

Misc. Hardware I

Department	
Subject	Hardware Performance
Name	SEGAL
Address	
	43-648
Computation Notebook	
Dennison Stationery Products Co., Framingham, MA 01701	
	75 Sheets 11 3/4" x 9 1/4" 4x4 Quad.
0 73333 43648 8	

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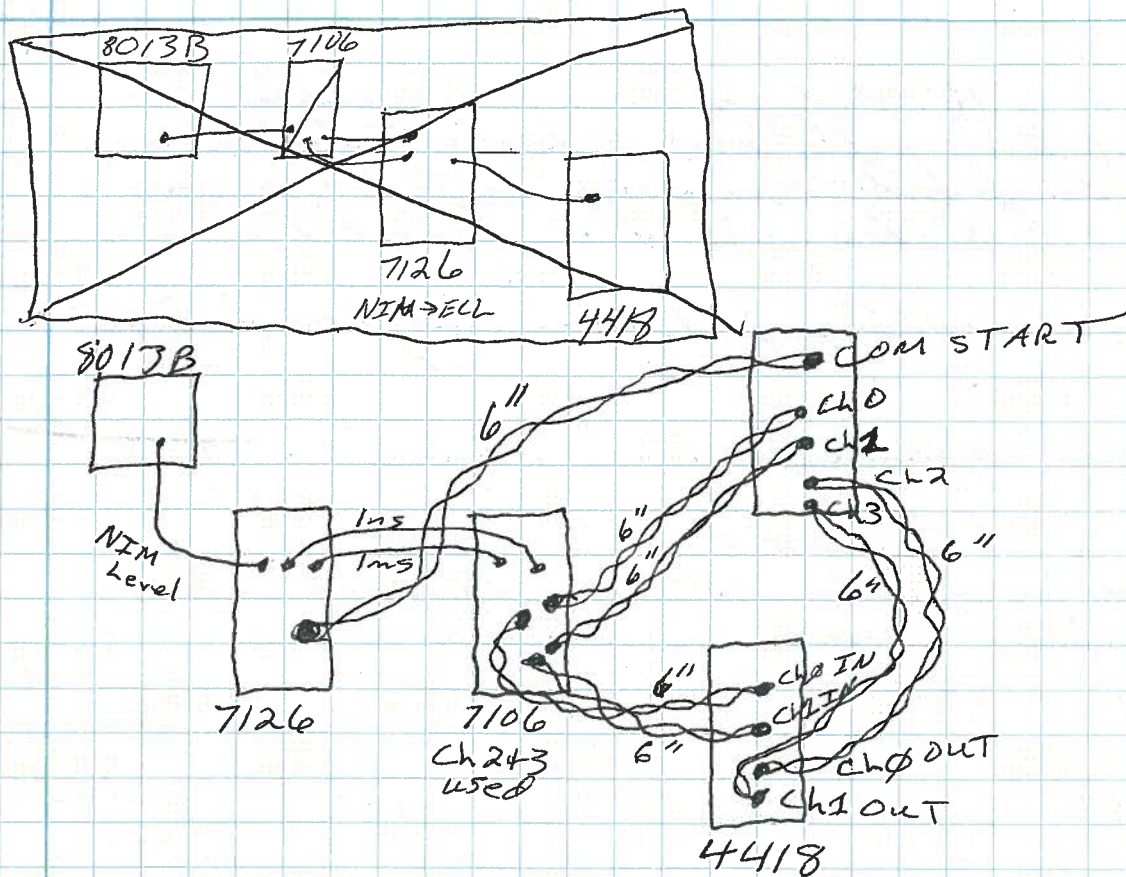
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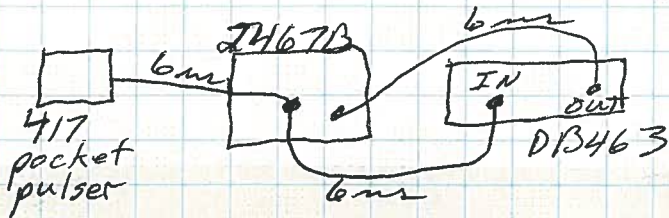
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150

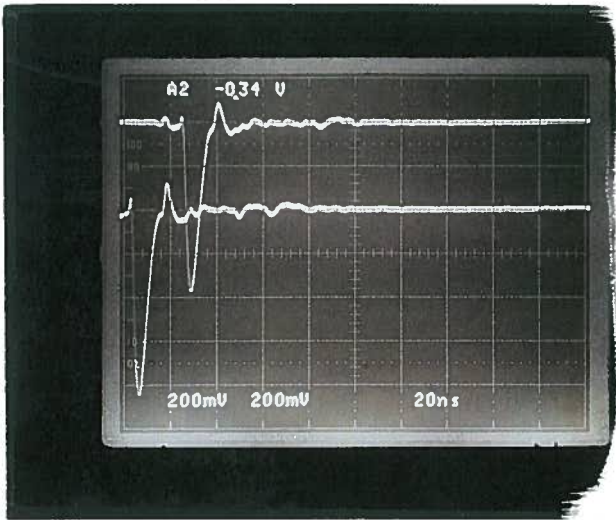
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EG&G DB463 Response

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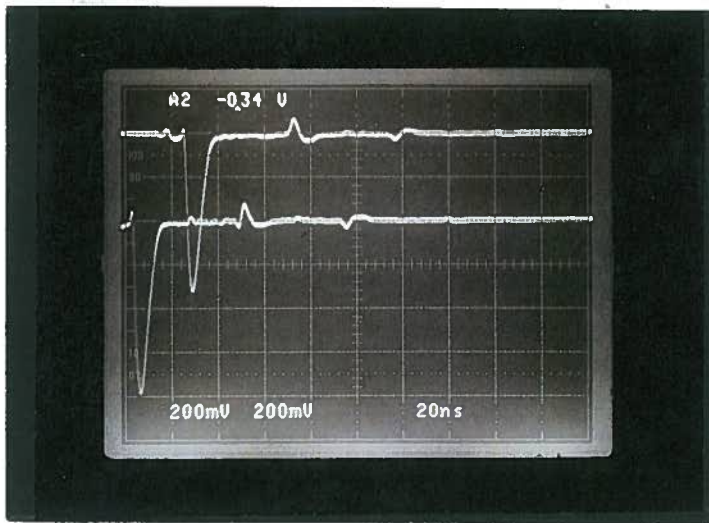


cables are AG174



← OUT

← IN

All delays are OUT.
(no delay)

← OUT

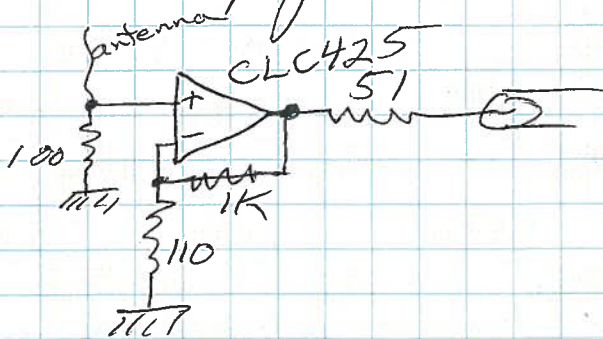
← IN

All delays are OUT.
(no delay)

3/7
js

6

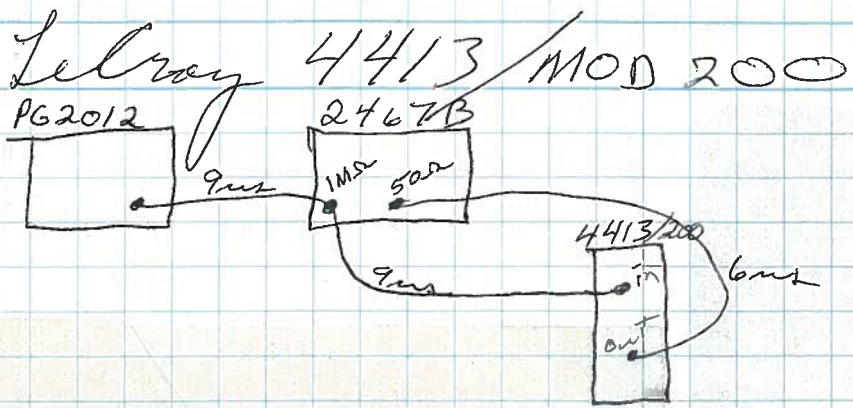
Snoopy in Hall A



$\sim 36 \text{ kHz}$

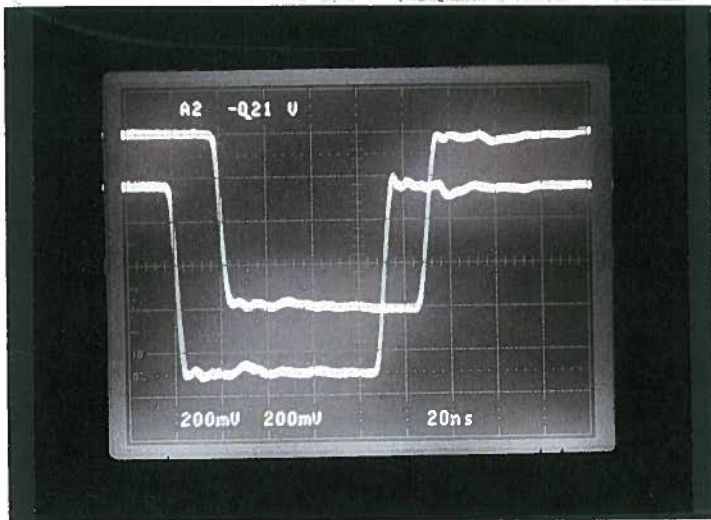


due to Hard Disk
external drive

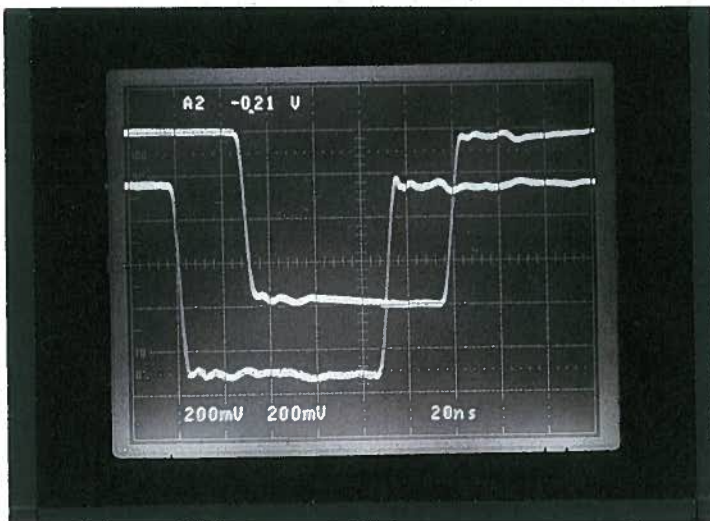


3/10
JF

Setup as diagram.



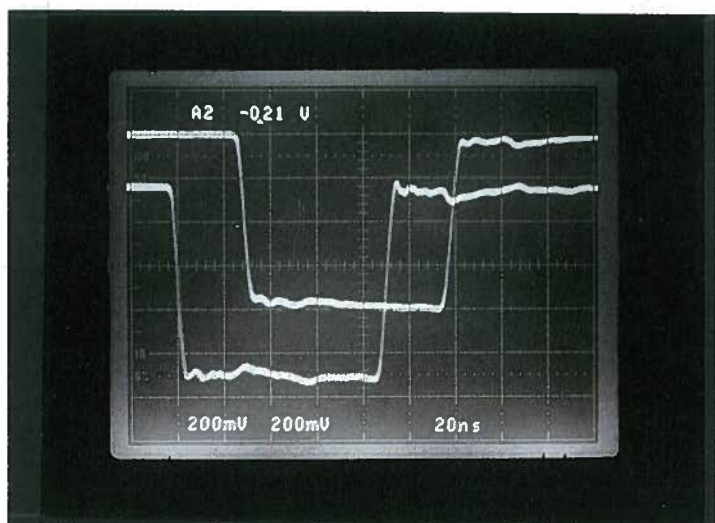
← out
 ← in



Setup as diagram except
18ms from scope to input



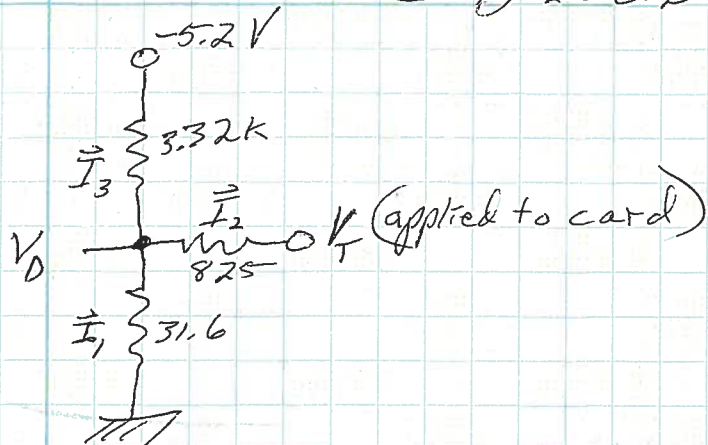
Setup as diagram except
18ns from pulser to scope



Setup as diagram except
15ns from output to scope.

2735DC Threshold

9
3/16
18



$$V_D = 31.6 I_1$$

$$I_1 = I_2 - I_3$$

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

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

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

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

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

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

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

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

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

$$\approx 1.3V$$

if add R in series with V_T (call it V_{T2})

$$V_D = \frac{V_{T2}}{.033(825+R)} - \frac{.00157}{.033}$$

to determine relation for new threshold

$$\frac{V_T}{.033(825)} = \frac{V_{T2}}{.033(825+R)}$$

$$V_{T2} = \left(1 + \frac{R}{825} \right) V_T$$

Wrong!

$$V_D = 31.6 \left[\frac{V_{T2}}{825+R} - \frac{5.2}{3320} - V_D \left(\frac{1}{825+R} - \frac{1}{3320} \right) \right]$$

$$V_D = \frac{31.6}{825+R} V_{T2} - .0495 - V_D \left(\frac{31.6}{825+R} - .00952 \right)$$

$$V_D \left(1 + \frac{31.6}{825+R} - .00952 \right) = \frac{31.6}{825+R} V_{T2} - .0495$$

for the same V_D $V_T \propto V_{T2}$ by

$$.03723 V_{T0} - .04822 = \frac{\left(\frac{31.6}{825+R}\right) V_{T2} - .0495}{\left(.9705 + \frac{31.6}{825+R}\right)}$$

For 2735 DC

$$V_{@discr} = .03723 V_{\text{thresh at input pin}} - .04822$$

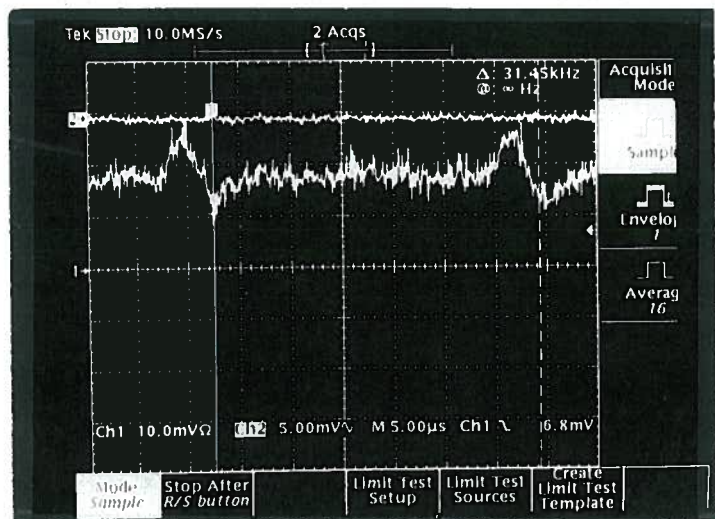
For N-277-L

$$V_{@discr} = .03163 V_{\text{thresh at input pin}}$$

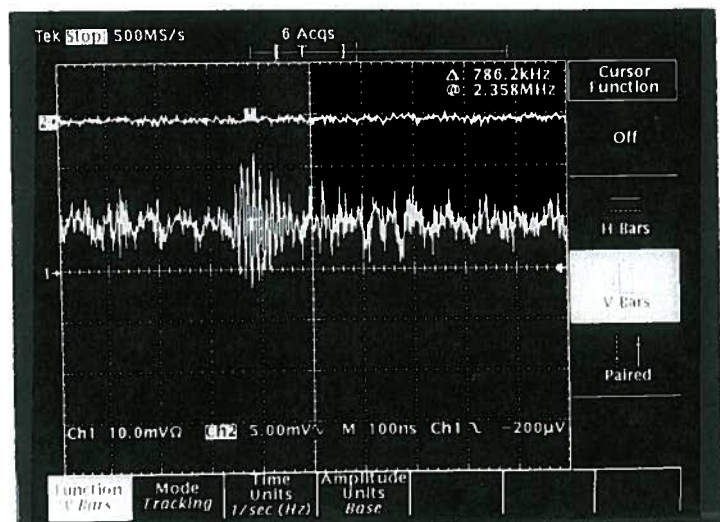
Noise in EEL 122

3/24

While looking at amp noise I find high readings. Investigating there is ~~noise~~

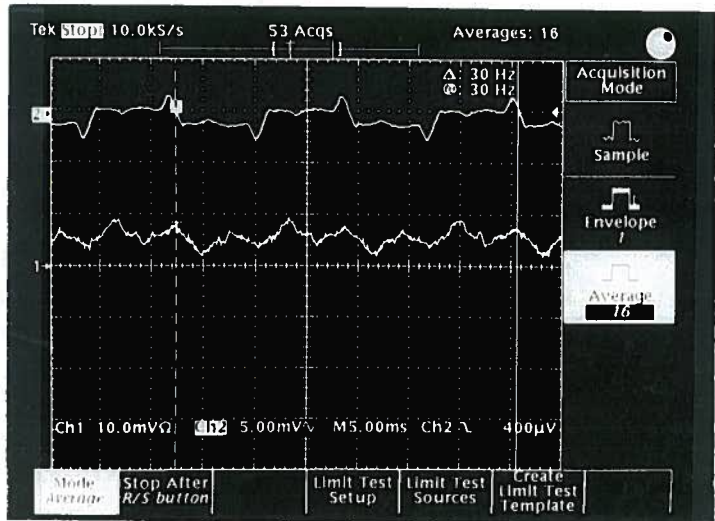


Ch 2 is an 8ms cable not connected to anything.
Ch 1 is FET probe held up in the air. Tip not touching anything.
Due to PC monitor.



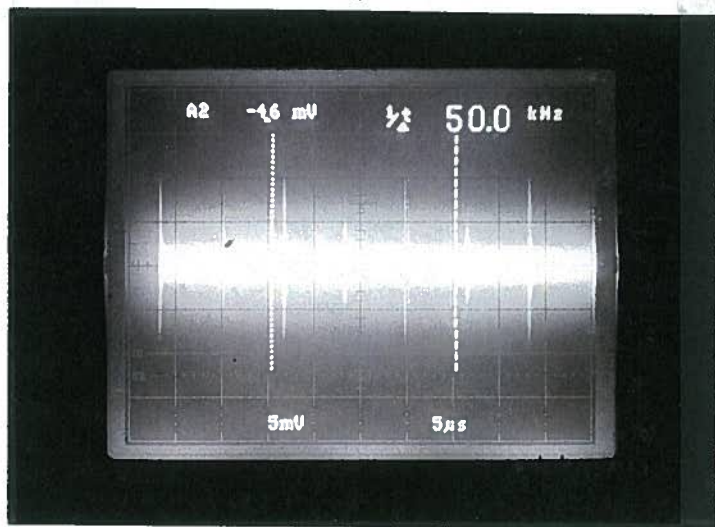
Ch 2 is 8ms cable not connected to anything.
Ch 1 is amp output picked off the input of the 7106 discriminator

This is at the same freq as the PC monitor. Not absolutely positive it is due to monitor.

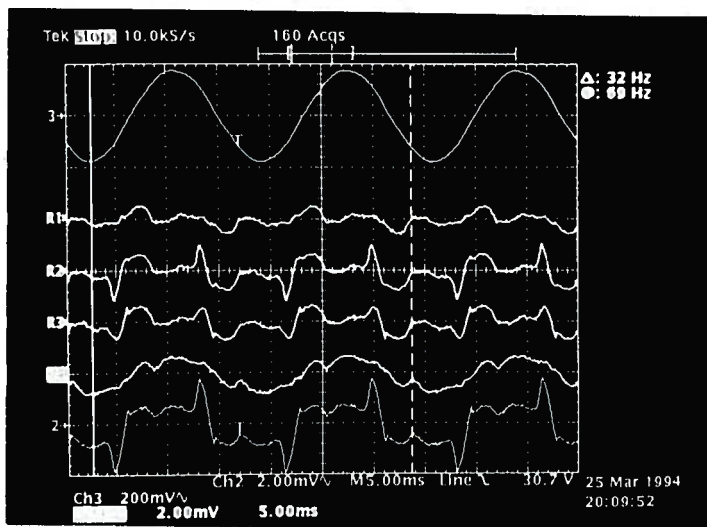
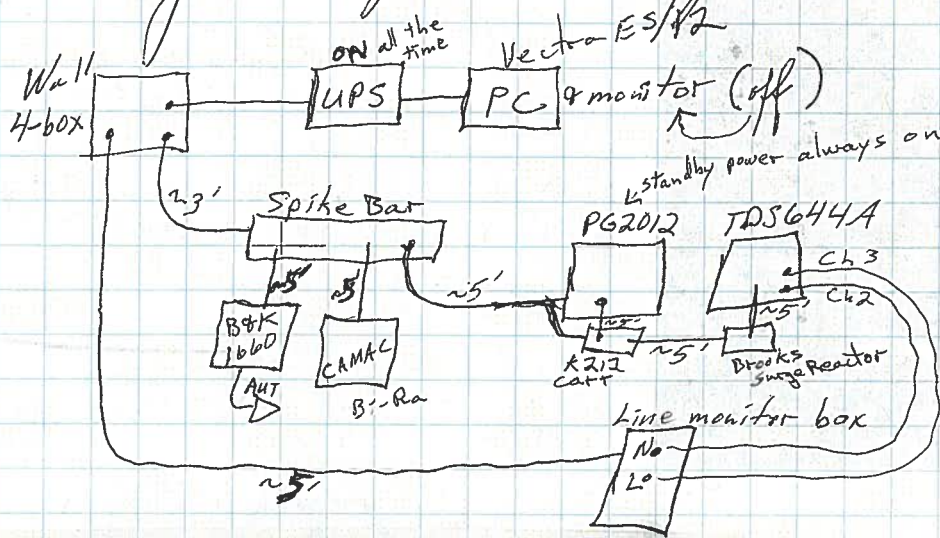


Ch 2 is Line Neutral
 I forgot what Ch 1 was.
 FET probe just hanging?

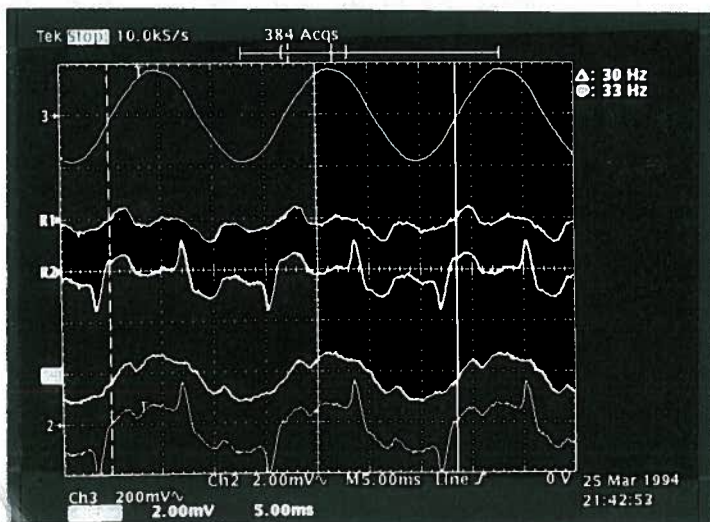
3/25 With Snoopy Mark I lying next to the
 HP 715/75. Display is off.



Looking at amp test setup.

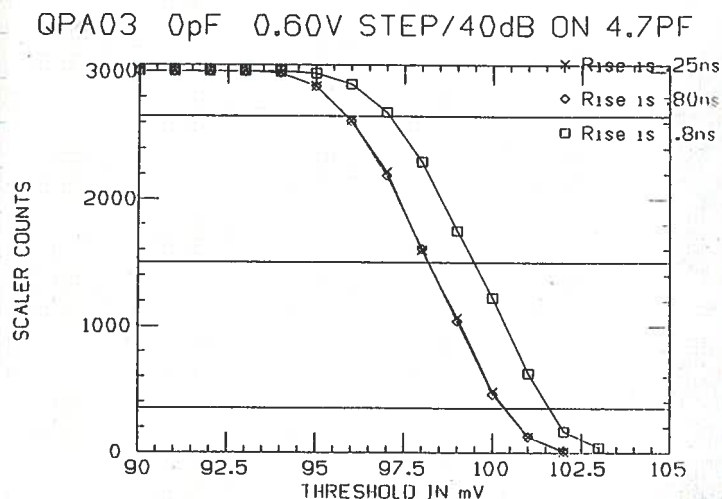
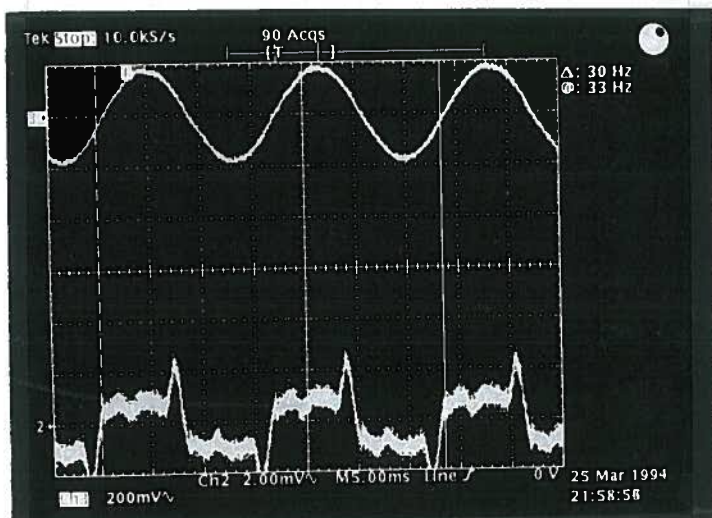


Ch 3 $\equiv$ Line voltage
 R1 $\equiv$ Neutral with only 644A on
 R2 $\equiv$ Neutral with 644 & PG2012 on
 R3 $\equiv$ Neutral with 644 & PC on
 R4 $\equiv$ Neutral with 644 & CAMAC on
 Ch 2 $\equiv$ Neutral with 644, PG20, PC and CAMAC on

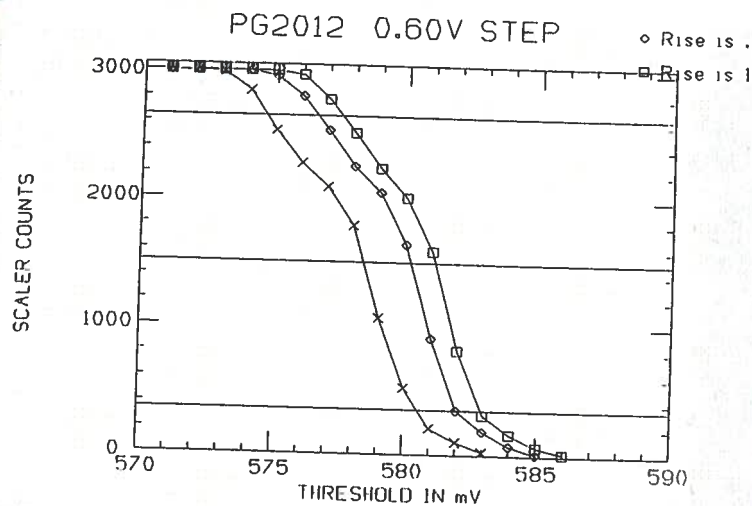


Same as above except 644A & PG2012 are both plugged directly into Spike Bar. Line monitor also plugged into Spike Bar. PC left off

same as last photo on
p. 13.
10 second persistence



Noise of the QPA03 with
PG2012 plugged into the
Spike Bar



PG2012 sent into 7106.
Capacitively coupled.

Using line monitor & TDS644A.

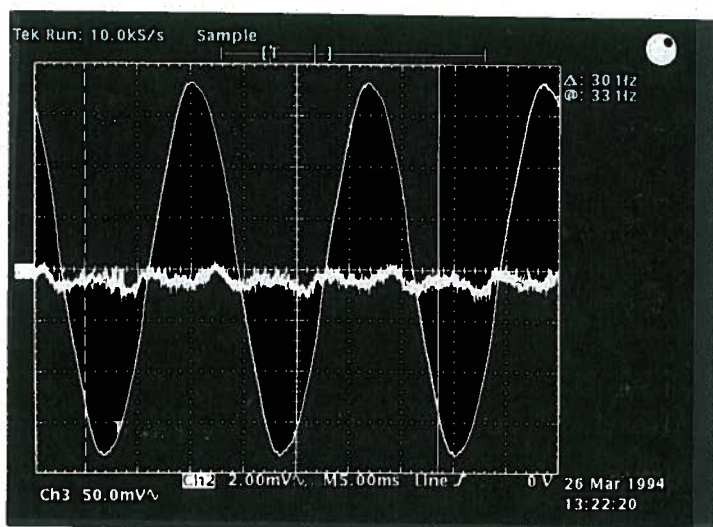
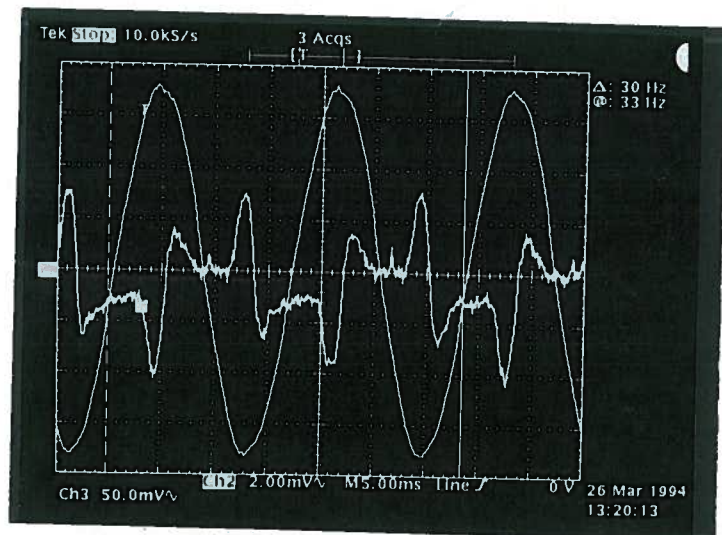
3/26
JA

Looking at outlet P3B-31
in #EL-122.

Outlet P3B-33 looks the
same.

Scope plugged into P3B-3

Same circuit has 2NFM, 1
CAMAC, 1 VME & HP box & 1
LN03.

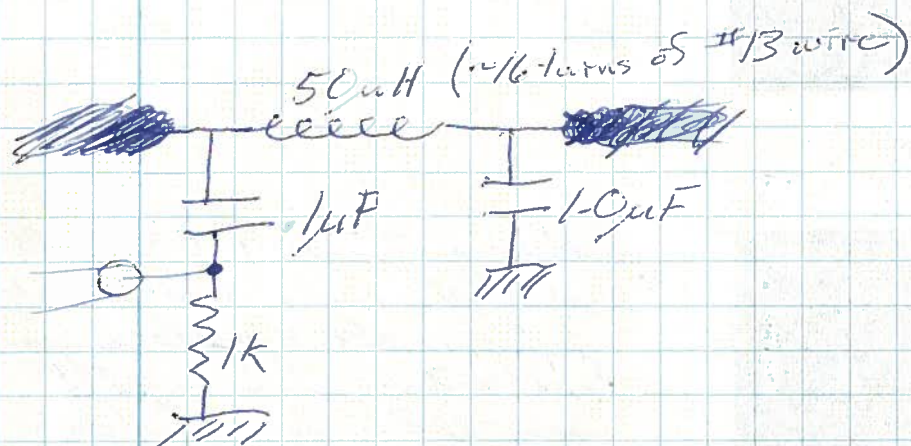
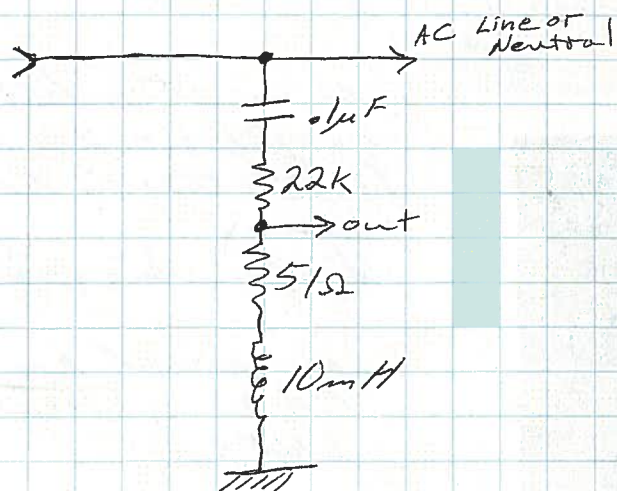


Looking at outlet P3B-39.
Looks the same for P3B-41
which is the one the amp
test setup is on with
everything turned off.
Scope plugged into P3B-31

Upper photo looks the same when scope plugged
into P3B-39 & monitor into P3B-31.

Bottom photo looks the same with scope plugged into
P3B-39 and monitor into P3B-41.

