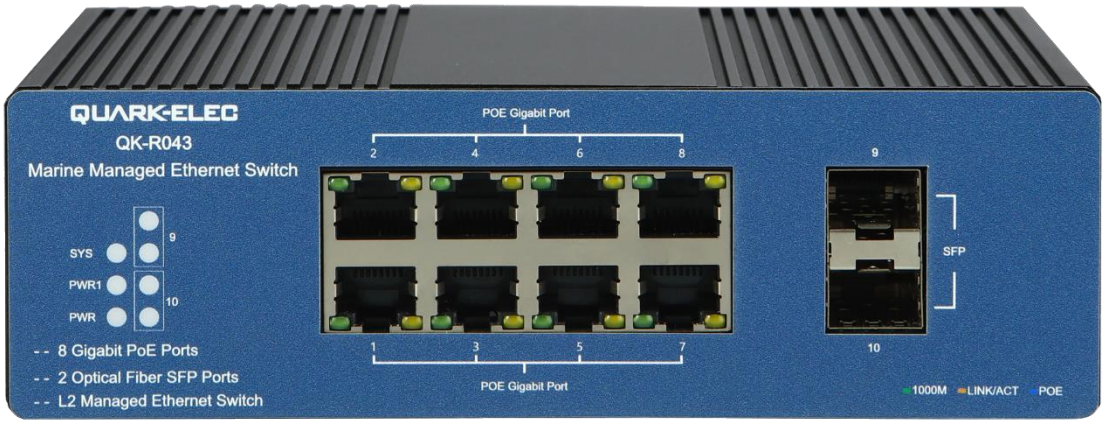
QK-R043 Manual

MANAGED MARINE ETHERNET SWITCH



Designed in UK

Features

- 8 Gigabit Power Over Ethernet (PoE) ports
- 2 SFP ports for optical fibre connection
- Support IPv4 and IPv6 traffic
- Ready to support the next generation NMEA standard, OneNet*.
- Plug & Play with most of IP cameras, IP sensors, VoIP phones
- Industrial design, metal enclosure, IP40 rating
- Wide input voltage range: DC 9-35V, redundant power with polarity reverse protects function
- Management interface via Webpage
- ESD, Surge, EFT/Burst protection

- Contents

1. Introduction

The R043 is a managed Ethernet switch, especially designed to provide reliable high-speed data connection in highly demanding industrial environments. It features a robust case with IP30 rating.

The R043 comes with eight Gigabit ethernet ports and two SPF (Small Form-factor Pluggable) optical fibre ports. The Gigabit Ethernet ports make the switch ideal for handling video, voice, and navigation data between devices on board. The Ethernet ports also support POE (Power Over Ethernet) and can provide up to a total of 196 Watts (8x22W) of power through the Ethernet cable to the connected devices that support this feature – e.g., VOIP phones, wireless access points or surveillance cameras.

The two SFP optical fibre ports offer an interconnecting option by using optical fibre. The optical fibre connection provides higher bandwidth capacity over longer distances.

The R043 also integrates advanced management and security features to provide a complete Internet-on-Board solution to the marine networking market.

The R043 is a Plug & play device with its default settings, only requires a 12VDC power supply. All this makes the system particularly easy to install.

2. Mounting

The R043 was designed with industrial level requirements in mind and is aimed at the commercial, leisure, fishing boat and vessel monitoring markets.

It is not waterproof, so it needs to be mounted in a dry place such as behind the instrument panel on a flat surface or a rack.

The default settings of the R043 have been chosen for optimum performance. We do not recommend users to make any changes to them, except for changing the default gateway, admin name and password. For most cases, it can be used as plug and play.

