40-Pin HAT Connector

3V3_PI
1W
GND
Valve_M2
Valve_M3
Valve_M4
3V3_PI
GND
ID_SD_EEPROM
Pump_WC
Pump_WW
Pump_A
Pump_M1
Pump_M2
GND

40HAT J3
P3V3 P5V
BCM2 P5V
BCM3 GND
BCM4 BCM14
GND BCM15
BCM17 BCM18
BCM27 GND
BCM22 BCM23
P3V3 BCM24
BCM10 GND
BCM9 BCM25
BCM11 BCM8
GND BCM7
BCM0 BCM1
BCM5 GND
BCM6 BCM12
BCM13 GND
BCM19 BCM16
BCM26 BCM20
GND BCM21

5V_PI
5V_PI
GND
LED_PWM
GND
Flow_C
Flow_W
GND
Trigger
ID_SC_EEPROM
GND
Valve_M1
GND
Valve_AL
Valve_AR
Valve_AO
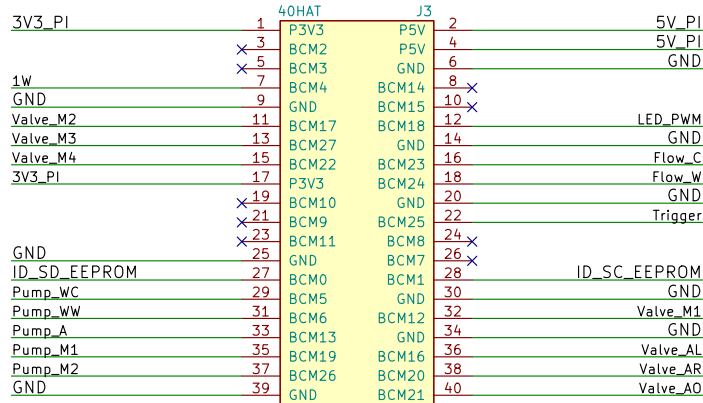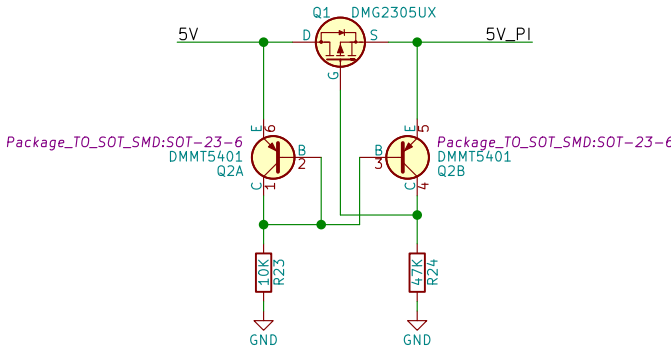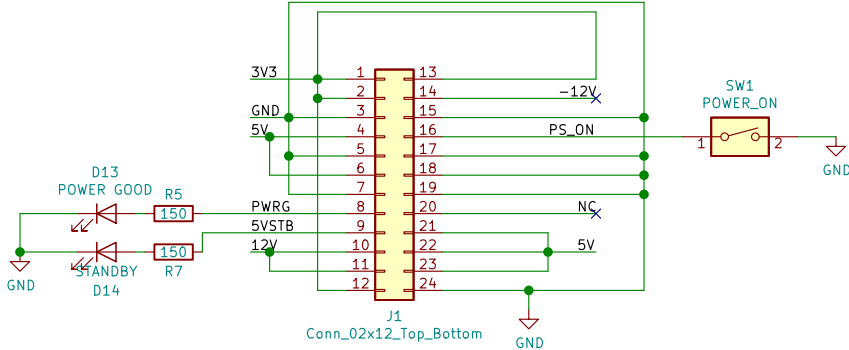
5V Powered HAT Protection
This is the recommended 5V rail protection for
a HAT with power going to the Pi.
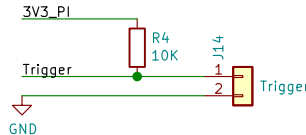See https://github.com/raspberrypi/hats/blob/master/designguide.md#back-powering-the-pi-via-the-j8-gpio-header

Q1 DMG2305UX
5V
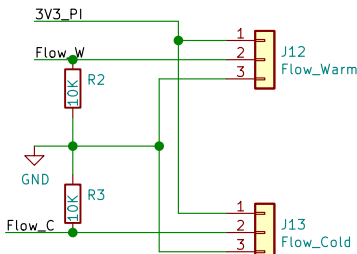5V_PI

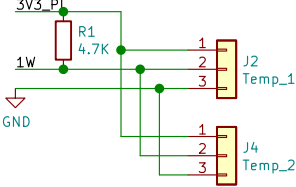Package_TO_SOT_SMD:SOT-23-6
DMMT5401 Q2A

Package_TO_SOT_SMD:SOT-23-6
DMMT5401 Q2B

10K R23
4.7K R24
GND

ATX Connector
3V3
GND
5V
PWRG
5VSTB
12V

-12V
PS_ON
NC
5V

D13 POWER GOOD R5 150
D14 STANDBY R7 150
GND

J1 Conn_02x12_Top_Bottom
GND

SW1 POWER_ON
GND

Trigger
Use a seperate pull-up since the 60k
built in from raspi might be insufficient
for longer cables.

