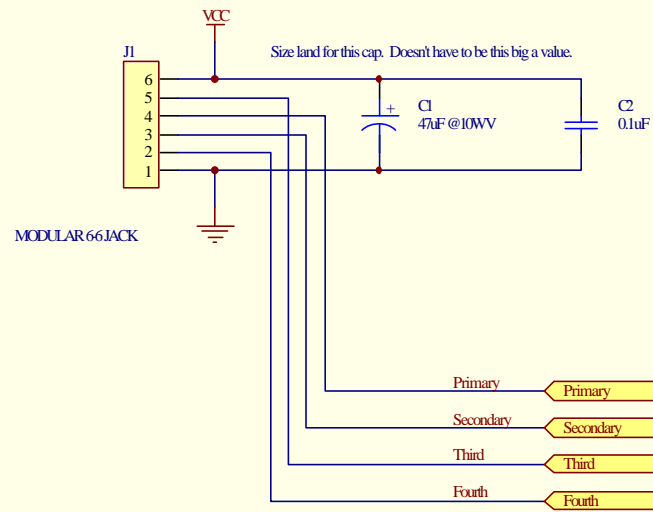


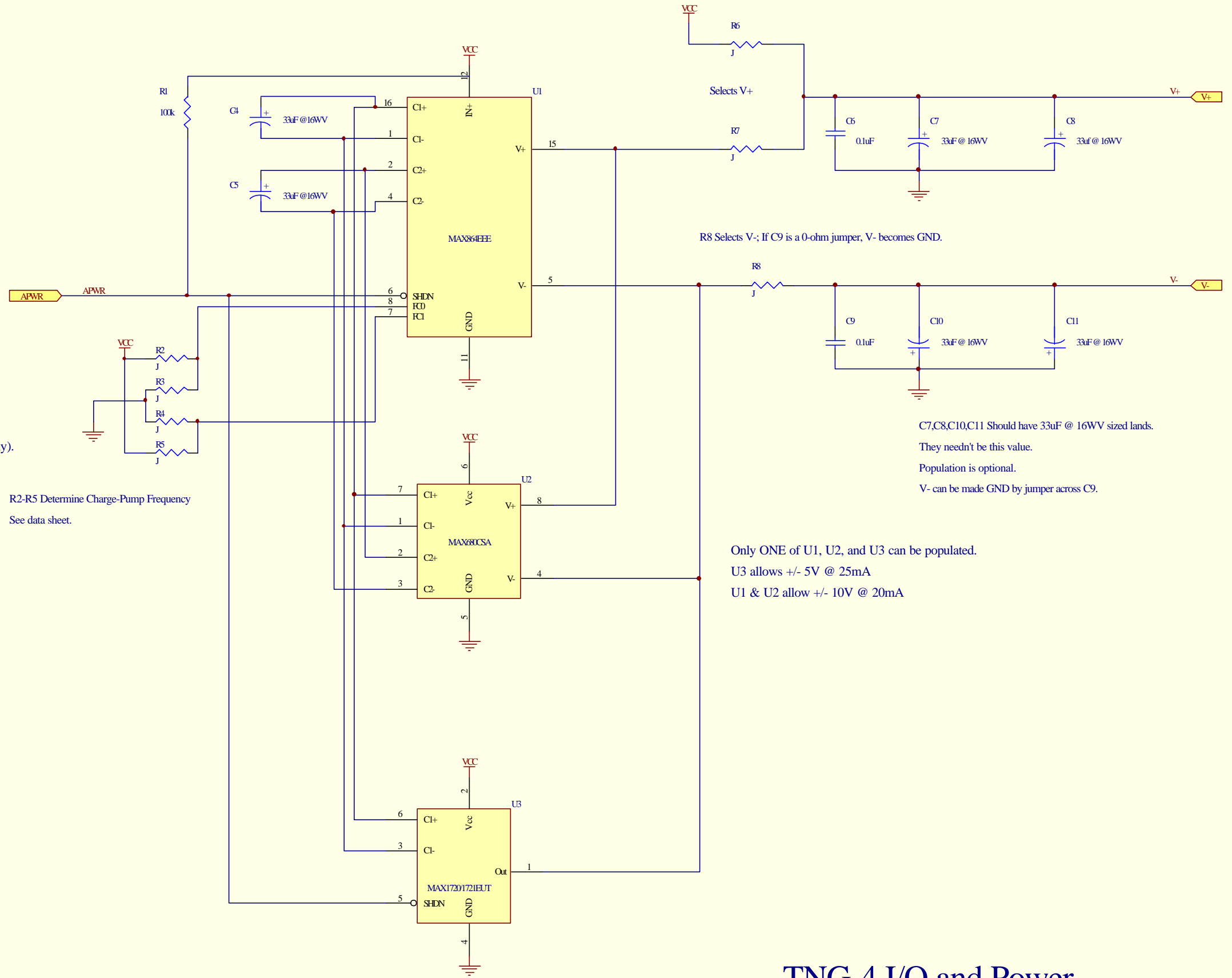
INPUT/OUTPUT CONNECTOR



Size land for this cap. Doesn't have to be this big a value.

Input/Output Data Lines:  
Analog Outputs First (if any), the Digital Lines (if any).  
