P-Bus Quick Start



Saia-burgess

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1 Introduction

1.1 Purpose of this document

The intention of this document is to give some help to the customer who wants to work with the P-Bus sample project.

1.2 What is the P-Bus gateway

With the P-Bus FBox Library and the P-Bus Gateway you can use Siemens P-Bus I/O modules (PTM) together with Saia NT-OS based Controllers.

1.3 How the data exchange is working



The data exchange can be separate into two parts. The first data exchange is working on the P-Bus line. This communication is driven by the P-Bus / Modbus Gateway itself. The P-Bus / Modbus Gateway automatically recognize the connected P-Bus modules and write to and read back the information from the module-reserved registers.

The second data exchange is working between the P-Bus / Modbus Gateway and the PCD. This communication is Modbus communication where the physical layer can be serial RS-485 or Ethernet. The P-Bus FBoxes are handling the data exchange between the module-reserved registers of the P-Bus / Modbus Gateway and the flags and registers inside of the PCD.

For this communication the firmware of the used PCD must support Modbus communication and it is needed to use the SAIA Modbus library.

So the PCD does not access directly to the P-Bus module but, it does access of the modulereserved Modbus registers in the P-Bus / Modbus Gateway.

2 Technical Informations

2.1 Capabilities of the P-Bus Gateway

- Two P-Bus lines with up to 64 PTM modules per each line (maximum possible modules: 127 !)
- Easy parameterization with a web interface
- Possible communication interfaces to the PCD are Modbus/Ethernet, Modbus/RS485 or Modbus/RS232

More information about the gateway you can find on: http://www.persy.nl/en/products.htm

2.2 Capabilities of the P-Bus FBoxes

- One FBox for every supported Siemens module type
- Easy configuration (P-Bus line and module address)
- All supported information's from the modules are transmitted

2.3 Minimum Hardware requirements

- Saia PCD3.Mxxxx / PCD2.M5xxx: The used PCD and its firmware must support Modbus communication.
- Persy P-Bus $\leftarrow \rightarrow$ Modbus Gateway with the latest firmware. (www.persy.nl)
- Siemens PTX1.01 P-Bus bus coupler plus backplane
- At least one P-Bus module with terminal block supported by the gateway
- 24 VAC min 50VA power supply
- 24 VDC power supply for PCD3
- if you would like to use Modbus TCP you need cross Ethernet cable for direct connection or straight cables and hub/switch to connect PCD3, Persy gateway and PC into a small network
- cabling for power supplies, and twisted wires for P-Bus and twisted wires RS-485/ RS232 null modem cable for connecting Persy gateway to PCD3 in serial line.

2.4 Minimum Software requirements

- PCD3 firmware which supports Modbus
- Saia Modbus library with licence (other Modbus libraries are not supported)
- Saia P-Bus library with licence
- Saia Heavac library

2.5 Supported PTM Modules

- PTM1.2C
- PTM1.2D20
- PTM1.2I25
- PTM1.2I420
- PTM1.2P100
- PTM1.2P1K
- PTM1.2Q250
- PTM1.2Q250-M
- PTM1.2QD
- PTM1.2R1K
- PTM1.2U10
- PTM1.2Y10(S)
- PTM1.2Y10-(S)-M
- PTM1.2Y250T-M
- PTM1.3Q-M3
- PTM1.4D20
- PTM1.4D20R
- PTM1.4Q250-P
- PTM1.4R1K
- PTM1.4Y10S
- PTM1.8D20E
- PTM1.2QD
- PTM1.2QDM
- PTM1.4QD
- PTM1.4QDM
- PTM1.2Y420
- Diagnostic of the P-Bus / Modbus gateway

Other modules can be implemented by demand (only if the Gateway itself supports them).

2.6 PTM Modules which are supported by the P-Bus / Modbus Gateway but currently not supported by FBox:

PTM1.2D42, PTM1.2D20S, PTM1.2Q250-B, PTM1.2D250, PTM1.4Q250-P3, PTM1.4Q250A-P

FBox support of these modules is possible on request.

3 Using the gateway with Modbus TCP Connection

3.1 Hardware Installation

Important !

Before you start the hardware installation you should be familiar with the hardware manual of the used modules, Gateway, PCD3.Mxxxx, Ethernet switch, Power supplies in order to know the wiring, necessary power supply and pin layout of the used hardware.

Hardware elements overview:



- 1 I/O bar PTX1...,
- 2 Standard mounting rail
- 3 Phase supply block PTX1.00
- 4 I/O module PTM1...
- 5 Module supply block PTX1.01
- 6 Address plug PTG1...

