

# CYCLONE V GPU SCHEMATICS

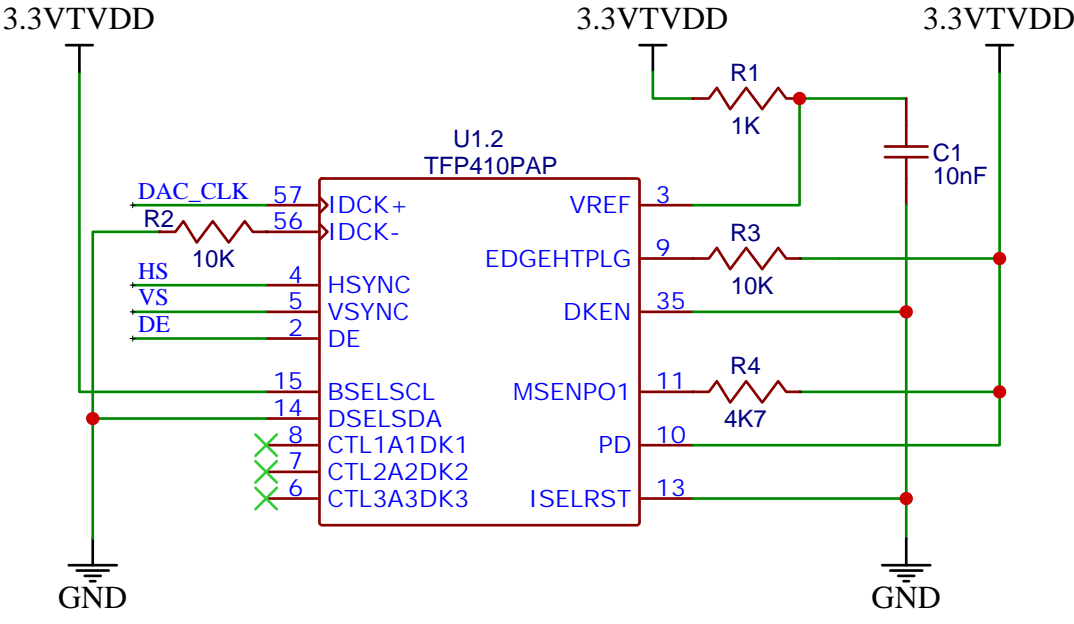
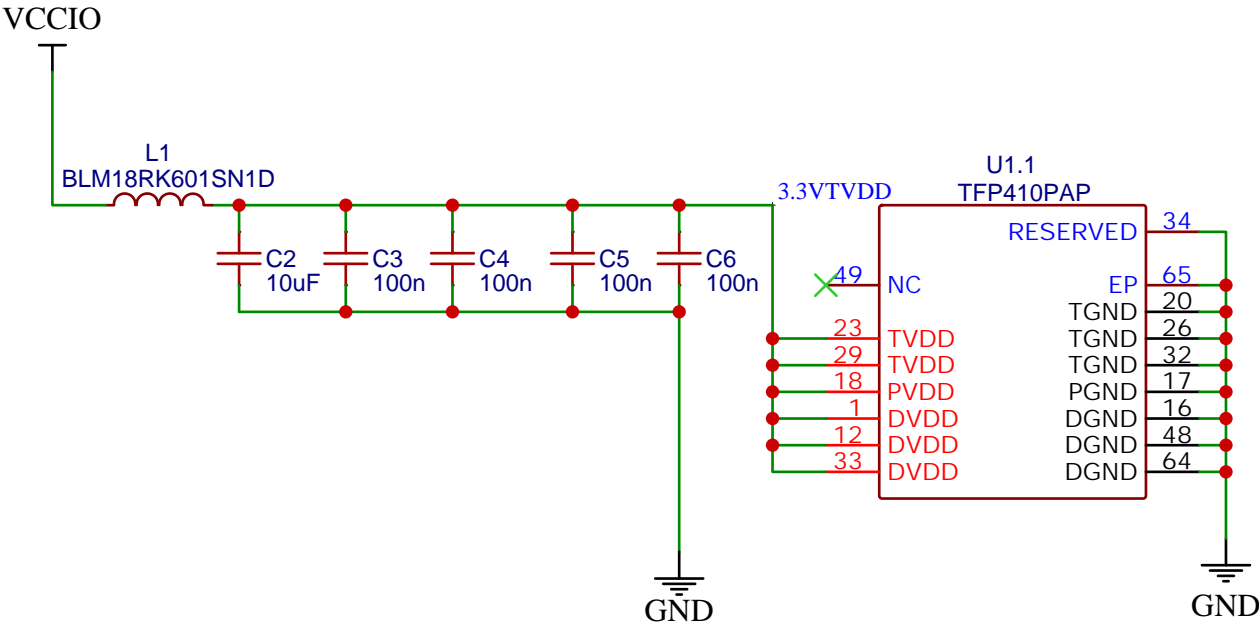
## REVISIONS

1.0 - Initial draft
1.1 - Replaced MAX5101 DAC with PCM5101A. Replaced wire-wound chokes with fixed inductors.
1.2 - Added decoupling and supply isolation for TFP410.
1.3 - Removed decoupling and supply isolation for TFP410. Added external memory.
1.4 - 10u caps and 100k pull-downs added to audio DAC output. Fixed micro-SD pullups. Corrected DDR-RAM clock pins. Variable-voltage added to U19.
1.5 - Trimpot orientation fixed. VCCA fixed to 3.3VA. Protection diodes added to PS2 port. Links added for AS x1/x4 config. VCCPGM replaced with VCCIO. TFP410 powered from VCCIO.

