GW-KNX1
Startup Guide
For Interfacing Unitronics PLCs To Building Automation Systems: KNX, Modbus RTU, Modbus/TCP

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A Quick Start Guide

1. Record the information about the unit. (**Section** 2.1)
2. **Connect GW-KNX1 's** 3 pin RS-485 port to Unitronics PLC RS485 port. (**Section** 3.1)
3. Connect GW-KNX1 6 pin KNX connector to the KNX network that is connected to each of the devices. (**Section** 3.2)
4. Connect Power to GW-KNX1 6 pin connector. (**Section** 3.4)
5. Modbus RTU: Use a browser to access the GW-KNX1 Web GUI to change the IP Address. No changes to the configuration are necessary. (**Section** 5.2)

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1 INTRODUCTION

1.1 GW-KNX1 Gateway

The GW-KNX1 is an external, high performance **Building Automation multi-protocol gateway** that is preconfigured to automatically communicate between Unitronics' products (hereafter called "device") connected to the GW-KNX1 and automatically configures them for Modbus.

The getaway will convert the Modbus communication to KNX, letting the user connect Unitronics products to KNX networks.

2 KNX SETUP FOR GW-KNX1

2.1 Record Identification Data

Each GW-KNX1 has a product label on the side or the back of the unit. The data from the table should be recorded, as it may be required for technical support. The product label appears with the following information (see table):

Model	Serial Number	MAC Address
GW-KNX1	xxxxxxxxx	NN:NN:NN:NN

Figure 1: GW-KNX1 Part Numbers

- GW-KNX1 units have the following 3 ports: RS-485 + Ethernet + KNX

2.2 Point Count Capacity and Registers per Device

The total number of KNX Registers presented by all of the devices attached to the GW-KNX1 cannot exceed 1500 registers.

Part number	Total Registers
GW-KNX1	1,500

Figure 2: Supported Point Count Capacity

3 INTERFACING GW-KNX1 TO DEVICES

3.1 GW-KNX1 Showing Connection Ports

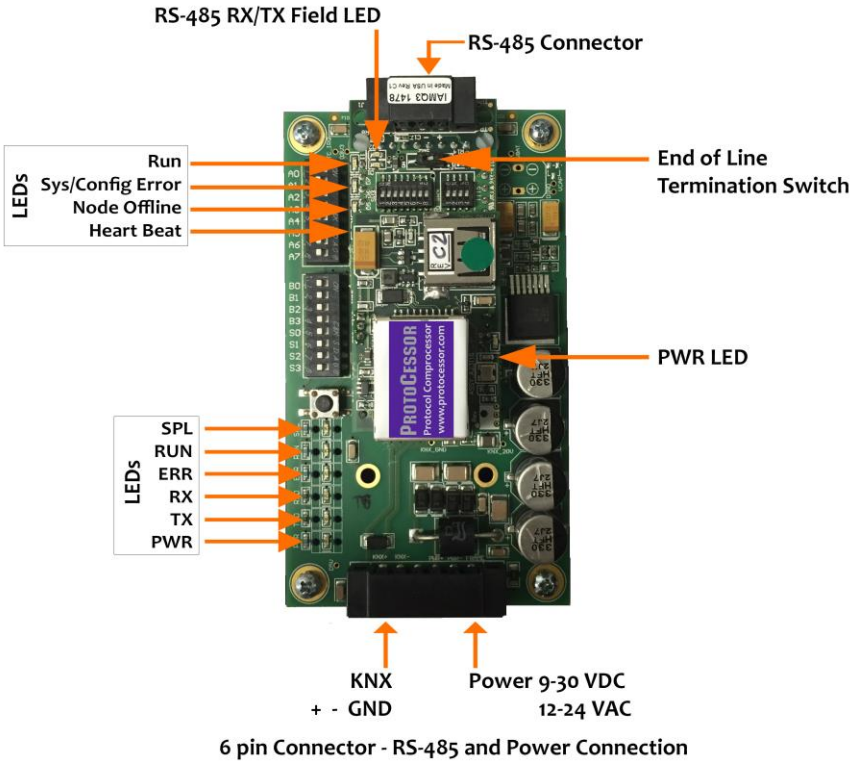


Figure 3: GW-KNX1

3.2 Device Connections to GW-KNX1

GW-KNX1 6 Pin Phoenix connector for KNX Devices

- Pins 1 through 3 are for KNX devices.
  - The RS-485 GND (Pin 3) is not typically connected
- Pins 4 through 6 are for power. **Do not connect power** (wait until **Section 3.4**).

Device Pins	GW-KNX1 Pin #	Pin assignment
Pin KNX +	Pin 1	KNX +
Pin KNX -	Pin 2	KNX -
Pin GND	Pin 3	KNX GND
Power In (+)	Pin 4	V +
Power In (-)	Pin 5	V -
Frame Ground	Pin 6	FRAME GND

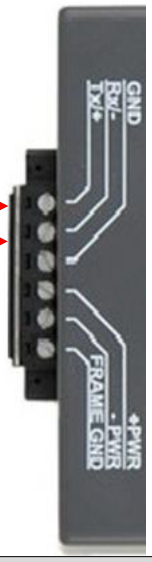


Figure 4: Power and KNX Connections

3.3 Modbus RTU: Wiring Field Port to R485 Network

- Connect the Modbus RTU RS-485 network wires to the 3-pin RS-485 connector on GW-KNX1 as shown below in **Figure 5**.
  - The RS-485 GND (Pin 3) is not typically connected
- If the GW-KNX1 is the last device on the RS-485 trunk, then the End-Of-Line Termination Switch needs to be enabled. (**Figure 6**).
  - The default setting from the factory is OFF (switch position = right side)
  - To enable the EOL Termination, turn the EOL switch ON (switch position = left side)

BMS RS-485 Wiring	GW-KNX1 Pin #	Pin Assignment
RS-485 +	Pin 1	RS-485 +
RS-485 -	Pin 2	RS-485 -
-	Pin 3	RS-485 GND

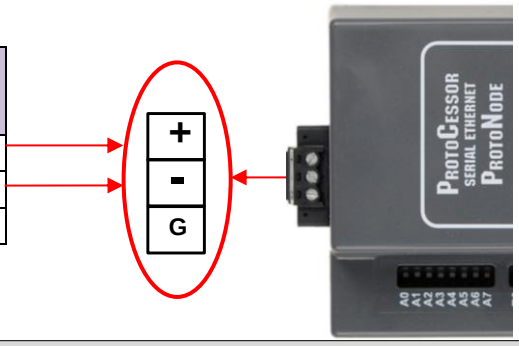


Figure 5: Connection from GW-KNX1 to RS-485 Field Network

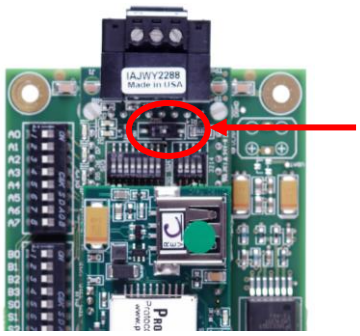


Figure 6: RS-485 BMS Network EOL Switch

3.4 Power-Up GW-KNX1

Apply power to GW-KNX1 as show below in **Figure 8**. Ensure that the power supply used complies with the specifications provided in **Appendix B.1**.

- GW-KNX1 accepts either 9-30VDC or 12-24 VAC on pins 4 and 5.
- **Frame GND should be connected.**

Power Requirement for GW-KNX1 External Gateway			
	Current Draw Type		
GW-KNX1 Family	12VDC/VAC	24VDC/VAC	30VDC
GW-KNX1 (Typical)	170mA	100mA	80mA
GW-KNX1 (Maximum)	240mA	140mA	100mA
NOTE: These values are 'nominal' and a safety margin should be added to the power supply of the host system. A safety margin of 25% is recommended.			

Figure 7: Required current draw for the GW-KNX1

Power to GW-KNX1	**GW-KNX1 Pin #**	**Pin Assignment**
Power In (+)	Pin 4	V +
Power In (-)	Pin 5	V -
Frame Ground	Pin 6	FRAME GND

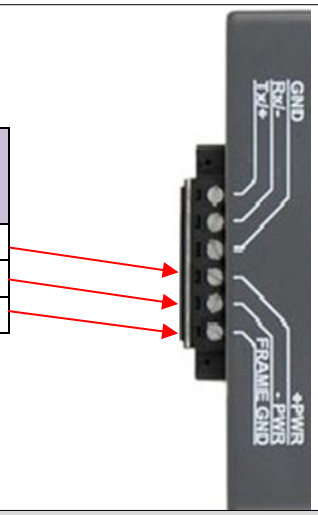


Figure 8: Power Connections

4 CREATING CONFIGURATION FILE AND CONFIGURATING THE PLC

4.1 UniKNX configurator

UniKNX configurator is a tool by Unitronics that allows the user to create the configuration file for the GW-KNX1 easily.

- **Client side connections**: In this window you will configure the KNX side of the communication.

