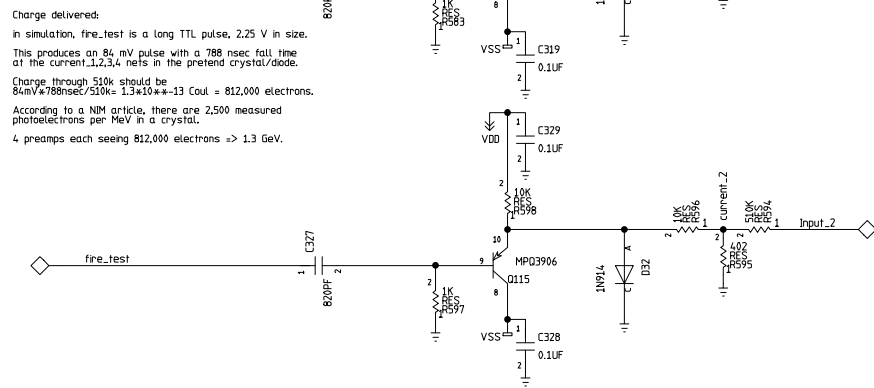


Pretend crystal and 4 photodiodes.

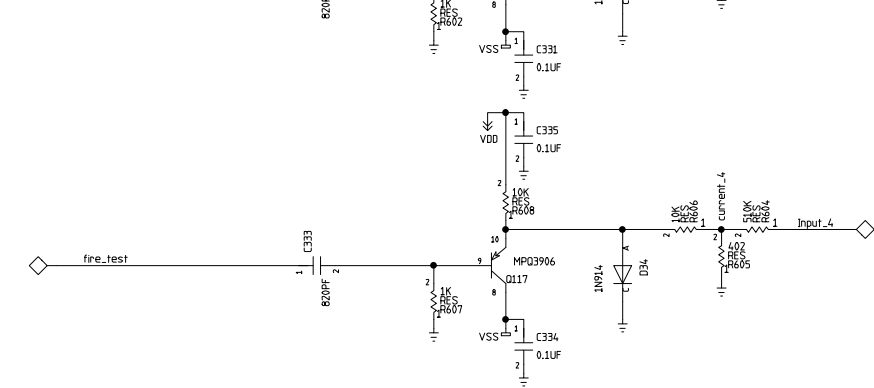
fire_test



Charge delivered:
in simulation, fire_test is a long TTL pulse, 2.25 V in size. This produces an 80 mV pulse with a 788 nsec fall time of the current. 1.2, 3.4 nats in the pretend crystal/diode.
Charge through 510k should be $84mV \cdot 788nsec / 510k = 1.3 \cdot 10^{-13} \text{ Coul} = 812,000 \text{ electrons}$.
According to a NIM article, there are 2,500 measured photoelectrons per MeV in a crystal.
4 preamps each seeing 812,000 electrons $\Rightarrow 1.3 \text{ GeV}$.

since the Cornell preamps have about 1.5k 7in, this acts as a current source for them. (See notes, p. 97)
 $RC = 788 \text{ nsec}$
pulse is about 84 mV at peak.

fire_test



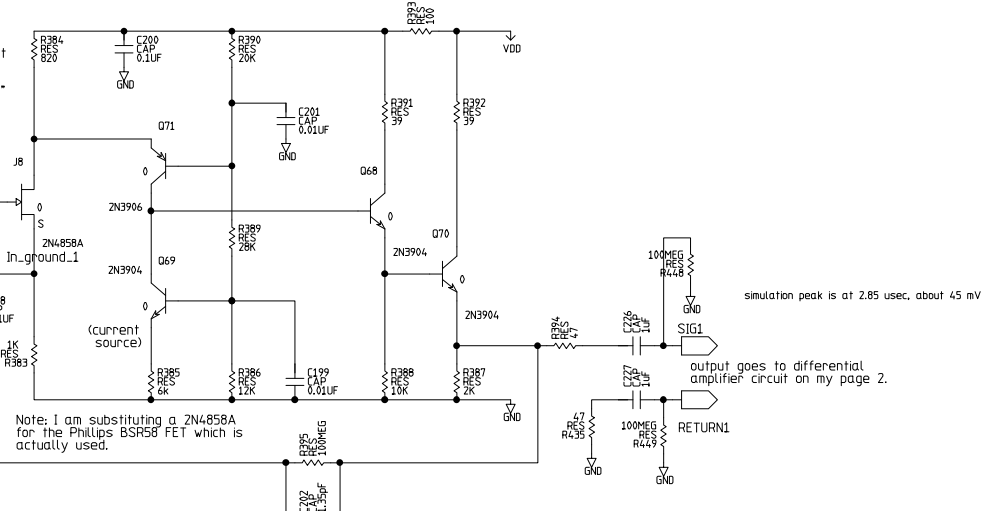
FET is an n-channel JFET with pinchoff voltage 4V below source. (When gate voltage is higher than this, there's drain-source current that's independent of drain-source voltage, and varies quadratically with gate voltage. The FET is run with the gate-source "diode" junction reverse biased.)

