Application Note

Configuring an Exor UniOP HMI using JMobile software to communicate with an MPiec Series Controller via Modbus TCP

Applicable Products:

Yaskawa MPiec Series Controller &

Exor UniOP HMI

Subject: Application Note	Product: MPiec Series Controller	Doc#: AN.MPIEC.10
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Application Overview:

This document will guide the user through the steps of configuring an Exor UniOP HMI using JMobile software to operate as a Modbus TCP master communicating with an MPiec Series Controller configured as a slave.

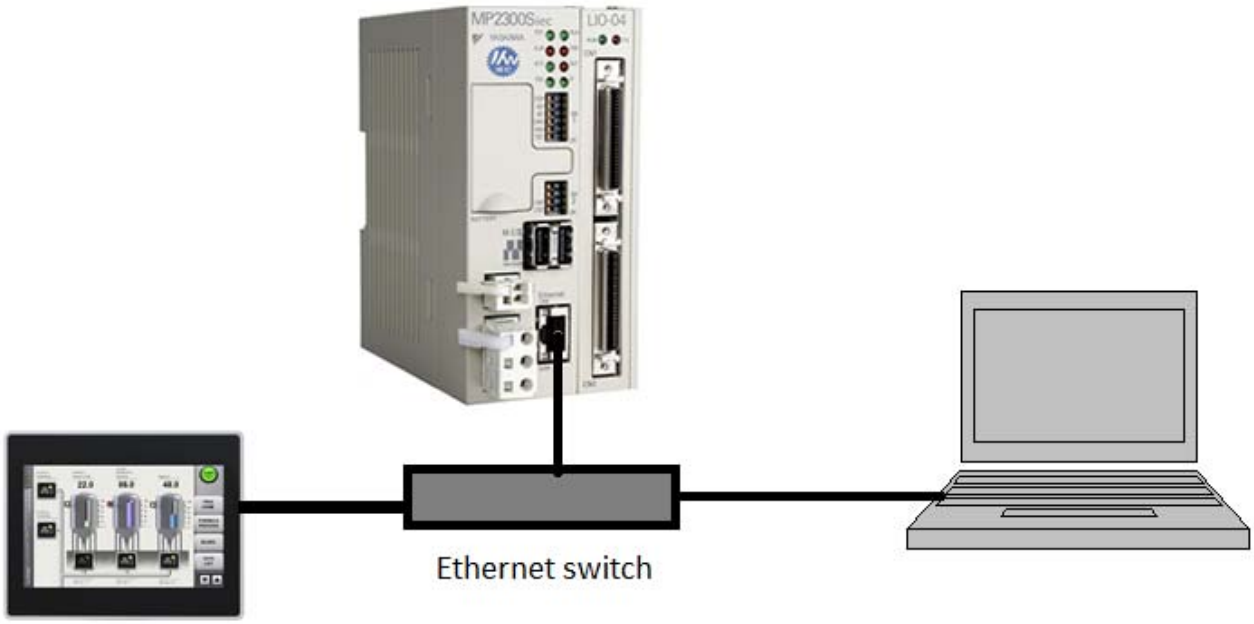

Figure 1: Overview of hardware setup

Configuration Overview:

Set the IP addresses of each of the devices (HMI, Controller, PC). In our configuration, the IP addresses were: 192.168.207.205 (MP Controller), 192.168.207.20 (HMI), 192.168.207.78 (PC).

Figure 2 shows the Modbus memory map of MPiec Series Controllers, and how it relates to the IEC Global Variables in MotionWorks IEC. Note that function codes 01 and 03 return data that was sent to the controller from the master and do not reflect data in the Global Variables of the IEC application program.

Modbus registers are copied to the Global Variables at the IEC task update rate which the Modbus driver is synchronized with. If using MotionWorks IEC Express, there is only one task. If using Pro, this is selected in the Hardware Configuration.

Modbus coil 0 equates to the Global Variable at %IX24560. 128 coils are available.
Modbus register 40000 equates to the Global Variable at %IW28672. 1024 registers are available.
Modbus input 10000 equates to the Global Variable at %QX24560. 128 inputs are available.
Modbus register 30000 equates to the Global Variable at %QW28672. 1024 registers are available.

