Software User Manual

ROQSTAR
Managed Gigabit Ethernet Switches

Rev. 2023-09-14

Introduction

Thank you for working with ROQSTAR Ethernet Switches.

This manual is intended to give you details on how to use ROQSTAR Managed Switches and their capabilities. It shall help you when working with ROQSTAR for the first time, when designing the network architecture as well as using software features.

Furthermore, it shall serve you when troubleshooting issues and answer common questions.
If you have any questions about the product or the documentation, please feel free to visit our website www.tronteq.com and contact us via support@tronteq.com.

Please refer to further product documentation such as the Release Notes with dedicated information about software versions, and the Installation Guide that describes technical data of ROQSTAR Ethernet Switches.

Table of Content

1. Parts Related to this Manual

Part number	Description
006-130-117	ROQSTAR Managed 2GE+8FE Gigabit Ethernet Switch M12
006-130-118	ROQSTAR Managed 2GE+8FE Gigabit Ethernet Switch M12 PoE
006-130-124	ROQSTAR Managed 4GE+12FE Gigabit Ethernet Switch M12
006-130-125	ROQSTAR Managed 4GE+12FE Gigabit Ethernet Switch M12 PoE
006-130-126	ROQSTAR Managed 4GE+12FE Gigabit Ethernet Switch M12
006-130-127	ROQSTAR Managed 4GE+12FE Gigabit Ethernet Switch M12 PoE
006-130-132	ROQSTAR Managed 10 Port Gigabit Ethernet Switch M12
006-130-133	ROQSTAR Managed 10 Port Gigabit Ethernet Switch M12 PoE

2. Software Related to this Manual

This manual describes features of software version **2.6.0** and higher.

3. Getting Started

To get the best experience with this documentation and to speed up the learning process, we recommend following the described steps and settings live on a ROQSTAR device.

- ► LED provide basic information about device. They display information about operational mode, configuration state, network connection, network and PoE.
- ► The USB Interface is used to apply or reset device settings. It is an easy way to change/update settings without additional tools.
- ► The Web Interface supports all settings and monitoring options. It is used to create configuration files, manage settings and maintain software.
- ► ROQSTAR devices support an API (Application Programming Interface) for applications where automated deployment or monitoring is needed.
- ► An Auto-Deployment feature makes the distribution and application of configuration files onto ROQSTAR devices easy and fast.
- ► There are several options, such as SNMP, event logging, ITxPT xstatus, to monitor and diagnose ROQSTAR device and network operation.

3.1. LED

Name	Color	Behavior	Description
PWR	-	off	power supply not connected or voltage level too low
	green	on	V1, V2 are both powered
	green	flashing	either V1 or V2 is powered
MOD	-	off	device is booting
	green	on	device is in operation
	green	flashing	USB action in process
ERR	-	off	normal operation
	red	flashing	error during last USB action or error during last boot-up
	red	on	internal system error
CFG	-	off	factory settings applied
	green	flashing	user settings applied but not saved
	green	on	user settings applied and saved
L/A	-	off	link down
	green	on	link up
	green	flashing	data traffic
Speed	-	off	link speed 10 Mbit/s or 100 Mbit/s
	orange	on	link speed 1000 Mbit/s
PoE	-	off	PoE port not powered
	orange	on	PoE port powered
	orange	flashing	PoE port blocked
	orange	flashing all ports	V1 not supplied or internal PoE error

3.2. USB Interface

The USB interface supports all common USB 2.0 flash drive.

3.3. USB Flash Drive

The USB flash drive must have a single FAT32 partition. To perform a USB action a command file needs to be put on the USB flash drive. The command file should be in the root directory. The command file is a text file with UTF-8 encoding and can be created or edited with any common text editor. The name of the command file must be `command.txt`. Valid commands are listed below.

3.4. USB Command and Actions

Command: `reset to default config`

All settings are reset to the default settings and saved permanently in the ROQSTAR device.

Command: `get running config`

Download the currently active configuration from the ROQSTAR device to the USB flash drive. The file will be saved in a subdirectory named after the serialnumber. The file name is the configuration name shown in the web interface, with file extension '.cfg'.

Command: `apply config file`

Upload, apply and save a configuration file from USB flash drive onto ROQSTAR device. This command requires a valid configuration file on the USB flash drive. The file extension must be ".cfg". The file name can be user defined. The file name and its relative path must be appended to the command text, e.g.:

`apply config file directory_name/myconfig.cfg`
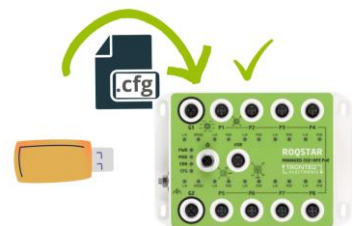
Command: `usb sync`

This command synchronizes the ROQSTAR device configuration file with the configuration file stored on USB flash drive.

The intention is to keep the USB flash drive plugged into the ROQSTAR device during operation. All persistently saved
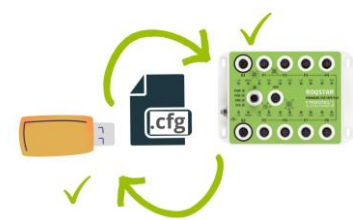
configuration changes are also stored on the attached USB flash drive in a file with the configuration's name, file extension ".cfg".

With this feature the current configuration file is always stored on the USB flash drive. In case of replacing a ROQSTAR device the configuration file will be automatically loaded from the USB flash drive onto the new ROQSTAR device.

Command: `file upload`

This command copies files from the USB flash drive to the ROQSTAR device. The files to copy must be in a directory named "`files`".

This feature provides an option for local upload of configuration files for multiple devices through one USB action.
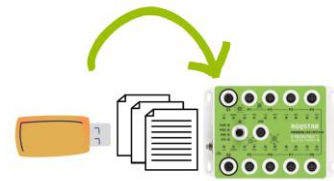
Command: `install update`

This command installs a software image from USB flash drive. The image must be either in the root file directory of the USB flash drive and named "`update.raucb`"; alternatively a file path relative to the USB root and a file name can be appended to the command:

`install update directory_name/newversion.bin`

After the installation the ROQSTAR device will reboot and load the new software automatically.

Please note that updates should be installes twice to ensure that the same version is installed on both partitions

3.5. Feedback on USB Actions

The execution of a USB action generates log entries.

While USB actions are executing the MOD LED is blinking. On successful completion the MOD LED goes back to permanently "on". If the command was not recognized or there was an error during execution, the red ERR LED lights up until the USB flash drive is removed. An error message will be generated in the event log.

3.6. Web Interface

We recommend to use the latest version of Firefox, Chrome or Edge web browsers. To access the web interface please proceed as follows:

► Connect ROQSTAR device to your PC through an Ethernet Port

► Configure the IP settings on your PC accordingly to ROQSTAR device IP settings. Factory default IP settings of ROQSTAR device are:

IP address `192.168.1.1`

subnet mask `255.255.255.0`

► Use a web browser on the computer to access the ROQSTAR device's web interface. Both http and https can be used. https will trigger a warning about the self-signed certificate that needs to be accepted.

► Login to the web interface with the user credentials. The default settings for login are:

user name: `admin`

password: `password`

After logging in you will see the dashboard, which provides an overview. On the left there is a menu bar containing the features of the ROQSTAR device. To get updated information, reload the page in the web browser.

3.7. Power up Sequence

ROQSTAR device starts the boot sequence immediately after the power supply is applied. During booting process device will load last saved configuration. Until device is ready to operate all Ethernet ports are disabled. This ensures that there is no unintended communication.

MOD LED indicates when boot process is finished and device is in operation. Apart from the number of ports the boot duration depends on the configuration of features and services like VLAN, DHCP and RSTP. Typically, the boot up process takes less than 20 seconds.

3.8. Settings and Configuration

A ROQSTAR Managed Ethernet Switch is a device that allows users to customize its behavior and the setup of the network. The user is able to control, to define and to modify certain parameters of the network settings. To do so, the user needs to adjust the settings for the desired feature in the ROQSTAR device. The entire process of this setup as well as the setup itself is called configuration.

All settings are stored in a **Configuration File**. After modification of settings user needs to save it explicitly. In this case all setting will be saved persistent in a configuration file. The configuration can be downloaded and applied to other ROQSTAR devices of same type.

3.9. Types of Configurations

There are different types of a ROQSTAR device configurations need to be considered:

► **Factory Default Configuration**: This is the initial setup of the device after the production process on factory side. This configuration consists of hard-coded (default) values for all settings and cannot be modified by the user. The user is able to return to this setup by performing a factory reset. The initial setup can be customized on factory side. Factory Default Configuration is identified by unique CFG number. CFG is printed on the device type label. **Appendix A** lists current CFG No.

► **Applied configuration**: The configuration running on the ROQSTAR device. The 'applied configuration' is affected immediately when the user changes settings via the web interface and presses the corresponding 'set' button. This configuration can be downloaded from the ROQSTAR device.

► **Saved configuration**: The configuration that was last saved to the ROQSTAR device by user, thereby making it persistent and available device reboots. During boot up the ROQSTAR device will load this configuration.

3.10. Managing the Configuration

We strongly recommend to handle ROQSTAR device settings by applying configuration files instead of manually changing settings in the web interface. A configuration file always contains the complete set of all settings for all features. This will ease the handling and prevent failures.

The strategy is to create all necessary configuration files up front using the web interface, then download them from the ROQSTAR device and store them. These configuration files can then be uploaded to the desired ROQSTAR devices via their web interface, USB port or API when needed.

When transferring a configuration file from one ROQSTAR device to another, be sure both devices running same software version.

3.11. Configurations File

A configuration file contains all settings of the ROQSTAR device, including credentials for web interface login and SNMPv3 users. The passwords are hashed.

The configuration files created on and downloaded from one ROQSTAR device can be applied to another ROQSTAR device of the same model. The configuration file contains the type information of the ROQSTAR device model they were created on. Furthermore, they contain the name of the configuration file itself.

The content of a configuration file is compressed and encoded and includes a checksum. To decode/encode the files please contact our support team.

In general, configuration files created with a previous software version can be applied to a ROQSTAR device with a newer software. Settings that are missing in new configuration files due to different software versions are automatically supplemented with the default values during application.

3.12. Creating a new Configuration File

To create a new configuration file, adjust the desired settings in the ROQSTAR device's web interface. Save the settings persistently and define the name for the configuration. Then download it to your computer.

The 'save' button appears in the upper right corner as soon as any setting has been changed. When saving the configuration, you will be asked to enter a name for this configuration. This name makes it easier to identify and manage the configuration file.

If access to the web interface is lost while working on the settings, power cycling the device. This will restore the previously saved state.

