Notes / Questions

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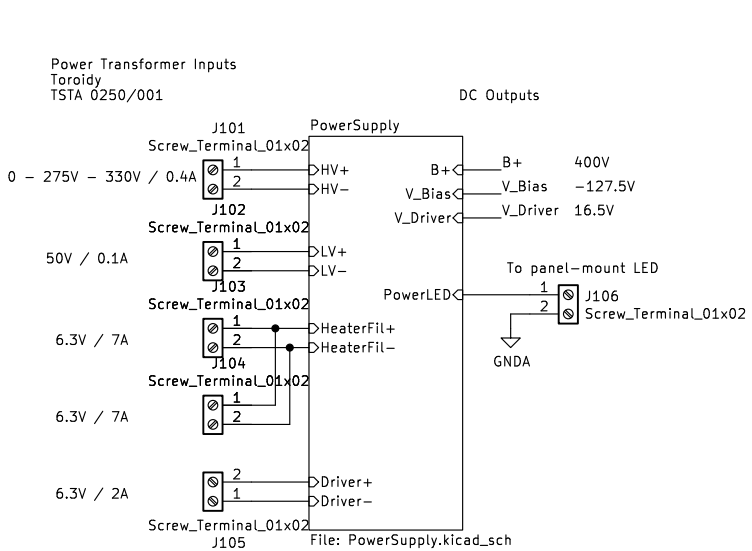