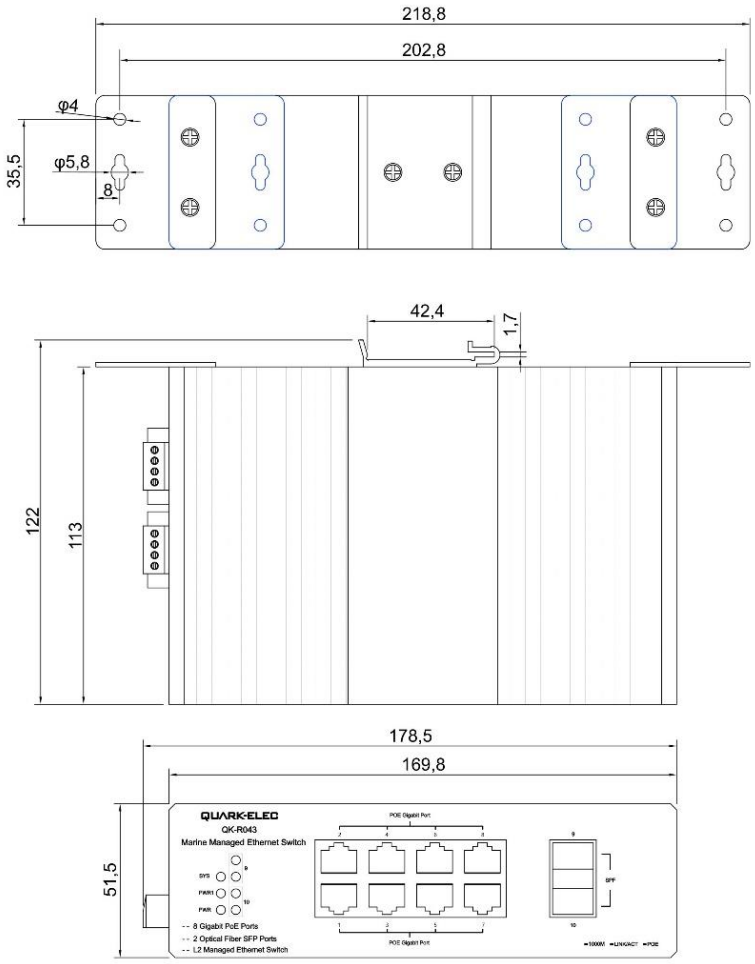


Figure 1: R041 Dimension in mm

3. Connections

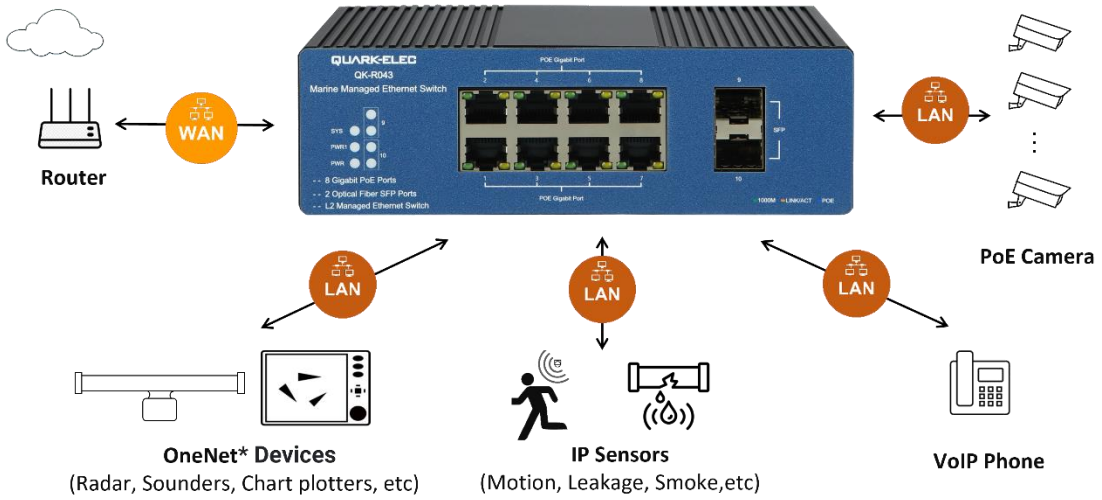


Figure 2 R043 connections

The R043 marine managed Ethernet switch has the following options for inputs, outputs.

