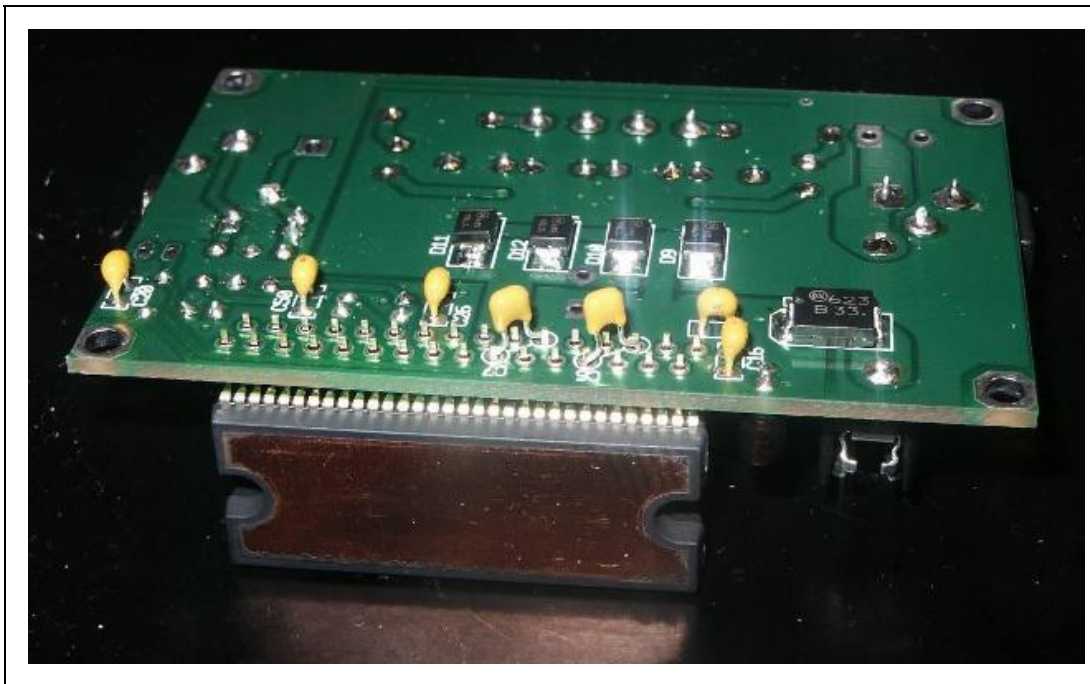
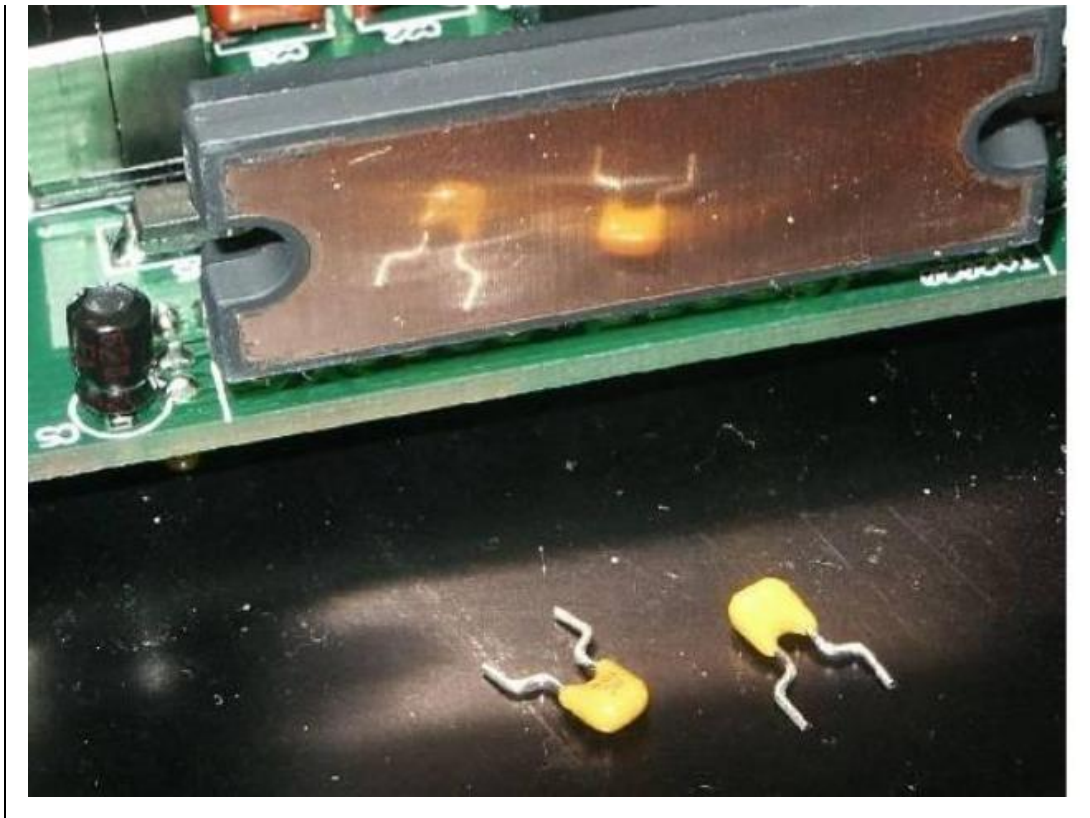


