

2-Port OABR Multi-Media-Switch

(EAN 4038816090041 - Art.-No. 94798)



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1. Delivery

Please check the packaging and contents for damage before startup:

- > Does the packaging indicate something was damaged during transport?
- > Are signs of use visible on the device?

You may not operate the OABR Multi-Media-Switch if something seems to be damaged. In any case of doubt, please contact our technical support.

Package contents:

- i-NOVATIVE OABR Multi-Media-Switch
- 2 USB-cable
- Network Cable RJ45
- Tyco MQS 18 Pol connection cable

System requirements (for GUI):

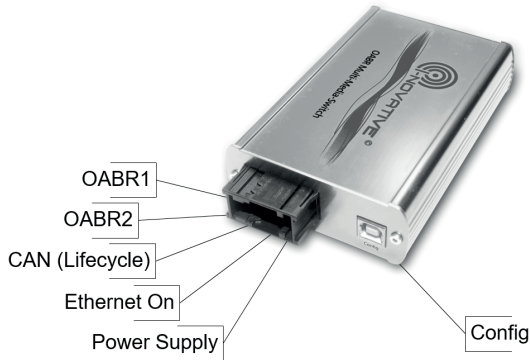
- Microsoft Windows 2000, Windows XP 32/64Bit, Windows Vista 32/64Bit, Windows 7 32/64Bit, Windows 8 32/64Bit
- x86 compatible Processor (32 Bit or 64 Bit)
- 512MB RAM
- 30 MByte free discspace
- Screen resolution 1024x768 or higher with at least 256 colors

2. Commissioning and configuration

2.1. Commissioning and connection

Step 1

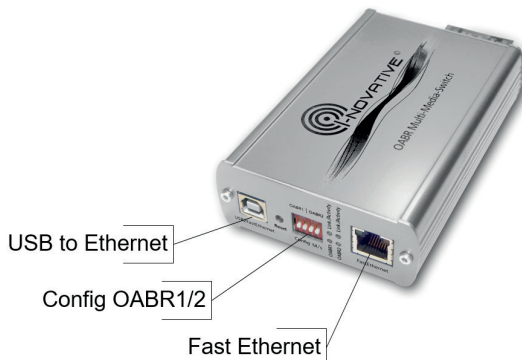
Connect your OABR Multi-Media-Switch to the existing test environment using the interface cable. If you do not have an i-NOVATIVE original cable, you can do your own cable wiring according to the description of pinning in chapter 2.5. Connect the two OABR ports of the OABR Multi-Media-Switch to the OABR ports of the devices to be connected.



Make sure that the power supply is within the specified range and connect the two CAN Bus lines. Please note that the correct CAN connections (CAN-High, CAN-Low) are used due to the CAN bus can be disturbed by incorrect connection. If necessary, check the correct configuration based on the pinning (2.5.).

Step 2

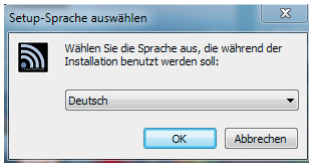
Connect your PC to a USB-A cable or RJ45 Ethernet cable and proceed with section 2.2. (Software installation and driver installation). Alternatively, the OABR Multi-Media-Switch can also be connected to the PC via a standard network switch and the Ethernet cable



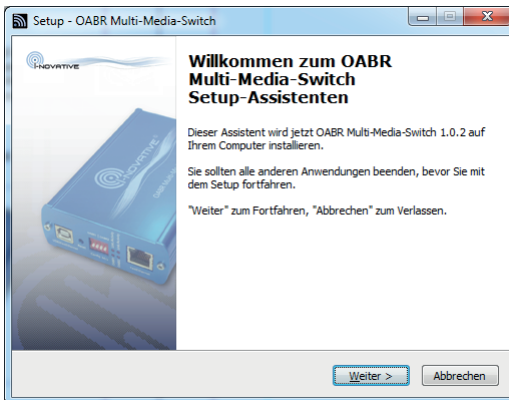
2.2. Installation of the GUI software

To use the GUI of the OABR Multi-Media-Switch, you must first install the software on your PC.

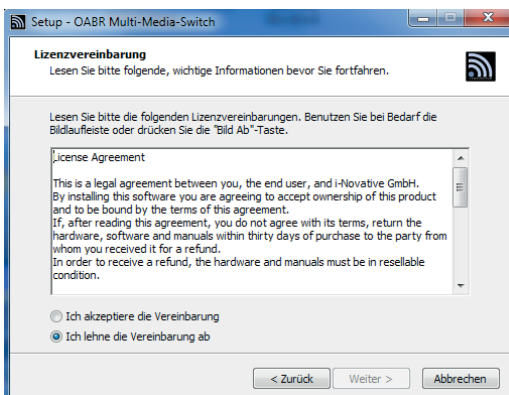
- If necessary, download the latest OABR Multi-Media-Switch software on our website: <http://www.i-novative.de/de/downloads>
- Please note the location of the installation file
- Start the application with a double-click



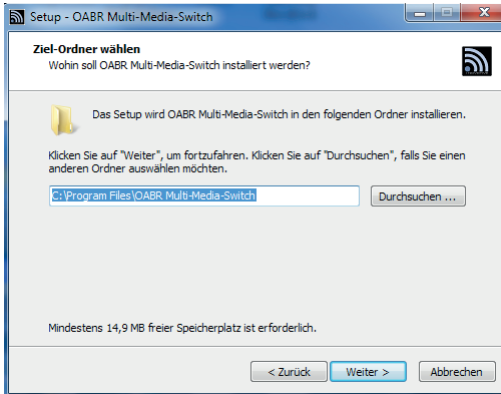
- Select the desired language for the installation process



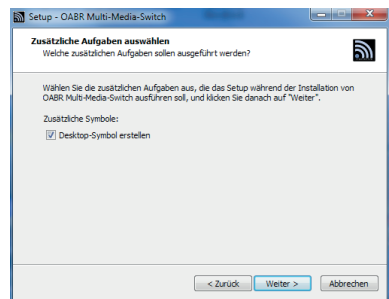
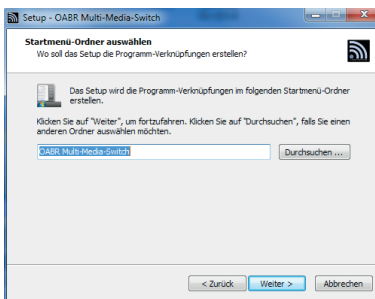
- Press „Next“ to proceed with the installation.



- Agree to the license agreement.



