TURCK

Industrial Automation

How to Use

BLXX-GW-EN with Red Lion

HOW TO

G1013
Published 11/07/2013

INTRODUCTION

About this Startup Guide

This startup guide contains step by step instructions to setup communication between a Turck BL Modbus TCP/IP Standard Gateway and a Red Lion display. This startup guide was written using a G310, however other models should be able to use a similar setup procedures.

REQUIRED PARTS

Hardware

The following hardware was used to create this startup guide. Other hardware may be used, however some steps may need to be changed to accommodate the different hardware.

- BL67-GW-EN – Standard Modbus TCP/IP Gateway
- BL67-8DI-P – 8 Digital Input Card
- BL67-B-4M12 - BL67 Base Module with 4 M12 connectors
- BL67-8DO-R-NO – 8 Normally Open Relay Card
- BL67-B-4M12 - BL67 Base Module with 4 M12 connectors
- G310 – Red Lion 10" G3 Display
- SE-44X-E924 – 9 Port Unmanaged Ethernet Switch
- RSSD RJ45S 441-2M –Ethernet Cable from HMI to Ethernet Switch
- RSSD RJ45S 441-2M –Ethernet Cable from PC to Ethernet Switch
- RSSD RSSD 441-2M – Ethernet Cable from BL67 to Ethernet Switch
- USB Programming cable for HMI
- PC loaded with required software

Software

The following software will be used and described in this startup guide.

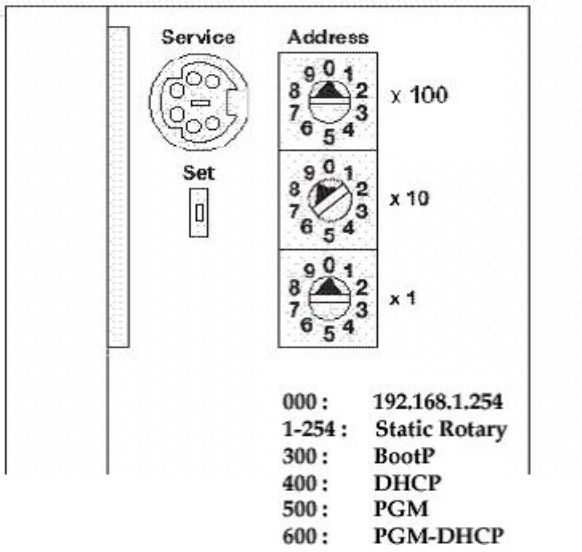
- Pactware loaded with BL DTMs 1.000.0700 – Available at www.turck-usa.com
- Crimson 2.0 Release Build 485G – Available at www.redlion.net

SETUP

Hardware Setup

1. Prepare the BL67 Hardware to look like the following:

2. Set the IP Address of the gateway to 192.168.1.90 using the rotary switches. They should be setup like this:



3. Power up the gateway. The IO LED will be blinking red.

4. Press and hold the SET button for 10 seconds to store the gateway configuration.

5. Power up the Ethernet Switch and HMI.

6. Connect Ethernet cable from BL67 to Ethernet Switch.

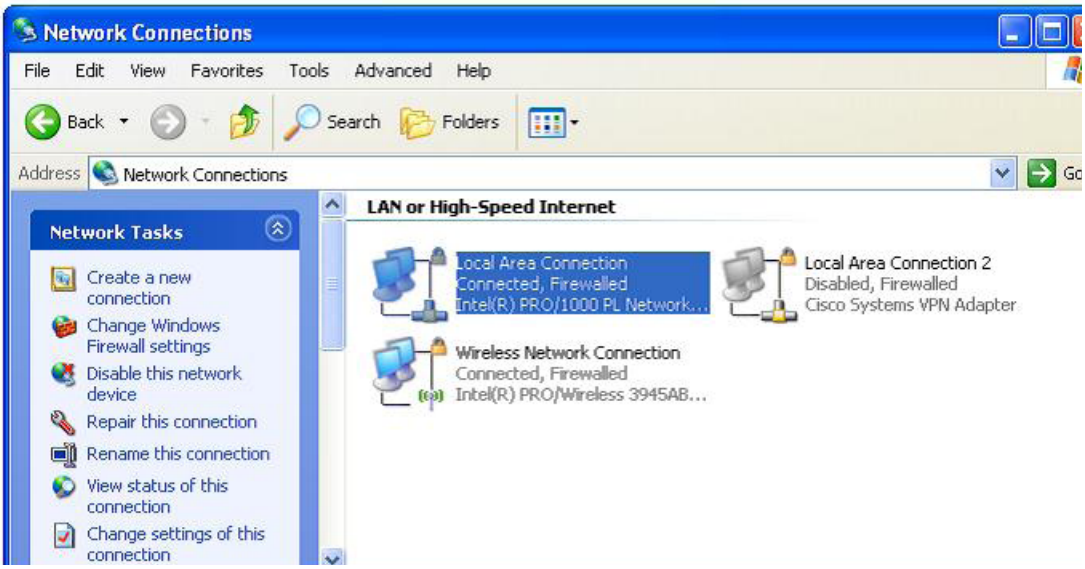
7. Connect Ethernet cable from HMI to Ethernet Switch.

8. Connect Ethernet cable from Ethernet Switch to PC.

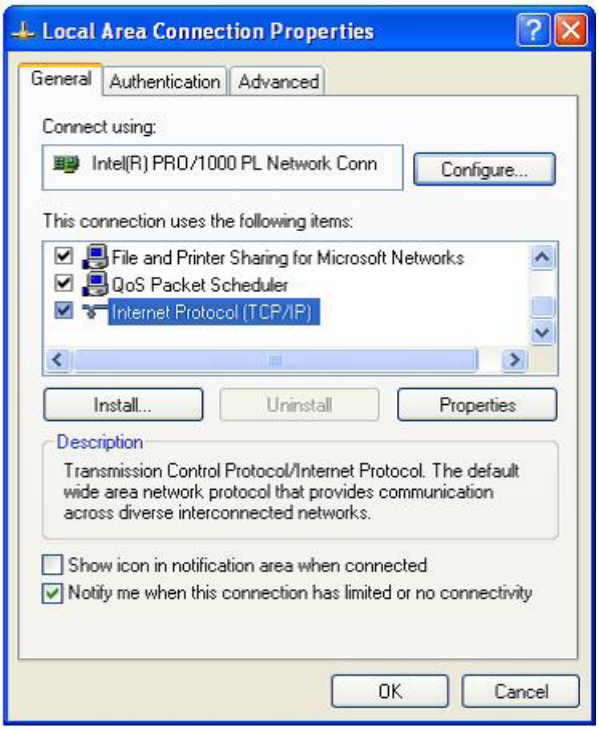
9. Connect USB cable from HMI to PC.

PC Setup

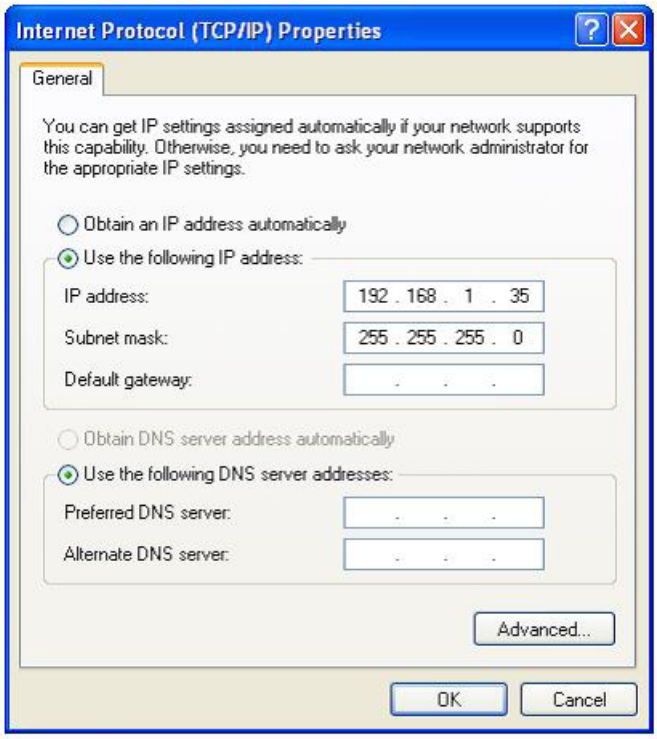
1. Open the "Network Connections" folder.



2. Right click on the "Local Area Connection" icon and choose "Properties."



3. Highlight "Internet Protocol (TCP/IP)" and click on the "Properties" button.



4. Choose the "Use the following IP address" option and set the IP address to 192.168.1.x. The x can be set to anything from 0-255 and must be a unique number. It cannot be the same as the IP address chosen for the gateway.

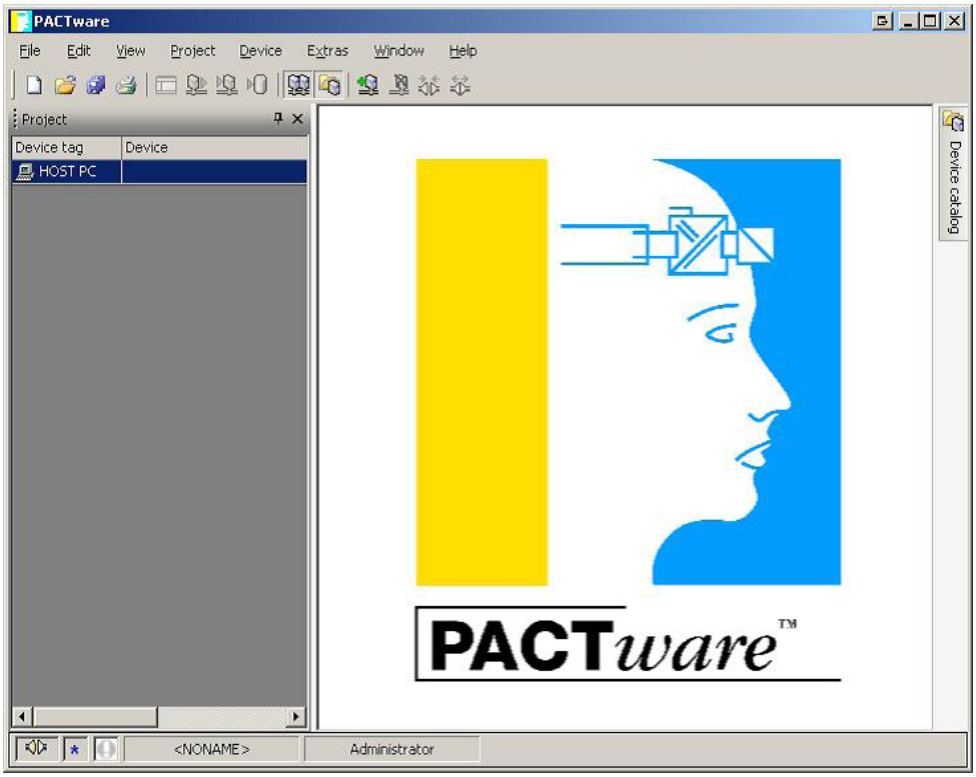
5. The "Subnet Mask" should be set to 255.255.255.0.

6. Close the "Internet Protocol (TCP/IP) Properties" and "Local Area Connection Properties" windows by clicking the "OK" button.

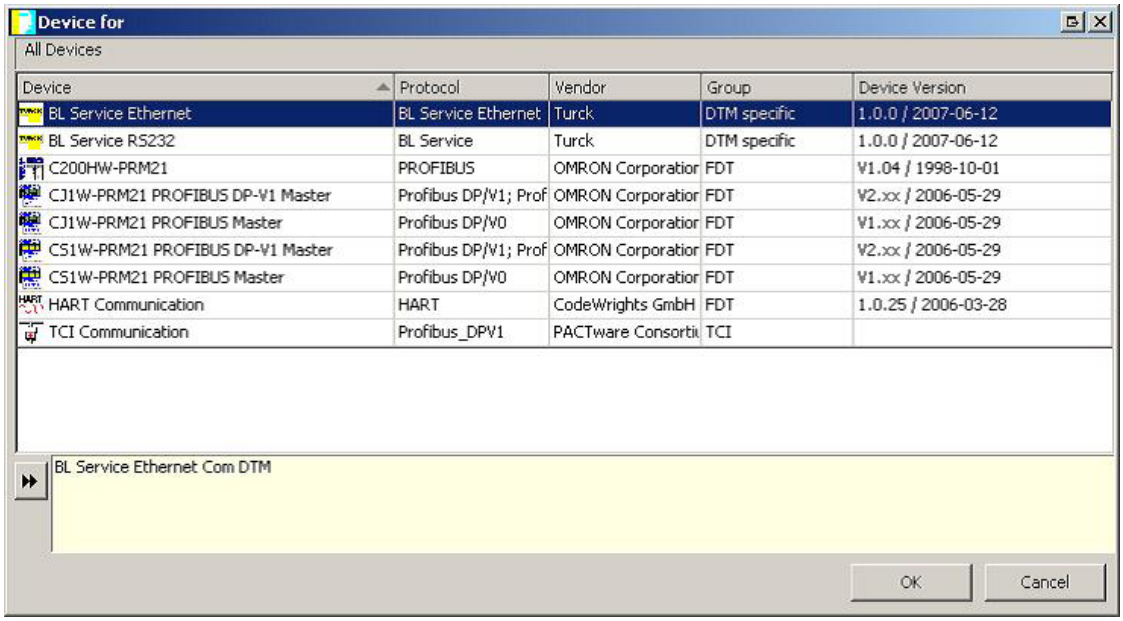
GET MODBUS TCP/IP DATAMAP OF THE BL67

The datamap of the BL products can be easily generated using Pactware and the BL DTMs.

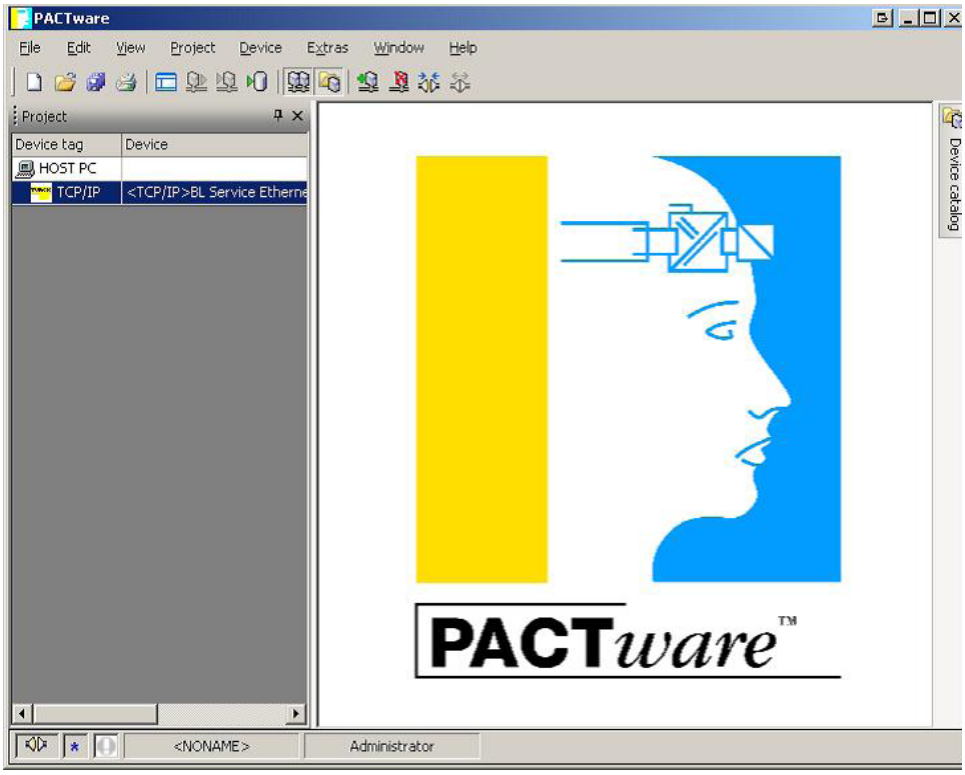
1. Open Pactware



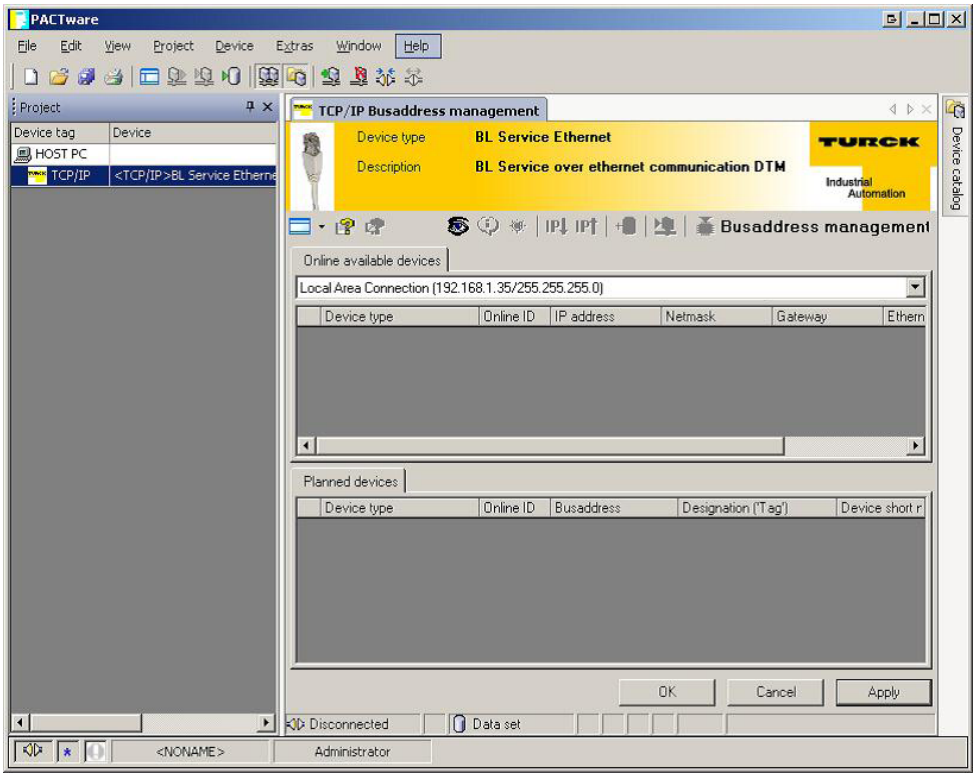
2. Right Click on Host PC, click "Add Device".



