Musical Concepts

PasPro 1

Vacuum Tube Modification for Hafler DH-101 Preamplifier

Thank you for purchasing the Musical Concepts PasPro 1 modification. The PasPro 1 is the result of many years of careful listening. The PasPro 1 uses parts specifically chosen for their extremely musical qualities. PasPro 1 is a professional level product with many precision parts. The sound quality you are about to enjoy has been achieved through careful engineering and careful listening evaluation. You are about to turn a decent solid-state preamplifier into a vacuum tube preamplifier comparable to any.

APPLICATION

This modification is designed for the Hafler DH-101(DH going forward) preamplifier or your choice of a custom chassis. Dedicated constructors with moderate experience can install and set up the PasPro 1. Installation in a custom chassis is for the experienced builder who can work with a simple diagram and schematic though schematic interpretation is of minor importance. PasPro 1(PP1 going forward) simplifies installation with very informative silkscreen labels on all I/O "ports". PP1 installations should be undertaken only by self sufficient builders. Musical Concepts cannot offer assistance for installations. We offer to repair installations only if the original parts are used in the construction of the PP1. If you choose a custom chassis for your PP1 we cannot service it though we can service a detached board.

CIRCUIT DESCRIPTION

The first stage of the PP1 phono stage has a grounded-cathode amplifier circuit first stage using the 6DJ8 / 6922 / Russian 6N23P tube family. Carefully chosen film and electrolytic capacitors are used in your PP1. The first stage is followed by a passive RIAA equalized filter circuit. The second stage is a grounded-cathode amplifier yielding a total gain of 34-36dB. That gain figure takes into account that this is a feedback-free circuit so one cannot pin the gain figure to an exact number. It is directly dependent on the mu(gain) of each tube. Obviously matched tubes are strongly recommended.
The PasPro 1 line stage is a single stage grounded-cathode amplifier with about 24dB gain. That is correct, there are only three amplifier stages, making the PasPro 1 an incredibly straightforward design. All tubes are the 6DJ8/6922/Russian 6N23P type. There are many variants to this tube type. Most can be used as long as the heater current is not exceeded.

DO NOT USE THE RUSSIAN 6N1P TUBE! The 6N1P is a fine tube, but it isn't compatible with the PP1 design. The 6N1P requires twice as much filament current as the recommended tubes. That will exceed the current capability of the heater voltage regulator. The circuit may fail to start up or automatically shut down to protect the voltage regulator.

OUTBOARD POWER SUPPLY

Our Musical Concepts **PS1** outboard power supply enhances sound quality. PS1 employs a quiet transformer design resulting in a lower-noise soundspace. PS1 is fully assembled and tested. It makes installation a snap since you do not have to work within the tighter preamplifier chassis to install an inboard power transformer. You will experience a quieter, more transparent soundstage, excellent image focus and gradation of dynamic range. Your preamplifier chassis will run cooler too. The **PS1** works with the PP1 board without regard to the chassis employed for installation.

PasPro 1 MINIMALIST DESIGN

You will lose the following functions:

- Tone Controls/ Tone Button - no longer functions(Tone can be used as Mute button)
- Balance Control - **if you choose** our Alps volume control installation
- Phono 2 Input - **if you choose** to convert to single Phono input for better performance
- Processor Loop - **if you choose** to eliminate it for better performance
- Power Button - **if you add** the PS1 outboard power supply

DISCLAIMER

Musical Concepts accepts no responsibility for damages, direct or consequential, resulting from this modification. The user solely determines his or her own ability to properly install this product. Musical Concepts accepts no responsibility for personal injury or death resulting from electrical shock hazard. **High voltages are present in this product and all cautions regarding such working conditions must be observed.**

SOLDERING

We recommend soldering experience before attempting this mod. We remind veterans to use **fresh** rosin core solder. Eutectic alloyed solders are absolutely recommended. We provide eutectic rosin core solder in this kit. **Some "audiophile" solders that we have evaluated will devastate the sweet delicate sound of the PP1. Be a "solder genius" before substituting solder. Do not use acid core solder - it will ruin the circuit board and we will not accept it for repair.**

TOOLS

3-prong, grounded 25 to 45 watt soldering iron--never use a solder gun, fresh eutectic alloy rosin core solder(provided), electric hand drill, 1/8" or 9/64" drill bit, stout needle nose pliers, diagonal cutters, wire stripper, screwdrivers(Philips #1, #2 and flat), miniature flat blade screwdriver, ¼ and $^{9}/_{16}$ inch nut drivers (optional), 1/16" & 3/32"" Allen wrench, DMM(digital multi-meter), deburring tool like file, large drill bits or Dremel tool

INSTALLATION INSTRUCTIONS

We recommend that you read through the instructions completely before beginning the modification to determine if you will need the assistance of an experienced friend or professional installation by Musical Concepts. TIP: To deburr a hole you might use a Dremel tool or a much larger drill bit for a drilled hole.

INVENTORY: See Page 12 - appendix is for unassembled kit and as a reference for full kits.
PROCEDURE: As you complete each step, to save your place, you may wish to check it off like so > 3.(✔)

PREPARING THE HAFLER CHASSIS

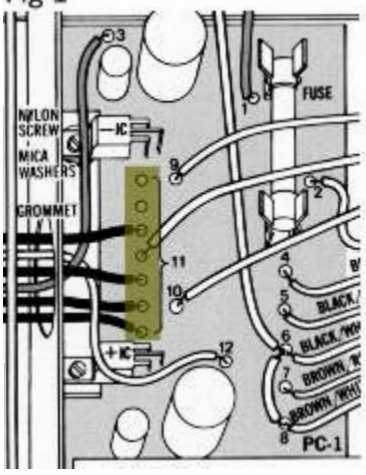
1.( ) Turn unit off, disconnect AC cord from wall socket and unplug all connecting cables.

>>>>>>Find a clear working table with good lighting. Collect your tools, soldering iron and desoldering aids.

2.( ) Remove all screws holding the top and bottom covers in place and remove the covers. A flat-blade or Philips screwdriver will be needed. A 1/4" nut driver is the handy tool here if stock hardware is present.

3.( ) READ COMPLETELY THRU FIRST: The **DH-101(DH) faceplate may have a third attachment point.** Remove nut behind the front sub-panel if present. Next remove the front panel knobs. A 1/16" Allen wrench is used for the set screws. Under the knobs remove the large flat nuts holding the front panel in place. A 9/16" deep socket is the best tool. A closed end wrench might be used. Some volume controls may have a larger or sheet metal nut. If you don't have a correct tool you can carefully use stout large needle nose pliers. **Don't scratch the panel.** Now with the panel totally loosened remove it and set it aside with the knobs, nuts, screws, bottom cover and lid. Keep all the hardware safe from Fido, young children, etc. to avoid scratches.

Fig 1



4.( )**If you have decided to use our PS1 power supply** you can skip the next paragraph. For the PS1 you would have to: Remove and replace the power cord with an umbilical cord. You could leave the transformer and power supply board in your DH-101. The umbilical cord will connect directly to the PP1 PCB power supply connector J201.
If you want to use a new internal power transformer then you should remove both the original power transformer and the regulated power supply circuit board, PC-1. Clip all of the ground wires at eyelet 11 on top and bottom, Fig 1, leaving them the full length for now. Clip other wires at the PC-1 ends only as needed to remove the board and transformer together. Remove the two screws/nuts holding the voltage regulators +IC and -IC in place and a third screw/nut at the front edge of the board. Remove the two nuts holding the power transformer. You can remove the transformer and board as a unit without cutting/desoldering anything more.

