LEMCO
TV SOLUTIONS

Manual

v.1.1

DTV - Headend

MLF-201

4 x DVB-S/S2/S2X to IP

www.lemco.gr

Contents

1. IMPORTANT SAFETY PRECAUTIONS INFORMATION

READ THE FOLLOWING WARNINGS BEFORE YOU USE YOUR DEVICE

WARNING

The following safety precautions must be observed to prevent fire or electric shock hazard. Safety precautions include but are not restricted to the following:

Power supply / Mains cord

- Operate the unit only within the voltage range defined as appropriate by the manufacturer.
- Occasionally check the power connector and remove dirt or dust that may have accumulated.
- Use only the mains cord that comes with your unit.
- Do not operate the unit or plug in the mains cord if it is broken, split, or damaged in any way.
- Do not place the mains cord next to heating devices. Do not pull it, place heavy objects on it or damage it in any way. Keep it out of reach of children.
- Ensure that the device is plugged in a properly grounded socket. Insufficient grounding may cause electrocution.
- Always carefully disconnect all plugs by pulling on the plug and not on the cord. Make sure the unit's power switch is turned off before removing the cord from an outlet.
- Disconnect the mains cord when the unit is not in use for long periods of time or during storms.
- Do not connect the unit to a multiple-outlet to avoid plug overheating.

Disassembling

- This unit contains parts that cannot be repaired by the user. Do not disassemble or try to repair it as this will void all warranties. Please contact the manufacturer if you experience any problems with your unit.

Water/humidity

- Do not keep the unit in a humid place or near water.
- Do not plug/unplug the unit with wet hands.

Fire

- Never place a candle or another source of fire on the unit as it may fall and start a fire.if the mains cord or the power connector is damaged or destroyed, or if there is a sudden loss of picture during operation, or if you notice a strange smell or there is smoke, immediately switch the unit off, disconnect the mains cord and contact the manufacturer's technical support department.

Installation / Storage

- This unit contains high precision pieces of electronics. To ensure optimal performance and avoid damage, do not store it in any location where it may collect dirt, duct, lint, etc. Do not expose it to extreme heat or cold (e.g. in direct sunlight, near a heater or in the car during the day). Place the unit in a secure place to avoid falls.
- Before moving the unit, always unplug all cords first.
- When installing the unit, make sure that an outlet is within easy reach. In case of malfunction, switch the unit off and unplug the power cord. When the unit is not in use for a long period of time, make sure that the mains cord is disconnected.

Connectivity

- Before connecting the unit to other electronic devices, always switch off and unplug all devices.

Maintenance

- Do not spill liquids on the unit. Do not use any diluents or volatile liquid to clean the unit. Instead, use a soft slightly damp cloth and allow the unit to dry completely before using again.

Handling

- Do not poke your finger into the openings on your unit.
- Never put paper, metal parts or other objects into the openings of your unit. If you suspect that there are foreign parts in your unit, switch it off and unplug the mains cord. Contact the manufacturer's technical support department.
- Do not step on or place heavy objects on top of the unit. To avoid hardware damage, handle all buttons, connectors and switches gently.

2. INTRODUCTION

Congratulations on purchasing the MLF-201. You now own a high quality, professional DTV headend. To get the most out of your purchase, please take the time to carefully read through this manual.

3. INSTRUCTIONS

3.1 - DESCRIPTION

The MLF-201 is a very powerful, all-in-one device, able to receive up to four (4) independent satellite (DVB-S/S2/S2X) signals supporting multistream reception and convert them in IPTV streaming using UDP/RTP protocols multicast/unicast. Moreover, it supports "pool" technology, meaning that the user is able to select any program from any of the four (4) inputs and assign it to any of the four (4) IP outputs providing great flexibility.

The embedded web server of the MLF-201 provides a very friendly user interface as well as the ability of remote or local control of the device via LAN.

Its small size and its powerful features render the MLF-201 the ideal solution in cases we want to distribute FTA (Free-To-Air) coming from satellite (DVB-S/S2/S2X) sources to a CATV installation using IP technology.

3.2 - FEATURES

- 4 x independent multi-standard inputs DVB-S/S2/S2X
- Multi-stream support
- Gbit IP streaming (up to 64 x SPTS / 4 x MPTS)
- "Pool" technology
- Dual power supplies offering redundancy mode
- PID Filtering
- Local or remote control via webserver
- Very friendly user interface
- Wall or rack mount options
- Ultra-compact size
- 5year warranty

3.2.1 - Auto-reset functions and watchdog

During the normal operation of the MLF-201, 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 MLF-201 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

The MLF-201 supports "pool" technology, meaning that the user is able to select any TV or Radio program from any input and assign it to any of the 4 outputs providing great flexibility.

3.2.3- IP streaming

The MLF-201 is able to make IP streaming of all programs coming from the 4x RF inputs using UDP or RTP protocol in multicast/unicast IP addresses. The max. output bitrate can be up to 480 Mpbs.

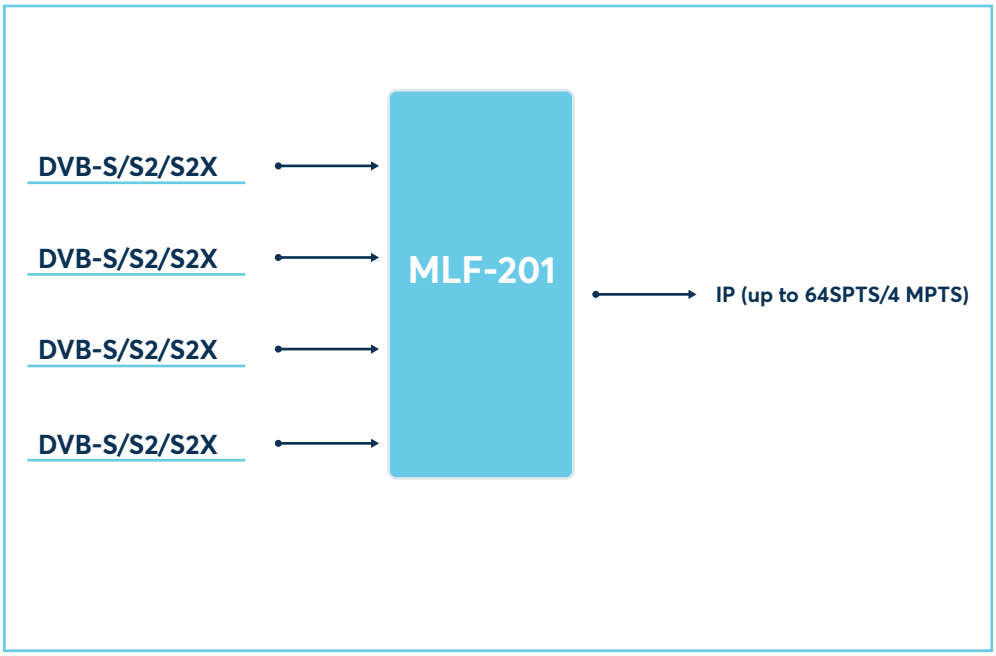
3.2.4 – Dual power supplies

The MLF-201 is powered from one or two external power supplies of +12VDC/2.5A. In case we connect two external power supplies then they will work in redundancy mode. Thus, in case of failure of one of the two external power supplies the device will continue working without stopping.

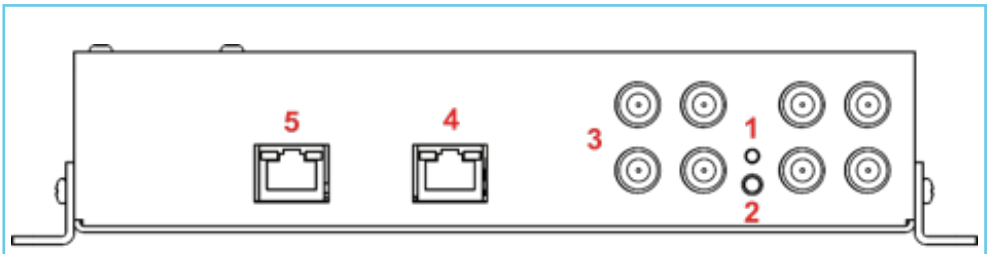
3.2.5 – Multi-stream SAT reception

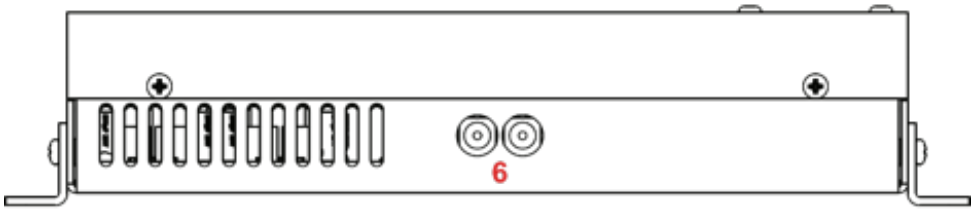
The MLF-201 is able to receive and analyze any kind of multi-stream satellite signal.

