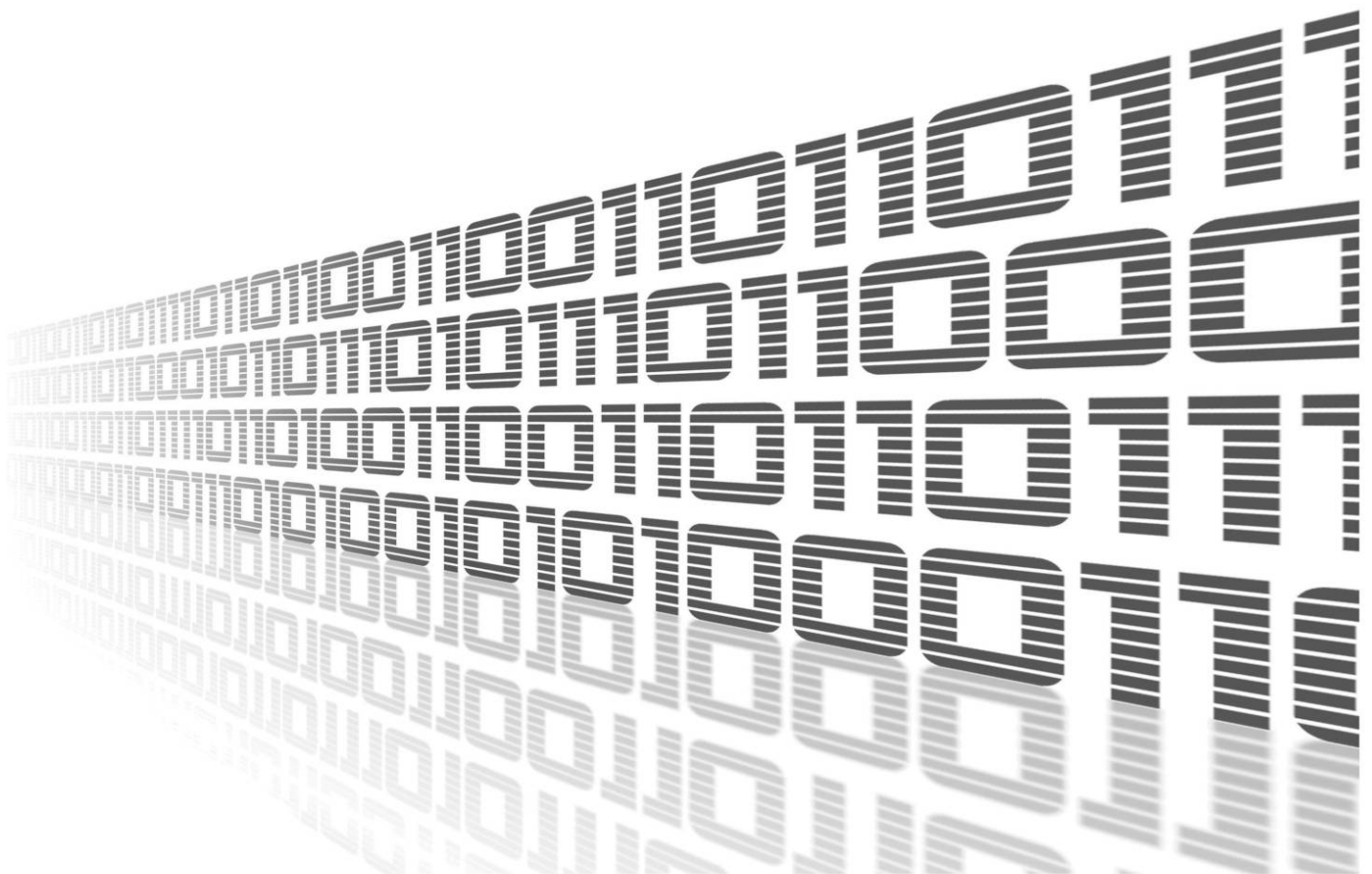


ADVANTECH



Protocol ALPHA-MODBUS



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Used symbols



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



Attention – Problems that can arise in specific situations.



Information – Useful tips or information of special interest.

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1. Router App Description



The router app *Protocol ALPHA-MODBUS* is not included in the standard router firmware. Uploading this router app is described in the Configuration Manual (see Chapter [Related Documents](#)).

The **ALPHA-MODBUS** protocol is a binary, transparent serial protocol used for communication with Mitsubishi ALPHA programmable logic controllers (PLCs). Between the Advantech router and the dispatching system (and vice versa), the **MODBUS-TCP** protocol is used. On the serial line from/to the Advantech router, the proprietary $\alpha 2$ protocol is utilized. The router performs real-time, transparent conversion of data flowing in both directions.

