LAOS Mainboard schematic (laos-board.sch)

Selected text labels visible on the schematic:

Top / connectors
- MAGJACK U10: LEDG+, LEDG−, LEDY+, LEDY−, GA, GK, YA, YK, TX+, TXC, TX−, RX+, RXC, RX−, FILTER, SHIELD, SH
- R1 470R, R2 470R, 3V3
- USB_A−H, USB, GND, VBUS, D−, D+
- R Vref, Vcc CANL, GND CANH, D U6 Rs, 65HVD251
- VAA SJ8, SJ6A +5V, VMOT, GND, P1 POWER
- C1, 1000uF, SJ6B

MBED (mbed1) U — pin labels
- GND, Vin(5..9V), VBat(3V3), /RESET
- P0.9/MOSI1/MAT2.3, P0.8/MISO1/MAT2.2, P0.7/SCK1/MAT2.1, P0.6/SSEL1/MAT2.0
- P0.0/CAN_RX1/TXD3/SDA1, P0.1/CAN_TX1/RXD3/SCL1
- P0.18/DCD1/MOSI0/MOSI1, P0.17/CTS1/MISO0/MISO
- P0.15/TXD1/SCK0/SCK, P0.16/RXD1/SSEL0/SSEL
- P0.23/AD0.0/CAP3.0, P0.24/AD0.1/CAP3.1
- P0.25/AD0.2/TXD3, P0.26/AD0.3/AOUT/RXD3
- P1.30/AD0.4, P1.31/SCK1/AD0.5
- (3V3)Vout, (5Vin)Vusb, IF_D−, IF_D+, ETH_RD−, ETH_RD+, ETH_TD−, ETH_TD+
- USB_D−, USB_D+, P0.4/CAN_RX2/CAP2.0, P0.5/CAN_TX2/CAP2.1
- P0.10/TXD2/SDA2/MAT3.0, P0.11/RXD2/SCL2/MAT3.1
- P2.0/PWM1.1/TXD1, P2.1/PWM1.2/RXD1, P2.2/PWM1.3/CTS1, P2.3/PWM1.4/DCD1, P2.4/PWM1.5/DSR1, P2.5/PWM1.6/DTR1
- +5V, SJ0

Left connectors
- I2C P7
- R9 2K, R10 2K
- SDCARD U5: RSV8, DO, GND, SCLK, VCC, DI, CS, RSV1
- ANALOG P8
- Vsensor P14, SJ9, SJ5A, VAA +5VD
- ZLIMIT P9, R18 470R, R16 470R
- XYLIMIT P10, R20 470R, R22 470R
- SJ5B
- OC8 TLP181, OC7 TLP181, OC6 TLP181, OC5 TLP181 (COL, EMIT)

Notes text
Keep Ethernet lines short, close and equal length

Solder joint 0: 5V from USB
Solder joint 1: 5V from VIN
Solder joint 5: Sensor voltage 5V
Solder joint 9: Sensor voltage VIN
Solder joint 6: Motor voltage 5V
Solder joint 8: Motor voltage VIN

Solder joint 2 to 4 (MS1 MS2 MS3)
Select Microstep resolution

MS1	MS2	MS3	
L	L	L	Full Step
H	L	L	Half Step
L	H	L	Quarter Step
H	H	L	Eighth Step
H	H	H	Sixteenth Step

Stepper drivers (POLOLU1201 U3, U2, U1)
- /ENABLE, MS1, MS2, MS3, /RESET, /SLEEP, STEP, DIR
- VMOT, GND, 2B, 2A, 1A, 1B, VDD, GND
- SJ2, SJ3, SJ4
- R3 10K, R4 10K, R5 10K, 3V3
- C2 100nF, C3 100nF, C4 100nF

Motor connectors
- P2 Z, P3 Y, P4 X

Right outputs
- R9 120R, R8 120R, R6 120R, R7 120R
- TLP181 OC4, OC3, OC1, OC2 (A, COL, EMIT)
- P11 OUTPUTS, P5 LASER

