

How to...

echochange

Setting up data exchange between a Siemens S7-1200 and an Allen-Bradley ControlLogix, using Siemens PUT and GET functions



Version: E-032014-01

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1 Introduction

This document provides step by step instructions on how to establish data exchange between a Siemens S7-300 PLC and an Allen-Bradley ControlLogix PLC, using a Softing “echochange” protocol converter.

General description of the presented example

- Both PLCs and the echochange are in the same network.
- The S7-1200 controls the flow of communications, using PUT and GET functions.
- The PUT function is used to write data from a S7-1200 data block (**Data_to_CLX**, 1 byte) onto a ControlLogix tag (**Data_from_S7**).
- The GET function is used to read data from a ControlLogix tag (**Data_to_S7**, integer array of 50 elements) and store it onto an S7-1200 data block (**Data_from_CLX**).

Software used

- Siemens TIA Portal V12 SP1
- Allen-Bradley RSLogix 5000 V20.01.00 (CPR 9 SR 5)
- Allen-Bradley RSLinx Classic Lite V2.59.02 (CPR 9 SR 5)
- Softing NetCon echo V4.33

Conventions

The following conventions are used throughout Softing customer documentation:

Keys, buttons, menu items, commands and other elements involving user interaction are set in bold font and menu sequences are separated by an arrow

Open **Start** → **Control Panel** → **Programs**

Buttons from the user interface are enclosed in brackets and set to bold typeface

Press **[Start]** to start the application

Coding samples, file extracts and screen output is set in Courier font type

MaxDlsapAddressSupported=23

Filenames and directories are written in italic

Device description files are located in C:
*\StarterKit\delivery\software\Device
Description files*

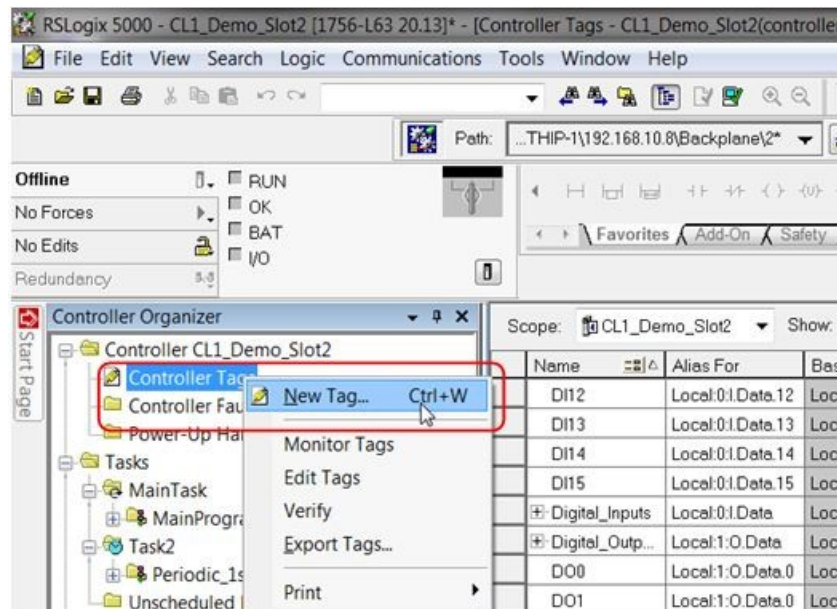


Note

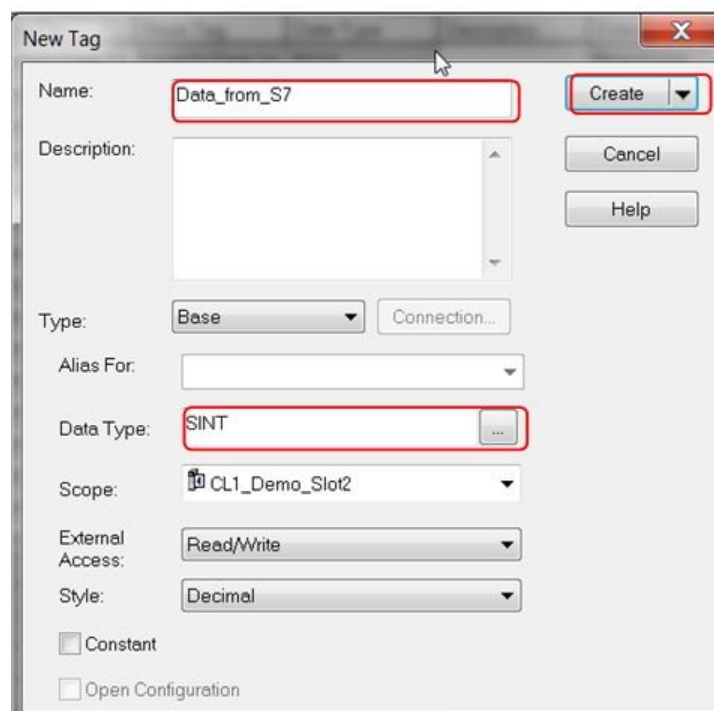
This symbol is used to call attention to notable information that should be followed during installation, use, or servicing of this device.

2 RSLogix 5000- create tags to send and receive data

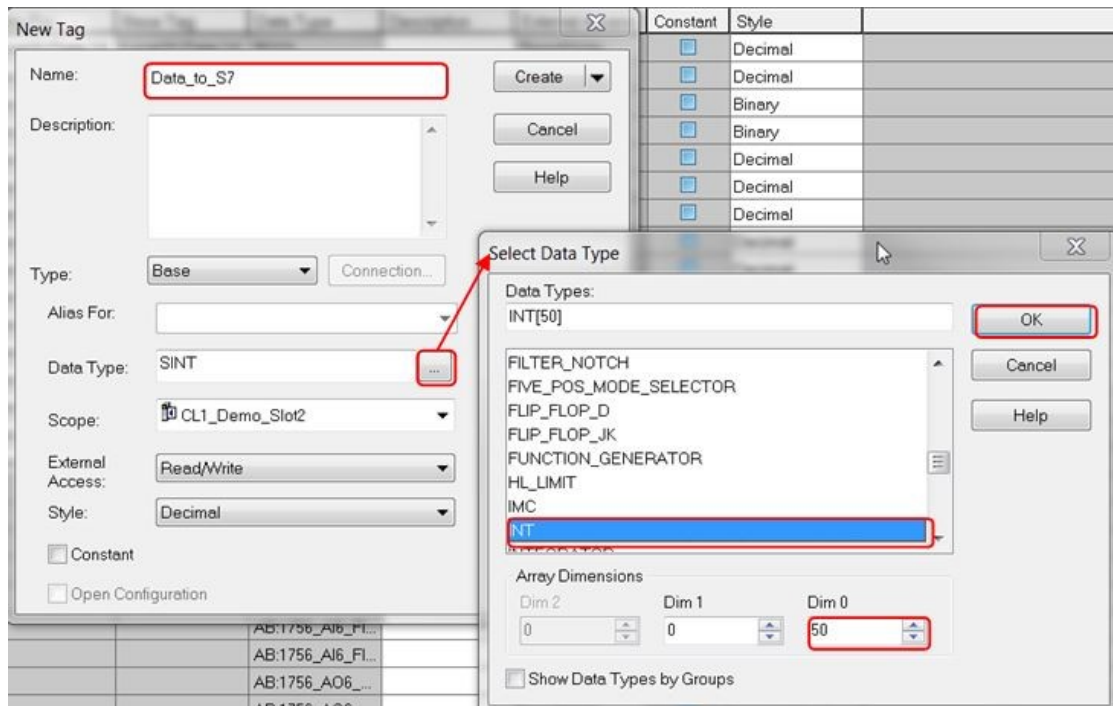
1. Create a tag to receive data from the S7-300 PLC. In this example we will create a SINT tag (short integer, 1 byte).
 - a. In the **Controller Organizer** section, right-click on **Controller Tags** and then click on **New Tag...**



- b. Enter a tag name, select data type **SINT** and click **Create**.



- Use the previous method to create a tag for the S7-300 to read. We will create an INT (integer) array with 50 elements.



