

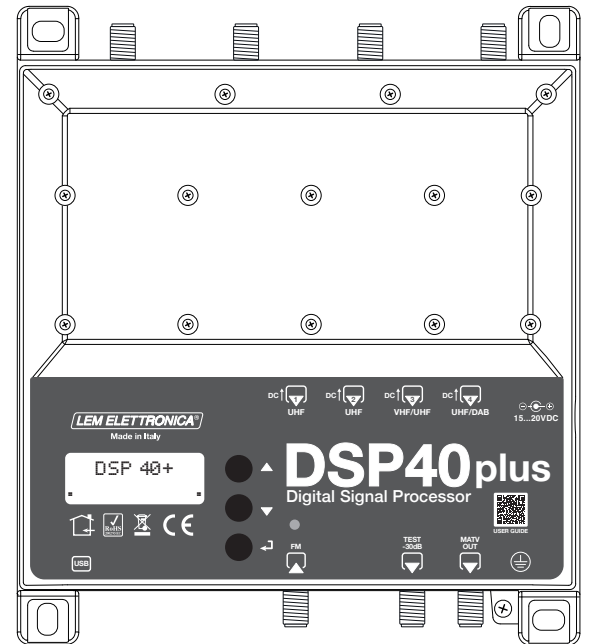
DSP40plus

Digital Signal Processor

LEM ELETRONICA®
Satellite and TV reception equipment

TV Terrestrial programmable amplifier

- ▶ Total output level max 123dBμV
- ▶ 50dB digital filters on adjacent channels
- ▶ Single filter selectable mode Standard/Narrow/Wide
- ▶ Channel to channel conversion
- ▶ Manual filter level adjustment (1)
- ▶ Filter frequency OFF-SET adjustment (1)
- ▶ UHF inputs Lte 700 filter with SAW technology
- ▶ Dual-stage input amplifiers
- ▶ DAB filter 174... 230MHz
- ▶ Automatic Channel search from all inputs
- ▶ Manual programming from display and APP



(1) Function only accessible with smartphone programming.



TECHNICAL SPECIFICATIONS		
NUMBER OF INPUTS	5	1 FM; 2 UHF; 1 VHF/UHF; 1 DAB/UHF
INPUTS FREQUENCY RANGE	MHz	FM (40... 108) BIII/DAB 170... 240 / UHF 470... 694/862
SINGLE CHANNEL FILTERS		32
NUMBER OF CHANNEL PER FILTERS		1 (With possibility of conversion)
INPUT LEVEL RANGES	dBμV	FM 35... 90 - BIII/DAB 40... 110 - UHF 40... 110
FILTERS SELECTIVITY	dB	≥50 (Adjacent channels)
AUTOMATIC CONTROL GAIN RANGE	dB	40 dB
VHF/UHF INPUTS AMPLIFIER GAIN		0 / +15 / +30
FM GAIN	dB	45 (Adjustable 0... -30dB)
VHF GAIN	dB	60
UHF GAIN	dB	75
SELECTABLE FILTERS BANDWIDTH		Standard (8MHz) / Narrow (-500KHz) / Wide (+750KHz)
OUTPUT LEVEL RANGE	dBμV	96... 116
FILTER LEVEL ADJUSTER	dB	-5... +5 (1dB step)
FILTER OFFSET ADJUSTER	KHz	-500... +500 (125KHz steps)
UHF ADJUSTABLE SLOPE	dB	0... -5
VHF ADJUSTABLE OUTPUT	dB	0... 10 (1 dB step)
MAX TOTAL VHF-UHF OUTPUT LEVEL	dBμV	123 DIN 45004B
INPUTS REMOTE POWER		12V / 24V 100 mA
RETURN LOSS IN/OUT	dB	>12
TEST OUTPUT		1 (-30 dB)
AMPLIFIER POWERING		100...240VAC 50/60Hz (External power supply 15VDC / 1,25A)
MAX AMPLIFIER CONSUMPTION	W	8,5
MAX AMPLIFIER CONSUMPTION + REMOTE POWER	W	10,9
OPERATING TEMPERATURE	°C	-5... 50
DIMENSIONS	mm	192 x 217 x 37

Product icons description



The **DSP40plus** amplifier is covered by an extended 5-year warranty from the date of manufacture.



