

# **DSP40pro**

# **DIGITAL SIGNAL PROCESSOR**

- 24 Digits LCD display
- Auto-Tuning function
- Additional AUX input
- Maximum Output Level 124dBµV
- 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.





WARRANTY YEARS		Firmware rel. 1.5 Hardware rel. 1.2
MODEL		DSP40PRO
NUMBER OF INPUTS	6	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 AUX (40 862)
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 030
BIII-DAB / UHF INPUTS ATTENUATORS	dB	020
AUX IINPUT ATTENUATOR	dB	020
A.C.G. RANGE	dB	40 dB
SELECTIVITY	dB	35 @1MHz
INTERSTAGE ATT. (1 dB STEP ADJUST.)	dB	020
FM GAIN	dB	45
VHF GAIN	dB	40
VHF ADJUSTER	dB	010
UHF GAIN	dB	50
UHF SLOPE	dB	0 5 (1 dB Step)
MAX OUTPUT LEVEL	dBµV	124 (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		20V / 10W
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



- 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. Conect the power adapter cord to a detachable power supply socket.

# **IMPORTANT!**

Use only the power pack YS50-2002250 supplied with the amplifier. The use of <u>not original</u> 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  $75\Omega$  terminators.
- Connect the power supplier unit and than connect the amplifier to the mains plug

# **Programming via display**

1. Press - to activate the display

2. Press - for three seconds to enter the programming menu

Firmware rel. 1.5 Hardware rel. 1.2



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

from the antenna.

### **AUTO-TUNING**



To start the automatic programming, AUTO-TUNING, place the pointer --- below AUTO. Press to proceed. The amplifier DSP40pro 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.

Wait for the AUTO-TUNING procedure to end,

which depends on the number of MUX received

TUNING

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  $\checkmark$ to confirm and complete the procedure. To change the output level press the keys  $\nabla \Delta$  then press  $\checkmark$  to confirm.



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



# **Manual programming**

ΤU	ŀ4 ]	NG	
ΑU	TC		MAN

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

**FM INPUT** 



Press ← to enter the menu to set the FM input parameters.

#### **FM REMOTE POWER SUPPLY**

	I	N	p	U	-	Μ	
>	D	С			0		F

Press  $\checkmark$  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  $\checkmark$  to confirm.

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

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.

FM GAIN

DC		ON
≥GA	IN:	3 <u>0</u> dB

Adjustable from 15 to 45dB

#### **AUX INPUT**



#### **AUX GAIN**



Adjustable from 22 to 42dB

#### **INPUT [1] VHF-UHF**

Press ← to enter the menu to set the AUX input parameters.

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..

To set the INPUT V/U 1 parameters press ← 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**

	Ι	ŀ	PUT	U/U	1
>	D	С		0 F <u>F</u>	

#### **INPUT GAIN**

I	Ы	Ρ	U	T	V/U	1
ÞG	Α	I	Ν		2 <u>0</u> dB	

Adjustable from 0 to 20dB

#### SINGLE MUX FILTERING

GAIN:	20dB
>ADD 1 (	CH
GAIN:	20dB
>2 <u>1</u> ->21	L 65
GAIN: >21->21	20dB

### **MUX CONVERSION**

GAIN:	20dB
>3 <u>6</u> ->36	L 65
GAIN:	20dB
>36->4 <u>1</u>	L 65

#### **TWO MUX FILTERING**

ADD	1	CH
>ADD	2	CH
GAIN: >21<>2	2	20dB L 65

#### **DELETE FILTER**



Press  $\checkmark$  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  $\checkmark$  to confirm.

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

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.

Press  $\nabla \Delta$  to position the function selector > on **ADD 1 CH** and press  $\checkmark$ .

To activate only the filtering function on a single MUX set the desired channel through the  $\nabla \Delta$  keys then press  $\checkmark$  twice to confirm.