Outputs first, then Inputs.

R2-R5 Determine Charge-Pump Frequency  
See data sheet.



R8 Selects V-; If C9 is a 0-ohm jumper, V- becomes GND.

C7,C8,C10,C11 Should have 33µF @ 16VW sized lands.  
They needn't be this value.  
Population is optional.  
V- can be made GND by jumper across C9.

Only ONE of U1, U2, and U3 can be populated.  
U3 allows +/- 5V @ 25mA  
U1 & U2 allow +/- 10V @ 20mA

# TNG-4 I/O and Power

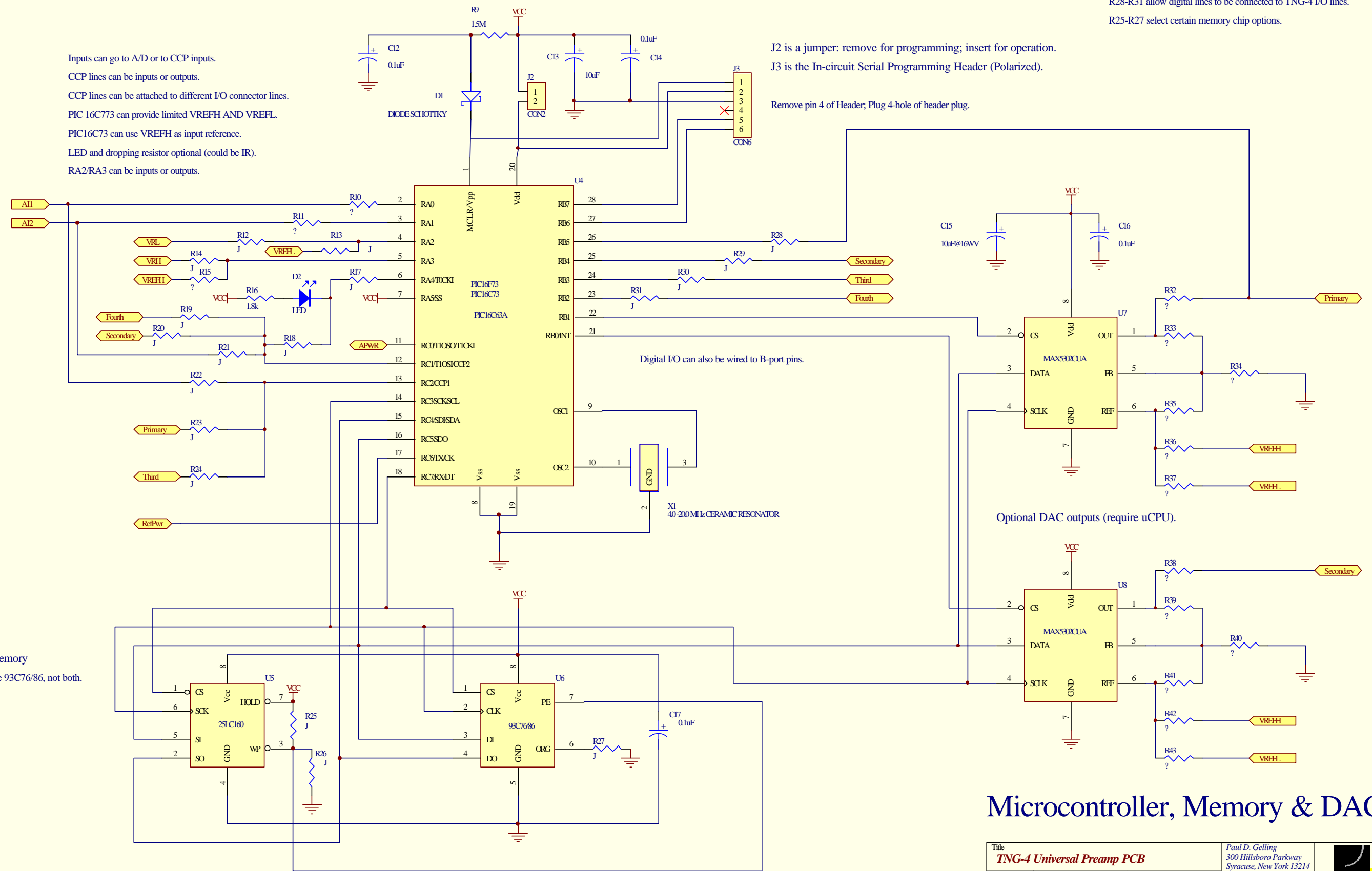
All discrete components size 0603 except where noted.

