

DSP-Lite

USER GUIDE



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DSP-Lite

Table of content

Table of content	1
1.DSP-Lite	3
1:1.Welcome	3
1:2.Unpacking&checking	3
1:3.Disposal of the packing material	3
2.Important safety instructions	4
3.Electrostatic Discharge (ESD)	4
4.Regulatory information	5
5.Mechanical drawings	6
5:1.How to fit the mounting plate to the DSP-Lite proc board	essing 6
5:2.Components	7
6.Mounting kit for DigiMod heatsink plate	8
7.Mounting kit for LiteMod heatsink plate	9
8.Connections	10
7:1.PL2 connector	10
8:1.PL3 connector	12
8:2.PL4 pinout	14
8:3.Input/Output signal connectors	14
9.LED chart	14
9:1.Clip/Temp LED	14
9:2.Signal FD	14
oriziorginal 220	

9:3.Status LED	14
10.Power management	15
10:1.How to permanently disable the power management	15
10:2.LiteMod deep sleep mode	15
11.Software	15
11:1.Configuring the software environment	15
11:1.1.DSP-Lite ETH	15
11:1.2.DSP-Lite USB	16
11:2.Routing presets	17
12.Processing architecture	18
12:1.Input processing	18
12:2.Output processing	18
12:3.Auxiliary processing	18
13.Specifications	20
14.Appendix	21
A. Two-input configuration	21
A.1. Note on J3 and J4 jumpers	21

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DSP-Lite

1

1:1.Welcome

Congratulations on your purchase of the Powersoft DSP-Lite processing board.

We know you are eager to use the DSP-Lite board, but please take a moment to read this user's manual and safety instructions. In case you have any questions, please do not hesitate to contact your dealer or Powersoft.

DSP-Lite is a 2in/3out processing board designed for LiteMod Series and DigiMod PFC2/PFC4 amp modules, integrating an extremely compact interface panel compatible with mono-in/link-out or stereo-in configurations.

The built-in USB port allows to access DSP-Lite processing capabilities directly from the PC running ArmoníaPlus software, to easily program and store up to 4 presets that can be selected by the end user.

Compatible with the Powersoft Integration Kit platform, DSP-Lite represents a powerful, easy to use yet cost effective tool for both the designer and the end user.

1:2.Unpacking & checking

Your Powersoft product has been completely tested and inspected before leaving the factory. Carefully inspect the shipping package before opening it, and then immediately inspect your new product. If you find any damage notify the shipping company immediately.

1:3.Disposal of the packing material

The transport and protective packing has been selected from materials which are environmentally friendly for disposal and can normally be recycled.

Rather than just throwing these materials away, please ensure they are offered for recycling.

Important safety instructions



This amplifier module is intended to be installed inside other devices and must be checked in the final product.

EXPLANATIONS OF GRAPHICAL SYMBOLS



The triangle with the lightning bolt is used to alert the user to the risk of electric shock.

The triangle with the exclamation point is used to alert the user to important operating or maintenance instructions.



• The CE-mark indicates the compliance with the low voltage and electromagnetic compatibility.



Symbol for earth/ground connection.

Symbol for conformity with Directive 2002/96/EC and Directive 2003/108/EC of the European
Parliament on waste electrical and electronic equipment (WEEE).

Symbol for electrostatic discharge sensitive devices.



- 1. Read these instructions.
- 2. Keep these instructions.
- 3. Heed all warnings.
- 4. Follow all instructions.
- 5. Do not use this equipment near water.
- 6. Do not block any ventilation openings. Install in accordance with Powersoft's instructions.
- 7. Do not install near any heat sources such as radiators, heat registers, stover or other apparatus that produce heat.
- Do not defeat the safety purpose of the polarized or groundingtype plug.
- 9. Only use attachments/accessories specified by Powersoft.
- 10. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.



WARNING: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT ATTEMPT TO REMOVE OR MODIFY ANY PART OF THE UNIT.