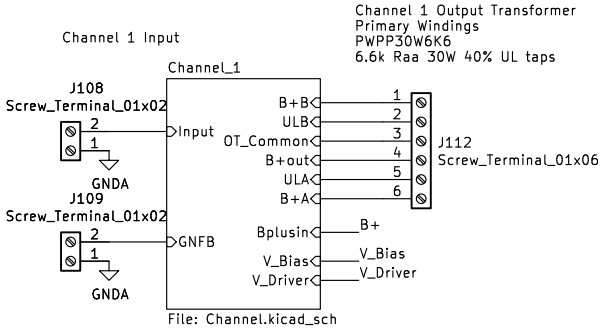

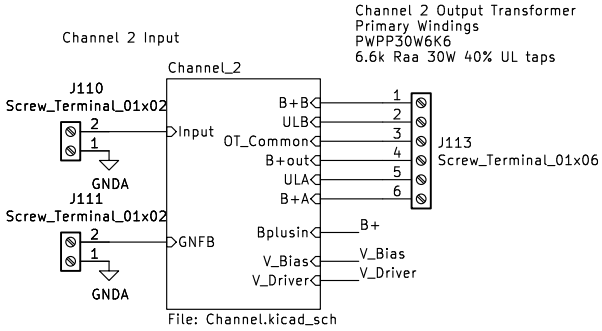

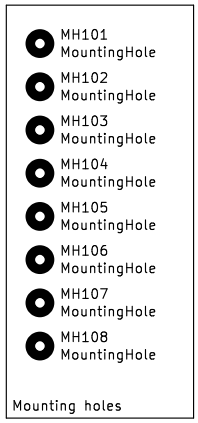

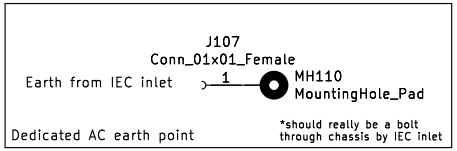

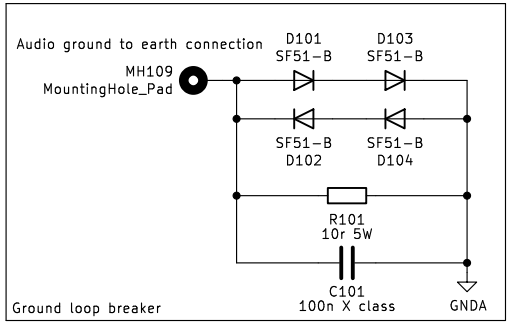

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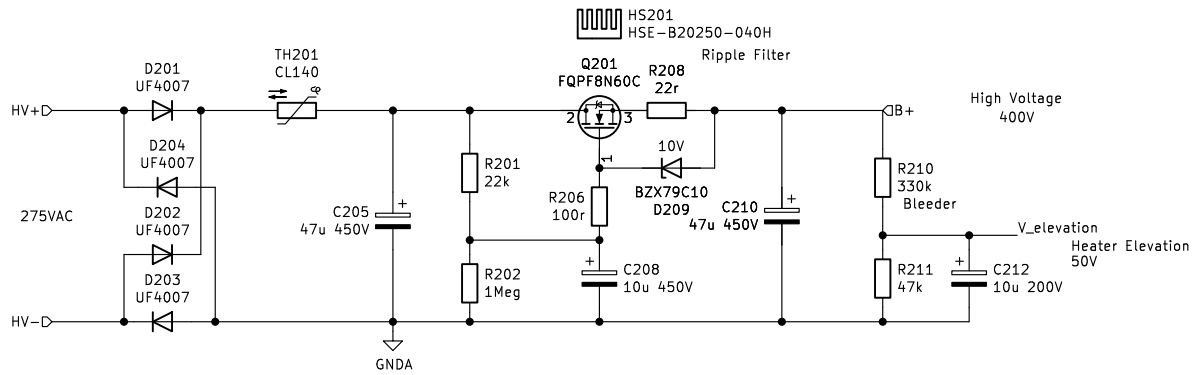
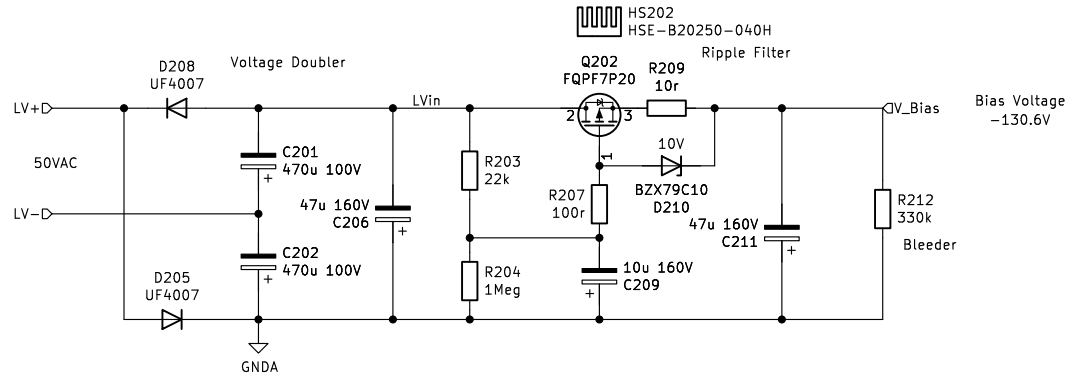
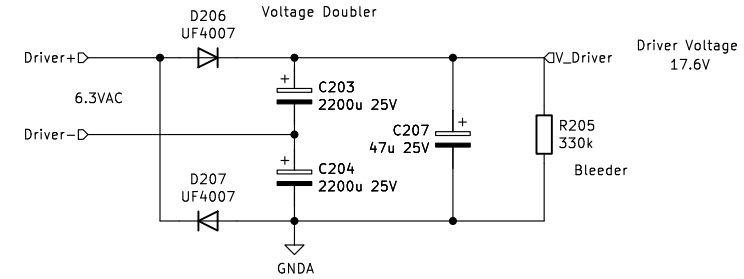
File: BabyHuey.kicad_sch

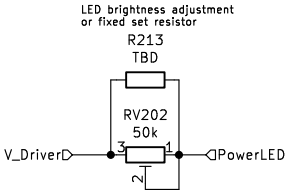
Title: Baby Huey – "Engineer's Version"

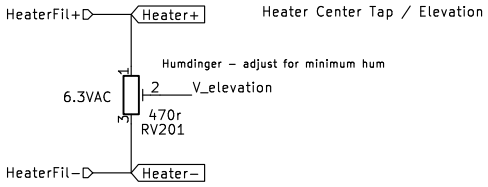
Size: A4	Date: 2021–04–25	**Rev:**
KiCad E.D.A. kicad 7.0.8		Id: 1/4









