Preamble

In the following experiments we use several sources as a Modbus Master for polling a single Modbus register:
- Temco T3-LB-WIFI-1kPT controller;
- Modbus Poll program;
- WAGO 750-881 controller.

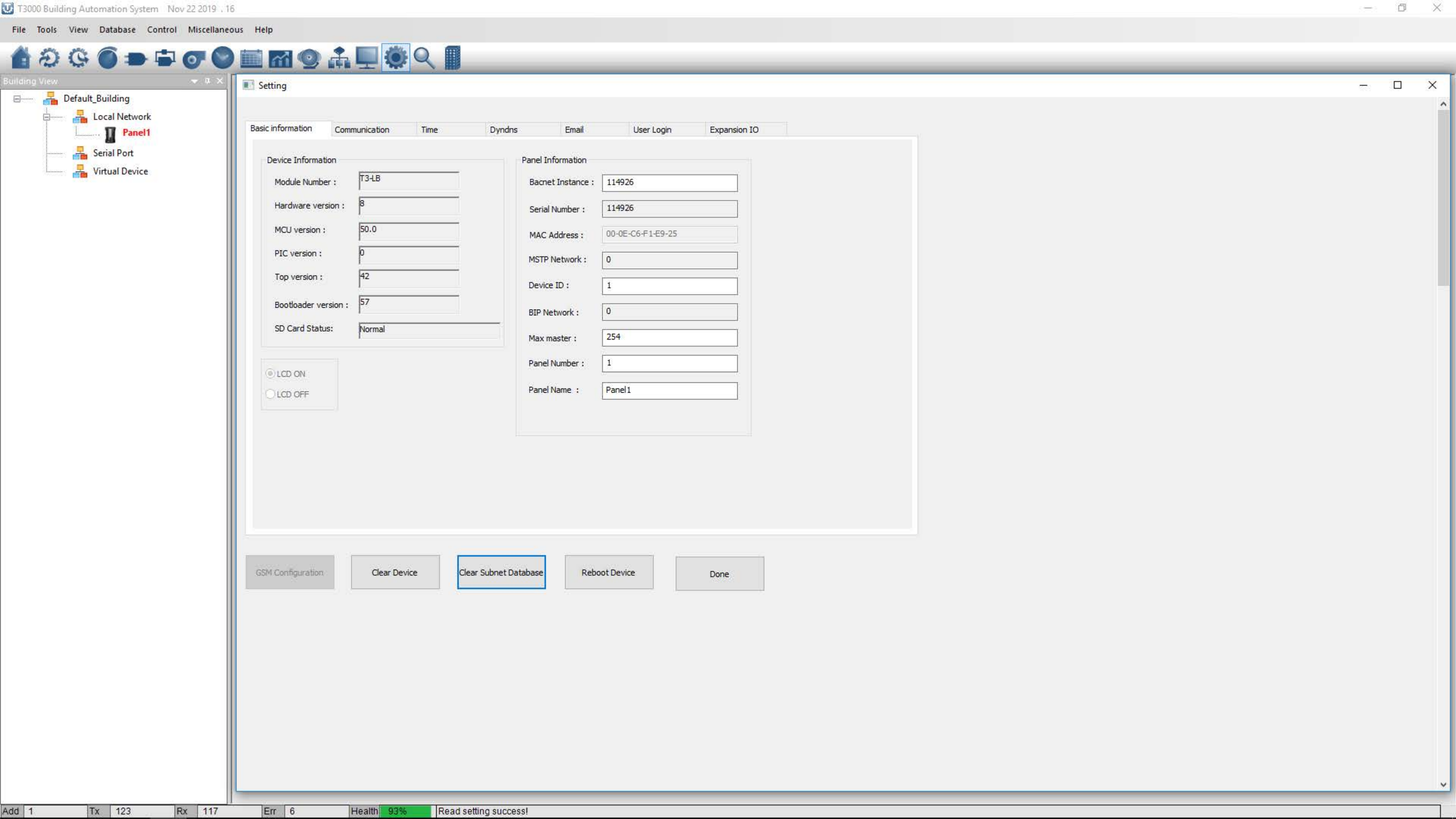
For receiving packets from the Modbus Master, as a Modbus Slave, we use a PC with the program "DUNOVO Serial Mon": https://www.dunovo.com/

Experiment 1:
Pages 2-6: we are setting up Temco T3-LB and DUNOVO Serial Mon
Page 7: fixing the flow coming from the T3-LB controller

Experiment 2:
Pages 8, 9: we are setting up Modbus Poll and DUNOVO Serial Mon
Page 10: fixing the flow coming from Modbus Poll

Experiment 3:
Pages 11-12: we are setting up WAGO 750-881 and DUNOVO Serial Mon
Page 13: fixing the flow coming from the WAGO controller

Summary: When we compare the results of three experiments, we see that the data in the requests from Temco T3-LB controller arrive randomly and the necessary structure for transmitting data in the form of packets is not observed.
Required packet structure clearly seen in the survey from other sources.
The lack of a clear structure of packets in requests from T3-LB leads to rejection of packets by slaves, the inability to quickly receive data and, in some cases, causes hang slave devices.


