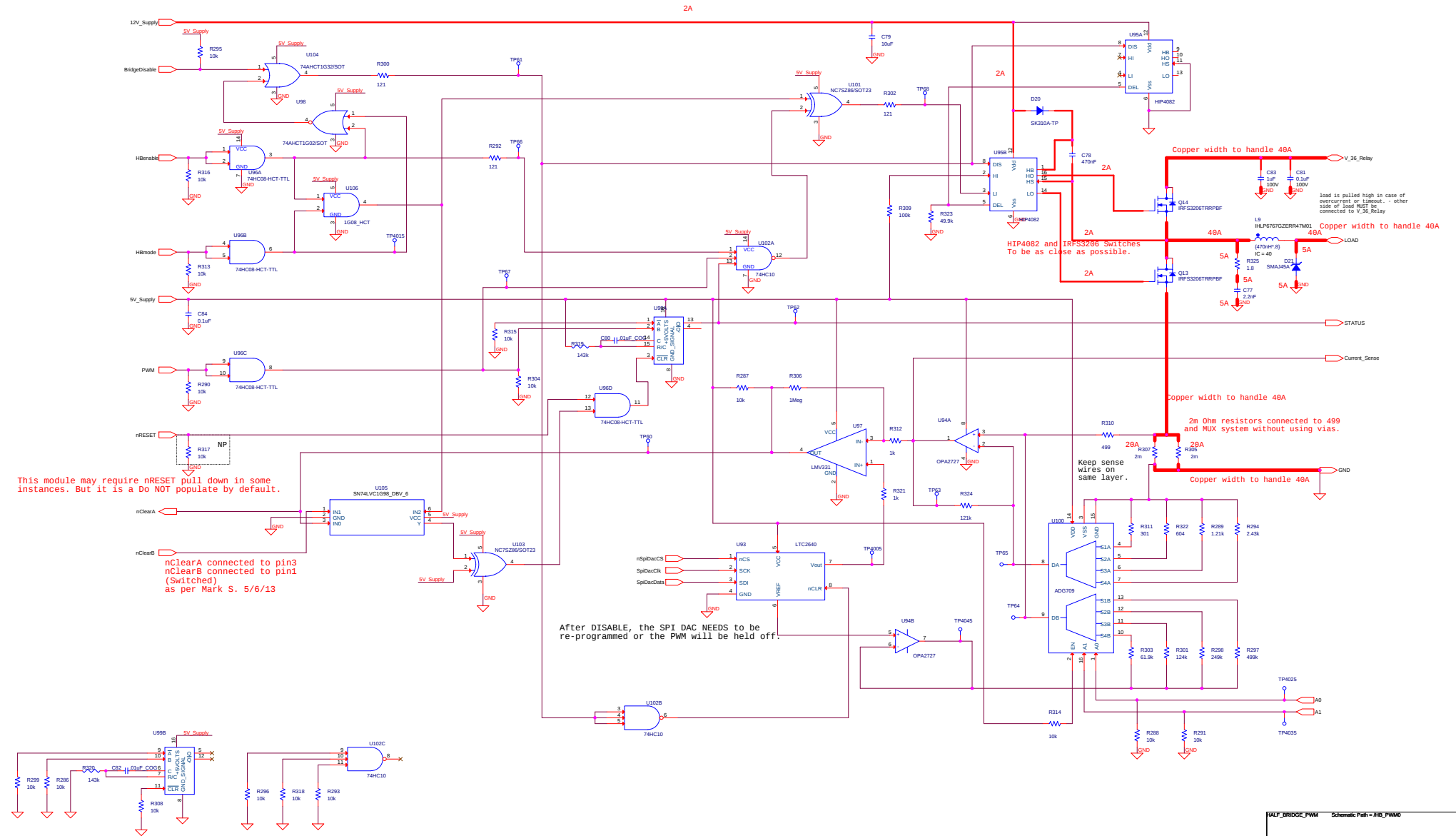


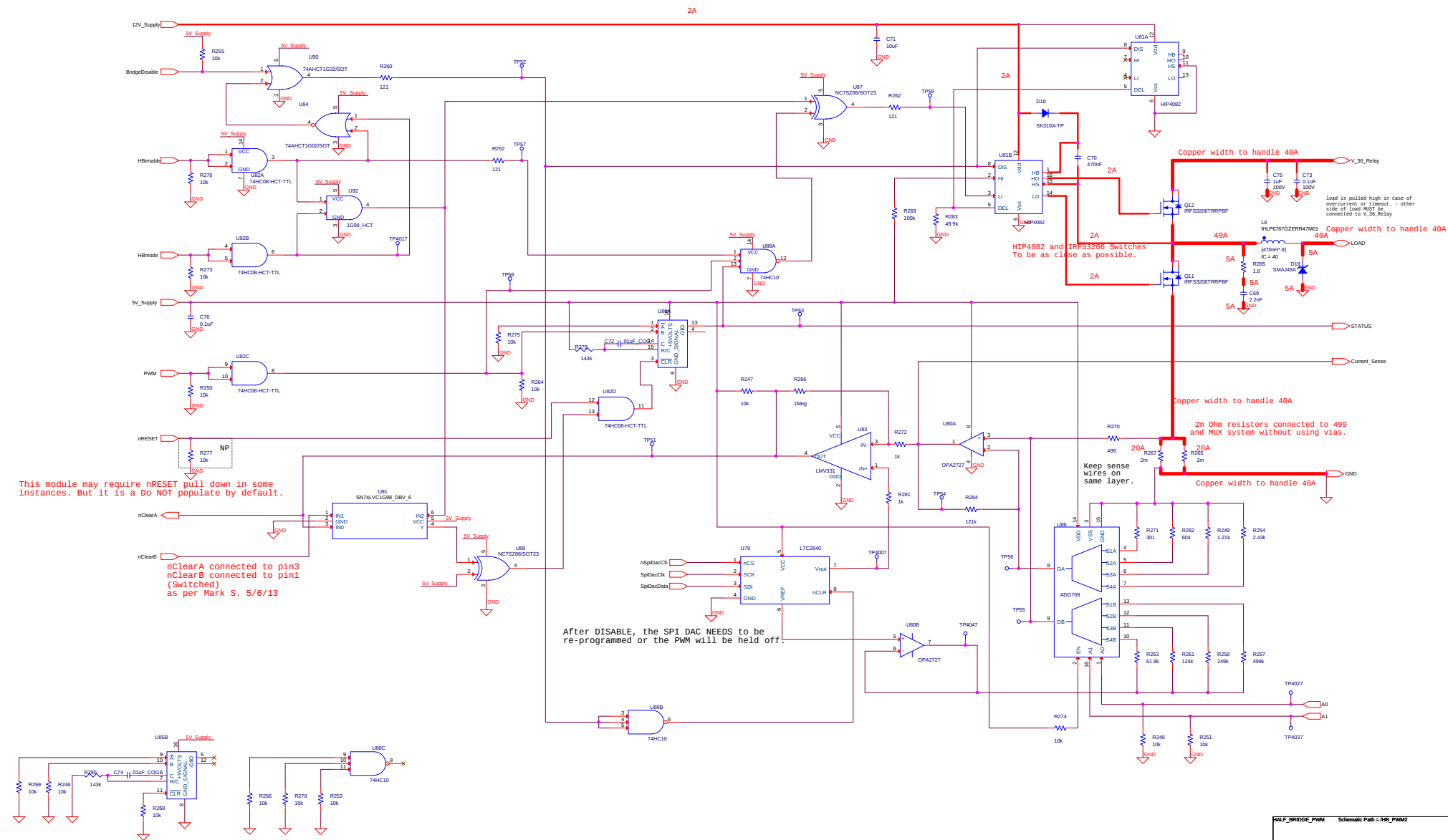
LAYOUT NOTES

- 1) Cu 250mils wide. ~ 10A capability. Need ~40A capability @ 1 oz Cu. May change for 2 oz Cu.
- 2) All Resistors at 1% Except 1Meg ohm Resistors can be 5% if no 1% available.
- 3) 2m Ohm resistors tied directly to 499 ohms on TOP LEVEL before via to ground. USE MANY VIAS to ground out this node.
- 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.



