Operation
Manual
v1.0

HDMOD 5S

"Home" modulator

1 x HD (in/out) to
DVB-T (COFDM) + IR TX

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 perform-ance 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 dam-age, handle all buttons, connectors and switches gently.

2. INTRODUCTION

Congratulations on purchasing the HDMOD-5S. You now own a high quality, "Home" DVB-T HD modulator with Bluetooth interface. To get the most out of your purchase, please take the time to carefully read through this manual.

3. DESCRIPTION

The HDMOD-5S is a high-quality DVB-T "Home" modulator with HDMI loop-through circuit. It receives one HDMI signal as input and converts it into one RF DVB-T channel output as well as in HDMI out. The excellent picture (Full HD 1920*1080-30p) and modulation quality (MER~35dB) renders the HDMOD-5S an ideal solution for distributing SD/HD digital signals received from any device (e.g. a DVD player, STB or camera) in a CATV network using the DVB-T technology.

The user has the ability to control the device remotely using a Bluetooth interface by downloading and using the appropriate application from Google play or IOS App Store for free.

Finally, the HDMOD-5S's small size and metal case provides excellent electromagnetic shielding as well as great temperature dissipation and rigidness.

3.1 - FEATURES
❚▶ High quality and performance
❚▶ Very clean RF spectrum
❚▶ HDMI input
❚▶ HDMI loop-through circuit
❚▶ MER value ~ 35dB
❚▶ RF output frequencies 174…230 MHz & 470...862 MHz
❚▶ H.264 HD encoder bitrate 1-19Mbps
❚▶ HDCP support
❚▶ IR support
❚▶ Bluetooth interface
❚▶ Very small size
❚▶ External power supply

3.2 - Typical schedule diagrm
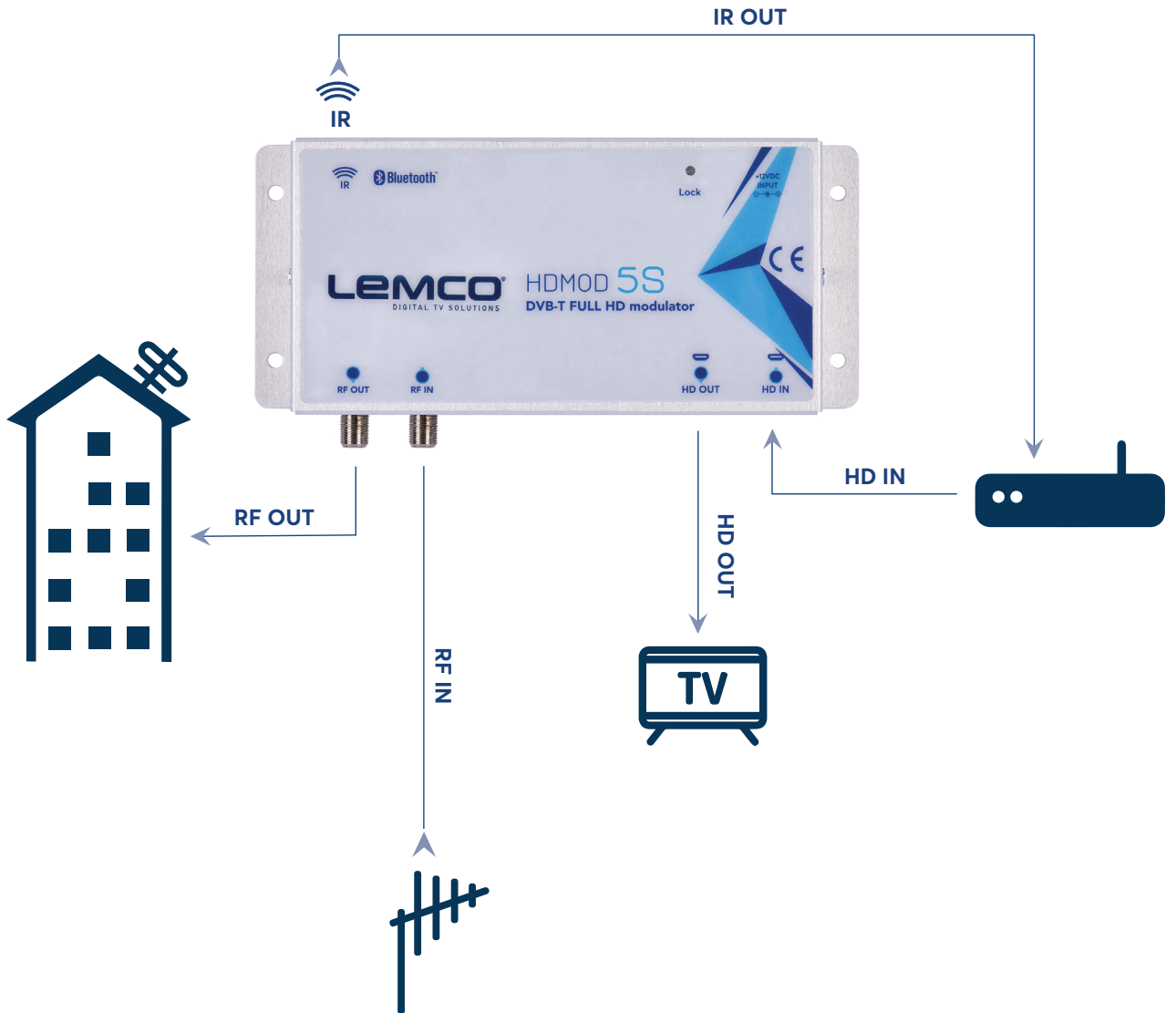
4. INSTRUCTIONS

4.1 - App installation

The HDMOD-5S can be programmed on the field using the following simple steps:

Step 1

Power up the HDMOD-5S, connecting the external power supply. The HDMOD-5S will need 20-30 seconds to initialize and the status indicator will blink between red and green until the procedure is finished. After the status indicator remains constantly green, you will be able to connect to the HDMOD-5S.

