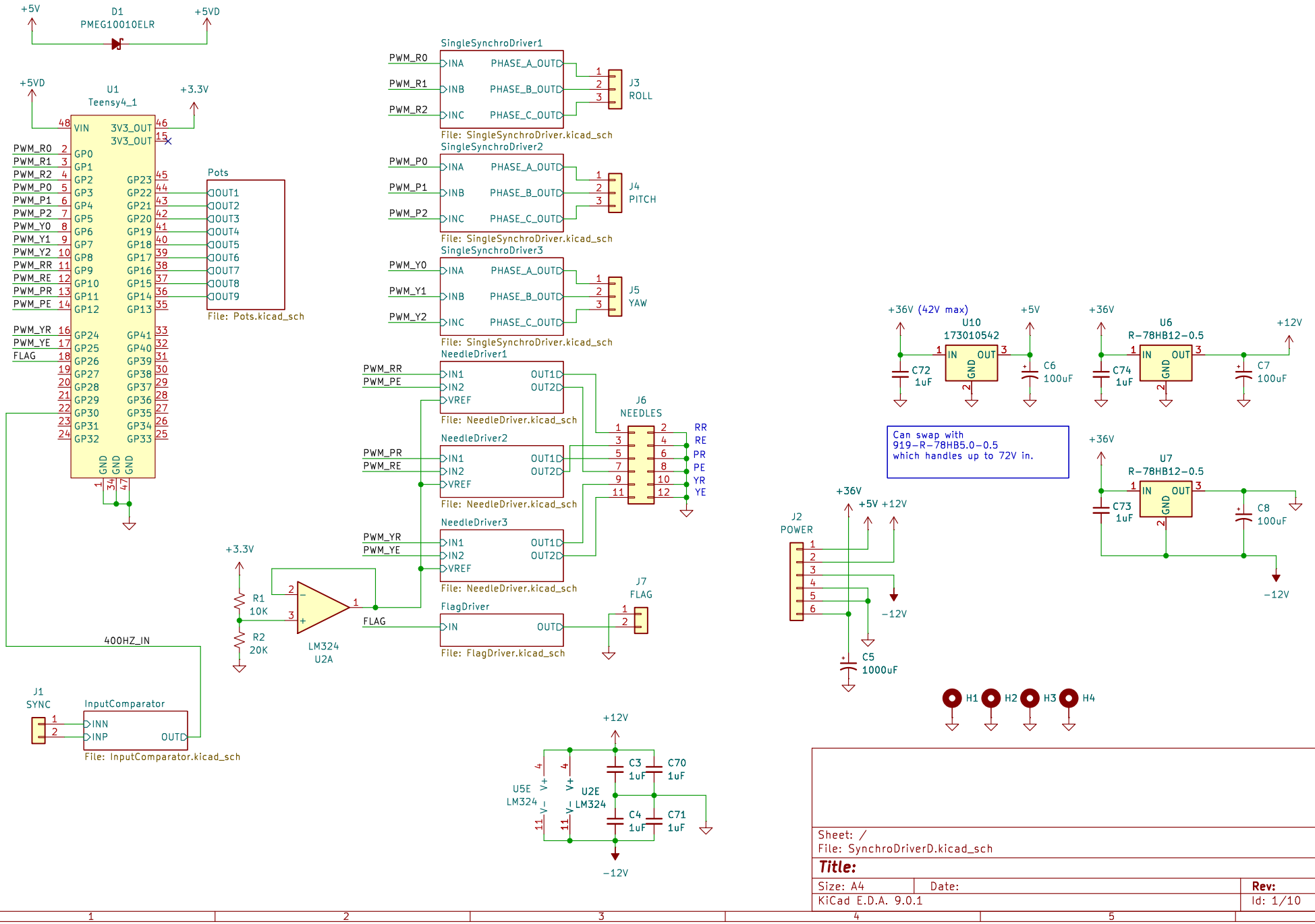
