



100BASE-T1 – Standard Ethernet

MEDIAGATEWAY

User Manual

Version 4.2.98

March 2018

Changelog

Version 4.2.98 – March 2018

- Added ARL status
- MediaGateway Remote control revised
- Added SFP port information and new SFP Modules compatibility
- CANGateway Chapter updated
- Removed bootloader update chapter

You can download the latest firmware and documentation for the MediaGateway here:

<http://www.technica-engineering.de/en/products/media-gateway/>



IMPORTANT: Basic software is provided. Additional functionalities can be activated through this email: order@technica-engineering.de

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1. Feature List

The Technica Engineering MediaGateway has the following basic features:

12 Ports Broadcom BroadR-Reach

100 MBit/s Full duplex on a single unshielded twisted pair

3 Ports Gigabit Ethernet 10/100/1000 BaseTX Full duplex

1 Port Gigabit Ethernet SFP module socket

- ✓ Broadcom BroadR-Reach Technology
- ✓ Tyco MQS Connectors for BroadR-Reach and Power Supply
- ✓ Webserver for easy configuration:
 - Master / Slave
 - Port Mirroring
 - VLAN Tagging
 - Port Status Display
- ✓ Import and Export of Configurations
- ✓ WakeUp functionality
- ✓ CAN, LIN and FlexRay interfaces (requires customer specific software)
- ✓ Power output for attached devices: V_{BAT} max. 1,2 Ampere in total (Fused)
- ✓ 19 Status LEDs
- ✓ Possibility to reset to default settings by pushbutton
- ✓ Robust steel case

Power requirement: 7 to 16 Volt DC (nominal 12 Volt DC) Power consumption: 7 to 12 Watt

Size: 195 x 143 x 33 mm

Weight: 0,77 kg

International Protection: IP 2 0

Operating Temperature: -40 to +80 °Celsius

2. Warranty and Safety Information



Before operating the device, read this manual thoroughly and retain it for your reference.

You can download the latest firmware and documentation for the MediaGateway here: <http://www.technica-engineering.de/MediaGateway>



Use the device only as described in this manual. Use only in dry conditions. Do not apply power to a damaged device.



Do not open the device. Otherwise warranty will be lost.



This device is designed for engineering purpose only. Special care has to be taken for operation.

Do not use this device in a series production car.

As this device is likely to be used under rough conditions, warranty is limited to 1 year.

Manufacturer liability for damage caused by using the device is excluded.

EG-Konformitätserklärung

**gemäß der EG-Richtlinie 2004/108/EG (elektromagnetische Verträglichkeit)
vom 15. Dezember 2004**

Hiermit erklären wir, dass das nachstehend bezeichnete Gerät in seiner Konzeption und Bauart sowie in der von uns in Verkehr gebrachten Ausführung den grundlegenden Sicherheits- und Gesundheitsanforderungen der EG-Richtlinie 2004/108/EG entspricht. Bei einer mit uns nicht abgestimmten Änderung des Gerätes verliert diese Erklärung ihre Gültigkeit.

Hersteller: Technica Engineering
Leopoldstr. 236
80807 München

Bevollmächtigter: Joseba Rodriguez

Beschreibung des Gerätes:
BroadR-Reach Ethernet MediaGateway

Datum der Erklärung: 01.06.2016


Name des Unterzeichners: Joseba Rodriguez

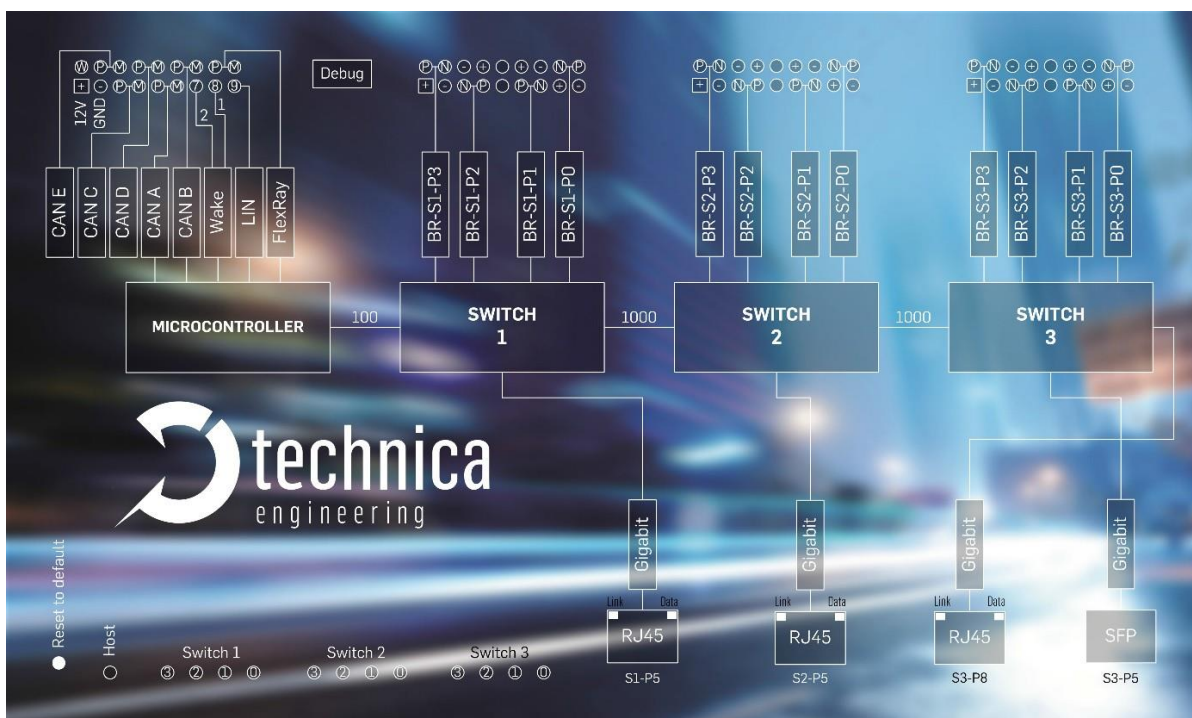
Unterschrift: 

3. Pinning

The pinning of the ECU connectors is listed on the label on top of the device. The Tyco Electronics (TE) Micro Quad Lock System (MQS) is used.

Name	Type	Part Number
Tyco, MQS Abdeckkappe	2x9 Pol, black	1-967416-1
	Alternatively	1-1355350-1
Tyco, MQS Abdeckkappe	2x9 Pol, blue	3-967416-1
Tyco, MQS Buchsenge- häuse	2x9 Pol	965778-1
	Alternatively	962108-2
Tyco crimp contact		928999-1

 **Note:** You can use the official Tyco tool for these crimp contacts. A cheap variant is the crimp tool for “PSK” contacts.




Power connector (top left)


Connector color: **Black**

Power supply for the device is supplied by Pin 1 (12Volt) and Pin 2 (Ground). Requirements for the MediaGateway itself: 12 Volt DC up to 1 Ampere (typical 600mA)

If the 12 Volt camera power output is used, this current is also sourced of Pin 1 and 2.

 **Warning:** If you apply a voltage higher than 16 Volt, the device **will be damaged!**


A wakeup-line may be connected on pin 7 or 8. The wakeup-line should have the same voltage level as the power supply (12 Volt). A high level on one of these pins wakes up the ECU from sleep mode and keeps it active. If the voltage on this pin drops below approx. 6 Volt for more than about 3 seconds the ECU will enter sleep mode. It will wake up on a high level again. Alternatively the “Prevent sleep” checkbox in the control panel of the website can be enabled.

 **Note:** Ethernet Traffic on any port will prevent sleep mode. Timeout is set to 100 seconds.

The LIN interface on pin 9 can be used to communicate with the Microcontroller by LIN bus. In the default software there is no data transmission specified. This interface may only be used in customer specific software.

The FlexRay interface on pin 17 and 18 can be used to communicate with the Microcontroller by FlexRay bus. In the default software there is no data transmission specified. This interface may only be used in customer specific software.

Pin	Function	Pin	Function
1	Battery +12 Volt Input	10	Wake Line 3 (Output only)
2	Ground Input	11	CAN E Plus
3	CAN C Plus	12	CAN E Minus
4	CAN C Minus	13	CAN D Plus
5	CAN A Plus	14	CAN D Minus
6	CAN A Minus	15	CAN B Plus
7	Wake Line 2	16	CAN B Minus
8	Wake Line 1	17	FlexRay Plus
9	LIN Bus	18	FlexRay Minus


 **Note:** CAN interfaces may only be used in customer specific CAN-Gateway firmware.

Switch connectors

Connector color: **Blue**

The pins marked with (P) or (N) are used for the BroadR-Reach ports. Four ports are available per switch.

You have to connect the (P) pin to the (P) pin of the periphery device. You have to connect the (N) pin to the (N) pin of the periphery device.

 **Note:** If you swap these two pins the link LED may be lit on the BroadR-Reach slave side, but no data transmission will be possible.

The pins marked with (+) or (-) are 12 Volt power output pins. The actual voltage level of these pins depends on the supply voltage of the ECU. Be aware that the sum of all 12 power output pairs will deliver **a maximum of 1.2 ampere**. If more current is used the output will temporary switch off. The power output has to be switched on by website configuration (Control panel).

Pin	Function	Pin	Function
1	Camera +12 Volt nominal output	10	BroadR-Reach Port 3, Positive
2	Camera Ground Output	11	BroadR-Reach Port 3, Negative
3	BroadR-Reach Port 2, Negative	12	Camera Ground Output
4	BroadR-Reach Port 2, Positive	13	Camera +12 Volt nominal output
5	n.c.	14	n.c.
6	BroadR-Reach Port 1, Positive	15	Camera +12 Volt nominal output
7	BroadR-Reach Port 1, Negative	16	Camera Ground Output
8	Camera +12 Volt nominal output	17	BroadR-Reach Port 0, Negative
9	Camera Ground Output	18	BroadR-Reach Port 0, Positive

RJ45 Ethernet connectors


There are three RJ45 Standard Ethernet connectors of the front side.

SFP slot

There is one SFP cage for a MiniGBIC module.

The following modules have been tested:

- Edimax Mini GBIC (SFP) LC, 1 Gigabit/s, 1000 Base-SX Module
- SFPEX S1GT-A Mini GBIC (SFP) 10/100/100 MBit RJ45 Module
- BEL SFP-1GBT-05 SFP 10/100/100 MBit RJ45 Module

 **Note:** New SFP 100Base-T1 and 1000Base-T1 modules are compatible with MediaGateway.

[SFP 1000 Base-T1](#)

[SFP 100 Base-T1](#)

4. Status LEDs and Pushbutton

The MediaGateway has several status LEDs at the front side of the case.




LEDs

The “Host” LED can toggle at three different speeds:

- Slow toggle (approx. 0.5 sec) during normal operation to show that the microcontroller is running in normal mode.
- Fast toggle (approx. 0.1 sec) when the microcontroller is in bootloader mode. The bootloader mode is used for firmware update only (see below in this manual). You cannot access the web-site when the device is in bootloader mode.
- When the device is in Bootloader-Update Mode the LED toggles with moderate frequency (approx. 0.25 sec).

The port status LEDs Switch 1 to 3 and Port 3 to 0 monitors the link status of the corresponding port. The LEDs are lit when there is BroadR-Reach link detected. They begin to blink when there is data traffic on this link.

 **Note:** There is an issue when P/N of the bus are swapped. The LED may be on in this case on BroadR-Reach slave side, but there will be no data transmission possible.

The built-in LEDs in RJ45 connector shows the status of the gigabit ports. The left (orange LED) is lit by a link-up. The right (yellow) will blink on data traffic.

Push button

The *Pushbutton* on the left side of the case will reset all settings to factory default.

Pressing this button down for 5~6 seconds with a pen when the Host Led is blinking normally:

- IP Address will be reset to default (192.168.0.49)
- All settings will be lost.


 **Note:** If the device is blocked and all LEDs are lit, device must be sent to Technica Engineering.

 **Note:** MAC Address will not be changed.

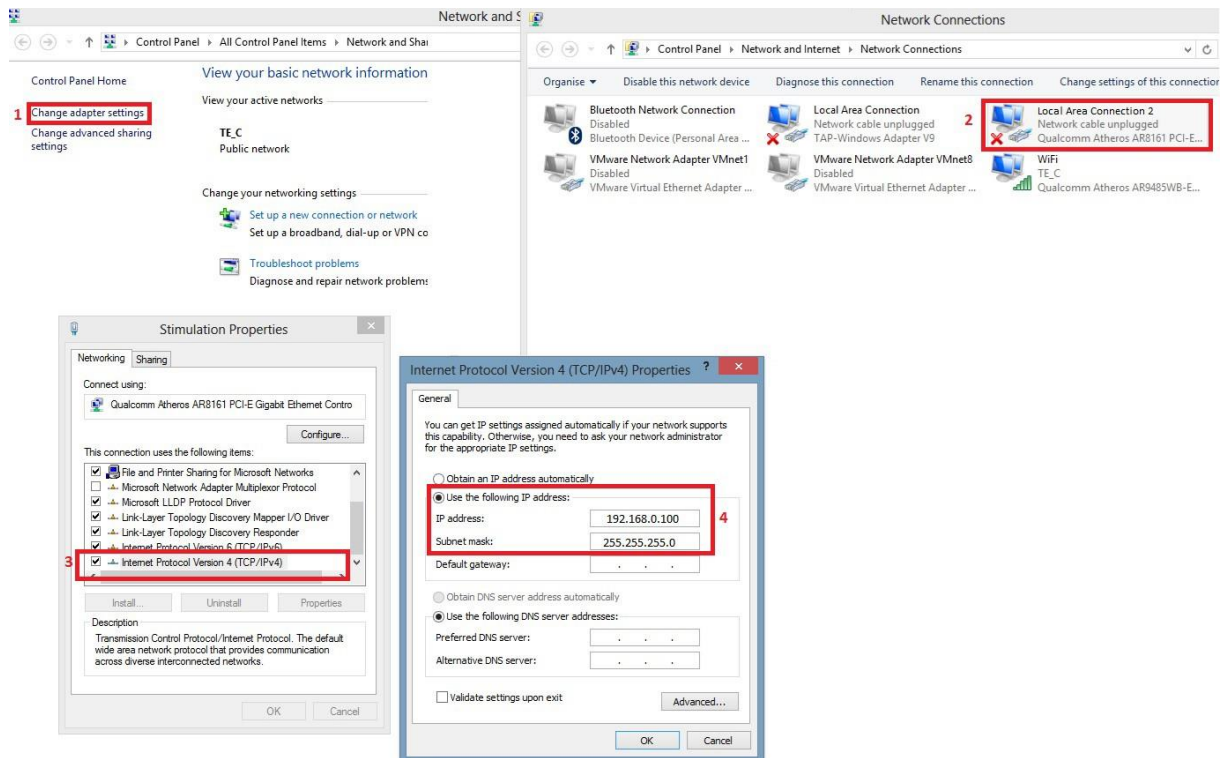
5. Configuration Website

You can access the configuration website with a standard web browser by connecting your PC to a RJ45 connector.

The default IP address of the device is 192.168.0.49 and subnet mask 255.255.255.0

 Note: If IP address has been changed, you can reset it to default as described in this manual.

For example, set the configuration PC to IP address 192.168.0.100 and subnet mask to 255.255.255.0



Website Home



Automotive Ethernet Switch

System Information Control Panel Switch Status Contact

Home

Please choose...

- System Information - to see general information and configure the IP address
- Control Panel - to change common settings
- Switch Status - to see the current status and configure the ports
- Contact - if you want to contact us

Warning: If there is a lot of *broadcast traffic* on the switch, the host microcontroller may be jammed. You cannot access the website in this case. Please use VLAN configuration to forward only relevant messages to the microcontroller.

With the first access to the website you will get the home screen. Please select one of the tabs for further configuration.

System Information	Control Panel	CAN Functions	Switch Status	Contact
System Information				
MediaGateway UUID	9a2636d789cd7e30d2454faa21113d22b2a1e09a			
Hardware version	Media Gateway 2.3			
Application Software version	4.1.20-basic		10:31:10, Dec 3 2015	
Bootloader version	4.0		19:19:54, Sep 4 2015	
Repository ID	660		15:51:06, Nov 25 2015	
BMW Extra Functions	Disabled			
CAN Gateway Function	Unlock			
MAC address	00:50:C2:E4:30:00			
IP address	<input type="text" value="192.168.0.49"/>			
Switch 1 ID/Revision	00089500/00			
Switch 2 ID/Revision	00089500/00			
Switch 3 ID/Revision	00089500/00			
Ethernet Phy 1 ID	03625CD2			
Ethernet Phy 2 ID	03625CD2			
Ethernet Phy 3 ID	03625CD2			

System Information Tab

On the tab „**System Information**“ some status information about the device is displayed. You can check the version number of the application firmware and the bootloader or the unique MAC address of the device. The version number registers of the switch and phy chips are displayed for information only.

Up to version 4.1.12 it also shows the UUID that the user will need to activate extra features. You can see which functionality is Unlocked.

The MAC address should be the same as on the label on the bottom of the device.

You can change the IP address of the host microcontroller (Webserver) here. If you want to use multiple devices in one network, you must configure a unique IP address for each device here.

Note: If you forgot your IP address you can reset it to default as described in chapter 4.

