i3 Modbus Slave Tutorial

Introduction

The purpose of this tutorial is to demonstrate the Modbus slave communication functions of the i3.

In this tutorial we will demonstrate the i3 as a Modbus slave with HMI connected to the i3 controlling it. The advantage of having the capability of connecting to an external HMI allows data to be represented in different aspects in another location.

To demonstrate the connection between an i3 and an HMI we will connect an i3 to an iView. This gives us the advantage of being able to provide the user with another and more graphical interface.

i3 Modbus Map

Modbus Master Mapping					
Internal Reference	Maximum Range	Traditional Modbus Reference	Expanded Modbus Reference	Modbus Command(s)	Modbus Offset
%Q1	2048	00001	000001	Read Coil Status (1) Force Single Coil (5) Force Multiple Coils (15)	00000
%M1	2048	03001	003001		03000
%T1	2048	06001	006001		06000
%QG1	256	09001	009001		09000
%I1	2048	10001	100001	Read Input Status (2)	00000
%IG1	256	13001	103001		03000
%S1	256	14001	104001		04000
%K1	256	15001	105001		05000
%AI1	512	30001	300001	Read Input Register (4)	00000
%AIG1	32	33001	303001		03000
%SR1	32	34001	304001		04000
%AQ1	512	40001	400001	Read Holding Registers (3) Preset Single Registers (6) Preset Multiple Registers (16)	00000
%R	9999	(previously 43001 for 2048 registers)	410001		03000 06000
%AQG1	32	46001	406001		10000

Protocol Configuration

Unlike with the master setting there is no protocol to set up before programming the ladder logic. The Modbus slave configuration is completely set up in Ladder logic.

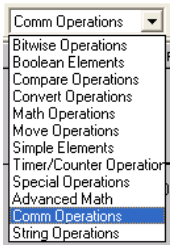
Programming Example

In this tutorial we are going to demonstrate the screens on the i3 demonstration program on a Graphical IV04M

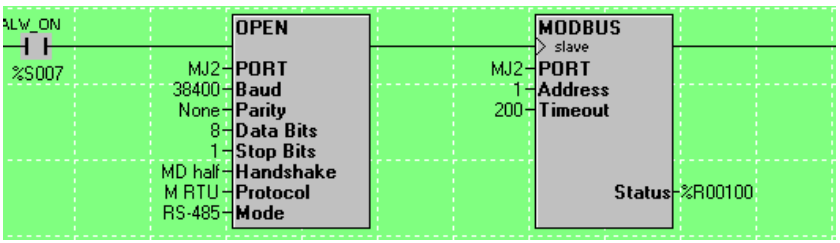
The i3 program will be very straightforward, we are just going to add the Modbus slave function to the demonstration program. The iView program will be programmed to display a similar screen to the screen showing on the i3.

Ladder Logic Programming

Using the program i3_demo_prog.csp add to the program the Modbus slave function and Open Port function.



Select from the Communication Operations the Open Communication Port function icon , insert it into a rung with an 'Always On' contact. Now select a Modbus slave function icon and insert it into the same rung.



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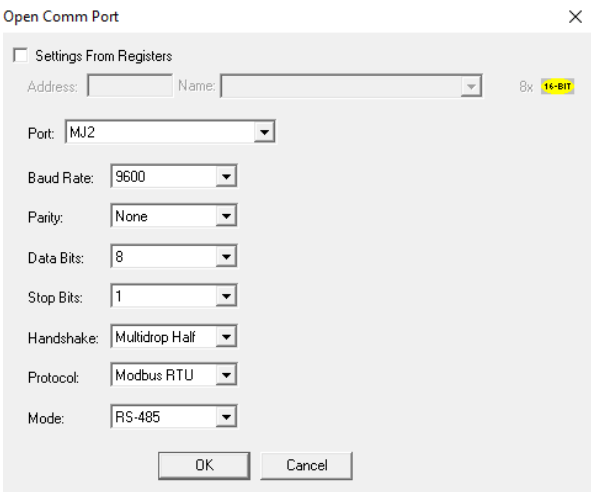
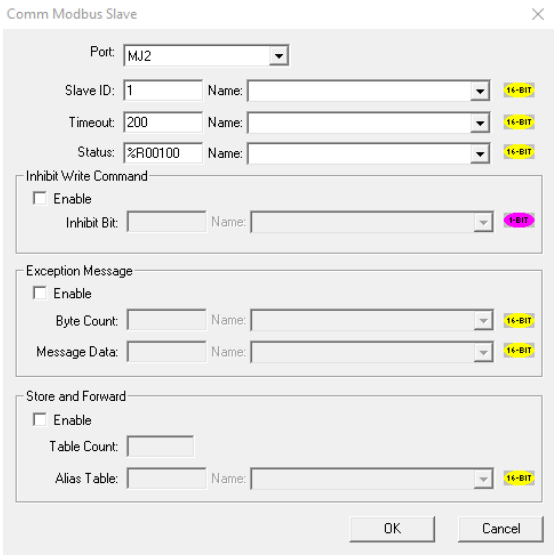
Double click on the functions and insert the parameter details as shown. This Port Open Function Opens the selected port and designates a protocol to it. The Modbus slave function defines the slave's address and a status register so that the communication link status can be viewed.