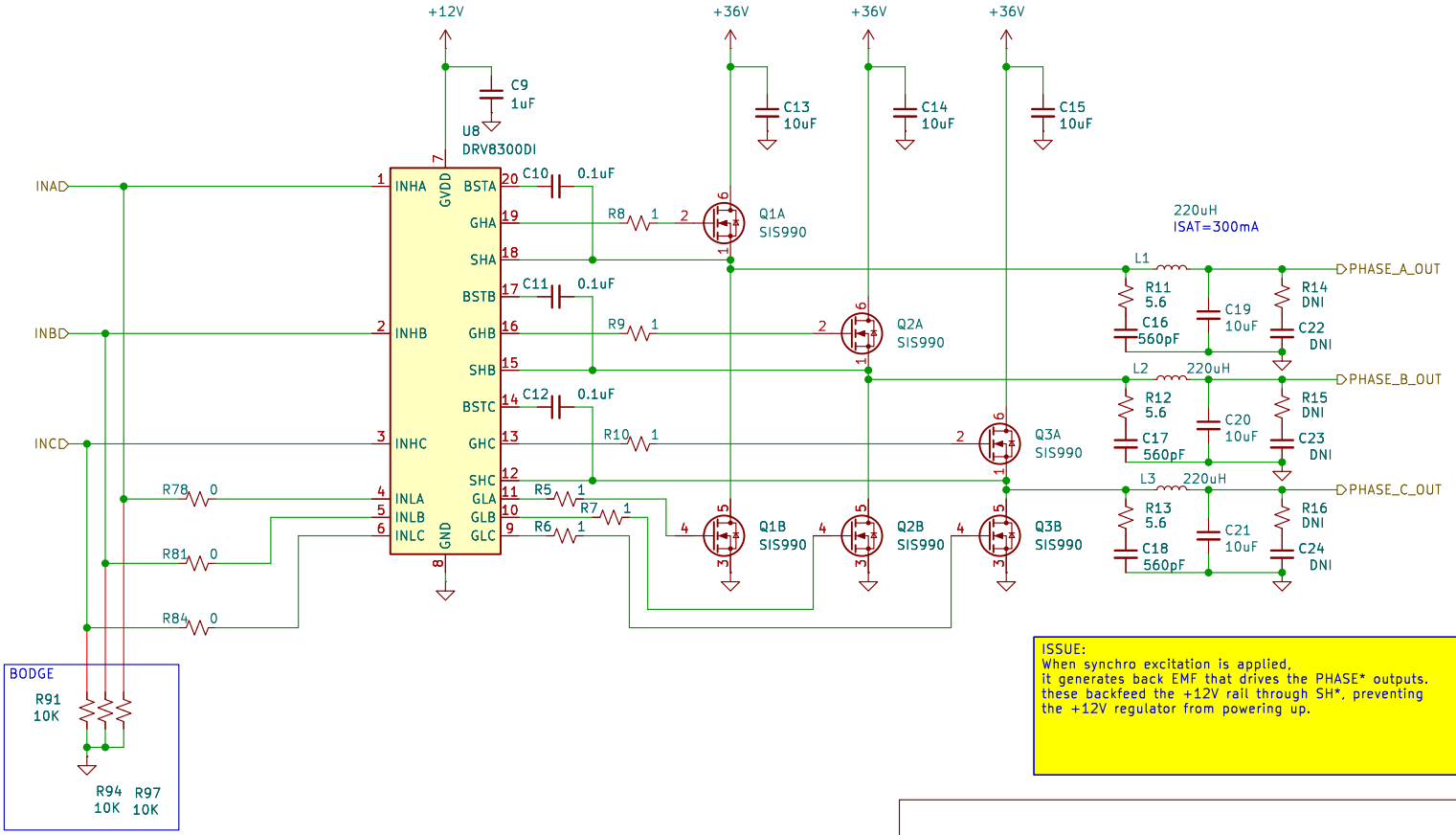