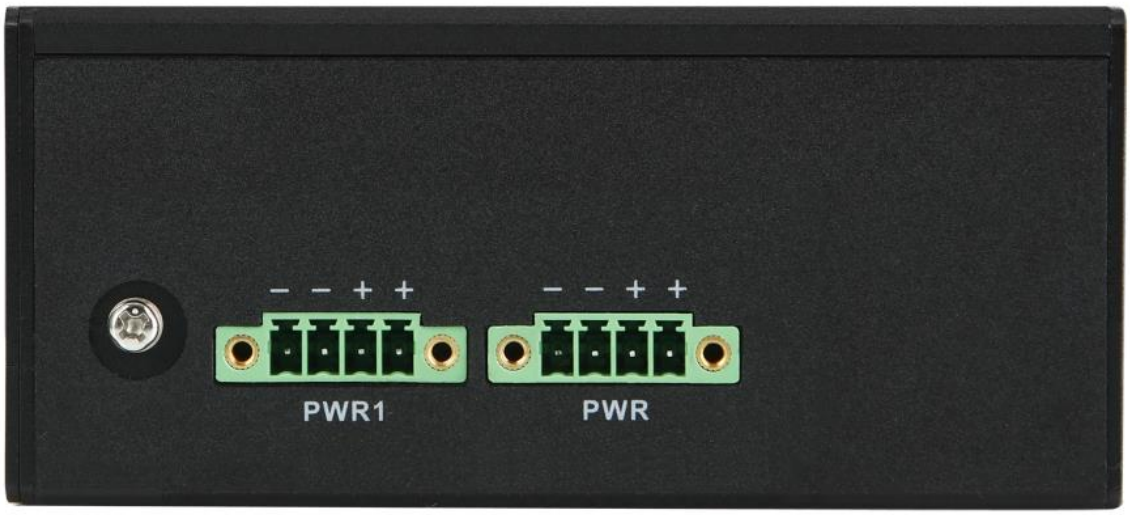
- Power supply terminals
- 8x Gigabit POE RJ45 ports
- 2x Optical fibre SFP ports

3.1. Power supply

The R043 needs to be powered from a stable 12V to 35V DC power supply. Power(+) and GND(-) terminals are clearly marked on the side of the terminal block. The R043 has been designed so that it can be connected to two independent power supplies, PWR and PWR1, if required, to minimize the chance of failure.

The R043 is equipped with reverse polarity protection to protect the device in case of improper installation.

Next to PWR1, there is a grounding screw. It's always recommended to connect a ground cable to this and link the other end of the cable to the ground on the boat.



3.2. Gigabit ethernet ports – support PoE

Power over Ethernet (PoE) support means that the operating power is applied from a power source over the LAN infrastructure, to power devices, which are connected to ports.

The R043 switch provides eight PoE ports which can be used to easily build a powered and centrally controlled camera system, IP monitor system, or Internet-on-board system on vessels. Cameras or IP sensors (e.g., temperature, humidity, leak, motion sensors can be easily installed for surveillance or monitoring purposes. Without a power socket limitation, the R043 switch makes the installation of surveillance and sensing equipment easier and more efficient.

All these RJ-45 type PoE ports are auto-negotiating. The ports can detect and adjust to the optimum Ethernet speed (10/100/1000 Mbps) and duplex mode (full duplex or half duplex) of the connected device.

3.3. Optical fibre SFP ports

The R043 features two optical fibre SFP slots, providing a high-speed and reliable connection option between devices through fibre optic cables. They are a great option for networking due to no electromagnetic interference, which can cause data transmission errors and affect network performance.

