



Part of **axing** group

MIE-1600 | MIE-3200 MIE-1600/48 | MIE-3200/48 IPQAM/COFDM

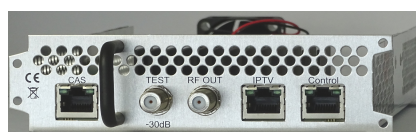


Table of contents



WARNING

Safety instructions:

- The installation of the device and repair work on the device must be carried out only by a professional in accordance with the applicable VDE directives. In case of incorrect installation, no liability is assumed.
- Never open the device. There are no parts to be maintained by the user inside the device, however, lethal voltages are present. This also applies to cleaning the device or working on the connections.
- Use only the mains cable enclosed to the device. Never replace any parts or make any modifications to the mains cable. Otherwise, there is a risk of death.
- If you intend not to use the device for a longer period of time, we recommend you to completely disconnect the device from the mains for safety reasons and for saving energy by pulling out the mains plug.
- Let the device adjust to the room temperature before commissioning, in particular if condensation is present on the device, or if it was exposed to large temperature fluctuations.
- The device must be operated only in moderate climate.
- The device must be operated only in dry rooms. In damp rooms or outdoors, there is a risk of short-circuits (attention: risk of fire) or electrical shocks (attention: risk of death).
- The device shall not be exposed to dripping or splashing. Do not place objects filled with liquids such as vases on the device.
- Plan the mounting or installation location such that you can easily reach the mains plug and interrupt the electric circuit in dangerous situations. Select the mounting or installation location such that children cannot play near the device and its connections without supervision. The mounting or installation location must allow a safe installation of all connected cables. Power supply cables and supply cables must not be damaged or squeezed by any objects.
- Operate the device only on a flat, firm surface and protect it against unintentional movements.
- Never expose the device to direct solar irradiation and avoid direct vicinity of heat sources (e.g. heaters, other electrical appliances, fireplace, etc.). It must be always ensured that devices with cooling elements or ventilation slots are not covered or obstructed.
- Ensure generous air circulation around the device. This will prevent possible damage to device and risk of fire due to overheating. It must be always ensured that cables are not located near heat sources (e.g. heaters, other electrical appliances, fireplace, etc.). The unit must be wall mounted with at least 5 cm clearance along the 4 sides. For 19-inch rack mounting, there must be at least 5 cm clearance in front of and behind the unit.
- In particular, the warranty and liability shall be excluded for the consequences of incorrect use, in case of incorrect modifications or repair work carried out by the customer. Use the device only as described in the operating instructions and in particular according to the state-of-the-art.
- The DVB-C/T distribution network must be installed and connected to the equipotential bonding according to EN 60728-11.



Herewith AXING AG declares that the marked products comply with the valid guidelines. You can call up the complete EU declaration of conformity for download by entering the article in the search field at www.axing.com.



WEEE Nr. DE26869279 | Electrical and electronic components must not be disposed of as residual waste, it must be disposed of separately.

• Product description

•General

- MIE-1600 Includes 1 module, supports SPTS and MPTS (also mixed), transmodulates max. 512 input streams in 16 DVB-C or 12 DVB-T output channels.
Power supply 100...240 VAC
- MIE-3200 Includes 2 modules, supports SPTS and MPTS (also mixed), transmodulates max. 2 × 512 input streams in 2 × 16 DVB-C or 2 × 12 DVB-T output channels.
Power supply 100...240 VAC
- MIE-1600/RED Includes 1 module, supports SPTS and MPTS (also mixed), transmodulates max. 512 input streams in 16 DVB-C or 12 DVB-T output channels.
Power supply redundand 100...240 VDC
- MIE-3200/RED Includes 2 modules, supports SPTS and MPTS (also mixed), transmodulates max. 2 × 512 input streams in 2 × 16 DVB-C or 2 × 12 DVB-T output channels.
Power supply redundand 100...240 VDC
- MIE-1600/48 Includes 1 module, supports SPTS and MPTS (also mixed), transmodulates max. 512 input streams in 16 DVB-C or 12 DVB-T output channels.
Power supply 36...60 VDC
- MIE-3200/48 Includes 2 modules, supports SPTS and MPTS (also mixed), transmodulates max. 2 × 512 input streams in 2 × 16 DVB-C or 2 × 12 DVB-T output channels.
Power supply 36...60 VDC

Common Features:

- IPTV input (900 Mbps)
- Converts SPTS / MPTS to DVB-C (J.83 Annex A/C) or DVB-T
- Remux | Crossmultiplex
- PID Filtering
- Web-based configuration
- Suitable for AXING SMARTPortal
- Supports SNMP
- 19 "housing, 1RU

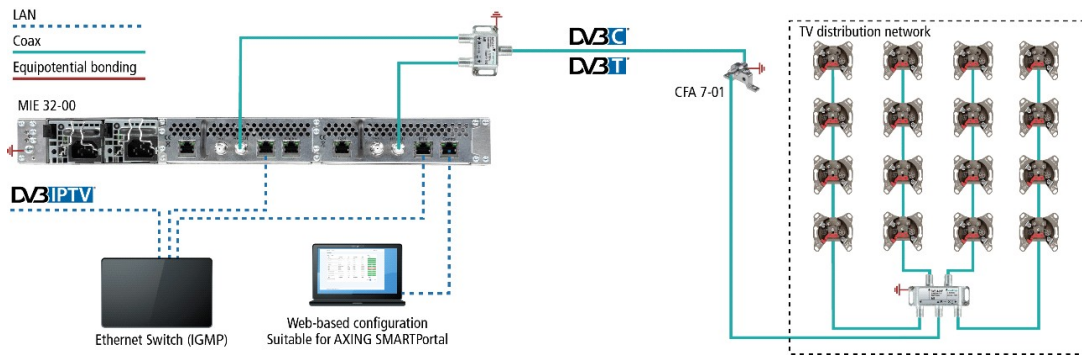
•Available Accessories

- MIM-1600 Extension module for MIE-1600 as well as MIE-1600/48, for extension to 2 × 512 input streams and 2 × 16 DVB-C or 2 × 12 DVB-T output channels.

•Scope of delivery

- 1 × IPQAM
- 1 × AC power cord (MIE 4-02 and MIE 8-02 only)
- 1 × Quick start guide

•Application examples



•Display elements and connectors

The MIE-3200 comes with two separate modules A and B. Each module have one IPTV input one RF output and one configuration interface.

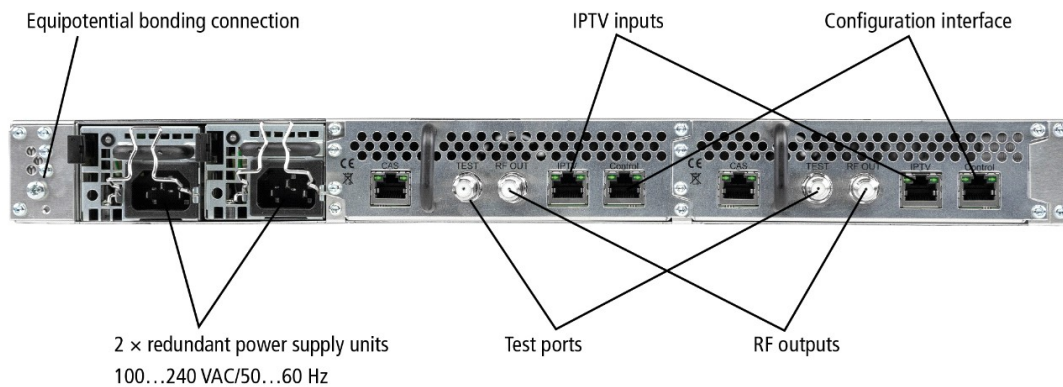
The MIE-1600 come with one module A.