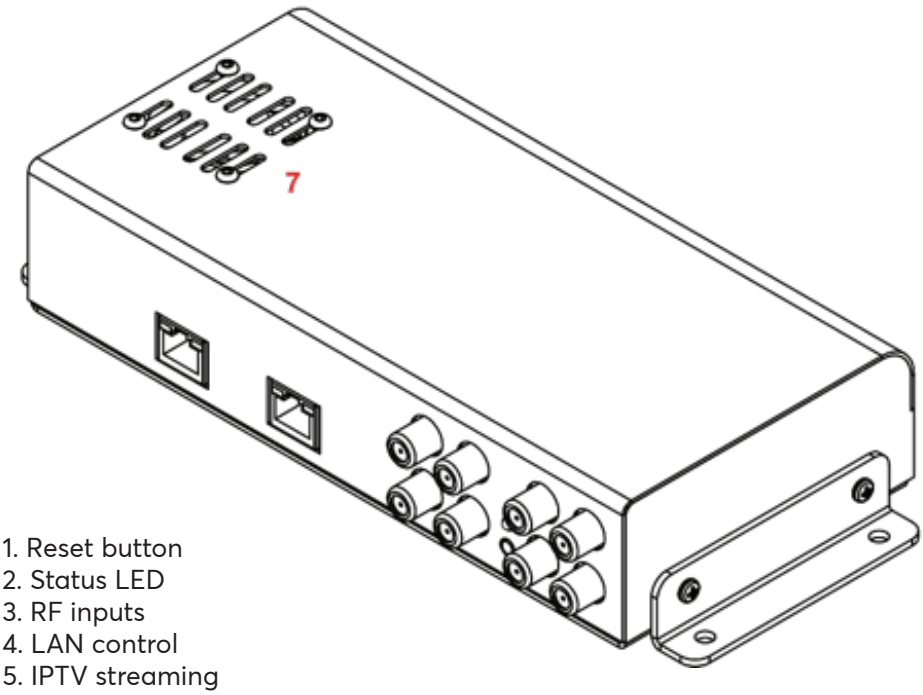
3.3 - BLOCK DIAGRAM



3.4 - Product drawing views







1. Reset button
2. Status LED
3. RF inputs
4. LAN control
5. IPTV streaming
6. Dual power supply inputs
7. Fan cooler

4. INSTALLATION

4.1 - General

The MLF-201 has a very friendly interface for programming and monitoring purposes. The user is able to gain access to the embedded webserver, by opening an Internet browser (e.g. Internet Explorer, Firefox or Chrome) and type the following static IP: 192.168.1.205.

The default username and password are the following:

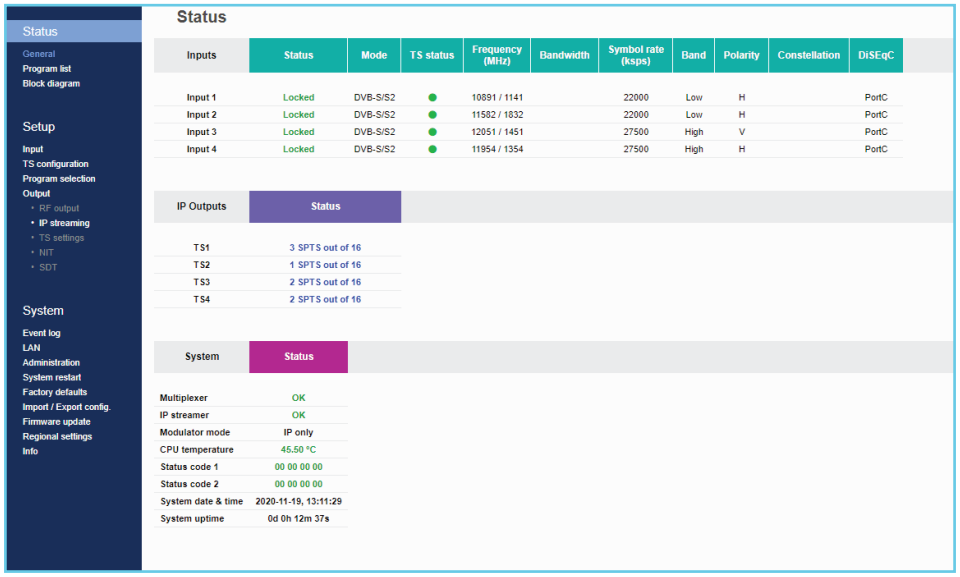
Username: admin
Password: 12345

4.2 - Embedded Webserver

Status

4.2.1 - "General" page

Every time that the user is connected to the device, the "General" page (Figure No 1) is loaded providing a current general status information of the device.



- Figure No 1

Status - Inputs 1...4

In these fields, the user is able to see the status of each tuner e.g. If it is locked / unlocked or disabled, the working mode eg. DVB-S/S2/S2X etc…

Outputs – IP

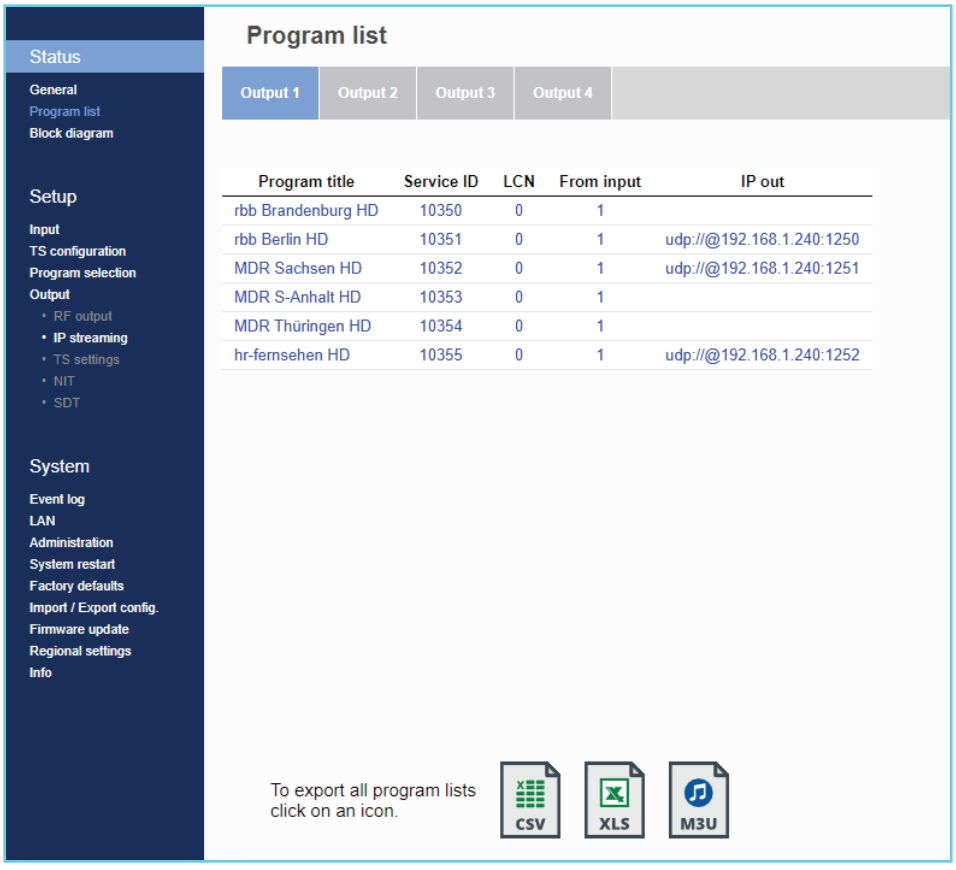
In these fields, the user is able to see the status of all the IP outputs of the device.

System

This section provides general information of the device, like internal status of all device's modules like Multiplexer and modulator, CPU temperature, system uptime and CI interface status as well as general status codes of the device for troubleshooting purposes.

4.2.2 - "Program list" page

At "Program list" page (Figure No 2) the MLF-201 provides information of all programs that are currently being distributed via its four IP outputs.



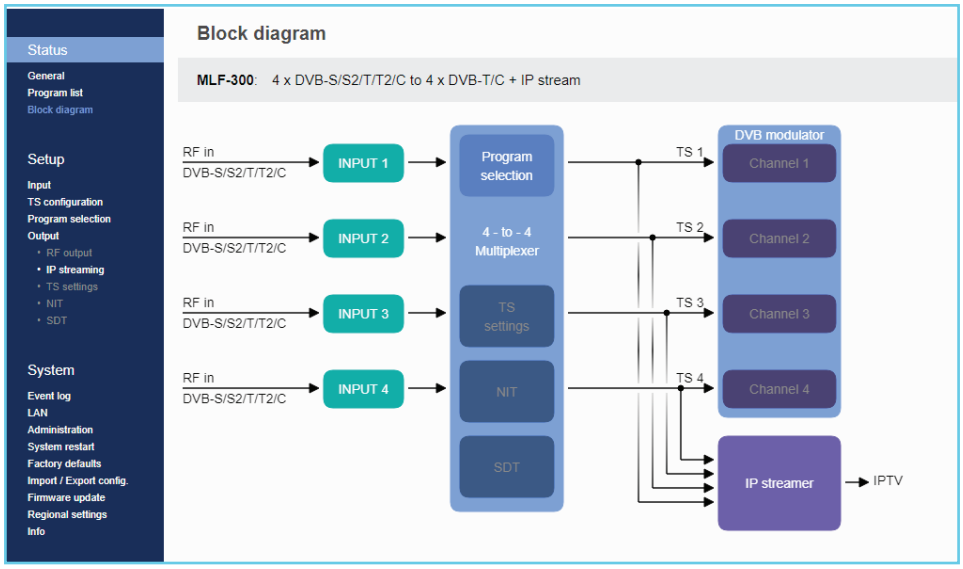
- Figure No 2

At the same time, the device offers the whole channel list to be exported under the follow file types:

- Excel – All the program list is exported in .xlsx format
- CSV – All the program list is exported in .csv format
- M3U – All the program list is exported in .m3u

4.2.3 - "Block diagram" page

The "Block diagram" page (Figure No 3) provides a general view of device's internal modules and architecture.



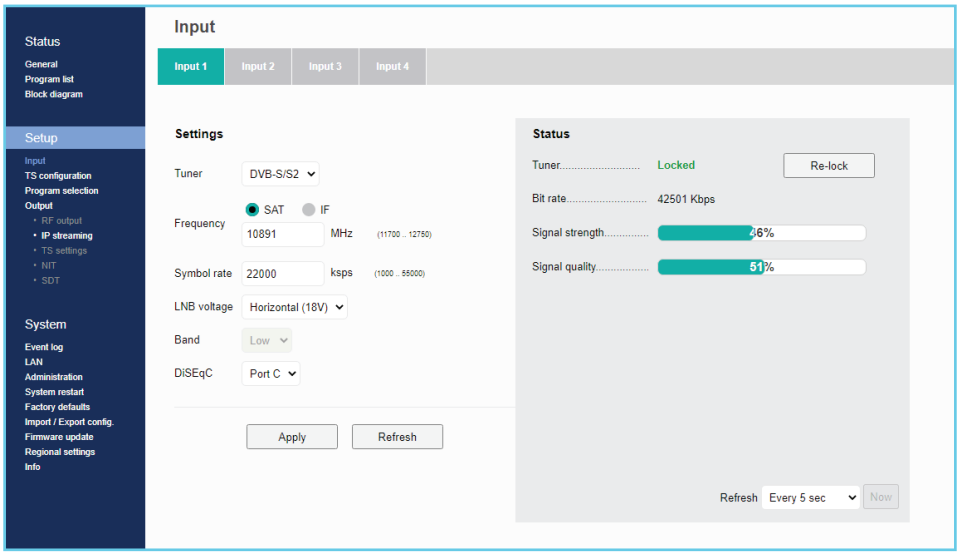
- Figure No 3

All icons are clickable providing the ability to the user to go directly to the setup page of all internal modules of the device. The grey icons mean that the current module is disabled.

