

DigiMod 500
DigiMod 1000
DigiMod 1500
DigiMod 2000HV
DigiMod 1000NPS

User Manual



COD: MAN-DGM-USER_MAN19-EN-11
NOV 2007

Caution

DigiMod 500/1000/1500/2000HV/1000NPS



IMPORTANT SAFETY INSTRUCTIONS!

- ! Read these instructions !**
- ! Keep these instructions !**
- ! Heed all warnings !**
- ! Follow all instructions !**

CAUTION: To reduce the risk of electric shock, do not remove the cover. No user-serviceable parts inside. Refer servicing to qualified service personnel.

WARNING: To prevent fire or electric shock, do not expose this equipment to rain or moisture.

SAFEGUARDS: Electrical energy can perform many useful functions. This unit has been engineered and manufactured to assure your personal safety. Improper use can result in potential electrical shock or fire hazards. In order not to defeat the safeguards, observe the following instructions for its installation, use and servicing.

This equipment is a Professional Audio Amplifier module, it has been tested and found comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules and to the product family standards for audio professional use:

2014/35/EU Low Voltage Directive

2014/30/EU EMC Directive

2011/65/EU RoHS Directive

For more details, please refer to Powersoft website.

This equipment may introduce harmonics components higher than IEC 61000-3-2 Class A limits when connected to the supply mains.

It is the responsibility of the installer or user of the equipment to inform and ask for, by consultation with the distribution network operator if necessary, the permission to connect this equipment to the low voltage supply (see clause 4 of IEC 61000-3-2).

Warning Notices

Location

Install the amplifier in a ventilated enclosure (IP20 at least), where it will not be directly exposed to high temperature or humidity.

Do not install the amplifier in a location that is exposed to direct rays of the sun, or near to hot appliances or radiators. Excessive heat can adversely affect the operation and internal components. Installation of the module in a damp or dusty environment may result in malfunction or accident.

Precautions regarding installation

Placing and using the amplifier for long periods on heat-generation sources will affect performances. Avoid placing the amplifier on heat-generating sources. Install this amplifier as far as possible from tuners and TV sets. An amplifier installed in close proximity to such equipment may cause noise or degradation of the picture.

Safety rules

DigiMod 500/1000/1500/2000HV/1000NPS



This device must be powered exclusively by earth connected mains sockets in electrical networks compliant to the IEC 364 or similar rules.

Is absolutely necessary to verify this fundamental requirement of safety and, in case of doubt, require an accurate check by a qualified personal.

Is absolutely necessary to ground this device using the proper earth connection on the metal frame of the chassis, use M4 nut and proper Grover type washer to secure the earth terminal lug.

The constructor cannot be considered responsible for eventual damages caused to persons, things or data for the missing of accurate earth link.

Provide the installed unit with bipolar switch to disconnect both mains connection with at least 3mm of distance of the switch contacts.

Before powering this device verify that the module is supplied with the correct voltage rating.

Verify that your mains connection is capable to satisfy the power ratings of the device.

Do not spill water or other liquids into or on the unit.

Do not use this unit if the electrical power cord is frayed or broken.

Do not remove the cover. Removing the cover will expose you to potentially dangerous voltage.

No naked flame sources such like lighted candles should be placed on the module.

Contact the authorized center for ordinary and extraordinary maintenance.

Input mains and output power connection wirings must not to be accessible to the user.

The enclosure apparatus shall be designed so that the start and spread of fire is prevented as much as possible, and shall not give rise to danger of fire to the surrounding of the apparatus. This is achieved as follows:

- by using good engineering practice in design and production of the enclosure apparatus to avoid potential ignition sources
- by using materials of low flammability for internal parts in the vicinity of potential ignition sources
- by using fire enclosures to limit the spread of fire



ESD Precautions

This product is an Electrostatic Discharge Sensitive Device. It is recommended that all workstations where the product is handled and assembled should be provided with all necessary devices and precautions to avoid damage from electrostatic discharges (e.g. some form of ground conductive or dissipative flooring).

Specifications

DigiMod 500/1000/1500/2000HV/1000NPS

SPECIFICATIONS

GENERAL

Type high efficiency 1/2 channels amplifier for professional applications

POWER REQUIREMENTS

DigiMod1000 / (DigiMod500)

