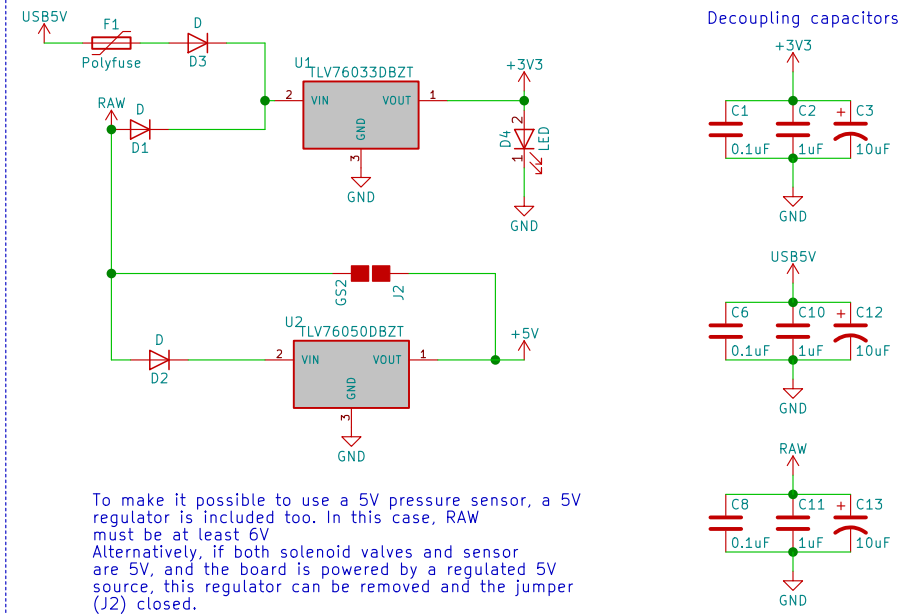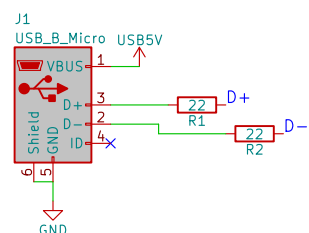## Power

Power input. RAW is 5 to 24VDC, and powers the valves directly.
3.3V regulator powers the microcontroller.
5V regulator powers the sensor, if a 5V sensor is used.
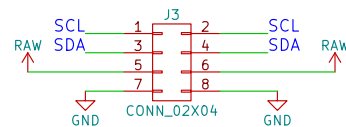
USB5V
F1 Polyfuse
D3 D
U1 TLV76033DBZT
VIN VOUT
GND
+3V3
D4 LED
GND

RAW
D1 D
GND2 J2
U2 TLV76050DBZT
VIN VOUT
GND
+5V
D2 D

To make it possible to use a 5V pressure sensor, a 5V
regulator is included too. In this case, RAW
must be at least 6V
Alternatively, if both solenoid valves and sensor
are 5V, and the board is powered by a regulated 5V
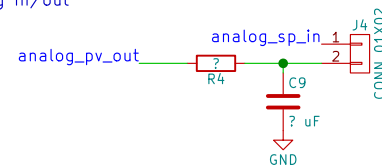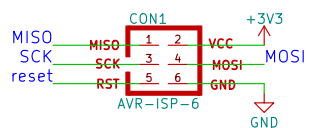source, this regulator can be removed and the jumper
(J2) closed.

Decoupling capacitors

+3V3
C1 0.1uF   C2 1uF   C3 10uF
GND

USB5V
C6 0.1uF   C10 1uF   C12 10uF
GND

RAW
C8 0.1uF   C11 1uF   C13 10uF
GND

Connectors

J1 USB_B_Micro   USB5V
VBUS
D+
D-
ID
Shield
GND
GND
R1 22   D+
R2 22   D-

i2c in/out, RAW and GND
2x4 connector to easily daisy-chain several boards
J3
SCL   SCL
RAW SDA   SDA RAW
GND   CONN_02X04   GND