- Select the desired installation directory.
Preselection directory: „C:\Program Files\OABR Multi-Media-Switch“.
You can also choose another installation directory if necessary. Please remind your installation directory for later usage. Press „Next“.



- Here you can select whether a shortcut of the application program shell be created. Press „Install“.



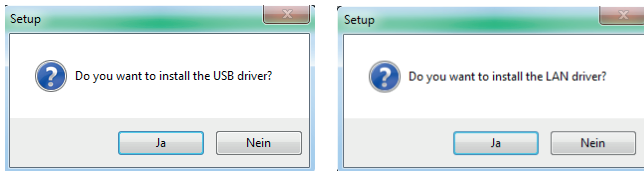
- If you do not want to start the PC application software after installation, please remove the checkbox mark „Start OABR Multi-Media-Switch“. Press afterwards „Finish“.

2.3. Driver Installation (USB, LAN)

1. Automatic driver installation

The OABR Multi-Media-Switch driver can be installed on the following operating systems: Windows 2000, Windows XP 32/64Bit, Windows Vista 32/64Bit, Windows 7 32/64Bit and Windows 8 32/64Bit.

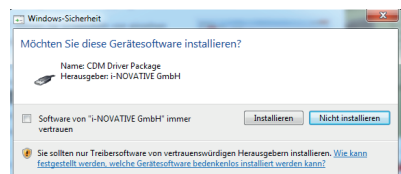
During the installation of the OABR Multi-Media-Switch software, the required driver for USB and „USB 2.0 to Ethernet“ will be installed automatically. During the installation you can choose if you want to install the USB and LAN driver.



Select „Yes“ if the driver is not previously installed or a new driver is provided. The driver installation continues with the following messages that you must confirm:

LAN-Treiber

USB Treiber



Select „Install“ or „Next“, the driver installation will continue. Follow the instructions on the screen to complete the installation

You will finally receive a message that the computer should be restarted.

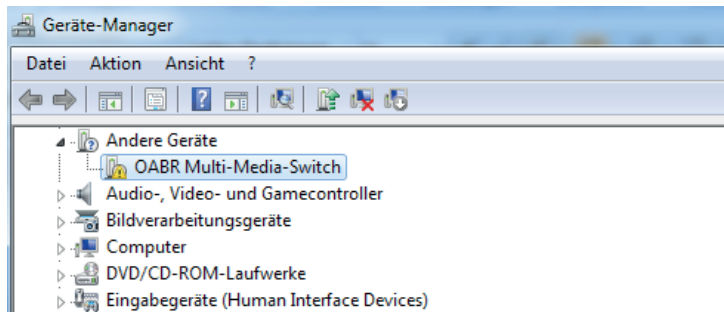


2. Manual Driver Installation

You can also manually install the OABR Multi-Media-Switch drivers.
Proceed as follows:

- Download the latest driver from our website. There is always the latest driver provided: <http://www.i-novative.de/de/downloads>
Alternatively, the driver is in the following folder after installing the GUI: \Driver\
- Unzip the downloaded driver with a double click in the default directory of your C drive.
- Connect the USB cable to the PC and the OABR Multi-Media-Switch and switch on the device (= with 12V supply voltage via the Tyco connector)
- After a short time comes a message in the system tray that a driver could not be installed successfully.
- Now navigate to the „*Device Manager*“ under the Windows Control Panel and search the entry „OABR Multi-Media-Switch“ under „*Other Devices*“.

Please select „*Update driver software*“:

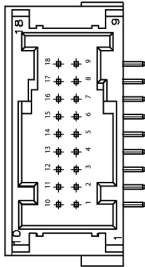


- Click on the entry OABR Multi-Media-Switch with the right mouse button and choose „*Search for driver software on the computer*“.
- Select the folder where you unpacked the driver before and click on „*Next*“ afterwards.
- Select „*Install*“.
- Finally, you will get the message „*The driver software has been successfully updated*“.

2.4. Network Configuration

In principle, the OABR Multi-Media-Switch acts as a standard switch in a network. This means:
 a) for the participation of the PC via the OABR switch on this network, the PC must have the same subnet mask as well as a valid IP address. b) Please make sure that no IP address is assigned twice. Sniffing in the network (e.g., via Wireshark) requires no special setting on the PC.

2.5. Pinning Tyco MQS



High Speed CAN - Low	18	9	High Speed CAN - High
U_BAT	17	8	GND
ETH_ON	16	7	GND
	15	6	
OABR Port1-	14	5	
OABR Port1+	13	4	
OABR Shield	12	3	OABR Shield
OABR Port2-	11	2	
OABR Port2+	10	1	

Explanation of the connections:

- HighSpeed CAN High/Low Connection of the Higspeed CAN. Please pay attention to the correct termination of your CAN bus.
- U_Bat Power supply 12V
- GND Ground
- ETH_ON The port is bi-directional. The OABR-Switch can be configured that in case of a positive signal level the devices wakes up. The pulse width can be configured. Additionally, over the GUI, a trigger signal can be sent. The signal level is GND (default) until U_BAT. In mode „Always On“, the input trigger signal is ignored, the device is always active.
- OABR +/- OABR connectors
- OABR Shield On this pins - if necessaary - a cable shield can be connected. The Shield is connected to the housing via a RC-Filter.

2.6. Configuration (GUI)

2.6.1. Toolbar

Device selection: All connected devices are listed here. If a device is selected, its settings are loaded and displayed.

Refresh Button: Refreshes the list of connected devices.

Store: Writes the changes to memory. Unsaved changes are discarded when the device is reset. The button is active as soon as a change has been made.

About: Shows the information about the application.

FAQ: Opens the FAQ page in the web browser.

Downloads: Opens the download page in the web browser. Here you will find the latest firmware, drivers and updates of the GUI as well as current instructions for use.

Homepage: Opens the i-novative homepage in the web browser.

Exit: Closes the application.

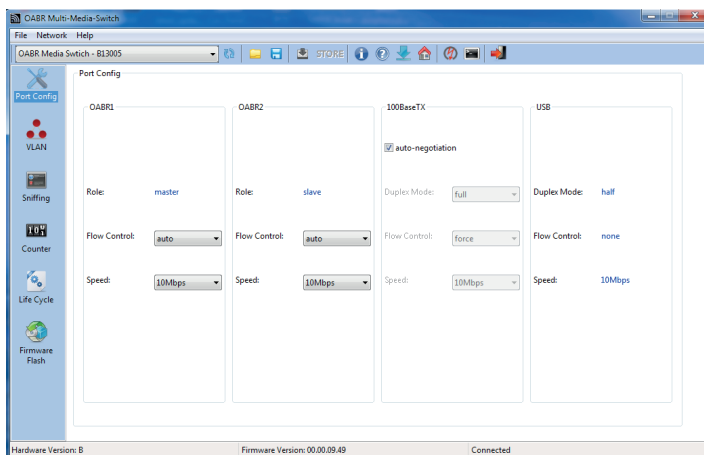
2.6.2. Statusbar

Hardware Version: Please provide this information when inquiring the support.

