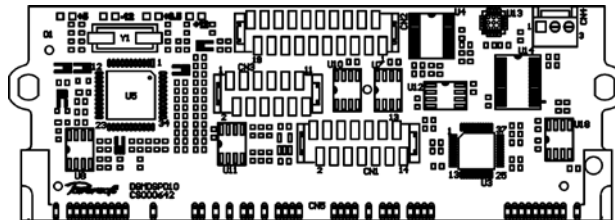
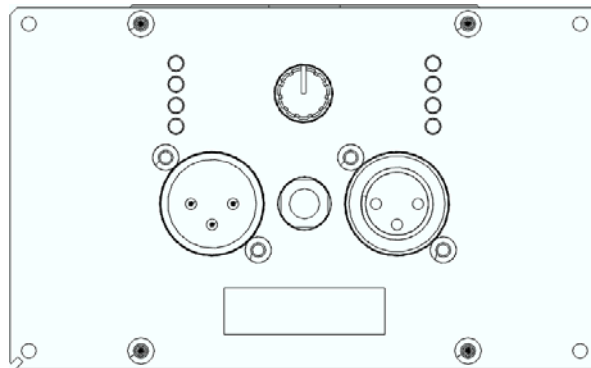


DSP-D

USER GUIDE



powersoft_DSP-D_uguide_en_v0.0

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For latest update please refer to the English
online version available on www.powersoft-audio.com.

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Designed in Italy by Powersoft S.p.A. (via E. Conti, 5 - 50018 Scandicci, Firenze)
Factory 1: MW.FEP S.p.A. (Via Modena, 68 - 40017 San Giovanni in Persiceto, Bologna - Italy)
Factory 2: MW.FEP S.p.A. (Via Mario Stoppani, 23 - 34077 Ronchi dei Legionari, Gorizia - Italy)

DSP-D

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1:1.Welcome

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

We know you are eager to use the DSP-D 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-D is a 2in/4out processing board designed for DigiMod Series amp modules, integrating an extremely compact interface panel compatible with mono-in/link-out or stereo-in configurations.

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.
8. Do not defeat the safety purpose of the polarized or grounding-type 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.**

 **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. static control areas) should be provided with some form of ground conductive or dissipative flooring.

Regulatory information

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 Powersoft S.p.A. for reprocessing. For more information about where you can send your waste equipment for recycling, please contact Powersoft 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-D

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 2017

Luca Lastrucci
Managing Director
Luca Lastrucci

For compliance questions only: compliance@powersoft.it

Mechanical drawings

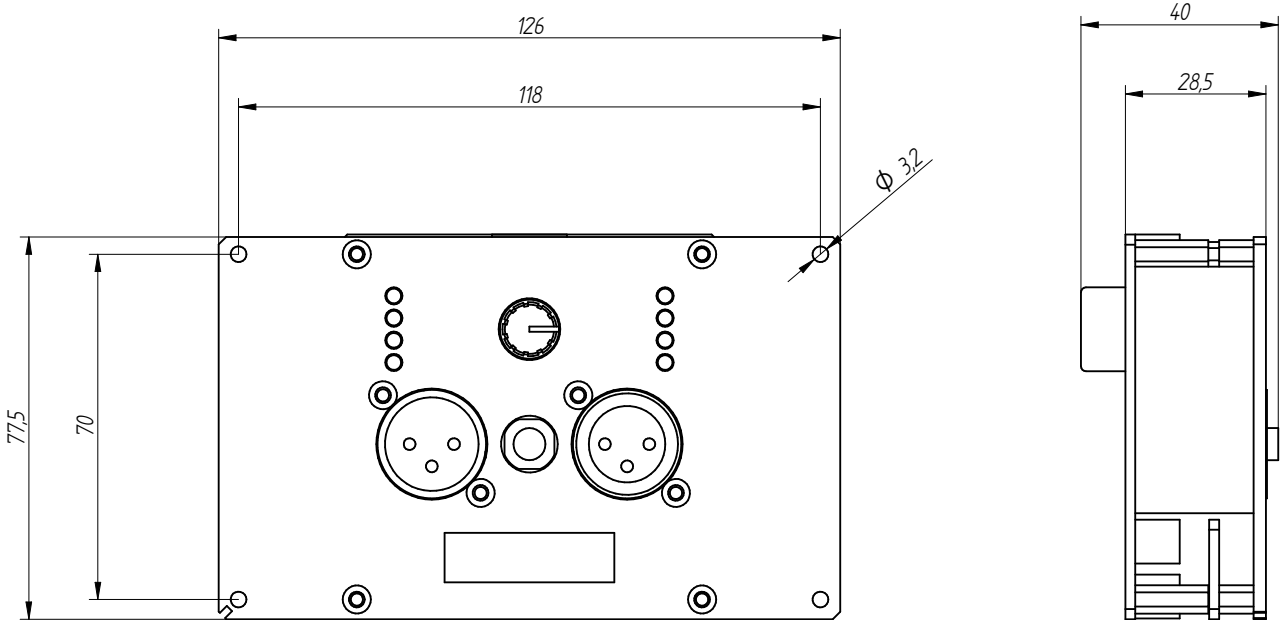
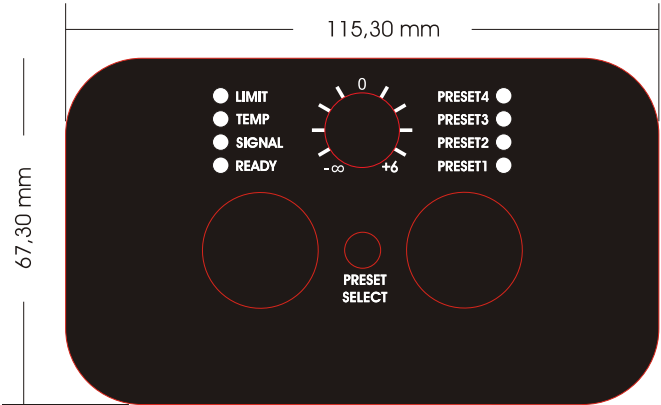
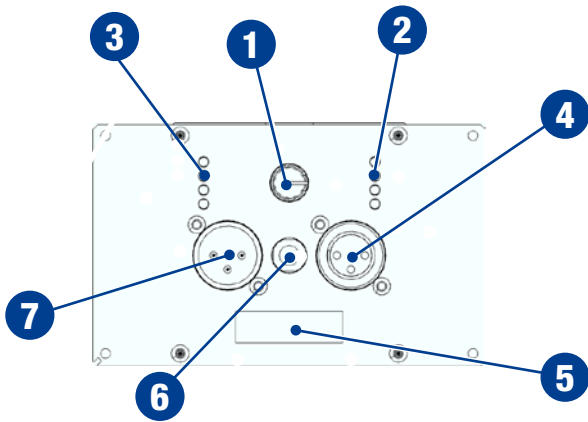


FIG. 1: DSP-D (all dimensions in millimetres).