Setup

4.2.4 - "Input" page

At the "Input" page (Figure No 4) the user is able to select the working mode for each input.



- Figure No 4

There are four tabs, one for each input. The user is able to select the working mode of each input as follows:

For Satellite signal reception the user must select DVB-S/S2/S2X mode:

1. Tuner Enabled/Disabled - Enable or disable the specific tuner
2. SAT or IF frequency – Select how to insert the SAT frequency
3. Symbol rate – Insert the symbol rate
4. LNB voltage – Select the LNB voltage (13V,18V, OFF)
5. Band – Select the appropriate SAT band (works only if IF frequency is selected as input method)
6. DiSEqC – Select DiSEqC A, B, C, D
7. PLS – Enter the PLS number of the stream

Multi-stream section

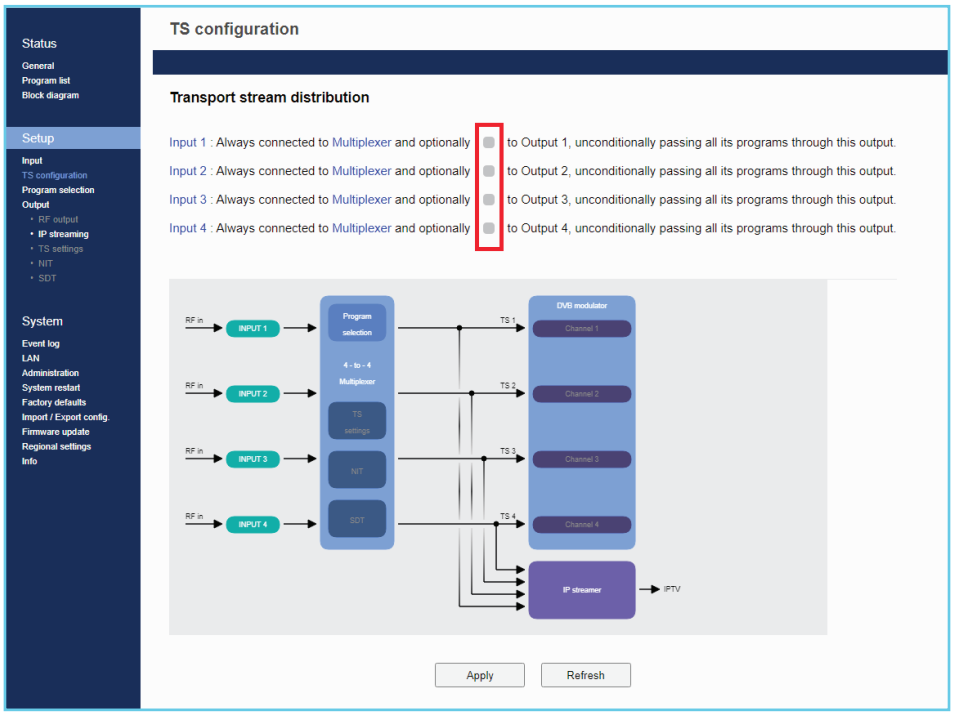
In case the tuner is lock to a satellite multi-stream transponder the first available stream will be chosen by default. The user is able to freely select which stream he wants to receive/ distribute from the Stream ID selection area. Moreover, in case PLS is needed the user is able to set the PLS from the available field.

Tuner status

For each input the MLF-201 provides several information such as tuner status (Locked/Unlocked), total bitrate, signal strength, quality etc.

4.2.5 - "TS configuration" page

At the "TS configuration" page (Figure No 5) the user is able to setup the by-pass mode of the device.



- Figure No 5

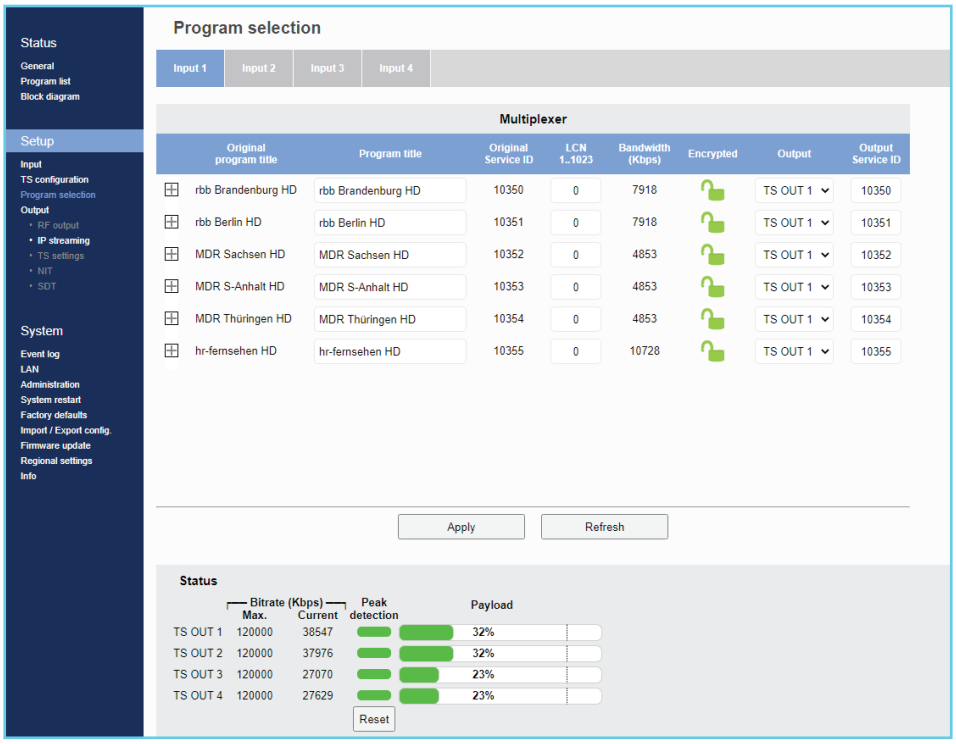
Bypass Mode

With the term "Bypass" we mean that the device is able to receive the transport stream (TS) from one input and send it to one output (modulator) without doing any kind of multiplexing. In this case, all PIDs or programs are not able to be changed and there are transfer transparently to one output.

The user is able to select if Input No 1,2,3 or No 4 wants to be send to Output No1,2,3 or No4 respectively using bypass mode by selecting the appropriate check box. (Figure No 5)

4.2.6 - "Program Selection" page

At the "Program Selection" page (Figure No 6) the user is able to select any program from any input and assign it to any output using the "pool" technology.



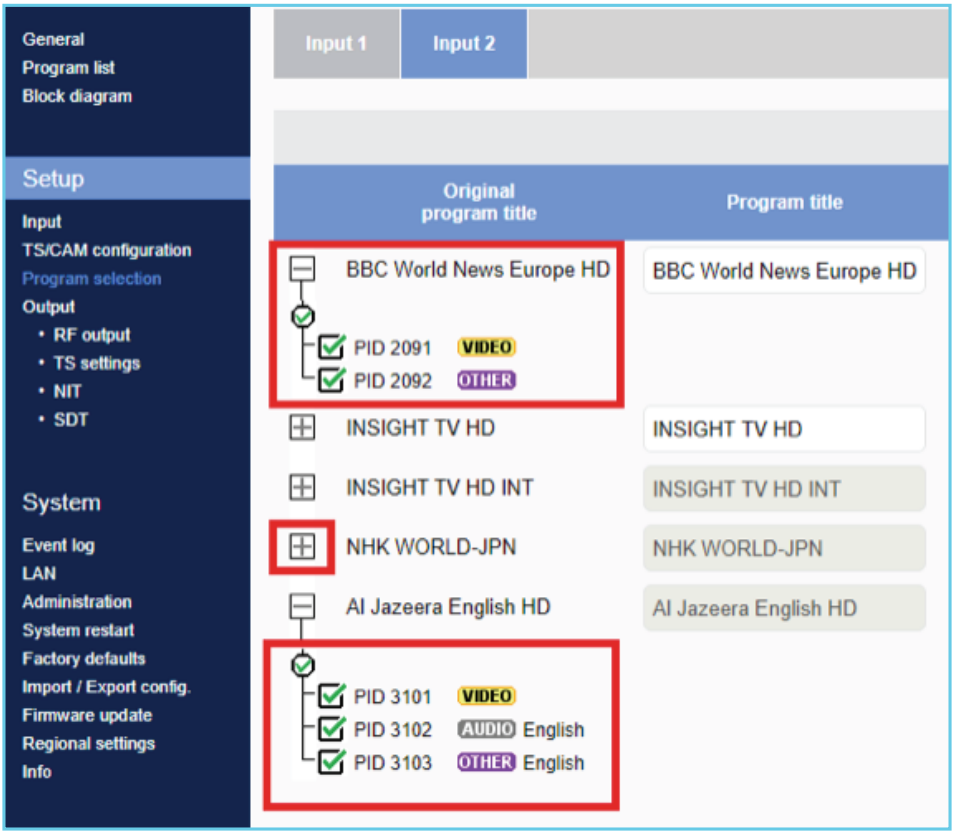
- Figure No 6

There are four (4) tabs, one for each input. Each tab depicts all the TV and Radio programs from the input that has being selected during the "Input page" processes.

