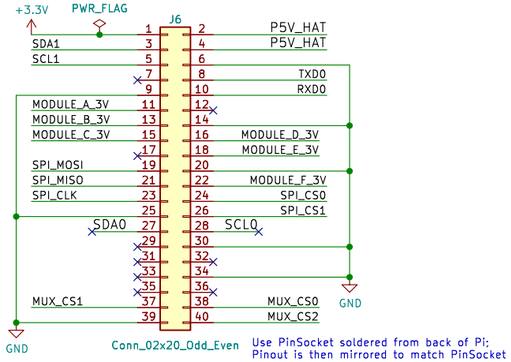
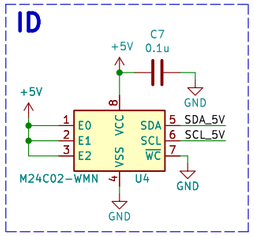
40-Pin HAT Connector



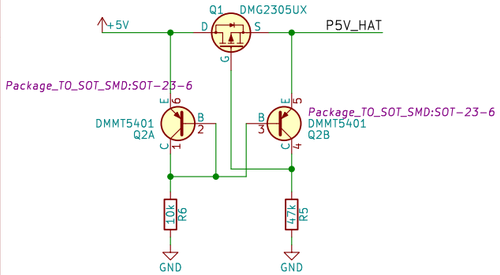
Use PinSocket soldered from back of Pi;
Pinout is then mirrored to match PinSocket

ID

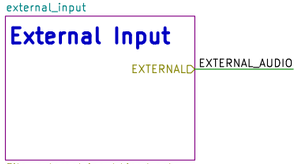


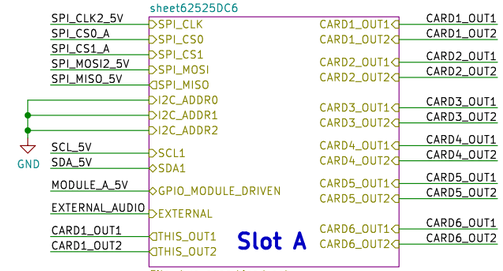
5V Powered HAT Protection

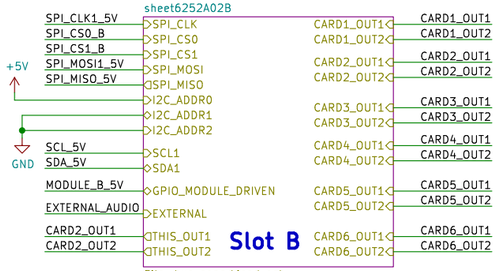
This is the recommended 5V rail protection for
a HAT with power going to the Pi.

