DFL-100H

2 x HDMI to 2 x DVB-T/C

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 proper grounded socket. Insufficient grounding may cause electrocution.
- Always carefully disconnect all plugs by taking off the plug and strictly forbitten to pull the cord in order to disconnect the unit . 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 DFL-100H. You now own a high quality, semiprofessional DTV modulator. To get the most out of your purchase, please take the time to read carefully through this manual.

3. INSTRUCTIONS

3.1 DESCRIPTION

The DFL-100H is a very powerful, all-in-one device, able to receive up to 2 independent HD sources and to convert them in 2 x DVB-T/C RF output channel. The embedded web server of the DFL-100H 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 makes the DFL-100H the ideal solution to distribute HD sources coming from e.g. a STB or DVD player to a CATV installation using the DVB-T/C signals.

3.2 FEATURES

- 2 x independent HD inputs
- 2 x RF output DVB-T/C (software selectable)
- 2 x Power Supply's in redundancy mode (standard 1 power supply in the Box)
- Auto NIT & SDT Configuration
- Low power consumption
- MER value > 45dB
- Very clean RF spectrum
- PCR re-stamping
- Custom NIT & SDT
- Very friendly user interface
- Wall mountable
- Compact size
- 5 year warranty

3.2.1 Auto-reset functions and watchdog

During the normal operation of the DFL-100H , 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 DFL-100H 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 DVB-T or DVB-C compliant

The user is able to software select the modulation standard, between DVB-T and DVB-C, of the DFL-100H without the need of any firmware upgrade.

DFL-100H

1. Reset button
2. Status LED
3. IP LAN control
4. RF output
5. Power supply's Input with redundancy mode
6. HD inputs

4. INSTALLATION

4.1 General

The DFL-100H 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 (eg. 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

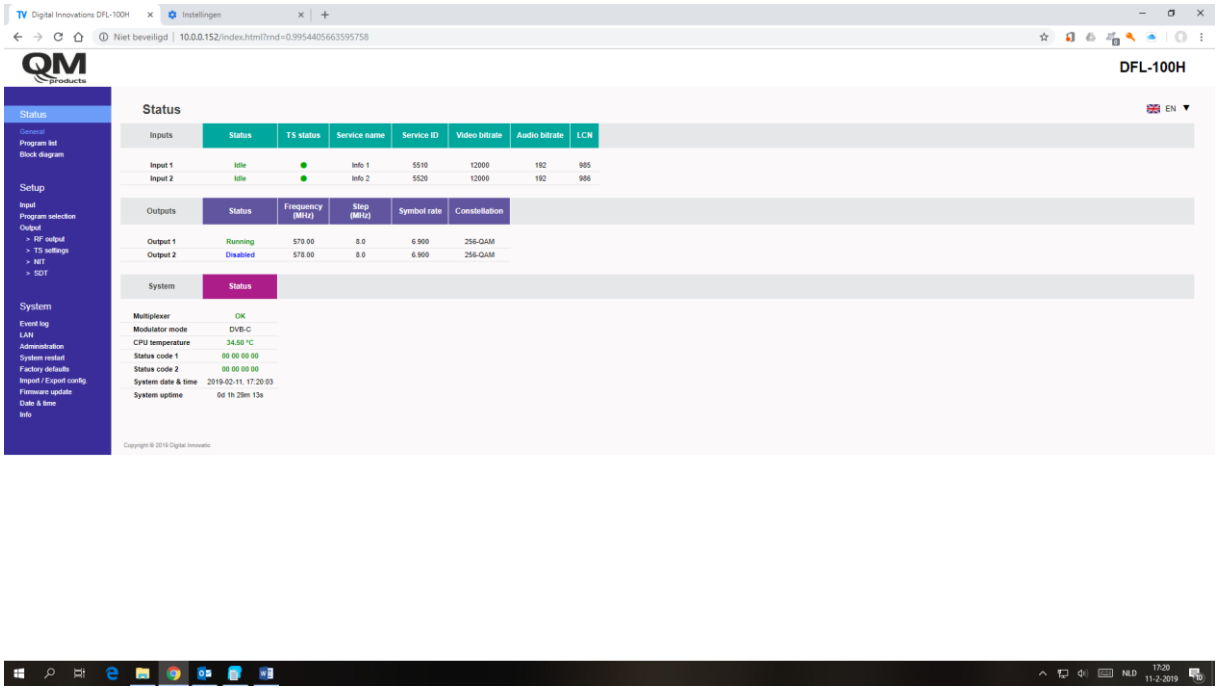

Figure No 1

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.

Status - Inputs 1.2.
In these fields, the user is able to see the status of each HD input e.g. if the H.264 encoder is running or if it is in idle state, its Service name, its Service ID, video/audio PID and LCN number.

Outputs – Modulator
In these fields, the user is able to see the status of all the RF output of the device such as modulator 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.

