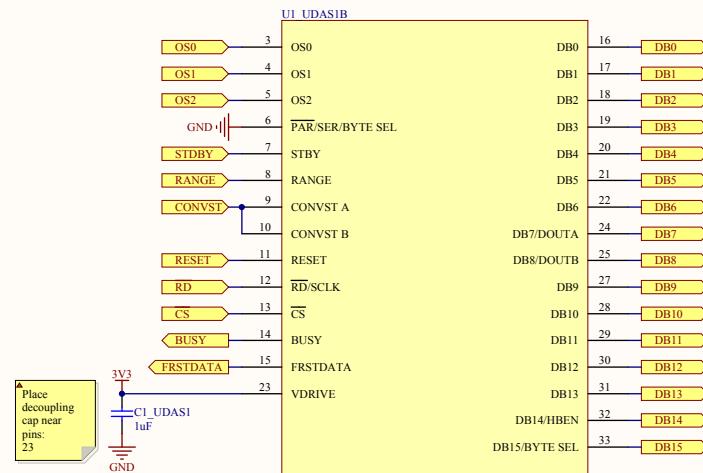
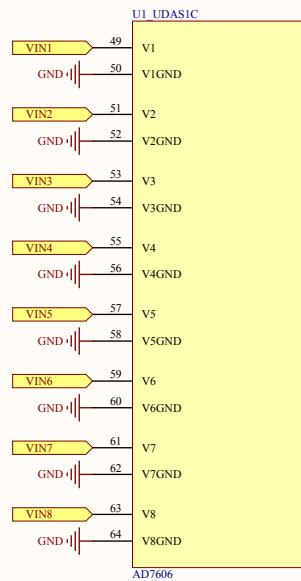
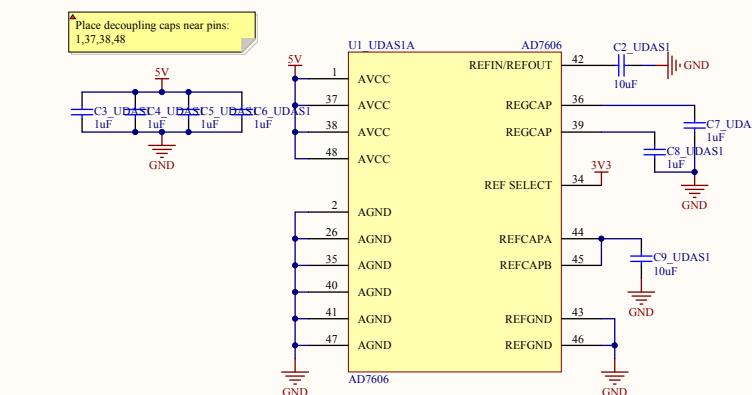


A



B



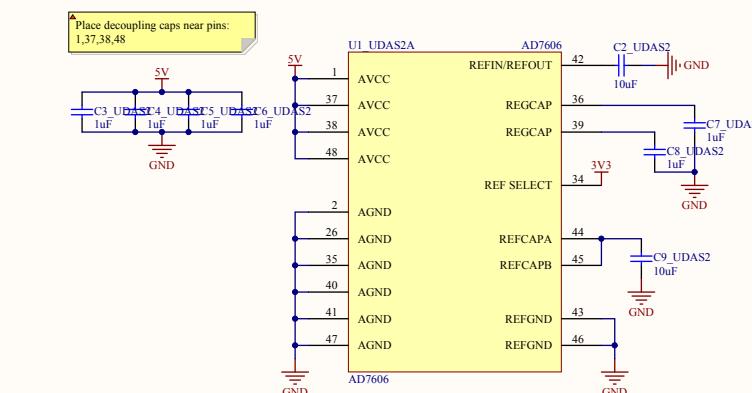
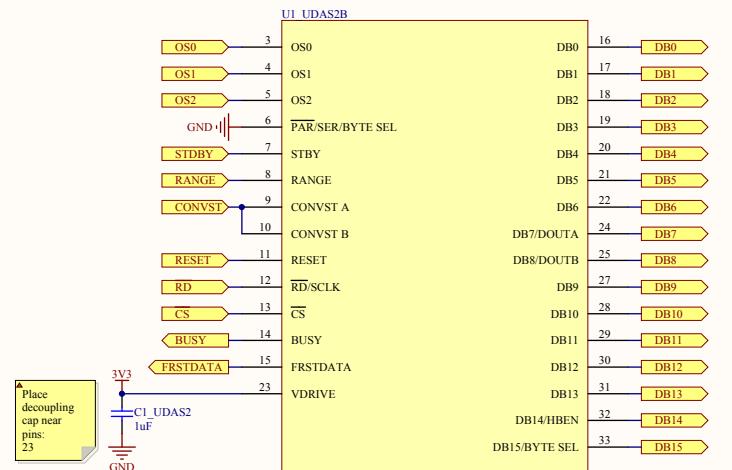
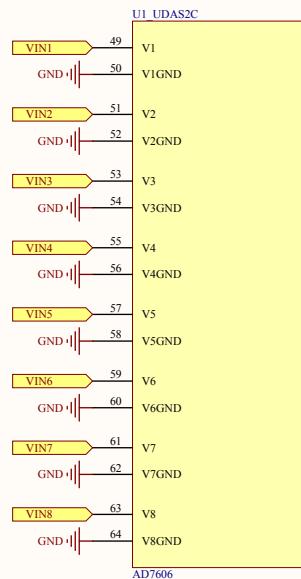
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D