When the user selects one input, the device's multiplexer does a real time analysis and depicts the program list from this specific input. For each program the MLF-201 provides the following information/options:

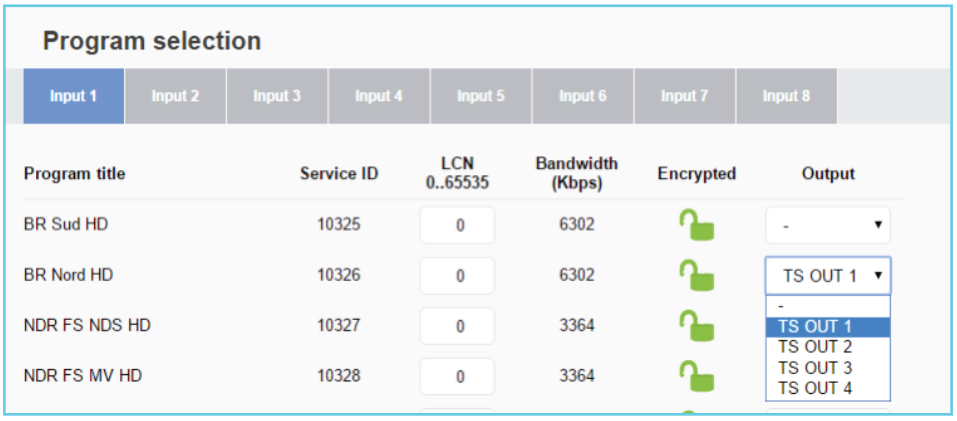
- Original Program Title – which is the name of the program
- Program Title – The ability to enter a custom name for this specific program
- Original Service ID – which is the original Service ID number of the program
- LCN No – which is the logic channel number of the program
- Bandwidth – which is the bitrate of the program in Kbps
- Encrypted – which depicts if the program is encrypted or not
- Output – To select in which the program must be assinged
- Output Service ID – The user is able to provide custom Service ID number

Each program title has a small cross at the left which can be expanded if the user will click on it. During this procedure, all the available PIDs of this specific program are reveled (Figure No 7). In this case, the user is able to select/deselect which PID want to be outputted.



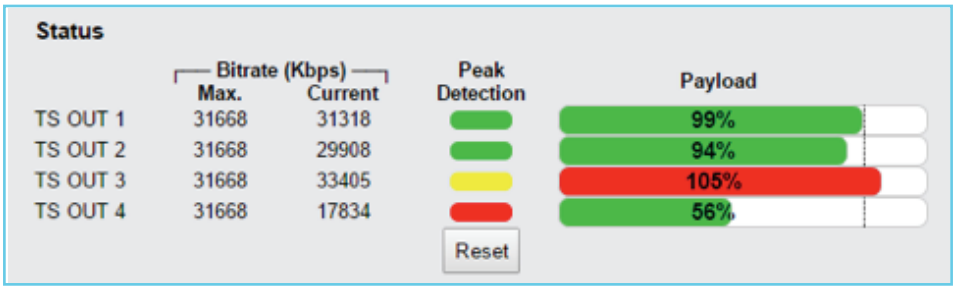
- Figure No 7

Using the Drop-down menu from "Output" column (Figure No 8) the user is able to assign any program to any of the four outputs. By doing the same process for each program, from all inputs the user is able to create his own 4 custom multiplex in the output



- Figure No 8

Caution!
The number of programs that the MLF-201 is able to distribute depends on the resolution (SD, HD, 4K etc.), the compression (MPEG2, H.264 etc…) and in general from the total bitrate of each program.



- Figure No 9

The status section in (Figure No 9) 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 bitrate are variable according to their specific content.

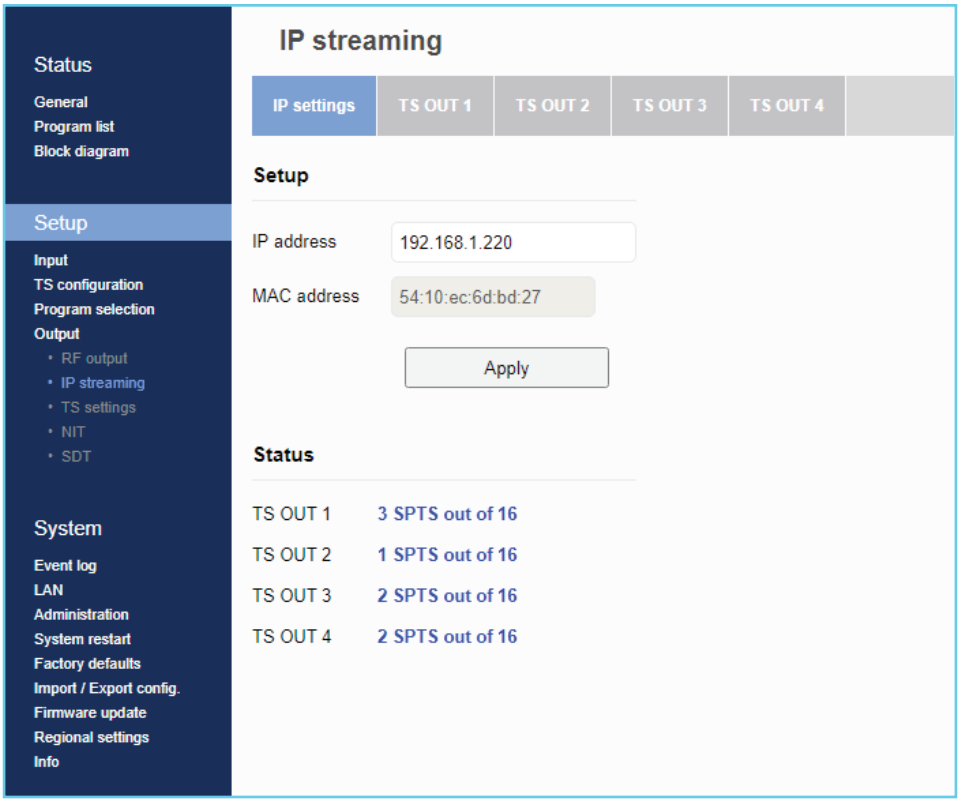
Peak Detection mechanism

As shown in Figure No 8 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

4.2.7 - "IP streaming" page

At "IP streaming" section the user is able to setup the IP streamer of the device (Figure No 10).

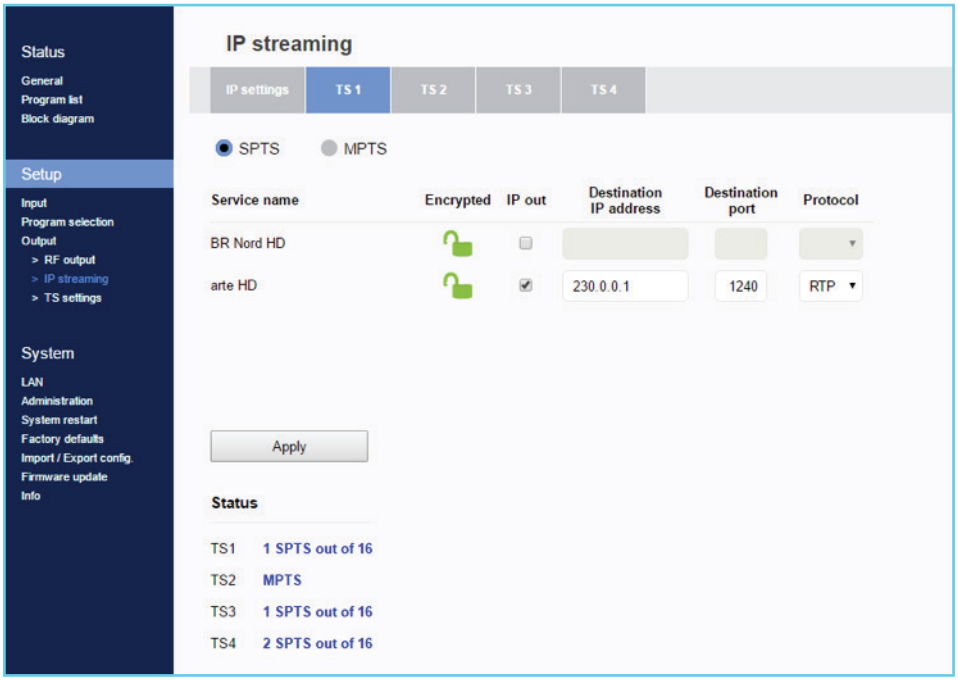


- Figure No 10

In Figure No 10 we have general settings of the IP streamer as follows:

- IP address: This is the IP address of the streamer for ping purposes.
- MAC address: This is the MAC address of the streamer

The Status section provides a general view of how many programs and in what format are currently being streamed from the device is its four outputs.



- Figure No 11

In order to setup the IP address for each program there are four tabs one for each IP output of the MLF-201.

By selecting e.g. the TS1 tab (Figure No 11) the user is able to setup the IP streamer for this specific output, following the steps below:

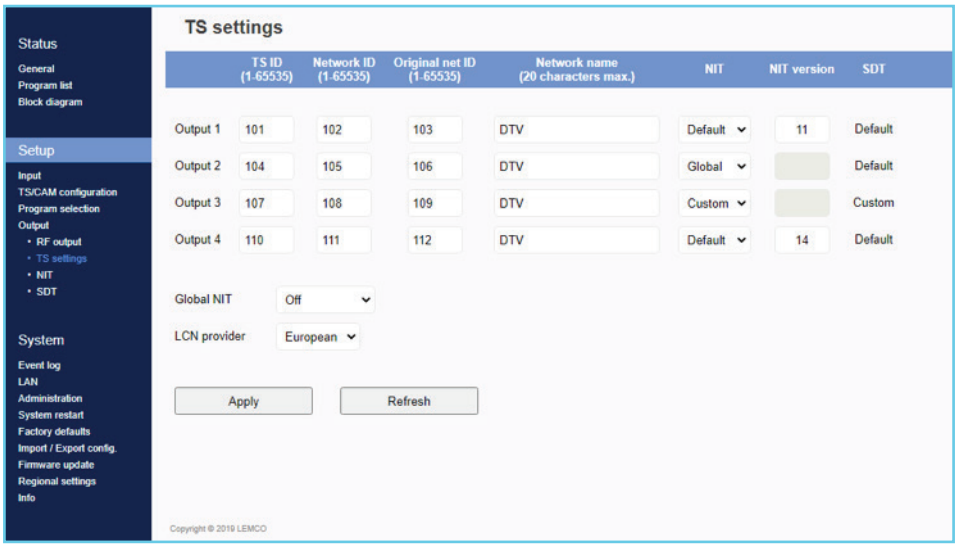
1st step: Select SPTS or MPTS streaming mode.
SPTS mode: Means that each program has its own IP
MPTS mode: Means that all the programs of the current output (e.g. TS1) will be streamed in a single IP.