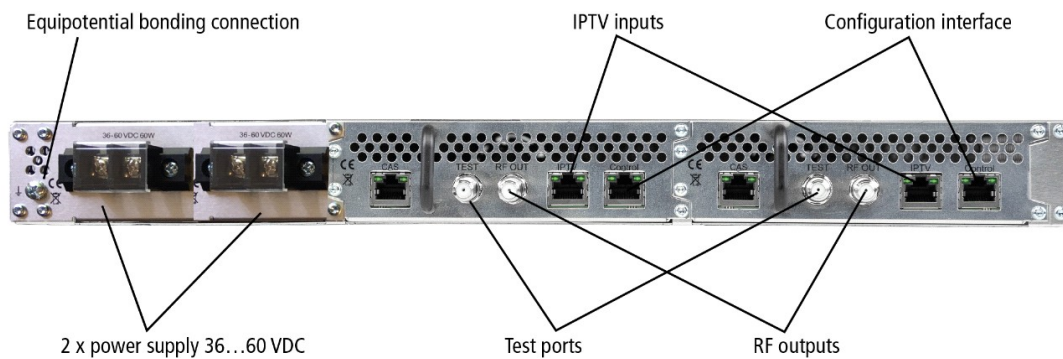
The LEDs show the state of the output modulators:

- When a modulator is filled with content and the modulator is not overloaded, the corresponding LED lights up green.
- If a modulator is on but not filled (without content), the corresponding LED flashes.
- If a modulator is overloaded (too much content), the LED lights up red.
- In case a modulator is turned off, the corresponding LED is off.

Connectors MIE-1600RED | MIE- 3200RED



Connectors MIE-1600/48 | MIE-3200/48

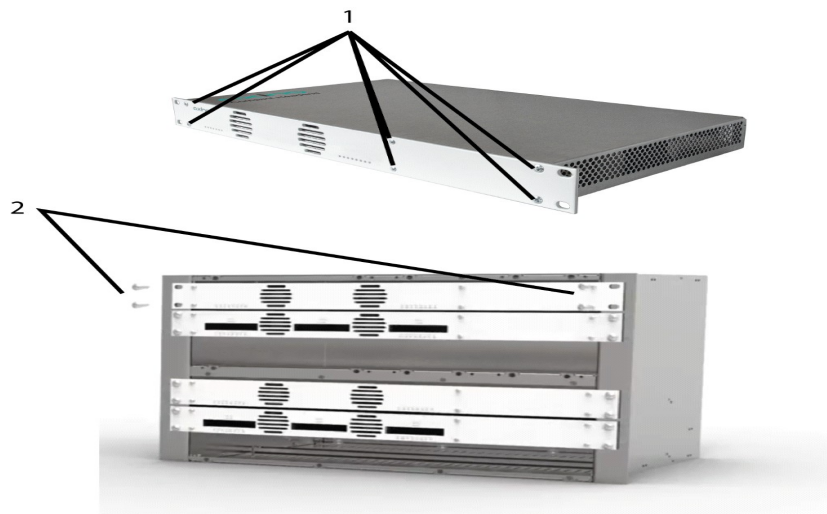


• Mounting and Installation

- Installation must be performed by authorized and skilled electricians only.
- Before mounting and installation, pull the mains plug!
- The DVB-C/T distribution network must be installed and connected to the equipotential bonding according to EN 60728-11.
- Install the device in compliance with the safety regulations defined by the EN 60728-11 standard.

• Mounting in a 19" rack

Note: For 19-inch rack mounting, there must be at least 5 cm clearance in front of and behind the unit.



- Slide the device into the 19 "rack.
- Screw the device with four screws (2).
- Install the device in compliance with the safety regulations defined by the EN 60728-11 standard.

• Equipotential bonding

- The device must be connected to the equipotential bonding according to EN 60728-11. Use the equipotential bonding connection at the device.
- To connect the outer conductor of the coaxial cable to the equipotential bonding, use e.g. QEW earthing angles or CFA earth connection blocks at the inputs and output.

•Power supply

The devices are equipped with two redundant power supplies to provide this e.g. to connect to different power supplies (such as a standard power outlet and a UPS) If a power failure occurs, the unit will sound with an alarm sound.

MIE-1600 | MIE-3200

- Connect both power supplies with the enclosed cables to 230 VAC. Open the stirrup, plug the appliance plugs into the power supply and secure it with the stirrup.

MIE-1600/48 | MIE-3200/48

The power supply input connectors are 2 × M4 screws.



- Connect the DC connectors to 36...60 VDC. Use sufficient conductor cross sections.

•IPTV input

The MIE is modular. Each module has its own IPTV interface.

The MIE-1600 and MIE-1600/48 contains one module A:

Default IPTV address of module A:	192.168.0.146
Subnet mask:	255.255.255.0

The MIE-3200 or MIE-3200/48 contains two modules A and B. Each module has its own IPTV address:

Default IPTV address of module A:	192.168.0.146
Default IPTV address of module B:	192.168.0.149
Subnet mask:	255.255.255.0

The expansion module MIM 16-00 also has its own IPTV address:

Default IPTV address of the expansion module:	192.168.0.149
Subnet mask:	255.255.255.0

- Connect the IPTV input to an Ethernet switch connected to the IPTV source. Use Class 5/6 Ethernet cables with RJ-45 connectors.

•RF output

Each module of the MIE has its own RF output.

- The DVB-C/T distribution network must be installed and connected to the equipotential bonding according to EN 60728-11.
- Connect the output (RF OUT) of the device to the established distribution network. Use a high-shielded coaxial cable with an F connector.
- If you are using a MIE with more than one module or several MIE, then the outputs must be connected to suitable combiners.
- There has to be used galvanic isolator between the output connector and antenna network in Sweden and Norway state area.

•Upgrading MIE 16-00

Hardware extension

The MIE-1600 can each be extended by a further hardware module MIM-1600.

- Disconnect the device from the mains.
- Disassemble the cover plate on the back.
- Insert the module carefully.
- The module noticeably snaps into the contacts.
- Screw the module with the screws of the cover plate.
- Then reconnect the device.

• Configuration

The device is configured via the graphical user interface of the integrated web interface.

To access the user interface, you need a standard PC/laptop with a network interface and the actual version of the installed web browser. To connect the network interface of the device to the computer, you need a commercially available network cable.

The HTTP protocol is used for communication allowing a worldwide remote maintenance of the systems at various locations via the Internet. Access protection is implemented by means of the password prompt.

The MIE is modular. Each module has its own configuration interface.

The MIE-1600 or MIE-1600/48 contains one module A:

Default IP address of module A: 192.168.0.145
Subnet mask: 255.255.255.0

The MIE-3200 or MIE-3200/48 contains two modules A and B. Each module has its own IPTV address:

Default IP address of module A: 192.168.0.145
Default IP address of module B: 192.168.0.148
Subnet mask: 255.255.255.0

The expansion module MIM-1600 also has its own IPTV address:

Default IP address of the expansion module: 192.168.0.148
Subnet mask: 255.255.255.0

The computer and the device must be in the same subnetwork. The network part of the IP address of the computer must be set to 192.168.0.x and the subnet mask must be set to 255.255.255.0.

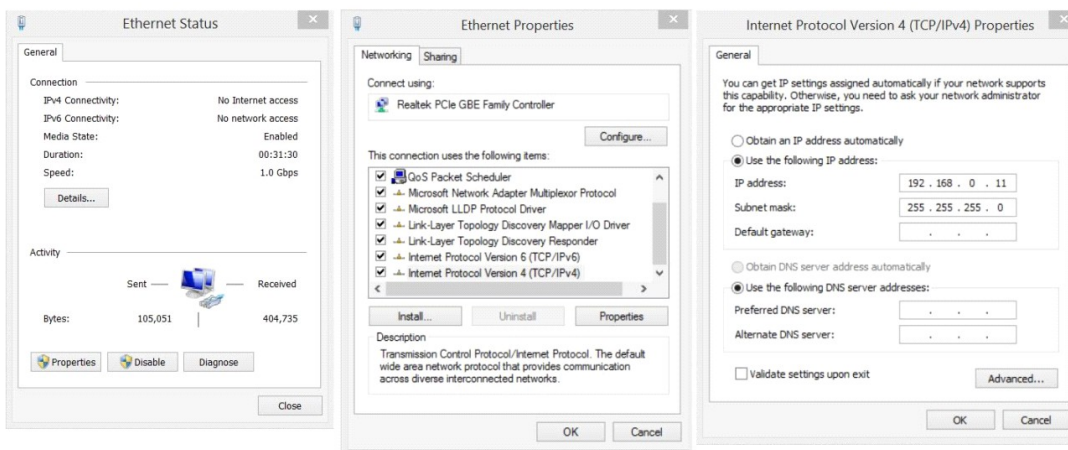
The host part of the network address is required for the identification of the devices and can be assigned in the subnetwork only once. You can allocate to the computer any not allocated host address between 0 and 255.