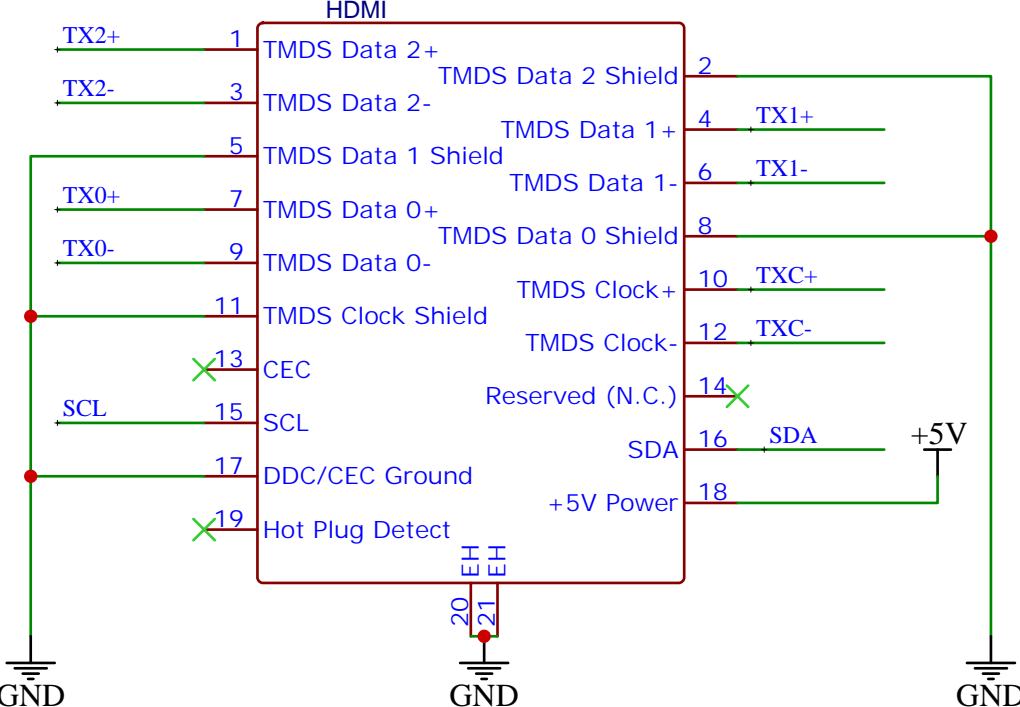
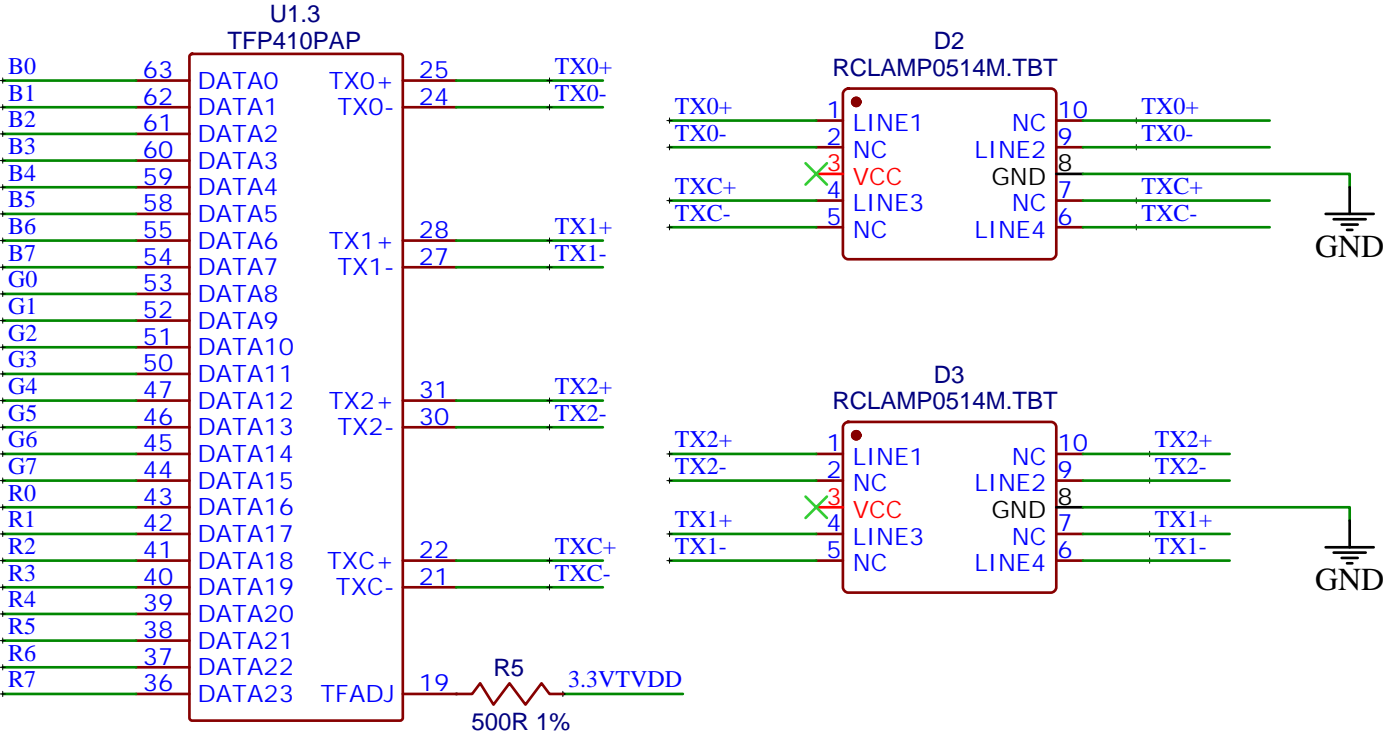
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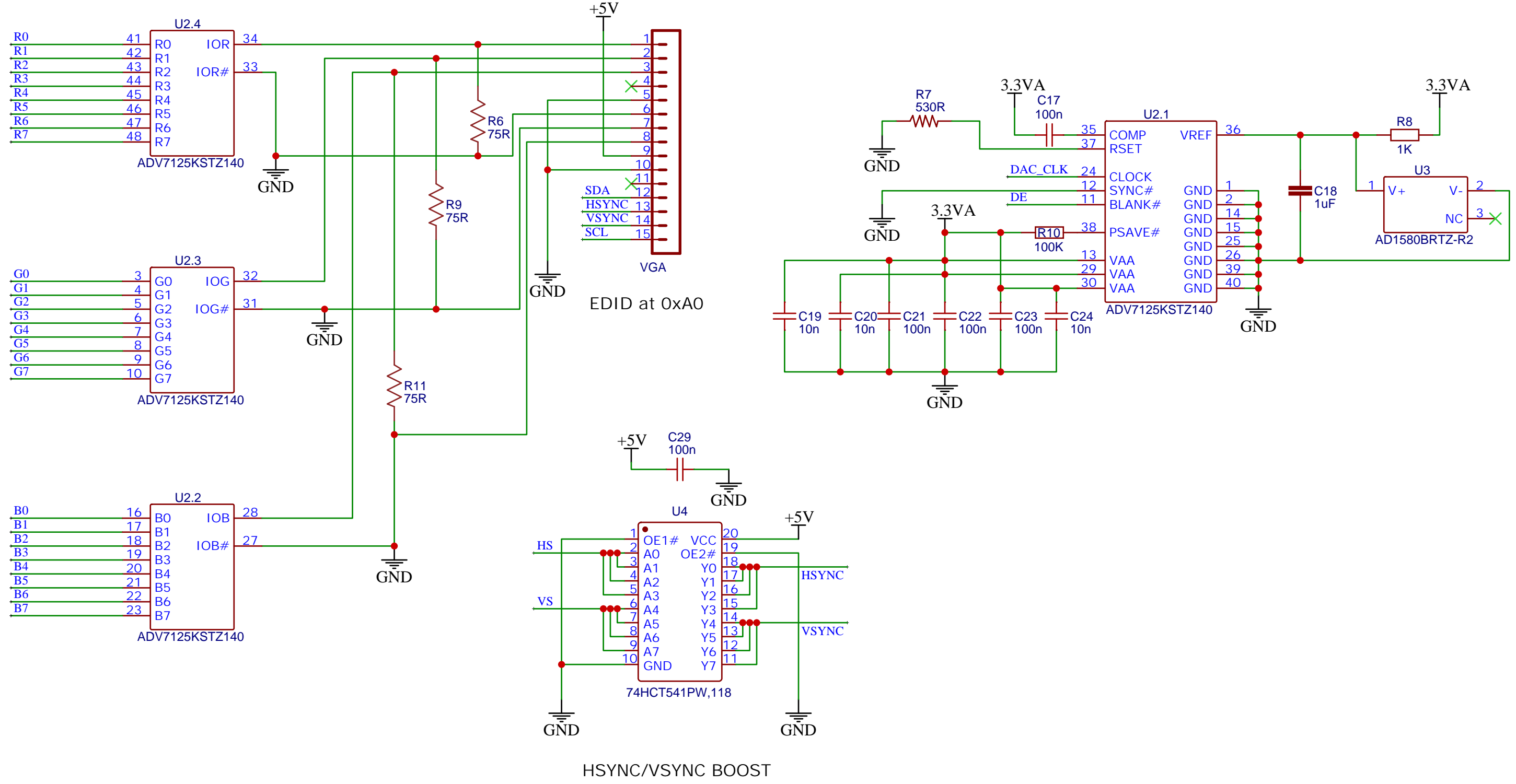
# 24-bit DVI VIDEO OUTPUT



Width 24-bit  
Latch Mode Single-edge  
Edge Rising  
