VDC

Department Hall A

Subject VDC

Name

Address

National® Brand 43-648

Computation Notebook

Dennison Stationery Products Co., Framingham, MA 01701

75 Sheets
11¾" x 9¼"
4x4 Quad.

0 73333 43648 8

91

95

100

105

110

115

120

125

130

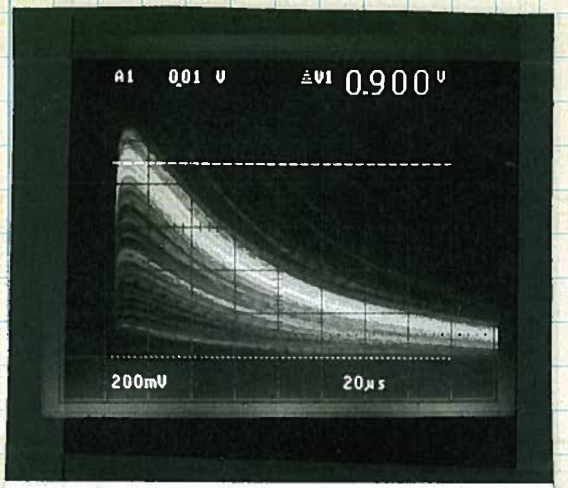
133

2/24
JA

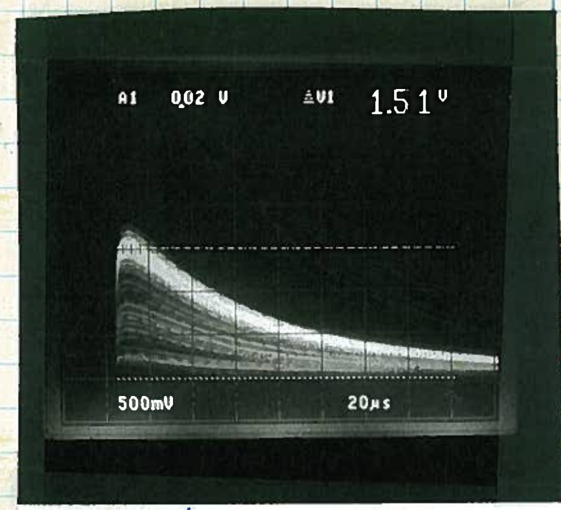
VDC Gain

Yesterday I looked at the VDC with Fe^{55} after ~24 hours of flushing out. Gas was Ar/Ethane 62/38%.

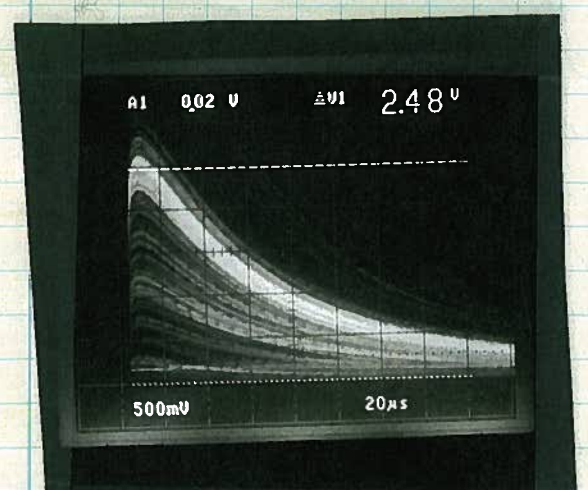
Wire is ~center of chamber.
Source is ~centered.
All 3 VDC planes (cathode) are at high voltage



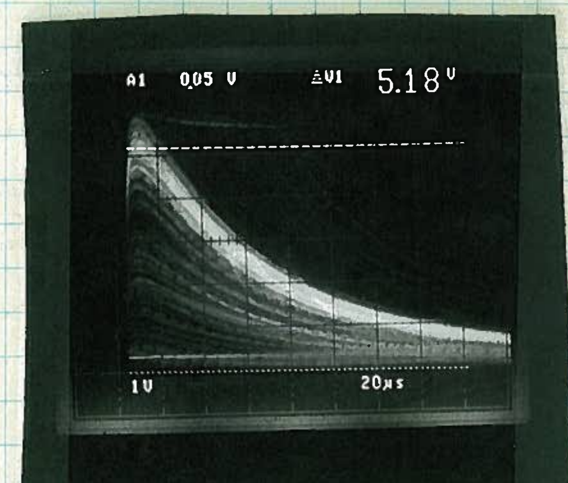
3150V



3250V



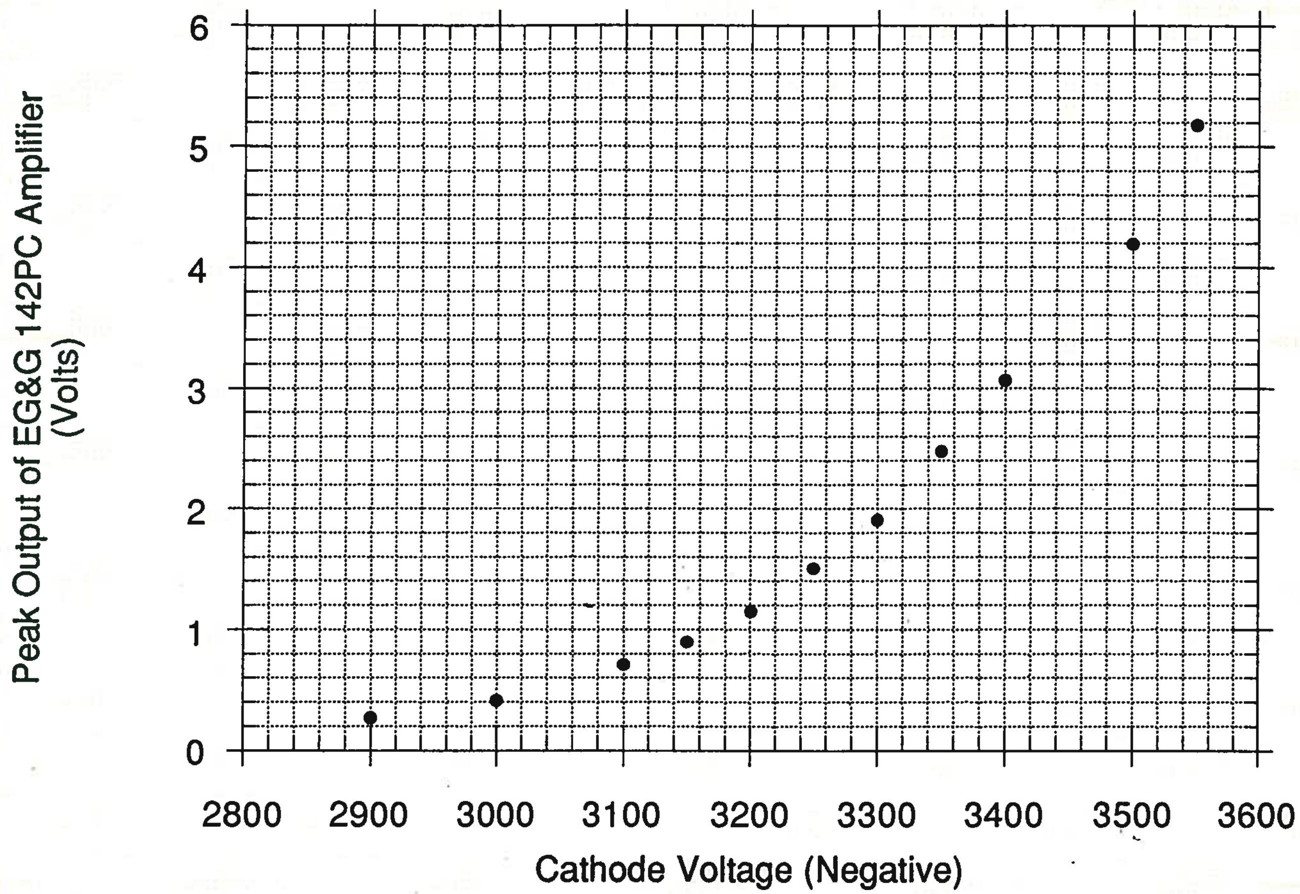
3350V



Fe^{55} 3550V

Pulse amplitude plotted on next page.

VDC Gas Gain for Argon(62%)/Ethane(38%)



This is lower than the gain for Ar/CO_2 75/25 Howard Fenker and I measured for the VDC prototype chamber.

The chamber starts bubbling at about .35 ft^3/hr input flow rate. ~1" silicone oil backpressure. Perhaps the gas has not flushed out completely?

Gain checked at a few points along VDC.

HV@ ~3100V

			window ← gas flow (or so we believe)
			cath.
624mV	615mV	624mV	cath.
522mV	516mV	560mV	cath.
			window → out

Note: It may be prudent to reverse the flow.

Straw tubes connected in series with the gas output. Input flow rate is ~.4 ft^3/hr. Pressure on input line as measured at the "safety" bubbler is ~½" (a little less) of silicon oil. Output bubble size is ~.260" wide × .185" high ~~× .300" deep~~

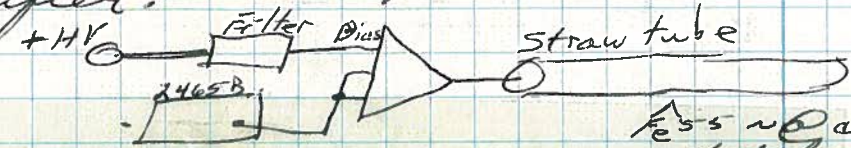
If bubble is ~2/3 volume of a cube/cylinder

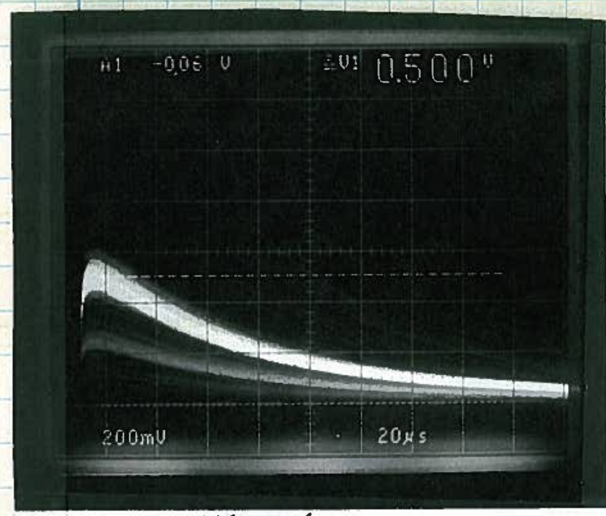
$\frac{2}{3} \cdot .185 \cdot \pi \cdot (.130)^2 = .0065\ in^3$

Bubbles timed at 20 per 34 sec $\Rightarrow$ .59 bubbles/sec

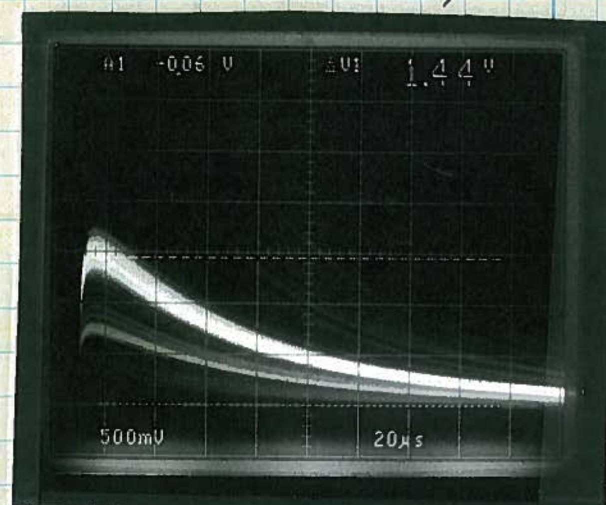
$\Rightarrow 13.8\ in^3/hr \cong .01\ ft^3/hr$

After ~4 hrs straw tube gain checked with 1142PC amplifier.

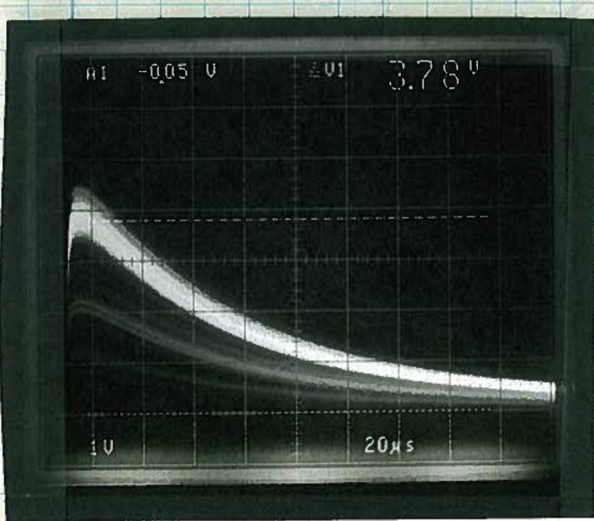




1450V



1551V



1651V

This gain is lower than previously measured for the FPP straw tubes.

without straw tubes gas flow is ~3.5 ft^3/hr and bubbling @ ~20 bubbles in 7 sec $\Rightarrow .05\ ft^3/hr$

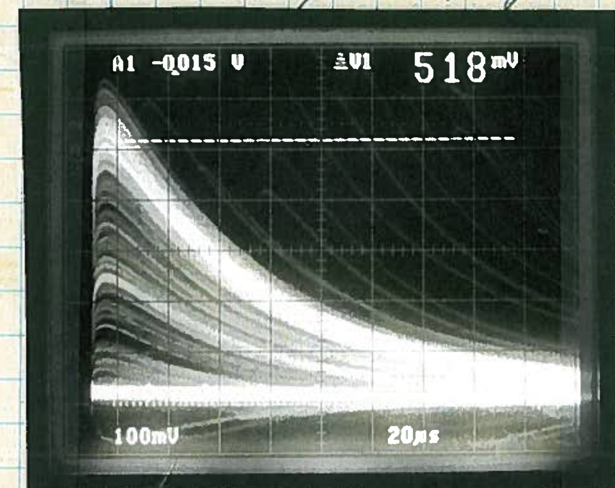
Gas flow through the VDC is reversed. ~1AM 2/25
Straw tube is disconnected.

2/26
JS

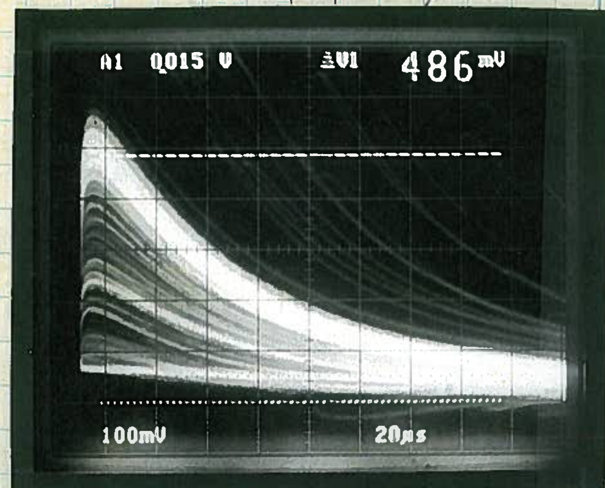
Gas has been flowing uninterrupted since 1 AM 2/25
it is now 14:45 PM. ⇒ 39 hours of flow.

Cheap DMM connected to monitor output of Bertan supply. This is the meter used previously. Set to 3100V as before (3.10V on DMM). Using Fluke 8060A DMM it is 3.122V on DMM.
Setup same as p. 5 & 6.

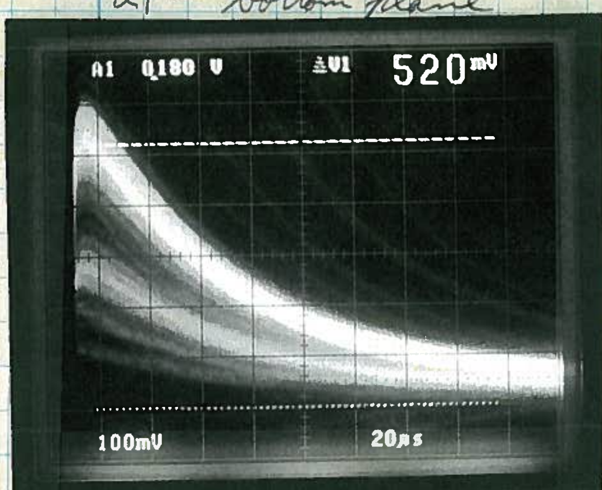
Fe^{55} 3rd connector from HV plugs (Bottom)



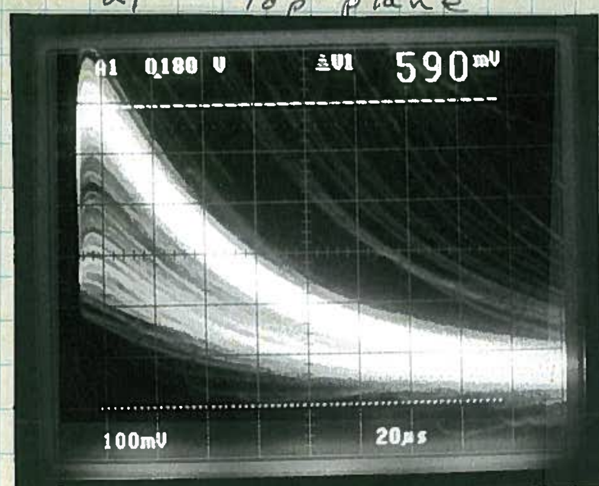
13th bottom plane



21st bottom plane

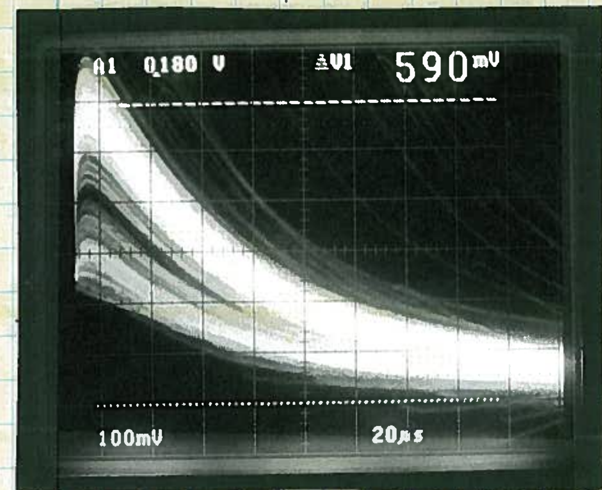


21st Top plane

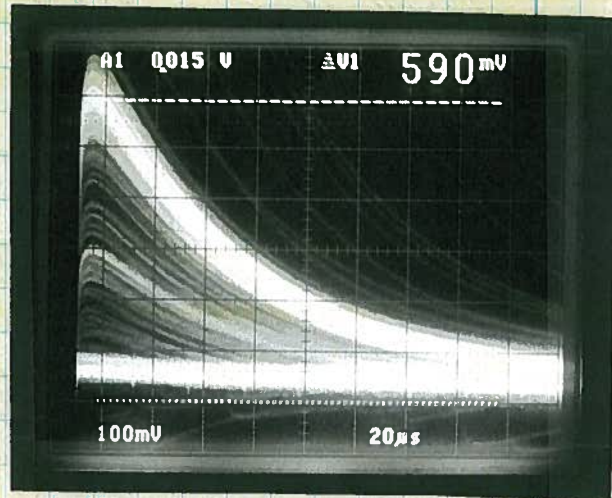


Gain $\simeq 3 \times 10^3$

13^{th} Top plane



3^{rd} Top plane



Straw tubes inserted in series with both input and output. After connecting the flow-rate was set to $\sim .4\ ft^3/hr$. Output bubbling at ~10 bubbles in 46 sec. .217 bubbles/sec

$.01 \times \frac{.217}{.59} \simeq .0035\ ft^3/hr.$

tube is 1cm in diameter and 22" long

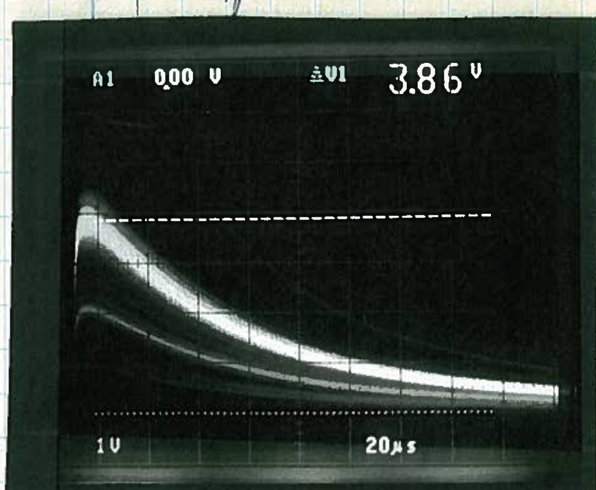
$(.3937'' \times .5)^2 \times \pi \times 22'' = 2.68\ in^3$

$= .0016\ ft^3$ $\Rightarrow$ 2 flushes/hr on output.

