Notes / Questions

- Fix B+ connections wrt to the smoothing cap
- Add in net labels

Power Transformer Inputs
Toroidy
TSTA 0250/001

0 – 275V – 330V / 0.4A
50V / 0.1A
6.3V / 7A
6.3V / 7A
6.3V / 2A

J101 Screw_Terminal_01x02
J102 Screw_Terminal_01x02
J103 Screw_Terminal_01x02
J104 Screw_Terminal_01x02
J105 Screw_Terminal_01x02

PowerSupply
HV+
HV–
LV+
LV–
HeaterFil+
HeaterFil–
Driver+
Driver–
B+
V_Bias
V_Driver
PowerLED

DC Outputs
B+ 360V
V_Bias –100V
V_Driver 15V

To panel–mount LED
J106 Screw_Terminal_01x02
GNDA

File: PowerSupply.kicad_sch

Left Input
J108 Screw_Terminal_01x02
J109 Screw_Terminal_01x02
GNDA
Input
GNFB

Left
B+B
ULB
B+out
OT_Common
ULA
B+A
Bplusin
V_Bias
V_Driver

Left Output Transformer
Primary Windings
PWPP30W6K6
6.6k Raa 30W

J112 Screw_Terminal_01x06
*use 2x3 terminal blocks

B+
V_Bias
V_Driver