Control Panel Tab

System Information **Control Panel** CAN Functions Switch Status Contact

Control Panel

Restart target	<input type="button" value="Restart"/>
Configuration	Default <input type="button" value="Export"/> <input type="button" value="Import"/> <input type="button" value="Default"/>
Enable camera power	<input type="checkbox"/>
Prevent sleep	<input checked="" type="checkbox"/>
Diagnose-Service	<input type="checkbox"/>

MediaGateway Feature License Activation

MediaGateway features	CANGateway <input type="button" value="Remove"/>
Activation key	<input type="text"/>
Remove extra features	<input type="button" value="Remove"/>

On the „Control Panel“ tab you can:

- **Restart target:** Software reset. Configuration will NOT be lost.
- **Configuration:** It shows the current configuration name.
- **Export:** Save the stored configuration from MediaGateway into user's PC.
- **Import:** User can import or export the configuration settings of the device to a file (*.cfg) on a computer connected to the RJ45 Port. A restart is needed to apply the new configuration.
- **Default:** You can reset the configuration settings to default. All the configuration stored will be revert to its defaults values. IP address will be not modified.
- **Enable camera power:** The camera power output pins are disabled by default. To activate them, this checkbox should be checked.
- **Prevent sleep:** If you do not want to use a Wakeup line, you can enable the “Prevent sleep” checkbox (default). This will keep the device running without entering the sleep mode. If this option is disabled, the device will restart if no ethernet activity is detected within 60 seconds.
- **Diagnostic service:** If you enable “Diagnose Service” functionality, MediaGateway will send periodically status information about its state. For example, transmitted and dropped frame counters, link quality, etc.. More details about the format of these frames see the Fibex File (and .pdf description) in the firmware release files.

MediaGateway Feature License Activation

In order to activate extra features (CAN Gateway, FlexRay Gateway, BMW Extra Functions), the user should contact us at order@technica-engineering.de to order an activation key.

User must provide de UUID code in the order of purchase.

System Information	Control Panel	Switch Status	Contact
System Information			
MediaGateway UUID	9a2636d789cd7e30d2454faa21113d22b2a1e09a		
Hardware version	Media Gateway 2.6		
Application Software version	4.2.98	11:38:55, Mar 7 2018	
Bootloader version	3.5.0	17:23:17, Feb 15 2018	
Repository ID	abdd075		
BMW Extra Functions	Disabled		
CAN Gateway Function	Disabled		
FlexRay Gateway Function	Disabled		

Technica-Engineering will provide an Activation code for the desired feature. Received activation code must be entered in control panel.

Next picture shows how to unlock CAN Gateway feature after receiving the activation code:

1. Select the feature: CANGateway
2. Insert the code
3. Save configuration and restart the device.

System Information	Control Panel	Switch Status	Contact
Control Panel			
Configuration changed. Save configuration Restart after saving <input type="checkbox"/>			
Restart target	Restart		
Configuration	Default	Export	Import Default
Enable camera power	<input type="checkbox"/>		
Prevent sleep	<input checked="" type="checkbox"/>		
Diagnose-Service	<input type="checkbox"/>		
MediaGateway Feature License Activation			
MediaGateway features	CANGateway 1		
Activation key	94798a4f6ec9d4d764cb15b3a5a09833f8e68e3a 2		
Remove extra features	Remove		

Switch Status Tab

The main configuration of the switch is done in the „Switch Status“ tab.

Here you can configure details about each port and get some status information about the ports and switch states.

On the left side of the page you can see an overview of all available ports. A blue bar at the side of a port label indicates an active link (On the Cascade SFP port there is no link indication).

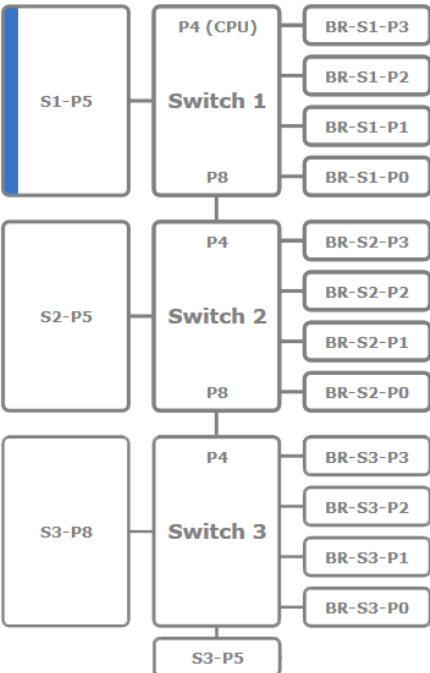
Global Configuration

In global configuration, user can change global settings affecting all three switches inside MediaGateway.

- **IEEE 802.1q (VLAN) mode:** Activates port based Single VLAN.
- **Double Tagging:** If IEEE 802.1q (VLAN) mode is activated, it is possible to work with double tagging.
- **Double Tagging TPID:** On Board Switches uses an old non-standard 802.1QinQ 0x9100 ether type (TPID) for double tagged frames. New 802.1QinQ standard uses TPID 0x88A8.

System Information
Control Panel
Switch Status
Contact

Switch Status



Global configuration

IEEE 802.1q (VLAN) mode

Double tagging

Double tagging TPID (hex)

Select a port or switch on the left for details.

ARL Table status


When you click on the “Switch 1..3” witch label the entries of the **Address Resolution Table** in selected switch will be displayed.

ARL Table shows the following information:

MAC addresses, VLAN ID, Forward port, Age Bit and Static bit

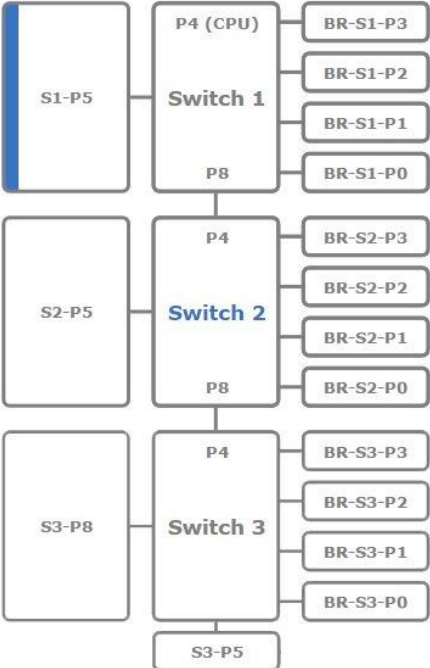
In next example we see that *Switch 1* has two ARL Entries:

- 1) MAC Address *00:50:C2:E4:34:E5* is present on *port 4* using *VLAN ID 0x049*.
- 2) MAC Address *00:24:9B:06:7B:97* is present on *port 5* using *VLAN ID 0x049*

 **Note:** When *IEEE 802.1q (VLAN) mode* is disabled, *VLAN* will be *0x000*.

[System Information](#) [Control Panel](#) [Switch Status](#) [Contact](#)

Switch Status



Switch 2

Functional Mode Dynamic Static

Address Resolution Table Export

MAC address	VLAN ID	Fwd port	Age bit	Static bit
00:0E:C6:F9:FE:7E	000	4	1	0
00:50:C2:E4:32:59	000	4	1	0

 **Note:** By default, the MediaGateway is using Dynamic ARL Table.

Dynamic ARL table

By default, dynamic ARL mode is active on all three internal switches. It means that the information collected from received unicast packets are learned or stored for the future purpose of forwarding frames addressed to the receiving port.

For a received frame, it learns *received MAC* source address, *VLAN ID* (if not present VLAN ID = 0x00) and it creates an entry. This entry is dynamic, so it will be active for 300 seconds. After 300 seconds, if no further frames matching this entry are received, the entry will be *aged* (*aged_bit* = 0) and removed from the forwarding table. New learning will be necessary.

Field	Description
MAC Address	Received Source MAC Address
VLAN ID	VLAN ID associated with the MAC Address
Fwd port	Port associated with the MAC Adr
Age bit	1 = Entry has been learned or accessed since last aging process 0 = Entry has not been accessed since last aging process.
Static bit	Entry has not been learned and cannot expire.

Static ARL table

The MediaGateway permits to each internal switch to use a dynamic or a static ARL table. In *ARL Static Table* mode the entries do not automatically learn MAC addresses or port associations and are not age out by the automatic internal aging process.

Changing the functional mode of a switch.

To change the functional mode of the switch, the following steps should be performed:

1. Select **Switch Status** tab.

System Information
Control Panel
Switch Status
Contact

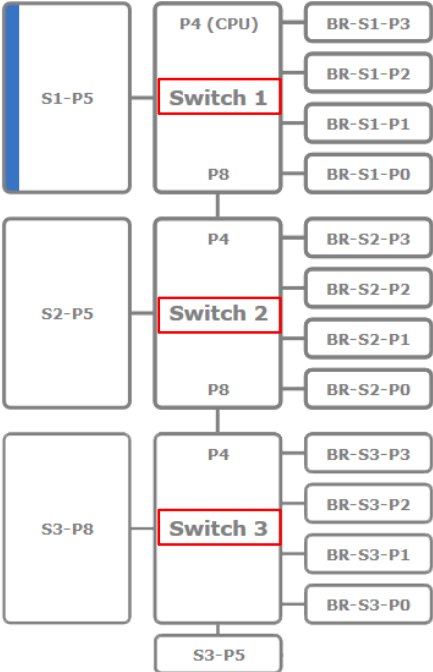
System Information

MediaGateway UUID	75ee83fc680f21669beb62adcbb5cc8f32ed3468	
Hardware version	Media Gateway 2.3	
Application Software version	4.2.4-basic	12:05:08, Nov 24 2016
Bootloader version	3.3.0	15:52:40, Sep 17 2015
Repository ID	706	10:50:30, Nov 23 2016
BMW Extra Functions	Disabled	
CAN Gateway Function	Disabled	
MAC address	00:50:C2:E4:32:59	
IP address	<input style="width: 100%;" type="text" value="192.168.0.49"/>	
Switch 1 ID/Revision	00089500/00	
Switch 2 ID/Revision	00089500/00	
Switch 3 ID/Revision	00089500/00	
Ethernet Phy 1 ID	03625CD2	
Ethernet Phy 2 ID	03625CD2	
Ethernet Phy 3 ID	00000000	

- Select the switch in which you want to modify the ARL Table.

System Information Control Panel **Switch Status** Contact

Switch Status



Global configuration

IEEE 802.1q (VLAN) mode

Double tagging

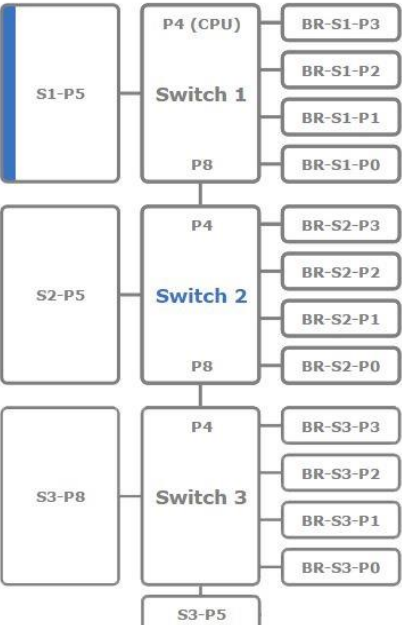
Double tagging TPID (hex)

Select a port or switch on the left for details.

- In the table, which will appear on the right side, user can select **Dynamic** or **Static** mode.

System Information Control Panel **Switch Status** Contact

Switch Status



Switch 2

Functional Mode Dynamic Static

Address Resolution Table Export

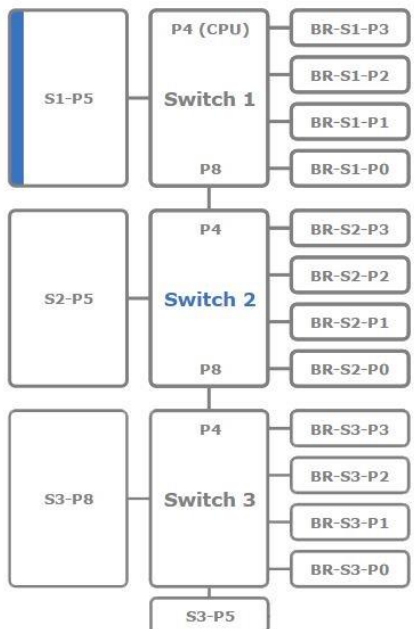
MAC address	VLAN ID	Fwd port	Age bit	Static bit
00:0E:C6:F9:FE:7E	000	4	1	0
00:50:C2:E4:32:59	000	4	1	0

Configuring the ARL table of a switch

To add new ARL entries the user must change the *Functional mode* to *Static* followed by selecting *Edit Table* option. The steps are described below.

System Information Control Panel Switch Status Contact

Switch Status



Switch 2

Configuration changed. [Save configuration](#) Restart after saving

Functional Mode Dynamic Static 1

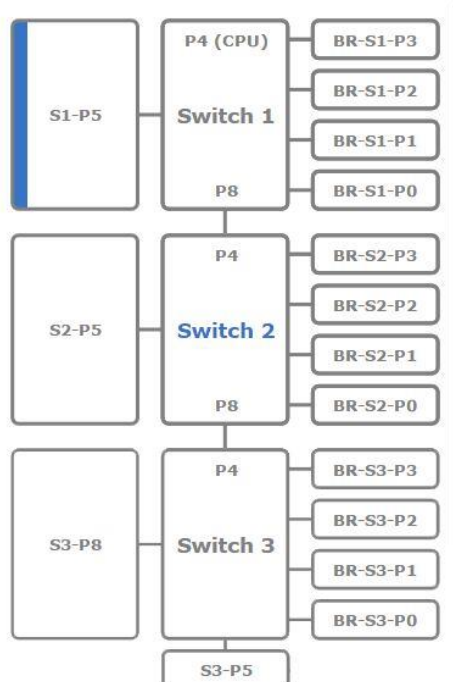
Address Resolution Table 2 [Edit Table](#) [Export](#)

MAC address	VLAN ID	Fwd port	Age bit	Static bit
00:0E:C6:F9:FE:7E	000	4	1	0
00:50:C2:E4:32:59	000	4	1	0

After performing the steps above the configuration options will appear. Here the user can add data manually, import configurations and reset the ARL table.

System Information Control Panel Switch Status Contact

Switch Status



Switch 2

Configuration changed. [Save configuration](#) Restart after saving

Functional Mode Dynamic Static

Address Resolution Table [Close Edit](#) [Export](#)

MAC address	VLAN ID	Fwd port	Age bit	Static bit	
00:0E:C6:F9:FE:7E	000	4	1	0	+
00:50:C2:E4:32:59	000	4	1	0	+

Static Configuration File

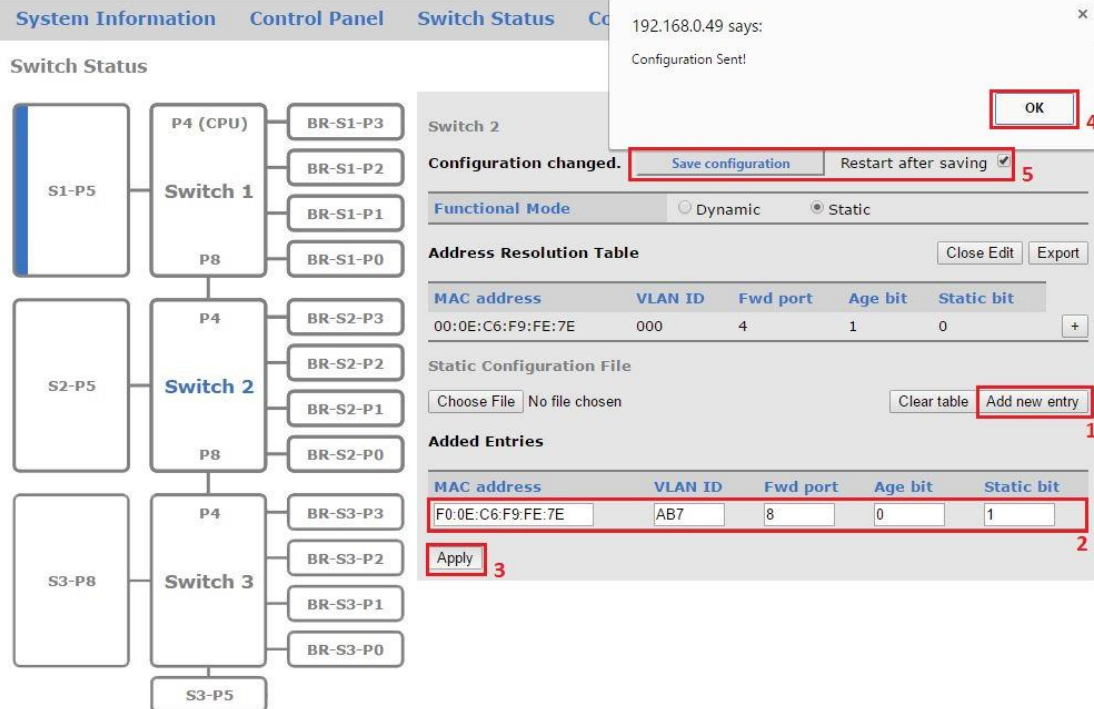
[Choose File](#) No file chosen [Clear table](#) [Add new entry](#)

