User Manual

UNIVERSE

Ref. 8600

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1. INTRODUCTION

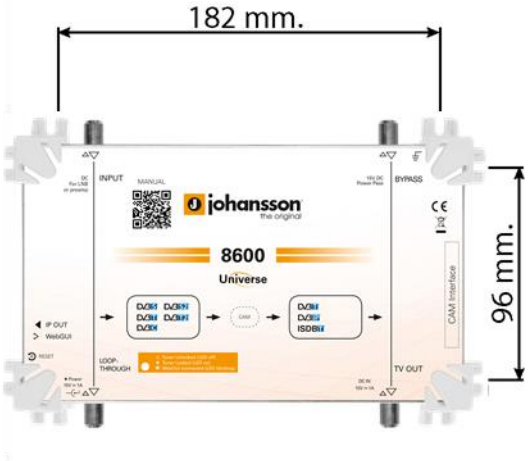
Product description

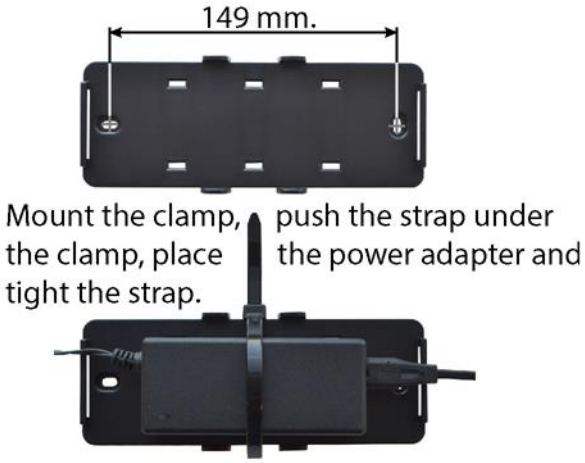
- Receives 1 transponder from any DVB source (satellite, terrestrial or cable)
- Decrypts the PayTV channels, when a professional CAM is inserted
- Puts the demodulated transponder on your private coaxial and IP network
- Can work standalone to insert channels in your existing network
- More products can be combined to a make a complete headend:
  - Cascadable inputs and outputs
  - Remote powering capabilities
- Supports LCN and HD LCN
- Compatible with SD and HD, with MPEG2 and MPEG4
- Perfect picture quality thanks to a MER, comparable to premium headend equipment
- Plug&Play thanks to a built-in WebGUI

Package contents

- 1x Universe (ref.8600)
- 1x Power adaptor (including mounting plate with tie-wrap)
- 1x Ethernet cable

Mounting





Typical installation

- Perfect when your TV installation does not have satellite tuners, but you wish to receive satellite TV.
- Perfect when your TV installation does not support DVB-T2 tuners, but you wish to receive the newest DVB-T2 signals. See figure 1.
- In existing installation where you want to add a few extra channels from different sources.
- New installations, where you can use one or multiple Universes to setup a complete network of TV and radio channels. See figures 2 and 3.
- In some countries, the operator does not support CAMs with business-to-business (B2B) subscriptions. However, if that operator allows professional installations, you can use multiple Universes with business-to-consumer (B2C) subscriptions without driving the costs too high.

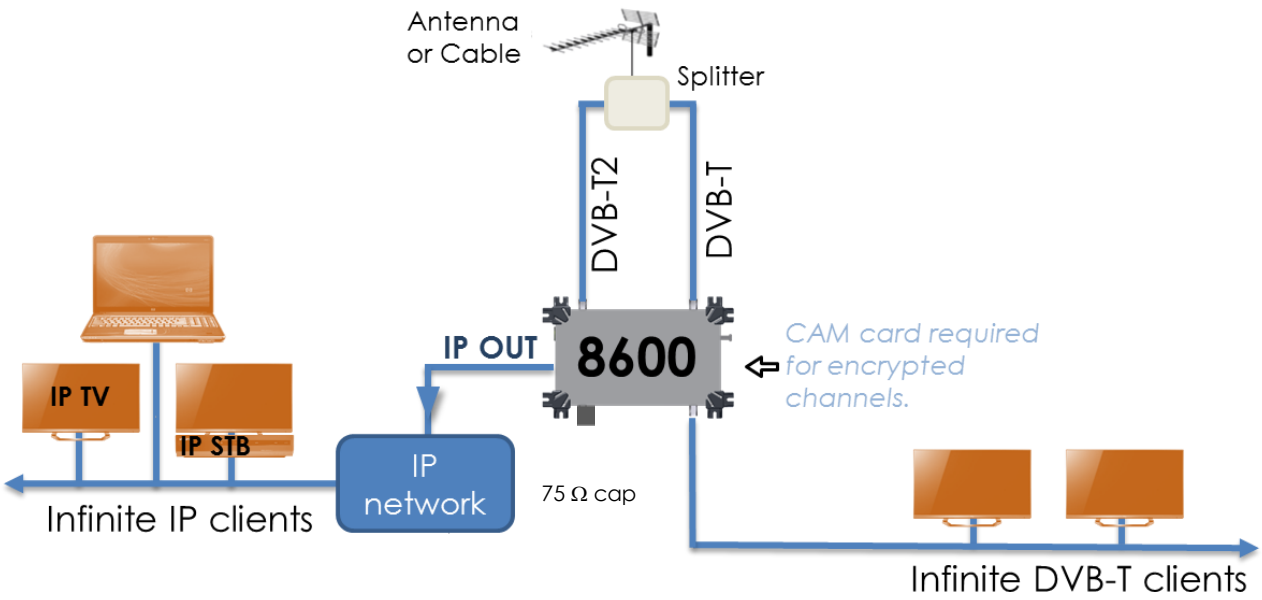


FIGURE 1: DVB-T2 CONVERTED TO DVB-T SIGNALS AND ADDED TO THE DVB-T BROADCAST

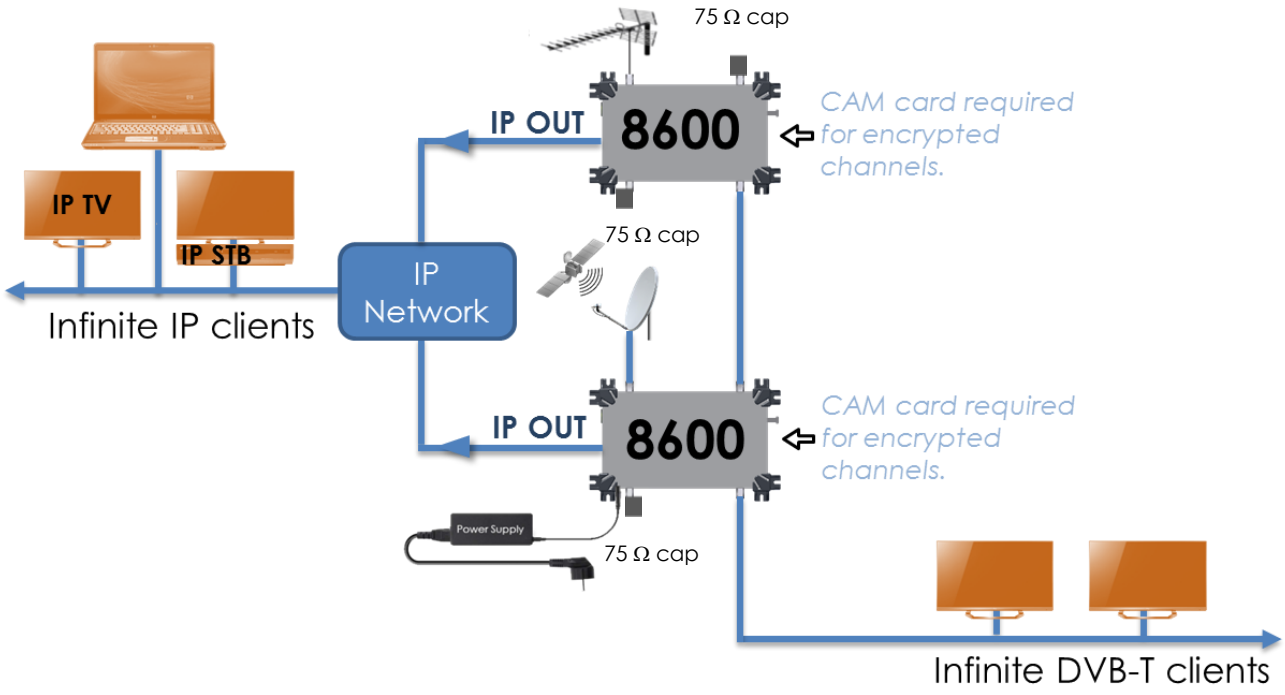


FIGURE 2: DVB-T AND DVB-S2 CONVERTED TO DVB-T AND IP CHANNELS

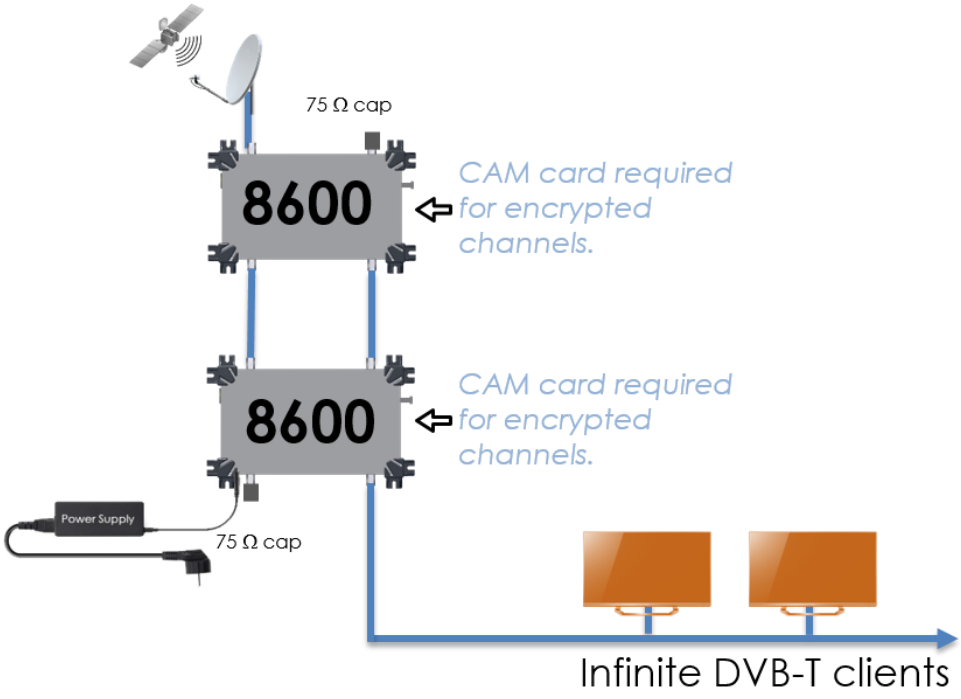


FIGURE 3: DVB-S2 CONVERTED TO DVB-T

Safety Instructions

Read these instructions carefully before connecting the unit

⚠ To prevent fire, short circuit or shock hazard:

- Do not expose the unit to rain or moisture.
- Install the unit in a dry location without infiltration or condensation of water.
- Do not expose it to dripping or splashing.
- Do not place objects filled with liquids, such as vases, on the apparatus.
- If any liquid should accidentally fall into the cabinet, disconnect the power plug.

⚠ To avoid any risk of overheating:

- Install the unit in a well aired location and keep a minimum distance of 15 cm around the apparatus for sufficient ventilation
- Do not place any items such as newspapers, table-cloths, curtains, on the unit that might cover the ventilation holes.
- Do not place any naked flame sources, such as lighted candles, on the apparatus
- Do not install the product in a dusty place
- Use the apparatus only in moderate climates (not in tropical climates)
- Respect the minimum and maximum temperature specifications

⚠ To avoid any risk of electrical shocks:

- Connect apparatus only to socket with protective earth connection.
- The mains plug shall remain readily operable
- Pull out power plug to make the different connections of cables
- To avoid electrical shock, do not open the housing of adapter.

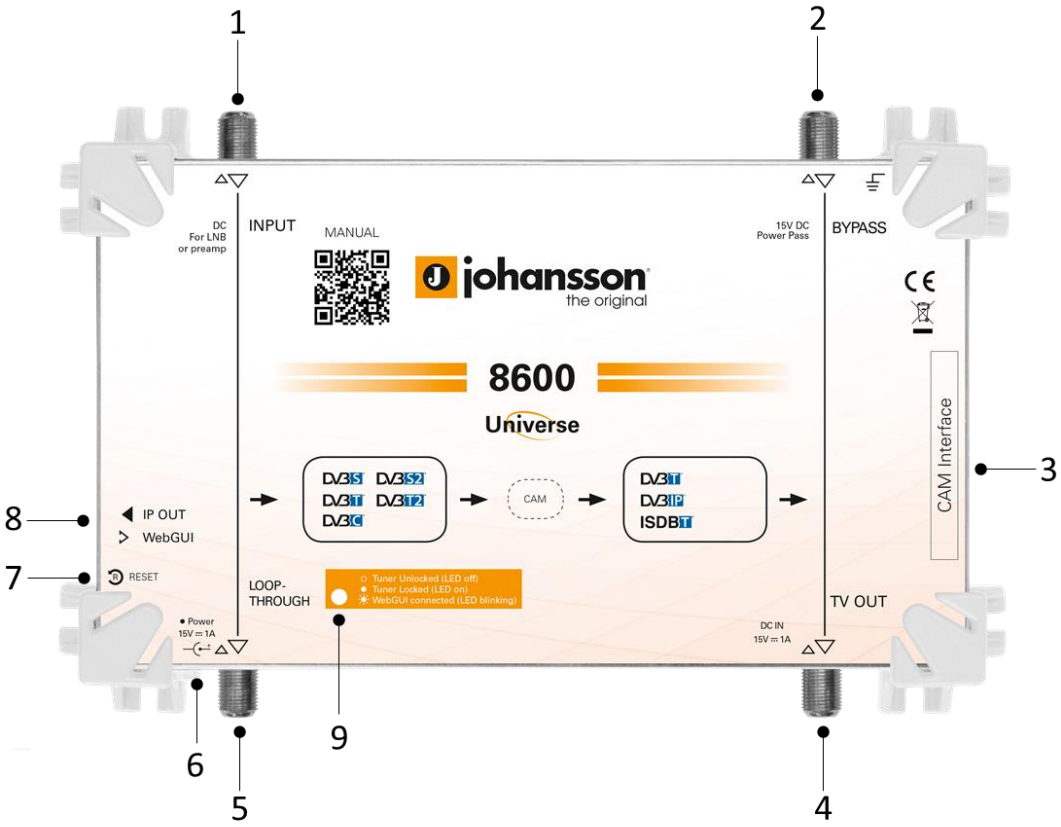
Maintenance

⚠ Only use a dry soft cloth to clean the cabinet.
⚠ Do not use solvent
⚠ For repairing and servicing refer to qualified personnel.

Dispose according your local authority's recycling processes

2. INSTALLATION OF THE HARDWARE

Module overview



1. INPUT: DVB-S/S2, DVB-T/T2, DVB-C
2. BYPASS: to insert a network of existing TV channels (should be blocked with a 75Ω DC-blocked resistor when not used)
3. CAM INTERFACE
4. TV OUT: DVB-T or ISDB-T
5. LOOP-THROUGH: to connect to the next Universe INPUT (should be blocked with a 75Ω DC-blocked resistor when not used)
6. 15 VDC INPUT + POWER LED
7. RESET BUTTON
8. ETHERNET CONNECTOR: WebGUI + IP OUT
9. TUNER LOCK LED: indicates if the tuner is locked. If the LED is blinking, that means the WebGUI is connected.

For typical applications, see figure 1, 2 and 3 on page 5 and next.

Connecting the power supply

The Universe works with the supplied adaptor of 15V DC. The power supply can be connected via the inlet (6) but the Universe can also be powered via the TV OUT (4).

The 15V DC is also being supplied to the BYPASS (2), which enables 1 power supply to feed more than 1 unit. Up to 3 Universes can be powered from the same adaptor.

3. CONFIGURATION OF THE MODULE

3.1. Minimal system requirements

The WebGUI is supported by the following web browsers (and newer versions of these browsers):

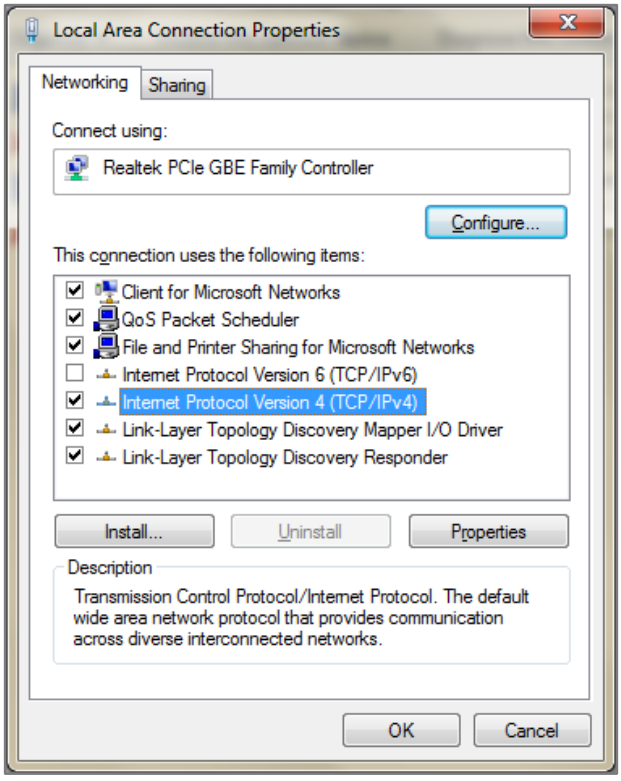
- Chrome 4
- Safari 3.1
- Firefox 3.6
- Explorer 9
- Opera 10.6

When using a different browser, we cannot guarantee a correct functioning of the interface.

3.2. Starting up the module

Connect all cables needed for your installation. (See p.8 Installation of the Hardware.)
For the first set-up, it is advised to connect the Ethernet cable (RJ45) directly to your PC (without using a switch).

- After powering the Universe, wait until the power led turns green (this can take up to about 2 minutes). Once the power led is green, the unit can be accessed through the WebGUI. The unit uses 192.168.50.50 as the default static IP address. Therefore, you will need to set-up a static IP in your PC that matches the subnet of the device. For example 192.168.50.25.



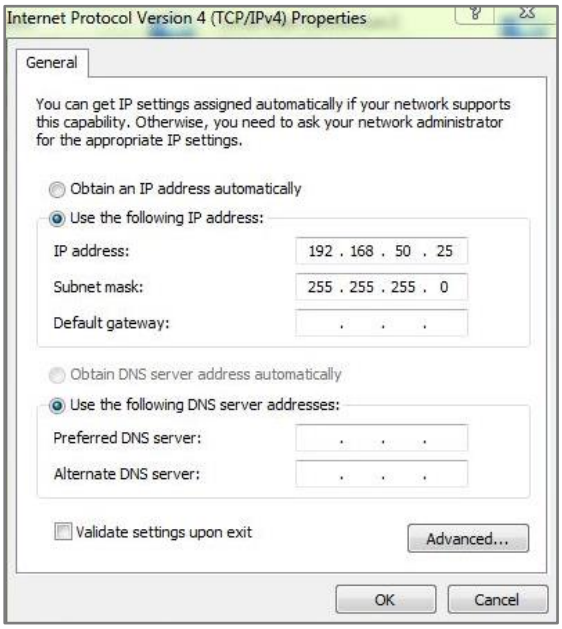
Windows 7

Go to start → Control Panel → Network and Internet → Network and Sharing Center → Change Adapter Settings.
Right-click on "Local Area Connection" and then on "Properties".

