IMO

i^3

…Display, Control, Connect…

User Guide

IMO

i^3

User Guide

Introduction to i^3

The i^3 is a brand new concept in control product. It is a combination of a mini-PLC and HMI (pixel based 128x64 backlit LCD display). It is a cost effective family of high performance all-in-one controllers.

The i^3 features an advanced control engine, operator interface, local and remote I/O capabilities, and a variety of communications options. The i^3 is extremely versatile and adept at a variety of automation functions.

The i^3 can be used to perform advanced machine control, factory machine monitoring, and process control.

Guide to Part Numbers

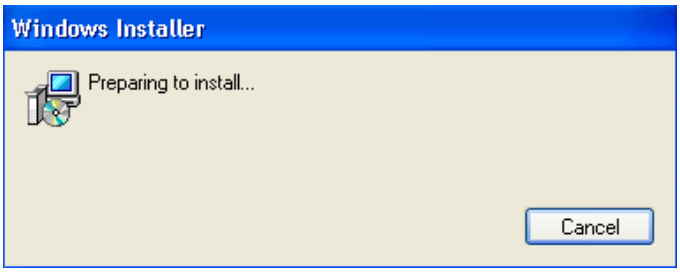
Model Number	Digital Inputs	Analogue Inputs	Digital Outputs	Analogue Outputs	HSC	PWM	CAN
i3A12X/10A01-SOO	12	**1 x 10 bit**	6 Relay		4		No
i3A12X/10D03-SCH	12	**4 x 10 bit**	6 Relay		4		Yes
i3A12X/10B04-SCH	12	2 x 10 bit	12x.5A		4	2	Yes
i3A12X/20B05-SOH	24	2 x 10 bit	16x.5A		4	2	No
i3A12X/13C14-SOH	12	2 x 14 bit	12x.5A	2 (V or mA)	4	2	No

Installing i^3 Configurator Software

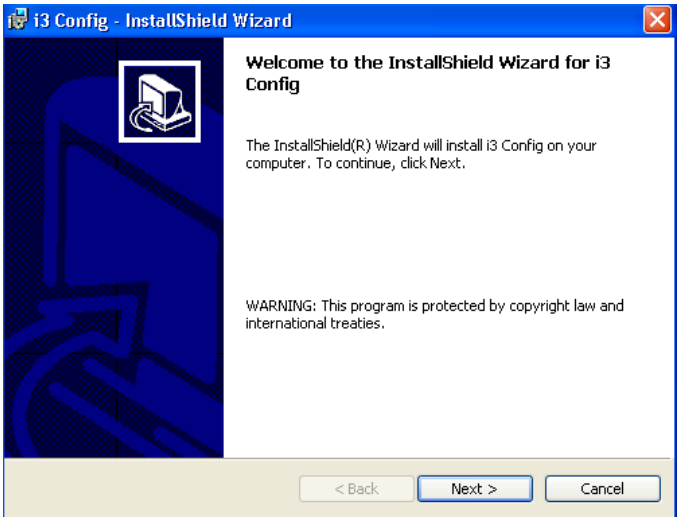
The IMO i^3 Configurator software can be obtained from a CD or download from the i^3 Configurator software from the IMO website: www.imopc.com

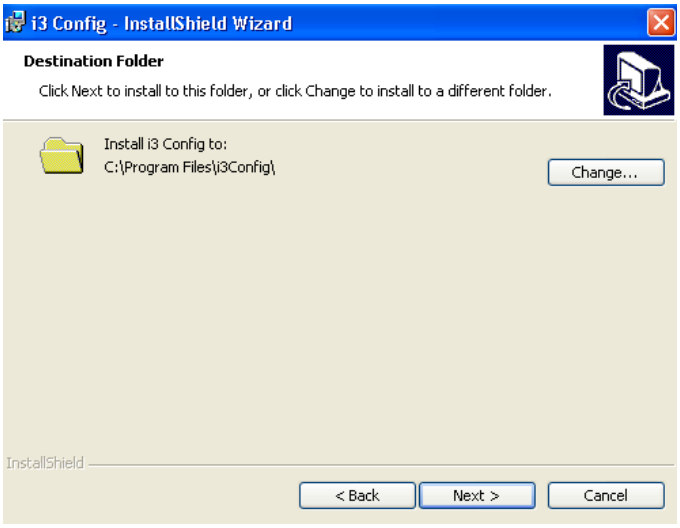
Double click on the icon 

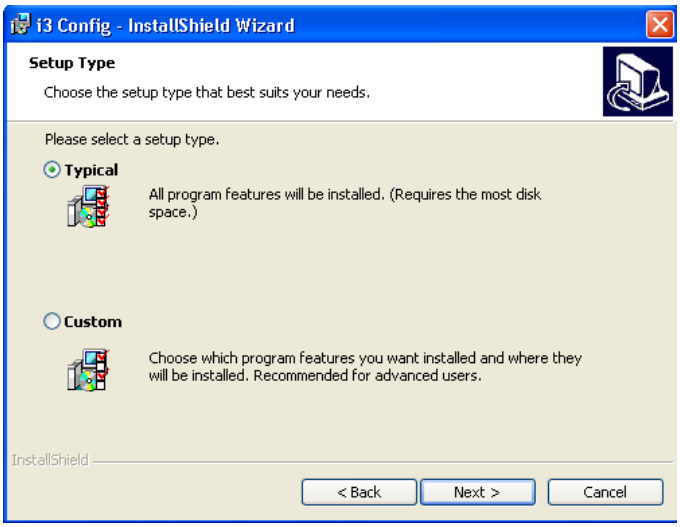
with the right mouse button to open the installation program.

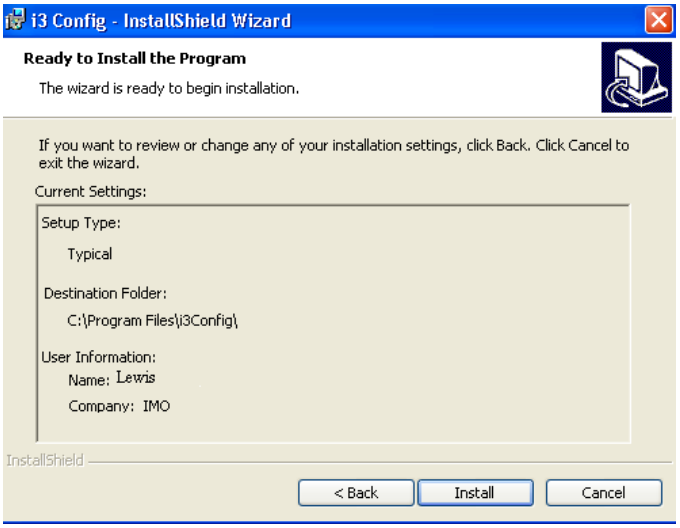


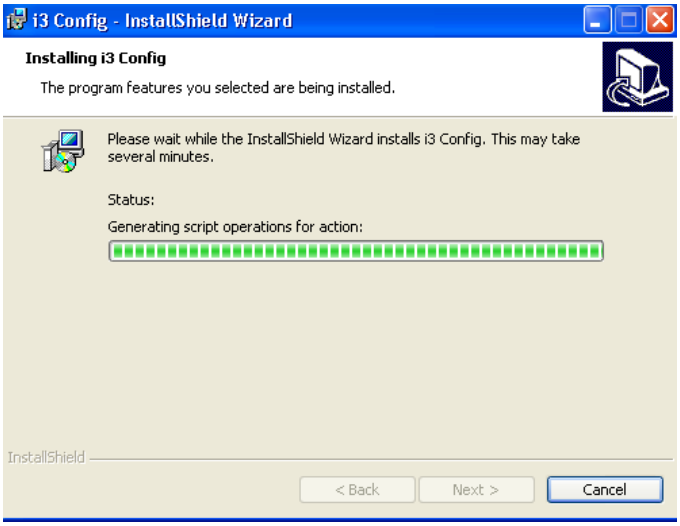
Follow the steps in the installation wizard to install the i^3 Configurator to your PC.

