User Manual UMAX140740
Version 5
Firmware 5.xx

USER MANUAL

5-Port Gigabit Ethernet Switch

1 Port 10Gbit/s, 4 Ports 1Gbit/s

P/N: AX140740

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ACRONYMS

AF	Application Firmware
ARP	Address Resolution Protocol
AX	Axiomatic
BATT	Battery
bps	Bit per second
°C	Celsius (degree)
CAT	Category
CQI	Channel Quality Indicator
DSCP	Differentiated Services Code Point
EMI	Electromagnetic Interference
ENET	Ethernet
IEEE	Institute of Electrical and Electronics Engineers
°F	Fahrenheit (degree)
GbE	Gigabit Ethernet
Gbps	Gigabit per second
GND	Ground
GPL	General Public License
H	Height (for size)
HTTP	Hypertext Transfer Protocol
ICMP	Internet Control Message Protocol
IEC	International Electrotechnical Commission
in	inch
IP	Internet Protocol or Ingress Protection (for housing)
L	Length (for size)
LAN	Local Area Network
lb	Pounds
LED	Light-Emitting Diode
K	kilo
kg	kilogram
kOhm	kiloohm
m	meters
mA	milliamperes
MAC	Media Access Control (address)
Mbit	Megabit
Mbps	Megabits per second
MDIX	Medium Dependent Interface Crossover
MIT	Massachusetts Institute of Technology
Mpps	Mega packets per second
mm	millimetres
N/A	Not Applicable or Not Assigned
PC	Personal Computer
PHY	Physical Layer Transceiver (Ethernet chip)
P/N	Part Number
PWR	Power
PWREN	Power Enable

QoS	Quality of service
RFC	Request For Comments
RoHS	Restriction of Hazardous Substances
RS	Recommended Standard
RTOS	Real-Time Operating System
SP	Service Pack
SSP	Software Support Package
STP	Shielded Twisted Pair
TBD	To be Determined
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
UTP	Unshielded Twisted Pair
V	Volt
VDC	Volt Direct Current
W	Width (for size)
Win	Windows

TABLE OF CONTENTS

1 INTRODUCTION

The following user manual describes architecture and functionality of the 5-Port Gigabit Ethernet Switch. It also contains technical specifications of the device.

The user manual is valid for application firmware with the same major version number as the user manual. For example, this user manual is valid for any application firmware version 5.xx. Updates specific to the user manual are done by adding letters: A, B, …, Z to the user manual version number.

The user can check the application firmware version number using the device embedded web server interface or through the RS-232 port.

2 DEVICE DESCRIPTION

The 5-Port Gigabit Ethernet Switch is designed for industrial and automotive applications requiring high performance 1Gbit/s Ethernet connectivity with ability to aggregate Ethernet traffic to one 10Gbit/s Ethernet port to prevent bandwidth loss.

The switch contains four regular 1Gbit/s Ethernet ports and one high-speed 10Gbit/s Ethernet port. All ports use industrial M12 X-coded connectors. The high-speed 10Gbit/s Ethernet port is intended for connection to the uplink Ethernet infrastructure or a high-bandwidth server but can be used as a regular downlink port.

Each switch port can be individually configured for the desired connection speed, duplex, and flow control. The switch internal logic is not configurable, resulting in unmanaged switch functionality.

An embedded web server allows users to configure switch ports, monitor the device performance, download and upload configuration parameters, and update application firmware.

An auxiliary RS-232 port can be used as a local alternative to the remote web server interface, similar to a console port on a generic Ethernet switch.

An internal state of the switch is displayed by LEDs on the front panel of the housing.

2.1 Hardware Block Diagram

The device hardware block diagram is presented in Figure 1.

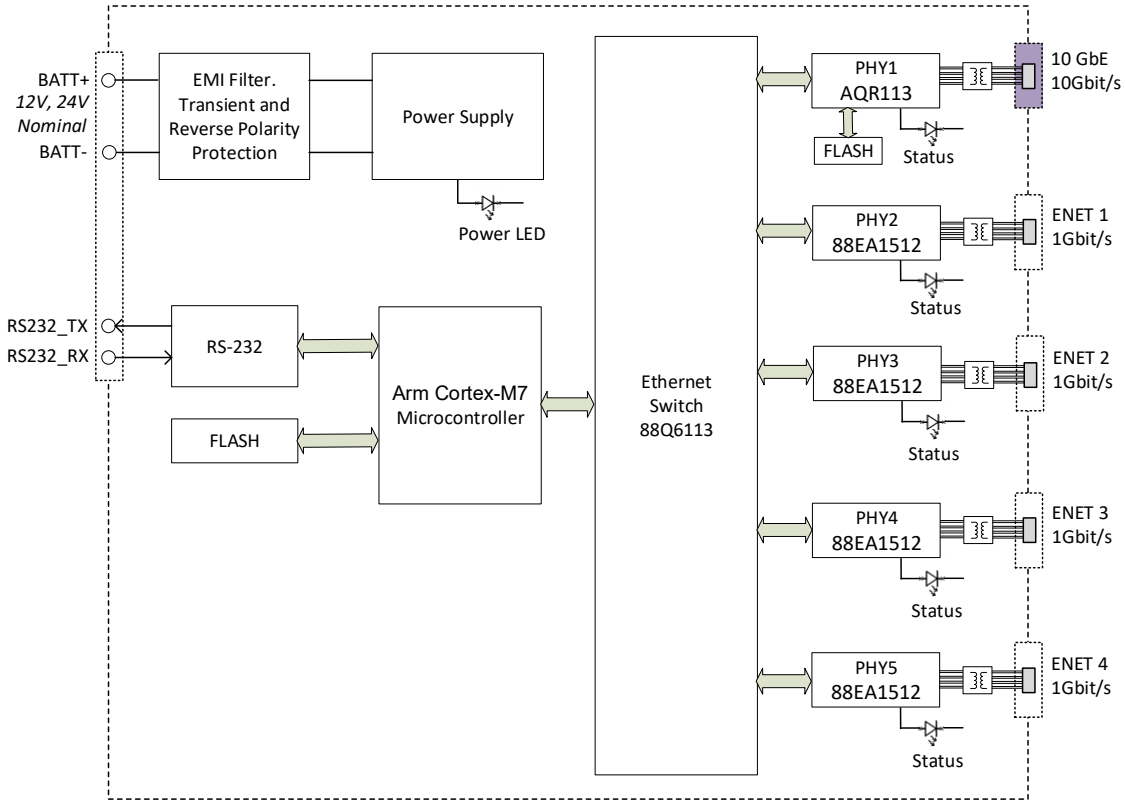


Figure 1. Device Hardware Block Diagram

The device contains five independent Ethernet ports: 10 GbE, ENET 1…4, an auxiliary RS-232 port, and a protected power supply. Port 10 GbE supports up to 10 Gbit/s, and ports ENET 1…4 support up to 1 Gbit/s communication speed[1].

[1]Port names were changed from Port #1…5 to 10 GbE, ENET 1…4 in firmware V4.00.

The power supply has Power LED indicator. It lights up when the device is powered.

The switch core is based on Marvell Automotive Ethernet switch 88Q6113 paired with one Marvell 10Gbit/s PHY transceiver AQR113, and four Marvell 1Gbit/s PHY transceivers 88EA1512. Each PHY transceiver has its own Status LED indicator hardwired to the PHY chip reflecting state, speed, and link activity on the port.

The 10Gbit/s PHY transceiver has its own flash memory holding the PHY firmware provided by Marvell.

A separate ARM Cortex-M7 microcontroller controls the switch chip and PHY transceivers and runs an embedded web server. The device configuration parameters are stored in the internal flash memory.

2.2 Device Organization

The device internal organization is presented in Figure 2.

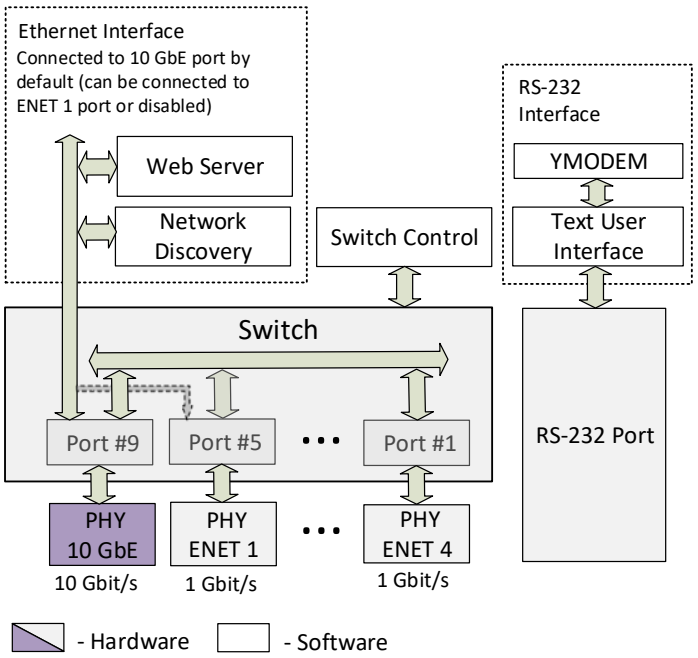


Figure 2. Device Internal Organization

The device software contains the *Switch Control* module and two user interfaces: *Ethernet Interface* and *RS-232 Interface*.

2.2.1 Ethernet Interface

The device *Ethernet Interface* is comprised of the *Web Server* and the *Network Discovery* software modules, both accessible through the switch interface port, which is 10 GbE port by

default. At the same time, the switch interface port can be used as a regular switch port without any restrictions.

The *Ethernet Interface* can be relocated from 10 GbE to ENET 1 port or completely disabled for security reasons. When the *Ethernet Interface* is disabled, the switch is invisible on the Ethernet.

2.2.1.1 Web Server

The device embedded web server delivers a front-end user interface with the switch. It runs a dynamic website that shows the device general information, configuration parameters, and the device real-time diagnostics.

The website can be used to change, save or restore configuration parameters, change the device password, and upload new firmware.

The user's web browser should support JavaScript.

For more information, see *Device Configuration*, *Device Diagnostics*, and *Firmware Update* sections of this document.

2.2.1.2 Network Discovery

The device supports a proprietary Axiomatic discovery protocol. It allows to find the device IP address on the LAN using Axiomatic discovery application `AxioDisc.exe`. For more information, see *Device Discovery* section.

2.2.2 RS-232 Interface

The *RS-232 Interface* serves as a local alternative to the embedded web server. It is presented by the *Text User Interface* module accessible through an auxiliary RS-232 port located on the device *Power Connector*, see *Power Connector* subsection of this document.

For more information, see *RS-232 Interface* section of this document.

2.2.2.1 Text User Interface

The *Text User Interface* is a simple menu-based user interface that provides the same scope of configuration, monitor and control options as the device web server. In addition, the user can relocate or disable the *Ethernet Interface* by individually changing *Ethernet Interface Port* configuration parameter.

The *Text User Interface* uses the *YMODEM* module for configuration file operations.

2.2.2.2 YMODEM

The *YMODEM* module is used by the Text User Interface module for configuration file upload and download operations. It interacts with the user's PC YMODEM software providing transmission of the configuration file.

3 DEVICE CONFIGURATION

The device supports configuration over the internal website running on the device embedded web server. For security reasons, the device website can be accessed only through the switch interface port (10 GbE port by default). The device web access is also password protected.

The switch interface port can be changed to ENET 1 or disabled by uploading a configuration file with *Ethernet Interface Port* configuration parameter set to the desired value, or through the RS-232 interface, see *RS-232 Interface* section of this document.

The device power should not be interrupted during updating configuration parameters to avoid possible corruption of nonvolatile memory.

3.1 Connecting to the Device

The default *Device IP Address* is “192.168.0.34”. Please, make sure that there are no other devices on this IP address when connecting the switch for the first time to your LAN for configuration.

To connect to the device, the user should run any web browser and point it to the *Device IP Address*. After a successful connection, the user will see the device login page, see Figure 3.

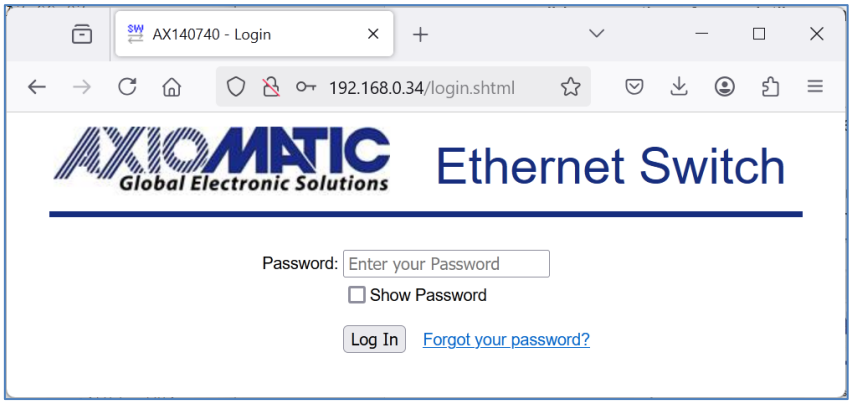


Figure 3. Device Login Page

If necessary, the user will need to allow JavaScript (this setting is default in the majority of web browsers). If JavaScript is disabled, the website will show a message asking to activate JavaScript at the top of the web page, see Figure 4.