analog in/out
analog_pv_out
R4
analog_sp_in   J4 CONN_01X02
C9 ? uF
GND

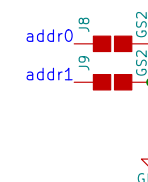ICSP header for flashing bootloader
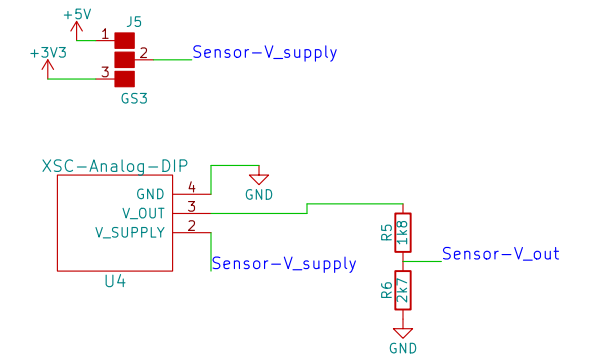CON1
MISO   MISO   VCC   +3V3
SCK   SCK   MOSI MOSI
reset RST   GND
AVR-ISP-6
GND

Jumpers for i2c address selection. This will
allow up to 4 different addresses without
requiring any reprogramming.
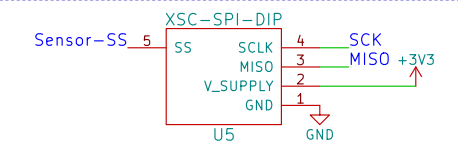addr0   J8
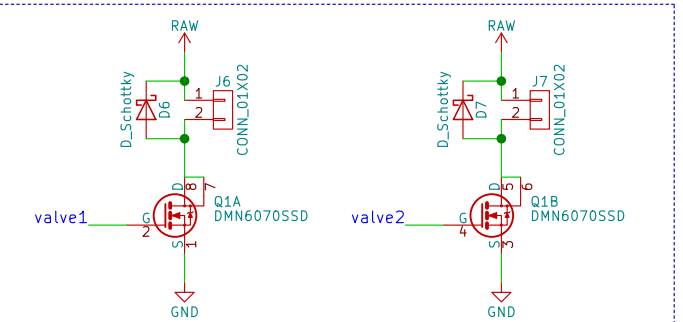addr1   J9   GS2
GND
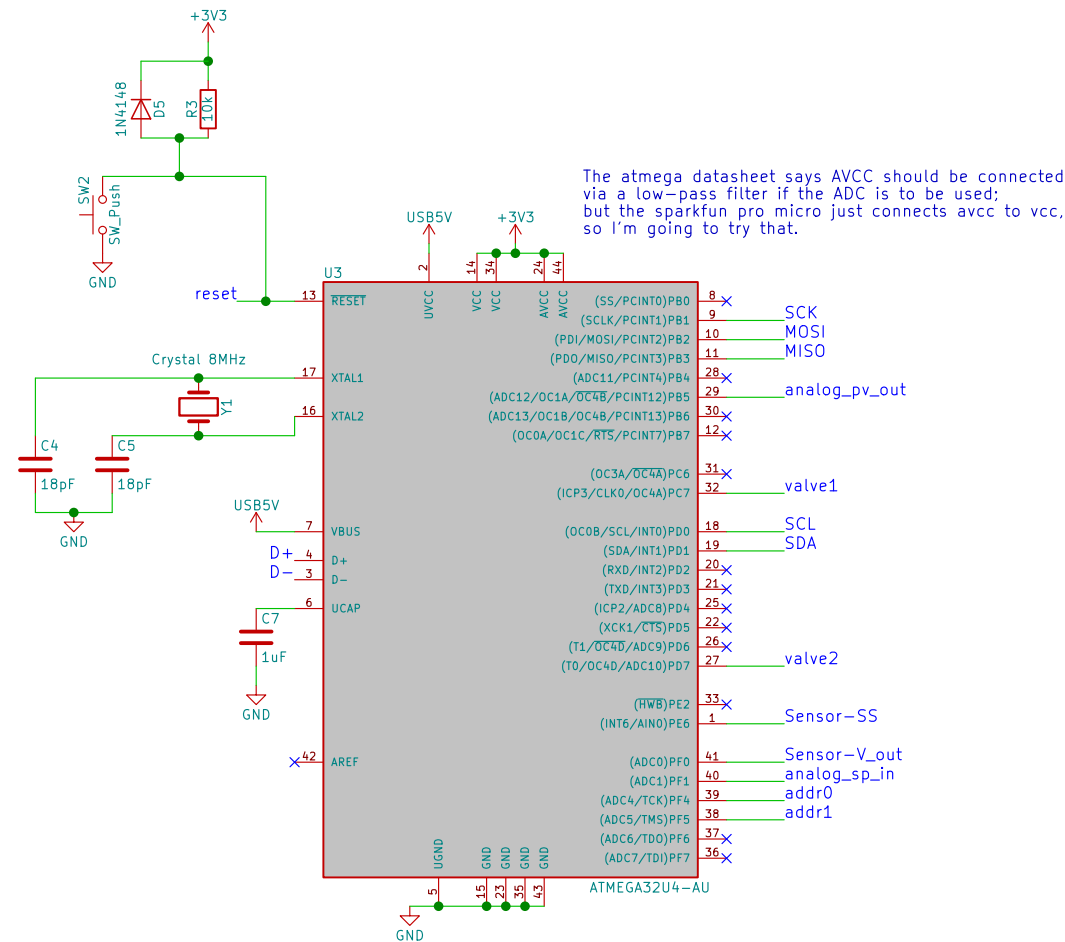
Analog pressure sensor

