

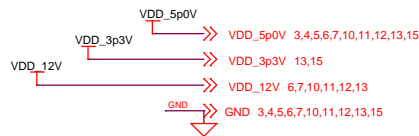


Q26016-003 **SIDE SWEEP BOARD CIRCUITRY**

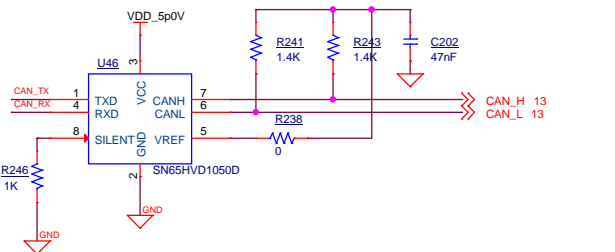
- Rev E - Major CHANGES from Design review.
Precharge to use micro to control.
- Rev F - References cleaned up for LAYOUT
- Rev G - DIODE added to Pre charge.
changed resistors from 0402 to 0603
changed HIGH current FETs to LOW current FETs
changed JTAG port to smaller version
added a NON-POP cap for possible filtering for Vac Fan
added 2 NON-POP resistors for possible increase in discharge time of BULK CAPS
- Rev H - Changed Precharge flyback diode connection to Precharge in.
- Rev J - Changed Op-Amps for Vac fan circuits from OPA2727 to LM358D.
OPA2727 were having latch-up issues due to ESD coming from FAN.

Title			
LIGHTNING: SIDE SWEEP BOARD			
Size	Document Number	Rev	
Custom Q26016-003		J	
Date: Wednesday, August 24, 2016		Sheet	1 of 16

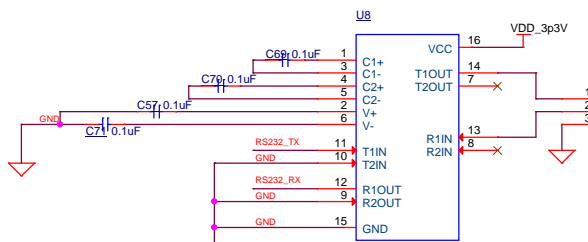
LIGHTNING SWEEP BOARD MICRO AND COMMUNICATIONS



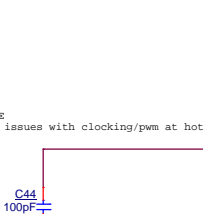
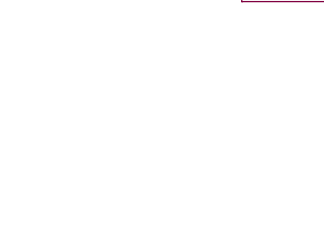
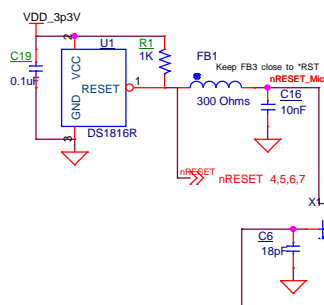
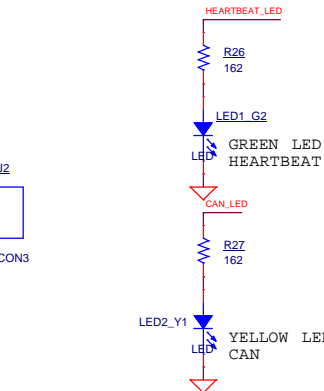
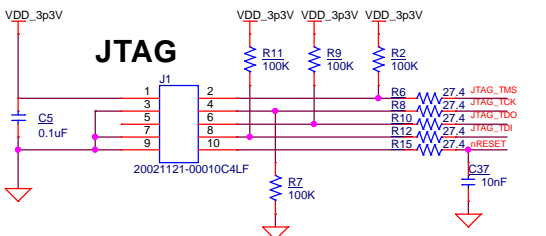
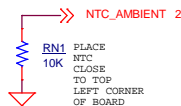
12V Going out the CAN J1-4 powers the User Interface Module



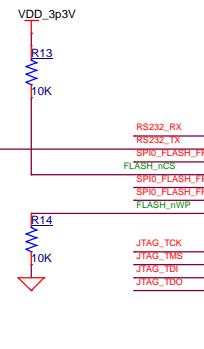
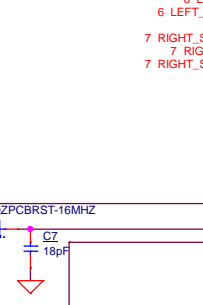
CAN COMMUNICATIONS



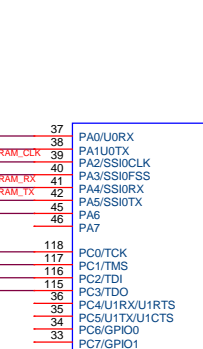
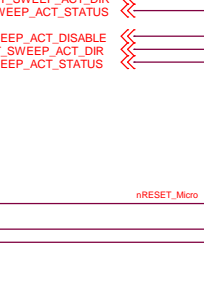
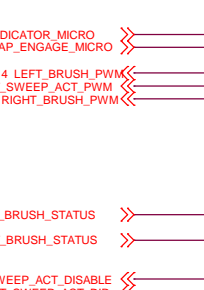
RS-232 SERIAL PORT



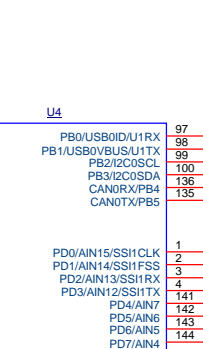
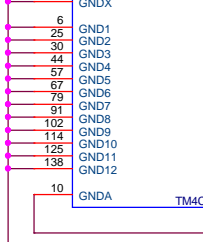
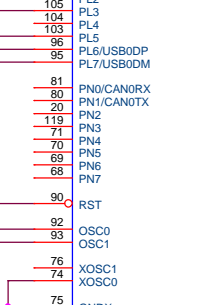
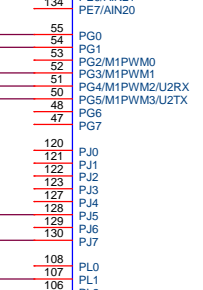
APP-NOTE
Thermal issues with clocking/pwm at hot