Firmware Version: Version of the currently connected device. Please refer to firmware update..

Connected/Not connected: Indicates if there is a connection to the firmware of a connected device.

2.6.3. Port Config



OABR1 / OABR 2:

Role: Indicates whether the OABR port is set to Master or Slave. The setting can be changed via the hardware switch <INSERT switch>. See chapter 2.7.

Flow Control:

- *force:* FC for RX and TX is activated
- *auto:* FC is deactivated, because no Auto-Negotiation is made

Speed: 100Mbps or 10Mbps

100BaseTX: Specifies the settings of the Ethernet interface.

Auto-Negotiation: initiates automatically the maximum possible transmission speed for the Ethernet-Networkport and as well as negotiation and configuration of the Duplex-mode. Precondition is that the connected network port also supports auto-negotiation.

Duplex Modus: Enables the network port to be switched to half-duplex mode to allow compatibility with certain network devices.

Flow Control:

- *force FC:* FC for RX and TX is activated, regardless of the result of Auto-Negotiation
- *auto FC:* FC is negotiated at auto-negotiation. The switch supports RX-FC and TX-FC. The result depends on what the link partner offers during the auto-negotiation.

Speed: Enables the network port to be switched to 10Mbps to allow compatibility with certain network devices.

USB:

The settings of the USB port are made automatic by the <Ethernet 2 USB driver> and can not be changed.

2.6.4. VLAN

The VLAN Panel provides the following configuration functionality

- switch ports can be combined to VLAN-like port groups,
- frame forwarding can be controlled by modifying the Static MAC Table,
- dynamically learned MAC addresses can be displayed.

Future software versions will support the setup of IEEE 802.1q compliant VLANs.

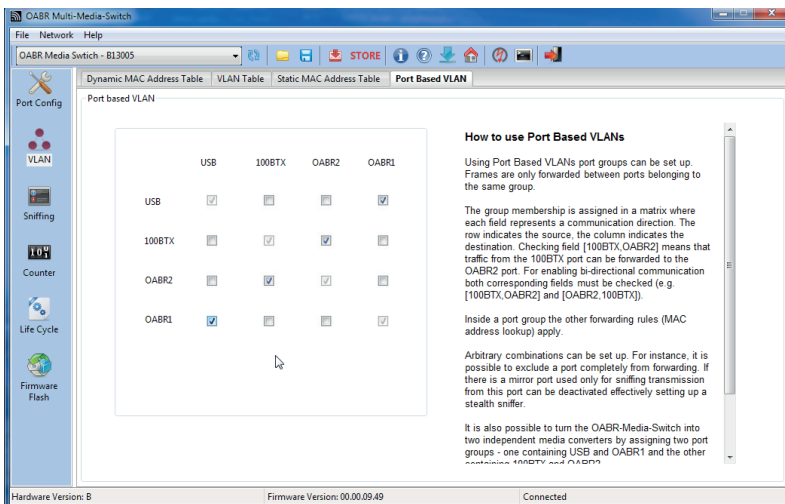
Port Based VLAN

Using Port Based VLANs port groups can be set up. Frames are only forwarded between ports belonging to the same group.

The group membership is assigned in a matrix where each field represents a communication direction. The row indicates the source, the column indicates the destination.

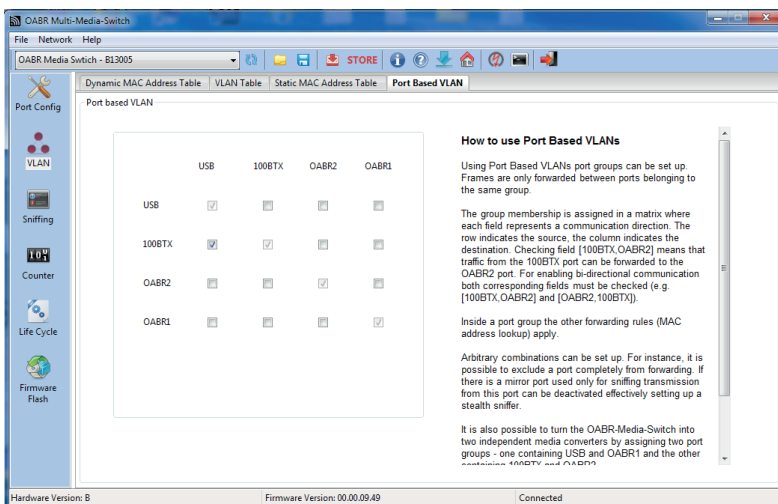
For enabling bi-directional communication both corresponding fields must be checked. Arbitrary combinations can be set up. Inside a port group the other forwarding rules (MAC address lookup) apply.

Configuration-Example 1: Two Port Groups



In the above example, the OABR-Media-Switch is turned into two independent media converters by assigning two port groups - one containing USB and OABR1 and the other containing 100BTX and OABR2.

Configuration-Example 2: Uni-Directional Traffic



The above example shows the setup of a uni-directional connection. Frames can be forwarded from the 100BTX port to the USB port but not vice versa. Practically this will only work with a static ARP table setup since ARP replies from USB to 100BTX are not forwarded. If there is a mirror port used only for sniffing transmission from this port can be deactivated effectively setting up a stealth sniffer. It is also possible to exclude a port completely from forwarding. Port Based VLANs are not IEEE 802.1q compliant. VLAN tags have no influence of the port group assignment.

Static MAC Table

The switch forwards Ethernet frames primarily based on MAC addresses that are stored in the Dynamic MAC Table. Source MAC addresses of frames received at a certain port are learned together with the respective port number. Thus the switch knows which nodes can be reached by which ports. By matching the destination MAC address with the learned source addresses the switch delivers an Ethernet frame only to the appropriate destination port.

This behavior can be overridden using the Static MAC Table. Entries within that table consist of a MAC address, a list of forwarding ports, and a validity flag. Frames matching an entry in the Static MAC table with their destination MAC address are forwarded to the ports set in this entry. Only valid entries are used for frame forwarding. Frames are never forwarded to their source port even when it is in the port list.

The port list inside a Static MAC Table entry can assign none, all, or a subset of ports for forwarding.

