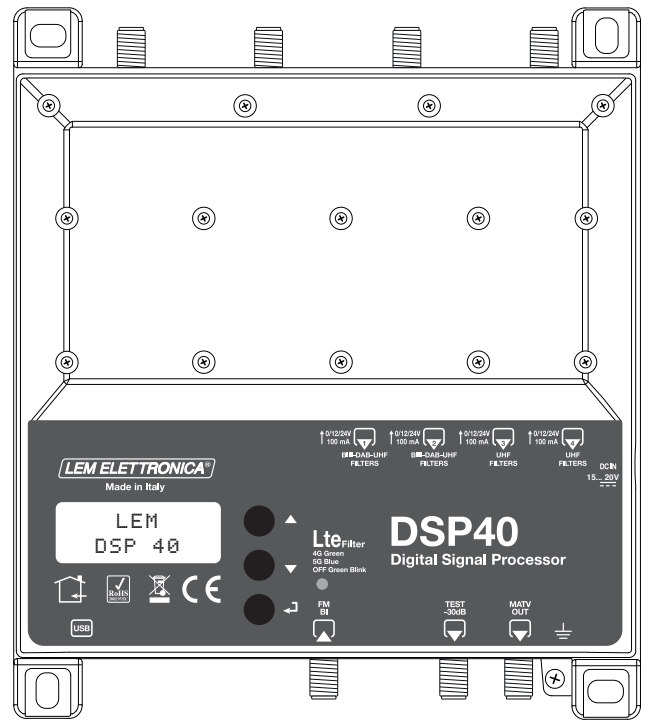


# DSP40

## DIGITAL SIGNAL PROCESSOR

- ▶ 24 Digits LCD display
- ▶ Auto-Tuning function
- ▶ Maximum Output Level 120dBμV
- ▶ Selectable Lte 4G/5G SAW filters
- ▶ Up to 64 High Selectivity Filters with ACG
- ▶ Converts up to 32 single channels
- ▶ Zamak die casting chassis

High selectivity programmable compact headend to digitally filter, convert and equalize DVB-T / T2 channels. The built in high output amplifier allow the use in medium and large installation plants.



MODEL		DSP40
NUMBER OF INPUTS	5	1 FM; 2 BIII-DAB/UHF; 2 UHF
INPUTS FREQUENCY RANGE	MHz	FM (40... 108 MHz) VHF (170... 240 MHz) UHF 470... 694/790/862
SINGLE CHANNEL FILTERS		32
NUMBER OF CHANNEL PER FILTERS		1... 2
INPUT LEVEL RANGE	dBμV	FM 35... 90 - BIII/DAB 40... 110 - UHF... 40... 110
FM INPUT ATTENUATOR	dB	FM 0...-30
BIII-DAB / UHF INPUTS ATTENUATORS	dB	0... -20
A.C.G. RANGE	dB	40 dB
SELECTIVITY	dB	35 @1MHz
INTERSTAGE ATT. (1 dB STEP ADJUST.)	dB	0...-20
FM GAIN	dB	45
VHF GAIN	dB	40
VHF ADJUSTER	dB	0... -10
UHF GAIN	dB	50
UHF SLOPE	dB	0... 5 (1 dB Step)
MAX OUTPUT LEVEL	dBμV	120 (IM3 DIN 45004B - 60 dBc)
RETURN LOSS IN/OUT	dB	>12
TEST OUTPUT		1 (-30 dB)
USB CONNECTOR		USB 1.0 / 2.0 Type B
REMOTE POWER SUPPLY VHF-UHF		12V / 24V 100 mA
MAX. POWER CONSUMPTION		15... 20V / 8W
OPERATING TEMPERATURE	°C	-5... 50
DIMENSIONS	mm	192 x 217 x 37

## ICONS DESCRIPTION



Selectable high rejection SAW filters for optimal protection against Lte 4G and 5G interferences



In addition to the easy to use built-in LCD display, programming applications are available for PC Windows and Android devices



Self programming Auto-tuning function to scan and detect DVB-T/T2 signals from the VHF/UHF inputs and allocate a single digital filter for each transponder

## DESCRIPTION OF SYMBOLS AND ELECTRICAL SAFETY



The equipment complies with the CE requirements



The equipment is designed for indoor use only



Equipment grounding terminal



This symbol indicates that the equipment complies with the safety requirements for class II equipment.