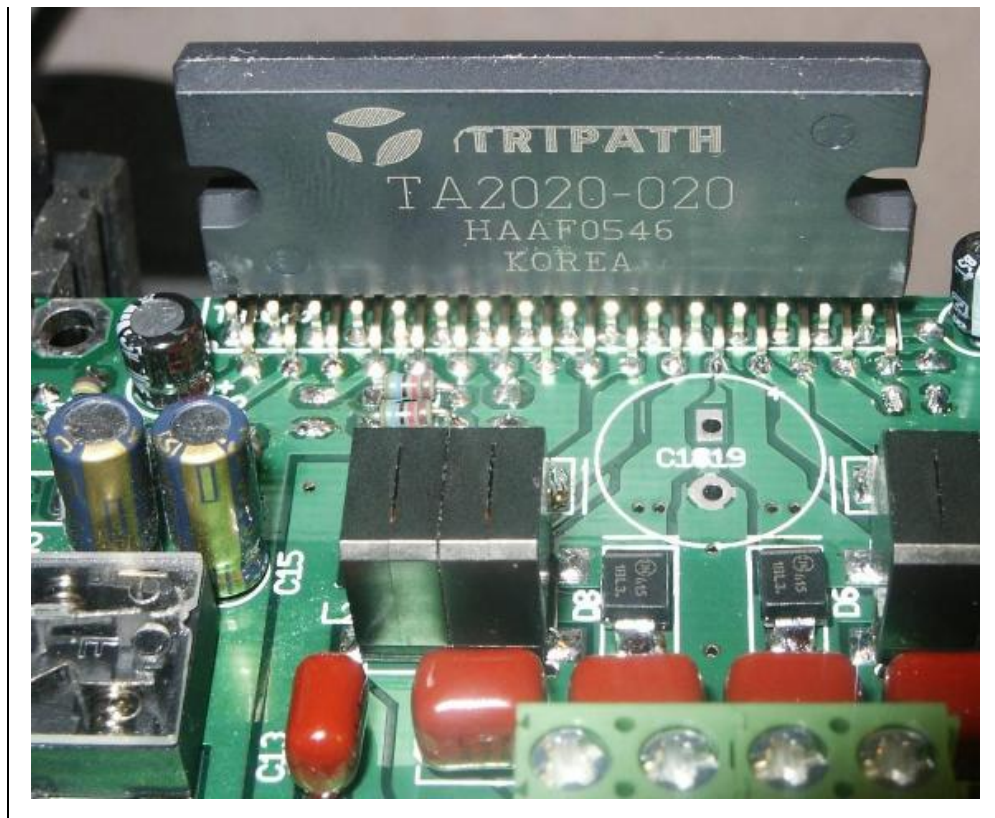
BAG 5, Contains all the components that should be handled with some ESD care.

