

Sheet: VeraModule

VERA FPGA

File: vera-fpga.sch

Sheet: BusDecoder

BUS DECODER

File: busdecoder.sch

Sheet: Vera FPGA flash

VERA SPI FLASH SD CARD INTERFACE

File: vera-fpga-flash.sch

Sheet: CartridgeInterface

CARTRIDGE INTERFACE

File: cartridgeInterface.sch

Sheet: PowerSupply

POWER SUPPLY

File: powersupply.sch

FIDUCIAL TOP

FID3
Fiducial

FID4
Fiducial

FIDUCIAL BOTTOM

FID2
Fiducial

FID1
Fiducial

LOGO1
VERA X16 LOGO

LOGO2
ATARI READY

LOGO3
KICAD DESIGN

LOGO4
ATARI DUO BUS

LOGO5
ESP32_BOBOARD

LBL1

Gianluca Renzi
RetroBit Lab

Sheet: /
File: VERA-MODULE-RBL.sch

Title: VERA FPGA Audio & Video Board

Size: A3 Date: 2025-09-23
KiCad E.D.A. kicad 5.1.9+dfsg1-1+deb11u1

Rev: 1.0
Id: 1/6

FPGA VERA LOGIC VIDEO & AUDIO CARD

The schematic diagram illustrates the internal connections of the FPGA VERA Logic Video & Audio Card. It features three ICE40UP5K-SG48ITR chips (U2A, U2B, U2C) and an ECS-2033-250-BN oscillator (X1).

U2A (ICE40UP5K-SG48ITR) Connections:

