



PRO Line Headend Series

PLH-200/210/300/310

Operation Manual

www.lemco.gr

v1.0



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1. IMPORTANT SAFETY PRECAUTIONS INFORMATION

READ AND UNDERSTAND THE FOLLOWING WARNINGS BEFORE USING YOUR DEVICE TO ENSURE SAFE AND PROPER USAGE

WARNING

To prevent fire, electric shock, or other hazards, always observe the following safety precautions. These precautions include, but are not limited to:

Power supply / Mains cord

- Use the unit strictly within the voltage range specified by the manufacturer to prevent damage or malfunction.
- Regularly inspect the power connector and remove any accumulated dirt or dust to maintain optimal performance.
- Use only the mains cord provided with your unit to ensure compatibility and safety.
- Avoid using the unit or plugging in the mains cord if it appears damaged, frayed, or compromised in any way.
- Keep the mains cord away from heat sources and avoid pulling, placing heavy objects on, or causing damage to the cord. Store it safely out of children's reach.
- Plug the device into a properly grounded socket to minimize the risk of electrocution.
- When disconnecting plugs, always pull on the plug and not the cord. Ensure the unit's power switch is off before removing the cord from an outlet.
- Unplug the mains cord during extended periods of non-use or during storms to protect the unit.
- Avoid connecting the unit to a multi-outlet to prevent plug overheating and potential fire hazards.

Disassembling

- This unit contains specialized components that are not user serviceable. Refrain from disassembling or attempting repairs, as this will void any warranties. Contact the manufacturer for assistance with any issues.

Water/humidity

- Store and operate the unit in a dry environment, away from moisture or water sources.
- Never plug or unplug the unit with wet hands to avoid electric shock.

Fire

- Avoid placing open flames, such as candles, on or near the unit to prevent potential fires.
- In case of damaged mains cords, power connectors, sudden loss of functionality, unusual smells, or smoke, promptly turn off the unit, disconnect the mains cord, and contact the manufacturer's technical support department.

Installation / Storage

- To ensure optimal performance and prevent damage, store the unit in a clean, dry location, away from temperature extremes (e.g., direct sunlight, heaters, or inside a car during the day). Securely place the unit to prevent falls.
- Before moving the unit, disconnect all cords.
- When installing the unit, ensure that an outlet is easily accessible for quick disconnection in case of malfunction. Disconnect the mains cord when the unit is not in use for extended periods.

Connectivity

- Always turn off and unplug all devices before connecting the unit to other electronic devices.

Maintenance

- Avoid spilling liquids on the unit. To clean, use a soft, slightly damp cloth and allow the unit to dry completely before using it again. Do not use harsh chemicals or volatile liquids.

Handling

- Do not insert fingers or objects into the unit's openings.
- Never insert paper, metal, or other foreign objects into the unit's openings. If foreign objects are suspected inside the unit, turn it off, unplug the mains cord, and contact the manufacturer's technical support department.
- Refrain from stepping on or placing heavy objects on the unit. Gently handle all buttons, connectors, and switches to avoid

hardware damage.

Electromagnetic Interference (EMI) and Radio Frequency Interference (RFI) precautions

- Be aware that your device may cause or be affected by electromagnetic interference or radio frequency interference. Keep the device at a safe distance from other electronic devices, such as pacemakers, hearing aids, or other medical equipment, to prevent potential interference.
- Avoid placing the device near or on top of audio equipment or televisions, as it may cause interference with the reception or operation of these devices.

Accessory compatibility

- Use only compatible accessories and attachments approved by the manufacturer. Using unauthorized or incompatible accessories may cause malfunction, damage to the unit, or pose safety risks.

Software updates

- Regularly check for software updates and install them to ensure your device stays up to date with the latest security patches and bug fixes. This will help maintain the device's performance, stability, and overall user experience.

Child safety

- Keep the device and all its accessories out of the reach of children. Small parts may pose a choking hazard. Additionally, improper use of the device by children could result in damage or injury.

Environment and disposal

- Recycle or dispose of the device, its accessories, and batteries according to local regulations. Electronic devices and batteries should not be disposed of in regular household waste to prevent environmental harm.

Emergency situations

- Be aware that in certain emergency situations, such as earthquakes, fires, or power outages, the device may not function as expected. Always have alternative communication methods and emergency plans in place.

Grounding Precaution

Proper grounding is crucial for the safe and effective operation of your device. To minimize the risk of electric shock, equipment damage, or interference, please follow these grounding precautions:

- Ensure the device is connected to a grounded electrical outlet: The device should be connected to a properly grounded, three-pronged electrical outlet. This will help to protect the device and users from potential electrical hazards.
- Check the grounding of your entire system: All interconnected devices, such as antennas, cables, and other equipment, should also be properly grounded. This helps prevent ground loops, which can cause interference and degrade system performance.
- Use grounded cables and connectors: When connecting the device to other devices, use shielded cables and connectors with proper grounding. This ensures that the entire signal path is grounded, reducing the potential for interference, and improving overall system performance.
- Inspect grounding connections periodically: Regularly check all grounding connections for signs of wear, damage, or corrosion. Loose or damaged grounding connections can compromise the safety and performance of your DTV headend system.
- Consult a professional if in doubt: If you are unsure about the grounding of your system or require assistance with grounding-related issues, consult a qualified technician or electrician. Proper grounding is essential for the safe and effective operation of your device and the overall DTV headend system.

By taking these additional safety precautions into consideration, you can further ensure the safe and proper use of your device.

2. INTRO

Congratulations on purchasing a Pro Line headend from PLH-2xx/3xx series. You are now the proud owner of a high-quality, professional DTV and IPTV headend. This powerful and versatile device is designed to provide you with exceptional performance and reliability for all your digital television needs.

3. INSTRUCTIONS

3.1 – DESCRIPTION

The Pro Line HDMI interface 2xx and 3xx series (PLH-2xx/3xx) are part of the Pro Line headends product line that provides distribution of HDMI content with advanced flexibility. These models offer TV distribution signal over RF+IP simultaneously or over IP ONLY for seamless integration with a wide range of applications. This feature-rich series is designed to meet the evolving needs of the broadcasting industry and offer a superior viewing experience to the end-users.

(PLH-2xx series)

The 2xx series headend from Lemco's Pro Line series is an advanced and powerful all-in-one device series, designed to meet diverse broadcasting requirements. It consists of the following part numbers:

PLH-200 can receive up to 16x HDMI inputs and convert them into a single 1 Gbit IPTV stream. It also supports IP reception, which requires an additional license.

PLH-210 can receive up to 8x HDMI inputs and convert them into a single 1 Gbit IPTV stream. It also supports IP reception, which requires an additional license.

(PLH-3xx series)

The 3xx series headend from Lemco's Pro Line series is an advanced and powerful all-in-one device series, designed to meet diverse broadcasting requirements. It consists of the following part numbers:

PLH-300 can receive up to 16x HDMI inputs and convert them into 16x DVB-T/C RF output channels while simultaneously providing 1xGbit IPTV streaming. It also supports IP reception, which requires an additional license.

PLH-310 can receive up to 8x HDMI inputs and convert them into 16x DVB-T/C RF output channels while simultaneously providing 1xGbit IPTV streaming. It also supports IP reception, which requires an additional license.

Powered by a robust CPU (Quad-core @ 1.8GHz / 2GB RAM) and operating on Linux OS, the device guarantees efficient device control and offers a user-friendly, highly responsive interface. Additionally, the device can be managed remotely or locally via Ethernet. With its compact design (1U rack mount) and impressive features, the PLH-2xx/3xx headend series is an ideal solution for distributing HDMI content from various sources satellite, terrestrial, cable or IP STBs to a CATV installation using DVB-T/C and IP technology.

Furthermore, the PLH-2xx/3xx headend series can host Fleex Embedded which is an IPTV middleware without requiring an external server, allowing users to control Hotel IPTV monitors in an installation as well as IPTV STBs (more information at: www.fleex.gr) This provides a wide range of features, including Live TV, Live Radio, Info channels, CAST, Weather, Alarm, EPG, and more.

Overall, the PLH-2xx/3xx headend series is a sophisticated and versatile device that delivers top-quality TV distribution, making it an excellent choice for cable TV companies, IPTV providers, hotels, hospitals, and other similar installations.

3.2 - FEATURES

- 16 HDMI inputs (for PLH 300/200 models)
- 8 HDMI inputs (for PLH 310/210 models)
- Full HD H.264 encoding
- HDCP v1.4 support
- 16 x RF output DVB-T/C (software selectable)
- MER value > 45dB
- IPTV streaming (up to 128x SPTS) @ 800Mbps
- IPTV reception (up to 112x SPTS) @ 800Mbps
- SAP/SDP support
- "Pool" technology
- PID Filtering
- Custom NIT/SDT support
- EPG over RF and IP
- 1U rack mount device
- 2x (HOT pluggable) power supplies working in redundancy mode
- Fleex Embedded support (IPTV middleware)
- DRM encryption support
- 5-year warranty

3.2.1 - Auto-reset functions and watchdog

During the normal operation of the PLH-2xx/3xx headend series, the main CPU monitors all the internal parts in order to ensure that the device works normally. In case of an internal error or module failure, the device immediately initiates the recovery procedure by resetting the appropriate module or the device. Finally, watchdog timers ensure that the device will be reset in case of CPU failure.

3.2.2 - "Pool" technology

One of the most state-of-the-art TS multiplexer is responsible of providing the "pool" technology feature as well as to offer a variety of different features such as custom NIT/SDT creation, EPG over RF and IP, LCN and more...

3.2.3 - RF and IPTV distribution simultaneously

Experience the best of both worlds with the PLH-2xx/3xx headend series solution, which offers simultaneous RF and IPTV distribution without any extra license. This cutting-edge system enables you to distribute content through both traditional coaxial infrastructure (RF) and modern internet protocol television (IPTV) networks, providing unparalleled flexibility and efficiency in content delivery.

3.2.4 - Dual Power supplies

The Pro Line headend series features dual power supplies operating in redundancy mode, ensuring uninterrupted performance. In case of a failure in the primary power supply, the system automatically switches to the backup, maintaining continuous operation. Both power supplies are hot-pluggable, allowing for easy replacement or maintenance without shutting down the system, further enhancing reliability and minimizing downtime.

3.2.5 - 1U Rack mount

The Pro Line headend series is designed as a compact 1U rack-mountable device, offering a space-efficient solution for installation in standard server racks. This form factor allows for easy integration into existing setups while maximizing rack space. The 1U design ensures optimal airflow and cooling, while maintaining a sleek and organized equipment configuration, perfect for professional environments where space and efficiency are key.

3.2.6 - Cold Reset

The Pro Line headend series includes a convenient Cold Reset feature, allowing users to remotely initiate a full reset of the device via LAN. When triggered, the device powers off completely for 10 seconds before automatically powering back on. This function helps in resolving system issues or applying critical resets without the need for physical access, making remote management and troubleshooting more efficient and user-friendly.

3.2.7 - Fleex Embedded support

Enhanced guest experience with Fleex Embedded IPTV middleware enabling control of TVs from major brands such as LG, Samsung, and Philips, and offering basic middleware functionality directly from the headend without the need for external server.

3.2.8 - DRM support

The headend supports DRM encryption (e.g., LG Pro:Idiom) for IPTV streaming. This feature is optional and requires an additional license.

3.3 – Product views



3.3.1 – Front panel view

1. RF output (Only for PLH-3xx series)
2. IP LAN & Fleex Embedded control port
3. Power ON/OFF button
4. Reset button
5. Status indicator
6. IP IN/OUT port

3.3.2 – Back panel view



PLH-200/300

1. Dual power supplies
2. HDMI inputs



PLH-210/310

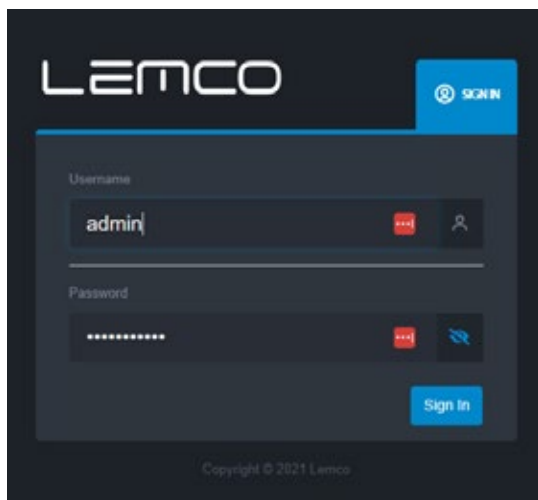
1. Dual power supplies
2. HDMI inputs

4. INSTALLATION

4.1 - General

The PLH-2xx/3xx headend series offers a highly user-friendly interface for programming and monitoring purposes. To access the intuitive graphical user interface, simply open an internet browser, such as Internet Explorer, Firefox, or Chrome, and enter the following static IP address: 192.168.1.200. This easy-to-use interface provides an efficient way to manage and monitor your headend system, ensuring optimal performance and seamless content delivery.