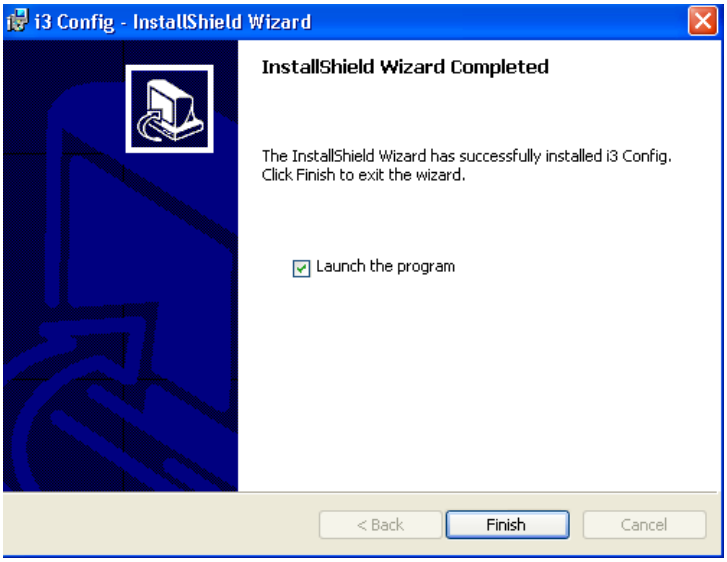








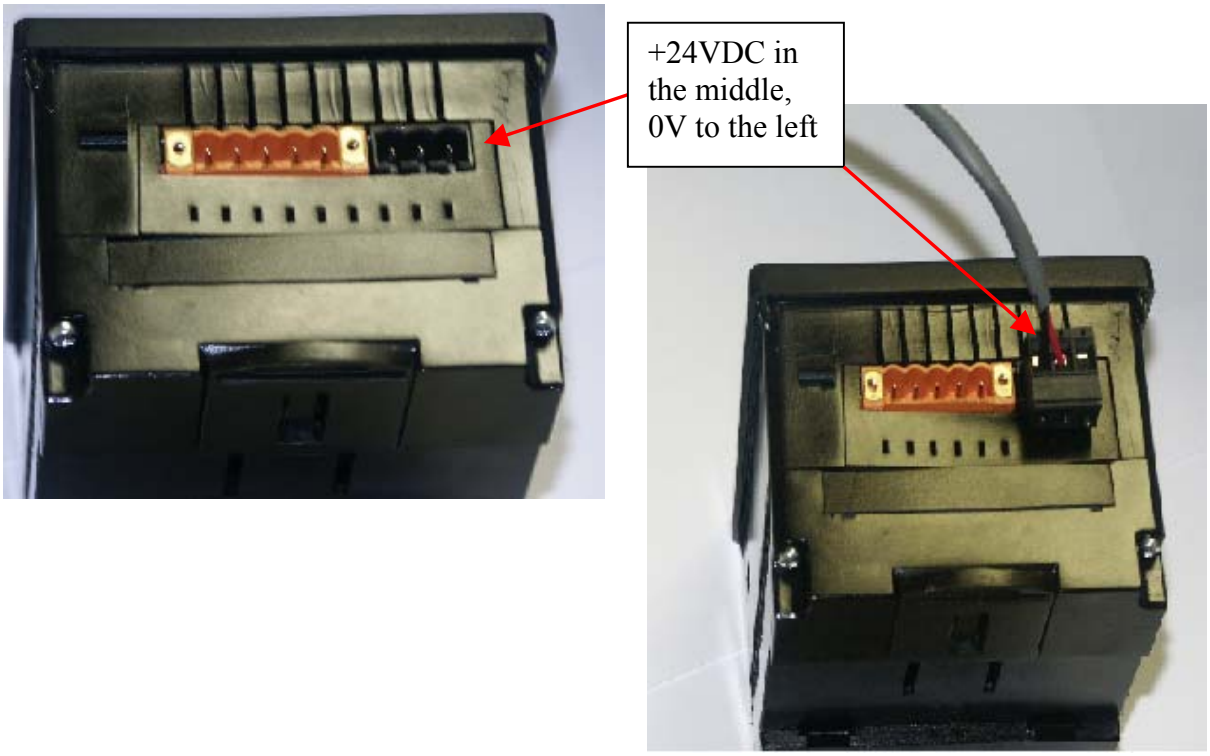




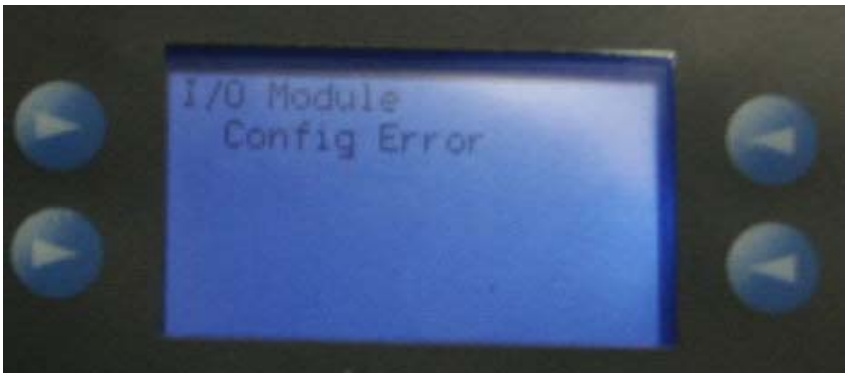
Tick the “Launch the program” box and click Finish.

Powering up and Connecting to an i^3

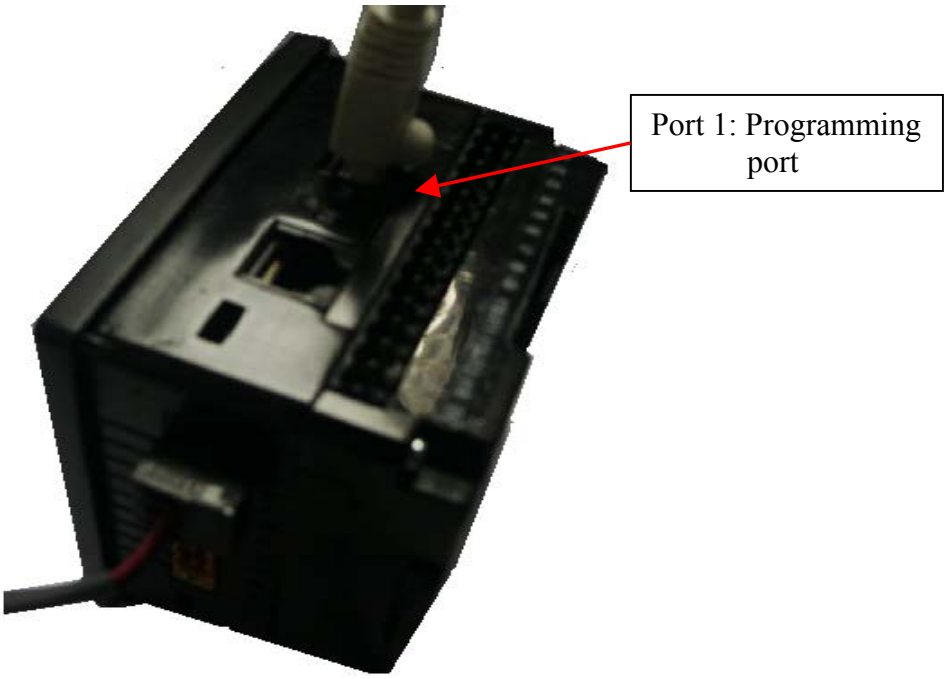
Connecting power to the i^3



When power is applied the i^3 will then run a system diagnostic before running the user program.



