

Case Study

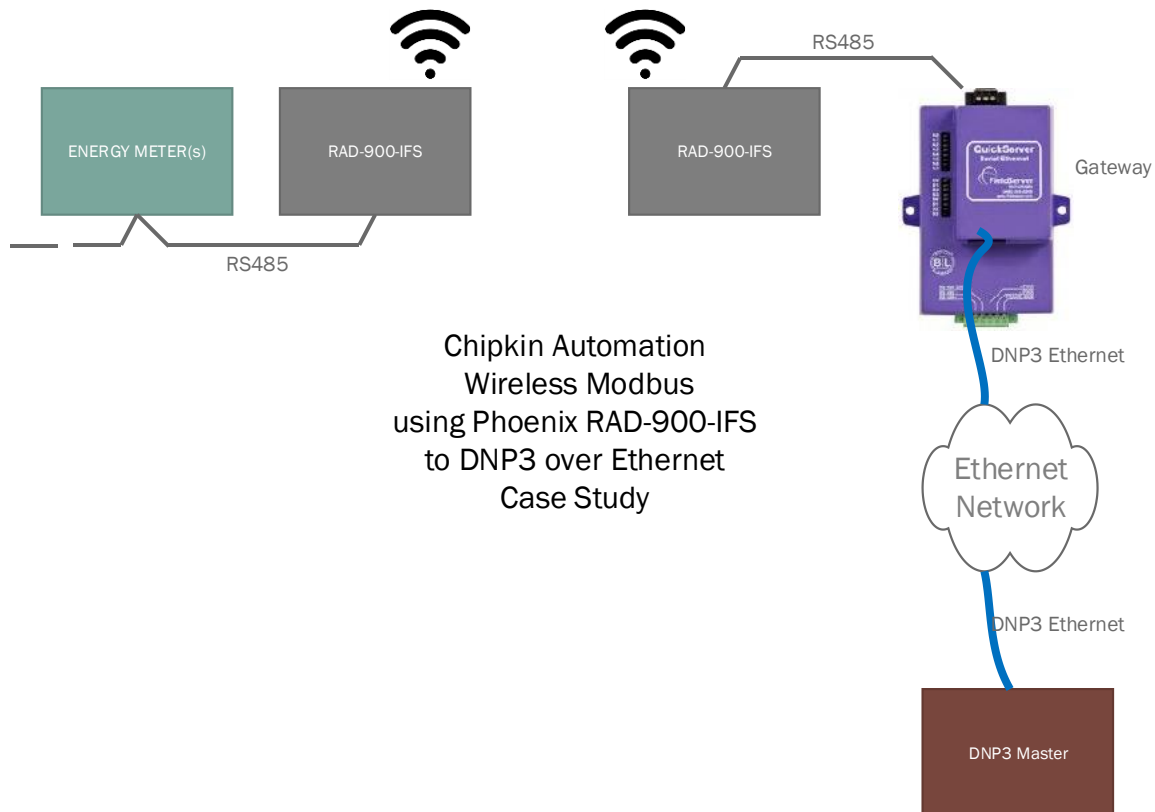
Wireless Modbus

using

Phoenix RAD-900-IFS

to DNP3 over Ethernet

In this project the customer could not bring an Ethernet access point to the location where the power meters were installed. A wireless solution was required as per the block diagram below.



Introduction

Running new conduit and cable was impossible, but getting the data was essential.

In this application the inconvenience of a location without a network drop was overcome using a wireless solution from Phoenix Contact. RS485 ModbusRTU power meters located in a location where running new conduit would have been expensive and possibly disruptive.

The problem arises because you have limited choices when you install new power meters on existing equipment.

Chipkin Automation Systems

Protocol to protocol – Enabling the IOT Internet of Things

Products that support approx.. 140 major protocols. If we don't have a solution for you we will make you one. More than a dozen customers a year have a custom driver developed for them.

