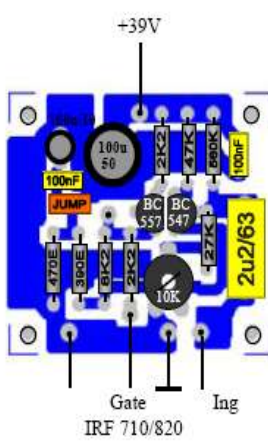
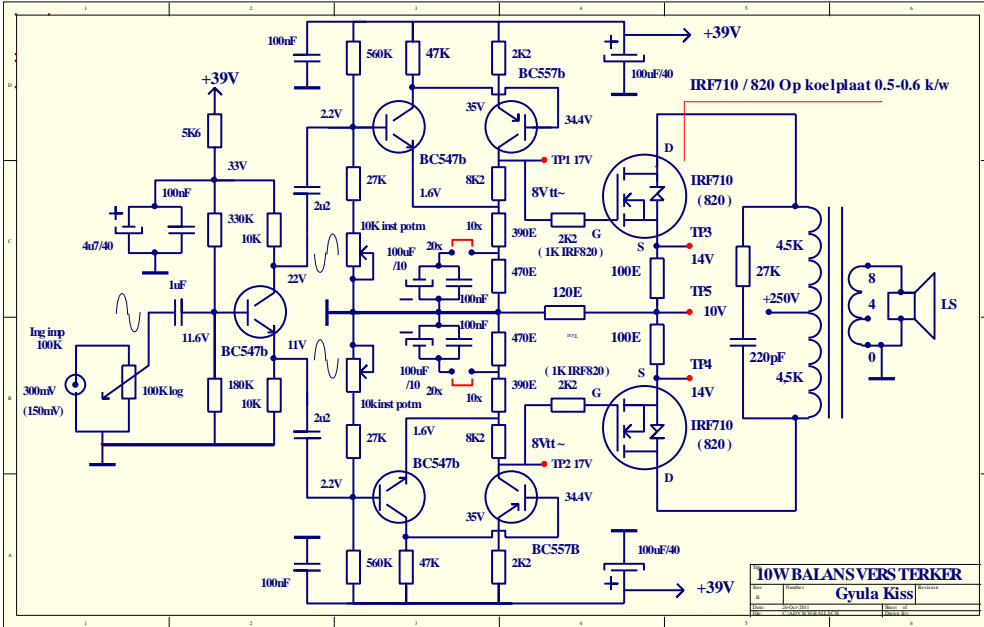
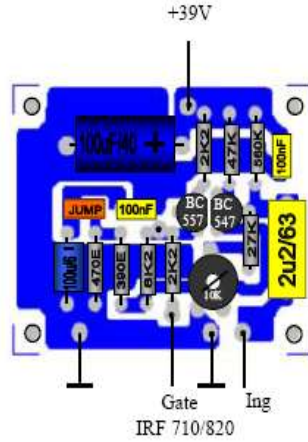