Step 2

Download the "Lemco" app from Google play or App Store:

This step is not necessary, if you already have installed the app on your phone / tablet.

Step 3

The app has the following icon:

Upon execution, the app will ask you to turn on Bluetooth. Depending on your phone / tablet OS version, you may be prompted also to turn on GPS / Location / Position. The app does NOT record or use your location. Location services are necessary on specific Android OS versions for Bluetooth Low Energy (BLE) access.

The HDMOD-5S utilizes BLE (Bluetooth Low Energy) and does NOT need to be "paired" with your phone / tablet. If you have paired the device with your phone / tablet, please unpair it.
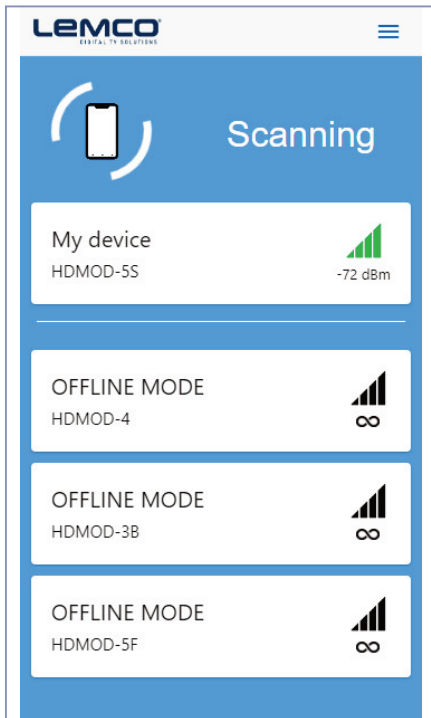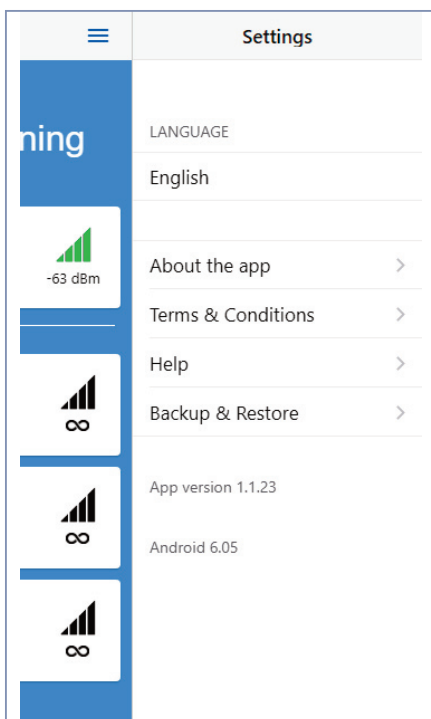
Picture No1

4.2 - App usage

The app will scan for any available devices that are within range (Picture No1). The list shows all detected devices within range, with the device closest to your phone / tablet at the top of the list. If your phone / tablet is moved closer to another device, that device will move at the top of the list in a few seconds.

Choose the device that you want to connect to, by tapping on the appropriate "box". As soon as the connection between the phone / tablet and the HDMOD-5S is established, the status indicator on the HDMOD-5S will become red and you may proceed to 4.4.1.

You may also "connect" to virtual devices shown as "OFFLINE MODE" to get acquainted with the menus and features of the app and the devices.
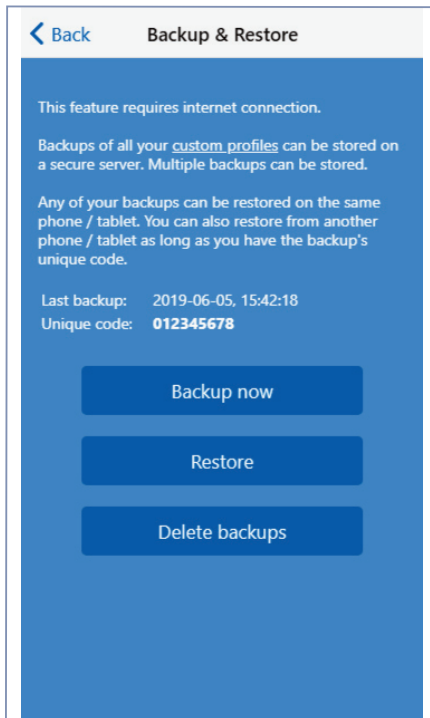

Picture No2

4.3 - App settings

The app has its own settings and features, independent of any device. The app features menu shows up when tapping on the ☰ icon at the top right corner of the screen while scanning (Picture No2).

You may select the app language, you may read the app information, terms & conditions, access the app help, backup or restore all stored custom profiles (4.3.1).

To close the app settings menu, swipe the scanning page to the right or tap on the ☰ icon again.

Back — **Backup & Restore**

This feature requires internet connection.

Backups of all your _custom profiles_ can be stored on a secure server. Multiple backups can be stored.

Any of your backups can be restored on the same phone / tablet. You can also restore from another phone / tablet as long as you have the backup's unique code.

Last backup: 2019-06-05, 15:42:18
Unique code: **012345678**

Backup now

Restore

Delete backups

Picture No3

4.3.1 - Backup & Restore

The app is capable of backing up and/or restoring all the stored custom profiles (4.4.4) for all the supported device models. This feature is useful in the following cases:

▌▶ Reinstalling the app
▌▶ Lost your phone / tablet
▌▶ Migrating to another phone / tablet
▌▶ Sharing your custom profiles with another phone / tablet.

