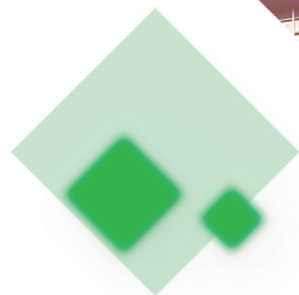


Operation Manual

v1.0



micro
line

MLF-200

4 x DVB-S/S2/T/T2/C to 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-200. 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-200 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 IPTV streaming using UDP/RTP protocols multicast/unicast.

The embedded web server of the MLF-200 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-200 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 IP technology.

3.2 - Features

- ▶ 4 x independent multi-standard inputs DVB-S/S2/T/T2/C
- ▶ Gbit IP streaming (up to 64 x SPTS / 4 x MPTS)
- ▶ Dual power supplies offering redundancy mode
- ▶ 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-200, 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-200 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.



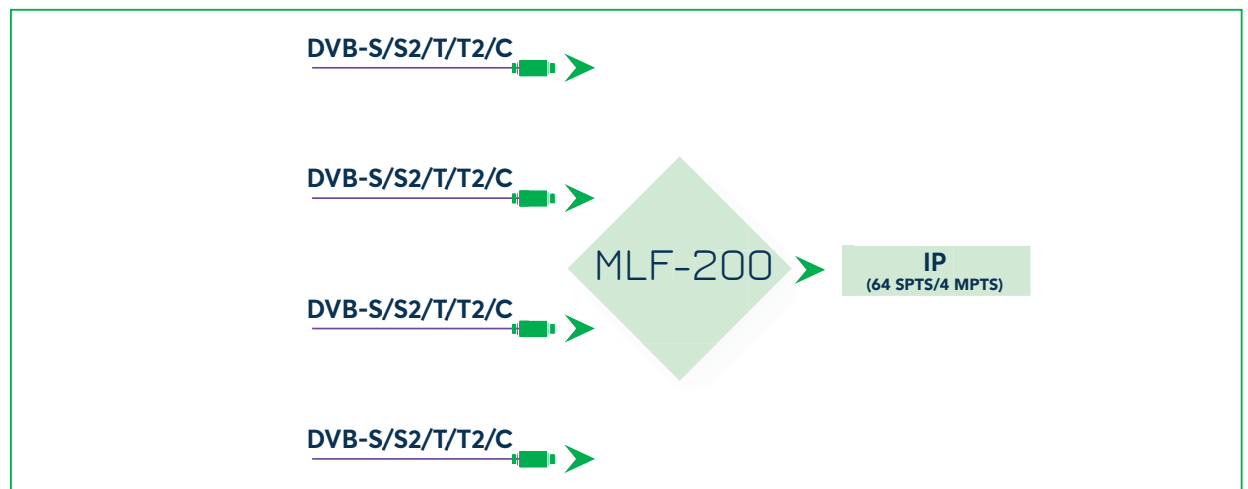
3.2.2 - IP streaming

The MLF-200 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.

3.2.3 - Dual power supplies

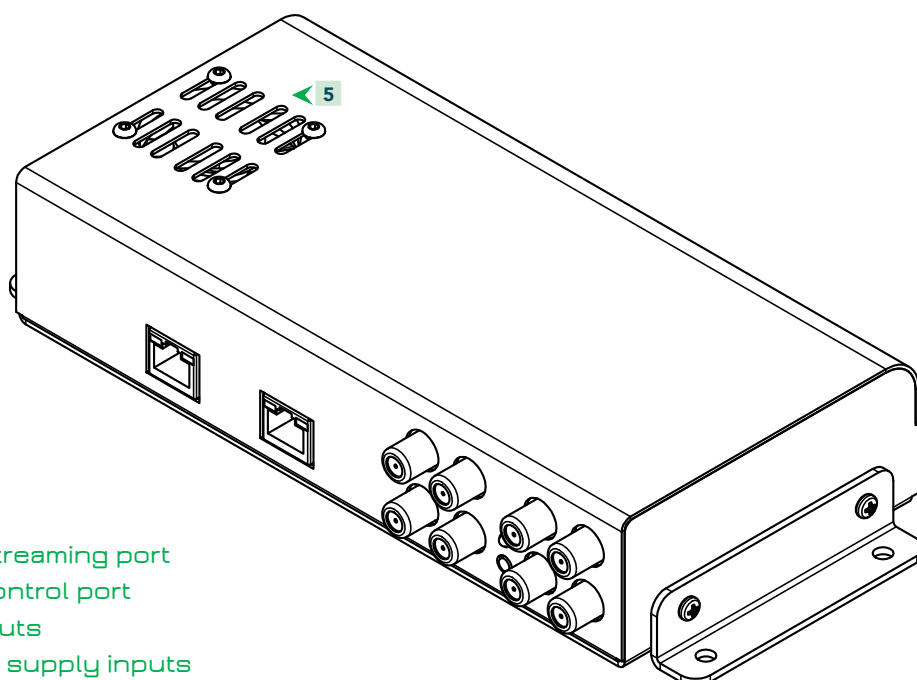
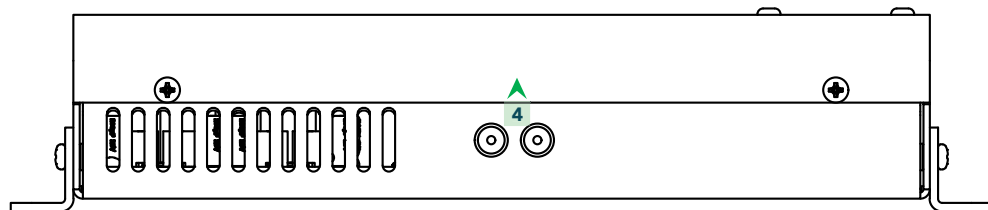
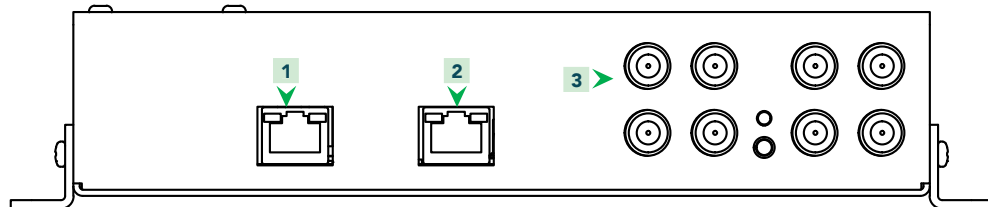
The MLF-200 is powered from one or two external power supplies of +12VDC/2.5A. In case we connect two external power supplies then they will work in redundancy mode. Thus, in case of failure of one of the two external power supplies the device will continue working without stopping.

