Starting From Scratch Creating a Configuration and Control Program for The New Family of RTUs

Abstract

This document will tell you how to get started with the basics in setting up the RTU to make it work for your particular application

Products

VT-MIPM-138-D,VT-MIPM-248-D, and ST-IPM-8460

Use Case:

To help you get started off on the right foot and not make common mistakes

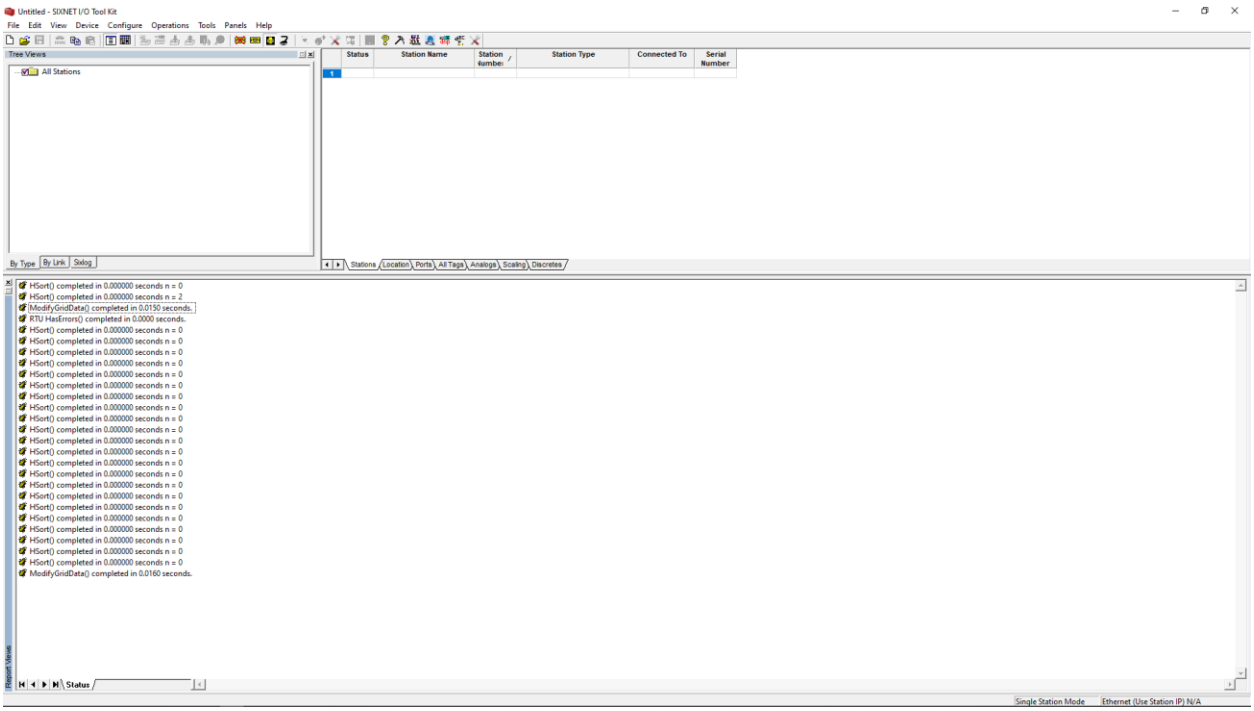
Required Software

Sixnet IO Toolkit Version 5.1.101 or higher Basic level

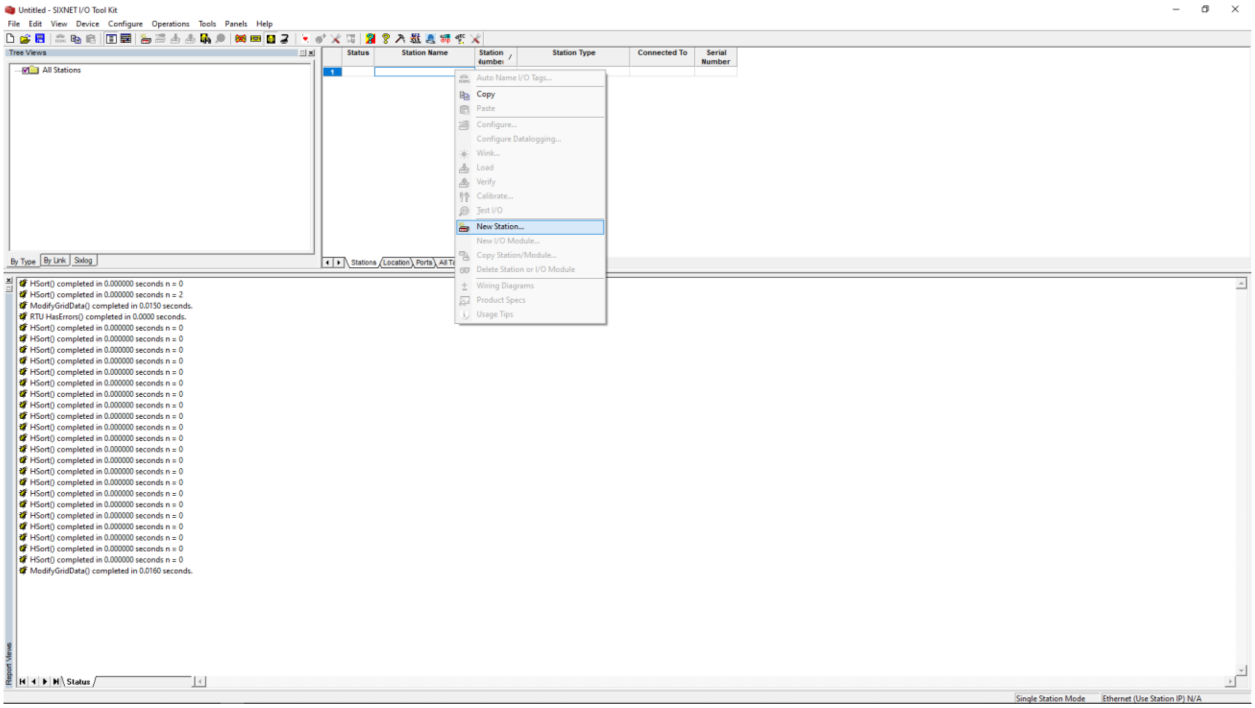
Red Lion Work Bench Version 1.03 or higher

Using the Sixnet IO Toolkit for basic communication parameters Setup

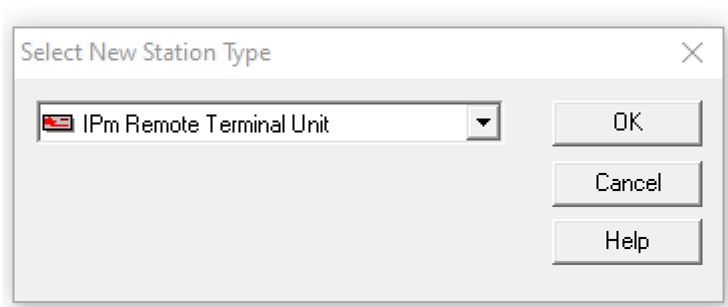
Here we start with a blank Sixnet IO Toolkit configuration



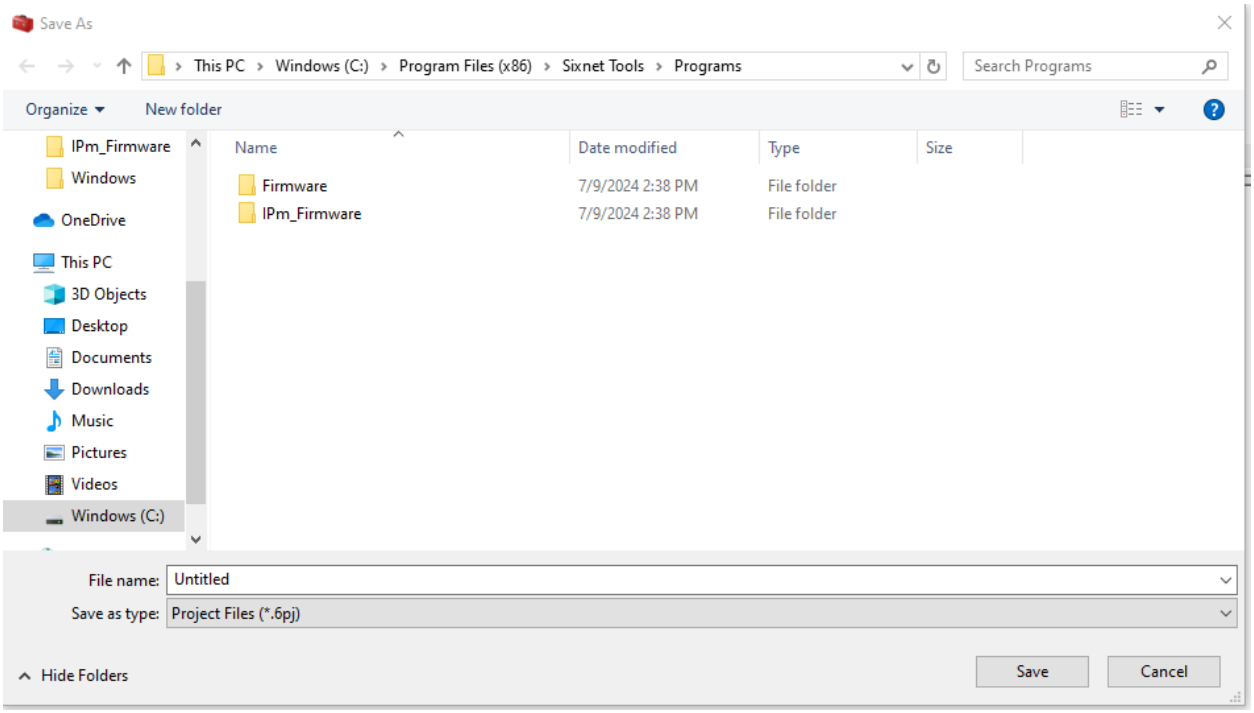
Click on the small square directly underneath the Station Name label like so and right click like so. Highlighting the word “New Station”



Click on this and the box pops open saying Select New Station Type

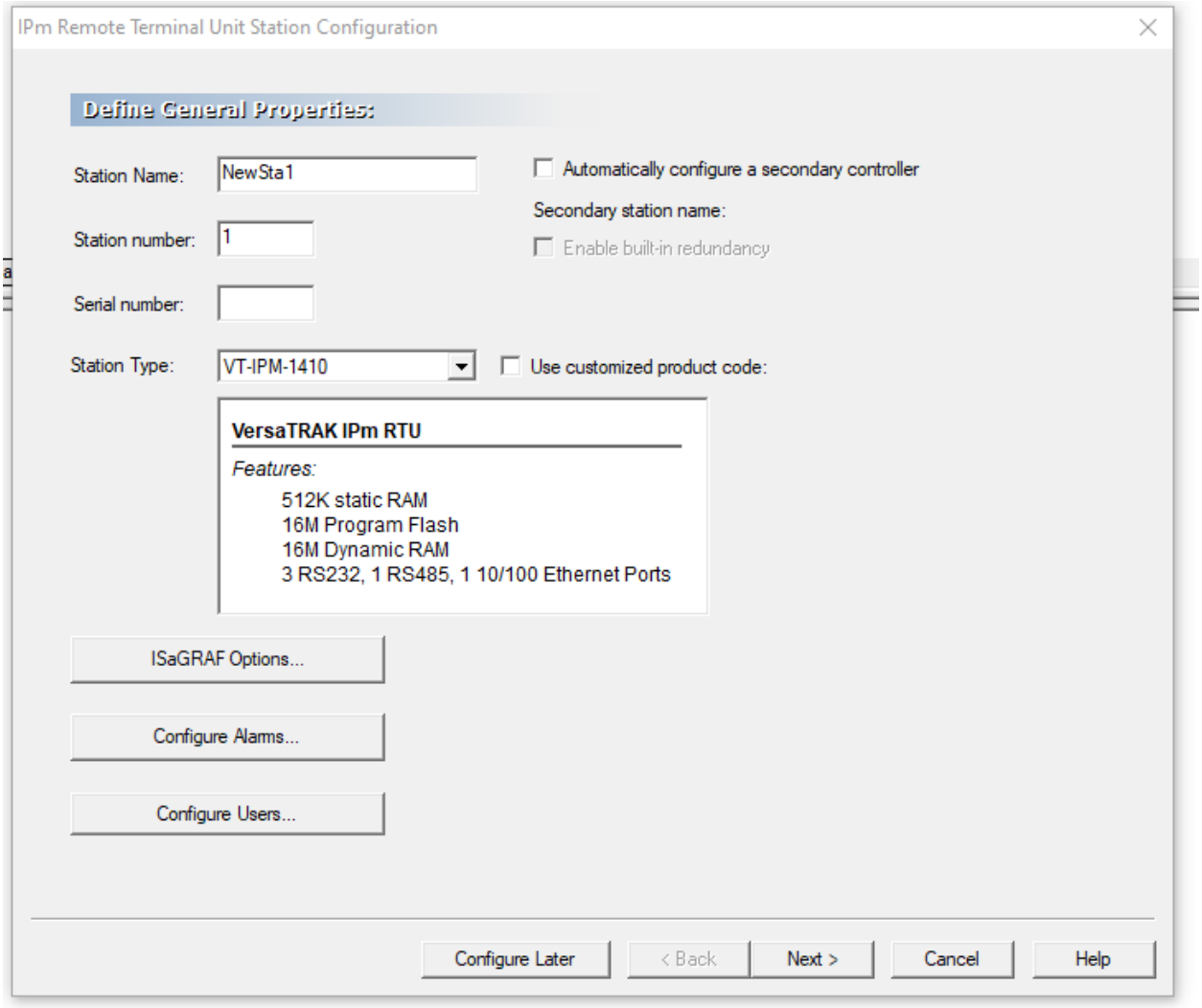


Click OK and then this pops open…



Browse to where you wish to put your new project and then give it a name and click save.

After that this box pops up like this…



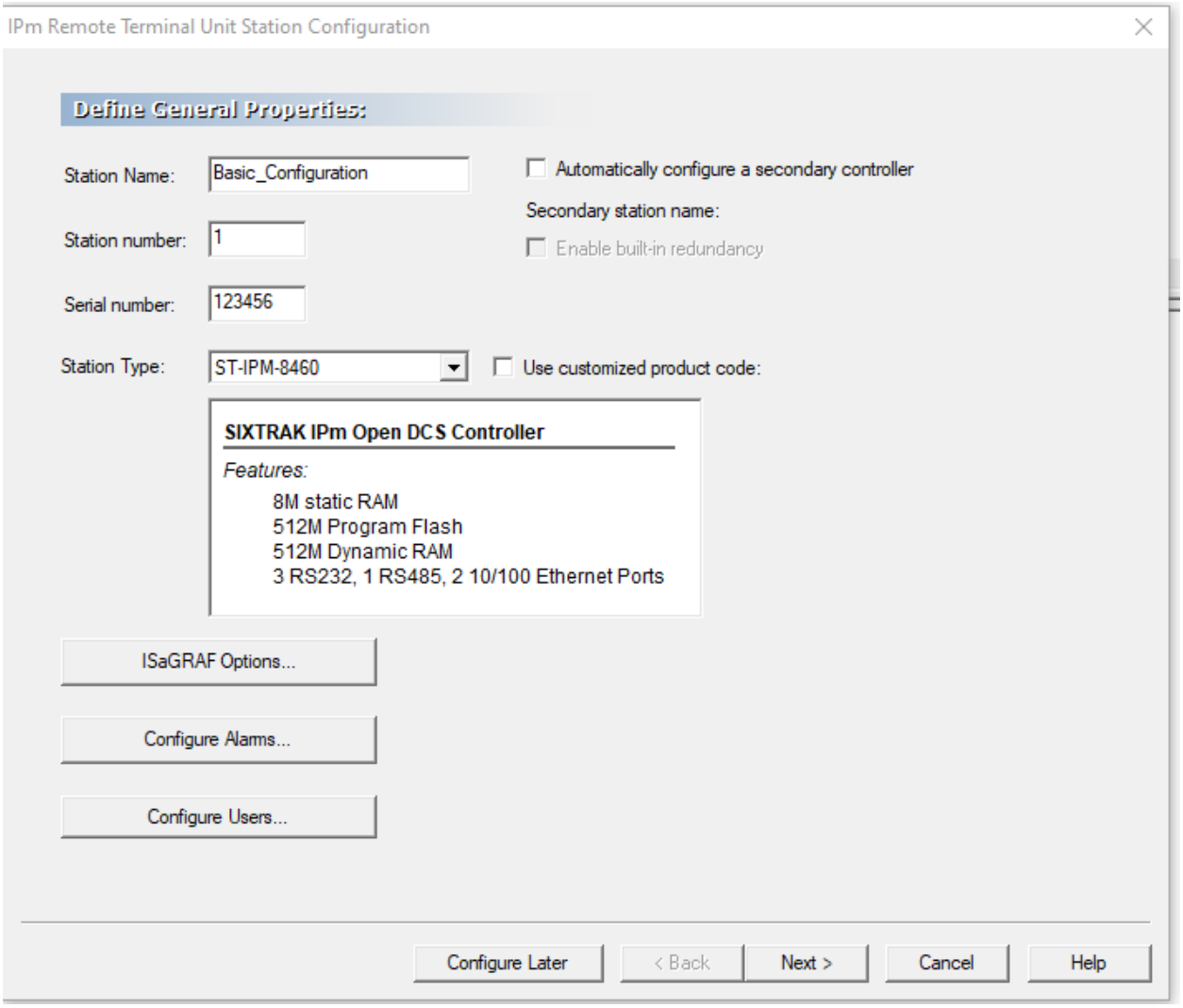
Fill in the Station Name, Station Number, serial number and select the RTU type.

The station number is important because this is the Modbus node address and the DNP3 node address if you are using those two communications drivers.