Line Monitor



Amp Test Noise

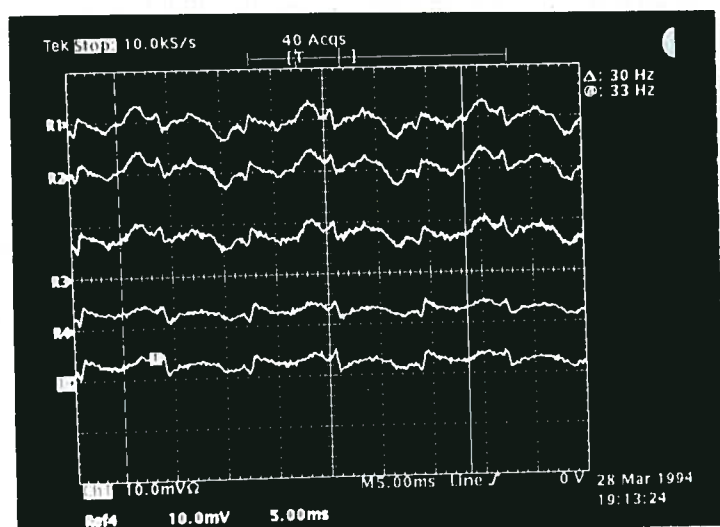
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Same setup as bottom photo p. 13 except line monitor is plugged into wall outlet.

AUT is LM359.

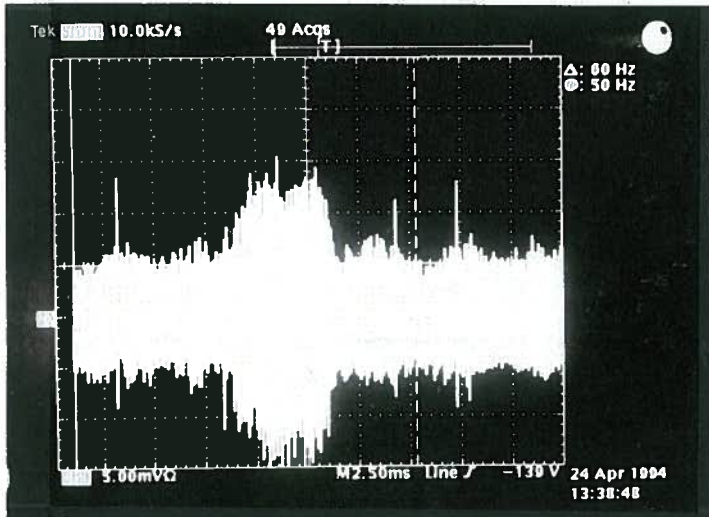
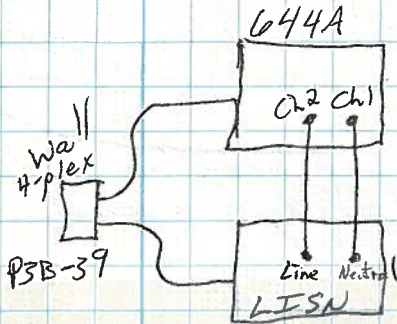
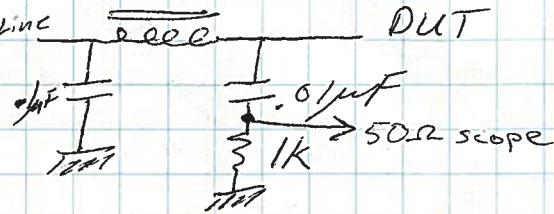
Looking at amp power supply @ $\sim 7V$ (scope offset only goes up to 10 on fine scale) there is no structure to the noise.

Looking at 7106 input, $\frac{1}{2}$ ms cable plugged into input. FET probe and connected to cable gnd and probe tip connected to center conductor.



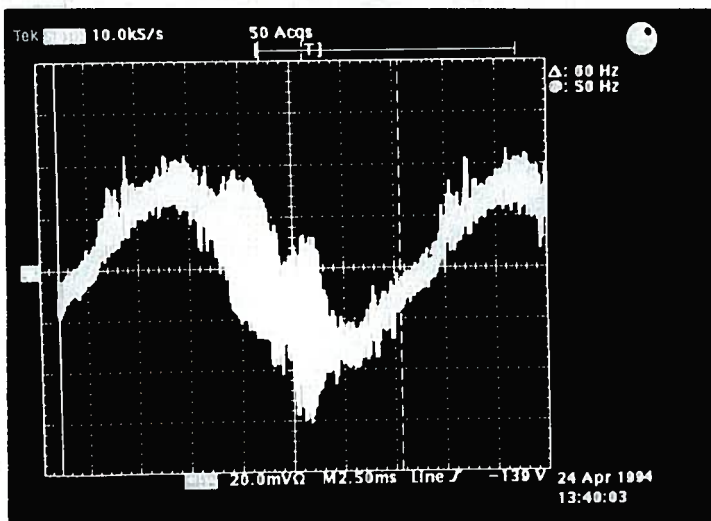
R₁ is $\frac{1}{2}$ ms plugged into 7106
 R₂ plugged into 7126
 R₃ is probe gnd connected to line monitor case & tip to camera crate frame.
 R₄ is probe gnd connected to camera crate case & probe tip also connected to camera crate case $\frac{1}{2}$ ms conductor
 R₅ is + plugged into 7106. Line monitor disconnected from scope
 R₁ is $\frac{1}{2}$ ms plugged into 7106 wire spring gnd on FET probe. Probe tip on center conductor & gnd wire to cable gnd sheath. Line monitor still disconnected.

4/24 Looking at noise EEL 122
 Using LISN



scope in envelope mode.

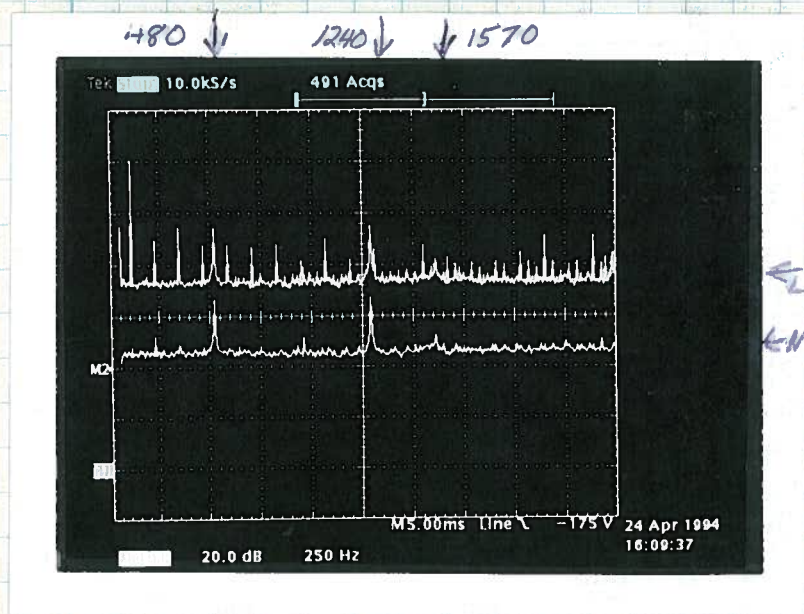
Ch1 neutral



Ch2 line

Looking at the scope in envelope mode the best response on neutral seems to be the $10\mu s$ after triggering on $-175V$ slope on the line.

Took an FFT of the line and neutral. Rectangle window.
Checking peak positions with cursors the 3 noted were measured. Also, spacing of line peaks is 120 Hz.



CONDUCTORS FOR GENERAL WIRING—ARTICLE 310

Table 310-16. Ampacities of Not More than Three Single Insulated Conductors, Rated 0 through 2000 Volts, in Raceway in Free Air and Ampacities of Cable Types AC, NM, NMC and SE

Based on Ambient Air Temperature of 30°C (86°F).

Size		Temperature Rating of Conductor. See Table 310-13.								Size	
AWG	MCM	60°C (140°F)	75°C (167°F)	85°C (185°F)	90°C (194°F)	95°C (203°F)	75°C (167°F)	85°C (185°F)	90°C (194°F)	AWG	MCM
		TYPES ↑TW, ↑UF	TYPES ↑FEPW, ↑RHL, ↑RHW, ↑THW, ↑THWN, ↑XHHW, ↑USE, ↑ZW	TYPE V	TYPES TA, TBS, SA, AVE, SIS, ↑FEP, ↑FEPB, ↑RHH, ↑THHN, ↑XHHW*	TYPES ↑TW, ↑UF	TYPES ↑RHL, ↑RHW, ↑THW, ↑THWN, ↑XHHW, ↑USE	TYPE V	TYPES TA, TBS, SA, AVE, SIS, ↑RHH, ↑THHN, ↑XHHW*		
COPPER						ALUMINUM OR COPPER-CLAD ALUMINUM					
18	....	....	....	18	14	....	....	....	....	....	....
16	....	....	....	18	18	....	....	....	....	....	....
14	20†	20†	25	25†	....	....	....	....	....	....	....
12	25†	25†	30	30†	20†	20†	....	....	....	....	....
10	30	35†	40	40†	25	30†	25	25†	25†	12	12
8	40	50	55	55	30	40	30	35†	45	10	8
6	55	65	70	75	40	50	55	60	6	6	6
4	70	85	95	95	55	65	75	75	4	4	4
3	85	100	110	110	65	75	85	85	3	3	3
2	95	115	125	130	75	90	100	100	2	2	2
1	110	130	145	150	85	100	110	115	1	1	1
1/0	125	150	165	170	100	120	130	135	1/0	1/0	1/0
2/0	145	175	190	195	115	135	145	150	2/0	2/0	2/0
3/0	165	200	215	225	130	155	170	175	3/0	3/0	3/0
4/0	195	230	250	260	150	180	195	205	4/0	4/0	4/0
250	215	255	275	290	170	205	220	230	250	250	250
300	240	285	310	320	190	230	250	255	300	300	300
350	260	310	340	350	210	250	270	280	350	350	350
400	280	335	365	380	225	270	295	305	400	400	400
500	320	380	415	430	260	310	335	350	500	500	500
600	355	420	460	475	285	340	370	385	600	600	600
700	385	460	500	520	310	375	405	420	700	700	700
750	400	475	515	535	320	385	420	435	750	750	750
800	410	490	535	555	330	395	430	450	800	800	800
900	435	520	565	585	355	425	465	480	900	900	900
1000	455	545	590	615	375	445	485	500	1000	1000	1000
1250	495	590	640	665	405	485	525	545	1250	1250	1250
1500	520	625	680	705	435	520	565	585	1500	1500	1500
1750	545	650	705	735	455	545	595	615	1750	1750	1750
2000	560	665	725	750	470	560	610	630	2000	2000	2000

AMPACITY CORRECTION FACTORS

Ambient Temp. °C	For ambient temperatures other than 30°C (86°F), multiply the ampacities shown above by the appropriate factor shown below.								Ambient Temp. °F
21-25	1.08	1.05	1.04	1.04	1.08	1.05	1.04	1.04	70-77
26-30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	79-86
31-35	.91	.94	.95	.96	.91	.94	.95	.96	88-95
36-40	.82	.88	.90	.91	.82	.88	.90	.91	97-104
41-45	.71	.82	.85	.87	.71	.82	.85	.87	106-113
46-50	.58	.75	.80	.82	.58	.75	.80	.82	115-122
51-55	.41	.67	.74	.76	.41	.67	.74	.76	124-131
56-60	.....	.58	.67	.71	.....	.58	.67	.71	133-140
61-70	.....	.33	.52	.58	.....	.33	.52	.58	142-158
71-80	.....	.....	.30	.41	.....	.....	.30	.41	160-176

† Unless otherwise specifically permitted elsewhere in this Code, the overcurrent protection for conductor types marked with an obelisk (†) shall not exceed 15 amperes for 14 AWG, 20 amperes for 12 AWG, and 30 amperes for 10 AWG copper; or 15 amperes for 12 AWG and 25 amperes for 10 AWG aluminum and copper-clad aluminum after any correction factors for ambient temperature and number of conductors have been applied.

* For dry and damp locations only. See 75°C column for wet locations.

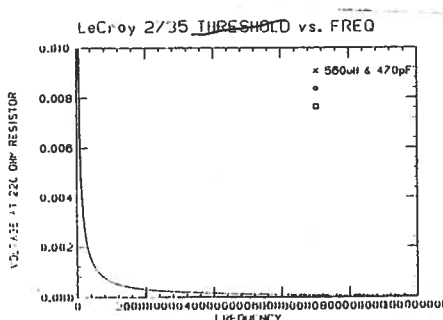
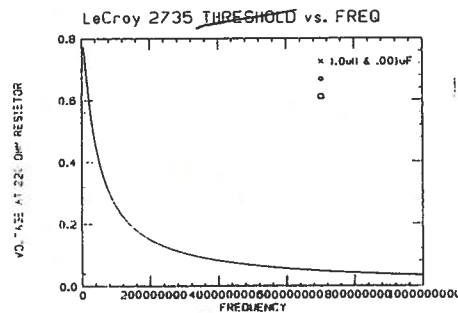
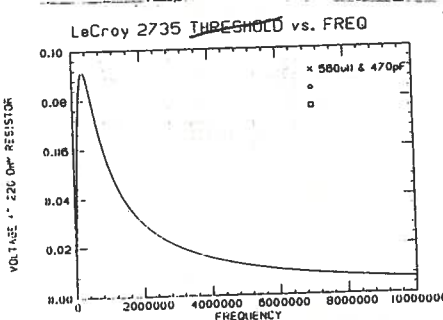
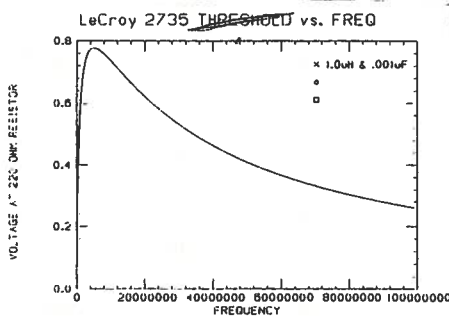
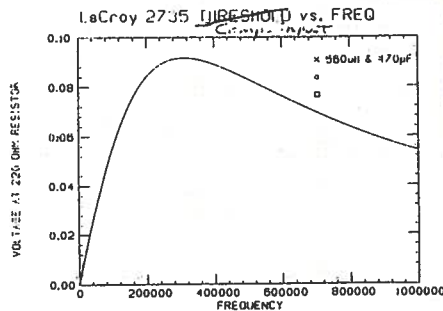
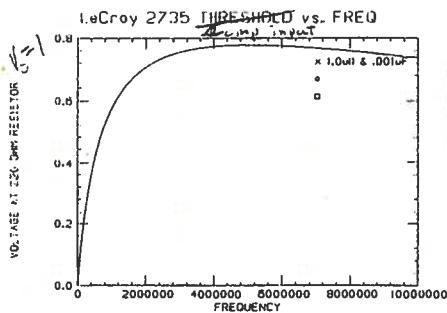
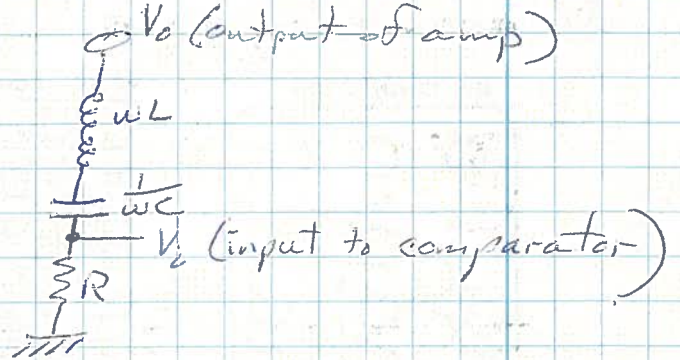
Calculated Frequency Response of 2735

From the output of the TRA4192S to the input of the MVL40T the 2735 has the following circuit;

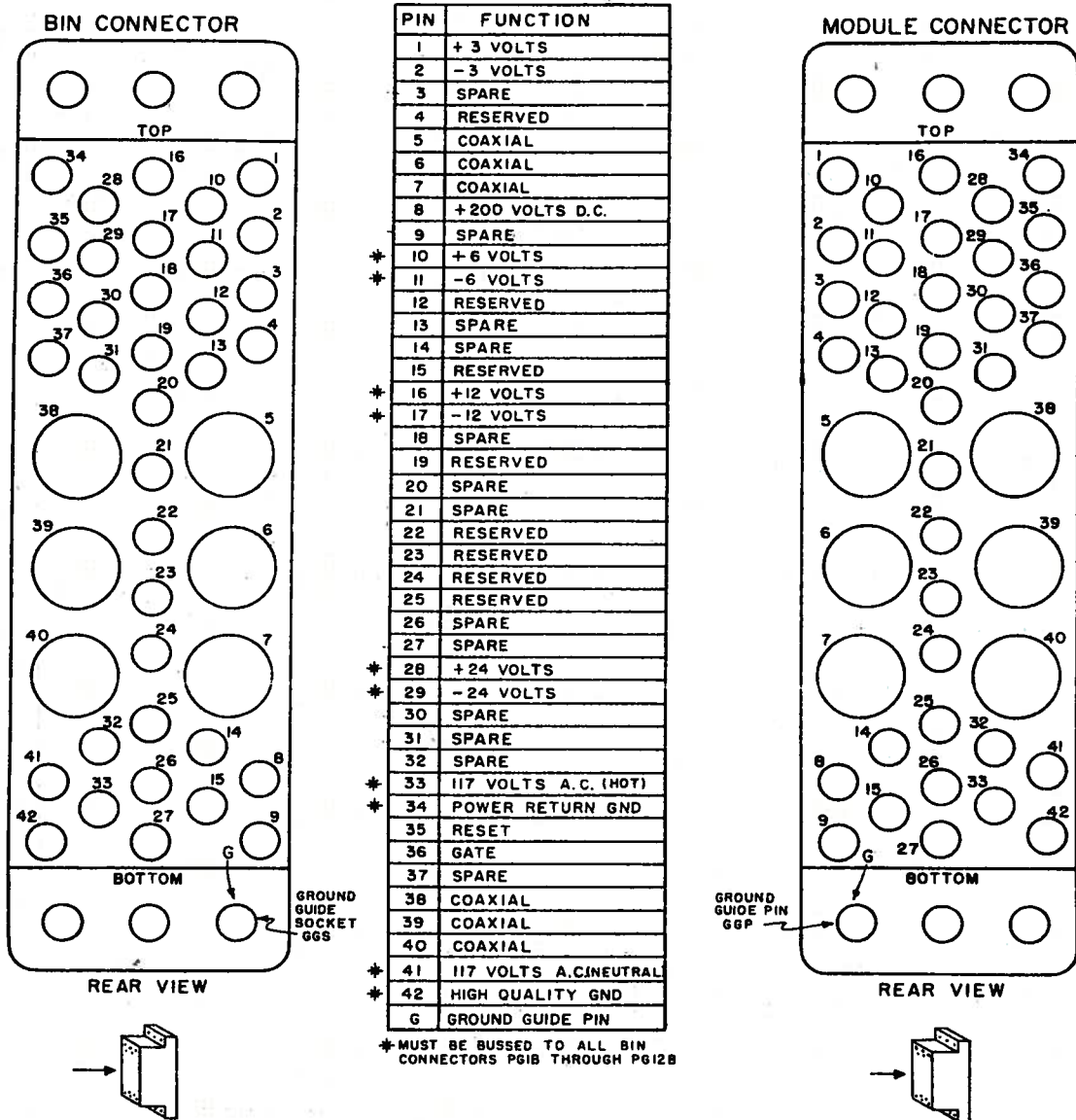
$$V_c = V \frac{R}{\omega L + \frac{1}{\omega C} + R}$$

for 2735 DC $R=220\Omega$, $L=560\mu H$
 $C=470pF$

for 2735 PC $L=1.0\mu H$, $C=.001\mu F$

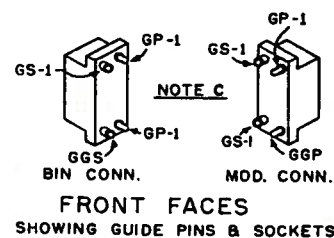


NIM Connector Pinout



NOTES:-

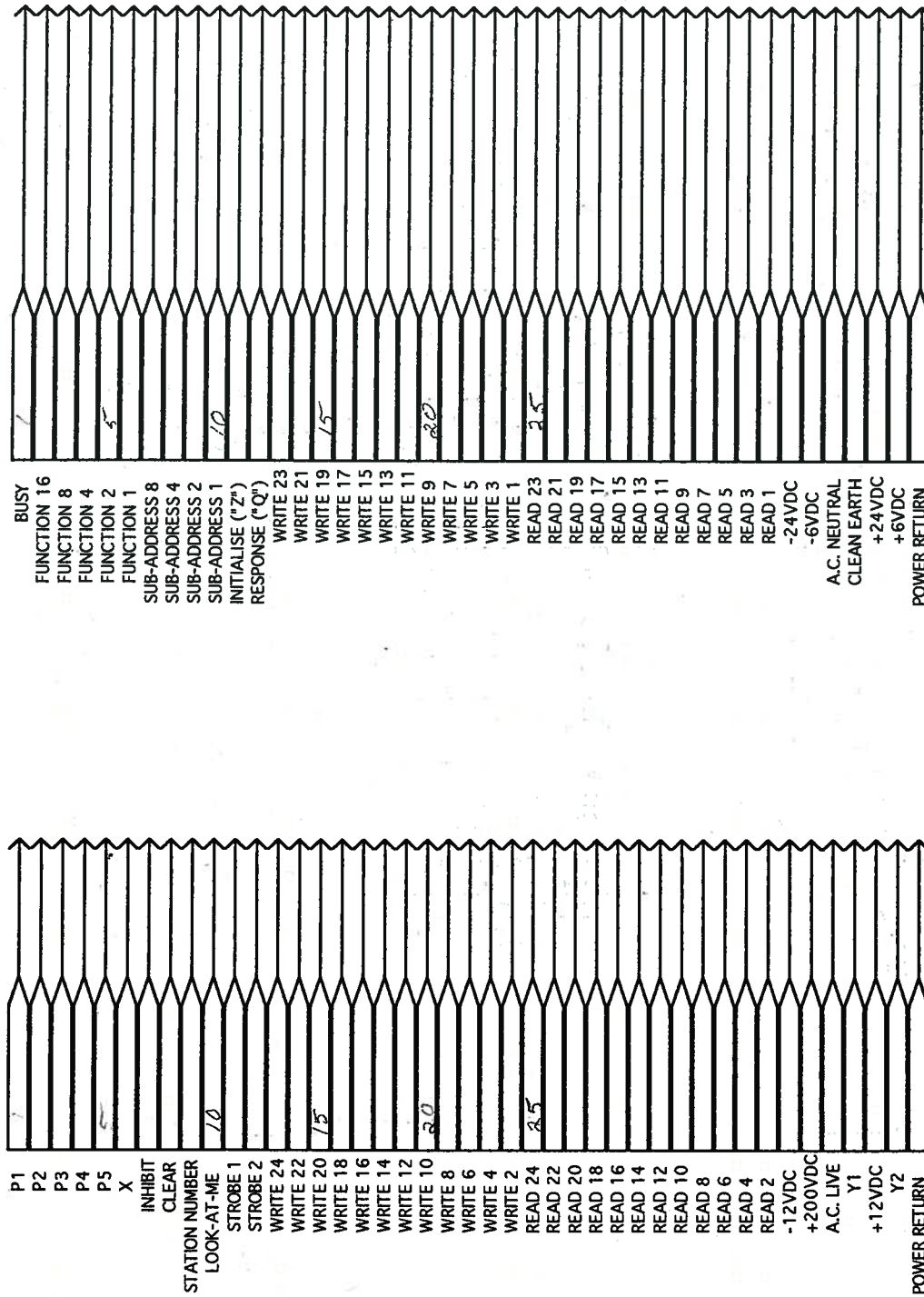
- A. CONNECTORS ARE IN ACCORDANCE WITH DRAWING NO. ND-519.
- B. RESERVED PINS ARE FOR FUTURE ASSIGNMENT BY THE COMMITTEE AND SHALL NOT BE USED UNTIL SUCH ASSIGNMENTS ARE MADE.
- C. GP-1 = GUIDE PIN
GGS = GROUND GUIDE PIN
GS-1 = GUIDE SOCKET
GGS = GROUND GUIDE SOCKET } PER ND-519
- D. SEE ALSO SECTION F OF THIS REPORT



ND-526

Fig. 5. Power Connector—Pin Assignments; and Other Details

CAMAC Connector Pinout



RIGHT SIDE

WHEN VIEWED FROM FRONT OF CRATE

LEFT SIDE

2/26 Low pass Bessel Filter (MAX281)

$$\text{Gain of AMP01} = 20 \frac{R_S}{R_G}$$

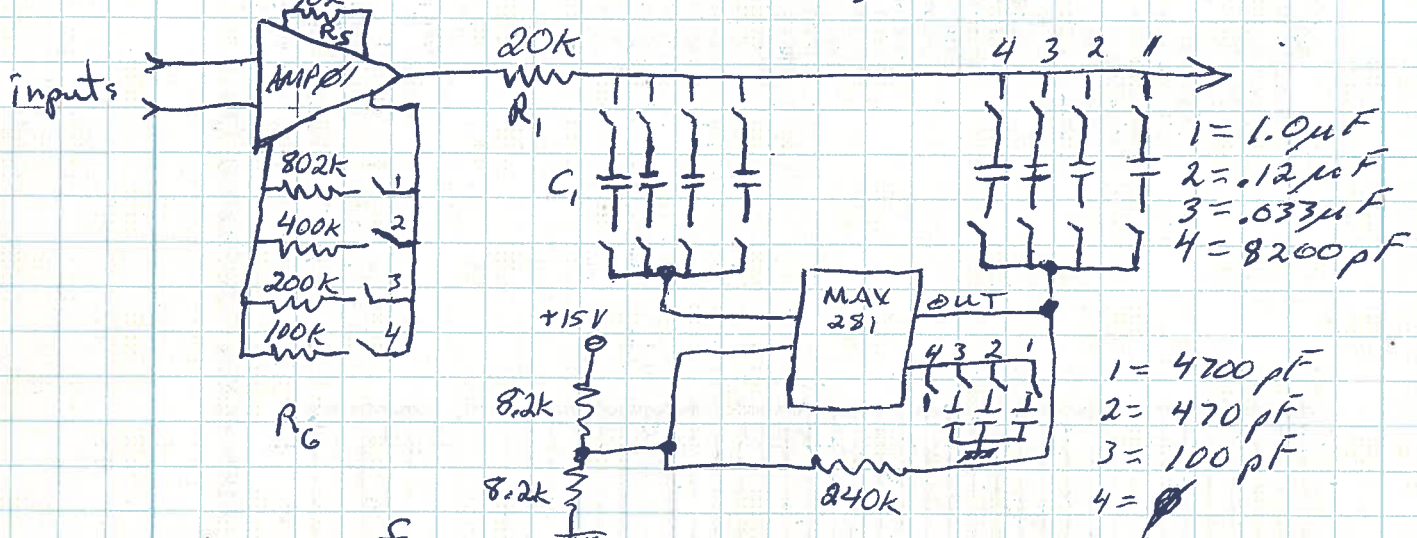
$$R_S = 10k\Omega$$

for $G = .25$ $R_G = 800k$ (300k+300k+200k)
 $.5$ $400k$ (200k+200k)
 1.0 $200k$
 2.0 $100k$

measured gains are

V_{in}	V_{out}
4.64	1.15
	2.31
	4.62
	9.32

for MAX281
 $f_{osc} = 140kHz \left(\frac{33pF}{33pF + C_{osc}} \right) \pm 20\%$



ant $\frac{1}{2\pi R_C} = \frac{f_{cutoff}}{1.2737}$

Gain set by R_G to switch 1 $\rightarrow G =$ (see top of page)

f_{cutoff} is for switch

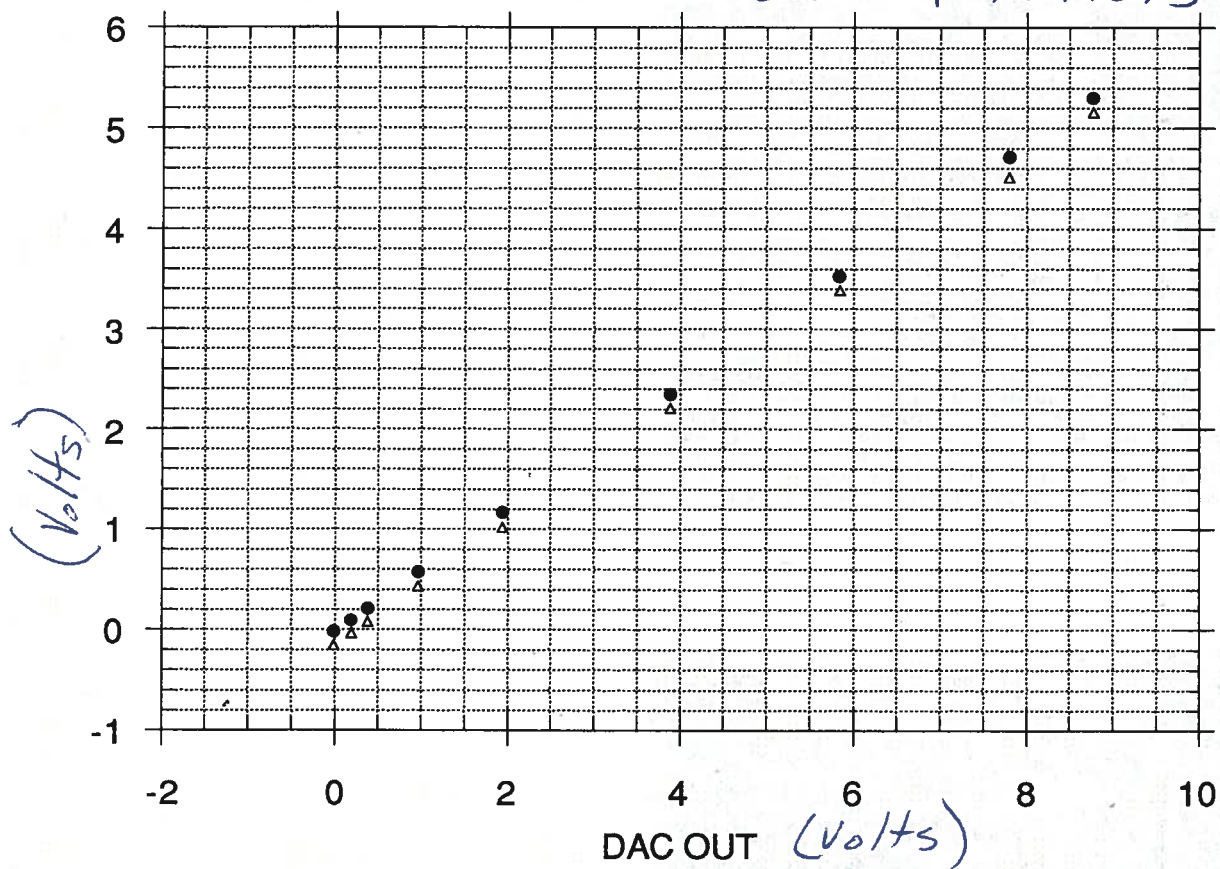
1	$\sim 10 Hz$
2	$\sim 91 Hz$
3	$\sim 350 Hz$
4	$\sim 1300 Hz$

10/16
JH

Output of KEPCO supply when set
for remote voltage programming.

- △ PS UNADJ
- PS ADJ

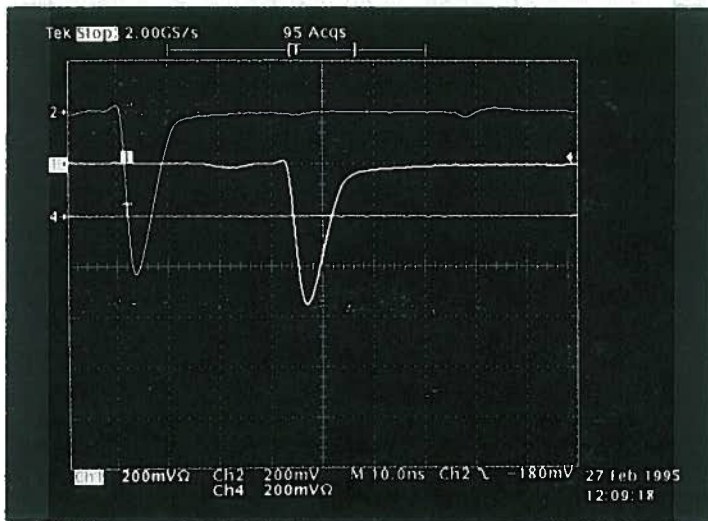
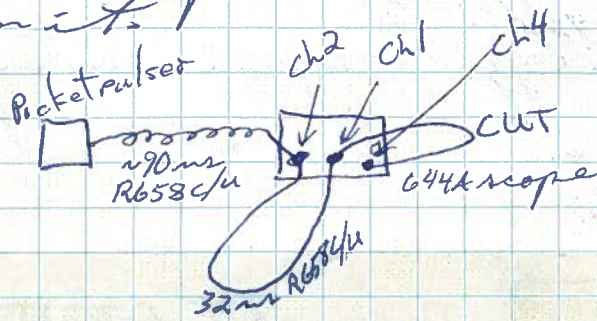
Kepeco ATE 6-100M
Data 1 CEBAF Prop. #F219073



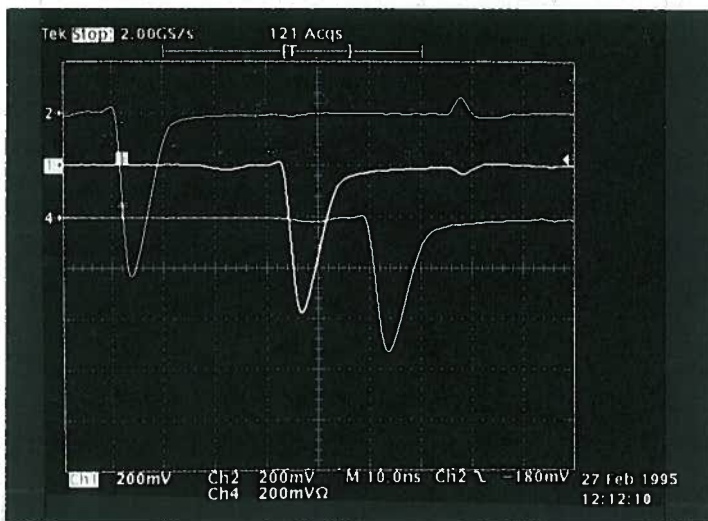
2/27

Accuwire Sample Cable

~8ms of Thinnet cable with BNC connectors on it.