Your phone / tablet has a hardware-embedded unchangeable unique code. This code is used to identify the phone / tablet. It cannot be used to identify the phone / tablet's owner, phone number or extract any other personal information.

The backup data are stored on Lemco's servers.

You may backup your data several times. Each backup has its own timestamp. When restoring you may select which backup you want to restore by its timestamp.

You may also delete all backups. In such case, all the backup data corresponding to your phone / tablet's unique code will be irrevocably deleted from Lemco's servers.

4.4 – Device settings

While connected to an HDMOD-5S, the app constantly observes the Bluetooth signal level and displays it on the appropriate on-screen indicator. If the level is critically low, the app will prompt you to move closer to the device.

If the device is powered down or the Bluetooth connection gets severed, the app will show a warning and return to scanning for devices.
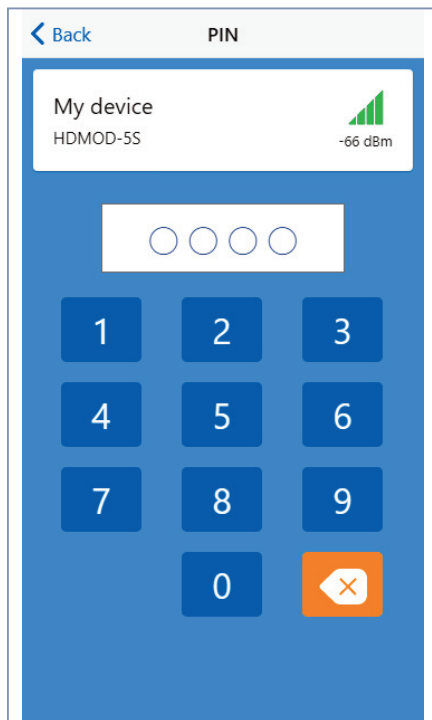
4.4.1 – PIN

Before accessing the connected device's settings, you will need to enter a PIN (Picture No4). This PIN is specific to the HDMOD-5S you have connected and is not associated with your phone / tablet.

The factory default PIN is 1234

You may change this PIN using the "*Security PIN*" menu option (4.4.12). If you change this PIN, please keep it somewhere safe, preferably written on a piece of paper or the "9. Notes" section on this leaflet.
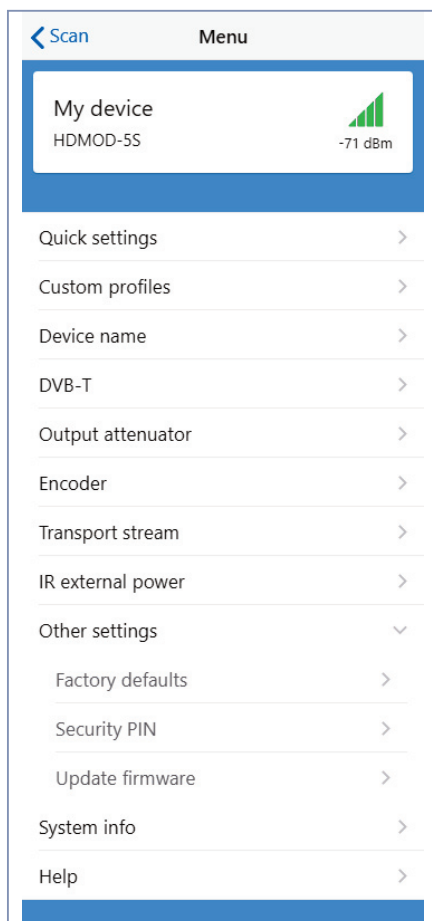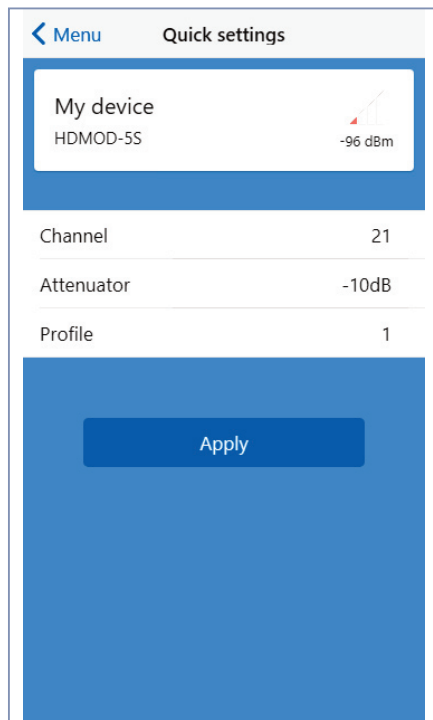
Picture No4

4.4.2 – Menu

When the app is connected to a device and the correct PIN is entered, the device's main menu will be displayed (Picture No5).
The main menu consists of the following options:
- Quick Settings (4.4.3)
- Custom profiles (4.4.4)
- Device name (4.4.5)
- DVB-T (4.4.6)
- Output attenuator (4.4.7)
- Encoder (4.4.8)
- Transport Stream (4.4.9)
- IR external power (4.4.10)
- Other settings
  - Factory defaults (4.4.11)
  - Security PIN (4.4.12)
  - Update firmware (4.4.13)
- System info (4.4.14)
- Help (4.4.15)

By tapping on the "Back" icon labeled "*Scan*", the app disconnects from the HDMOD-5S and returns to scanning for all devices.

Picture No5

Picture No6

4.4.3 - Quick Settings

With this feature you are able to setup several HDMOD-5S modulators easily and quickly, one at a time. All you need is to enter the following parameters, for each of your modulators:

▮▶ The output RF channel
▮▶ Set the output level by adjusting the modulator's attenuator
▮▶ Set the Profile No.