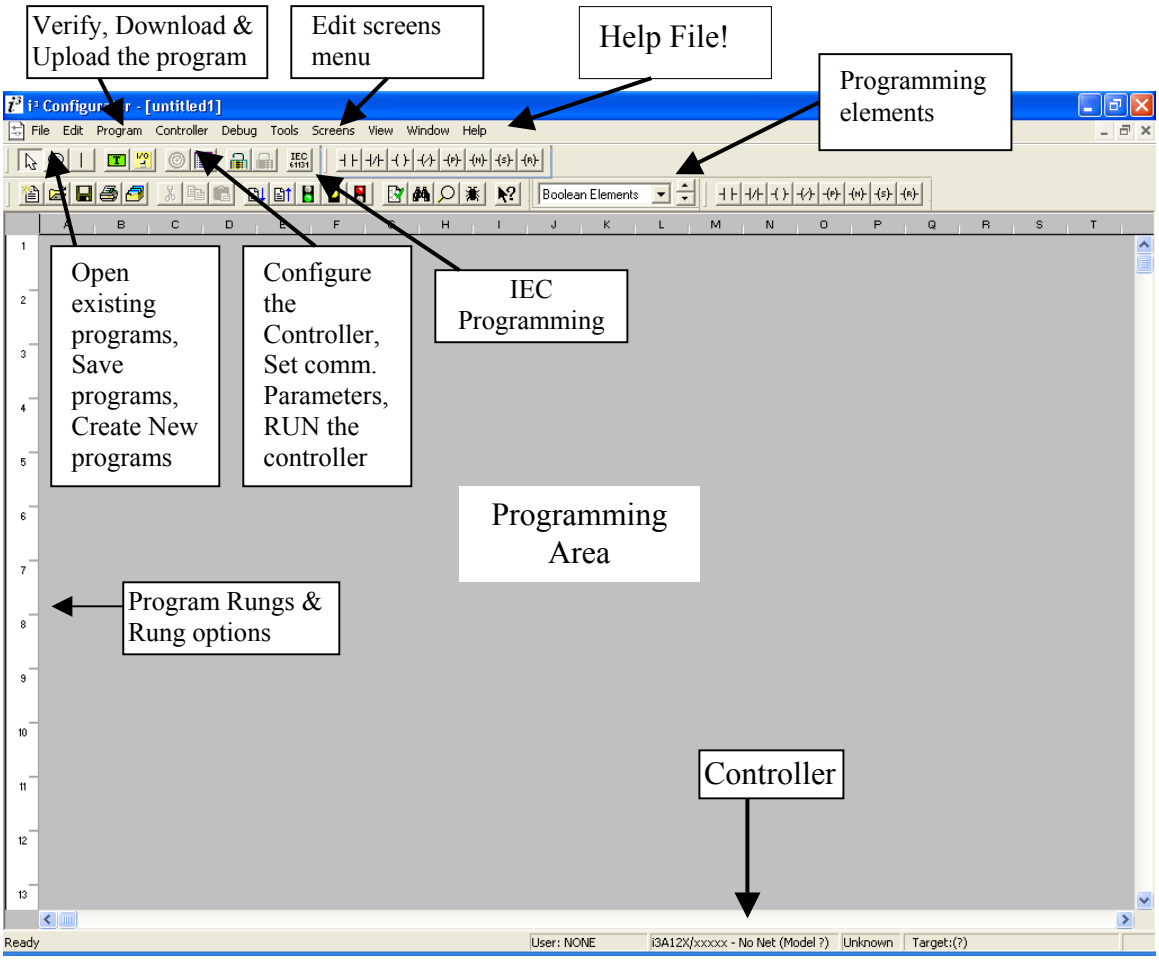
To connect the i^3 to a PC, connect the i3-PC45, RJ45 end into port 1 of the i^3 and the 9 pin serial connector into the serial port of the PC (or USB to Serial adaptor).



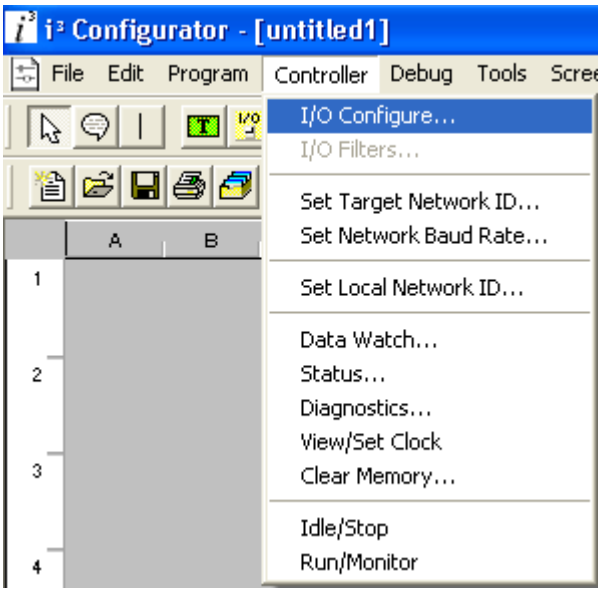
Tour of the i^3 Configurator

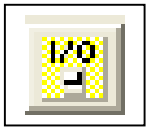
To launch the i^3 Configurator program, either select the option from the Programs menu in Windows or double click the icon on the desktop with the right mouse button.

The program is launched and we are faced with a blank new program named "untiled1.csp".



With an ***i***³ connected it will automatically link to the ***i***³ configurator software and set up the Controller, however it is best to check.



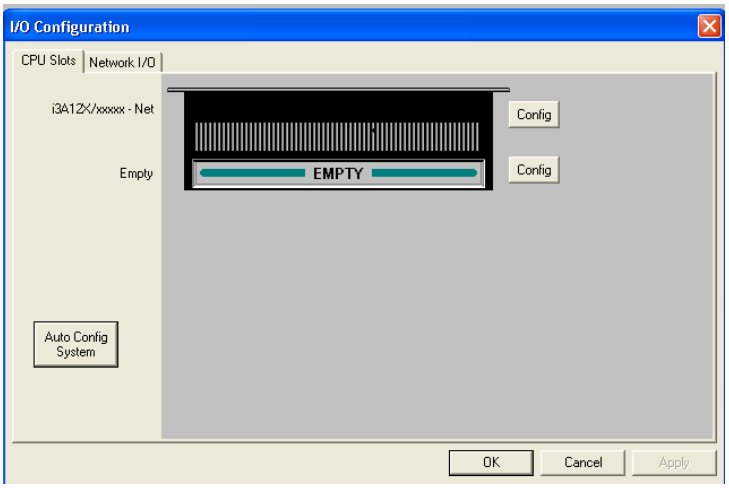


Click the icon or select from the Controller menu "I/O Configure"

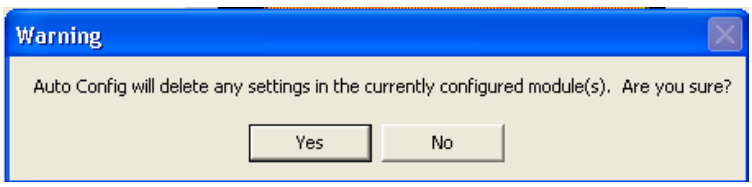
There are two ways to configure the controller, manually or automatic.

With an ***i***³ connected to the PC the easiest method is to Auto-Config.