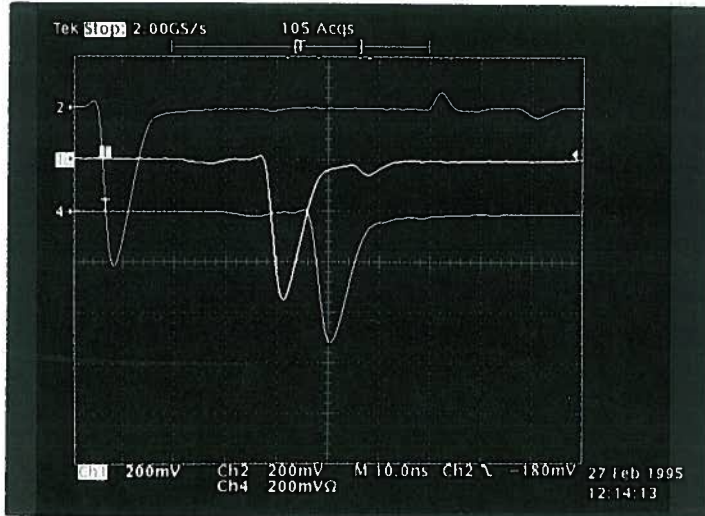


CUT is not in place.
Ch1 is 50Ω terminated

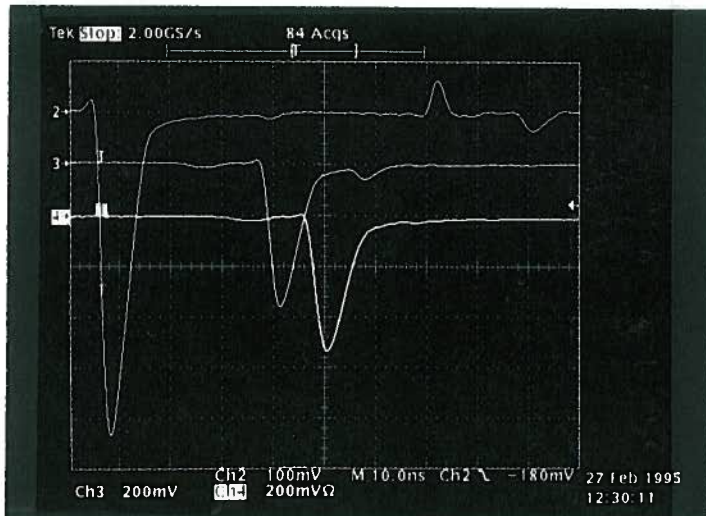


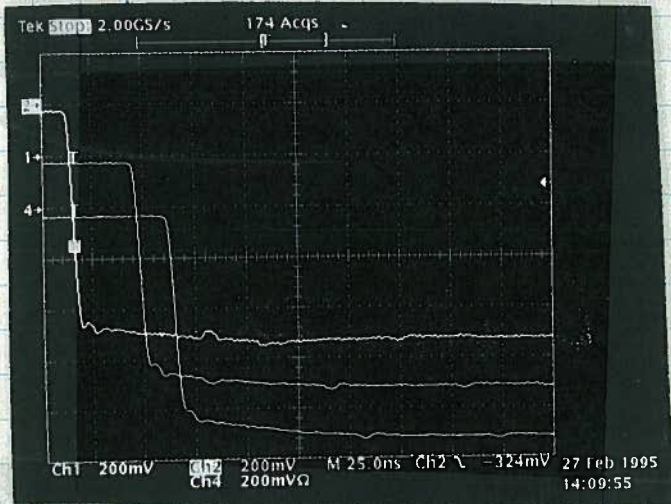
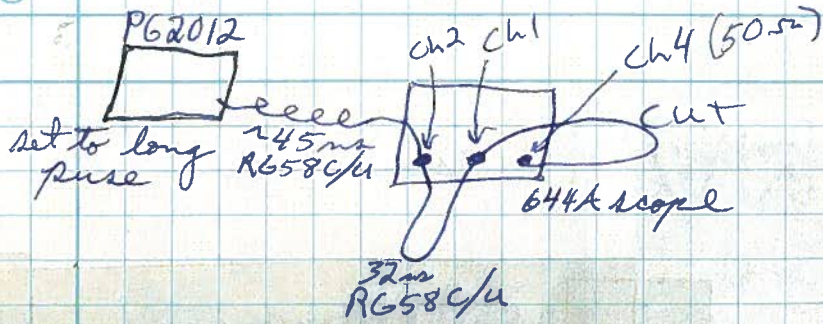
CUT is 16ms R658C/u
Ch4 is 50Ω terminated

CUT is sample from
Acuwire

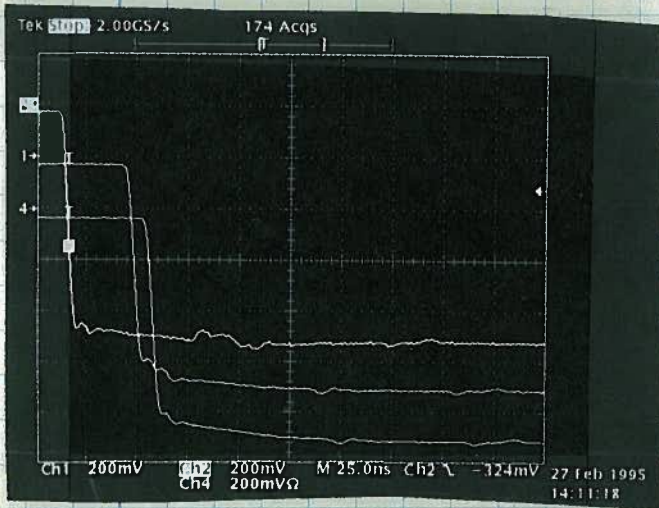


CUT as above
Expanded scale

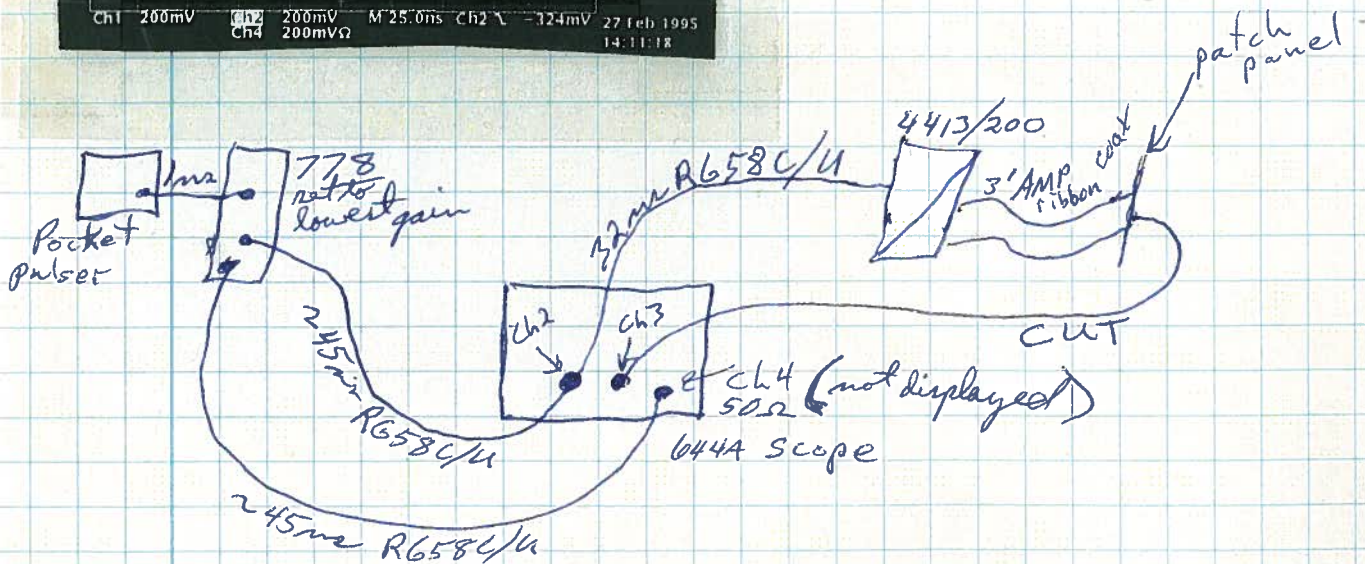


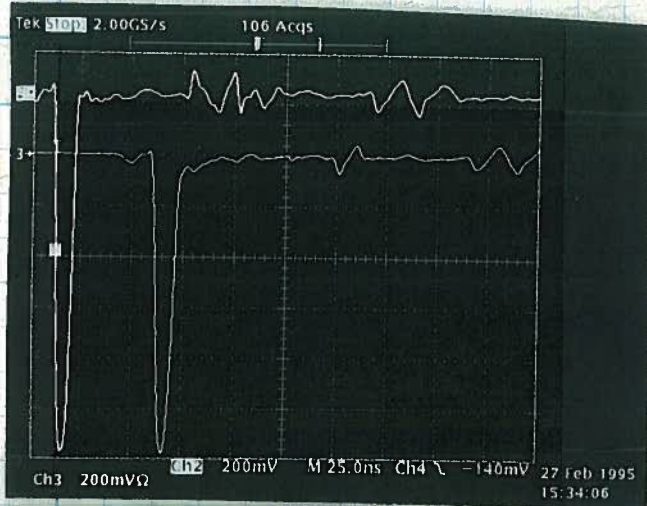


CUT is 16ms of RG58C/U

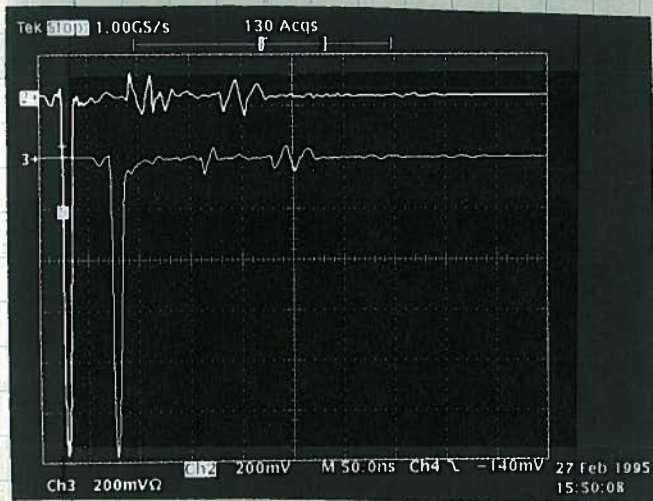


CUT is sample from Accuwire

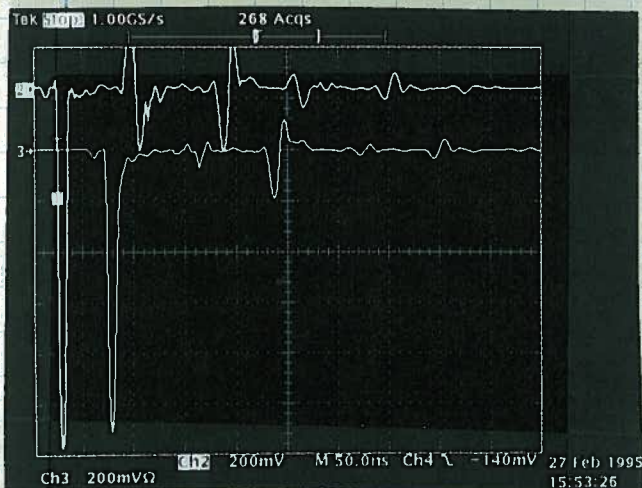




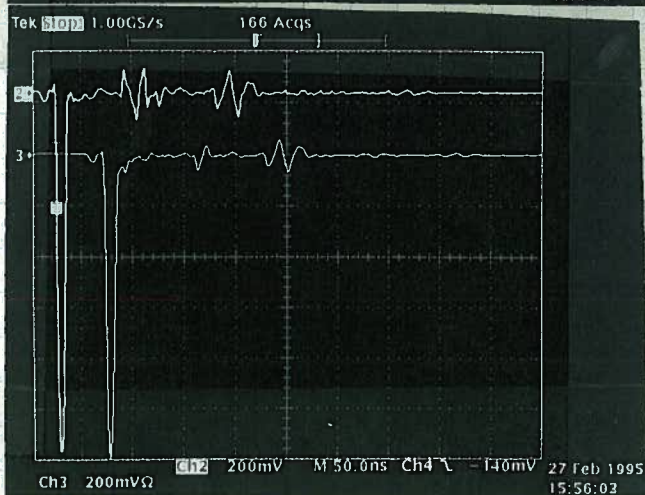
panel in mine (Ch3 of panel)
CUT is Accuwire sample



same as above
change in time scale

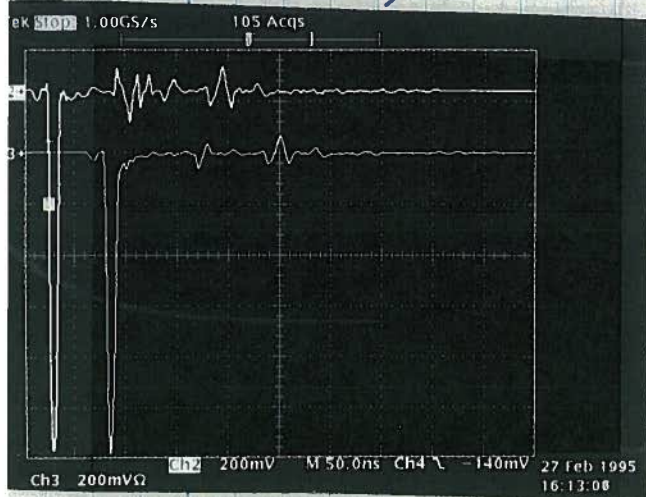


As above except ribbon coax
cable is flipped (driving shield)

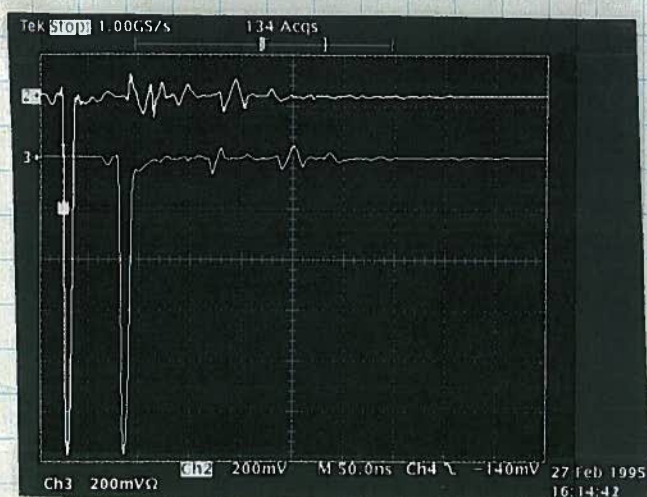


panel is Detector group's (Ch4 of panel)
CUT is Accuwire sample

Panel in detector group's
CUT is 16ms R658C/u



panel in mine
CUT is 16ms R658C/u



3/2
1/8

Bi-Ra CAMAC crate containing

5 of 4413/MOD 200

6 of 4518

1 of 4518/300

1 of 4418

2 of 4516

2 of 2373

1 of 4564

1 of 7126 (Phillips)

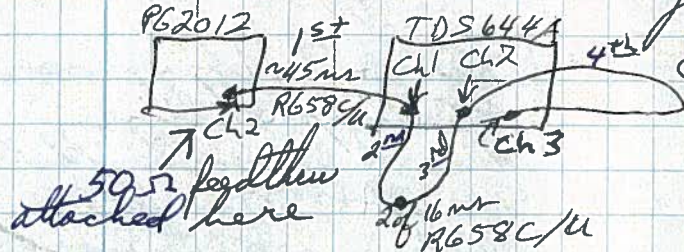
1 of 3922 crate controller

Draws 9.1 Amps on the
AC input line
Measured with fluke
8060A & 80T-600
DMM 1000:1 transformer

Phillips 702 NIM bin moderately loaded is
drawing 2.3 Amps

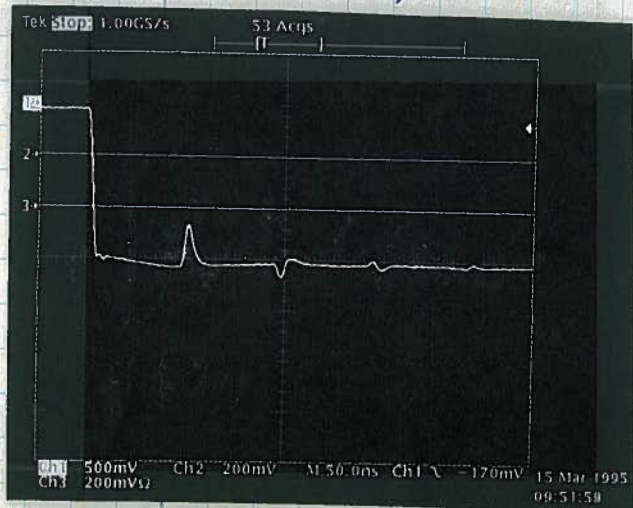
3/15 Accuwire Thinner Cable

JS Trench cable assembly from Accuwire, should be 50' long.

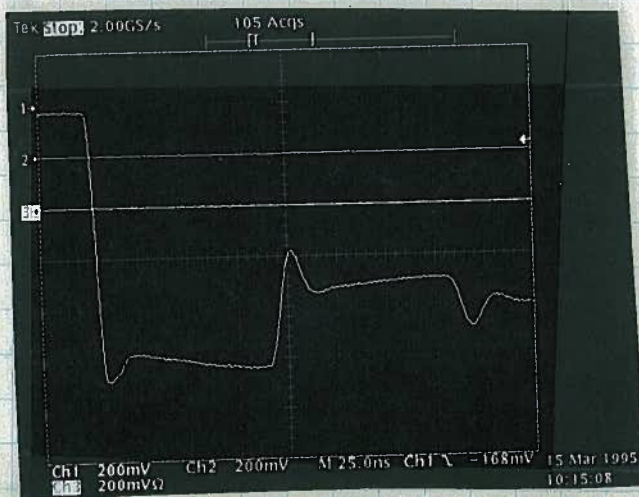


Pulse is $\begin{matrix} 0V \\ -8V \end{matrix}$
1000ns wide
leading edge & trailing are 5ns
rep rate is 1KHz

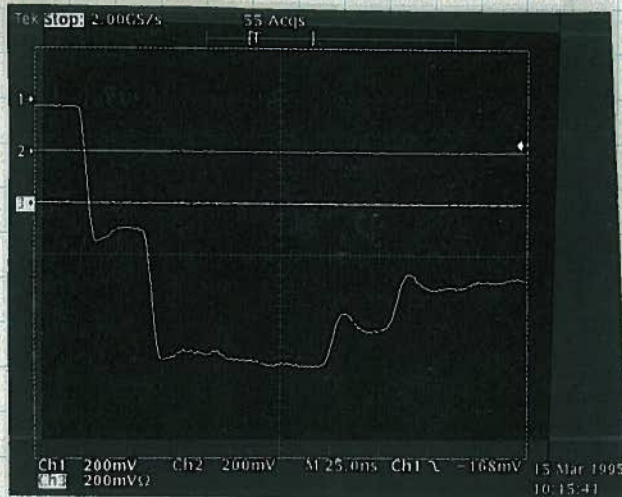
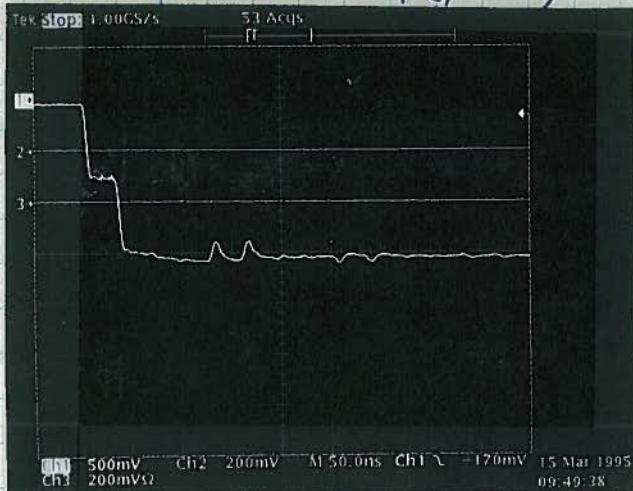
Without 50Ω feed thru
only 1st cable in place



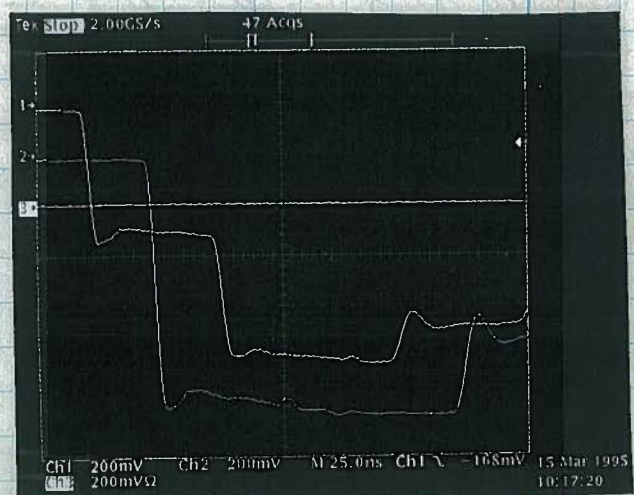
With 50Ω feed thru



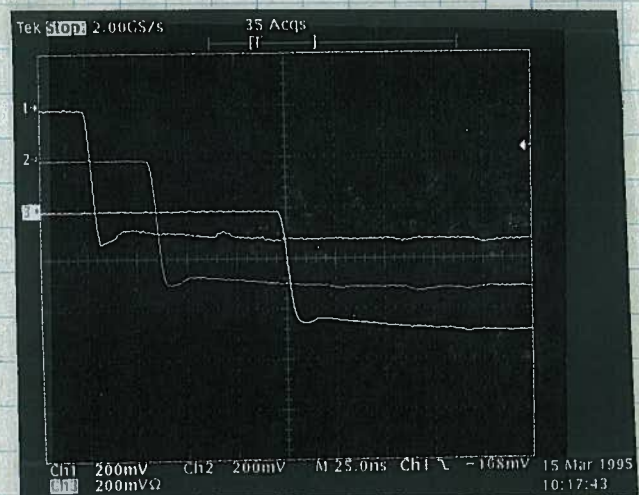
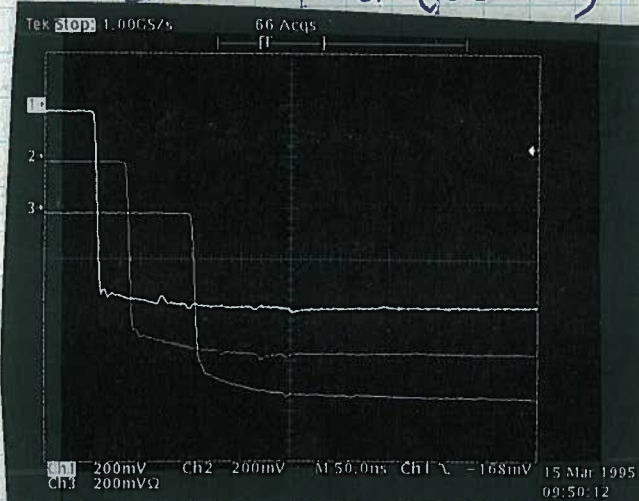
2nd cable attached (open end)



3rd cable attached (1Meg)



4th cable attached (50Ω)

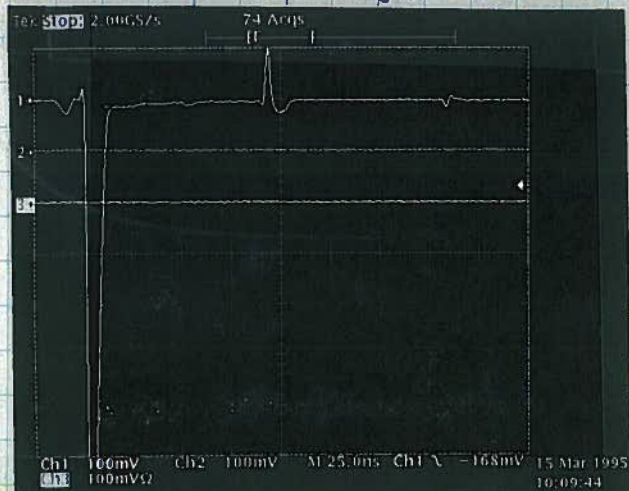


4th cable open ended (not input to Ch3) ($R = \infty$)

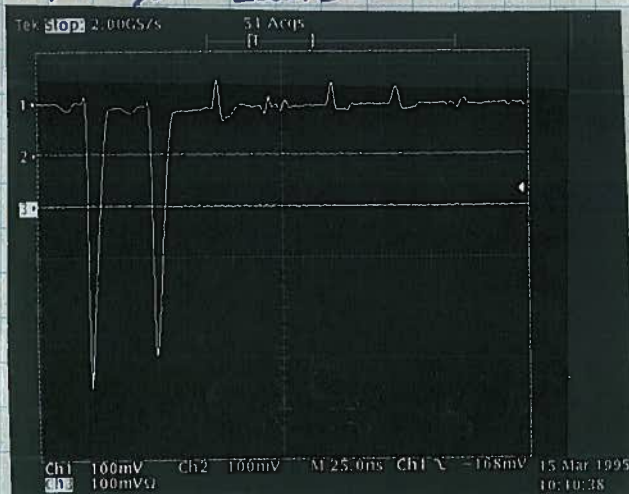


PG2012 replaced by a pocket pulser. Same series of photos as p. 32 & B3 except all with 50 Ω feedthru in place.

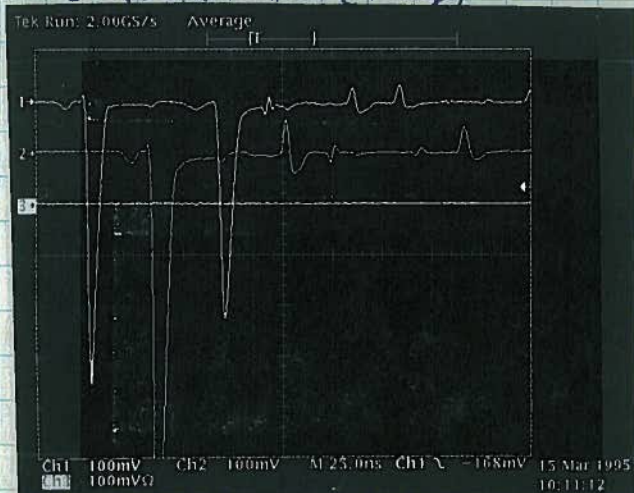
1st cable only (1Meg)



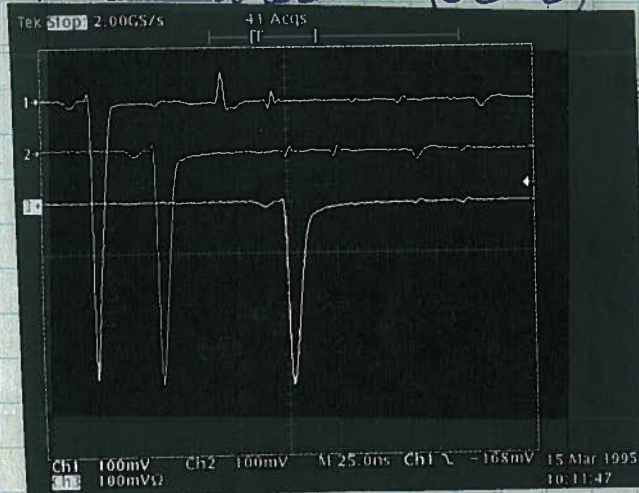
1st & 2nd cable R= ∞



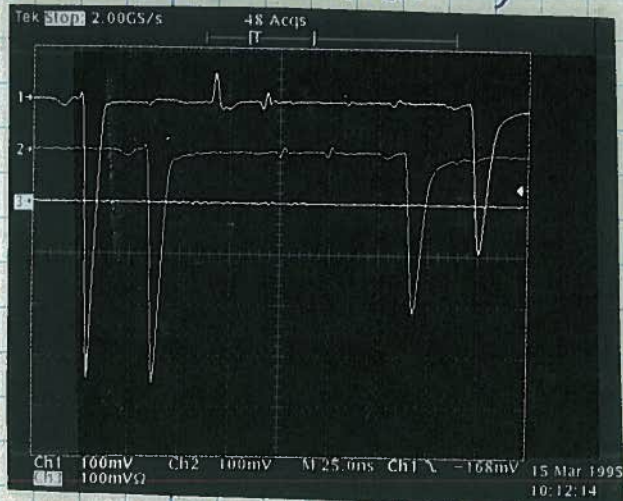
3rd cable attached (1Meg)



4th cable attached (50 Ω)



4th cable disconnected (R= ∞)

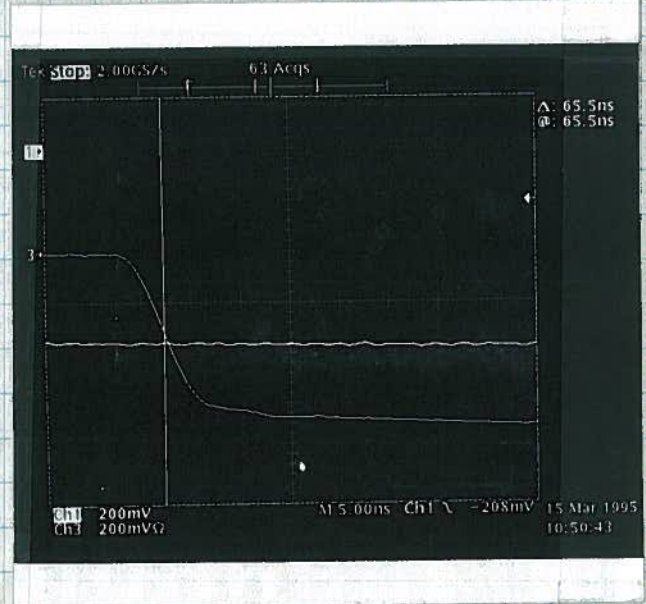
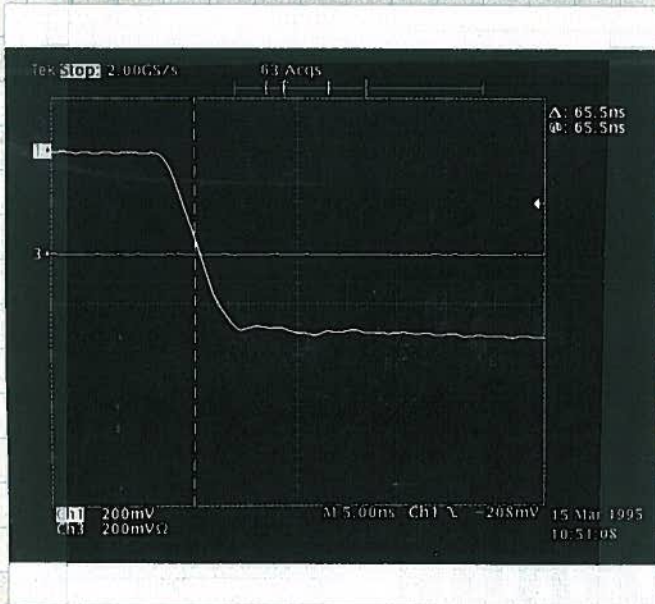


Same as above photo $\nearrow$
except no 50 Ω feedthru

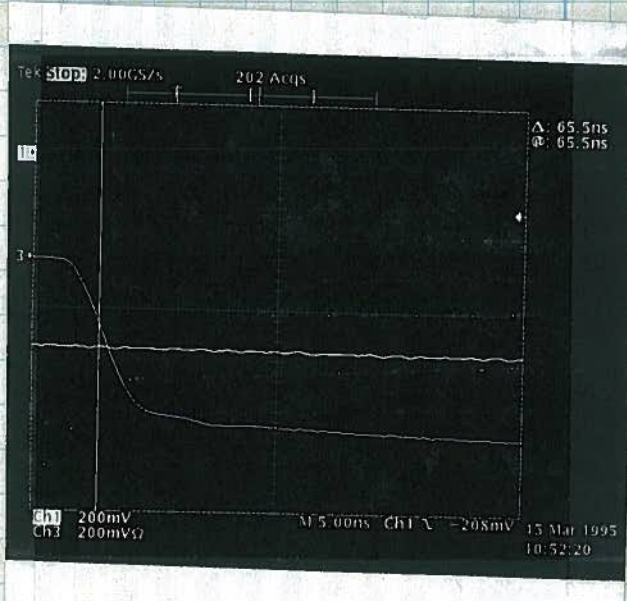
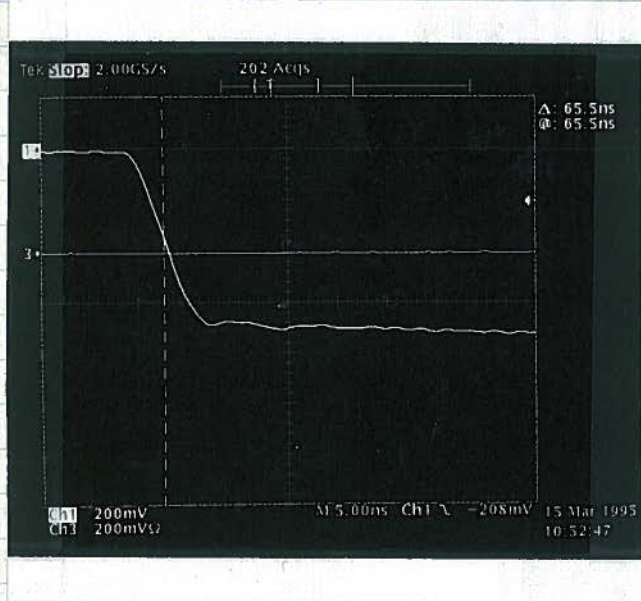


Cable comes in two obtrusive batches. The outer jackets are a slightly different shade of tan. One of each shade is checked for transmission speed. A rough measurement with a tape measure gives ~ 50 ft. $1\frac{1}{2}$ in 2" off.