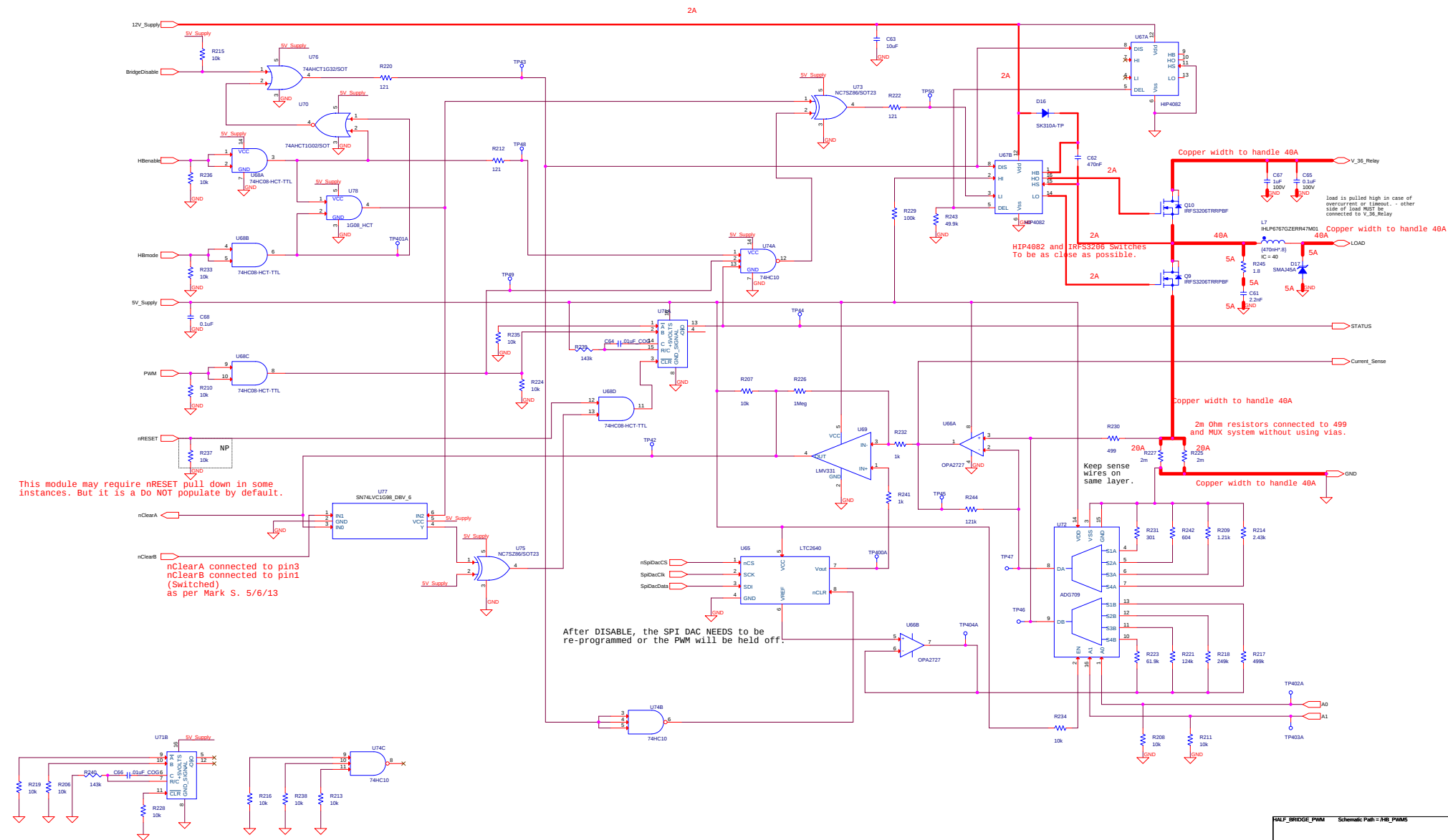
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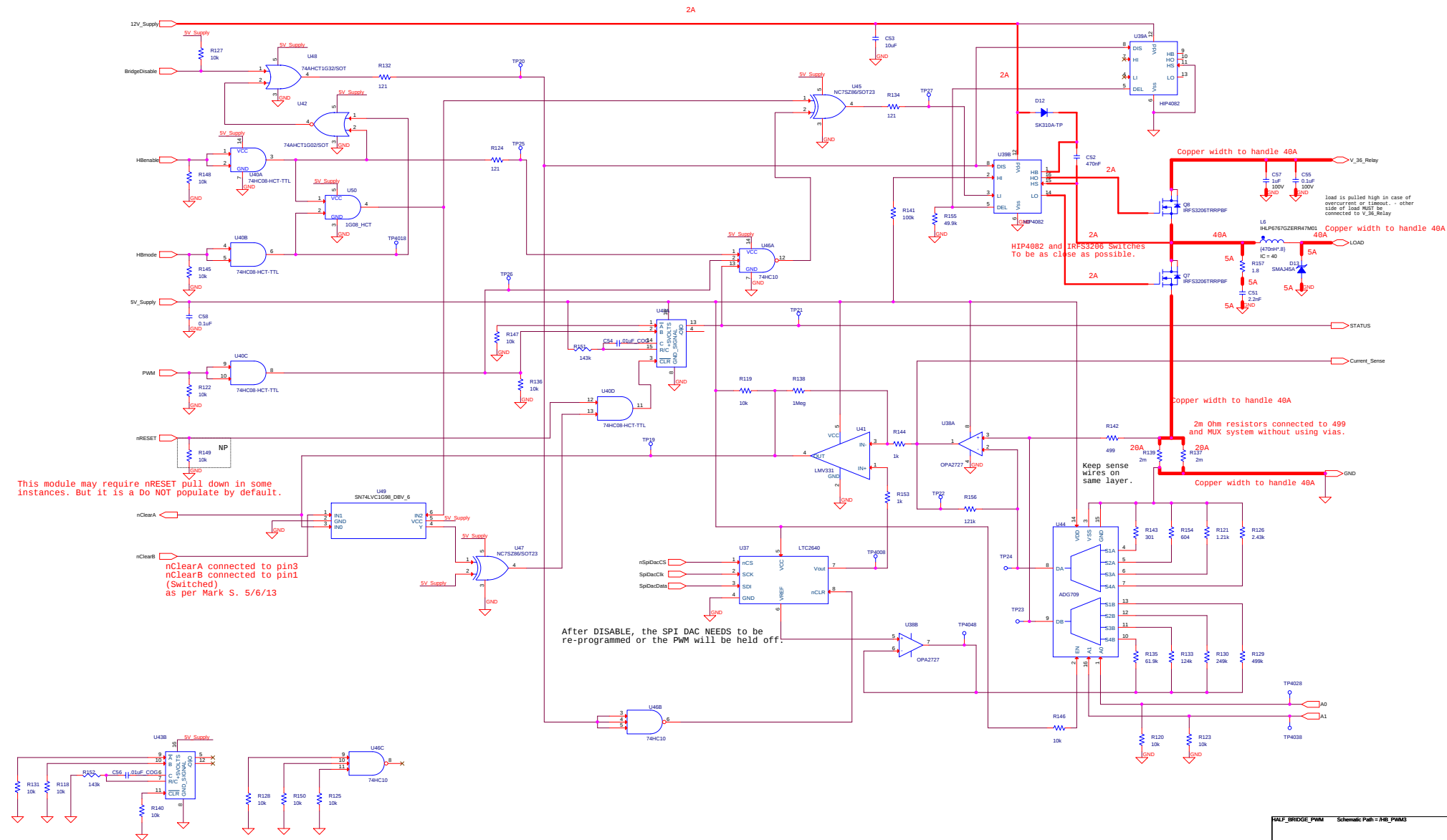
LAYOUT NOTES