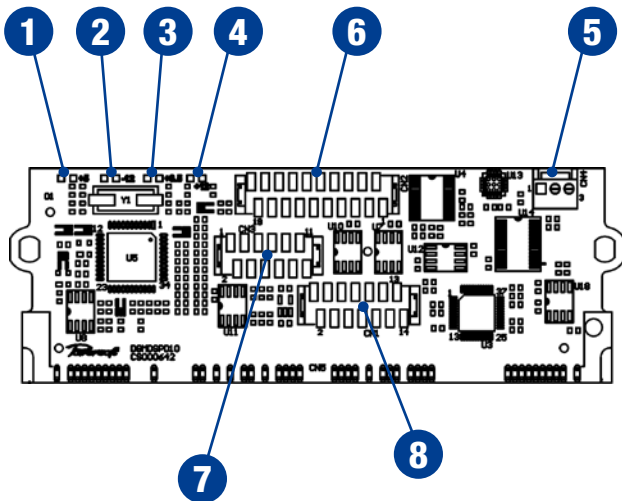


ET000290.00 Label



5:1.Components

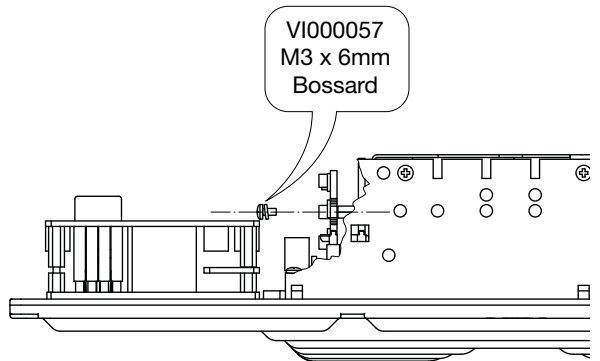
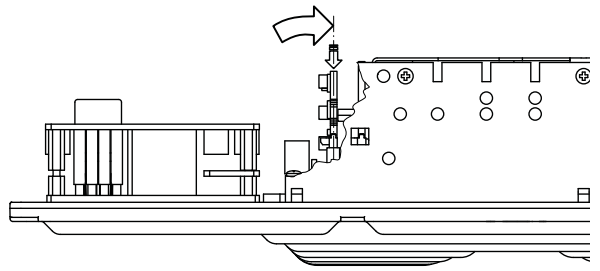
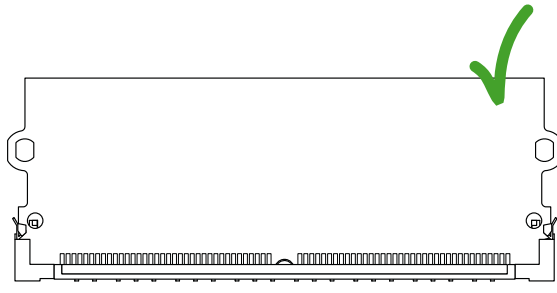
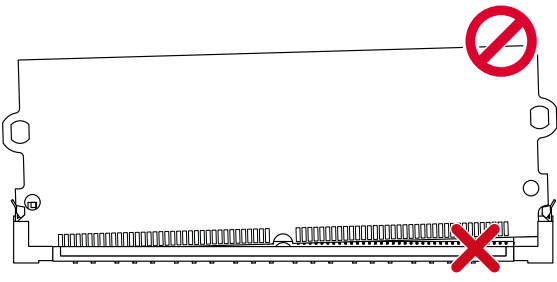
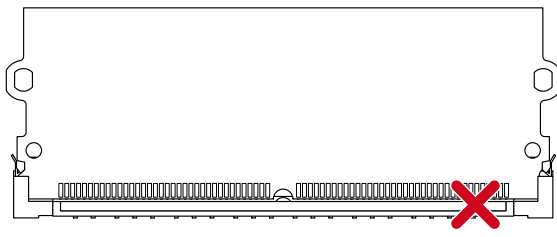
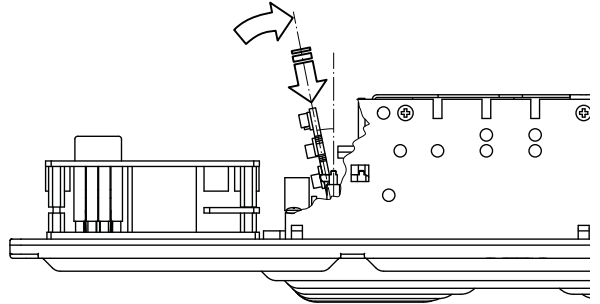
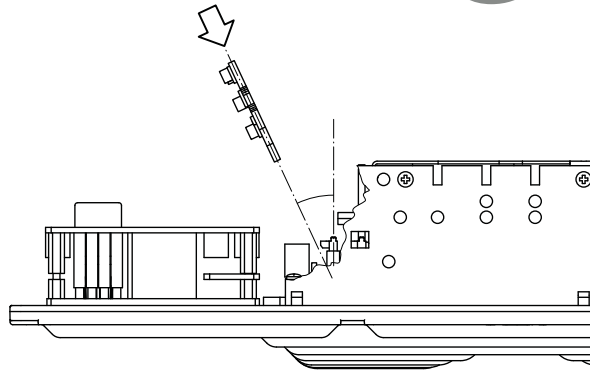
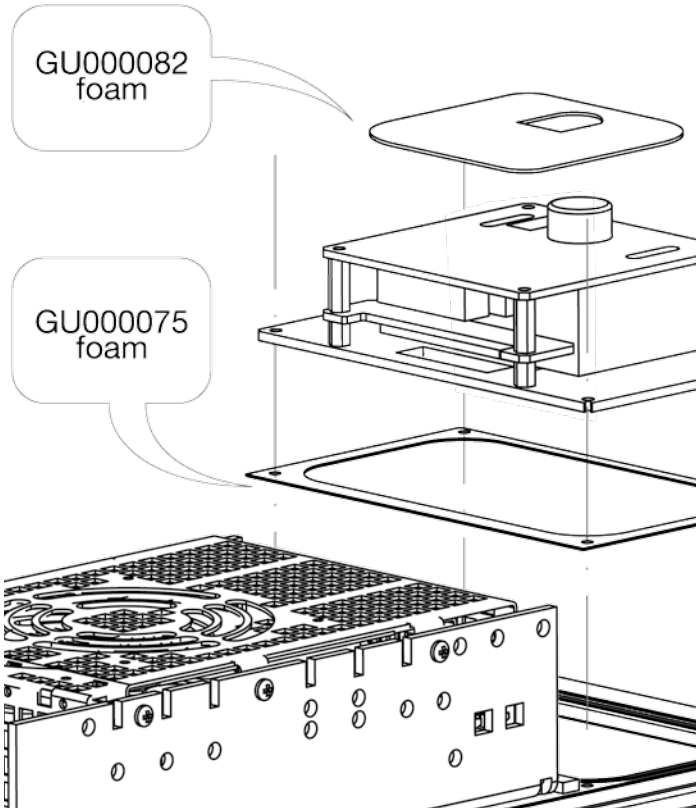
	Code	Type	Description
1	R1009	Input Attenuator	Volume Potentiometer
2	D1021, D1022, D1023, D1024	LED	Preset LEDs
3	D1025, D1026, D1027, D1020	LED	Status LEDs
4	CN1001	XLR-F	Input Signal Connector
5	CN1004	DIL20P Connector	Programming Connector
6	S1000	PushButton	Preset Selector
7	CN1003	XLR-M	Linkout Signal Connector