3.3 - Block Diagram





3.4 - Product drawing views



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



4. INSTALLATION

4.1 - General

The MLF-200 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.

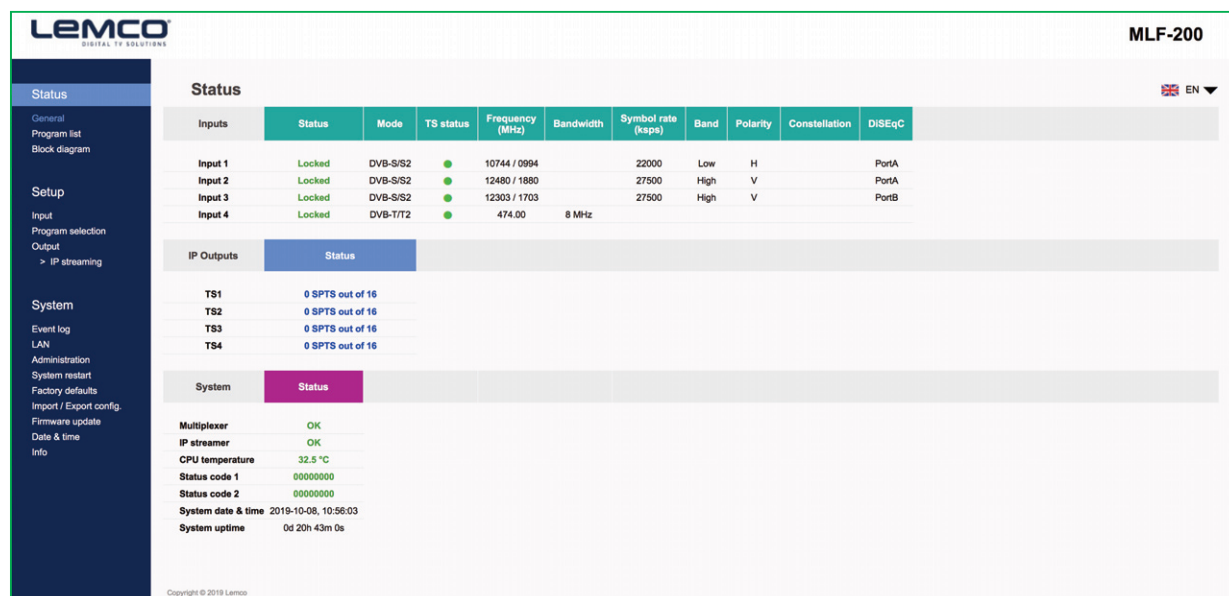


Figure No 1

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, DVB-T/T2 or DVB-C 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, 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-200 provides information of all programs that are currently being distributed via its four IP outputs.

LEMCO DIGITAL TV SOLUTIONS **MLF-200**

EN

Program list

Output 1	Output 2	Output 3	Output 4															
<table><thead><tr><th>Program title</th><th>Service ID</th><th>LCN</th><th>From input</th><th>IP out</th></tr></thead><tbody><tr><td>tagesschau24</td><td>28721</td><td>0</td><td>1</td><td></td></tr><tr><td>arte</td><td>28724</td><td>0</td><td>1</td><td></td></tr></tbody></table>	Program title	Service ID	LCN	From input	IP out	tagesschau24	28721	0	1		arte	28724	0	1				
Program title	Service ID	LCN	From input	IP out														
tagesschau24	28721	0	1															
arte	28724	0	1															

To export all program lists click on an icon.

CSV XLS M3U

Copyright © 2019 Lemco

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.