T3000 Building Automation System Nov 22 2019 . 16
File Tools View Database Control Miscellaneous Help
Building View
Default_Building
Local Network
Panel1
Serial Port
Virtual Device
Setting
Basic information
Communication
Time
Dyndns
Email
User Login
Expansion IO
Device Information
Module Number : T3-LB
Hardware version : 8
MCU version : 50.0
PIC version : 0
Top version : 42
Bootloader version : 57
SD Card Status: Normal
LCD ON
LCD OFF
Panel Information
Bacnet Instance : 114926
Serial Number : 114926
MAC Address : 00-0E-C6-F1-E9-25
MSTP Network : 0
Device ID : 1
BIP Network : 0
Max master : 254
Panel Number : 1
Panel Name : Panel1
GSM Configuration
Clear Device
Clear Subnet Database
Reboot Device
Done
Add 1 Tx 123 Rx 117 Err 6 Health 93% Read setting success!

T3000 Building Automation System Nov 22 2019 . 16

File Tools View Database Control Miscellaneous Help

Building View

- Default_Building
  - Local Network
    - Panel1
  - Serial Port
  - Virtual Device

Setting

Basic information | Communication | Time | Dyndns | Email | User Login | Expansion IO

IP Address

- Obtain IP Address Automatically
- Use The Following IP Address

IP Address : 192 . 168 . 1 . 102

Subnet Mask : 255 . 255 . 255 . 0

Gateway Address : 0 . 0 . 0 . 0

Modbus TCP Port : 502

Wifi Configuration | Change IP

Device Serial Port Config

			Parity Bit	Stop Bit
RS485 SUB :	Modbus Master	9600	None	2
Zigbee :	Unused	19200	None	1
RS485 Main :	Unused	9600	None	1

USB Port : Com port GSM

Zigbee Pan ID : 0

Zigbee Information | Network Health

GSM Configuration | Clear Device | Clear Subnet Database | Reboot Device | Done

Add 1 | Tx 123 | Rx 117 | Err 6 | Health 93% | Read setting success!

