DigiMod 3000PFC
DigiMod 3000PFCsu

User Manual

COD: MAN-DGM3K-USER_MAN_Ver-1.3
September 2008

Caution

DigiMod 3000PFC / 3000PFCsu

IMPORTANT SAFETY INSTRUCTIONS!

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

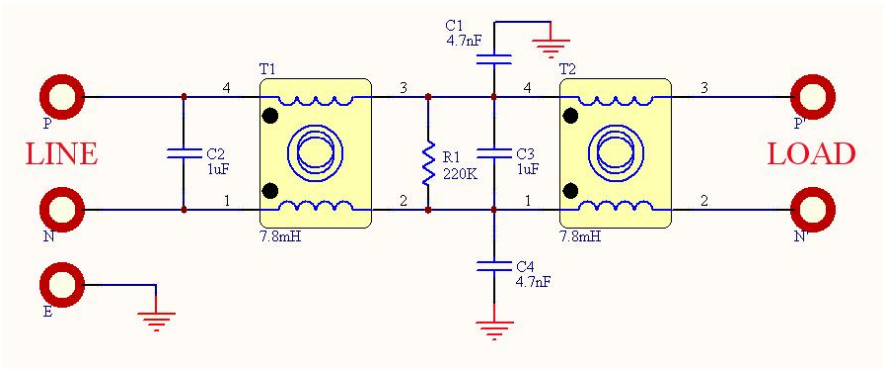
CAUTION: To reduce the risk of electric shock, do not remove the cover. No user-serviceable parts inside. Refer servicing to qualified service personnel.

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

NOTES: This equipment has been tested and found to comply by Notified Body (Directive 89/336/EEC-EMC) pursuant to the product family standard for audio professional use:
EN 55103-1 and EN 55103-2 standard (with the limits for E4 and E5 electromagnetic environment); EN61000– 3 – 2 , EN 61000 – 3 - 3
This is a Class A product. In a domestic environment this product may cause radio interferences in which case the user may be required to take adequate measures.
This equipment has been tested and found to comply by Notified Body 0715 (Directive 73/23/EEC L.V) pursuant to the audio apparatus safety requirements: Standard EN 60065.

NOTES: With use of the followings parts described below, this equipment has been tested and found to comply by Notified Body (Directive 89/336/EEC-EMC) pursuant to the product family standard for audio professional use:
EN 55103-1 and EN 55103-2 standard (with the limits for E1, E2 and E3 electromagnetic environment); EN61000– 3 – 2 , EN 61000 – 3 - 3
This equipment has been tested and found to comply by Notified Body 0715 (Directive 73/23/EEC L.V) pursuant to the audio apparatus safety requirements: Standard EN 60065.

Mains Filter for E1, E2, E3 electromagnetic environment compliance



Ferrite chokes:
All the connection cable must be turn for 4 times on ferrite choke with an impedance of at least 210 Ohm/Turn

Caution

DigiMod 3000PFC / 3000PFCsu

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.

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 3000PFC / 3000PFCsu

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 unconnect 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 enclusure 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

Specifications
DigiMod 3000PFC / 3000PFCsu

SPECIFICATIONS

GENERAL
Type ..... high efficiency 2 channels amplifier for professional applications

POWER REQUIREMENTS
Digimod 3000PFC / 3000PFCsu Power supply integrates Power Factor Correction
85 to 270 Vrms mains voltage 50/60Hz..... Power ratings 900 VA

DIMENSIONS / WEIGHTS
Weight ..... 1.5 Kg DigiMod3000PFC Power supply
Weight ..... 0.8 Kg DigiMod3000PFC Amplifier
Weight ..... 2.27 Kg DigiMod3000PFCsu
External dimensions ..... 216mm (W), 122mm (D), 51mm (H) DigiMod3000PFC Power Supply
External dimensions ..... 146mm (W), 122mm (D), 51mm (H) DigiMod3000PFC Amplifier
External dimensions ..... 308mm (W), 122mm (D), 51mm (H) DigiMod3000PFCsu

AUDIO SPECIFICATIONS
Slew Rate (8Ω) ..... 30V/Us (Input filter bypassed)
S/N ratio..... 108 dB/A
Distortion ..... <0.5% (THD, DIM, SMPTE)
Inputs..... Balanced to ground
Input impedance ..... 10 KΩ
Gain ..... 38 dB
Efficency (4Ω) ..... 75% (typical)
Power factor ..... better than 0.95
Output type ..... Unbalanced to ground
Bandwidth (4Ω) ..... 5 Hz - 25KHz
Damping factor 20Hz – 1000Hz ..... >200