Clock Mode Single-ended

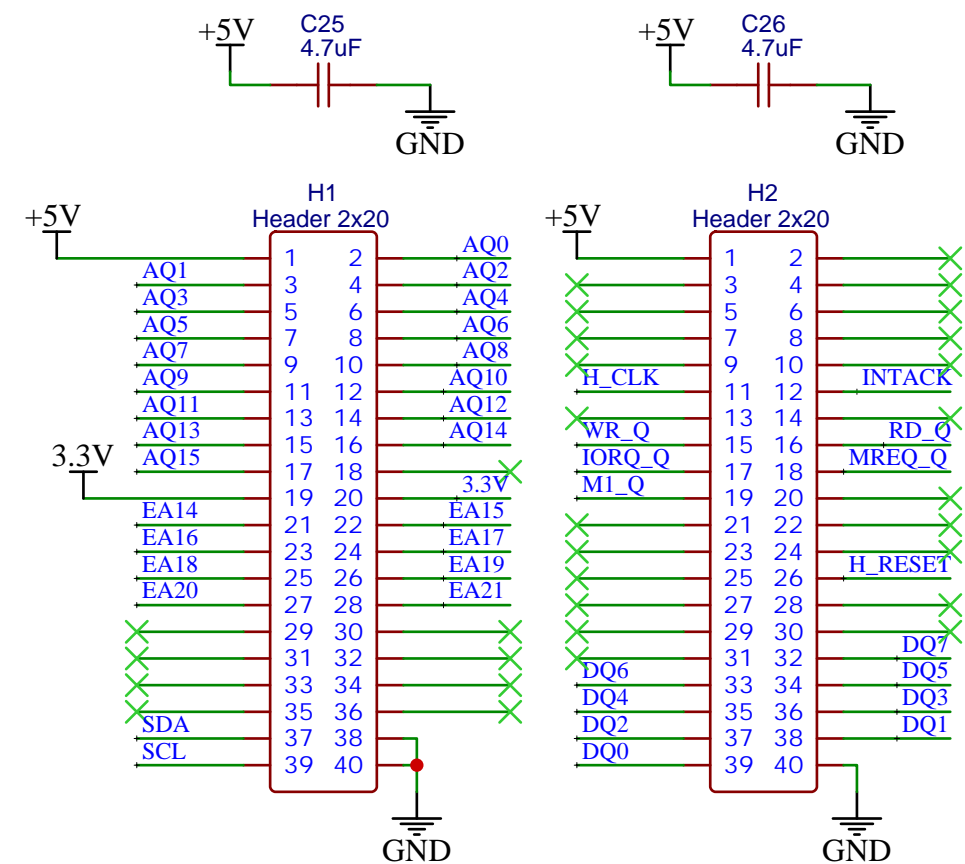
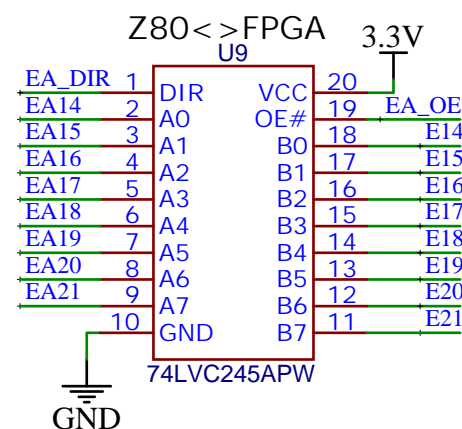
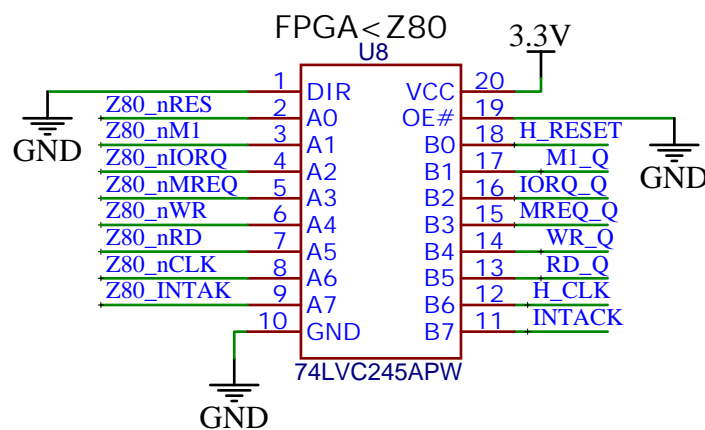
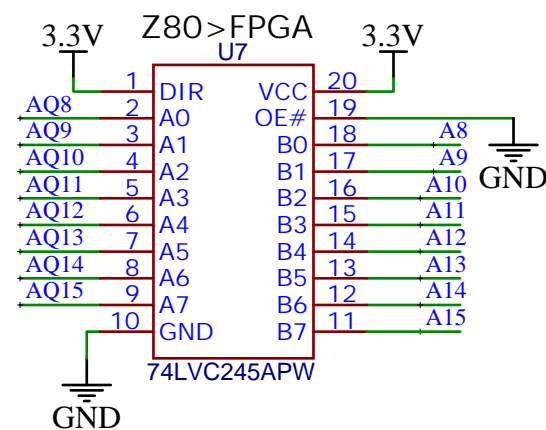
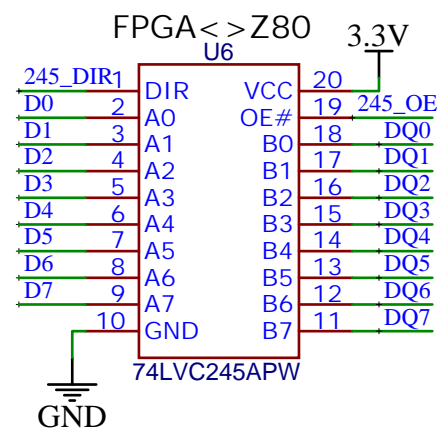
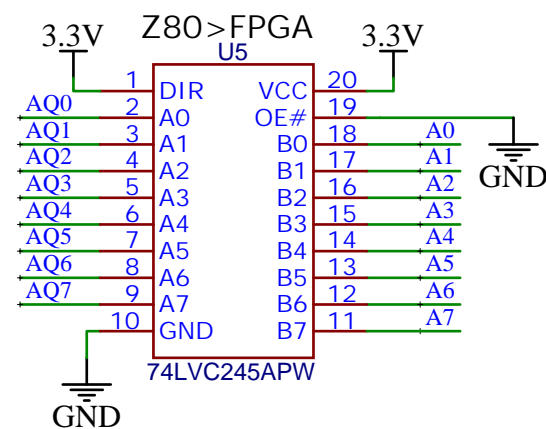