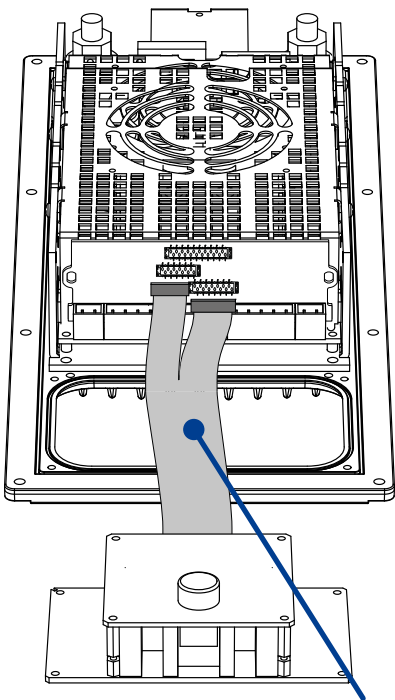
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1	D51	LED	+5VDC LED
2	D53	LED	-12VDC LED
3	D52	LED	+3.5VDC LED
4	D54	LED	+12VDC LED
5	CN4	3P MOLEX	AUX Output Signal (3+4)
6	CN2	20P MicroMatch	Programming Connector
7	CN3	12D MicroMatch	Status Signal Connector
8	CN1	14P MicroMatch	Status Signal Connector

Mounting kit for DigiMod heatsink plate

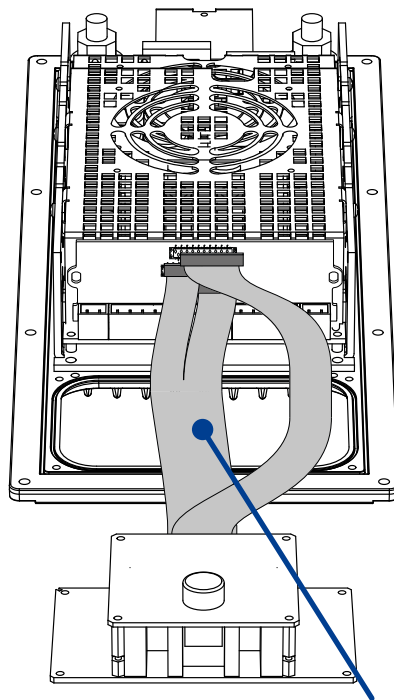
6



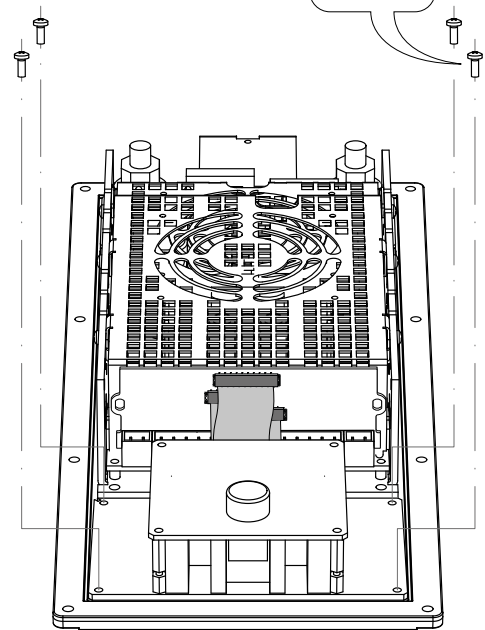
VI000121
M3 x 8 mm
BOSSARD



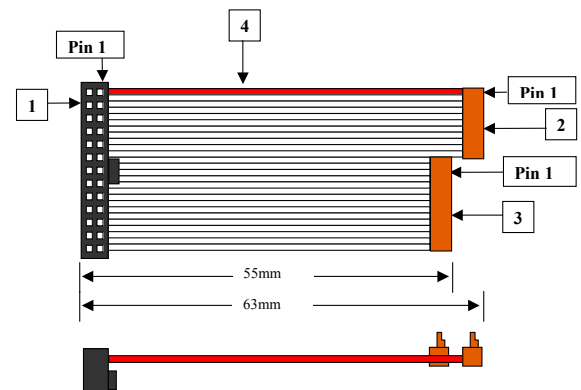
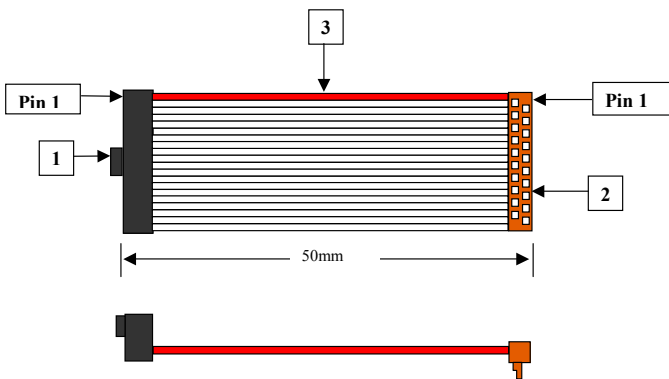
CB000286



CB000285



6:1.Cabling description:



CB000285

REF	Description
1	20P DIL Connector (Female)
2	20P Micromatch Connector
3	20p Flat Cable

CB000286

REF	Description
1	26P DIL Connector (Female)
2	6x2 Micromatch Connector
3	7x2 Micromatch Connector
4	26P Flat Cable