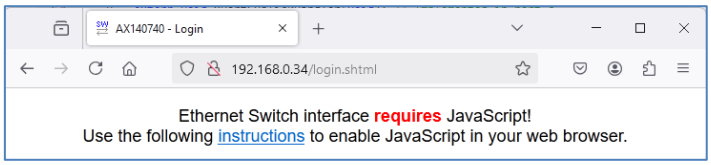


Figure 4. Enable JavaScript Prompt

The device default password is **Axiomatic1** (case sensitive).

The device home page will be shown upon entering the correct password. The user can see the password text when *Show password* checkbox is clicked.

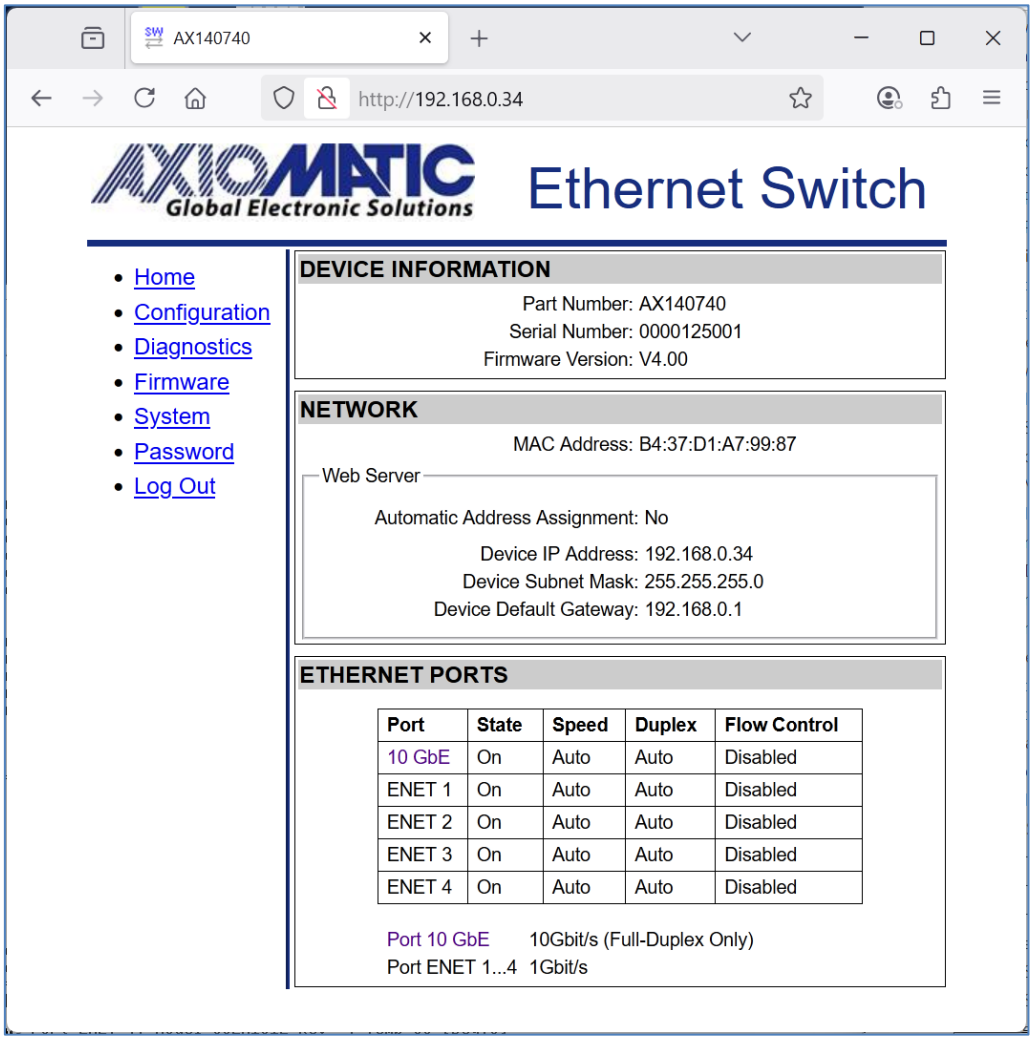
It is strongly advisable to change the default password to a unique one after performing the initial device setup to prevent unauthorized access to the device, see *Password Update Web Page* subsection of this document.

To protect the device from password guessing, the number of unsuccessful attempts to connect to the device is limited. Access to the device will be denied for several minutes upon reaching this limit. Also, for security reasons, the device web session will be automatically closed and the user logged out on the user's inactivity.

In case the password is lost, the user can reset the password using RS-232 interface, see *Change Web Access Password* subsection of this document.

3.2 Device Homepage

The device home page shows the device information, including the switch part number, serial number, and firmware version, see Figure 5. It also shows the device network configuration parameters and configuration of the Ethernet ports.



Port	State	Speed	Duplex	Flow Control
10 GbE	On	Auto	Auto	Disabled
ENET 1	On	Auto	Auto	Disabled
ENET 2	On	Auto	Auto	Disabled
ENET 3	On	Auto	Auto	Disabled
ENET 4	On	Auto	Auto	Disabled

Figure 5. Device Home Page[1]

[1]The Firmware Version number may be different from the firmware version described in the manual.

The 10 GbE port is shown in different color to emphasize that it is a 10 Gbit/s port.

The *Network* and *Automotive Ethernet Ports* configuration parameters have tooltips clarifying their meaning, see Figure 6.

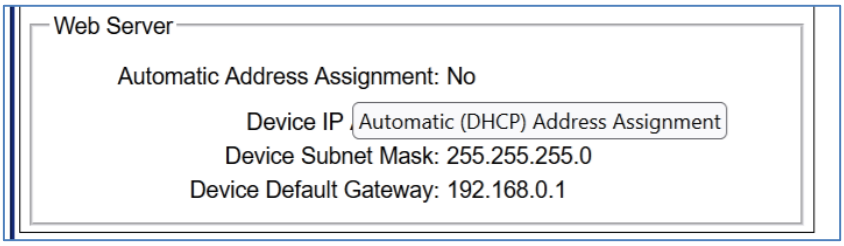


Figure 6. Tooltip for the "Auto Connect to Remote" Configuration Parameter

3.3 Changing Configuration Parameters

All configuration parameters can be changed either on an individual basis through the Configuration web page or by using a configuration file on the *System Settings* web page.

3.3.1 Configuration Web Page

The user can change configuration parameters in interactive mode using *Configuration* web page. It can be reached by clicking on the link on the left side of the website, see Figure 7.

The *Configuration* web page has fields to enter values of the configuration parameters and four buttons: *Save Settings*, *Discard Settings, Reboot Device* and *Set Defaults*. The configuration parameters have tooltips for the user convenience.

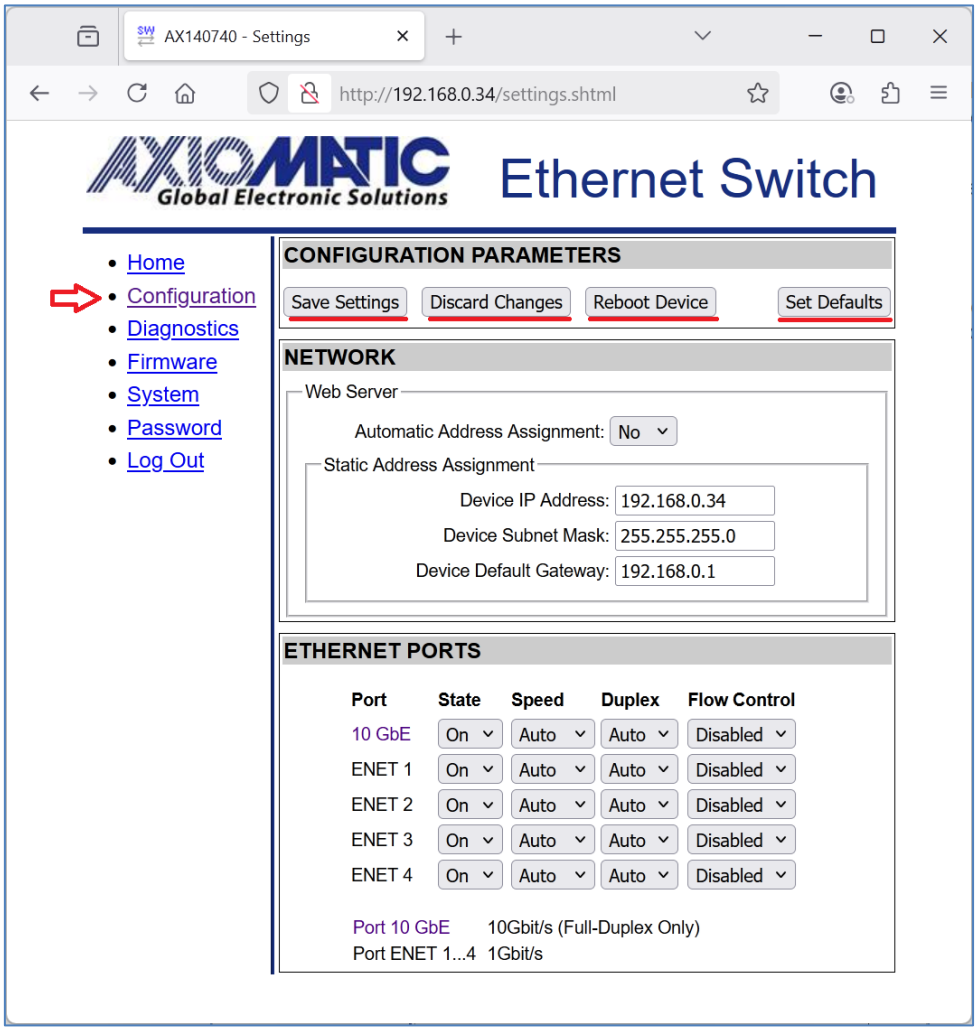


Figure 7. Configuration Web Page

The *Save Settings* button will save configuration parameters in nonvolatile memory. Some changes will not be immediately applied and will require the device reboot.

The *Discard Changes* button will bring back the original device settings on the webpage before they have been changed. In case the user leaves the page without saving, all changes will be also discarded.

The *Reboot* button will reboot the device. This will activate all updates to configuration parameters stored in the non-volatile memory, if any.

The *Set Defaults* button will load default values of the configuration parameters into data fields on the configuration page. The configuration parameters will not be automatically saved.

When the user presses the *Save Settings* button, the web page runs a script to check the validity of the new configuration parameters before uploading them to the web server. For example, the following alert message will be displayed if the user enters an invalid value for the *Device IP Address*, see Figure 8.

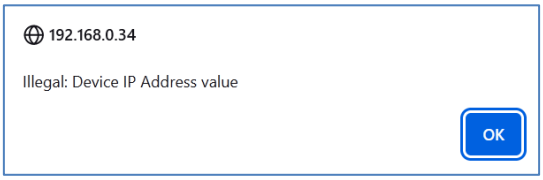


Figure 8. Settings Configuration Parameter Alert Message. Error in Configuration Parameter

The website messages should be enabled (not suppressed) in the browser to see this and other feedback messages.

After pressing the *Save Settings* button and saving the configuration parameters in non-volatile memory, the device replies with a confirmation message showing the result of the saving operation. For example, for operations requiring reboot, the following message will be displayed, see Figure 9.

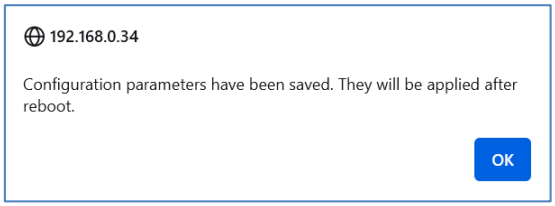


Figure 9. Settings Configuration Parameter Alert Message. Configuration Parameters have been Changed Successfully

3.3.2 Network Configuration

Network configuration parameters include *Ethernet Interface Port* and the web server configuration parameters, see Table 1. The device *MAC Address*, shown on the home page, is a read-only parameter programmed at the factory.

Table 1. Network Configuration Parameters

Configuration Parameter	Default Value	Range	Description
Ethernet Interface Port	10GbE	{Disabled, 10GbE, ENET1}	Ethernet interface port for configuring the switch. No Ethernet interface when

Configuration Parameter	Default Value	Range	Description
			"Disabled". Not accessible through the configuration web page[3]
Automatic Address Assignment	No	{No, Yes}	Automatic Address assignment using DHCP server
Device IP Address	192.168.0.34	Any IP address[1]	The device static IP address
Device Subnet Mask	255.255.255.0	Any IP subnet mask[1]	The device static subnet mask
Device Default Gateway	192.168.0.1	Any IP address[1]	The device static default gateway

[1] Must be assigned by a network administrator when a static address assignment is used, i.e. *Automatic Address Assignment* is set to "No". Restrictions apply
[3]Can be updated through the configuration file or by using the RS-232 interface where it can be changed individually in interactive mode.

The user should ensure the correctness of IP addresses and the subnet mask when the static address assignment is used, i.e. the *Automatic Address Assignment* is set to "No". This includes avoiding special IP addresses (broadcast, multicast, loopback, etc.) when configuring the *Device IP Address* and the *Device Default Gateway*. The only exception is "0.0.0.0" address that can be used to disable the device default gateway.