(steps 1+2 might have been done at start, remember?)

So please discharge yourself before touching any of them. Avoid touching any of the Tripath chip leads with your hands.

1. Solder the 8 diodes in place (4x bottom, 4x top).
These have a polarity as marked by a band across them. They MUST be mounted in the right direction or there will be a short circuit.
2. Solder D1 on bottom side (right direction!)
It provides polarity protection for the power supply connection.
3. Almost done, now Solder the TA2020 chip in place.
Take care getting the chip straight and orthogonally to the PCB. Solder a few of the leads lightly and mount C6 + C7 in the holes indicated on the bottom side of the board.
You need to cut the leads of these capacitors before mounting them. It is essential to mount these capacitors as close as possible to the PCB. You will need to push them gently into place and then solder all of the TA2020 leads.
TIP
If space is too tight for you, you can solder the front row of pins of the TA2020 from the TOP of PCB side.
Make sure the solder flows well around the pins, so it comes out the other side of PCB.
4. Solder the C1819 capacitor from bag 4.
Make sure it is pushed right to the board so that the leads can not work loose.





Lastly, solder the loudspeaker connector block (*not with Sneaky*) and you are ready for testing.

For testing at low power no heat sink is required. For low to medium power applications the amplifier housing may be sufficient as a heat sink. For high power use like at full power into 4 ohm speakers, the amplifier can dissipate upto/abs.max. 10W of heat.

Then, a 3 or 4°C/W heat sink is reasonable (check pictures in amp6 forum). Running at medium or low power the amp will not dissipate a lot of heat. The heat slug of the TA2020 chip is connected to ground and does not require electrically insulated mounting (but recommended). Silica heat transfer compound or similar should be used to improve cooling (good connect to heatsink).

The mounting holes on the PCB are NOT connected to the ground plane (but check!). Pin 1 of J6 is grounded.

Powering up for the first time

Always de-power the amp before doing any work! Never connect or disconnect signal connector or speaker cables with power connected as this can damage the amp. The Sleep/mute jumpers are the ONLY exception.

The Tripath TA2020 chip is rated 16V absolute maximum.