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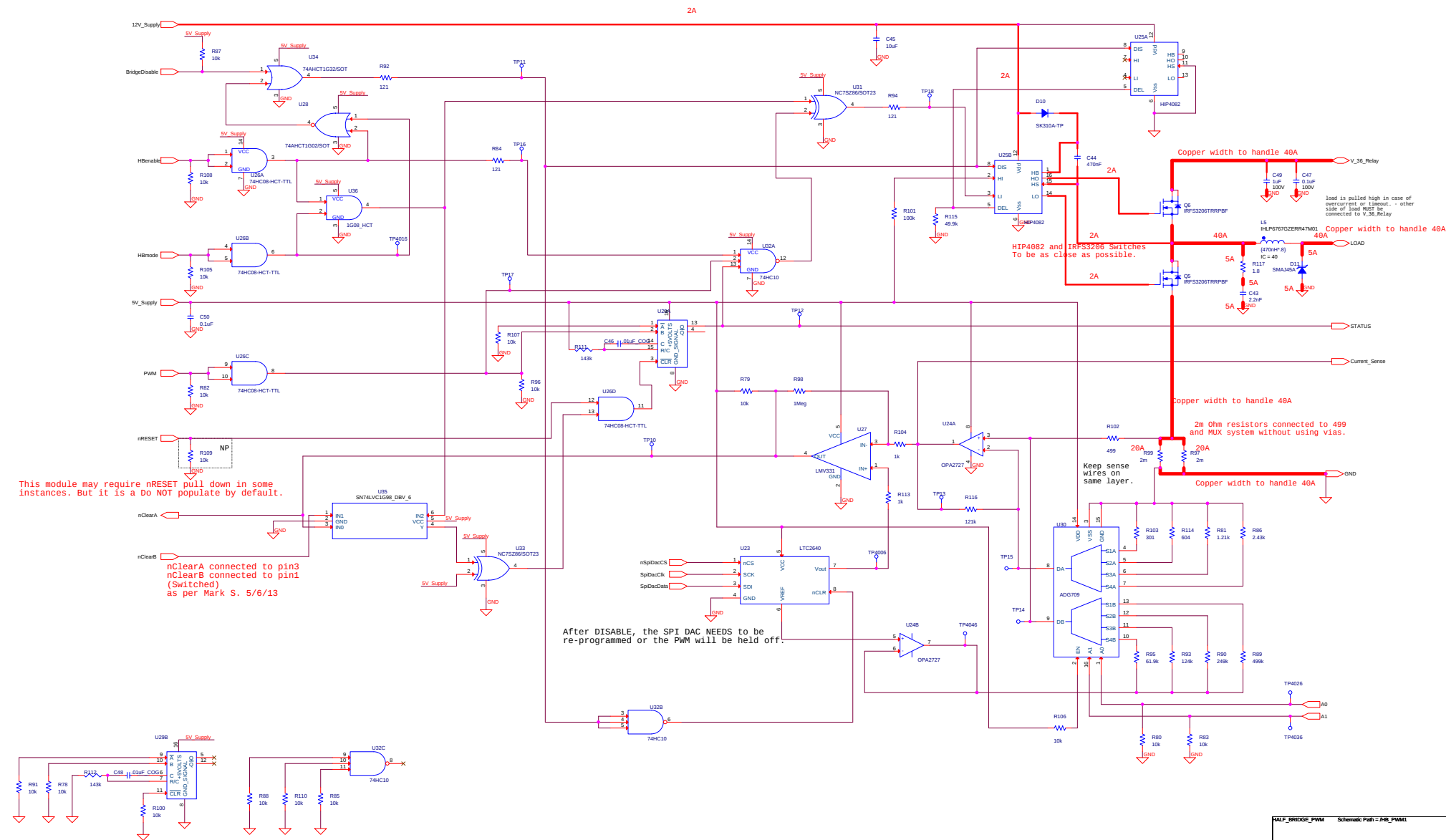
LAYOUT NOTES

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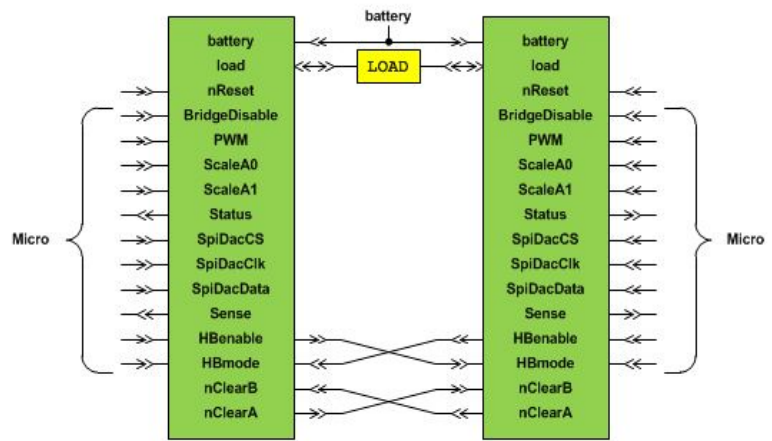