Decision Point: The Hafler DH-101(DH) has two phono inputs. For **minimum** distortion and noise wire **Phono 1** RCA jacks directly to PP1 board phono inputs. **Phono** inputs will be stripped of the lengthy wires, switch contacts, cross talk, etc. Engaging **either** the front panel **Phono 1** or **Phono 2** selector can then select the Phono 1 input.

5.( )If you are keeping two phono inputs cut the wires connected at 1R/2R and 1L/2L underneath PC-4 by cutting them flush. These eyelet labels are “printed” in circuit foil on the underside of the Hafler PC-4 board. If you are adopting a single phono input approach cut all the **insulated** wires from the **Phono 1** and **Phono 2** RCA input jacks. Follow to where these are connected at the **Phono 1** and **Phono 2** switches and clip them off those switches. Two wires will remain connected to the Phono 2 switch. Clip phono cartridge load caps off the connectors from each RCA hot to RCA ground, labeled 220 in figure 8.

6.( )Now clip the wires flush on the top side of PC-4 connected at 3R&L and 9R&L. Do not cut from their destination ends. These will be reused to install the PP1.

7.( )We strongly recommend that you disable the ‘processor loop’ for the same reasons as the dual phono inputs, to minimize noise and distortion. If agreed you must completely clip out the wires between the the ‘FROM’ jacks that also terminate at the 4R&L eyelets on PC-4. Cut the wires loose from the ‘TO’ RCA jacks(R&L). If you are using a provided volume control then also clip or desolder them at the other end, the mono switch. If using your own volume control then you must decide on clipping them. This same pair of pins on the mono switch will later connect to the volume control.

8.( )Locate the TONE switch. Clip all the wires at the TONE switch. The clipped wires can be fully removed with PC-4 later.

9.( )Remove the nuts holding the original **Volume/Balance, Bass** and **Treble** controls to the front sub-panel. Pull the wires connected to eyelets 10, 11 and 12 of PC-4 through the power supply partition. Remove PC-4 now. It should easily be removed.

10.( )Carefully remove the LED from PC-4 for use with the PP1 **or** leave it on the board so you’ll remember where it is.

Physical preparation for installation of PP1----------

11. ( )You will need the power drill and a 1/8” or preferably a 9/64” drill bit. The 9/64” hole size will simplify alignment later when you install the PP1. You will need to drill three holes in the bottom lip of the chassis to install screws with standoffs. This is how you will install and secure the PP1 main board. The installed three standoffs will stand upward from the bottom lip with the head of the screw against the bottom lip. You can fit the PP1 board over the screws, install a nut and secure it in later steps. Turn your DH chassis ‘upside down’ and mark the holes for drilling while referring to the exact locations on the 1:1 pictorial, Figure B. The hole locations correspond to MH1, MH3 and MH5 mounting holes on the PP1 board. It might be best to take scissors and cut out the board illustration at its borders for this. Do it by the numbers if you like. Work how you’re comfortable. When you’re certain you have located the holes precisely drill holes at the marked locations. Now use your preferred method to deburr the holes - Dremel, much larger drill bit, file, etc.

12.( )While you have that drill handy and the chassis is kind of empty we will drill a hole in the power supply partition surface for mounting the heater voltage regulator later. It’ll make a great heatsink. The partition is aluminum so drilling the hole is easy but you might be working at an angle. It makes it easier if you put the hole nearer the top of the partition. Pick a spot, around 1” back from front of the partition about 1/2” down from “top”, near the location where you will terminate the voltage regulator wires. See step 17. Drill a hole and deburr it. The drilled area must be perfectly flat. Sand it if not sure.

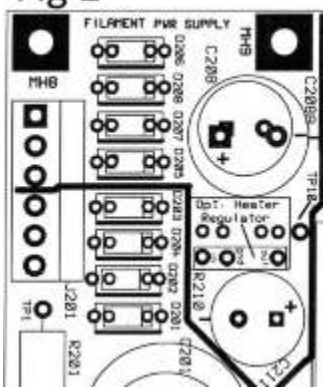
13.( )When you finish the mod the bottom cover will be deformed by these new screw heads when it is installed . This is easy to fix. Install the bottom cover. Square it up to the chassis. On the inside mark through the newly drilled holes against the bottom cover. Now remove the cover and drill it out with a 3/8” drill bit, slice with metal snips, etc where you have made the centering marks. Deburr, flatten the holes/cuts. Now when you install the bottom cover it will fit flush. If you skip this step until later it will add difficulty.

14.( )Select three 1/4” standoffs, three #4 x 5/8” screws and three #4 inside star lock washers. Put a screw in one of the newly drilled bottom lip holes from the “outside” of the preamp. On the inside slip a #4 lock washer over the screw and then spin on a standoff. Just loosely finger-tighten it for now. Repeat this at the other two newly drilled holes.

15.( )Take your PP1 board and slip it over the three screw shafts making sure it fits nicely and that none of the screws sit at an angle compared to the chassis. If this happens you might have to enlarge a hole or two with a slightly larger drill bit or a rat tail file. When it’s all aligned you can tighten each screw from the bottom. Hopefully this doesn’t bind up the board preventing an easy removal of PP1. Adjust the position of the screws a bit if needed so it can be removed easily. Set the PP1 board aside for now.

16.( )PP1 main board does not have tone controls. You surely want your DH-101 to look like a factory preamp so you’ll want to reinstall the Bass and Treble knobs. Select the two 1” long 1/4”x 20 bolts. Fit one into the old Bass control hole from the inside. Select a thicker 1/4” nut. Spin it on the bolt and finger tighten. Repeat at Treble location. You might notice that the circular ridge on the head of the bolt sort of centers the bolt - handy. Firmly tighten both nuts!

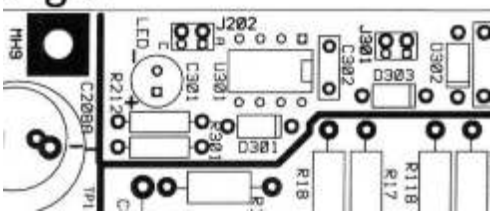
Fig 2



Preparation of PasPro 1 board for installation

17.( )Your heater voltage regulator is pre-installed with flexible wire leads. **>>>>The remainder of this step is a sort of assistance for those who might want to use a different voltage regulator for whatever reason.<<<<** Refer to Fig 2. Select the heater voltage regulator. It's a three terminal device with red(in), black(ground) and green(out) wires attached. If you want your installation to look a little neater bring the leads in from the bottom of the board in this step. We have left plenty of length for this type of install. You will now strip the wires and solder the regulator to the PP1 board. Solder the red wire to the "IN" eyelet, black wire to "GND" eyelet and green wire to "OUT" eyelet. Now the heater(filament) regulator is ready to install on the power supply shield surface in a later step.

