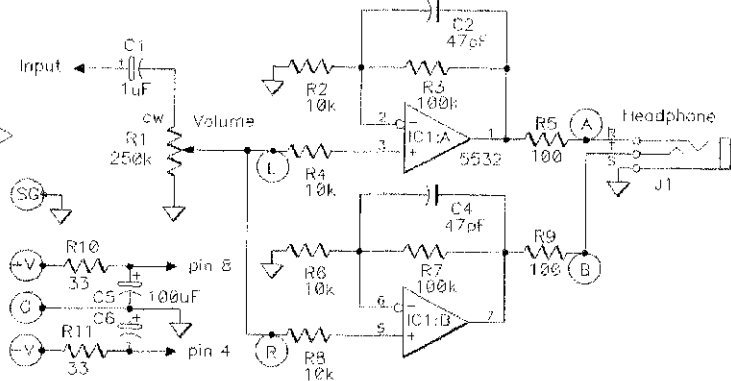
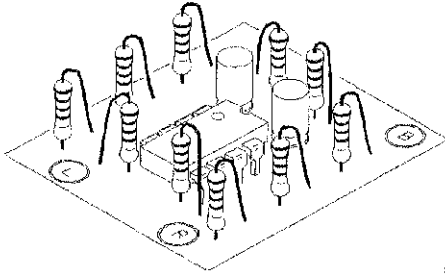


PAIA HeadPhone Buffer

Model 9605k Assembly and Using Instructions



This simple Headphone Buffer Amp is an easy solution to the problem of adding a headphone jack to equipment that lacks one and can also serve as an inexpensive practice amp.

As shown in the schematic above, the circuit is built around a 5532 type dual op-amp. Ordinarily this part is used for its low noise characteristics, but in this application its line driving capabilities make it a suitable component choice.

Each amp in the package is configured as a noninverting gain stage. Taking the left channel (IC1:A and associated components) as typical, C1 provides AC coupling of the input signal to the volume pot R1. R4 connects the signal to the noninverting input of the amp. Gain is approximately set by the ratio of R3/R2 and Capacitor C2 provides a 6db/oct low pass knee at about 30kHz for immunity to RF. Resistor R5 provides isolation to the headphone transducer.

Power to the circuitry is isolated from the source by R10 and R11 with C5 and C6 acting as filter capacitors.

Headphone Buffer Kit Parts List

Qty	Description	Designation
1	5532 Dual Low Noise Op Amp	IC1
<i>Capacitors</i>		
2	47pF Ceramic Disk Capacitor	C2,C4
2	100uF 25V Electrolytic	C5,C6
1	1uF 25V Electrolytic	C1
<i>Potentiometer</i>		
1	250k Panel Mount 1/4W, 5% resistors	R1
<i>1/4W, 5% resistors</i>		
2	100 brown-black-brown	R5,R9
2	100k brown-black-yellow	R3,R7
4	10k brown-black-orange	R2,R4, R6,R8
2	33 orange-orange-black	R10,R11
<i>Hardware & Misc.</i>		
1	1/4" Stereo Phone Jack	J1
1	Knob	
1	#4 "L" Bracket	
1	#4 Machine Nut	
1	4-40 X 1/4" Machine Screw	
1	4-40 X 1/2" Machine Screw	
1	Wire Bundle	
1	9605 Circuit Board	

THE CIRCUIT BOARD

The Headphone Buffer is built on a single-sided circuit board. Before beginning assembly, clean oxidation from the copper side of the board using scouring cleanser and water. The copper should be bright and shiny before beginning assembly.

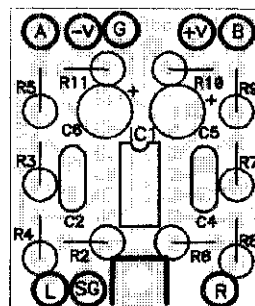
SOLDERING

Select a soldering iron with a small tip and a power rating not more than 35 watts. Soldering guns are completely unacceptable for assembling solid state equipment because the large magnetic field they generate can damage components.

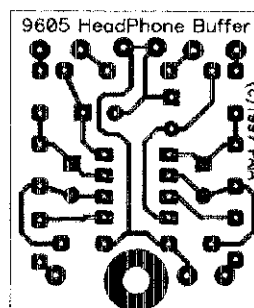
Use only rosin core solder (acid core solder is for plumbing, not electronics work). A proper solder joint has just enough solder to cover the soldering pad and about 1/16 inch of lead passing through it. There are two improper connections to beware of: Using too little solder will sometimes result in a connection which appears to be soldered when actually there is a layer of flux insulating the component lead from the solder bead. This situation can be cured by reheating the joint and applying more solder. If too much solder is used on a joint there is the danger that a conducting bridge of excess solder will flow between adjacent circuit board conductors forming a short circuit. Accidental bridges can be cleaned off by holding the board upside down and flowing the excess solder off onto a clean, hot soldering iron.

Mount the circuit board components by passing their leads through the holes provided for them on the silk-screen legended side of the board and solder on the copper side. Clip off any excess component lead flush with the solder joint. Use care when mounting all components. Never force a component into place.

Check off each component as it is mounted. Resistors and disk capacitors are not polarized and may be mounted with either lead in either of the holes in the circuit board. The electrolytic capacitors and IC are polarized and must be oriented as shown in the illustrations.



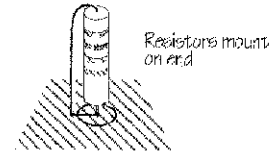
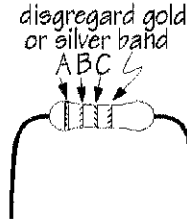
Components are mounted on the board in the locations shown. Phantom traces show connections between parts.