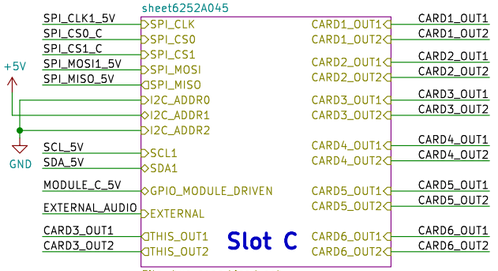


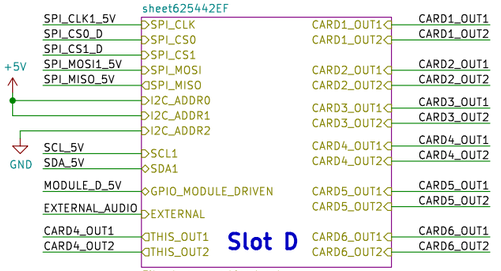
external_input

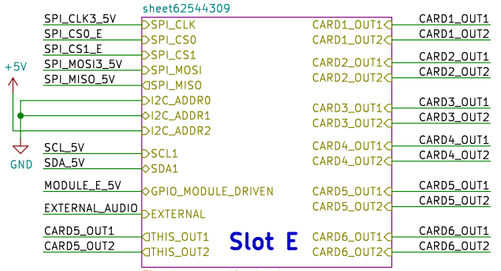


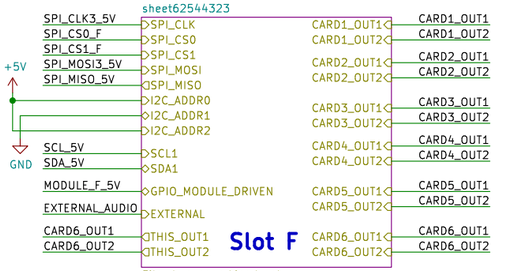




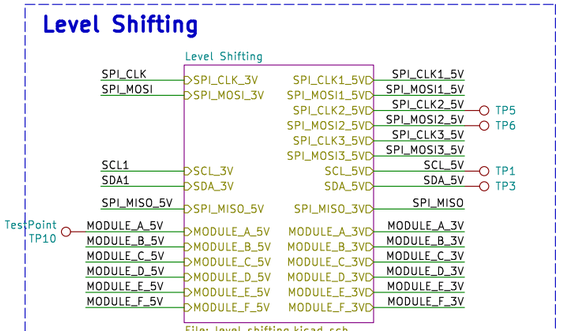






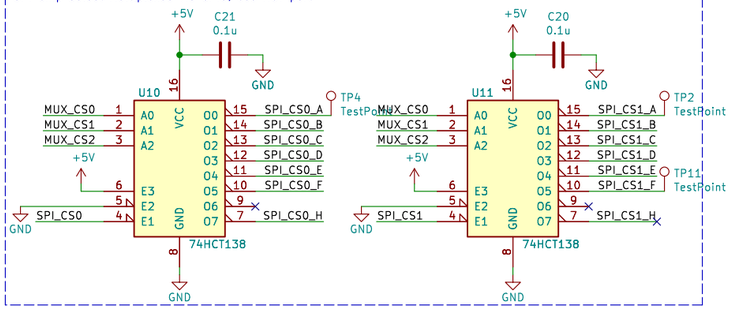


Level Shifting

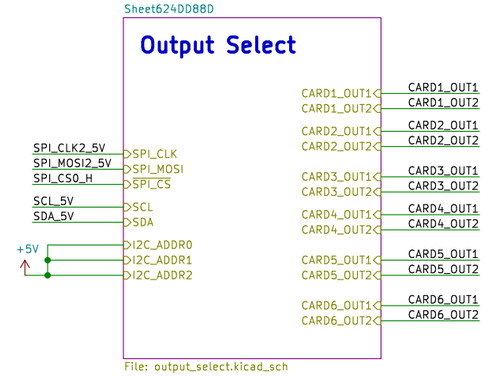


Chip Select w/ Level Shift

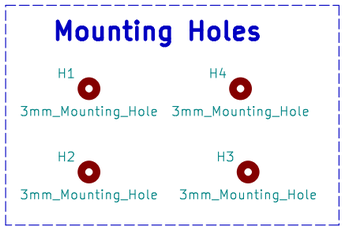
SPI Chip Select Multiplexed via GPIO; use HCT part