The app applies a suitable predefined profile to the connected device.
The settings are applied to the connected HDMOD-5S by tapping on the "*Apply*" button.
This feature may be used with different modulator models.

How the quick settings profile works

In an installation all the modulators (or Mux in general) need to have different values of the following settings to avoid conflict in the automated scan of the TV sets:

Program Nam	Service ID	TS ID

For that reason, the user must always select a unique Profile number in every modulator starting from Number #1.
E.g. If we want to install three modulators in a CATV network, in the profile option we will select:

▮▶ Profile **No 1** for the **1st** modulator
 ❍ meaning: Program Name = DTV **1**
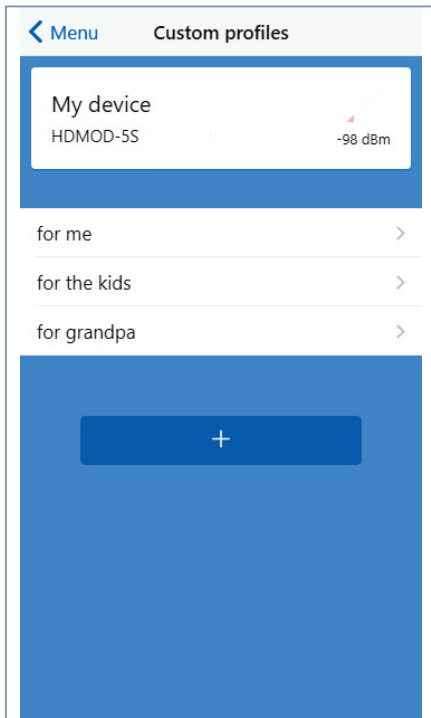 ❍ meaning: Service ID = **1**
 ❍ meaning: TS ID = 224**0**

▮▶ Profile **No 2** for the **2nd** modulator
 ❍ meaning: Program Name = DTV **2**
 ❍ meaning: Service ID = **2**
 ❍ meaning: TS ID = 224**1**

▮▶ Profile **No 3** for the **3rd** modulator
 ❍ meaning: Program Name = DTV **3**
 ❍ meaning: Service ID = **3**
 ❍ meaning: TS ID = 224**2**

As a result, all the above modulators have different values in the above settings.
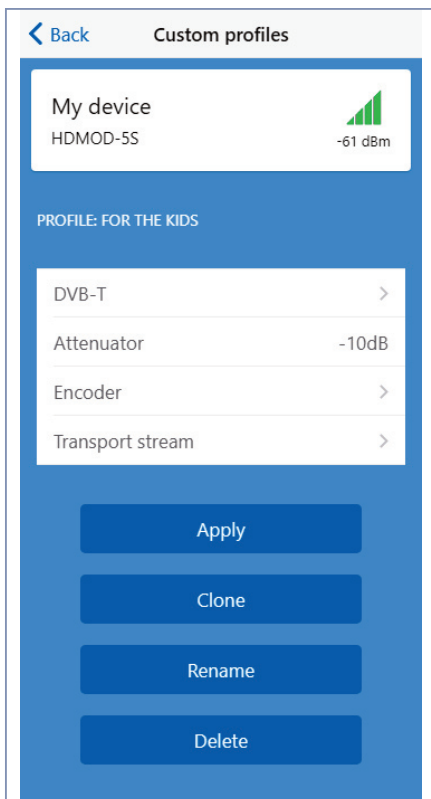
Picture No7

Picture No8

4.4.4 - Custom Profiles

The app provides the ability to create custom profiles under your custom name (Picture No7, Picture No8).

By tapping on the "+" button you are able to save the current configuration in your phone / tablet for future use. You can create as many customs profiles as you need.

By selecting a custom profile, you may view its properties, apply it to the connected device, clone it, rename it or delete it. By tapping on the "*Apply*" button, all the selected profile's settings are applied to the connected HDMOD-5S.

Note: The app supports multiple device models. Each model has its own custom profile list. You may not apply a custom profile of a device to a different device model.
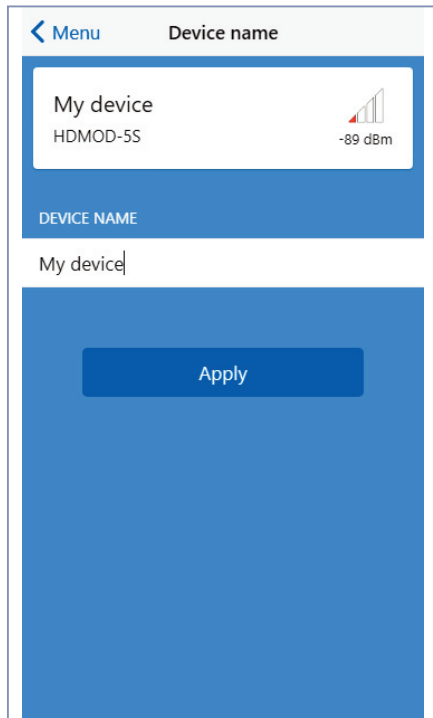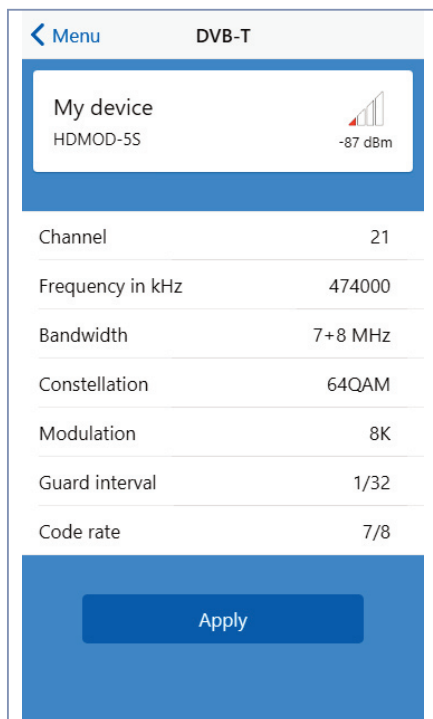
Picture No9

4.4.5 – Device name

You may assign any name you want on the HDMOD-5S (Picture No9). The names you may have assigned to your devices are shown while scanning. The name of the connected device is shown on all the app's pages. In this way, you may have multiple devices, even of different models but still be able to select the right one for changing its settings.

