WOODWARD

Product Manual 35095
(Revision -, 3/2018)
Original Instructions

Security Appliance
Moxa EDR-810 Router/Firewall/VPN/NAT

Configuration and Service Manual

General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.
Practice all plant and safety instructions and precautions.
Failure to follow instructions can cause personal injury and/or property damage.

Revisions

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, check manual *35095*, *Customer Publication Cross Reference and Revision Status & Distribution Restrictions*, on the *publications page* of the Woodward website:
www.woodward.com/publications

The latest version of most publications is available on the *publications page*. If your publication is not there, please contact your customer service representative to get the latest copy.

Proper Use

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

Translated Publications

If the cover of this publication states "Translation of the Original Instructions" please note:
The original source of this publication may have been updated since this translation was made. Be sure to check manual *35095*, *Customer Publication Cross Reference and Revision Status & Distribution Restrictions*, to verify whether this translation is up to date. Out-of-date translations are marked with ⚠. Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

Revisions— A bold, black line alongside the text identifies changes in this publication since the last revision.

Contents

Illustrations and Tables

Warnings and Notices

Important Definitions

This is the safety alert symbol used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER - Indicates a hazardous situation, which if not avoided, will result in death or serious injury.
WARNING - Indicates a hazardous situation, which if not avoided, could result in death or serious injury.
CAUTION - Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury.
NOTICE - Indicates a hazard that could result in property damage only (including damage to the control).
IMPORTANT - Designates an operating tip or maintenance suggestion.

⚠WARNING

Overspeed / Overtemperature / Overpressure

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.
The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

⚠WARNING

Personal Protective Equipment

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage.
Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:
Eye Protection
Hearing Protection
Hard Hat
Gloves
Safety Boots
Respirator
Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

⚠WARNING

Start-up

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

⚠WARNING

Automotive Applications

On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

Electrostatic Discharge Awareness

NOTICE

Electrostatic Precautions

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:
Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).
Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.
Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.
To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual *82715*, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Follow these precautions when working with or near the control.
1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
   - Do not touch any part of the PCB except the edges.
   - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
   - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

Regulatory Compliance

Standards and Certifications:
Safety: UL 508
EMC: EN 55032/24
Hazardous Location: UL/cUL Class I Division 2 Groups A/B/C/D
EMI: CISPR 32, FCC Part 15B Class A
EMS:
IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV
IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m
IEC 61000-4-4 EFT: Power: 2 kV; Signal: 2 kV
IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV
IEC 61000-4-6 CS: Signal: 10 V
IEC 61000-4-8
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6

Safety Symbols


Direct Current


Alternating Current


Both Alternating and Direct Current


Caution, risk of electrical shock


Caution, refer to accompanying documents


Protective conductor terminal


Frame or chassis terminal

Chapter 1.
General Information

Introduction

The MOXA EDR-810 is an industrial all-in-one Router/Firewall/VPN/NAT which provides network traffic management and security functionality for one WAN and one LAN (VLAN, Bridge). The device has eight (8) RJ45 10/100BaseT(X) interface ports and two (2) 1000BaseSFP interface slots. The 1000 Mbps SFP slots are configurable and require separate multi-mode or single-mode modules. The network security features include Layer 2 switch functions, IPSec protocol, IP/MAC address filtering, Modbus/TCP deep packet inspection, and DoS/DDoS protection. The device is DIN-rail mounted (wall mount optional), supports dual 12/24(0.32 A)/48 Vdc input voltage, and is available in standard (-10 to 60 °C) and extended (-40 to 75 °C) operating temperature ranges.

Purpose and Scope

The purpose of this manual is to provide the necessary background information for installing, configuring, and operating the MOXA EDR-810 Industrial Secure Router appropriately. Topics covered include mechanical installation, electrical wiring, firmware installation, software configuration (via service tools), as well as troubleshooting and diagnostic information.

Intended Applications

The combined network traffic management and security functionality of the MOXA EDR-810 is well suited for creating and protecting industrial control system networks. The Woodward 26479 MicroNet Cyber Security Manual describes how this device can provide a security boundary between embedded control systems (LAN) and either a security DMZ or a customer WAN. The MOXA EDR-810 is similar to, and often used in combination with, the TofinoXe to create cyber secure MicroNet Plus control systems.

Chapter 2.
Reference Documents and Information:

Applicable Woodward Part Numbers:

1711-1293 (Router)
1751-6741 (Gigabit Ethernet Fiber Optic Module)
10-004-484 (Firmware EDR810_V3.13.rom)
10-004-485 (Configuration file 10-004-485.ini)

Woodward Documentation:

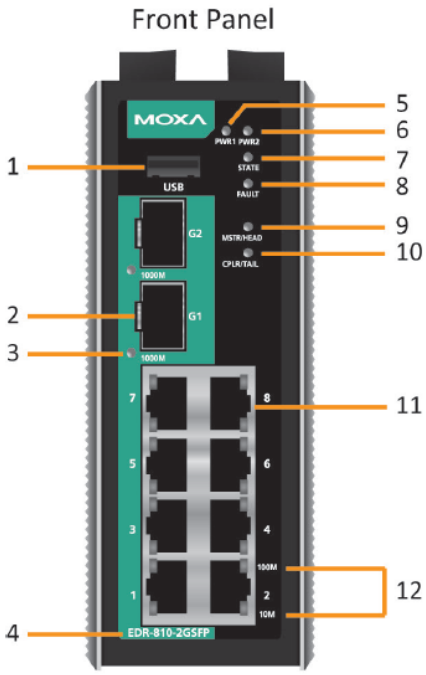
26479 MicroNet Cyber Security Manual

Manufacturer Resources:

https://www.moxa.com/product/

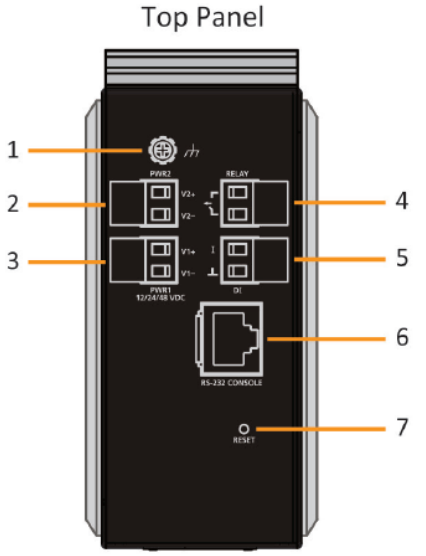
Chapter 3.
Installation and Connections

The device is DIN-rail mounted (wall mount optional) and supports dual 12/24(0.32 A)/48 Vdc input voltage power supplies. Additional details and mounting dimensions are available in the Industrial Secure Router Installation Guide .



Front Panel:

1. USB port for ABC-02
2. 1000Mbps SFP port
3. 1000Mbps SFP port speed LED indicator
4. Model name
5. Power input PWR1 LED indicator
6. Power input PWR2 LED indicator
7. STATE LED indicator
8. FAULT LED indicator
9. MSTR/HEAD LED indicator
10. CPLR/TAIL LED indicator
11. 10/100Mbps copper port
12. 10/100Mbps copper port speed LED indicator



Top Panel:

1. Grounding screw
2. Terminal block for power input 2
3. Terminal block for power input 1
4. Terminal block for relay output
5. Terminal block for digital input
6. RS-232 serial console port
7. RESET button

Figure 3-1 Device Panel Connections

Chapter 4. Configuring the Router:

The Moxa EDR-810 appliance (P/N 10-004-483) is pre-configured with the Woodward Cyber Secure configuration file 10-004-485 (10-004-485.ini). Custom configurations (*.ini) can be installed as described in the following procedures of this section

Table 4-1 Default Configuration Comparisons compares parameters between the various configurations for the device.