Input_1
Photodiode 1 signal arrives here
Preamp for diode 1

The 1.01uF capacitance includes the capacitance to ground near the preamp input. (See OSU sheet 31)

In NIM A265 258-265, 1988, bebek says 5,000 electrons in a diode corresponds to 20 MeV. So 1 GeV = 2,500,000 electrons. He also says that measured photoelectrons per crystal per MeV is typically 2,500.

model the test input

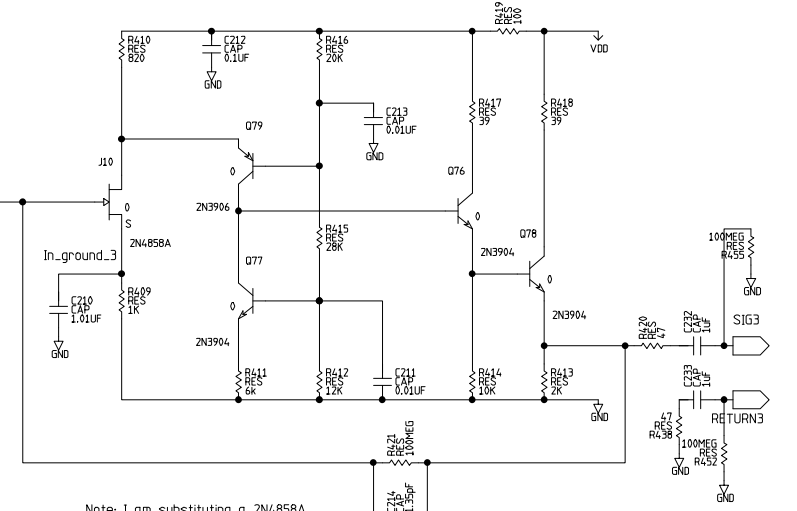


simulation peak is at 2.85 usec, about 45 mV.

output goes to differential amplifier circuit on my page 2.

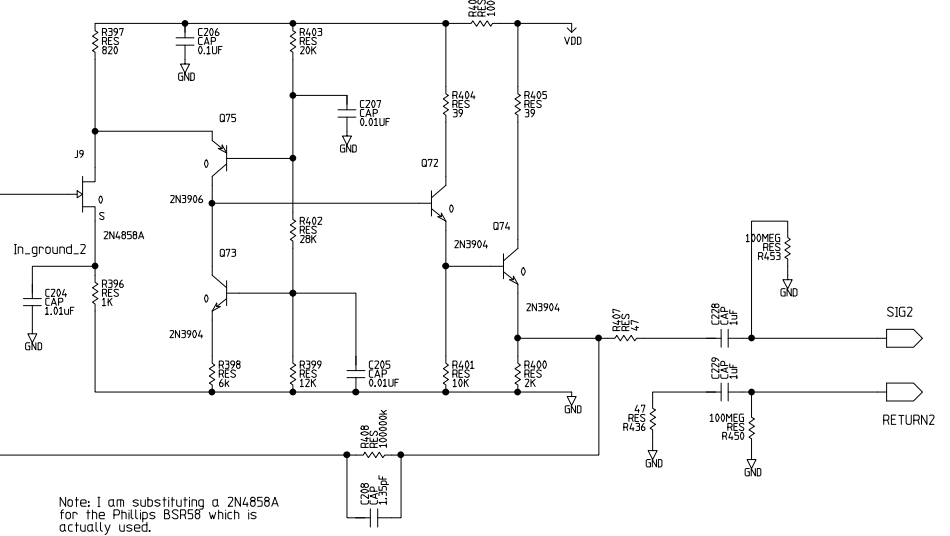
Note: I am substituting a 2N4858A for the Philips BSR58 FET which is actually used.

Input_3
Input_3



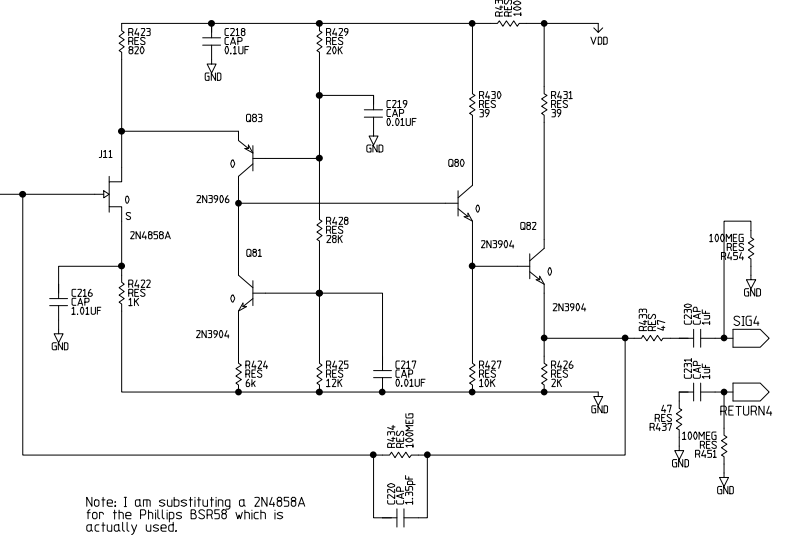
Note: I am substituting a 2N4858A for the Philips BSR58 which is actually used.