Hint:

Change the IP address and the subnet mask of your computer accordingly.

(e.g.: IP address:192.168.0.11 and subnet mask: 255.255.255.0)

Control panel > Network connections > LAN connection > Properties > Internet protocol version 4 TCP/IPv4 > Properties > Use the following IP address:

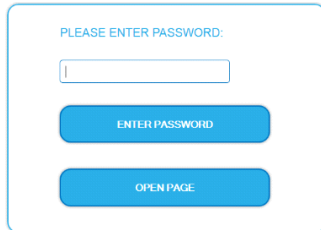


•Click OK to save.

- Connect the PC to the RJ-45 Ethernet connector **Control**.
- Start your web browser and enter the IP address of the connected module: e.g.: 192.168.0.145.

•Login and logout

The web-based user interface is protected against unauthorized access. When accessing the user interface, the first thing is the password request.



PLEASE ENTER PASSWORD:

ENTER PASSWORD

OPEN PAGE

- Enter the default password: *Ramsen8262*
- Click ENTER PASSWORD.
- If you are not automatically forwarded to the start page, click OPEN PAGE.

The standard language of the user interface is English. In the header, the the language of the user interface can be changed. The chosen language applies until the end of the session.



- To log out, click LOG OUT.

Notes:

- If the browser is closed while you are still logged in, an automatic logout occurs 2.5 minutes later.
- If the browser window stays open, there is no automatic logout. It allows monitoring the installation via the web browser.

Changing the password:

- Please change the password immediately after the first commissioning and choose a sufficiently safe password. Keep this password at a safe place.
- Menu item: MAINTENANCE > SET NEW PASSWORD (see 3.7.4 on page 29).

Changing the IP address:

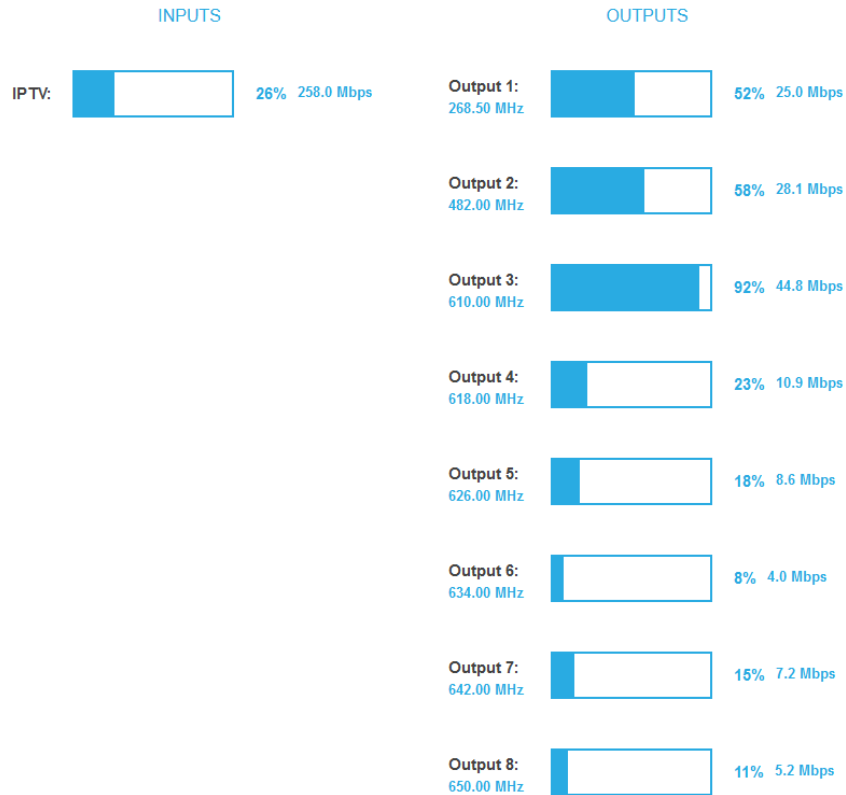
If needed, the devices can be integrated in a network. For this application, some changes must be applied to the network configuration.

- Menu item MAINTENANCE > SYSTEM.

•Front page

•Input

The data rate of the IPTV- input ist shown.



•Outputs

The fill level of all modulators is shown. 100% modulator fill level correspond to the maximal net data rate of the output channel.

If the current fill level exceeds the maximal fill level, it may cause image disturbances, e.g. mosaic images.

The data rates of the programmes are not constant. They are dynamically changed by the sender. To ensure an undisturbed reception, a reserve must absolutely be observed.

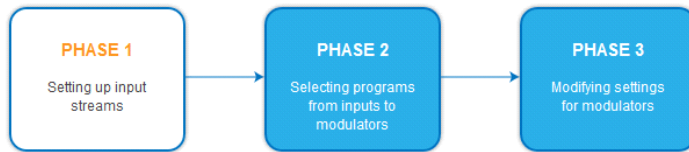
We recommend you to set the maximal fill level to 90%.

From a fill level of 95%, this is indicated in red.

The number of chosen programmes (see 3.4 on page 15) and the configuration of the modulators (see 3.5 on page 19) have an influence to the fill level.

•Initialization - phase 1

- Choose INITIALIZATION from the main menu.
The initialization starts with PHASE 1.



•Input streams

In Phase 1, the **IP address**, **port**, data rate in **Mbps**, and **status** of the input streams are displayed in a table.

Total IPTV:

IP Address	Port	Mbps	Status		
238.1.1.1	1234	5.4	●	↺	🗑️
238.1.1.2	1234	14.2	●	↺	🗑️
238.1.1.3	1234	14.3	●	↺	🗑️
238.1.1.4	1234	7.9	●	↺	🗑️
238.1.1.5	1234	15.8	●	↺	🗑️
238.1.1.6	1234	15.8	●	↺	🗑️
238.1.1.7	1234	4.4	●	↺	🗑️

- Click on a stream.
Further information, such as the program name, is displayed.

238.1.1.1	1234	15.2	●	↺	🗑️
Das Erste HD	TV	FTA			

- You can rescan a stream or delete a stream.

- Add one or multiple input streams

- Click **Add Input**.

The **Add input streams dialog** opens.

- Enter the **IP address** of the stream and its **port**.

- Click **OK**, the stream will be added and scanned.

To add multiple streams:

- Activate the option **Add multiple streams**.

- Enter the **End IP**.

Streams are created between the IP-Address and the End-IP (in the example 239.0.0.1, 239.0.0.2 and 239.0.0.3).

239.0.0.1	1234	9.8	●	↺	🗑️
239.0.0.2	1234	0.4	●	↺	🗑️
239.0.0.3	1234	0.3	●	↺	🗑️

Options:

- Activate the option **Select all to modulator** and select a modulator.

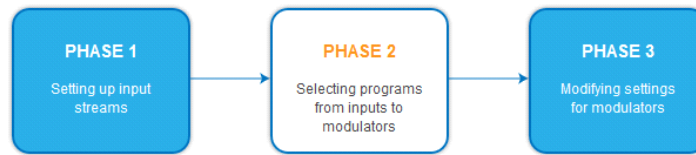
All newly added streams are assigned to this modulator.

