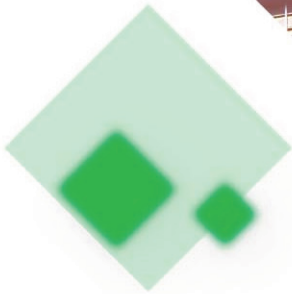


# Operation Manual

v1.0



micro  
line

MLF-300

4 x DVB-S/S2/T/T2/C to 4 x DVB-T/C + IP





## 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, dust, 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. INTRO

---

Congratulations on purchasing the MLF-300. 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-300 is a very powerful, all-in-one device, able to receive up to 4 independent satellite (DVB-S/S2), terrestrial (DVB-T/T2) or cable (DVB-C) signals and convert them in 4 x DVB-T/C RF output channels or in IPTV streaming using UDP/RTP protocols multicast/unicast. It supports "pool" technology, meaning that the user is able to select any program from any of the 4 inputs and assign it to any of the 4 RF or IP outputs providing great flexibility.

The embedded web server of the MLF-300 provides a very friendly user interface as well as the ability of remote or local control of the device via Ethernet.

Its small size and its powerful features renders the MLF-300 the ideal solution in cases we want to distribute FTA (Free-To-Air) TV programs coming from satellite (DVB-S/S2), terrestrial (DVB-T/T2) or cable (DVB-C) sources to a CATV installation using the DVB-T/C or IP technology.

### 3.2 - Features

- ▶ 4 x independent multi-standard inputs DVB-S/S2/T/T2/C
- ▶ 4 x RF output DVB-T/C (software selectable)
- ▶ Gbit IP streaming (up to 64 x SPTS / 4 x MPTS)
- ▶ "Pool" technology
- ▶ MER value > 42dB
- ▶ Dual power supplies offering redundancy mode
- ▶ PID Filtering
- ▶ Custom NIT/SDT
- ▶ Local or remote control via webserver
- ▶ Very friendly user interface
- ▶ Wall or rack mount options
- ▶ SNMP v2
- ▶ Ultra-compact size
- ▶ 5year warranty

#### 3.2.1 - Auto-reset functions and watchdog

During the normal operation of the MLF-300, 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-300 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-300 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 - DVB-T or DVB-C compliant

The user is able to software select the modulation standard, between DVB-T and DVB-C, of the MLF-300 without the need of any firmware upgrade.

### 3.2.4 - IP streaming

The MLF-300 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 Mbps.

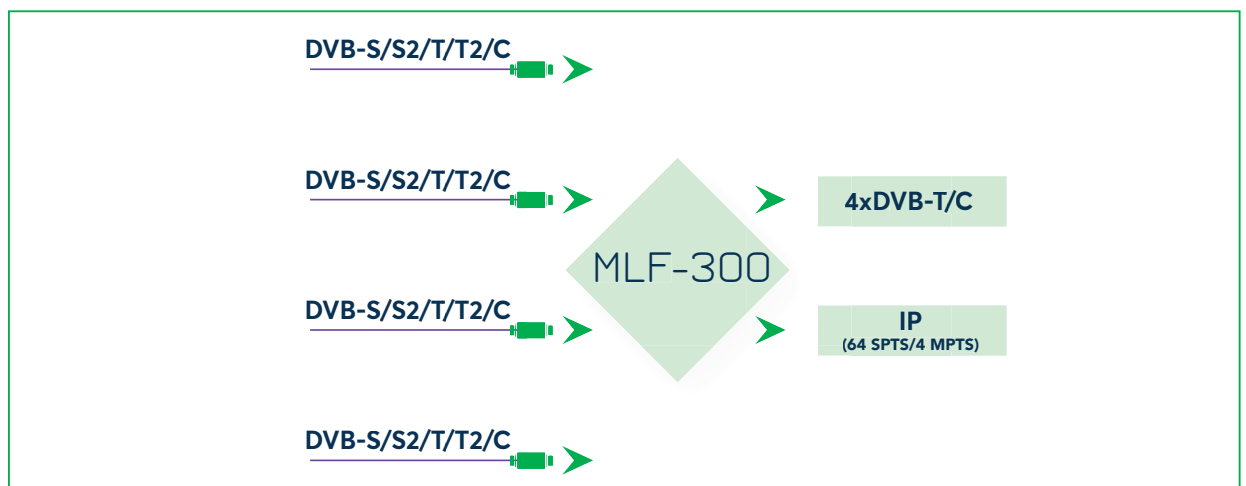
### 3.2.5 - Custom NIT/SDT

Using the MLF-300 the user is able to create custom NIT and SDT tables according to his needs.

### 3.2.6 - Dual power supplies

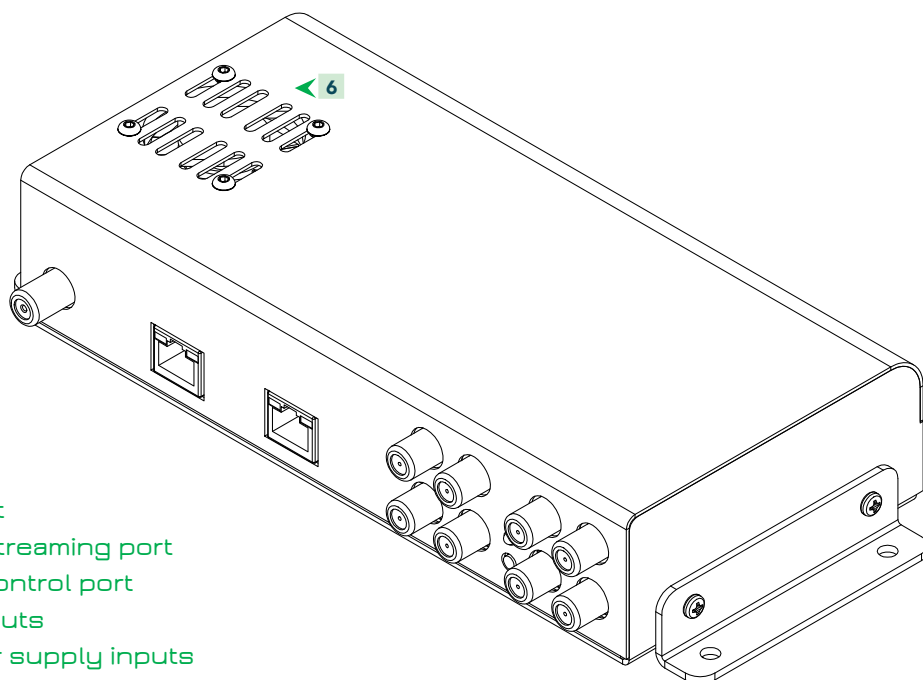
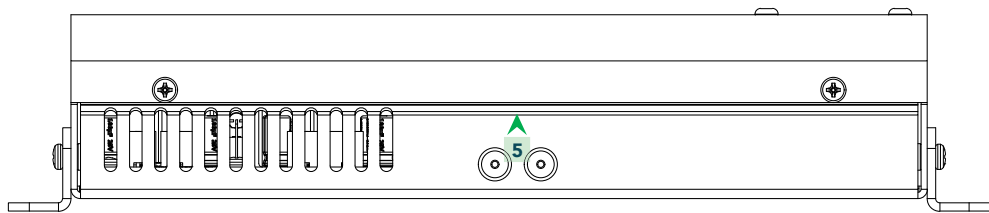
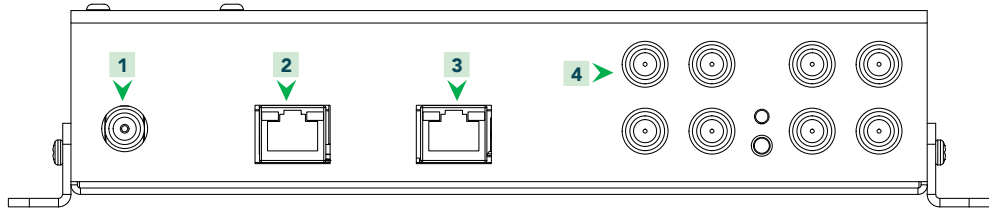
The MLF-300 is powered from one or two external power supplies of +12VDC/2.5A. In case we connect two external power supplies then they will work in redundancy mode. Thus, in case of failure of one of the two external power supplies the device will continue working without stopping.

## 3.3 - Block Diagram





### 3.4 - Product drawing views



- 1. RF out
- 2. IPTV streaming port
- 3. LAN control port
- 4. RF inputs
- 5. Power supply inputs
- 6. Fan cooler



## 4. INSTALLATION

### 4.1 - General

The MLF-300 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.