4

DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE, DRIPPING OR SPLASHING LIQUIDS. OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, SHOULD NOT BE PLACED ON THIS APPARATUS.

Electrostatic Discharge (ESD)



Electrostatic discharge (ESD) is one of the most significant factors leading to damage and failure of a wide variety of electronic components.

Poor handling can cause internal damage, which is invisible. This internal damage can then cause electrical failure or reliability problems. It is recommended that all workstations where Electrostatic Discharge Sensitive devices (ESDS) and assemblies are handled outside of full static protection packaging (i.e. within static control areas) should be provided with some form of ground conductive or dissipative flooring.

Regulatory information



(F

FCC COMPLIANCE NOTICE

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- ► Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WEEE DIRECTIVE

If the time arises to throw away your product, please recycle all the components possible.



This symbol indicates that when the end-user wishes to discard this product, it must be sent to separate collection facilities for recovery and recycling. By separating this product from other household-type waste, the volume of waste sent to incinerators or land-fills will be reduced and natural resources will thus be conserved.

The Waste Electrical and Electronic Equipment Directive (WEEE Directive) aims to minimise the impact of electrical and electronic goods on the environment. Powersoft S.p.A. comply with the Directive 2002/96/EC and 2003/108/EC of the European Parliament on waste electrical finance the cost of treatment and recovery of electronic equipment (WEEE) in order to reduce the amount of WEEE that is being disposed of in land-fill site. All of our products are marked with the WEEE symbol; this indicates that this product must NOT be disposed of with other waste. Instead it is the user's responsibility to dispose of their waste electrical and electronic equipment by handing it over to an approved reprocessor, or by returning it to Powesoft S.p.A. for reprocessing. For more information about where you can send your waste equipment for recycling, please contact Powesoft S.p.a. or one of your local distributors.

EC DECLARATION OF CONFORMITY

Manufacturer: Powersoft S.p.A. via E. Conti 5 50018 Scandicci (Fi) Italy

We declare that under our sole responsibility the products: Model Names: DSP-Lite Intended use: Professional Audio Amplifier

Are in conformity with the provisions of the following EC Directives, including all amendments, and with national legislation implementing these directives:

- ► 2006/95/EC Low Voltage Directive
- ► 2004/108/EC Electromagnetic Compatibility Directive
- ► 2002/95/CE RoHs Directive

The following armonized standards are applied:

- ▷ EN 55103-1
- ▷ EN 61000-3-2
- ▷ EN 61000-3-3
- ▷ EN 55103-2
- ▷ EN 61000-4-2
- ▷ EN 61000-4-3
- ▷ EN 61000-4-4
- ▷ EN 61000-4-5
- ▷ EN 61000-4-6
- ▷ EN 61000-4-11
- ▷ EN 60065

Scandicci, July 2014

For compliance questions only: compliance@powersoft.it

Mechanical drawings





FIG. 1:DSP-Lite (all dimensions in millimetres). General Tolerance = UNI-ISO 2768-M

5:1. How to fit the mounting plate to the DSP-Lite processing board



Pull out the locking spline.



Tilt the mounting plate, pass the locking spline through its hole and fit the plate to the DSP board.



Push the locking spline in its normal position and attach the plate to the DSP board.





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	Code	Туре	Description
1	PL2	IDC 34 pin	Channel 1&2 input connector
2	PL3	IDC 34 pin	Channel 3&4 input connector
3	D7, D8, D9, D10	LED	Preset LEDs
4	SW1	Switch	Preset selector / power management
5	PL1	-	Programming connector (RESERVED)
62	-	RJ45	Programming connector (DSP-Lite ETH)
61	_	USB-B	Programming connector (DSP-Lite USB)
72	-	XLR M	Through (line output) connector
1	-	Combo Jack - XLR*	Input signal connector
8	-	Combo Jack - XLR	Input signal connector
9	R60	VCA	Volume potentiometer
0	PL4	Molex 22-01-2031	Optional LEDs connector
0	D1	LED	Status LED
Ð	D2	LED	Signal presence / limiting
13	D3	LED	Signal clipping / temperature

*Stereo versions only



FIG. 2: Example of connection: DSP-Lite with LiteMod amp module.

