Your Global Automation Partner



# 2RFID-S Modbus Sample Program-Visual Basic and C# Application Note

02/06/2018

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## **1** General Information

## 1.1 About these instructions

The following user manual describes the setup, functions, and use of the system. It helps you to plan, design, and implement the system for its intended purpose.

**Note**\*: Please read this manual carefully before using the system. This will prevent the risk of personal injury or damage to property or equipment. Keep this manual safe during the service life of the system. If the system is passed on, be sure to transfer this manual to the new owner as well.

## 1.2 Explanation of symbols used

#### 1.2.1 Warnings

Action-related warnings are placed next to potentially dangerous work steps and are marked by graphic symbols. Each warning is initiated by a warning sign and a signal word that expresses the gravity of the danger. The warnings have absolutely to be observed:



## DANGER!

DANGER indicates an immediately dangerous situation, with high risk, the death or severe injury, if not avoided.



## WARNING!

WARNING indicates a potentially dangerous situation with medium risk, the death or severe injury, if not avoided.



#### ATTENTION!

ATTENTION indicates a situation that may lead to property damage, if it is not avoid-ed.



## NOTE

In NOTES you find tips, recommendations and important information. The notes facilitate work, provide more information on specific actions and help to avoid overtime by not following the correct procedure.

#### CALL TO ACTION

This symbol identifies steps that the user has to perform.

#### → RESULTS OF ACTION

This symbol identifies relevant results of steps

## 1.3 Feedback about these instructions

We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to <u>techdoc@turck.com</u>.

## 1.4 Technical support

For additional support, email inquiries to <a href="mailto:appsupport@turck.com">appsupport@turck.com</a>, or call Application Support at 763-553-7300, Monday-Friday 8AM-5PM CST.

## 1.5 About this Guide

The purpose of this guide is to provide a fast and simple demonstration of how RFID works without having to install a large program such as PACTware or CoDeSys.



# 2 Hardware Setup

To use the "2RFID-S Modbus Sample Program" you will need one of the following 3 hardware configurations setup at your station:

1.	Gateway	->	BL67-GW-EN
	Slice Housing Slice Power Cable Data Cable Transceiver Cable Transceiver Tag	-> -> -> -> -> -> -> -> -> ->	BL67-B-2M12-P BL67-2RFID-S <b>(Must be in first slot)</b> RKM 50-*M RSSD RJ45S 441-*M RK 4.5T-*-RS 4.5T/S2501 Any <b>(Connect to channel 1 not channel 0)</b> Any
2.	Gateway	->	BLCEN-2M12MT-2RFID-S
	Power Cable Data Cable Transceiver Cable Transceiver Tag	-> -> -> ->	RKC 4.4T-3-RSC 4.4T RSSD RJ45S 441-*M RK 4.5T-*-RS 4.5T/S2501 Any <b>(Connect to channel 1 not channel 0)</b> Any
3.	Gateway	->	BL20-GW-EN or BL20-E-GW-EN
	Slice Housing Slice Power Cable Data Cable Transceiver Cable Transceiver	-> -> -> -> -> ->	BL20-S4T-SBBS BL20-2RFID-S (Must be in first slot) Field Supply RJ45S RJ45S 845-2M RK 4.5T-*/S2501 Any (Connect to channel 1 not channel 0)
	iay		

Note: I am using configuration 3. (Displayed below)





\* If you choose to use a BL20 gateway then you need to wire the transceiver up to channel 1 not channel 0. (Blue->22, Brown->23, Black->14 and White->24)

**Choose Your Path** 



Open email and drop folder on your desktop. desktop.



#### Open "RFID-S Sample"





Open email and drop folder on your



#### Open "RFID\_Modbus\_Sample"







#### Open "ModbusMaster Test"

#### Open "bin"

Documents

J Music

Pictures 2 items



#### **Open** "Release"



Organize 🔻 🗦 Open 🛛 » Name 쑦 Favorites RFID\_Modbus\_Sample 🧮 Desktop Downloads RFID\_Modbus\_Sample.sln 💝 Dropbox 📃 Recent Places 🥃 Libraries Documents J Music Pictures RFID\_Modbus\_Sample 1 File folder



#### **Open** "Release"



#### Open "RFID\_Modbus\_Sample"



Type in the Gateway IP address and hit connect.