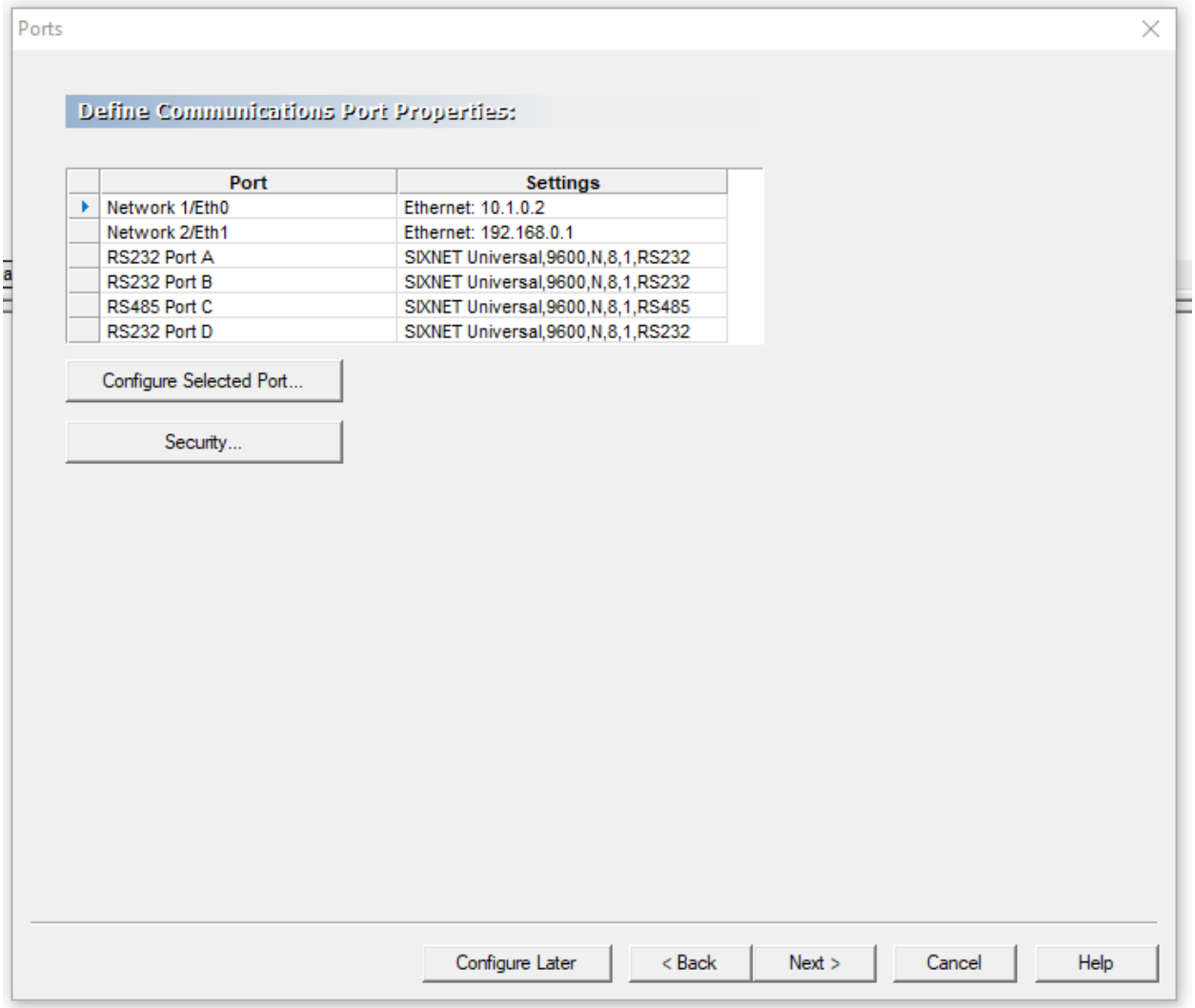
The Serial Number is important because sometimes the Sixnet IO Toolkit will want to use a “broadcast” method for communications and it relies on that number being correct.

Of course having the proper RTU type being correct is important as well because this will stop comms to the device is it is not set correctly.

Now your configuration should look something like this…



If you are wanting to use security now would be the time to click on the “users” button for this basic setup we will just be using the basic configuration of the unit. Now click on the next button and this screen should pop up.

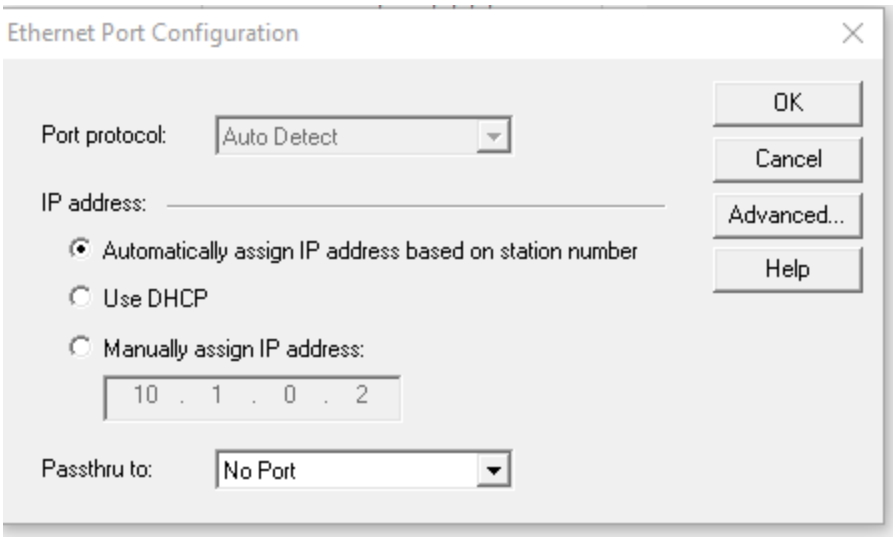


The RTU that has been chosen has 2 separate IP addresses for the hardware.

Network 1 is the single standalone port at the front of the 8460 unit

Network 2 is the multiport at the back of the unit

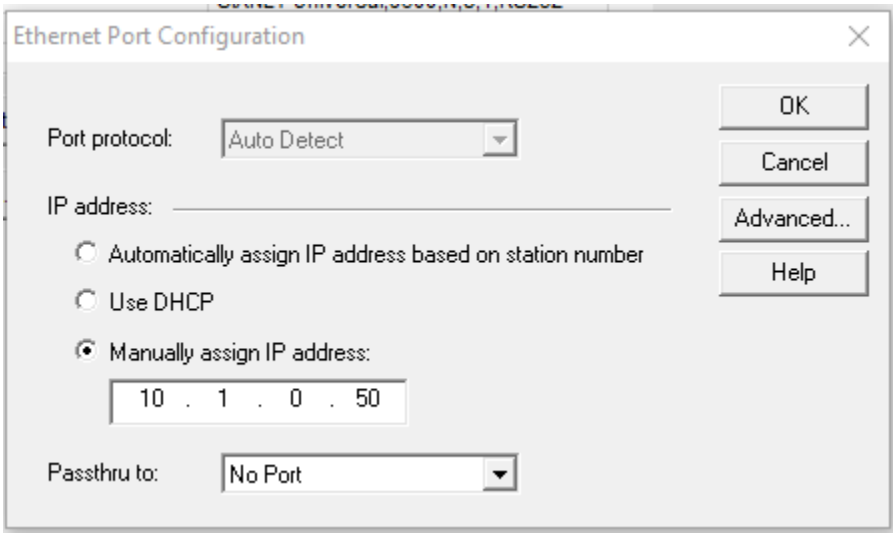
Now highlight Network 1 and click Configure Selected Port and this box will pop up.



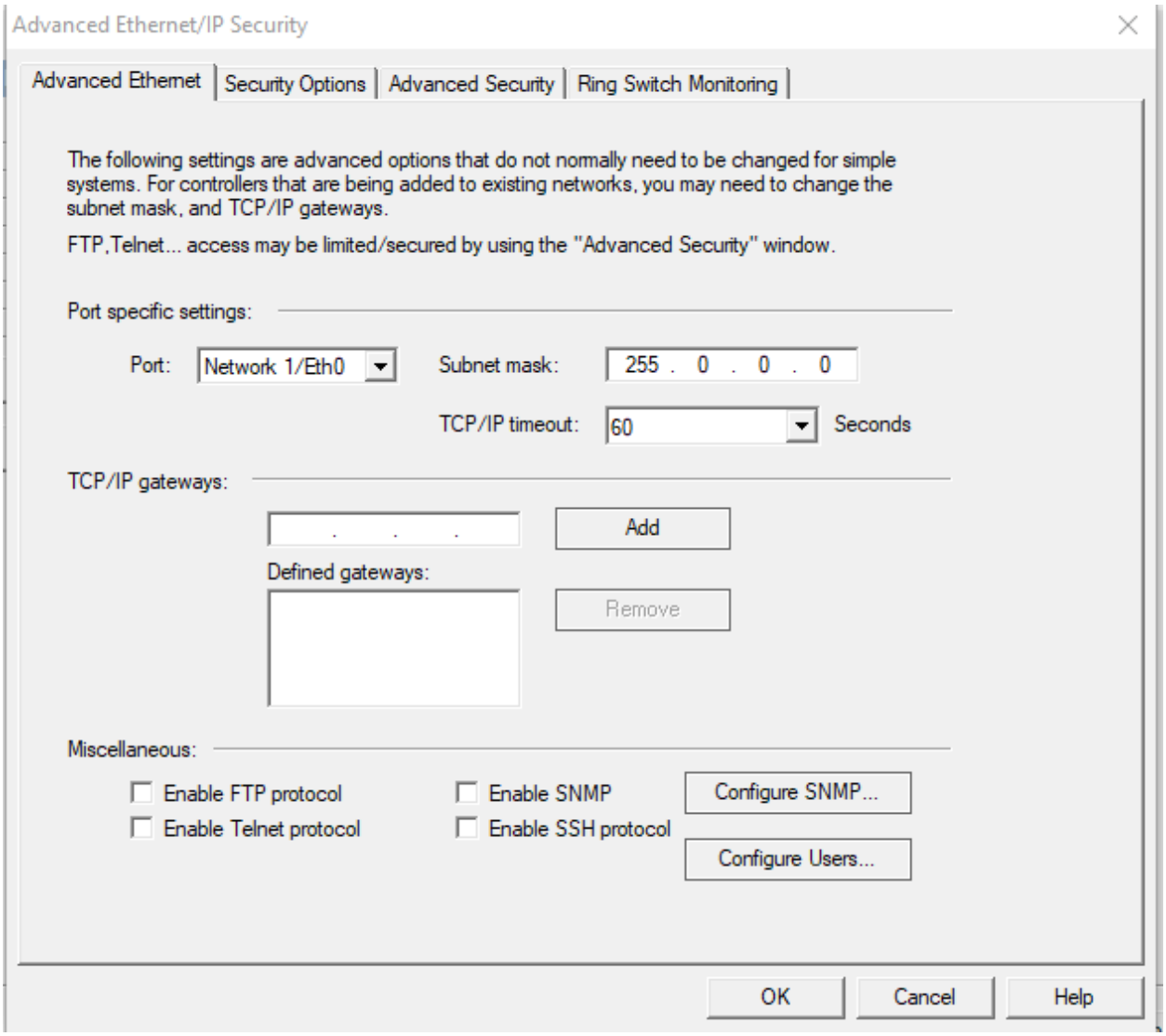
More than likely the IP address in here will not be correct for your application. Click on the

Manually assign IP address. This will allow you to enter in the IP address you wish, I have changed this one to 10.1.0.50.

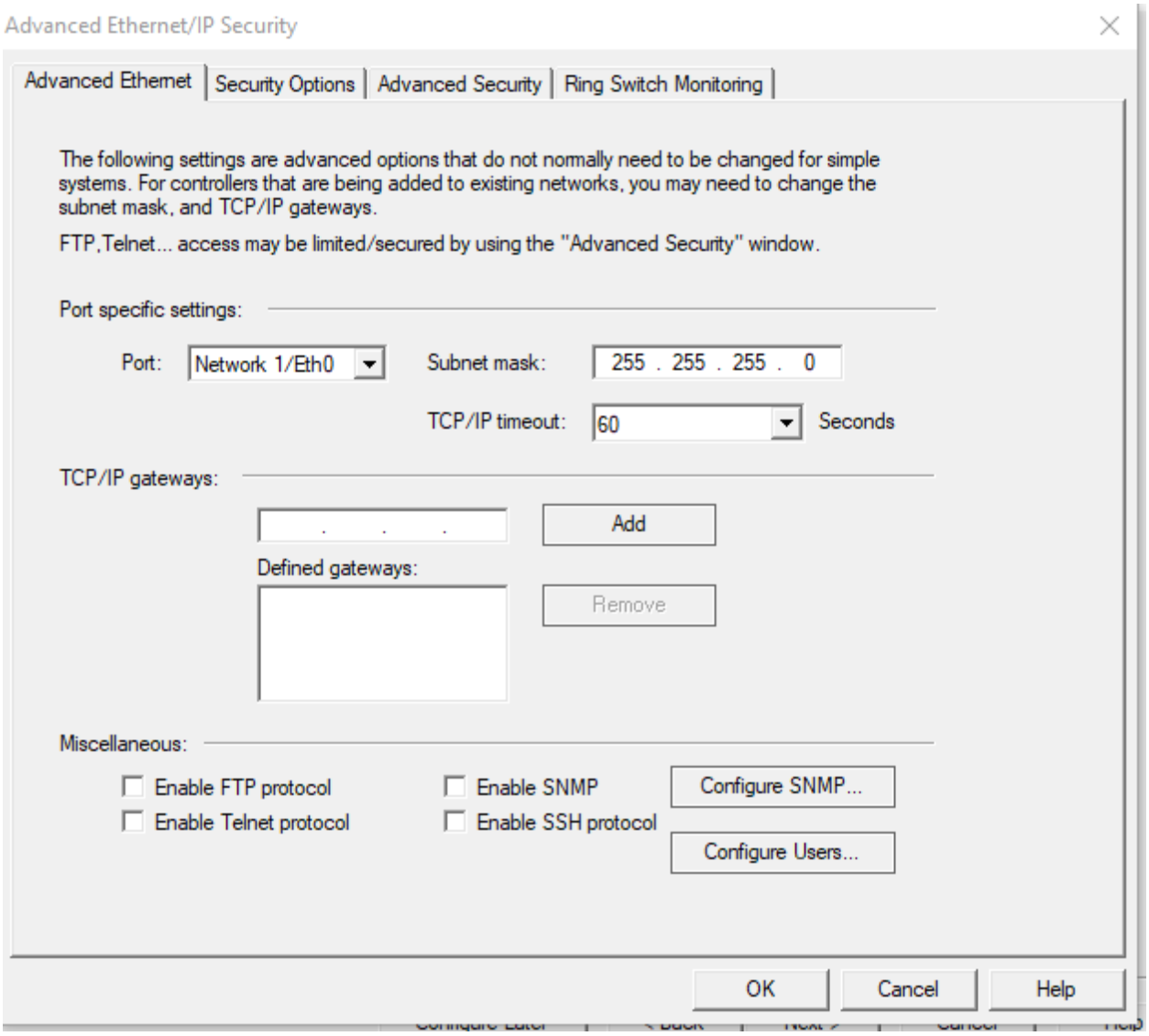
Repeat this process for Network 2



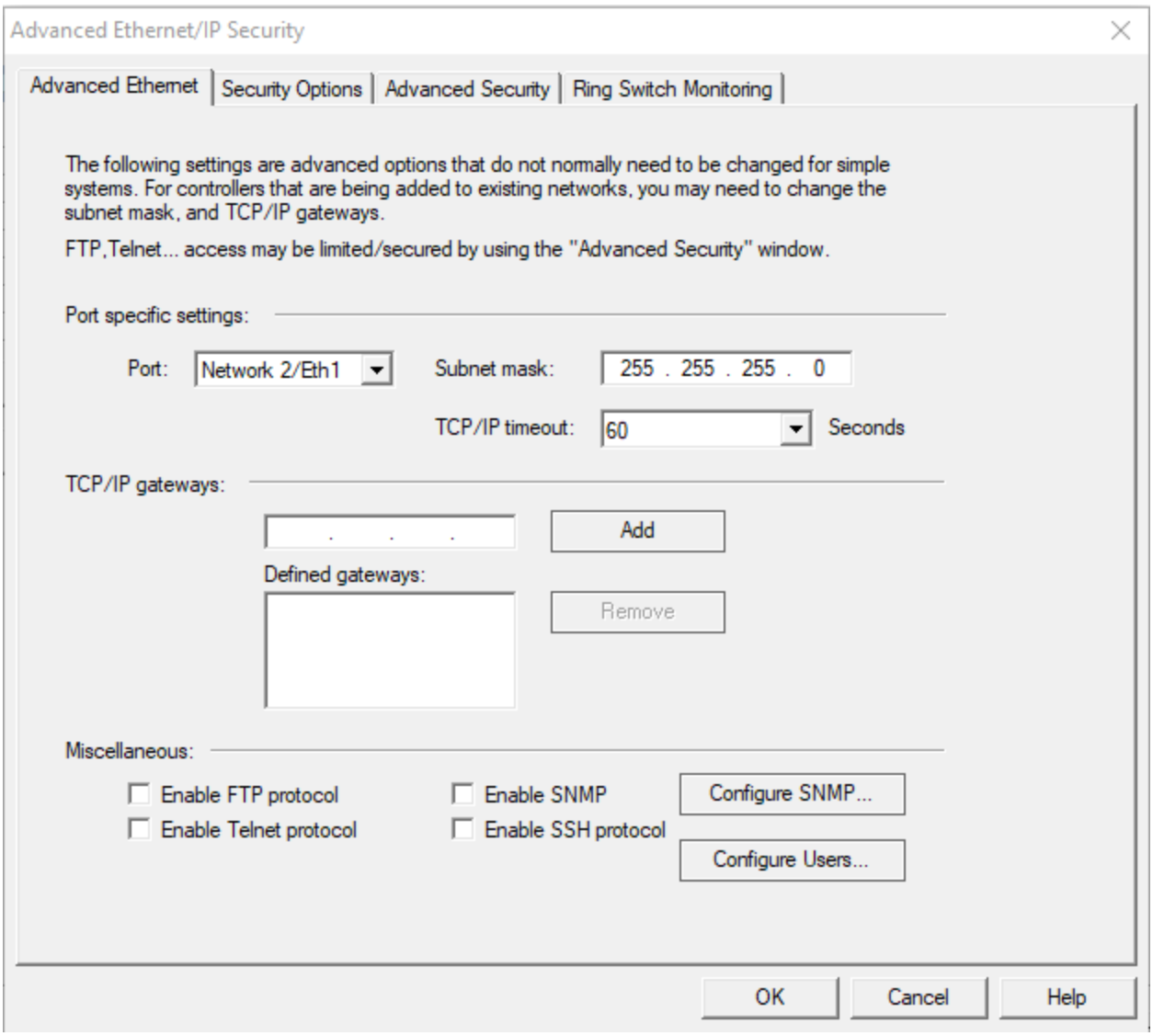
Now click on the Advanced button and this box will pop up...



