Power & Config

File: driver_Power.kicad_sch

Transducers & Drive

File: driver_Transducers.kicad_sch

Ultrasonic Sound Steering Capstone

Driver PCB Master Sheet

K. Harper 03/06/2024

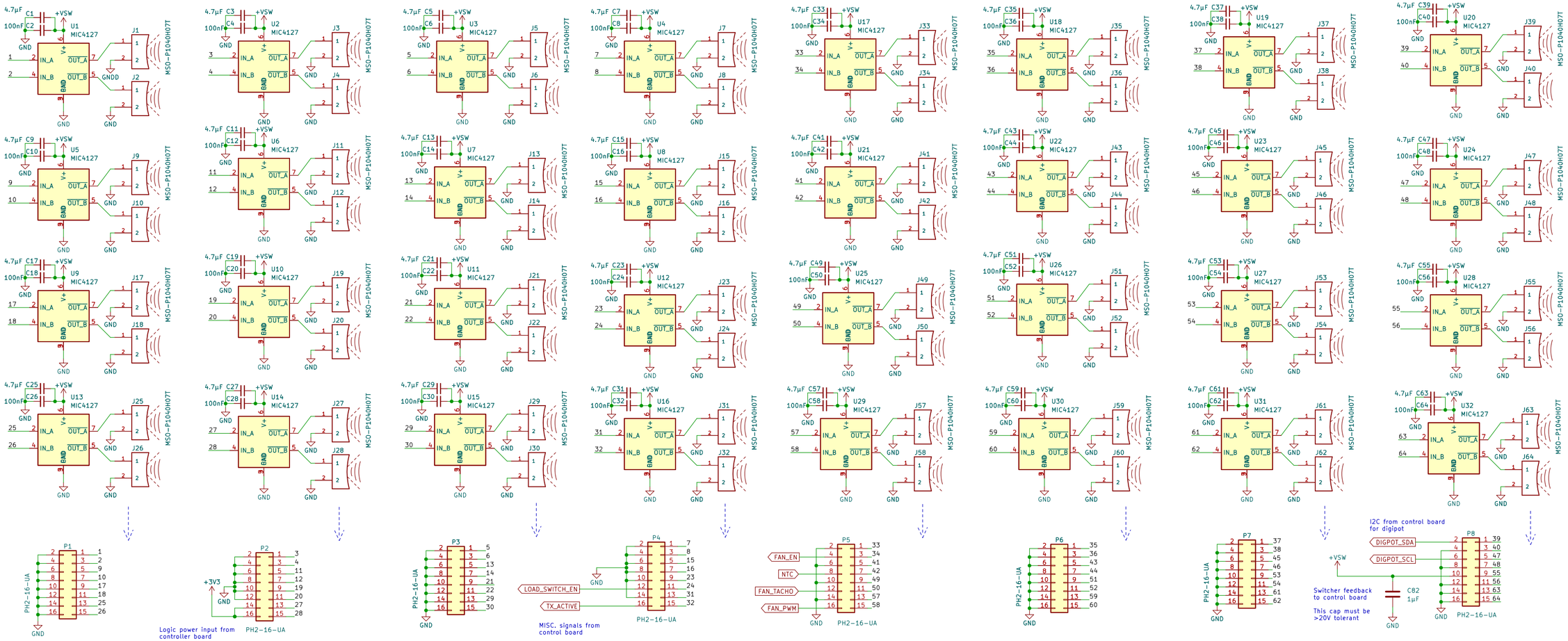
Sheet: /
File: Ultrasonic Sound Steering – Driver Rev. C.kicad_sch

Title:

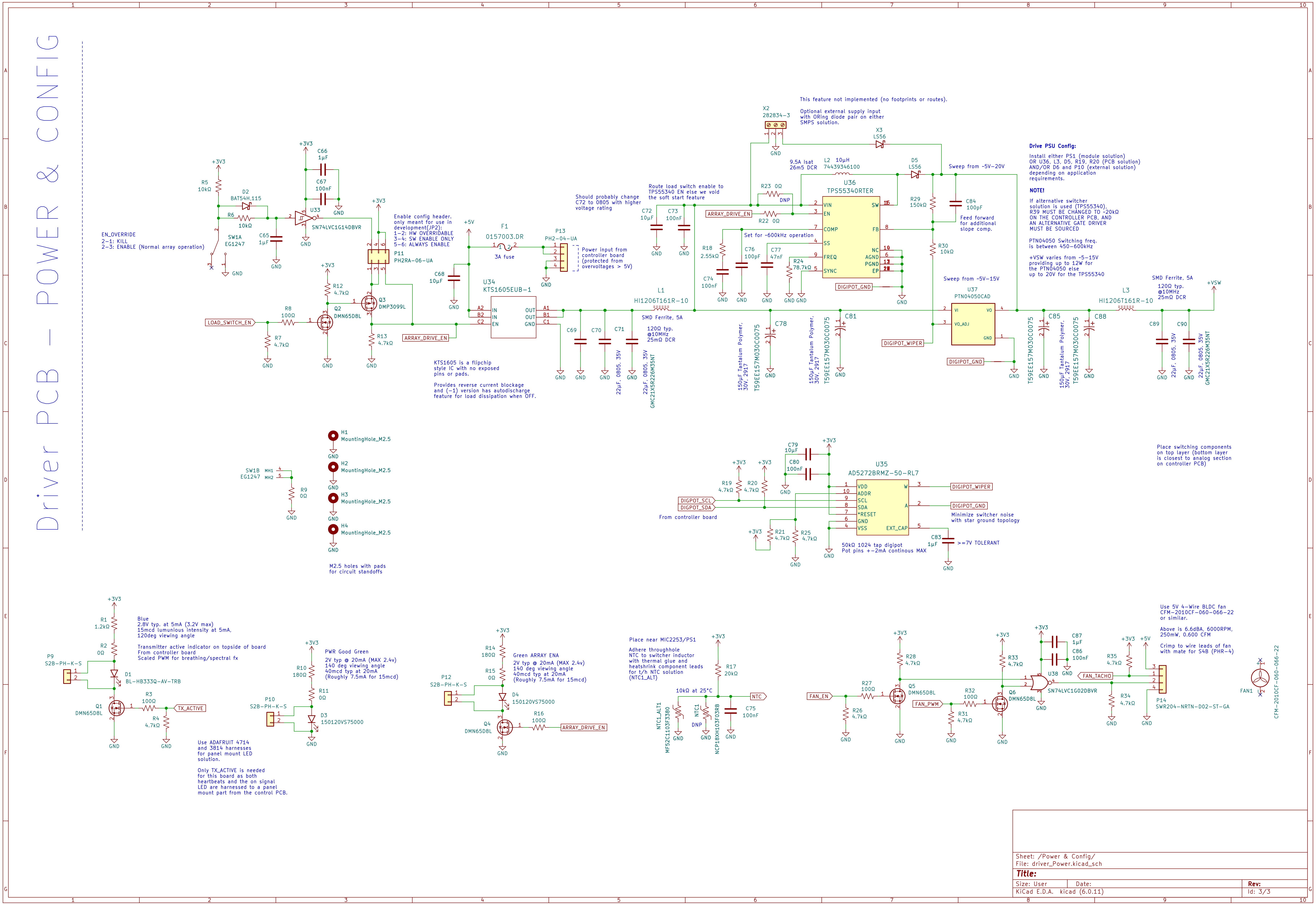
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.11)		Id: 1/3

Driver PCB — Drive section

! ALL BYPASS CAPACITORS MUST BE RATED FOR A MINIMUM OF 35V. USE X5R, X7R, NP0



Sheet: /Transducers & Drive/		
File: driver_Transducers.kicad_sch		
Title:		
Size: User	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.11)		Id: 2/3