LAYOUT NOTES

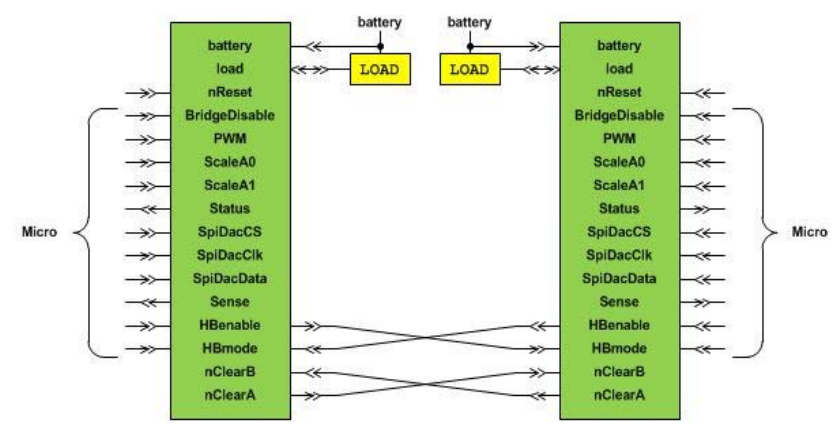
- 1) Cu 250mils wide. ~ 10A capability. Need ~40A capability @ 1 oz Cu. May change for 2 oz Cu.
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APP NOTES

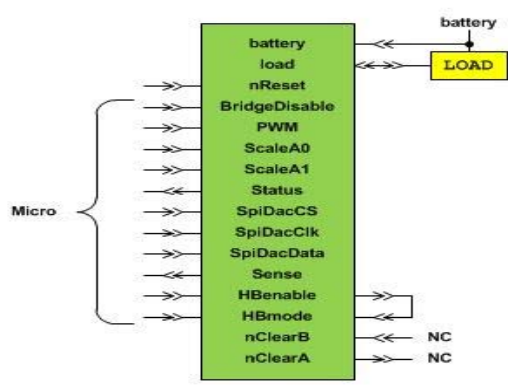


H-Bridge Application



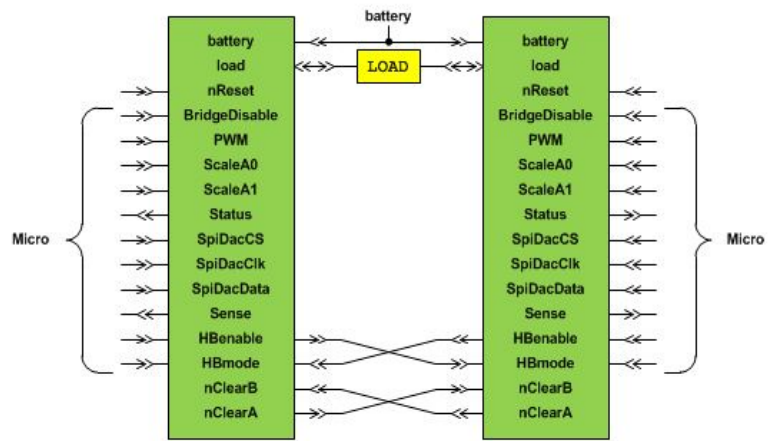
2 Half Bridge Application

Update: BridgeDisable Pull up to 5V to solve Startup issues. 9-19-13

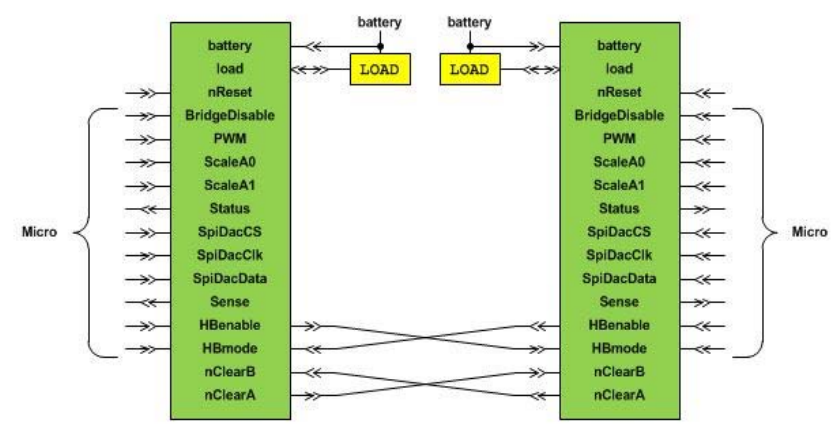


Half-Bridge Application

APP NOTES

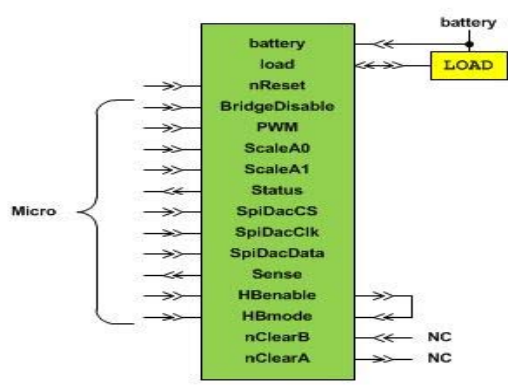


H-Bridge Application



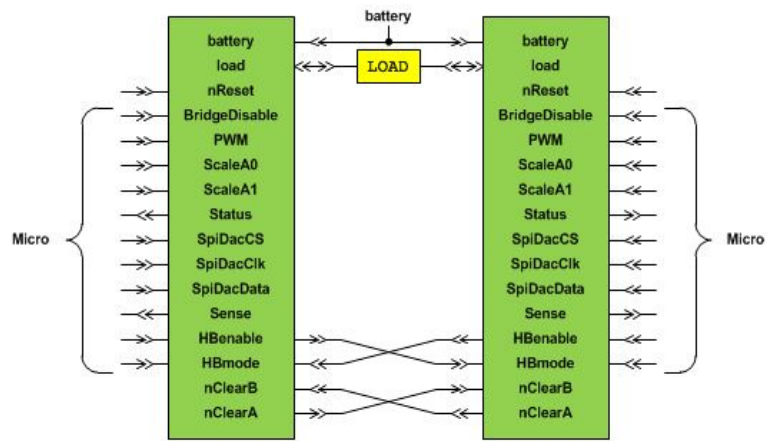
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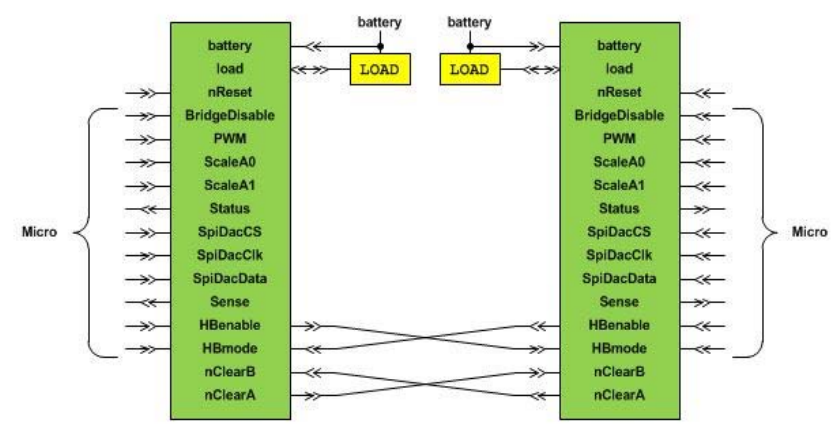