Mounting kit for DigiMod heatsink plate



Available for DSP-L USB and ETH



Mounting kit for LiteMod heatsink plate



Only available for DSP-L USB



(*) General Tolerance = UNI-ISO 2768-M

Connections

7:1.PL2 connector

This connector interfaces the DSP-Lite to Powersoft amp modules featuring the IDC 34 pin connector.

The PL2 connector is the default input/output connector, meant to be used in two-channel applications or for driving the MF & HF ways in three-channel applications.

The audio outputs in the PL2 connector are optimized for high performances (115dB SNR).

PIN#	Name	IN	OUT	POWER	Range	Scale factor	Impedance	Tolerance	Description
1	SDPWS		•		Active High, Logic output 0-5 V_{DC}		10 Ω		Power Supply Shut Down
2	RESERVED								
3	RESERVED								
4	RESERVED								
5	GND			٠					Ground
6	OUT 1 +		•		Unbalanced 2.05 V _{RMS} Absolute Max output Balanced 4.1 V _{RMS} Absolute Max output		27 Ω		Channel 1 Positive Balanced output
7	OUT 1 -		•		Unbalanced 2.05 V _{RMS} Absolute Max output Balanced 4.1 V _{RMS} Absolute Max output		27 Ω		Channel 1 Negative Balanced output
8	GND			•					Ground
9	VOUT1MON	٠				20 V/V	4.5 kΩ		Channel 1 Output Voltage Monitor
10	PROTECT1	•			Level 1 (4 to 5) = not in Protection Level 0 (0 to 1) = Protection		330Ω		Channel 1 Output Stage Protection Monitor
11	IOUT1MON	•				8.35 A/V	4.5 kΩ		Channel 1 Output Current Monitor
12	TEMPMON12	•			0 – 5 V		7 kΩ		NTC sensor tap input
13	+12VDCIN			•	+12 V_{DC} input (250 mA max current draw)			±5%	(same as pin 22)
14	-12VDCIN			•	–12 V _{DC} input (40 mA max current draw)			±5%	(same as pin 21)
15	MUTE		•		Active Low, pulled to GND				CH1 and CH2 Output Stage Mute
16	+VCCMON	•			+7.5 V _{DC}		4.5 kΩ		Rail Bus Positive Monitor
17	-VCCMON	•			-7.5 V _{DC}		4.5 kΩ		Rail Bus Negative Monitor

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PIN#	Name	IN	OUT	POWER	Range	Scale factor	Impedance	Tolerance	Description
18	-VCCMON	•			-7.5 V _{DC}		4.5 kΩ		Rail Bus Positive Monitor
19	+VCCMON	٠			+7.5 V _{DC}		4.5 kΩ		Rail Bus Negative Monitor
20	MUTE		•		Active Low, pulled to GND				CH1 and CH2 Output Stage Mute
21	-12VDCIN			•	–12 V _{DC} input (40 mA max current draw)			±5%	(same as pin 14)
22	+12VDCIN			•	+12 V _{DC} input (250 mA max current draw)			±5%	(same as pin 13)
23	TEMPMON12	٠			0 – 5 V		7 kΩ		NTC sensor tap input
24	IOUT2MON	•				8.35 A/V	4.5 kΩ		Channel 2 Output Current Monitor
25	PROTECT2	•			Level 1 (4 to 5) = not in Protection Level 0 (0 to 1) = Protection		330Ω		Channel 2 Output Stage Protection Monitor
26	VOUT2MON	٠				20 V/V	4.5 kΩ		Channel 2 Output Voltage Monitor
27	GND			٠					Ground
28	OUT 2 -		•		Unbalanced 2.05 V _{RMS} Absolute Max output Balanced 4.1 V _{RMS} Absolute Max output		27 Ω		Channel 2 Negative Balanced output
29	OUT 2 +		•		Unbalanced 2.05 V _{RMS} Absolute Max output Balanced 4.1 V _{RMS} Absolute Max output		27 Ω		Channel 2 Positive Balanced output
30	GND			•					Ground
31	RESERVED								
32	RESERVED								
33	RESERVED								
34	SDPWS		•		Active High, Logic output 0-5 V _{DC}		10 Ω		Power Supply Shut Down