- Activate the option **Erase all current streams**.

IMPORTANT: All previous input streams will be deleted. Only the newly created ones are available.

● Initialization - phase 2

- Click on PHASE 2, to select programs.



The Transport stream IDs the Network ID and the network name can be changed. Different LCN standards can be selected with the drop down menu **Region**.

DVB-C

If DVB-C is selected as the output modulation.

COLOR CODES	TRANSPORT STREAMS AND NETWORK		
M1 = Modulator 1	TS ID1: <input type="text" value="1"/>	TS ID2: <input type="text" value="2"/>	TS ID3: <input type="text" value="3"/>
M2 = Modulator 2			
M3 = Modulator 3	TS ID4: <input type="text" value="4"/>	TS ID5: <input type="text" value="5"/>	TS ID6: <input type="text" value="6"/>
M4 = Modulator 4			
M5 = Modulator 5	TS ID7: <input type="text" value="7"/>	TS ID8: <input type="text" value="8"/>	Network ID / ONID: <input type="text" value="20"/>
M6 = Modulator 6			
M7 = Modulator 7			
M8 = Modulator 8			
	Network Name: <input type="text" value="Axing"/>	Region (PDS): <input type="text" value="Central Europe (0x28)"/>	
	<input type="button" value="ADVANCED OPTIONS"/>		

DVB-T

If DVB-T is selected as the output modulation.

COLOR CODES	TRANSPORT STREAMS AND NETWORK		
M1 = Modulator 1	TS ID1: <input type="text" value="1"/>	TS ID2: <input type="text" value="2"/>	TS ID3: <input type="text" value="3"/>
M2 = Modulator 2			
M3 = Modulator 3	TS ID4: <input type="text" value="4"/>	TS ID5: <input type="text" value="5"/>	TS ID6: <input type="text" value="6"/>
M4 = Modulator 4			
M5 = Modulator 5	Network ID / ONID: <input type="text" value="20"/>	Network Name: <input type="text" value="Axing"/>	
M6 = Modulator 6			
	Region (PDS): <input type="text" value="Central Europe (0x28)"/>	<input type="button" value="ADVANCED OPTIONS"/>	

•Assigning programmes

Every tuner is assigned to a modulator. The programmes of the tuner can only be assigned to the associated modulator.

- For example, click on M1.

The program is assigned to modulator 1. The button of the modulator is highlighted in color (a new click on a modulator allow the assignment to be canceled. The modulator fades then again).

Modulator	LCN	Program Name	Type	Encryption	Input
M1 M2 M3 M4 M5 M6 M7 M8		Das Erste HD	TV	FTA	238.1.1.1:1234
M1 M2 M3 M4 M5 M6 M7 M8		arte HD	TV	FTA	238.1.1.2:1234
M1 M2 M3 M4 M5 M6 M7 M8		SWR BW HD	TV	FTA	238.1.1.3:1234
M1 M2 M3 M4 M5 M6 M7 M8		SWR RP HD	TV	FTA	238.1.1.4:1234
M1 M2 M3 M4 M5 M6 M7 M8		ZDF HD	TV	FTA	238.1.1.5:1234
M1 M2 M3 M4 M5 M6 M7 M8		zdf_neo HD	TV	FTA	238.1.1.6:1234
M1 M2 M3 M4 M5 M6 M7 M8		RTL Television	TV	FTA	238.1.1.7:1234
M1 M2 M3 M4 M5 M6 M7 M8		RTL2	TV	FTA	238.1.1.8:1234

- Click on SAVE CHANGES.

The assignment is saved to the device.

•LCN (Logical Channel Numbering)

The LCN function enables channel allocation for the station scan of the TV devices. The TV device must support the LCN function.

- Different LCN standards can be selected with the drop down menu **Region**. This standard may vary from area to area.
- An LCN can only be entered for programs assigned to a modulator.
- Click on the **LCN** column for the corresponding program.

M1 M2 M3 M4	6	RTL2	TV	FTA	238.1.1.8:1234
-------------	---	------	----	-----	----------------

- Enter the LCN with the keyboard or increase / decrease the LCN with the arrow buttons right of the number.
- Enter a own LCN for each desired program.
- To erase the LCN, enter 0 in the LCN column.
- Click SAVE CHANGES.

The LCNs of the channels are saved.

●Changing Program Name

The program name can be changed.

- Click on one of the programs.

The table with the Information opens.

Modulator		LCN	Program Name	Type	Encryption	Input
M1	M2	M3	M4	M5	M6	
M7	M8	M9	M10	M11	M12	
			Das Erste HD	TV	FTA	238.1.1.1:1234
Program Name:		German ARD 1		✓	✗	
Service-ID				10301		
PMT PID:				5100		

- Click right of the field **Program Name**.

- Enter an individual program name.

The entered program name appears in the channel list of the TV devices.

●PID Filtering

Individual packages can be filtered out of the transport stream.

- Click on one of the programs.

The table with the Packages opens. This contains the name, the PID and a check mark. By default, all PIDs are initially selected.

M1	M2	M3	M4		arte HD	TV	FTA	238.1.1.2:1234
Program Name:								
Service-ID				10302				
PMT PID:				5110				
Private data PID:				1270		<input checked="" type="checkbox"/>		
DSM-CC PID:				1276		<input checked="" type="checkbox"/>		
H.264 Video PID:				5111		<input checked="" type="checkbox"/>		
MPEG1 Audio (deu) PID:				5112		<input type="checkbox"/>		
MPEG1 Audio (fra) PID:				5113		<input checked="" type="checkbox"/>		
Teletext (deu) PID:				5114		<input type="checkbox"/>		
Subtitles (deu) PID:				5115		<input type="checkbox"/>		
AC-3 Audio (mul) PID:				5116		<input checked="" type="checkbox"/>		
MPEG1 Audio (mis) PID:				5117		<input checked="" type="checkbox"/>		
Subtitles (fra) PID:				5118		<input checked="" type="checkbox"/>		
Subtitles (deu) PID:				5119		<input type="checkbox"/>		

- Remove the check mark if desired.

The packet is no longer transmitted in the transport stream.

•Advanced options

- Click on ADVANCED OPTIONS.

A dialog with options will open.

NIT table version: ?
 Fixed:

OK

CANCEL

If programs change, then the NIT is recreated. In most countries, the end user does not notice, because the receivers automatically read in the new NIT. However, in some countries (eg France) end users are asked to start a channel search. If it comes to the case that one or more stations are weak to receive, then the NIT changes frequently and the end users are always unnecessarily prompted to start a channel search.

In this case, the NIT version can be "frozen" (recommended for use in France).

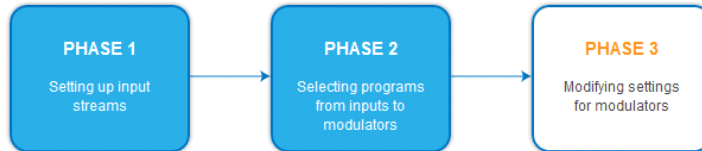
- Under NIT version, select Fixed.
- Enter a version between 1 and 31.

Note: If the station list really changes, the channel search must be done manually.

●Initialization - phase 3 (DVB-C)

In phase 3, the modulators are configured.

Note: Depending on the modulation standard the signals are modulated into DVB-C or DVB-T (see 3.7.2 on page 26).



●Click on PHASE 3, to modify the setting of the modulator.