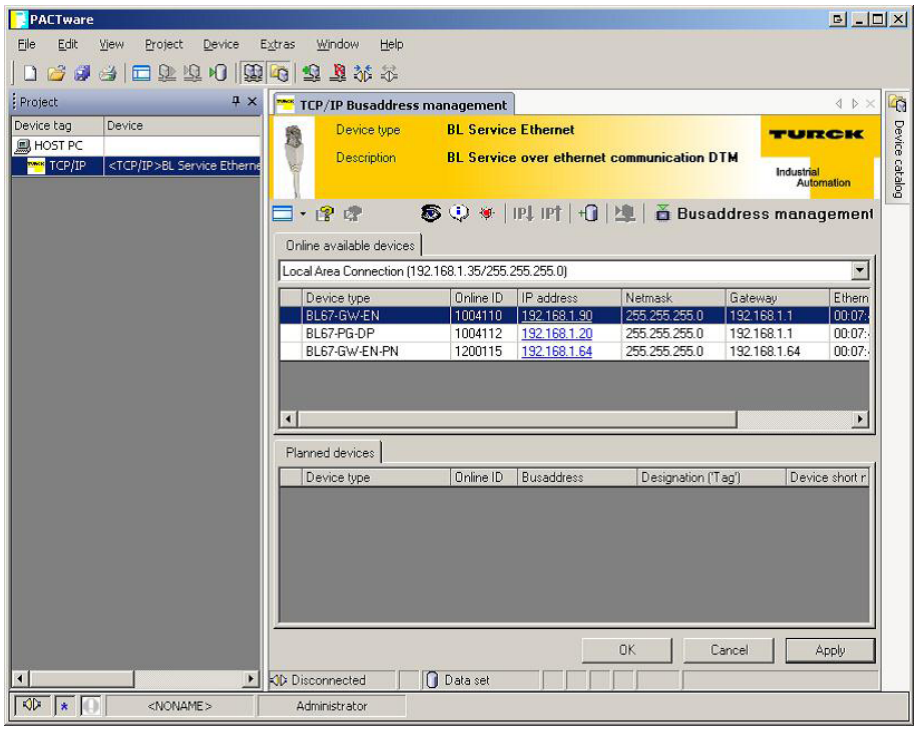
3. Highlight BL Service Ethernet, and click “OK”.



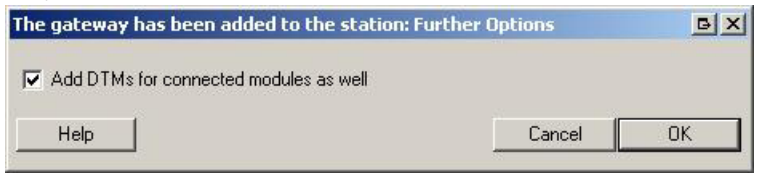
4. Right click on the new ethernet device -> Additional Functions -> Busaddress Management.

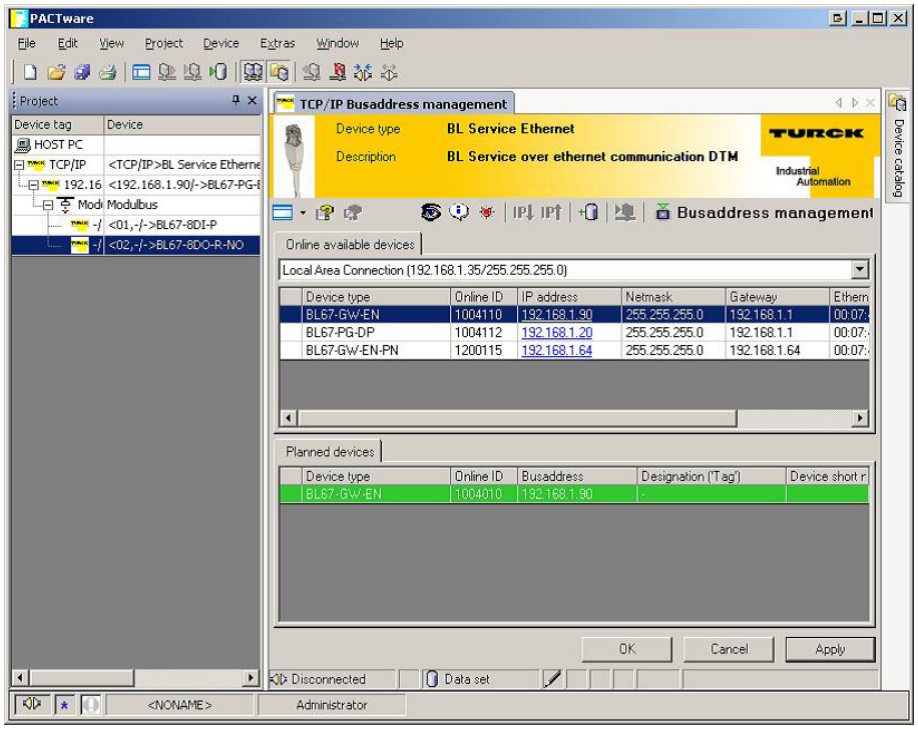


5. Click on the in the toolbar above “Online Available Devices” tab. This will search for any available online devices.

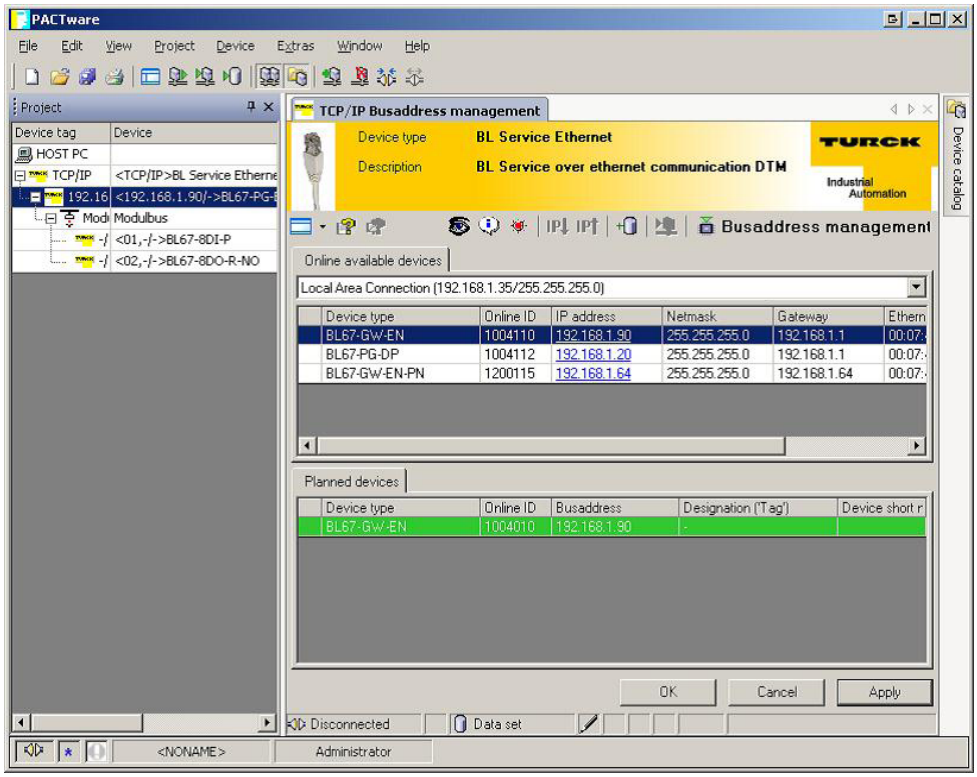


6. Click on the on the same toolbar as the previous search button. This will add the highlighted gateway to the current project. It will ask if the connected slices should be added as well. Click "OK".

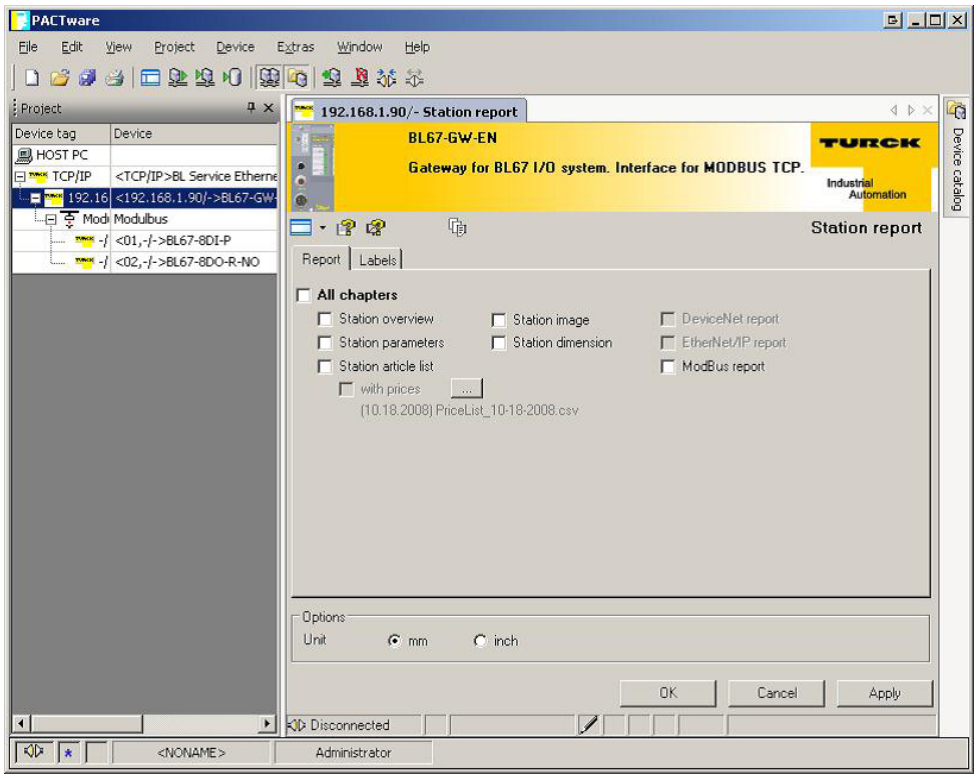




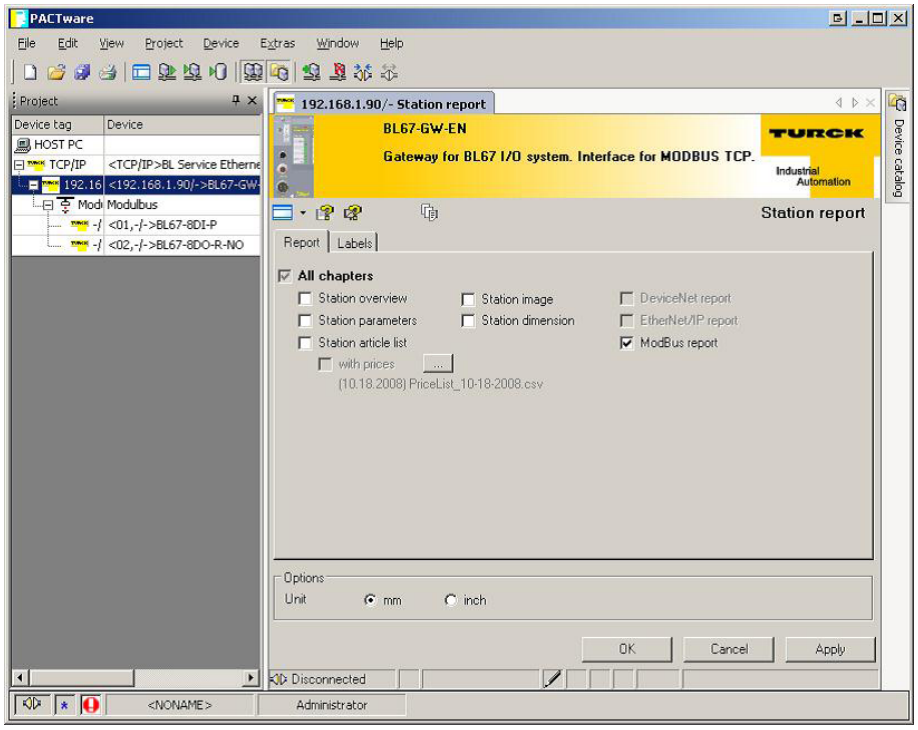
7. Highlight the gateway in the Project view on the left hand side.



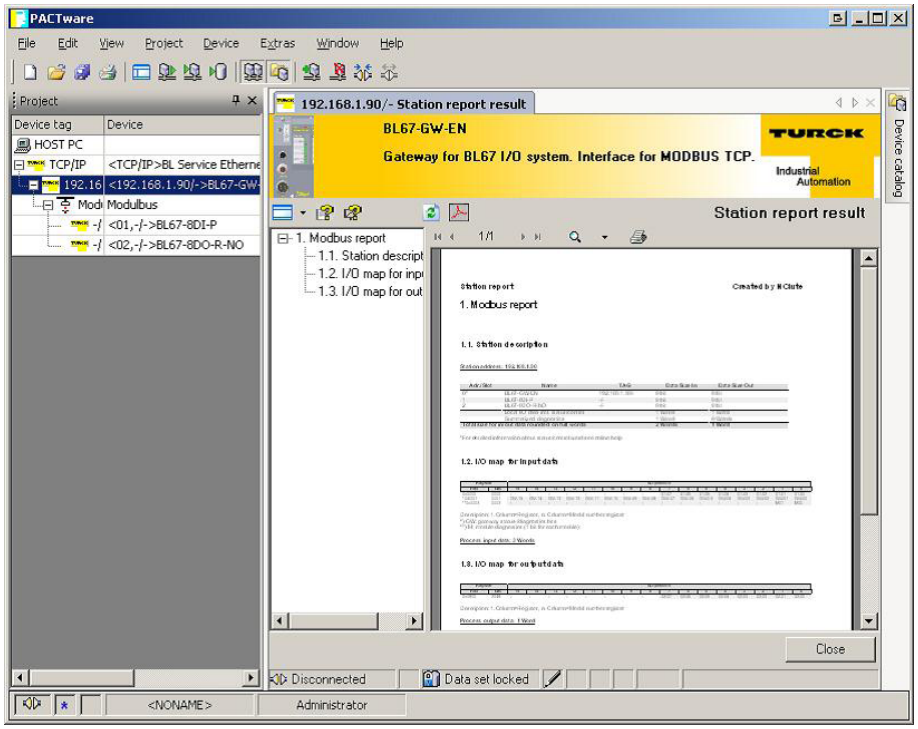
8. Right click on the gateway that was just highlighted, Additional Functions -> Station Report.



