SCL-814CT

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

Operation Manual

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. INTRO

Congratulations on purchasing the SCL-814CT. 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 SCL-814CT is a very powerful, all-in-one device, able to receive up to 8 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 while making Gbit IP streaming **simultaneously**. It supports "pool" technology, meaning that the user is able to select any program from any of the 8 inputs and assign it to any of the 4 RF + IP outputs providing great flexibility.

The embedded web server of the SCL-814CT 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 SCL-814CT 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 and IP technology.

3.2 - FEATURES

- 8 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 > 40dB
- Very clean RF spectrum
- PCR re-stamping
- Very friendly user interface
- Wall or rack mountable
- Compact size
- 5 year warranty

3.2.1 - Auto-reset functions and watchdog

During the normal operation of the SCL-814CT, 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 SCL-814CT 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 SCL-814CT 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 SCL-814CT without the need of any firmware upgrade.

3.2.4 - IP streaming

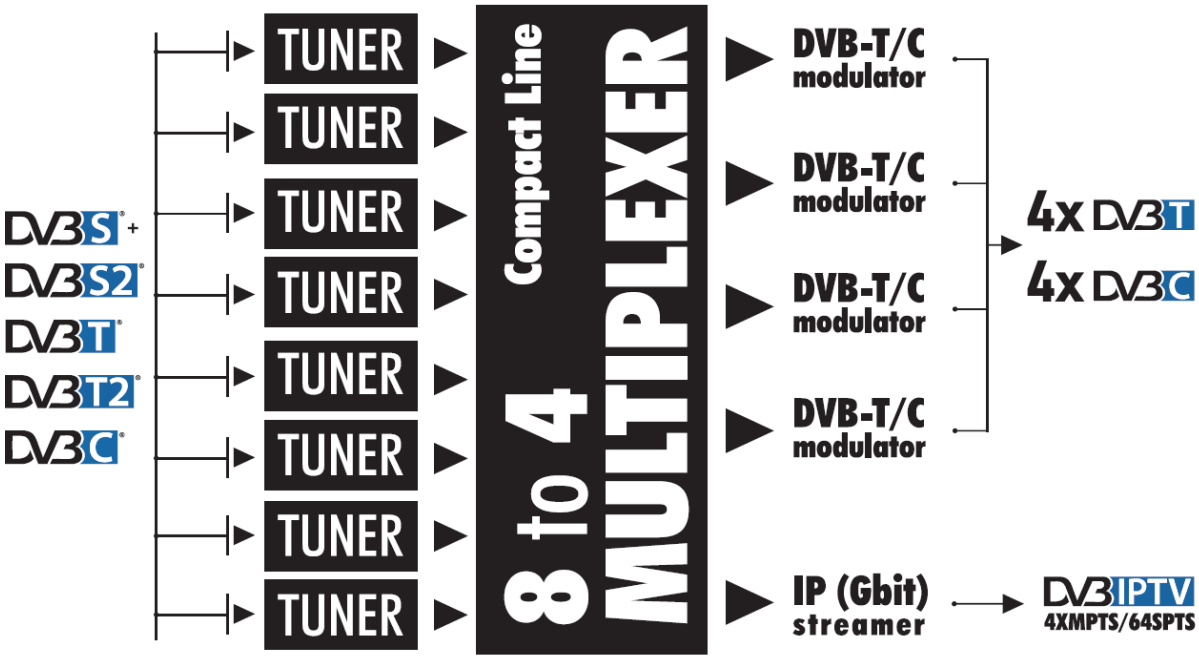
The SCL-814CT is able to make IP streaming simultaneously with the RF modulation up to 64 SPTS programs or 4 MPTS using UDP or RTP protocol, multicast or unicast.

The max. output bitrate can be up to 480 Mbps in “IP only” mode.

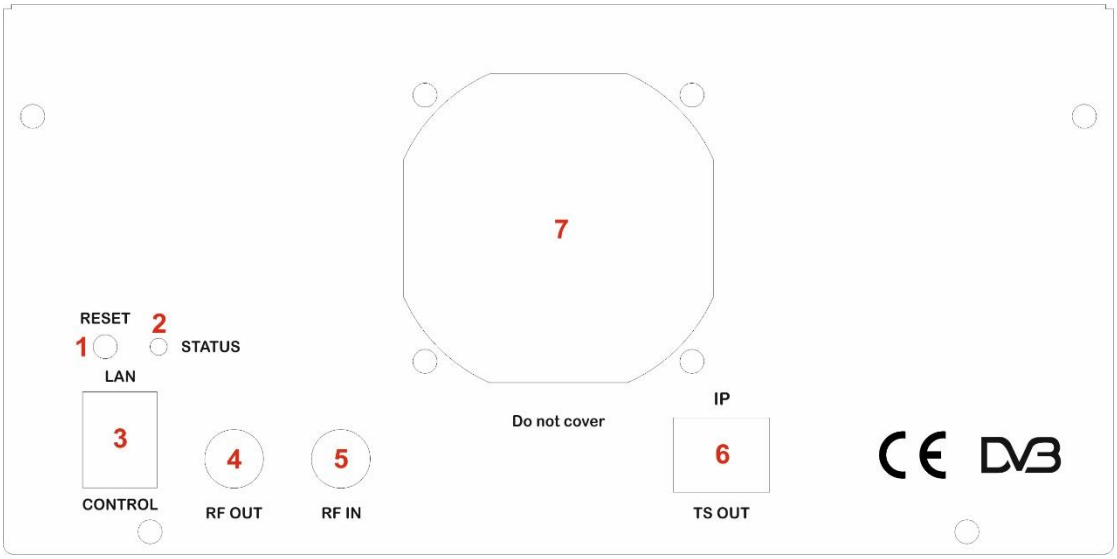
3.2.5 - Smart cooling

The SCL-814CT uses “Smart Cooling” technology in which the fan increases/decreases its speed according to temperature variation. In case the temperature is lower than 25ºC the fan stops working to expand its lifetime. In case of fan failure or over temperature (>65ºC) the device stops working to protect itself.

3.3 - BLOCK DIAGRAM

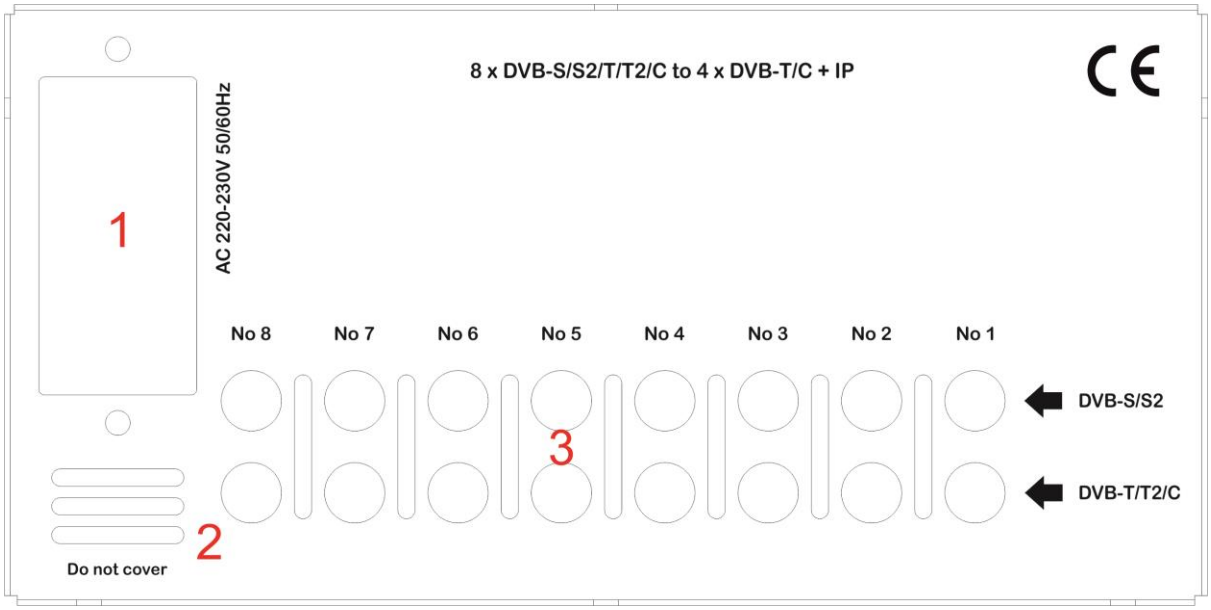


3.4 - FRONT PANEL



1. Reset button
2. Status LED
3. IP LAN control
4. RF output
5. RF input
6. IP streaming output
7. Fan cooler

3.5 - BACK PANEL



1. Power input
2. DVB-S/S2/T/T2/C inputs
3. Air ways

4. INSTALLATION

4.1 - General

The SCL-814CT 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: **192.168.1.200.**

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.