3.13. Deployment Strategies

Deployment refers to a process for the distribution and installation of configuration files or software image updates. ROQSTAR Ethernet Switches support the following deployment options:

► Use the **web interface** to upload and apply a configuration file. This is typically used for testing purposes and while designing the network. However, the IP address settings of the ROQSTAR device need to be considered. Using several ROQSTAR devices with factory default settings within the same network will likely cause an IP address conflict.

► Use a **USB flash drive** to apply an existing configuration file to a single ROQSTAR device. This is the easiest way to change the devices settings, especially if there is no network access to it. We call this type of distribution `Offline Deployment`.

► Use the **Auto-Deployment feature**. This function will distribute configuration files from a single USB source to all ROQSTAR devices connected within a network. This is especially helpful when setting up initial operation on a vehicle with more than one ROQSTAR device.

► Use mobile app "**ROQSTAR Stage Manager**". This application is delivered on a tablet and uses USB interface to accesses ROQSTAR device through the USB interface. It supports and guides users through deployment process.

► Use the built-in **API** to automate distribution of configuration files. This is the most efficient way to update existing settings of multiple ROQSTAR devices, if they are already accessible through the network. We call this type of distribution `Online Deployment.`

► Order **pre-configured** ROQSTAR devices with customized configuration. The customer's configuration file can be loaded on factory side.

3.14. Auto-Deployment

This feature provides automated distribution and installation of configuration files for all "unconfigured" ROQSTAR devices connected within a network. User can trigger this function by USB command. The ROQSTAR devices will distribute and apply dedicated configurations by themselves in a daisy chain manner.

To utilize the feature, ROQSTAR devices should enabled following functions. This will be usually done on factory site by installing dedicated default configuration with following setting.

- ► DHCP Client enabled, provision and filter options enabled
- ► VLAN for Auto Configuration Deployment

The USB flash drive should contain

- ► Configuration files for all devices
- ► A `command.txt` file commands: `files upload`, `apply config file`

The user has to perform the following actions

- ► Install all ROQSTAR devices and interconnect them to a network
- ► Power up all ROQSTAR devices
- ► Connect a prepared USB flash drive to one pre-determined ROQSTAR device
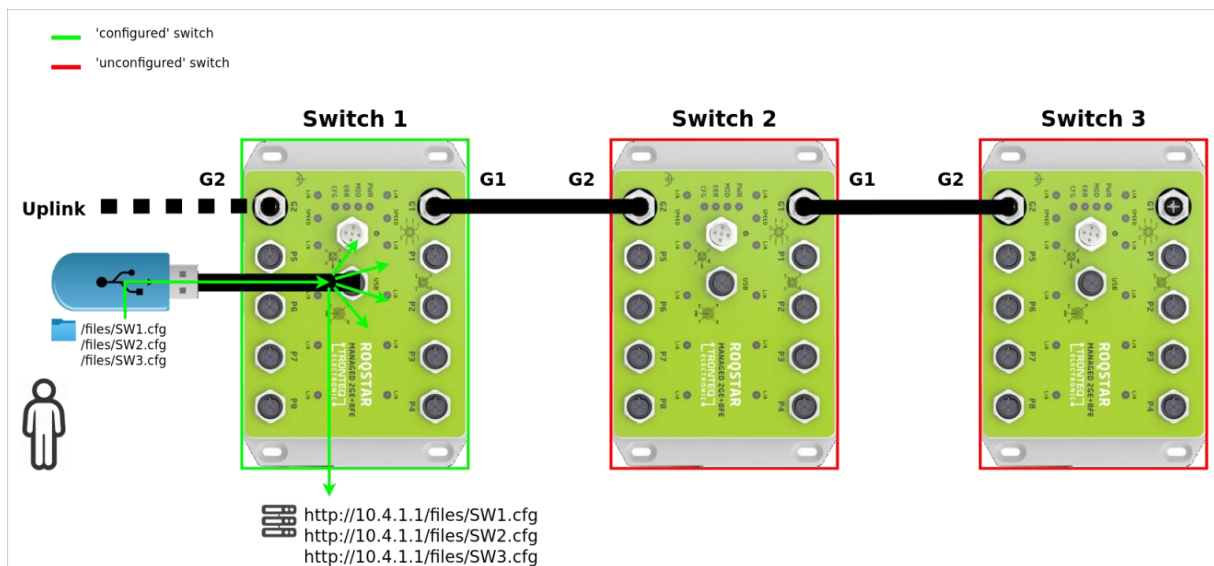
The ROQSTAR Ethernet Switches will perform following actions

- ► First device will load and apply its configuration file
- ► After that, it will serve the configuration files to next device connected to it
- ► All configuration files will be uploaded in local storage of all connected devices
- ► Once uploaded, the configuration files can also be seen in web interface

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3.15. Software Update

The software running on the ROQSTAR Ethernet Switch supports updates. To check the differences between the software versions, please refer to the "release notes" documents.

The ROQSTAR devices support two equivalent software partitions. During an update the software image is always installed on the alternate partition. After reboot the software will be loaded from the partition that was updated last. The ROQSTAR devices must be rebooted to complete the update.

The installation of a new software image can be performed through:

- ► web interface
- ► USB flash drive
- ► ROQSTAR Stage Manager App
- ► API

The ROQSTAR device validates the software image and proceeds with the installation, if the software image supports given device model.

During the update process corresponding log entries are generated. The current software version is displayed in the web interface.

When updating via USB interface the reboot will be triggered automatically.

When performing the update through the web interface the reboot must be triggered manually by using the reboot button in the web interface.

Software Update

Setting	Status	
Booted Partition	Partition 1	
Software Version of Booted Partition	2.6.0-A01-466b368b-debug	
Software Version of Alternate Partition	2.6.0-A01-466b368b-debug	Boot Alternative Partition
Update File	Durchsuchen... Keine Datei ausgewählt.	
Update Status	inactive	
Progress		

Start Install   Reboot Device

Start Install	Start installing uploaded OS image
Reboot Device	Reboot the device. This will load new OS after reboot
Boot Alternative Partition	This will change the boot order to the other partition after reboot

3.16. Device Settings after a Software Update

When performing a software update, saved settings of the ROQSTAR device will be copied to a new configuration file. If the new software version supports additional settings that are unknown in the previous software version, they will be set to default values automatically.

We strongly recommend checking all settings after the software update.

3.17. Fail-Save boot

The system always starts from one of two partitions until a software update will be performed or the boot sequence will fail from this partition for 3 times in a row. In case of a failure during boot the process will automatically switch to the alternate partition and load the software image stored there.

It is important to ensure that both partitions contain the same software version. This avoids unintended loading of older software version.

Booting from the alternate partition can also be triggered if power loss occurs during the boot process repeatedly. To avoid unintended booting of older images, we recommend to perform a software update twice in a row.

4. System Settings

4.1. System Information

The system information contains device specific identification and general parameters such as device's Name, Serial Number, Software Version, Management MAC. Description, Contact and Location settings can be modified by user. The system information will be used by several features to provide the identification of the device:

► Name is advertised by LLDP

► Name, Contact and Location are advertised via SNMP

► Management MAC Address is being used for the device's IP communication

System	Status
Name	roqstar-fcf8b7080000
Serial Number	524F531A04000000
Software Version	2.0.1
Management MAC	FC:F8:B7:08:00:00
Description	description
Contact	contact
Location	location

Username	New user's name.
New Password	New user's password.
New Password (Repeat)	New user's password entered a second time.

4.2. System Access

This function provides control over the access to the Management Interface of the ROQSTAR device. New administrative users may be added/deleted or existing credentials may be changed here. A user may be deleted only when it is not used for the current Management session.

Note: More than one user may be logged in at same time but it should be avoided that multiple users are actively changing the configuration settings simultaneously.

Add User

Setting	Status
Username	
New Password	
New Password (Repeat)	

Add User

Username	New user's name.
New Password	New user's password.
New Password (Repeat)	New user's password entered a second time.
Add User	This operation will activate this user. After this operation the new user may be used for Management Login.

Edit User

Setting	Status
Username	admin ⌄
New Password	
New Password (Repeat)	

Change Password   Remove User

Username	The user's name to be edited.
New Password	The new password for the selected user.
New Password (Repeat)	The new password for the selected user entered a second time.
Change Password	This operation will change the selected user's password.
Remove User	This operation will delete the selected user.
	Note: The selected user cannot be deleted if it is being used for the current Management session.

Note: The user passwords are saved in an encrypted form in the configuration file.

4.3. Management IP Interfaces

This feature allows the configuration of management IP Interfaces. In a non-VLAN configuration only one IP Interface is available for configuration while in a VLAN enabled setup one IP Interface per VLAN will be available for configuration. IP Interface is defined by Name, IP Address, Netmask, Gateway (optional).

IP interfaces are necessary for ROQSTAR device to provide IP-based services/features like:

- ► Web interface / API access
- ► DHCP Server
- ► DNS Client
- ► NAT
- ► SNMP
- ► Remote Logging
- ► NTP Client
- ► DNS-SD

The IP Interfaces may be configured using a static IP Address or a DHCP Client may be activated to obtain dynamic IP Address configuration. When enabling the DHCP Client function, the ROQSTAR device will retain the current configured static IP Address until the DHCP Clients obtains a new IP Address.

Configuration changes to the VLAN function will directly impact the state of the IP Interfaces configuration:

- ► VLANs without any Port Member will have no IP Interface available for configuration
- ► toggling the 'VLANs enabled' function will reset and delete existing IP Interfaces
- ► deleting a VLAN will delete the corresponding IP Interface configuration
- ► existing non-VLAN IP Interface is automatically migrated to a "Management" VLAN with VID 1 if VLAN is set to enabled

Notes:

- ► Creating and maintaining a stable IP Interfaces configuration is made possible by creating a stable VLAN configuration up front.
- ► Extending the VLAN configuration will have no impact on the existing IP Interfaces configuration.

Interface	Settings			NAT		DHCP Client		
	IP Address	Netmask	Gateway	IP Forwarding	Proxy ARP	Operation	Provision	Filter
ipvlan1	192.168.1.1	255.255.255.0		☐	☐	☐	☐	☐

Interface   IP Interface name may be used to differentiate between VLAN and non-VLAN interfaces:

"iplan" IP Interface name is used for a non-VLAN configuration.

"ipvlanN" IP Interface names are used for VLAN configurations where N is the VLAN ID.

IP Address   The static IP Address to be configured for this IP Interface.

Netmask	The static IP Netmask to be configured for this IP Interface.
Gateway	The IP Address of an IP Router used to manage IP communication between different local IP subnets.
	Note: Only one Gateway is supported.
IP Forwarding	This setting will allow IP packets to be routed between different VLANs if they match a NAT (Network Address Translation) rule. This setting is necessary for applying NAT rules to IP packets entering or exiting this IP Interface.
Proxy ARP	This setting will allow ROQSTAR device to answer ARP requests for the 1:1 NAT External IP Addresses. This setting is necessary to assure successful connectivity to an external IP address while using 1:1 NAT.
DHCP Client Operation	IP Interface will dynamically configure itself using a DHCP Client.
DHCP Client Provision	This setting enables the DHCP Client to request and to process the Auto-Deployment content.
DHCP Client Filter	This setting will redirect all incoming DHCP Client Request/Discover packets to be handled by the ROQSTAR device. They will not be broadcasted.
	This setting is effective only when the DHCP Client Operation and Provision settings are enabled.
Status	The current IP Address of ROQSTAR device.