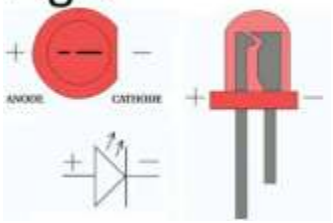
Fig 3



18.( )Refer to Fig 3. If you **don't want** a front panel mute button you can select a small piece of bare wire, insert it across the two small eyelets at J301 and solder it there. You will have a 30 second delay at turn-on and that's all! **If you want a front panel mute button** we can use the now "abandoned" **Tone** button as a new **Mute** button when it's depressed. Select two thin wires, any color. Cut them to 4" long. Strip insulation back 1/4" off one end for each, insert them from beneath PP1 for a neat install and solder them to PP1 board in the two larger eyelets located at J301. Twist them lightly together off to the "right" of PP1 board.

OPTION: If you are using the PS1 outboard power supply you could use the power switch which only has two lugs as the mute switch. Make wires 5" in that case.

Fig 4

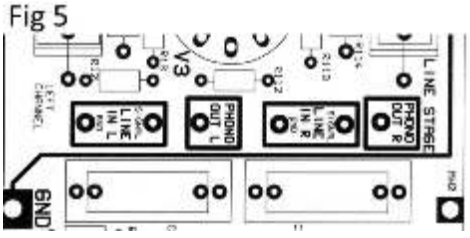


19.( )If you want a "pilot light" the PP1 has connection eyelets for an LED lamp. You can reuse the red led from the original Hafler PC-4 board or you can select your favorite color from other T-1 shape LED lamps. LED lamps like any diode require proper connection polarity. Cut a black and red wire to 5" length. Refer to the Fig 3 of the previous step. These wires should logically be soldered to the top but you decide. At J202 solder a black wire at the side with the "C" label and a red wire at the other "A" side (**C**athode and **A**node). LEDs have an identifiable Cathode(-) side, the short lead, the flat side, see Fig 4. It shouldn't be necessary to insulate the wires as you connect them to the LED body. Even if they short together or to the chassis no damage will occur, but the LED will not light. It's recommended that you clip the cathode lead to 1/4" length and the other to 3/8" in. Solder the black wire to the short lead and the red to the longer. Make sure they are not shorted together. You will insert the LED into the front panel later.

20.( )Install the PP1 circuit board. If you elected to keep both phono inputs place the Phono 1 and Phono 2 wire bundles beneath the board as with the original preamp. Slide PP1 over the three screws onto the standoffs. This might be a little easier if you remove the sheet metal screw securing the left side, bottom row of pushbutton switches. This makes it easier to install and tighten the nut at MH1. Don't forget to reinstall the screw. You can grab 2 - #4-40 KEP nuts(with integral lock washers) or all three and lightly tighten them to hold the PP1 in place while you work. **OPTION:** A fourth standoff(parts are in your kit) for added rigidity can be installed later. It involves drilling a bottom cover hole for installation at MH8 which is seen in Fig 3.

21.( )Install the 3-terminal voltage regulator to the power supply partition. You previously drilled a mounting hole. Select a #4-40 x 3/8" screw, a #4-40 KEP nut, a fiber washer and the transistor insulator/heatsink pad, a gray(or other color) soft plastic pad. Hold the screw with the threaded shaft upward. Put the fiber washer over the screw, then the voltage regulator, then the insulator pad - now push the screw through the pre-drilled hole. Spin on the #4-40 KEP nut "finger tight" onto the screw threads. Make sure everything is aligned with the regulator leads pointing downward. Tighten the whole assembly. Don't get all muscular, just firmly tighten it. If you have white silicon heatsink compound, usually a white paste, you can use it in a very thin layer to replace the "pad".

Fig 5



22.( )See Fig 6. Install the Phono stage wiring from the phono switch assembly (you left this connected earlier) to the PHONO OUT eyelets on the PP1. The Phono 2 switch ***receives*** the amplified signal from the phono stage, therefore it is connected to PHONO OUT of the PP1. The Phono 2 switch, second pushbutton/top row, should have these wires still connected. Connect and solder the one from Lug 4 to the **PHONO OUT L** eyelet on PP1, Fig 5. Solder the other from Lug 10 to **PHONO OUT R** eyelet on PP1. Early production DH preamps may have a different switch but the thing to remember is that lug closer to the center is the left and you know what the other one is.

Fig 6

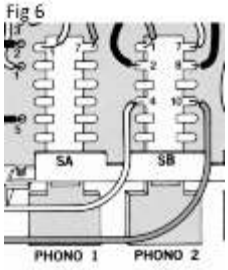
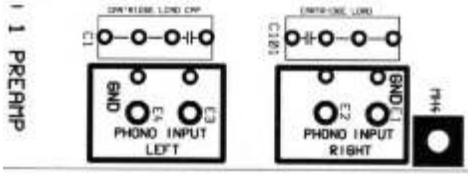
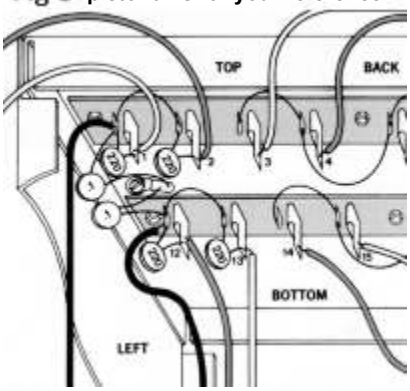


Fig 7



23.( )>>**If you elected to retain two phono inputs skip ahead to the next step.<<** If you have chosen the single phono input option, you will next connect the Phono 1 input RCA jacks on the rear panel to the PP1. Musical Concepts(MC) provides two lengths of shielded 2-conductor cable with bare shield drain wire. On the RCA jack end you will connect all three wires. At the PP1 end, Fig 7, you will connect the two insulated wires. Again these will look neater if installed from beneath, but either way is fine.. Start at the PP1. Select a 2-cond. cable **end**. Strip the wire insulation and solder RED at E2, BLACK at E1. Select the second cable. Solder the RED at E3, BLACK at E4. At the RCA jack end select the cable connected to the right channel of PP1. Strip wires as needed and solder the RED wire to center pin of Rch RCA jack. Solder BLACK wire to RCA jack ground tab/lug. Insert bare wire, solder later, into the ground lug situated between the RCA jacks off to one side. You'll probably have to remove solder from the common ground lug. Solder the remaining cable - RED to the Lch RCA jack center pin, BLACK wire to the RCA jack ground tab/lug and the bare wire to the separate common ground lug soldering both new wires and two original caps there. This completes single phono input wiring. Skip ahead to step 26.

Fig 8 **pictorial is for your reference**

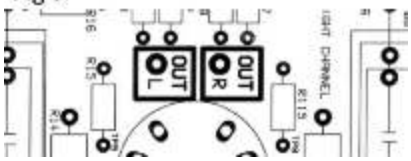


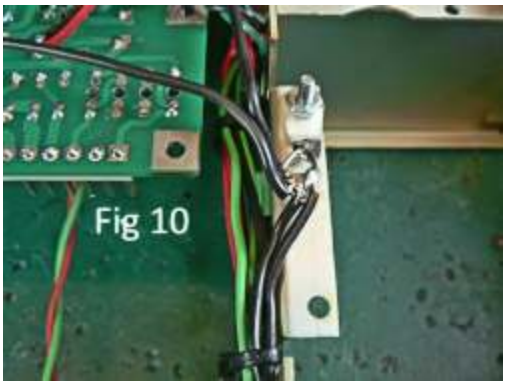
24.( )**[2 phono input install only]** If you decided to keep the both phono inputs you should have the original wire bundles for the right and left wiring beneath the PP1. From that side connect the wire exiting the bundle associated with right channel phono inputs at PP1 eyelet E2 at the PHONO INPUT R on PP1. From the other bundle connect that exiting wire to eyelet E3 at PHONO INPUT L on PP1.