To avoid the risk of electric shock, do not open the equipment.



The equipment is compliant with RoHS 2011/65EU



Dispose according your local authority's recycling processes

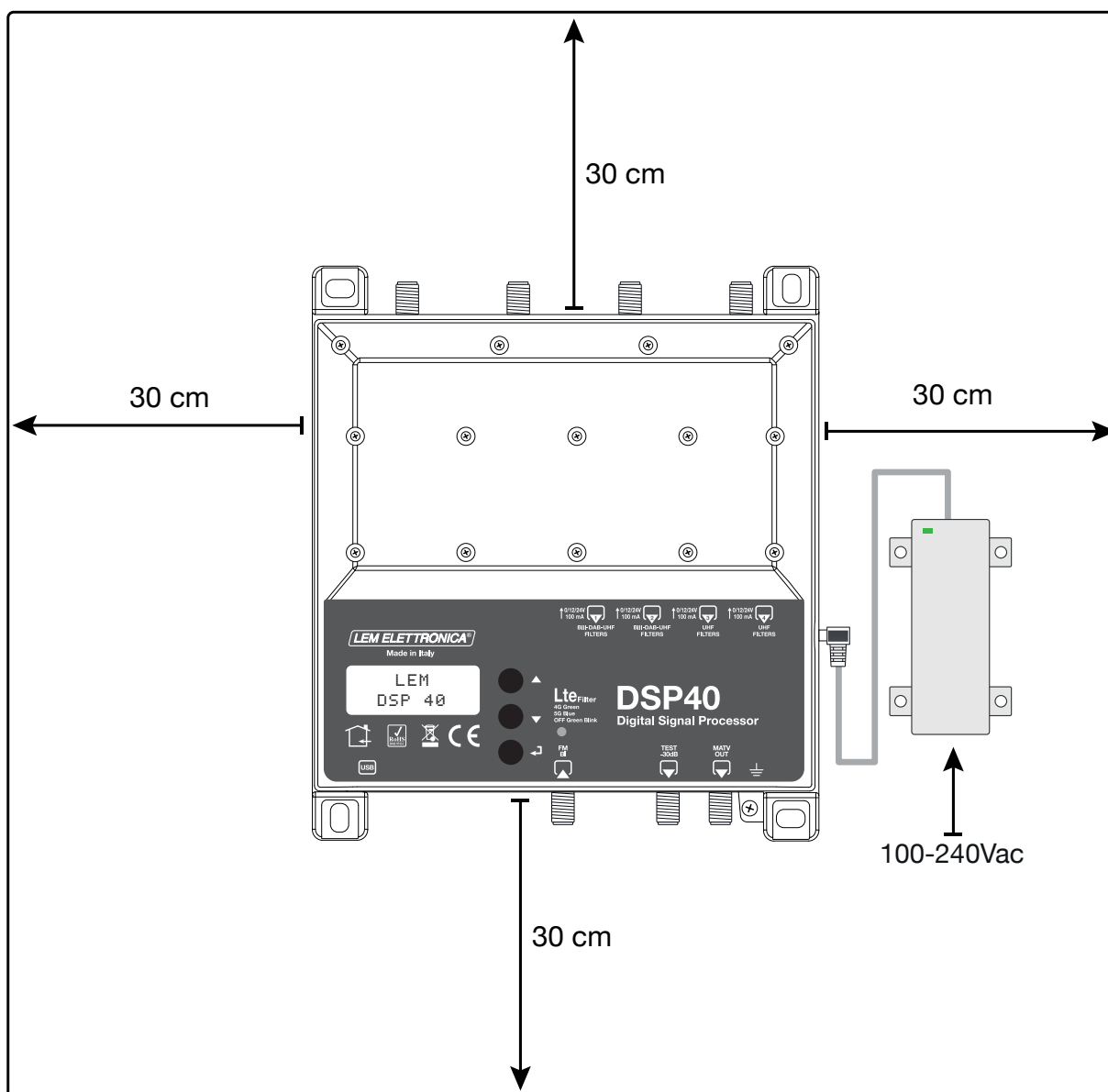


## Safety instructions

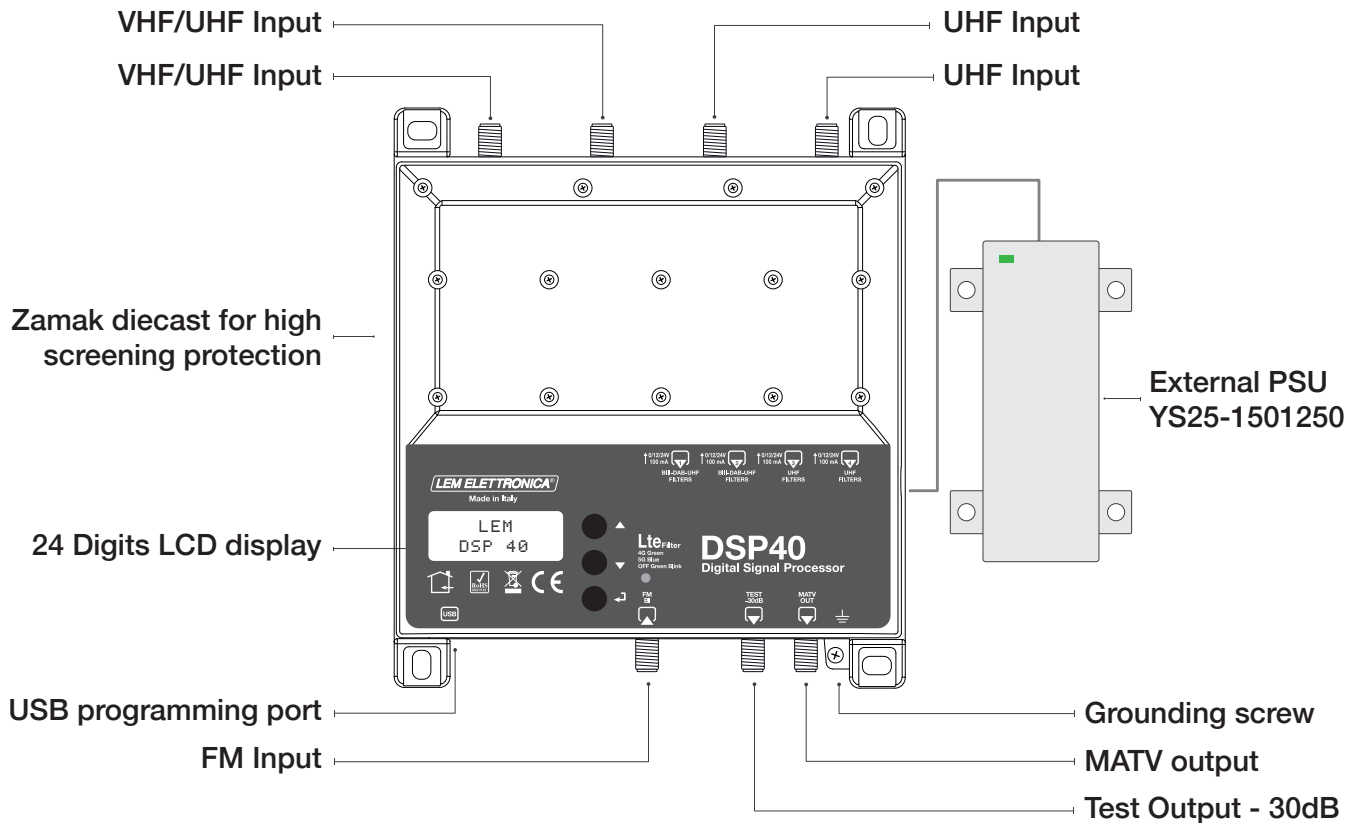
1. Do not expose the amplifier to extreme temperatures.
2. Place the amplifier in a dry and well-aired location.
3. Install the unit on a vertical wall, or in a waterproof cabinet to a minimum IP55 rating, and fix it safely using the provided fixing plugs
4. Connect the power adapter cord to a detachable power supply socket.

### IMPORTANT!

Use only the power pack YS25-1501250 supplied with the amplifier. The use of not original power packs can cause malfunctioning and invalidate the warranty.