Connections

6:2.DSP-D SIMM Connector Pinout

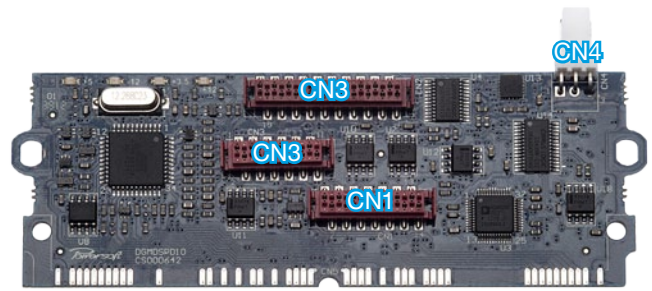
Pin Number	Name	Type	Description
1	OUT1	Input	Source from: amp power output CH1 ⚠️ (MAX +/-142Vp)
2	-	NC	Reserved - Do Not Connect
3	GND	GND	
4	IN1+	Output	Input signal from interface board (XLR), balanced
5	IN1-	Output	Input signal from interface board (XLR), balanced
6	BY OUT1	Input	Signal to potentiometer on interface board, unbalanced
7	BY IN1	Input	DSP CH1 input (from pot on interface board), unbalanced
8	DSPOUTCH1	Output	DSP output CH1, unbalanced (+6dBu nominal)
9	EARECT1	Input	Amplifier output CH1 clip detection signal, routed to interface board CLIP LED only
10	CRRECT1	Input	Amplifier output CH1 output current readout
11	PROTECT1	Input	Amplifier output CH1 protect flag readout
12-21	-	NC	Reserved - Do Not Connect
22	GND	GND	-
23	DSPOUTCH4	Output	DSP output CH4, unbalanced (+6dBu nominal)
24		GND	
25	DSPOUTCH3	Output	DSP output CH3, unbalanced (+6dBu nominal)
26	-	NC	Reserved - Do Not Connect
27	-	NC	Reserved - Do Not Connect
28	TEMP	Input	=pin45. Amplifier temperature readout. Does also feed the fan controller circuit on the interface board
29	GND	GND	
30		NC	Reserved - Do Not Connect
31	GND	GND	
32		NC	Reserved - Do Not Connect
33	GND	GND	
34	-12VDC	VCC	-12VDC rail
35	+12VDC	VCC	+12VDC rail
36	+5VDC	VCC	+5VDC rail
37	+5VDC	VCC	As above (pin 36)

Table continues on the next page...

...continues from previous page.

38	+12VDC	VCC	As above (pin 35)
39	-12VDC	VCC	As above (pin 34)
40	GND	GND	
41		NC	Reserved - Do Not Connect
42		NC	Reserved - Do Not Connect
43		NC	Reserved - Do Not Connect
44	GND	GND	
45	TEMP	Input	=pin28. Amplifier temperature readout. Does also feed the fan controller circuit on the interface board
46		NC	Reserved - Do Not Connect
47	GND	GND	
48		NC	Reserved - Do Not Connect
49	GND	GND	
50		NC	Reserved - Do Not Connect
51	GND	GND	
52	SDPWS	Output	
53-57		NC	Reserved - Do Not Connect
58	MUTE	Output	
59-61		NC	Reserved - Do Not Connect
62	PROTECT2	Input	Amplifier output CH2 protect flag readout
63	CRRECT2	Input	Amplifier output CH2 output current readout
64	EARECT2	Input	Amplifier output CH2 clip detection signal, routed to interface board CLIP LED only
65	DSPOUTCH2	Output	DSP output CH2, unbalanced (+6dBu nominal)
66	BY IN2	Input	DSP CH1 input (from pot on interface board), unbalanced
67	BY OUT2	Input	Signal to potentiometer on interface board, unbalanced
68	IN2-	Input	Input signal from interface board (XLR), balanced
69	IN2+	Input	Input signal from interface board (XLR), balanced
70	GND	GND	
71		NC	Reserved - Do Not Connect
72	OUT2	Input	Source from: amp power output CH2 (MAX +/- 142Vp)

7:1.CN1, CN2, CN3, CN4 connectors



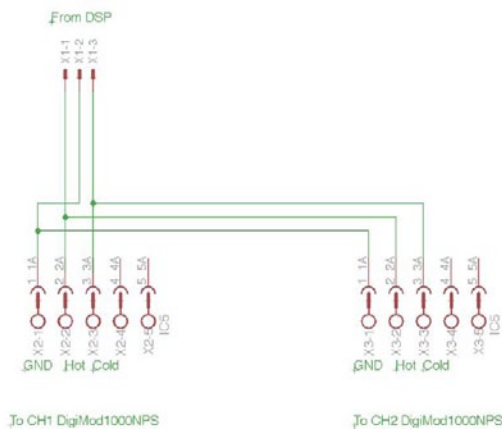
CN1 (14P DIL)	
Pin Number	Name
1	PRSTLED2
2	PRSTLED3
3	PRSTLED4
4	READYOUT
5	PRSTSELECT
6	PRTOUT1
7	BYIN1
8	BYOUT1
9	GROUND
10	IN1+
11	IN1-
12	DSPOUTCH3
13	+12VDC
14	GROUND

CN2 (20P DIL)	
Pin Number	Name
1	GROUND
2	IOUT1MONITOR
3	ZLOAD1
4	EARECT1
5	RSTATMEGA32
6	MISO
7	MOSI
8	TXD
9	SCK/DE-RE
10	RXD
11	TEMP
12	RESETDSP
13	PRSTSTORE
14	SCL
15	SDA
16	+5VDC
17	EARECT2
18	ZLOAD2
19	IOUT2MONITOR
20	GROUND

CN3 (12P DIL)	
Pin Number	Name
1	GROUND
2	-12VDC
3	DSPOUTCH4
4	IN2-
5	IN2+
6	GROUND
7	BYOUT2
8	BYIN2
9	PRTOUT2
10	MUTE
11	TEMPOUT
12	PRSTLED1

CN4 (3P MOLEX)	
Pin Number	Name
1	DSPOUTCH3
2	GROUND
3	DSPOUTCH4

CN4 wiring



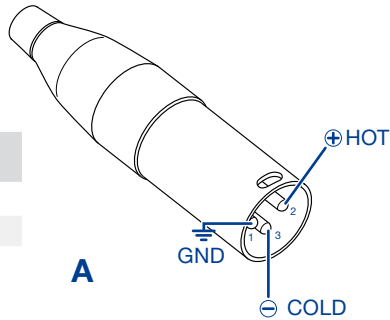
7:2.CN1000, CN1004

CN1000 (26P DIL)		CN1004 (20P DIL)	
Pin Number	Name	Pin Number	Name
1	GROUND	1	GROUND
2	-12VDC	2	IOUT1MONITOR
3	DSPOUTCH4	3	ZLOA1
4	IN2-	4	EARECT1
5	IN2+	5	RESERVED
6		6	RESERVED
7	BYOUT2	7	RESERVED
8	BYIN2	8	RESERVED
9	PRTOUT2	9	RESERVED
10	MUTE	10	RESERVED
11	TEMPOUT	11	TEMP
12	PRSTLED1	12	RESERVED
13	PRSTLED2	13	PRSTSTORE
14	PRSTLED3	14	RESERVED
15	PRSTLED4	15	SDA
16	READYOUT	16	+5VDC
17	PRSTSELECT	17	EARECT2
18	PRTOUT1	18	ZLOAD2
19	BYIN1	19	IOUT2MONITOR
20	BYOUT1	20	GROUND
21			
22	IN1+		
23	IN1-		
24	DSPOUTCH3		
25	+12VDC		
26	GROUND		