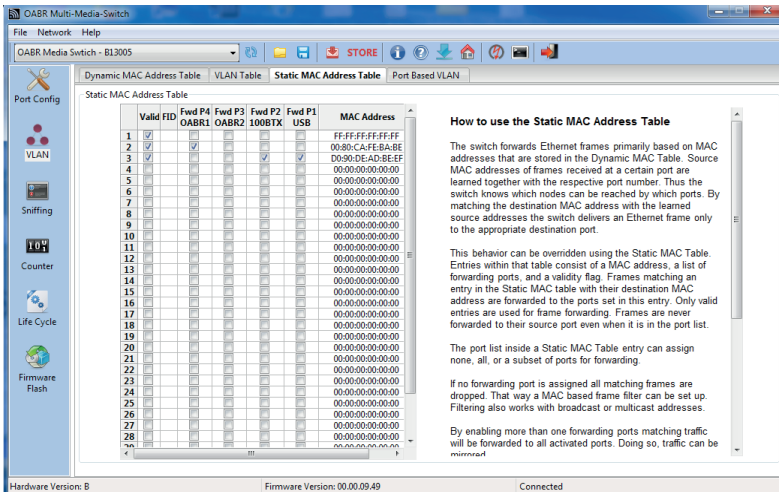
If no forwarding port is assigned all matching frames are dropped. That way a MAC based frame filter can be set up. Filtering also works with broadcast or multicast addresses.

By enabling more than one forwarding ports matching traffic will be forwarded to all activated ports. Doing so, traffic can be mirrored.

Using a single forwarding port can be used to avoid the MAC learning procedure and thus speeding up the initial frame delivery. Statically populating the nodes' ARP tables additionally eliminates the need for the address resolution procedure.

The Static MAC Table can hold a maximum of 32 entries.

Configuration-Example: Static Mac Table with 3 entries



The screenshot shows the configuration interface for an OABR Multi-Media-Switch. The 'Static MAC Address Table' is selected, displaying a table with 32 rows and columns for Valid FID, Fwd P1, Fwd P2, Fwd P3, Fwd P4, and MAC Address. Three entries are configured:

Valid FID	Fwd P1	Fwd P2	Fwd P3	Fwd P4	MAC Address
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FFFFFFFFFFFF
2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:80:CA:FE:BA:BE
3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	00:90:DE:AD:BE:EF
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
21	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
22	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
23	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
24	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
25	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
26	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
28	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
29	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
30	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
31	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00
32	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00:00:00:00:00

Hardware Version: B Firmware Version: 00.00.09.49 Connected

Entry 1: Ethernet broadcasts (FF:FF:FF:FF:FF:FF) are blocked.

Entry 2: Frames with destination address 00:80:CA:FE:BA:BE are only forwarded to port OABR1.

Entry 3: Frames with destination address 00:90:DE:AD:BE:EF are forwarded to ports USB and 100BTX

Reading and writing of the Static MAC Table takes a bit of time thus it is not automatically synchronized with the switch. Instead, the Refresh and Apply buttons must be used.

When storing the Static MAC Table only valid entries are made persistent. This way startup time is minimized since the table has to be populated at each power-on or reset.

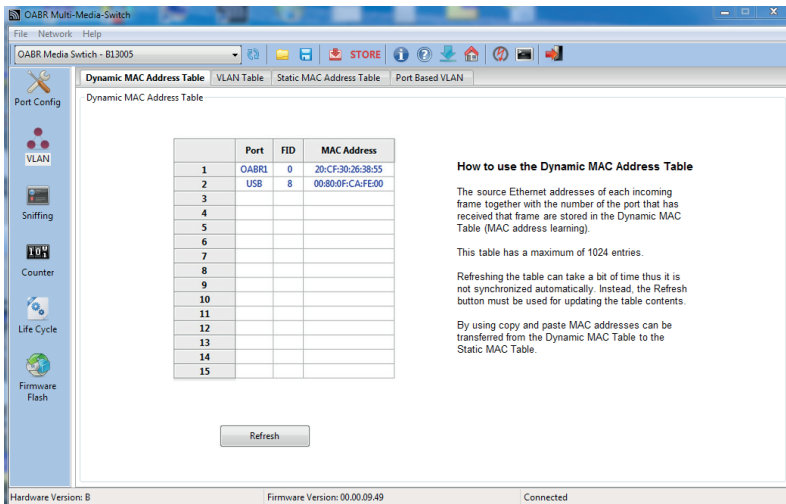
Dynamic MAC Address Table

The source Ethernet addresses of each incoming frame together with the number of the port that has received that frame are stored in the Dynamic MAC Table (MAC address learning).

This table has a maximum of 1024 entries.

Refreshing the table can take a bit of time thus it is not synchronized automatically. Instead, the Refresh button must be used for updating the table contents.

Example Dynamic MAC Table



MAC addresses from the Dynamic MAC table can be transferred to the static MAC table via copy/paste.

The function of the Filter ID (FID) is described in chapter 802.1Q VLAN.

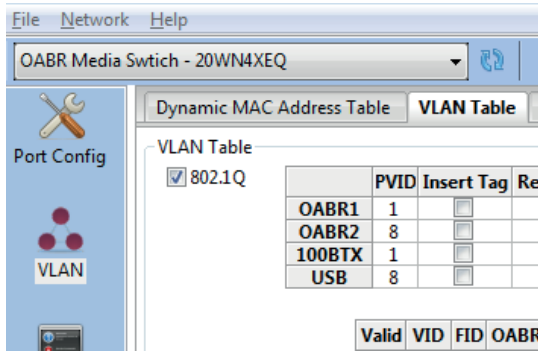
802.1Q VLAN

The OABR Media Switch supports IEEE 802.1Q compliant VLAN functionality. The following features are available:

- Insert / remove VLAN tags,
- Filtering based on the Port VLAN ID (PVID),
- Filtering / Forwarding based on the VLAN Table.

a) Enable / disable 802.1Q VLAN functionality

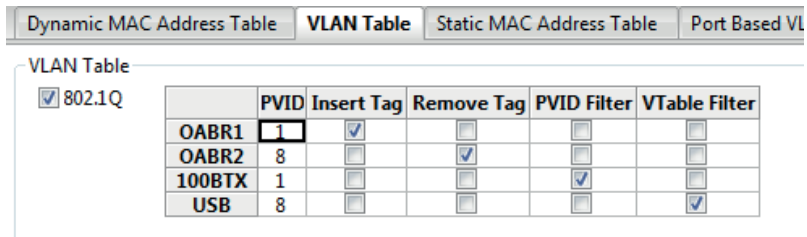
802.1Q VLAN features are enabled and disabled through the checkbox in the upper left corner of the VLAN tab.