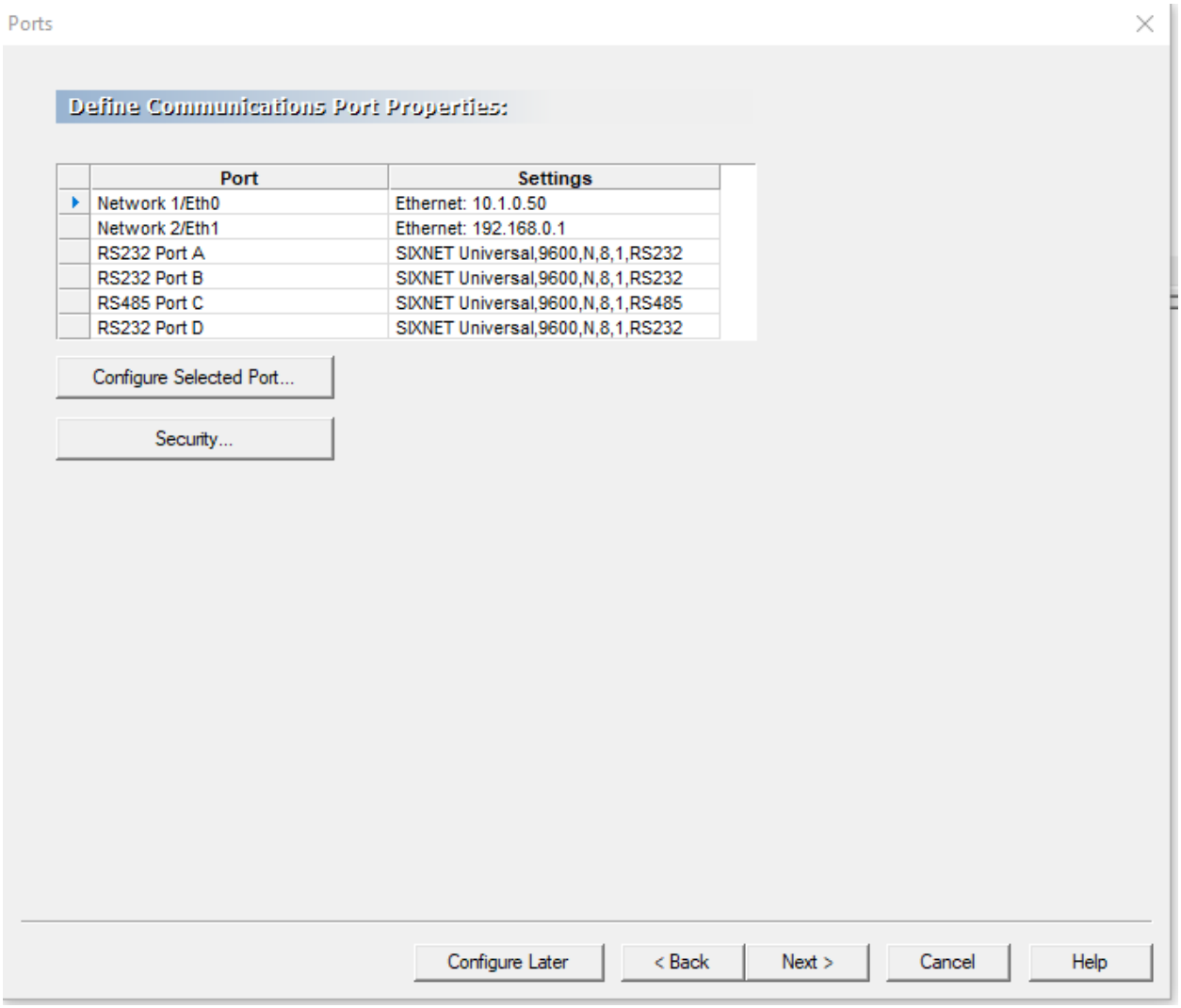
On this page you set up your subnet mask and default gateway settings for Network 1. I will change this to 255.255.255.0.



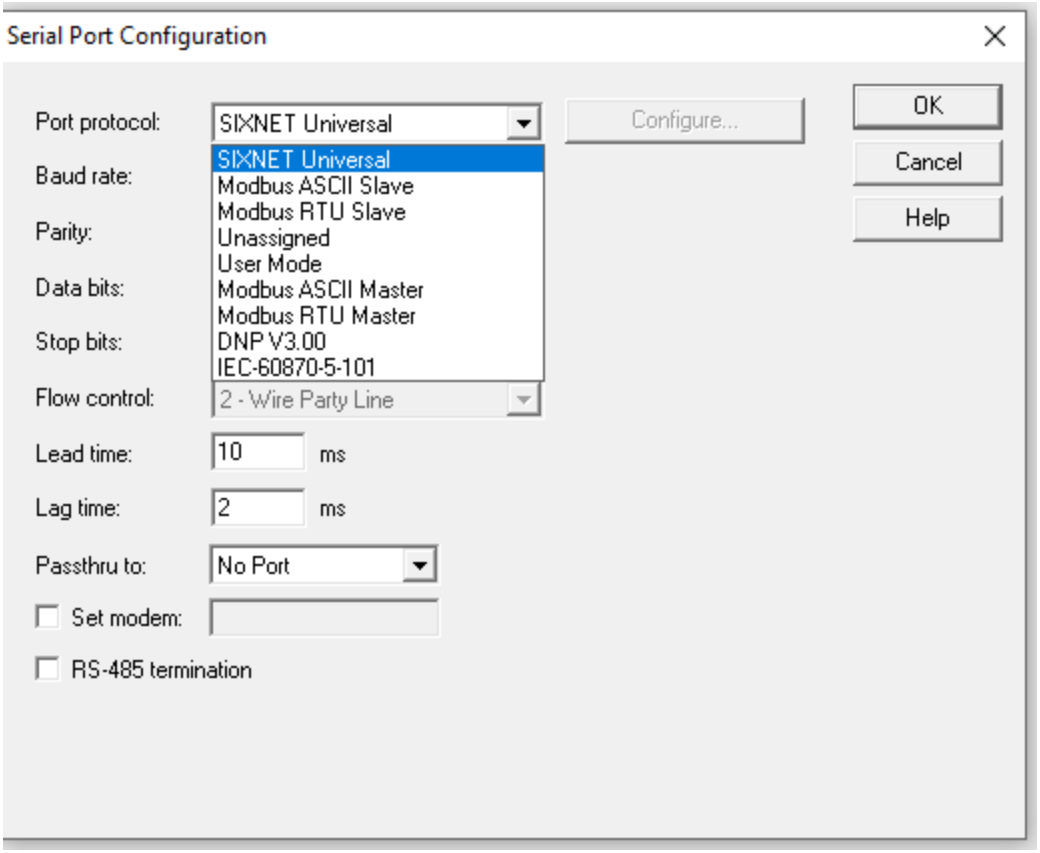
Remember this is simply for Network 1, now we must hit the Port drop down button and select Network 2 and do the same for it.



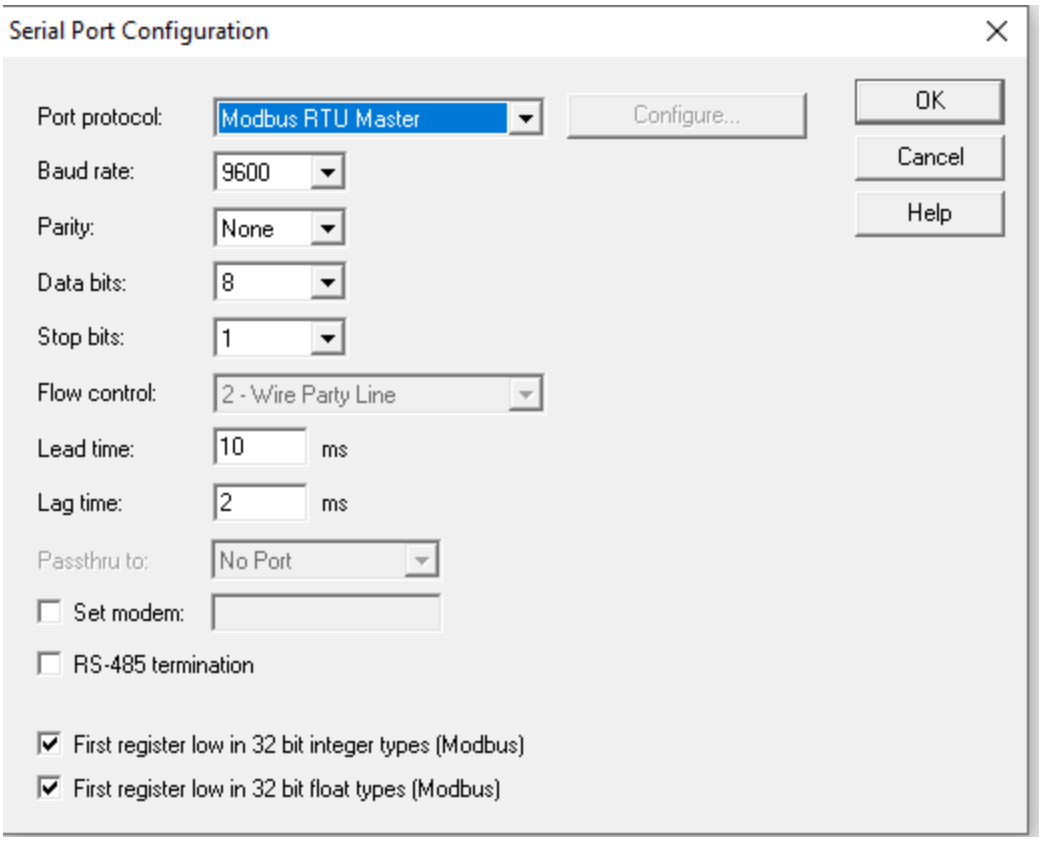
Now we are ready to click OK. Then click Ok on the first box that pops up. Now our Define Communication Properties Box should look something like this...



If you are going to use the Serial ports for something besides the Sixnet Universal driver then click on the port letter. The ports are labeled on the front of the unit. I will chose the RS485 port or Port C for this example.

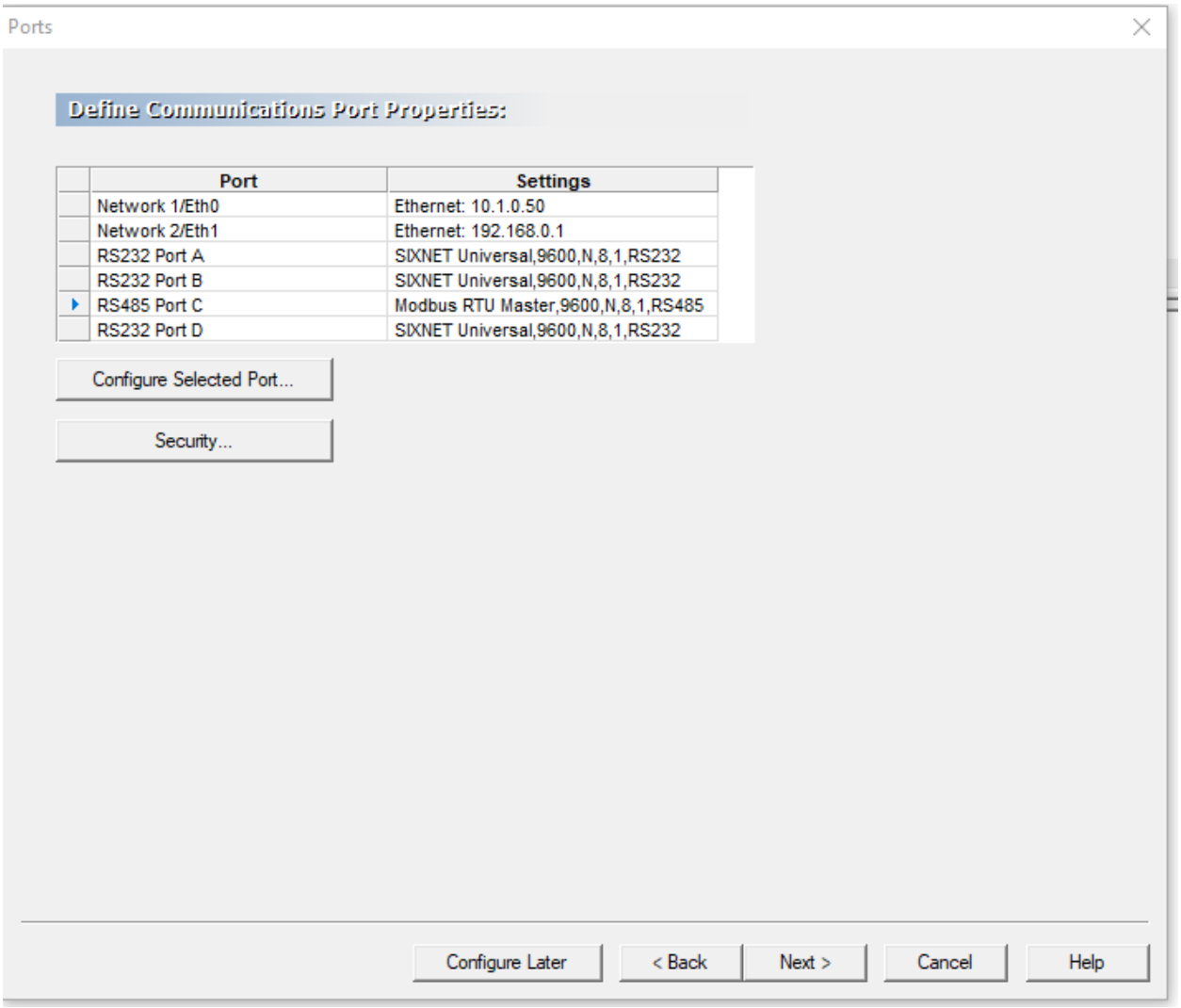


This gives a list of the available drivers that the Serial Ports can be set for. In this case I am going to choose ModbusRTU master, probably our most widely used driver.



Be sure to set the baud rate, parity, data bits, stop bits, and any lead lag times up based on the device or devices you might be trying to talk too. After you have done this click the OK button

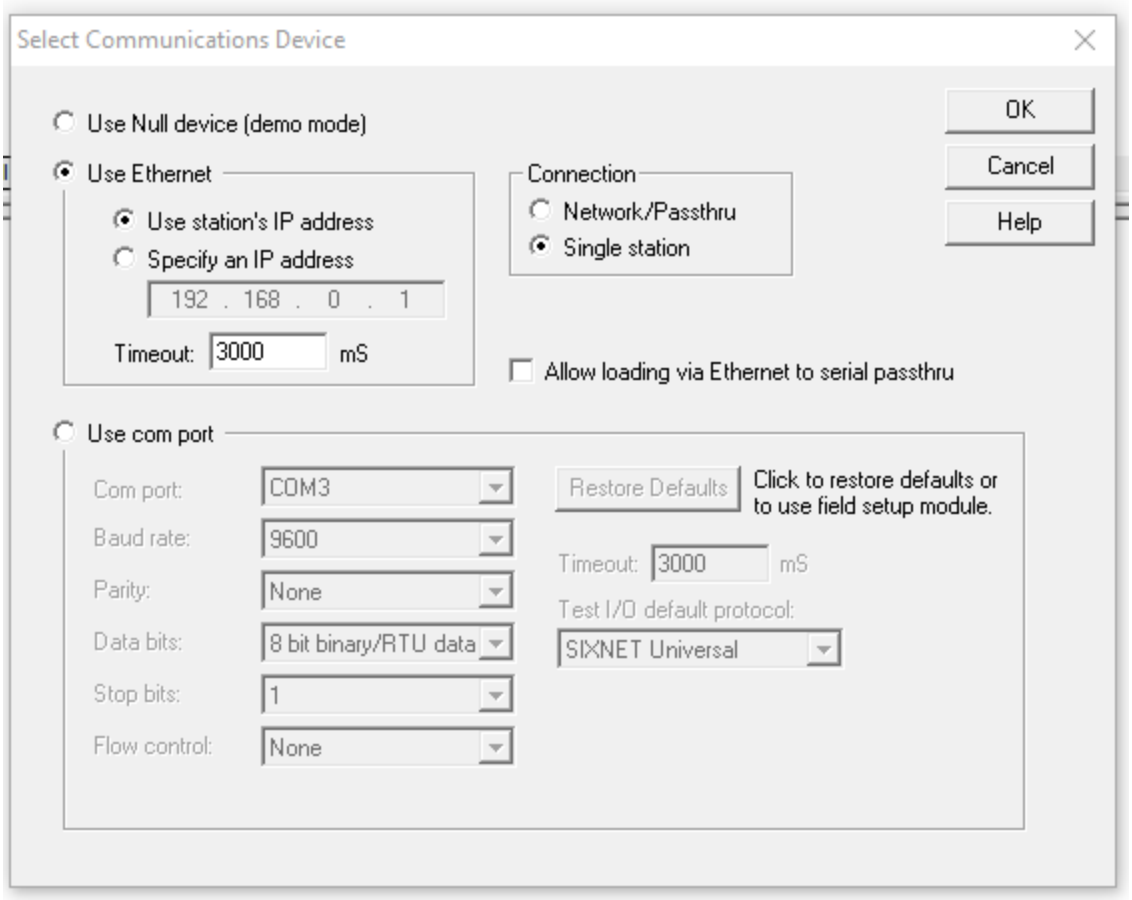
The previous box should look like this now...