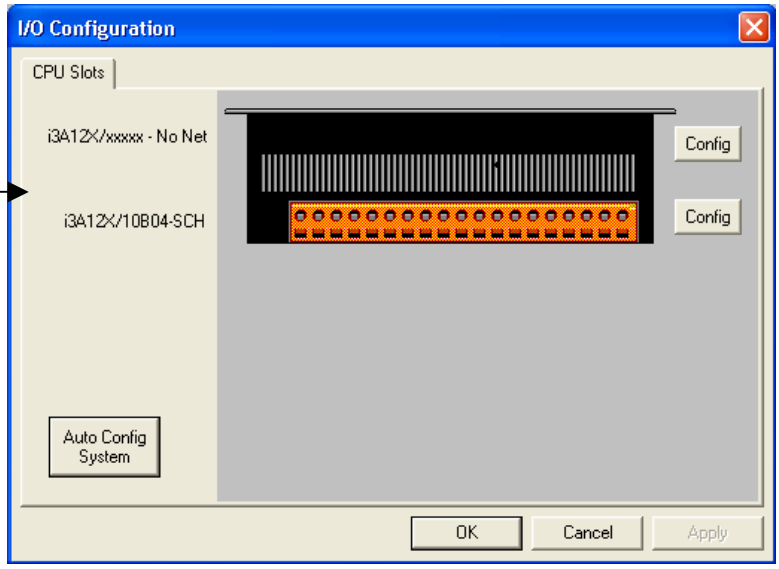
Automatic



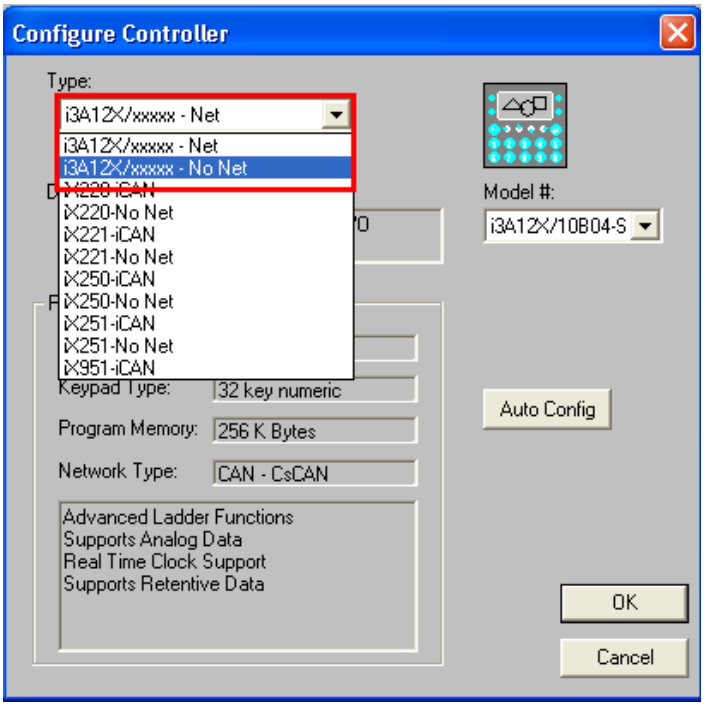
Click on the Auto-Config button. A warning pop up will appear, click Yes.



Correct type and model have now been set up



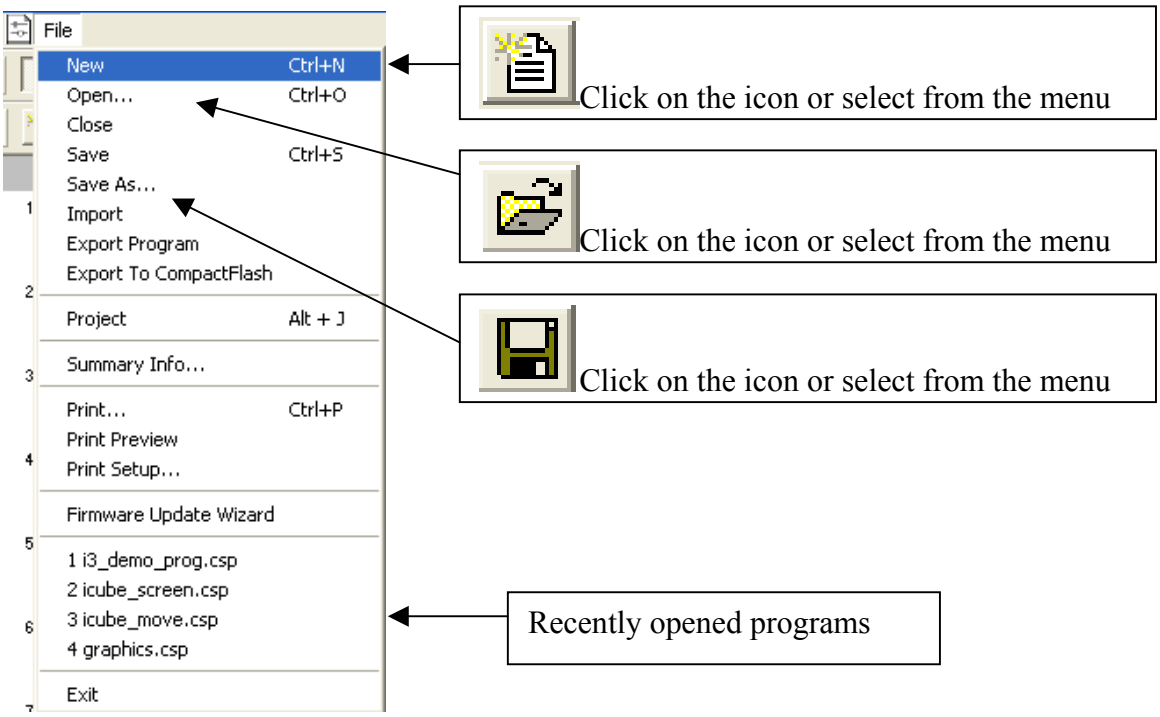
Manual



To configure the Controller manually click on the Config button with the right mouse button and then select the type of controller from the pull down list. Then select the correct model number.

Creating a Program

Creating a New program, Saving a program or Opening an existing program, all done in the file menu.



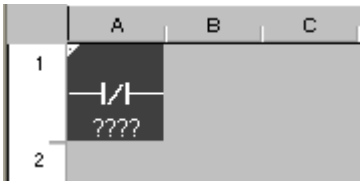
The program file name format is “program_name” followed by the extension .csp
For example, program_name.csp

Example

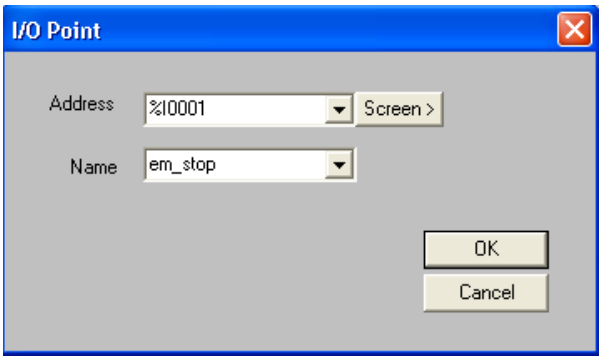
Create a new program and save it. Name the program “bestofbothworlds”.csp

Select the Boolean elements and right click the mouse on the NC contact.

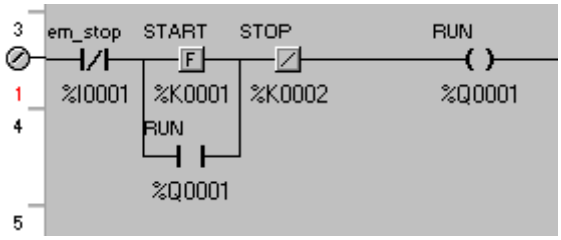
Insert it at A1.