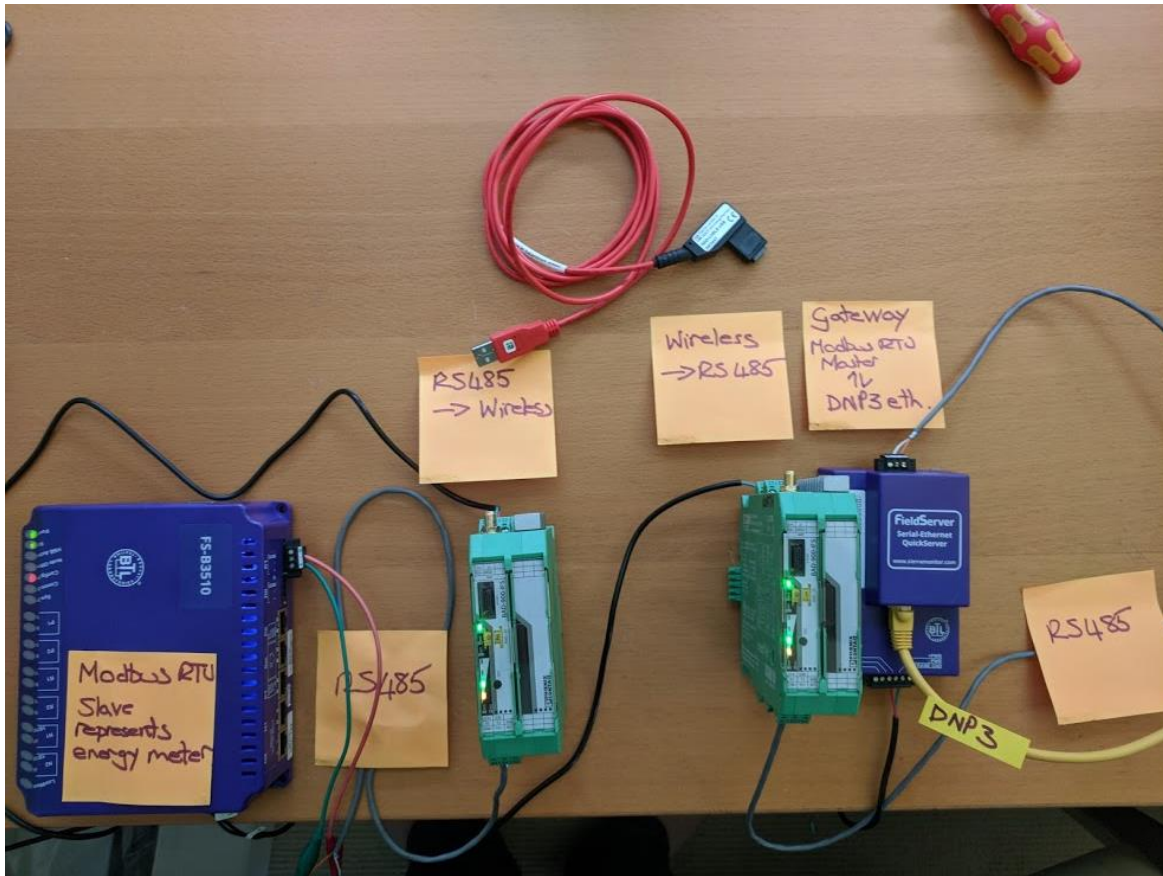
Chipkin are highly regarded for their outstanding support. System integration isn't always trivial even if that is what they tell you.

The Chipkin BACnet stack comes with a 100% copyright infringement indemnity to make corporate lawyers happy. Customers get direct access to the stack developers for coaching and problem solving.

Lab Setup

Purple unit on left is a ModbusRTU server device. In this case a gateway has been programmed to be a Modbus Server, emulating a series of Power Meters with the same set of registers and points as the installed energy meters at the customer's site.

The purple unit on the right is a gateway configured to read Modbus data from a series of RS485 connected Energy meters and to serve the data to a remote monitoring station that uses DNP3.0 Ethernet over TCP/IP.