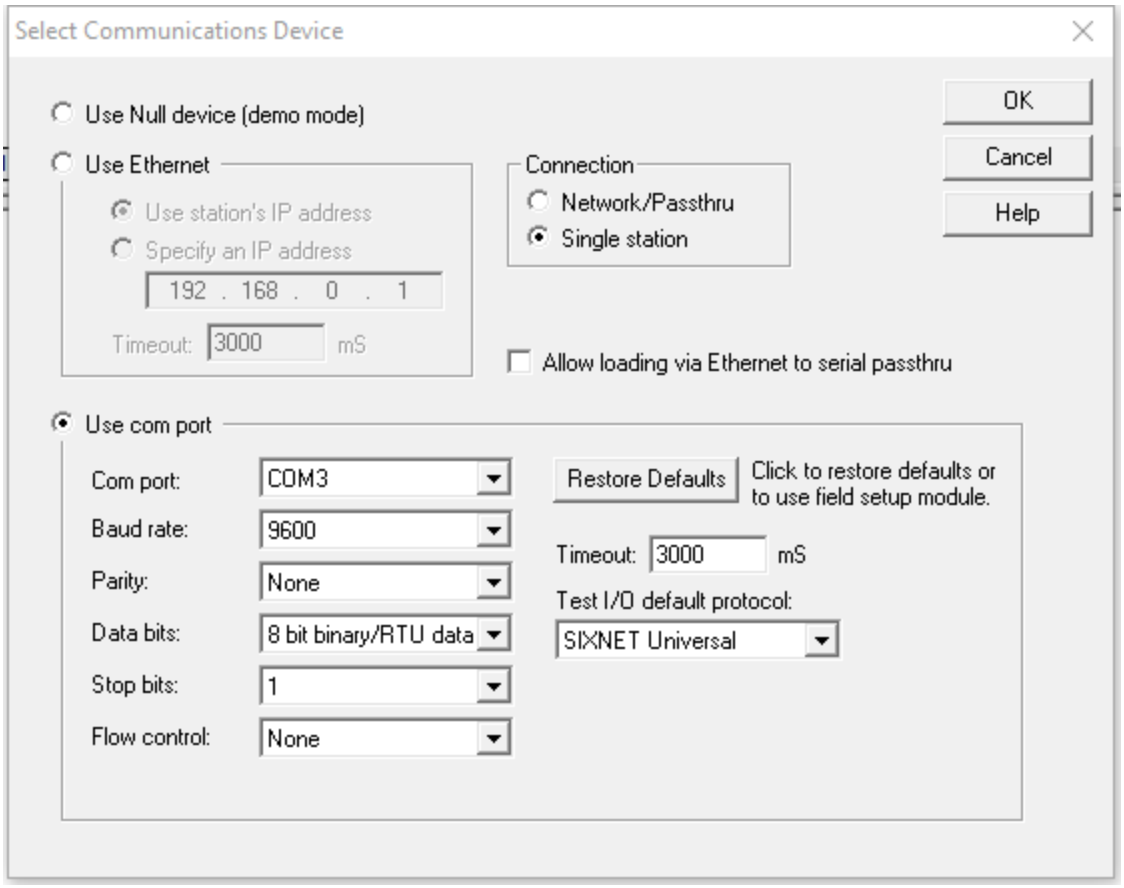
Unless you need to make additional changes to the serial ports you can now download this configuration to the RTU.

Now let's look at the first download which is usually done serially.

In the toolkit software looking up at the upper left hand corner click on the word Device and then Select and this box should pop up...

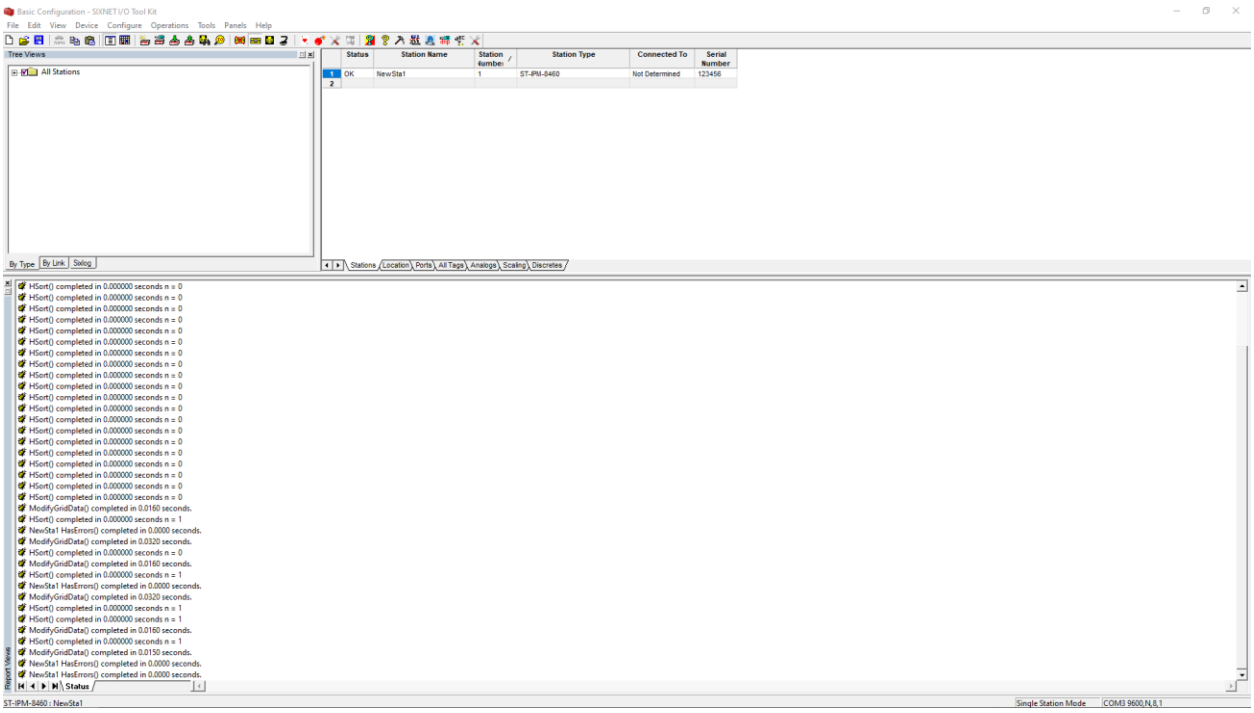


Right now it is set to talk using Ethernet and the stations IP address you set for it. It is a recommended setup to first download thru the serial port B on the unit. So now set up your Communications Device box like below...

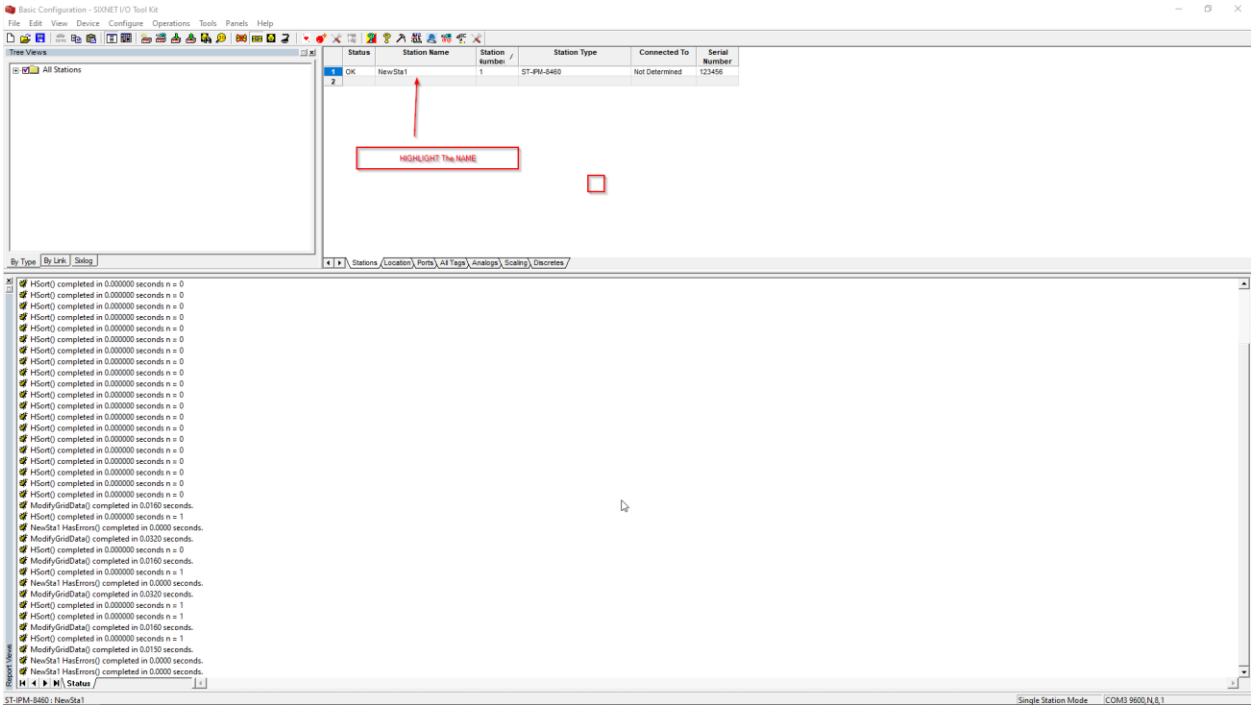


You will need to hit the down arrow on the Com Port as the port number on your laptop may be different than what is listed. It will show the port being used in that list. Once that is done click OK and it will close.

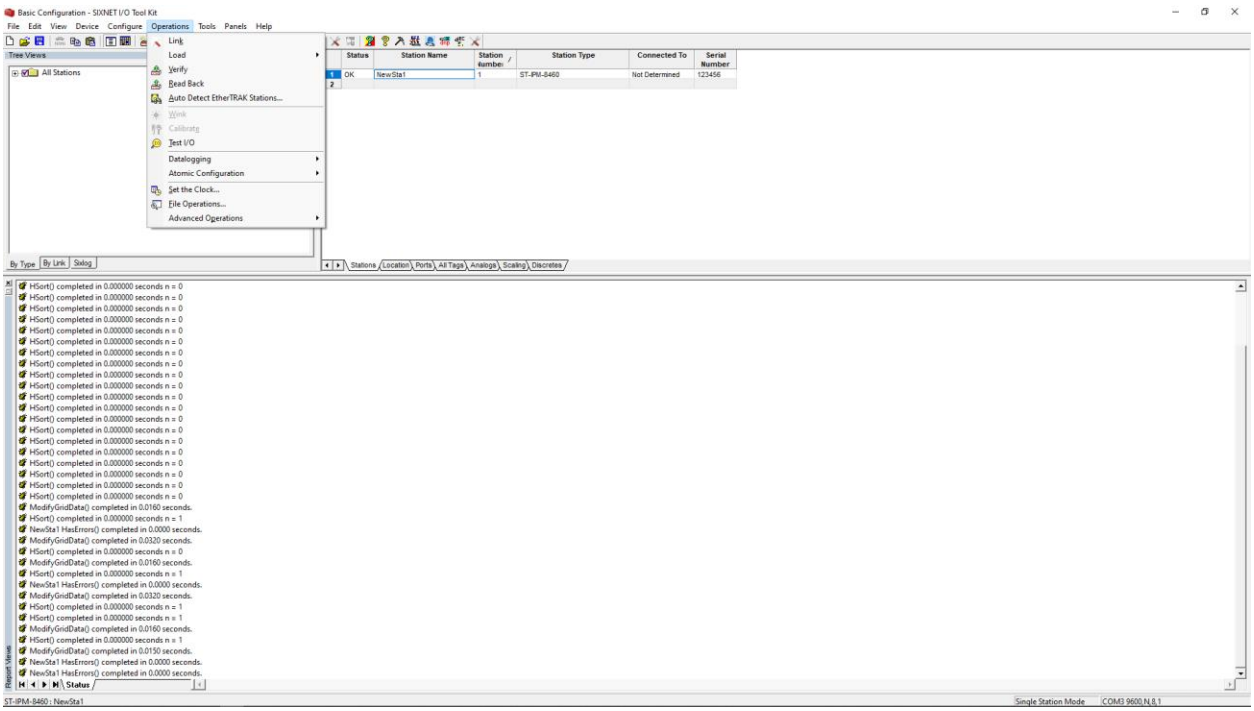
If you look in the lower right corner of your screen you will see the communications configuration and the number of the port that the software is going to try to use.



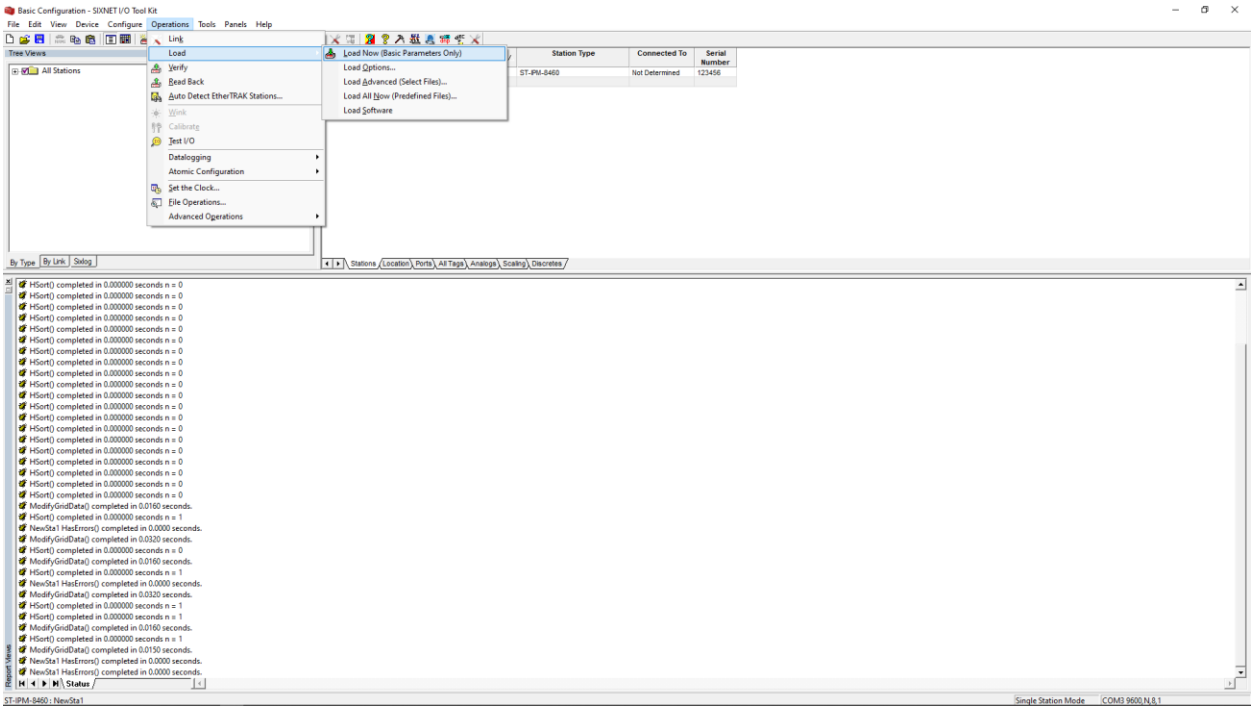
To be able to complete this you will need 2 RJ45 cables and the adapter that came with your RTU. Using a USB to RS232 adapter cable available at most office supply stores, you will put the RS232 adapter on the end of the cable and that will expose the RS232 port adapter to the other RJ45 cable which can be plugged into port B on the RTU. Now you have it wired up and are ready to download.



Highlight the name of the RTU and then click on Operations in the upper right hand part of the software and a box will drop down.



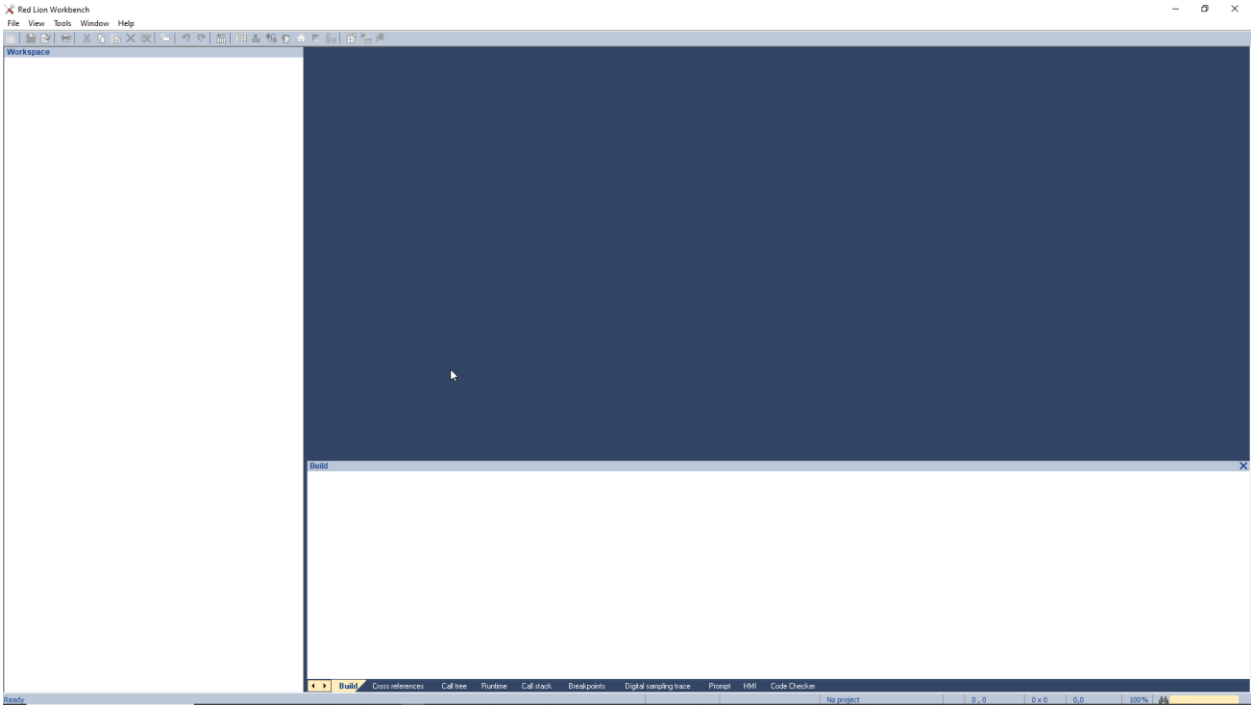
Hit the load now button and then you should see the RTu start to load.