  First the user must choose the type of KNX physical memory scheme he wishes to work with and the physical KNX address of the GW-KNX1

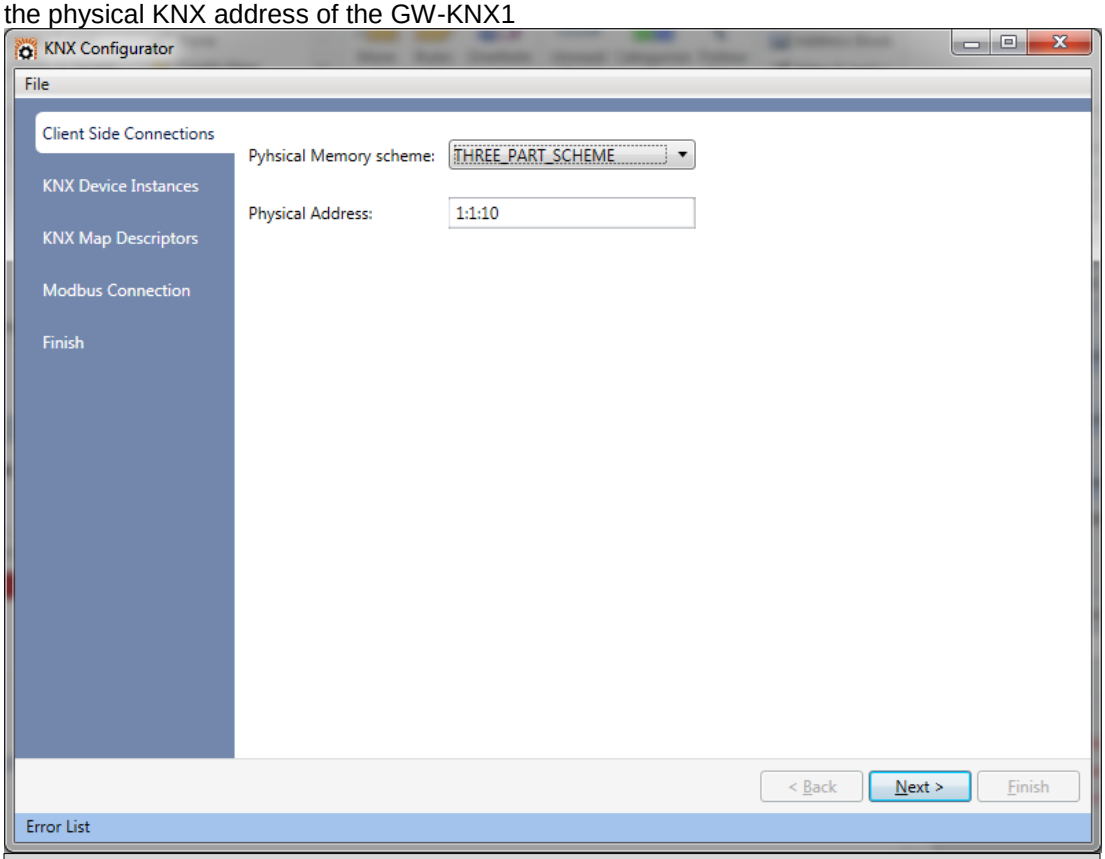


Figure 9: Client side connection

- **KNX Device instances**: Here you will add all the KNX slave devices.

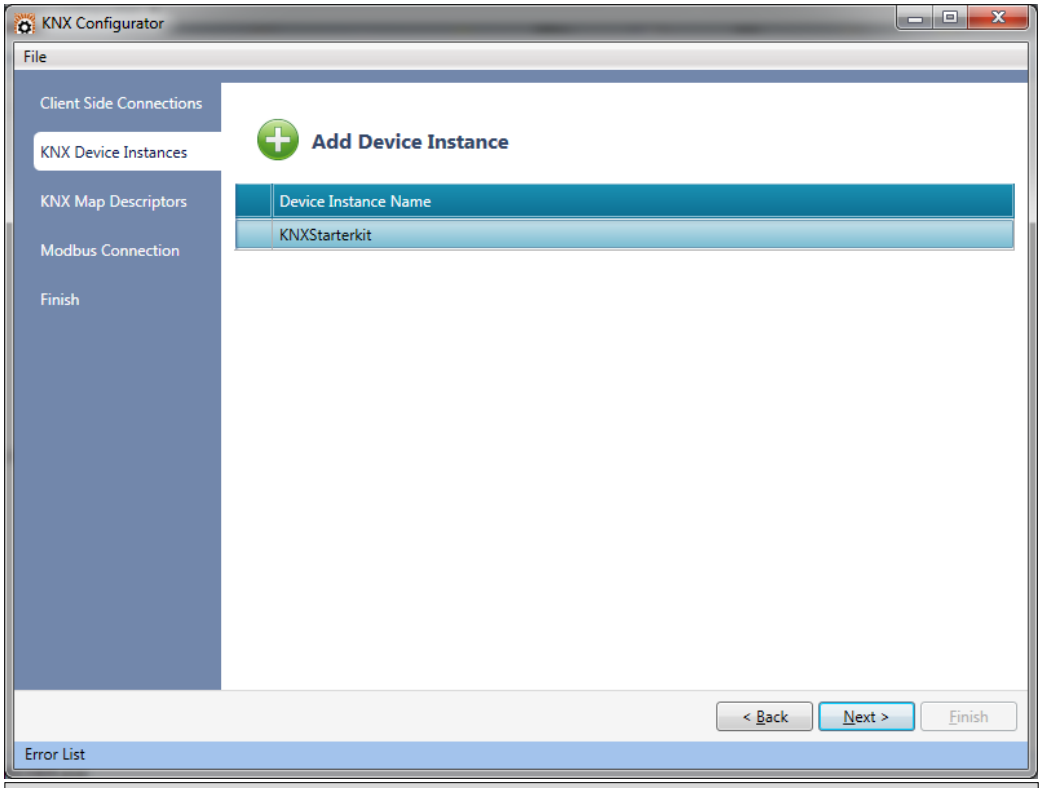


Figure 10: KNX Device Instances

- **KNX Map Descriptions**: Here you will add the data types to be read and/or write in each node, select the data type, group address and function type.

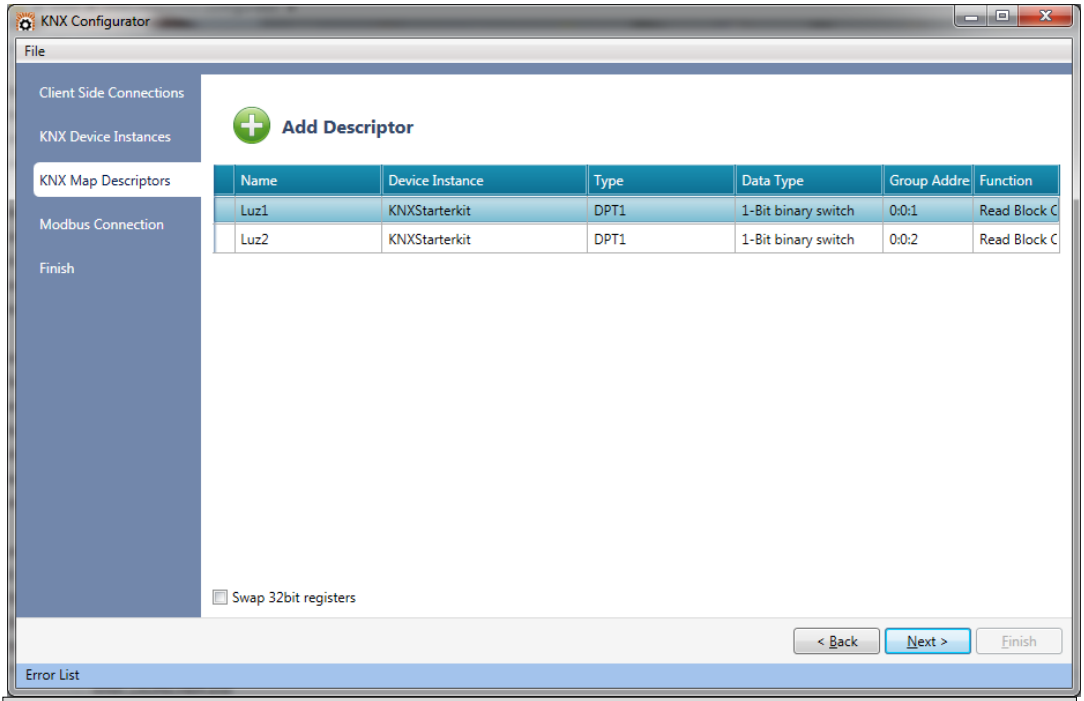


Figure 11: KNX Map Descriptor

Note that:

- Read function will let you read and write while write function will only let you write.
- Read and write block continuous means that the data will be read and write continuously.
- Write block on change means that only when there is change in the data, it will be written.
- Active Read at Startup function is a once-off read function, and then waits for any updated data.