4. Status LEDs

The R043 features indicator LEDs which show power, system, Ethernet status. It helps monitor and troubleshoot when needed.

LED	Function	
PWR	**On**	Main Power is active
	Off	Main Power is inactive
PWR1	**On**	Backup Power is active
	Off	Backup Power is inactive
SYS	**ON**	Works properly
	Blinks	Starting up or possible system failure
Gigabit port (1-8)	**Green Light**	Indicates the port is successfully connected to the network at 1000Mbps
	Orange Light	Indicates that the switch is actively sending or receiving data over the port
	Off	Indicates that no device is connected to the port
	Blue Light	PoE device connected
SFP port (9-10)	**Top Light**	Indicates the port is successfully connected via optical fibre
	Bottom Light	Indicates link/active

5. Configuration

The R043 can be configured using its web-based Graphical User Interface (GUI). To access the GUI, a computer should be connected to the R043 through a network cable to one of the Ethernet ports (1 to 8). The computer must be assigned an IP address that's on the same subnet as the managed switch with an identical subnet mask.

The switch's default IP address is: **192.168.0.1** and the default subnet mask is: **255.255.255.0**
For example: If the switch keeps the default IP address which is 192.168.0.1, then
the other device's IP address that is used to access the GUI has to be set to 192.168.0.x (where x is a number between 1 and 254, except 100). As the switch supports DHCP it's likely that your computer will automatically be assigned an IP address in the same range, unless your device has a manually assigned IP address.

For laptops and tablets that don't have an Ethernet port (e.g., no RJ45 port), please connect the switch to your wireless router first by using a network cable and then the switch's GUI can be accessed on these devices through the wireless router's WiFi network.

After the IP address and Subnet mask has been set up, please launch a web browser on your device and enter 192.168.0.1 into the navigation bar and press Enter. On the login page, enter **admin** for username and **admin** for password and click **Login** to access the main configuration page.