File: Channel.kicad_sch

Right Input
J110 Screw_Terminal_01x02
J111 Screw_Terminal_01x02
GNDA
Input
GNFB

Right
B+B
ULB
B+out
OT_Common
ULA
B+A
Bplusin
V_Bias
V_Driver

Right Output Transformer
Primary Windings
PWPP30W6K6
6.6k Raa 30W

J113 Screw_Terminal_01x06
*use 2x3 terminal blocks

B+
V_Bias
V_Driver

File: Channel.kicad_sch

MH101 MountingHole
MH102 MountingHole
MH103 MountingHole
MH104 MountingHole
MH105 MountingHole
MH106 MountingHole
MH107 MountingHole
MH108 MountingHole

Mounting holes

J107 Conn_01x01_Female
Earth from IEC inlet
MH110 MountingHole_Pad
*should really be a bolt through chassis by IEC inlet

Dedicated AC earth point

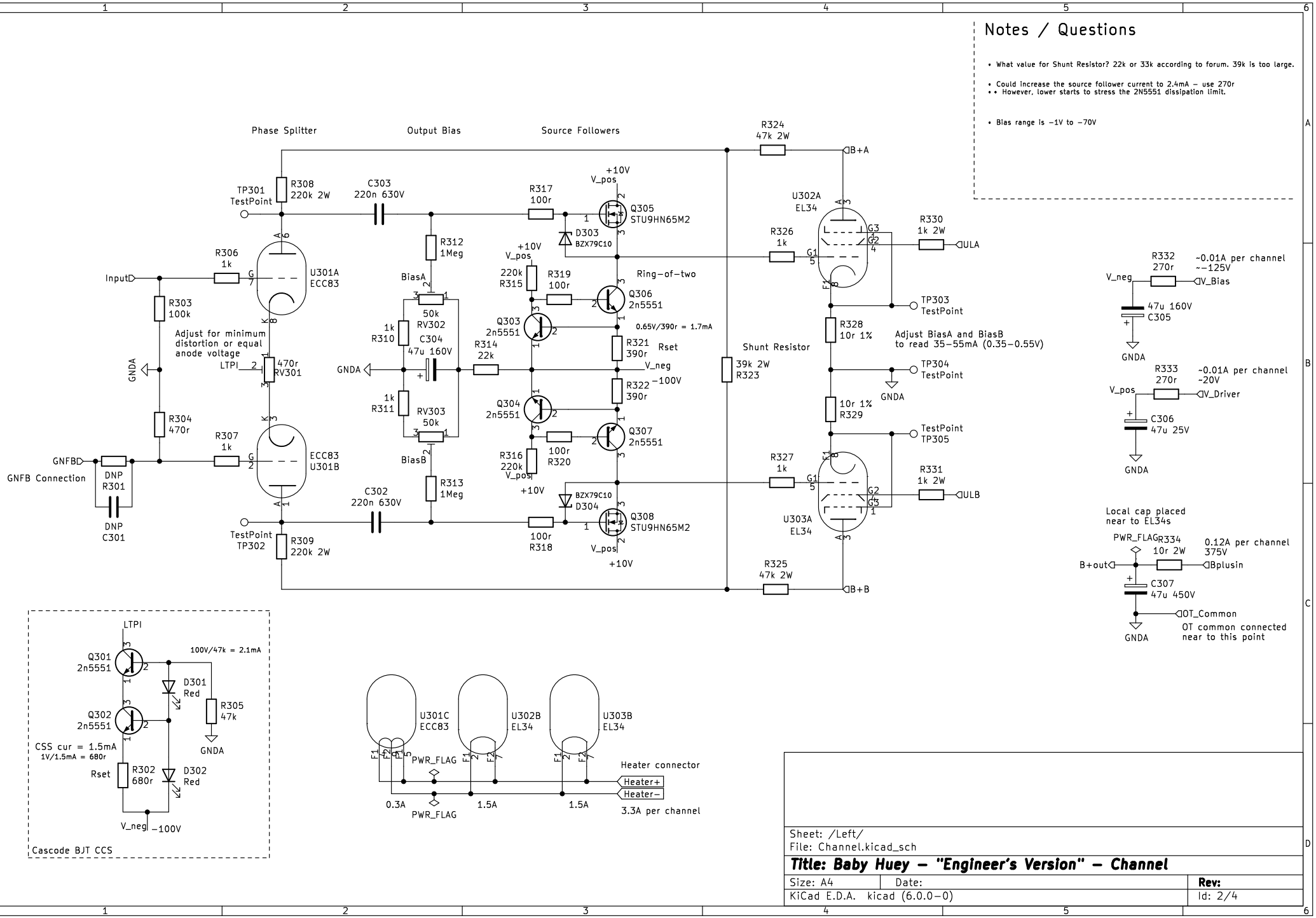
Audio ground to earth connection
MH109 MountingHole_Pad
D101 SF51–B
D103 SF51–B
SF51–B D102
SF51–B D104
R101 10r 5W
C101 100n
GNDA