Added Entries

MAC address	VLAN ID	Fwd port	Age bit	Static bit
Apply				

Adding a unicast

Frames containing a unicast destination address are assigned a forwarding field corresponding to a single port. Adding manually an entry of this type shall be performed as following:



Switch Status

Switch 2

Configuration changed. Restart after saving

Functional Mode Dynamic Static

Address Resolution Table

MAC address	VLAN ID	Fwd port	Age bit	Static bit
00:0E:C6:F9:FE:7E	000	4	1	0

Static Configuration File No file chosen

Added Entries

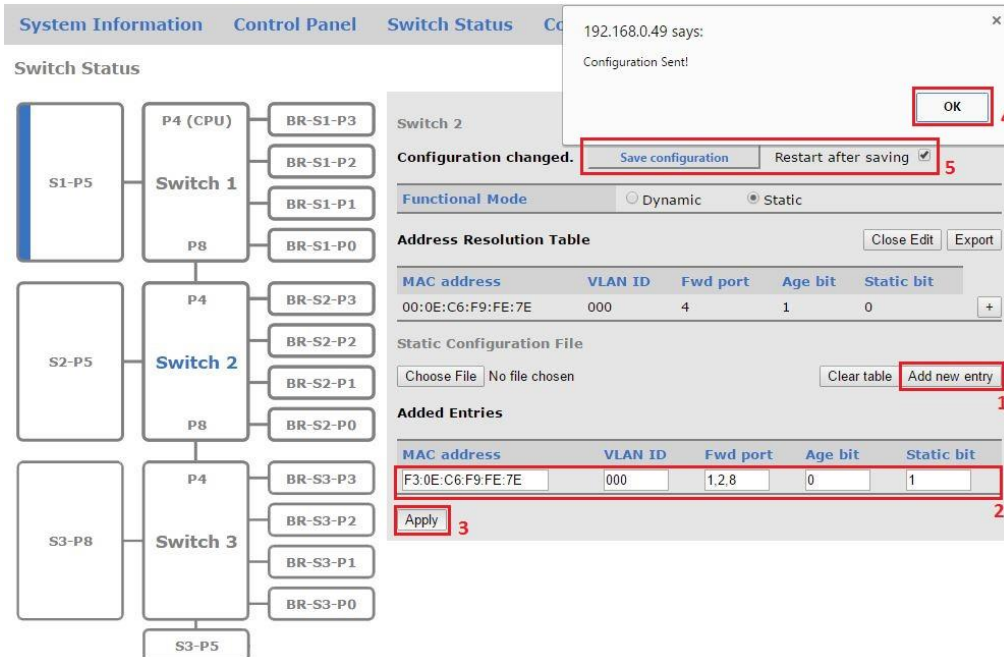
MAC address	VLAN ID	Fwd port	Age bit	Static bit
F0:0E:C6:F9:FE:7E	AB7	8	0	1

After restart the data entered shall be displayed in the **Address Resolution Table** of the switch.

 **Note:** The last bit of first byte of a MAC of a unicast shall be **0**. Ex: FE:FF:FF:FF:FF

Adding a multicast

Frames containing a multicast destination address are assigned a forwarding field corresponding to multiple ports specified in a port map. If no matching ARL entry is found, the packet is flooded to all appropriate ports.



Switch Status

Switch 2

Configuration changed. Restart after saving

Functional Mode Dynamic Static

Address Resolution Table


MAC address	VLAN ID	Fwd port	Age bit	Static bit
00:0E:C6:F9:FE:7E	000	4	1	0

Static Configuration File No file chosen

Added Entries

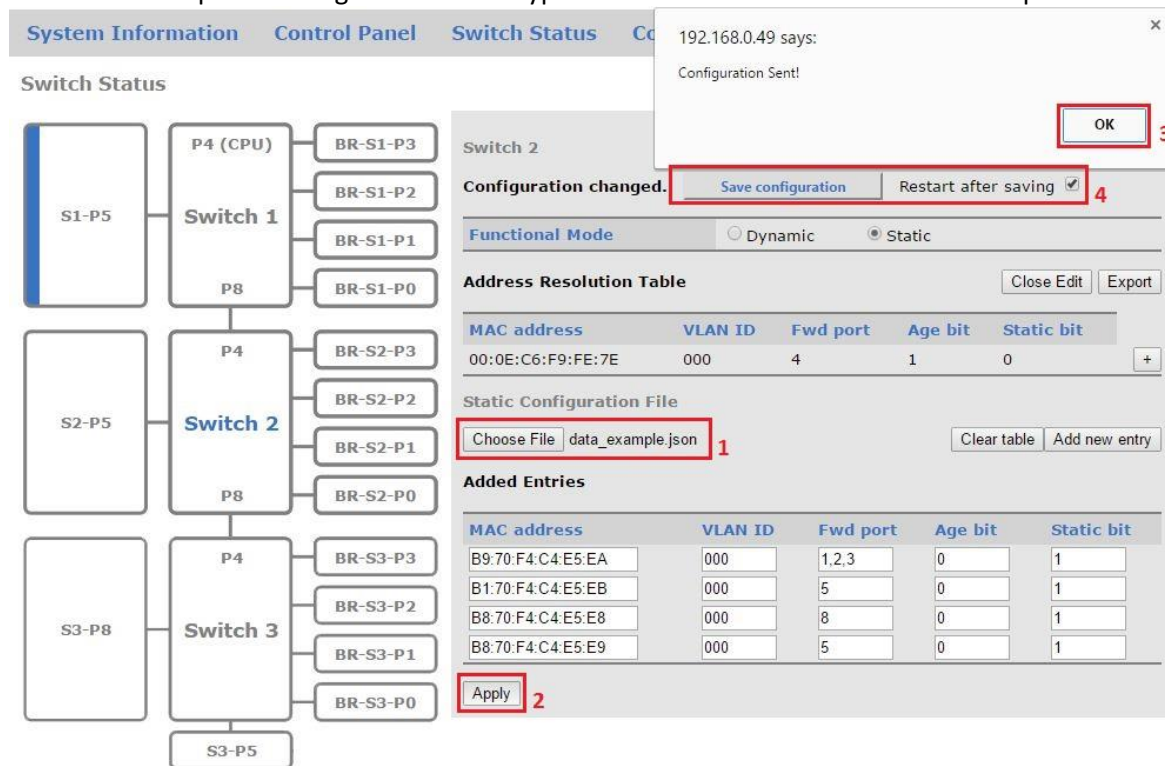
MAC address	VLAN ID	Fwd port	Age bit	Static bit
F3:0E:C6:F9:FE:7E	000	1,2,8	0	1

After restart the data entered shall be displayed in the **Address Resolution Table** of the switch.

 **Note:** The last bit of first byte of a **multicast** shall be **1**. Ex: F9:FF:FF:FF:FF

Importing configuration

The user can import a configuration file of type JSON which contains the desired setup:



System Information Control Panel Switch Status Contact

192.168.0.49 says:
Configuration Sent!

Switch 2

Configuration changed. Save configuration Restart after saving

Functional Mode Dynamic Static

Address Resolution Table Close Edit Export

MAC address	VLAN ID	Fwd port	Age bit	Static bit
00:0E:C6:F9:FE:7E	000	4	1	0

Static Configuration File Choose File data_example.json Clear table Add new entry

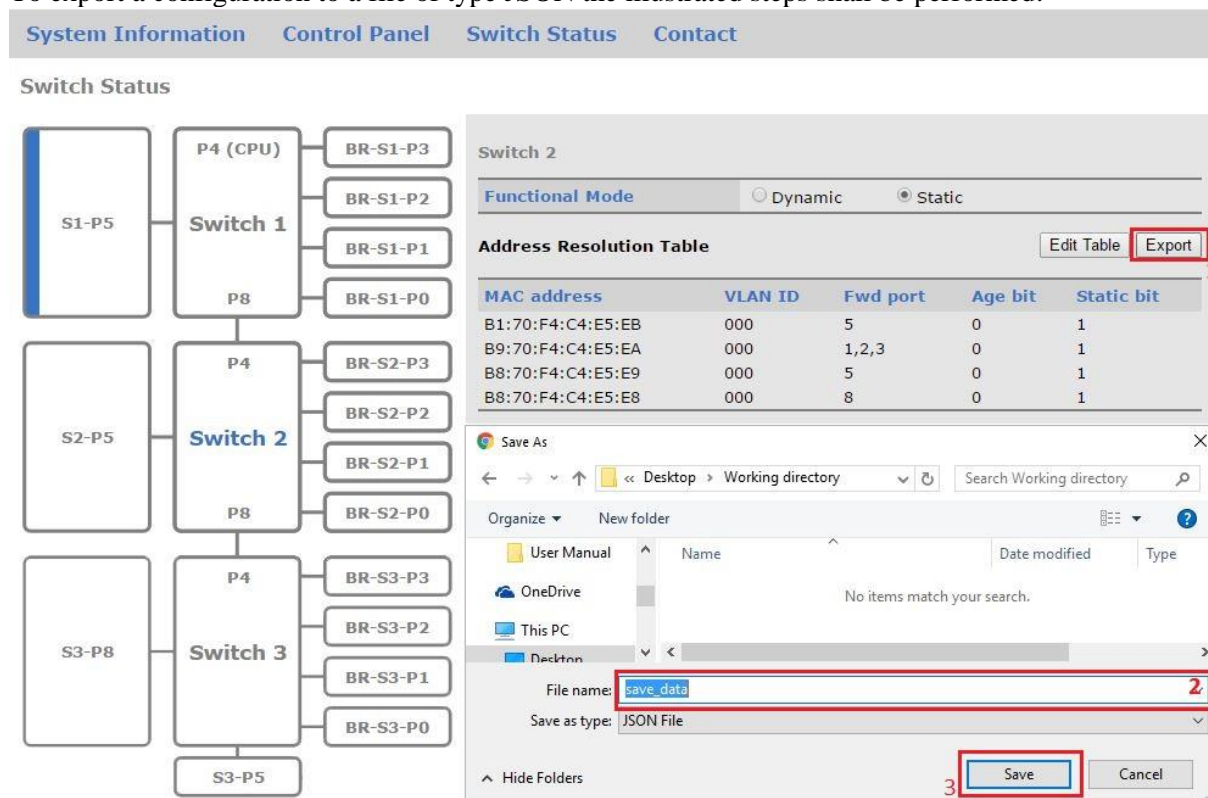
Added Entries

MAC address	VLAN ID	Fwd port	Age bit	Static bit
B9:70:F4:C4:E5:EA	000	1,2,3	0	1
B1:70:F4:C4:E5:EB	000	5	0	1
B8:70:F4:C4:E5:E8	000	8	0	1
B8:70:F4:C4:E5:E9	000	5	0	1

Apply

Export configuration

To export a configuration to a file of type JSON the illustrated steps shall be performed:



System Information Control Panel Switch Status Contact

Switch Status

Switch 2

Functional Mode Dynamic Static

Address Resolution Table Edit Table Export

MAC address	VLAN ID	Fwd port	Age bit	Static bit
B1:70:F4:C4:E5:EB	000	5	0	1
B9:70:F4:C4:E5:EA	000	1,2,3	0	1
B8:70:F4:C4:E5:E9	000	5	0	1
B8:70:F4:C4:E5:E8	000	8	0	1

Save As

Desktop Working directory Search Working directory

Organize New folder

Name Date modified Type

No items match your search.

File name: save_data

Save as type: JSON File

Save Cancel

Configuration file format

Below it is illustrated a valid configuration JSON file:

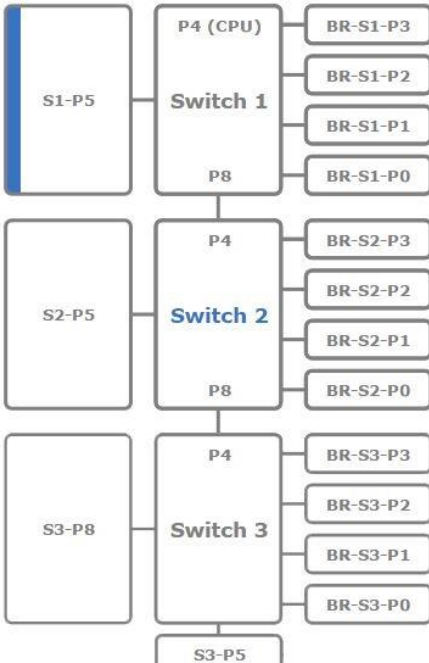
```
{
  "arlEntry":{
    "unicast":[
      {
        "arlMAC": "B8:70:F4:C4:E5:E8",
        "vId": "0",
        "port": "4",
        "age":"0",
        "staticBit":"1"
      },
      {
        "arlMAC": "B8:70:F4:C4:E5:E9",
        "vId": "0",
        "port": "5",
        "age":"0",
        "staticBit":"1"
      }
    ]
  },
  "multicast":[
    {
      "arlMAC": "B9:70:F4:C4:E5:EA",
      "vId": "0",
      "port": ["1","0","2","3","4"],
      "age":"0",
      "staticBit":"1"
    },
    {
      "arlMAC": "B1:70:F4:C4:E5:EB",
      "vId": "0",
      "port": ["8"],
      "age":"0",
      "staticBit":"1"
    }
  ]
}
```

Reset switch configuration

If needed, the user can erase the all the changes applied to a switch as follows:

[System Information](#) [Control Panel](#) [Switch Status](#) [Contact](#)

Switch Status



Switch 2

Configuration changed. [Save configuration](#) Restart after saving **2**

Functional Mode Dynamic Static

Address Resolution Table [Close Edit](#) [Export](#)

MAC address	VLAN ID	Fwd port	Age bit	Static bit	
B1:70:F4:C4:E5:EB	000	8	0	1	+
B9:70:F4:C4:E5:EA	000	0,1,2,3,4	0	1	+
B8:70:F4:C4:E5:E9	000	5	0	1	+
B8:70:F4:C4:E5:E8	000	4	0	1	+

Static Configuration File

[Choose File](#) No file chosen [Clear table](#) [Add new entry](#) **1**

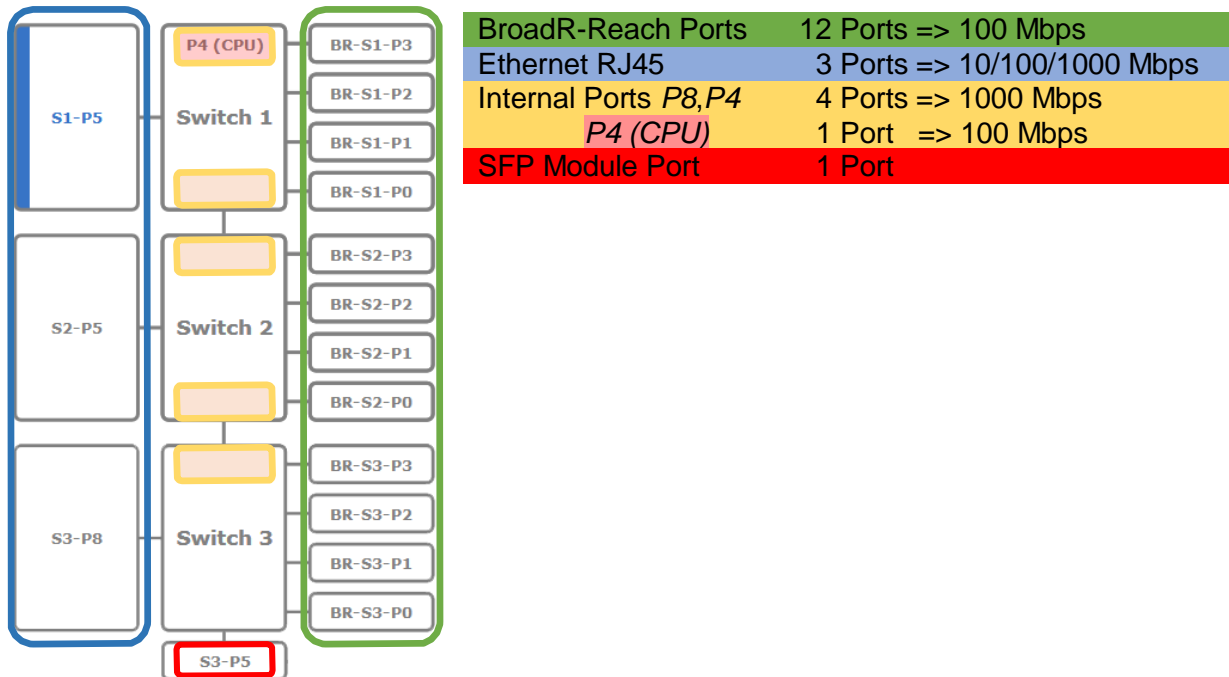
Added Entries

MAC address	VLAN ID	Fwd port	Age bit	Static bit
Apply				

Ports

The MediaGateway has 4 kinds of ports. A total of 21 configurable ports.

Switch Status



- P4 and P8 are internal Ports which are used to connect the switches with a gigabit link.
- The Microcontroller is connected with a 100 MBit/s link to Switch-1 Port 4 (P4 CPU).
- Switch-3 P8 is an extension gigabit port for the right RJ45 port. For every port, following fields are common.

Port Name	Description label will give a better information. (<i>Config-PC, Datalogger, CAM-1, etc.</i>)
Default VLAN ID	Port will use this identifier per default
VLAN membership	Port will be member of this list of VLANs
VLANs to untag	Port will untag packet
Egress VID remarking	Port can modify the inner/outer VLAN at egress.