1st cable (50')



2nd 50' cable



50' in 66.5 ns
 $15.24 \text{ m in } 66.5 \text{ ns} \Rightarrow 2.292 \times 10^8 \text{ m/s}$
 $C \approx 2.998 \times 10^8 \text{ m/s}$
 $\Rightarrow .76c$

Belden Ethernet 9907 $v_0 \approx .80c$
 IEEE 802.3 10base2 25.4 pF/ft. 83.3 pF/m
 $Z_0 = 50 \Omega$

Note:
 $Z_0 = \sqrt{\frac{L_0}{C_0}}$
 $v_0 = \frac{1}{\sqrt{L_0 C_0}}$
 $Z_0 = \frac{1}{v_0 C_0}$

Solid Wire Data



Technical Information 1 Pages

Stranded Tinned Copper Wire American Wire Gage

Gage (AWG)	Stranding	Stranding Diameter	Stranding Area	Stranding Circumference	Stranding Weight	Stranding Resistance	Stranding Capacitance
36	7/44	.002	.0008	.002	.0008	.0008	.0008
34	7/42	.002	.0008	.002	.0008	.0008	.0008
32	7/40	.002	.0008	.002	.0008	.0008	.0008
30	7/38	.002	.0008	.002	.0008	.0008	.0008
28	7/36	.002	.0008	.002	.0008	.0008	.0008
26	7/34	.002	.0008	.002	.0008	.0008	.0008
24	7/32	.002	.0008	.002	.0008	.0008	.0008
22	7/30	.002	.0008	.002	.0008	.0008	.0008
20	7/28	.002	.0008	.002	.0008	.0008	.0008
18	7/26	.002	.0008	.002	.0008	.0008	.0008
16	7/24	.002	.0008	.002	.0008	.0008	.0008
14	7/22	.002	.0008	.002	.0008	.0008	.0008
12	7/20	.002	.0008	.002	.0008	.0008	.0008
10	7/18	.002	.0008	.002	.0008	.0008	.0008
8	7/16	.002	.0008	.002	.0008	.0008	.0008
6	7/14	.002	.0008	.002	.0008	.0008	.0008
4	7/12	.002	.0008	.002	.0008	.0008	.0008
3	7/10	.002	.0008	.002	.0008	.0008	.0008
2	7/8	.002	.0008	.002	.0008	.0008	.0008
1	7/6	.002	.0008	.002	.0008	.0008	.0008
0	7/4	.002	.0008	.002	.0008	.0008	.0008
00	7/3	.002	.0008	.002	.0008	.0008	.0008
000	7/2	.002	.0008	.002	.0008	.0008	.0008



Technical Information 1 Pages

Solid Bare Copper Wire American Wire Gage

Gage (AWG)	Stranding	Stranding Diameter	Stranding Area	Stranding Circumference	Stranding Weight	Stranding Resistance	Stranding Capacitance
36	7/44	.002	.0008	.002	.0008	.0008	.0008
34	7/42	.002	.0008	.002	.0008	.0008	.0008
32	7/40	.002	.0008	.002	.0008	.0008	.0008
30	7/38	.002	.0008	.002	.0008	.0008	.0008
28	7/36	.002	.0008	.002	.0008	.0008	.0008
26	7/34	.002	.0008	.002	.0008	.0008	.0008
24	7/32	.002	.0008	.002	.0008	.0008	.0008
22	7/30	.002	.0008	.002	.0008	.0008	.0008
20	7/28	.002	.0008	.002	.0008	.0008	.0008
18	7/26	.002	.0008	.002	.0008	.0008	.0008
16	7/24	.002	.0008	.002	.0008	.0008	.0008
14	7/22	.002	.0008	.002	.0008	.0008	.0008
12	7/20	.002	.0008	.002	.0008	.0008	.0008
10	7/18	.002	.0008	.002	.0008	.0008	.0008
8	7/16	.002	.0008	.002	.0008	.0008	.0008
6	7/14	.002	.0008	.002	.0008	.0008	.0008
4	7/12	.002	.0008	.002	.0008	.0008	.0008
3	7/10	.002	.0008	.002	.0008	.0008	.0008
2	7/8	.002	.0008	.002	.0008	.0008	.0008
1	7/6	.002	.0008	.002	.0008	.0008	.0008
0	7/4	.002	.0008	.002	.0008	.0008	.0008
00	7/3	.002	.0008	.002	.0008	.0008	.0008
000	7/2	.002	.0008	.002	.0008	.0008	.0008

Stranded Wire Data

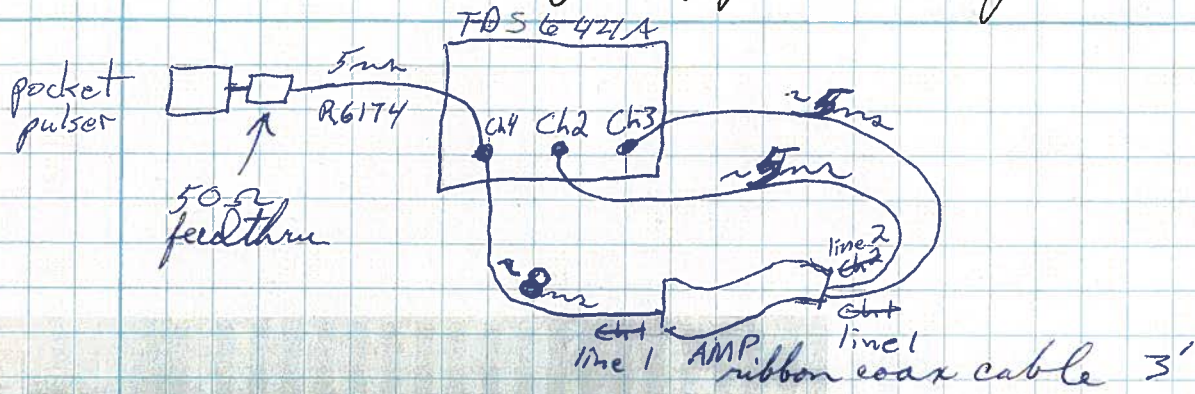
STRANDED TINNED COPPER WIRE TABLE OF DATA

AWG Size	Stranding	Nom. O.D. of Strand	Approx. O.D.	Circular MIL Area	Wt. Lbs./ 1000 Ft.	Ohms Per 1,000 Ft.*
36	7/44	.002	.006	28.00	.085	371.0
34	7/42	.0025	.0075	43.75	.132	237.0
32	7/40	.0031	.008	67.27	.203	164.0
32	19/44	.002	.009	76.00	.230	136.4
30	7/38	.004	.012	112.00	.339	103.2
30	19/42	.0025	.012	118.75	.359	87.3
28	7/36	.005	.015	141.75	.529	64.9
28	19/40	.0031	.016	182.59	.553	56.7
27	7/35	.0056	.018	219.52	.664	51.47
26	7/34	.0063	.019	277.83	.841	37.3
26	10/36	.0050	.021	250.00	.757	41.48
26	19/38	.0040	.020	304.00	.920	34.43
24	7/32	.008	.024	448.00	1.356	23.3
24	10/34	.0063	.023	396.90	1.201	26.09
24	19/36	.0050	.024	475.00	1.430	21.08
24	41/40	.0031	.023	384.40	1.160	25.59
22	7/30	.0100	.030	700.00	2.120	14.74
22	19/34	.0063	.031	754.11	2.28	13.73
22	26/36	.0050	.030	650.00	1.97	15.94
20	10/30	.0100	.035	1000.00	3.025	10.32
20	19/32	.0080	.037	1216.00	3.68	8.63
20	26/34	.0063	.036	1031.94	3.12	10.05
20	41/38	.0050	.036	1025.00	3.10	10.02
18	7/28	.0159	.048	1769.60	5.36	5.86
18	16/30	.0100	.047	1600.00	4.84	6.48
18	19/30	.0100	.049	1900.00	5.75	5.46
18	41/34	.0063	.047	1627.29	4.92	6.37
18	65/36	.0050	.047	1625.00	4.91	6.39
16	7/24	.0201	.060	2828.00	8.56	3.67
16	19/29	.0113	.058	2428.30	7.35	4.27
16	26/30	.0100	.059	2600.00	7.87	4.00
16	65/34	.0063	.059	2579.85	7.81	4.02
16	105/36	.0050	.059	2625.00	7.95	3.99
14	7/22	.0253	.073	4480.0	13.58	2.31
14	19/27	.0142	.073	3830.4	11.49	2.70
14	41/30	.0100	.073	4100.0	12.40	2.53
14	105/34	.0063	.073	4187.5	12.61	2.49
12	7/20	.0320	.096	7168.0	21.69	1.45
12	19/25	.0179	.093	6087.6	18.43	1.70
12	65/30	.0100	.095	6500.0	19.66	1.75
12	165/30	.0063	.095	6548.9	19.82	1.58

AWG Size	Stranding	Nom. O.D. of Strand	Approx. O.D.	Circular MIL Area	Wt. Lbs./ 1000 Ft.	Ohms Per 1,000 Ft.*
10	37/28	.0159	.115	9353.8	28.31	1.11
10	49/27	.0142	.116	9878.4	29.89	1.09
10	105/30	.0100	.116	10,530.0	31.78	.98
8	49/25	.0179	.147	15,699.6	47.53	.67
8	133/29	.0113	.147	16,984.1	51.42	.61
8	655/36	.0050	.147	16,825.0	49.58	.62
6	133/27	.0142	.184	26,812.8	81.14	.47
6	259/30	.0100	.184	25,900.0	78.35	.40
6	1050/36	.0050	.184	26,250.0	79.47	.386
4	133/25	.0179	.232	42,613.0	129.01	.243
4	259/27	.0143	.232	52,214.4	158.02	.20
4	1666/36	.0050	.232	41,650.0	126.10	.25
2	133/23	.0226	.292	67,936.4	205.62	.152
2	259/26	.0159	.292	65,475.2	198.14	.16
2	665/30	.0100	.292	66,500.0	201.18	.157
2	2646/36	.0050	.292	66,150.0	200.28	.157
1	133/22	.0253	.328	85,133.3	257.60	.121
1	259/25	.0179	.328	82,983.6	251.20	.125
1	817/30	.0100	.328	81,700.0	247.10	.127
1	2109/34	.0063	.328	83,706.2	253.29	.124
1/0	133/21	.0285	.368	108,035.9	327.05	.096
1/0	259/24	.0201	.368	104,636.0	316.76	.099
1/0	1045/30	.0100	.368	104,500.0	318.11	.099
1/0	2660/34	.0063	.368	105,575.4	319.47	.098
1/0	4214/36	.0050	.368	105,350.0	318.96	.098
2/0	133/20	.0320	.414	136,192.0	412.17	.077
2/0	259/23	.0226	.414	132,297.2	400.41	.077
2/0	1330/30	.0100	.414	133,000.0	402.33	.077
2/0	3325/34	.0063	.414	131,969.2	399.33	.077
2/0	5292/36	.0050	.414	132,300.0	400.55	.077
3/0	259/22	.0253	.464	163,195.9	501.7	.062
3/0	427/24	.0201	.464	172,608.0	522.2	.059
3/0	1661/30	.0100	.464	166,100.0	502.45	.062
3/0	4258/34	.0063	.464	166,920.8	511.15	.061
3/0	6713/36	.0050	.464	167,825.0	508.11	.061
4/0	259/21	.0285	.522	210,385.7	638.88	.049
4/0	427/23	.0226	.522	218,111.8	660.01	.047
4/0	2104/30	.0100	.522	210,400.0	636.46	.049
4/0	5320/34	.0063	.522	211,150.8	638.89	.049
4/0	8512/36	.0050	.522	212,600.0	644.27	.049

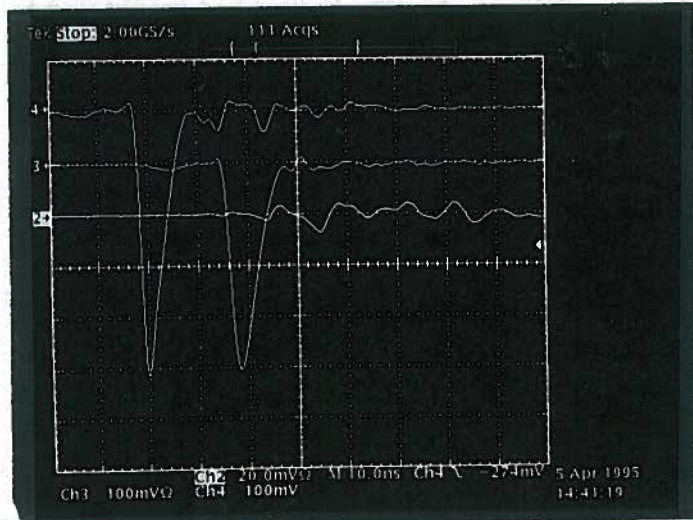
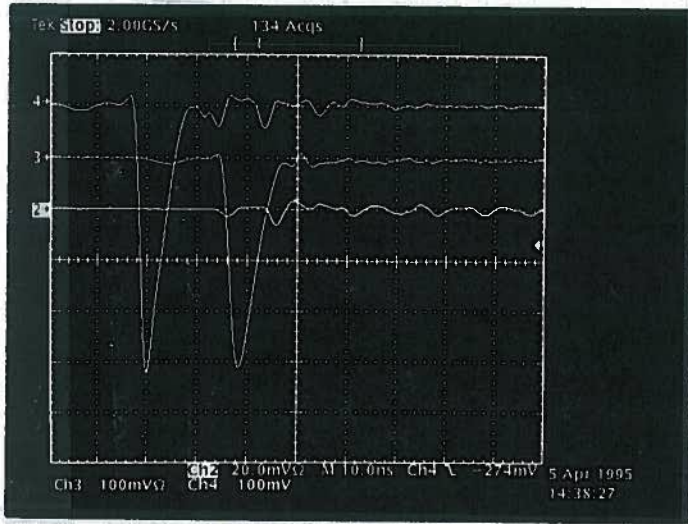
*Resistance in Ohms per 1000 ft. at 68°F (20°C)

Various driving configurations of ribbon-ax



line 1 - driving center conductor
shield @ gnd

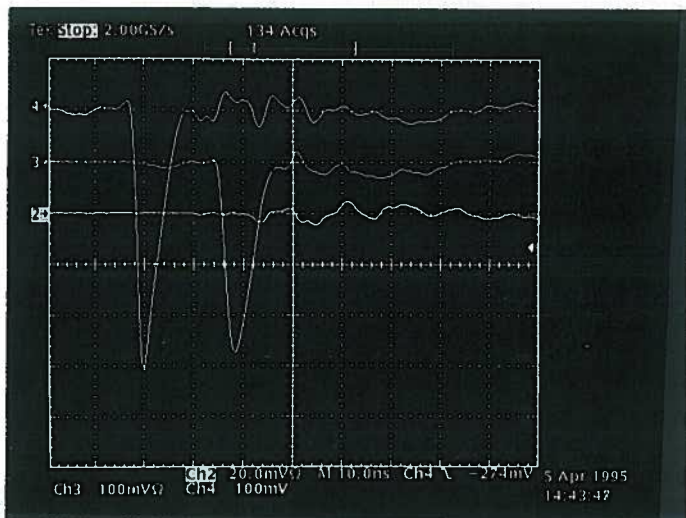
line 2 - signal off center conductor
shield @ gnd



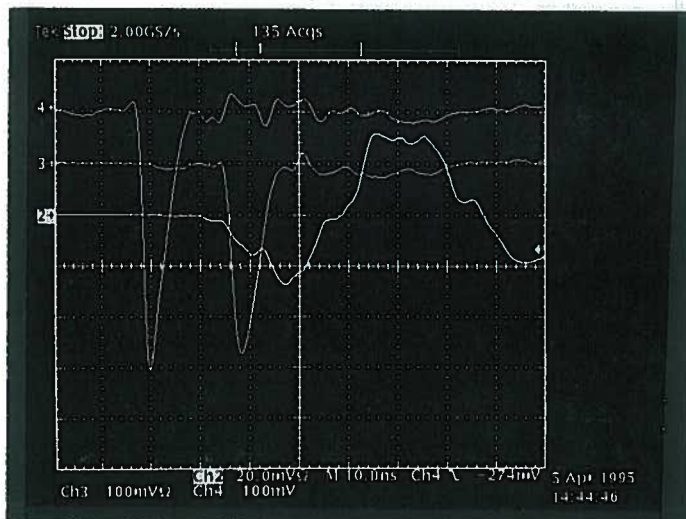
line 1 - driving center
shield @ gnd

line 2 - signal off shield
center @ gnd

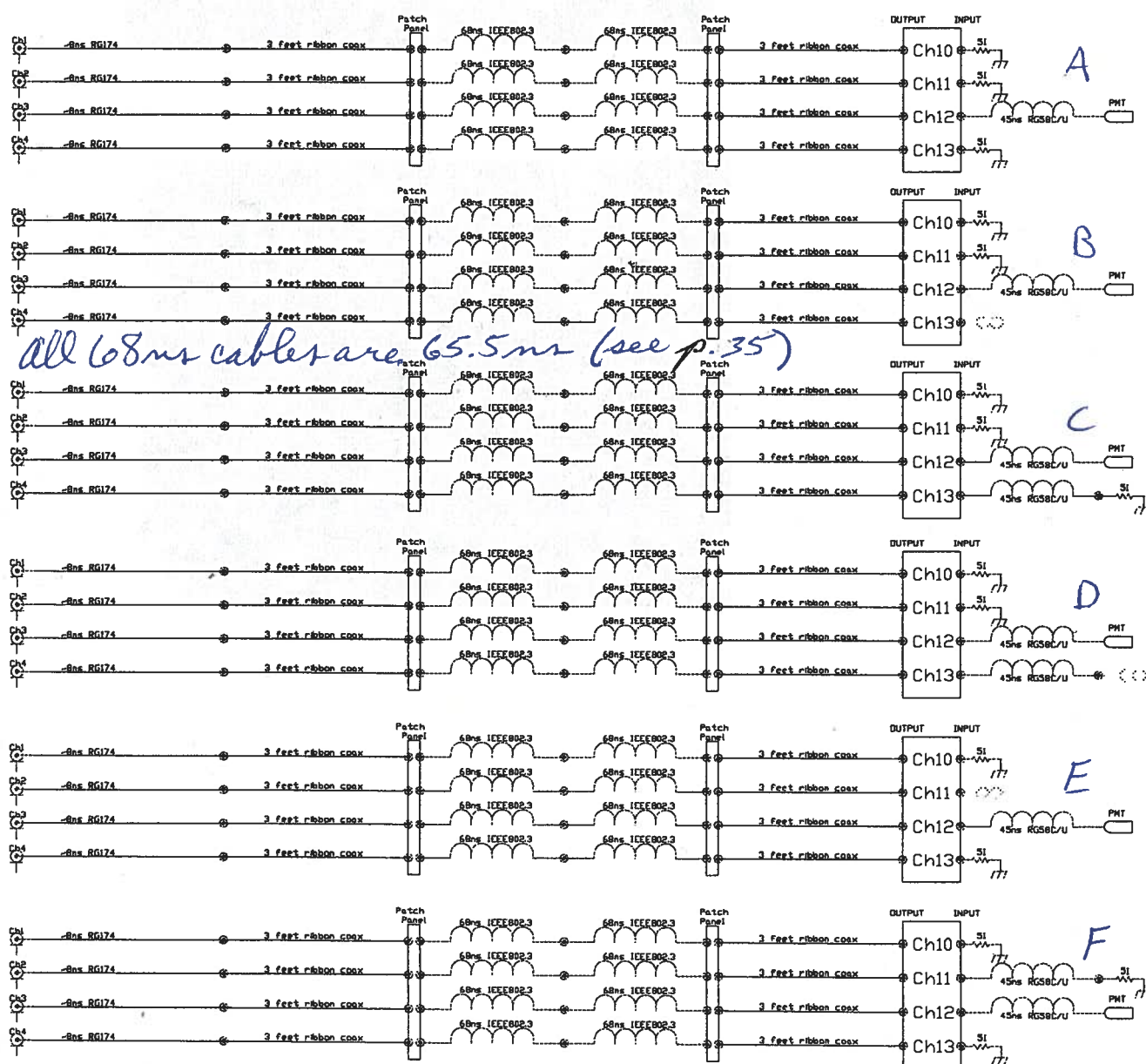
line 1- driving shield
center @ gnd
line 2- signal off center
shield @ gnd



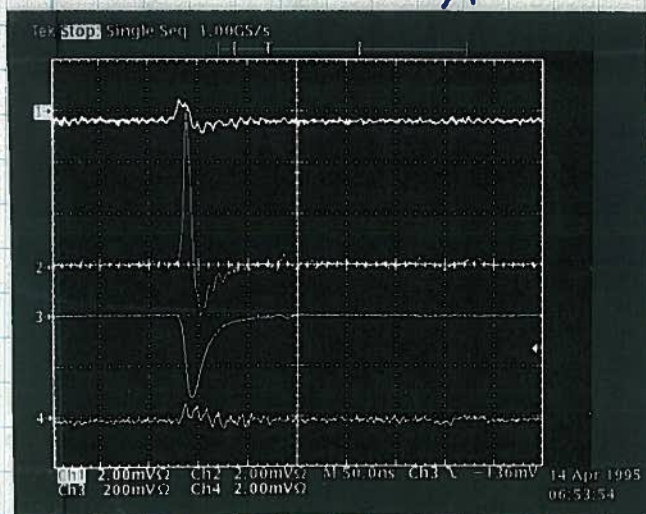
line 1-driving shield
center @ gnd
line 2- signal off shield
center @ gnd



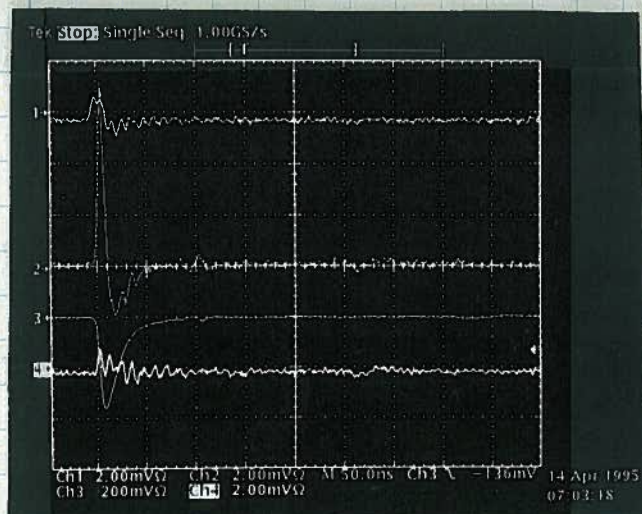
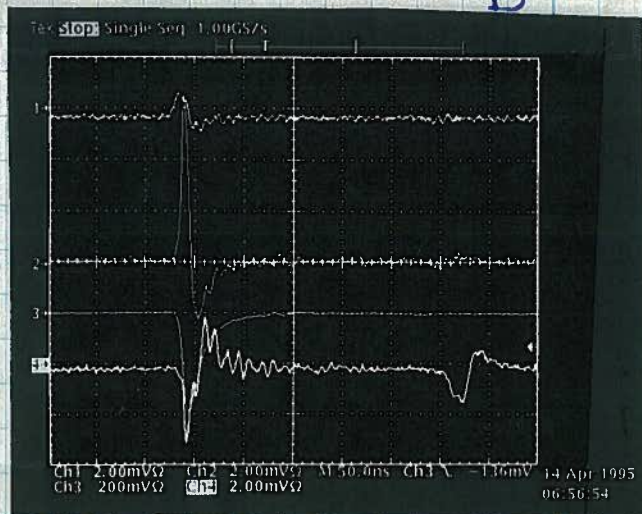
4/14 & 4/15 Evaluation of Detector Group's Patch Panel
in approximate final configuration.



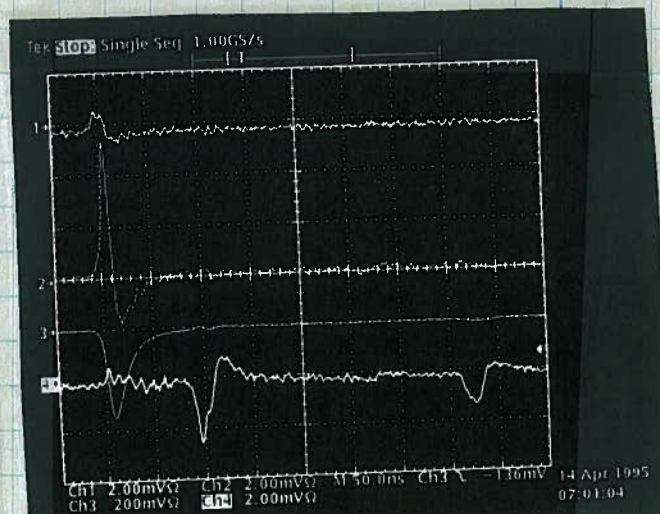
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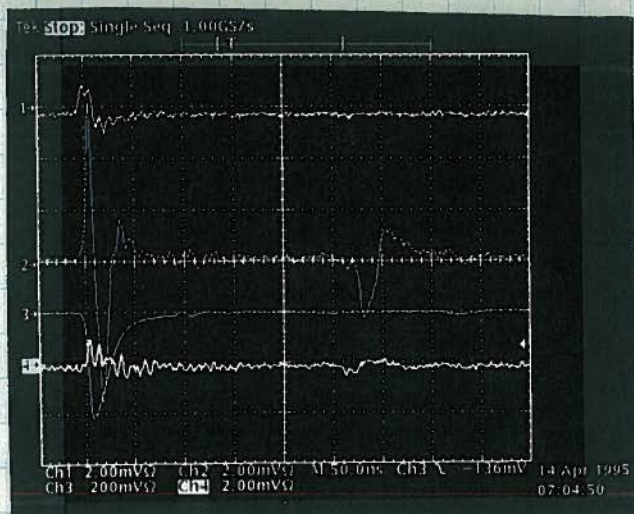
B



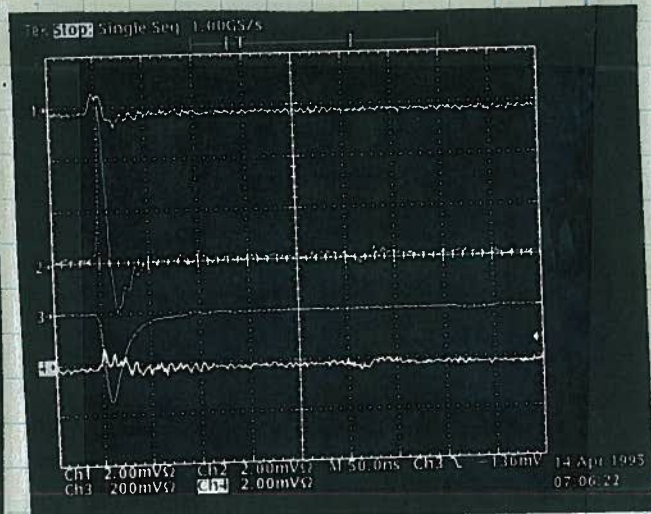
C.



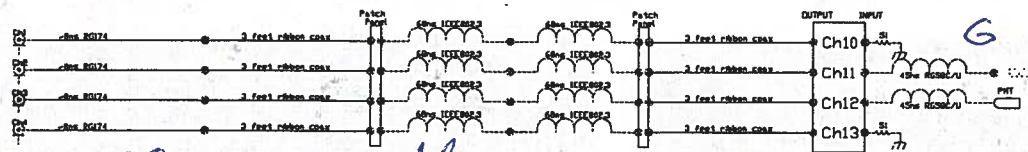
D



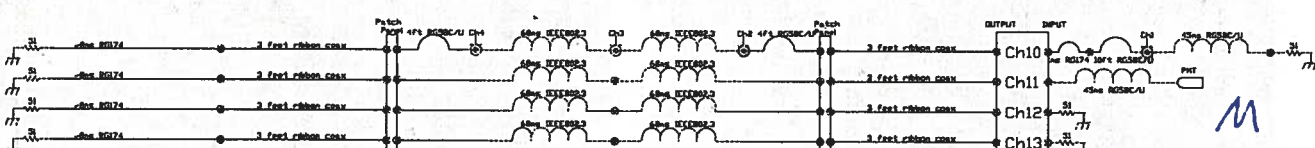
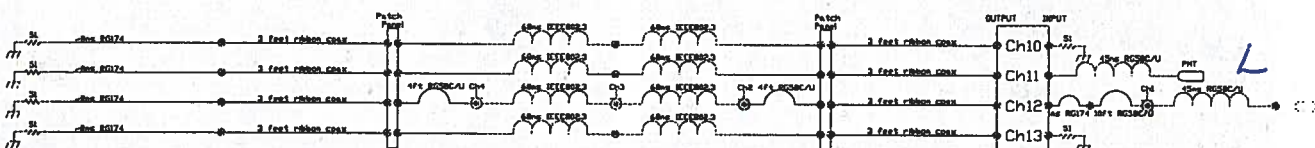
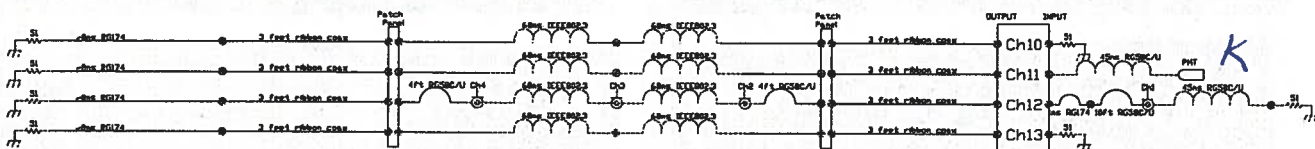
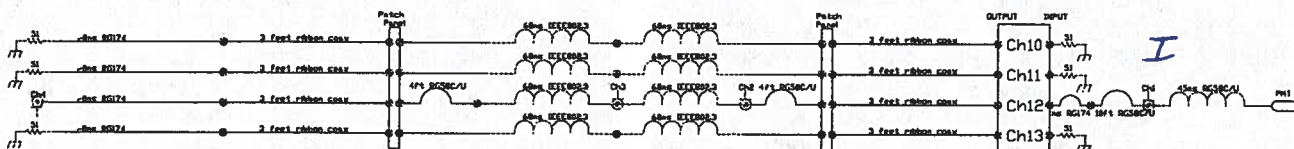
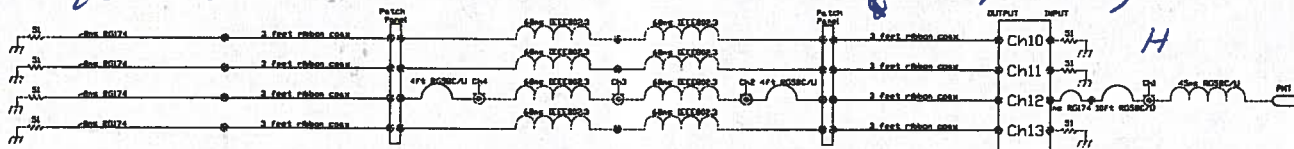
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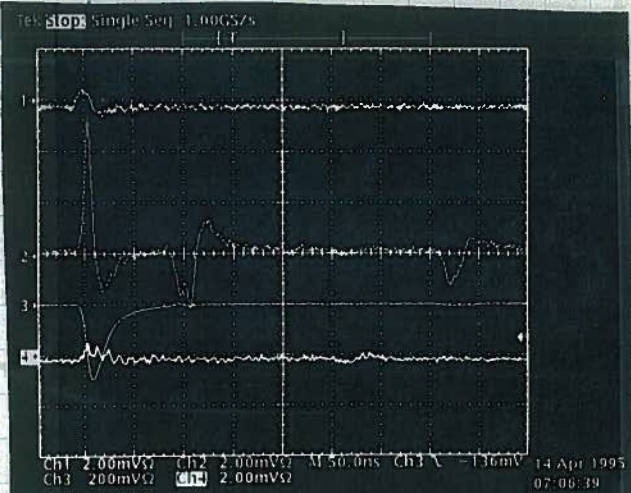


F

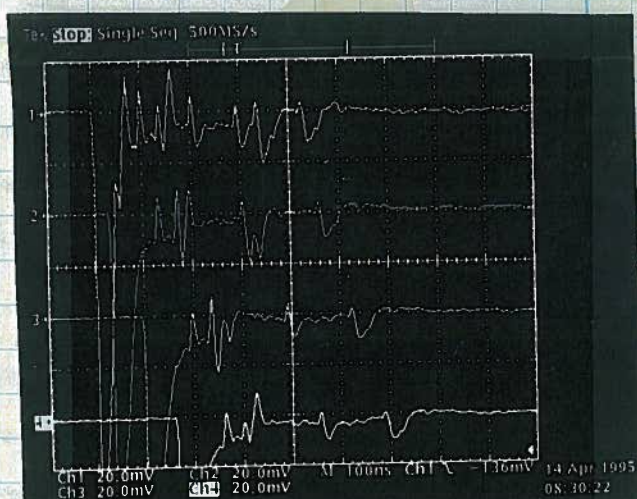


All 68ms cables are 65.5ms (see p. 35)