●Configuration of the modulator

MODULATOR 1 SETTINGS

Common Output Level: 15 dB

Output Channel: S16 DVB-C Constellation: QAM256 DVB-C Symbol Rate: 6900 Fine Level: 0 dB

Fine Tune: 0.0 MHz

FILL

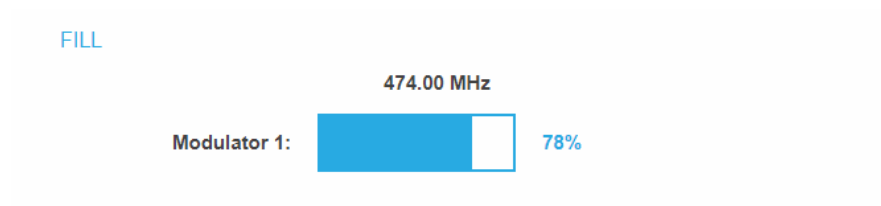
268.50 MHz

Modulator 1: 39%

Common level	The <i>Common Output Level</i> option include a general attenuation of all modulator outputs. The highest output level is reached with a setting of 20 dB, the lowest level with a setting of 0 dB.
Output channel	The modulators can be set to any output channel between S2 and CH 87. No output channel can be assigned several times!
DVB-C constellation:	With DVB-C modulation, you can choose between 32QAM, 64QAM, 128QAM and 256QAM. 256QAM enables the highest data transmission rate, but it also requires the best network quality.
DVB-C symbol rate:	The DVB-C symbol rate can be freely set between 1000 and 7500. The standard value is 6900. Some networks also work with 6875. When working with a bandwidth of 7 MHz, 6111 is customary.
Fine Level	The <i>Fine Level</i> option include fine attenuation from 0 to -3dB of each modulator output and the deactivation of the modulator (off).
Fine Tune:	The <i>Fine Tune</i> adjustment of the output channel is performed in 0.5 MHz steps.

•Fill level

The fill level depends on the number of activated channels in the channel list (menu item Phase 2).



To ensure an undisturbed reception, a reserve must absolutely be observed. We recommend you to set the maximum fill level to 95%. If the current fill level exceeds the maximal fill level, it may cause image disturbances, such as mosaic images. The LEDs on the front panel will light up in red in this case.

The data rate of a DVB-C channel depends on the selected channel bandwidth (7 or 8 MHz), the set symbol rate and the DVB-C modulation (QAM32;64;128;256) of the modulator.

If the displayed data rate exceeds 95%, there are different possibilities to change it:

- Change to a channel with a bandwidth of 8 MHz if a 7 MHz channel was selected previously.
- Set DVB-C modulation to a larger value, for example, change from QAM 64 to QAM 128.
- Reduce the number of selected channels in the channel list.
- If the connected receivers support this option, increase the symbol rate.

•Selected Programmes

The programme table SELECTED PROGRAMS shows the programmes that were activated in phase 2.

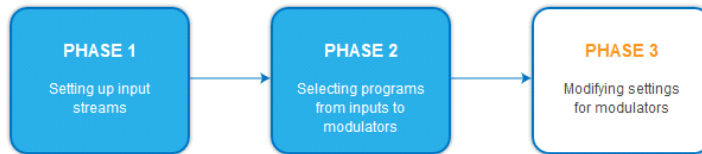
SELECTED PROGRAMS

Program Name	Type	Encryption
Das Erste HD	TV	FTA
SWR BW HD	TV	FTA

●Initialization - phase 3 (DVB-T)

In phase 3, the modulators are configured.

Note: Depending on the modulation standard the signals are modulated into DVB-C or DVB-T (see 3.7.2 on page 26).



●Click on PHASE 3, to modify the setting of the modulator.

MODULATOR 1 SETTINGS

Common Output Level: 15 dB

Norm: CCIR

Output Channel: S16

DVB-T Constellation: QAM64

DVB-T FEC Coderate: 7/8

DVB-T Bandwidth: 8 MHz

DVB-T Guard Interval: 1/32

DVB-T Transmission Mode: 2k

Fine Level: 0 dB

Fine Tune: 0.0 MHz

●Configuration of the modulators

- Common Output level** The *Common Output Level* option include a general attenuation of all modulator outputs. The highest output level is reached with a setting of 20 dB, the lowest level with a setting of 0 dB.
- Norm:** In this selection field, you can set the norm for the output channel spacing.
 Note: Changing the norm works now according to following rules:
 CCIR-->Australia : all modulators forced to 7MHz
 Australia-->CCIR : all modulators forced to 8MHz, however with following exception: low channels S2-S20 are 7MHz only, so those remain in 7MHz
- Output channel:** The first modulator can be set to any output channel between S2 and CH 69. The other three modulators are automatically set by incrementing the output channels in accordance with the chosen channel spacing.
 For example: modulator 1 = Channel 21
 modulators 2, 3 and 4 = Channels 22, 23 and 24

DVB-T modulation:	<p>The modulation can be set on QPSK, on QAM 16 or on QAM 64.</p> <p>The QPSK-setting provides the smallest data rate to the output channel. The QPSK-modulation process is used in bad distribution networks because of its robustness against disturbances and of its safe transmission.</p> <p>The QAM-modulation process allow reaching higher data rates, so that more programmes can be transmitted on a channel. The QAM 64-modulation gives the highest data rate.</p> <ul style="list-style-type: none"> •QPSK (2 bit) – small data rate – very robust signal. •QAM 16 (4 bit) - middle data rate. QAM 64 (6 bit) - high data rate.
DVB-T FEC (forward error correction):	<p>Thanks to the error correction, errors resulting from high-disturbed transmission routes can be balanced by restoring data.</p> <p>The data required to restore the signal are included in the transmitted FEC bits.</p> <p>Changing the FEC factor modifies the part of the FEC data in relation to the application data.</p> <p>A higher part of FEC data means an higher transmission redundancy. But this reduces the bandwidth for the useful data too.</p> <p>A FEC of 7/8 means the highest rate for the useful data and the smallest transmission redundancy.</p> <ul style="list-style-type: none"> •FEC 1/2 - small data rate - strong protection against errors. FEC 7/8 - high data rate - weak protection against errors.
DVB-T bandwidth:	<p>The DVB-T standard plans a broadcast on 6, 7 or 8 MHz channels. A bigger bandwidth means that more data can be transmitted on a single channel.</p> <p>In the CCIR channel spacing, the lower channels: C5...S20 have a provided bandwidth of 7 MHz. The other channels have a bandwidth of 8 MHz.</p> <p>If the bandwidth is changed, the channel does not correspond any longer to the set channel spacing. Therefore, the output frequency for all 4 modulators also changes.</p>
DVB-T guard interval:	<p>A guard interval is transmitted between the symbols of the useful signal. This guard interval avoids the intersymbol interference during the DVB-T transmission.</p> <p>The delayed signals of other synchronized DVB-T senders or reflections have no effects on the decoding of the useful signal if they arrive during the guard interval. The period of the echoes must be shorter than the duration of the guard interval.</p> <p>Changing the guard interval adjusts the ratio between the transmission duration of the useful symbols and the duration of the guard interval.</p> <p>A great guard interval (e.g. 1/4) leads to a really small data rate.</p> <p>When transmitting on a perfect coaxial distribution network, a really small guard interval (1/32) is enough.</p>

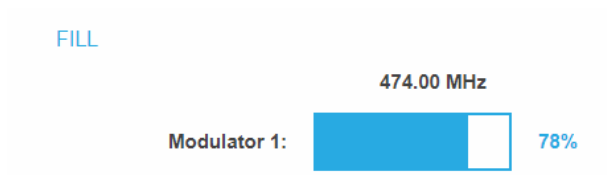
DVB-T transmission modes 2k fix

Fine Level: The *Fine Level* option include fine attenuation from 0 to -3dB of each modulator output and the deactivation of the modulator (off).

Fine Tune: The fine Tuning of the output channel is performed in 1 MHz steps.

•Fill level

The data rate of the sender may vary depending on the image contents and on the transmission quality. To ensure an undisturbed reception, a reserve must absolutely be observed.



We recommend you to set the maximal fill level to 90%.

If the current fill level exceeds the maximal fill level, it may cause image disturbances, e.g. mosaic images.

If the net data rate of the signal exceeds the net data rate of the output channel, the modulator overflows. This overflow leads to disturbances. If the modulator overflows, the status LED on the front side of the device lights in red.

Filtering the programmes reduces the net data rate of the input signal. Subsequently, the net data rate of the output signal is also reduced.