Title <b>TNG-4 Universal Preamp PCB</b>		Paul D. Gelling 300 Hillsboro Parkway Syracuse, New York 13214 (315)445-8701 gelling@bigfoot.com		
Size: Tablod	Number: 1	Revision: A	Date: 27-Dec-2002	
File:		Time: 15:14:51	Sheet 1 of 5	

Inputs can go to A/D or to CCP inputs.  
 CCP lines can be inputs or outputs.  
 CCP lines can be attached to different I/O connector lines.  
 PIC16C773 can provide limited VREFH AND VREFL.  
 PIC16C73 can use VREFH as input reference.  
 LED and dropping resistor optional (could be IR).  
 RA2/RA3 can be inputs or outputs.

J2 is a jumper: remove for programming; insert for operation.  
 J3 is the In-circuit Serial Programming Header (Polarized).  
 Remove pin 4 of Header; Plug 4-hole of header plug.

R32 and R38 connect DAC's to outputs.  
 R33/R34 or R33/R35, and R39/R40 or R39/R41 establish DAC gain.  
 R36 or R37, and R42 or R43 select DAC reference.  
 R28-R31 allow digital lines to be connected to TNG-4 I/O lines.  
 R25-R27 select certain memory chip options.

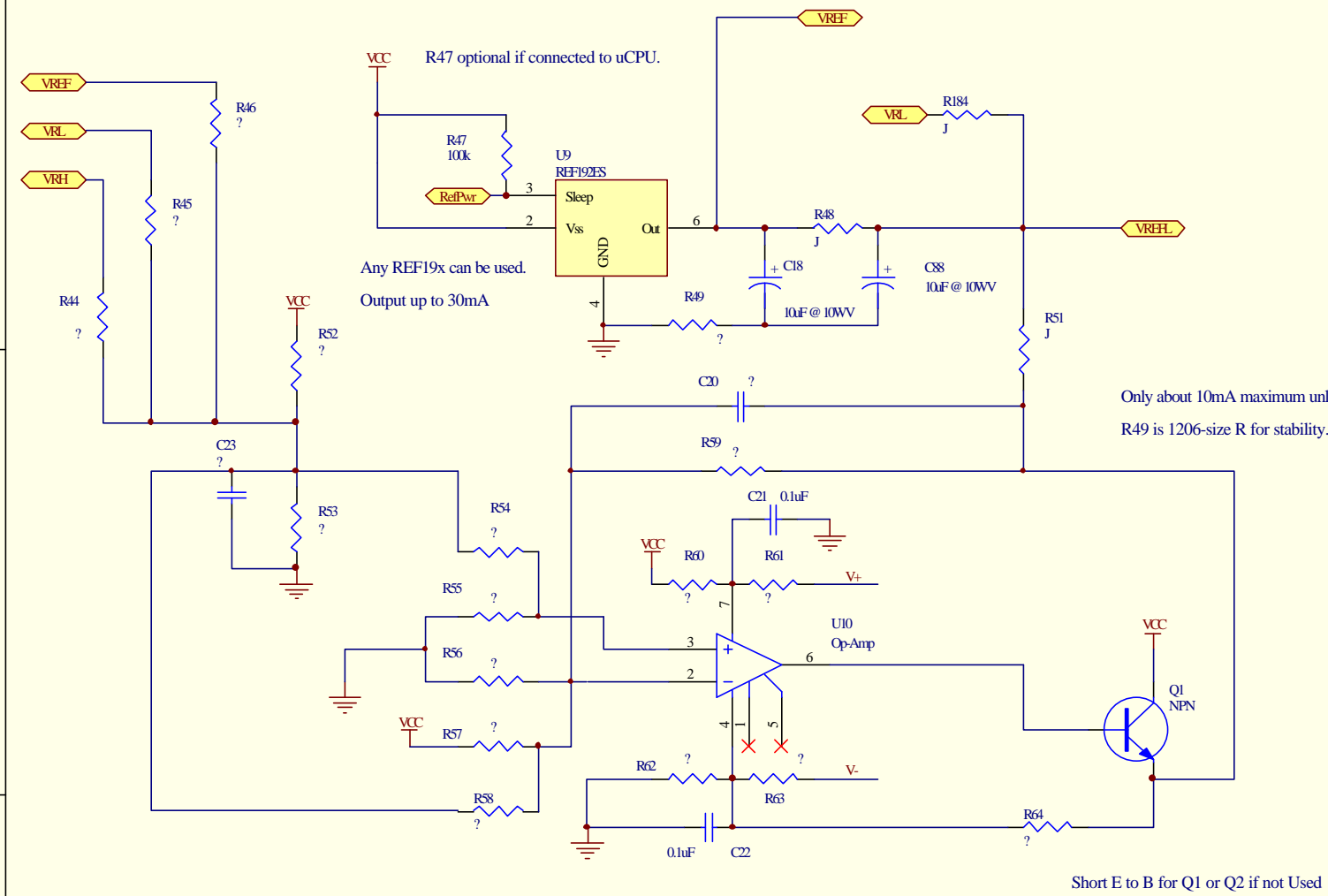


Digital I/O can also be wired to B-port pins.