Program list

4.2.1A "Program list" page

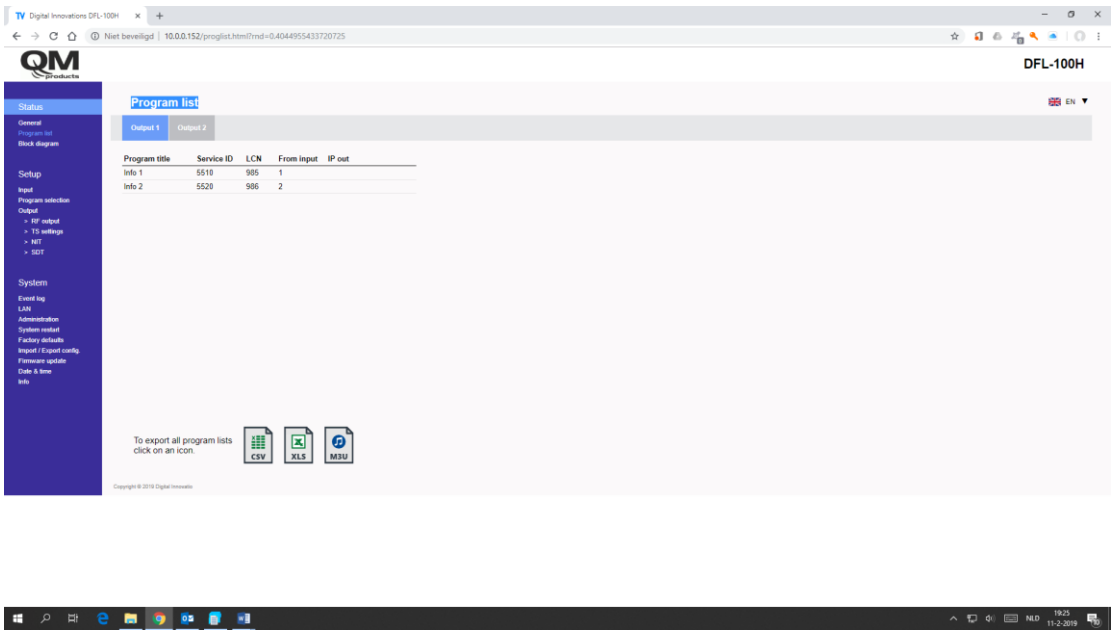

Figure No 1A

In "Program list" page (Figure No 1A) the DFL-100H provides information of all programs that are currently being distributed via its two RF outputs.

By pressing the Excel or the CSV icon at the bottom of the page, a report is generated in an Excel format document or Text document .

Block diagram

4.2.1B “Block diagram” page

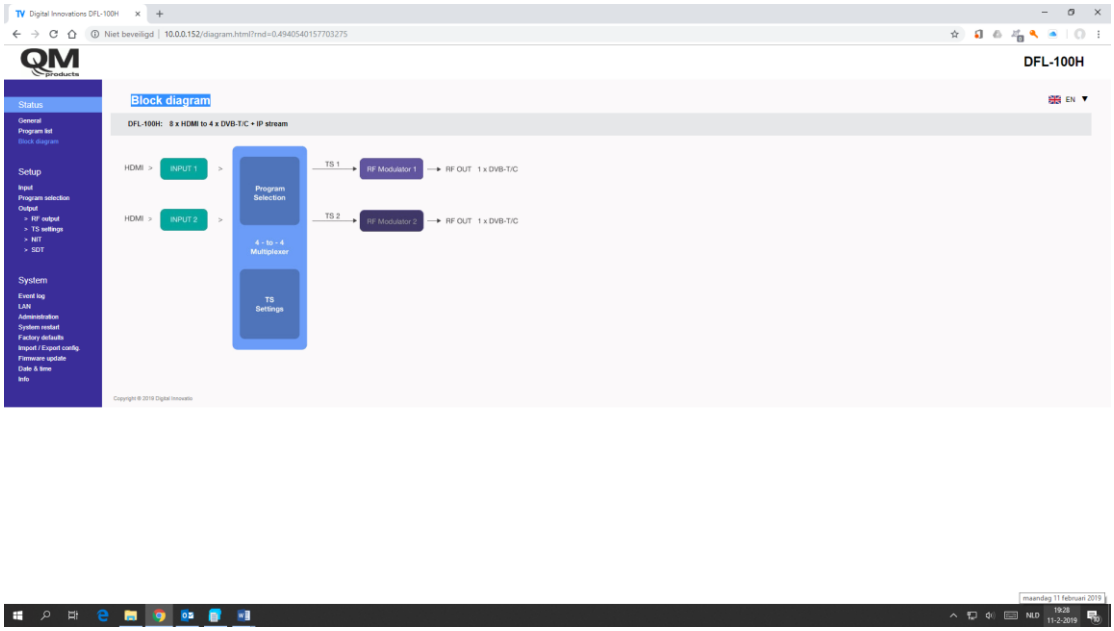

Figure No 1B

The “Block diagram” page (Figure No 1B) 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.

Setup

4.2.2 “Input” page

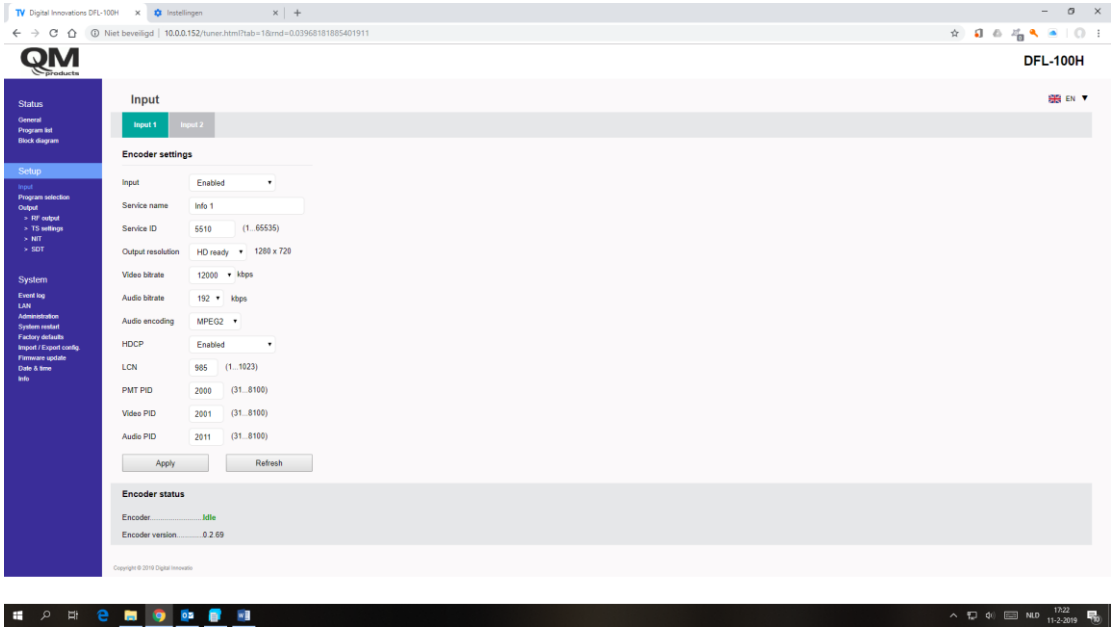

Figure No 2

In the “Input page” (Figure No 2) the user is able to setup each HD input independently. There are two tabs including all the 2 HDMI inputs. For each input the user needs to program the following fields:

1. Input Enabled/Disabled - Enable or disable the specific HDMI input
2. Service Name – Insert the preferred service name
3. Service ID – Insert the service ID number
4. Video Bitrate – Set the video bitrate (2000-19000 Kbps)
5. Audio Bitrate – Set the audio bitrate (64,96,128,192,256,320 Kbps)
6. Audio encoding – Set the audio encoding (AAC, AC3, Mpeg2)
7. HDCP – Enable/disable the HDCP function
8. LCN – Set the LCN number
9. PMT PID – Set the PMT PID
10. Video PID – Set the Video PID
11. Audio PID – Set the Audio PID

Once all settings are being written, the user must click the “Apply” button for the settings to be saved.

Program selection

4.2.2A “Program Selection” page

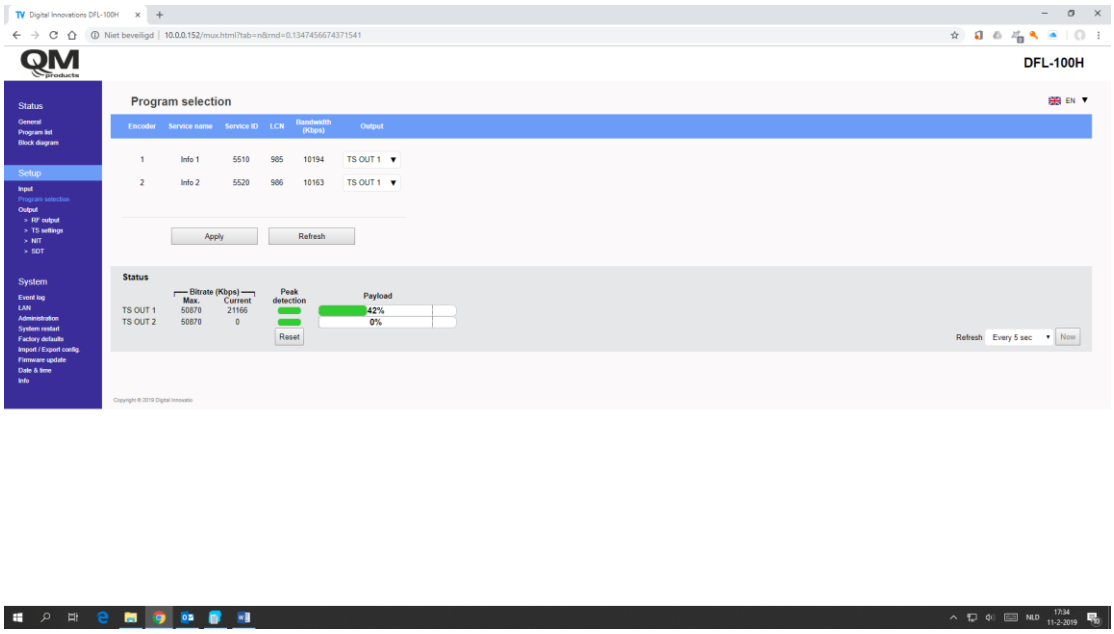

Figure No 2A

In the “Program Selection” Page (Figure No 2A) the user is able to select any program from any input and assign it to any output using the “pool” technology. Usually we assign two programs per one output. This page depicts all programs coming from the 2 HDMI inputs and their settings.

For each program the DFL-100H provides the following information:

- Service Name – which is the name of the program
- Service ID – which is the 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

RF output

4.2.3 “RF Output” page

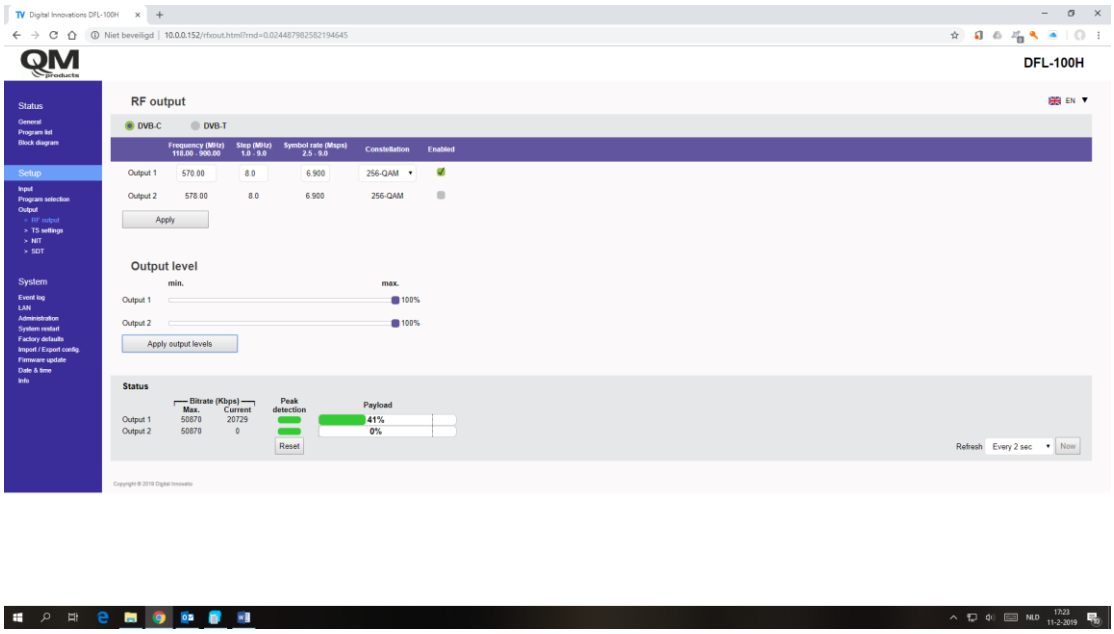

Figure No 3

In the “RF Outputs” page (Figure No 3) the user is able to setup the RF outputs settings of the DFL-100H.