Table 4-1 Default Configuration Comparisons

Parameter	Configuration	
	Firmware Default	Woodward Cyber Secure
Woodard Configuration P/N	N/A	10-004-485
Username	admin (Admin) user (User)	ServiceUser
Password	moxa (Admin) moxa (User)	ServiceUser@1
DHCP Server	Disabled	Disabled
Port 7	LAN (192.168.127.254)	WAN (10.0.10.10)
Port(s) 1-6, 8	LAN (192.168.127.254)	LAN (10.0.100.100)
WAN	VLAN (Dynamic IP)	VLAN 2 (Static IP)
NAT Mode	Disabled	1-1
NAT Host IP	N/A	(e.g. 10.0.101.1)
NAT Interface IP	N/A	(10.0.10.10)
Firewall DoS	Disabled	Enabled (All)
RADIUS	Disabled	Enabled (10.0.100.110: 1812)
Modbus TCP Policy	Disabled	Accept All

Connect to the Router

The router provides three (3) service connections: Web browser, Serial Console (RJ45), and Telnet Console. This section presents the Web browser connection method.
Attach a cable from the local Ethernet connection on the service computer to a RJ45 LAN port on the front of the router.

NOTICE

The eight (8) RJ45 10/100BaseT(X) interface ports are configurable as either WAN or LAN. Therefore, if the route has been configured previously, the firmware default LAN ports (1-8, G1, G2) may not be available (see Verify Port configuration).

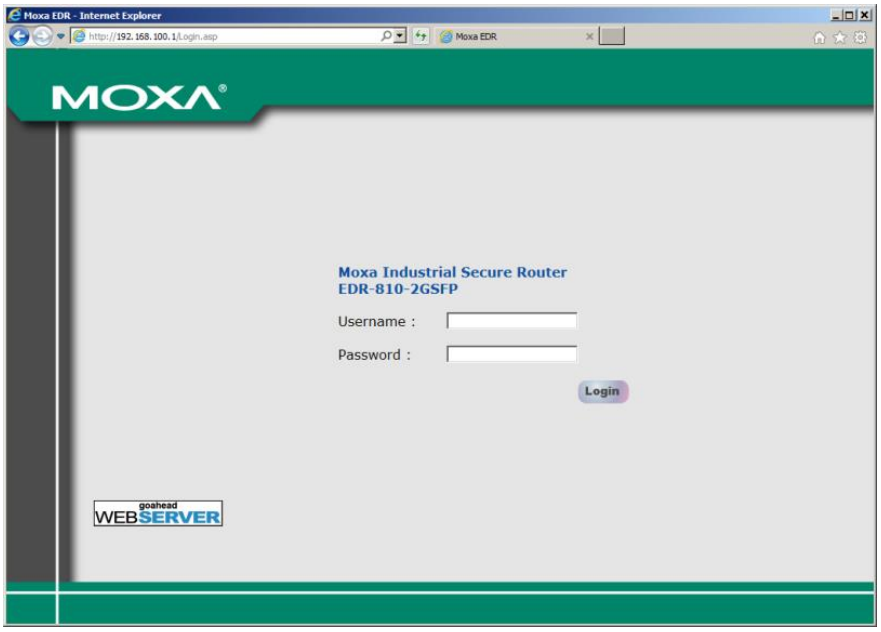
The firmware default address of the router is 192.168.127.254 with all ports (1-8, G1, G2) configured as LAN and available for a service connection. If the Woodward standard is the current active configuration, port 7 is for WAN connections and the available service ports are LAN ports (1-6, 8, G1, G2) for connections to the cyber secure default address 10.0.100.100.

If the router has been configured previously and no knowledge about the configuration exists, press the RESET button on the router for 5 seconds and then wait 30 seconds for the device to reboot and the green STATE LED to turn on. This will erase all settings and restore the firmware defaults.

NOTICE

The DHCP server is enabled by the firmware default configuration and disabled by the Woodward standard cyber secure configuration. Before proceeding to establish a connection on a network without a DHCP server, the service computer must be assigned an IP address on the same subnet (e.g. *192.168.127.101 or 10.0.100.101*). It may be necessary to copy any firmware or configuration files to a local directory on the service computer before changing the IP address. Network directories will not be accessible during Load/Save a Configuration operations.

Open a web browser, type in the address of the router (firmware default address is 192.168.127.254). The login screen will appear:

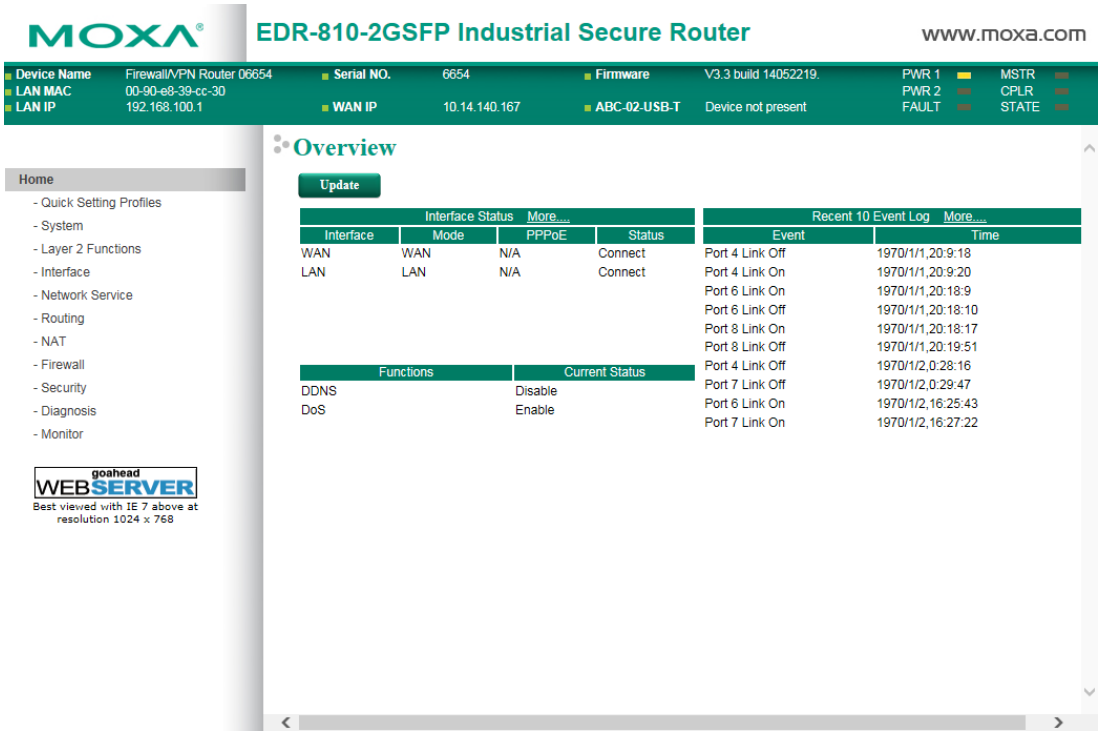


- Username field: “admin”
- Password: “moxa” (case sensitive)
- Click Login

NOTICE

Close the browser at the end of every session as a security best practice.