This foil pattern art will be useful if you need to check for solder bridges.

These parts are nonpolarized, either lead can go in either circuit board hole

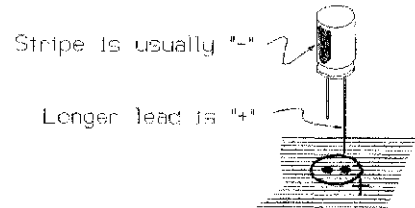
Design.	Value	Color code A-B-C
() R5	100	brown-black-brown
() R9	100	brown-black-brown
() R3	100k	brown-black-yellow
() R7	100k	brown-black-yellow
() R2	10k	brown-black-orange
() R4	10k	brown-black-orange
() R6	10k	brown-black-orange
() R8	10k	brown-black-orange
() R10	33	orange-orange-black
() R11	33	orange-orange-black



Disk capacitors



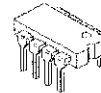
Capacitors		
() C2	47pF	Ceramic Disk
() C4	47pF	Ceramic Disk



Electrolytic capacitors

These parts are polarized - observe orientation in the drawings

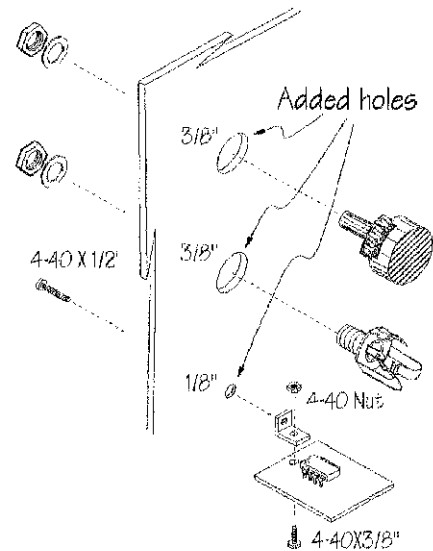
() C5	100uF 25V	Electrolytic
() C6	100uF 25V	Electrolytic
() IC1	5532	Dual Low Noise Op Amp



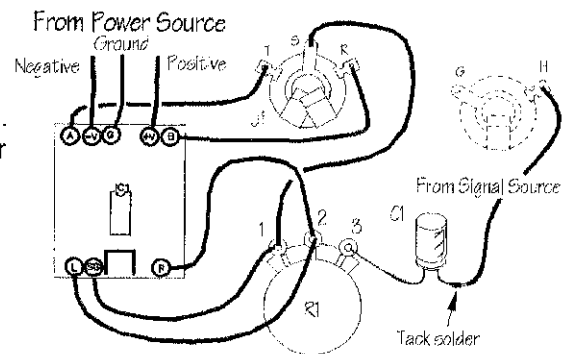
5532

This completes the installation of the circuit board mounted components. Details of installation and use will vary according to application but in general will proceed as follows:

Find a suitable place on the panel or case of the equipment to be retrofitted to mount the Volume control R1 and headphone jack J1 and drill 3/8" holes to accommodate both. If possible, mount the Headphone Buffer circuit board in close proximity to the Volume control and headphone jack. A #4 "L" bracket and 4-40 hardware are provided for this purpose as shown in the illustration.

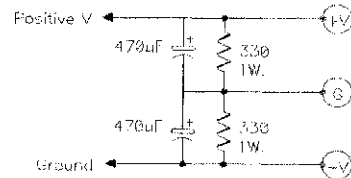


Use appropriate lengths of the #22 insulated stranded wire supplied to connect the circuit board to the Volume control and Jack as shown. Notice that the (+) lead of the coupling capacitor (C1) solders to lug 3 of the pot and a wire extension to the signal input is soldered directly to the (-) lead of the capacitor. Usually the best place to tap the output of the device being retrofitted is directly from the "Hot" lug of the existing device output jack.



Shown from rear of panel

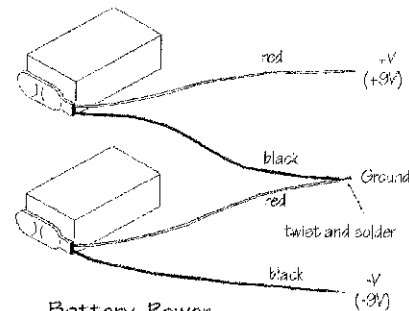
ABOUT POWER SUPPLIES: In most cases power can be tapped from the unit being retrofitted with the Headphone Buffer. The circuit is designed to operate with bi-polar supplies from +/- 6V to +/- 18V. The higher the voltage, the greater the sound level from the headphones. The bipolar supply lines need not be symmetrical; for example, it's OK if one of them is 9V and the other is 15V.



Single Supply Operation

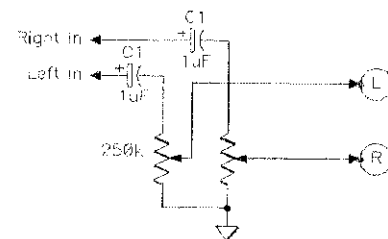
If no bi-bipolar supply is available a single supply can be used by generating a synthetic ground with a pair of resistors and capacitors as shown. Single Supply voltages should be from 12VDC to 36VDC.

The Headphone Buffer can be run from a pair of 9V batteries but not for very long. Perhaps 8 hours from alkaline cells. Rechargeable batteries are the only economical choice. Connect batteries as shown. If you add a switch, it should be a Double Pole type that switches both the "+" and "-" battery leads. The ground lead need not be switched.



Battery Power

To use the Headphone Buffer as a stereo amp, use a dual-ganged pot in place of R1 as shown. Notice the added coupling capacitor.



Use a Dual Pot for Stereo