The new name is applied to the HDMOD-5S by tapping on the "*Apply*" button.

Picture No10

4.4.6 – DVB-T

With the "DVB-T" option (Picture No10), you may setup all the necessary DVB-T parameters according to the standards, as follows:

Channel: Select the desired output RF channel

Frequency: Select the output RF channel frequency

Bandwidth: Select the channel bandwidth

Constellation: Select the channel constellation

Modulation: Select the channel modulation mode

Guard interval: Select the guard interval

Code Rate: Select the desired code rate

The settings are applied to the HDMOD-5S by tapping on the "*Apply*" button.
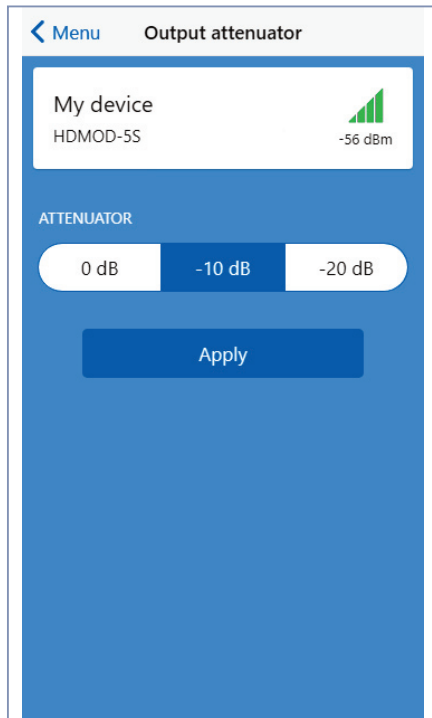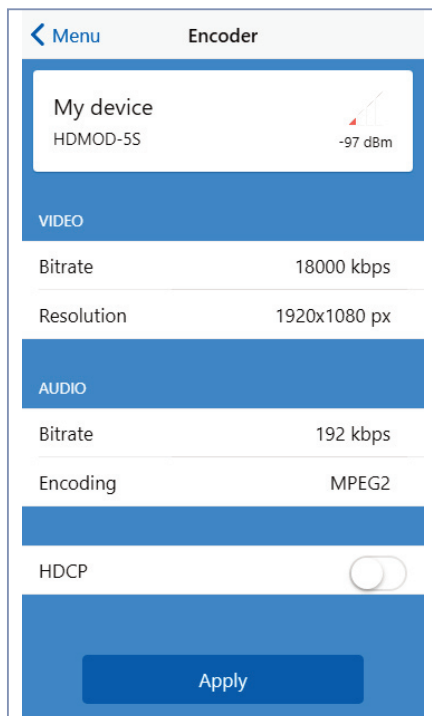
Picture No11

4.4.7 – Output attenuator

In the "Output attenuator" option (Picture No11), you may select the attenuation applied on the output level, between 0dB, -10dB and -20dB.

Set to 0dB: Set the output level to 90dBµV

Set to -10dB: Set the output level to 80dBµV

Set to -20dB: Set the output level to 70dBµV

The setting is applied to the HDMOD-5S by tapping on the "*Apply*" button.

Picture No12

4.4.8 - Encoder

You may set manually all the encoder parameters (Picture No12).

Video Bitrate: Select the video bitrate of the encoder

Resolution: Select the output resolution of the modulator

Audio Bitrate: Select the audio bitrate of the encoder

Audio encoding: Select the audio encoding of the encoder

HDCP: Enable or disable the HDCP function

The settings are applied to the HDMOD-5S by tapping on the "*Apply*" button.
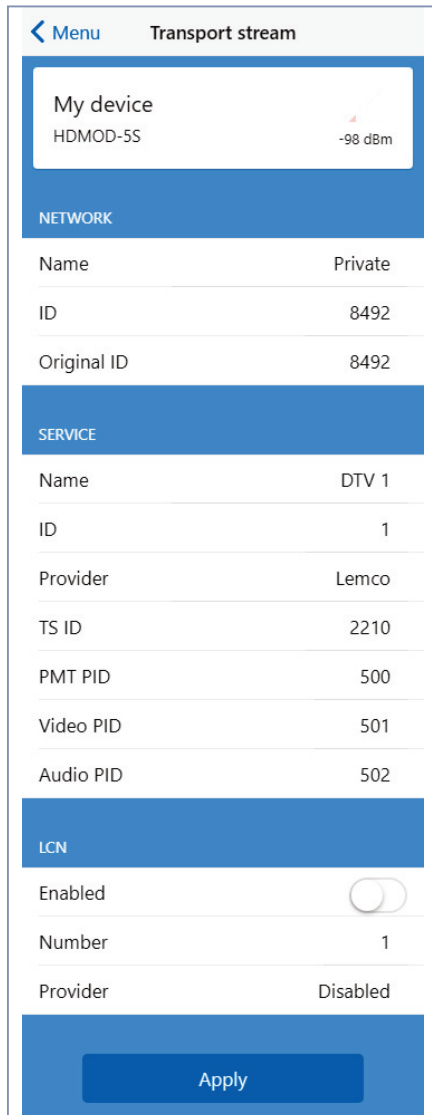
Picture No13

4.4.9 - Transport Stream

You may set manually all the TS (Transport Stream) parameters (Picture No13).