2nd step: For each program (in SPTS mode) or for the whole TS (in MPTS mode) the user is able to assign a multicast IP address from 224.0.0.0 to 239.255.255.255 or a unicast IP address as well as its destination port and protocol (UDP or RTP).

By repeating the above procedure for all four outputs of the MLF-201, the user is able to setup the IP streamer of the device.

4.2.8 - "TS settings" page

At this section (Figure 12), the user is able to setup all the TS settings of the four multiplexes at device's output.



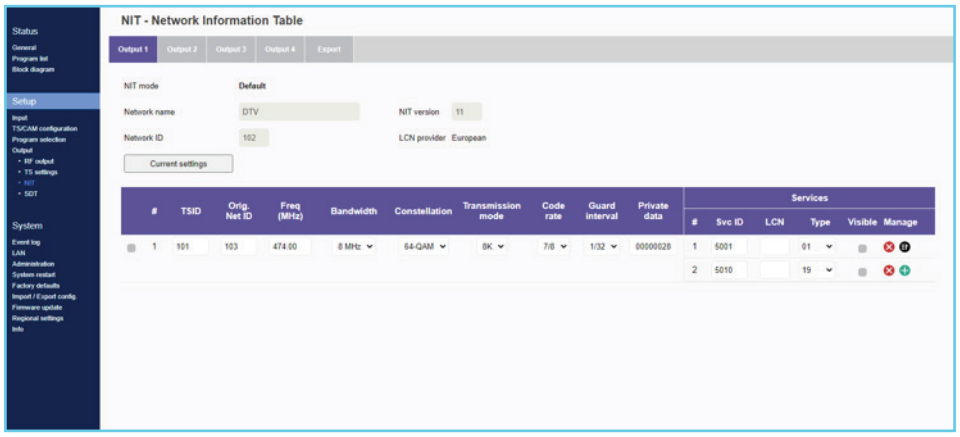
• Figure No 12

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

TS ID:	Which is the ID No of the specific multiplex (1…65535)
Net 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:	Select from Global, Default and Custom options
NIT version:	Select the NIT version
Global NIT	Select the input source of Global NIT. In this case NIT will be the same for all outputs.
LCN provider:	Choose the appropriate LCN provider (EACEM, ITC, Nordig, APN)

4.2.9 - "NIT" page

At this section (Figure 13), the user is able to create custom NIT table for each of the four outputs of the device. Moreover, this section offers the ability to export / import a NIT table.

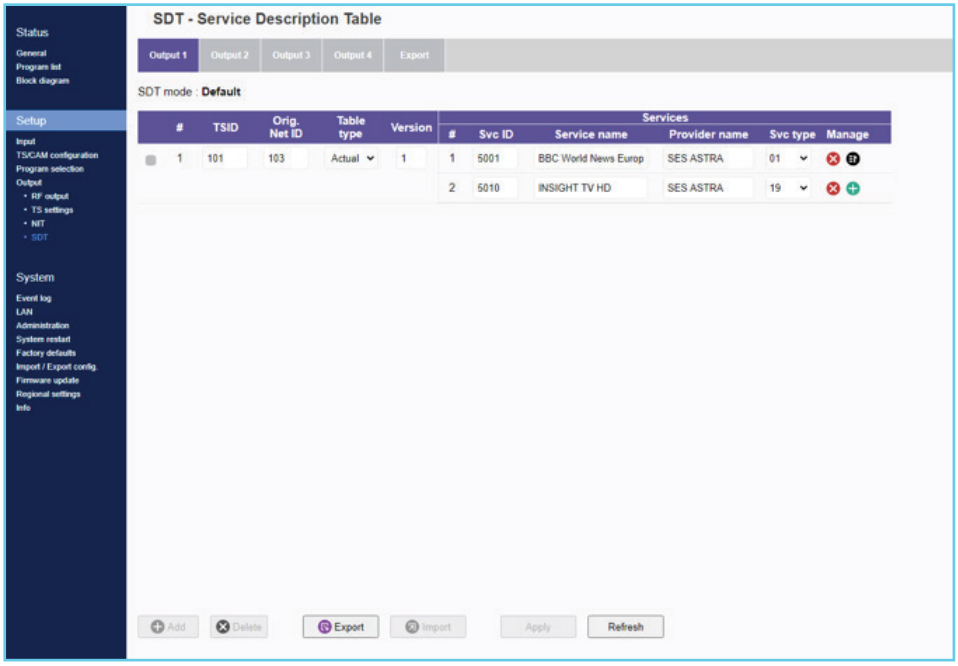


- Figure No 13

For more information on how to create a custom NIT table please refer to "Lemco NIT creation guidelines.pdf" document in Lemco's website.

4.2.10 - "SDT" page

At this section (Figure 14), the user is able to create custom SDT table for each of the four outputs of the device. Moreover, this section offers the ability to export / import a SDT table.



- Figure No 14

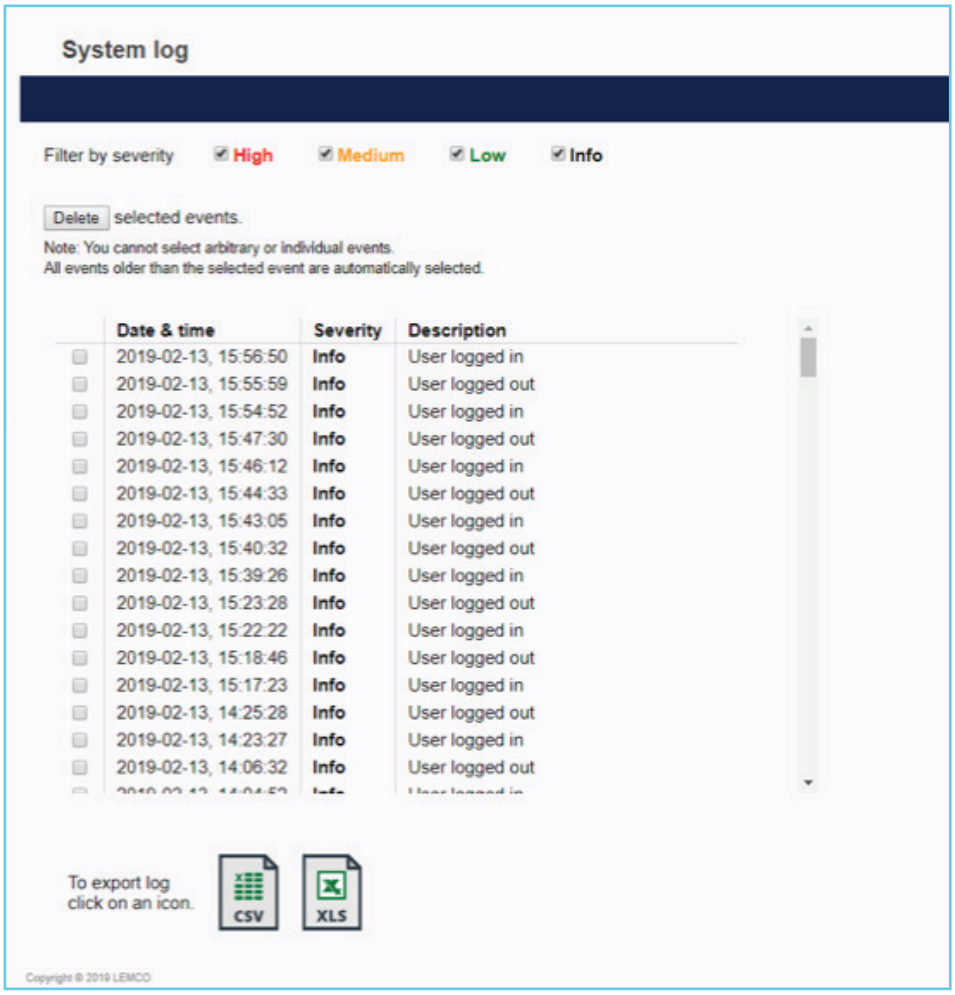
For more information on how to create a custom SDT table please refer to "Lemco SDT creation guidelines.pdf" document in Lemco's website.

System

4.2.11 - "Event log" page

At "Event log" page (Figure No 15) the system logs all the events occurs in the device during its operation. These logs are divided in three different categories based on their priority as follow:

- High – Using the red color the system logs the events which are of high priority.
- Medium – Using the orange color the system logs the events which are of medium priority.
- Low – Using the red color the system logs the events which are of low priority.



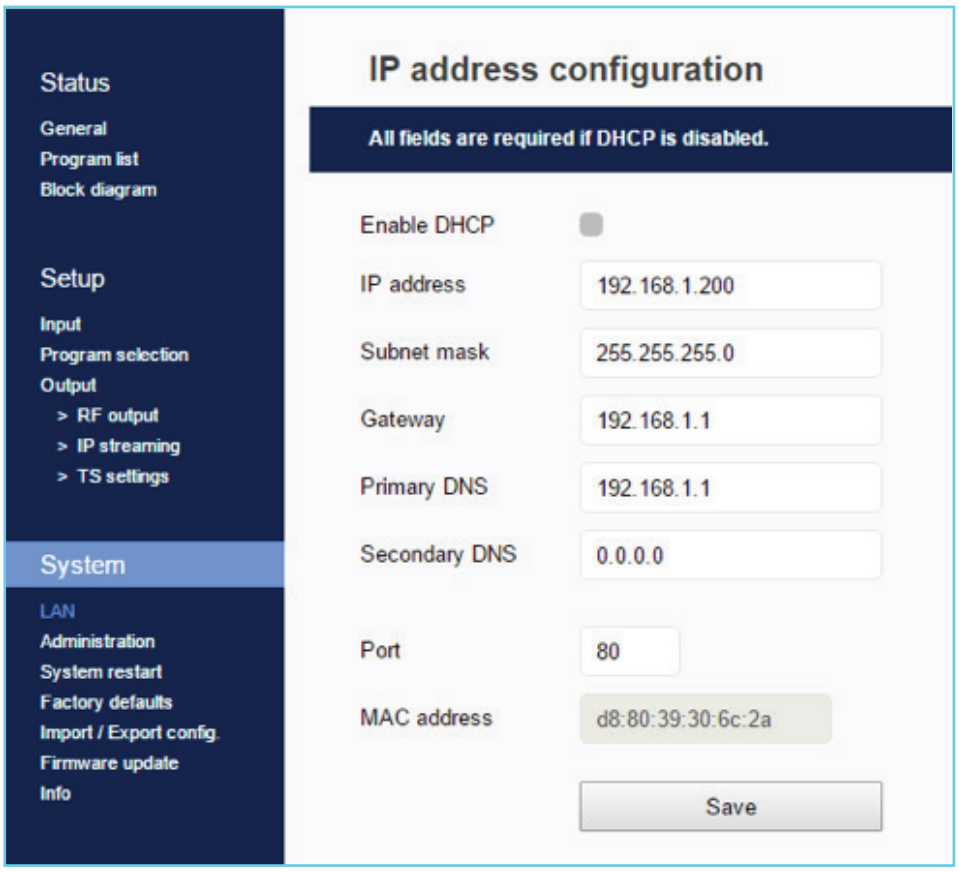
- Figure No 15

The user has the ability to select which kind of events to display as well as the device gives the opportunity to export these logs as follow:

- Excel – All the program list is exported in .xlsx format
- CSV – All the program list is exported in .csv format

4.2.12 - "LAN" page

At "LAN" page (Figure No 16) the user is able to setup all the parameters of the LAN control of the device as follows:

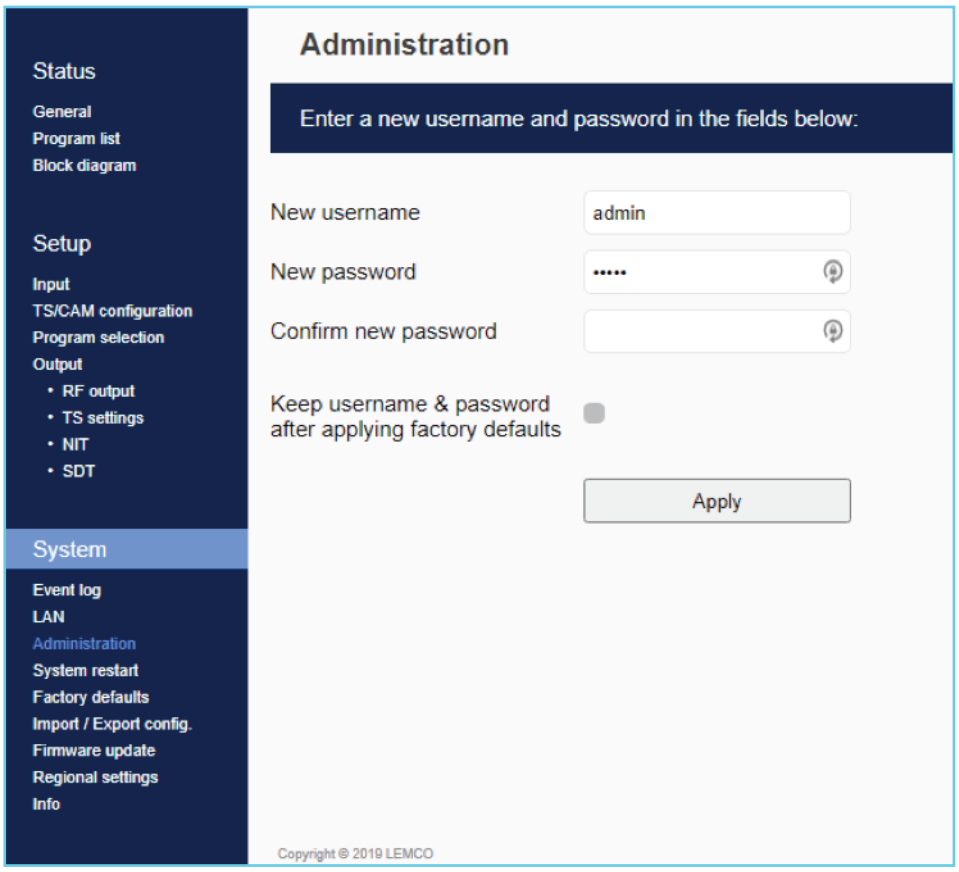


- Figure No 16

- 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

4.2.13 - "Administration" page

At "Administration" section (Figure No 17) the user is able to change the default password of the webserver.

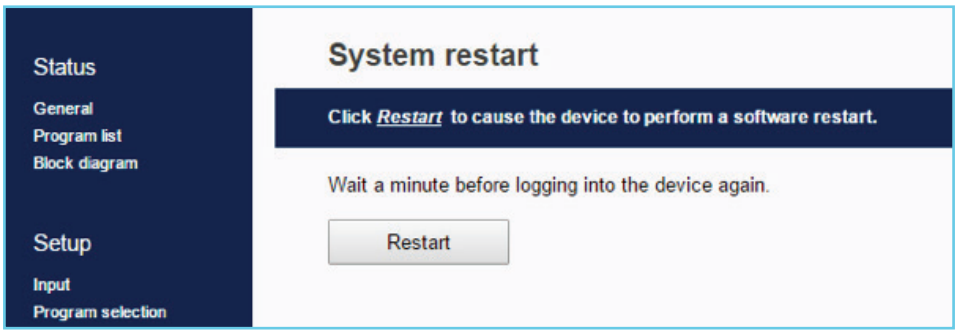


• Figure No 17

Caution!
• In case of factory default procedure, the username and password will be reset unless we select the check box "Keep username & password after applying factory defaults".

4.2.14 - "System restart" page

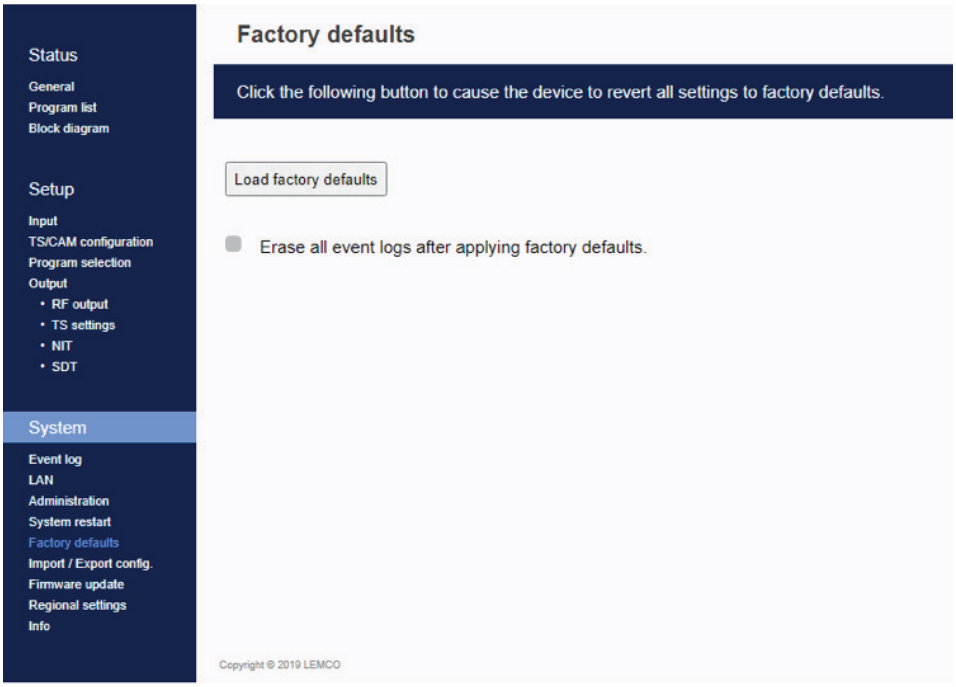
At "System restart" section (Figure No 18) the user is able to apply a full reset to the device.



- Figure No 18

4.2.15 - "Factory default" page

In "Factory default" section (Figure No 19) the user is able to apply a factory default reset to the device and select if the event logs should be deleted or not.

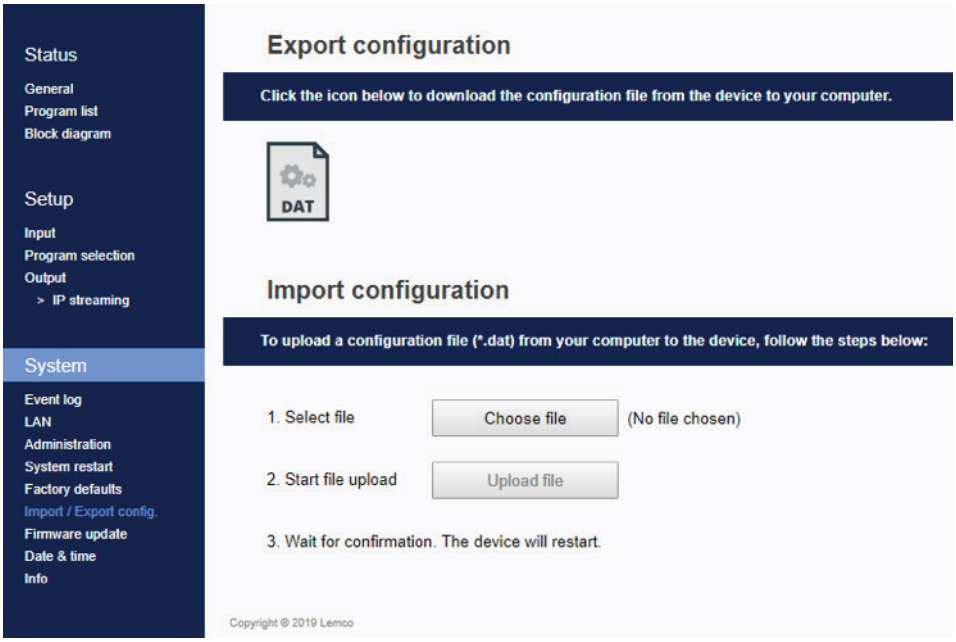


- Figure No 19

4.2.16 - "Import/Export Config" page

At "Import/Export Config" section (Figure No 20) the user is able to do the following:

- 1. Export: Save all the configuration is a specific file
- 2. Import: Upload a previously save configuration file.

