The Cen / Sen IV Converter Evaluation Kit (Standard Version)
Xen-Audio, June 2011

The Contents

2x Cen IV PCBs (4 single ended or 2 balanced IV in total), single sided 35uM copper, 1.6mm FR4
2x Sen IV PCBs (4 single ended or 2 balanced IV in total), single sided 35uM copper, 1.6mm FR4
4x Quad JFET heat sink Type 10 (for Sen IV)
4x Dual JFET heat sink Type 0 (for Cen IV)

Optionally (only in combination with the above and while stock last

2x Idss matched 2SJ74BL

The Schematics

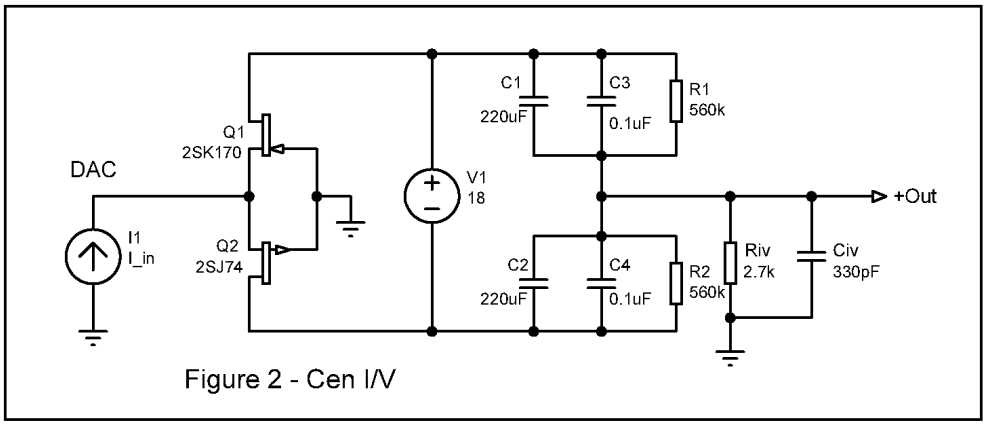


Figure 2 - Cen I/V

The Cen IV (2SK170 / 2SJ74, matched Idss)

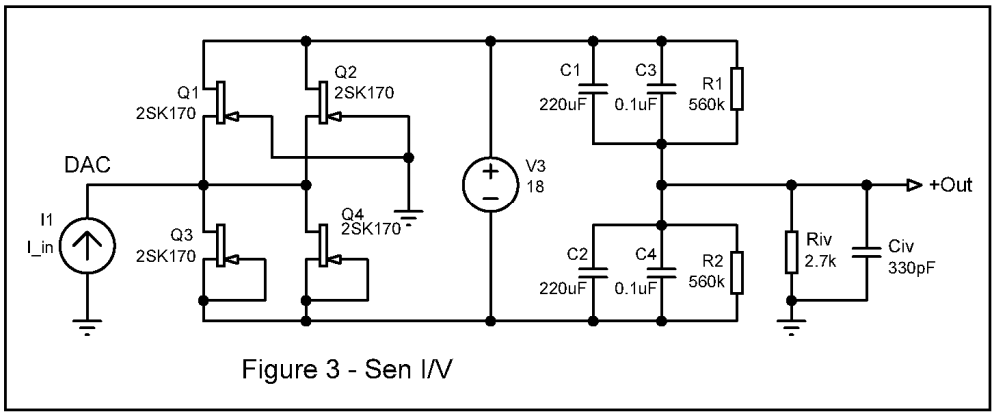


Figure 3 - Sen I/V

The Sen IV (4x 2SK170, matched Idss)

The Bill of Materials

Cen IV (per single ended IV converter)