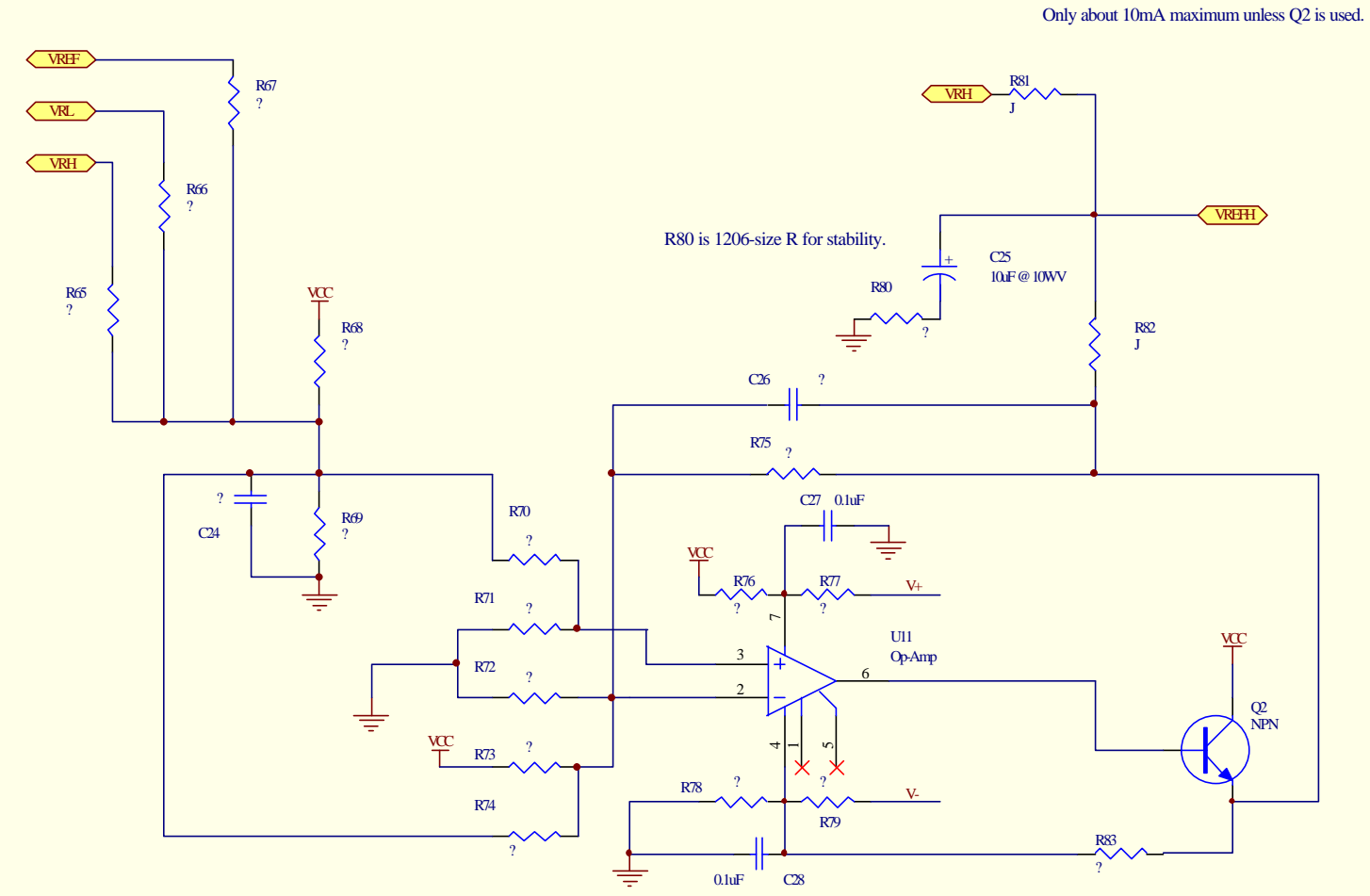
Optional DAC outputs (require uCPU).

Optional EEPROM memory  
 Either the 25LC160 or the 93C76/86, not both.  
 Up to 2k bytes.