8:1.PL3 connector

The PL3 connector suites three-channel applications for driving the LF way.

The audio outputs in this connector are designed to drive a twin load or a bridge tied load (BTL).

PIN#	Name	IN	OUT	POWER	Range	Scale factor	Impedance	Tolerance	Description
1	SDPWS		•		Active High, Logic output 0-5 V _{DC}		10 Ω		Power Supply Shut Down
2	RESERVED								
3	RESERVED								
4	RESERVED								
5	GND			•					Ground
6	OUT 3 +		•		Unbalanced 2.05 V _{RMS} Absolute Max output Balanced 4.1 V _{RMS} Absolute Max output		27 Ω		Channel 3 Positive Balanced Input (same as pin 29)
7	OUT 3 -		•		Unbalanced 2.05 V _{RMS} Absolute Max output Balanced 4.1 V _{RMS} Absolute Max output		27 Ω		Channel 3 Negative Balanced Input (same as pin 28)
8	GND			•					Ground
9	RESERVED								
10	PROTECT3	•			Level 1 (4 to 5) = not in Protection Level 0 (0 to 1) = Protection				Channel 3 Output Stage Protection Monitor
11	RESERVED								
12	TEMPMON34	•			0 – 5 V				NTC sensor tap input
13	+12VDCIN			•	+12 V _{DC} input (250 mA max current draw)			±5%	(same as pin 22)
14	-12VDCIN			•	–12 V _{DC} input (40 mA max current draw)			±5%	(same as pin 21)
15	MUTE		•		Active Low, pulled to GND				CH3 and CH4 Output Stage Mute
16	+VCCMON	•			+7.5 V _{DC}				Rail Bus Positive Monitor
17	-VCCMON	•			-7.5 V _{DC}				Rail Bus Negative Monitor

Table continues on the next page...

PIN#	Name	IN	OUT	POWER	Range	Scale factor	Impedance	Tolerance	Description
18	-VCCMON	•			-7.5 V _{DC}				Rail Bus Positive Monitor
19	+VCCMON		•		+7.5 V _{DC}				Rail Bus Negative Monitor
20	MUTE		•		Active Low, pulled to GND				CH3 and CH4 Output Stage Mute
21	-12VDCIN			•	–12 V _{DC} input (40 mA max current draw)			±5%	(same as pin 14)
22	+12VDCIN			•	+12 V _{DC} input (250 mA max current draw)			±5%	(same as pin 13)
23	TEMPMON34	٠			0 – 5 V				NTC sensor tap input
24	RESERVED								
25	PROTECT4	•			Level 1 (4 to 5) = not in Protection Level 0 (0 to 1) = Protection				Channel 4 Output Stage Protection Monitor
26	RESERVED								
27	GND			•					Ground
28	OUT 4 –		•		Unbalanced 2.05 V _{RMS} Absolute Max output Balanced 4.1 V _{RMS} Absolute Max output		27 Ω		Channel 4 Negative Balanced Output (same as pin 7)
29	OUT 4 +		•		Unbalanced 2.05 V _{RMS} Absolute Max output Balanced 4.1 V _{RMS} Absolute Max output		27 Ω		Channel 4 Positive Balanced Output (same as pin 6)
30	GND			•					Ground
31	RESERVED								
32	RESERVED								
33	RESERVED								
34	SDPWS		•		Active High, Logic output 0-5 V _{DC}		10 Ω		Power Supply Shut Down

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8:2.PL4 pinout

Optionally connect one or two external high efficiency LEDs. Driving current is about 2 mA. Mates with Molex 22-01-2031 housing and 08-50-0113 terminal.

