

# Configuring RAD-900-IFS with GW EIP/MODBUS 1E/1DB9 for EtherNet/IP I/O Emulation using EDS file (implicit messaging)

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## Introduction

#### **Objectives:**

This document covers configuring the RAD-900-IFS wireless module and the GW EIP/MODBUS 1E/1DB9 for I/O to EtherNet/IP communication between a master site and two remote slave sites. The communication between the Rockwell controller and the GW EIP/MODBUS 1E/1DB9 and the GW EIP/MODBUS 1E/1DB9 and the RAD-900-IFS network will use an EDS file (implicit messaging).





#### **Requirements:**

The following hardware and software is used in the development of this procedure

- Wireless Module 2901540 RAD-900-IFS (Quantity 3)
- Combination I/O modules 2901533 RAD-DAIO6-IFS (Quantity 2)
- Antenna 2904801 RAD-900-ANT-OMNI-2-2-RSMA (Quantity 3)
- Communication Gateway 1062540 GW EIP/MODBUS 1E/1DB9 (Quantity 1)
- Software
  - PSI CONF 2.74 or higher available at <u>www.phoenixcontact.com/catalog/2901540</u>
  - o Studio 5000



### Procedure

#### Configuring the RAD-900-IFS wireless modules for PLC Mode communication

- Set the yellow thumbwheels of the three RAD-900-IFS modules to 01, 02 and 03 and reference the data sheet for power connections. Set the white thumbwheels of the RAD-DAIO6-IFS modules to 01 and 02. Connect the RAD-DAIO6-IFS modules to the RAD-900-IFS modules via the TBUS connectors supplied in the box. The RAD-DAIO6-IFS module with thumbwheel setting 01 should be connected to RAD-900-IFS module with yellow thumbwheel setting 02. The RAD-DAIO6-IFS module with thumbwheel setting 02 should be connected to RAD-900-IFS module with yellow thumbwheel setting 03. Apply power to all three wireless modules.
- 2. Open PSI-CONF 2.60 and select the 900 MHz selection under the Wireless tab. Click 'Next'

Device Select Welcome! Please select the device DeviceNet	to be configured:	7						
2313559 FL COMSERVER W	Bluetooth           2313005         2708517.           L         2313795PSI-WIL-R5232	2702184 RAD-RS485-IFS	2,40Hz 2702863 RAD-2400-IFS-JP	200mu 2702878 RAD-900-IFS-AU	2901540, 2702877 AD-900-IFS B	2,400 2,901541 RAD-24004FS	2904509 RAD-868-IFS	
								Next

#### 3. Click on 'New'

Network Project	
Create new network project	Current network project file
Open saved network project from file	Edt in Wizard
Open	Edit in Individual Settings
Read physical network	Compare physical network with project file
Read	Compare



4. Select 'Point To Point / Star' and click 'Next'



5. Set the number of slaves to '2' and click "OK'.





- 6. On Wizard, Step 2, confirm information is correct and click 'Next'.
- 7. On 'Wizard, Step 3', select 'PLC/Modbus RTU mode' in the 'Application of wireless network section'. Leave the Modbus address at 1. In PLC mode, the Modbus address will function as a single Modbus ID for the entire wireless network. For a simple bench test the rest of the settings can be left unchanged, but depending on the environment that the system will be installed in the "Network Settings' and 'Network speed/distance relation' settings may need to be adjusted. Click 'Next'

Wizard, Step 3					
Step 1 Project configuration	Step 2 Device configuration	Step 3 Radio Network configuration	Step 4 Serial configuration	Step 5 Settings overview	Step 6 Safe & transfer
Application of wireless network	Netwo	k settings			
1.)	IO data (Wire in/Wire out)	RF channel:	A V		
2.)	Serial data (RAD-900-IFS only)	Network ID: 127			
3.) 🗐 🔍 👘	PLC/Modbus RTU mode Modbus address:	Blocked frequency ranges: Range 1: 902-903 MHz Range 2: 903-904 MHz Range 3: 904-905 MHz Range 3: 905-905 MHz			
4.)	PLC/Modbus RTU dual mode Modbus address: 1	Range 6: 907-908 MHz	~		
Explanation of ope	aration modes				
Network speed/distance relation		() ()			
749 799	740 700	740 700			
Short distance					
Fast speed 500kbps	250kbps 125kbps	Normal speed 16kbps			
Cancel				[	Back Next



