

ControlLogix Polling with GW EIP/ASCII..

Integration guide for the GW EIP/ASCII... into ControlLogix using polling



Quick Reference Guide

QRG_920_EN_01_ControlLogix-polling-with-GW-EIP-ASCII.docx

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Pos.	Qty.	Order-No.	Type-Description	Description
1	1	2702772	GW EIP/ASCII 1E/1DB9	EtherNet/IP to ASCII gateway, one Ethernet port, one serial port
		2702773	GW EIP/ASCII 1E/2DB9	EtherNet/IP to ASCII gateway, one Ethernet port, two serial ports
		2702774	GW EIP/ASCII 2E/2DB9	EtherNet/IP to ASCII gateway, two Ethernet ports, two serial ports
		2702776	GW EIP/ASCII 2E/4DB9	EtherNet/IP to ASCII gateway, two Ethernet ports, four serial ports
2	1			ControlLogix PLC
3	1			RSLogix 5000 version 29.00

1 Overview

This document describes how to use RSLogix 5000 to read and write messages to the GW EIP/ASCII... using polling.

With polling, the PLC will request data on a periodic basis. It provides the ability to control the received data flow. However, it does require periodic data requests and the request rate must be fast enough to ensure that the serial port RX queues on the GW EIP/ASCII... do not overflow. The serial or socket data is returned in response to the data request message.

This document assumes the user understands basic electrical concepts including serial and ethernet communication and is proficient in programming using RSLogix 5000.

2 GW EIP/ASCII... web manager

Open a web browser and navigate to the IP address of the GW EIP/ASCII.... To log-in to the web manager use the following credentials:

- Username: Admin
- Password: admin

3 Serial port configuration

Navigate to the Serial Port Configurations tab under Serial Settings and Port 1 Configuration. Confirm the Baud rate, Parity, Data bits, Stop bits, and Flow control to match those of the serial communication device. Refer to Figure 1: Serial port configuration.



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The screenshot displays two configuration panels. The left panel, titled 'Serial Port Configuration', includes fields for Port name (Port 1), Port mode (RS-232), Baud rate (19200), Parity (none), Data bits (8), Stop bits (1), Flow control (none), RS-485 terminating resistor (on), DTR mode (off), RX timeout between packets (30 ms), and a checked box for 'Discard messages with errors'. The right panel, titled 'Raw/ASCII Serial Packet Delimiters', is divided into two sections: 'Detect delimiters from serial device' and 'Append delimiters from PLC'. Each section has dropdowns for Start transmission (STX) and End transmission (ETX), both set to 'none'. Below each dropdown are input fields for Byte 1 and Byte 2, both set to '00' in hexadecimal format. A checked box for 'Strip RX STX/ETX Chars' is also present.

Figure 1: Serial port configuration

Take note of the Start transmission (STX) and End transmission (ETX) settings. When the Start transmission (STX) setting is enabled, the GW EIP/ASCII... detects an STX byte sequence which is configured as one or two bytes when it receives a serial packet. If none is selected, the GW EIP/ASCII... accepts the first byte received after the last End Transmission (ETX) byte(s) as the start of the next data packet. If one byte is selected, the GW EIP/ASCII... starts to collect data when the STX byte is detected. If the first byte is not the STX byte, it discards the byte. The GW EIP/ASCII... continues to discard the bytes until it finds an STX byte. If two bytes is selected, the GW EIP/ASCII... starts to collect data when both of the STX bytes are detected. If the STX bytes cannot be found, it discards the bytes. The GW EIP/ASCII... continues to discard the bytes until it finds the two STX bytes.

- *Byte 1*: Specifies the character that represents the first STX byte. The GW EIP/ASCII... looks for this character in the first STX byte, if the length is one byte or two bytes. Specify a value between 0 and FF in hexadecimal format.
- *Byte 2*: Specifies the character that represents the second STX byte. The GW EIP/ASCII... looks for this character in the second STX byte, only if the length is two bytes. Specify a value between 0 and FF in hexadecimal format.

When the End transmission (ETX) setting is enabled, the GW EIP/ASCII... detects an ETX byte sequence that is configured as one byte or two bytes marking the end of the serial packet. The length indicates the number of ETX bytes; if none is selected, this function is disabled and the GW EIP/ASCII... uses the Rx Timeout Between Packets to indicate the end of data packet. If one byte is selected, the serial data is checked for one ETX byte to identify the end of a serial packet. If two bytes is selected, the serial data is checked for two ETX bytes to identify the end of a serial packet.

