Extras connector
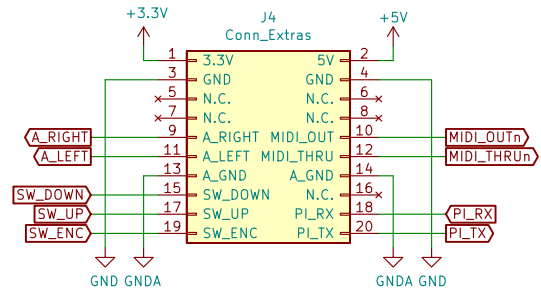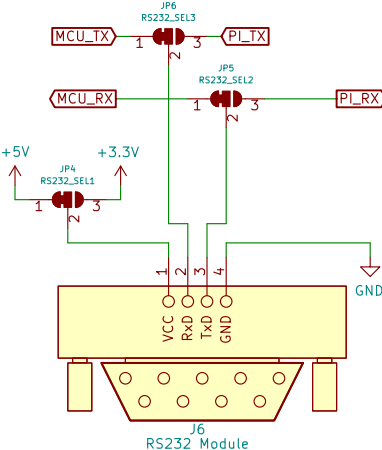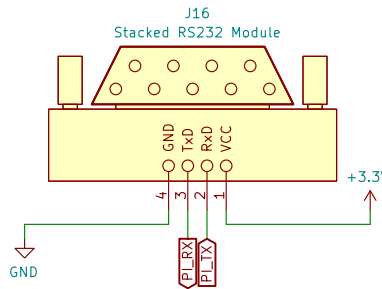
When the extras board is used along with the BulkyMIDI-32, this connector takes care of all signals to and from the main module. The board is powered from this connector as well; for that reason the barrel connection should not be installed unless you intend to use it this way.
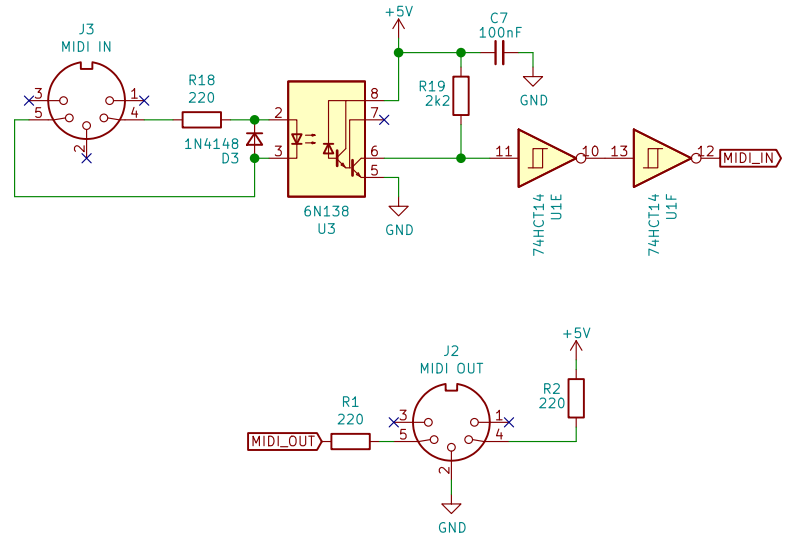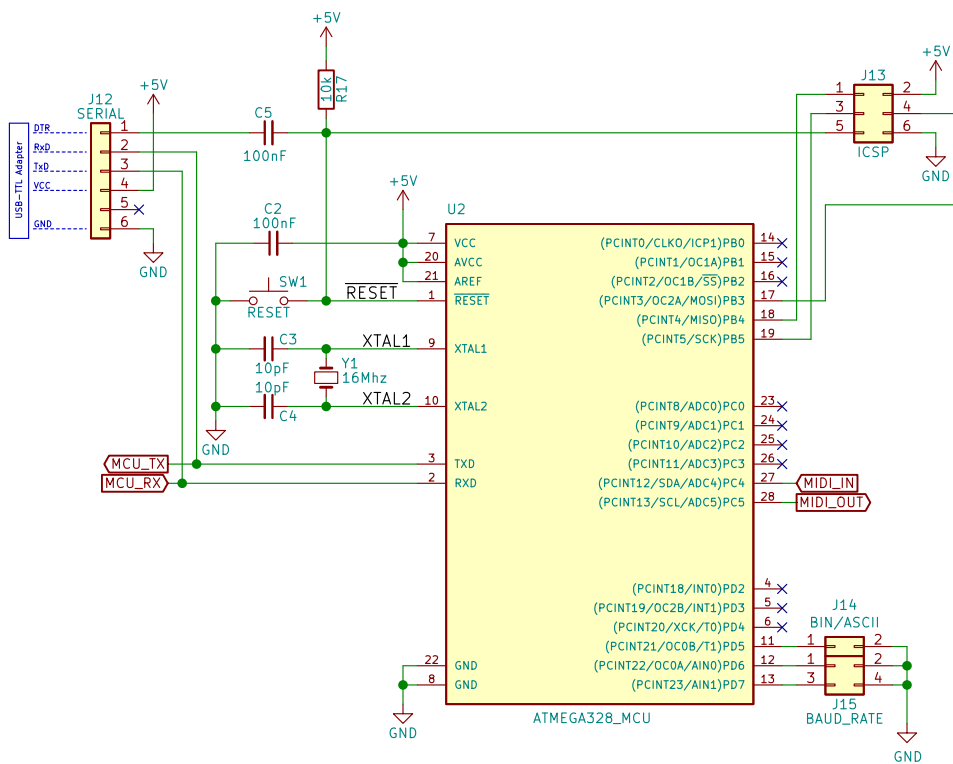
J4
Conn_Extras

