Application Note

Configuring a Phoenix Bus Coupler to communicate Modbus/TCP with an MPiec Controller

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Subject: Application Note	Product: MPiec	Doc#: AN.MCD.09.045
Title: Phoenix bus coupler communicating with an MPiec controller		

Application Overview

This document provides detailed steps on how to configure the Phoenix bus coupler to communicate with an Yaskawa MPiec controller using the Modbus/TCP protocol.

Application Highlights

Industry:	Any
Major Features:	Modbus I/O, Phoenix coupler operating as a slave (server)
Results:	Easy configuration, extra I/O using the Phoenix bus coupler

Products Used:

Component	Product and Model Number
Controller	MPiec controller, Minimum Firmware version 1.1.1.4
Software	MotionWorks IEC Express or Pro, Minimum Ver 1.1.1.7
Third Party Devices	Phoenix MODBUS bus coupler: IL ETH BK DI8 DO4 2TX-PAC

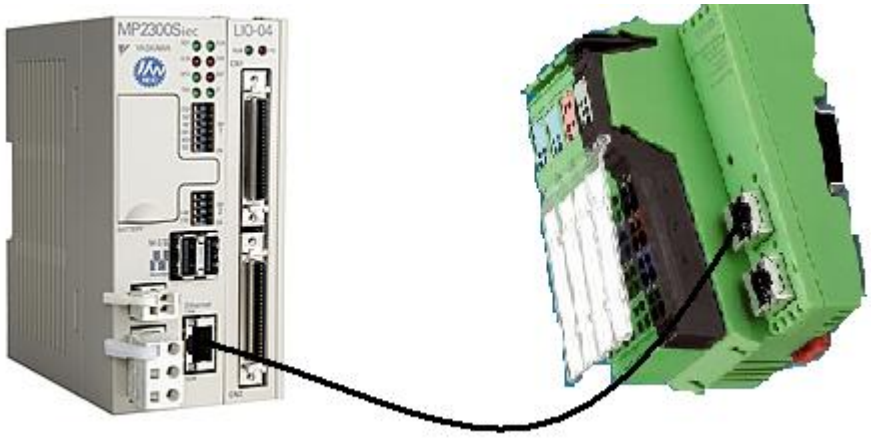

Figure 1: Communication configuration

Application Requirements

Application Specifications and Constraints

- Cycle Speeds: Modbus poll period 20 ms
- Transmission: Modbus TCP

Implementation Method of Core Operation

Configuration on the Phoenix bus coupler:

Use IP assign.exe which is free downloadable software from Phoenix's web page to assign the bus coupler an IP address of choice. For the test set up used in this document the Phoenix bus coupler IP address was set at 192.168.207.241. Once a valid IP address has been assigned to the device, go to the web interface of the bus coupler.

Figure 2: Phoenix bus coupler web page

Set the configuration on each page of the Phoenix bus coupler as follows:

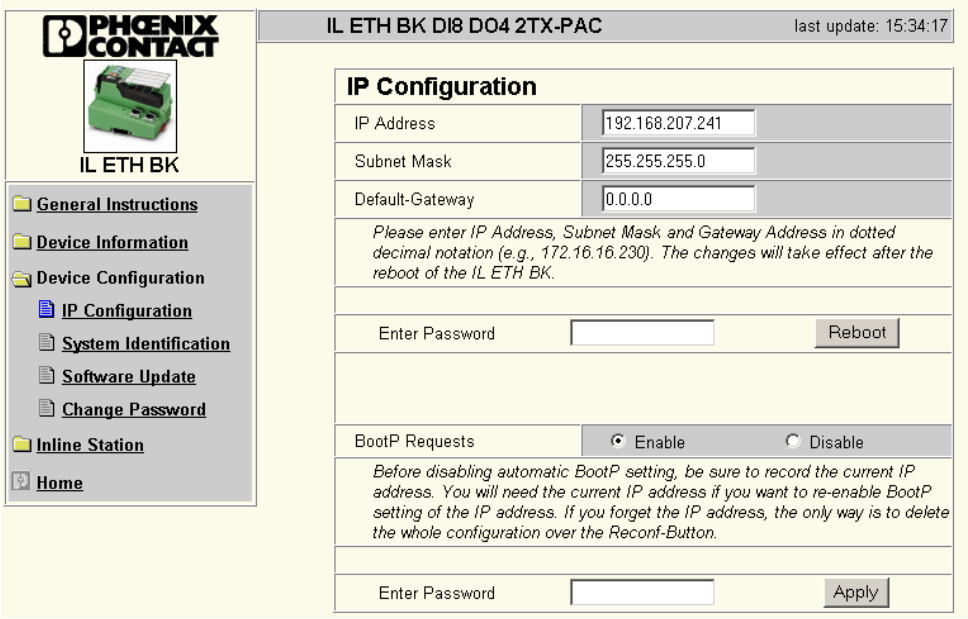

Figure 3: IP configuration of the Phoenix bus coupler

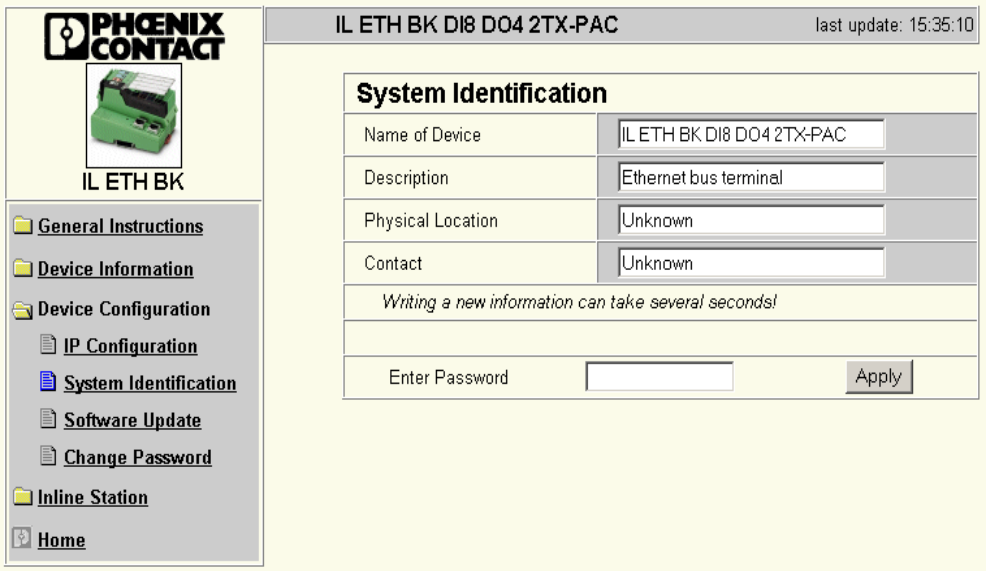

Figure 4: Device ID page on Phoenix bus coupler

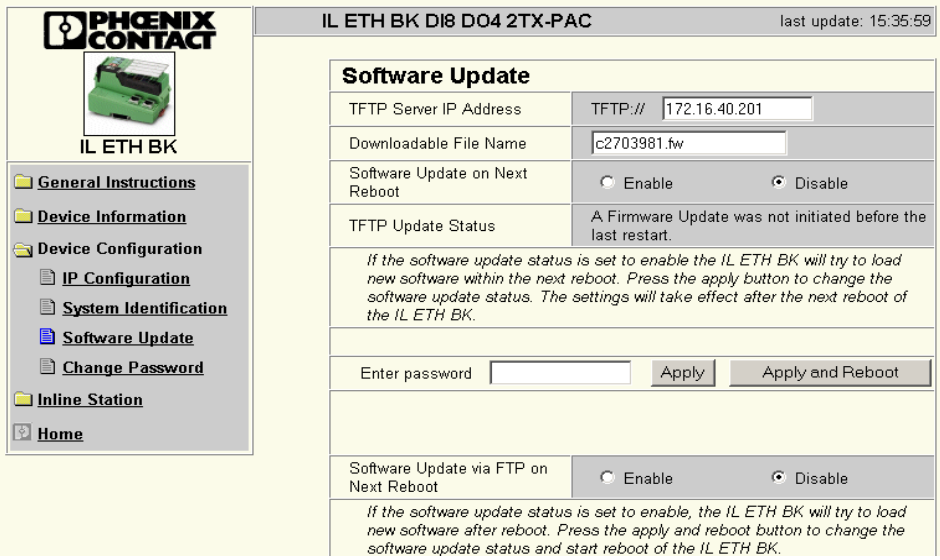

Figure 5: Software update page

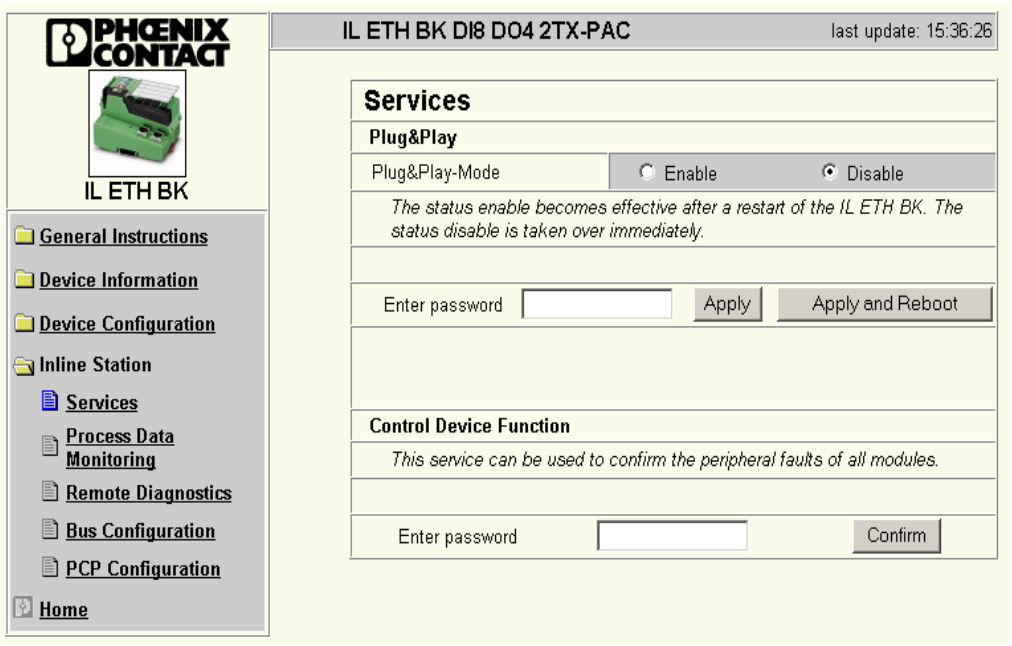

Figure 6: Disable Plug and Play mode

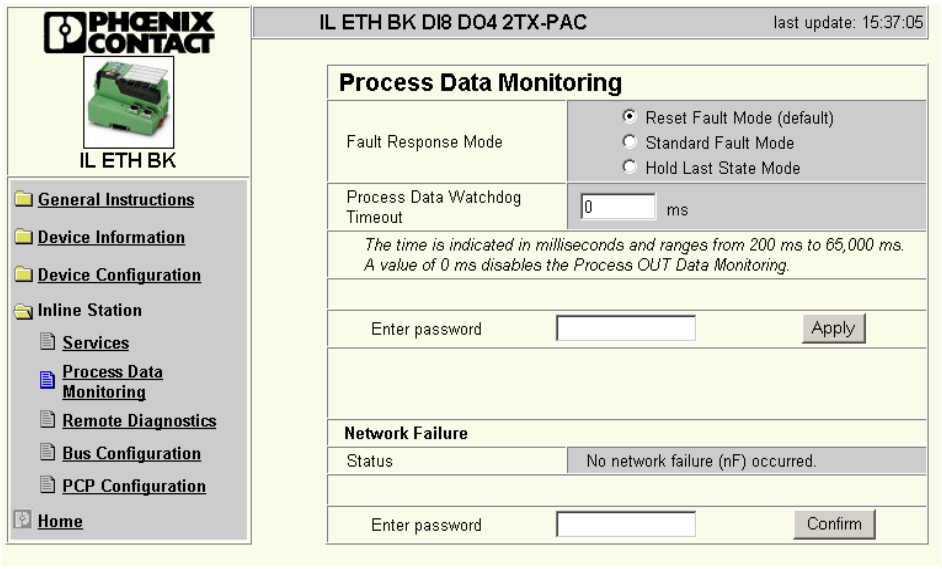

Figure 7: Set watchdog to 0 ms

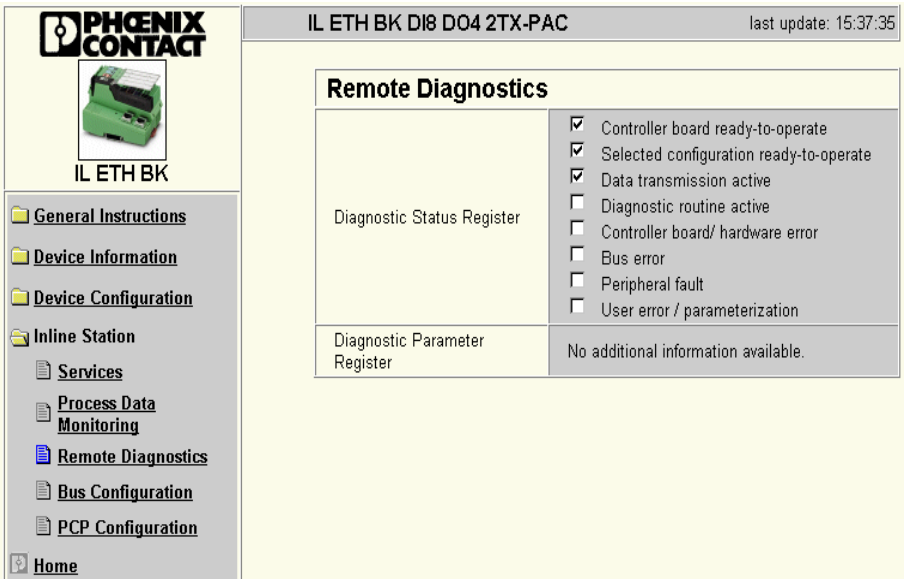

Figure 8: Remote diagnostics page on phoenix web interface

Configuration for the MPiec controller:

Open a new project in MotionWorks IEC.

1) Open the Configuration Tool.
2) The Phoenix bus coupler will be a server (slave) and the MPiec controller will be the client (master) in this Modbus communication set up. The phoenix device will have to be added as a server device in the configuration tool. This addition must be performed while the Configuration Tool is offline to the controller.

3) Click on 'Modbus /TCP' in the left of the configuration tool in the configuration tree.

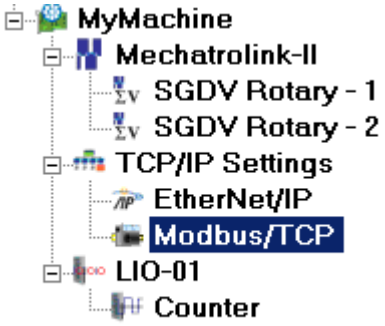

Figure 9: MotionWorks IEC - Device Configuration Tree

4) At the right bottom corner of the Configuration window, there will be an option to 'Add Slave Device'. Click on 'add slave device'

Figure 10: Add Phoenix bus coupler as Modbus slave

5) Add the details of the phoenix bus coupler as shown below.