8. On 'Wizard, Step 4', leave the settings at default and click 'Next'.

Wizard, S	Step 4					
Ster	• • 1	Step 2	Step 3	Step 4	Step 5	Step 6
Project cor	figuration	Device configuration	Radio Network configuration	Serial configuration	Settings overview	Safe & transfer
	Serial cor	figuration (valid for RAD-900-IFS only) Connection profile: Default Setial Communication Interface type: R5-232 ↓ Baud rate (pos): 19200 ↓ Data bts: 8 ↓ ↓	Party: None Stop bits: 1 Handshake: None			
Cancel						Back Next

9. On 'Wizard, Step 5', review the data and click 'Next'



10. On 'Wizard, Step 6', make sure your programming cable is connected from your computer to the wireless module with Yellow thumb wheel setting '01'. Click 'Transfer' to send the configuration to the wireless modules. You will be prompted to save your configuration. Choose a file location to save your program.

Wizard, Step 4					
Step 1 Project configuration Wizard Step 6	Step 2 Device configuration	Step 3 Radio Network configuration	Step 4 Serial configuration	Step 5 Settings overview	Step 6 Safe & transfer
Step 1 Project configuration	Step 2 Device configuration	Step 3 Radio Network configuration	Step 4 Serial configuration	Step 5 Settings overview	Step 6 Safe & transfer
Las	Transfer lot transferred at transfer date:	Save Save as Not saved Last save date:			

#### 11. When prompted, click 'OK' to go online to the wireless module

			Save			
Transfer						
			Save as			
	Informatio	on				23
Not transferred		<b>-</b>				
		To use th	he transfer function the conn	ection mode will now b	be switched to online r	node.
Last transfer date:						
			ок	Cancel		



12. Click on 'Start Transfer' under 'Local Transfer' to send the configuration to each device. Once you transfer the configuration to one wireless module, move your programming cable to the next wireless module. The Transfer Window will show you which module you are connected to and which modules have had the configuration transferred.

Wizard, Step 6					
Step 1 Project configuration	Step 2 Device configuration	Step 3 Radio Network configuration	Step 4 Serial configuration	Step 5 Settings overview	Step 6 Safe & transfer
ر الم	Choose TransferDialog Local transfer Tr Stat transfer Stat transfer Comfort transfer The configuration is transfer The configuration is transfer Stat transfer	aferred to the device connected to the PC	Earcel		
Cancel					Back Finish
Wizard, Step 6	Step 2 Device configuration Insfer Select each device marked as not 1 RAD-ID 1 RAD-ID Device 1: Master Device 2:	Step 3 Radio Network configuration rannferred one by one and click the "Tra 12 RAD-ID 3 Save Device 3: Save	Step 4 Serial configuration	Step 5 Settings overview	Step 6 Safe & transfer
•	Port M. Not transferred Not transferred	s Not transferred	Next device - Cancel Finish		



13. Once you have sent the configuration to each wireless module, the wireless network configuration is complete. The RF Link LEDs on the wireless modules should illuminate. On the master wireless module (Yellow Thumbwheel on 01) should have one amber LED illuminated (assuming there is more than one slave wireless module in the network) and depending on the antennae on the slave wireless modules, there should be an amber and module green LEDs illuminated. Red ERR LEDs will be flashing at this point since there is no Modbus communication.

The wireless network configuration is complete and is set up for PLC Mode communication.



# Configuring the GW EIP/MODBUS 1E/1DB9 module for Modbus RTU to EtherNet/IP communication using the EDS file (implicit messaging).