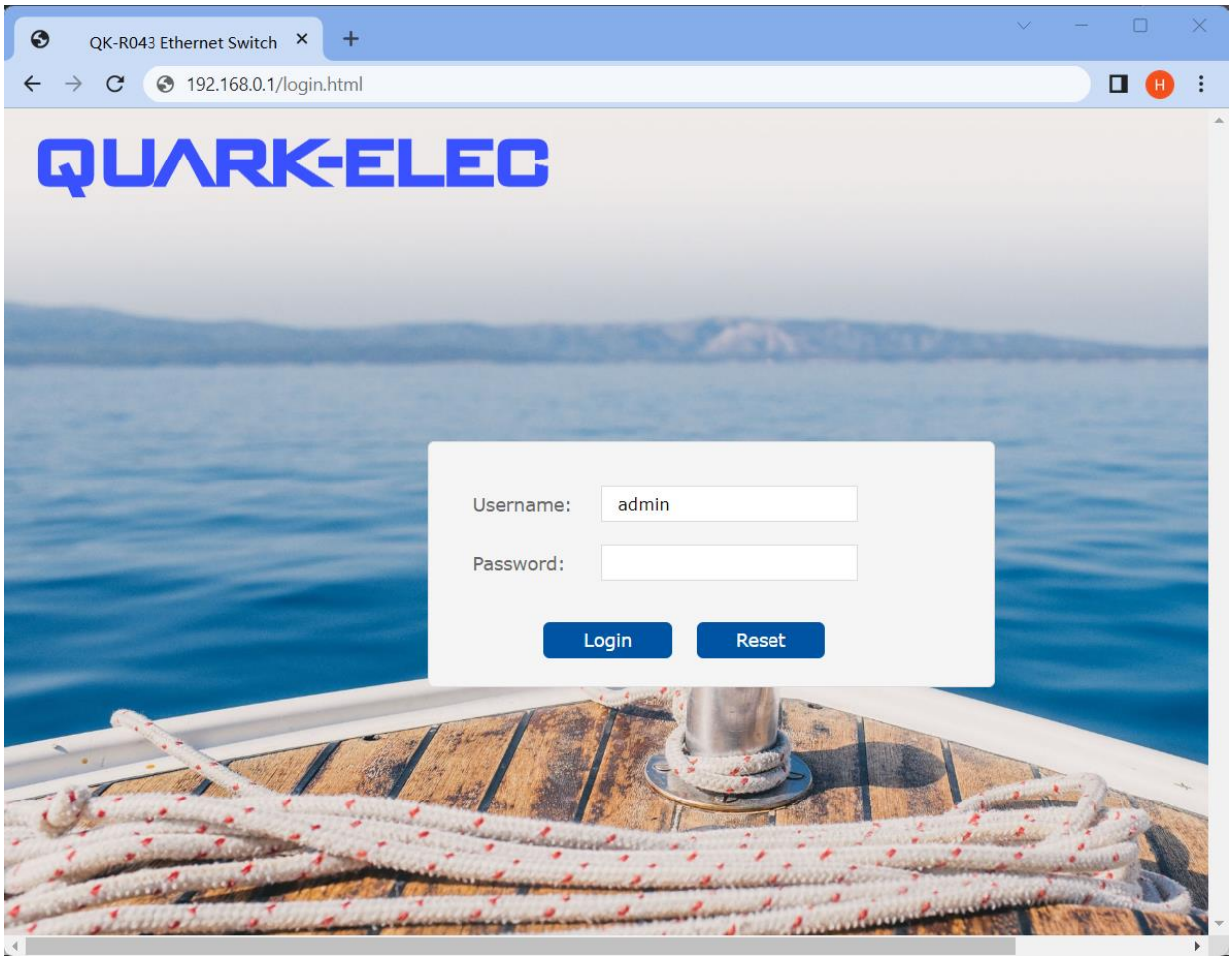