Data Aquisition System		
Size	Number	Revision
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Date:	8/29/2012	Sheet of 1 of N
File:	C:\Users\.\DataAquisitionSystem.SchDoc	Drawn By: Henry Herman

A

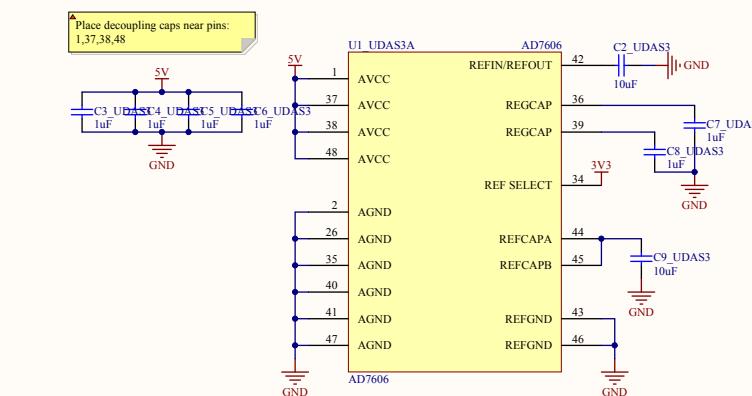
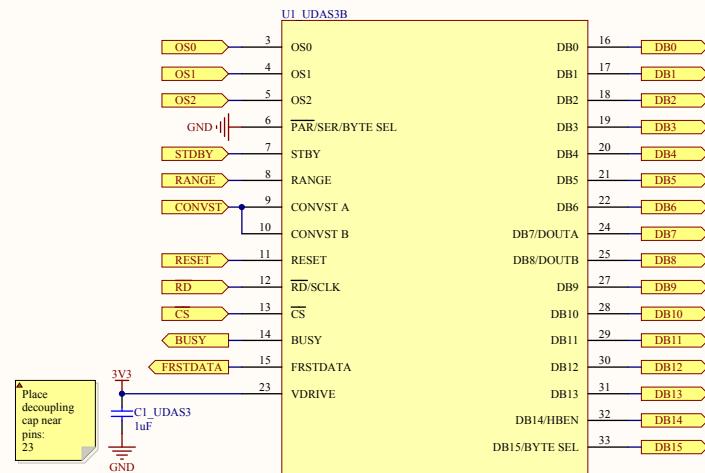
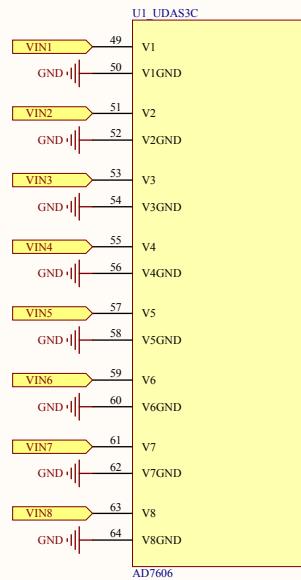


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Title: Data Aquisition System
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Date: 8/29/2012 Sheet of 1 of N
File: C:\Users\.\DataAquisitionSystem.SchDoc Drawn By: Henry Herman

