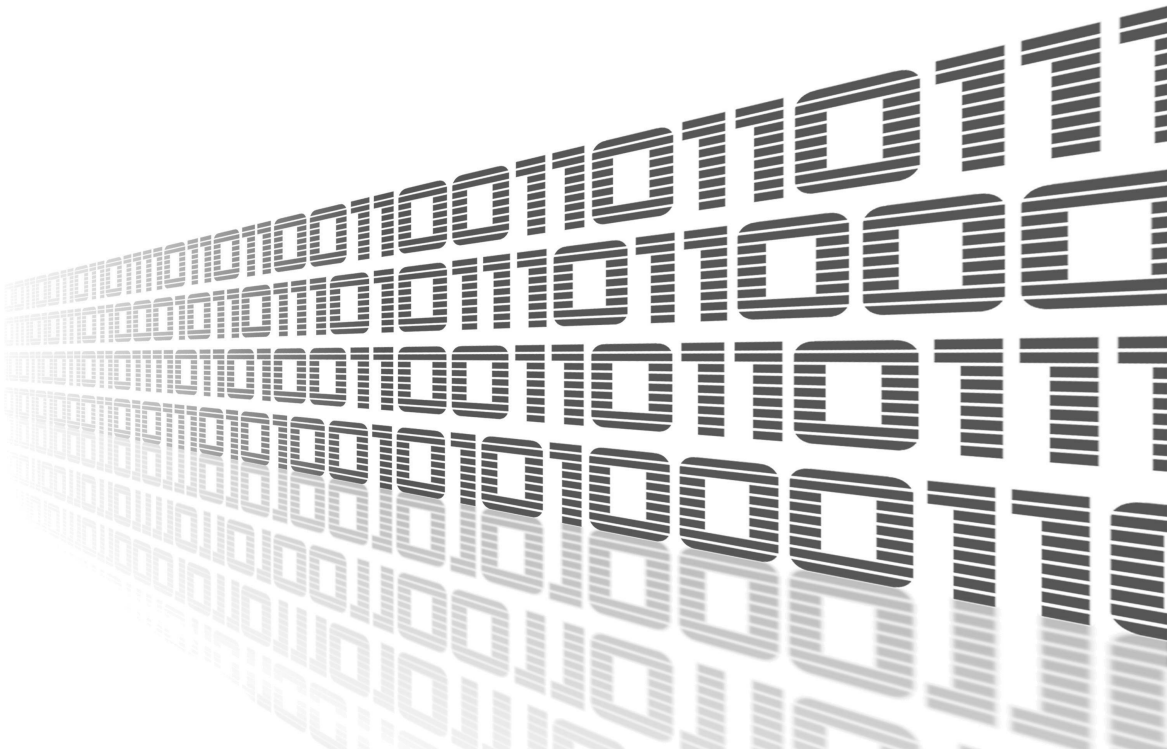
RouterApp

User Module

APLHA-MODBUS

APPLICATION NOTE



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Used symbols

Danger – Information regarding user safety or potential damage to the router.

Attention – Problems that may arise in specific situations.

Information or notice – Useful tips or information of special interest.

Example – example of function, command or script.

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1. User Module Description

User module *Cumulocity Agent* is not a part of the standard router's firmware. Uploading of this user module is described in the Configuration manual (see [1, 2]).

User module is v2 and v3 routers compatible

Protocol ALPHA-MODBUS is a binary transparent serial protocol for communication with Mitsubishi ALPHA automatons. From Advantech router to dispatching (and vice versa) the MODBUS-TCP protocol is used. On the serial line from/to Advantech router the proprietary ALPHA dedicated protocol is used. Router does the real-time transparent conversion of data flowing in both ways.

In the Client mode the router communicates with the automaton in the interval configured. If the interval isn't configured, the data won't be sent regularly. Alarm flags are also detected in the configurable interval. Data will be sent to the server in the configured period or when alarm detected. If router reads and sends desired data to the server, alarm flag will be changed to nonactive level.

in the Server mode the router communicates only when requested from dispatching and allows to write values into the Mitsubishi automaton, too.

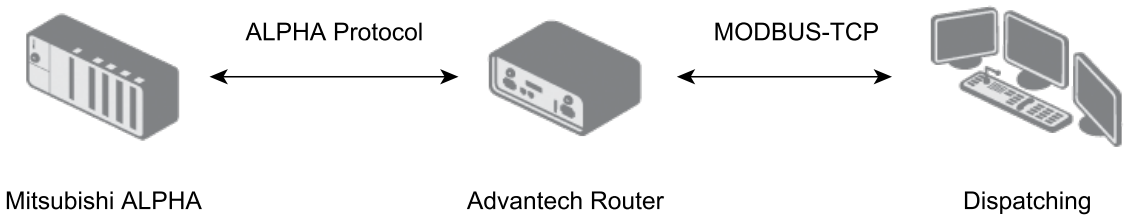

Figure 1: Principle of communication – Advantech router with ALPHA-MODBUS user module

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2. Configuration

Access the configuration in the *Customization* section in the *User Modules* item. Two modules appear after uploading the user module – see the following figure. These are to allow the configuration on both expansion ports separately.