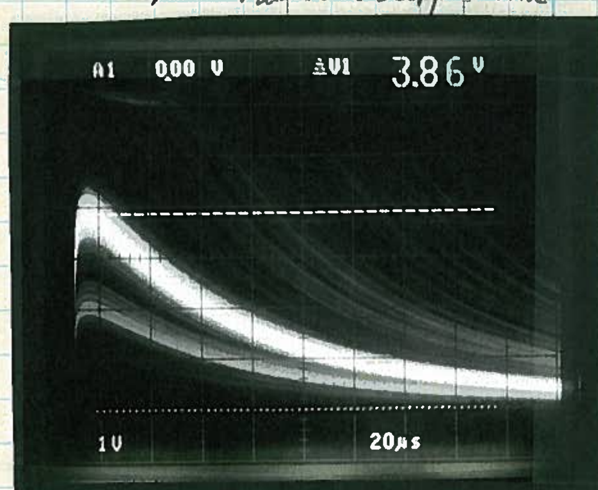
Output tube will probably still be valid chamber gas mix after 2 hours. Time for 7PM.

9:15 PM - straw tubes fired up.

1^{st} tube on input line +1651V



1^{st} tube on output line +1651V



Gain $\simeq 2.1 \times 10^4$

2/27 **Voltage Drops on Power Lines**

J.S. & J.G.

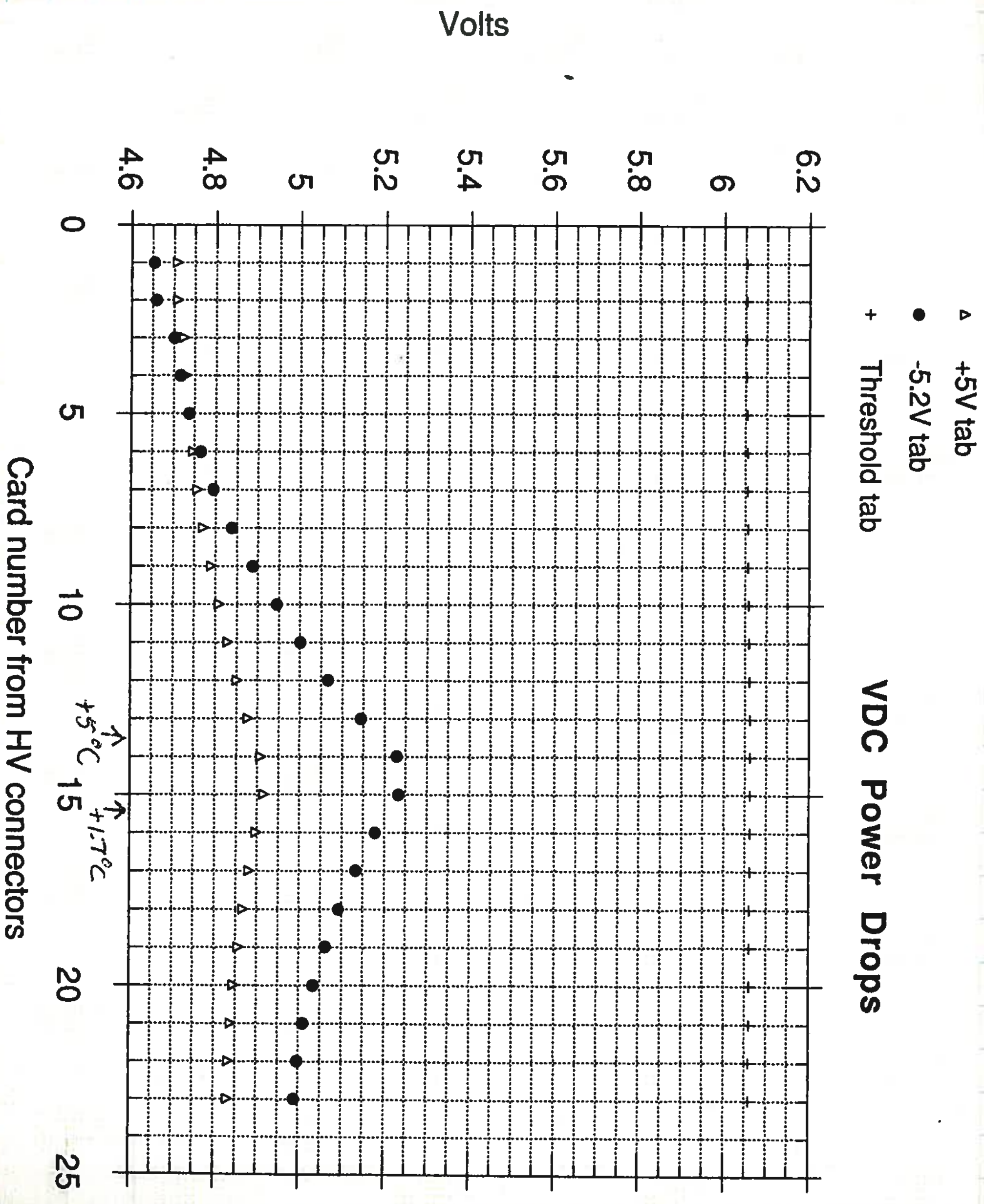
John Gillespie

Bill Vance filed down the power connectors on 23 of the LeCroy cards so they would fit in the VDC connector. Only a slight bit needs to be shaved off. It appears the two connectors are just a little bit too far apart. File Out Connectors!

All cards installed. John Gillespie hooked up power and measured the voltage on each card. Reference probe clamped to upper ground plane next to the power connector.

Current was measured afterwards

10.1A on -5.2V
5.2A on +5V
.163A on Threshold supply

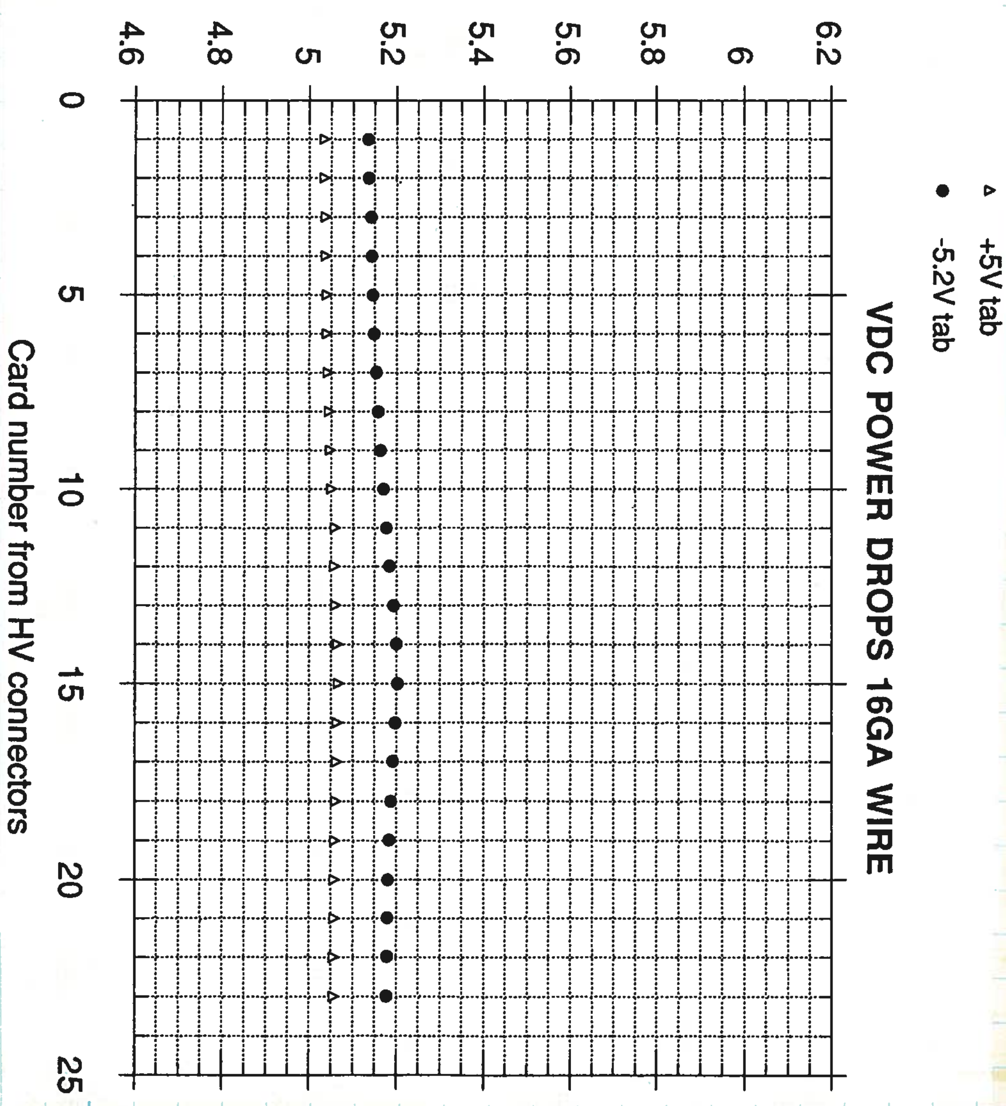


Voltage Drops w/16 AWG Wire on Power Lines 3/1

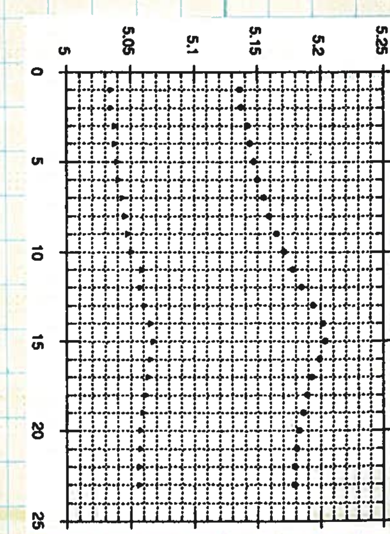
16 AWG bus bar wire soldered over trace to beef it up.

J.S.
Bill Vance

No temperature increase detected on power traces.



Same Plot
Expanded Scale



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FAX (717) 467-4297

DATE: 12/05/94
TIME: 14:04
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****
* CERTIFICATE OF ANALYSIS *
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APCI - HAMPTON
411 ROTARY STREET
HAMPTON VA 23670

CUSTOMER ACCOUNT : 813
CUSTOMER ORDER NO :
ORDER NO : 813-061163
ORDER DETAIL SEQ : 2

REMARKS : GAS MIXTURE(S) LISTED BELOW ARE TRACEABLE TO NIST CLASS S WEIGHTS AND/OR NIST GAS MIXTURE STANDARD REFERENCE MATERIALS (SRM's) - REFERENCE APCI SGD FIELD DIRECTIVE BOOK I PART A-3.

CERTIFIED GAS MIXTURE: ETHANE IN ARGON

BATCH NO	ANALYSIS DATE	BAR CODE	CYLINDER NO	COMPONENT REQUESTED	CONCENTRATION REQUESTED	ANALYTICAL RESULT	UNIT OF MEASURE
59735	12/05/94	BQL798	SG029806B	ETHANE	38	37.6	MOLAR %
				ARGON		Balance	
		BQK114	SG26852B	ETHANE	38	37.6	MOLAR %
				ARGON		Balance	
		DHT531	SG288492	ETHANE	38	37.7	MOLAR %
				ARGON		Balance	
		DBC526	SG4902B	ETHANE	38	37.5	MOLAR %
				ARGON		Balance	
		DHT535	SG70082	ETHANE	38	37.7	MOLAR %
				ARGON		Balance	
		BQM478	SGX1502	ETHANE	38	37.6	MOLAR %
				ARGON		Balance	

connected to VDC as of 3/6/95 JJ

CERTIFICATION

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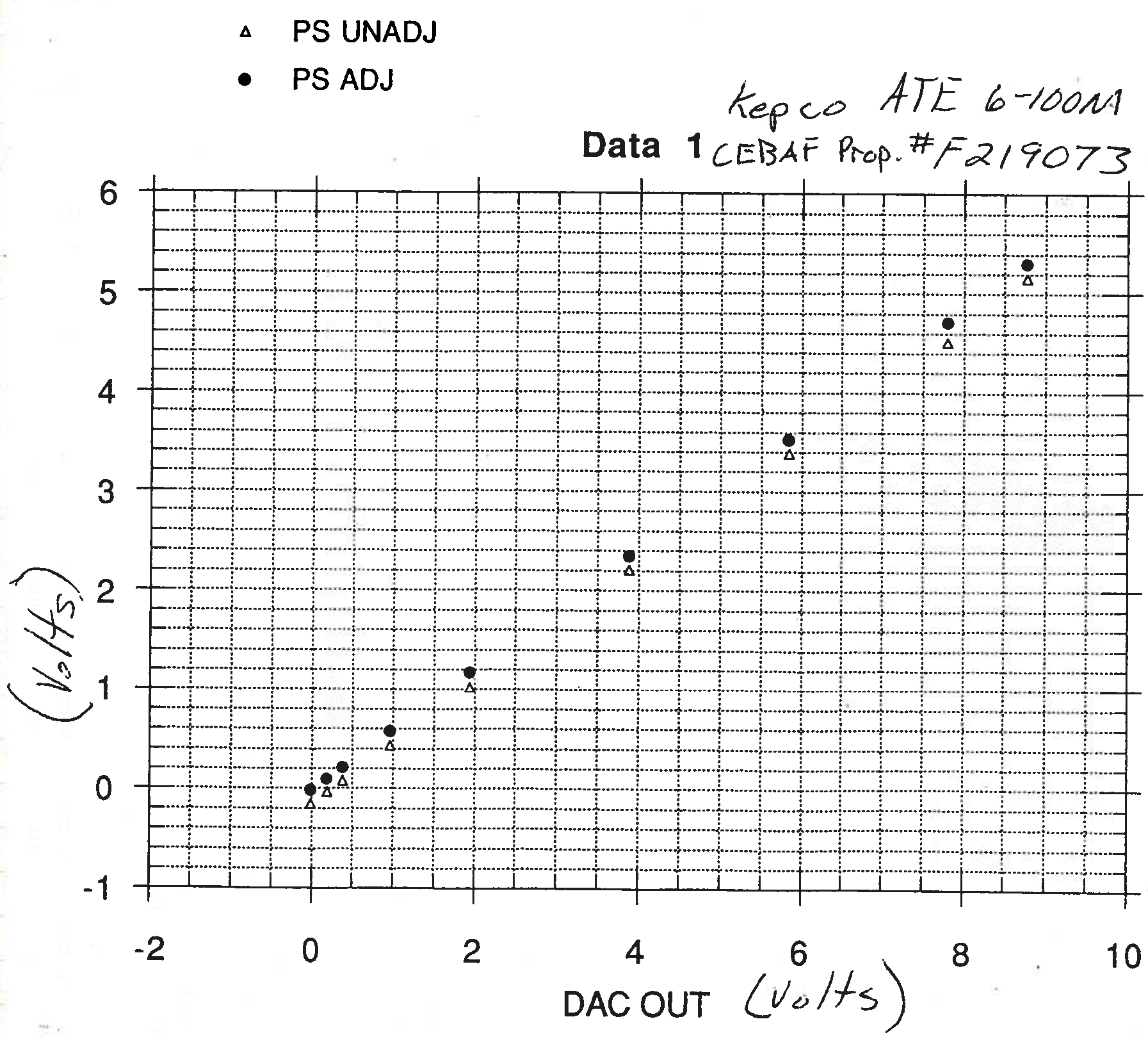
J. P Jones
AUTHORIZED SIGNATURE

Linearity of Kepco Supplies

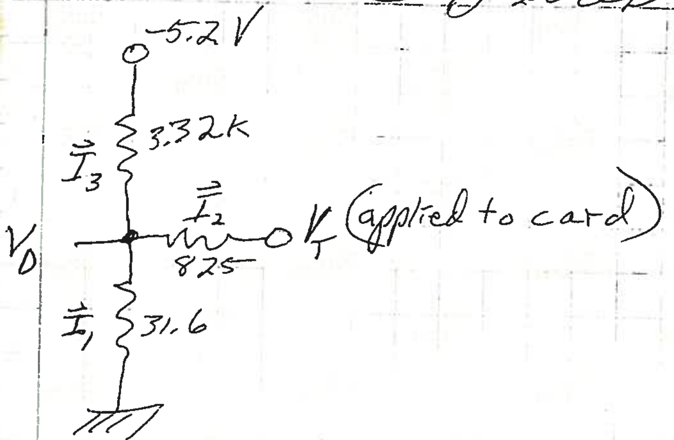
10/16 JA

Ouput of KEPCO supply when set for remote voltage programming.



3/16

2735DC Threshold



$$V_D = 31.6\, I_1$$

$$I_1 = I_2 - I_3$$

$$I_3 = \left(\frac{-5.2 - V_D}{3.32k}\right)$$

$$I_2 = \left(\frac{V_T - V_D}{825}\right)$$

$$V_D = 31.6\left[\frac{(V_T - V_D)}{825} - \frac{(-5.2 - V_D)}{3.32k}\right]$$

$$V_D = 31.6\left(\frac{V_T}{825} - \frac{5.2}{3320} - \frac{V_D}{825} + \frac{V_D}{3320}\right)$$

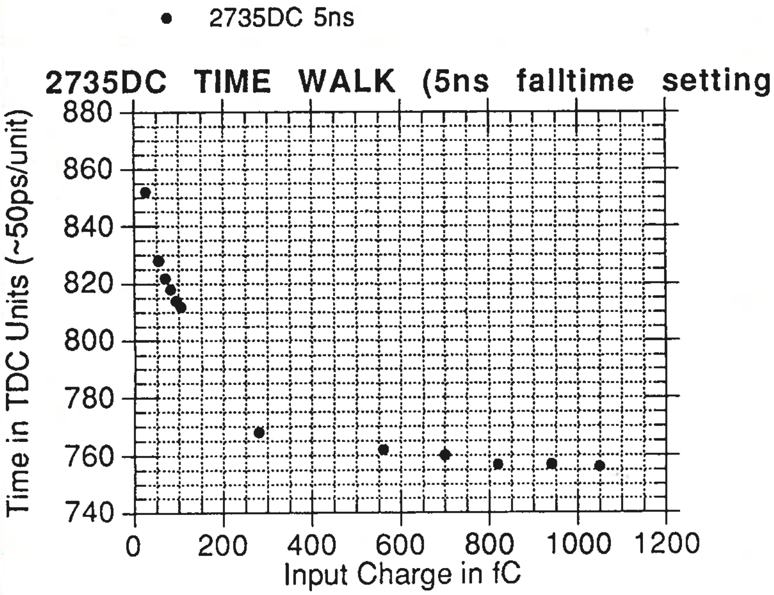
$$V_D = 31.6\left[\frac{V_T}{825} - \frac{5.2}{3320} - V_D\left(\frac{1}{825} - \frac{1}{3320}\right)\right]$$

$$\frac{V_D}{31.6}\left[1 + 31.6\left(\frac{1}{825} - \frac{1}{3320}\right)\right] = \frac{V_T}{825} - \frac{5.2}{3320}$$