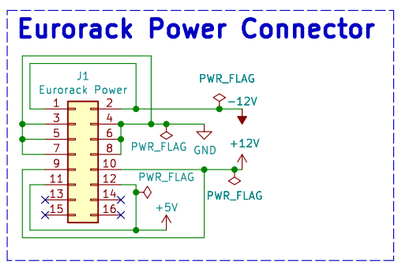
Output Select



Mounting Holes

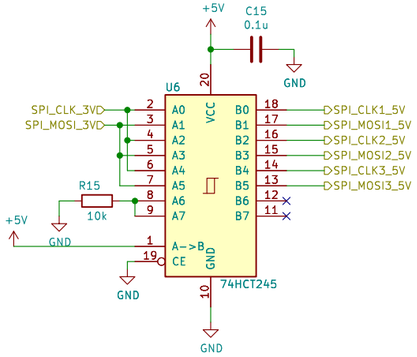


Eurorack Power Connector



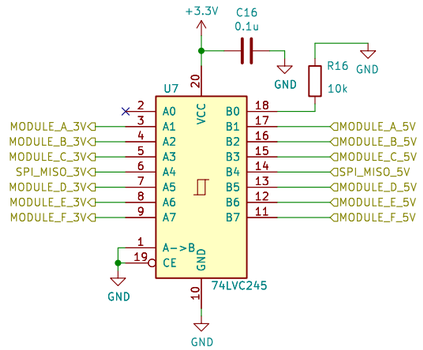
Zoxnoxious Engineering
Sheet: /
File: vca_backplane.kicad_sch
Title: Zoxnoxious Backplane and VCA
Size: B | Date: 2025-06-03 | Rev: 0.3
KiCad E.D.A. kicad 7.0.11 | Id: 1/10

SPI Level Shifting: Pi Out to Modules
Clock and MOSI split for better fanout



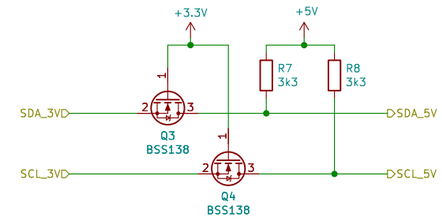
Spec for HCT component; must level shift

Module to Pi: Level shift to 3.3V



Signal flow is right to left; Set from B->A for layout alignment
Note: use LVC part

I2C Level Shifting: Pi Out



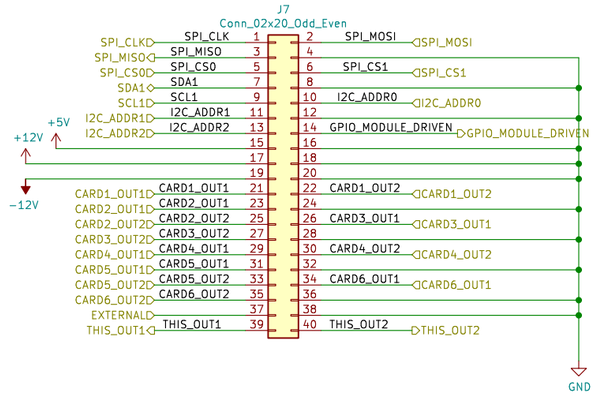
3.3V pullups are already on pi; not needed here
Pullups to 5V to be placed near BSS138