7:10.Input/Output signal connectors

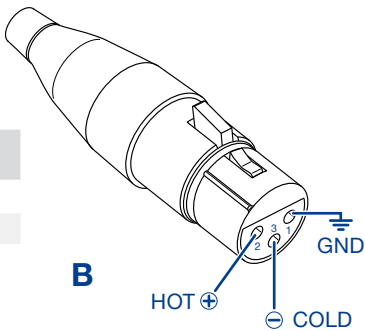
Analog input XLR-M pinout

Pin 1	GND
Pin 2	HOT ⊕
Pin 3	COLD ⊖



Analog line output XLR-F pinout

Pin 1	GND
Pin 2	HOT ⊕
Pin 3	COLD ⊖



LED chart

8

8:1.Clip LED

Color	
OFF	SYSTEM OK
● RED	Clipping, the output signal is strong enough to reach the Clip Limit
● RED	Steady On, Amplifier is in Protection

8:2.Preset LED

Color	
● GREEN	#1 Preset, Steady on when selected
● GREEN	#2 Preset, Steady on when selected
● GREEN	#3 Preset, Steady on when selected
● GREEN	#4 Preset, Steady on when selected

8:3.Status LED

Color	
● GREEN	System is Ready to Play
● GREEN	Signal Presence, Input level in the Linear Range
● ORANGE	Temp LED (Check Thermal LED behaviour)
● RED	Clipping/OverCurrent Protection

8:3.1.Thermal LED

Color	
OFF	$T \leq 65^\circ$
● ORANGE/ BLINKING	Amplifier will lower the clipping voltage level to reduce the Output Power, and limit in case of $T \geq 65^\circ$
● ORANGE/ STEADY ON	$T \geq 70^\circ$ Amplifier continues to decrease the Output Power
● ORANGE/ STEADY ON	$T \geq 80^\circ$ Amplifier will go in thermal shutdown, PROTECT LED WILL TURN ON.

Customization

9:1. Turn interface mono input to stereo

The procedure described below entails a deep change of the hardware configuration of the module interface: carefully follow the instructions in order to avoid damages to the module's interface and guarantee system performances.

The procedure described below shall be performed by qualified personnel

Powersoft declines any responsibility in damages and malfunctions caused by non-fulfilment of the procedure herein described or poor/improper work performed on the device.

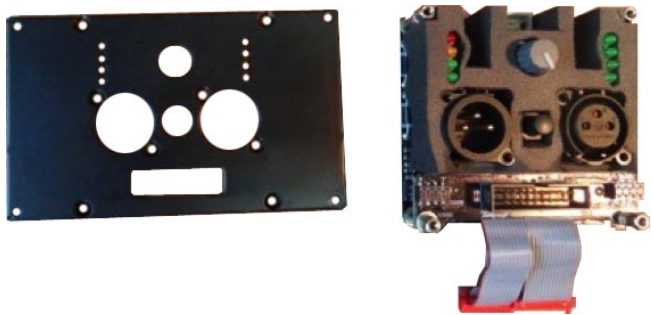
9:1.1. Spare parts

XLR female connector Neutrik NC3FAV-0
 3 pole female XLR receptacle without ground / shell contact, vertical PCB mount, retention spring.

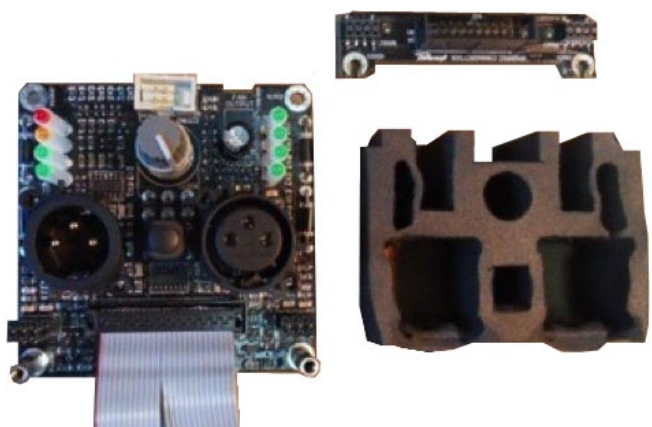


9:1.2. Procedure

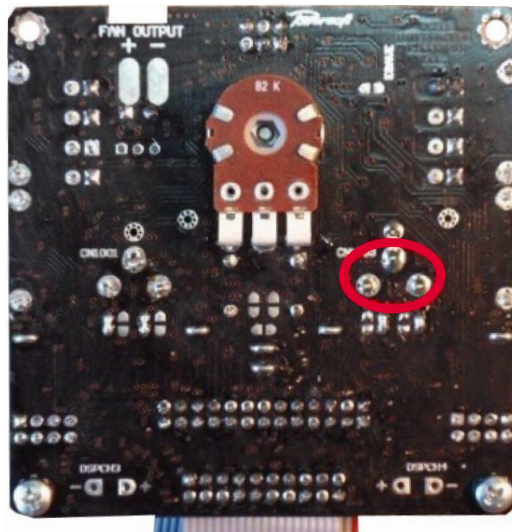
Unscrew the four screws on the plate of the interface and the four screws that tighten the XLR connectors.



Remove the two long pillars and the two short pillars to remove the card with DIL 20 poles connector, then remove the rubber packing.

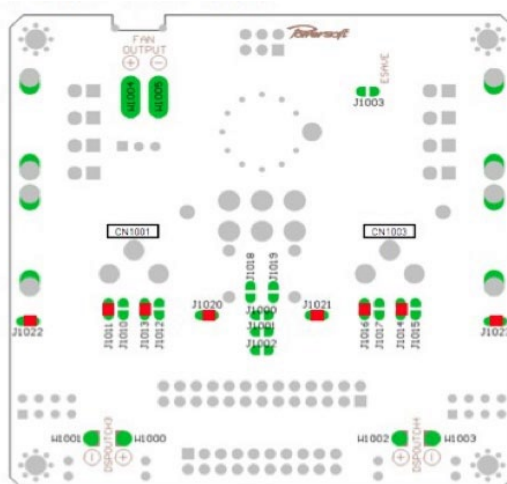


Unsolder the three pins of XLR male connector and remove it from the PCB.