The screenshot shows the MLF-300 web interface. The top right corner displays 'MLF-300' and a language dropdown set to 'EN'. The left sidebar contains navigation options: Status, General, Program list, Block diagram, Setup, Input, Program selection, Output, RF output, TS settings, NIT, SDT, System, Event log, LAN, Administration, System restart, Factory defaults, Import / Export config, Firmware update, Date & time, and Info.

The main content area is titled 'Status' and contains two tables:

Inputs	Status	Mode	TS status	Frequency (MHz)	Bandwidth	Symbol rate (kaps)	Band	Polarity	Constellation	DISEqC
Input 1	Locked	DVB-S/S2	●	10744 / 0994		22000	Low	H		PortA
Input 2	Locked	DVB-S/S2	●	12480 / 1880		27500	High	V		PortA
Input 3	Locked	DVB-S/S2	●	12303 / 1703		27500	High	V		PortB
Input 4	Locked	DVB-T/T2	●	474.00	8 MHz					

Outputs	Status	Frequency (MHz)	Constellation	Code rate	Guard interval	Channel bandwidth	Modulation
Output 1	Running	474.00	64-QAM	7/8	1/32	8 MHz	8K
Output 2	Running	482.00	64-QAM	7/8	1/32	8 MHz	8K
Output 3	Running	490.00	64-QAM	7/8	1/32	8 MHz	8K
Output 4	Running	498.00	Error	Error	1/32	8 MHz	4K

Below the tables is a 'System' section with a 'Status' header:

- Multiplexer: OK
- Modulator mode: DVB-T
- CPU temperature: 32.5 °C
- Status code 1: 00000000
- Status code 2: 00000000
- System date & time: 2019-10-03, 07:57:08
- System uptime: 0d 20h 43m 17s

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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, DVB-T/T2 or DVB-C etc.



### Outputs – Modulator 1...4

In these fields, the user is able to see the status of all the RF outputs of the device such as modulator's state, RF output frequencies and modulation settings.

### System

This section provides general information of the device, like internal status of all device's modules, CPU temperature and fan state as well as error codes for troubleshooting purposes.

### 4.2.2 - "Program list" page

In "Program list" page (Figure No 2) the MLF-300 provides information of all programs that are currently being distributed via its four RF and IP outputs.

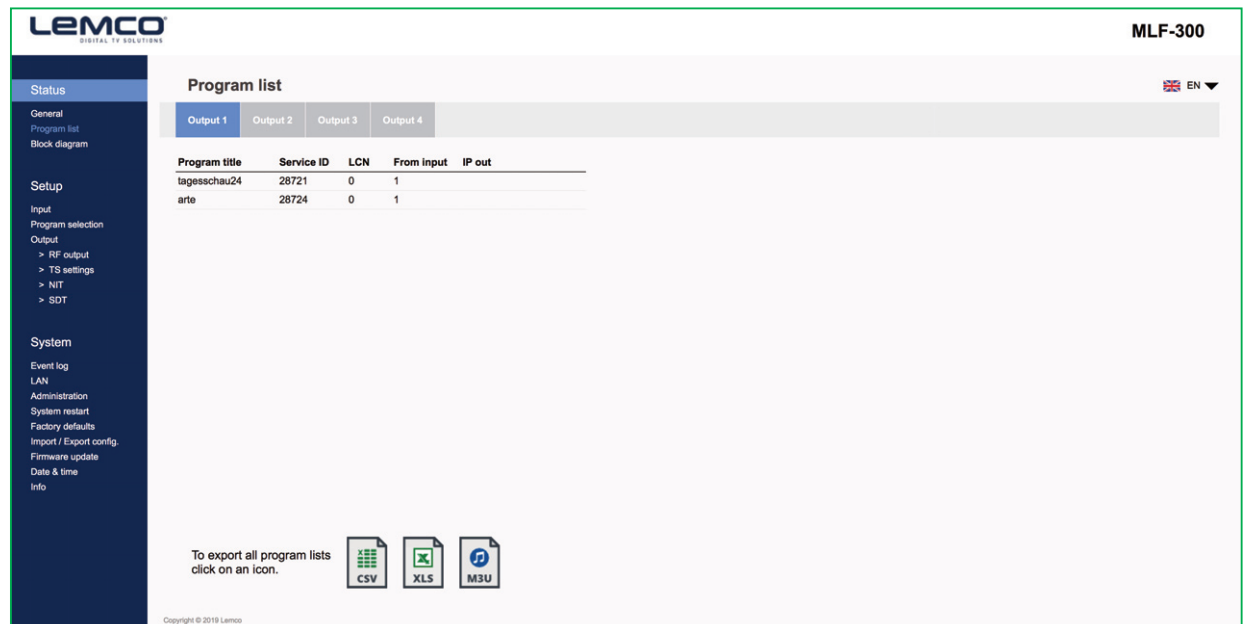


Figure No 2

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.

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.



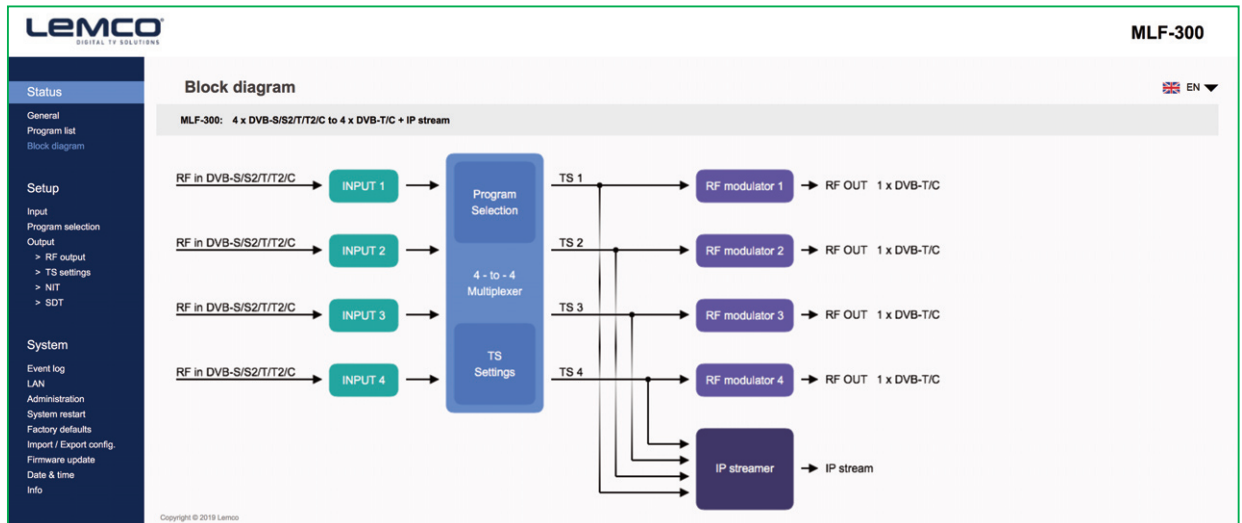


Figure No3

### Setup

#### 4.2.4 - "Input" page

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

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

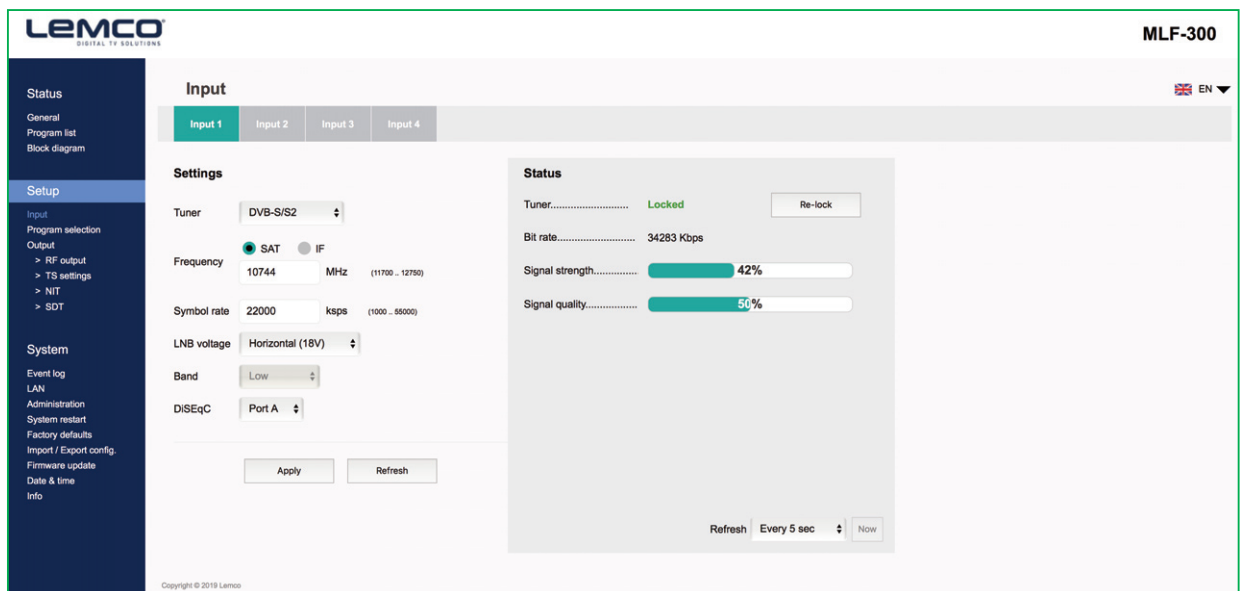


Figure No 4

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



For Terrestrial signal reception the user must select DVB-T/T2 mode:

1. Tuner Enabled/Disabled - Enable or disable the specific tuner
2. Frequency - Insert the input frequency or
3. Channel - Instead of frequency your can add the channel number
4. Bandwidth - Insert the input channel bandwidth

For DVB-C mode:

1. Tuner Enabled/Disabled - Enable or disable the specific tuner
2. Frequency - Insert the input frequency
3. Symbol rate - Insert the symbol rate
4. Constellation - Insert constellation

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

### Tuner status

For each input the MLF-300 provides several information such as tuner status (Locked/Unlocked), total bitrate, signal strength, quality etc.