The UHF inputs are protected by SAW technology filters against 5G and 4G LTE interference.



The DSP40plus amplifier can also be programmed via a free graphic application available for Android OS.



The **AUTO-TUNING** scanning function serves to speed up the programming procedure by automatically storing DVB-T/T2 Channel's.

Description of symbols and electrical safety



Product complies with CE marking requirements



Installation is only permitted in dry rooms and on a non-flammable surface. Ensure that there is adequate air circulation.



Symbol indicating earth terminal



Symbol indicating that the supplied mains power supply complies with the safety requirements for class II devices.



To avoid risk of fire or electrocution, do not open the mains power supply provided.



RoHS 2011/65EU compliant product.



Pursuant to Article 24 of Legislative Decree No. 49 of 14 March 2014 "Implementation of Directive 2012/19/EU on waste electrical and electronic equipment (WEEE)". The crossed-out wheeled bin symbol on the equipment or its packaging indicates that the product at the end of its useful life must be collected separately from other waste for proper treatment and recycling.

Package Contents

01 DSP40plus programmable amplifier

01 Power supply YS25-1501250 (100... 240VAC 50/60Hz 0.5A - 15VDC 1.25A)

08 Dowels 6x30mm with screws 4.5x40mm

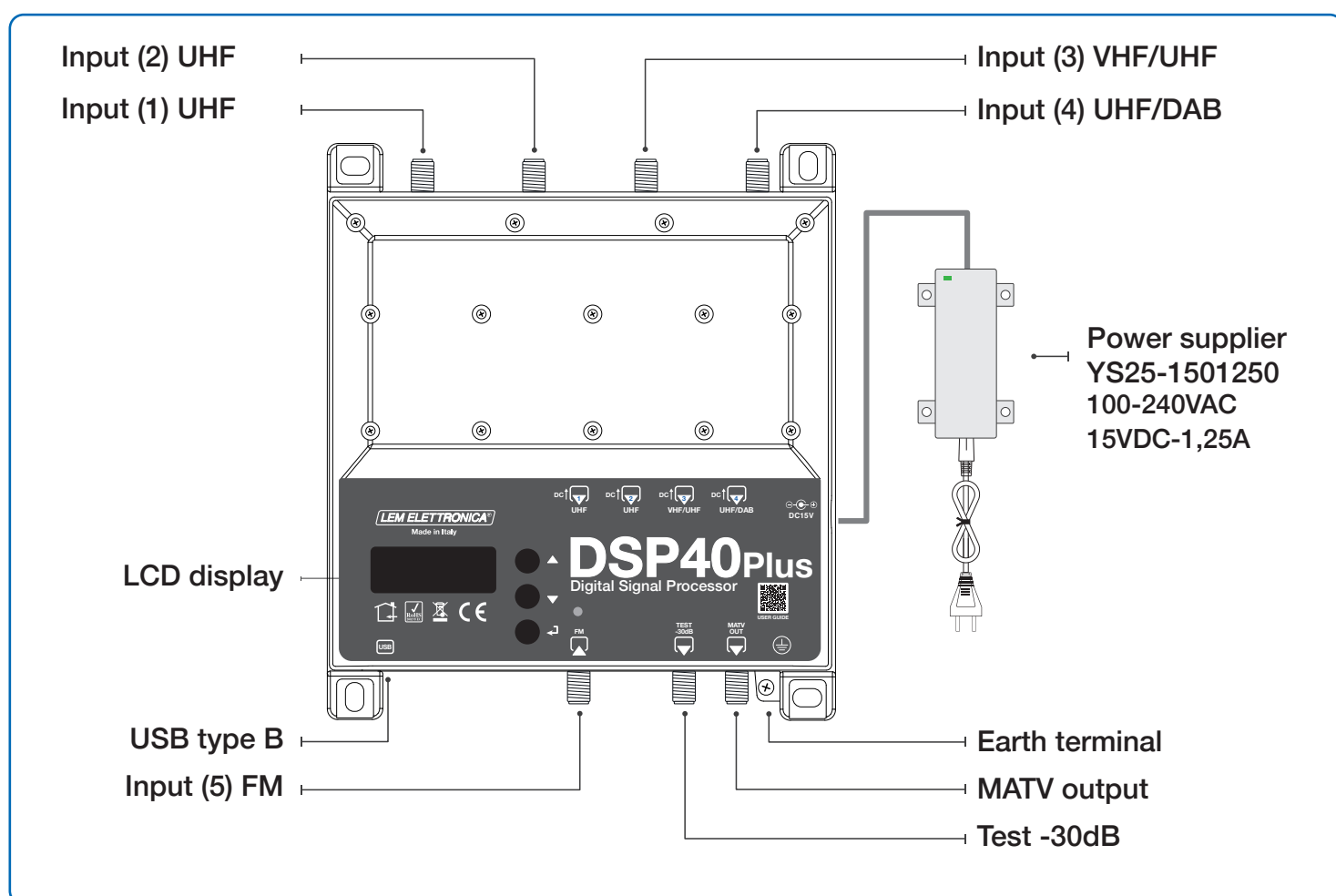
01 User Manual

Installation warnings

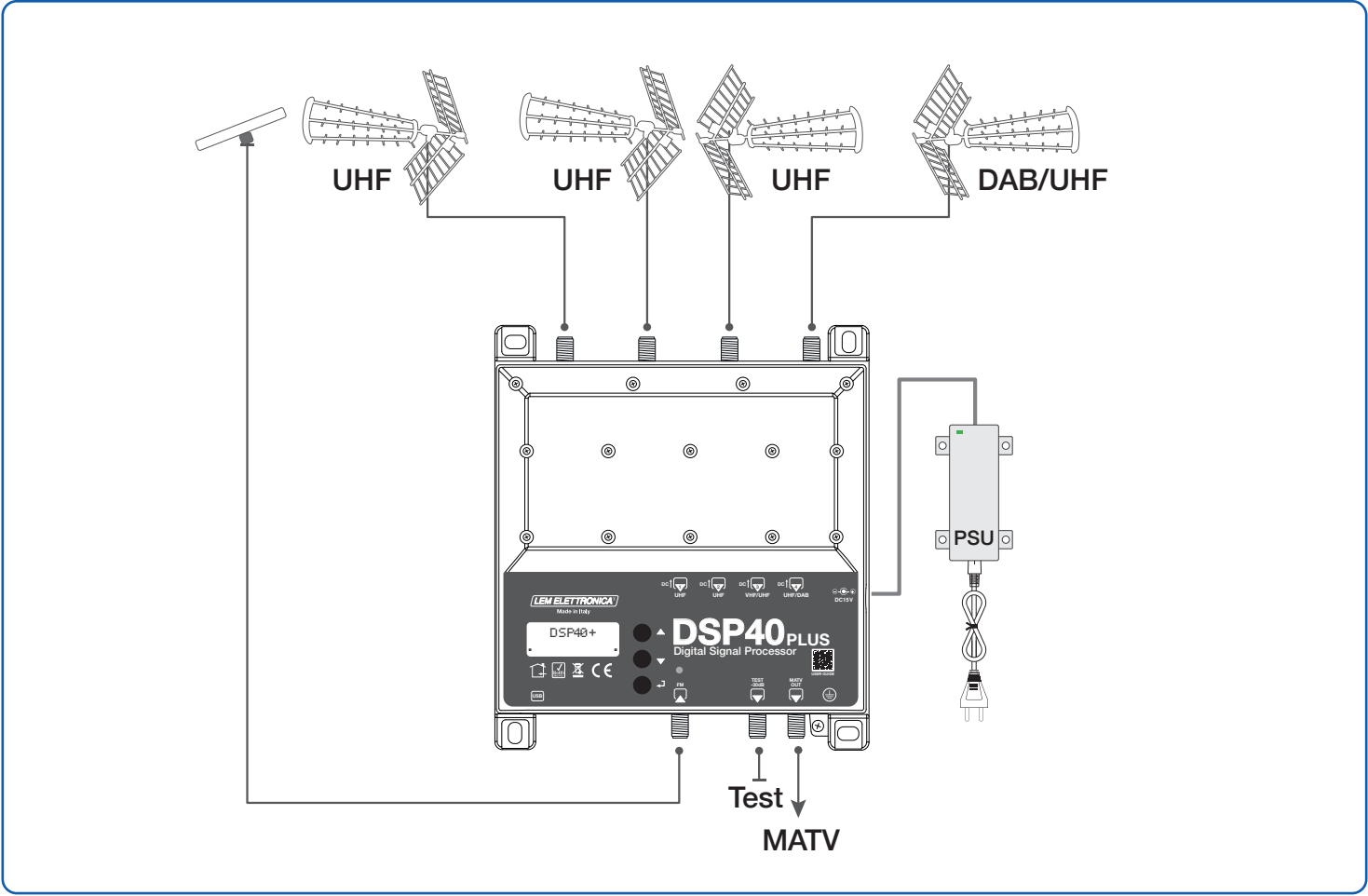
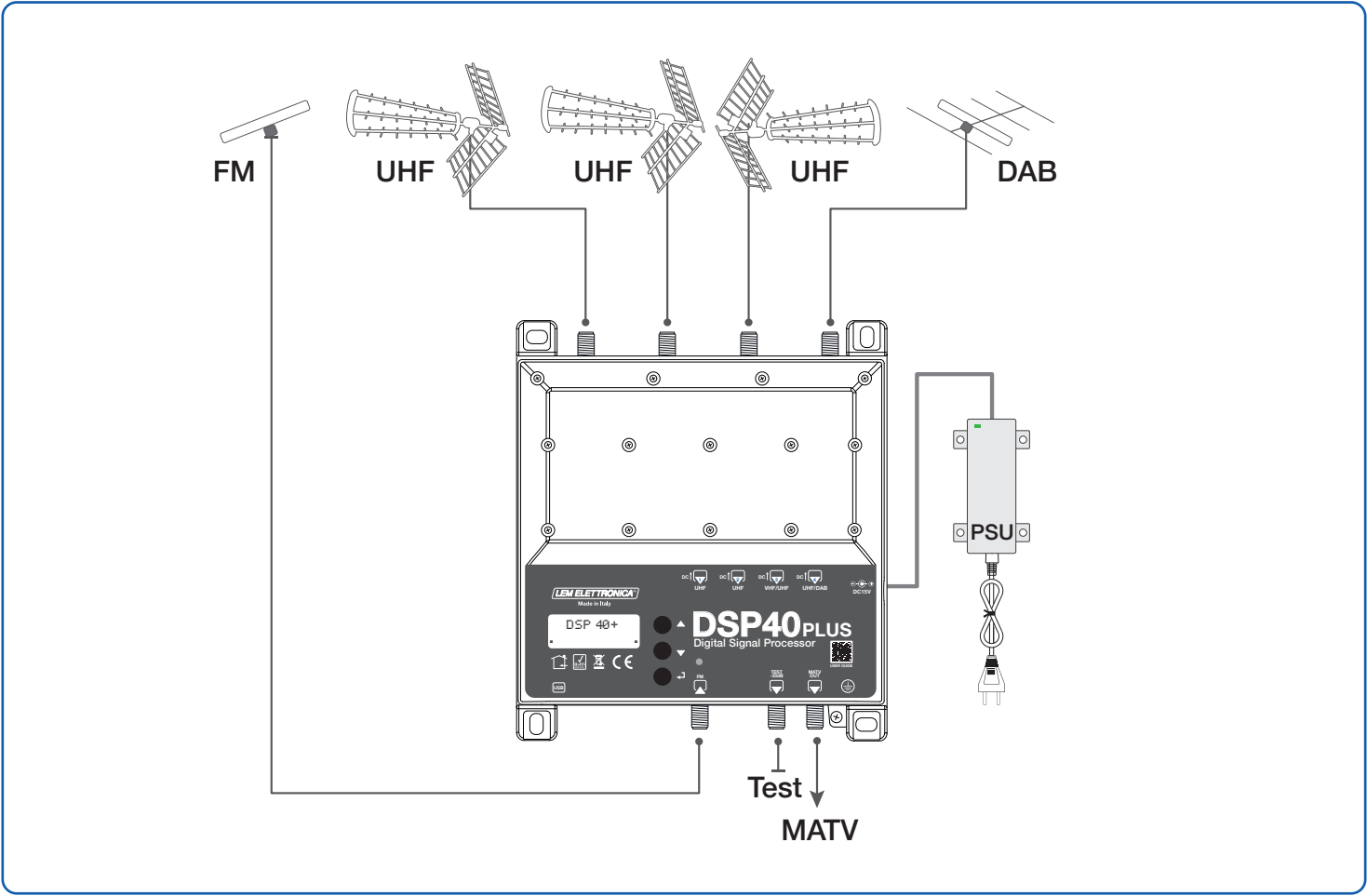
- Use only the supplied power supply unit.
- To ensure adequate cooling and ventilation, the **DSP40plus** control unit and power supply unit must be securely fixed to a vertical wall.
- To avoid the risk of fire or electrocution, do not expose the products to rain or moisture.
- Products must not come into contact with water or be wetted by liquids.
- Do not place products near heat sources or in places with moisture.
- In the case of installation in a cabinet or recessed compartment, provide adequate ventilation and observe the minimum distances given in the drawing below.
- Prepare the mains connection in accordance with the regulations in force in the country of installation and in such a way that the power supply to the control unit can be easily disconnected.