T3000 Building Automation System Nov 22 2019 . 16

File Tools View Database Control Miscellaneous Help

Building View

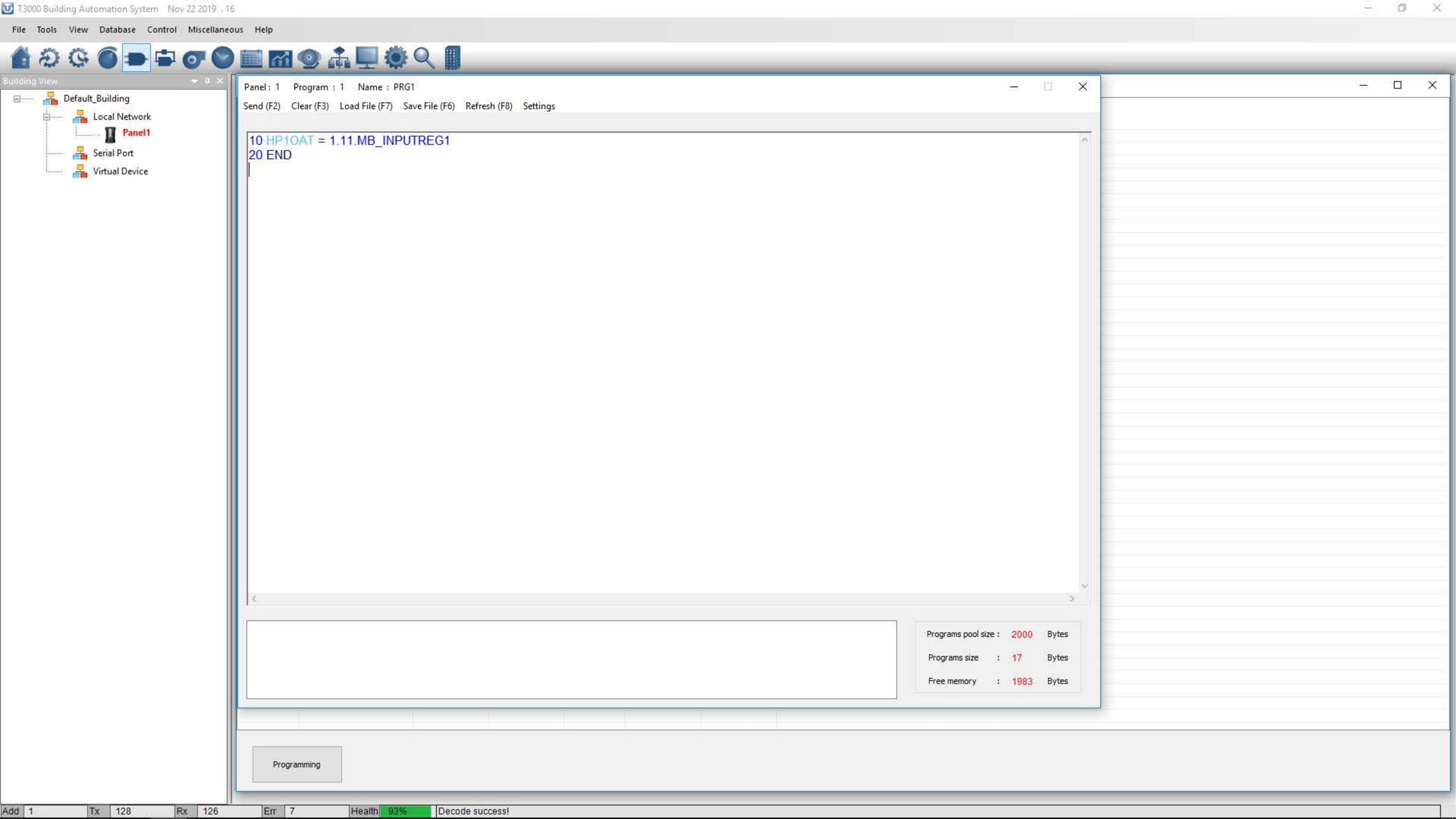
- Default_Building
  - Local Network
    - Panel1
  - Serial Port
  - Virtual Device

PROGRAM

Program	Full Label	Status	Auto/Manual	Size	Run Status	Label
1	TEST POLLIING	ON	Auto	17	Normal	
2		ON	Auto	0	Normal	
3		ON	Auto	0	Normal	
4		ON	Auto	0	Normal	
5		ON	Auto	0	Normal	
6		ON	Auto	0	Normal	
7		ON	Auto	0	Normal	
8		ON	Auto	0	Normal	
9		ON	Auto	0	Normal	
10		ON	Auto	0	Normal	
11		ON	Auto	0	Normal	
12		ON	Auto	0	Normal	
13		ON	Auto	0	Normal	
14		ON	Auto	0	Normal	
15		ON	Auto	0	Normal	
16		ON	Auto	0	Normal	

Programming

Add 1 | Tx 126 | Rx 119 | Err 6 | Health 93% | Read Program List Item From 10 to 15 success!


T3000 Building Automation System Nov 22 2019 . 16
File Tools View Database Control Miscellaneous Help
Building View
Default_Building
Local Network
Panel1
Serial Port
Virtual Device
Panel : 1 Program : 1 Name : PRG1
Send (F2) Clear (F3) Load File (F7) Save File (F6) Refresh (F8) Settings
10 HP1OAT = 1.11.MB_INPUTREG1
20 END
Programs pool size : 2000 Bytes
Programs size : 17 Bytes
Free memory : 1983 Bytes
Programming
Add 1 Tx 128 Rx 126 Err 7 Health 93% Decode success!

SerialMon

File Edit View Mode Action Tools Help

ASCII None

www.dunovo.com

Id Date/Time Port Dir Size Data

Connection

Protocol Connection Properties

Connection
Network Monitor
Network TCP Client
Network TCP Server
Serial Hardware
Serial Software

1: Direct connection

Communication settings

Serial port PC: COM5
Baud rate: 9600
Data bits: 8
Parity: None
Stop bits: 2
Handshake: None

Monitor pins (See preferences: Triggers)

Ok Cancel

ASCII None Send

Trial. Expires 25.11.2019

Register

Raw: 0 Interface: Serial [COM5 9600 8N2]