- VCCIO_0: 3V3
- VCCIO_2: 3V3
- VCCIO_3: 3V3
- VCCIO_4: 3V3
- VCCIO_5: 3V3
- VCCIO_6: 3V3
- VCCIO_7: 3V3
- VCCIO_8: 3V3
- VCCIO_9: 3V3
- VCCIO_10: 3V3
- VCCIO_11: 3V3
- VCCIO_12: 3V3
- VCCIO_13: 3V3
- VCCIO_14: 3V3
- VCCIO_15: 3V3
- VCCIO_16: 3V3
- VCCIO_17: 3V3
- VCCIO_18: 3V3
- VCCIO_19: 3V3
- VCCIO_20: 3V3
- VCCIO_21: 3V3
- VCCIO_22: 3V3
- VCCIO_23: 3V3
- VCCIO_24: 3V3
- VCCIO_25: 3V3
- VCCIO_26: 3V3
- VCCIO_27: 3V3
- VCCIO_28: 3V3
- VCCIO_29: 3V3
- VCCIO_30: 3V3
- VCCIO_31: 3V3
- VCCIO_32: 3V3
- VCCIO_33: 3V3
- VCCIO_34: 3V3
- VCCIO_35: 3V3
- VCCIO_36: 3V3
- VCCIO_37: 3V3
- VCCIO_38: 3V3
- VCCIO_39: 3V3
- VCCIO_40: 3V3
- VCCIO_41: 3V3
- VCCIO_42: 3V3
- VCCIO_43: 3V3
- VCCIO_44: 3V3
- VCCIO_45: 3V3
- VCCIO_46: 3V3
- VCCIO_47: 3V3
- VCCIO_48: 3V3
- VCCIO_49: 3V3
- VCCIO_50: 3V3
- VCCIO_51: 3V3
- VCCIO_52: 3V3
- VCCIO_53: 3V3
- VCCIO_54: 3V3
- VCCIO_55: 3V3
- VCCIO_56: 3V3
- VCCIO_57: 3V3
- VCCIO_58: 3V3
- VCCIO_59: 3V3
- VCCIO_60: 3V3
- VCCIO_61: 3V3
- VCCIO_62: 3V3
- VCCIO_63: 3V3
- VCCIO_64: 3V3
- VCCIO_65: 3V3
- VCCIO_66: 3V3
- VCCIO_67: 3V3
- VCCIO_68: 3V3
- VCCIO_69: 3V3
- VCCIO_70: 3V3
- VCCIO_71: 3V3
- VCCIO_72: 3V3
- VCCIO_73: 3V3
- VCCIO_74: 3V3
- VCCIO_75: 3V3
- VCCIO_76: 3V3
- VCCIO_77: 3V3
- VCCIO_78: 3V3
- VCCIO_79: 3V3
- VCCIO_80: 3V3
- VCCIO_81: 3V3
- VCCIO_82: 3V3
- VCCIO_83: 3V3
- VCCIO_84: 3V3
- VCCIO_85: 3V3
- VCCIO_86: 3V3
- VCCIO_87: 3V3
- VCCIO_88: 3V3
- VCCIO_89: 3V3
- VCCIO_90: 3V3
- VCCIO_91: 3V3
- VCCIO_92: 3V3
- VCCIO_93: 3V3
- VCCIO_94: 3V3
- VCCIO_95: 3V3
- VCCIO_96: 3V3
- VCCIO_97: 3V3
- VCCIO_98: 3V3
- VCCIO_99: 3V3
- VCCIO_100: 3V3
- VCCIO_101: 3V3
- VCCIO_102: 3V3
- VCCIO_103: 3V3
- VCCIO_104: 3V3
- VCCIO_105: 3V3
- VCCIO_106: 3V3
- VCCIO_107: 3V3
- VCCIO_108: 3V3
- VCCIO_109: 3V3
- VCCIO_110: 3V3
- VCCIO_111: 3V3
- VCCIO_112: 3V3
- VCCIO_113: 3V3
- VCCIO_114: 3V3
- VCCIO_115: 3V3
- VCCIO_116: 3V3
- VCCIO_117: 3V3
- VCCIO_118: 3V3
- VCCIO_119: 3V3
- VCCIO_120: 3V3
- VCCIO_121: 3V3
- VCCIO_122: 3V3
- VCCIO_123: 3V3
- VCCIO_124: 3V3
- VCCIO_125: 3V3
- VCCIO_126: 3V3
- VCCIO_127: 3V3
- VCCIO_128: 3V3
- VCCIO_129: 3V3
- VCCIO_130: 3V3
- VCCIO_131: 3V3
- VCCIO_132: 3V3
- VCCIO_133: 3V3
- VCCIO_134: 3V3
- VCCIO_135: 3V3
- VCCIO_136: 3V3
- VCCIO_137: 3V3
- VCCIO_138: 3V3
- VCCIO_139: 3V3
- VCCIO_140: 3V3
- VCCIO_141: 3V3
- VCCIO_142: 3V3
- VCCIO_143: 3V3
- VCCIO_144: 3V3
- VCCIO_145: 3V3
- VCCIO_146: 3V3
- VCCIO_147: 3V3
- VCCIO_148: 3V3
- VCCIO_149: 3V3
- VCCIO_150: 3V3
- VCCIO_151: 3V3
- VCCIO_152: 3V3
- VCCIO_153: 3V3
- VCCIO_154: 3V3
- VCCIO_155: 3V3
- VCCIO_156: 3V3
- VCCIO_157: 3V3
- VCCIO_158: 3V3
- VCCIO_159: 3V3
- VCCIO_160: 3V3
- VCCIO_161: 3V3
- VCCIO_162: 3V3
- VCCIO_163: 3V3
- VCCIO_164: 3V3
- VCCIO_165: 3V3
- VCCIO_166: 3V3
- VCCIO_167: 3V3
- VCCIO_168: 3V3
- VCCIO_169: 3V3
- VCCIO_170: 3V3
- VCCIO_171: 3V3
- VCCIO_172: 3V3
- VCCIO_173: 3V3
- VCCIO_174: 3V3
- VCCIO_175: 3V3
- VCCIO_176: 3V3
- VCCIO_177: 3V3
- VCCIO_178: 3V3
- VCCIO_179: 3V3
- VCCIO_180: 3V3
- VCCIO_181: 3V3
- VCCIO_182: 3V3
- VCCIO_183: 3V3
- VCCIO_184: 3V3
- VCCIO_185: 3V3
- VCCIO_186: 3V3
- VCCIO_187: 3V3
- VCCIO_188: 3V3
- VCCIO_189: 3V3
- VCCIO_190: 3V3
- VCCIO_191: 3V3
- VCCIO_192: 3V3
- VCCIO_193: 3V3
- VCCIO_194: 3V3
- VCCIO_195: 3V3
- VCCIO_196: 3V3
- VCCIO_197: 3V3
- VCCIO_198: 3V3
- VCCIO_199: 3V3
- VCCIO_200: 3V3
- VCCIO_201: 3V3
- VCCIO_202: 3V3
- VCCIO_203: 3V3
- VCCIO_204: 3V3
- VCCIO_205: 3V3
- VCCIO_206: 3V3
- VCCIO_207: 3V3
- VCCIO_208: 3V3
- VCCIO_209: 3V3
- VCCIO_210: 3V3
- VCCIO_211: 3V3
- VCCIO_212: 3V3
- VCCIO_213: 3V3
- VCCIO_214: 3V3
- VCCIO_215: 3V3
- VCCIO_216: 3V3
- VCCIO_217: 3V3
- VCCIO_218: 3V3
- VCCIO_219: 3V3
- VCCIO_220: 3V3
- VCCIO_221: 3V3
- VCCIO_222: 3V3
- VCCIO_223: 3V3
- VCCIO_224: 3V3
- VCCIO_225: 3V3
- VCCIO_226: 3V3
- VCCIO_227: 3V3
- VCCIO_228: 3V3
- VCCIO_229: 3V3
- VCCIO_230: 3V3
- VCCIO_231: 3V3
- VCCIO_232: 3V3
- VCCIO_233: 3V3
- VCCIO_234: 3V3
- VCCIO_235: 3V3
- VCCIO_236: 3V3
- VCCIO_237: 3V3
- VCCIO_238: 3V3
- VCCIO_239: 3V3
- VCCIO_240: 3V3
- VCCIO_241: 3V3
<