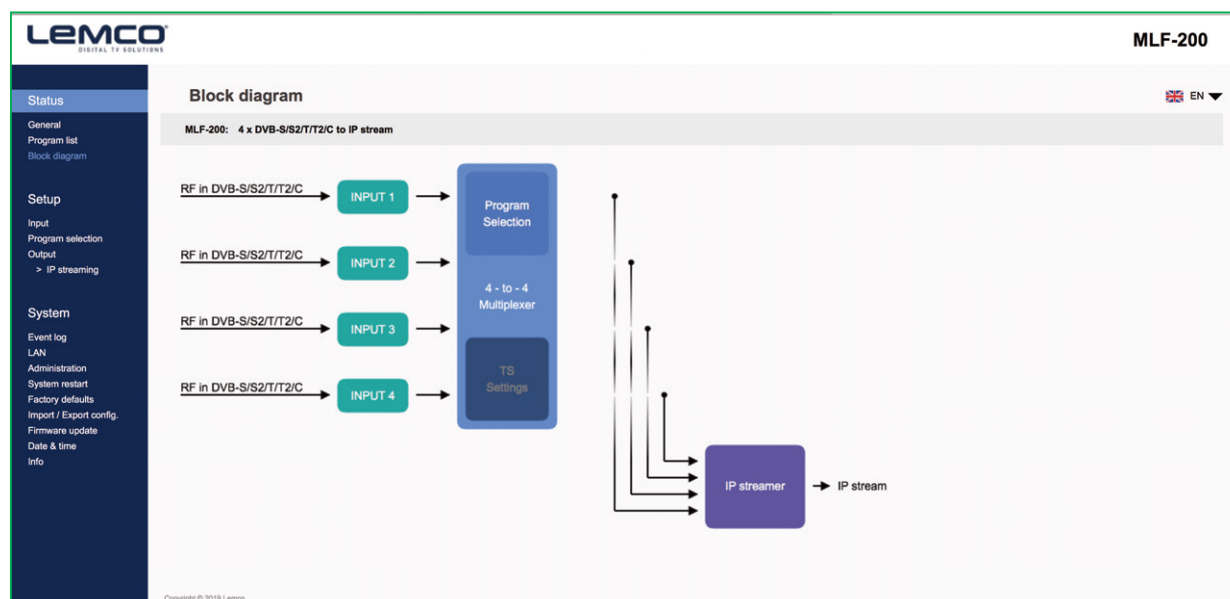


Figure No3

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

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

The screenshot shows the 'Input' configuration page for the MLF-200. The page has a sidebar with navigation options and a main content area. The 'Input' tab is selected, showing settings for four inputs. The 'Settings' section includes fields for Tuner (DVB-S/S2), Frequency (10744 MHz), Symbol rate (22000 kps), LNB voltage (Horizontal (18V)), Band (Low), and DiSEqC (Port A). The 'Status' section shows the Tuner is Locked, Bit rate is 34572 Kbps, Signal strength is 52%, and Signal quality is 38%. There are 'Apply' and 'Refresh' buttons at the bottom of the settings section, and a 'Refresh' button with a frequency dropdown at the bottom of the status section.

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 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-200 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.

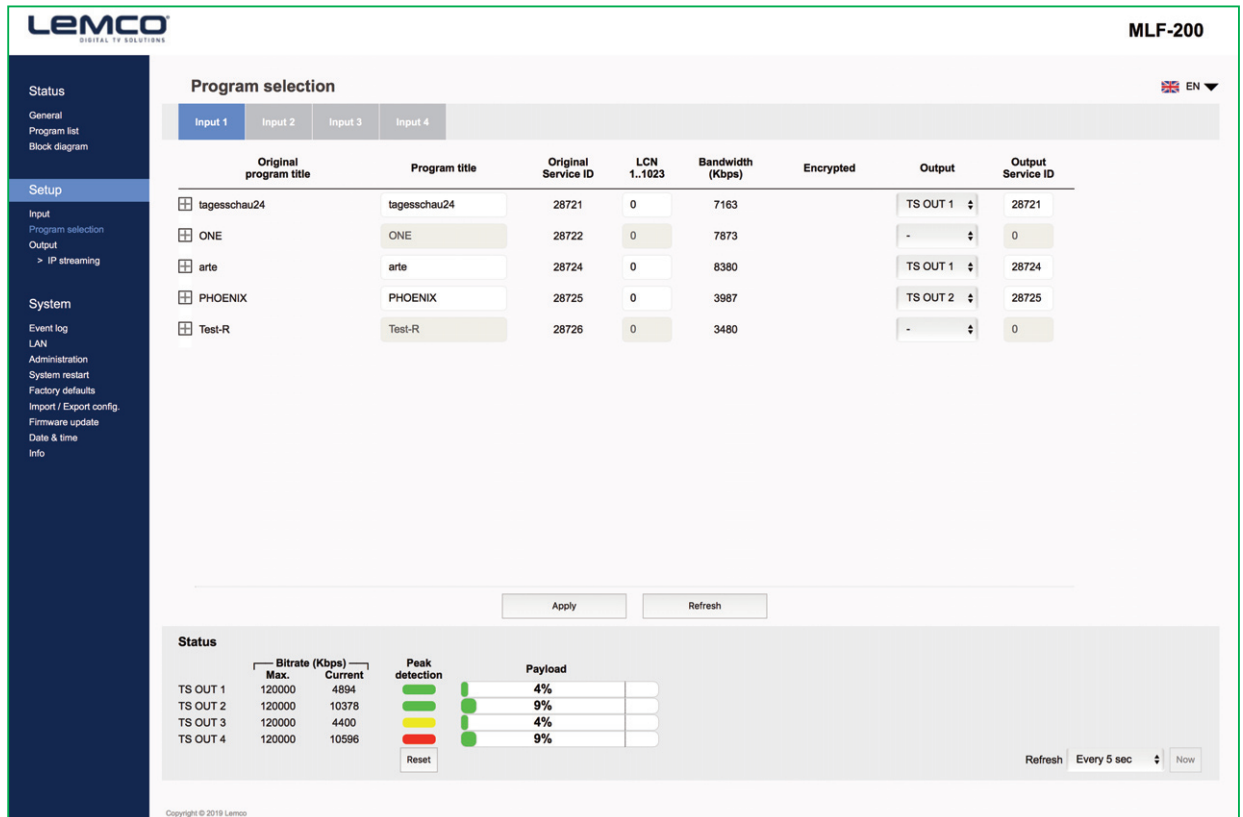


Figure No 5

There are 4 tabs, one for each input. Each tab depicts all the TV and Radio programs from the input that has been 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-200 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.

