Sheet: MotionControllerInput

Sheet: dsPIC

Sheet: InterfaceDriver

DIR — DIR
STEP — STEP

MCLR — MCLR

ENABLE — ENABLE

TX — TX
RX — RX

PGD — PGD
PGC — PGC

File: MotionControllerInput.sch

PWM_H_A — Pos
PWM_H_B — Neg

OUT1 — OUT1
IN1 — IN1

FLTA — FLTA

File: InterfaceDriver.sch

Sheet: Encoder

QEA — QEA
QEB — QEB
INDX — INDX

SDO
SDI
SCL
SDA
SCK
AN2

File: Encoder.sch

File: dsPIC.sch

H1
MountingHole
H2
MountingHole
H3
MountingHole
H4
MountingHole

Sheet: SupplyCircuit

File: SupplyCircuit.sch

Modifications in components and layout from the original YAPSC:10V by MaX-MoD
Onboard -12V supply

Sheet: /
File: YAPSCO.sch

Title: YAPSCO:10V

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Power for the comparator

+5V

U8E

3
V+

V-
12

LM339D

2.5V reference

+5V

R23
1K

+2.5V

R24
1K

PWR_FLAG

J2

+5V
1
6
A−   2
A+   7
B−   3
B+   8
I−   4
9
I+   5

DB9_Female_MountingHoles

+12V

A+   5
A−   4

+2.5V

Jumper
P7
2   1

U8A
LM339D

2

QEA

R25
4K7

+5V

B+   7
B−   6

+2.5V

Jumper
P8
2   1

U8B
LM339D

1

QEB

R26
4K7

+5V

I+   11
I−   10

+2.5V

Jumper
P9
2   1

U8C
LM339D

13

INDX

R27
4K7

+5V
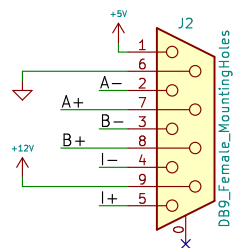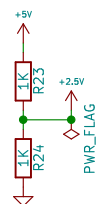
NOTE: J1 is optional
For compatibility with
YAPSC:V2 (same pinout)
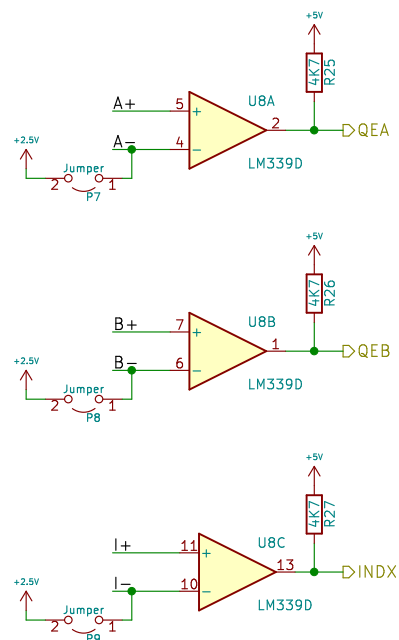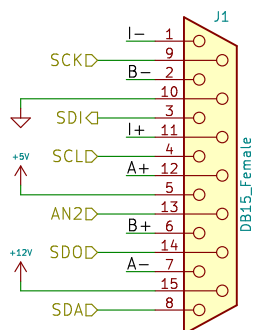
SCK

SDI

+5V

SCL

AN2

+12V

SDO

SDA

J1

I−   1
9
B−   2
10
3
I+   11
4
A+   12
5
13
B+   6
14
A−   7
15
8

DB15_Female

Differential amplifier generating the
positive/negative voltage output for the servo drive

