EE/CprE/SE 491 BI-WEEKLY REPORT 4

Start Semester – 04/07/2023

Group number:

sdmay23-41

Project title:

Automated Testing Station for Sensing Applications

Client &/Advisor:

Moneim Ismail

Team Members/Role:

Thomas McCoy - Group Organizer, Software developer

Matthew Rief - CAD designs/3D printing

Garth Anderson - PCB designs

Malvin Lim - PCB designs

- **Weekly Summary**

  Overall objective for this week was to get as close as possible to a testable design. Garth and Malvin continued working on PCB design, improvements, fixes, etc. Thomas continued work on the LabView program for project interface, and Matt continued 3D printing components and continued work on DUT platform design.

  Thomas was out of state this week of 4/3 for the holy days.

- **Past week accomplishments**

Thomas McCoy:

- Cleaned up LabView program.

Garth Anderson:

- Met with Malvin to compare the components that we got from ETG with the footprints in our PCBs.
- Changed the op amp in my photodetector circuit since we received different op amps from ETG than I was expecting.
- Fixed errors in footprints.

Malvin Lim:

- Tested on components I received from ETG: +-15V reg, 5V reg, and potentiometer: Capacitors, LMs, diode, and potentiometer.
- Double-checked PCB layout.
- Designed RGBW LED footprint.
- Worked in the lab in Coover Hall with Garth.
- Updated the footprints for the Capacitors to 1000uF and 100uF.
- Created a footprint for the op-amp

- Tested the Atmega chip with an Arduino Uno
- Checked the footprints and component arrangement.

Matthew Rief:

- Frame 3D printing
- O-rings.

- **Individual contributions**

NAME	**Individual Contributions** *(Quick list of contributions. This should be short.)*	**Hours this week**	**HOURS cumulative**
Thomas McCoy	LabView programming (see list above)	3	31
Garth Anderson	PCB design improvements (see list above)	6	30
Malvin Lim	PCB design improvements (see list above)	6	32
Matthew Rief	CAD designs and 3D printing (see list above)	3	23

- **Plans for the upcoming week**

Thomas McCoy:

- Continue LabView programming, get Keithley sweep data collection finalized.
- Save sweep data to files

Garth Anderson:

- Meet with Mo to check designs
- Send designs to ETC

Malvin Lim:

- Same as listed under Garth.

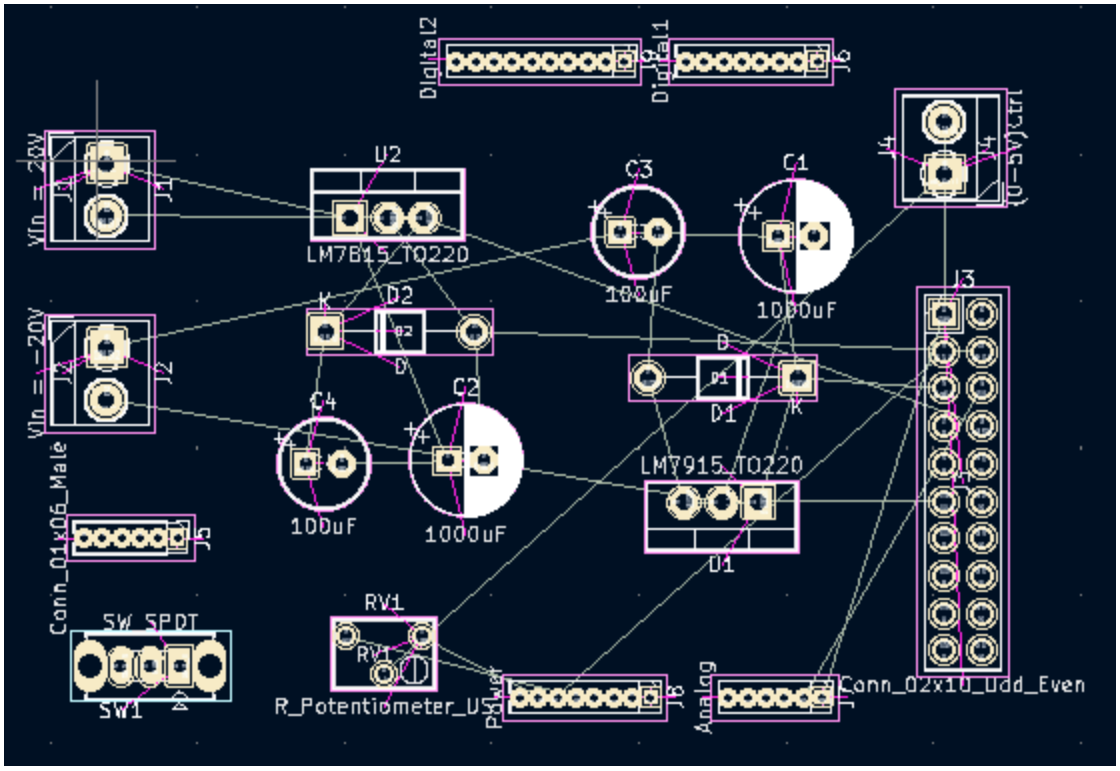
Matthew Rief:

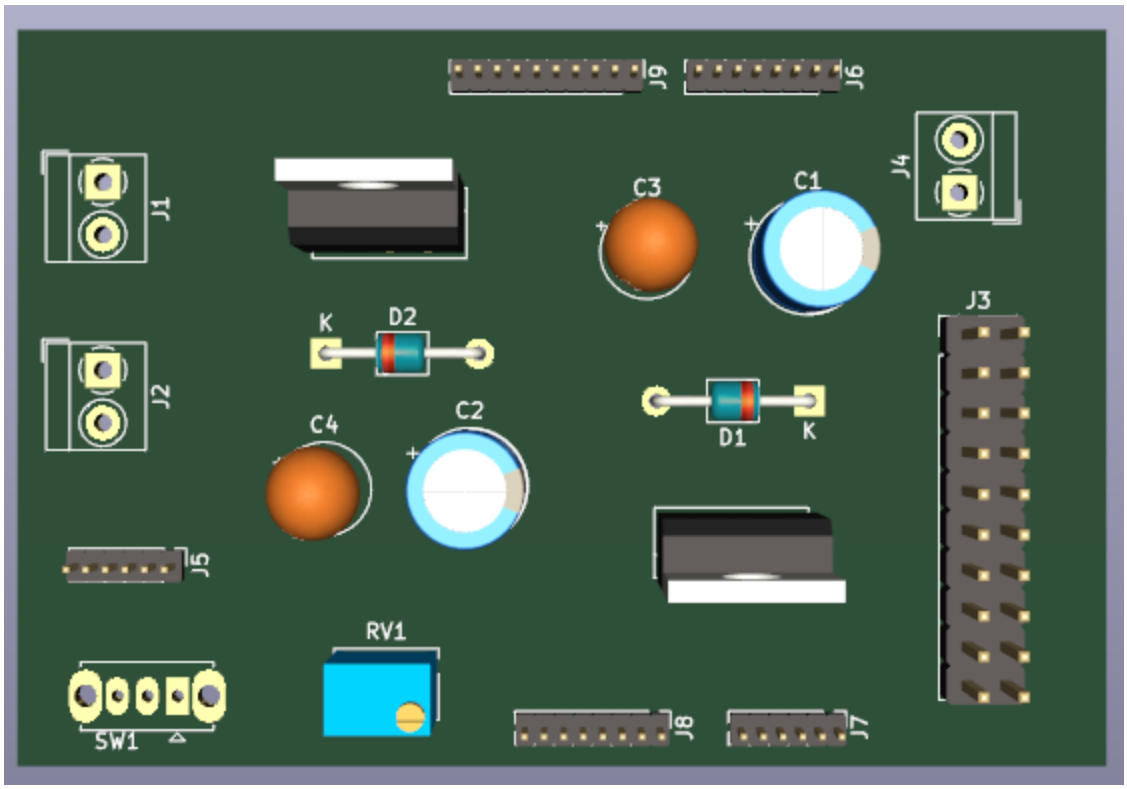
- Make the base and sides of the box thin with a high filling ratio.
- Print a prototype for everything using a low resolution filling ratio. (20% or 10%)