In **Client mode**, the router communicates with the automaton at the configured interval. If the interval is not configured, data will not be sent regularly. Alarm flags are also detected within the configurable interval. Data is sent to the server either periodically, as per the configured interval, or immediately when an alarm is detected. After the router reads and sends the required data to the server, the alarm flag is reset to an inactive state.

In **Server mode**, the router communicates only upon request from the dispatching system. It also allows writing values into the Mitsubishi ALPHA automaton.

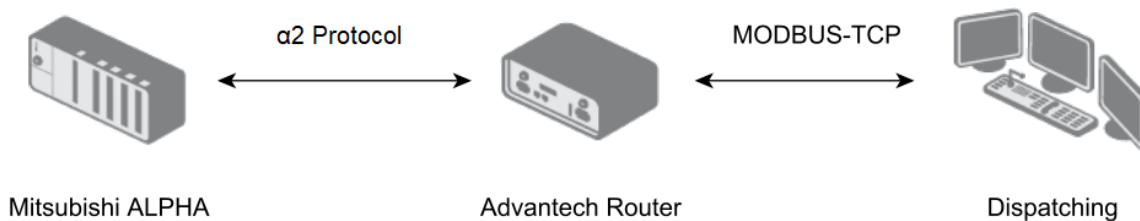


Figure 1: Communication Principle – Advantech Router with ALPHA-MODBUS RA

2. Configuration

2.1 Introduction



Multiple programs cannot share access to the same serial interface. Therefore, if the use of the serial interface (on the expansion port or a convertor connected to USB) is enabled in the ALPHA-MODBUS app, it must not be enabled neither in other apps nor in the system.

Access the application configuration from the *Customization* section under the *Router Apps* menu item.

If you have installed RA **version 1.6.1 or earlier**, a separate instance of the router app is created for each serial interface during installation (e.g., *ALPHA-MODBUS 1* and *ALPHA-MODBUS 2*).

Newer versions install only a **single instance** of the router app, which allows you to manage settings for all available interfaces. The application menu, as shown in the following figure, displays only items corresponding to physically present hardware. For example, if the router does not have a second expansion port or an external USB connector, the related items will not be displayed.

Newer application versions also support the **USB port**, if available on the router. The USB port can be used to connect a serial converter.



If you are upgrading from version 1.6.1 or earlier to a version newer than 1.6.1, you must manually reconfigure the *Expansion Port 2* interface. The configuration is not transferred automatically.

ALPHA-MODBUS

Configuration
Expansion Port 1
Expansion Port 2
USB Port
Administration
Return

Figure 2: ALPHA-MODBUS Router App Main Menu (for versions later than 1.6.1)

2.2 Configuration Items

For each interface, you can configure items as shown in the next figure and described in the table.

ALPHA-MODBUS Configuration

Expansion port 1

Enable ALPHA-MODBUS protocol on expansion port

Port Type: RS-232

Baudrate: 9600

Data Bits: 8

Parity: none

Stop Bits: 1

Server Address:

TCP Port: 502

Station Number: 0

Data Reading Period: sec

Alarm Reading Period: sec

Starting Address	Number of Registers	Alarm Address
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>

Figure 3: Interface Configuration Items

Item	Description
Port Type	Indicates the detected type of the serial interface on the expansion port or if the of USB ↔ Serial convertor is connected or not.
Baudrate	Communication speed in bits per second (bit/s).
Data Bits	Number of data bits: 7 or 8.
Parity	Parity setting: none, even, or odd.
Stop Bits	Number of stop bits: 1 or 2.
Server Address	IP address of the server (Client mode only).
TCP Port	TCP port number of the server or client.
Station Number	Address of the connected automaton.
Data Reading Period	Period for reading data (Client mode only).
Alarm Reading Period	Period for detecting alarms (Client mode only).
Starting Address	Starting address of the data area to send (Client mode only).
Number of Registers	Length of the data area to send (Client mode only).
Alarm Address	Address of the alarm register (Client mode only).

Table 1: Interface Configuration Items

2.3 Map of MODBUS/ALPHA Device Registers

Notes:

- A more detailed information can be found in the *Mitsubishi α2 Communication Manual* and *Mitsubishi α Software Manual*.
- All items are 16-bit; the higher byte (MSB) is sent first.

RefNum MODBUS	ALPHA 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
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

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RefNum MODBUS	ALPHA Device	Can Write	Note
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	
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	

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RefNum MODBUS	ALPHA Device	Can Write	Note
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

3. Related Documents

You can obtain product-related documents on *Engineering Portal* at icr.advantech.com address.

To get your router's *Quick Start Guide*, *User Manual*, *Configuration Manual*, or *Firmware* go to the [Router Models](#) page, find the required model, and switch to the *Manuals* or *Firmware* tab, respectively.

The *Router Apps* installation packages and manuals are available on the [Router Apps](#) page.

For the *Development Documents*, go to the [Development](#) page.