230Vrms mains voltage selection AC 230+/- 10 % 50/60 Hz / 1.6 (1.0) A

115Vrms mains voltage selection AC 115+/- 10 % 50/60 Hz / 2.6 (2.0) A

DigiMod1500

230Vrms mains voltage selection AC 230+/- 10 % 50/60 Hz / 2.2 A

115Vrms mains voltage selection AC 115+/- 10 % 50/60 Hz / 3.6 A

DigiMod2000HV

230Vrms mains voltage selection AC 230+/- 10 % 50/60 Hz / 2.9 A

115Vrms mains voltage selection AC 115+/- 10 % 50/60 Hz / 5.5 A

DigiMod500+DigiMod1000NPS/ DigiMod1000+DigiMod1000NPS

230Vrms mains voltage selection AC 230+/- 10 % 50/60 Hz / 2.2 A

115Vrms mains voltage selection AC 115+/- 10 % 50/60 Hz / 3.6 A

POWER REQUIREMENTS DigiMod1000NPS

Power bus Dc +/- 75 V (+8% -20%)@(7 A)

Auxiliary supply Dc +15V (+30% -15%)@(0.7 A) / -15 V (+30% -15%)@ (0.3 A)

+7V (+30% -15%)@(0.5 A)

All requirements are provided by a master DigiMod 500 or DigiMod 1000 thru slave connector

DIMENSIONS / WEIGHTS

Weight 1.0 Kg DigiMod500

Weight 1.1 Kg DigiMod1000

Weight 1.15 Kg DigiMod1500/2000HV

Weight 0.6 Kg DigiMod1000NPS

External dimensions 216mm (W), 122mm (D), 51mm (H) DigiMod500/1000/1500

External dimensions 146mm (W), 122mm (D), 51mm (H) DigiMod1000NPS

AUDIO SECTION

Slew Rate (8 Ω) 50V/Us

S/N ratio 105 dB/A

Distortion <0.5% (THD, DIM, SMPTE)

Inputs Balanced to ground

Impedance 10 K Ω

Damping factor 500Hz/8 Ω (Digimod500/1000/1500/1000NPS) > 500

Damping factor 500Hz/8 Ω (Digimod2000HV) > 100

Gain (Digimod500/1000/1500/1000NPS) 32 dB

Gain (Digimod2000HV) 38 dB

Output Unbalanced to ground

Bandwidth 10 Hz - 30KHz

POWER SPECIFICATIONS (measured at 115 or 230V AC, 50/60Hz)

DigiMod500

Power continuous

(1KHz, 0.5% THD) 4 Ω = 450W 8 Ω = 260W

Power EIAJ

(1KHz, 1% THD) 4 Ω = 530W 8 Ω = 280W

DigiMod1000

Power continuous, both channels driven

(1KHz, 0.5% THD) 4 Ω = 2X 390W 8 Ω = 2X 240W

Power EIAJ, both channels driven

(1KHz, 1% THD) 4 Ω = 2X 500W 8 Ω = 2X 270W

Bridged 8 Ω = 1000W 16 Ω = 520 W

DigiMod1500

Power continuous, both channels driven

(1KHz, 0.5% THD) 4 Ω = 2X 590W 8 Ω = 2X 330W

Power EIAJ, both channels driven

(1KHz, 1% THD) 4 Ω = 2X 750W 8 Ω = 2X 370W

Bridged 8 Ω = 1500W 16 Ω = 740W

DigiMod500+DigiMod1000NPS

Power continuous, all channels driven

(1KHz, 0.5% THD) 4 Ω = 3X 350W 8 Ω = 3X 230W

Power EIAJ, all channels driven

(1KHz, 1% THD) 4 Ω = 3X 410W 8 Ω = 3X 250W

DigiMod1000+DigiMod1000NPS

Power continuous, all channel driven

(1KHz, 0.5% THD) 4 Ω = 4X 310W 8 Ω = 4X 210W

Power EIAJ, all channels driven

(1KHz, 1% THD) 4 Ω = 4X 375W 8 Ω = 4X 230W

Bridged 8 Ω = 2X 750W 16 Ω = 2X 460W

DigiMod2000HV

Power continuous, both channels driven

(1KHz, 0.5% THD) 8 Ω = 2X 780W 16 Ω = 2X 440W

Power EIAJ, both channels driven

(1KHz, 1% THD) 8 Ω = 2X 1050W 16 Ω = 2X 570W

Bridged 16 Ω = 2100W 32 Ω = 1140W

FUNCTIONS

- Thermal protection (over-temperature power limiting, thermal shutdown)
- Short-circuit / overload output protection
- Clip limiter, Permanent signal limiter, High frequency protection
- Auxiliary output voltage ($\pm 12V$ regulated, 200mA)
- Bypass outputs for external active/passive filters
- Digimod500/1000/1000NPS: Temperature controlled Fan output (CN10)
- Digimod1500/2000HV: Temperature controlled Fan
- DSP based or Analog processing plugin optional boards