# 24-bit VGA VIDEO OUTPUT

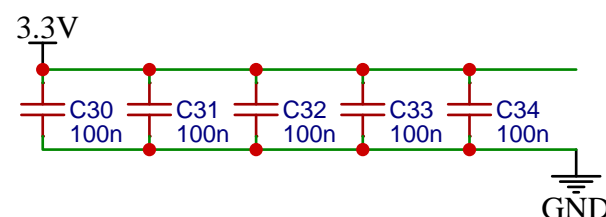


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	Date: 2020-08-23	Drawn By: nockieboy

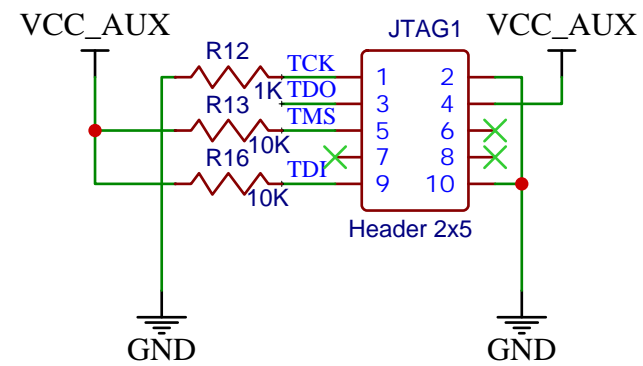
# 5V<->3.3V SYSTEM BUS CONVERTERS



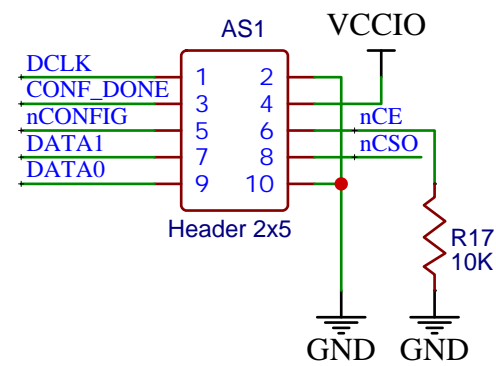
SYSTEM BUS HEADERS



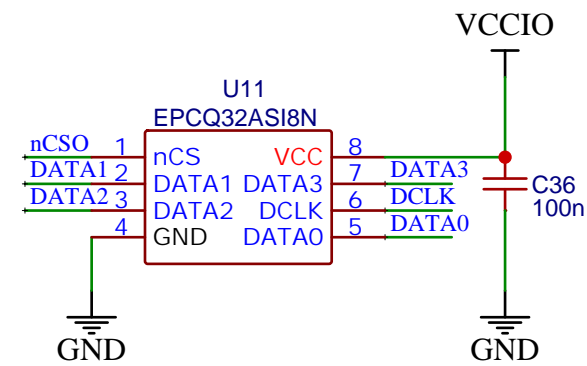
# CLOCK & FPGA CONFIGURATION



JTAG HEADER

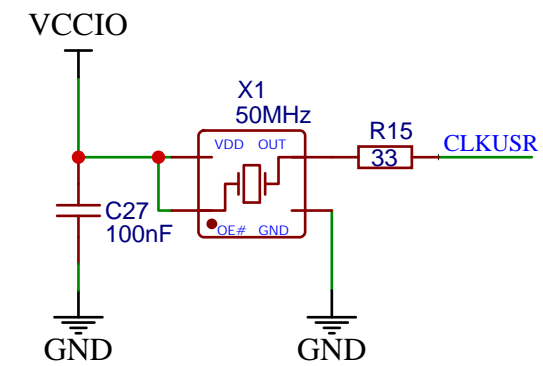


AS HEADER

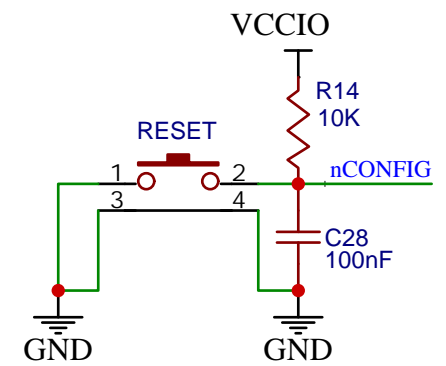


CONFIG EEPROM

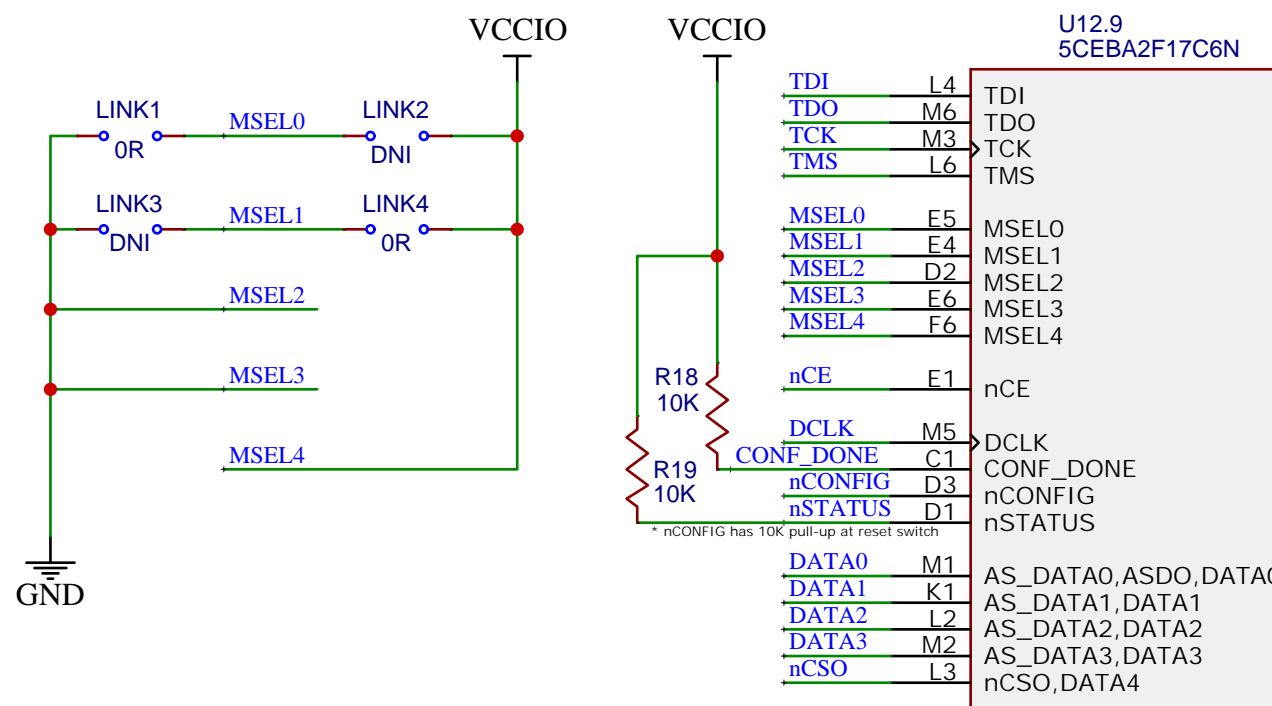
\* Minimum 32Mbit EEPROM required for 21Mbit image