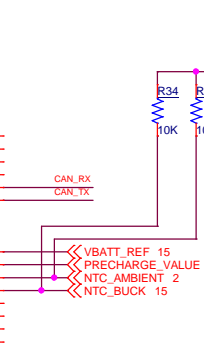
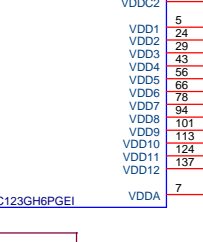
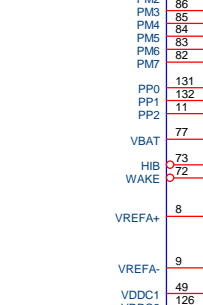
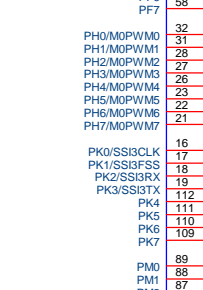
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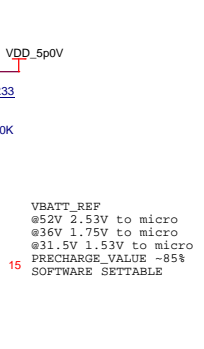
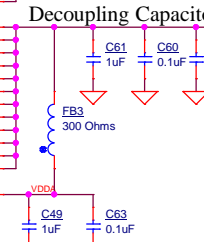
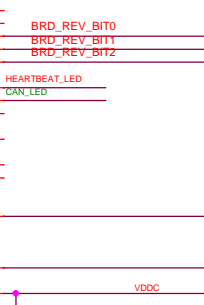
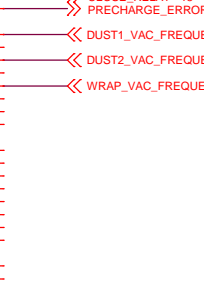
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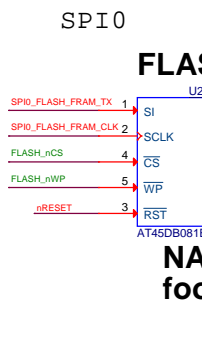
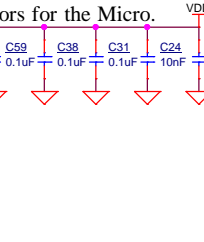
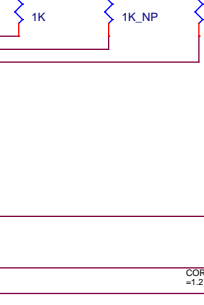
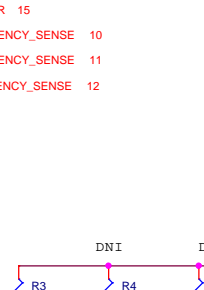
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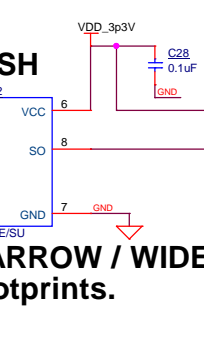
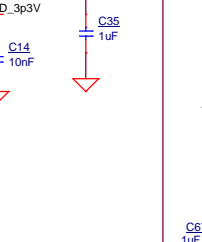
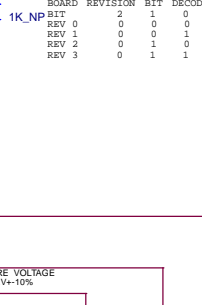
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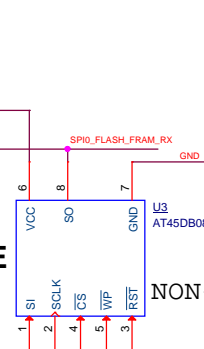
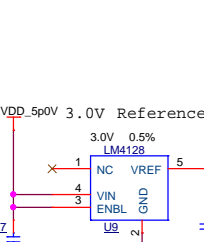
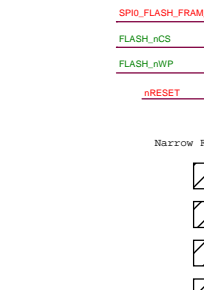
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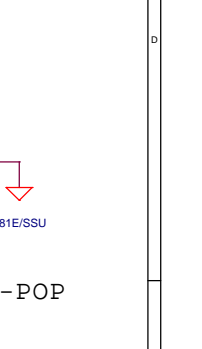
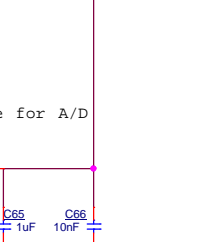
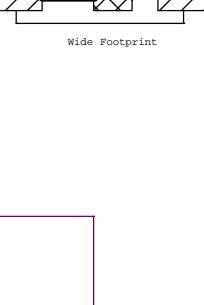
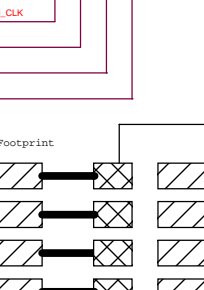
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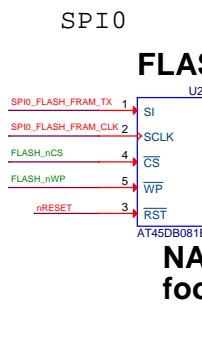
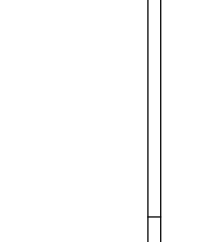
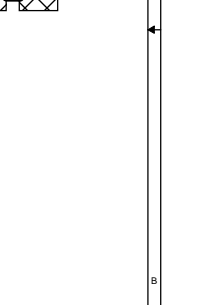
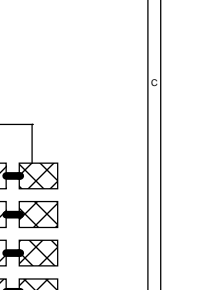
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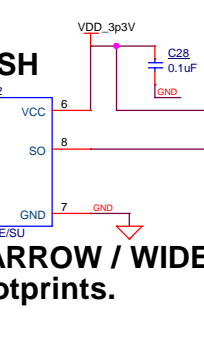
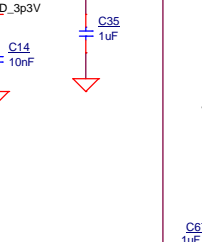
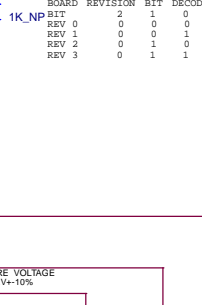
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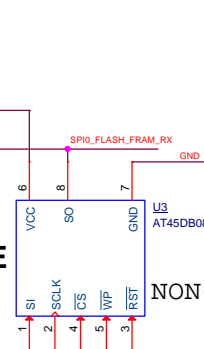
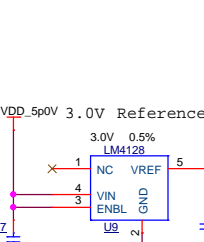
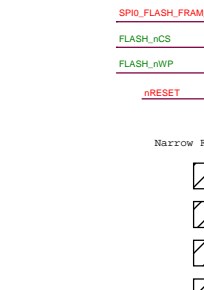
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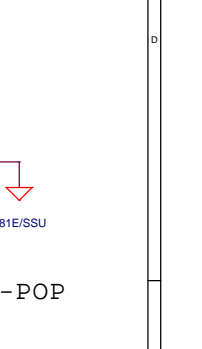
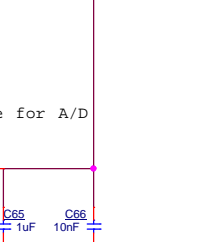
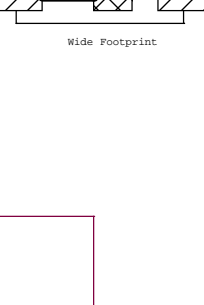
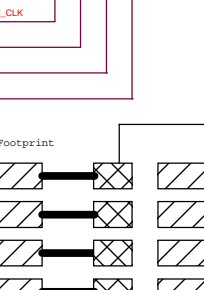
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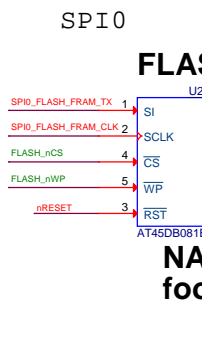
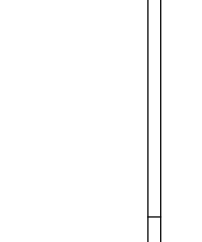
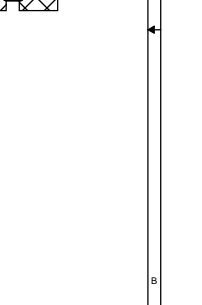
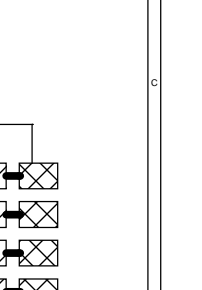
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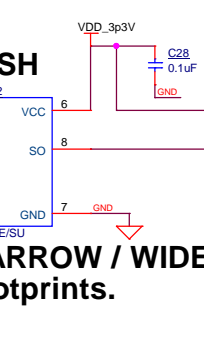
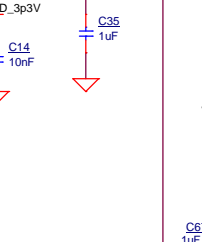