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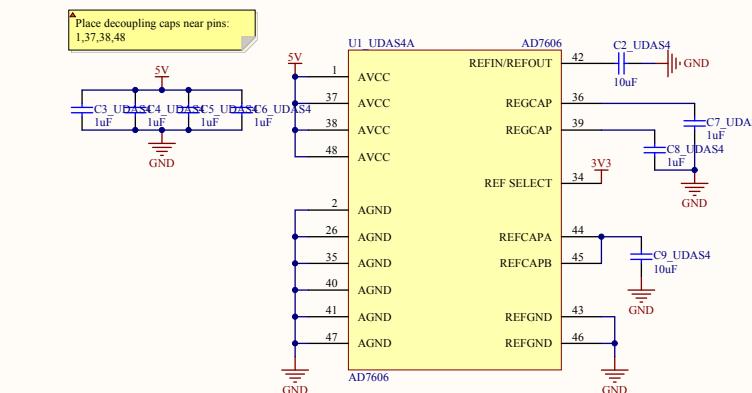
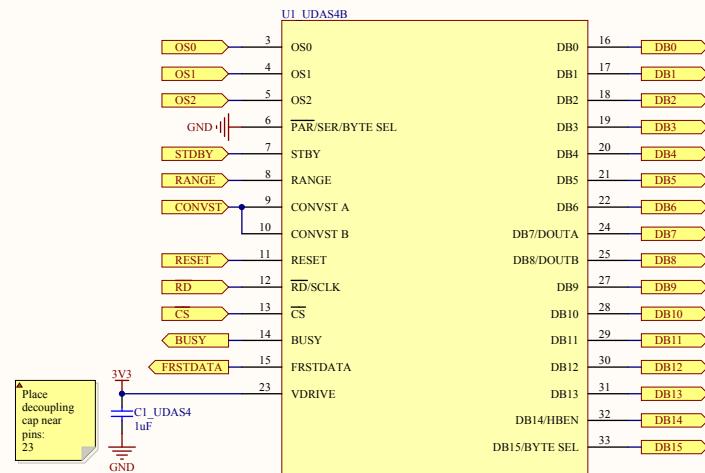
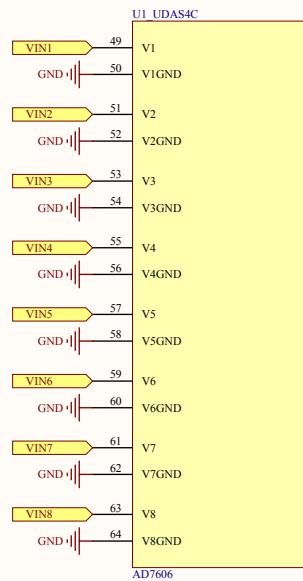
NESL Networked & Embedded Systems Laboratory



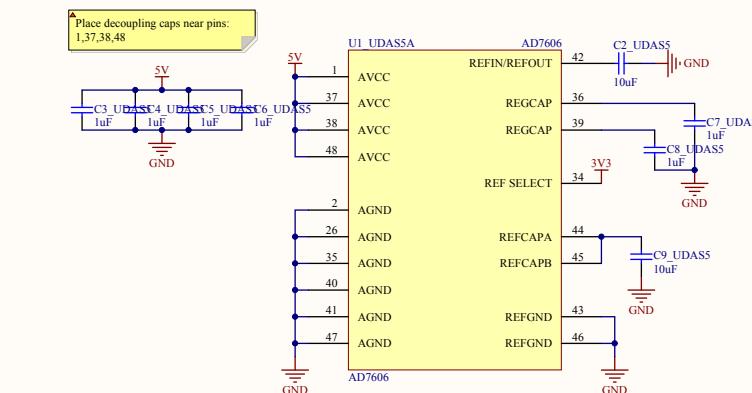
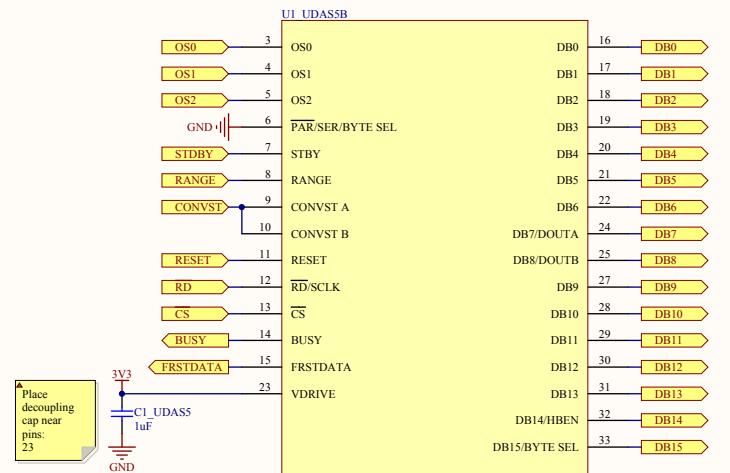
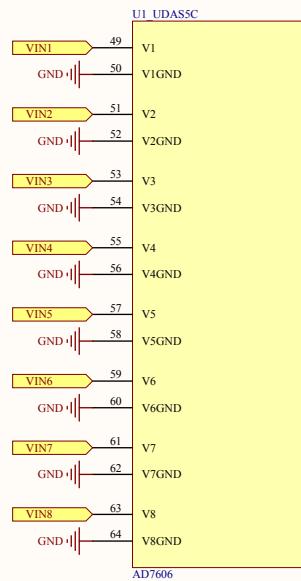
Data Aquisition System