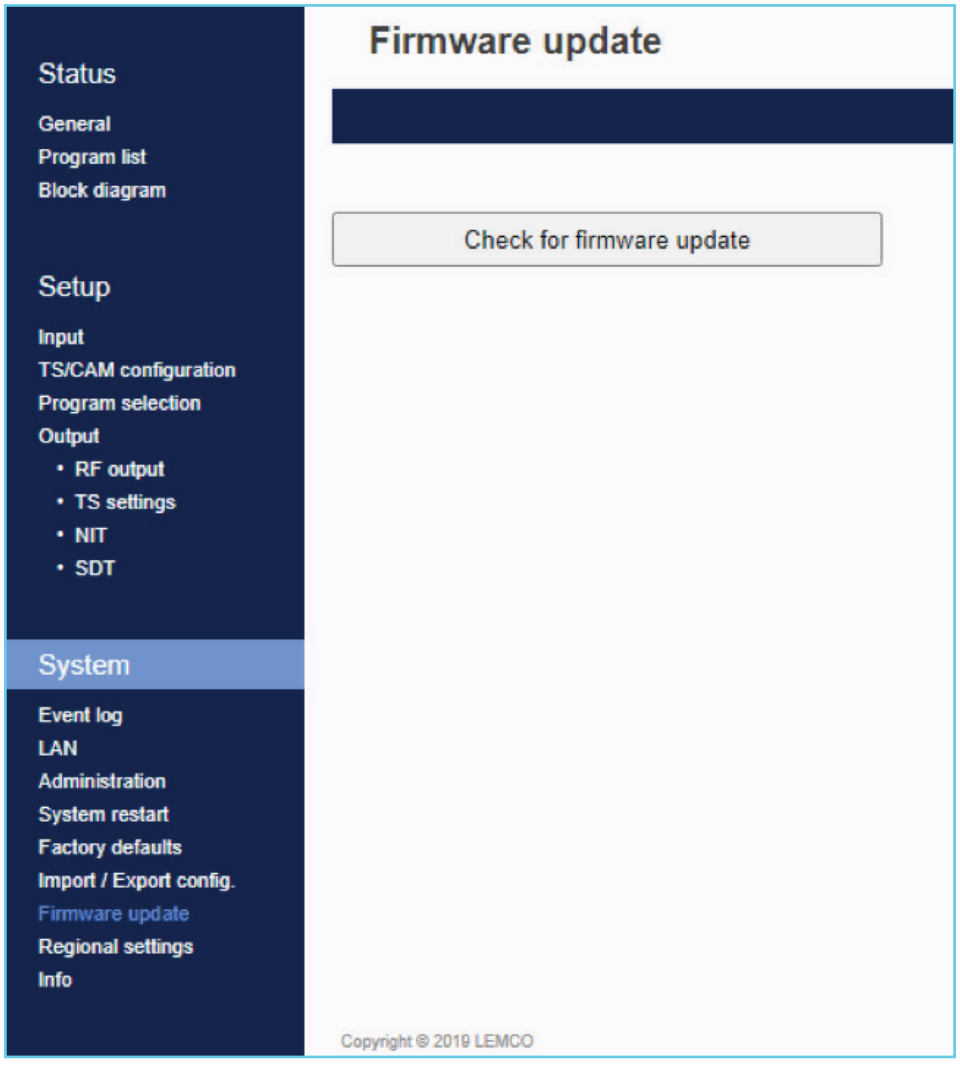


- Figure No 20

4.2.17 - "Firmware update" page

In "Firmware update" (Figure No 21) section the user is check if there is any new firmware for the device. In case of new firmware, the user is able to proceed with the firmware update procedure.

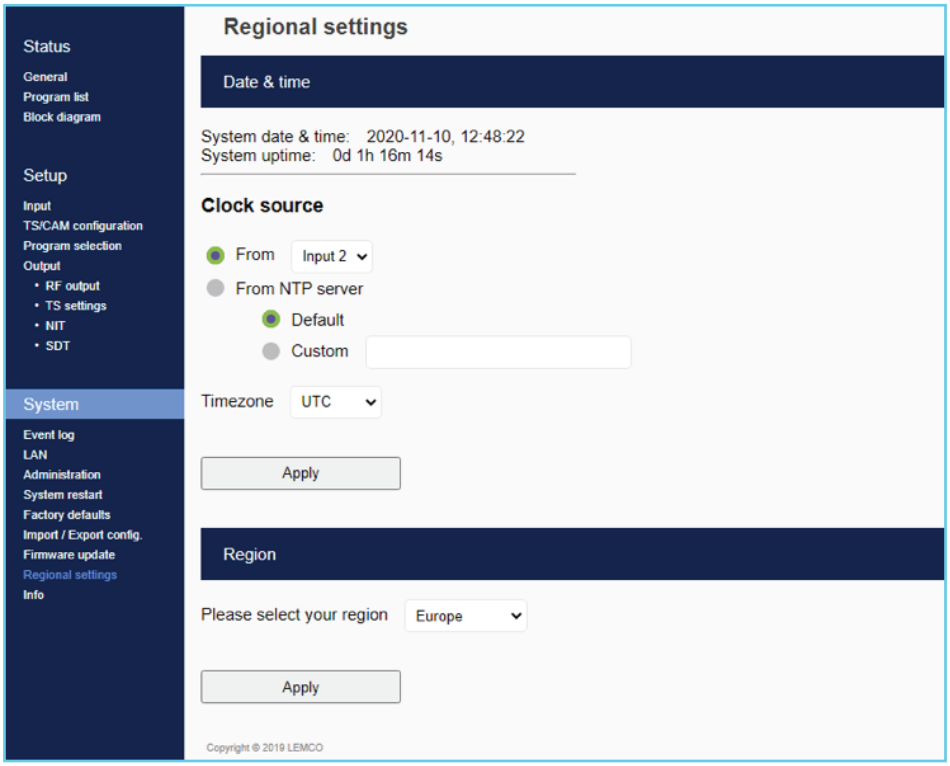
Caution!
For the above procedure a internet connection is mandatory.



• Figure No 21

4.2.18 - "Date & Time" page

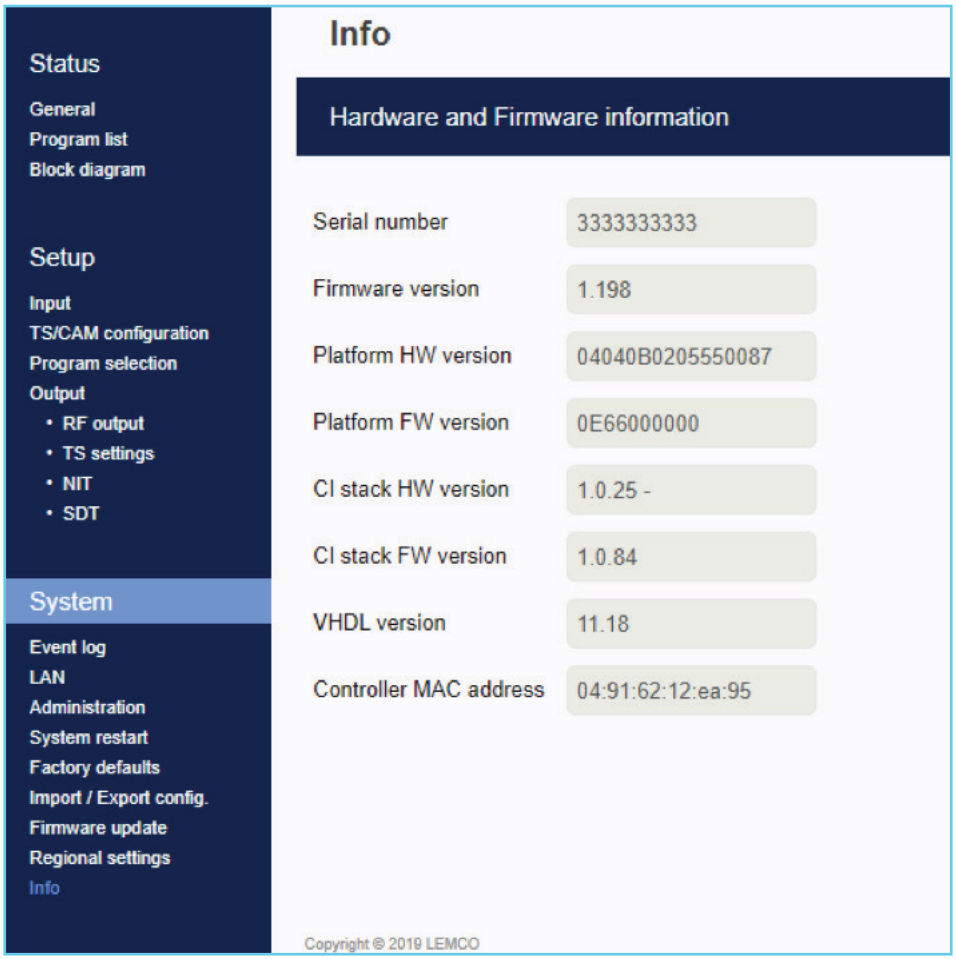
In "Regional settings" (Figure No 22) section the user is able to select the NTP server in order for the device to receive the date and time as well as to set the time zone of his country and his region.



- Figure No 22

4.2.19 - "Info" page

In "Info" (Figure No 23) section the user is able to see the serial No of the device as well as firmware and hardware versions.