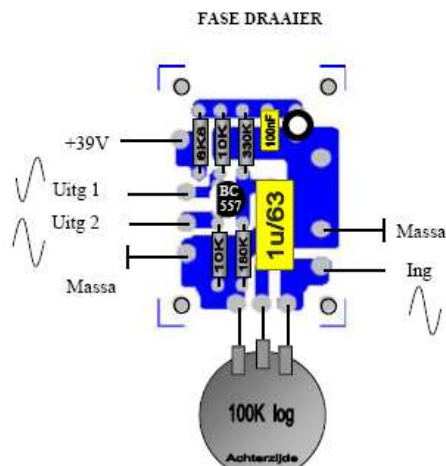
5 en 10 Watt Geluidsversterker



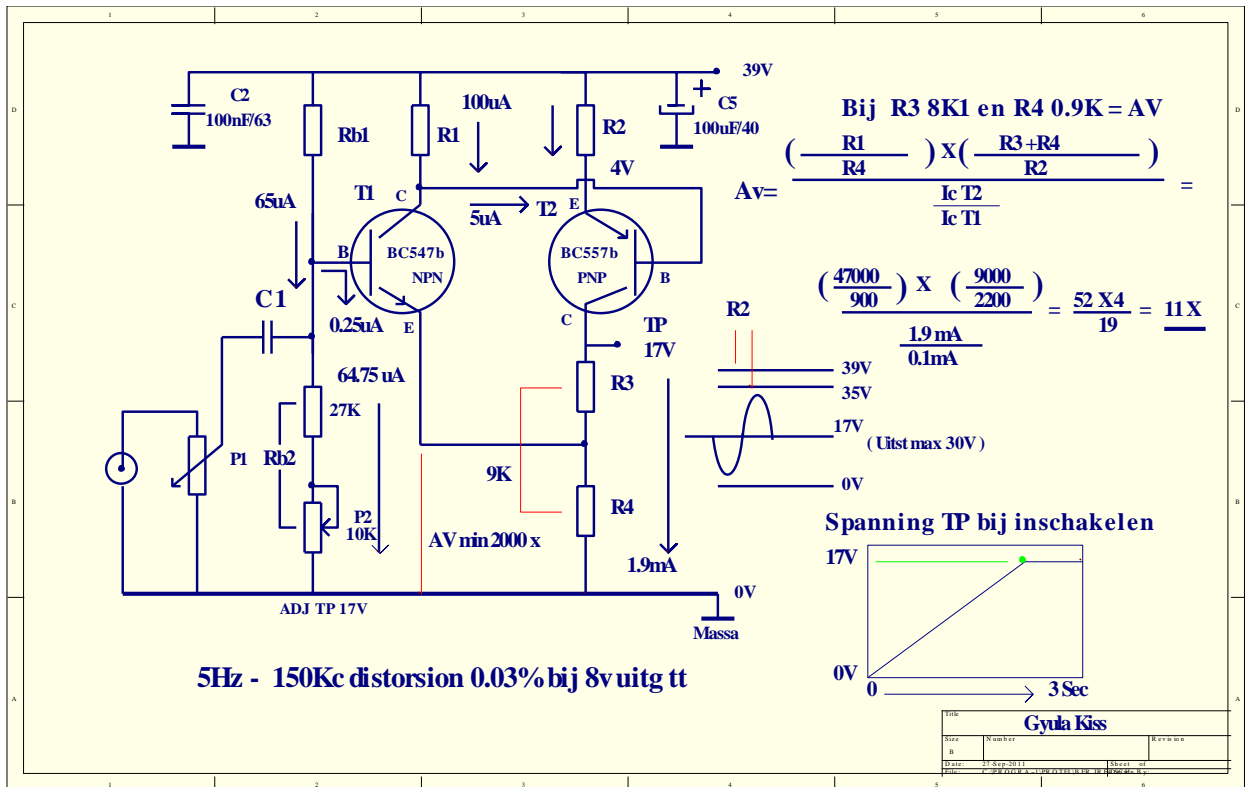
VOORVERSTERKER ELKO'S
RADIAAL



VOORVERSTERKER ELKO'S
AXIAAL



Oscilloscoop beelden
gemeten op T_{p1}



GEG: Uitgangs imp ber 9k
Ucoll T2 17V (reg 15-18V)
Versterking 10 / 30x

R3 = Rtot - R4 = 9K - 0.9K = 8K1 (VERST 10x)
R3 = Rtot - R4 = 9K - 0.3K = 8K7 (VERST 30x)

$$IC T2 = \frac{U R3 + R4}{R3 + R4} = \frac{17V}{9K} = 1.9mA$$

$$R2 = \frac{U R1}{I R1} = \frac{4V (gek)}{1.9mA} = 2K2$$

Gek instelstroom T1 = 100uA

$$R1 = \frac{U R2 + UBET2}{I R1} = \frac{4V6}{100uA} = 47K$$

Openlus versterking = 2000x
Bij versterking 10 x (30x)

$$R4 = \frac{AV \times \left(\frac{IC T2}{IC T1} \right)}{\left(\frac{R3 + R4}{R2} \right)} = \frac{R1 = 47K}{\left(\frac{9K}{2K2} \right)} = \frac{(33x) 11 \times \left(\frac{1.9mA}{0.1mA} \right)}{\left(\frac{9K}{2K2} \right)} = \frac{(627) (156.75)}{4} = 52.26$$

10 en 30 x met jumper

10x 30x
R3 8K1 8K7
R4 0.9K 0.3K

9k

8K2
0.3K
0.6K
100uF

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Voorversterker

Bereken : Rb1 Rb2

$U_{R4} = R4 \times I_{R4} = 0.9K \times 1.9mA = 1.6V$

$RB1 = \frac{UB - U_{R4} - U_{BE T1}}{I_{RB1}} = \frac{39V - 1.6V - 0.6V}{65\mu A} = \frac{36.8}{65\mu A} = \underline{560K}$