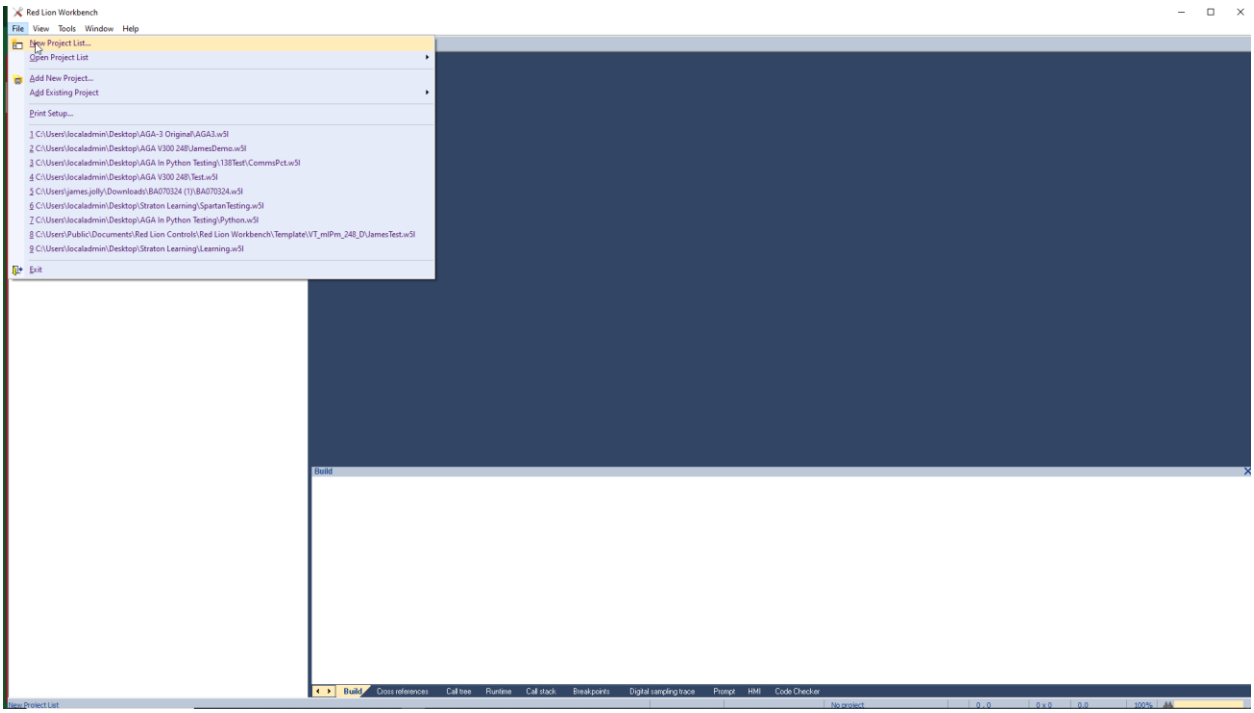
If you get a successful load then we are done with the Sixnet IO Toolkit. Time for using the

Red Lion Work Bench...

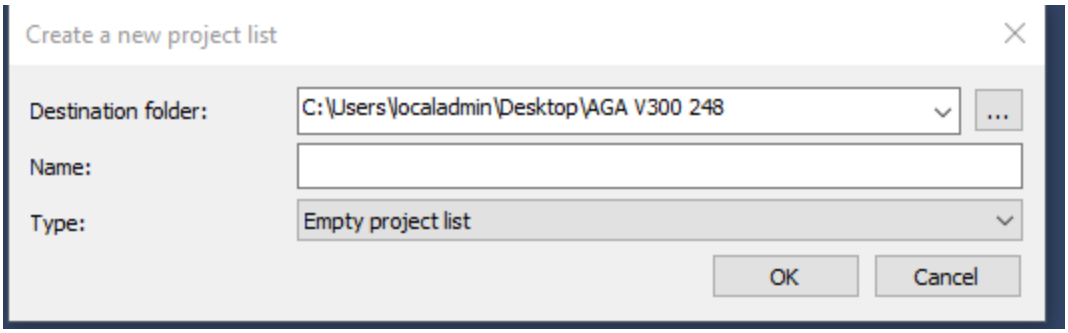
This is the splash screen for the Red Lion Work Bench…



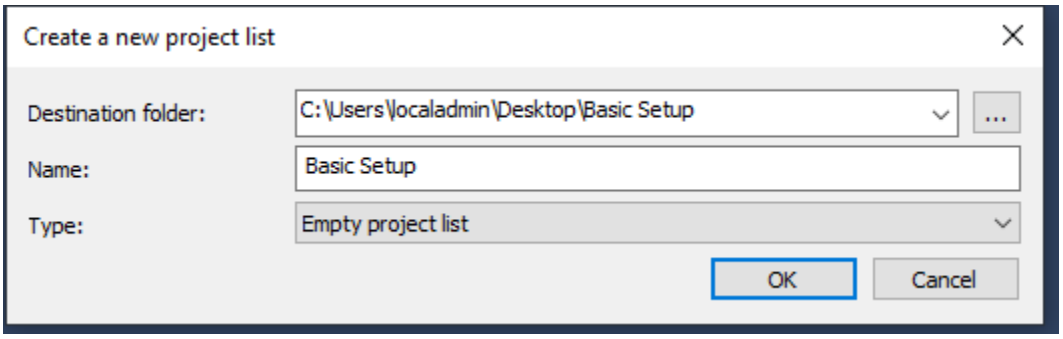
We must first create a Project List



When we click on the new Project List button as shown above, a new box will appear.



From here we will browse to where we want to store this list and also give this list a name.

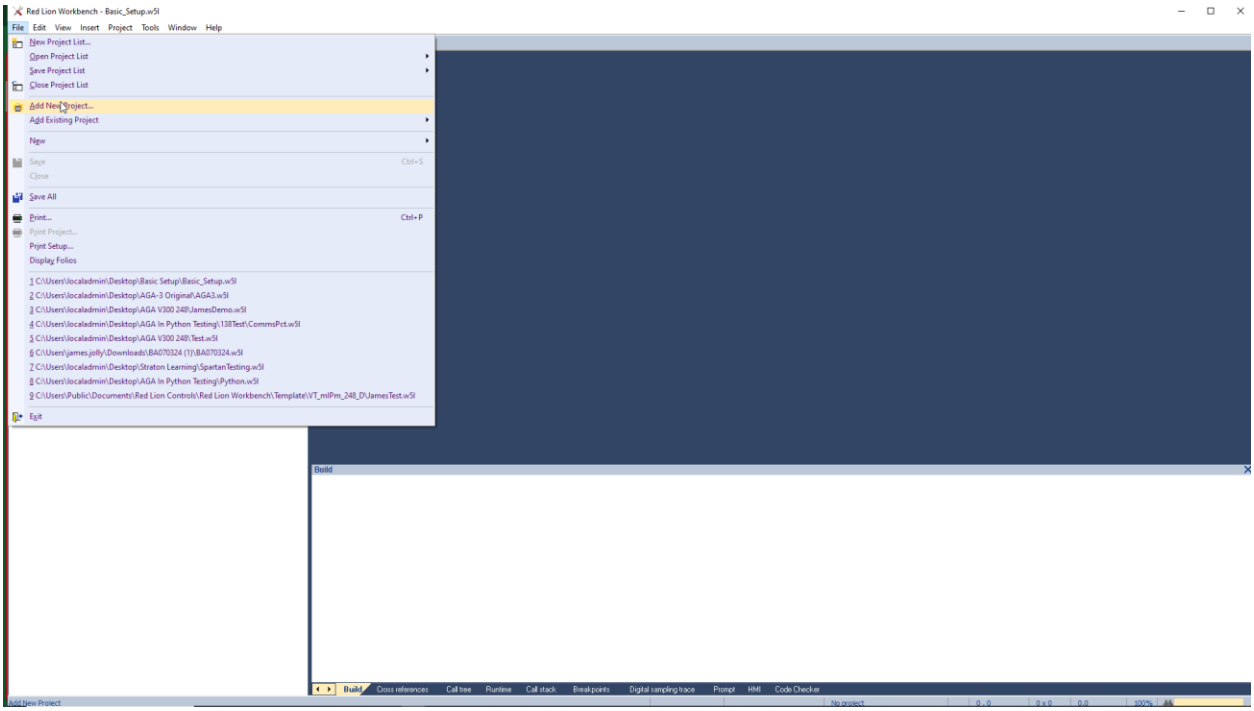


As you can see I have now given this a destination folder and a the name Basic Setup

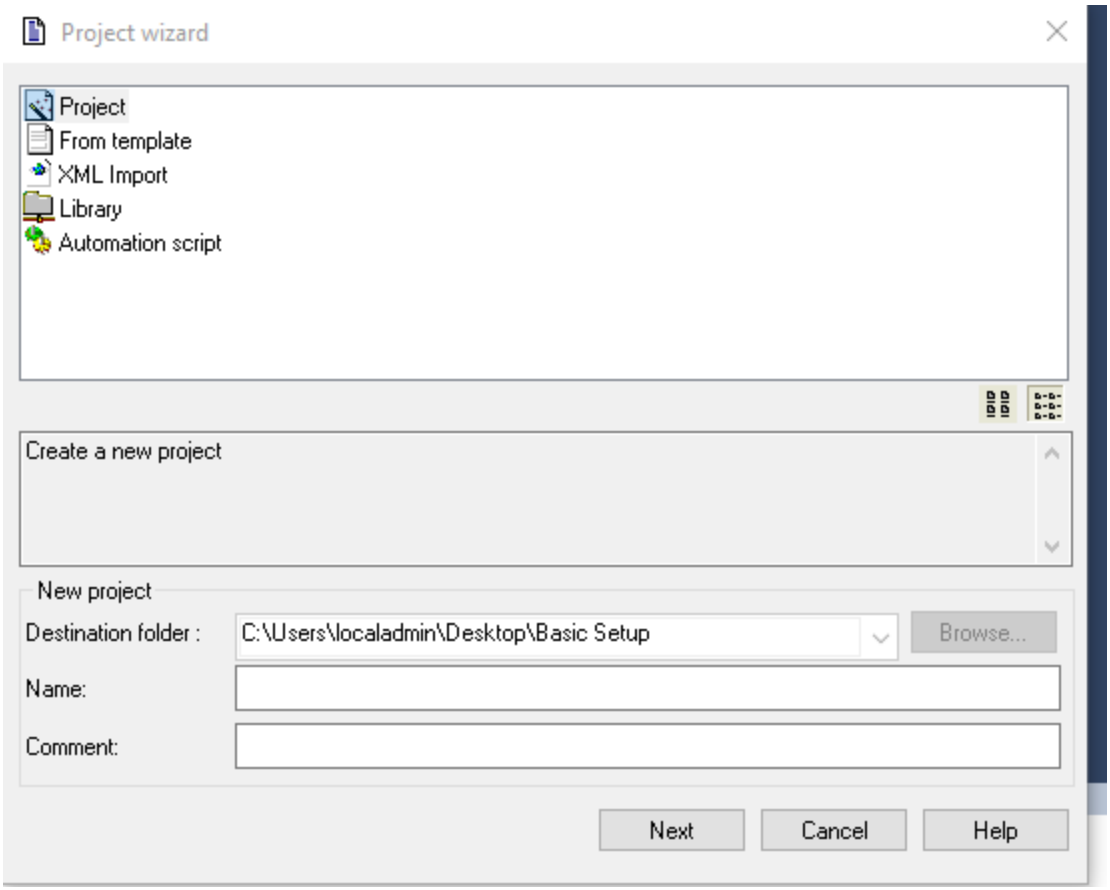
You will want to use Empty Project list for this setting and then click ok

Note: The list name does NOT allow for spaces in the name.

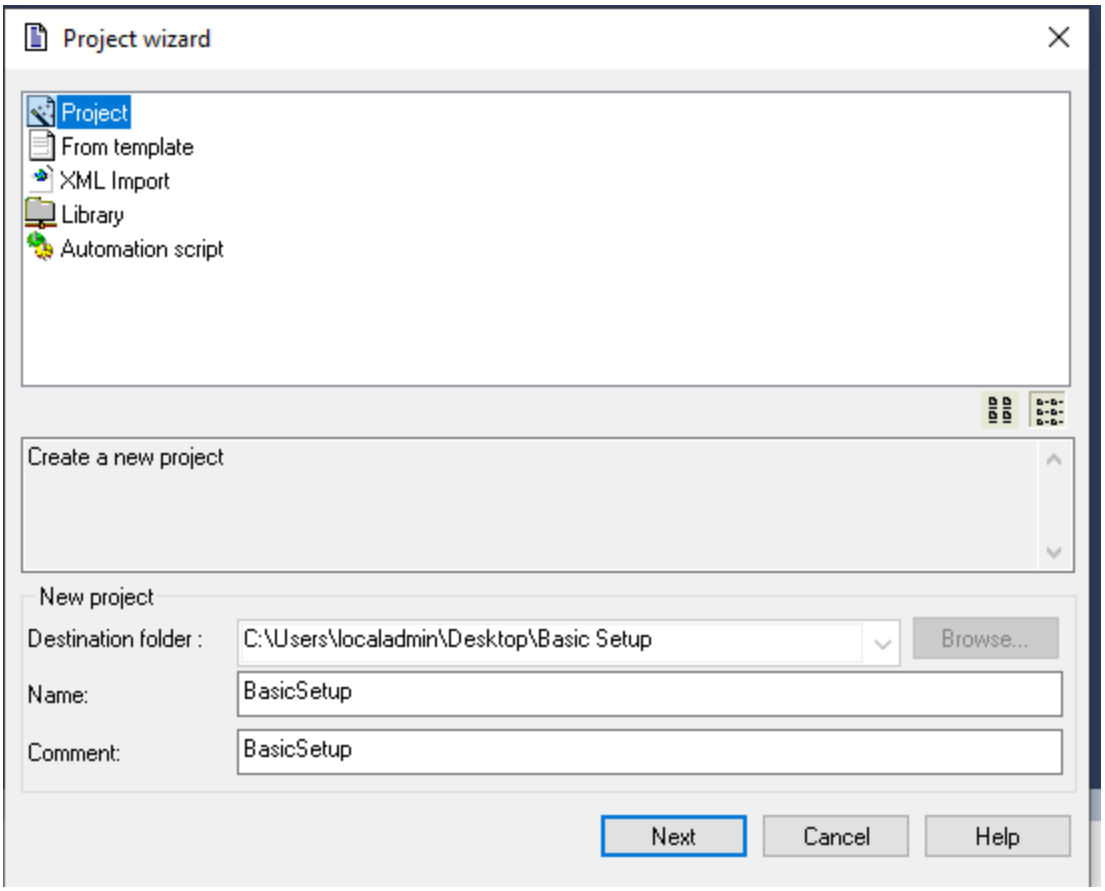
Next, we must add in a new Project. To do that we click on the file and then Add New Project…



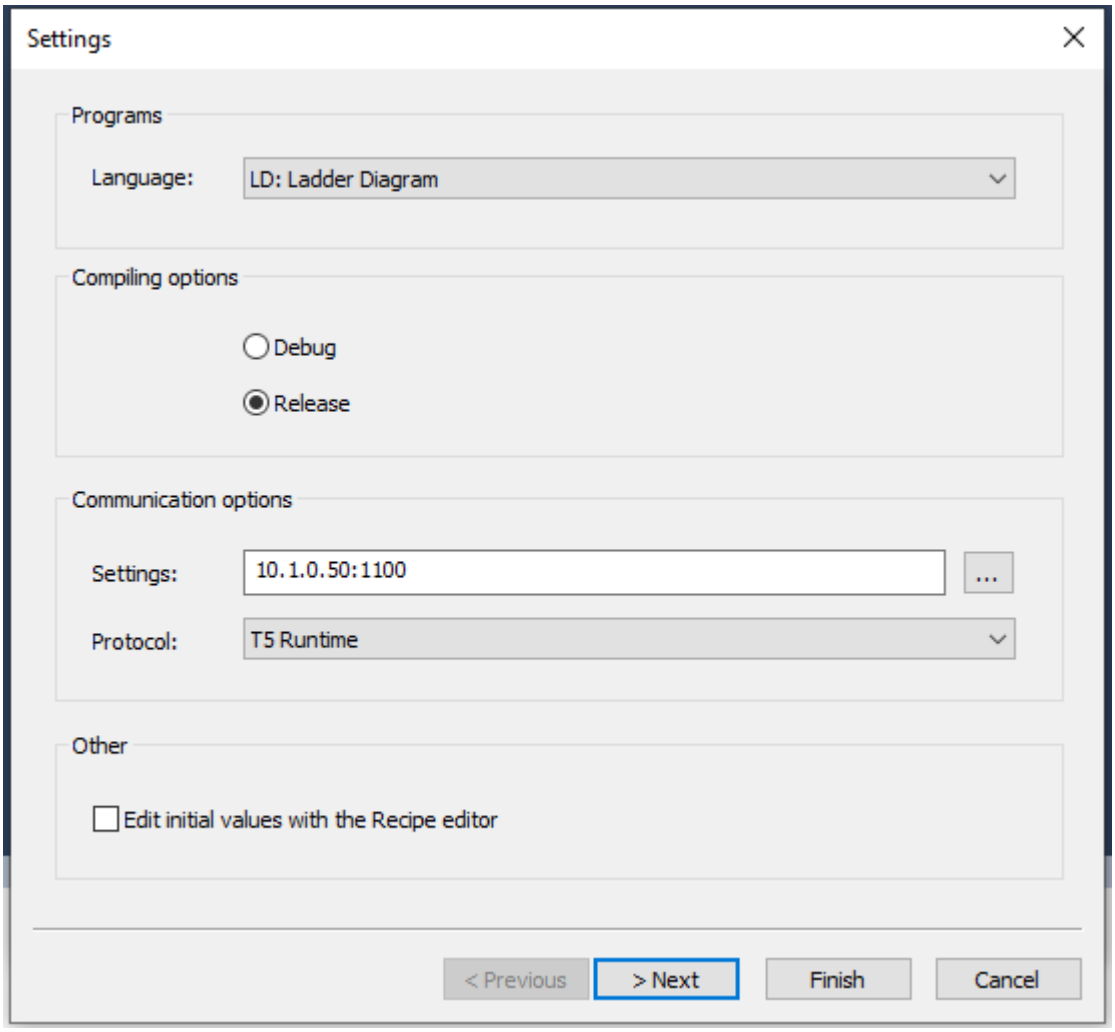
Another box opens up...