+5V
D1
PMEG10010ELR
+5VD
+5VD
U1
Teensy4_1
+3.3V
VIN
3V3_OUT
3V3_OUT
PWM_R0
PWM_R1
PWM_R2
PWM_P0
PWM_P1
PWM_P2
PWM_Y0
PWM_Y1
PWM_Y2
PWM_RR
PWM_RE
PWM_PR
PWM_PE
PWM_YR
PWM_YE
FLAG
GP0
GP1
GP2
GP3
GP4
GP5
GP6
GP7
GP8
GP9
GP10
GP11
GP12
GP13
GP14
GP15
GP16
GP17
GP18
GP19
GP20
GP21
GP22
GP23
GP24
GP25
GP26
GP27
GP28
GP29
GP30
GP31
GP32
GP33
GP34
GP35
GP36
GP37
GP38
GP39
GP40
GP41
GND
GND
GND
Pots
OUT1
OUT2
OUT3
OUT4
OUT5
OUT6
OUT7
OUT8
OUT9
File: Pots.kicad_sch
SingleSynchroDriver1
PWM_R0
PWM_R1
PWM_R2
INA
INB
INC
PHASE_A_OUT
PHASE_B_OUT
PHASE_C_OUT
J3
ROLL
File: SingleSynchroDriver.kicad_sch
SingleSynchroDriver2
PWM_P0
PWM_P1
PWM_P2
J4
PITCH
File: SingleSynchroDriver.kicad_sch
SingleSynchroDriver3
PWM_Y0
PWM_Y1
PWM_Y2
J5
YAW
File: SingleSynchroDriver.kicad_sch
NeedleDriver1
PWM_RR
PWM_PE
IN1
IN2
VREF
OUT1
OUT2
File: NeedleDriver.kicad_sch
NeedleDriver2
PWM_PR
PWM_RE
File: NeedleDriver.kicad_sch
NeedleDriver3
PWM_YR
PWM_YE
File: NeedleDriver.kicad_sch
J6
NEEDLES
RR
RE
PR
PE
YR
YE
+3.3V
R1
10K
R2
20K
LM324
U2A
FLAG
FlagDriver
IN
OUT
File: FlagDriver.kicad_sch
J7
FLAG
400HZ_IN
J1
SYNC
InputComparator
INN
INP
OUT
File: InputComparator.kicad_sch
+12V
U5E
LM324
U2E
LM324
C3
1uF
C70
1uF
C4
1uF
C71
1uF
−12V
+36V (42V max)
U10
173010542
+5V
C72
1uF
C6
100uF
Can swap with
919−R−78HB5.0−0.5
which handles up to 72V in.
+36V
U6
R−78HB12−0.5
+12V
C74
1uF
C7
100uF
+36V
U7
R−78HB12−0.5
C73
1uF
C8
100uF
−12V
J2
POWER
+36V
+5V
+12V
−12V
C5
1000uF
H1
H2
H3
H4
Sheet: /
File: SynchroDriverD.kicad_sch
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. 9.0.1
Id: 1/10