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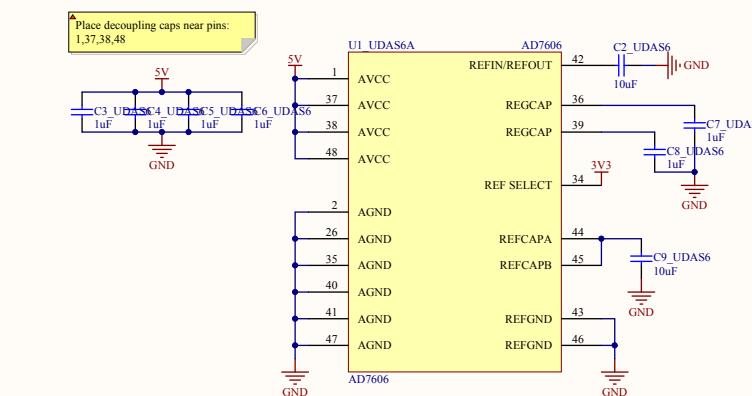
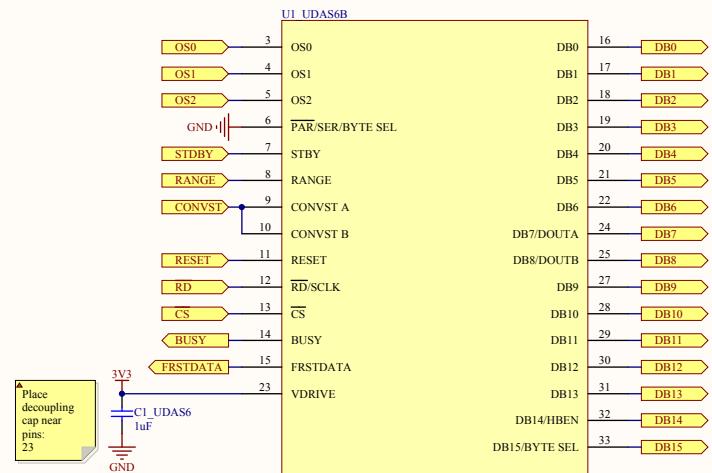
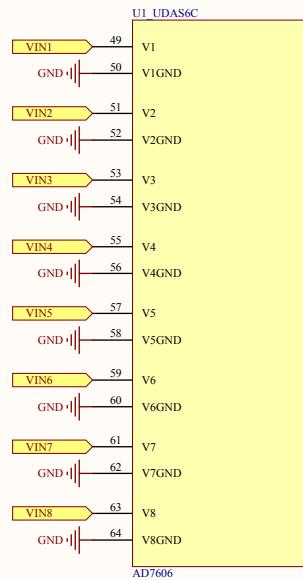


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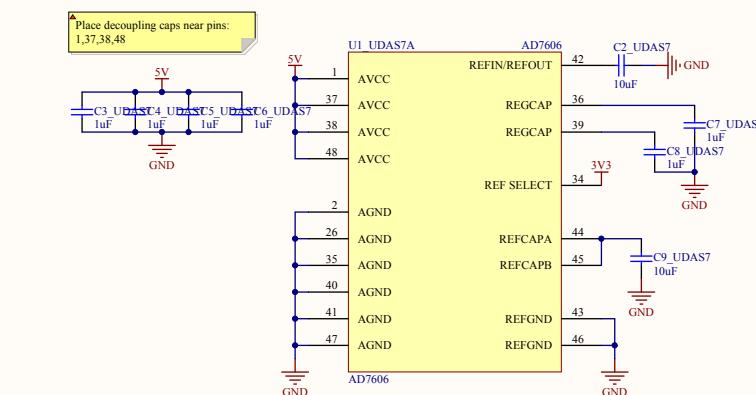
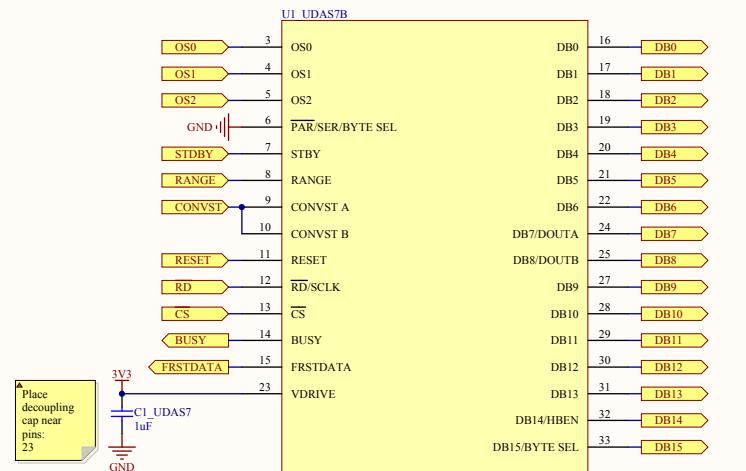
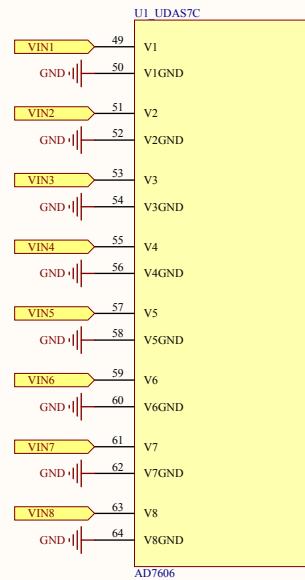
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Title		Revision
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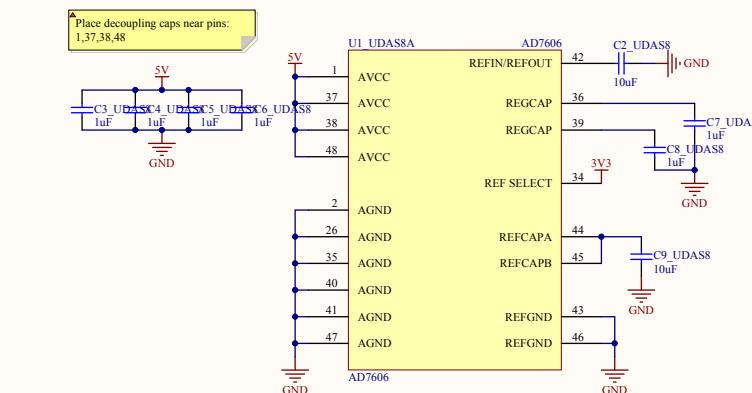
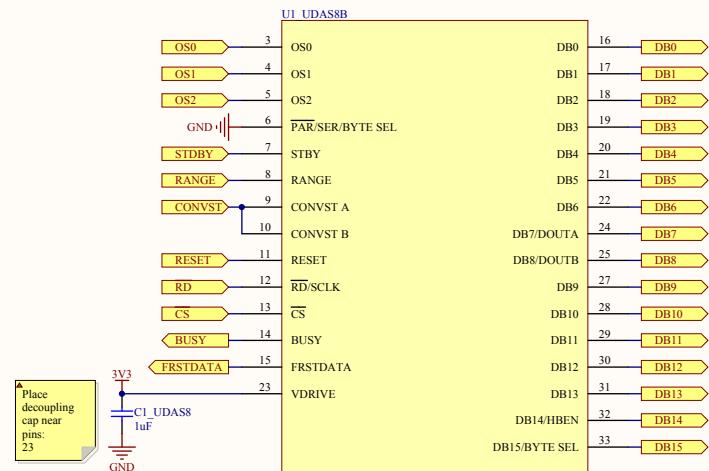
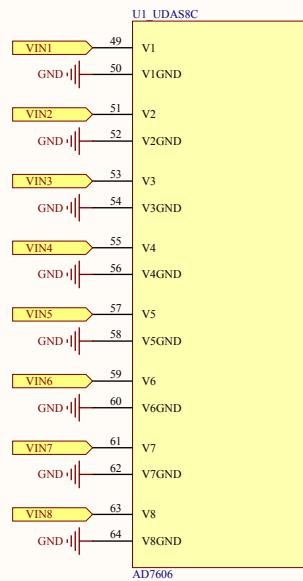


