INDUSTRIAL CONTROL DIRECT
A B&D Industrial Company

TRAINING

i^3 ...Display, Control, Communicate

Tutorial

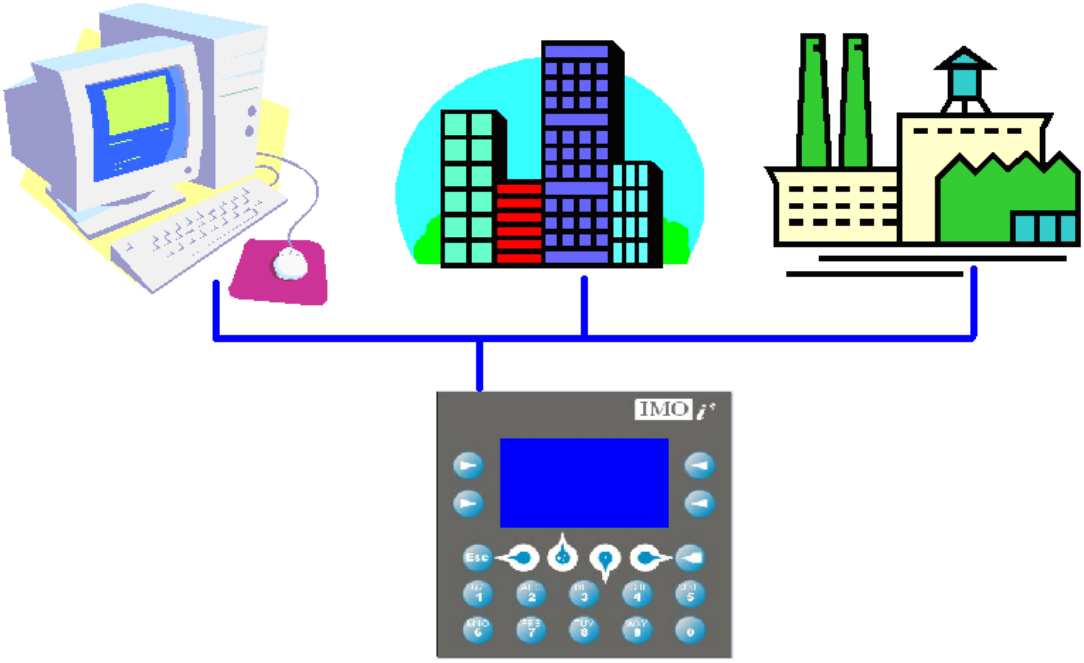
Ethernet Communication

IMO

Table of Contents

Introduction

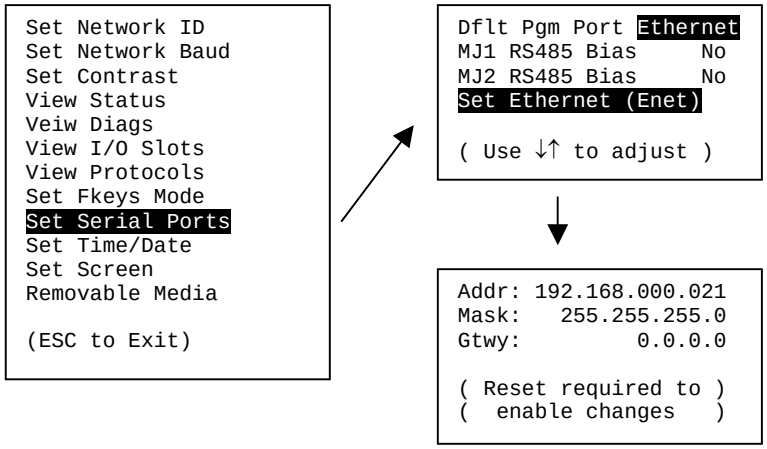
The purpose of this tutorial is to demonstrate the ***i***^{3} with the Ethernet port option card installed. In this tutorial we will configure several ***i***^{3}'s on an office/factory Ethernet network. We will demonstrate programming of and control of several ***i***^{3} on the network. We will also demonstrate by using the IMO OPC server ODIN, live data logging from the ***i***^{3} network.



Ethernet has historically been an office "IT" network but now industrial devices have been Ethernet enabled to unite the office and factory into one standard network. This allows for a flexible, fast and global network. Also as users of office networks are able to dial into their own secured network offsite, monitoring and maintenance can be performed remotely.

Configuring the i³ Hardware

Access to the main menu can be gained by pressing the UP and DOWN arrow on the ***i***³.