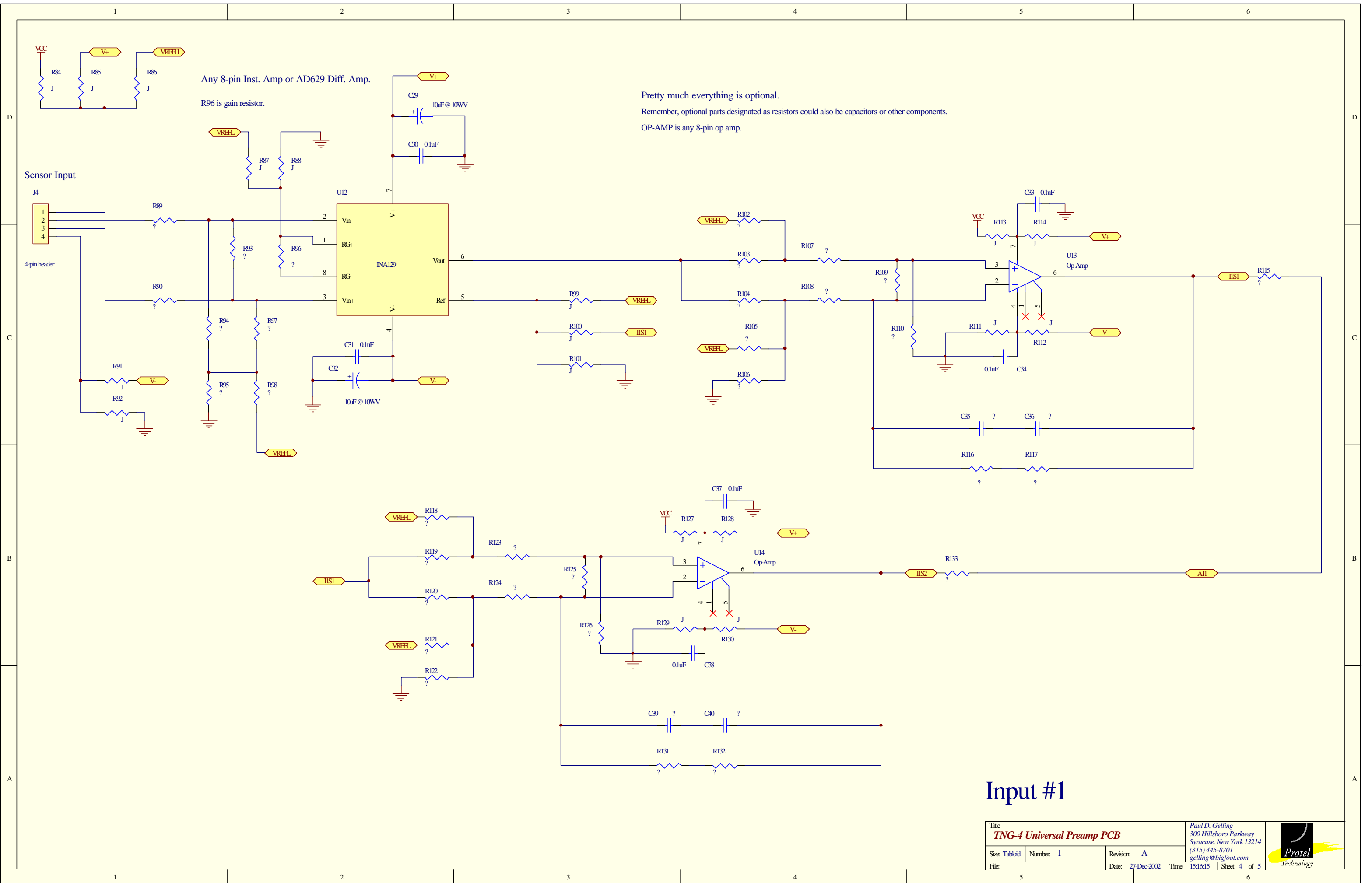
# Microcontroller, Memory & DAC's



Short E to B for Q1 or Q2 if not Used

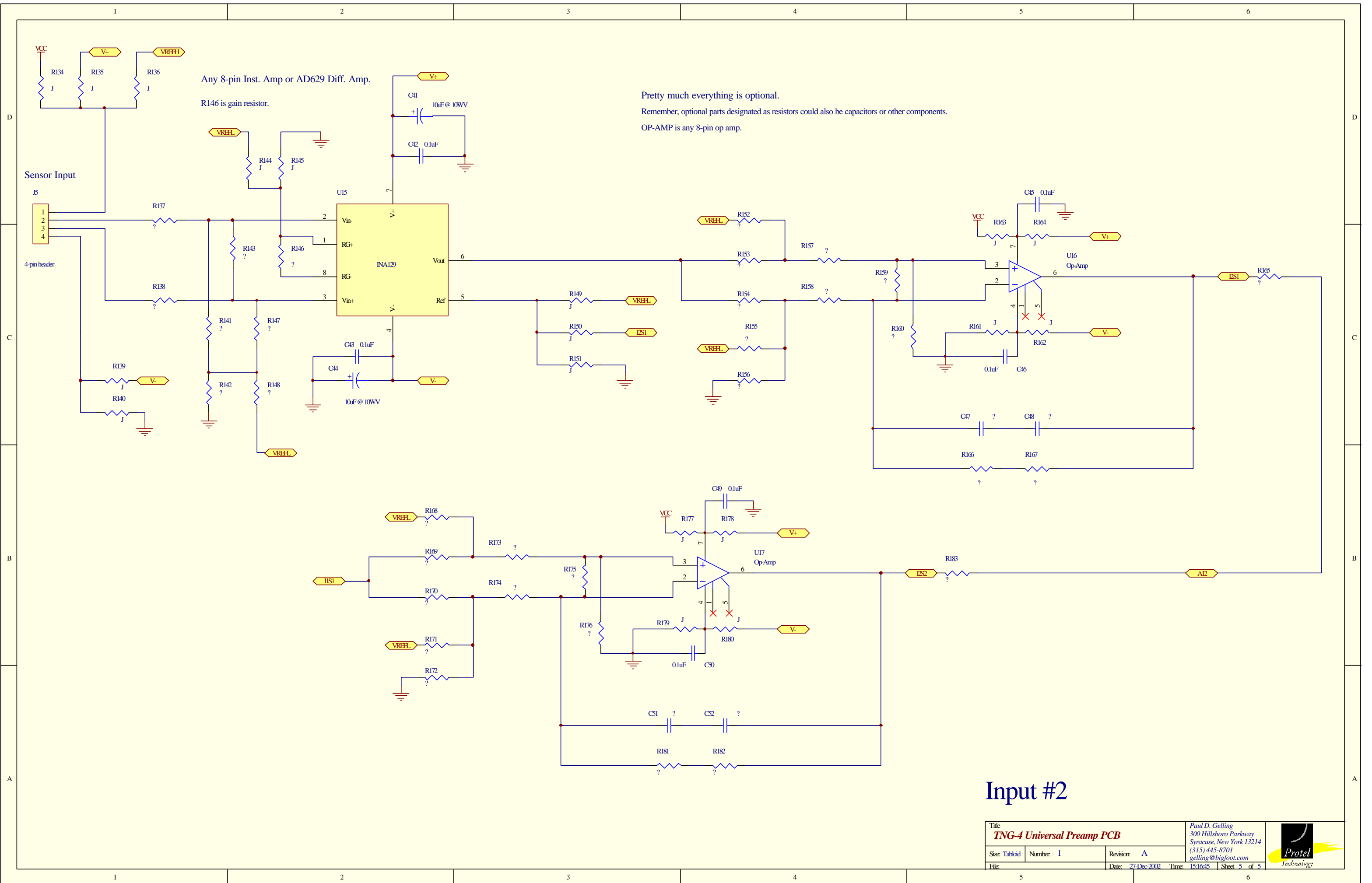


## Reference Voltage(s)



Pretty much everything is optional.  
 Remember, optional parts designated as resistors could also be capacitors or other components.  
 OP-AMP is any 8-pin op amp.

### Input #1



Any 8-pin Inst. Amp or AD629 Diff. Amp.  
 R146 is gain resistor.

Pretty much everything is optional.  
 Remember, optional parts designated as resistors could also be capacitors or other components.  
 OP-AMP is any 8-pin op amp.

## Input #2