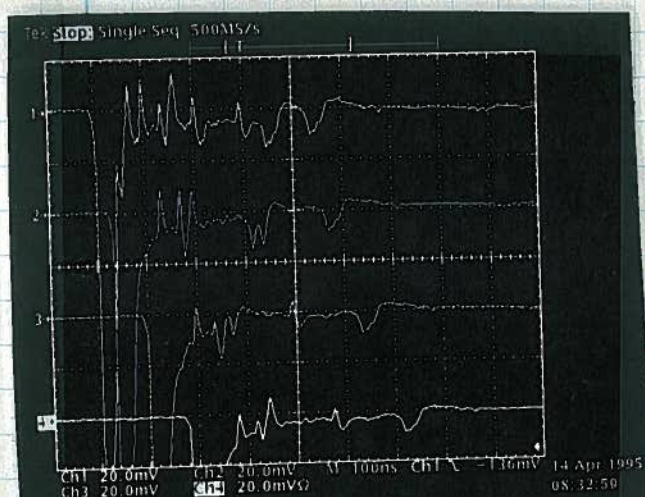




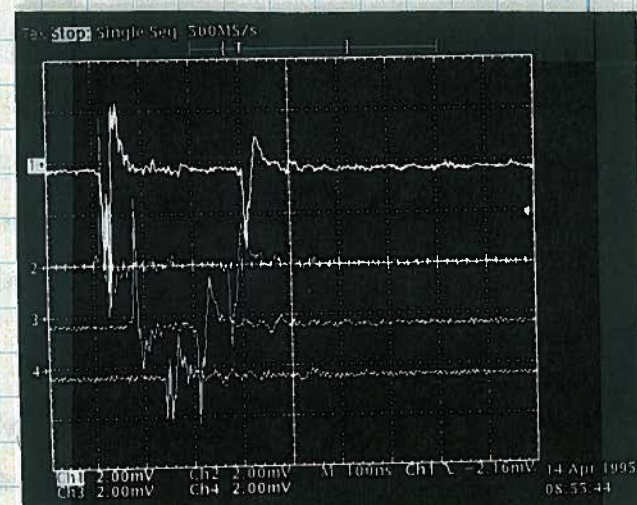
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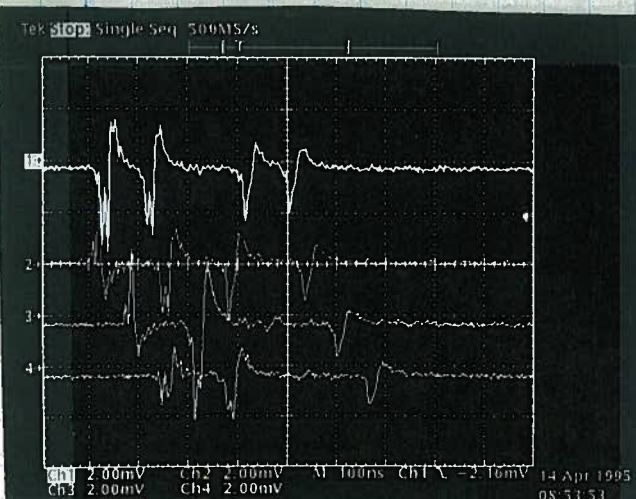
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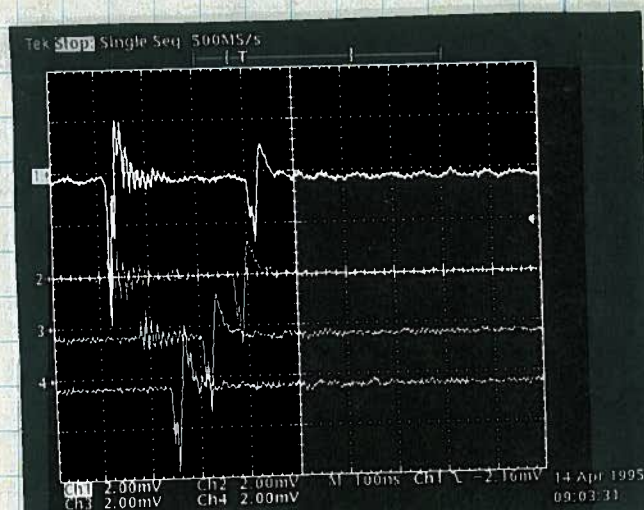
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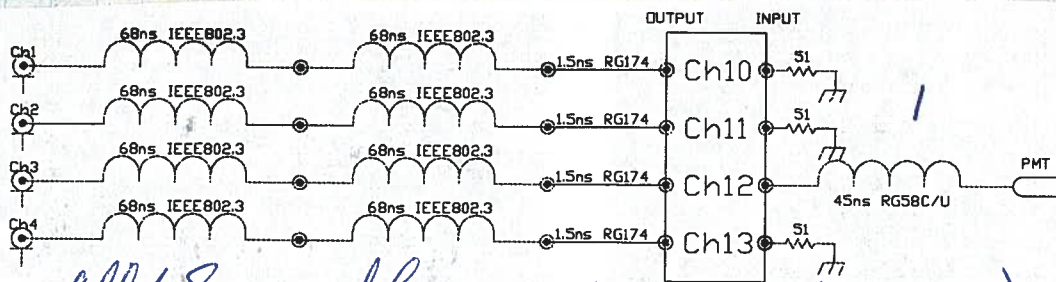
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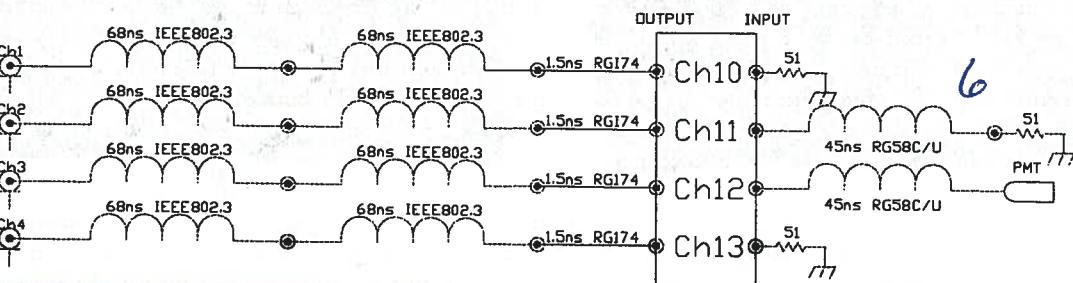
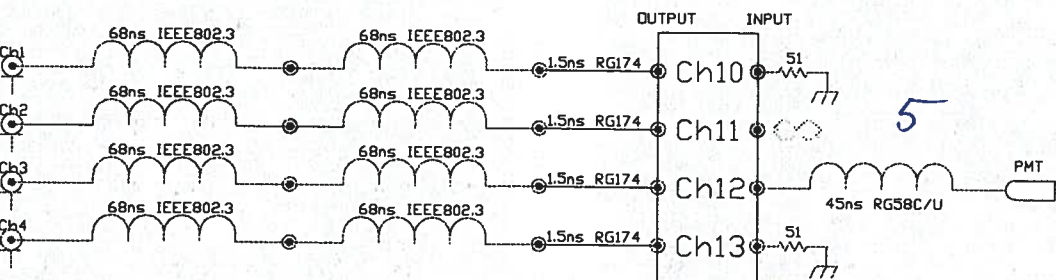
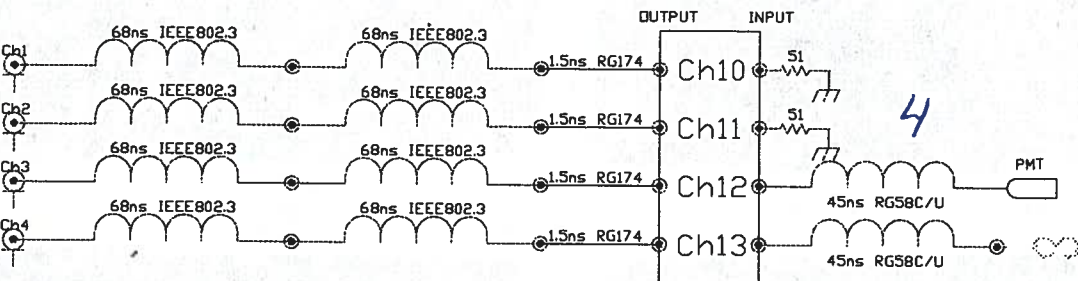
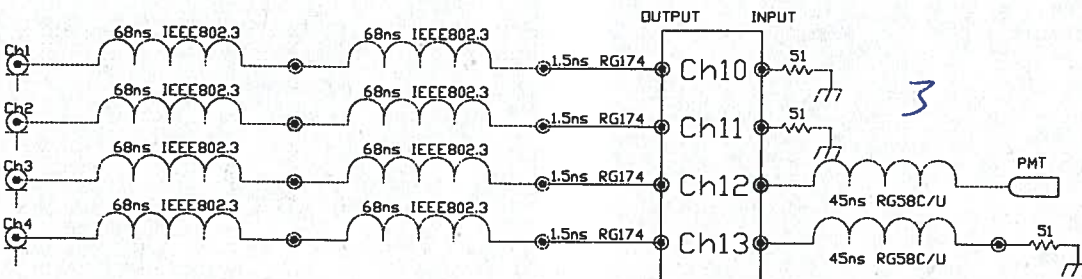
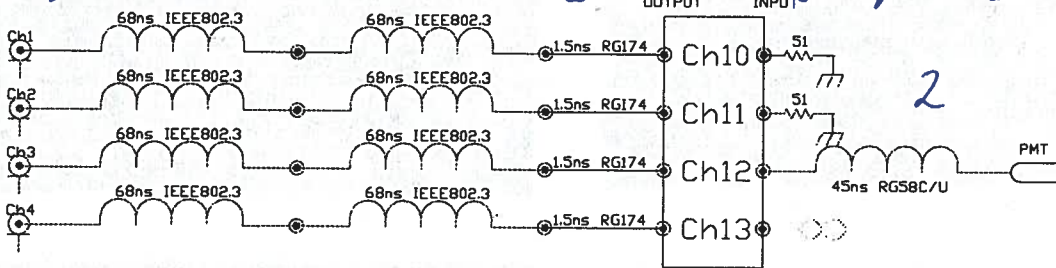
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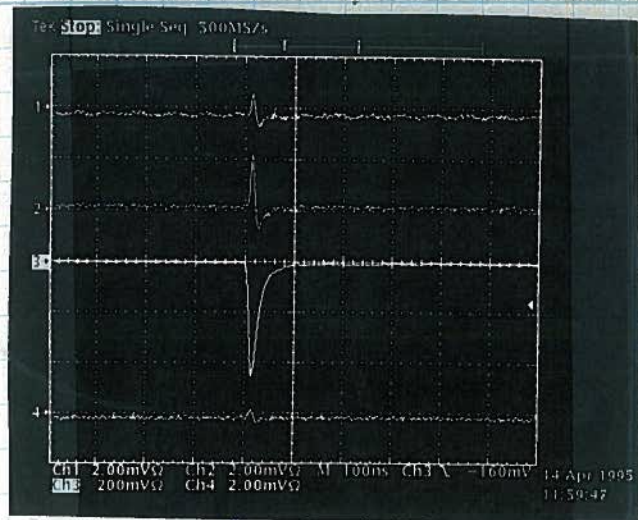


M

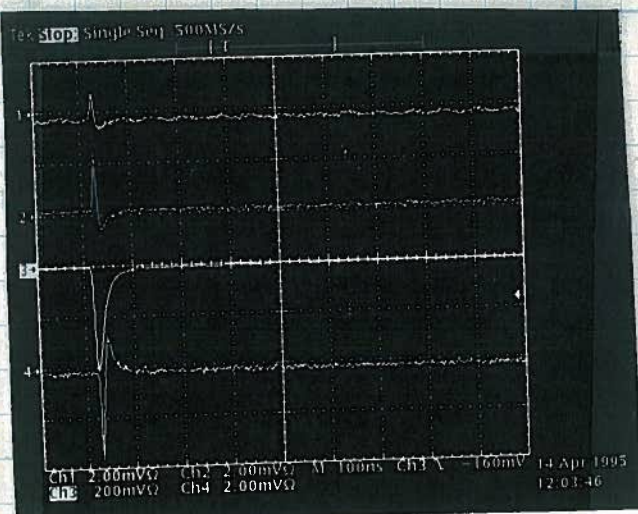


All 68ns cables are 63.5ns (see p. 35)

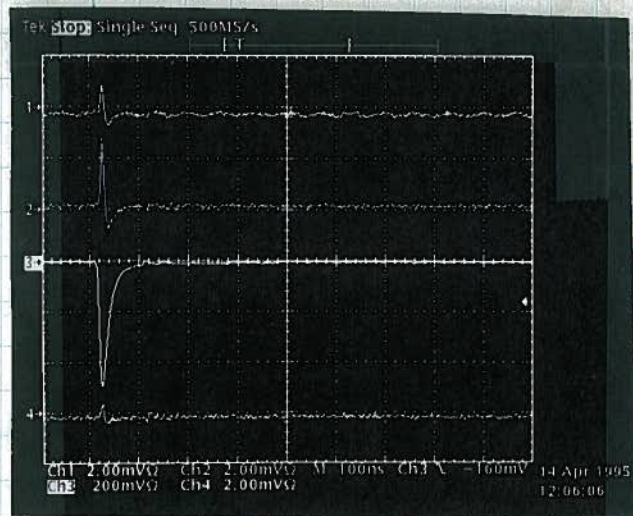




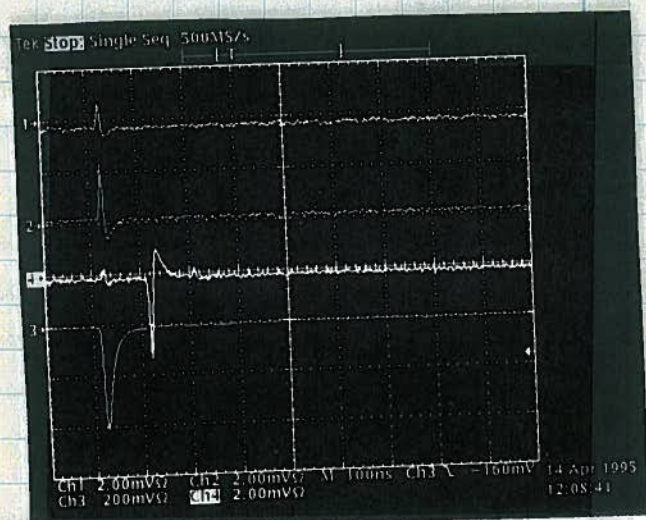
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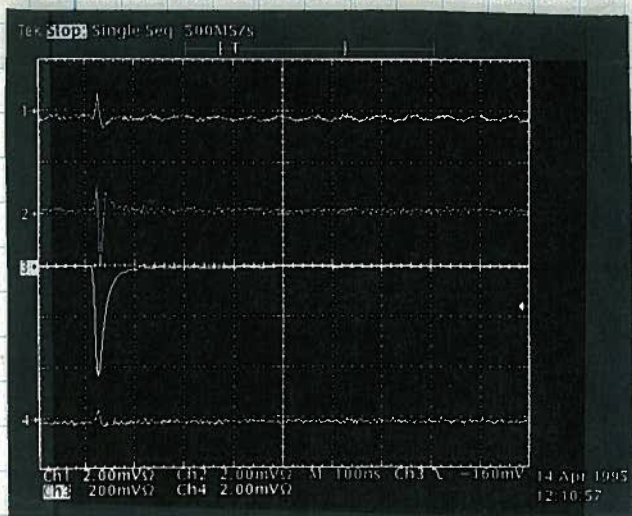
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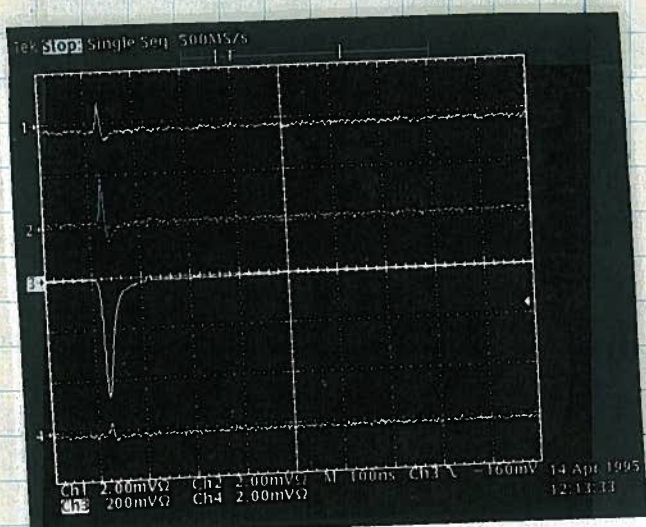
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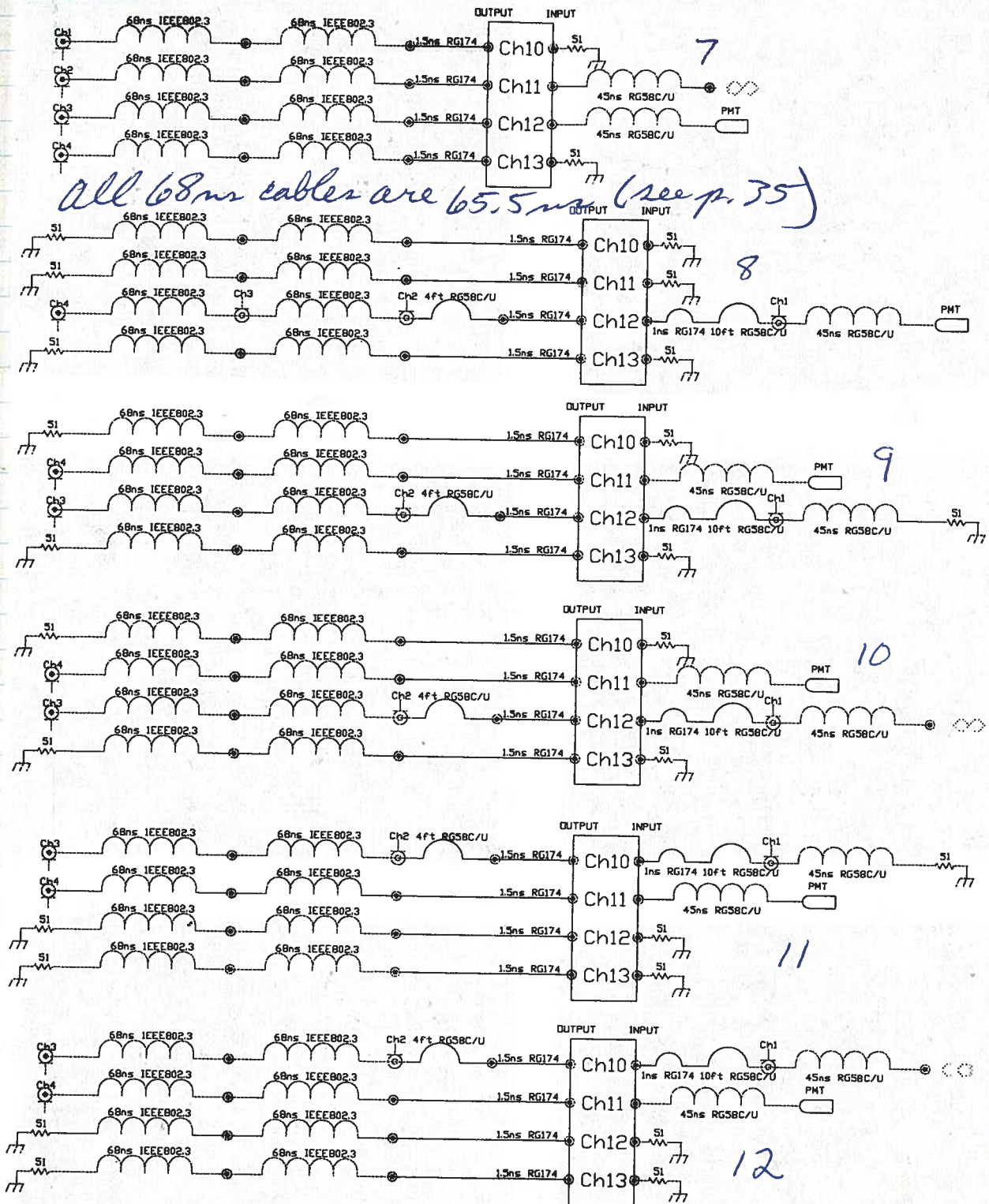
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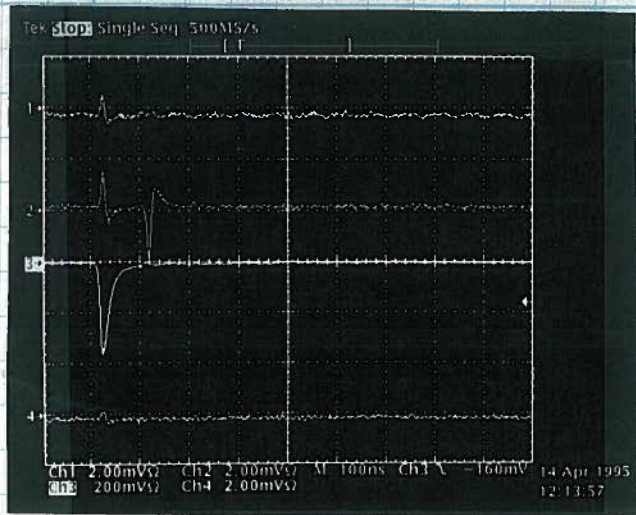


5

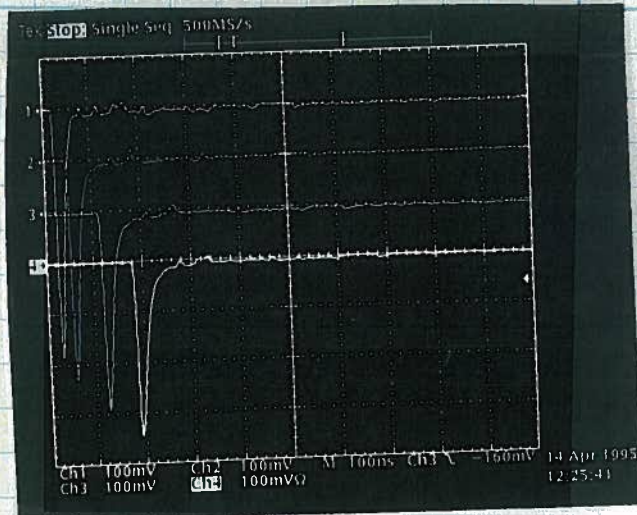


6

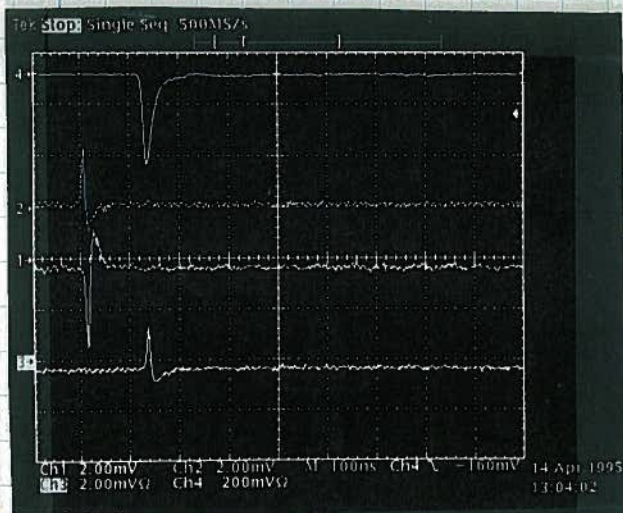




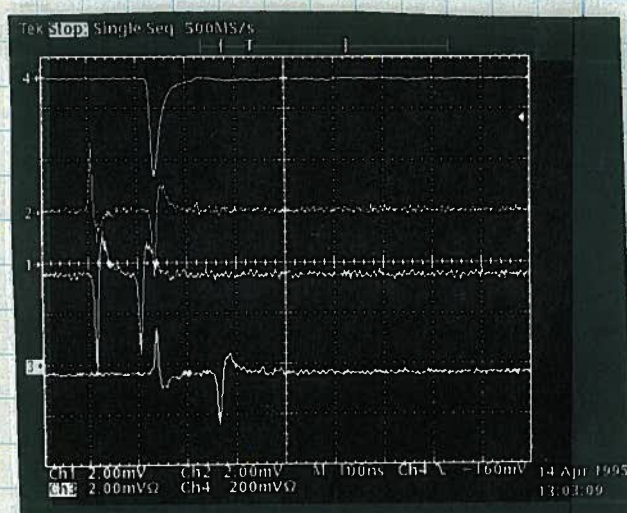
7



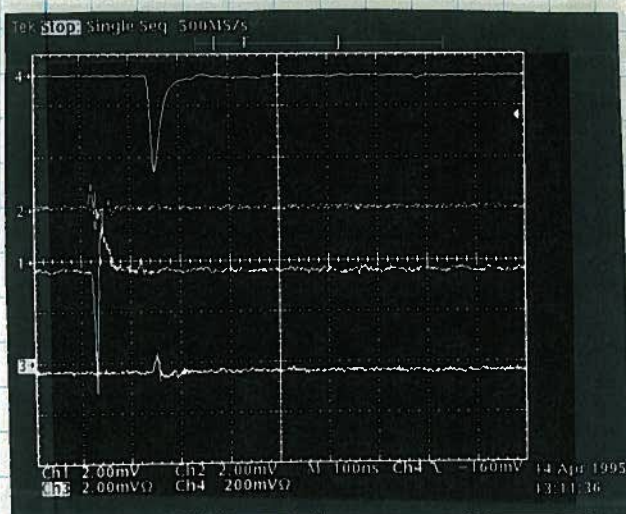
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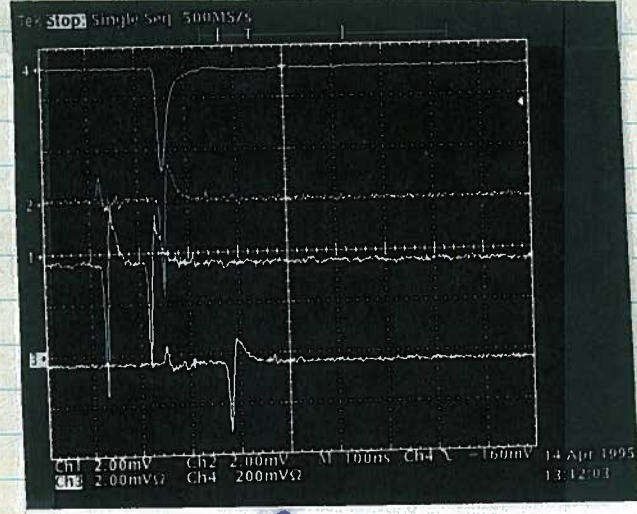
9



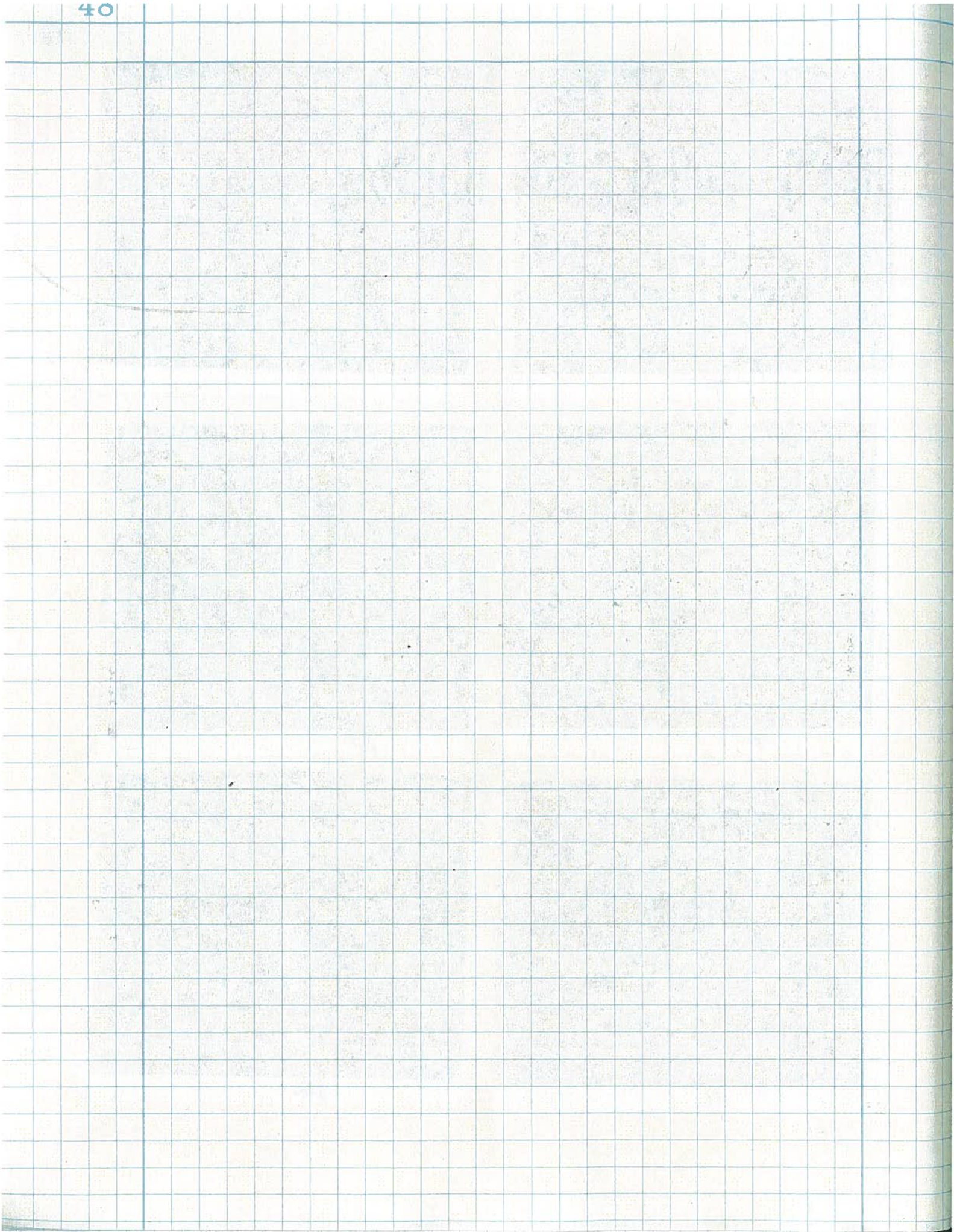
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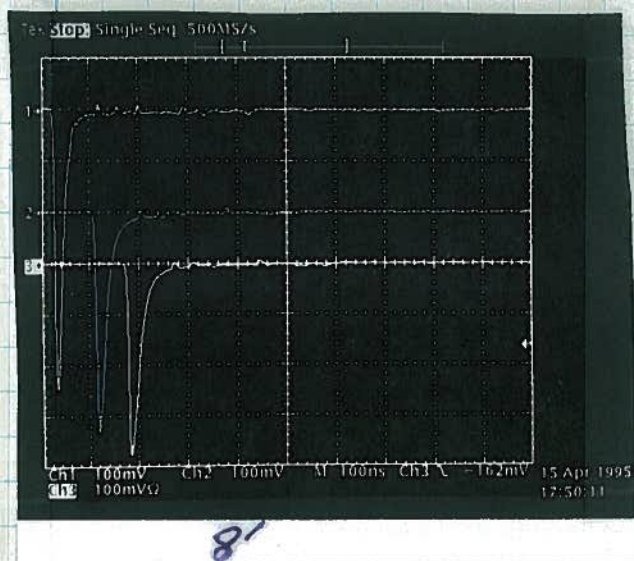
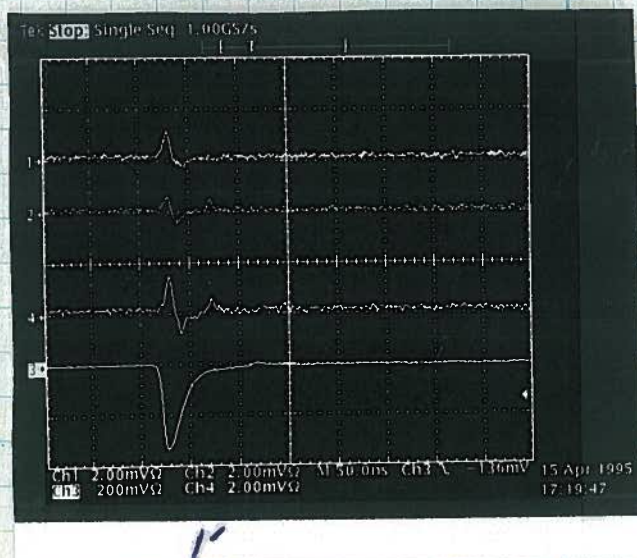
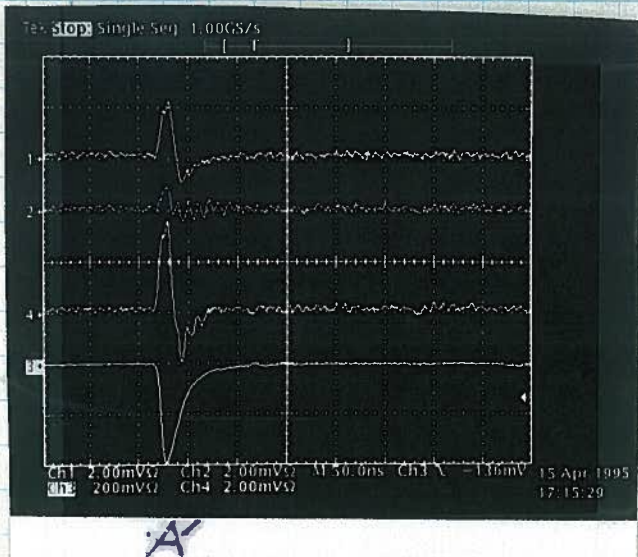