(A new gateway's default address is 192.168.1.254)

Open "RFID\_Modbus\_Sample Include in library 🔻 🔹 » Organize 🔻 = -



Type in the Gateway IP address and hit connect. (A new gateway's default address is 192.168.1.254)

Start Communi	cation		
IP Address	192.168.1.10	Connect	
			X
Transceiver		Done	
Next		Busy	
Tag II		Error	
Read		Transceiver Conne	cted
Write		Transceiver On	
Tag In	io	Tag Present Tag Fully Read	
Trans Ir	fo		
Rese	:		
Write Data		Write Data	
Write Data 1:	0	Read Data 1: 0	
Write Data 2:	0	Read Data 2: 0	
Write Data 3:	0	Read Data 3: 0	
Write Data 4:	0	Read Data 4: 0	
Write Data 5:	0	Read Data 5: 0	
Write Data 6:	0	Read Data 6: 0	
Write Data 7:	0	Read Data 7: 0	
Write Data 8:	0	Read Data 8: 0	

Note: If you are unable to connect to the station you should set the rotary switches to 000 and power cycle the device. Once the device comes back up, attempt to ping the device.

- Open Start Menu
- Type "cmd" into the command line
- Click on "c

md.exe"						_
	Programs	(1)				- 1
	💽 cmd.e	ĸe				
	Microsoft	Outlook (80)				- 1
	See more	results				
	cmd		×	Shut do	wn 🕨	
	<b>a</b> (	9 👳		0	XION	0



Type "ping 192.168.1.254" into the command line and press "Enter" on the key board.



You should notice the device replying to your ping. You should now be able to connect to your device.



Check "Read Tag". Notice "Busy" is checked. Uncheck "Read Tag". Change drop down menu to read "8 bytes".

🖳 Modbus RFID Sample	
192.168.1.10	Disconnect
V Tum On Transceiver	Done
Next Mode	🗹 🍉
Read Tag ID	Errol
🔽 Read Tag @ Address	Transcover Connected
Write Ing to Address	Transceiver On
Read Tag Info	Tag Present
Read Trans Info	Tag Fully Read
Reset Number of Bytes to Reset/Write     Byte     Byte     Sytes     Sytes	
4 Bytes 5 Bytes 6 Bytes 7 Bytes 8 Bytes	Read         Data           00         00         00         00           00         00         00         00         00

Present tag. Notice "Done", "Tag Present", and "Tag Present", and "Tag Fully Read" are all checked. Also notice the "Read Data" in the lower right

💀 Modbus RFID Sample	
192.168.1.10	Disconnect
Tum On Transceiver	Done
Next Mode	Busy
🔲 Read Tag ID	Error
Read Tag @ Address	Transceiver Connected
Write Tag to Address	✓ Transceiver On
Read Tag Info	✓ Tag Present
Read Trans Info	Tag Fully Read
Reset	
Number of Bytes to Read/Write	
8 Bytes 👻	
Address	
0	
Write Data	Read Data
	14 15 16 17
	14 15 16 17

Input new data into the "Write Data" registers. registers. Check "Write Tag". Notice "Busy" is checked. Uncheck "Write Tag". (Each register can only support a Value between 0-255)



Click "Read". Notice "Busy" LED is yellow.

IP Address	192.168.1.10	Connect	
Transce	ver	Done	
Next		Busy	
Tag II		Error	
Read		Transceiver Connecte	
Write		Transceiver On	
Tag In	0	Tag Present	
Trans Ir	fo	Tag Fully Read	
Rese	:		
Write Data		Write Data	
Write Data 1:	0	Read Data 1: 0	
Write Data 2:	0	Read Data 2: 0	
Write Data 3:	0	Read Data 3: 0	
Write Data 4:	0	Read Data 4: 0	
Write Data 5:	0	Read Data 5: 0	
Write Data 6:	0	Read Data 6: 0	
Write Data 7:	0	Read Data 7: 0	
Write Data 8:	0	Read Data 8: 0	

Present tag. Notice "Done", "Tag Present", "Tag Fully Read", are all Green. Also notice the "Read Data" in the lower right

