

USER MANUAL UMAX1418X0A Version 1.0.5

Modbus Router with Ethernet and CAN

USER MANUAL

P/N: AX141810A, AX141830A

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VERSION HISTORY

Version	Date	Author	Modification
1.0.0.	May 9, 2023	Antti Keränen	Initial Draft
1.0.1	May 16, 2023	M Ejaz	Added Technical Specifications
			Fixed legacy issues
1.0.2	Feb. 6, 2024	M Ejaz	Updated technical specifications
1.0.3	Feb. 13, 2024	M Ejaz	Updated temperature ratings
1.0.4	Feb. 15, 2024	M Ejaz	Added a note about default Ethernet settings
			where default passwords are mentioned.
1.0.5	Nov. 25, 2024	M Ejaz	Updated dimensional drawing of AX141810A
			Updated technical specifications
			Marketing review
1.0.5	Jan. 6, 2025	A Wilkins	Updated Temperature to +85°C based on
			validation



The default passwords: AX141810A firmware: **'AX141810A**'

AX141830A firmware: 'AX141830A'

For default Ethernet settings, please go to section 5.2.

ACCRONYMS

ACK	Positive Acknowledgement (from SAE J1939 standard)
BATT +/-	Battery positive (a.k.a. Vps) or Battery Negative (a.k.a. GND)
DM	Diagnostic Message (from SAE J1939 standard)
DTC	Diagnostic Trouble Code (from SAE J1939 standard)
EA	Axiomatic Electronic Assistant (A Service Tool for Axiomatic ECUs)
ECU	Electronic Control Unit (from SAE J1939 standard)
GND	Ground reference (a.k.a. BATT-)
I/O	Inputs and Outputs
IP	Internet Protocol
MAC	Media Access Control
MAP	Memory Access Protocol
MB	Modbus
NAK	Negative Acknowledgement (from SAE J1939 standard)
PDU1	A format for messages that are to be sent to a destination address, either specific or global (from SAE J1939 standard)
PDU2	A format used to send information that has been labeled using the Group Extension technique, and does not contain a destination address.
PGN	Parameter Group Number (from SAE J1939 standard)
PropA	Message that uses the Proprietary A PGN for peer-to-peer communication
PropB	Message that uses a Proprietary B PGN for broadcast communication
SPN	Suspect Parameter Number (from SAE J1939 standard)
TCP/IP	Transmission Control Protocol / Internet Protocol
TP	Transport Protocol
Vps	Voltage Power Supply (a.k.a. BATT+)

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REFERENCES

J1939	Recommended Practice for a Serial Control and Communications Vehicle Network, SAE, April 2011
J1939/21	Data Link Layer, SAE, December 2010
J1939/71	Vehicle Application Layer, SAE, March 2011
J1939/73	Application Layer-Diagnostics, SAE, February 2010
J1939/81	Network Management, SAE, March 2017
TDAX141810A	Technical Datasheet, RS485-MODBUS-ENET Converter, Axiomatic Technologies
UMAX07050x	User Manual, Axiomatic Electronic Assistant and USB-CAN, Axiomatic Technologies

This document assumes the reader is familiar with the SAE J1939 standard. Terminology from the standard is used, but not described in this document.



NOTE: This product is supported by Axiomatic Electronic Assistant V5.15.129.0 and higher

1. OVERVIEW OF CONTROLLER



Figure 1 – Block diagram of the RS485-MODBUS Converter with Ethernet and CAN

The Modbus Router Converter with Ethernet and CAN (later RS485-MODBUS-ENET) is a device that forwards Modbus data between the serial port (RTU), CAN and Ethernet based on a custom routing configuration. The configuration can be done using a web browser and the built-in web server running on the RS485-MODBUS-ENET device.

The Axiomatic Electronic Assistant can be used to configure the network parameters (both RS485 and Ethernet) of the RS485-MODBUS-ENET device. The web browser interface (TCP port 80) supports the configuration of all parameters, also including the ones that have EA configuration support.

The two firmware versions, AX141810A and AX141830A both support the same data routing functions. The difference is in the amount of routing rules and message definitions. The AX141810A is a general-purpose device with support for both directions, Modbus (RTU+TCP/IP) to CAN and vice versa.

The AX141830A is targeted mainly for CAN to Modbus (RTU+TCP/IP) direction.