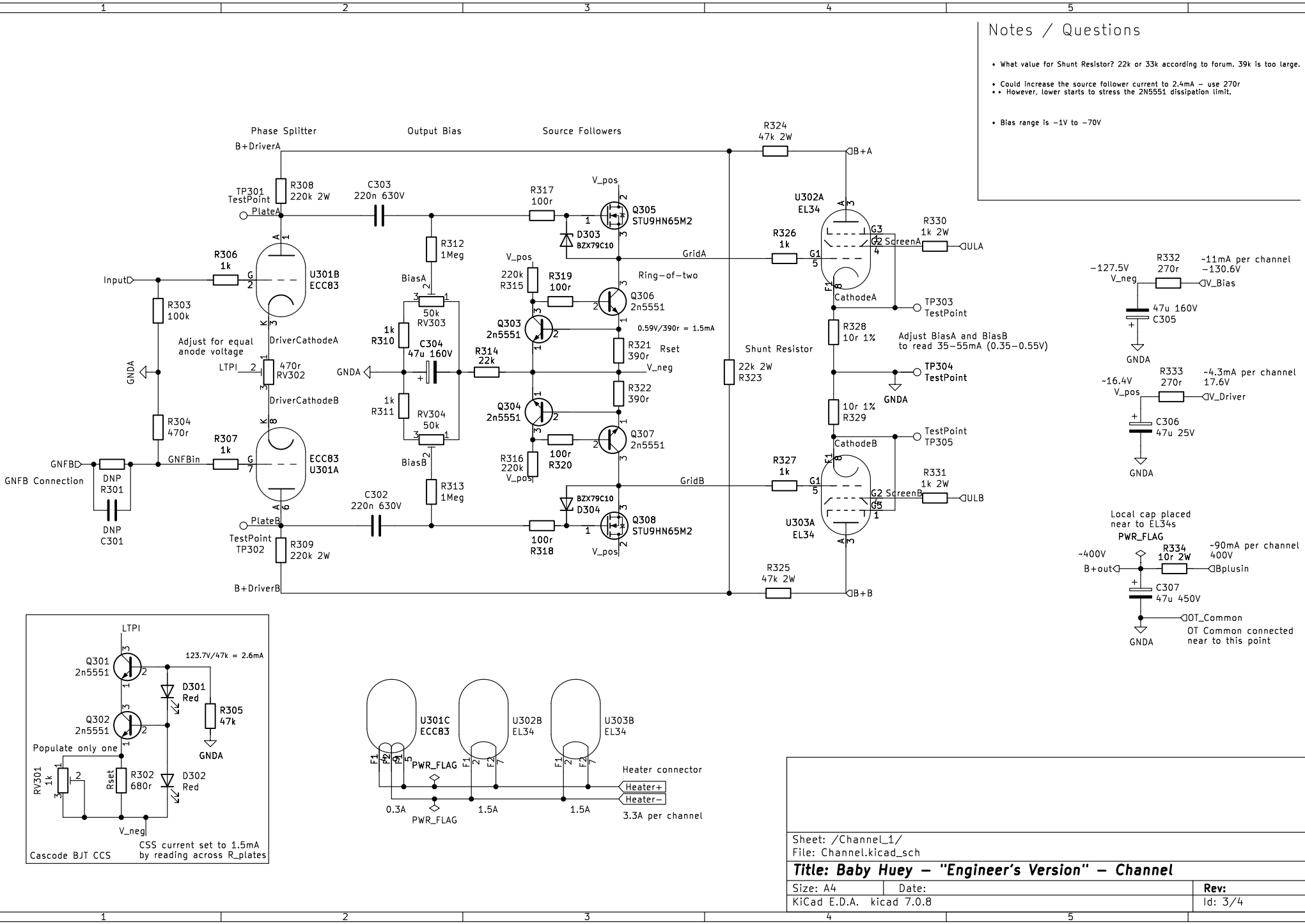


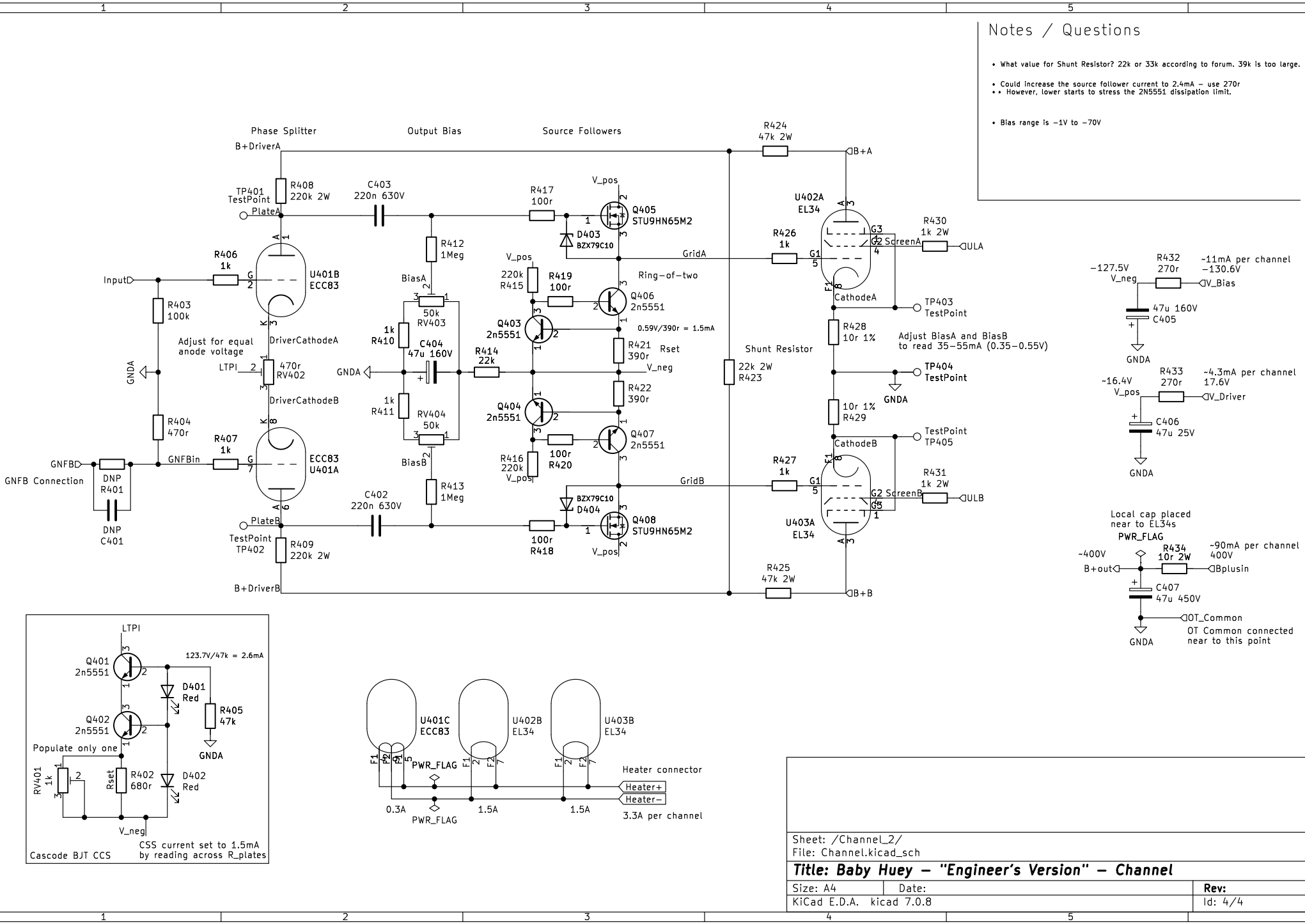
Notes

* 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 7.0.8		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
TP302 TestPoint
R308 220k 2W
R309 220k 2W
C303 220n 630V
C302 220n 630V
R306 1k
R307 1k
R303 100k
R304 470r
Input
GNFB
GNFBin
GNFB Connection
DNP R301
DNP C301
U301B ECC83
ECC83 U301A
DriverCathodeA
DriverCathodeB
Adjust for equal anode voltage
LTPI
GNDA
470r RV302
R312 1Meg
R313 1Meg
BiasA
BiasB
50k RV303
50k RV304
1k R310
1k R311
C304 47u 160V
R314 22k
V_pos
220k R315
R316 220k
R317 100r
R318 100r
R319 100r
R320 100r
Q305 STU9HN65M2
Q308 STU9HN65M2
Q306 2n5551
Q307 2n5551
Q303 2n5551
Q304 2n5551
D303 BZX79C10
D304 BZX79C10
Ring−of−two
0.59V/390r = 1.5mA
R321 390r Rset
R322 390r
V_neg
GridA
GridB
R324 47k 2W
R325 47k 2W
R326 1k
R327 1k
R323 22k 2W
Shunt Resistor
U302A EL34
U303A EL34
R330 1k 2W
R331 1k 2W
G2 ScreenA
G2 ScreenB
ULA
ULB
TP303 TestPoint
CathodeA
R328 10r 1%
Adjust BiasA and BiasB to read 35−55mA (0.35−0.55V)
TP304 TestPoint
R329 10r 1%
CathodeB
TestPoint TP305
−127.5V
V_neg