POWER SPECIFICATIONS (measured at 230Vac mains voltage)

Power continuous			
(1KHz, 0.5% THD)	4Ω = 1400W	8Ω = 1000W	
Power EIAJ			Both channels driven
(1KHz, 1% THD)	4Ω = 1500W / 2000W**	8Ω = 1100W	
Bridge Power EIAJ			Both channels driven
(1KHz, 1% THD)	8Ω = 3000W / 4000W**	16Ω = 2200W	

**Peak Power 10ms

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 (±12V regulated , 350mA)
- Bypass outputs for external active/passive filters
- Temperature controlled Fan output (2 outputs on Power Amplifier, 1 output on Power Supply)
- Output current monitor available
- Mains overvoltage tolerance up to 400Vac
- DSP based or Analog processing plugin optional boards
- Multiple Amplifier Units can be connected on the same Power Supply*

*** It is possible to connect up to 3 amplifier modules on the same power supply module and up to 2 amplifier modules on the Digimod 3000PFCsu integrated Power Supply and 2 channels amplifier.**
The total power must be no more than the maximum power declared.
We recommend to utilize only one amplifier unit for the subwoofer section.

Connection description
DigiMod 3000PFC / 3000PFCsu

DIGIMOD 3000PFC AMPLIFIER / DIGIMOD 3000PFCsu

FA5: POWER OUTPUT CHANNEL 1 POSITIVE
FA6: 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 350 mA.
PIN4, -12VOLTS DC REGULATED AUXILIARY OUTPUT, CURRENT SHALL NOT EXCEED -350 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,

FA8: POWER OUTPUT CHANNEL 2 POSITIVE (ground connected)
FA7: 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).

CN10,CN19: PIN1,PIN3 TO NEGATIVE WIRE OF EXTERNAL 24VDC FAN
PIN2 TO POSITIVE WIRE OF EXTERNAL 24VDC FAN

CN15: POWER BUS CONNECTOR

CN8: PIN1 TO 72 SEE PAGE 13

DIGIMOD 3000PFC POWER SUPPLY / DIGIMOD 3000PFCsu

FA1,FA2: MAINS INPUT. **(Use external fuse with inferior value respect F1)**

CN1: PIN1,PIN3 TO NEGATIVE WIRE OF EXTERNAL 24VDC FAN
PIN2 TO POSITIVE WIRE OF EXTERNAL 24VDC FAN

CN2: POWER BUS CONNECTOR

!WARNING!
CHECK PROPER CHASSIS EARTH CONNECTION BEFORE OPERATE

Mating connectors
DigiMod 3000PFC / 3000PFCsu

DIGIMOD 3000PFC POWER SUPPLY / DIGIMOD 3000PFCsu

Connectors ID	Manufacturer	Model/Code
FA1,FA2	Various	6.3x0.8 mm female Faston
CN1 (3POLES 2.54mm)	Molex22-01-2035	(Molex ordering number)
CN2 (60 POLES 2.54mm)	Various	60 Poles female flat connector

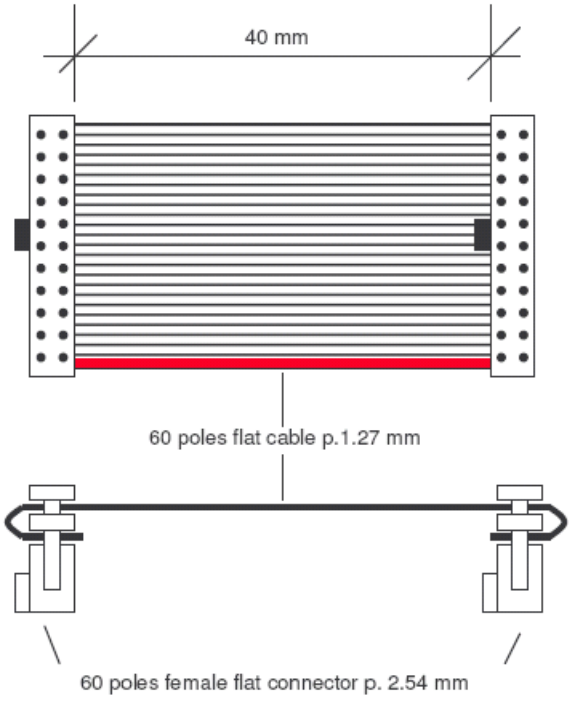
DIGIMOD 3000PFC AMPLIFIER / DIGIMOD 3000PFCsu