Driver PCB - POWER & CONFIG
EN_OVERRIDE
2-1: KILL
2-3: ENABLE (Normal array operation)
Enable config header, only meant for use in development(JP2):
1-2: HW OVERRIDABLE
3-4: SW ENABLE ONLY
5-6: ALWAYS ENABLE
Power input from controller board (protected from overvoltages > 5V)
Should probably change C72 to 0805 with higher voltage rating
Route load switch enable to TPS55340 EN else we void the soft start feature
This feature not implemented (no footprints or routes).
Optional external supply input with ORing diode pair on either SMPS solution.
Drive PSU Config:
Install either PS1 (module solution) OR U36, L3, D5, R19, R20 (PCB solution) AND/OR D6 and P10 (external solution) depending on application requirements.
NOTE!
If alternative switcher solution is used (TPS55340), R39 MUST BE CHANGED TO ~20kΩ ON THE CONTROLLER PCB, AND AN ALTERNATIVE GATE DRIVER MUST BE SOURCED
PTN04050 Switching freq. is between 450-600kHz
+VSW varies from -5-15V providing up to 12W for the PTN04050 else up to 20V for the TPS55340
Sweep from -5V-20V
Sweep from -5V-15V
Feed forward for additional slope comp.
Set for ~600kHz operation
9.5A Isat 26mΩ DCR
SMD Ferrite, 5A
120Ω typ. @10MHz 25mΩ DCR
KTS1605 is a flipchip style IC with no exposed pins or pads.
Provides reverse current blockage and (-1) version has autodischarge feature for load dissipation when OFF.
150µF Tantalum Polymer, 30V, 2917
M2.5 holes with pads for circuit standoffs
From controller board
Minimize switcher noise with star ground topology
50kΩ 1024 tap digipot
Pot pins +-2mA continous MAX
>=7V TOLERANT
Place switching components on top layer (bottom layer is closest to analog section on controller PCB)
Blue
2.8V typ. at 5mA (3.2V max)
15mcd lumunious intensity at 5mA, 120deg viewing angle
Transmitter active indicator on topside of board
From controller board
Scaled PWM for breathing/spectral fx
PWR Good Green
2V typ @ 20mA (MAX 2.4v)
140 deg viewing angle
40mcd typ at 20mA
(Roughly 7.5mA for 15mcd)
Green ARRAY ENA
2V typ @ 20mA (MAX 2.4v)
140 deg viewing angle
40mcd typ at 20mA
(Roughly 7.5mA for 15mcd)
Use ADAFRUIT 4714 and 3814 harnesses for panel mount LED solution.
Only TX_ACTIVE is needed for this board as both heartbeats and the on signal LED are harnessed to a panel mount part from the control PCB.
Place near MIC2253/PS1
Adhere throughhole NTC to switcher inductor with thermal glue and heatshrink component leads for t/h NTC solution (NTC1_ALT)
10kΩ at 25°C
Use 5V 4-Wire BLDC fan CFM-2010CF-060-066-22 or similar.
Above is 6.6dBA, 6000RPM, 250mW, 0.600 CFM
Crimp to wire leads of fan with mate for S4B (PHR-4)
U36 TPS55340RTER
U37 PTN04050CAD
U35 AD5272BRMZ-50-RL7
U34 KTS1605EUB-1
U33 SN74LVC1G14DBVR
U38 SN74LVC1G02DBVR
F1 0157003.DR 3A fuse
L1 HI1206T161R-10
L2 10µH 74439346100
L3 HI1206T161R-10
LOAD_SWITCH_EN
ARRAY_DRIVE_EN
DIGIPOT_GND
DIGIPOT_WIPER
DIGIPOT_SCL
DIGIPOT_SDA
TX_ACTIVE
NTC
FAN_EN
FAN_PWM
FAN_TACHO
+VSW
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Id: 3/3