The data rate of the DVB-T channel depends furthermore on the chosen channel bandwidth (7 or 8 MHz), on the set error correction rate (FEC) and the modulation rate (QPSK, 16QAM, 64QAM) of the modulator.

If the displayed data rate exceeds 90%, there are different possibilities to change it:

- Change to a channel with a bandwidth of 8 MHz if a 7 MHz channel was selected previously.
- Raise the modulation rate to 64QAM. QPSK corresponds to the lowest, the 64QAM setting to the highest output data rate.
- Set the forward error correction to 7/8. With this setting, the data rate is increased, but the error correction is lower. A lower error correction requires a better transmission quality from the antenna network.
- Set the guard interval to 1/32. This shorter guard interval allows you to reach greater data rates.
- Reduce the number of selected programmes in the channel list.

COFDM modulated channels allow net data rates from 4.98 up to 31.67 Mbit/s (typically 24).

Modulation	Code rate	Guard interval			
		1/4	1/8	1/16	1/32
QPSK	1/2	4.976	5.529	5.855	6.032
	2/3	6.635	7.373	7.806	8.043
	3/4	7.465	8.294	8.782	9.048
	5/6	8.294	9.216	9.758	10.053
16-QAM	7/8	8.709	9.676	10.246	10.556
	1/2	9.953	11.059	11.709	12.064
	2/3	13.271	14.745	15.612	16.086

	3/4	14.929	16.588	17.564	18.096
	5/6	16.588	18.431	19.516	20.107
	7/8	17.418	19.353	20.491	21.112
64-QAM	1/2	14.929	16.588	17.564	18.096
	2/3	19.906	22.118	23.419	24.128
	3/4	22.394	24.882	26.346	27.144
	5/6	24.882	27.647	29.273	30.16
	7/8	26.126	29.029	30.737	31.668

•Selected Programmes

The programme table SELECTED PROGRAMS shows the programmes that were activated in phase 2.

SELECTED PROGRAMS

Program Name	Type	Encryption
Das Erste HD	TV	FTA
SWR BW HD	TV	FTA

•Maintenance

The menu entry MAINTENANCE enables software updates, changing the IP address, changing the password, restarting the device and much more.



CURRENT SETTINGS

Firmware version: V205-20180727-U (DVB-C)
Software version: 0.67
Serial number: 8688747
Processor temperature: 61 C
Ventilation temperature: 28 C
RF output level: OK

Under Current Settings, you will find the following information:

- Firmware version: Displays the firmware version and the output modulation type.
- Software version: Displays the version of the interface
- Serial number of the device
- Processor temperature - must remain below 90° C
- Ventilation temperature - must remain below 50° C
- RF output level state

Important: If you stay on the maintenance page for more than 2.5 minutes, an automatic logout will occur and you will

have to repeat the login procedure.

•Updating software

NOTICE

- After an update, initialization data saved with older Software versions can be loaded into the device with a newer Software version.
- Initialization data saved with the current Software versions can **not be loaded** into devices with an **older Software** version.
- Therefore, if possible, make a Software update of all devices.
We recommend the AXING SMARTPortal for easier handling and overview.

Download

You can find software updates by entering the article in the search field at www.axing.com.

- Download the current version of the file to your computer and unpack it.

Update

New software for the graphical user interface can be installed under SOFTWARE FILE.

UPDATE A NEW DESIGN TO FLASH

SOFTWARE FILE:

Datei auswählen

 Keine ausgewählt

UPDATE

- Click under SOFTWARE FILE on „Browse...“.
- Browse for the file on your computer.
- Click on UPDATE.

The file will be uploaded to the device.



After this the update of the device begins, the remaining time ist shown as a countdown.

SYSTEM IS RECONFIGURING

PLEASE WAIT 172

The device will be automatically rebooted after an update. The enter password dialog will be displayed.

- After the Update, log in again.

- **Modulation standard**

Depending on the modulation standard the output signals are modulated into DVB-C or DVB-T.

MODULATION STANDARD

Select Modulation Standard:

DVB-C

SAVE & REBOOT

- Select a **Modulation Standard**.

- Click SAVE & REBOOT.

The changing of the modulation standard begins, the remaining time ist shown as a countdown.

SYSTEM IS RECONFIGURING

PLEASE WAIT 172

The device will be automatically rebooted, the enter password dialog will be displayed.

- Enter the password again.

- Check especially the modulator settings and their fill level.

•Changing the IP address

The network options are configured under the menu item MAINTENANCE> SYSTEM OPTIONS.

There you will find the following tabs:

- Control: IP address of the Configuration interface
- IPTV: IP address of the IPTV input interface
- CAS: IP address of the access to a CA Simulcrypt server

Dynamic IP address

- Use **dynamic IP address** to connect the device to a network with a DHCP server.

Static IP address

- Use a **static IP address** to connect the device to a network with a fixed IP address. The IP address, netmask and the gateway can be changed here. In addition, DNS server 1 and DNS server 2 can be entered.

SYSTEM OPTIONS

Control IPTV CAS

Use dynamic IP address

Use static IP address

IP Address (0-255):

192	168	177	168
-----	-----	-----	-----

Netmask (0-255): (0-255):

255	255	255	0
-----	-----	-----	---

Gateway (0-255):

192	168	177	1
-----	-----	-----	---

DNS Server 1 (0-255):

8	8	8	8
---	---	---	---

DNS Server 2 (0-255):

8	8	4	4
---	---	---	---

SAVE & REBOOT

- Click **SAVE & REBOOT** to confirm and save the changes.

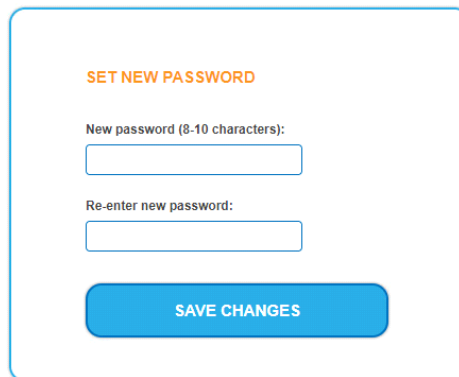
When the changes are saved, the device will reboot automatically.

- The **new IP address** has to be entered in the web browser and the enter password dialog will be displayed.

•Changing the password

The default password is: *Ramsen8262*.

The default password should be changed right after commissioning the device.



SET NEW PASSWORD

New password (8-10 characters):

Re-enter new password:

SAVE CHANGES

- Type an new password with 8-10 characters (letters and/or digits).
- Re-enter the password.
- Click SAVE CHANGES to confirm and save the changes.

When the changes are saved, the frontpage will be shown.

•Rebooting

Under REBOOT THE SYSTEM the device can be rebooted.



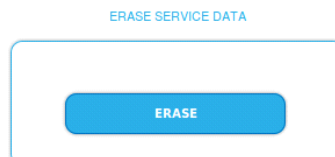
REBOOT

- Click on REBOOT.

After rebooting, the password must be entered again.

•Erasing service data

In the section ERASE SERVICE DATA you can erase the settings of phase 1 and phase 2. The input streams and the selection of programs are deleted.



ERASE SERVICE DATA

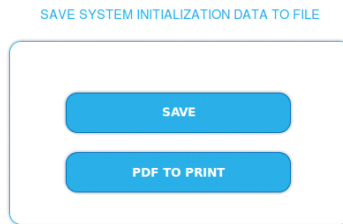
ERASE

- Click on erase.

The frontpage will be shown.

•Save Initialization Data

In the section SAVE SYSTEM INITIALIZATION DATA TO FILE you can save the current initialization data from phase 1 to 3 into a file on your computer.



- Click on SAVE.

The data will be saved in a file called config.dat at the download folder on your computer.

- Click on PDF TO PRINT.

A PDF will be generated and saved in a file called config.pdf at the download folder on your computer.

Note: Password and IP adress will not be saved.