- This is how the new tags should look in the **Controller Tags** table:

scope: CL1_Demo_Slot2 Show: All Tags								
Name	Alias For	Base Tag	Data Type	Description	External Access	Constant	Style	
AI0	Local:3:I.Ch0Data	Local:3:I.Ch0Data	REAL		Read/Write	<input type="checkbox"/>	Float	
AI1	Local:3:I.Ch1Data	Local:3:I.Ch1Data	REAL		Read/Write	<input type="checkbox"/>	Float	
AO0	Local:4:O.Ch0D...	Local:4:O.Ch0D...	REAL		Read/Write	<input type="checkbox"/>	Float	
AO1	Local:4:O.Ch1D...	Local:4:O.Ch1D...	REAL		Read/Write	<input type="checkbox"/>	Float	
BitCounter			COUNTER[10]		Read/Write	<input type="checkbox"/>		
Data_from_S7			SINT		Read/Write	<input type="checkbox"/>	Hex	
Data_to_S7			INT[50]		Read/Write	<input type="checkbox"/>	Decimal	
DI0	Local:0:I.Data 0	Local:0:I.Data 0	BOOL		Read/Write	<input type="checkbox"/>	Decimal	

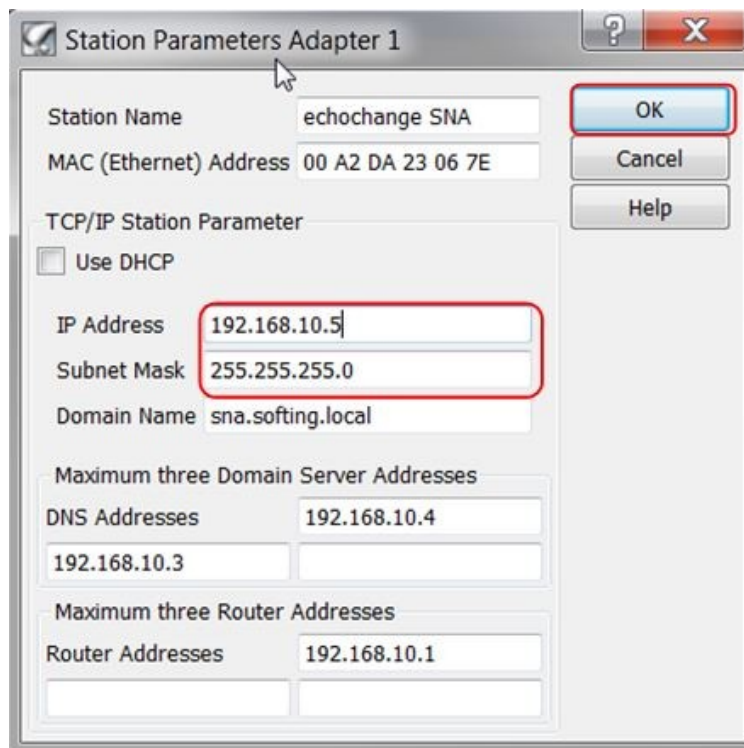
- Download the project to the ControlLogix device.

3 NetCon echo – echochange network settings

1. Configure the network settings of the echochange port to be used. We will use port 1 (Eth 1).
 - a. Click on **Station** → **Own Station 1**.

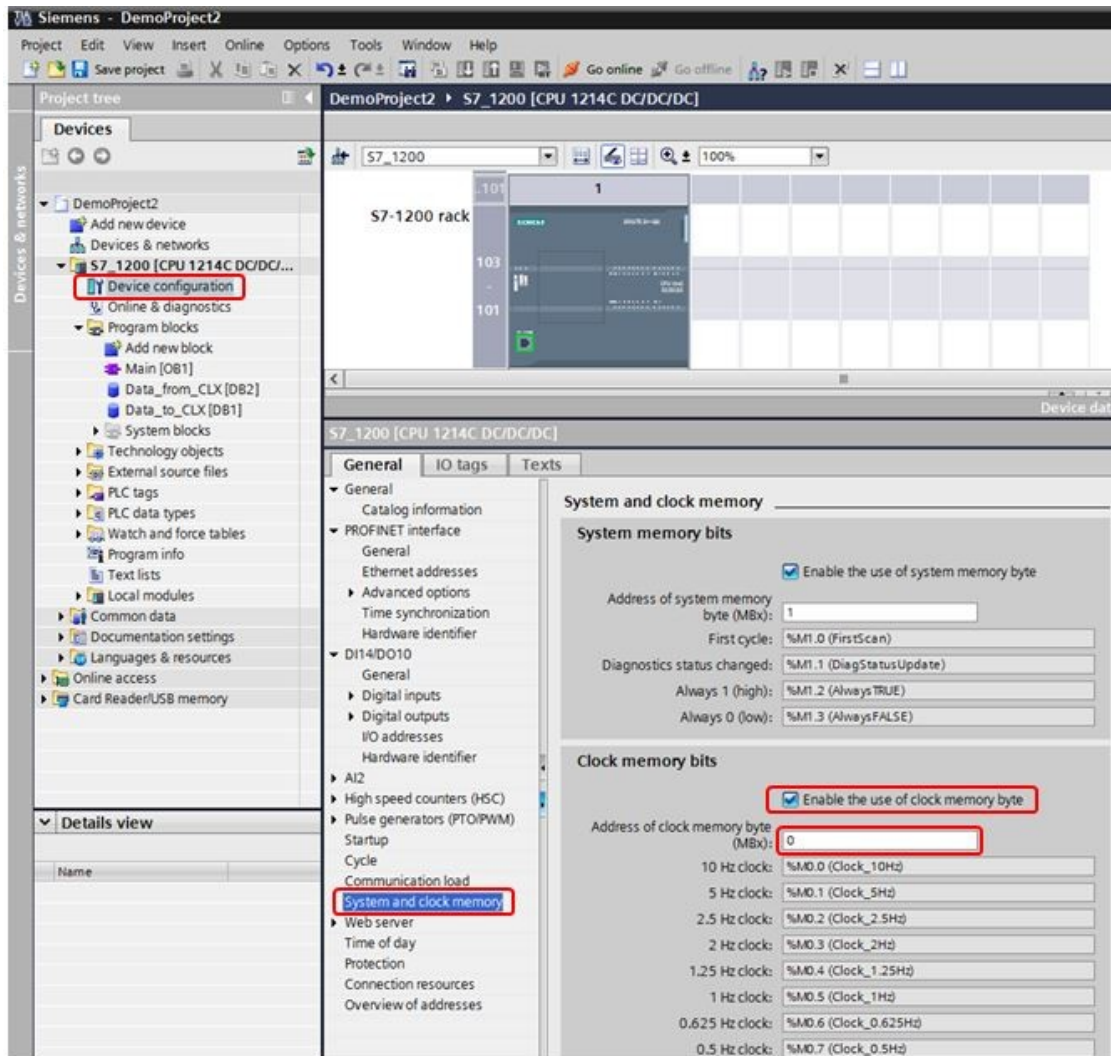


- b. As a minimum, the IP address and subnet mask are required. DNS and Router addresses may be necessary in some cases.