TX Octets	Tx octets status counter for the outgoing bytes of this port.
Rx Octets	Rx octets status counter for the incoming bytes of this port.

Inner VLAN IDs:	Port will drop packets with single tag specified
Source IP	Port will drop packets with specified source IP address
Destination IP	Port will drop packets with specified destination IP address

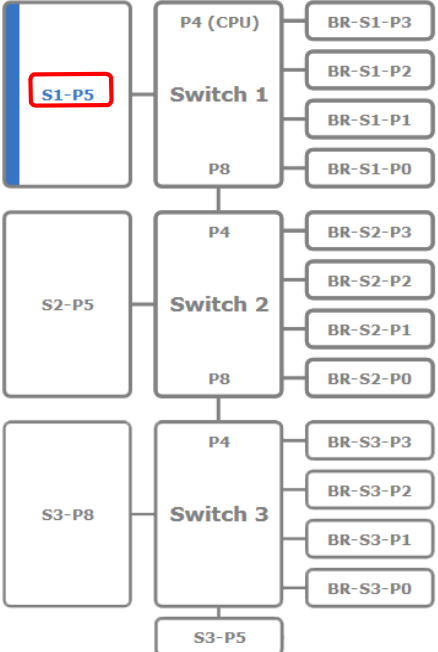
Some other fields are *port dependent* and will be discussed in following sections.

 **Note:** More information about VLANs will be described in chapter 6.

Ethernet Port

System Information
Control Panel
Switch Status
Contact

Switch Status




Switch 1 Ethernet Port 5

Port name	Config-PC
Default VLAN ID	049
VLAN membership	049
VLANs to untag	
Egress VID remarking	Inner: Remove Outer: Remove
Tx octets	1049491
Rx octets	99904
Mirroring	P0 <input type="checkbox"/> P1 <input type="checkbox"/> P2 <input type="checkbox"/> P3 <input type="checkbox"/> P4 <input type="checkbox"/> P8 <input type="checkbox"/>
Speed	Autonegotiation all Capable
Detected Speed	1000 Mbps Full Duplex
Drop ingress packets with...	
• inner VLAN IDs	
• source IP	
• destination IP	

Besides the common fields to all ports, Ethernet ports allows the user to select link speed.

- **Mirroring:** The “Mirroring” feature of a current port copies all **incoming** traffic from the checked port (BroadR-Reach or internal port) to this “capture” port.

 **Note:** Only one port per switch can be the “capture” port! If another port (internal P4 or P8) is using mirroring, Ethernet port cannot use mirroring.

- **Speed:** It is possible to set the speed of an Ethernet port through auto-negotiation. Following table shows the available options:

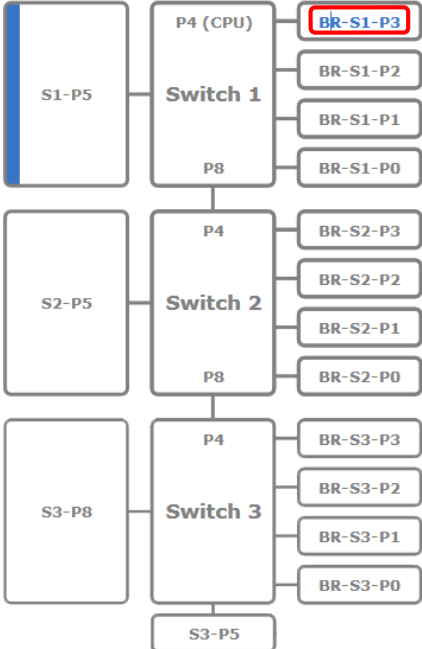
Auto-negotiation all Capable	Duplex and Speed auto-detection
Auto – Only 10 Mbps Capable	Duplex auto-detection – 10 Mbps
Auto – Only 100 Mbps Capable	Duplex auto-detection – 100 Mbps adv.
Auto – Only 1000 Mbps Capable	Duplex auto-detection – 1000 Mbps adv.

- **Detected speed:** Show result of link negotiation. Speed and half/full duplex.

BroadR-Reach Port

System Information
Control Panel
Switch Status
Contact

Switch Status




Switch 1 BroadR-Reach® Port 3

Port name	BR-S1-P3
Default VLAN ID	061
VLAN membership	061
VLANs to untag	
Egress VID remarking	Inner: As received Outer: Remove
Tx octets	0
Rx octets	0
Enable port	<input checked="" type="checkbox"/>
BroadR-Reach® mode	Slave
Output level	Fullout
Link quality	-
Test Mode	Normal operation mode
Drop ingress packets with...	
• inner VLAN IDs	
• source IP	
• destination IP	

Besides the common fields to all ports, *BroadR-Reach* ports allows the user to:


- **Enable port:** With this checkbox the BroadR-Reach ports can be enabled or disabled completely.

 **Note:** If port is disabled and cable is still connected, LED status for this port will be lit but no data is sent or received. Webpage will show no blue bar for this port.

- **BroadR-Reach mode:** On each BroadR-Reach link there has to be one *master* and one *slave* device.

Please set the “BroadR-Reach mode” to the opposite of what the device is set you have connected to this port.

- **Output level:** The “Output Level” is the amplitude level of the BroadR-Reach signal. You can set Full level (Fullout = default) or half amplitude.

 **Note:** Both devices of one BroadR-Reach link have to use the same level. Otherwise you will get an instable link. FullOut Level is always recommended.

- **Link Quality:** The “link quality” is an indicator about the signal integrity of the BroadR-Reach link on this port.

1 = Poor , 5 = Excellent

BroadR-Reach Test Modes

Switch 1 BroadR-Reach® Port 3	
Port name	BR-S1-P3
Default VLAN ID	061
VLAN membership	061
VLANs to untag	
Egress VID remarking	Inner: As received Outer: Remove
Tx octets	0
Rx octets	0
Enable port	<input checked="" type="checkbox"/>
BroadR-Reach® mode	Slave
Output level	Fullout
Link quality	-
Test Mode	Normal operation mode
Drop ingress packets with...	<ul style="list-style-type: none">Normal operation modeTransmit droop test modeTransmit jitter test in Master modeTransmit jitter test in Slave modeTransmitter distortion testTransmitter Power Spectral Density Mask
• inner VLAN IDs	
• source IP	
• destination IP	

For BroadR-Reach Ports it is possible to set a *BroadR-Reach Physical Layer Test Mode*. There are five test modes defined in the BroadR-Reach Specification to check the compliance of a port.

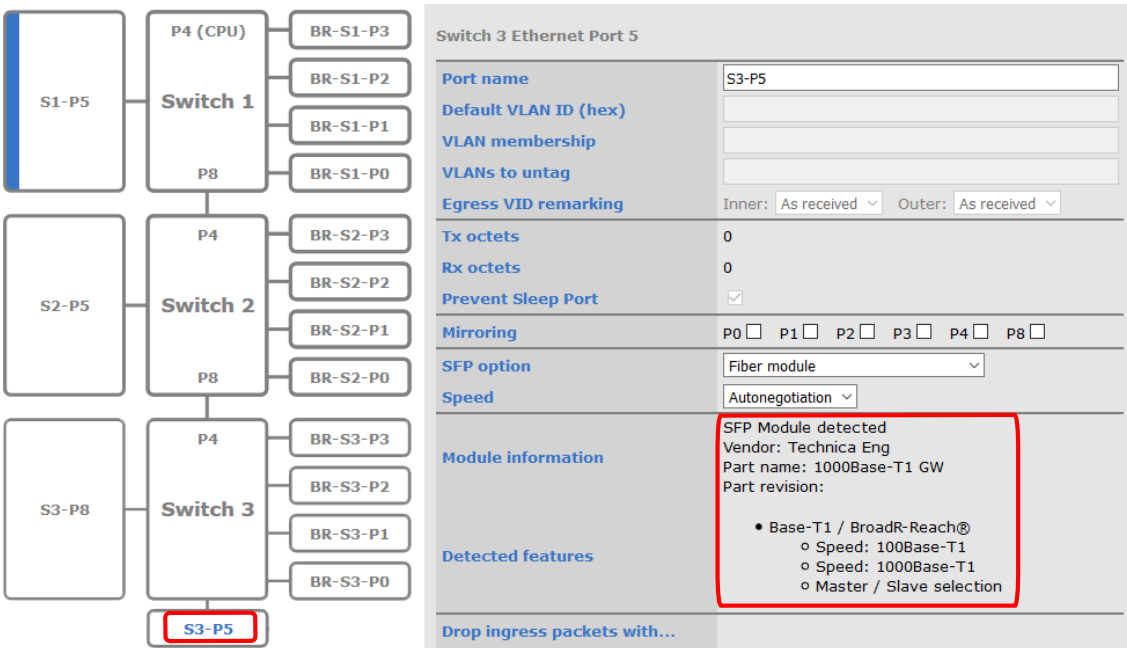
Warning: When a test mode has been selected there is no communication possible for this port.

Important: In case to of BroadR-Reach Master, it is mandatory to restart the Switch to recover link.

Note: For compliance testing an oscilloscope with special test software is necessary.

SFP Port

Up to HW version 2.6, it is possible to read and configure some parameters for connected SFP Modules.



The image shows a network diagram on the left and a configuration interface on the right. The diagram illustrates three switches (Switch 1, Switch 2, and Switch 3) connected to various components. Switch 1 is connected to S1-P5, P4 (CPU), and P8. Switch 2 is connected to S2-P5, P4, and P8. Switch 3 is connected to S3-P8, P4, and P8. Each switch is also connected to four bridge routers (BR-S1-P0 to BR-S1-P3 for Switch 1, BR-S2-P0 to BR-S2-P3 for Switch 2, and BR-S3-P0 to BR-S3-P3 for Switch 3). The SFP port S3-P5 on Switch 3 is highlighted with a red box. The configuration interface on the right shows the settings for Switch 3 Ethernet Port 5. The SFP option is set to 'Fiber module' and the speed is set to 'Autonegotiation'. The detected SFP module information is highlighted with a red box:

```

SFP Module detected
Vendor: Technica Eng
Part name: 1000Base-T1 GW
Part revision:
  • Base-T1 / BroadR-Reach®
    ◦ Speed: 100Base-T1
    ◦ Speed: 1000Base-T1
    ◦ Master / Slave selection
  
```

Besides the common fields to all ports, *SFP* ports allows the user to select which module is connected.


- **SFP option:** You have the choice of different modules.
 1. The SFP Port can be set to “Fiber” if you care using a SFP MiniGBIC Fiber module.
 2. Use “RJ45” for copper modules.
 3. Use HSD for old MediaSwitches which have an HSD connector instead of an SFP slot.

4. The SFP module is not part of standard delivery.

- ✓ The SFPEX 10/100/1000 Modules have been tested in this device.
- ✓ The Bel SFP-1GBT-05 Copper Modules 10/100/1000Base-T have been tested in this device.

The Edimax Mini GBIC (SFP) LC, 1Gigabit/s, 1000 Base-SX Modules have been tested in this device.



 **Note:** New SFP 100Base-T1 and 1000Base-T1 modules are compatible with MediaGateway.

[SFP 100Base-T1](#)



[SFP 1000Base-T1](#)



6. Ethernet CAN Gateway (extra license needed)

The Ethernet CAN gateway can be configured using a web page. Its properties can be set on the “CAN Functions” page. The following picture shows the available settings



System Information Control Panel **CAN Functions** Switch Status Contact


Eth-CAN Gateway Functions Panel

Settings	Basic ▾
Communication mode	<input type="radio"/> UDP <input type="radio"/> RAW <input type="radio"/> Speed RAW <input checked="" type="radio"/> Extrem RAW

CAN Gateway settings can be set as *Basic* or *Advance* mode.

Basic settings

Most common configuration. Gateway between Ethernet and CAN frames and vice versa. User is only able to configure MAC destination addresses for Ethernet outgoing frames.

 **Note:** Basic mode is recommended when using together with ANDi Tool software.

CAN to Ethernet: Outgoing configurable parameters

Target MAC address	<input type="text"/>
EtherType (hex)	1887

Advanced settings

In advanced settings all configuration parameters are available for the users.

There are four modes of communications (UDP, RAW, Speed RAW and Extrem RAW). The switching between them is done using the radio button Communication Mode.

User can use CAN Parameters table to set CAN Channel speed and set a list of CAN IDs to be filtered.

- **Speed:** CAN channel speed can be set to: 125 Kbps, 500 Kbps or 1000 Kbps.
- **CANID Filtering:** Can be activated for each channel independently.
- **Can Listen-Only Mode:** This is used for logging without sending ACK on CAN bus

CAN Parameters

	CAN A	CAN B	CAN C	CAN D	CAN E
Speed	500 Kbps ▾	500 Kbps ▾	500 Kbps ▾	500 Kbps ▾	500 Kbps ▾
CAN ID Filtering	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CAN Listen-Only Mode	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Ethernet CAN Gateway Configuration (UDP mode):

Here the Ethernet CAN gateway can be configured by setting target IP Address and the port of the UDP packets. Non-valid entries will not be accepted and will be replaced by default values. If either the target IP address or the port has the default value set, the Ethernet CAN Gateway will be disabled.

Eth-CAN Gateway Functions Panel

Ethernet CAN Gateway Mode

Communication mode UDP RAW Speed RAW Extrem RAW

CAN Parameters

	CAN A	CAN B	CAN C	CAN D	CAN E
Speed	500 Kbps	500 Kbps	500 Kbps	500 Kbps	500 Kbps
CANID Filtering	Filter: <input checked="" type="checkbox"/>	Filter: <input checked="" type="checkbox"/>	Filter: <input type="checkbox"/>	Filter: <input type="checkbox"/>	Filter: <input type="checkbox"/>

CAN IDs for CAN A	001, 002, 003
CAN IDs for CAN B	004, 001, 005

Ethernet to CAN: Incoming configurable parameters

rxPort 1024

CAN to Ethernet: Outgoing configurable parameters

Destination IP address 192.168.0.55

- Destination IP address** Here the target IP address for the UDP packets can be entered in dot-decimal notation. The default IP address is 255.255.255.255.
- rxPort** MediaGateway will listen for UDP-CAN packets on selected UDP port. Please select a non-reserved port number
 Received CAN messages will be send to destination IP and destination port set on **rxPort**.

Ethernet CAN Gateway Configuration (RAW mode):

Here the Ethernet CAN gateway can be configured by setting target MAC Address and the EtherType of the RAW packets. Non-valid entries will not be accepted and will be replaced by default values. If either the target MAC address or the EtherType has the default value set, the Ethernet CAN Gateway will be disabled.

Eth-CAN Gateway Functions Panel

Ethernet CAN Gateway Mode

Communication mode UDP RAW Speed RAW Extrem RAW

CAN Parameters

	CAN A	CAN B	CAN C	CAN D	CAN E
Speed	500 Kbps	500 Kbps	500 Kbps	500 Kbps	500 Kbps
CANID Filtering	Filter: <input type="checkbox"/>	Filter: <input type="checkbox"/>	Filter: <input type="checkbox"/>	Filter: <input type="checkbox"/>	Filter: <input type="checkbox"/>

Ethernet to CAN: Incoming configurable parameters

EtherType (hex) FC00

CAN to Ethernet: Outgoing configurable parameters

Target MAC address 00:11:22:33:44:55
EtherType (hex) FC01

- Target MAC Address** Target MAC address must respect the usual format (a sequence of six hexadecimal numbers having two bytes size each, separated by a two points delimiter) xx:xx:xx:xx:xx:xx. Note that entering Broadcast MAC address “0xFFFFFFFF” as Target MAC address will cause sending time stamps frames to be disabled.
- Ethertype** EtherType is a two bytes hexadecimal number. EtherType field can accept any value between 0 and FFFF.

6.1 Ethernet CAN Gateway Configuration (Speed and Extreme RAW)

- Speed RAW is faster as normal RAW. Incoming Ethernet-RAW frames are fixed to Ethernet Type: 0x1886
- Extreme RAW is the fastest mode. It is only accepting RAW Frames with EthernetType 0x1887

Structure of a CAN/Ethernet packet

The following picture shows the structure of a CAN packet that is sent as a UDP packet/RAW frame.

	B0	B1	B2	B3	B4	B5	B6	B7
	UDP Packet/RAW frame containing CAN Packet							
0	version	CAN Channel	ID	ID	ID	ID	ID type	frame type
8	DLC	D0	D1	D2	D3	D4	D5	D6
16	D7							

Field	Size	Description
version	uint8	Version of the CAN/Ethernet Packet type. It is always 1 for this type of CAN/Ethernet packet.
CAN channel	uint8	Number between 1 and 4 for the channel CAN of this packet.
ID	uint32	CAN ID for base or extended frame format.
ID type	uint8	0 for 11 Bit standard ID 1 for 29 Bit extended ID
frame type	uint8	0 for CAN data frame 1 for CAN remote transmission request
DLC	uint8	Payload length of the CAN packet.
D0 ... D7	1 to 8 x uint8	Payload

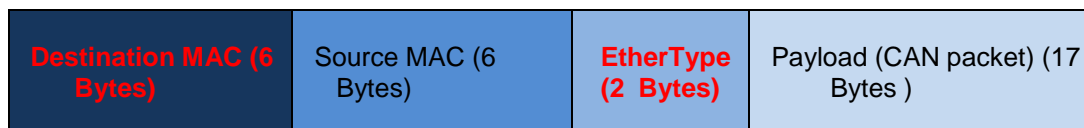
Structure of a UDP packet / RAW frame:

- CAN packet packed in a UDP packet:




UDP Packet size=59

- CAN packet packed in RAW frame:



RAW Frame Size=31

 **Note:** Fields in red color are settable through the website (Ethernet CAN Gateway Configuration).

7. 802.1AS

This chapter explains the current support of the MediaGateway for 802.1AS protocol.