9. Here a number of different documents can be generated. For just the Modbus Map, check “ModBus report”.



10. Click “OK” to generate the Modbus datamap.



11. Click the button to generate a pdf file of the datamap.

Station report **Created by NCIute**

1. Modbus report

1.1. Station description

Station address: 192.168.1.90

Adr./Slot	Name	TAG	Data Size In	Data Size Out
0*	BL67-GW-EN	192.168.1.90/-	0 bit	0 bit
1	BL67-8DI-P	-/-	8 bit	0 bit
2	BL67-8DO-R-NO	-/-	0 bit	8 bit
	Local I/O data incl. status/control		1 Word	1 Word
	Summarized diagnostics		1 Word	0 Words
Total size for in/out data rounded on full words			**2 Words**	**1 Word**

*For detailed information about status/control word see online help

1.2. I/O map for input data

Register		Bit position															
Hex	Dec	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0x0000	0000	-	-	-	-	-	-	-	-	01.07	01.06	01.05	01.04	01.03	01.02	01.01	01.00
*0x0001	0001	GW.15	GW.14	GW.13	GW.12	GW.11	GW.10	GW.09	GW.08	GW.07	GW.06	GW.05	GW.04	GW.03	GW.02	GW.01	GW.00
**0x0003	0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M01	M00

Description: 1.Column=Register, n. Column=Modul number.register
*) GW: gateway status-/diagnostics bits
**) M: module diagnostics (1 bit for each module)

Process input data: 3 Words

1.3. I/O map for output data

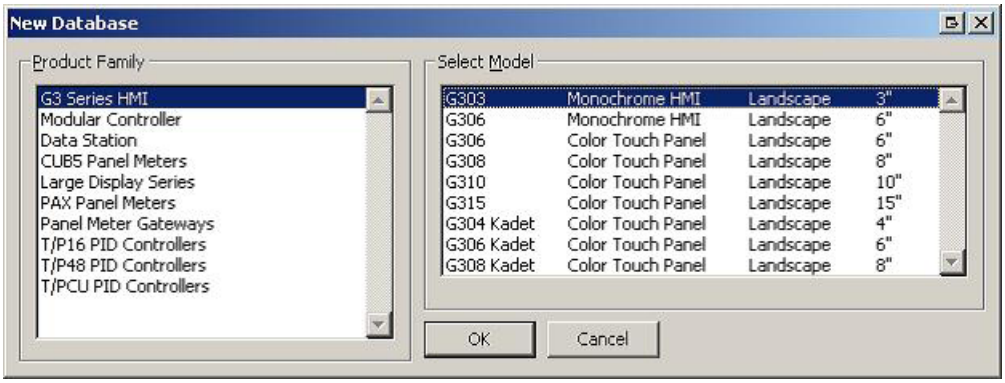
Register		Bit position															
Hex	Dec	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0x0800	2048	-	-	-	-	-	-	-	-	02.07	02.06	02.05	02.04	02.03	02.02	02.01	02.00

Description: 1.Column=Register, n. Column=Modul number.register

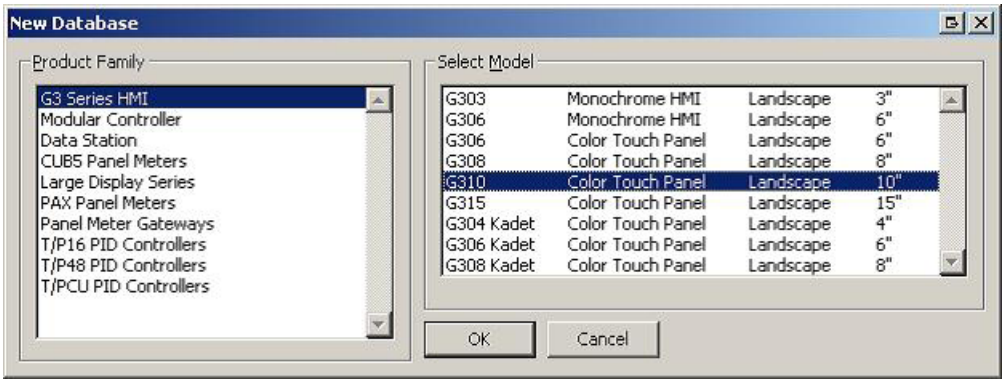
Process output data: 1 Word

SETTING UP RED LION G310

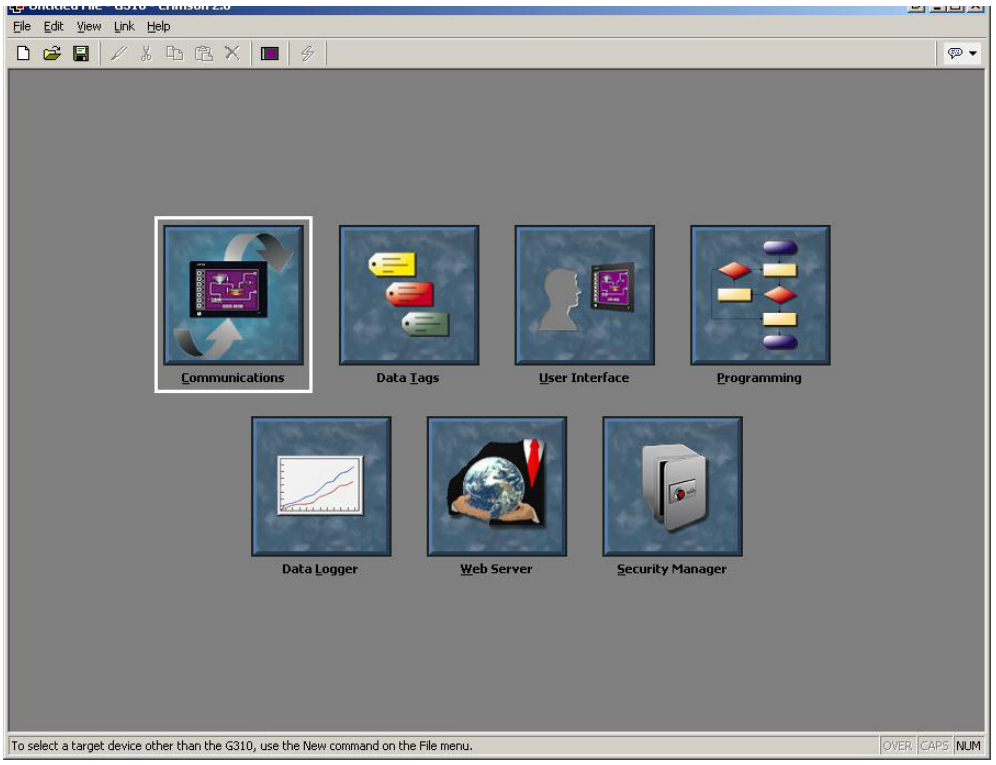
1. Start Crimson 2.0.



2. Choose the model of Red Lion HMI that is being used. This startup guide used a G310.

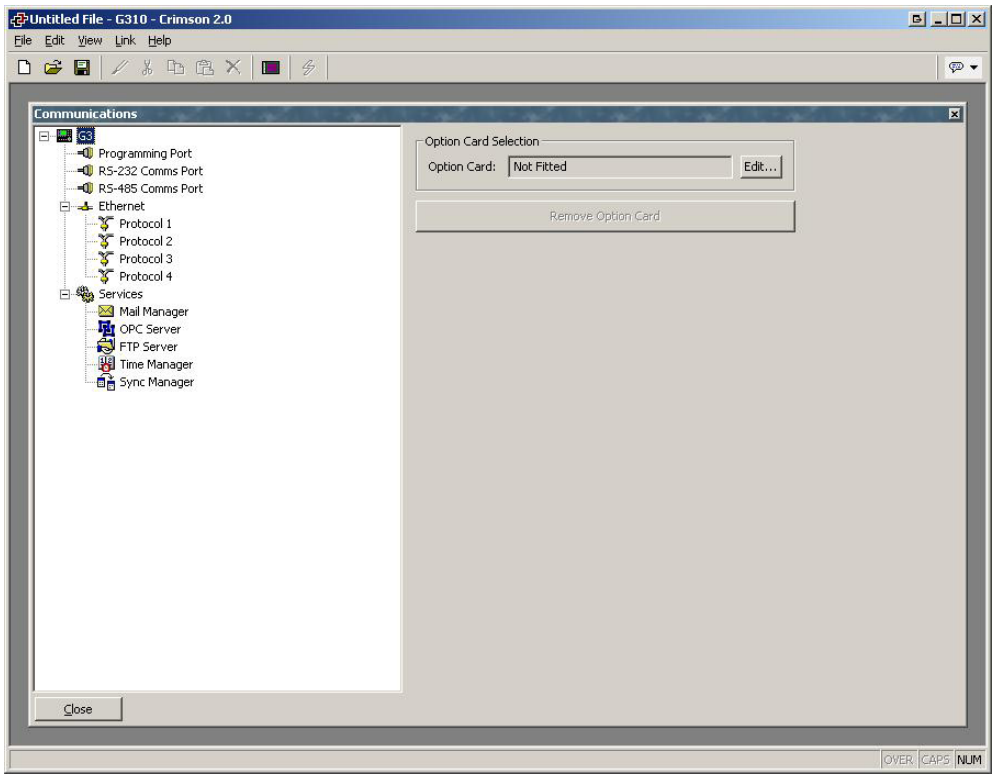


3. Click "OK".

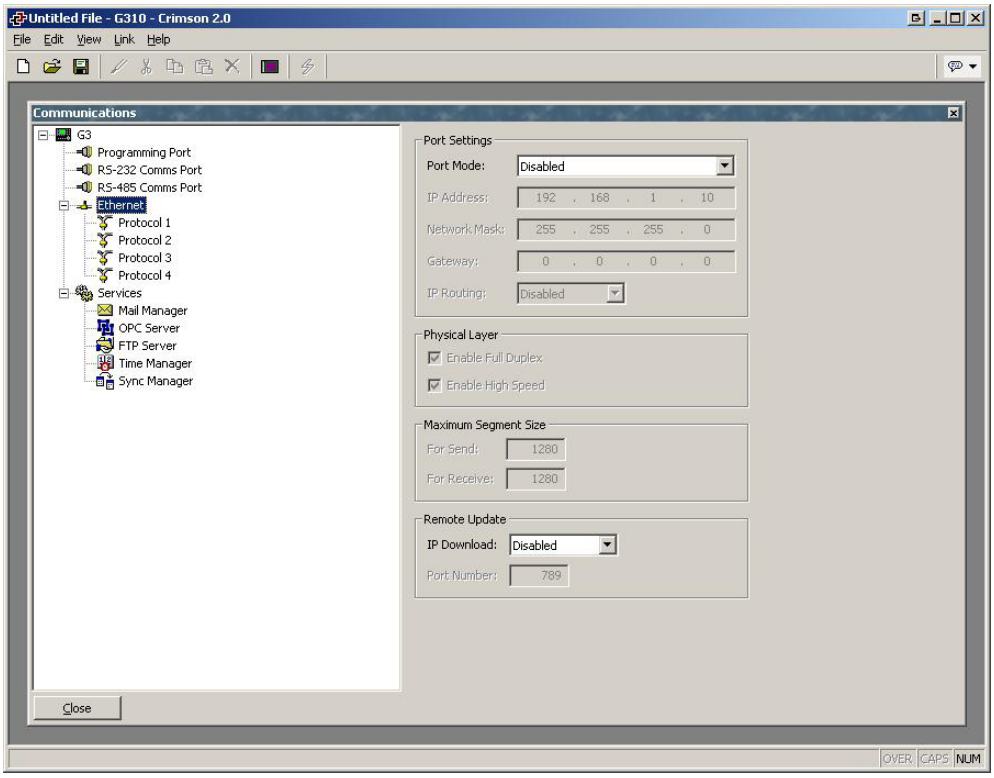


Setup Communications

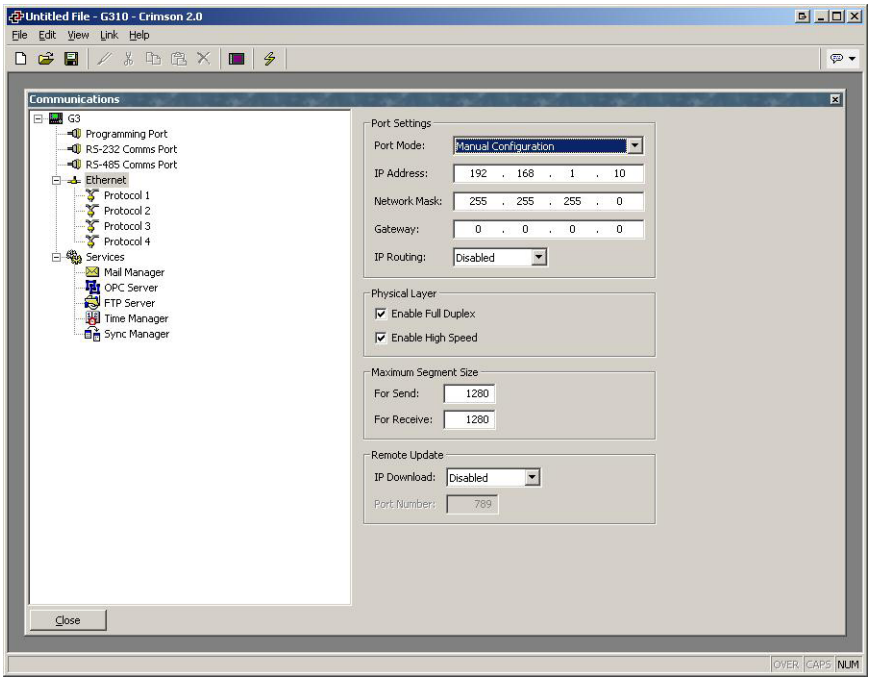
1. Double click on "Communications".



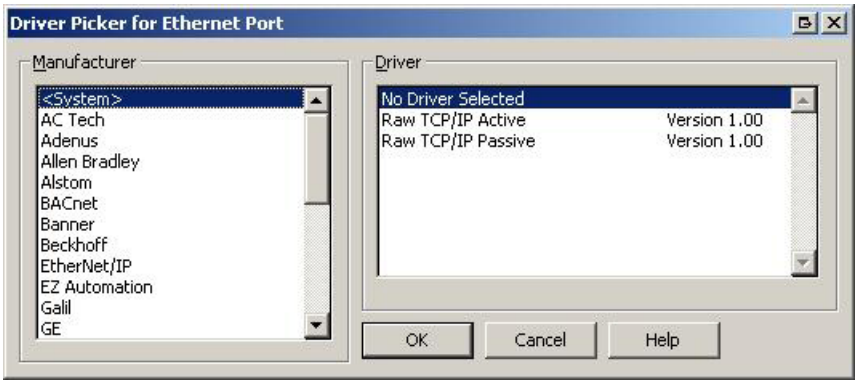
2. Highlight "Ethernet" from the left treeview.



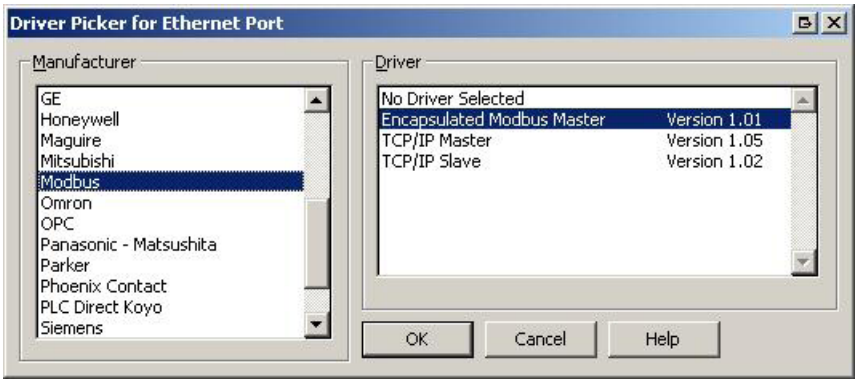
4. Change the "Port Mode" dropdown to "Manual Configuration".



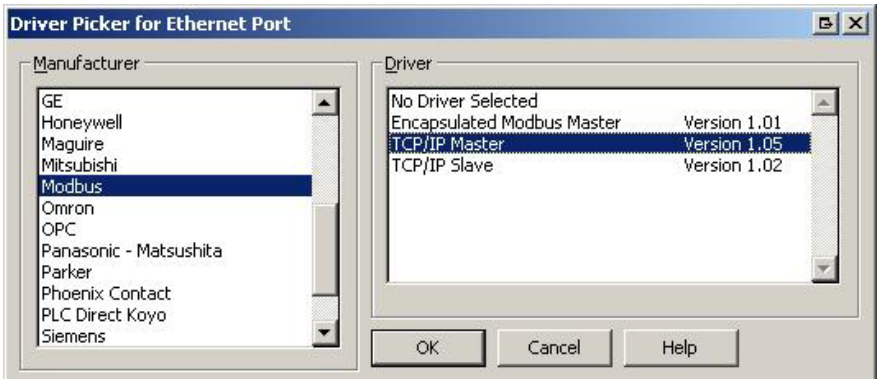
5. Click on the "Edit..." button in the "Driver Selection" frame.