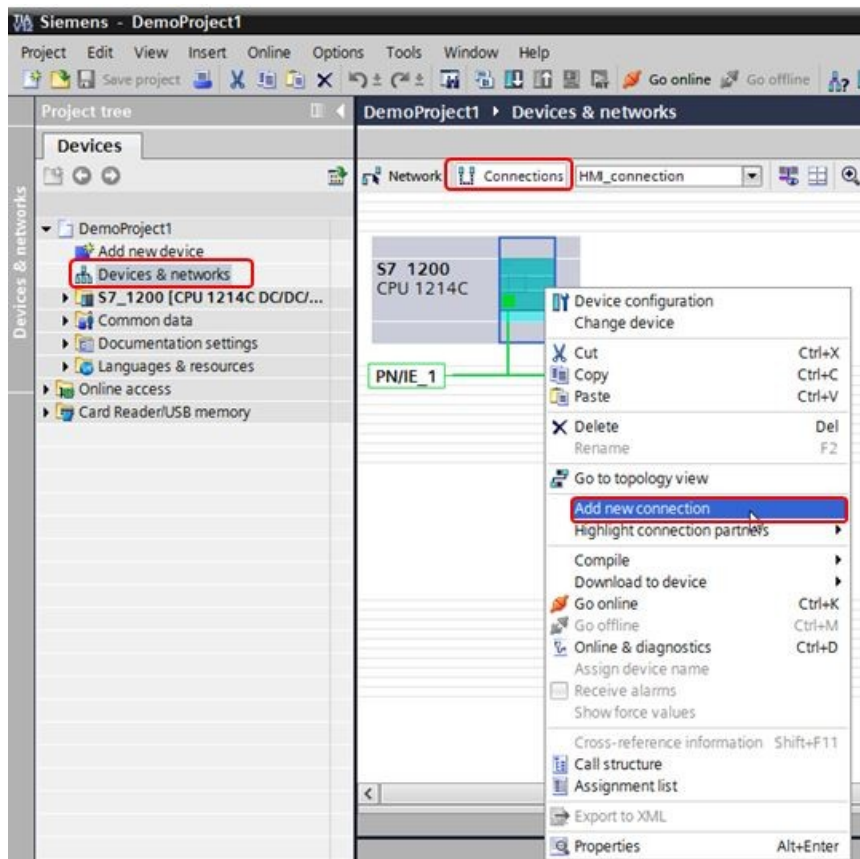


4 TIA portal setup

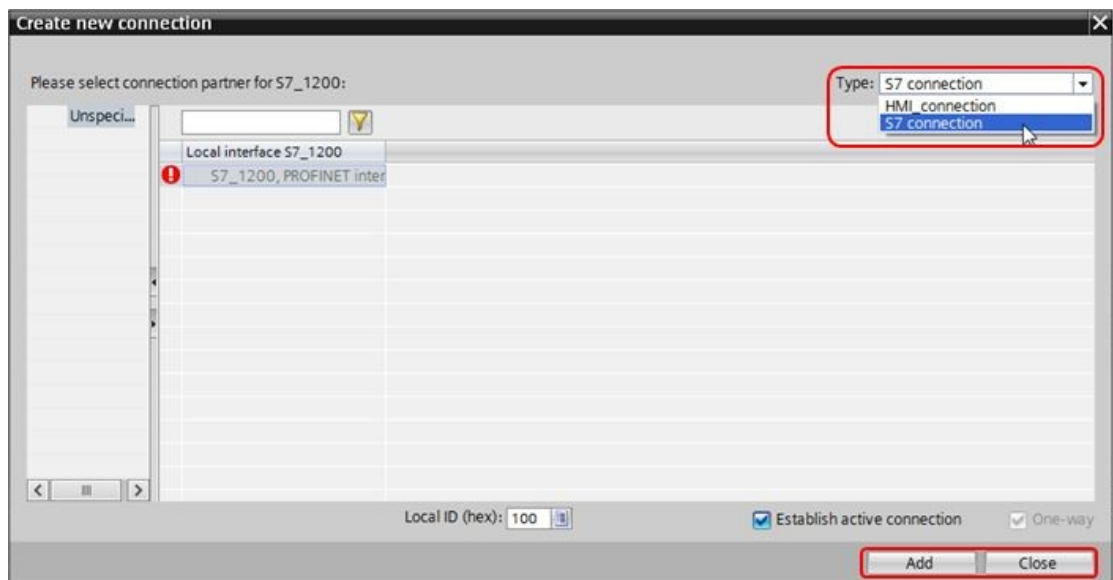
1. Open or create your project.
2. Enable the clock memory byte, as we will need a cyclic trigger. We use MB0.



3. Create a new connection.



4. Select **S7 connection** from the drop-down menu.



5. Click **[Add]**, then **[Close]**.

6. Name the connection. Under the **Partner** section, enter the IP address of the echochange and select **Unknown** for the **Interface**.

echochange [S7 connection]

General | IO tags | Texts

General

Local ID

Special connection properties...

Address details

Connection

Name: echochange

Connection path

Local

Partner

End point: S7_1200

Interface: S7_1200, PROFINET interface_1[X1:PN]

Interface type: Ethernet

Subnet: PN/IE_1

Address: 192.168.10.7

Unknown

Unknown

Ethernet

192.168.10.5

Find connection path

7. The echochange accepts TSAPs from 2 to 8 bytes long. The **SIMATIC-ACC** option must be disabled and the TSAPs have to be manually configured.
8. We chose the first available **Connection res.** value (10) resulting in local TSAP 10.01. We recommend using the same TSAP for the Partner to avoid confusion.

echochange [S7 connection]

General | IO tags | Texts

General

Local ID

Special connection properties...