.

- **Modbus Connection**: Here the user will configure the Modbus connection to the PLC.
  First the user must select between Modbus protocol: RTU or TCP/IP, then the corresponding configuration.

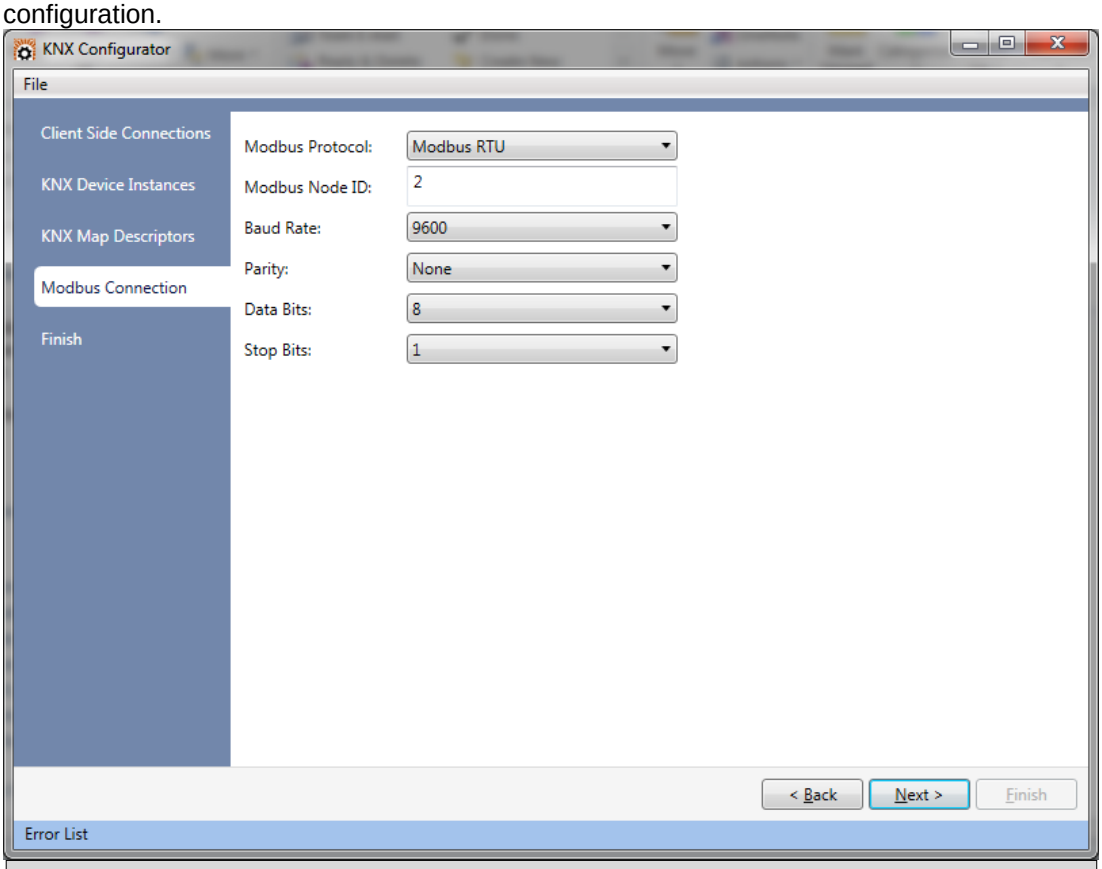


Figure 12: Modbus RTU connection

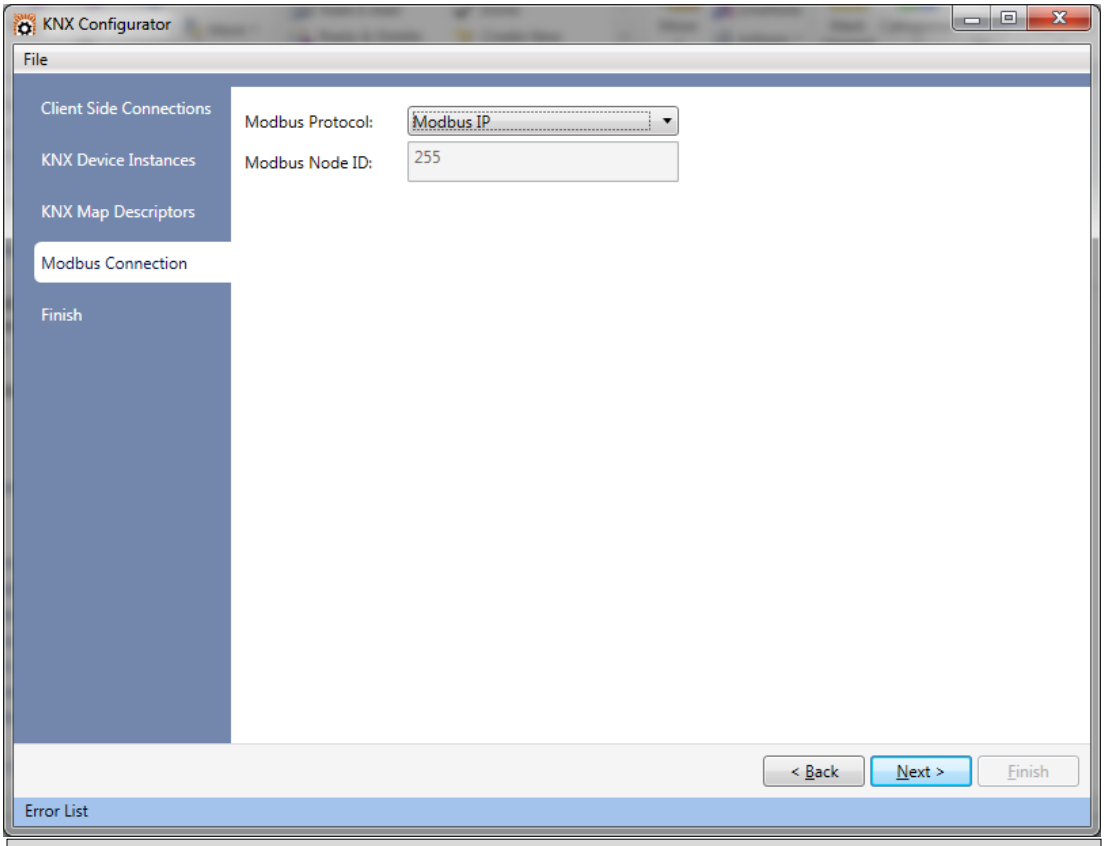


Figure 13: Modbus TCP/IP connection

- **Finish**: This window will show the MODBUS slave addressing map of the data to be read/write from/to the device -to be use in Unitronics software- and will let you export the configuration file that you will download to the GW-KNX1 via the GUI browser.

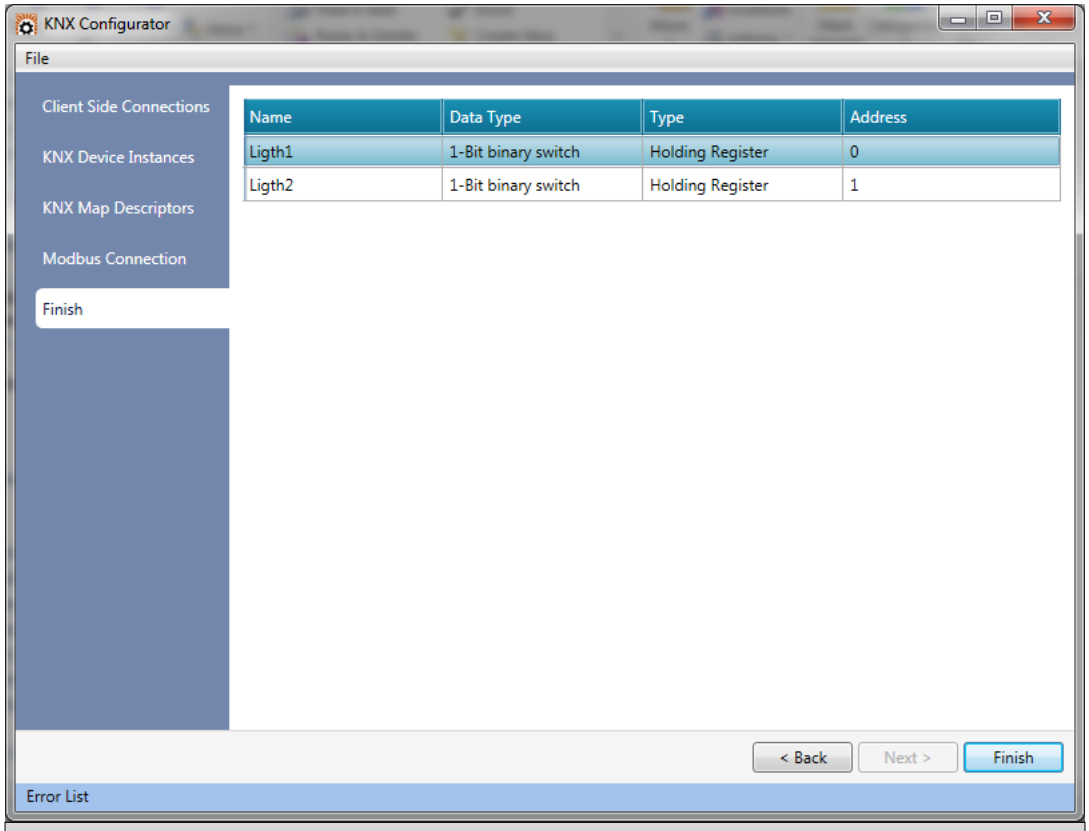


Figure 14: Finish

- **File menu** will let you save the current configuration or open a previously saved one.

