

## PA12CC

### Power Amplifier module with 12 pairs output devices

#### Features

- 1200W Power Amplifier module
- Class AB output stage
- Unique aluminium assembly profile
- Short circuit protection
- Thermal protection at 85°C
- Mute control
- Very reliable construction

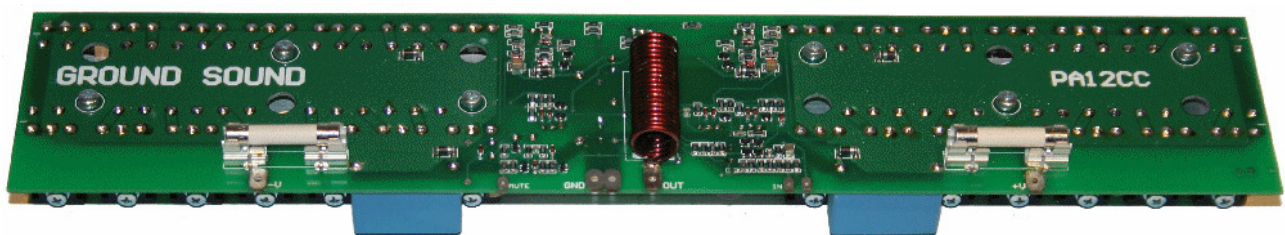
#### Applications

- High End Stereo
- Supreme Surround Sound

#### Description

PA12CC is a bipolar power amplifier of classical design working in class AB. PA12CC consists of a differential cascode coupled input stage controlled by a current generator. The input stage is totally discreet to optimize for linearity and bandwidth. The voltage gain stage is also cascode coupled, which is differentially symmetric in class A, to achieve low distortion at high frequencies. The output stage is of high current gain being an easy load to the voltage gain stage. The output stage consists of 24 pieces totally complimentary high speed high power bipolar transistors. PA12CC has short circuit protection, thermal protection and rail fuses to prevent output device break down. PA12CC features sonic excellence, constant low output impedance, low noise, low distortion and high reliability.

#### PA12CC Module



## Operating Conditions

	Min	Typ	Max	Units
Supply voltage	±30		±95	Volts
Recommended supply voltage		±95		Volts
Quiescent current	150	200	260	mA
Thermal protection			85	°C
Load	1			Ω

## Technical specifications

Measured with PSU12SA and TR1500, one module driven	Typ	Units
Maximum output power at 8Ω	450	Watts
Maximum output power at 4Ω	800	Watts
Maximum output power at 2Ω	1500	Watts
THD, 20-20kHz and 8Ω	<0,1	%
Power bandwidth	10 – 50.000	Hz
Slew rate	40	V/μS
Signal to Noise Ratio	>110	dB
Gain	23,5	dB
Input impedance	4	kΩ
Output impedance	<0,1	Ω
Weight	1150	g
Rail fuses, supplied and recommended	T20	A

## Power Supply

A symmetric power supply is required in the range from about ±30V to ±95V. A classical construction would be transformer 2 x 67V, bridge rectifier GBPC3506, 12 pcs 4700uF per module. Additional comments: The transformer should be rated about 800VA per module for normal conditions and remember that music has a crest factor of 10 – 12dB, which means peak power level of 400W is 40W average! Bridge rectifier GBPC3506 (rated 35A/600V) has lower voltage drop than GBPC2506 (rated 25A/600V) giving less heat generation. Our experience is telling us that the bank of capacitors is very important for the sonic excellence of sound. To get the best performance of any amplifier it is important to have very low ESR resistance. This is reflected in our own power supply PSU12SA. A rather strange assumption is that it is important with a very high rated transformer in VA and less requirement of the capacitors, when it's the opposite which is valid! The amplifier can't wait for a new portion of power from the transformer whether it's an iron or ferrite transformer, when it has to reproduce a music signal. It's much better to have a large capacitor bank with low ESR, just look at the peak and average power!

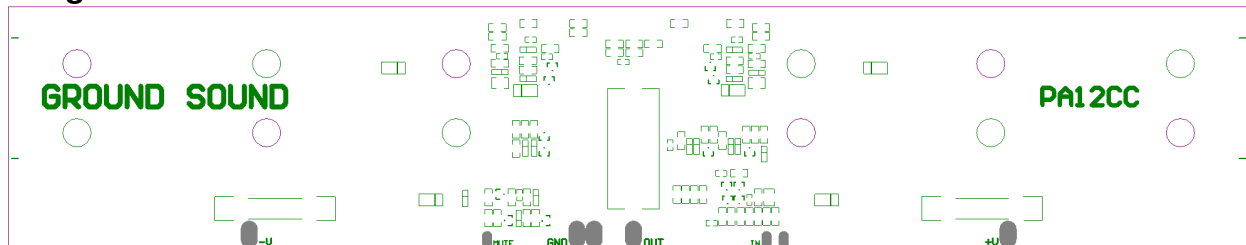
## Cooling

This amplifier module has a Class AB output stage, which will require cooling for uninterrupted reproduction of music. We recommend cooling capacity of around 0,2K/W for normal applications, but the requirement of cooling is very depending upon supply voltage, load and signal strength. Higher thermal resistance than 0,2K/W (less cooling efficiency) can be sufficient with recommended supply voltage, easy load (8Ω) and normal listening level. The output stage is low biased and does not produce much heat which has to be dissipated under normal conditions. In fact this amplifier has comparable efficiency as a Class D amplifier at normal conditions (dissipates equal amount of heat). Remember to put thermal conductive compound (silicon-free paste or goop if you prefer) between ALU profile and heatsink.