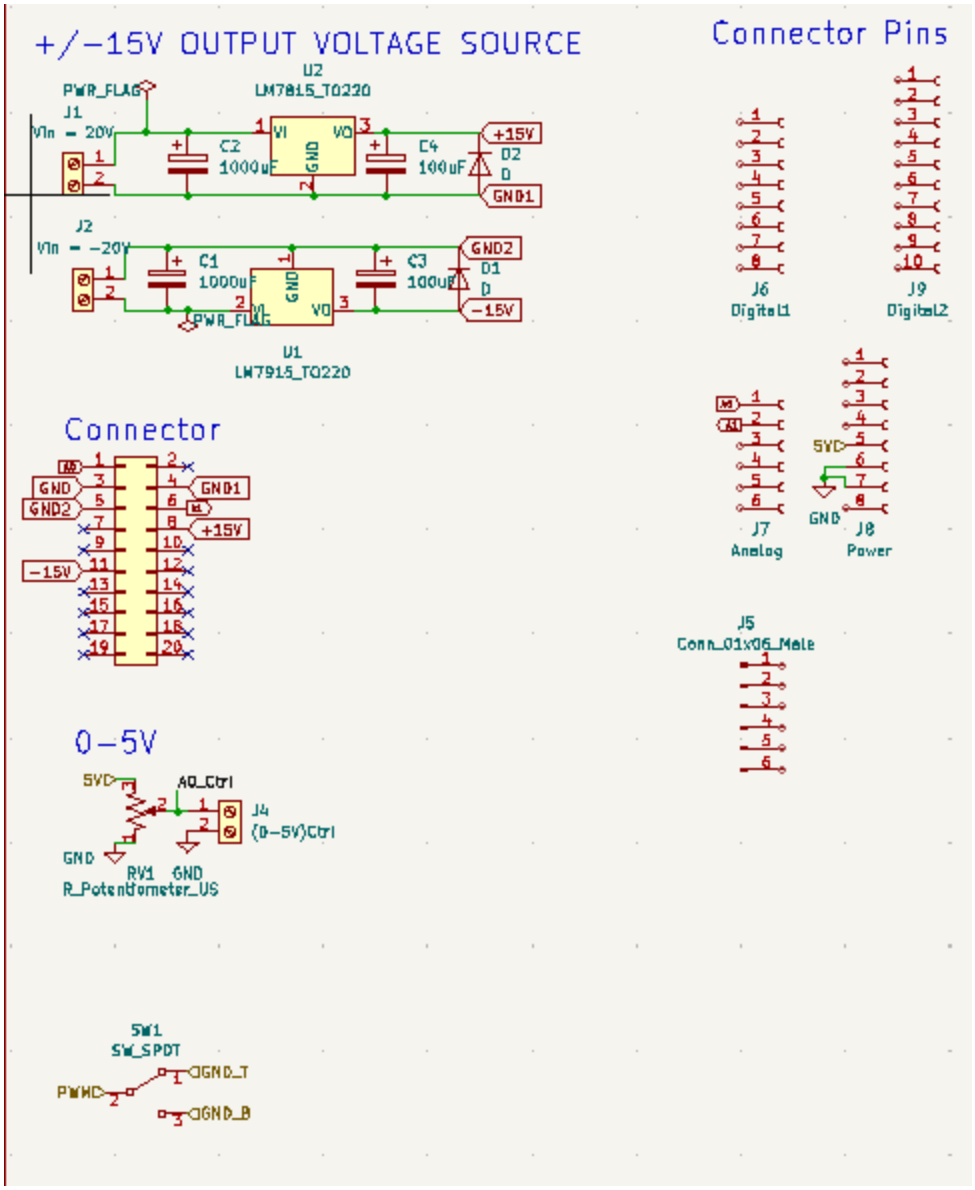
- **Summary of weekly advisor meeting**

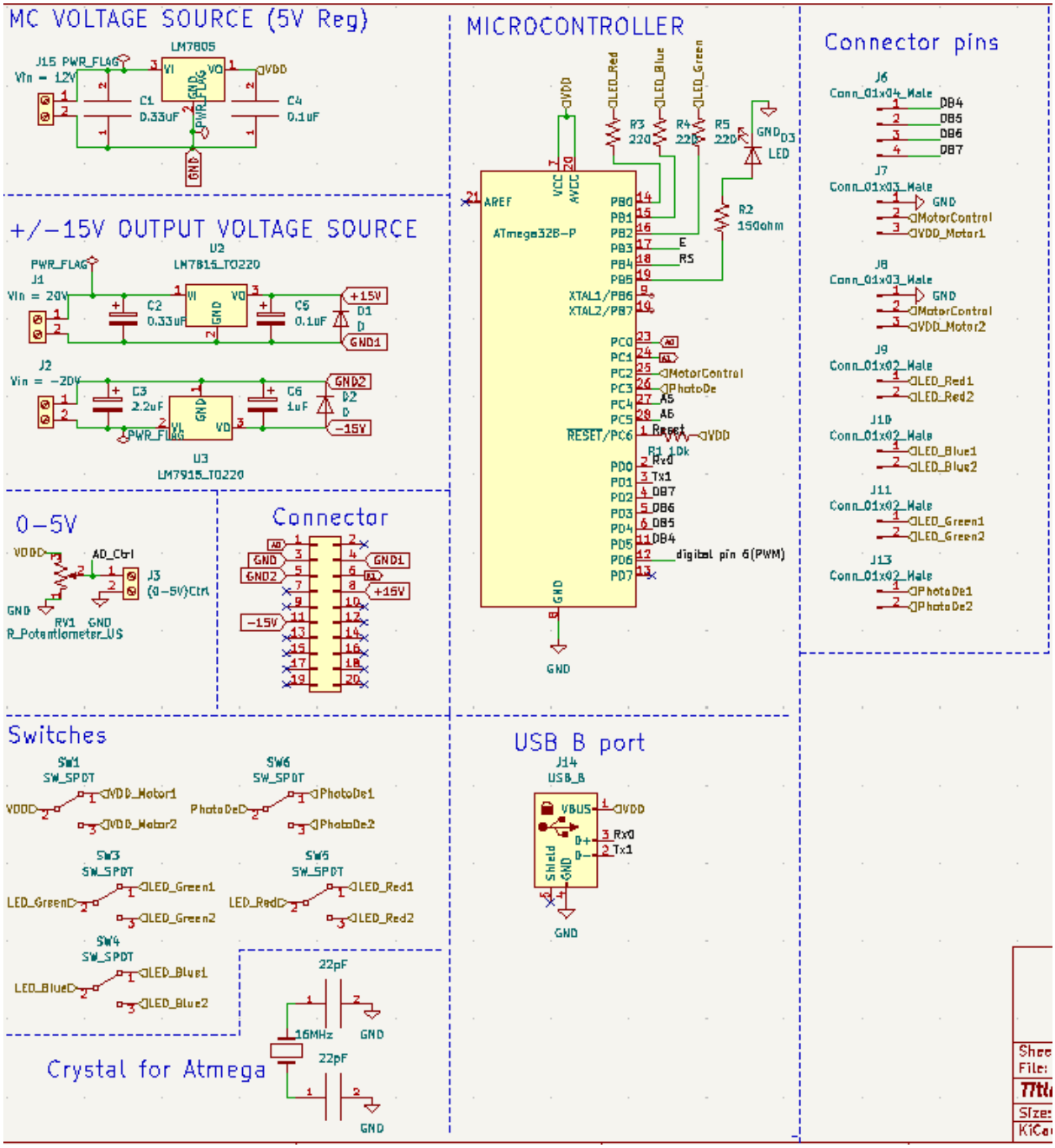