Steps of building the hardware together:

- Connect the Persy gateway P bus1 (PC, PU, PD) pins to PTX1.01 module (PC, PU, PD) pins. 3-core round cable (unshielded).
- Connect 24 VAC to Persy gateway (G, G0) pins and PTX1.01 module (G, G0) pins.
- Connect 24 VDC to PCD3.Mxxxx
- Connect power for the Ethernet switch (patch cable)
- Connect Persy Gateway Ethernet connector into the switch (patch cable)
- Connect PC Ethernet connector to the switch
- Install the terminal block of the P-Bus function module onto the backplane
- Install the P-Bus function module
- Put the address plug into the module
- Check the wiring and switch on the power ©
- After power on the 24VAC LED should be green on Persy gateway. And If you have chosen P-Bus port 1 to communicate with the P-Bus module the Master LED should be green and activity LED must be flashing yellow above this terminal (of course the port must be enabled in the settings. It is described later).
- After power on the 24VAC LED should be green on Persy gateway. And If you have chosen P-Bus port 2 to communicate with the P-Bus module the Master LED should be green and activity LED must be flashing yellow above this terminal (of course the port must be enabled in the settings. It is described later).
- If you are connected to Persy Gateway via Ethernet the Link and Activity LED's must be green and yellow to show you that there is online connection

3.2 Software settings of the gateway

First you have to modify your PC LAN settings in order to connect to the Persy P-Bus/Modbus gateway. The gateway can be configured via your web browser (Internet Explorer or Mozilla or Opera e.t.c)

The necessary steps are the following:

1. Open the network connection of your computer

🗞 Network Connections
Eile Edit View Favorites Iools Advanced Help 🥂
🔇 Back 🔻 🕤 👻 🏂 Search 🜔 Folders 🛛 🕼 🎲 🗙 🍤 🛄 -
Address 🗞 Network Connections 💌 🔁 Go
LAN or High-Speed Internet
Eccal Area Connection Disabled Broadcom BCM570BC NetXtre
New Connection Wizard

2. Right mouse click on Local Area Connection which will be used for communicating with the gateway (if you have several Ethernet card installed into your PC you must choose one which are connected to the Gateway) and choose Internet Protocol TCP/IP and click on the properties button of the popup window.

Local Area Connection Properties
General Advanced
Connect using:
Broadcom BCM5708C NetXtreme II
This connection uses the following items:
Client for Microsoft Networks Potwork Load Balancing File and Printer Sharing for Microsoft Networks
Internet Protocol (TCP/IP)
Install Uninstall Properties
Description Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.
 Show icon in notification area when connected Notify me when this connection has limited or no connectivity

3. In the next popup window you must write down your original network settings on a piece of paper to remember. And modify your network settings as you can see on the picture below.

ternet Protocol (TCP/IP) Properti	es 🤶 🔀
General	
You can get IP settings assigned auto this capability. Otherwise, you need t for the appropriate IP settings.	matically if your network supports o ask your network administrator
O Obtain an IP address automatica	ally
┌ ⓒ Use the following IP address:—	
IP address:	192.168.1.1
S <u>u</u> bnet mask:	255 . 255 . 255 . 0
Default gateway:	
C Obtain DNS server address auto	matically
□ Use the following DNS server ad	dresses:
Preferred DNS server:	· · · ·
<u>A</u> lternate DNS server:	· · · ·
	Ad <u>v</u> anced
	OK Cancel

The standard IP settings (factory default) of the gateway are:

IP address 192.168.1.254, Subnet mask 255.255.255.0

So you must set an IP address of your computer which is in the same range as the Gateway plus you must set the subnet mask also the same.

Apply the changes and now you will be able to connect to the gateway via your browser.