Pin#	Symbol	Description
1	-	Standby LED cathode (suggested: blue)
2	+	LEDs anode
3	-	Ready LED cathode (suggested: green or amber)

8:3.Input/Output signal connectors



LED chart

9

9:1.Clip/Temp LED

(Color	Solid ON
	OFF	System temperature OK, no signal clipping
	YELLOW	High system temperature. The DSP will lower the clipping voltage level (soft clip limiter) to reduce the output power and limit the increase of temperature.
	RED	Output signal clipping

9:2.Signal LED

(Color	Solid ON
	OFF	No input signal
	GREEN	Signal presence, output level in the linear range
	YELLOW	Input signal strong enough to engage one of the output limiters (peak or RMS)
	RED	Input signal too high: less than 4 dB margin to cause the input stage to hard clip the signal (i.e. high THD)

9:3.Status LED

(Color	Solid ON
	OFF	System down
	GREEN	System ready to play, auto standby mode disabled
	CYAN	System ready to play, auto standby mode enabled
	BLUE	System in standby mode: no signal detected in the latest 15 minutes

Power anagement

Software

11

The DSP-Lite processing board implements a power saving strategy to reduce power consumption and heat build-up.

The power management feature can be activated/deactivated by the user or even inhibited by the loudspeaker manufacturer (see below).

By factory default the power management feature is not active. By pressing the preset select push-button for at least 3 seconds the user can toggle the power management: when active, after 15 minutes of no input signal (input level below -45 dBu) the DSP-Lite board enters a low power operating mode (standby) and sends a signal to the power amplifier that turn off the output stages.

When the power management is active, the Status LED turns cyan. In standby mode the status LED becomes blue (refer <u>§9:3.Status LED</u>).

10:1.How to permanently disable the power management



The power management can be permanently disabled by shorting jumper J1 on the rear surface of the DSP-Lite PCB. In this case, any long pressure on the preset button has no effect.



10:2.LiteMod deep sleep mode



When connected to Powersoft LiteMod amp module, the DSP-Lite processing board can force the system to turn in deep sleep mode instead of standby mode.

In deep sleep mode the system consumption falls down to 2 watt: both the output stages and the power supply are switched off. The auxiliary power supply embedded in the LiteMod amp module guarantees the system to turn back operating when the input signal level exceeds -45 dBu.

This feature is not available for Powersoft DigiMod amp module, since they don't implement the auxiliary power supply.

By default the deep sleep mode is not active. In order to activate this feature (only available for LiteMod amp module) the J2 jumper on the rear surface of the DSP-Lite PCB must be shorted.

11:1.Configuring the software environment

11:1.1.DSP-Lite ETH

DSP-Lite ETH can be remotely controlled via an Ethernet connection through a personal computer and Powersoft ArmoníaPlus software. Powersoft recommend the use of Ethernet Cat5 straight through – patch – cables with pin/ pair assignments TIA/ EIA-568-B, i.e. T568B.

DSP-Lite ETH is set in AutoIP/DHCP by default, once it is connected to PC's network card will take a proper IP. Before proceeding to discover the DSP-Lite ETH, check if the network card you are using is enable on Communication Manager.