11



12

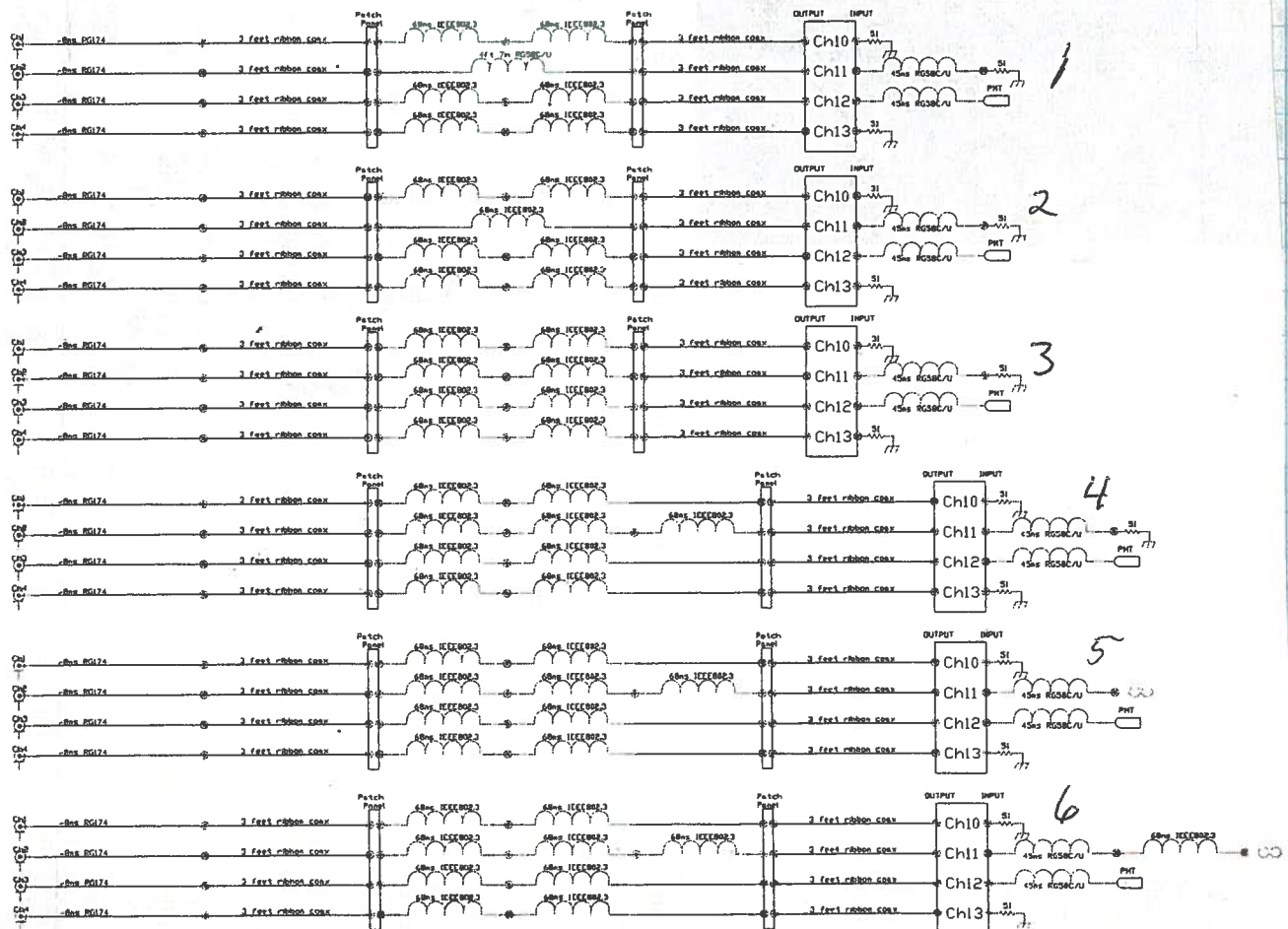


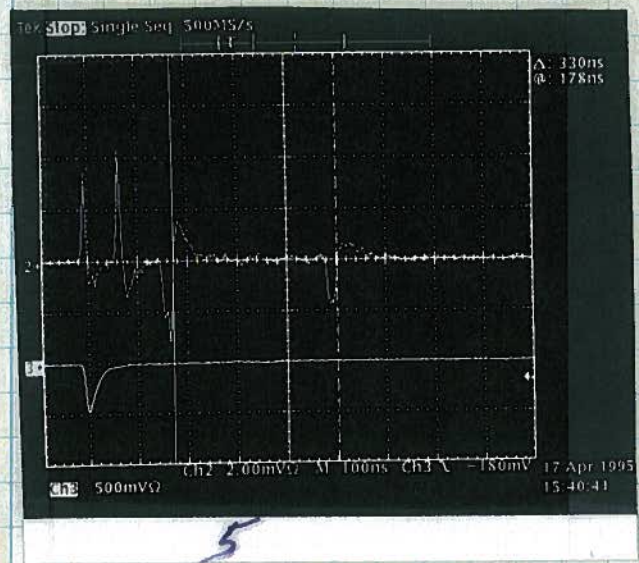
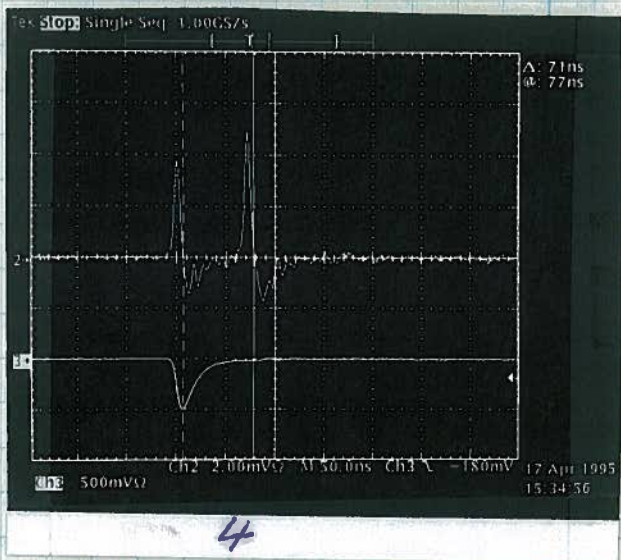
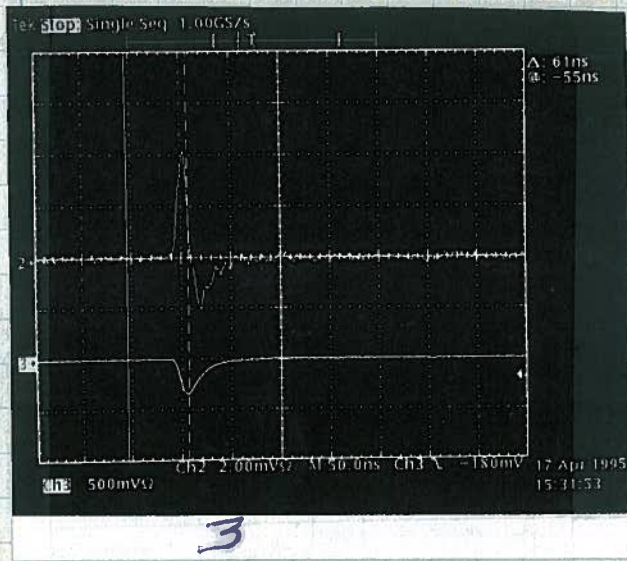
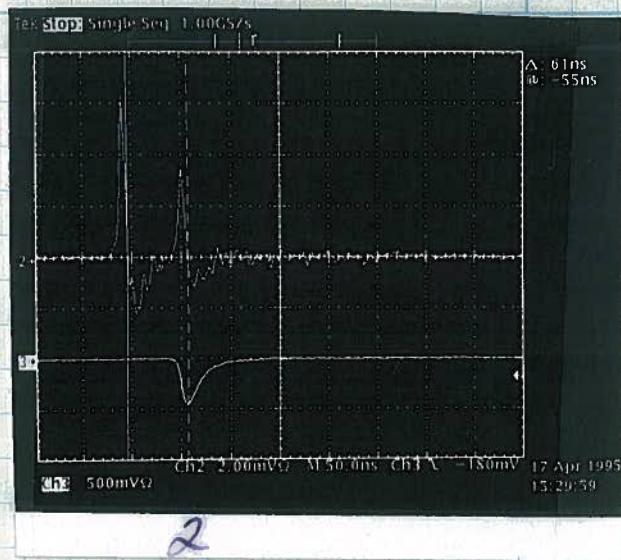
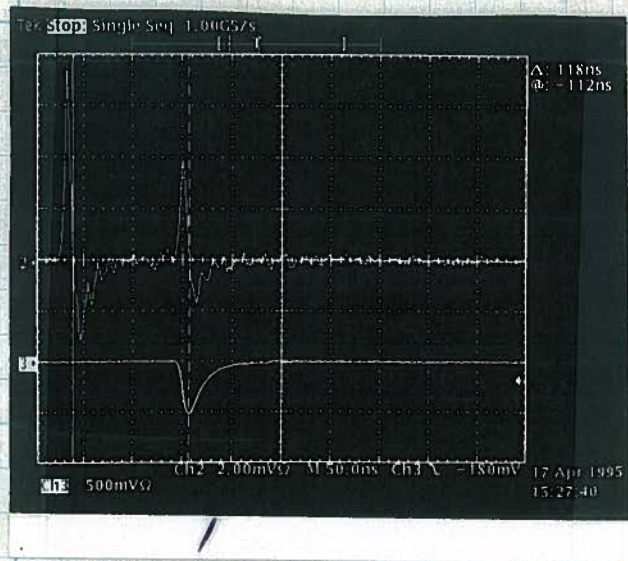


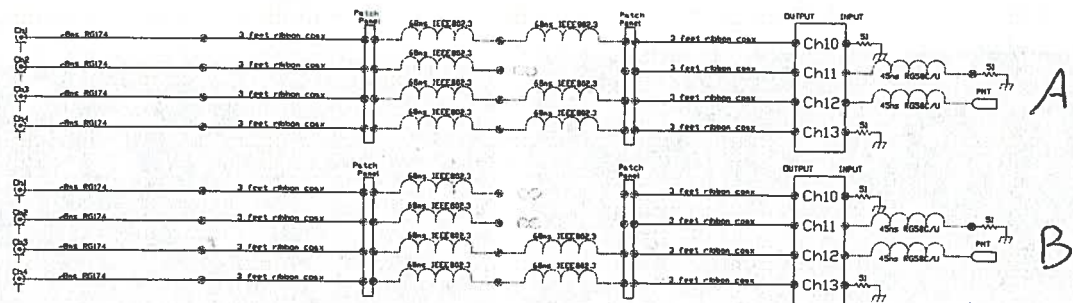
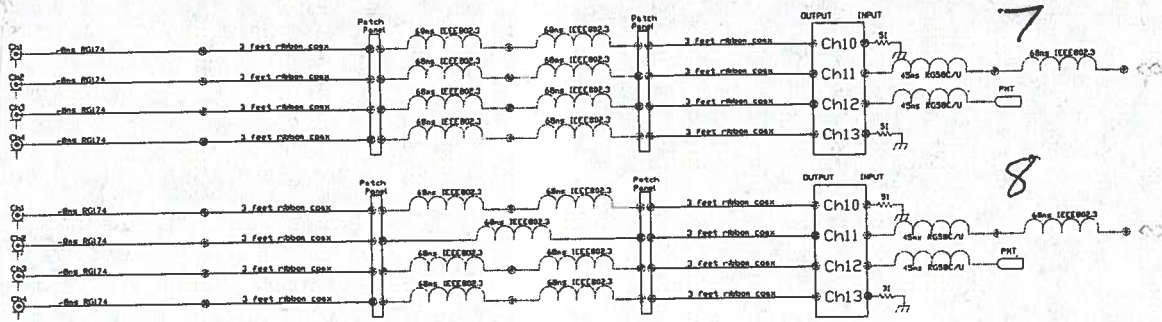
I guess there are
somehow related to
pictures on the previous
pages. I do not recall
exactly what the relation
is. JPL 1/14/97

4/17 More Patch Panel Investigations

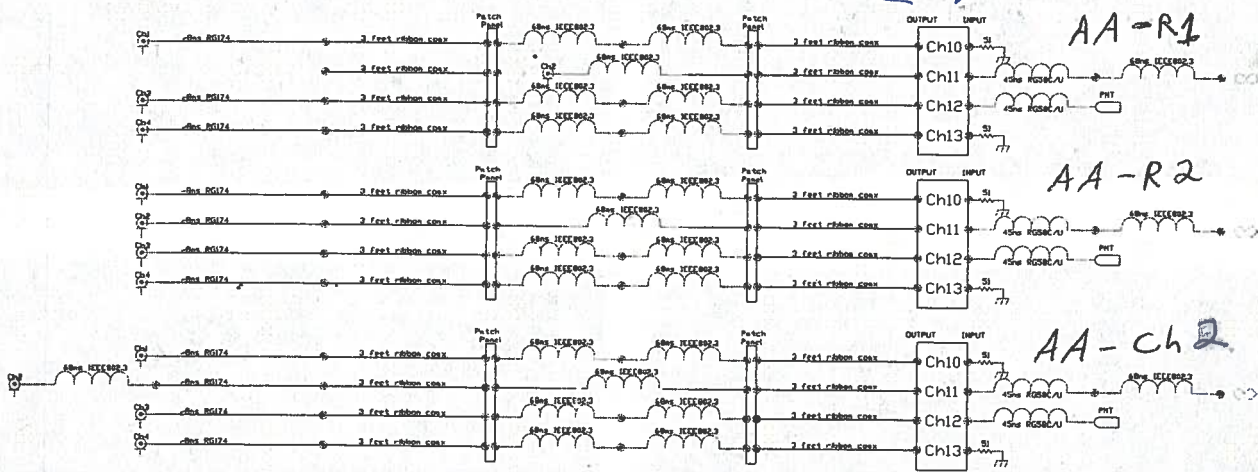
all 68ms cables are 65.5 (see p. 35)

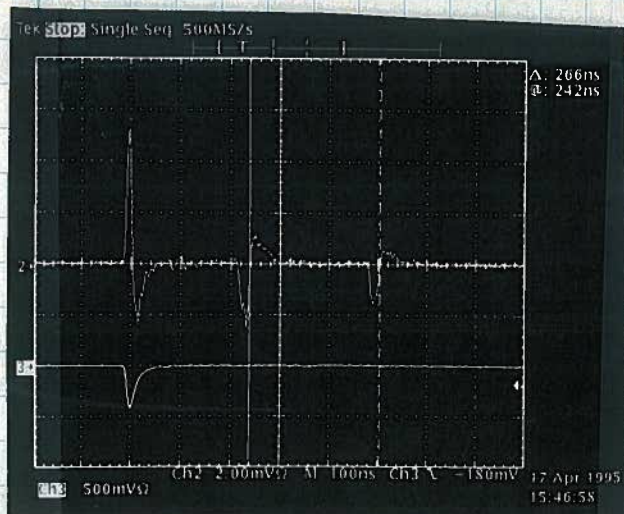






All 68ms cables are 65.5ms (see p. 35)

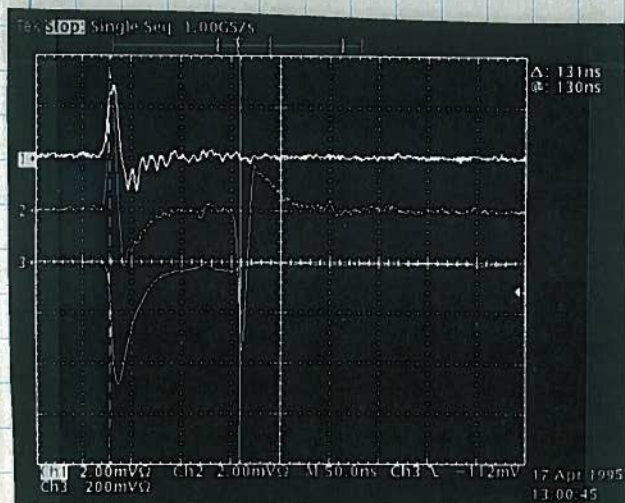




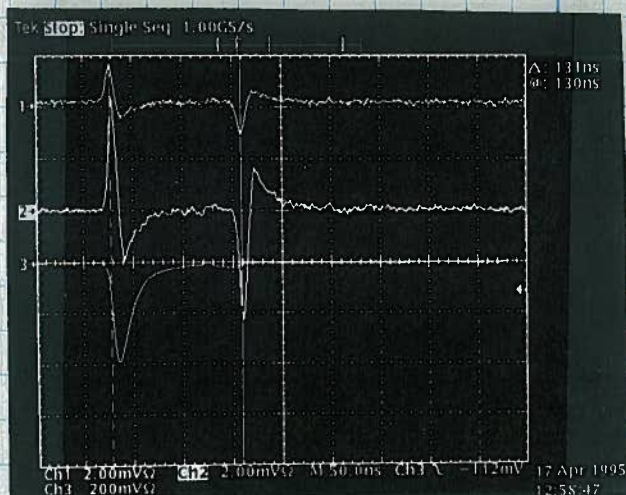
7



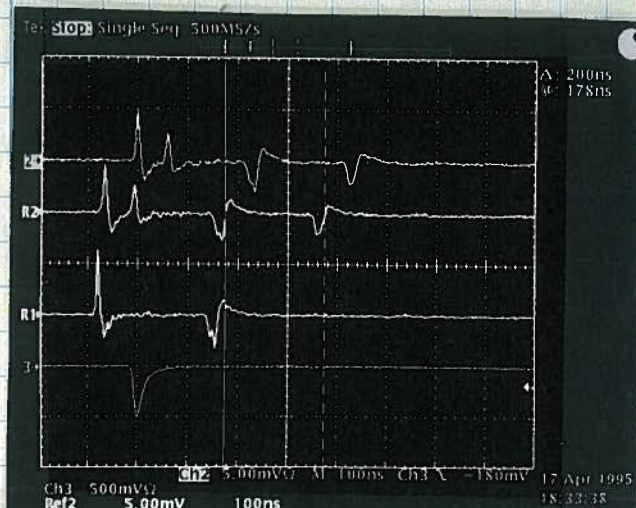
8



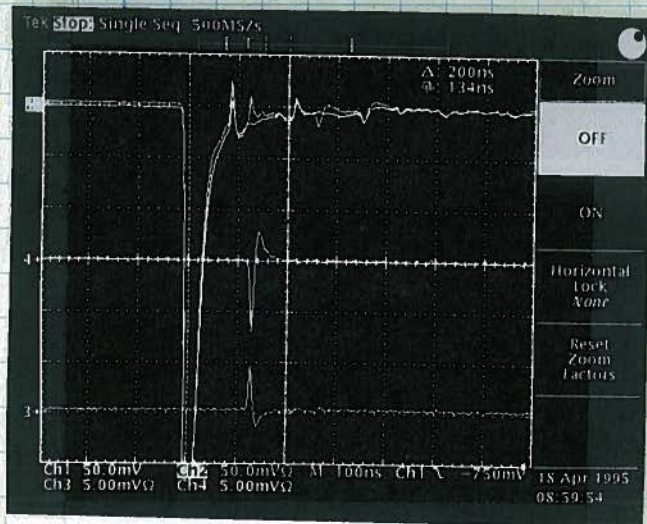
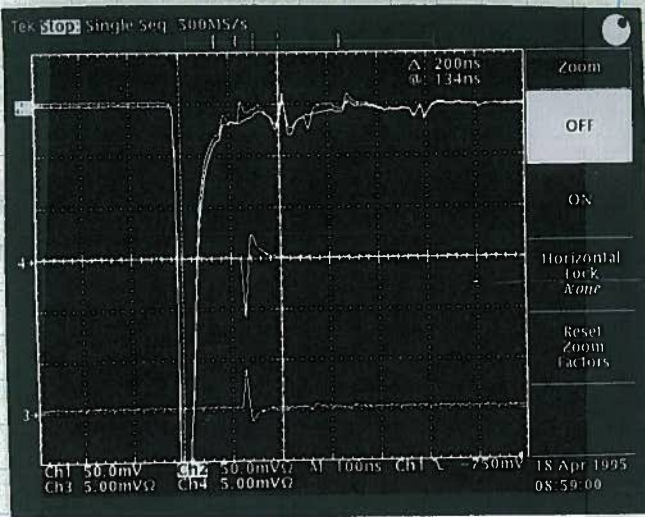
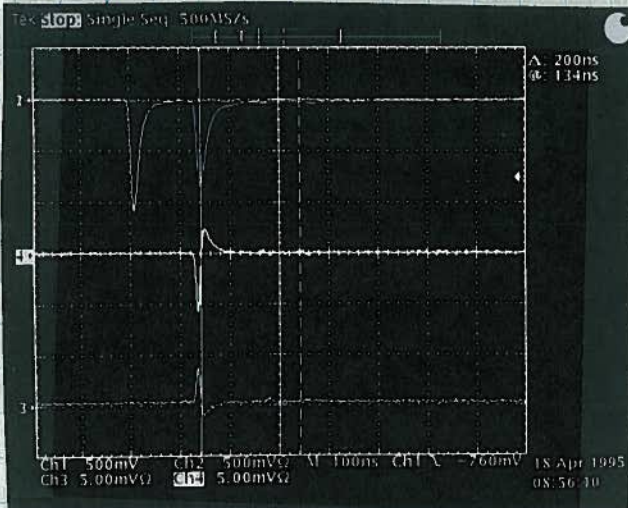
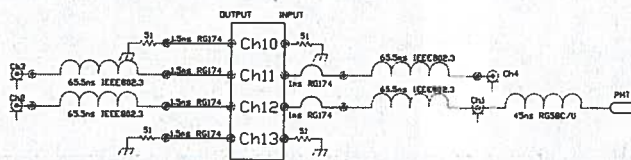
A



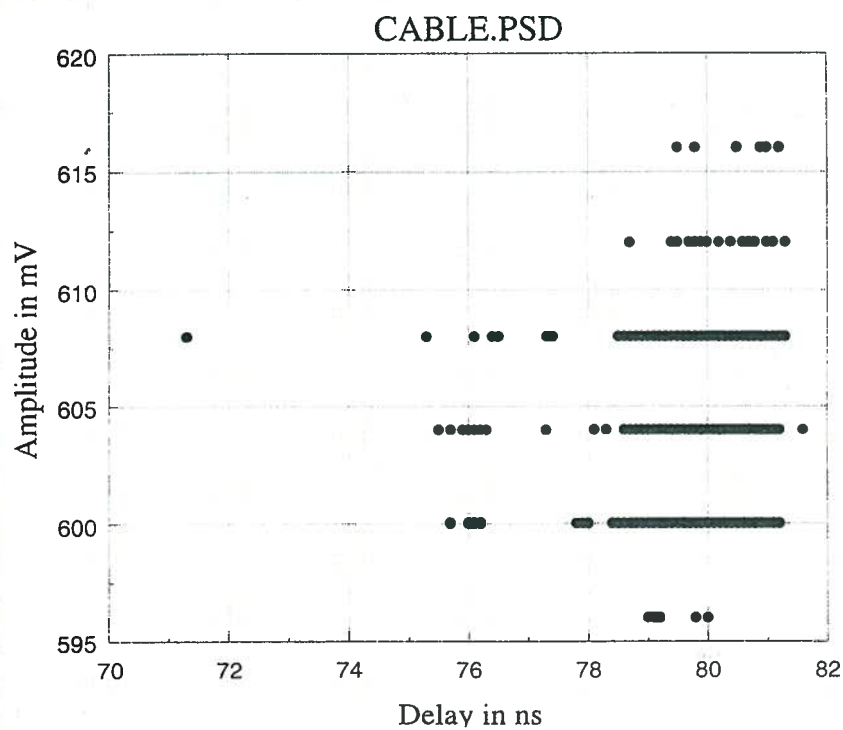
B



AA



Delay And Attenuation spread of 50 Patch Cables



6/30/95 CAMAC Crate Temperatures
 JS Temperatures of the crates were checked in place after equilibrium.

Ref 1 1 phase A-RCK-06 49 Amps	Ref 2 1 phase A-RCK-07 42.1 Amps	Ref 3 1 phase A-RCK-08 8.7 Amps
Rack Monitor	Rack Monitor	Rack Monitor
Cooling Space	Scalers VME	
Lecroy 145B HV	12.5 Amps	
18_Amps	Patch to delay	X-term shelf
VME Breakout	CAMAC Trigger	7_Amps
Monitoring VME	14.5_Amps	
13_Amps	Patch to delay	
Shelf for Scope	CAMAC Trigger	Space Reserved for FPP Electronics
1_Amp	95 to 102°	
VDC Thresholds	14.5_Amps	
2_Amps	Cooling Space	
Shelf	Multiplexer (Link)	
VDC +5V Supply		
7_Amps		
Shelf		
VDC -5.2V Supply		
7_Amps		
Shelf		

87°
on back

85° main
58° unused
breaker

90° breaker
119° on top
120° back
118° back
118° core

90° 107°
Breakout on
102° back
108° core

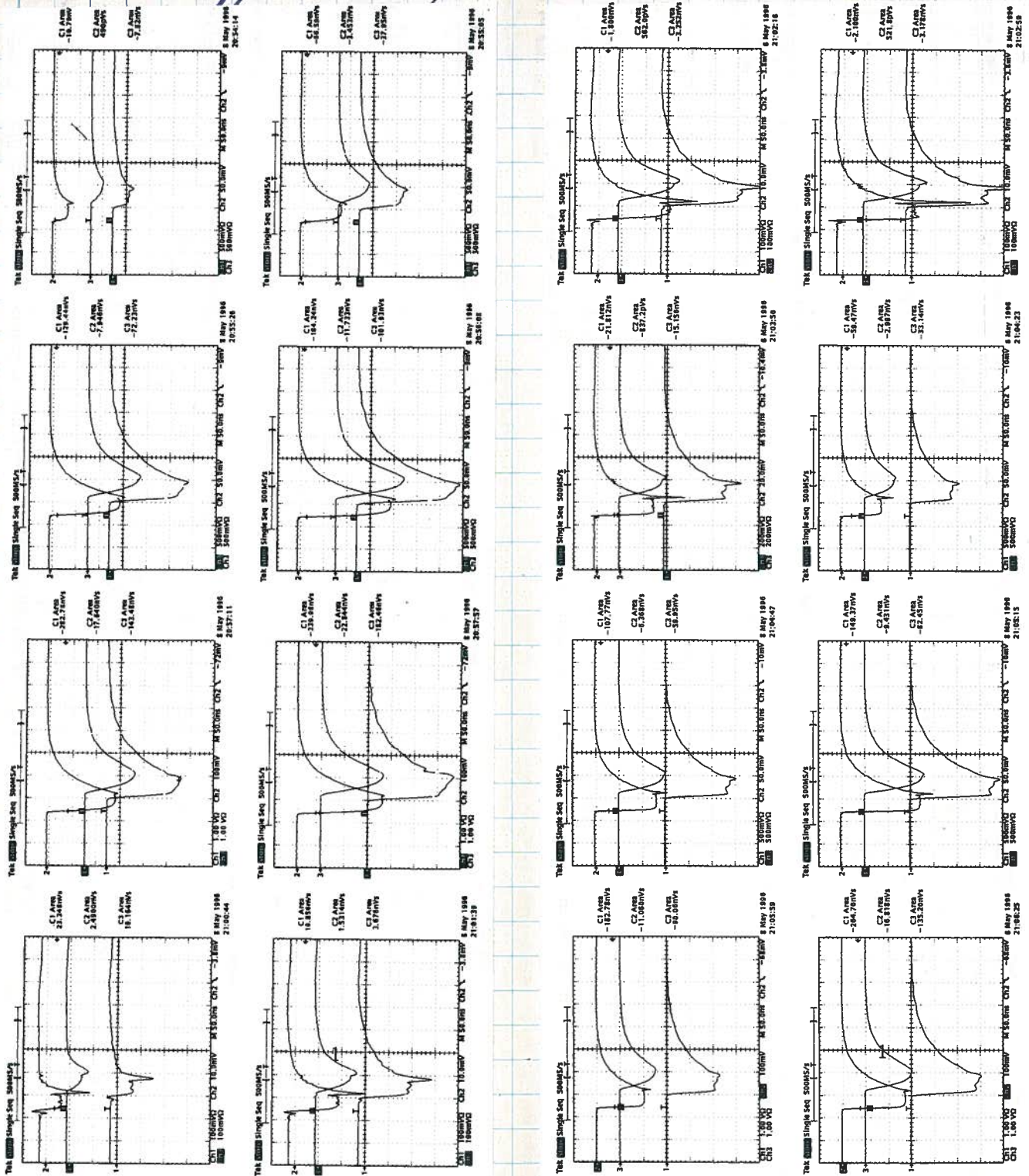
~77°
On interior
wall of
test lab

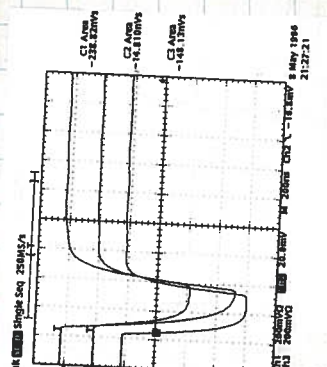
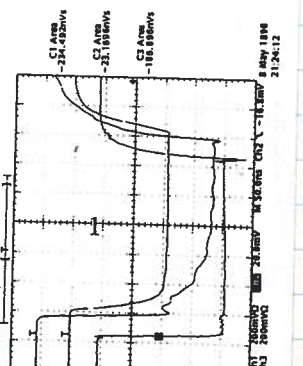
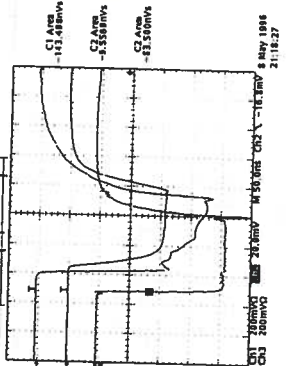
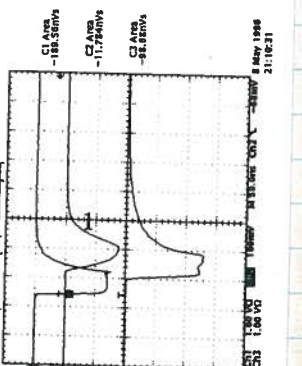
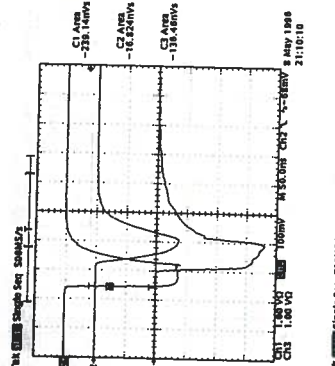
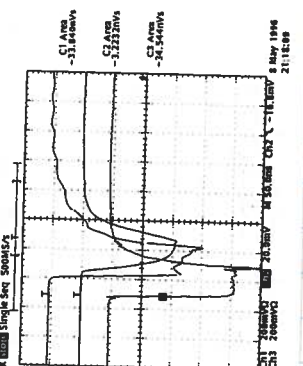
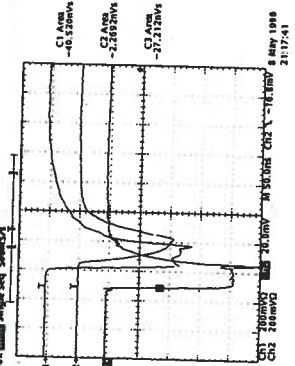
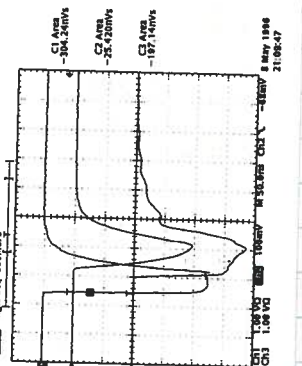
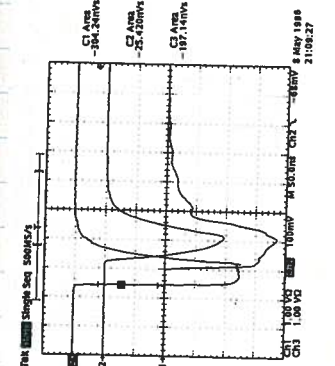
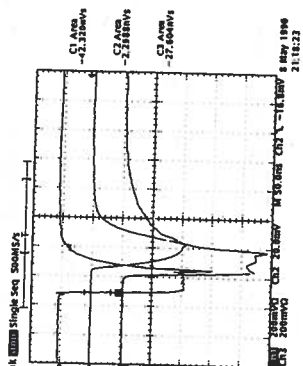
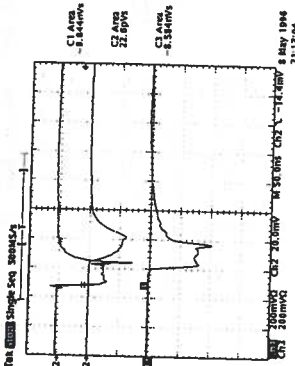
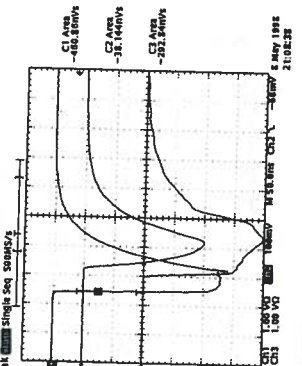
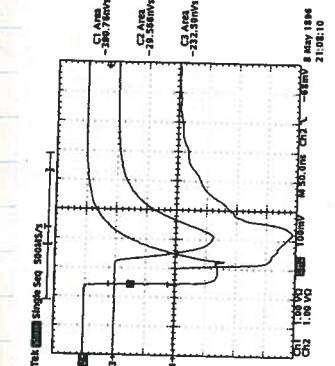
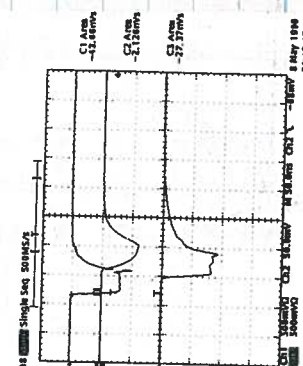
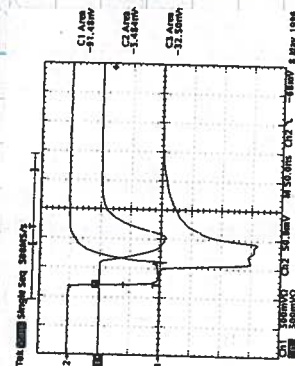
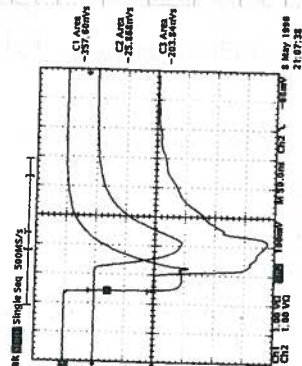
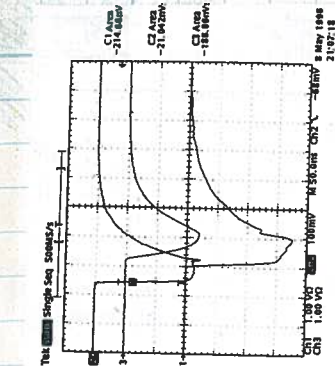
Measured using Fluke infrared
meter accessory.