Connection description

DigiMod 500/1000/1500/2000HV/1000NPS

- CN3: PIN1, POWER OUTPUT CHANNEL 1 POSITIVE
PIN2, POWER OUTPUT CHANNEL 1 NEGATIVE
- CN11: PIN1, SIGNAL GROUND CHANNEL 1
PIN2, BALANCED INPUT + CHANNEL 1
PIN3, BALANCED INPUT – CHANNEL 1
PIN4, OUTPUT TO EXTERNAL VOLUME CONTROL CHANNEL 1,
R Potentiometer = 1KOhm to 2.7Kohm, linear type
(remove J1 placed on pins 3,4 of CN17 to insert external potentiometer)
PIN5, INPUT FROM EXTERNAL VOLUME CONTROL CHANNEL 1,
- CN14: PIN1, AUXILIARY SUPPLY OUTPUT GROUND
PIN2, MUTE CONTROL PIN, PULL DOWN TO GROUND TO MUTE BOTH
OUTPUTS
PIN3, +12VOLTS DC REGULATED AUXILIARY OUTPUT,
CURRENT SHALL NOT EXCEED 200 mA.
PIN4, -12VOLTS DC REGULATED AUXILIARY OUTPUT,
CURRENT SHALL NOT EXCEED -200 mA.
- CN12: PIN1, SIGNAL GROUND CHANNEL 2
PIN2, BALANCED INPUT + CHANNEL 2
PIN3, BALANCED INPUT – CHANNEL 2
PIN4, OUTPUT TO EXTERNAL VOLUME CONTROL CHANNEL 2,
R Potentiometer = 1KOhm to 2.7Kohm, linear type
(remove J2 placed on pins 1,2 of CN18 to insert external potentiometer)
PIN5, INPUT FROM EXTERNAL VOLUME CONTROL CHANNEL 2,
- CN7: PIN1, POWER OUTPUT CHANNEL 2 POSITIVE (ground connected)
PIN2, POWER OUTPUT CHANNEL 2 NEGATIVE (hot pole, CHANNEL 2 has reversed
polarity to have bridged output with CHANNEL 1 directly between positive output of
CH1 with negative output of CH2; input stage of CH1 is phase reversing).
- CN1: PIN1, PIN2, MAINS INPUT FOR BOTH 115V AND 230 OPERATION,
SEE CN2 FOR VOLTAGE SELECTION.
- CN2: PIN1, PINS2 OPEN FOR 230VAC OPERATION, CONNECT PIN1 TO PIN2 FOR 115VAC
OPERATION. DEFAULT SELECTION 230VAC.
(SEE PAG 10/13 DRAWING FOR LOCATION)
- CN10: PIN1, PIN3 TO NEGATIVE WIRE OF EXTERNAL 24VDC FAN
PIN2 TO POSITIVE WIRE OF EXTERNAL 24VDC FAN
- CN8: PIN1 TO 72 SEE PAGE 13

!WARNING!

**CHECK PROPER VOLTAGE SELECTION BEFORE OPERATE
CHECK PROPER CHASSIS EARTH CONNECTION BEFORE OPERATE**

Mating connectors

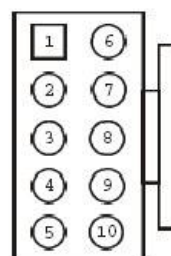
DigiMod 500/1000/1500/2000HV/1000NPS

Connectors ID	Manufacturer	Model/Code
CN1 (2POLES 7.5mm) (DigiMod500/1000/1500)	Phoenix Contact	GMSTB 2,5/2-ST(Cod. Ph.C. 1766880) (Cod. Powersoft CN000153)
CN1 (2 poles, Faston) (DigiMod2000HV)	Various	6.3x0.8 mm female Faston
CN2 (2POLES 7.5mm) (DigiMod500/1000/1500)	Phoenix Contact	GMSTB 2,5/2-ST (Cod. Ph.C. 1766880) (Cod. Powersoft CN000153)
CN2 (2 poles, Faston) (DigiMod2000HV)	Various	6.3x0.8 mm female Faston
CN3 (2POLES 5.08mm) (DigiMod500/1000/1500)	Phoenix Contact	MSTB 2,5/2-ST-5,08 (Cod. Ph.C. 1757019) (Cod. Powersoft CN000149)
CN3 (2 poles, Faston) (DigiMod2000HV)	Various	4.8x0.8 mm female Faston
CN7 (2POLES 5.08mm) (DigiMod500/1000/1500)	Phoenix Contact	MSTB 2,5/2-ST-5,08 (Cod. Ph.C. 1757019) (Cod. Powersoft CN000149)
CN7 (2 poles, Faston) (DigiMod2000HV)	Various	4.8x0.8 mm female Faston
CN14 (4POLES 5.08mm)	Phoenix Contact	MSTB 2,5/4-ST-5,08 (Cod. Ph.C. 1757035) (Cod. Powersoft CN000151)
CN11 (5POLES 5.08mm)	Phoenix Contact	MSTB 2,5/5-ST-5,08 (Cod. Ph.C. 1757048) (Cod. Powersoft CN000152)
CN12 (5POLES 5.08mm)	Phoenix Contact	MSTB 2,5/5-ST-5,08 (Cod. Ph.C. 1757048) (Cod. Powersoft CN000152)
CN10 (3POLES 2.54mm)	Molex22-01-2035	(Molex ordering number)
CN15 (10POLES 3.0mm)	Molex	43025-1000 (Molex Housing ordering number) 43030-0001 (Molex contact ordering number)
CN8 (72POLES Simm socket)	Various	Right polarized / 1,27mm Pcb thickness
CN16 (8 POLES 2.54mm)	Berg	DUBOX (Cod. Ph.C. 76384-308) (Cod. Powersoft CN000218)
CN17 (4 POLES 2.54mm)	Berg	DUBOX (Cod. Ph.C. 76384-304) (Cod. Powersoft CN000217)
CN18 (4 POLES 2.54mm)	Berg	DUBOX (Cod. Ph.C. 76384-304) (Cod. Powersoft CN000217)