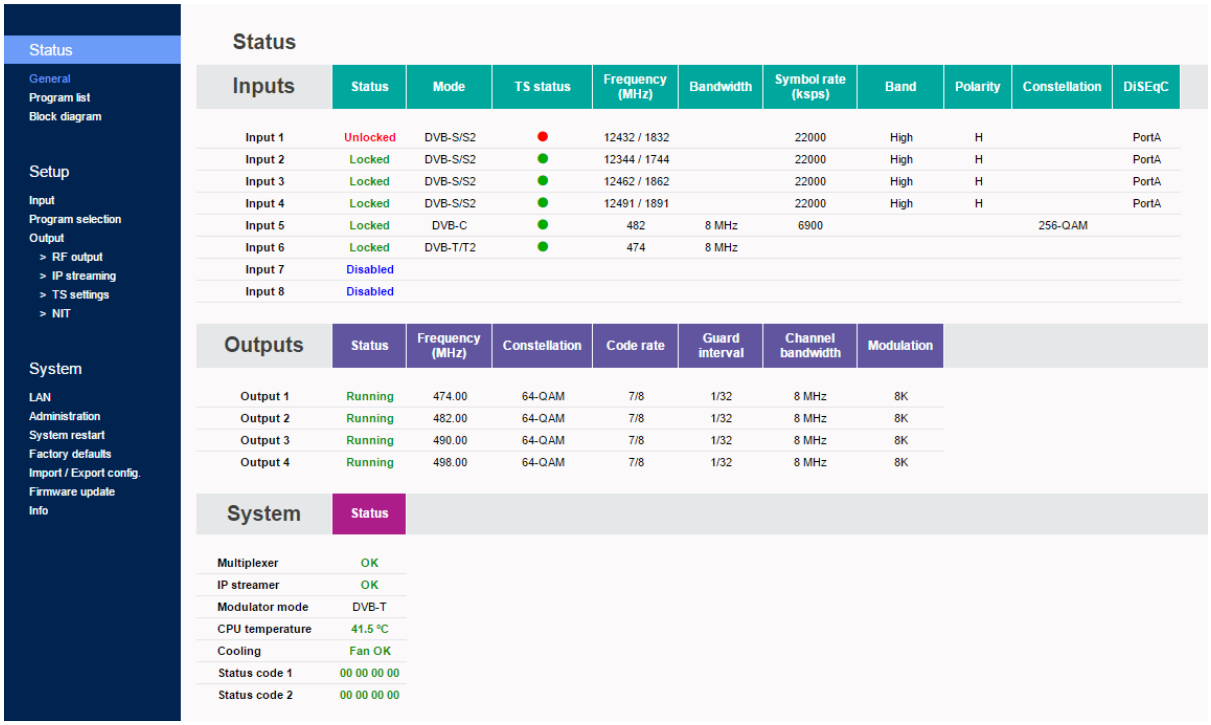


Figure No 1

Status - Inputs 1…8
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 SCL-814CT provides information of all programs that are currently being distributed via its four RF and IP outputs.

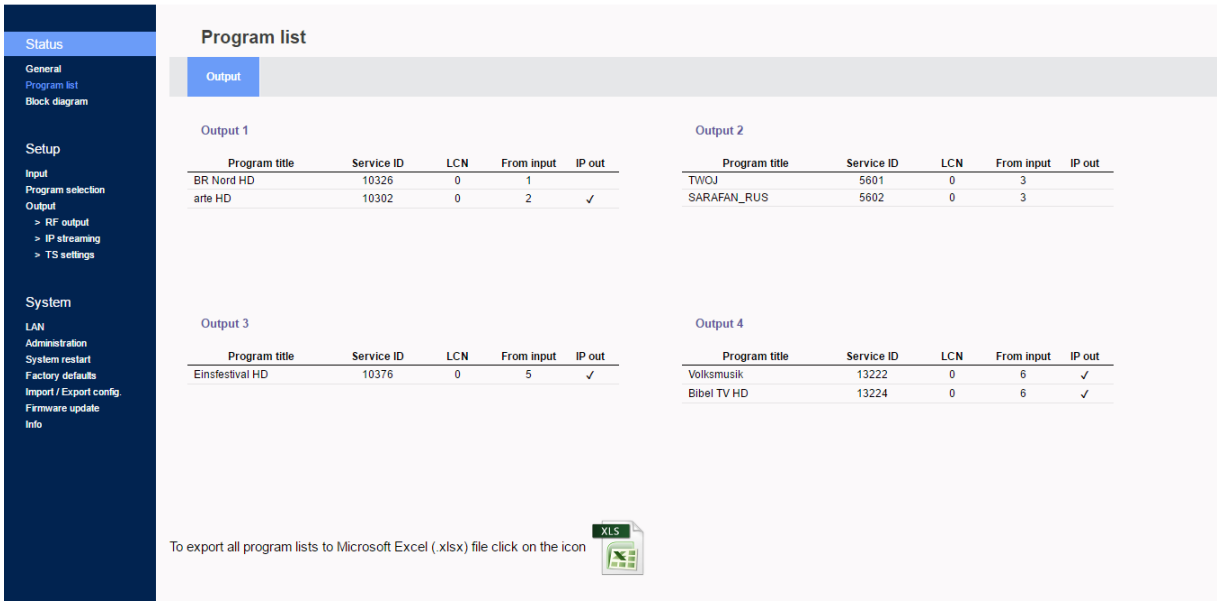


Figure No 2

A small √ appears under the IP column indicating that the current program is being distributed via IP too, along with the RF output.

By pressing the Excel icon at the bottom of the page, a report is generated in an Excel format document (.xlsx).