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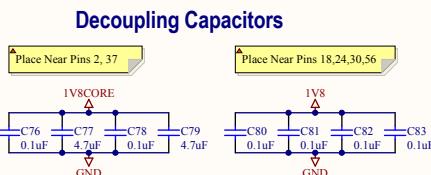


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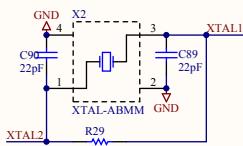
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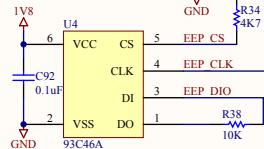
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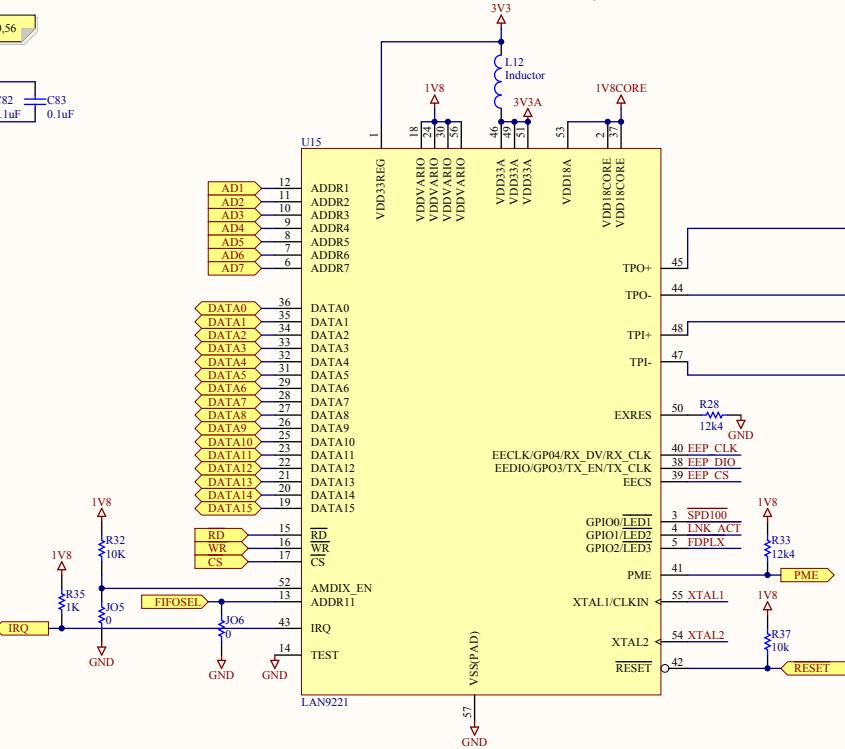
LAN Crystal