### 4.2.5 - "Program Selection" page

In the "Program Selection" page (Figure No 5) the user is able to select any program from any input and assign it to any output using the "pool" technology.

**LEMCO** MLF-300

Program selection

Input 1	Input 2	Input 3	Input 4				
Original program title	Program title	Original Service ID	LCN 1..1023	Bandwidth (Kbps)	Encrypted	Output	Output Service ID
tagesschau24	tagesschau24	28721	0	7163		TS OUT 1	28721
ONE	ONE	28722	0	7873		-	0
arte	arte	28724	0	8380		TS OUT 1	28724
PHOENIX	PHOENIX	28725	0	3987		TS OUT 2	28725
Test-R	Test-R	28726	0	3480		-	0

Apply Refresh

**Status**

	Bitrate (Kbps)		Peak detection	Payload
	Max	Current		
TS OUT 1	31688	12049		38%
TS OUT 2	31688	8921		28%
TS OUT 3	31688	5730		18%
TS OUT 4	31688	10104		32%

Reset Refresh Every 5 sec Now

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Figure No 5



There are 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-300 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 assigned
- ▣▣ 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 revealed (Figure No 6). In this case, the user is able to select/deselect which PID want to be outputted.

**Program selection**

Original program title	Program title	Original Service ID	LCN 1..1023	Bandwidth (Kbps)	Encrypted	Output	Output Service ID
tagesschau24	tagesschau24	28721	0	7163		TS OUT 1	28721
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> PID 101 VIDEO</li> <li><input checked="" type="checkbox"/> PID 102 AUDIO German</li> <li><input checked="" type="checkbox"/> PID 104 OTHER</li> <li><input checked="" type="checkbox"/> PID 170 OTHER</li> <li><input checked="" type="checkbox"/> PID 176 OTHER</li> <li><input checked="" type="checkbox"/> PID 2171 OTHER</li> </ul>							
ONE	ONE	28722	0	7873		-	0
arte	arte	28724	0	8380		TS OUT 1	28724
PHOENIX	PHOENIX	28725	0	3987		TS OUT 2	28725
Test-R	Test-R	28726	0	3480		-	0

Apply Refresh

**Status**

	Bitrate (Kbps)		Peak detection	Payload
	Max.	Current		
TS OUT 1	31668	2640		8%
TS OUT 2	31668	2701		9%
TS OUT 3	31668	4310		14%
TS OUT 4	31668	9095		29%

Reset Refresh Manual Now

Figure No 6

Using the Drop-down menu from "Output" column (Figure No 7) 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.



The screenshot shows the MLF-300 web interface. On the left is a navigation menu with sections: Status (General, Program list, Block diagram), Setup (Input, Program selection, Output, RF output, TS settings, NIT, SDT), and System (Event log, LAN, Administration, System restart, Factory defaults, Import / Export config, Firmware update, Date & time, Info). The main area is titled 'Program selection' and has tabs for Input 1, 2, 3, and 4. It displays a table of programs with columns: Original program title, Program title, Original Service ID, LCN 1..1023, Bandwidth (Kbps), Encrypted, Output, and Output Service ID. Programs listed include tagesschau24, ONE, arte, PHOENIX, and Test-R. A dropdown menu is open for the first program, showing options for TS OUT 1 through 4. Below the table are 'Apply' and 'Refresh' buttons. At the bottom, a 'Status' section shows a table of Bitrate (Kbps) with Max and Current values, and a 'Peak detection' bar chart with corresponding Payload percentages (8%, 9%, 14%, 29%). A 'Reset' button is below the bar chart, and a 'Refresh' button with a dropdown menu is at the bottom right.

Original program title	Program title	Original Service ID	LCN 1..1023	Bandwidth (Kbps)	Encrypted	Output	Output Service ID
tagesschau24	tagesschau24	28721	0	7163	Yes	TS OUT 1	28721
PID 101	VIDEOK						
PID 102	German						
PID 104							
PID 170							
PID 176							
PID 2171							
ONE	ONE	28722	0	7873	Yes	-	0
arte	arte	28724	0	6380	Yes	TS OUT 1	28724
PHOENIX	PHOENIX	28725	0	3987	Yes	TS OUT 2	28725
Test-R	Test-R	28726	0	3480	Yes	-	0

	Bitrate (Kbps)		Peak detection	Payload
	Max.	Current		
TS OUT 1	31668	2640	8%	
TS OUT 2	31668	2701	9%	
TS OUT 3	31668	4310	14%	
TS OUT 4	31668	9095	29%	

Figure No 7

**Caution!**

The number of programs that the MLF-300 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.

For example, if we select the following DVB-T setting for the four modulators on MLF-300 outputs:

- Constellation: 64 QAM
- Guard Interval: 1/32
- Code rate: 7/8
- Bandwidth: 8 MHz

According to Appendix A we will have a total output bitrate of 31.67Mbps/ modulator. That means that we can select as many programs as the user wants but their total bitrate must not exceed the 31.67Mbps, otherwise artifacts may occur.

This is a close-up of the 'Status' section from the screenshot above. It shows the Bitrate table and the Peak detection bar chart. The bar chart has four bars of increasing height and color (green, yellow, orange, red) corresponding to the payload percentages. A 'Reset' button is located below the bar chart.

	Bitrate (Kbps)		Peak detection	Payload
	Max.	Current		
TS OUT 1	31668	2640	8%	
TS OUT 2	31668	2701	9%	
TS OUT 3	31668	4310	14%	
TS OUT 4	31668	9095	29%	

Figure No 8



The status section in (Figure No 8) 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

4.2.6 - "RF Output" page

In the "RF Output" page (Figure No 9) the user is able to setup the RF output settings of the MLF-300.

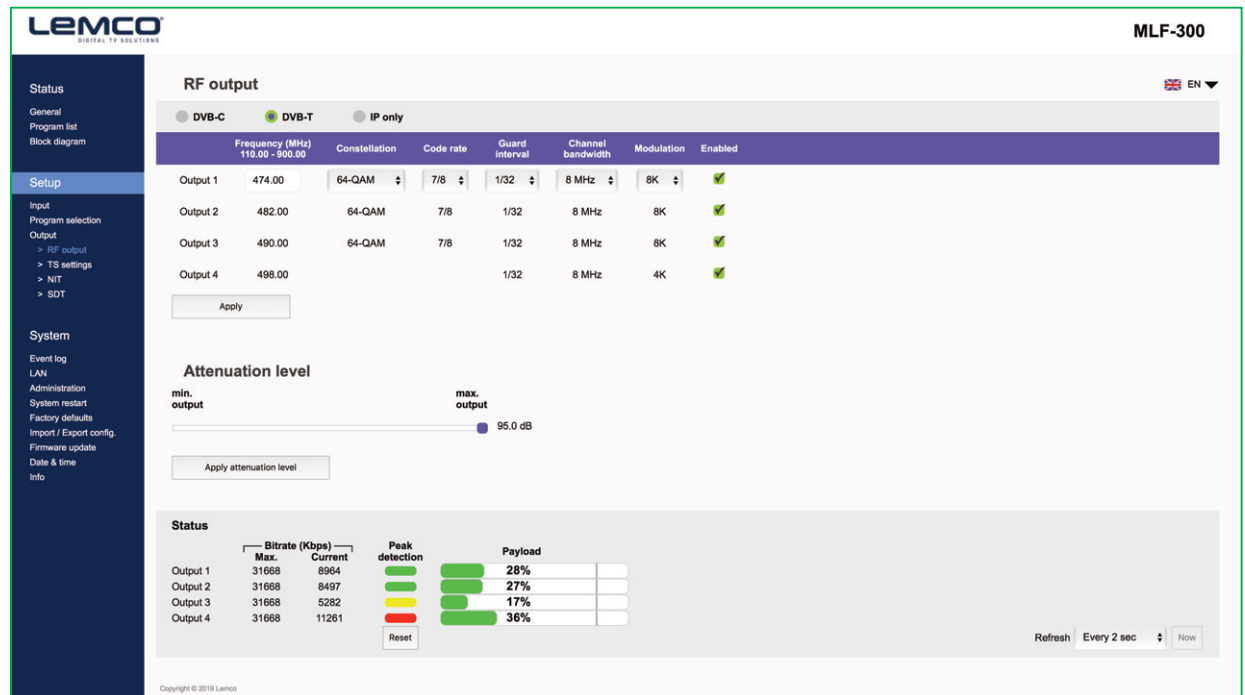
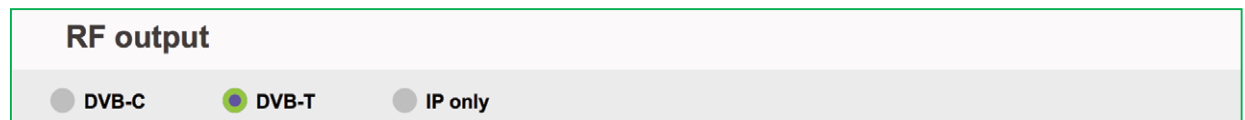