VREF is 2.6 VAC.
FDAI CT winding: 11.8VAC, is 152 mH and 62 ohms. Current is up to 28 mA, depending on the shaft position.
If you want to drive a synchro directly, I measure about 25 mA if the shaft is spinning freely. If you hold the synchro shaft so it's generating maximum torque, the current goes up to 600 mA.

DV_BSTX = VGVDD − VBOOTD − VBSTUV
VGVDD = 12V
VBOOTD = 0.85V (DRV8300)
VBSTUV = 4.5V (DRV8300)
DV_BSTX = 6.65V
Qg=8nC (SIS990)
fSW = 60KHz
ILBS_TRAN = 220uA (DRV8300)
Qtot = Qg + ILBS_TRAN/fSW = 8nC + 3.7nC = 11.7nC
Cbst_min = Qtot / DV_BSTX = 1.76nF



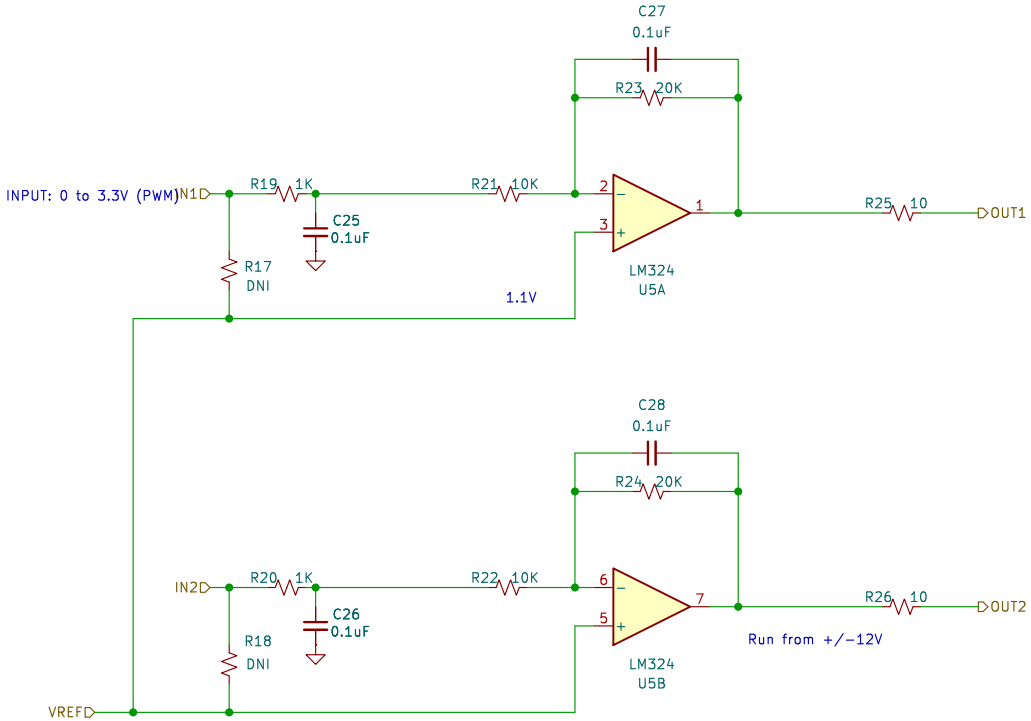
ISSUE:
When synchro excitation is applied,
it generates back EMF that drives the PHASE* outputs.
these backfeed the +12V rail through SH*, preventing
the +12V regulator from powering up.

Sheet: /SingleSynchroDriver1/
File: SingleSynchroDriver.kicad_sch

Title:

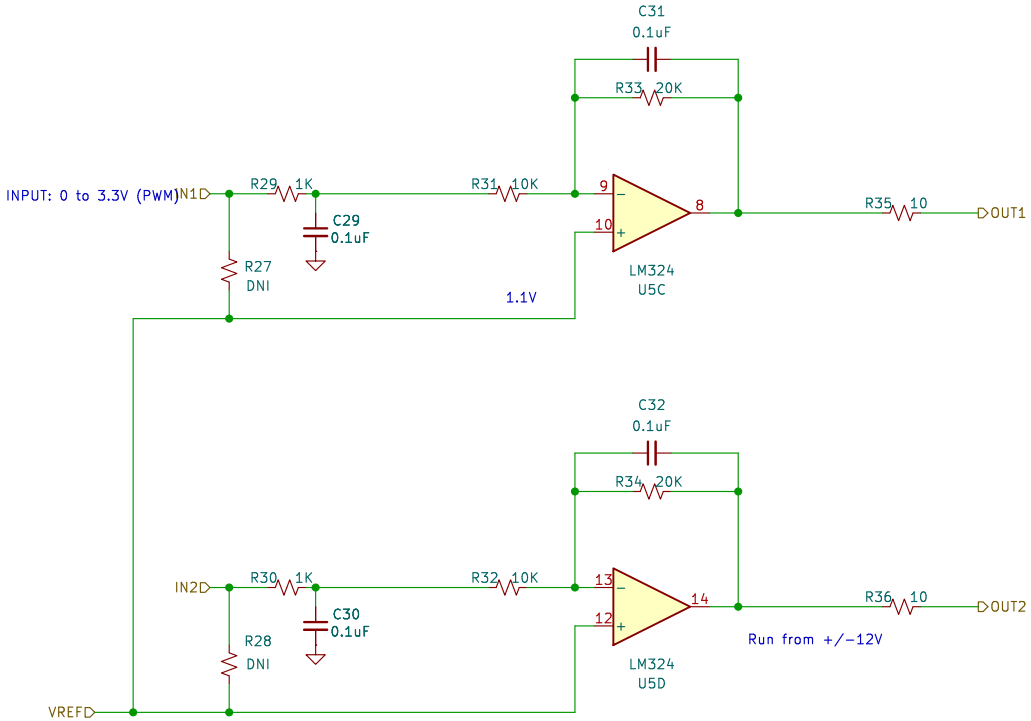
Size: A4 | Date: | **Rev:**
KiCad E.D.A. 9.0.1 | Id: 2/10

FDAI needles: 180 or 260 ohms. The full-deflection drive signal is roughly +/- 3V, but they are all slightly different. So 15 mA should be enough.
6 needles total.