Once connected to the PRO Line headend device, you will be prompted to log in, as shown in the provided image:



The default username and password for the device are as follows:

Username: **admin**
Password: **12345**

Enter the default credentials to access the system's user interface, where you can manage and monitor your headend solution with ease.

4.2 – Graphical User Interface (GUI)

Status

4.2.1 - "Dashboard" page

Every time you connect to a PLH-2xx/3xx headend device, the "Dashboard" page is automatically loaded, providing a comprehensive overview of the device's current status. This dashboard presents essential information about the system's performance and operation, allowing you to monitor and manage your headend solution effectively.

In the Dashboard, users can easily monitor essential aspects of the device's operation, ensuring smooth performance and quick identification of any issues. The information displayed on the Dashboard includes:

Temperatures

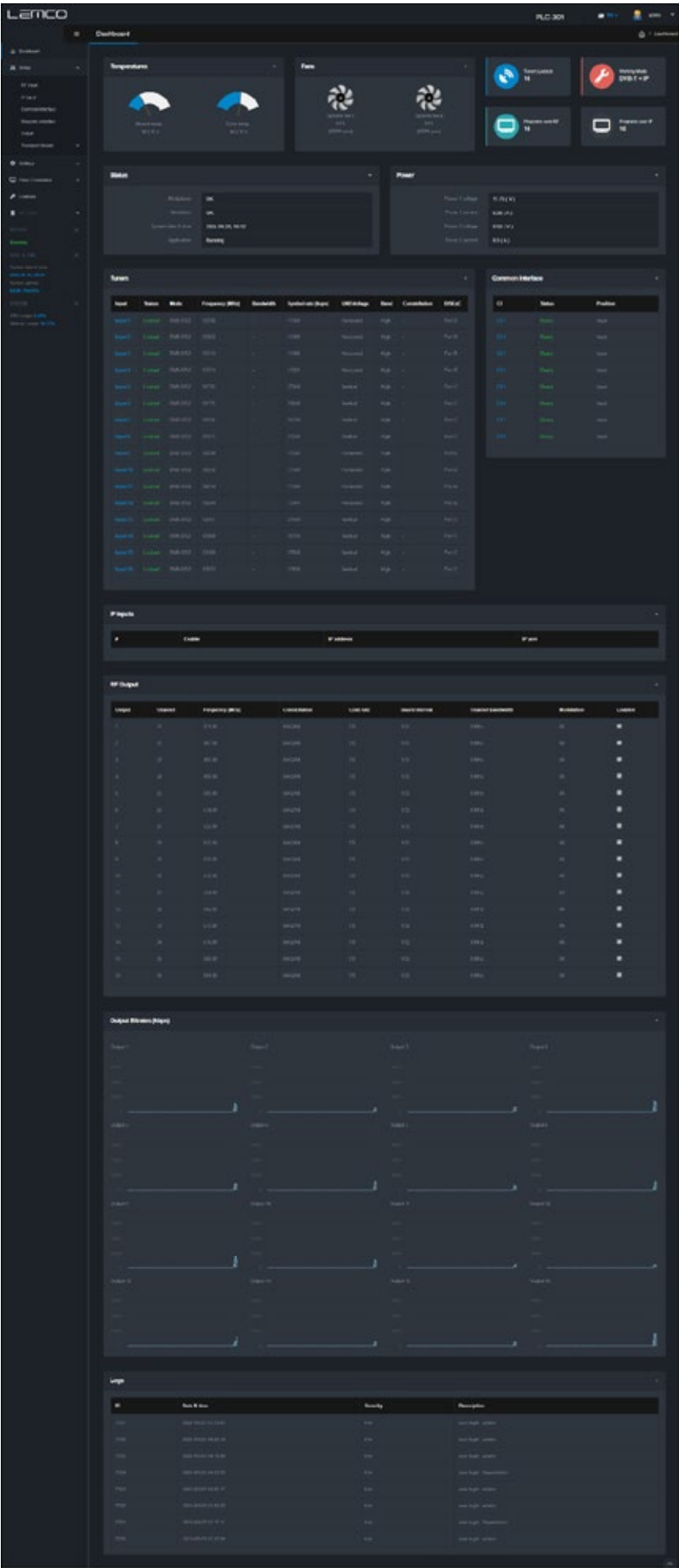
Keep track of the device's board and CPU temperature to ensure proper cooling and temperature monitoring.

Fans

Monitor the performance of the two cooling fans to maintain optimal operating conditions as well as displaying their current RPM. The PLH-2xx/3xx headend device use a sophisticated smart cooling system in which the RPM of the fans increases/decreases based on the internal board and CPU temperature. In case of fan failure, several alarms will take place to inform the user.

Status

1. Multiplexer and Modulator engine status: Check the working status of the device's core components for seamless content processing and distribution.
2. System date and time: Verify the accuracy of the device's internal clock for proper scheduling and event handling.
3. Application: Monitor the overall health and functionality of the device's primary software such as multiplexers, modulators condition etc...



Power

Monitor the voltage and current of both power supplies of the PLH-2xx/3xx headend device.

Infographics

Additionally, the Dashboard features four infographics that provide insights into:

1. Encoders enabled: Display the number of encoders currently locked onto a HDMI source.
2. Device working mode: Show the operational mode of the device, indicating how it processes and distributes content.
3. Number of TV programs distributed over RF: Display the count of TV programs being transmitted via RF (Radio Frequency) channels.
4. Number of TV programs distributed over IP: Show the count of TV programs being streamed via IP (Internet Protocol) networks.

Inputs:

In this section, users can monitor the working status of all the HDMI inputs of the device. This includes information on whether they are in running or idle state and their current settings.

RF Output:

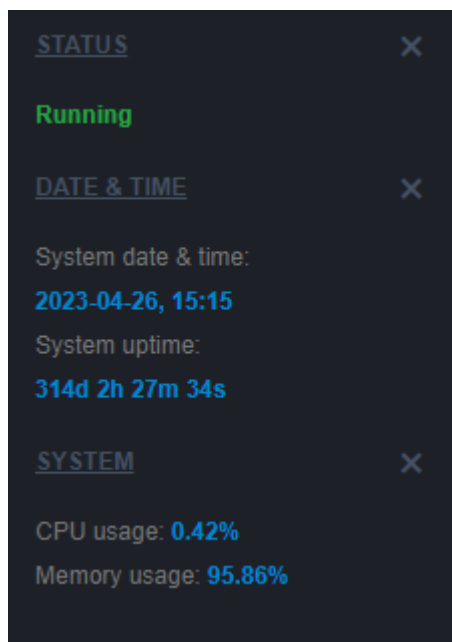
This section allows users to view the working status of all the RF outputs of the device, such as the modulator's state, RF output frequencies, and modulation settings.

Output Bitrates:

The device displays the output bitrates of all multiplexers in a chart format, enabling users to quickly assess the data transmission rates for each output.

Logs:

The Logs section provides a record of the last ten event logs, giving users a snapshot of recent device activity and assisting in troubleshooting any issues that may arise.

**Status Device**

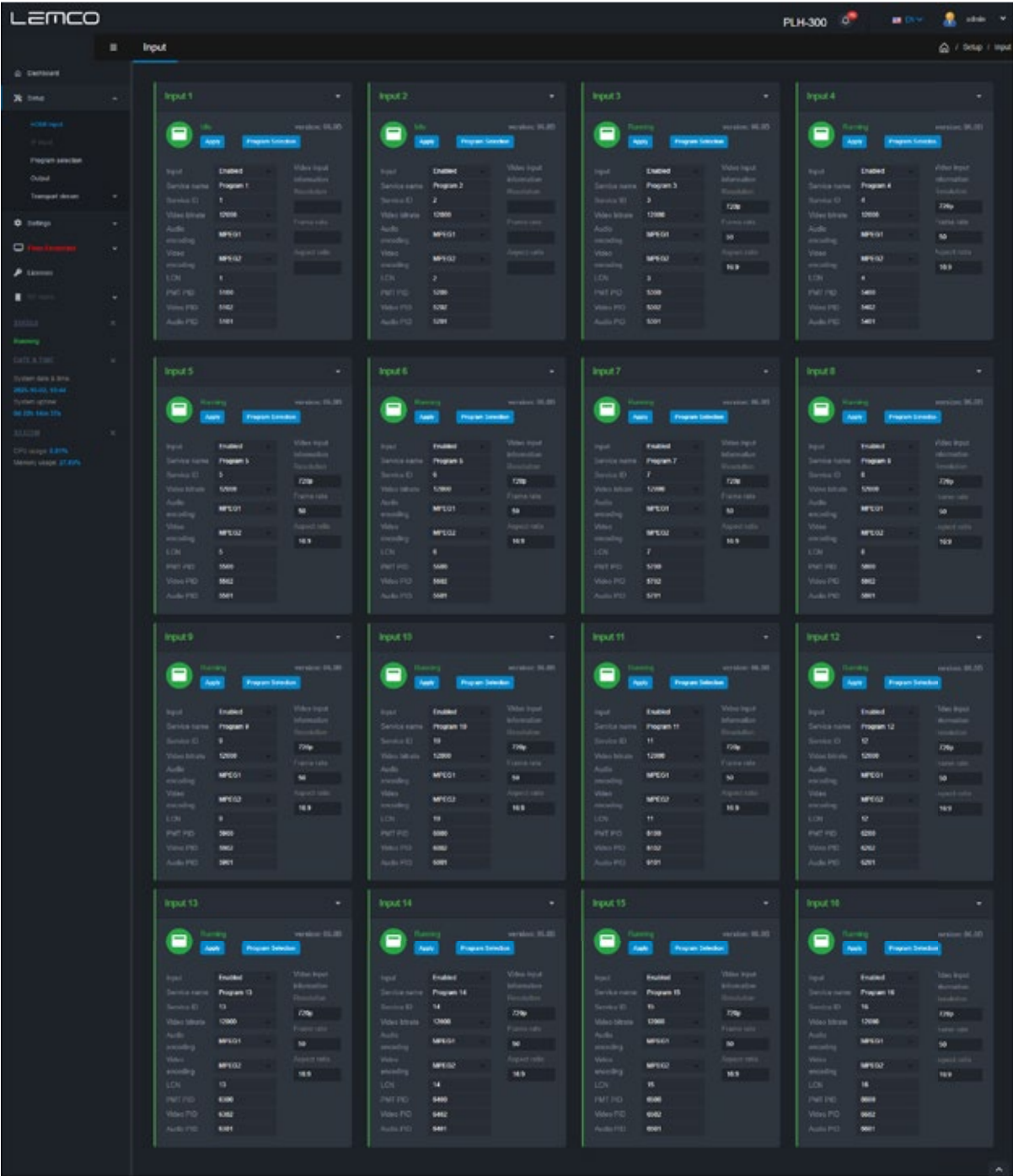
At the bottom of the left menu of the device we've the following information:

- Status of the software application:
 - o Running: The application is running properly
 - o Initializing: The application initializes the headend device
 - o Stopped: The application has stopped working
- System's current date and time
- System's up time
- CPU and Memory usage by %

Setup

4.2.2 - “HDMI Input” page

In the “HDMI Input” page, users have the ability to select the working mode for each HDMI input:



There are sixteen sections, one for each HDMI input.

Users can configure the working mode of each HDMI input using the following field:

- 1. Input – Enable/Disable this specific HDMI input
- 2. Service Name – Set the name of this specific service
- 3. Service ID – Set the Service ID of this specific service
- 4. Video Bitrate – Set the output video bitrate in Kbps
- 5. Audio Encoding – Set the output audio encoding
- 6. Video Encoding – Select Mpeg2 or H.264 output video encoding
- 7. LCN – Set the LCN number
- 8. PMT PID- Set the value of PMT PID
- 9. Video PID – Set the value of video PID
- 10. Audio PID – Set the value of Audio PID

Once all settings are being written for both tuners, the user must click the “Apply” button to begin the lock process.