50 MHz CLOCK



FPGA RESET

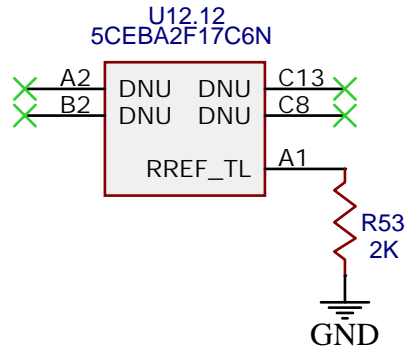
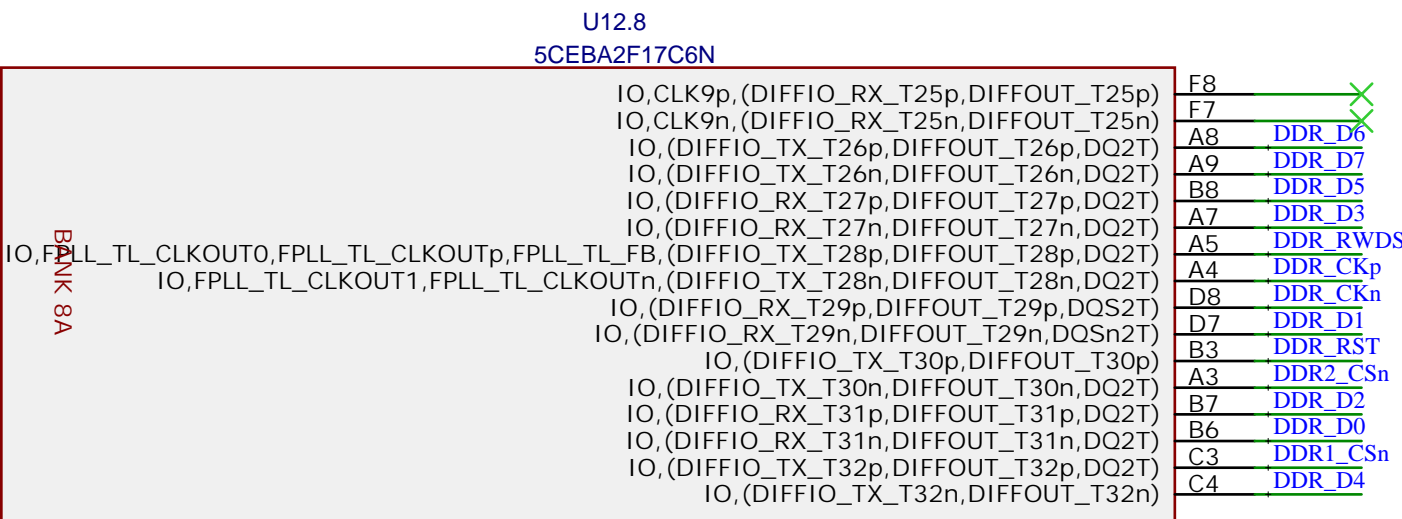
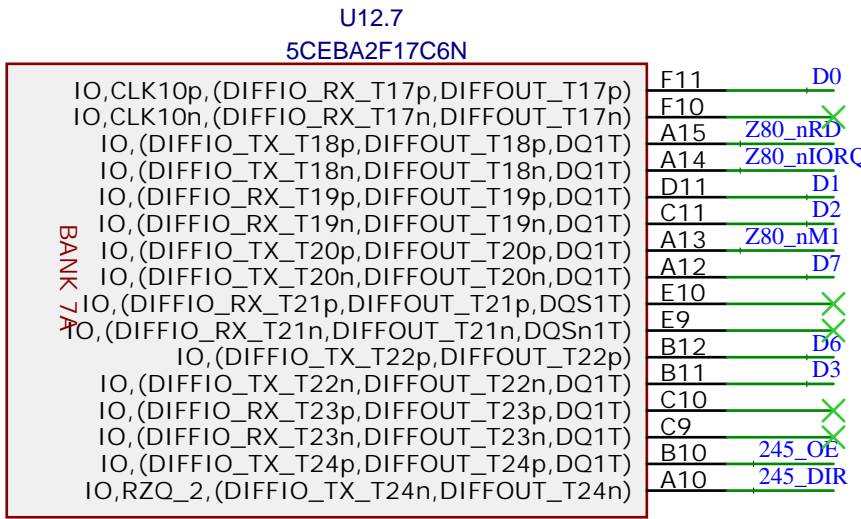
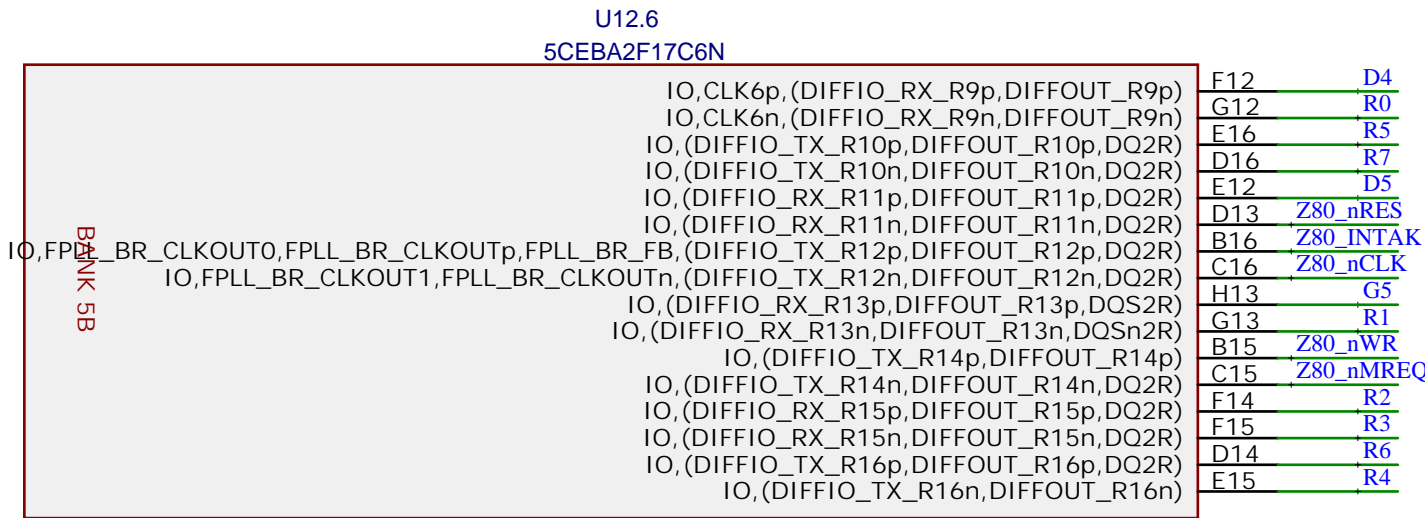
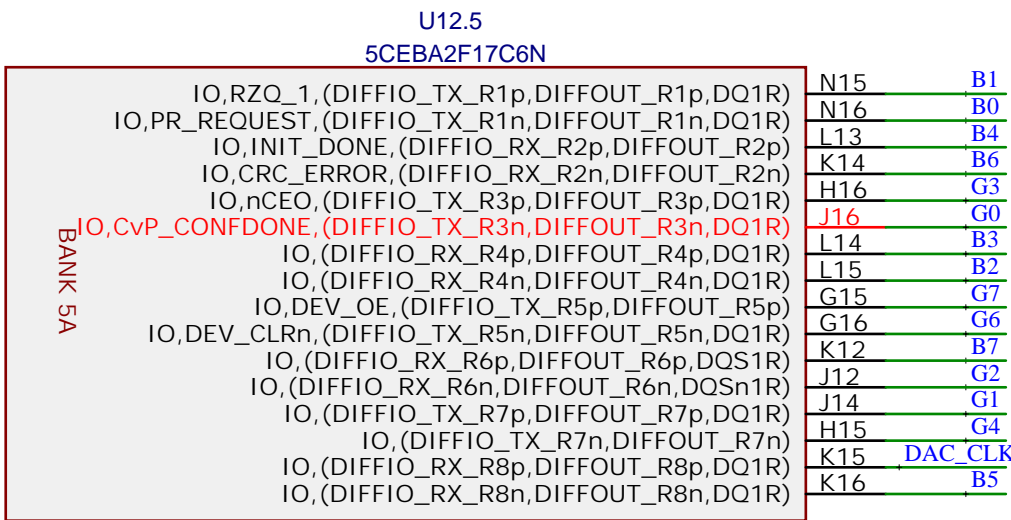
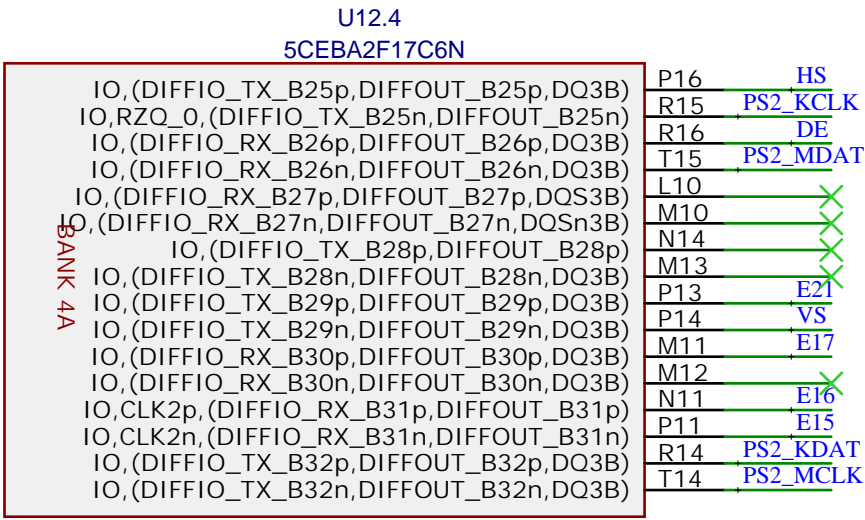
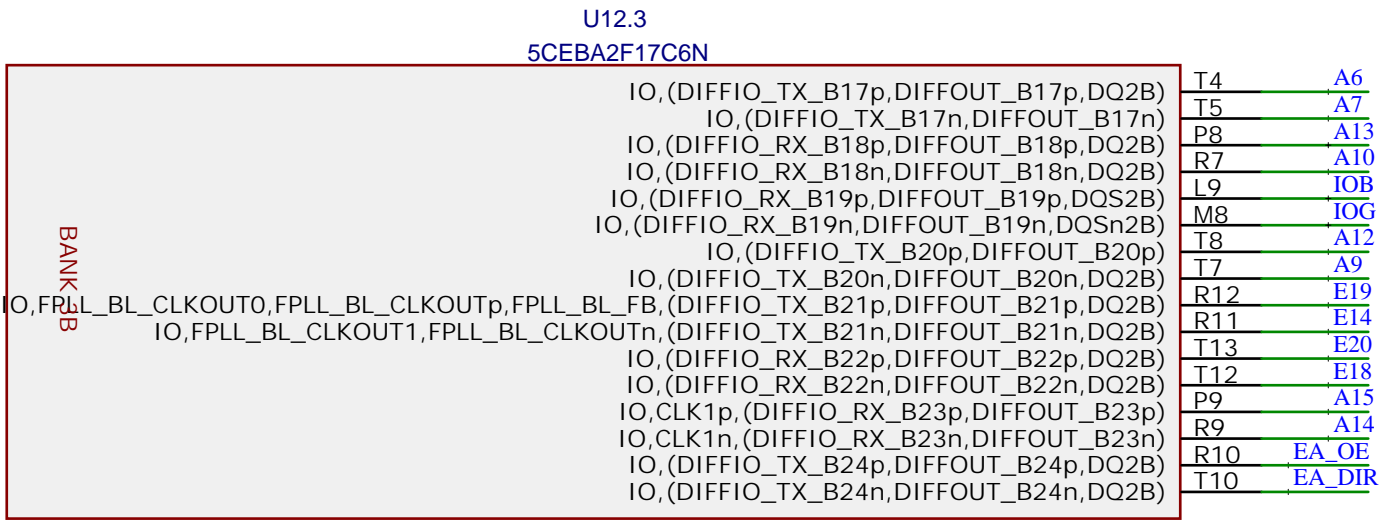
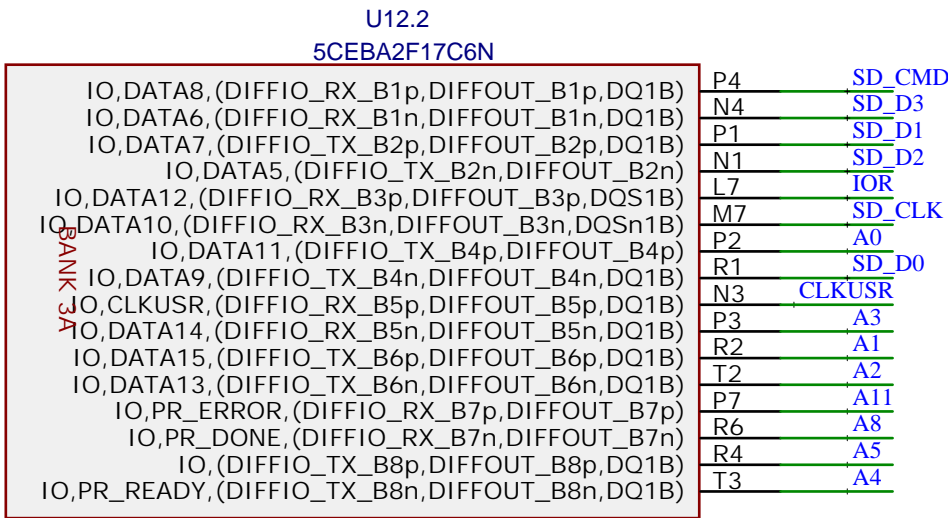
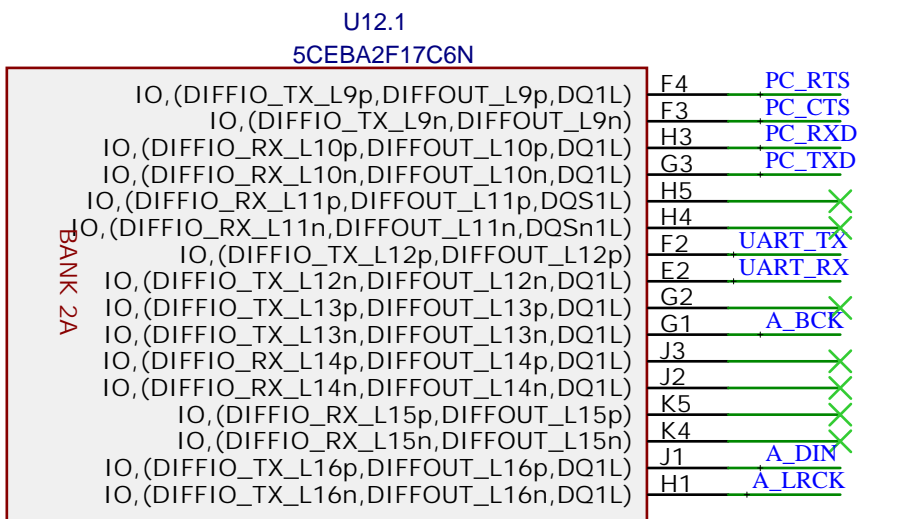