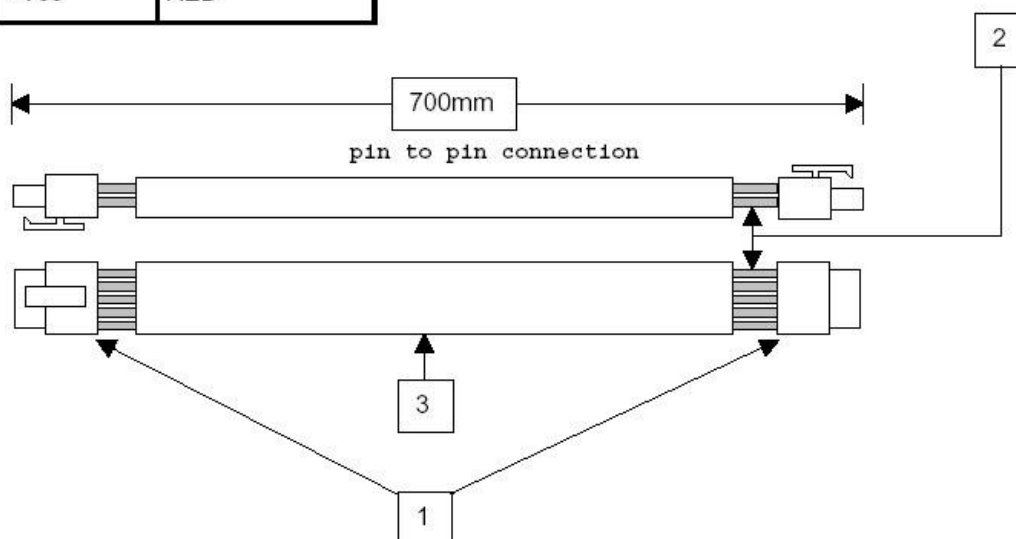
Power Wiring Cable DigiMod1000NPS

	CODE:	
	CB000098	
	DESCRIPTION:	
	NPS POWER BUS	

PIN	FUNZIONE	COLORE
1	-Vcc	BLACK
2	MUTE	BLUE
3	GND	YELLOW/GREEN
4	GND	YELLOW/GREEN
5	+Vcc	RED
6	-Vcc	BLACK
7	-18Vdc	GREY
8	+7Vdc	PINK
9	+18Vdc	VIOLET
10	+Vcc	RED



C.S. SIDE VIEW



1. Connector MOLEX Micro-Fit 3.0 Cod.43025-1000
2. Single wire type AWG 22
3. Thermoplastic tube Ø8/10mm
Contacts MOLEX Micro-Fit 3.0 for AWG 20-24 Cod.43030-0001

Thermal constraints

DigiMod 500/1000/1500/2000HV/1000NPS



This device must be correctly heatsinked for correct and reliable operation:
Two operating modes are feasible for DigiMod 500/1000/1000NPS.

- 1) fan cooled operation
- 2) external heatsink operation

For DigiMod 1500/2000HV only fan cooling operation is provided

- 1) Thermal behaviour with upper mounted fan cooler (80X80mm, 24 Vdc) is warranted by design up to 50°C environmental temperature with 6 dB power crest factor program operation, both channels driven on 4 ohms load (DigiMod 2000HV on 8 ohms load)
- 2) Thermal behaviour with external heatsink is related to power operation level and load impedance.