1. Open ArmoníaPlus and click on the Armonía button in the top left corner of the window.

				×
GENERAL	Network Interfaces			\mathbf{Q}
COMMUNICATION MANAGER	Name	Address	ArmoniaPlus	Dante™
APPEARANCE	Portatile Realtek PCIe GbE Family Controller	192.168.1.12		
FILE PATHS	Wi-Fi Qualcomm QCA9377 802.11ac Wireless Adapte	192.168.1.83	ON	
MEASUREMENT LOGGING	Serial Port	СОМ6	ON	
INTERACTIVE TUNING				
OPERATORVIEW				
ARMONIA LEGACY				
ACCESS MANAGER				
AUDIO CONVERTER				
	Ok Cancel	Apply		

FIG. 3: ArmoníaPlus: communication manager.

2. Click on the Option button and select the Communication Manager tab.

3. Activate the proper network card.

4. Apply the changes: now Armonia is capable to discover the connected device.

5. Click on the Match Tab and then click on "Discovery"



FIG. 4: Unit embedding DSP-L discovered.

11:1.1.1.Changing Network Settings

Drag and drop the DSP-Lite ETH just discovered and double click on it for entering inside the processing. Network Settings section is available by click on button in the scheme view. Here you can get the current ethernet status and change address settings.



In order to set static IP press on Change Address Settings, choose Static as Addressing Mode and write below a proper IP. Warning: changing these settings could break communication with the remote device. Confirm the setting by click on Apply Settings. The new static IP will be applied immediately.

11:1.1.2. Networking troubleshooting

DSP-L cannot be discovered by Armonia Plus when is set with a different subnet than network card where is connected, in this case after you have a "Discovery", Armonia Plus reports that a connected device has an incompatible IP address (software doesn't able to determ what kind product is).



Passing the mouse pointer over the allert message at the right bottom, it will be shown the device IP. In order to discover DSP-L you make compatible the network card setting an IP at the same DSP-L subnet. Go to Network Connection following this path:

Control Panel\Network and Internet\Network Connections,

Right click on the network card you are using and click on "Properties", in Networking tab find the item "internet Protocol Version 4 (TCP/IPv4), select and click on Properties.

Internet Protocol Version 4 (TCP/IPv4)	Properties	\times			
General					
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.					
O Obtain an IP address automatical	У				
Use the following IP address:					
IP address:	200.200.1.1				
Subnet mask:	255.255.255.0				
Default gateway:					
Obtain DNS server address autom	natically				
• Use the following DNS server add	resses:				
Preferred DNS server:					
Alternate DNS server:					
Validate settings upon exit	Ad <u>v</u> anced				
	OK Cancel				

Before to have a "Discovery", remember to able the network card with new IP settings in the communication manager.

	Preferences				×
	GENERAL	Network Interfaces			$\langle \rangle$
L	COMMUNICATION MANAGER	Name	Address	ArmonìaPlus	Dante™
	APPEARANCE	Portatile Bealtek PCIe GbF Family Controller	200.200.1.1	ON	
	FILE PATHS				
	MEASUREMENT LOGGING				
	INTERACTIVE TUNING				
	OPERATORVIEW				
	ARMONIA LEGACY				
	ACCESS MANAGER				
	AUDIO CONVERTER				
		Ok Cancel	Apply		

Once DSP-L is discovered you can change its IP configuration (passing in Auto IP in case it was set in static IP) and then restablish the network card with previous settings.

11:1.2.DSP-Lite USB

In order to access the DSP via the USB port of your computer, the CP210x USB to UART Bridge Virtual COM Port (VCP) drivers are required.

Freely download the drivers from the Silicon Labs website: www.silabs.com > Products > USB bridge > Software download > CP210x VCP Drivers:

https://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx

- Once the driver has been properly installed, the Windows operating system provides a new virtual COM port with a high identification number.
- 2. Open ArmoníaPlus and click on the Armonía button in the top left corner of the window.