Connectors ID	Manufacturer	Model/Code
FA5,FA6,FA8,FA7	Various	6.3x0.8 mm female Faston
CN11 (5POLES 5.08mm)	Phoenix Contact	MSTB 2,5/5-ST-5,08 (Cod. Ph.C. 1757048) (Cod. Powersoft CN000152)
CN14 (4POLES 5.08mm)	Phoenix Contact	MSTB 2,5/4-ST-5,08 (Cod. Ph.C. 1757035) (Cod. Powersoft CN000151)
CN12 (5POLES 5.08mm)	Phoenix Contact	MSTB 2,5/5-ST-5,08 (Cod. Ph.C. 1757048) (Cod. Powersoft CN000152)
CN10,CN19 (3POLES 2.54mm)	Molex22-01-2035	(Molex ordering number)
CN15 (60 POLES 2.54mm)	Various	60 Poles female flat connector
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 Bus Cable

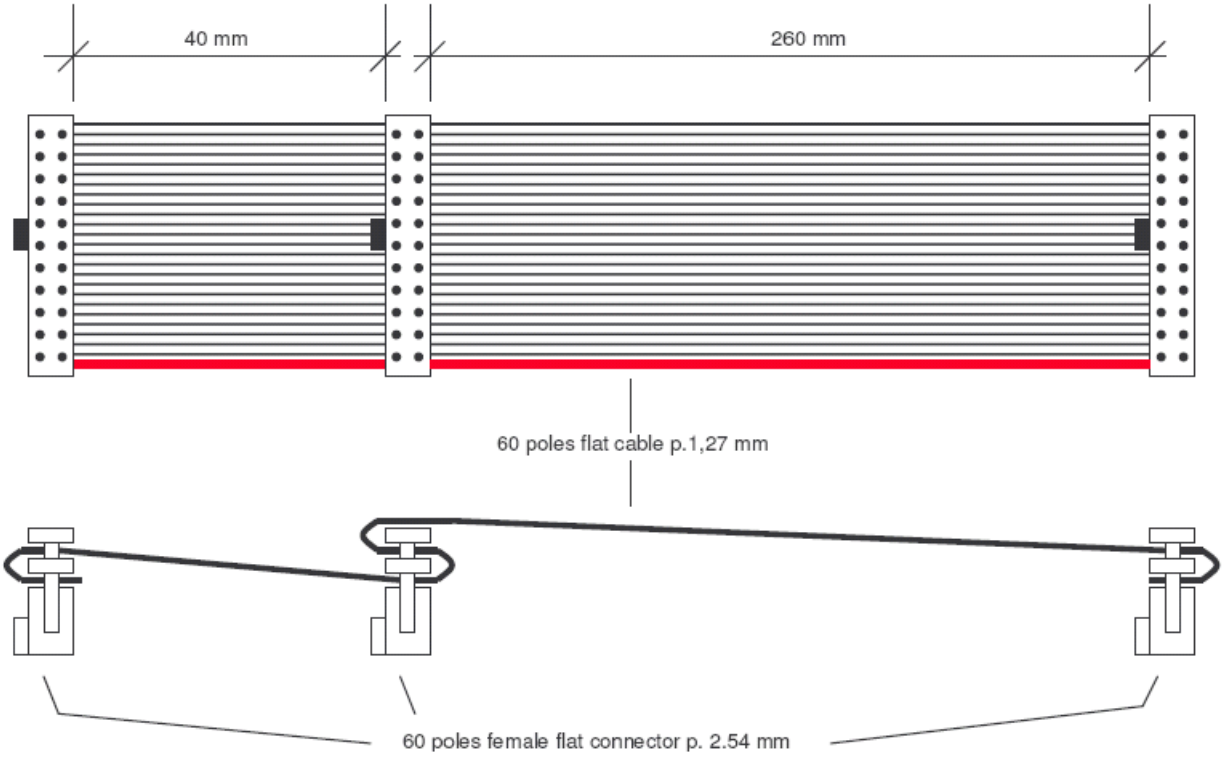
DigiMod 3000PFC / 3000PFCsu

Powersoft ADVANCED TECHNOLOGIES	CODE: CB 000218	
	DESCRIPTION: DIGIMOD 3000 POWER BUS CABLE	



Power Bus Cable
DigiMod 3000PFC /3000PFCsu

Powersoft ADVANCED TECHNOLOGIES	CODICE: CB 000224	
	DESCRIZIONE: DIGIMOD 3000 POWER BUS CABLE 2A 40+260mm	



Thermal constrains

DigiMod 3000PFC / 3000PFCsu

This device must be correctly heatsinked for correct and reliable operation:

For Digimod 3000PFC only fan cooling operation is provided

Thermal behaviour with upper mounted fan cooler (80X80mm, 24 Vdc) and with an appropriate external heatsink is warranted by design up to 50°C enviromental temperature with 6 dB power crest factor program operation, both channels driven on 4 ohms load.

For the above conditions 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:

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

For example, with a maximum output power of 3400W and a typical efficiency of 80% the expected dissipated power is 170W. For a maximum ambient temperature of 45°C and a maximum operating temperature of the module of 70°C is necessary an heatsink of 0.14°C/W

$$\text{Rth(heatsink)} = \frac{70°C - 45°C}{170W} = 0.14°C/W$$

Proper heatsink planarity is strongly suggested to allow thermal transfer from the bottom plate to the heatsink, thermal compound is recommended.
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 eccessive power and to reduce clipping distortion.

Application tips
DigiMod 3000PFC / 3000PFCsu

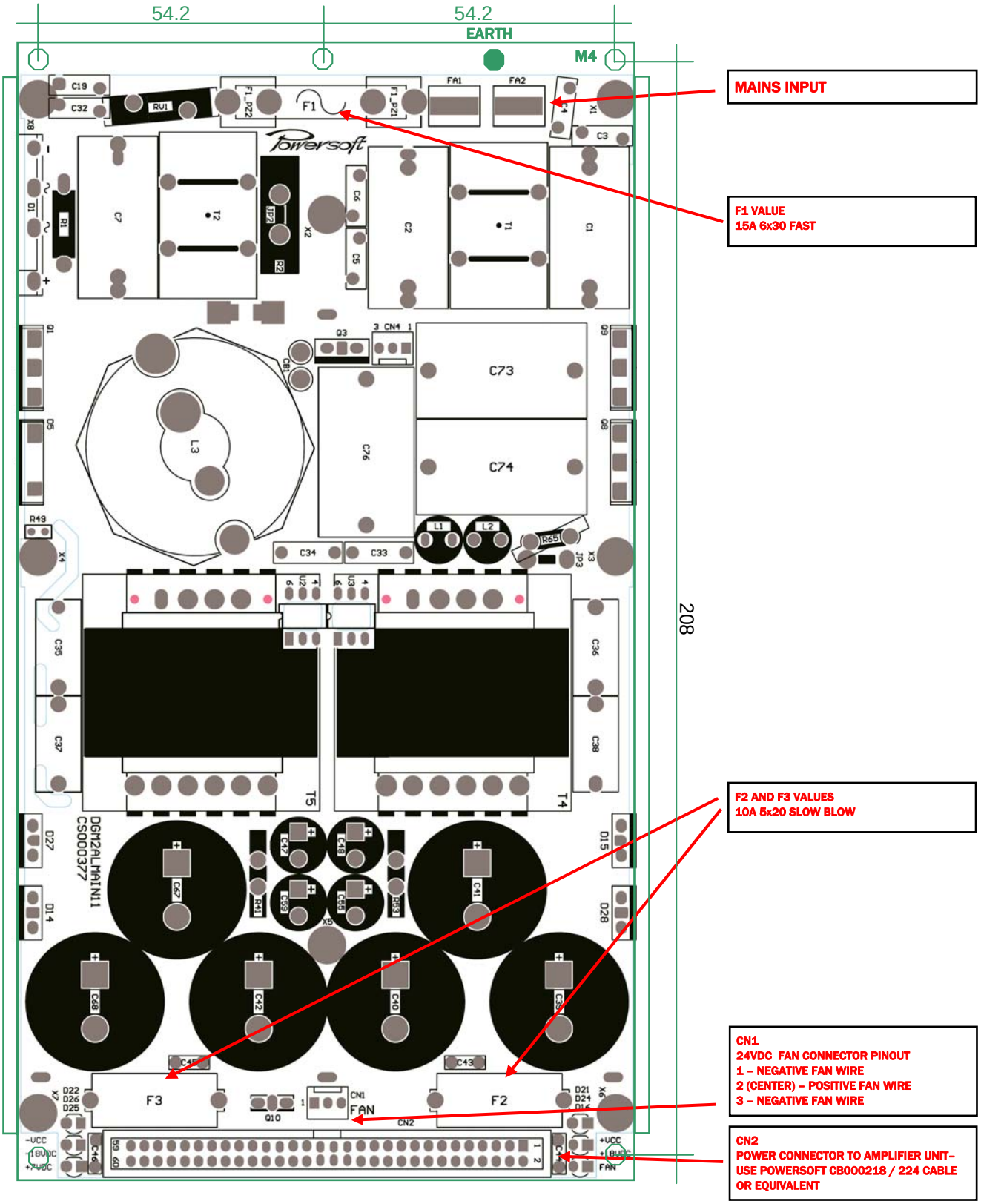
Single ended operation (stereo and bi-amp mode):
DigiMod output stage is designed to work in balanced supply mode.
This allows better exploitation of power supply capacitors and power supply dynamic.
This specific configuration lead to have CH2 in inverting operation respect to CH1.
For proper connection 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:
DigiMod3000 are capable to work in bridge mode on load nominal impedance down to 8 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.