Figure No 9





With the use of the radio buttons the user is able to select the mode that the MLF-300 will operate as follows:

DVB-T: 4 x modulator working in DVB-T standard

DVB-C: 4 x modulator working in DVB-C standard

IP only: All modulators are disabled, the device does IP streaming only

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

- ▣▣ Frequency – The output frequency of the first modulator\*
- ▣▣ Constellation – The constellation of the first modulator\*
- ▣▣ Code Rate – The coder rate of the first modulator\*
- ▣▣ Guard Interval - The guard interval of the first modulator\*
- ▣▣ Channel Bandwidth – The channel bandwidth of the first modulator\*
- ▣▣ Modulation – The modulation type of the first modulator\*
- ▣▣ Enable/Disable – Enable or disable the current modulator
- ▣▣ Output level – Adjust the output level for each modulator from 70-90dBμV.

\* All the four outputs of the MLF-300 operate in adjacent RF output channels. This means that the user setups only the first modulator 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.

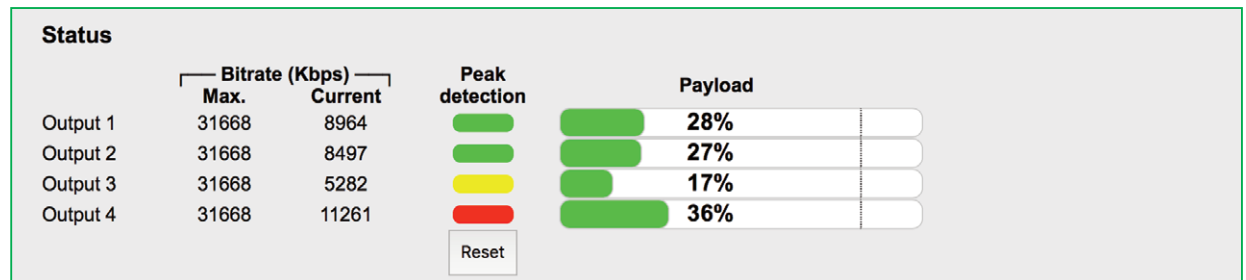


Figure No 10

The status section in (Figure No 10) provides a general idea to the user of the current payload (according to the selected programs) comparing 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.



### 4.2.7 - "IP streaming" page

In "IP streaming" section the user is able to setup the IP streamer of the device.

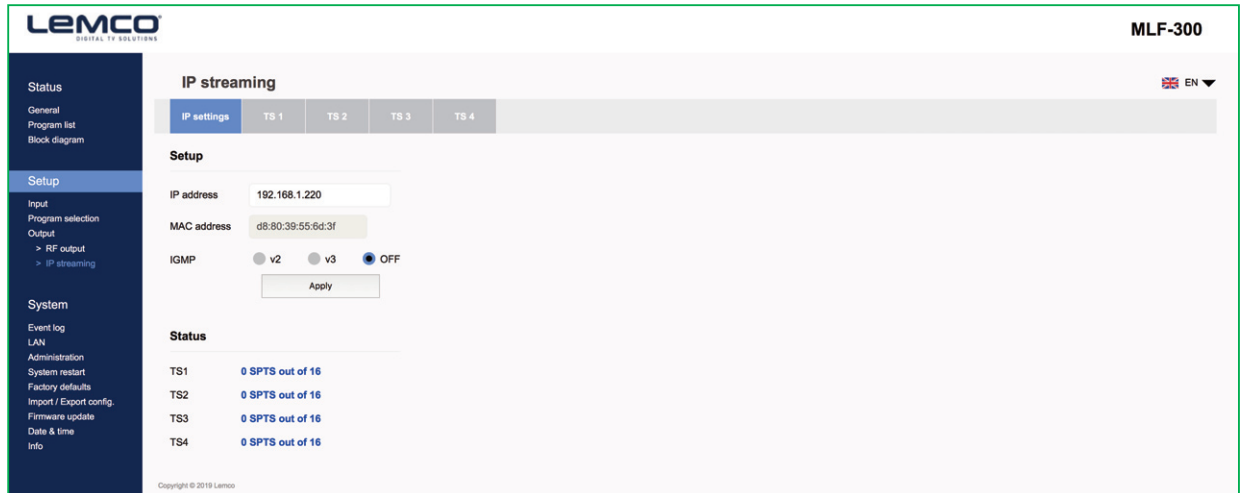


Figure No 11

In Figure No 11 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
- IGMP: The user is able to select IGMP v2 or v3 or disable the IGMP.

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.

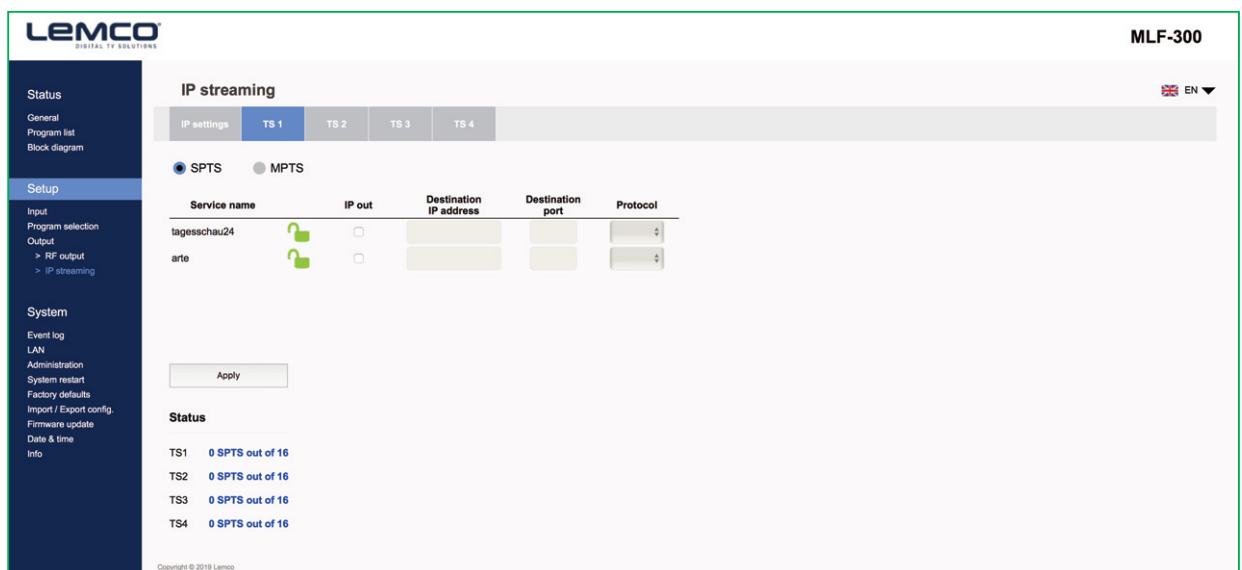


Figure No 12



In order to setup the IP address for each program there are four tabs one for each IP output of the MLF-300.

By selecting e.g. the TS1 tab (Figure No 12) 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-300, the user is able to setup the IP streamer of the device.

### 4.2.8 - "TS settings" page

In this section (Figure 13), the user is able to setup all the TS settings of the four multiplex in MLF-300's output.