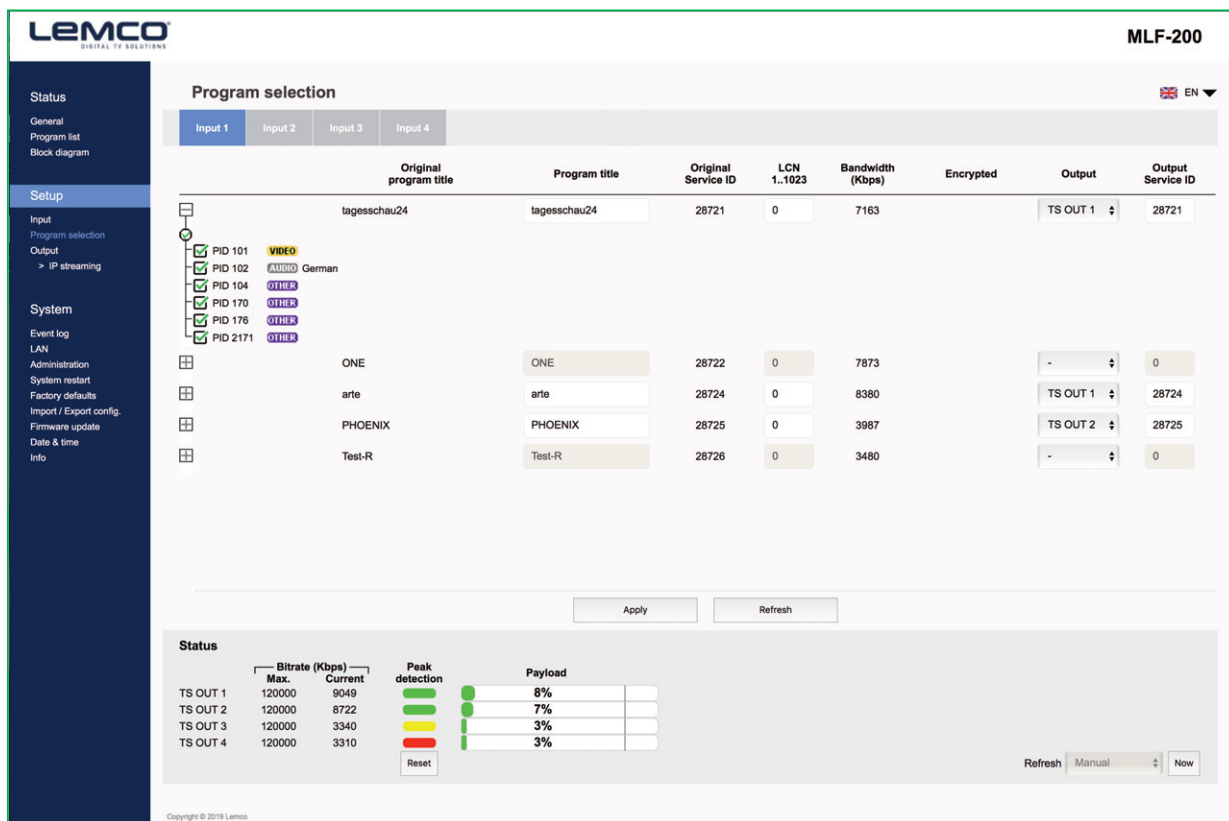


Figure No 6

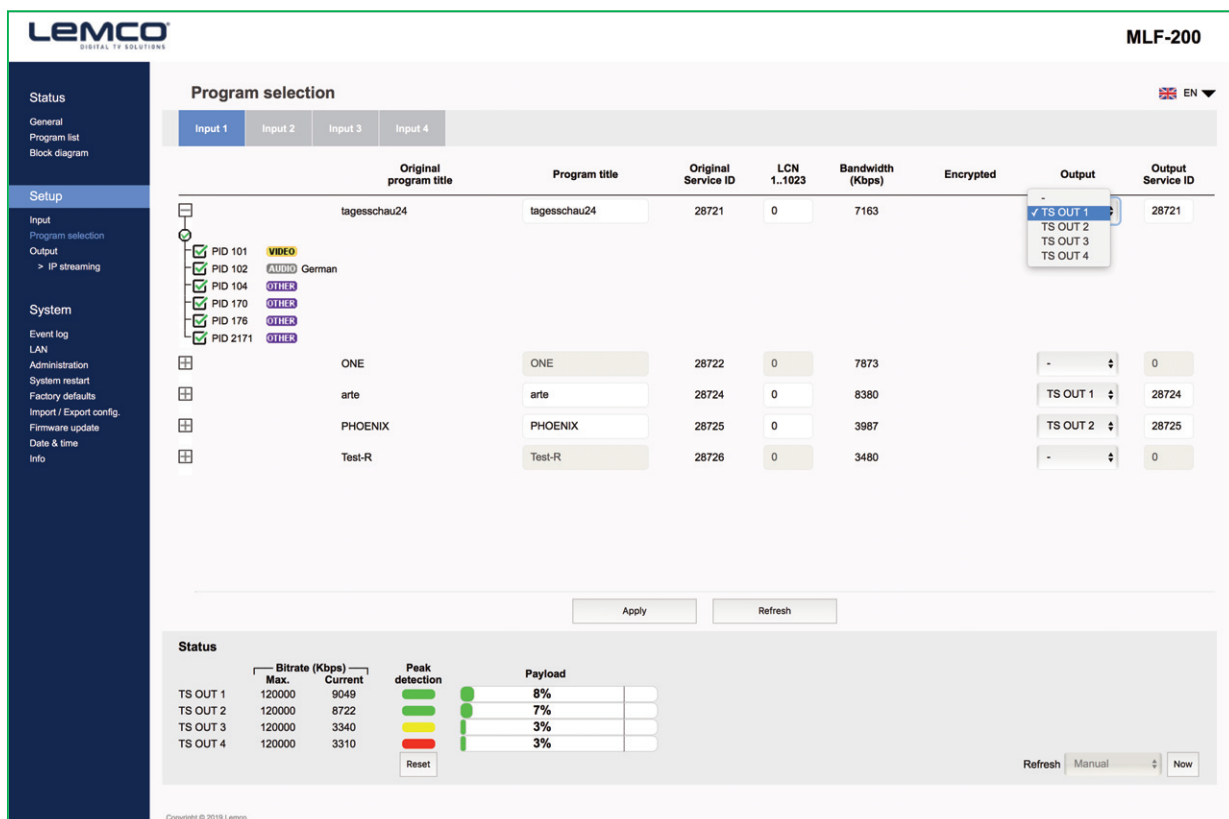


Figure No 7



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.