- 1. The GW EIP/MODBUS 1E/1DB9 comes with a default IP address of 192.168.254.254. Set your computer's IP address in the same network as the GW EIP/MODBUS 1E/1DB9 (192.168.254.XXX). Reference the data sheet for power connections and apply power to the GW EIP/MODBUS 1E/1DB9.
- 2. Log into the GW EIP/MODBUS 1E/1DB9 by browsing to the default IP address of 192.168.254.254 (accept any warnings that may pop up in your browser) and using the default User Name and Password
  - a. User Name: Admin
  - b. Password: admin

🖸 GW EIP/MODBUS × +	
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G Google 🚯 PHOENIX CONTAC 📃 Phoenix Contact	
Log in	System Settings
User Name: Admin	Description: GW EIP/MODBUS 2E/2DB9
Password:	Device Name: device name
tog In	Firmware Version: 1.01
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3. Verify the serial port settings of the gateway match the serial port settings of the master Radioline unit (the default serial settings of the gateway should match the Radioline settings, but double check to make sure.) Click on the 'Serial Settings' tab. The next screen will show you the settings, verify Port 1 is set to RS-232, 19200, 8, none, 1

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Firmware: 1.01					DPHENIX
<u>^</u>					
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Welcome! To access quick configuration options, pl	ease click on a port in the i	image below or use the men	u to access advanced configuration settings.	U EVICE MININELIAIRE	
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4. Click on the 'Port 1 Configuration' tab and set the 'Serial Device(s)' drop down to 'Modbus RTU Slaves'. This tells the gateway it will be talking to a Modbus slave device. Click 'Apply Changes'.

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5. Click on the 'Data Mapping Settings' tab and then the 'Shared Memory' tab. In this section we will enable shared memory. By default, this enables the 200 input and output registers of internal memory associated to ID 252. This data area can be directly accessed when using the EDS file for the gateway in RSlogix.

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201-400					EIP Class1 w		200 holding registers	Display	12			
401-600					All (Except Class1) *		200 holding registers	Display	10			
601-800					All (Except Class1) *		200 holding registers	Display	12			
801-1000					All (Except Class1)		200 holding registers	Deplay	181			
1001-1200					All (Except Class1)		200 holding registers	Display	13			
1201-1400					All (Except Class1)		200 holding registers	Display				
1401-1600					All (Except Class 1) -		200 holding registers	Display				
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Case1       Case1       Case1       Description       Description         201-00       Cl	K          EtherNet/IP           BaaN          temp          Gogle          Phoenix Contact          Phoenix comunity          News         Personal          Microsoft Office Ho           Microsoft Office Ho	K               EtherNet/IP	X <sup>•</sup> EtherNet/IP <sup>•</sup> BaaN <sup>•</sup> temp <sup>•</sup> Google <sup>•</sup> Phoenix Contact <sup>•</sup> Phoenix comunity <sup>•</sup> News <sup>•</sup> Personal <sup>•</sup> Microsoft Office Ho          File       Tag/Fale to Moduue <sup>•</sup> Moduue <sup>•</sup> Seriel Settings <sup>•</sup> Moduue <sup>•</sup> Seriel

This shared memory ID will be referenced in the next step.



6. To move data in and out of the shared memory you need to use the Modbus to Modbus tab. The Modbus communication from the Radioline wireless network to the EtherNet/IP master (Modbus to EtherNet/IP). In the example below, we are reading from Modbus ID 1, the 30012 and 30022 registers and pointing them to the internal/shared memory of the gateway at ID 252 (from previous configuration step).

GW EIP/MODBUS     ×			-	o ×
← → C ☆ ▲ Not secure   192.168.1.254/modbusToModbusCfg.asp	Q 🕁	. 🔤 (	Pau	sed 🤳 🚦
G Google D PHOENIX – Phoenix Contact D PHOENIX CONTACT				
			_	
Firmware: 1.01			Ø	CONTACT
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Modbus to Tag/File Tag/File to Modbus to Modbus Shared Memory EtherNet/IP Class1 Verify Data Mapping Shared Memory Map				
Modbur to Modbur Configuration				
Modbus (Read) Modbus (Write)				
Device Function Address Length Rate Device Function Address Delete				
Line Active         ID         code         (base 1)         (Registroils)         (ms)         ID         code         (base 1)           1         1         04         Legot Registers (30x)         11         1         2000         252         16: Multiple Registers (40x)         1				
2         I         04: Input Registers (30x)         21         1         2000         252         16: Multiple Registers (40x)         2           3         Image:				
4 2 252 03 ₩eking Registers (40x) → 202 1 2000 1 16: Multiple Registers (40x) → 22				
Add Default Configuration Clone Line: 1				
				pply Changes
			$\sim$	$\sim$
© PHOENIX CONTACT				

First two are to shared memory, second to are from shared memory to Radioline network

Click 'Apply Changes' once you have entered all of the information

.



