



ON Semiconductor®

NCxx164A

Strata Enabled Adjustable LDO

Variant Name = NCP164A DFN6

Comment Legend

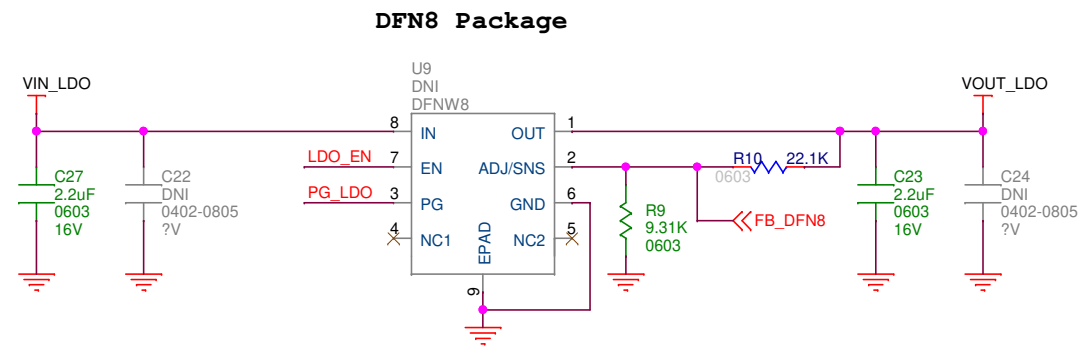
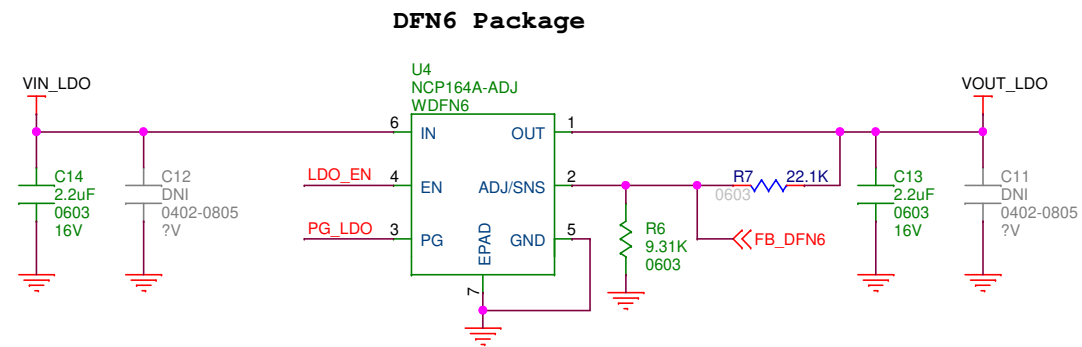
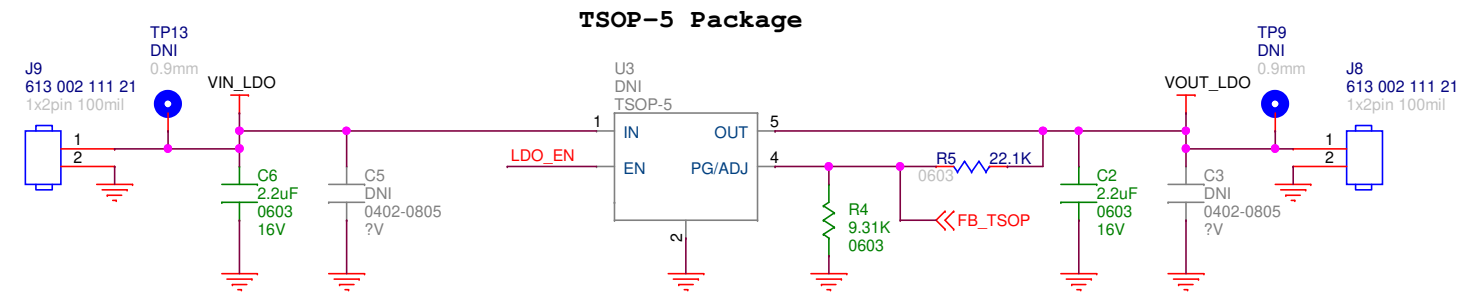
- Description**
Description of circuit that is intended to be evaluated with this PCB.
- Optional**
Circuits that customer could optionally implement yet do not affect PCB purpose.
- Not Required**
Circuits that support the Strata ecosystem that customer would not implement.

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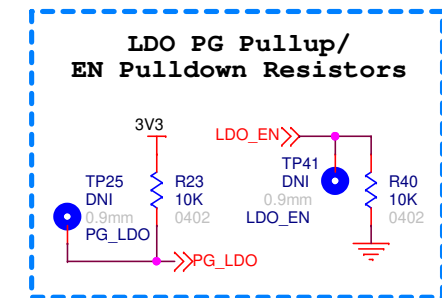
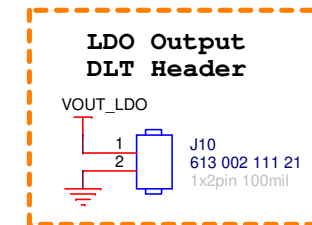
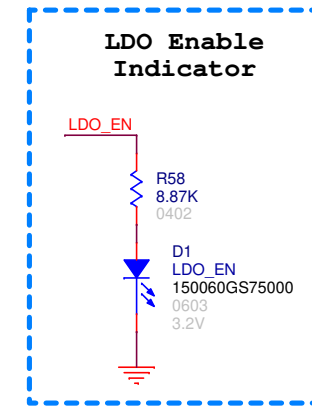
NCxx164A Adjustable LDO