ANALOG VGA SIGNALS

The diagram illustrates the analog VGA signal connections. It shows three resistor networks for the color channels (Red, Green, Blue) and two for the sync signals (Vsync and Hsync). The color channels are connected to a common bus (VGA_B0 to VGA_B3) and then to the respective color lines (VGARED, VGAGREEN, VGABLUE). The sync signals are connected to a common bus (VGA_VSYNC, VGA_HSYNC) and then to the respective sync lines (VGA_VSYNC, VGA_HSYNC). The connector pinout for the DS1038-15FBNSIA74-0CC connector is shown, with pins 1 through 15 labeled. Pins 11, 12, 13, 14, and 15 are marked with an 'X' and are not connected. The connector is connected to a 5V supply and ground (GND). The component is identified as DS1038-15FBNSIA74-0CC.

Resistor values and connections:

- VGA_B0: R8 (4K3), R11 (2K), R12 (150R)
- VGA_B1: R17 (910R), R18 (160R)
- VGA_B2: R23 (510R), R24 (27R)
- VGA_G0: R9 (4K3), R13 (2K), R14 (150R)
- VGA_G1: R19 (910R), R20 (160R)
- VGA_G2: R25 (510R), R26 (27R)
- VGA_R0: R10 (4K3), R15 (2K), R16 (150R)
- VGA_R1: R21 (910R), R22 (160R)
- VGA_R2: R27 (510R), R28 (27R)
- VGA_VSYNC: R29 (820R)
- VGA_HSYNC: R30 (820R)

Connector Pinout (DS1038-15FBNSIA74-0CC):

- Pin 6: VGARED
- Pin 7: VGAGREEN
- Pin 8: VGABLUE
- Pin 9: 5V
- Pin 10: GND
- Pin 11: X
- Pin 12: X
- Pin 13: VGAHSYNC
- Pin 14: VGA_VSYNC
- Pin 15: X