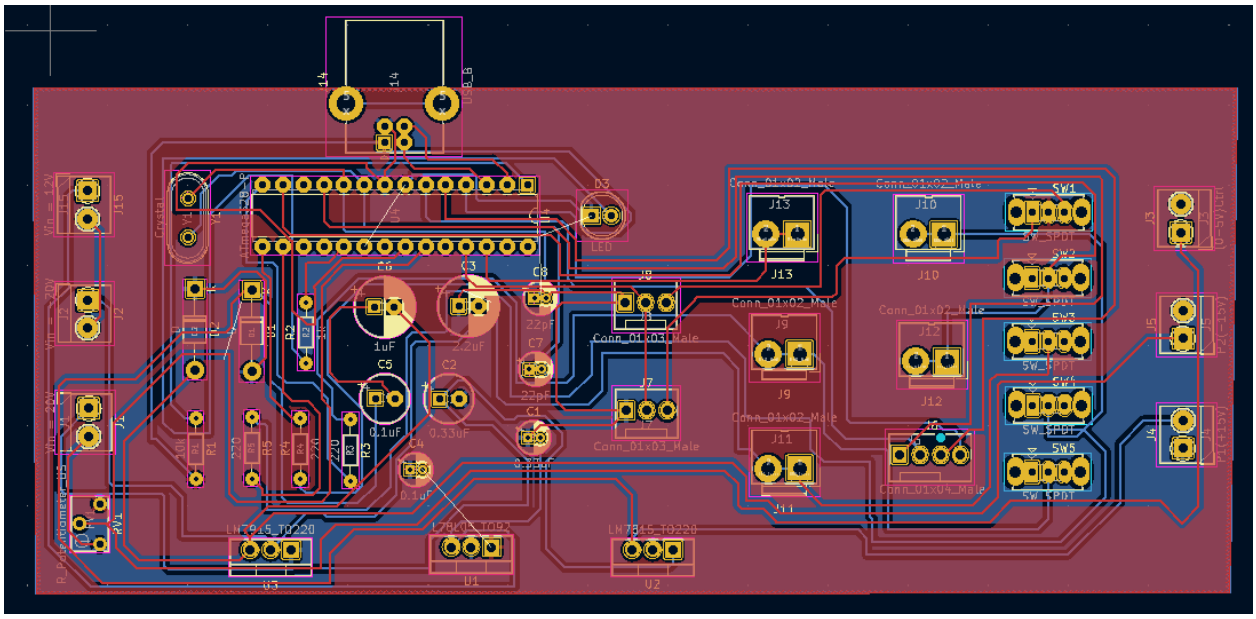
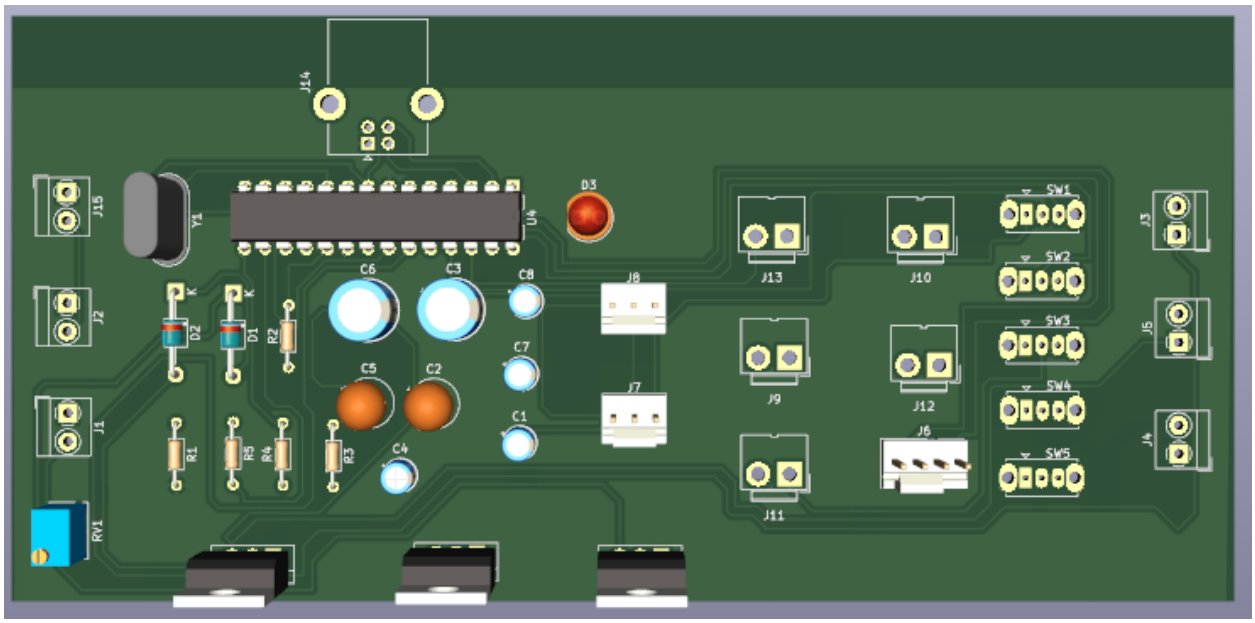
Discussed some changes, and proposed a small design change. The 2nd week meeting was canceled because a majority of the group couldn't attend.