For the above conditions (1), the dissipated power is:

$$\text{Maximum dissipated power} = \frac{\text{Maximum power} \cdot (1 - \text{Efficiency}^*)}{4^{**}}$$

* *Typical efficiency = 0.8*

** *6 dB power crest factor program*

Considering that thermal protection is set at 75°C on bottom aluminium plate, thermal resistance of the heatsink is derived from the following formula:

$$R_{th}(\text{heatsink}) = \frac{\text{Maximum operating temperature} - \text{Maximum ambient temperature}}{\text{Maximum dissipated power}}$$

For example, with a maximum output power of 1000W and a typical efficiency of 80% the expected dissipated power is 50W. For a maximum ambient temperature of 45°C and a maximum operating temperature of the module of 70°C is necessary an heatsink of 0.5°C/W

$$R_{th}(\text{heatsink}) = \frac{70^{\circ}\text{C} - 45^{\circ}\text{C}}{50\text{W}} = 0.5^{\circ}\text{C/W}$$

Proper heatsink planarity is strongly suggested to allow thermal transfer from the bottom plate to the heatsink, thermal compound is recommended also if not strongly necessary.

In case of installation inside of loudspeaker enclosure, proper spacing of at least 100 mm is necessary between the frame of the unit and side components or surfaces of the enclosure.

Be Aware that this product is designed for audio applications.

High energy long term high frequency output may damage output damping RC network.

High frequency time shaped built in limiter works to limit high level steady high frequency output signals.

High energy long term output may blow power supply fuses.

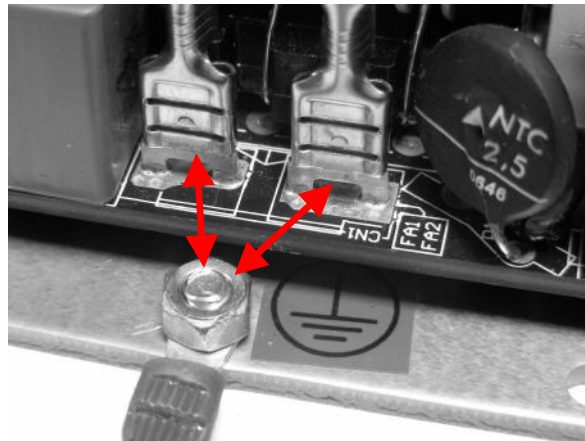
Time shaped built in limiter works to limit excessive power and to reduce clipping distortion.

Application tips

DigiMod 500/1000/1500/2000HV/1000NPS

WARNING!

Mains Connections details for Digimod 2000HV



In case of usage of not protected fast-on connectors, the minimum air distance between Earth connection and mains energized fast-on body / blades, must be at least 2,5mm.

Single ended operation (stereo and bi-amp mode):

DigiMod output stage is designed to work in balanced supply mode.

This allows better exploitation of power supply capacitors and power supply dynamic.

This specific configuration lead to have CH2 in inverting operation respect to CH1.

For proper connection please follow the connecting instructions and consider that CH2 output connector hot pole is the negative and the positive of the output is grounded (only for CH2).

Input stage of CH2 is designed to have reversed phase path to maintain overall not inverting behaviour.

Bridge mode operation:

DigiMod1000/1500/NPS are capable to work in bridge mode on load nominal impedance down to 8 ohms, DigiMod2000HV on load nominal impedance down to 16 ohms

Output stage of the two channels is designed to work in balanced supply mode , that allows better exploitation of power supply capacitors.

This specific configuration lead to have CH2 output stage inverting operation as previously mentioned.

Bridge mode connection on inputs is performed directly paralleling the inputs without phase reversing (INPUT+1 wired to INPUT+2 and INPUT-1 wired to INPUT-2).

Bridge mode connection on outputs is performed directly wiring the load between OUTPUT+1 and OUTPUT-2.

Note:

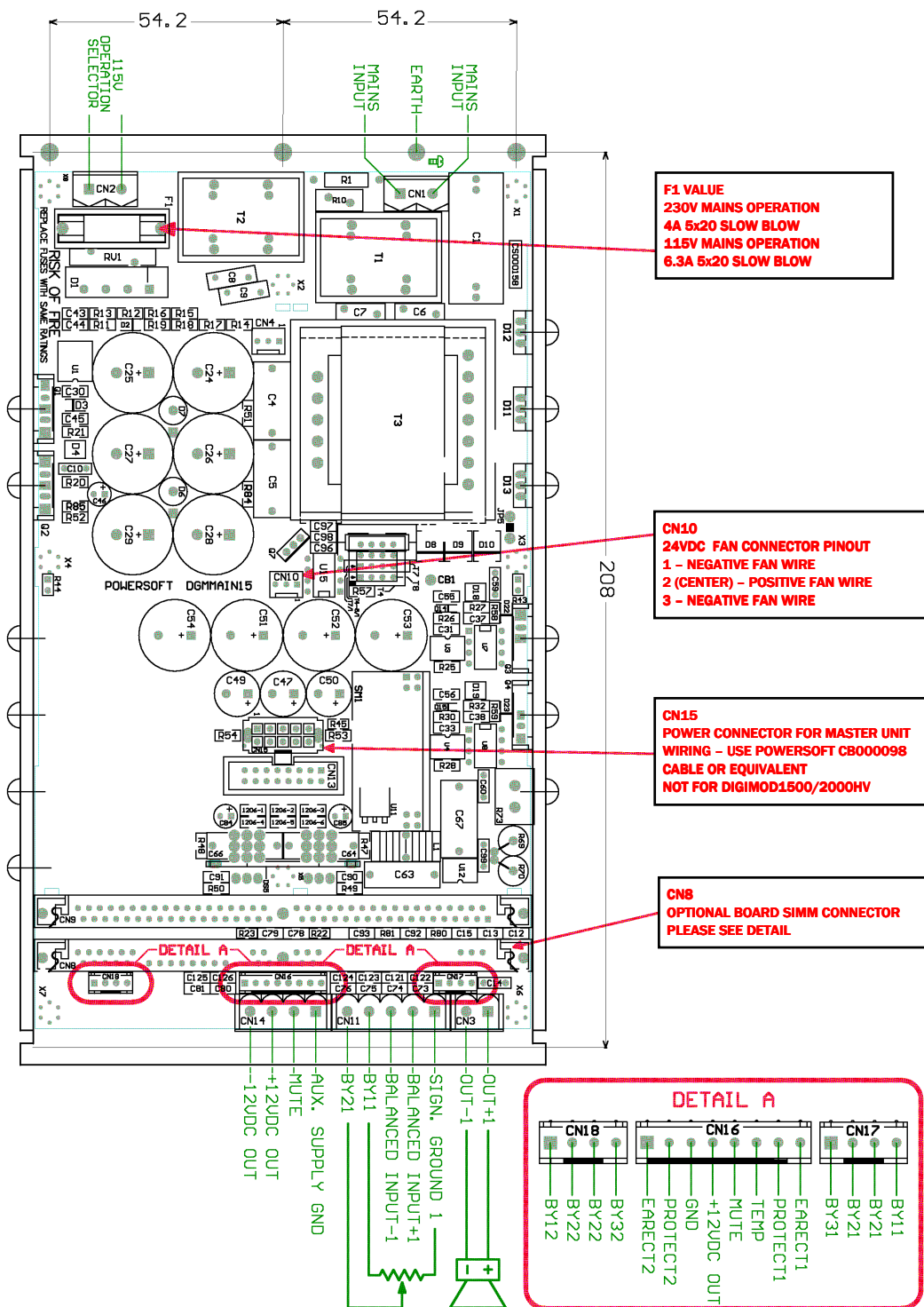
It is important to respect the connection indications.

Do not to reverse output signal of CH2 to maintain