Address details

Address details

Local

Partner

End point: S7_1200

Rack/slot: 0 1

Connection res. (hex): 10

TSAP: 10.01

☐ SIMATIC-ACC

Subnet ID: 4F6D-0000-0001

Unknown

0 1

10

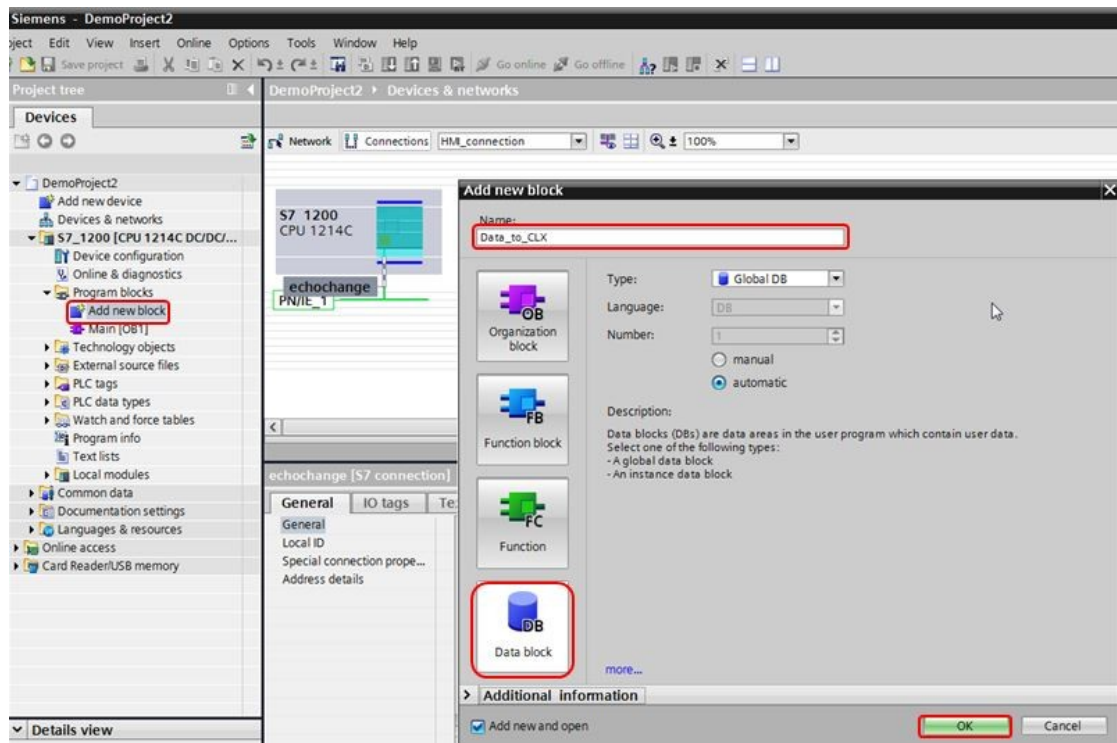
10.01

☐ SIMATIC-ACC

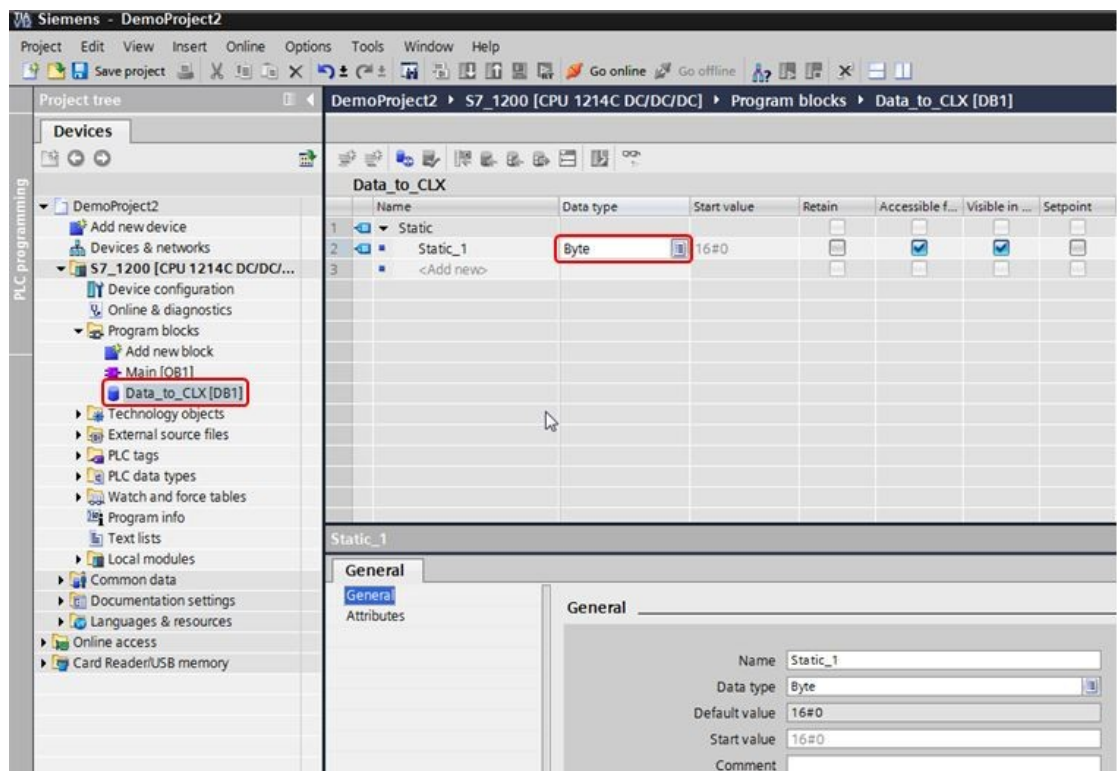
-

9. Create a data block for the data to be sent to the ControlLogix PLC (1 byte):

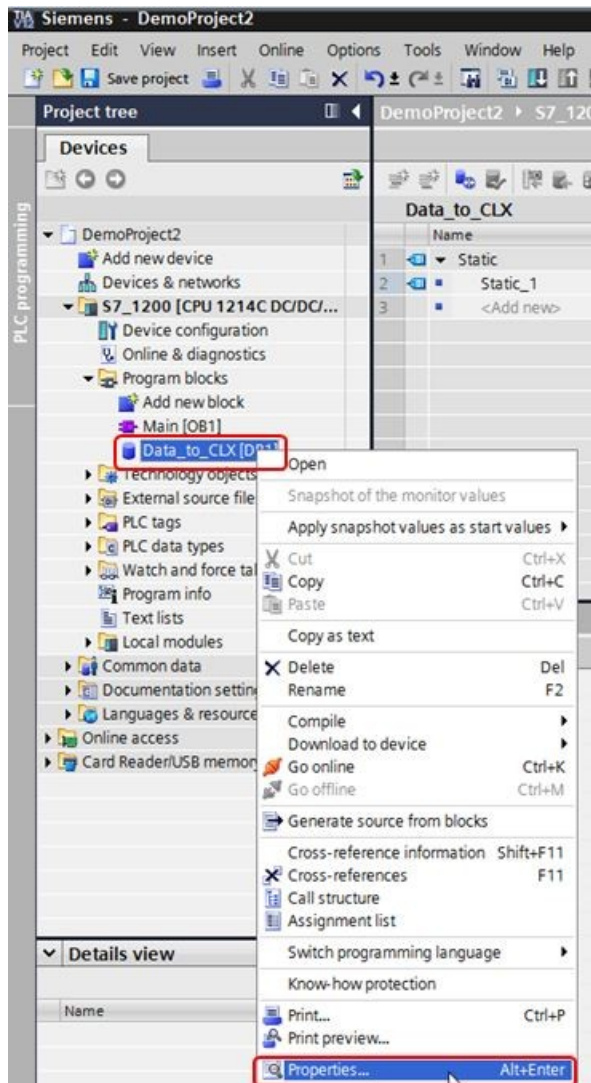
10. Double-click on **Add new block**. In the new **Add new block** window, select **Data block** and enter a name (**Data_to_CLX** in our example).



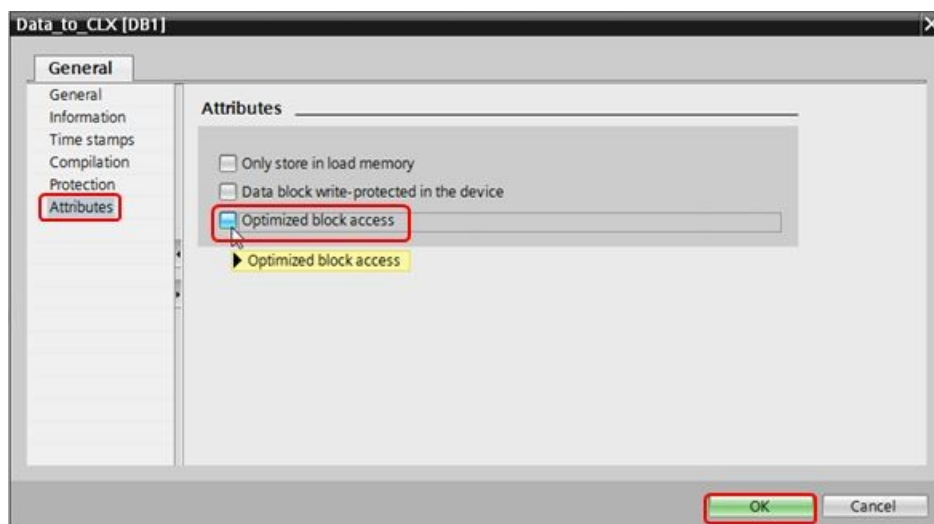
11. After clicking [OK], select **Byte** for the data type.



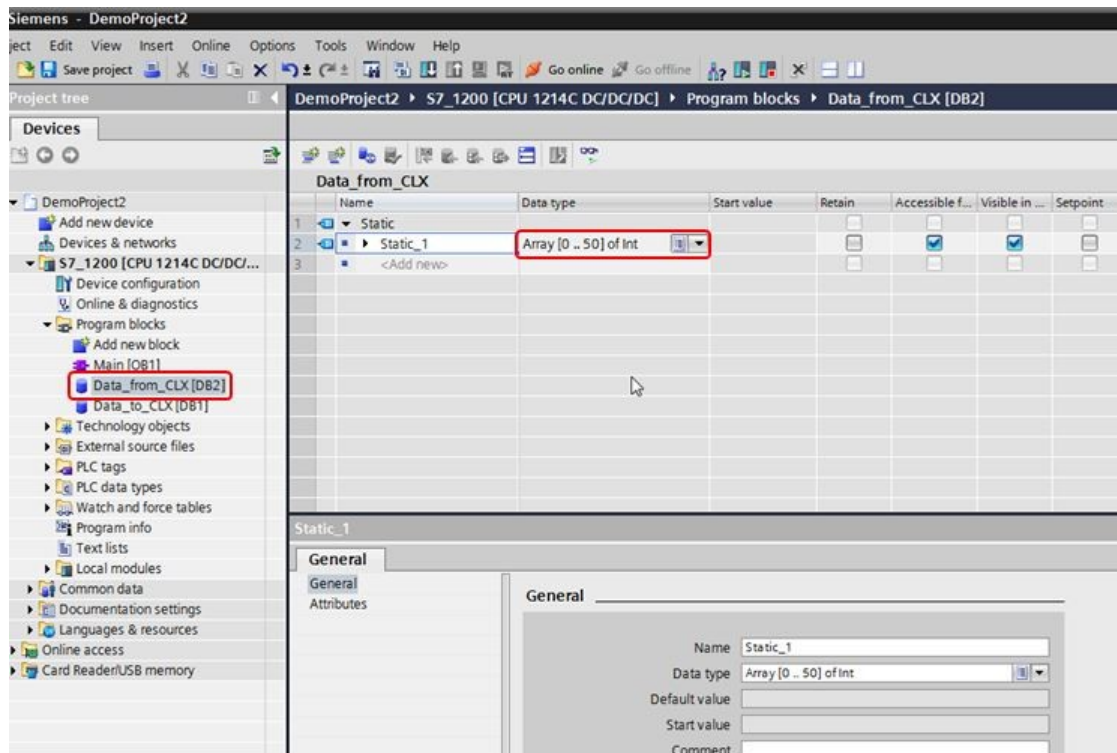
12. Right click on the new data block and click on **Properties**.