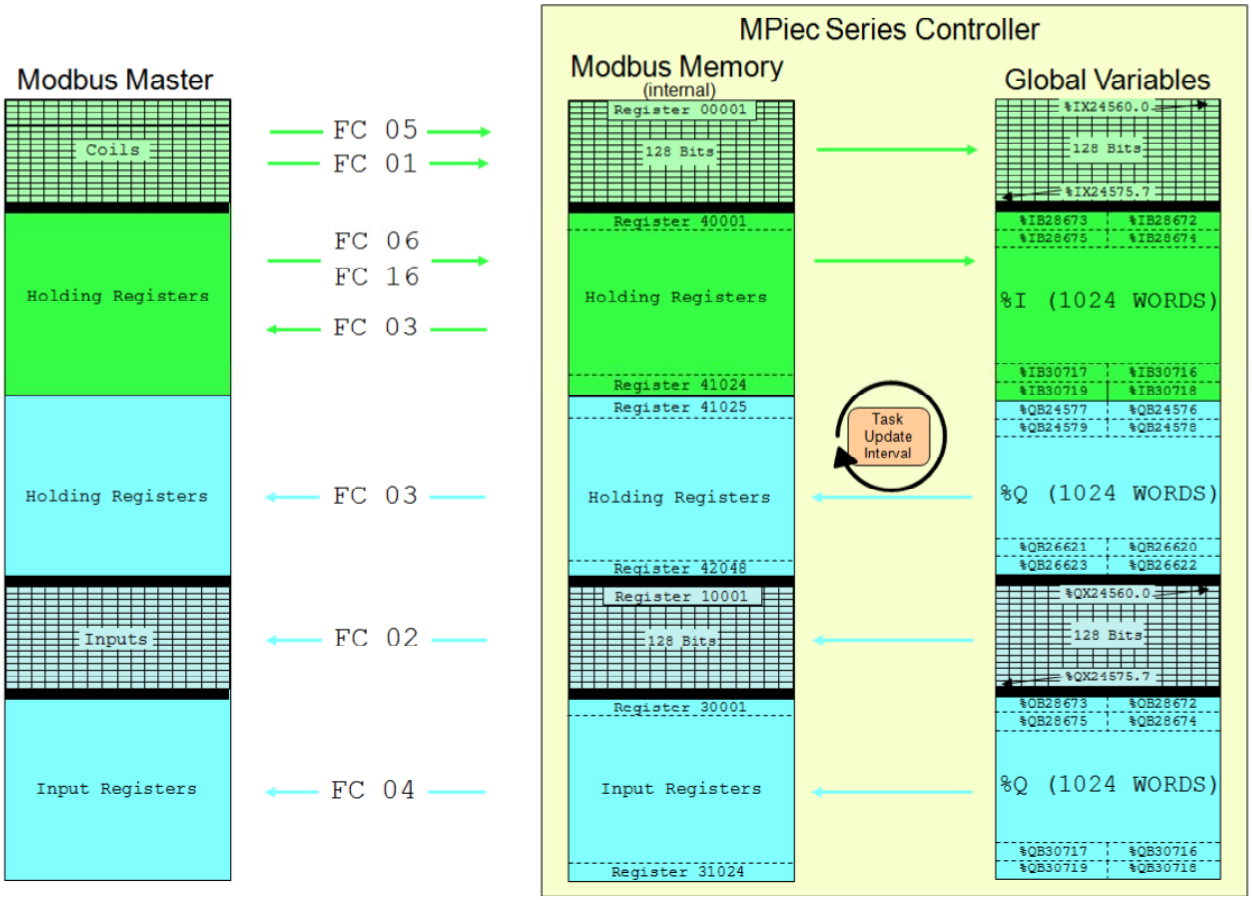

Figure 2: Modbus register mapping to IEC address

As shown in Figure 2 above, the input and output IEC addresses map to a different modbus register.

MotionWorks IEC Configuration:

To configure the MPiec Series Controller as a Modbus server (slave), launch the Hardware Configuration and connect to the MPiec controller. See Figure 3 to correctly select the controller to operate as a Modbus server (slave). Save the configuration and reboot the controller.