Voltage regulator
- VAA, 7805, +5VD, +5V, SJ1
- C5 0.33uF, U4, C6 0.1uF, GND
- P12 VIN

Bottom resistor array
- R23 10K, R24 10K, R21 10K, R25 10K (3V3)

Title block
- File: laos−board.sch
- Sheet: /
- Title: LAOS Mainboard (www.laoslaser.org)
- Size: A4
- Date: 9 mar 2011
- Rev: 2
- KiCad E.D.A. eeschema (2010−05−05 BZR 2356)−stable
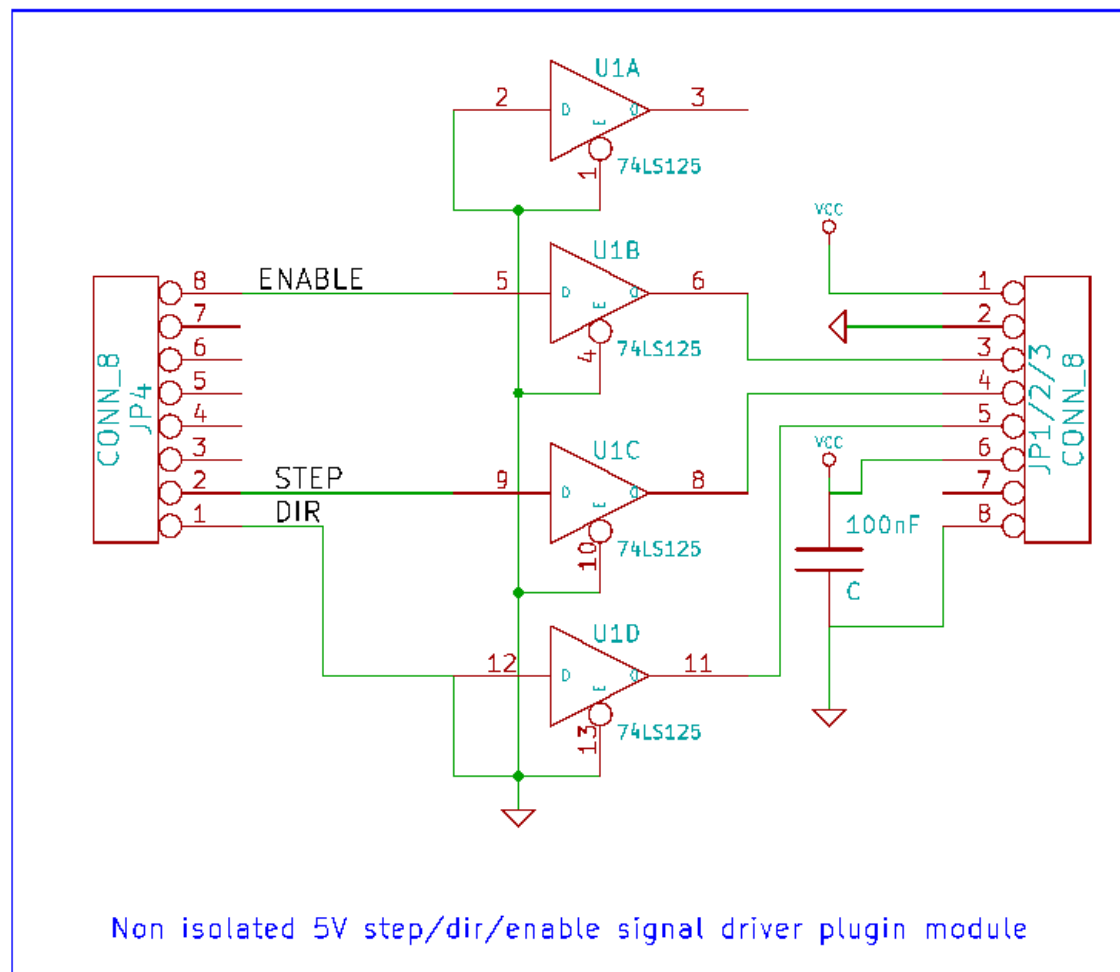- Id: 1/1