$RB2 = \frac{U_{R4} + U_{BE T1}}{I_{RB2}} = \frac{1.6V + 0.6V}{64.75\mu A} = \frac{2.2V}{64.75\mu A} = \underline{32K}$ (27K+10K instelpot)

De spanningsdeler RB1 en RB2 is zodanig gekozen om een ing imp te verkrijgen van 25K

$I_{ng \ imp} = R_v = (R_{b1} / R_{b2}) // (\beta \times I_{C} \times R_{4})$

$R_v / R_{b1} / R_{b2} = \frac{560K \times 32K}{560K + 32K} = \frac{17920}{592} = 30.2K$

$\beta \times I_{C} \times R_{4} = 400 \times 900 = 360K \quad \frac{30.2K \times 360K}{30.2K + 360K} = \frac{10872}{390.2} = \underline{28K} \quad A_v \ 11X$

Bereken ingangs condensator C1

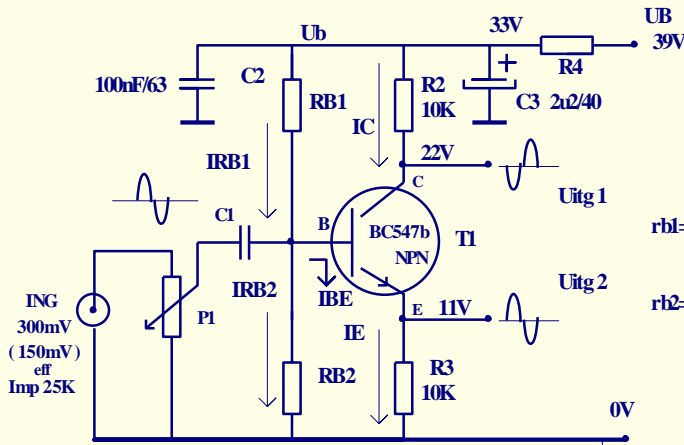
$24K \quad A_v \ 30X$

$C1 = \frac{1}{\sqrt{2\pi \cdot f \cdot r}} = \frac{159.2}{Hz \times Kohm} = \frac{159.2}{3 \times 25} = \underline{2.2 \mu F}$

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Fasedraaier voor balans eindtrap

5 Hz - 250 Kc +/-1db



Geg: Ing imp 100k

Uitg imp 10k

Geloozen Ub 33V voor gelijke weerst R2 en R3

" " $I_{rb}/r_{b2} \ 65\mu A = 25 \times I_{b \ vmm} \ imp$

" " $U_c \ 22V$

" " $U_e \ 11V$

Max output is 20v tt

Max output wat voor volle uitst wordt gebruikt is 800mV tt

$I_c = I_e$

$I_e = \frac{U_{r3}}{r3} = \frac{11V}{10k} = \underline{1.1mA}$

$r4 = \frac{U_{r4}}{I_{r4}} = \frac{6V}{1.1mA} = \underline{5k6}$

$I_{be} = \frac{I_c}{\beta \times T1} = \frac{1.1mA}{400} = \underline{2.5\mu A}$

$r_{b1} = \frac{U_b - (U_{r3} + U_{be})}{I_{r_{b1}}} = \frac{33 - (11 + 0.6)}{65\mu A} = \frac{21.4}{65\mu A} = \underline{330K}$

$r_{b2} = \frac{U_{r3} + U_{be}}{I_{r_{b1}} - I_{be}} = \frac{11 + 0.6}{65\mu A - 2.5\mu A} = \frac{11.6}{62.5\mu A} = \underline{180K}$

$I_{ng \ imp} = \frac{r_{b1} \times r_{b2}}{r_{b1} + r_{b2}} = \frac{59400}{510} = 116k$