Network name:	Set the network name
Network ID:	Set the network ID
Original Network ID:	Set the original network ID
Service name:	Set the service name
Service ID:	Set the service ID
Service provider:	Set the service provider
TS ID:	Set the TS ID
PMT ID:	Set the PMT PID number
Video PID:	Set the video PID number
LCN Enabled:	Enable or disable the LCN function
LCN No:	Set the LCN number
LCN Provider:	Select the LCN provider

The settings are applied to the HDMOD-5S by tapping on the "*Apply*" button.
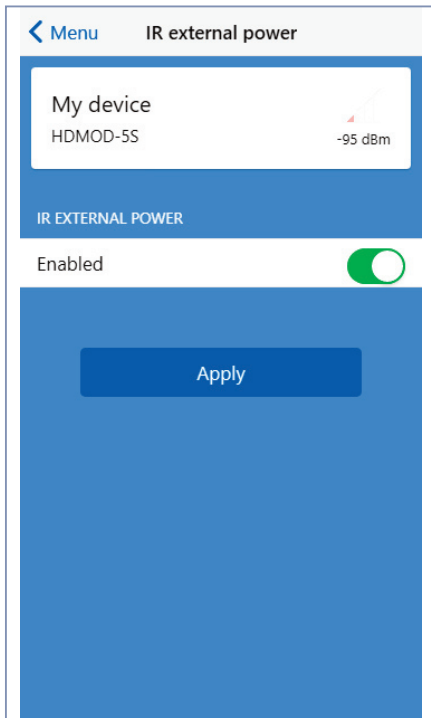
Picture No14

4.4.10 – IR external power

You may activate or deactivate the IR external power (Picture No14).

The setting is applied to the HDMOD-5S by tapping on the "*Apply*" button.

Picture No15

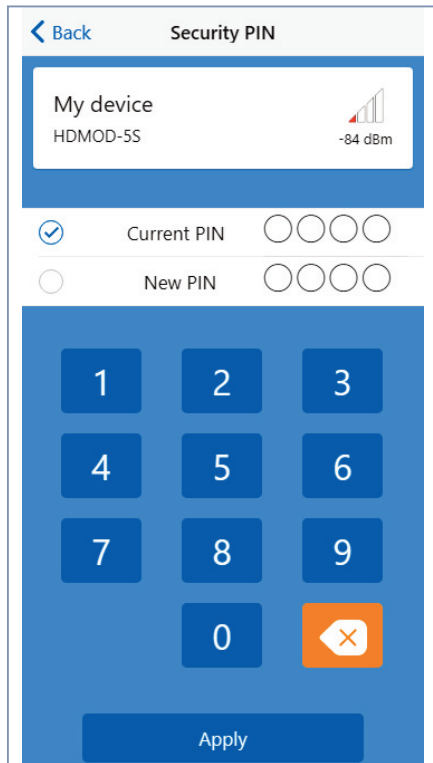## 4.4.11 – Other settings / Factory defaults

You may revert the HDMOD-5S to factory defaults by tapping on the "*Apply factory defaults*" button (Picture No15).

Note: All settings of the device will be reset, including the PIN (4.4.1) and any custom profile (4.4.4) you may have applied.

Picture No16

4.4.12 – 0ther settings / Security PIN

You may change the device PIN which is asked upon connecting (Picture No16).

First you have to enter the existing PIN and then you'll be able to enter the new PIN.

Note which checkbox is highlighted on the left side, to know which PIN is currently being entered.

The new PIN is applied to the HDMOD-5S by tapping on the "*Apply*" button.

4.4.13 – 0ther settings / Update firmware

The app is capable of updating the device's firmware. The procedure is automatic and if a newer firmware version is available, you only need to tap on the "Update firmware" button for the procedure to start. (Picture No17, 18, 19)

Note: You need an internet connection on your phone / tablet to perform a firmware update.
Caution: Please follow the on-screen instructions when updating firmware.
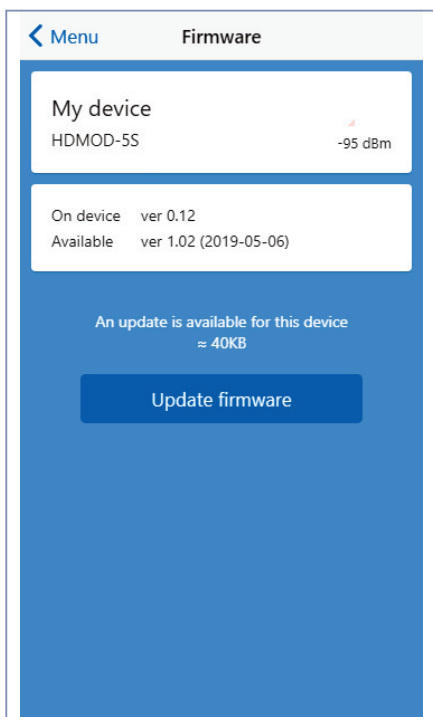
Picture No17   Picture No18   Picture No19
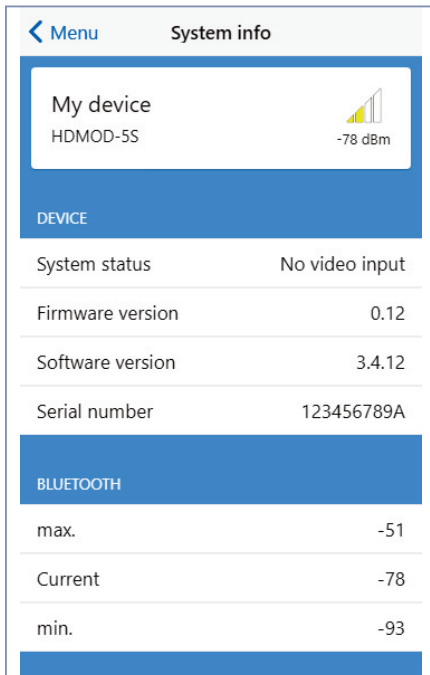
4.4.14 - System Info

On this page you may see information details of the connected HDMOD-5S (Picture No20).