25.( )**[2 phono input install only]** There should be two wires coming from the two phono input RCA jack pairs connected to the ground tab/lug of each input channel's RCA jacks. Connect the one from the right jacks to eyelet E1 on the PP1. Connect the other from the left channel to eyelet E4 on the PP1.

26.( )Connections to the Main Output RCA jacks to the PP1 final output stage will be made now. These wires may still be connected to the RCA jacks if you followed the previous instructions. If not, select the wire you wish use. This does not require heavy gauge wire. Shielded wire at this point probably has little value if the preamp is operated with the top and bottom cover in place. Noting Fig 9, if the original wire is still connected to the right Main Ouptut RCA jack(labeled OUTPUT/OUT on the back) then strip and solder it to PP1 eyelet **OUT R**. Select the left channel wire and solder it at **OUT L**

Fig 9

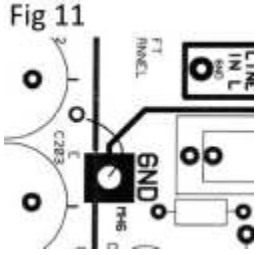


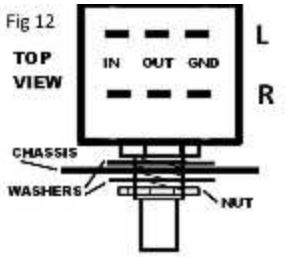


27.( )Four wires will be soldered to the common chassis ground. Locate a #4 lug terminal, a #4-40 x 3/8" screw and a regular(no integral lock washer) #4-40 nut from the kit parts. Find the hole originally used for the positive voltage regulator, clearly shown in Fig 1. Sand the anodized surface on the bottom of the hole to get to the bare aluminum - scratch with razor knife, Dremel it, use sandpaper, etc. Push the screw through the hole from "above". On the bottom side install the solder lug and spin a standard #4-40 nut onto the threads from 'below'. You have lots of spare wire right now so take about two inches of it, strip the insulation off and form it to insert and install in a terminal lug mimicking Fig 10. Make a little loop of bare wire connected to the lug terminal as shown. Now solder the 'loose' ends of the loop after twisting them a bit to give you a 3/8" or so loop. Make sure the nut is very tight. In the next step you solder several ground wires to the loop.

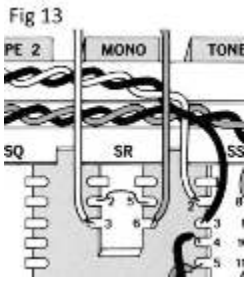
28.( )There are two black wires connected at the ground side of the right and left bank at the RCA out jacks. These are on the ground lugs of the right and left of the EXT PATCH FROM jacks - twist around the new loop, stripping if needed. Likewise there is a wire emerging from the top switch board eyelet 5 you must connect there. Don't solder just yet.
A ground wire for the PP1 must be connected to the loop. Select a 5" black wire. Since you won't be using the GND screw hole MH6 on the PP1 in the DH installation then you can just solder the wire at the PP1 end to the large hole from beneath. There is another hole just off to the side of it also connected to that same hole. A curved line on the cutout view, Fig 11, indicates their common connection for grounding. After soldering to the PP1 from beneath route this wire to the new ground loop and solder all four of the wires there.

Fig 11



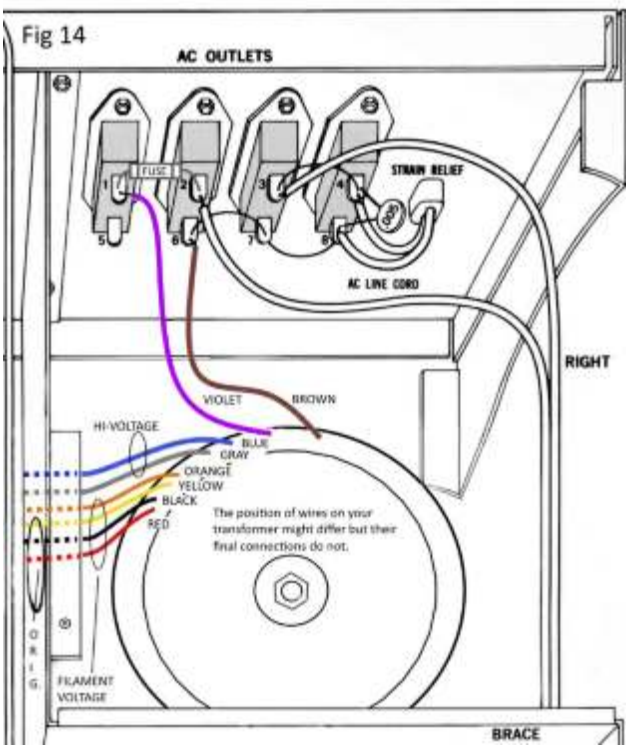


29.( )If you have purchased the Alps blue volume control, Fig 12, with your PP1 you can now install it. If you have your own control to use then just follow the basic procedure outlined here. For the mechanical install the details are at the left. Loosely tighten the nut for now. Each section, front and rear, is one channel obviously.Lead wires have already been soldered/insulated for installation into the DH. Lightly twist the wires from right ground(GND) and OUT, same for left channel. ***Careful, volume control lugs are delicate.*** Insert the OUT wire from the right into the PP1 LINE IN R SIGNAL eyelet and solder. Solder the R GND wire from the pot into the LINE IN R GND eyelet on PP1. Repeat for the left channel pot output. Now route those two long wires connected to the IN terminals toward the right side of the preamp. Keep those wires close to the metal front subpanel all the way to the mono switch, Fig 13. Solder the wire from the right channel to lug 6. Solder the left channel wire to lug 3. Route these wires snugly against the front panel. Now turn the pot body a little so the volume control terminals will be pointing to the right from a front view, say 3pm. Center the pot in its somewhat too large hole as good as you can and tighten the nut. You might have to sit back, have a look and reposition it some to get the perfect centering that you want. Tighten securely after you get it right.



Make an inspection of the circuit board and wiring. Remove excess solder flux with a mini-screwdriver or knife blade. **CHECK THE PP1 FOR SOLDER BRIDGES OR SPLASHES. THE SMALLEST SOLDER BRIDGE/SPLASH CAN SPELL DISASTER.**

Now all the signal routing and the basic installation is completed, but it won't go without power. If you purchased the PS1 then you can follow the instructions for that product to finish powering up your PP1 installation. If you have purchased the internally installed transformer we will do that in the following steps. Those using their own transformer must follow their own procedure.



30.( )Temporarily install bottom cover. Place new transformer as suggested by Fig 14. The transformer should not sit atop the bottom lip on the right side too far. You want the bottom cover to be easily removable with the transformer attached. Watch the metal folds near the partition bottom - leave a bit of space there. When you're satisfied mark a round hole with a pencil directly in the center of the transformer footprint where the mounting bolt will be installed. Remove bottom cover, select power drill and a 1/4" bit. Drill out a hole where you made the mark. A small starter hole or center punch is handy. Deburr the hole.