2. INSTALLATION INSTRUCTIONS

2.1. Dimensions and Pinout



Figure 2 – Controller Dimensions and Label

Pin	Description
1	Battery -
2	Ethernet TX +
3	Ethernet RX +
4	RS485 TX + / RX +
5	CAN Shield
6	CAN H
7	CAN L
8	RS485 Ground
9	RS485 TX - / RX -
10	Ethernet RX -
11	Ethernet TX -
12	Battery +

Table 1 – AX141810A/AX141830A Connector Pinout

3. OVERVIEW OF J1939 FEATURES

The software was designed to provide flexibility to the user with respect to messages sent from the ECU by providing:

- Configurable ECU Instance in the NAME (to allow multiple ECUs on the same network)
- Configurable PGN and Data Parameters
- Configurable Diagnostic Messaging Parameters, as required

3.1. Introduction to Supported Messages

The ECU is compliant with the standard SAE J1939, and supports following PGNs from the standard.

From J1939-21 – Data Link Layer

 Request Acknowledgement Transport Protocol – Connection Management Transport Protocol – Data Transfer Message Proprietary B 	from	59904 59392 60416 60160 65280	0x00EA00 0x00E800 0x00EC00 0x00EB00 0x00FF00
	to	65535	0x00FFFF
 From J1939-73 – Diagnostics DM1 – Active Diagnostic Trouble Codes DM2 – Previously Active Diagnostic Trouble Codes DM3 – Diagnostic Data Clear/Reset for Previously Act DM11 – Diagnostic Data Clear/Reset for Active DTCs 	ive DTCs	65226 65227 65228 65235	0x00FECA 0x00FECB 0x00FECC 0x00FED3
 From J1939-81 – Network Management Address Claimed/Cannot Claim Commanded Address 		60928 65240	0x00EE00 0x00FED8
 From J1939-71 – Vehicle Application Layer ECU Identification Information Software Identification Component Identification 		64965 65242 65259	0x00FDC5 0x00FEDA 0x00FEEB

None of the application layer PGNs are supported as part of the default configurations, but they can be selected as desired for transmit function blocks.

Setpoints are accessed using standard Memory Access Protocol (MAP) with proprietary addresses. The Axiomatic Electronic Assistant (EA) allows for quick and easy configuration of some of the unit's main parameters over CAN network.

3.2. NAME, Address and Identification Information

The RS485-MODBUS-ENET has the following default for the J1939 NAME. The user should refer to the SAE J1939/81 standard for more information on these parameters and their ranges.

Arbitrary Address	Yes
Capable	
Industry Group	0, Global
Vehicle System	0
Instance	
Vehicle System	0, Non-specific system
Function	25, Axiomatic Protocol Converter
Function Instance	23/24, Axiomatic AX141810A/AX141830A
ECU Instance	0, First Instance
Manufacture Code	162, Axiomatic Technologies
Identity Number	Variable, uniquely assigned during factory programming for each
	ECU

The ECU Instance is a configurable setpoint associated with the NAME. Changing this value will allow multiple ECUs of this type to be distinguishable from one another when they are connected on the same network.

The default value of the "ECU Address" setpoint is 128 (0x80), which is the preferred starting address for self-configurable ECUs as set by the SAE in J1939 tables B3 and B7. The EA will allow the selection of any address between 0 and 253. *It is the user's responsibility to select an address that complies with the standard*. The user must also be aware that since the unit is arbitrary address capable, if another ECU with a higher priority NAME contends for the selected address, the RS485-MODBUS-ENET will continue select the next highest address until it finds one that it can claim. See J1939/81 for more details about address claiming.

ECU Identification Information

PGN 64965		ECU Identification Information	-ECUID
Transmission Repetition Rate:		On request	
Data Length: Extended Data Page: Data Page: PDU Format: PDU Specific: Default Priority: Parameter Group Number:		Variable 0 0 253 197 PGN Supporting Information: 6 64965 (0x00FDC5)	
Start Position a b c d e (a)*(b)*(c)*(d)*(e)*	Length Variable Variable Variable Variable Variable	Parameter Name ECU Part Number, Delimiter (ASCII "*") ECU Serial Number, Delimiter (ASCII "*") ECU Location, Delimiter (ASCII "*") ECU Type, Delimiter (ASCII "*") ECU Manufacturer Name, Delimiter (ASCII "*")	SPN 2901 2902 2903 2904 4304

Software Identifier

PGN 65242 Software Identification		-SOFT	
Transmission Repetition Rate:		On request	
Data Length:		Variable	
Extended Data Pa	age:	0	
Data Page:		0	
PDU Format:		254	
PDU Specific:		218 PGN Supporting Information:	
Default Priority:		6	
Parameter Group Number:		65242 (0x00FEDA)	
Start Position	Length	Parameter Name	SPN
1	1 Byte	Number of software identification fields	965
2-n	Variable	Software identification(s), Delimiter (ASCII "*")	234
Byte 1 is set to 5	and the identi	fication fields are as follows	

1 is set to 5, and the identification fields are as follows.