Quick Look At Maryland Summing Prototype 5/10/94

CH2 = input
CH3 = sum output
CH1 = buffered output

done on 5/8





First Look At Electron Arm Temperature Cards 5/10/96
done on 5/9

May 9, 1996

20:50:16

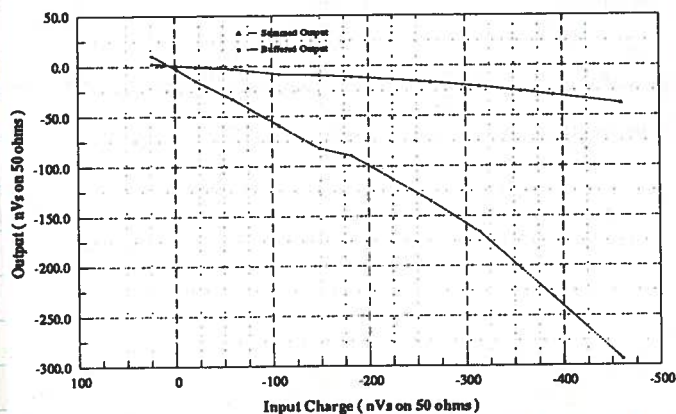
HRS ELECTRON -- DETECTOR PACKAGE

HPLE1313A:0 ADC

+/- 16 Volts MAX

Ch0	0.617	Ch16	1.509	Ch32	0.131	Ch48	1.471
Ch1	1.506	Ch17	1.462	Ch33	1.450	Ch49	1.473
Ch2	1.523	Ch18	0.832	Ch34	1.440	Ch50	0.852
Ch3	1.516	Ch19	1.450	Ch35	1.425	Ch51	1.455
Ch4	1.518	Ch20	1.472	Ch36	1.589	Ch52	1.507
Ch5	1.518	Ch21	1.467	Ch37	1.423	Ch53	1.492
Ch6	0.848	Ch22	1.482	Ch38	0.834	Ch54	1.468
Ch7	1.555	Ch23	1.395	Ch39	1.465	Ch55	1.437
Ch8	1.532	Ch24	0.762	Ch40	1.464	Ch56	0.847
Ch9	1.570	Ch25	1.396	Ch41	1.446	Ch57	1.439
Ch10	1.570	Ch26	1.390	Ch42	1.440	Ch58	1.455
Ch11	1.525	Ch27	1.388	Ch43	1.435	Ch59	1.448
Ch12	0.880	Ch28	1.387	Ch44	0.831	Ch60	1.477
Ch13	1.460	Ch29	1.382	Ch45	1.458	Ch61	1.480
Ch14	1.587	Ch30	0.779	Ch46	1.462	Ch62	0.873
Ch15	1.586	Ch31	0.431	Ch47	1.444	Ch63	0.522

Mayland Summing Module Linearity



This plot goes with pp 57+58

8/18 First Check of Background in Hall A

Three Russian tubes were assembled with a small finger of scrap scintillator. Machine shop cut to size and polished one end.

Tubes were assembled and signal checked with ^{51}Cr source. 51.1Ω resistor added to base at anode. Have $40k/51.1\Omega$.

Tube ^{base} marked 1900 - tube 90 - $2\text{cm} \times 1\text{cm} \times 6.0\text{cm}$ scintilla
@ 1500V $\sim 15\text{mV}$ max signal ^{51}Cr
1900V $\sim 200\text{mV}$ max signal ^{51}Cr

Tube base marked 1700 - tube 1190 - $2\text{cm} \times 1\text{cm} \times 6.0\text{cm}$ scintilla
~~@ 1500V~~
@ 1750V $\sim 200\text{mV}$
1375V $\sim 15\text{mV}$

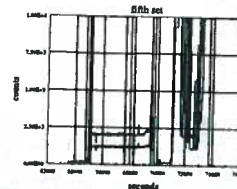
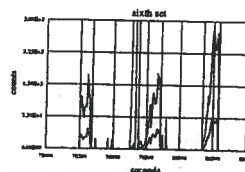
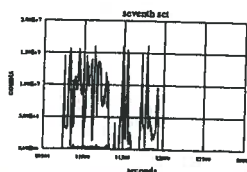
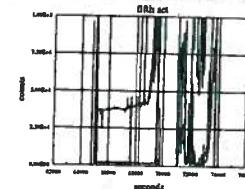
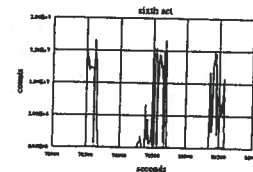
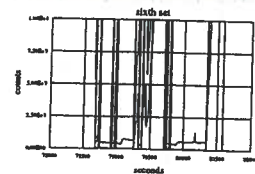
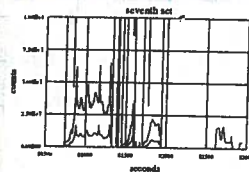
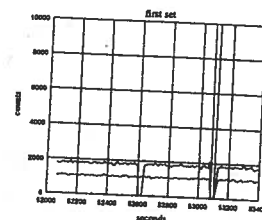
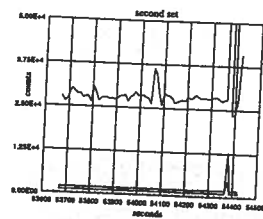
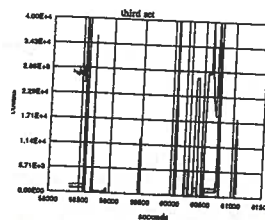
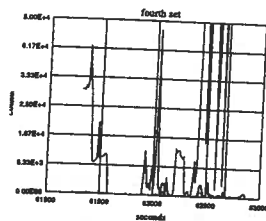
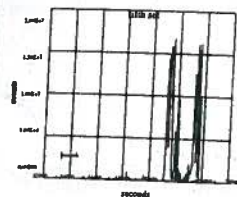
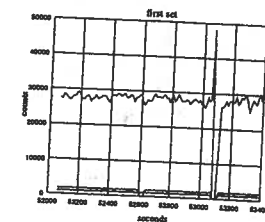
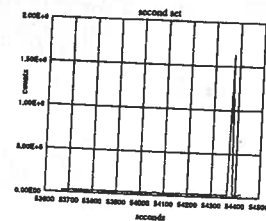
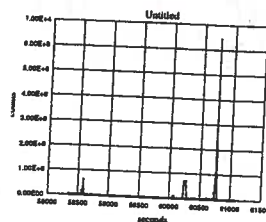
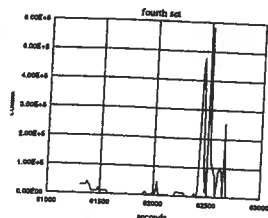
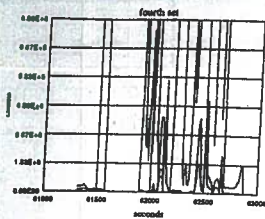
Unmarked base - tube 1550 - $2\text{cm} \times 1\text{cm} \times 5.8\text{cm}$
@ 1700V $\sim 200\text{mV}$
1340V $\sim 15\text{mV}$

All three tubes are wrapped in one layer of 0.001in thick and three layers of 1.5in thick.

In counting room A are CAMAC crate readout by a 286. Readout program in Hall. FOR. A 10 second gate is used for the 4434 scaler. 10mV threshold on the 1706 discriminator.

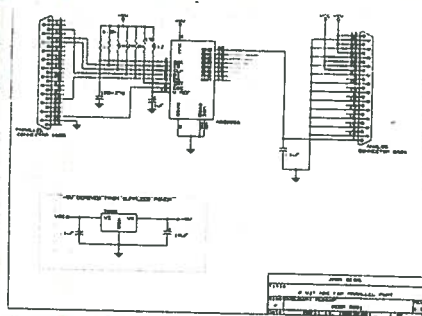
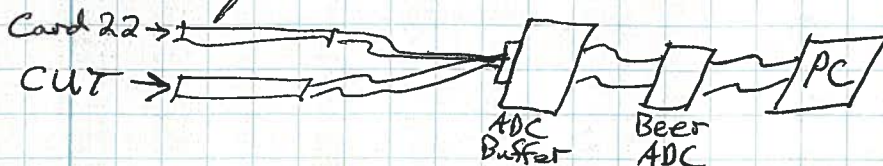
Tubes high voltage supplied by 1458 mainframe on floor behind brick wall. Between wall & racks.

3 long counters from Hall C are placed on floor by Dick Lundgren.



Temperature Readout Cards (Calibration) 9/8/96

22 of the temperature cards are calibrated.
The first three channels of Card 22 are used as reference channels.



ABSOLUTE MAXIMUM RATINGS

Input Supply Voltage, (V _{IN})	40V
Alarm Output Voltage (8-Pin Version Only)	40V
Alarm Delay Voltage	10V
Alarm Threshold Set Voltage	10V
2.5V Reference Output Current	400 mA
Alarm Output Current (8-Pin Version Only)	0 mA
Power Dissipation at T _a = 25°C (Pole 2)	1000 mW
Power Dissipation at T _a = 25°C (Pole 2)	2000 mW
Thermal Resistance Junction to Ambient	110°C/W
N, 8-Pin Plastic DIP	110°C/W
4, 8-Pin Ceramic DIP	110°C/W

T, 8-Pin Plastic DIP TO-220

Thermal Resistance Junction to Case

N, 8-Pin Plastic DIP

J, 8-Pin Ceramic DIP

T, 8-Pin Plastic TO-220

Operating Junction Temperature

Storage Temperature

Lead Temperature (Soldering, 10 Seconds)

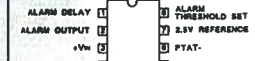
Note 1: Voltages are referenced to ground. Currents are positive into, negative out of, the specified terminals.

Note 2: Consult Packaging section of Datasheet for Thermal Ratings and considerations of package.

CONNECTION DIAGRAMS

8-PIN (TOP VIEW)

H or J Package



8-PIN TO-220 (TOP VIEW)

T Package



PLCC-20 (TOP VIEW)

Q Package



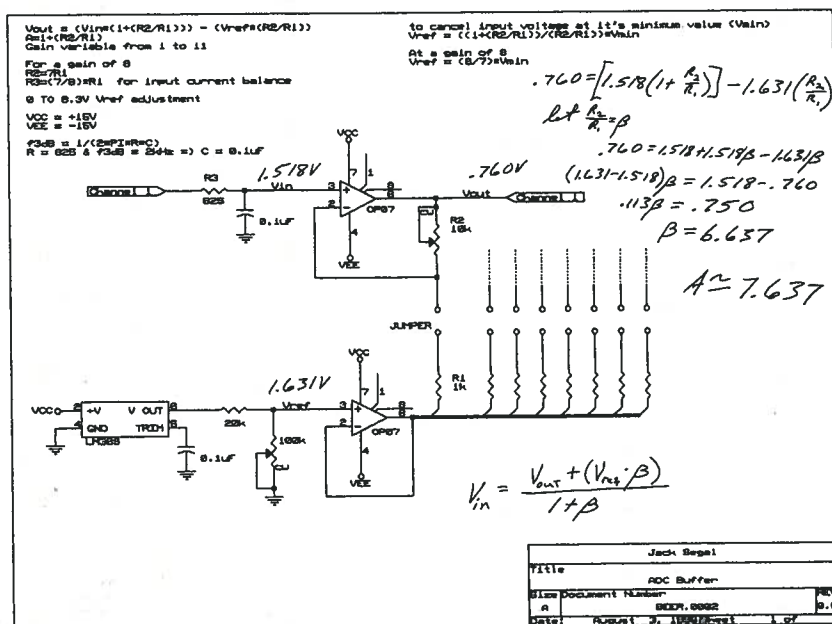
PACKAGE PIN FUNCTION

FUNCTION	PIN
NC	1-3
ALARM DELAY	4
ALARM OUTPUT	5
+V _{IN}	6
GND	7
NC	8-13
PTAT+	14
PTAT-	15
2.5V REFERENCE	16
2.5V REFERENCE	17
ALARM THRESHOLD SET	18
NC	19-20

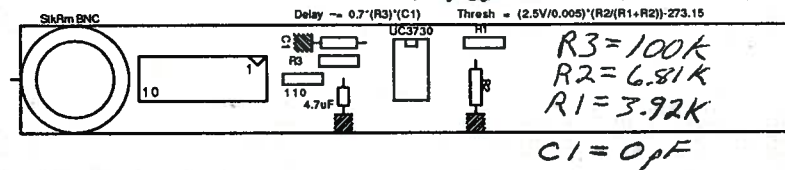
ELECTRICAL CHARACTERISTICS: Unless otherwise stated, these specifications apply for T_a = 0°C to +100°C for the UC2730, -25°C to +100°C for the UC2730 and -55°C to +125°C for the UC1730, -V_{IN} = 5V, and PTAT = 0V, T_a = T_a.

PARAMETERS	TEST CONDITIONS	MIN	TYP	MAX	UNITS
INPUT SUPPLY					
Supply Current	+V _{IN} = 35V +V _{IN} = 5V		2.8 2.3	4.0 3.5	mA
REFERENCE					
Output Voltage	T _a = 25°C	2.475	2.5	2.525	V
	Over Temperature	2.46		2.54	V
Load Regulation	I _{OUT} = 0 to 250mA		6.0	25	mV
Line Regulation	+V _{IN} = 5 to 25V		1.0	5.0	mV
TEMPERATURE COMPENSATOR					
Temperature Compensator Threshold	At 300°K (26.85°C), Nominaly 5mV/K V _{OUT} High to Low	1.475	1.50	1.525	V
Temperature Error		-10		10	°C
Threshold Line Regulation	+V _{IN} = 5 to 25V		0.005	0.02	%/V
Temperature Linearity	Note 2		2.0	5.0	°C
Threshold Hysteresis		3.0	8.0	15	mV
Input Bias Current	V _{OUT} at 1.5V	-0.5	-0.1		µA
Max Output Current	V _{OUT} = 1V	1.2	2.0		mA
Output Set Voltage	I _{OUT} = 100µA		0.05	0.25	V

7-66



$$\text{Thresh} = 44^{\circ}\text{C} = 111^{\circ}\text{F}$$

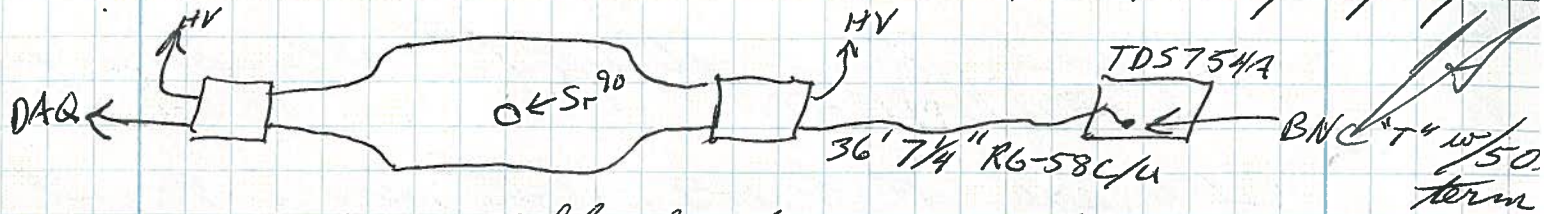


CARD	CHAN	COOL	WARM	INC	INW	DIFF
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1.000000	1.000000	0.481000	0.770000	1.480	1.518	0.038
1.000000	2.000000	0.539000	0.809000	1.488	1.523	0.035
1.000000	3.000000	0.674000	0.944000	1.506	1.541	0.035
1.000000	4.000000	0.424000	0.713000	1.473	1.511	0.038
1.000000	5.000000	0.385000	0.655000	1.468	1.503	0.035
1.000000	6.000000	0.636000	0.905000	1.501	1.536	0.035
1.000000	7.000000	0.578000	0.847000	1.493	1.528	0.035
2.000000	0.000000	0.539000	0.790000	1.488	1.521	0.035
2.000000	1.000000	0.501000	0.770000	1.483	1.518	0.035
2.000000	2.000000	0.520000	0.790000	1.486	1.521	0.035
2.000000	3.000000	0.539000	0.809000	1.488	1.523	0.035
2.000000	4.000000	0.636000	0.905000	1.501	1.536	0.035
2.000000	5.000000	0.404000	0.655000	1.470	1.503	0.033
2.000000	6.000000	0.655000	0.905000	1.503	1.536	0.033
2.000000	7.000000	0.597000	0.847000	1.496	1.528	0.033
3.000000	0.000000	0.539000	0.828000	1.488	1.526	0.038
3.000000	1.000000	0.559000	0.828000	1.491	1.526	0.035
3.000000	2.000000	0.597000	0.886000	1.496	1.533	0.038
3.000000	3.000000	0.462000	0.751000	1.478	1.516	0.038
3.000000	4.000000	0.481000	0.770000	1.480	1.518	0.038
3.000000	5.000000	0.404000	0.655000	1.470	1.503	0.033
3.000000	6.000000	0.655000	0.905000	1.503	1.536	0.033
3.000000	7.000000	0.597000	0.847000	1.496	1.528	0.033
4.000000	0.000000	0.539000	0.809000	1.488	1.523	0.035
4.000000	1.000000	0.462000	0.732000	1.478	1.513	0.035
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4.000000	6.000000	0.655000	0.905000	1.503	1.536	0.033
4.000000	7.000000	0.597000	0.847000	1.496	1.528	0.033
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5.000000	1.000000	0.578000	0.867000	1.493	1.531	0.038
5.000000	2.000000	0.520000	0.809000	1.486	1.523	0.038
5.000000	3.000000	0.501000	0.790000	1.483	1.521	0.038
5.000000	4.000000	0.481000	0.790000	1.480	1.521	0.040
5.000000	5.000000	0.404000	0.636000	1.470	1.501	0.038
5.000000	6.000000	0.655000	0.905000	1.503	1.536	0.033
5.000000	7.000000	0.597000	0.828000	1.496	1.526	0.038
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6.000000	1.000000	0.520000	0.790000	1.486	1.521	0.035
6.000000	2.000000	0.539000	0.828000	1.488	1.526	0.038
6.000000	3.000000	0.385000	0.674000	1.468	1.506	0.038
6.000000	4.000000	0.501000	0.790000	1.483	1.521	0.038
6.000000	5.000000	0.404000	0.674000	1.470	1.506	0.035
6.000000	6.000000	0.655000	0.924000	1.503	1.538	0.035
6.000000	7.000000	0.578000	0.867000	1.493	1.531	0.038
7.000000	0.000000	0.559000	0.828000	1.491	1.526	0.035
7.000000	1.000000	0.578000	0.867000	1.493	1.531	0.038
7.000000	2.000000	0.559000	0.847000	1.491	1.528	0.038
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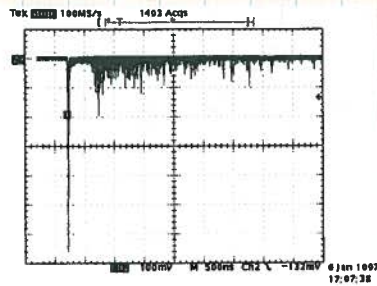
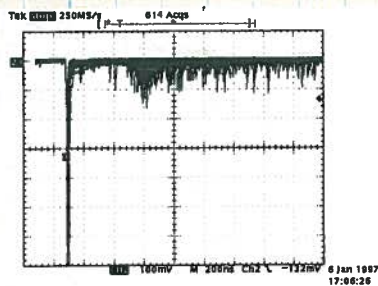
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8.000000	3.000000	0.578000	0.867000	1.493	1.531	0.038
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8.000000	5.000000	0.404000	0.655000	1.470	1.503	0.033
8.000000	6.000000	0.655000	0.924000	1.503	1.538	0.035
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9.000000	1.000000	0.501000	0.790000	1.483	1.521	0.038
9.000000	2.000000	0.501000	0.790000	1.483	1.521	0.038
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12.000000	5.000000	0.404000	0.674000	1.470	1.506	0.035
12.000000	6.000000	0.655000	0.924000	1.503	1.538	0.035
12.000000	7.000000	0.578000	0.867000	1.493	1.531	0.038
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14.000000	6.000000	0.655000	0.924000	1.503	1.538	0.035
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15.000000	6.000000	0.655000	0.924000	1.503	1.538	0.035
15.000000	7.000000	0.578000	0.867000	1.493	1.531	0.038
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16.000000	6.000000	0.655000	0.924000	1.503	1.538	0.035
16.000000	7.000000	0.578000	0.847000	1.493	1.528	0.035
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17.000000	1.000000	0.501000	0.770000	1.483	1.518	0.035
17.000000	2.000000	0.597000	0.867000	1.496	1.531	0.035
17.000000	3.000000	0.501000	0.770000	1.483	1.518	0.035
17.000000	4.000000	0.347000	0.636000	1.463	1.501	0.038
17.000000	5.000000	0.404000	0.655000	1.470	1.503	0.033
17.000000	6.000000	0.655000	0.924000	1.503	1.538	0.035
17.000000	7.000000	0.578000	0.847000	1.493	1.528	0.035
18.000000	0.000000	0.481000	0.732000	1.480	1.513	0.033
18.000000	1.000000	0.636000	0.924000	1.501	1.538	0.038
18.000000	2.000000	0.539000	0.828000	1.488	1.526	0.038
18.000000	3.000000	0.443000	0.751000	1.475	1.516	0.040
18.000000	4.000000	0.443000	0.751000	1.475	1.516	0.040
18.000000	5.000000	0.404000	0.655000	1.470	1.503	0.033
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18.000000	7.000000	0.578000	0.867000	1.496	1.531	0.035
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19.000000	1.000000	0.539000	0.828000	1.488	1.526	0.038
19.000000	2.000000	0.424000	0.693000	1.473	1.508	0.035
19.000000	3.000000	0.539000	0.828000	1.488	1.526	0.038
19.000000	4.000000	0.443000	0.751000	1.475	1.516	0.040
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19.000000	7.000000	0.578000	0.847000	1.491	1.528	0.035
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20.000000	5.000000	0.404000	0.655000	1.470	1.503	0.033

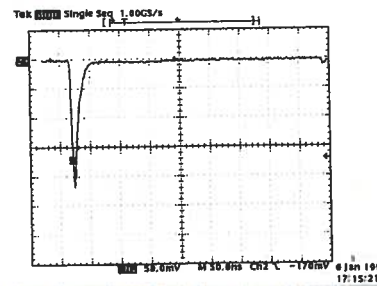
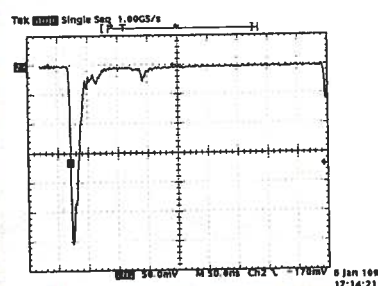
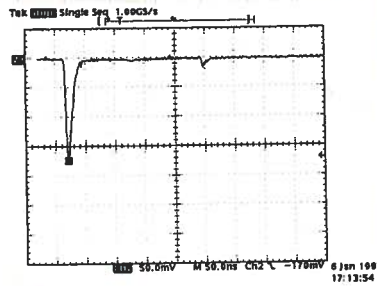
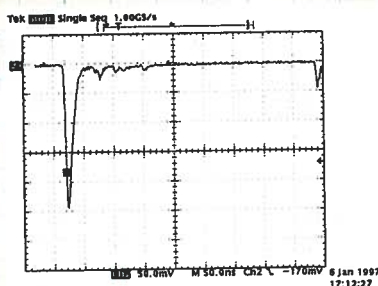
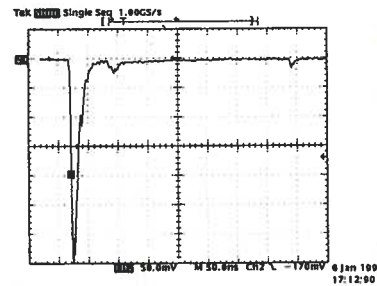
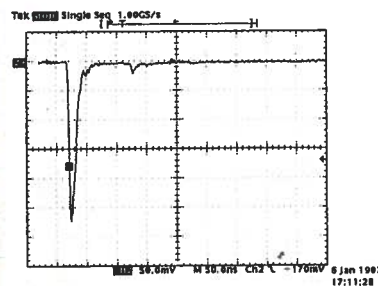
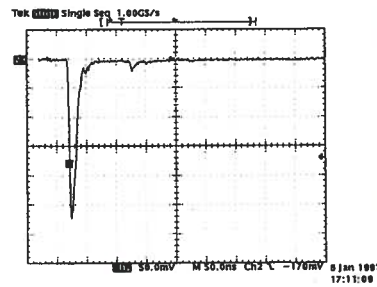
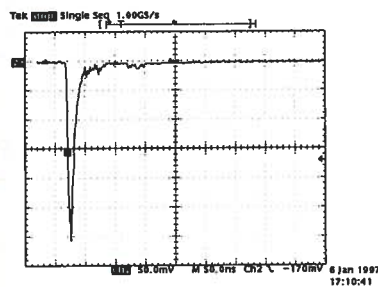
Quick Look At SI 8575 PMT ES1/6L1/7/9/1



HV was left at its prior setting ~2000V



Instances (both of them)
←



1/7/97 IEEE 802.3 Cable Spool Lengths

Checking the lengths of the cable spools from
PO # 97 P1427.

Cables are cut to 105'. Intention is to cut $\pm 0.5"$. We are probably doing this well, with respect to the indication marks on the floor of Hall A.

105' marks are checked with a 100' Lufkin "Trophy" model 1706. End of tape is stamped with 29 10 4.

6" mark is placed at one floor mark. At 100' 6" mark placed the 6" mark of the second tape measure.

2nd tape measure is a metal Lufkin 50' model HC 253. End of tape is stamped 18019

second mark on floor is at 5' 6" on the second tape.
← actually 5' 5 7/8"

Laying a 16' tape measure mfg. by Trophy along the first tape measure. Line the two tapes up at the 2" mark. The 16' mark on the Trophy is 3/32" longer than the 100' Lufkin.

Comparing the two Lufkin tapes. Line up the tapes at the 6" mark. At 50" the Metal tape is 1/8" longer than the flexible tape.

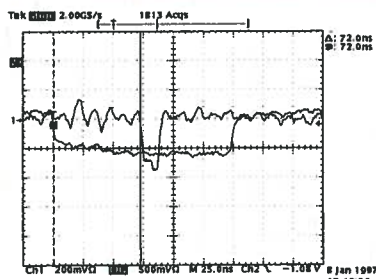
Checked cable length by running it through counter on the cable coiler. Counter by Weber Electric Co. model 600. It read 104' 8"

Checked a spool which was wound neatly. Perhaps direct from the manufacturer. Unspooled through the Weber counter. Spool labeled 1000'. Got 982' 9" on the Weber counter.

LeCroy 1881M ADC Gate Timing Check 1/8/97

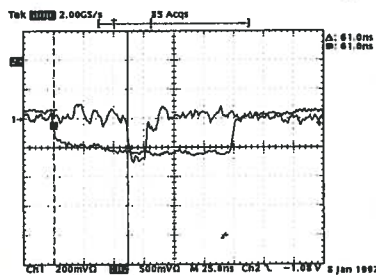


With NIM pulse going to external trigger of 8013B the pulse delay is varied to move the pulses output with respect to the ADC gate signal. ADC values are visually checked on the CODA display by Bogdan.



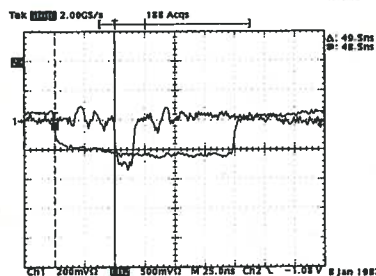
ADC counts = 2080

pedestal - with external trigger removed but pulser still fed into 1881M is 100 to 135 counts

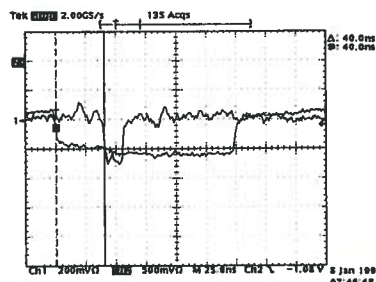


2090

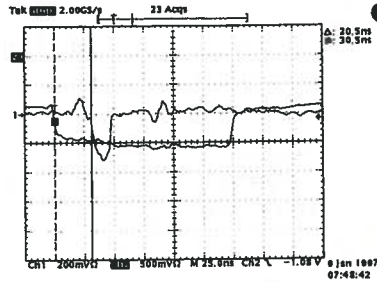
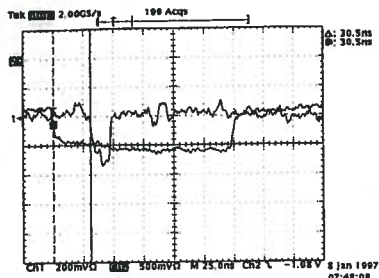
Page 4-1 of LeCroy manual states the charge integration begins 20ns (nominally) after the leading edge of the gate signal.