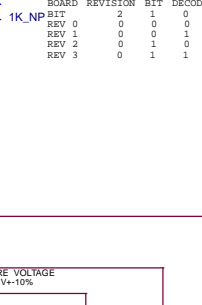
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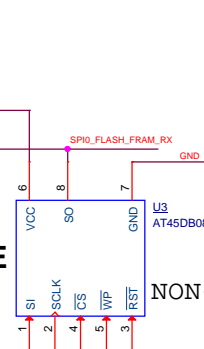
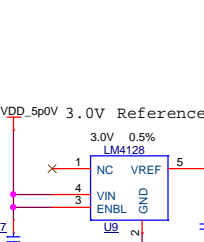
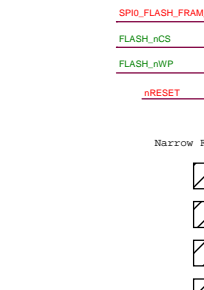
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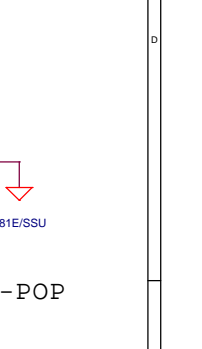
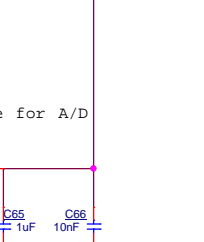
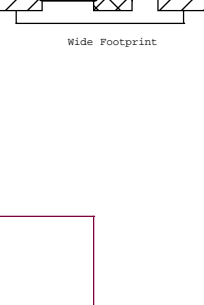
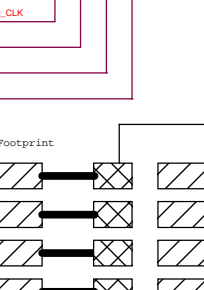
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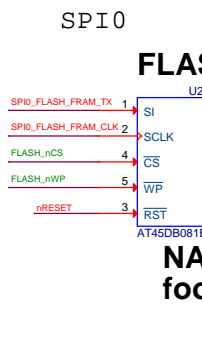
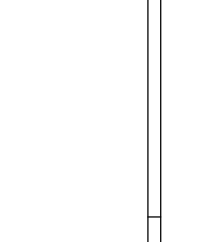
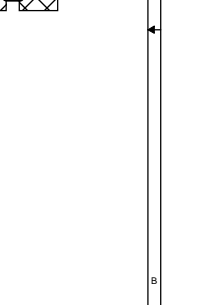
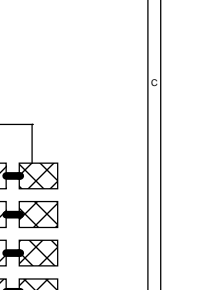
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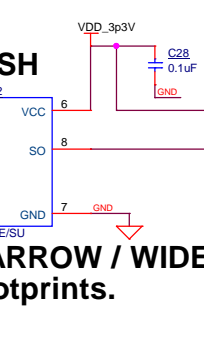
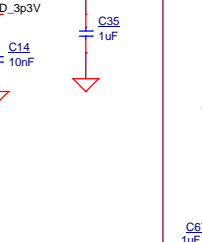
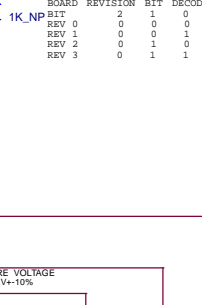
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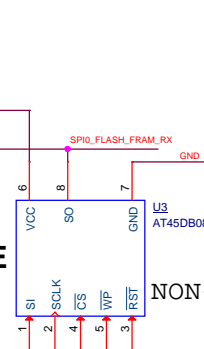
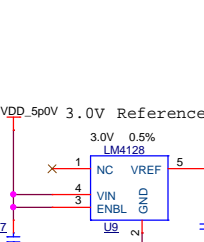
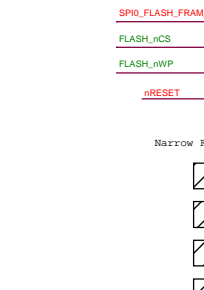
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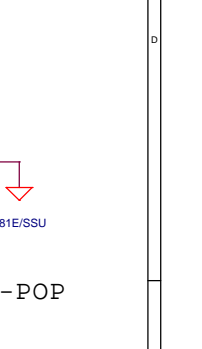
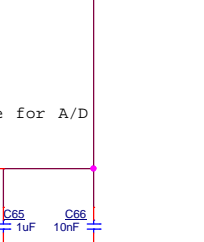
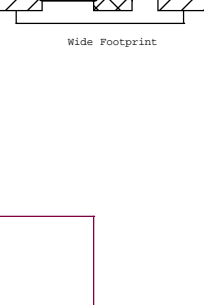
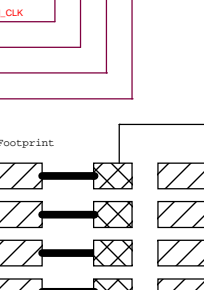
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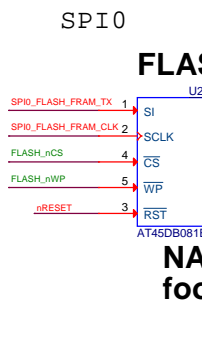
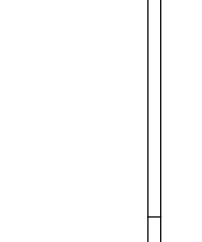
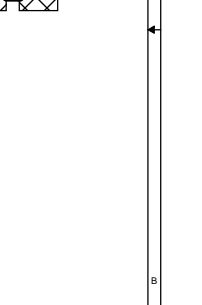
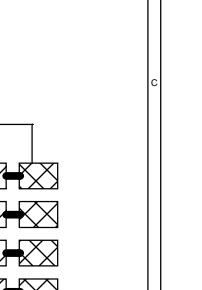
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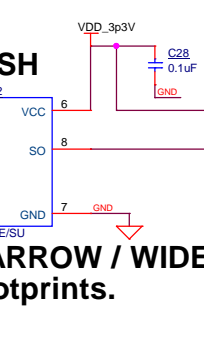
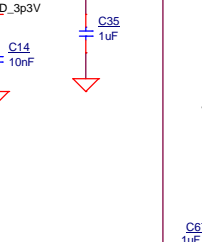
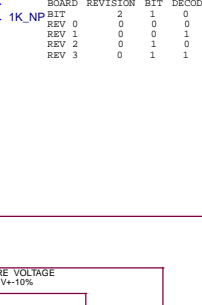
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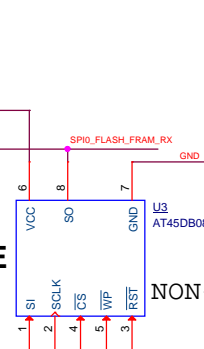
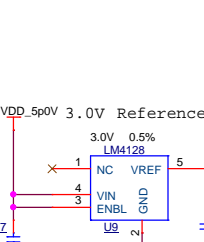
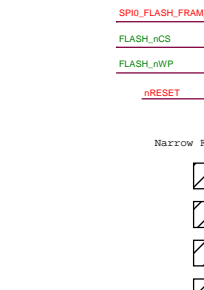
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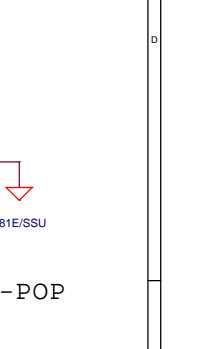
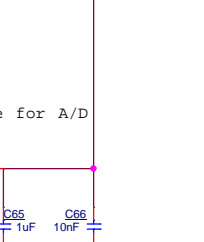
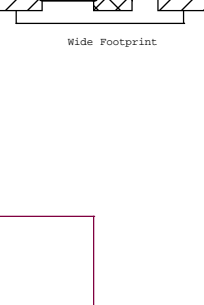
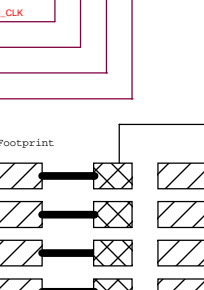
APP-NOTE
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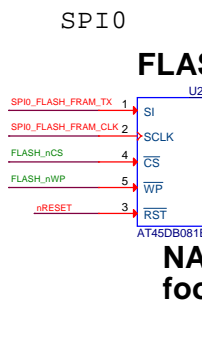
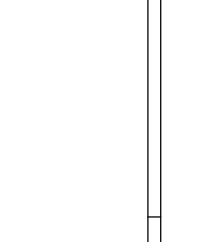
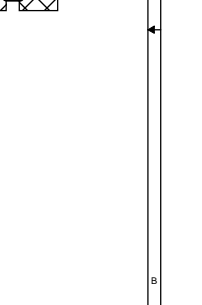
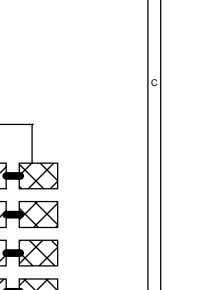
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Thermal issues with clocking/pwm at hot