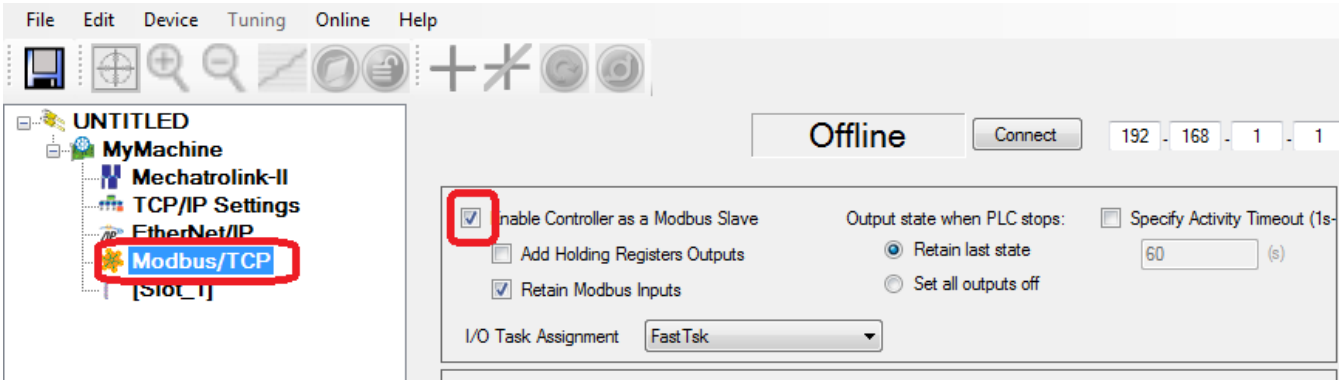

Figure 3: Configuring the MPiec Series Controller as a Modbus slave

The above configuration steps create Modbus TCP groups in the Global variables worksheet in MotionWorks IEC. Variables must be added to each group as shown in Figure 4. It is important to set the correct data type and memory address in the Global variables worksheet. After creating Modbus variables, compile and download the project to the controller. In the resource dialog box, run the IEC program by pressing warm start.

Modbus FC#05 Qty: 128 Coils, Address Range: %IB24560 - %IB24575				
Exor_To_IEC_BOOL	BOOL	VAR_GLOBAL		%IX24560.0
Modbus FC#06,16 Qty: 1024 Registers, Address Range: %IB28672 - %IB30719				
Exor_To_IEC_REAL	REAL	VAR_GLOBAL		%ID28672
Modbus FC#02 Qty: 128 Inputs, Address Range: %QB24560 - %QB24575				
IEC_To_Exor_BOOL	BOOL	VAR_GLOBAL		%QX24560.0
Modbus FC#04 Qty: 1024 Input Registers, Address Range: %QB28672 - %QB30719				
IEC_To_Exor_REAL	REAL	VAR_GLOBAL		%QD28672

Figure 4: Creating variables in Modbus groups in MotionWorks IEC

Exor UniOP Configuration:

In Jmobile software, select the protocols tab then select the Modbus TCP driver and enter the IP address of the Yaskawa MPiec controller.