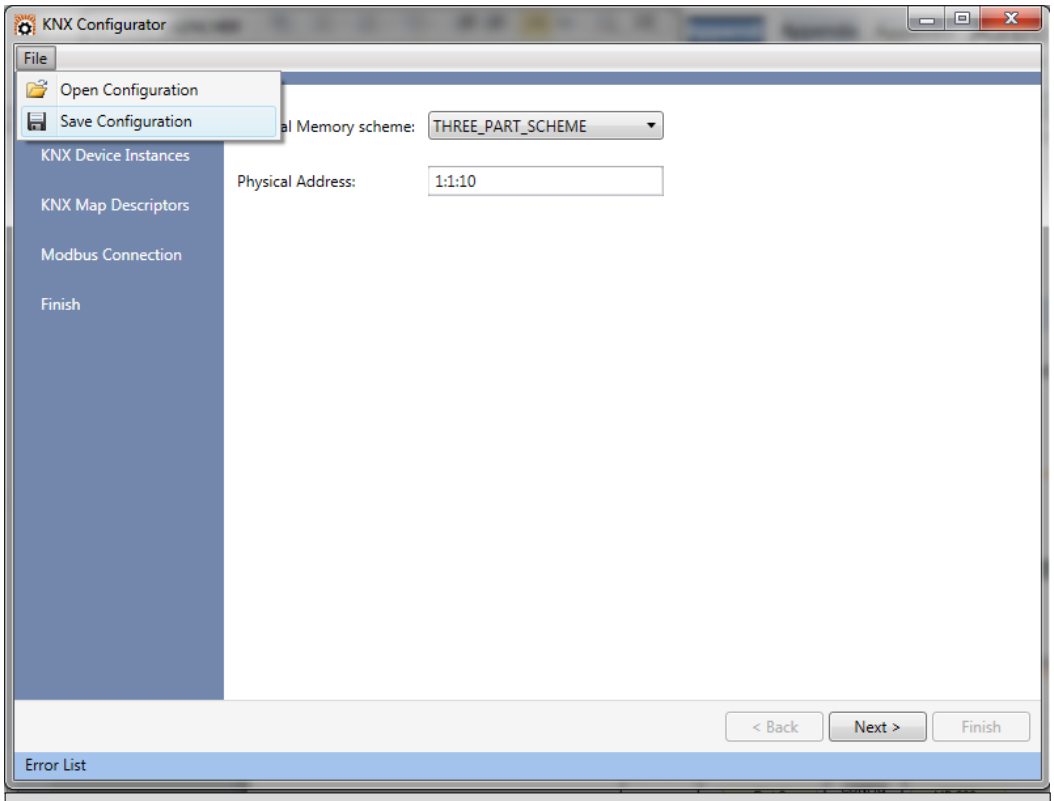


Figure 15: File menu

To download the CSV file you just created, please follow the next instructions:

a. Connect a standard CAT5 Ethernet cable (Straight through or Cross-Over) between the PC and GW-KNX1

b. The Default IP Address of GW-KNX1 is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and GW-KNX1 are on different IP Networks, assign a static IP Address to the PC on the 192.168.1.xxx network

c. Go to

>

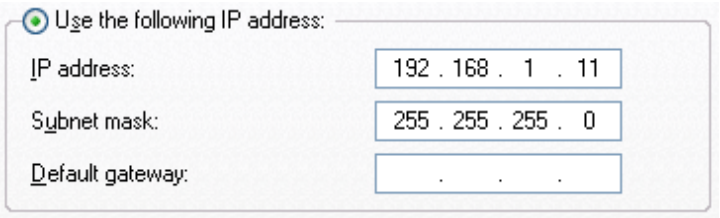
>

d. Right-click on Local Area Connection > Properties

e. Highlight

>

f. Select: Use the following IP address



g. Click

twice

h. After setting your PC to be on the same subnet as the GW-KNX1, open a web browser on your PC and enter the IP address of the GW-KNX1; the default address is 192.168.1.24.

i. If IP address of the GW-KNX1 has been changed by previous configuration, down load FieldServer Toolbox to discover unknown IP address of the GW-KNX1. http://www.fieldserver.com/docs/downloads/FieldServer-Toolbox.zip

j. The Web GUI page will be presented.

k. From the FST Web GUI's landing page, click on "Setup" to expand the navigation tree and then select "File transfer" to access the IP Settings menu. (Error! Reference source not found.)

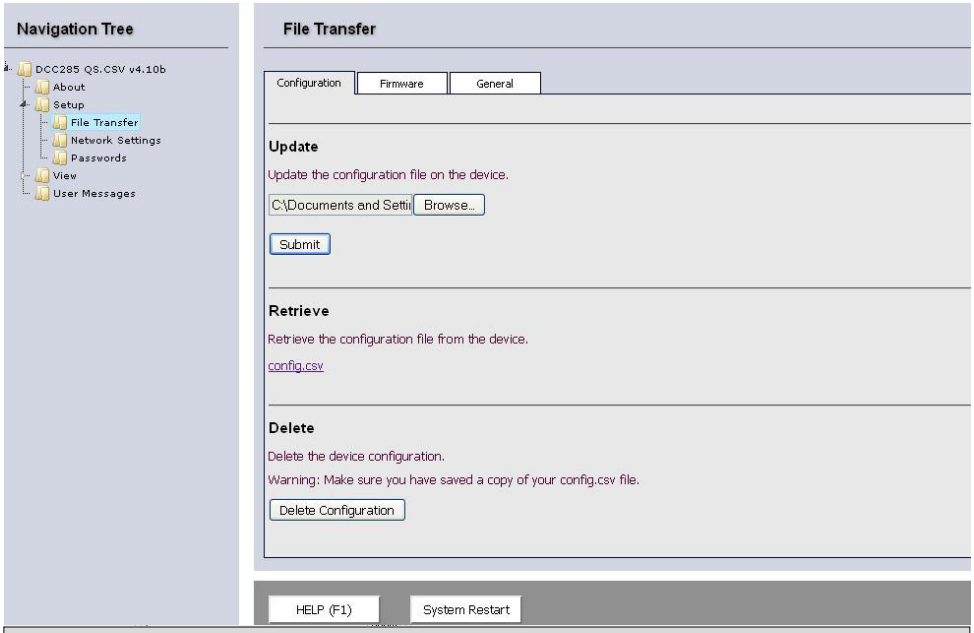


Figure 16: File Transfer Screen

l. Select browse and look for the CSV file you just created.

m. Click on submit button. The download process should take a couple of seconds.

n. To finish please click on system restart.

4.2 PLC Configuration

The PLC must be configured as a MODBUS master.
Depending on the MODBUS protocol the user has chosen, the PLC needs to be configure as MODBUS RTU or MODBUS TCP_IP master.
Example for Vision/Samba:

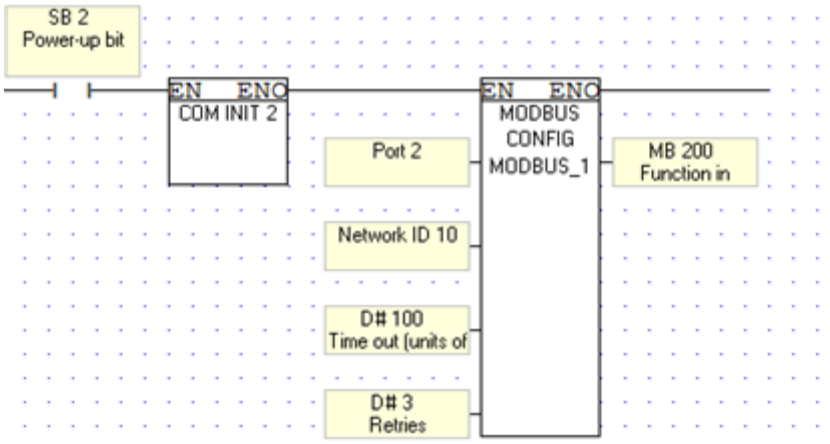


Figure 17: MODBUS RTU configuration

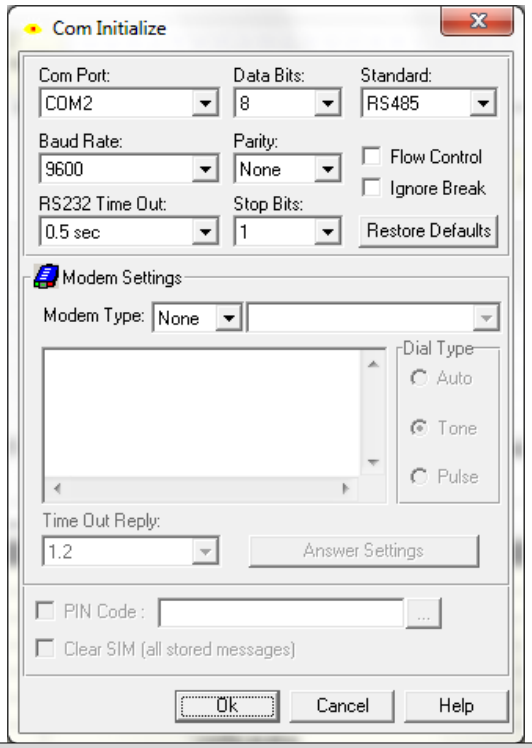


Figure 18: Example of COM initialize

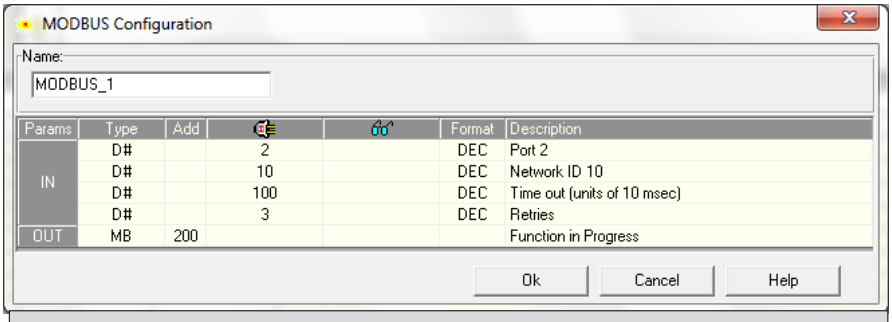


Figure 19: Example of Modbus configuration

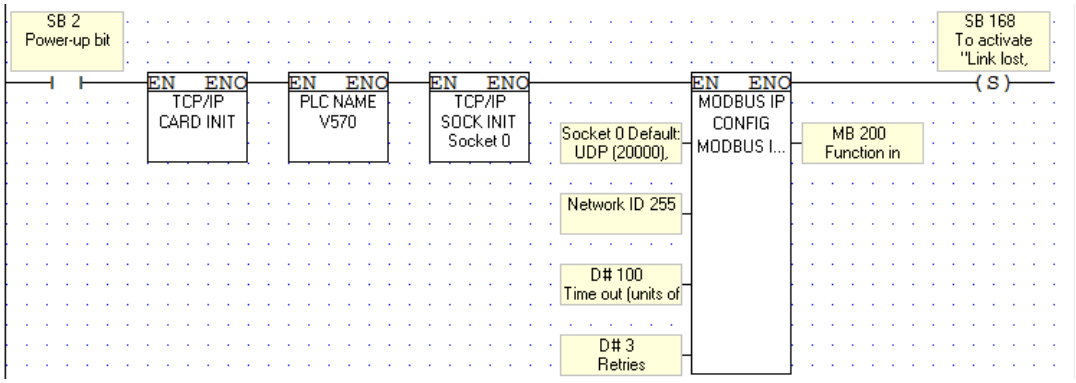


Figure 20: Example of MODBUS TCP/IP configurator

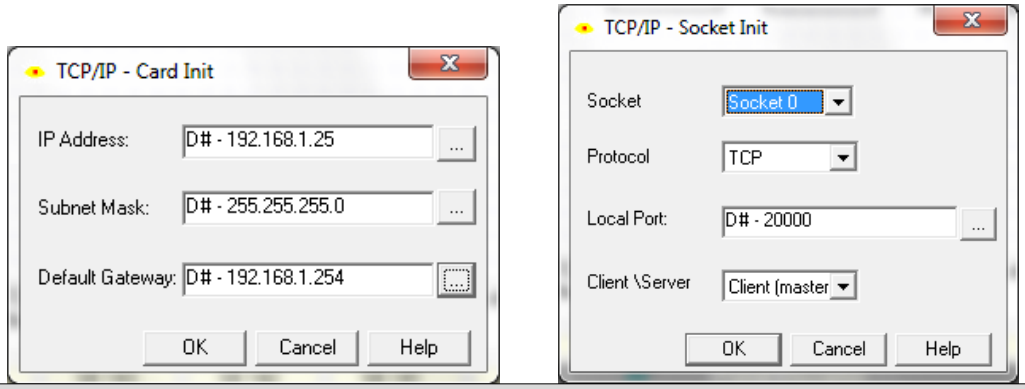


Figure 21: Example of TCP/IP card and socket initialize

For technical support and questions concerning setting up the GW-BAC1 to work with a Unitronics PLC (e.g. Vision, UniStream etc.) please contact Unitronics technical support at support@unitronics.com.

5 MODBUS RTU: CHANGE THE GW-KNX1 IP ADDRESS

5.1 Connect the PC to the GW-KNX1 via Ethernet Port

- Connect a CAT5 Ethernet cable (Straight through or Cross-Over) between the local PC and GW-KNX1.
- The Default IP Address of GW-KNX1 is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and GW-KNX1 are on different IP Networks, assign a static IP Address to the PC on the 192.168.1.xxx network.
- For Windows XP:

  Go to

>

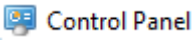
>

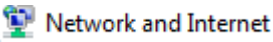
  Right-click on Local Area Connection > Properties

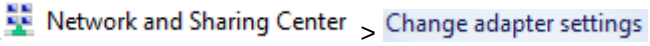
  Highlight

>

- For Windows 7:

  Go to
> 

> 

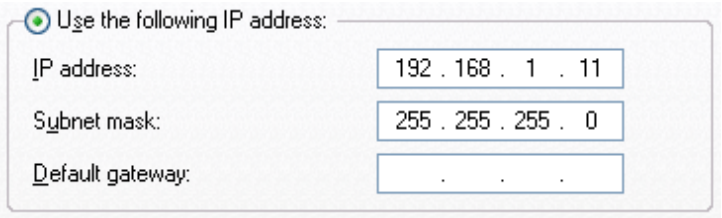
> 

  Right-click on Local Area Connection > Properties

  Highlight

>

- For Windows XP and Windows 7, use the following IP Address:



- Click

twice.

5.2 Modbus TCP/IP: Setting IP Address for Field Network

- After setting your PC to be on the same subnet as the GW-KNX1 (**Section** 5.1), open a web browser on your PC and enter the IP Address of the GW-KNX1; the default address is 192.168.1.24.
- The Web GUI will be displayed as the landing page (Figure 22)

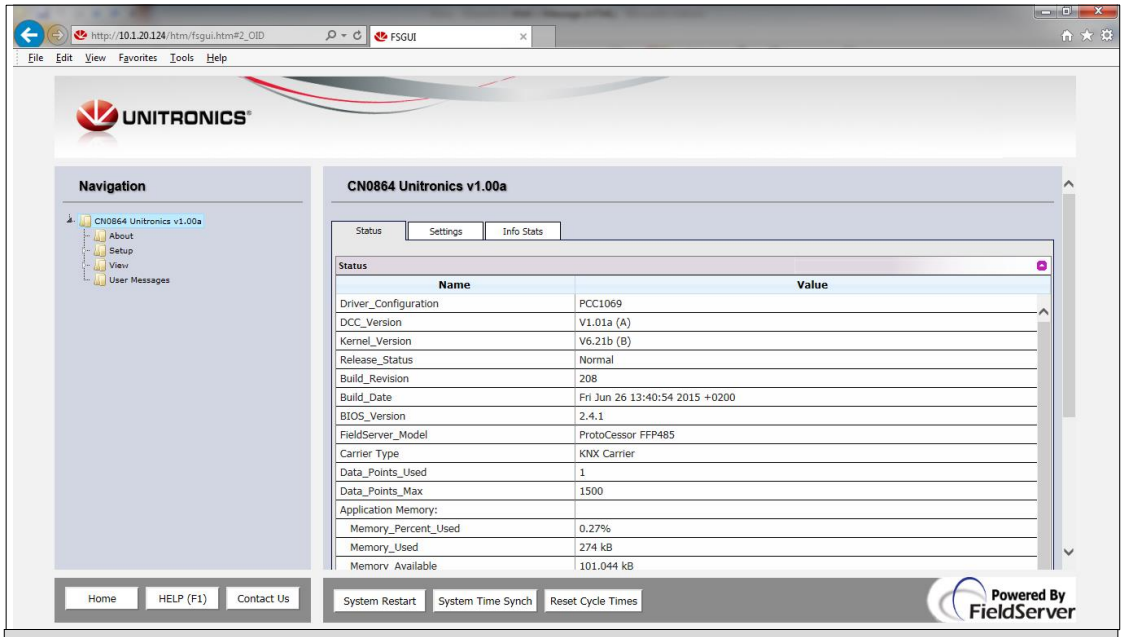


Figure 22: Web GUI Landing Page

- From the Web GUI landing page, click on “Setup” to expand the navigation tree and then select “Network Settings” to access the IP Settings menu. (Figure 23)