With the use of the radio buttons the user is able to select the mode that the

DFL-100H will operate as follows:

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

- Frequency – The output frequency
- Constellation – The constellation
- Code Rate – The coder rate
- Guard Interval - The guard interval
- Channel Bandwidth – The channel bandwidth
- Modulation – The modulation type
- Enable/Disable – Enable or disable the modulator
- Output level – Adjust the output level from 90-104 dBµV.

The status section 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.

TS settings

4.2.3 “TS settings” page

In this section (Figure 4), the user is able to setup all the TS settings of the multiplexer in DFL-100H output.

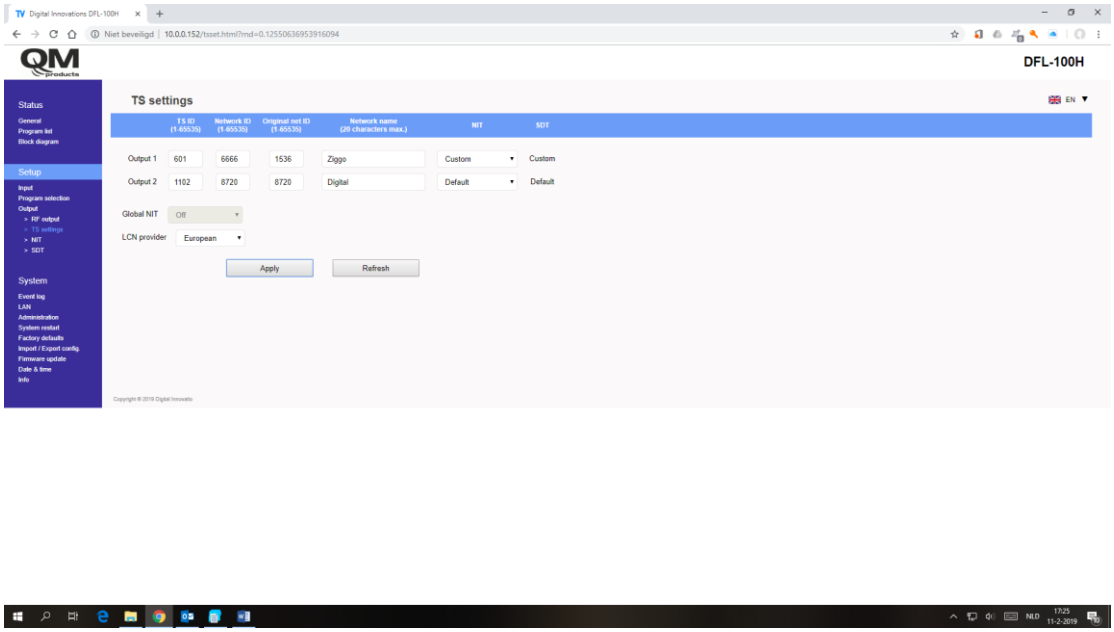

Figure No 4

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: User can choose the following options (Global , Default , Custom)
LCN provider: Choose the appropriate LCN provider (EACEM, ITC, Nordig, APN)

NIT - Network Information Table

4.2.4 “NIT” page

In “NIT” page (Figure No 5) the user is able to create a full customize NIT table

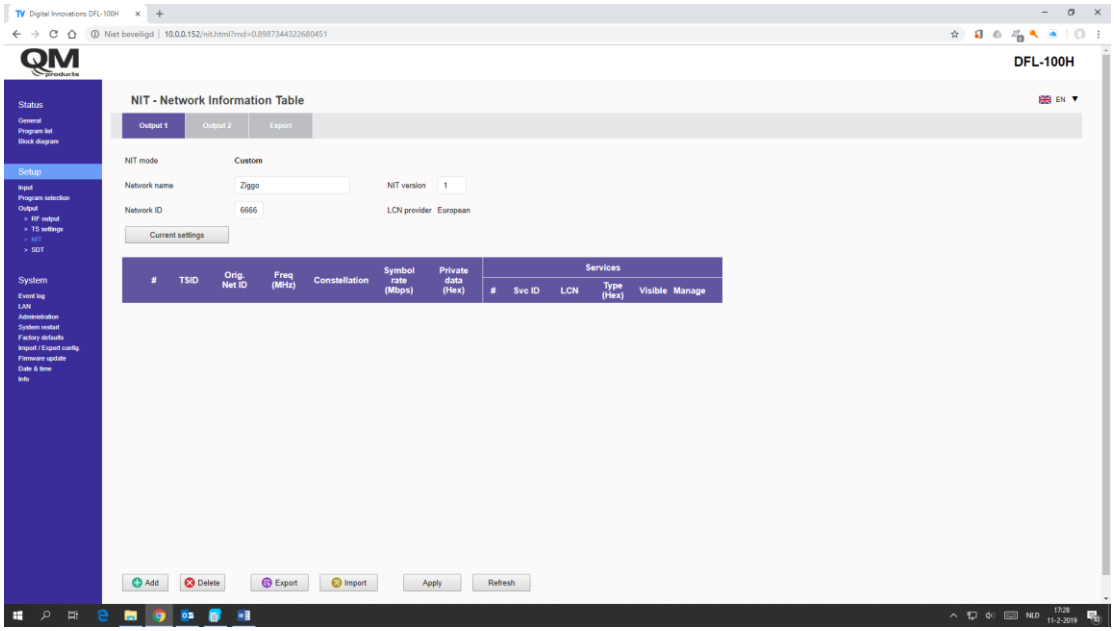

Figure No 5

SDT - Service Description Table

4.2.4A “SDT” page

In “SDT” page (Figure No 5A) The user is able to create a full customize SDT table