Note - There are six BOM variants:

- NCP164A TSOP5
- NCP164A DFN6
- NCP164A DFN8
- NCV8164A TSOP5
- NCV8164A DFN6
- NCV8164A DFN8



Max input voltage = 5.5V
 Min input voltage = 1.6V
 Output voltage adjusted via Strata interface (see Strata Control page)
 Max rated output current = 300 mA
 No PG output for adjustable TSOP-5 version
 LDO_EN pin is pulled low so LDOs are off at startup
 1 uF Cin/Cout datasheet recommended values
 No minimum Cout ESR requirement for stability

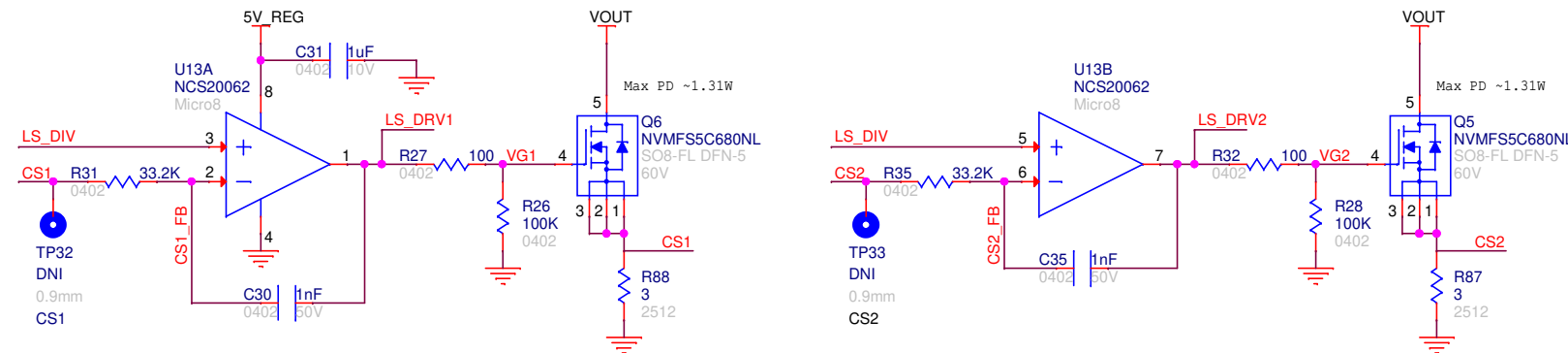


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Strata Control

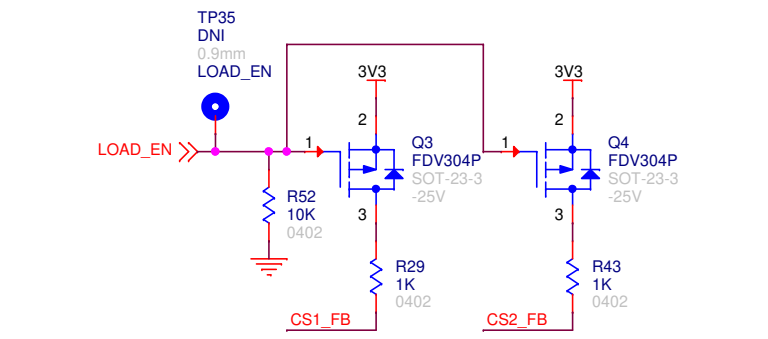
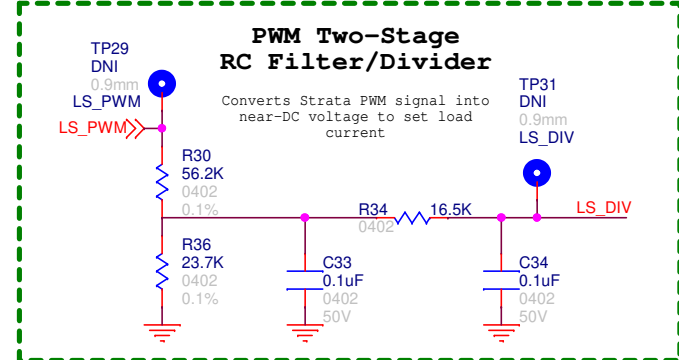
650mA Max Adjustable Onboard Load



$$I_{OUT} = 0.297 * (LS_PWM \text{ amplitude}) * [(LS_PWM \text{ duty cycle}) / 100]$$