Input_2
Input_2

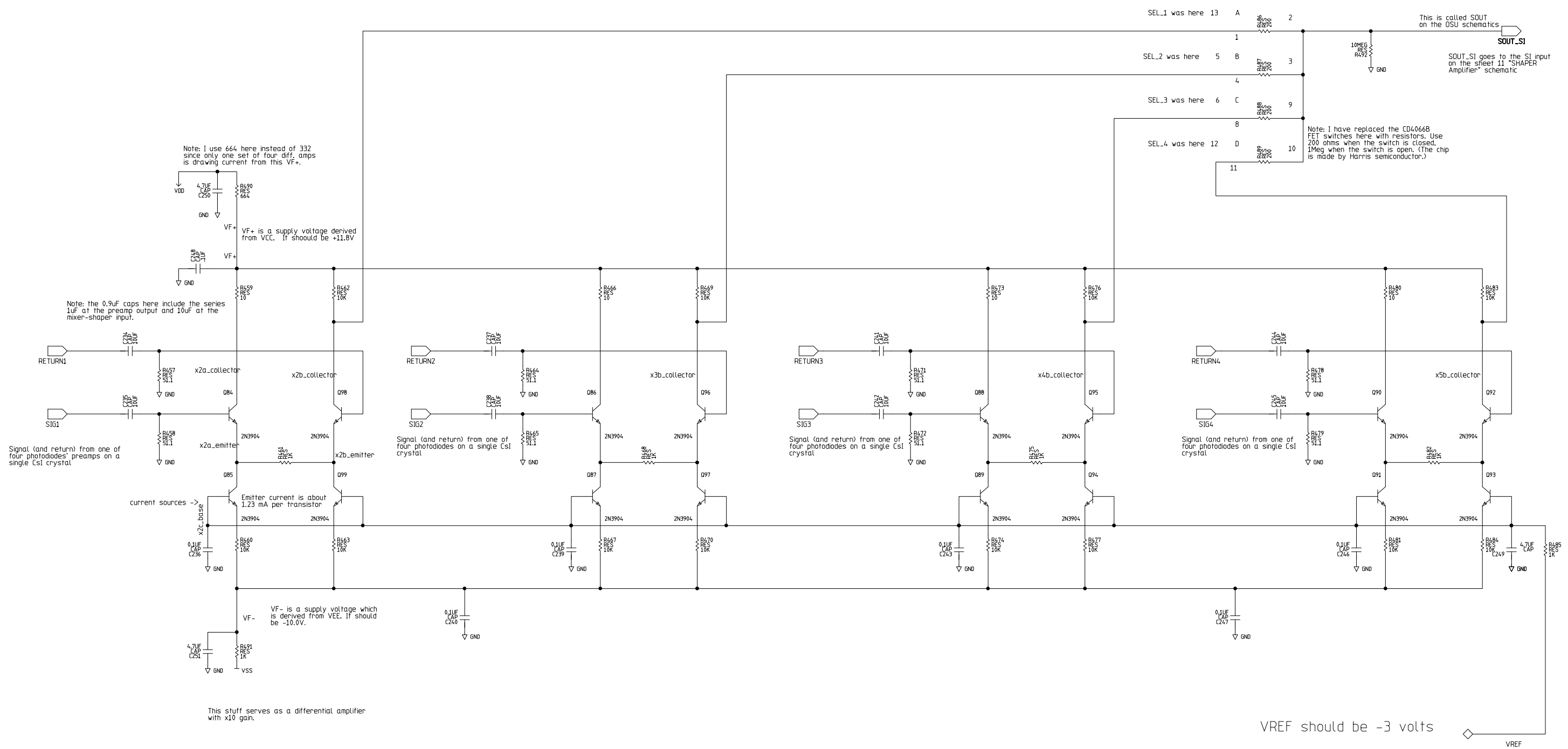


Note: I am substituting a 2N4858A for the Philips BSR58 which is actually used.

Input_4
Input_4



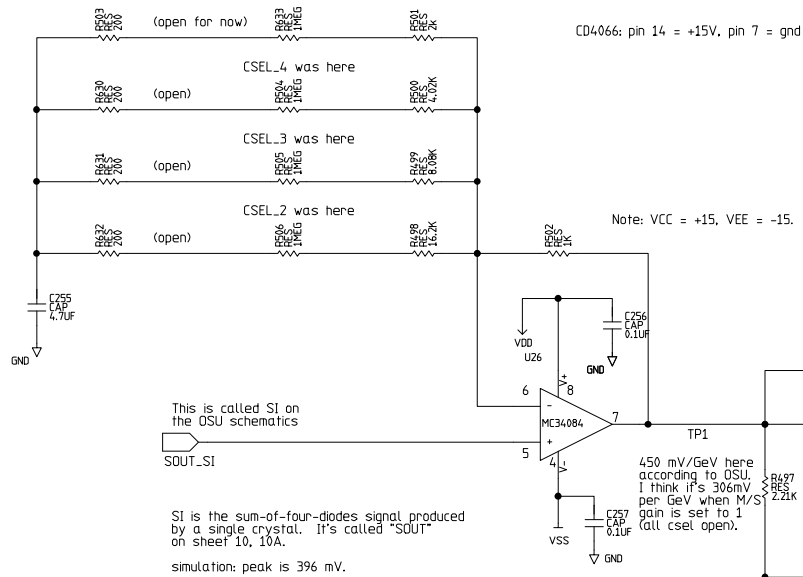
Note: I am substituting a 2N4858A for the Philips BSR58 which is actually used.



CSEL lines (used to adjust gain for this channel). I think the OSU test setup ran with the 2k resistor "enabled", the others off.

Since we don't have an analogue model of the CD4066, I have replaced closed switches with 200 ohm resistors, and open switches with 1 Meg resistors.

CD4066: pin 14 = +15V, pin 7 = gnd



Note: VCC = +15, VEE = -15.