Connections and start-up

- 1) Proceed with the connection of the coaxial input and output cables equipped with their own earth terminal block.
- 2) Close the unused inputs with 75 Ω terminations (code RCS75).
- 3) Connect the power supply to the mains socket only after all other connections have been made.
- 4) Always use the test output for connecting measuring instruments.



Application examples











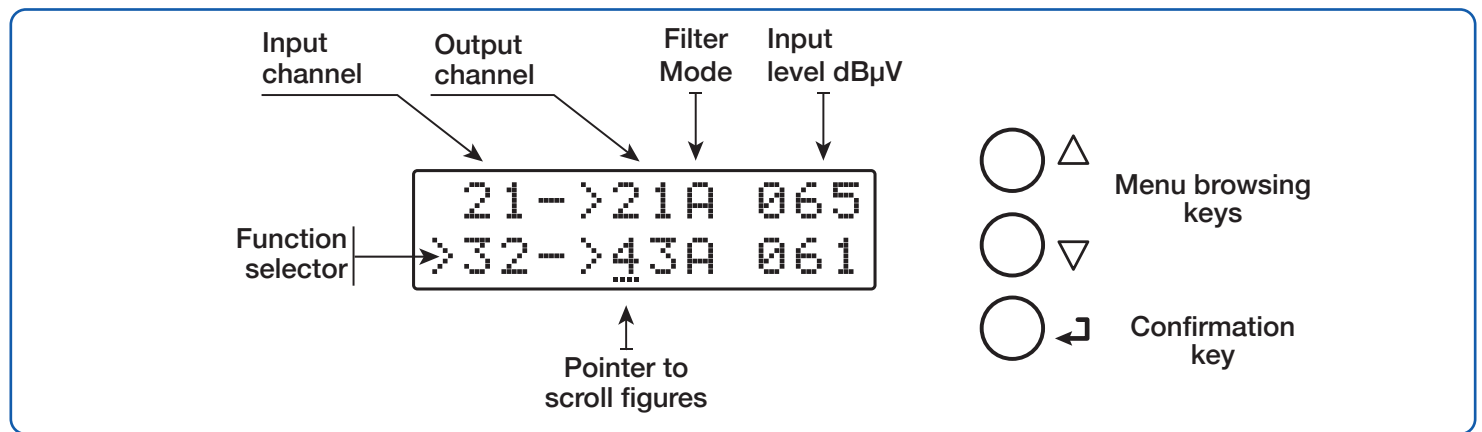
Device Programming

The **DSP40plus** programmable amplifier can be configured in two different ways:

- 1) using the display and navigation keys integrated into the control unit.
- 2) using the **LEM USB** application for Android smart phones, which can be downloaded free of charge from the Google Play Store.

