

```
.options plotwinsize = 0      ;ac oct 1000 1 10meg
```

```
.tran 0 5m 0 1E-8
```

.four {F} V(OUT+,OUT-)

```
.four {F} V(OUT+)  
.four {F} V(OUT-)
```

```
.step param F list 20K 10K 5K
```

```
.model 1 ako:BC550
model 2 ako:BC560
```

.MODEL THAT_300 NPN (
 + IS = 5.005475E-15 BF = 150
 + NF = 1 BR = 119.4532856
 + NR = 1 ISE = 3.002016E-16 NE = 1.3340565
 + ISC = 3.173175E-14 NC = 1.6525 VAF = 60
 + VAR = 10.8094728 IKF = 0.2850543 IKR = 0.0103675
 + RB = 30 RBM = 2.94235 IRB = 1.750788E-4
 + RE = 0.2 RC = 12.4561714 CJE = 5.086292E-12
 + VJE = 0.7241957 MJE = 0.49456 FC = 0.97
 + CJC = 2.190824E-12 VJC = 0.5595858 MJC = 0.498675
 + TF = 7.063932E-11 XTF = 17.846692 ITF = 0.0862198
 + VTF = 1.7447209 QCO = 1E-12 RCO = 1
 + VO = 1 GAMMA = 1E-13 XTB = 1.1
 + PTF = 20)
 .include t1431.mod

The circuit is a 14-bit DAC implemented using a current mirror architecture. It consists of several key blocks:

- DAC Core:** A central block that takes a 14-bit digital input (IN+) and produces a 14-bit digital output (OUT-). It includes a DAC+ block with a SINE(1.65 1.55 (F)) input and a DAC- block with a SINE(1.65 1.55 (F)) input.
- Current Mirror Array:** A series of current mirrors (Q1-Q14) that convert the digital input into an analog current. The current mirrors are connected to a common current source (Q1) and a common current sink (Q14).
- Output Stage:** A series of current mirrors (Q15-Q17) that convert the analog current into a digital output (OUT-). The output stage is connected to a common current source (Q15) and a common current sink (Q17).
- Resistors and Capacitors:** Various resistors (R1-R54) and capacitors (C1-C11) are used to bias the transistors and filter the output signals. Key components include R1 (150), R2 (47), R3 (47), R4 (470), R5 (10), R6 (221), R7 (21), R8 (21), R9 (150), R10 (47), R11 (221), R12 (2.21K), R13 (470), R14 (47), R15 (47), R16 (470), R17 (470), R18 (RE), R19 (RE), R20 (RE), R21 (RE), R22 (RE), R23 (RE), R24 (RE), R25 (RE), R26 (RE), R27 (RE), R28 (47), R29 (RE), R30 (RE), R31 (RE), R32 (1K), R33 (10K), R34 (3K), R35 (4.7K), R36 (3K), R37 (47), R38 (47), R39 (1), R40 (1), R41 (4.7K), R42 (1), R43 (1), R44 (1), R45 (1), R46 (1), R47 (1), R48 (10), R49 (221), R50 (221), R51 (221), R52 (221), R53 (47), R54 (47), R55 (47), R56 (47), R57 (47), R58 (47), R59 (47), R60 (47), R61 (47), R62 (47), R63 (47), R64 (47), R65 (47), R66 (47), R67 (47), R68 (47), R69 (47), R70 (47), R71 (47), R72 (47), R73 (47), R74 (47), R75 (47), R76 (47), R77 (47), R78 (47), R79 (47), R80 (47), R81 (47), R82 (47), R83 (47), R84 (47), R85 (47), R86 (47), R87 (47), R88 (47), R89 (47), R90 (47), R91 (47), R92 (47), R93 (47), R94 (47), R95 (47), R96 (47), R97 (47), R98 (47), R99 (47), R100 (47).

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--- C:\dt_projects\Headamp_Disc_Symm\cool.asc ---
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