4.4. DNS Client

DNS Client allows the usage of domain host names instead of IP Addresses for settings like NTP Server IP, SNMP Trap Receiver or Remote Logging Destination. DNS Client settings can be configured to use Domain Name to IP Address resolution provided by a DNS Server.

Name	Setting
Enabled	☐
DNS Server Primary	0.0.0.0
DNS Server Secondary	0.0.0.0
Domain Search Name	
Timeout	3 ⌄ seconds
Retries	2 ⌄
DNS over TCP	☐

Enabled	This setting will activate or deactivate DNS function in ROQSTAR device.
DNS Server Primary	This setting is the IPv4 Address of a DNS Server towards which DNS Queries are sent. This DNS Server is the first one which is queried and as such it should always be reachable and not very far from the DNS Client in order to provide fast answers to the DNS Queries directed to it.
DNS Server Secondary	This setting is the IPv4 Address of a DNS Server towards which DNS Queries are sent. However, this DNS Server is used as a fallback server which receives only the DNS Queries which were not responded by the primary DNS Server.
Domain Search Name	This setting stores the name of a domain which may be used as a suffix when resolving incomplete DNS host names. A typical DNS host name is in the "hostname.domain" format. When referring to "hostname" alone the DNS Client can automatically construct "hostname.domain" DNS Queries by appending the value stored in this setting to the "hostname".
Timeout	This setting dictates the amount of time in seconds to wait for a response to a DNS Query. A time value between 1 and 30 seconds may be configured here.
Retries	This setting dictates the amount of times an unanswered DNS Query should be retransmitted. Between 1 and 5 retries may be configured here.
DNS over TCP	This setting tells the DNS Client to send DNS Queries encapsulated in the TCP protocol. By default, the UDP protocol is used to transport the DNS Queries to DNS Servers.

4.5. Local File Storage

This feature provides local file storage for files to be distributed via Auto-Deployment function. The upload of files can be done via web interface or with a defined USB command. ROQSTAR device's web server provides the access to the files through an URL for other devices in the network.

Files Settings

Name	Setting
Remaining free space	221 MB
Access files via URL	☐

Set Files

Files Upload

Browse... No files selected.		Upload File

Remaining free space	Free space available for uploading new configuration files in the local persistent storage.
Access files via URL	This setting makes all stored configuration files available for access via the Web Server. This should be used with care as the access is available without authentication.
Upload File	New configuration files can be uploaded using this upload form. Up to 16 configuration files can be stored in the local storage.

All files currently present in the storage are listed in a table:

Files List

Name	Size	URL	Operation		
files.tar	34 KB	http://192.168.1.1/files/files.tar	Apply	Download	Delete
SW1.cfg	25 KB	http://192.168.1.1/files/SW1.cfg	Apply	Download	Delete
SW2.cfg	2 KB	http://192.168.1.1/files/SW2.cfg	Apply	Download	Delete
SW3.cfg	2 KB	http://192.168.1.1/files/SW3.cfg	Apply	Download	Delete

Clear All Files

Name	File name
Size	File size
URL	URL for accessing given file
Operation	**Apply**: activate the selected configuration file for the local ROQSTAR device. The configuration file needs to be compatible with the current ROQSTAR device in order for this operation to be successful.
	Download: retrieve the selected configuration file.
	Delete: permanently remove the selected file from the storage.
Clear All Files	This operation will remove all files from the ROQSTAR device storage. Resetting the ROQSTAR device configuration to factory settings will also remove cfg. files.

5. Network Features

5.1. Port Settings

This feature provides Ethernet Switch port settings such as Name, Link State, Auto Negotiation, Speed and Duplex.

Port	Name	Link	Auto Negotiation	Speed	Duplex	MDI-X	ITxPT xstatus
G1		enabled	enabled	100	full	auto	☐
G2		enabled	enabled	100	full	auto	☐
P1		enabled	enabled	100	full	auto	☐
P2		enabled	enabled	100	full	auto	☐
P3		enabled	enabled	100	full	auto	☐
P4		enabled	enabled	100	full	auto	☐

Port
The port label corresponding to the port labels seen on the ROQSTAR device itself. A 'P' port represents a Fast Ethernet port while a 'G' port represents a Gigabit Ethernet port.

Name
A descriptive text for the specific port link can be saved here.

Link
enabled: This port is enabled and tries to establish a link whenever another device is connected to it.

disabled: This port is disabled and it will not establish a link with any other device that might be connected to it thus preventing any communication through it.

Auto Negotiation
enabled: This port tries to automatically detect partner's link parameters for link establishment. When this setting is enabled the configured Speed and Duplex settings are ignored.

disabled: This port uses the given settings for Speed and Duplex for the link.

Speed
10: This port configures itself for Ethernet 10Mbps operation.

100: This port configures itself for Fast Ethernet 100Mbps operation.

Note: This setting is used only when link Auto Negotiation is disabled. A speed of 1000Mbps (Gigabit Ethernet) cannot be forced since it requires Auto Negotiation.

Duplex
full: This port configures itself for Ethernet Full Duplex operation. In this operation mode the optimal transmission speed is reached by allowing the two sides of a link to use separate transmission (TX) and reception (RX) lines.

half: This port configures itself for Ethernet Half Duplex operation. In this operation mode a limited transmission speed is reached because the transmission (TX) and reception (RX) lines are shared between the two sides of a link.

Note: This setting is used only when link **Auto Negotiation** is disabled.

MDI
Auto: The port will automatically choose between MDI and MDI-X

MDI-X: This port configures itself as an MDI-X port.

MDI: This port configures itself as an MDI port.

ITxPT xstatus
Enable link down reporting via xstatus on this port

Broadcasts Storm Protection provides control to packet flooding behavior.

Option	Enabled
Broadcast Storm Protection	☐

Broadcast Storm Protection

If enabled, it will detect and limit high-bandwidth switching of broadcast frames. It offers protection against invalid network configurations which introduce switching loops.

Note: The switching loops are not eliminated, just their effects on the network bandwidth are limited. To eliminate switching loops Spanning Tree feature must be used.

5.2. VLAN

This feature allows ROQSTAR device to participate in or create multiple logical networks mapped over a single physical Ethernet network composed of one or more switches. The VLAN feature is implemented according to IEEE 802.1Q standard.

The VLAN configuration map, called **Port VLAN Membership**, is realized on a per port level. It allows a strict isolation of Ethernet traffic between groups of ports belonging to different VLANs. A physical ROQSTAR port may participate in different VLANs and still be able to properly segregate the traffic belonging to the different logical networks. VLAN traffic segregation is made possible because each VLAN has a unique identifier known as VLAN ID or **VID**. The VLAN ID information may be embedded in the switched frame as a **VLAN Tag**. A VLAN enabled ROQSTAR device will always evaluate the VLAN Tag frame information before switching it.

The ROQSTAR device supports the creation of up to 64 VIDs thus being able to create or participate in up to 64 separate logical networks.

VLAN function differentiates between two traffic types as seen from a port's perspective:

- ► **ingress** traffic consists of frames entering a ROQSTAR port (received frames)
- ► **egress** traffic consists of frames leaving a ROQSTAR port (transmitted frames)

Additionally, attention is paid to whether the frames carry a VLAN tag:

- ► **untagged** means that the frames do not have a VLAN tag.
- ► **tagged** means that the frames have a VLAN tag.

If the VLAN function is enabled, an ingress frame generally may be transmitted only to those ports belonging to the VLAN that is specified in the frame's VLAN tag. In case of untagged ingress packets the ingress, port's **Default VID** is used instead.

The assignment of ports to VLAN are configured via the **Port VLAN Membership** described below. This table also specifies whether the packets that are egressing on a specific port will carry a VLAN tag or not.

VLAN function needs to be enabled before editing VLAN settings:

Setting	Status
VLANs enabled	☐

Set VLAN Status

Set VLAN Status   **enable VLAN**: This operation will activate the VLAN function and the default management VLAN ID 1 is automatically created. VID 1 will include all ports, and the previous management IP configuration is transferred to the IP interface of VID 1 (see section 'IP Interfaces').

disable VLAN: This operation will deactivate the VLAN function. The management IP configuration of VID 1 will be applied to the non-VLAN IP Interface, thereby preserving management access (see section 'IP Interfaces'). VID 1 will be deleted.

Notes:

- ► For ease of use VID 1 should be used as the Management VLAN and it should not be deleted. However, if desired, VID 1 can be removed after configuring a Management IP address in another VLAN.
- ► Disabling of the VLAN functionality is possible only if a VLAN with VID 1 is configured and assigned an IP address.

A new VID needs to be created in order to able to set up a new logical network:

Add VID

VID	Name
2	CCTV

Add VID

VID	The VLAN ID of the new logical network in the range 1 to 4094.
Name	A descriptive name for the logical network.
Add VID	Create new VLAN ID operation.

An existing VLAN ID may be deleted from the VID list:

VID	Name	action
1	Management	remove
2	CCTV	remove
3	TICKETING	remove

VID	VLAN Identifier for a logical network.
Name	The descriptive name given for this logical network.
Action	remove: deletes the selected VID.
	Note: A VID can be deleted only when it's corresponding Port VLAN Membership table configuration is '-' and it is not used as a Default VID. Care should be taken to not remove all VLANs as this will remove the access to the Management Interface as well.

The mapping of the VLAN network to the physical ports is done in the Port VLAN Membership table:

Port VLAN Membership

VID	G1	G2	G3	G4	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
1	u	u	u	t	u	-	u	-	u	u	u	-	u	-	u	-
2	-	-	-	t	-	u	-	u	-	-	-	u	-	u	-	u
3	t	t	t	t	-	-	-	-	-	-	-	-	-	-	-	-

Set Port VLAN Membership

VID	The VLAN ID corresponding to a logical network.
<physical port list>	The individual physical ports may belong to one or several logical networks at one time. This is indicated using one of the following settings:
	"**-**": This port is not a member of this VID.

"**u**": This port is a member of this VID and the egress frames will leave the ROQSTAR port without being tagged with the VID.

"**t**": This port is a member of this VID and the egress frames will leave the ROQSTAR port tagged with the VID.

Notes:

The untagged "**u**" option is typically used for end network devices or edge devices, like IP cameras, that do not support VLANs.

The tagged "**t**" option should be used for VLAN capable devices which are able to access multiple VLAN networks or for the ports connecting to another VLAN capable device. VLAN transfer ports require this setting.