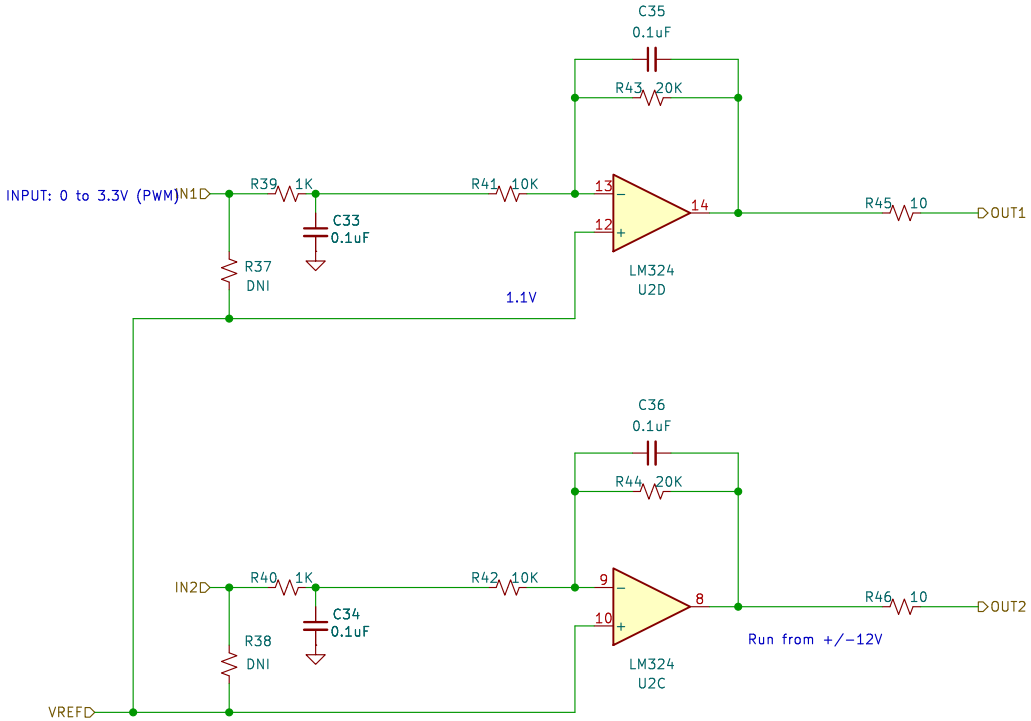
Sheet: /NeedleDriver1/		
File: NeedleDriver.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 3/10

FDAI needles: 180 or 260 ohms. The full-deflection drive signal is roughly +/- 3V, but they are all slightly different. So 15 mA should be enough.
6 needles total.



Sheet: /NeedleDriver2/		
File: NeedleDriver.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 4/10

FDAI needles: 180 or 260 ohms. The full-deflection drive signal is roughly +/- 3V, but they are all slightly different. So 15 mA should be enough. 6 needles total.



Sheet: /NeedleDriver3/		
File: NeedleDriver.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 5/10