4. Now open your web browser and type in the URL field **192.168.1.254** and press enter.

Definition of the probability of the probabili		J 🎢 bearun 📈 Fayunia	» 🔍 🔯 🥳 .		
Proteod Settings Pagew2.128 PBUS-Gateway Busice Settings Ceneral • Yystem Overview System Overview • Proteod Settings Physical Address 00-50-C2-86-50-01 • Port Settings Physical Address 00-50-C2-86-50-01 • Port Settings Physical Address 00-50-C2-86-50-01 • Proteod Settings Physical Address 00-50-C2-86-50-01 • Proteod Settings DHCP OFF • Paddress 192.168.1.254 Operating Mode MASTER • Potocod Settings 192.168.1.254 Operating Mode MASTER • Protocod Settings 192.168.1.254 Operating Mode MASTER • Protocod Settings 192.168.1.254 Operating Mode MASTER • Protocod Settings 192.168.1.254 Operating Mode MASTER • Pail	ddress e http://192.168.1.254/				
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→ System Overview System Overview Interface Setup → TCP/IP TCP/IP → TCP/IP Physical Address 00-50-C2-86-50-01 Operating Mode MASTER Phase Physical Address 00-50-C2-86-50-01 Operating Mode MASTER → Settings PH Address 192.168.1.254 Operating Mode MASTER Modbus RTII Server IP Address 192.158.1.254 Operating Mode MASTER Nonetmask 255.255.0 Modbus on RS-232 Operating Mode MASTER Baudrate 9600 Slave-address 1 Inter-frame timeout AUTO Databits 8 Inter-frame timeout AUTO Modbus on RS-485 Inter-frame timeout AUTO Stopbits 1 Handshaking NONE Enabled YES RS-485 Slave-address 1 Enabled YES	General	General			
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→ TCP/IP P-Bus 1 → Port Settings Physical Address 00-50-C2-86-50-01 Operating Mode MASTER P-Bus DHCP OFF P-Bus 2 Operating Mode MASTER → Settings IP Address 192.168.1.254 Operating Mode MASTER Modbus R11 Server P-Bus 2 Operating Mode MASTER → Protocol Settings RS-232 Decomposition Operating Mode MASTER Baudrate 9600 Slave-address 1 Inter-frame timeout AUTO Parity NONE Inter-frame timeout AUTO Modbus on RS-485 Inter-frame timeout AUTO Handshaking NONE Enabled YES YES Inter-frame timeout AUTO	Device Setup				
→ Port Settings Physical Address 00-50-C2-86-50-01 Operating Mode MASTER P-Bue DHCP OFF P-Bus 2 → Settings IP Address 192.168.1.254 Operating Mode MASTER Subnetmask 255.255.0 Operating Mode MASTER Modbus of RS-232 Baudrate 9600 Slave-address 1 Databits 8 Inter-frame timeout AUTO Parity NONE Inter-frame timeout AUTO Handshaking NONE Enabled YES RS-485 1 Enabled YES	→ TCP/IP Settings	TCP/IP		P-Bus 1	
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→ Settings IP Address 192.168.1.254 Operating Mode MASTER Subnetmask 255.255.0 Modbus on RS-232 Master Master Modbus RTU Server Baudrate 9600 Enabled YES Databits 8 Inter-frame timeout AUTO Parity NONE Inter-frame timeout AUTO Handshaking NONE Enabled YES RS-485 Enabled YES	P-Bus	DHCP	OFF	P-Bus 2	
Modbus R1U Server Subnetmask 255.255.0 Operating Mode MASTER → Protocol Settings RS-232 Enabled YES Baudrate 9600 Slave-address 1 Parity NONE Inter-frame timeout AUTO Stopbits 1 Modbus on RS-485 1 Handshaking NONE Enabled YES	→ Settings	IP Address	192.168.1.254		
Modbus error Modbus on RS-232 → Protocol Settings Baudrate 9600 Enabled YES Databits 8 Slave-address 1 Parity NONE Inter-frame timeout AUTO Stopbits 1 Modbus on RS-485 RS-485 NONE Enabled YES		Subnetmask	255.255.255.0	Operating Mode	MASTER
→ Protocol Settings Baudrate 9600 Databits 8 Databits 8 Parity NONE Inter-frame timeout AUTO Stopbits 1 Handshaking NONE Enabled YES RS-485 Elume address 1	Modbus RTU Server	RS-232		Modbus on RS-232	
Databits 8 Slave-address 1 Databits 8 Inter-frame timeout AUTO Parity NONE Modbus on RS-485 Stopbits 1 Enabled YES RS-485 Slave-address 1	→ Protocol Settings	Baudrata	0600	– Enabled	YES
Parity NONE Inter-frame timeout AUTO Stopbits 1 Handshaking NONE Enabled YES RS-485 Slope address 1		Dauurate	9000	Slave-address	1
Party NONE Stopbits 1 Modbus on RS-485 Handshaking NONE Enabled YES RS-485 Slave address 1		Databits		Inter-frame timeout	AUTO
Stoppins 1 Handshaking NONE Enabled YES RS-485 Elama address 1		Parity	NONE	Modbus on RS-485	
Handshaking NONE Enabled YES RS-485 Elava address 1		Stopbits	1		
RS-485 Slave address 1		Handshaking	NONE	Enabled	YES
Slave-duiress I		RS-485		Slave-address	1
Baudrate 9800 Inter-frame timeout AUTO		Baudrate	9600	Inter-frame timeout	AUTO
Databite 8 Modbus on TCP/IP		Datahits	8	Modbus on TCP/IP	

This is an overview window you can see the settings of your Gateway.

You have to modify only two settings to enable the communication.

5. You have to modify the P-Bus settings with left mouse click on P-Bus ->settings tab

PCS	PBGW2.128 PBUS-Gateway	
General	P-Bus	
→ System Overview	Settings	
Device Setup → TCP/IP Settings → Port Settings	P-Bus 1	
, for counge	Configured Operating Mode	Master 💌
P-Bus	Current Operating Mode	MASTER
→ Settings	I/O-Modules	25
	Loadunits	36
Modbus RTU Server	Overload	NO
→ Protocol Settings	P-Bus 2	
	Configured Operating Mode	Slave 💌
	Current Operating Mode	SLAVE
	I/O-Modules	0
	Loadunits	0
	Overload	NO
	Apply Settinge Discard Settings	

Modify P-Bus1 Configured Operating Mode to Master. And Apply the Settings with pressing the button down.