Zoxnoxious Engineering

Sheet: /Level Shifting/
File: level_shifting.kicad_sch

Title: Zoxnoxious Backplane and VCA

Size: B	Date: 2025-06-03	**Rev: 0.3**
KiCad E.D.A. kicad 7.0.11		Id: 2/10

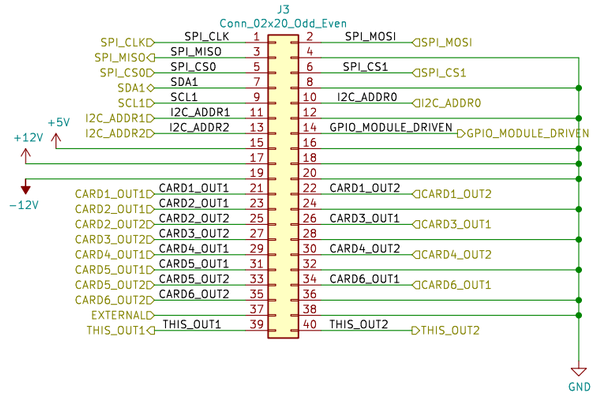


Zoxnoxious Engineering

Sheet: /sheet625442EF/
File: bus_conn.kicad_sch

Title: Zoxnoxious Backplane and VCA

Size: B	Date: 2025-06-03	**Rev: 0.3**
KiCad E.D.A. kicad 7.0.11		Id: 3/10



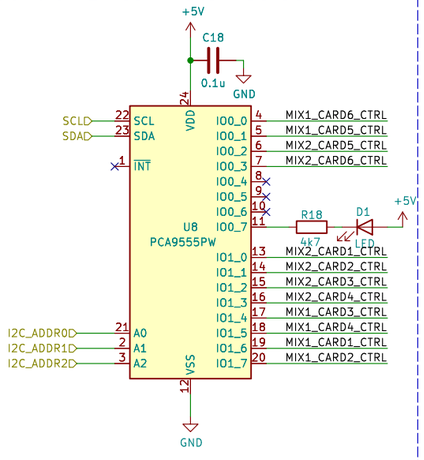
Zoxnoxious Engineering

Sheet: /sheet62525DC6/
File: bus_conn.kicad_sch

Title: Zoxnoxious Backplane and VCA

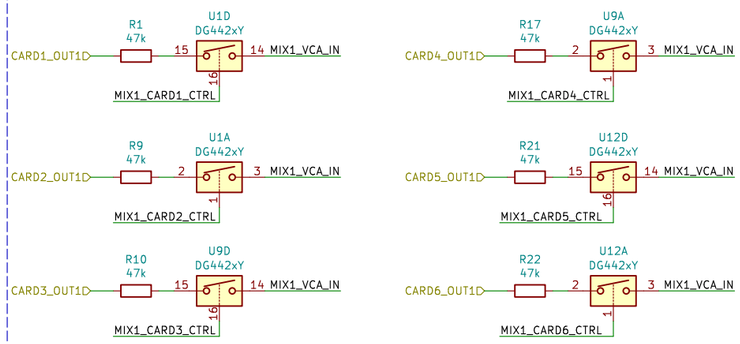
Size: B	Date: 2025-06-03	**Rev: 0.3**
KiCad E.D.A. kicad 7.0.11		Id: 4/10

Control Lines "Patch Select"