Each port should have at most one untagged "**u**" setting. If more are configured then it will be impossible to correctly perform the required traffic segregation thus mixing together frames coming from different logical networks.

The Port Settings can be used to filter out ingress frames or modify the frame's VID:

Port VLAN Settings

Port	Default VID	Discard Tagged	Discard Untagged	Force Default VID
G1	1	☐	☐	☐
G2	1	☐	☐	☐

Default VID   The Default VID is used for incoming untagged frames and for overwriting tags. If the port is for one VID in the Port VLAN Membership table configured as "**u**" (untagged), then this setting should have the same VID value.

Discard Tagged   Discard all Tagged Ingress Frames.

Discard Untagged   Discard all Untagged Ingress Frames.

Force Default VID   This will override the tag in all ingress frames with the Default VID.

5.3. DHCP Server

ROQSTAR device supports dynamic distribution of IP address configuration to peripheral devices with DHCP functionality. The DHCP feature allows both dynamic and static IP address configuration to be assigned to different classes of network hosts (DHCP clients).

Dynamic IP address configuration makes use of **Dynamic Leases** (DYN). Dynamic leases are IP addresses taken from a **Default Pool** or "range" of reserved IP addresses and given (leased) to other network hosts on a temporary basis specified by a configurable **Lease Time**. These leases are returned to the default pool and reused for future leases once the network host is disconnected and its reserved Lease Time expires.

Static IP address configuration makes use of two other lease variations called DHCP Option 82 Leases (Option 82) and Host Based MAC Leases (MAC).

► **DHCP Option 82 Leases** may be used to assign the same IP configuration to any network host attached to a specific ROQSTAR port (port based).

► **Host Based MAC Leases** may be used to assign the same IP configuration to a specific network host as identified by its MAC address.

The ROQSTAR device supports a separate DHCP server for each VLAN / IP subnet (also called DHCP subnet). Each DHCP subnet can be configured independently. A DHCP-subnet is represented by valid **VLAN** / **IP Interfaces** combinations configured in the ROQSTAR device. Changes to either VLAN or IP interfaces configuration will directly impact the DHCP configuration as follows:

► changing the **IP Address** of an **IP Interface** will reset the existing DHCP configuration belonging to the respective subnet

► deleting the **IP Address** of an **IP Interface** will reset the existing DHCP configuration belonging to the respective subnet. DHCP Service will not function on subnet in which the ROQSTAR has no configured IP address (the IP address is 0.0.0.0).

► adding an **IP Address** to an **IP Interface** will automatically create a corresponding DHCP subnet.

► changing **Port VLAN Membership** will reset the existing **DHCP Option 82 Lease** DHCP configuration of any affected ROQSTAR ports.

► deleted **VLAN Ids** or **VLANs** without any **Port Members** will have their corresponding DHCP configuration deleted.

Notes:

► Create stable **VLAN** and **IP Interfaces** configuration **before** creating a DHCP configuration

► Extending the **VLAN** or **IP Interfaces** configuration will have no impact on the existing DHCP configuration.

Name	A fixed identifier stating the **VLAN** from which this DHCP Subnet was created.
	Note: Local subnets are automatically created/deleted/reseted based on the local **VLAN** / **IP Interfaces** configuration.
IP Interface	The corresponding IP Interface configuration for this DHCP Subnet.
	Needs to be non 0.0.0.0.
	Note: DHCP subnets with no **IP Address** are unusable for DHCP server
Network	The network address of the current subnet derived from the **IP Interface** configuration.
	Needs to be non 0.0.0.0.
Netmask	The netmask address of the current subnet derived from the **IP Interface** configuration.
	Needs to be non 0.0.0.0.
DHCP Role	**server**: The ROQSTAR device operates as a DHCP Server for all enabled subnets.
	relay: The ROQSTAR device operates as a DHCP Relay for all enabled subnets.
DHCP Active	Check mark to enable or disable the DHCP operation for this subnet. Enabling the DHCP operation on this subnet will reroute all DHCP packets entering the ROQSTAR device to the local DHCP service.
Description	A descriptive text can be saved here.
DELETE	Remote DHCP subnets may be removed with this operation.
	Note: This button is disabled for automatically created DHCP subnets based on the local **VLAN** / **IP Interfaces** configuration.
APPLY	This button becomes available only when a configuration setting has been changed. Using this button will validate and apply the DHCP configuration for this subnet.
	Notes:
	• Using the **APPLY** operation for a DHCP Subnet, it will discard any unsaved changes which may have been made in other DHCP subnets.
	• Unsaved DHCP configuration for a subnet is indicated by a light yellow background color of the subnet table.

Other Server   This setting configures the DHCP service on this Subnet to use a remote DHCP Server located in another device. When configured this will set the DHCP Role to "relay".

Note: The IP Address 127.0.0.1 configured here points to the local DHCP Server.

This Switch   This setting configures the DHCP service on this Subnet to use the local DHCP Server. When configured this will set the DHCP Role to "server".

Note: The Parameters settings will be visible only when this setting is selected.

Parameters   **Lease Time:** the time in seconds after which an IP Address configuration leased to a DHCP Client expires. After expiration the lease will be marked as free and reused for future leases. The default value is 86400 seconds (24 hours) with the minimum value being 300 seconds (5 minutes) and the maximum 604800 seconds (7 days).

Default Pool: An IP Address range valid within this subnet's range of valid network hosts and non-conflicting with any static leases configuration. The range start IP Address needs to be smaller or same as the range end IP Address in order to be able to define a valid range. The default range 0.0.0.0 to 0.0.0.0 means that no dynamic leases are configured which effectively disables dynamic clients IP Address configuration.

Edit DHCP Parameters: A drop-down list of additional DHCP configuration parameters which may be offered to DHCP Clients together with an IP Address lease. The parameters are grouped in this list when their default configuration remains unchanged. Select any parameter from the drop-down list to configure it. Delete the value of any configured parameter to restore it to its default state.

Netmask: The DHCP Option 1 – Subnet Mask information to be offered to clients. The default value is the same value as the local subnet's network mask. A valid value here needs to be a subset of the local subnet's network mask.

Gateway: The DHCP Option 3 – Router information to be offered to clients. The default value is 0.0.0.0 which means that no Router information is offered. A valid value here needs to be an IP Address non-conflicting with the Network and Netmask addresses, with the Default Pool range or with any static lease IP Address configuration. The Gateway's IP Address is also required to be included in the range of valid IP Hosts for this Subnet.

Primary DNS and Secondary DNS: The DHCP Option 6 - Domain Name Server information to be offered to clients. The default value is 0.0.0.0 which means that no DNS Server information is offered to clients. The Secondary DNS may be used only in conjunction with a valid Primary DNS.

Domain: The DHCP Option 15 - Domain Name information to be offered to clients. The default value is an empty text string. Domain names up to 255 characters may be configured here.

Lease Settings						
Type	**Identifier**	**IP Address**	**Configuration Provision**	**State**	**Expiry**	**Delete**
Option 82	Port P2	0.0.0.0		free	00:00:00	X
Option 82	Port P3	0.0.0.0		free	00:00:00	X
MAC	00:00:00:00:00:00	0.0.0.0		free	00:00:00	X

Click to configure new static lease ⌄

Type	Option 82: short name for static Port Based Option 82 Leases.
	MAC: short name for static Host Based MAC Leases.
	DYN: short name for dynamic leases.
	Note: Option 82 and MAC leases are added through the Click to configure new static lease drop-down list.
Identifier	for Option 82 leases this is the Port Name where a fixed static IP Configuration is offered to any attached device.
	for MAC leases this is the MAC Address of a client being offered static IP Configuration. A value of 00:00:00:00:00:00 means that the lease is not yet configured.
	for DYN leases this is the MAC Address of the client using this dynamic lease.
IP Address	For all lease types this is the IP Address associated with this lease.
State	N/A: the lease is unconfigured.
	free: the lease is not in use by a client.
	leased: the lease is used by a client.
Expiry	Time in HH:MM:SS until this lease expires.
	If the lease is inactive then 00:00:00 is displayed.
Operation	Delete: this button will delete the selected lease and its configuration.
	Note: after using DELETE the whole DHCP Subnet configuration needs to be saved in order to effectively deactivate the lease.
Click to configure new static lease	By default, the Lease Settings table has no lease configuration. Only through this drop-down list new static leases may be configured.
	This drop-down list offers the list of unconfigured Port Based Option 82 leases and a Host Based MAC lease which may be multiple times selected for individual static MAC leases configuration.
	The presence of Port Based Option 82 leases is directly influenced by the Port VLAN Membership. Adding and/or removing port members in a VLAN will add and/or remove Port Based Option 82 leases in the Lease Settings configuration.
	Once a Port Based Option 82 lease is selected it will be directly shown in the Lease Settings table.
	A Port Based Option 82 lease is returned to this drop-down list after a delete operation.

5.4. Rapid Spanning Tree

Spanning Tree is a protocol and algorithm used to prevent packets from circling in loops. This is crucial when the physical network topology consists of one or more rings. Rings are often used to get redundant physical communication paths.

In such a setup Spanning Tree is needed for correct network operation. Otherwise switching loops are created which will inhibit the correct and stable operation of the whole network, because traffic will quickly reach 100% utilization.

Spanning Tree is able to detect such loops in the physical topology and break them up logically. For proper operation a Root Bridge is needed, towards which all other Ethernet Switches in the network will maintain open communication. The placement of this Root Bridge may be critical to the performance of the whole network in cases where frequent link failures occur.

Best practices indicate that the Root Bridge should be the Ethernet Switch with the most central physical position in the network, which has the most available bandwidth. It makes sense to also designate a second-best Ethernet Switch as "backup" Root Bridge.

To decide which Ethernet Switch will be the Root Bridge the configurable **Bridge Priority** parameter is used. A lower value specifies a higher priority. In case of equal Bridge Priority values the Management MAC Addresses will be used as a tie breaker to determine the Root Bridge.

To ensure proper Spanning Tree operation in a network all Ethernet Switches must either forward or process the RSTP packets. Therefore, all devices that support RSTP should have that feature enabled.

RSTP works on the physical connection and is not affected by VLANs. If RSTP is enabled, RSTP packets are sent on all ports, irrespective of VLANs. If VLANs are used, care must be taken to ensure that rings present in the topology carry the same VLANs for the complete ring (respectively).

The source MAC address of the sent RSTP packets is that port's individual MAC address.

Option	Setting
Spanning Tree Protocol	RSTP ⌄
Bridge Priority	32768 ⌄

Spanning Tree Protocol	**RSTP**: Spanning Tree operation according to IEEE 802.1Q-2005 RSTP standard.
	none: Spanning Tree operation is disabled.
Bridge Priority	Values starting from 0 to 61440 based on which a "root" bridge can be elected. A value of 0 is the highest priority.