					×
	GENERAL	Network Interfaces			$\langle \rangle$
I	COMMUNICATION MANAGER	Name	Address	ArmoniaPlus	Dante™
	APPEARANCE	Wi-Fi Outcomm 0C49377 802 11ac Wirelass Adapta	192.168.1.83	ON	
	FILE PATHS	Serial Port	COM6	ON	
	MEASUREMENT LOGGING				
	INTERACTIVE TUNING				
	OPERATORVIEW				
	ARMONIA LEGACY				
	ACCESS MANAGER				
	AUDIO CONVERTER				
		Ok Cancel	Annly		
Γ.		Calicel			

FIG. 5: ArmoníaPlus: communication manager.

- 3. Click on the Option button and select the Communication Manager tab.
- 4. Activate the Serial Port communication and select the proper COM port (usually the one with the higher ID).
- 5. Apply the changes: now Armonía is capable to discover the connected device.
- 6. Click on the Match Tab and then click on "Discovery"



FIG. 6: Unit embedding DSP-L discovered.

DSP-L must be initialized via ProManager Plus prior to be discovered on ArmoniaPlus, please refer to the ProManager Plus web page for further details

11:2.Routing presets

Armonía Pro Audio Suite provides four routing preset for the DSP-Lite processing board. These presets shall be loaded BEFORE configuring the signal processing.

The available routing presets may change according to the selected amp module; furthermore, some routing presets require two amp module (same model) connected to the same DSP-Lite. Refer to TAB. 1 for matching.

Please note that in 3-way presets, the third output drives both CH3 and CH4 signal lines with the same signal, forcing either a bridge mode configuration (see specific power module BTL connection) or a "clone" configuration (two loudspeakers driven with the same signal) on the module connected to PL3.

Peak and RMS limiters settings in Armonía are related to a single output, so when BTL connected, actual output voltage will be twice the Armonía setting, and output power will be four times the Armonía setting.

	Preset	LiteMod	LiteMod HV	DigiMod 2004PFC2	DigiMod 3004PFC4
2-1421	00 DSP0 1 IN - 2 OUT	ОК	ОК	ОК	_
2-way	00 DSP0 2 IN - 2 OUT	ОК	ОК	ОК	-
3	0 DSP0 1 IN - 3 OUT	OK 2 amp modules required Output channel 3 reserved to LF	OK 2 amp modules required Output channel 3 reserved to LF	-	ОК
5-way	DSP 0 2 IN - 3 OUT	OK 2 amp modules required Output channel 3 reserved to LF	OK 2 amp modules required Output channel 3 reserved to LF	-	ОК

TAB. 1: Routing Presets.

		LiteMod	LiteMod HV	DigiMod 2004PFC2	DigiMod 3004PFC4
	Preset				
2-way	OO 1 IN - 2 OUT	11 biquad bands	per output - 5 biqua	d bands per input	_
2-way	ODSPO 2 IN - 2 OUT	11 biquad bands per output - 5 biquad bands per input			-
2	ODSPO 1 IN - 3 OUT	2 amp modu 8 biquad ban 5 biquad bar	Iles required ds per output nds per input	_	11 biquad bands on output ch. 1&2 10 biquad bands on output ch. 3 5 biquad bands per input
3-way	00 DSP0 2 IN - 3 OUT	2 amp modu 7 biquad bands c 8 biquad bands 2 biquad bar	ules required on output ch. 1&2 on output ch. 3 nds per input	-	9 biquad bands on output ch. 1&2 10 biquad bands on output ch. 3 5 biquad bands per input

TAB. 2: Input and output equalizers: available bands.

Processing architecture



FIG. 6 displays the block diagram of the DSP-Lite hardware architecture. The signal processing layout can be summarized in three blocks:

- Input processing;
- Output processing;
- Auxiliary processing.

12:1.Input processing

Input processing provides the following feature:

- Inputs mono mix (not implemented in presets with only one input signal).
- Long delay: up to 340ms total, 1 sample step (about 21us).
- Level trimmer via the VCA (smoothed).
- ► Gain (smoothed).
- Equalizer: 5 biquad bands (limited to 4 bands in 2 IN -3 OUT preset of LiteMod, LiteMod HV).