Requirements

Wireless module - RAD-900-IF

<https://goo.gl/j6VyAS>

PSI-CONF Software

<https://goo.gl/9gTKAz>

PSI-CONF USB Cable – Proprietary cable is required

<https://goo.gl/na78QX>

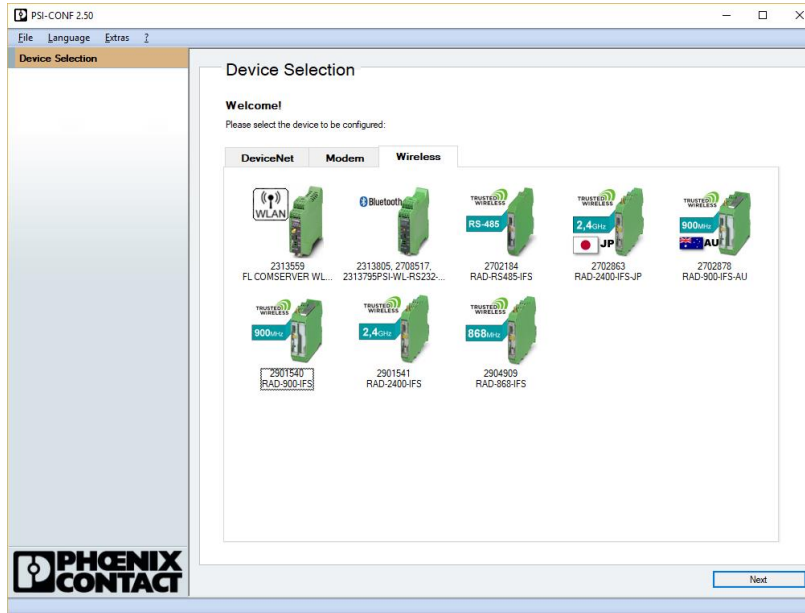
QS-1010 Dual RS485 gateway

<http://store.chipkin.com/products/fieldserver-devices/quickserver-gateways>

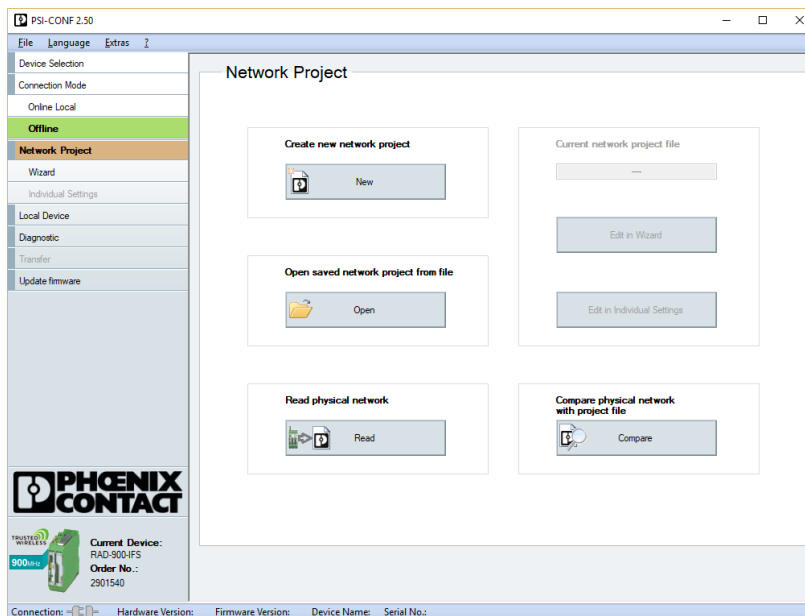


Wireless Module Configuration

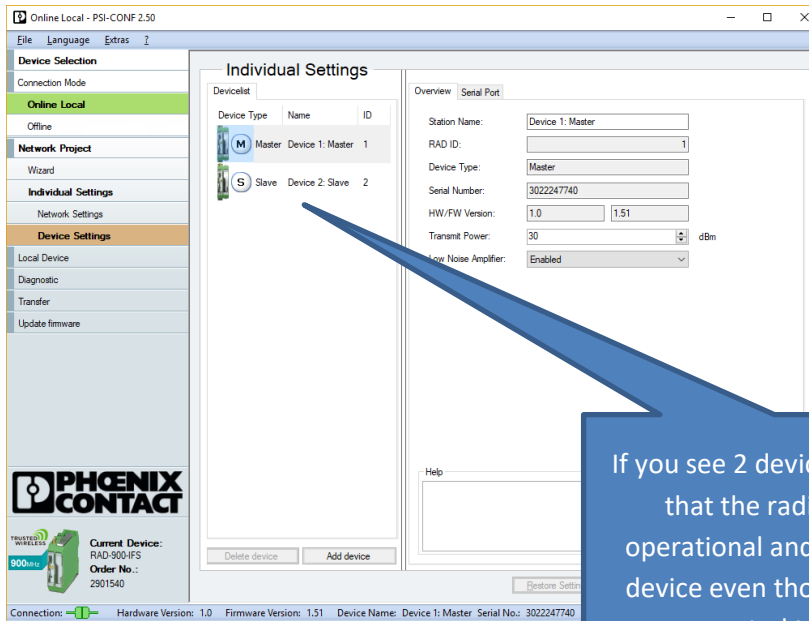
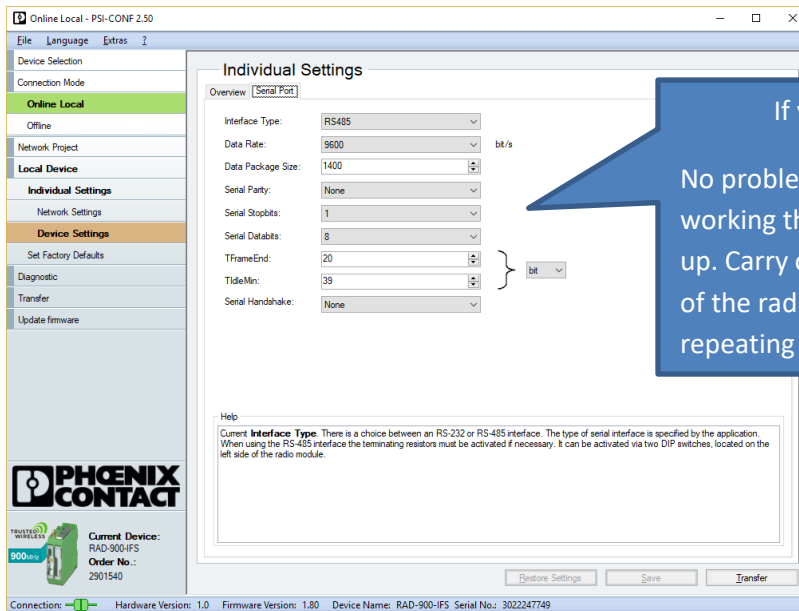
Step 1 – Launch the software



Step 2 – Connect the cable. Read from the Devices



Step 3 : Edit Individual Settings



Step 4: Make Sure the RS485 settings match the settings for the Energy Meters and The Gateway.

Online Local - PSI-CONF 2.50

File Language Extras ?

Device Selection

Connection Mode

Online Local

Offline

Network Project

Wizard

Individual Settings

Network Settings

Device Settings

Local Device

Diagnostic

Transfer

Update firmware

PHENIX CONTACT

TRUSTED WIRELESS 900MHz

Current Device: RAD-900-IFS
Order No.: 2901540

Individual Settings

Device Type Name ID

M Master Device 1: Master 1

S Slave Device 2: Slave 2

Delete device Add device

Overview Serial Port

Interface Type: RS485

Data Rate: 9600 bit/s

Data Package Size: 1480

Serial Parity: Even

Serial Stopbits: 1

Serial Databits: 8

TFrameEnd: 20 } bit

TIdleMin: 39 } bit

Serial Handshake: None

Help

TIdleMin: this is the minimum time between two consecutive frames. Between two frames there must be a certain time, so it does not come to a concatenation of several frames. The time TIdleMin must be in any case larger, as the maximum distance between the characters within a frame.
Idle refers to the state, where no activities take place on an interface, ie no data is transferred. Also, the time between two consecutive frames is called idle.