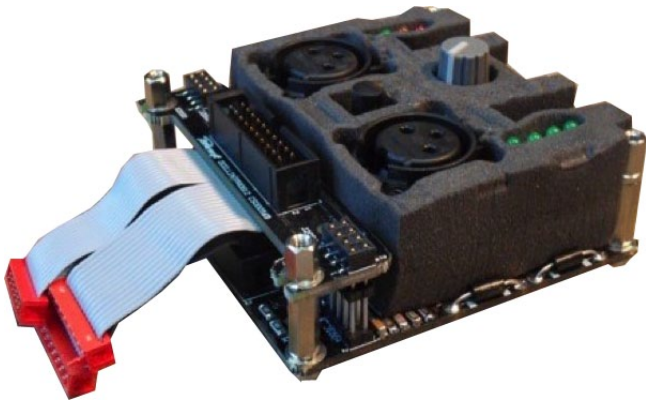


- On the rear face of the interface pcb:
- unsolder the jumpers: J1017, J1015, J1001 and J1002
 - solder the jumpers: J1016 and J1014

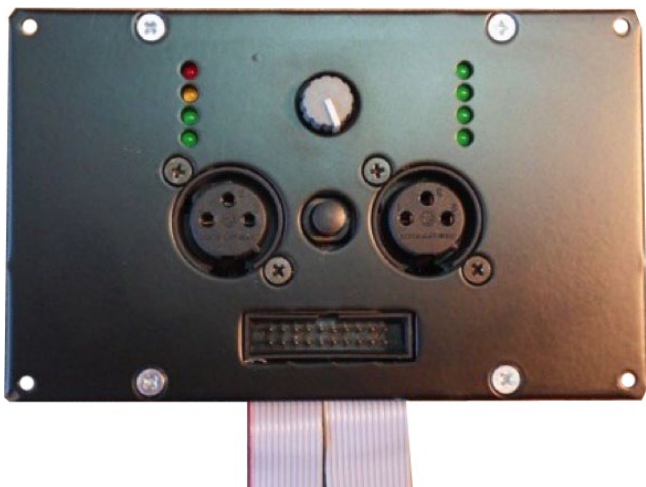
JUMPER	OPEN	CLOSED
J1001	●	
J1002	●	
J1011		●
J1013		●
J1014		●
J1015	●	
J1016		●
J1017	●	
J1020		●
J1021		●
J1022		●
J1023		●



Connect the card with DIL 20 poles connector and screw the four pillars like in the following pictures.

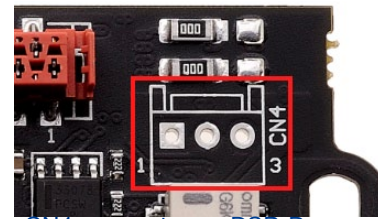


Screw the frontal plate with the four screws on the interface and screw the four screws on the XLR Connectors.



9:2. Balancing DSP out 3,4

- ▶ Two NE5532D operational amplifiers
- ▶ Two 100 nF capacitors
- ▶ Four 10 kΩ resistors
- ▶ Two 100 Ω resistors

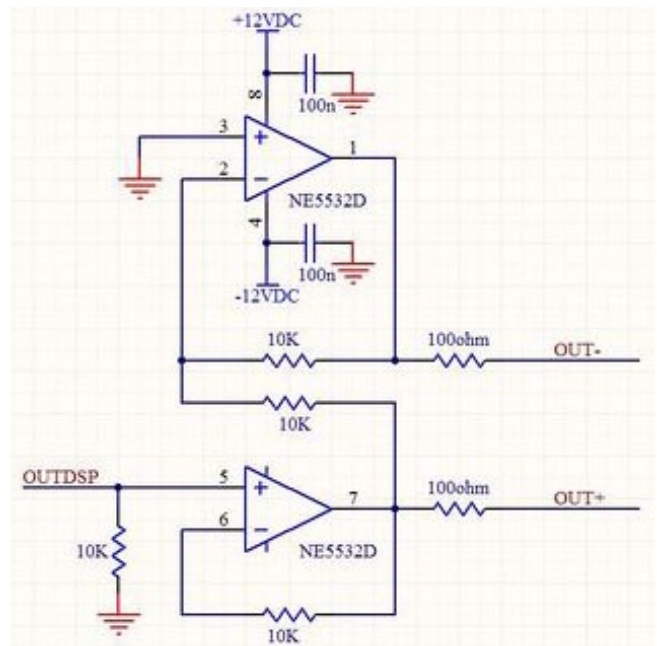


CN4 connector on DSP-D

You will find the unbalanced outputs on the CN 4 connector, on the DSP-D

- ▶ pin 1 = DSPOUTCH3
- ▶ pin 3 = DSPOUTCH4

Create the balancing circuit by following the schematics below.



In standard mode (DSP via Armonia), output 3 and 4 auxiliary Outputs must be used in bridged mode.

When used in conjunction with the aforementioned circuit, it is necessary to use the DSP through Sigma Studio

Software

10:1. Configuring the software environment

Starting from version 2.5.3, Armonía Pro Audio Suite supports the DSP-D processing board.

In order to access the DSP via the PRONET485 of your computer, the Virtual COM Port (VCP) drivers are required.

Freely download the drivers from the following website:

<http://www.ftdichip.com/Drivers/VCP.htm>

1. Once the driver has been properly installed, the Windows operating system provides a new virtual COM port with a high identification number.
2. Open Armonía Pro Audio Suite and click on the Armonía button in the top left corner of the window.
3. Click on the Option button and select the Communication Manager tab.
4. Activate the Serial Port communication and select the

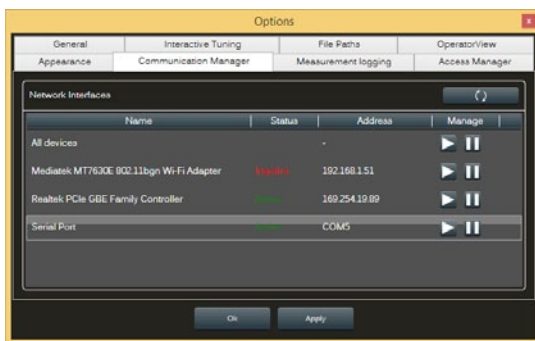


FIG. 2: Armonía Pro Audio Suite: communication manager.

proper COM port (usually the one with the higher ID).

5. Apply the changes: now Armonía is capable to discover the attached device.



FIG. 3: Unit embedding DSP-D discovered.