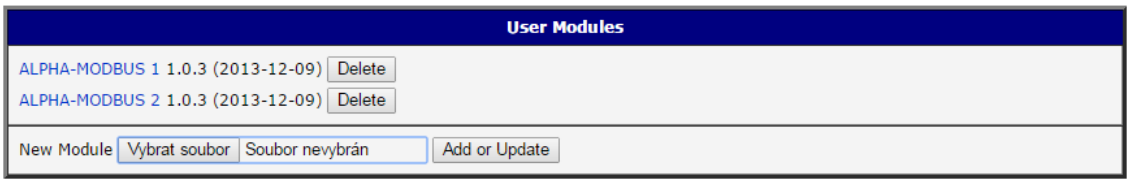

Figure 2: Use module ALPHA-MODBUS after upload

Clicking on one of the modules, you can configure them – se the next figure. The following table describes the items of configuration.

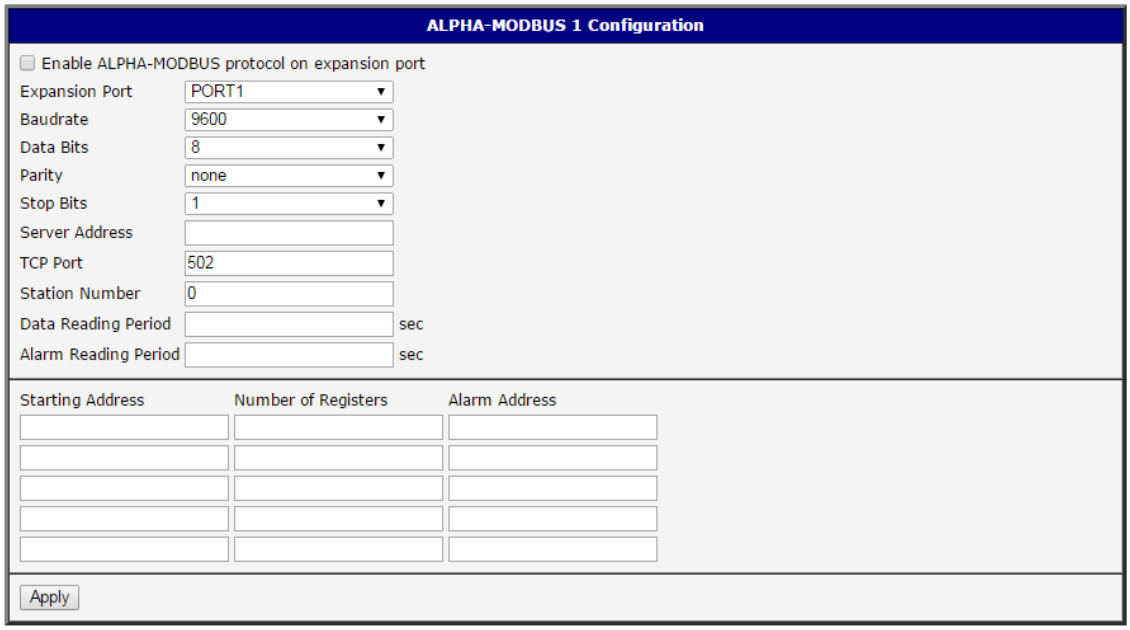

Figure 3: Configuration of ALPHA-MODBUS user module

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Item	Description
Baudrate	bit communication speed [bit/s].
Data Bits	8 or 7 data bits
Parity	none, even or odd parity
Stop Bits	1 or 2 stop bits
Server Address	IP adress of the server (only for Client mode)
TCP Port	port of the server/client
Station Number	adress of the connected automaton
Data Reading Period	period of reading data (only for Client mode)
Alarm Reading Period	period of alarms detection (only for Client mode)
Starting Address	starting address of the data area to send (only for Client mode)
Number of Registers	length of the data area to send (only for Client mode)
Alarm Address	address of the alarm register (only for Client mode)

Table 1: Items of *APLHA-MODBUS* configuration

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3. Map of MODBUS/ALPHA device registers

Notes:

- More detailed description of the items can be found in the documentation of ALPHA automatons – Alpha 2 Communication manual.pdf.
- All the items are 16-bit, higher byte (MSB) is sent first.

