Notes / Questions

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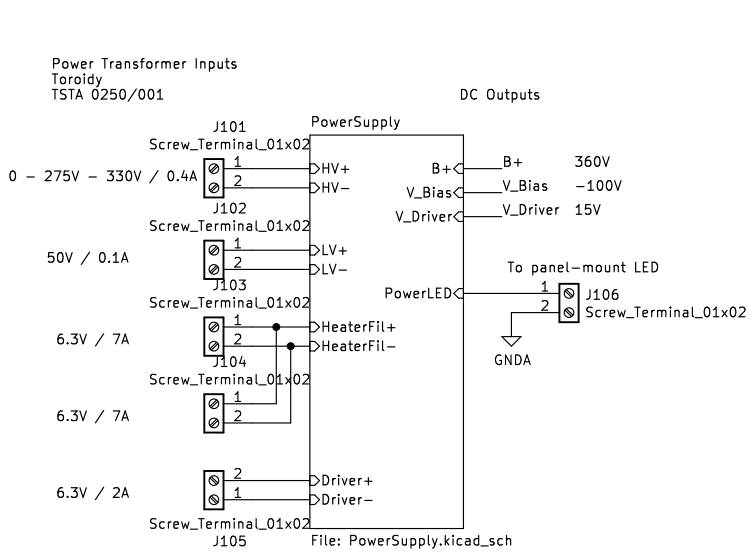