- *Byte 1*: Specifies the character that represents the first ETX byte. The GW EIP/ASCII... looks for this character in the first ETX byte, if the length is one byte or two bytes. Specify a value between 0 and FF in hexadecimal format.
- *Byte 2*: Specifies the character that represents the second ETX byte. The GW EIP/ASCII... looks for this character in the second ETX byte, only if the length is two bytes. Specify a value between 0 and FF in hexadecimal format.

Disabling STX and ETX delimiters can help with testing and troubleshooting.

4 Polling

The "Polling" option allows the PLC to periodically request data from the GW EIP/ASCII.... The serial or socket data is returned in the response to the data request message. To use the Polling option, the user must create a program to perform the desired command. In the example the program reads and writes data using contacts, timers, and message blocks configured in RSLogix 5000.

Note: The polling rate must be fast enough to ensure that the serial port RX queues on the GW EIP/ASCII... do not overflow.

4.1 GW EIP/ASCII configuration for polling

In the web manager, navigate to EtherNet/IP Configuration tab under the Serial Settings and Port 1 Configuration tabs. Refer to Table 1: Polling setting configuration and Figure 2: Polling settings in web manager.

Table 1: Polling setting configuration

SETTING	VALUE	DESCRIPTION
PLC type	ControlLogix	Type of controller. ControlLogix messages are formatted differently than MicroLogix messages. Refer to the user manual for additional details.
Transfer mode to PLC	Polling	Communication method
Transfer mode from PLC		Polling does not use this attribute
PLC IP address		Polling does not use this attribute
PLC controller slot number		Polling does not use this attribute
Maximum PLC update rate (ms)		Polling does not use this attribute
Maximum RX packet size (bytes)	244	Specifies the maximum acceptable size of a received packet
Maximum TX packet size (bytes)	240	Polling does not use this attribute
Oversized RX packets	Truncate	Specifies how to process oversized received packets
RX data tag/file name		Polling does not use this attribute

The screenshot shows the 'EtherNet/IP Configuration' tab in the web manager. The 'EtherNet/IP Interface Configuration' section contains the following settings:

- PLC type: ControlLogix (dropdown)
- Transfer mode to PLC: Polling (dropdown)
- Transfer mode from PLC: Write Msg (dropdown)
- PLC IP address: 0.0.0.0 (text input)
- PLC controller slot number: 0 (text input)
- Maximum PLC update rate (ms): 10 (text input)
- Maximum RX packet size (bytes): 244 (text input)
- Maximum TX packet size (bytes): 240 (text input)
- Oversized RX packets: Truncate (dropdown)
- RX data tag/file name: (text input)

The 'Advanced Configuration' section contains the following options:

- Enable TX sequence number check:
- Disable RX queue (to PLC):
- Receive MicroLogix MSB first:
- Transmit MicroLogix MSB first:

Figure 2: Polling settings in web manager

4.2 Read data

Navigate to the "MainRoutine" workspace to create the logic needed to read/write data via polling. Refer to Figure 3: Workspace.

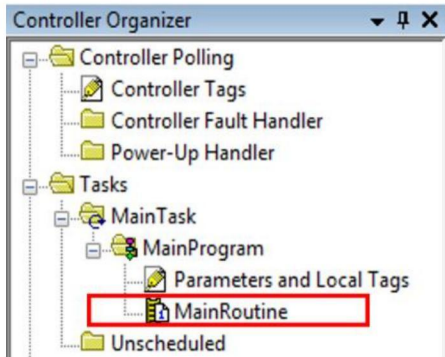


Figure 3: Workspace

Add a rung to the workspace and attach a normally open contact and MSG block. Refer to Figure 4: Read data.

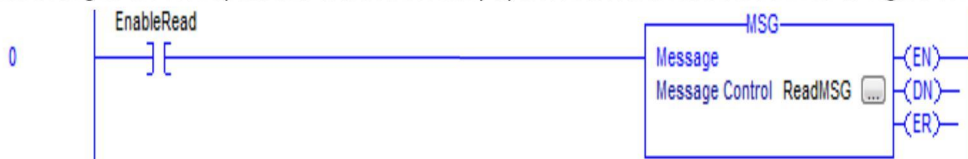


Figure 4: Read data

Double click the question mark above the normally open contact and name the contact. The example uses "EnableRead". Right click the name and select "New "VARIABLE NAME HERE"" and configure the contact in the pop-up window. Ensure it is type BOOL. Refer to Figure 5: Read contact configuration.