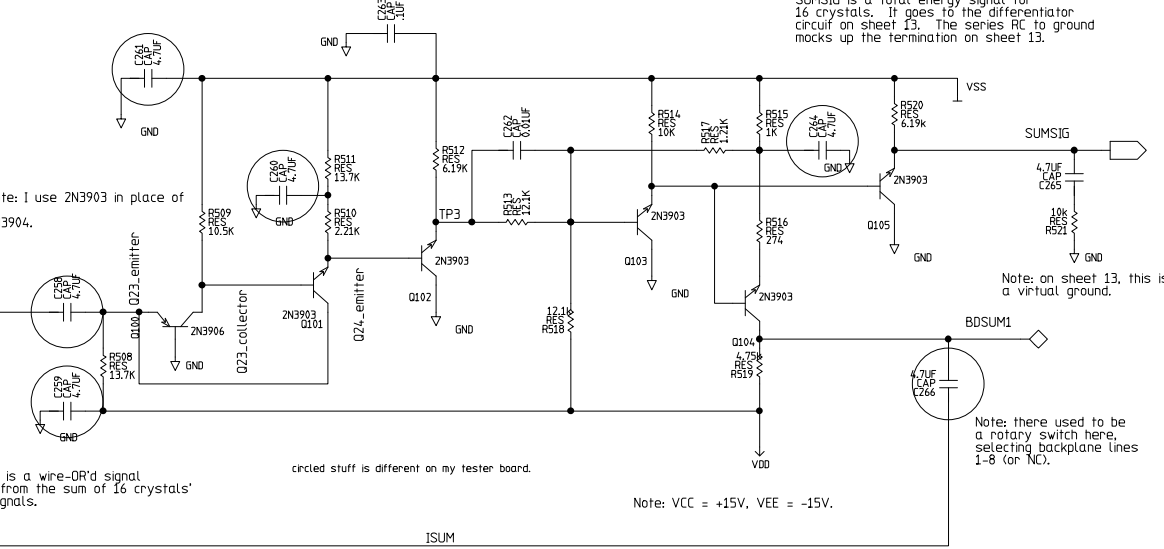
The SUM line from each crystal goes to the M/S crate backplane, then out a connector to the ADC's. The resistor represents the termination on the line to the ADC's.

This represents the "drag" on SBUS made by 23 other channels which all happen to stay at ground.

The SBUS lines from 16 crystals are wire-OR'd to form the single line called SUMBUS.

This is called SUMBUS on the OSU schematics.

Ohio State Mixer/shaper board "SUMMER AMPLIFIER", sheet 12. Transcribed by George Gollin, 8/95. There is only one of these per M/S board.



Note: I use 2N3903 in place of 2N3904.

SUMBUS is a wire-OR'd signal formed from the sum of 16 crystals' SBUS signals.

circled stuff is different on my tester board.

Note: VCC = +15V, VEE = -15V.

Note: there used to be a rotary switch here, selecting backplane lines 1-8 (or NC).

This line goes to the mixer/shaper controller. See Bebek's schematic, document number 6057-140. 3/17/98, page 29 of 17 (???)

isum voltage is 41.3 mV in simulation, or 31.8 mV/GeV.