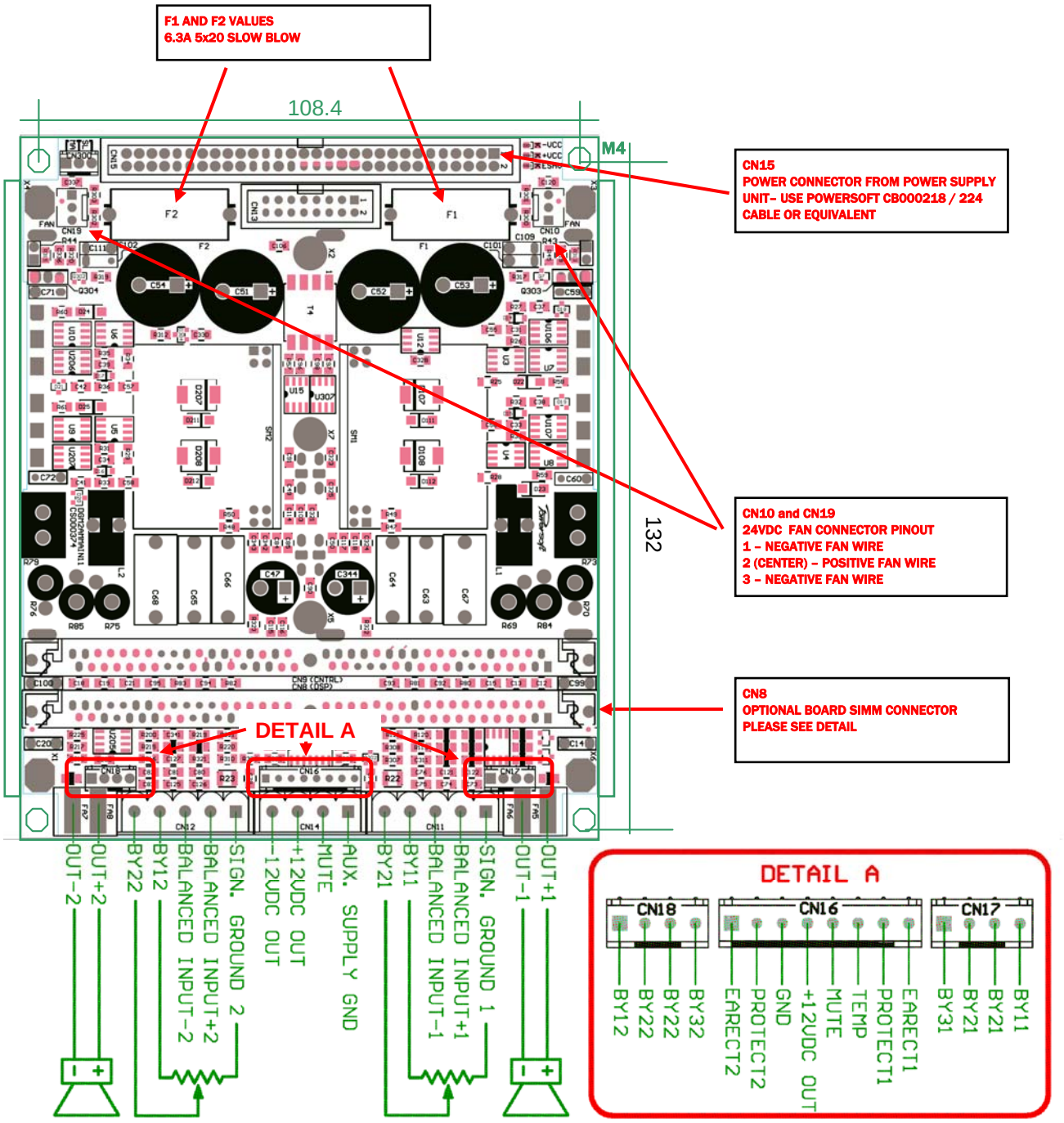
Note:
It is important to respect the connection indications.
Do not to reverse output signal of CH2 to maintain grounded negative output on CH2.
Damage of the unit may occurr in case of equally phased outputs.