Use 1…223 (except 127) for the first (rightmost) address octet in the *Device IP Address* and the *Device Default Gateway*. The *Device Default Gateway* should not be equal to the *Device IP Address*.

The *Device Subnet Mask* should have all ones on the left side and all zeros on the right side when converted to the binary presentation as per RFC 1878. The *Device Subnet Mask* should not be equal to "255.255.255.255" when the *Device Default Gateway* is equal to "0.0.0.0".

The device will check the validity of the IP addresses and the subnet mask before saving the new configuration parameters to avoid permanent loss of communication with the embedded web server.

The device embedded web server uses a standard port number 80.

3.3.3 Ethernet Port Configuration

The user can individually change configuration parameters of each Ethernet port, see Table 2 and Table 3.

Table 2. Ethernet Configuration Parameters for 10 GbE Port

Configuration Parameter	Default Value	Range	Description
State	On	{Off, On}	Enables or disables the port[1]
Speed	Auto	{Auto, 10M, 100M, 1G, 2.5G, 5G, 10G}	Port communication speed
Duplex	Auto	{Auto, Full}	Port duplex setting. Only full-duplex is supported
Flow Control	Disabled	{Disabled, Enabled}	Port flow control

[1] When the port *State* is "Off", the port PHY is disabled and switched to a low-power mode.

Table 3. Ethernet Configuration Parameters for ENET 1…4 Ports

Configuration Parameter	Default Value	Range	Description
State	On	{Off, On}	Enables or disables the port[1]
Speed	Auto	{Auto, 10M, 100M, 1G}	Port communication speed
Duplex	Auto	{Auto, Half, Full}	Port duplex setting
Flow Control	Disabled	{Disabled, Enabled}	Port flow control

[1]When the port *State* is “Off”, the port PHY is disabled and switched to a low-power mode.

The Ethernet port should be enabled if it is used for configuring the switch. For example, if *Ethernet Interface Port* is equal to “10GbE”, *State* of the 10 GbE port should be “On”.

The user should exercise cautious when using forced (manually set) *Speed* and *Duplex* combinations, unless the same combination is used on the other side of the network link. It is always advisable to use “Auto” settings on both sides of the network.

When ether *Speed* or *Duplex* is in “Auto” mode, the *Speed* and *Duplex* combination is not forced, and auto-negotiation is applied to find the best speed and duplex match between the device and its link partner on the network. The “Auto” setting for *Speed* with a forced setting for *Duplex* limits the auto-negotiation to all supported speed values with the defined duplex setting. The “Auto” setting for *Duplex* limits the auto-negotiation to all supported duplex values at the specified speed.

When the user sets *Speed* to 10Mbps or 100Mbps at a forced *Duplex* value (any value other than “Auto”), the auto-negotiation will be disabled. This will impact the flow control resolution in full-duplex mode, see *Flow Control*, and can also cause duplex mismatch, see *Duplex Mismatch*.

Please note that the forced 1Gbps half-duplex mode, available on 1G ports (ENET 1…4), is not supported by the majority of network equipment.

3.3.3.1 Duplex Mismatch

The duplex mismatch can happen at a legacy 10Mbps or 100Mbps speed when two connected nodes have different forced duplex settings or when one of the nodes is set to full-duplex at a forced speed and the other one is in the auto-negotiation mode for speed or duplex. In the latter case, the auto-negotiation will fail, and the node will default to half-duplex mode if half-duplex is supported.[1]

[1]10 GbE port will not default to half-duplex mode. It supports only full-duplex communication.

The duplex mismatch should not occur at 1Gbps due to the auto-negotiation mode being always enabled even for forced speed and duplex combinations. For speeds above 1Gbps, only full-duplex mode is available, preventing duplex mismatch as well.

3.3.3.2 Flow Control

The flow control can be enabled on any port. Ports configured for full-duplex mode use 802.3x flow control (based on PAUSE frames), and half-duplex ports use backpressure flow control.

When the *Flow Control* is “Enabled”, the actual flow control configuration of the device port in full-duplex mode is based on the result of the auto-negotiation with the link partner, see Table

4. During this auto-negotiation, the device advertises both symmetric and asymmetric flow control capability.

Table 4. Device Port Flow Control Resolution in Full-Duplex Mode

Link Partner Advertisement		Device Port Flow Control	
Symmetric	Asymmetric	RxD[1]	TxD[2]
No	No	Disabled	Disabled
Yes	Any Value	Enabled	Enabled
No	Yes	Enabled	Disabled

[1]Device receives PAUSE frames from the link partner and pauses transmission accordingly.
[2]Device transmits PAUSE frames to the link partner.

In case the auto-negotiation has failed or is not performed for legacy forced *Speed* and *Duplex* combinations (when speed is 10Mbps or 100Mbps), the device will use backpressure in half-duplex mode and symmetric flow control (both: RxD and TxD are enabled) in full-duplex mode when the flow control is enabled.

3.3.4 System Settings Web Page

The device configuration can be saved and then restored back from a configuration file. The configuration file operations are provided on the *System Settings* web page, see Figure 10, accessible by clicking on the *System* link on the left side of the website.

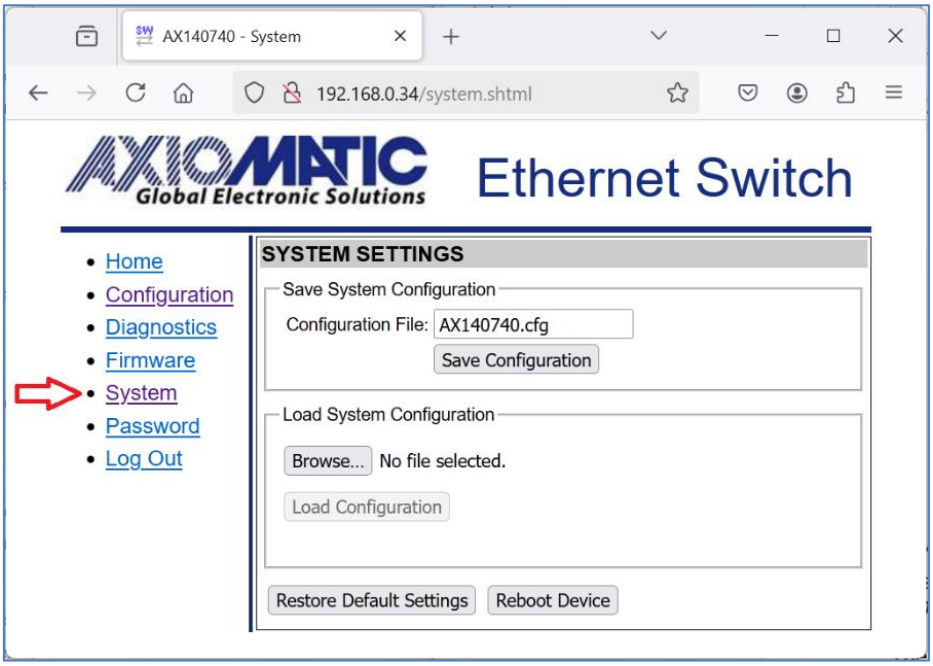


Figure 10. System Settings Web Page

3.3.4.1 Saving System Configuration

To save system configuration, the user should enter the system configuration file name in the *Configuration File* field and then press the *Save Configuration* button.

The default system configuration file name is “AX140740.cfg”. The configuration file will be generated and saved in the *Downloads* location of the web browser, see Figure 11.

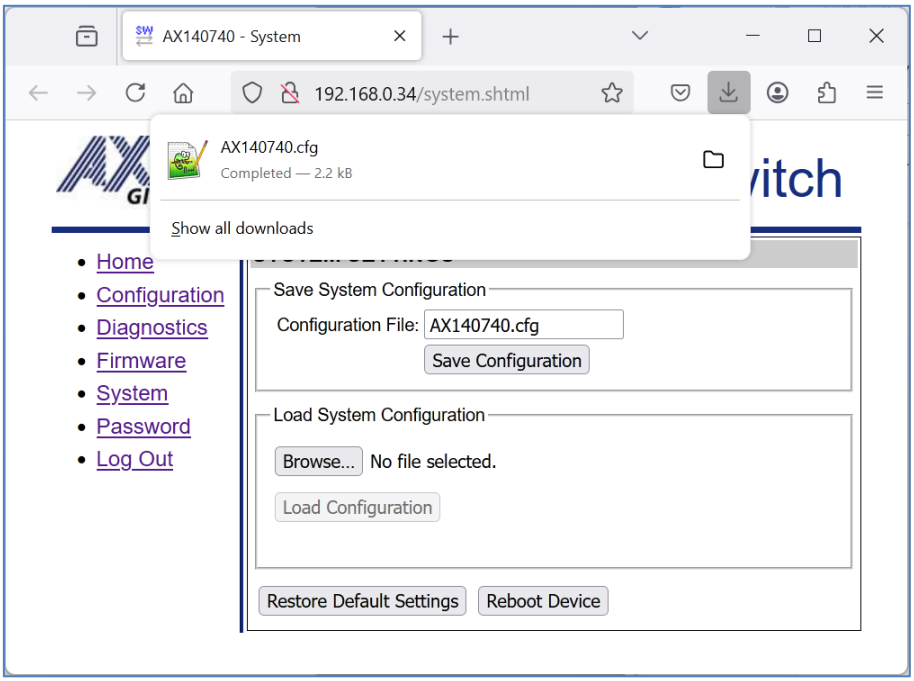


Figure 11. Saving System Configuration

In case the web session is expired on inactivity, an empty configuration file will be generated.

3.3.4.2 Loading System Configuration

The user can restore system configuration from a configuration file. The configuration file will be processed, and configuration parameters will be updated during the file upload operation.

To upload the device configuration file, the user should first select the configuration file by pressing the *Browse…* button in the *Load System Configuration* group on the *System Settings* web page. Then the user should press the *Load Configuration* button to upload the selected configuration file to the device.

The result of the upload operation will be shown to the user in an alert message from the web site. For example, a successful upload of previously saved configuration parameters will result in the following message, see Figure 12.

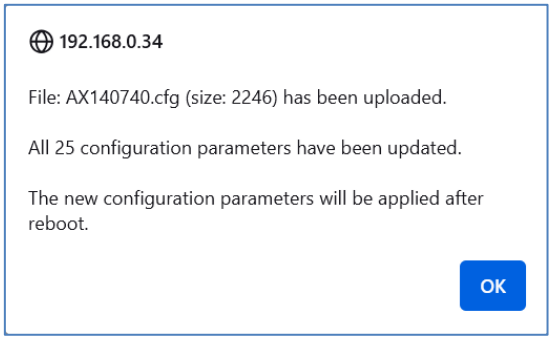


Figure 12. Loading System Configuration File Alert Message. All Configuration Parameters Have Been Updated

The device upload operation provides extended diagnostic information to the user. In case of an error in the configuration file, a detailed description and location of the error will be reported. Similarly, the exact number of the updated configuration parameters will be reported

on a successful operation, together with the total number of the device configuration parameters that could have been updated.

For example, a syntax error in the *SwitchENET1State* configuration parameter, when instead of *SwitchENET1State* an incorrect *SwitchINET1State** name is written, will result in the following error message, see Figure 13.

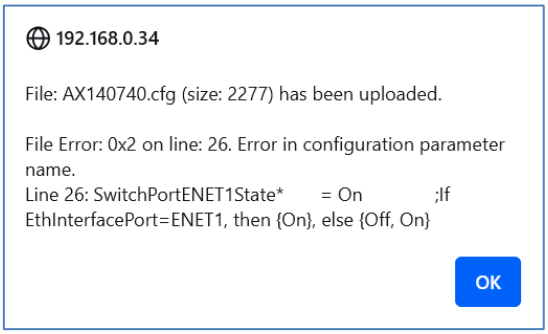


Figure 13. Loading System Configuration File Alert Message. Error in Configuration File

This message contains a file error number, an error description, and a line number where this error was found in the configuration file. The file line content is also shown to facilitate debugging of the configuration file.

An error in the value of a configuration parameter is presented the same way. For example, if the *SwitchENET1State* configuration parameter has an incorrect value of “On1” instead of “On”, the following error message will be generated, see Figure 14.

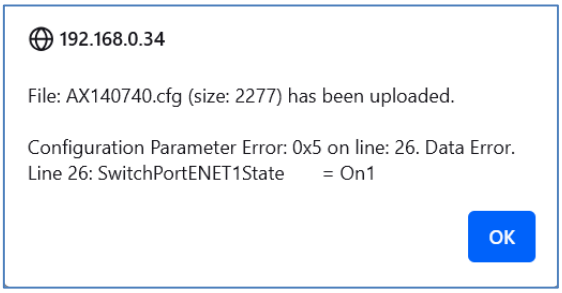


Figure 14. Loading System Configuration File Alert Message. Error in Configuration Parameter Value

After the configuration file has been parsed, the device checks integrity of the uploaded new configuration. Any errors will result in a data integrity error message. For example, if the *Switch10GbEState* is set to “Off” when *EthInterfacePort* is equal to “10GbE”, the following message will be generated, see Figure 15.