802.1AS is a protocol used between two or more devices to synchronize all of them through an Ethernet communication. This synchronization allows two or more devices (one master and one or multiple slaves) to transmit/receive time-critical information as audio or video through a physical link and assures that all the devices will handle the same time reference to encode/decode correctly the information.

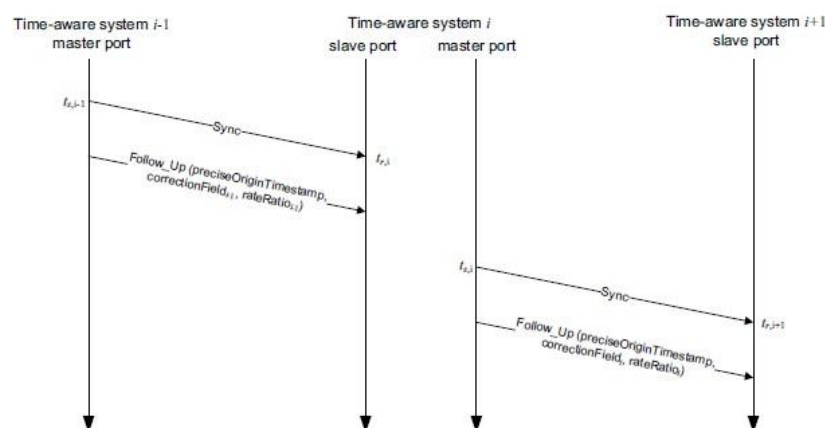
This special software allows to maintain the synchronization between the 802.1AS connected devices, receiving, modifying and creating new corrected packets for the 802.1AS protocol, correcting so the possible delays generated for the routing through the Switch and the propagation delays of the cables.

Protocol

The software allows MediaGateway to be converted in a time-aware system bridge, which implements the transport of time-synchronization information and also the mechanism for the measurement of the propagation delay.

Transport of time-synchronization information

For the reference case where this communication is established only between two devices, „Time-aware system $i-1$ “ configured as 802.1as master and „Time-aware system $i+1$ “ configured as slave, the ports of the MG („Time-aware system I “) implements additionally then the respective opposite sides of the communication, one slave port and one master port, as shown in the next image.

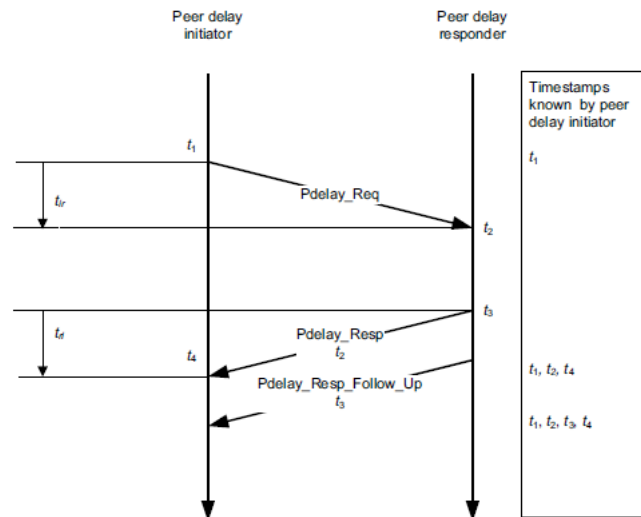


The time-synchronization information contained on the Sync and Follow Up messages sent by the „Time-aware system $i-1$ “ is redirected and only received by the MediaGateway processor.

These packets are decoded and the relevant information extracted. The extracted information is used later to generate, together with the information extracted from the propagation delay algorithm, the new corrected Sync and Follow Up messages that will be sent to the „Time-aware system $i+1$ “. In the new generated packets, a field called „*correction field*“ will be changed and this parameter will be used on reception side to adjust the reference time of the system considering the delay of the switch and the delay in the path „Time-aware system $i-1$ “ to „Time-aware system i “.

Propagation delay measurement

For the correction adjust of the time reference transmitted by the Sync and Follow Up Packets, the delay between the initiator of the protocol „Time-aware system i-1“ and the first slave port of the MediaGateway „Time-aware system i“, should be measured



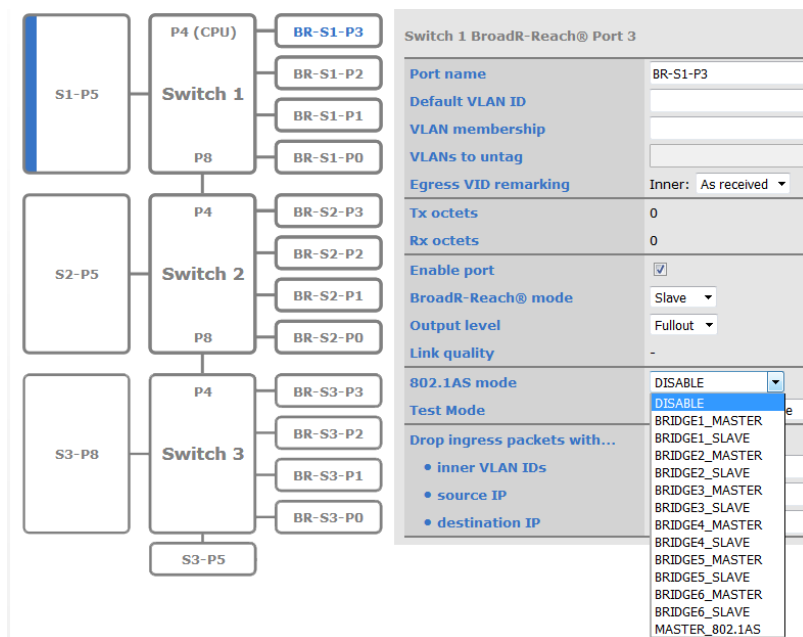
$$D = \frac{t_{ir} + t_{ri}}{2} = \frac{(t_4 - t_1) - (t_3 - t_2)}{2}$$

The measures of the propagation delay are performed by each attached link of an 802.1as communications, it means each side of the link will generate and response to these packets, called Pdelay_Request, Pdelay_Response and Pdelay_Response_Follow_Up.

Using 802.1 AS

MediaGateways allows the user to configure through the webpage six different bridges. Each of them offers two possibilities: *BridgeX_Master* or *BridgeX_Slave*. Each Broad-R Reach port can set as:

1. **Disabled:** Port will not take part of any 802.1AS traffic.
2. **BridgeX_Slave:** Only one per *BridgeX*. It will receive 801.2AS traffic from an external master.
3. **BridgeX_Master:** Port will send 802.1AS traffic coming from its *BridgeX_Slave*.



Note: Only one port in each bridge can receive the information of one attached 802.1AS Master. This means that only one port of this MediaGateway BridgeX should be configured as a BridgeX_Slave, but more than one port of the same BridgeX can be configured as BridgeX_Master, allowing so a distribution of the time reference 1 to N (with all the devices of the bridge sharing the same time reference, with N limited to 3).

4. **Master_802.1AS:** Port will work as 802.1AS Master Clock.

Time	Source	Destination	Protocol	Length	Info
0.30102400	Technica_08:00	LLDP_Multicast	PTPv2	68	Path_Delay_Req Message
0.30185700	Technica_08:00	LLDP_Multicast	PTPv2	60	Sync Message

Traffic capture of a Master Clock

Warning: Redirection of 802.1AS packets to processor are not following normal use of VLANs.

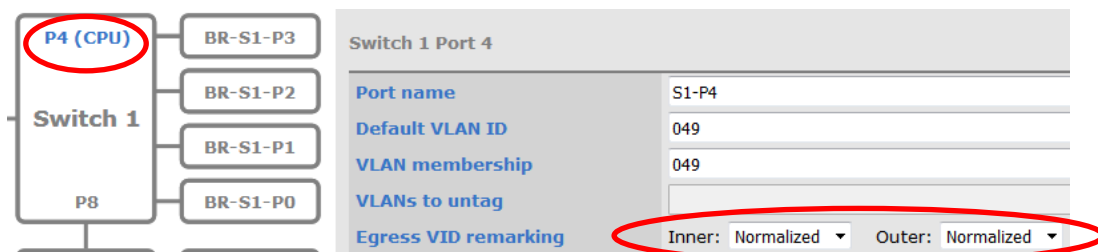
Limitations

Due the need of working constantly with a high precision timestamping's and the huge number of packets pro 802.1AS OABR port that should be received and transmitted by the microcontroller of the MediaGateway there are some limitations that the user has to know before start to use it.

- The implementation allows only the use of the 802.1AS in the 12 x OABR Ports of the MediaGateway, due technical reasons the use of the protocol 802.1AS on the Ethernet Ports is not possible.
- A Bridge should be formed by at least one port configured as Bridge_Slave (Connected with 802.1AS Master) and up to 3 Ports configured as Bridge_Master (Connected with 802.1AS Slave). It means the next possibilities pro Bridge are allowed: 1BS:1BM, 1BS:2BM and 1BS:3BM.
- For a correct synchronization, all ports that forms one Bridge (2 to 4 ports) should be connected to the same Broadcom Ethernet Switch.
 - Broadcom Ethernet Switch 1: OABR Ports 0 to 3
 - Broadcom Ethernet Switch 2: OABR Ports 4 to 7
 - Broadcom Ethernet Switch 3: OABR Ports 8 to 11
- For the use of the 802.1AS Bridge functionality of the MG, the configuration of the MediaGateway should use **double VLAN** with **unidirectional VLANs**.
- For 802.1AS should not be used together with traffic injection. This means that no Ethernet Test Tools should generate traffic and routed using a MediaGateway while 802.1AS is being used.
- Announcement packages from *best master clock* (BMC) algorithm are not corrected or forwarded. They should not be present on automotive as there is only one Master Clock.

⚠ Important: When 802.1AS is activated, there some parameters should be taken into account:


1. It is mandatory to set Egress Remarking of port P4 (CPU) as Normalized / Normalized.



2. The implementation won't be functional using bidirectional VLANs. 802.1AS packets are automatically forwarded to CPU port and destination ports. It is mandatory to use Double Tagging for the processor to be able to send the corrected packet into correct destination port.

8. VLAN Configuration

This chapter describes the Virtual Local Area Network (VLAN) feature supported by internal switches present in the device. MediaGateway provides flexible VLAN configuration for each ingress (receiving) port.

 **Note:** It is not possible to cover all of possible combinations that VLAN feature provides. It will be explained as accurate as possible with a couple of uses cases.

VLAN Basics

A Virtual LAN (VLAN) is a **logical** switched LAN formed by segmenting physical Local Area Networks (LANs).

Separating a switched LAN into one or more VLANS provides multiple advantages:

1. Multicast and Broadcast packages flood are limited only to the required segments to save LAN bandwidth.
2. Provides security. LAN traffic is restricted only to its specific segment.
3. Eases management by logically grouping ports across multiples switches.

VLAN work in the same was as physical LANs. Source device sends a packet to an end station or network device inside the same VLAN.

The MediaGateway allows the user to create Virtual Local Area Networks (VLANs), in order to separate traffic of different sources and providing a better general performance.

Port-Based VLAN

MediaGateway uses port-based VLAN. This feature partitions the switching ports into a virtual private domain designated on a per-port basis. Data switching outside of the port private domain is not allowed.

The port-based VLAN feature works as a filter, rejecting all the traffic destined to non-private domain ports.

Once a packet is received, MediaGateway's switch tries to identify the VLAN for the received packet. A port based VLAN determines the membership of a data frame by examining the configuration of the port that received the transmission or reading a portion of the data frame's tag header. A four-byte field in the header is used to identify the VLAN. This VLAN identification indicates what VLAN the frame belongs to. If the frame has no tag header, the switch checks the VLAN setting of the port that received the frame. If the switch has been configured for port based VLAN support, it assigns the port's VLAN identification to the new frame.

Single Tagging - IEEE 802.1q (VLAN) mode

When the “IEEE 802.1q (VLAN) mode” is enabled, it is possible to can up to 4096 VLANs (Virtual Local Area Network) for routing the traffic through the switch.

System Information **Control Panel** **Switch Status** **Contact**

Switch Status

S1-P5

P4 (CPU)

Switch 1

P8

BR-S1-P3

BR-S1-P2


BR-S1-P1


BR-S1-P0

Global configuration

IEEE 802.1q (VLAN) mode	<input checked="" type="checkbox"/>
Double tagging	<input type="checkbox"/>

Select a port or switch on the left for details.

 **Note:** This is a global option applying to all three switches.

 **Warning:** Expert knowledge is needed to use these VLAN settings! Only use these settings if you have understood the VLAN process.

Difference between a normal Ethernet and a Single tagged VLAN frame is represented as it follows:

VLAN Frame	Ethernet Frame																										
Untag	Destination MAC						Source MAC						EtherType/Size		Payload				CRC / FCS								
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	1	.	.	.	n	1	2	3	4				
	n = 46-1500																										
Single Tag	Destination MAC						Source MAC						802.1Q Header				EtherType/Size		Payload				CRC / FCS				
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	1	2	1	.	.	.	n	1	2	3	4
	TPID=0x8100 PCP/DEI/VID n = 42-1500																										

TPID = Tag Protocol Identifier, EtherType.

A value of 0x8100 indicates that the frame has VLAN 802.1q information.

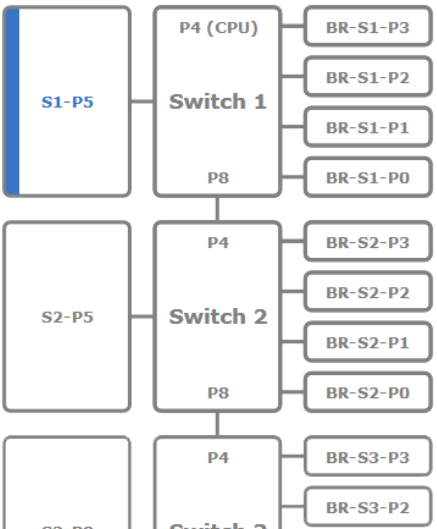
VID = Vlan Identifier.

A value indicating to which VLAN domain belongs the packet.

View of the Port Configuration with Single Tagging activated:

System Information
Control Panel
Switch Status
Contact

Switch Status



Switch 1 Ethernet Port 5

Port name	S1-P5
Default VLAN ID	
VLAN membership	
VLANs to untag	
Egress VID remarking	Inner: <input type="text" value="As received"/> Outer: <input type="text" value="As received"/>
Tx octets	1402891
Rx octets	1153048
Mirroring	P0 <input type="checkbox"/> P1 <input type="checkbox"/> P2 <input type="checkbox"/> P3 <input type="checkbox"/> P4 <input type="checkbox"/> P8 <input type="checkbox"/>
Speed	Autonegotiation all Capable
Detected Speed	1000 Mbps Full Duplex
Drop ingress packets with...	
• inner VLAN IDs	
• source IP	
• destination IP	

Once *IEEE 802.1q (VLAN) mode* is enabled, several fields common to all ports will be available:

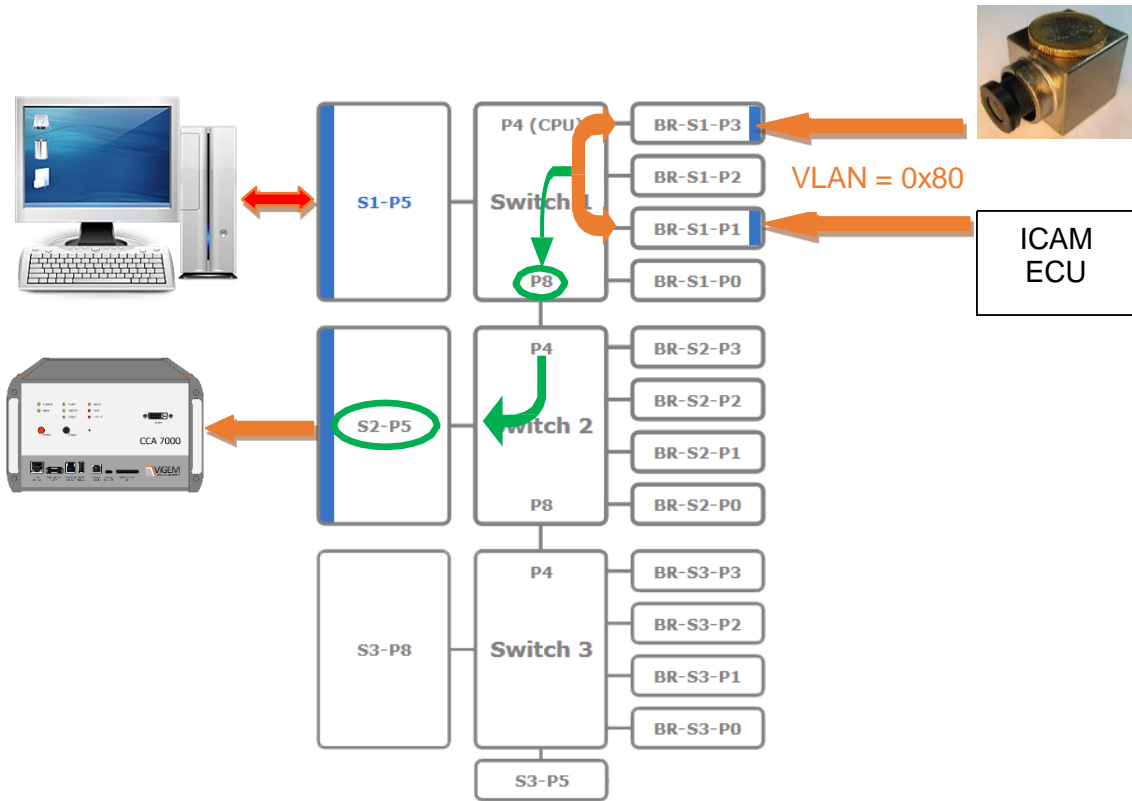
- **Default VLAN ID:** User can set the default VLAN identifier for this port.
 - 📄 **Note:** Untagged frames received to this port will be tagged with its Default VLAN ID. If user does not set a Default VLAN ID, frames will be tagged with ID=1 at ingress.
- **VLAN Membership:** Setting a “VLAN membership” ID makes the port a member in the given virtual LAN. The switch will route (“forward”) packets which are tagged with one of these IDs to this port.
- **VLAN to untag:** Packets matching this list of VLAN IDs will be untagged at egress (“outgoing”).
- **Drop ingress packets with:**
 - inner VLAN IDs:** Packets matching this list of VLAN IDs will be dropped. This fields may be filled with comma or space separated lists of numbers (VLAN IDs). The VLAN IDs are entered in 3 digit hexadecimal format. Valid numbers range from 001 to FFF.