The VLAN settings can only be changed if 802.1Q VLAN is enabled. The same applies to updating the tables. If 802.1Q VLAN is not needed, it should remain disabled. This saves time for loading the VLAN table.

b) Port-related VLAN settings

The upper table in the VLAN tab contains the port-specific VLAN settings.



PVID: The Port VLAN ID can be used to filter or tag packets without a tag.

Insert Tag: The PVID is inserted in packages without a tag. Packages that already have a VID are not changed.

Remove Tag: The VLAN tag from received packets is removed.

PVID Filter: Received packets whose VID corresponds to the PVID are forwarded. All others are discarded. The PVID must have a valid VLAN ID in the range from 0-4095.

VTable Filter: The forwarding of the packages happens on the basis of the entries in the VLAN Table.

c) VLAN Table

The VLAN Table contains VLAN-specific settings for forwarding packets with VLAN tag. The entries in the VLAN table are applied only to the packets received on ports whose *VTable Filter* Flag is set.

Valid	VID	FID	OABR1	OABR2	100BTX	USB	▲
<input checked="" type="checkbox"/>	2	9	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	73	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

The VLAN table contains a maximum of 32 entries. Using the context menu (right mouse button), entries can be deleted, added or the whole table can be deleted.

An entry in the VLAN table has the following meaning:

Valid:

This entry is used for packet forwarding. Entries that are not marked as valid, will be ignored. When saving the configuration (Store) only valid entries are persisted.

VID:

The *VLAN ID* is the key in the VLAN table. Each VID may only exist once. The forwarding rules of this entry are applied to packages with matching VIDs. The VID must be in the range of 0-4095.

FID:

The switch supports a maximum of 128 active of 4096 possible VLANs. The packet forwarding is therefore internally based on the filter ID rather than the VLAN ID. For this purpose, each entry must be assigned to a filter ID in the range 0-127. If 802.1Q is activated, the FID is also learned during MAC address learning and stored in the Dynamic MAC table. The forwarding is then based on the destination address and FID. In the static MAC table, the combination of MAC address and FID can be specified manually.

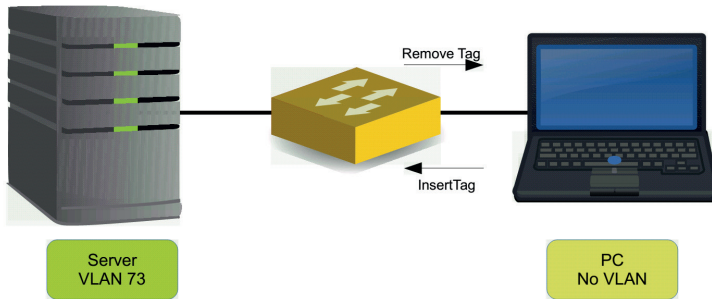
OABR1/OABR2/100BTX/USB:

The individual port flags indicate to which ports packets with a specific VID should be forwarded. Certain VLANs can be blocked if no port is activated.

d) VLAN examples

Tag Insertion/Removal:

The insertion and removal of VLAN tags e.g. makes sense, if non VLAN-capable devices shall be integrated into a VLAN.



As example, a PC and a server shall communicate with each other. The server is configured for VLAN 73, the PC does not support 802.1Q VLAN. From packages that go from the server to the PC side, the VLAN tag must be removed. In packets that the PC to the server, the VLAN tag must be inserted. The PC is connected to the USB port of the OABR Multi-Media-Switch, the server is connected to the 100BTX port.

Dynamic MAC Address Table		VLAN Table	Static MAC Address Table		Port Based	
VLAN Table						
<input checked="" type="checkbox"/> 802.1Q						
	PVID	Insert Tag	Remove Tag	PVID Filter	VTable Filter	
OABR1	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
OABR2	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
100BTX	88	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
USB	73	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Valid	VID	FID	OABR1	OABR2	100BTX	USB
<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	73	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

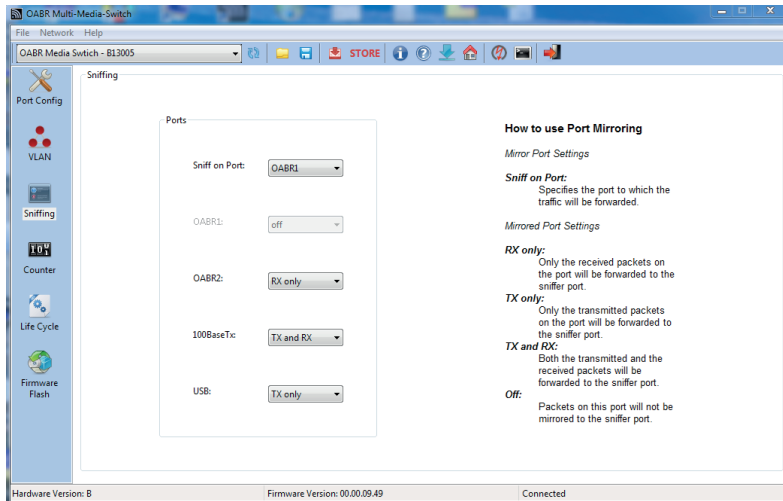
The VLAN 73 must be configured as a valid VLAN in the VLAN table. The forwarding ports are not important in this case because VLAN table filtering is disabled.

The port to which the PC is connected (USB), is configured with VLAN ID 73 as PVID. The PVID of the input port is inserted when the packet is forwarded, if at the Output port (100BTX) the flag „insert tag“ is set.

In order to remove the VLAN tag 73 from the packets of the server, the Remove Tag flag must be set on the destination port (USB).

The PVID of port 100BTX (88) is irrelevant in this case, since no other port has the insert tag flag set.

2.6.5. Sniffing



Sniff on Port: Specifies the port on which the traffic is output.

