Setup Modbus RTU and TCP/IP Communication Protocols in AC500 PLC Using Automation Builder Software

1 Description

This application note will take you through the configuration of AC500 eCo CPU's Modbus RTU and TCP/IP protocols in Automation Builder software tool.

2 Setup the Ethernet communication in Windows:

Before you are able to download the compiled program the first time from the PC to the PLC, you have to setup the communication parameter. There are two options you can use to login to the PLC, either with Ethernet or serial with TK503 USB cable.

Make sure that your PC address is in the same class as the CPU's IP address. The factory setting of the CPU for IP address is **192.168.0.10**. Then the IP of the PC should be **192.168.0.x**, **x** should be different number than **10** so that it will not have an IP conflict with the CPU. Subnet mask should be **255.255.255.0**.

To change the IP address in your PC:

- 2.1 Windows Control Panel > Network and Internet > Network and Sharing Center
- 2.2 Click on Change adapter settings
- **2.3** Select Local Area Connection (in this example is PLC network connection below) and right click it to open the menu.

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Choose **Properties** (the status is active when the Ethernet connection between PC and PLC is active) 2.4 Select **Internet Protocol Version 4 (TCP/IPv4)** and double click to see properties.

2.5 Type in your desired IP address and subnet mask then click OK.



PLC network Status	<u>x</u>	PLC network Properties	Internet Protocol Version 4 (TCP/IPv4) Properties
General		Networking Sharing	General
Connection IPv4 Connectivity:	No Internet access	Connect using:	You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
IPv6 Connectivity: Media State: Duration: Speed:	No network access Enabled 01:04:22 100.0 Mbps	Configure This connection uses the following items: Image: Clerit for Microsoft Networks Image: Microsoft Network Filter Driver	Obtain an IP address automatically Use the following IP address:
Activity			Subnet mask: 255 . 255 . 0 Default gateway: Obtain DNS server address automatically
Sent	- Received		Use the following DNS server addresses: Preferred DNS server: Alternate DNS server: .
Properties 😵 Disable	Diagnose	Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.	Validate settings upon exit Advanced
	Close	OK Cancel	OK Cancel

3 Setup the IP address in Automation Builder software:

- 3.1 Make sure the CPU's RUN switch is STOP position
- 3.2 Click IP-Configuration to access Scan tool

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- 3.3 Click on Scan button for searching active PLC on the network
- 3.4 Highlight the active IP address in the search window
- 3.5 Change the IP address to new IP address such as 192.168.3.20
- 3.6 Click on Send Configuration button to send new IP address to PLC.



- The warning message window display is shown below for this change.
- This screen shows the progress of IP address settings is sending to CPU. Wait about 30 seconds for CPU to register new IP address (the RUN and ERR lights are flashing during this process).
- Click OK to accept this new IP address for this CPU.





• Press "Scan" button again to verify the IP address of CPU. This window shows the Configured IP address sent to CPU successfully. This IP address will be used in IEC 61131-3 CoDeSys to download your PLC project to CPU.

00-24-59-04-03-A1 PM554-T-ETH Slot 0 0000005929 0x00 192.168.3.20 192.168.3.20	
	no

- 3.7 Click File > Save Project to save the configuration settings for this lab.
- 3.8 Right on Application > Create Configuration data to save the settings before go to CoDeSys window.

4 Modbus TCP/IP Configuration:

- 4.1 Right click on Protocols > Add object to access Protocols menu
- 4.2 Select Modbus TCP/IP Server for this connection

Devices	- ₽ X	PLC_AC500 x	(
Project11 PLC_AC500 (PM564-ETH) II Application III Application III OFIL 1 (ED1+5D0+2A1+1A0)	Add object belo	PM564-ETH Configuration	PM564-ETH Hardware Informa	ation		x
	Object path: PLC_AC500\ Object name	Interfaces\Ethernet\Proto	cols			
ETH1 (ETH1)	Categories	•				
Protocols (Protocols)		otocols	Name	Version	Order Number	Sł
			FTP Server Tri EC 60870-5-104 Controlstation Tri EC 60870-5-104 Substation Modbus TCP/IP Client SMTP Vient SMTP Vient SMTP Client SMTP Server UDP (no AC31 header) UDP data exchange Web Server	2.4.1.0 2.4.0.0 2.4.0.0 2.4.1.0 2.4.1.0 2.4.1.0 2.4.1.0 2.4.1.0 2.4.1.0 2.4.1.0 2.4.1.0		-
			Diseleu ell'uneriene			-
		alog aller each transactik	Display all versions			
	Reset filter		Add obje	ct	Close	