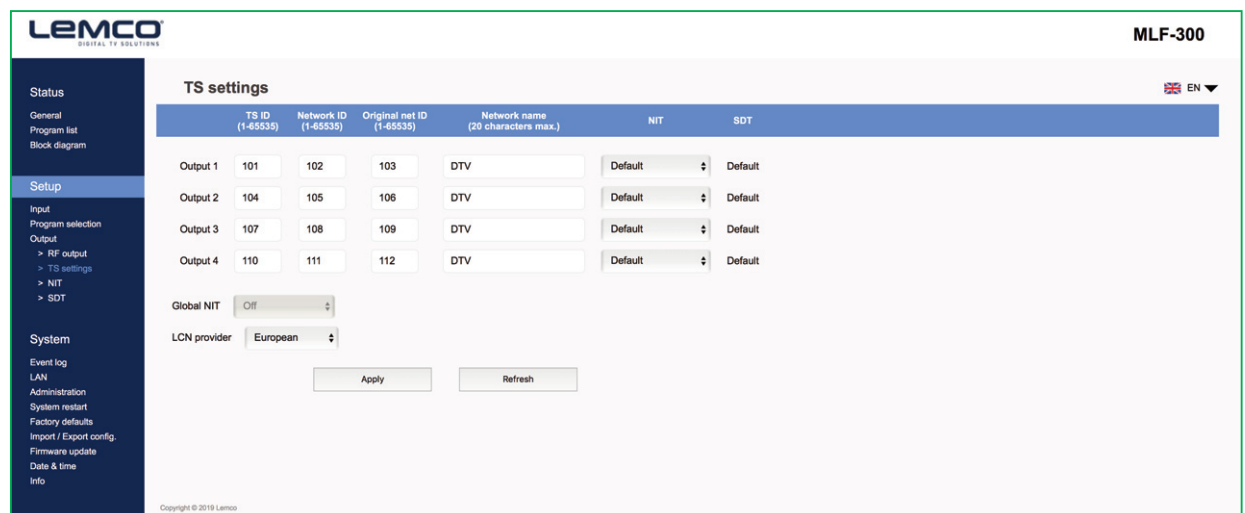


Figure No 13

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:                Choose from Global, Basic, Default and Custom
- LCN provider:      Choose the appropriate LCN provider (EACEM, ITC, Nordig, APN)





### 4.2.9 - "NIT" page

In this section (Figure 14), 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.

The screenshot shows the 'NIT - Network Information Table' configuration page. It includes a sidebar with navigation options like 'Status', 'Setup', and 'System'. The main area has tabs for 'Output 1', 'Output 2', 'Output 3', 'Output 4', and 'Export'. Below the tabs, there are input fields for 'Network name', 'Network ID', 'NIT version', and 'LCN provider' (set to 'European'). A 'Current settings' button is present. At the bottom, there are 'Add', 'Delete', 'Export', 'Import', 'Apply', and 'Refresh' buttons.

#	TSID	Orig. Net ID	Freq (MHz)	Bandwidth	Constellation	Code rate	Guard interval	Transmission mode	Private data	Services			
										#	Svc ID	LCN	Type

Figure No 14

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

In this section (Figure 15), 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.

The screenshot shows the 'SDT - Service Description Table' configuration page. It features a sidebar with navigation options. The main area has tabs for 'Output 1', 'Output 2', 'Output 3', 'Output 4', and 'Export'. Below the tabs, it shows 'SDT mode : Default'. A table is displayed with columns for '#', 'TSID', 'Orig. Net ID', 'Table type', 'Version', '#', 'Svc ID', 'Service name', 'Provider name', 'Svc type', and 'Manage'.

#	TSID	Orig. Net ID	Table type	Version	#	Svc ID	Service name	Provider name	Svc type	Manage
---	------	--------------	------------	---------	---	--------	--------------	---------------	----------	--------

Figure No 15



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

In "Event log" page (Figure No 16) 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.

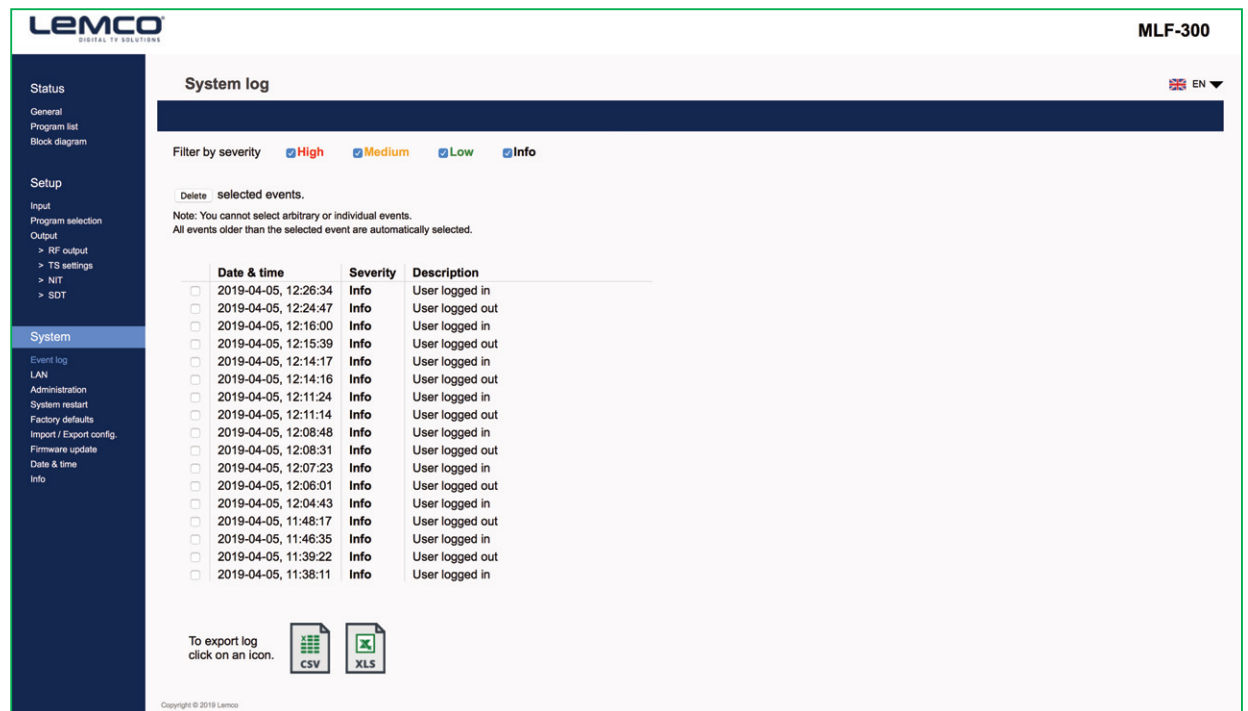


Figure No 16

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

In "LAN" page (Figure No 17) the user is able to setup all the parameters of the LAN control of the device as follows:

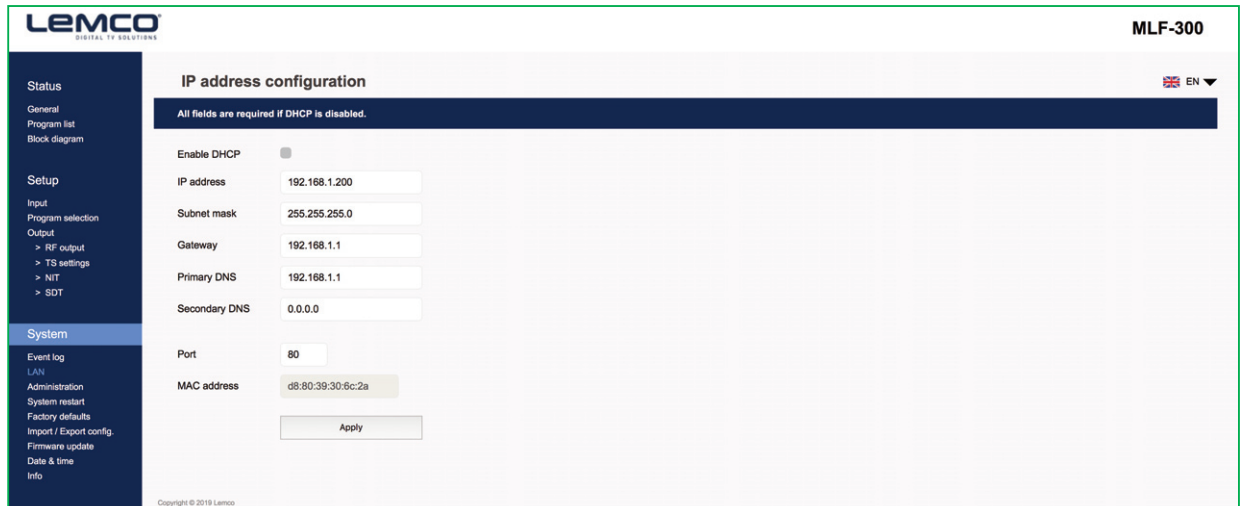


Figure No 17

- || ▸ 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

In "Administration" section (Figure No 18) the user is able to change the default password of the webserver.