(Part Number)*(Version)*(Date)*(Owner)*(Description)

The EA shows all this information in its "General ECU Information" page. Note: The information provided in the Software ID is available for any J1939 service tool which supports the PGN -SOFT

Component Identification

PGN 65259		Component Identification	-CI	
Transmission Repetition Rate:		On request		
Data Length: Extended Data Page: Data Page: PDU Format: PDU Specific: Default Priority: Parameter Group Number:		Variable 0 254 235 PGN Supporting Information: 6 65259 (0x00FEEB)		
Start Position a b c d (a)*(b)*(c)*(d)*(e)*	Length 1-5 Byte Variable Variable Variable	Parameter Name Make, Delimiter (ASCII "*") Model, Delimiter (ASCII "*") Serial Number, Delimiter (ASCII "*") Unit Number (Power Unit), Delimiter (ASCII "*")	SPN 586 587 588 233	

4. WEB BROWSER BASED CONTROLLER CONFIGURATION

The RS485-MODBUS-ENET controller supports configuration of the data routing parameters from Ethernet port using a standard web browser.

The web browser-based configuration requires a password before any of the parameters can be viewed or edited.



The default passwords: AX141810 firmware: **AX141810A**' AX141830 firmware: **AX141830A**' For default Ethernet settings, please go to section 5.2.

4.1. Parameter Editing

The RS485-MODBUS-ENET has a web server running on TCP port 80. Please note that the "Save settings" button must be pressed to save the parameters. If not, the modified parameters are discarded when moving to another configuration page or closing the web browser. The RS485-MODBUS-ENET web server supports the configuration options described on the following pages.

<configured ip>

<configured ip>/index.shtml



The Home page (index.shtml) shows the main configuration parameters and communication statistics for the different interfaces.

<configured ip>/main_settings.shtml

The Main Settings configuration page allows the user to modify the device's IP address, netmask and the main configuration parameters for the communication interfaces. The CAN configuration parameters include the default baud rate to use and the auto-baud rate capability.

The serial port configuration contains baud rate (freely settable in range 75bps...256kbps), number of data bits, start and stop bits and parity.

The password can be changed by entering the same password to both **New password** and **Retype new password** entries. In case the **Retype new password** is left empty or the two passwords don't match, the password is not modified.

AX AX141810 Main Settings X	+	~	- 0	×
\leftarrow \rightarrow C O $\&$ 192.168.1.20/mai	n_settings.shtml	v III\ 🗉 🔕	<u>۱</u>	≡
Home Main Settings CAN RX Settings Modbus Slave Settings Modbus Montor	Solutions ModbusRTU - MAIN SETTINGS Save Settings Discard Changes ETHERNET Server (Modbus Slave & Web Configuration) Device IP Address: 192.168.1.20 Web Server Port: 80	Set Defaults		=
<u>Modbus Master</u> <u>Settings</u> <u>Diagnostics Routing</u> <u>Settings</u> <u>Upload/Download</u> <u>Firmware</u>	CAN Baud Rate: 250 v kbit/s Auto baudrate enabled: Yes v			
	RS485 Baud rate: 9600 Number of data bits: 8 Parity: None Number of stop bits: 1			
	Password New password: Retype new password:			
	Reboot Reboot controller	Enable rebooting		

<configured ip>/can_rx_settings.shtml

The CAN receive message parameter settings are displayed one message at time. The message can be selected using the 'Next' and 'Previous' buttons. The 'Jump to' button selects the specified message directly. Please remember to save settings before selecting another CAN receive message to be configured, otherwise the modified settings will be lost.

The 'Discrete' data type reads in the CAN data as a number (or bit field data), using the range specified by the configured number of bits (**Data width**). With discrete data types, the resolution, offset, minimum and maximum are not used.

The 'Continuous' data type uses the J1939 data formatting with resolution, offset, minimum and maximum values. With continuous data, the data range is limited for reserving the upper range for J1939 special and error codes.

The Data destination and Data destination number settings specify the target interface for the received data. The received data is always stored to a local variable assigned for each CAN receive message, but the Data destination needs to be configured for forwarding the data to the Modbus slave interfaces.

