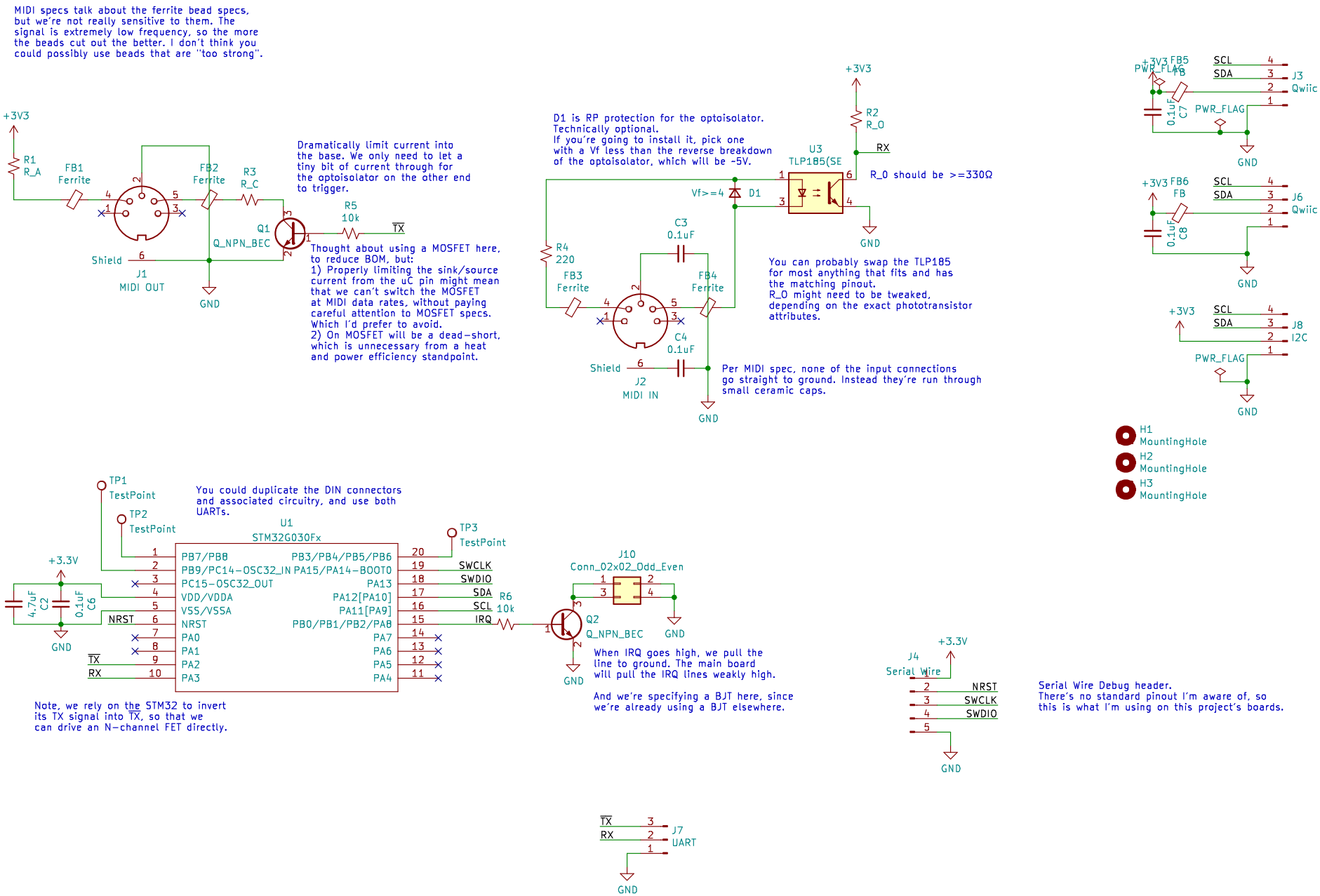
MIDI specs talk about the ferrite bead specs, but we're not really sensitive to them. The signal is extremely low frequency, so the more the beads cut out the better. I don't think you could possibly use beads that are "too strong".
+3V3
R1
R_A
FB1
Ferrite
FB2
Ferrite
R3
R_C
Dramatically limit current into the base. We only need to let a tiny bit of current through for the optoisolator on the other end to trigger.
R5
10k
TX
Q1
Q_NPN_BEC
Shield
J1
MIDI OUT
GND
Thought about using a MOSFET here, to reduce BOM, but:
1) Properly limiting the sink/source current from the uC pin might mean that we can't switch the MOSFET at MIDI data rates, without paying careful attention to MOSFET specs. Which I'd prefer to avoid.
2) On MOSFET will be a dead-short, which is unnecessary from a heat and power efficiency standpoint.
D1 is RP protection for the optoisolator. Technically optional.
If you're going to install it, pick one with a Vf less than the reverse breakdown of the optoisolator, which will be ~5V.
+3V3
R2
R_O
RX
U3
TLP185(SE
R_O should be >=330Ω
Vf>=4
D1
C3
0.1uF
R4
220
FB3
Ferrite
FB4
Ferrite
C4
0.1uF
Shield
J2
MIDI IN
GND
You can probably swap the TLP185 for most anything that fits and has the matching pinout.
R_O might need to be tweaked, depending on the exact phototransistor attributes.
Per MIDI spec, none of the input connections go straight to ground. Instead they're run through small ceramic caps.
+3V3
FB5
FB
PWR_FLAG
C7
0.1uF
SCL
SDA
J3
Qwiic
PWR_FLAG
GND
+3V3
FB6
FB
C8
0.1uF
SCL
SDA
J6
Qwiic
GND
+3V3
SCL
SDA
J8
I2C
PWR_FLAG
GND
H1
MountingHole
H2
MountingHole
H3
MountingHole
TP1
TestPoint
TP2
TestPoint
You could duplicate the DIN connectors and associated circuitry, and use both UARTs.
U1
STM32G030Fx
TP3
TestPoint
+3.3V
C2
4.7uF
C6
0.1uF
GND
PB7/PB8
PB9/PC14-OSC32_IN
PC15-OSC32_OUT
VDD/VDDA
VSS/VSSA
NRST
PA0
PA1
PA2
PA3
PB3/PB4/PB5/PB6
PA15/PA14-BOOT0
PA13
PA12[PA10]
PA11[PA9]
PB0/PB1/PB2/PA8
PA7
PA6
PA5
PA4
SWCLK
SWDIO
SDA
SCL
IRQ
TX
RX
R6
10k
J10
Conn_02x02_Odd_Even
Q2
Q_NPN_BEC
GND
When IRQ goes high, we pull the line to ground. The main board will pull the IRQ lines weakly high.
And we're specifying a BJT here, since we're already using a BJT elsewhere.
Note, we rely on the STM32 to invert its TX signal into TX, so that we can drive an N-channel FET directly.
+3.3V
J4
Serial Wire
NRST
SWCLK
SWDIO
GND
Serial Wire Debug header.
There's no standard pinout I'm aware of, so this is what I'm using on this project's boards.
TX
RX
J7
UART
GND