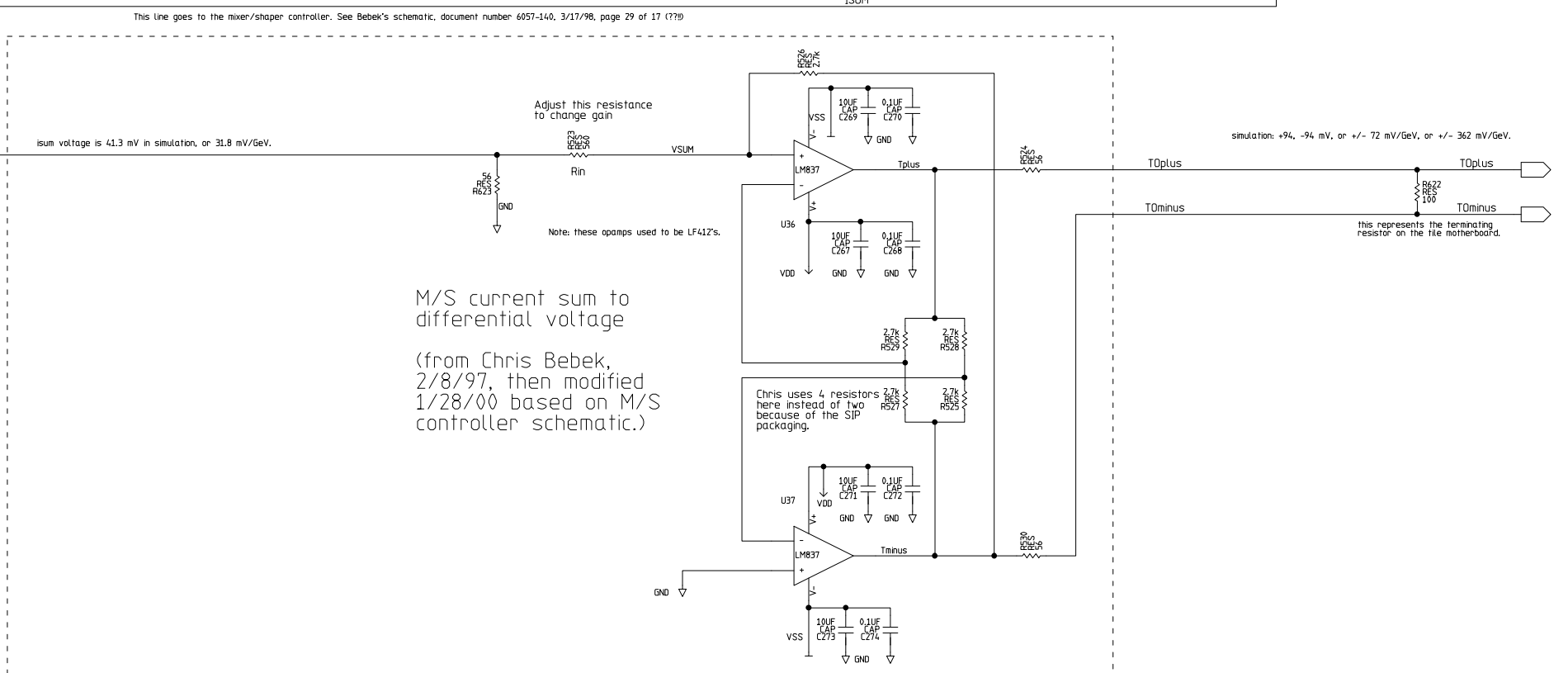
Adjust this resistance to change gain

Note: these opamps used to be LF412's.

M/S current sum to differential voltage

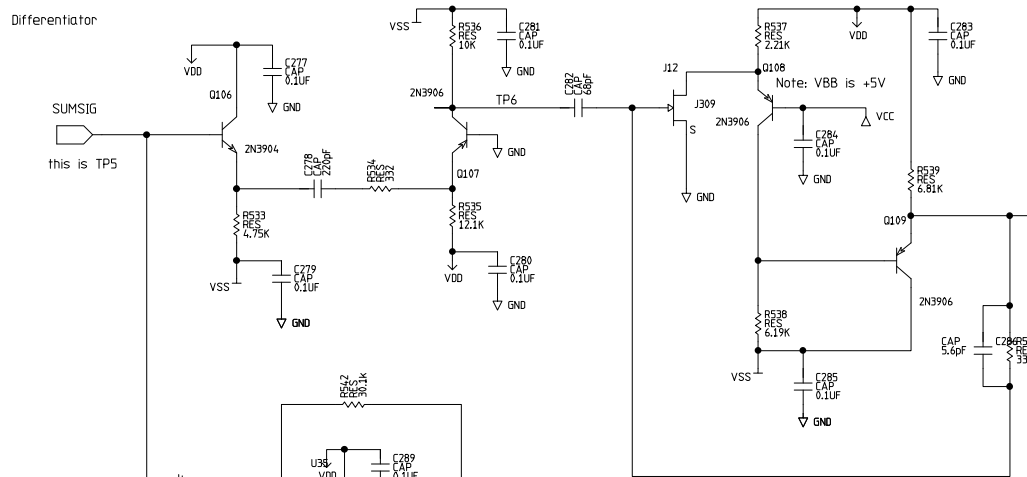
(from Chris Bebek, 2/8/97, then modified 1/28/00 based on M/S controller schematic.)

Chris uses 4 resistors 2.7k here instead of two because of the SIP packaging.

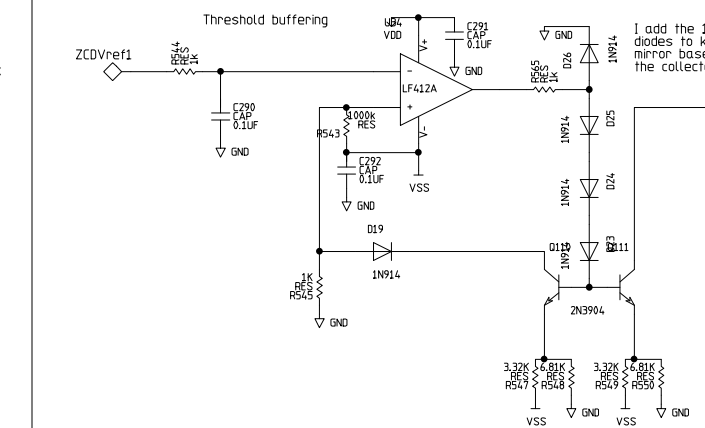


simulation: +94, -94 mV, or +/- 72 mV/GeV, or +/- 362 mV/GeV.