There is support for either a 3.3V or a 5V sensor.
For a 3.3V sensor, the resistors are not populated,
and the 1k8 resistor is replaced by a solder bridge

+5V   J5
+3V3   Sensor-V_supply
GS3

XSC-Analog-DIP
GND   GND
V_OUT
V_SUPPLY
U4
Sensor-V_supply   R5 1k8   Sensor-V_out
R6 2k7
GND

Digital pressure sensor

Sensor-SS
XSC-SPI-DIP
SS   SCK   SCK
SCLK MISO +3V3
MISO
V_SUPPLY
GND
U5   GND

Solenoid valve drivers

RAW
D_Schottky D6   J6 CONN_01X02
valve1
G   Q1A DMN6070SSD
GND

RAW
D_Schottky D7   J7 CONN_01X02
valve2
G   Q1B DMN6070SSD
GND

Schottky diodes are used due to their very fast
recovery times, which is necessary for PWM
driving of the valves.

+3V3
1N4148 D5
R3 10k
SW2 SW_Push
GND
reset

Crystal 8MHz
Y1
C4 18pF   C5 18pF
GND

The atmega datasheet says AVCC should be connected
via a low-pass filter if the ADC is to be used;
but the sparkfun pro micro just connects avcc to vcc,
so I'm going to try that.

USB5V   +3V3
U3
RESET   UVCC VCC VCC AVCC AVCC
13
17 XTAL1
16 XTAL2
USB5V
7 VBUS
4 D+
3 D-
UCAP
C7 1uF
GND
AREF

(SS/PCINT0)PB0   SCK
(SCLK/PCINT1)PB1   MOSI
(PDI/MOSI/PCINT2)PB2 MISO
(PDO/MISO/PCINT3)PB3
(ADC11/PCINT4)PB4   analog_pv_out
(ADC12/OC1A/OC4B/PCINT12)PB5
(ADC13/OC1B/OC4B/PCINT13)PB6
(OC0A/OC1C/RTS/PCINT7)PB7

(OC3A/OC4A)PC6   valve1
(ICP3/CLK0/OC4A)PC7

(OC0B/SCL/INT0)PD0   SCL
(SDA/INT1)PD1   SDA
(RXD/INT2)PD2
(TXD/INT3)PD3
(ICP2/ADC8)PD4
(XCK1/CTS)PD5
(T1/OC4D/ADC9)PD6   valve2
(T0/OC4D/ADC10)PD7

(HWB)PE2   Sensor-SS
(INT6/AIN0)PE6

(ADC0)PF0   Sensor-V_out
(ADC1)PF1   analog_sp_in
(ADC4/TCK)PF4   addr0
(ADC5/TMS)PF5   addr1
(ADC6/TDO)PF6
(ADC7/TDI)PF7

UGND GND GND GND GND
GND
ATMEGA32U4-AU