+3.3V   +5V

1	3.3V	5V	2
3	GND	GND	4
5	N.C.	N.C.	6
7	N.C.	N.C.	8
9	A_RIGHT	MIDI_OUT	10
11	A_LEFT	MIDI_THRU	12
13	A_GND	A_GND	14
15	SW_DOWN	N.C.	16
17	SW_UP	PI_RX	18
19	SW_ENC	PI_TX	20

A_RIGHT
A_LEFT
SW_DOWN
SW_UP
SW_ENC
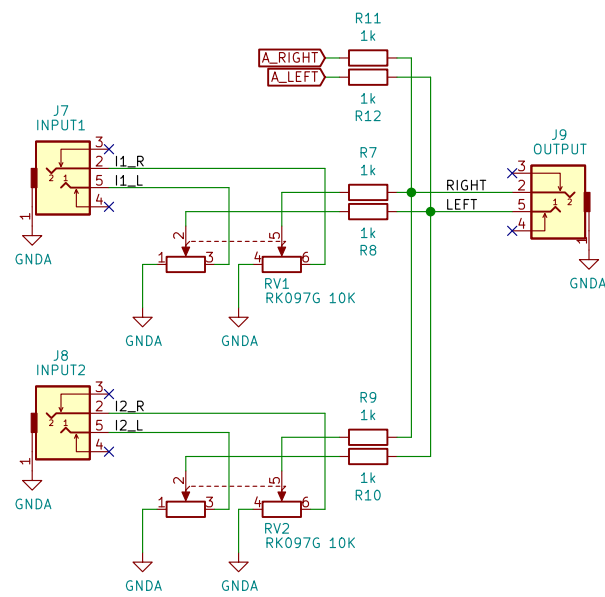
MIDI_OUTn
MIDI_THRUn
PI_RX
PI_TX

GND GNDA   GNDA GND

RS-232 Baud rate converter

1 or 2 RS-232 modules may be installed on the board, this section uses an Atmega328 MCU in order to convert the incoming serial data to the baud rate used by the MIDI protocol (31500 baud). A regular PC serial port can use different baud rates, but the closest is 38400 baud rate and that is still too far out of spec. Note that the MT32-PI itself is able to handle these non-standard baud rates via a configuration option, this is more intended for real MIDI devices.
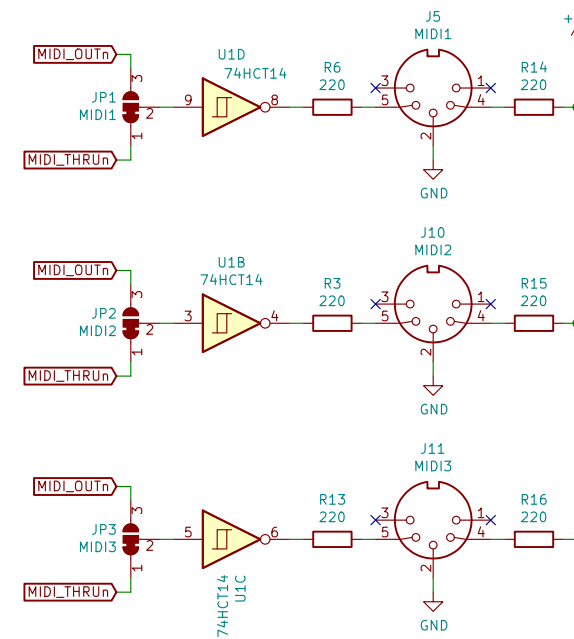
RS-232 Modules (1 or 2 stacked)