VREF is 2.6 VAC.
FDAI CT winding: 11.8VAC, is 152 mH and 62 ohms. Current is up to 28 mA, depending on the shaft position.
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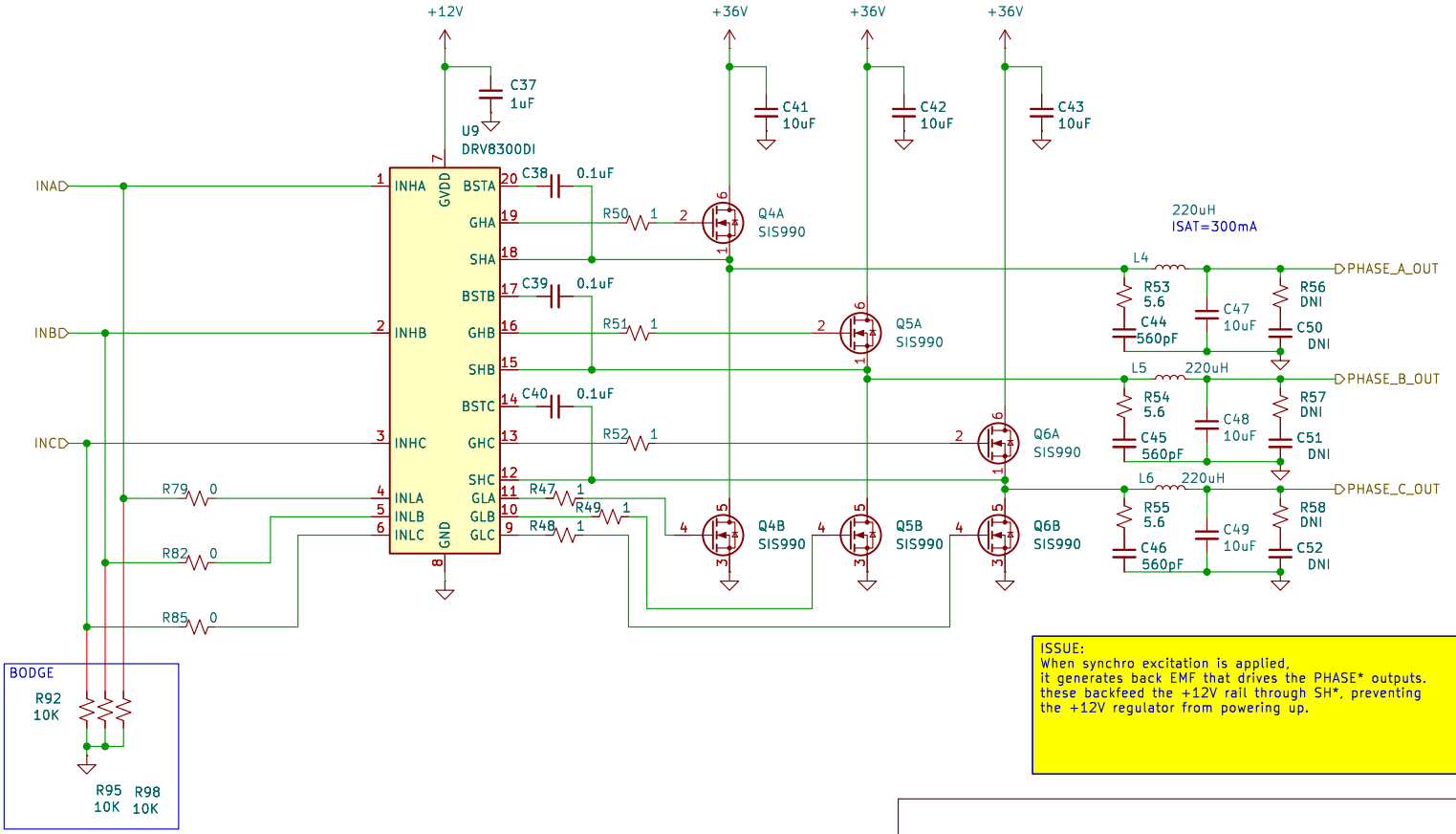
VGVDD = 12V
VBOOTD = 0.85V (DRV8300)
VBSTUV = 4.5V (DRV8300)
DV_BSTX = 6.65V
Qg=8nC (SIS990)
fSW = 60KHz
ILBS_TRAN = 220uA (DRV8300)
Qtot = Qg + ILBS_TRAN/fSW = 8nC + 3.7nC = 11.7nC
Cbst_min = Qtot / DV_BSTX = 1.76nF



ISSUE:
When synchro excitation is applied,
it generates back EMF that drives the PHASE* outputs.
these backfeed the +12V rail through SH*, preventing
the +12V regulator from powering up.