Single Tagging Example

If user needs to analyze traffic between a Camera and ICAM to a “stand alone” datalogger or a computer using a Traffic analyzer, following setup can meet this purpose.

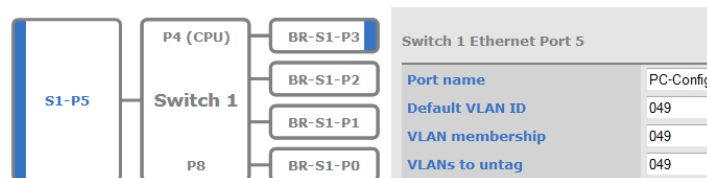
User wants to:

1. Set VLAN for accessing to MediaGateway’s webpage.
2. Set VLAN between ports *BR-S1-P3* and *BR-S1-P1* and redirect it to Log Device at *S2-P5*.



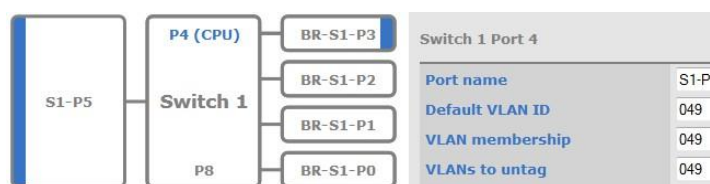
Setting VLAN for MediaGateway’s webpage.

- a. For PC-Config port (*S1-P5*) we set a both VLAN and a VLAN Membership to 0x49



Warning: As our computer is not using VLAN, we untag packets.

- b. For CPU port, we set the same VLAN as in PC-Config.



Warning: MediaGateway’s CPU is not using VLANs. Make sure you untag the frames.

2. Setting VLAN between ports *BR-S1-P3* and *BR-S1-P1* and redirect it to Log Device at *S2- P5*.

It is supposed that the devices (*Camera and iCAM*) are working with VLAN ID=0x80. Now we are going to create a VLAN with ID *0x80* between ports *BR-S1-P3* and *BR-S1-P1*.

- a. Create a VLAN with ID 0x80. Ports *BroadR-Reach 1* and *3* will be members.

Port	Switch 1 BroadR-Reach@ Port 3	Port	Switch 1 BroadR-Reach@ Port 1
BR-S1-P3	Port name: BR-S1-P3	BR-S1-P3	Port name: BR-S1-P3
BR-S1-P2	Default VLAN ID: 080	BR-S1-P2	Default VLAN ID: 080
BR-S1-P1	VLAN membership: 080	BR-S1-P1	VLAN membership: 080
BR-S1-P0	VLANs to untag:	BR-S1-P0	VLANs to untag:

- b. Datalogging is on *Switch2 – Port5*. User has to do a Mirroring from Ports *P3* and *P1* to obtain a copy of traffic flow to *P8*.

Switch 1 Port 8	
Port name	S1-P8
Default VLAN ID	
VLAN membership	080
VLANs to untag	
Egress VID remarking	Inner: As received Outer: As received
Tx octets	42183
Rx octets	0
Mirroring	P0 <input type="checkbox"/> P1 <input checked="" type="checkbox"/> P2 <input type="checkbox"/> P3 <input checked="" type="checkbox"/> P4 <input type="checkbox"/> P5 <input type="checkbox"/>

 **Note:** Mirroring copies only traffic inside the same VLAN Membership.

- c. On port *P4* from *Switch-2*, the membership *0x80* must be added. At this moment all the packets from ports *P3* and *P1* from the *Switch 1* will be visible through *P4*. Last step is forwarding all the traffic to the Datalogger port *S2-P5*.

Switch 2 Ethernet Port 5	
Port name	S2-P5
Default VLAN ID	
VLAN membership	080
VLANs to untag	
Egress VID remarking	Inner: As received Outer: As received
Tx octets	52040
Rx octets	30947
Mirroring	P0 <input type="checkbox"/> P1 <input type="checkbox"/> P2 <input type="checkbox"/> P3 <input type="checkbox"/> P4 <input checked="" type="checkbox"/> P8 <input type="checkbox"/>

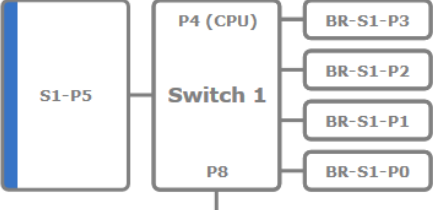
Double Tagging - IEEE 802.1q (VLAN) mode

Media Gateway supports *Double tagging*. This feature can be enabled at the global configuration.

 **Note:** This is a global option applying to all three switches.

[System Information](#) [Control Panel](#) [Switch Status](#) [Contact](#)

Switch Status

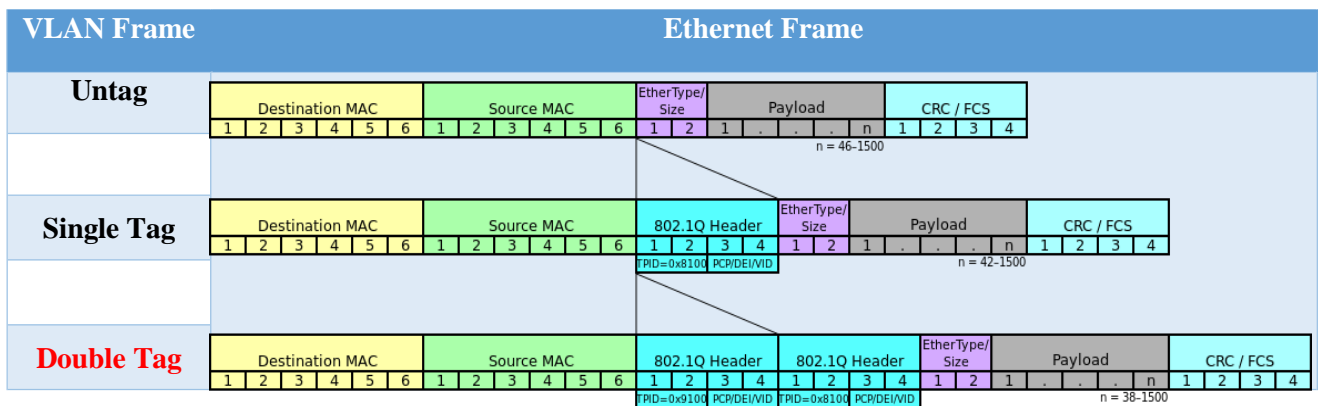


Global configuration

- IEEE 802.1q (VLAN) mode
- Double tagging
- Double tagging TPID (hex)

Select a port or switch on the left for details.

This feature allows to use a second tag “Outer Tag” besides the Single tag “Inner Tag”. This extra tag (Double tag) provides an addition layer of tagging to the existing IEEE 802.1Q VLAN. When the double-tagging feature is enabled, users can expect two VLAN tags in a frame.



TPID = Tag Protocol Identifier, EtherType.

A value of 0x9100 indicates that the frame has double tag information.

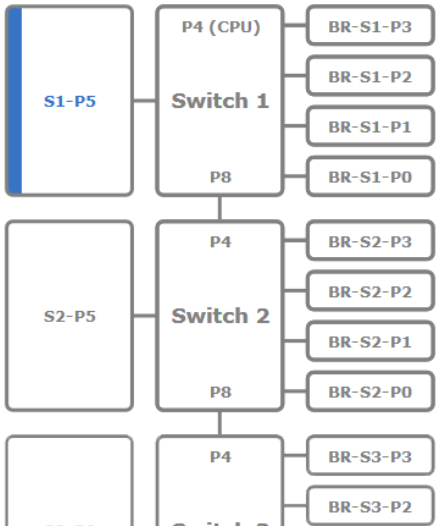
Outer VID = Tag close to Source MAC is the ISP tag (Outer Tag).

Inner VID = Tag following is the Customer tag (Inner Tag).

With enabled “Double tagging” for each port, user can set now the following parameters for VLAN settings. Following picture shows in green the available fields for *Double tagging*.

System Information
Control Panel
Switch Status
Contact


Switch Status



Switch 1 Ethernet Port 5

Port name	S1-P5
Default VLAN ID	
VLAN membership	
VLANs to untag	
Egress VID remarking	Inner: As received ▼ Outer: As received ▼
Tx octets	2610780
Rx octets	3012168
Mirroring	P0 <input type="checkbox"/> P1 <input type="checkbox"/> P2 <input type="checkbox"/> P3 <input type="checkbox"/> P4 <input type="checkbox"/> P8 <input type="checkbox"/>
Speed	Autonegotiation all Capable ▼
Detected Speed	1000 Mbps Full Duplex
Drop ingress packets with...	<ul style="list-style-type: none"> <li style="background-color: #e0ffe0; margin-bottom: 2px;">• inner VLAN IDs <li style="background-color: #f0f0f0; margin-bottom: 2px;">• source IP <li style="background-color: #f0f0f0;">• destination IP

Default VLAN ID: User can set the default VLAN identifier for this port.

 **Note:** Untagged frames received to this port will be tagged with its Default VLAN ID. In case of

VLAN Membership: Setting a “VLAN membership” ID makes the port a member in the given virtual LAN. The switch will route (“forward”) packets which are tagged with one of these IDs to this port.

VLAN to untag: Packets matching this list of VLAN IDs will be untagged at egress (“outgoing”).

 **Note:** This option is not available if “*Double tagging*” is activated.

Drop ingress packets with inner VLAN IDs: Packets matching this list of VLAN IDs will be dropped.

If double tagging is active the “Normalization” process takes place on all ingress packets on all ports. The normalization process modifies all incoming packets with one or zero VLAN tags so that every packet has two VLAN tags afterwards. Every packet that flows through the switch is double tagged.

Three different cases of normalization are possible:

1. **Packet is received with two VLAN tags** (double tagged)
 - ⚠ The packet will be left unchanged
 - ⚠ The packet will be forwarded if the packet VLAN is matching its Outer VLAN membership.
2. **Packet is received with one VLAN tag** (a single tagged packet with a so called customer tag /inner tag)
 - ⚠ A second tag (also called ISP /outer tag) with TPID 0x9100 will be added with configured with the “Default VLAN” ID for this port to the packet during normalization.
3. **A packet is received without any VLAN tags**
 - ⚠ In this case, the normalization process adds two VLAN tags, the inner tag with TPID 0x8100 and the outer tag with TPID 0x9100. Both tags will hold the “Default VLAN” ID of this port.
With double tagging enabled, only the **outer** tag (the one with TPID 0x9100) is relevant for frame forwarding, i.e. the “VLAN membership” refers to the outer tag.
TPID = Tag Protocol Identifier, EtherType
A value of 0x8100 indicates that the frame has VLAN 802.1q information.
A value of 0x9100 indicates that the frame has QinQ (Double Tagging).

With “Egress VID remarking” (available if double tagging is enabled only) you can specify, how to modify the packets before they are sent on this port.


Three options are available for inner and outer VLAN tag:

1. **“As received”** means the tag shall left unchanged as the packet was received from its ingress port.
If this tag was there before normalization it shall be sent with the same value.
If no tag was there on ingress it shall be sent without this tag.
2. **“Normalized”** means that the tag shall be sent as the internally normalized VLAN tag (Default VID of the receiving port).
3. **“Remove”** indicates that this tag shall be removed before the packet is transmitted.

Double Tagging Example

The scenario of this use-case is:

- Up to six BroadR-Reach cameras should be connected to their dedicated ports on one central ICAM ECU.
- Each camera stream must not influence the other camera streams.
- Mirroring of all the camera data streams to the “Datalogger” gigabit Ethernet port has to be possible.

 **Note:** By default all series cameras are configured as a BroadR-Reach *Master* and *FullOut*.

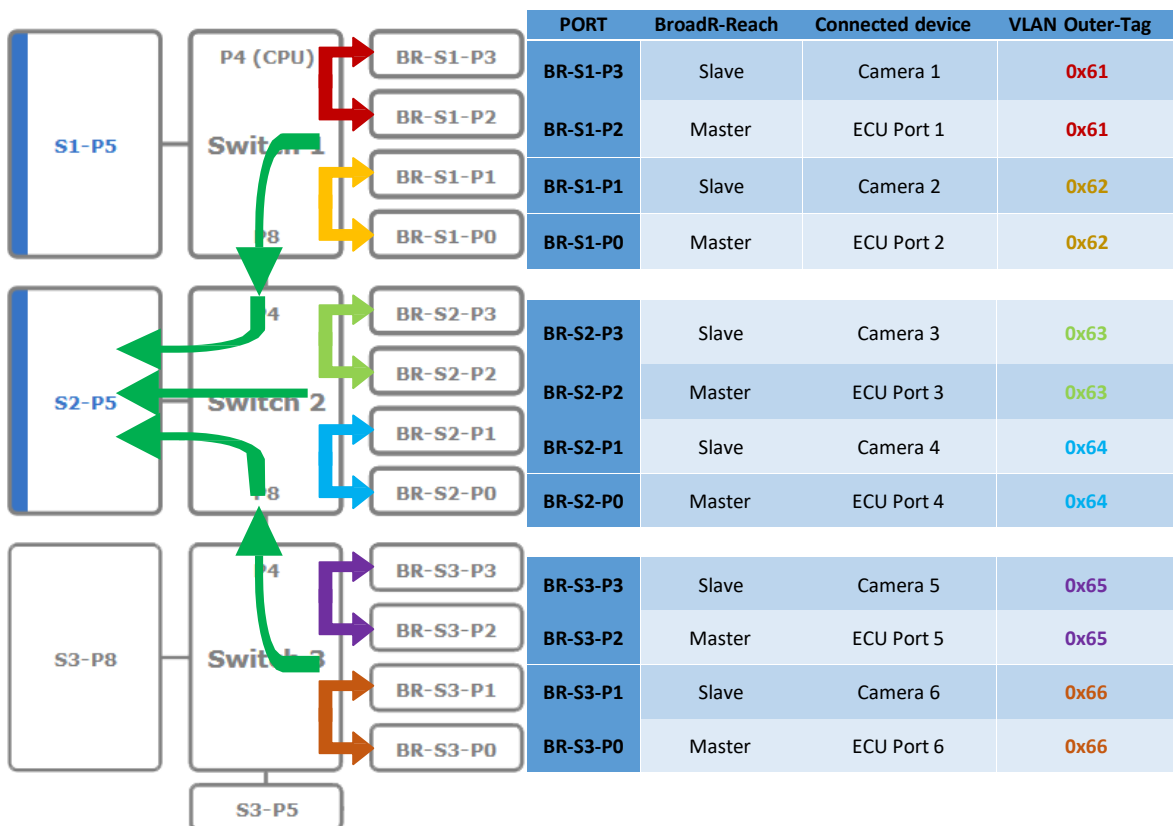
The BroadR-Reach cameras used for series production send their Ethernet packets with a VLAN tag (inner Tag) to identify the “type” of traffic transported in it (e.g. video- or control-data).

With *double tagging* a VLAN “outer-tag” will be added to each data packet.

After all data is stored on the datalogger hard disk drive, the *information “On which connection has the packet been received?”* can be derived from the ID number of the “outer tag”.