# Connections Schematic



## Installation and start-up

- Connect an earth wire to grounding clamp
- Connect the TV aerial(s) to the amplifier's inputs.
- Terminate the unused inputs with 75Ω terminators.
- Connect the power supplier unit and then connect the amplifier to the mains plug

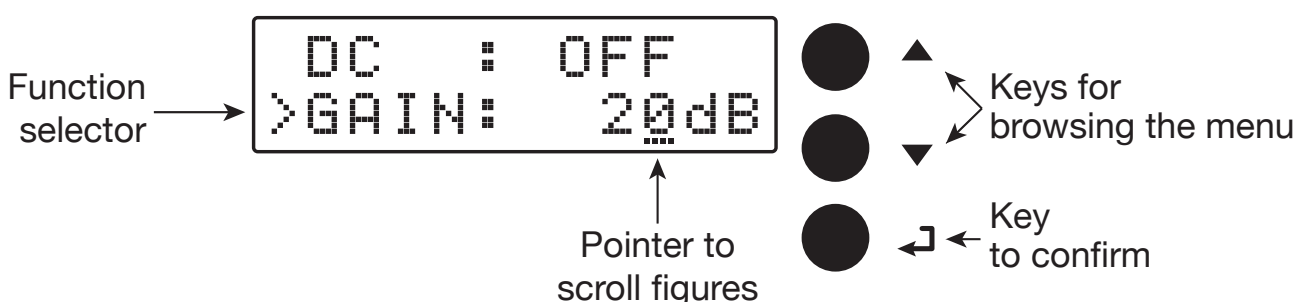
## Programming via display

Firmware rel. 1.5  
Hardware rel. 3.2

1. Press to activate the display
2. Press for three seconds to enter the programming menu



**Note:** the display will go out after 3 minutes if inactive, but the menu will remain open on the last selected function. Press any key to resume to continue.



# Automatic channel scan and memorization

## AUTO-TUNING

```
TUNING
AUTO      MAN
```

To start the automatic programming, **AUTO-TUNING**, place the pointer --- below **AUTO**. Press **↵** to proceed. The amplifier **DSP40** will start scanning the MUX on input [1] for UHF band and on input [2] for III° band.

---

To stop the **AUTO-TUNING** procedure press **↵** for 5 seconds.

---

```
TUNING
>      >
```

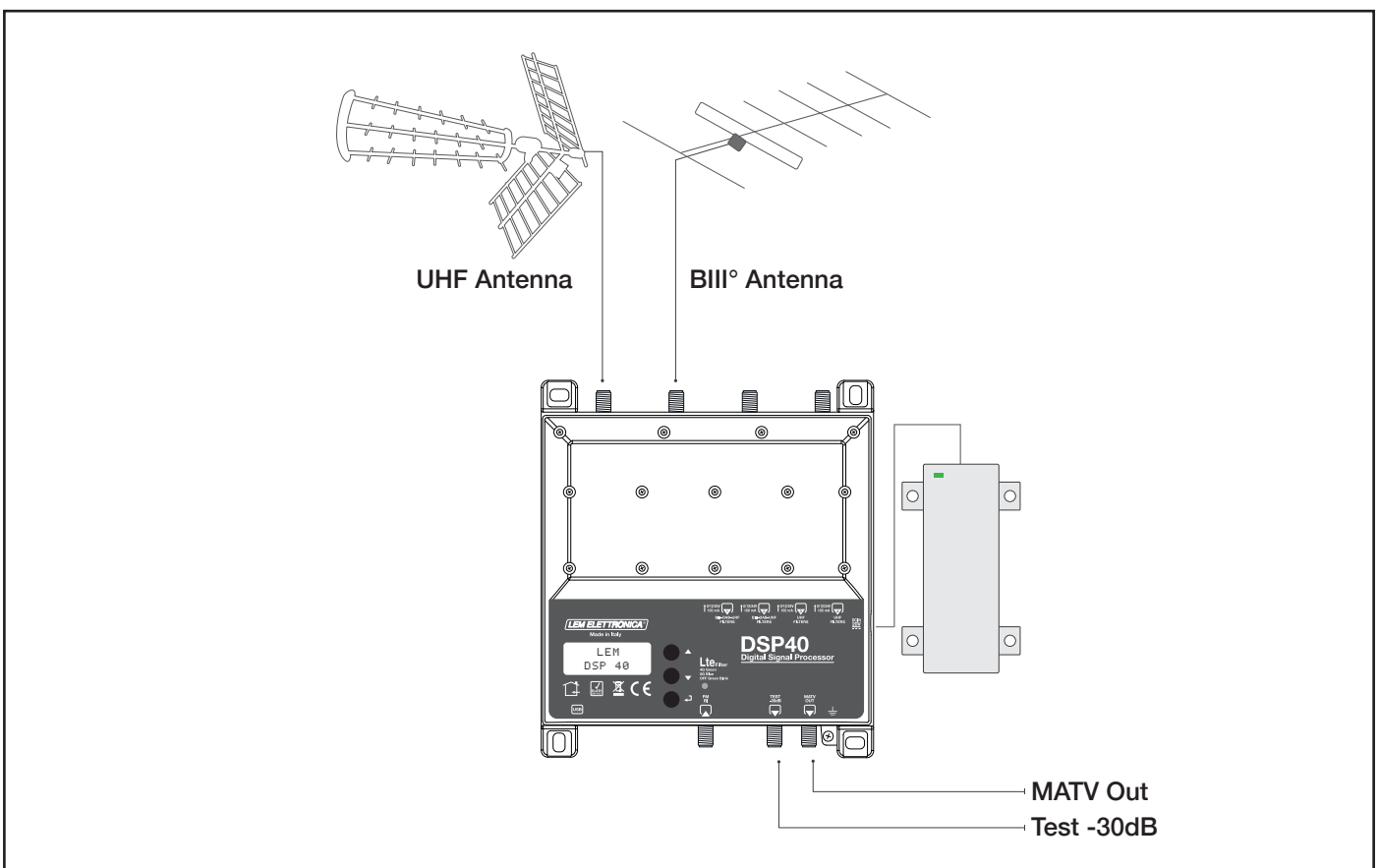
Wait for the **AUTO-TUNING** procedure to end, which depends on the number of MUX received from the antenna.

```
OUTPUT
>LEV: 110dBuV
```