🔹 🛝 AX141810 CAN RX Settings 🗙	+			\sim	-		×
← → C () 👌 192.168.1.20/can_rx	_settings.shtml	\$			۵ (பி	≡
Giobal Electronic So	Modbus Modbus	rtu - FCP/IP C	conv	erte	r		
	CAN SETTINGS						
Home Main Settings	Save Settings Discard Chang	es		Set Defa	ults		
<u>CAN RX Settings</u> CAN TX Settings	CAN Receive Message Se	lect					
Modbus Slave Settings	Next Previous	Jump to 0					
<u>Modbus Master</u> Settings	CAN Receive Message Se	ttings					
• <u>Diagnostics Routing</u> • <u>Settings</u> <u>Upload/Download</u> • <u>Firmware</u>	CAN RX #0 Message enabled: No PGN: 0xF Timeout: 0 Source address: 0 Check source address: No Data type: Not Data width: 1 Data byte index: 0 Data byte index: 0 Data bit index: 0 Data offset: 0.00 Data maximum: 1.00 Data maximum: 1.00 Data destination: Not Data destination: Not Data destination number: 0 Allow TP: No	 ▼ Configured ▼ 0000 Configured Configure		×			
	L						

<configured ip>/can_tx_settings.shtml

Each of the CAN transmit messages support several signals for sending out received data. The transmit messages support the same 'Discrete' and 'Continuous' data types with same characteristics than the CAN receive messages do.

Please remember to save the settings before selecting a new transmit message or transmit signal. In case the values are not saved, the modifications are lost when a new message or signal is selected.

🔹 🍂 AX141810 CAN TX Settings 🗙 🚽	÷				~		-			×
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Giobal Electronic So	Modbe Modbe	usR1 usT0	ru - CP/IP	Con	ve	rte	r			
Home Main Settings CAN RX Settings CAN TX Settings Modbus Slave	CAN SETTINGS Save Settings Discard CAN Transmit Messa Next Previous	Changes	ct Jump to 0		Se	t Defa	ults			
Settings • <u>Modbus Master</u> <u>Settings</u> • <u>Diagnostics Routing</u> • <u>Settings</u> <u>Upload/Download</u> • <u>Firmware</u>	CAN Transmit Messa CAN Tx #0 Message enabled: N PGN: 0x TX interval: 0 Priority: 6 Destination address: 0	age Setti o ~ 	ngs							
	Next Previous	I Select	lump to 0							
	CAN Transmit Signal CAN Tx #0 Signal #0	I Setting Not config Not config 1 0 0 1.00000 0.00 1.00	s jured jured v		~					

<configured ip>/modbus_settings.shtml

The RS485-MODBUS-ENET device supports Modbus RTU and Modbus TCP/IP slaves running on the RS485 and Ethernet ports, respectively. The number and start address for each of the Modbus slave's inputs, coils and registers can be specified.

Please note that the slave interface is enabled only if the Modbus master implementation is not running on that interface.

The Modbus TCP/IP node address is a "don't care", but the RTU slave interface will read in only the messages that are targeted to the configured Modbus node address.

The number of inputs, coils and registers have an upper limit, and the web server will not accept values beyond the built-in maximum limit. If the upper limit is exceeded, the value is saturated to the maximum allowed value.

🔹 🛝 AX141810 Modbus Slave Settin X	+			~	-	_		×			
← → C O 192.168.1.20/mo	dbus_settings.shtml	☆	\bigtriangledown	\ E		٩	பி	=			
Giobal Electronic	Solutions ModbusRT	U - P/IP	Con	vert	er						
• <u>Home</u>	MODBUS SLAVE SETTINGS				() I						
Main Settings CAN BX Settings	Main Settings Discard Changes Set Defaults										
<u>CAN TX Settings</u>	TCP/IP										
Modbus Slave Sottinge	Modbus TCP Port:	502									
Modbus Master	Number of coils:	10									
Settings	Coils start address:	1		_							
Diagnostics Routing	Number of inputs:	10									
Settings Upload/Dowpload	Number of input registers:	10									
<u>Firmware</u>	Input registers start address:	1									
	Number of holding registers:	256									
	Holding registers start address:	1									
	RTU (RS485)										
	Modbus RTU node address:	21									
	Number of coils:	10									
	Coils start address:	1									
	Inputs start address:	10									
	Number of input registers:	10									
	Input registers start address:	1		5							
	Number of holding registers:	256									
	Holding registers start address:	1									
	L										

<configured ip>/modbus_master.shtml

The RS485-MODBUS-ENET device supports Modbus RTU and Modbus TCP/IP master running on the RS485 and Ethernet ports, respectively. The "Ethernet master enabled" and "RS485 master enabled" options need to be set to 'Yes' for enabling the corresponding Modbus master.

