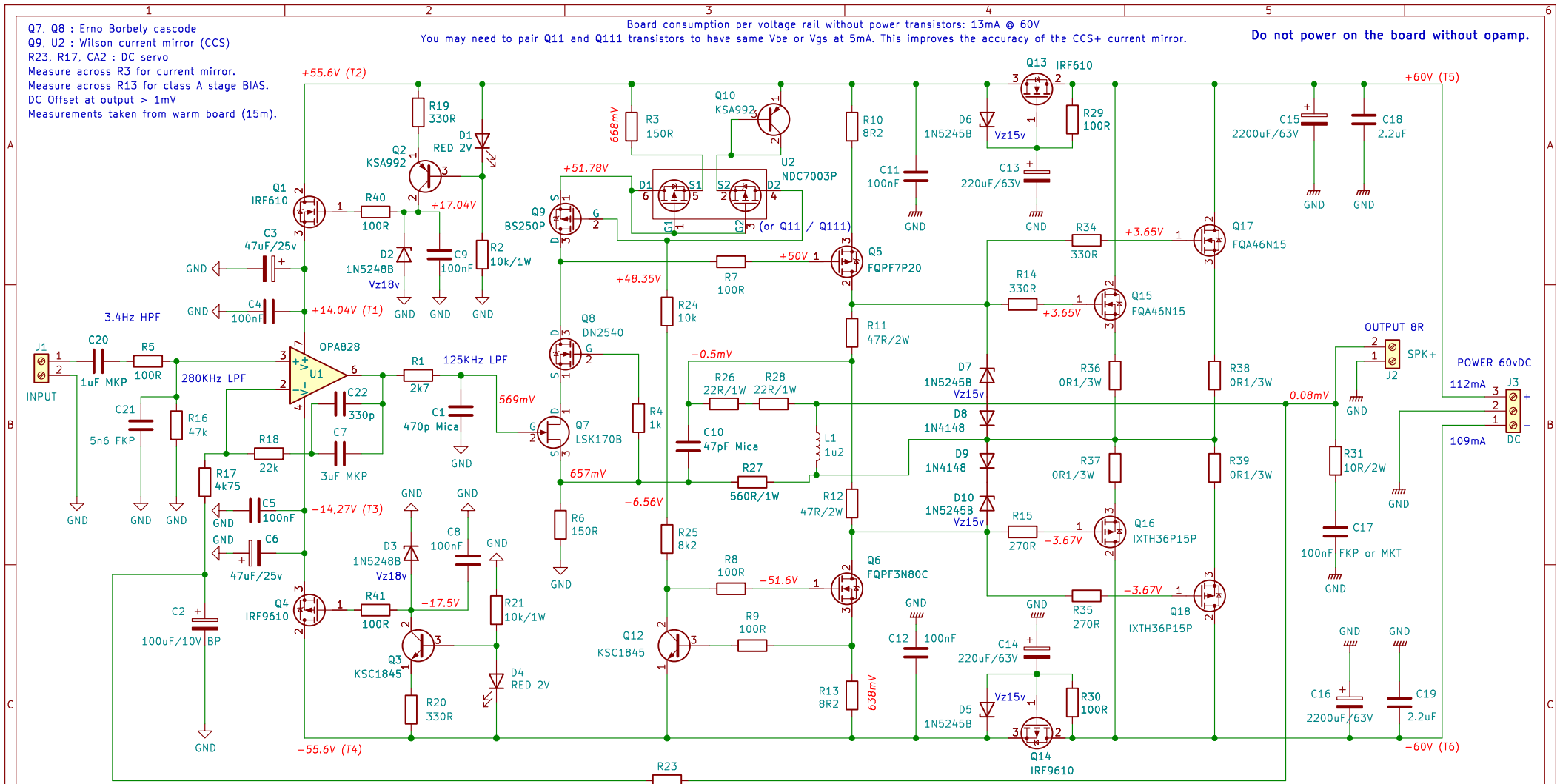


Q7, Q8 : Erno Borbely cascode
 Q9, U2 : Wilson current mirror (CCS)
 R23, R17, CA2 : DC servo
 Measure across R3 for current mirror.
 Measure across R13 for class A stage BIAS.
 DC Offset at output > 1mV
 Measurements taken from warm board (15m).