Status/Overview Screen



The green bar in the router administration page contains pertinent information about the router status:

- LAN IP
- WAN IP
- Firmware version[1]

System Configuration

Load/Save a Configuration

Navigate to System->System File Update->Local Import/Export

Load a saved configuration:

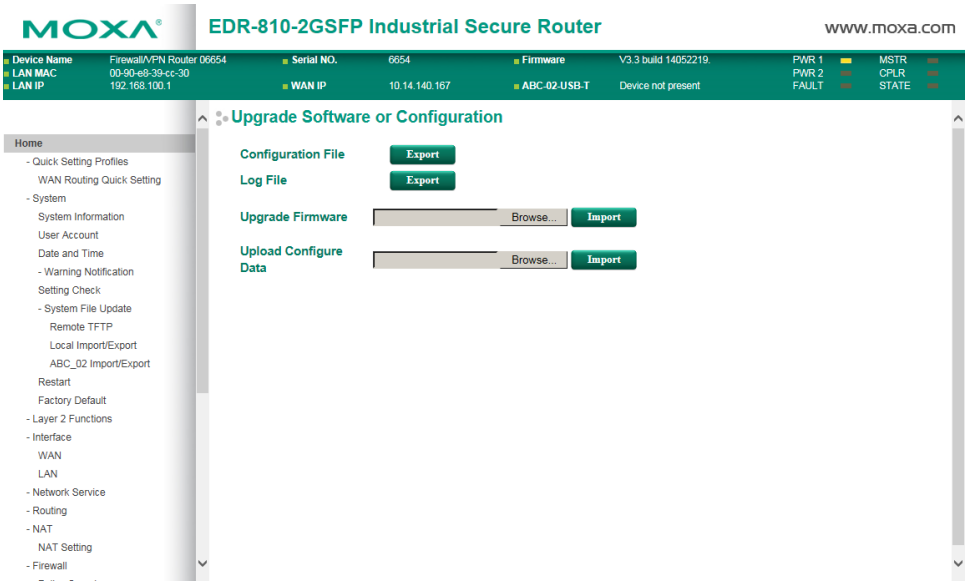
- Select Upload Configure Data
- Click Brose and navigate to the .ini file.[2]
- Click Import
- Restart router

[1] Always consult http://www.woodward.com/Software.aspx or email CybersecurityHelpDesk@woodward.com to verify the latest recommended firmware version to ensure optimal operation and cyber security protections.

[2] Always consult http://www.woodward.com/Software.aspx or email CybersecurityHelpDesk@woodward.com to verify the latest recommended firmware version to ensure optimal operation and cyber security protections.

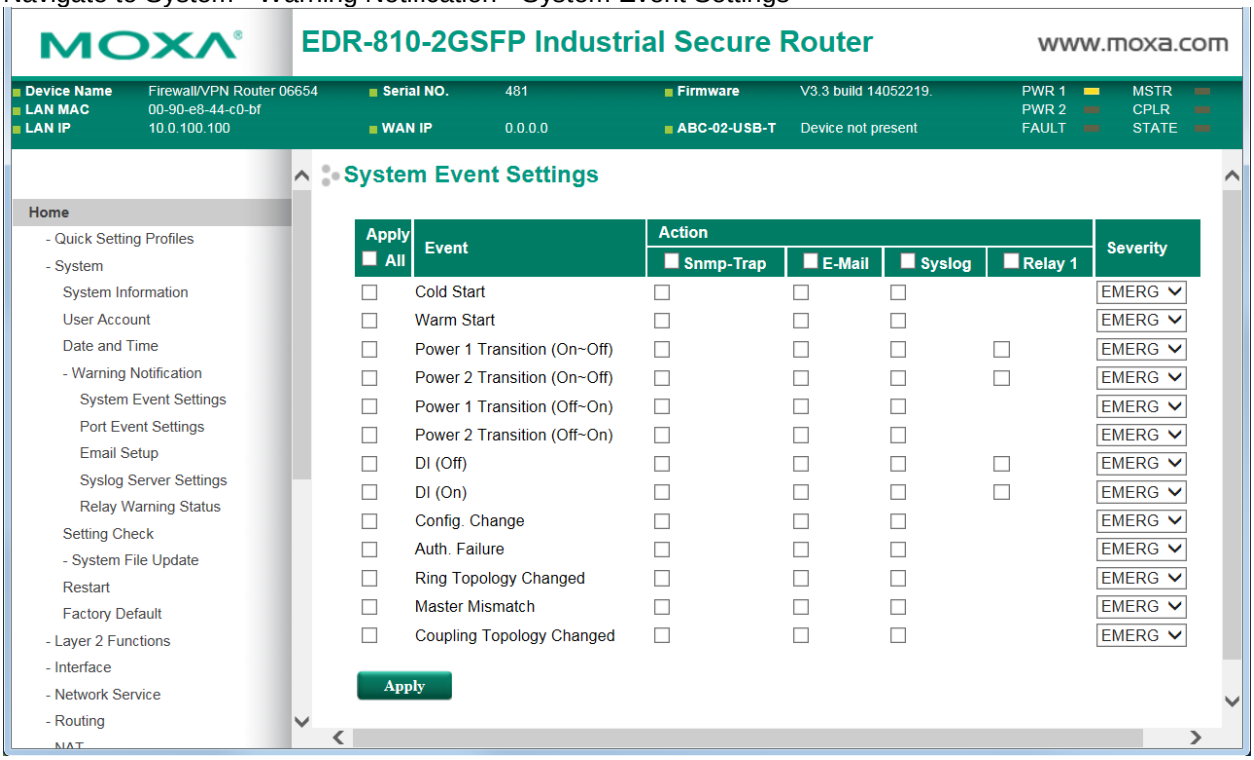
Save a configuration:

- Select Configuration File
- Click Export
- Browse… to the directory/folder you wish to save the file in and click save