U6C
+12V
8 V+
4 V-
LM358
-12V

C10
33nF

R15
47K

Pos
R12
22K

Neg
R13
22K

U6A
3 +
2 -
1
LM358

R16
22k

C12
33nF

R14
47K

C11
33nF

U6B
5 +
6 -
7
LM358

P5
+-10V
1
2

R17
R

U7A
1
2
74HC14

U7C
5
6
74HC14

FLTA

K3
FaultPol
1
2
3

R20
R

R18
R

U7B
3
4
74HC14

IN1

R21
R

P6 InOut
4
3
2
1

R19
100

Q1
NPN
3
2
1

R22
1K

OUT1

+5V

14 VCC
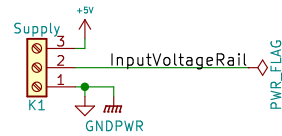U7C
74HC14
7 GND
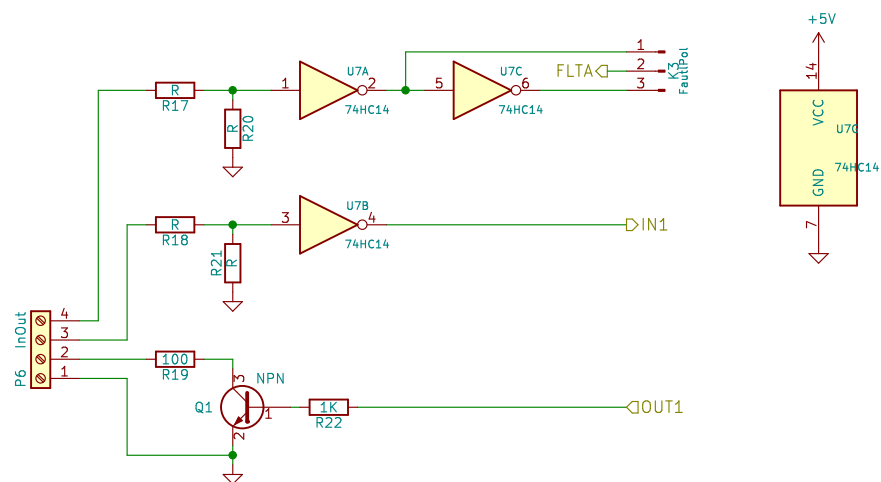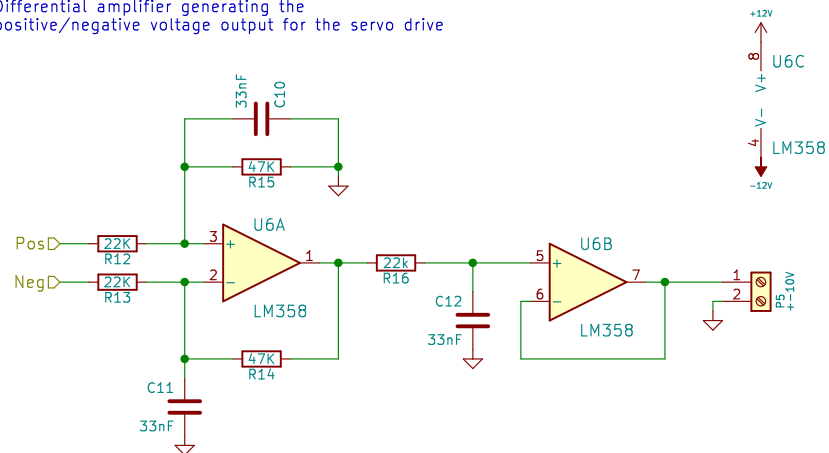
Sheet: /InterfaceDriver/
File: InterfaceDriver.sch

Title: YAPSCO:10V
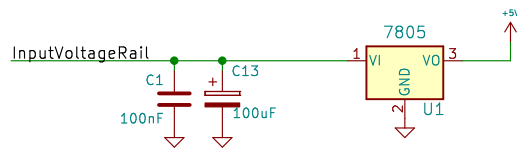
Size: A4   Date: 2019-03-30   Rev: A.1
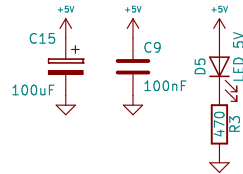KiCad E.D.A. kicad (5.1.0)-1   Id: 3/6
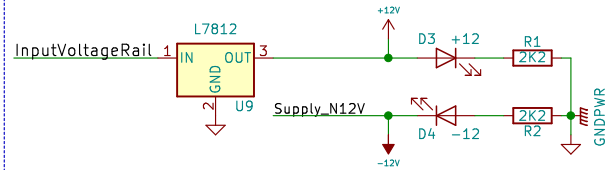
Input voltage connector with 5V out

Supply
+5V
3
2 InputVoltageRail
1
K1
GNDPWR
PWR_FLAG

5V supply rail

InputVoltageRail
7805
C1 C13
100nF 100uF
1 VI VO 3
2 GND
U1
+5V

Bypass 5V rail

+5V +5V +5V
C15 C9 D5 LED 5V
100uF 100nF 470 R3

+12V/−12V supply rail

L7812
InputVoltageRail 1 IN OUT 3
2 GND
U9
Supply_N12V
+12V
D3 +12 R1 2K2
D4 −12 R2 2K2
−12V
GNDPWR

Bypass +12V rail

+12V +12V
C3 C5
100nF 100uF

Bypass −12V rail

C4
100nF
−12V
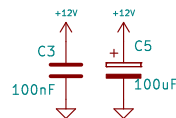
−12V onboard power supply
(Not needed if −12V is supplied directly from connector)
Component values are calculated with SMath−sheet