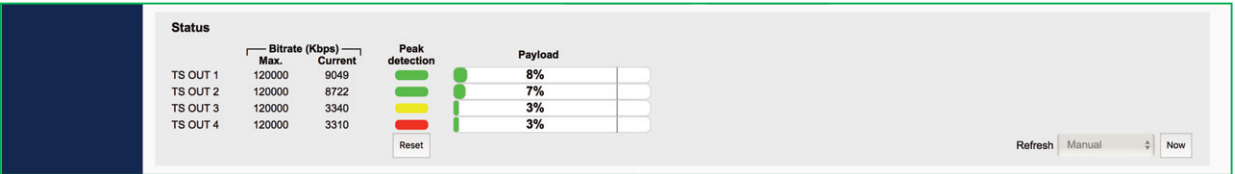


Figure No 8

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 - "IP streaming" page

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

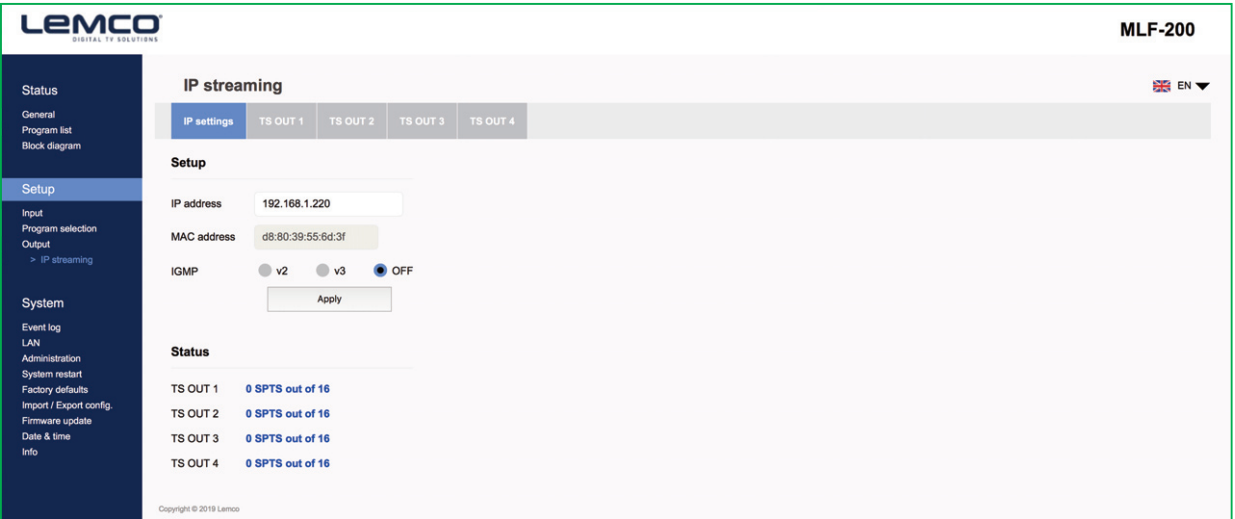


Figure No 9



In Figure No 9 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.

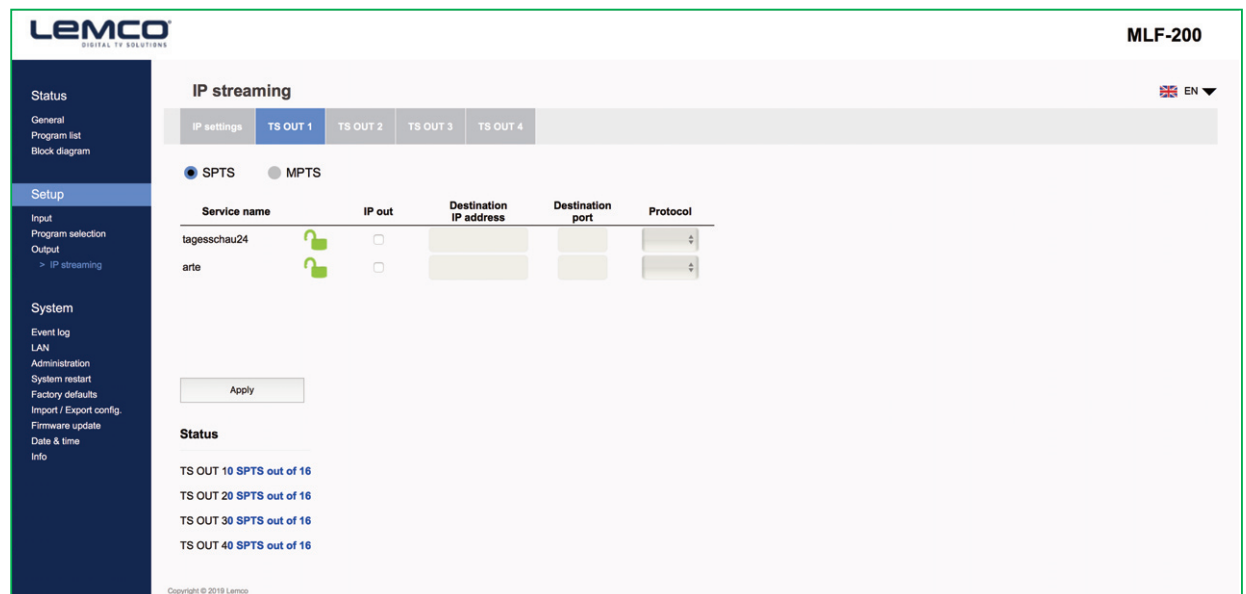


Figure No 10

In order to setup the IP address for each program there are four tabs one for each IP output of the MLF-200.

By selecting e.g. the TS1 tab (Figure No 10) 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-200, the user is able to setup the IP streamer of the device.



4.2.7 - “Event log” page

In “Event log” page (Figure No 11) 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.