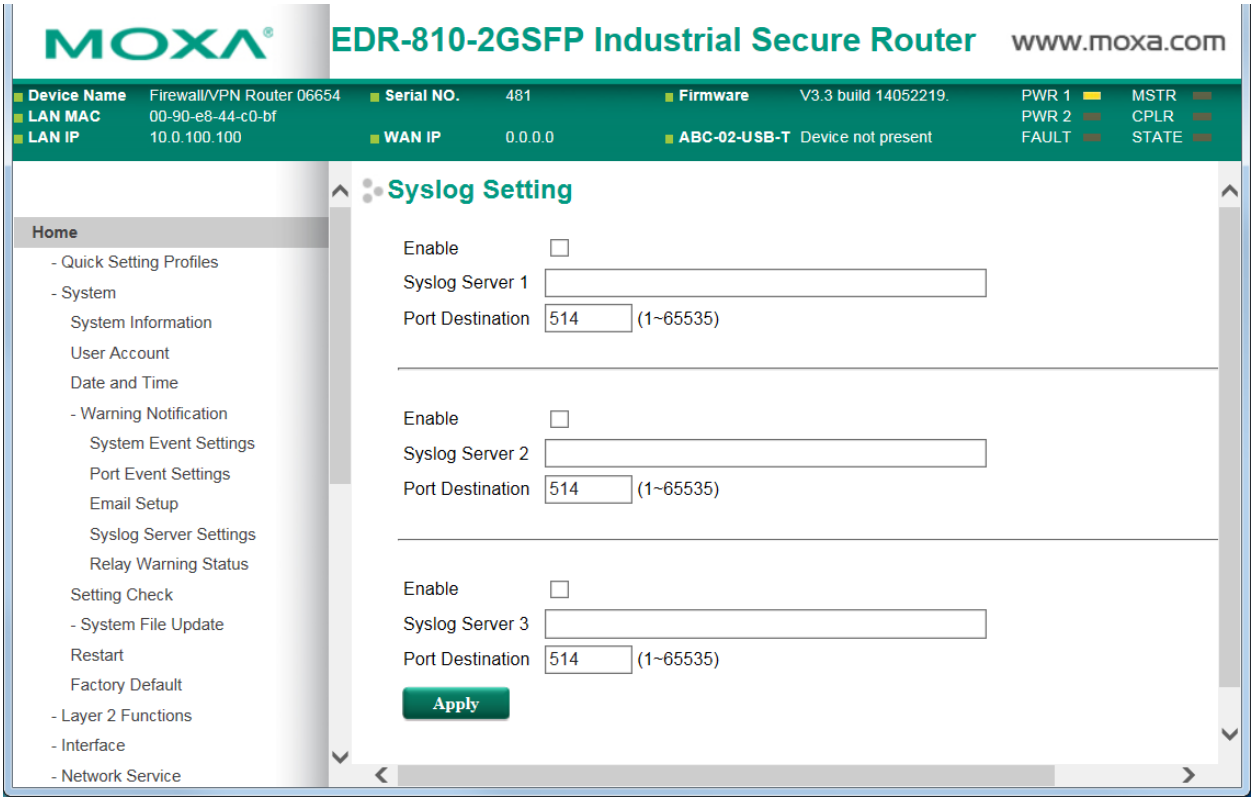
SIEM Log File Configuration

Navigate to System->Warning Notification->System Event Settings



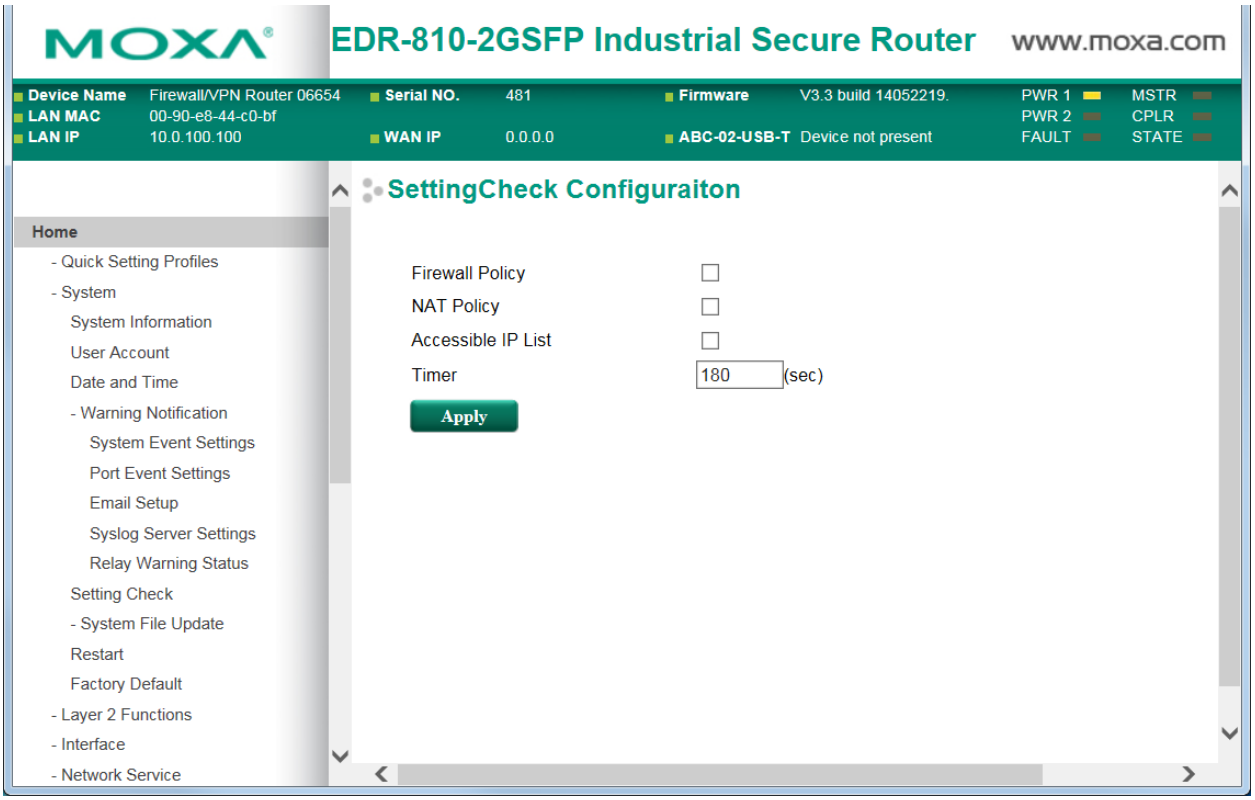
Click Apply after any revisions

Navigate to System->Warning Notification->Syslog Server Settings



Click Apply after any revisions

Navigate to System->Setting Check



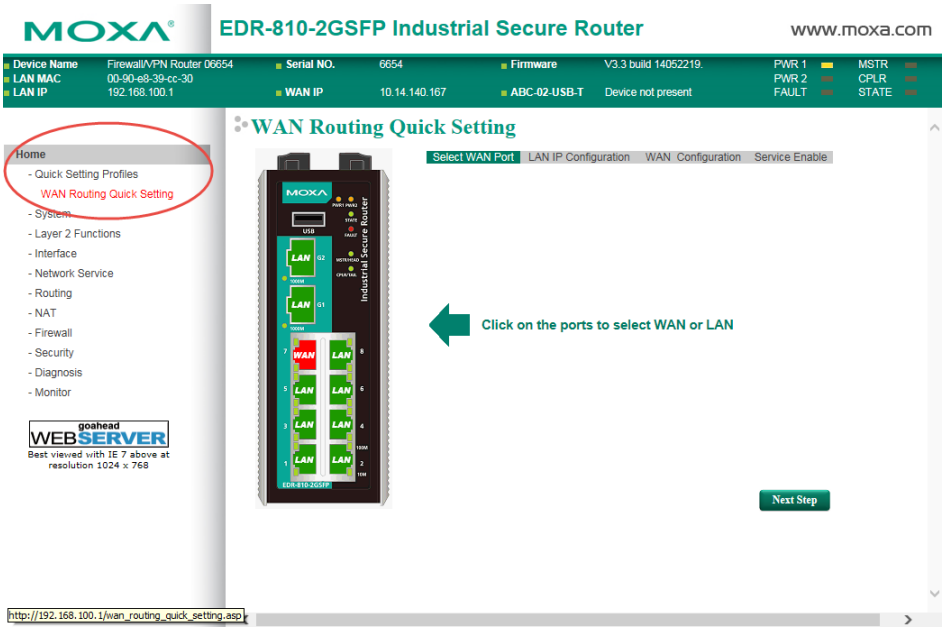
Click Apply after any revisions

Verify Port configuration

Navigate to Quick Settings Profiles -> WAN Routing Quick Setting to view the port configuration. WAN ports will be marked in Red and labeled WAN. Clicking on the ports will set the port to either WAN or LAN.