Menu	System info
My device HDMOD-5S	-78 dBm
DEVICE	
System status	No video input
Firmware version	0.12
Software version	3.4.12
Serial number	123456789A
BLUETOOTH	
max.	-51
Current	-78
min.	-93
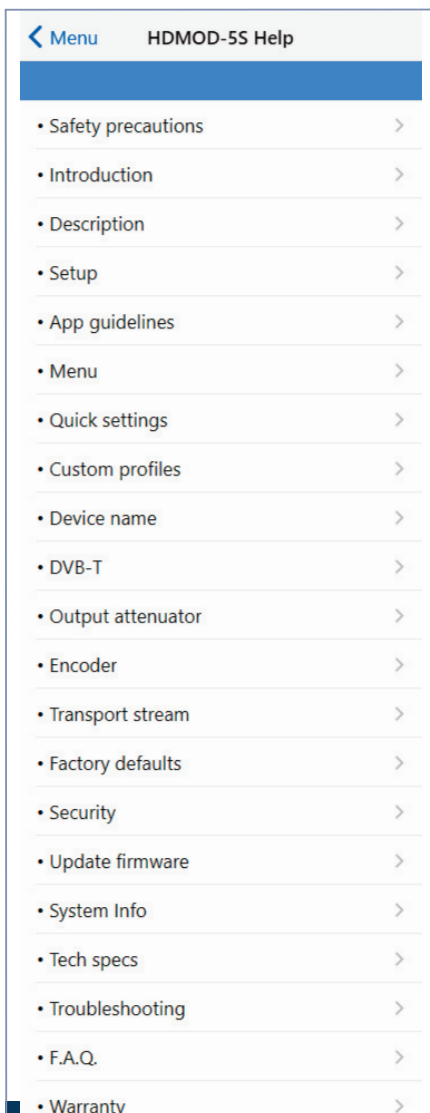
Picture No20

4.4.15 - Help

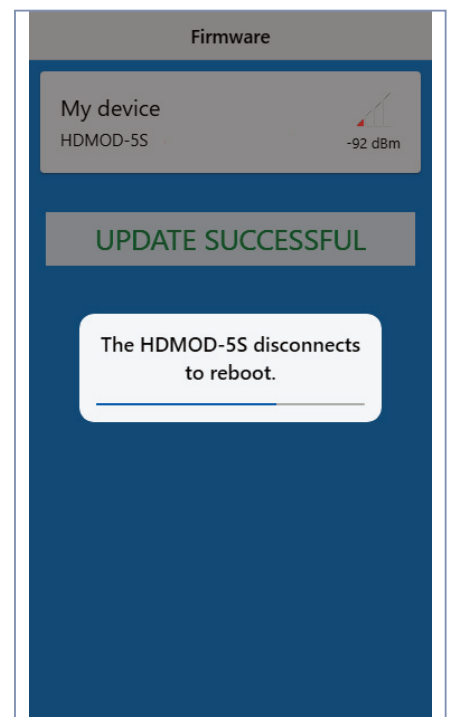The last menu entry is the "Help" for the device (Picture No21). The contents are divided in chapters that expand by tapping on each chapter title.

Note: When in trouble with a device, please refer to the "Troubleshooting" and "F.A.Q." chapters first.

Menu	HDMOD-5S Help
• Safety precautions	>
• Introduction	>
• Description	>
• Setup	>
• App guidelines	>
• Menu	>
• Quick settings	>
• Custom profiles	>
• Device name	>
• DVB-T	>
• Output attenuator	>
• Encoder	>
• Transport stream	>
• Factory defaults	>
• Security	>
• Update firmware	>
• System Info	>
• Tech specs	>
• Troubleshooting	>
• F.A.Q.	>
• Warranty	>

Picture No21

5. TECHNICAL SPECIFICATIONS

Input

Type:	1 x HDMI in & 1 x HDMI out
HDMI loop-through:	Yes
Connector:	1 x HDMI Type A
Video coding:	MPEG-4 AVC/H.264
Profile:	High profile 4.0
Resolution:	1920x1080-30p for HDMI
HDCP support:	Yes
Audio:	HDMI
Audio encoding:	MPEG2, ACC, AC3
Standard:	MPEG-1 Layer II
Audio Bit Rate:	64, 96, 128, 192, 256, 320, 384 kbps
Level:	0.5Vpp to 1.0Vpp adjustable

H.264 Encoder

Standard:	MPEG-4 AVC/H.264
Bit Rate:	1 – 19 Mb/s adjustable
Configurable parameters:	Service Name, Service ID, Video PID, Audio PID, PMT PID

Transport Stream Processing

Automatic regeneration:	NIT, PAT, CAT, SDT, PMTs, EITs tables
Configurable parameters:	TS ID, Original Network ID, Network ID, Provider Name
LCN support:	Yes
LCN Providers:	Nordig, ITC/UK, EICTA/Europe, New Zealand