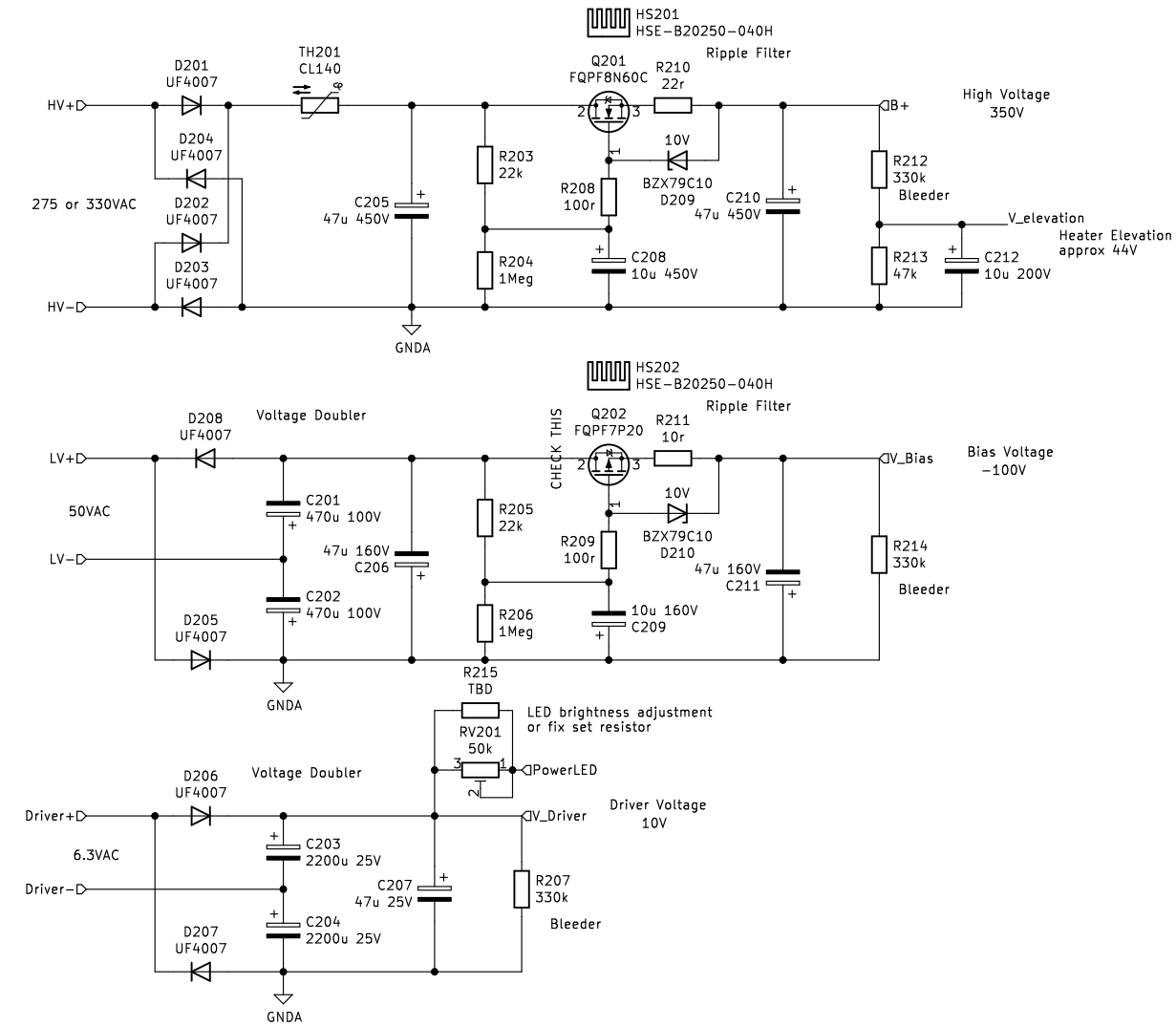
Ground loop breaker

Sheet: /
File: BabyHuey.kicad_sch

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 / 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
Shunt Resistor
Input
TP301 TestPoint
R308 220k 2W
C303 220n 630V
R306 1k
U301A ECC83
R303 100k
Adjust for minimum distortion or equal anode voltage
LTPI
470r RV301
R304 470r
GNDA
GNFB
GNFB Connection
DNP R301
DNP C301
R307 1k
ECC83 U301B
TestPoint TP302
R309 220k 2W
C302 220n 630V
R312 1Meg
BiasA
50k RV302
1k R310
C304 47u 160V
1k R311
RV303 50k
BiasB
R313 1Meg
R314 22k
R317 100r
+10V V_pos
Q305 STU9HN65M2
D303 BZX79C10
220k R315
R319 100r
Ring−of−two
Q306 2n5551
Q303 2n5551
0.65V/390r = 1.7mA
R321 390r Rset
V_neg
R322 390r −100V
Q304 2n5551
Q307 2n5551
R316 220k
100r R320
BZX79C10 D304
Q308 STU9HN65M2
100r R318
R324 47k 2W
B+A
U302A EL34
R326 1k
R330 1k 2W
ULA
TP303 TestPoint
R328 10r 1%
Adjust BiasA and BiasB to read 35−55mA (0.35−0.55V)
39k 2W R323
TP304 TestPoint
10r 1% R329
TestPoint TP305
R327 1k
R331 1k 2W
ULB
U303A EL34
R325 47k 2W
B+B
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
100V/47k = 2.1mA
D301 Red
R305 47k
Q302 2n5551
CSS cur = 1.5mA
1V/1.5mA = 680r
Rset
R302 680r
D302 Red
V_neg −100V
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: /Left/
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: 2/4