NOTICE

Only use this Quick setting page to reference which ports are set for WAN. Do not use the "next step" button to configure the router.

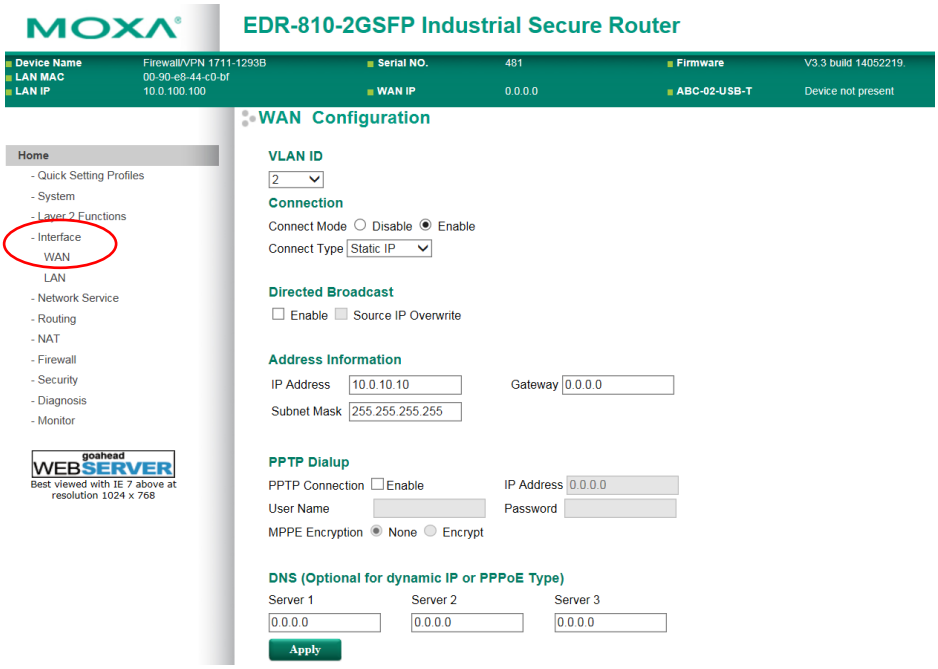


Network Interface Configurations

Setting the WAN IP address

Navigate to Interface->WAN to set the IP Address.
Revise the following settings as necessary for the given network:

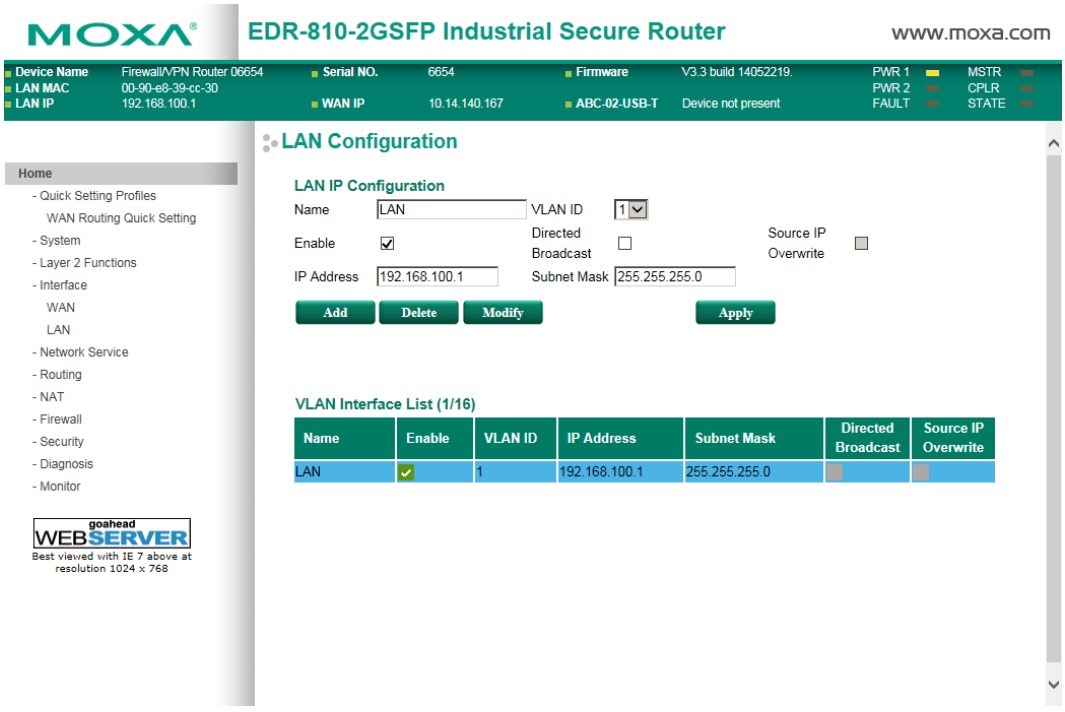
- VLAN ID: 2
- Connect Mode: Enable
- Connect Type:Static IP
- Gateway: 0.0.0.0
- IP Address: set the IP address to an appropriate WAN address (usually the control's address, e.g. 10.0.10.10)
- Subnet Mask: Set the subnet mask to a compatible setting with the control network
- Click Apply after any revisions



Setting the LAN IP address

Navigate to Interface->LAN to set the LAN IP Address.
Verify the following settings:

- VLAN ID: 1
- IP Address: This IP address will be the network gateway and should be used on the MicroNet CPU as the gateway setting (e.g. 10.0.100.100).
- Subnet Mask: Set the subnet mask to a compatible setting with the control network
-

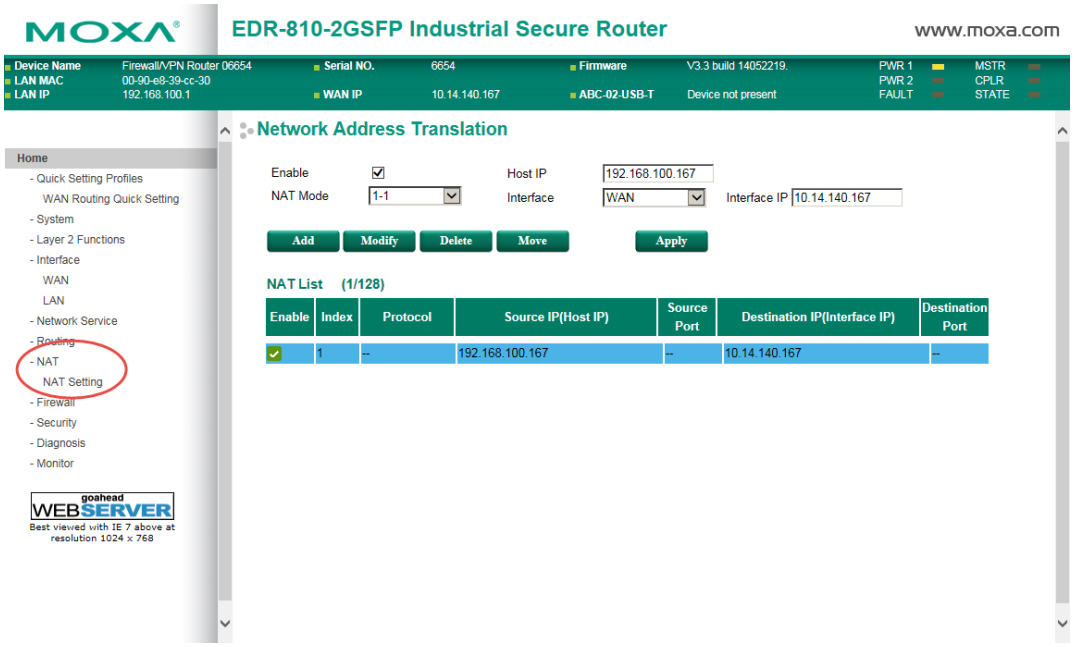


Click Apply after any revisions

Configuring NAT

Navigate to NAT->NAT Setting
Verify following settings:

- Enable: Not Checked (default)
- NAT mode: 1-1
- Host IP: IP Address of the MicroNet CPU (e.g. 10.0.101.1)
- Interface: WAN
- Interface IP: IP Address of the WAN IP (10.0.10.10)
- If no rules exist click Add, if a rule exists, click Modify
-

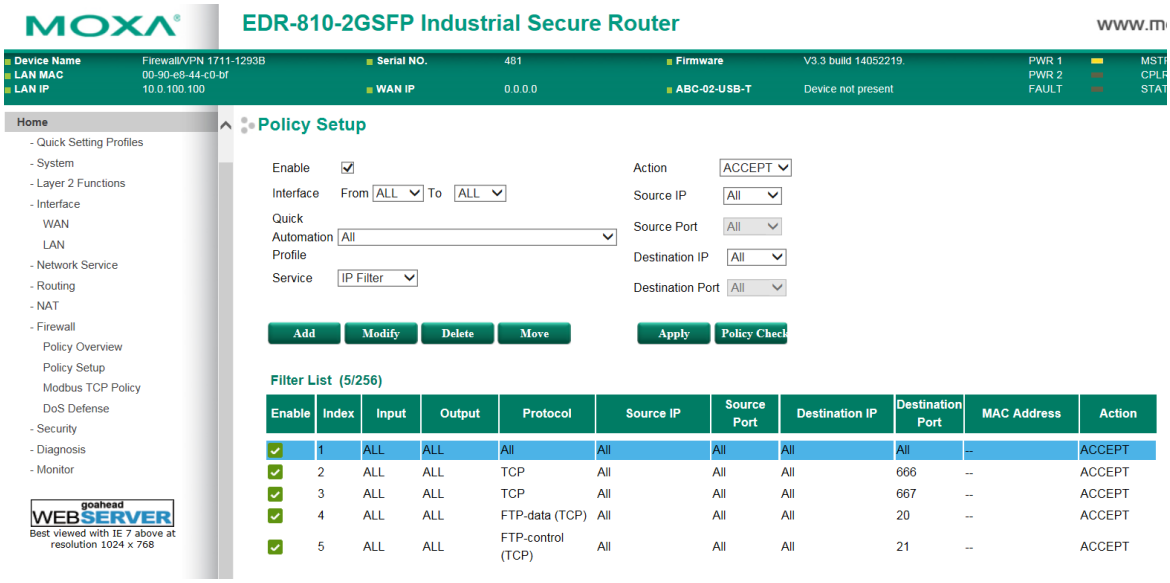


Click Apply after any revisions

Configure Firewall Security

Policy Setup

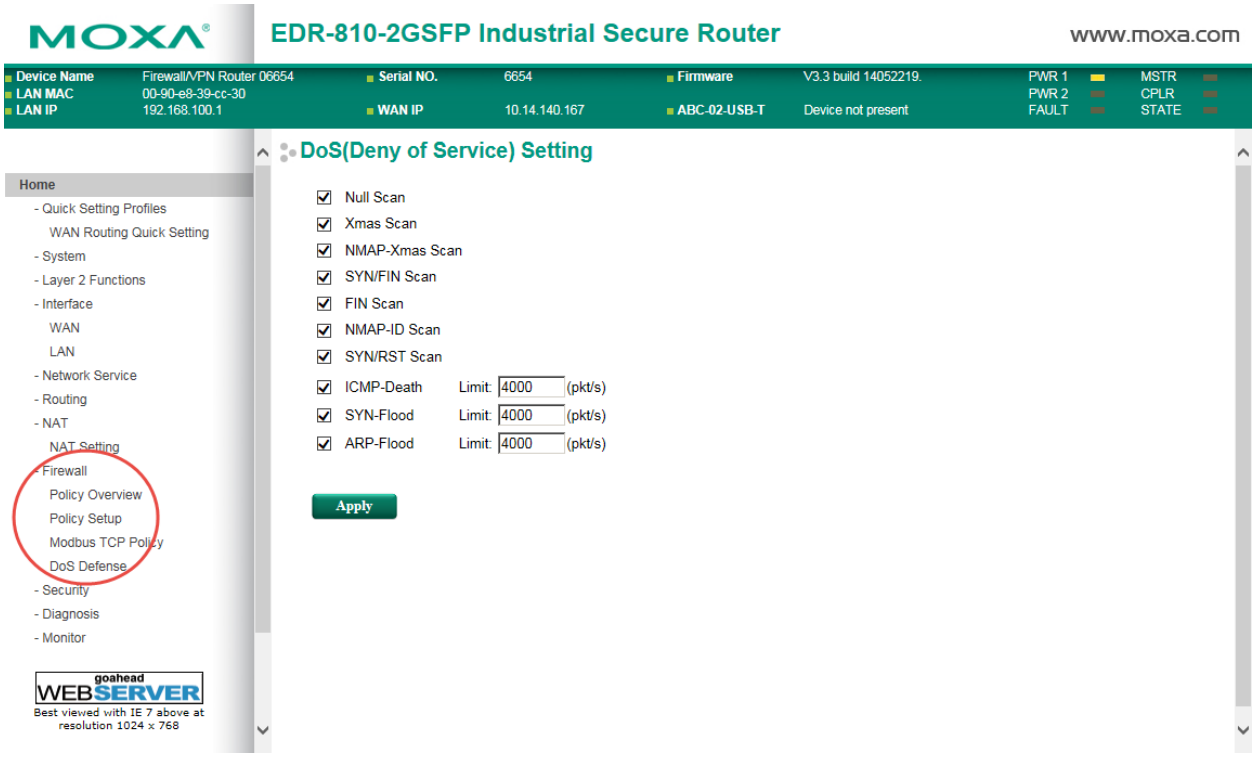
Navigate to Firewall->Policy Setup
Revise settings as necessary and click apply



Click Apply after any revisions

Denial-of-Service (DoS)