1R Rsc1
1R Rsc2
1R Rsc3

MC33063AD
+12V
6 Vin Ipk 7
DC 8
SwC 1
3 TC SwE 2
GND Vfb 5
C8 4 U10
360p
R29 1K
R28 8K6
C14 100u
Supply_N12V
PWR_FLAG
D1 1N5819
L1 1m

dsPIC30F4012

U2

Pins (left side):
- 13 VDD_2 (+5V)
- 20 VDD (+5V)
- 28 AVDD
- 1 MCLR (MCLR)
- 16 SFLT2/INT0/OCFLTA/RA9 (FLTA)
- 2 AN0/CMP1A/CN2/RB0 (IN1)
- 3 AN1/CMP1B/CN3/RB1 (ENABLE)
- 4 AN2/CMP1C/CMP2A/CN4/RB2
- 5 AN3/CMP1D/CMP2B/CN5/RB3 (INDX)
- 6 AN4/CMP2C/CN6/RB4 (QEA)
- 7 AN5/CMP2D/CN7/RB5 (QEB)
- 9 AN6/CMP3C/CMP4A/OSC1/CLKI/RB6
- 10 AN7/CMP3D/CMP4B/OSC2/CLKO/RB7
- 19 VSS_2
- 8 VSS
- 27 AVSS

Pins (right side):
- 15 PGC2/EMUC2/OC1/SFLT1/IC1/INT1/RD0 (STEP)
- 14 PGD2/EMUD2/SCK1/SFLT3/INT2/RF6 (DIR)
- 18 PGC/EMUC/SDI1/SDA/U1RX/RF7 (PGC)
- 17 PGD/EMUD/SDO1/SCL/U1TX/RF8 (PGD)
- 26 PWM1L/RE0 (OUT1)
- 25 PWM1H/RE1
- 24 PWM2L/RE2
- 23 PWM2H/RE3 (PWM_H_A)
- 22 PWM3L/RE4
- 21 PWM3H/RE5 (PWM_H_B)
- 12 PGC1/EMUC1/EXTREF/PWM4L/T1CK/U1ARX/CN0/RE6 (RX)
- 11 PGD1/EMUD1/PWM4H/T2CK/U1ATX/CN1/RE7 (TX)

R5 10K
R4 470
LED D6

Output from motion controller
— optically coupled for isolation

STEP P1 R6 470 U3 6N137 R8 4K7 +5V STEP

DIR P2 R7 470 U4 6N137 R9 4K7 +5V DIR

ENABLE P4 R10 470 U5 6N137 R11 4K7 +5V ENABLE

+5V P3 CONN

STEP 1 2 MCLR
3 4
TXD 5 6 RXD
ENABLED 7 8 DIR
PGC 9 10 PGD
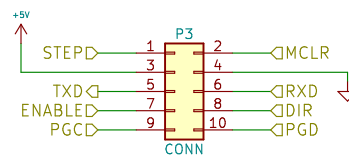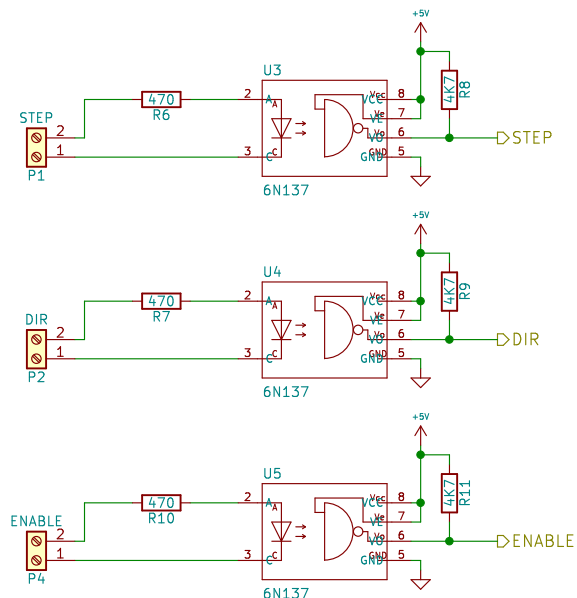
TXD, RXD are data pins for normal COMport.
MCLR, PGC, PGD are ICSP programming pins for dsPIC.

Sheet: /MotionControllerInput/
File: MotionControllerInput.sch
Title: YAPSCO:10V
Size: A4   Date: 2019-03-30   **Rev: A.1**
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