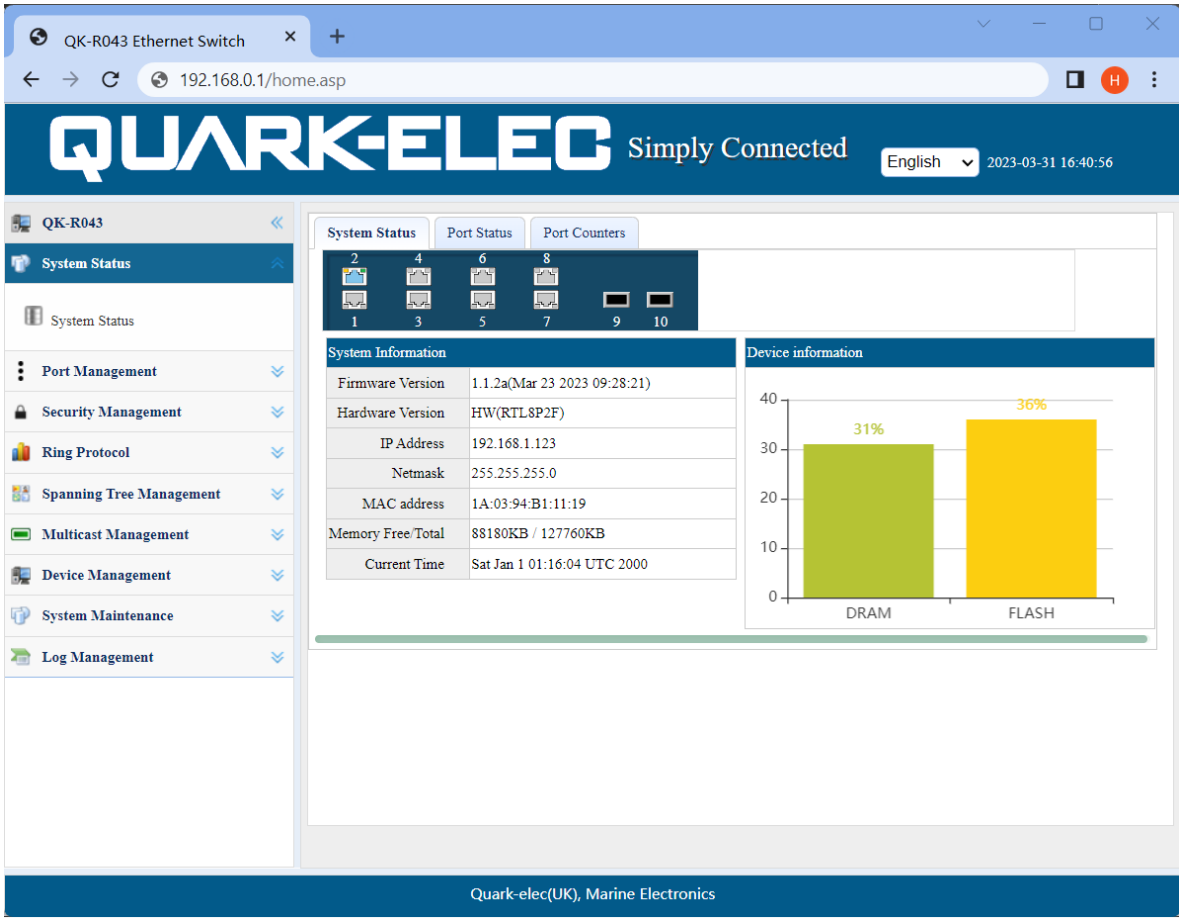