Windows 8

Open the windows 8 start screen by pressing the start button. Type "Control Panel" and press enter. Then go to "Network and Internet" → "Network and Sharing Center" → "Change Adapter Settings". Right-click on "Local Area Connection" and then on "Properties".

Double click on "Internet Protocol Version 4 (TCP/IPv4)" to enter the IP settings of your adaptor.

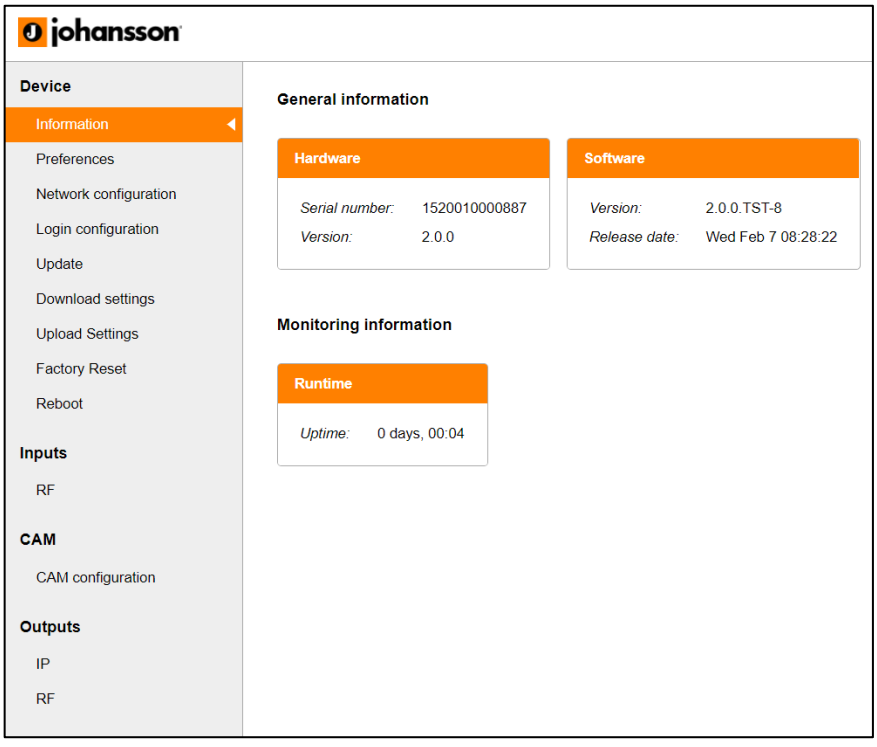


Check the radio button "Use the following IP address" and enter an IP and subnet mask.

You can leave the Default gateway and DNS settings empty.

Open your browser and surf to the website http://192.168.50.50.
If everything went fine you will see the following webpage, if not check your network settings and try again.

Alternatively, the webpage can default also be accessed via http://start but also in this case your PC needs to be in the same subnet.



After you have changed the IP address of your device (See page 12.) you can unplug the direct cable and add the device to your installation. Do not forget to change the IP settings of your PC back to its previous settings.

Resetting the device

Reboot the device by shortly pressing the reset button 1 second. When the button is released, the power led will turn red until the device is rebooted.

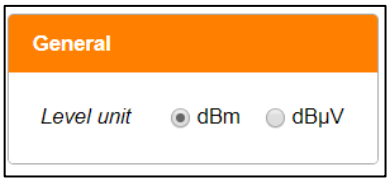
Reset the device to factory default settings by pressing the reset button for more than 10 seconds. When the button is released, the power led will turn red until the reset is done. The device will be restored to factory default settings and the IP of the device will be changed to 192.168.50.50. You can also reset the device in the WebGUI.

3.2.1. Device Information

Device Information gives some basic information about the device. Here you can find the uptime, the serial number, firmware version, the release date of the firmware and the hardware version. This is useful for checking if your device is up-to-date.

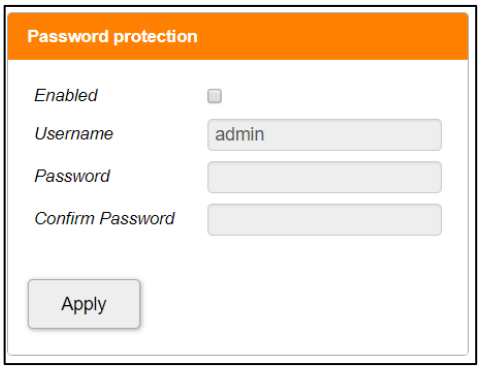
3.2.2. Device Configuration

Preferences

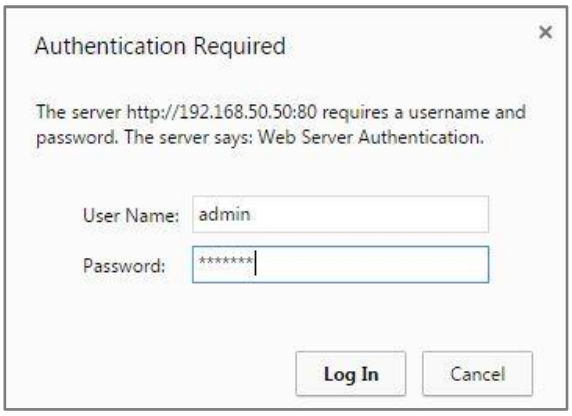


Here you can choose between dBm and dBµV as your default level unit.

Login



Here you can set up a user and password to secure the WebGUI. After pressing the "Apply" button you will be asked to reboot the device. Press "OK" to confirm the reboot.



The next time you want to access the configuration pages you will be asked to login. The device information page remains accessible without authenticating.

If you have forgotten your password you will need to reset the Universe to its default settings by pressing the reset button (see p. 12).

Network

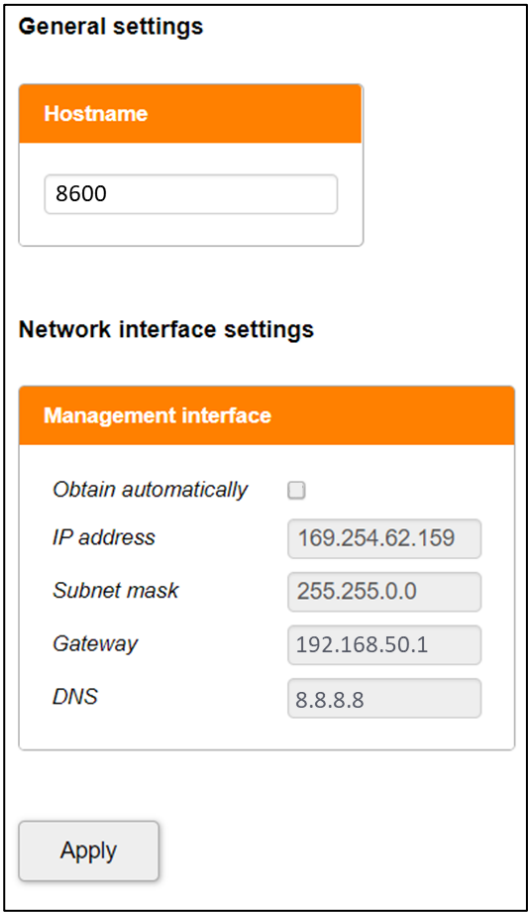
Go to "Device Configuration" ➔ "Network" to change your network settings. After changing the IP settings you will need to reconnect to the new IP.

You can choose to obtain an IP address automatically. This requires a DHCP server, which is available on most home and professional IP networks. You can find the IP address of your device in the DHCP client list of your DHCP server.

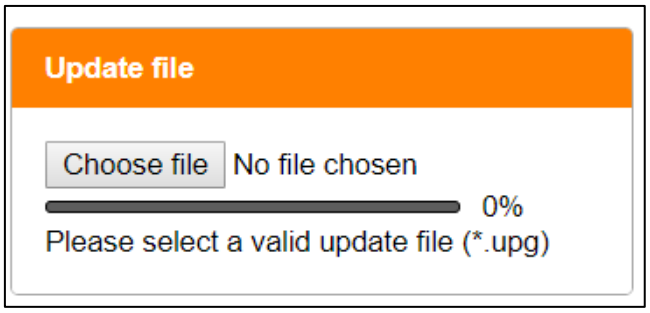
Alternatively, you can keep the Universe in static IP 192.168.50.50 or any other address of your choice.

➔ *Remark: The "Apply" button starts blinking if you change the settings of the Universe so you will not forget to press it.*

Default the Universe webpage can be accessed via http://start . In this example, the hostname was changed to 8600, which means the webpage can now be found on http://8600.