HDMI status

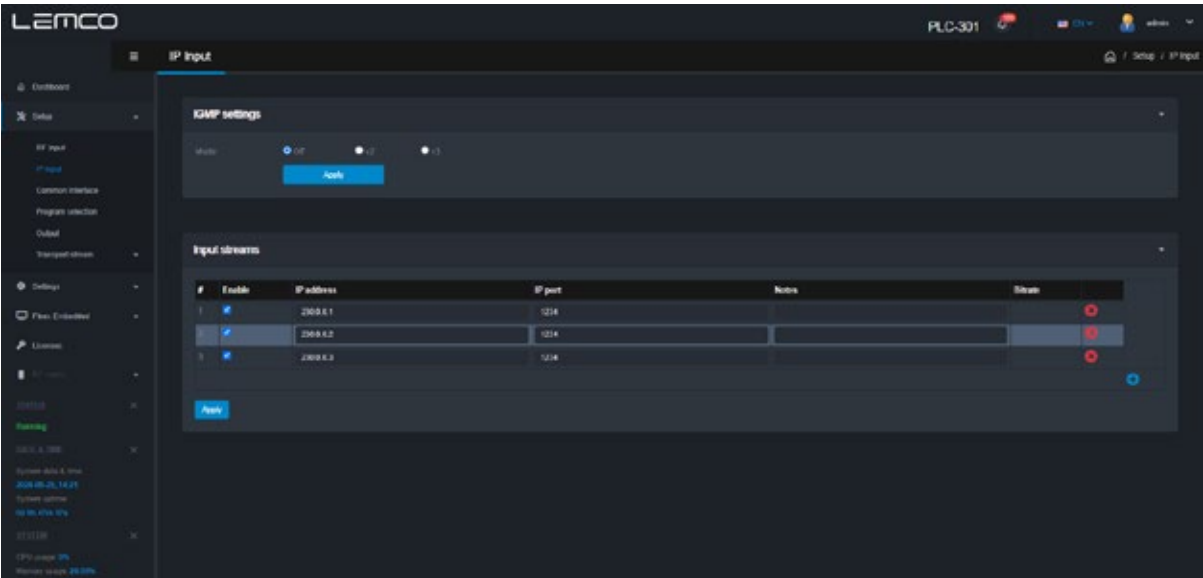
For each HDMI input the device provides several information such input resolution detection, input frame rate as well as input aspect ratio as show below:



Tuner Status color	Description
Green	The HDMI input is enabled
Red	Error in the HDMI input
Blue	HDMI input is disabled

4.2.3 - “IP Input” page

From the “IP Input” page the user is able to setup all the parameters regarding the IP reception option of the device. Both IP receiver and IP streamer share the same LAN interface which is the “TS OUT” RJ45 port.



IGMP Settings

From this section the user is able to Disable, or enable IGMP v2 or IGMP v3.

Input Streams



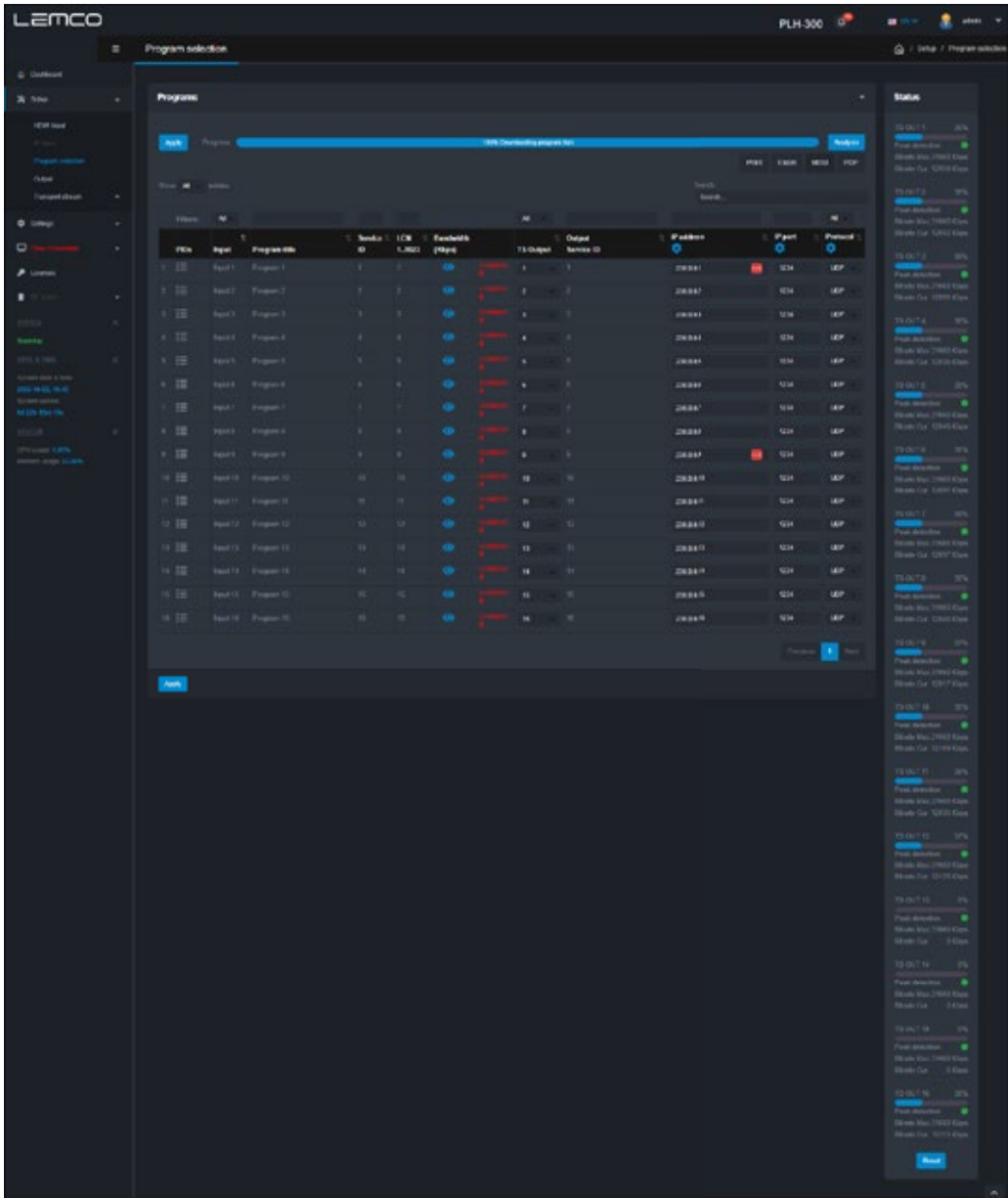
To add an IP input stream the user requires to click the “Add” button and then for each IP input stream to provide the following information:

- IP address – The multicast/unicast IP address of the incoming stream
- IP port – The port of the incoming stream
- Notes – Field in which the user is able to write free notes

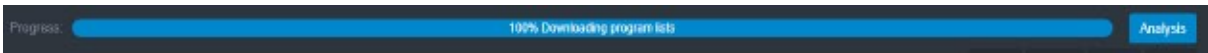
When all IP inputs streams are set, by clicking the “Apply” button the device will start receiving them. A green indicator as well as each stream bitrate will be visible under the “Bitrate” field.

4.2.4 - “Program Selection” page

At the “Program Selection” page the user is able manage all the available TV programs of the device as follow:

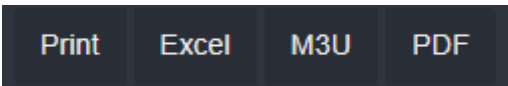


Progress Bar



At the top of the page there is a progress bar depicting the analysis status of the multiplexer. When the progress bar is at 100% it means that the multiplexer has successfully finished the analysis of all the available TV/Radio programs of all HDMI inputs.

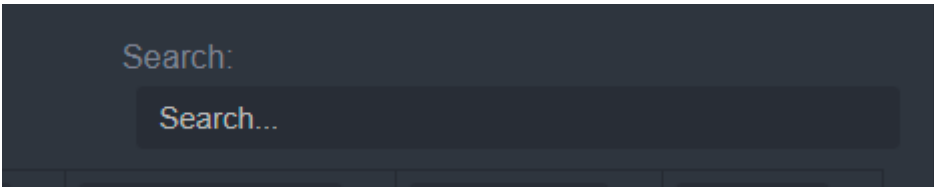
Export Options



The user is able to print or export the selected TV/Radio programs in Excel, .m3u or pdf file by clicking on the appropriate button.

Search

The headend provides the ability for real-time searching of any program from the list by using the following Search field.



By entering any text in the search field, the list will automatically start to filter and display the available results that match the entered text. This feature allows users to quickly find and sort through the programs or options they are looking for, enhancing the overall user experience and simplifying the process of content management.

TV / Radio programs list table

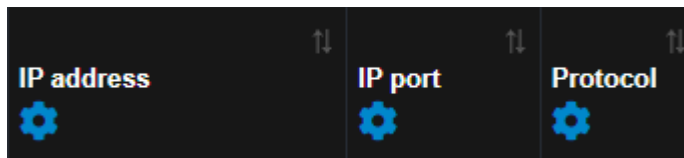
PIDs	Input	Program title	Original Service ID	LCN 1..1623	Bandwidth (Kbps)	Encrypted	TS Output	Output Service ID	IP address	IP port	Protocol
------	-------	---------------	---------------------	-------------	------------------	-----------	-----------	-------------------	------------	---------	----------

- The TV/Radio programs list table provides the following field information for each program:
- PIDs – Submenu for PID filtering (see below)
- Input – Depicts from which input the TV/Radio programs is received
- Program Title – Displays the name of the TV/Radio program. At the same time the user can edit this field to change it.
- Service ID – Depicts the Service ID number
- LCN No – which is the logic channel number of the program
- Bandwidth – which is the bitrate of the program in Kbps
- TS Output - To select in which multiplexer's output the TV/Radio program will be assigned.
- Output Service ID – The user is able to provide custom Service ID number
- IP address – Set the IP address of the current TV/Radio program for IPTV streaming
- Port – Set the port of the current TV/Radio program for IPTV streaming
- Protocol – Select between UDP/RTP IPTV streaming protocol for the current TV/Radio

* Most of the fields provide Sorting options by using the UP/DOWN arrows

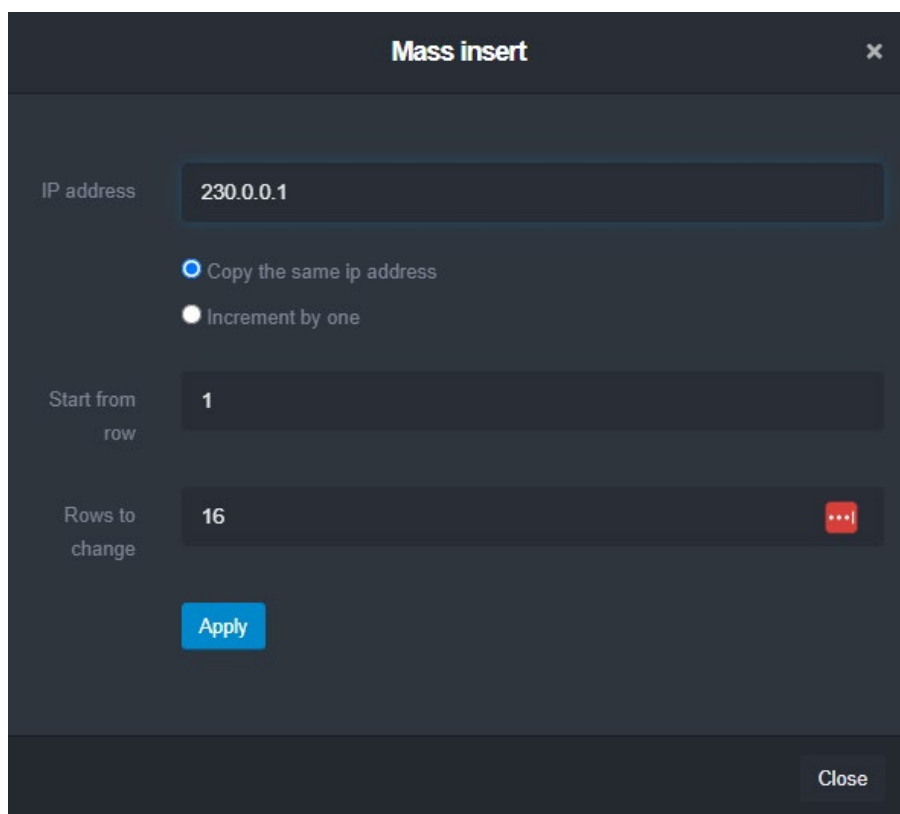
Mass insert function

The IP address, port and Protocol fields offering quick setup by clicking the edit button as follow:



To massively insert IP addresses to selected TV/Radio programs follow the below steps:

1. Sort all the TV/Radio programs by clicking the DOWN arrow at "TS Output" column to sort all the programs that you've selected to output from the device.
2. By clicking the edit button under the title of IP Address column the following pop-up window is displayed:

A screenshot of a 'Mass insert' pop-up window. The window has a title bar with 'Mass insert' and a close button (X). Inside, there are three input fields: 'IP address' with the value '230.0.0.1', 'Start from row' with the value '1', and 'Rows to change' with the value '16'. Below the 'IP address' field are two radio buttons: 'Copy the same ip address' (selected) and 'Increment by one'. At the bottom left is a blue 'Apply' button, and at the bottom right is a 'Close' button. The 'Rows to change' field has a red '...' button next to it.