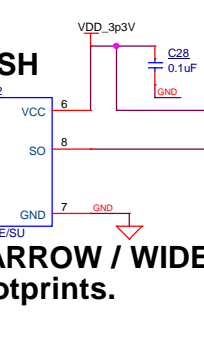
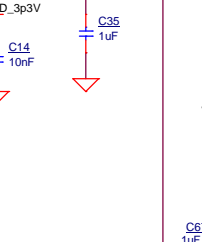
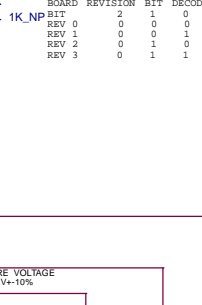
APP-NOTE
Thermal issues with clocking/pwm at hot



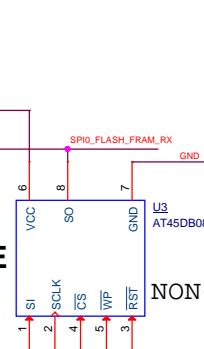
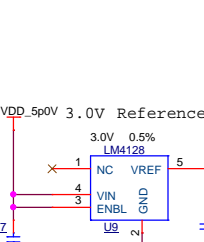
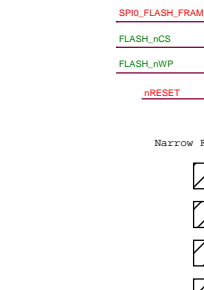
APP-NOTE
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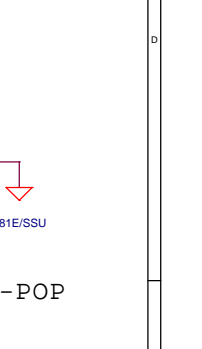
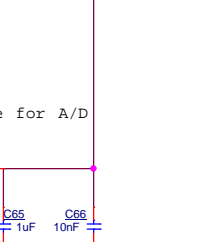
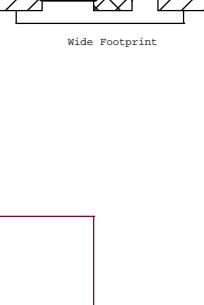
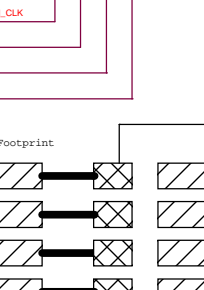
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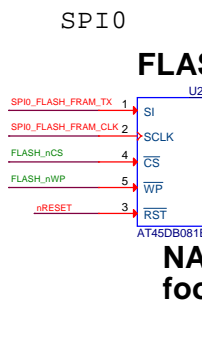
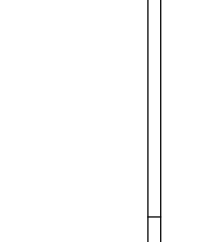
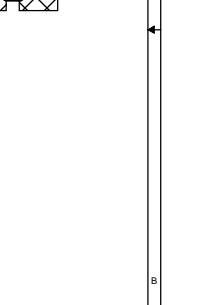
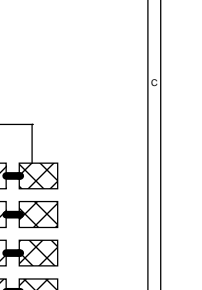
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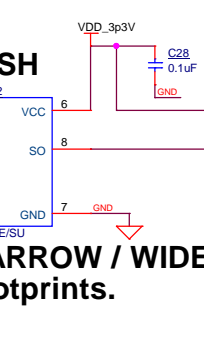
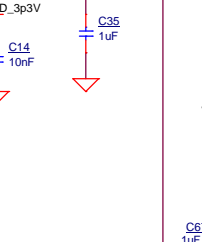
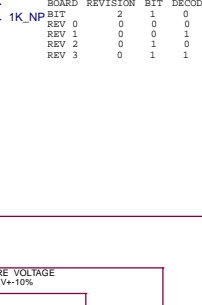
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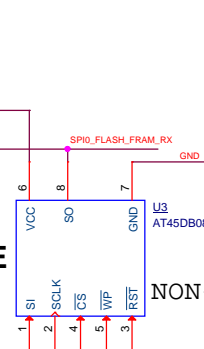
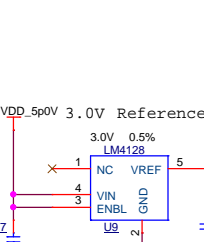
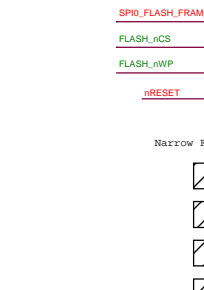
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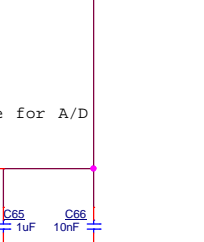
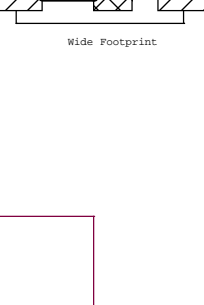
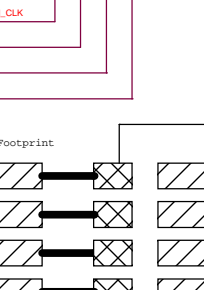
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Thermal issues with clocking/pwm at hot



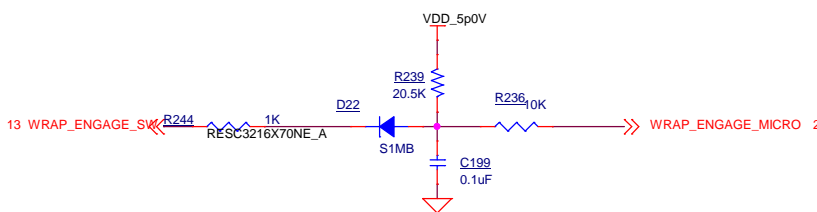
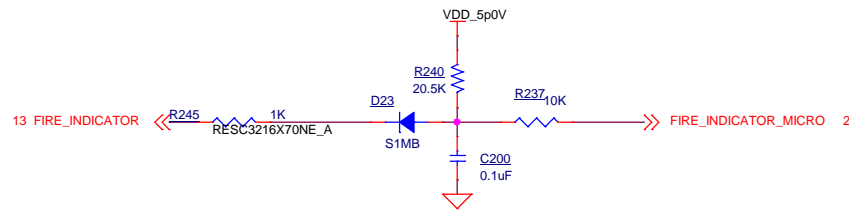
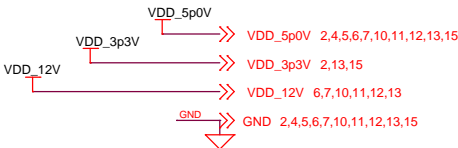
APP-NOTE
Thermal issues with clocking/pwm at hot