SerialMon

File Edit View Mode Action Tools Help

ASCII None www.dunovo.com

Id	Date/Time	Port Dir	Size	Data
1	2019-11-22 12:17:42.147	A → PC	3	11 4 0
2	2019-11-22 12:17:42.154	A → PC	5	1 0 1 ` 160
3	2019-11-22 12:17:42.395	A → PC	1	11
4	2019-11-22 12:17:42.396	A → PC	1	4
5	2019-11-22 12:17:42.398	A → PC	1	0
6	2019-11-22 12:17:42.404	A → PC	5	1 0 1 ` 160
7	2019-11-22 12:17:42.647	A → PC	1	11
8	2019-11-22 12:17:42.648	A → PC	1	4
9	2019-11-22 12:17:42.648	A → PC	5	0 1 0 1 `
10	2019-11-22 12:17:42.660	A → PC	1	160
11	2019-11-22 12:17:42.896	A → PC	1	11
12	2019-11-22 12:17:42.897	A → PC	1	4
13	2019-11-22 12:17:42.898	A → PC	4	0 1 0 1
14	2019-11-22 12:17:42.906	A → PC	2	` 160
15	2019-11-22 12:17:43.148	A → PC	1	11
16	2019-11-22 12:17:43.148	A → PC	1	4
17	2019-11-22 12:17:43.150	A → PC	3	0 1 0
18	2019-11-22 12:17:43.153	A → PC	3	1 ` 160
19	2019-11-22 12:17:43.396	A → PC	1	11
20	2019-11-22 12:17:43.397	A → PC	1	4
21	2019-11-22 12:17:43.400	A → PC	5	0 1 0 1 `
22	2019-11-22 12:17:43.411	A → PC	1	160
23	2019-11-22 12:17:43.648	A → PC	1	11
24	2019-11-22 12:17:43.649	A → PC	1	4
25	2019-11-22 12:17:43.651	A → PC	6	0 1 0 1 ` 160
26	2019-11-22 12:17:43.899	A → PC	1	11
27	2019-11-22 12:17:43.900	A → PC	1	4
28	2019-11-22 12:17:43.902	A → PC	5	0 1 0 1 `
29	2019-11-22 12:17:43.909	A → PC	1	160
30	2019-11-22 12:17:44.156	A → PC	1	11
31	2019-11-22 12:17:44.156	A → PC	1	4
32	2019-11-22 12:17:44.158	A → PC	2	0 1
33	2019-11-22 12:17:44.163	A → PC	4	0 1 ` 160
34	2019-11-22 12:17:44.406	A → PC	1	11
35	2019-11-22 12:17:44.407	A → PC	1	4
36	2019-11-22 12:17:44.409	A → PC	5	0 1 0 1 `
37	2019-11-22 12:17:44.420	A → PC	1	160
38	2019-11-22 12:17:44.654	A → PC	1	11
39	2019-11-22 12:17:44.655	A → PC	1	4
40	2019-11-22 12:17:44.657	A → PC	4	0 1 0 1
41	2019-11-22 12:17:44.665	A → PC	2	` 160
42	2019-11-22 12:17:44.905	A → PC	1	11
43	2019-11-22 12:17:44.906	A → PC	1	4
44	2019-11-22 12:17:44.908	A → PC	2	0 1
45	2019-11-22 12:17:44.910	A → PC	2	0 1
46	2019-11-22 12:17:44.912	A → PC	2	` 160
47	2019-11-22 12:17:45.153	A → PC	1	11
48	2019-11-22 12:17:45.154	A → PC	1	4
49	2019-11-22 12:17:45.156	A → PC	4	0 1 0 1
50	2019-11-22 12:17:45.164	A → PC	2	` 160
51	2019-11-22 12:17:45.403	A → PC	1	11
52	2019-11-22 12:17:45.405	A → PC	2	4 0
53	2019-11-22 12:17:45.407	A → PC	1	1
54	2019-11-22 12:17:45.408	A → PC	2	0 1
55	2019-11-22 12:17:45.410	A → PC	1	`
56	2019-11-22 12:17:45.411	A → PC	1	160