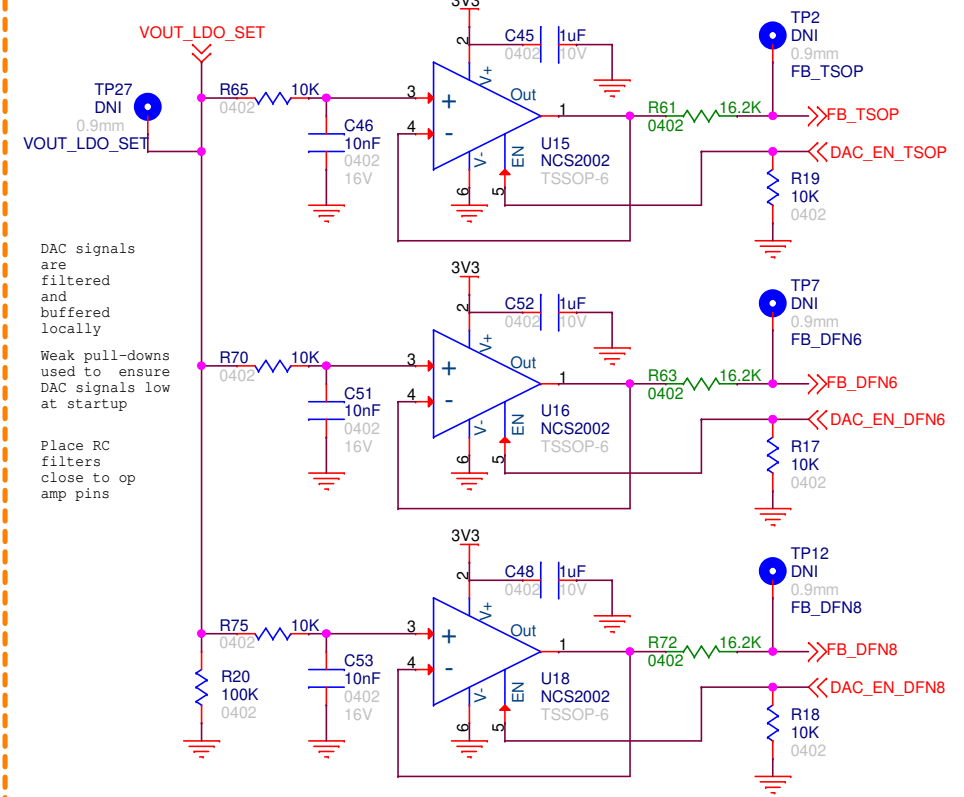
$$I_{OUT} = 2 * (LS_DIV / 3) = 0.198 * (LS_PWM \text{ amplitude}) * [(LS_PWM \text{ duty cycle}) / 100]$$

For PWM frequency = 10 kHz, MCU clock = 48 MHz, IOUT resolution = ~136 uA
RC filter cutoff frequency = ~100 Hz



Used to turn off onboard load quickly. Also forces load circuit off at startup

LDO/Buck Output Voltage Set

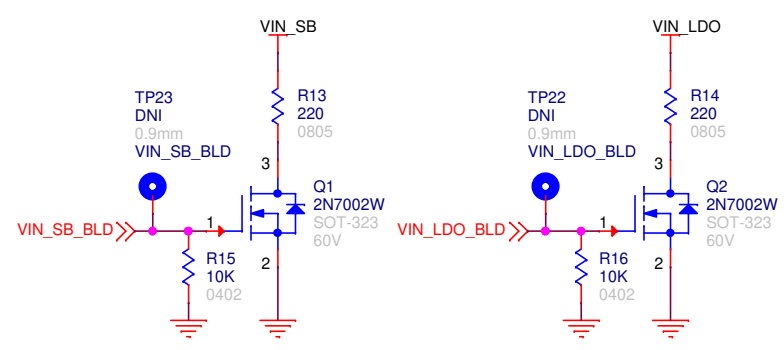


DAC signals are filtered and buffered locally
Weak pull-downs used to ensure DAC signals low at startup
Place RC filters close to op amp pins

VOUT_LDO_SET range: 0.1V - 3V
VOUT_LDO range:
1.1V - 5.2V NCP164A
1.2V - 5.2V NCV8164A

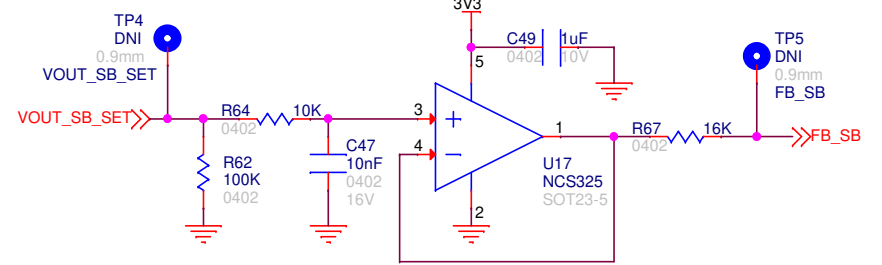
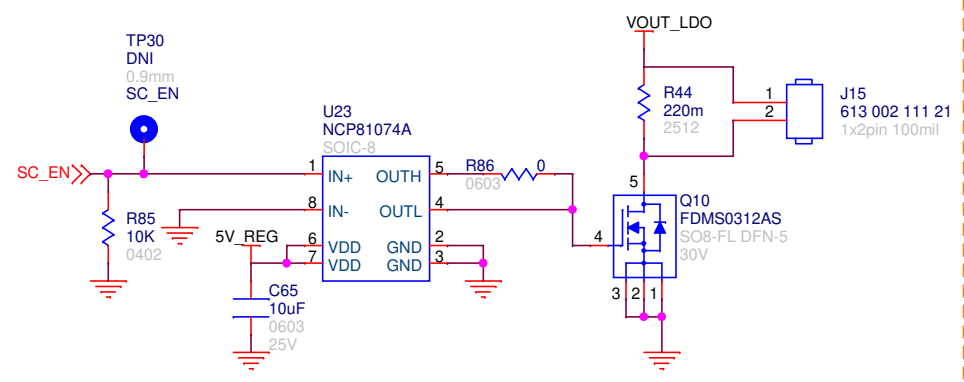
Bleed Circuits