APP-NOTE
Thermal issues with clocking/pwm at hot

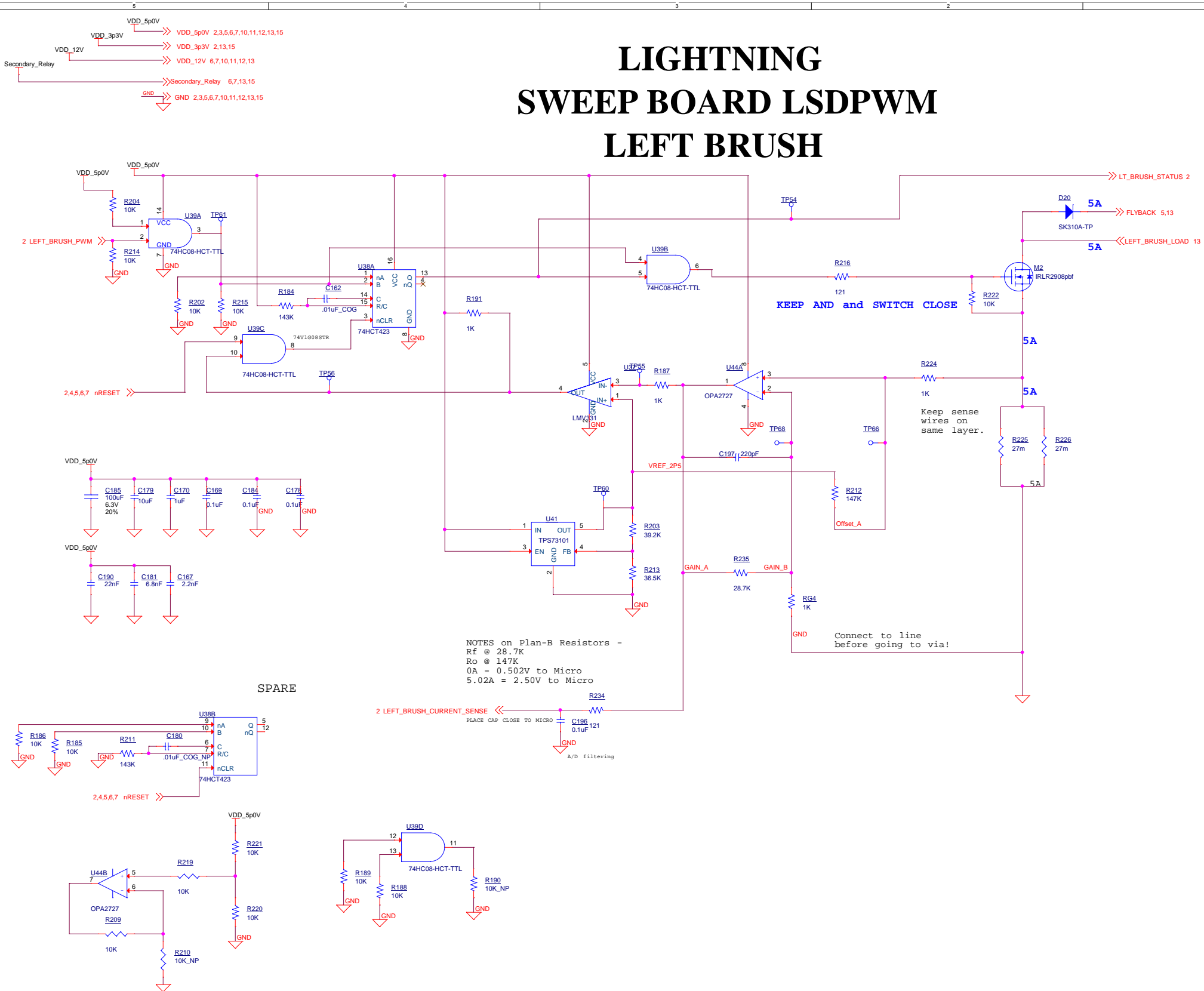


LIGHTNING SWEEP BOARD BOARD INPUTS



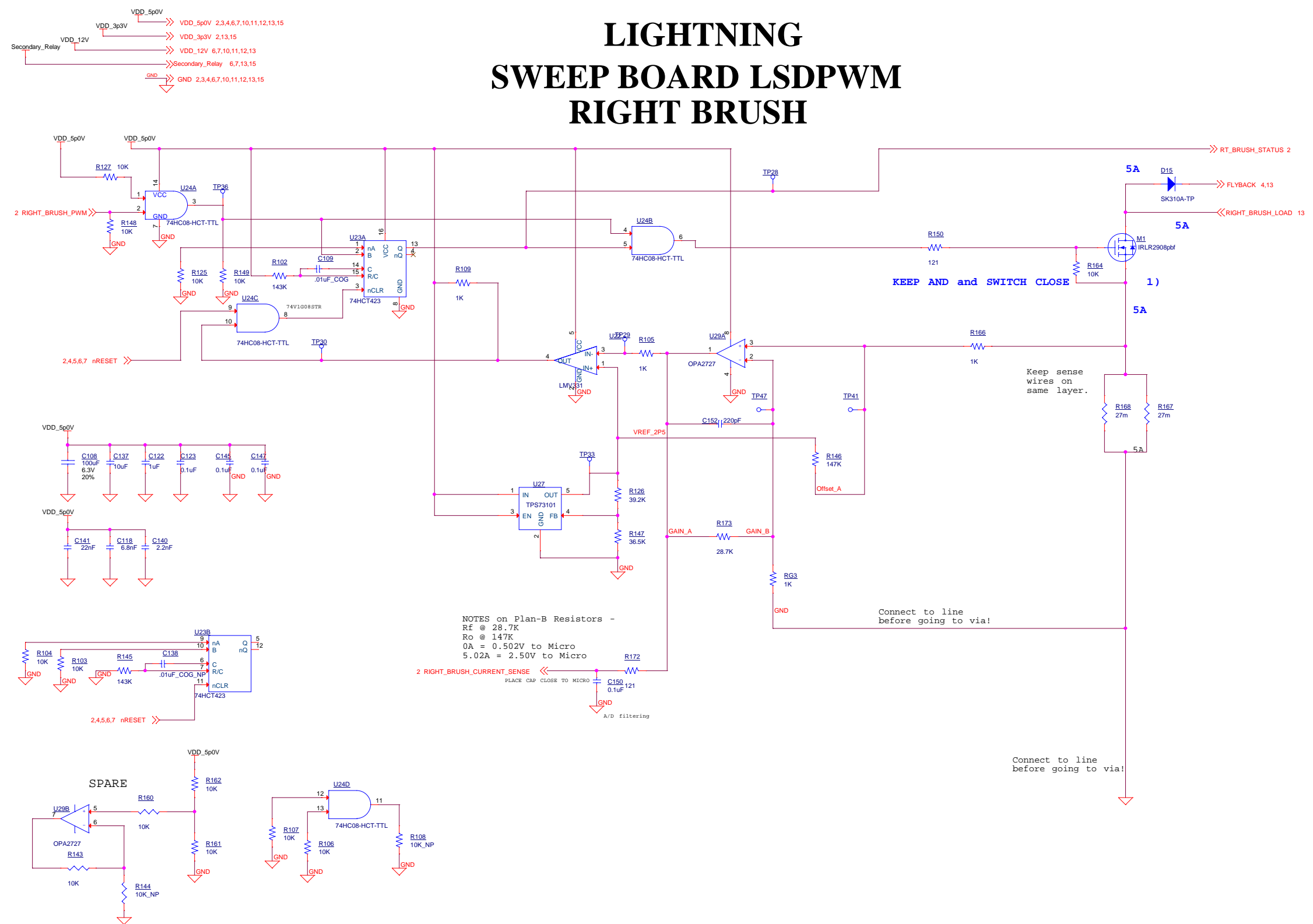
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Size	Document	Number	Rev
Custom	Q26016-003		J
Date:	Wednesday, August 24, 2016	Sheet	3 of 16