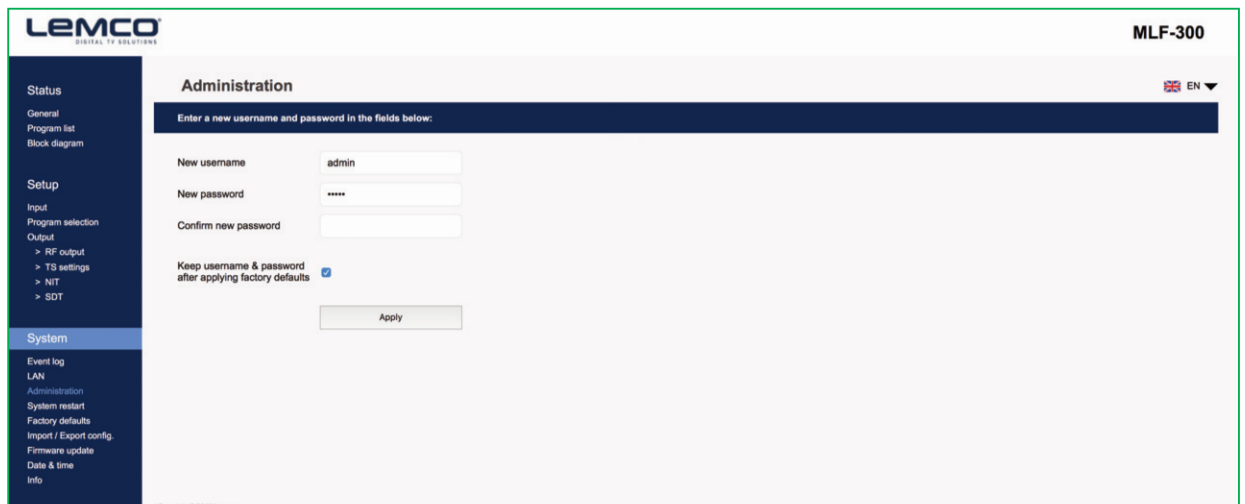


Figure No 18



**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

In “System restart” section (Figure No 19) the user is able to apply a full reset to the device.

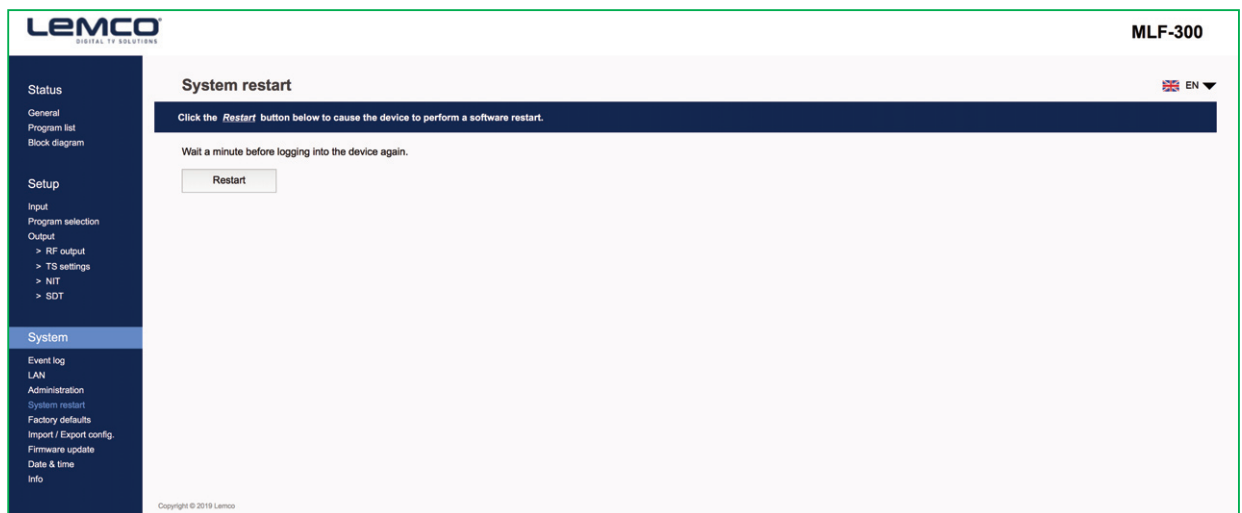


Figure No 19

### 4.2.15 - “Factory default” page

In “Factory default” section (Figure No 20) the user is able to apply a factory default reset either as DVB-T or DVB-C.

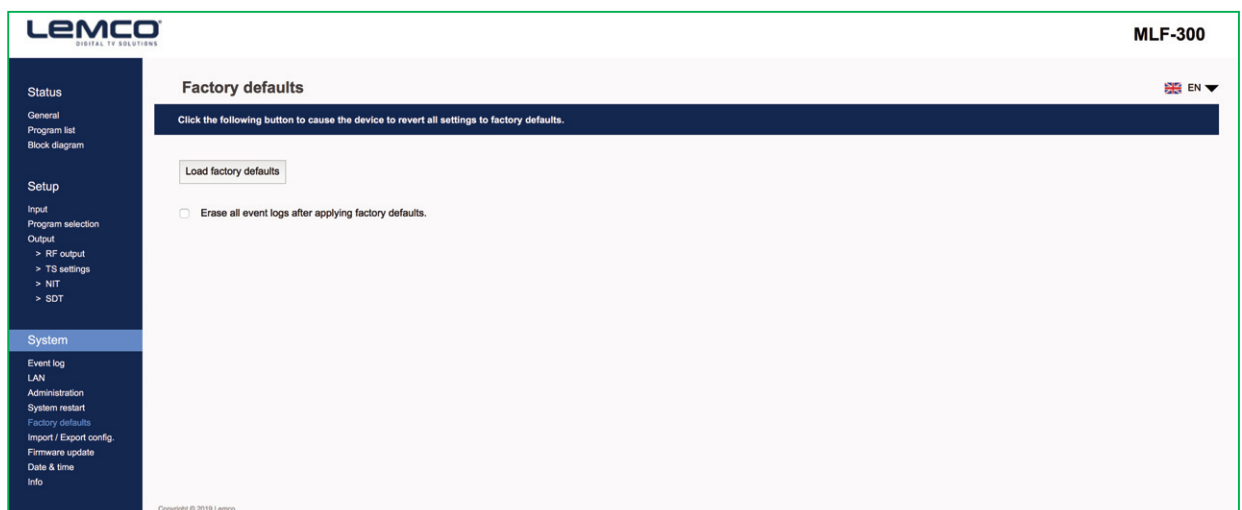


Figure No 20



### 4.2.16 - "Import/Export Config" page

In "Import/Export Config" section (Figure No 21) 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.

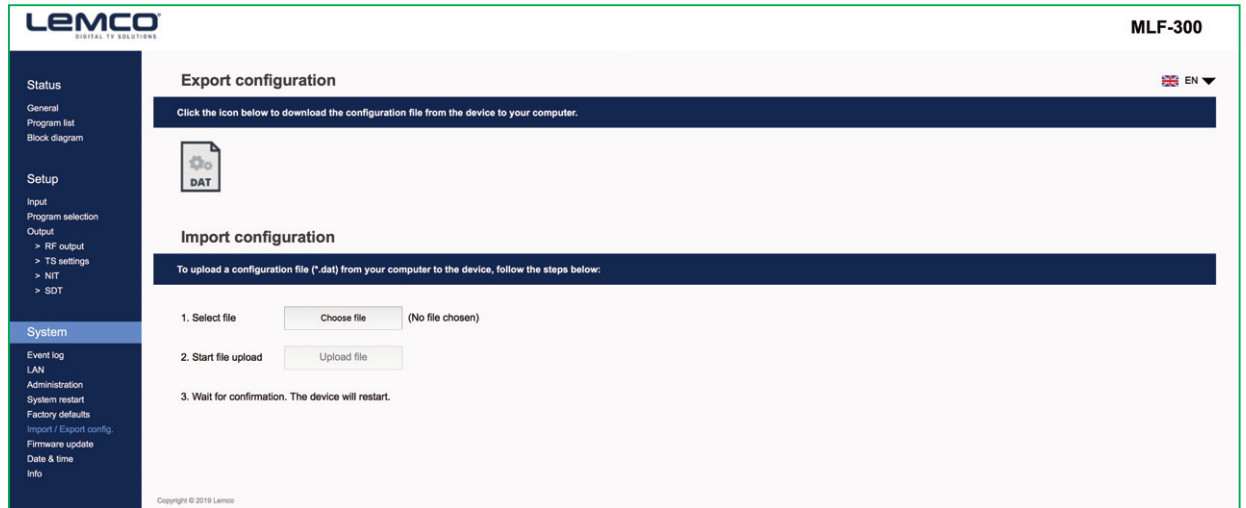


Figure No 21

### 4.2.17 - "Firmware update" page

In "Firmware update" (Figure No 22) section the user is able to upload a new firmware update using the appropriate file.