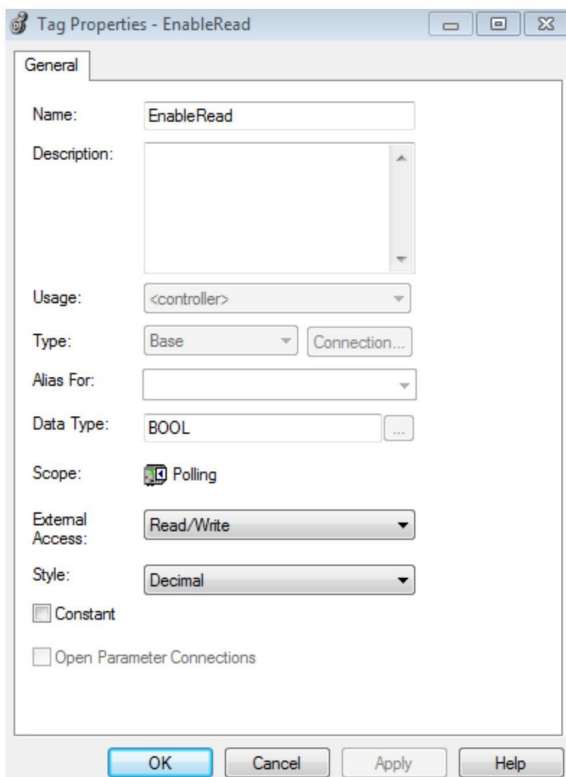


Figure 5: Read contact configuration

Double click the question mark in the “Message Control” category in the MSG block for the read and name it. The example uses “ReadMSG”. Right click and select “New “VARIABLE NAME HERE”” and configure the settings in the pop-up window. Refer to Table 2: Read message block setting configuration and Figure 6: Read MSG configuration.

Table 2: Read message block setting configuration

SETTING	VALUE	DESCRIPTION
Message Type	CIP Generic	
Service Type	Get Attribute Single	
Instance	1	The port used for communication
Class	71	
Attribute	2	Attribute for read
Destination Element	ReadPort1	This needs to be a SINT type long enough to hold the message. Refer to Figure 7: Destination element.

In the “Communication” tab of the “Message Configuration” pop-up window, set the path for communication and apply it. The path’s format is “2, IP OF GW EIP/ASCII...”. The 2 represents the ethernet connection. Refer to Figure 6: Read MSG configuration.