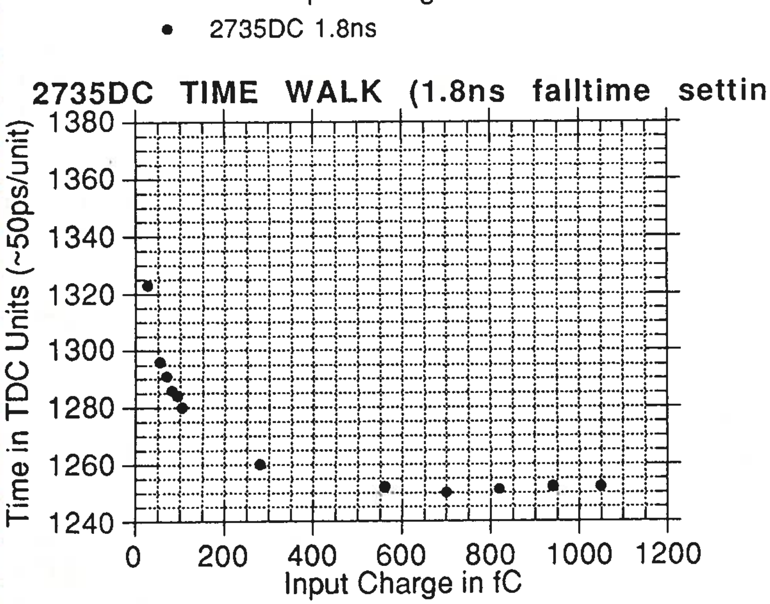
$$.033\, V_D = \frac{V_T}{825} - .00157$$

$$V_D = .03723\, V_T - .04822$$

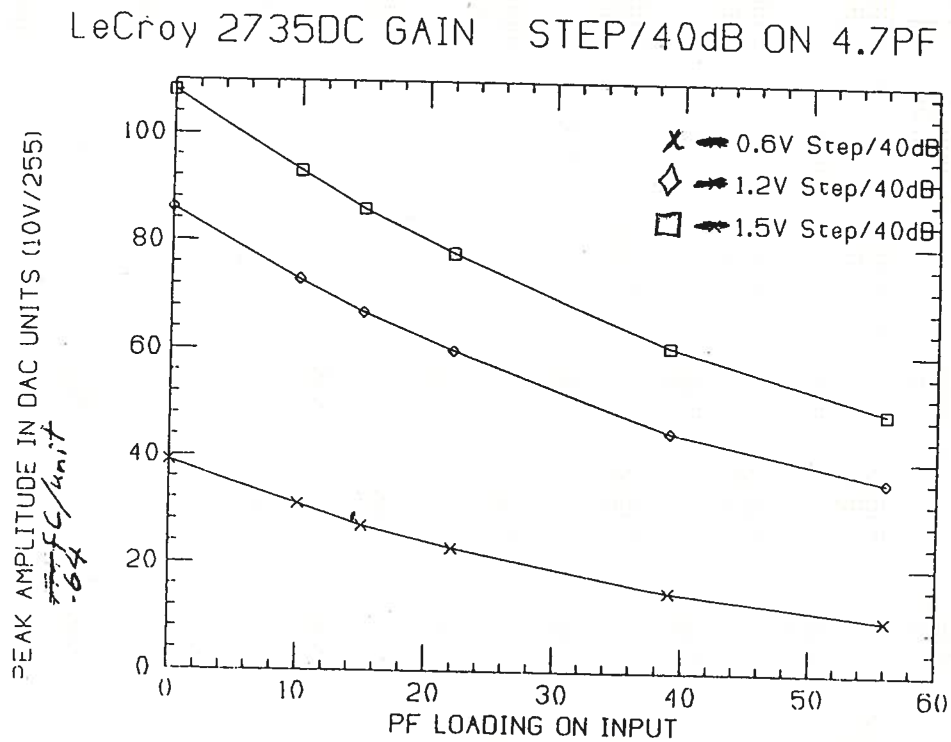
$V_D = 0$ @ $V_T = 1.295\,V$



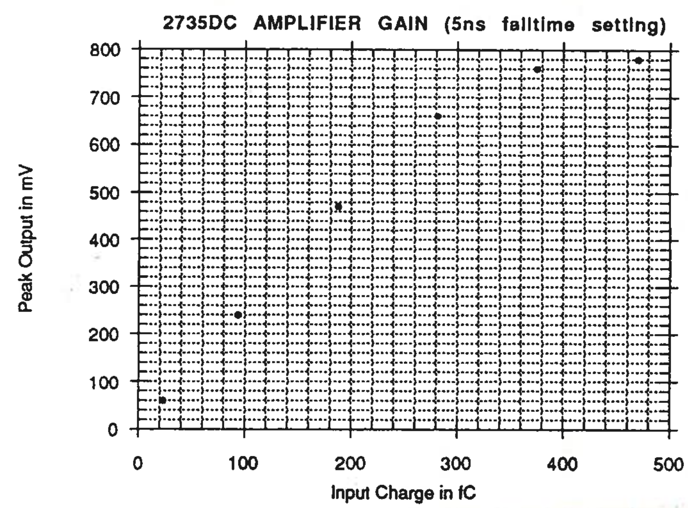
2735DC 5ns
2735DC TIME WALK (5ns falltime setting
Time in TDC Units (~50ps/unit)
880
860
840
820
800
780
760
740
0
200
400
600
800
1000
1200
Input Charge in fC



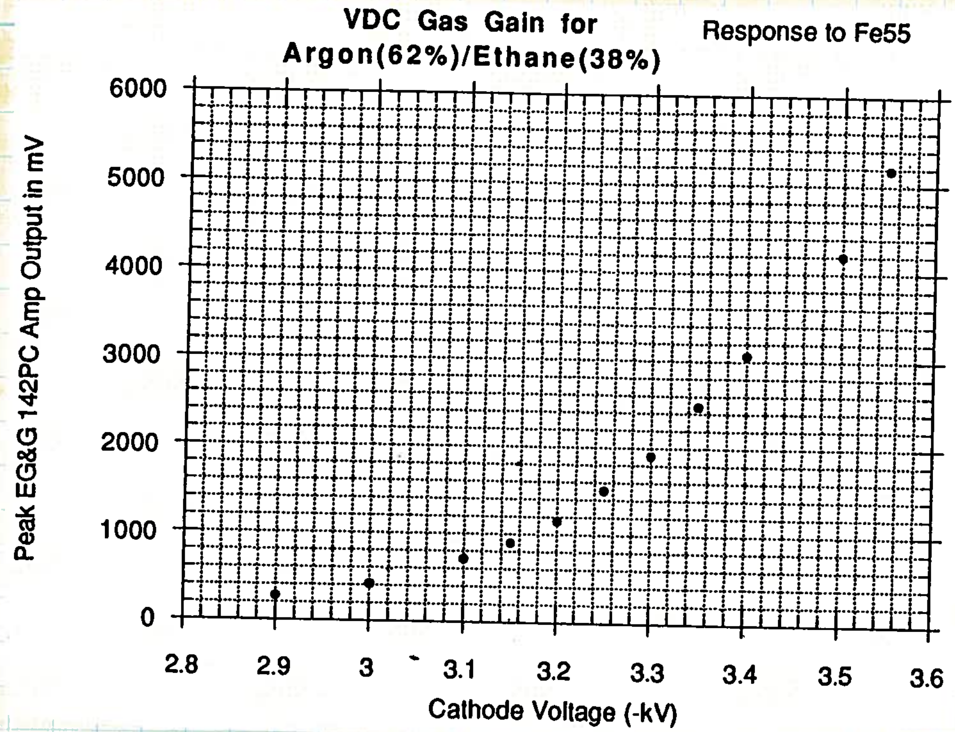
2735DC 1.8ns
2735DC TIME WALK (1.8ns falltime settin
Time in TDC Units (~50ps/unit)
1380
1360
1340
1320
1300
1280
1260
1240
0
200
400
600
800
1000
1200
Input Charge in fC

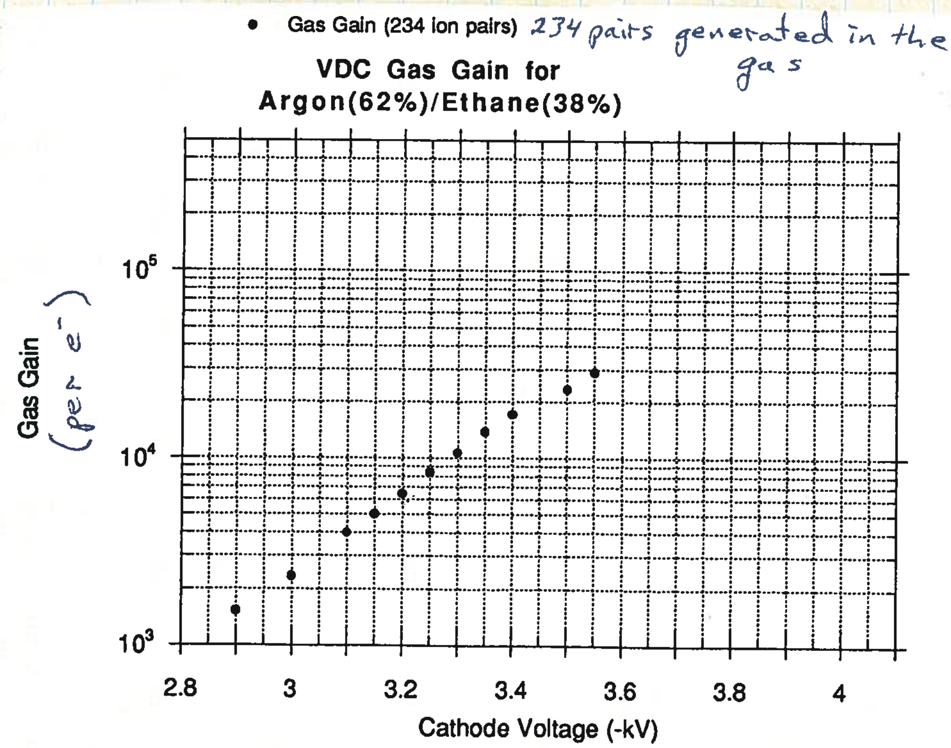


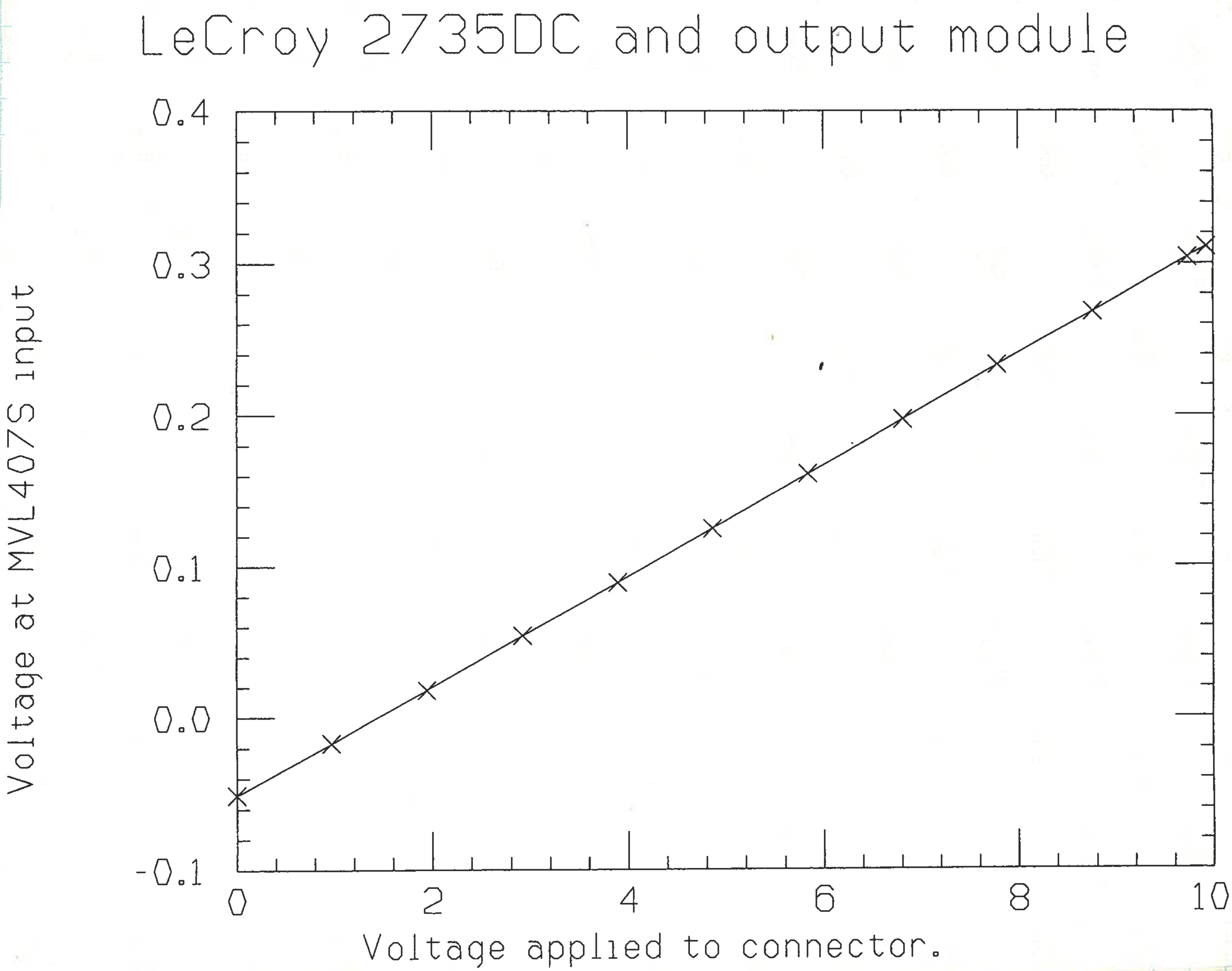
LeCroy 2735DC GAIN STEP/40dB ON 4.7PF
PEAK AMPLITUDE IN DAC UNITS (10V/255)
.64 fC/unit
0.6V Step/40dB
1.2V Step/40dB
1.5V Step/40dB
100
80
60
40
20
0
0
10
20
30
40
50
60
PF LOADING ON INPUT



2735DC AMPLIFIER GAIN (5ns falltime setting)
Peak Output in mV
800
700
600
500
400
300
200
100
0
0
100
200
300
400
500
Input Charge in fC


VDC Gas Gain for
Argon(62%)/Ethane(38%)
Response to Fe55
Peak EG&G 142PC Amp Output in mV
6000
5000
4000
3000
2000
1000
0
2.8
2.9
3
3.1
3.2
3.3
3.4
3.5
3.6
Cathode Voltage (-kV)


Gas Gain (234 ion pairs)
234 pairs generated in the gas
VDC Gas Gain for
Argon(62%)/Ethane(38%)
Gas Gain
(per e⁻)
10^5
10^4
10^3
2.8
3
3.2
3.4
3.6
3.8
4
Cathode Voltage (-kV)


LeCroy 2735DC and output module
0.4
0.3
0.2
0.1
0.0
-0.1
0
2
4
6
8
10
Voltage at MVL407S input
Voltage applied to connector.

3/26/18

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				ARGON			Balance	
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				ARGON			Balance	
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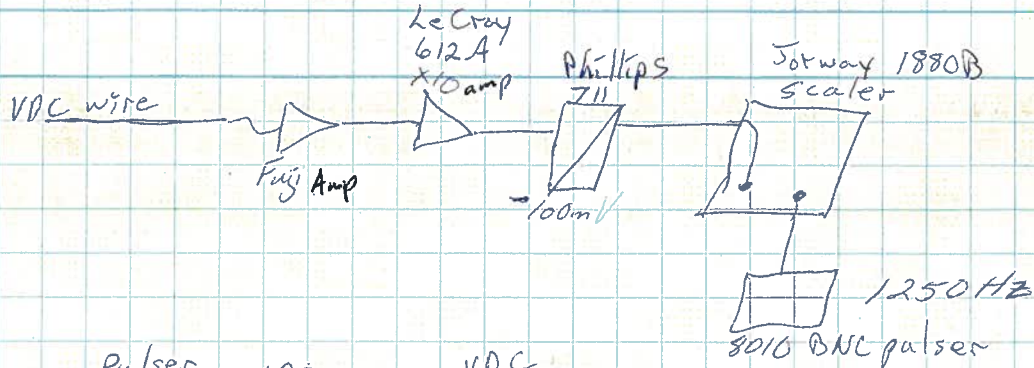
J. P. Jones
AUTHORIZED SIGNATURE

5/27
& BW



Wire	Pulser ~~cycles~~ ~~Hz~~	VDC Counts	VDC Counts/Pulser
~~1~~	~~9033~~	~~12087~~	
~~2~~	~~9037~~	~~966225~~	
3	5705	3922049	687
2	11525	2844610	247
4	6452	4360258	676
1	7579	12148	1.6
5	4567	6033	1.3
6	9685	11655	1.2
7	7077	7435	1.1
8	~~7717~~ 7736	~~77~~ 7217	
9	9001	7259	
10	8540	5829	
11	8180	4696	
12	9561	4889	
	10121	5398	

Fastbus crate was generating too much interference.

1	11068	18122	1.64
2	12937	20334	1.57
3	10542	15904	1.51
4	8076	11393	1.41
5	11016	14649	1.33
6	10169	12153	1.20
7	10541	11029	1.05
8	12597	11707	.93
9	10011	8178	.82
10	12860	8936	.69
11	13239	7852	.59
12	13698	6710	.49
13	15256	6258	.41
14	11133	3789	.34
15	12065	3346	.28
16	13455	3053	.23
			14.49

$14.49 \times 1250\,Hz = 18113$ pulses/second

Cathode @ $-3622\,V$ on voltage monitor

28 nA

$2.8 \times 10^{-8}\,C/s$

$$\frac{2.8 \times 10^{-8}}{18113} = 1.56 \times 10^{-12}\,C/\text{pulse}$$

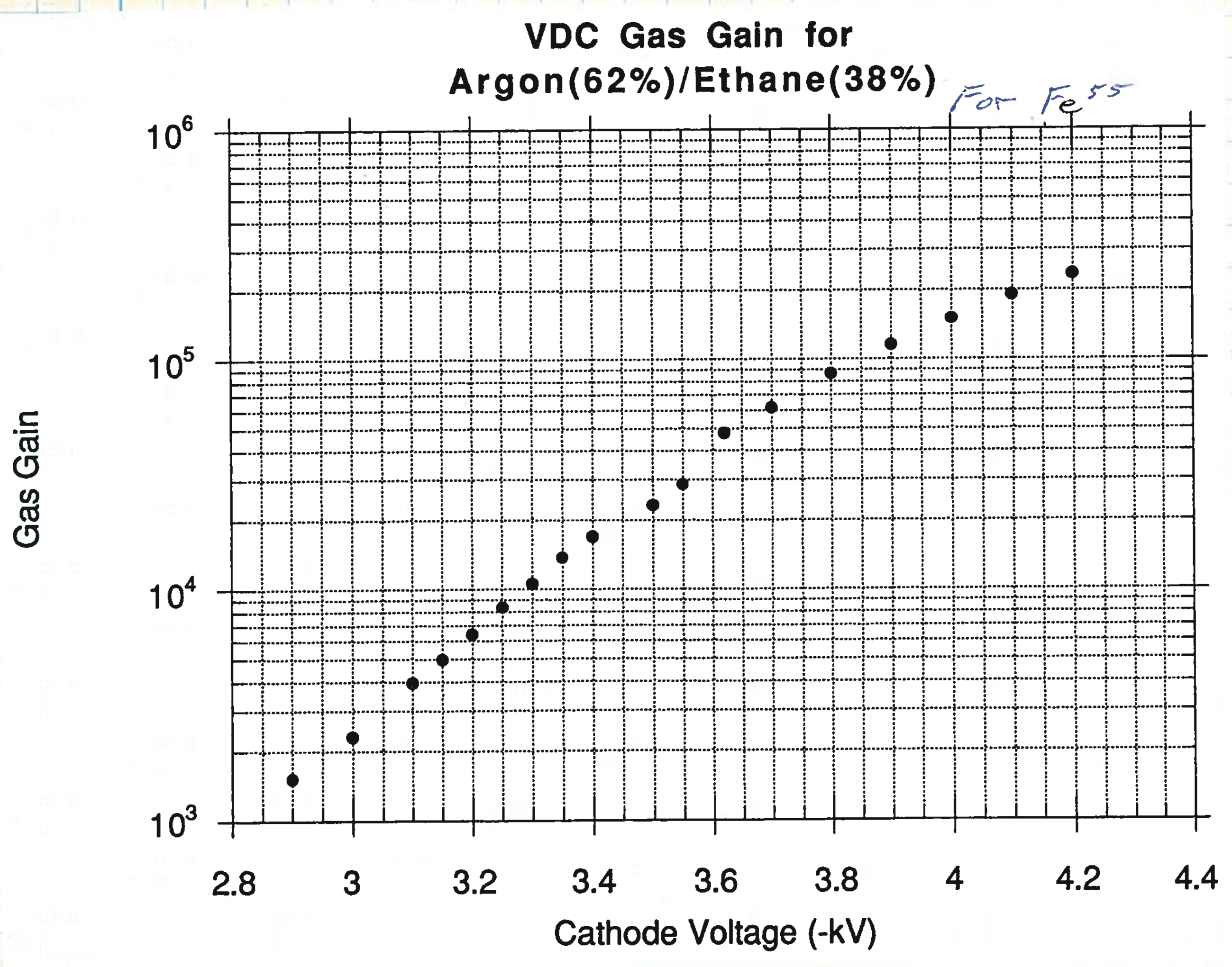
$1.6 \times 10^{-19}\,C/e$

$$1.56 \times 10^{-12} \left(\frac{1\,e^-}{1.6 \times 10^{-19}\,C} \right) = 9.75 \times 10^{6}\,e^-/\text{pulse}$$

$$\frac{9.75 \times 10^{6}\,e^-/\text{pulse}}{234\ \text{ions}/\text{pulse}} = 4.2 \times 10^{4}\,e^-/\text{ion pair}$$

Bogdan extended the range of measurements using the Keithly ammeter.

V (-kV)	mA
3.62	32.7
3.7	42.2
3.8	59.0
3.9	79.0
4.0	102.5
4.1	129.5
4.2	159.5
3.62	30.9



5/31

Previously I measured the overall length of the VDC.

frame is 97 11/16" (Stanley 12' tape)

2461mm ÷ 25.4 = 96.89"

$$\begin{array}{r} 97.69 \\ -96.89 \\ \hline .80 \end{array}$$

" longer than specified

4/18/98
JS

A long time ago I wrote a short note to the guys at MIT.