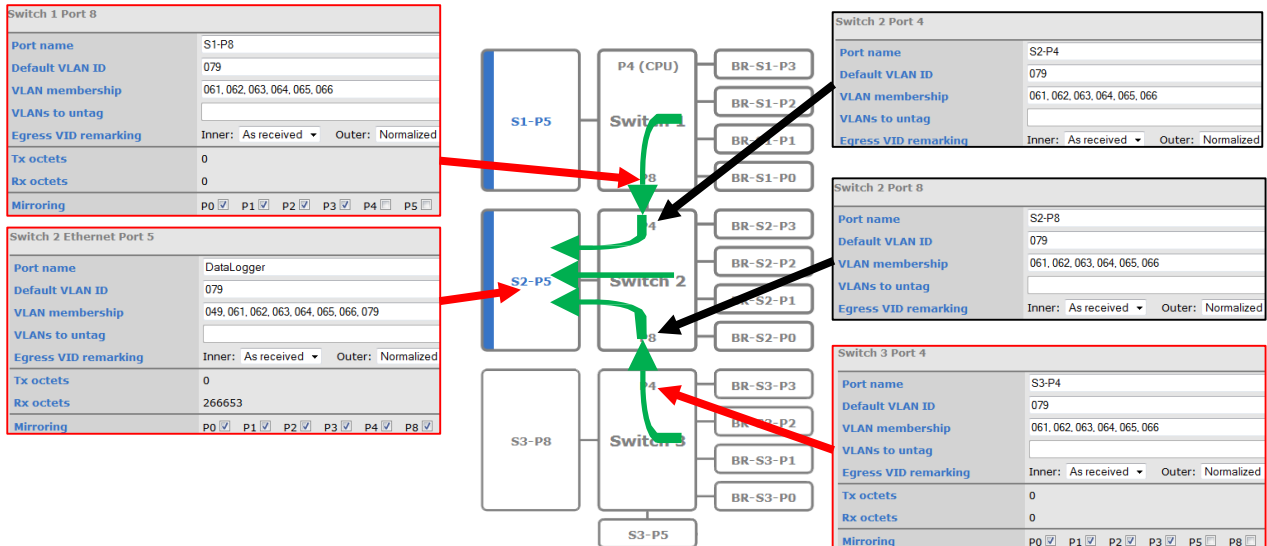
Each Ethernet packet recorded by the data-logger has an inner VLAN tag (with TPID 0x8100) showing the type of traffic and an outer VLAN tag (with TPID 0x9100) containing information about the ingress port.

Packets sent from the camera to the ECU (and vice versa) will show up unchanged on the outgoing BroadR-Reach port with only one VLAN tag. The switch is “transparent” for this connection.

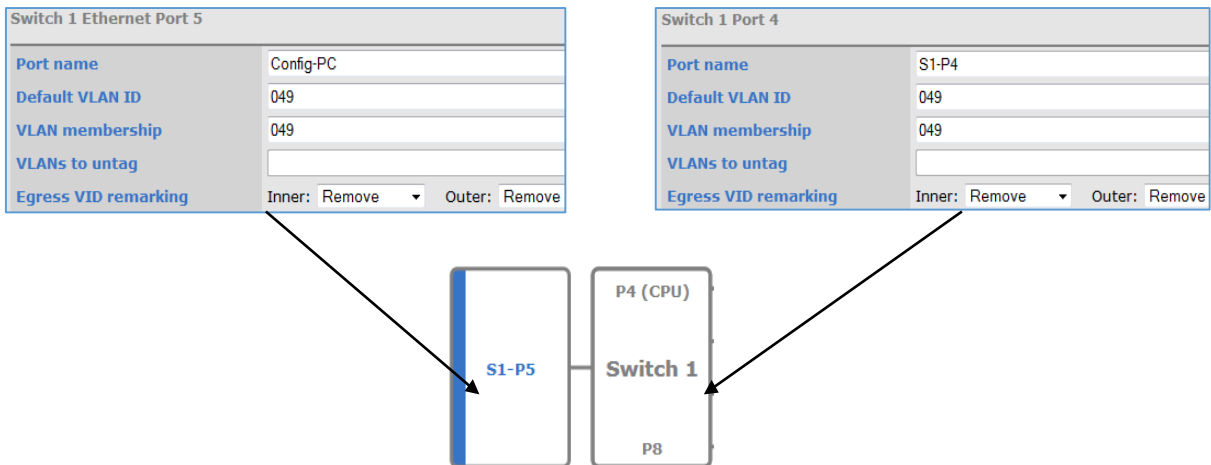


 **Note:** For BR-Ports, **Egress VID Remarking** will be set. **Inner:** *As received.* **Outer:** *Remove*

The “Datalogger” gigabit Ethernet port and the internal ports (P4, P8) connecting the three switches are configured so that all incoming BroadR-Reach packets will be mirrored to the data-logging port, regardless of the address resolution learning mechanism of the switches (“promiscuous mode”). To achieve this, suitable mirror maps are defined as well as the VLAN Memberships of the BR-Ports for the internal ports (S1-P8 and S3-P4) and the data-logging port (S2-P5).



The gigabit Ethernet port “Config-PC” shares a private VLAN (ID 0x049) with port S1-P4 to be able to reach the internal CPU of the MediaSwitch for configuration and status-monitoring. All outgoing packets on the “Config-PC” port will be untagged (all VLAN tags removed) for usage with a standard desk-top PC.

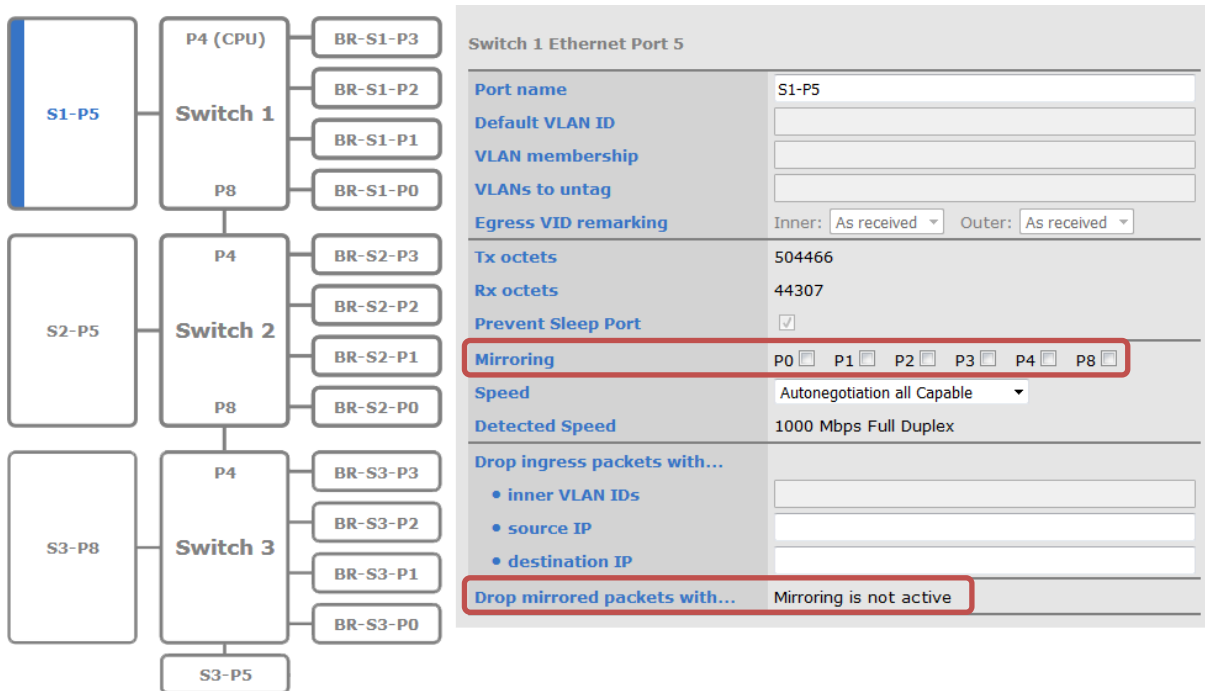


Note: There is a pre-configured port-based forward map that avoids packet-forwarding from ports other than the “Config-PC” port to the CPU port (S1-P4). This rule is intended to prevent flooding the CPU with useless packets and prevent loops. This implies that the integrated webserver of the MediaSwitch is reachable via the port “Config-PC” only.

9. MAC Filtering for mirroring

This new feature allows the user to filter undesired packets arriving from several sources to be mirrored to a Datalogger.

 **Note:** This feature is only available on Ethernet Ports (S1-P5, S2-P5, S3-P5, S3-P8)



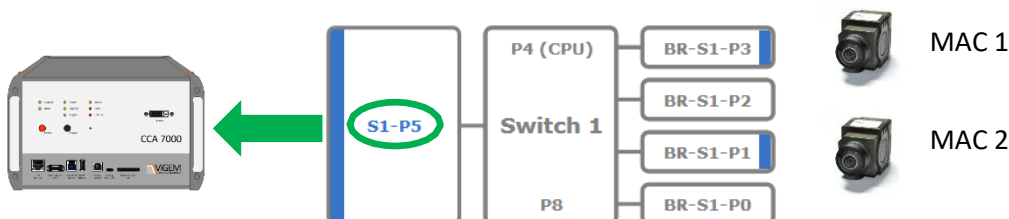
Switch 1 Ethernet Port 5	
Port name	S1-P5
Default VLAN ID	
VLAN membership	
VLANs to untag	
Egress VID remarking	Inner: As received Outer: As received
Tx octets	504466
Rx octets	44307
Prevent Sleep Port	<input checked="" type="checkbox"/>
Mirroring	P0 <input checked="" type="checkbox"/> P1 <input checked="" type="checkbox"/> P2 <input checked="" type="checkbox"/> P3 <input checked="" type="checkbox"/> P4 <input checked="" type="checkbox"/> P8 <input checked="" type="checkbox"/>
Speed	Autonegotiation all Capable
Detected Speed	1000 Mbps Full Duplex
Drop ingress packets with...	
• inner VLAN IDs	
• source IP	
• destination IP	
Drop mirrored packets with...	Mirroring is not active

By default, no port has Mirror activated, so this feature won't be active by default

If the user wants to mirror traffic from several sources but does not need all of them to be mirrored, this options allows to “filter” undesired MAC sources.

Next example will clarify how MAC Filtering for mirroring ports is working:

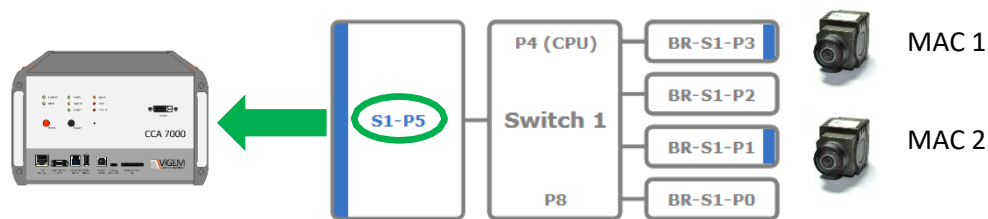
1. Mirroring is active and MAC filtering disabled




In this case, all devices will be mirrored on S1-P5 as usual in normal mirroring.

2. Mirroring is active and MAC filtering activated for Broadcast packets

Port name	S1-P5
Default VLAN ID	
VLAN membership	
VLANs to untag	
Egress VID remarking	Inner: As received Outer: As received
Tx octets	2706306
Rx octets	2785473
Prevent Sleep Port	<input checked="" type="checkbox"/>
Mirroring	P0 <input type="checkbox"/> P1 <input checked="" type="checkbox"/> P2 <input type="checkbox"/> P3 <input checked="" type="checkbox"/> P4 <input type="checkbox"/> P8 <input type="checkbox"/>
Speed	Autonegotiation all Capable
Detected Speed	1000 Mbps Full Duplex
Drop ingress packets with...	
• inner VLAN IDs	
• source IP	
• destination IP	
Drop mirrored packets with...	
• MAC Destination 1	FF:FF:FF:FF:FF:FF
• MAC Destination 2	
• MAC Destination 3	
• MAC Destination 4	
• MAC Destination 5	
• MAC Destination 6	



In this case, all devices will be mirrored on S1-P5 as usual in normal mirroring but packets with destination MAC `FF:FF:FF:FF:FF:FF` which the user does not need to analyze will not reach the port S1-P5.

 **Note:** MAC filtering will not affect the normal forwarding behavior of the Switch. Dropped packets at mirroring port will still reach its destination.

10. MediaGateway Remote Control

From firmware version 4.1.23, it is possible to configure and change some values of the MediaGateway through SOME/IP messages.

Currently there are some methods implemented:

1. Restart device
2. Import Configuration
3. Export Configuration
4. Import Dynamic Configuration
5. Check Status
6. Wake Up Line Trigger
7. Wake Up Line Sense
8. Port Enable
9. Port Master/Slave
10. Reset to Defaults
- 11.

To use one of the previous, user should be send an SOME/IP packet over UDP to the MediaGateway.

UPD Packet should be sent to:
 IP destination: MediaGateway IP
 UDP Port: 30491

This SOME/IP packet contains 16 bytes of header. The bytes description of following table refers only the SOME/IP header (16 bytes after UDP layer) and payload.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Service ID [16bit]										Method [16 bit]																					
Length [32 bit]																															
Request ID [32bit]																															
Protocol Version [8 bit]								Interface Version [8 bit]								Message Type [8 bit]								Return Code [8 bit]							
PAYLOAD [variable size]																															

Covered by Length

Source:192.168.0.150:30491 (depending on Computers IP)
 Destination:192.168.0.49:30491 (depending on MediaGateways current IP)
 ServiceID: 0x0124
 MethodID: 0x0001 (depending on users requested method)
 Length: 0x8 + sizeof(payload)
 Request: 0x00000000
 Interface version: 0x1
 Protocol version: 0x1
 Message Type: 0x00
 SessionID: 0x0000 ClientID: 0x0000
 Payload: (if necessary)

The fields of a SOME/IP request (message from user to MediaGateway) differs only on:
Method ID
Length (depending on used payload)
Payload

Reset device

This method performs a complete device reset. Configuration after a device restart will loaded from flash.

Method ID: 0x0001

- a) **REQUEST:** Method ID has to be set to 0x0001. No payload needed.

```
Internet Protocol Version 4, Src: 192.168.0.150 (192.168.0.150), Dst: 192.168.0.49 (192.168.0.49)
User Datagram Protocol, Src Port: 30491 (30491), Dst Port: 30491 (30491)
SOME/IP Protocol, Service ID: 0x0124, Method ID: 0x0001, Length: 8, Session ID: 0x0000
  Message ID: 0x01240001
  Service ID: 0x0124 (DebugServiceMediaSwitch)
  Method ID: 0x0001
  Length: 8
  Client ID: 0x0000
  Session ID: 0x0000
  SOME/IP Version: 0x01
  Service Version: 0x01
  Message Type: 0x00 Request
  Return Code: 0x00 ok
```

- b) **RESPONSE:** This method returns a SOME/IP Message with Return Code 0x00 (OK) before restarting.

Import configuration

Same behavior as Import button from Webpage. It will store the load configuration into the flash
New settings will be applied at next device restart.

Method ID: 0x0002

- a) **REQUEST:** **Payload** of this message is the configuration file as HEX stream.

 **Note:** Length field should be adjusted

```
Internet Protocol Version 4, Src: 192.168.0.150 (192.168.0.150), Dst: 192.168.0.49 (192.168.0.49)
User Datagram Protocol, Src Port: 30491 (30491), Dst Port: 30491 (30491)
SOME/IP Protocol, Service ID: 0x0124, Method ID: 0x0002, Length: 359, Session ID: 0x0000
  Message ID: 0x01240002
  Service ID: 0x0124 (DebugServiceMediaSwitch)
  Method ID: 0x0002
  Length: 359
  Client ID: 0x0000
  Session ID: 0x0000
  SOME/IP Version: 0x01
  Service Version: 0x01
  Message Type: 0x00 Request
  Return Code: 0x00 ok
  Payload: 0a0a0a0842522d53312d50300a0a0a0842522d53312d5031...
```

- b) **RESPONSE:** This method returns a SOME/IP Message with Return Code 0x00 (OK)

Export Config

Same behavior as Export button from Webpage. Response message from MediaGateway will contain the CFG file in its payload as HEX stream.


Method ID: 0x0003

- REQUEST:** Method ID has to be set to 0x0003. No payload needed.
- RESPONSE:** This method returns a SOME/IP Message with Return Code 0x00 (OK)

```

[+] Internet Protocol Version 4, Src: 192.168.0.49 (192.168.0.49), Dst: 192.168.0.150
[+] User Datagram Protocol, Src Port: 30491 (30491), Dst Port: 30491 (30491)
[+] SOME/IP Protocol, Service ID: 0x0124, Method ID: 0x0003, Length: 235, Session ID:
    Message ID: 0x01240003
    Service ID: 0x0124 (DebugServiceMediaswitch)
    Method ID: 0x0003
    Length: 235
    Client ID: 0x0000
    Session ID: 0x0000
    SOME/IP Version: 0x01
    Service Version: 0x01
    Message Type: 0x80 Response
    Return Code: 0x00 ok
    Payload: 0a0a0a0842522d53312d50300a0a0a0842522d53312d5031...
  