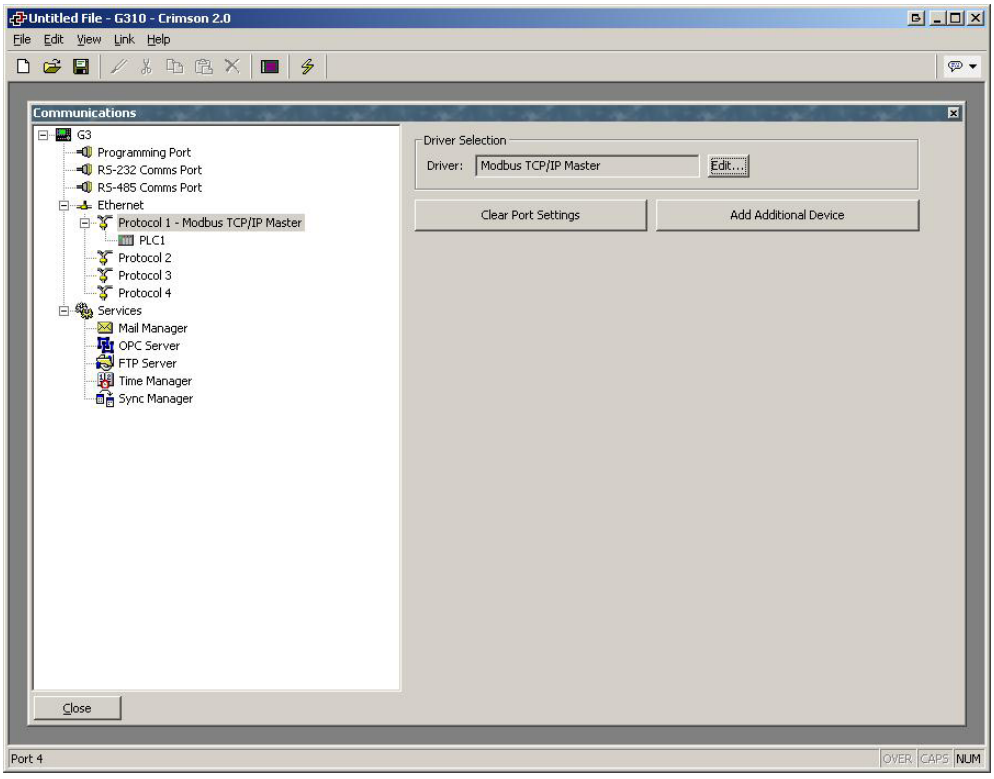
6. Choose "Modbus" from the left list.



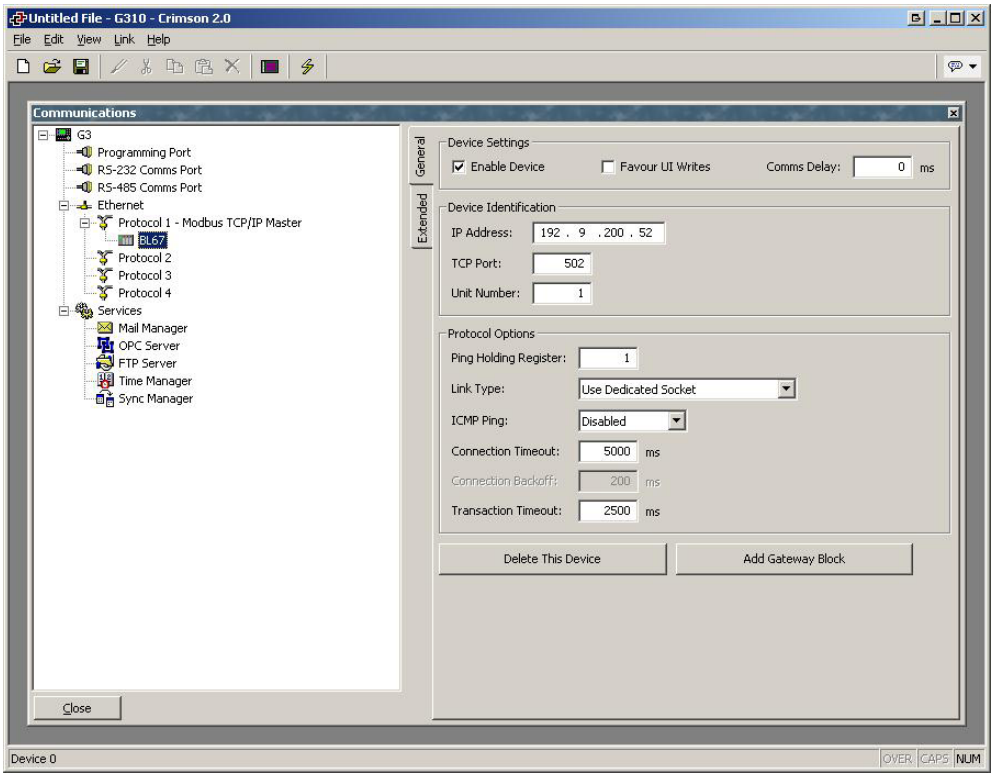
7. Choose TCP/IP Master from the right list.



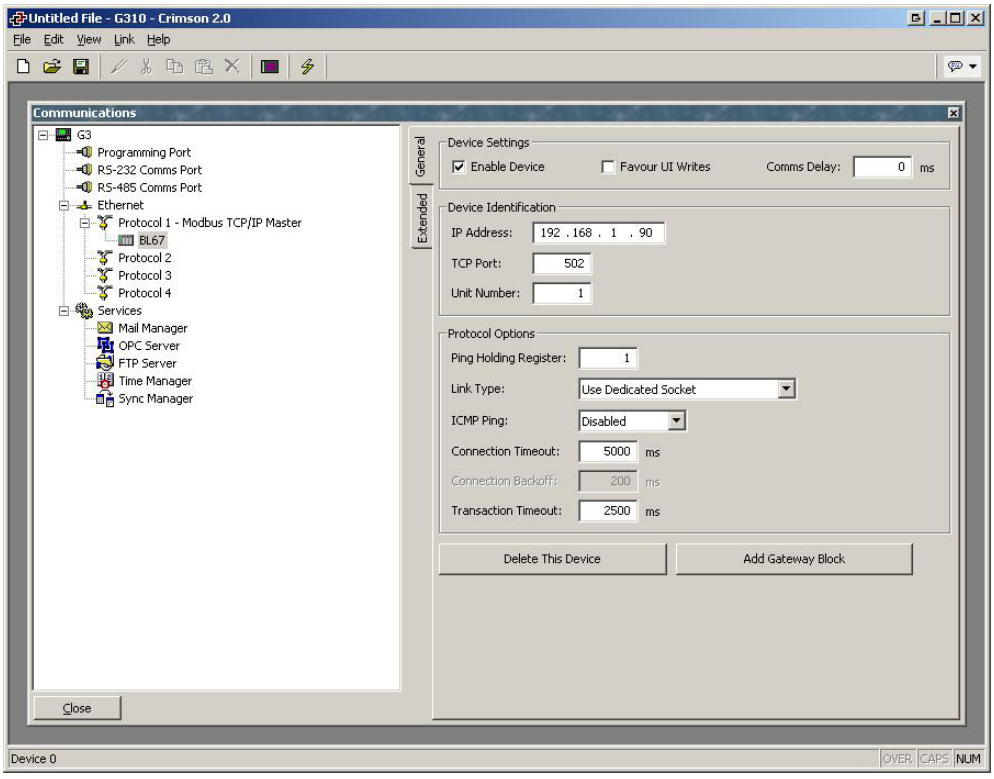
8. Click "OK".



9. Right Click "PLC1" on the left treeview, click "Rename". Rename it to "BL67"



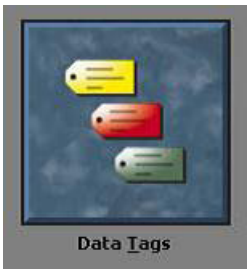
10. Change the IP Address field to our BL67 IP Address, 192.168.1.90.

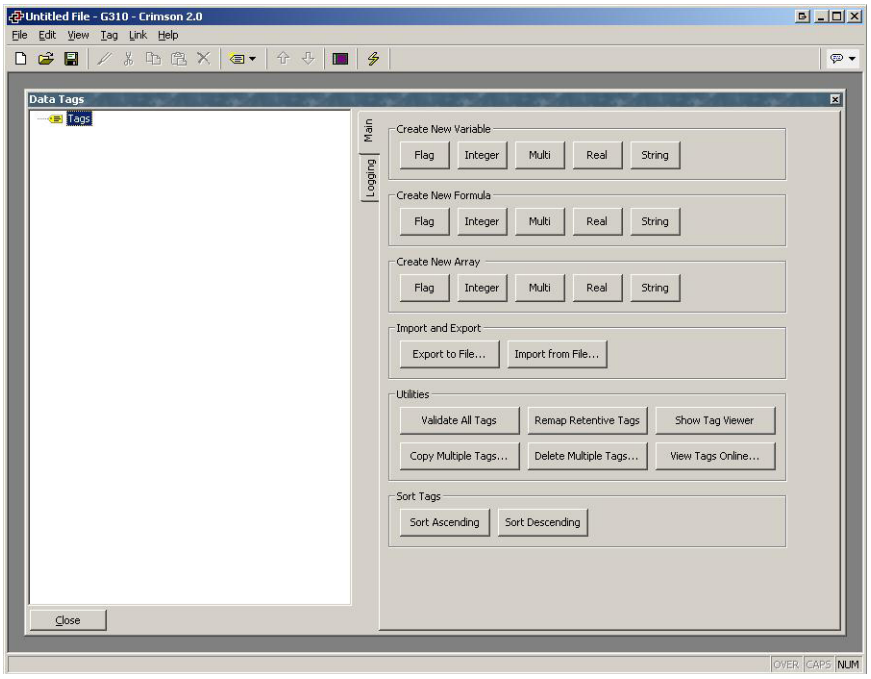


11. Click "Close".

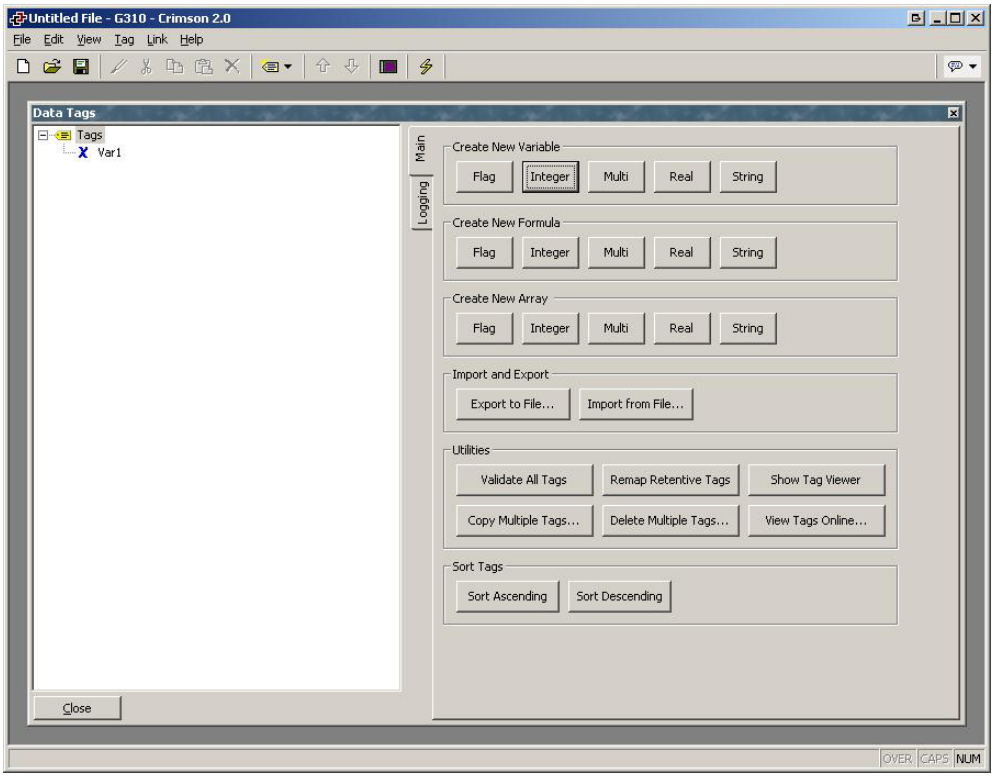
Setup Data Tags

1. Double click on "Data Tags".

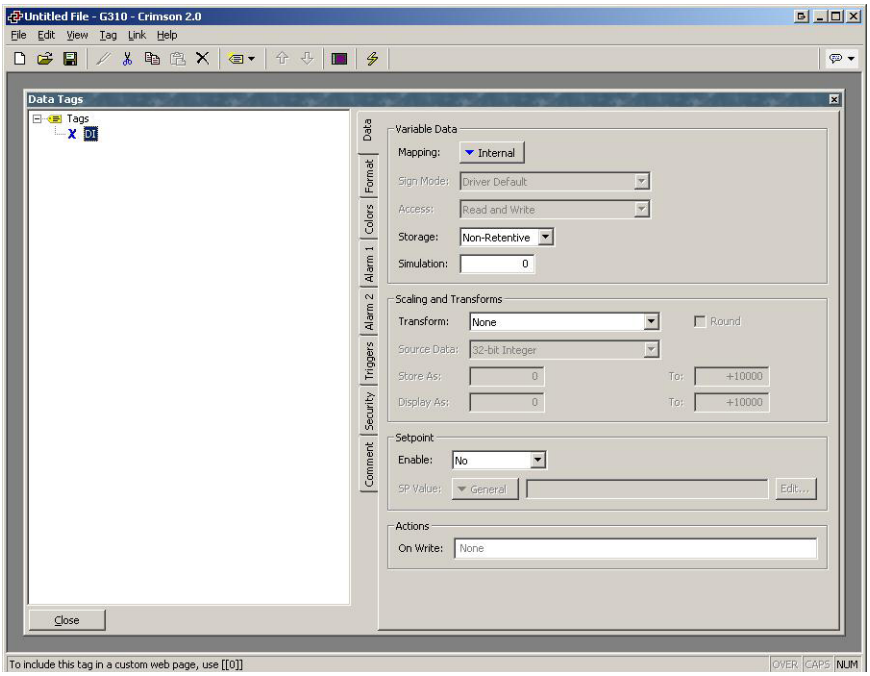




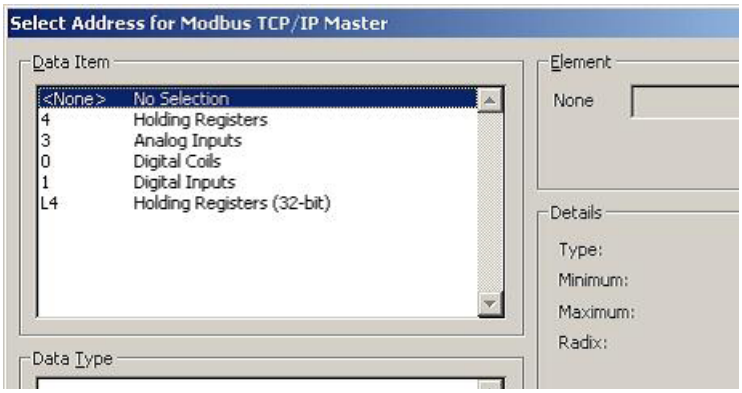
2. Click on the "Integer" button on the right hand side in the "Create New Variable" frame.



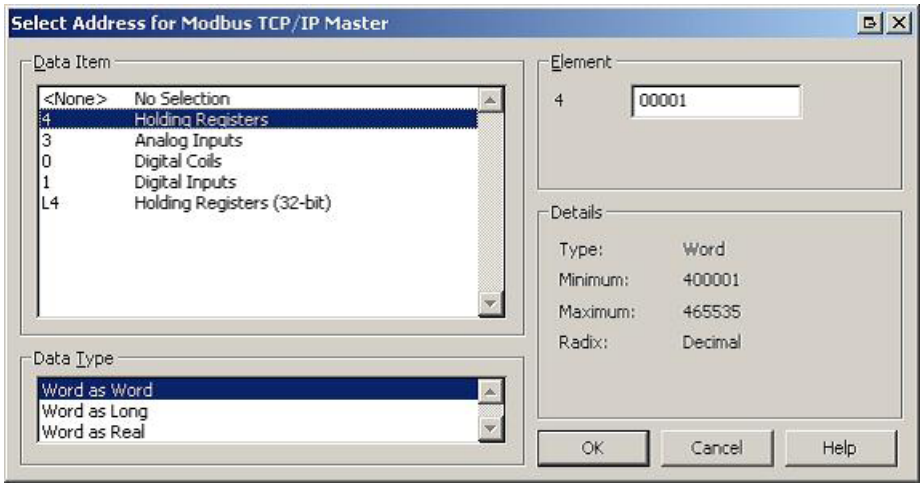
3. Right click on "Var1" in the left treeview, click "Rename". Rename this to "DI".



4. Click on the "Internal" button in the "Variable Data" frame on the right hand side. Choose "BL67"



5. Modbus data can be accessed as different data types. The "Data Item" frame allows you to choose which data type in hich to access the data. For this example, select "Holding Registers" which will access the data in words.