4.2.3 - "Block diagram" page

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

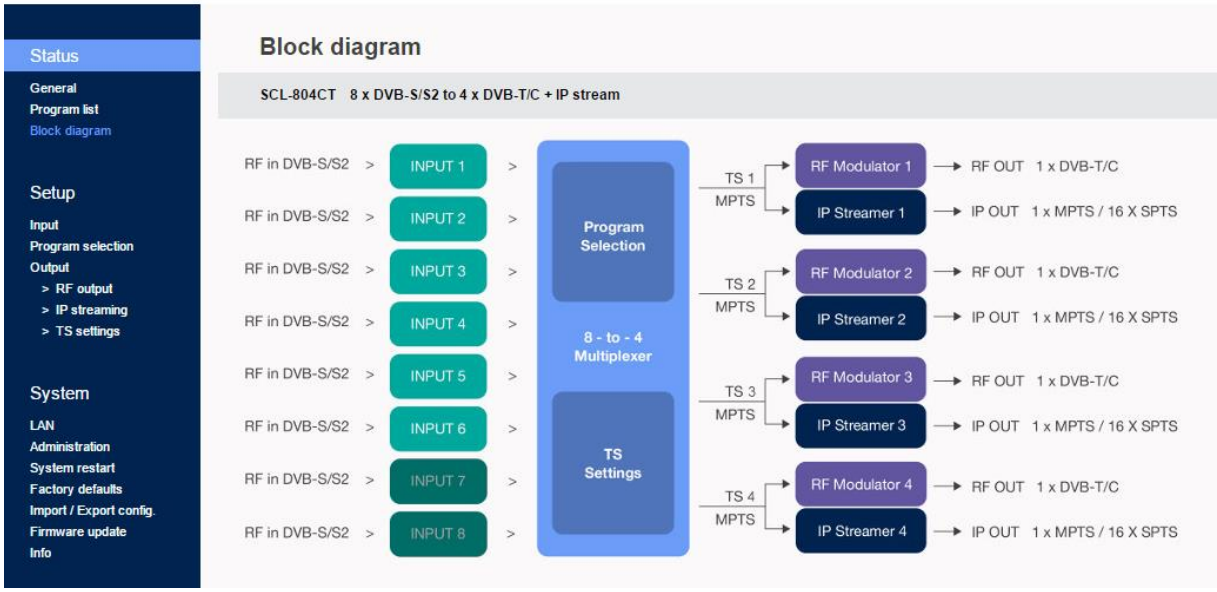


Figure No 3

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

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

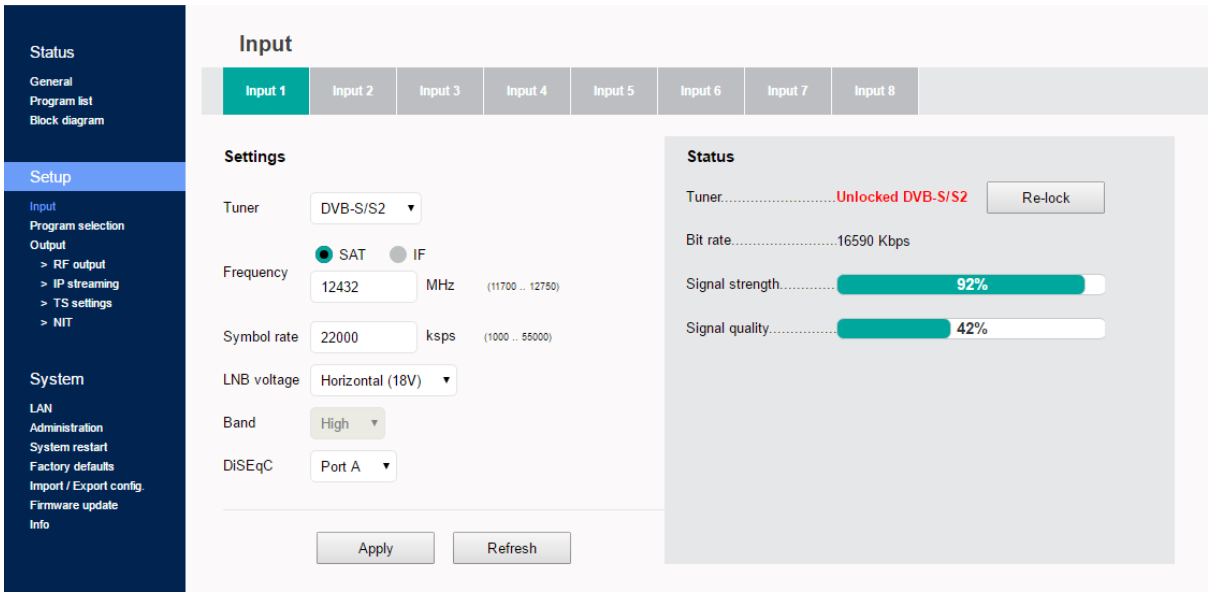


Figure No 4

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

For 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 DVB-T/T2 mode:

1. Tuner Enabled/Disabled - Enable or disable the specific tuner
2. Frequency – Insert the input frequency
3. Bandwidth – Insert the input 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 SCL-814CT provides several information such as tuner status (Locked/Unlocked), total bitrate, signal strength and 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.

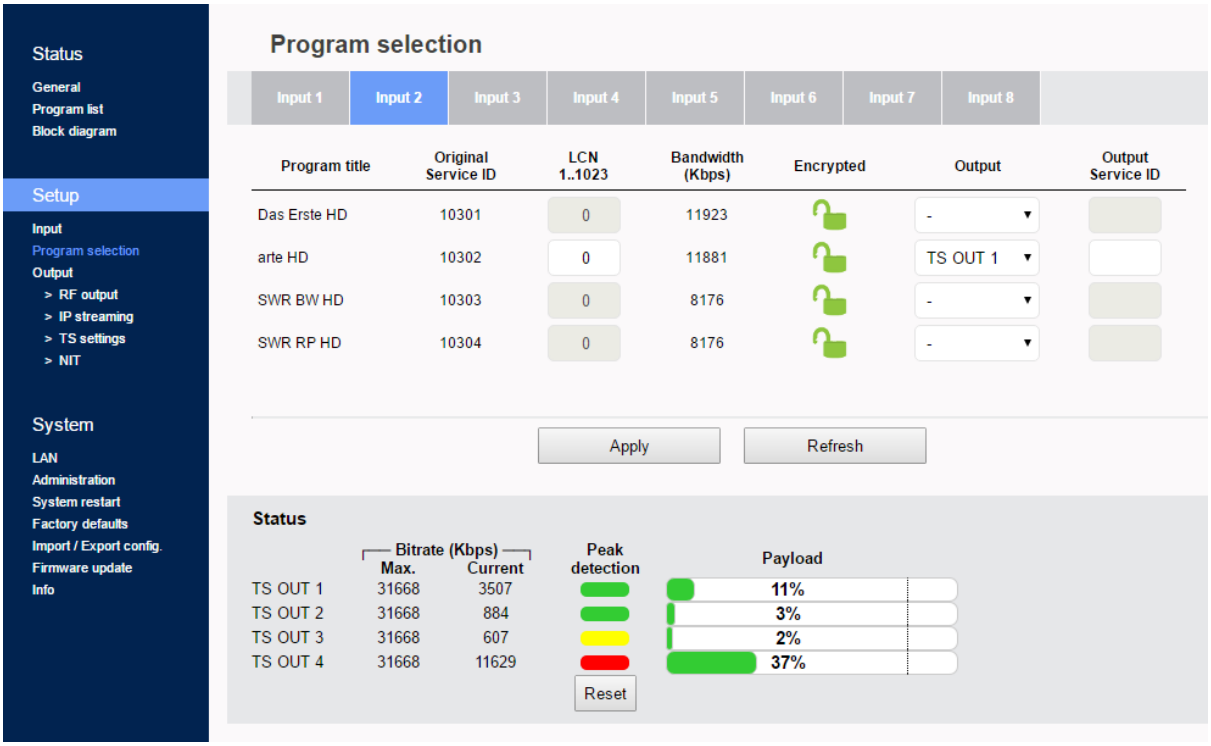


Figure No 5

There are 8 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.

For each program the SCL-814CT provides the following information:

- Program Name – which is the name of the 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
- Encrypted – which depicts if the program is FTA (Free-To-Air) or not
- Output Service ID – The user is able to provide custom Service ID number

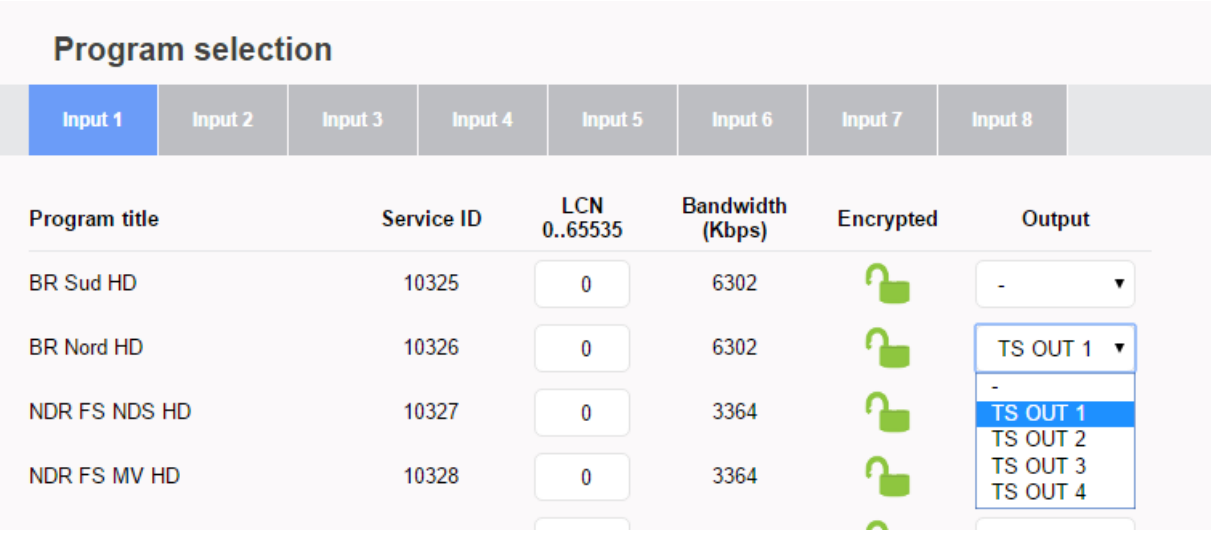


Figure No 6

Using the Drop down menu from "Output" column (Figure No 6) 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.