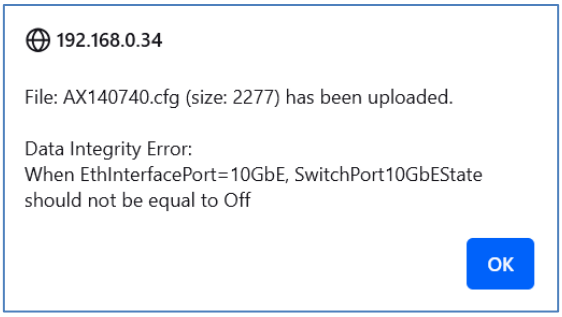


Figure 15. Loading System Configuration File Alert Message. Data Integrity Error

In case, for example, only 24 configuration parameters out of the total 25 updatable device configuration parameters have been updated, the result message will show this information, see Figure 16.

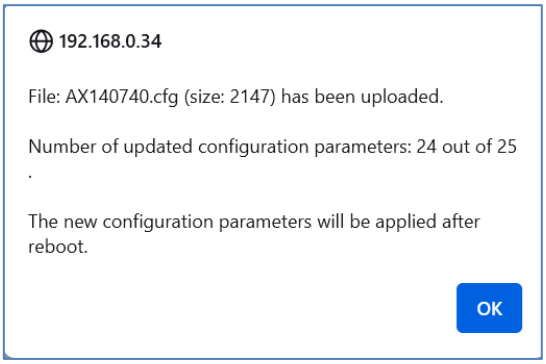


Figure 16. Loading System Configuration File Alert Message. Configuration Parameters Have Been Partially Updated

The user will need to reboot the device to apply the new configuration parameters already saved in non-volatile memory after a successful upload operation. This can be done by using the *Reboot* button on the *System Settings* web page.

All changes in configuration parameters will be rolled back if an upload operation has failed.

3.3.4.3 Restoring Default Settings

The user can restore the device to the factory default configuration by pressing the *Restore Default Settings* button on the *System Settings* page, see Figure 17.

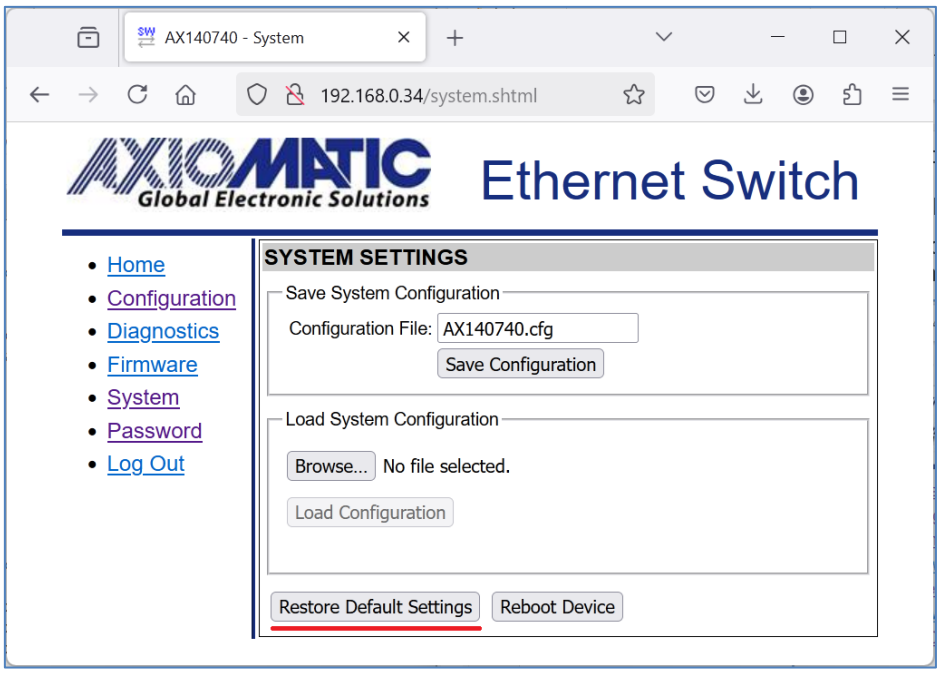


Figure 17. System Settings Page. Restore Default Settings

This operation complements the *Set Defaults* operation on the *Configuration* web page. The main difference is that the *Restore Default Settings* operation restores all device configuration parameters, not only the ones presented on the *Configuration* web page. The exception is the device password, which is not affected by the *Restore Default Settings* operation.

The confirmation alert message will appear to protect the device configuration from accidental modification, see Figure 18.

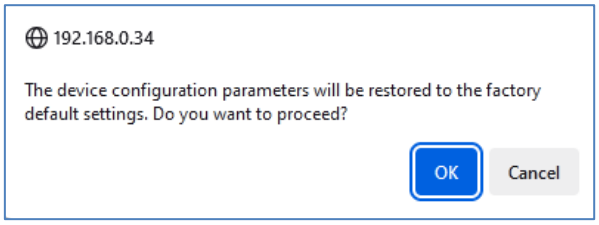


Figure 18. Restoring Default Settings. Confirmation Alert Message

If the user chooses to proceed, the second alert message will inform the user of the result of this operation, see Figure 19.

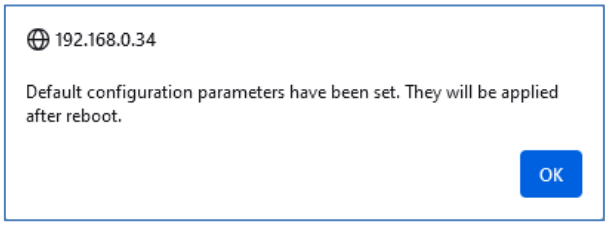


Figure 19. Restoring Default Setting. Successful Result Alert Message

3.4 Configuration File Format

The device configuration is stored in a human-readable text file based on a proprietary implementation of the well known INI file format, https://en.wikipedia.org/wiki/INI_file.

The device configuration parameters are grouped in configuration parameter groups that form INI file sections. The user can edit a configuration file generated by the device in any text editor and change values of configuration parameters according to the user's requirements.

A device configuration file generated by the device with default configuration settings is presented in Figure 20[1].

```
; Device Configuration File
; -------------------------
; File format v1.00. Copyright (c) 2025 Axiomatic Technologies Corporation.

[Info]
; This information group was automatically generated by the device.
; All configuration parameters in the device "Info" group are read-only.
PartNumber                = AX140740
SerialNumber              = 0000125001
MACAddr                   = B4:37:D1:A7:99:87
FirmwareID                = 24014
FirmwareVersionNumber     = 4.00

[Controller]

[Ethernet]
EthInterfacePort          = 10GbE          ;{Disabled, 10GbE, ENET1}
AutoAddrAssign            = 0              ;{1-Yes, 0-No}
DeviceIpAddress           = 192.168.0.34   ;{Any IP Address: x.x.x.x. Restrictions apply}
DeviceSubnetMask          = 255.255.255.0  ;{Any IP Subnet Mask: x.x.x.x. Restrictions apply}
DeviceDefaultGateway      = 192.168.0.1    ;{Any IP Address: x.x.x.x. Restrictions apply}
SwitchPort10GbEState      = On             ;If EthInterfacePort=10GbE, then {On}, else {Off, On}
SwitchPort10GbESpeed      = Auto           ;{Auto, 10M, 100M, 1G, 2.5G, 5G, 10G}
SwitchPort10GbEDuplex     = Auto           ;{Auto, Full}
SwitchPort10GbEFlowControl = Disabled      ;{Disabled, Enabled}
SwitchPortENET1State      = On             ;If EthInterfacePort=ENET1, then {On}, else {Off, On}
```

```
SwitchPortENET1Speed       = Auto           ;{Auto, 10M, 100M, 1G}
SwitchPortENET1Duplex      = Auto           ;{Auto, Half, Full}
SwitchPortENET1FlowControl = Disabled       ;{Disabled, Enabled}
SwitchPortENET2State       = On             ;{Off, On}
SwitchPortENET2Speed       = Auto           ;{Auto, 10M, 100M, 1G}
SwitchPortENET2Duplex      = Auto           ;{Auto, Half, Full}
SwitchPortENET2FlowControl = Disabled       ;{Disabled, Enabled}
SwitchPortENET3State       = On             ;{Off, On}
SwitchPortENET3Speed       = Auto           ;{Auto, 10M, 100M, 1G}
SwitchPortENET3Duplex      = Auto           ;{Auto, Half, Full}
SwitchPortENET3FlowControl = Disabled       ;{Disabled, Enabled}
SwitchPortENET4State       = On             ;{Off, On}
SwitchPortENET4Speed       = Auto           ;{Auto, 10M, 100M, 1G}
SwitchPortENET4Duplex      = Auto           ;{Auto, Half, Full}
SwitchPortENET4FlowControl = Disabled       ;{Disabled, Enabled}
```

Figure 20. Device Configuration File. Default Configuration Parameters

[1]Names of the switch port configuration parameters were changed in firmware V4.00 due to the device port name changes from Port #1…5 to 10 GbE, ENET 1…4. For example, *SwitchPort1State* was changed to *SwitchPort10GbEState*, *SwitchPort2State* to *SwitchPortENET1State*, etc. The firmware versions 4.00 and higher will still read configuration parameters generated by older versions of the firmware, but the older versions of the firmware will not accept configuration files generated by the newer firmware versions.

The *[Info]* configuration parameter group is automatically generated by the device for information purposes only. It contains read-only configuration parameters. It is completely optional and can be omitted if the file is prepared by the user.

The *[Controller]* configuration parameter group does not have any configuration parameters in this version of the firmware. It can be also omitted.

The *[Ethernet]* configuration parameter group contains all 25 updatable configuration parameters of the device. The user can change any of them.

For the user's convenience, the device automatically writes all allowed values of an updatable configuration parameter in comments beside that configuration parameter when a configuration file is generated.

For detailed information on the updatable configuration parameters, please refer to:

- Table 1. Network Configuration Parameters.
- Table 2. Ethernet Configuration Parameters for 10 GbE Port.
- Table 3. Ethernet Configuration Parameters for ENET 1…4 Ports.

There are no specific restrictions on the number of configuration parameters in a configuration file. The file can have all or just one configuration parameter provided that the configuration parameter group of the configuration parameter is also specified. This allows creation of a configuration file that changes only a specific set of configuration parameters without affecting all other settings.

For example, a configuration file that disables ENET 4 port is presented in Figure 21.

```
; Device Configuration File
; -------------------------
; This file will disable ENET 4 port

[Ethernet]
SwitchPortENET4State       = Off            ;{Off, On}
```

Figure 21. Device Configuration File to Disable ENET 4 Port

3.5 Password Update Web Page

The device password can be changed on the *Password Update* web page by clicking on the *Password* link on the left side of the device website, see Figure 22.

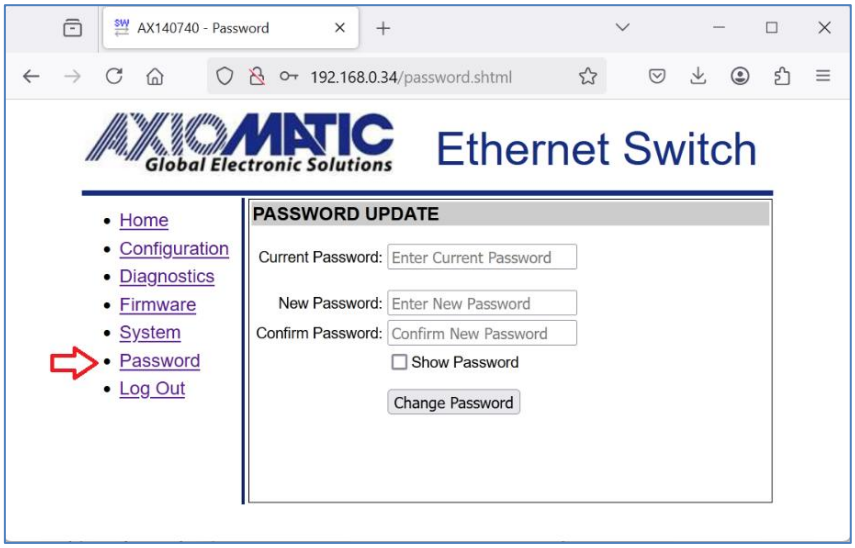


Figure 22. Password Update Web Page

Alternatively, the password can be changed through RS-232 interface, see *Change Web Access Password* subsection of this document.

To update the device password, the user should enter the current passwords and then enter and confirm the new password.

The password should contain at least one number, one uppercase and one lowercase English letter. Special characters are allowed except colon (:). Spaces are allowed in the middle of the password. The password length should be from 8 to 30 characters.[1] The new password should be different from the old one. The user will be prompted to follow the password rules in case any of the password requirements are not met.

[1]The password rules were updated in V3.00. Passwords used in previous versions comply with the new password rules and are preserved when upgrading firmware to V3.xx from previous versions. The opposite is not true. Downgrading firmware from V3.xx to V2.xx or to an earlier firmware version will reset the password to the default one.

The user can see all entered passwords when the *Show Password* checkbox is selected.

The result of the password update operation will be shown to the user in an alert message from the device web site after pressing the *Change Password* button, see Figure 23.