Figure 3: R043 login interface

The R043's default settings have been carefully selected to work well in most situations/installations, commonly found on pleasure boats. Most PoE cameras, VoIP phones or wireless routers can be plugged in directly and should work straightforward. We strongly suggest you not to change any settings except those specifically mentioned in this manual.

The below image shows the main status page of the router. On the left side of the page, it's the main menu bar, which will take you to various status, configuration, tools, and service menus.

The hardware of R043 and the latest firmware of it were designed to be able to support the next generation NMEA standard, OneNet*.



For most of marine applications, the only setting that users should check and set if needed is the default gateway, which can be accessed via Device Management → System Configuration.

The primary function of a typical network switch is to connect devices together within a local area network (LAN), allowing them to communicate with each other. It doesn't have the router function. In another words, the switch only provides the function to communication between devices within the same local area network. However, with a managed function, like the R043 features, the switch can be used to connect to different LANs and route traffic between them.

The default gateway IP address in the managed network switch is typically set to the IP address of the next-hop device that can forward data to the other LANs or remote networks, such as an 4G router or a remote server. The default gateway is a critical network parameter that is used by R043.

The default gateway IP address can be checked and modified via Device Management → System Configuration.

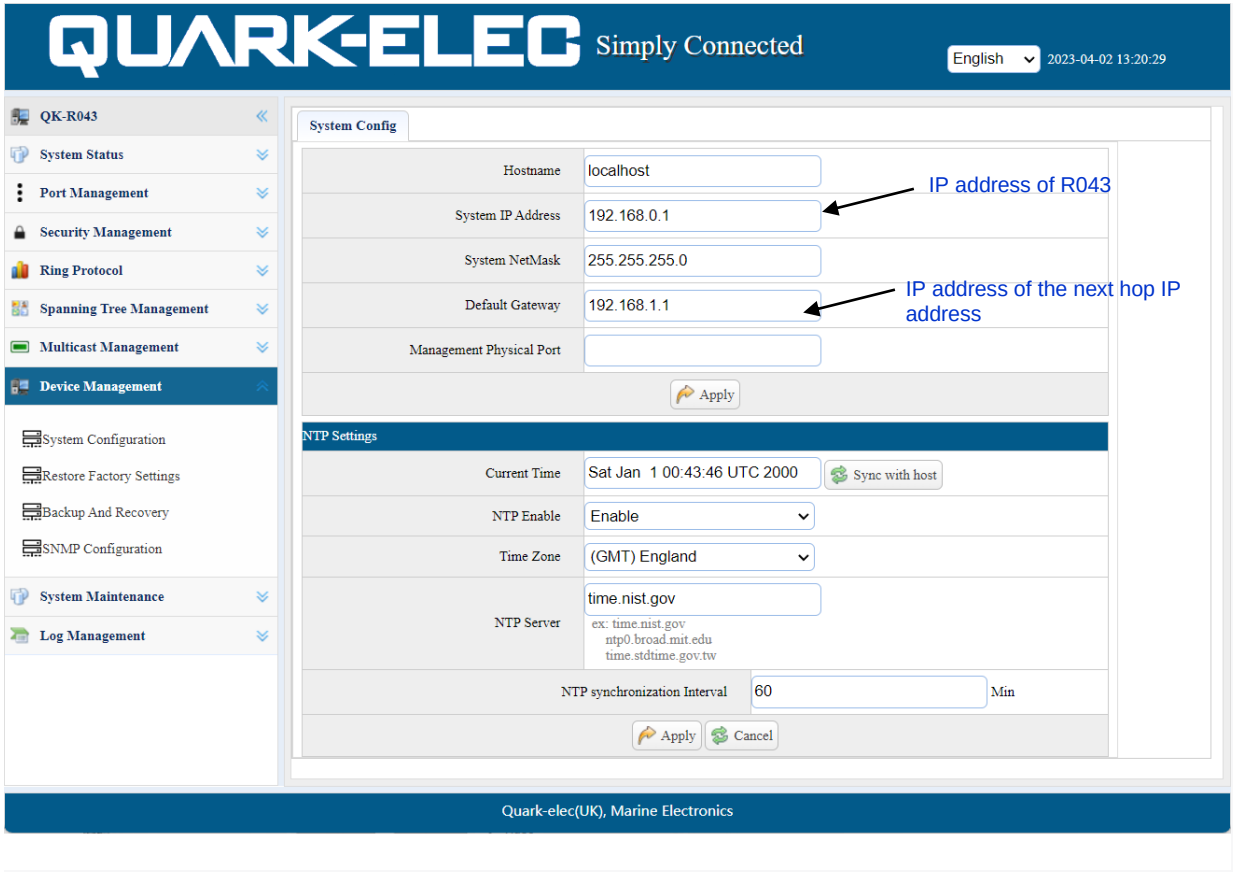


Figure 4 R043 gateway setting

6. Upgrading software

Before updating the router's firmware, please disconnect all devices connected to the R043.

The current software version is displayed on the main status page. To update the firmware please go to System Maintenance -> Software Upgrade.
Before starting the upgrading process, please download the latest firmware from the Quark-elec website and save it to your computer.
1, Unzip the downloaded file to your computer.
2, Click 'Choose file' and select the saved .img file.
3, Click 'Start upgrading'.
4, Wait until the 'Reboot Done!' status message is displayed and re-power your device.

Firmware update is completed, you can start using your device now.