Please note that enabling the Modbus master will disable the corresponding Modbus slave.

The **Forward received data to** and **Default source for writes** data routing options are the built-in variables for each Modbus master message definition. The CAN receive messages' **Data destination** configuration can access these variables directly if configured to do so on the CAN receive message configuration page.

The received Modbus data can be also sent directly to CAN bus by selecting the 'Direct CAN TX' option for the **Forward received data to** setpoint. In this case, the **Received data number** specifies the J1939 PGN to use (the priority will default to 6 and the RS485-MODBUS-ENET's J1939 address will be used as the source address for the direct transmit messages).

🔹 🛝 AX141810 Modbus Master Setti 🗙	+	~		-		×
← → C O & 192.168.1.20/mod	lbus_master.shtml රි			٩	ථ	≡
Giobal Electronic	ModbusRTU - ModbusTCP/IP C	onver	ter			
- Here	MODBUS MASTER SETTINGS			1		
<u>Home</u> <u>Main Settings</u>	Save Settings Discard Changes	Set	t Defaults			
CAN RX Settings	MASTER ENABLE			1		
<u>CAN TX Settings</u> Modbus Slave	Ethernet master enable	ed: No 🗸				
Settings	RS485 master enable	ed: No 🗸				
Modbus Master	MASTER MESSAGE SELECT			1		
Settings Diagnostics Routing	Next Previous Jump to 0					
Settings						
Upload/Download	Master Message					
Firmware	Message enabled: No V					
	Device address: 0					
	Function: Not configured	• •				
	Register address: 0					
	Number of registers: 0	1 ~				
	Transmit interval: 0	• <u>•</u>				
	Forward received data to: Default target	~				
	Received data number: 0					
	Data source for writes: Default source					
	Source data number: 0					

<configured ip>/diagnostics_routing.shtml

J1939 DM1 diagnostics frames can be routed to Modbus slave interfaces (either RTU or TCP/IP) using the Diagnostics routing configuration.

The routing options include routing all received diagnostics to Modbus or only routing the specified ones.

In case specified diagnostics routing is configured, the SPN is the main parameter to configure. The diagnostics are filtered using this setting. In case needed, the FMI and SA values can be used for more detailed filtering of the received DM1 frames. The FMI and SA can be set to "don't care" values (32 for FMI and 255 for SA) for accepting a wider range of SPNs.

The received DM1 data is forwarded to Modbus slave holding registers using this data layout.

	Holding register				
	<15:8>	<7:0>			
<mb addr.="" diag.="" start=""></mb>		SPN (MSBs)			
<mb +="" 1="" addr.="" diag.="" start=""></mb>	SPN (16 LSBs)				
<mb +="" 2="" addr.="" diag.="" start=""></mb>	Lamp	FMI			
<mb +="" 3="" addr.="" diag.="" start=""></mb>	SA	OC			

W AX141810 Diagnostics Routing ×	+			\sim			-		×
\leftarrow \rightarrow C O $\&$ 192.168.1.20/diagr	nostics_routing.shtml	☆	${\times}$	hI\		٥	٩	ඪ	≡
 ← → C ♦ 192.168.1.20/diagr ♦ Home ♦ Main Settings ♦ CAN RX Settings ♦ CAN TX Settings ♦ Modbus Slave Settings ♦ Modbus Slave Settings 	In the second se	☆ J - P/IP C GS			t Defa	ults	٢	£	=
Modbus Master Settings Diagnostics Routing Settings Upload/Download Firmware	Target interface: M DIAGNOSTIC FORWARD ENTRY SELECT Next Previous LIST OF SPNs/FMIs/SAs TO FOR SPN/FMI/SA Entry #0 SPN: 0x0 FMI: 0 SA: 0	Jump to C)	•					

<configured ip>/settings_transfer.shtml

The settings can be downloaded from the RS485-MODBUS-ENET as a binary file. When a settings file is uploaded to the RS485-MODBUS-ENET, the settings are checked using a CRC32 checksum. In case the checksum isn't correct, the uploaded settings won't be stored to RS485-MODBUS-ENET's non-volatile memory.