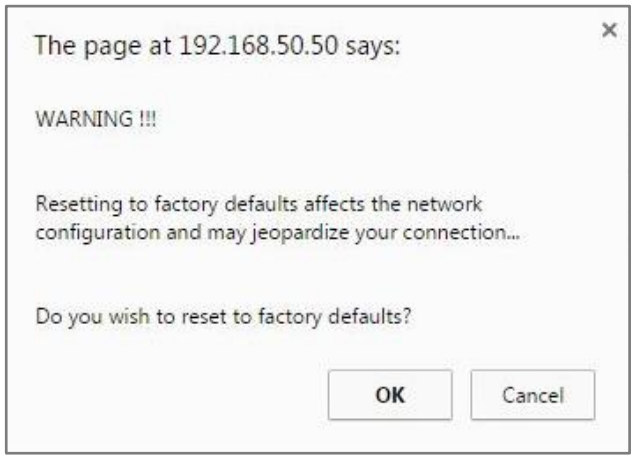
Firmware Update



If you want to update the firmware, click on "Choose File" and select the update file. The firmware file ends with the *.upg extension. Then click the "Upload" button and wait until the file is uploaded and the device is rebooted (this can take a while).

Factory Reset

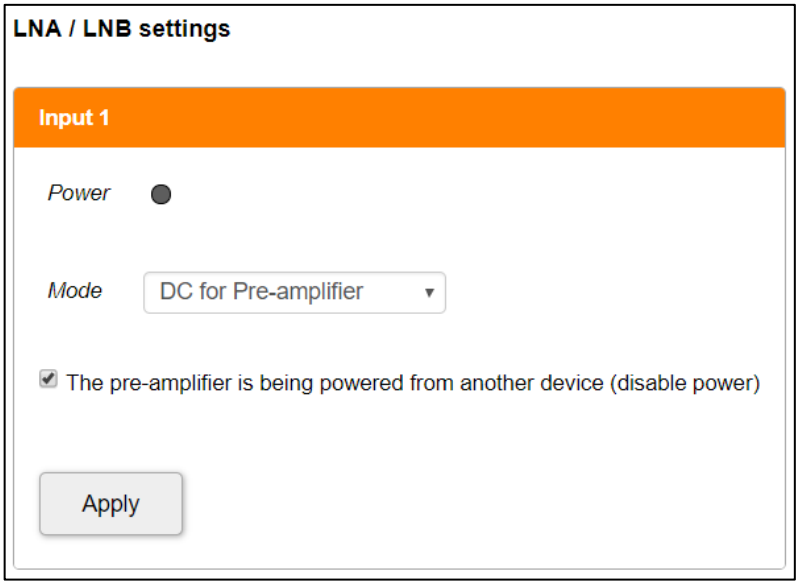
To reset the Universe to its factory default settings click on "Factory Reset" and confirm with "OK". You can also reset the Universe by pressing the reset button for 10 seconds (see p. 12).



Reboot

Click on "Reboot" to restart your device. This is useful when you don't have physical access to the Universe and you need to restart the device.

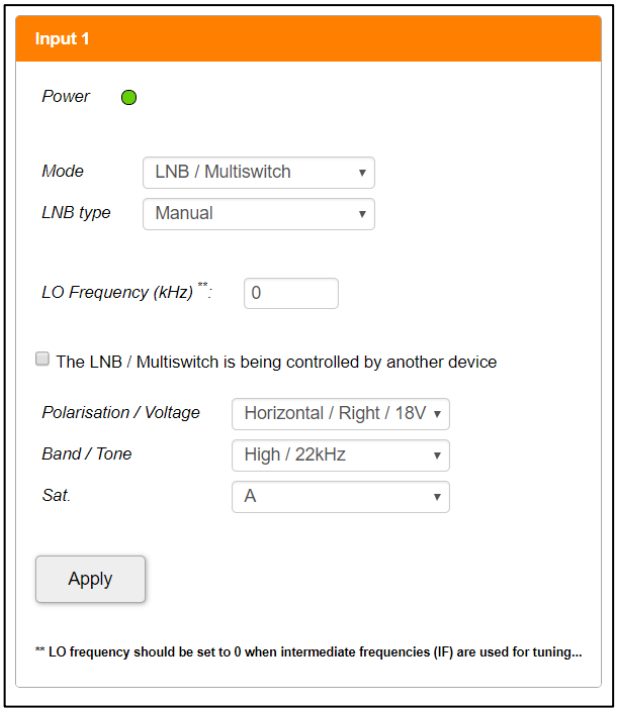
3.2.3. Inputs - RF



Choose the mode you want to use and if required the type of LNB. The following settings depends on the Mode and LNB used. If you select the Universal or C-Band LNB the LO Frequency and Band / Tone settings will not be shown because those settings are filled in automatically.

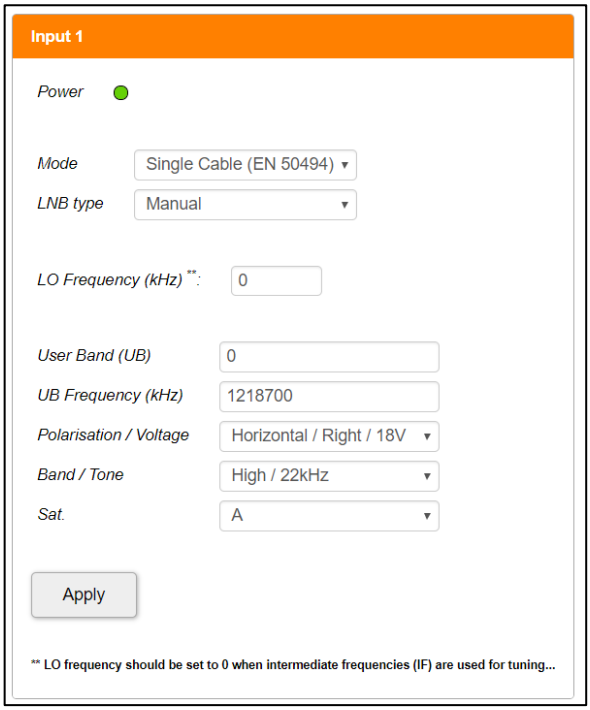
LNB / Multiswitch

Choose this mode if you are using a regular LNB or a multiswitch.



- LO Frequency (kHz): The LO Frequency used in the LNB. Set this to 0 when intermediate frequencies (IF from 950 to 2150MHz) are used for tuning. This setting will be filled in automatically when choosing the Universal or C-Band LNB type. *(only available if LNB type is manual)*
- The LNB / Multiswitch is being controlled by another device: Enable this setting if you are using another device to control and power the LNB or multiswitch e.g. another Universe.
- Polarisation / Voltage: The polarisation or voltage you want to use.
- Band / Tone: The band / tone you want to use. *(only available if LNB type is manual)*
- Sat.: The satellite (A, B, C, D) used.
- Apply: Save your current settings!

Single Cable (EN 50494) and (EN 50607)



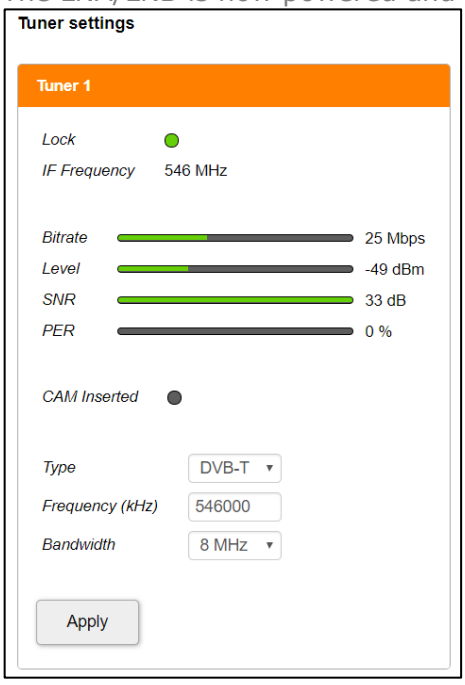
- LO Frequency (kHz): The LO Frequency used in the LNB. Set this to 0 when intermediate frequencies (IF) are used for tuning. This setting will be filled in automatically when choosing the Universal or C-Band LNB type. *(only available if LNB type is manual)*
- User Band (UB)*: The user band the Universe should receive.
- UB Frequency (kHz)*: The user band frequency the Universe should receive.
- Polarisation / Voltage: The polarisation or voltage you want to use.
- Band / Tone: The band / tone you want to use. (only available if LNB type is manual)
- Sat.: The satellite (A, B, C, D) used.
- Apply: Save your current settings!

*: You can find the desired User Band and User Band frequency in the manual of your SCR LNB or multiswitch.

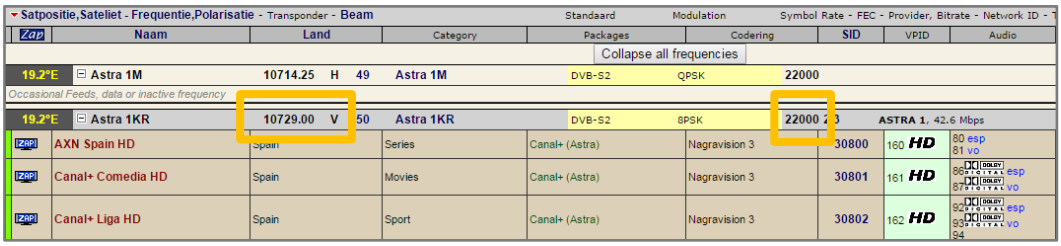
DC for Pre-amplifier

- The pre-amplifier is being powered from another device (disable power): Enable this option if you use another device to power the pre-amplifier.
- Voltage: Choose the desired voltage 12V or 24V.
- Apply: Save your current settings!

The LNA/LNB is now powered and configured. Next, we will configure the tuner.



Change your input type to the DVB source you are using. Select the frequency and symbol rate or bandwidth to match the transponder you want to receive and click on "Apply". To know the transponder go to http://www.lyngsat.com or http://kingofsat.net. If all settings are correct, the lock icon will turn green.