Half-Bridge Application

APP NOTES

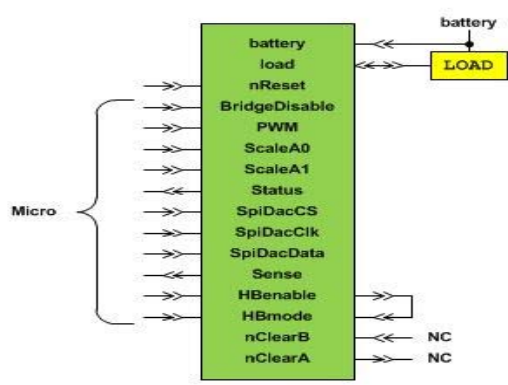


H-Bridge Application



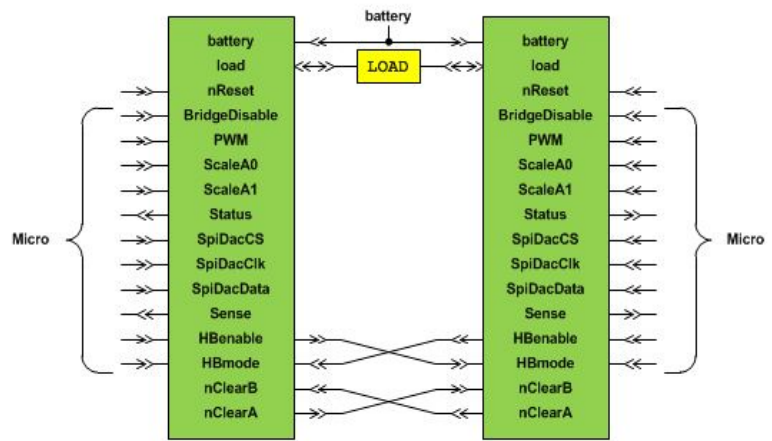
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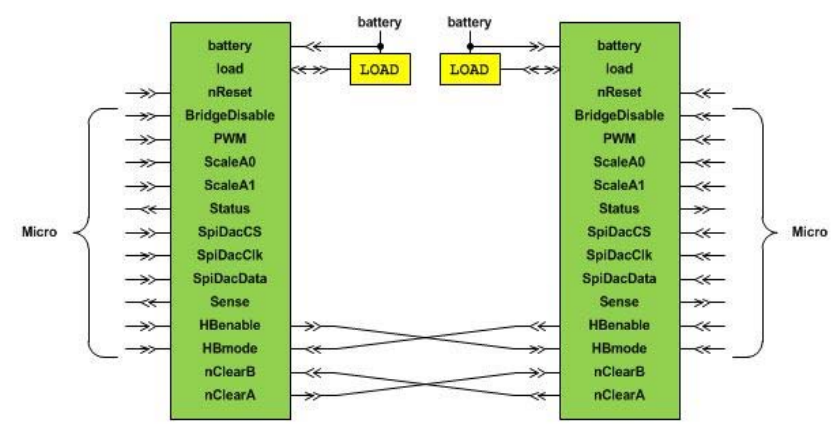