C# RFID Mod	bus Example		
Start Communic	ation		
IP Address	P Address 192.168.1.10		ct
Transceiv	/er	Done	
Next		Busy	
Tag ID		Error	
Read		- Transce	eiver Connected
Write		Transceiver On	
Tag Info		Tag Present	
Trans Inf	fo	Tag Fully Read	
Reset			
Write Data		Write Data	
Write Data 1:	0	Read Data 1:	10
Write Data 2:	0	Read Data 2:	11
Write Data 3:	0	Read Data 3:	12
Write Data 4:	0	Read Data 4:	13
Write Data 5:	0	Read Data 5:	14
Write Data 6:	0	Read Data 6:	15
Write Data 7:	0	Read Data 7:	16
Write Data 8:	0	Read Data 8:	0

Input new data into the "Write Data" Click "Write". Notice "Busy" is yellow. (Each register can only support a value between 0-255)

Start Communie IP Address	192.168.1.10	Conne	act
Transcei	ver	Done	
Next		Busy	
Tag ID		Error	
Read		Transe	ceiver Connect
Write		- Transe	seiver On
Tag Inf	•	Tag Present	
Trans In	fo	Tag F	ully Read
Reset			
Write Data		Write Data	
Write Data 1:	20	Read Data 1:	0
Write Data 2:	21	Read Data 2:	0
Write Data 3:	22	Read Data 3:	0
Write Data 4:	23	Read Data 4:	0
Write Data 5:	24	Read Data 5:	0
Write Data 6:	25	Read Data 6:	0
Write Data 7:	26	Read Data 7:	0
Write Data 8:	27	Read Data 8:	0



Present tag. Notice "Done", "Tag Present", and Fully Read" are all checked. Also notice the "Read Data" in the lower right corner.



#### Check "Read Tag". Notice "Busy is checked. Uncheck "Read Tag"



Present tag. Notice "Done", "Tag Present", and "Tag Fully Read" are all checked. Also notice the Data" in the lower right corner.



Present tag. Notice "Done", "Tag Present", and "Tag "Tag Fully Read" are all green. Also notice the "Read Data" in the lower right corner

Start Communication IP Address 19	2.168.1.10	Connect
Transceiver		Done
Next		Busy
Tag ID		Error
Read		Transceiver Connected
Write		Transceiver On
Tag Info		Tag Present
Trans Info		Tag Fully Read
Reset		· · · · · · · · · · · · · · · · · · ·
Write Data		Write Data
Write Data 1: 20		Read Data 1: 0
Write Data 2: 21		Read Data 2: 0
Write Data 3: 22		Read Data 3: 0
Write Data 4: 23		Read Data 4: 0
Write Data 5: 24		Read Data 5: 0
Write Data 6: 25		Read Data 6: 0
Write Data 7: 26		Read Data 7: 0
Write Data 8: 27		Read Data 8: 0

#### Click "Read". Notice "Busy" is Yellow

Start Commun	ication		
IP Address	192.168.1.10	Connect	
Transce	iver	Done	
Next		Busy	
Tag II	D	Error	
Read	1	Transceiver Connec	tec
Write	•	Ansceiver On	
Tag In	fo	Tag Prisent	
Trans I	nfo	Tag Fully Read	
Rese	t		
Write Data		Write Data	
Write Data 1:	20	Read Data 1: 0	
Write Data 2:	21	Read Data 2: 0	
Write Data 3:	22	Read Data 3: 0	
Write Data 4:	23	Read Data 4: 0	
Write Data 5:	24	Read Data 5: 0	
Write Data 6:	25	Read Data 6: 0	
Write Data 7:	26	Read Data 7: 0	
Write Data 8:	27	Read Data 8: 0	

Present tag. Notice "Done", "Tag Present" and "Tag Fully Read" are all green. Also "Read Notice the "Read Data" in the lower right corner.

C# RFID Mod	dbus Example			
Start Communi	cation			
IP Address	192.168.1.10	Connect		
-				
Transce	iver	Done		
Next		Busy		
Tag II	<b>D</b>	Error		
Read	1	Transceiver Connected		
Write		Transceiver Or		
Tag In	fo	Tag Pres		
Trans Ir	nfo	Tag Fully Read		
Rese	t			
Write Data		Write Data		
Write Data 1:	20	Read Data 1: 20		
Write Data 2:	21	Read Data 2: 21		
Write Data 3:	22	Read Data 3: 22		
Write Data 4:	23	Read Data 4: 23		
Write Data 5:	24	Read Data 5: 24		
Write Data 6:	25	Read Data 6: 25		
Write Data 7:	26	Read Data 7: 26		
Write Data 8:	27	Read Data 8: 0		

Check "Read Tag ID". Notice "Busy" is checked. Uncheck "Read Tag ID".