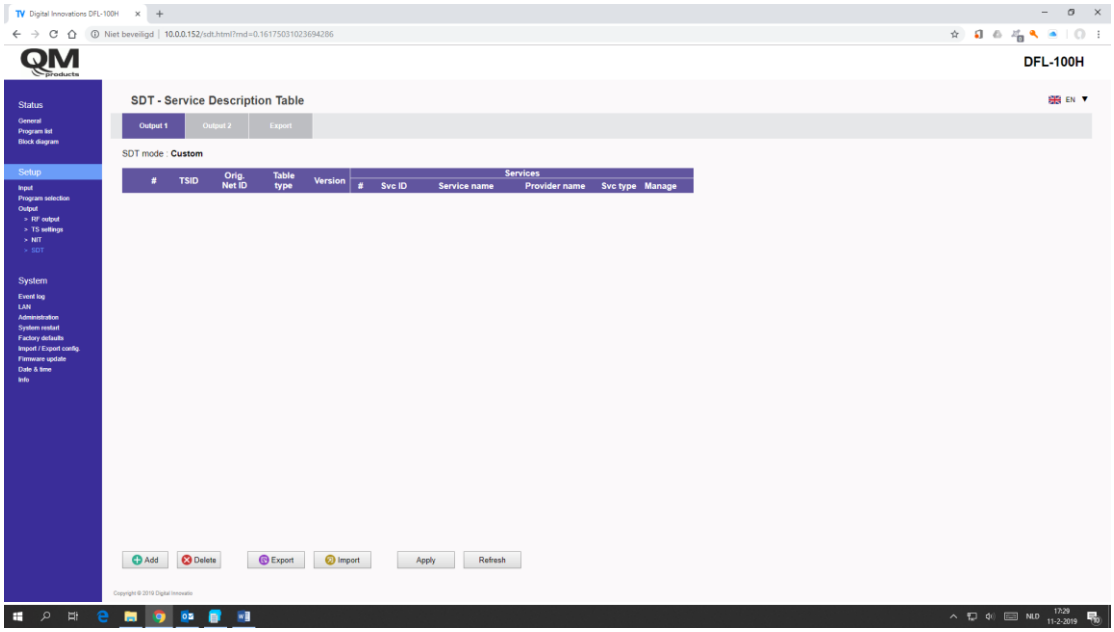

Figure No 5A

System

4.2.5 “System log” page

In “System log” page (Figure No 6) the user is able to see all the events of the unit

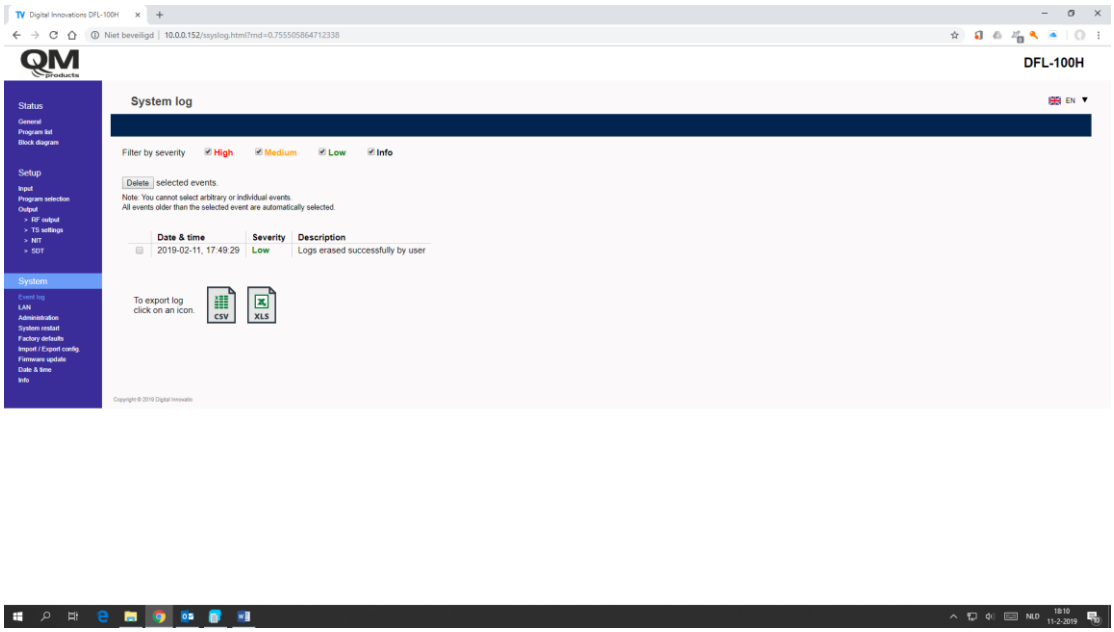

Figure No 6

4.2.6 “LAN” page

In “LAN” page (Figure No 7) the user is able to setup all the parameters of the LAN control of the device as follows:

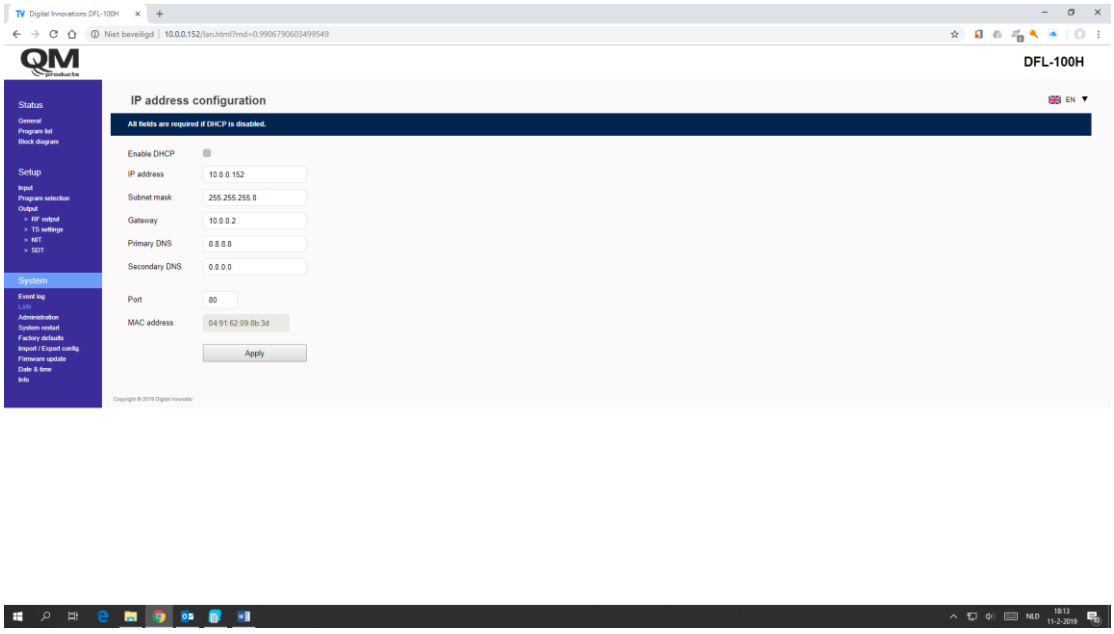

Figure No 7

- 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

4.2.7 "Administration" page

In "Administration" page (Figure No 8) the user is able to change the default password of the webserver.

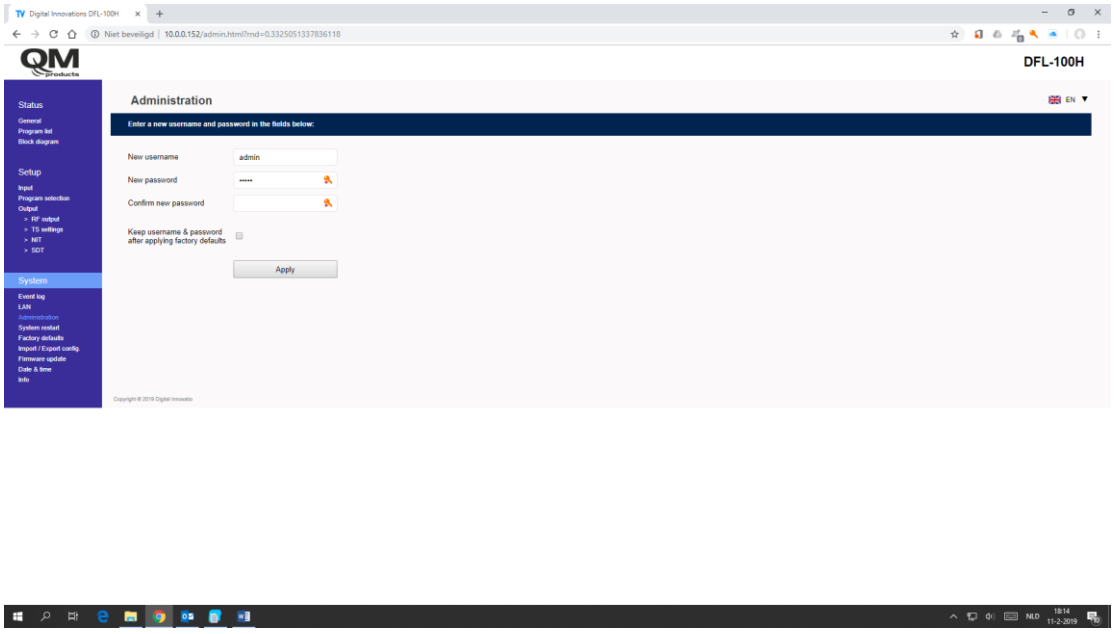

Figure No 8

4.2.8 "System restart" page
In "System restart" section the user is able to restart the device.

4.2.9 "Factory default" page
In "Factory default" section the user is able to apply a factory default reset either as DVB-T or DVB-C.

4.2.10 “Import/Export Config” page

In “Import/Export Config” page (Figure No 9) the user is able to do the following:

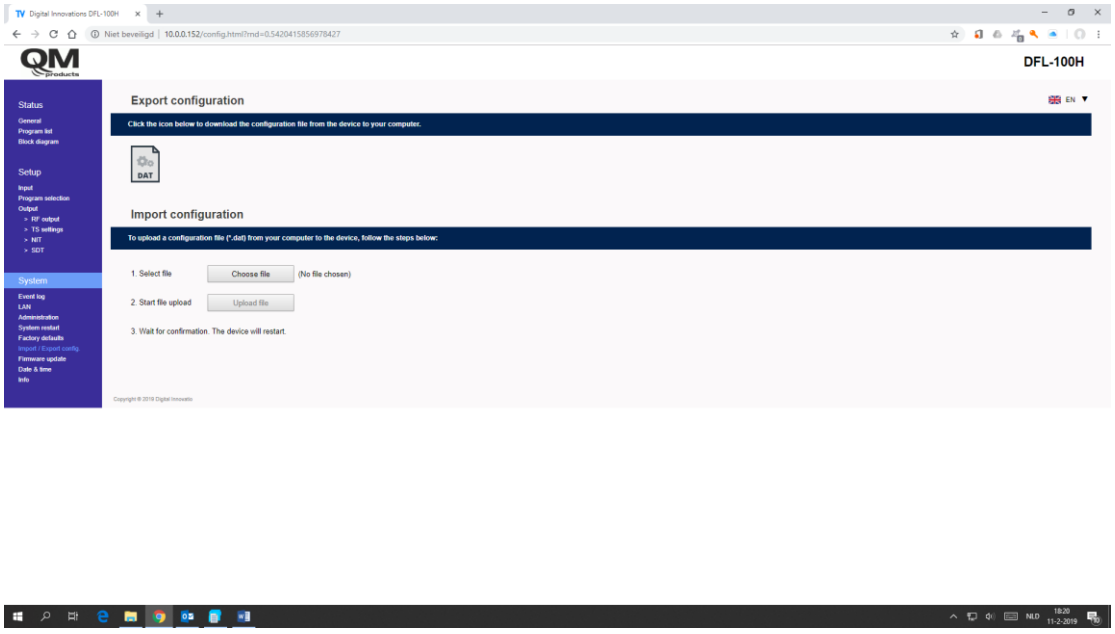

Figure No 9

1. Export: Click the icon to download the configuration file from the device to your computer.
2. Import: Upload a previously save configuration file.

4.2.11 “Firmware update” page

In “Firmware update” page (Figure No 10) the user is able Check for firmware upgrade on the cloud server

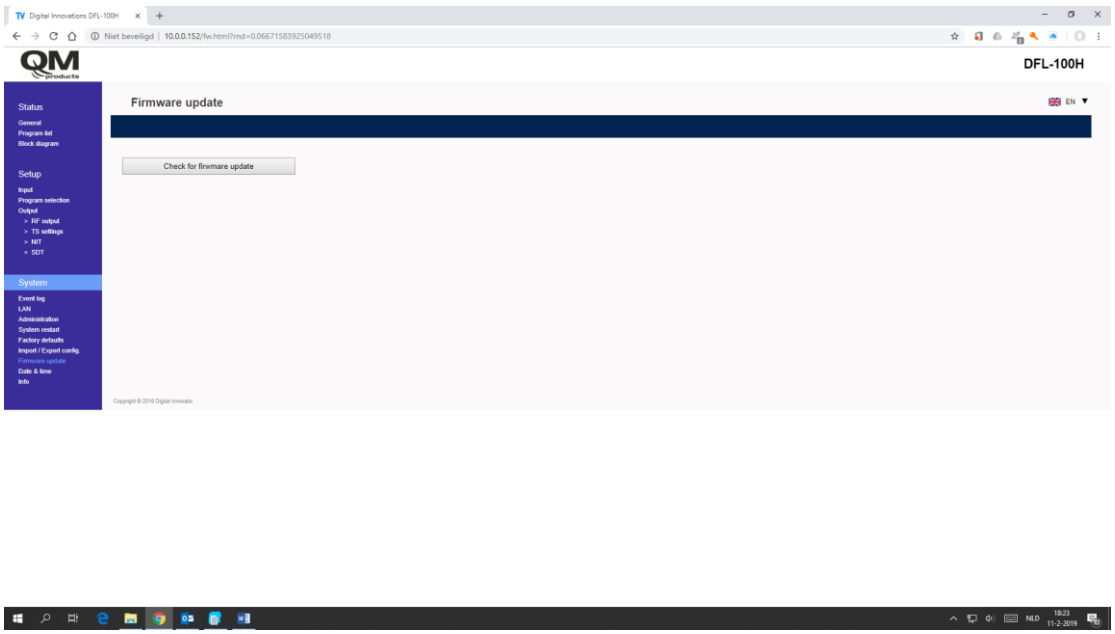

Figure No 10

4.2.12 “Date & time” page

In “Date & time” page (Figure No 11) the user is able to set date & time into the system (this is very important for the System logs)