grounded negative output on CH2.

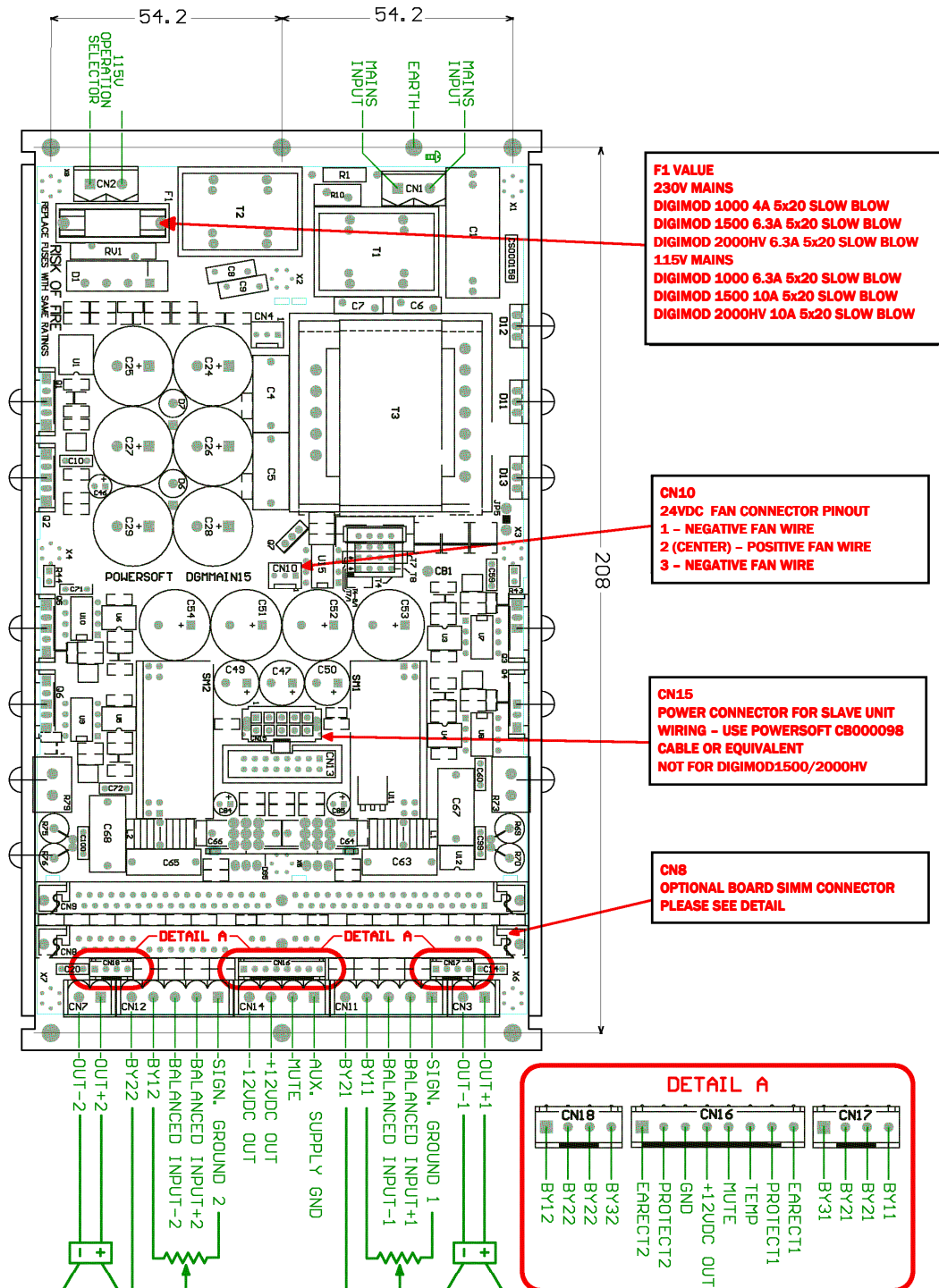
Damage of the unit may occur in case of equally phased outputs.