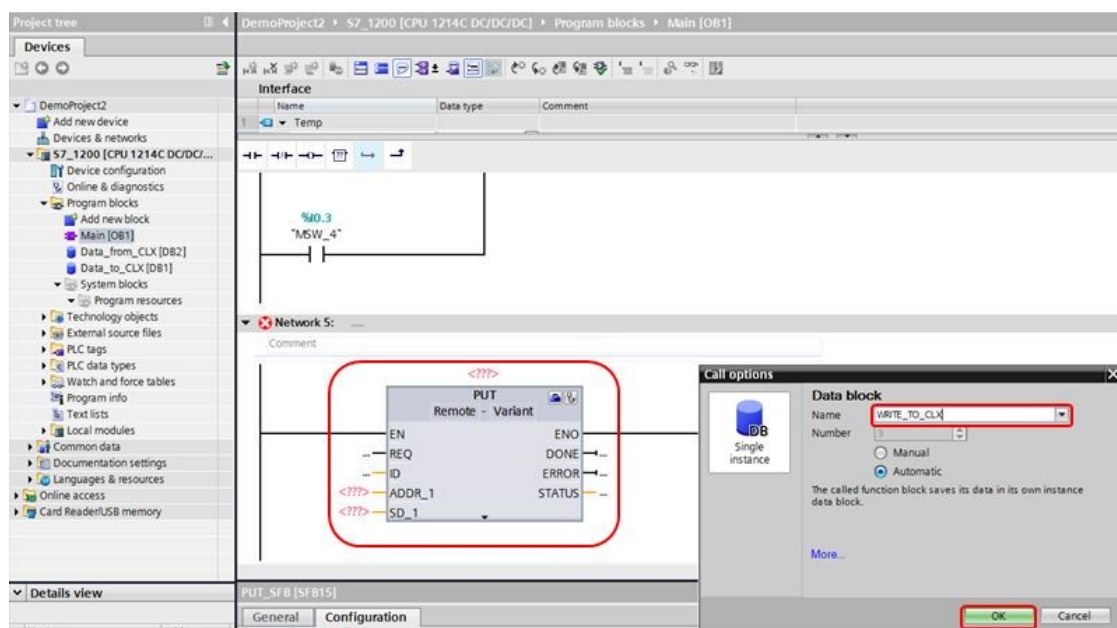
13. We will use **ANY** type pointers as input parameters in our GET and PUT function blocks, therefore we need to uncheck **Optimized block access** (see **Basics of block access** section in TIA Portal's help).



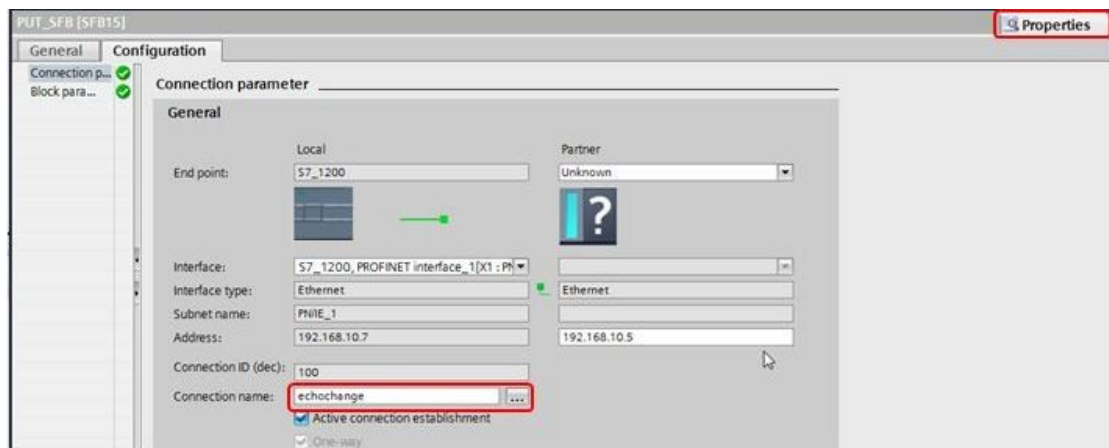
14. Create a data block for the data to be read from the ControlLogix PLC following the same method described previously. We name it **Data_from_CLX** and make it an integer array of 50 elements.



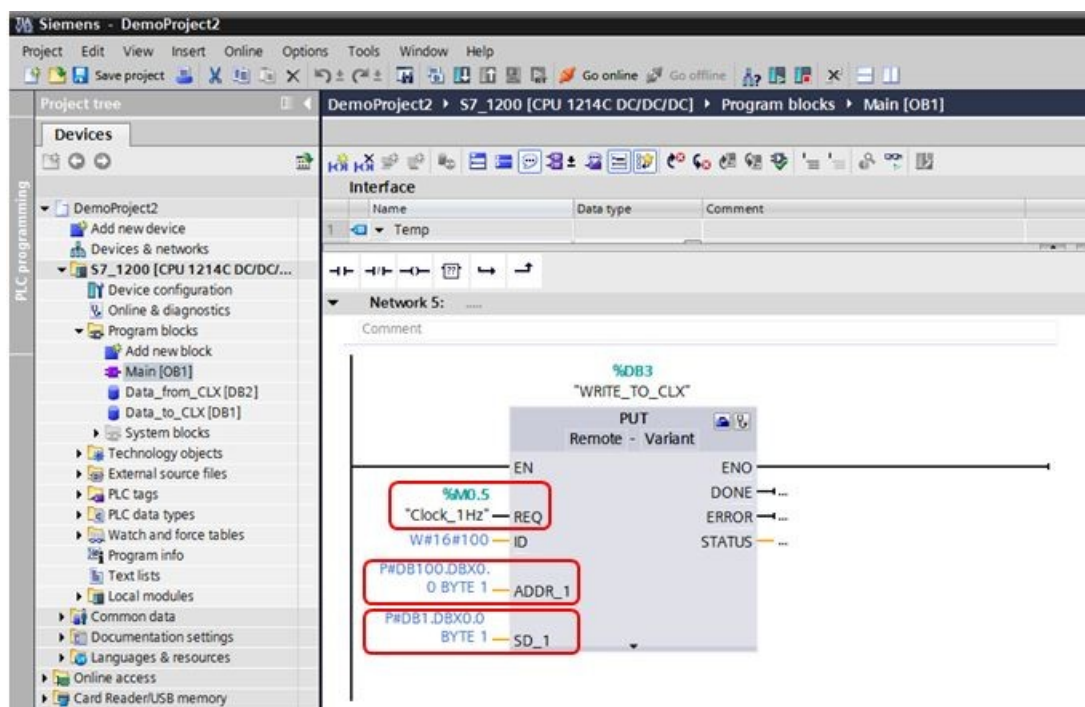
15. Also uncheck **Optimized block access** as previously described.
16. Add a PUT function on your program to write data to the ControlLogix PLC, and name it. We call it **WRITE_TO_CLX** in this example.