Stepper driver
It is possible to mount a Pololu 1201 stepper motor driver or a non-isolated or isolated stepper signal interface.
This interface connects to external stepper motor driver.
For example:

Non isolated 5V step/dir/enable signal driver plugin module

Connectors

All connectors (except specified otherwise): 3.5MM plug

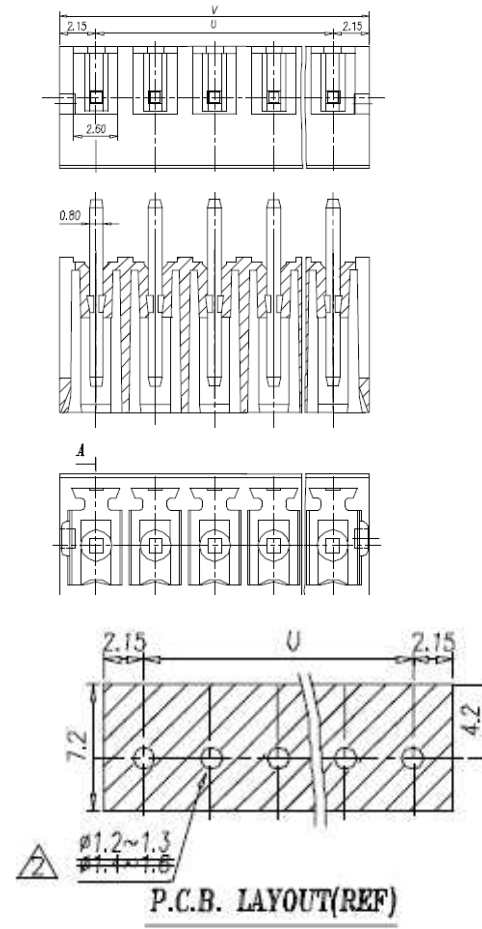Fabrikant: IMO PRECISION CONTROLS
Farnell: Ordercode: 1761552
Fabrikantnummer: **20.155MV/4**

Counter part:
Fabrikant: IMO PRECISION CONTROLS
Farnell: Ordercode: 1761534
Fabrikantnummer: **20.1550M/4**

Vertical:
2 PIN: Board: **20.155MV/2** and connector **20.1550M/2**
4 PIN: Board: **20.155MV/4** and connector **20.1550M/4**
6 PIN: Board: **20.155MV/6** and connector **20.1550M/6**
8 PIN: Board: **20.155MV/8** and connector **20.1550M/8**
10 PIN: Board: **20.155MV/10** and connector **20.1550M/10**

Horizontal:
2 PIN: Board: **20.155MH/2** and connector **20.1550M/2**
4 PIN: Board: **20.155MH/4** and connector **20.1550M/4**
6 PIN: Board: **20.155MH/6** and connector **20.1550M/6**
8 PIN: Board: **20.155MH/8** and connector **20.1550M/8**
10 PIN: Board: **20.155MH/10** and connector **20.1550M/10**

P.C.B. LAYOUT(REF)

Opto-couplers:
TLP504A (dual) **TLP504A−2** (quad)
DIP (place in IC socket)

TLP504A

1	8
2	7
3	6
4	5
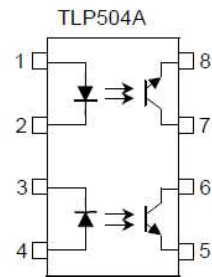
1, 4 : Anode
2, 3 : Cathode
5, 8 : Emitter
6, 7 : Collector