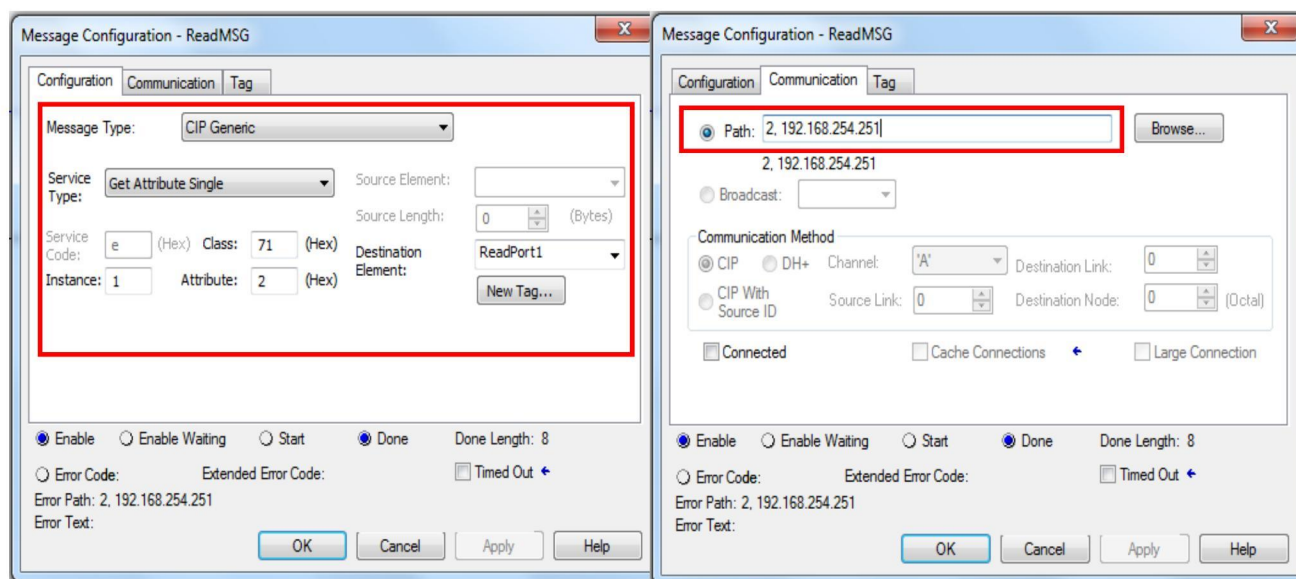


Figure 6: Read MSG configuration

Scope: Polling Show: All Tags

	Name	Alias For	Base Tag	Data Type	Description	External Access
	+ Local:1:C			AB:Embedded_Di...		Read/Write
	+ Local:1:I			AB:Embedded_Di...		Read/Write
	+ Local:1:O			AB:Embedded_Di...		Read/Write
	+ Local:2:C			AB:Embedded_An...		Read/Write
	+ Local:2:I			AB:Embedded_An...		Read/Write
	+ Local:2:O			AB:Embedded_An...		Read/Write
	+ Local:3:C			AB:Embedded_H...		Read/Write
	+ Local:3:I			AB:Embedded_H...		Read/Write
	+ Local:3:O			AB:Embedded_H...		Read/Write
	+ ReadPort1			SINT[248]		Read/Write
	+ WritePort1			SINT[248]		Read/Write
	EnableRead			BOOL		Read/Write

Figure 7: Destination element

To read data, navigate back to the “MainRoutine”. Click on the “Verify Program” button. Refer to Figure 8: Verify program.



Figure 8: Verify program

Set the path of the program to the IP address of the ControlLogix controller. Refer to Figure 9: Path of program.

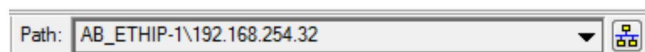


Figure 9: Path of program

Change the controller from “Offline” to “Download” to download the logic to the controller. Once the download is complete switch from “Download” to “Go Online”. The controller will be in “Run” mode now. Refer to Figure 10: Run program.

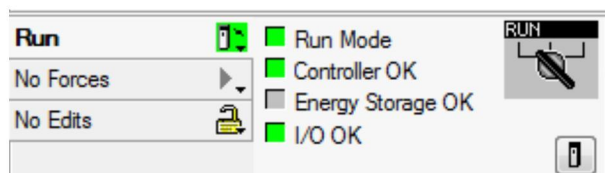


Figure 10: Run program

Send serial data then navigate to the “MainRoutine” and toggle the contact by right-clicking on the contact and selecting “Toggle Bit”. Navigate to “Controller Tags” and monitor the tag created for the read’s “Destination Element”. The example created “ReadPort1” as the destination element to monitor. Refer to Figure 11: Read data on PLC.

ReadPort1	{...}	{...}	Decimal	SINT[248]
+ ReadPort1[0]	87		Decimal	SINT
+ ReadPort1[1]	0		Decimal	SINT
+ ReadPort1[2]	10		Decimal	SINT
+ ReadPort1[3]	0		Decimal	SINT
+ ReadPort1[4]	49		Decimal	SINT
+ ReadPort1[5]	50		Decimal	SINT
+ ReadPort1[6]	51		Decimal	SINT
+ ReadPort1[7]	52		Decimal	SINT
+ ReadPort1[8]	53		Decimal	SINT
+ ReadPort1[9]	54		Decimal	SINT
+ ReadPort1[10]	55		Decimal	SINT
+ ReadPort1[11]	56		Decimal	SINT
+ ReadPort1[12]	57		Decimal	SINT
+ ReadPort1[13]	57		Decimal	SINT

Sequence Number
 Message Length
 Start of data

Figure 11: Read data on PLC

The web manager for the GW EIP/ASCII... verifies the read. Refer to Figure 12: Read data on web manager.