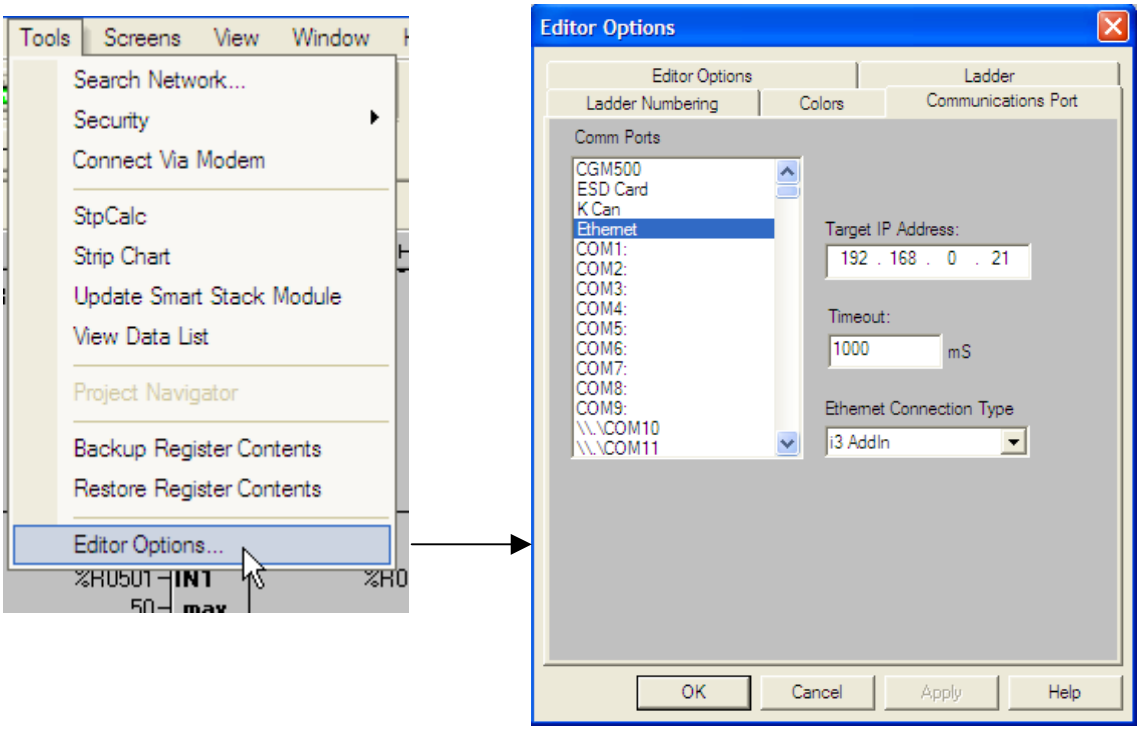
Once in the main menu, use the arrow keys to move down to Set serial ports and press enter.

Press enter on the Default programming port and change to Ethernet, then press enter.

Change the Ethernet addressing to suit your needs and remember to cycle the power of the ***i***³ before trying to use the new settings.

Connecting via i³-Configurator

Open the Configurator software. Select 'Tools' -> 'Communication Port'. Select the Ethernet option, input the correct IP address, and Set the Connection Type to ***i³*** Add-in.

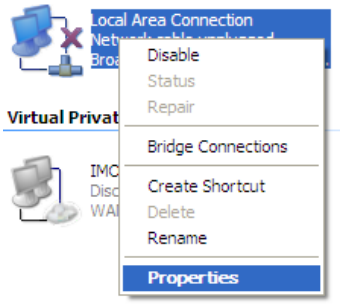


There will be a short delay while the connection is established. Then the traffic lights should show the current state of the ***i³*** Controller, as one will depress automatically. ie. 

If this does not happen then there is no communication, and all settings should be rechecked. Including the Target and Local network ID's if the ***i³*** is a CAN enabled type.

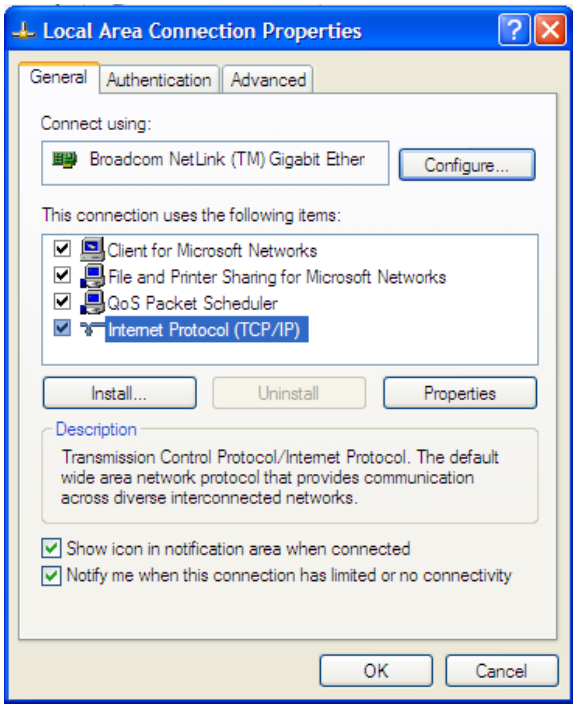
Connecting directly to a PC

If a direct RJ45 cable connection is required between a PC and the ***i***^{3} rather than connecting via a network hub or router, then the alteration of some Windows XP settings is required. This because neither the ***i***^{3} nor a PC uses a DHCP (Dynamic Host Connection Protocol), which automatically assigns a compatible IP address when a new device is detected on the network.