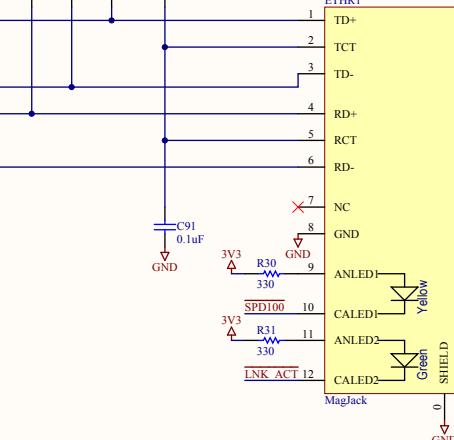
MACEEPROM



10/100 Ethernet Controller, 16-bit



MagJack Ethernet Connector

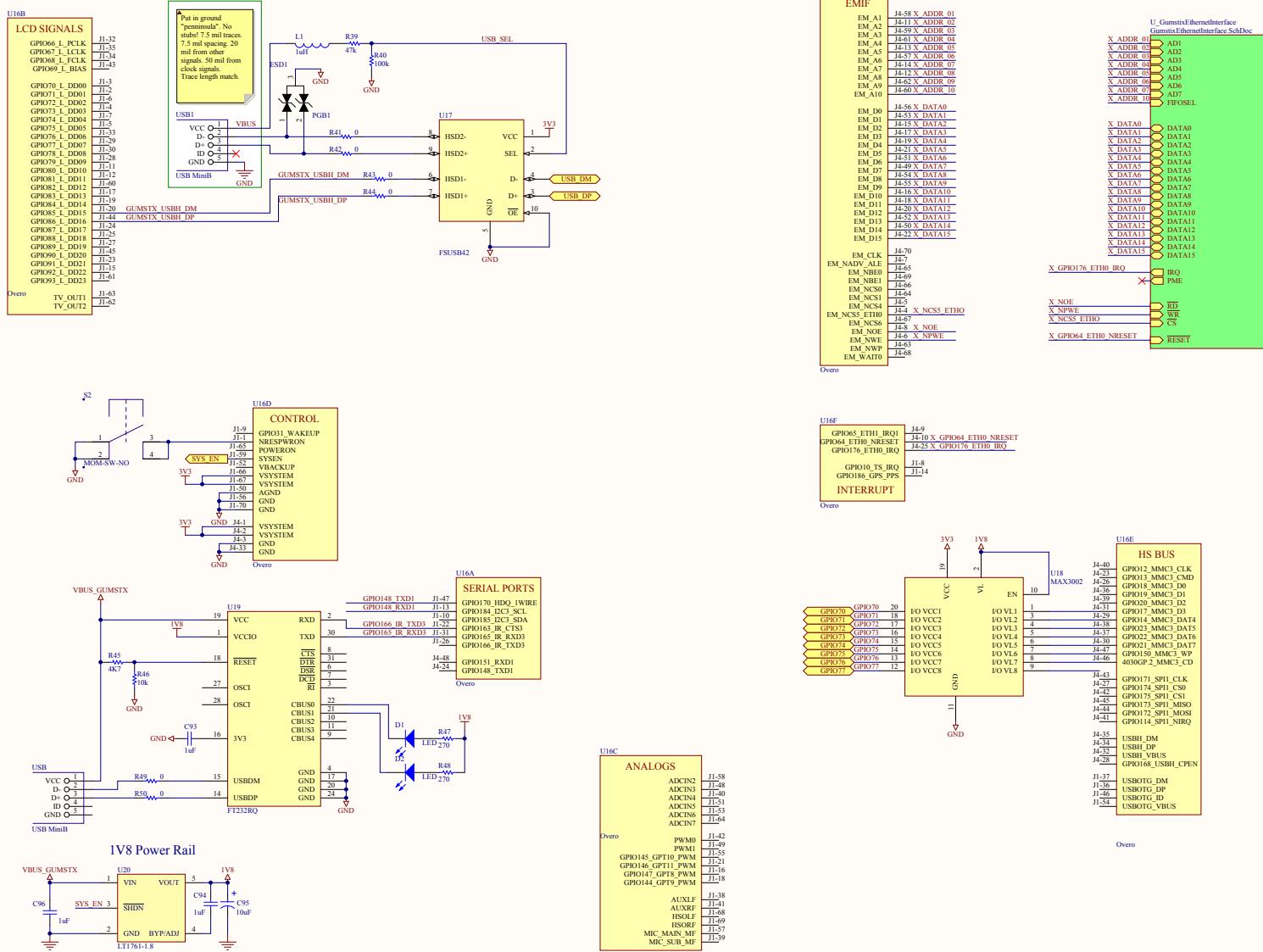


The logo consists of a blue gear icon above the text "open hardware".