Capacitors: C53 (100nF), C54 (100nF)

VERA FPGA PROGRAMMED OK

VERA READY Internal LED

EXTERNAL VIDEO CONNECTOR

The diagram illustrates the pin configuration for the External Video Connector (J1). The connector has 16 pins, numbered 1 through 16. The connections are as follows:

- Pin 1:** VGARED
- Pin 2:** VGAGREEN
- Pin 3:** VGABLUE
- Pin 4:** 3V3
- Pin 5:** GND
- Pin 6:** 3V3
- Pin 7:** 5V
- Pin 8:** AUDIOL
- Pin 9:** 5V
- Pin 10:** AUDIOR
- Pin 11:** 5V
- Pin 12:** AUDIOL
- Pin 13:** 5V
- Pin 14:** AUDIOR
- Pin 15:** 5V
- Pin 16:** 3V3

The diagram also shows the following connections:

- Pin 1:** VGARED
- Pin 2:** VGAGREEN
- Pin 3:** VGABLUE
- Pin 4:** 3V3
- Pin 5:** GND
- Pin 6:** 3V3
- Pin 7:** 5V
- Pin 8:** AUDIOL
- Pin 9:** 5V
- Pin 10:** AUDIOR
- Pin 11:** 5V
- Pin 12:** AUDIOL
- Pin 13:** 5V
- Pin 14:** AUDIOR
- Pin 15:** 5V
- Pin 16:** 3V3