The L figure shows the input level of the selected MUX in  $dB\mu V\!.$ 

To activate the filtering and conversion function on a single MUX set the desired channel through the  $\nabla$  $\Delta$  keys then press  $\checkmark$  to confirm the input channel Adjust the conversion channel through the  $\nabla \Delta$  keys then press  $\checkmark$  to confirm.



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

To add a filter for two channels with two adjacent MUX press  $\nabla$  and select ADD 2 CH. Press  $\checkmark$  to confirm. Select the first channel with the  $\nabla \Delta$  keys. The second channel will automatically appear in second position. Press  $\checkmark$  to confirm.

Position the function selector > on MUX filtering or MUX conversion using  $\nabla \Delta$  then press  $\checkmark$  for five seconds.

#### INPUT [2] VHF-UHF

INPUT V/U 2

#### **INPUT [3] UHF**

ΙN	ΡU		U	3	
	i ""	•			

#### **INPUT [4] UHF**

I	Ν	P	U	Τ	U	4

#### **OUTPUT LEVEL SELECTION**

### OUTPUT

#### Adjustable from 93 to 113dBµV



#### **UHF OUTPUT SLOPE**



### Adjustable from 0 to 5dB

### **VHF OUTPUT GAIN**



Adjustable from 0 to -10dB

To set the INPUT V/U 2 parameters, press  $\checkmark$  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

To set the INPUT 3 U parameters press ← 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

To set the INPUT 4 U parameters press - 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

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

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

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

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

#### **ADVANCED SETTINGS**





In any position of the ADAVANCE menu press the keys ∇∆ at the same time to go back to main menu.

#### Lte Filter 4G or 5G

	β	D	ŲΑ	N	С	D	
>	L	T	E:			4	G





A	D	Ųβ	N	С	-	D		
>L		Eŧ				Ö	-	

Press  $\checkmark$  and the  $\nabla \Delta$  keys to select the SAW Filter Lte 4G or 5G. Press again  $\checkmark$  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:	46
>DC:	1 <u>2</u> V
LTE:	46
>DC:	2 <u>4</u> V

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

#### **PROTECTION PASSCODE**

>PSW: 000	D	C		12V
	>Р	Sb	!:	000

DC		12V
>PS	W:	00 <u>0</u>

AUTO-TUNING INPUTS THRESHOLD

PSW		000
>THR		55dBuV
	4.5	

Adj. from 45 to 90dBµV

	S	W	000
>		R	5 <u>9</u> dBuV

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

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

		β	5	Ī		0	-	-	
>	R		S	-	T				

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

#### **RESET DSP40pro**



Select the **RESET** function and and press  $\leftarrow$  to enter a second safety menu **RESET**?

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

If you wish to cancel the operation select NO by pressing  $\nabla$  then press  $\checkmark$  to confirm.

#### MONITOR

	R		S		T				
$\geq$	Μ	O	Ы	I	Т	ĺ	0	F	

Function is still under developing please do not use.

#### S/N DSP40pro

	R		5		T	
>	5	N	В	R		00001

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

#### EXIT

	Χ	I	T		
--	---	---	---	--	--

	EΧ	I	T	
Y	ЕS			NO

To close the procedure select **EXIT** and and press  $\checkmark$ . Select **YES** by pressing the  $\nabla \Delta$  keys and press  $\checkmark$  to confirm.

If you wish to cancel the operation, select **NO** by pressing  $\nabla$  then press  $\checkmark$  to confirm and carry on your setting procedure.

# **PC Windows Programming GUI**

- 1. Download from our website http://www.lemelettronica.it download area the latest GUI release.
- 2. Install the GUI slecting 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 DSP40pro.
- 5. Connect the DSP40pro 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 DSP40pro.



LEM ELETTRONICA srl · Via Grezze, 38 · 25015 Desenzano d/G · Italy Tel. +39 0309120006 · Fax. +39 0309123035 · info@lemelettronica.it www.lemelettronica.it