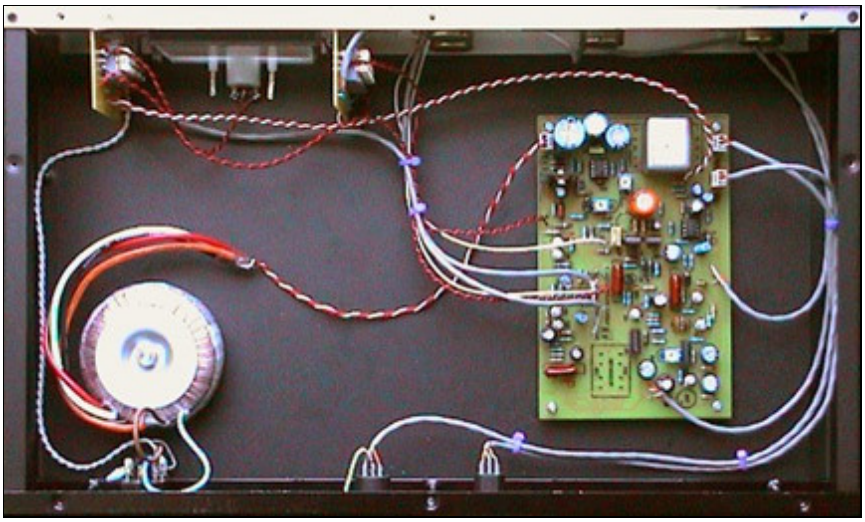
Back to Main 1176 Page

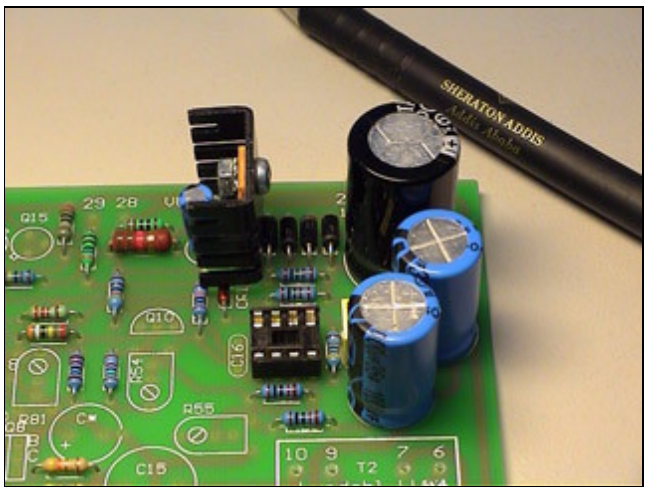
15 October 2004
modified 9 January 2005
revised 31 January 2006



Wiring the 1176LN Clone

Keeping the Hum to a Minimum

There's a feeling of satisfaction you get when you finish stuffing a board as if your project is nearly complete. Ignore that feeling - there's still a lot to do!



Before you get started there's something I would advise you do preferably before stuffing in the transistors and ICs. *Build up the power supply first and test it.* The power supply sits in the upper right-hand corner of the Gyraf/mnats board.

It shouldn't matter too much if you've put in some of the other components, unless something is drastically wrong with your power supply. But try to stick with building up the power supply first. The only semiconductor you should have installed is the 24V voltage regulator - the 7824.

The components you need to have in place are as follows:

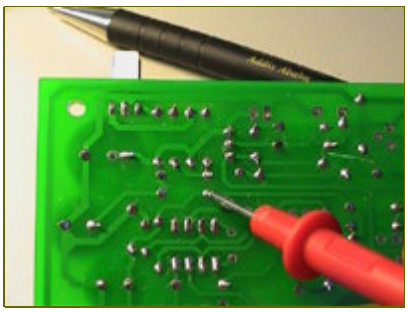
- R85
- R86
- R87
- R89
- C23
- C24
- C25
- C26
- VR1
- CR6
- CR7
- CR8
- CR9
- CR10

The components are clearly legended on my boards with the component identifications above. If you are using a Gyraf Rev 7 board, you'll need to refer to the schematic to identify the parts you need and correspond them to the

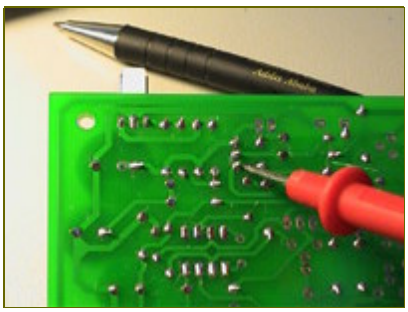
component values on the board.