Restore Settings Save Transfer

Connection: Hardware Version: 1.0 Firmware Version: 1.51 Device Name: Device 1: Master Serial No.: 3022247740

Online Local - PSI-CONF 2.50

File Language Extras ?

Device Selection

Connection Mode

Online Local

Offline

Network Project

Wizard

Individual Settings

Network Settings

Device Settings

Local Device

Diagnostic

Transfer

Update firmware

PHENIX CONTACT

TRUSTED WIRELESS 900MHz

Current Device: RAD-900-IFS
Order No.: 2901540

Individual Settings

Device Type Name ID

M Master RAD-900-IFS 1

S Slave RAD-900-IFS 2

Delete device Add device

Overview Serial Port

Station Name: RAD-900-IFS

RAD ID: 1

Device Type: Master

Serial Number: 3022221469

HW/FW Version: 1.0 1.80

Transmit Power: 30 dBm

Low Noise Amplifier: Disabled

Help

Restore Settings Save Transfer

Connection: Hardware Version: 1.0 Firmware Version: 1.80 Device Name: RAD-900-IFS Serial No.: 302221469

Online Local - PSI-CONF 2.50

File Language Extras 2

Device Selection

Connection Mode

Online Local

Offline

Network Project

Wizard

Individual Settings

Network Settings

Device Settings

Local Device

Diagnostic

Transfer

Update firmware

PHENIX CONTACT

TRUSTED WIRELESS 900MHz

Current Device: RAD-900-IFS
Order No.: 2901540

Individual Settings

DeviceList

Device Type	Name	ID
M	Master Device 1: Master	1
S	Slave Device 2: Slave	2

Overview Serial Port

Interface Type: RS485

Data Rate: 9600 bt/s

Data Package Size: 1480

Serial Parity: Even

Serial Stopbits: 1

Serial Databits: 8

TFrameEnd: 20 } bit

TIdleMn: 39

Serial Handshake: None

Help

Delete device Add device

Restore Settings Save Transfer

Connection: Hardware Version: 1.0 Firmware Version: 1.51 Device Name: Device 1: Master Serial No.: 3022247740

Online Local - PSI-CONF 2.50

File Language Extras 2

Device Selection

Connection Mode

Online Local

Offline

Network Project

Wizard

Individual Settings

Network Settings

Device Settings

Local Device

Diagnostic

Transfer

Update firmware

PHENIX CONTACT

TRUSTED WIRELESS 900MHz

Current Device: RAD-900-IFS
Order No.: 2901540

Individual Settings

DeviceList

Device Type	Name	ID
M	Master RAD-900-IFS	1
S	Slave RAD-900-IFS	2

Overview Serial Port

Station Name: RAD-900-IFS

RAD ID: 2

Device Type: Slave

Serial Number: 3022247749

HW/FW Version: 1.0 1.80

Transmit Power: 30 dBm

Low Noise Amplifier: Disabled

Help

Delete device Add device

Restore Settings Save Transfer

Connection: Hardware Version: 1.0 Firmware Version: 1.80 Device Name: RAD-900-IFS Serial No.: 302221469

Online Local - PSI-CONF 2.50

File Language Extras ?