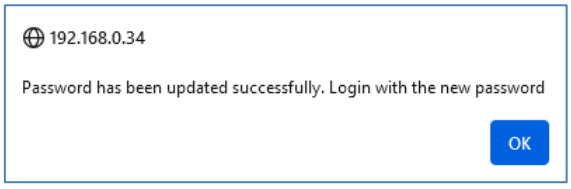


Figure 23. Password Update Alert Message

After the password has been changed successfully, the user will be automatically logged out and prompted to login again using the new password.

4 DEVICE DIAGNOSTICS

The user can see real-time diagnostic information on the *Diagnostics* web page of the device internal website.

To see the *Diagnostics* page, Figure 24, the user should click on the *Diagnostics* link on the left side of the website.

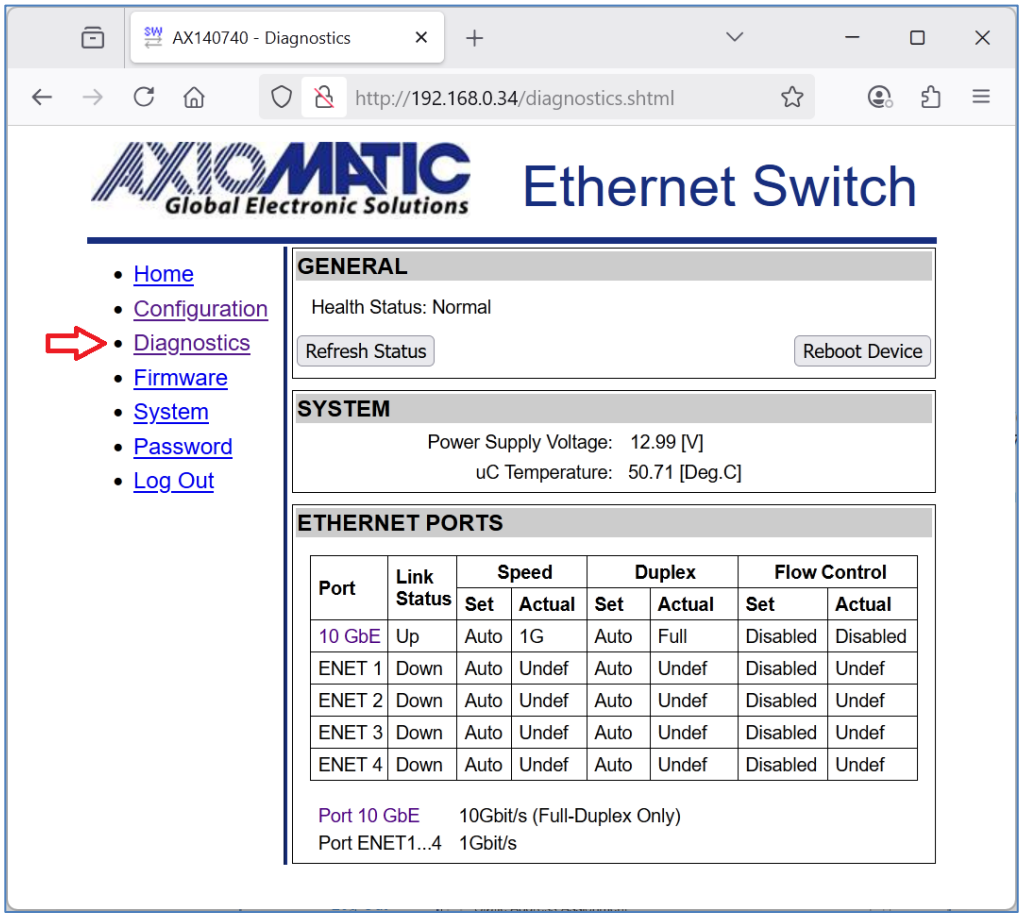


Figure 24. The Device Diagnostics Web Page

The *Diagnostics* web page shows the *Health Status* of the device together with the *System* and *Ethernet Ports* status information.

The user can refresh the values on the *Diagnostics* page by pressing the *Refresh Status* button. The *Reboot Device* button activates the device rebooting.

4.1 Health Status

The device *Health Status* is an aggregated system real-time parameter calculated on the base of individual operational statuses of the major device hardware and software components.

The *Health Status* presents the overall operational status of the switch, based on the following rules, see Table 5.

Table 5. Health Status

Health Status	Condition
Error	“Error” is reported when at least one operational status is in “Error” state.

Health Status	Condition
Warning	“Warning” is reported when at least one operational status is in “Warning” state and there are no operational statuses in “Error” state.
Undefined	“Undefined” is reported when at least one operational status is in “Undefined” state and there are no operational statuses in “Error” or “Warning” state.
Normal	“Normal” is reported when all operational statuses are in “Normal” state.

If the *Health Status* is different from “Normal”, the user will see a verbose message on the *Diagnostics* web page below the *Health Status* describing which operational status is causing a problem.

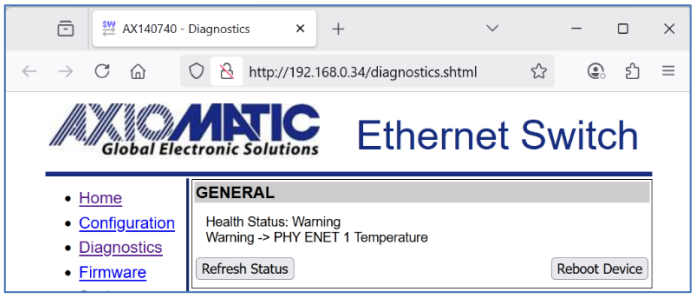


Figure 25. Health Status Message on PHY temperature error

In case several operational statuses differ from “Normal”, all of them will be shown on the *Diagnostics* page.

4.2 Ethernet Ports

Each Ethernet port displays the *Link Status* of the port. It also shows the configured and the actual *Speed*, *Duplex* and *Flow Control* settings.

The actual *Speed*, *Duplex* and *Flow Control* settings are either the same as configured based on the forced *Speed* and *Duplex* settings or are acquired during the auto-negotiation between the link partners.

4.3 Device Rebooting

The user can reboot the device, when necessary, using the *Reboot Device* button.

The switch rebooting operation takes 10 seconds. The user will see the *Reboot* screen with a countdown counter during this operation, see Figure 26.

When the rebooting operation is over, the device home page will be loaded.

Figure 26. The Device Reboot Screen

5 FIRMWARE UPDATE

The device application firmware can be updated through the device internal website or the device auxiliary RS-232 port in the field.

The update procedure through the internal website is described below. The Ethernet interface on the device should not be disabled through the RS-232 port.

The firmware update procedure is performed in two stages. First, the application firmware is uploaded into the device internal flash. During this stage, the device checks the firmware checksum and other conditions to determine whether it can be programmed into the device microcontroller.

Then, upon the user confirmation, the firmware is programmed into the microcontroller, and the device is restarted. At the end of this procedure, the user should see the new firmware version number on the device home page in the web browser.

The device power should not be interrupted during firmware update to avoid possible corruption of nonvolatile memory.

5.1 Uploading New Firmware

To upload the new firmware, the user should activate the *Firmware Uploading* page, see Figure 27, by clicking on the *Firmware* link on the left side of the website[1].

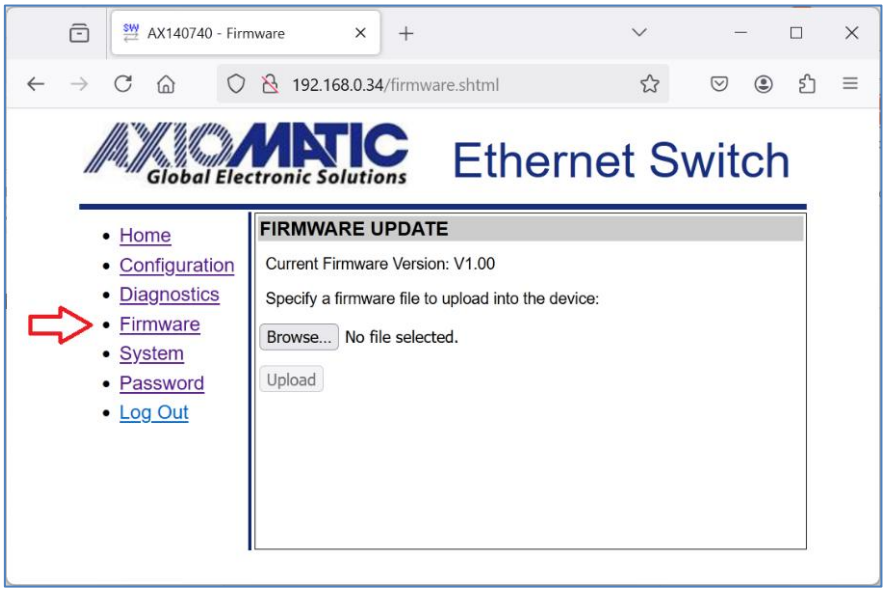


Figure 27. Firmware Uploading Page[1]

[1]The Current Firmware Version number may be different from the firmware version described in the manual.

Then the user selects the new firmware file using the *Browse…* button.

The firmware file is provided by Axiomatic in a proprietary binary format with extension: `.af`. The file name should have the following format: `AF-24014-X.XX.af`, where the `<X.XX>` field wildcard reflects the firmware version number[1].

[1]`AF-24014-1.00.af` file will be used for illustration of the firmware update process in this manual.

When the file is selected, the user should press the *Upload* button. The user will see the dynamic message: “Loading…” at the bottom of the screen and then, if everything is in order, the device will switch automatically to the *Firmware Update* page.

5.2 Applying New Firmware

On the *Firmware Update* page, the user will see the new firmware file information, see Figure 28.

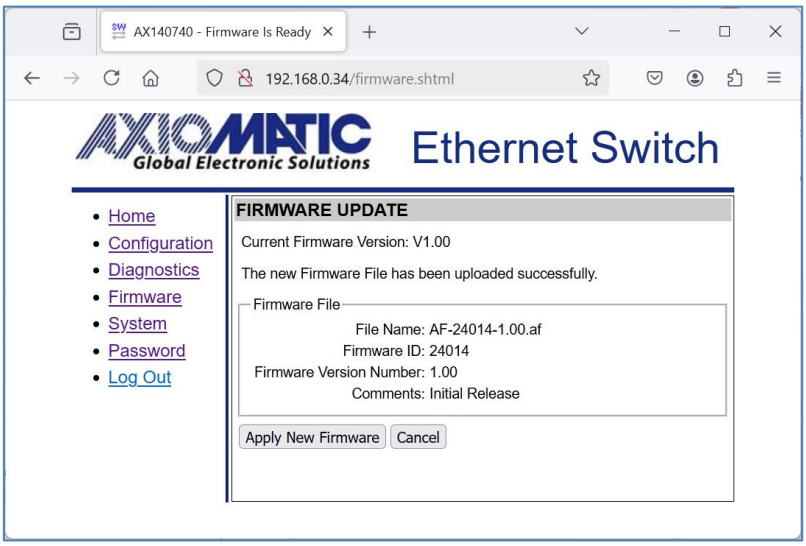


Figure 28. Firmware Update Page

From this point, the user can cancel the firmware update process and keep the old firmware or proceed with flashing the new firmware into the microcontroller by pressing the *Apply New Firmware* button.

When the user presses the *Apply New Firmware* button, the firmware update process is activated, and the *Firmware Upload* page will show a countdown timer, see Figure 29.

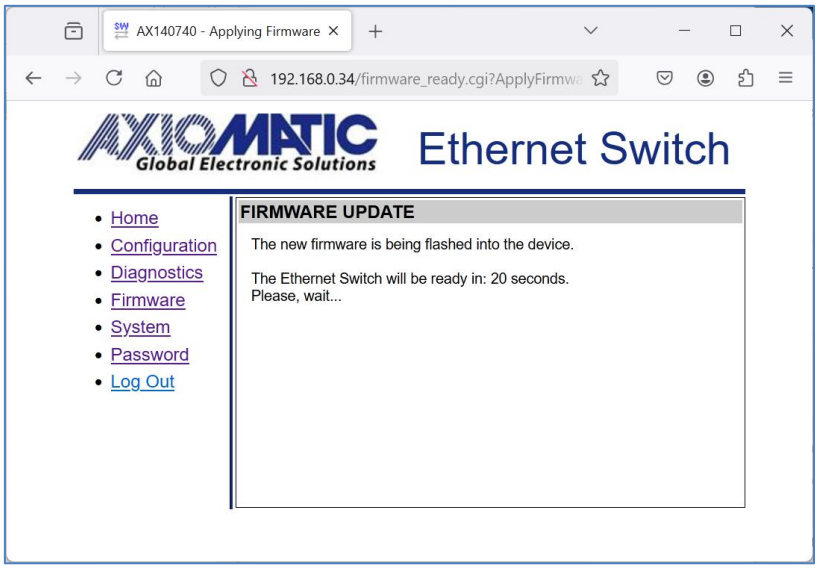


Figure 29. Firmware Update Countdown Has Been Started

The countdown timer is set for 30 seconds necessary to complete the flashing process and reboot the device.

The device home page will be displayed after rebooting. The user will see the new application firmware version number in the *Device Information* section on the switch home page[1], see Figure 30.

[1]In our example, it is the same 1.00 version number since we used firmware version 1.00 to illustrate the firmware update process.