Please also note that AX141810A and AX141830A settings are not compatible with each other due to different number of supported routing functions.



5. ECU SETPOINTS ACCESSED WITH AXIOMATIC ELECTRONIC ASSISTANT

5.1. J1939 Network Setpoints

"ECU Instance Number" and "ECU Address" setpoints and their effect are defined in section 3.2.

Name	Range	Default	Notes
ECU Instance Number	0-7	0x00	Per J1939-81
ECU Address	0-253	0x80	Preferred address for a self-
			configurable ECU

Table 2 – J1939 Setpoints

If non-default values for the "ECU Instance Number" or "ECU Address" are used, they will be mirrored during a setpoint file flashing, and will only take effect once the entire file has been downloaded to the unit. After the setpoint flashing is complete, the unit will claim the new address and/or re-claim the address with the new NAME. If these setpoints are changing, it is recommended to close and re-open the CAN connection on EA after the file is loaded so that only the new NAME and address are showing in the J1939 CAN Network ECU list.

Electronic Assistant			- 0	×					
<u>File View Options H</u> elp									
🧱 🕮 🖪 F									
- J1939 CAN Network	Setpoint Name	ne Value Comment							
i Casard FCI Information	ar ECU Address	Address 0X60 Reserved for future assignment by SAE, but available for use by self conligurable b							
General ECU Information Setpoint File Explored Parameters RS485 Parameters	SPECU Instance Number	0000	#1 - Hrst Instance						
Ready			5	0 kbit/					

Figure 3 – Screen Capture of J1939 Setpoints

5.2. Ethernet Parameter Setpoints

The main Ethernet parameters can be configured using EA for easier initial configuration of the RS485-MODBUS-ENET device. A power cycle is needed for taking the new settings into use.

Electronic Assistant				nte de chestice de debuidendes	_		×
<u>File View Options H</u> elp							
🥦 🕮 🖪 F							
□ - J1939 CAN Network	Setpoint Name	Value	Comment				
Ecv AX141810, RS485-Ethernet-CAN Converter #1	SP IP Address, B0	192					
- i General ECU Information	SP IP Address, B1	168					
🖃 🗐 Setpoint File	SP IP Address, B2	1					
I J1939 Network	SP IP Address, B3	20					
- Ethernet Parameters	SP Netmask, BO	255					
RS485 Parameters	SP Netmask, B1	255					
	SP Netmask, B2	255					
	SP Netmask, B3	0					
	SP ModbusTCP/IP Port	502					
Ready						:50	kbit/

Figure 4 – Screen Capture of Ethernet Parameter Setpoints

Name	Range	Default	Notes
IP Address, B0	0255	192	These settings define an IP address: 192.168.1.20
IP Address, B1	0255	168	
IP Address, B2	0255	1	
IP Address, B3	0255	20	
Netmask, B0	0255	255	These settings define a netmask 255.255.255.0
Netmask, B1	0255	255	
Netmask, B2	0255	255	
Netmask, B3	0255	0	
ModbusTCP/IP Port	065535	502	The port for accessing the Modbus slave interface.

 Table 3 – Ethernet Parameter Setpoints

5.3. RS485 Parameter Setpoints

Electronic Assistant	19 - 19 - 19 - 19 - 19 - 19 - 19 - 19 -				-		×
Eile View Options Help							
	Setpoint Na S ^P Baudrate S ^P Wordlength S ^P Parity S ^P Stop Bits	Value 9600 0 0	Comment 8 bits None 1 bit				
Ready	1					:50 k	kbit/ 🤙

Figure 5 – Screen Capture of RS485 Parameter Setpoints

Name	Range	Default	Notes
Baudrate	0256000	9600	The RS485 port baud rate to use.
Wordlength	0, 1	0 – 8 bits	Number of data bits to use, 8bits or 9bits.
Parity	0, 1, 2	0 – None	Parity: None, even, odd.
Stop bits	0, 1	0 – 1 bit	Number of stop bits, 1 bit or 2 bits.

Table 4 – RS485 Parameter Setpoints

6. REFLASHING OVER ETHERNET USING A WEB BROWSER

The AX141810A/AX141830A can be upgraded with new application firmware using a web browser. Once the correct configuration password is entered, the firmware reflash can be done using the 'Firmware' page.