17. Select **echochange** for the **Connection name**.

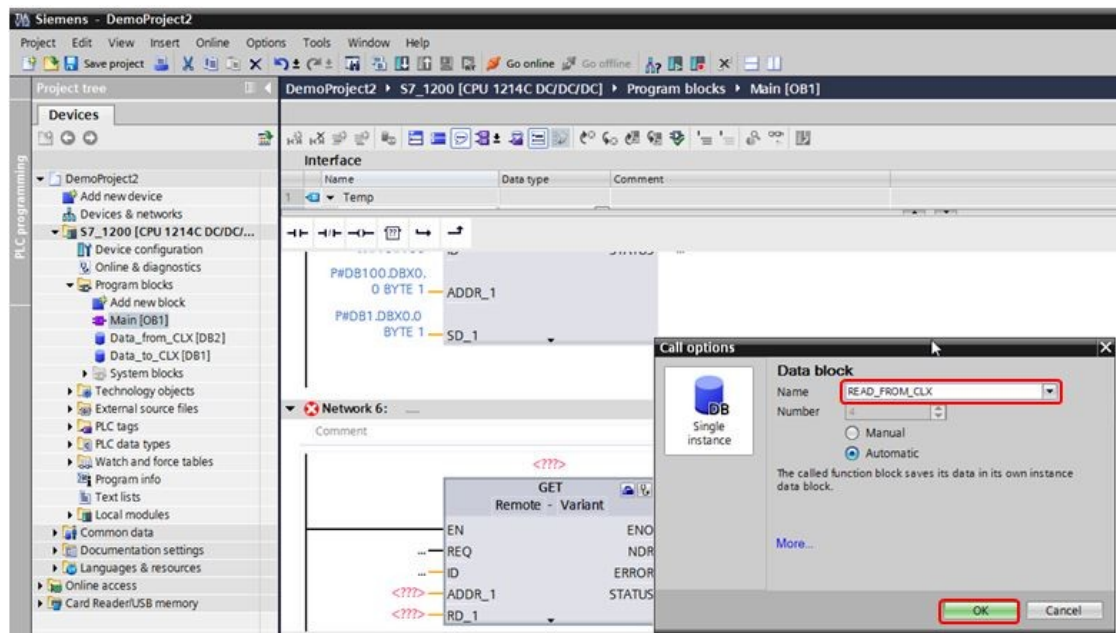


18. Enter the required parameters for the PUT function.

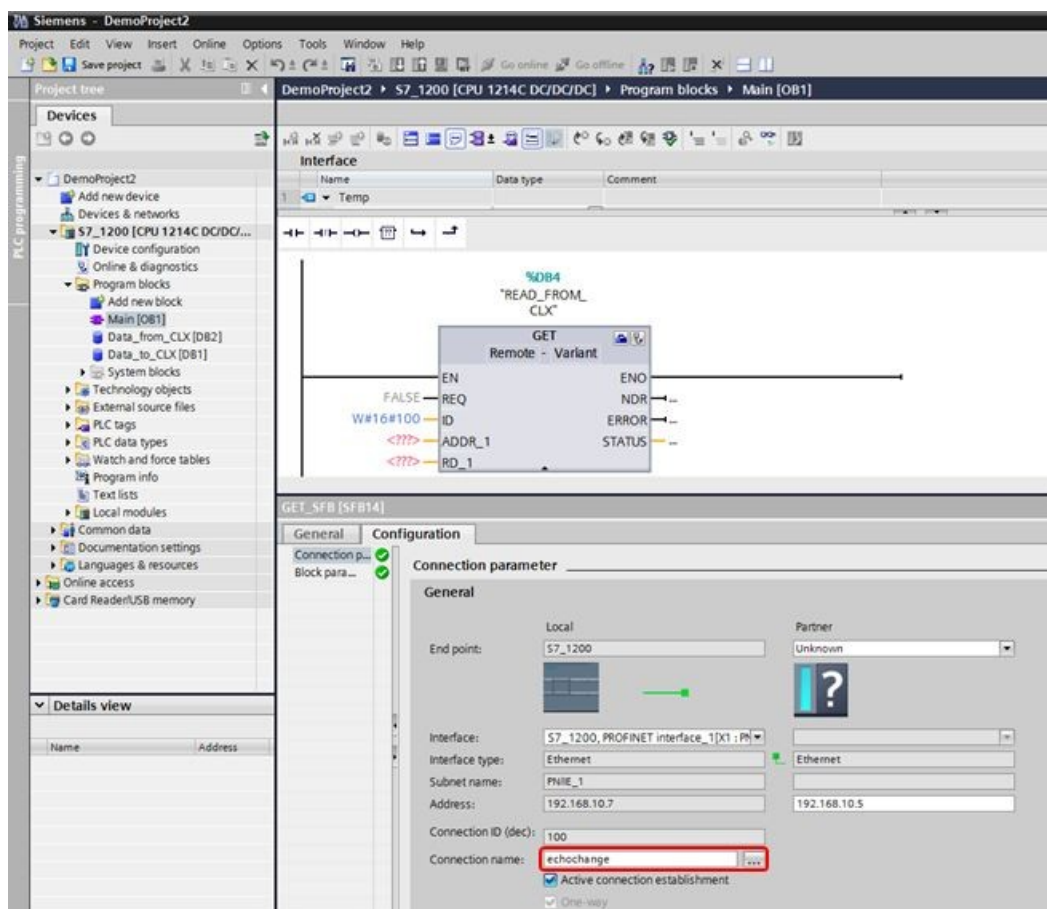


- **REQ:** control parameter request, activates the data exchange on a rising edge. We use M0.5, which is a 1 Hz clock bit from the clock memory byte we enabled at the start of this section.
- **ADDR_1:** pointers to the areas on the partner CPU to which the data will be written. This address will be mapped in the echochange.
P#DB100.DBX0.0 BYTE 1: pointer to data block 100, byte offset 0, bit offset 0, of data type BYTE, 1 element.
- **SD_1:** pointers to the areas on the local CPU which contain the data to be sent.
P#DB1.DBX0.0 BYTE 1: pointer to data block 1 (Data_to_CLX), byte offset 0, bit offset 0, of data type BYTE, 1 element.

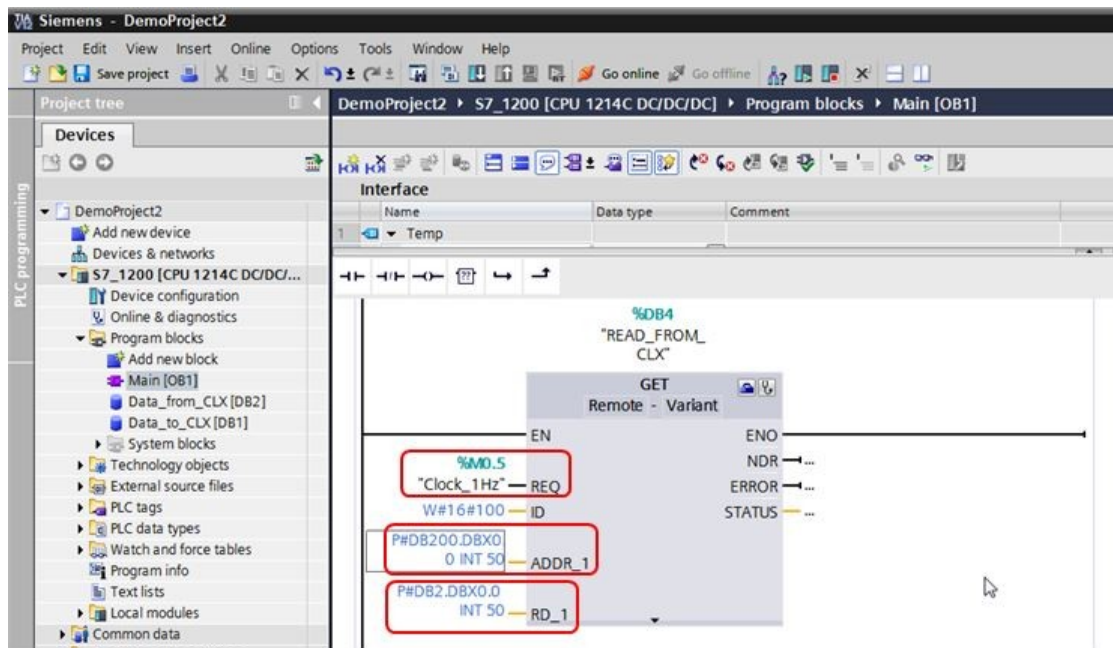
19. Add a GET function on your program to read data from the ControlLogix PLC, and name it. We call it **READ_FROM_CLX** in this example.