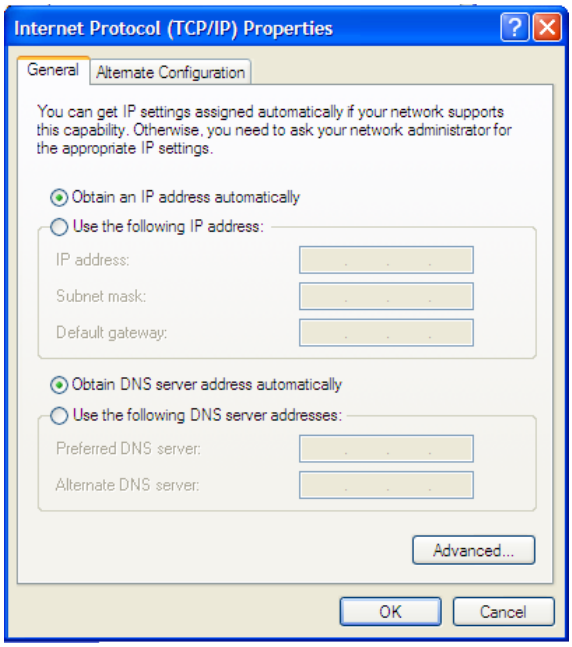


Open ‘Network Connections’ from the Start Menu, right click on your LAN connection and select ‘Properties’.

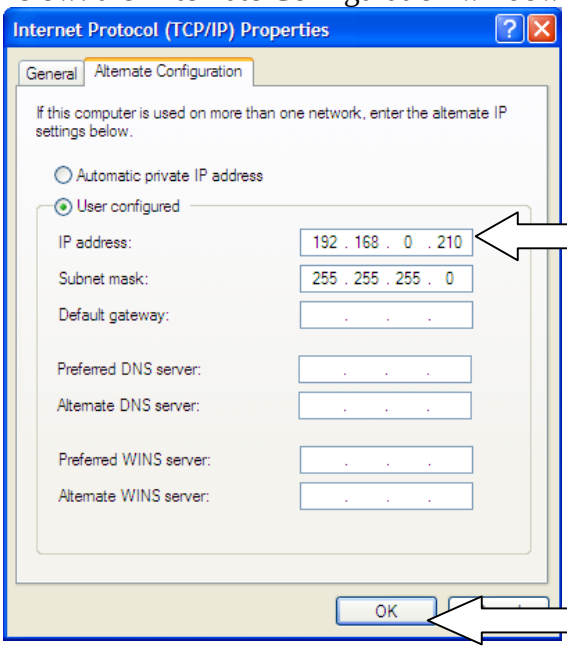
Opposite: This window or one like it should appear. Select Internet Protocol (TCP/IP) and click on the ‘Properties’ button.



Below: to allow the PC to still communicate with DHCP enabled devices, such as business or home networks, leave the ‘General’ settings for automatic configuration and select the ‘Alternate Configuration’ tab. The PC will automatically use these settings if no DHCP is detected.



Below: the Alternate Configuration window appears similar to the General.



Set to 'User configured' and make the last number of the IP address different to that of the all the ***i***^{3} controllers on the network.

Click on OK, then, also OK the 'Local Area Connection' properties window.

When the PC is plugged directly into the ***i***^{3} Ethernet card it will access the 'General' configuration first and wait for a DHCP response. Because there will not be one; it will switch to the 'Alternate Configuration' and set up the port using the 'User' settings. This will ensure that the ***i***^{3} and the PC have compatible IP addresses.
It may take up to a minute to establish an Ethernet connection in this way as the 'General configuration' has to time out before switching to the alternate. But this method has the advantage of still allowing the PC to connect automatically to a work or home network.