Connecting Layout

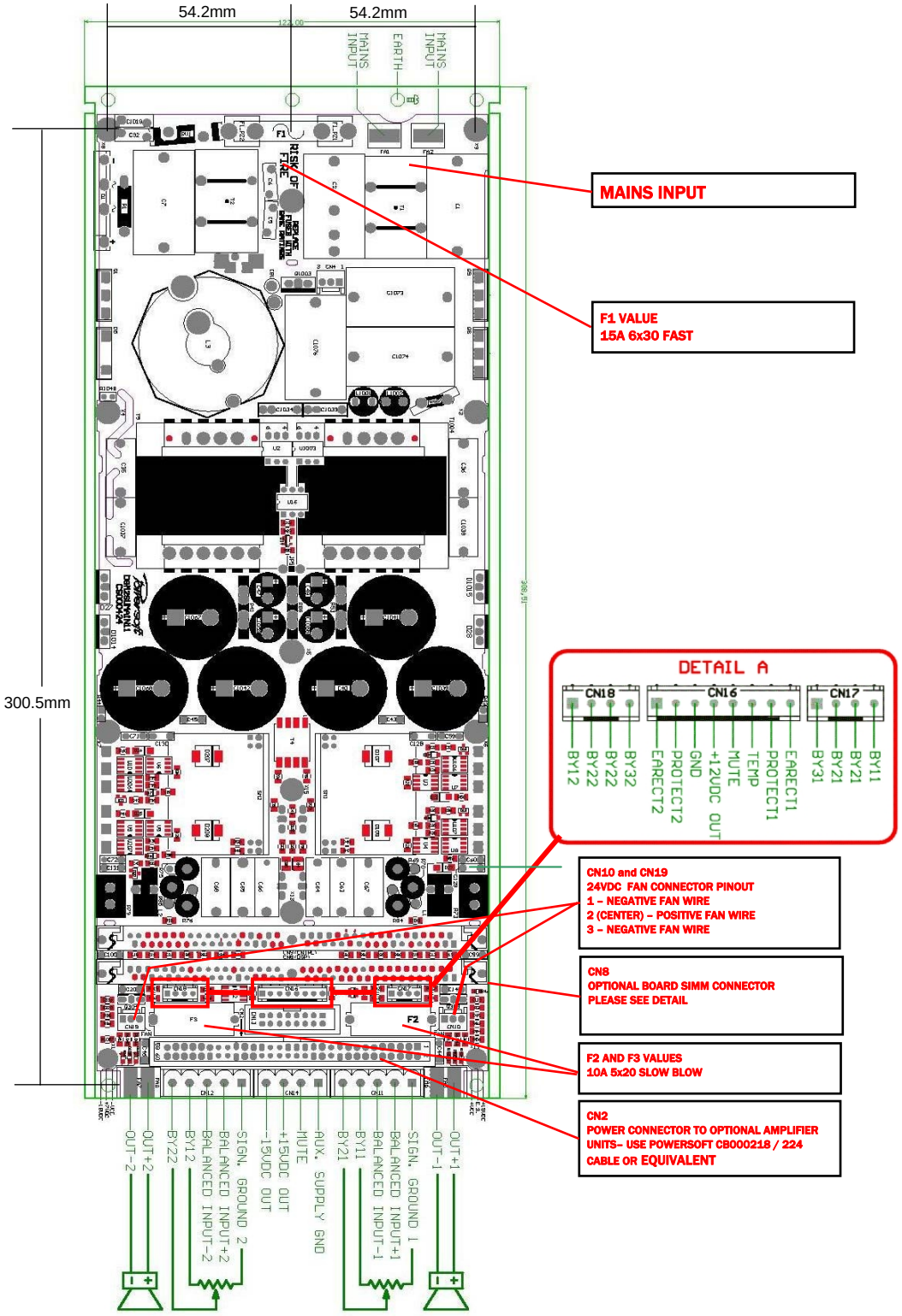
DigiMod3000PFC Power supply