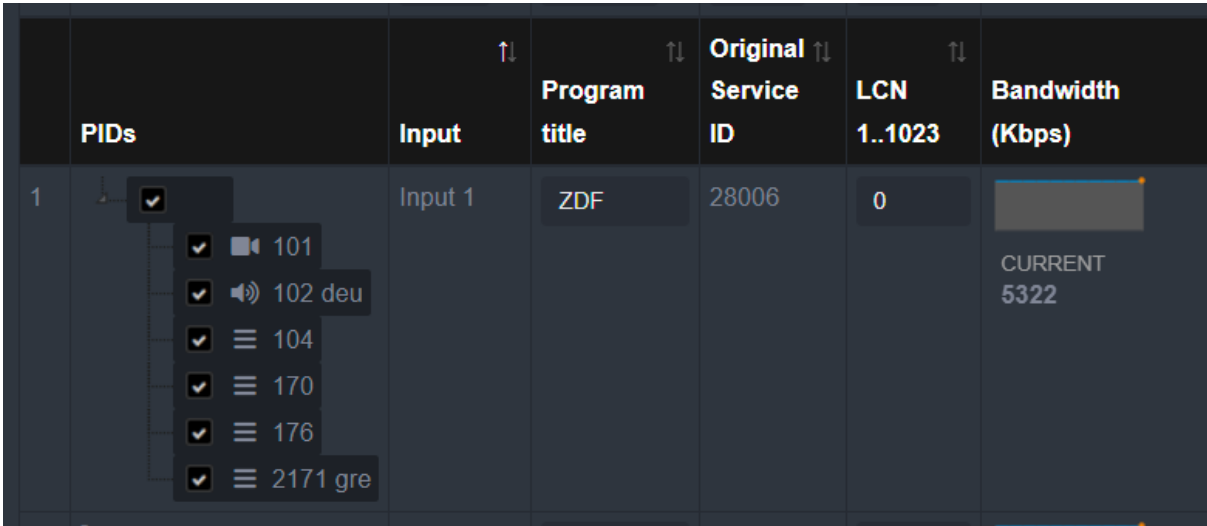
3. In the IP address field insert your starting IP address
4. If you want to copy the same address in all programs, choose the radio button "Copy the same ip address". In case you want to increment by one the last octet of the IP address choose the "Increment by one" option.
5. From the "Start from row" and "Rows to change" fields define from which specific rows the automatic procedure will begin and it will end.
6. And click the "Apply" button.

Repeat the same process for Port and Protocol field.

PID Filtering

At the second column the headend provides the ability to make PID filtering by clicking the “burger” icon  to reveal the available PIDs for each TV/Radio program as show below:

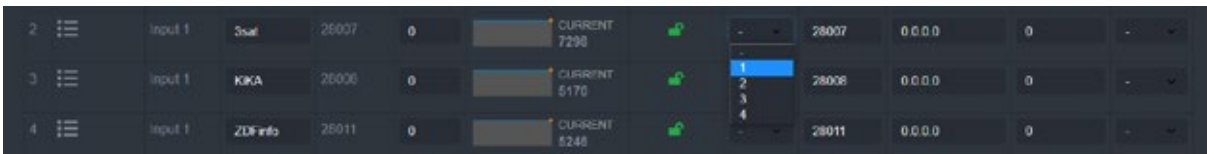
By using the checkboxes, users can easily deselect any PIDs, instructing the headend to filter them out. This feature allows



users to manage and control which PIDs are processed and distributed, further enhancing the customization and flexibility of the system according to their specific needs and preferences.

Program Selection

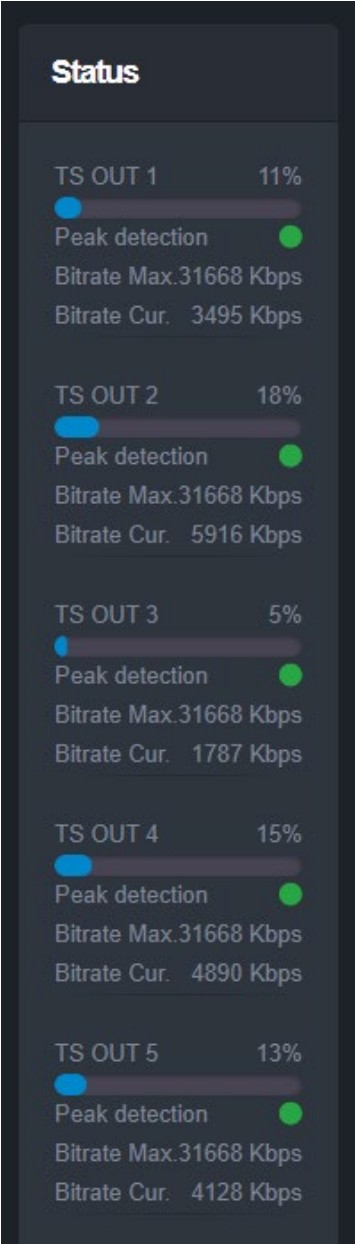
With the drop-down menu in the “TS Output” column, users can easily assign any TV/Radio program to any of the sixteen outputs of the headend. By following the same process for each program, users can create their own custom multiplex for the sixteen output channels. This feature provides a high level of flexibility and customization, allowing users to tailor the head-end’s output to their specific needs and preferences for content distribution.



Status

The status section at the right provides a general idea to the user of the current payload (according to the selected programs) comparing it to the max. output payload.

It is recommended that the user must not exceed the 85% from each output, since all the bitrates are variable according to their specific content.



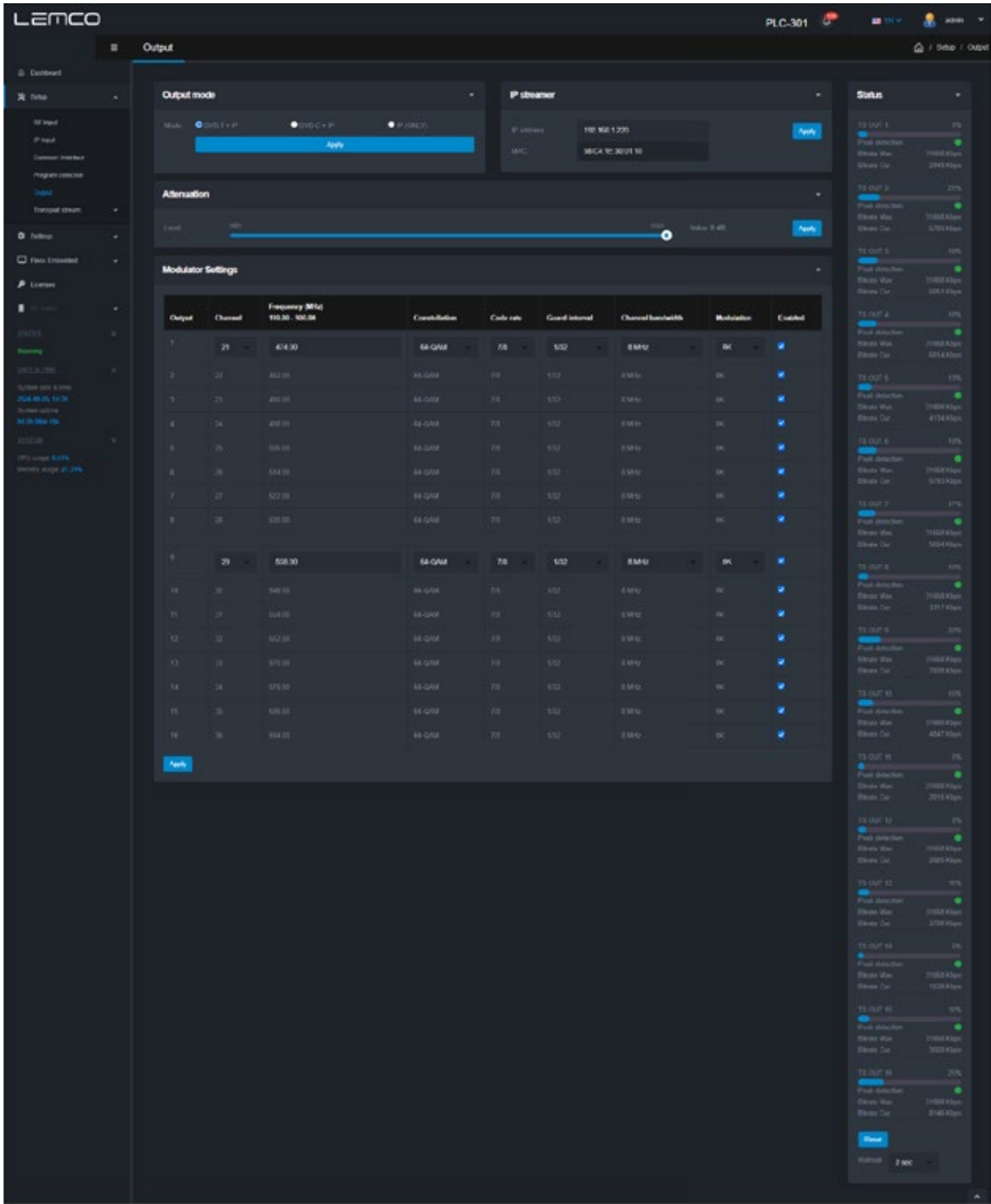
Peak Detection mechanism

As shown above there is a colored indicator of the peak detection mechanism, for each output transport stream. This indicates if any overflow has occurred on modulator's output bitrate with the following colors:

- Green – No overflow occurred
- Yellow – No overflow occurred but the input bitrate is close to the output bitrate
- Red – Overflow occurred. The user must decrease the input bitrate

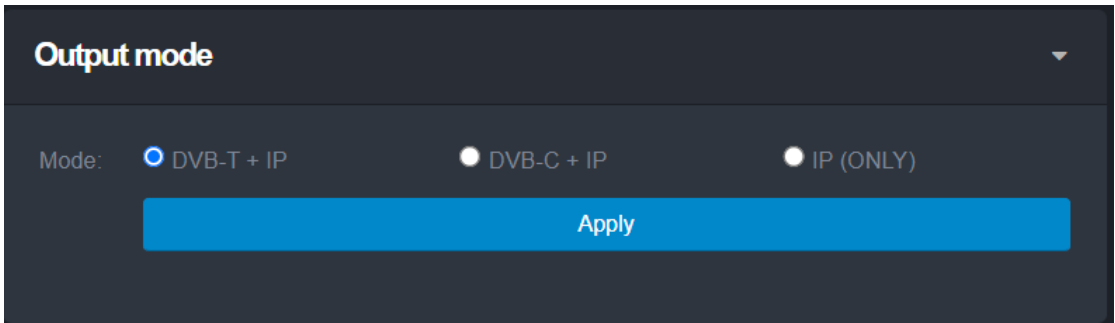
4.2.5 - “Output” page

On the “RF Output” page, the user can configure the RF output settings for the device as shown below:



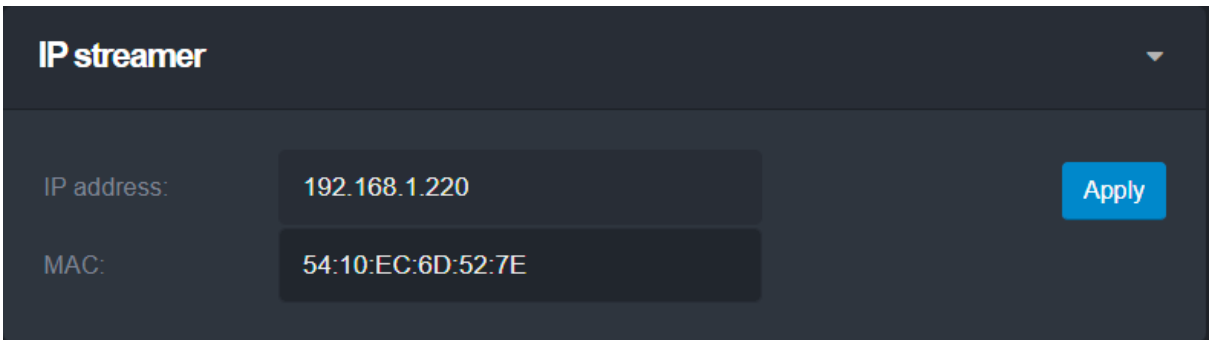
Output Mode

With the use of the radio buttons the user is able to select the mode that the device will operate as follows:



DVB-T: 16 x modulator working in DVB-T standard + IP streaming
DVB-C: 16 x modulator working in DVB-C standard + IP streaming
IP only: All modulators are disabled, the device does IP streaming ONLY

IP streamer



The IP streamer section provides the IP address of the headend's streamer that can be used for PING purposes as well as it's MAC address.

Attenuation



The device headend provides an electronic embedded -31.5dB attenuator to provide the ability to the user to increase or decrease the total RF output level of all outputs of the headend at the same time.