Programming Example

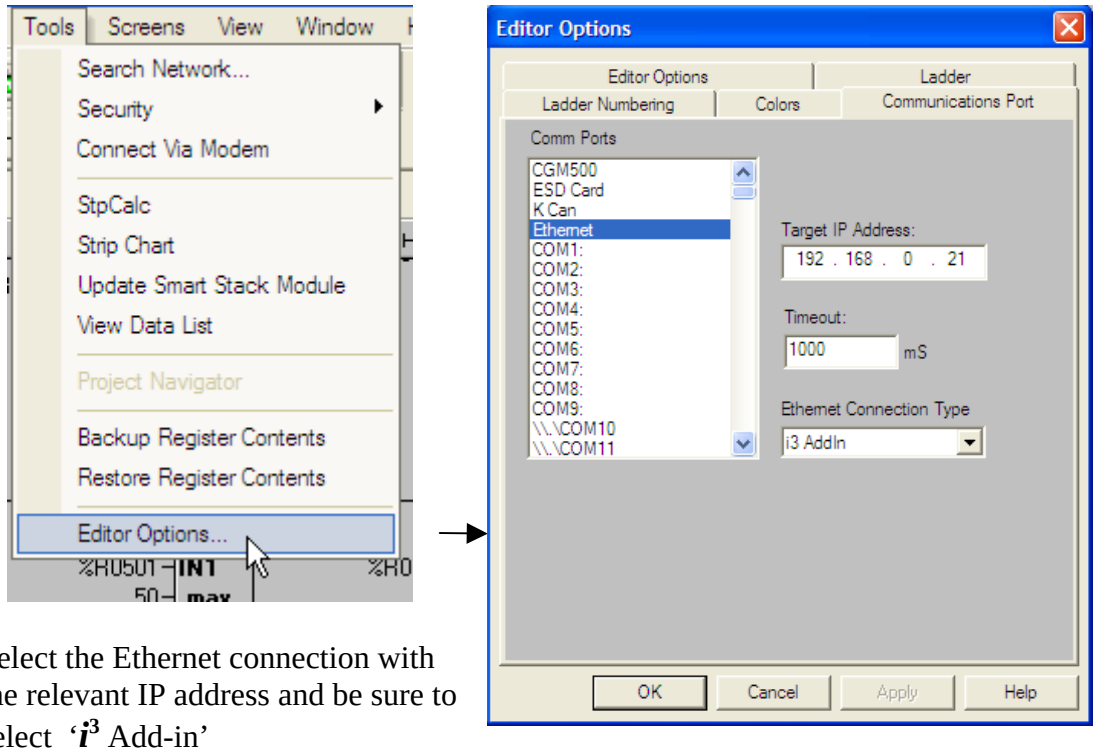
Example 1: i³ Demo Program connection through Ethernet

First we need to ensure that the ***i³*** has been configured to accept the Ethernet port for programming and that the address has been set correctly. Check through the main ***i³*** system screen to ensure that the Ethernet address is set, matching the IP address in the Communication Port options of the ***i³*** Configurator.

Connect the ***i³*** directly to your computer as described in the section of this tutorial dedicated to Direct Connection to a PC (If connected into an office network/router, this set-up should not be necessary)

Open the existing program i3_demo_program.csp.

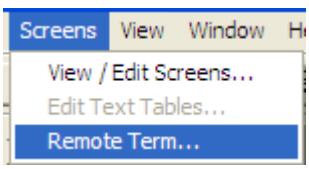
Now select the connection option from the option menu in the Tools drop down menu.



Select the Ethernet connection with the relevant IP address and be sure to select '***i³*** Add-in'

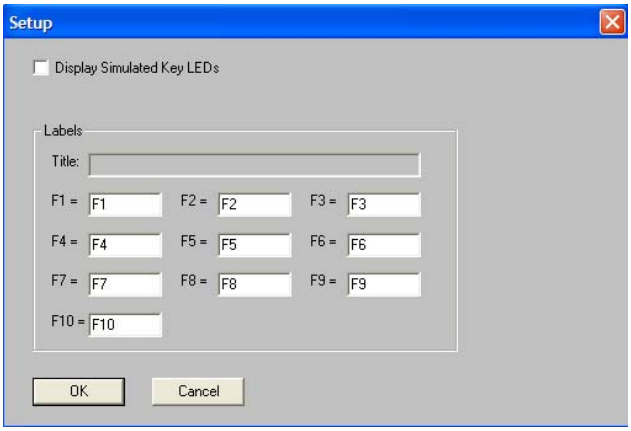
Once connected correctly the traffic lights will illuminate showing the correct state of the ***i³*** , i.e. RUN, STOP, IDLE.

Now we can program the ***i³*** as we usually would but this time instead of connection into a serial port we can connect the ***i³*** into the Ethernet port on the PC.
After downloading has been completed we now want to open the Remote Terminal Viewer. Select the Remote Term option from the screens menu.