AS FAST (x4) 10010 configuration @ 3.3V with J2 pins 1-2 connected.  
AS STANDARD (x1) 10011 configuration @ 3.3V with J2 pins 2-3 connected.

\*MSEL Pin Settings\* 7-2 in Cyclone V Device Handbook Volume 1: Device Interfaces and Integration

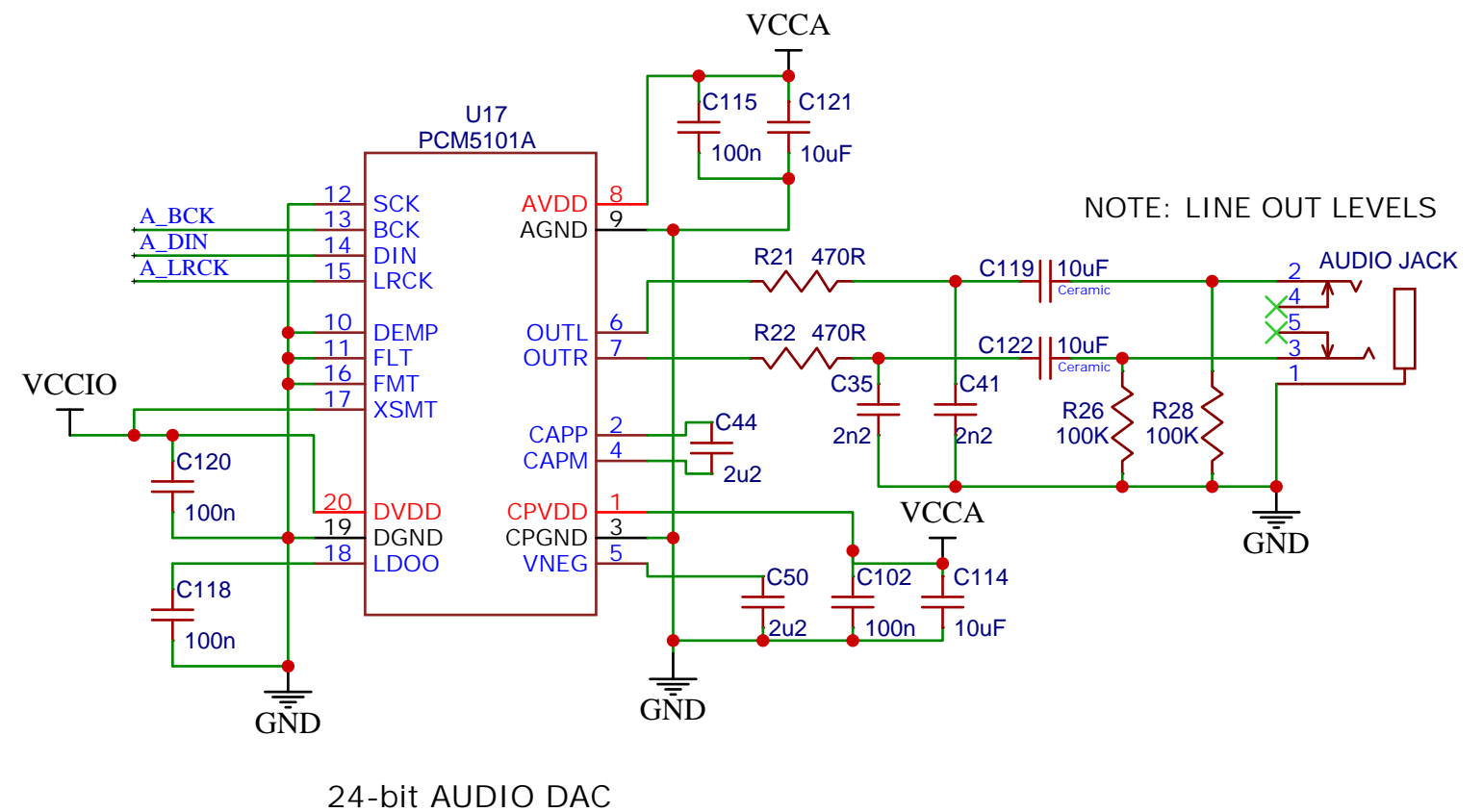
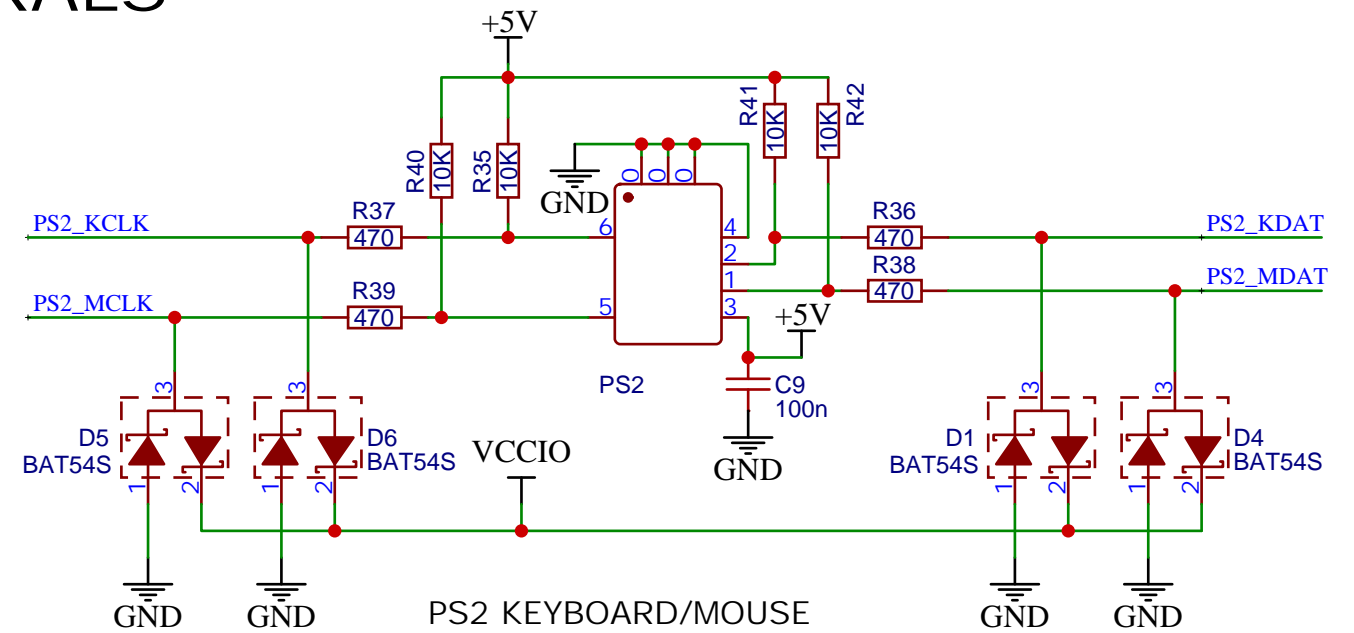
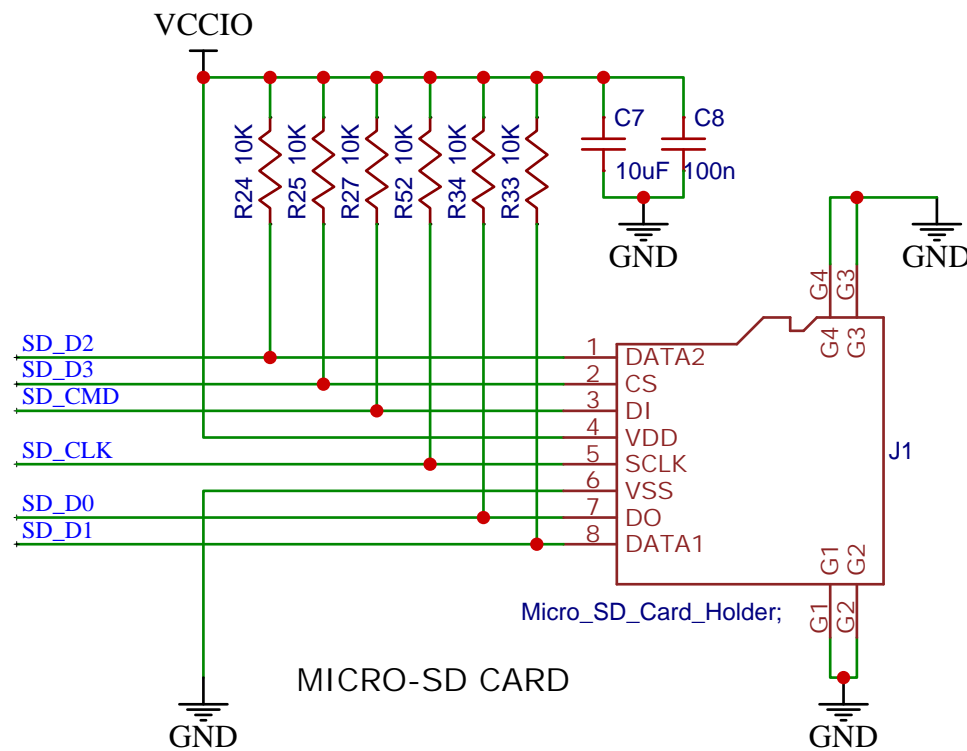
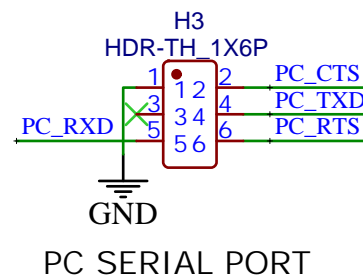
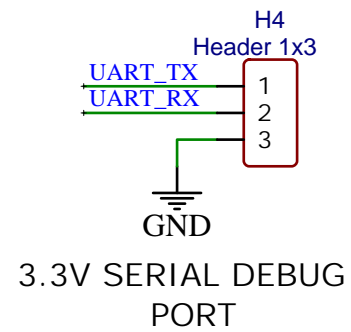
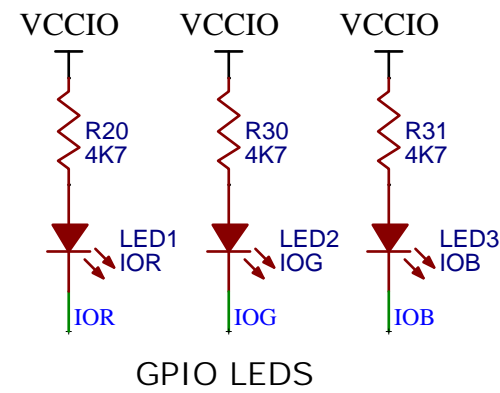
# Cyclone V FPGA

NOTE: Cyclone V A2 and A4 versions are pin-compatible and interchangeable on this PCB design.



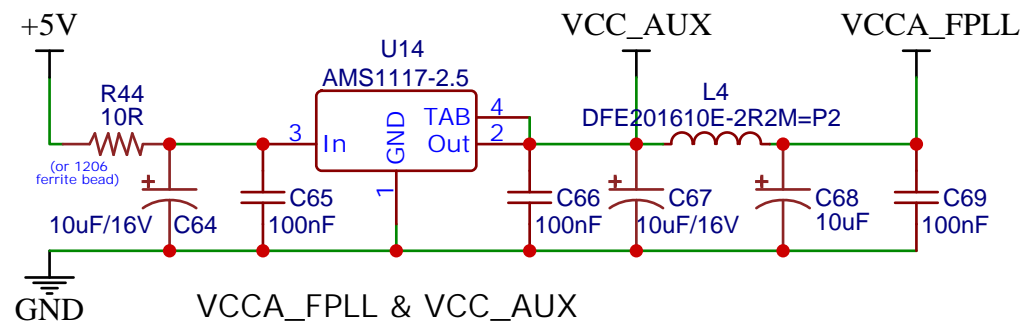
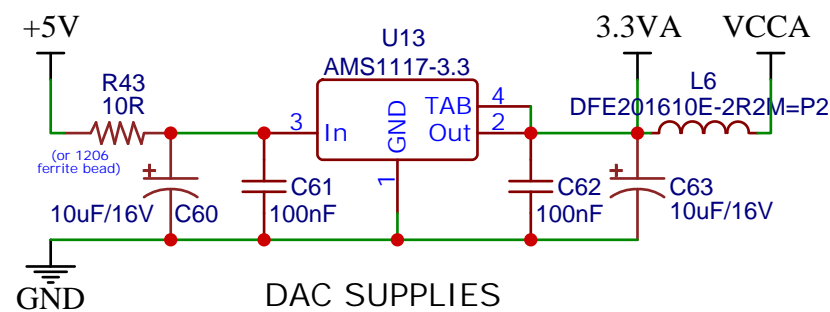