Modulator Settings

All the RF output channels from the device are working in adjacent frequencies based on the DVB standard as follows:

DVB-T mode

In DVB-T mode, the 16x RF output channels are working in 2x different groups of 8x adjacent RF channels (2x8). The user is able to select the modulation parameters only from the first channel of the group and then all the other RF channels will use the same.

DVB-C mode

In DVB-C mode, the 16x RF output channels are working in 8x different groups of 2x adjacent RF channels (8x2). The user is able to select the modulation parameters only from the first channel of the group and then all the other RF channels will use the same.

Output	Channel	Frequency (MHz) 110.00 - 900.00	Constellation	Code rate	Guard interval	Channel bandwidth	Modulation	Enabled
1	21	474.00	64-QAM	7/8	1/32	8 MHz	8K	☒
2	22	482.00	64-QAM	7/8	1/32	8 MHz	8K	☒
3	23	490.00	64-QAM	7/8	1/32	8 MHz	8K	☒
4	24	498.00	64-QAM	7/8	1/32	8 MHz	8K	☒
5	25	506.00	64-QAM	7/8	1/32	8 MHz	8K	☒
6	26	514.00	64-QAM	7/8	1/32	8 MHz	8K	☒
7	27	522.00	64-QAM	7/8	1/32	8 MHz	8K	☒
8	28	530.00	64-QAM	7/8	1/32	8 MHz	8K	☒

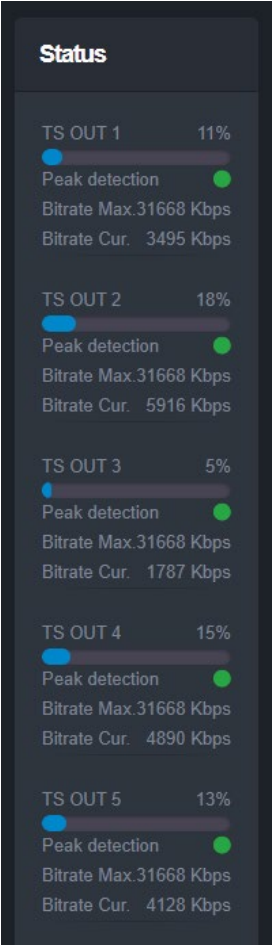
For each modulator output in DVB-T mode as the above example the user is able to setup the following parameters:

- Channel – Set the desired output channel in channel format
- Frequency – Set output frequency of the first modulator*
- Constellation – Set the constellation of the first modulator*
- Code Rate – Set the code rate of the first modulator*
- Guard Interval – Set the guard interval of the first modulator*
- Channel Bandwidth – Set the channel bandwidth of the first modulator*
- Modulation – Set the modulation type of the first modulator*
- Enable/Disable – Enable or disable the current modulator

In DVB-C the available fields are the following:

- Frequency – Set output frequency of the first modulator*
- Constellation – Set the constellation of the first modulator*
- Symbol Rate – Set the Symbol rate of the first modulator*
- Frequency Step – Set the frequency step of the first modulator*

* All the sixteen outputs of the device operate in adjacent RF output channels. This means that the user setups only the first modulator output and all the other three modulators have the same settings and automatically are being programmed in adjacent channels.



E.g. If the user sets the CH21 in UHF band on modulator No1 the other three modulators will be automatically set to CH22, CH23 and CH24, respectively.

Status

The status section at the right provides a general idea to the user of the current payload (according to the selected programs) comparing it to the max. output payload.

It is recommended that the user must not exceed the 85% from each output, since all the bitrates are variable according to their specific content.

Transport Stream

4.2.6 - "Settings" page

In this section the user is able to setup all the TS settings of the sixteen-output multiplexes of the device as shown below:

For each multiplex output the user can set the following settings:

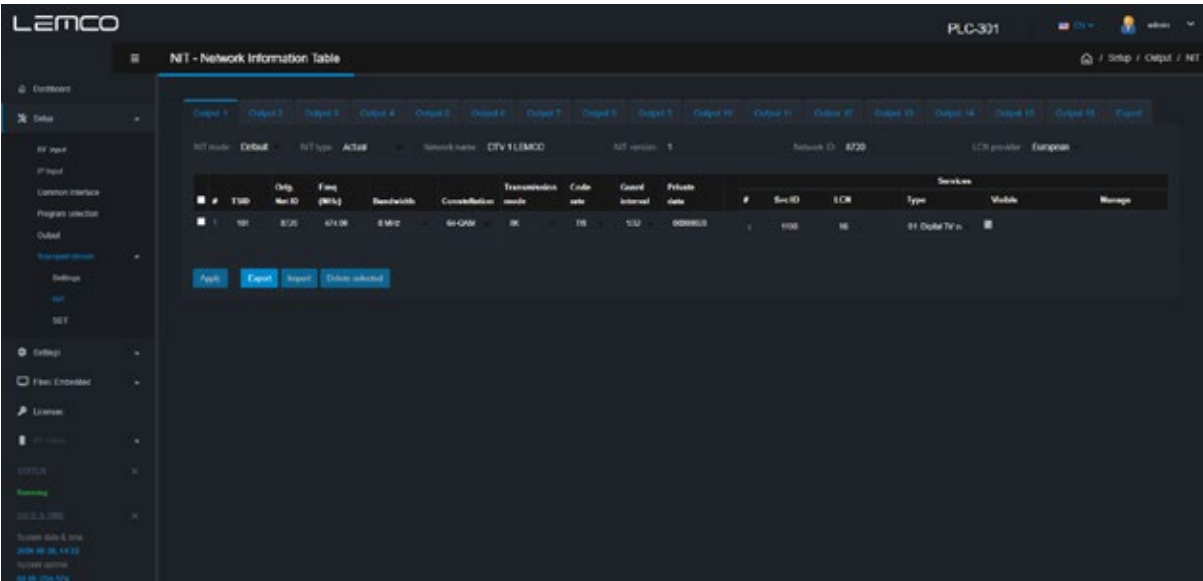
- TS ID: Which is the ID No of the specific multiplex (1...65535)
- Network ID: Which is the Net ID No of the specific multiplex (1...65535)
- Original Net ID: Which is the Org. Net ID No of the specific multiplex (1...65535)
- Network Name: Which is the network name of the specific multiplex
- NIT: Choose from Default, Global and Custom
- NIT version: From 1 to 31
- SDT: Select Default or Custom
- LCN provider: Choose the appropriate LCN provider (EACEM, ITC, Nordig, APN)

The TS settings page displays a table with 16 rows, each representing a multiplex output. The columns are:

Output	TS ID (1-65535)	Network ID (1-65535)	Original net ID (1-65535)	Network name (15 characters max)	NIT	NIT version (1-31)	SDT
1	101	8120	8120	QTV 1 LEMCO	Default	1	Default
2	102	8120	8120	QTV 2 LEMCO	Default	1	Default
3	103	8120	8120	QTV 3 LEMCO	Default	1	Default
4	110	8120	8120	QTV 4 LEMCO	Default	1	Default
5	112	8120	8120	QTV 5 LEMCO	Default	1	Default
6	116	8120	8120	QTV 6 LEMCO	Default	1	Default
7	119	8120	8120	QTV 7 LEMCO	Default	1	Default
8	122	8120	8120	QTV 8 LEMCO	Default	1	Default
9	126	8120	8120	QTV 9 LEMCO	Default	1	Default
10	128	8120	8120	QTV 10 LEMCO	Default	1	Default
11	131	8120	8120	QTV 11 LEMCO	Default	1	Default
12	134	8120	8120	QTV 12 LEMCO	Default	1	Default
13	137	8120	8120	QTV 13 LEMCO	Default	1	Default
14	140	8120	8120	QTV 14 LEMCO	Default	1	Default
15	143	8120	8120	QTV 15 LEMCO	Default	1	Default
16	146	8120	8120	QTV 16 LEMCO	Default	1	Default

4.2.7 - “NIT” page

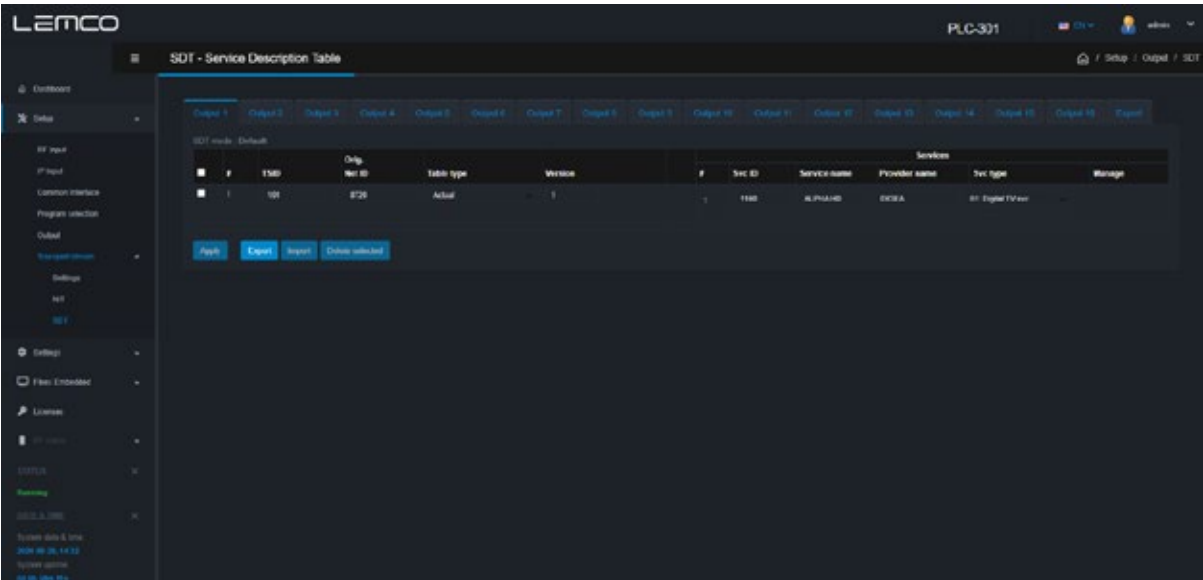
In this section the user is able to create custom NIT table for each of the sixteen outputs of the device as shown below:



For more information on how to create a custom NIT/SDT table please refer to “Lemco custom NIT/SDT guideline.pdf” document in Lemco’s website.

4.2.8 - “SDT” page

In this section the user is able to create custom SDT table for each of the sixteen outputs of the device as shown below:

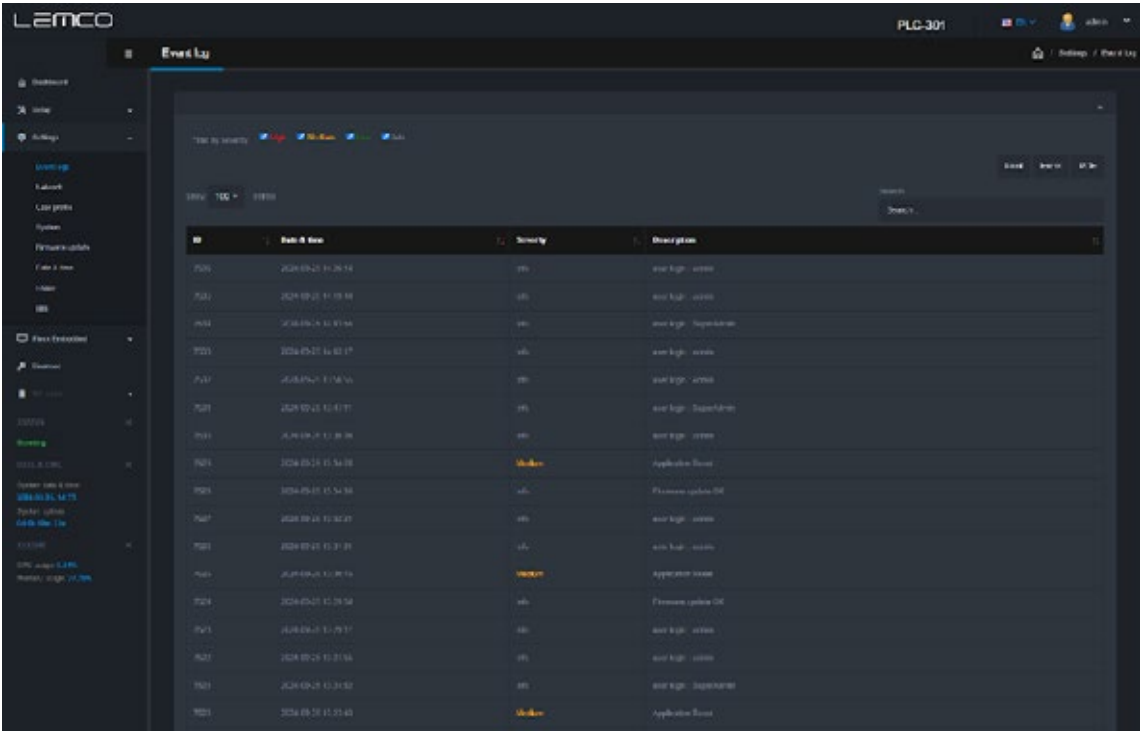


For more information on how to create a custom NIT/SDT table please refer to “Lemco custom NIT/SDT guideline.pdf” document in Lemco’s website.