7. Change IP address by clicking the "LAN Settings' tab and then the "IP Address' tab. Change the IP address to 192.168.1.254 (for this guide's purposes) and click 'Apply Changes'.

Gw EIP/MODBUS × +	- 🗆 ×
← → C △ A Not secure   192.168.1.254/ipconfig.asp	Q 🖈 🔤 🛛 Paused 🧶 🗄
G Google 🚺 PHOENIX 📒 Phoenix Contact 🚺 PHOENIX CONTACT	
Firmware: 1.01	
â	Reboot Device   Log Out
General Settings Serial Settings Modbus Settings Data Mapping Settings Diagnostics Device Maintenance	
PAddress Security EtherNet/IP Stack	
LAN IP Address         Automatic address assignment (DHCP)         Manetal address assignment.         IP Address:       192 168 1254         Subnet Mask:       255 255 255 0         Indault Gateway:	Hardware Address 00.40.45.A7.9D.44

The configuration for the GW EIP/MODBUS 1E/1DB9 is now complete.



#### **Configuring the Rockwell PLC**

1. First download EDS file from Phoenix Contact website and install it into RSLOGIX using the EDS Hardware installation tool. The EDS file can be found on the downloads tab of the Gateway product page

Device Description							
	Description	Language	Revision				
	[zip, 12 KB] <b>Device Description</b> EDS file for project planning EDS_GW-EIP-MODBUS_1_02_20190805.zip	International	1.02				

2. In the RSlogix project you will need add the gateway into your I/O Configuration. You can do this by right clicking on "Ethernet" and selecting New Module.





3. In the "Select Module Type" window you will want to filer to show only Phoenix Contact devices and select "GW EIP/MODBUS 1E/1DB9"





4. In the New Module window you will need to enter a name for you gateway and the IP address that you assigned to the gateway (IE 192.168.1.254 in this guide). Once those settings are made, click the 'Change' button



5. After clicking change button, the following screen will pop up. Change the definition the default SINT format to INT to better match the word-based Modbus formatting. Click 'Okay' on this screen and then 'Okay' on the New module screen.

Module Definition*							
Revision: 001 -							
Electronic Keying: Compatible Module							
Co	nnections:						
	Name			Size			
	Read/Write - Shared		Input:	220	INT		
	Memory		Output:	220			
OK Cancel Help							



6. Now you are finished and can access the 220 words of Input and output data you activated in the shared memory of the gateway.





#### Making the physical connections

In this setup, there are three stations, the master station, slave station 1 and save station 2. Connect an antenna to each wireless module and make the physical connections for the data cables and I/O modules for each station shown below.

#### **Host Station**

- 1. Connect a RJ45 cable from the PLC to the GW EIP/MODBUS 1E/1DB9 with IP address 192.168.254.254.
- 2. Connect a Straight through RS232 cable from GW EIP/MODBUS 1E/1DB9 to RAD-900-IFS with yellow thumbwheel of '01'.



#### **Remote Station 1**

1. Verify the RAD-DAIO6-IFS module with thumbwheel setting 01 is connected to RAD-900-IFS module with yellow thumbwheel setting 02.





#### **Remote Station 2**

1. Verify the RAD-DAIO6-IFS module with thumbwheel setting 02 is connected to RAD-900-IFS module with yellow thumbwheel setting 03.



Your setup is complete, and you are ready to verify communication. Your network layout should match the drawing below.





# **Disclaimers and notes**

- 1. The purpose of this document is to provide basic configuration settings to show communication. Each application has different requirements and those need to be discussed before implementing any solution.
- 2. The setup described in this document uses a default PLC configuration. The PLC configuration will be different from application to application.
- This setup was a point to multi-point setup in a bench test environment. The addition of repeaters and RF interference can cause added latency and should be expected. If there are concerns about these items a temporary installation should be tested.
- 4. The installation of these components in a real application is at the discretion of the user.ok