Allow manual bleeding off of charge at VIN_SB/VIN_LDO nodes if load switches are disabled



Short Circuit Load

This is meant to short the output to test LDO current limiting



VOUT_SB_SET range: 0.1V - 3V
VOUT_SB range:
1.6V - 5.5V

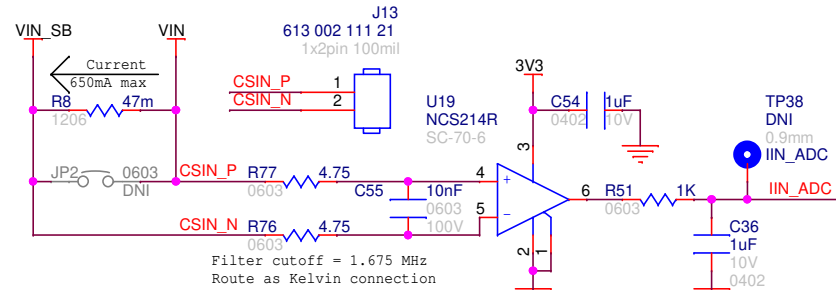
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Embedded Interface/Telemetry

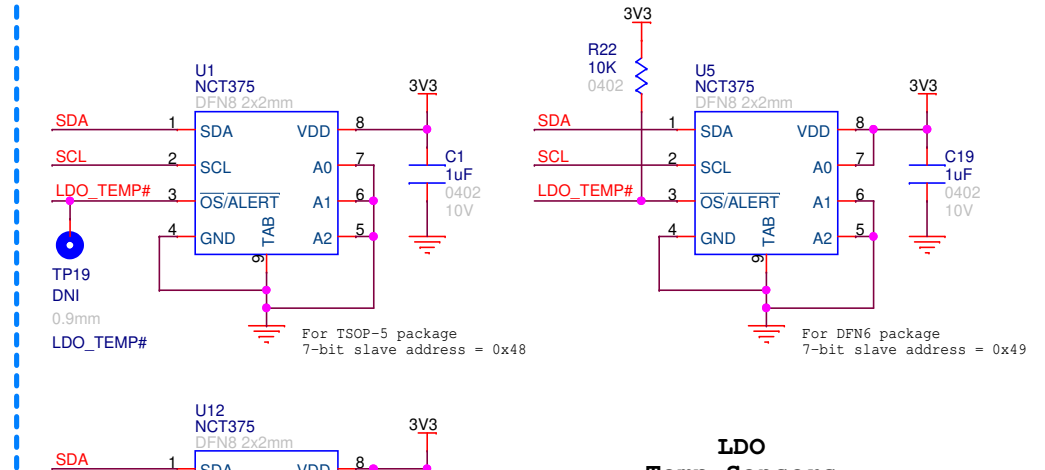
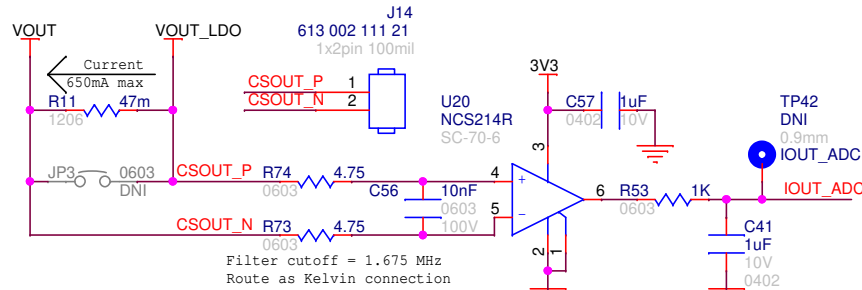
Input Current Sense

NCS214R gain = 100V/V
Output signal range 3.06V
Max input signal 30.6mV
Output filter cutoff = 159 Hz



Output Current Sense

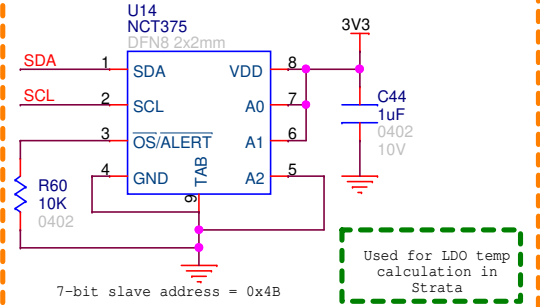
NCS214R Gain = 100V/V
Output signal range 3.06V
Max input signal 30.6mV
Output filter cutoff = 159 Hz



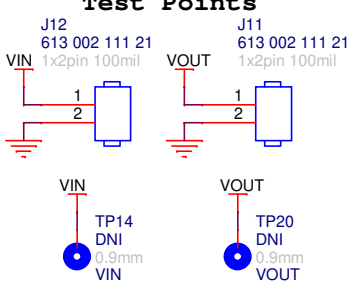
LDO Temp Sensors

Monitor temperatures of LDO ground pads. LDO_TEMP# is interrupt to alert MCU when temperature is over threshold.