Settings

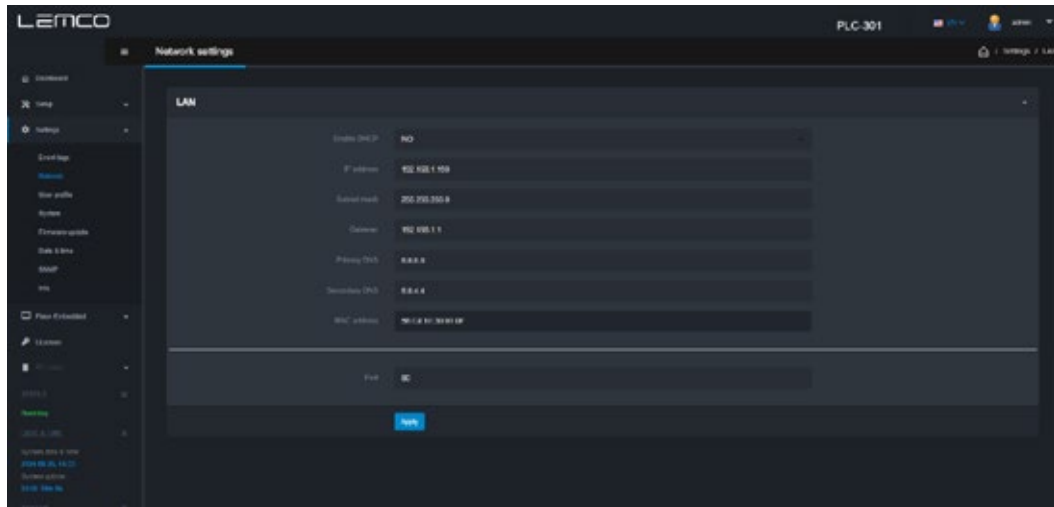
4.2.9 - “Event log” page

In “Event log” page the system logs all the last one thousand (1000) events occurs in the device during its operation. These logs are divided in three different categories based on their priority as follow:



- High – With red color the system indicates event logs which are of high priority
- Medium – With yellow color the system indicates event logs which are of high priority
- Low – With green color the system indicates event logs which are of high priority
- Info – With grey color the system indicates event logs which are of high priority

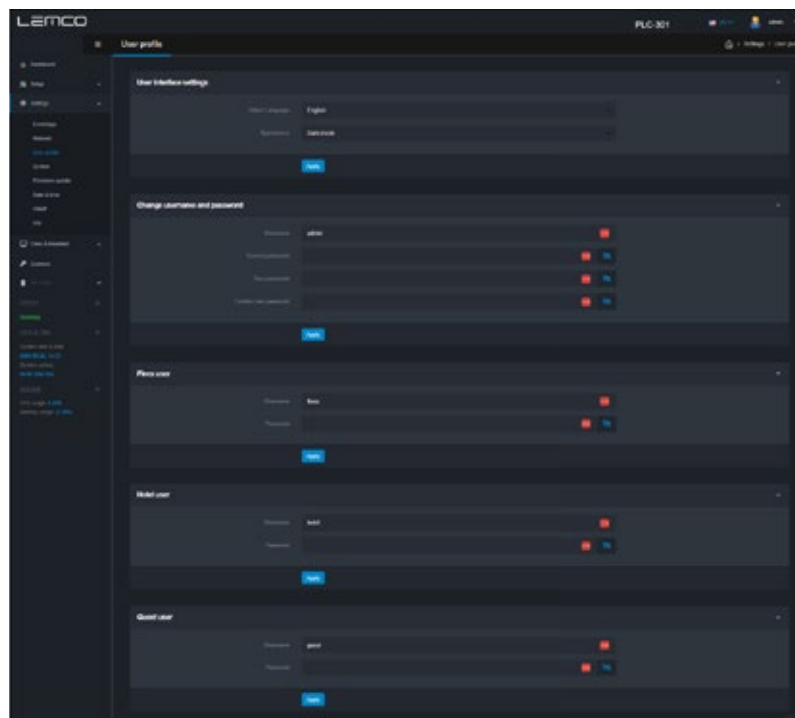
The user has the ability to print or export in excel or pdf file all the selected events.



4.2.10- "Network" page

On the "Network" page, users can set up all the parameters related to the LAN control of the device as follows:

- DHCP – Enable or disable DHCP
- IP address: Set a static IP address for controlling the device
- Subnet mask: Set the specific Subnet mask
- Gateway: Set the gateway's IP address
- Primary DNS: Set the IP address of the primary DNS
- Secondary DNS: Set the IP address of the secondary DNS
- Port: Assign the control port
- MAC address: Depicts the MAC address of the LAN control



4.2.11 - "User profile" page

On "User profile" section the user is able to do the following:

- From the "Select Language" field to select the language of the interface

Profile Name	Username	Password	Description
Admin	admin	12345	The user has full read/write privileges to all pages
Fleex	fleex	12345	The user has full read/write privileges only to Fleex section
Hotel	hotel	12345	The user has full read/write privileges only to "Home page" and "Info" page from Fleex Embedded.
Guest	guest	12345	The user has full read privileges

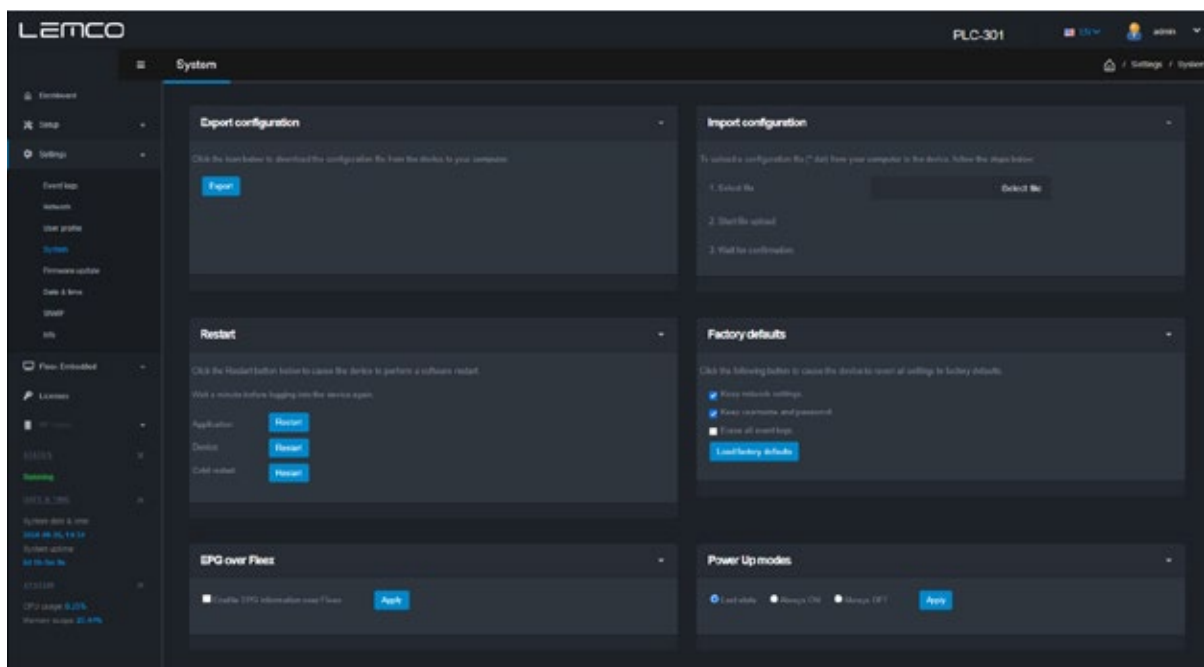
- From the "Appearance" field to select the Light of dark mode theme.

The device supports several user profiles as follow:

Caution!

In case of factory default procedure, the username and password will be reset unless the check box "Keep username & password after applying factory defaults" is selected.

4.2.12 - "System" page



On system page the user is able to do the following:

Import/Export

- Export: Save the headend's configuration in a specific .dat format file.
- Import: Upload a previously saved configuration .dat file to the device

Restart

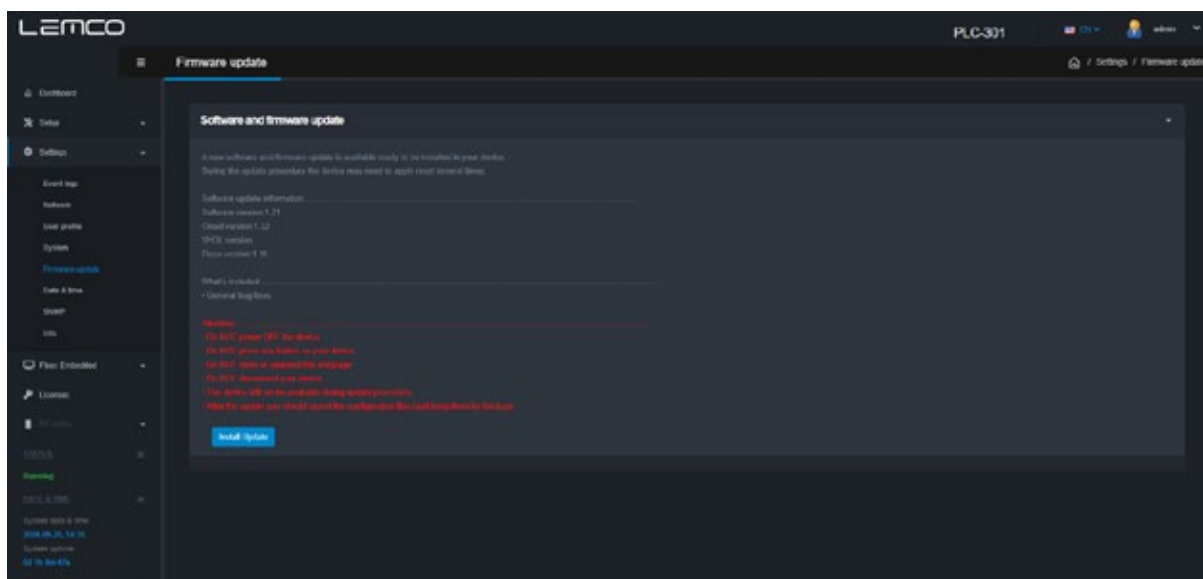
The device offers the following restart options:

- Application – The device will apply restart only to software application that controls the device.
- Device – The device will apply restart to its Linux Operating System.
- Cold – The device will power OFF and after 10 seconds will power ON automatically.

Check Box	Description
Keep network settings	If enabled, the device will keep Network settings upon factory default
Keep username and password	If enabled, the device will keep username and password.
Erase all event logs	If enabled, the device will erase all event logs during factory default procedure.

Factory Defaults

By clicking on the "Load factory defaults" button the device will restore to factory defaults supporting the following options:

4.2.13 - "Firmware update" page

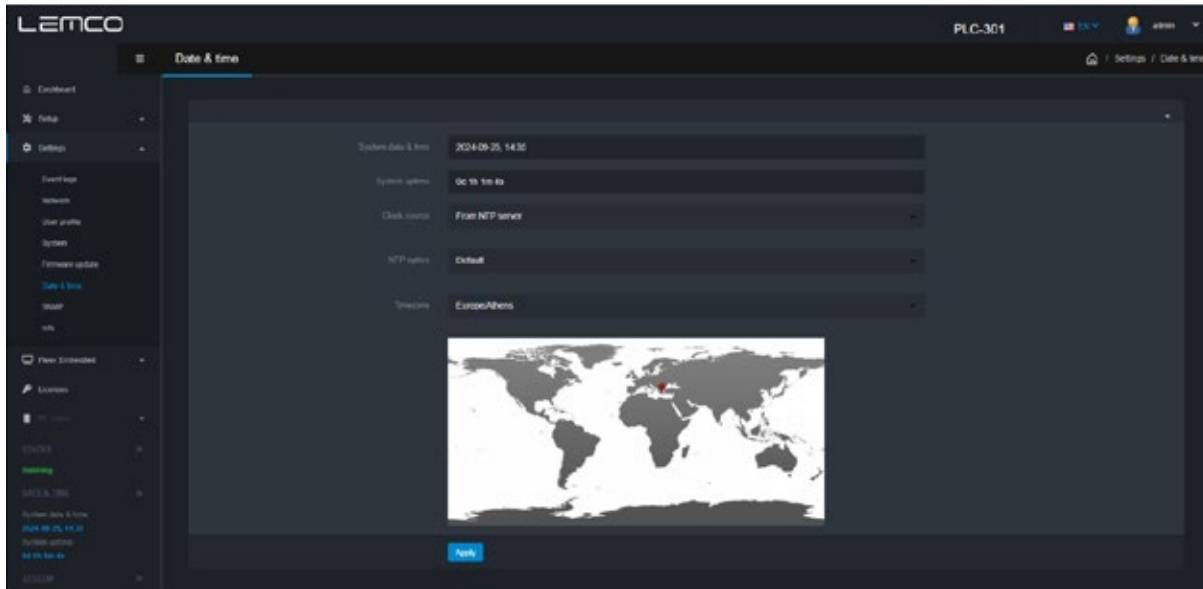
On "Firmware update" section the user is able to apply a new firmware update to the device.