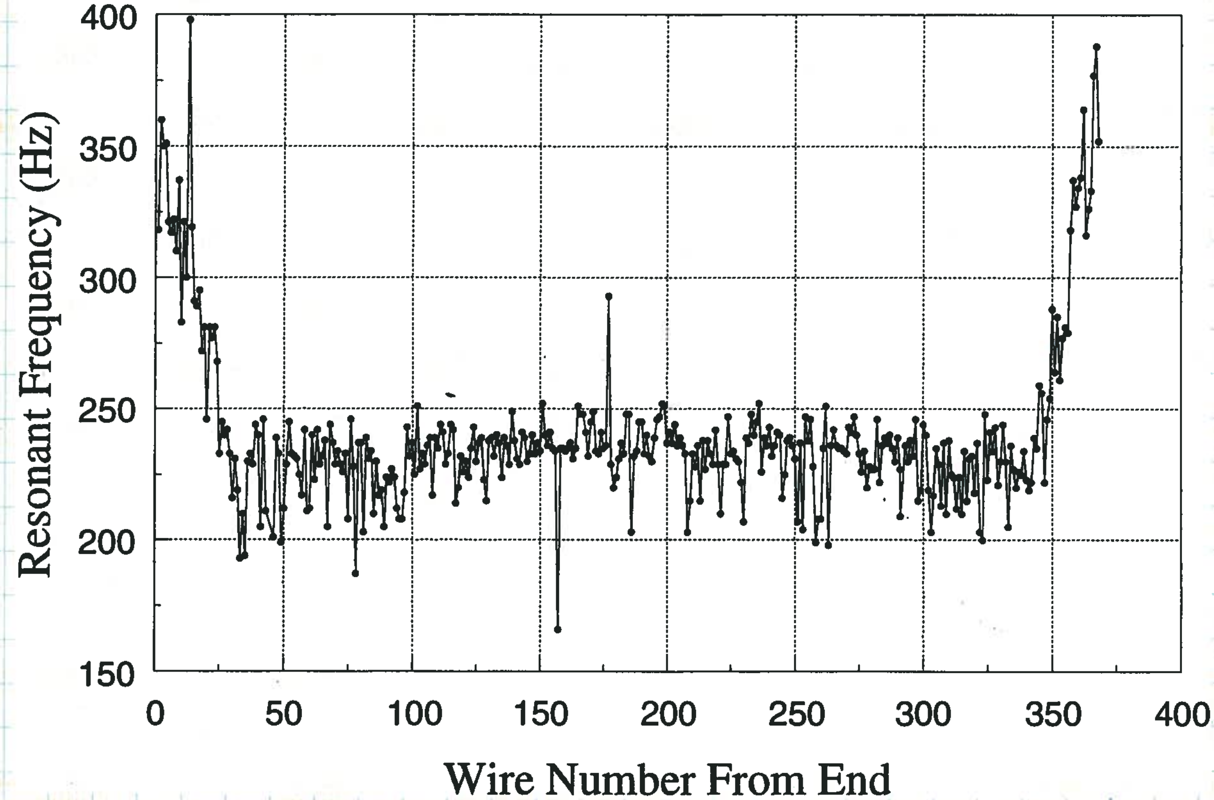
I would like to address the question of lifetime of the VDC's vs. Gain.

Let there exist an amplifier, LeCroy 2735DC, such that its gain with 15pF capacitance on the input is 1.8mV per fC of input charge. This is what I find for bench measurements of this amplifier. (My logbook p.112)
Furthermore, let the threshold to input charge have a relationship of
fC input = ((.036*Threshold voltage) + .0075V) / (.0018 V per fC)
(My logbook p.136)
This is in agreement with bench measurements made by me, Jack Segal. Thus
a Threshold of 5V => 104fC of input charge and
a Threshold of 8V => 164fC of input charge
Given 6250 electrons = 1fC
104fC = 6.5 * 10**5 electrons
and 164fC = 1.03 * 10**6 electrons
If only 10% of the total charge is accumulated in the initial portion of the wire chamber signal the gain must be 10 times greater than that required to exceed threshold. So,
for 5V threshold => 6.5 * 10**6 electrons
for 8V threshold => 1.03 * 10**7 electrons
Assume the gas used is Argon/Isobutane at a ratio of 50/50.
Then, as given in the sacred text of Sauli(p.9),
the number of primary ion pairs per cm will be 37.7/cm and
the total number of ion pairs per cm will be 144.7/cm
Given a wire spacing of 4.23mm and a track angle of 45 degrees
then (4.23 * 2**0.5 * 2**0.5) = 8.46mm per track in a cell
(This is not used in the calculation.)
Given a cathode to cathode spacing of 26mm and a track angle of 45 degrees
then (26 * 2**0.5) = 36.8mm per track in a plane
(This is used in the calculation.)
Since 36.8mm per track and 144.7 ion pairs per cm
36.8 * 14.47 = 532 ion pairs per track per plane
Assume the first electron is sufficient to cross threshold.
Assume the overall gain is 0.6*(Gain for the first electron) due to the 45 degree inclination of the track with respect to the sense wire and the physical size of the avalanche. These two affect shielding of charge.
For 5V threshold this gives
(0.6 * (6.5*10**6 electrons)) * 532 ion pairs = 2.1*10**9 electrons
= 332pC per track per plane
For 8V threshold this gives
(0.6 * (1.03*10**7 electrons)) * 532 ion pairs = 3.3*10**9 electrons
= 526pC per track per plane
Assume a uniform flux of particles over the active area of VDC1
1666.9mm[dispersive*2**0.5] * 113.2mm[transverse] = 188697[mm**2]
For one wire
113.2mm * 2**0.5 = 160.1mm long and covers an area
160.1mm * 4.23mm = 677.2(mm**2)
which is 0.36% of the active area of the VDC1.
Assume the particle flux is 1MHz over the VDC1 active area.
For 5V threshold there will be 1*10**6 * 332pC = 332uC per second per plane
For 8V threshold there will be 1*10**6 * 526pC = 526uC per second per plane
Given that 1 year = 31536000 seconds
For 5V threshold there will be 10470C per plane per year
= 10470C * .36% = 38C per wire per year
= 38C / 16cm = 2.4C per cm per year
For 8V threshold there will be 16590C per plane per year
= 16590C * .36% = 60C per wire per year
= 60C / 16cm = 3.7C per cm per year

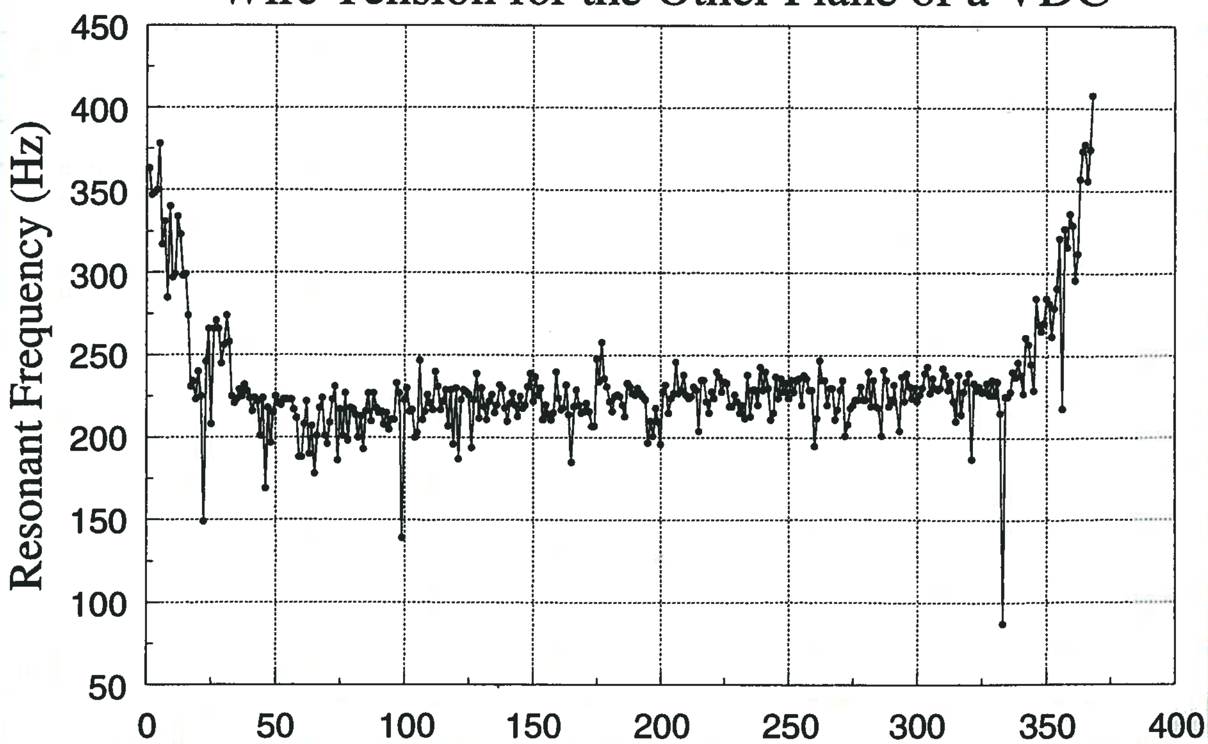
VDC Wire Tension Measurements 6/21/98

A long time ago (the data file shows 8/26/95 for PSI Plot data) I measured the wire tensions on both planes of a VDC.

Wire Tension for One Plane of a VDC



Wire Tension for the Other Plane of a VDC



Circuit used was a bridge modeled
after NIM A324 (1993) 551-557 N. Shenhav

Calculate the energy delivered to the capacitor before the power supply shut down.

HV (KV)	VK		Bertan		LeCroy		Caen	
	V_cap	CV^2/2 (μJ)	V_cap	CV^2/2 (μJ)	V_cap	CV^2/2 (μJ)	V_cap	CV^2/2 (μJ)
1	21	2205	1.9	18	0.2	0.2	3.6	64.8
1.5	35	6125	2.6	34	0.31	0.5	4.1	84.1
2	50	12500	3.3	54	0.43	0.9	4.4	96.8
Avg. Effective Capacitance		5.4E-09		3.1E-11		4.3E-13		8.4E-11

From measured charge-up of capacitor and known current from supply voltage / limiting resistor, calculate how long the charging current was on.

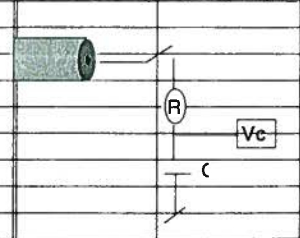
$V=Q/C = I \cdot tau/C$

HV (KV)	I (μA)	effective tau (sec)			
		VK	Bertan	LeCroy (SOT=14)	CAEN (10μA limit)
1	196	1.1	0.10	0.010	*0.184*
1.5	294	1.2	0.09	0.011	*0.139*
2	392	1.3	0.08	0.011	*0.112*

The Bertan and VK supplies appear to deliver full power until they trip after some time delay. From the data we see that the Bertan time constant is about 10x shorter than the VK.

The LeCroy system trips by opening a relay after some number of 'samples-over-threshold', where a sample is taken roughly every millisecond. It is by far the fastest to trip of the supplies tested and delivers the least energy to the short circuit. <u>However, the LeCroy supply disables its trip circuit during voltage ramp-up. Thus it appears that it will deliver all its available power into a pre-existing short circuit after a reset or turn-on.</u>

The CAEN supply both current limits and trips. Apparently it is a constant-voltage supply as long as the load current is below the set limit. When the limiting current is reached the supply lowers the voltage in order to supply only the specified current. If this current is delivered for more than about 3 seconds the channel trips off.



cap	1.00E-05
res	5.10E+06

So continue to use Bertans!

HH 3/25/18

1/5/99 VDC Analog Signals

JA

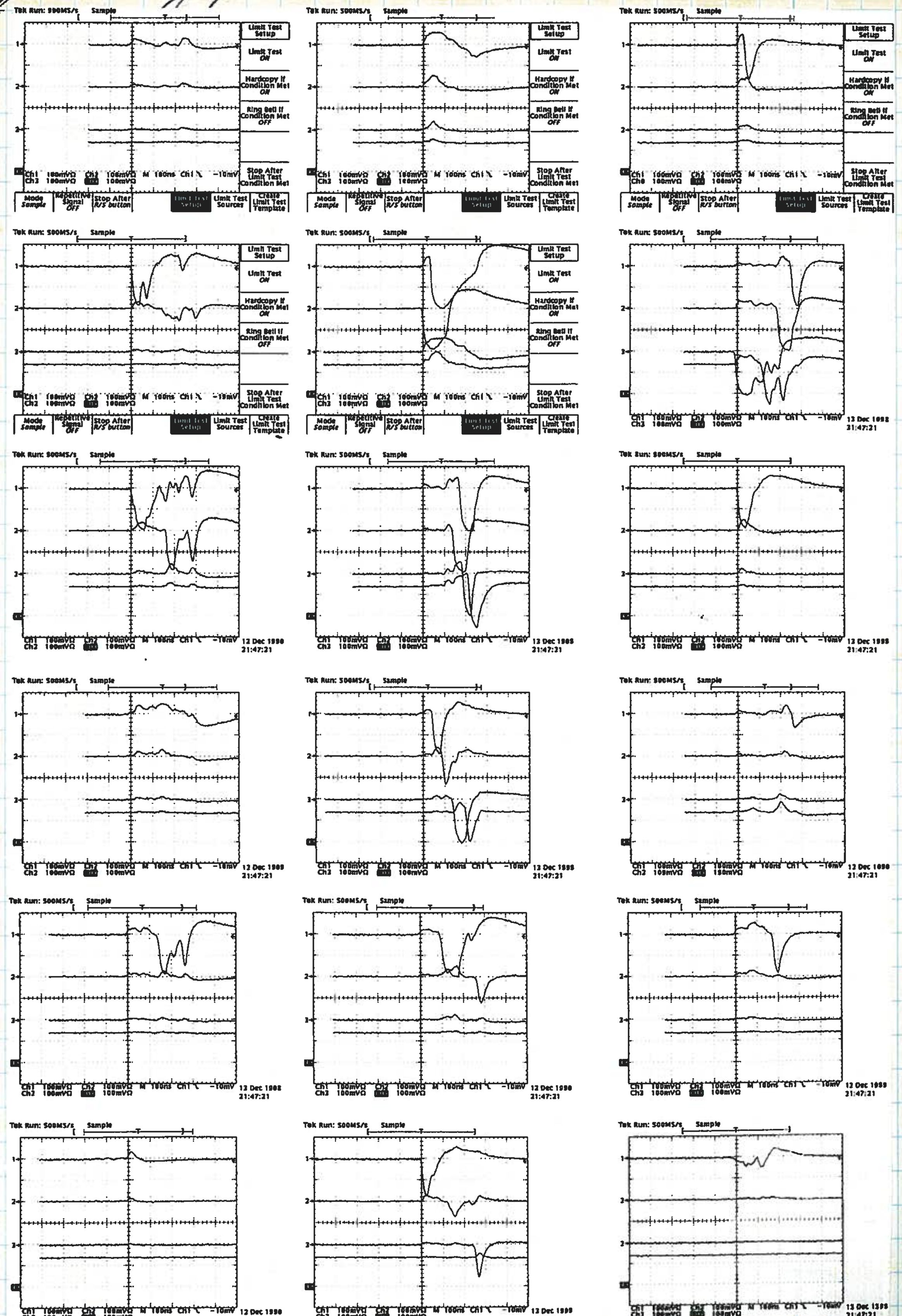
I put a modified 2735 DC amplifier card on the low momentum end of the upper plane of the lower VDC. It was in the first slot. The 2735 DC card has some MAX 435s on it to pick off the analog signal.

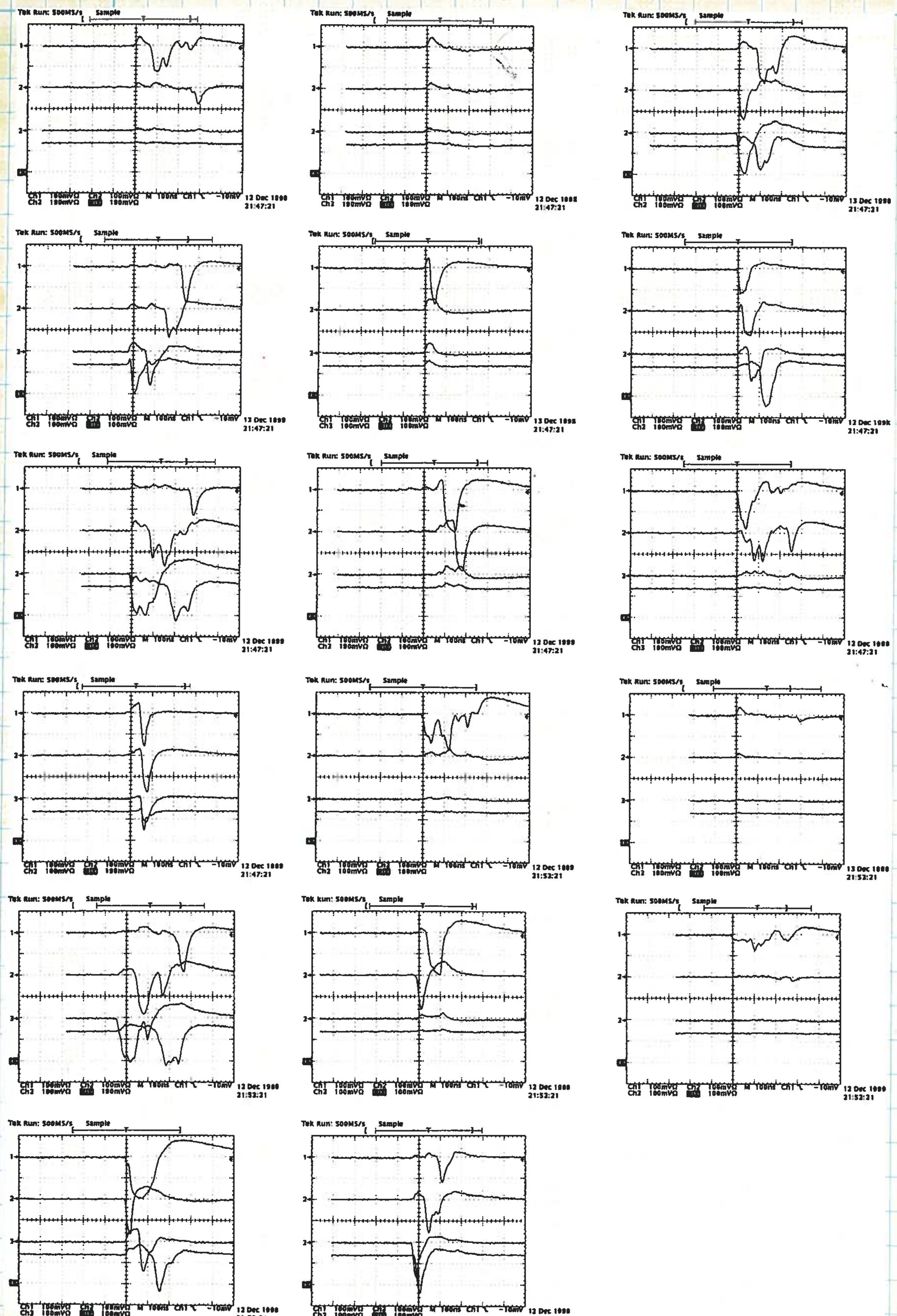
I got 4 baluns to run the analog signal through coax up to the counting house.