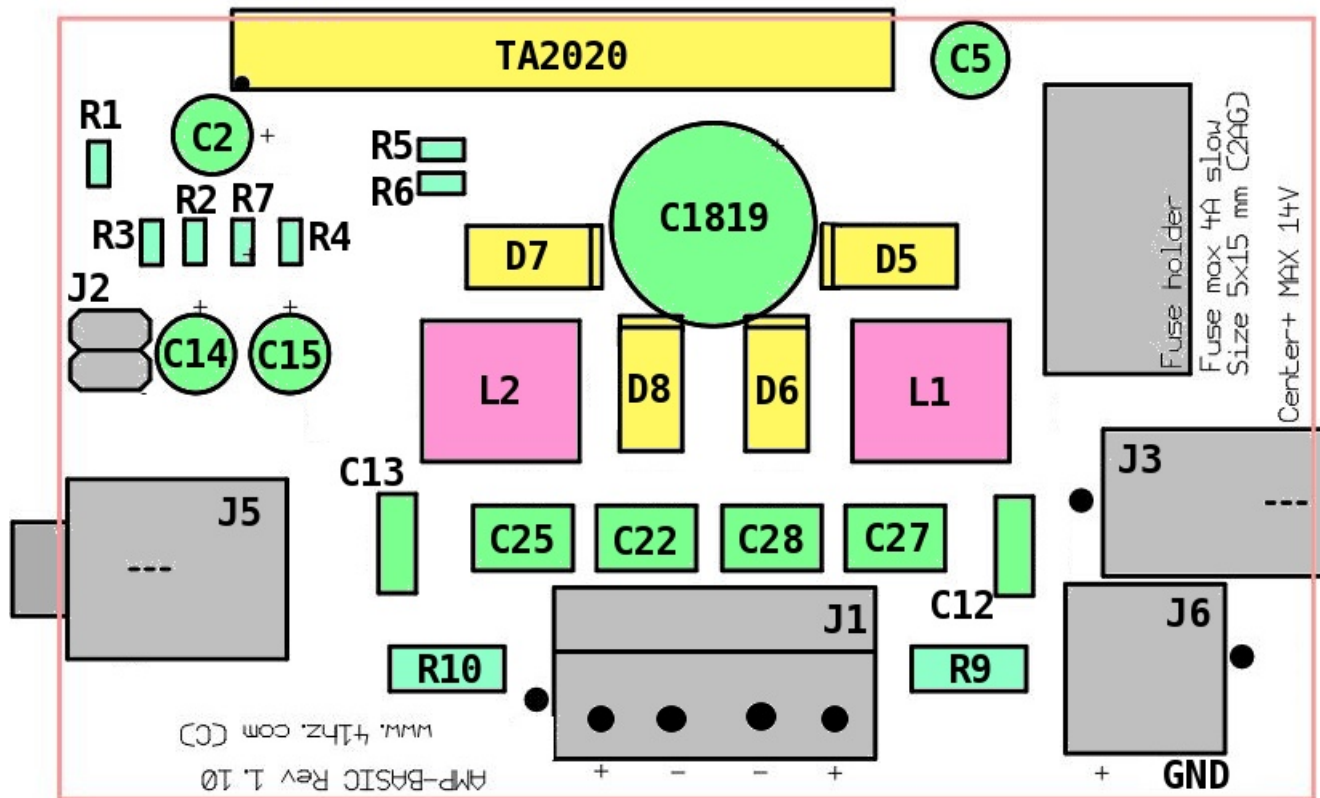
About 14.0V is a reasonable maximum (and wise) in real life, to allow for fluctuations. The center pin of the power supply connector J3 is positive (the 'plus').

- Before connecting the power, inspect the board closely for any solder splutter or other contaminations/dirt. Clean off everything that looks suspicious. Re-do any solder joint that does not look perfect.
- Remove the jumper from J2 (PCB 1.1 : closest two pins (line around them) to TA2020), if it is on there, to put amp in sleep mode.
- Connect the power supply. When in sleep mode, the amp should draw less than one mA.
- If all seems OK, connect the J2 jumper (rev. 1.1+1.2: closest two pins to TA2020) to Awake the AMP. Rev. 1.1+1.2: If all is OK, connect the MUTE jumper, J2, (the two pins closest to the output connections) as well (better is to mount a switch on your amp front panel instead of this jumper, but that can be done later).
- Check the fuse. If it has blown, shut off the power, disconnect the board and check all components and solder connections. Check that the Tripath chip heat slug is not hot.
- If all seems OK, switch-off power.
- Connect the speaker wires to J1. Important: the output is bridged, so each speaker should connect ONLY to its own respective plus and minus. The minus is NOT ground and negative is NOT common for the two channels and NOT common to the power supply minus/ground.
- Connect a signal source with its ground leads to J5, the 3.5mm jack
- Connect a signal source and set the volume very low
- Turn on the power, awake the amp and check if you get any sound.
- If everything seems OK, you can slowly increase the power. If all is OK, switch off power, replace the power supply fuse for a larger one, rated as for your transformer and try again with higher volume. For testing at higher power, the chip should be mounted on a heat sink.
- Enjoy the music!
- (sound should be OK, but will even improve after some (5-30) hours of playing time, don't push it hard in the first hour)