Add a 90ï¿½ 3 way pin to the three transformer inputs labelled 24 - 0 - 24 as pictured on the right. Wire a 3 way header to your AC power transformer secondary. The middle wire goes to the transformer center tap and the other two go to either outside pin. Which of the other secondary leads goes to which pin is unimportant. Just make sure all three leads are connected. I'm sorry that I cannot give specific details about wire colors etc as each transformer uses a different color code. Look here for Mark Burnley's most perfect explanation of wiring a typical power transformer (hosted by DIY Factory). Example 3 of the linked .gif file is the configuration that applies to the 1176. Plug the 3 way header into the 3 way pins and power up the transformer primary from your wall socket. Be sure you have wired a fuse to the primary in case there is a problem!



With the negative lead of your multimeter connected to a ground point (the square pad underneath the output transformer on my mnats board is a convenient spot) *and your multimeter set to DC and 50 or more volts,* touch the positive probe to the point indicated on the image on the right. You can click on the image to see a larger version. You should read approximately negative 10 volts at this point. If so, go to the head of the class.



Keeping the negative probe on the ground, move the positive probe to the point indicated in the next image. Though it is the 'bottom' lead of the 7824, for some reason this point is labelled "2" on the UREI schematic. You should have +30 volts at this point. If so, proceed with stuffing the board with the remainder of the components. You can be fairly certain that your board won't blow up unless you stuff things the wrong way around or have shorts elsewhere. Double check the voltages on the IC sockets before plugging in the chips.

Wiring the 1176 clone is fairly straightforward and the schematic actually contains most of the information you need. Deciphering that information can be troublesome though. I'll try to provide images to match the relevant and important parts of wiring your 1176 in order to minimize hum.

Central to the idea of eliminating hum from your clone (or any electronic equipment you design, build or repair) is the idea of eradicating ground loops. Ground loops occur when two or more paths are allowed to the electrical ground (also called neutral or earth). When wiring the 1176 you'll want to make sure only one end of your hookup wire is attached to ground. Hopefully this concept will become clearer as we go on.

Shielded cable is suggested to wire certain parts of your 1176. Both one and two conductor shielded cable can be used - each has a specific place where it would be more suitable but a two conductor can be used in place of single conductor cable. If you only have one conductor cable you'll need two lengths to do the job of a two conductor cable. Note that even though the convention is to call it "two conductor" cable the shield, in fact, conducts too meaning there are actually three conductors!

For my examples I've used Canare L-2B2AT, a good multipurpose hook-up wire.

The images will link to larger versions to provide a closer view of the action. Note that I have used no less than three main boards and both the Revision F and Revision G in the images where deemed appropriate. As a side note, please forgive the quality of the images - I shot them with my Sony DCR PC100 "Megapixel" Digital Video camera, clearly not the best for still images but very quick and dirty.

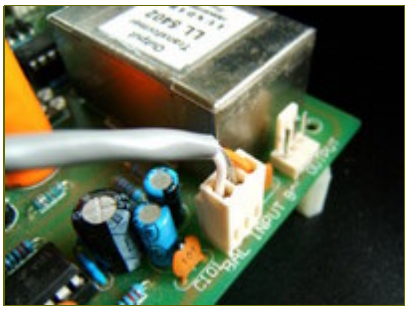


Starting at the input jack, use a two conductor shielded cable and twist and solder the shield wire to another short piece of hookup wire. This will become the one and only point at which the electrical ground of the main circuit board connects to the chassis of your unit. Connect the pair of wires to terminal 1 of the XLR jack.

Connect the opposite end of the hookup wire to one of the mounting screws of the jack. You may want to use a crimp "eye" here or solder lug as I did for a mechanically reliable electrical connection. Terminal 3 is soldered to the white wire and terminal 2 to the orange wire.

You'll need to wire the input jack to the main board in either of two places, depending on which option you have chosen. If you have decided to build the electronically balanced version, which uses IC2, use option A. If you are using either an OEP or Lundahl **input** transformer, use option B.

Input Wiring Option A (electronically balanced input)



When using the opamp balanced input circuit, the other end of the input cable is connected to the main board at the BAL INPUT pads located near the output transformer. Pay attention to the polarity! In my example, I've used three way pins and headers to attach the cable to the board end. I did this primarily because the headers easily and effectively isolate the three wires from each other even though they are only 0.1" apart. You can solder the wires directly to the board as well but you need to make sure the insulation runs flush to the board to avoid any shorts between them.