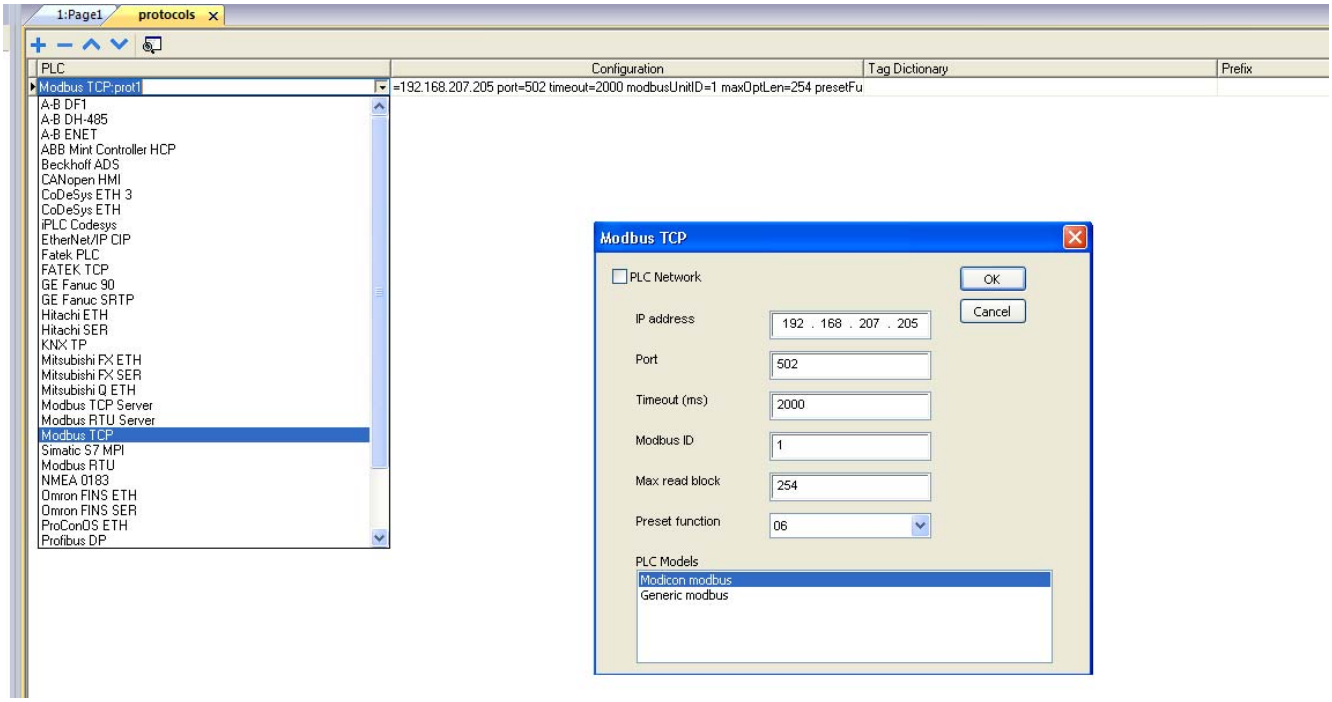

Figure 5: Configuring the Modbus driver in JMobile

Add tags under the tags tab as shown in Figure 6.

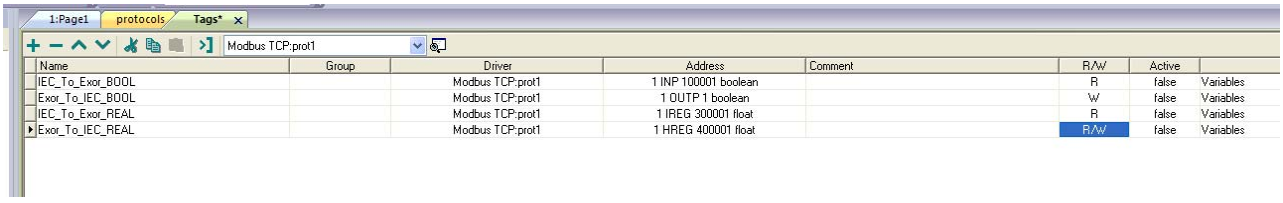

Figure 6: Adding tags in JMobile

Add widgets to the HMI page from the widget gallery. Right click on the widget and attach it to a Modbus tag.

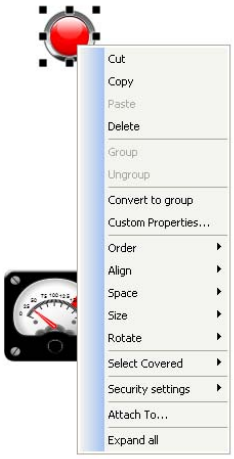

Figure 7: Adding tags in JMobile

Select the tag that should be associated with the widget and click OK.