```

0000	c4 7d 46 15 59 22 00 50	c2 e4 30 00 08 00 45 00	.}F.Y".P ..O...E.
0010	01 0f 0a 5e 00 00 40 11	ed 68 c0 a8 00 31 c0 a8	...A..@. .h...1..
0020	00 96 77 1b 77 1b 00 fb	00 00 01 24 00 03 00 00	...W.W... ..3... ..
0030	00 eb 00 00 00 00 01 01	80 00 0a 0a 0a 08 42 52BR
0040	2d 53 31 2d 50 30 0a 0a	0a 08 42 52 2d 53 31 2d	-S1-P0.. ..BR-S1-
0050	50 31 0a 0a 0a 08 42 52	2d 53 31 2d 50 32 0a 0a	P1...BR -S1-P2..
0060	0a 08 42 52 2d 53 31 2d	50 33 0a 0a 0a 08 42 52	..BR-S1- P3...BR
0070	2d 53 32 2d 50 30 0a 0a	0a 08 42 52 2d 53 32 2d	-S2-P0.. ..BR-S2-
0080	50 31 0a 0a 0a 08 42 52	2d 53 32 2d 50 32 0a 0a	P1...BR -S2-P2..
0090	0a 08 42 52 2d 53 32 2d	50 33 0a 0a 0a 08 42 52	..BR-S2- P3...BR
00a0	2d 53 33 2d 50 30 0a 0a	0a 08 42 52 2d 53 33 2d	-S3-P0.. ..BR-S3-
00b0	50 31 0a 0a 0a 08 42 52	2d 53 33 2d 50 32 0a 0a	P1...BR -S3-P2..
00c0	0a 08 42 52 2d 53 33 2d	50 33 0a 07 0a 05 53 31	..BR-S3- P3...S1
00d0	2d 50 35 0a 07 0a 05 53	32 2d 50 35 0a 07 0a 05	-P5...S 2-P5...S
00e0	53 33 2d 50 35 0a 07 0a	05 53 31 2d 50 34 0a 07	S3-P5... ..S1-P4..
00f0	0a 05 53 31 2d 50 38 0a	07 0a 05 53 32 2d 50 34	..S1-P8. ...S2-P4
0100	0a 07 0a 05 53 32 2d 50	38 0a 07 0a 05 53 33 2d	...S2-P 8...S3-
0110	50 34 0a 07 0a 05 53 33	2d 50 38 12 00	P4...S3 -P8..

 **Note:** Payload of this message is the configuration file as HEX stream.


Dynamic Config

It is useful for automation of tests which different configurations are needed.

This method loads a configuration and applies it with “fast restart”. No complete reset is needed.

When Dynamic Configuration is applied and running, Host LED will blink faster as in normal operation.

This Dynamic Configuration will run until next device restart or new load dynamic configuration.

 **Note:** At a device restart, current configuration stored in flash will be applied.

Method ID: 0x0004

- REQUEST:** Same as Import Configuration Method. Method ID has to be set to 0x0004
- RESPONSE:** Same as Import Configuration Method.

Check Status

This method will response with the current status of the device. Current status can be:

Normal Mode: When current configuration is loaded from flash.

Dynamic Mode: When current configuration is loaded dynamically. In dynamic mode, Host LED will blink a little faster.

Method ID: 0x0005

- a) **RESPONSE:** This method returns a SOME/IP Message with Return Code 0x00 (OK). The response payload will contain: Normal Operation or Dynamic Operation

Payload	Byte[0]	
Value	0x01	0x02
Info	Normal	Dynamic

Set WakeUp Line Status

This method provide users the possibility of driving the wakeup line to high or low level.

Two wake up lines are available in the MediaGateway

Method ID: 0x0006

- a) **REQUEST:** Method ID has to be set to 0x0006. Payload will have to contain the pair values { wakeup line, line status }

If user want to set WakeUp Lines to High, the payload should contain these two bytes:

Payload	Byte 0 (line select)		Byte 1(line new status)	
Value	0x01	0x02	0x00	0x01
Info	WakeUp Line 1 or 2		Low or High	

- b) **RESPONSE:** This method returns a SOME/IP Message with Return Code 0x00 (OK) if values passed are correct. Otherwise it will return Code 0x01 (NOT_OK)

Get WakeUp Line Status

This method returns the state of the selected wake up line.

Method ID: 0x0007

- a) **REQUEST:** Method ID has to be set to 0x0007. **No payload needed.**
- b) **RESPONSE:** This method returns a SOME/IP Message with Return Code 0x00 (OK) and its payload will contain the current status of both WakeUp Lines

Payload	Byte[0] (Status Line 1)		Byte[1] (Status Line 2)	
Value	0x00	0x01	0x00	0x01
Info	Low or High		Low or High	

Port Enable (OABR)

It allows the user to enable or disable selected BroadR-Reach ports.

Method ID: 0x0008

- a) **REQUEST:** Method ID has to be set to 0x0008.

First byte will select the desired port. Valid range is 0 to 11. (0x00 to 0x0B in hexadecimal)

Payload	Byte[0]	Byte[1]	
Value	0x00 to 0x0B	0x00 or 0x01	
Info	BR Port select	0x00	0x01
		Disable	Enable

- b) **RESPONSE:** This method returns a SOME/IP Message with Return Code 0x00 (OK)

Port Master/Slave (OABR)

It allows the user to set selected BroadR-Reach ports in Master or Slave Mode.

This method it is useful in cases where user does not know which mode is using the DUT (Device under Test)

Method ID: 0x0009

- a) **REQUEST:** Method ID has to be set to 0x0009.

First byte selects the desired port. Valid range is 0 to 11. (0x00 to 0x0B in hexadecimal)

Second byte refers to new OABR mode for selected port. Slave or Master.

Payload	Byte[0]	Byte[1]	
Value	0x00 to 0x0B	0x00 or 0x01	
Info	BR Port select	0x00	0x01
		Slave	Master

- b) **RESPONSE:** This method returns a SOME/IP Message with Return Code 0x00 (OK)

Reset to default

It performs a reset configuration to default values and device restarts.

Method ID: 0x0010

- a) **REQUEST:** Method ID has to be set to 0x0010. No payload needed.

- b) **RESPONSE:** This method returns a SOME/IP Message with Return Code 0x00 (OK) before restarting.

Get System Information

This method returns device information and its active licenses.

Method ID: 0x0011

- a) **REQUEST:** Method ID must be set to 0x0011. **No payload needed.**
- c) **RESPONSE:** This method returns a SOME/IP Message with Return Code 0x00 (OK) and its payload will contain the following parameters

Payload	Byte[0]	Byte[1]	Byte[2..4]	Byte[5]	Byte[6]	Byte[7]
Value	0x02	0x06	0x040262	0x00	0x01	0x00
Info	HW version high	HW version low	SW version	Basic BMW	CAN	FlexRay

The response is showed above, is showing the information shown on System Information Page

Hardware version	Media Gateway 2.6
Application Software version	4.2.98
Bootloader version	3.3.0
Repository ID	5575c07
BMW Extra Functions	Disabled
CAN Gateway Function	Unlock
FlexRay Gateway Function	Disabled

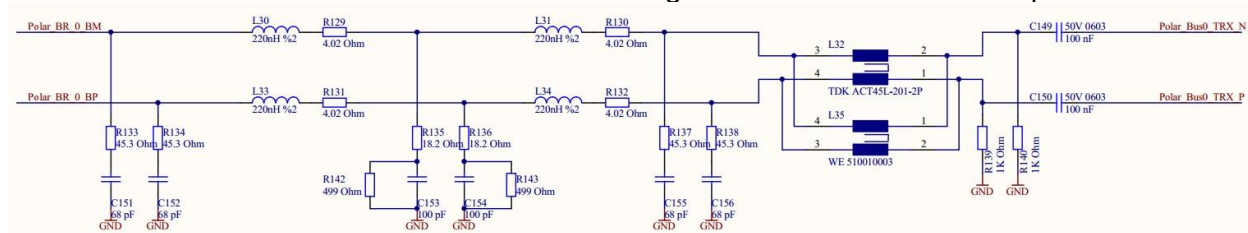
11. Hardware Variants

Different versions of the MediaGateway have been built. Here some information about hardware variants. The HW version is stated on the label on the bottom of the case.

BroadR-Reach Analog Filter:

All filter versions are compatible with each other.

Hardware Version 2.0 and above have the following filter for all BroadR-Reach ports:



L32 and L35 are placement options.

In Version 2.0 and 2.1 the CMC L32 is not fixed.

In Version 2.2 and above the CMC L35 is not fixed.

Debug connector

There is a debug connector on the Tyco Connector side of the case. This small connector is only for customer service purpose.

Warning: Do not connect anything to this port.

Startup Time


The startup time on the device has been greatly reduced in firmware version 3.7. It is dependent of the used hardware version.

MediaSwitch (all Versions), MediaGateway Version up to 2.1:

PowerUp and Processor Boot time:	65 ms
Configuration time depending on complexity:	173 ms
BroadR-Reach LinkUp time:	20-130 ms

MediaGateway Version since 2.1a:

PowerUp and Processor Boot time:	65 ms
Configuration time depending on complexity:	47-55 ms
BroadR-Reach LinkUp time:	20-130 ms


 **Note:** On the RJ45 gigabit ports the Linkup time is about 3 to 4 seconds. This is because of IEEE Auto Negotiation which must be done in gigabit mode.


12. Application Firmware Update


You can download the latest firmware and documentation for the MediaGateway here:


<http://www.technica-engineering.de/MediaGateway>


The application firmware of the device may be updated by the following process:

 **Warning:** Never downgrade the bootloader or application to a former version. This could cause serious problems.

 **Note:** If you update the application the bootloader should also be updated to the latest version.

 **Warning:** Not following this instruction may cause erroneous states of the device. You will have to send it back to Technica Engineering for repair. Technica Engineering may charge support fees for this service.

 **Warning:** Only upgrade to the latest firmware. Do not downgrade to old releases. Otherwise it may happen that you cannot access the device anymore because old firmware does not support new hardware.

 **Note:** You need to have administration privileges on a Windows PC to be able to do the firmware update on the MediaGateway.

1. Power up the device by a stable 12 Volt DC power supply. Do **not** switch off the powersupply during the update process.
2. It is recommended to connect the Wake-up line (Pin 8 of the black MQS connector) to 12 Volt of the same power supply to make sure the ECU is awake during update.
3. Connect a Windows PC with a RJ45 cable directly to the left RJ45 Port of the MediaGateway and make sure there is a link. Do not connect a switch in between.
4. Disconnect all other Ethernet, CAN, FlexRay, LIN and BroadR-Reach links from the MediaGateway.
5. **Disable the Firewall** of the Windows PC. Set the network device of the PC to the same subnet as the MediaGateway. (For example 192.168.0.100 and 255.255.0.0)
6. Check that your firmware package you received from Technica Engineering contains the following files:
redtool.exe EthernetSwitch.crc.srec

You will need to have java installed on your PC.


7. Check that the “Host” LED toggles slowly (so the device is running in application mode).
8. Check that you can access the website at 192.168.0.49 (or whatever the IP address of the MediaGateway is).

9. Open a DOS-Box and execute the following command to enter bootloader mode:

```
redtool.exe -t 192.168.0.49 -e
```

Option `-t` specifies the IP Address of the MediaGateway.

Option `-e` restarts the MediaGateway and starts it in bootloader mode.


 **Note:** The Host LED is blinking fast when in bootloader mode.

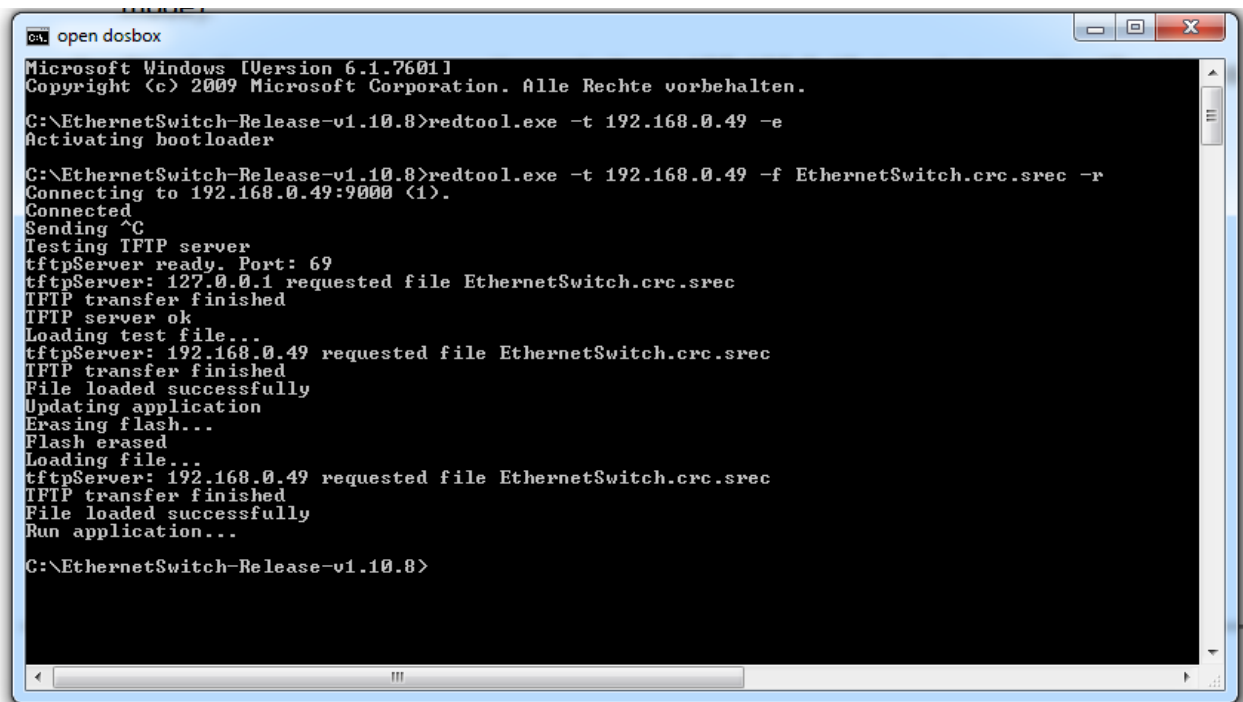
10. In the DOS-Box execute the following command:

```
redtool.exe -t 192.168.0.49 -f EthernetSwitch.crc.srec -r
```

Option `-t` specifies the IP Address of the MediaGateway. Option `-f` specifies the new firmware file.

Option `-r` activates the application mode after successful update.

 **Note:** during the update process the Host LED will stop to blink. This is a normal condition. Do not reset the device! The update process will **last about one minute**. When the update is finished the Host LED will toggle slowly again.



```
open dosbox
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. Alle Rechte vorbehalten.

C:\EthernetSwitch-Release-v1.10.8>redtool.exe -t 192.168.0.49 -e
Activating bootloader

C:\EthernetSwitch-Release-v1.10.8>redtool.exe -t 192.168.0.49 -f EthernetSwitch.crc.srec -r
Connecting to 192.168.0.49:9000 (<1>).
Connected
Sending ^C
Testing TFTP server
tftpServer ready. Port: 69
tftpServer: 127.0.0.1 requested file EthernetSwitch.crc.srec
TFTP transfer finished
TFTP server ok
Loading test file...
tftpServer: 192.168.0.49 requested file EthernetSwitch.crc.srec
TFTP transfer finished
File loaded successfully
Updating application
Erasing flash...
Flash erased
Loading file...
tftpServer: 192.168.0.49 requested file EthernetSwitch.crc.srec
TFTP transfer finished
File loaded successfully
Run application...

C:\EthernetSwitch-Release-v1.10.8>
```

11. You can re-activate your Windows firewall after successful update.

13. Frequently Asked Questions – FAQ

Q: What is the delay time for Ethernet packets through the switch?

A: The propagation delay of the switch depends on the load. The switch works collisionfree. So buffers are used to solve collisions. These buffers delay packets for some time and cause delay jitter. On high load these times rise exponential. On normal load the delay should be about 0.3 ms. But if the packet passes all 3 switches it may sum up to about 1 ms.

Q: Is AVB supported?

A: Currently Audio Video Bridging is not supported.
Only automotive 802.1AS time synchronization protocol is implemented.

Q: What to do to get CAN, FlexRay and LIN supported?

A: In the standard firmware edition these interfaces are not supported. Please contact the sales of Technica Engineering GmbH to get information about advanced software features.

Q: When I use the MediaGateway in my test setup, I cannot access the configuration website anymore.

A: The host microcontroller is jammed by mislead packets. Please use a valid VLAN configuration and avoid too much broadcast packets.

Q: After a firmware update the host LED is still blinking fast. What to do?

A: The firmware update failed, and the host is still in bootloader mode. Please restart the device and try to update the application again as described in this manual.

Q: All LEDs on the front of the MediaGateway are lit permanently?

A: The host microcontroller is not running. Maybe a firmware update has failed. Please send the device to Technica Engineering GmbH for service.

Q: I have problems with the website user interface.

A: The website is tested with Firefox and Internet Explorer. Firefox is preferred. Chrome is not supported.

Q: I have problems with firmware update. TFTP Timeout error is appearing.

A: It is known that some Ethernet-USB adapters are having problems with Update procedure.
Try to connect your MediaGateway directly to your integrated LAN Adapter.

14. Contact



System Information Control Panel Switch Status Contact

Contact

Technica Engineering GmbH

LeopoldStr. 236
80807 München

Phone +49(0) 8988986971

Fax +49(0) 8932490265

E-mail info@technica-engineering.de

In the „Contact Tab „information is displayed how to contact us if you need service.

If you have any questions regarding this product please or you want to obtain buy a new li- cense, you can contact us at:

Technica Engineering GmbH
LeopoldStr 236
80807 München Germany

Fax: +49-89-34290265

info@technica-engineering.de

www.technica-engineering.de