Serial Receive/Transmit Logs - Format: Pkt(n) ddd hh:mm:ss:mss:Tx/Rx:(data)

Reset Log

Port 1 RX/TX Packets (first 128 packets, max of 128 bytes):

Pkt(0): 006 20:24:41.188:Rx:1234567891234567899

Figure 12: Read data on web manager

4.3 Write data

Navigate to the “MainRoutine” workspace on RSLogix 5000 to create the logic needed to read/write data via polling. Refer to Figure 3: Workspace.

Add a rung to the workspace and attach a normally open contact and MSG block. Refer to Figure 13: Write message logic.

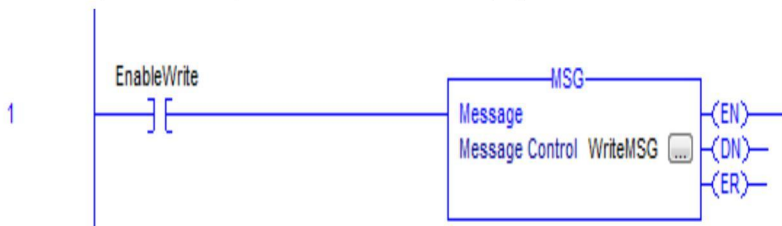


Figure 13: Write message logic

Double click the question mark above the normally open contact and name it. The example uses “EnableWrite”. Right click on the name and select “New “VARIABLE NAME HERE”” and configure the contact in the pop-up window. Make sure it is type BOOL. Refer to Figure 14: Contact configuration.

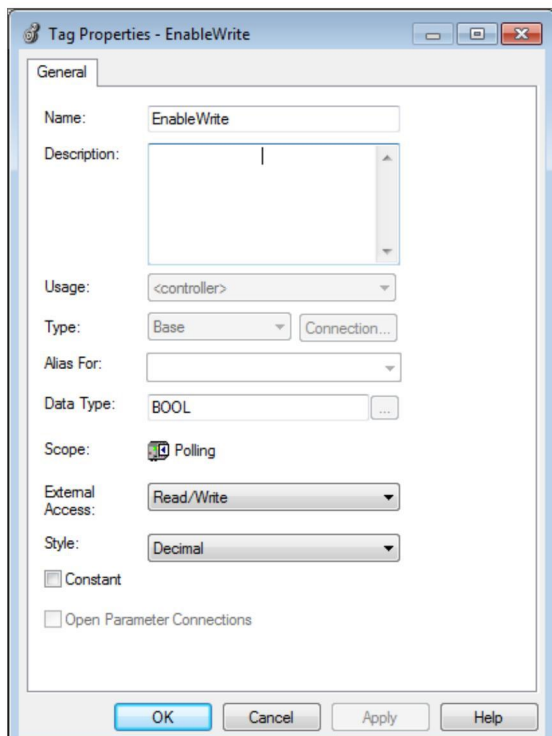


Figure 14: Contact configuration

Double click the question mark in the “Message Control” category in the MSG block for the write and name it. The example uses “WriteMSG”. Right click and select “New “VARIABLE NAME HERE”” and configure the settings in the pop-up window. Refer to Table 3: Write message block setting configuration.

Table 3: Write message block setting configuration

SETTING	VALUE	DESCRIPTION
Message Type	CIP Generic	
Service Type	Set Attribute Single	
Instance	1	The port used for communication
Class	71	
Attribute	1	Attribute for write
Source Length	50	The length in bytes. Needs to be at least four times the size of the message length because the messages are SINT's which are 4 bytes each. EX: If the message length is 4, the source length needs to be at least 16. Can be longer than needed.
Source Element	WritePort1	This needs to be a SINT type long enough to hold the message. Refer to Figure 15: Write MSG configuration.

In the “Communication” tab of the “Message Configuration” pop-up window, set the path for communication and apply it. The path’s format is “2, IP OF GW EIP/ASCII...”. The 2 represents the ethernet connection. Refer to Figure 15: Write MSG configuration.