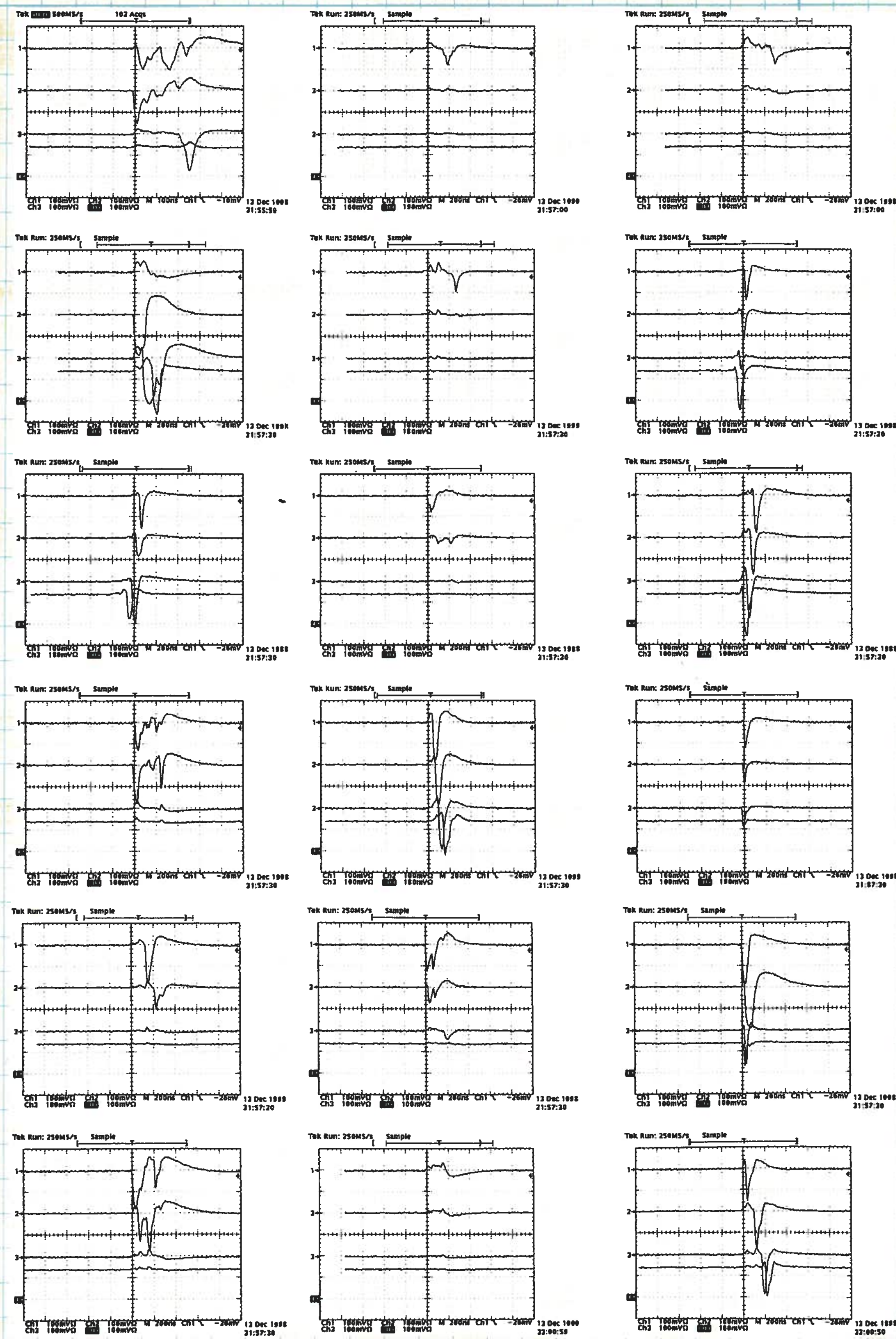
The cable routing was

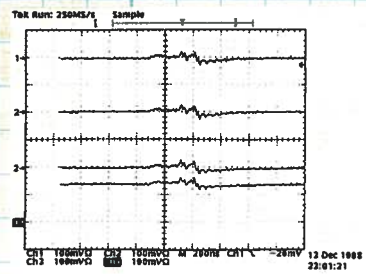
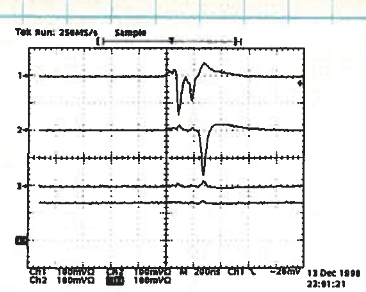
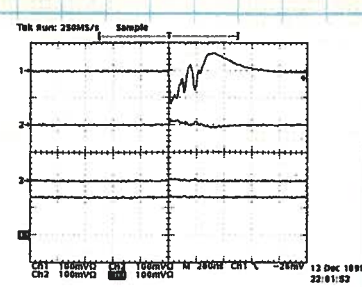
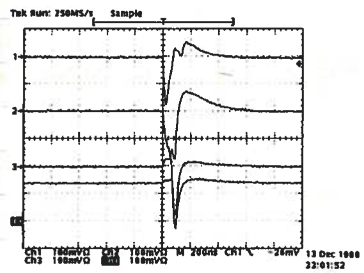
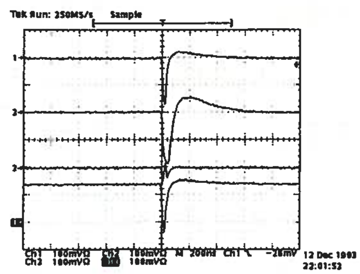
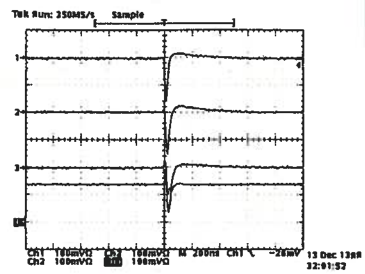
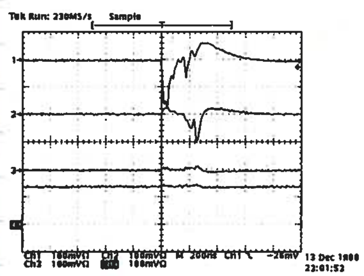
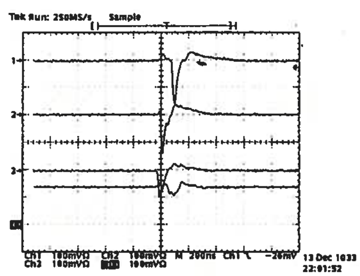
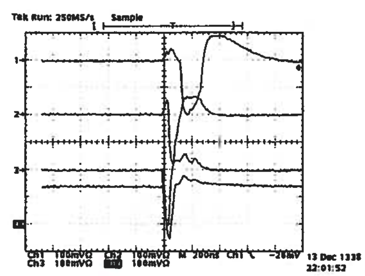
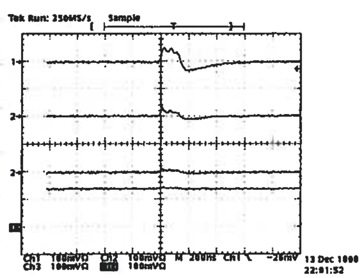
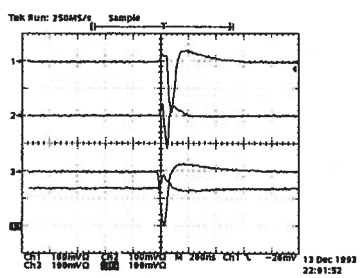
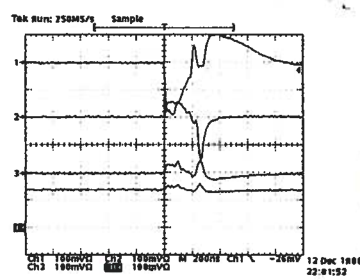
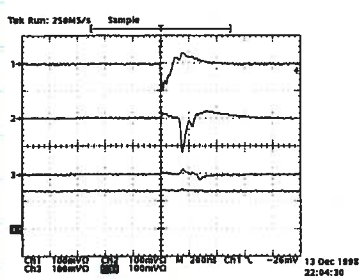
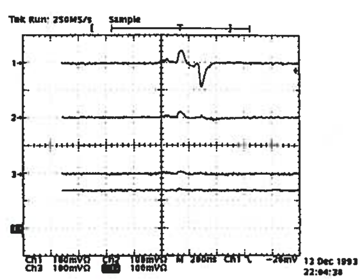
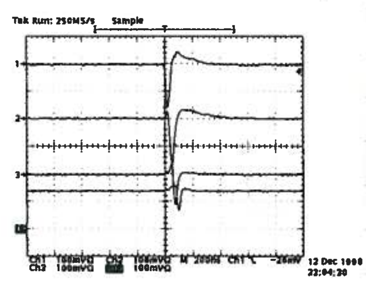
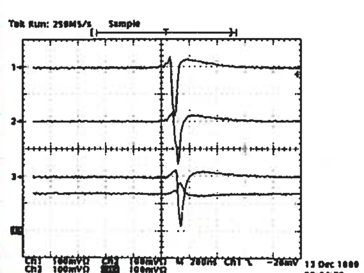
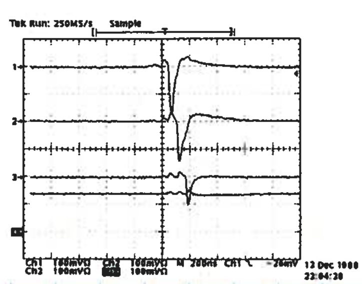
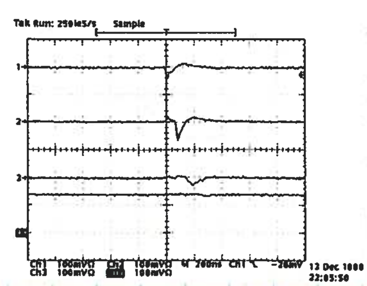
ribbon cable line	balun type	RG58 to rear of stack	RG-213 at rear of stack	RG-213 in counting room A
13	toko Ø7	1	8	7
14	toko Ø7	2	7	6
16	copper barrel	3	6	5
15	"large" core	4	4	9

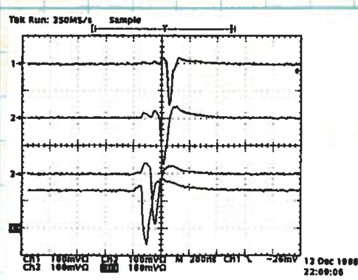
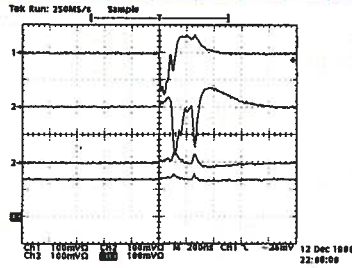
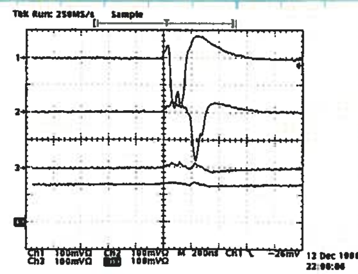
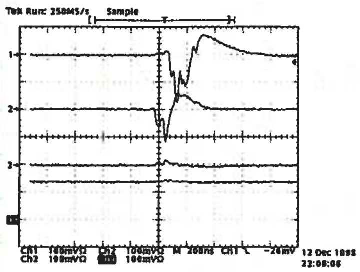
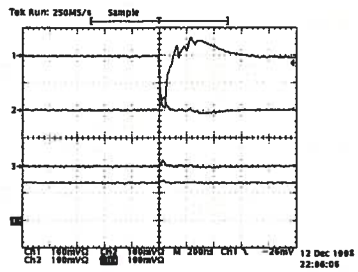
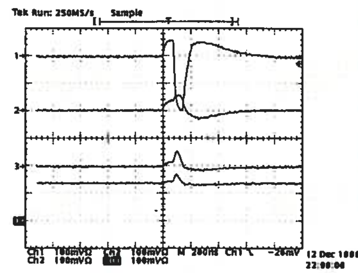
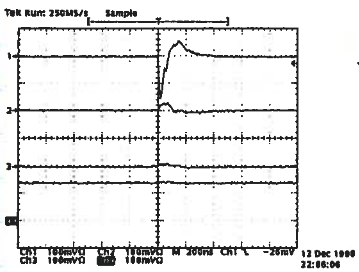
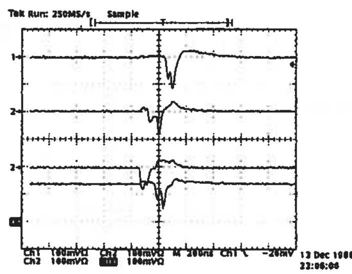
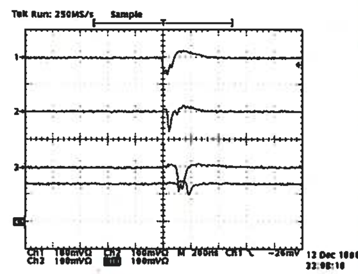
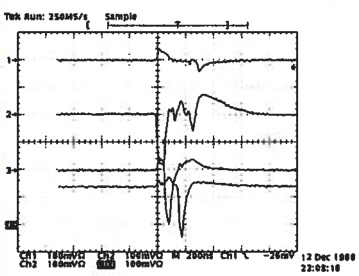
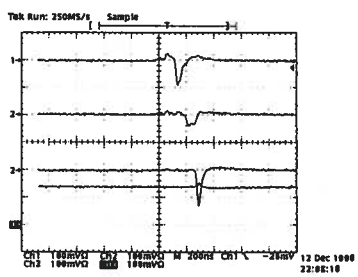
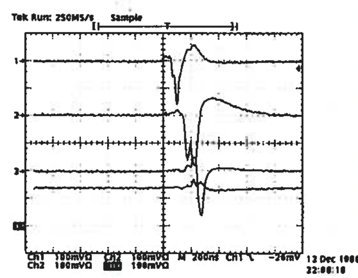
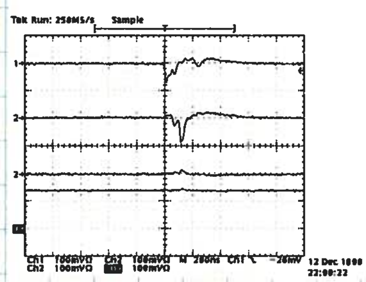
The following pictures are without beam into the Hall



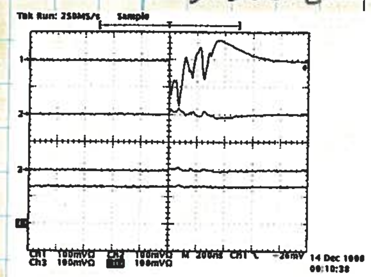
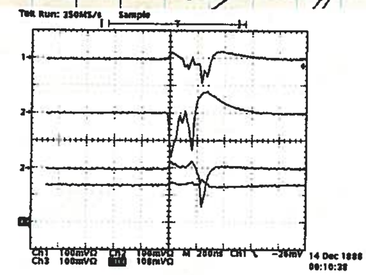
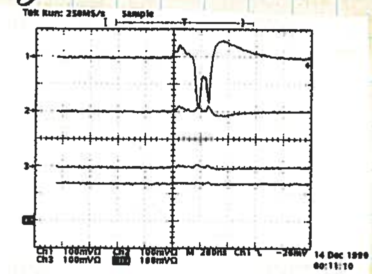
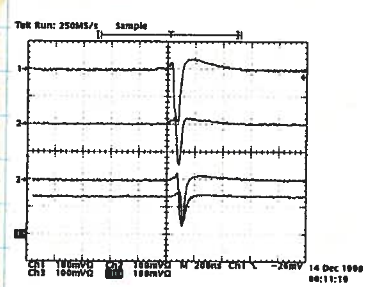
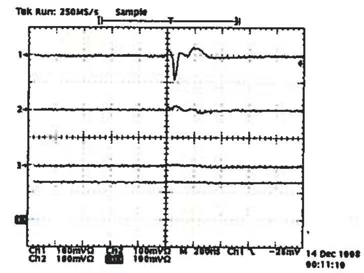
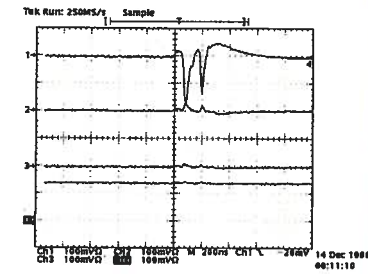
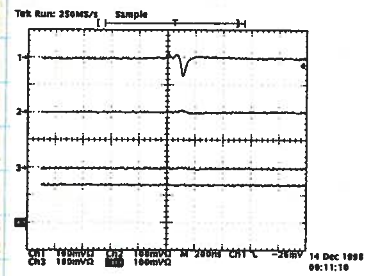
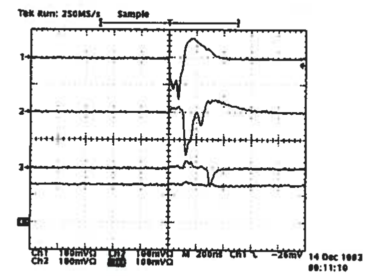
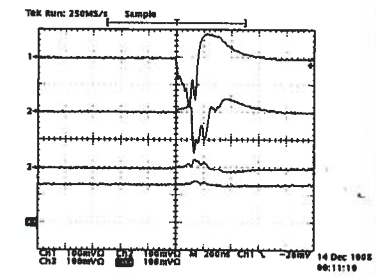
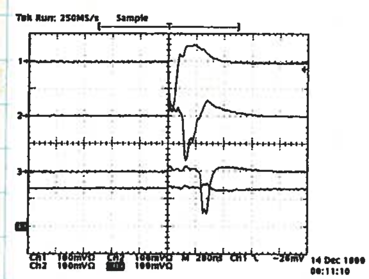
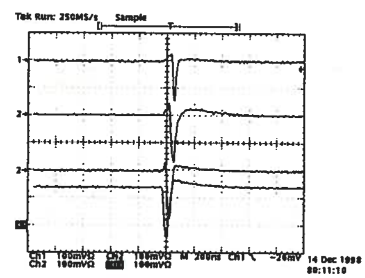
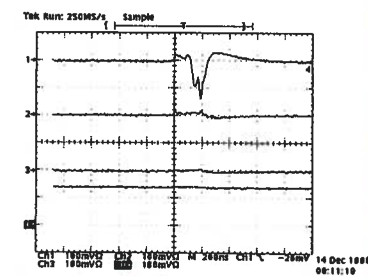
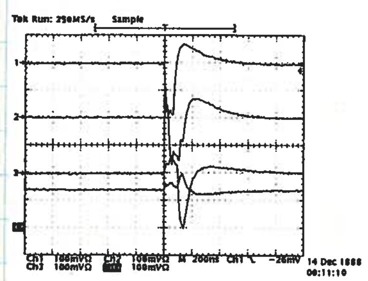
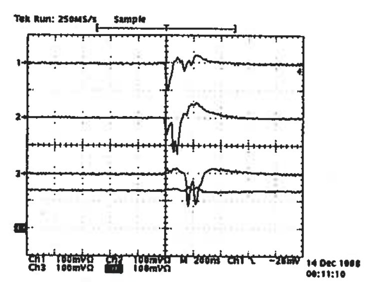
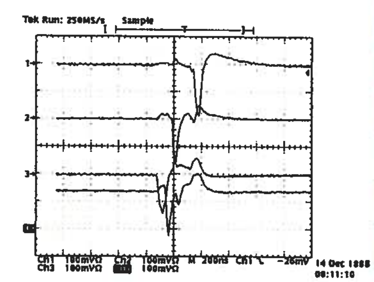
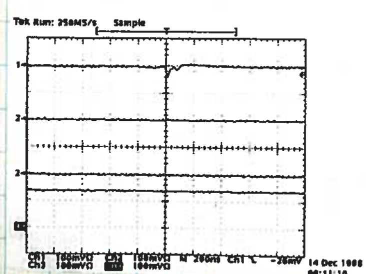
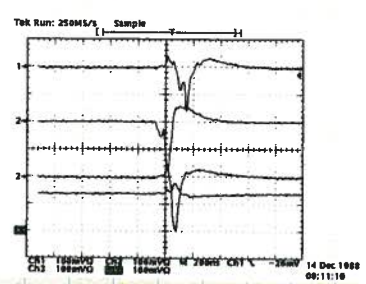
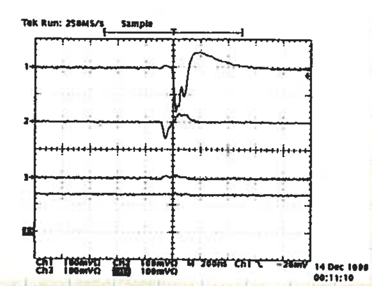