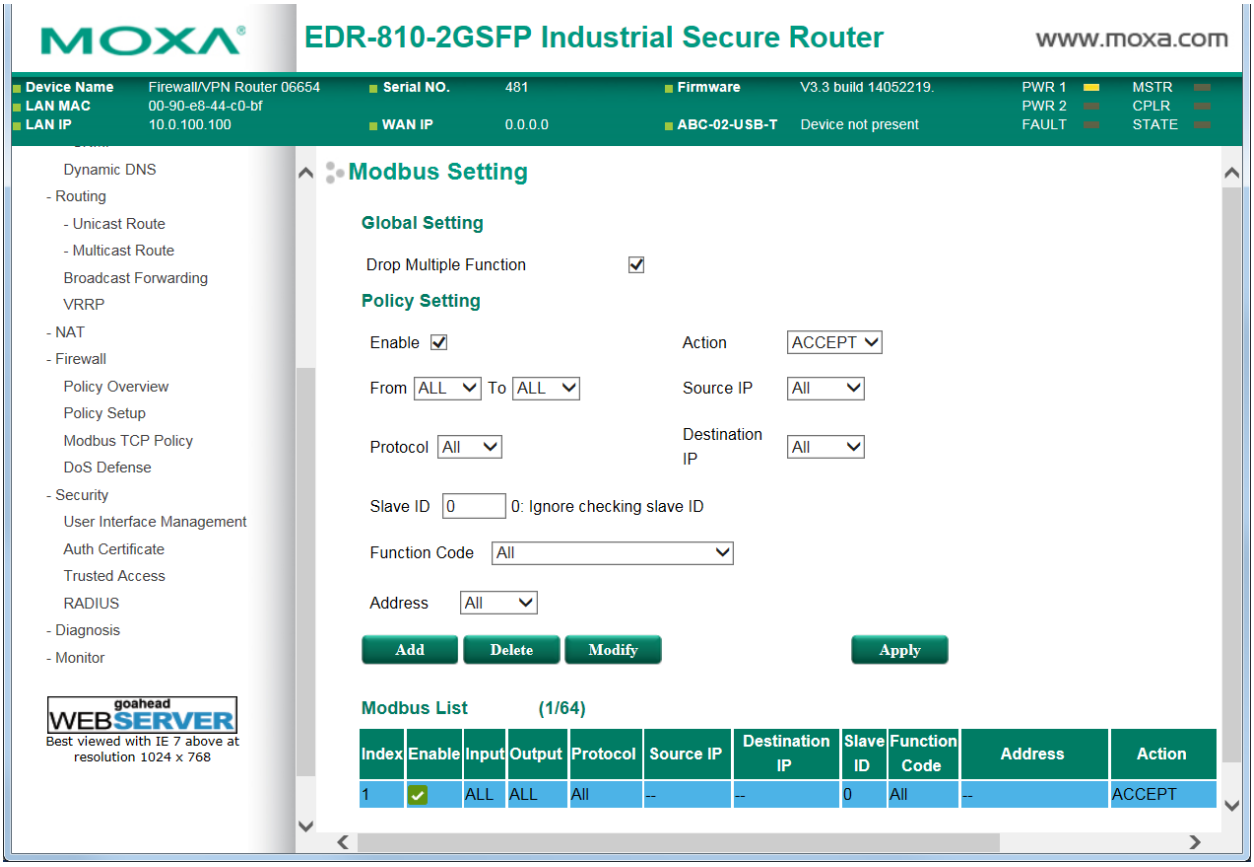
Navigate to Firewall->DoS Defense
Revise settings as necessary and click apply



Click Apply after any revisions

Modbus TCP Policy

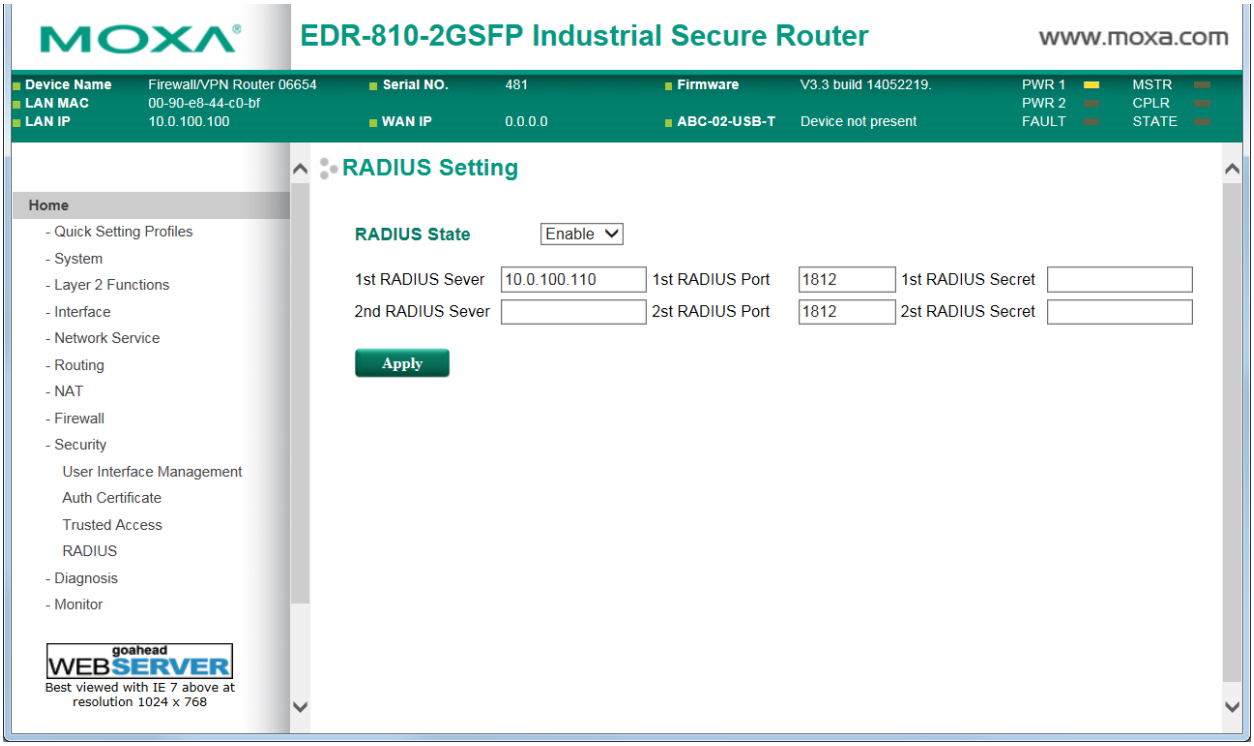
Navigate to Firewall->Modbus TCP Policy
Global Setting: Check Drop Multiple Function
Policy Setting: Check Enable, Action = ACCEPT, Slave ID = 0, All other settings = ALL



Click Apply after any revisions

Configure Network Security

Navigate to Security->RADIUS
Select RADIUS State = Enable
Enter 1st RADIUS Server = 10.0.100.110, 1st RADIUS Port = 1812



Click Apply after any revisions

Chapter 5.
Product Support and Service Options

Product Support Options

If you are experiencing problems with the installation, or unsatisfactory performance of a Woodward product, the following options are available:
Consult the troubleshooting guide in the manual.
Contact the manufacturer or packager of your system.
Contact the Woodward Full Service Distributor serving your area.
Contact Woodward technical assistance (see “How to Contact Woodward” later in this chapter) and discuss your problem. In many cases, your problem can be resolved over the phone. If not, you can select which course of action to pursue based on the available services listed in this chapter.

OEM or Packager Support: Many Woodward controls and control devices are installed into the equipment system and programmed by an Original Equipment Manufacturer (OEM) or Equipment Packager at their factory. In some cases, the programming is password-protected by the OEM or packager, and they are the best source for product service and support. Warranty service for Woodward products shipped with an equipment system should also be handled through the OEM or Packager. Please review your equipment system documentation for details.