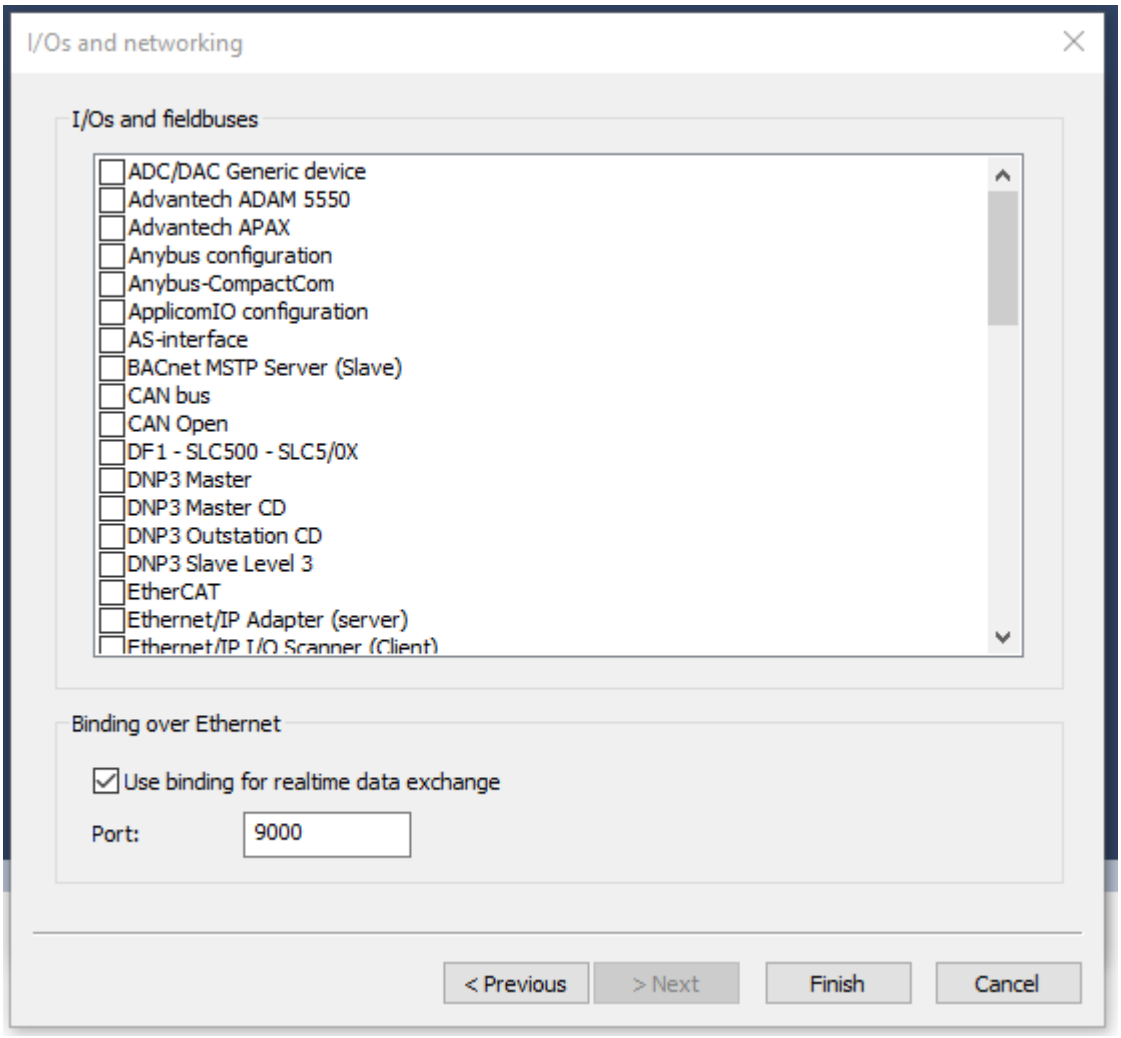
On this box we will Choose Project from the above selections and then give it a name and comment if wanted. Note: Name does not allow spaces…



Now we click on Next...



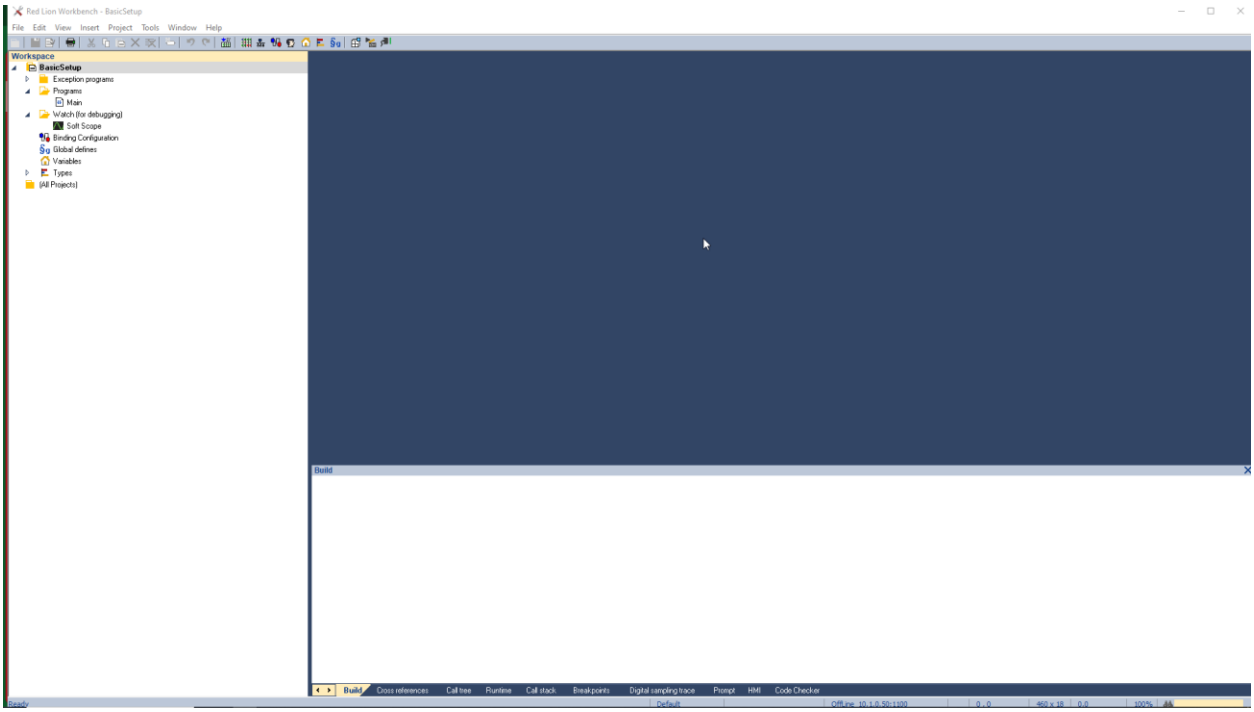
Now we select the language we want to start up in the project, this is changeable latter on depending on what language you want to use in your programming and set the communication settings for the download. You will always want to choose T5 Runtime for the protocol. Uncheck the other box.



This box now appears. You can just hit the finish button from here.

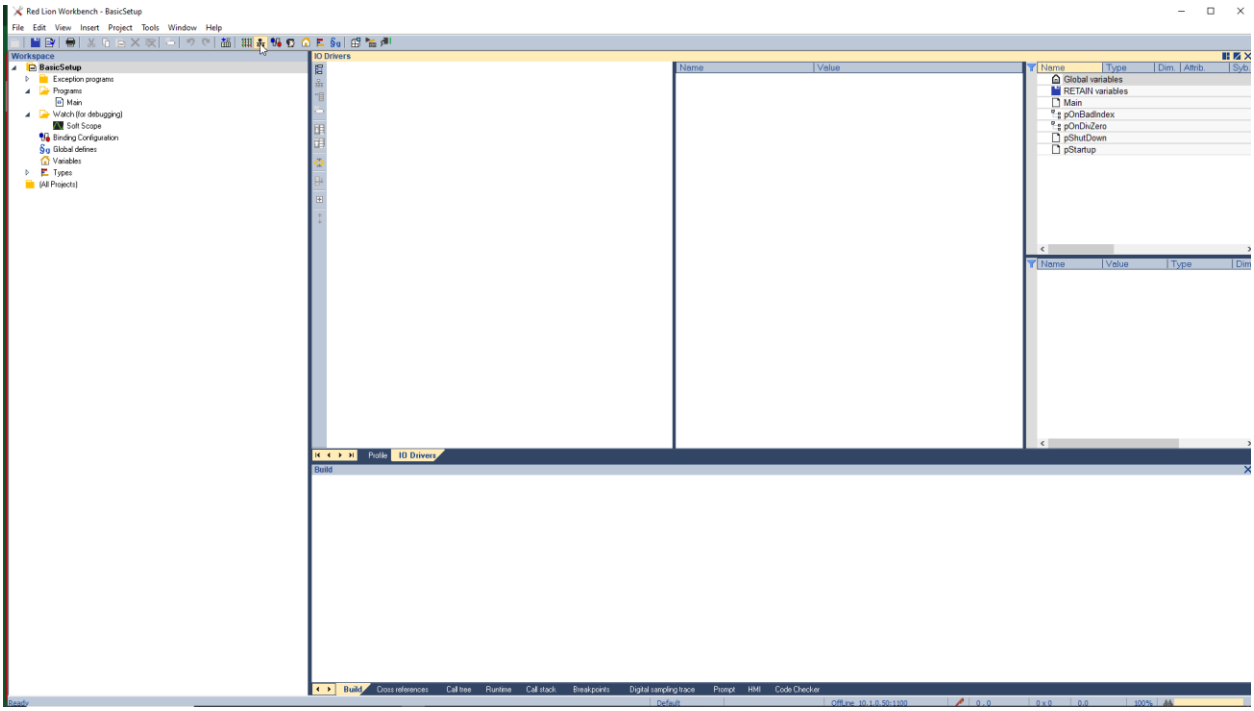
Building the Actual Project Itself…

Now we are building the actual communications with the Remote IO since the 8460 has no IO on it. This is how your current screen should look…

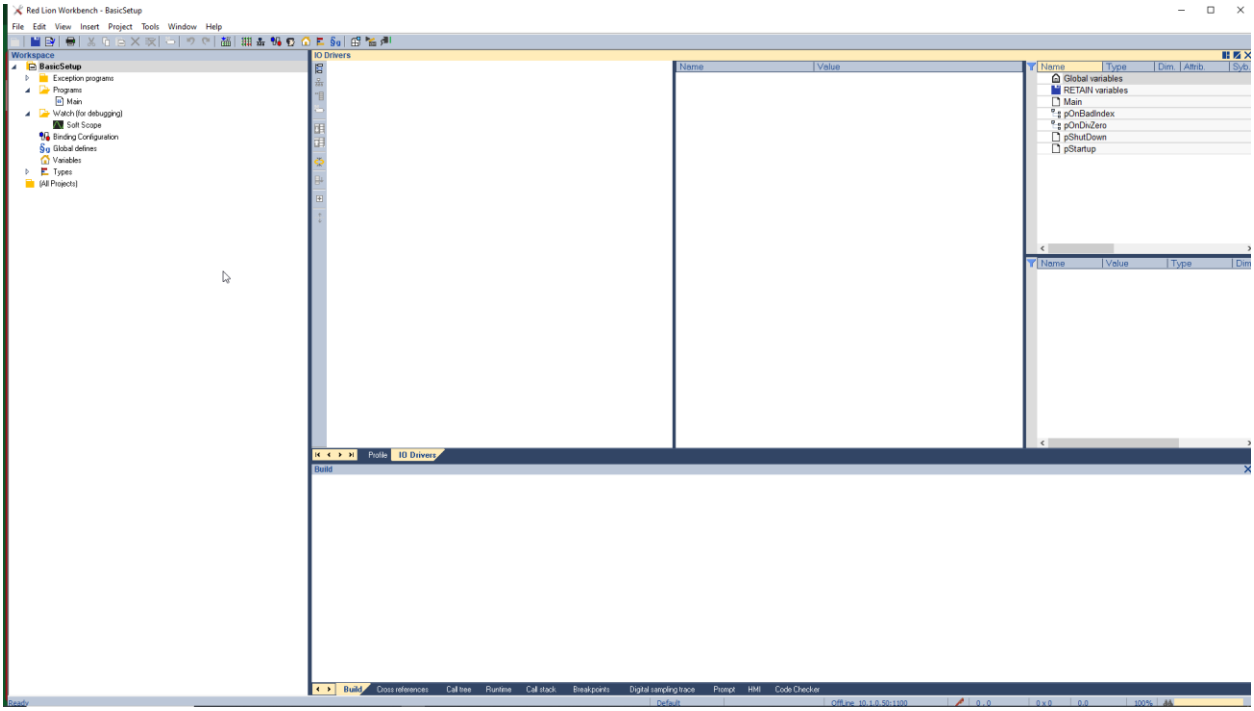


We are going to start off by using our E3-32DI24-D which is a 32 pt 24 vdc input module. We are going to use ModbusTCP master driver and show you how easy it is to work with the Red Lion Work Bench and how quickly it is to set up communications in this software.

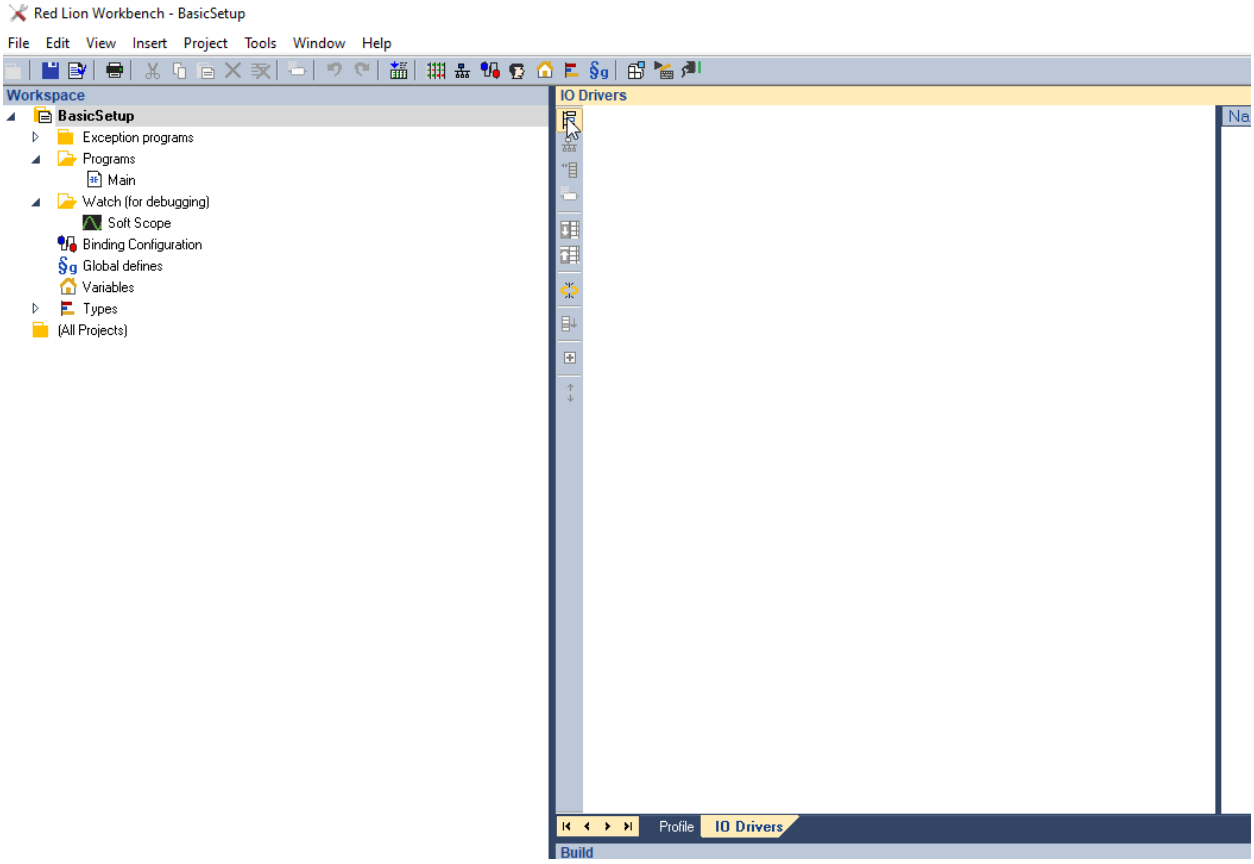
Now click on this…



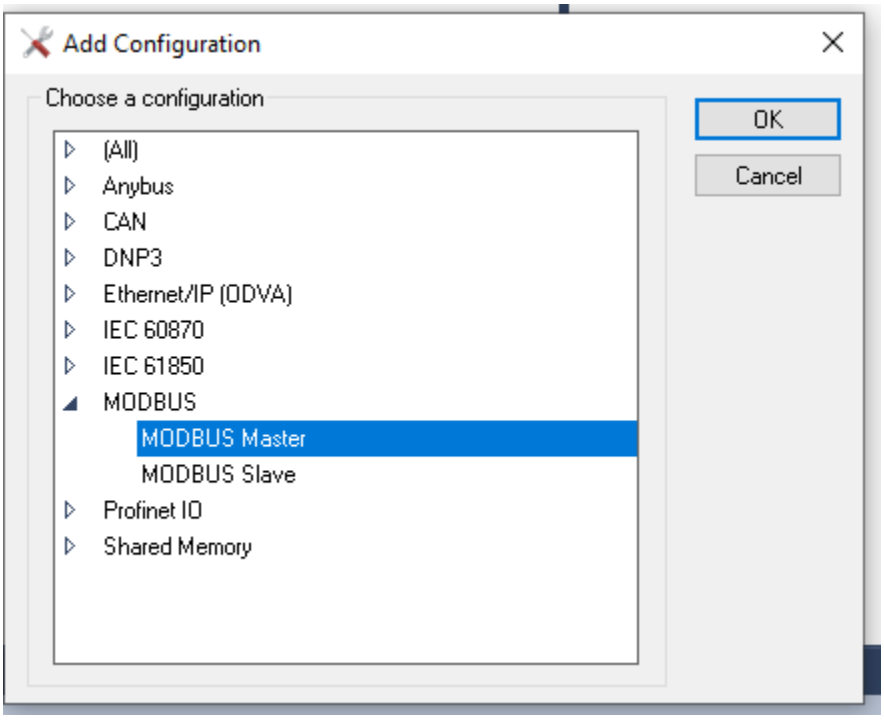
A new part of the screen will pop up looking like this.