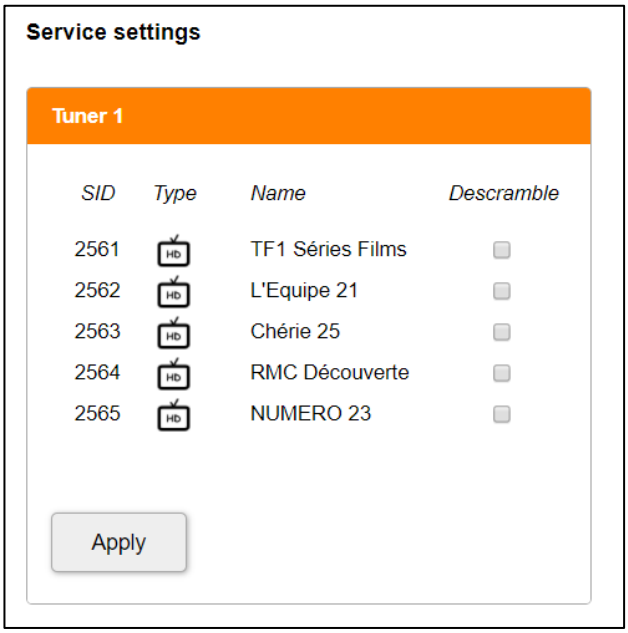


- Lock: Green symbol means the device is locked on the chosen transponder.
- Bitrate: The bitrate of the incoming signal.
- Level: The level of the incoming signal.
- SNR: Signal to Noise Ratio of the incoming signal.
- PER: Packet Error Rate of the incoming signal. This should be 0% otherwise the incoming signal quality is bad.
- CAM Inserted: Turns green if a CAM module is detected.

If the tuner is well configured and the lock icon is green, the list of channels should be available.

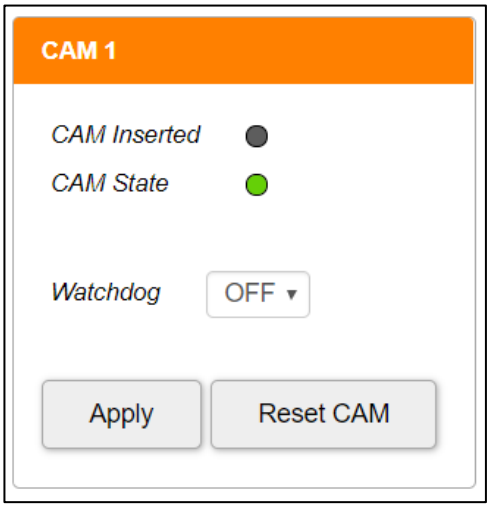
Select the service(s) you want to run through the CAM Interface by checking the Descramble checkboxes. A grey lock means the service is encrypted. Confirm with the "Apply" button.

- SID: Service ID for listed service.
- Type: : HD-TV
  : SD-TV
  : Radio
  : Data
- Lock: : Scrambled service
  No lock symbol: FTA service
- Name: Name of the service.
- Descramble: When selected, that service will go through the CAM.



3.2.4 CAM

CAM Configuration



Watchdog: The CAM watchdog is OFF by default witch is the advised position for most applications. But in some configurations, it can be useful to switch on the CAM watchdog, this CAM watchdog will monitor all scrambled services that are set to "descramble". A service that still has scrambled streams after the CAM is marked as problematic (and will have a red lock symbol on the output pages).

If at least one service is descrambled successfully, the CAM is considered healthy and will not be reset. If none of the scrambled services are descrambled anymore the CAM will be reset.

➔ *Remark:* There will be 3 attempts to reset the CAM, after those reset attempts the CAM will get some time to update the smartcard rights. If the CAM becomes healthy again, the watchdog will become fully active again.

CAM Inserted: Turns green if a CAM module is detected.

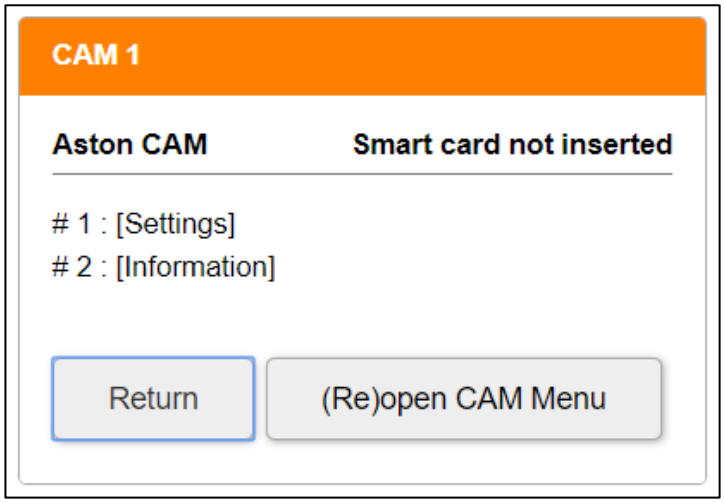
CAM State: Turns red if the CAM can't decrypt scrambled services.

CAM Menu

The CAM menu will open automatically in a few seconds, if it doesn't you can click the "(Re)open CAM Menu" button. To use the CAM menu click on the menu item you want to open or click on "Return" to go back 1 step in the menu.

The CAM menu will be different if you use another CAM module and/or CAM card. For more information about the CAM menus refer to its specific manual.

If you get the message "Waiting for smart card, please wait" you will need to wait a few seconds and then click the "(Re)open CAM Menu" button or the "Waiting for smart card" message to refresh the menu.



3.2.5 Output Settings

IP

There are 2 modes for the IP output : SPTS (default) and MPTS.

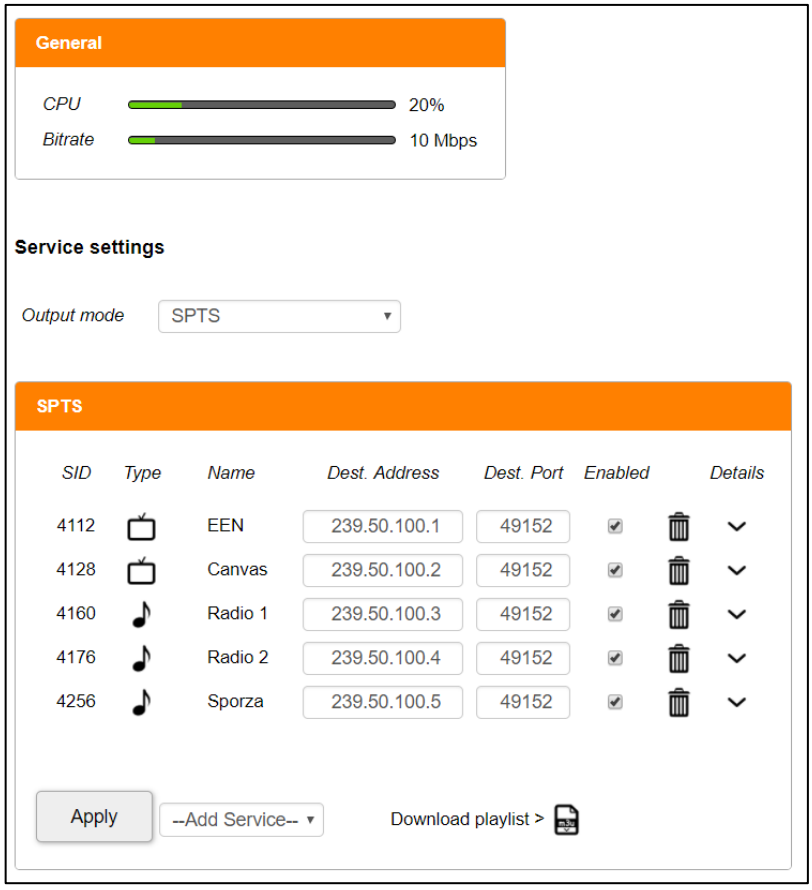
Mode : SPTS

This is the default mode and is used in IPTV solutions. In this mode, multiple SPTS streams are being streamed to client devices (PC, TV, STB, …) who can independently select any of the video and/or audio channels.

Click on "Add Service" to add a service to an IP stream. You can keep adding services until the CPU hits 100%. But if the CPU usage exceeds 90% you can have performance issues, due to peaks in the services. If you want the Universe to decrypt the services, make sure the lock icon is green otherwise go back to input settings and descramble the service.

Remark: The CPU also has to process the incoming signal. This typically takes 30% of the processor even when no output streams are active. When the RF output is in overflow the CPU usage will be affected.

Do not forget to press the "Apply" button when all output settings are done.

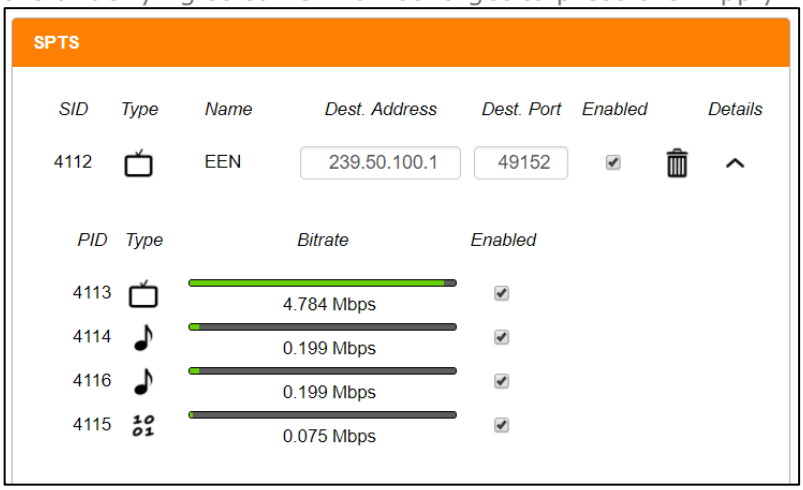


- SID: Service ID.
- Type: : HD-TV
  : SD-TV
  : Radio
  : Data
- Lock: : Descrambled service
  : Problematic service (still scrambled after running through the CAM)
  : FTA service that runs through the CAM module
  : Scrambled service not running through the CAM module
  No lock symbol: FTA service
- Name: Name of the service.
- Dest. Address: Destination address, the IP address the service will run on, needs to be in the 239.0.0.0-239.255.255.255 range.
- Dest. Port: Destination port, the port the service will run on.