Description of display use

- To activate the display, briefly press the  key.
- To access the menus, press and hold the  key for 3 seconds.
- To make a value in the display editable, position the function selector > using the navigation keys  . Pressing  will activate the pointer under the data, which can be modified with   keys. To confirm the change press .



Note: after 3 minutes of inactivity the display switches off but the menu remains open on the last selected function. To resume press any key



To return to the main level menu from any sub-menu, simultaneously press the  

Automatic Channel Programming

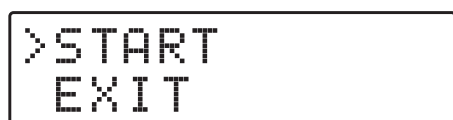
To speed up programming operations, it is possible to use the **AUTO-TUNING** function. By activating this function, the **DSP40plus** amplifier will scan the inputs and automatically store the DVB-T/T2 signals present on the antenna. The remote power supply voltage is activated automatically only if a current draw is detected, indicating the presence of an external preamplifier or an active antenna.



TUNING
AUTO MAN

To start the **AUTO-TUNING** procedure select **AUTO** and press **↵**. For best results, you will be asked to confirm some parameters before starting the scan.

AUTO-TUNING START



>START
EXIT

Select **START** to start automatic channels scanning.



TUNING ✕
WAIT

During the **AUTO-TUNING** scanning and storage operations, the message **TUNING WAIT** appears, and the LED to the right of the display flashes green. The duration of the procedure depends on the number of MUX signals received from the connected antennas.



OUTPUT
>LEV: 110dBuV

Once the **AUTO-TUNING** procedure is complete, the display will show the total output level calculated according to the number of channels found in the scan. To confirm and complete the procedure press the **↵** key. If you wish to change the value of the output level, use the **▽ Δ** keys and confirm by pressing the **↵** key.



NO MUX
FOUND

If no channel/MUX is found, the display will show the message **NO MUX FOUND**. Check that the connections to the TV antennas are correct.

Menu description

```
TUNING
AUTO      MAN
```

To start manual programming, select MAN using the ▾ key and press ↵.

INPUT (1) UHF

```
IN (1)    UHF
```

To set input parameters (1) press ↵.

REMOTE POWER SUPPLY

```
IN (1)    UHF
>DC: OFF
```

To enable remote feed from input (1) press ↵ and use the ▾ Δ keys to select **ON / OFF** and confirm by pressing ↵ again.



The 12 or 24 voltage selection can be found in the **ADVANCED** menu.



The presence of a short circuit or overload at the inputs is signalled by the **POWER LED** flashing and the display will prompt **ERROR OVERCURRENT!**

INPUT AMPLIFIER

```
DC: OFF
>AMPLI: MID
```

Press ▾ to set function switch > to **AMPLI** and press ↵ and use the ▾ Δ keys to select the proper input amplifier mode confirm by pressing ↵ again. The recommended criteria for selecting the amplifier type are shown in the diagram below

Input amplifier mode

AMPLI: HIGH

AMPLI: MID

AMPLI: OFF

Input signals level < 55dBμV

55 ÷ 85dBμV

> 85dBμV

CHANNEL FILTER

```
AMPLI: MID
>ADD 1CH
```

Press ▾ to position function switch > to **ADD 1CH** and press ↵. To select the channel number use the ▾ Δ keys; to confirm that the output channel is the same as the input channel press ↵ twice.

```
>21->21A 065
ADD 1 CH
```

```
>21->21A 065
ADD 1 CH
```

```
21->21A 065
>25->25A 060
```

CHANNEL CONVERSION

```
>21->345 065
ADD 1 CH
```

To convert a Channel to a different channel from the one received as input, place the pointer ... under the output filter and select the channel number using the ∇ Δ keys, press \leftarrow to confirm.

LTE 5G FILTER	INPUT CH.	OUTPUT CH.
ON	E21÷E48	E21÷E69
OFF	E21÷E69	E21÷E69



Useful function for converting one or more adjacent channels that interfere with each other.