Half-Bridge Application

APP NOTES

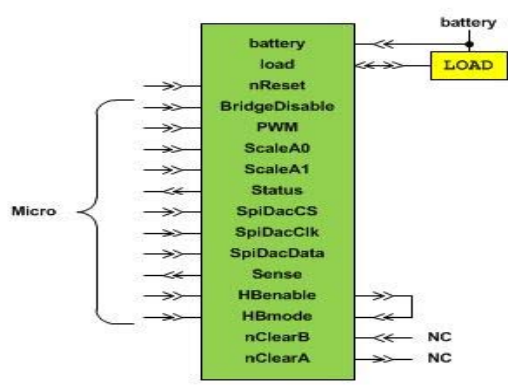


H-Bridge Application



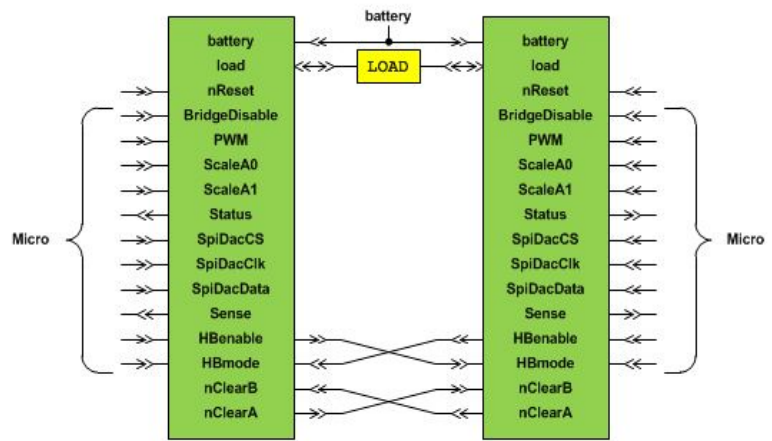
2 Half Bridge Application

Update: BridgeDisable Pull up to 5V to solve Startup issues. 9-19-13

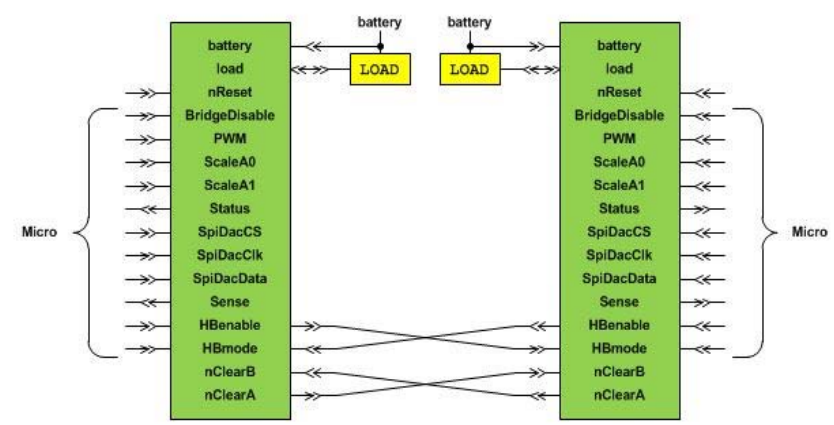


Half-Bridge Application

APP NOTES

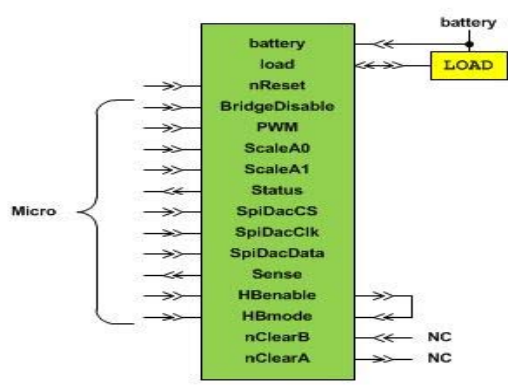


H-Bridge Application



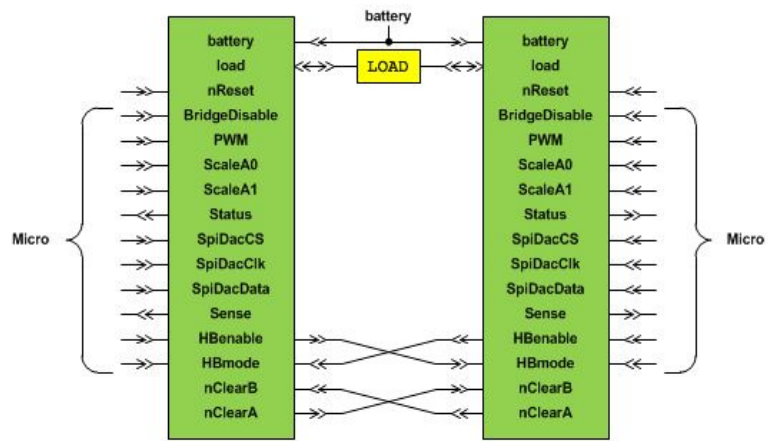
2 Half Bridge Application

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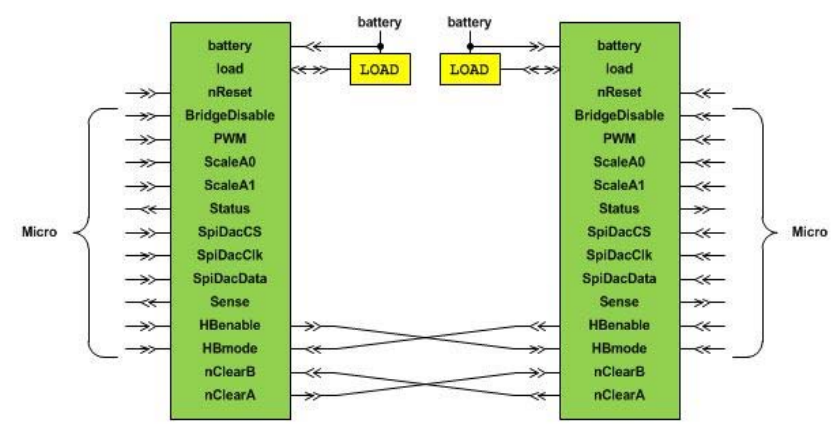


Half-Bridge Application

APP NOTES

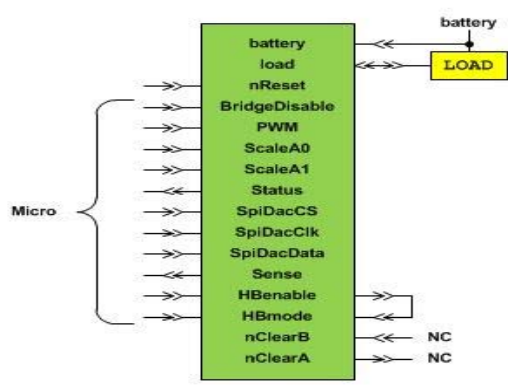


H-Bridge Application

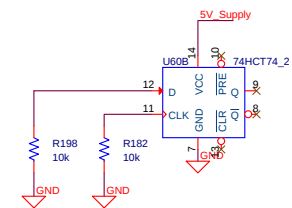
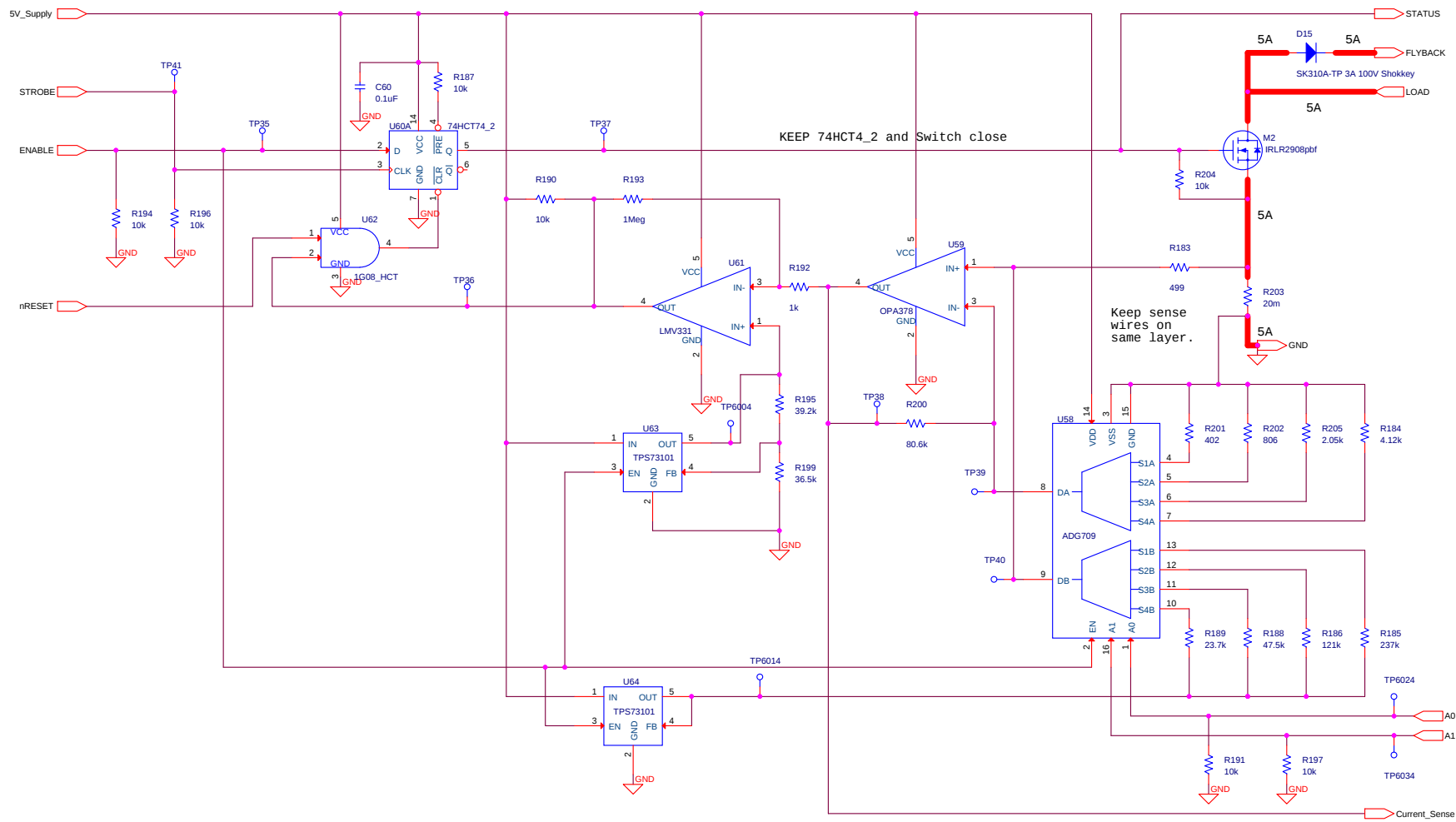


2 Half Bridge Application

Update: BridgeDisable Pull up to 5V to solve Startup issues. 9-19-13



Half-Bridge Application



REV_B: Changes -
1) Changed Schottkey to 3A (80A non-repetitive peak) Diode

LSD Schematic Path = /LSD1		
Low Side Driver Circuit		
<OrigAddr1>		
<OrigAddr2>		
<OrigAddr3>		
<OrigAddr4>		
Size	Document Number	Rev
CustomerDoc =		B
Date:	Monday, September 23, 2013	Sheet 0 of 12