  ! ➔ Make sure that no 2 service(s) have the same Destination address and Destination port, in that case only 1 service will be available.
- Enabled: Turns the service on or off. Can be used instead of the delete button if you are planning to use that service later.
- Delete button: Deletes the service from the list.
- Details: Show advanced settings about the service, see details below.
- Apply: Saves the current settings!

Click "Download playlist: " to download a playlist for your streams. This playlist can be opened on your computer with VLC or can be imported in your IPTV setup box or middleware.

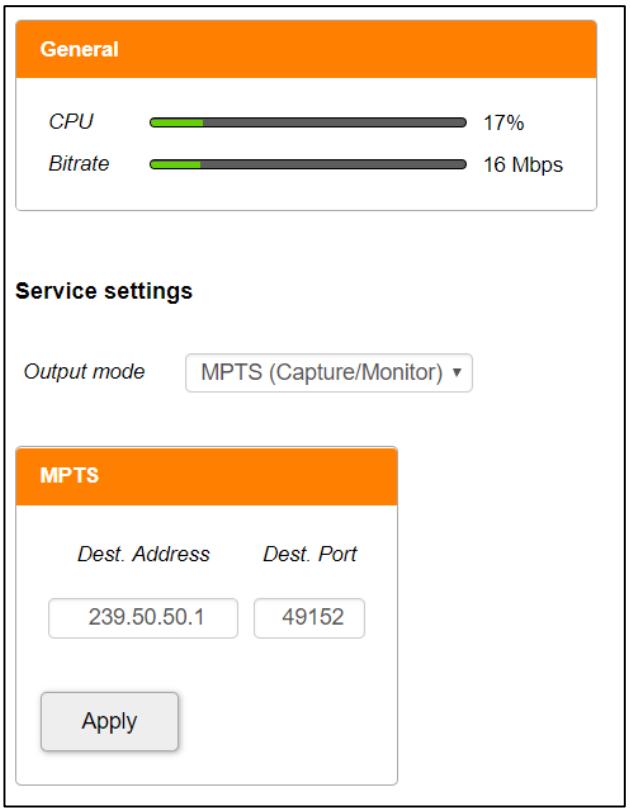
Click on "Details" to enter the advanced settings for that service. Here you can enable or disable the underlying streams. Do not forget to press the "Apply" button.



- PID: Package identifier for the listed stream.
- Type: : Video
  : Audio
  : Data
- Bitrate: Bitrate of the stream.
- Enabled: Turns the selected stream on or off.

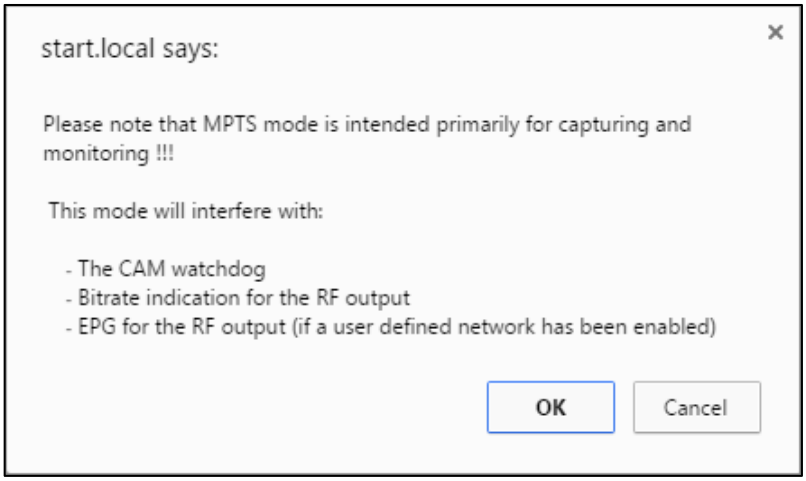
Mode : MPTS

This is a special mode and is mainly used for capturing or monitoring purposes. Basically this mode receives the DVB transponder and removes the RF part. The remaining digital transponder is entirely transmitted on the IP output. So there is no need to select services, all services are streaming. This is not used for IPTV solutions as some clients (STB, TV, …) are not able to separate the different services. VLC however can still select the services.



Although this mode is mainly used for capturing and monitoring purposes, it can also be used 24/7 as a transport stream to transmit the entire DVB transponder over IP from point A to point B. This stream can then be received in point B by an Edge-QAM and rebroadcasted over DVB-C on a second local network.

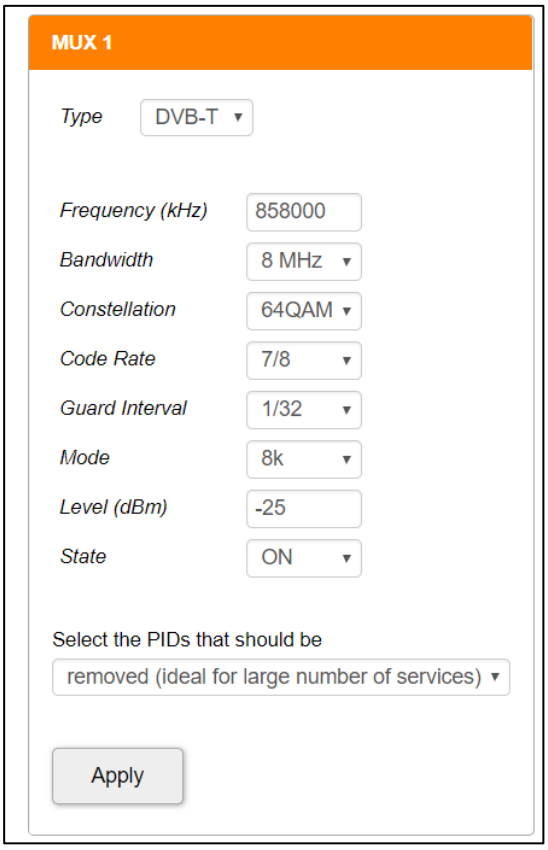
The disadvantages of this mode is that some features are deactivated. See the screenshot below.



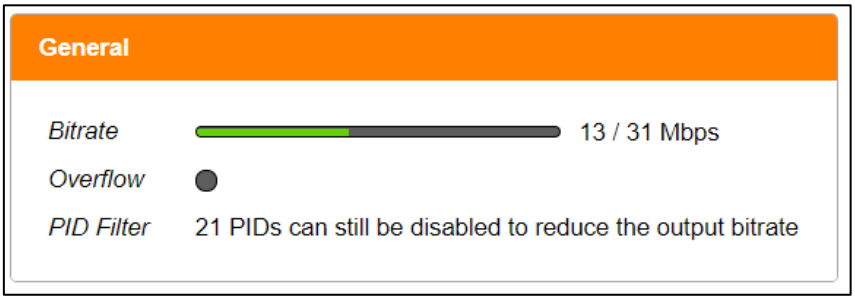
RF

In the RF section, you can choose between adding (passing) services to your list or removing services from your list. When you choose for passing services to your list, you have the complete flexibility to choose which services must be processed by the Universe. When you choose for removing services from your list, you must disable services until you have no longer an overflow. The reason for this is that for instance a 55Mbps satellite transponder will not fit in a DVB-T MUX of 32 Mbps.

Do not forget to press the "Apply" button after the configuration is done.



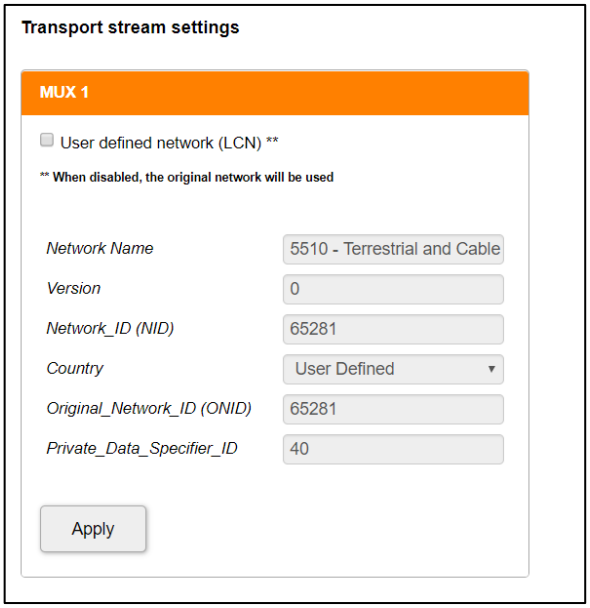
- Type: Type of output signal (DVB-T or ISDB-T).*
- Frequency (kHz): Here you can select the frequency you want to transmit on.
- Bandwidth: Choose the desired bandwidth.
- Constellation: Choose the type of constellation you want to use. (64QAM, 16QAM, QPSK)
- Code Rate: The following code rates can be used 7/8, 5/6, 3/4, 2/3 or 1/2. A higher code rate means more services can be selected without having an overflow.
- Guard Interval: The following code rates can be used 1/32, 1/16, 1/8 or 1/4.
- Mode: 2k, 4k or 8k.
- Level (dBm): Enter a value between -52 and -7 dBm.
- State: Turns the output on or off.
- Bitrate: Total bitrate that is being output at the TV OUT connector. Turns red if you have an overflow.
- Overflow: Turns red if too many services are selected. Please uncheck some services or streams and click apply until the symbol turns grey, and the Bitrate turns green.