6.   Enhanced Features

6.1.   Power Over Ethernet (PoE)

Power over Ethernet (PoE) is a standard to deliver power through Ethernet cable. The ROQSTAR device acts as Power Sourcing Equipment (PSE), while the connected device, that consumes the power, is called Powered Device (PD).

As soon as PoE enabled on a port, the PoE function will automatically monitors the port for a PD detection and classification. If a valid PD is detected, it will be classified according to IEEE802.3at and powered according port settings.

ROQSTAR device utilizes port-based power management settings to budget power per port. This is necessary to avoid overallocation of power. Practically, most of the PDs are low power devices. There are two options to set budget power per port, based on:

► **PoE Class:** Power allocation values per port are 4W, 7W, 15.4W, 30W
► **Current Limit:** Power allocation values per port are 2W, 4W, 6W, 8W, 10W, 12W, 15W, 18W, 20W, 24W

Port	Powered Device Name	Enable PoE	Limit Class	nominal Power Limit	Priority	ITxPT xstatus
P1		☑	Class 4 (30W) ⌄	Class based ⌄	low ⌄	☐
P2		☑	Class 4 (30W) ⌄	Class based ⌄	low ⌄	☐
P3		☑	Class 4 (30W) ⌄	Class based ⌄	low ⌄	☐
P4		☑	Class 4 (30W) ⌄	Class based ⌄	low ⌄	☐

Port	The name of the specific port being configured.
Powered Device Name	Descriptive name which may be used for the PD.
Enable PoE	Check box for enabling/disabling PoE on the selected port.
Limit Class	Setting for Class Limit according to PoE Classes. PD with classification matches set Limit Class or lower will be powered. PoE Class overview:

► Class 0 (15.4W)
► Class 1 (4W)
► Class 2 (7W)
► Class 3 (15.4W)
► Class 4 (30W)

Note: Class 0 is handled as Class 3

Nominal Power Limit	Setting for port-based power budget according to current limit values. PD equal or lower to set current limit will be powered. In case a PD exceeds the port power budget, it will be immediately dropped.

► Class based (current limit set according to Class Wattage)
► 2W (current limit set to 56.25mA)
► 4W (current limit set to 93.75mA)
► 6W (current limit set to 131.25mA)

- ► 8W (current limit set to 168.75mA)
- ► 10W (current limit set to 206.25mA)
- ► 12W (current limit set to 243.75mA)
- ► 15W (current limit set to 318.75mA)
- ► 18W (current limit set to 356.25mA)
- ► 20W (current limit set to 412.50mA)
- ► 24W (current limit set to 506.25mA)

Priority	Port based priorities for dropping PD in case of exceeding power budget.
	low: PD on this port will be dropped first
	high: PD on this port will be dropped, after all low priority ports are being dropped
	critical: PD on this port will be dropped at last
ITxPT xstatus	Enable PoE port power off reporting via xstatus on this port

Note: All limits are measured at the port of ROQSTAR device. The available power reaching the PD also depends on the length and quality of the cable used.

6.2. Network Address Translation (NAT)

This feature allows communication between selected hosts in different IP segments. The 1:1 NAT is an IP address translation between the External IP Address and the Device IP Address. The External IP Address is a "virtual" IP address inside ROQSTAR device. All incoming packets for the External IP Address will be sent to local Device IP Address by replacing the original External IP Address with the Device IP Address.
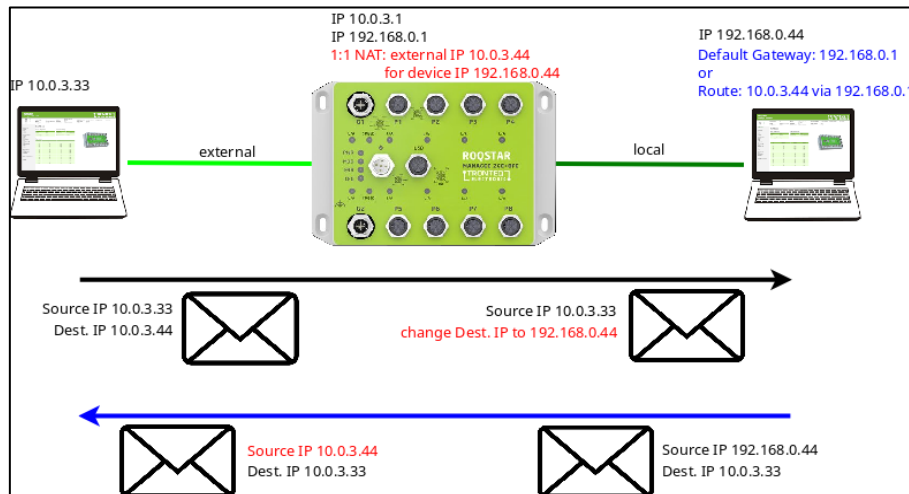
If **Masquerade** is enabled this will also replace the source address with the ROQSTAR device's IP address. For both parties it looks like they are communicating with a device in the local subnet. This has the advantage that no routing tables and gateway are needed.

If **Masquerade** is disabled, extra settings are needed in the local device:

- ► default gateway should be set to IP address of ROQSTAR device, or
- ► a routing table entry to the device should be configured
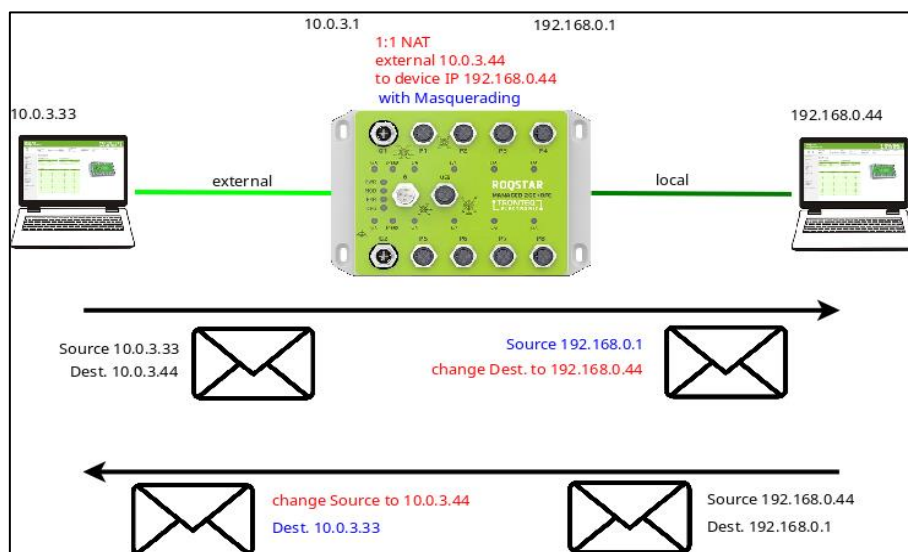
Note:

► Changing the NAT settings will interrupt existing connections.

► Masquerading makes the configuration much easier, because the participating device doesn't need default route (or gateway) configuration.

NAT Status

Setting	Status
NAT enabled	☑

Set NAT Status

NAT enabled	Enable / Disable NAT function.
Set NAT Status	**enable** NAT: This operation will activate the NAT function
	disable NAT: This operation will deactivate the NAT function. All existing NAT rules will be removed.

Create 1:1 NAT

Parameter	Value
Device IP Address	192.168.10.20
External IP Address	10.12.21.20
Masquerade	☐

Create 1:1 NAT Rule

Device IP Address	The Device IP Address of the device that should be reachable form the other network
External IP Address	The IP Address that should represent the device in the other network
Masquerade	enable Masquerade: If Masquerade is selected this will also replace the source address with the ROQSTAR device IP address.
	disable Masquerade: No masking of the sender.
	Note: Masquerade will not need extra routing table entries.

Notes:

Interface	Settings			NAT	
	IP Address	Netmask	Gateway	IP Forwarding	Proxy ARP
ipvlan2	10.12.21.1	255.255.0.0		☐	☐
ipvlan3	192.168.10.1	255.255.255.0		☐	☐

► IP Forwarding will allow IP packets to be routed between different VLANs if they match a NAT rule. This is necessary to applying NAT rules for IP packets entering or exiting this IP Interface.

► Proxy ARP will allow the ROQSTAR device to answer ARP requests regardless of VLAN.

6.3. Port Forwarding

This feature will redirect a single TCP or UDP port to a different device. The *Incoming IP Address* must be one of the ROQSTAR device's IP addresses.

Create Port Forwarding

Parameter	Value
Incoming IP Address	192.168.1.1
Incoming Port	1500
Protocol	TCP
Destination IP Address	192.168.2.10
Destination Port	80
Masquerade	☐

Create Port Forwarding

Incoming IP Address   The IP Address where connections are expected. This must be a ROQSTAR device's IP Address to work

Incoming Port   The port where connections are expected.

Note: If a port is used where a service is running (e.g. the web server) this service will no longer be reachable.

Protocol   The Protocol

TCP

UDP

Destination IP Address   The IP Address where packages are sent to.

Destination Port   The Port where packages are sent to.

Masquerade   enable Masquerade: This will mask the original sender of the message with the ROQSTAR device's IP Address

disable Masquerade: No masking of the sender.

Note: Masquerade makes routing table entries unnecessary.

6.4. Quality of Service (QoS)

QoS feature allows setting priority to outgoing packets. Priority is mapped to output queues. Each port contains eight independent output queues with different options for priority. Depending on the queue's properties an algorithm selects which of the queues gets to send the next packet. There are two different types of queues:

► **Strict queues** have a ranking. First, all packets of the highest-ranking queue are sent, then all packets of the next-highest ranking queue etc.

► **Weighted queues** have a fixed ratio between them. For example, one queue is allowed to send two times as many packets as a particular other weighted queue. A round robin scheduling is utilized. Weighted queues are ranked lower than strict queues.

Q7	strict, with highest rank
Q6	strict, with second-highest rank
Q5	strict, with third-highest rank
Q4	weighted, with factor 12
Q3	weighted, with factor 6
Q2	weighted, with factor 3
Q1	weighted, with factor 2
Q0	weighted, with factor 1

The priority ranking is: Q7 > Q6 > Q5 > [round robin between Q4/Q3/Q2/Q1/Q0].

Assigning packets to a queue is possible through values in the packet itself (the PCP value of a VLAN tag or the DSCP value of an IP header) or by assigning fixed priority to the port the packet was received on.