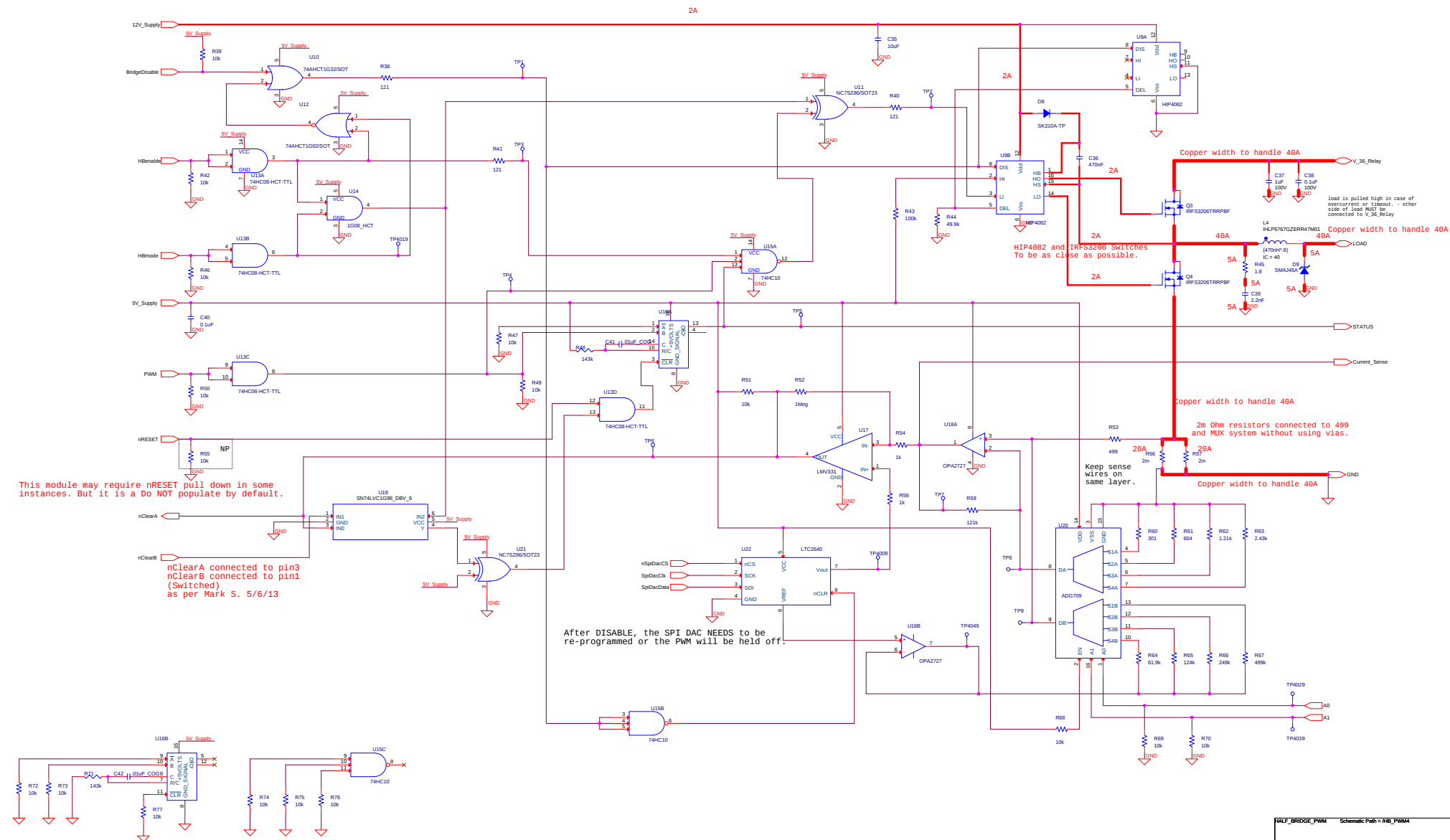
Thunderbolt Combo Board

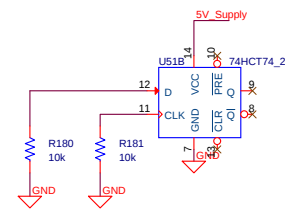
Rev A -- numerous errors
Rev B -- fixed for submission to Logic
Rev C -- Removed USB
Rev D -- Fixed Footprints. Changed Capacitors in Power Supply.
- Added missng 3.3 to JTAG

TENNANT	
Title Thunderbolt: Combo Board	
Size C	Document Number <Doc>
Date: Thursday, February 06, 2014	Sheet 1 of 12
Rev D	

LAYOUT NOTES

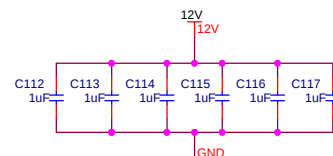
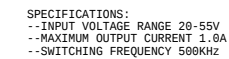
- 1) Cu 250mils wide. ~ 10A capability. Need ~40A capability @ 1 oz Cu. May change for 2 oz Cu.
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L5D Schematic Path = /L5D2 Low Side Driver Circuit <OrgAddr1> <OrgAddr2> <OrgAddr3> <OrgAddr4>			Rev B
Size	Document Number		
CustomDoc =			
Date:	Monday, September 23, 2013	Sheet 1 of 12	

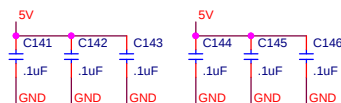
Power Supplies *+12V Supply*



BYPASSING



The diagram shows a 5V voltage regulator circuit. The input is connected to a +5V supply. The output is connected to a 5V load. The circuit includes a 10uF input capacitor (C139), a 1uF output capacitor (C131), and two 0.1uF bypass capacitors (C132 and C133). The output is labeled TP71.

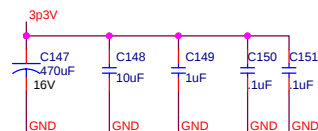


```
+5V Supply
.5A Version is QPL: Q19012-007 (T0263)
.4A Version is QPL: Q19012-011 (S0T233)
```

+3.3V Supply

The circuit diagram shows a 12V input connected to the INPUT pin (pin 1) of the LM2937ES-3.3/NOBP voltage regulator. The regulator's GND pins (pins 2 and 4) are connected to ground. The OUTPUT pin (pin 3) is connected to a 3.3V output. The circuit includes several capacitors: C134 (1uF) at the input, C135 (1uF) at the input, C136 (1uF) at the output, C137 (1uF) at the output, C138 (1uF) at the output, and C140 (10uF) at the output. Test points TP72, TP73, and TP74 are indicated. A note states: "Put near power supplies please."

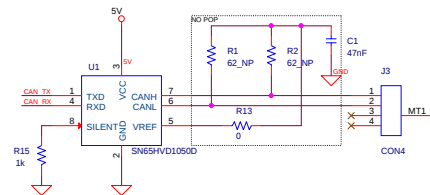
Put near
power
supplies
please.