Caution!

The number of programs that the SCL-814CT can distribute on its output depends on the quality (SD or HD), the compression (MPEG2, H.264 etc…) and the total bitrate of each program.

For example, if we select the following DVB-T setting for the four modulators on SCL-814CT 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.

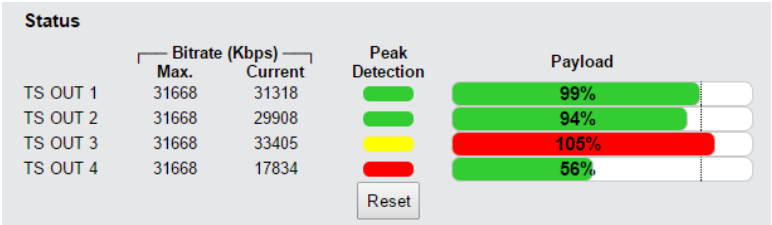


Figure No 7

The status section in (Figure No 7) 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 7 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 8) the user is able to setup the RF output settings of the SCL-814CT.

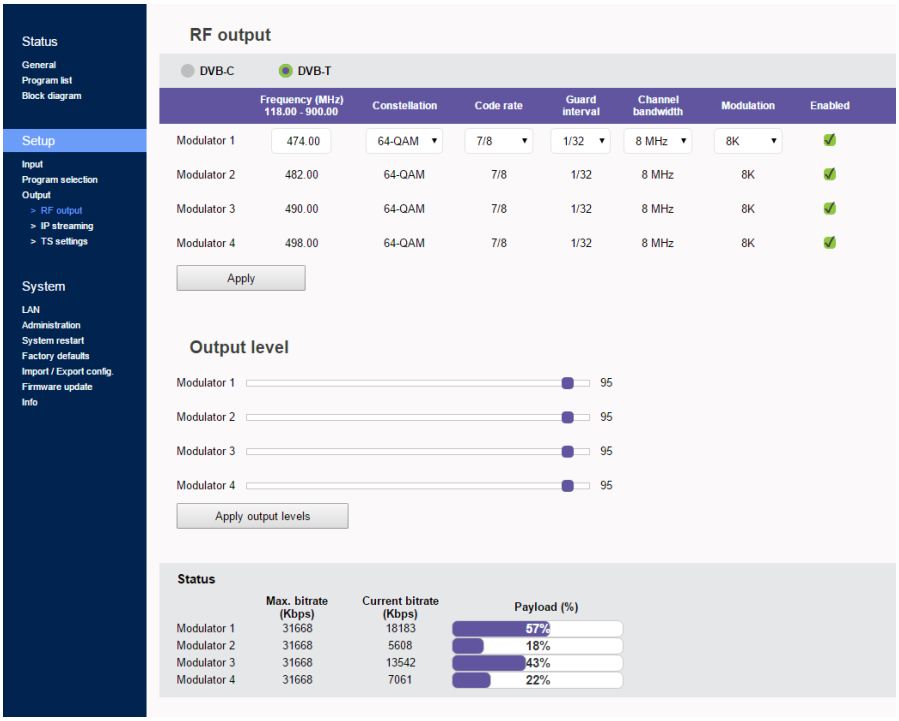
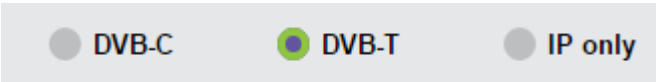


Figure No 8



With the use of the radio buttons the user is able to select the mode that the SCL-814CT will operate as follows:

DVB-T: 4 x modulator working in DVB-T standard + IP streaming
DVB-C: 4 x modulator working in DVB-C standard + IP streaming
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 SCL-814CT 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.

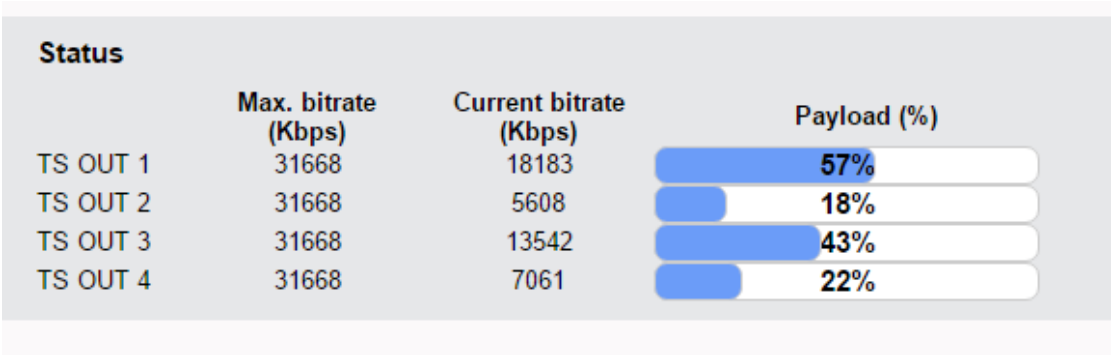


Figure No 9

4.2.7 - “IP streaming” page

In “IP streaming” page the user is able to setup the IP streamer of the device.

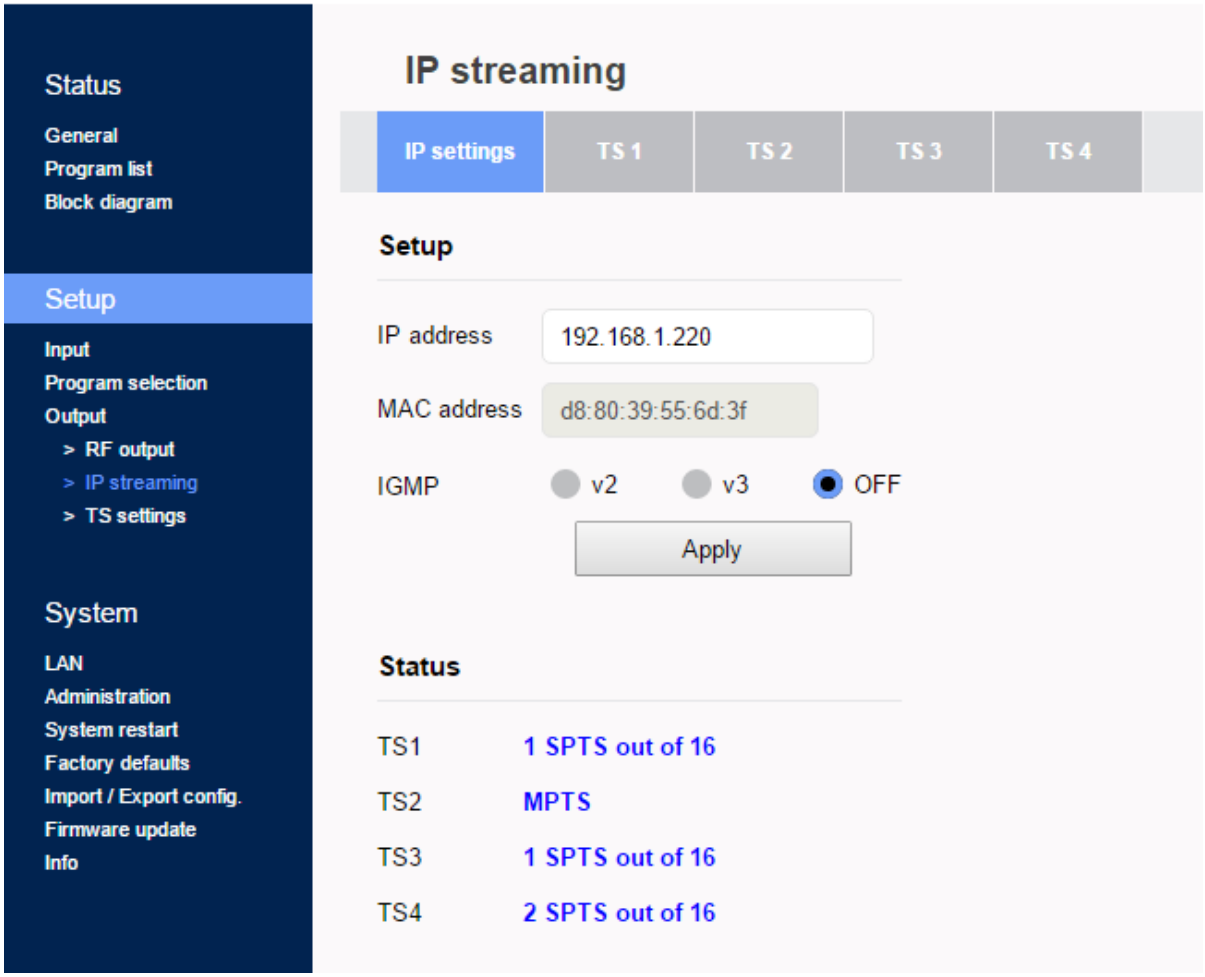


Figure No 10

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
- 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.