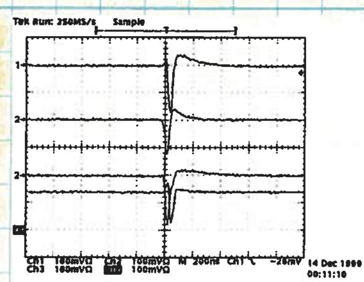
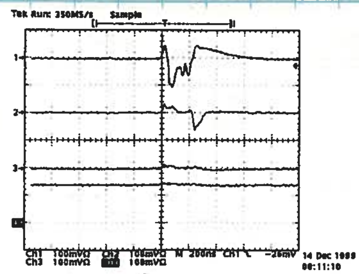
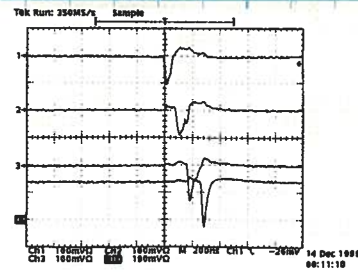
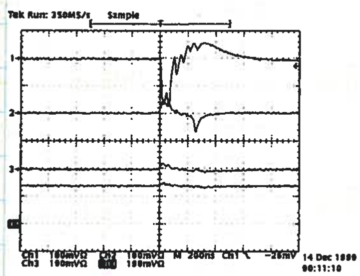
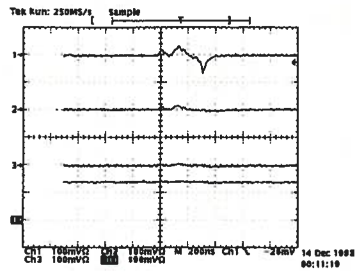
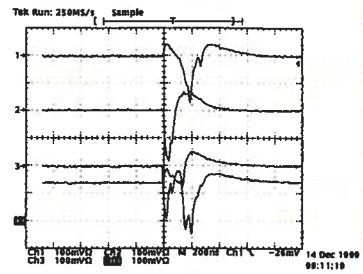
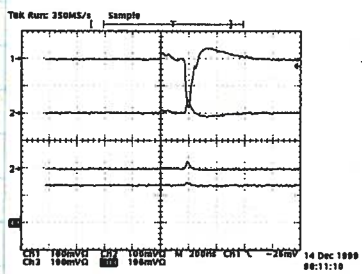
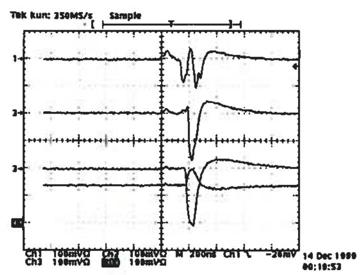
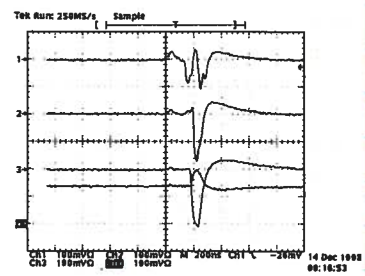
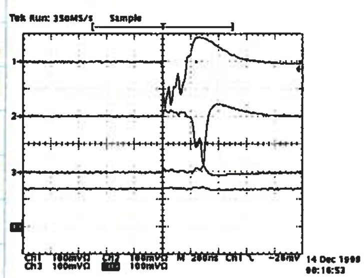
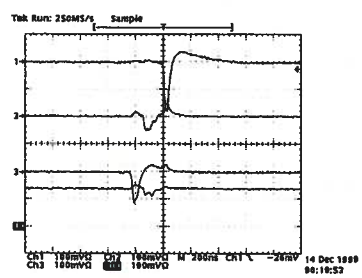
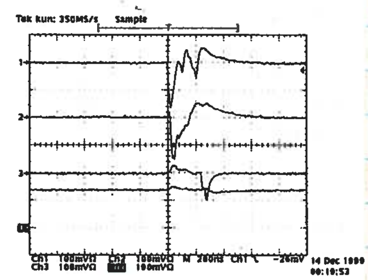
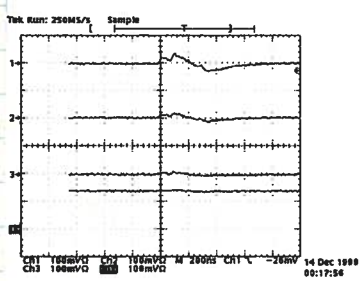
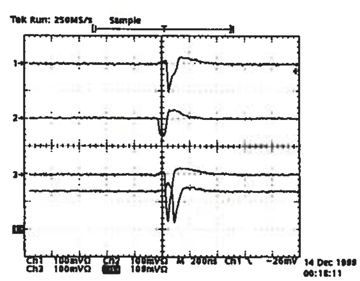
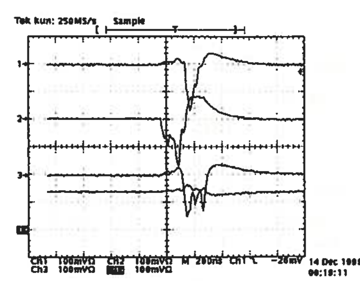
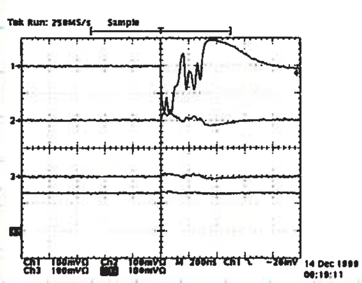
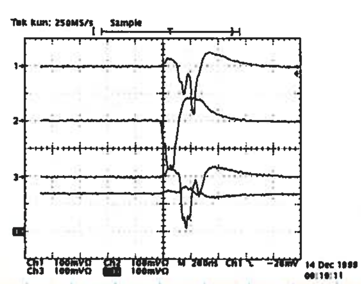
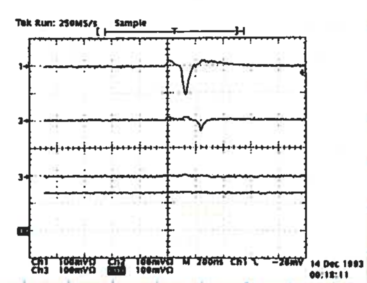


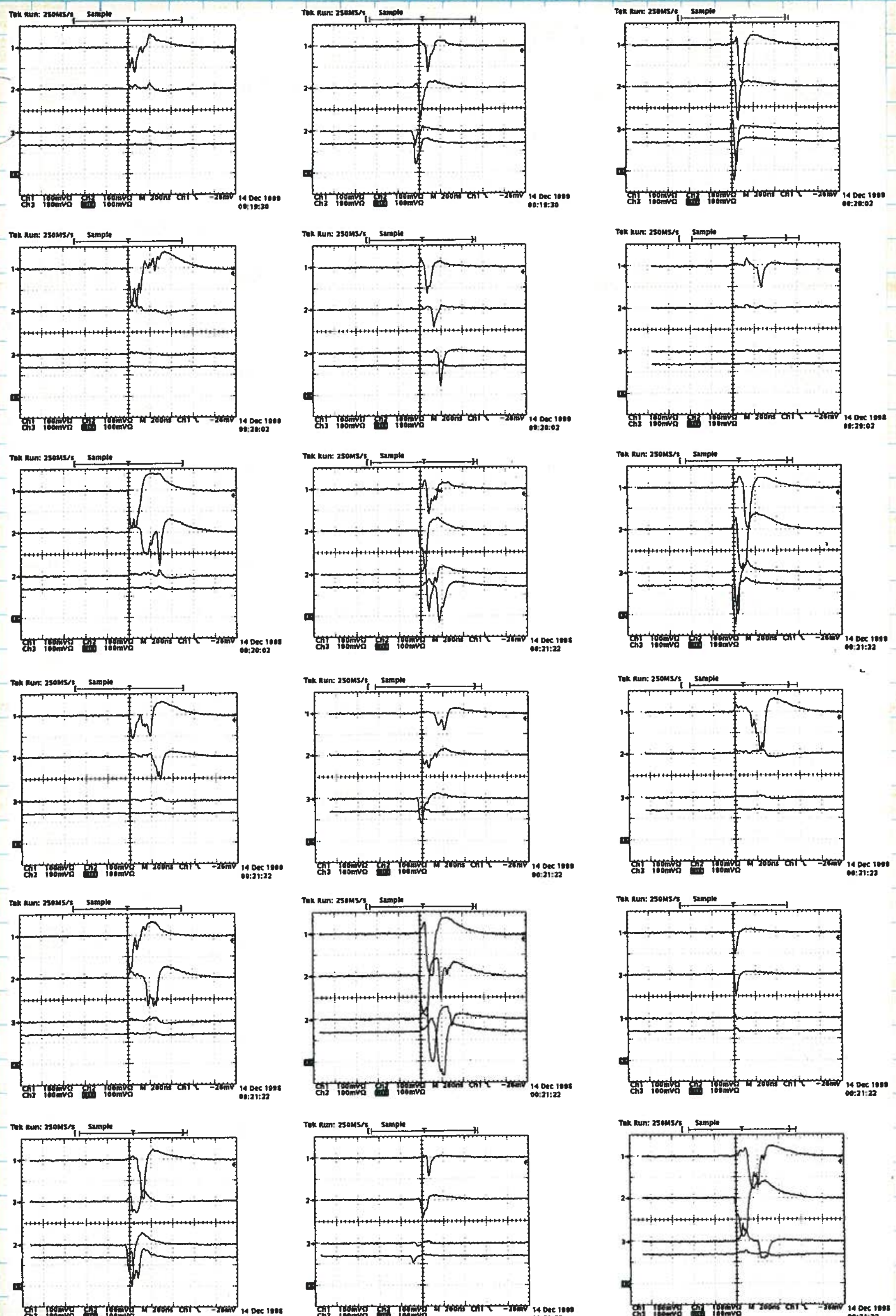



















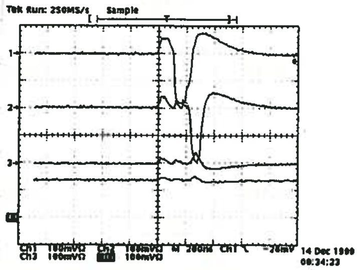














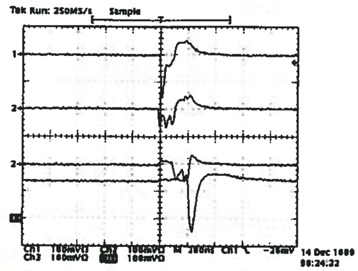
I left the scope acquiring these pictures with a little over 2μA of beam into the hall (~2.3μA)

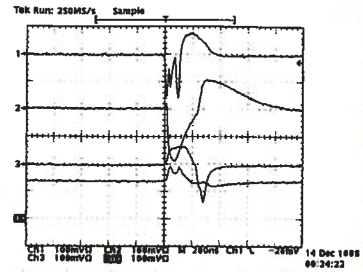




















Tek Run: 250MS/s Sample


Tek Run: 250MS/s Sample
Ch1
Ch3


Tek Run: 250MS/s Sample


Tek Run: 250MS/s Sample

11/22/99 VDC Voltage Drops

JS

At the start of this down I went up to measure the voltages on the VDC LeCroy cards on the e⁻ arm. I looked at the upper chamber, top plane ("U" cables). I measured voltages on the card, at the input power connector tabs. Also measured voltages at the power bus jumpers to the card mounts.

e⁻ VDC low voltages

top chamber (23 is high momentum) "U" cables (right side)

Used my Fluke 8060A DMM

23	4.793	-4.517	4.798	-4.520
22	4.792	-4.511		-4.518
	4.788	-4.504	4.790	
20	4.787	-4.507		
	4.787	-4.514		
	4.784	-4.502		
17	4.783	-4.499		
	4.785	-4.508		
	4.787	-4.513	4.790	-4.520
14	4.784	-4.512		
	4.788	-4.502		
	4.792	-4.503		
11	4.795	-4.511		
	4.790	-4.510		
	4.790	erratic on -5.2V		

-5.04V on cables to VDC

I find two of the -5.2V cables from the splitting terminal block have loose screws at the fuse blocks!

On the lower chamber's LV bus bar I see pieces of paper wedged between the copper strips.

Checking the tightness of all the screws, I found an additional loose one.

The +5V connections looked ok.

The +5V supply bus looks stable.
The -5.2V supply bus looks unstable. Bouncing around between -4.8 & -4.9V.

I find the + lead on the -5.2V supply hot!

	+	-
-5.2	~~106°F~~ 112°F	89°F
+5	82°F	81°F

a steady 4.989V across the supply terminals (on nut on terminal) cleaned ends of wires at power supplies using abrasive pads. Put some conductive lubricant on the ends of the wires. Hope to retard oxidation of the wire. Reconnected the wires.

On the backs of the terminal nuts I now see

5.247 V on -5.2V supply
4.987 V on +5V supply

after a few minutes of running the nuts still feel cool to the touch.

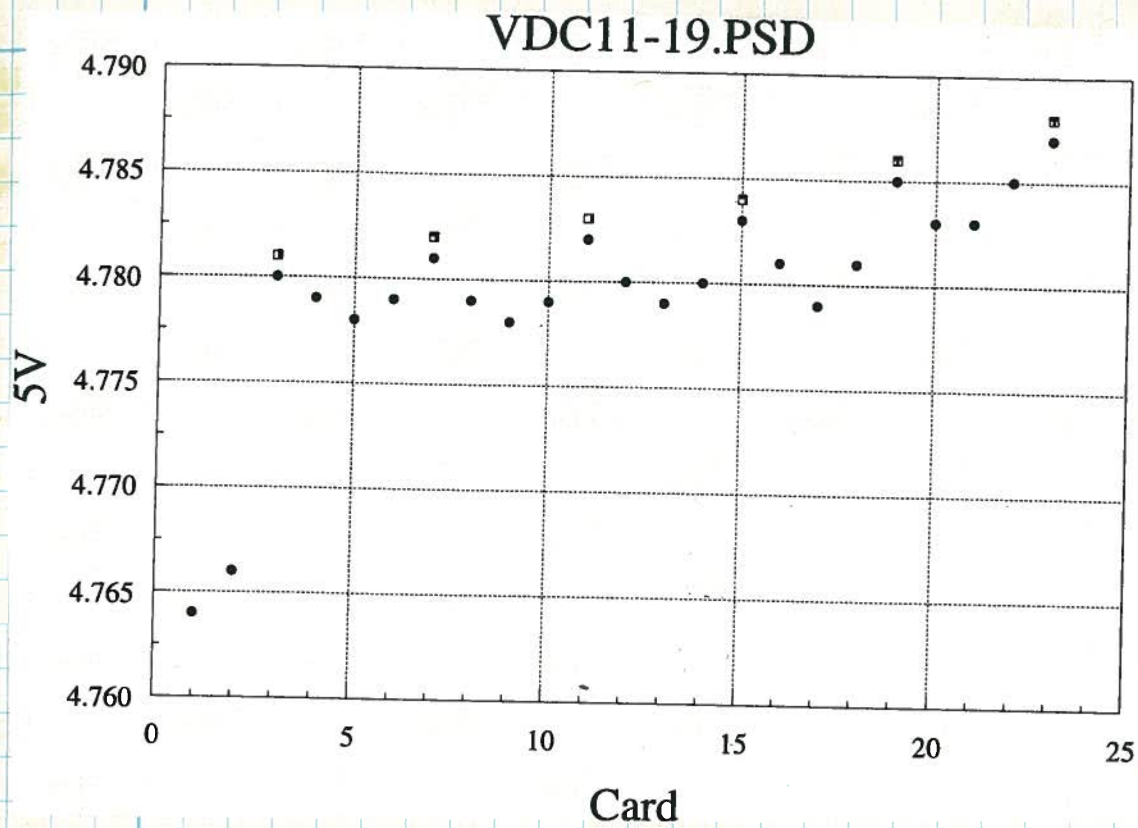
-5.2V on the chamber seems stable @ -4.757V

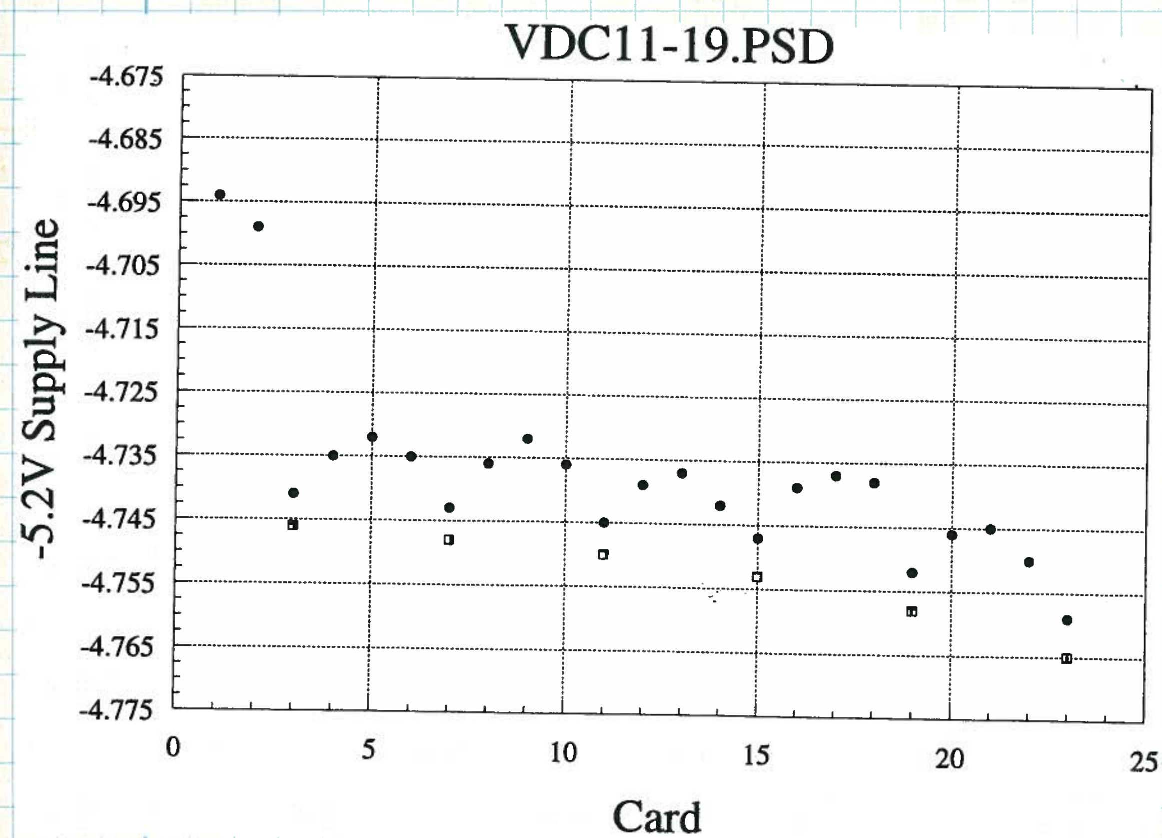
23	4.787	-4.759	4.788	-4.765
22	4.785	4.750		
21	783	745		
20	783	746		
19	785	752	4.786	-4.758
18	781	738		
17	779	737		
16	781	739		
15	783	747	4.784	-4.753
14	780	742		
13	779	737		
12	780	739		
11	782	745	4.783	-4.750
10	779	736		
9	778	732		
8	779	736		
7	781	743	4.782	-4.748
6	779	735		
5	778	732		
4	779	735		
3	780	741	4.781	-4.746
2	766	699		
1	764	694		

temp of Terminals (been ~½ hr.)

	—	+
+5V	82°F	81°F
-5.2V	91°F	90°F

-4.880	end of cables	4.829
-4.878	on term block	4.828
-4.791	at busbar connection	4.781





□ ≡ voltage at power bus jumper

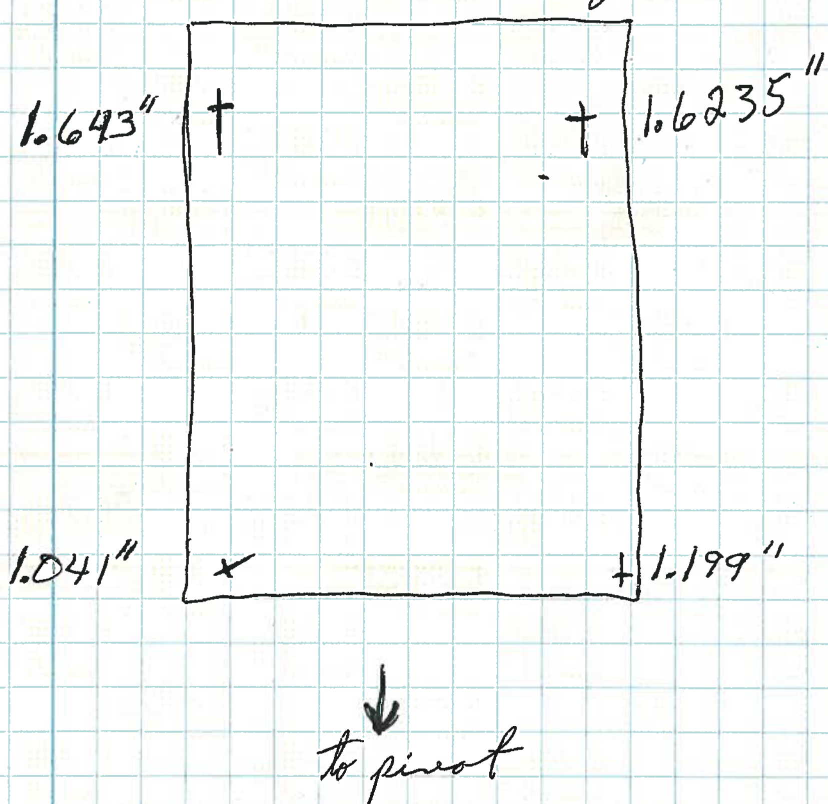
● ≡ voltage on card

Left Arm VDC Orientation

5/8/01

Checking the present orientation of the VDC on the left spectrometer.

I am using a Starrett no. 120A dial caliper to measure from the boxbeam surface to the underside of the VDC support frame. I am putting a mark on the boxbeam where I place the caliper head. A black mark from a Sharpie marking pen.