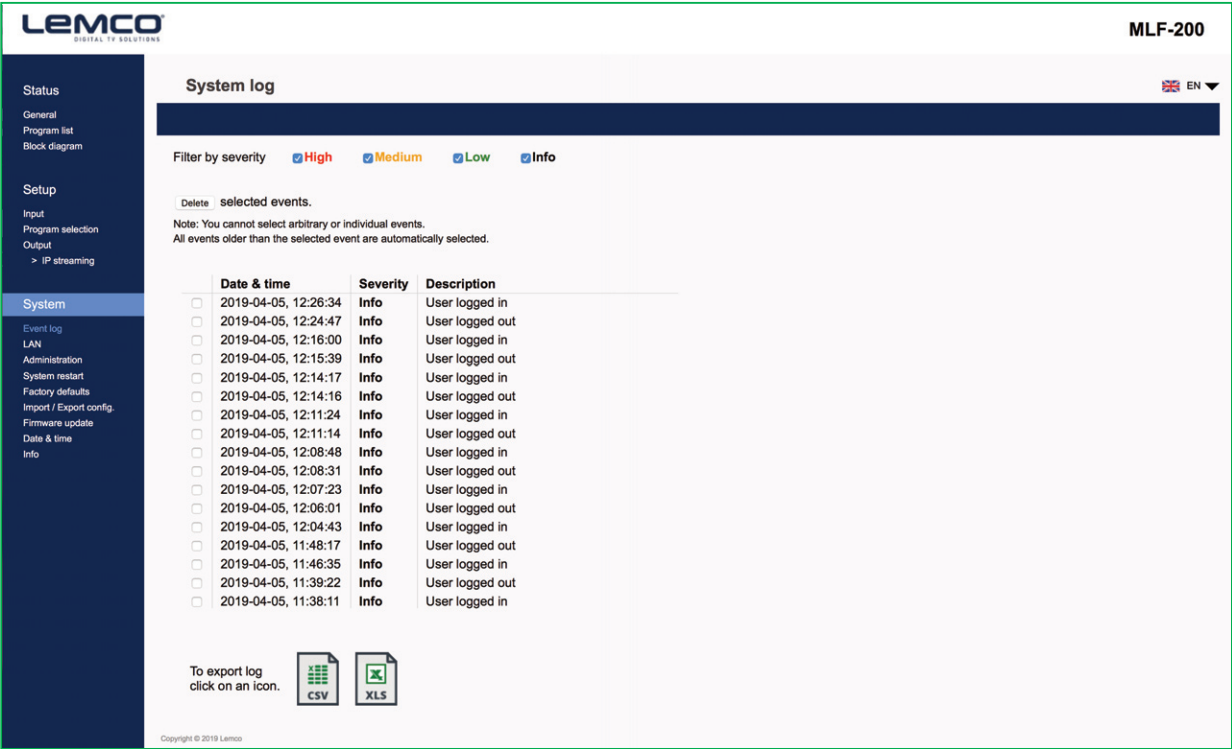


Figure No 11

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



4.2.8 - "LAN" page

In "LAN" page (Figure No 12) the user is able to setup all the parameters of the LAN control of the device as follows:

The screenshot shows the 'IP address configuration' page of the Lemco MLF-200 web interface. The sidebar on the left contains a menu with 'Status', 'Setup', and 'System' sections. The 'System' section is currently selected, showing options like 'Event log', 'LAN', 'Administration', 'System restart', 'Factory defaults', 'Import / Export config.', 'Firmware update', 'Date & time', and 'Info'. The main content area is titled 'IP address configuration' and includes a warning: 'All fields are required if DHCP is disabled.' Below this, there is a checkbox for 'Enable DHCP' which is currently unchecked. The configuration fields are as follows: IP address (192.168.1.200), Subnet mask (255.255.255.0), Gateway (192.168.1.1), Primary DNS (192.168.1.1), Secondary DNS (0.0.0.0), Port (80), and MAC address (d8:80:39:30:6c:2a). An 'Apply' button is located at the bottom of the configuration fields.

Figure No 12

- 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

4.2.9 - "Administration" page

In "Administration" section (Figure No 13) the user is able to change the default password of the webserver.

The screenshot shows the 'Administration' page of the Lemco MLF-200 web interface. The sidebar on the left contains a menu with 'Status', 'Setup', and 'System' sections. The 'System' section is currently selected, showing options like 'Event log', 'LAN', 'Administration', 'System restart', 'Factory defaults', 'Import / Export config.', 'Firmware update', 'Date & time', and 'Info'. The main content area is titled 'Administration' and includes a warning: 'Enter a new username and password in the fields below:'. Below this, there are three input fields: 'New username' (admin), 'New password' (masked with asterisks), and 'Confirm new password'. There is also a checkbox for 'Keep username & password after applying factory defaults' which is currently checked. An 'Apply' button is located at the bottom of the configuration fields.

Figure No 13



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”.

4.2.10 - “System restart” page

In “System restart” section (Figure No 14) the user is able to apply a full reset to the device.

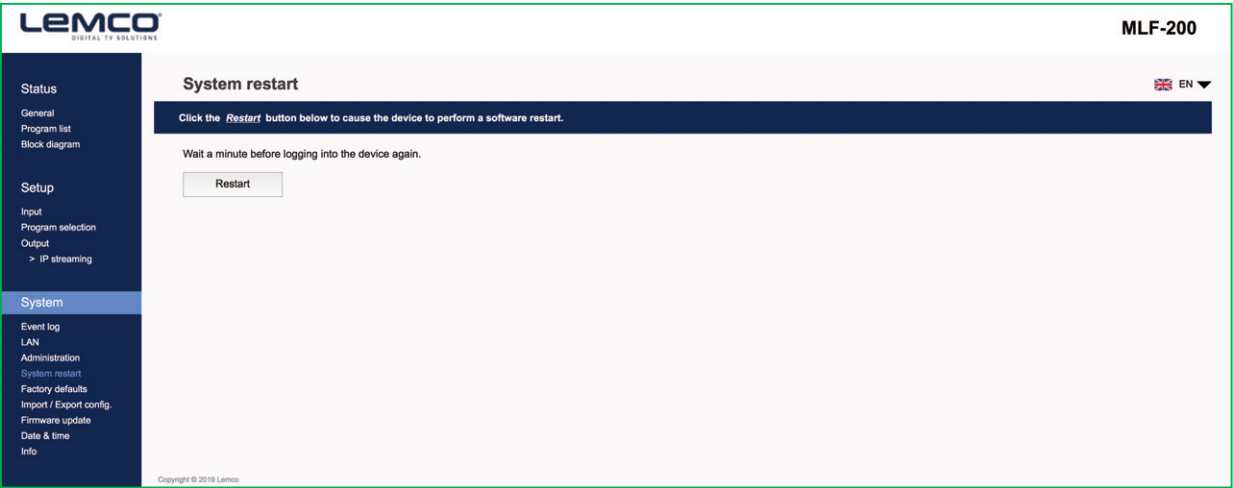


Figure No 14

4.2.11 - “Factory default” page

In “Factory default” section (Figure No 15) the user is able to apply a factory default reset either as DVB-T or DVB-C.