31.( ) See Fig 14. Cut the original wires between lugs 5 and 6, then 1 and 2 of the AC OUTLETS. Select the pigtail fuse. Form the wires appropriately and insert in lugs 1 and 2 leaving a little wire slack. Carefully solder it to lug 2. You will solder lug 1 later.

32.( ) See Fig 15, 'sandwich' transformer parts as shown. The metal bolt with flat washer on its head installs thru bottom cover. Insert thru 'sandwich'. Put the nut onto the bolt and tighten lightly.

33.( )Making sure that the wires go beneath the power supply partition loosely attach the bottom cover/transformer to the bottom of the preamp with all screws. If you like the fit then align and tighten the bottom cover. Tighten the transformer center bolt too.

AC Electrical Connections and Final Testing

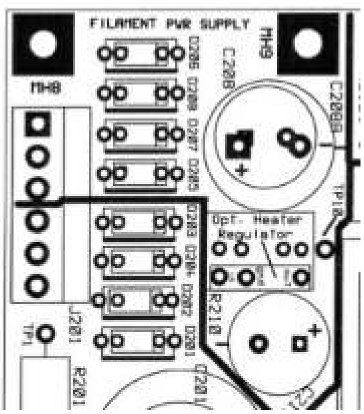
34.( )See Fig 14. Solder the Brown transformer wire to lug 6 of AC OUTLETS. Insert the Violet wire into lug 1 soldering it and the pigtail fuse at the same time. The primary of the power transformer is now connected. We're almost ready to power up your PP 1.

The transformer is mounted in place and ready to be energized. You should have the transformer's connector just to the left of the power supply partition very near the power connector of the PP1. Give the chassis a sharp rap to dislodge any mischievous wire clippings.

ALWAYS REMEMBER THAT THERE ARE DANGEROUS AC AND DC VOLTAGES PRESENT IN A PP1 INSTALLATION. ANYTIME IT IS PLUGGED INTO THE WALL SOCKET THERE IS FULL 120VAC ON SOME OF THE AC OUTLETS EVEN WITH THE POWER SWITCH OFF. PLEASE BE CAREFUL!!!!!!!

We must do a few tests now. Make sure that you have tightened the voltage regulator to the power supply partition so that it can utilize the surface as a heatsink. If it is loose or not mounted perfectly flat it will get hot very fast and shut down.

Fig 16

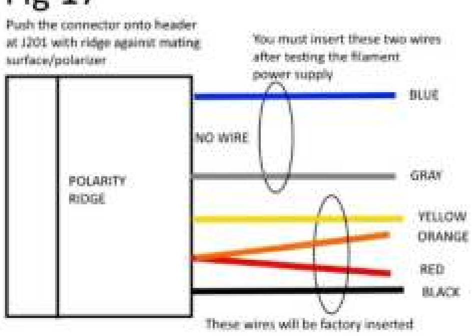


35.( ) As received your transformer will have two wires not yet inserted into the power connector. You will want to power up the filaments first to check your filament voltage and make sure the your tubes glow orange. Clearly we must install three fresh tested 6922, 6DJ8 type tubes now. Now push the power connector over the 6 pins of the power receptacle J201, Fig 16, on the PP1. Follow the mating of the polarity ridge as indicated, Fig 17. It goes toward the rectifiers, D207, etc. The three wires closest to mounting hole MH8 are now connected. Make sure the Blue and Gray wires are isolated from each other, the chassis, points on PP1 and you.

36.( )Check to make sure the power switch is in the 'out'/off position. Referring to Fig 16 connect a voltmeter to check the DC voltage between TP10 and the PP1 circuit ground. It's the eyelet labeled GND also MH6, Fig 11. Solder a small wire loop into TP10 to make it easier if you want. Keeping your fingers out of danger plug in the preamp to an AC wall socket. It's the moment of truth. Push in the power switch. You should see the tube filaments slowly lighting. Your LED should light instantly if you chose to use one. If your relay is set to engage you will hear it make a light click in 30 seconds. If the filaments glow and the voltage is from 5.9 to 6.1VDC then shut off the preamp. **Remove the preamp plug from the wall socket now.**

37.( )Pull the transformer connector off the PP1. With the power cord out of the wall socket remove the covering insulation from the Blue and Gray transformer wires. Note the spring terminals already installed on the wires. There is one side with a 'tang', a 'little barb' or ear. That side is the one that aligns with the slotted hole side of the connector, Fig 17. Note the position that receive **NO WIRE** as indicated. Insert the two wires as shown. Alignment is important. If you have it right they will click in place. Lightly try to pull the wires out of the connector to make sure they are locked successfully. Now put the connector back on with all five wires in place.

Fig 17



38( )It's time for a full test. On Fig 16 you see TP1 at one end of R201. Measure the DC voltage between that point and the GND we mentioned in earlier steps. Connect your meter and set for a minimum 200VDC scale if it's that type of meter. An auto-ranging meter will automatically handle that. Plug in the preamp while observing safety strategy. Push in the power switch. The tubes will light and the high voltage will be present at TP1. You should read within 10% of 145 Volts DC, maybe a little higher until tubes begin conducting. A far lower voltage indicates a problem. Immediately shut the preamp off and troubleshoot.

39.( )There are several points on the PP1 where you can check voltages. These points are on the PP1 silkscreen or enlarged Figure A. Due to varying tube parameters there may be some variation in the following voltages. These numbers could be useful to locate a malfunctioning tube. Tubes can vary quite a bit.

TP1 = 145VDC
TP2 = 130VDC
TP3 = 125VDC
TP4 thru TP9 = 1.1VDC
TP10 = 6VDC

40.( ) [If you have test equipment] – We assume tech knowledge here - You can insert a very low level 1kHz sine wave tone into the phono input then you can observe the output of the phono stage at the TAPE REC 1 or 2 jacks with PHONO 1 or PHONO 2 push button selected. If that looks okay you can view the full preamp output at the main output jacks while varying the position of the volume control. Of course, you just tested the line stage but to test line stage/V3 separately insert a higher level input into AUX or TUNER jacks and observe the output at OUTPUT-OUT jacks after selecting the correct pushbutton.

If these tests all look good then you should reassemble the preamp for some listening.

41.( )Start reassembly with the front panel. Place it over the new 'bass' and 'treble' bolts and over the pushbutton arrays. Some coaxing for alignment may be needed. Now select the two "thin' ¼ x 20 jamb nuts and spin them onto the bolts finger tight. If there was an internal screw for the faceplate put that nut on and go finger tight again. Check that everything looks aligned correctly including the appearance of the volume control shaft appearing in the center of its hole and freedom of movement of all the pushbuttons. Tighten all loose nuts. The new volume control bushing does not attach to the face panel. Reinstall the bass and treble control knobs with the slits pointing straight up. Set the volume control shaft all the way counter-clockwise. Select the new knob, push onto volume control shaft and set its indicator slit at approximately 7am in analog clock lingo. Tighten the knob with a 3/32" Allen wrench.