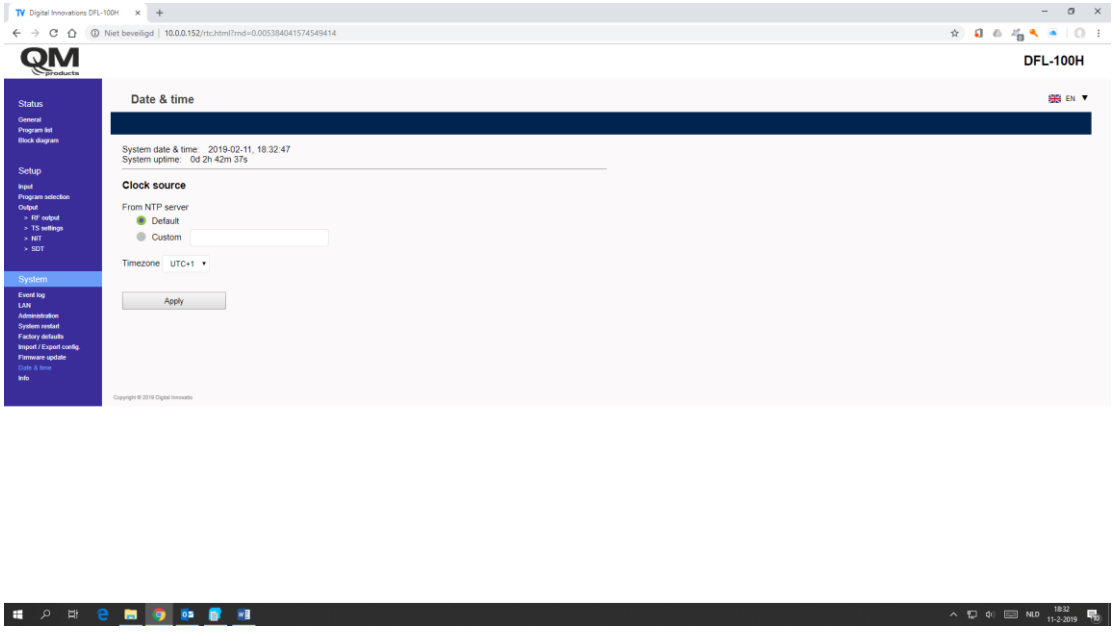

Figure No 11

4.2.13 “Info” page

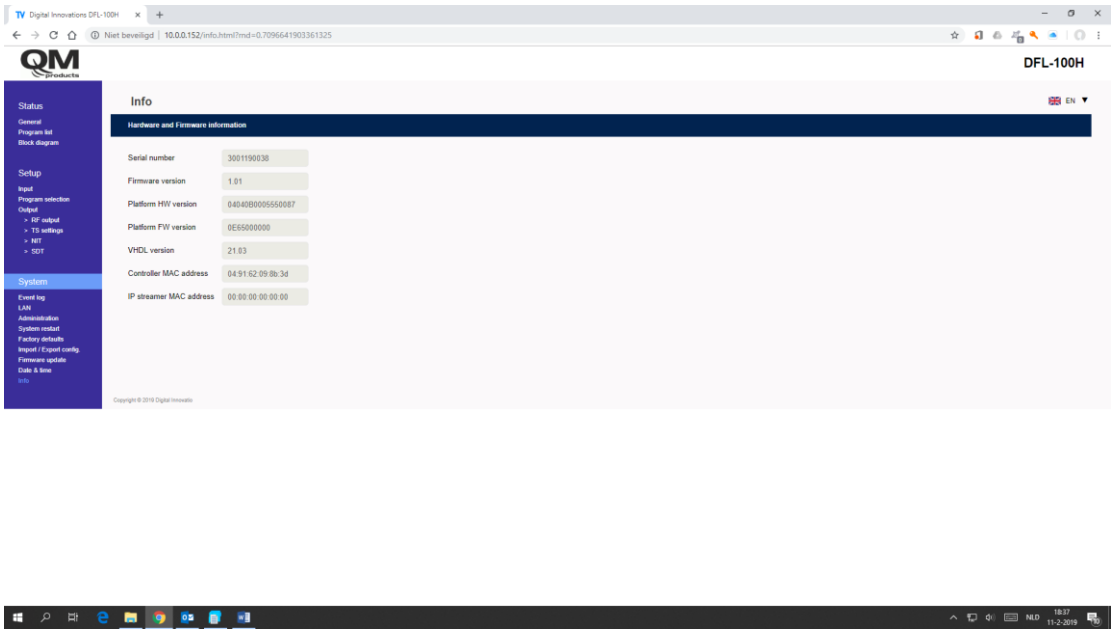

Figure No 12

In “Info” page (Figure No 12) the user is able to see the serial number , firmware version , Platform HW version , Platform FW version , VHDL version , Controller MAC address of the device.

5. TECHNICAL SPECIFICATIONS

Input Specifications

HDMI Input

Type	2 x HDMI inputs
Video coding	MPEG-4 AVC/H.264
Profile	High profile 4.0
Input resolution	Up to 1920x1080 - 50/60 p & i
Output resolution	Up to 1920x1080 - 30p
HDCP support	Yes

Audio

Audio	HDMI
Standard	MPEG-1 Layer II
Audio Bit Rate	64,96,128,192,256,320 Kbps
Format	Mpeg2, AAC, AC3

H.264 encoder

Standard	MPEG-4 AVC/H.264
Bit Rate	1 – 19 Mbps adjustable
Configurable Parameters	Service Name, Service ID
LCN processing	Yes

Output Specifications

DVB-T

Bandwidth	5,6,7,8MHz
Mode	2K,8K
Constellation	QPSK,16QAM,64QAM
Guard Interval	1/4,2/3,3/4,5/6,7/8
Code Rate	1/2,2/3,3/4,5/6,7/8

DVB-C

Bandwidth	5,6,7,8MHz
Mode	2K,8K
Constellation	16QAM,32QAM,64QAM,128QAM,256QAM
Symbol Rate	1-7.2Ms/s

RF Output

Type	2 x RF out
Output Frequencies	110…950MHz (1 Hz step)
Output Level	104 dbµV
Connector	75Ω - F, female
Output Attenuator	0…-15dB
MER	>45dB

Transport Stream Processing

Services	User selection by service names
Automatic Regeneration	PAT,CAT,SDT,PMTs, EITs tables
NIT	Global , Default , Custom
PCR	re-stamping
LCN support	Yes
Custom NIT & SDT	

Programming Interface

Ethernet webserver	Yes, embedded webserver
Speed:	10/100 Mbps
Connector:	RJ45
Compatible browsers:	IE Edge, Firefox, Chrome

General

Power Supplys:	12 VDC 50/60Hz
Power supply consumption:	1.3A
Operating Temperature:	0 ºC to 40 ºC
Storage Temperature:	-10 ºC to +70 ºC
Humidity:	Up to 90%

7. QM-Products LIMITED WARRANTY

This “QM-products” is guaranteed against defects in workmanship and materials for a period of five (5) years beginning on the date of the purchase of the product. During the applicable warranty period, Digital-Innovations BV will repair or replace at our own cost and without charges, any defective component parts of the purchased unit. The unit must be packed in adequate packing, and send to us, only AFTER receiving an authorization to allow the return of the product.

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.

Content warning

This document contains preliminary information about a product of Digital-Innovations BV. Digital-Innovations BV 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

Declaration of Conformity

Certify and declare under our sole responsibility that the following apparatus:

DFL-100H HDMI/AV

Conforms with the essential requirements of the EMC Directive 2004/108/EC the Safety Directive 2006/95/EC and 2001/65/EU RoHS Directive, based on the following specifications applied:

EU Harmonized Standards:
EN 55022:2010
EN 61000-3-2:2006+A1:2009+A2:2009, EN61000-3-3:2008
EN:55024:2010
EN 50083-2:2006, IEC60728-2:2010
EN 61000-4-2:2009, EN61000-4-3:2006+A1:2008+A2:2010
EN 61000-4-4:2012, EN61000-4-5:2006
EN 61000-4-6:2009, EN61000-4-8:2010, EN 61000-4-11:2004
EN 60950-1:2006+A11:2009+A1:2010+A12:2011+AC:2011