DVB-T Output

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

RF Output

Type:	RF DVB-T (COFDM)
Output frequencies:	174…230 MHz & 470…862 MHz
Output level:	85dbμV max.
Connector:	75Ω - F, female
Output attenuator:	0, -10, -20dBm
MER:	35dB (Typical)
Shoulder attenuation:	>45dBc
Connectors:	1 x F – female

IR Transmitter

Output frequency:	10.7MHz
Working frequencies:	5…862MHz
Modulation Type:	ASK
Insertion Loss:	<1dB

IR Emitter cable

IR Frequency range	30 to 60KHz
IR Wavelength	940nm
IR Distance	15-20m
Length:	1m
Connector:	3.5mm Stereo Mini-jack

Programming interface

via Bluetooth

Requires version 4.0 and above

ETSI EN 300 328 and EN 300 440 Class 2 (Europe),
FCC CFR47 Part 15 (US) and ARIB STD-T66 (Japan)

Platform support:

Android version 5.1 and above
iOS version: 9.3 or above
iPhone: 4S or newer
iPad: 3rd gen or newer

General

Power supply:	+12VDC
Power supply consumption:	290 mA max.
Operating temperature:	0 °C to 50 °C
Storage temperature:	-10 °C to +70 °C
Humidity:	Up to 90%
Dimensions:	160.0 x 89.3 x 28.4 mm
Weight:	0.25 Kg

6. DIMENSIONS
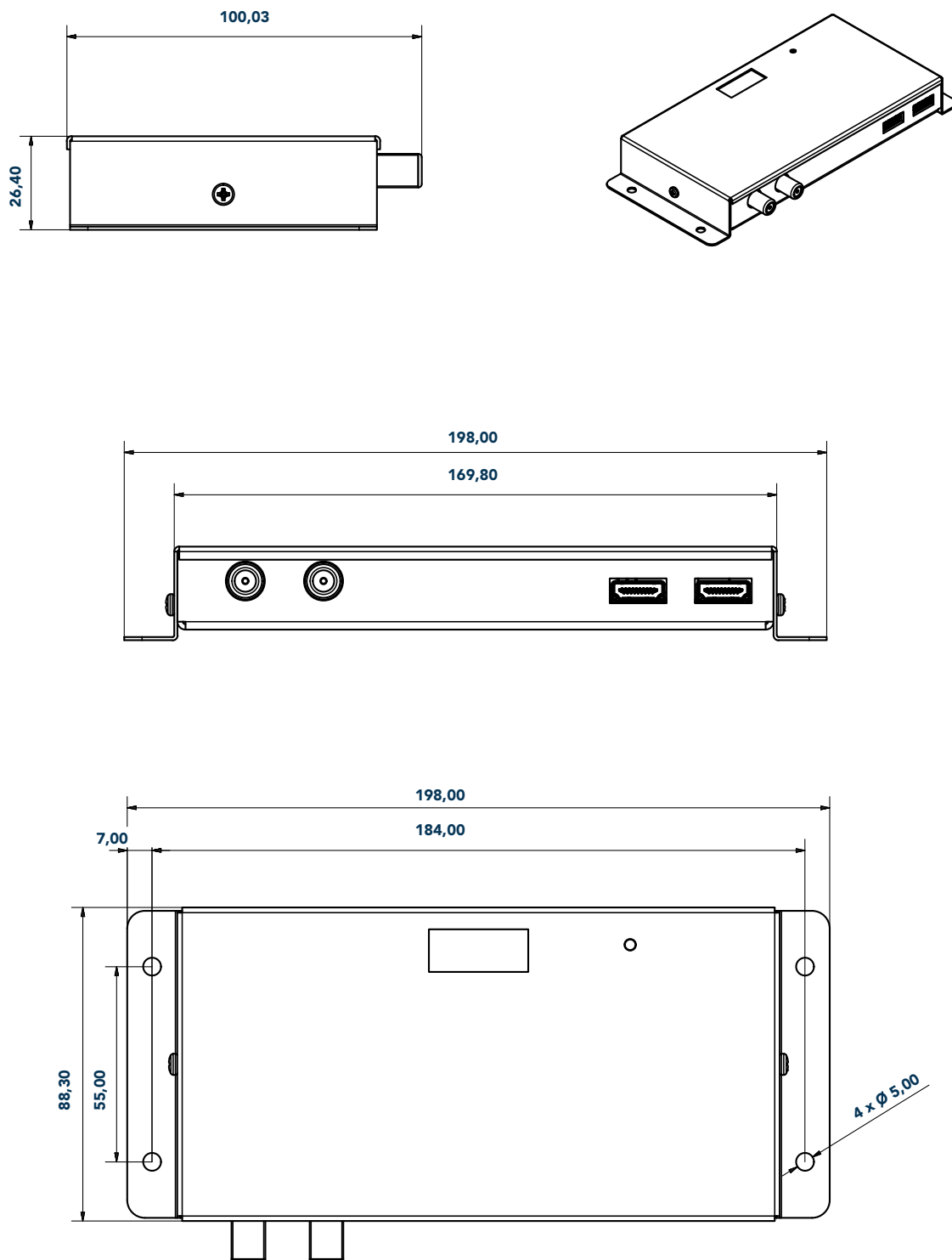
*dimensions in mm

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 in-structions, 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 unau-thorized 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

9. NOTES

LEMCO®
DIGITAL TV SOLUTIONS

Στοιχεία επικοινωνίας
Lemco IKE
Λαθέας 46 - 13678
Αχαρνές, Αθήνα
www.lemco.tv

Τηλ.: +30 210 2811401
Fax: +30 210 2825755
Email: info@lemco.gr