The device automatically downloads the available firmware update from the cloud server and notifies the user that there is a new firmware update. The user by clicking the "Install" button the device does the update automatically and reboots itself...

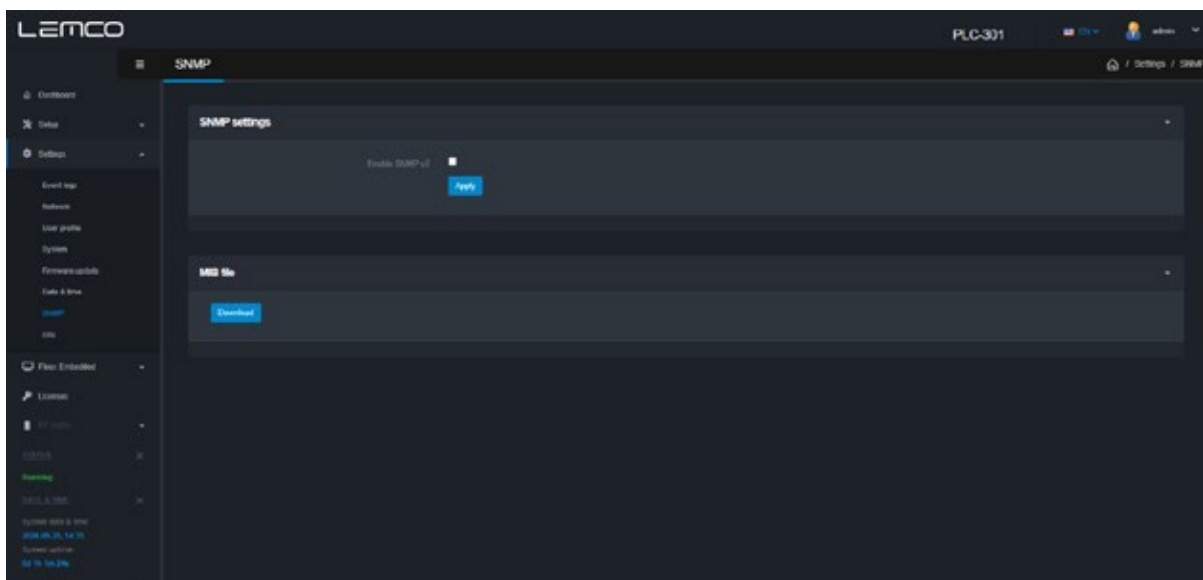
The whole procedure might take up to 2 min and it does not affect the current configuration of the device.

At the same time, device offers offline firmware update by uploading a firmware update .bin file manually.

4.2.14 - "Date & Time" page



On "Date & Time" section the user is able to select the time zone for the device by using the "Timezone" drop down menu:

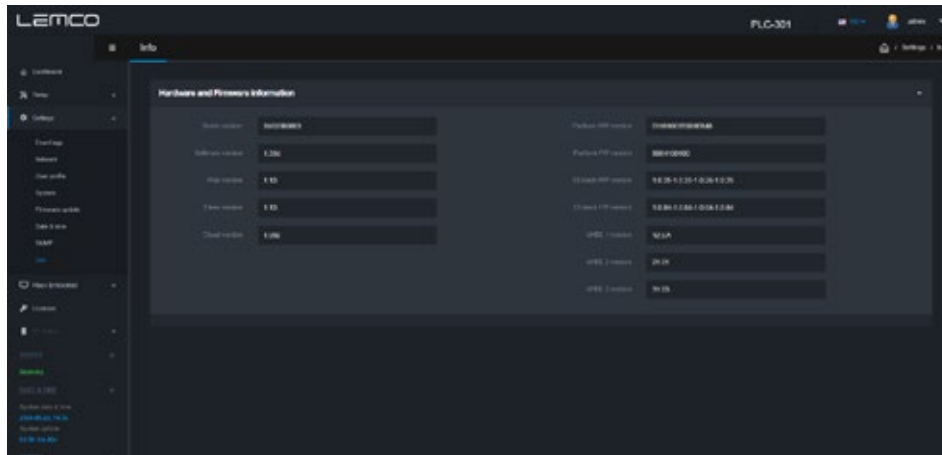


4.2.15 - "SNMP" page

On this section, the user is able to setup the SNMP interface of the device.

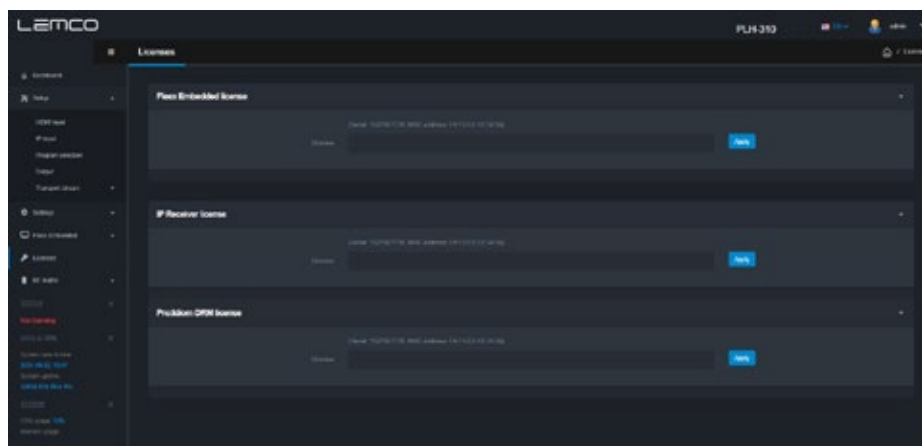
- The device supports SNMP v2
- To use the SNMP client feature of the device a SNMP manager software is required
- To export the .MIB file of the device the user must click the Download button from MIB file section.

4.2.16- "Info" page



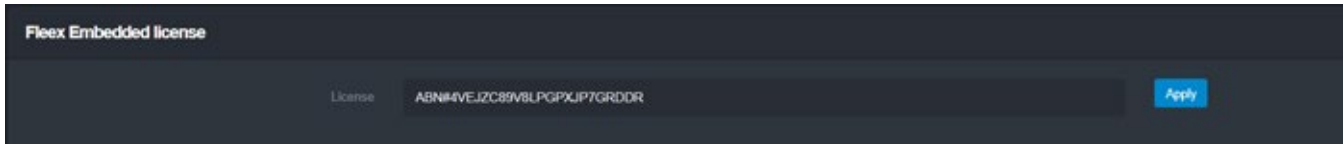
The "Info" page provides several information of the device as follow:

- Serial number of the device
- Software application – Which is the version of the software application
- Web version – Which is the version of the web application
- Fleex version – Which is the version of the Fleex Embedded
- Cloud version - Which is the version of the firmware package.
- Platform HW version – Hardware version of the FPGAs
- Platform FW version – Firmware version of the FPGAs
- VHDL 1 version – VHDL version of the FPGA No1
- VHDL 2version – VHDL version of the FPGA No2
- VHDL 3 version – VHDL version of the FPGA No3



4.2.17- "Licenses" page

From the "Licenses" page the user is able to enable extra features and options of the device as follows:

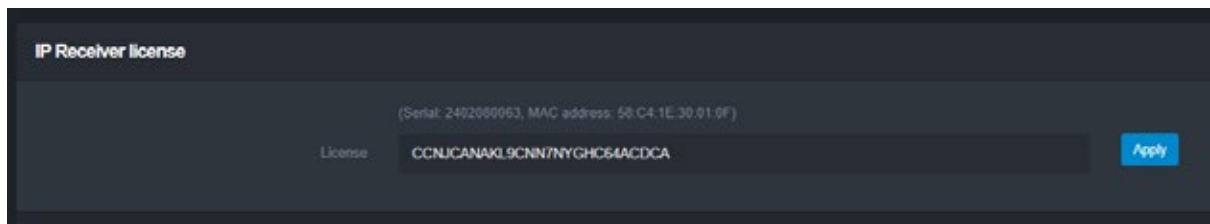


The screenshot shows a dark-themed interface titled "Fleex Embedded license". Below the title, there is a "License" label followed by a text input field containing the license key "ABNH4VEJZC89V8LPGPXJP7GRDDR". To the right of the input field is a blue "Apply" button.

Fleex Embedded license

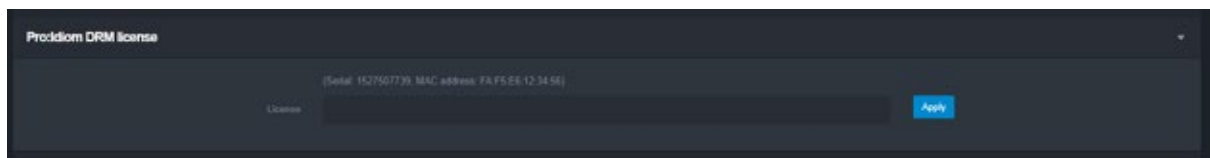
To enable the Fleex Embedded on the specific device the user has to enter the license in the following field and click the "Apply" button:

*More information regarding Fleex Embedded can be found here: www.fleex.gr

IP Receiver license

The screenshot shows a dark-themed interface titled "IP Receiver license". Above the license input field, it displays "(Serial: 2402080063, MAC address: 58:C4:1E:30:01:0F)". The "License" label is followed by a text input field containing the license key "CCNJCANAQL9CNN7NYGHC64ACDCA". To the right of the input field is a blue "Apply" button.

To enable the IP receiver option on the specific device the user has to enter the license in the following field and click the "Apply" button:



The screenshot shows a dark-themed interface titled "Proddiom DRM license". Above the license input field, it displays "(Serial: 1527507739, MAC address: FA:F5:E8:12:34:56)". The "License" label is followed by a text input field. To the right of the input field is a blue "Apply" button.

DRM license

To enable the DRM option on the specific device the user has to enter the license in the following field and click the "Apply" button:

**To obtain any of the above license please contact us at: info@lemco.gr

5. TECHNICAL SPECIFICATIONS

PROLINE

PLH-300

16 x HDMI to 16 x DVB-T/C & IP



Input		IP Streaming (OUT)	
Type	16 x HDMI	IP TS Out	Yes
Video		Protocol	UDP / RTP (Multicast/Unicast)
Video coding	MPEG-4 AVC / H.264	Speed	1 Gbit (800 Mbps in IP only mode)
Profile	High profile 4.0	Type	Up to 16 x SPTS or 16 x MPTS
Input resolution	Up to 1920 x 1080 - 50/60 p & i	SDP/SAP Support	Yes
Output resolution	Up to 1920 x 1080 - 30p	IP Streaming (IN)	
HDCP support	Yes, v1.4	Optional	Requires extra license
Audio		IP TS In	Yes
Audio	HD	Protocol	UDP / RTP (Multicast/Unicast)
Standard	MPEG-1 Layer II	Speed	1 Gbit (800 Mbps)
Audio Bit Rate	64, 96, 128, 192, 256, 320 Kbps	Type	128 x SPTS or 16 x MPTS
Format	MPEG2, AAC, AC3	IGMP snooping	Yes, v2 and v3
H.264 encoder		Programming Interface	
Standard	MPEG-4 AVC / H.264	Operating system	Linux OS
Bit Rate	1 – 19 Mbps adjustable	Ethernet webserver	Yes, embedded webserver
Configurable Parameters	Service Name, Service ID	Speed	100/1000 Mbps
LCN processing	Yes	Connector	RJ45
Transport Stream Processing		Browser compatibility	Chrome, Firefox, Safari, Opera, Edge et al.
Pool technology support	Yes	EAN-13	
Services	User selection by service names or Service ID	Code	5213009761901
Automatic regeneration	PAT, CAT, SDT, PMTs, EITs tables	General	
NIT	Pass-through, custom, automatic	Power supply	230-240 VAC
Custom NIT/SDT creation	Yes	Frequency range	50...60Hz
LCN support	Yes	Number of power supplies	Up to two(2)
PID filtering	Yes	Hot-swap technology	Yes
RF Output		Power supply consumption	~60VA
Type	16 x DVB-T or 16 x DVB-C RF channels	Operating temperature	0 °C to 40 °C
	2 groups of 8 adjacent channels in DVB-T	Storage temperature	-10 °C to +70 °C
	8 groups of 2 adjacent channels in DVB-C	Humidity	Up to 90%
Output Frequencies	110...900 MHz (10 KHz step)	Dimensions	480 x 295 x 43.5mm
Output Level	90dBuV	Mounting	1U rack
Connector	75Ω - F, female	Weight	4.20 Kg
Output Attenuator	0...-30dB		
DVB-T (OUT)			
Bandwidth	5, 6, 7, 8 MHz		
Mode	2K, 8K		
Constellation	QPSK, 16QAM, 64QAM		
Guard interval	1/4, 1/8, 1/16, 1/32		
Code rate	1/2, 2/3, 3/4, 5/6, 7/8		
MER	More than 42dB @ Full Band		
DVB-C (OUT)			
Constellation	16QAM, 32QAM, 64QAM, 128QAM, 256QAM		
Symbol rate	2.5-8.4 Ms/s		
Channel step	3...10MHz		
MER	More than 40dB @ Full Band		