Woodward Business Partner Support: Woodward works with and supports a global network of independent business partners whose mission is to serve the users of Woodward controls, as described here:
A **Full Service Distributor** has the primary responsibility for sales, service, system integration solutions, technical desk support, and aftermarket marketing of standard Woodward products within a specific geographic area and market segment.
An **Authorized Independent Service Facility (AISF)** provides authorized service that includes repairs, repair parts, and warranty service on Woodward's behalf. Service (not new unit sales) is an AISF's primary mission.
A **Recognized Turbine Retrofitter (RTR)** is an independent company that does both steam and gas turbine control retrofits and upgrades globally, and can provide the full line of Woodward systems and components for the retrofits and overhauls, long term service contracts, emergency repairs, etc.

A current list of Woodward Business Partners is available at **www.woodward.com/directory**.

Product Service Options

The following factory options for servicing Woodward products are available through your local Full-Service Distributor or the OEM or Packager of the equipment system, based on the standard Woodward Product and Service Warranty (5-01-1205) that is in effect at the time the product is originally shipped from Woodward or a service is performed:
Replacement/Exchange (24-hour service)
Flat Rate Repair
Flat Rate Remanufacture

Replacement/Exchange: Replacement/Exchange is a premium program designed for the user who is in need of immediate service. It allows you to request and receive a like-new replacement unit in minimum time (usually within 24 hours of the request), providing a suitable unit is available at the time of the request, thereby minimizing costly downtime. This is a flat-rate program and includes the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205).

This option allows you to call your Full-Service Distributor in the event of an unexpected outage, or in advance of a scheduled outage, to request a replacement control unit. If the unit is available at the time of the call, it can usually be shipped out within 24 hours. You replace your field control unit with the like-new replacement and return the field unit to the Full-Service Distributor.

Charges for the Replacement/Exchange service are based on a flat rate plus shipping expenses. You are invoiced the flat rate replacement/exchange charge plus a core charge at the time the replacement unit is shipped. If the core (field unit) is returned within 60 days, a credit for the core charge will be issued.

Flat Rate Repair: Flat Rate Repair is available for the majority of standard products in the field. This program offers you repair service for your products with the advantage of knowing in advance what the cost will be. All repair work carries the standard Woodward service warranty (Woodward Product and Service Warranty 5-01-1205) on replaced parts and labor.

Flat Rate Remanufacture: Flat Rate Remanufacture is very similar to the Flat Rate Repair option with the exception that the unit will be returned to you in “like-new” condition and carry with it the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205). This option is applicable to mechanical products only.

Returning Equipment for Repair

If a control (or any part of an electronic control) is to be returned for repair, please contact your Full-Service Distributor in advance to obtain Return Authorization and shipping instructions.

For instructions about sending your MicroNet Plus Cyber Secure control to Woodward for repairs, please consult your product manual. It is suggested that you change the password of the Administrator account to the default value (“Admin@1”) before sending it to Woodward. This will make it possible for Woodward to make appropriate changes to your control without removing your account configuration.

If you do not provide Administrator account credentials to Woodward for performing the work, Woodward will return the Password Manager configuration to the default configuration (see 3.1 Password Manager Configuration / Using Default Settings). It will be your responsibility to reconfigure the accounts to a secure and appropriate configuration.

When shipping the item(s), attach a tag with the following information:
Return authorization number
Name and location where the control is installed
Name and phone number of contact person
Complete Woodward part number(s) and serial number(s)
Description of the problem
Instructions describing the desired type of repair

Packing a Control

Use the following materials when returning a complete control:
Protective caps on any connectors
Antistatic protective bags on all electronic modules
Packing materials that will not damage the surface of the unit
At least 100 mm (4 inches) of tightly packed, industry-approved packing material
A packing carton with double walls
A strong tape around the outside of the carton for increased strength

NOTICE

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Replacement Parts

When ordering replacement parts for controls, include the following information:
The part number(s) (XXXX-XXXX) that is on the enclosure nameplate
The unit serial number, which is also on the nameplate

Engineering Services

Woodward offers various Engineering Services for our products. For these services, you can contact us by telephone, by email, or through the Woodward website.
Technical Support
Product Training
Field Service

Technical Support is available from your equipment system supplier, your local Full-Service Distributor, or from many of Woodward's worldwide locations, depending upon the product and application. This service can assist you with technical questions or problem solving during the normal business hours of the Woodward location you contact. Emergency assistance is also available during non-business hours by phoning Woodward and stating the urgency of your problem.

Product Training is available as standard classes at many of our worldwide locations. We also offer customized classes, which can be tailored to your needs and can be held at one of our locations or at your site. This training, conducted by experienced personnel, will assure that you will be able to maintain system reliability and availability.

Field Service engineering on-site support is available, depending on the product and location, from many of our worldwide locations or from one of our Full-Service Distributors. The field engineers are experienced both on Woodward products as well as on much of the non-Woodward equipment with which our products interface.

For information on these services, please contact us via telephone, email us, or use our website: **www.woodward.com**.

Contacting Woodward's Support Organization

For the name of your nearest Woodward Full-Service Distributor or service facility, please consult our worldwide directory at **www.woodward.com/directory**, which also contains the most current product support and contact information.

You can also contact the Woodward Customer Service Department at one of the following Woodward facilities to obtain the address and phone number of the nearest facility at which you can obtain information and service.

Products Used in Electrical Power Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany:	
Kempen	+49 (0) 21 52 14 51
Stuttgart	+49 (711) 78954-510
India	+91 (124) 4399500
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

Products Used in Engine Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany	+49 (711) 78954-510
India	+91 (124) 4399500
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
United States	+1 (970) 482-5811

Products Used in Industrial Turbomachinery Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
India	+91 (124) 4399500
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

Technical Assistance

If you need to contact technical assistance, you will need to provide the following information. Please write it down here before contacting the Engine OEM, the Packager, a Woodward Business Partner, or the Woodward factory:

General

Your Name _____

Site Location _____

Phone/Cell Number _____

email (Fax Number)

Appliance/Device Information

Manufacturer _____

S/N Serial Number _____

MAC Address (if available) _____

Firmware Version (if available) _____

Application
(power generation, marine, etc.)

Status Information

Control/Governor #1

POWER1/2 (LED) Status _____

STATE (LED) Status _____

FAULT (LED) Status

Order/Warranty Information

Woodward Part Number _____

Woodward Rev. Letter

Symptoms

Cybersecurity Related ☐ H/W or S/W Related ☐

Description _____

_____

_____

_____

If you have an electronic or programmable control, please have the adjustment setting positions or the menu settings written down and with you at the time of the call.

Glossary

Acronym/Term	Definition/Description
LAN	**Local Area Network** - The network behind the router (private/protected zone or access-controlled)
NAT	**Network Address Translation** - A routing method which modifies network address information of data packets to map one IP address space into another. IP masquerading is one application of NAT which helps to hide private networks behind a single public IP address.
Firmware	A binary computer program which provides the core security and device functionality used by higher-level software applications.
LSM	**Loadable Software Module** is licensed code which provides configurable functionality for the Tofino Xenon appliance.

Revision History

New Manual —

We appreciate your comments about the content of our publications.
Send comments to: icinfo@woodward.com
Please reference publication 35095-.

B 3 5 0 9 5 : -

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