Insert the following detail into the contact

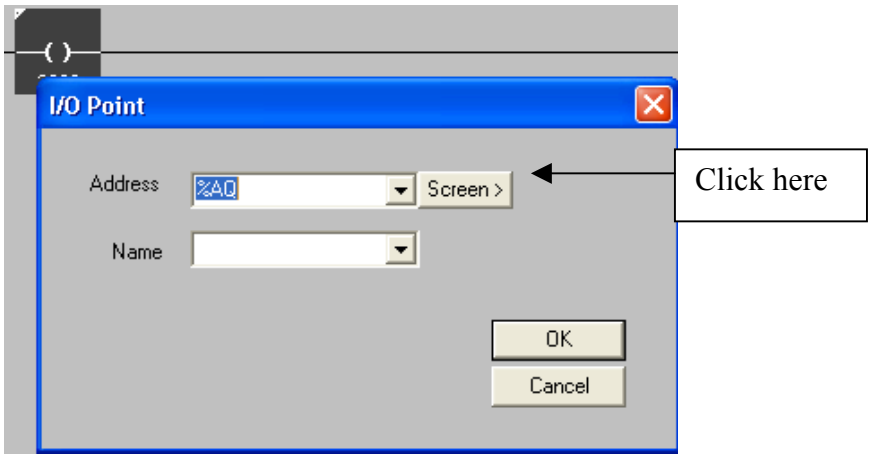


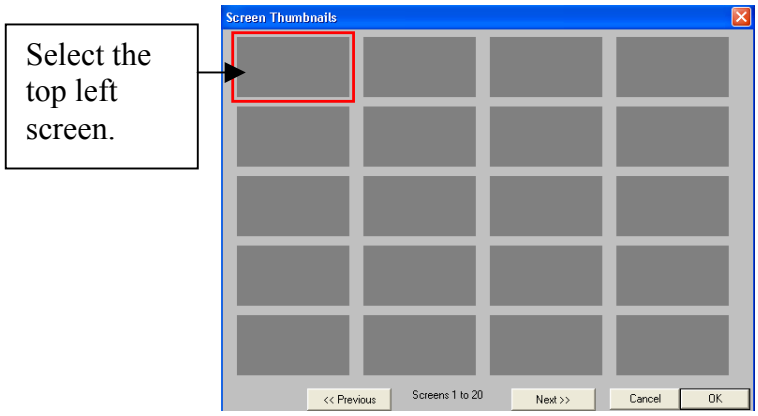
Now using the Boolean elements insert contacts and coils to make the following latching ladder diagram.

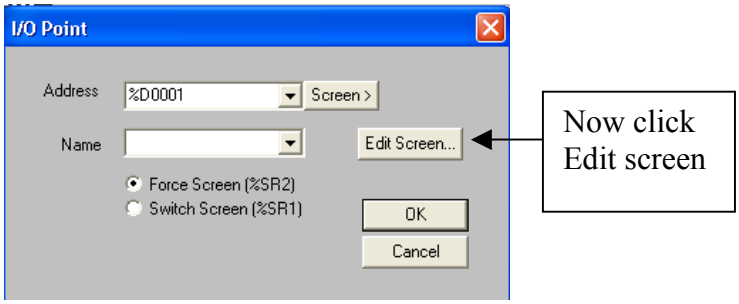


Variable Name	Address	Type
EM_STOP	%I0001	NC CONTACT
START	%K0001	NO Function Key
STOP	%K0002	NO Function Key
RUN	%Q0001	NO Coil & Contact

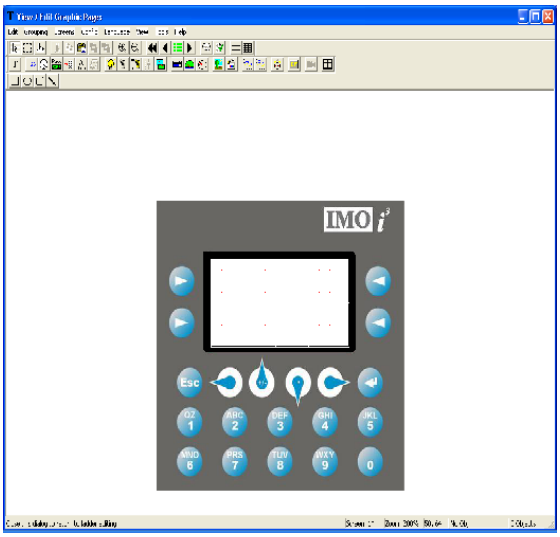
Now select another NO coil and insert it to the right of the RUN coil. When the I/O point menu pops up, click the screen button.





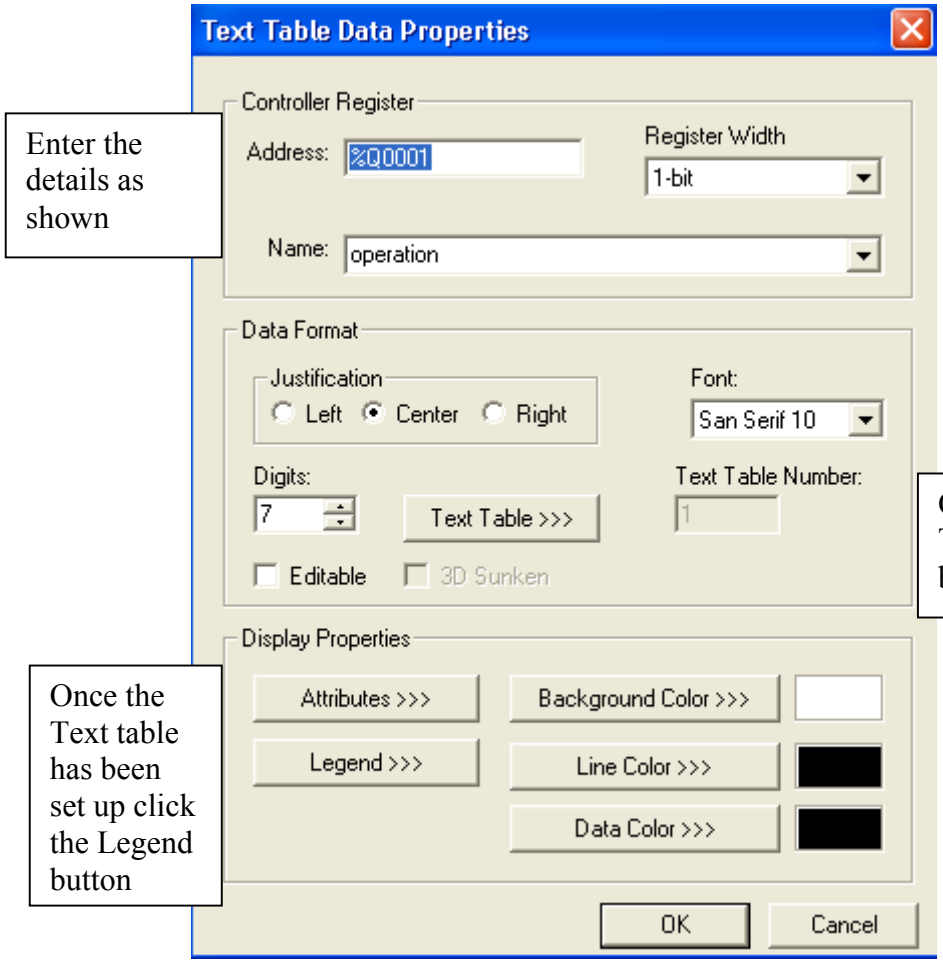


This will open up the screen editor.



Select the Text Table button and right click on the screen.