RefNum MODBUS	APLHA device	Can write	Note
1	System Bit 1–16	NO	
2	System Bit 17–24	NO	Bits 25–32 always 0
3	Input Terminal 1–15	YES	Bit 16 is always 0
4	Reserve	YES	Not used, always 0
5	External Input 1–4	YES	Bits 5–16 always 0
6	Output Terminal 1–9	YES	Bits 10–16 always 0
7	External Output 1–4	YES	Bits 5–16 always 0
8	Key Input 1–8	YES	Bits 9–16 always 0
9	Link Input 1–4	YES	Bits 5–16 always 0
10	Link Output 1–4	YES	Bits 5–16 always 0
11	Control Device 1–4	YES	Bits 5–16 always 0
12–16	Reserve	NO	Not used, always 0
17	Analog In 1	NO	
18	Analog In 2	NO	
19	Analog In 3	NO	
20	Analog In 4	NO	
21	Analog In 5	NO	
22	Analog In 6	NO	
23	Analog In 7	NO	
24	Analog In 8	NO	
25–256	Reserve	NO	Not used, always 0
257	System Bit 1–16	NO	
258	System Bit 17–24	NO	Bits 25–32 always 0

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RefNum MODBUS	APLHA device	Can write	Note
259	Input Terminal 1–8	YES	Bits 9–16 always 0
260	Reserve	YES	Not used, always 0
261	External Input 1–4	YES	Bits 5–16 always 0
262	Output Terminal 1–6	YES	Bits 7–16 always 0
263	External Output 1–4	YES	Bits 5–16 always 0
264	Key Input 1–8	YES	Bits 9–16 always 0
265	Link Input 1–4	YES	Bits 5–16 always 0
266	Link Output 1–4	YES	Bits 5–16 always 0
267	Control Device 1–4	YES	Bits 5–16 always 0
268–512	Reserve	NO	Not used, always 0
513	Communication Bit Device 1	YES	
514	Communication Bit Device 2	YES	
515	Communication Bit Device 3	YES	
516–612	Communication Bit Device 4 – Communication Bit Device 100	YES	
613–1024	Reserve	NO	Not used, always 0
1025	Communication Word Device 1	YES	
1026	Communication Word Device 2	YES	
1027	Communication Word Device 3	YES	
1028–1124	Communication Word Device 4 – Communication Word Device 100	YES	
1125–1536	Reserve	NO	Not used, always 0
1537	RTC – Year	YES	
1538	RTC – Month	YES	
1539	RTC – Day	YES	
1540	RTC – Hour	YES	
1541	RTC – Min	YES	
1542	RTC – Sec	YES	
1543	RTC – Adj	YES	
1544	RTC – DoW	NO	

To be continued on the next page

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RefNum MODBUS	APLHA device	Can write	Note
1545	RTC – Status	NO	
1546–2048	Reserve	NO	Not used, always 0
2049	Run/Stop	YES	Only write, can't be read! 1 = Run, 0 = Stop
2050–8192	Reserve	NO	Not used, always 0
8193–8216	System Bit 1 – System Bit 24	NO	
8217–8448	Reserve	NO	Not used, always 0
8449–8463	Input Terminal 1 – Input Terminal 15	YES	
8464–8704	Reserve	NO	Not used, always 0
8705–8708	External Input 1 – External Input 4	YES	
8709–8960	Reserve	NO	Not used, always 0
8961–8969	Output Terminal 1 – Output Terminal 9	YES	
8970–9216	Reserve	NO	Not used, always 0
9217–9220	External Output 1 – External Output 4	YES	
9221–9472	Reserve	NO	Not used, always 0
9473–9480	Key Input 1 – Key Input 8	YES	
9481–9728	Reserve	NO	Not used, always 0
9279–9282	Link Input 1 – Link Input 4	YES	
9283–9984	Reserve	NO	Not used, always 0
9985–9988	Link Output 1 – Link Output 4	YES	
9989–10240	Reserve	NO	Not used, always 0
10241–10244	Control Device 1 – Control Device 4	YES	

Table 2: Map of MODBUS/ALPHA device registers

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4. Related Documents

[1] Advantech Czech: **v2 Routers Configuration Manual** (MAN-0021-EN)
[2] Advantech Czech: **SmartFlex Configuration Manual** (MAN-0023-EN)
[3] Advantech Czech: **SmartMotion Configuration Manual** (MAN-0024-EN)
[4] Advantech Czech: **SmartStart Configuration Manual** (MAN-0022-EN)
[5] Advantech Czech: **ICR-3200 Configuration Manual** (MAN-0042-EN)

Product related documents can be obtained on *Engineering Portal* at www.ep.advantech-bb.cz address.

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