20. Select **echochange** for the **Connection name**.



21. Enter the required parameters for the GET function.

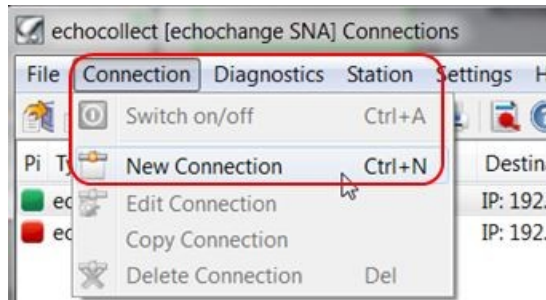


- REQ: control parameter request, activates the data exchange on a rising edge. We use M0.5, which is a 1 Hz clock bit from the clock memory byte we enabled at the start of this section.
- ADDR_1: pointers to the areas on the partner CPU that are to be read. This address will be mapped in the echochange.
P#DB200.DBX0.0 INT 50: pointer to data block 200, byte offset 0, bit offset 0, of data type INT, 50 elements.
- RD_1: pointers to the areas on the local CPU in which the read data will be entered.
P#DB2.DBX0.0 INT 50: pointer to data block 2 (Data_from_CLX), byte offset 0, bit offset 0, of data type INT, 50 elements.

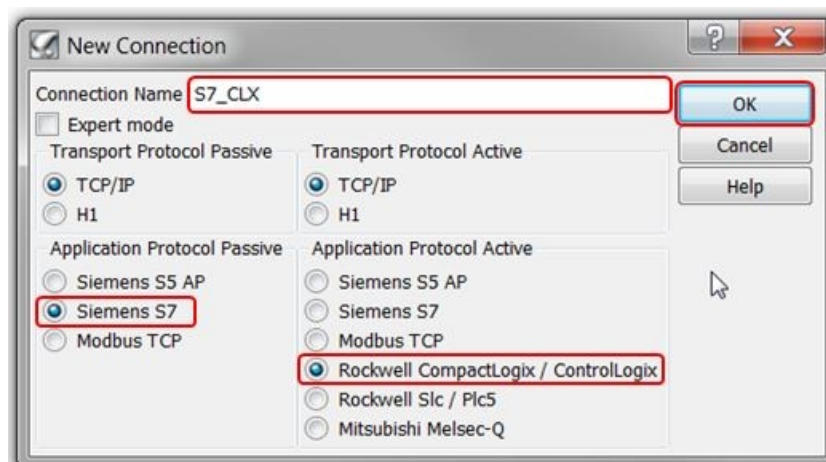
22. Compile and download the project to the S7-1200 device.

5 NetCon echo - establish the connections

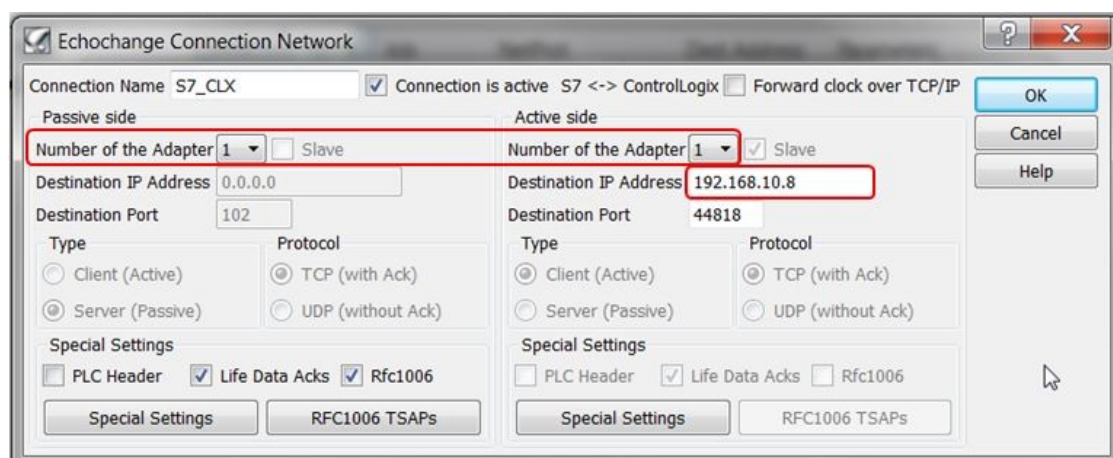
1. Create a new connection.



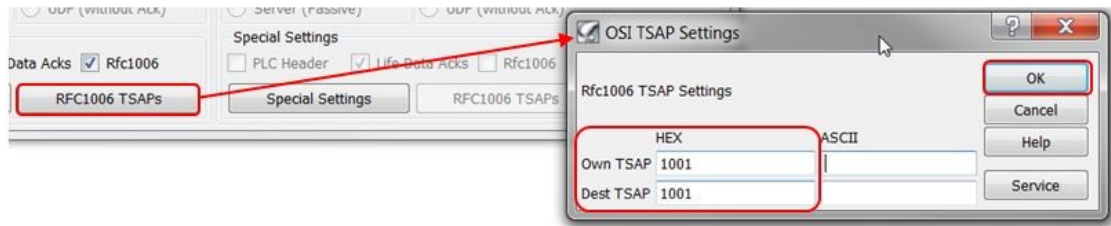
2. Enter a connection name and select **Siemens S7** under the **Application Protocol Passive** section and **Rockwell CompactLogix/ControlLogix** under the **Application Protocol Active** section.



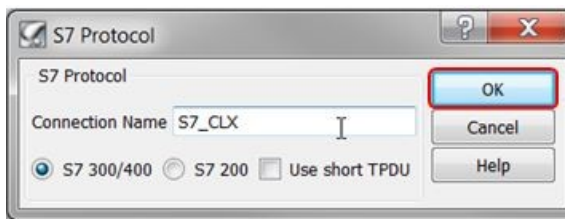
3. Since we are only using port 1 (Eth 1), we will leave the **Number of Adapter** at 1.
4. Enter the IP of the ControlLogix PLC on the **Destination IP Address**, under the **Active side** section.



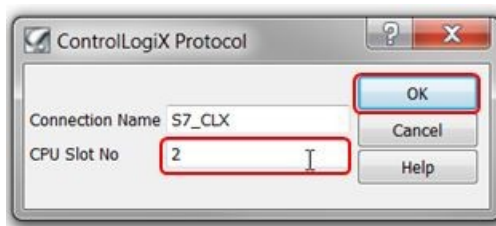
- Click on **RFC1006 TSAPs** and enter the TSAPs chosen in TIA PORTAL.



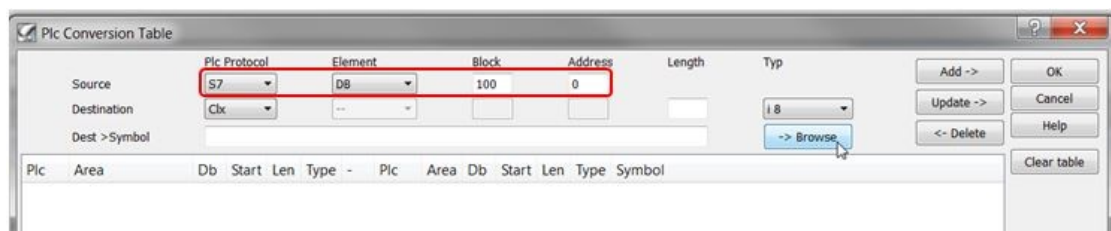
- After clicking **[OK]** on the **Echochange Connection Network** window, click **[OK]** on the next window:



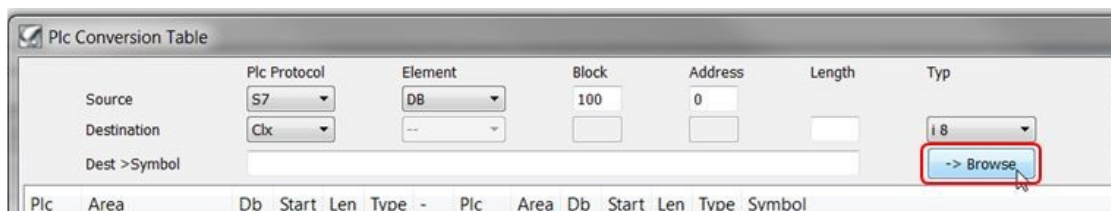
- Enter the ControlLogix CPU slot. In our case we use slot 2.