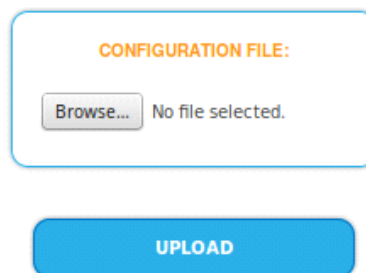
•Upload Initialization Data

In the section UPLOAD SYSTEM INITIALIZATION DATA FROM FILE you can upload the initialization data from a file to the modul.

NOTICE

- After an update, initialization data saved with older software versions can be loaded into the device with a newer Software version.
- Initialization data saved with a newer software versions can **not be loaded** into devices with an **older Software** version.

UPLOAD SYSTEM INITIALIZATION DATA FROM FILE



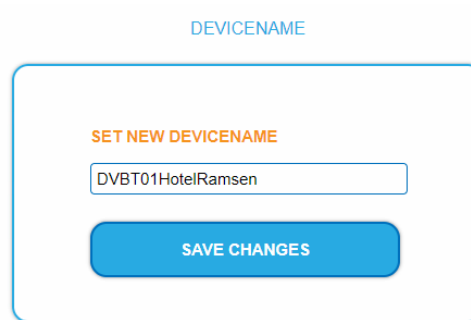
- Choose a configuration file.

- Click on UPLOAD.

The upload will take a few seconds.

•Device name

In the section DEVICE NAME you can set a new device name for the device.



- Enter a name in the field SET NEW DEVICE NAME.
- Click on SAVE CHANGES.

The new device name is shown at the login.

•Access to SMARTPortal

If you are a registered user of the SMARTPortal, then you can remotely control the device via the SMARTPortal and, if necessary, receive support from AXING.

Prerequisite is an internet connection for the device.



- In the **State** field, select **Enabled**.
- Activate, if required, the option **AXING support allowed**.
- In the field **Location**, enter a name for the location of the device. This name will appear later in the SMARTPortal to help you identify the device.
- In the field **Email address**, enter the e-mail address with which you are registered at SMARTPortal.
- In the field **User key**, enter the user key that you received when registering at SMARTPortal.
- Click on SAVE & REBOOT. The data is saved, the device is rebooted and the connection to the SMARTPortal is established.

Where required, you have to adjust the connection data (see 3.7.3 on page 28).

•Network Management Protocol (SNMP)

The Simple Network Management Protocol (SNMPv1 or SNMPv2c) is supported. With the help of a Network Management Station (NMS) information can be read or alarms can be received.

Supported SNMP message types are GET-REQUEST, GETNEXT-REQUEST and TRAP.

The MIB object definition is stored in the device. If you are connected to the device in the network, then you can download the file from the device.

URL = [IP address of device] /MIB/AXING-MIB.txt

For example: 192.168.0.145/MIB/AXING-MIB.txt

SNMP

Agent: OFF ON

Agent Port:

SNMP Version:

Community Name:

Traps: OFF ON

Destination Address:

Destination Port:

SNMP Agent

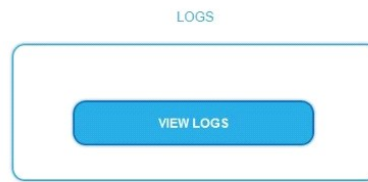
- Set the **Agent** switch to **ON** to use GET-REQUEST and GETNEXT-REQUEST.
- The **Agent Port** is by default 161, if necessary enter another port.
- In the **SNMP Version** field, select version SNMPv1 or SNMPv2c. SNMPv2c is recommended.
- The **Community Name** (the SNMP "password") is public by default, if necessary enter a different community name.

Traps

Traps can also be output independently of the SNMP agent.

- If traps are to be transmitted from the device, then set the **Traps** switch to **ON**.
- Enter the **Destination Address** of the NMS receiving traps.
- Enter **Destination Port** of NMS, by default 162 is used.

•Log files



In the section LOGS you can view the Log files .

- Choose Status Log.

The status log is written to RAM and starts again after a restart. In the status log for example, the lock in time and the frequencies of the tuners are stored.

- Select System log.

The system log is written to the flash memory, so it is still available after a restart. In the system log for example, the boot time and hardware defects are stored.

Simulcrypt User Guide

Conditional Access system setup starts by installing and configuring CAS server that, among others, generates ECMs and EMMs. CAS server setup is not covered in this guide.







Simulcrypt setup at headend side is started from Maintenance → CAS Settings. Tables described in the next chapters must be configured according to CAS server setup.

1) Global CAS settings

GLOBAL SETTINGS	
Enable Simulcrypt:	<input checked="" type="checkbox"/>
Network Interface:	<input type="text" value="CAS"/>
EMMG Listening Port:	<input type="text" value="9998"/>

- **Enable Simulcrypt:** Simulcrypt license needed to activate.
- **Network interface** used for all simulcrypt-related network traffic. By default Ethernet-port labeled as CAS is used. IP address of this port must be configured for EMMG (CAS server).
- **EMMG Listening Port:** TCP port configured in EMMG (CAS server) to connect the headend.

2) CAS list

CAS LIST			
Name	CAS ID	Sub ID	+
Conax	0x0B00	0x0001	 
Test	0x1234	0x5678	 
Verimatrix	0x5604	0x0000	 

Add here all connected CA-Systems. Each CA-System is identified by two IDs, the “CA_system_id” (CAS ID) and “CA_subsystem_id” (Sub ID). Sometimes both values can be seen combined to a single “Super_CAS_id”. This table is to map CAS ids to human readable names in the next tables.

3) Scrambling Control Groups (SCG)

This table lists all scramblers used in the device. Services connected to the same SCG are scrambled at the same time with the same control word (encryption key). Each SCG can contain one or more services. Services are connected to SCGs at page Phase2 (explained more detail below in chapter #7).

SCG LIST						
Name	Algorithm	Scrambling Policy	Fallback	Crypto Period (sec)	Status	+
Conax 2501	DVB-CSA-1	All ECMGs	Keep last CW	15		
Conax 2504	DVB-CSA-1	All ECMGs	Keep last CW	15		
Conax 2511	DVB-CSA-1	All ECMGs	Keep last CW	15		
Conax 2521	DVB-CSA-1	All ECMGs	Keep last CW	15		
Conax 2531	DVB-CSA-1	All ECMGs	Keep last CW	15		
Conax 2505	DVB-CSA-1	All ECMGs	Keep last CW	15		

- **Name:** Only used in web interface to easily identify the scrambling groups. Therefore groups should have descriptive names to enable easy identification at Phase2 when connecting services to SCGs.

- **Algorithm:** Scrambling algorithm. Option values:

- # disabled : scrambling for this SCG is actually disabled
- # DVB-CSA-1 : CSA with reduced entropy (48 bit keys) – the most typically used.
- # DVB-CSA-2 : CSA with full length keys (64 bit keys)

- **Scrambling Policy:** Option values:

- # All ECMGs : Services connected to this SCG are scrambled only if all ECMGs are connected ok
- # Any ECMG : Services connected to this SCG are scrambled as long as at least one ECMG is connected
- # Always : Services are scrambled always. If all ECMG connections are lost, no one is able to descramble.

- **Fallback:** Fallback rule in case Scrambling Policy (defined above) is not fulfilled. Option values:




- # Revert to clear : Stop scrambling. Subscribers will receive services as unscrambled. Also non-subscribers are able to view the content.
- # Keep last CW : Scrambling is continued using the last CW and the last received ECM. Subscribers are able to continue the descrambling.

- **(Min) Crypto Period:** Period in seconds for one control word (encryption key). Also ECM generator can specify a minimum period it supports and in this case maximum of these two values is used.

- **Status:** Scrambling status as traffic lights to provide a quick visual feedback.

4) ECM Generators










ECM generator is provided by CAS supplier to produce ECM messages.