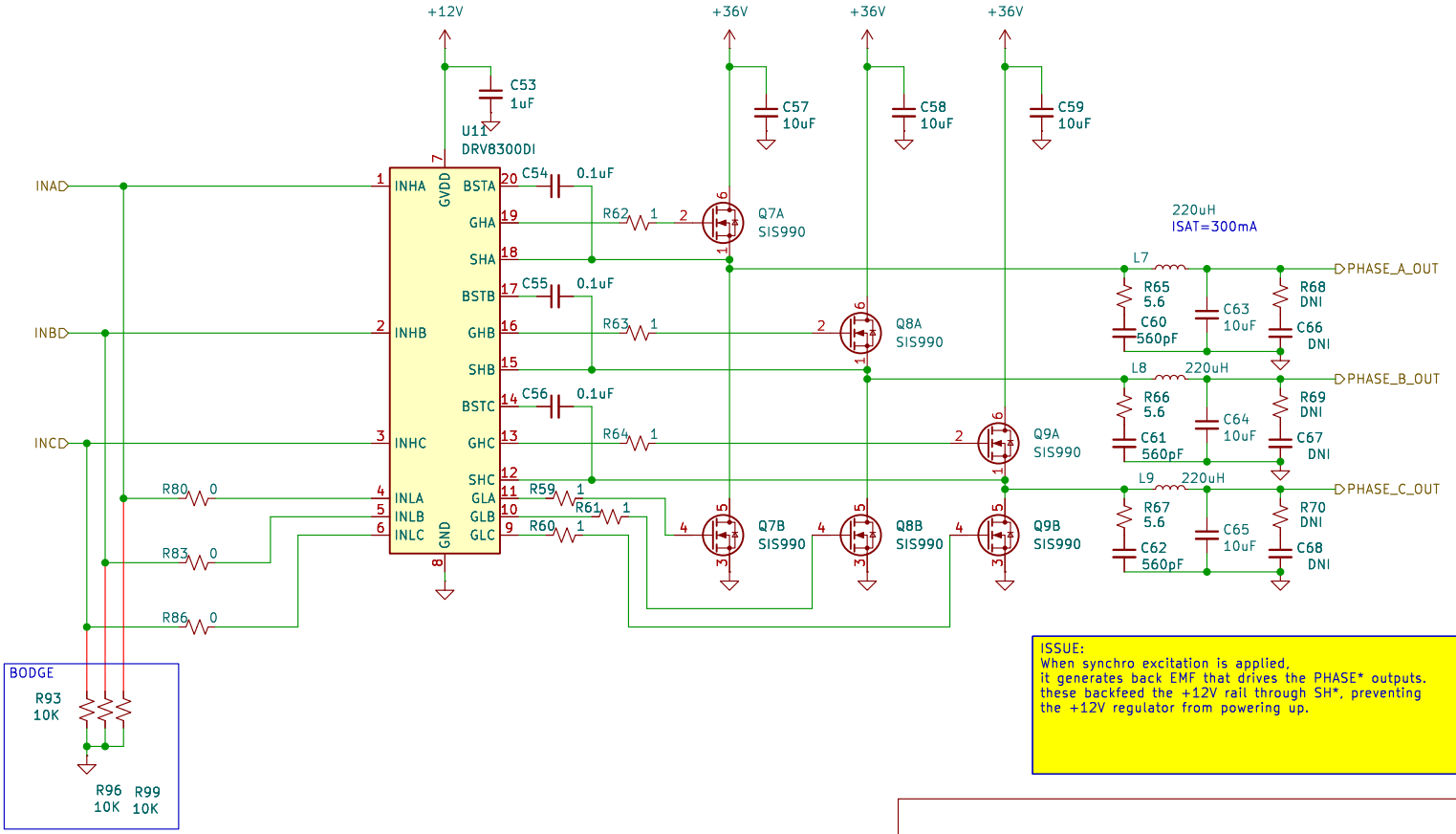
Sheet: /SingleSynchroDriver2/
File: SingleSynchroDriver.kicad_sch

Title:

Size: A4 | Date: | **Rev:**
KiCad E.D.A. 9.0.1 | Id: 6/10

VREF is 2.6 VAC.
FDAI CT winding: 11.8VAC, is 152 mH and 62 ohms. Current is up to 28 mA, depending on the shaft position.
If you want to drive a synchro directly, I measure about 25 mA if the shaft is spinning freely. If you hold the synchro shaft so it's generating maximum torque, the current goes up to 600 mA.

DV_BSTX = VGVDD − VBOOTD − VBSTUV
VGVDD = 12V
VBOOTD = 0.85V (DRV8300)
VBSTUV = 4.5V (DRV8300)
DV_BSTX = 6.65V
Qg=8nC (SIS990)
fSW = 60KHz
ILBS_TRAN = 220uA (DRV8300)
Qtot = Qg + ILBS_TRAN/fSW = 8nC + 3.7nC = 11.7nC
Cbst_min = Qtot / DV_BSTX = 1.76nF