QoS Port Settings

Port	Priority Criterion	Default Queue	Default PCP
G1	default queue	Q1 (weighted, 2x)	0
G2	default queue	Q1 (weighted, 2x)	0
G3	default queue	Q1 (weighted, 2x)	0
G4	default queue	Q1 (weighted, 2x)	0
P1	default queue	Q1 (weighted, 2x)	0
P2	default queue	Q1 (weighted, 2x)	0
P3	default queue	Q1 (weighted, 2x)	0

default queue	Packets are assigned to the configured "Default Queue" of this port, regardless of their PCP or DSCP values.
PCP **> default queue**	Packets are assigned by their PCP value (if a VLAN tag is present), else to the configured "Default Queue".
DSCP **> default queue**	Packets are assigned by their DSCP value (if a IP header is present), else to the configured "Default Queue".
PCP	Packets are assigned by their PCP value (if a VLAN tag is present),

> DSCP   else by their DSCP value (if a IP header is present),

> default queue   else to the configured "Default Queue".

PCP -> Queue Mapping

PCP Value	Egress Queue
0	Q1 (weighted, 2x)
1	Q0 (weighted, 1x)
2	Q2 (weighted, 3x)
3	Q3 (weighted, 6x)
4	Q4 (weighted, 12x)
5	Q5 (3rd strict)
6	Q6 (2nd strict)
7	Q7 (1st strict)

Set PCP -> Queue Mapping

DSCP Mapping

DSCP Value	Egress Queue	DSCP Value	Egress Queue	DSCP Value	Egress Queue	DSCP Value	Egress Queue
0	Q0 (weighted, 1x)	16	Q2 (weighted, 3x)	32	Q4 (weighted, 12x)	48	Q6 (2nd strict)
1	Q0 (weighted, 1x)	17	Q2 (weighted, 3x)	33	Q4 (weighted, 12x)	49	Q6 (2nd strict)
2	Q0 (weighted, 1x)	18	Q2 (weighted, 3x)	34	Q4 (weighted, 12x)	50	Q6 (2nd strict)
3	Q0 (weighted, 1x)	19	Q2 (weighted, 3x)	35	Q4 (weighted, 12x)	51	Q6 (2nd strict)
4	Q0 (weighted, 1x)	20	Q2 (weighted, 3x)	36	Q4 (weighted, 12x)	52	Q6 (2nd strict)
5	Q0 (weighted, 1x)	21	Q2 (weighted, 3x)	37	Q4 (weighted, 12x)	53	Q6 (2nd strict)
6	Q0 (weighted, 1x)	22	Q2 (weighted, 3x)	38	Q4 (weighted, 12x)	54	Q6 (2nd strict)
7	Q0 (weighted, 1x)	23	Q2 (weighted, 3x)	39	Q4 (weighted, 12x)	55	Q6 (2nd strict)
8	Q1 (weighted, 2x)	24	Q3 (weighted, 6x)	40	Q5 (3rd strict)	56	Q7 (1st strict)
9	Q1 (weighted, 2x)	25	Q3 (weighted, 6x)	41	Q5 (3rd strict)	57	Q7 (1st strict)
10	Q1 (weighted, 2x)	26	Q3 (weighted, 6x)	42	Q5 (3rd strict)	58	Q7 (1st strict)
11	Q1 (weighted, 2x)	27	Q3 (weighted, 6x)	43	Q5 (3rd strict)	59	Q7 (1st strict)
12	Q1 (weighted, 2x)	28	Q3 (weighted, 6x)	44	Q5 (3rd strict)	60	Q7 (1st strict)
13	Q1 (weighted, 2x)	29	Q3 (weighted, 6x)	45	Q5 (3rd strict)	61	Q7 (1st strict)
14	Q1 (weighted, 2x)	30	Q3 (weighted, 6x)	46	Q5 (3rd strict)	62	Q7 (1st strict)
15	Q1 (weighted, 2x)	31	Q3 (weighted, 6x)	47	Q5 (3rd strict)	63	Q7 (1st strict)

Set DSCP Mapping

DSCP -> PCP Mapping

DSCP Value	PCP Value	DSCP Value	PCP Value	DSCP Value	PCP Value	DSCP Value	PCP Value
0	1	16	2	32	4	48	6
1	1	17	2	33	4	49	6
2	1	18	2	34	4	50	6
3	1	19	2	35	4	51	6
4	1	20	2	36	4	52	6
5	1	21	2	37	4	53	6
6	1	22	2	38	4	54	6
7	1	23	2	39	4	55	6
8	0	24	3	40	5	56	7
9	0	25	3	41	5	57	7
10	0	26	3	42	5	58	7
11	0	27	3	43	5	59	7
12	0	28	3	44	5	60	7
13	0	29	3	45	5	61	7
14	0	30	3	46	5	62	7
15	0	31	3	47	5	63	7

Set DSCP -> PCP Mapping

The assignment of PCP / DSCP values to the queues is defined in corresponding tables:

   ► mapping of PCP value (0..7) to queue (Q0..Q7)

   ► mapping of DSCP value (0..63) to queue (Q0..Q7)

Notes:

► If ROQSTAR device adds VLAN tag to packet the PCP value in this tag will be determined by DSCP to PCP mapping. There is an additional mapping for this case: mapping of DSCP value (0..63) to PCP value (0..7).

► In all other cases the configured "Default PCP" value of the packet's ingress port is used.

► Typically, there are no usable PCP/DSCP values in the packets coming from the peripheral devices, so the ROQSTAR device could be configured to use the "Default Queue" criterion. A port whose connected device should always be allowed to send, is assigned the Default Queue Q7 (strict, highest rank), while two less important devices are assigned Q2 and Q4. Q4 is favored by a factor of 12/3=4 compared to Q2. When the packets coming from these devices have the same destination port, the packet scheduling is as follows: As long as there are packets in Q7 they are sent exclusively. When Q7 is empty, both Q2 and Q4 are allowed to send. As long as both contain packets, Q4 sends four times as many packets as Q2.

6.5. Bypass Relay

This feature is intended for bypassing the traffic between two dedicated ports, if ROQSTAR device is not powered or not in operation mode. The ports affected by this function called bypass ports. A relay provides electrical connection between these ports. The relay is switched on/off by operating state of the ROQSTAR device.

In power down state and during boot process the relay is switch on (active) and hard-wire the ports. The electrical signals can then pass directly from one port to other.

When ROQSTAR device is in operation state, the bypass relay is switched off (inactive) and disconnects the bypass ports from each other. Data traffic between the ports is then forwarded based on Layer 2 addresses

Notes:

- ► If bypass relay is active, LED of bypass ports has no function
- ► In the Ignition Sleep Mode bypass relay is active

6.6. Ignition Sleep Mode

ROQSTAR device supports a sleep mode to reduce power consumption. In sleep mode all functions are turned off, no features are available.

The sleep mode is triggered by ignition signal and supports a configurable timer to remain power-on state for a defined period of time.

If the ignition signal gets LOW, a sleep mode event is recorded and timer is started. Once the timer is timed out, the ROQSTAR device enters the sleep mode. A HIGH on ignition signal before the timer is timed out resets the timer.

In sleep mode the ignition signal is continuously monitored. When ignition signal gets HIGH in sleep mode, the ROQSTAR device wakes up, boots and runs in normal operation.

Option	Setting
Ignition	disabled
Timeout	1800
Update Ignition Settings	

Ignition
enabled: Ignition Sleep Mode is active
disabled: Ignition Sleep Mode is inactive

Timeout
timer value in seconds
minimal value 60, maximum value 86400

6.7. Open API

ROQSTAR device supports an Application Programming Interface (API). It is intended for management and diagnostics task automation like monitoring, configuration and update. The API adheres to the OpenAPI specification, for which there are many third-party tools available.

The API can be accessed using http or https in order to send commands and receive responses. Authentication is required, using the same credentials as the web interface.

The exact URL paths for each command as well as additional parameters, values, examples etc. are specified in a yaml OpenAPI description file. It is available on our home page together with additional documentation to help with the implementation of and integration into user applications.

Some requests and responses of the API contain parameters that are in JSON format, which is readable by machines and humans alike. Whether a request was successful is shown via the http status codes.

OpenAPI latest version is v1.3

OpenAPI supports in current version following features to be monitored and/or managed:
- ► System (ID, log, update, reboot)
- ► Configuration
- ► Port link
- ► Port PoE
- ► TLD/HTTPS certificates
- ► LLDP

Refer to **ROQSTAR-GE_OpenAPI_v1.3-full.yaml** for detailed documentation.

6.8. User Certificates for HTTPS

ROQSTAR device supports HTTPS for web interface access. To use trustworthy encrypted communication identity certificate is used. The identity certificate consists of two files: private key and public certificate. Both files use PEM format.

In factory default configuration the ROQSTAR device uses a pre-installed generic self-signed certificate. However, the user may also generate and install his own certificates to ensure his system is communicating with the intended partner by validating the installed certificates.

In this case user can create the files externally, upload and save them on a ROQSTAR device. Immediate after upload the ROQSTAR device restarts its web server automatically and uses the uploaded certificates. Once installed, the user certificates will always be used until they are removed by user or factory reset was performed.

Note:

► ROQSTAR device doesn't validate the certificates against some root-ca

► The certificates are not updated automatically before they expire

► Certificate files are checked during application. If there is an error the web server will use the pre-installed self-signed certificate.

► Supported algorithms for the certificates:

rsa 2048 / SHA3_256	SECP256R1 / SHA3_256
rsa 2048 / SHA3_384	SECP256R1 / SHA3_384
rsa 2048 / SHA3_512	SECP256R1 / SHA3_512
rsa 4096 / SHA3_256	SECP384R1 / SHA3_256
rsa 4096 / SHA3_384	SECP384R1 / SHA3_384
rsa 4096 / SHA3_512	SECP384R1 / SHA3_512
	SECP521R1 / SHA3_256
	SECP521R1 / SHA3_384
	SECP521R1 / SHA3_512

Description	File	
Used Certificate	User Certificate	refresh
Private Key	Durchsuchen... Keine Datei ausgewählt.	
Public Certificate Chain	Durchsuchen... Keine Datei ausgewählt.	
Upload & Change Certificates		
Remove User Certificates		
Download Public Certificate Chain		

Used Certificate	Shows currently used certificate
Private Key	Choose the file with private key
Public Certificate Chain	Choose the file with public certificate chain
Upload & Change certificates	Upload and install both files
Remove User Certificate	Delete user certificate files
Download Public Certificate Chain	Download public certificate file

6.9. Layer 2 Static Multicast

ROQSTAR Ethernet switches support static multicast on Layer 2. This feature is designed for point-to-multipoint communication.

ROQSTAR Ethernet switch must know the destination for multicast frames, before it can forward them. The multicast frames are identified by the multicast MAC addresses. The destination is configured as static entry that bind a port to a multicast group.

The configuration of multicast table is connected to VLAN settings. Ports must be in same VID in order to be in same multicast group.

Note:

- ► If no multicast entries exist, multicast frames are handled as broadcast
- ► Adding a multicast mac address without any destination will result in dropping the frame with this multicast mac address. This can be used to blacklist multicast mac addresses.
- ► DNS-SD uses the Ipv4 and Ethernet multicast addresses. When new entries are created this can MGMT option for this MAC address must be set in order to include ROQSTAR to DNS-SD multicast group.
- ► Frames with MAC address **01:80:C2:00:00:0E** (LLDP) and **01:80:C2:00:00:00** (STP) are not forwarded, even if a multicast entry is created for this MAC addresses.