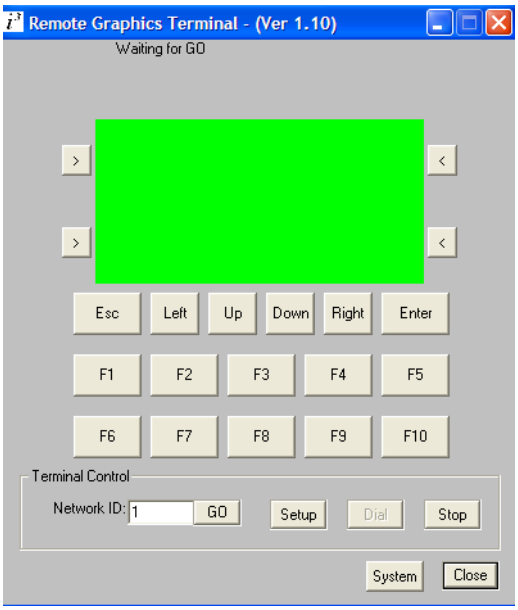


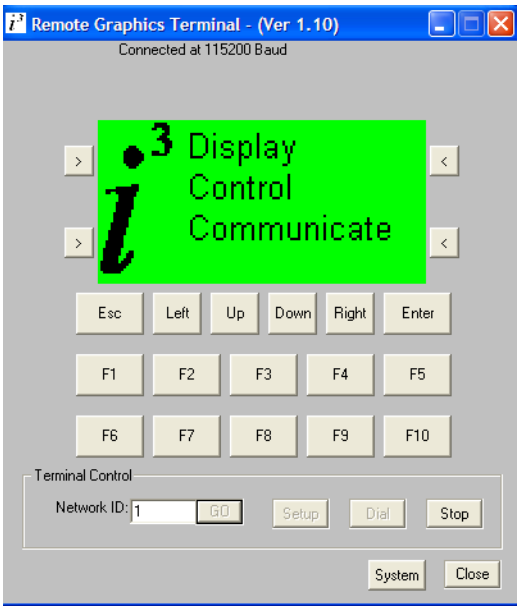
This will open a setup window that will allow the user to enter labels onto the front keys.

Click OK when done to continue forward.



This now takes the user to a simulated screen of the ***i***^{3}, (ensure that the ID matches the that of the ***i***^{3} if you are using a CAN version) click GO to start Viewing and controlling the ***i***^{3} live.





Click GO and now the user can remotely operate the ***i***^{3} through the remote terminal viewer. When the user presses a button on the screen with the mouse it will operate the ***i***^{3} as if the actual button had been pressed. This is a very useful tool for remote maintenance and operation.

Please see the example program i3_demo_program.csp.

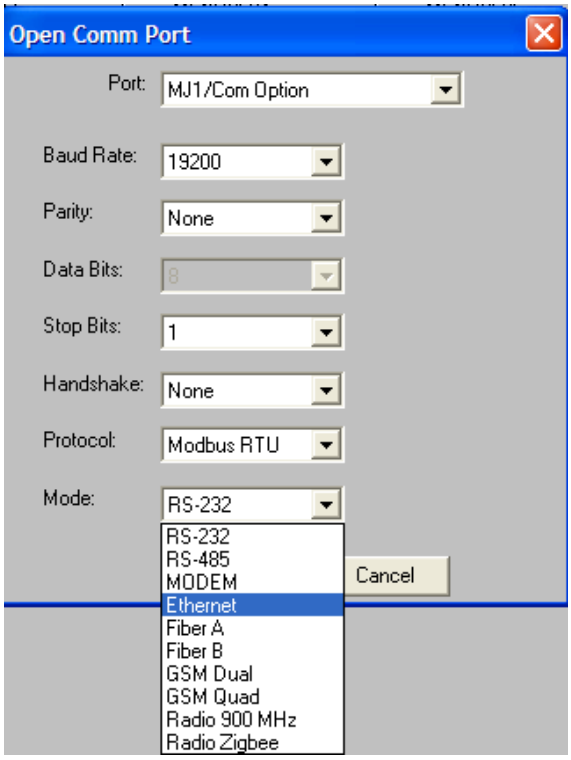
Example 2: i^3 communicating over Modbus through Ethernet

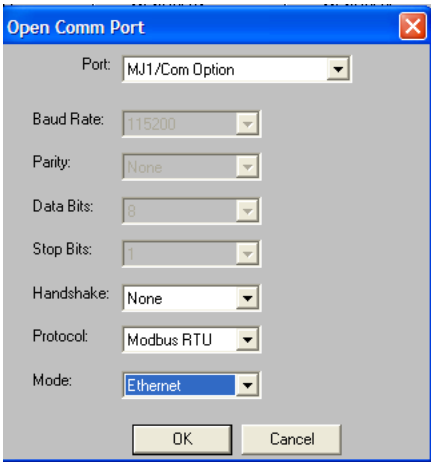
Program Configuration

In this example we will modify an existing program to demonstrate the data logging to Odin through Ethernet from the i^3. The program we are going to modify is from the tutorial "i^3 Logging Tutorial" and is named log-tut-comms.csp.