6. And you have to enable the Ethernet port for Modbus TCP/IP communication. Check the ModbusTCP/IP Enabled checkbox and press Apply Settings button.

PCS PBUS-Gateway - Windows Int	ernet Explorer		
🕒 🕑 👻 🖉 http://192.168.1.254	/MBPROT.HTM	▼ 4 ₇ ×	<u>₽</u> -
😭 🏟 🔏 PCS PBUS-Gateway			🔓 • 🗟 • 🖶 • 🎽
P-C-S	PBGW2.128 PB	8US-Gateway	Firmware: v1.00
y dystem overview	Protocol Settings		
Device Setup → TCP/IP Settings → Port Settings	Modbus on RS-232		-
	Enabled	V	
P-Bus	Slave-address	1	
→ Settings	Inter-frame timeout	☑ Auto 50 * 0.1ms	
Modbus RTU Server → Protocol Settings	Modbus on RS-485		-
	Enabled		
	Slave-address	1	
	Inter-frame timeout	☑ Auto 50 * 0.1ms	
	Modbus on TCP/IP		
			-
	Enabled	V	
	TCP Port	502	
	!! Applying settings caus	ses a stop and restart of all Modbus Communications	s !!
	This can take a few sec	onds.	
	Apply Settings D	viscard Settings	
			T

Now the gateway settings are done. You can switch off your browser. Later if your small P-Bus installation is working you can modify other settings to adapt your network to the real installation of yours.

3.3 Settings of the PCD

The necessary steps for setting up your PCD3:

- Check that your PCD is capable of working with P-Bus FBoxes. (You need PCD3.Mxxxx / PCD2.M5xxx: series of PCD with Modbus capable firmware V1.10.16, installed and licensed Saia Modbus library and installed P-Bus library.)
- 2. Restore the project: P-Bus_Quick_Start_projectxxxxx.zip using PG5 Project Manager "Project → Restore menu.
- 3. Go to the project tree and first check the online settings. The settings should be S-Bus USB with PGU = Yes. If you have other type of connection, like serial PGU, please apply the necessary settings, which are needed for program downloading.

		Decap	
- S-BUS USB		C Due LICD	
		S-DUS USD	
S-Bus station number	ər	254	
Auto Station	21	No	
Usb serial number		<i care="" don't=""></i>	
Refresh USB list		(Scan)	
Refresh USB list Number of retries		(Scan) 3	
Refresh USB list Number of retries	4	(Scan) 3	

4. Open the Device configurator and check the important settings like PLC type and PCD memory settings

5. Go to the onboard communication tab and check the Ethernet port settings. If you need other network settings please apply the new settings and be ensured that the P-Bus / Modbus Gateway and the PCD are connected to the same network with different IP address (If you have notebook in the network it must have different IP also).





- 6. Download the hardware settings into the PCD with pressing the button.
- 7. Double Click on to the Build Options tab in the Project Tree and press the "Set Defaults" button of the bottom of the popup window.
- 8. Go to the Fupla program called "**pbus_test_ethernet.fup**" and check the pages.
- 9. On the first page there are the FBoxes for setting up the Modbus TCP communication.
- 10. The FBoxes and their settings:

Heavac Init FBox:



No special settings are needed. The Heavac Init FBox is placed because of some internal functions is used by the P-Bus FBoxes.

Init Client TCP FBox:

Control Systems and Components

								4 Þ	×		Properties		Ψ×
										Μ	Iodbus SAIA Client:Init Clien	it TCP	-
			• •	• •		• •		· · · ·			₹↓ ≫		
		• •					Ċ	• •			General		
Modbuc Client											(Name)	ModbusClient	
	P O	· · ·	· ·	· ·	 	· ·		· ·			Comment		
	Active-	<u> </u>	• •	• •		• •	·	• •			Adjust Parameters		
	Error-					: :	÷				Channel	Channel 4	
	LIIU										Remote port number	502	
		• •	• •	• •	• •	• •	·	• •			Protocol	Modbus/TCP	
	ua Clianata a					: :	÷				Idle disconnect time [s]	10	
	usclient										Timeout [s]	5.0	
📙 🛛 🕒 Def Unit Clie	ent 🔵		• •			• •					Repetitions	1	
	Activo		• •				:			Ð	Static Symbols		
	Active									Ð	Advanced Info		

Channel - Logical channel. If several Client FBoxes are used, each one must use a different channel

Remote port number is the port number (502), which is set in the Persy Gateway.

Protocol is Modbus/TCP which is used by Persy Gateway.

Timings, Repetitions can be left as default.

If you have large network it is possible that you need different timing. For the right settings please refer to the Modbus user manual.(SFC_Modbus_Classic_V1.5.pdf)

If you are online you can delete the error counter by pressing the clear button in the adjust window.

Def Unit Client FBox:



Reference connection is needed between the Init Client TCP FBox and the Def Unit Client FBox.