ASCII None Send

Trial. Expires 25.11.2019 Register

Raw: 56 Interface: Serial [COM5 9600 8N2] Timer: 00:03

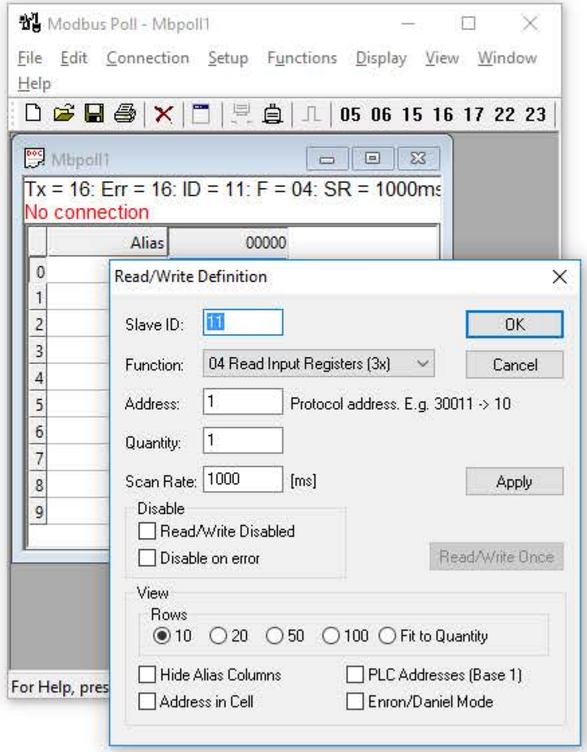
SerialMon

File Edit View Mode Action Tools Help

ASCII None

www.dunovo.com

Id Date/Time Port Dir Size Data



ASCII None Send

Trial. Expires 25.11.2019

Register

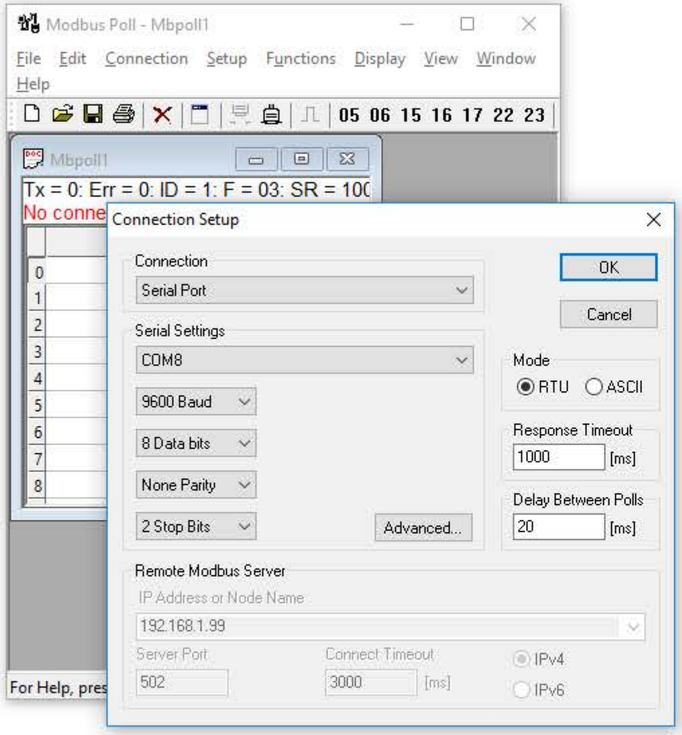
Raw: 0 Interface: Serial [COM5 9600 8N2]

SerialMon

File Edit View Mode Action Tools Help

ASCII None www.dunovo.com

Id Date/Time Port Dir Size Source Destination Protocol Data



ASCII None Send

Trial. Expires 25.11.2019 Register

Raw: 0 Interface: Ethernet TCP server [502]

SerialMon

File Edit View Mode Action Tools Help

ASCII None

www.dunovo.com

Id	Date/Time	Port Dir	Size	Data
1	2019-11-22 12:22:06.207	A → PC	8	11 4 0 1 0 1 ` 160
2	2019-11-22 12:22:07.245	A → PC	8	11 4 0 1 0 1 ` 160
3	2019-11-22 12:22:08.284	A → PC	8	11 4 0 1 0 1 ` 160
4	2019-11-22 12:22:09.323	A → PC	8	11 4 0 1 0 1 ` 160
5	2019-11-22 12:22:10.361	A → PC	8	11 4 0 1 0 1 ` 160
6	2019-11-22 12:22:11.401	A → PC	8	11 4 0 1 0 1 ` 160
7	2019-11-22 12:22:12.447	A → PC	8	11 4 0 1 0 1 ` 160
8	2019-11-22 12:22:13.487	A → PC	8	11 4 0 1 0 1 ` 160
9	2019-11-22 12:22:14.528	A → PC	8	11 4 0 1 0 1 ` 160
10	2019-11-22 12:22:15.573	A → PC	8	11 4 0 1 0 1 ` 160
11	2019-11-22 12:22:16.613	A → PC	8	11 4 0 1 0 1 ` 160
12	2019-11-22 12:22:17.653	A → PC	8	11 4 0 1 0 1 ` 160
13	2019-11-22 12:22:18.692	A → PC	8	11 4 0 1 0 1 ` 160
14	2019-11-22 12:22:19.734	A → PC	8	11 4 0 1 0 1 ` 160
15	2019-11-22 12:22:20.776	A → PC	8	11 4 0 1 0 1 ` 160
16	2019-11-22 12:22:21.819	A → PC	8	11 4 0 1 0 1 ` 160
17	2019-11-22 12:22:22.861	A → PC	8	11 4 0 1 0 1 ` 160
18	2019-11-22 12:22:23.883	A → PC	8	11 4 0 1 0 1 ` 160
19	2019-11-22 12:22:24.927	A → PC	8	11 4 0 1 0 1 ` 160
20	2019-11-22 12:22:25.965	A → PC	8	11 4 0 1 0 1 ` 160
21	2019-11-22 12:22:27.004	A → PC	8	11 4 0 1 0 1 ` 160
22	2019-11-22 12:22:28.042	A → PC	8	11 4 0 1 0 1 ` 160
23	2019-11-22 12:22:29.079	A → PC	8	11 4 0 1 0 1 ` 160
24	2019-11-22 12:22:30.118	A → PC	8	11 4 0 1 0 1 ` 160