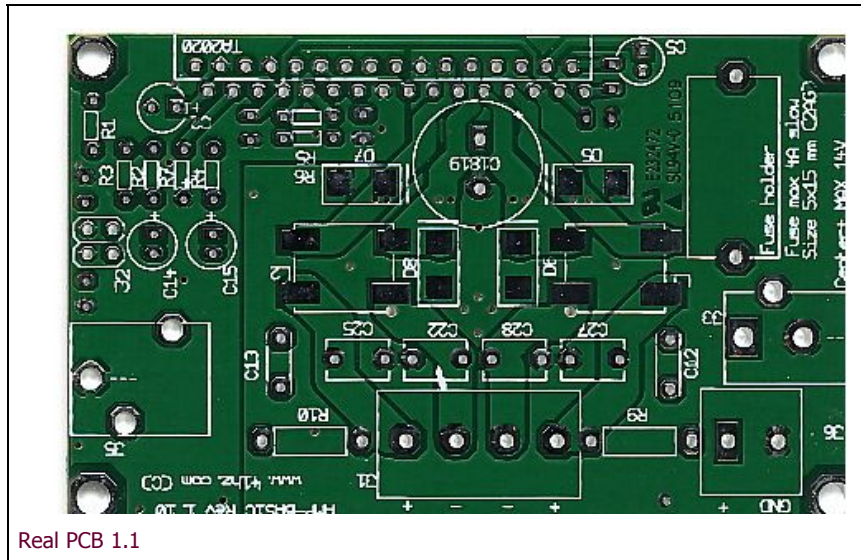
Also read *Troubleshooting*

Component placement and PCB. Rev. 1.1

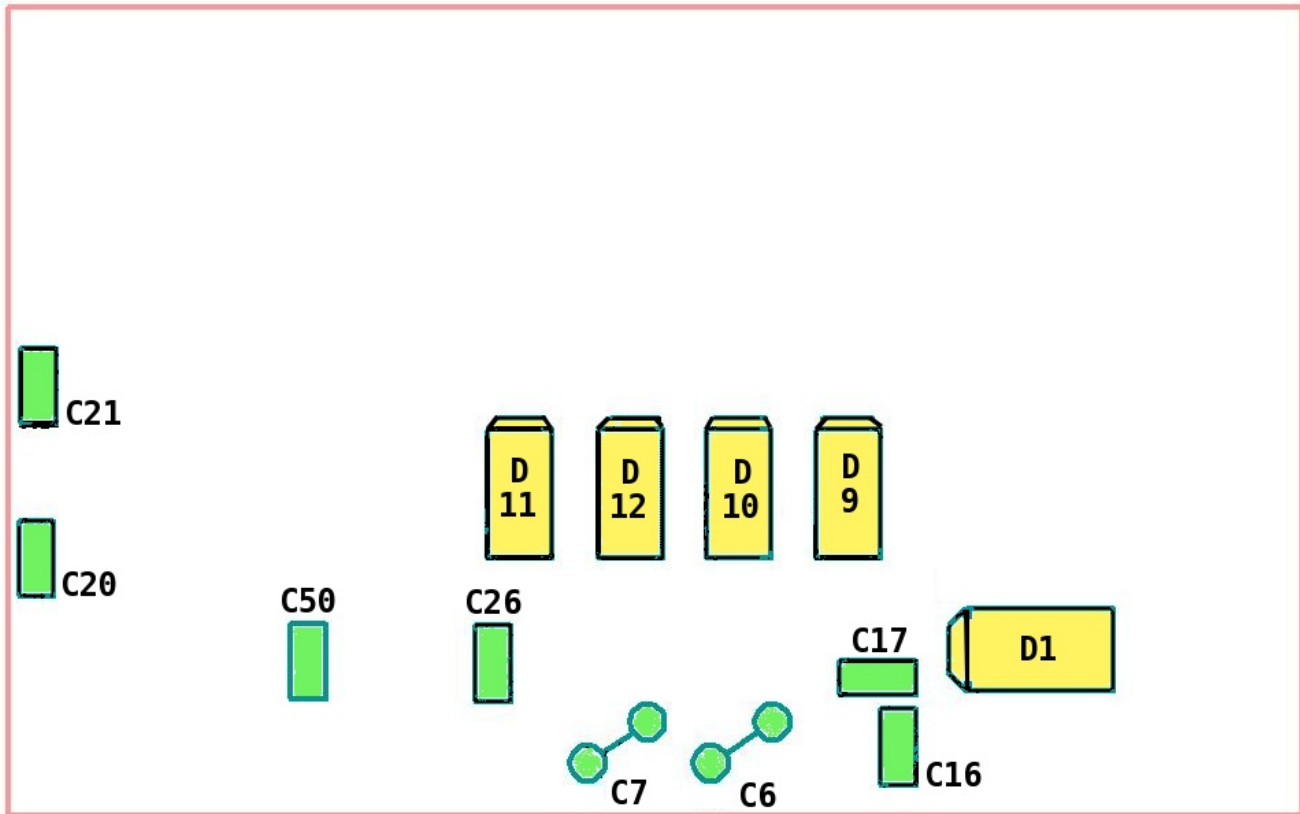
Top view



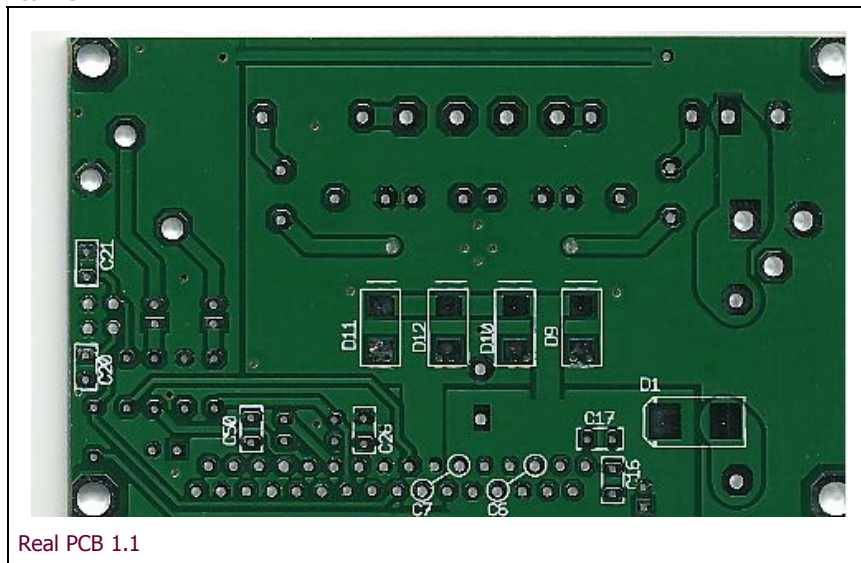
Real PCB:



Bottom view



Real PCB:



Real PCB 1.1

Connections

A 'Jx' is a jumperblock, can be 2 to 20 pins (1 to 10 pairs). So 'J2' has two pins on rev. 1.0, but four pins on rev. 1.1/1.2.

- J1, The Speakers connector block (*not with Sneaky*)
 - Pin 1 Out 1 +
 - Pin 2 Out 1 -
 - Pin 3 Out 2 -
 - Pin 4 Out 2 +
- J2 on PCB rev. 1.0, Place the jumper from J2 to Awake, otherwise amp is in Sleep mode (overrides un-mute)
- J2 on PCB rev. 1.1 + 1.2
 - it has 4 pins (sticking up from board), a line around each two pins (a pair)
 - ----1st pair-----
 - the two pins closest to the TA2020 (the BIG chip) refer to Sleep, an input

- when pins are connected (jumper on/placed), AMP is 'Awake', active/working (very low-power mode)
- -----2nd pair-----
- the two pins closest to the J1 (output-connections, for the speakers) refer to Mute, an input
- when pins are connected (jumper on/placed), AMP is UN-muted = active/working (unless still 'sleeping')
- It is NOT recommended to place/remove jumpers when the amp is powered: use a switch (or two). Switching Mute and Sleep/Awake is not useful; just leave on Awake and switch Mute.
- J3, Power connector. 5/5.5mm sleeve, 2.5mm center pin (*not with Sneaky*)
- J4, Not there.....
- J5, Signal input. Stereo 3.5 mm jack. (*not with Sneaky*)
- J6, Parallel to J3, cable/wire power connection/input

J1, J3, J5 'blocks/connectors' are not supplied with Sneaky, but connections ('pads') on PCB are there of course.