Reference connection is needed between the Def Unit Client FBox and the following P-Bus FBoxes.

You can change the name of the FBoxes but the reference connection must be kept, if not you will get error message during the build.

IP address (192.168.1.254) is the IP address of the Persy Modbus/P-Bus Gateway.

Unit identifier (1) – is used to determine the Modbus address of the Gateway (address of the Modbus slave) if you are using RS485 line for the communication with the P-Bus gateway. Use the "1" in both side (PCD and the P-Bus gateway) if you are using Modbus TCP for communication.

😐 Z 🕇 🛛 🖊 Pbus,ref:ModbusClient General Def Unit Client (Name) Pbus Reference Enable Enable com Active Comment 0 Clear Error Adjust Parameters bus gateway hardware diagnos Configured num. of mod. PB1... 9 Configured num. of mod. PB2... 0 🗄 Static Symbols en Diag bus line 1 erro ·En err1 Advanced Info bus line 2 erro err2 ComErr

PMG Diag FBox:

In the FBox it is possible to set up how many P-Bus modules are installed per each P-Bus line.

If the "Configured number of modules" does not match the number of modules recognized by the P-Bus / Modbus gateway the user gets error. If the "Configured number of modules" is set to "0" the error generation is switched off.

- 11. On the following Fupla pages there can be many different P-Bus FBoxes found. You can use them according to your project. If you need more than one from one kind of P-Bus FBoxes you can place them on, but strictly after the first Fupla page and set up the reference connection. If you place a P-Bus FBox before the second page you will get error message during build because of the faulty reference connection. If you do not need all of the placed P-Bus FBox you can delete the unnecessary ones.
- 12. It is necessary to set up on the face of every each P-Bus FBoxes the **Port** number and **Mod**ule number. The port number represents the identification number of P-Bus line (1 or 2) of the P-Bus / Modbus Gateway is used to connect the physical P-Bus module to the gateway. The Module number is the address number of the physical P-Bus module. It is possible to read out this number from the address stick plugged into the P-Bus module.



- 13. After setting up the Port and the Module number of the used P-Bus FBoxes the project is ready to build and download.
- 14. After the project download the user can go online in the Fupla and can enable the used FBoxes step by step. If every communication parameter and other settings were correct the communication must start between the P-Bus / Modbus gateway and the PCD. If the P-Bus line is correctly installed to the physical P-Bus modules and the modules are correctly installed and put under power the Gateway can read out the information from the physical P-Bus modules and can transfer the data to the PCD and back.

4 Using the Gateway with Modbus RTU on RS485 serial line

4.1 Hardware Installation

Important !

Before you start the hardware installation you should be familiar with the hardware manual of the used modules, Gateway, PCD3.Mxxxx, Ethernet switch, Power supplies in order to know the wiring, necessary power supply and pin layout of the used hardware.

Hardware elements overview:



http://www.notebooksarok.hu/product_images/8cdbababf84045eaddfad7134142f6ba.jpg http://www.superwarehouse.com/3Com_OfficeConnect_Dual_Speed_5_Port_Switch/3C167



1 I/O bar PTX1...,

2 Standard mounting rail

- 3 Phase supply block PTX1.00
- 4 I/O module PTM1...
- 5 Module supply block PTX1.01
- 6 Address plug PTG1...

Steps of building the hardware together:

- Connect the Persy gateway P bus1 (PC, PU, PD) pins to PTX1.01 module (PC, PU, PD) pins. 3-core round cable (unshielded).
- Connect 24 VAC to Persy gateway (G, G0) pins and PTX1.01 module (G, G0) pins.
- Connect 24 VDC to PCD3.Mxxxx
- Connect Persy Gateway RS-485 port to PCD3.Mxxxx RS-485 port.

pin 1 means Data A must be connected to PCD3.Mxxxx /D pin

pin 2 means Data B must be connected to PCD3,Mxxxx D pin

pin 3 means shield must be connected if you have long wires

in case of long wiring do not forget to install termination resistor of the communication lines according to PCD3.Mxxxx manual

- Connect power for the Ethernet switch (patch cable)
- Connect PC Ethernet connector to the switch
- Install the terminal block of the P-Bus function module onto the backplane
- Install the P-Bus function module
- Put the address plug into the module
- Check the wiring and switch on the power ©
- After power on the 24VAC LED should be green on Persy gateway. And if you have chosen P-Bus port 1 to communicate with the P-Bus module the Master LED should be green and activity LED must be flashing yellow above this terminal (of course the port must be enabled in the settings, it is described later).
- After power on the 24VAC LED should be green on Persy gateway. And If you have chosen P-Bus port 2 to communicate with the P-Bus module the Master LED should be green and activity LED must be flashing yellow above this terminal (of course the port must be enabled in the settings, it is described later).
- If you are connected to Persy Gateway via Ethernet the Link and Activity LED's must be green and yellow to show you that there is online connection
- LED's on the RS-485 would be yellow if the communication is enabled inside of the Fupla program. (if you don't have Fupla program with enabled communication and the LED's are yellow the wires are changed and the LED's shows this error.