## Mute control

The mute control enables the amplifier when power ground (GND) is applied. It can be controlled either by a switch, relay, opto-coupler with transistor output or a transistor. It works like a **pullup** to ground as the mute circuit actually is at the negative voltage part of the amplifier. The opto-coupler with transistor output solution or a relay is the easiest way if you already got a control system and the isolation ensures that no ground loops are introduced. If a Ground Sound power supply is used it's simply connecting all amp mute pads with PSU mute with 0,2mm wire.

## Wiring



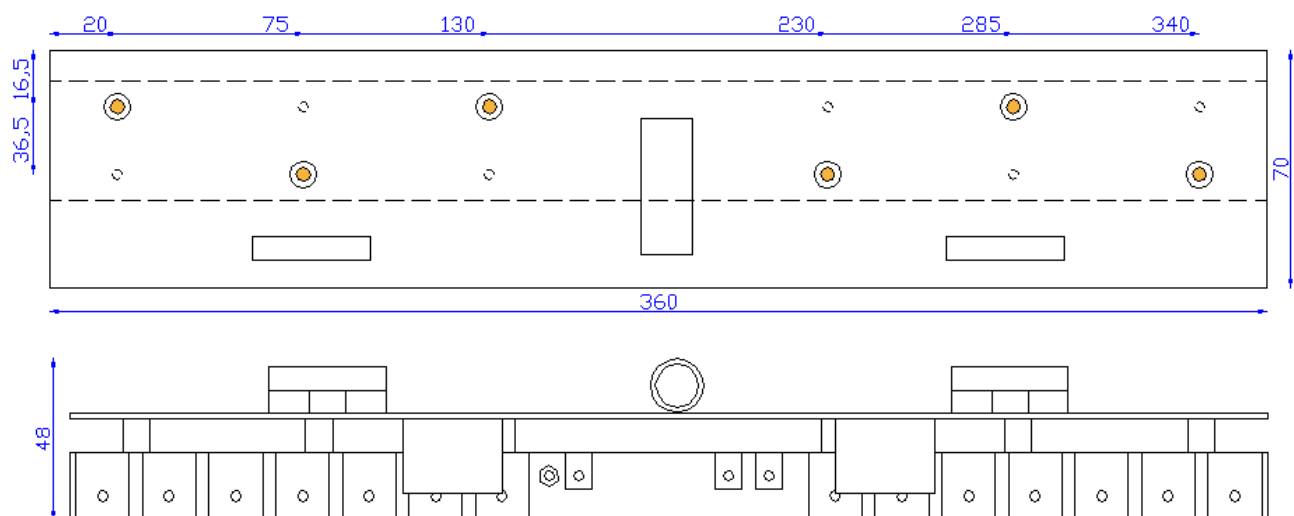
The power supply wires should be  $1\text{mm}^2 - 2,5\text{mm}^2$  multi core and recommended is  $1,5\text{mm}^2$ . We recommend that the three wires from the supply is twisted rather than using thicker cable because there is very little difference of resistance in this length of wire, but crosstalk between wires can degrade performance - enhancing hum and noise. The same recommendations apply for the output wires. To obtain a good performance for amplifiers, it's recommended to use star ground, which is placed at ground plane between the power supply's positive and negative capacitors. Usually one would take the output ground from this star ground, but that's not necessary as the "same" wire runs in the supply ground wire. It also ensures that the twisted output wires produce less hum and noise rather than the two wires running separately!

The mute control is only a control signal requiring a wire of  $0,2\text{mm}^2$ .

The input signal requires a good shielded cable to maintain low noise, but there is no need for big diameters as this is low current signal. The pad marked IN is the "hot"/signal (inner core) and the pad beside it is the signal ground (shield). Note that signal ground isn't the same as power ground - GND!

## Mechanical dimensions

PA12CC is to be mounted parallel to the heat sink. It requires 6 pcs 4mm screws + spring washer to secure module. Make sure that the heat sink / aluminium metal sheet has a sufficient even plain surface that will be able to transfer the dissipated heat.



## Remarks and Revision history

Ground Sound reserves the rights to make alterations without prior notice.

Please notice that Ground Sound will not be held responsible for any property damage. It's assumed that the customer is aware of the danger of high voltage and takes the necessary precautions to avoid personal injury and fully understands the consequence of dealing with high voltage.

Revision A: 2010-02-05

Revision B: 2010-07-30      Dimension drawing updated