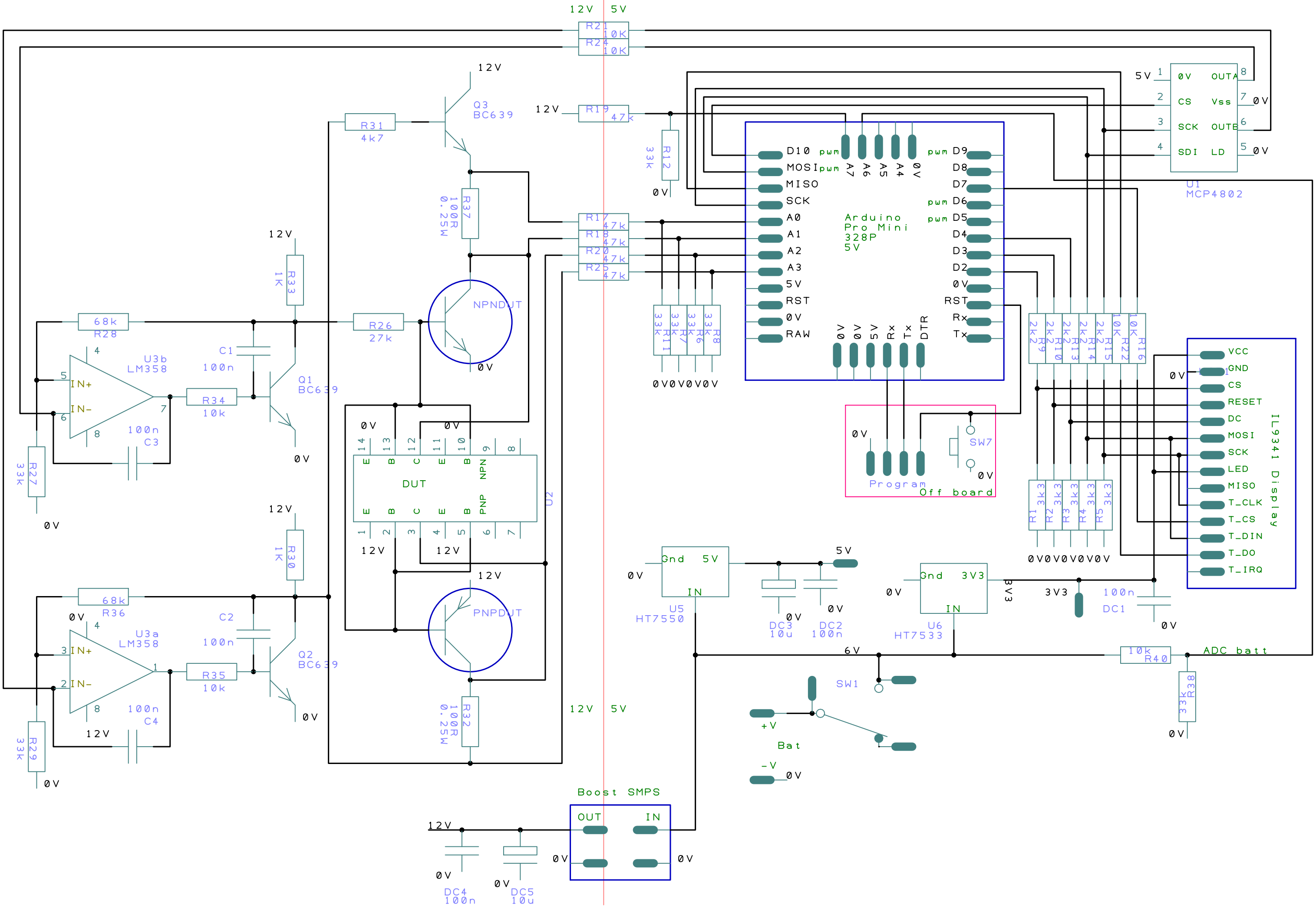
12V 5V
R21 10K
R24 10K
12V
Q3 BC639
R31 4k7
12V R19 47k
R12 33k
0V
R37 100R 0.25W
R17 47k
R18 47k
R20 47k
R25 47k
12V
R33 1K
68k R28
R26 27k
NPNDUT
0V
U3b LM358
C1 100n
Q1 BC639
R34 10k
IN+ IN-
100n C3
R27 33k
0V
DUT
NPN PNP
E B C E B
14 13 12 11 10 9 8
1 2 3 4 5 6 7
U2
12V 12V
12V
R30 1K
68k R36
U3a LM358
C2 100n
Q2 BC639
R35 10k
100n C4
R29 33k
PNPDUT
R32 100R 0.25W
12V 5V
R11 33k R7 33k R6 33k R8 33k
0V0V0V0V
Arduino Pro Mini 328P 5V
D10 pwm
MOSI pwm
MISO
SCK
A0 A1 A2 A3
5V RST 0V RAW
A7 A6 A5 A4 0V
0V 0V 5V Rx Tx DTR
pwm D9
D8
D7
pwm D6
pwm D5
D4 D3 D2 0V RST Rx Tx
5V 1 0V OUTA 8
2 CS Vss 7 0V
3 SCK OUTB 6
4 SDI LD 5 0V
U1 MCP4802
R9 2k2 R10 2k2 R13 2k2 R14 2k2 R15 2k2 R22 10K R16 10K
VCC GND CS RESET DC MOSI SCK LED MISO T_CLK T_CS T_DIN T_DO T_IRQ
IL9341 Display
R1 3k3 R2 3k3 R3 3k3 R4 3k3 R5 3k3
0V0V0V0V0V
Program Off board
SW7
0V
Gnd 5V IN
U5 HT7550
DC3 10u DC2 100n
Gnd 3V3 IN
U6 HT7533
3V3
100n DC1
6V
R40 10k
ADC batt
R38 33k
SW1
+V Bat -V
0V
Boost SMPS
OUT IN
12V
DC4 100n DC5 10u