4.2 Software settings of P-Bus gateway

First you have to modify your PC LAN settings in order to connect to the Persy P-Bus/Modbus gateway. The gateway can be configured via your web browser (Internet Explorer or Mozilla or Opera e.t.c)

The necessary steps are the following:

1. Open the network connection of your computer



2. Right mouse click on Local Area Connection which will be used for communicating with the gateway (if you have several Ethernet card installed into your PC you must choose one which are connected to the Gateway) and chose Internet protocol TCP/IP and click on the properties button of the popup window.

🚣 Local Area Connection Properties 🔋
General Advanced
Connect using:
Broadcom BCM5708C NetXtreme II
This connection uses the following items:
Client for Microsoft Networks Ple Chient for Microsoft Networks Ple and Printer Sharing for Microsoft Networks Ple and Printer Sharing for Microsoft Networks Internet Protocol (TCP/IP)
Install Uninstall Properties Description Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.
✓ Show icon in notification area when connected ✓ Notify me when this connection has limited or no connectivity
OK Cancel

3. In the next popup window you must write down your original network settings on a peace of paper to remember. And modify your network settings as you can see on the picture below.

ernet Protocol (TCP/IP) Propert	ies 🤶 🤶
You can get IP settings assigned aut this capability. Otherwise, you need for the appropriate IP settings.	omatically if your network supports to ask your network administrator
O Obtain an IP address automatic	ally
$\neg \odot$ Use the following IP address:-	
IP address:	192.168.1.1
S <u>u</u> bnet mask:	255 . 255 . 255 . 0
Default gateway:	· · ·
C Obtain DNS server address aut	omatically
. Use the following DNS server a	ddresses:
Preferred DNS server:	· · ·
Alternate DNS server:	· · ·
	Ad <u>v</u> anced

The standard IP settings (factory default) of the gateway are: IP address **192.168.1.254**, Subnet mask **255.255.255.0**

So you must set an IP address of your computer which is in the same range as the Gateway plus you must set the subnet mask also the same.

Apply the changes and now you will be able to connect to the gateway via your browser.

4. Now open your web browser and type in the URL field **192.168.1.254** and press enter.

BGW2.128 I	PBUS-Gateway		
Generai System Overview			
TCP/IP		P-Bus 1	
Physical Address DHCP	00-50-C2-86-50-01 OFF	Operating Mode P-Bus 2	MASTER
IP Address Subnetmask	192.168.1.254 255.255.255.0	Operating Mode	MASTER
RS-232			
Baudrate	9600	Enabled Slave-address	YES 1
Parity	NONE	Inter-frame timeout	AUTO
Stopbits	1	Modbus on RS-485	
Handshaking RS-485	NONE	Enabled Slave-address	YES 1
Baudrate	9600	– Inter-frame timeout	AUTO
	PBGW2.128 I Ceneral System Overview TCP/IP Physical Address DHCP IP Address Subnetmask RS-232 Baudrate Databits Parity Stopbits Handshaking RS-485 Baudrate	PBGW2.128 PBUS-Gateway General System Overview TCP/IP Physical Address 00-50-C2-86-50-01 DHCP OFF IP Address 192.168.1.254 Subnetmask 255.255.255.0 RS-232 Baudrate 9600 Databits 8 Parity NONE Stopbits 1 Handshaking NONE RS-465 Baudrate 9600	PBGW2.128 PBUS-Gateway P-Bus 1 System Overview P-Bus 1 Physical Address 00-50-C2-86-50-01 Operating Mode DHCP OFF P-Bus 2 Operating Mode IP Address 192.168.1.254 Operating Mode Modbus on RS-232 Baudrate 9600 Enabled Slave-address Inter-frame timeout Modbus on RS-485 Inter-frame timeout Modbus on RS-485 Enabled Stopbits 1 Handshaking NONE Enabled Slave-address Rs-485 9800 Inter-frame timeout Modbus on RS-485 Enabled Slave-address

This is an overview window you can see the settings of your Gateway.

5. You have to modify the P-Bus settings with left mouse click on P-Bus ->settings tab

P-C-S	PBGW2.128 PBUS-	-Gateway			
General	P-Bus				
→ System Overview	Settings				
Device Setup → TCP/IP Settings → Port Settings	P-Bus 1				
	Configured Operating Mode	Master -			
P-Bus	Current Operating Mode	MASTER			
→ Settings	I/O-Modules	25			
	Loadunits	36			
Modbus RTU Server	Overload	NO			
→ Protocol Settings	P-Bus 2				
	Configured Operating Mode	Slave 💌			
	Current Operating Mode	SLAVE			
	I/O-Modules	0			
	Loadunits	0			
	Overload	NO			
	Apply Settings Discard	Settings			

Modify P-Bus1 Configured Operating Mode to Master. And Apply the Settings with pressing the button down.