EXTERNAL DISPLAY WITH AUDIO

ALL SIGNALS MUST BE IN 3.3V RANGE

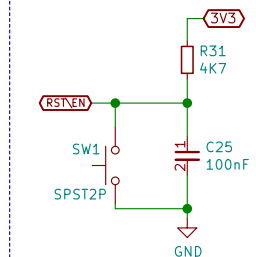
PBI DEVICE ID: software selectable only



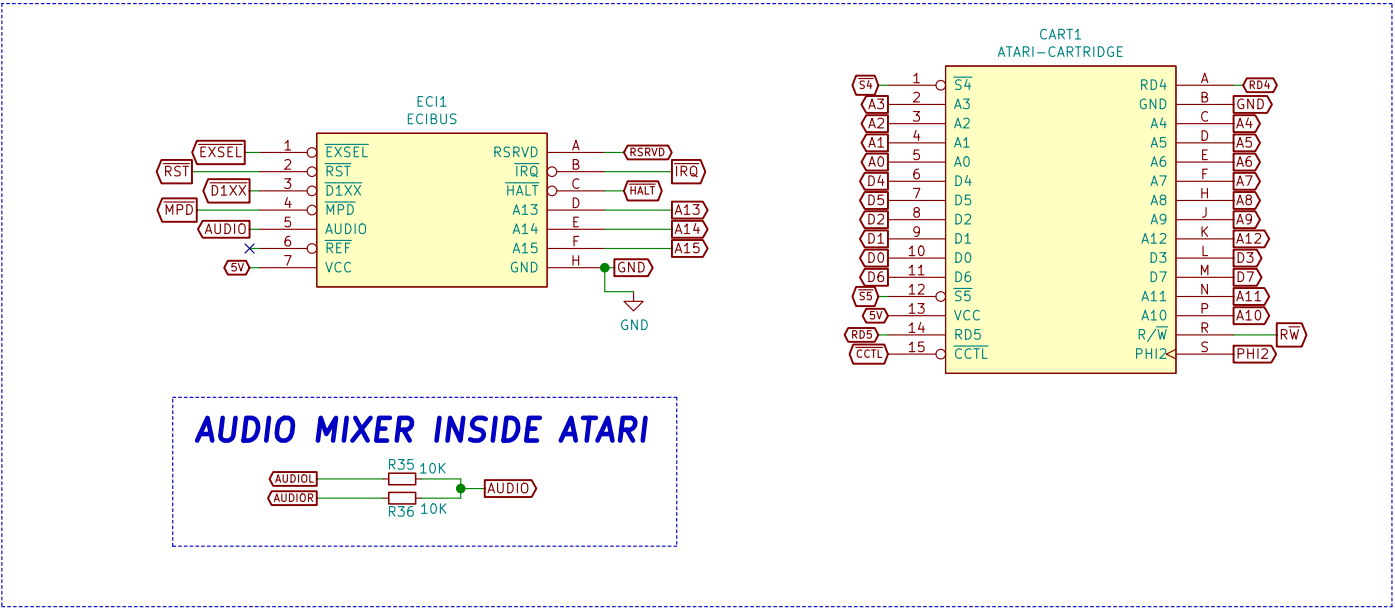
Accessing \$D5XX area space



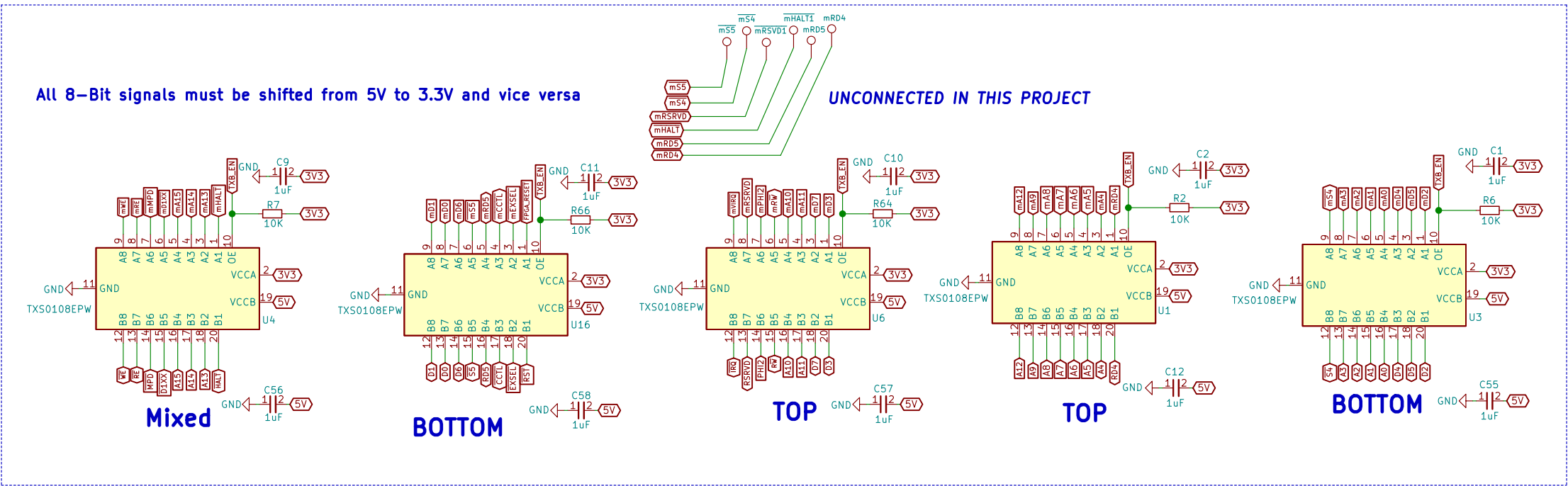
In PBI Atari XL there is EXTENB signal output and EXTSEL signal input
In PBI Atari XE there is only the EXSEL signal output