We are required to change on the last part of that program regarding the communications. We need to change it from serial communications to Ethernet.

We only need to change the Open Comm. Port function.

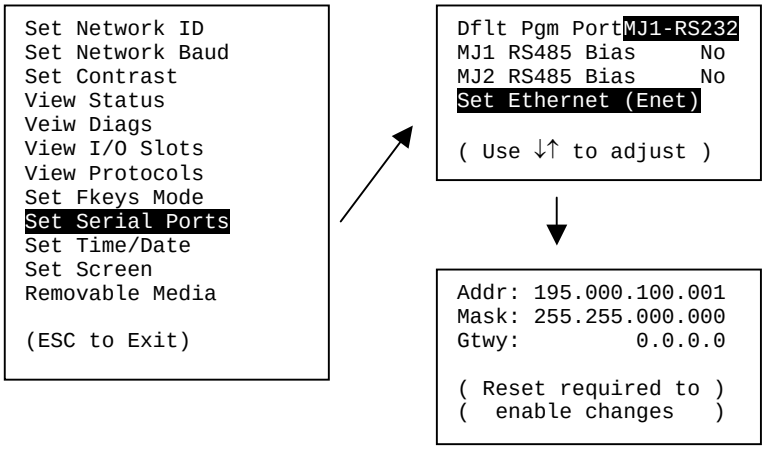




To edit the function, double click on it.

Select Ethernet from the Mode drop down menu and click ok to save and exit.

Now that has been changed in the program we can download this to the i^3. We need to ensure that the Ethernet settings through the main system menu in the i^3 have been set accordingly, these will need to match the Odin program.



Make a note of the Ethernet settings, as we will need to enter these details in the Odin program.

Once you have downloaded the program and set the ***i***^{3} into RUN mode the communication between the ***i***^{3} and ***i***^{3}-Configurator will time-out. To be able to program the unit, you need to put the ***i***^{3} into Idle mode through the Main system screen.

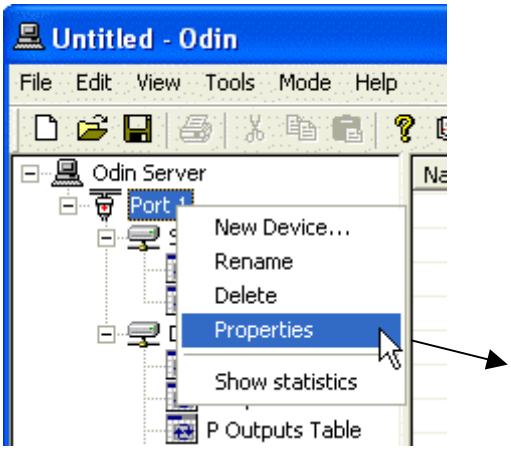
Please see the example program log-tut-comms-ethernet.csp.

Configuring Odin

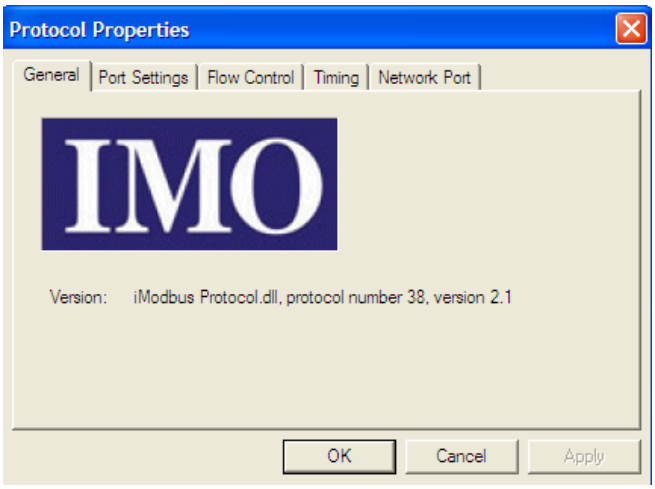
Start Odin by clicking on the icon and open the file i3-log-tut-Ethernet.wos.

The only difference between this file and the previous logging file is the port properties and the Device address.

To view the differences right click on the port and select properties.