6. Referring to our Modbus Datamap, we see that our Digital Inputs are in register 0x0000 or 0000.

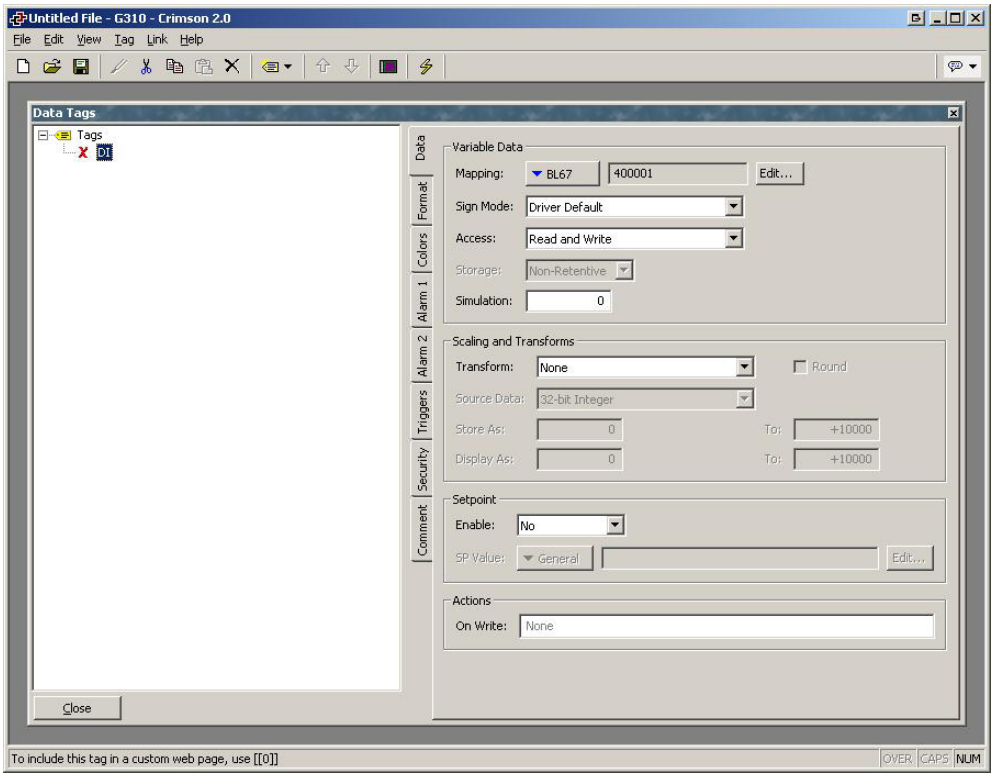
1.2. I/O map for input data

Register		Bit position															
Hex	Dec	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0x0000	0000	-	-	-	-	-	-	-	-	01.07	01.06	01.05	01.04	01.03	01.02	01.01	01.00
*0x0001	0001	GW.15	GW.14	GW.13	GW.12	GW.11	GW.10	GW.09	GW.08	GW.07	GW.06	GW.05	GW.04	GW.03	GW.02	GW.01	GW.00
**0x0003	0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M01	M00

Description: 1.Column=Register, n. Column=Modul number.register
*) GW: gateway status-/diagnostics bits
**) M: module diagnostics (1 bit for each module)

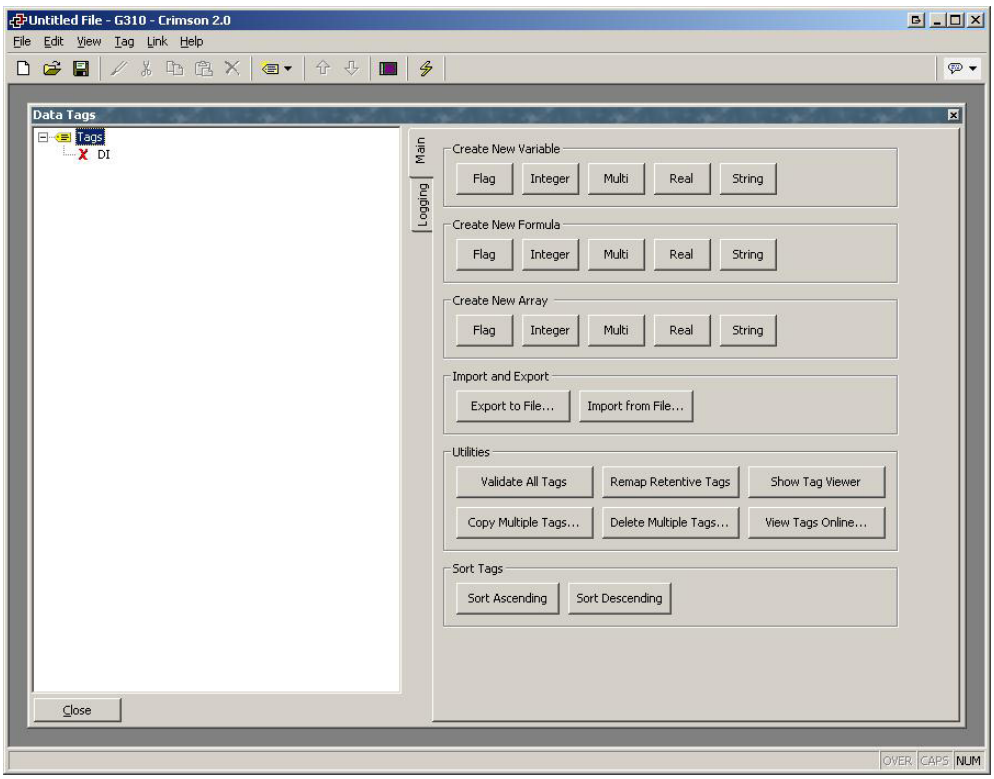
Process input data: 3 Words

7. Red Lion uses decimal numbering for the Modbus registers. However, they also do not use "0000" as a register, but rather they increase all Modbus registers by 1. So the digital input data will be found in register 00001. Verify that this is what is in your "Element" textbox, and click "OK".

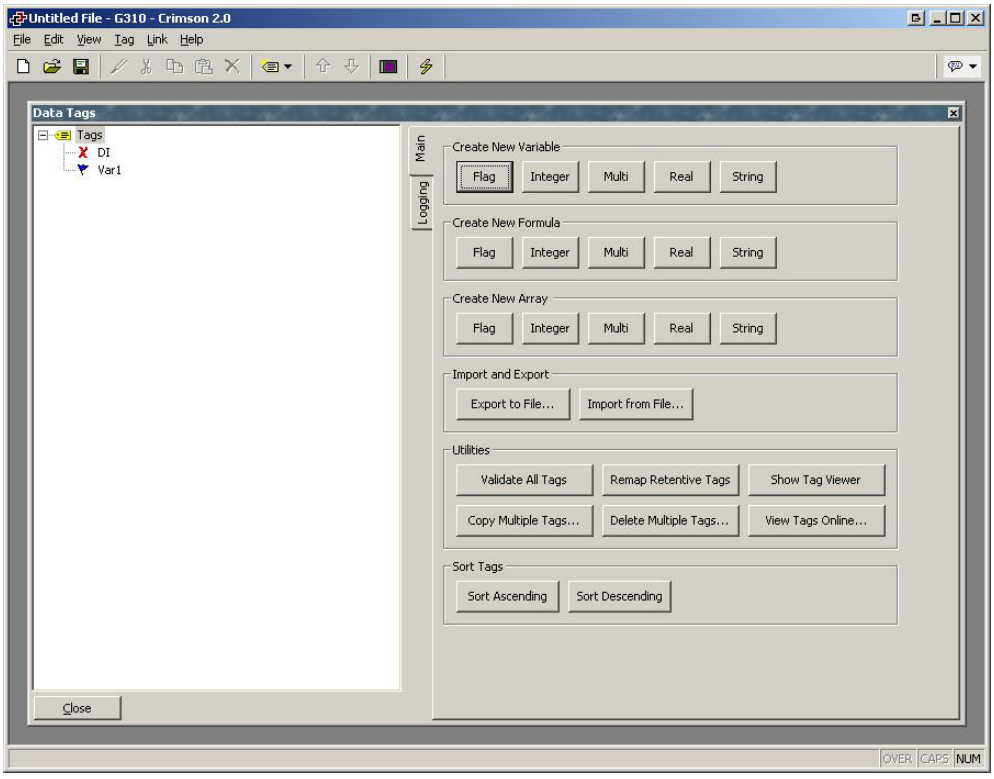


**Notice: In the "Variable Data" frame, the Mapping: line will have combined the "holding register" number "4" and the actual modbus register "00001" into "400001".*

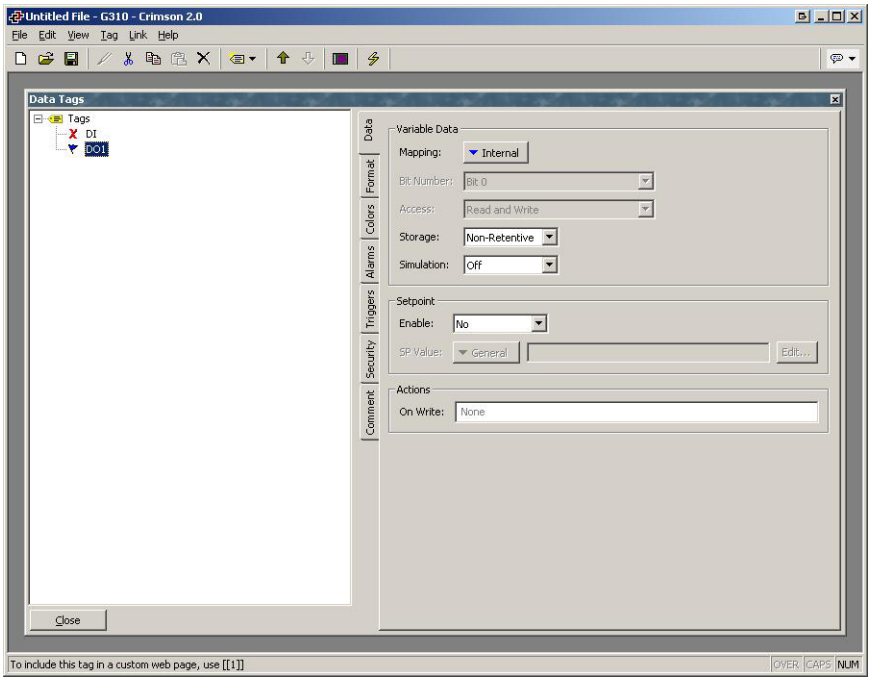
8. Highlight the "Tags" item in the left hand treeview.



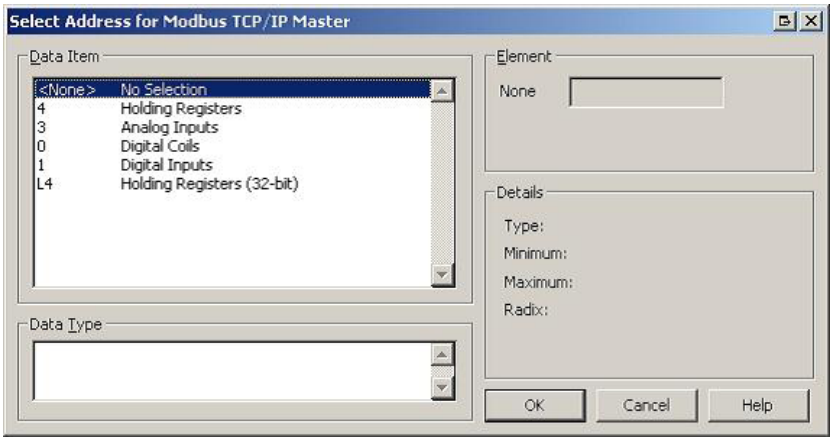
9. Click on the "Flag" button on the right hand side in the "Create New Variable" frame.



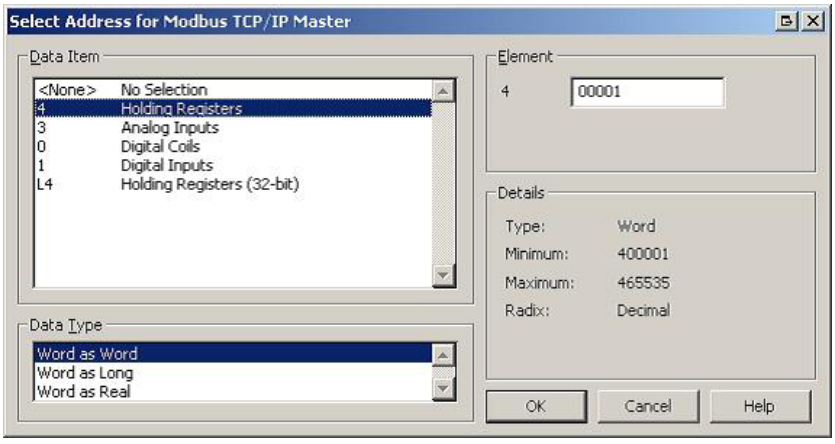
10. Right click on "Var1" in the left treeview, click "Rename". Rename this to "DO1".



11. Click on the "Internal" button in the "Variable Data" frame on the right hand side. Choose "BL67"



12. Again, select "Holding Registers".



13. Referring to our Modbus Datamap, we see that our Digital outputs are in register 0x0800 or 2048.

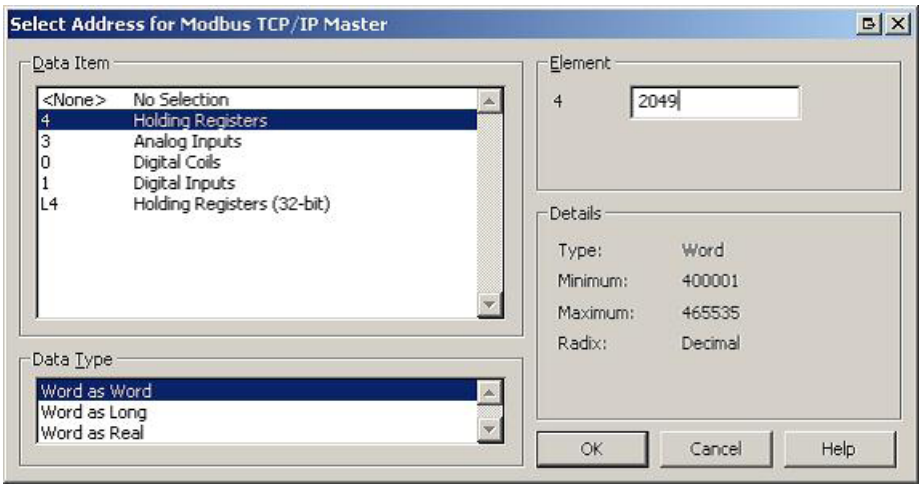
1.3. I/O map for output data

Register		Bit position															
Hex	Dec	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0x0800	2048	-	-	-	-	-	-	-	-	02.07	02.06	02.05	02.04	02.03	02.02	02.01	02.00

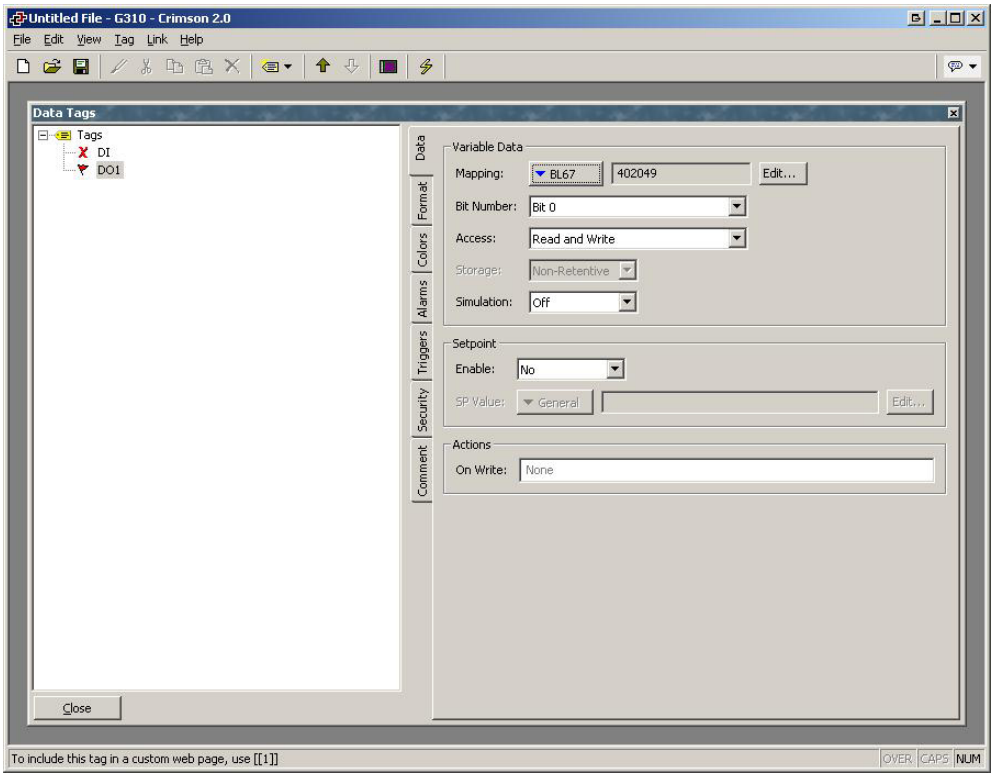
Description: 1.Column=Register, n. Column=Modul number.register

Process output data: 1 Word

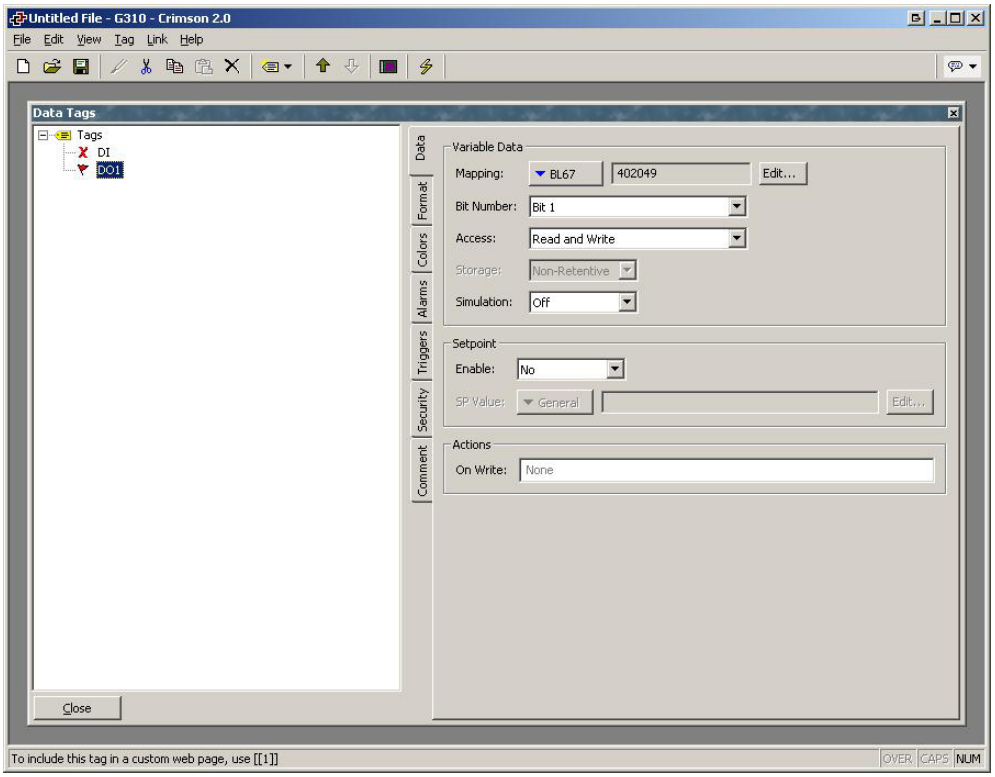
14. So now we must fill in 2049 into the "Element" text box. Remember this is because Red Lion uses a "Decimal + 1" register numbering system.