Port Settings:

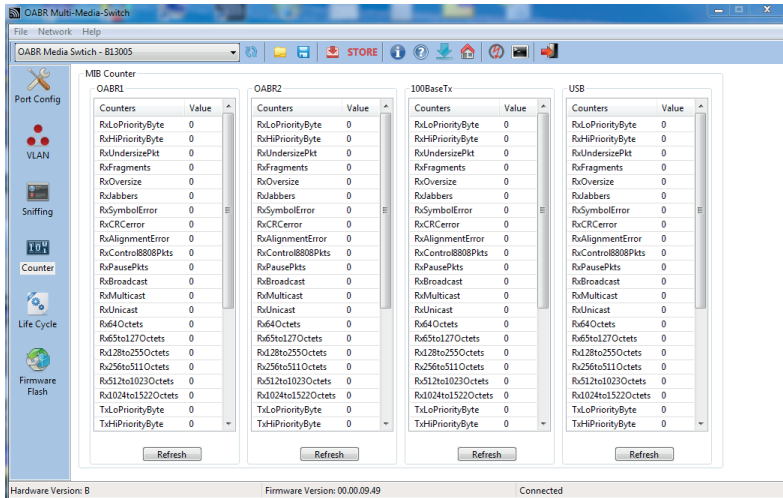
- *RX only:* Only the incoming packets are forwarded to the sniffing port
- *TX only:* Only the outgoing packets are forwarded to the sniffing port
- *RX and TX:* Both the inbound and outbound packets are forwarded to the sniffing port
- *Off:* Packages at this port are not considered during sniffing

Dynamic MAC Table: Displays the dynamic MAC table for each port.

Refresh Mac Table: Read the table again from the device.

2.6.6. Counter

Displays a list of counters of the selected OABR switch. The lists can be updated via the Refresh button. The counters are reset to zero each time the switch is restarted..



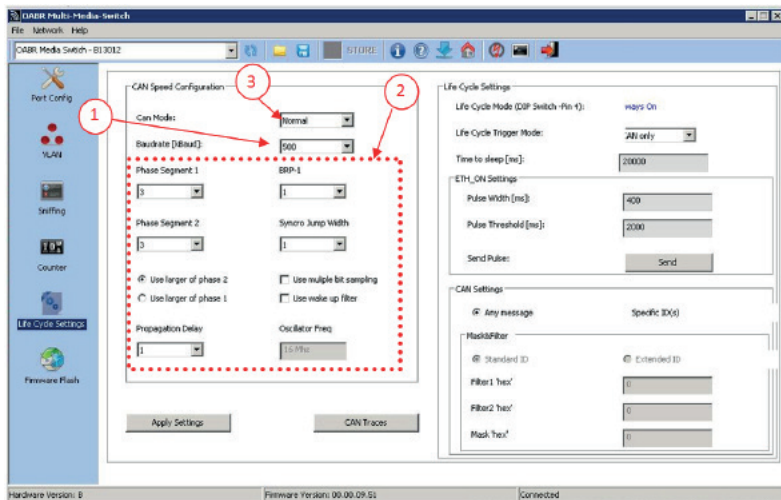
RxLoPriorityByte	Rx lo-priority (default) octet count including bad packets.
RxHiPriorityByte	Rx hi-priority octet count including bad packets.
RxUndersizePkt	Rx undersize packets w/good CRC.
RxFragments	Rx fragment packets w/bad CRC, symbol errors or alignment errors.
RxOversize	Rx oversize packets w/good CRC (max: 1536 or 1522 bytes).
RxJabbers	Rx packets longer than 1522B w/either CRC errors, alignment errors, or symbol errors (depends on max packet size setting) or Rx packets longer than 1916B only.
RxSymbolError	Rx packets w/ invalid data symbol and legal preamble, packet size.
RxCRCError	Rx packets within (64,1522) bytes w/an integral number of bytes and a bad CRC (upper limit depends up on max packet size setting).
RxAlignmentError	Rx packets within (64,1522) bytes w/a non-integral number of bytes and a bad CRC (upper limit depends on max packet size setting).
RxControl8808Pkts	The number of MAC control frames received by a port with 88-08h in EtherType field
RxPausePkts	The number of PAUSE frames received by a port. PAUSE frame is qualified with EtherType (88-08h), DA, control opcode (00-01), data length (64B min), and a valid CRC.
RxBroadcast	Rx good broadcast packets (not including errored broadcast packets or valid multicast packets).
RxMulticast	Rx good multicast packets (not including MAC control frames, errored multicast packets or valid broadcast packets).
RxUnicast	Rx good unicast packets.
Rx64Octets	Total Rx packets (bad packets included) that were 64 octets in length.
Rx65to127Octets	Total Rx packets (bad packets included) that are between 65 and 127 octets in length.
Rx128to255Octets	Total Rx packets (bad packets included) that are between 128 and 255 octets in length.
Rx256to511Octets	Total Rx packets (bad packets included) that are between 256 and 511 octets in length.
Rx512to1023Octets	Total Rx packets (bad packets included) that are between 512 and 1023 octets in length.
Rx1024to1522Octets	Total Rx packets (bad packets included) that are between 1024 and 1522 octets in length (upper limit depends on max packet size setting).
TxLoPriorityByte	Tx lo-priority good octet count, including PAUSE packets.
TxHiPriorityByte	Tx hi-priority good octet count, including PAUSE packets.
TxLateCollision	The number of times a collision is detected later than 512 bit-ticks into the Tx of a packet.
TxPausePkts	The number of PAUSE frames transmitted by a port
TxBroadcastPkts	Tx good broadcast packets (not including errored broadcast or valid multicast packets).
TxMulticastPkts	Tx good multicast packets (not including errored multicast packets or valid broadcast packets).
TxUnicastPkts	Tx good unicast packets.
TxDeferred	Tx packets by a port for which the 1st Tx attempt is delayed due to the busy medium.
TxTotalCollision	Tx total collision, half-duplex only.
TxExcessiveCollision	A count of frames for which Tx fails due to excessive collisions.
TxSingleCollision	Successfully Tx frames on a port for which Tx is inhibited by exactly one collision.
TxMultipleCollision	Successfully Tx frames on a port for which Tx is inhibited by more than one collision.

2.6.7. Life Cycle Settings

Displays a list of counters of the selected OABR switch. The lists can be updated via the Refresh button. The counters are reset to zero each time the switch is restarted.

In the „*Life Cycle Settings*“ submenu, all configurations can be made to make the OABR Multi-Media-Switch operate in a life-cycle-dependent environment, such as in a test-car.

ATTENTION: As long as the OABR Multi-Media-Switch is connected to a host via the Config Port via USB, the device will always remain active!