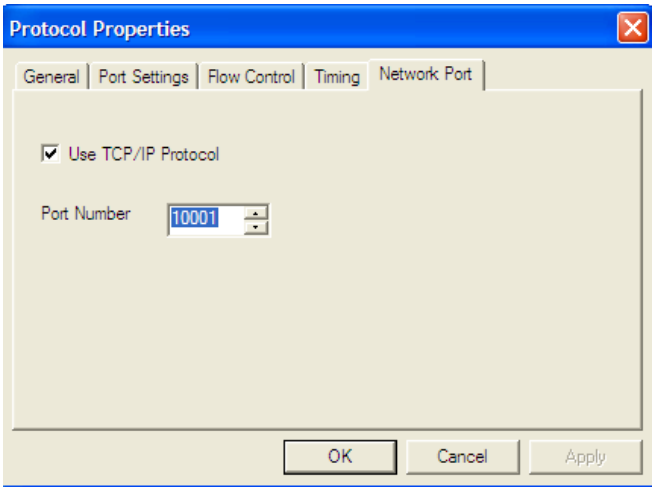
...next click 'Advanced'…



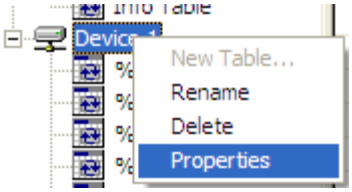
With the latest version of Odin (v2.02 and above) there is a forth tab to set a network port.

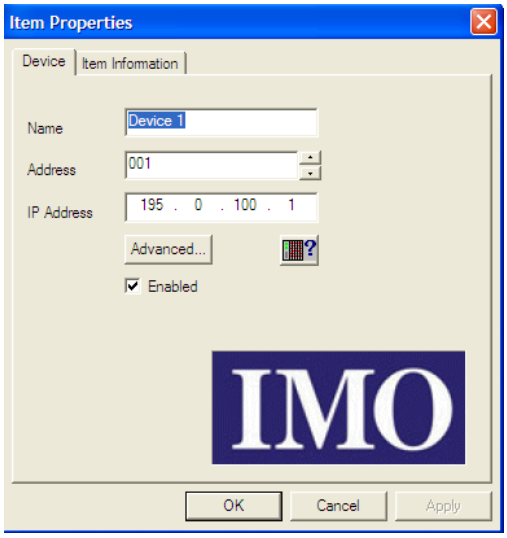
To use the Ethernet, the Use TCP/IP Protocol box needs to be checked.

Enter the port number of 10001. Click Apply, then OK to save and exit



Next we need to select the Device properties, right click on the device and select properties.

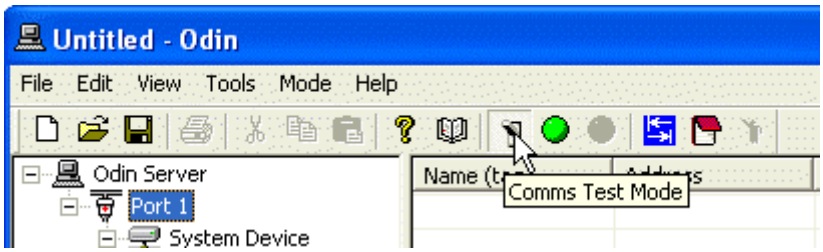




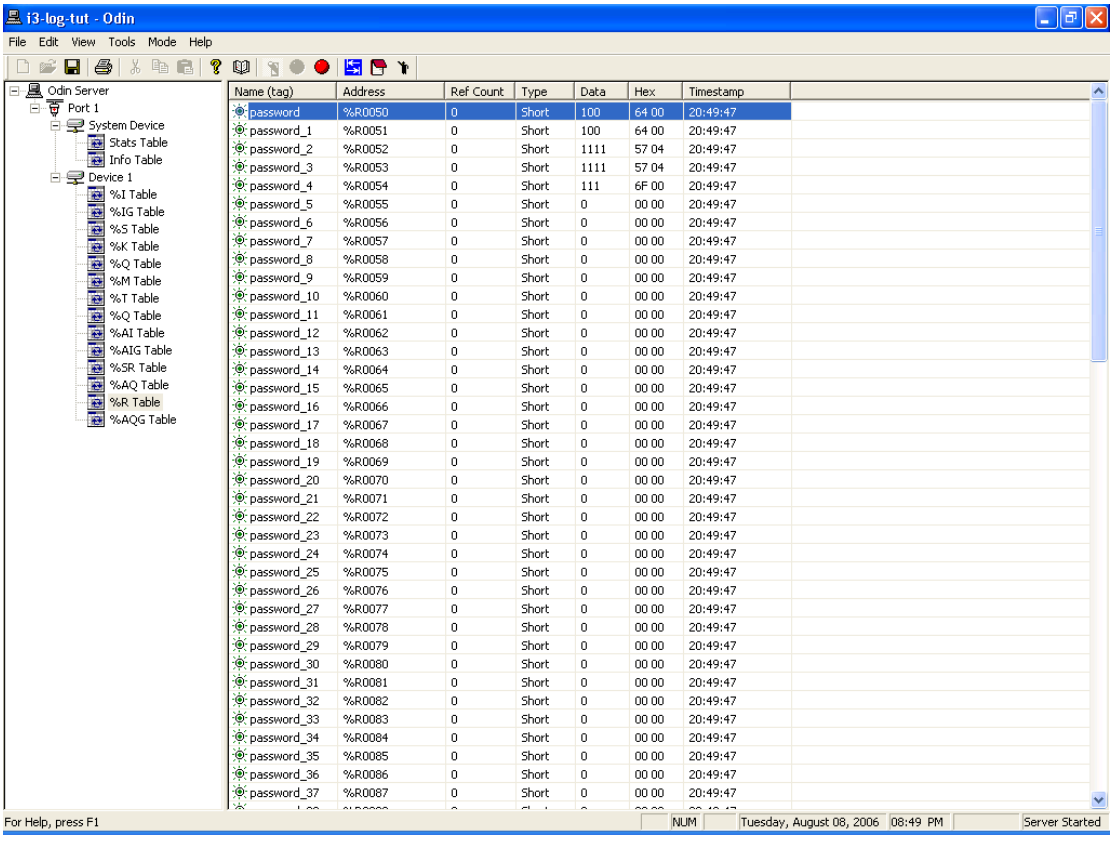
The device address and IP address need to match that which is on the i^3. Once completed click and Apply and then OK