ASCII None Send

Trial. Expires 25.11.2019

Register

Raw: 24 Interface: Serial [COM9 9600 8N2] Timer: 00:24

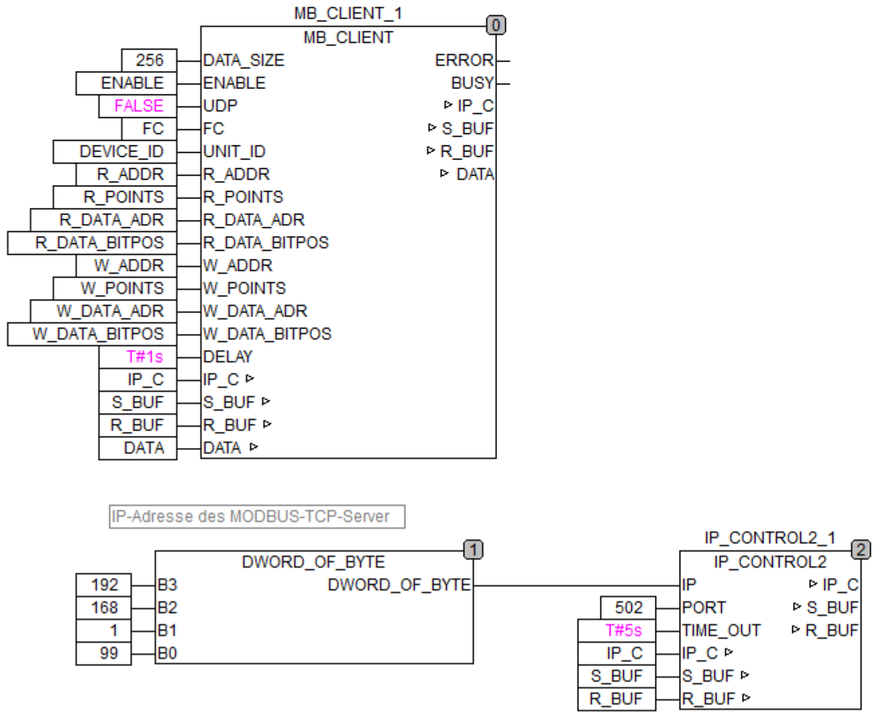
CoDeSys - Modbus_TCP_Client.pro - [MB_CLIENT_DEMO (PRG-CFC)]

Файл Правка Проект Вставка Дополнения Онлайн Окно Справка

100 %

POU
- Engineering
- HARDWARE
- Logic
- NETWORK
- MB_CLIENT_DEMO (PRG)
- PLC_PRG (PRG)