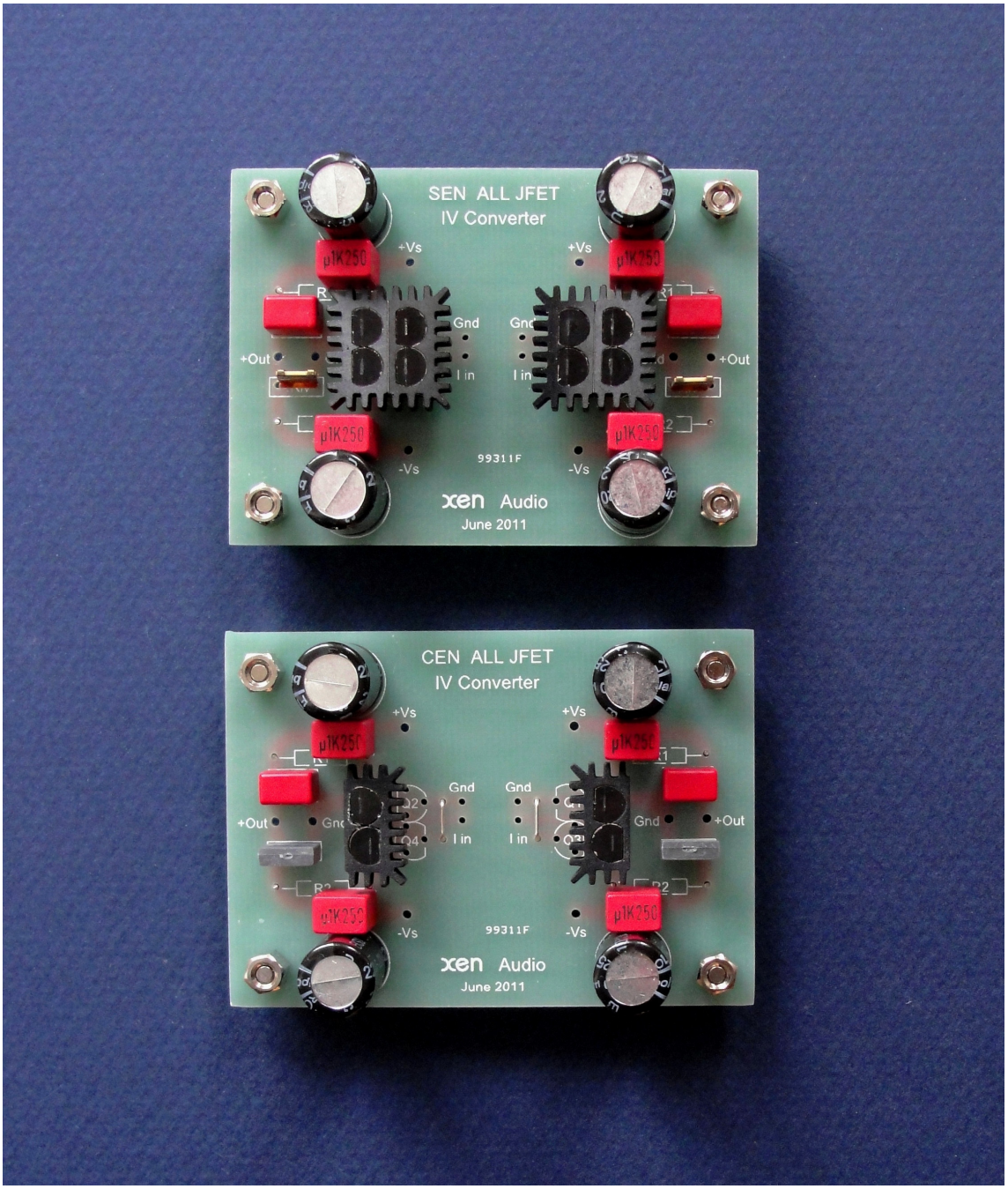
Q1 (Q2)	2SK170BL
Q3 (Q4)	2SK74BL, Idss matched to Q1 (Q2)
C1, C2	e.g. Nichicon ES Bipolar 220uF 16V
C3, C4	e.g. WIMA MKP2 0.1uF 250V
R1, R2	e.g. PRP 560k 1/4W
R_iv	e.g. 2.2k Caddock MK132V for PCM1704 (1.2mA)
C_iv	optional, e.g. WIMA FKP2 or LCR EXFS polystyrene 1st order LP filter in combination with R_iv
Rg (2x)	optional JFET gate resistors, 100R 1% 0603 SMD Susumu
Power Supply	e.g. 2x 8.4V 250mAH NiMH cells.

Sen IV (per single ended IV converter)

Q1, Q2	2SK170BL (alternatives 2SK369, 2SK117*)
Q3, Q4	Same as Q1, Q2, Idss matched to Q1, Q2
C1, C2	e.g. Nichicon ES Bipolar 220uF 16V
C3, C4	e.g. WIMA MKP2 0.1uF 250V
R1, R2	e.g. PRP 560k 1/4W
R_iv	e.g. 2.2k Caddock MK132V for PCM1704 (1.2mA)
C_iv	optional, e.g. WIMA FKP2 or LCR EXFS polystyrene 1st order LP filter in combination with R_iv
Rg (2x)	optional JFET gate resistors, 100R 1% 0603 SMD Susumu
Power Supply	e.g. 2x 8.4V 250mAH NiMH cells.

* For details refer to article in Linear Audio Volume 2

The Prototypes



Building Instructions

1. Stuff all JFETs onto the PCB to about 4mm free leg length from top PCB surface. Do not solder.
2. Place heatsink on top and fine juggle the JFET positions. The legs are now bent correctly.
3. Remove JFETs and heatsink, clean with acetone and glue together with thermal glue (Arctic Silver).
4. Solder gate resistors Rg on the PCB (use 0R if you prefer not to use gate resistors).
5. Solder R1, R2 on the bottom side of the PCB, leaving 1mm gap between PCB & Rs.
6. Trim off excess wires flush to the top PCB surface.
7. Screw on 4x standoffs (min 5mm).
8. Solder Gnd jumper using 0.6 / 0.8 mm silver plated copper wire. Solid line means on top of PCB, dotted line below (with Teflon insulation).
9. Solder R_iv and C_iv as necessary.
10. Stuff FETs with heatsink and solder in place.
11. Stuff and solder C1 – C4.
12. PCB is ready for testing.

Testing Instructions

1. Using 2x 9V battery, apply power to the circuit via a 10R resistor.
2. The input should be left open circuit.
3. Measure the bias current with a voltmeter across the 10R resistor. The bias should equal Idss of the JFETs.
4. If bias is as expected (=JFET Idss), the 10R resistor can now be bypassed with a jumper wire.
5. Use a functions generator to supply a 1V 10kHz square wave to the input via a 1k resistor. You should see a corresponding square wave at the output across R_iv. The output voltage should have amplitude equal to R_iv divided by 1k, in volts. The circuit is now fully functional.
6. If you, for whatever reason, get oscillation, increase the gate resistors Rg to say 220R. In the only one of our four prototypes where oscillation occurred, only 22R was required.