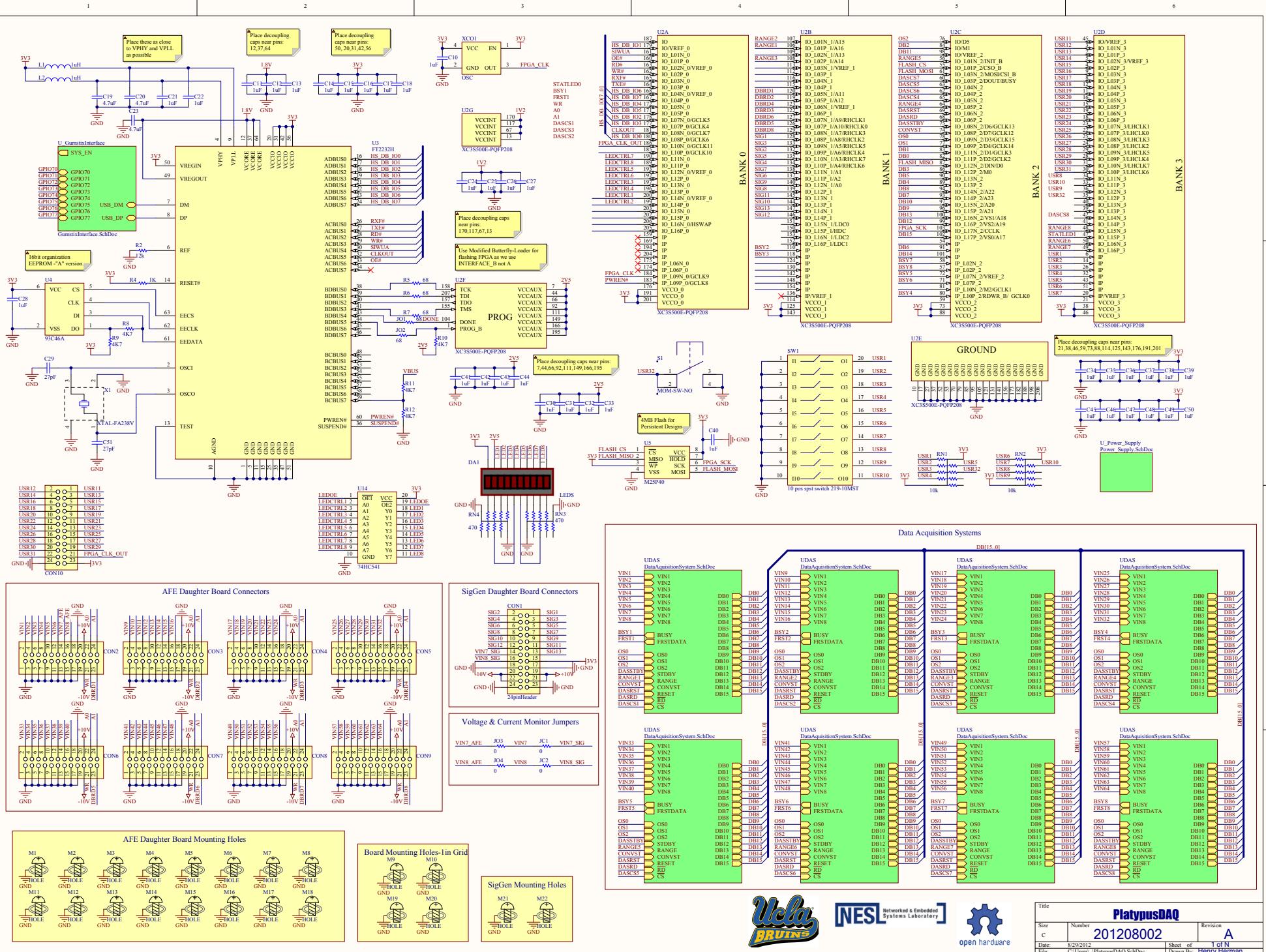
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4

10



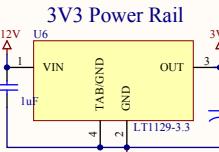
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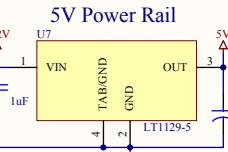
1 2 3 4 5 6

Digital Power Rails

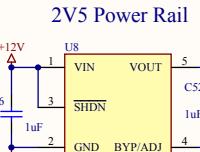
3V3 Power Rail



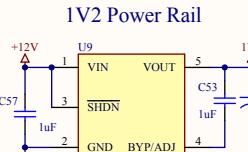
5V Power Rail



2V5 Power Rail

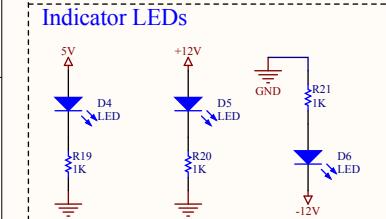


1V2 Power Rail



Switching Positive and Inverting Regulators

Indicator LEDs



Design Notes

The goal of this power supply design is to boost and invert the voltage supplied by a 4.2V lithium-ion battery.