TLP504A-2

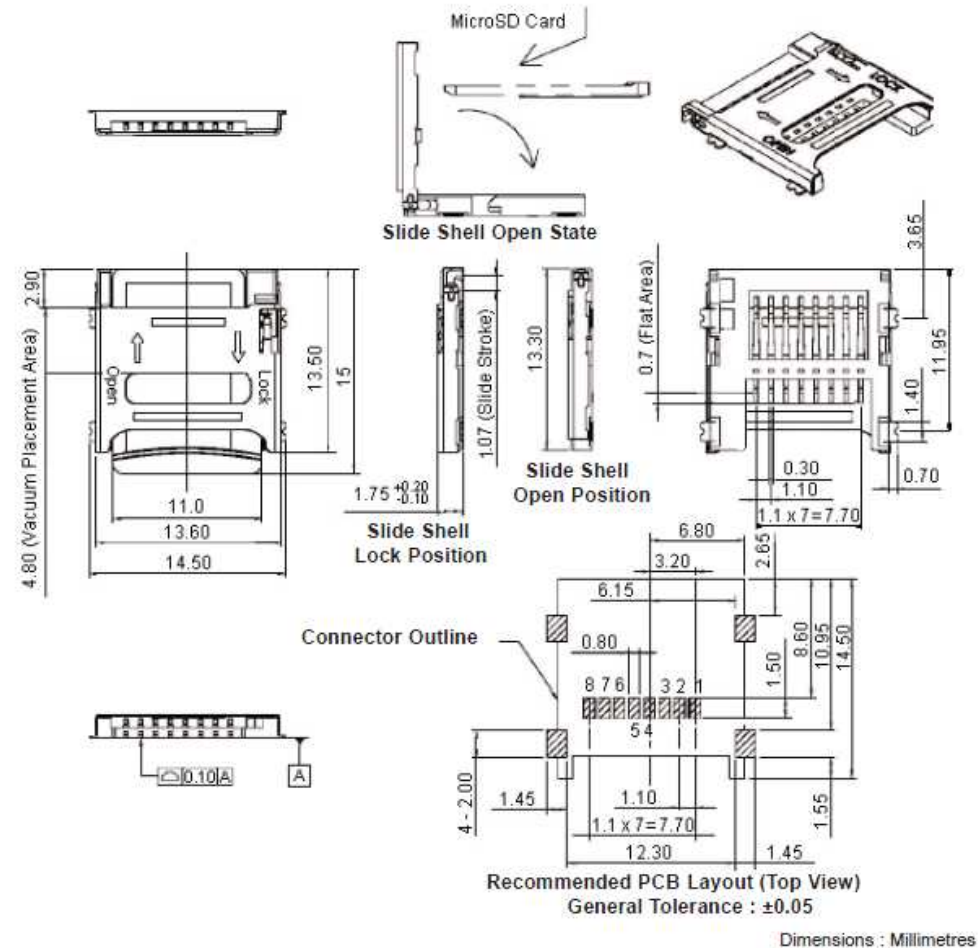|	
1	16
2	15
3	14
4	13
5	12
6	11
7	10
8	9
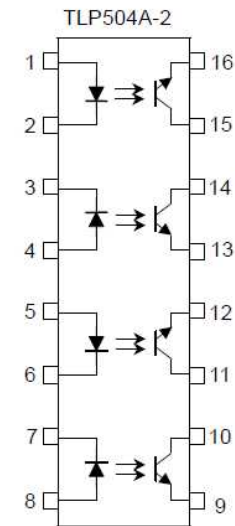
1, 4, 5, 8 : Anode
2, 3, 6, 7 : Cathode
9, 12, 13, 16 : Emitter
10, 11, 14, 15 : Collector