# PERIPHERALS

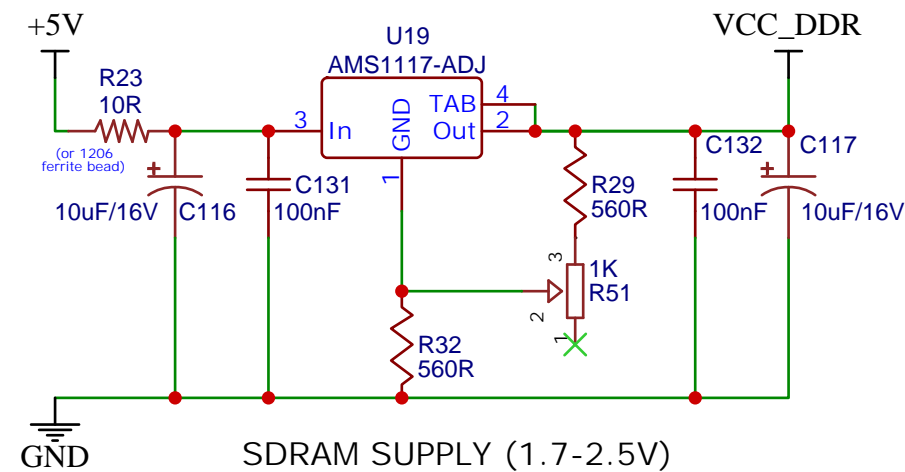
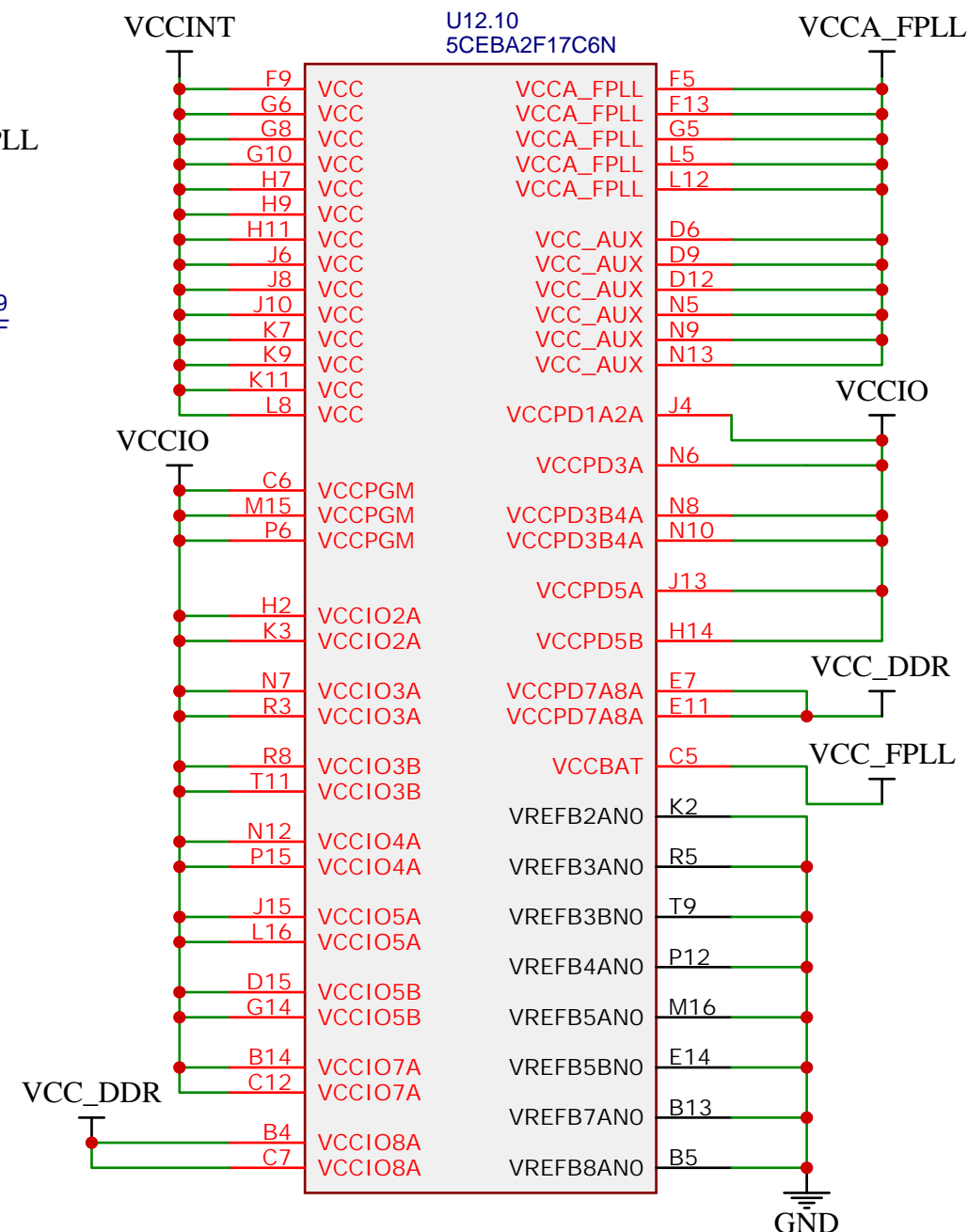
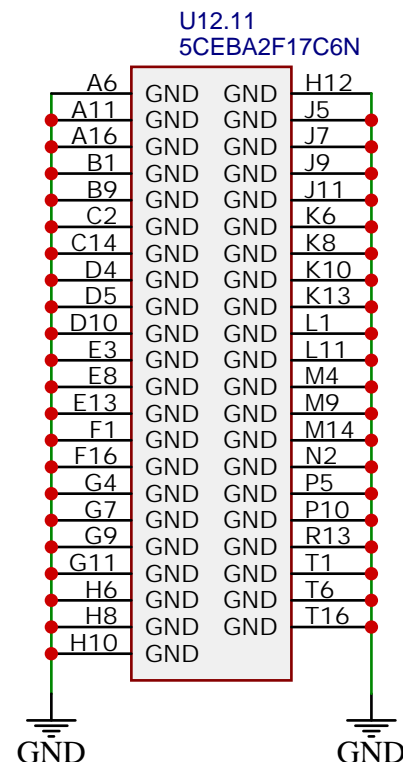
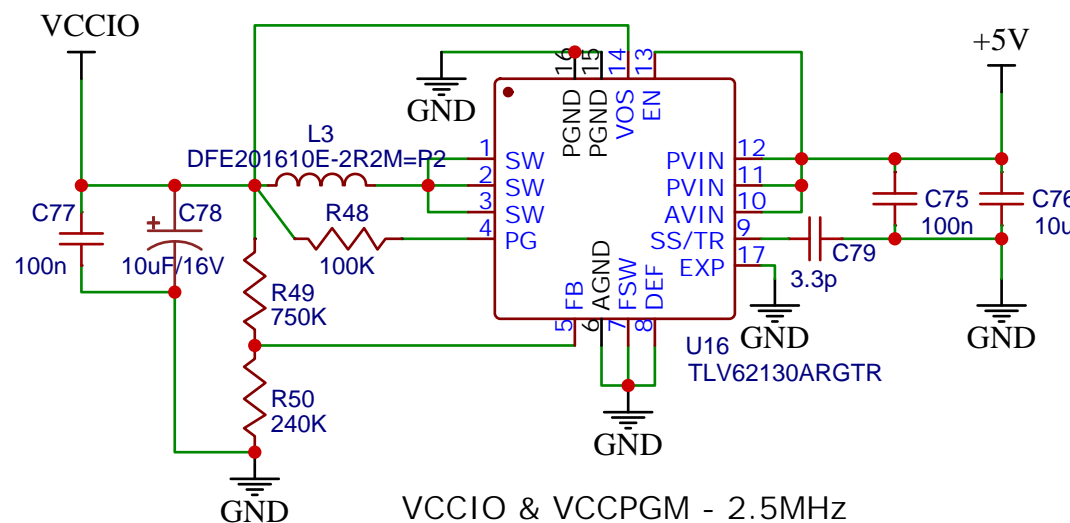
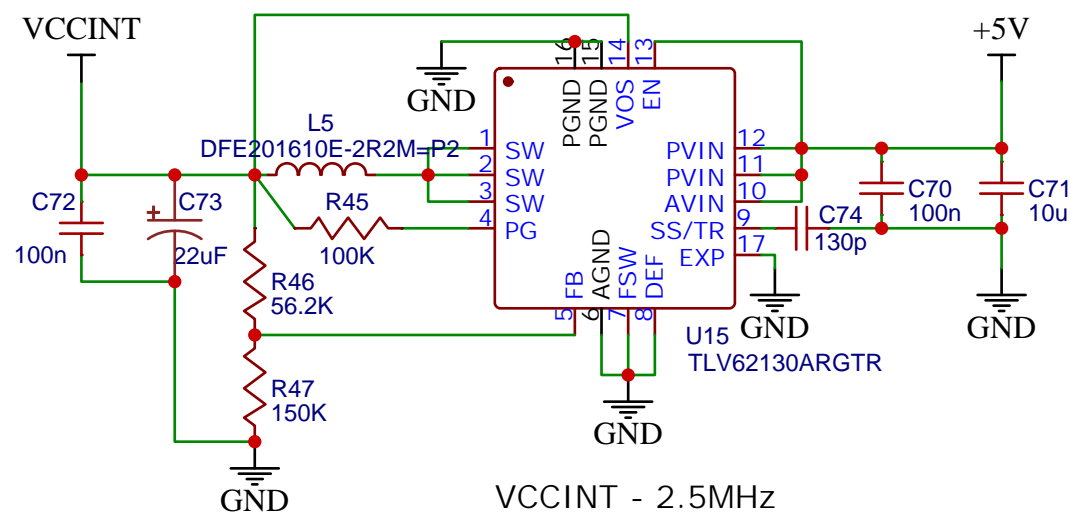


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# POWER SUPPLIES



DESIGN NOTE: All 10uF/22uF components are SMD 3216 tantalum caps.