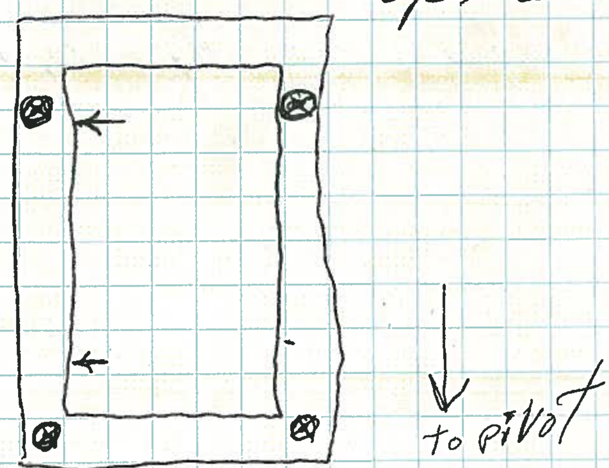


5/9/01 VDC Movement When Stack Pulled

JS

I put 6 dial indicators on the VDC support frame. One under each corner, to the Boxbeam. One along the left side toward the front. One along the left side toward the rear.

top view



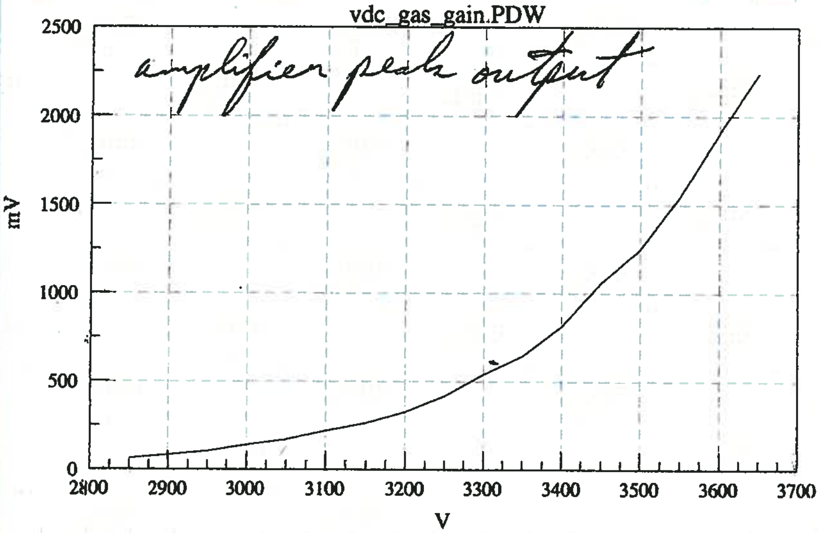
	as set up	before pulled out	after pulled out	before pull in	after pulled in
front left under	.147"	.143"	.143"	.143"	.143"
front right under	.133"	.132"	.1315"	.131"	.132"
back left under	.5315"	.5300"	.5295"	.5295"	.5295
back right under	.5535"	.5510"	.5505"	.5505"	.5505
left inside front	.935 cm	.931 cm	.928 cm	.926 cm	.9235
left inside back	.234"	.234"	.234"	.234"	.2335

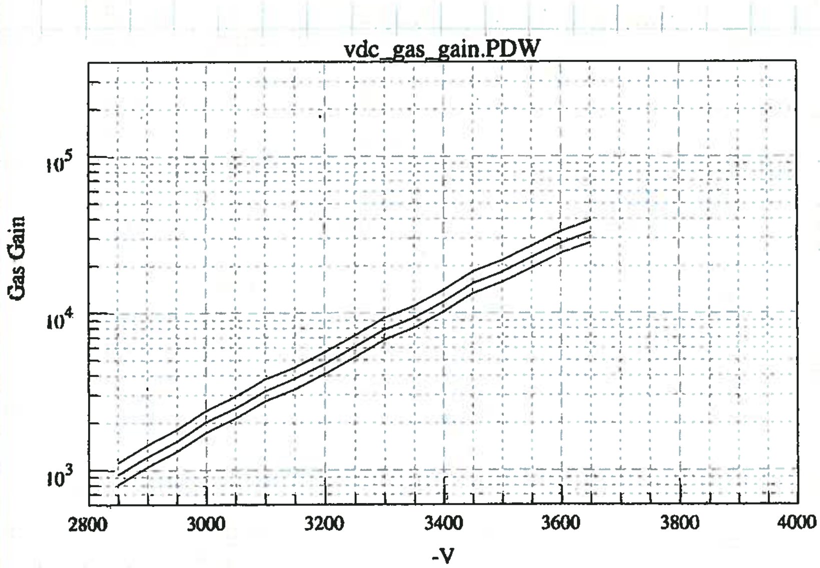
These were measurements made before and after the Detector Stack was pulled out. To see if the stack rubbing on the frame changed anything. I assume this was the Left Arm.

VDC Gas Gain in the Hall

9/29/02

Friday I took an Fe^{55} source and an OPA655 FET input amplifier to the hall to check the gas gain in the Right Arm VDC. Bottom VDC, upper plane.





The 3 plots are different mV/fC values for the OPA655 amp. Sort of best case, worst case and most likely case

This can be compared to the plots on p. 16 and p. 20 which were done with premixed gas in the EEL building.

9/4/07 VDC Gas Gain in the Hall

Tuesday I set up an iron 55 source and amplifier to check the gain of the VDC.

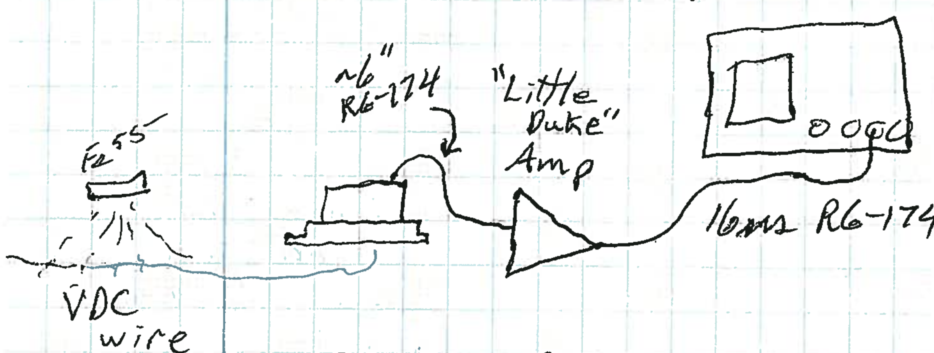
On the Right Arm, bottom VDC, top plane (V plane). I have a card to put in the amplifier connector that grounds all but one channel. That channel has a short RG-174 cable to connect to the "Little Duke" amplifier.

The one channel being looked at is on the low momentum end of the set of 16. ie - closest to the pivot in the hall.

The output of the single channel amplifier goes to the scope.

The setup is the same as was used on p. 127 of Lab Techniques IV 9-23-02.

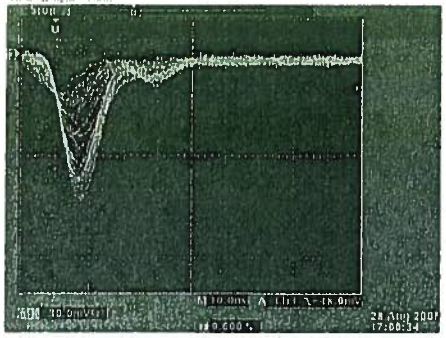
This data does not directly compare to the data on p. 41 of this volume!!



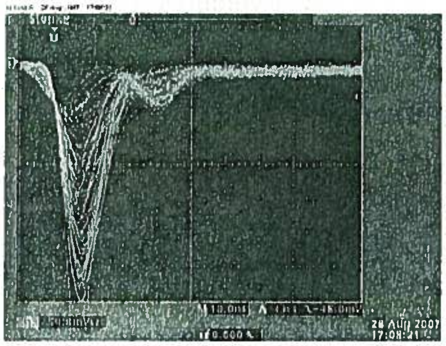
All other LeCroy amplifiers were powered OFF

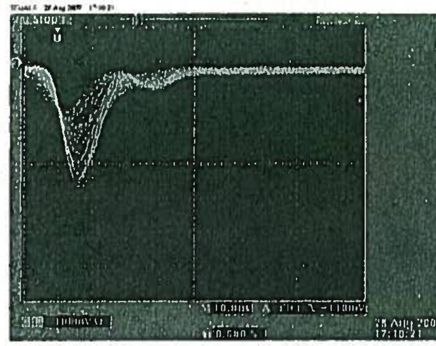
High voltage was varied through EPICS interface.

1st connector. LeCroy output cable in Lower V1 Low Momentum end of VDC.

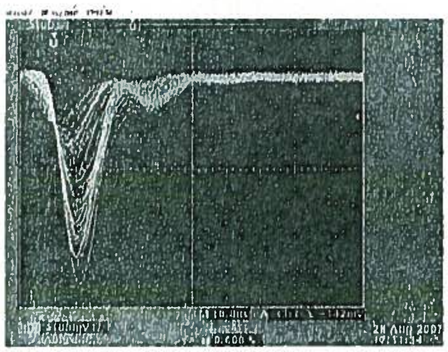


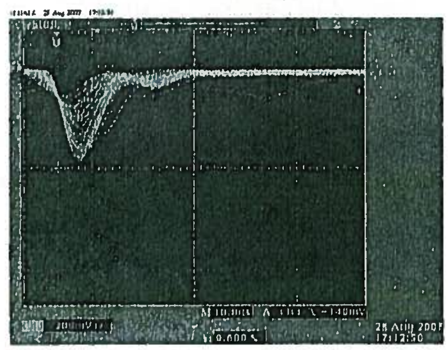
3300V



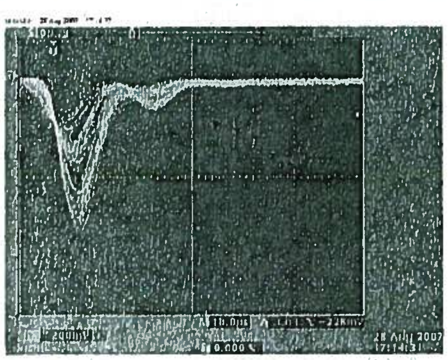


3400V

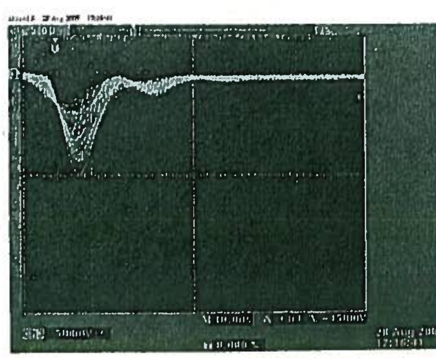




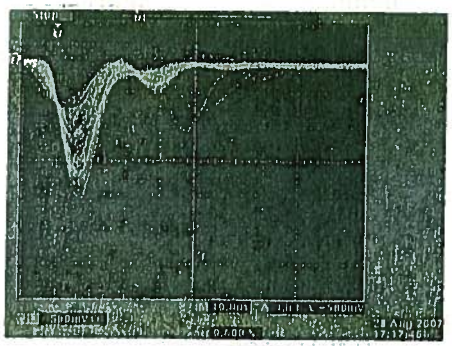
3500V



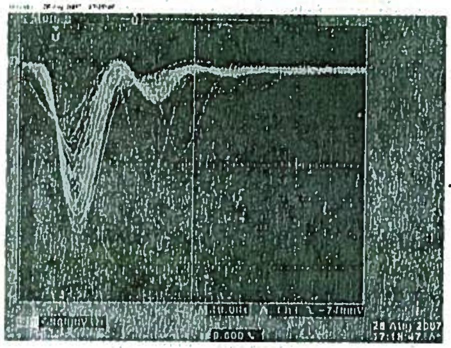
3600V



3700V

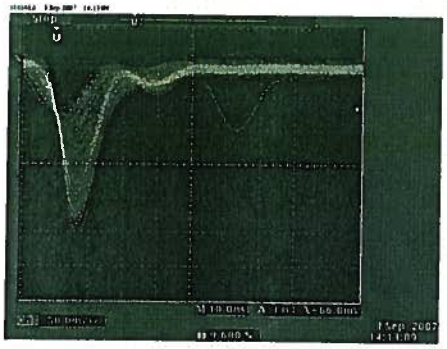


3800 V



3900 V

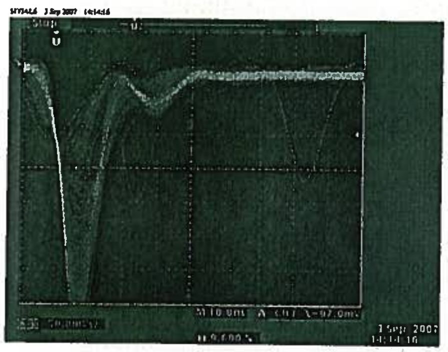
4000 V



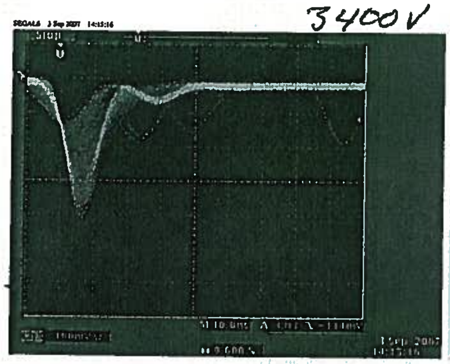
3300V

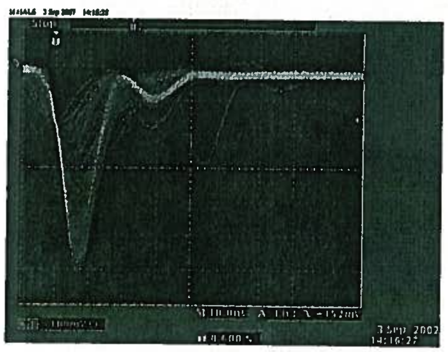
3rd connector
LeCroy output
cable is labeled
Lower V3

From here to
p. 54 were
taken monday
9/3/07.



3400V





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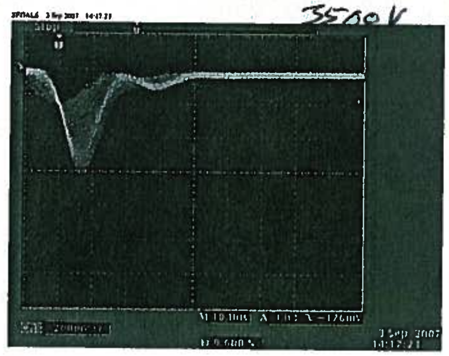
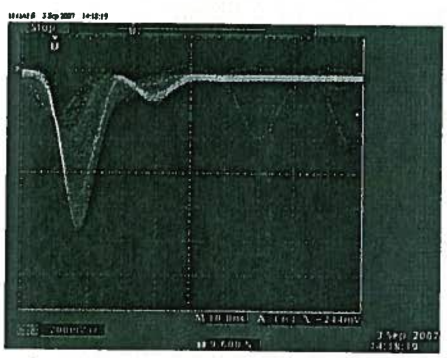
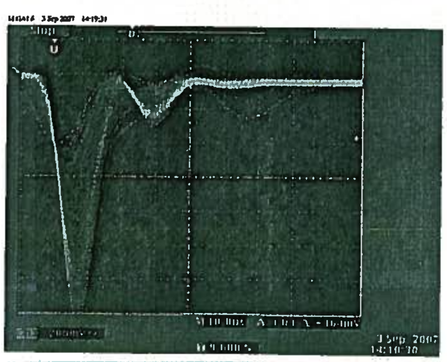
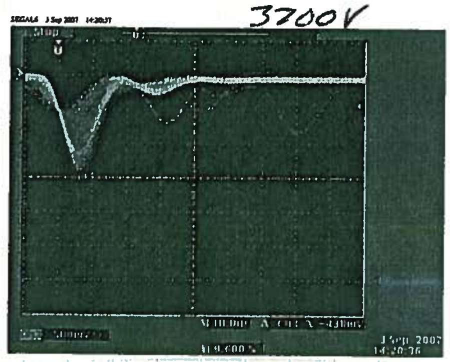


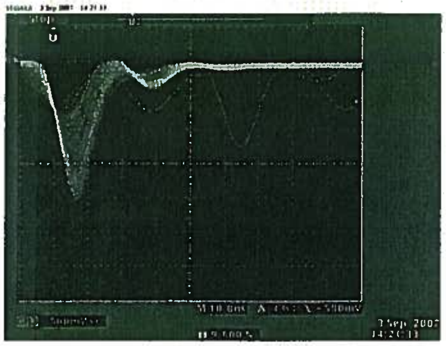


3600V



3700V





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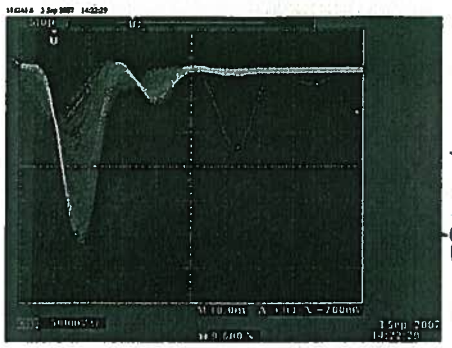
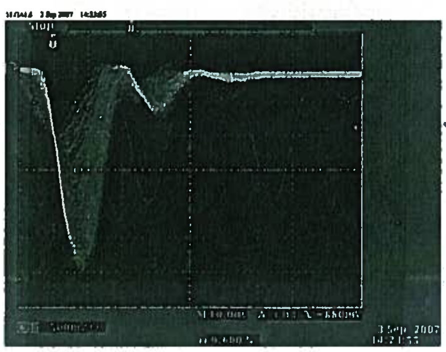
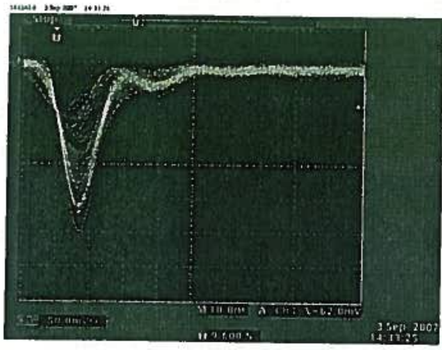


3900 V

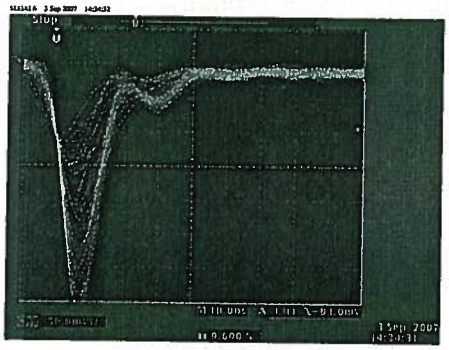


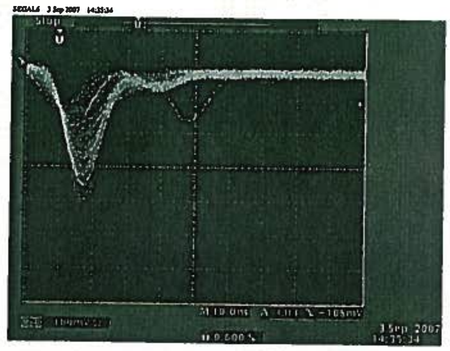
4000 V

7th connector
LeCroy output
cable is labeled
Lower V7

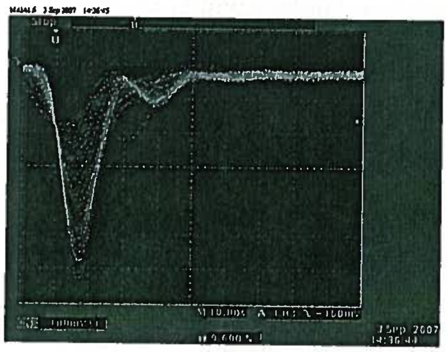


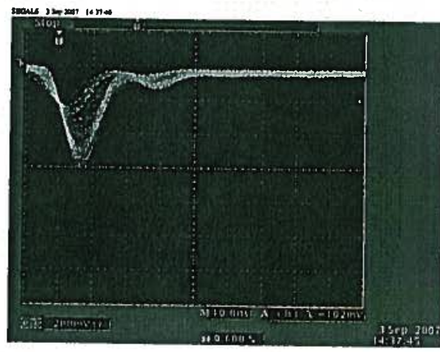
3300 V



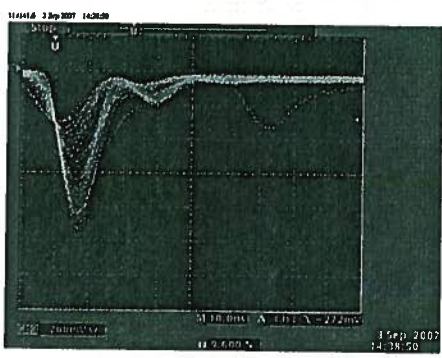


3400 V

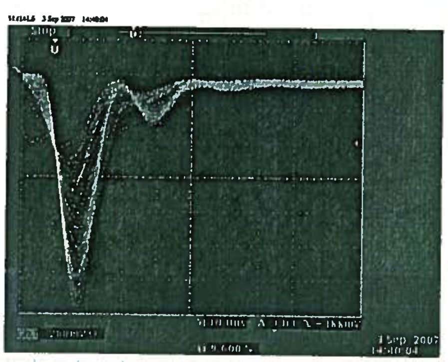


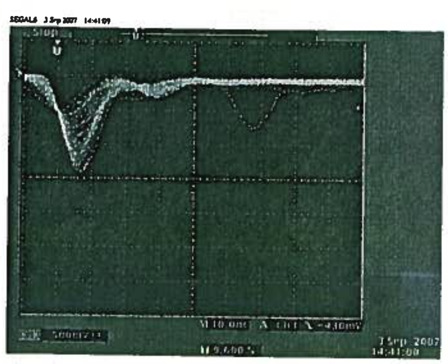


3500 V

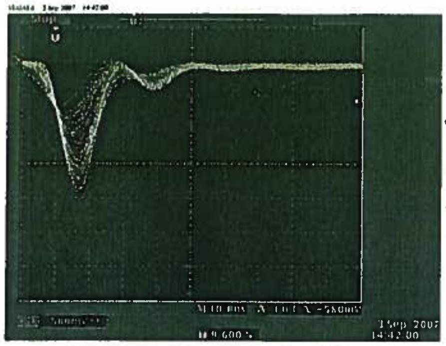


3600 V

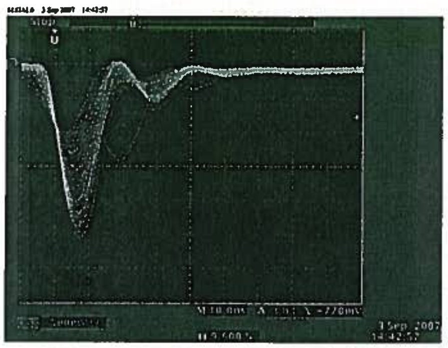




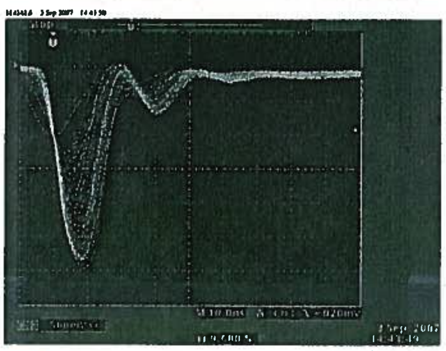
3700 V



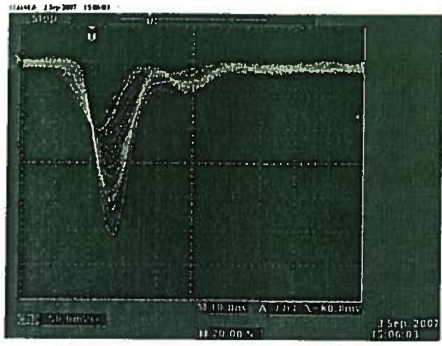
3800V



3900V

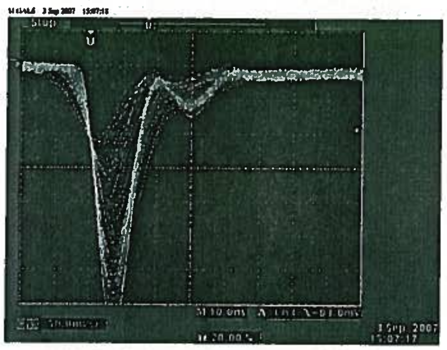


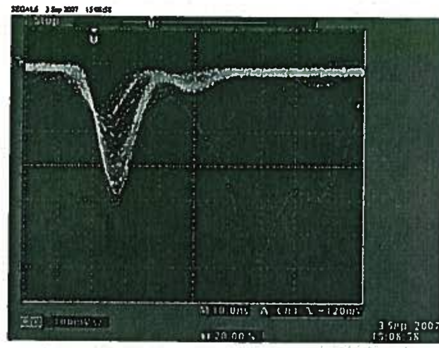
4000V



3300V

11th connector
LeCroy output
cable is labeled
Lower VII





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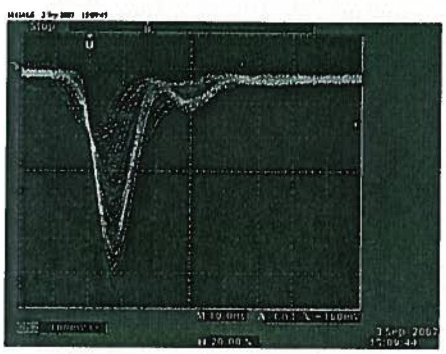