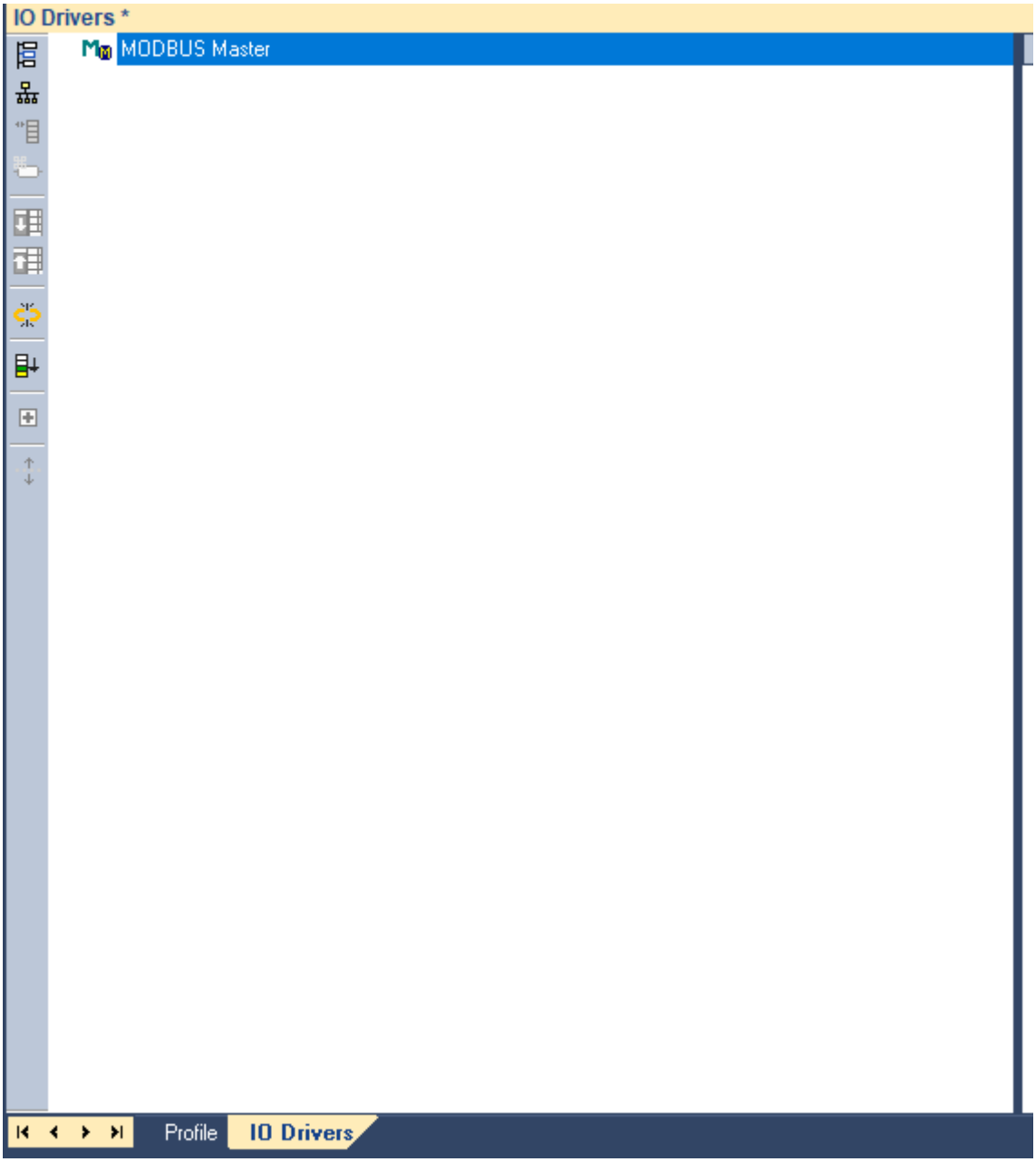
This is where we will set up communications with the remote IO modules and also create the tags for the points to be used in our ladder logic program.



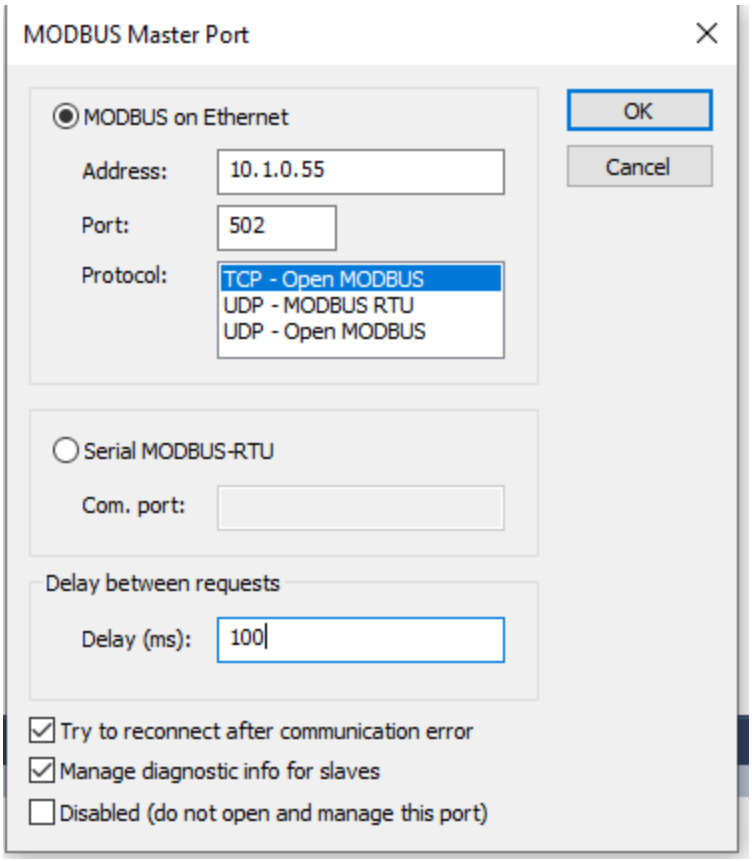
This is where we add in the ModbusTCP Master Driver...



After this just click OK and then your software should look something like this...



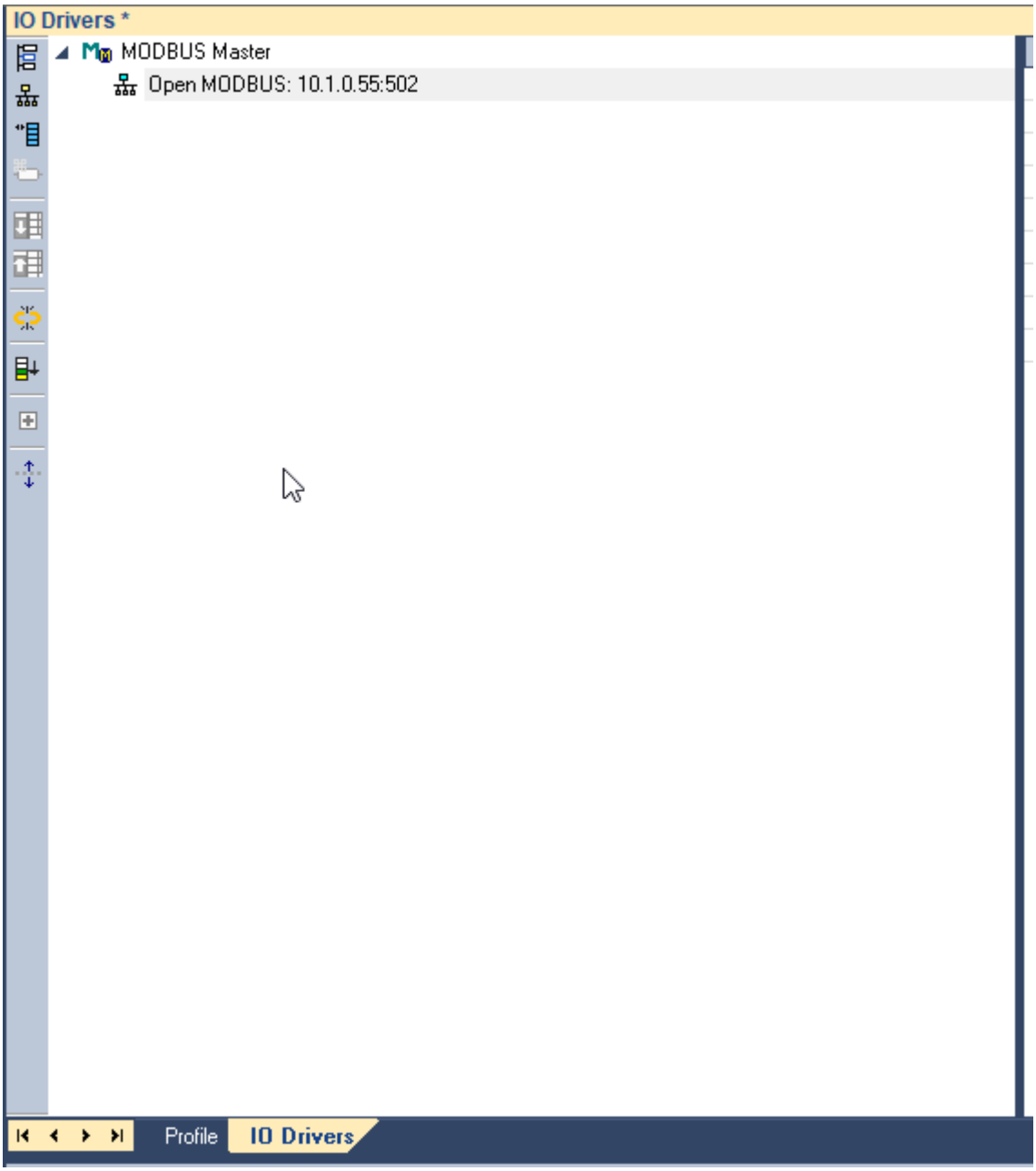
Then right click on the Modbus Master and then this appears...



When this box appears, put in the IP address, leave the port at 502 and select TCP-Open Modbus.

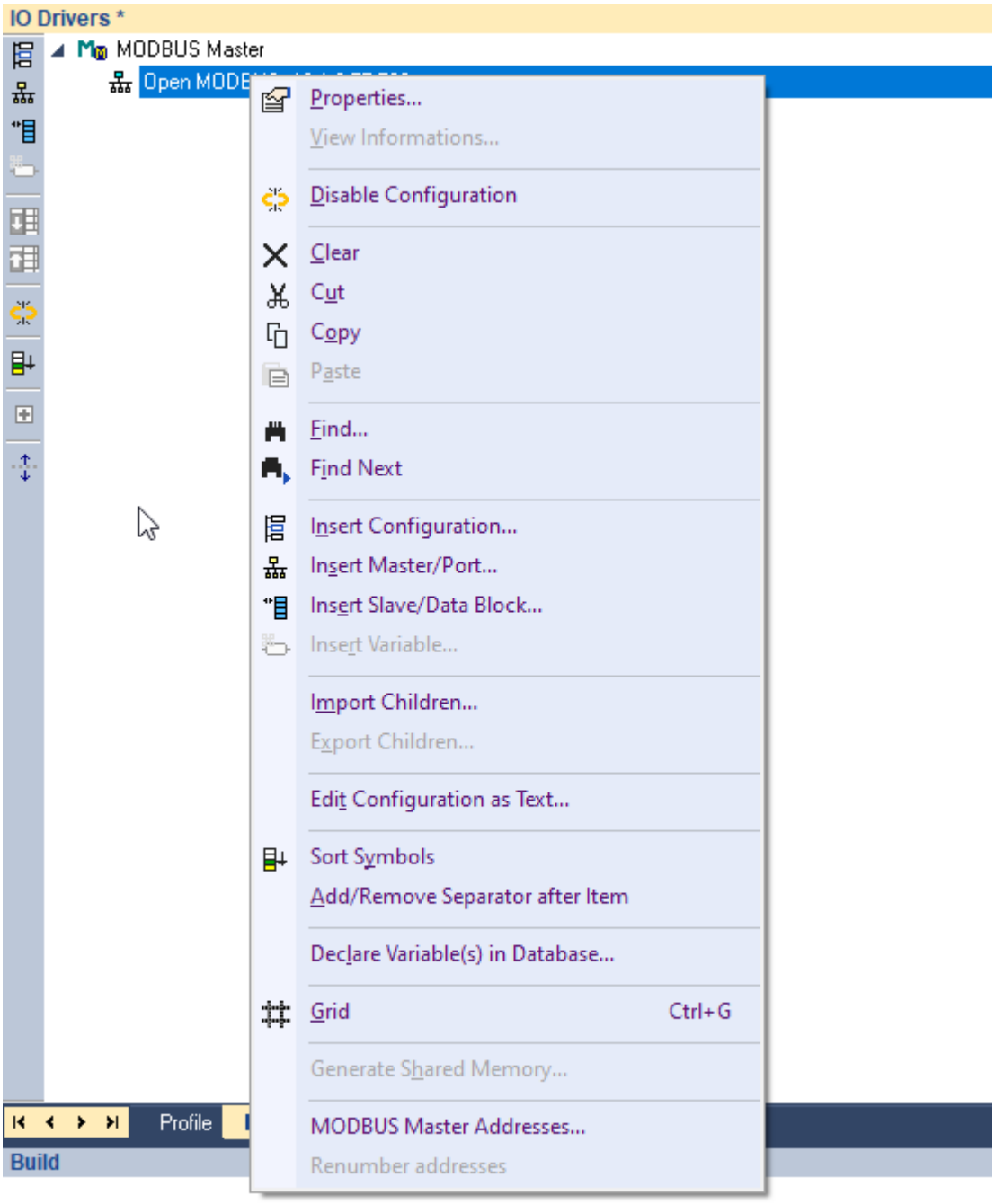
The delay is how fast the IO module will be polled. In this example I said 100ms between polls.

Now your software should look something like this…



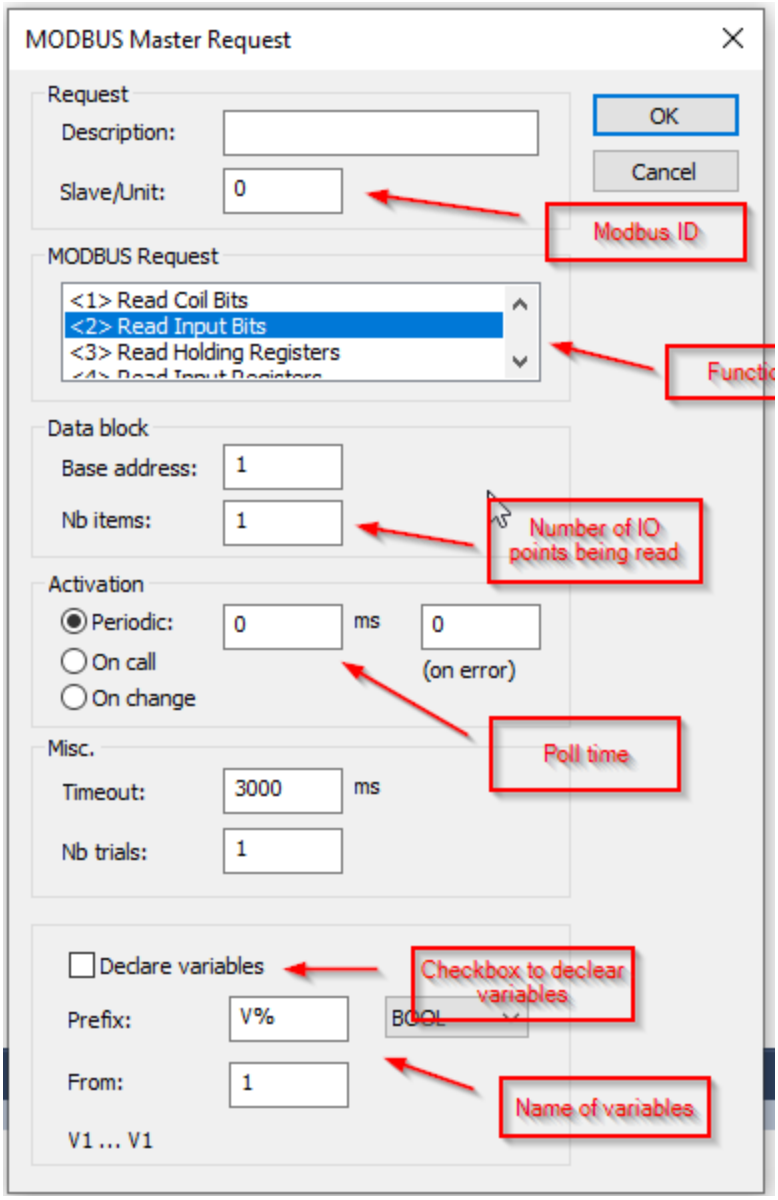
Now we add in the IO points and tags...

Right click on the Open Modbus and a box will appear like this one...

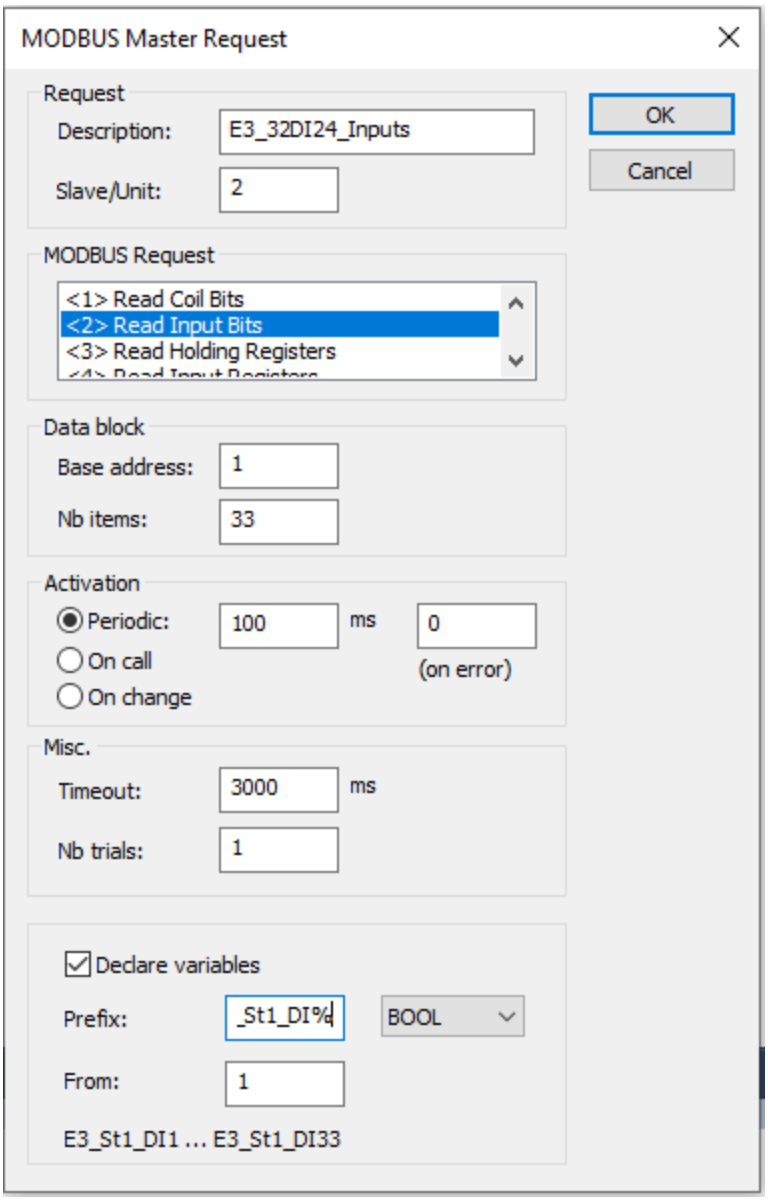


Select Insert Slave/Data Block...