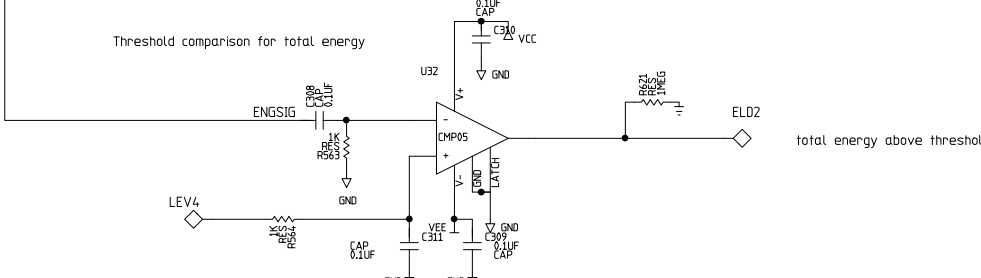
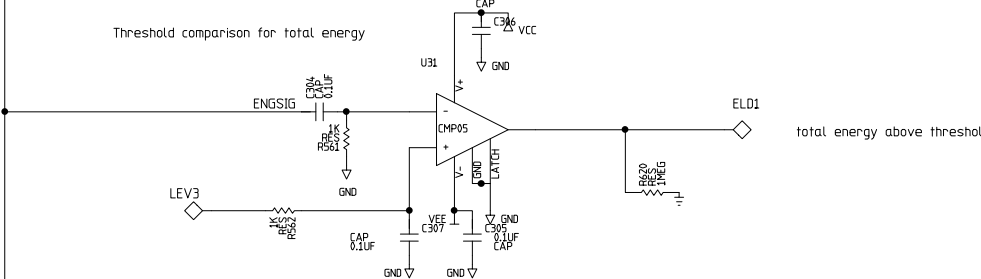
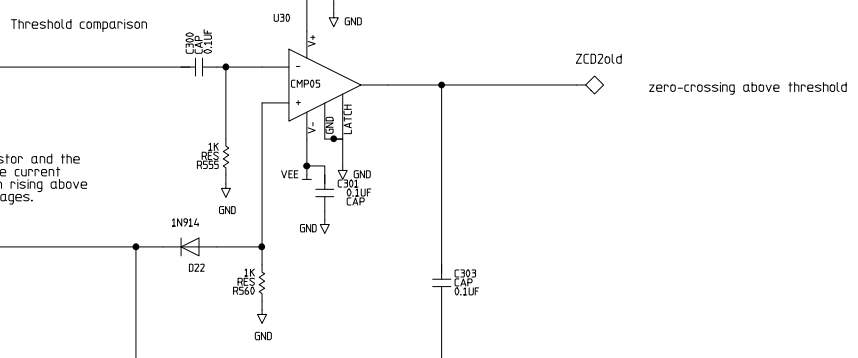
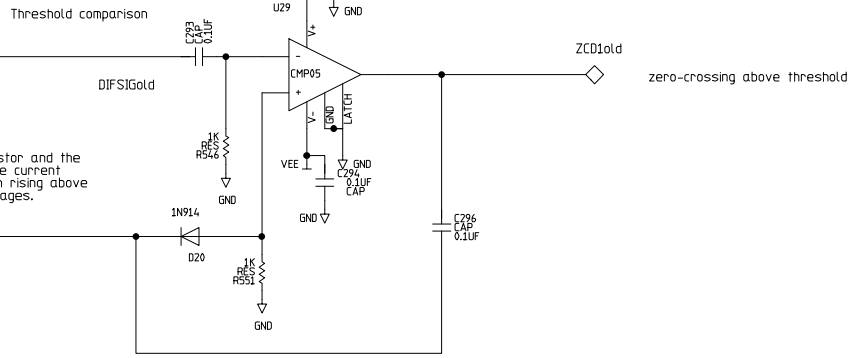
this represents the terminating resistor on the tile motherboard.



This is TP7

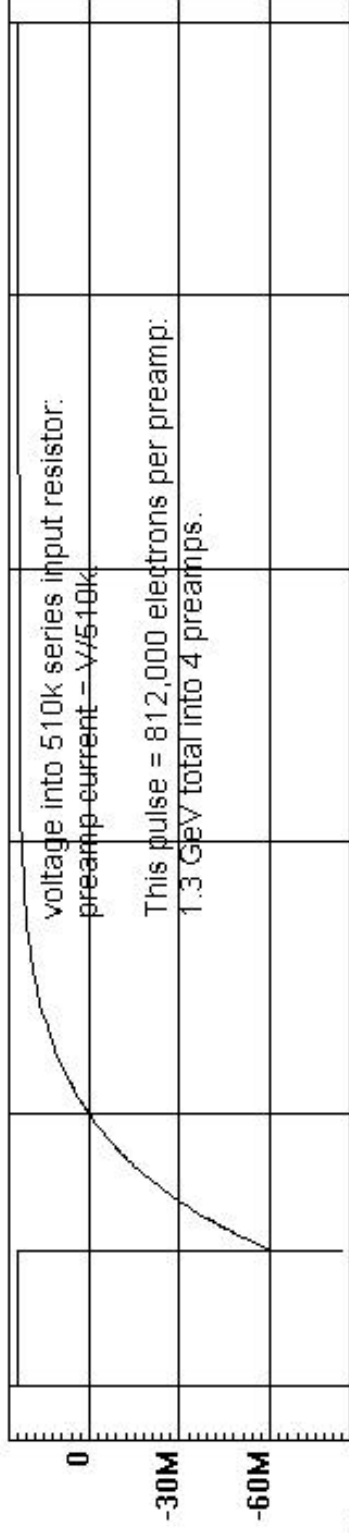


Note: in the OSU design, this is a CMP08 (like an AMD AM685) which has ECL outputs. The CMP05 isn't as fast, and also has TTL outputs.