R332 270r
~11mA per channel
−130.6V
V_Bias
47u 160V C305
~16.4V
V_pos
R333 270r
~4.3mA per channel
17.6V
V_Driver
C306 47u 25V
Local cap placed near to EL34s
PWR_FLAG
~400V
B+out
R334 10r 2W
~90mA per channel
400V
Bplusin
C307 47u 450V
OT_Common
OT Common connected near to this point
LTPI
Q301 2n5551
Q302 2n5551
123.7V/47k = 2.6mA
D301 Red
R305 47k
GNDA
Populate only one
RV301 1k
Rset
R302 680r
D302 Red
V_neg
CSS current set to 1.5mA by reading across R_plates
Cascode BJT CCS
U301C ECC83
U302B EL34
U303B EL34
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 7.0.8
Id: 3/4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• Bias range is −1V to −70V
Phase Splitter
Output Bias
Source Followers
B+DriverA
B+DriverB
B+A
B+B
TP401 TestPoint
PlateA
PlateB
TP402 TestPoint
R408 220k 2W
R409 220k 2W
C403 220n 630V
C402 220n 630V
R412 1Meg
R413 1Meg
R417 100r
R418 100r
R419 100r
R420 100r
R421 390r
R422 390r
R424 47k 2W
R425 47k 2W
R426 1k
R427 1k
R428 10r 1%
R429 10r 1%
R430 1k 2W
R431 1k 2W
R423 22k 2W
Shunt Resistor
U401B ECC83
U401C ECC83
U402A EL34
U402B EL34
U403A EL34
U403B EL34
Q405 STU9HN65M2