4.3 Set Server connections = 4 (Max. 12 connections for this eCo PM64 ETH CPU) The task timeout = 2000ms and OMB time = 1000ms are default values.



Note: Server Connections are for Maximum number of logical parallel connections, that are kept for connection requests by clients in operation mode as server.

4.4 Click File > Save for Modbus TCP/IP configuration parameters.

Devices	- 4 X	AC500_eCo	COM2_Online_Access_1	ETH1
PM564_ACS355_ModbusTCP_Final	-	Modbus TCP/IP Server Settings	Modbus Server Settings	Information
🖹 🗐 AC500_eCo (PM564-ETH)			riododo berrer betango	
				-
BIO (6DI+6DO+2AI+1AO)				
IO_Bus		Modbus TCP/IP Server		
😑 👝 Interfaces		Server connections	4	
		Task timeout	2000	(ms)
Ethernet		OMB time	1000	(ms)
Protocols (Protocols)		Send timeout	0	(ms)
Modbus_TCP_IP_Server (Modbus TCP/IP Serve	er)	Connect timeout	18000	(ms)
		Close timeout	0	(ms)
		Byte order	Big endian 🔻	
		Set default values		

5 Modbus RTU Configuration:

- 5.1 Right click on COM2_None> Add Object
- 5.2 Select COM2-Modbus then click Replace object to accept the changes.

Devices	→ ₽ ×			
Project11				
PLC_AC500 (PM556-ETH)				
Application				
OBIO (8DI+6DO)				
IO Bus	Replace object : COM2_None			X
Interfaces				
	Object path:			
- 💭 COM2_None (COM2 - None)	PLC AC500\Interfaces\COM2 None			
Ethernet				
ETH1 (ETH1)	Object name:			
Protocols (Protocols)				
_	Categories -			
	- Serial protocols	Name	Version Order Number	r Short Description
		COM2 - ASCII	2410	
		COM2 - Modbus	2410	
			2.4.1.9	
		COM2 - None	2.4.0.0	
		COM2 - Online Access	2.4.1.0	
		•	III	•
	Close this dialog after each transaction	Display all versions		
	Reset filter		Add object	Close

- 5.3 Set the configuration as shown below
 - Operation mode = Client
 - Address = 0 or any number from 0 to 31 for this eCo CPU

COM2 - Modbus Configuration	Modbus Server Settings				
Parameter	Туре	Value	Default Value	Unit	Description
🖗 Enable login	Enumeration of BYTE	Disabled	Disabled		Check for CoDeSys login
RTS control	Enumeration of BYTE	Telegram	None		RTS control must be set to 'telegram' for RS485 !
🔷 🖗 Telegram ending value	WORD(065535)	3	3		Set the telegram ending value in ms or characters
🖤 🖗 Baudrate	Enumeration of DWORD	19200	19200	Bits/s	Set the baudrate in Bits per seconds
🗝 🖗 Parity	Enumeration of BYTE	None	even		Set the parity Bit type
🖤 🖗 Data Bits	Enumeration of BYTE	8	8	Bits/character	Set the character size
Stop Bits	Enumeration of BYTE	1	1		Set the number of stop Bits per character 2 means 1,5 when character size is 5.
🖤 🖗 Run on config fault	Enumeration of BYTE	No	No		Start PLC program even on configuration fault
Operation mode	Enumeration of BYTE	Client	None		Set the operating mode
Address	BYTE(0255)	0	0		Set the address of the device (Note: Client requires address 0)

5.4 Click File > Save Project to save the configuration settings for this setup.