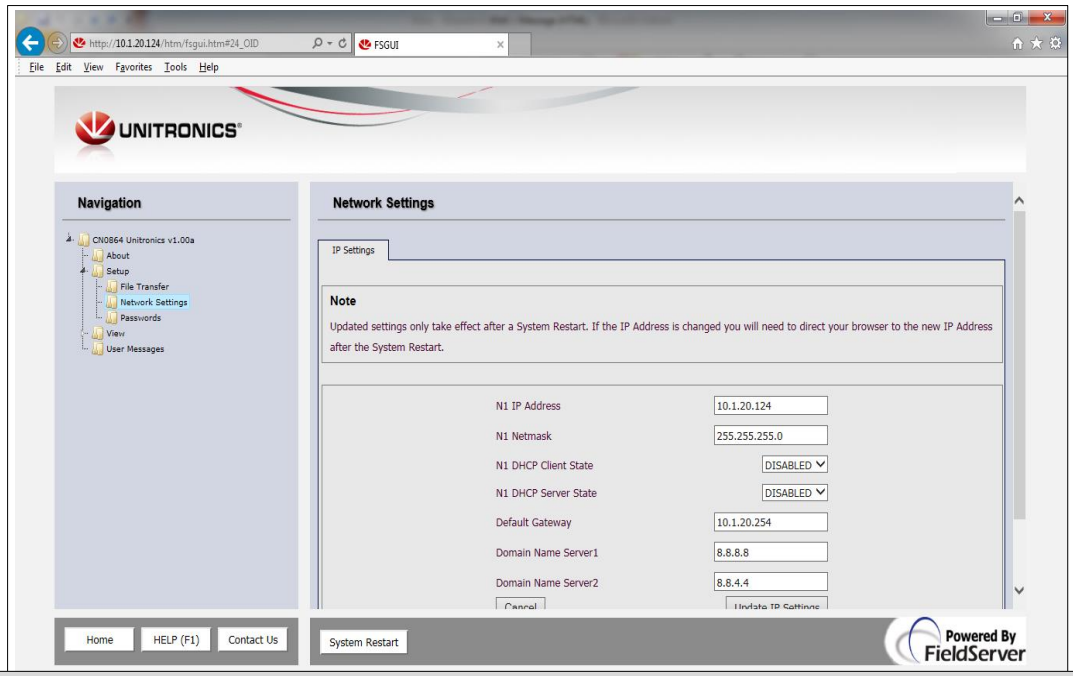


Figure 23: Changing IP Address via Web GUI

- Enter the new IP Address for the GW-KNX1's Ethernet port in the "N1 IP Address" field.
- If necessary, change the Subnet Mask setting in the "N1 Netmask" field.
- If necessary, change the IP Gateway setting in the "Default Gateway" field.

NOTE: If the GW-KNX1 is connected to a router, the IP Gateway of the GW-KNX1 should be set to the IP Address of that router.

- Click the "System Restart" button at the bottom of the page to apply changes and restart the GW-KNX1.
- Unplug Ethernet cable from PC and connect the GW-KNX1 to the network hub or router.
- **Record the IP Address assigned to the GW-KNX1 for future reference.**

Appendix A. Troubleshooting

Appendix A.1. Lost or Incorrect IP Address

- Ensure that FieldServer Toolbox is loaded onto the local PC. If not, download FieldServer-Toolbox.zip on the Sierra Monitor webpage, under Customer Care-Resource Center, Software Downloads:

  http://www.sierramonitor.com/customer-care/resource-center?filters=software-downloads

- Extract the executable file and complete the installation.

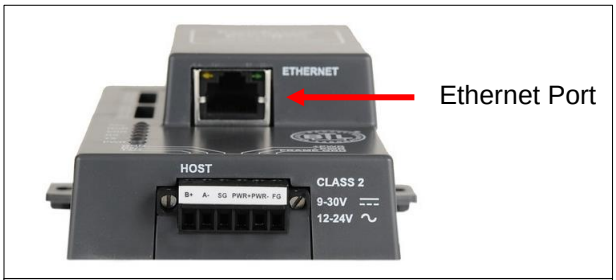
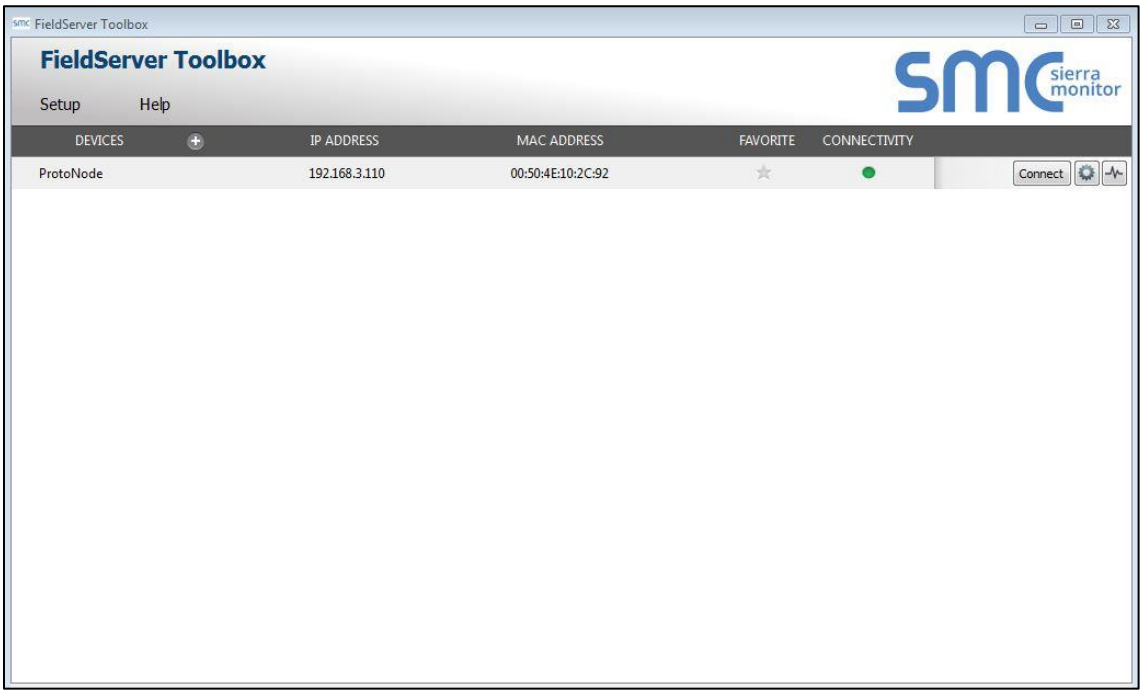


Figure 24: Ethernet Port Location

- Disable any wireless Ethernet adapters on the PC/Laptop.
- Disable firewall and virus protection software if possible.
- Connect a standard CAT5 Ethernet cable between the PC and GW-KNX1.
- Double click on the FS Toolbox Utility.
- Check IP Addresses from the Device listings.



- Correct IP Address(es) by right clicking the settings icon and changing the IP Address.

Appendix A.2. Viewing Diagnostic information

- Type the IP Address of the GW-KNX1 into the web browser or use the FieldServer Toolbox to connect to the GW-KNX1.
- Click on Diagnostics and Debugging Button, then click on view, and then on connections.
- If there are any errors showing on the Connection page, please refer to **Appendix A.3** for the relevant wiring and settings.