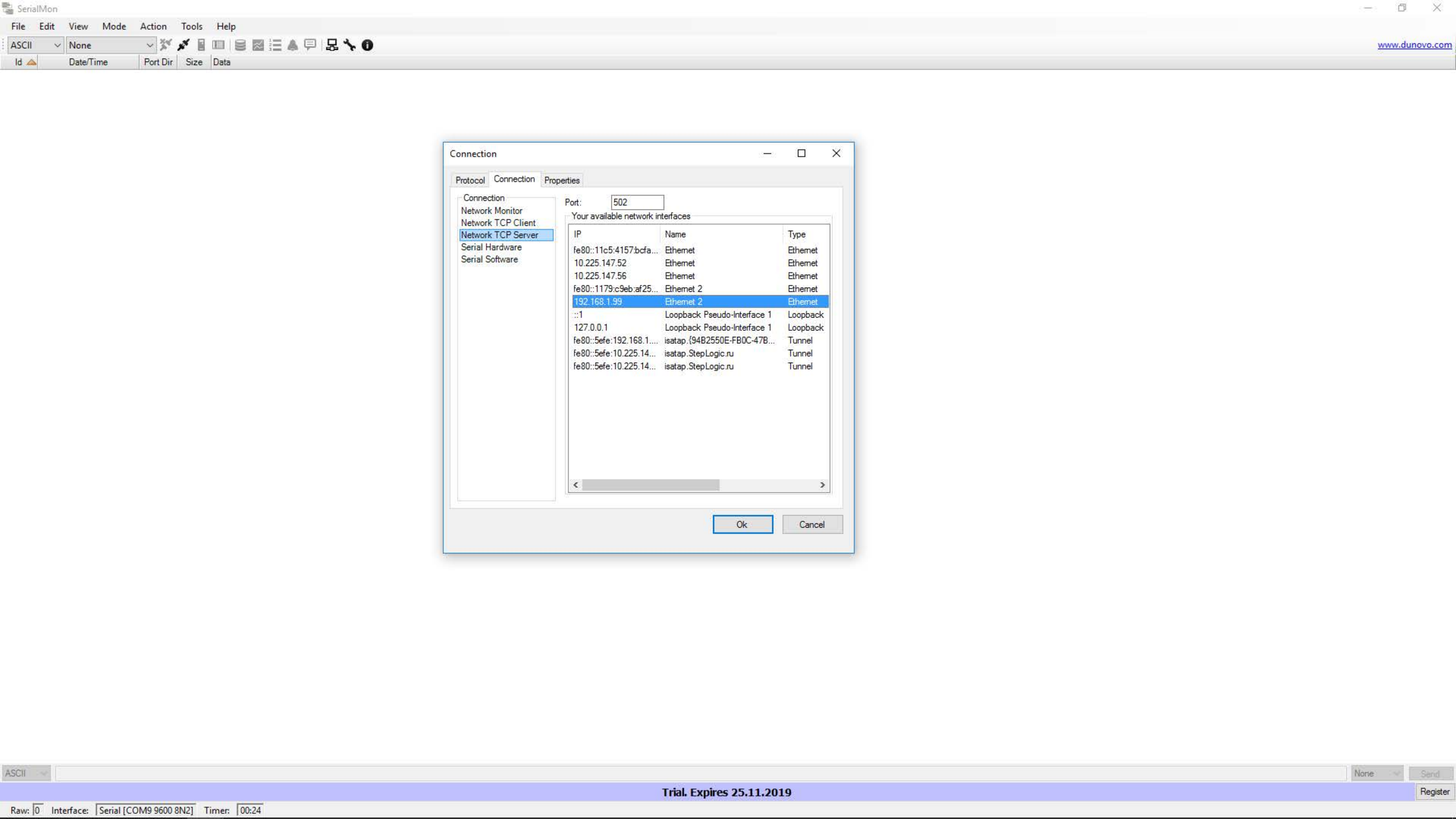
```
0001 PROGRAM MB_CLIENT_DEMO
0002 VAR
0003     IP_CONTROL2_1: IP_CONTROL2;
0004     MB_CLIENT_1: MB_CLIENT;
0005     IP_C: IP_C;
0006     S_BUF: NETWORK_BUFFER_SHORT;
0007     R_BUF: NETWORK_BUFFER_SHORT;
0008     DATA: ARRAY [0..255] OF WORD;
0009     W_DATA_BITPOS: INT;
0010     W_DATA_ADR: INT;
0011     W_POINTS: INT;
0012     W_ADDR: INT;
0013     R_DATA_BITPOS: INT;
0014     R_DATA_ADR: INT;
0015     R_POINTS: INT := 1;
0016     R_ADDR: INT := 1;
0017     FC: INT := 4;
0018     DEVICE_ID: BYTE := 11;
0019     ENABLE: BOOL;
0020 END_VAR
```




```
Загрузка библиотеки "C:\Program Files (x86)\WAGO Software\CODESYS V2.3\Targets\WAGO\Libraries\32_Bit\Standard.lib"
Загрузка библиотеки "C:\Program Files (x86)\WAGO Software\CODESYS V2.3\Targets\WAGO\Libraries\32_Bit\SYSLIBCALLBACK.LIB"
```