Now save your configuration file, use ‘save as’ to save the file under your own name.

In order to test communications with your device, connect it to the PC as described in the above sections. Now click the ‘test’ mode button, and then the green start button on the toolbar.



Open up the tree on the left, to reveal the data tables within each device. Click to the tables to see the data that’s being read.



If data is being read correctly then the data items will have a green ‘LED’ next to them. If communications is down, then the LEDs are red. If you don’t have good communications then check your cabling and the port settings detailed above. All port settings should match the settings configured for your ***i***^{3}.

Make sure your configuration is saved and exit Odin. If you wish to configure LOKI to log the data then please follow the example set out in the ***i***^{3} Logging Tutorial.

IMO Precision Controls Limited
1000 North Circular Road
Staples Corner, London
NW2 7JP United Kingdom
Tel: +44 (0)20 8452 6444
Fax: +44 (0)20 8450 2274
Email: imo@imopc.com
Web: www.imopc.com

IMO Jeambrun Automation SAS
165 Rue Jean Jaures,
94700 Maisons Alfort
Paris, France
Tel: +33 (0)1 45 13 47 05
Fax: +33 (0)1 45 13 47 37
Email: info@imopc.fr
Web: www.imopc.fr

IMO Deutschland
Für weitere Einzelheiten
zu IMO Agenten und
Distributoren in Ihrer Nähe
schreiben. Sie bitte ein E-mail
an folgende Adresse:
imo@imopc.com

IMO Italia
Viale A. Volta 127/a
50131 Firenze, Italia
Tel: +39 800 783281
Fax: +39 800 783282
Email: info@imopc.it
Web: www.imopc.it

IMO Canada
Unit 10, Whitmore Road
Woodbridge, Ontario.
L4L 8G4 Cananda
Tel: +1 905 265 9844
Fax: +1 905 265 1749
Email: imocanada@imopc.com

PANEL
- Cam Switches
- Din Terminals
- Drives
- Enclosures
- Fieldbus remote I/O
- Isolators & Switch Fuses
- MCB & RCD
- Motor Circuit Breakers
- Motor Control Gear
- Panel Meters
- Relays
- Signal Conditioning
- Sockets
- Timers
- Transformers & Power Supplies

MACHINE
- Drives
- Intelligent Terminals/HMI
- Limit Switches
- Photoelectric Switches
- PLCs
- Proximity Switches
- Temperature Controls

PROCESS
- Data Acquisition & Control
- Drives
- Intelligent Terminals/HMI
- Limit Switches
- Photoelectric Switches
- Proximity Switches
- PLCs
- Signal Conditioning
- Temperature Controls

SAFETY
- Lightguards
- Safety Limit Switches
- Safety Relays

IMO JAGUAR DRIVES
- Jaguar VXM 0.37-500kW
- Jaguar VXSM 0.37-7.5kW
- Jaguar CUB 0.37-2.2kW

PCB EMECH
- Audible devices
- Chip-on-Board
- Device programmers
- LEDs & 7 seg. displays
- PCB Terminal blocks
- Relays - automotive
- Relays - power
- Relays - signal
- Switches

All IMO products are tried, tested and approved to relevant international quality standards

nqa. ISO 9001 Registered · UKAS · 3 YEAR GUARANTEE · 5 YEAR GUARANTEE