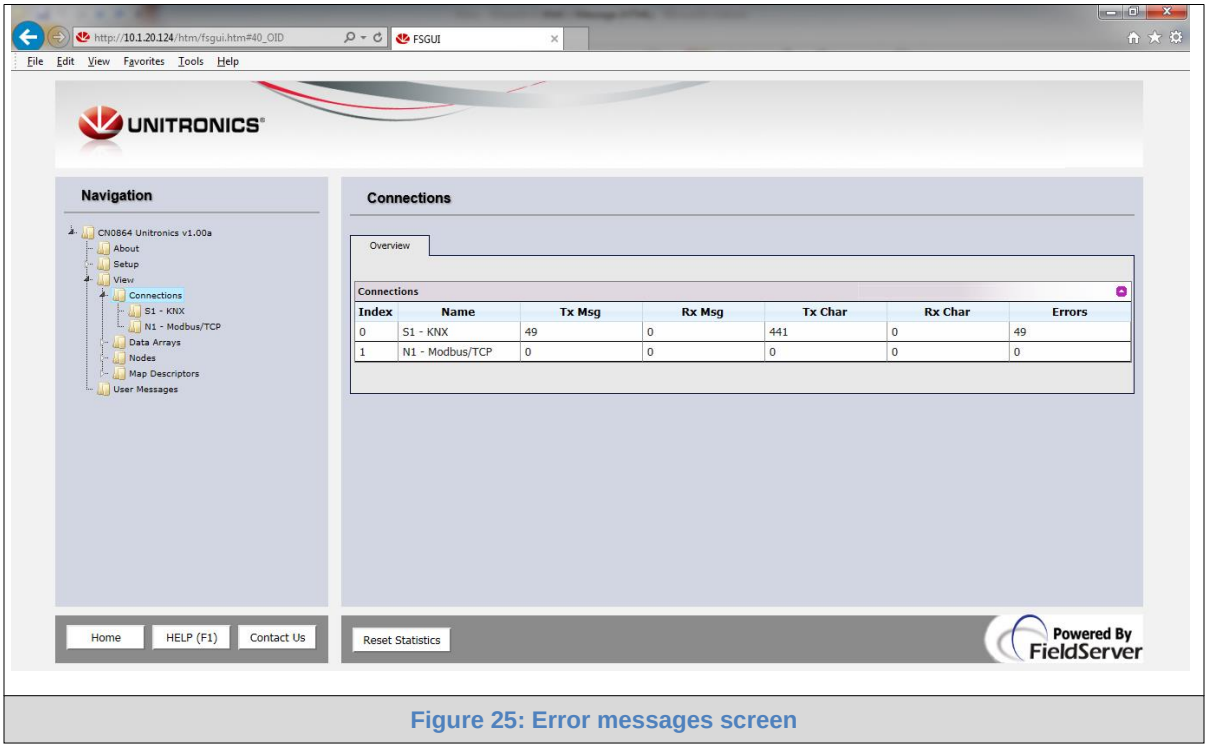


Figure 25: Error messages screen

Appendix A.3. Check Wiring and Settings

- No COMS on KNX side. If Tx/Rx are not flashing rapidly then there is a COM issue on the KNX side. To fix, check the following:
  - Visual observations of LEDs on GW-KNX1 (**Appendix A.5**)
  - Verify wiring
  - Verify KNX device is connected to the same subnet as the GW-KNX1
- Field COM problems:
  - Visual observations of LEDs on GW-KNX1 (**Appendix A.5**)
  - Check dipswitch settings (using correct baud rate and device instance)
  - Verify IP Address setting
  - Verify wiring

If the problem still exists, a Diagnostic Capture needs to be taken and sent to Sierra Monitor Corporation. (Appendix A.4)

Appendix A.4. Take Diagnostic Capture With the FieldServer Utilities

- Once the Diagnostic Capture is complete, email it to **support@sierramonitor.com**. The Diagnostic Capture will allow us to rapidly diagnose the problem.
- Ensure that FieldServer Toolbox is Loaded on the PC that is currently being used, or download FieldServer-Toolbox.zip on the Sierra Monitor webpage, under Customer Care: Resource Center, Software Downloads:
  http://www.sierramonitor.com/customer-care/resource-center?filters=software-downloads
- Extract the executable file and complete the installation.

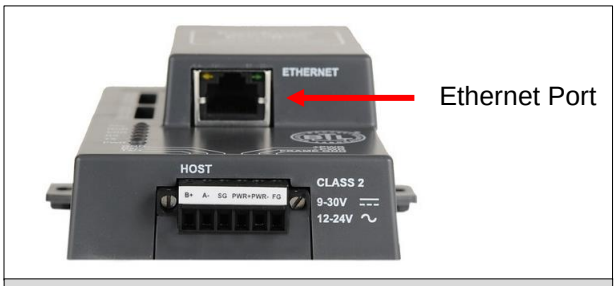
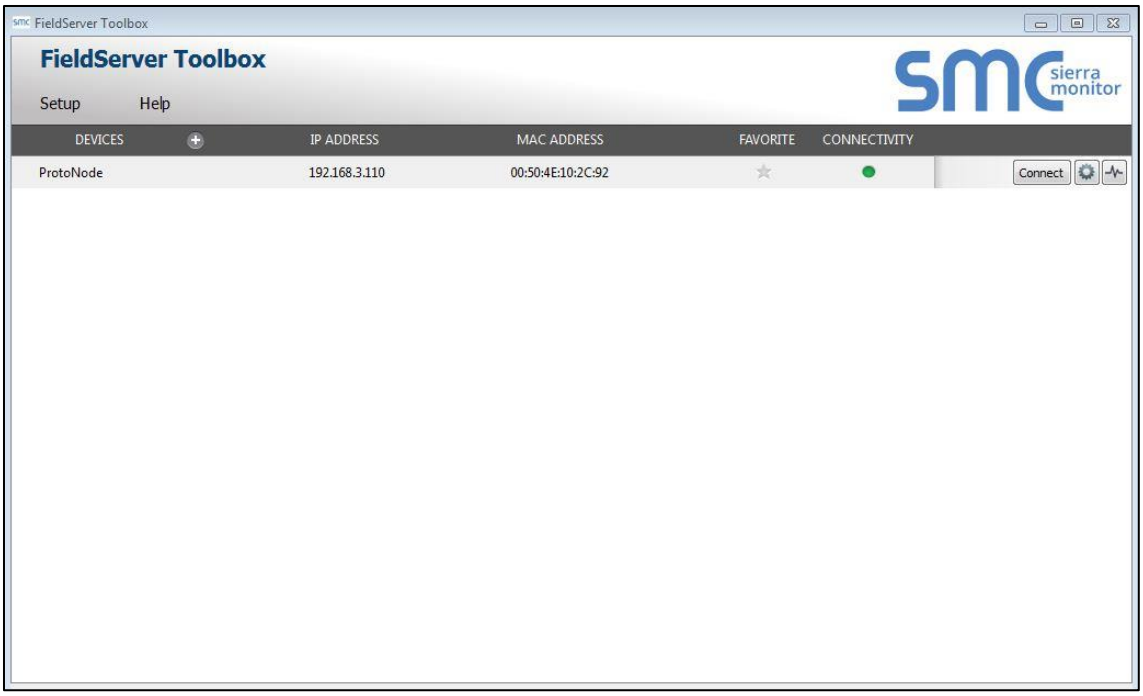


Figure 26: Ethernet Port Location

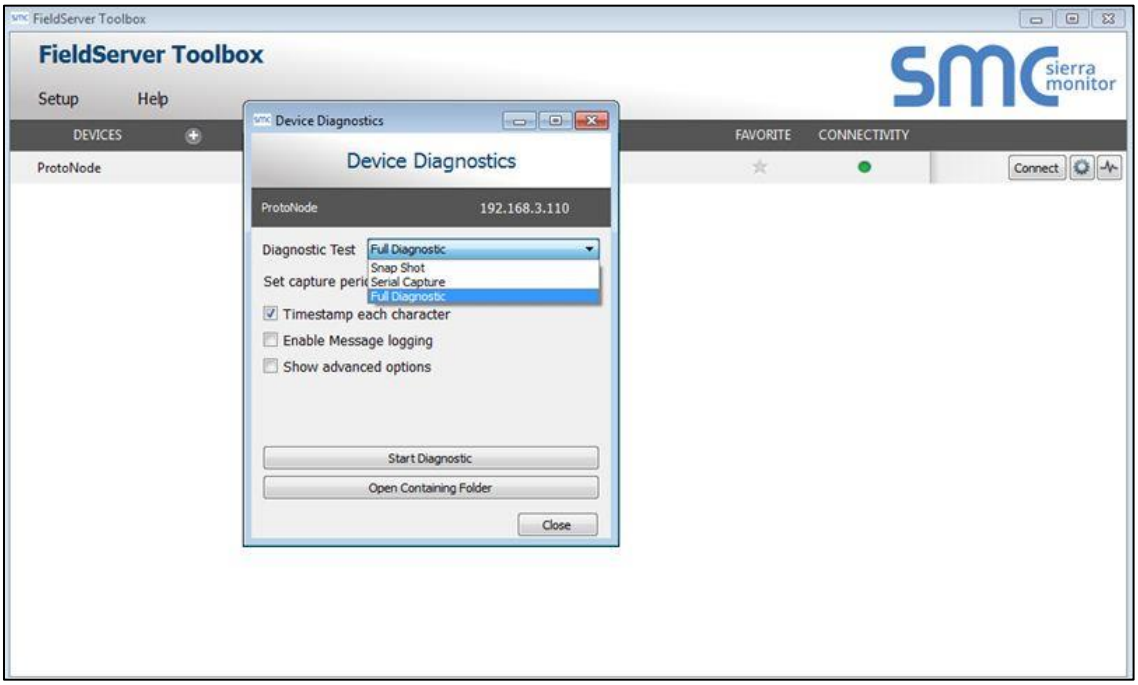
- Disable any wireless Ethernet adapters on the PC/Laptop.
- Disable firewall and virus protection software if possible.
- Connect a standard CAT5 Ethernet cable between the PC and GW-KNX1.
- Double click on the FS Toolbox Utility.