A set of two RS232 modules can be stacked upside down, the second one on top is usually just connected to the Raspberry Pi. The primary module can either be linked to the MCU for baud rate converttersion by linking 1-2 across JP4-JP6, 2-3 is instead used when we just want the adapter without any conversion.

J16
Stacked RS232 Module

J6
RS232 Module

Status LEDs

Board status, the ACTIVITY follows data sent to the MT32-PI.

U1A
74HCT14

R4 330   D1 POWER
R5 330   D2 ACTIVITY

MIDI_THRUn

Control scheme ("simple_encoder")

4-pin connector for connecting up a rotary encoder, but because I couldn't find a pre-made module that would fit this is included as a separate PCB. This would have been easier if the real right-angle encoders weren't so expensive.

ENC1
Rotary Encoder

DAT	1	SW_UP
CLK	2	SW_DOWN
GND	3	
BTN	4	SW_ENC
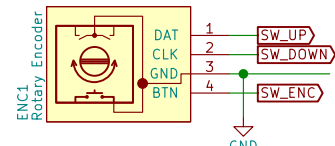
Power section

The power section has been duplicated for the main MT32-PI module, you only need the barrel jack when extras is used without MT32-PI.

DC_5V
J1 DC IN

C6 470uF   C1 100nF   U1G 74HCT14

Passive audio mixer

The audio inputs can be routed via the extras connector from the main module, alternatively you can manually route it externally to INPUT1/INPUT2. The two inputs will passively be mixed into the output sound, note that the level will be slightly lower on the output as compared to directly from the DAC.
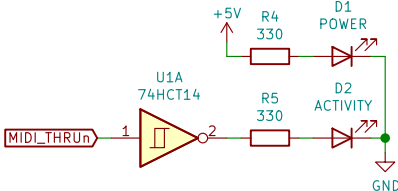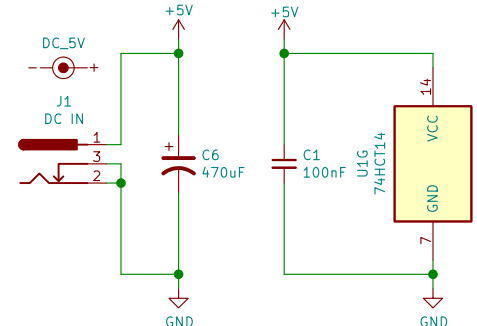
J7 INPUT1
J8 INPUT2
J9 OUTPUT

R11 1k
R12 1k
R7 1k
R8 1k
R9 1k
R10 1k

RV1 RK097G 10K
RV2 RK097G 10K

Extra MIDI ports

J5 MIDI1
J10 MIDI2
J11 MIDI3

U1D 74HCT14
U1B 74HCT14
U1C 74HCT14

R6 220   R14 220
R3 220   R15 220
R13 220   R16 220

J3 MIDI IN
R1B 220
1N4148 D3
6N138 U3
R19 2k2
74HCT14 U1E
74HCT14 U1F
MIDI_IN

J2 MIDI OUT
R1 220   R2 220
MIDI_OUT

U2
ATMEGA328_MCU

J12 SERIAL
USB-TTL Adapter

C5 100nF   R17 10k
C2 100nF
C3 10pF   Y1 16Mhz
C4 10pF
SW1 RESET

J13 ICSP
J14 BIN/ASCII
J15 BAUD_RATE

Basically a bunch of features that I wasn't able to fit onto the main PCB.