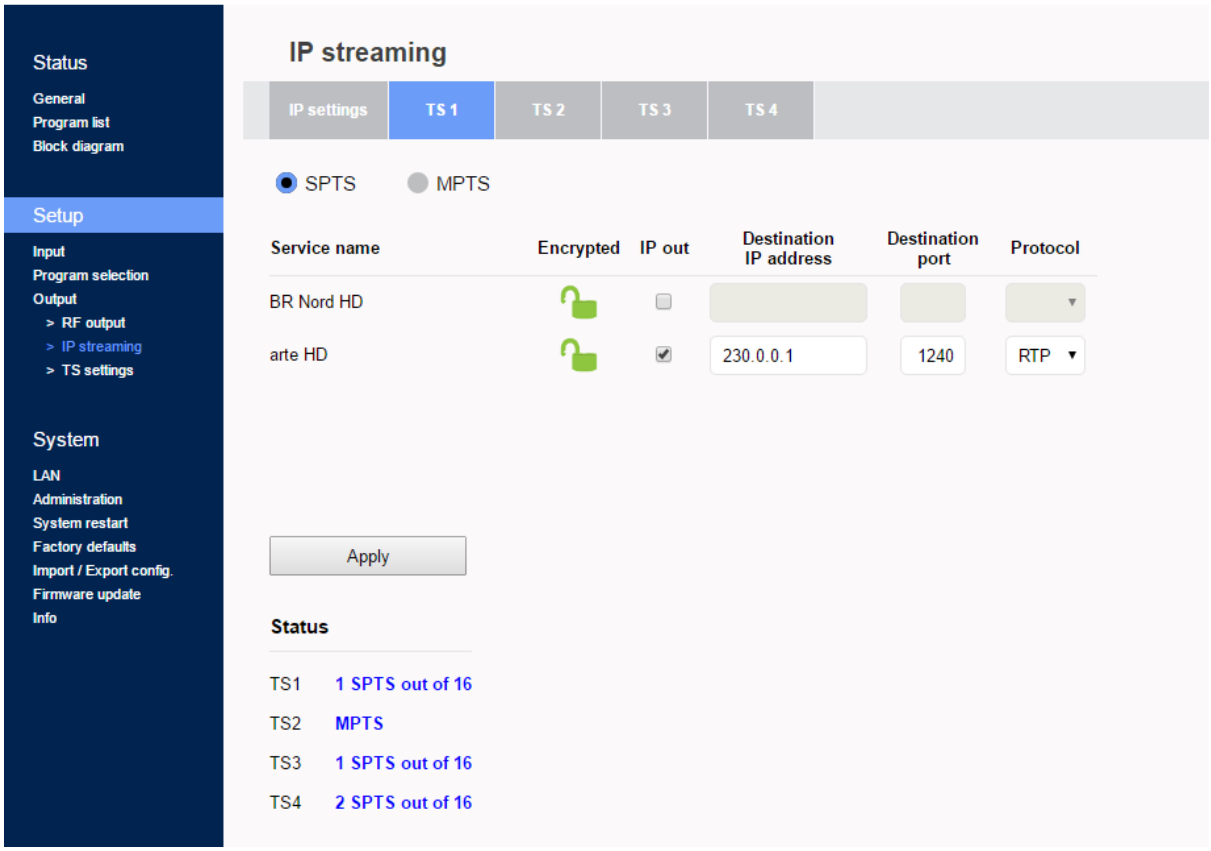


Figure No 11

In order to setup the IP address for each program there are four tabs one for each IP output of the SCL-814CT.

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 SCL-814CT, the user is able to setup the IP streamer of the device.

4.2.8 - “TS settings” page

In this section (Figure 12), the user is able to setup all the TS settings of the four multiplex in SCL-814CT’s output.

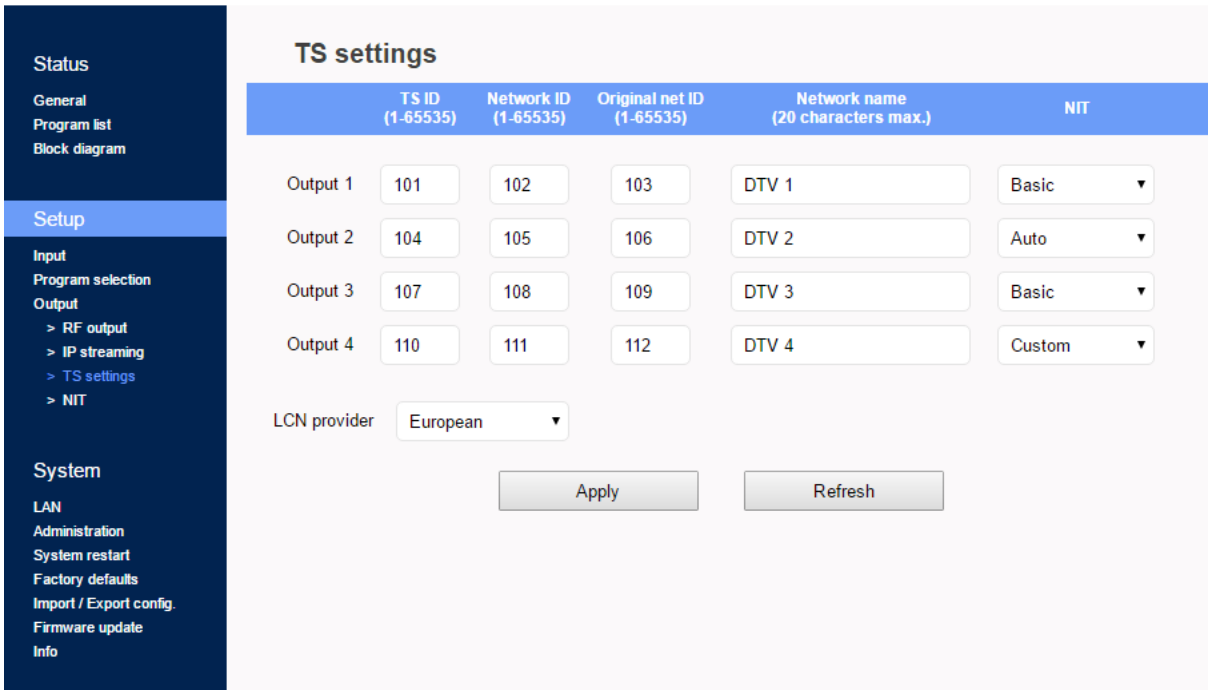


Figure No 12

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
LCN provider: Choose the appropriate LCN provider (EACEM, ITC, Nordig, APN)
NIT: In this field the user is able to select on of the following NIT mode:

1. Off – In case we don’t need NIT
2. Basic – In case we need a basic NIT
3. Auto – In case we need a NIT with more information comparing to Basic.
4. From Input 1 – In case we need to pass-through the NIT from input No 1
5. From Input 2 – In case we need to pass-through the NIT from input No 2
6. From Input 3 – In case we need to pass-through the NIT from input No 3
7. From Input 4 – In case we need to pass-through the NIT from input No 4
8. From Input 5 – In case we need to pass-through the NIT from input No 5
9. From Input 6 – In case we need to pass-through the NIT from input No 6
10. From Input 7 – In case we need to pass-through the NIT from input No 7
11. From Input 8 – In case we need to pass-through the NIT from input No 8

4.2.9 - “NIT” page

In this section (Figure 13) the user is able to setup several NIT (Network Identification Table) for SCL-814CT’s output.