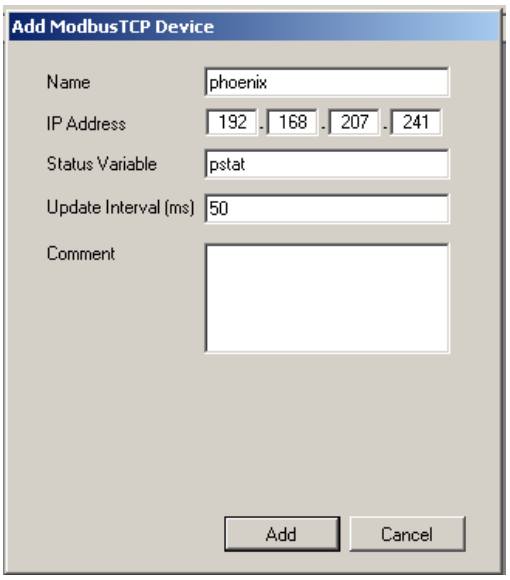

Figure 11: Configuration details of the bus coupler

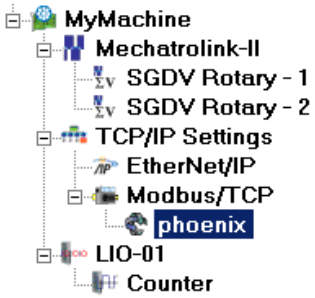

Figure 12: MotionWorks IEC Configuration after Phoenix slave added

Figure 13: Adding data blocks for Modbus communication

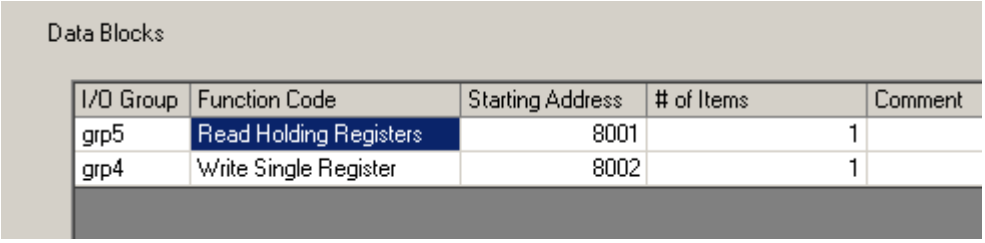

Figure 14: Data block details for communication with the Phoenix Modbus bus coupler

6) Enter the IP address of the controller and connect to the controller.
7) Choose the offline configuration if asked to choose between auto discovered and offline configuration.
8) After going online, save the configuration and cycle power on the machine for the new configuration to take effect.

9) Also after saving, MotionWorks IEC will have variable groups created in the global variable list.
10) Insert new variables and assign hardware addresses as shown below. Two variables in this example are Input and output. The status of the connection with the phoenix bus coupler is available in the variable 'pstat' which was defined in the Configuration.

Figure 15: Variables added to the Phoenix Variable Group

11) Make the project.
12) Download it and 'Warm Start' the program.
13) Going into debug mode, one can see the variables in their online values. For a healthy connection, the status word 'pstat' displays 16#1000 (4096 decimal). In this example, the phoenix bus coupler has been wired such that the bus coupler's inputs have been looped back to its outputs. So, the inputs to the

MPiec will display the same values that are written to the outputs.

⊟ <phoenix> 'igrp5' Address Range: %IB0 - %IB1 (* Do Not Modify Group Name or Status Variable!! *)							
input	16#07	BYTE	VAR_GLOBAL		%IB0		
pstat	16#1000	WORD	VAR_GLOBAL	(* Do Not Modify!! *...	%IW2		
⊟ <phoenix> 'ogrp4' Address Range: %QB2068 - %QB2069 (* Do Not Modify Group Name or Status Variable!! *)							
output	16#07	BYTE	VAR_GLOBAL		%QB2068		

Figure 16: Debug mode values of the Modbus variables and status word