<configured ip>/firmware.shtml

😫 🛝 AX141810 Firmware 🛛 🗙	+	~	- 🗆 X
\leftarrow \rightarrow C O $\stackrel{\text{O}}{\approx}$ 192.168.1.20/firmw	are.shtml 🖒		⊛ එ ≡
Giobal Electronic S	ModbusRTU - ModbusTCP/IP	Converter	
 Home Main Settings CAN RX Settings CAN TX Settings Modbus Slave Settings Modbus Master Settings Diagnostics Routing Settings Upload/Download Firmware 	FIRMWARE UPDATE Current Firmware Version: V97.99 Specify a firmware file to upload into the device: Browse No file selected.		

On the 'Firmware' page, a file selection dialog can be opened by pressing the 'Browse...' button.

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Organize • New folder				≣ .	- 🔳 (
		Name	C	Date modified	Туре
↓ Downloads	*	AF-23010-1.00.af	2	8/03/2023 20.36	AF File
Documents	*				
Pictures	*				
oogle Drive	*				

Navigate to where you had saved the **AF-23010-x.xx.af** file sent from Axiomatic. (Note: only binary (.af) files can be flashed using the web browser firmware update interface.)



Once the file is selected, the actual upload/upgrade process is started by pressing the 'Upload' button.

•	AX141810 Firmware × + ·	- 0	×
$\leftarrow \ \ \rightarrow \ \ \times$	 ල සි 192.168.1.20/firmware.shtml ක් ල III II) () É) ≡
	Giobal Electronic Solutions Modbus RTU - Modbus TCP/IP Converter	_	
	 Home Main Settings CAN RX Settings CAN TX Settings CAN TX Settings Current Firmware Version: V97.99 Modbus Slave Settings Modbus Master Settings Diagnostics Routing Settings Upload Firmware 		

The firmware upload process is shown below the 'Upload' button.



Once the upload is finished and the file checked and stored to a temporary location on the AX141810A/AX141830A, the user is prompted to either to 'Apply New Firmware' or cancel the operation.



The firmware reflash procedure takes 30 seconds to finish. After this the AX141810A/AX141830A reboots automatically to the new firmware and returns to the password dialog.

APPENDIX A - TECHNICAL SPECIFICATION

Specifications are indicative and subject to change. Actual performance will vary depending on the application and operating conditions. Users should satisfy themselves that the product is suitable for use in the intended application. All our products carry a limited warranty against defects in material and workmanship. Please refer to our Warranty, Application Limitations & Return Materials Process as described on https://www.axiomatic.com/service/.

Note: All specifications are typical at nominal input voltage and 25°C unless otherwise specified.

Power

Power Supply Input	12 or 24 VDC nominal (9 to 36 VDC)
Quiescent Current	AX141810A: 160 mA @ 12 V; 80 mA @ 24 V typical (power only, no other connections) AX141830A: 130 mA @ 12 V; 70 mA @ 24 V typical (power only, no other connections)
Surge Protection	95 VDC
Under-Voltage	AX141810A: Hardware shutdown at 5 VDC
Protection	AX141830A: Hardware shutdown at 6 VDC
Over-Voltage	AX141810A: Hardware shutdown at 41.5 VDC
Protection	AX141830A: Hardware shutdown at 42 VDC
Reverse Polarity	AX141810A: Provided up to -36 V
Protection	AX141830A: Provided up to -40 V

Functionality

Conversion Platform	The Protocol Converter supports conversion logic for bi-directional data exchange between Ethernet (Modbus TCP/IP), RS-485 (Modbus RTU) and SAE J1939 CAN
	networks.
	The actual conversion logic setup is highly application specific. The two firmware versions, AX141810A and AX141830A both support the same data routing functions. The difference is in the amount of routing rules and message definitions.
	The AX141810A is a general-purpose device with support for both directions, Modbus (RTU+TCP/IP) to CAN and vice versa. The AX141810A ships with no configuration to allow the user to set up the parameters.
	The AX141830A is targeted mainly for CAN to Modbus (RTU+TCP/IP) direction.
Ethernet	1 port 10/100 Mbit Ethernet compliant
	10/100 Mbit Ethernet compliant 10BASE-T, 100BASE-Tx (auto-negotiation and full-duplex supported)
	Auto-MDIX
DS 185	
N3-403	Isolated
	1 half-duplex RS-485 port provided
	Baud rate: Configurable (75 bit/s to 256 kbit/s)
CAN	SAE J1939 port
	Isolated
	Baud rate: 250 kbit/s (default)
	250 KDIt/s, 500 KDIt/s, 1 MDIt/s auto-baud-rate detection