This box will appear, and you need to give it a description, and the ModbusTCP node address is the Slave/Unit Number.



Now I will fill this out like this one should be.



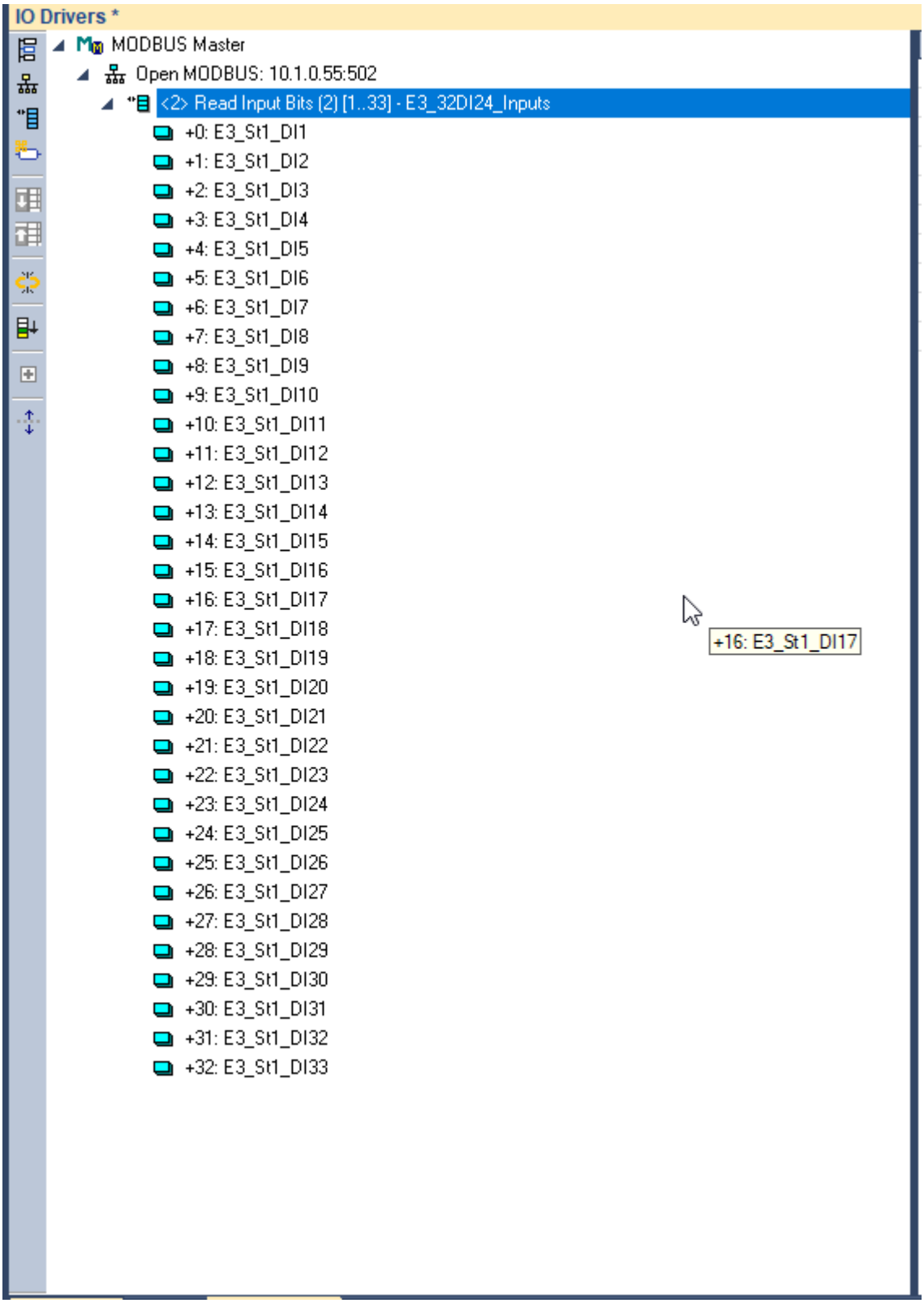
This is slave address 2

Reading Input bits

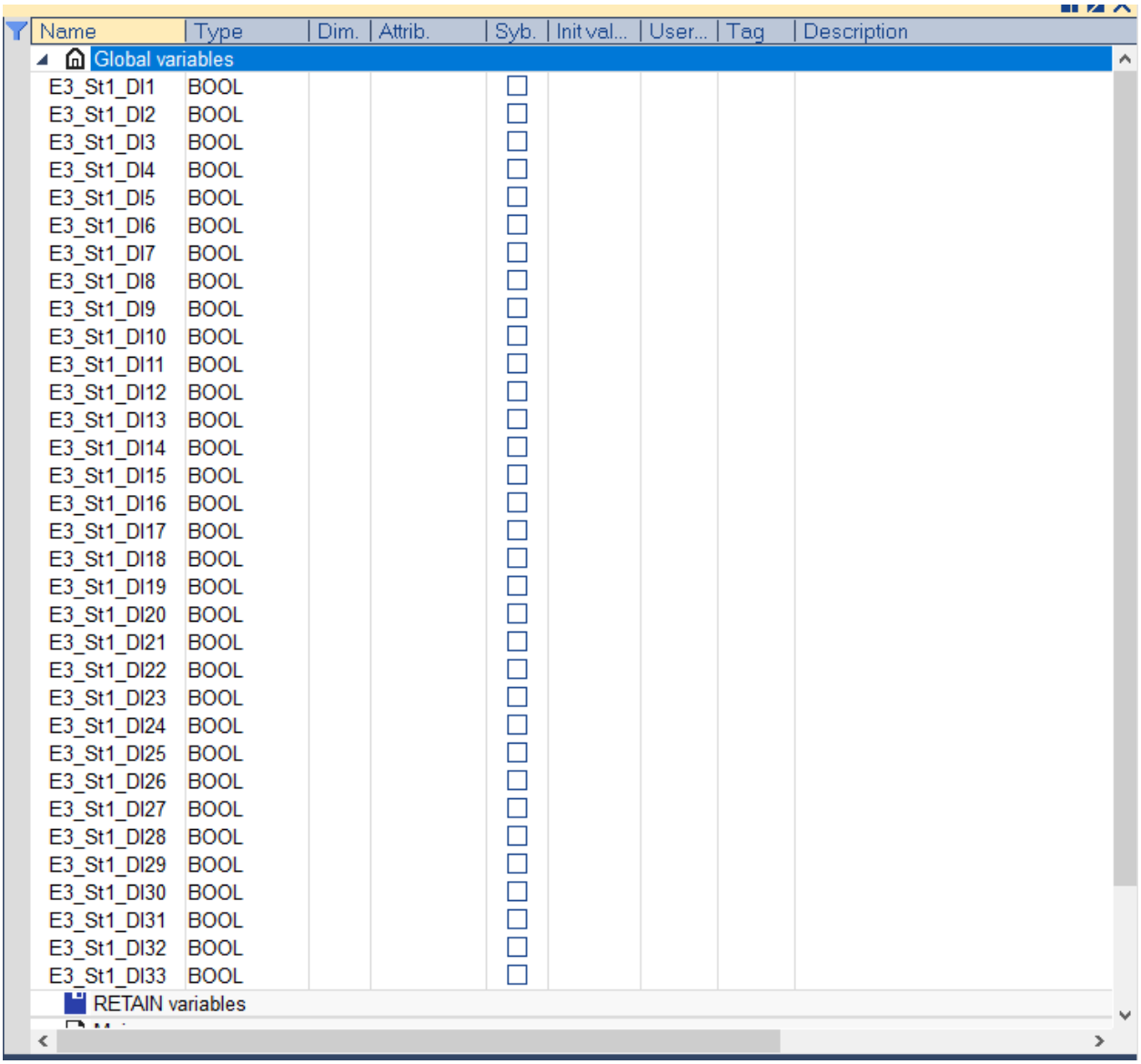
A total of 33 bits will be requested

The Poll time is 100ms

The variable Prefix is E3_ST1_DI (E3 module_Station2_DI (number of the DI)

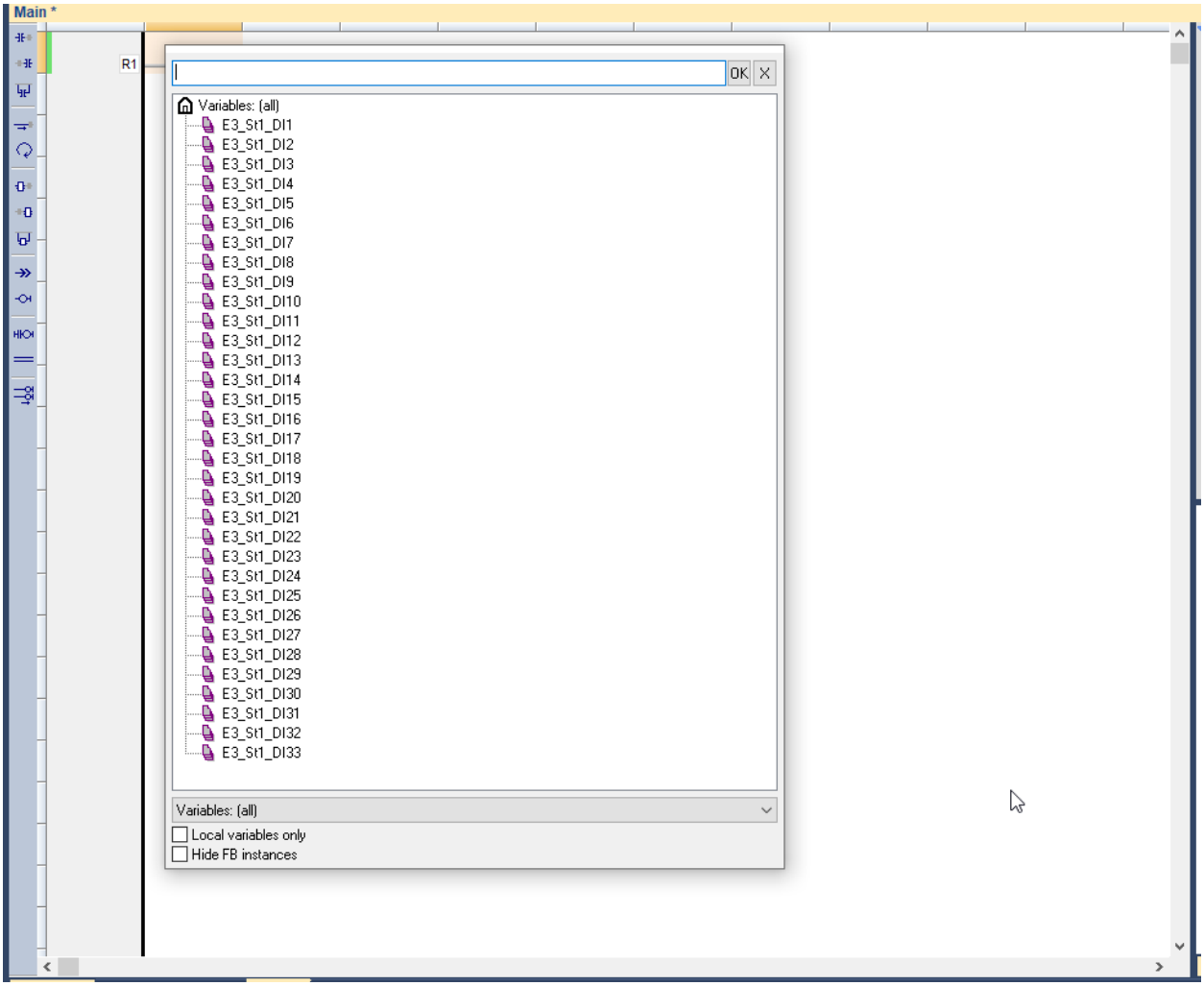


As you can see, just by filling out that little questionnaire, the software will create all of our tags for us and have them ready to use in a program.

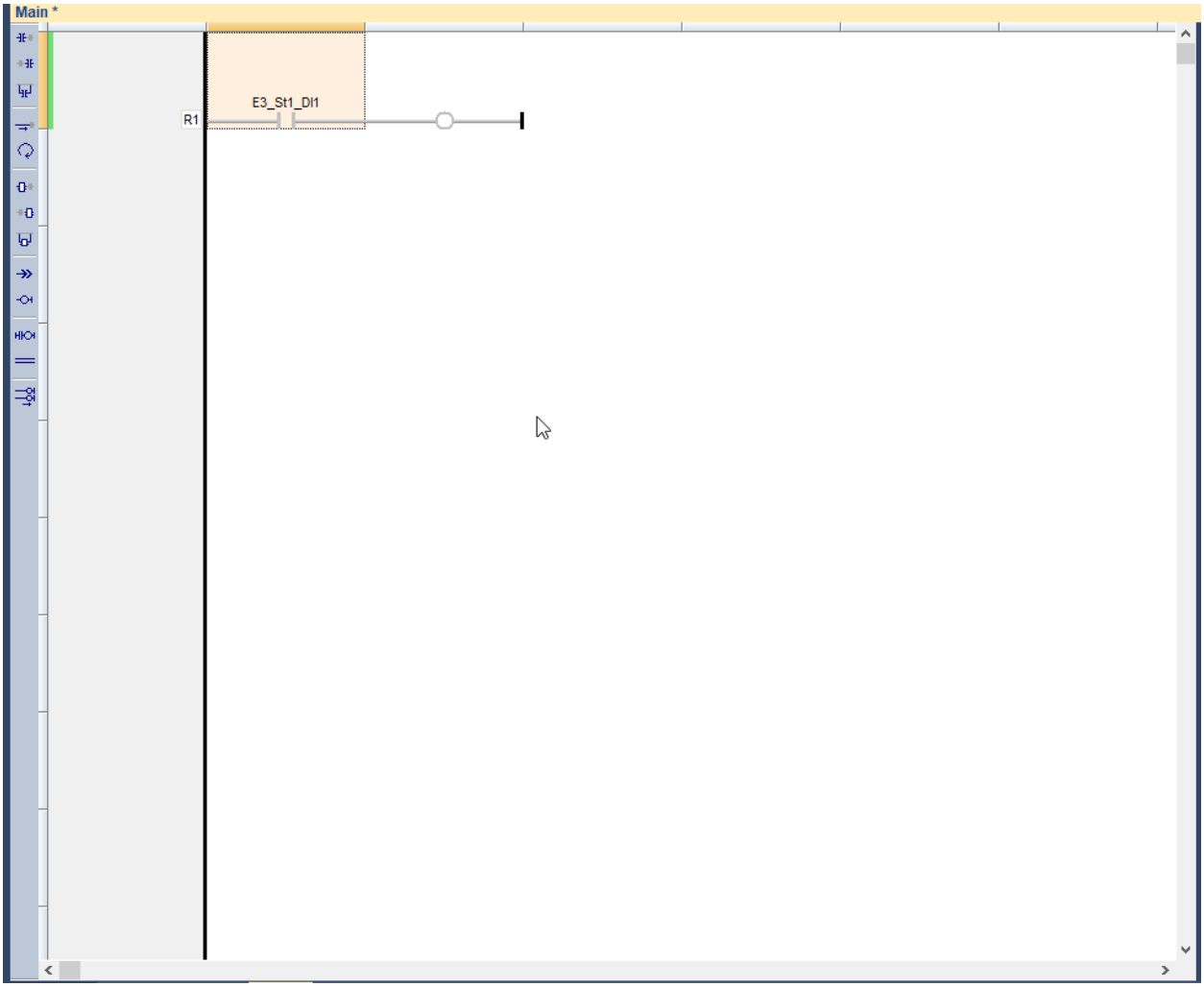


Name	Type	Dim.	Attrib.	Syb.	Init val...	User...	Tag	Description
Global variables								
E3_St1_DI1	BOOL			☐				
E3_St1_DI2	BOOL			☐				
E3_St1_DI3	BOOL			☐				
E3_St1_DI4	BOOL			☐				
E3_St1_DI5	BOOL			☐				
E3_St1_DI6	BOOL			☐				
E3_St1_DI7	BOOL			☐				
E3_St1_DI8	BOOL			☐				
E3_St1_DI9	BOOL			☐				
E3_St1_DI10	BOOL			☐				
E3_St1_DI11	BOOL			☐				
E3_St1_DI12	BOOL			☐				
E3_St1_DI13	BOOL			☐				
E3_St1_DI14	BOOL			☐				
E3_St1_DI15	BOOL			☐				
E3_St1_DI16	BOOL			☐				
E3_St1_DI17	BOOL			☐				
E3_St1_DI18	BOOL			☐				
E3_St1_DI19	BOOL			☐				
E3_St1_DI20	BOOL			☐				
E3_St1_DI21	BOOL			☐				
E3_St1_DI22	BOOL			☐				
E3_St1_DI23	BOOL			☐				
E3_St1_DI24	BOOL			☐				
E3_St1_DI25	BOOL			☐				
E3_St1_DI26	BOOL			☐				
E3_St1_DI27	BOOL			☐				
E3_St1_DI28	BOOL			☐				
E3_St1_DI29	BOOL			☐				
E3_St1_DI30	BOOL			☐				
E3_St1_DI31	BOOL			☐				
E3_St1_DI32	BOOL			☐				
E3_St1_DI33	BOOL			☐				
RETAIN variables								

Global Variable Database... and this only takes 2 mins once you get used to it. Very easy to work with. Now lets see if this can be used in our programming section...



As you can see from above, the variables we created are now able to be used in our ladder logic programming (or whatever flavor of control programming you like)...



Note: If you want the variables to be “retained” you must put that variable in the Retain Variables folder.