*** For ISB-T configuration, please see Appendix A (p. 34 of this manual)**

- PID Filter: Shows the amount of PIDs you can still filter out or pass. The Universe can disable up to 27 PIDs and pass up to 31 pids depending on the mode.

LCN can be enabled (default it is off) in the following screen.



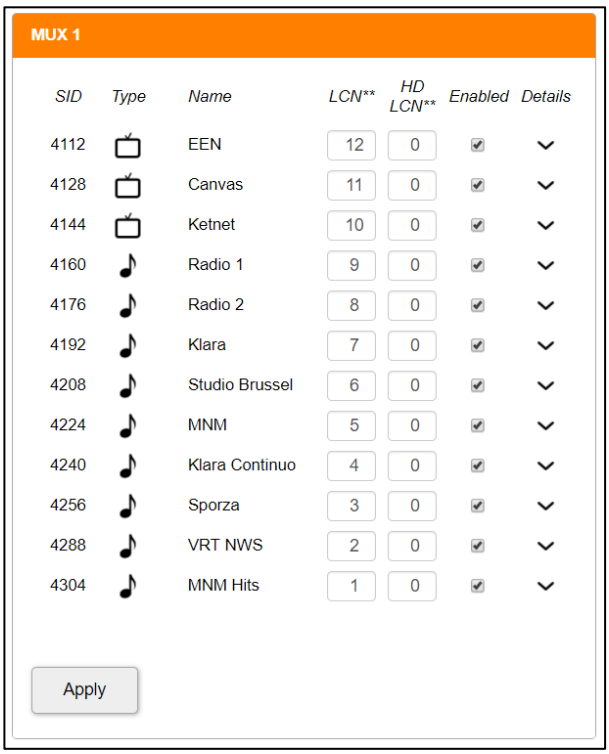
When "User defined network (LCN)" is disabled, the Universe will use all settings from the original incoming network.

When "User defined network (LCN)" is enabled, the Universe will create a new network on the output, where the LCN is used to logically number your services.

- Network Name : Name of the network on the output.
- Version : Version of your new network on the output (default set to 0).
- Network_ID (NID) : NID of your new network on the output (default set to 65281).
- Country : Select your country. This will determine the Original_Network_ID (ONID) and Private_Data_Specifier_ID automatically. This is required for optimal performance of the LCN and EPG values (TV must be set to the same country).

Do not forget to press the "Apply" button after the configuration is done.

In the next screenshot, you can finalize which channels to put on your RF network.



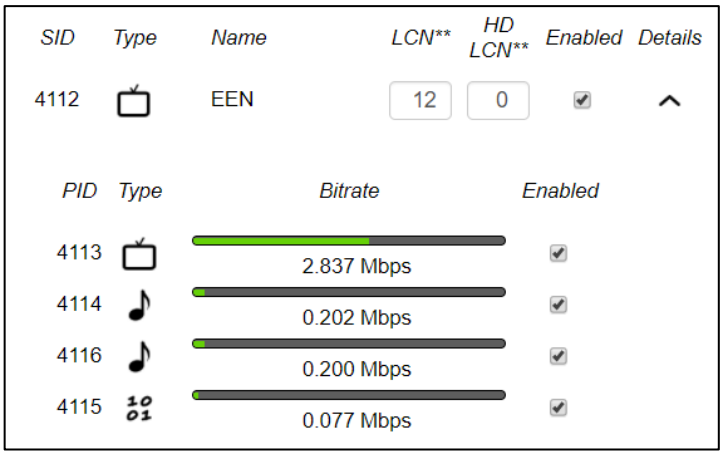
- SID: Service ID.
- Type: : HD-TV
  : SD-TV
  : Radio
  : Data
- Lock: : Descrambled service
  : Problematic service (still scrambled after running through the CAM)
  : FTA service that runs through the CAM module
  : Scrambled service not running through the CAM module
  No lock symbol: FTA service
- Name: Name of the service.
- LCN : Defines the logical sequence of your services on the TV. Note : only available when User defined network (LCN) is enabled.
- HD LCN : This will overrule the LCN value in case the TV or STB is able to receive HD channels. Older (non HD) TVs will then be able to fall back on the SD channel using the LCN numbers. Note : only available when User defined network (LCN) is enabled.
  In the above example, HD TVs will follow the sequence of the HD LCN, while SD TVs will follow the sequence of the LCN.
- Enabled: Add the service to the RF output. If you disable a video service only the video stream will be disabled, see remark below.
- Details: Show advanced settings about the service.
- Apply: Save the current service list.

➔ *Remark: If you disable a SID only the main PID and SID will be disabled. All smaller underlying PIDs (data, audio services) will remain active. The audio will keep running until you rescan your TV. For disabling specific underlying PIDs please go to "Details".*

➔ *Remark: The order of the channels will be determined by your receiver. It is advised to set the country to "Others" when scanning the receiver for channels. You can always use the*

channel numbering function of your receiver if you want to change the order of the channels.

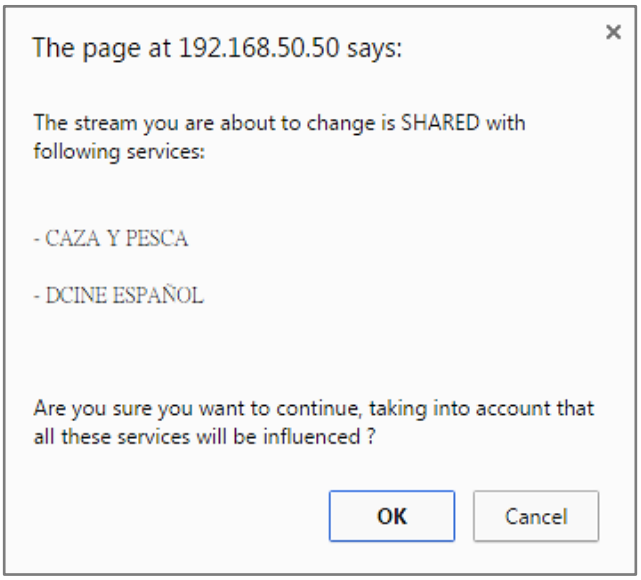
Click on details to enter the advanced settings for that service. Here you can enable or disable the underlying streams. Do not forget to press the "Apply" button.



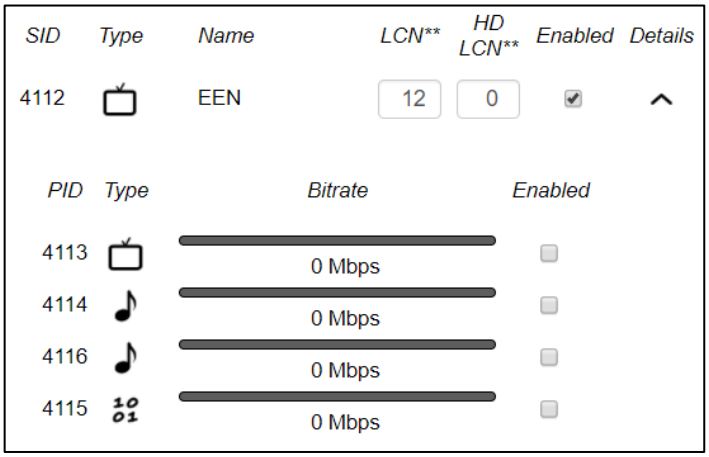
- PID: Package identifier.
- Type: : Video
  : Audio
  : Data
- Bitrate: Bitrate of the stream.
- Enabled: Turns the selected stream on or off.

➔ *Remark: A lot of transponders use shared PIDs. That means that 2 or more services make use of the same stream. In that case, when disabling that shared PID, the Universe will warn you about all the services that will be influenced by disabling that shared stream.*

Click "OK" to continue or click on "Cancel" if you don't want those services to be affected.



Disabling SIDs vs disabling PIDs.



If you disable all PIDs but let the covering SID enabled your receiver will still find the service but there will be no image or sound. This can be used if you temporary want to disable a service but do not want to rescan your receiver.

If you enable all PIDs and disable the covering SID, the PIDs will remain active and consume bandwidth but your receiver won't find it when you do a rescan. So if you want to save bandwidth you better disable the underlying PIDs starting with the one that has the biggest bitrate as the amount of PIDs that can be filtered is limited.

4. TECHNICAL SPECIFICATIONS

8600 – Universe		
INPUT		
Number of inputs	-	1 with passive loop-through (-2dB)
Tuner	-	1
Frequency Range	MHz	42 – 2150
Input level	dBm	-65 to -20
Standard	-	DVB-S/S2 DVB-T/T2 DVB-C
DC remote power for LNB or LNA	V - mA	0/13/18/22kHz DiSEqC, EN50494, EN50607 350
RF OUTPUT		
Number of outputs	-	1 RF with passive loop-through (-2 dB)
Multiplex	-	1
Frequency range	MHz	174-862
Output level	dBm	-52 to -7 (adjustable)
Standard	-	DVB-T ISDB-T
Modulation error rate (MER)	dB	40
ETHERNET OUTPUT		
Number of outputs	-	1Gb Ethernet
Standard	-	IEEE 203ab 10/100/1000 Base-T
Protocol	-	Multicast IP/UDP
Transport stream	-	SPTS / MPTS *

GENERAL		
CI slot	-	1
Input voltage	VDC	12-20
Power consumption	W	7 (without CAM and without remote power)
DC jack	mm	Ø 2.1
Powering remote units	-	Yes, 1 unit can power other units
Operating temperature	°C	0-50
Dimensions	mm	222x142x50
Weight	kg	1.1
Accessories	-	15V power adapter, 1 Ethernet cable

* Full MPTS from DVB input transponder

5. CONDITIONS OF WARRANTY

Unitron N.V. warrants the product as being free from defects in material and workmanship for a period of 24 months starting from the date of production indicated on it. See note below.