General Specifications

Microcontroller	STM32H723VGT6
Isolation	CAN isolation: 330 Vrms
	RS-485 isolation: 300 Vrms
User Interface	Parameters are configurable using a web browser. Firmware can also be updated using a
	web browser.
	Aviamatic Electronic Assistant (P/N: AV070502 or AV070506K) can be used for
	configuring device IP address, netmask, and Modbus port.
Compliance	RoHS
Operating Conditions	-40 to 85°C (-40 to 185°F)
Storage Temperature	-40 to 105°C (-40 to 221°F)
Weight	0.70 lbs. (0.32 kg)
Protection	IP67
Enclosure and	Aluminum enclosure
Dimensions	Integral TE Deutsch equivalent connector
	Encapsulation
Electrical Ocurrentiana	All min TE Deutech commonter D/NL DT15 40DA
Electrical Connections	12-pin TE Deutsch connector P/N: DT15-12PA
	A mating plug KIT is available as Axiomatic P/N: AX070105 (includes 1 plug DT06-12SA, 1 wedgelock W12S, 3 sealing plugs 114017, 12 contacts 0462-201-16141)
Mounting	Mounting holes sized for #10 or M4.5 bolts. The bolt length will be determined by the end- user's mounting plate thickness. The mounting flange of the controller is 0.19 inches (4.75 mm) thick.
	If the module is mounted without an enclosure, it should be mounted to reduce the likelihood of moisture entry. Install the unit with appropriate space available for servicing and for adequate wire harness access (6 inches or 15 cm) and strain relief (12 inches or 30 cm).
	The CAN wiring is considered intrinsically safe. The power wires are not considered intrinsically safe and so in hazardous locations, they need to be located in conduit or conduit trays at all times. The module must be mounted in an enclosure in hazardous locations for this purpose.
	All field wiring should be suitable for the operating temperature range of the module.
	All chassis grounding should go to a single ground point designated for the machine and all related equipment.



OUR PRODUCTS

AC/DC Power Supplies

Actuator Controls/Interfaces

Automotive Ethernet Interfaces

Battery Chargers

CAN Controls, Routers, Repeaters

CAN/WiFi, CAN/Bluetooth, Routers

Current/Voltage/PWM Converters

DC/DC Power Converters

Engine Temperature Scanners

Ethernet/CAN Converters, Gateways, Switches

Fan Drive Controllers

Gateways, CAN/Modbus, RS-232

Gyroscopes, Inclinometers

Hydraulic Valve Controllers

Inclinometers, Triaxial

I/O Controls

LVDT Signal Converters

Machine Controls

Modbus, RS-422, RS-485 Controls

Motor Controls, Inverters

Power Supplies, DC/DC, AC/DC

PWM Signal Converters/Isolators

Resolver Signal Conditioners

Service Tools

Signal Conditioners, Converters

Strain Gauge CAN Controls

Surge Suppressors

OUR COMPANY

Axiomatic provides electronic machine control components to the off-highway, commercial vehicle, electric vehicle, power generator set, material handling, renewable energy and industrial OEM markets. *We innovate with engineered and off-the-shelf machine controls that add value for our customers.*

QUALITY DESIGN AND MANUFACTURING

We have an ISO9001:2015 registered design/manufacturing facility in Canada.

WARRANTY, APPLICATION APPROVALS/LIMITATIONS

Axiomatic Technologies Corporation reserves the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. Users should satisfy themselves that the product is suitable for use in the intended application. All our products carry a limited warranty against defects in material and workmanship. Please refer to our Warranty, Application Approvals/Limitations and Return Materials Process at https://www.axiomatic.com/service/.

COMPLIANCE

Product compliance details can be found in the product literature and/or on axiomatic.com. Any inquiries should be sent to sales@axiomatic.com.

SAFE USE

All products should be serviced by Axiomatic. Do not open the product and perform the service yourself.



This product can expose you to chemicals which are known in the State of California, USA to cause cancer and reproductive harm. For more information go to www.P65Warnings.ca.gov.

SERVICE

All products to be returned to Axiomatic require a Return Materials Authorization Number (RMA#) from <u>rma@axiomatic.com</u>. Please provide the following information when requesting an RMA number:

- Serial number, part number
- Runtime hours, description of problem
- · Wiring set up diagram, application and other comments as needed

DISPOSAL

Axiomatic products are electronic waste. Please follow your local environmental waste and recycling laws, regulations and policies for safe disposal or recycling of electronic waste.

CONTACTS

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