- Figure No 23

5. TECHNICAL SPECIFICATIONS

Input Specifications

Input

Type	2 x DVB-S/S2/S2X
Frequencies	950…2150 MHz
Connector	75Ω - F, female

LNB

Voltage	OFF / 13V / 18V
Current	< 400mA
22 KHz signal	On / Off
-Voltage	0.65V ±0.35V
-Frequency	22 KHz ±4Hz
-DiSEqC	1.0 (Port A, B, C, D)

DVB-S

Standard	EN 300-421 V1.1.2
Symbol Rate	1 - 55 MBaud
Roll off factor	0.2, 0.25, 0.35
Code Rate	1/2, 2/3, 3/4, 5/6, 7/8 (automatic)
Spectral Inversion	Reverse, Non-reverse (automatic)

DVB-S2

Standard	EN 307-421 V1.2.1
Constellation	QPSK, 8PSK (automatic)
Symbol rate	1 - 55 MBaud (QPSK) 1 - 45 MBaud (8PSK)
Roll off factor	0.2, 0.25, 0.35 (automatic)
Code rate	1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 8/10 (QPSK- automatic) 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 (8PSK- automatic)
Spectral inversion	Reverse, Non-reverse (automatic)

DVB-S2X

Standard	EN302 307-1 V1.4.1
Constellation	QPSK, 8PSK (automatic)
Symbol rate	1 - 45 MBaud (QPSK) 1 - 30 MBaud (8PSK)
Roll off factor	Από 0.05 to 0.35 (automatic)
Code rate	1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 8/10 (QPSK- automatic) 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 (8PSK- automatic)

Output Specifications

Transport Stream Processing

Services	User selection by service names
Automatic Regeneration	PAT, CAT, SDT, PMTs, EITs tables
PCR	re-stamping
Bypass Mode:	Yes

IP Streaming

IP TS Out	Yes
Protocol	UDP / RTP (Multicast/Unicast)
Speed	1Gbit
IGMP support	Yes, v2, v3
Type	MPTS (up to 4 TS) SPTS (up to 64 programs)
Max. Bitrate	480Mbps max. (in IP only mode)

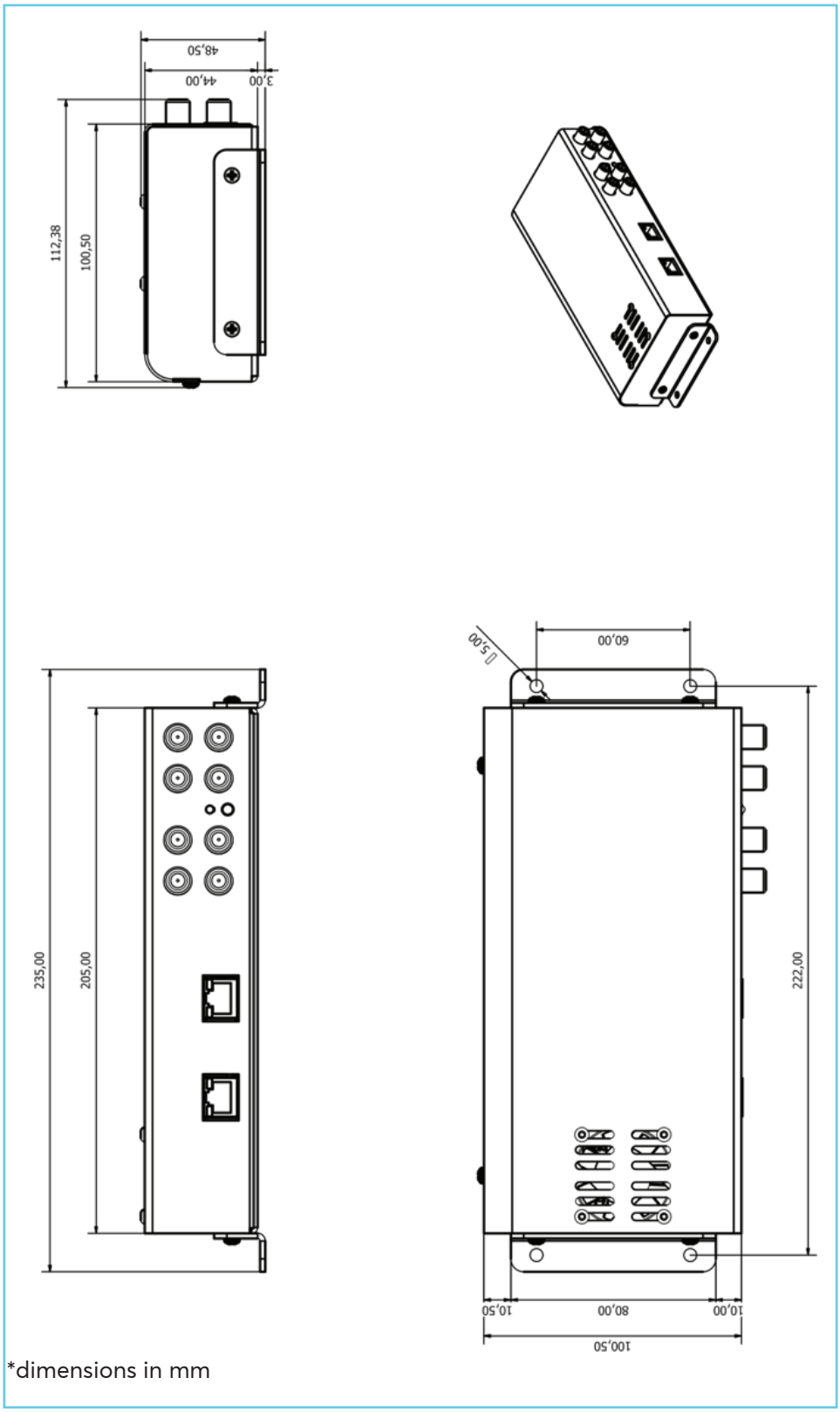
Programming Interface

Ethernet webserver	Yes, embedded webserver
Speed	10/100 Mbps
Connector	RJ45
Browser compatibility	Chrome, Firefox, Safari, Opera, Edge etc. (Must support HTML v5.0)

General

Power Supply	2 x +12VDC
Power supply consumption	1.8A max.
Operating Temperature	0 °C to 40 °C
Storage Temperature	-10 °C to +70 °C
Humidity	Up to 90%
Dimensions	235 x 115 x 48 mm
Weight	0.45 Kg

6. DIMENSIONS



*dimensions in mm

7. WARRANTY TERMS & CONDITIONS

Lemco provides warranty for its products under the following terms and conditions:

1. Products covered by Lemco warranty

Products covered by Lemco warranty policy are products solely produced by Lemco and labeled under the Lemco logo, as well as products sold by Lemco and labeled under the Lemco Addons logo. No third-party products or parts of products are covered by Lemco warranty policy. Lemco bears not responsibility for third party products sold along with Lemco products. Such third-party products are covered by the warranty policy of their manufacturer. Lemco warranty does not cover any accessories and/or consumables that come along with its products (i.e. cables, batteries, remote controls etc.).

2. Liability

Lemco accepts no liability whatsoever for loss of profit, loss of associated product, loss of goodwill or other costs arising from any malfunction of the product in question before and after repairs are completed to return the product to normal operation.

3. Clauses

Equipment repaired under warranty shall be warranted to the end of the original warranty period - including any parts replaced.

4. State of the products

Warranty covers defective products. Defective products are products unfit for proper use due to a defect existing already at the time of their purchase. Any defect attributable to normal wear and tear or improper use by the customer does not constitute the merchandise defective and is not covered by the conditions of defective merchandize warranty.
It rests in Lemco's absolute discretion to determine whether the defect of the product is attributable to a misuse by the customer or is attributable to a defect existing already at the time of purchase.

5. Warranty does not cover any problem resulting from:

a. Mechanical or electric damages resulting from incorrect installation, configuration, usage or other activities inconsistent with the operation manual or contradictory to technical specifications attached to the device;
b. Damages caused by acts of God, floods, fires, lighting, electrostatic discharge, heat, humidity beyond product specifications, accident, abuse, neglect or other natural disasters, wars, unexpected events, inappropriate voltage, defective supply materials or other external factors;
c. The device that has been tempered with by the Warranty beneficiary or any other person in any way, including reconfiguration, repair, willful constructional variations, modifications and adjustments;
d. The device with serial numbers and/or the Guarantor seals damaged or illegible;
e. The activities specified in the operation manual, which remain the sole responsibility of the Customer in his own capacity and at his own expense;
f. Defects resulting from the usage of improper or non-genuine supply materials;
g. Damages due to the user's fault or lack of knowledge;
h. Defective functioning of the device caused by a conflict or incompatibility between software applications installed on the damaged device or on the equipment, which the device permanently cooperates with in accordance with the intended purpose of the device

6. Duration of the warranty

Lemco warranties for its products labeled under the "Lemco" logo for a period of five (5) years after their purchase. Lemco warranties for its products labeled under the "Lemco Addons" logo for a period of two (2) years after their purchase.
For the whole duration of the warranty period, and provided the product meets warranty requirements under paragraph No4 above, Lemco is obliged to repair or exchange the product at no cost to customer.

7. Warranty Claims

Claims under warranty must be reported and returned to Lemco within 30 days from the date of detection and need to specify at least the following information via the RMA procedure that can be found at www.lemco.gr (additional information may be requested):

- Details of the defective Products; and for System warranty also details of other used components.
- Installation date, invoice date.
- Detailed problem description, number and %, date and code of defects.
- Equipment operating hours.
- Photos (and videos if possible) of defective product.

Lemco does not bear any responsibility for the transportation of the products to its premises and/or back to customer's premises. Customer shall be solely responsible to ensure a safe transportation of its products at Lemco's premises.
After the product is received, Lemco Service Department will examine whether the product is covered by warranty and will notify customer respectively. Lemco undertakes all best-efforts obligation to inform customer within twenty-four [24] hours after the product has been delivered to Lemco.
If the product is covered by warranty, Lemco will repair or replace it and send it back to customer within 15 working days from receiving the product (depending on product's overall condition) at no repair costs to customer.
Lemco can charge Client for returned Products that are not found to be defective or non-conforming, in addition to shipping- test-, and handling costs associated therewith.

8. Competent Courts – Jurisdiction

The present warranty terms are construed in accordance to Greek law and the Courts of Athens shall have exclusive jurisdiction for any dispute arising out of or in connection with the present warranty terms.
Lemco reserves the right to refuse to provide any Warranty services if it would result in a breach of applicable laws.

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

Address: Latheas 46, 13678, Acharnes, Greece
Tel: +30 210 2811401, +30 210 2405237 - Fax: +30 210 2825755
Email: info@lemco.gr - Website: www.lemco.gr

Follow us: facebook.com/Lemco twitter.com/lemco linkedin.com/company/lemco