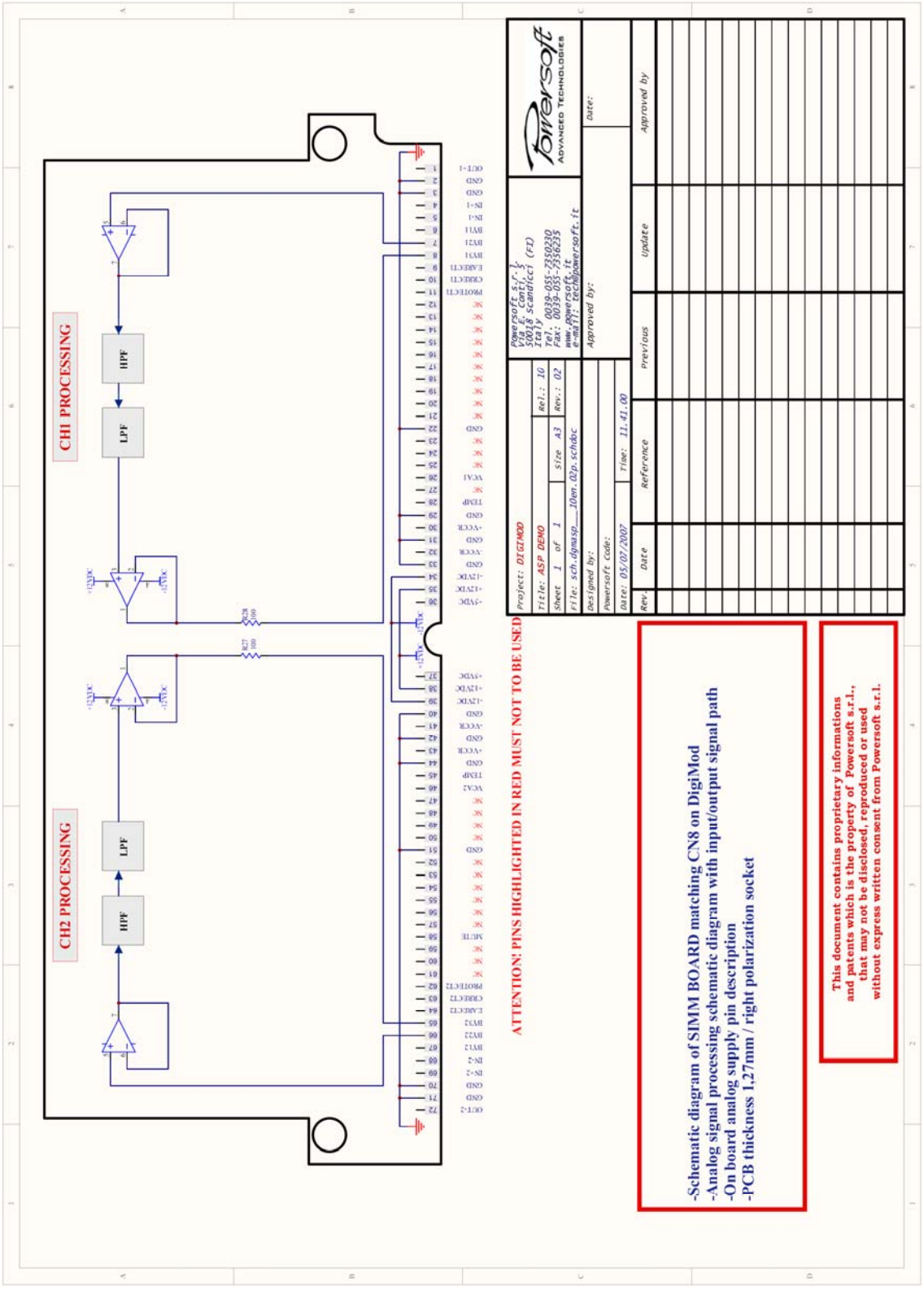
Connecting Layout
DigiMod 3000PFC Amplifier