When the **AUTO-TUNING** procedure is completed the display will show the total output level depending on the number of MUX automatically saved. Press **↵** to confirm and complete the procedure. To change the output level press the keys **∇** **Δ** then press **↵** to confirm.



Setting higher output levels than the one obtained through the **AUTO-TUNING** could reduce the quality of the received signals.



# Manual programming

```
TUNING
AUTO      MAN
```

Position the pointer --- on **MAN** to start the manual programming though the  $\Delta$  key and press  $\leftarrow$  to continue.

## FM INPUT

```
INPUT FM
```

Press  $\leftarrow$  to enter the menu to set the **FM** input parameters.

## FM REMOTE POWER SUPPLY

```
INPUT FM
>DC : OFF
```

Press  $\leftarrow$  to start the pointer --- to scroll options then press  $\nabla \Delta$  to select **ON** or **OFF** to enable the remote power supply on the **FM** input. Press  $\leftarrow$  to confirm.

---

The remote power supply is set on 12Volt. It can be changed to 24Volt in the **ADVANCED** menu.

---

## FM GAIN

```
DC : ON
>GAIN: 30dB
```

Position the function selector > on **Gain** and press  $\leftarrow$  to start the pointer --- to scroll options, select the desired output level through the keys  $\nabla \Delta$  and press  $\leftarrow$  to confirm.

Adjustable from 15 to 45dB

## INPUT [1] VHF-UHF

```
INPUT V/U 1
```

To set the **INPUT V/U 1** parameters press  $\leftarrow$  to enter the menu.

### INPUT V/U 1 Processable channels

BIII° = E5... E13 - DAB

UHF 21... 48 with filter Lte 5G selected

UHF 21... 60 with filter Lte 4G selected

UHF 21... 69 with filter Lte OFF

---

The selection of the Lte filter is available in the **ADVANCED** menu.

---



In any position of the menus **INPUT V/U 1; INPUT V/U 2; INPUT U 3; INPUT U 4** press the keys  $\nabla \Delta$  at the same time to go back to main menu.

## REMOTE POWER SUPPLY

```
INPUT V/U 1
>DC : OFE
```

Press **↵** to start the pointer --- to scroll options then press **▽ Δ** to select **ON** or **OFF** to enable the remote power supply on the **FM** input. Press **↵** to confirm.