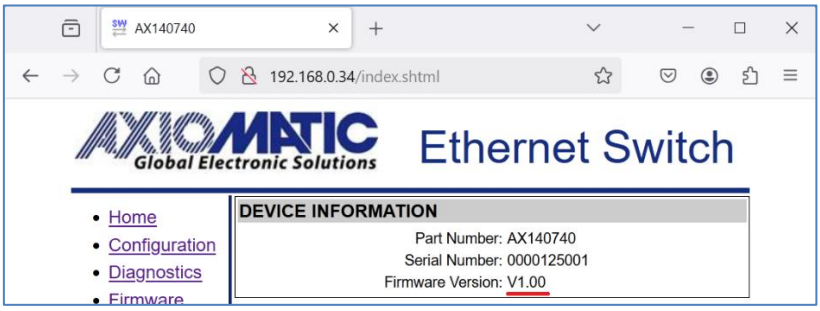


Figure 30. Firmware Version Number After Flashing

When the firmware is upgraded, all configuration parameters new to that version will take default values.

The device password rules were updated in V3.00. Passwords from previous versions will be accepted, whereas downgrading the firmware from V3.xx to V2.xx or below will automatically reset the password to the default one.

Device Port #1…5 configuration parameters from firmware V1.xx…3.xx will be mapped to 10 GbE, ENET 1…4 port configuration parameters when upgrading the firmware to V4.xx. When downgrading the firmware to V1.xx…3.xx, the opposite mapping takes place.

6 DEVICE DISCOVERY

In case the IP address of the device is unknown or has been lost, the user can recover it using the Axiomatic Windows console application `AxioDisc.exe`. The Ethernet interface on the device should be enabled.

6.1 Axiomatic Discovery Application

The `AxioDisc.exe` application uses a proprietary discovery protocol originally designed for Axiomatic converters. The application is available upon request.

The `AxioDisc.exe` application sends a UDP request to the broadcast IP address `255.255.255.255`, port `35100`, and waits for the responses from devices located on the same physical link of the LAN as the PC. The switch should be connected to the LAN through the Ethernet interface port (10GbE port by default).

The device discovery response includes the unit *MAC Address*, *IP Address*, *Web Server Port*, the device *Part Number* and *Serial Number*, see Figure 31. It also includes parameters specific to Axiomatic converters that are not defined for the switch: *Device Port*, and *Device Port Type*. These parameters are set to {DevPort=0, DevPortType=UDP} and should be ignored.

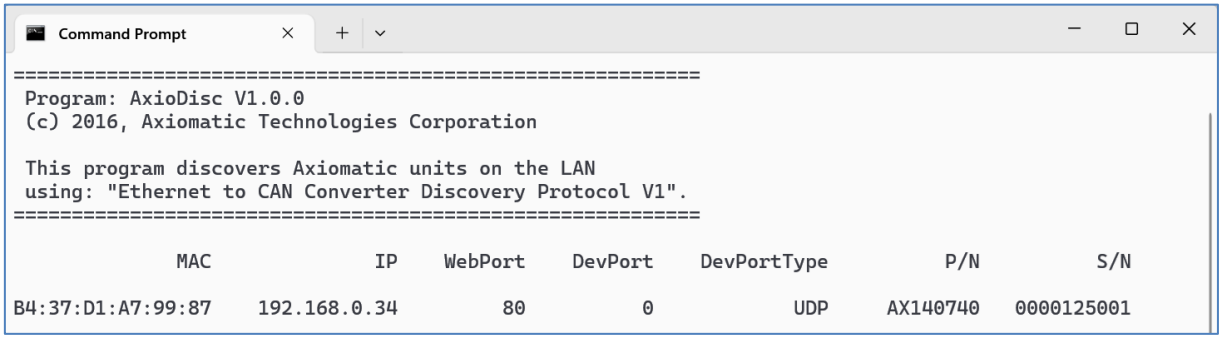


Figure 31. `AxioDisc.exe` Network Discovery Application

In case the application does not see the device, the user should ensure that the IP network where the device is located is the only one that is enabled and active. All other network connections including Wi-Fi, VNP, virtual adapters, etc., should be temporarily disabled through the PC *Network Connections* settings.

The `AxioDisc.exe` application can run on Windows starting from Win XP SP3. It was tested on Win XP SP3, Win 7, Win 10, and Win 11. In case the application cannot find standard dlls, the Visual C++ Redistributable for Visual Studio 2015 x86 must be installed on the user's computer from the Microsoft website:
https://www.microsoft.com/en-ca/download/details.aspx?id=48145

The Axiomatic proprietary discovery protocol is supported by the CAN-ENET Software Support Package, P/N AX140910. The Software Support Package can be used by third party software developers to implement network discovery of the device.

7 RS-232 INTERFACE

The RS-232 menu driven text user interface can be used as a local alternative to the device web interface for configuring, monitoring and controlling of the device.

The device power should not be interrupted during changing configuration parameters and flashing new firmware to avoid possible corruption of nonvolatile memory.

7.1 Main Menu

After successful connection to a PC using any type of terminal emulation software (TeraTerm is preferred, https://teratermproject.github.io/index-en.html), the user will see the main menu, presented in Figure 32.

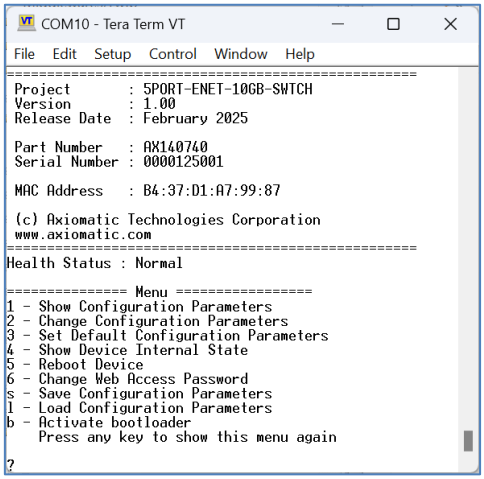


Figure 32. Main Text Menu[1]

[1]The firmware version number may be different from the firmware version described in the manual.

To activate options on the menu, the user should press the appropriate number or letter on the keyboard. For example, to show configuration parameters of the device the user should press '1', to change web access password – '6', etc.

7.1.1 Show Configuration Parameters

When this option is activated, the user will see values of all configuration parameters, see Figure 33.

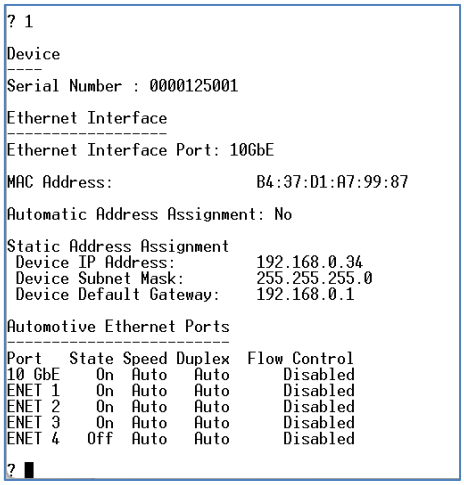


Figure 33. List of All Configuration Parameters

Some of the configuration parameters, including *Serial Number* and *MAC Address,* are read-only and cannot be changed through this interface. The updatable configuration parameters are described in Table 1, Table 2, and Table 3.

7.1.2 Change Configuration Parameters

The user can change a configuration parameter by activating this menu item. A list of names of all updatable configuration parameters will be presented to the user, see Figure 34.

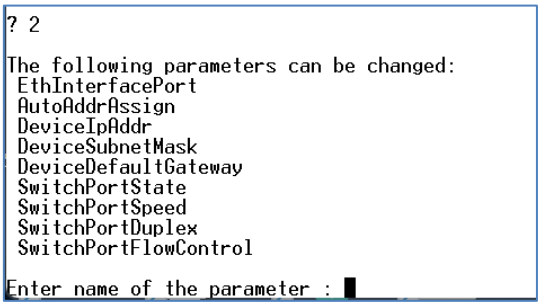


Figure 34. List of Updatable Configuration Parameters

The user then enters the name of the configuration parameter from the list and follows the prompts for changing the selected configuration parameter. For example, changing the value of *Ethernet Interface Port* configuration parameter is presented in Figure 35.

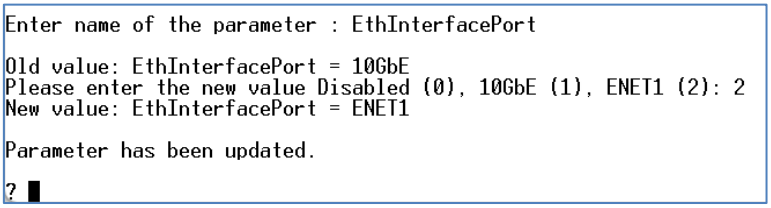


Figure 35. Changing Ethernet Interface Enabled Configuration Parameter

Once successfully changed, the new configuration parameter is applied immediately, without waiting for the device reboot.

7.1.3 Set Default Configuration Parameters

The user can reset the device configuration parameters to their default values by activating this menu item and then confirming the decision by entering “Yes”, see Figure 36.

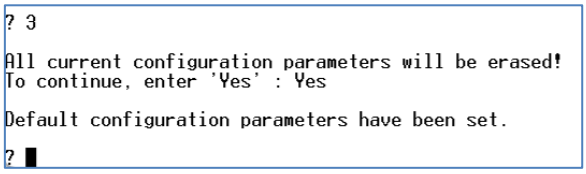


Figure 36. Setting Default Configuration Parameters

The default configuration parameters are applied immediately. No reboot is required.

7.1.4 Show Device Internal State

This menu option shows the internal state of the device, see Figure 37.

The *Ethernet Switch ID* and *Ethernet Switch State* show the internal state of the device switch chip, while the *PHY ID and Temperature,* and *PHY State* show the internal state of the device PHY ships, see Figure 1. Please note that the internal port numbers of the switch chip do not

match the device external port numbers. For example, the switch chip internal port #1 is connected to the device port ENET 4.

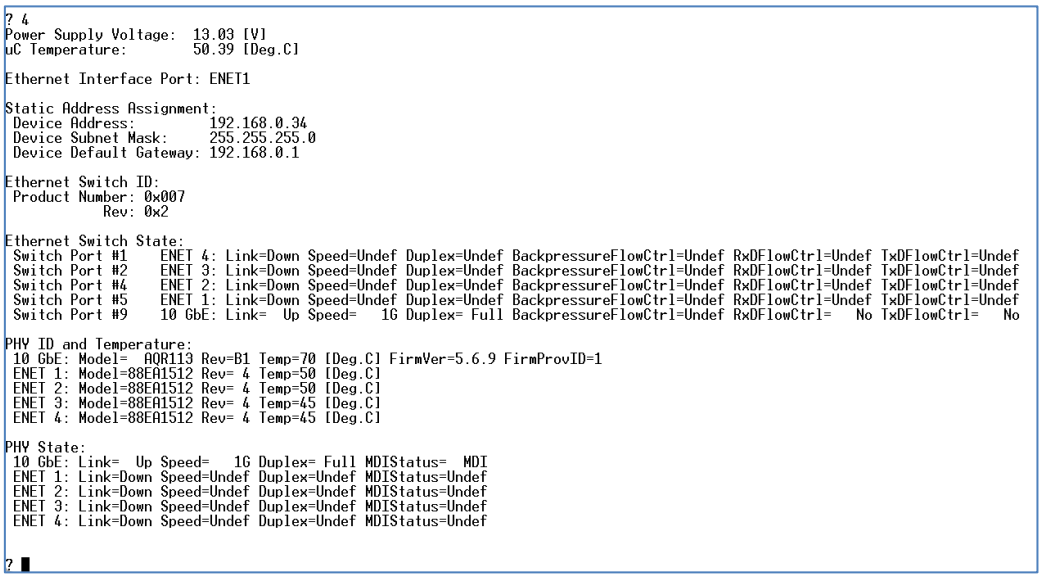


Figure 37. Device Internal State

7.1.5 Reboot Device

The device will be rebooted when the user activates this option.

7.1.6 Change Web Access Password

The user can reset the web access password using this option, see Figure 38.

The user will be prompted to enter and confirm the new password. The password should follow the password rules described in *Password Update Web Page* subsection of this document.

After successful update of the password, the user can choose to see the new password.

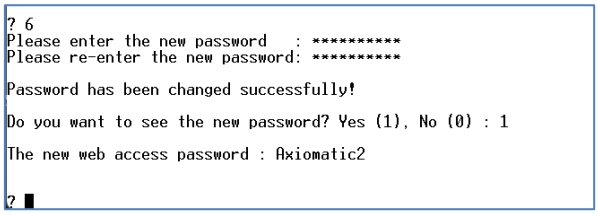


Figure 38. Changing Device Password

7.1.7 Save Configuration Parameters

The user can save the device configuration parameters in a file on the user's PC by activating this option. TeraTerm instructions will be provided on the screen, see Figure 39.