15. Click "OK"



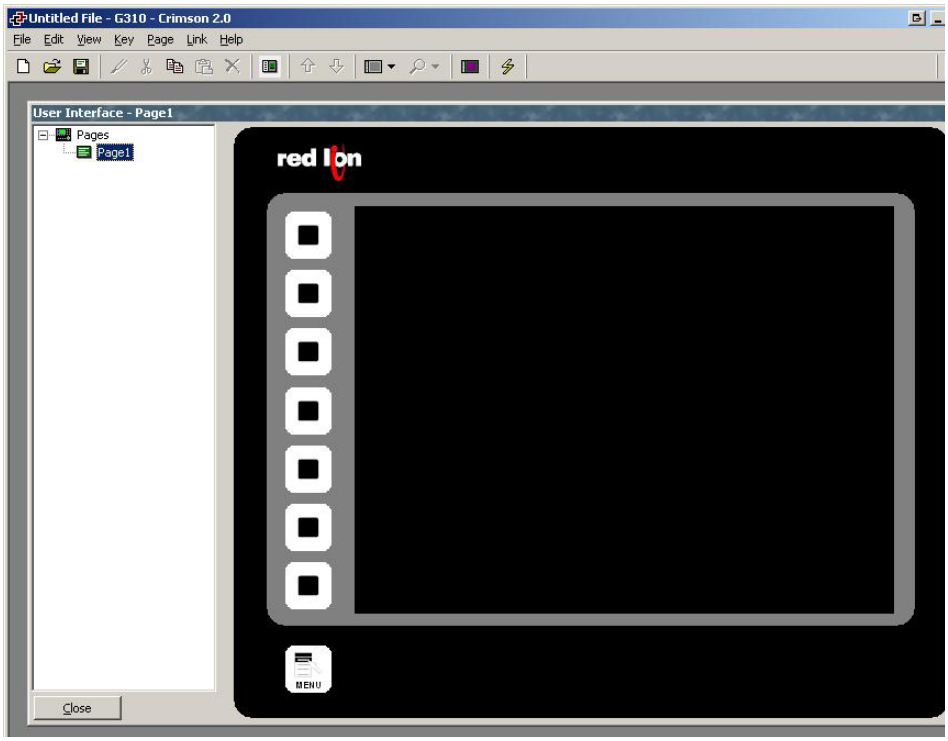
16. We want to tie this to DO1, which means we must point this to Bit 1 of the Modbus register. To do this, change the "Bit Number" dropdown on the left side from "Bit 0" to "Bit 1".



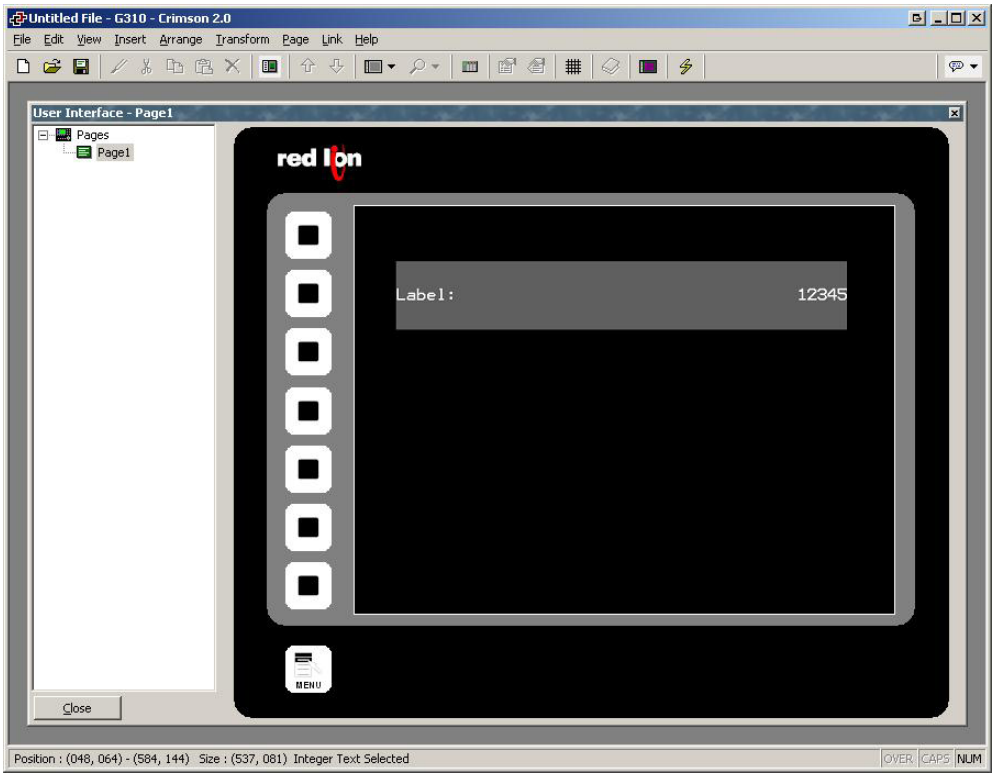
17. Click "Close"

Setup User Interface

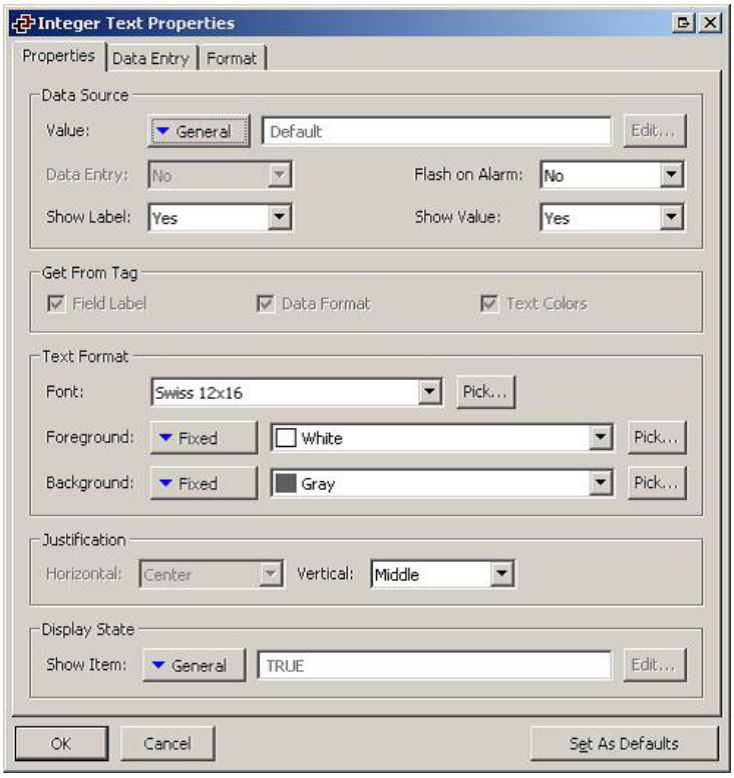
1. Double Click on "User Interface".



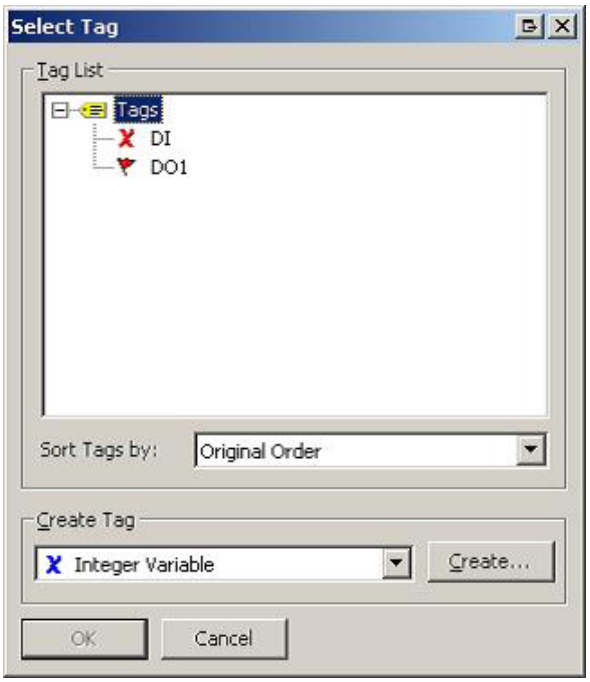
2. Add an "Integer Text" onto the screen.



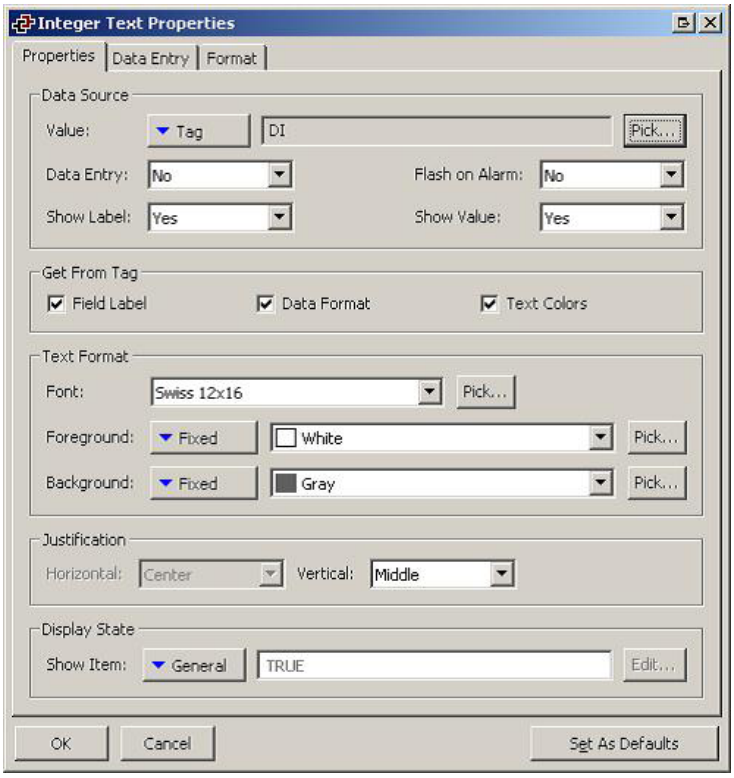
3. Double click on the new object to bring up its properties.



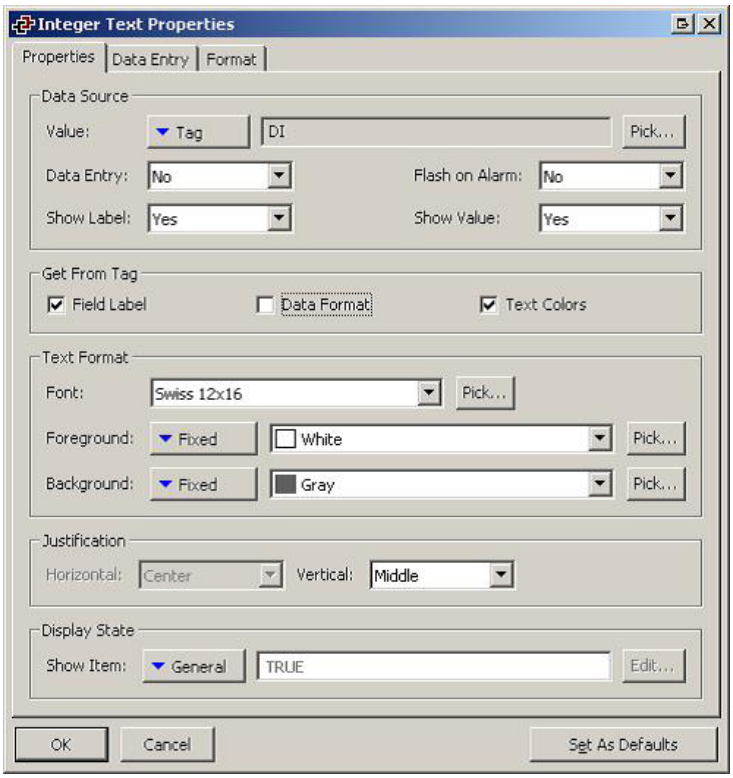
4. In the "Data Source" frame, click on the "General" dropdown and change it to "Tag". This will bring up the tag list.



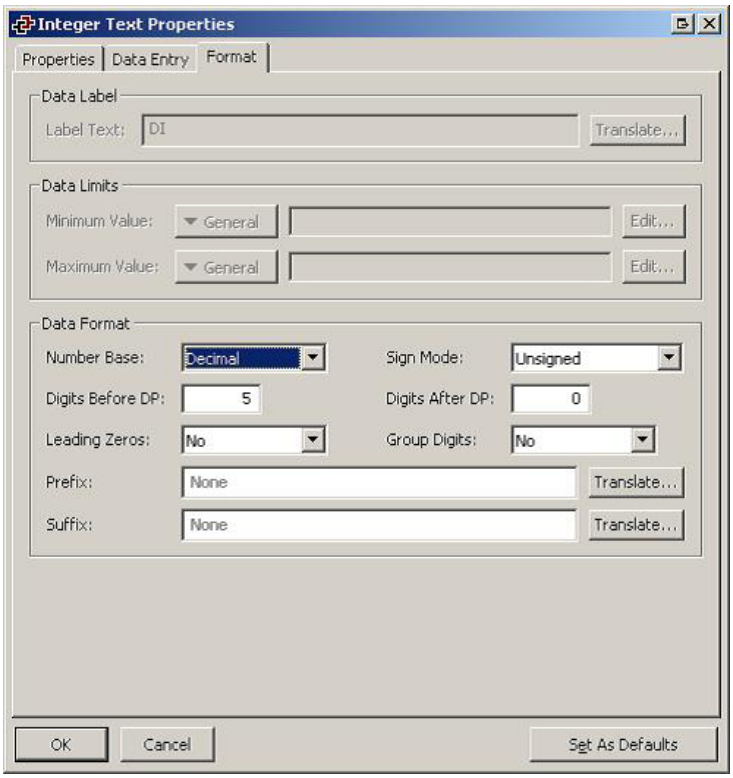
5. Select the "DI" tag. Then click "OK".



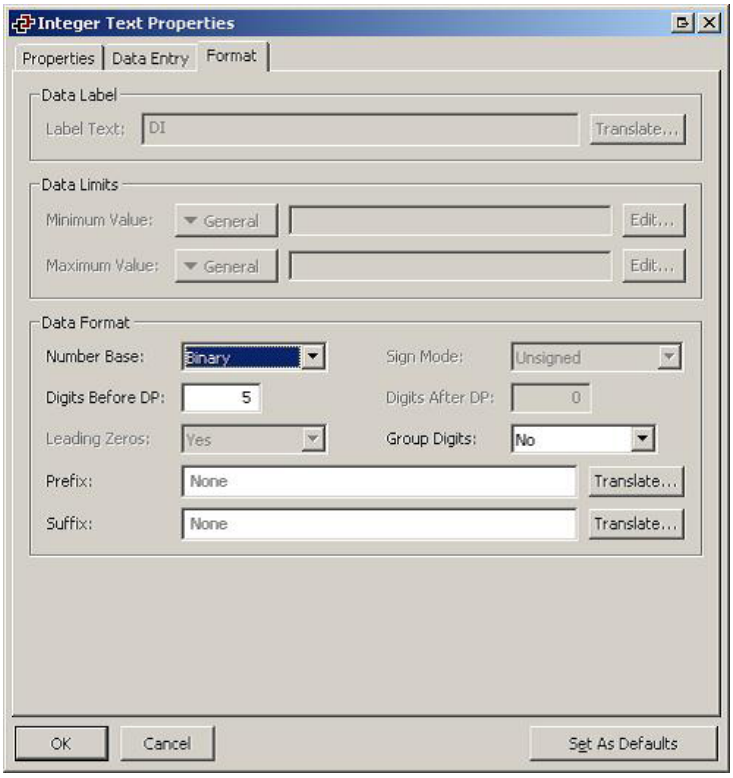
6. Data can be represented in a number of ways on an HMI. Because we're looking at a slice of digital inputs, we should show them as a series of 1's and 0's. To do this, uncheck "Data Format" in the "Get From Tag" frame.