---

The remote power supply is set on 12Volt. It can be changed to 24Volt in the **ADVANCED** menu.

---

## INPUT GAIN

```
INPUT V/U 1
>GAIN: 20dB
```

Adjustable from 0 to 20dB

Position the function selector **>** on **Gain** and press **↵** to start the pointer --- to scroll options, select the desired output level through the keys **▽ Δ** and press **↵** to confirm.

## SINGLE MUX FILTERING

```
GAIN: 20dB
>ADD 1 CH
```

```
GAIN: 20dB
>21->21 L 65
```

```
GAIN: 20dB
>21->21 L 65
```

Press **▽ Δ** to position the function selector **>** on **ADD 1 CH** and press **↵**.

To activate only the filtering function on a single MUX set the desired channel through the **▽ Δ** keys then press **↵** twice to confirm.

---

The **L** figure shows the input level of the selected MUX in **dBμV**.

---

## MUX CONVERSION

```
GAIN: 20dB
>36->36 L 65
```

```
GAIN: 20dB
>36->41 L 65
```

To activate the filtering and conversion function on a single MUX set the desired channel through the **▽ Δ** keys then press **↵** to confirm the input channel. Adjust the conversion channel through the **▽ Δ** keys then press **↵** to confirm.



Regardless of the selected **Lte 4G** or **5G** filter, output conversions up to the **UHF** channel 69 are permitted.

## TWO MUX FILTERING

```
ADD 1 CH
>ADD 2 CH
```

```
GAIN: 20dB
>21<>22 L 65
```

To add a filter for two channels with two adjacent MUX press **▽** and select **ADD 2 CH**. Press **↵** to confirm. Select the first channel with the **▽ Δ** keys. The second channel will automatically appear in second position. Press **↵** to confirm.

## DELETE FILTER

```
CH DELETED
```

Position the function selector **>** on **MUX filtering** or **MUX conversion** using **▽ Δ** then press **↵** for five seconds.

## INPUT [2] VHF-UHF

INPUT V/U 2

To set the **INPUT V/U 2** parameters, press  $\leftarrow$  to enter the menu.

The procedures described for input 1 apply to all settings.

### INPUT V/U 2 Processable channels

BIII° = E5... E13 - DAB

UHF 21... 48 with filter Lte 5G selected

UHF 21... 60 with filter Lte 4G selected

UHF 21... 69 with filter Lte OFF

## INPUT [3] UHF

INPUT U 3

To set the **INPUT 3 U** parameters press  $\leftarrow$  to enter the menu.

The procedures described for input 1 apply to all settings.

### INPUT V/U 3 Processable channels

UHF 21... 48 with filter Lte 5G selected

UHF 21... 60 with filter Lte 4G selected

UHF 21... 69 with filter Lte OFF

## INPUT [4] UHF

INPUT U 4

To set the **INPUT 4 U** parameters press  $\leftarrow$  to enter the menu.

The procedures described for input 1 apply to all settings.

### INPUT V/U 4 Processable channels

UHF 21... 60 with filter Lte 4G selected

UHF 21... 48 with filter Lte 5G selected

UHF 21... 69 with filter Lte OFF

## OUTPUT LEVEL SELECTION

OUTPUT

Press  $\nabla$  to select the menu **OUTPUT** and press  $\leftarrow$  to confirm and check the selected output level.

Adjustable from 93 to 113dBuV

OUTPUT  
>LEV: 105dBuV

To adjust the output level press  $\leftarrow$  and change the figure where the pointer is positioned, to the required level. Press  $\leftarrow$  to confirm.

## UHF OUTPUT SLOPE

LEV: 110dBuV  
>SLP: 5dB

To adjust the UHF **SLOPE** select SLP and press  $\leftarrow$ , press  $\nabla \Delta$  to select the required value and press  $\leftarrow$  to confirm.

Adjustable from 0 to 5dB

## VHF OUTPUT GAIN

SLP: 5dB  
>VHF: -10dB

To adjust the VHF gain select **VHF** and press  $\leftarrow$ , press  $\nabla \Delta$  to select the required value and press  $\leftarrow$  to confirm.