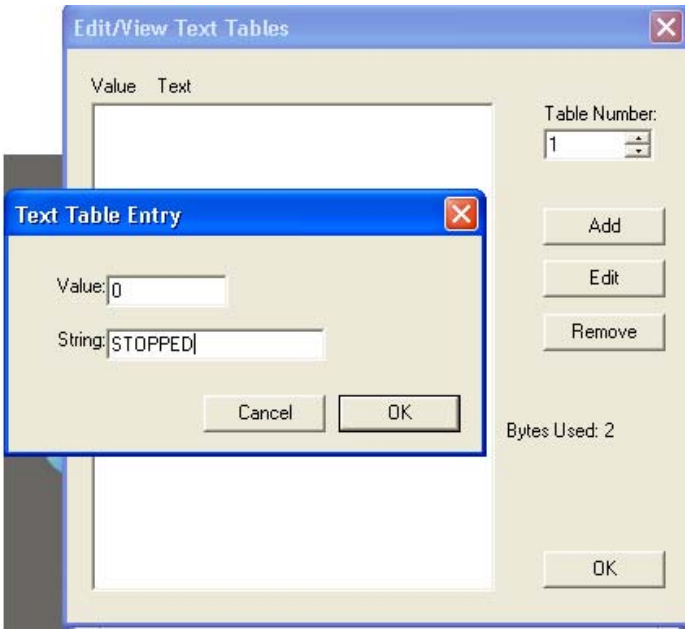
Double click on the word box to open up the properties.



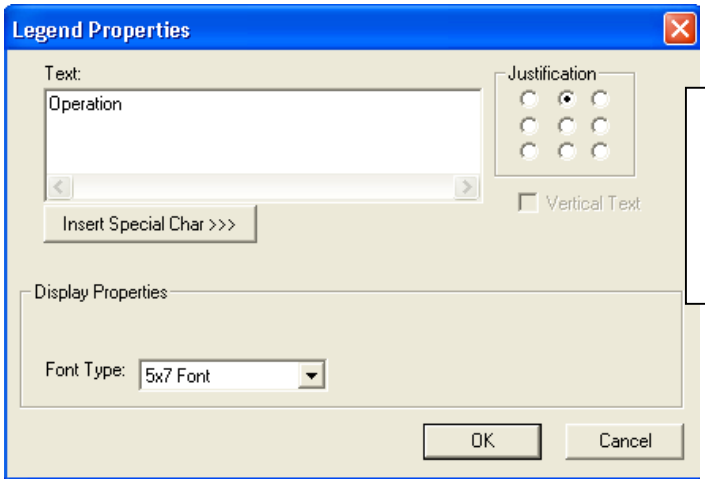
Enter the details as shown

Click on the Text table button.

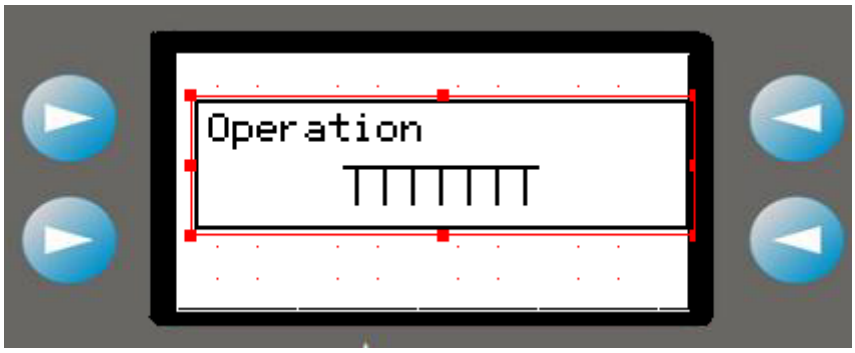
Once the Text table has been set up click the Legend button



Click Add and assign the string STOPPED to the value 0, Click OK. Click Add again and assign the string RUNNING to the value 1. Finally click OK to exit the Text Table Entry.



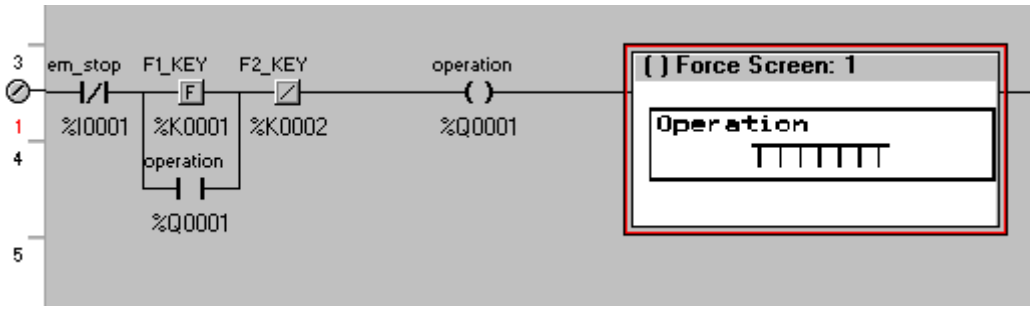
Delete the default text and enter the details shown. Click OK.



The Text Table box may need to be resized. Click and hold on the edge of the box and drag bigger

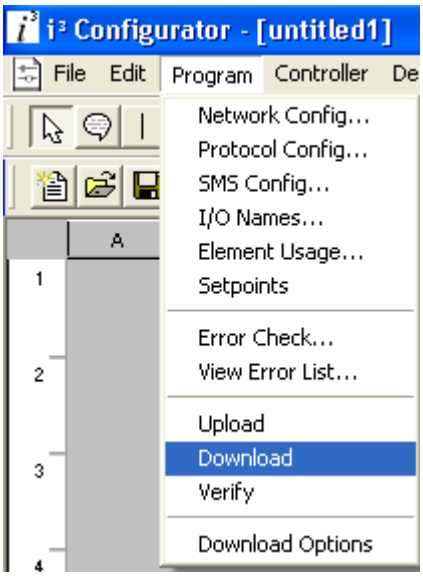
Now close the graphic edit by clicking on the cross at the top right of the window. Click OK and the I/O point pop up window

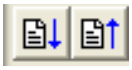
The ladder diagram will now look like the diagram below.



Program Options

Downloading, Uploading and Error Checking the program.

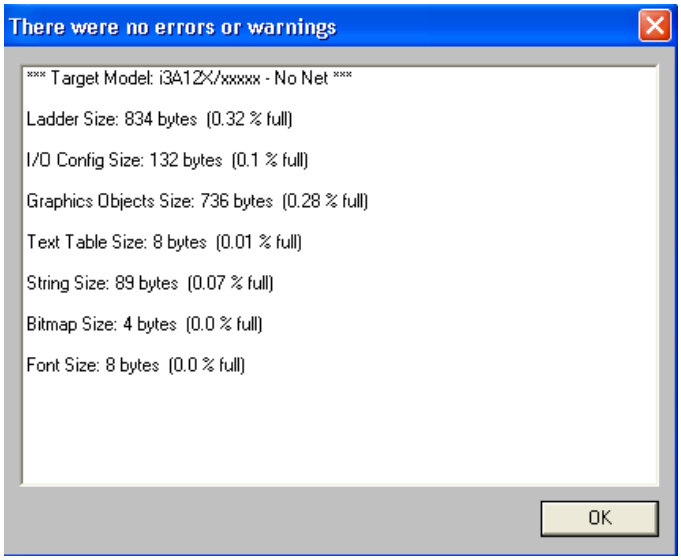




To Download or Upload from the i3 either select the options from the menu or click on the icon.

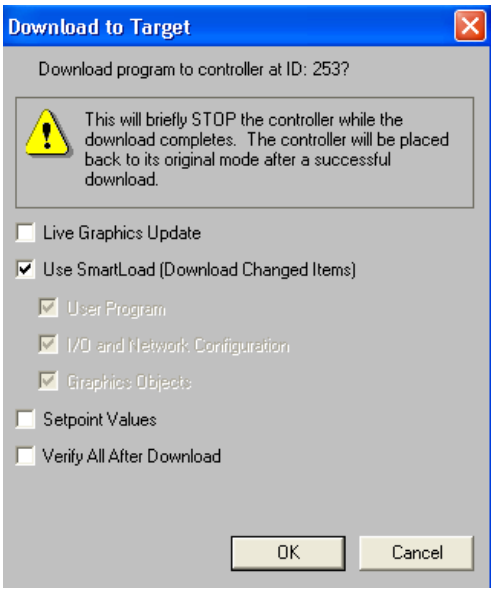
It is a good idea to Error Check the program before downloading. Click the icon or select from the menu.