Screen Editor Programming

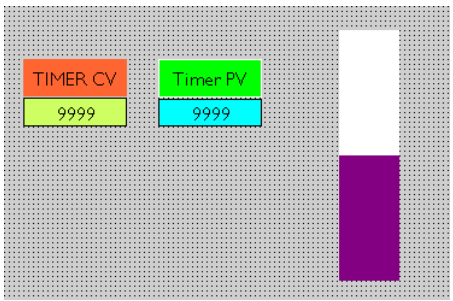
The screen editor program will be exactly the same as in the demo program.

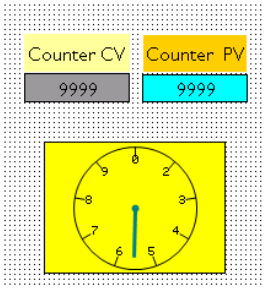
iView Programming

The iView screens will change as the i3 screens change and display a similar screen to that on the i3. Please refer to the iView Training manual for programming instructions on the iView.

Screen	i3 Address	Modbus Reference Address
2	Timer PV - %R3	43003
2	Timer CV - %R7	43007
2	Bar Graph - %R7	43007
3	Lamp - %M1	03001
3	Meter - %R9	43009
3	CV - %R9	43009
3	PV - %R11	43011
4	Message - %R4	43004
5	Graph - %R7	43007
5	Up - %K6	15006
5	Reset - %K10	15010
6	Keys - %K1 to %K4	15001 to 15004
7	Alarm - %R4	43004
8	Inputs - %I1 to %I4	10001 to 10004

iView - i3 Screens





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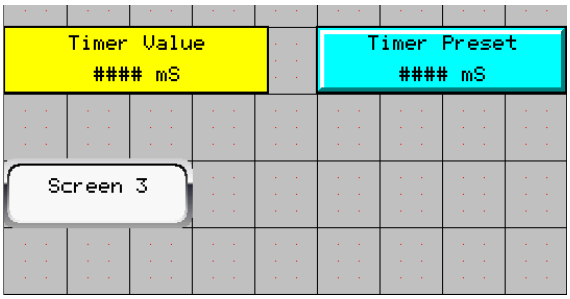
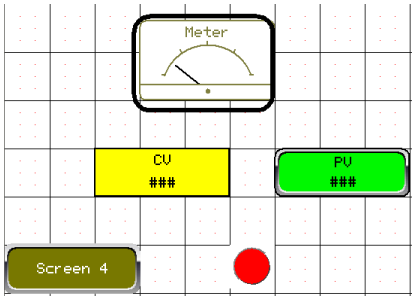
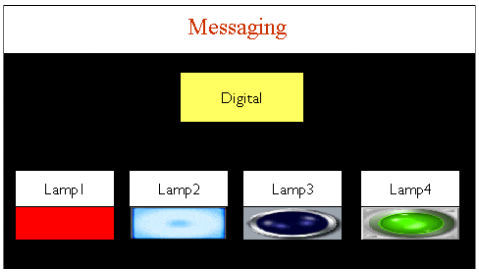
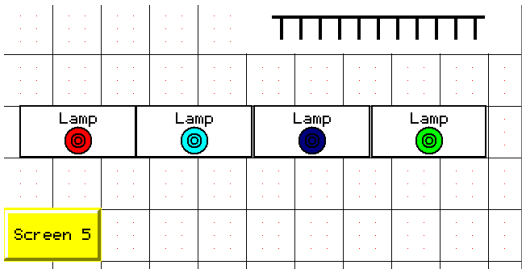
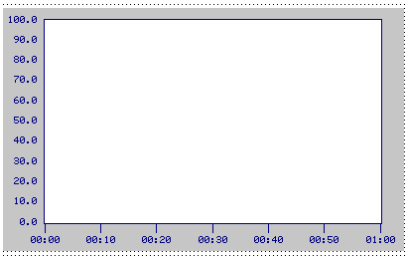
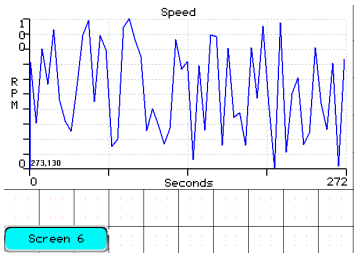