42.( )Find that LED that you have wired up and insert it into the face panel from behind. If you are concerned about it getting bumped back inside the preamp there are several ways that it could be secured, - duct tape, water-based silicon caulk, etc - your call. Another idea is to put a cut out piece of duct tape over the LED sub-panel hole from the inside, cut a slit in it and insert the LED thru that and then into the front panel hole. At this point neaten your wiring if desired. We have provided several tie wraps for your convenience.

42.( ) Select the top cover and reinstall with the hardware you have retained.

36.( ) Select the sticker "Musical Concepts" and apply under 'Hafler' silkscreen lettering on the front panel.

37.( ) Select the product identification sticker with model no. etc. and install on the bottom of the preamp. Congratulations! The PP1 modification is finished. Please let us know your thoughts on your registration card.

WARRANTY: The parts used in Musical Concepts modifications are warranted for a period of 1 year from the date of original sale to the original purchaser with the exception of vacuum tubes which are warranted for 90 days. Original Hafler parts are not covered. Parts clearly damaged by the installer are not warranted. Use of 'contact enhancers' that cause adverse chemical reactions with metal parts is not warranted. Use of acid core solder automatically invalidates your warranty. Malfunctions caused by consumer applied chemicals will void the warranty of even factory installed PasPro kits. ***Labor is <u>not</u> covered on user installed modifications.***

PERFORMANCE OPTIONS

Musical Concepts tests numerous parts for sonic invisibility! We do not recommend any parts substitutions in this kit. Allow it to burn in for 6 weeks before serious testing. Trust your ears! We believe our parts come as close to the mythical straight wire as possible. Some of the most hyped parts are lauded for their colorations, i.e. parts are often admired for their character. We like parts without character.

ADD MAIN OUTPUTS: If you need more than one main out, for instance a power amplifier and one or two subwoofers, you will need additional RCA main out jacks. Perhaps you want to bi-amp. You can connect the **TO** and **FROM** center pins in parallel to the **OUT** for each channel which would give three main outs. Always keep the interconnects to the shortest length possible.

PHONO LOAD CAPS: 220pf polystyrene caps are installed at C1 and C101. Leave those in place with moving coil and moving iron cartridges. Though they are not needed technically for loading, they provide a benefit of minimizing RFI interference. If your cartridge requires a different load cap then add more in parallel to these or replace them with your favored value. LOAD RESISTORS, while we're at it, are 47.5K Ohms. These are R1 and R101. Though the circuit is not designed to accommodate low output moving coil cartridges the value could be changed within reason for some customization. For instance, some people like the Grado cartridges with something a bit over 20K Ohm at the input stage..

FUSES: Should you desire to put in a fuse holder to make a fuse change easy then go ahead wiring it into the same points as our pigtail fuse. Somebody is bound to ask so I'll preemptively answer. Yes, some 'audiophile' fuses can make a sonic improvement. Unless you see them for sale on our website we do not make any brand recommendations. Please quiz the sellers.

WIRING/SOLDER: Proceed carefully, many "Special Audiophile Grade" wires won't necessarily sound superior to the standard wire provided. We don't provide guidance for that unless you see a special wire offered on our website. One advantage of the PasPro is its large wire holes/pads which allow for experimentation.
Don't even think about using "audiophile grade" solder unless you are very sure of what you are doing. Some of it we've tested is simply awful sounding. If you're curious try soldering a few connections in a critical area for a sample of the results. Please quiz the sellers.

HEAT: Although the preamp will run warmer than the original we don't think the Hafler DH-101 with the PP1 runs very hot in the scheme of things. Many tube preamps run warmer. Still, do not install it in a tight space without ventilation provisions. If you want it even cooler you can probably think of many ventilation strategies. Some of the hardware chains sell perforated metal. It would be simple to make a bottom cover which would reduce heat build-up. Contact us if you would like to see a perforated metal top cover offered. It would look kind of cool too.

Figure A, PasPro 1 Main Board, Rev D., Expanded Reference View
Light layer is “solder side” of board.
Dark layer is “component side” where parts are inserted. Some dark lines are silkscreen.