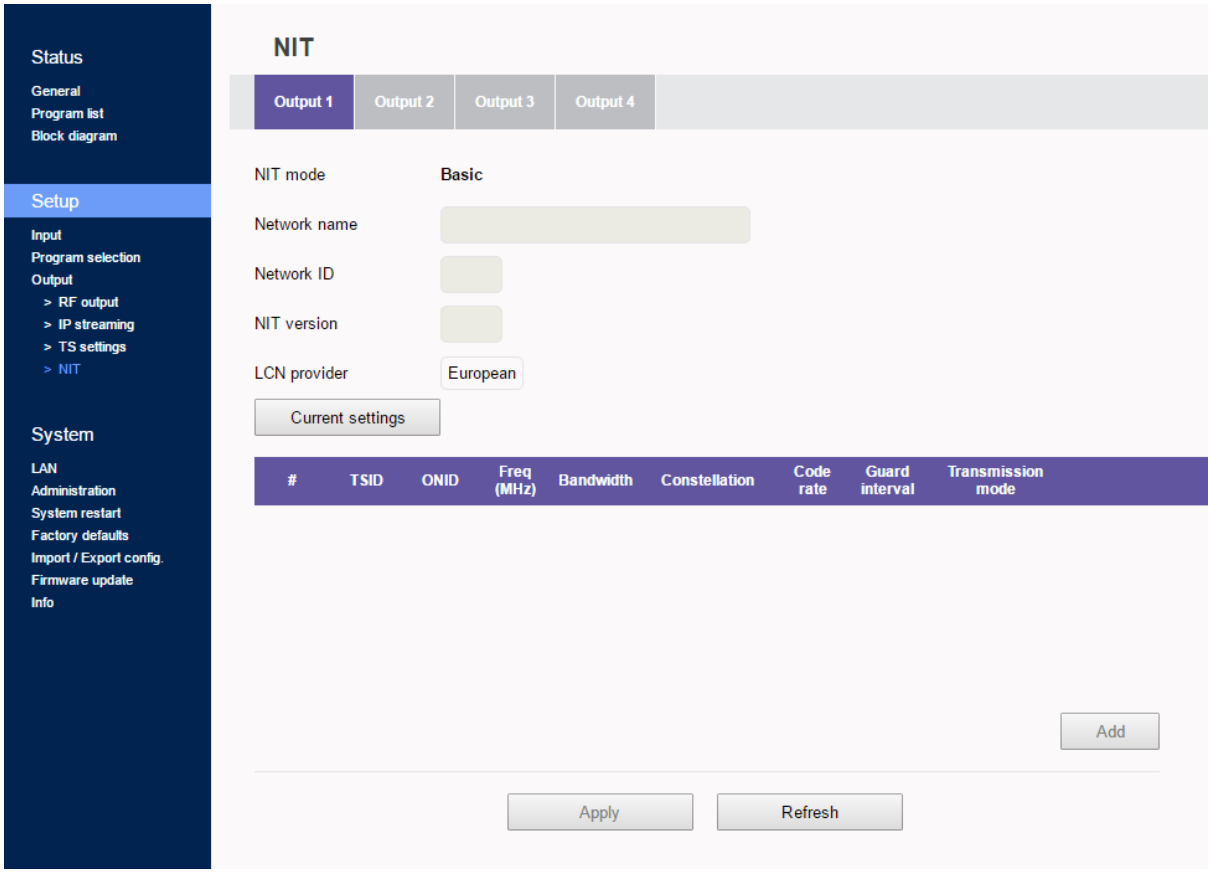


Figure No 13

System

4.2.9 - “LAN” page

In “LAN” page (Figure No 13) the user is able to setup all the parameters of the LAN control of the device as follows:

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

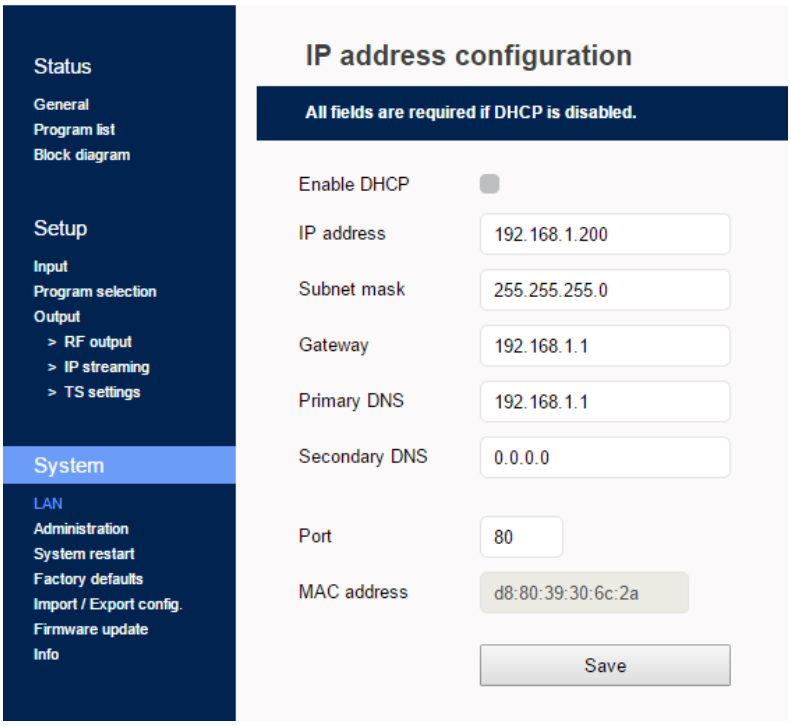


Figure No 14

4.2.10 - “Administration” page

In “Administration” section the user is able to change the default password of the webserver.