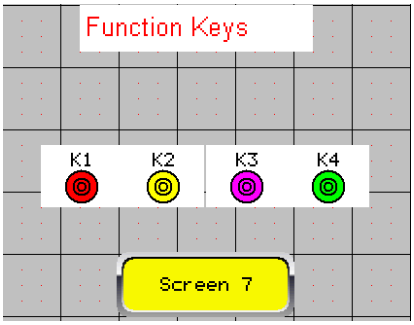




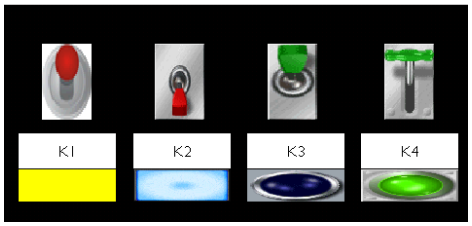






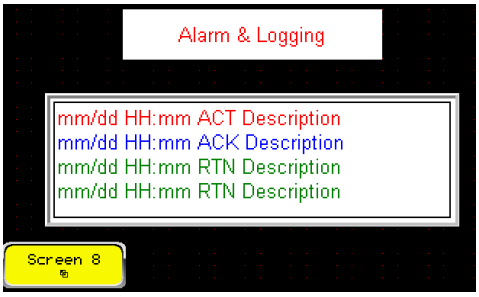


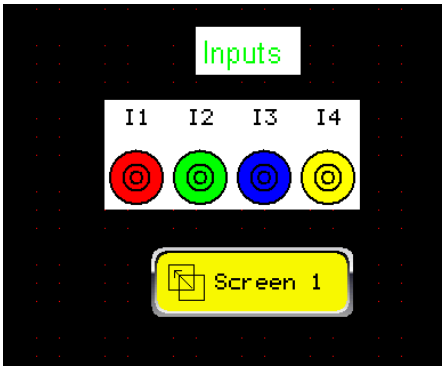
Function Keys

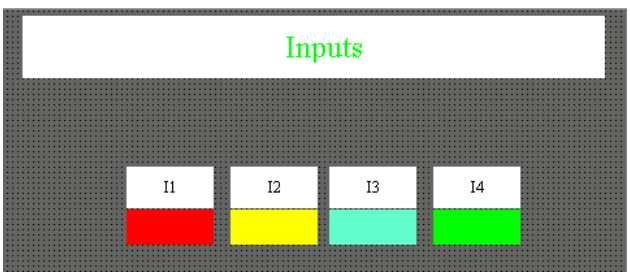


Alarms and Logging

Date	Time	Status	Message
31/12/16	23:59	AAA	A...
31/12/16	23:59	AAA	A...
31/12/16	23:59	AAA	A...
31/12/16	23:59	AAA	A...
31/12/16	23:59	AAA	A...
31/12/16	23:59	AAA	A...







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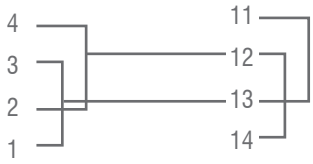
Wiring Diagram

We are using Port 2 on the i3 as a RS485, 2 wire, twisted-pair to connect to the iView.
The wiring for this is as follows.

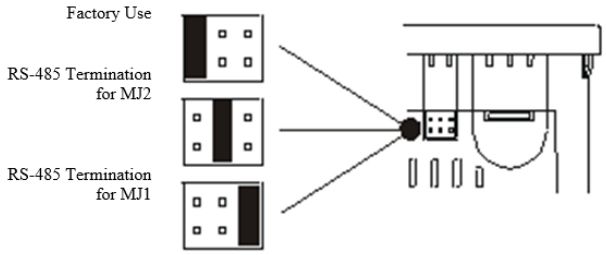
Port 2 connections

Pin	MJ2 Pins	
8	TXD	OUT
7	RXD	IN
6	0 V	GND
5	N/C	N/C
4	TX-	OUT
3	TX+	OUT
2	RX-	IN
1	RX+	IN

i3 to iView



This wiring has the advantage that both the iView and i3 can still have their programming ports connected, thus making debugging easier.



Remember to connect the RS-485 termination jumper as shown

Running the Program

Please connect the i3 and iView as shown and use the programs below:

As the user scrolls through the screens on the i3 the iView screens will change in sync. The user will also be able to enter data on the iView and change the values in the i3.

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