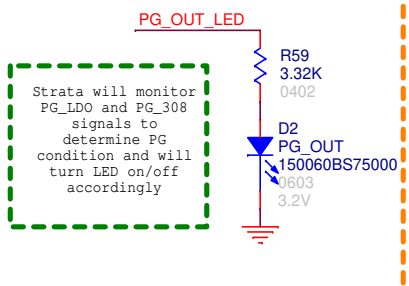
Ambient Temp Sensor



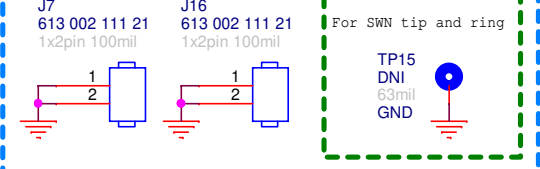
Input/Output Voltage Test Points



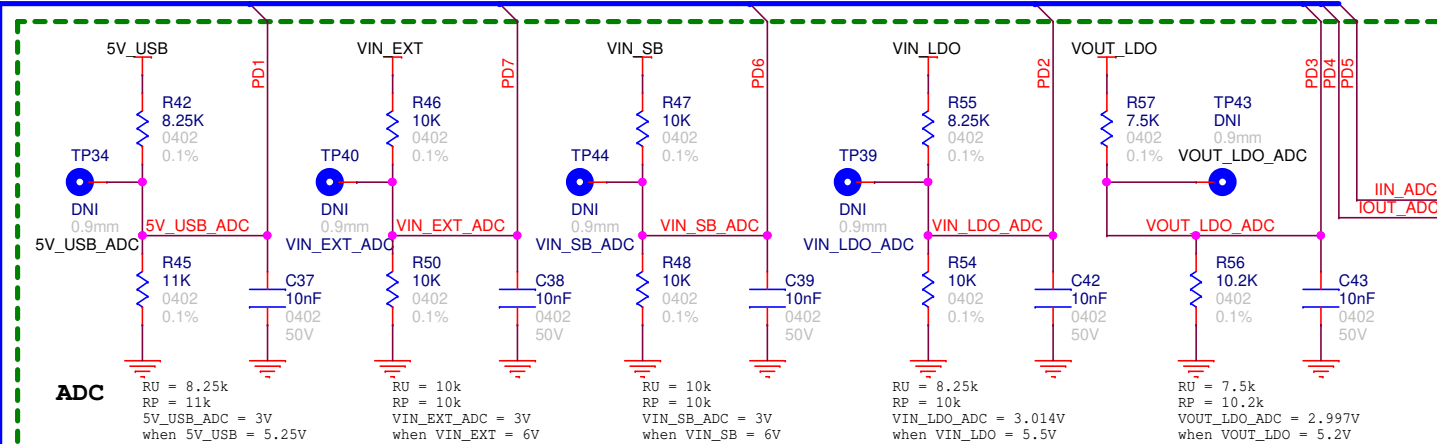
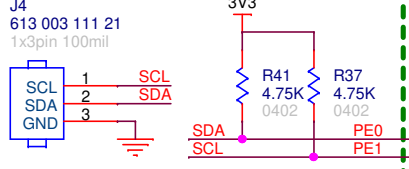
Output Power Good Indicator



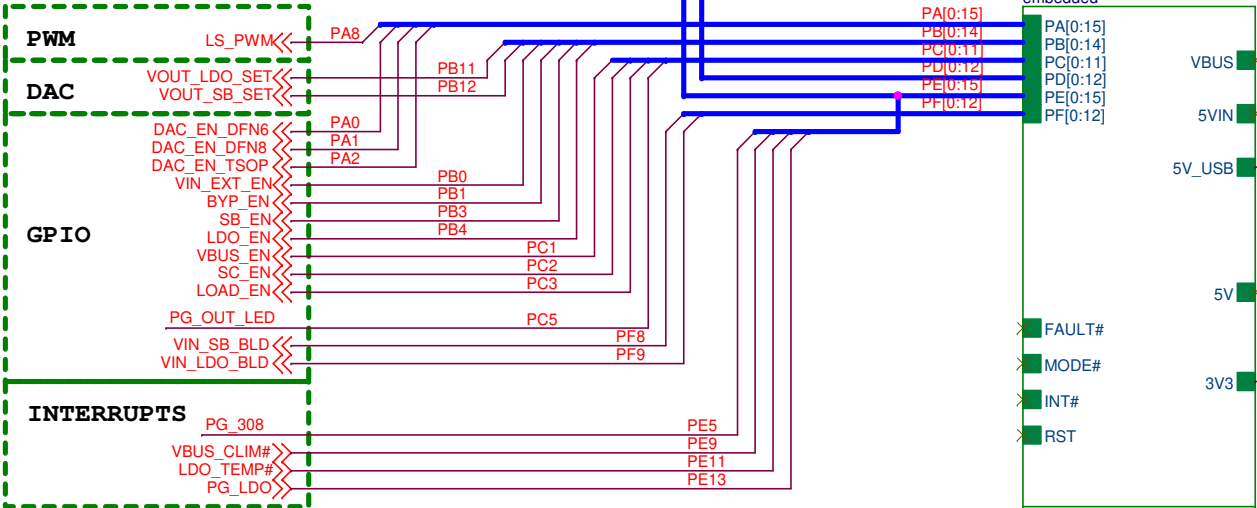
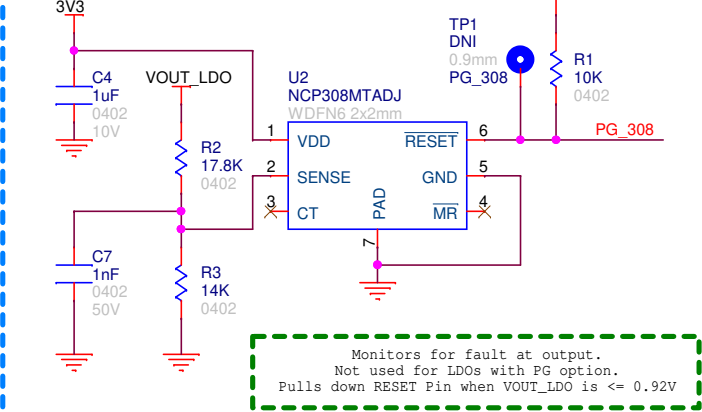
Ground Test Points