The error check gives the user a report on the project and lists any errors found.

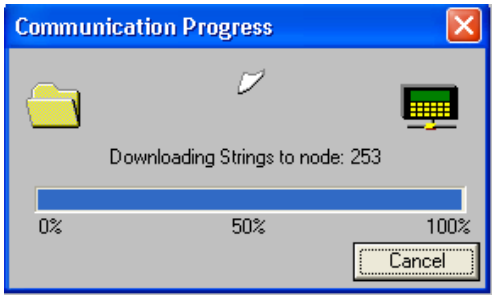


Example

First Error Check the program you just created and then download it to the controller.

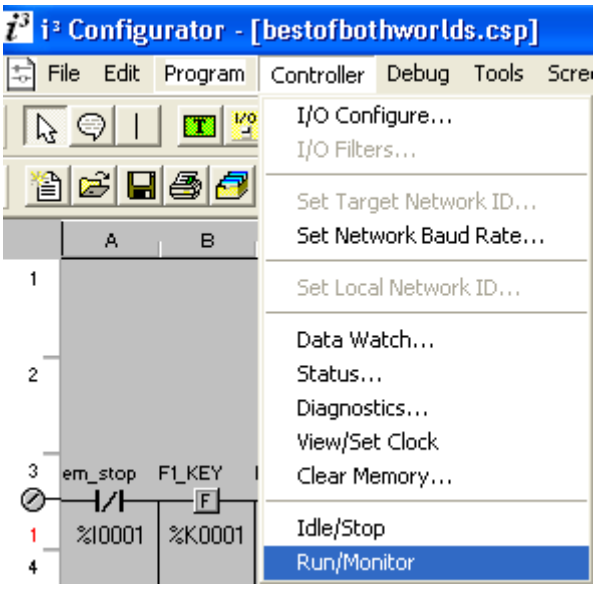


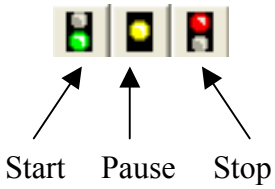
Tick the Use SmartLoad and click OK.



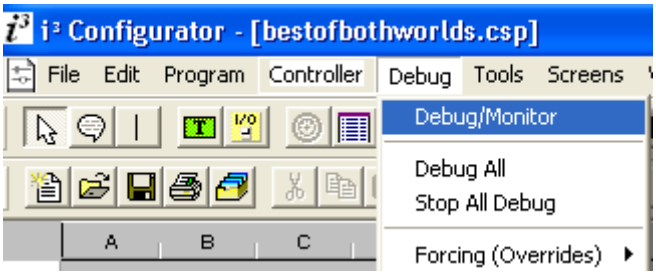
Running and Monitoring the *i*3 Program

The i^3 will be by default in STOP mode and requires to be put into RUN mode for the programmed i^3 to operate.



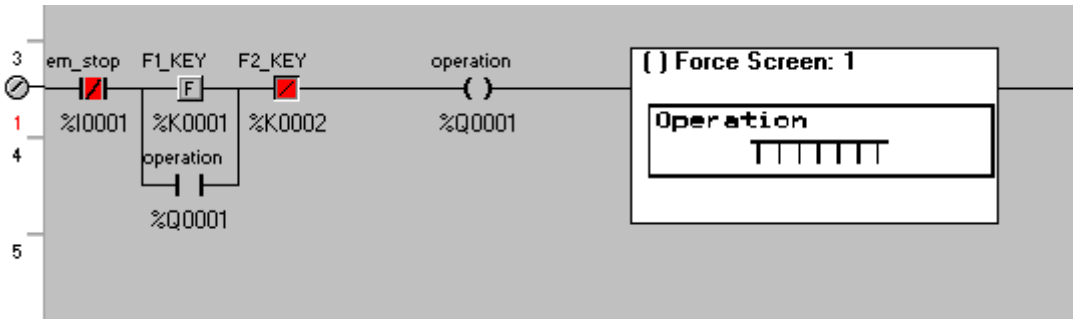


Either use the icons or select from the menu.



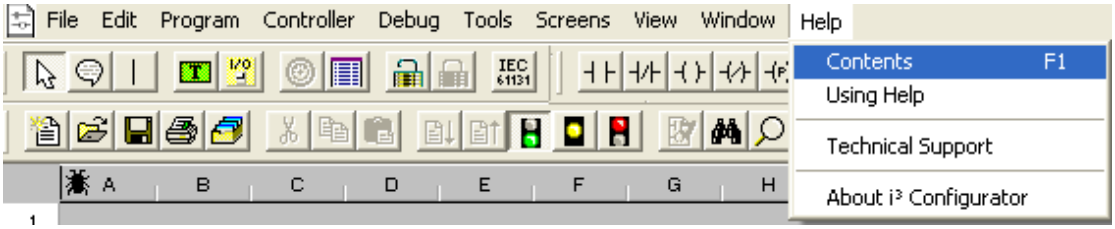
To Monitor the RUNNING program either select from the menu or click the icon.

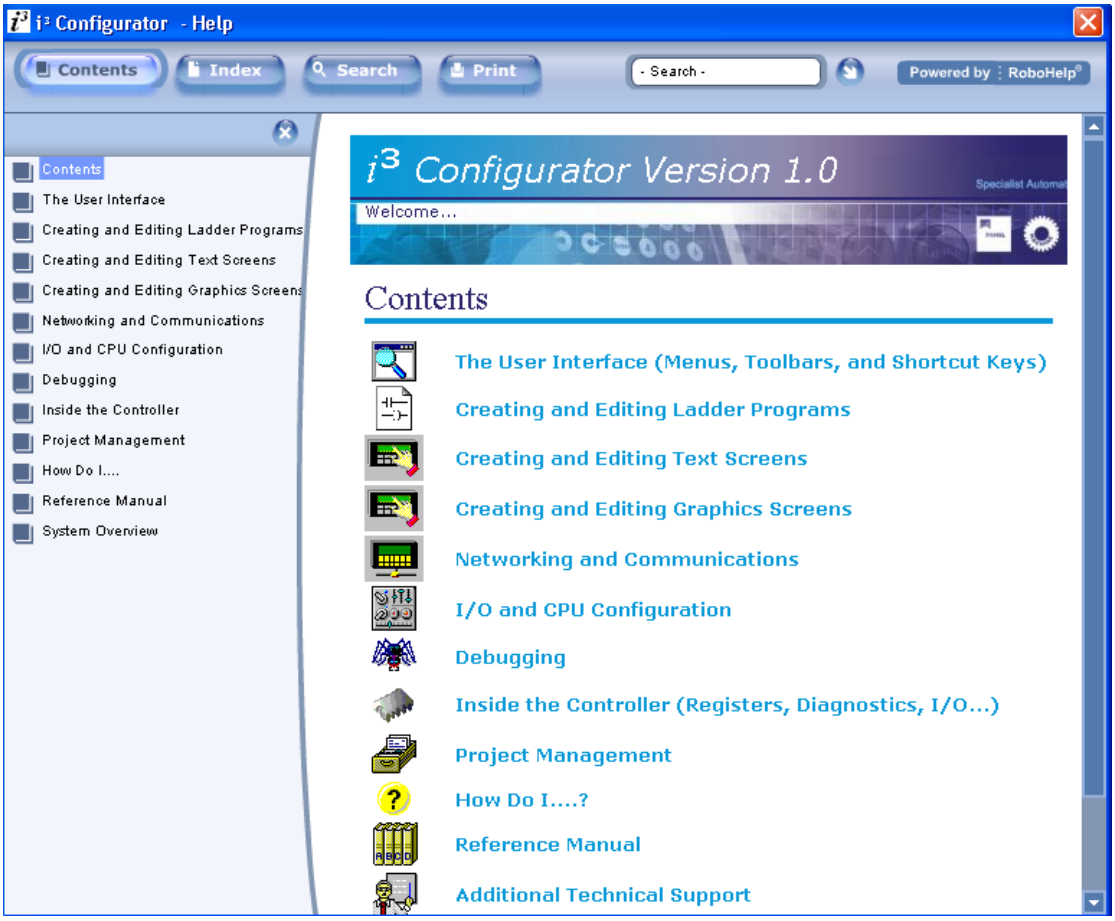
When the program is being monitor, made contacts and coils are shown in red.



i^3 Help File

The help file is extensive and explains all that there is to know on the i^3, to open the Help file, either use the menu or press F1.