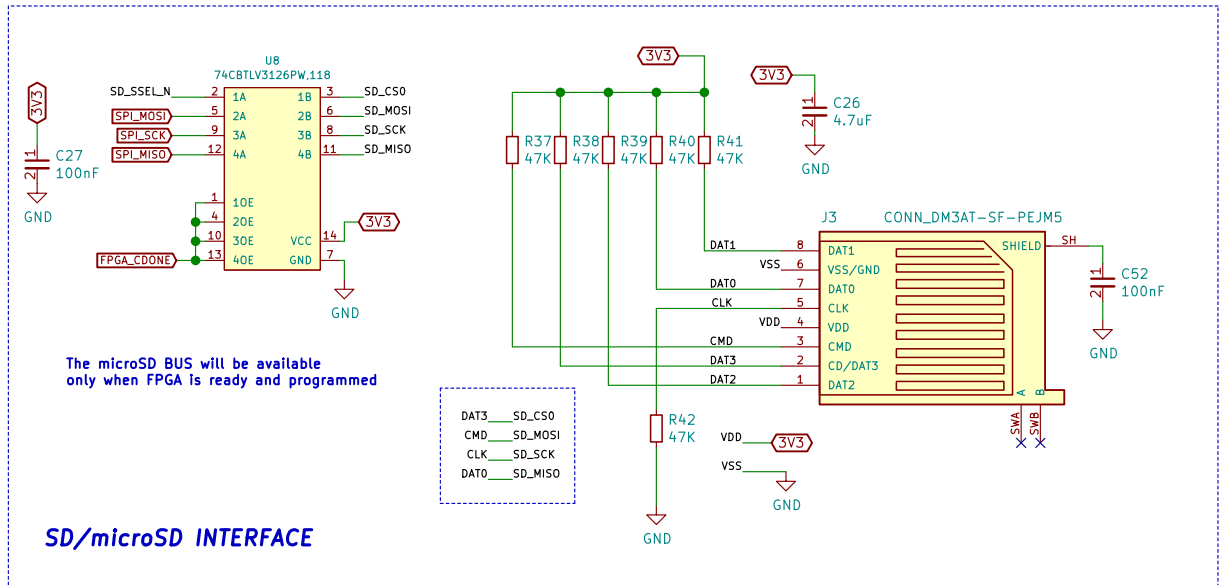


ATARI 130XE ECI & CARTRIDGE INTERFACE



BUS LOGIC LEVEL SHIFTERS



[illegible]

The diagram illustrates the pin configuration and internal circuitry of the IC DAC/AUDIO 24BIT 192K 16TSSOP (U11). The chip is shown as a yellow rectangle with pins numbered 1 through 16. The internal components and connections are as follows:

- Pin 10 (ASYCLK):** Connected to the MCLK pin.
- Pin 9 (AUDIO_BCK):** Connected to the BCLK pin.
- Pin 8 (AUDIO_LRCK):** Connected to the LRCLK pin.
- Pin 7 (AUDIO_DATA):** Connected to the DACDAT pin.
- Pin 12 (AIFMODE):** Connected to a 3V3 supply.
- Pin 11 (MUTE):** Connected to a 3V3 supply.
- Pin 1 (LINEVOUTL):** Connected to a 560R resistor (R46) and a 560R resistor (R45) in series with a 1uF capacitor (C30) to GND.
- Pin 16 (LINEVOUTR):** Connected to a 560R resistor (R45) and a 1uF capacitor (C31) to GND.
- Pin 5 (CPCA):** Connected to a 2uF capacitor (C32) to GND.
- Pin 3 (CPCB):** Connected to a 2uF capacitor (C32) to GND.
- Pin 15 (AVDD):** Connected to a 3V3 supply.
- Pin 6 (LINEVDD):** Connected to a 3V3 supply.
- Pin 2 (CPVOUTN):** Connected to a 2uF capacitor (C33) to GND.
- Pin 4 (LINEGND):** Connected to a 2uF capacitor (C33) to GND.
- Pin 13 (AGND):** Connected to a 2uF capacitor (C36) to GND.
- Pin 14 (VMID):** Connected to a 2uF capacitor (C36) to GND.
- Internal Components:**
 - Capacitors: C30 (1uF), C31 (1uF), C32 (2uF), C33 (2uF), C34 (4.7uF), C35 (4.7uF), C36 (2.2uF).
 - Resistors: R46 (560R), R45 (560R).

AUDIO 3.5mm OUTPUT

AUDIO1 560R R67 2 TIP

AUDIO2 560R R68 3 RING

1 SLEEVE

GND

SJ-3523-SMT-TR

J7