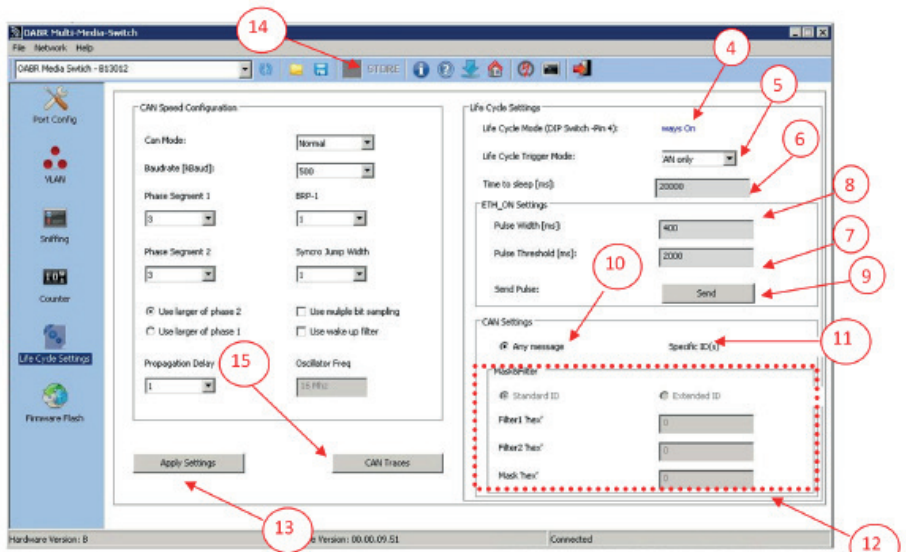
In the section „*CAN Speed Configuration*“ the baud rate (1) as well as specific bit timing Parameter (2) of the CAN bus adjustable. Optionally, one of the 6 preconfigured or customized settings can be selected. The configuration mask (2) is based on the „*Microchip CAN Bit Timing Calculator*“ tool of the company „*Intrepid Control Systems, Inc.*“, which can be downloaded from the following link:

<http://www.intrepidcs.com/support/mbtime.htm>

NOTE: Special attention is paid to the CAN mode (3). This must be configured properly. In mode „*Normal*“, the OABR Multi-Media-Switch is participating actively on low level with the CAN bus data communication according to the CAN specification. This means, that CAN telegrams are acknowledged with an acknowledgement. In the „*Listen only*“ Mode, on the other hand, the OABR Multi-Media-Switch acts as a spy, making the actual data communication transparent.

ATTENTION: If the OABR Multi-Media-Switch is required to be operated together with another CAN node, the mode „*Normal*“ must be selected!

In the section „Life Cycle Settings“ you can find further Life Cycle specific settings. The Life Cycle mode (4) of the OABR Multi-Media-Switch is set with the DIP switch 4. In the „Always On“ position, the switch does not participate in the life cycle process. If „Customized“ is selected, the device behaves according to the specified Life Cycle parameters.



For the life cycle, the following must be set accordingly.:

- Life Cycle Trigger Mode (5): Specifies the operating mode. Here can be switched between „CAN only“, „ETH_ON only“ and „ETH_ON & CAN“.
- Time to sleep (6): Specifies the time in milliseconds where the device goes to sleep mode.

In section „ETH_ON Settings“, the settings for the bi-directional wake-up line (ETH_ON) can be configured. The ETH_ON wake-up line is in idle state at low level. If the mode „ETH_ON only“ or „ETH_ON & CAN“ is selected, the OABR Multi-Media-Switch responds to a high level of the ETH_ON. The pulse width stimulus threshold can be set under Pulse Threshold (7) in the millisecond range.

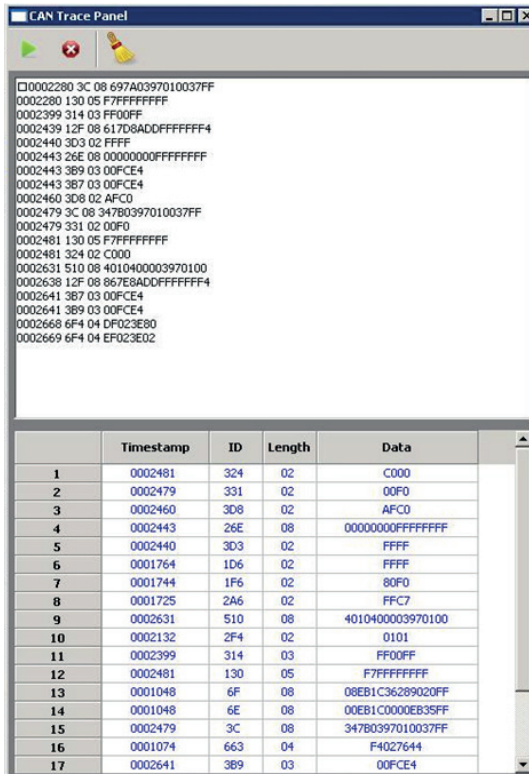
The OABR Multi-Media-Switch is also able to actively send a trigger pulse on the ETH_ON line. The pulse width (8) can also be specified in the millisecond range. By means of the „Send“ button (9) the pulse is generated.

In the section „CAN Settings“ mask- and filter settings for the CAN Life Cycle Management can be specified. In this case, any message can be received (10), which also wakes up the OABR Multi-Media-Switch. Alternatively you can set Filter criteria (11), whereby the switch is then awakened by one or more specific CAN messages with a special identifier. Here, two filter parameters and one mask parameter (12) can be set. The mask parameter specifies the relevant bits of the identifier, which can also be used to set identifier groups.

By using the button „*Apply Settings*“ (13), the settings are temporarily transferred to the OABR Multi-Media-Switch. In order to save the data permanently, you have to save with „*STORE*“ (14).

Via the button „*CAN Traces*“ (15) a Trace window can be opened for checking the previously configured CAN settings. The recording of the CAN Telegrams can simply be started, stopped and stored telegrams can be deleted.

ATTENTION: An active CAN tracing with a high data rate can increase the response times of the PC software massivly.



The screenshot shows the 'CAN Trace Panel' window. The top section displays raw CAN data in hexadecimal format. Below this is a table with the following columns: 'Timestamp', 'ID', 'Length', and 'Data'. The table lists 17 traces.