POU | Типы данн.. | Визуализа.. | Ресурсы

ОНЛАЙН | ЗАМ | ПРОСМОТР


SerialMon
File Edit View Mode Action Tools Help
ASCII None
www.dunovo.com
Id Date/Time Port Dir Size Data
Connection
Protocol Connection Properties
Connection
Network Monitor
Network TCP Client
Network TCP Server
Serial Hardware
Serial Software
Port: 502
Your available network interfaces
IP Name Type
fe80::11c5:4157:bcfa... Ethernet Ethernet
10.225.147.52 Ethernet Ethernet
10.225.147.56 Ethernet Ethernet
fe80::1179:c9eb:af25... Ethernet 2 Ethernet
192.168.1.99 Ethernet 2 Ethernet
::1 Loopback Pseudo-Interface 1 Loopback
127.0.0.1 Loopback Pseudo-Interface 1 Loopback
fe80::5efe:192.168.1.... isatap.{94B2550E-FB0C-47B... Tunnel
fe80::5efe:10.225.14... isatap.StepLogic.ru Tunnel
fe80::5efe:10.225.14... isatap.StepLogic.ru Tunnel
Ok
Cancel
ASCII None Send
Trial. Expires 25.11.2019
Register
Raw: 0 Interface: Serial [COM9 9600 8N2] Timer: 00:24

SerialMon

File Edit View Mode Action Tools Help

ASCII None www.dunovo.com

Id	Date/Time	Port Dir	Size	Data
1	2019-11-22 12:26:39.749	#		TCP/IP client connected: 192.168.1.100:44136
2	2019-11-22 12:26:39.751	#		TCP/IP client disconnected: 192.168.1.100:44136
3	2019-11-22 12:26:40.748	#		TCP/IP client connected: 192.168.1.100:31906
4	2019-11-22 12:26:40.781	A → PC	12	1 20 0 0 0 6 11 4 0 1 0 1
5	2019-11-22 12:26:42.858	A → PC	12	1 21 0 0 0 6 11 4 0 1 0 1
6	2019-11-22 12:26:44.833	A → PC	12	1 22 0 0 0 6 11 4 0 1 0 1
7	2019-11-22 12:26:46.798	A → PC	12	1 23 0 0 0 6 11 4 0 1 0 1
8	2019-11-22 12:26:48.878	A → PC	12	1 24 0 0 0 6 11 4 0 1 0 1
9	2019-11-22 12:26:50.843	A → PC	12	1 25 0 0 0 6 11 4 0 1 0 1
10	2019-11-22 12:26:52.813	A → PC	12	1 26 0 0 0 6 11 4 0 1 0 1
11	2019-11-22 12:26:54.890	A → PC	12	1 27 0 0 0 6 11 4 0 1 0 1
12	2019-11-22 12:26:56.858	A → PC	12	1 28 0 0 0 6 11 4 0 1 0 1
13	2019-11-22 12:26:58.827	A → PC	12	1 29 0 0 0 6 11 4 0 1 0 1
14	2019-11-22 12:27:00.906	A → PC	12	1 30 0 0 0 6 11 4 0 1 0 1
15	2019-11-22 12:27:02.879	A → PC	12	1 31 0 0 0 6 11 4 0 1 0 1
16	2019-11-22 12:27:04.957	A → PC	12	1 0 0 0 6 11 4 0 1 0 1
17	2019-11-22 12:27:06.921	A → PC	12	1 ! 0 0 0 6 11 4 0 1 0 1
18	2019-11-22 12:27:08.893	A → PC	12	1 " 0 0 0 6 11 4 0 1 0 1
19	2019-11-22 12:27:10.967	A → PC	12	1 # 0 0 0 6 11 4 0 1 0 1
20	2019-11-22 12:27:12.937	A → PC	12	1 $ 0 0 0 6 11 4 0 1 0 1
21	2019-11-22 12:27:14.906	A → PC	12	1 % 0 0 0 6 11 4 0 1 0 1
22	2019-11-22 12:27:17.050	A → PC	12	1 & 0 0 0 6 11 4 0 1 0 1
23	2019-11-22 12:27:18.959	A → PC	12	1 ' 0 0 0 6 11 4 0 1 0 1
24	2019-11-22 12:27:20.922	A → PC	12	1 (0 0 0 6 11 4 0 1 0 1
25	2019-11-22 12:27:23.003	A → PC	12	1) 0 0 0 6 11 4 0 1 0 1
26	2019-11-22 12:27:24.971	A → PC	12	1 * 0 0 0 6 11 4 0 1 0 1
27	2019-11-22 12:27:25.718	#		TCP/IP client disconnected: 192.168.1.100:31906

ASCII None Send

Trial. Expires 25.11.2019 Register

Raw: 27 Interface: Ethernet TCP server [502] Timer: 00:46