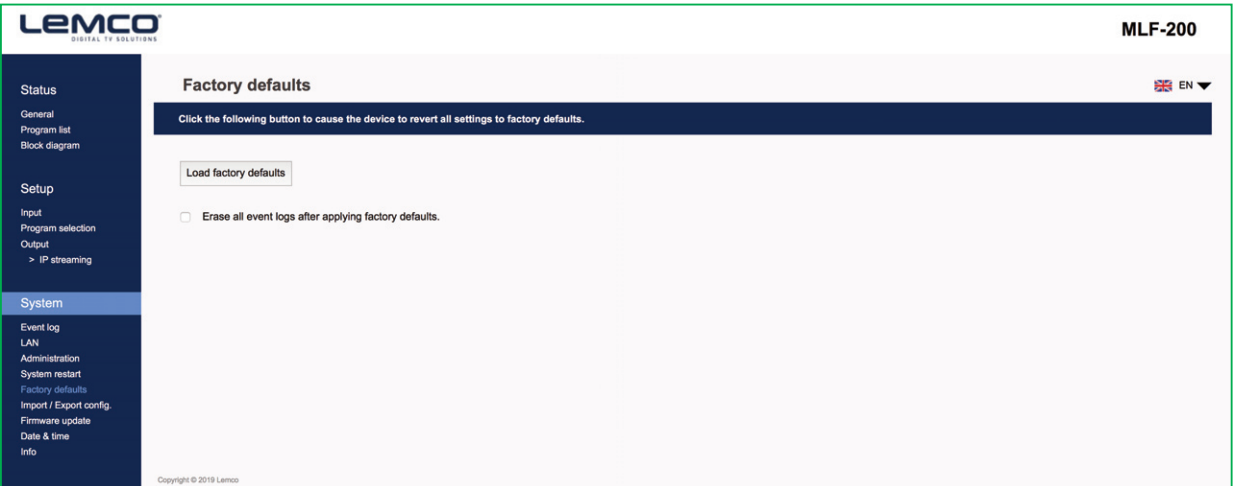


Figure No 15



4.2.12 - "Import/Export Config" page

In "Import/Export Config" section (Figure No 16) the user is able to do the following:

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

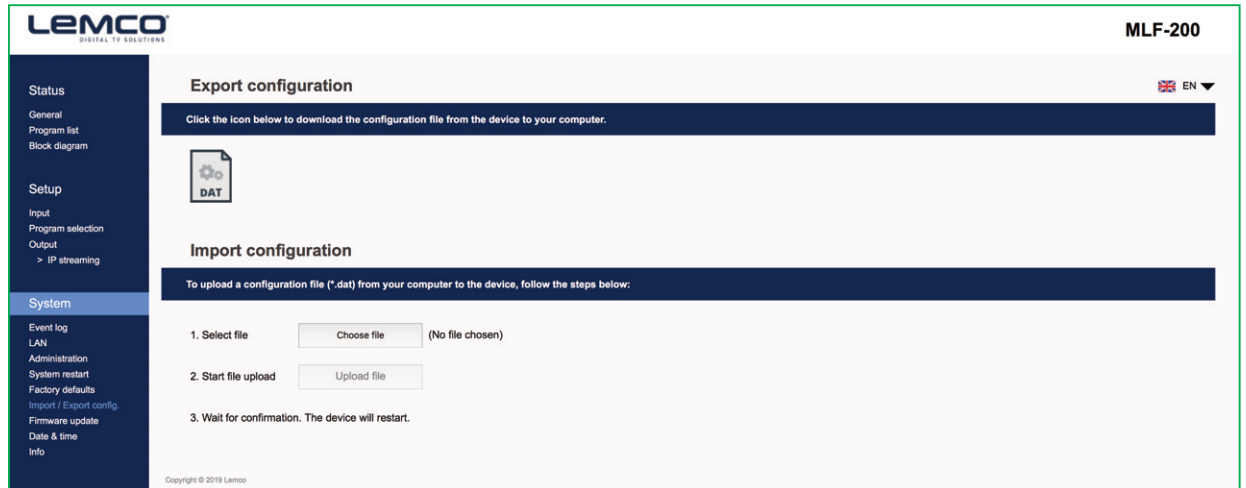


Figure No 16

4.2.13 - "Firmware update" page

In "Firmware update" (Figure No 17) section the user is able to upload a new firmware update using the appropriate file

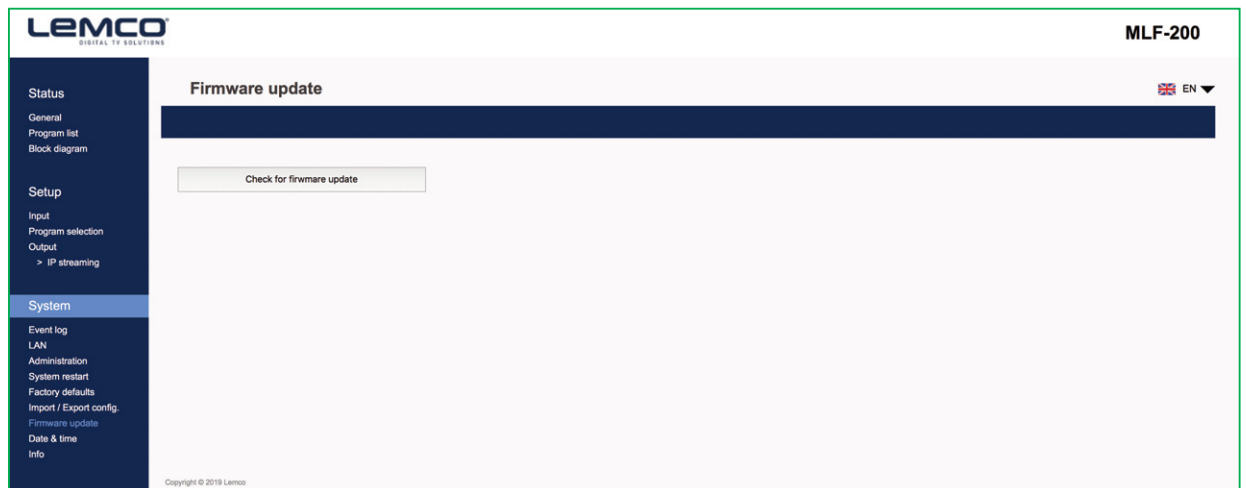


Figure No 17



4.2.14 - "Date & Time" page

In "Date & Time" (Figure No 18) 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.