6. You have to modify the Port settings with left mouse click on Port settings in Device Setup tab

PCS	PBGW2.128	PBUS-Gateway	Firmware: v1.00
General	Device Setup		
→ System Overview	Port Settings		
Device Setup → TCP/IP Settings → Port Settings	RS-232		
	Baudrate	9600 -	
P-Bus	Databits	8 •	
→ Settings	Parity	NONE -	
Marchan DZH Provide	Stopbits	1 •	
→ Protocol Settings	Handshaking	NONE	
	RS-485		
	Baudrate	9600 💌	
	Databits	8 💌	
	Parity	NONE -	
	Stopbits	1	
	Apply Settings	Discard Settings	

You can see the necessary values on the picture. Of course you can modify or adapt these values, but you have to set the same into the Modbus communication FBox in the Fupla.

7. And you have to enable the Modbus on RS-485 and set the slave address to 1. Press Apply Settings button to accept the changes.

PCS PBUS-Gateway - Windows	Internet Explorer			_0
🕘 🕘 🔻 🙋 http://192.168.1.	254/MBPROT.HTM		<u>▼</u>	<u>م</u>
😚 🥻 PCS PBUS-Gateway				👌 • 🗟 - 🖶 •
P C S	BGW2.128 PE	3US-Gatev	way	Firmware: v1.00
General → System Overview	Wodbus RTU Server			
	Protocol Settings			
Device Setup → TCP/IP Settings → Port Settings	Modbus on RS-232			
	Enabled	V		
P-Bus	Slave-address	1		
→ Settings	Inter-frame timeout	Auto	50 * 0.1ms	
Modbus RTU Server → Protocol Settings	Modbus on RS-485			
	Enabled	V		
	Slave-address	1		
	Inter-frame timeout	Auto	50 * 0.1ms	
	Modbus on TCP/IP			
	Enabled	V		
	TCP Port	502		
	!! Applying settings cau	ises a stop and i	restart of all Modbus Communication	ons !!
	This can take a few see	conds.		
	Apply Settings	Discard Settings		

Now the gateway settings are done. You can switch off your browser. Later if your small P-Bus installation is working you can modify other settings to adapt your network to the real installation of yours.

4.3 Settings of PCD3.Mxxxx

The necessary steps for setting up your PCD3:

- Check that your PCD is capable of working with P-Bus FBoxes. (You need PCD3.Mxxxx / PCD2.M5xxx: series of PCD with Modbus capable firmware V1.10.16, installed and licensed Saia Modbus library and installed P-Bus library.)
- 2. Restore the project: P-Bus_Quick_Start_projectxxxxx.zip using PG5 Project Manager "Project → Restore menu.
- 3. Go to the project tree and first check the online settings. The settings should be S-Bus USB with PGU = Yes. If you have other type of connection, like serial PGU, please apply the necessary settings, which are needed for program downloading.

Ξ	S-Bus USB		
	Channel Type	S-Bus USB	
	PGU	Yes	
	S-Bus station number	254	
	Auto Station	No	
	Usb serial number	<i care="" don't=""></i>	
	Refresh USB list	(Scan)	
	Number of retries	3	
	k		

4. Open the Device Configurator and check the important settings like PLC type and PCD memory settings

5. Go to the onboard communication tab and check the "RS-485 port for general purpose" settings. Please disable the serial S-Bus support for this port.

🤌 Saia Device Configurator - [Device1.saiadev]				
File Edit View Unline Lools Window Help			~	
🗅 📽 😪 📕 🥼 🐰 🖻 🋍 🗠 역 🥪 💰 🔳 🚮				
Selector # X	-	Properties	$_{ au} imes$	
Memory Modules		Onboard : RS-485		
Digital I/O Module Iype Description Description		Serial S-Bus		
⊕ Analogue I/0 Mo ☐ PCD3.M5540 CPU with 256/512/1024K Bytes RAM, 4 I/0		Port Number	2	
Special Function I		Enabled Serial S-Bus	∽ No	
Multi-Function Mo Ethernet Protocols		Full Protocol (PGL)	Yes	
Communications Section Description		E Serial S-Bus Master G	ateway	
Hemory Modules		Port Number Gateway	2	
Expansion Module IP Protocols DHCP, DNS, SNTP, SNMP protocols		Use Serial S-Bus For Gat I	No	
⊕ Digital I/D Module		First S-Bus Station Serial (0	
Analogue I/O More Memory Slots		Last S-Bus Station Serial	253	
Special Function I State Turne Description		🗉 Serial S-Bus Mode And Timing		
Multi-Function Mo Mo M1		Mode (Data Mode	
M2		Baud Rate 9	9600 Baud	
		Response Timeout [ms] (0	
Onhoard Communications		Training Sequence Delay (0	
Chibida Communications		Turnaround Delay [ms]	0	
Type Description				
RS-485/S-Net RS-485 port for Profi-S-Bus or general-put				
USB Universal Serial Bus port, PGU or genera				
RS-232/PGU RS-232, PGU or general-purpose serial p				
Memory Modules RS-485 RS-485 port for general-purpose commun		Port Number		
Memory Modules for Ethernet Ethernet port.		The port number of the RS-4	185 port, fixed as	
Slot Mem, M1, M2 of		Port 2.		
CD2/3 controller.	-			
Ready			OVR /	