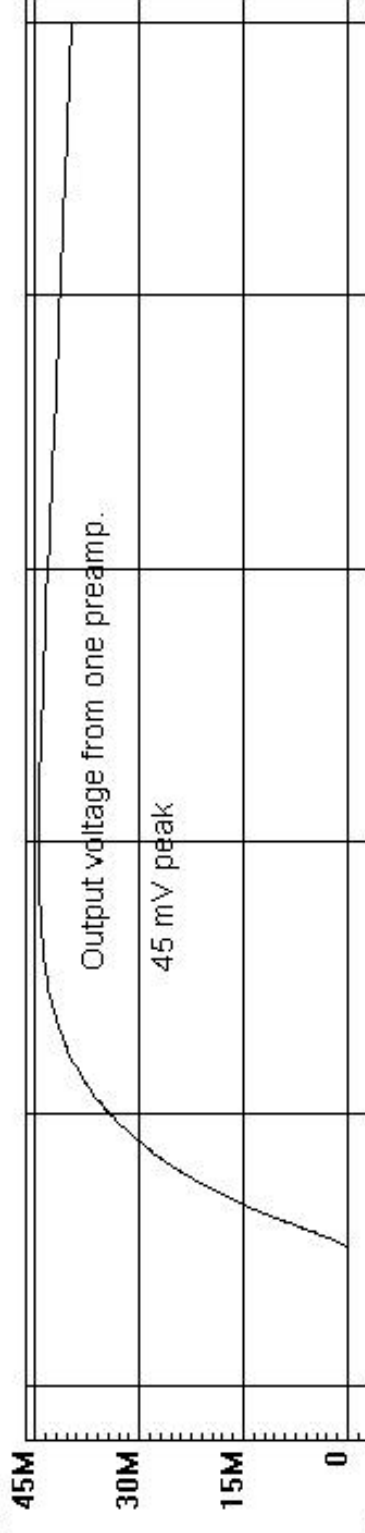


2	c	3
a	b	
0		1

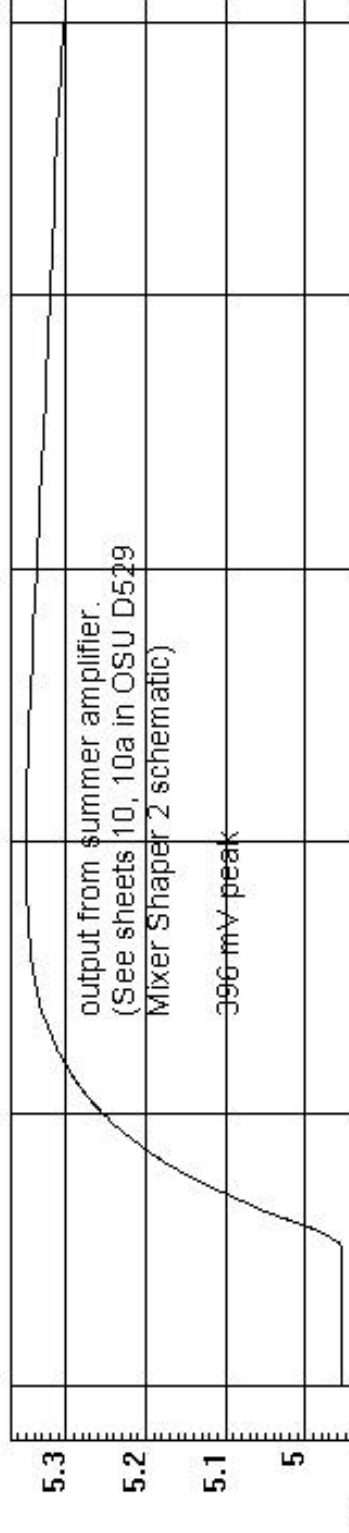
Volts



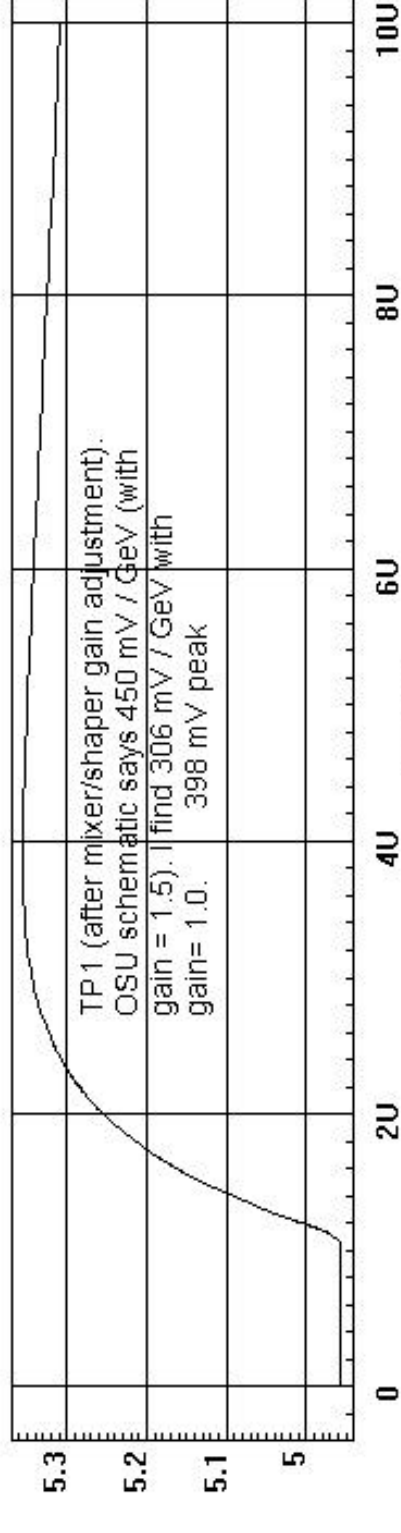
Volts



Volts



Volts



Ref Seconds

Seconds 2.569277U

dSeconds 2.569277U

Ref Volts

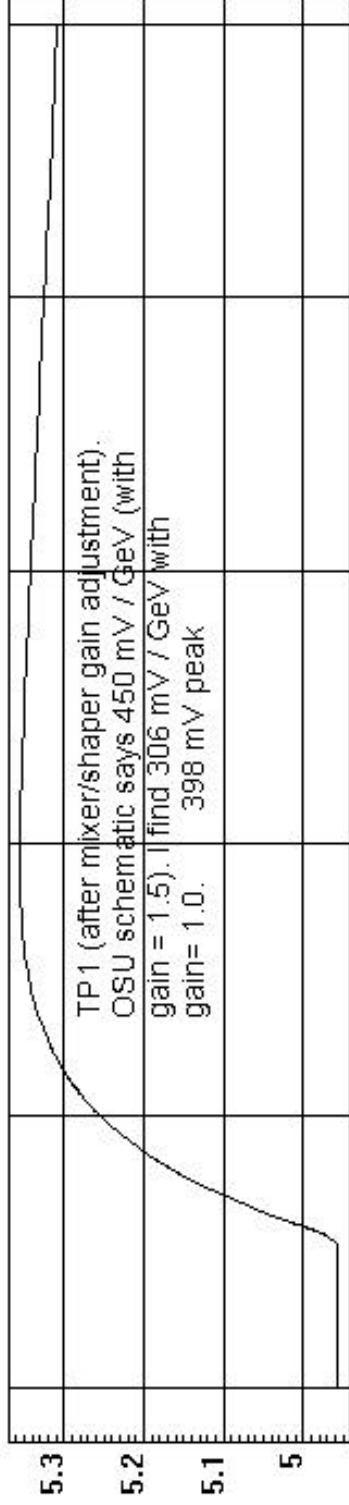
Volts 7.518989M