Adjustable from 0 to -10dB



## ADVANCED SETTINGS

ADVANCED



In any position of the **ADAVANCE** menu press the keys  $\nabla \Delta$  at the same time to go back to main menu.

### Lte Filter 4G or 5G

ADVANCED  
>LTE: 4G

ADVANCED  
>LTE: 4G

ADVANCED  
>LTE: 5G

ADVANCED  
>LTE: OFF

Press  $\leftarrow$  and the  $\nabla \Delta$  keys to select the SAW Filter Lte 4G or 5G. Press again  $\leftarrow$  to confirm.

LTE FILTER	UHF CH	FREQ. RANGE	LED STATUS
5G	21... 48	470... 694 MHz	Blue
4G	21... 60	470... 790 MHz	Green
OFF	21... 69	470... 862 MHz	Green Blinking

### REMOTE POWER SUPPLY

LTE: 4G  
>DC: 12V

LTE: 4G  
>DC: 24V

Select the **DC** voltage setting function and press  $\leftarrow$ , press the  $\nabla \Delta$  keys to select the 12Volt or 24Volt tension then press  $\leftarrow$  to confirm.

### PROTECTION PASSCODE

DC : 12V  
>PSW: 000

DC : 12V  
>PSW: 000

Select **PSW** and press  $\leftarrow$ , press the  $\nabla \Delta$  keys to select the first figure from the right. Press  $\leftarrow$  to confirm. Repeat for the other figures and press  $\leftarrow$  to confirm.

### AUTO-TUNING INPUTS THRESHOLD

PSW: 000  
>THR: 55dBuV

Adj. from 45 to 90dB $\mu$ V

PSW: 000  
>THR: 59dBuV

Select **THR**, the **AUTO-TUNING** minimum threshold function and press  $\leftarrow$ . Use the  $\nabla \Delta$  keys to select the required value and press  $\leftarrow$  to confirm.

## FAST

```
FAST: OFF
>RESET
```

Select OFF for a slower A.C.G. response  
Select ON for a faster A.C.G response.

## RESET DSP40

```
THR: 55dBuV
>RESET
```

Select the **RESET** function and and press **↵** to enter a second safety menu **RESET?**

```
RESET?
YES     NO
```

If you want to cancel all setting and restore the original settings, confirm YES by pressing **↵**. The display will show **RESET OK** for a few second to confirm the operation.

```
RESET OK
```

If you wish to cancel the operation select **NO** by pressing **▽** then press **↵** to confirm.

## MONITOR

```
RESET
>MONIT: OFF
```

Function is still under developing please do not use.

## S/N DSP40

```
RESET
>SNBR: 00001
```

Select **SNBR**. The number displayed on the right is the univocal serial number of the product.

## EXIT

```
EXIT
```

To close the procedure select **EXIT** and and press **↵**. Select **YES** by pressing the **▽ Δ** keys and press **↵** to confirm.

```
EXIT
YES     NO
```

If you wish to cancel the operation, select **NO** by pressing **▽** then press **↵** to confirm and carry on your setting procedure.

## PC Windows Programming GUI

1. Download from our website <http://www.lemeletronica.it> download area the latest GUI release.
2. Install the GUI selecting the file Setup.exe and follow the guided procedure step by step until the installation is completed.

### Software minimum requirements

Windows 7 or more recent operating system, Microsoft Framework .NET 3.5\* or higher and langpack (free download from Microsoft website).

The program needs the Framework.NET 3.5 it's usually in the PC if there is a recent version of Windows 7. If not the Framework.NET can be freely downloaded from the Microsoft website.

### Hardware requirements

PC Windows compatible with USB interface.

USB A-B cable.

## SmartPhone/Tablet Android Programming GUI

1. Check if your Android device support the USB OTG mode. The free application like USB OTG Checker can help.
2. To connect the Android Smartphone/Tablet you need a USB OTG cable or adapter.
3. Download from Google play and install the application LEMGUI
4. Switch on the DSP40.
5. Connect the DSP40 to your Android device with the USB-OTG cable
6. The LEM GUI will start automatically and you will be ready to set up the DSP40.

### Label with serial and tracking data

AA 1 0000 15019 - X 1020 L

AA	1	0000	15	01	9	-	X	1	0	2	0	L
Model	Serial #			Manuf. Week	Manuf. Year			HW Rel.		FW Rel.		

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