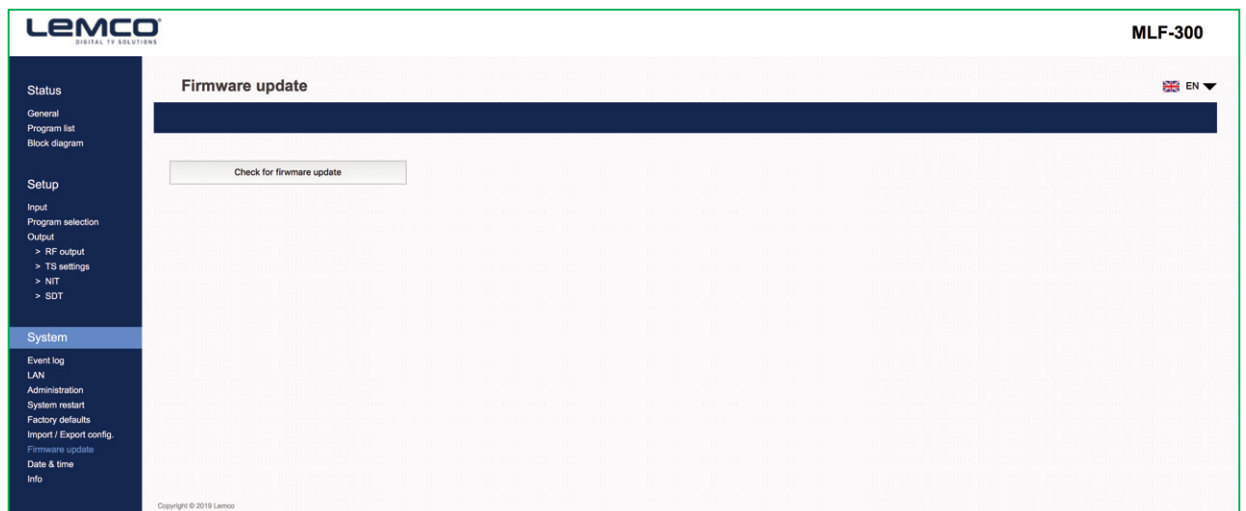


Figure No 22



### 4.2.18 - "Date & Time" page

In "Date & Time" (Figure No 23) 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 timezone of his country.

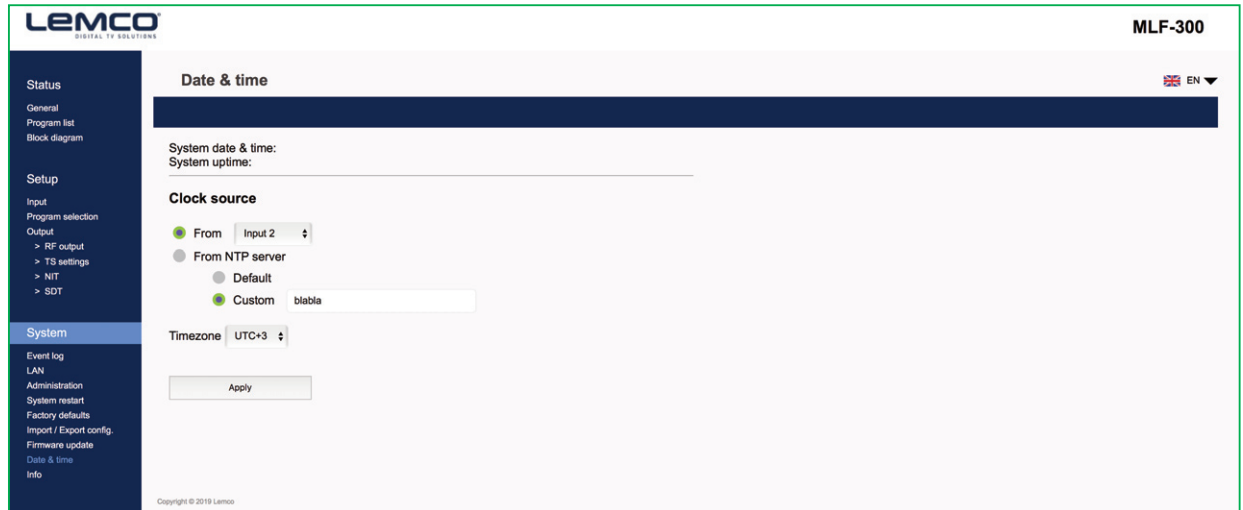


Figure No 23

### 4.2.19 - "Info" page

In "Info" (Figure No 24) section the user is able to see the serial No of the device as well as firmware and hardware versions.

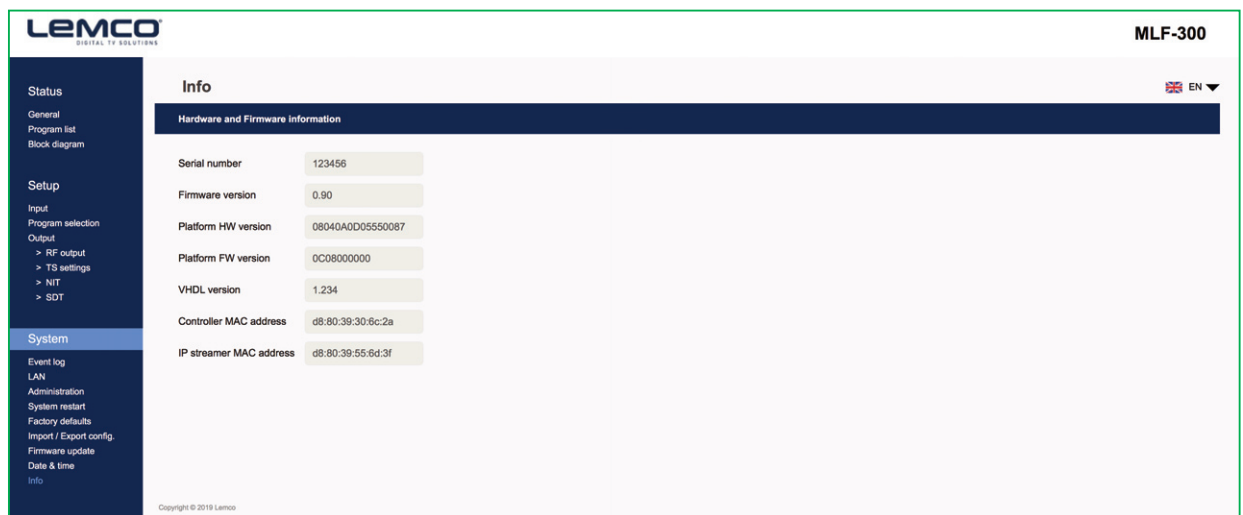


Figure No 24



## 5. TECHNICAL SPECIFICATIONS

### Input Specifications

#### Input

Type	4 x DVB-S/S2/T/T2/C	
Frequencies	950...2150 MHz	DVB-S/S2
	118...900MHz	DVB-T/T2/C
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-T

Standard	EN 300-744 V1.6.1
Bandwidth	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



**DVB-T2 / T2 Lite**

Standard	EN 302-755 V1.3.1
Bandwidth	5, 6, 7, 8 MHz
Mode	1K, 2K, 4K, 8K, 16K, 32K(Included extended mode)
Constellation	QPSK, 16QAM, 64QAM, 256QAM
Code rate	1/2, 3/5, 2/3, 3/4, 4/5, 5/6

**ITU-T J.83**

Standard	Annex A(DVB-C), B(US cable),C
Bandwidth	5, 6, 7, 8 MHz
Mode	Automatic modulation detection
Constellation	16QAM, 32QAM, 64QAM, 128QAM, 256QAM

**Output Specifications**

**DVB-T**

Standard	EN 300-744
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

**ITU-T J.83**

Standard	Annex A(DVB-C)
Bandwidth	5, 6, 7, 8 MHz
Mode	2K, 8K
Constellation	16QAM, 32QAM, 64QAM, 128QAM, 256QAM
Symbol rate	1-7.2 Ms/s

**RF Output**

Type	4 x RF out in adjacent channels
Output Frequencies	110...950 MHz (1 Hz step)
Output Level	90dB $\mu$ V
Connector	75 $\Omega$ - F, female
Output Attenuato	0...-20dB
MER	>42dB
Output loop-through loss	<1dB

**Transport Stream Processing**

Services	User selection by service names
Automatic Regeneration	PAT, CAT, SDT, PMTs, EITs tables
NIT/SDT	Pass-through, custom, automatic
PCR	re-stamping
LCN support	Yes