3V3_PI R4 10K
Trigger
GND
J14 Trigger

Flowmeter
3V3_PI
Flow_W
R2 10K
GND
R3 10K
Flow_C
J12 Flow_Warm
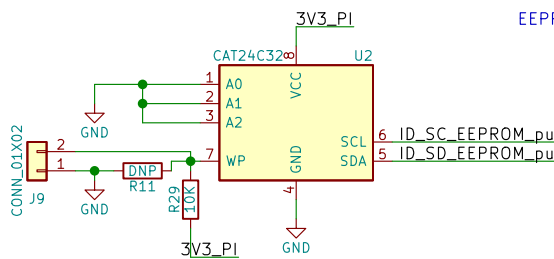J13 Flow_Cold

1 Wire Port
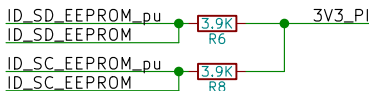3V3_PI R1 4.7K
1W
GND
J2 Temp_1
J4 Temp_2

HAT EEPROM
The HAT spec requires this EEPROM with system information
to be in place in order to be called a HAT. It should be set up as write
protected (WP pin held high), so it may be desirable to either put a
jumper as shown to enable writing, or to hook up a spare IO pin to do so.
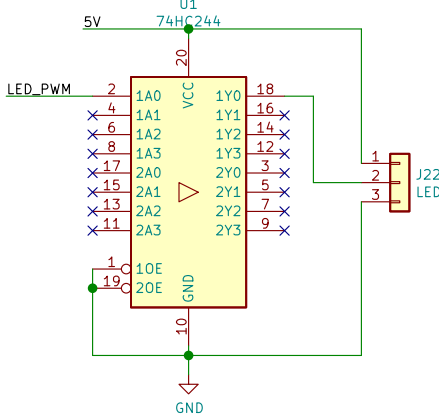
3V3_PI
CAT24C32 U2
A0 VCC
A1
A2
WP SCL ID_SC_EEPROM_pu
GND SDA ID_SD_EEPROM_pu
GND
GND 3V3_PI
CONN_01X02 J9
DNP R11 10K R29

EEPROM WRITE ENABLE

Pullup Resistors
These are just pullup resistors for the I2C bus on the EEPROM.
The resistor values are per the HAT spec.

ID_SD_EEPROM_pu
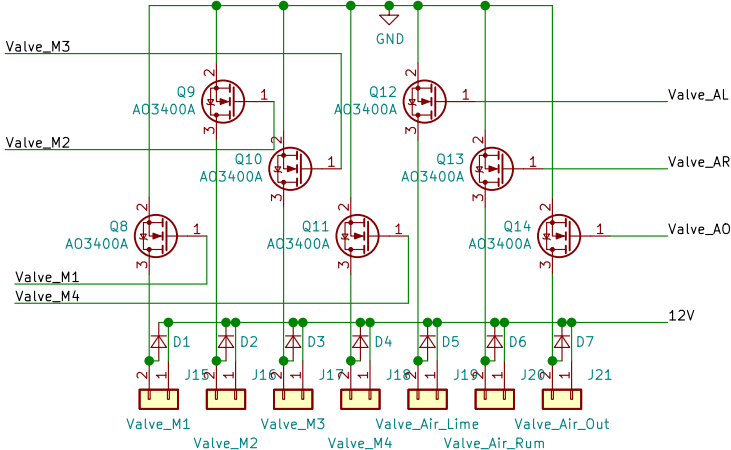ID_SD_EEPROM R6 3.9K 3V3_PI
ID_SC_EEPROM_pu
ID_SC_EEPROM R8 3.9K

Pumps
12V
D8 J6 Pump_Water_Cold
D9 J7 Pump_Water_Warm
D10 J8 Pump_Air
D11 J10 Pump_Misc_1
D12 J11 Pump_Misc_2

Pump_M2
Pump_M1
Pump_A
Pump_WW
Pump_WC

Q3 AO3400A
Q4 AO3400A
Q5 AO3400A
Q6 AO3400A
Q7 AO3400A
GND

Mounting Holes
H1 3mm_Mounting_Hole
H2 3mm_Mounting_Hole
H3 3mm_Mounting_Hole
H4 3mm_Mounting_Hole

LEDs
5V
U1 74HC244
LED_PWM
1A0 1Y0
1A1 1Y1
1A2 1Y2
1A3 1Y3
2A0 2Y0
2A1 2Y1
2A2 2Y2
2A3 2Y3
VCC
1OE
2OE
GND
J22 LED

Valves
Valve_M3
GND
Valve_M2

Q9 AO3400A
Q12 AO3400A
Valve_AL
Q10 AO3400A
Q13 AO3400A
Valve_AR
Q8 AO3400A
Q11 AO3400A
Q14 AO3400A
Valve_AO
Valve_M1
Valve_M4
12V

D1 D2 D3 D4 D5 D6 D7
J15 J16 J17 J18 J19 J20 J21
Valve_M1
Valve_M2
Valve_M3
Valve_M4
Valve_Air_Lime
Valve_Air_Rum
Valve_Air_Out