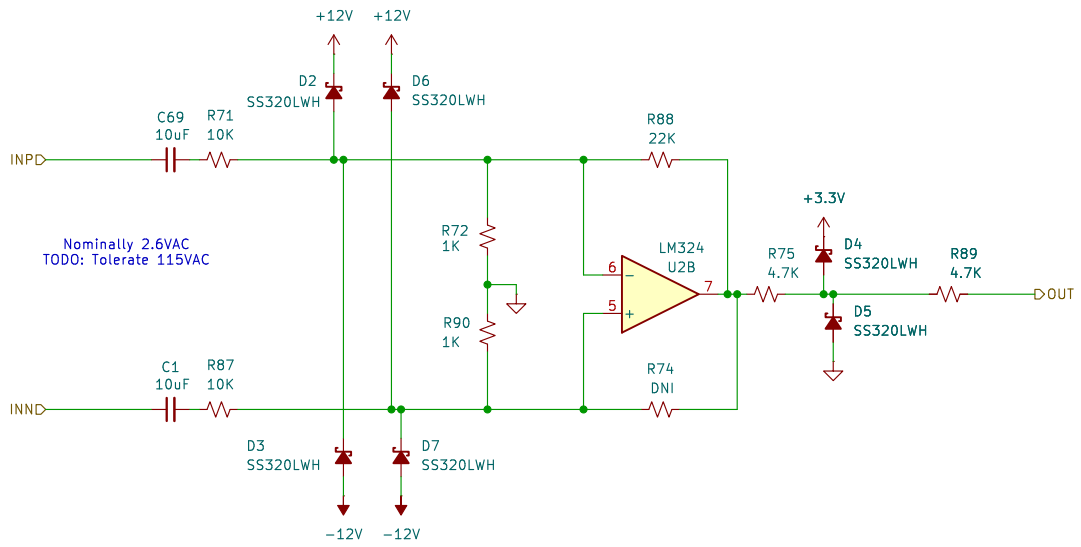


ISSUE:
When synchro excitation is applied,
it generates back EMF that drives the PHASE* outputs.
these backfeed the +12V rail through SH*, preventing
the +12V regulator from powering up.

Sheet: /SingleSynchroDriver3/
File: SingleSynchroDriver.kicad_sch

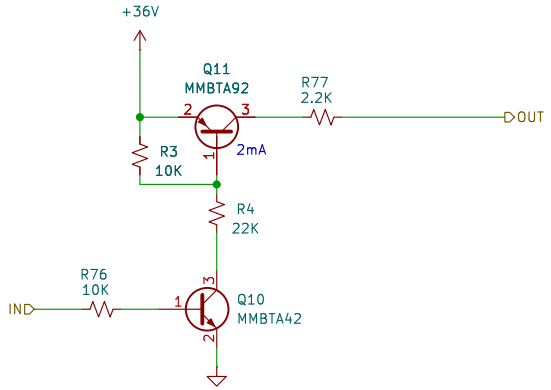
Title:

Size: A4 | Date: | **Rev:**
KiCad E.D.A. 9.0.1 | Id: 7/10



Sheet: /InputComparator/		
File: InputComparator.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 8/10

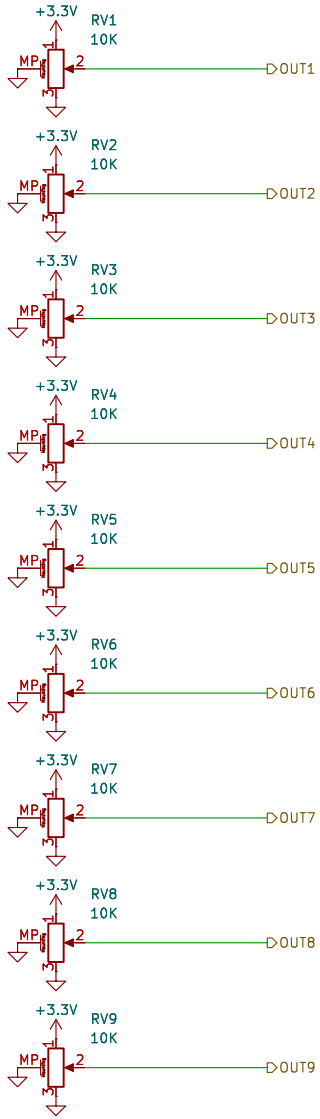
Flag solenoid
3.55k ohm
Voltage range approx 16 to 28V
4.5ma at 16v
6.75ma at 24V
7.89ma at 28V



Sheet: /FlagDriver/
File: FlagDriver.kicad_sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 9/10



Sheet: /Pots/ File: Pots.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 10/10