- **Diagrams**


Digital2
Digital1
J6
Vin = 20V
J1
U2
LM7815_TO220
C3
100uF
C1
1000uF
J4
(0-5V)ctrl
J3
Vin = -20V
J2
D2
K
D
D1
C4
C2
100uF
1000uF
LM7915_TO220
Conn_01x06_Male
J5
SW_SPDT
SW1
RV1
R_Potentiometer_US
Power
Analog
Conn_02x10_Odd_Even


J9
J6
J1
C3
C1
J4
J3
K
D2
J2
C4
C2
D1
K
J5
RV1
SW1
J8
J7


+/−15V OUTPUT VOLTAGE SOURCE
PWR_FLAG
J1
Vin = 20V
U2
LM7815_TO220
C2
1000uF
C4
100uF
+15V
D2
D
GND1
J2
Vin = −20V
C1
1000uF
C3
100uF
GND2
D1
D
−15V
PWR_FLAG
U1
LM7915_TO220
Connector
GND
GND2
GND1
+15V
−15V
0−5V
5VD
A0_Ctrl
J4
(0−5V)Ctrl
GND
RV1
R_Potentiometer_US
SW1
SW_SPDT
PWMD
GND_T
GND_B
Connector Pins
J6
DigitalI1
J9
DigitalI2
J7
Analog
5VD
GND
J8
Power
J5
Conn_01x06_Male


MC VOLTAGE SOURCE (5V Reg)
LM7805
J15 PWR_FLAG
Vin = 12V
C1
0.33uF
C4
0.1uF
VDD
+/−15V OUTPUT VOLTAGE SOURCE
U2
LM7815_TO220
PWR_FLAG
J1
Vin = 20V
C2
0.33uF
C5
0.1uF
+15V
D1
D
GND1
J2
Vin = −20V
C3
2.2uF
C6
1uF
GND2
D2
D
−15V
PWR_FLAG
U3
LM7915_TO220
0−5V
VDDC
AD_Ctrl
J3
(0−5V)Ctrl
GND
RV1
R_Potentiometer_US
Connector
GND
GND1
GND2
+15V
−15V
MICROCONTROLLER
VDD
LED_Red
LED_Blue
LED_Green
R3
220
R4
220
R5
220
D3
LED
R2
150ohm
AREF
VCC
AVCC
ATmega328-P
PB0
PB1
PB2
PB3
PB4
PB5
E
RS
XTAL1/PB6
XTAL2/PB7
PC0
PC1
PC2
PC3
PC4
PC5
RESET/PC6
MotorControl
PhotoDe
A5
A6
Reset
R1
10k
PD0
PD1
PD2
PD3
PD4
PD5
PD6
PD7
Rx0
Tx1
DB7
DB6
DB5
DB4
digital pin 6(PWM)
GND
Connector pins
J6
Conn_01x04_Male
DB4
DB5
DB6
DB7
J7
Conn_01x03_Male
GND
MotorControl
VDD_Motor1
J8
Conn_01x03_Male
GND
MotorControl
VDD_Motor2
J9
Conn_01x02_Male
LED_Red1
LED_Red2
J10
Conn_01x02_Male
LED_Blue1
LED_Blue2
J11
Conn_01x02_Male
LED_Green1
LED_Green2
J13
Conn_01x02_Male
PhotoDe1
PhotoDe2
Switches
SW1
SW_SPDT
VDD
VDD_Motor1
VDD_Motor2
SW6
SW_SPDT
PhotoDe
PhotoDe1
PhotoDe2
SW3
SW_SPDT
LED_Green
LED_Green1
LED_Green2
SW5
SW_SPDT
LED_Red
LED_Red1
LED_Red2
SW4
SW_SPDT
LED_Blue
LED_Blue1
LED_Blue2
USB B port
J14
USB_B
VBUS
VDD
D+
Rx0
D−
Tx1
Shield
GND
GND
Crystal for Atmega
22pF
16MHz
GND
22pF
GND