SD Card

MULTICOMP
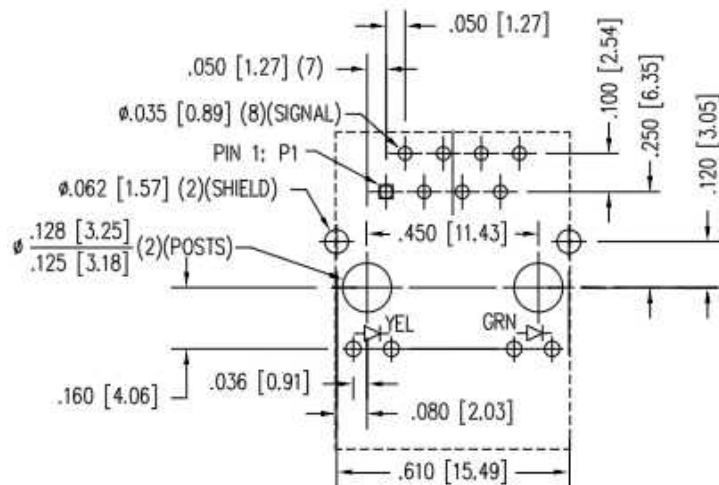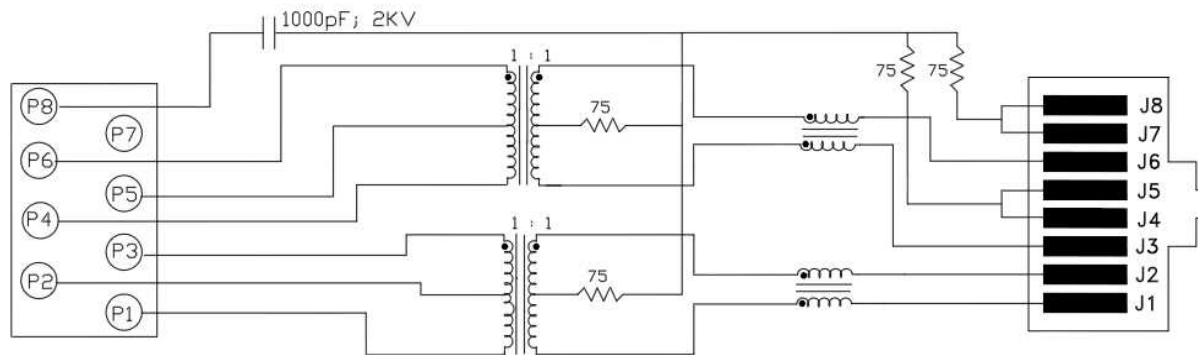Farnell Ordercode: 1686452
Fabrikantnummer: 460DE08C3

MicroSD Card

Slide Shell Open State

Slide Shell
Open Position

3.65

11.95

1.40

0.30
1.10

0.70

1.1 x 7 = 7.70

2.90

4.80 (Vacuum Placement Area)

Open

Lock

13.50

15

1.07 (Slide Stroke)

13.30

0.7 (Flat Area)

1.75 +0.20 -0.10

11.0

13.60

14.50

Slide Shell
Lock Position

Connector Outline

6.80

3.20

2.65

6.15

0.80

8.60

10.95

14.50

1.50

8 7 6   3 2 1

5 4

4 - 2.00

1.45

1.10

1.1 x 7 = 7.70

12.30

1.55

1.45

Recommended PCB Layout (Top View)
General Tolerance : ±0.05

0.10 A

A

Dimensions : Millimetres

Ethernet
Fabrikant: STEWART CONNECTOR
Farnell Ordercode: 1137983
Fabrikantnummer: SI-60062-F

P.C.B. RECOMMENDED HOLE LAYOUT
SEEN FROM COMPONENT SIDE

ALL CENTERLINE DIMENSIONS ARE BASIC.

Pololu
mounted on SIL header (female)

MBED
Mounted on 2x 2x40 header (female) (similar to mbed workshop board)

USB
USB-A connector for USB-stick (flat)

Solder Joints
2.54 mm pitch holes (should be able to place jumper)

I2C / ANALOG / CAN (P7/P8)
Can be 2.54 mm holes

LIMIT SENSORS
ZLIMITS and XY limits can be combined on 8pin connector (3.5mm pitch) or 10 pin connector (combined with Vsensor)

LASER & OUTPUT
Can be combined on 8 pin connector (3.5mm pitch)