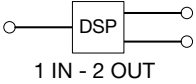
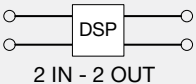
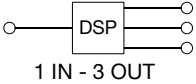
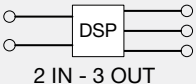
10:2.Routing presets

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

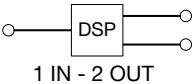
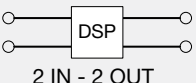
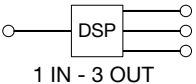
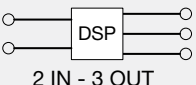
The available routing presets may change according to the selected amp module; furthermore, some routing presets require two amp modules (same models) connected to the same DSP-D. Refer to [TAB. 1](#) for matching.

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	DigiMod 2004PFC2 DigiMod 1000 DigiMod 1500 DigiMod 2000 HV DigiMod 3000SU	DigiMod 3004PFC4 DigiMod 1000 + DigiMod 1000NPS DigiMod 3000SU+ DigiMod 3000AMP
2-way 	OK	—
	OK	—
3-way 	—	OK
	—	OK

TAB. 1: Routing Presets.

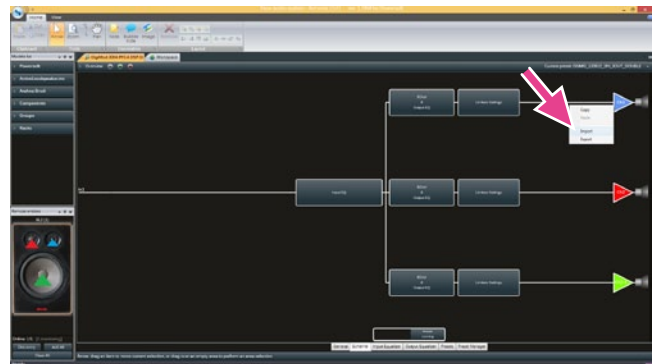
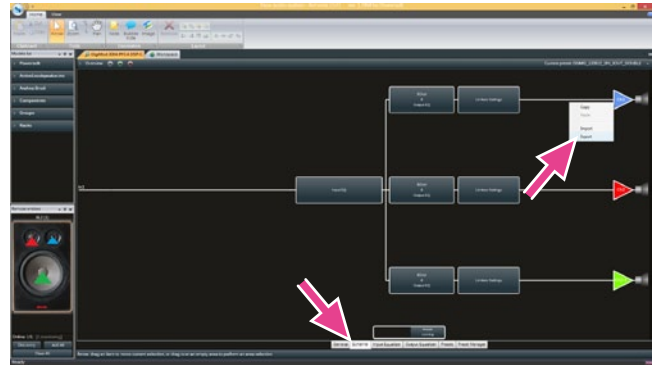
Preset	DigiMod 2004PFC2 DigiMod 1000 DigiMod 1500 DigiMod 2000 HV DigiMod 3000SU	DigiMod 3004PFC4 DigiMod 1000 + DigiMod 1000NPS DigiMod 3000SU+ DigiMod 3000AMP
2-way 	11 biquad bands per output - 5 biquad bands per input	—
	11 biquad bands per output - 5 biquad bands per input	—
3-way 	2 amp modules required 8 biquad bands per output 5 biquad bands per input	11 biquad bands on output ch. 1&2 10 biquad bands on output ch. 3 5 biquad bands per input
	2 amp modules required 7 biquad bands on output ch. 1&2 8 biquad bands on output ch. 3 2 biquad bands 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.

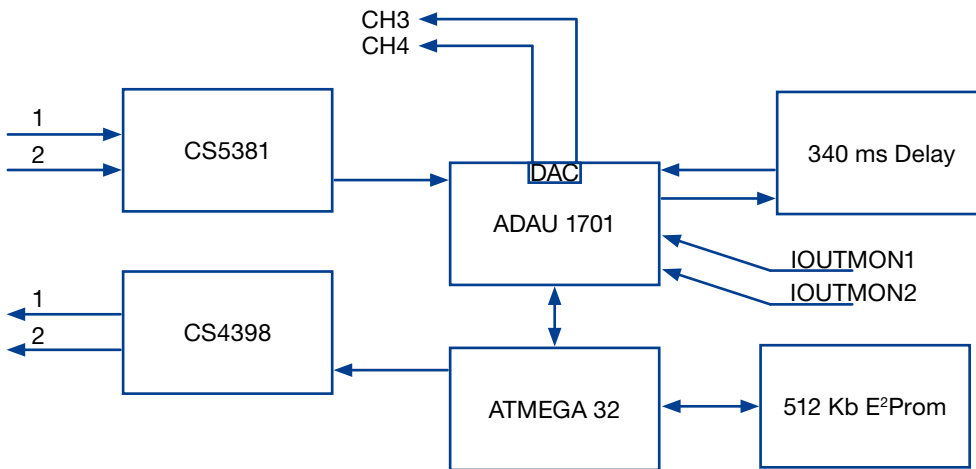
10:3. How to import the Armonia preset for DSP-C into DSP-D via Armonia

The DSP-D board has a signal routing path completely different with respect to the DSP-C board, but similar processing environment so, for some extent, you can import the signal processing schema developed with Armonía Pro Audio Suite for the DSP-C into the DSP-D.

1. Connect your DSP-C based system to Armonía, make a discovery and import it into the workspace.
2. Open the schema of your system
3. By right-clicking on the output (rightmost triangles) export the channel configuration: you will obtain a .CHP file for each channel.
4. Connect your DSP-D based system to Armonía, make a discovery and import it into the workspace.
5. **Make sure that the I/O configuration in the DSP-D based system is exactly the same of the one in the DSP-C based system**
6. Open the schema of your system
7. By right-clicking on the output (rightmost triangles) import the .CHP channel configuration file for each channel
8. Save the preset.