I2C



Output Voltage Fault Monitor



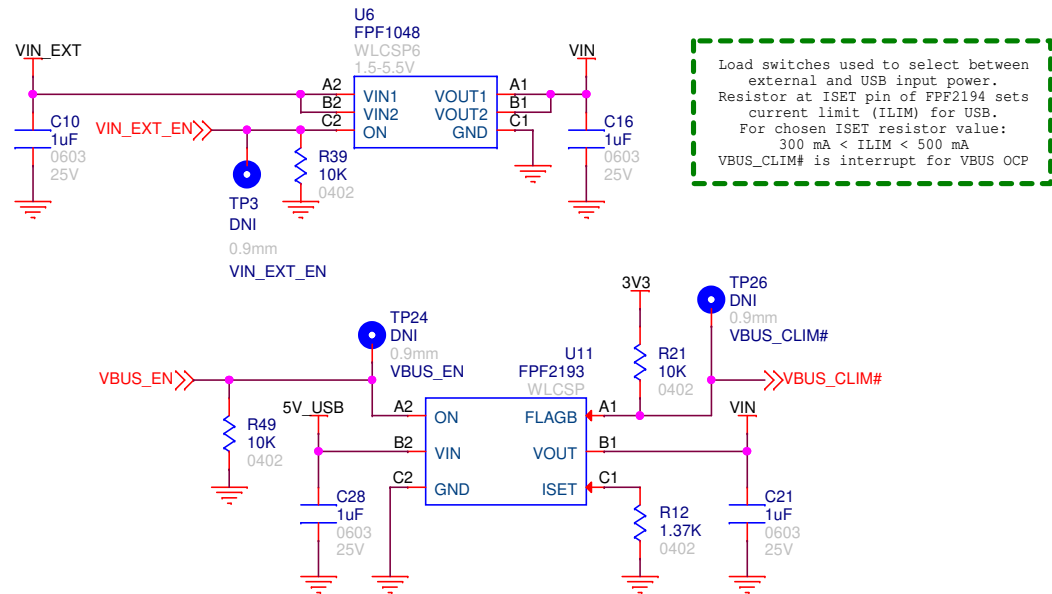
Port pins being used by Strata
DO NOT USE THESE PINS!!
PA = None
PB = 7, 8, 9, 10, 13, 14
PC = None
PD = None
PE = 10, 14, 15
PF = 0, 1, 2, 3, 4, 5

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Power/Load Switches/Connectors

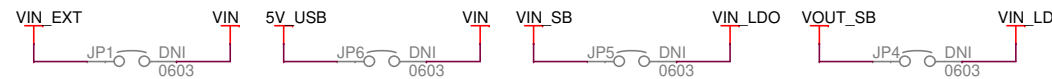
External/VBUS Input Power Selection



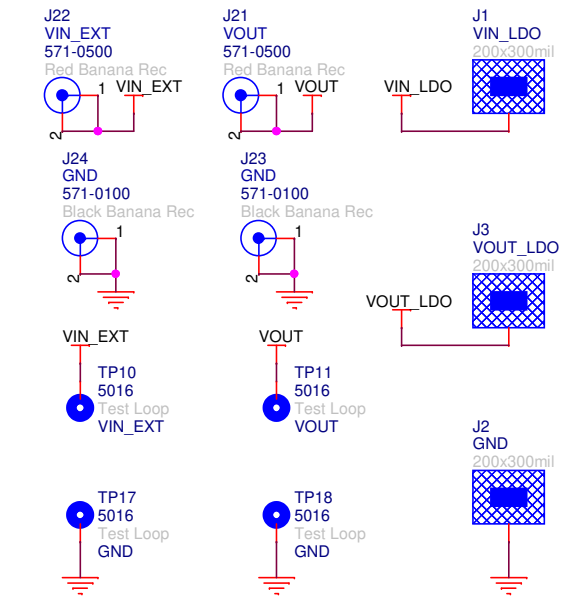
LDO Input Power Configurations

VIN_EXT_EN	VBUS_EN	BYP_EN	SB_EN	LDO Input
LOW	LOW	-	-	Pulled low or solder pad input
-	-	LOW	LOW	Pulled low or solder pad input
LOW	HIGH	LOW	HIGH	Buck regulator step-down from USB 5V
LOW	HIGH	HIGH	LOW	USB 5V
HIGH	LOW	LOW	HIGH	Buck regulator step-down from external input
HIGH	LOW	HIGH	LOW	External input (VIN_EXT)
-	-	HIGH	HIGH	Not allowed
HIGH	HIGH	-	-	Not allowed