The screenshot shows the 'Date & Time' configuration page. The left sidebar contains a menu with 'Status', 'Setup', and 'System' sections. The 'System' section is active, showing options like 'Event log', 'LAN', 'Administration', 'System restart', 'Factory defaults', 'Import / Export config.', 'Firmware update', 'Date & time', and 'Info'. The main content area is titled 'Date & time' and includes a language selector (EN). It displays 'System date & time:' and 'System uptime:'. Under 'Clock source', there are three options: 'From Input 2' (selected), 'From NTP server', and 'Custom' (with a text field containing 'biabla'). A 'Timezone' dropdown is set to 'UTC+3'. An 'Apply' button is at the bottom.

Figure No 18

4.2.15 - "Info" page

In "Info" (Figure No 19) section the user is able to see the serial No of the device as well as firmware and hardware versions.

The screenshot shows the 'Info' configuration page. The left sidebar is the same as in Figure 18. The main content area is titled 'Info' and includes a language selector (EN). It displays 'Hardware and Firmware Information'. A table lists the following information:

Serial number	123456
Firmware version	0.90
Platform HW version	08040ADD0550087
Platform FW version	0C08000000
VHDL version	1.234
Controller MAC address	d8:80:39:30:6c:2a
IP streamer MAC address	d8:80:39:55:6d:3f

Figure No 19



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
Spectral inversion	(8PSK- automatic)
	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**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

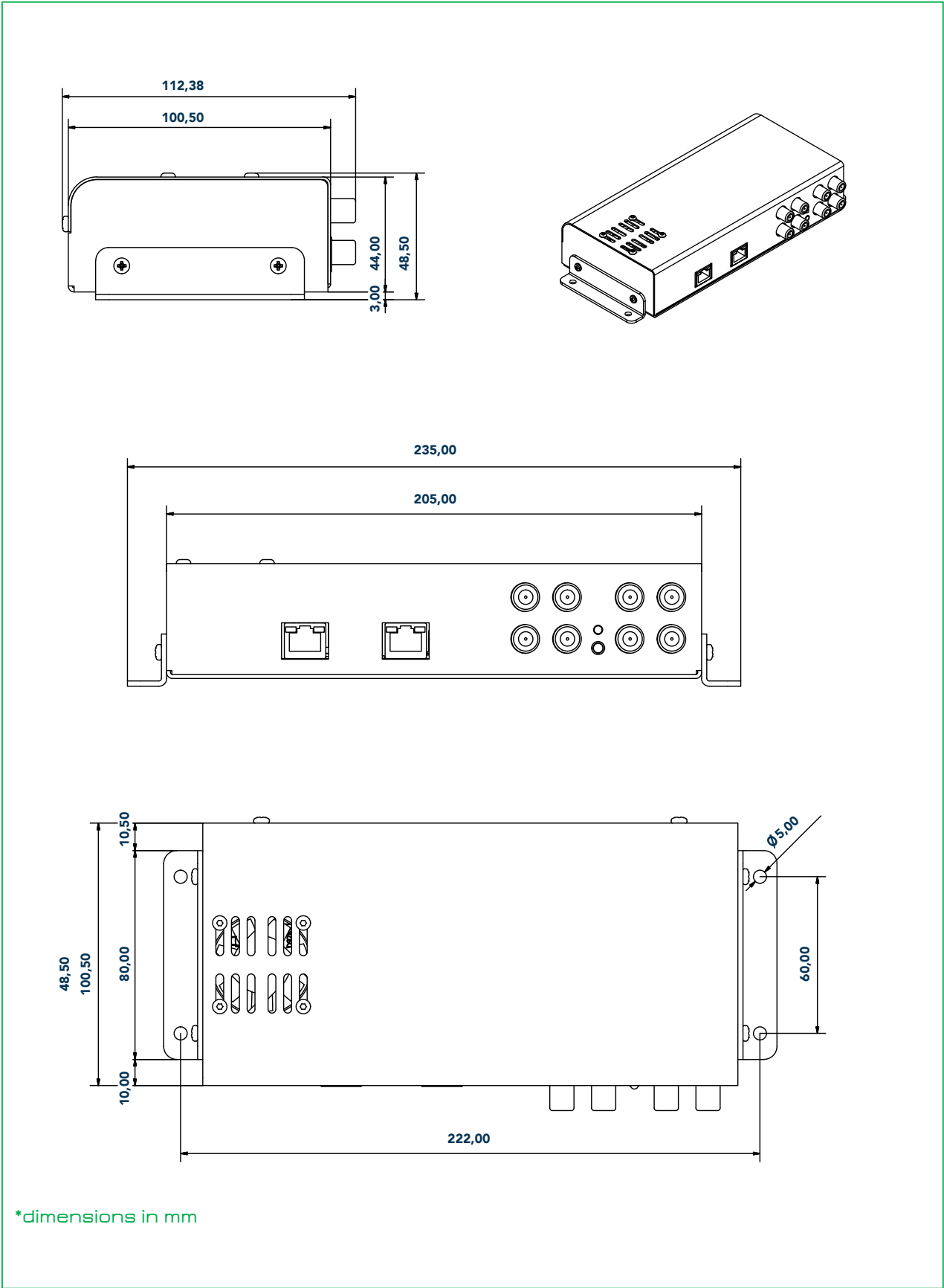
Ethernet webserver	Yes, embedded webserver
Speed	10/100 Mbps
Connector	RJ45
Browser compatibility	Chrome, Firefox, Safari, Opera, Edge etc. (Must support HTML v5.0)
SNMP support	Yes
SNMP version	v2.0

General

Power Supply	2 x +12VDC
Power supply consumption	1.4A 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





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.

9. NOTES



LEMCO[®]

DIGITAL TV SOLUTIONS

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