If during this period of warranty the product proves defective, under normal use, due to defective materials or workmanship, Unitron N.V, at its sole option, will repair or replace the product. Return the product to your local dealer for reparation.

THE WARRANTY IS APPLIED ONLY FOR DEFECTS IN MATERIAL AND WORKMANSHIP AND DOES NOT COVER DAMAGE RESULTING FROM:

- Misuse or use of the product out of its specifications,
- Installation or use in a manner inconsistent with the technical or safety standards in force in the country where the product is used,
- Use of non-suitable accessories (power supply, adapters...),
- Installation in a defect system,
- External cause beyond the control of Unitron N.V. such as drop, accidents, lightning, water, fire, improper ventilation…

THE WARRANTY IS NOT APPLIED IF

- Production date or serial number on the product is illegible, altered, deleted or removed.
- The product has been opened or repaired by a non-authorized person.

NOTE

Date of production is YYWW format, example 1527 = year 2015 – week 27.
For the serial number barcodes, the date corresponds to the 4 first numbers

6. APPENDIX

6.1. VHF Frequency table

TV Band	Channel	Center Frequency (KHz)	Frequency (KHz)
I	2	50500	47000 – 54000
	3	57500	54000 – 61000
	4	64500	61000 – 68000
III	5	177500	174000 – 181000
	6	184500	181000 – 188000
	7	191500	188000 – 195000
	8	198500	195000 – 202000
	9	205500	202000 – 209000
	10	212500	209000 – 216000
	11	219500	216000 – 223000
	12	562000	223000 – 230000

6.2. UHF Frequency table

TV Band	Channel	Center Frequency (KHz)	Frequency (KHz)
IV	21	474000	470000 – 478000
	22	482000	478000 – 486000
	23	490000	486000 – 494000
	24	498000	494000 – 502000
	25	506000	502000 – 510000
	26	514000	510000 – 518000
	27	522000	518000 – 526000
	28	530000	526000 – 534000
	29	538000	534000 – 542000
	30	546000	542000 – 550000
	31	554000	550000 – 558000
	32	562000	558000 – 566000
	33	570000	566000 – 574000
	34	578000	574000 – 582000
	35	586000	582000 – 590000
	36	594000	590000 – 598000
	37	602000	598000 – 606000
	38	510000	606000 – 614000
V	39	618000	614000 – 622000
	40	626000	622000 – 630000
	41	634000	630000 – 638000
	42	642000	638000 – 646000
	43	650000	646000 – 654000
	44	658000	654000 – 662000
	45	666000	662000 – 670000
	46	674000	670000 – 678000
	47	682000	678000 – 686000
	48	690000	686000 – 694000
	49	698000	694000 – 702000
	50	706000	702000 – 710000
	51	714000	710000 – 718000
	52	722000	718000 – 726000
	53	730000	726000 – 734000
	54	738000	734000 – 742000
	55	746000	742000 – 750000
	56	754000	750000 – 758000
	57	762000	758000 – 766000
	58	770000	766000 – 774000
	59	778000	744000 – 782000
	60	786000	782000 – 790000

6.3. Power Conversion Table

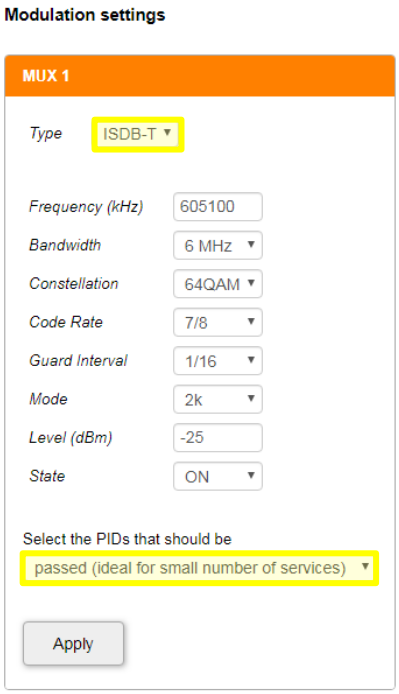
µV 75Ω	dBµV	dBm
1	0	-109
1.5	3.5	-105.5
2	6	-103
2.5	8.0	-101
3	9.5	-99.5
3.5	11	-98
4	12	-97
4.5	13	-96
5	14	-95
6	15.5	-93.5
7	17	-92
8	18	-91
9	19	-90
10	20	-89
15	23.5	-85.5
20	26	-83
25	28	-81
30	29.5	-79.5
35	31	-78
40	32	-77
45	33	-76
50	34	-75
60	35.5	-73.5
70	37	-72
80	38	-71
90	39	-70
100	40	-69
150	43.5	-66.5
200	46	-63
250	48	-61
300	49.5	-59.5
350	51	-58
400	52	-57
450	53	-56
500	54	-55
600	55.5	-53.5
700	57	-52
800	58	-51
900	59	-50

mV 75Ω	dBµV	dBm
1	60	-49
1.5	63.5	-45.5
2	66	-43
2.5	68	-41
3	69.5	-39.5
3.5	71	-38
4	72	-37
4.5	73	-36
5	74	-35
6	75.5	-33.5
7	77	-32
8	78	-31
9	79	-30
10	80	-29
15	83.5	-25.5
20	86	-23
25	88	-21
30	89.5	-19.5
35	91	-18
40	92	-17
45	93	-16
50	94	-15
60	95.5	-13.5
70	97	-12
80	98	-11
90	99	-10
100	100	-9
150	103.5	-5.5
200	106	-3
250	108	-1
300	109.5	+0.5
350	111	+2
400	112	+3
450	113	+4
500	114	+5
600	115.5	+6.5
700	117	+8
800	118	+9
900	119	+10
1000	120	+11

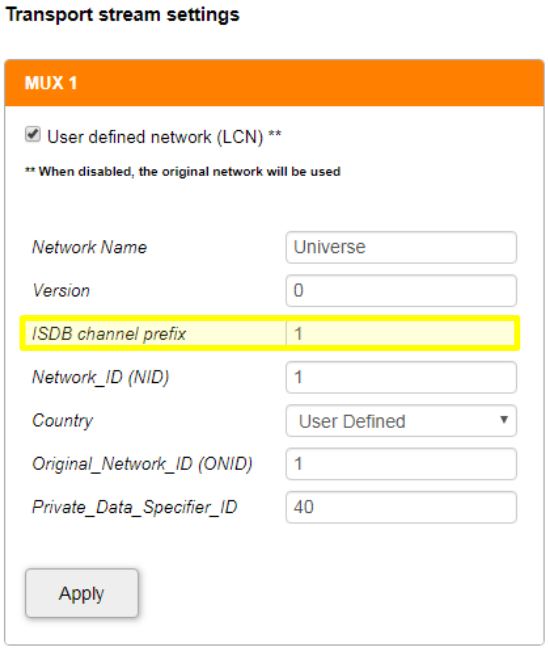
µV 75Ω	dBµV	dBm
1	120	+11
1.5	123.5	+14.5
2	126	+17
2.5	128	+19
3	129.5	+20.5
3.5	131	+22
4	132	+23
4.5	133	+24
5	134	+25
6	135.5	+26.5
7	137	+28
8	138	+29
9	139	+30
10	140	+31

6.4. Configuring the Universe for ISDB-T

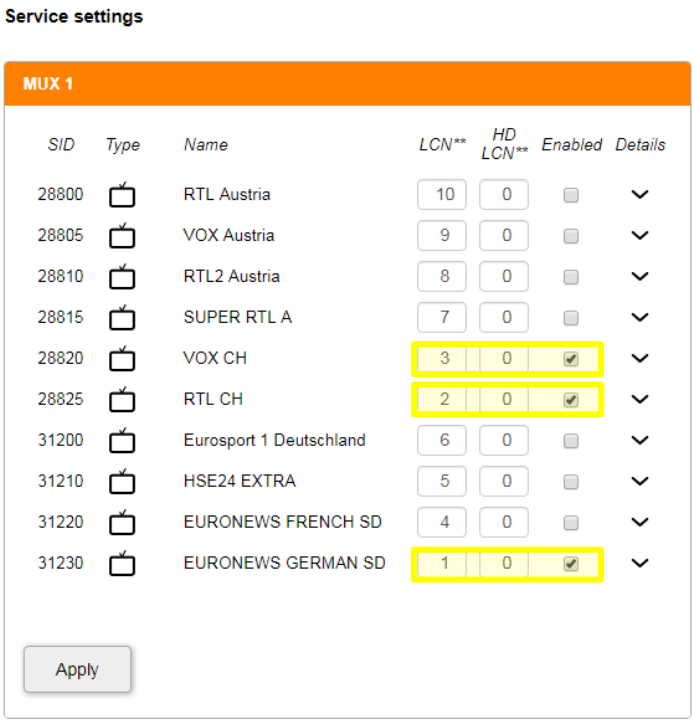
To set the xx.yy channel numbering, output should be set to ISDB-T and service mode to "Select the PIDs that should be passed (ideal mode for a small number of services)".



User define network (LCN) should be active => xx value can be set by the ISDB channel prefix value (same as previous test release).



Now the yy number can be set by filling the LCN field:



With the config above, the different ISDB-T receivers/ TV sets should find the services as following:

1.01 => EURONEWS GERMAN HD
1.02 => RTL CH
1.03 => VOX CH

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