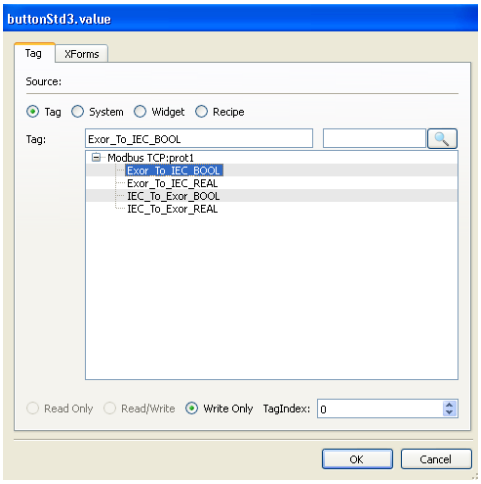

Figure 8: Associating widgets to specific tags

Set appropriate tag properties as shown in Figure 8.

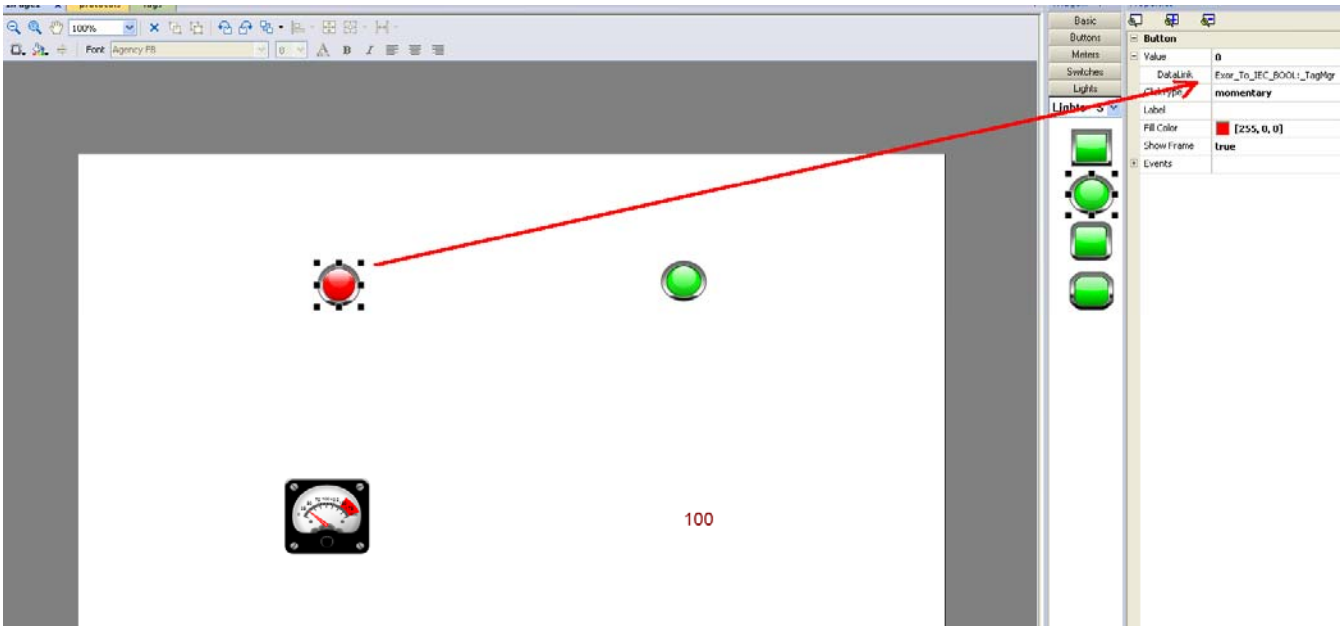

Figure 9: Setting widget properties

Download the project to the target HMI. Run the project.

Execution:

Communication between the Exor UniOP HMI and the Yaskawa MPiec Series Controller should commence as soon as the two projects start running.

MPiec variable	IEC address		Modbus Register	UniOP tag
Exor_To_IEC_BOOL	%IX24560.0	←	1	Exor_To_IEC_BOOL
Exor_To_IEC_REAL	%ID28672	←	400001	Exor_To_IEC_REAL
IEC_To_Exor_BOOL	%QX24560.0	→	100001	IEC_To_Exor_BOOL
IEC_To_Exor_REAL	%QD28672	→	300001	IEC_To_Exor_REAL

Table 1: variable mapping