	Timestamp	ID	Length	Data
1	0002481	324	02	C000
2	0002479	331	02	00F0
3	0002460	3D8	02	AFC0
4	0002443	26E	08	00000000FFFFFFF4
5	0002440	3D3	02	FFFF
6	0001764	1D6	02	FFFF
7	0001744	1F6	02	80F0
8	0001725	2A6	02	FFC7
9	0002631	510	08	4010400003970100
10	0002132	2F4	02	0101
11	0002399	314	03	FF00FF
12	0002481	130	05	F7FFFFFFF4
13	0001048	6F	08	08EB1C36289020FF
14	0001048	6E	08	00EB1C0000EB35FF
15	0002479	3C	08	347B0397010037FF
16	0001074	663	04	F4027644
17	0002641	3B9	03	00FCE4

2.6.8. Firmware Flash

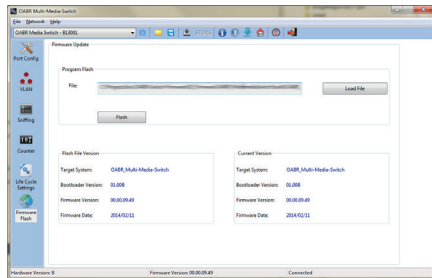
This panel is used to update the firmware of the OABR switch. The firmware will exclusively delivered by i-novative GmbH as i-nvoative firmware file (.iff). After Installing the GUI, the associated Flash software is also in the program folder: \ Firmware \.

To enable upload, the target system and the bootloader version in the loaded file and the attached hardware must match together. After starting the flash process, the switch performs a reset and the firmware is flashed. If the switch can not perform an automatic reset, the reset switch on the switch must be pressed for 5 seconds (point 2.), until the firmware is loaded.

Note: Flashing the device resets or overwrites all OABR switch configurations to their default values. **Please save all configuration settings via the GUI in a file (XML Config) before the firmware flash.**

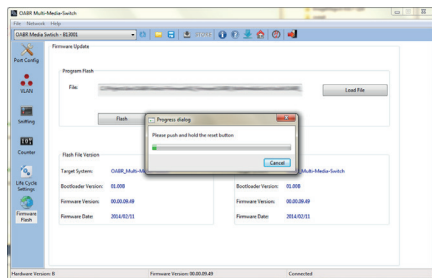
1. Loading the firmware file:

Please select the location of the Firmware file with „Browse“...



2. Reset switch:

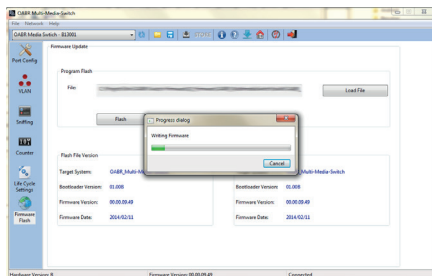
In case of no automatic reset, the reset switch must be pressed for at least 5 seconds to start update process.



3. Flash process

The device starts with the upload of the firmware. Please wait until the flash process ended correctly and was confirmed by the GUI.

NOTE: Installing the firmware must not be interrupted as this can lead to an inconsistent condition of the device.



2.7. Hardware-Configuration (DIP-Switch)

The OABR Multi-Media-Switch can also be configured for basic functions without GUI via the front panel DIP selector switches:



DIP1:	<i>off</i> = OABR1-Slave;	<i>on</i> = OABR1-Master
DIP2:	<i>off</i> = OABR2-Slave;	<i>on</i> = OABR2-Master
DIP3:	not used	
DIP4:	<i>on</i> = always on;	<i>off</i> = on@CAN-Activity

2.8. Default settings

It may happen that your OABR Multi-Media-Switch is no longer accessible through user settings, etc. In this case, you can use the following reset procedure to reset the device to the factory settings (all settings and values of the device are lost!!):

Switch on the device. By using a non-conductive pointed article (e.g.toothpick), press the RESET button through the small hole and hold it pressed for about 6 seconds. After that, the reset process is completed and all settings are back to default.

3. Cleaning

Before cleaning, unplug all cables from the OABR Multi-Media-Switch. When cleaning, use a slightly damp and soft cloth (best of all Microfiber cloth). Never use cleaning agents, alcohol or other solvents for cleaning. Please note that the plugs are very sensitive and already at improper contact, damage to the contacts may occur..

4. Technical specifications

- 2 Ports Broadcom BroadR-Reach® (100 MBit/s Full duplex on a single unshielded twisted pair)
- 1 Port Fast Ethernet (100BaseTX Full duplex)
- 1 Port USB to Ethernet (100 MBit/s Ethernet via USB2.0)
- 1 High-Speed CAN (selective: CAN Identifier or CAN Activity)
- 1 Ethernet WakeUp Line
- Status LEDs for each BroadR-Reach® port

- Life-Cycle management function by
 - CAN Bus (selective: CAN Identifier or CAN Activity)
 - Ethernet/BroadR-Reach® (via Ethernet WakeUp Line)

- Easy to use GUI for configuration and firmware update:
 - Master/Slave
 - HalfOut/FullOut
 - Port Forwarding
 - Port Mirroring
 - VLAN Tagging
 - CAN Settings
 - Ethernet WakeUp Settings

- Power requirement: 8 to 16 Volt DC
- Size: 120 x 80 x 35 mm
- Robust aluminium case with EMC optimization
- Manufacturer: i-NOVATIVE® GmbH

5. Important instructions

5.1 Packaging ordinance

„Basically, manufacturers as well as distributors are obliged to ensure that Sales packaging are in principle taken back after use by the end user and recycled or reused.“ (according § 4 Satz 1 VerpackVO). If you as a customer have problems with the disposal of packaging and shipping materials, please write an email to info@i-novative.de.

5.2. Recycled reference and RoHS compliance



Please note that parts of the products of i-novative® GmbH should be submitted to recycle deposits not disposed of with household waste (i.e. circuit boards, power supply, etc.).



ii-novative® products are RoHS compliant (RoHS = Restriction of the use of certain hazardous substances; dt. „Restriction of use certain dangerous substances „).

5.3. CE marking

The i-novative OABR Multi-Media-Switch has the CE mark.



This device complies with the requirements of EU Directive: 89/336 / EC Directive on electromagnetic compatibility and the mutual recognition of their Conformity. Conformity with the o.a. Directive is confirmed by the CE mark.

5.4. Registered trademarks

BroadR-Reach® is a registered trademark of Broadcom Corporation, 5300 California Avenue Irvine, CA 92617 US

6. Manufacturer and Support

i-novative® is a registered trademark of i-novative® GmbH. If you have quaaestions ans for any problems or product information please contact us directly

Manufacturer:

i-novative® GmbH
Kesselbodenstrasse 11
85391 Allershausen

E-Mail: support@i-novative.de
Phone: +49 (0)8166 5 82 91 40
Fax: +49 (0)8166 9 88 91 70
Internet: www.i-novative.de

7. Guarantee

Within the warranty period, we eliminate manufacturing and material defects free of charge. You can find the guarantee conditions valid for your country on the homepage of your Distributors. If you have questions or problems with the device, you can reach us during our normal opening times at the following telephone number +49 (0)8166 5 82 91 40 or via e-Mail: support@i-novative.de.