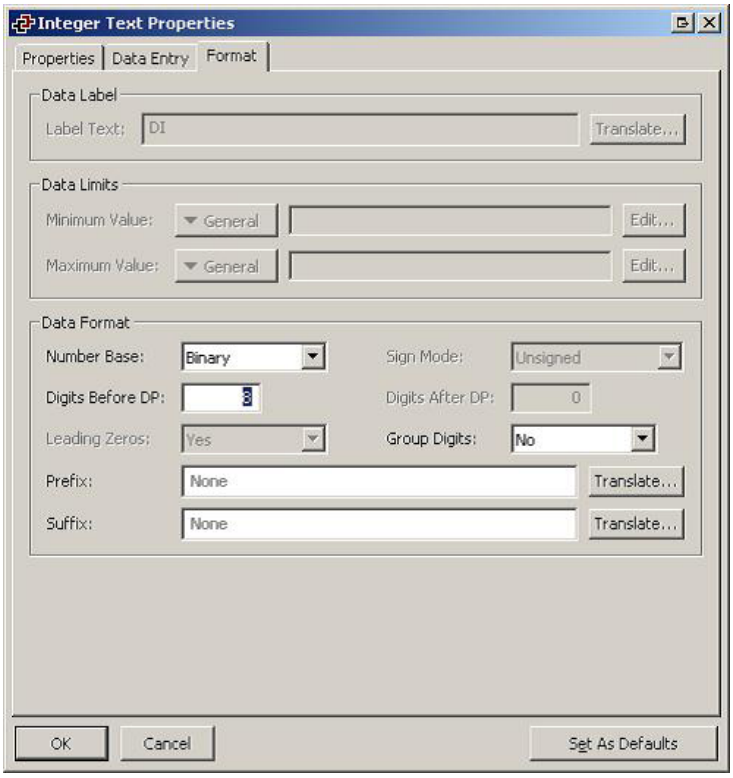
7. Change to the "Format" tab from the top tablist.



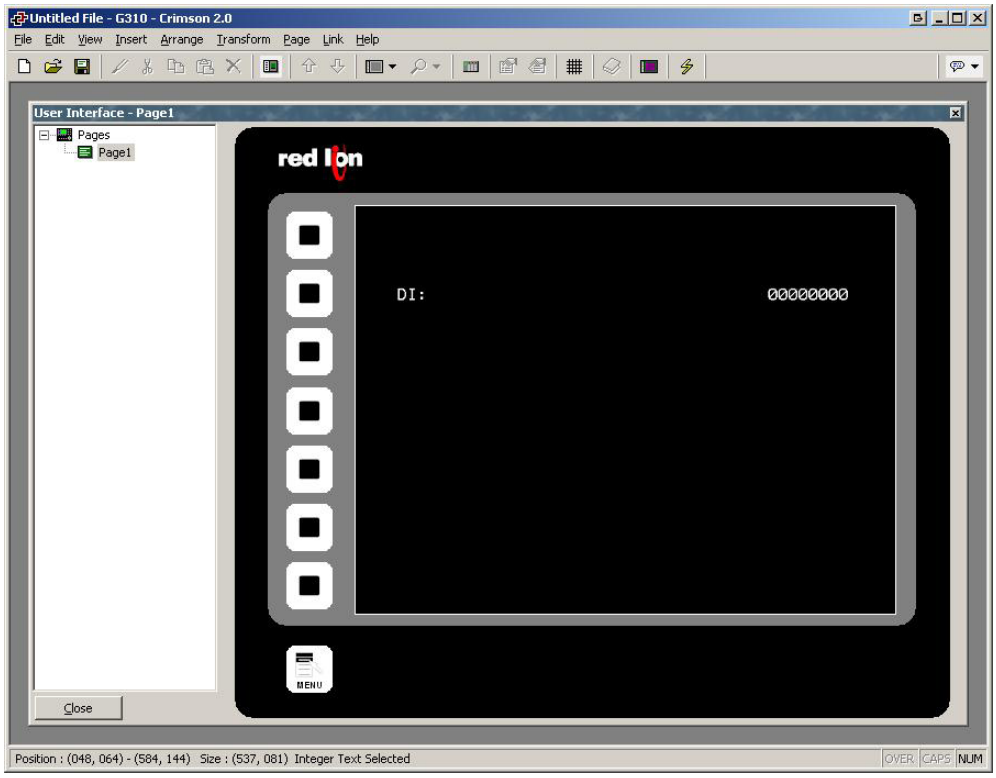
8. Change the "Number Base" dropdown in the "Data Format" frame to "Binary".



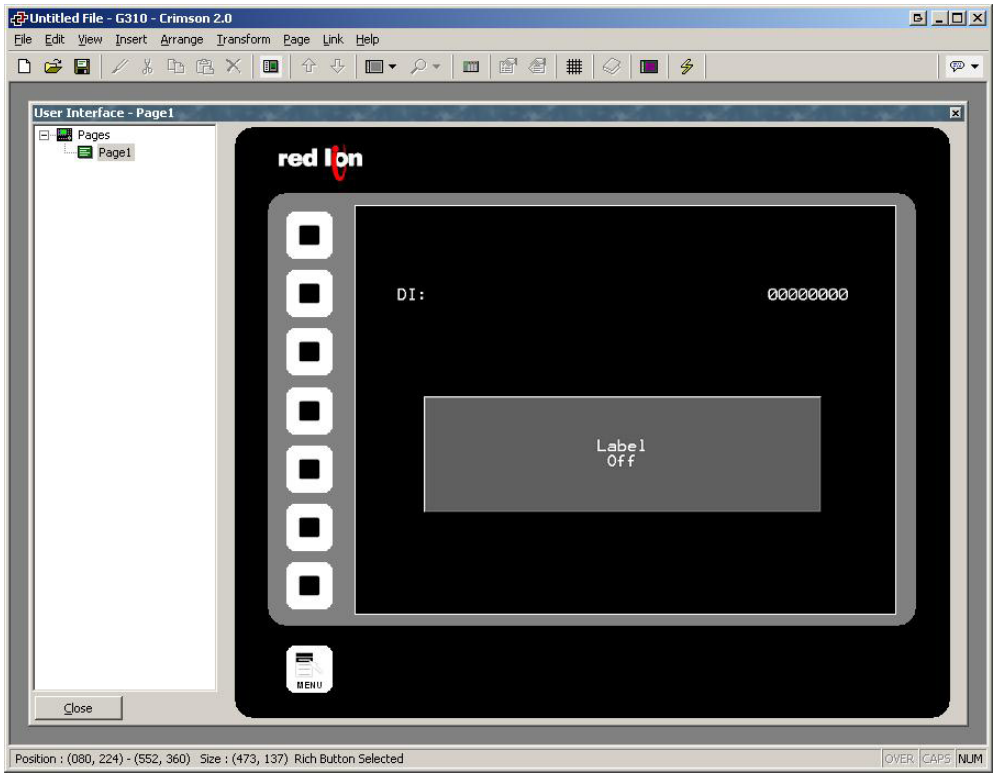
9. Change the "Digits Before DP" to 8. (DP = Decimal Point)



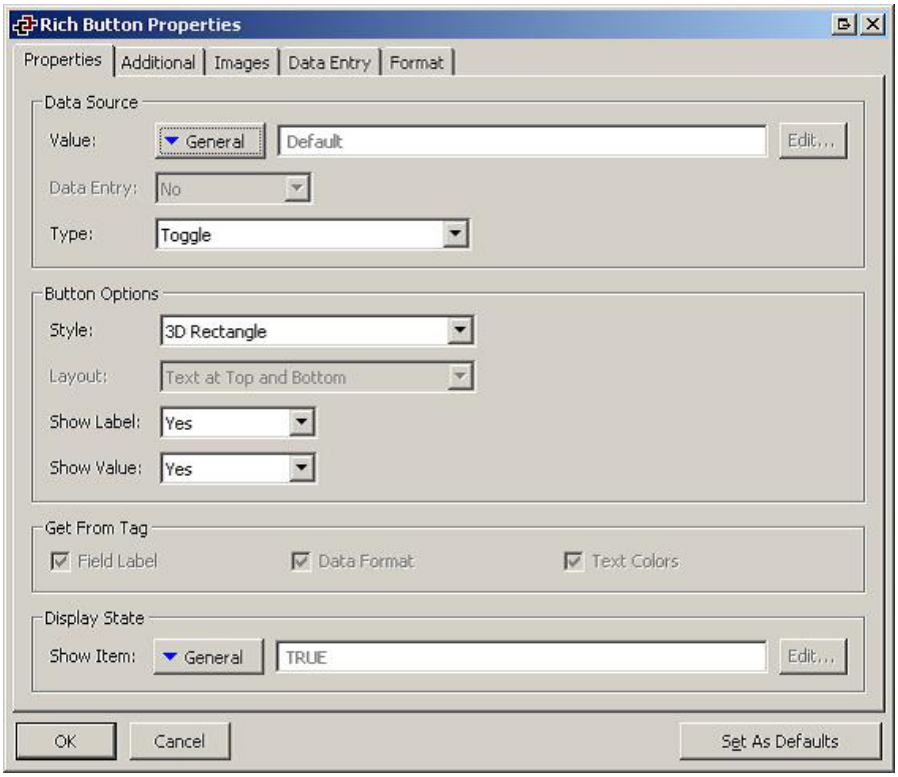
10. Click "OK".



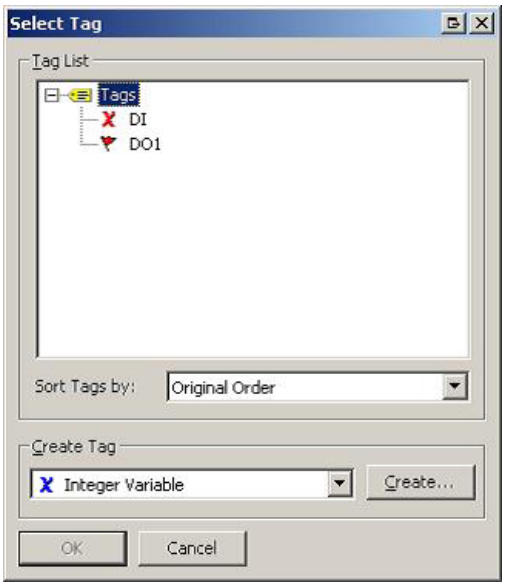
11. Draw a "Flag Tag Button" on the screen.



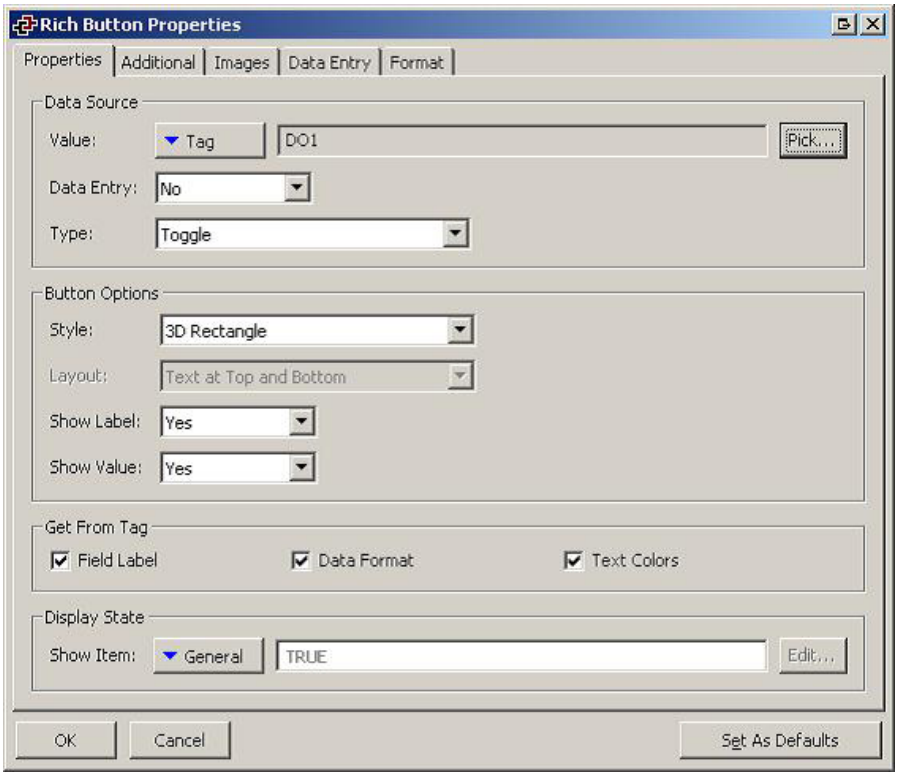
12. Double click on the new object to bring up its properties.



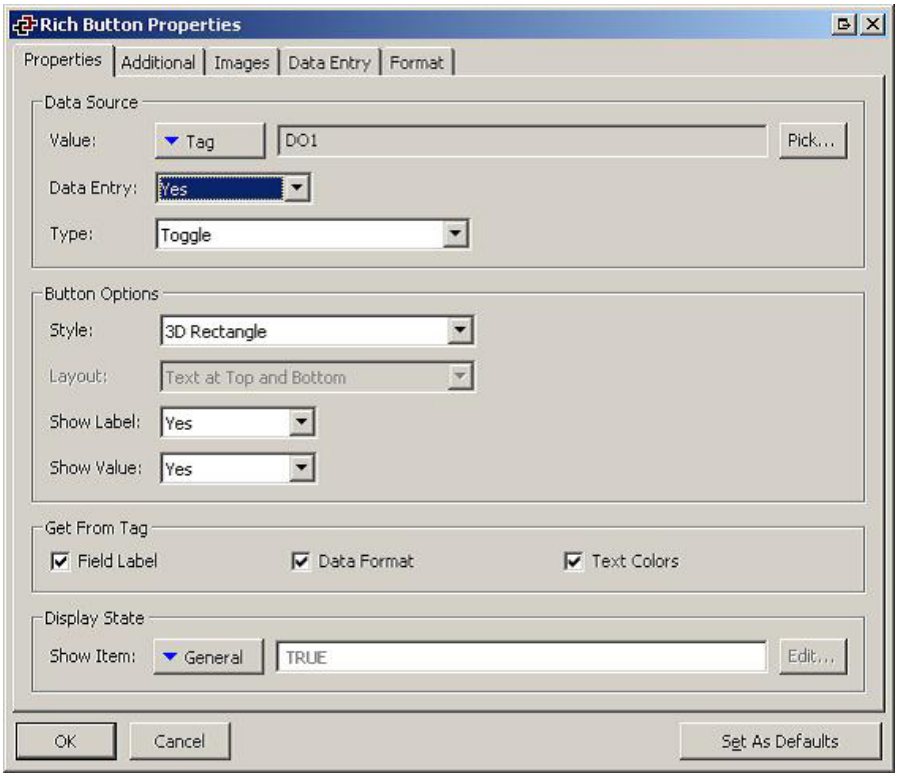
13. In the "Data Source" frame, click on the "General" dropdown and change it to "Tag". This will bring up the tag list.



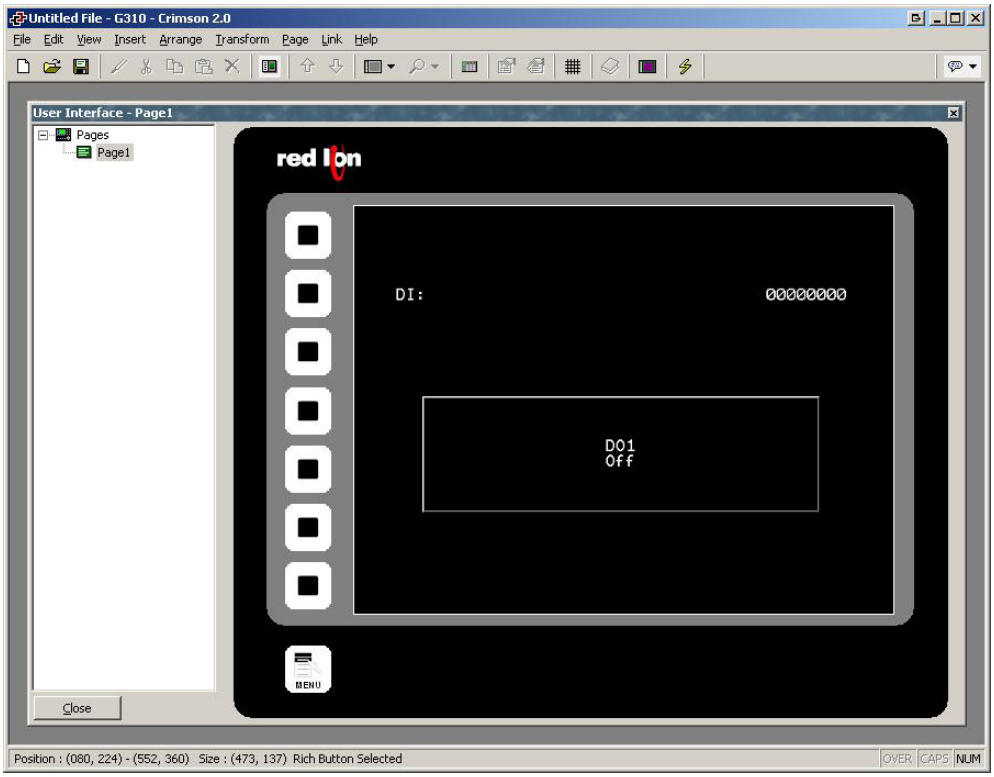
14. Select the "DO1" tag and click "OK".