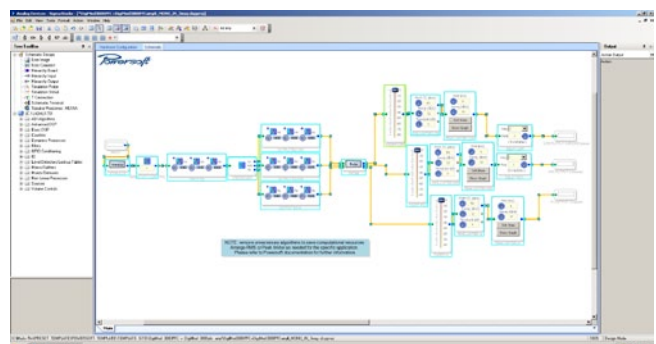
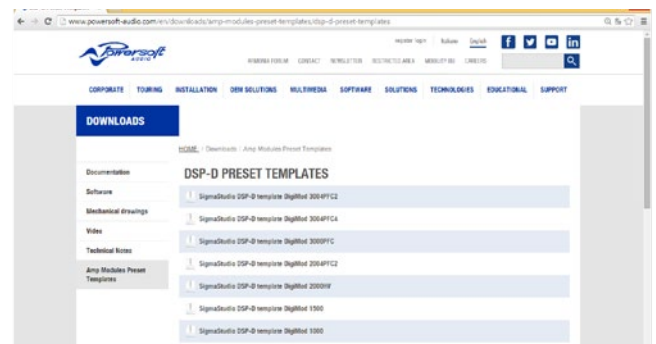
Processing architecture



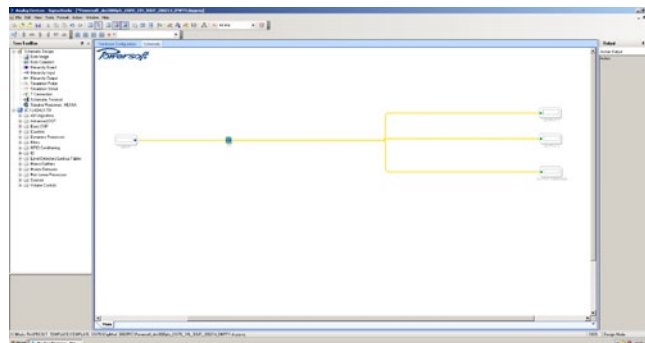
How to import the SigmaStudio™ presets for DSP-C into the DSP-D

The DSP-D board has a signal routing path completely different with respect to the DSP-C board, but similar processing environment so, for some extent, you can import the signal processing schema developed with SigmaStudio™ for the DSP-C into the DSP-D.

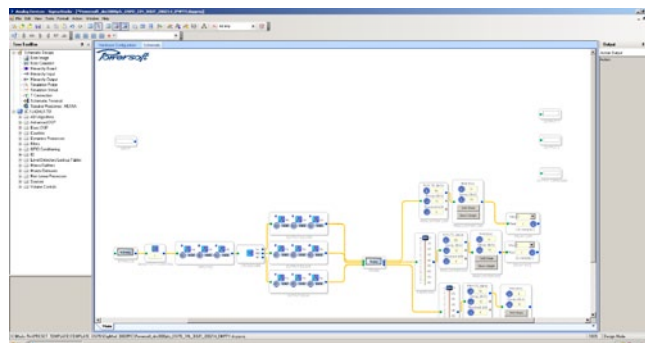
1. Access the Powersoft website and browse the download area: go to Downloads/ Amp Modules Preset Templates/DSP-D preset templates
2. Download the preset template according to your DigiMod model and I/O configuration
3. Open SigmaStudio™ and load your custom preset for DSP-C board
4. Select all the processing algorithms and copy them into the clipboard (CTRL+C)



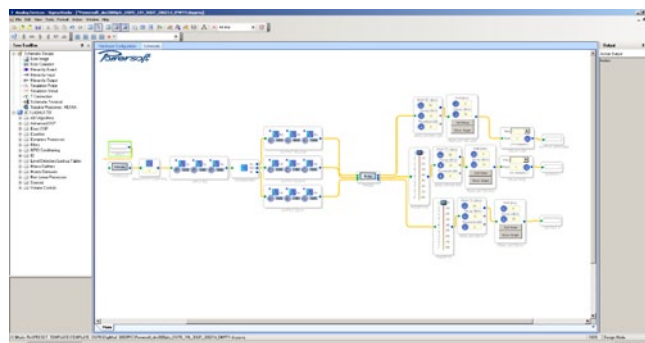
5. Open the DSP-D preset template you have previously downloaded into SigmaStudio™



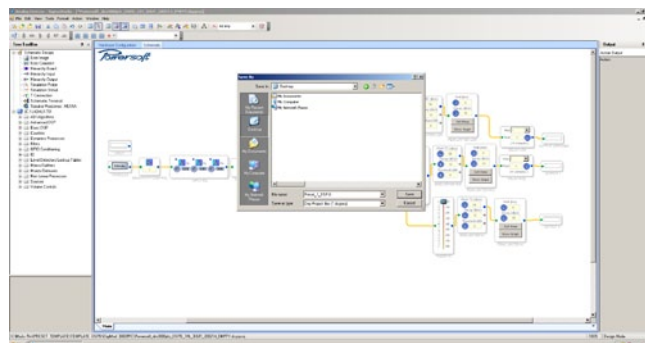
6. Paste from the clipboard (CTRL+V) all the algorithms into the DSP-D preset template



7. Properly connect inputs and outputs



8. Save the new DSP-D preset.



Specifications

General	
Architecture	Analog Devices SigmaDSP® 50 MIPS
Internal processing	28 bit data path with 56 bit internal processing
Latency	1 ms fixed latency architecture
Configuration	up to 2IN-3OUT using Armonía Pro Audio Suite, up to 2IN-4OUT using SigmaStudio
User data storage	Up to 4 local presets, unlimited via Armonía Pro Audio Suite™ software
Firmware update	RS-485 protocol or DSP Programming Board
Remote control	Armonía Pro Audio Suite™ software

Audio	
Frequency response	20 Hz - 20 kHz (-0.5 dB)
Max input voltage	1.95 V / +8 dBu
Max output voltage	5 V / +16 dBu
S/N ratio	> 116 dB
THD+N	< 0.02% (20 Hz - 20 kHz)

DSP features	
Delay	Up to 170 ms output delay for time alignment
Input equalizer	5 parametric equalizers: hi/lo-shelving, all-pass, band-pass, band-stop, hi/lo-pass
Output equalizer	Parametric equalizers: parametric IIR (peaking, hi/ lo-shelving, all-pass, band-pass, band-stop, hi/lo-pass)
Crossover	Butterworth, Linkwitz-Riley, Bessel: 6 dB/oct to 48 dB/oct (IIR)
Limiters	Peak limiter, RMS limiter, frequency dependent RMS limiter
Damping control and impedance monitoring	DampingControl™ and cable resistance compensation, up to 2 Ω negative/positive compensation for optimal low-end speaker control
Input impedance	High performance monitoring of Power Amp output voltage/current/impedance
Parameters locking	Protection of OEM/user features

AD/DA converters	
AD Converters	Dual 24 bit 48 kHz Tandem™ architecture
Sample rate sup- ported	32 kHz, 44.1 kHz, 48 kHz, 96 kHz, 192 kHz
Dynamic range	120 dB
DA Converters	Dual 24 bit 48 kHz Tandem™ architecture
THD+N	< 0.005% (20 Hz - 20 kHz)
Dynamic range	120 dB



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