LIGHTNING SWEEP BOARD LSDPWM LEFT BRUSH



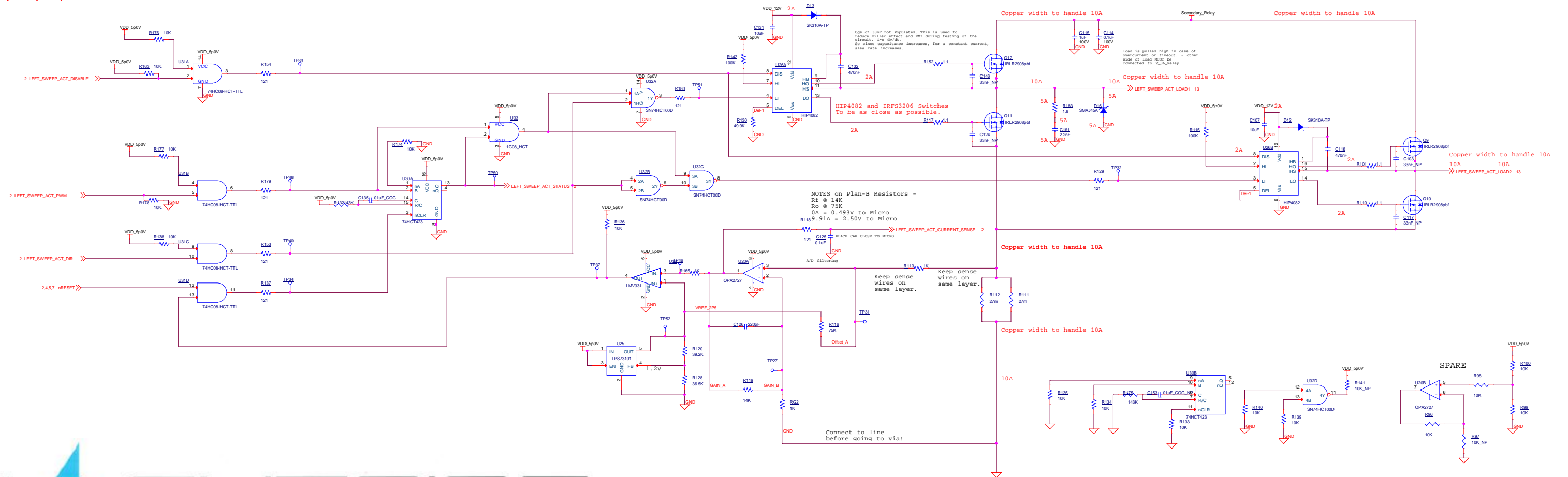
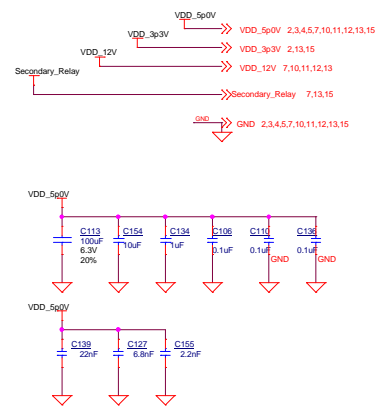
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Size	Document Number	Rev	
Custom	Q26016-003	J	
Date:	Wednesday, August 24, 2016	Sheet	4 of 16

LIGHTNING SWEEP BOARD LSDPWM RIGHT BRUSH



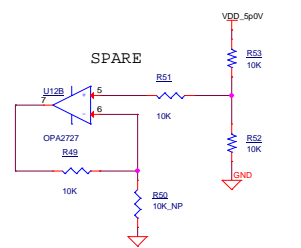
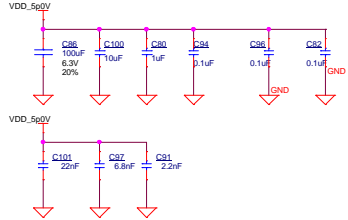
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Size	Document Number		Rev J
Custom	Q26016-003		
Date:	Wednesday, August 24, 2016	Sheet	5 of 16

LEFT BRUSH ACT



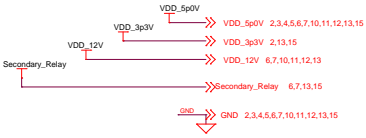
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Size	Document Number		Rev
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Date:	Wednesday, August 24, 2016	Sheet	6 of 16

SWEEP BOARD H - BRIDGE

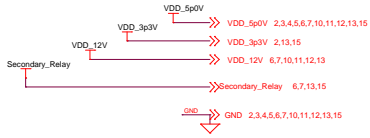


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Size	Document Number		Rev
Custom	Q26016-003		J
Date:	Wednesday, August 24, 2016	Sheet	7 of 16

LIGHTNING
SWEEP BOARD H - BRIDGE
WRAP FLAPPER ACT
REMOVED



Title			LIGHTNING: SIDE SWEEP BOARD
Size	Document Number	Rev	
CustomQ25016-003		J	
Date:		Wednesday, August 24, 2016	Sheet 8 of 16



LIGHTNING

SWEEP BOARD H - BRIDGE

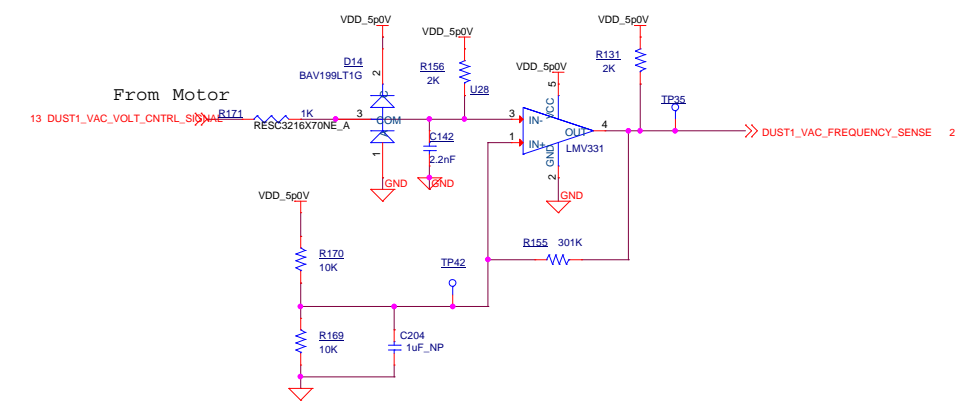
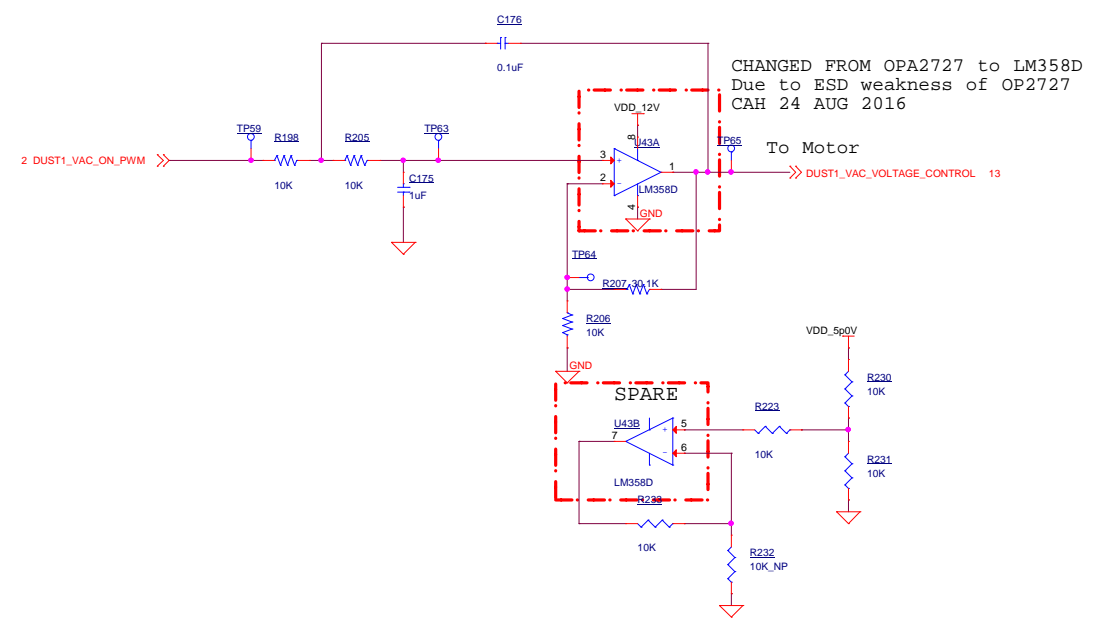
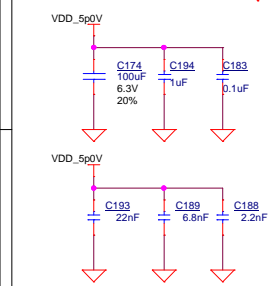
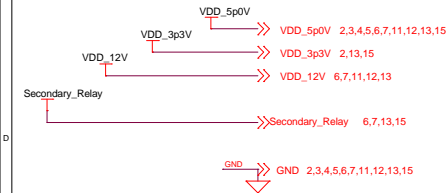
WRAP ACT REMOVED



Title			LIGHTNING: SIDE SWEEP BOARD
Size	Document	Number	Rev
Custom	Q25016-003		J
Date:		Wednesday, August 24, 2016	Sheet 9 of 16