15. Change "Data Entry" dropdown to "Yes"



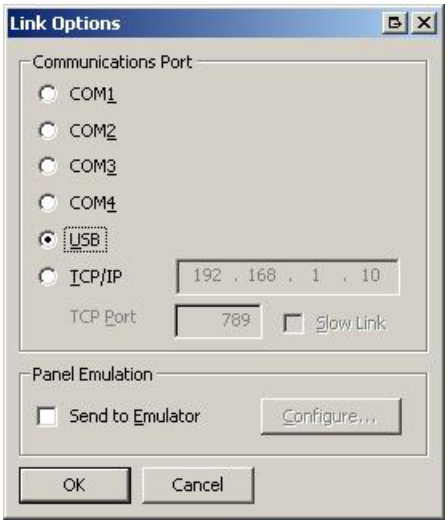
16. Click “OK”.


Untitled File - G310 - Crimson 2.0
File Edit View Insert Arrange Transform Page Link Help
User Interface - Page1
Pages
Page1
red lion
DI:
00000000
DO1
Off
MENU
Close
Position : (080, 224) - (552, 360) Size : (473, 137) Rich Button Selected
OVER CAPS NUM

Download Project to HMI

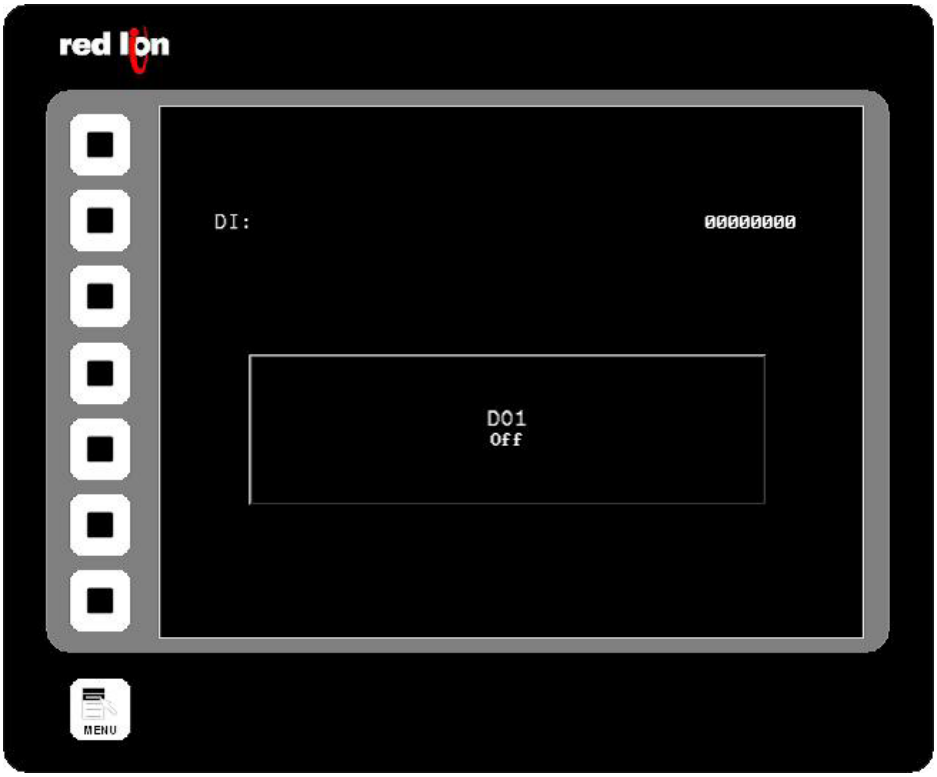
With Actual HMI

1. From the "Link" menu choose "Options".



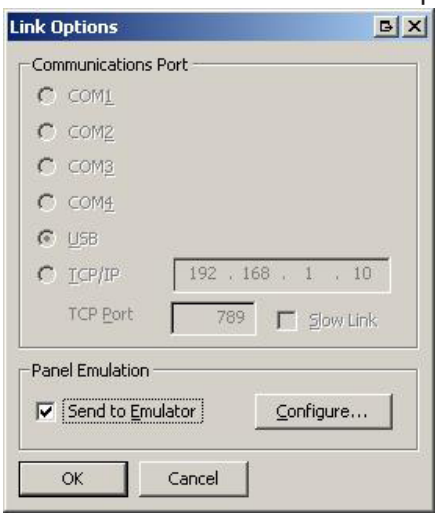
2. Verify that the method you communicate to the HMI is chosen. Recommended connection is USB.

3. Click the ⚡ button to download your program to the HMI.

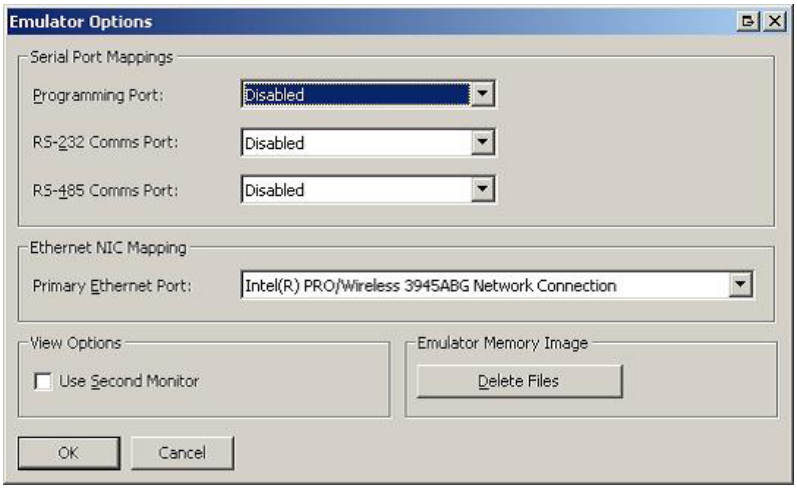


With HMI Emulator

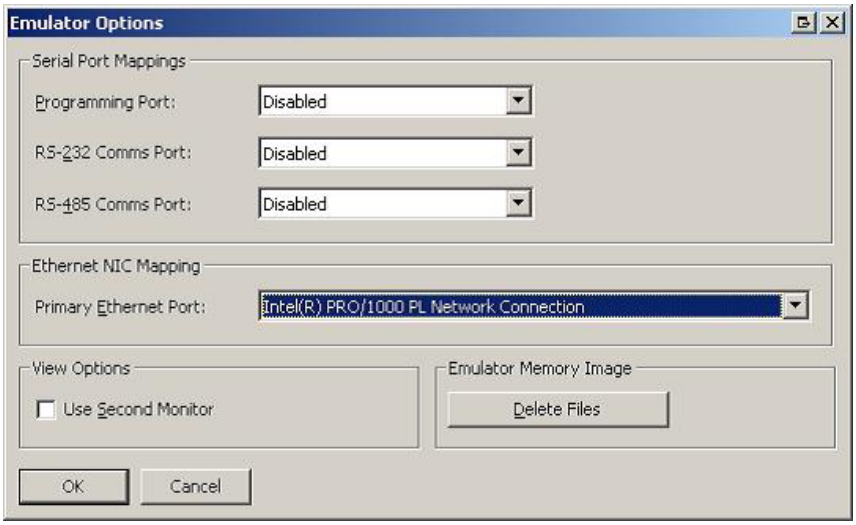
1. From the "Link" menu choose "Options".



2. Click "Configure".

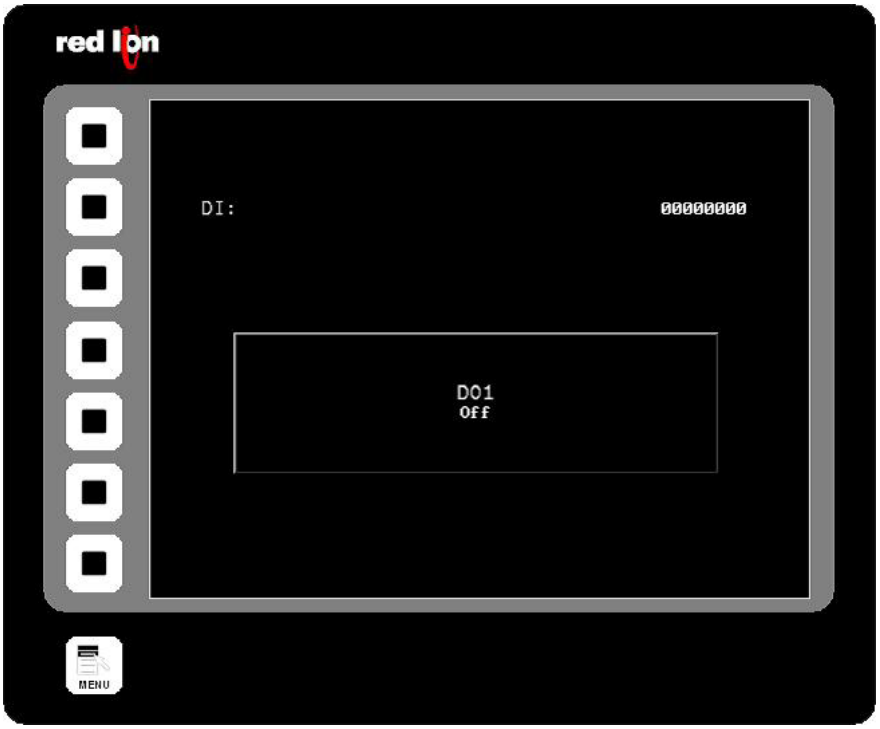


3. Change the "Ethernet NIC Mapping" to the Ethernet connection on your computer that you have connected to the BL67.



4. Click "OK" twice.

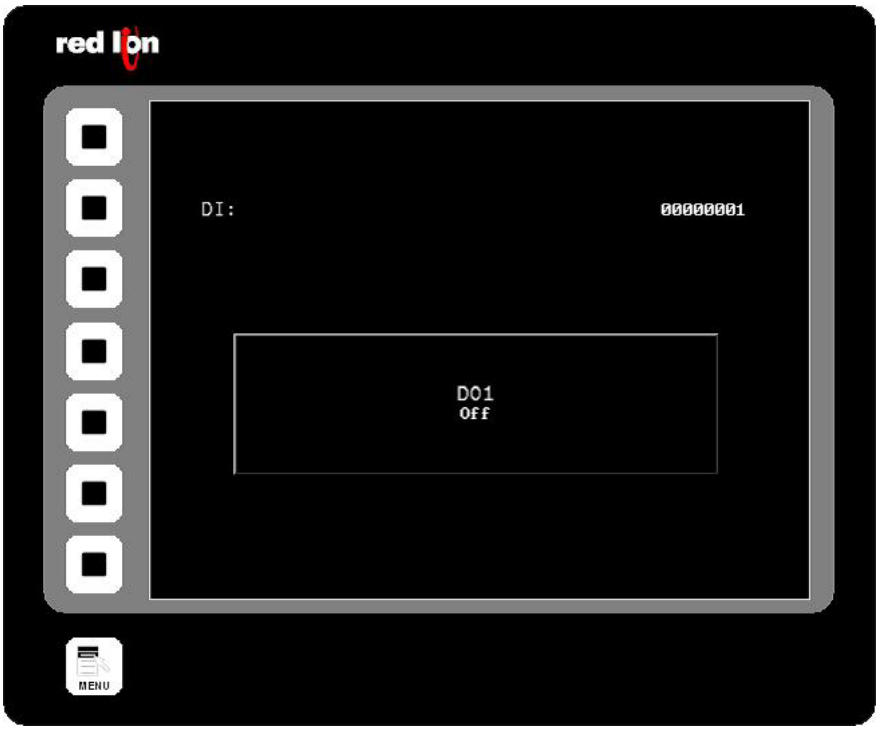
5. Click the button to download your program to the HMI Emulator.



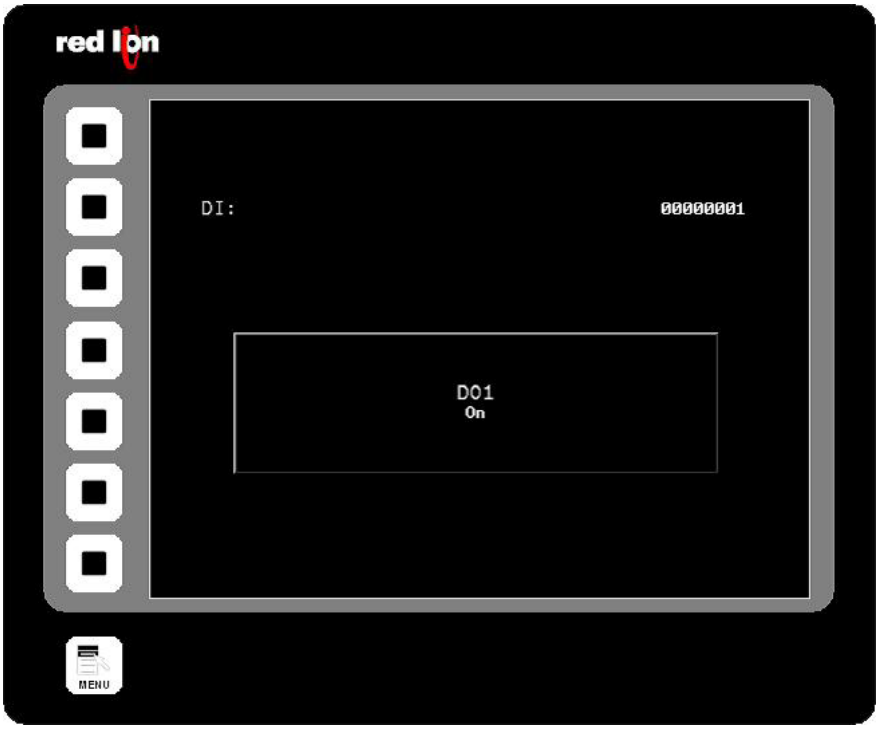
Note: Once the Emulator is setup properly, it can be quickly enabled/disabled from the Main Toolbar, as next to the button is the button.

5.4.3 Running the HMI Program

6. By turning on a digital input on the BL67, the status will change in the DI string.



7. By pressing the button on the HMI, the Digital Output on the BL67 is turned on.



Troubleshooting

Pactware

Problem	Issue	Resolution Steps
When starting Pactware, the project pane with "Host PC" is not shown.	The View properties don't always get saved. The project pane must be made visible again.	From the "View" menu, chose "Project" or press "F2" on your keyboard.
When trying to add the Ethernet communication, there are no Turck devices.	The BL DTMs are not installed or not updated in Pactware.	• Verify the BL DTMs are installed by checking "Add/Remove Programs". The DTM's are installed in separate installation package than Pactware. • If the DTM's are installed and still not visible, open the Device Catalogue in Pactware and click "Update Device Catalogue".
In Busaddress Management, there are no Ethernet Connections in the drop down list, it just says COM 1	BL Service Serial was chosen instead of BL Service Ethernet.	Delete the BL Service Serial from the Project list on the left. Right click on "Host PC"-> "Add Device" and choose the BL Service Ethernet.
In the Busaddress Management, there are no choices in the drop down list.	No Ethernet Connections available to Pactware.	Verify that there are Ethernet connections enabled on the PC by going to Start-> Settings->Network Connections.
In Busaddress Management, after searching for devices there are no choices in the list.	No Ethernet communication to BL67.	Verify communications using Ping commands. Commonly these issues are wiring or fireware related.

Red Lion HMI and Crimson

Problem	Issue	Resolution Steps
When downloading the HMI project, it errors saying "No acknowledge from target device."	No communication between the PC and the HMI.	From the "Link" menu, choose "Options". Verify the method of communication, recommended is USB.
Once the project was downloaded to the HMI, no data was displayed. The DI data was grey and displayed "_____"	No Communication between HMI and BL67.	• Verify PC can ping both HMI and BL67. • Verify Ethernet settings on HMI that it is enable and given and IP address. • Verify that the Modbus settings are set up properly. • Make sure the BL67 in the HMI software is setup with a different IP address than the HMI and PC.