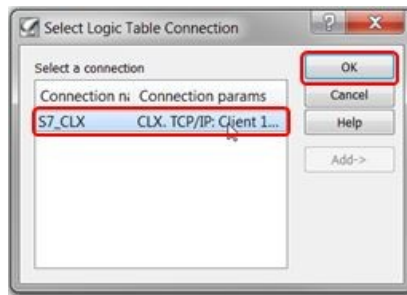
- The **PLC Conversion Table** will come up. Here you will link the S7-1200 data areas with the ControlLogix tags.
- First map the S7 data area to be written to the ControlLogix tag. We used P#DB100.DBX0.0 BYTE 1 for the ADDR_1 parameter in our PUT instruction, so in the echochange we specify **DB100** with **0** offset as follows:



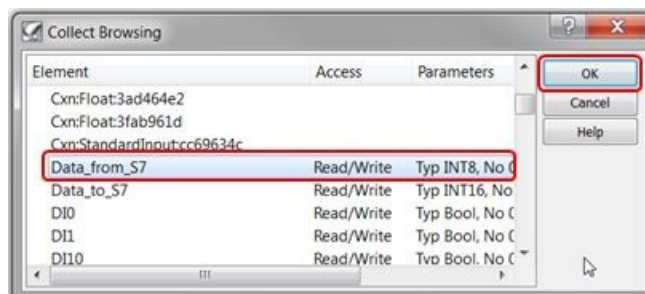
- Click on **[> Browse]** to select the respective ControlLogix tag.



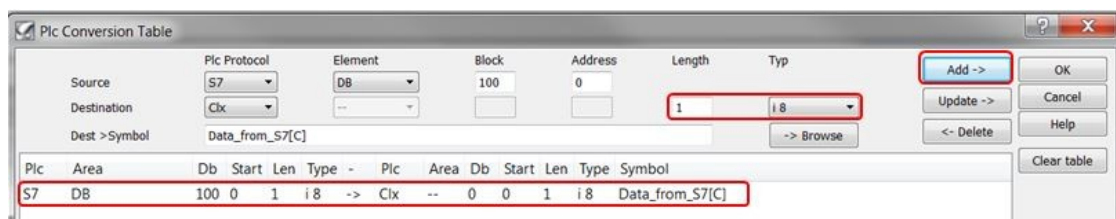
11. Select the connection you created and click **[OK]**.



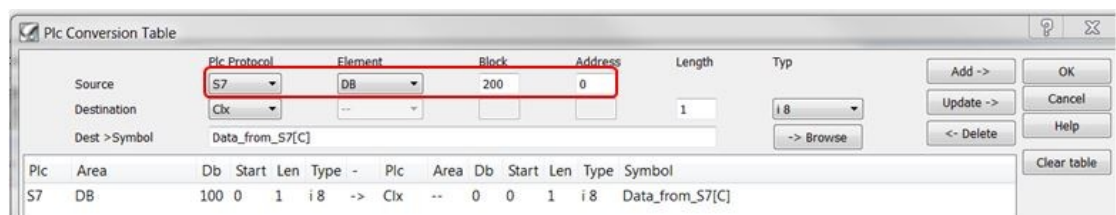
12. Select the tag and click **[OK]**.



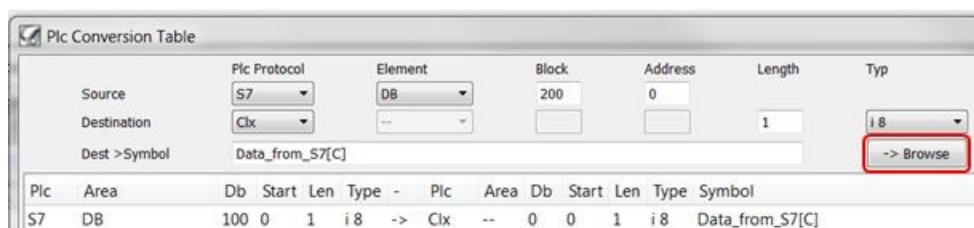
13. Enter the data length and type (1, byte) and click on **[Add →]** to add the mapping to the conversion table.



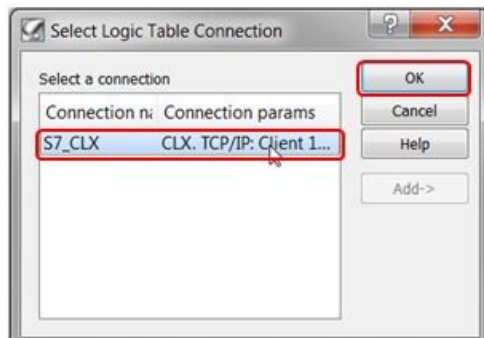
14. Now map the S7 data area used to read from the ControlLogix tag. We used P#DB200.DBX0.0 BYTE 1 for the ADDR_1 parameter in our GET instruction, so in the echochange we specify **DB200** with **0** offset as follows:



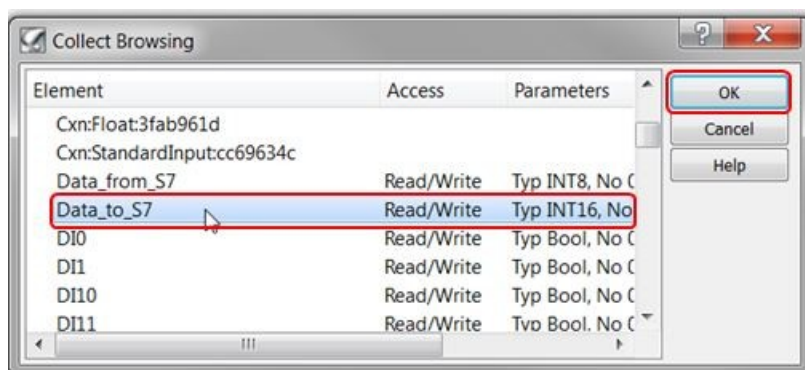
15. Click on **[→ Browse]** to look for the respective ControlLogix tag.



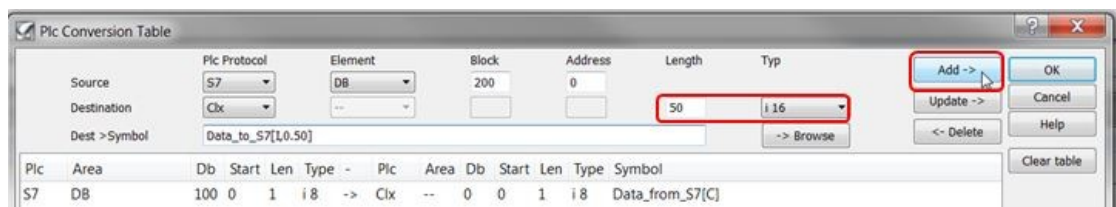
16. Select the connection you created and click **[OK]**.



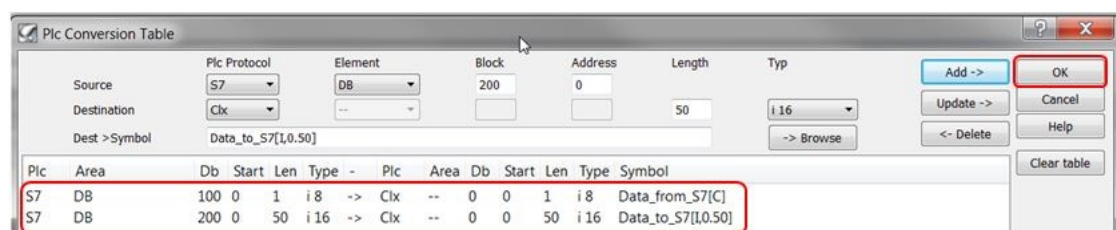
17. Select the tag and click **[OK]**.



18. Enter the data length and type (50, Integer) and click on **[Add →]** to add the mapping to the conversion table.



19. The conversion table should look like this:



20. Click **[OK]** to confirm. Setup is now complete.



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