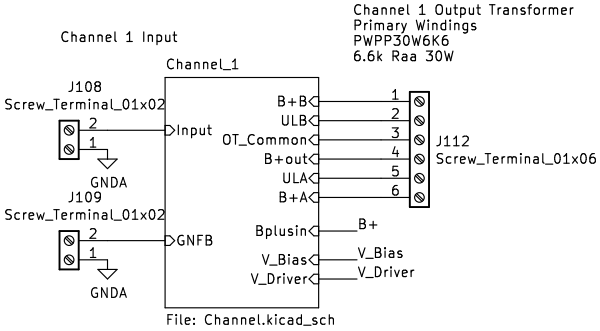

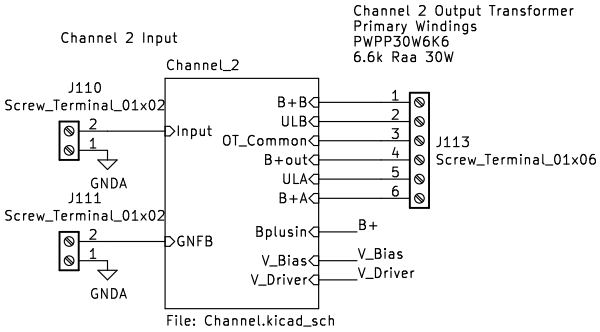

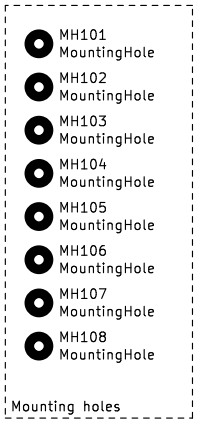

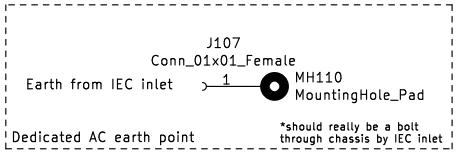

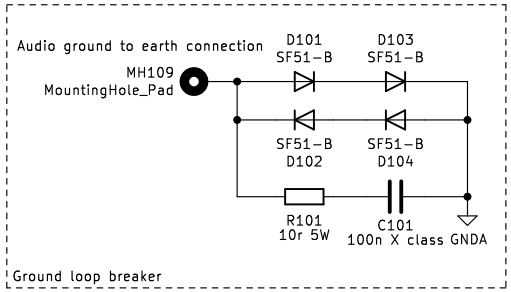

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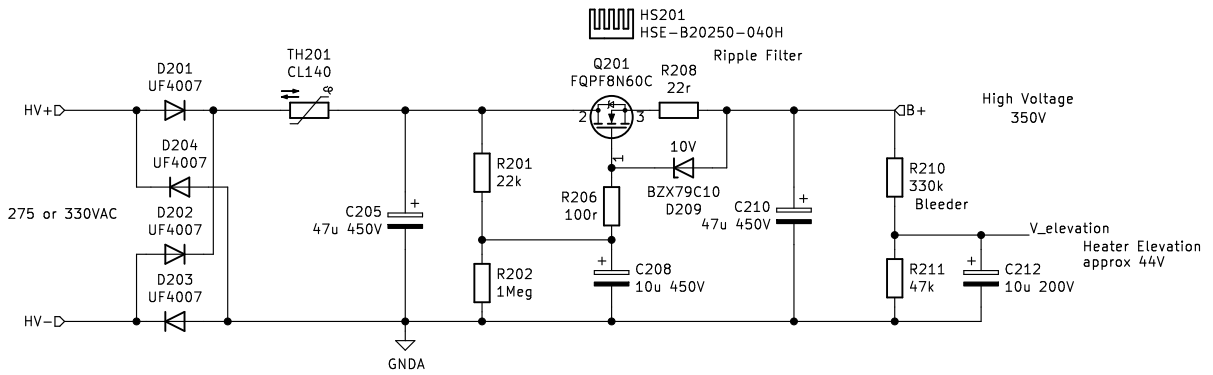
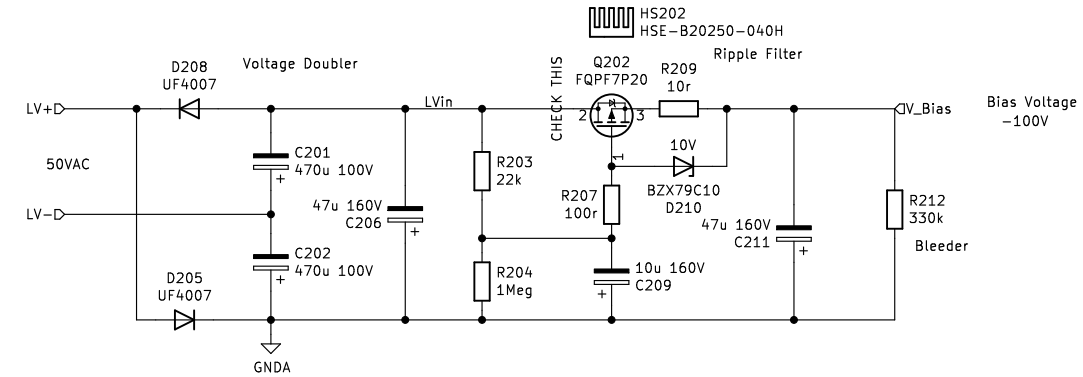
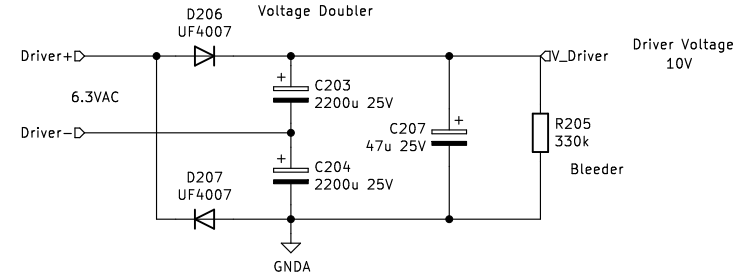
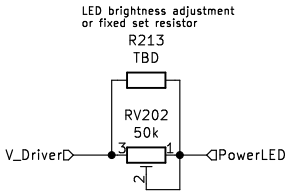
Title: Baby Huey – "Engineer's Version"

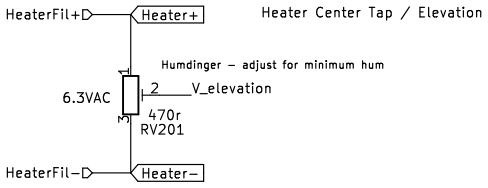
Size: A4	Date: 2021–04–25	**Rev:**
KiCad E.D.A. kicad (6.0.0–0)		Id: 1/4