Configure > Static Multicasts

Settings

Multicast Mac Address	VID	MGMT Port	G1	G2	P7	P8	P9	P10	P11	P12	Description	Action
01:80:00:00:4A:FF	1	☐	☑	☑	☑	☑	☑	☑	☑	☑	Camera Streams	Update Remove
01:45:55:18:98:54	2	☐	☑	☐	☑	☐	☑	☐	☑	☐	Audio Systerm	Update Remove
	4 ⌄	☐	☐	☐	☐	☐	☐	☐	☐	☐		Add

Multicast MAC Address	Field for multicast MAC address. The entry will be validated if a given address corresponds to a multicast address.
VID	Choose corresponding VLAN ID. After VID selected, all assigned ports to this VID will displayed with enabled checkbox. If no VID are assigned, VID field will display 0
MGMT Port	Option to include ROQSTAR services like DNS-SD into a multicast group
G1, G2 … Pn	Destination port. Port is assigned, if checkbox is checked
Description	Label for naming the multicast group
Action	Add – activate the settings for the entry
	Update – update the entry
	Remove – remove the entry

7. Diagnostics Features

7.1. Identifying the ROQSTAR Device

ROQSTAR devices have several identifiers that are either immutable and unique or can be changed by the user.

Identifier	Example	Description	Occurrence
Serial number	524F531B05000009	unique	type label on enclosure web interface LLDP message SNMP sysDescr DNS-SD inventory
host name	roqstar-fcf8b7080286	unique	LLDP message SNMP sysName
Management MAC address	FC:F8:B7:08:02:86	unique	type label on enclosure web interface LLDP message IP communication
Port MAC addresses	FC:F8:B7:08:02:87 one for each Ethernet port	unique	web interface LLDP message SNMP ifPhysAddress
Description	CCTV Switch_123	parameter	web interface
Contact, Location	Vehicle_123, Door_1	parameter	web interface SNMP sysContact, sysLocation

7.2. Port Monitoring

This monitoring function shows the current state and settings of the Ethernet ports:

Port		Status			Configuration				MACs
Port	Name	Link	Speed	Duplex	Link	Auto Negotiation	Speed	Duplex	
G1		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:07
G2		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:0f
G3		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:10
G4		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:0e
P1		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:01
P2		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:02
P3		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:03
P4		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:04
P5		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:05
P6		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:06
P7		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:08
P8		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:09
P9		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:0a
P10		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:0b
P11		down	-	-	enabled	enabled	-	-	fc:f8:b7:08:00:0c
P12		up	100	full	enabled	enabled	-	-	fc:f8:b7:08:00:0d

Port	The name of the port as seen on the device's casing
Name	A descriptive name assigned by the user
Link Status	down: the port has no link partner or link negotiation failed
	up: the port has successfully established a link with another device
Speed Status	"-": no speed can be reported because there is no link
	10: 10 Mbit Ethernet
	100: 100 Mbit Fast Ethernet
	1000: 1000 Mbit Gigabit Ethernet
Duplex Status	full: Ethernet Full Duplex operation is active.
	half: Ethernet Half Duplex operation is active. If this mode hasn't been explicitly configured then it may be an indicator of cable problems or link configuration incompatibilities.
Link Configuration	Current configured setting
Auto Negotiation Configuration	Current configured setting
Speed Configuration	Current configured setting
Duplex Configuration	Current configured duplex setting
MAC	The MAC Address associated to this port

7.3. Packet Counters

Port	Incoming					Outgoing				
	Octets	Unicast Packets	Non-Unicast Packets	Discards	Errors	Octets	Unicast Packets	Non-Unicast Packets	Discards	Errors
G1	42,134	0	246	0	0	98,644	0	1,273	0	0
G2	0	0	0	0	0	0	0	0	0	0
G3	0	0	0	0	0	0	0	0	0	0
G4	0	0	0	0	0	0	0	0	0	0
P1	0	0	0	0	0	0	0	0	0	0
P2	0	0	0	0	0	0	0	0	0	0
P3	0	0	0	0	0	0	0	0	0	0

Port	The name of the port as seen on the device's label.
Incoming Octets	The total number of bytes received on this port since ROQSTAR device has been powered on.
Incoming Unicast Packets	The total number of unicast packets received on this port since ROQSTAR device has been powered on.
Incoming Non-Unicast Packets	The total number of non-unicast packets (multicast and broadcast packets) received on this port since ROQSTAR device has been powered on.
Incoming Discards	The total number of packets which could not be received on this port since ROQSTAR device has been powered on. Note: Due to bandwidth the packets need to be discarded because not enough resources are available to correctly process them.
Incoming Errors	The total number of malformed packets received on this port since ROQSTAR device has been powered on. Note: Malformed packets may be generated by cable issues or incorrect port settings.
Outgoing Octets	The total number of bytes sent on this port since the ROQSTAR device has been powered on.
Outgoing Unicast Packets	The total number of unicast packets sent on this port since the ROQSTAR device has been powered on.
Outgoing Non-Unicast Packets	The total number of non-unicast packets (multicast and broadcast packets) sent on this port since the ROQSTAR device has been powered on.
Outgoing Discards	The total number of packets which could not be sent on this port since the ROQSTAR device has been powered on. Note: Due to bandwidth constraints, the packets need to be discarded because not enough resources are available for correct processing.
Outgoing Errors	The total number of malformed packets sent on this port since the ROQSTAR device has been powered on.

7.4. PoE Monitoring

This monitoring function shows the PoE port state, allocated total power, detected PD classes, power consumption, voltage and current values per port.

Power budget	The **Power Budget** shows total power value available and that may be allocated by all PoE devices in sum
Power allocated	The **Power Allocated** shows how much power is currently allocated.

Port	PD Name	PoE Mode	Priority	PoE Status	PD Class	Limit Class	Power Limit	Power allocated	Power Usage (W)	Voltage (V)	Current (mA)
P2		enabled	low	not detected	-	30W (Class 4)	-				
P3		enabled	low	powered	0 (15.4W)	30W (Class 4)	-	15.4W	1.86	53.8	34.5
P4		enabled	low	not detected	-	30W (Class 4)	-				
P5		enabled	low	not detected	-	30W (Class 4)	-				
P8		enabled	low	not detected	-	30W (Class 4)	-				
P9		enabled	low	not detected	-	30W (Class 4)	-				
P10		enabled	low	not detected	-	30W (Class 4)	-				
P11		enabled	low	not detected	-	30W (Class 4)	-				

|	
Port	The name of the port as seen on the device's casing
PD Name	This is a descriptive name which may be used for the powered device
PoE Mode	PoE operation on the selected port
Priority	Set port priority
PoE Status	PoE state of the port
PD Class	This shows the class of the connected PoE device
PD Limit Class	The upper limit for the maximum accepted PoE class on this port
Power Limit	This shows the current Nominal Power Limit for this port
Power allocated	This shows how much power is allocated for this port
Power Usage (W)	This shows the present power delivered
Voltage (V)	This shows the present voltage on the port
Current (mA)	This shows the present current delivered by the ROQSTAR device in mA

7.5. Internal Event Logging

The ROQSTAR device can store up to 8000 log entries in its internal memory. By exceeding 8000 entries a corresponding event with message "Log entries limit 8000 exceeded." is generated and oldest entries will be replaced if new event entries occur. Following interaction are supported:

Action
Reload Log
Download Log
Clear Log
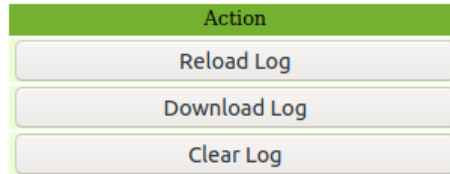
Reload Log   This operation will refresh the log entries being displayed.

Download Log   This will offer the download of all log entries in a CSV formatted file

Clear Log   This operation will delete all current log entries.

The log entries information is organized as follows:

Total Runtime	Synchronized Time (UTC)	Impact	Service	Message
7 days 21:52:57	2020-07-28 14:51:30	NOTICE	STP	Port G1 Spanning Tree state changed to forwarding.
7 days 21:52:57	2020-07-28 14:51:30	NOTICE	STP	Port G1 Spanning Tree state changed to learning.
7 days 21:52:55	2020-07-28 14:51:28	NOTICE	PORT	Link up 1000Mbit/s Full Duplex detected on port G1.
7 days 21:52:55	2020-07-28 14:51:28	NOTICE	STP	Port G1 Spanning Tree state changed to blocking.
7 days 21:52:09	2020-07-28 14:50:43	NOTICE	NTP	Time synchronization completed.
7 days 21:19:22	-	NOTICE	PORT	Link down detected on port G1.

Total Runtime   The total run time of the device since the first boot.

Synchronized Time   The synchronized time in UTC format.

                            Note: This is available only when NTP synchronization is active.

Impact   The impact describes the importance or the severity of the log message:

                            CRITICAL: Function is disrupted.

                            ERROR: Function error is detected.

                            WARNING: Function may not behave as expected.

                            NOTICE: Informational message, no function impact.

Service   The service that triggered the message. May be one of:

                            POE: Power Over Ethernet function.

                            NTP: Network Time synchronization function.

                            POWER: Power supply monitoring function.

                            PORT: Switch port management function.

                            STP: Spanning Tree function.

                            IP: IP Interfaces management function.

                            SYSTEM: System management function.

                            USB: USB management function.

                            DHCP: Dynamic IP Address configuration function.

Message   The message body.

7.6. Remote Event Logging

This feature allows to send log messages to a remote server for collection and storage in addition to the local event logging. In case no network connection is available an effort to try sending the log messages later is made. The feature utilizes the syslog protocol via UDP and TCP.

Apart from the event-driven log messages sending of periodic messages can be enabled, also known as MARK or heartbeat messages. On the receiver side their presence indicates that the ROQSTAR device is running and the network connection is alive.

Remote Logging

Setting	Value
Enabled	☑
Destination	192.168.1.222
Protocol	UDP ⌄
Port	514
Periodic heartbeat messages	☑
Interval of heartbeat messages	60 seconds

Set Remote Logging

Enable	Activate or deactivate the remote logging functionality.
Destination	The IPv4 address or hostname of the computer the log messages shall be sent to.
Protocol, Port	The protocol (either UDP or TCP) used to send the log messages, along with the protocol's destination port (1 – 65535).
Periodic heartbeat messages	Whether periodic messages (also known as "MARK") shall be sent to signify that the ROQSTAR device is still "alive".
Interval of heartbeat messages	Interval of the heartbeat messages from 10 seconds to 3600 seconds.