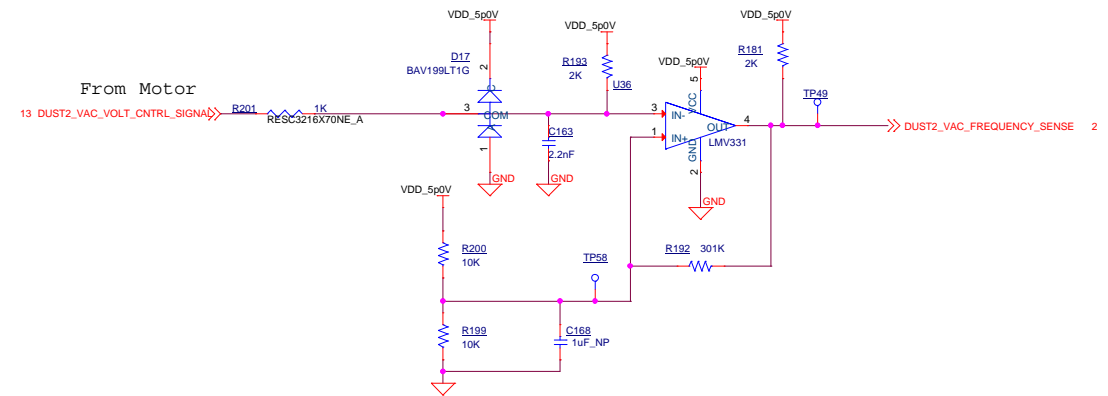
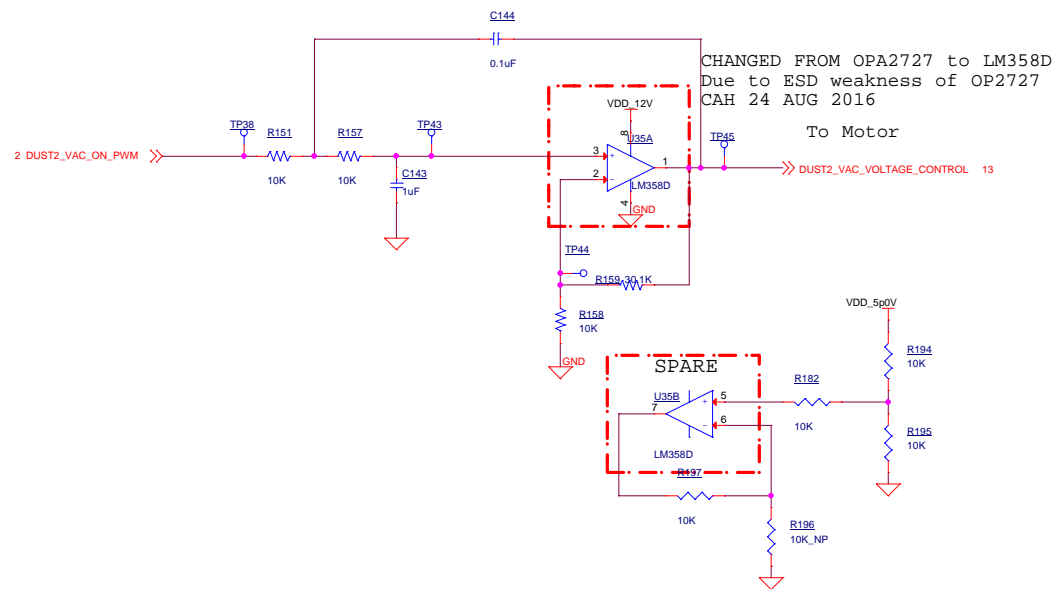
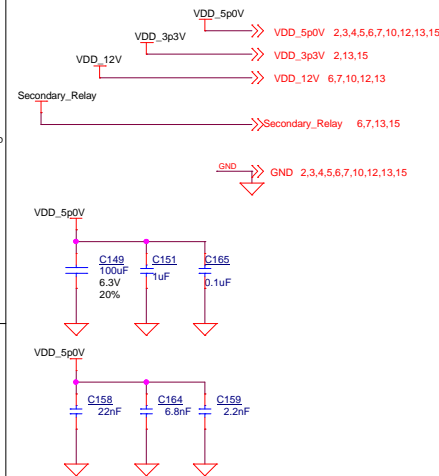
LIGHTNING SWEEP BOARD

DUST 1 VAC CONTROL & CURRENT MONITOR



File			
LIGHTNING: SIDE SWEEP BOARD			
Size	Document	Number	Rev
Custom	Q26016-003		J
Date:	Wednesday, August 24, 2016	Sheet	10 of 16

LIGHTNING SWEEP BOARD DUST 2 VAC CONTROL & CURRENT MONITOR

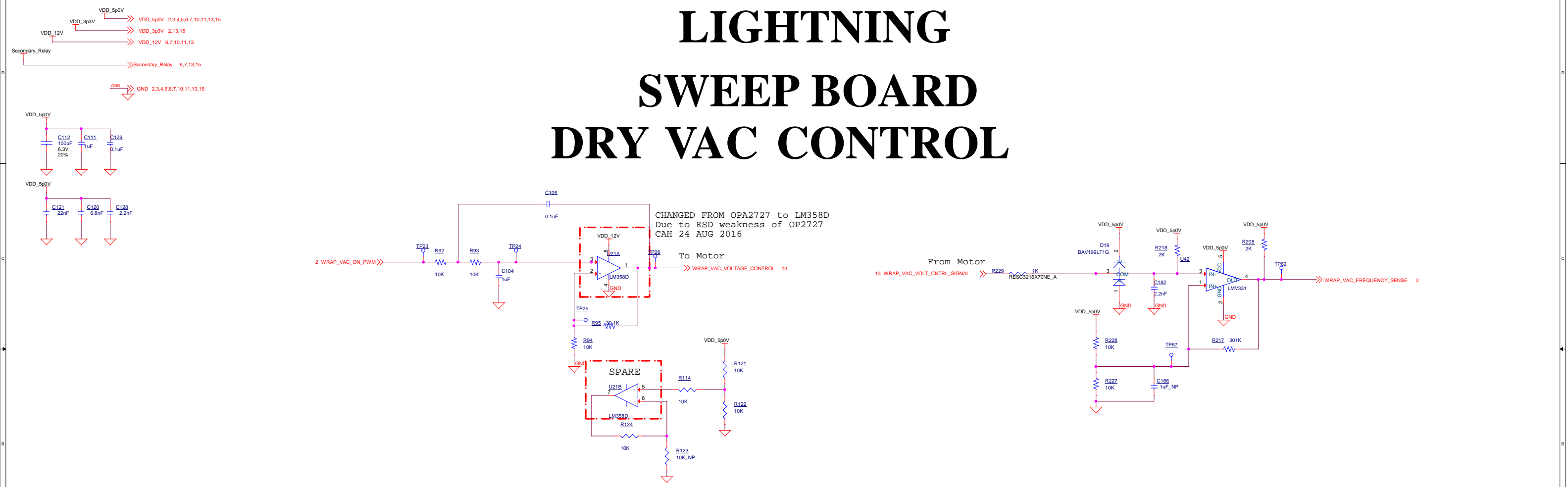


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LIGHTNING: SIDE SWEEP BOARD			
Size	Document	Number	Rev
Custom	Q26016-003		J
Date:	Wednesday, August 24, 2016	Sheet	11 of 16

LIGHTNING

SWEEP BOARD

DRY VAC CONTROL

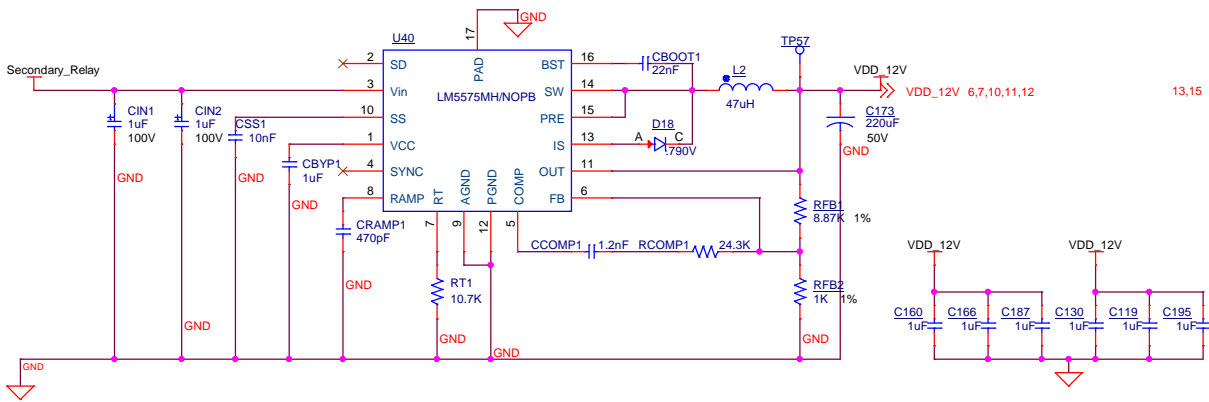


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Size	Document	Number	Rev
Custom	Q26016-003		J
Date:	Wednesday, August 24, 2016	Sheet	12 of 16