Connecting Layout

DigiMod500

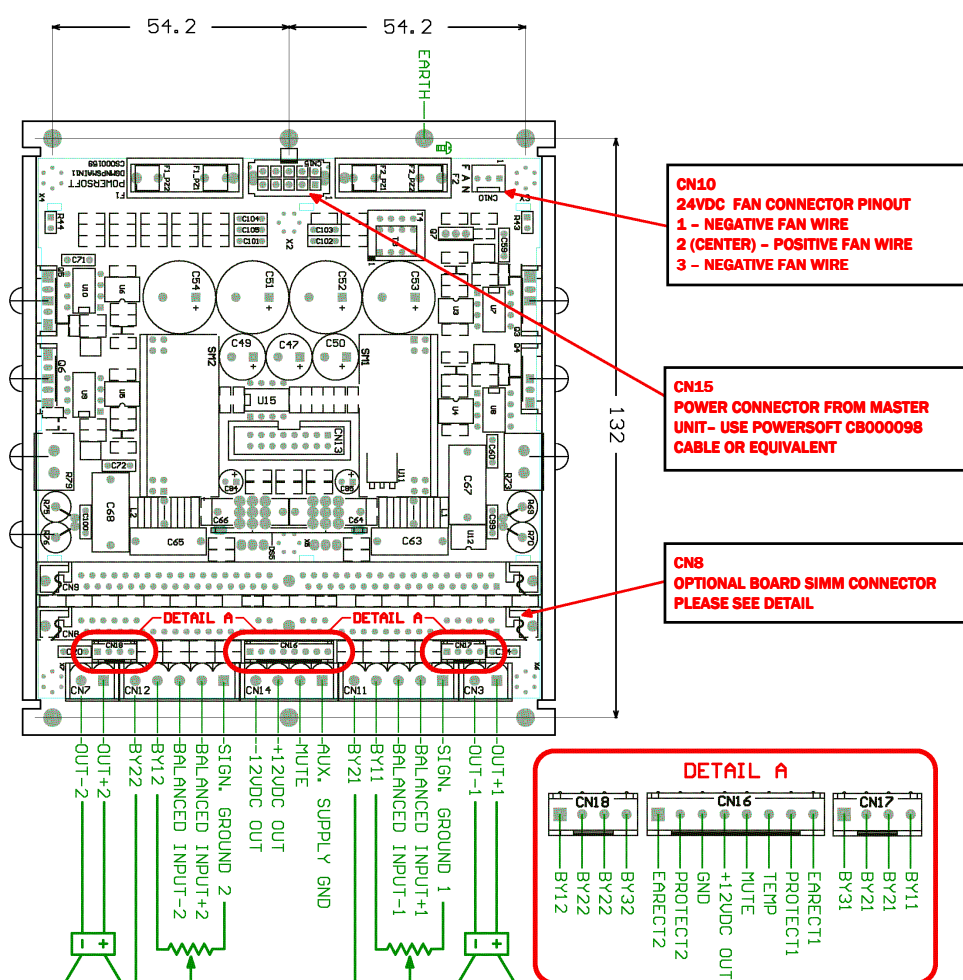


Connecting Layout DigiMod1000/1500/2000HV



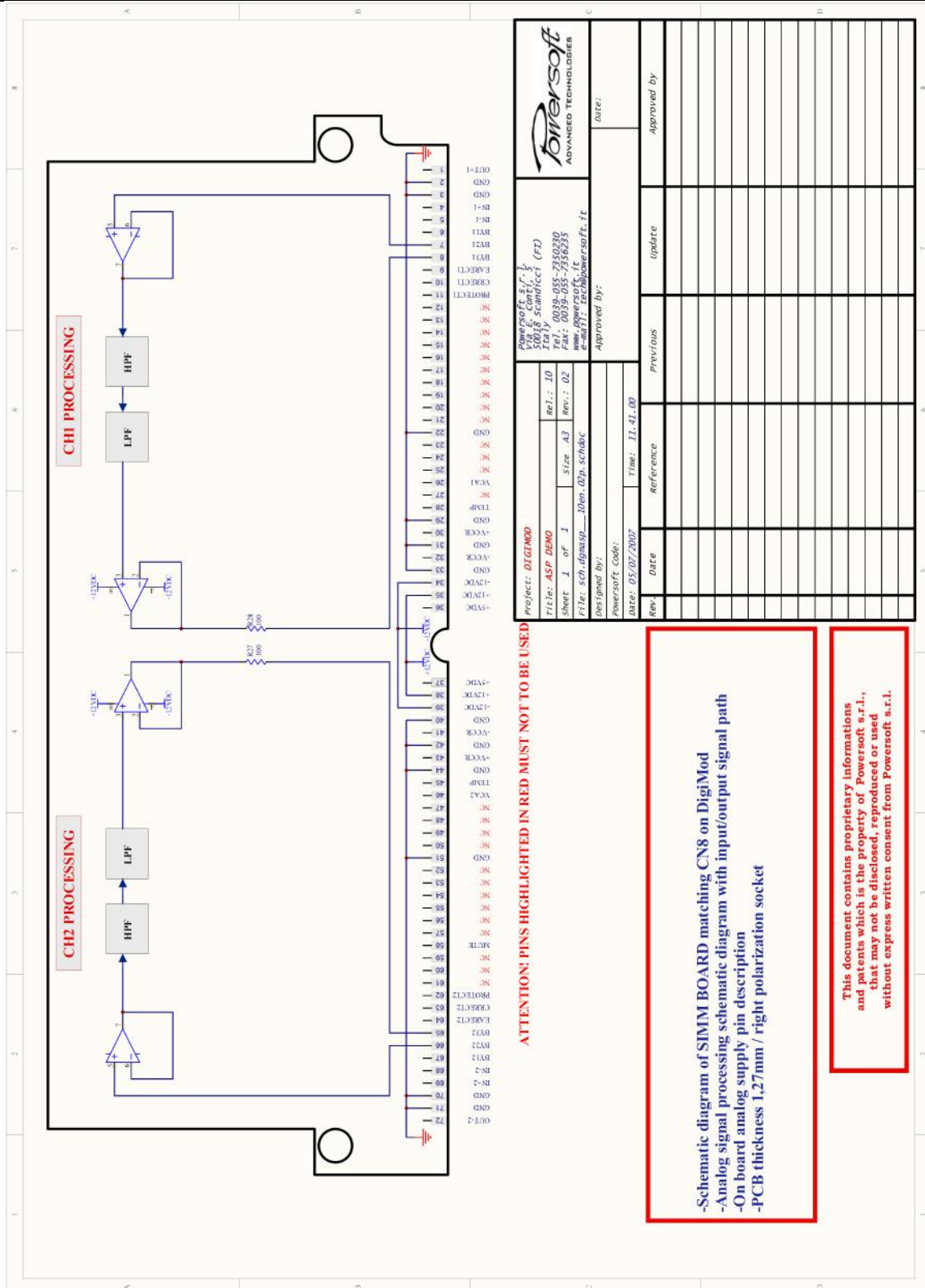
Connecting Layout

DigiMod1000NPS



CN8 Simm Socket application

DigiMod 500/1000/1500/2000HV/1000NPS



DGMDSPA installation

DigiMod 500/1000/1500/2000HV/1000NPS

DGMDSPA installation consist in removing J3 and J4 jumpers to allow signal path to flow to DGMDSPA board or remove the jumpers located on pins 3,4 of CN18 and 1,2 of CN17 (in the latest releases of the units) .

Insert the DGMDSPA board on the only one spare simm socket on the main board of DigiMod module. Take care that side holders are correctly closed and the polarization is respected.

The module is ready to work.