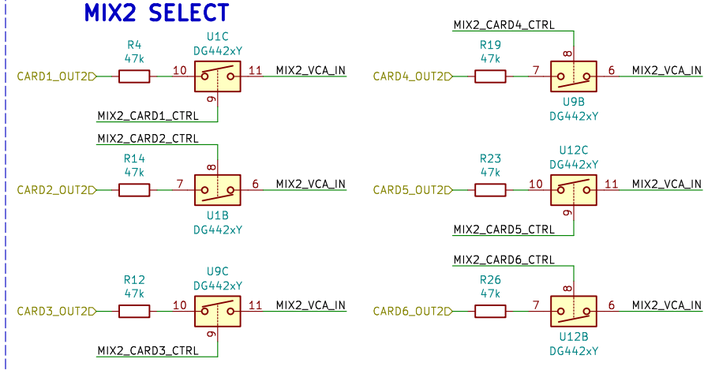


MIX1 SELECT

Use SPDT to allow any of Card N Out 1 to be routed to Mix1

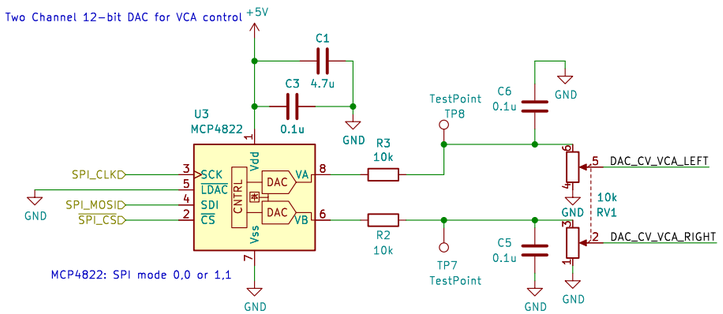


MIX2 SELECT

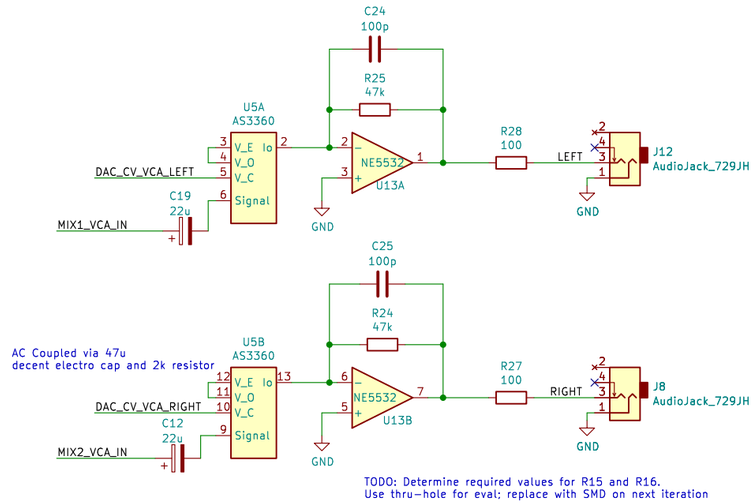


DAC and VCA Level

Two Channel 12-bit DAC for VCA control

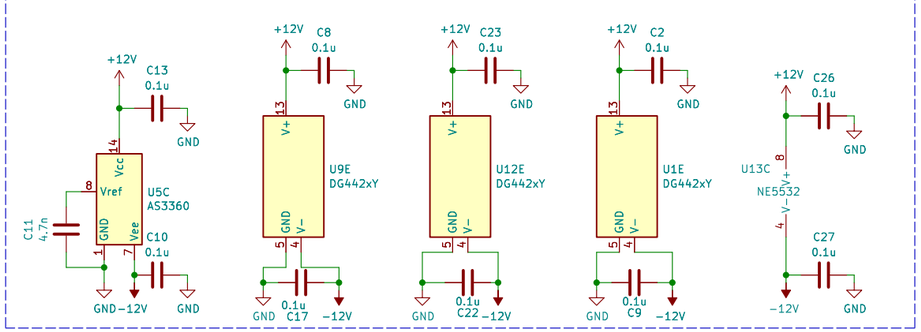


OUTPUT VCA AND BUFFER



DECOUPLING CAPS

Decoupling caps to be physically close to device

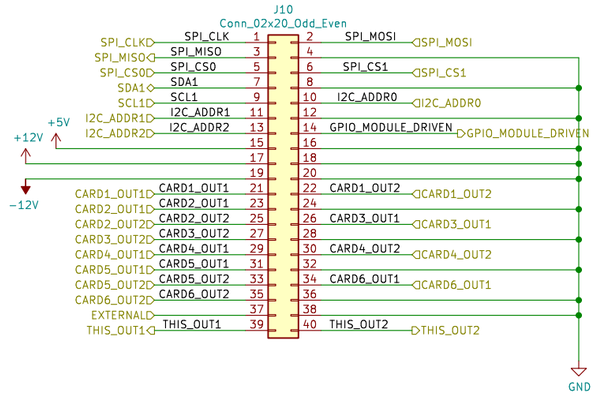


Zoxnoxious Engineering

Sheet: /Sheet624DD88D/
File: output_select.kicad_sch

Title: Zoxnoxious Backplane and VCA

Size: B	Date: 2025-06-03	**Rev: 0.3**
KiCad E.D.A. kicad 7.0.11		Id: 5/10

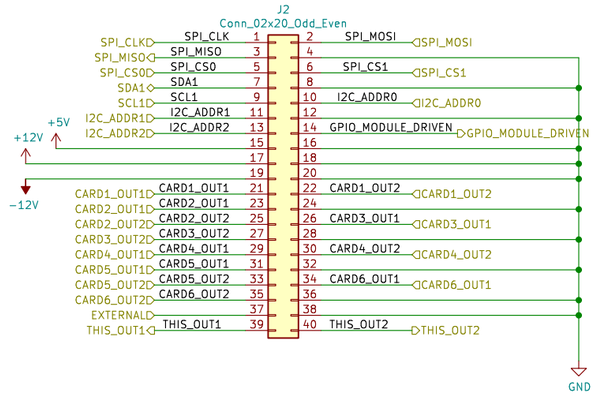


Zoxnoxious Engineering

Sheet: /sheet62544309/
File: bus_conn.kicad_sch

Title: Zoxnoxious Backplane and VCA

Size: B	Date: 2025-06-03	**Rev: 0.3**
KiCad E.D.A. kicad 7.0.11		Id: 6/10

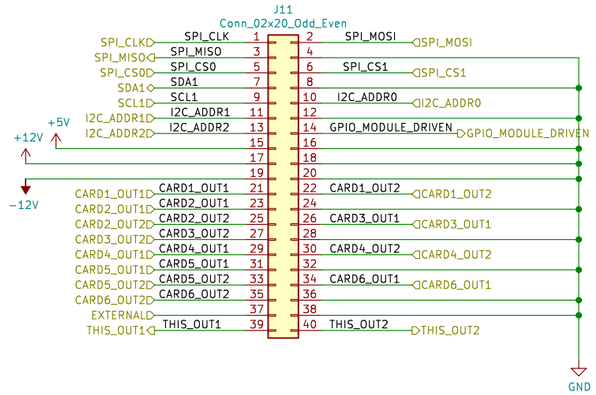


Zoxnoxious Engineering

Sheet: /sheet6252A02B/