SINGLE FILTER BANDWIDTH

```
>21->21A 065
25->25A 060
```

The default settings for the filter bandwidth is **A** (Automatic). In the **ADVANCED** menu can be switched to **MAN** (Manual).

In manual mode **MAN** for each individual channel/MUX a filter with a width of your choice between **S** (Standardized) / **N** (Narrow) / **W** (Wide) can be used. To manually assign a filter bandwidth press \leftarrow again and use the ∇ Δ keys to choose the most suitable filter.

FILTER	CHANNEL CONDITION	USE SUGGESTION
S	Non-adjacent channels or adjacent channels with a level difference less than 10dB μ V.	The S (Standardized) filter is the best performing filter in most cases.
N	Two or more adjacent channels with level difference of more than 10dB μ V.	Set filter N (Narrow) for the channel/channels with the lowest level.
W	Non-adjacent channels received with low quality parameters.	The W (Wide) filter is suitable filter for non-adjacent channels only.

OVERLAPPING FILTERS

```
23->23S*065
>23->23S*065
```

The overlapping of two or more filters with the same output channel is indicated by the symbol *.

DELETE FILTER

```
CH DELETED
```

Select a channel filter or conversion and press \leftarrow for 5 seconds to delete.

INPUT (2) UHF

```
IN (2) UHF
```

To set the input parameters (2) press \leftarrow and access the menu. For programming, follow the instructions described for **INPUT (1) UHF**.

INPUT (3) VHF/UHF

IN (3) V/UHF

To set input **(3)** parameters, press **↵** to access the menu. For programming, follow the instructions described for **INPUT (1) UHF**

LTE 5G FILTER	INPUT CH.	OUPUT CH.
ON	E5÷E13/E21÷E48	E5÷E13/E21÷E69
OFF	E5÷E13/E21÷E69	E5÷E13/E21÷E69

INPUT (4) UHF

IN (4) UHF

To set input **(4)** parameters, press **↵** to access the menu. For programming, follow the instructions described for **INPUT (1) UHF**

INPUT (4) DAB

IN (4) DAB

To activate the input filter for the DAB band select **ON**. The **DAB** filter has its own amplifier that can be set to three levels.

: ON
>AMPLI:MID

AMPLIFIER	GAIN
OFF	-8 dB
MID	0 dB
HIGH	+15 dB

Note: Activating the DAB filter does not exclude the possibility of process UHF channels from the same input so COMBO DAB-UHF antennas can be used.

INPUT (5) FM

IN (5) FM

Input **(5)** is dedicated to the FM radio band. To adjust the input attenuation press **↵** and use the **▽** **△** keys to set the desired level.

IN (5) FM
>ATTEN:-15dB

OUTPUT LEVEL

OUTPUT

Press ∇ to select the OUTPUT menu and confirm with \leftarrow to access the amplifier output level setup.

OUTPUT
>LEV: 119dBuV

To set the output level, press \leftarrow and use the $\nabla \Delta$ keys to change the numerical value. To confirm, press \leftarrow again.

SLOPE

LEV: 119dBuV
>SLOPE: 05dB

To correct the slope of the output, set the pointer > to SLOPE and press \leftarrow , use the $\nabla \Delta$ keys to change the value and press \leftarrow to confirm.

VHF OUTPUT LEVEL

SLOPE: 05dB
>VHF: -00dB

To change the VHF level output, select VHF and press \leftarrow ; use the $\nabla \Delta$ keys to change the value and press \leftarrow to confirm.



To return to the main level menu from any submenu, press and hold the $\nabla \Delta$

ADVANCED SETTINGS

ADVANCED

PROTECTION PASSWORD

ADVANCED
>PASSW: 000

Select **PASSW**, press **↵** and use the **▽** **△** keys to choose the numerical value of the first digit on the right and confirm with **↵**. For the next two digits, repeat the operation and press **↵** to confirm.

Code 0 0 0 equals no password protection

Lte 5G FILTER

PASSW: 000
>LTE: 5G

Press **↵** and use the **▽** **△** keys to enable or disable the Lte5G SAW filters, press **↵** to confirm.