The signal generator will use +10/-10 volts rails. Along with a 3.3V rail for logic.

The boost and inverting regulation is done by two switching ICs from Linear Tech. The LT1370 is a BEAST of a regulator with internal 6A switch!!! They use a fixed switching frequency of 500kHz. The datasheet shows a output efficiency above 80%. The voltage from the switching regulators is set to +8V and -8V.

The second stage regulation uses a pair of LDO regulators. The LM2941 positive and LM2991 negative regulator from National Semiconductor. Both chip provide current in excess of 1A. This should be enough to power the second stage amplifier of the Signal Generator. It was difficult to find LDO Regulators capable of this type of current without resorting to current bypass topologies. There is a very similar circuit in the LM2991 datasheet under "Typical Applications", it was used for reference.

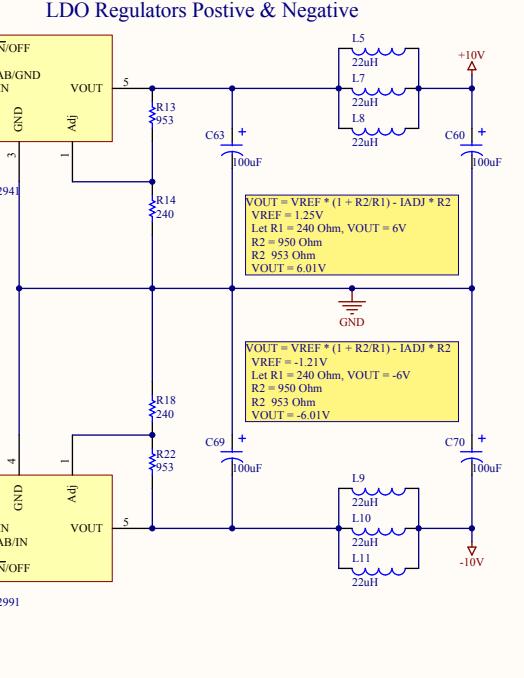
A third LDO, the LT1129-3.3 from Linear Technology, creates the logic rail 3.3V supply.

$V_{OUT} = VNFB(1+R1/R2) + INF(B1)$
 $VNFB = -2.48V, R2 = 2.49k, VOUT = -12V$
 $R1 = (VOUT + 2.48V) / (2.48k/R2) + (30e10-6)$
 $R1 = 9378 \text{ Ohms}$
 $R1 = 5.36k$
 $VOUT = -11.92V$

LDO Regulators Positive & Negative

LDO Regulators Positive & Negative

NOTE For additional design reference please see LM2991 Datasheet page 8, "Typical Applications" Figure 2.



$V_{OUT} = VREF(1+R1/R2) - IADJ * R2$
 $VREF = 1.25V$
 $\text{Let } R1 = 240 \text{ Ohm, } VOUT = 6V$
 $R2 = 950 \text{ Ohm}$
 $R2 = 953 \text{ Ohm}$
 $VOUT = 6.01V$

$V_{OUT} = VREF(1+R1/R2) - IADJ * R2$
 $VREF = 1.21V$
 $\text{Let } R1 = 240 \text{ Ohm, } VOUT = -6V$
 $R2 = 950 \text{ Ohm}$
 $R2 = 953 \text{ Ohm}$
 $VOUT = -6.01V$



Power Supply

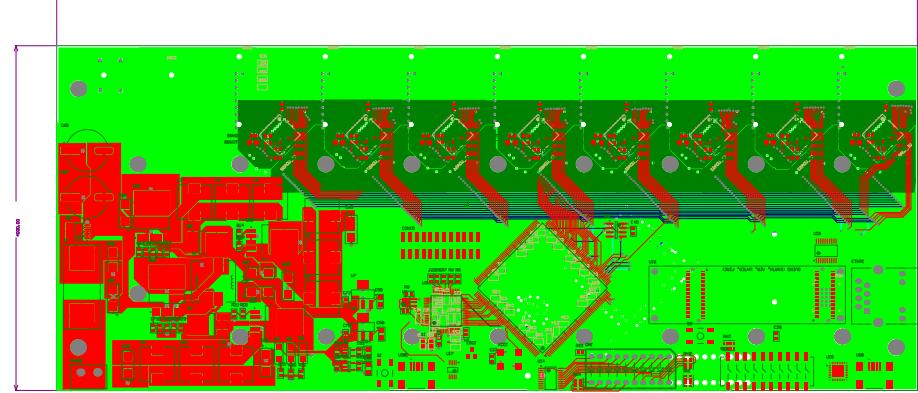
201208003

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1 2 3 4 5 6



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QA				
MFG				
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