LIGHTNING

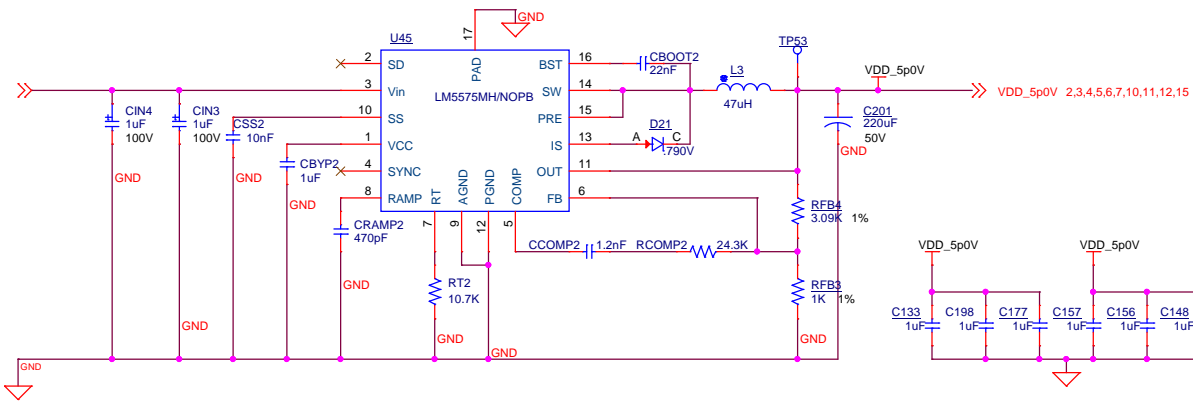
SWEEP BOARD: SUPPIES and CONNECTORS

12V

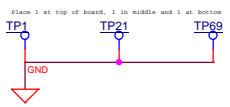
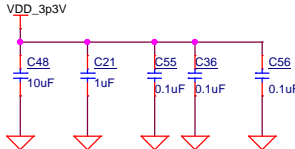
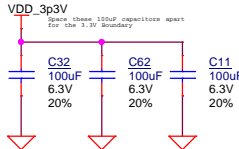
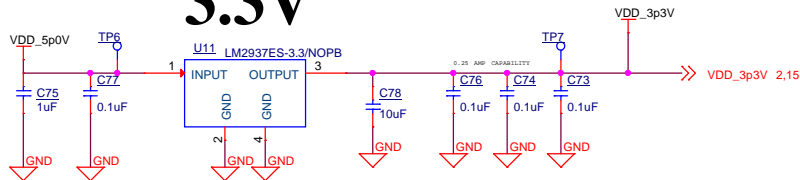


5V

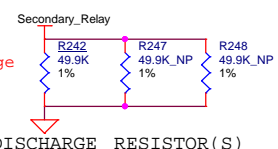
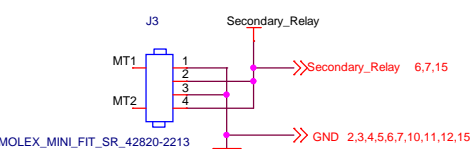
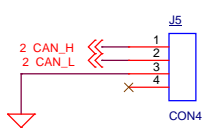
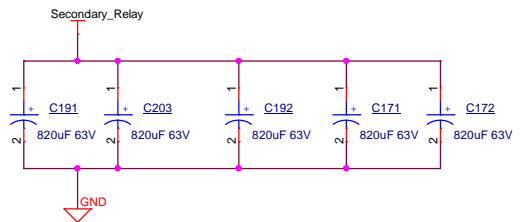
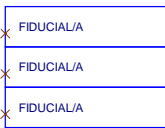
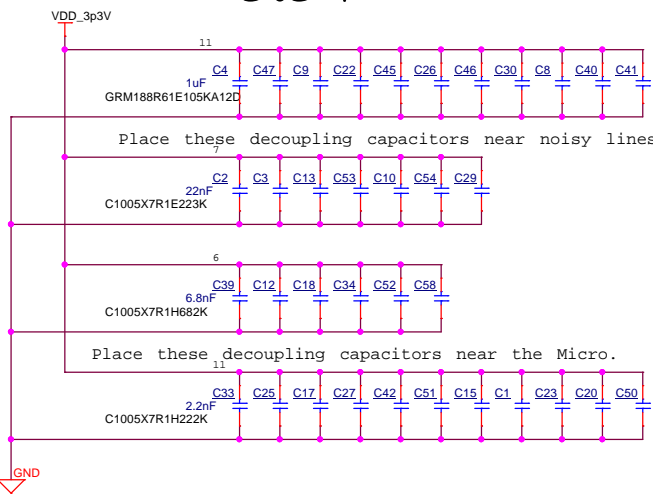
Need a bit more current than the linear can provide. Peaks of 2A.



3.3V

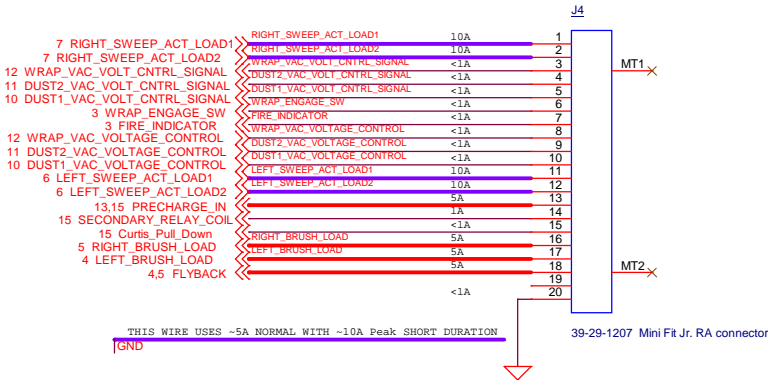


3.3V



Changed connector references to help keep Machine schematic clean

Resistor to discharge BULK Capacitors



Title		
LIGHTNING: SIDE SWEEP BOARD		
Size	Document Number	Rev
Custom	Q26016-003	J
Date:	Wednesday, August 24, 2016	Sheet 13 of 16

LIGHTNING SIDE SWEEP BOARD PRE-CHARGE LINEAR REMOVED



Title			
LIGHTNING: SIDE SWEEP BOARD			
Size	Document Number	Rev	
Custom23016-003		J	
Date:	Wednesday, August 24, 2016	Sheet	14 of 16

LAYOUT NOTES - GENERAL NOTES

1) Check Schematics for heavy RED wiring. There will be notes on current density.
Rule of thumbs:
10-15mil per Amp on top level. (increase to reduce power dissipation if there is room)
40mil per Amp for inner traces.
Stack as needed to handle currents. Try to keep same size parallel between stacks.

LAYOUT NOTES - LSDPWM, HALF BRIDGES AND H-BRIDGES

1) Cu 250mils wide. ~ 10A capability. Need ~40A capability 2 oz Cu.
2) All Resistors at 1% Except 1Meg ohm Resistors can be 5% if no 1% available.
3) Current Sense resistors tied directly to 499 ohms on TOP LEVEL before via to ground. Connect Opamp Grounds to current sense Resistors on Top Level. USE MANY VIAS on node to ground after resistors and op-amps are connected.
4) To minimize ringing in the bootstrap circuit, keep the PCB traces from the HIP4082 to the external bootstrap capacitor and MOSFETs as short as possible. The bypass capacitor should be located as close as possible to the IC. Ceramic dielectric is the best choice for bypass and bootstrap capacitors.



Title			
LIGHTNING: SIDE SWEEP BOARD			
Size	Document Number		Rev
Customer	Q26016-003		J
Date:	Wednesday, August 24, 2016	Sheet 16 of 16	