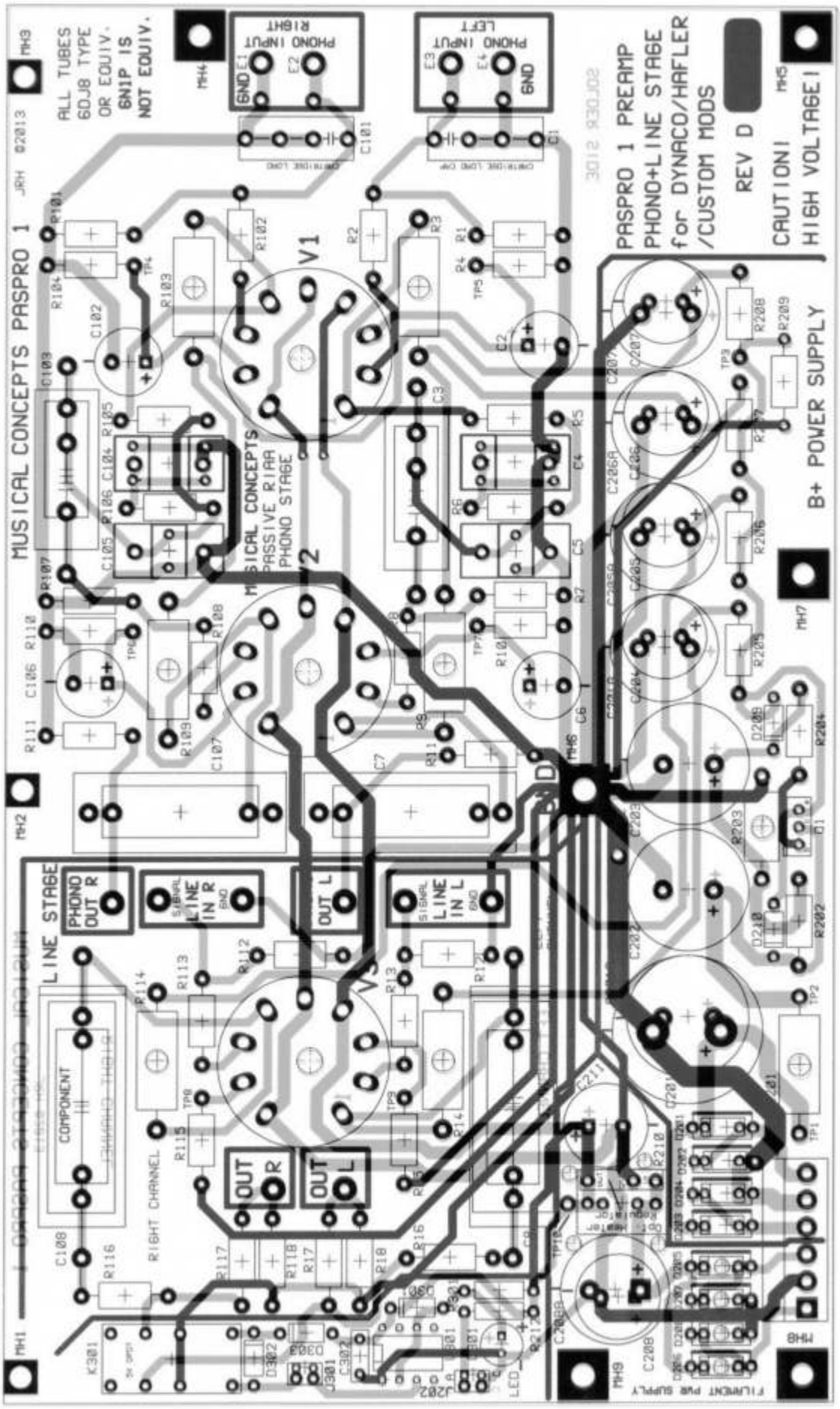
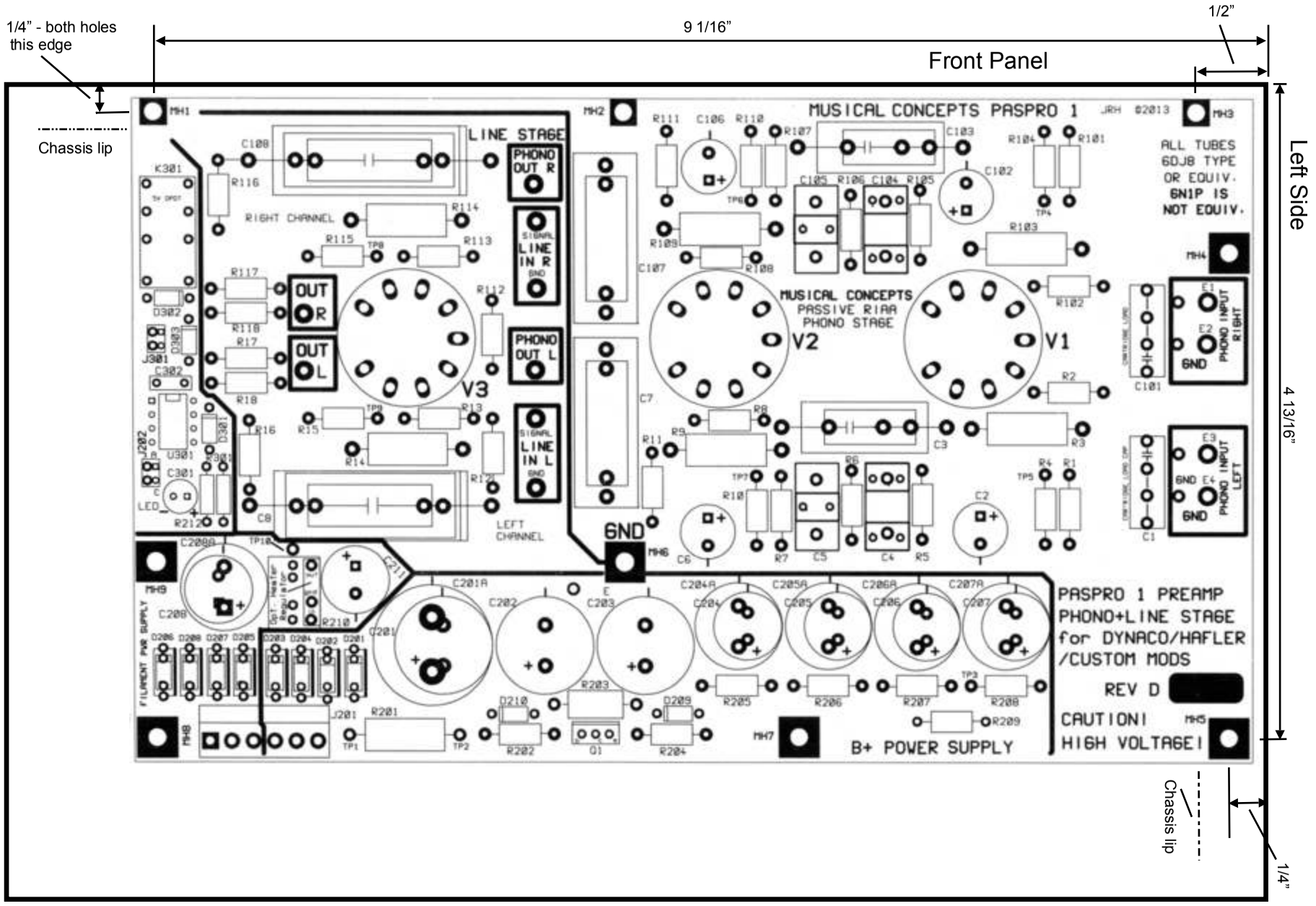


Figure B, 1:1 representation of PasPro 1 circuit board

Light layer is “solder side” of board.
Dark layer is “component side” where parts are inserted. Some dark lines are silkscreen.

Imagine this rectangle area as the Hafler DH-101 chassis. Dimensions for drilling the three ‘lip’ standoff holes are shown. Alternately you can cut out the circuit board from this page and use it to guide your drilling. Dimensions are to outside surface of chassis.



PasPro 1 Parts List

Conventions: Parts may use a number/letter ID system. For example, 47K5 means 47,500 or 47.5K, 47R5 has the R indicator for a decimal point so it is 47.5, even numbers are simple - 100R is 100, 1M(M means 6 zeroes) means 1000000. For capacitors, pF is picofarads - N means a thousand so 6N8 is 6800pF, 68N is 68000pF, N68 is 680pF.

AMPLIFIER CIRCUIT: Parts for amplifier circuitry begin with 1, for example, R1 is left channel and R101 is right channel.

PREAMP STAGES: 1 - **PasPro 1** board(bare), Rev D

RESISTORS: All 1%, ¼ or ½ watt unless noted. Bag A

R1, 101: 47K5, label is 4752**(final digit means 2 zeroes)**
R2, 102: 221R, label is 2210**(final digit 0 means 0 zeroes)**
R3, 103: 10K0, ¾ Watt, label 1002
R4, 104: 200R, label 2000
R5, 105: 121K, label 1213**(final digit = 3 zeroes, 121000 Ohms)**
R6, 106: 16K2, label 1622
R7, 107: 1M, label 1004
R8, 108: 221R, label 2210
R9, 109: 10K0, ¾ Watt, label 1002
R10, 110: 200R, label 2000
R11, 111: 1M, label 1004
R12, 112: 1M, label 1004
R13, 113: 221R, label 2210
R14, 114: 7K5, ¾ Watt, label 7501
R15, 115: 150R, label 1500
R16, 116: 100R, label 1000
R17, 117: 100R, label 1000
R18, 118: 100K, label 1003

CAPACITORS: Some may use their own parts. Guidelines given.