12:2.Output processing

Output processing provides the following feature:

- Gain.
- Alignment delay: up to 10ms.

- Equalizer: specifications changes according to preset, see <u>TAB. 2</u>
- RMS Limiter: frequency dependent limiter with 2 biquad controls available on 2-way presets only.
- Peak Limiter
- Mute
- Clip limiter (not implemented in DigiMod presets)

12:3. Auxiliary processing

Output processing provides the following feature:

- ► Signal presence detection.
- Input ADC clipping detection.
- Measurement and smoothing of the VCA potentiometer.
- Rails measurement and output stage soft clipping
- Output clipping detection
- Output stage temperature measurement and temperature limiter (not implemented in DigiMod 3-way presets)
- Peak and RMS limiters engaged detection (not implemented in 3-way presets).











Specifications

General

Latency

Audio

THD

Delay

Crossover

Number of channels 1 in / 3 out (configurable as 2 in / 3 out) Architecture Analog Devices SigmaDSP® 50 MIPS 28 bit data path with 56 bit internal processing Internal processing 1.02 ms fixed latency architecture Up to 4 local presets, unlimited via ArmoníaPlus software User data storage Firmware update via Ethernet/USB port Remote control ArmoníaPlus software Frequency response 20 Hz - 20 kHz (-0.5 dB) Max input voltage 8.2 V / +20 dBu 4.1 V / +14.3 dBu Max output voltage > 113 dB S/N ratio (analog-to-analog) < 0.01% @ 1 kHz **DSP** features 340 ms input delay 10 ms per channel output delay 5 parametric equalizers: hi/lo-shelving, all-pass, Input equalizer band-pass, band-stop, hi/lo-pass Parametric IIR filters: peaking, hi/lo-shelving, all-pass, band-pass, band-stop, hi/lo-pass Output equalizer Butterworth, Linkwitz-Riley, Bessel: 6 dB/oct to 48 dB/oct (IIR)

Peak limiter, RMS limiter, frequency dependent RMS limiter, Clip limiter, Temperature limiter Limiters Parameters locking Protection of OEM/user features

AD/DA converters

Architecture	AKM 24 bit @ 48 kHz
	1 IN 118 dB (A weighted)
Dynamic range AD	2 IN 115 dB (A weighted)
	OUT 1&2 114 dB (A weighted)
Dynamic range DA	OUT 3 102 dB (A weighted)

Power requirement

-	
+12 V _{DC}	250 mA max current draw
-12 V _{DC}	40 mA max current draw

13

Appendix





The DSP-Lite processing board can support two hardware configurations, with 1 input or 2 input connectors.

The former layout is the factory default hardware configuration. The layout with 2 input connectors suites stereo signal input and can be achieved with few modification of the surface mounted components.

In order to complete the hardware customization, a 3 pole XLR female receptacle for vertical PCB mount must be available. Powersoft suggests to adopt the Neutrik NCJ6FA-V XLR/jack hybrid chassis connector, combining 3 pole XLR receptacle and 1/4" jack.



1. Remove the pass through XLR-M connector (Neutrik NC3MAV-0).



2. Remove the two LINK resistors R53 and R7, that route the signal from the input connector to the through connector.



3. Remove the swap resistors R147 and R148.



4. According to following picture, properly short to the highlighted contacts. Take care to clean the solders.



5. Mount and solder the XLR-F connector.



FIG. 8: DSP-Lite with two input connectors.

A.1. Note on J3 and J4 jumpers

J3 and J4 jumper on the rear surface of the DSP-Lite PCB are directly connected to the front R7 and R53 resistors respectively.

J3 and J4 link the input connector pins 2 and 3 to the pass through connector pins 2 and 3 respectively. Even if J3 and J4 appear opened, by default they are closed through the resistors R7 and R53 in the component side of the PCB.





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