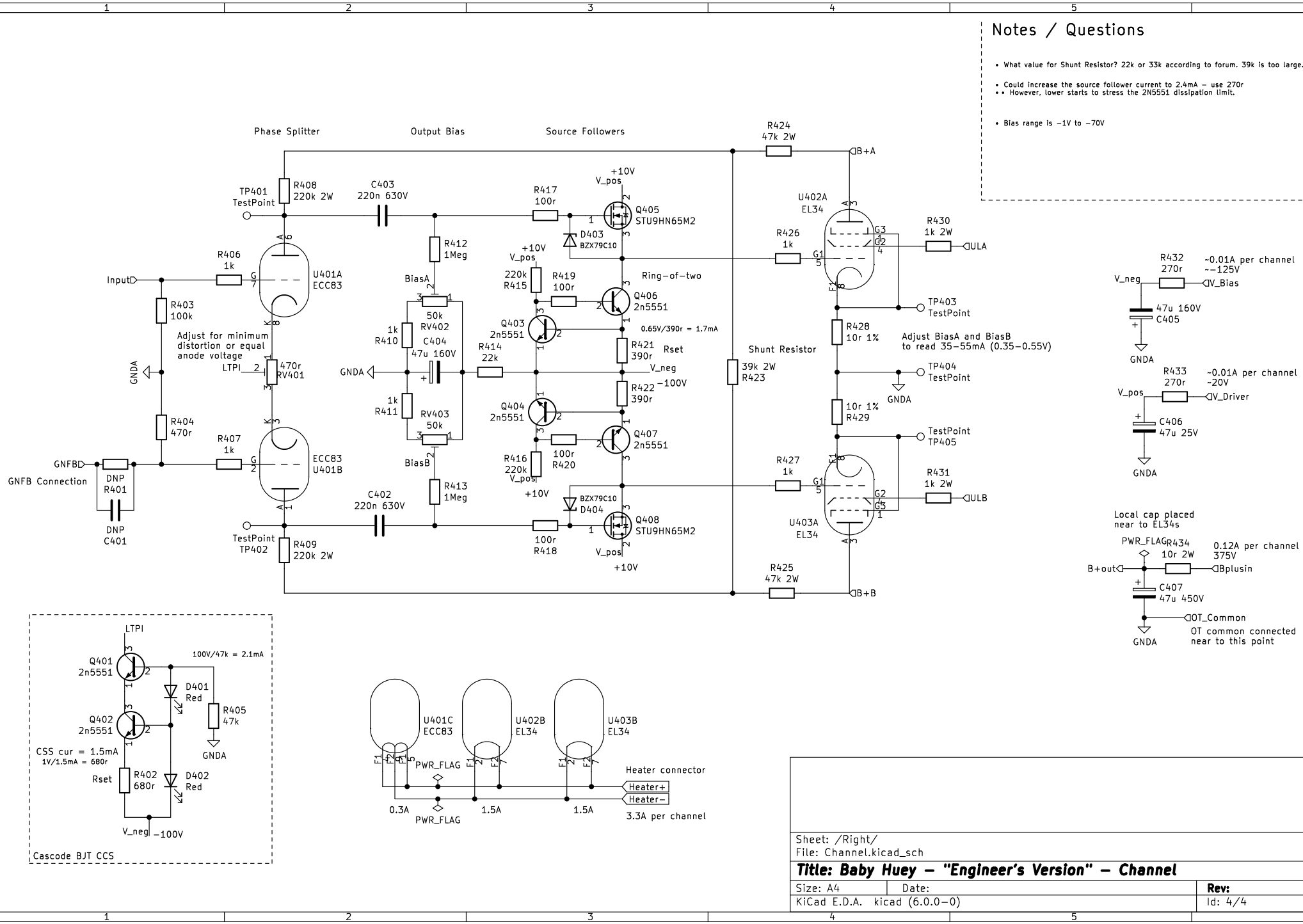


Notes

* 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: 3/4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Output Bias
Source Followers
Input
TP401 TestPoint
R408 220k 2W
C403 220n 630V
R406 1k
U401A ECC83
R403 100k
Adjust for minimum distortion or equal anode voltage
LTPI
470r RV401
R404 470r
R407 1k
GNFB
GNFB Connection
DNP R401
DNP C401
ECC83 U401B
C402 220n 630V
TestPoint TP402
R409 220k 2W
R412 1Meg
BiasA
50k RV402
1k R410
C404 47u 160V
1k R411
RV403 50k
BiasB
R413 1Meg
GNDA
R414 22k
+10V
V_pos
220k R415
R416 220k
R417 100r
R418 100r
R419 100r
R420 100r
Q405 STU9HN65M2
Q406 2n5551
Q407 2n5551
Q408 STU9HN65M2
Q403 2n5551
Q404 2n5551
D403 BZX79C10
D404 BZX79C10
Ring−of−two
0.65V/390r = 1.7mA
R421 390r
Rset
R422 390r
V_neg
−100V
R423 39k 2W
Shunt Resistor
R424 47k 2W
B+A
B+B
U402A EL34
U403A EL34
R426 1k
R427 1k
R428 10r 1%
R429 10r 1%
R430 1k 2W
R431 1k 2W
ULA
ULB
TP403 TestPoint
TP404 TestPoint
TestPoint TP405
Adjust BiasA and BiasB to read 35−55mA (0.35−0.55V)
R425 47k 2W
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
B+out
Bplusin
C407 47u 450V
OT_Common
OT common connected near to this point
LTPI
Q401 2n5551
Q402 2n5551
D401 Red
D402 Red
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100V/47k = 2.1mA
CSS cur = 1.5mA
1V/1.5mA = 680r
Rset
R402 680r
V_neg
−100V
Cascode BJT CCS
U401C ECC83
U402B EL34
U403B EL34
F1
F2
F3
F4
F5
PWR_FLAG
0.3A
1.5A
1.5A
Heater connector
Heater+
Heater−
3.3A per channel
Sheet: /Right/
File: Channel.kicad_sch
Title: Baby Huey – "Engineer's Version" – Channel
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KiCad E.D.A. kicad (6.0.0−0)
Id: 4/4