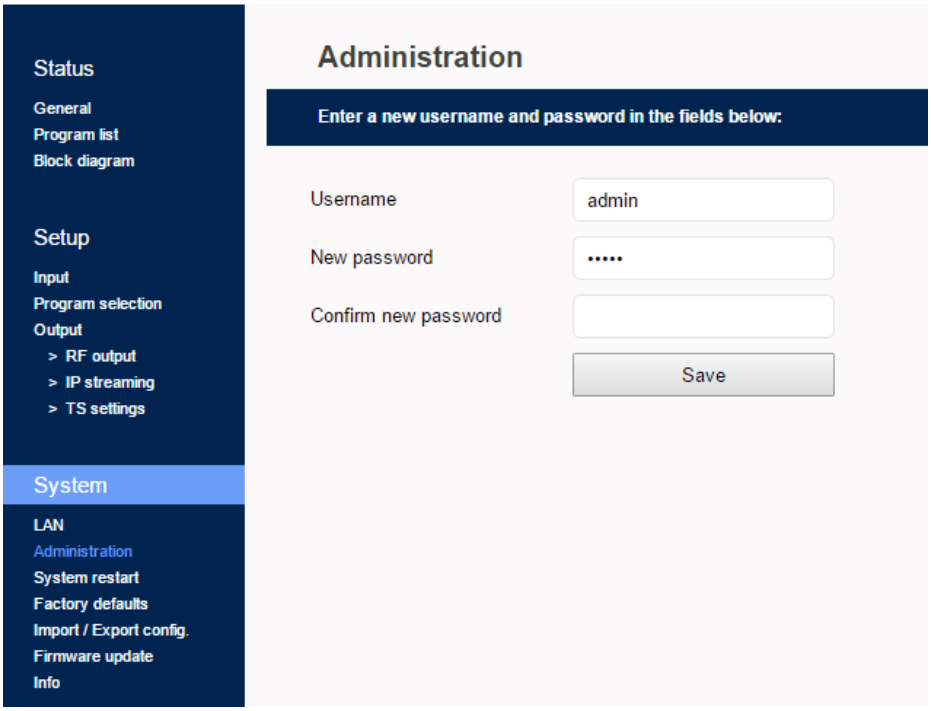


Figure No 15

4.2.11 - “System restart” page

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

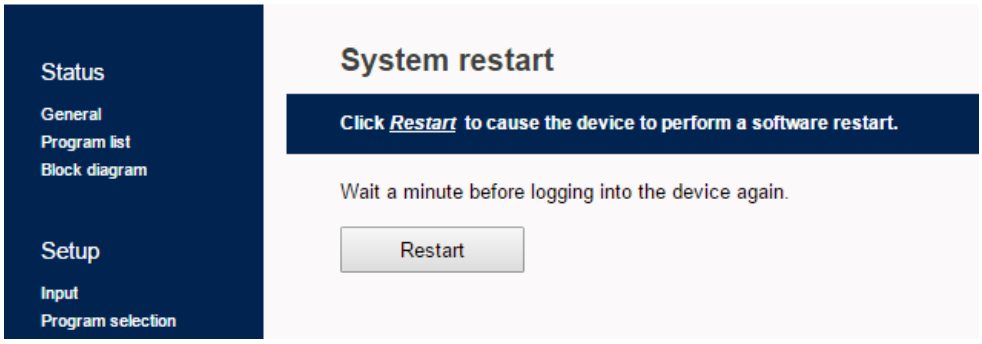


Figure No 16

4.2.12 - “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.

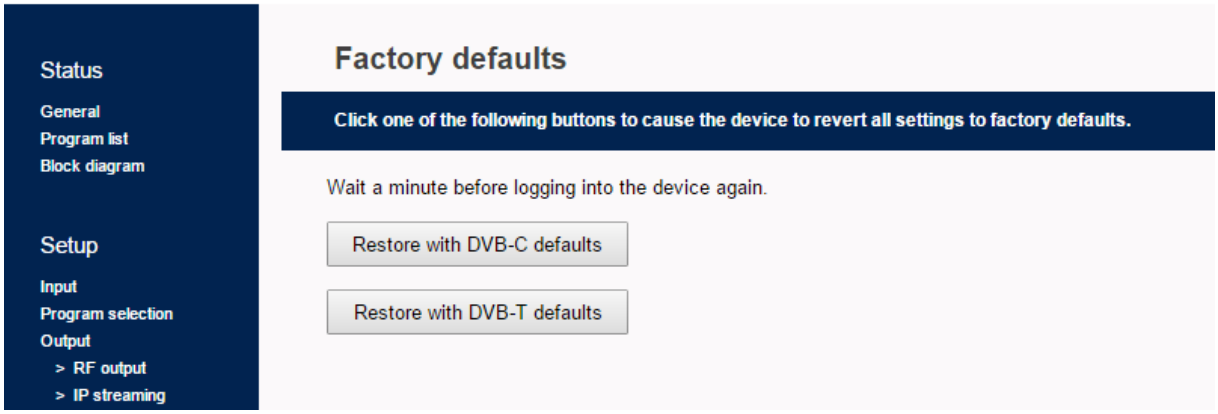


Figure No 17

4.2.13 - “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 is a specific file
2. Import: Upload a previously save configuration file.

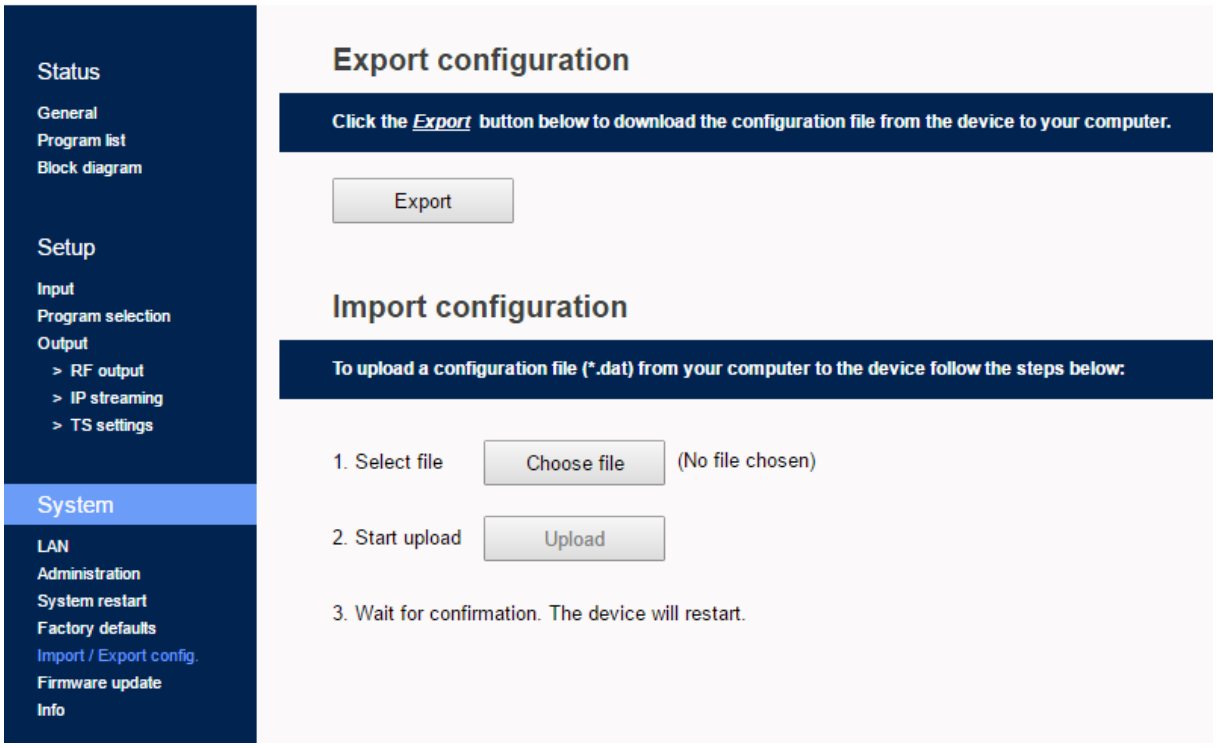


Figure No 18

4.2.14 - “Firmware update” page

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

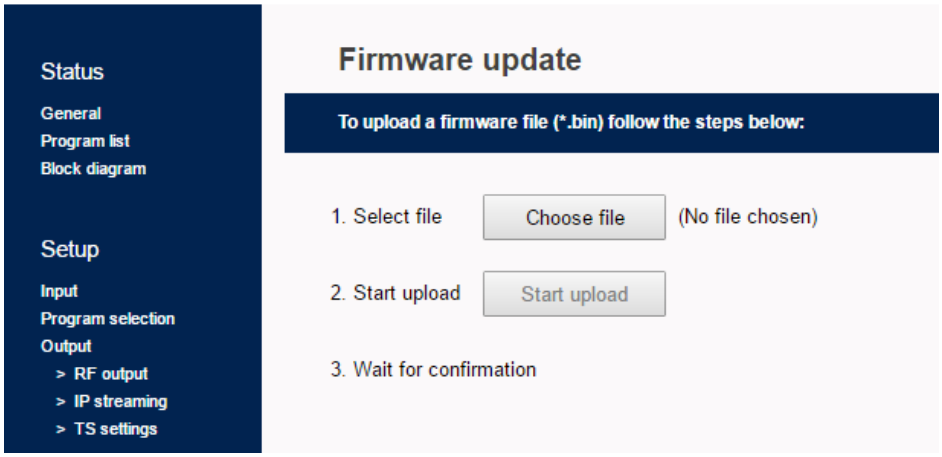


Figure No 19

4.2.15 - “Info” page

In “Info” (Figure No 18) section the user is able to see the serial No of the device as well as firmware and hardware versions.

