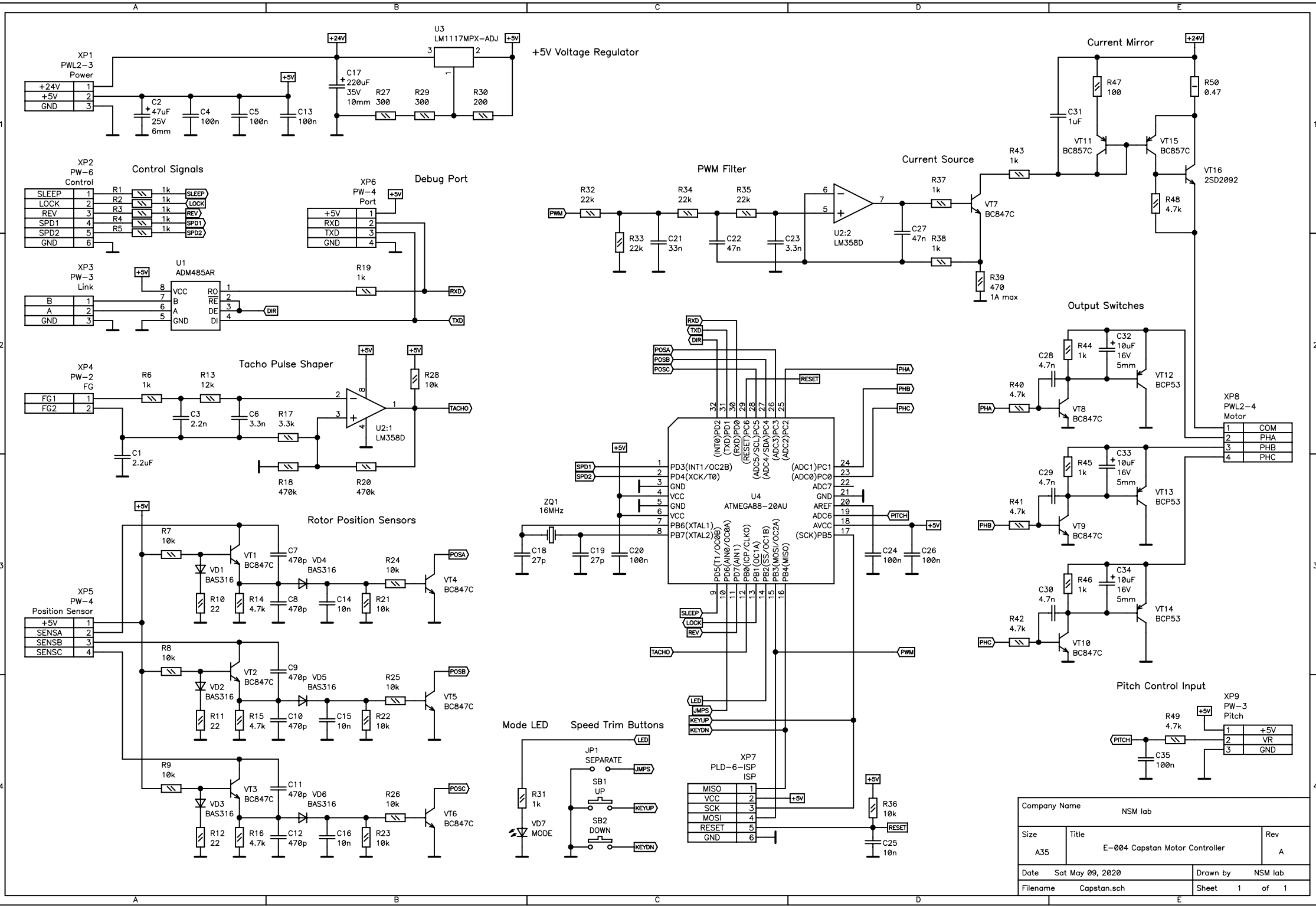
+5V Voltage Regulator
U3
LM1117MPX-ADJ
XP1
PWL2-3
Power
+24V
+5V
GND
C17
220uF
35V
10mm
R27
300
R29
300
R30
200
C2
47uF
25V
6mm
C4
100n
C5
100n
C13
100n
Control Signals
XP2
PW-6
Control
SLEEP
LOCK
REV
SPD1
SPD2
GND
R1
R2
R3
R4
R5
1k
Debug Port
XP6
PW-4
Port
RXD
TXD
R19
1k
XP3
PW-3
Link
B
A
U1
ADM485AR
VCC
RO
RE
DE
DI
DIR
Tacho Pulse Shaper
XP4
PW-2
FG
FG1
FG2
R6
1k
R13
12k
C3
2.2n
C6
3.3n
R17
3.3k
C1
2.2uF
R18
470k
R20
470k
R28
10k
U2:1
LM358D
TACHO
Rotor Position Sensors
XP5
PW-4
Position Sensor
SENSA
SENSB
SENSC
POSA
POSB
POSC
VT1
BC847C
VT2
BC847C
VT3
BC847C
VT4
BC847C
VT5
BC847C
VT6
BC847C
VD1
BAS316
VD2
BAS316
VD3
BAS316
VD4
BAS316
VD5
BAS316
VD6
BAS316
R7
10k
R8
10k
R9
10k
R10
22
R11
22
R12
22
R14
4.7k
R15
4.7k
R16
4.7k
C7
470p
C8
470p
C9
470p
C10
470p
C11
470p
C12
470p
C14
10n
C15
10n
C16
10n
R21
10k
R22
10k
R23
10k
R24
10k
R25
10k
R26
10k
PWM Filter
R32
22k
R33
22k
R34
22k
R35
22k
C21
33n
C22
47n
C23
3.3n
U2:2
LM358D
C27
47n
R37
1k
R38
1k
Current Source
VT7
BC847C
R39
470
1A max