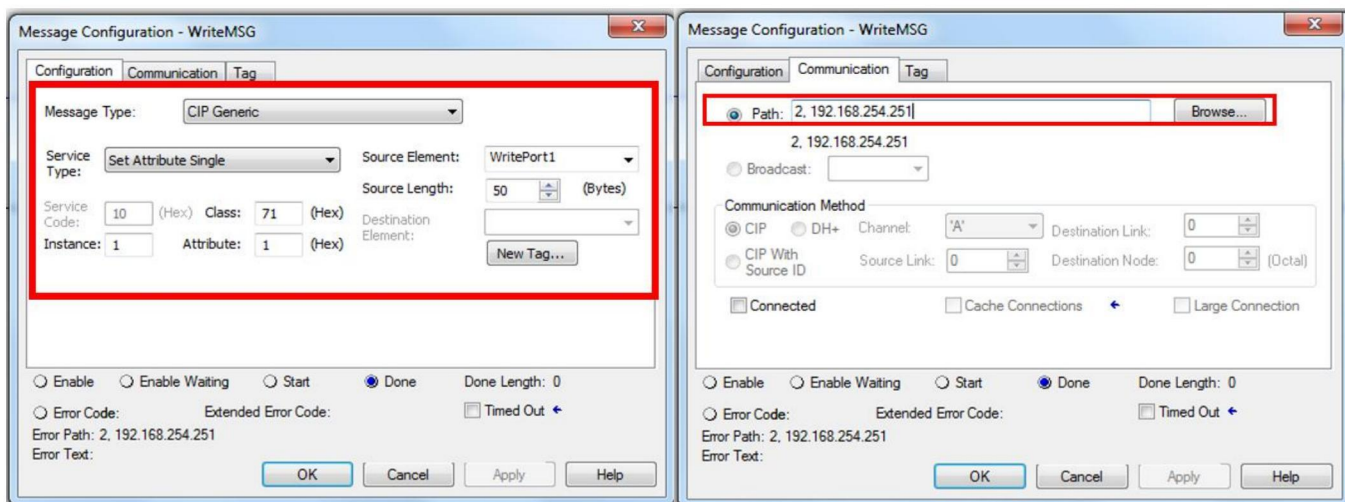


Figure 15: Write MSG configuration

To write data, navigate to the “MainRoutine” on RS Logix 5000. Click on the “Verify Program” button. Refer to Figure 8: Verify program.

Set the path of the program to the IP address of the MicroLogix controller. Refer to Figure 9: Path of program.

Change the controller from “Offline” to “Download” to download the logic to the controller. Once the download is complete switch the controller from “Download” to “Go Online”. The controller will be in “Run” mode now. Refer to Figure 10: Run program.

To write data, navigate to the destination element created in the write MSG block. The first two bytes of the message are the sequence number. Each successive message must have an incremented number, or the message will not send. The second two bytes determine to the size of the message in bytes. Any data outside of this range will not be accessible. Byte 4 and the subsequent bytes contain the data Refer to Figure 16: Write tag configuration.

Name	Value	Force Mask	Style	Data Type
WritePort1	{...}	{...}	Decimal	SINT[248]
+ WritePort1[0]	1		Decimal	SINT ← Sequence Number
+ WritePort1[1]	0		Decimal	SINT
+ WritePort1[2]	5		Decimal	SINT ← Message Length
+ WritePort1[3]	0		Decimal	SINT
+ WritePort1[4]	48		Decimal	SINT ← Start of data
+ WritePort1[5]	49		Decimal	SINT
+ WritePort1[6]	50		Decimal	SINT
+ WritePort1[7]	51		Decimal	SINT
+ WritePort1[8]	52		Decimal	SINT
+ WritePort1[9]	0		Decimal	SINT
+ WritePort1[10]	0		Decimal	SINT

Figure 16: Write tag configuration

Navigate to the “MainRoutine” on RS Logix 5000 and toggle the contact by right-clicking on the contact and selecting “Toggle Bit”. Navigate to the web manager for the GW EIP/ASCII... to see the data written to the PLC. Refer to Figure 17: Data written to PLC.

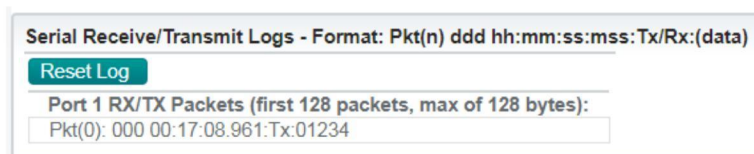


Figure 17: Data written to PLC