Q408 STU9HN65M2
Q406 2n5551
Q407 2n5551
Q403 2n5551
Q404 2n5551
D403 BZX79C10
D404 BZX79C10
Ring−of−two
0.59V/390r = 1.5mA
Rset
V_pos
V_neg
GridA
GridB
CathodeA
CathodeB
ULA
ULB
G2 ScreenA
G2 ScreenB
TP403 TestPoint
TP404 TestPoint
TestPoint TP405
GNDA
Input
R406 1k
R403 100k
R404 470r
R407 1k
GNFB
GNFBin
GNFB Connection
DNP R401
DNP C401
Adjust for equal anode voltage
LTPI
470r RV402
DriverCathodeA
DriverCathodeB
BiasA
BiasB
50k RV403
50k RV404
1k R410
1k R411
C404 47u 160V
R414 22k
R415 220k
R416 220k
Adjust BiasA and BiasB to read 35−55mA (0.35−0.55V)
−127.5V
V_neg
R432 270r
~11mA per channel
−130.6V
V_Bias
47u 160V C405
~16.4V
V_pos
R433 270r
~4.3mA per channel
17.6V
V_Driver
C406 47u 25V
Local cap placed near to EL34s
PWR_FLAG
~400V
B+out
R434 10r 2W
~90mA per channel
400V
Bplusin
C407 47u 450V
OT_Common
OT Common connected near to this point
LTPI
Q401 2n5551
Q402 2n5551
123.7V/47k = 2.6mA
D401 Red
D402 Red
R405 47k
Populate only one
RV401 1k
Rset
R402 680r
V_neg
Cascade BJT CCS
CSS current set to 1.5mA by reading across R_plates
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 7.0.8
Id: 4/4