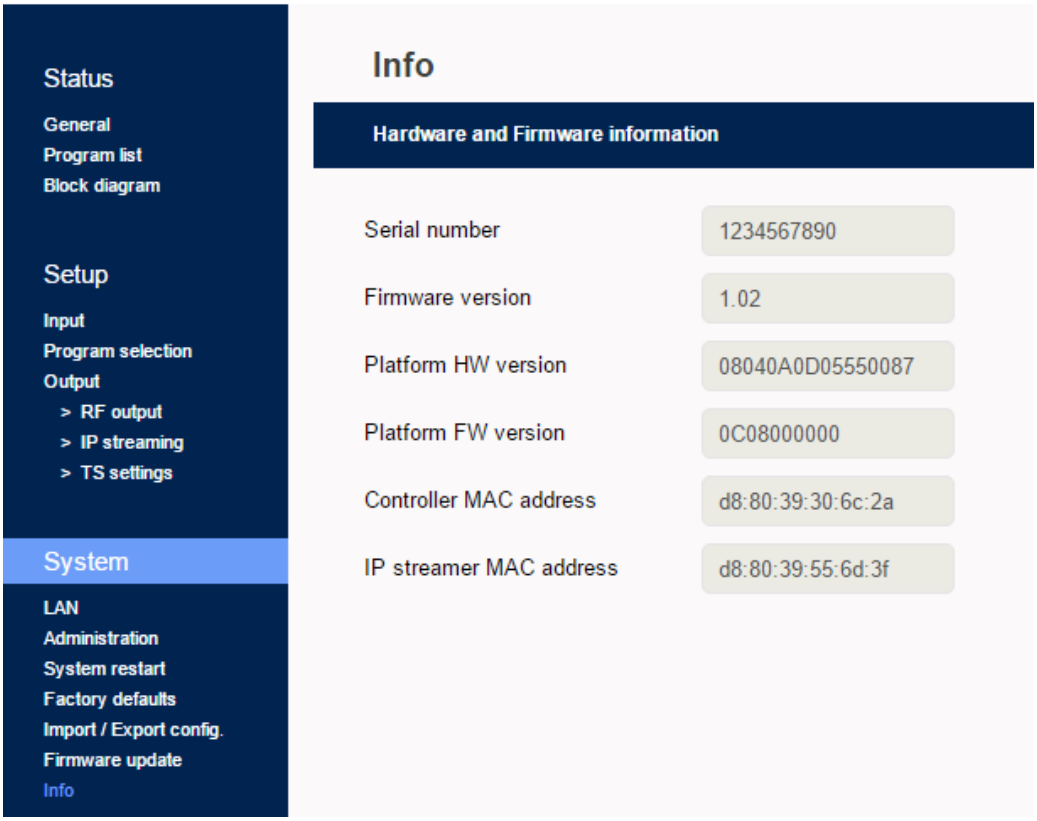


Figure No 20

5. TECHNICAL SPECIFICATIONS

Input Specifications

Input

Type	8 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

Symbol Rate	1 - 45 MBaud
Roll off factor	0.35
Code Rate	1/2, 2/3, 3/4, 5/6, 7/8 (Automatic)
Spectral Inversion	Reverse, Non-reverse (Automatic)

DVB-S2

Constellation	QPSK, 8PSK (Automatic)
Symbol Rate	1 - 45 MBaud (QPSK)
	1 - 30 MBaud (8PSK)
Roll off factor	0.2 / 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

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

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

DVB-C (Annex A,B,C)

Bandwidth	5, 6, 7, 8 MHz
Mode	Automatic modulation detection
Constellation	16QAM, 32QAM, 64QAM, 128QAM, 256QAM

Output Specifications

DVB-T

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

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	36…950 MHz (1 Hz step)
Output Level	90dBμV
Connector	75Ω - F, female
Output Attenuator	0…-20dB
MER	>40dB
Output loop-through loss	<1dB

Transport Stream Processing

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

IP Streaming

IP TS Out	Yes
Protocol	UDP / RTP (Multicast/Unicast)
Speed	1 Gbit (480 Mbps in IP only mode)
IGMP support	Yes, v2, v3
Type	MPTS (up to 4 TS) SPTS (up to 8 HD programs)

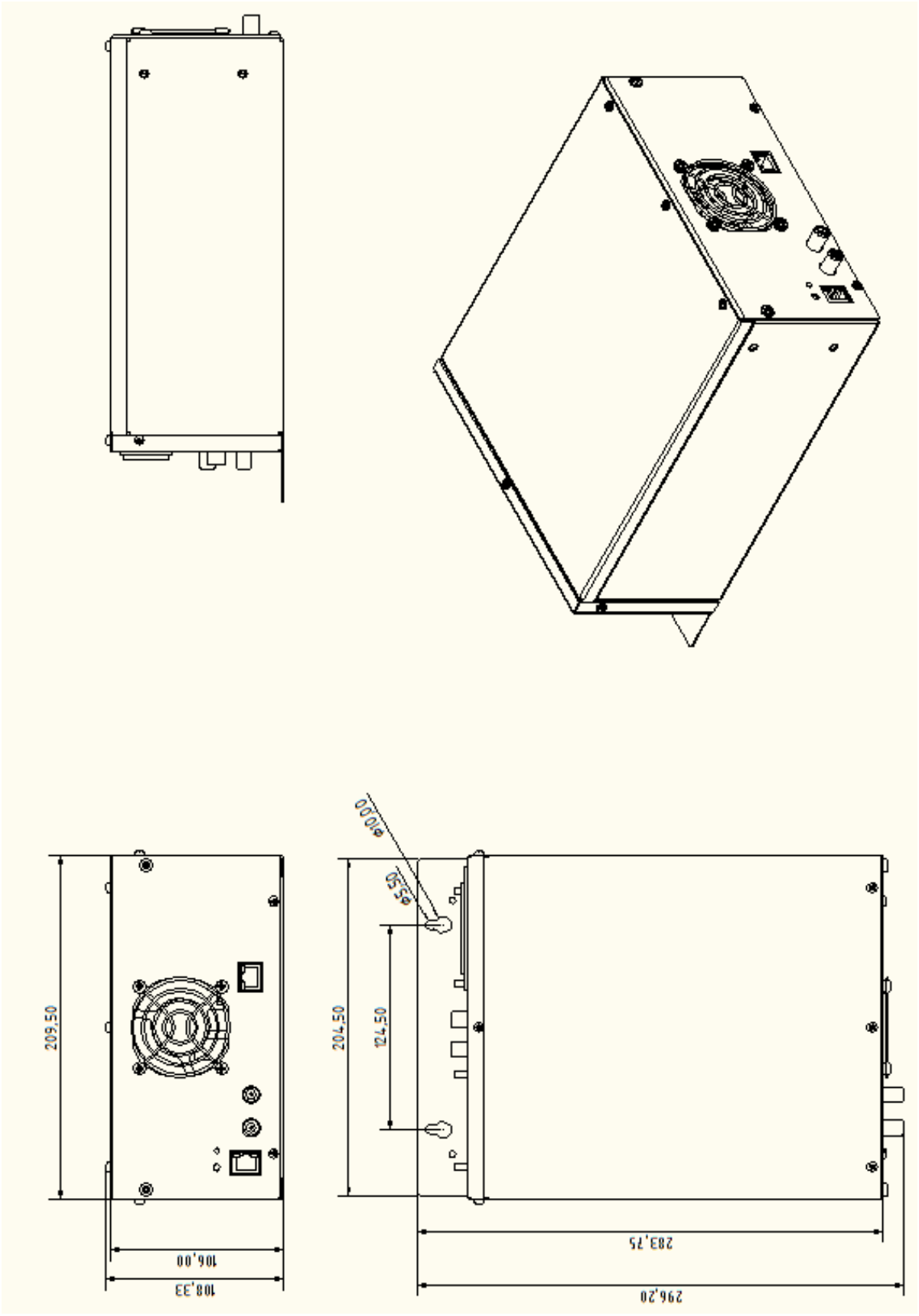
Programming Interface

Ethernet webserver	Yes, embedded webserver
Speed	10/100 Mbps
Connector	RJ45
Browser compatibility	Chrome, Firefox, Safari, Opera, Edge et al.

General

Power Supply	~108 to 240 VAC 50/60Hz
Power supply consumption	55 VA max.
Operating Temperature	0 ºC to 40 ºC
Storage Temperature	-10 ºC to +70 ºC
Humidity	Up to 90%
Dimensions	296.2 x 204.50 x 106 mm
Weight	1.7 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
QPSK	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
16-QAM	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
64-QAM	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
QPSK	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
16-QAM	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
64-QAM	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
QPSK	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
16-QAM	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
64-QAM	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

8. NOTES

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