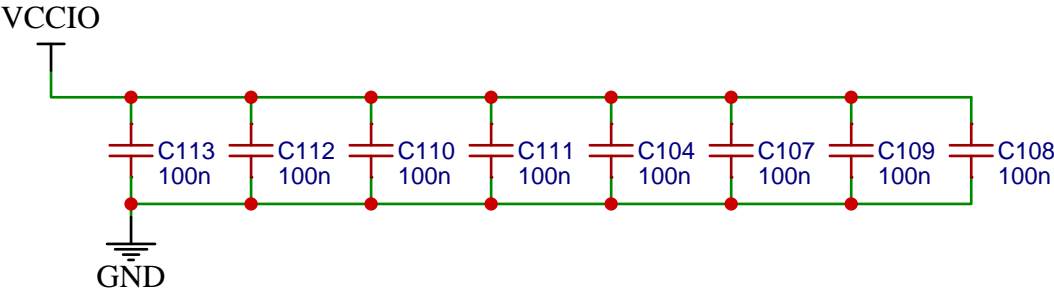
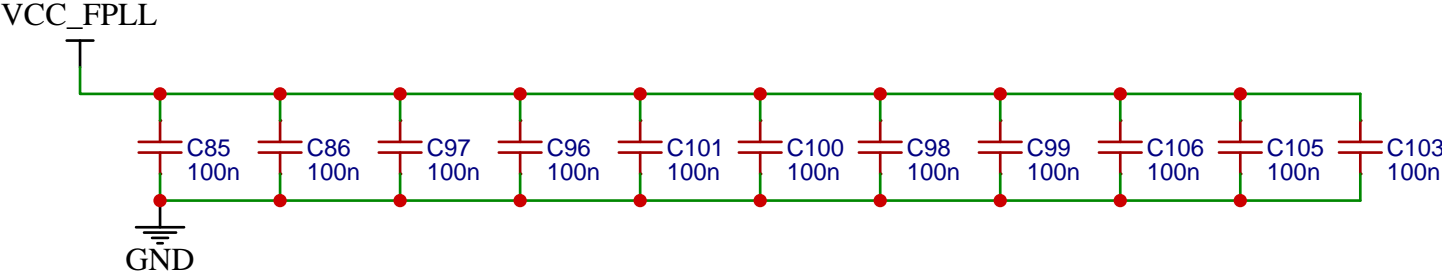
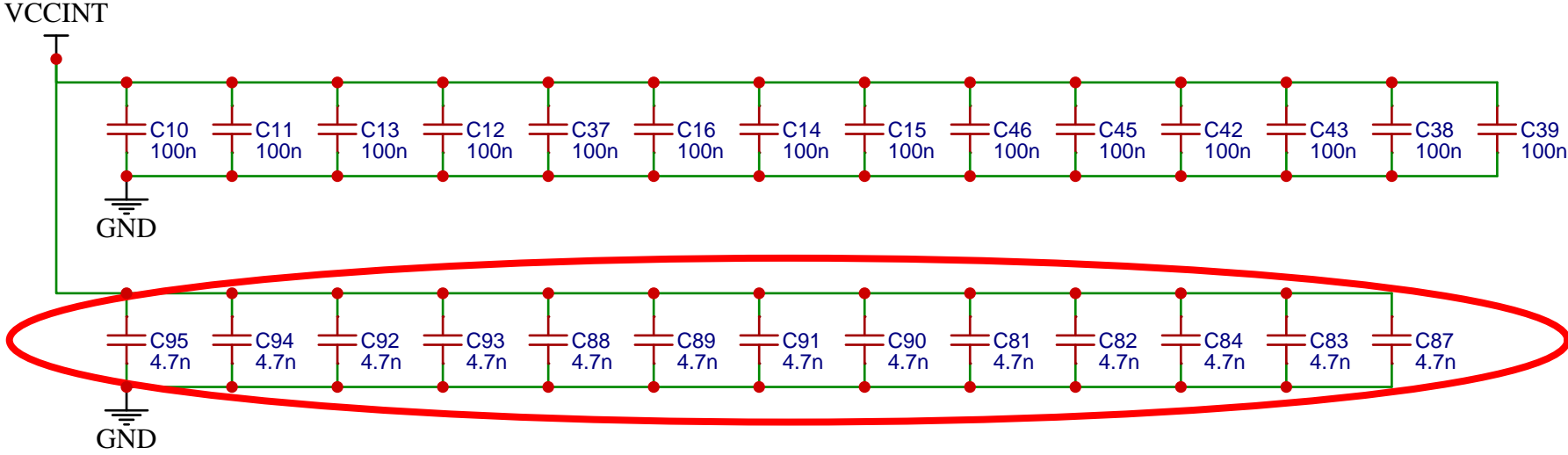
Supplies: U13 - 3.3V supply ( 3.3VA, VCCA )  
 U14 - 2.5V supply ( VCCA\_FPLL, VCC\_AUX )  
 U15 - 1.1V supply ( VCCINT )  
 U16 - 3.3V supply ( VCCIO )  
 U19 - 1.8V supply ( VCC\_DDR )


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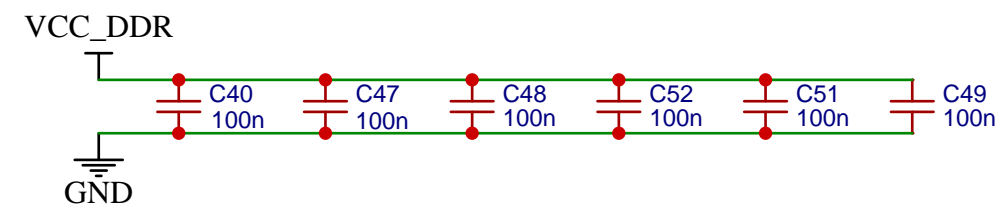
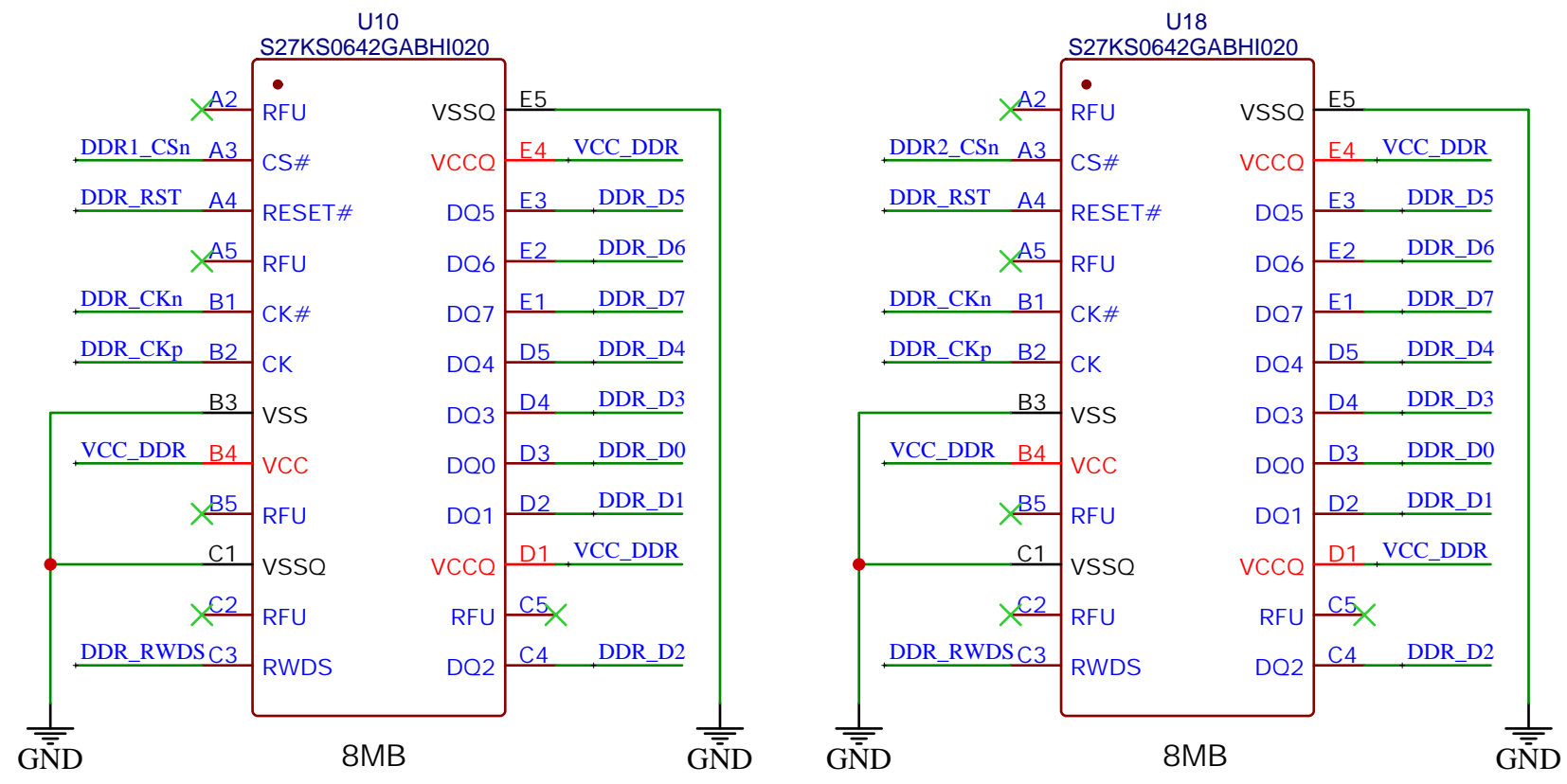
# FPGA DECOUPLING

Note: Place capacitors near FPGA pins



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FPGA EXTERNAL MEMORY



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