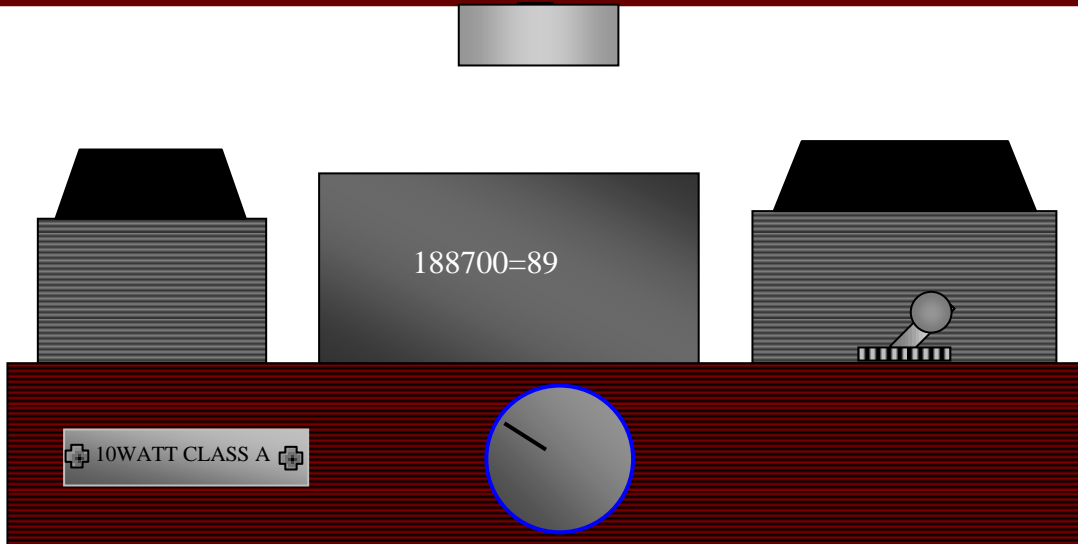
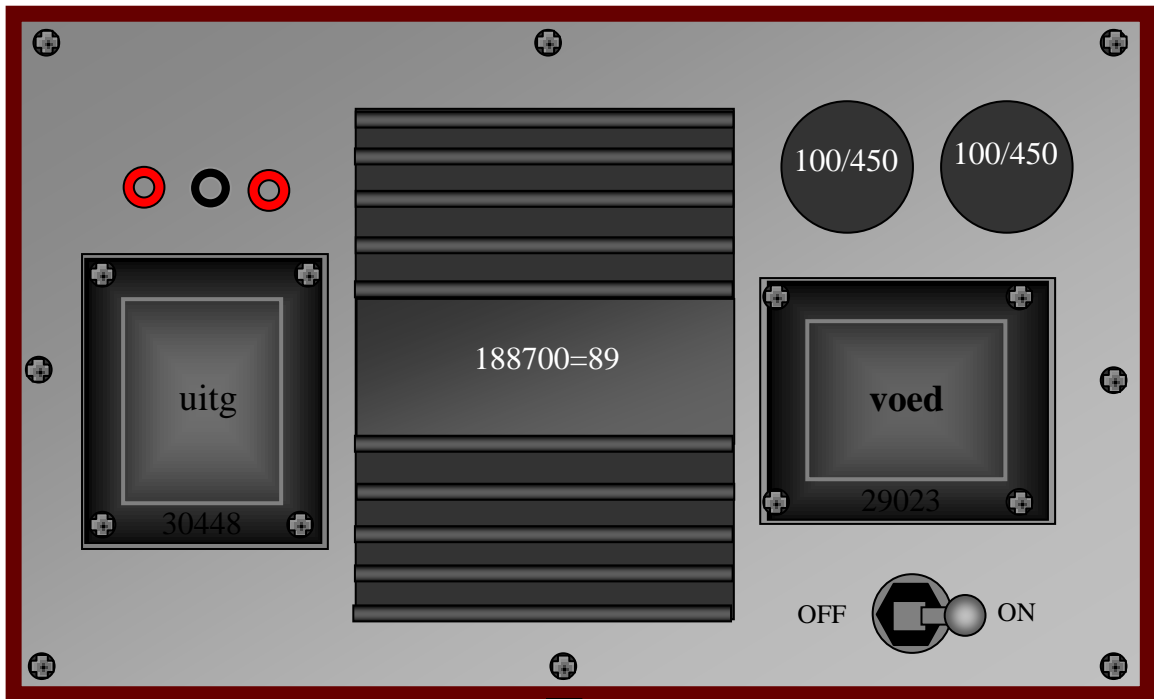
$\beta \times r3 = 400 \times 10k = 4000k$

$\frac{\beta \times r3 \times 140k}{\beta \times r3 + 116k} = \frac{4000k \times 116k}{4116} = \underline{110K}$

$C1 \ \mu F = \frac{1}{2\pi \cdot f \cdot r} = \frac{159.2}{Hz \times kohm} = \frac{159.2}{2 \times 110} = \frac{159.2}{220} = \underline{0.72\mu F}$

$C1 = \underline{0.82-1\mu F}$

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Bouwplan balansversterker

Gyula Kiss