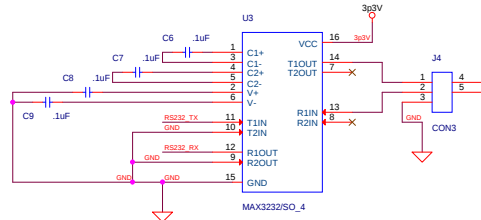
+3.3V Supply
.5A Version is QPL: Q19012-006 (T0263)
.4A Version is QPL: Q19012-010 (S0T233)

POWER_SUPPLIES Schematic Path = /POWER_SUPPLIES1			
Title Power Supplies Module			
Size B	Document Number <Doc>		Rev ?
Date:	Monday, September 23, 2013	Sheet	1 of 12

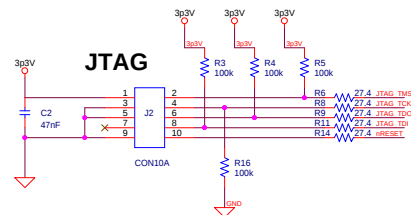
CAN COMMUNICATIONS



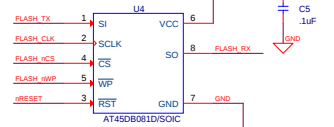
RS-232 SERIAL PORT



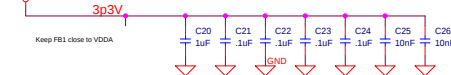
JTAG



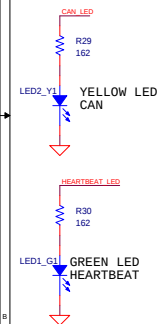
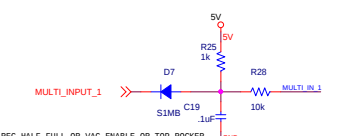
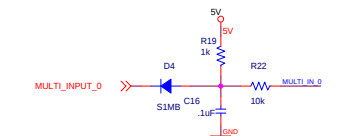
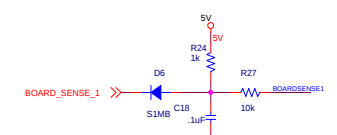
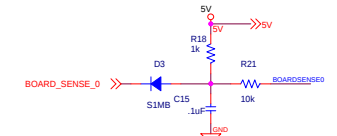
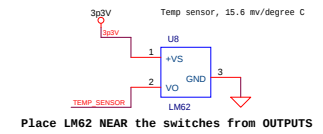
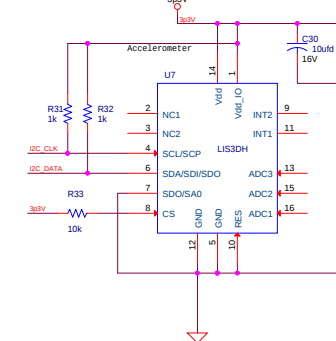
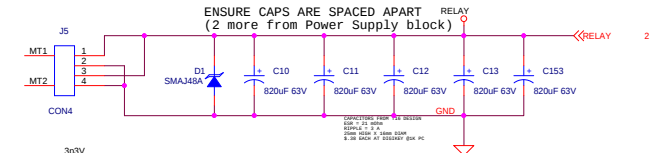
FLASH



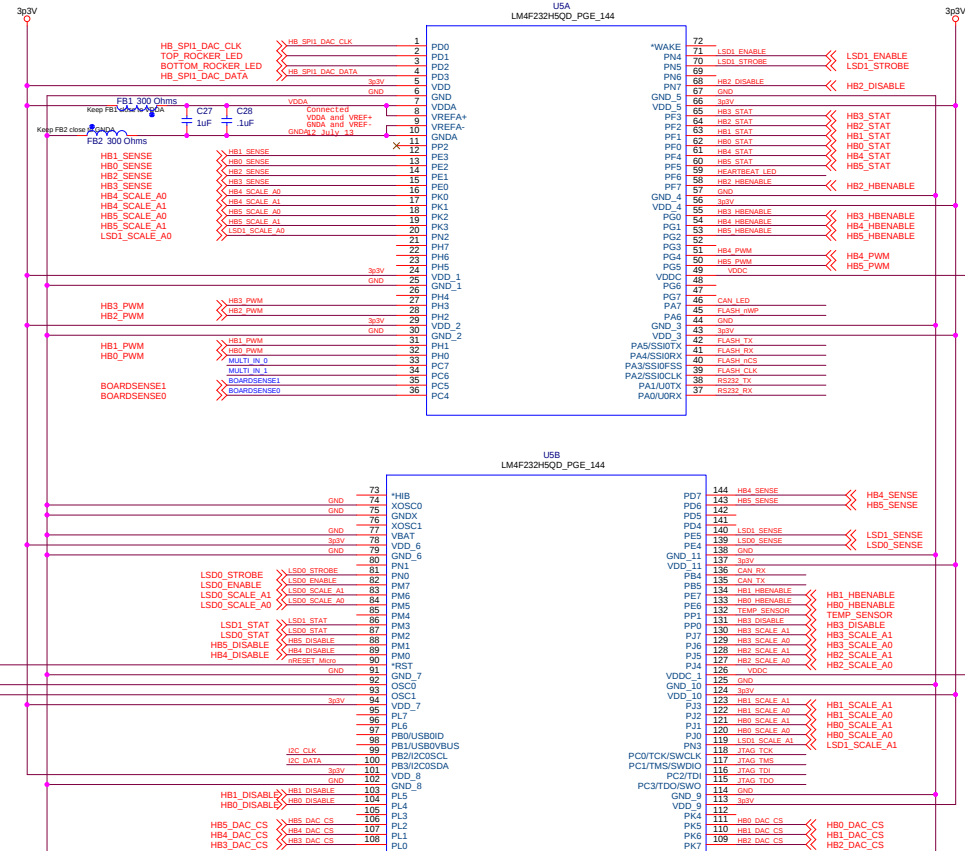
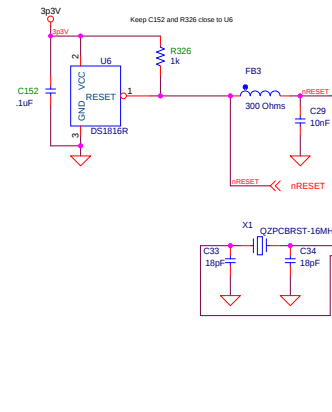
De-coupling Capacitors for the Micro.



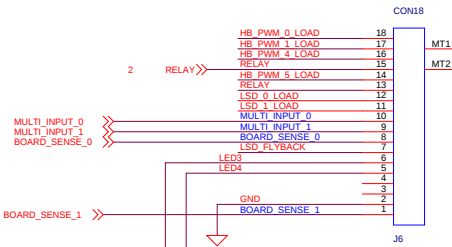
USB - Removed as Per Angela Forrest 3/6/13 CAH



R326 and C152
ADDED 07/03/13 CAH



TENANT			
Title Thunderbolt: Combo Board			
Size	Document Number	Rev D	
Custom	<Doc>		
Date:	Thursday, February 06, 2014	Sheet	2 of 12



CHECK Base Emitter PADS on Q1 and Q2