Board consumption per voltage rail without power transistors: 13mA @ 60V
 You may need to pair Q11 and Q111 transistors to have same Vbe or Vgs at 5mA. This improves the accuracy of the CCS+ current mirror.

Do not power on the board without opamp.



Transformer for 2 boards: 2 x 44Vac 400–500VA

L1 : 19.5 turns of a 1mm diameter copper insulated wire wound around a 8mm tube.
 This will give you a coil of 10x20mm (see picture on github repository).

U1 : OPA1611 (BIPOLAR) or OPA828 (JFET)
 U2: NDC7003P or PJS6839
 Q1, Q13 : IRF610
 Q2, Q10 : KSA992
 Q3, Q12 : KSC1845
 Q4, Q14 : IRF9610
 Q5 : FQP3P20 (isolator) or FQPF7P20
 Q6 : FQP3N30 (isolator) or FQPF3N80C
 Q7 : LSK170B (TH) or JFE150 (SMD SOT23–5)
 Q8 : DN2540 or DN2535
 Q9, Q11, Q111 : BS250P
 Q15, Q17 : FQA46N15 or IXTH36N30P (isolator)
 Q16, Q18 : FQA36P15 or IXTH36P15P (isolator)

100nF capacitor : Wima MKS2
 1W resistor : Vishay PRO1
 2W resistor : Vishay CCF02 or PR02
 D1, D4 : LED RED 2V TLHR5400
 D2, D3 : 1N5248B
 D5, D6, D7, D10 : 1N5245B
 D8, D9 : 1N4148
 C3, C6 : Panasonic EEU–FC1V470B
 C7 : 3uF CDE 935C1W3K–F
 TO–220 thermal pad : Aavid 4171G
 TO–247 thermal pad : Aavid 4180G
 J1 : KF127 or JST B2B–XH–A–GU

For resistor < 150R : sort then or use 1% range.
 0.25W, 0.5W resistor : Vishay MRS25 or CCF07 or MB
 R27 : 560R 1W 1% Ohmite WNB560FET or Vishay CMF60560R00JKR6
 R26, R28 : 22R 1% 1W TE Connectivity H4P22RFZA
 R36, R37, R38, R39 : 0R1 MOSX3CT631RR10J
 C1 : 470pF CDE CD15FD471J03F or polystyrene capacitor.
 C2 : Non polar capacitor Nichicon Muse UES1A101MPM.
 C10 : 47pF Mica CDE CD15ED470J03 or ceramic NPO.
 C15, C16 : Vishay MAL22562822E23 or Wurth 861140783006.
 C17 : 100nF capacitor FKP3C031004C00JSSD or MKT1822410255.
 C18, C19 : 2.2uF MKP MKP4D042205100KSSD or PHC1254220KG.
 C20 : 1uF Wima MKP2C041001N00MMN00
 C21 : 5.6nF Wima FKP2C015601D00HC00

Opamp input gain = $1 + R18/R17$
 Global gain = $((R17 + R18)/R17) \times ((R27 + R6)/R6)$
 For input sensibility at 1.2Vrms (+4dBu): R17=4k75 and R6=150R
 For input sensibility at 0.7Vrms (0dBu): R17 = 5k1 and R6=100R
 The value of R25 depends on the input voltage (42v = 2K7, 50v = 7K5, 60v = 8k2).

Q17 a QUAD405 audiophile approach

Modified by Stef for the Q17–TURBO project
 by eng. Tiberiu Nicol

Sheet: /
 File: Q17–TURBO.kicad_sch

Title: Q17–TURBO (P2) Amplifier

Size: A4 Date: 2024–09–12

KiCad E.D.A. 8.0.4

Rev: 1.5.3

Id: 1/1