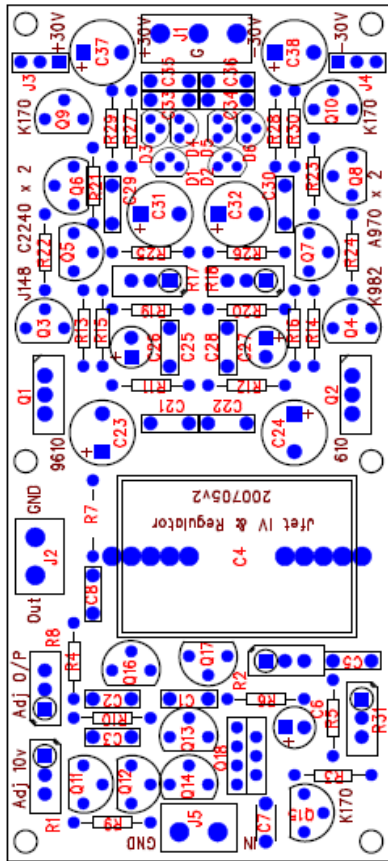


## Modified NP D1 IV into Jfet IV with super low noise regulator

This pcb is good for CD player or DAC upgrade with current output type DAC chip like TDA1541, PCM63, PCM1702, PCM1704 etc... PCB size is 2 x 4.5 inches with six M3 mounting holes. Input, output and supplier are using standard 5mm 2 or 3 pins connectors.

A DC supplier of about +/-28 to +/-32V dc is able to work with this board.

This is the silk printing of the pcb on top.



### Features:

1. One single IV with one super low noise regulator for each channel.
2. Voltage reference of regulator can use either TL431 x 4 pcs or LM336-5V x 2 pcs (D1/D2 or D3 to D6).
3. Two 2SK170 (Q9 and Q10) as current source for the voltage reference ICs. Eliminate hard to find and more expensive 2SJ74 part in regulator. **A 2mA current regulator diode can be used to replace these Jfets and source resistors.**
4. Regulator output device has two choices, either TO-92 or TO-220 mosfet; J148/K982 (Q3/Q4) or IRF9610/IRF610 (Q1/Q2). No heatsink is required as each Jfet IV only consume about 20mA max with dissipation of active device about 200mW.

5. Jfet IV part input has reserved input device for either one or two K170 (Q13/Q14) plus a choice of 2SK389 (Q18) if the user want to use a dual fet of BL grade. This is to solve the problem of hard to find K170V or expensive LSK170V by using two matched K170BL as replacement. The input device need to be with  $I_{dss} > 10\text{mA}$ , best is about 15mA range. **Need closely matched  $I_{dss}$  for K170BL for both channels.**
6. The current source on top of Jfet IV (Q11/Q12) has a choice of using one or two Jfet. Thus J74BL grade is able to be used if user cannot find J74V grade. **These two jfets do not need close matching and within 2mA  $I_{dss}$  is fine.**
7. The current source at the bottom of the input stage has a Pot (R31) to fine tune the current setting. This is to adjust the current within a certain range for careful listening so that the diyer can choose the current for best sonic to his taste. For normal operation, a current of about 2 to 4 mA is about right. A pot of 100R or 50R can be used depending on the range of current that diyer want to control. Changing the bias current of Q13/14 will means changing its operation point and the distortion and sonic of the ckt will also be changed.
8. Output level control is by R8 to tune within about 5%. This is to match left and right channel in case the resistor or DAC output current has some tolerance. If diyer do not want to adjust the output level, do not solder R8 and R10.
9. Pot R1 is to adjust the output stage to mid dc voltage of supply voltage, ie 10V at point A for a supply of 20V.
10. Pot R2 is to adjust the bias of input fets (Q13/Q14 or Q18) so that the input pt B is at 0V (virtual ground) or the desired voltage of the DAC.
11. Q16 and Q17 should be match for  $I_{dss}$  within 0.2mA if possible. **It is famous John Curl's Jfet source follower. No DC drift as an output couple capacitor is used.**
12. Output couple capacitor C4 pads has different hole distance thus diyer can choose the capacitor he want to use more easily.

The R4 at 1.5k ohm is good for DAC TDA1541 and PCM63 with +/-2mA output level. For a PCM1702 DAC with +/-1.2mA output, the resistor (R4) should be adjusted to about 2.5k ohm to get the same output level.

2007 May 14.

Upadated in **RED** on May 16.