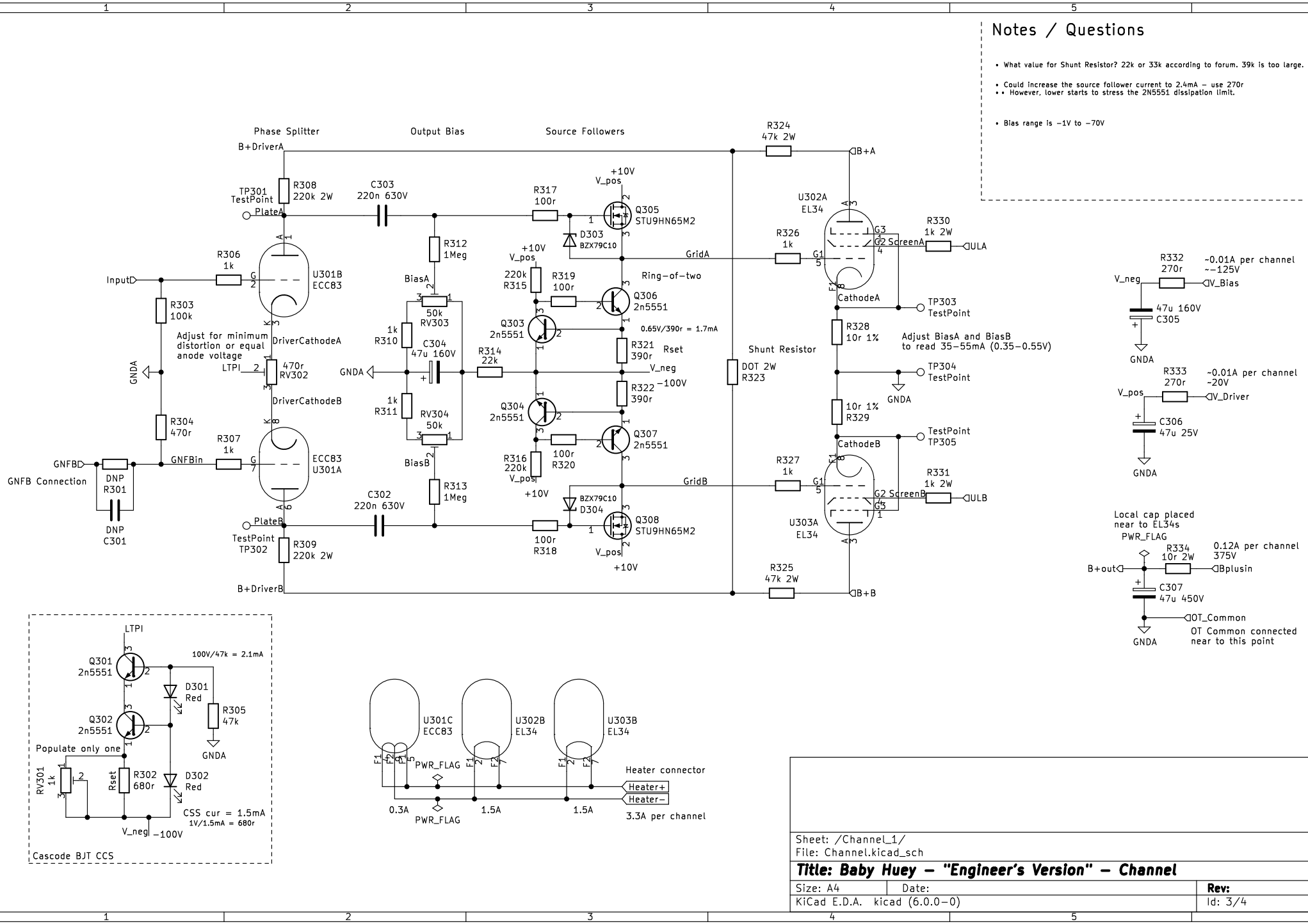


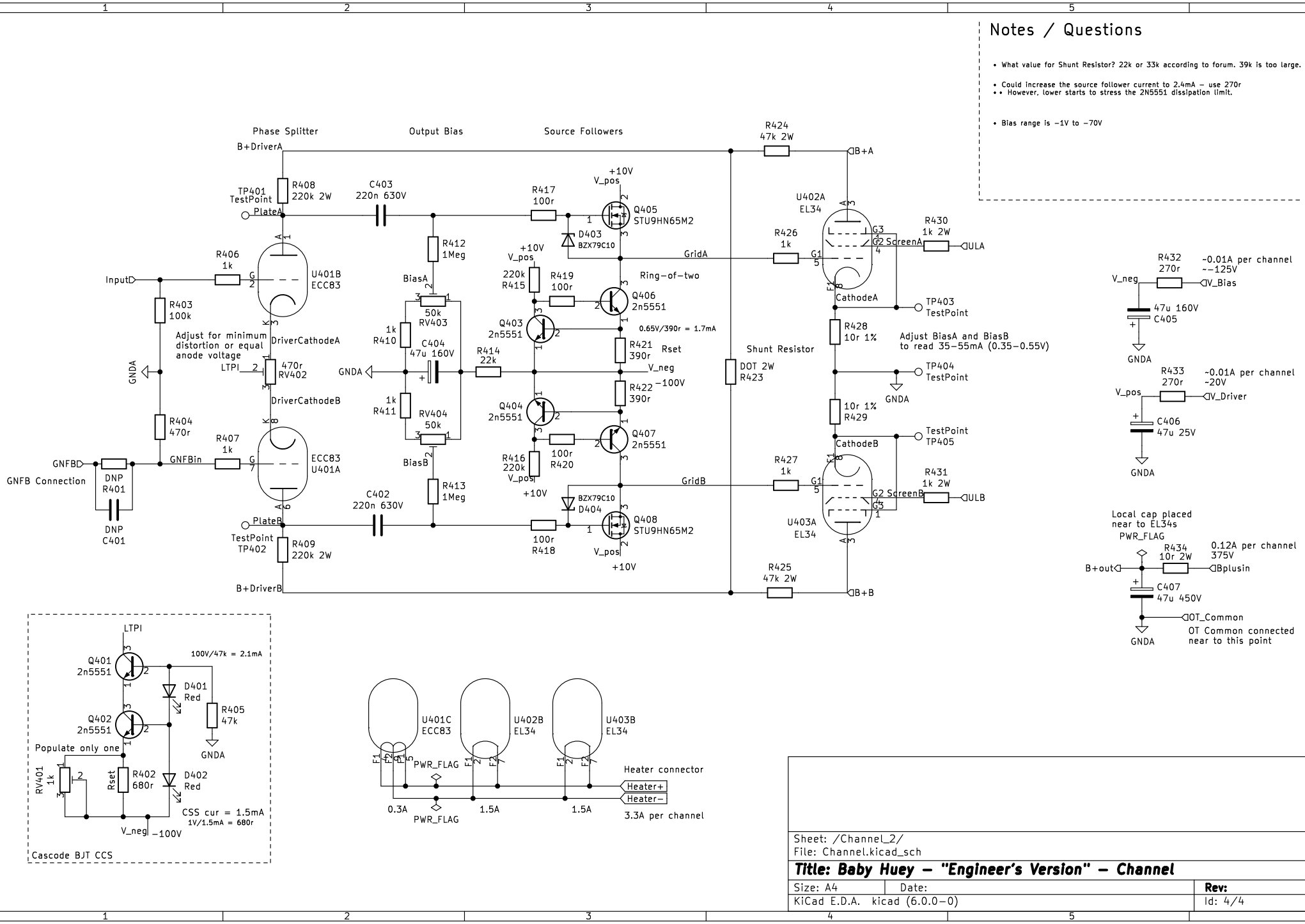
Notes

* Both FETs are encapsulated in plastic
- no isolation pad / shoulders needed
- use heat transfer pad / paste

The regulator gives protection to inrush
Max V across the 22r resistor is V_Z - V_GS = 10 - 4 = 6
Max current is 6/22 = 270mA

Sheet: /PowerSupply/		
File: PowerSupply.kicad_sch		
Title: Baby Huey - "Engineer's Version" - Power Supply		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.0-0)		Id: 2/4