File: bus_conn.kicad_sch

Title: Zoxnoxious Backplane and VCA

Size: B	Date: 2025-06-03	**Rev: 0.3**
KiCad E.D.A. kicad 7.0.11		Id: 7/10



Zoxnoxious Engineering

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File: bus_conn.kicad_sch

Title: Zoxnoxious Backplane and VCA

Size: B	Date: 2025-06-03	**Rev: 0.3**
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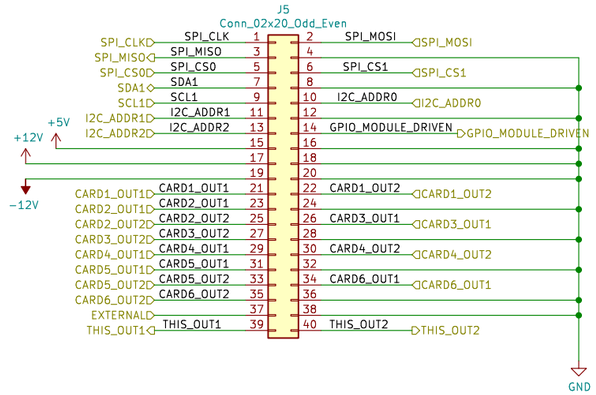

Zoxnoxious Engineering

Sheet: /sheet6252A045/
File: bus_conn.kicad_sch

Title: Zoxnoxious Backplane and VCA

Size: B	Date: 2025-06-03	**Rev: 0.3**
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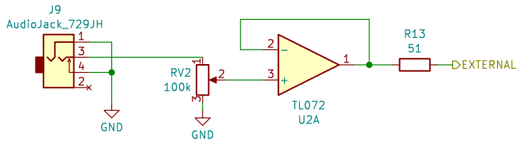

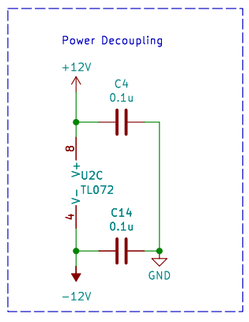

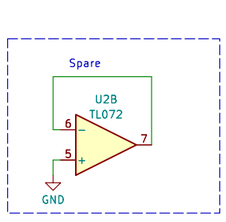

Zoxnoxious Engineering

Sheet: /external_input/
File: external_input.kicad_sch

Title: Zoxnoxious Backplane and VCA

Size: B	Date: 2025-06-03	**Rev: 0.3**
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