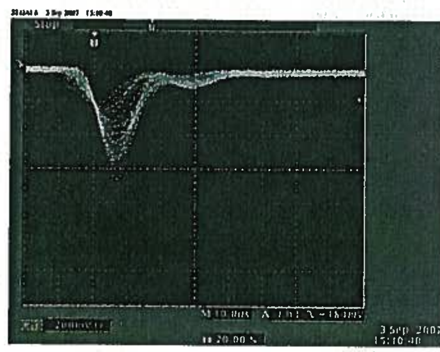

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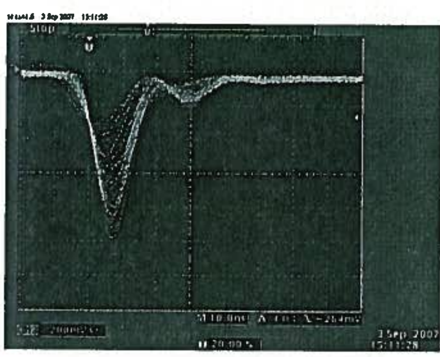
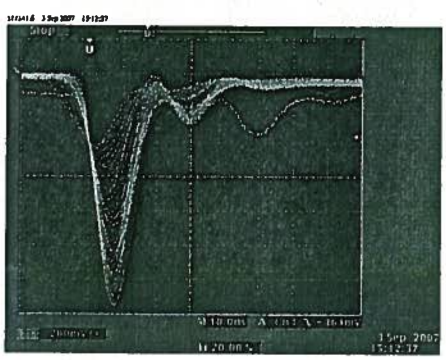
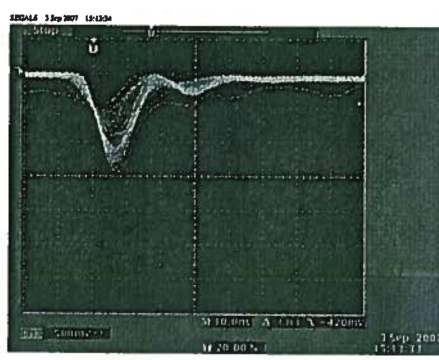


3600V





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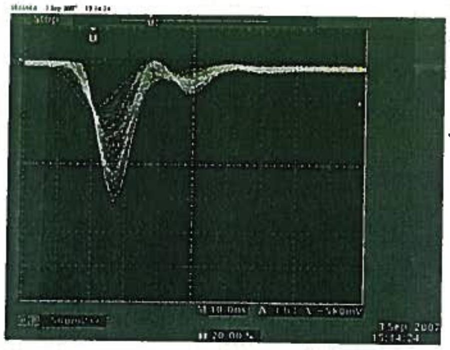

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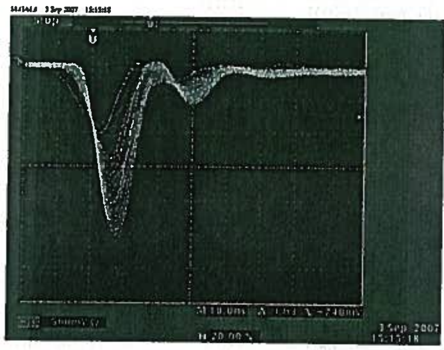

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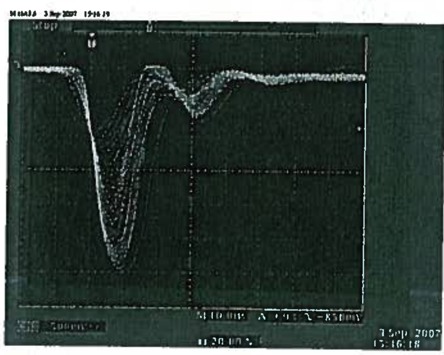
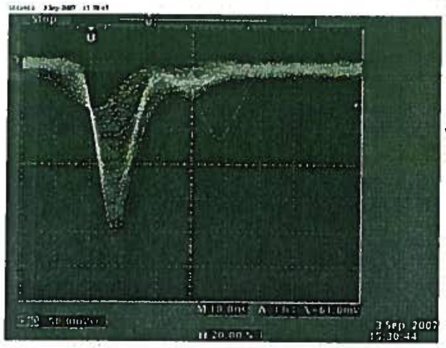
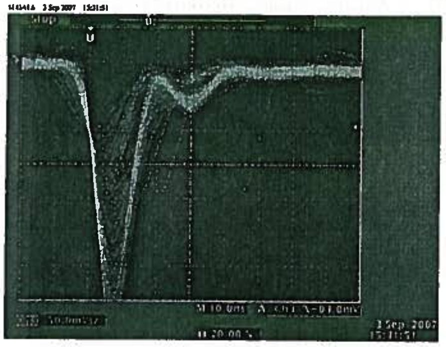


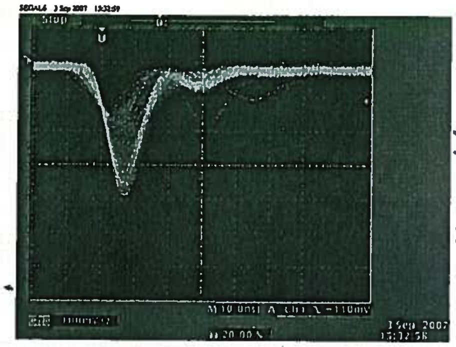
4000V



3300V

15th connector
LeCroy output
cable is labeled
Lower V15





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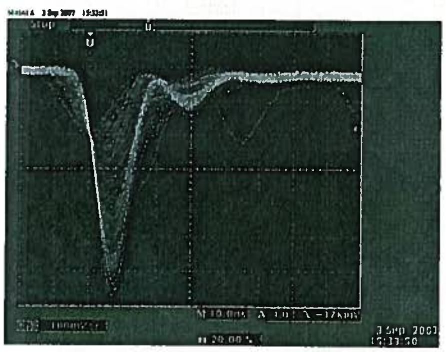

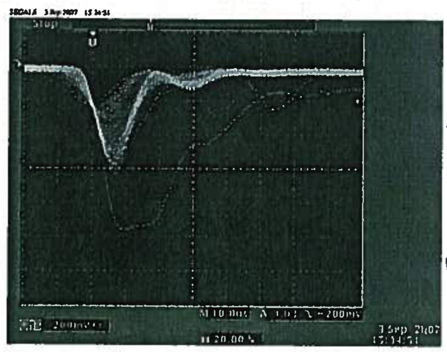

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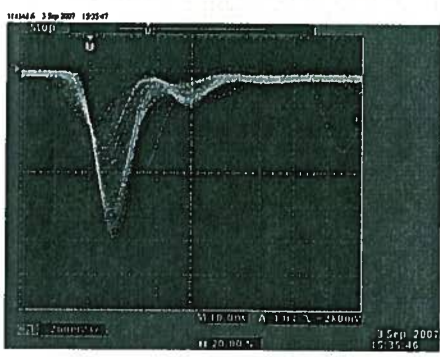

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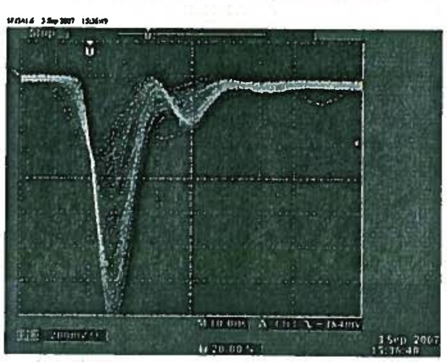

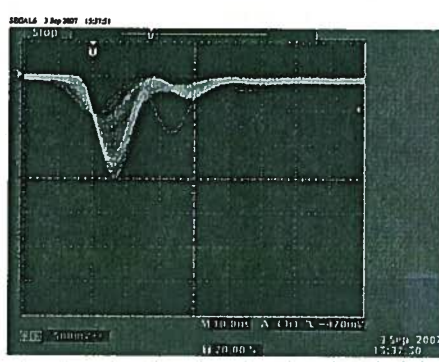

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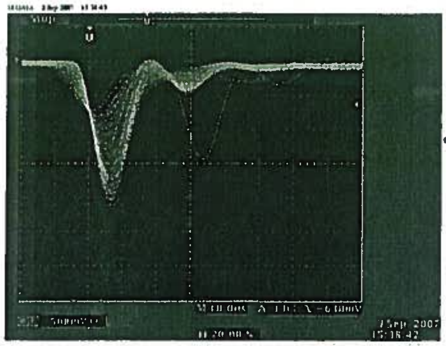

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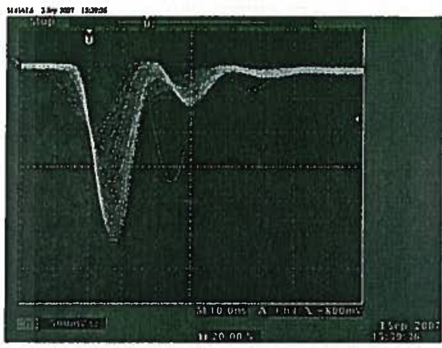

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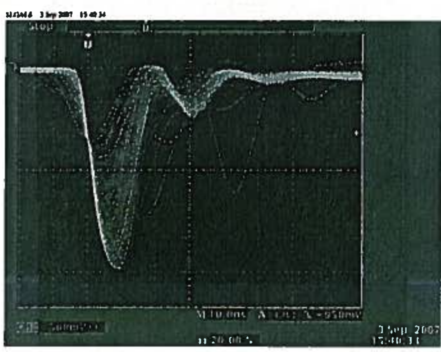
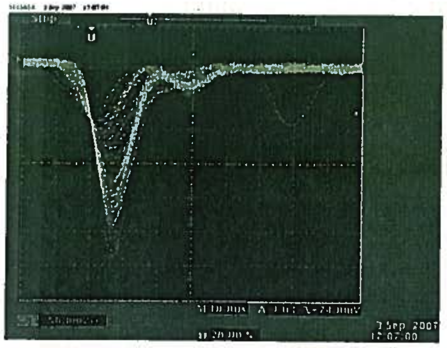


4000V

19th connector
LeCroy output
cable is labeled
Lower V19



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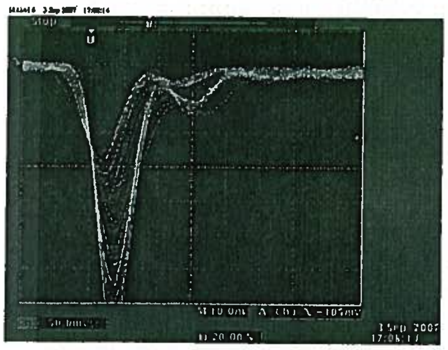

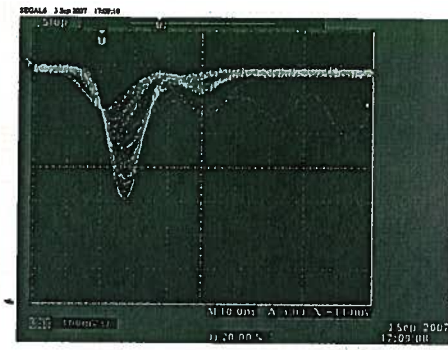

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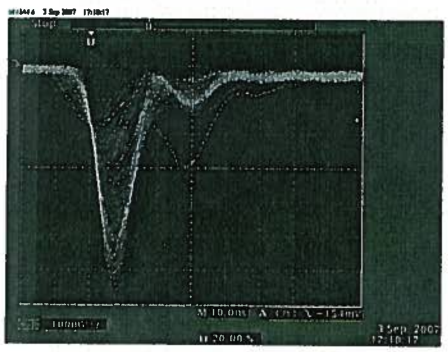

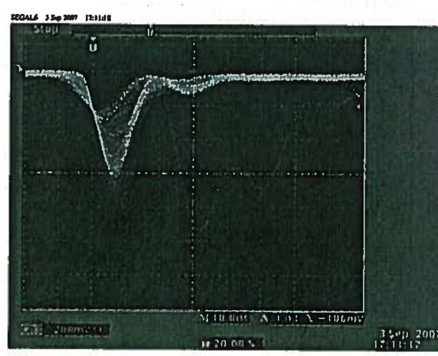

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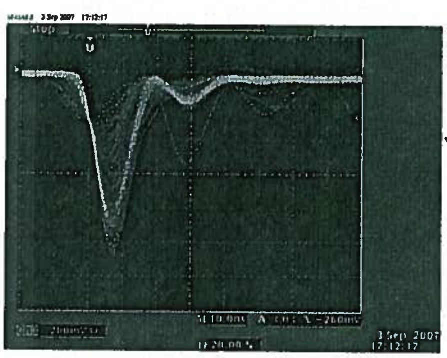

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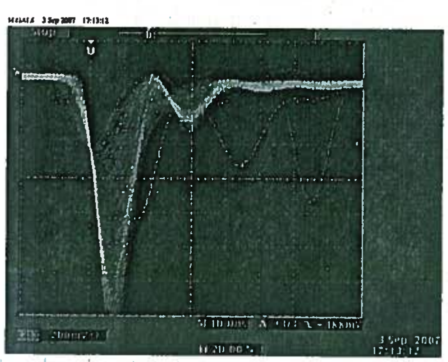

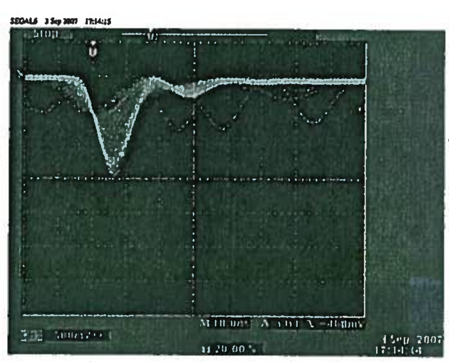

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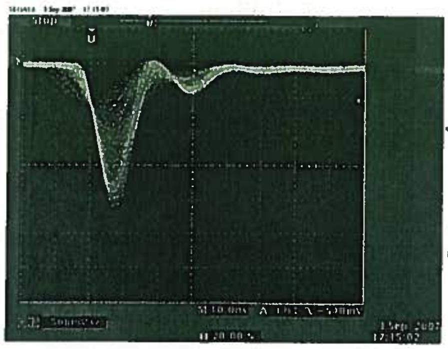

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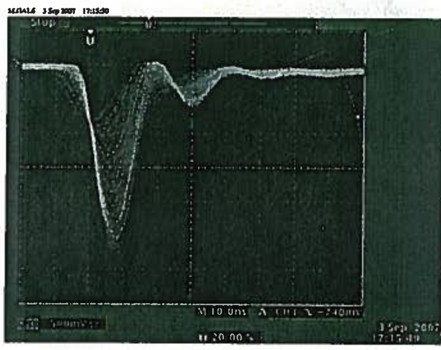

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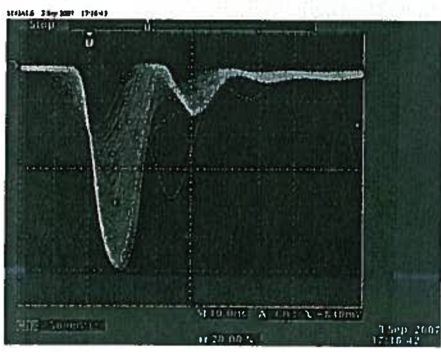


4000V

Bad HV Supply Causes Inefficiency (Loss of Gain) 3/7/12

JA

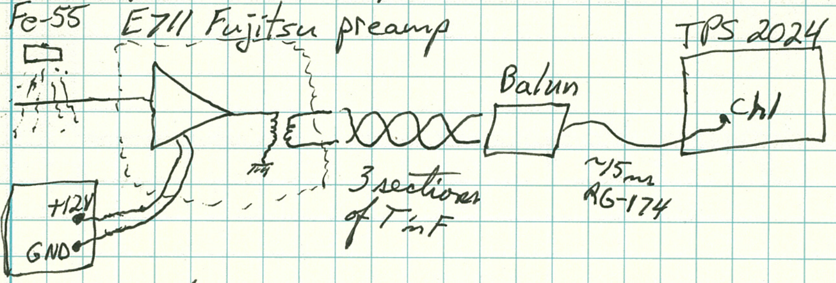
Over the weekend the gain of the Right Arm, bottom VDC was found to be dropping. Well, it dropped early Friday and was noticed on Saturday.

Sunday Bogdan went in to look at it. He thought the gas flow might have been too low. We bypassed the exhaust bubblers with a short piece of flexible tubing. This did not solve the problem.

Monday morning Bogdan tried swapping HV cables to the two VDCs. The inefficiency followed the cable swap. Now the top VDC was inefficient.

I thought this would be a good opportunity to show checking of a wire chamber with an Fe-55 source, for a few people.

I put this together with Jessie's help.



With Jessie, Melissa, and Ryan we checked the gains of the VDCs. The top VDC had about half the gain of the bottom VDC. All the set and readback voltages showed 4kV on the chambers.

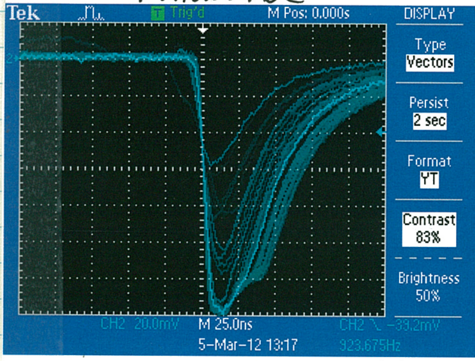
We replaced the Bertan power supply with the spare and checked the gains of the VDCs. Both VDCs looked to have the same gain.

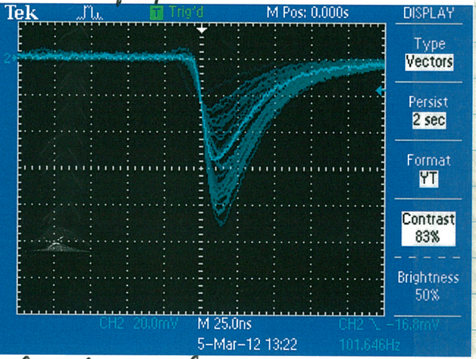
I reconnected the bubblers on the exhausts.

Scope pictures are on the following page.

As found

Bottom VDC   Top VDC





After HV supply changed

Top VDC   Bottom VDC