dVolts 7.518989M

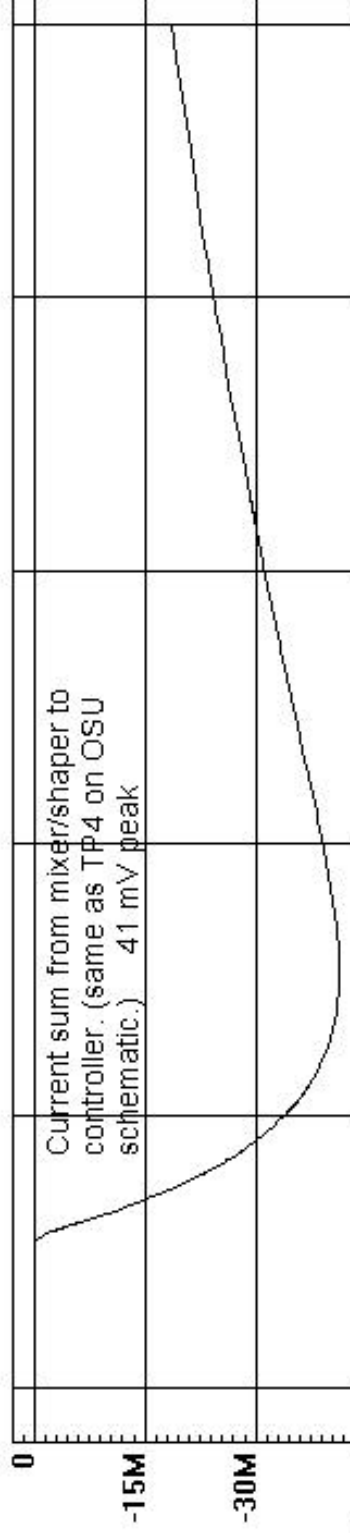
dMarker X 2.692121U



Volts



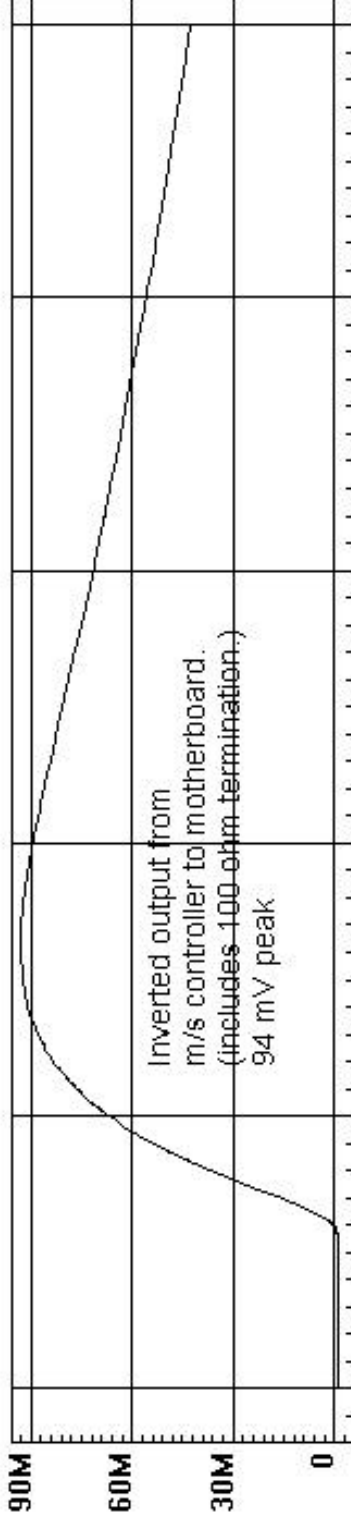
Volts



Volts



Volts



100

80

60

40

20

0

Seconds

Ref Seconds

Seconds -96.686733N

dSeconds -96.686733N

Ref Volts

Volts 5.307405

dVolts 5.307405

dMarker X

2.692121U