Notes / Questions
• What value for Shunt Resistor? 22k or 33k according to forum. 39k is too large.
• Could increase the source follower current to 2.4mA – use 270r
• • However, lower starts to stress the 2N5551 dissipation limit.
• Bias range is −1V to −70V
Phase Splitter
Output Bias
Source Followers
B+DriverA
B+DriverB
B+A
B+B
TP301 TestPoint
PlateA
PlateB
TestPoint TP302
R308 220k 2W
R309 220k 2W
C303 220n 630V
C302 220n 630V
R312 1Meg
R313 1Meg
U301B ECC83
U301A ECC83
Input
R306 1k
R303 100k
R304 470r
R307 1k
GNFB
GNFBin
GNFB Connection
DNP R301
DNP C301
GNDA
Adjust for minimum distortion or equal anode voltage
LTPI
470r RV302
DriverCathodeA
DriverCathodeB
BiasA
BiasB
50k RV303
RV304 50k
1k R310
1k R311
C304 47u 160V
R314 22k
V_neg
−100V
+10V
V_pos
R315 220k
R316 220k
R317 100r
R318 100r
R319 100r
R320 100r
R321 390r
Rset
R322 390r
Ring−of−two
0.65V/390r = 1.7mA
Q303 2n5551
Q304 2n5551
Q305 STU9HN65M2
Q306 2n5551
Q307 2n5551
Q308 STU9HN65M2
D303 BZX79C10
D304 BZX79C10
GridA
GridB
R324 47k 2W
R325 47k 2W
U302A EL34
U303A EL34
R326 1k
R327 1k
R330 1k 2W
R331 1k 2W
G1
G2 ScreenA
G2 ScreenB
G3
ULA
ULB
CathodeA
CathodeB
TP303 TestPoint
TP304 TestPoint
TestPoint TP305
R328 10r 1%
R329 10r 1%
Shunt Resistor
DOT 2W R323
Adjust BiasA and BiasB to read 35−55mA (0.35−0.55V)
R332 270r
~0.01A per channel
~−125V
V_Bias
47u 160V C305
R333 270r
~0.01A per channel
~20V
V_Driver
C306 47u 25V
Local cap placed near to EL34s
PWR_FLAG
R334 10r 2W
0.12A per channel
375V
B+out
Bplusin
C307 47u 450V
OT_Common
OT Common connected near to this point
LTPI
Q301 2n5551
Q302 2n5551
100V/47k = 2.1mA
D301 Red
R305 47k
Populate only one
RV301 1k
Rset
R302 680r
D302 Red
CSS cur = 1.5mA
1V/1.5mA = 680r
Cascode BJT CCS
U301C ECC83
U302B EL34
U303B EL34
F1
F2
PWR_FLAG
0.3A
1.5A
1.5A
Heater connector
Heater+
Heater−
3.3A per channel
Sheet: /Channel_1/
File: Channel.kicad_sch
Title: Baby Huey – "Engineer's Version" – Channel
Size: A4
Date:
Rev:
KiCad E.D.A. kicad (6.0.0−0)
Id: 3/4


Notes / Questions
• What value for Shunt Resistor? 22k or 33k according to forum. 39k is too large.
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• • However, lower starts to stress the 2N5551 dissipation limit.
• Bias range is −1V to −70V
Phase Splitter
Output Bias
Source Followers
B+DriverA
B+DriverB
B+A
B+B
TP401 TestPoint
PlateA
PlateB
TestPoint TP402
R408 220k 2W
R409 220k 2W
C403 220n 630V
C402 220n 630V
R412 1Meg
R413 1Meg
R417 100r
R418 100r
R424 47k 2W
R425 47k 2W
+10V
V_pos
Q405 STU9HN65M2
Q406 2n5551
Q407 2n5551
Q408 STU9HN65M2
D403 BZX79C10
D404 BZX79C10
Ring−of−two
0.65V/390r = 1.7mA
Q403 2n5551
Q404 2n5551
R419 100r
R420 100r
R415 220k
R416 220k
R421 390r
R422 390r
Rset
V_neg
−100V
R414 22k
BiasA
BiasB
50k RV403
RV404 50k
1k R410
1k R411
C404 47u 160V
GNDA
U401B ECC83
U401A ECC83
Input
R406 1k
R407 1k
R403 100k
R404 470r
LTPI
470r RV402
DriverCathodeA
DriverCathodeB
Adjust for minimum distortion or equal anode voltage
GNFB
GNFBin
GNFB Connection
DNP R401
DNP C401
U402A EL34
U403A EL34
R426 1k
R427 1k
R430 1k 2W
R431 1k 2W
G2 ScreenA
G2 ScreenB
ULA
ULB
CathodeA
CathodeB
TP403 TestPoint
TP404 TestPoint
TestPoint TP405
R428 10r 1%
R429 10r 1%
Adjust BiasA and BiasB to read 35−55mA (0.35−0.55V)
Shunt Resistor
DOT 2W R423
GridA
GridB
R432 270r
~0.01A per channel
~−125V
V_Bias
C405 47u 160V
R433 270r
~0.01A per channel
~20V
V_Driver
C406 47u 25V
Local cap placed near to EL34s
PWR_FLAG
R434 10r 2W
0.12A per channel
375V
Bplusin
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C407 47u 450V
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OT Common connected near to this point
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Q402 2n5551
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R405 47k
Populate only one
RV401 1k
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R402 680r
D402 Red
CSS cur = 1.5mA
1V/1.5mA = 680r
V_neg
−100V
Cascade BJT CCS
U401C ECC83
U402B EL34
U403B EL34
PWR_FLAG
0.3A
1.5A
1.5A
Heater connector
Heater+
Heater−
3.3A per channel
Sheet: /Channel_2/
File: Channel.kicad_sch
Title: Baby Huey – "Engineer's Version" – Channel
Size: A4
Date:
Rev:
KiCad E.D.A. kicad (6.0.0−0)
Id: 4/4