R43
1k
Current Mirror
R47
100
R50
0.47
C31
1uF
VT11
BC857C
VT15
BC857C
VT16
2SD2092
R48
4.7k
Output Switches
XP8
PWL2-4
Motor
COM
PHA
PHB
PHC
R44
1k
R45
1k
R46
1k
C28
4.7n
C29
4.7n
C30
4.7n
C32
10uF
16V
5mm
C33
10uF
16V
5mm
C34
10uF
16V
5mm
R40
4.7k
R41
4.7k
R42
4.7k
VT8
BC847C
VT9
BC847C
VT10
BC847C
VT12
BCP53
VT13
BCP53
VT14
BCP53
U4
ATMEGA88-20AU
PD3(INT1/OC2B)
PD4(XCK/T0)
GND
VCC
GND
VCC
PB6(XTAL1)
PB7(XTAL2)
PD5(T1/OC0B)
PD6(AIN0/OC0A)
PD7(AIN1)
PB0(ICP/CLKO)
PB1(OC1A)
PB2(SS/OC1B)
PB3(MOSI/OC2A)
PB4(MISO)
(ADC1)PC1
(ADC0)PC0
ADC7
GND
AREF
ADC6
AVCC
(SCK)PB5
(INT0)PD2
(TXD)PD1
(RXD)PD0
(RESET)PC6
(ADC5/SCL)PC5
(ADC4/SDA)PC4
(ADC3)PC3
(ADC2)PC2
ZQ1
16MHz
C18
27p
C19
27p
C20
100n
C24
100n
C26
100n
Mode LED
Speed Trim Buttons
R31
1k
VD7
MODE
JP1
SEPARATE
SB1
UP
SB2
DOWN
XP7
PLD-6-ISP
ISP
MISO
VCC
SCK
MOSI
RESET
GND
R36
10k
C25
10n
Pitch Control Input
XP9
PW-3
Pitch
VR
R49
4.7k
C35
100n
Company Name
NSM lab
Size
A35
Title
E-004 Capstan Motor Controller
Rev
A
Date
Sat May 09, 2020
Drawn by
NSM lab
Filename
Capstan.sch
Sheet
1
of
1