Lte 5G FILTER	INPUT CHANNELS
ON	E21÷E48
OFF	E21÷E69

PASSW: 000
>LTE: OFF

REMOTE POWERING

LTE: 5G
>DC: 12V

To set the **DC** voltage press **↵** and use the **▽** **△** keys to select **12V** or **24V** voltage confirm by pressing **↵**.

The selected remote supply voltage will be the same for all inputs.

FILTERS BANDWIDTH

DC: 12V
>BW: MAN

Selecting **MAN** (manual) mode, in the **INPUT** menu each filter can be assigned as **N**arrow, **S**tandard or **W**ide.

DC: 12V
>BW: AUTO

Selecting **AUTO** the filters width will be assigned automatically.

THRESHOLD LEVEL

BW: AUTO
>THRES: 055dB

The **THRES** value determines the sensitivity of the **MONITOR** function.

FAST FUNCTION

THRES: 055dB
>FAST: ON

Activation of the **FAST** function reduces the adjusting time of the **CAG** (automatic gain control). This function is useful in the presence of unstable channels with sudden changes in their level.

MONITOR FUNCTION

```
FAST:OFF
>MONITOR:OFF
```

Activation of the **MONITOR** function, a continuous cyclic check of all the programmed filters, disabling those that are not affected by the transmission of a channel. The switch-off threshold is set by the **THRES** value described in the **THRESHOLD LEVEL** function.

SERIAL NUMBER

```
MONITOR:OFF
>SRNBR:12345
```

The number series to the right of **SRNBR** represents the serial number of the product.



To return to the main level menu from any submenu, press and hold the **▽ Δ**

RESET

```
RESET
```

If you wish to delete all settings and restore the control unit to factory state, select **YES** and confirm **↵**. The display will show the message **OP EXECUTED** to confirm the successful cancellation operation.

```
ARE U SURE?
YES          NO
```

```
OP
EXECUTED
```

EXIT

```
EXIT
```

To end the programming procedures select **EXIT** pressing **↵** and select with **▽ Δ** **YES** press **↵** to confirm. If you wish to continue programming select **NO** and confirm with **↵**.

```
ARE U SURE?
YES          NO
```

Android SmartPhone Programming

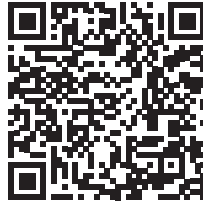
Requirements

The **DSP40plus** can also be programmed by the **LEMUSB** App available for Android smartphones, which can be downloaded free of charge from the Google Play portal.

To check whether your device's USB port supports **OTG** (On The Go) mode, please refer to the user manuals of your smartphone/tablet, failing which you can check **OTG** compatibility with a free APP called **USB OTG Checker** that can be downloaded from the Google Play portal.

The LEM USB application requires at least the Android 11 operating system or higher.

A **USB-OTG** cable or adapter is required to connect and program the amplifier.



LEM USB

Setup

- 1 Power up the control unit and wait the end of booting until the LCD display shows **DSP40plus**
- 2 Connect the USB port of your Android device with the **USB** type B port integrated in the amplifier using a proper USB-OTG cable.
- 3 If the connection procedure was successfully completed, the **LEM USB** application will start automatically allowing all programming operations.

Microsoft Windows App Programming

Install in a PC Windows OS the latest version of the application **LEM USB for Windows** that can be found in the download page of the website www.lemelettronica.it

The LEM USB application requires at least Windows 7 operating system or higher.

Setup

- 1 Power up the control unit and wait for the LCD display to show **DSP40plus**.
- 2 Connect the USB port type A of the Windows OS personal computer to **USB** type B port integrated in the **DSP40plus** unit using standard USB A-B cable.
- 3 Launch the **LEM USB** application, select the amplifier model and start to programming.

Label with serial and tracking data

AA1000015019-X1020L

AA	100001	50	19	-X	10	20	L
└──┘	└──┘	└──┘	└──┘		└──┘	└──┘	
Model	Serial #	Manuf. Week	Manuf. Year		HW Rel.	FW Rel.	

REL. 250108

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