C1,101: 220pf supplied or user's cartridge matching value(any voltage)
C2, 102: 470uF - 6.3V+
C3, 103: 0.22uF - 150V(B)+
C4, 104: 0.02uF - may be 4 total 0.01uF, 100V(B)+
C5, 105: 6800pF - may be large or small 100V(B)+
C6, 106: 470uF- 6.3V+
C7, 107: 1.0uF - 150V(B)+, 106 or 1u0 code possible
C8, 108: 2.2uF - 150V(B)+, 206 or 2u2 code possible

TUBES, ETC:

3 - 9-pin miniature tube sockets
3 - 6DJ8, 6922, 7308, ECC88, 6N23P family of tubes - too many equivalents to mention - **IF PROVIDED!**

>>>>>>DO NOT USE 6N1P(6H1N) TUBE NO MATTER WHAT YOU MAY HAVE READ OR BEEN TOLD. YOUR HEATER REGULATOR WILL SHUT DOWN QUICKLY OR REFUSE TO START!<<<<<<<

POWER SUPPLY: All parts are 2xx numbers. Bag B

SEMICONDUCTORS:
D201-204: 1N4007 rectifier diode or CREE 1A/600V SiC rectifier
D205-208: 1N4002/4003,TO-220 size or MBR-1100E rectifier diode, **only two provided for center-tapped transformers.**
D209: Not used
D210: 1N4007 rectifier diode
D211: 1N4007 - added, mounted beneath/above PCB parallel to R202, band oriented toward R201
Q1: N-CH mosfet

RESISTORS:
R201:470, 2 Watt or higher, (green body)
R202: 47K, ½ Watt or higher
R203: Not Used
R204: 1K0, ¼ Watt or higher, label 1001
R205,206,207,208: 100R, ¼ Watt or higher, label 1000
R209: 150K, ½ Watt or higher, label brn-grn-yel-gold
R210: Option for custom transformer, you can create pi-filter filament power supply, not standard build
R211: NA
R212: 2K74 or 2K7, 1/4W red-pur-blk-brn

CAPACITORS:
C201: 220uF/200V +
C202,203: 100uF/200V+
C204,205,206,207: 47uF/200V(B)+, 100uF option
C208/208A: 4700uF- 16V+
C209,210: NA
C211: 2200uF- 10V+ cap

MISC:
J201: 6-pin Molex KK style 0.156" center and 6 terminals, **pre-installed with full kit or separate transformer purchase**
U201: LM7806 filament voltage regulator**(already installed in full kit)**, 1 - #4-40 x 3/8" screw, #4 KEP nut, 1 fiber washers and TO-220 insulator pad to install U201.

MUTING CIRCUIT: Parts are 3xx numbers. Bag C

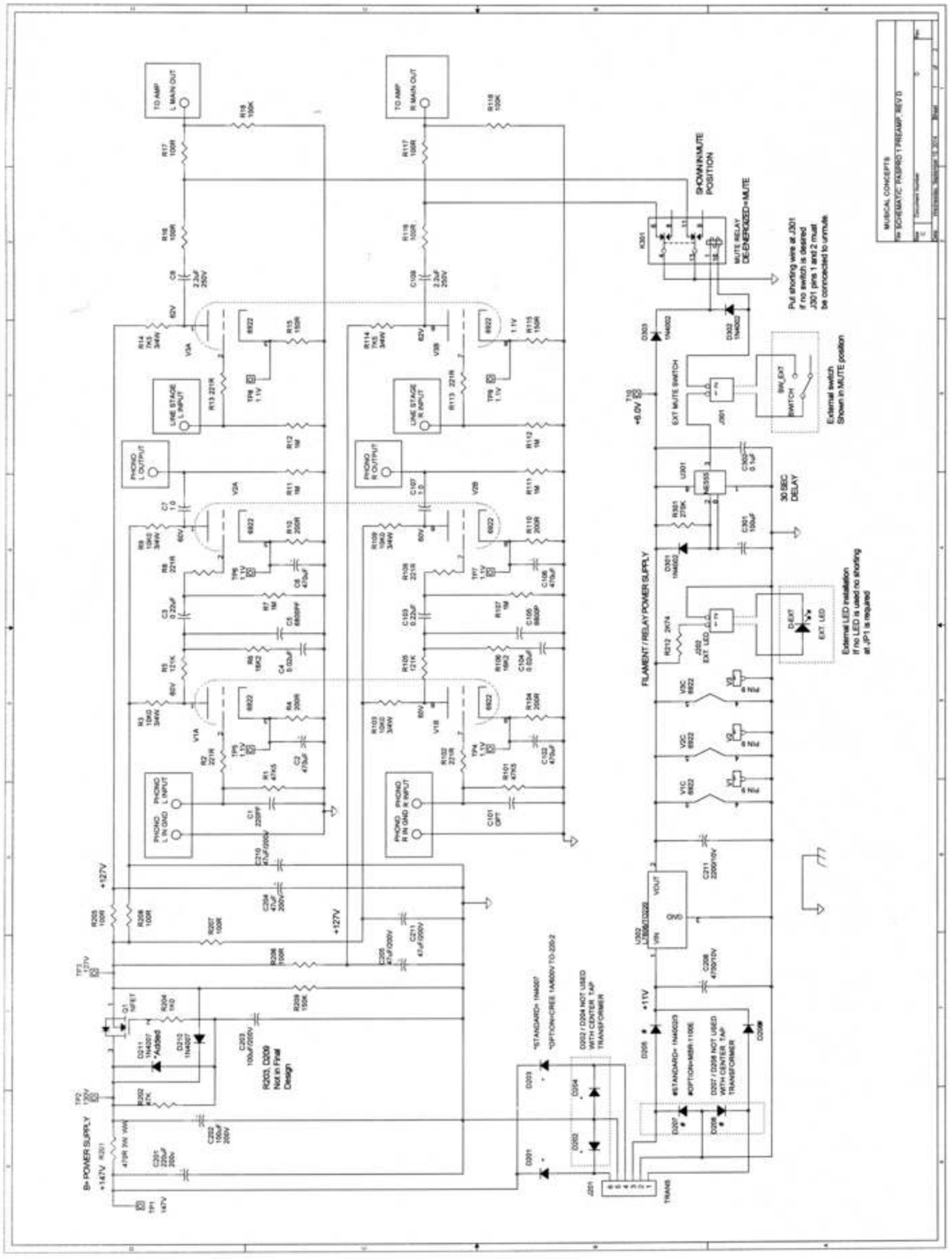
D301-303: 1N4002 or 1N4003 rectifier diode
R301: 270K Ohm, ¼ Watt or up, red-pur-blk-orange
C301: 100uF/10V+, sets auto-mute time with R301 combo
C302: 0.1uF/10V+, label may be 104
U301: NE-555 timer IC - drives relay after 30 sec. time delay
K301: 5V DPDT relay(8-pins) - auto-mute & switch activated muting

INSTALLATION HARDWARE, ETC: Bag D

4 - #4-40 X ¼" threaded metal standoffs
4 - #4-40 x 5/8" machine screw
4 - #4 internal tooth lock washers
1 - #4-40 x 3/8" machine screw
6 - #4-40 metal nuts - 5 with integral lock washer(KEP), 1 plain
2 - 1/4" x 20 bolts, 1" full length threaded
2 - 1/4" x 20 nuts
2 - 14/" x 20 jamb nuts(thin)
1 - assorted wiring of multiple colors, two shielded phono input wires
1 - length of eutectic-alloy, thin 0.031" dia. rosin core solder
1 - 0.6 amp slow-blowing pigtail line fuse
1 - misc tie wraps, labels etc.

Separately packed:
1 - Stereo volume pot(pre-wired), w/hdwe & knob - **IF PROVIDED**
1 - Power transformer with connector pre-installed - **IF PROVIDED**

PasPro 1 Schematic Diagram - Rev D, September 2014



A *Musical Concepts* PasPro 1 will look like this installed into your stock Hafler DH-101. You can do it equally well. Optional connectors, etc. could be installed.