💀 Modbus RFID Sample					
192.168.1.10	Disconnect				
Tum On Transceiver	Done				
Next Mode	Busy				
🔽 Read Tag ID	Error				
🔲 Read Tag @ Auc ass	Transceiver Connected				
Write Tag to Address	Transceiver On				
🔲 Read Tag Info	Tag Present				
Read Trans Info	Tag Fully Read				
Reset					
Number of Bytes to Read/Write					
8 Bytes 🔻					
Address 0					
Write Data	Read Data				
20 21 22 23	20 21 22 23				
24 25 26 27	24 25 26 27				

Present tag. Notice "Done", "Tag Present", and "Tag Fully Read" are all checked. Also notice the "Read Data" in the lower right corner.



Check "Read Tag Info". Notice "Busy" is checked. Uncheck "Read Tag Info".







Present tag. Notice "Done", "Tag Present", and "Tag Fully Read" are all checked. Also notice the "Read Data" in the lower right corner.

💀 Modbus RFID Sample		
192.168.1.10	Disconnect	
Tum On Transceiver	Done	
Next Mode	Busy	
📃 Read Tag ID	Error	
📃 Read Tag @ Address	Transceiver Connected	
Write Tag to Address	Transceiver On	
🔲 Read Tag Info	🔽 Tag Present	
🔲 Read Trans Info	🔽 Tag Fully Read	
Reset Number of Bytes to Read/Write Bytes		
Address 0		
Write Data 20 21 22 23	Read Data 27 3 0 0	
24 25 26 27	1000	

Note: The "Read Trans Info" check box does not Function. The "Reset" check box resets a "Busy" command. You must check and then uncheck "Reset" to clear a "Busy" command.

🖳 Modbus RFID Sample			
192.168.1.10	Disconnect		
Tum On Transceiver	Done		
Next Mode	Busy		
🔲 Read Tag ID	Error		
🔲 Read Tag @ Address	Transceiver Connected		
🔲 Write Tag to Address 💋	Transceiver On		
🔲 Read Tag Info	Tag Present		
Read Trans Info	Tag Fully Read		
Reset			
Number of Bytes to Read/Write			
8 Bytes			
Address			
0			
Write Data	Read Data		
20 21 22 23	1000		
24 25 26 27	1000		

Note: The "Reset" clears stored "Read Data" and resets a "Busy" command. Start Communication IP Address 192.168.1.10 Connect Transceiver Done Next Busy Tag ID Error Transceiver Connected Read Transceiver On Write Tag Present Tag Info Tag Fully Read Trans Info Reset

Write Data		Write Data	
Write Data 1:	20	 Read Data 1:	0
Write Data 2:	21	Read Data 2:	0
Write Data 3:	22	Read Data 3:	0
Write Data 4:	23	Read Data 4:	0
Write Data 5:	24	Read Data 5:	0
Write Data 6:	25	Read Data 6:	0
Write Data 7:	26	Read Data 7:	0
Write Data 8:	27	Read Data 8:	0

# 3 Scenarios

#### Scenario 1

You could demonstrate how RFID is different from "line of sight" technologies. Try placing a tag under a table, assuming that the table is not metal, point the transceiver toward the tag and demonstrate how data can be written to and read from the tag.

#### Scenario 2

You could demonstrate how RFID works in wet environments. Place the transceiver into a container of liquid, water is probably the easiest. Assuming the container is not metal; you can show the read/write functionality by placing a tag outside the container in the field of the transceiver. This scenario also shows the ingress protection of the transceiver and associated cord set.

#### Scenario 3

It doesn't need to be water and might be better suited to a typical sales call, drop a tag in your coffee cup and have the transceiver read and write data, assuming the coffee cup is not metal this should be a good demonstration of how RFID technology is less susceptible to environmental influences.