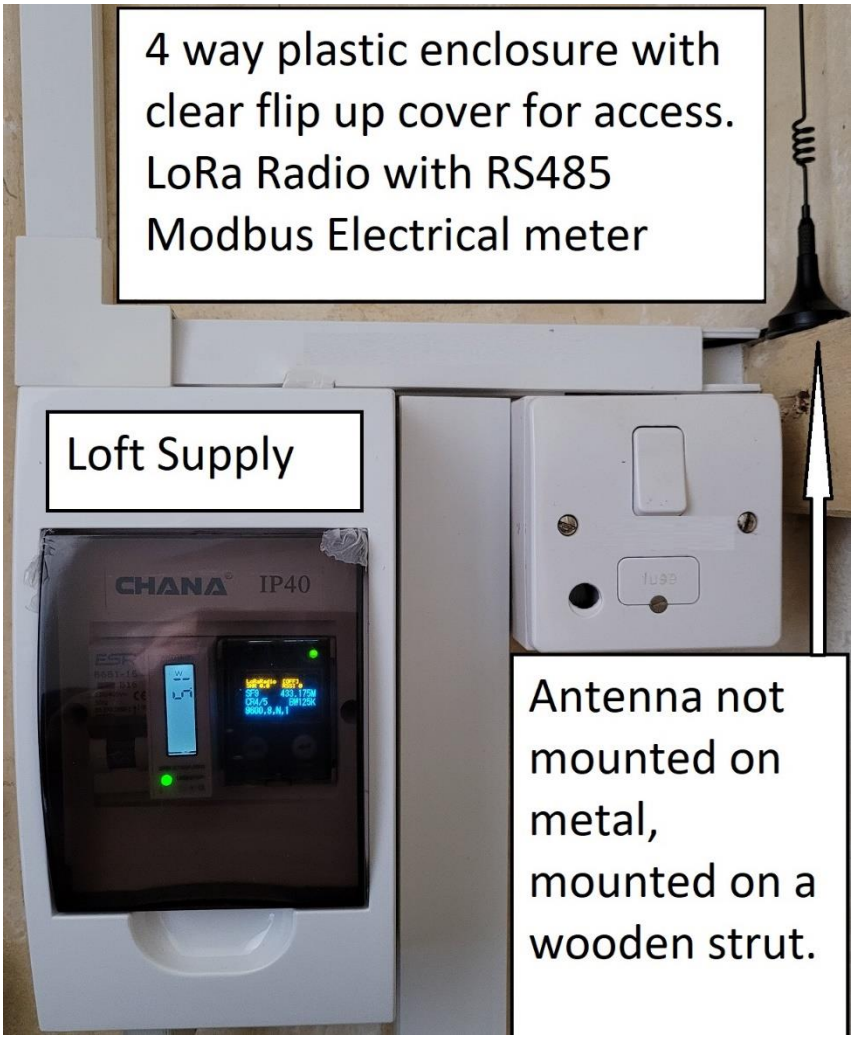
Communication to DDM 18 SD MODBUS Electrical Meter in LoRa Radio mode.

The DDM 18 SD Modbus single phase electrical meter monitoring the loft room electrical consumption is connected to a LoRa Radio transmitter with antenna. The 433MHZ LoRa signal is traveling through two outside insulated walls (250mm cavity construction with brickwork build 1930) to a distance of over 60 meters to the LoRa radio receiver mounted in a log cabin with 100mm thick wooden walls.

The setting for the DDM 18 SD single phase electrical meter is 9600 baud, 8 bits, even parity and 1 stop bit.

The LoRa Radio Transmitted is set at 9600 Baud, 8 bits, even parity and 1 stop bit, see below.



LoRa Radio TRANSMITTER

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LoRa Radio Receiver

The LoRa Radio Receiver is set at 9600 Baud, 8 bits, even parity and 1 stop bit, and connected to a MAC35-NL BMS controller to monitor the data.

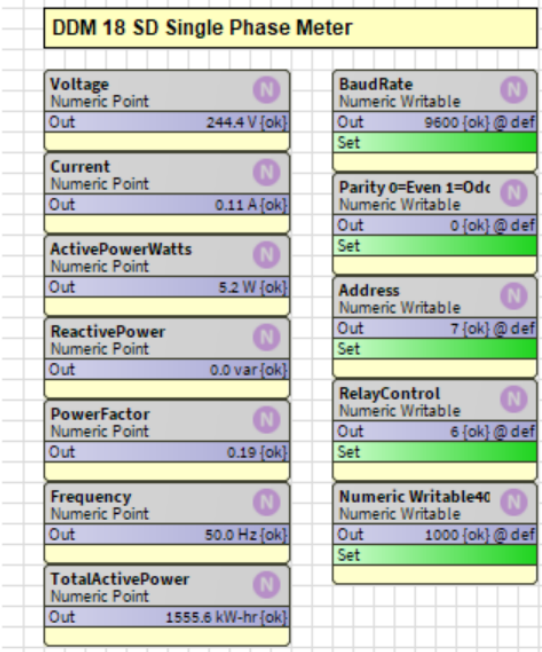
Config : Drivers : ModbusAsyncNetwork : DDM_18_SD : Points

Database

Name	Out	Absolute Address
Voltage	244.8 V {ok}	modbus:30001
Current	0.11 A {ok}	modbus:30009
ActivePowerWatts	4.9 W {ok}	modbus:30019
ReactivePower	0.0 var {ok}	modbus:30027
PowerFactor	0.18 {ok}	modbus:30043
Frequency	50.0 Hz {ok}	modbus:30055
TotalActivePower	1555.6 kW-hr {ok}	modbus:30257
BaudRate	9600 {ok} @ def	modbus:40001
Parity 0=Even 1=Odd 2=None	0 {ok} @ def	modbus:40003
Address	7 {ok} @ def	modbus:40009
RelayControl	6 {ok} @ def	modbus:40011
Numeric Writable40013	1000 {ok} @ def	modbus:40013

Config : Drivers : ModbusAsyncNetwork : DDM_18_SD : Points

Wire Sheet



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LoRa Radio Transmitter connections in enclosure

The B16A MCB, DDM 18 SD Electrical meter and the LoRa radio module all mounted in a 4-way plastic enclosure on the 1st floor landing cupboard that feeds the Loft bedroom.

Below is the LoRa Radio Transmitter in the 4-way plastic enclosure

Setting LoRa Radio mode with Even Parity 9600 bps.

1. Steps from factory setting to set LoRa Radio mode for RS485 communication via LoRa with Even parity.
2. Press FUNC button 

for 2 seconds.
3. Then press FUNC button 

twice to select system.
4. Press enter button 

, then press enter button again to select LoRa radio.
5. Press FUNC button 

(takes you back to menu – [system])
6. Press FUNC button 

to go to the UART section (12 times)
7. Once in the UART menu, you have the serial baud rate, leave at 9600 baud.
8. Press FUNC button 

which then displays Serial Parity
9. Press Enter button 

to select Even parity.
10. Press FUNC button 

11. Press Enter button to restart system [OK] 

12. No requirement to set the MODBUS addresses, you can leave at Default 0.