PROLINE

PLH-310

8 x HDMI to 8 x DVB-T/C & IP



Input		IP Streaming (OUT)	
Type	8 x HDMI	IP TS Out	Yes
Video		Protocol	UDP / RTP (Multicast/Unicast)
Video coding	MPEG-4 AVC / H.264	Speed	1 Gbit (800 Mbps in IP only mode)
Profile	High profile 4.0	Type	Up to 16 x SPTS or 16 x MPTS
Input resolution	Up to 1920 x 1080 - 50/60 p & i	SDP/SAP Support	Yes
Output resolution	Up to 1920 x 1080 - 30p	IP Streaming (IN)	
HDCP support	Yes, v1.4	Optional	Requires extra license
Audio		IP TS In	Yes
Audio	HD	Protocol	UDP / RTP (Multicast/Unicast)
Standard	MPEG-1 Layer II	Speed	1 Gbit (800 Mbps)
Audio Bit Rate	64, 96, 128, 192, 256, 320 Kbps	Type	128 x SPTS or 16 x MPTS
Format	MPEG2, AAC, AC3	IGMP snooping	Yes, v2 and v3
H.264 encoder		Programming Interface	
Standard	MPEG-4 AVC / H.264	Operating system	Linux OS
Bit Rate	1 – 19 Mbps adjustable	Ethernet webserver	Yes, embedded webserver
Configurable Parameters	Service Name, Service ID	Speed	100/1000 Mbps
LCN processing	Yes	Connector	RJ45
Transport Stream Processing		Browser compatibility	Chrome, Firefox, Safari, Opera, Edge et al.
Pool technology support	Yes	EAN-13	
Services	User selection by service names or Service ID	Code	5213009761901
Automatic regeneration	PAT, CAT, SDT, PMTs, EITs tables	General	
NIT	Pass-through, custom, automatic	Power supply	230-240 VAC
Custom NIT/SDT creation	Yes	Frequency range	50...60Hz
LCN support	Yes	Number of power supplies	Up to two(2)
PID filtering	Yes	Hot-swap technology	Yes
RF Output		Power supply consumption	~50VA
Type	8 x DVB-T or 8 x DVB-C RF channels	Operating temperature	0 °C to 40 °C
	1 group of 8 adjacent channels in DVB-T	Storage temperature	-10 °C to +70 °C
	4 groups of 2 adjacent channels in DVB-C	Humidity	Up to 90%
Output Frequencies	110...900 MHz (10 KHz step)	Dimensions	480 x 295 x 43.5mm
Output Level	90dBµV	Mounting	1U rack
Connector	75Ω - F, female	Weight	4.00 Kg
Output Attenuator	0...-30dB		
DVB-T (OUT)			
Bandwidth	5, 6, 7, 8 MHz		
Mode	2K, 8K		
Constellation	QPSK, 16QAM, 64QAM		
Guard interval	1/4, 1/8, 1/16, 1/32		
Code rate	1/2, 2/3, 3/4, 5/6, 7/8		
MER	More than 42dB @ Full Band		
DVB-C (OUT)			
Constellation	16QAM, 32QAM, 64QAM, 128QAM, 256QAM		
Symbol rate	2.5-8.4 Ms/s		
Channel step	3...10MHz		
MER	More than 40dB @ Full Band		

PROLINE

PLH-200

16 x HDMI to IP

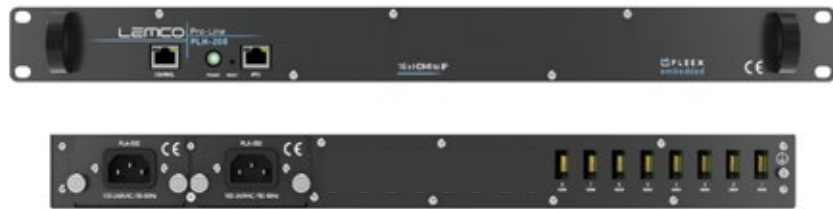


Input		IP Streaming (IN)	
Type	16 x HDMI	Optional	Requires extra license
Video		IP TS In	Yes
Video coding	MPEG-4 AVC / H.264	Protocol	UDP / RTP (Multicast/Unicast)
Profile	High profile 4.0	Speed	1 Gbit (480 Mbps)
Input resolution	Up to 1920 x 1080 - 50/60 p & i	Type	128 x SPTS or 16 x MPTS
Output resolution	Up to 1920 x 1080 - 30p	IGMP snooping	Yes, v2 and v3
HDCP support	Yes, v1.4	Programming Interface	
Audio		Operating system	Linux OS
Audio	HD	Ethernet webserver	Yes, embedded webserver
Standard	MPEG-1 Layer II	Speed	100/1000 Mbps
Audio Bit Rate	64, 96, 128, 192, 256, 320 Kbps	Connector	RJ45
Format	MPEG2, AAC, AC3	Brower compatibility	Chrome, Firefox, Safari, Opera, Edge et al.
H.264 encoder		EAN-13	
Standard	MPEG-4 AVC / H.264	Code	5213009761857
Bit Rate	1 – 19 Mbps adjustable	General	
Configurable Parameters	Service Name, Service ID	Power supply	230-240 VAC
LCN processing	Yes	Frequency range	50...60Hz
Transport Stream Processing		Number of power supplies	Up to two(2)
Pool technology support	Yes	Hot-swap technology	Yes
Services	User selection by service names or Service ID	Power supply consumption	~60VA
Automatic regeneration	PAT, CAT, SDT, PMTs, EITs tables	Operating temperature	0 °C to 40 °C
NIT	Pass-through, custom, automatic	Storage temperature	-10 °C to +70 °C
Custom NIT/SDT creation	Yes	Humidity	Up to 90%
LCN support	Yes	Dimensions	480 x 295 x 43.5mm
PID filtering	Yes	Mounting	1U rack
IP Streaming (OUT)		Weight	4.10 Kg
IP TS Out	Yes		
Protocol	UDP / RTP (Multicast/Unicast)		
Speed	1 Gbit (800 Mbps in IP only mode)		
Type	Up to 16 x SPTS or 16 x MPTS		
SDP/SAP Support	Yes		

PROLINE

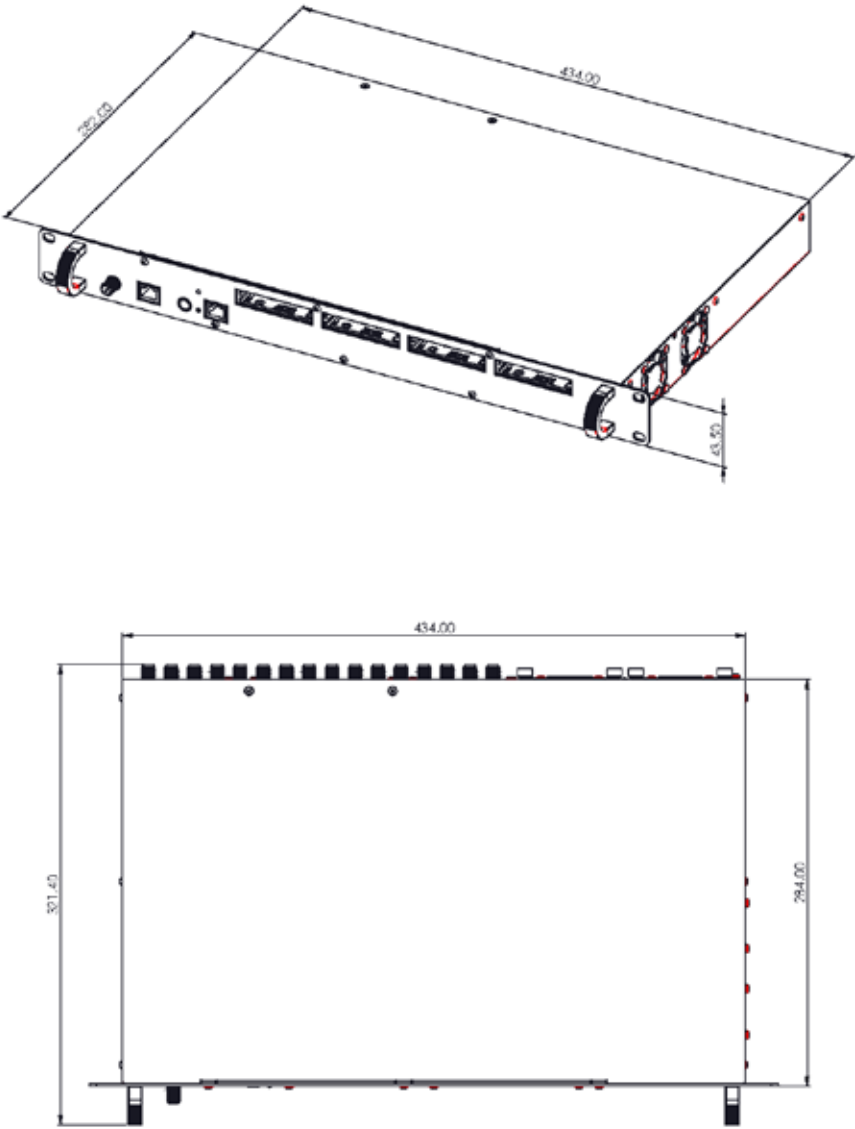
PLH-210

8 x HDMI to IP



Input		IP Streaming (IN)	
Type	8 x HDMI	Optional	Requires extra license
Video		IP TS In	Yes
Video coding	MPEG-4 AVC / H.264	Protocol	UDP / RTP (Multicast/Unicast)
Profile	High profile 4.0	Speed	1 Gbit (480 Mbps)
Input resolution	Up to 1920 x 1080 - 50/60 p & i	Type	128 x SPTS or 16 x MPTS
Output resolution	Up to 1920 x 1080 - 30p	IGMP snooping	Yes, v2 and v3
HDCP support	Yes, v1.4	Programming Interface	
Audio		Operating system	Linux OS
Audio	HD	Ethernet webserver	Yes, embedded webserver
Standard	MPEG-1 Layer II	Speed	100/1000 Mbps
Audio Bit Rate	64, 96, 128, 192, 256, 320 Kbps	Connector	RJ45
Format	MPEG2, AAC, AC3	Browser compatibility	Chrome, Firefox, Safari, Opera, Edge et al.
H.264 encoder		EAN-13	
Standard	MPEG-4 AVC / H.264	Code	5213009761857
Bit Rate	1 – 19 Mbps adjustable	General	
Configurable Parameters	Service Name, Service ID	Power supply	230-240 VAC
LCN processing	Yes	Frequency range	50...60Hz
Transport Stream Processing		Number of power supplies	Up to two(2)
Pool technology support	Yes	Hot-swap technology	Yes
Services	User selection by service names or Service ID	Power supply consumption	~50VA
Automatic regeneration	PAT, CAT, SDT, PMTs, EITs tables	Operating temperature	0 °C to 40 °C
NIT	Pass-through, custom, automatic	Storage temperature	-10 °C to +70 °C
Custom NIT/SDT creation	Yes	Humidity	Up to 90%
LCN support	Yes	Dimensions	480 x 295 x 43.5mm
PID filtering	Yes	Mounting	1U rack
IP Streaming (OUT)		Weight	4.00 Kg
IP TS Out	Yes		
Protocol	UDP / RTP (Multicast/Unicast)		
Speed	1 Gbit (800 Mbps in IP only mode)		
Type	Up to 16 x SPTS or 16 x MPTS		
SDP/SAP Support	Yes		

6. DIMENSIONS



*dimensions in mm

7. LEMCO LIMITED WARRANTY

This device is subject to Lemco Warranty Terms & Conditions that can be downloaded from Lemco's website www.lemco.gr

8. WARNINGS

Content warning

This document contains preliminary information about a product of Lemco company. Lemco reserves the right to make any changes or modifications at any time without prior notice.

9. NOTES

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