7.7. NTP Client

The ROQSTAR device is able to synchronize its internal time with a remote source. The NTP Client queries the time from an NTP server, whose address must be configured. Either an IPv4 address or a hostname. The interval in which the time is queried is configurable from 8 seconds to 1092 minutes.

Once the NTP Client has synchronized its clock it will generate a log entry. This can be used to calculate the time of earlier log entries. The time synchronization status will be directly visible in the log entry.

Option	Setting
Enable	☐
Server IP	192.168.1.1
Query Interval	8 seconds ⌄

Enable   Activate or deactivate the time synchronization service.

Server IP   The IP Address or hostname of an NTP time source server.

Query Interval   This interval determines how often the client should sent time requests to the server.

7.8. DNS-SD Inventory Service

The DNS-SD Inventory service can be used for discovering and monitoring devices. It utilizes mDNS multicasts, so devices can be discovered even if it is not known which or how many devices are expected. This inventory service is specified by ITxPT and implemented according to specification version 2.1.1.

The information is provided by a TXT record. It is automatically transmitted at startup and can also be queried via the address `_itxpt_socket._tcp.local`

Parameter	Explanation	Example value
txtvers	version of the TXT record	1
version	version of the ITxPT specification	2.1.1
type	type of the device (MESW: Managed Ethernet Switch)	MESW
model	model of the device	**Part No. #1**
manufacturer	manufacturer of the device	TRONTEQ
serialnumber	serial number of the device	524F531904000014
softwareversion	software version running on the device	2.5.0
hardwareversion	hardware version of the device	1
macaddress	Management MAC address of the device	FC:F8:B7:08:01:21
status	status of the last self-check	0
services	active ITxPT services	inventory
xstatus	hardware state	C0FFFFFFFFF3FFFF01 FCFFFFFFFFFFFFFF

#1 the model is defined as ROQSTAR Part No. (e.g. 006-130-125)

7.9. ITxPT xStatus and Device Status

xStatus

The xStatus is information provided in the ITxPT inventory service TXT record. It is used to publish the device status in a generic way. Up to 60 device status are supported. Each device status can have one of the following states:

Status code	Implication
00	OK
01	Alarm
10	Warning
11	Not available

Device Status No.1

Represents the value of the most urgent values of the other device status fields that are supported. In that sense it reports whether there are any alerts.

Device Status No.20 – Power Supply

Status code	Implication
00 (OK)	voltage of V1 and V2 are valid
01 (Alarm)	supply voltage of V1 is not valid, V2 is valid
10 (Warning)	supply voltage of V1 is valid, V2 is not valid

Device Status No.31 – Link

Status code	Implication
00 (OK)	all monitored ports have a links established
01 (Alarm)	at least one monitored links has no link

Device Status No.32 – PoE General

Status code	Implication
00 (OK)	PoE is running
01 (Alarm)	PoE error
11 (not available)	PoE function not available

Device Status No.33 – PoE Ports

Status code	Implication
00 (OK)	all monitored PoE ports provide power
01 (Alarm)	On at least one monitored PoE port provides no power
11 (not available)	PoE function not available

7.10. SNMP

The SNMP function allows for remote monitoring of certain ROQSTAR device functions. The information is defined in MIBs and referred to by their OID numbers. The MIBs supported by ROQSTAR devices are

- ► MIB-2 > system (OID 1.3.6.1.2.1.1)
- ► MIB-2 > ifTable (OID 1.3.6.1.2.1.2.2)
- ► MIB-2 > powerEthernetMIB (OID 1.3.6.1.2.1.105)
- ► LLDP-MIB (OID 1.0.8802.1.1.2)

SNMP versions 1, 2c and 3 are supported. SNMP version 1 and 2c implement access based on a community name. ROQSTAR device supports one community with read only access (**read community**) and one community with read and write access (**write community**). In these SNMP versions the authentication mechanism transmits the communities in an insecure manner over the network.

In SNMP version 3 a stronger authentication mechanism is used to prevent eavesdropping. The supported cryptography standards are SHA as **authentication protocol** and AES-128 as **privacy protocol**. Together with the user settings these are the credentials required when requesting information via SNMPv3.

Note: It is possible to forego authentication by omitting the passwords.

Server settings:

Setting	Status
Version 1:	☑
Version 2c:	☑
Version 3:	☑
Version 1 / 2c Settings	
Read Community	public
Write Community	private

Version 1	Check mark to enable or disable SNMP version 1.
Version 2c	Check mark to enable / disable SNMP version 2c.
Version 3	Check mark to enable / disable SNMP version 3.
Read Community	The community name consisting of a size between 4 to 32 characters.
Write Community	The community name consisting of a size between 4 to 32 characters.

SNMP user settings:

Add User

Parameter	Value
Username:	
Authpass:	
Privpass:	

Add User

Username	SNMPv3 user name to be added. A valid user name must have a size between 1 to 32 printable ASCII characters. Note: An SNMP version 3 user has always read and write access.
Authpass	SNMP Authentication password for the new user. A valid password must have a size between 8 - 255 printable ASCII characters.
Privpass	User's private password consisting of a size between 8 to 255 printable ASCII characters.
Add User	This operation configures the given user.

7.11. SNMP Traps

SNMP Traps are messages sent by the ROQSTAR device to give notification on certain events to a remote server for monitoring purposes. SNMP Traps are configured with the following parameters:

Parameter	Status
Enabled	☐
Receiver	192.168.1.1
Trap Community	trap

Enable   Check mark to enable or disable the SNMP trap function.

Receiver   The IP address or hostname of the SNMP trap receiver.

Trap Community   The name of the SNMP Trap community used for authentication.

Note: SNMP traps are always sent using SNMP version 1.

Supported SNMP Trap events:

Event	Content	Enterprise (OID)	Information
Link up	A port identifier in the form of ifIndex from IF-MIB.	1.3.6.1.2.1.11	Generic-trap: 3 (linkUp)
Link down	A port identifier in the form of ifindex from IF-MIB.	1.3.6.1.2.1.11	Generic-trap: 2 (linkDown)
Device start	-	1.3.6.1.4.1.8072.4.0.1	Enterprise (OID)
Device restart	-	1.3.6.1.4.1.8072.4.0.2	Enterprise (OID)
PoE port starts to deliver power	A port identifier in the form of pethPsePortIndex from powerEthernetMiB.	1.3.6.1.2.1.105.0.1	Variable bindings: value: 3
Powered device is removed	A port identifier in the form of pethPsePortIndex from powerEthernetMiB.	1.3.6.1.2.1.105.0.1	Variable bindings: value: 4
PoE power supply disabled/stopped on a port due to power limit	A port identifier in the form of pethPsePortIndex from powerEthernetMiB	1.3.6.1.2.1.105.0.1	Variable bindings: value: 1

7.12. LLDP

LLDP is a protocol used for topology mapping and discovery by having neighboring devices regularly exchange information on the interconnection links. The messages contain general information about the sender like MAC Address or Names. LLDP message content sent by ROQSTAR device:

Note: The source MAC address in the LLDP packets sent by ROQSTAR device is specific per port.

Data	Example value
System Name	roqstar-fcf8b7000000
System Description	ROQSTAR Managed Ethernet Switch, FW: 2.3.0, SN: 524F531B05000009
Chassis ID Type and Value	Locally assigned, FC:F8:B7:00:00:00
Port ID Type and Value	MAC address, FC:F8:B7:00:00:03
Port Description	P3
Time To Live	40 seconds

LLDP settings:

Port	Port designator for ROQSTAR device port
receive only	Incoming LLDP frames are processed only
receive & transmit	Incoming LLDP frames are processed local LLDP frames are periodically transmitted by an interval of 10 sec.

LLDP Information:

Local Port	System Name	System Description	Chassis ID Type	Chassis ID Value	Port ID Type	Port ID Value	Port Description	Age
G2	roqstar-fcf8b7080033	ROQSTAR Managed Ethernet Switch, FW: 2.0.1, SN: 524F531B04000000	local	fc:f8:b7:08:00:33	mac	fc:f8:b7:08:00:43	G3	0 day, 00:00:25

Local Port   The local Port Name on which this neighbor device has been detected.

System Name   The name of the neighbor.

System Description   The system description of the neighbor.

Chassis ID Type   The chassis id advertised by the neighbor.

Chassis ID Value   The chassis id advertised by the neighbor.

Port ID Type   The port ID type on the neighbor device the frame was sent from.

Port ID Value   The port ID value on the neighbor device the frame was sent from.

Port Description   The port description on the neighbor device the frame was sent from.

Age   The time in seconds since this neighbor has been detected.

7.13. Port Mirroring

Port Mirroring allows the duplication of network traffic seen on specific ports. The duplicated packets are sent out on another port. These "mirrored" packets reflect the actual traffic and can be captured using packet sniffer tools for debugging purposes.

For multiple ports either the **incoming** traffic, **outgoing** traffic or both can individually configure to be mirrored to a single **destination port**.

Port	Traffic to mirror		Destination
	Incoming	Outgoing	
G1	☐	☐	☐
G2	☐	☐	☐
G3	☐	☐	☐
G4	☐	☐	☐
P1	☐	☐	☐
P2	☐	☐	☐

Port	The ROQSTAR device port to be mirrored or used as a destination port.
Traffic to mirror	**Incoming**: RX frames entering this port.
	Outgoing: TX frames leaving this port.
Destination	The port where mirrored packets are copied to. Only one port may be configured as destination port.
	Note:
	The destination port cannot be used as a mirrored port.
	Do not attach another ROQSTAR device to the destination port.

Appendix – Factory Default Configuration

CFG No. ###-000-003

System identification	description: "description",
	contact: "contact",
	location: "location"
Ignition Sleep Mode	disabled
USB API	enabled
Files	no files present, access via URL disabled
DNS Client	disabled
Ethernet Ports	All ports are enabled, Auto Negotiation, Auto-MDI
	Monitoring via ITxPT xstatus is disabled
VLAN	enabled
	VLAN ID 1 for management, untagged, all ports
	VLAN ID 3579 for Auto Configuration Deployment, tagged, all ports
IP Interfaces	IP address 192.168.1.1, subnet mask 255.255.255.0
	IP Forwarding, Proxy ARP disabled
DHCP Client	enabled
	provisioning option enabled on all ports
QoS	disabled
	default PCP is 0
Port Mirroring	disabled
LLDP	enabled
Spanning Tree (RSTP)	enabled
	Bridge Priority 32768
DHCP Servers	disabled
PoE	enabled
	all ports, limit class: class 4, nominal power limit: Class based, priority: low
	ITxPT xstatus for PoE monitoring disabled
NTP	disabled
Remote Logging	disabled
SNMP	SNMP v1, v2c and v3 enabled
	SNMPv3 user accounts: none
	read community: public
	write community: private
SNMP Traps	disabled
NAT	disabled
Multicast	no entries
User accounts	user name: admin
	password: password