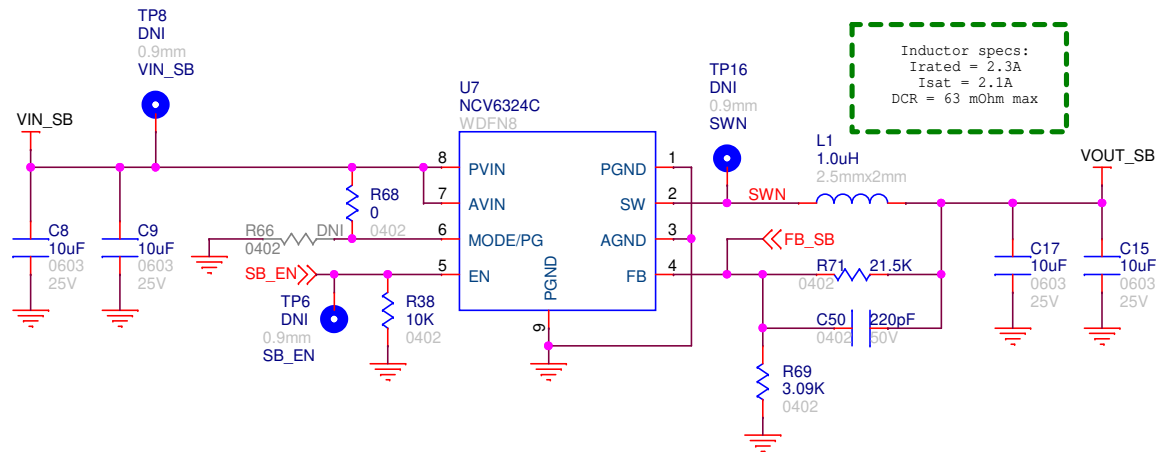
Load Switch Bypass Jumpers



External Power Connectors

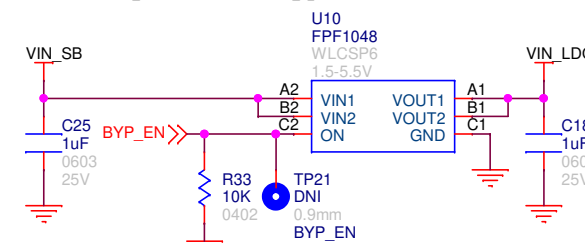


LDO Input Voltage Control NCV6324 Sync Buck with Adjustable Output Voltage

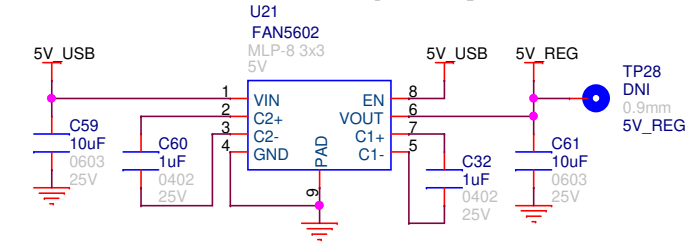


Input voltage range: 2.5V - 5.5V
 Designed for IOUT max = 1A
 Fsw = 3 MHz
 SB_MODE = HIGH -> Forced PWM mode
 SB_MODE = LOW -> Auto PWM/PFM mode
 Output voltage adjusted via Strata interface (see Strata Control page).
 Allows user to adjust LDO input voltage via Strata using fixed USB 5V or external input voltage