Now strip a piece of two conductor sheilded cable and solder it to the input pot (input gain on the Gyraf layout) pads. The schematic shows that shielded cable is used here and that it is connected to the ground at one end and to the potentiometer at the other. Note where the shield goes. The wiper (middle lug on the potentiometer) conductor is the middle pad which I arbitrarily designated to the orange wire.

Already we can see that there isn't another practical reason to use pins and headers like in the previous example. The pads here are 0.2" apart so you would need a different connector if you were to make them all removable. Also, since they are 0.2" apart they aren't nearly as prone to shorts as the 0.1" separation of the pads in the input connector.



The opposite end of this cable goes to the input potentiometer. Be sure to wire the shield to the correct terminal. The orange wire goes to the middle (wiper) lug and the last wire goes to the lug opposite the shield. I used small pieces of clear heat shrink tubing to prevent accidental shorts and for a cleaner

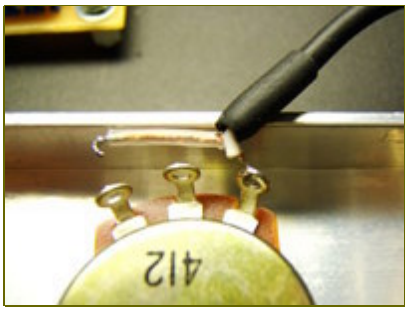


look. You should try to find pots with eye lugs rather than the PC mount ones I used. Ideally, the wires should be mechanically secure before they are soldered. It is bad practise to rely on solder to secure the wires to the terminals. Wrapping the wire around the PC pins would have been a good idea here...however, this isn't intended to be a soldering tutorial.

Input Wiring Option B (transformer balanced input)

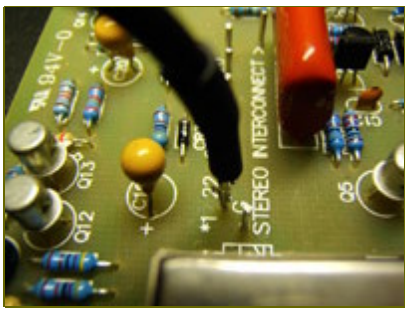


If you are using the transformer balanced input (either Lundahl or OEP), you will need to connect your input jack to the OPTIONAL IN pads located near the input transformer. Pay close attention to polarity, which is marked on the board. Convention states that pin 2 of the XLR jack is "hot", or positive and that pin 3 is negative. The shield connects to the pad marked 0 on the board.



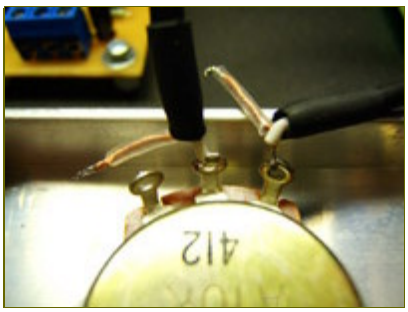
Using a single-conductor shielded cable, solder the inner conductor to the clockwise lug of the input potentiometer. Try to expose as little of the inner conductor as possible.

Strip back enough outer insulation so that you can reach over to the opposite lug (where the shield will eventually connect). Cover the shield wire with shrink tubing to prevent shorts.

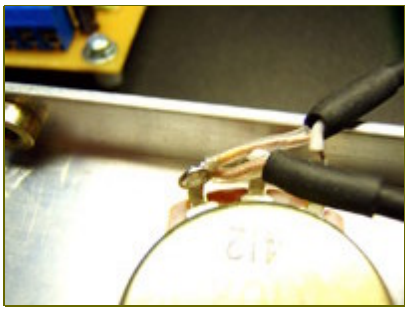


Strip back the outer insulation on the other end of the wire and cut back the shield so that only the inner conductor is exposed. Put some shrink tubing over the place where you stripped back the outer insulation so that there is no possibility of the shield touching anything on this end.

Attach the inner conductor to Pad *1 located right near C19 and R*1.



Solder another single-conductor shielded cable to the wiper of the input pot. Use a similar technique to the first wire, exposing as little of the inner conductor as possible within reason.



Now solder both of the shield wires together on the counter-clockwise lug of the input potentiometer.



Finally, solder the remaining wires from the input pot to the main board as shown.

Remember that Pad 1 at this location is kept unconnected for the transformer version as you used Pad *1 instead to connect to the clockwise lug of the input pot.



From here, you can go on to continue wiring my pushbutton version or go to a draft version of my rotary switch version wiring page:

Go to the pushbutton wiring page >
Go to the rotary switch wiring page >