## IP Streaming

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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

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Ethernet webserver	Yes, embedded webserver
Speed	10/100 Mbps
Connector	RJ45
Browser compatibility	Chrome, Firefox, Safari, Opera, Edge etc. (Must support HTML v5.0)
SNMP support	Yes
SNMP version	v2.0

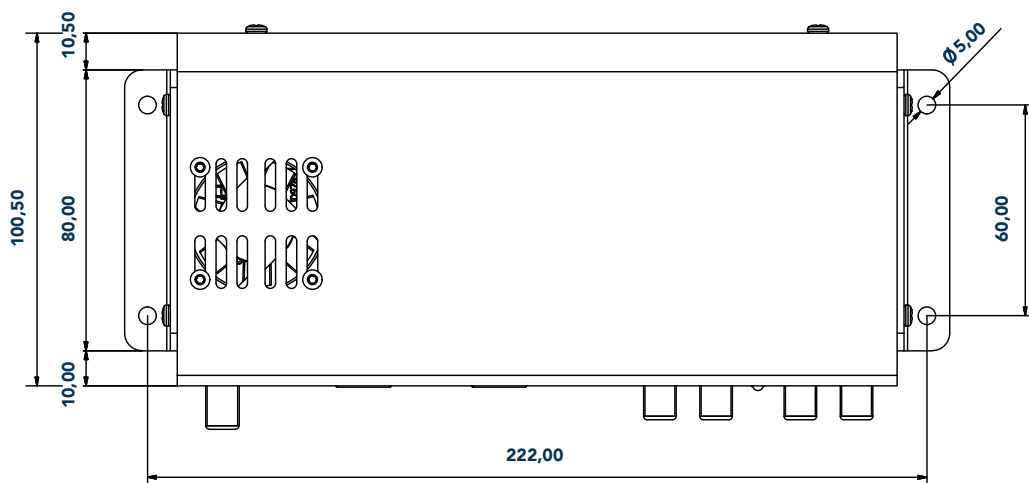
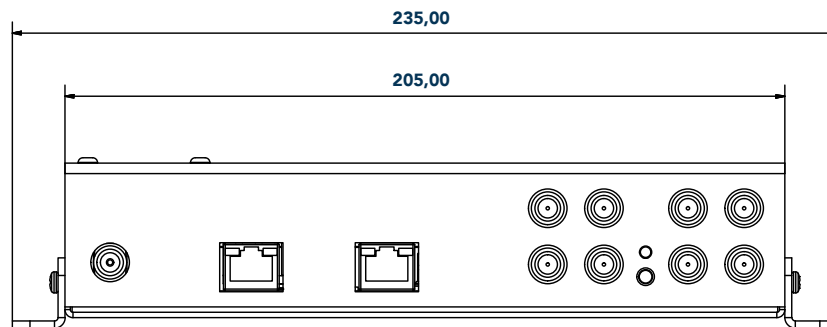
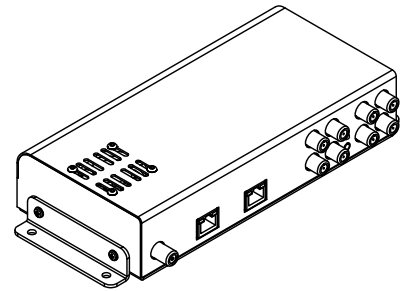
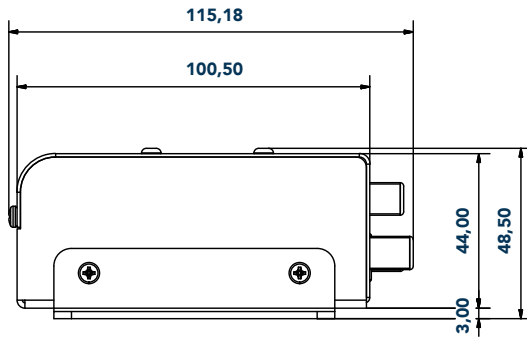
## General

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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. LEMCO LIMITED WARRANTY

This Lemco unit is guaranteed against defects in workmanship and materials for a period of five (5) years beginning on the date of purchase of the product. During the applicable warranty period, Lemco will repair or replace at our sole option, without charge, any defective component part of the purchased unit. The unit is to be delivered packed in adequate packing AFTER an authorization for return has been received.

The owner's responsibilities are to use the instrument in accordance with its written instructions, to provide transport to and from our facilities in the event service is required, and to provide proof of purchase if requested.

### **Our warranty does not cover any problem resulting from:**

- (a) accident; abuse; neglect; shock; electrostatic discharge; heat or humidity beyond product specifications; improper installation, operation, maintenance or modification
- (b) any misuse contrary to the instructions in the user manual
- (c) malfunctions caused by other equipment.

#### **WARNING!!**

Our limited warranty is considered void if a product is returned with removed, damaged or tampered labels or any alterations (including removal of any component or external cover) carried out by unauthorized personnel.

### **OUT OF WARRANTY SERVICING**

We repair and service units of our production even once the warranty has expired, if this is economically the best solution to the customer.

The mechanical and electronic spare parts are replaceable for a five-year period after production when the circuits are assembled with discrete components. When integrated circuits are used, the supply of spare parts is guaranteed up to the depletion of our stock and, depending on the possibility of procuring them on the worldwide market.

To avoid any unnecessary loss of time, it is very important that the instrument be returned to our premises accompanied by a proper delivery note, duly completed with all the required information, as per the legal dispositions currently enforced.



## 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.

### APPENDIX A

DVB-T bitrates (Mbit/s) for **8 MHz** bandwidth (non-hierarchical systems)

Modulation	Coding Rate	Guard Interval			
		1/4	1/8	1/16	1/32
<b>QPSK</b>	1/2	4.976	5.529	5.855	6.032
	2/3	6.635	7.373	7.806	8.043
	3/4	7.465	8.294	8.782	9.048
	5/6	8.294	9.216	9.758	10.053
	7/8	8.709	9.676	10.246	10.556
<b>16-QAM</b>	1/2	9.953	11.059	11.709	12.064
	2/3	13.271	14.745	15.612	16.086
	3/4	14.929	16.588	17.564	18.096
	5/6	16.588	18.431	19.516	20.107
	7/8	17.418	19.353	20.491	21.112
<b>64-QAM</b>	1/2	14.929	16.588	17.564	18.096
	2/3	19.906	22.118	23.419	24.128
	3/4	22.394	24.882	26.346	27.144
	5/6	24.882	27.647	29.273	30.160
	7/8	26.126	29.029	30.737	31.668



DVB-T bitrates (Mbit/s) for 7 MHz bandwidth (non-hierarchical systems)

Modulation	Coding Rate	Guard Interval			
		1/4	1/8	1/16	1/32
<b>QPSK</b>	1/2	4.354	4.838	5.123	5.278
	2/3	5.806	6.451	6.830	7.037
	3/4	6.532	7.257	7.684	7.917
	5/6	7.257	8.064	8.538	8.797
	7/8	7.620	8.467	8.965	9.237
<b>16-QAM</b>	1/2	8.709	9.676	10.246	10.556
	2/3	11.612	12.902	13.661	14.075
	3/4	13.063	14.515	15.369	15.834
	5/6	14.515	16.127	17.076	17.594
	7/8	15.240	16.934	17.930	18.473
<b>64-QAM</b>	1/2	13.063	14.515	15.369	15.834
	2/3	17.418	19.353	20.491	21.112
	3/4	19.595	21.772	23.053	23.751
	5/6	21.772	24.191	25.614	26.390
	7/8	22.861	25.401	26.895	27.710

DVB-T bitrates (Mbit/s) for 6 MHz bandwidth (non-hierarchical systems)

Modulation	Coding Rate	Guard Interval			
		1/4	1/8	1/16	1/32
<b>QPSK</b>	1/2	3.732	4.147	4.391	4.524
	2/3	4.976	5.529	5.855	6.032
	3/4	5.599	6.221	6.587	6.786
	5/6	6.221	6.912	7.318	7.540
	7/8	6.532	7.257	7.684	7.917
<b>16-QAM</b>	1/2	7.465	8.294	8.782	9.048
	2/3	9.953	11.059	11.709	12.064
	3/4	11.197	12.441	13.173	13.572
	5/6	12.441	13.824	14.637	15.080
	7/8	13.063	14.515	15.369	15.834
<b>64-QAM</b>	1/2	11.197	12.441	13.193	13.572
	2/3	14.929	16.588	17.564	18.096
	3/4	16.796	18.662	19.760	20.358
	5/6	18.662	20.735	21.995	22.620
	7/8	19.595	21.772	23.053	23.751



9. NOTES

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# LEMCO<sup>®</sup>

DIGITAL TV SOLUTIONS

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