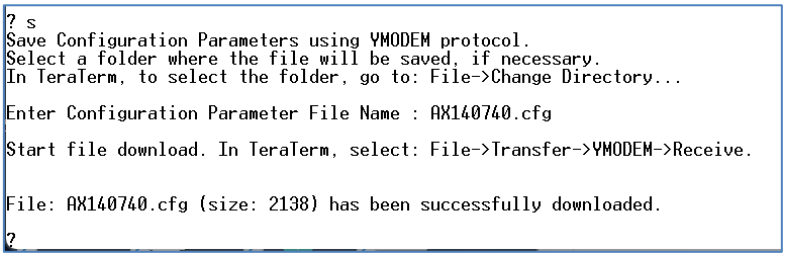


Figure 39. Saving Device Configuration Parameters

The device uses YMODEM protocol to download the configuration file. The user should select a directory where the configuration file will be downloaded in case it is not the default directory for file transfers. In case of TeraTerm, in the main menu, go to *File, Change Directory…*, see Figure 40.

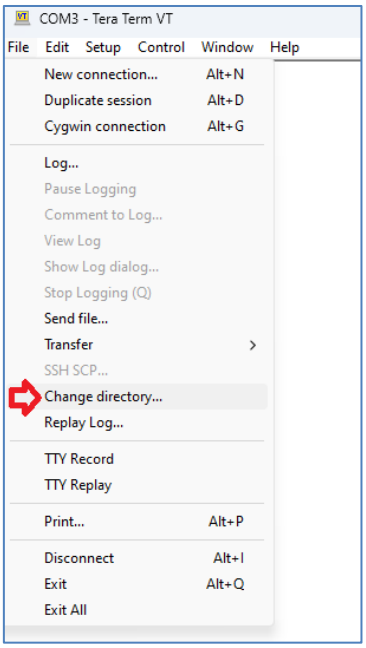


Figure 40. Changing Download Directory in TeraTerm

After entering the configuration file name, the user will be prompted to activate the YMODEM file receiving mode. In TeraTerm, in the main menu, go to *File, Transfer, YMODEM, Receive…*, see Figure 41. The device will generate and download the configuration file to the user's PC immediately after the file receiving mode is activated. The result will be shown to the user.

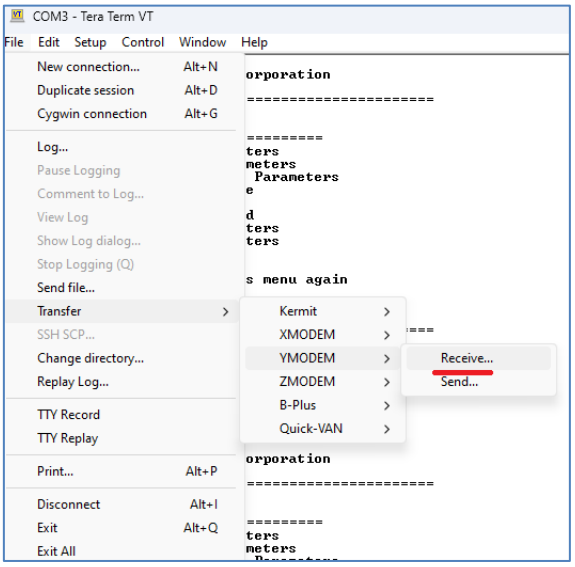


Figure 41. Activating YMODEM for Downloading Configuration File in TeraTerm

7.1.8 Load Configuration Parameters

The user can load the device configuration parameters from a configuration file by activating this option. TeraTerm instructions will be provided on the screen, see Figure 42.

```
? l
Load Configuration Parameters using YMODEM protocol.
In TeraTerm, select: File->Transfer->YMODEM->Send... and a configuration file
.


File: AX140740.cfg (size: 2138) has been uploaded.

All 25 configuration parameters have been updated.
The new configuration parameters will be applied after reboot.


? 
```

Figure 42. Loading Device Configuration Parameters. Successful Result

The device uses YMODEM protocol to upload the configuration file from the user's PC to the device. The user will be prompted to activate the YMODEM sending mode and then select a configuration file to start the upload process. In TeraTerm, in the main menu, go to *File, Transfer, YMODEM, Send*, and then select a configuration file, see Figure 43.

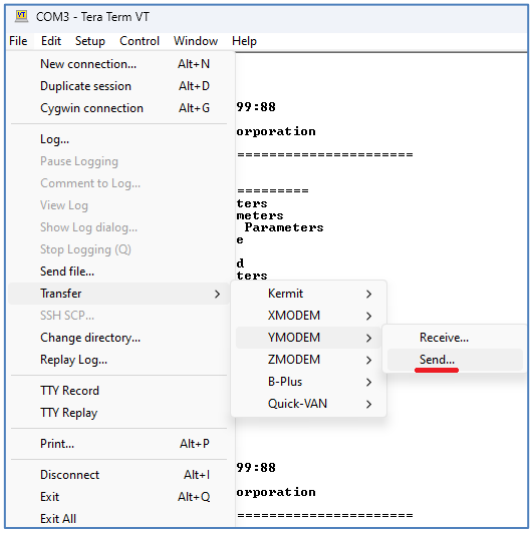


Figure 43. Activating YMODEM for Uploading Configuration File in TeraTerm

There is normally a small delay in starting the upload process, which can take up to 10 seconds to start.

The device will report the result of the file upload operation similarly to the web interface, see *Loading System Configuration* subsection of this document. In case of an error, the same detailed description of the error will be provided.

For example, if the *SwitchPortENET2State* configuration parameter has an incorrect value of "On1" instead of "On", the following error message will be shown, see Figure 44.

```
? l
Load Configuration Parameters using YMODEM protocol.
In TeraTerm, select: File->Transfer->YMODEM->Send... and a configuration file.


File: AX140740.cfg (size: 2277) has been uploaded.

Configuration Parameter Error: 0x05 on line 30. Data Error.
Line 30: SwitchPortENET2State       = On1


? 
```

Figure 44. Loading Device Configuration Parameters. Error in Configuration Parameter Value

7.2 Bootloader Activation

The user can activate the device bootloader using this option. The bootloader will be activated after an immediate device reboot, see Figure 45.

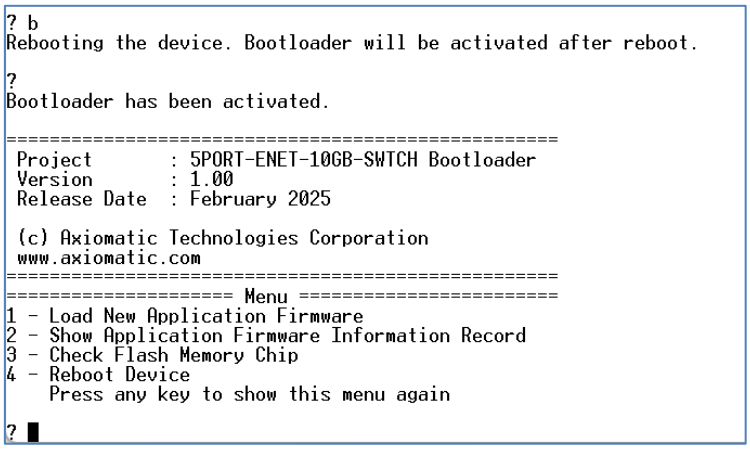


Figure 45. Activating Bootloader Menu

This activation is not permanent. Next reboot will return the device to the normal operation.

7.2.1 Load New Firmware

The user can load a new application firmware by activating this bootloader menu option. The file uploading instructions for TeraTerm will appear on the screen, see Figure 46.

Figure 46. Load Application Firmware File Prompt

The user should pick the firmware file and start the uploading process by pressing the *Ok* button, see Figure 47.

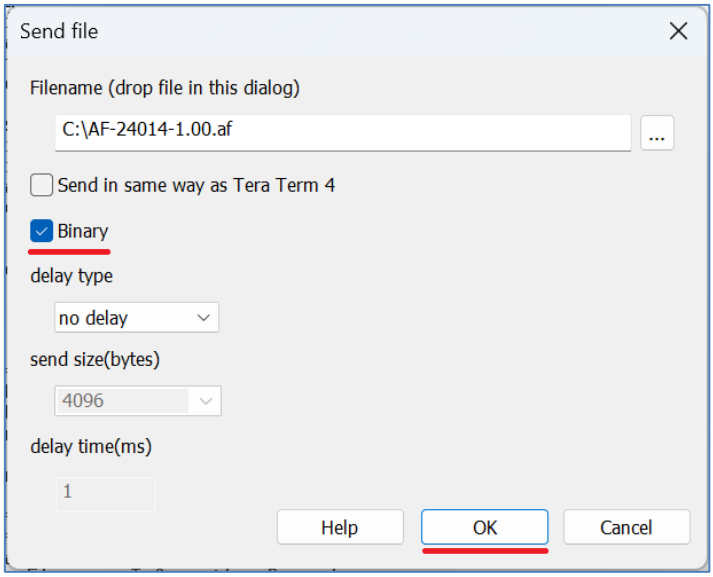


Figure 47. Selecting New Firmware

The firmware file is provided by Axiomatic in a proprietary binary format with extension: `.af`. The file name should have the following format: `AF-24014-X.XX.af`, where the `<X.XX>` field wildcard reflects the firmware version number[1].

[1] `AF-24014-1.00.af` file will be used for illustration of the firmware update process in this manual.

Once uploading of the new firmware is done, it is checked and programmed into the microcontroller and the device is restarted.

The uploading and programming processes are animated on the terminal screen. At the end of the firmware update, if no errors are encountered, the user will see the main menu of the new uploaded firmware, see Figure 48.

```
b
Rebooting the device. Bootloader will be activated after reboot.

?
Bootloader has been activated.

=====================================================
 Project       : 5PORT-ENET-10GB-SWTCH Bootloader
 Version       : 1.00
 Release Date  : February 2025

 (c) Axiomatic Technologies Corporation
 www.axiomatic.com
=====================================================
==================== Menu ========================
1 - Load New Application Firmware
2 - Show Application Firmware Information Record
3 - Check Flash Memory Chip
4 - Reboot Device
    Press any key to show this menu again

? 1

Load Application Firmware File.
Use Menu: File->Send File... with XON/XOFF control and "Binary File" options.
**************************************************************************************************
**********************************************************
Application firmware file has been loaded successfully to the internal flash memory.
Programming application firmware...
Checking firmware integrity...
Programing firmware...
**************************************************************************************************
**************************************************************
Checking checksum...
Finalizing flashing operation...
Application firmware has been successfully programmed.
Rebooting the device...

=====================================================
 Project       : 5PORT-ENET-10GB-SWTCH
 Version       : 1.00
 Release Date  : February 2025

 Part Number   : AX140740
 Serial Number : 0000125001

 MAC Address   : B4:37:D1:A7:99:87

 (c) Axiomatic Technologies Corporation
 www.axiomatic.com
=====================================================
Health Status : Normal

================ Menu ================
1 - Show Configuration Parameters
2 - Change Configuration Parameters
3 - Set Default Configuration Parameters
4 - Show Device Internal State
5 - Reboot Device
6 - Change Web Access Password
s - Save Configuration Parameters
l - Load Configuration Parameters
b - Activate bootloader
    Press any key to show this menu again

?
```

Number of '*' depends on the file length

Figure 48. Uploading New Firmware

If something goes wrong, an error message will be displayed, and the whole process will be terminated.

7.2.2 Show Application Firmware Information Record

This menu option is intended to show the user a description of the application firmware programmed into the microcontroller during the last firmware update, see Figure 49.

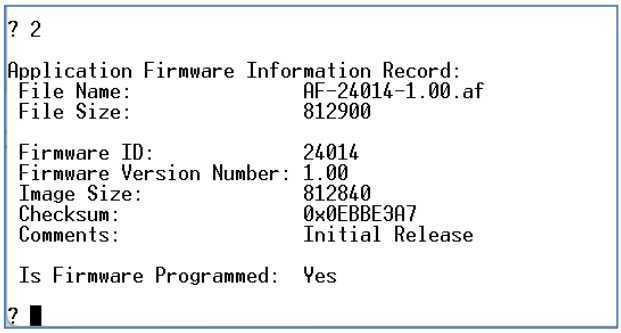


Figure 49. Application Firmware Information Record

The application firmware file name is only available when the firmware was updated through the web interface.

7.2.3 Check Flash Memory Chip

This auxiliary menu option shows information of the flash memory chip installed in the device.

7.2.4 Reboot Device

The user will leave the bootloader by choosing this option and rebooting the device. The device main menu will be displayed after reboot.