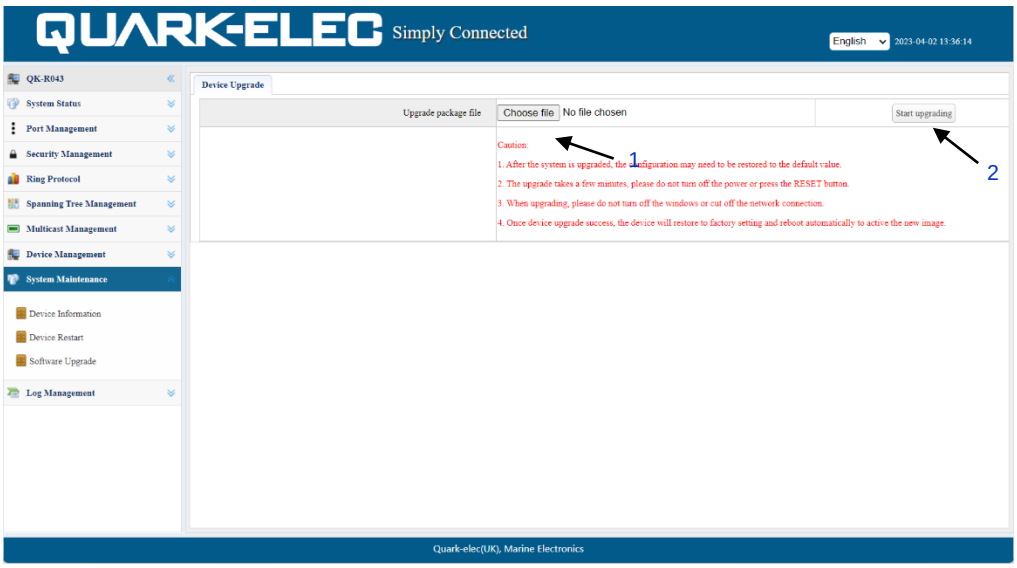


Figure 5 R043 firmware upgrading

7. Specification

Item	Specification
DC supply	9V-35V
Average supply current	575mA @ 12V(without PoE devices)
Maximum supply current	3.2A @ 12V
Security	WPA/WPA2
Supported network protocols	IEEE 802.3, IEEE 802.3u, IEEE 802.3ab, IEEE 802.3x, IEEE 802.3z, IEEE 802.1q, IEEE 802.1p. Support PPP, PPPoE, DHCP client.
RJ45 Ethernet port speed	100Mbps/1000Mbps auto-negotiating.
RJ45 Ethernet port PoE power rate	Up to 22Watts
SFP Ports speed	1000Mbps(1G)
Supported wavelength	850nm, 1310nm, 1550nm
Operating temperature	-20°C to +55°C
Storage temperature	-30°C to +75°C
Operating humidity	10%～90%RH（non-condensing）
EMC	EN55022 EN55032 Pulsed Electric Field 6KV
Recommended humidity	0 - 93% RH
Grounding protection	Screw

Waterproof level	IP40

8. Limited Warranty and Notices

Quark-elec warrants this product to be free from defects in materials and manufacture for one year from the date of purchase. Quark-elec will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labour. The customer is, however, responsible for any transportation costs incurred in returning the unit to Quark-elec. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alteration or repairs. A returns number must be given before any unit is sent back for repair.
The above does not affect the statutory rights of the consumer.

Disclaimer

This product is designed to aid navigation and should be used to augment normal navigational procedures and practices. It is the user's responsibility to use this product prudently. Neither Quark-, nor their distributors or dealers accept responsibility or liability either to the products user or their estate for any accident, loss, injury or damage whatsoever arising out of the use or of liability to use this product.

Quark- products may be upgraded from time to time and future versions may therefore not correspond exactly with this manual. The manufacturer of this product disclaims any liability for consequences arising from omissions or inaccuracies in this manual and any other documentation provided with this product.

Document history

Issue	Date	Changes / Comments
1.0	01-04-2023	Initial release

9. Glossary

- **IP:** internet protocol (ipv4, ipv6)- explains which version
- **IP Address:** is a numerical label assigned to each device connected to a computer network.
- **OneNet**: is a standard for IP Networking of Marine Electronic Devices, which is an open industry standard based on Internet Protocol, Version 6 (IPv6) and the IEEE 802.3 Ethernet Local Area Network. OneNet provides a common network infrastructure for marine devices and/or services on IPv6.
- **PoE:** Power over Ethernet is a technology that lets network cables carry electrical power.
- **SFP:** Small form-factor pluggable

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