Appendix A: Data Types

BOOL - Boolean; A single bit. '0' or '1', a.k.a 'FALSE' or 'TRUE'

BYTE - Byte; 8 consecutive bits. Byte format is used more where the value of the data is not as important as the bit patterns (shifts and rotates).

WORD – Word; A string of 16 consecutive bits. Word format is used more where the value of the data is not as important as the bit patterns (shifts and rotates).

DWORD - Double Word; A string of 32 consecutive bits. DWORD format is used where the value of the data is not as important as the bit patterns (shifts and rotates).

INT – Integer; A 16-bit signed value. Integers are used where the value of the data is expected to be in the range of -32,768 to +32,767

SINT - Short Integer; An 8-bit signed value. Short Integers are used where the value of the data is expected to be in the range of -128 to +127.

DINT - Double Integer; A 32-bit signed value. Double Integers are used where the value of the data is expected to be in the range of -2,147,483,648 to +2,147,483,647.

UINT - Unsigned Integer; A 16-bit unsigned value. Unsigned Integers are used where the value of the data is expected to be in the range of -0 (zero) to 65,535.

USINT - Unsigned Short Integer; An 8-bit unsigned value. Unsigned Short Integers are used where the value of the data is expected to be in the range of 0 (zero) to 255

UDINT - Unsigned Double Integer; A 32-bit unsigned value. Unsigned Double Integers are used where the value of the data is expected to be in the range of 0 (zero) to 4,294,967,296.

REAL - Floating Point; A 32-bit value. Values are stored and operated on in IEEE single precision (six digit) format. Values range from -3.40282E+38 to +3.40282E+38.

STRING – String; A variable-length succession of characters. Each character is represented by one byte.

Appendix B: i^3 Register Types

Type	Description and example of use	Format	Retentive	#Available
%I	Discrete Inputs from the field; prox sensors, panel buttons, etc	BOOL	YES	2048
%Q	Discrete Outputs to the field; relays, indicator lamps, etc.	BOOL	NO	2048
%AI	Analog Inputs from the field; Thermocouples, 4-20mA inputs	WORD	YES	512
%AQ	Analog Outputs to the field; 0-10VDC or 4-20mA outputs	WORD	NO	512
%IG	Global Discrete Inputs from the CAN; in from other OCS	BOOL	YES	64 per node
%QG	Global Discrete Outputs to the CAN; out to other OCS	BOOL	NO	64 per node
%AIG	Global Analog Inputs from the CAN; in from other OCS	WORD	YES	32 per node
%AQG	Global Analog Outputs to the CAN; out to other OCS	WORD	NO	32 per node
%T	Internal Temporary bits, use for contacts and coils	BOOL	NO	2048
%M	Internal Temporary bits, use for contacts and coils	BOOL	YES	2048
%R	Internal Registers, use for Timers and Counters and other data	WORD	YES	2048-9999
%K	Keypad bits, reflect Function Key status	BOOL	NO	5-12
%D	Display bits, control screens or indicate screen on/off	BOOL	NO	200-1023
%S	Internal System Bits (See System Registers)	BOOL	---	---
%SR	Internal System Registers (See System Registers)	WORD	---	---

Appendix C: System Bits

Point	Name	Function
%S01	FST_SCN	Indicates First Scan
%S02	NET_OK	Network is OK
%S03	T_10MS	10mS pulse
%S04	T_100MS	100mS pulse
%S05	T_1SEC	1 second pulse
%S06	IO_OK	I/O is OK

Point	Name	Function
%S07	ALW_ON	Always ON
%S08	ALW_OFF	Always OFF
%S09	PAUSING_SCN	Pause 'n Load soon
%S10	RESUMED_SCN	Pause 'n load done
%S11	FORCE	I/O being forced
%S12	FORCE_EN	Forcing is enabled

Appendix D: System Registers

For Details on the functionality of the different SR registers, consult the help file.

SR #	Name	Min	Max
1	**User Screen Number**	**0**	**200***
2	**Alarm Screen Number**	**0**	**200***
3	**System Screen Number**	**0**	**10***
4	**Self Test Result**		
5	**Controller Mode (RUN..)**	**0**	**2**
6	**Scan Rate Avg**		
7	***Reserved***		
8	***Reserved***		
9	**Edit Buffer Low**		
10	**Edit Buffer High**		
11	**Ladder Size Low**		
12	**Ladder Size High**		
13	**User Text Size Low**		
14	**User Text Size High**		
15	**System Text Size Low**		
16	**System Text Size High**		
17	**I/O Config Size Low**		
18	**I/O Config Size**		

SR #	Name	Min	Max
39	**BIOS Version**		
40	**FPGA Version**		
41	**LCD Columns**		
42	**LCD Rows**		
43	**Keypad Type**		
44	**RTC Seconds**	**0**	**59**
45	**RTC Minutes**	**0**	**59**
46	**RTC Hours**	**0**	**23**
47	**RTC Day of Month**	**1**	**31**
48	**RTC Month**	**1**	**12**
49	**RTC Year**	**1996**	**2095**
50	**RTC Day of Week**	**1**	**7**
51	**Network Error Count**		
52-55	***Reserved***		
56	**Last Key**		
57	**LCD Backlight**		
58	**User Leds**		
59-60	***Reserved***		

SR #	Name	Min	Max
	High		
19	**Net Config Size Low**		
20	**Net Config Size High**		
21	**Security Data Size Low**		
22	**Security Data Size High**		
23	**Ladder CRC**		
24	**User Text CRC**		
25	**System Text CRC**		
26	**I/O Config CRC**		
27	**Net Config CRC**		
28	**Security Data CRC**		
29	**Network ID Low**	**1**	**253**
30	**Network Baud Rate**	**0**	**3**
31	**Network Required**	**0**	**1**
32	**LCD Contrast**	**1**	**255**
33	**Key Toggle Mode**	**0**	**1**
34	**Serial Protocol**		
35	**Serial Number Low**		
36	**Serial Number High**		
37	**Model Number**		
38	**Engine Version**		

SR #	Name	Min	Max
61	**Num Ids**		
62-174	***Reserved***		
175	**CF Status**		
176	**CF Free Low**		
177	**CF Free High**		
178	**CF Total Low**		
179	**CF Total High**		
180	**Reserved**		
181	**Alarms Unacknowledged**		
182	**Alarms Active**		
183	**System Beep**	**0**	**1**
184	**User Beep**	**0**	**1**
185	**Screen Saver**	**0**	**1**
186	**Screen Saver Time**	**5**	**1200**
187	**Network Usage (Avg)**	**0**	**1000**
188	**Network Usage (Min)**	**0**	**1000**
189	**Network Usage (Max)**	**0**	**1000**
190	**Network TX Use (Avg)**	**0**	**1000**
191	**Network TX Use (Min)**	**0**	**1000**
192	**Network TX Use (Max)**	**0**	**1000**

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