ECM GENERATOR LIST						
Name	Channel ID	Remote IP	Port	CAS	Status	+
Conax	1	192.168.0.100	8007	Conax		 

- **Name:** Only used in web interface to easily identify separate ECMG servers
- **Channel ID <optional>:** 'ECM_channel_id' used when communicating with ECMG. Some ECMGs require a specific value for this ID (info from CAS supplier). If left empty, device uses some unused random ID.
- **Remote IP:** IP address of the ECMG server to connect to.
- **Port:** Port of the ECMG server to connect to.
- **CAS:** CA system of this ECMG (name from the CAS table)
- **Status:** ECMG server connection status

5) ECM List

ECM contains CAS supplier private information which carries the control word (encryption key) in a secure manner and private entitlement information. Each ECM entry corresponds to one generated ECM stream. Each SCG requires at least one ECM stream, otherwise nobody is able to descramble.





ECM LIST						
ECM Generator	ECM ID	SCG	Access Criteria	Private Data	Status	+
Conax	2501	Conax 2501	00 00 09 C5	<empty>		 
Conax	2504	Conax 2504	00 00 09 C8	<empty>		 
Conax	2505	Conax 2505	00 00 09 C9	<empty>		 
Conax	2521	Conax 2521	00 00 09 D9	<empty>		 
Conax	2511	Conax 2511	00 00 09 CF	<empty>		 
Conax	2531	Conax 2531	00 00 09 E3	<empty>		 




- **ECM Generator:** ECMG responsible for generating this ECM stream (value from ECMG table)
- **ECM ID <optional>:** 'ECM_id' used when communicating with ECMG. Some ECMGs may require a specific value for this (info from CAS supplier). If left empty some random ID is used.
- **SCG:** Scrambling Control Group whose control words are transmitted by this ECM (value from SCG table)
- **Access Criteria:** Arbitrary binary data transmitted to the ECMG. Typically used to tell the ECMG which clients should be able to decode the ECMs. Format and value is given by CAS supplier.
- **Private Data:** Arbitrary binary data included as 'private_data' in the CA_descriptor of the PMT associated to this ECM (info from CAS supplier).
- **Status:** ECM stream status

6) EMM configuration

EMM contains CAS supplier private information which for example specifies the authorization levels of subscribers or groups of subscribers. EMM generator is an external server from CAS supplier which produces EMM messages and repeatedly sends them to the headend.

EMM configuration is divided to two tables: EMM Generators and list of generated EMMs.

EMM GENERATOR LIST				
Name	IP Filter	CAS	Client ID	+
Conax	<none>	Conax	<use Super_CAS_id>	 
Test	<none>	Test	<use Super_CAS_id>	 

EMM LIST				
EMM Generator	Data ID	Bandwidth (kbps)	Private Data	Status +
Conax	<auto>	100	<empty>	  

EMM Generator table:

- **Name:** Only used in web interface to easily identify separate EMMG servers

- **IP filter <optional>:** By default different EMM generators are separated by Client ID and this cell can be left empty. But if IP address is entered, only connections from this address are allowed.

- **CAS:** CA-System from the CAS table.

- **Client ID <optional>:** The value EMMG uses to identify itself (info from CAS supplier). Often 'Super_CAS_id' is used as 'client_id', so can be left empty and device automatically uses 'Super_CAS_id' of the selected CAS.

EMM List table:

- **EMM Generator:** Name from EMM Generator table

- **Data ID <optional>:** EMMG identifies separate streams by 'data_id'. If left empty, all 'data_id's get accepted.

- **Bandwidth:** Allocated bandwidth (kbps) for this EMM stream. It is responsibility of the EMMG to actually maintain the bitrate.

- **Private Data <optional>:** Arbitrary binary data included as 'private_data' in the CA_descriptor for this EMM.

- **Status:** EMM receiving status.

7) Service configuration (Phase2)

Services are connected to SCGs at Phase2:

- Click desired service to view service details
- Simulcrypt SCG drop-down shows all configured SCGs, select one.
- By default all video and audio PIDs for the service are selected for the scrambling. Select/unselect individual PIDs at "Scramble" column to overwrite the defaults.
- Press "Save changes" once ready.

After saving the changes encryption status column shows scrambling status for each service selected for scrambling.

Modulator	LCN	Program Name	Type	Encryption	Input
M1 M2 M3		RTL Television	TV		239.0.0.1:1234
		Program Name:	RTL Television		
		Service-ID:	12003		
		Simulcrypt SCG:	Conax 2501		
		Duplicate program:	Add		
Stream type	IN PID	OUT PID	FIXED	BLOCK	SCRAMBLE
PMT	44	44	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MPEG2 Video	163	163	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
MPEG1 Audio (ger)	104	104	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Private data	108	108	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teletext (deu)	105	105	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AC-3 Audio (ger)	106	106	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Subtitles (deu)	110	110	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DSM-CC	111	111	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DSM-CC	112	112	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M1 M2 M3		RTL Regional NRW (user modified)	TV		239.0.0.2:1234

8) Scrambling status monitoring

Web interface contains multiple Simulcrypt status traffic lights and they all give different level of details:

- 1) **Phase2 → Service scrambling status:** This is the most important status. If all scrambled services have green light, system is working without problems. But if any service has red light, Maintenance → CAS page gives more details.
- 2) **SCG table status:** Once SCG status is green, services connected to this SCG are scrambled and status must be green also at related rows in ECMG and ECM tables. If SCG status is red, please check status columns at ECMG and ECM tables.
- 3) **ECM table status:** Status of each ECM stream. Re-check access criteria value if status is red.
- 4) **ECMG table status:** Server connection status. The least important item but indicates some network setup problem if status color is red. Check that e.g. network cable is properly connected to the device. All the other status items stay red until ECMG status becomes green.

Maintenance → View Logs gives overview about scrambling status in long-term. All SCG errors are reported here.

SNMP traps give the most detailed immediate information for studying e.g. CAS server connection problems. One good tool for collecting SNMP traps is iReasoning MIB Browser. SNMP traps must first be enabled at Maintenance page.

• Technical specifications

Type	MIE-1600	MIE-3200
Input		
Supported input transport streams	SPTS, MPTS	
Max. number of input streams (out of SPTS or MPTS)	512	2 × 512
Supported protocols IPTV input	UDP, RTP	
Total net data rate IPTV input (net load capacity of transport stream)	1 × 900 Mbps	2 × 900 Mbps
Input connectors	1 x RJ45, IEEE 802.3, 1000 Base-T	2 x RJ45, IEEE 802.3, 1000 Base-T
Output		
Output frequency range	109...1006 MHz @ DVB-C 109...862 MHz @ DVB-T	
Number of output channels	1 × 16 DVB-C 1 × 12 DVB-T	2 × 16 DVB-C 2 × 12 DVB-T
Output channels adjustable	S2...K87 @ DVB-C S2...K69 @ DVB-T	
Output level	80...105 dBμV @ DVB-C 77...102 dBμV @ DVB-T	
Output connector	1 × F	2 × F
Output test port	-30 dB	
Output modulation		
Compliance	DVB-C (J.83 Annex A/C) DVB-T	
Modulation type	QAM32, QAM64, QAM128, QAM256 @ DVB-C QPSK, QAM16, QAM64 @ DVB-T	
Output transmission symbol rate	1...7,5 Mbps	
MER	≥ 40 dB @ DVB-C ≥ 36 dB @ DVB-T	
FFT @ DVB-T	2k mode	
FEC @ DVB-T	1/2, 2/3, 3/4, 5/6, 7/8	
Common		
Configuration interface / CAS interface	1×RJ-45, IEEE 802.3, 10/100 Base-T	2×RJ-45, IEEE 802.3, 10/100 Base-T
Operation voltage	100...240 VAC/50...60 Hz optional 36...60 VDC	
Power consumption	30 W	60 W
Equipotential bonding connection	4 mm ²	
Ambient temperature range (acc. to EN 60065)	-10°C...+50°C	
Dimensions (W × H × D) appr.	480 × 43 × 275 mm	

Deviating data MIE-1600/48 and MIE-3200/48

Type	MIE-1600/48	MIE-3200/48
Operation voltage	36...60 VDC	