Step 1: Take a Log

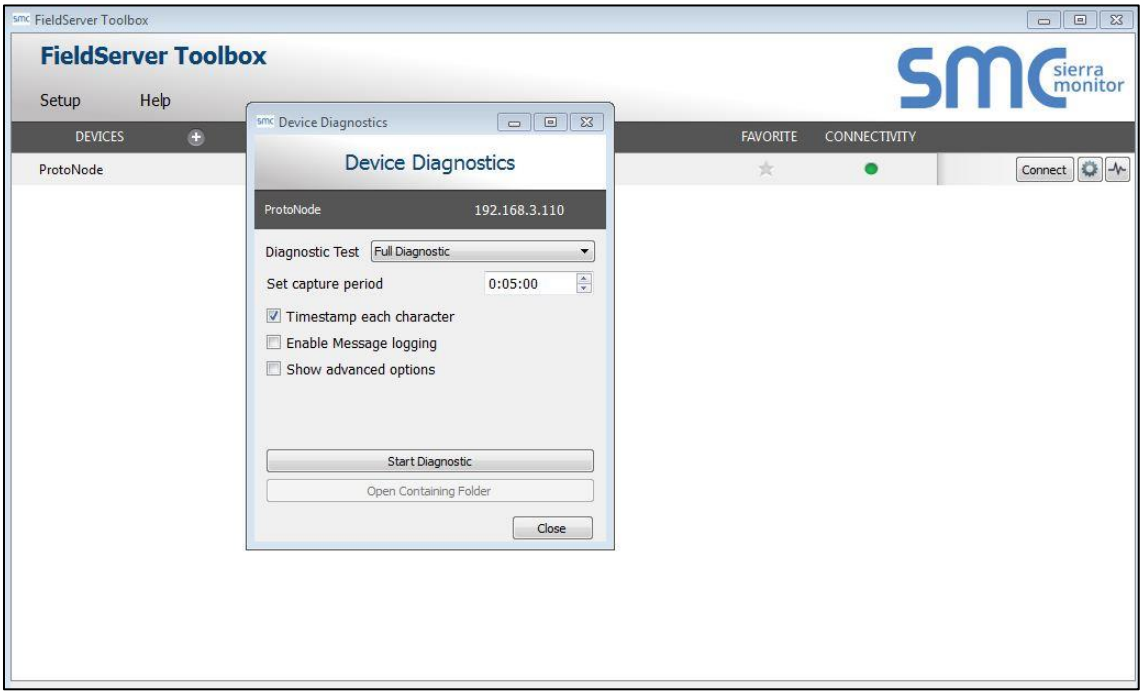
- Click on the diagnose icon of the desired device



- Select “Full Diagnostic"



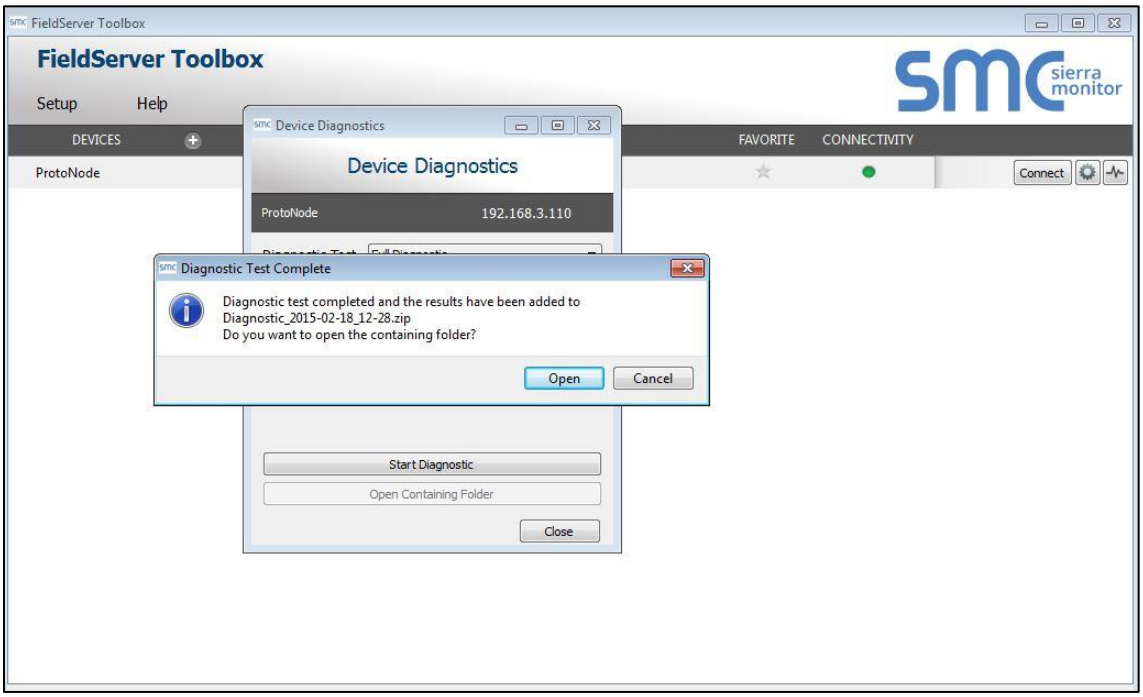
- If desired, the default capture period can be changed
- Click on “Start Diagnostic”



- When the capture period is finished, the “Diagnostic Test Complete” window will appear

Step 2: Send Log

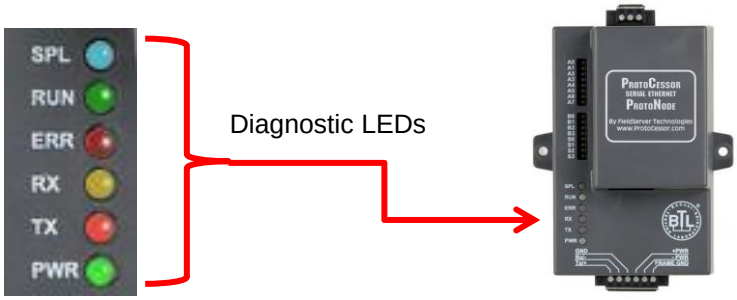
- Once the diagnostic test is complete, a .zip file will be saved on the PC



- Click “Open” to launch explorer and have it point directly at the correct folder, then email the diagnostic zip file to **support@sierramonitor.com**.

Appendix A.5. LED Diagnostics for Communications Between GW-KNX1 and Devices

Please see the diagram below for GW-KNX1 LED Locations.



Tag	Description
SPL	The SPL LED will light if the unit is not getting a response from one or more of the configured devices.
RUN	The RUN LED will start flashing 20 seconds after power indicating normal operation.
ERR	The SYS ERR LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. A steady red light will indicate there is a system error on the unit. If this occurs, immediately report the related “system error” shown in the error screen of the GUI interface to technical support for evaluation.
RX	The RX LED will flash when a message is received on the host port.
TX	The TX LED will flash when a message is sent on the host port.
PWR	This is the power light and should show steady green at all times when unit is powered.

Figure 27: Diagnostic LEDs

Appendix B. Reference

Appendix B.1. Specifications

	GW-KNX1
Electrical Connections	One 6-pin Phoenix connector with: KNX port (+ / - / gnd) Power port (+ / - / Frame-gnd) One 3-pin Phoenix connector with: RS-485 port (+ / - / gnd) One Ethernet 10/100 BaseT port
Approvals	CE Certified; TUV approved to UL 916, EN 60950-1, EN 50491-3 and CSA C22-2 standards; FCC Class A Part 15; DNP3 Conformance Tested; RoHS Compliant; CSA 205 Approved
	BTL Marked
Power Requirements	Multi-mode power adapter: 9-30VDC or 12 - 24VAC
Physical Dimensions	11.5 cm L x 8.3 cm W x 4.1 cm H (4.5 x 3.2 x 1.6 in.)
Weight	0.2 kg (0.4 lbs)
Operating Temperature	-40°C to 75°C (-40°F to167°F)
Surge Suppression	EN61000-4-2 ESD EN61000-4-3 EMC EN61000-4-4 EFT
Humidity	5 - 90% RH (non-condensing)
(Specifications subject to change without notice)	

Figure 28: Specifications

Appendix B.2. Compliance with UL Regulations

For UL compliance, the following instructions must be met when operating GW-KNX1.

- The units shall be powered by listed LPS or Class 2 power supply suited to the expected operating temperature range.
- The interconnecting power connector and power cable shall:
  - Comply with local electrical code
  - Be suited to the expected operating temperature range
  - Meet the current and voltage rating for GW-KNX1/Net
- Furthermore, the interconnecting power cable shall:
  - Be of length not exceeding 3.05m (118.3”)
  - Be constructed of materials rated VW-1, FT-1 or better
- If the unit is to be installed in an operating environment with a temperature above 65 °C, it should be installed in a Restricted Access Area requiring a key or a special tool to gain access.
- This device must not be connected to a LAN segment with outdoor wiring.