Device Selection

Connection Mode

Online Local

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Network Project

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Individual Settings

Network Settings

Device Settings

Local Device

Diagnostic

Transfer

Update firmware

PHOENIX CONTACT

TRUSTED WIRELESS 900MHz

Current Device:
RAD-900-IFS
Order No.:
2901540

Network Settings

Radio Network

Use Confstick: Off

RF Band: Band #1

Network ID: 126

Transmissions: 3

RF Encryption: Disabled

Encryption Key: min. 4, max 16 characters

Data rate of the radio interface: 125 kBit/s

Network: Point To Point / Star

Network Application: **Serial data**

Modbus Address: 1

Watchdog: Enabled 1000 ms

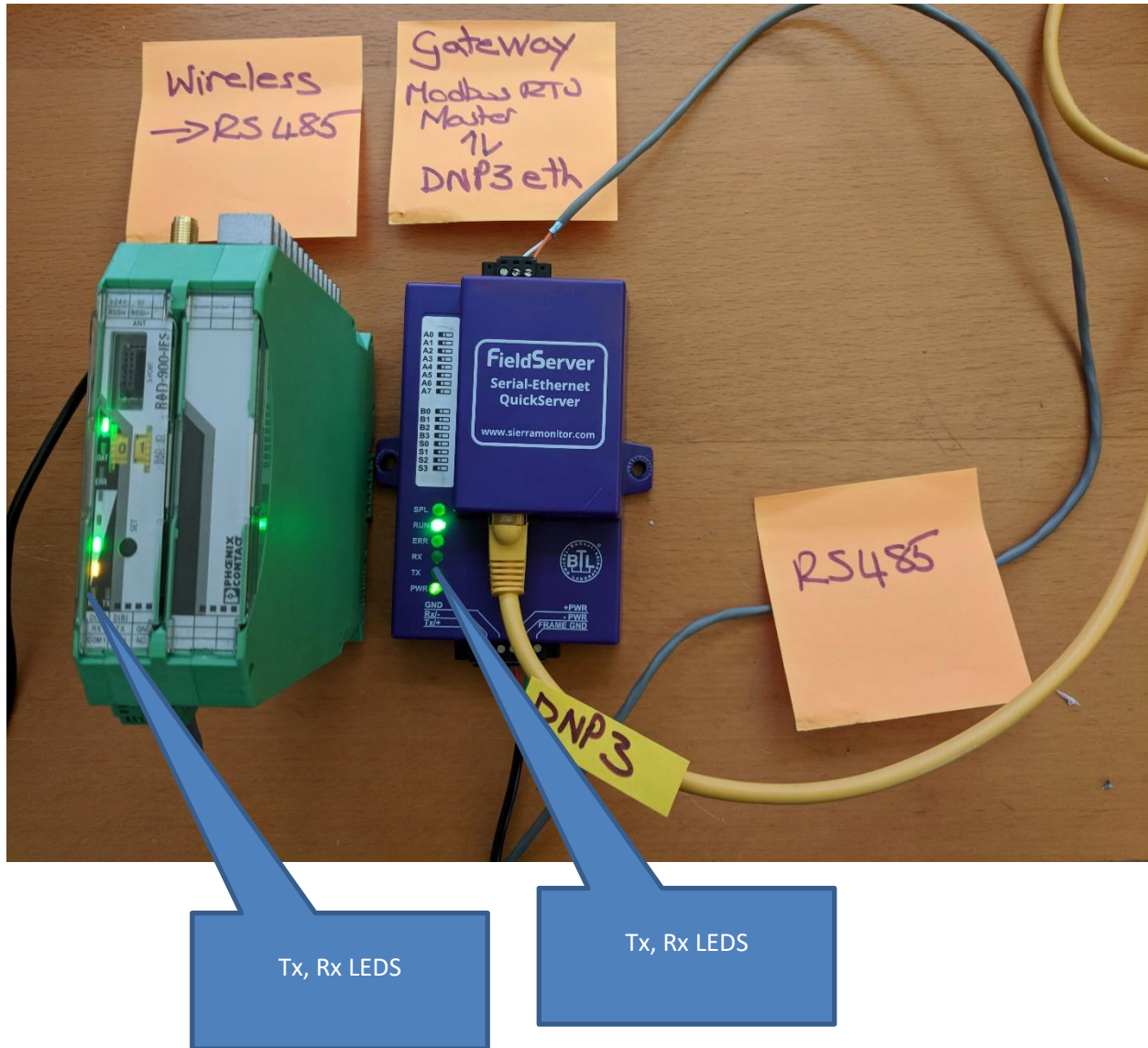
Blocked frequency ranges:

- Range 1: 902-903 MHz
- Range 2: 903-904 MHz
- Range 3: 904-905 MHz
- Range 4: 905-906 MHz
- Range 5: 906-907 MHz

Help

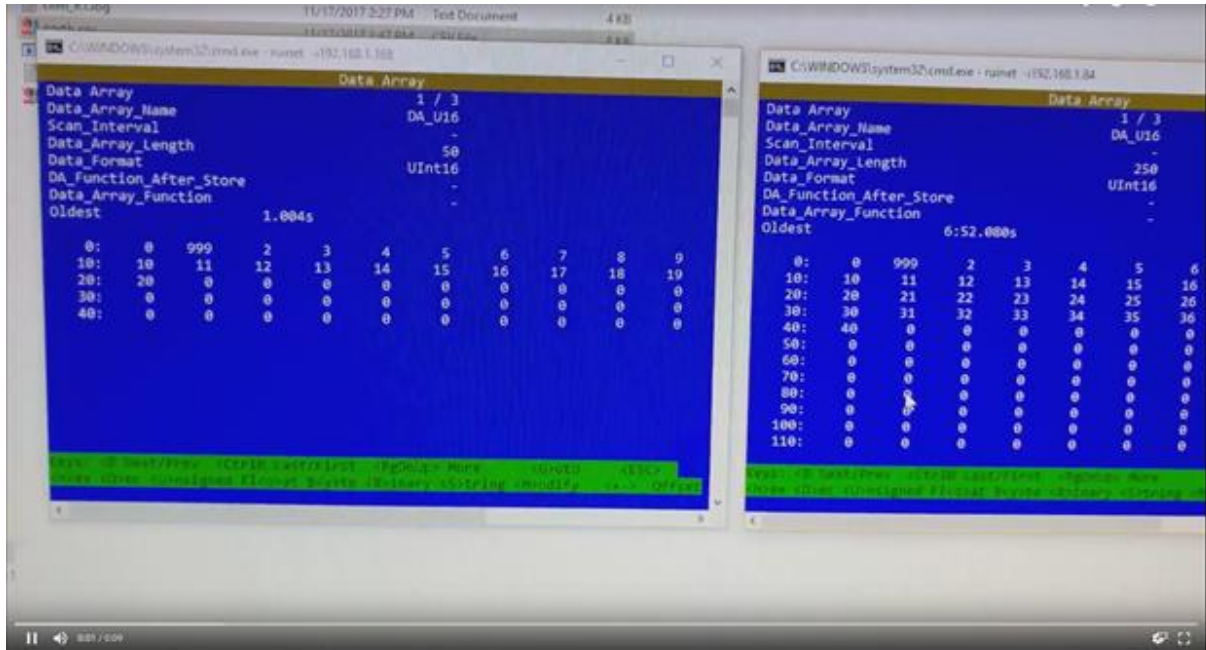
Connection: Hardware Version: 1.0 Firmware Version: 1.51 Device Name: Device 1: Master Serial No.: 30

Step 5 – Check for communications



Step 6 : Check for Data Transfer

The one screen represents the server data (right) and the other screen represents the data inside the gateway.



Images and Videos

<https://photos.app.goo.gl/f6pM6OVaSWsgib4i2>

All Vid file names to begin with Chipkin Automation Wireless Modbus using Phoenix RAD-900-IFS to DNP3 over Ethernet and Quickserver protocol gateway

VID_20171117_163155

Data Transfer as indicated by the Tx,Rx LEDS and the number of message and bytes sent and received by the gateway.

VID_20171117_163116

Data Transfer as indicated by the Tx,Rx LEDS

VID_20171117_155333

Data transfer shown by displaying server (energy Meter) data and the data in the Modbus master of the gateway.

VID_20171117_155300

VID_20171117_153331

Data Transfer as indicated by the Tx,Rx LEDS