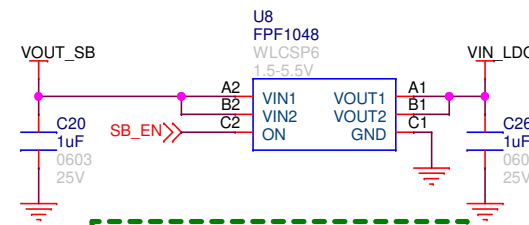
Sync Buck Bypass Switch



5V LDO/Charge Pump



Sync Buck Output Enable Switch



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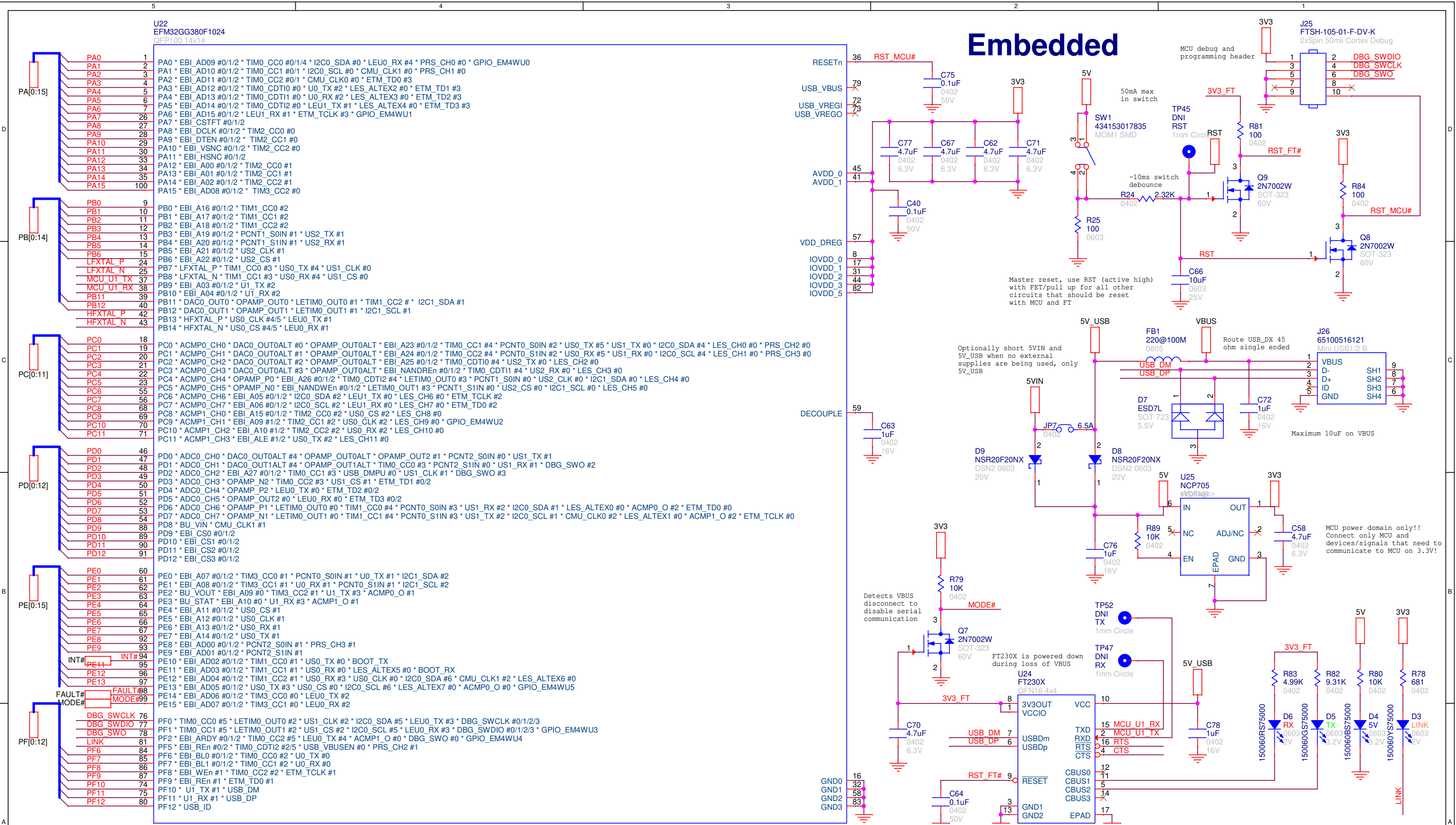
Title
Power/Load Switches/Connectors

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U22
EFM32GG380F1024
QFP100 14x14

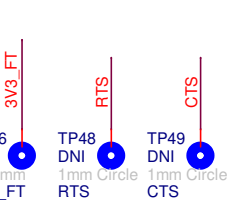
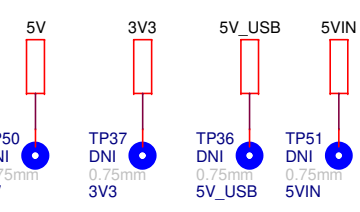
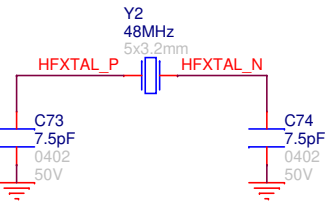
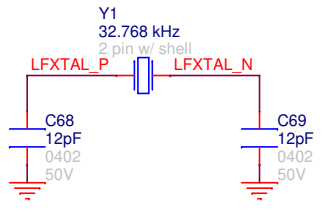
Embedded

J25
FTSH-105-01-F-DV-K
2x5pin 50mil Cortex Debug

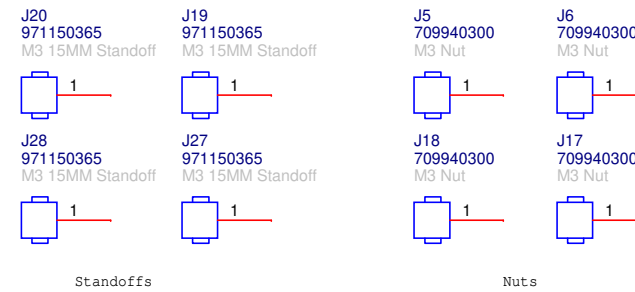
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Mounting Holes, Standoffs, and Nuts



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