Connecting Layout
DigiMod 3000PFCsu

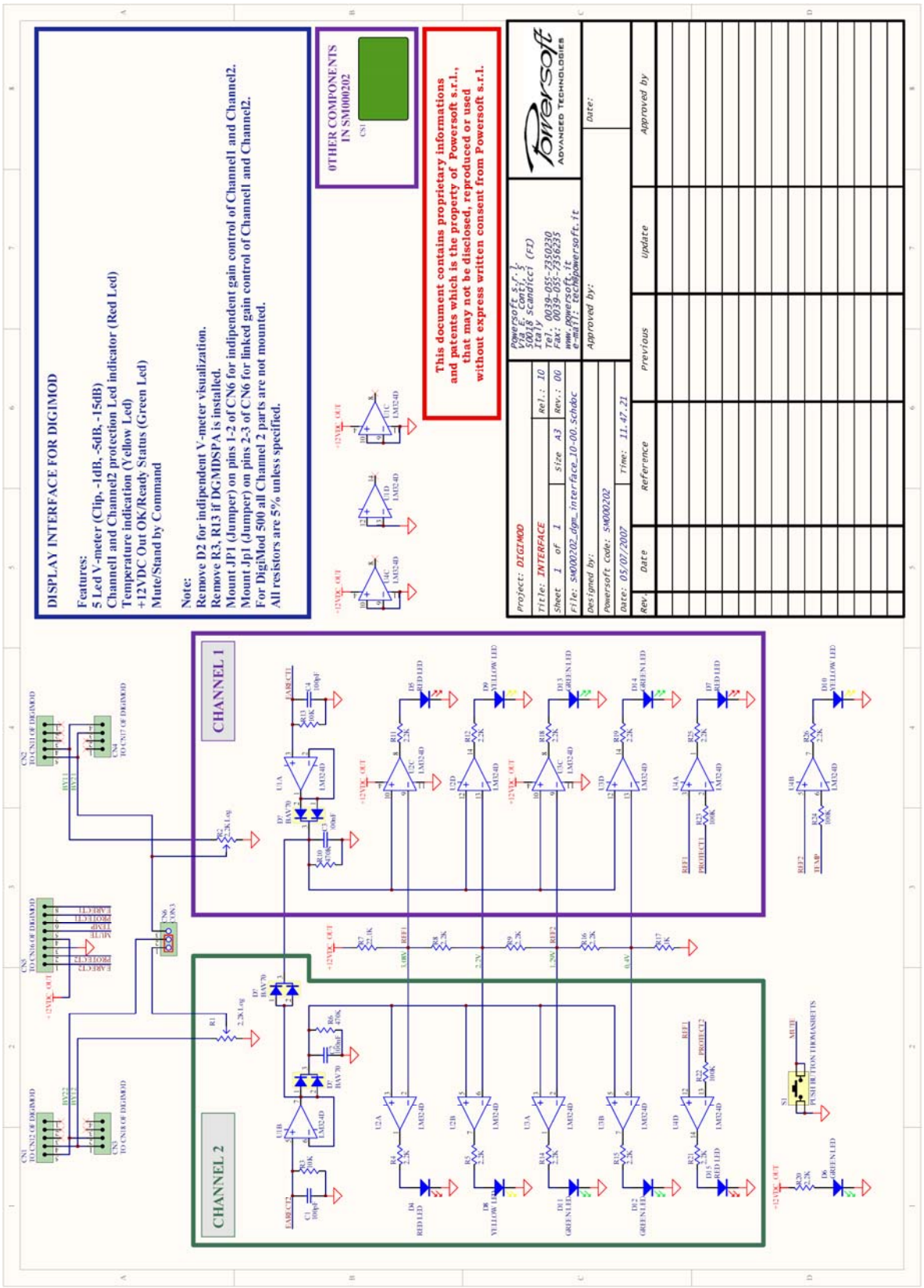


CN8 Simm Socket application
DigiMod 3000PFC / 3000PFCsu



CN11,CN12,CN16 interface board application

DigiMod 3000PFC / 3000PFCsu



DGMDSPA/DGMDSPB installation
DigiMod 3000PFC / 3000PFCsu

DGMDSPA or DGMDSPB installation consist in removing the jumpers located on pins 3,4 of CN18 and 1,2 of CN17.
Insert the DGMDSPA or DGMDSPB board on the only one spare simm socket on the main board of DigiMod amplifier module. Take care that side holders are correctly closed and the polarization is respected. Use two M3x6 screws to fix the board to the spacers.
The module is ready to work.