8 TECHNICAL SPECIFICATIONS

8.1 Power Supply

Table 6. Power Supply Input

Parameter	Value	Remarks
Supply Voltage	9 to 36 VDC	12 V, 24 V – nominal
Standby Supply Current[1]	230 mA	12 V – typical[3]
	120 mA	24 V – typical[3]
Maximum Supply Current[2]	510 mA	12 V – typical[3]
	260 mA	24 V – typical[3]
Standby Supply Current Decrease per Disabled Ethernet Port	17 mA	12V, 10Gbps port – typical[3]
	8 mA	12V, 1Gbps port – typical[3]
	10 mA	24V, 10Gbps port – typical[3]
	4 mA	24V, 1Gbps port – typical[3]
LED Indicator	Power ON	Green LED
Protection	Overvoltage, Reverse Polarity, Transients/Surge	

[1]All Ethernet ports are set at maximum speed, enabled, and disconnected.
[2]All Ethernet ports are set at maximum speed, enabled, and connected.
[3]At room temperature (25 °C)

8.2 Ethernet Switch

Table 7. Ethernet Switch Parameters

Parameter	Value	Remarks
Number of Ports	5	1 port – 10 Gbps, 10 GbE port 4 ports – 1 Gbps, ENET 1…4 ports All ports are Individually configurable
Switch Type	Unmanaged	Based on Marvell 88Q6113, with individually configurable PHYs, based on Marvell AQR113 (10 Gbps) and Marvell 88EA1512 (1 Gbps)
Switching Capacity	28 Gbps	
Forwarding Rate	20.83 Mpps	
MAC Address Table	16 K Entries	16384 address database entries
Packet Buffer Memory	2 Mbit	
Jumbo Frame	10236/10240 bit	Tagged/Untagged frames
QoS	8 Priority Queues	
	802.1p/DSCP QoS	
10 Gbps Port		
Port Type	10GBASE-T, 5GBASE-T, 2.5GBASE-T, 1000BASE-T, 100BASE-TX, 10BASE-Te	IEEE 802.3an/bz/ab NBASE-T IEEE 802.3-2012 compliant auto-negotiation Port can be disabled to save power and for security reasons.
MDIX	Auto-MDIX	Automatic A/B and C/D pair swaps, polarity inversions, and semi-cross (A/B or C/D only)
Port Speed	10 Gbps, 5 Gbps, 2.5 Gbps, 1 Gbps, 100 Mbps, 10 Mbps	Configurable or auto-negotiation
Port Duplex	Full Duplex	Resolved to full-duplex, if auto-negotiation

Parameter	Value	Remarks
Flow Control	Available	IEEE 802.3x symmetric and asymmetric PAUSE
Port LED Indicator	Link/Speed/Activity	Red-green bicolor LED
1 Gbps Ports		
Port Type	1000BASE-T, 100BASE-TX, 10BASE-T	IEEE 802.3ab/u/i IEEE 802.3 compliant auto-negotiation Port can be disabled to save power and for security reasons.
MDIX	Auto-MDIX	Automatic A/B and C/D pair swaps, and polarity inversions
Port Speed	1 Gbps, 100 Mbps, 10 Mbps	Configurable or auto-negotiation
Port Duplex	Full-Duplex, Half-Duplex	Configurable or auto-negotiation
Flow Control	Available	IEEE 802.3x symmetric and asymmetric PAUSE for full-duplex, backpressure for half-duplex
Port LED Indicator	Link/Speed/Activity	Red-green bicolor LED
Communication Protocols	Ethernet IEEE 802.3, IP, ICMP, ARP, UDP, TCP, DHCP, HTTP, Proprietary[1]	For internal web server and proprietary discovery protocol on Port #1 or Port #2. Communication with the switch over Ethernet can be disabled for security reasons.
Web server	On Port #1 or Port #2 only	Used for configuration, diagnostics, and flashing application firmware. Supports configuration files. Password protected. Can be disabled
Internal Diagnostics	Health Status	Available from the web server or RS-232 port user interface
RS-232 Port	3-wire	Local alternative to the web server. Menu based text user interface[2]. YMODEM for upload/ download configuration files

[1] Proprietary discovery protocol is supported by Axiomatic Windows console application `AxioDisc.exe` and *CAN-ENET Software Support Package* (SSP), P/N AX140910, v3.0.0+.
[2] Use any terminal emulation software, TeraTerm is preferred (free download from: https://teratermproject.github.io/index-en.html).

8.2.1 LED Indicators

Table 8. 10 Gbps Port LED

LED Color[1]	Port Speed
Off	No Link
Green	10 Mbps
Yellow	100 Mbps
Red	10 Gbps, 5 Gbps, 2.5 Gbps, 1 Gbps

[1]Transmit or receive activity on the Link if blinking

Table 9. 1 Gbps Port LEDs

LED Color[1]	Port Speed
Off	No Link
Green	10 Mbps
Yellow	100 Mbps
Red	1 Gbps

[1]Transmit or receive activity on the Link if blinking

8.2.2 RS-232 Port

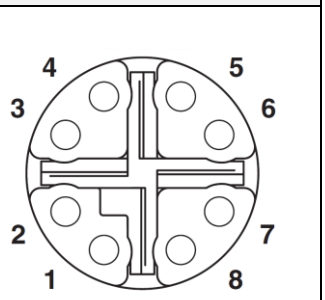
Table 10. RS-232 Port Settings

Parameter	Value	Remarks
Bit Rate	115200 bps	
Data	8-bit	
Parity	None	
Stop	1 bit	
Flow Control	Xon/Xoff	For flashing new application firmware only

8.3 Ethernet Connector

M12 socket, 8-pin, X-coded, shielded female connector, Phoenix Contact, P/N: 1411964. Use X-coded mating connectors compliant with IEC 61076-2-109.

Table 11. Ethernet Connector Pinout

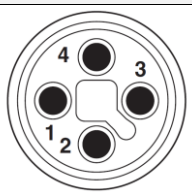
PIN #	Description	
1	DA+	
2	DA-	
3	DB+	
4	DB-	
5	DD+	
6	DD-	
7	DC-	
8	DC+	

For cable requirements see Appendix A.

8.4 Power Connector

M12 socket, 4-pin, T-coded, male connector, Phoenix Contact, P/N: 1412017. Use T-coded mating connectors compliant with IEC 61076-2-111.

Table 12. Power Connector

PIN #	Description	
1	RS232_TX	
2	RS232_RX	
3	BATT+	
4	BATT- (RS232_GND[1])	

[1] RS-232 Ground is connected to BATT-.

8.5 General Specifications

Table 13. General Specifications

Parameter	Value	Remarks
Operating Temperature	-40 to +65 °C (-40 to 149 °F)	
Storage Temperature	-40 to +85 °C (-40 to 185 °F)	
Environmental Protection	IP67	IEC 60529. With mated connectors
Size	6.11 in x 6.38 in x 1.46 in	L x W x H excluding connectors. See dimensional drawing

Parameter	Value	Remarks
	(155.30 mm x 162.09 mm x 37.00 mm)	
Weight	1.572 lb (0.713 kg)	
Compliance	RoHS Directive	

8.6 Housing

Cast aluminum, anodized enclosure. Lexan overlay. For dimensional drawing, see Figure 50.

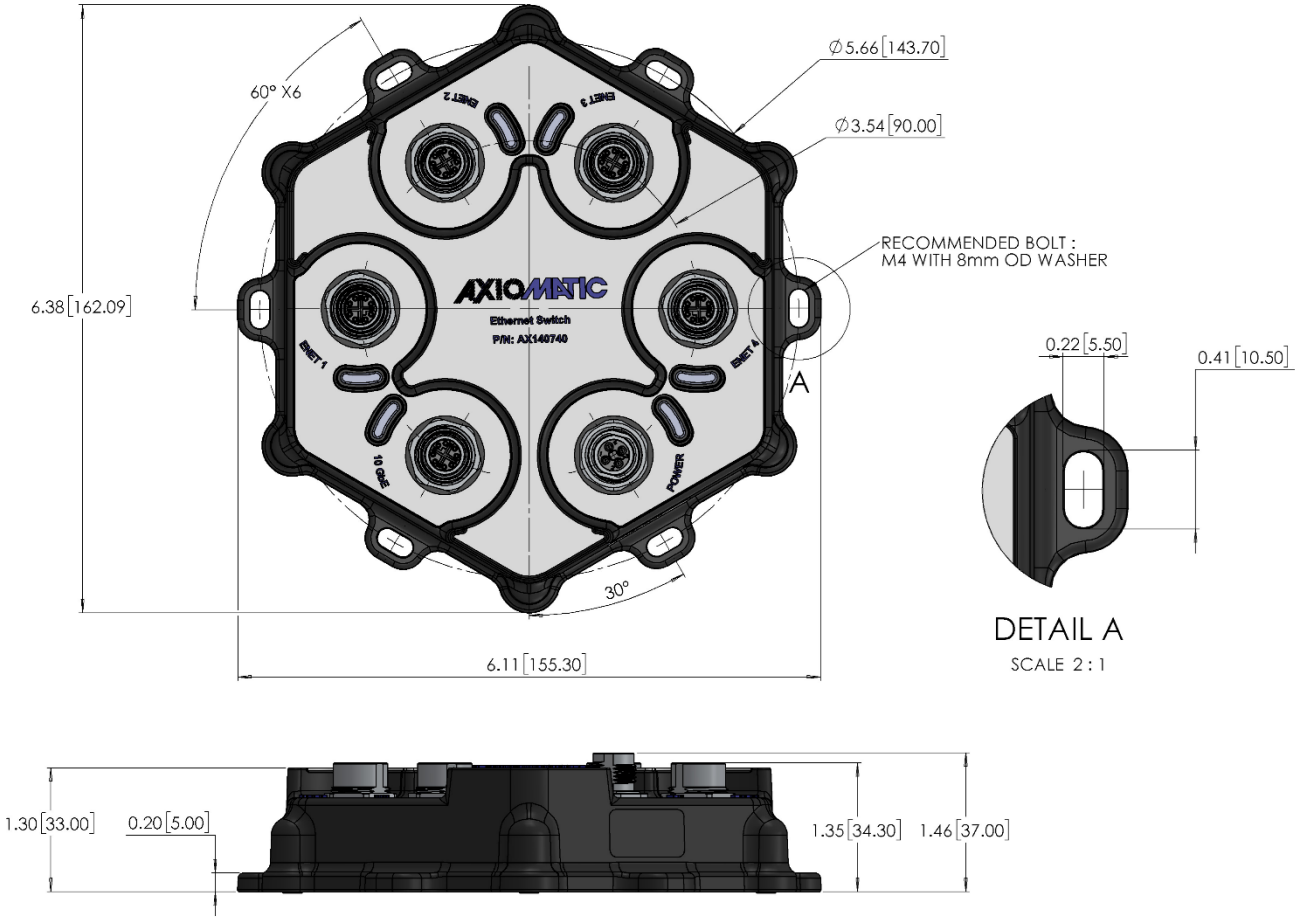


Figure 50. Dimensional Drawing

9 APPENDIX A. Ethernet Cable Requirements

Table A1. 10 Gbps Port Cable Requirements

Port Speed	Cable Category	Maximum Distance[1]	Cable Standard
10 Gbps	CAT 7 STP (or better)	100m	ISO/IEC 11801-1:2017 Class F
	CAT 6a UTP	100m	ANSI/TIA-568.2-D
	CAT 6	55m	
5 Gbps, 2.5 Gbps	CAT 5e (or better)	100m	
1 Gbps, 100 Mbps, 10 Mbps	CAT 5e (or better)	130m	

[1]Based on the PHY rating

Table A2. 1 Gbps Port Cable Requirements

Port Speed	Cable Category	Maximum Distance[1]	Cable Standard
1 Gbps	CAT 5e (or better)[2]	100m	ANSI/TIA-568.2-D
100 Mbps	CAT 5e (or better)[2]	100m	
10 Mbps	CAT 3 (or better)	100m	

[1]Based on the appropriate Ethernet standard

[2]Legacy CAT 5 can be used, but not recommended

10 APPENDIX B. Third Party Software License Notices

This section contains Third Party Software License Notices and/or Additional Terms and Conditions for licensed third-party software components included in the switch firmware.

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11 VERSION HISTORY

User Manual Version	Firmware version	Date	Author	Modifications
5	5.xx	December 8, 2025	Olek Bogush	• Updated *Network Configuration* subsection • Updated *Device Configuration File. Default Configuration Parameters* figure • Updated *Device Discovery* section • Added *Weight* in *General Specifications* table • Updated *Appendix B. Third Party Software License Notices* • Updated Axiomatic Logo on the front page
4A	4.xx	October 16, 2025	Olek Bogush	• Updated requirements for *Network Configuration Parameters.*
4	4.xx	September 15, 2025	Olek Bogush	• Changed Ethernet port names from Port#1…5 to 10GbE, ENET1…4 throughout the document. • Added port names to *Ethernet Switch Parameters* table in *Technical Specifications* section.
3A	3.xx	June 24, 2025	Olek Bogush	• Updated *Device Internal Organization* figure. • Updated *Ethernet Port Configuration* and *Configuration File Format* subsections. • Updated *Ethernet Connector* subsection in *Technical Specifications*. Moved *Ethernet Cable Requirements* subsection to Appendix A. • Moved *Third Party Software License Notices* section to Appendix B.
3	3.xx	May 7, 2025	Olek Bogush	• Updated password rules. Updated *Password Update Web Page* and *Applying New Firmware* subsections.
2A	2.xx	March 21, 2025	Olek Bogush	• Added device *Size* and *Dimensional Drawing* in *Technical Specifications* section.
2	2.xx	March 11, 2025	Olek Bogush	• Added *Show Password* checkbox. Updated *Device Login Page* and *Password Update Web Page* figures. • Added statement to change the default password to a unique one in *Connecting to the Device* subsection. • Added integrity data check of the uploaded new configuration in *Loading System Configuration* subsection. • Performed various updates in *Connecting to the Device, Ethernet Port Configuration*, *Loading System Configuration*, *Configuration File Format, Password Update Web Page, Device Rebooting, Show Device Internal State* subsections. • Updated document format. • Added statement not to interrupt power during updating configuration parameters and flashing new firmware in *Device Configuration*, *Firmware Update*, and *RS-232 Interface* sections.

1	1.xx	February 14, 2025	Olek Bogush	• Initial release

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