- 6. Download the hardware settings into the PCD with pressing the button.
- Double Click on to the Build Options tab in the Project Tree and press the "Set Defaults" button of the bottom of the popup window.
- 8. Go to the Fupla program called "**pbus_test_RS485.fup**" and check the pages
- 9. On the first page there are the FBoxes for setting up the serial Modbus communication.
- 10. The FBoxes and their settings:

Heavac Init FBox:



No special settings are needed. The Heavac Init FBox is placed because of some internal functions is used by the P-Bus FBoxes.

Modbuscherit		MOODOS SATA CIIGUCITHIC CIIG	SILK5
Init Client RS		∄ 2↓ ≫	
0 Clear Active	e	🛛 General	
		(Name)	ModbusClient
Pbus.ref:ModbusClient		Comment	
Def Linit Client		Adjust Parameters	
		Channel	Channel 1
itclient Enable Active Active		Serial port	Port 2
Clear Error		Line type	RS485
		Transmission speed	9600 bps
		Bits-Parity-Stop	8-N-1
		Protocol	Modbus/RTU
		Timeout [s]	1.0
- PMG Diag 💮 💮		Repetitions	1
		Static Symbols	

Init Client RS FBox:

Channel: Logical channel. If several Client FBoxes are used, each one must use a different channel

Serial Port: is the RS-485 port number of PCD3.Mxxxx. (take care and check which serial port is supported by this Modbus implementation)

Line type: must be RS485

Transmission speed: 9600 bps must be the same settings like in the Persy Gateway

Bits-Parity-Stop: must be 8-N-1 same settings like Persy gateway.

Protocol: Modbus/RTU (Persy Gateway supports Modbus RTU over RS-232, RS485, and TCP/IP)

Timings (Timeout, Repetitions): can be left as default.

If you have large network it is possible that you need different timing. For the right settings please refer to the Modbus user manual. (SFC_Modbus_Classic_V1.5.pdf)

If you are online you can delete the error counter by pressing the clear button in the adjust window.



Def Unit Client FBox:

Reference connection is needed between the Init Client RS FBox and the Def Unit Client FBox.

Reference connection is needed between the Def Unit Client FBox and the following P-Bus FBoxes.

You can change the name of the FBoxes but the reference connection must be kept if not you will get error message during the build.

IP address (192.168.1.254) is not important because we use serial communication.

Unit identifier (1) – is used to set the Modbus address of the Gateway (<u>address of the</u> <u>Modbus slave</u>) if you are using RS485 line for the communication with the P-Bus gateway.

If you have several other Modbus slaves on the serial network it is necessary to give different Unit identifier (slave address) to them.

(You must check the firmware revision inside of Persy P-Bus gateway and download firmware 1.01at least. The older firmware only supports Modbus slave address 1.)

If you are online you can delete the error counter and request counter by pressing the clear buttons in the adjust window.



In the FBox it is possible to set up how many P-Bus modules are installed per each P-Bus line.

If the "Configured number of modules" does not match the number of modules recognized by the P-Bus / Modbus gateway the user gets error. If the "Configured number of modules" is set to "0" the error generation is switched off.

- 11. On the following Fupla pages there can be many different P-Bus FBoxes found. You can use them according to your project. If you need more than one from one kind of P-Bus FBoxes you can place them on, but strictly after the first Fupla page and set up the reference connection. If you place a P-Bus FBox before the first page you will get error message during build because of the faulty reference connection. If you do not need all of the placed P-Bus FBox you can delete the unnecessary ones.
- 12. It is necessary to set up the **Port** number and **Mod**ule number on the face of every each P-Bus FBoxes. The port number represents the identification number of P-Bus line (1 or 2) of the P-Bus / Modbus Gateway is used to connect the physical P-Bus module to the gateway. The Module number is the address number of the physical P-Bus module. It is possible to read out this number from the address stick plugged into the P-Bus module.





- 13. After setting up the Port and the Module number of the used P-Bus FBoxes the project is ready to build and download.
- 14. After the project download the user can go online in the Fupla and can enable the used FBoxes step by step. If every communication parameter and other settings were correct the communication must start between the P-Bus / Modbus gateway and the PCD. If the P-Bus line is correctly installed to the physical P-Bus modules and the modules are correctly installed and put under power the Gateway can read out the information from the physical P-Bus modules and can transfer the data to the PCD and back.

(More information of the Modbus and P-Bus FBoxes you can find in the help.)