Rev. 1.2 PCB has new connection pads:

- 3pins within J5 'space' for a neat wire connection of input signals
- 4pins next to J5 for using the Overloadb + Fault status signals

Minimum requirements to build a working amplifier

There are some essential parts needed to turn this kit into a working amplifier:

- A suitable power supply, typically 12-14Vdc/4A, toroid 2x9Vac/60VA (2Adc or 30VA will suffice mostly on average)
- Heat sink (small), connectors

Additional components

The following will at some stage be needed to complete the amplifier, but is not included in the kit:

- Heat sink, screws and heat conductive paste to mount the heat sink.
In most cases, if you mount the Tripath chip to an aluminum amplifier casing, this is sufficient to cool the chip. The Tripath chip does not need to be insulated, as the back of the chip is internally connected to ground.
- Mute/un-mute switch.
A jumper on the board can be used to mute/un-mute the amplifier. Preferably wire this to a switch on your casing panel. Muting the amp before power on minimizes the turn on thump and is recommended.
- A power supply.
AMP6-BASIC is intended to be used with an external power supply or a 12V battery. The maximum recommended voltage is 14.5Vdc, with 12 to 14Vdc being more comfortable values. The recommended power rating (total) is at least 25W with 8Ω speakers and at least 50W with 4Ω speakers. The amplifier works with voltages down to about 9Vdc.
You can use power supplies with lower power rating, but the amplifier may not perform as well and the power supply may get overloaded.

Tweaks, Tips, Mods

Please be advised that this amplifier module is a 'core' module. So secondary circuits should be added, like a power-supply, input protection, output-speaker protection, volume control, etc.

Troubleshooting

Please read [Troubleshooting article](#) under *Tech Info, Building Kits*.

AMP6-BASIC revision history

- 1.0
- 1.1
 - Change in J2 (Mute+Sleep) + See notes at beginning of Building/assembly section.
- 1.2
 - A diode has been added to make the sleep mode work properly, so you can use both sleep and mute. In sleep mode, it uses less than 1mA
 - Output and LED for error added. It turns high/on, on errors like overtemperature, overload etc.
 - Input overload pin (ovrldb) added. It turns LOW if the analogue input signal is too high. This output can not directly drive a LED, you would need to add one transistor to drive a LED. A P-channel logic MOSFET can easily be used to invert the logic, turning ON a LED when input is too high. One LED, one small MOSFET and one resistor is needed to implement this. (like 5.6k+2N7000 ed.)
 - Another type of fuse holder is used, that can take both US 2AG sizes and European 5mm size fuse.
 - Polarity protection diode footprint now allows both SMC and D-Pak diode sizes.
 - Various drill hole sizes are now better adapted to fit the actual components.

Categories: AMP6x

3 Comments



RalpH_himself - 12-Oct-10, 14:06

[Reply](#)

R1.2:

- * what about J10?
- * where to place the included LED?
- * C21 apparently has become C200



FFF - 12-Oct-10, 15:06

[Reply](#)

Gimme some time please? ed.

For now: only Fault-pin can pull a LED, trace an outer pin to the TA2020, to see where it is connected.

If R8 and R11 (for J10) really are 930k ohm and not 930 ohm, then a LED won't light up. Check those first.

When 930k ohm, you need a driver circuit...like with a 2N7000. For both Fault and Overloadb.



Jan - 12-Oct-10, 15:12

[Reply](#)

Please see the latest schematic, uploaded a day or two ago. Fault can drive a LED (one) directly, but then remove the one on the board just in case.

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