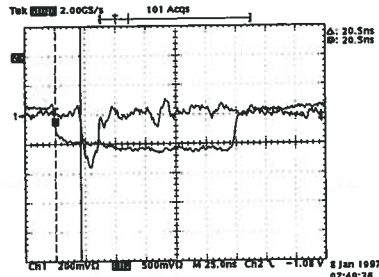
2090



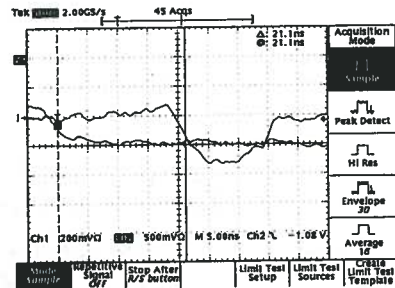
2100



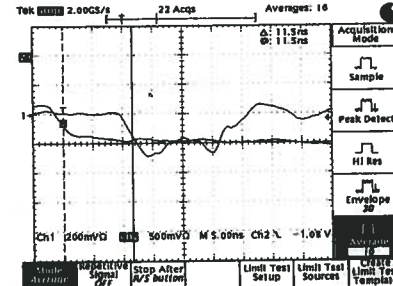
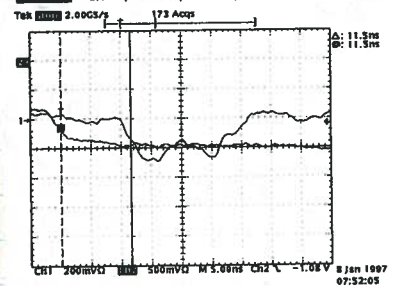
2100



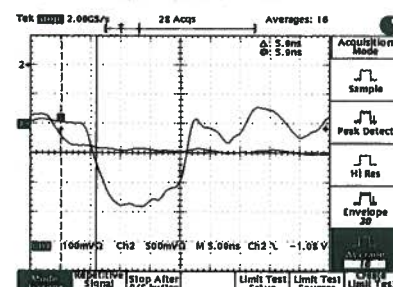
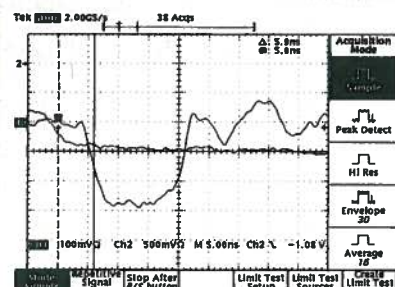
1800



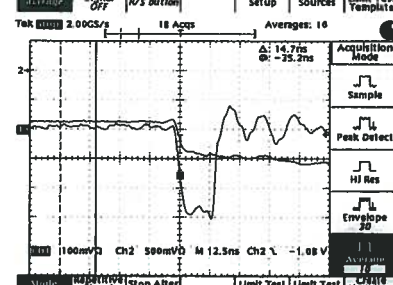
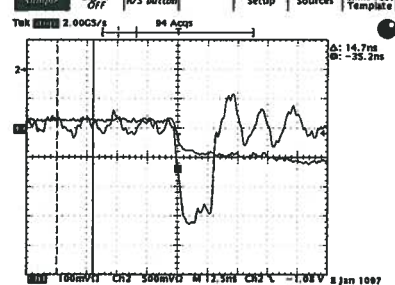
time base change



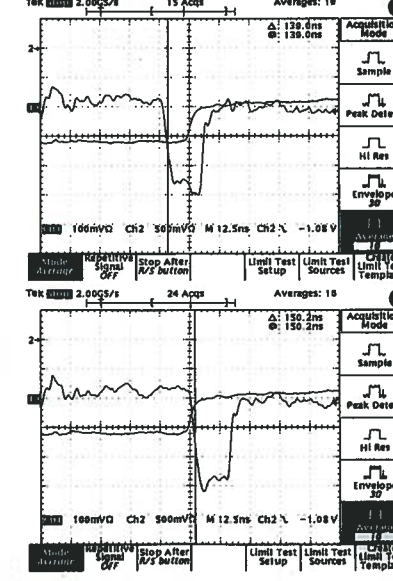
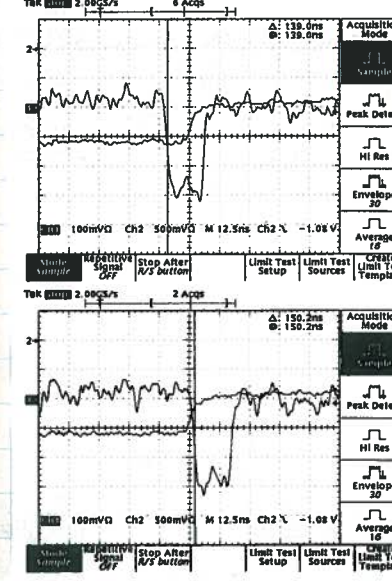
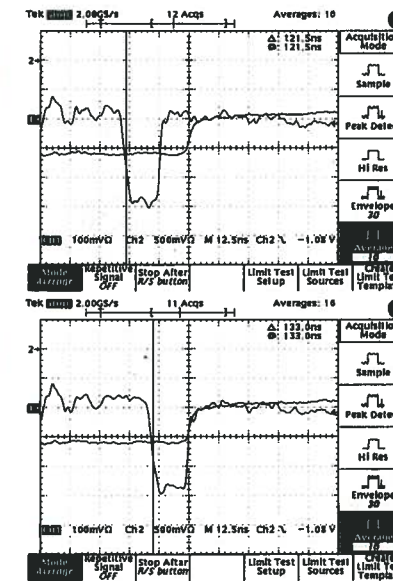
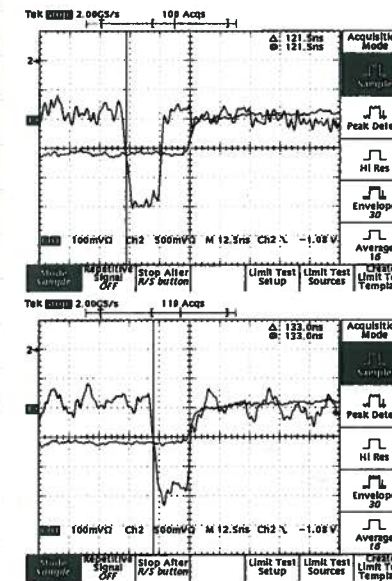
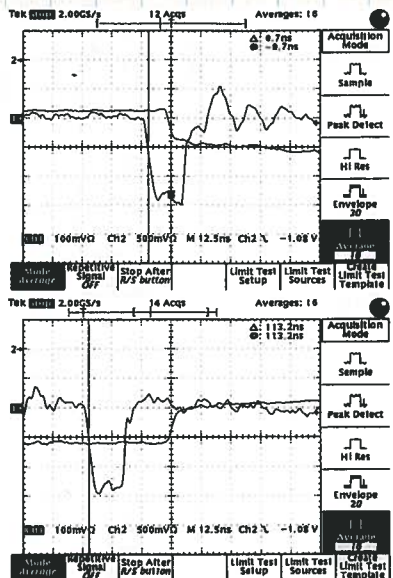
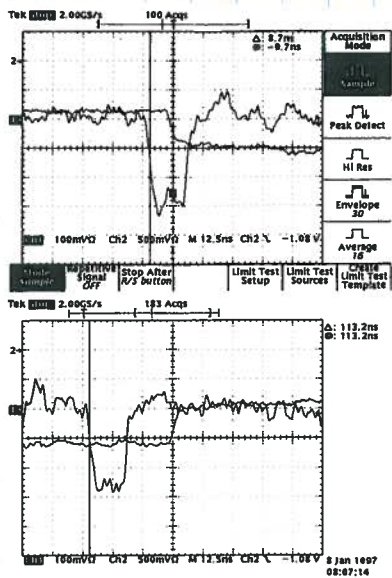
600

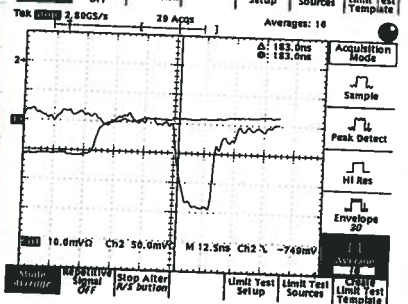
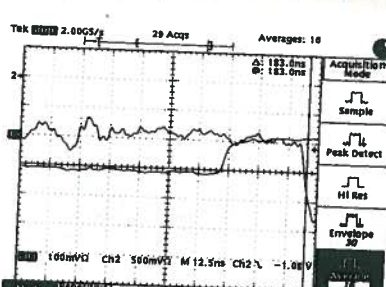
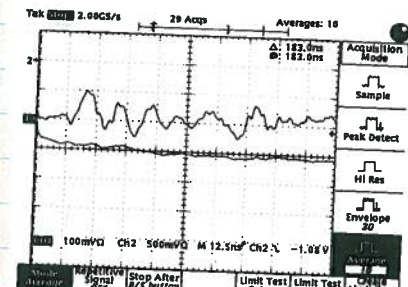
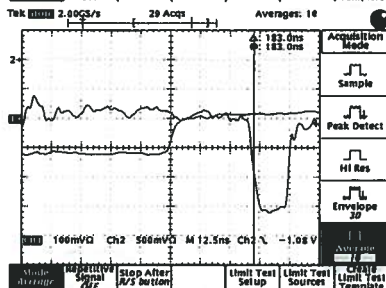
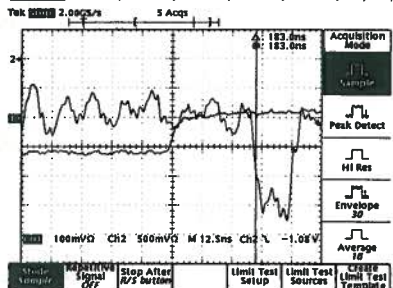
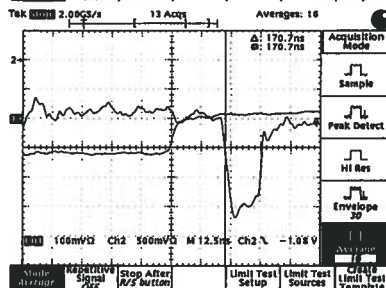
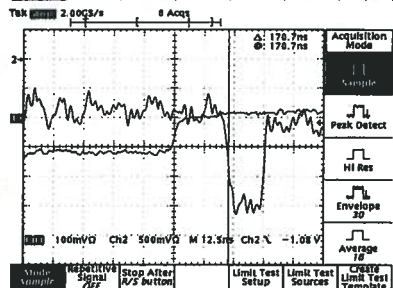
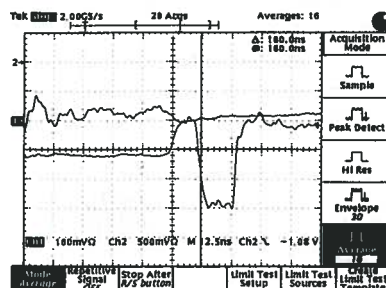
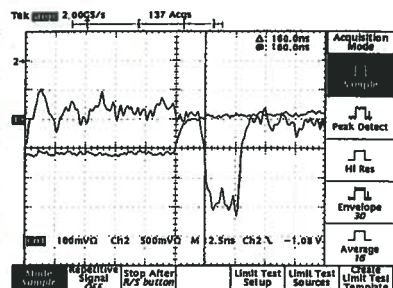


200



120 change in time scale





1930

980

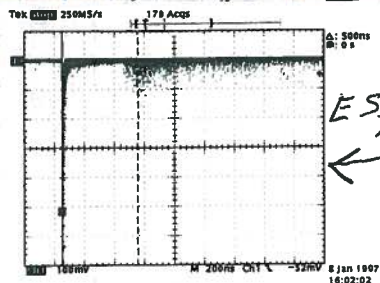
110

Just a view of averaged
input pulse across
the entire gate
width.

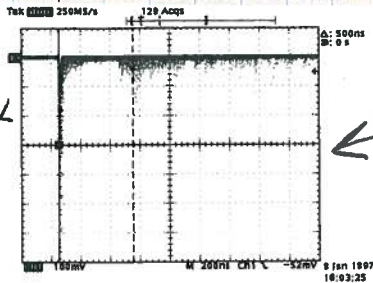
Input pulse was
not ideal, but
serves the purpose.

Input pulse should be more than 20ns after gate
leading edge and completely contained within
the gate.
ADC does not integrate charge significantly outside the gate.

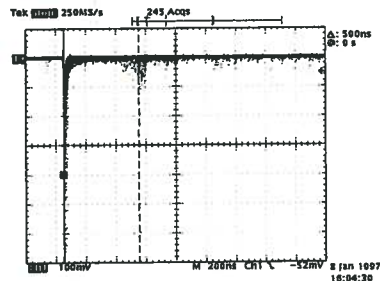
Quick Check of S1 PMT's Direct Output 1/8/98
 Setup is the same as on p. 65 of this volume.
 Except no Sr^{90} source. Used Cosmic rays.



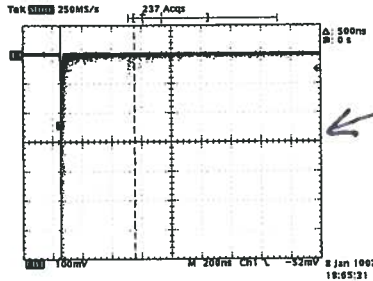
ES1/6L



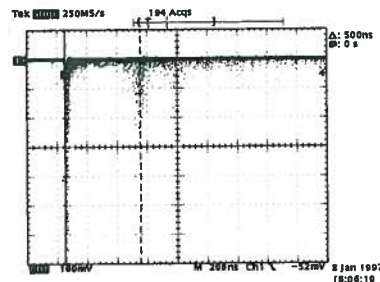
ES1/5L



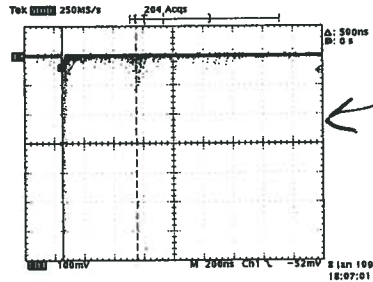
ES1/3L



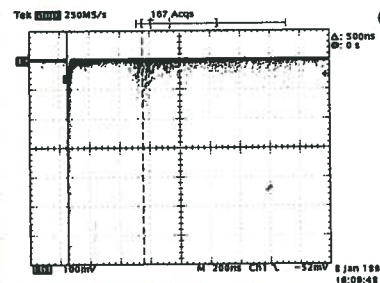
ES1/2L



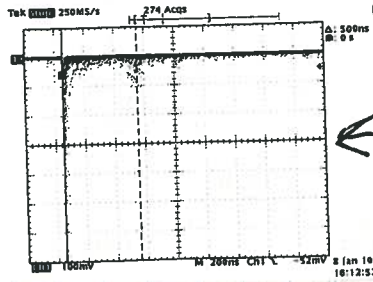
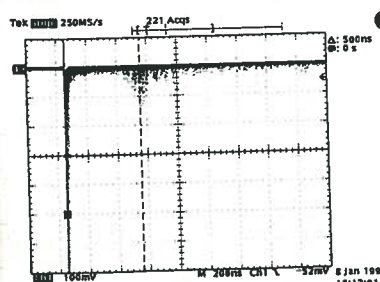
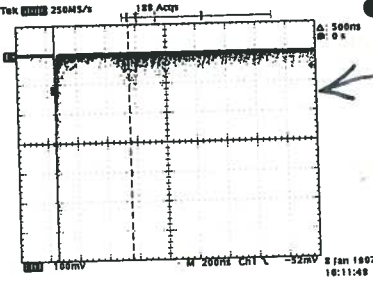
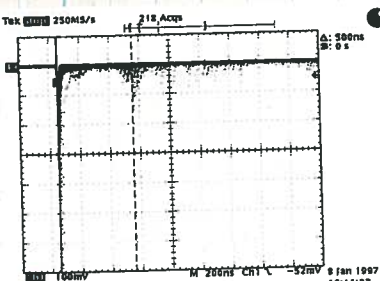
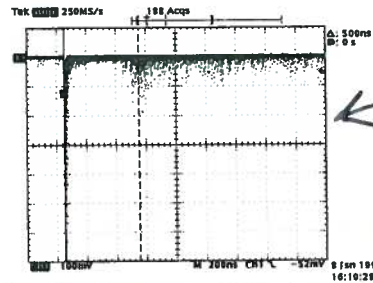
ES1/5R

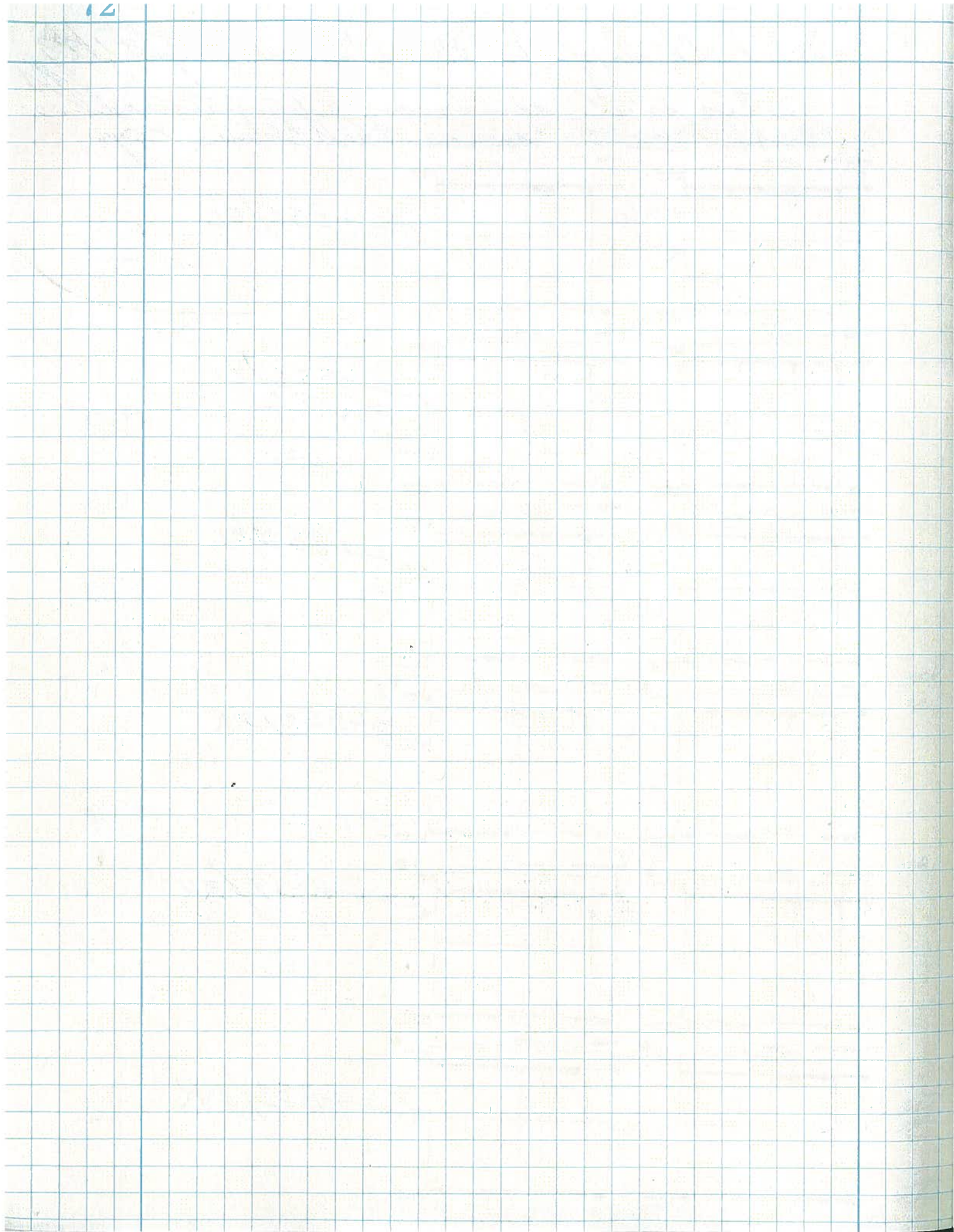


ES1/3R



ES1/1R

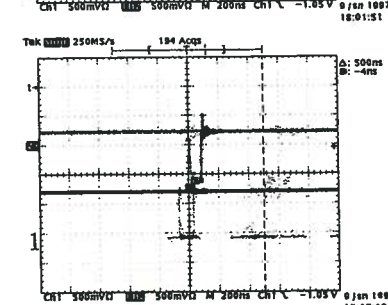
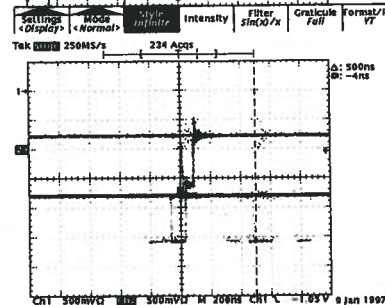
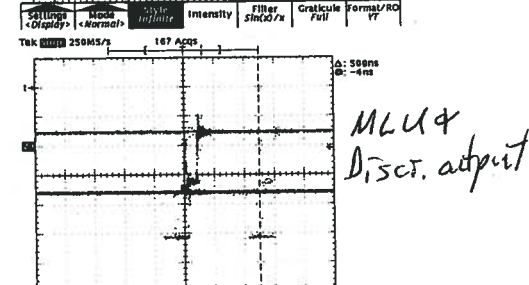
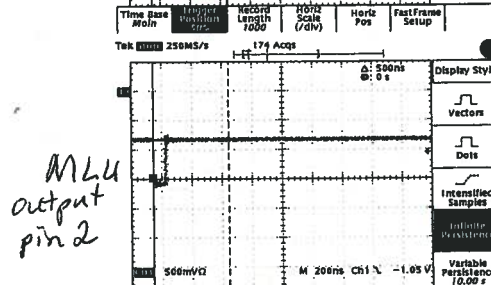
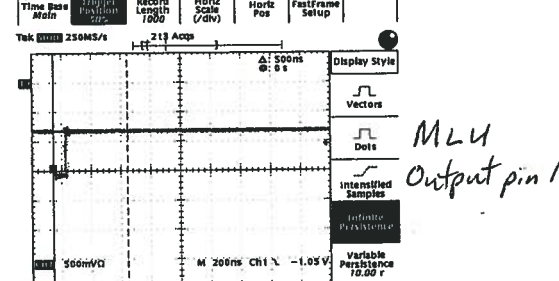
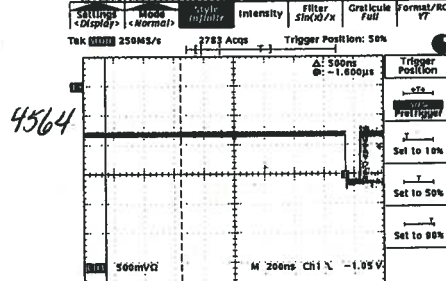
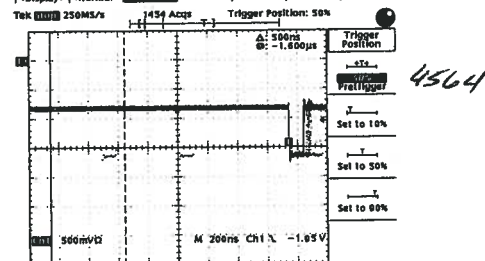
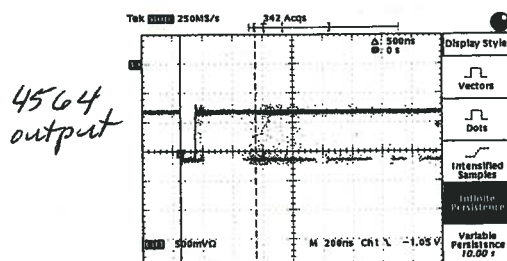
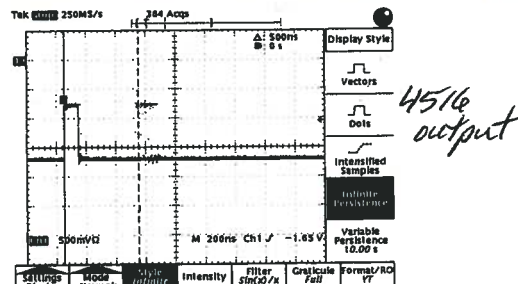
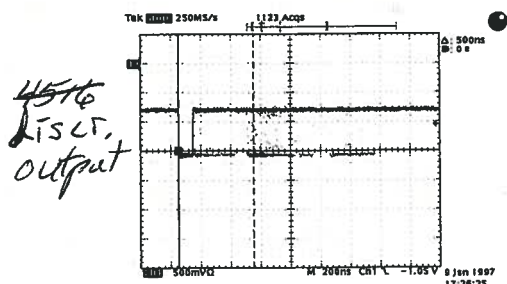


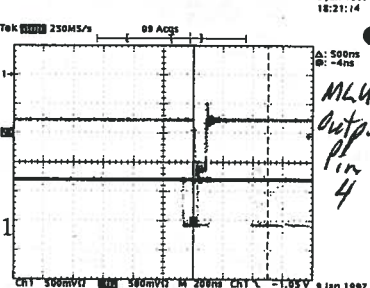
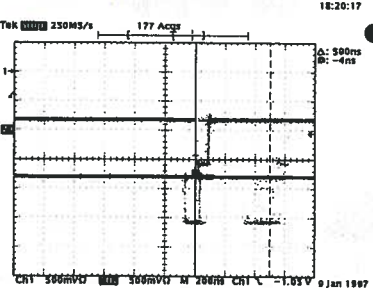
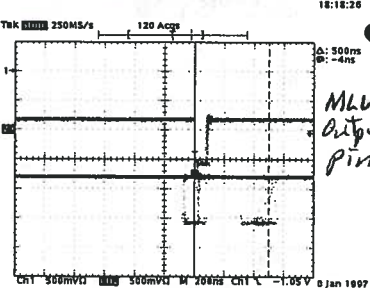
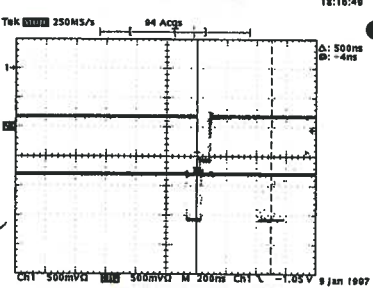
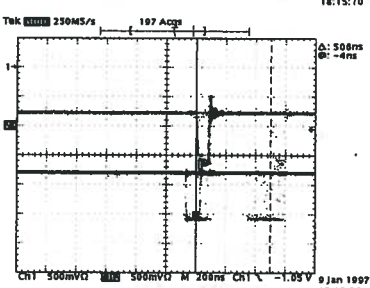
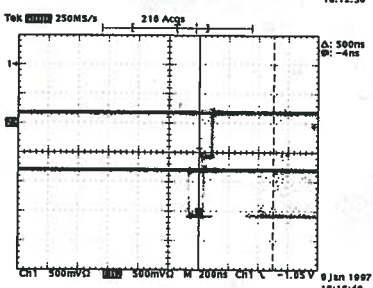
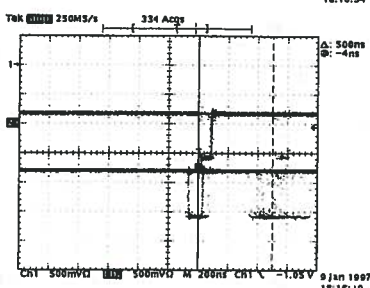
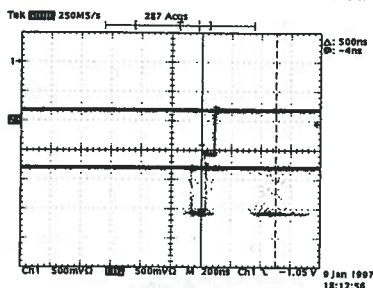
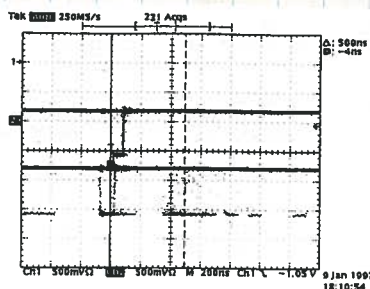
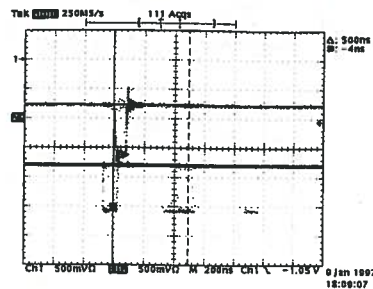


Another cursory look at the trigger

Using the TDS754A and FET probes.

15
1/9
JA





Scope was set on Auto Trig. set to Normal MLU output pin 1 & Discr.

MLU output pin 2

MLU output pin 3

MLU output pin 4

Checked HV

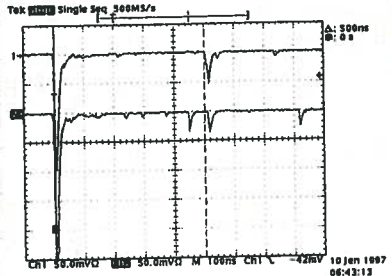
Discriminators set to	slot card Chan	1	2
60mV for left		1950	1900 ← IR
62mV for right		1935	2020
		1950	1900
		1920	2020
		1955	1930
		1940	1870 ← GR

left ↑ ↑ right

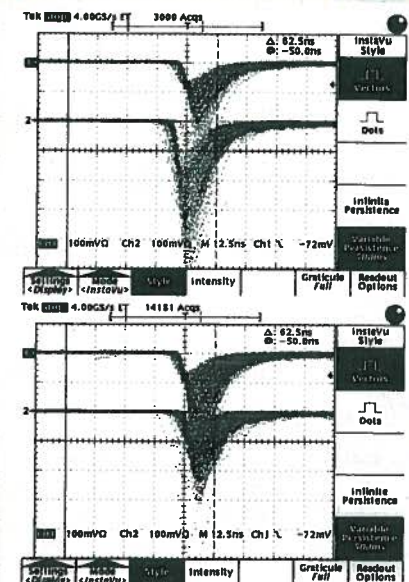
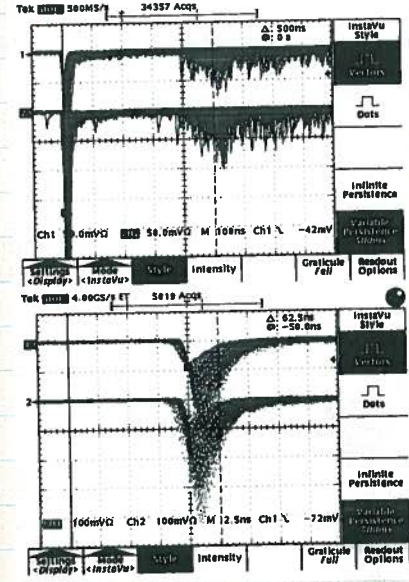
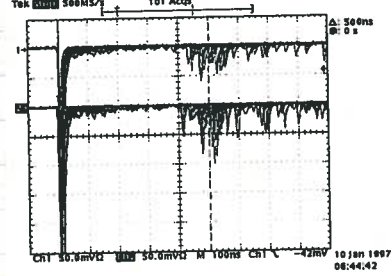
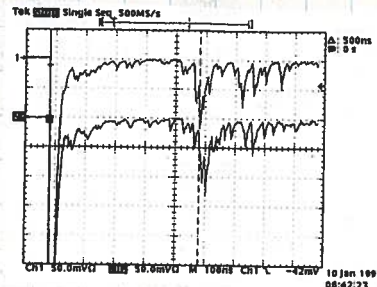
~200µA current drawn for each tube

Quick Check of Trigger With Sr^{90}

1/10/97
JA



Single
Sequence
← →



Sr^{90} is approximately
at the center off
51/5

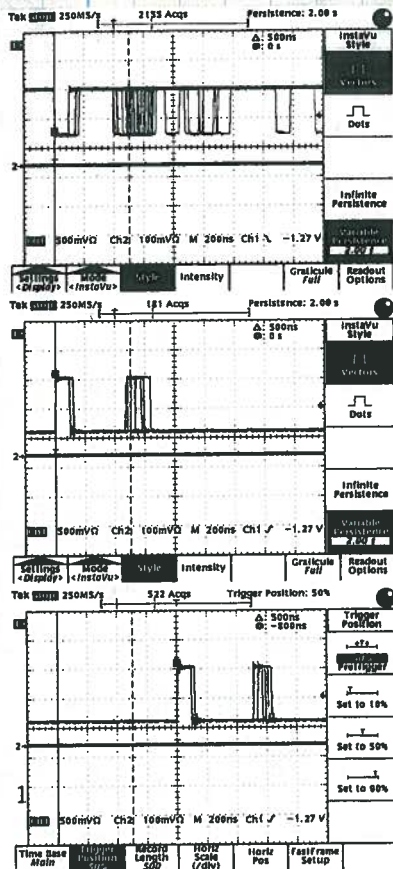
Direct output of
tubes is through
2 cables. Both
36' 7 1/4" long, intended
for use on S3.

InstaVu
mode

Source ~@
center of
counter

Source on
left edge of
counter

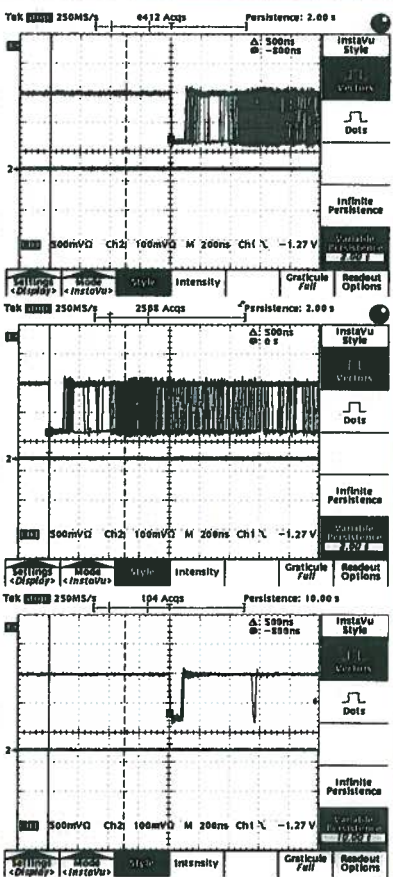
Source on
right edge
of counter



4516 output pin 2
discriminator output pin 2
(I got the wrong channel by mistake)

4516 output pin 2

4516 output pin 2
nothing happening before discrim.

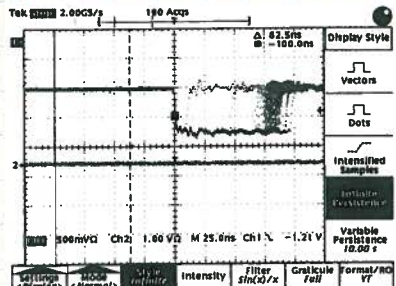


4564 output
output is from pin 1
includes S1/5

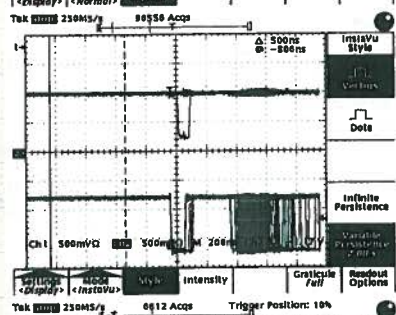
4564 output

MLU output
after pulse
I only caught a few after
pulses

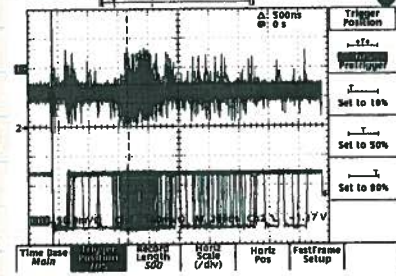
Second Look With Si^{90} source 1/11/97
 Si^{90} is on ~ center of 511 (it really is correct this time)



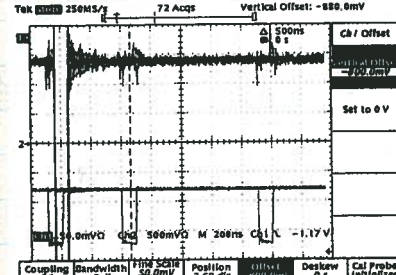
MLU output pin 1
 cosmic rays
 note "bunt" pulse



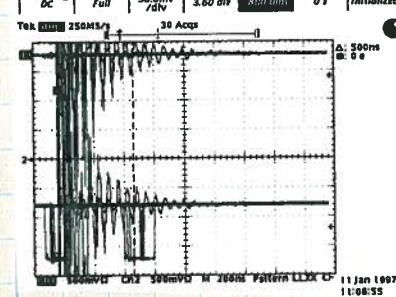
MLU output & discrim output for Si^{90} source



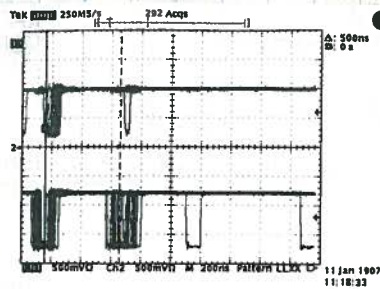
Same looking at noise on MLU output



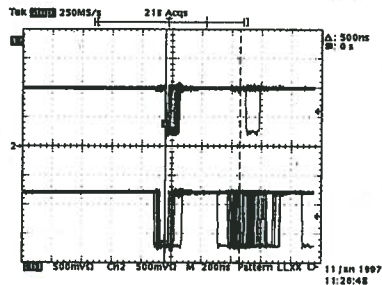
Same more noise



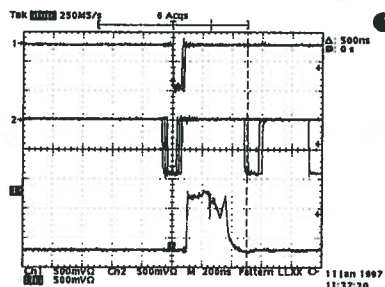
Changed trigger to coincidence of the two channels
 caught a noise blatt



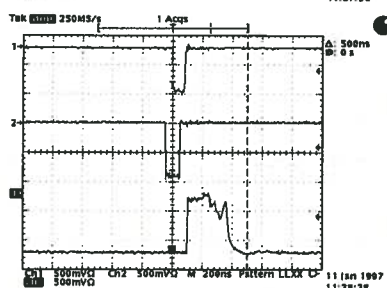
same as previous



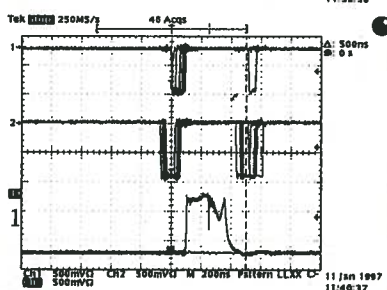
same



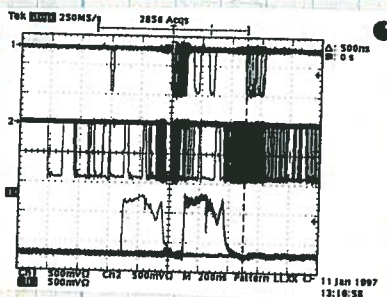
MLU output pin 1
discriminator output
gate signal from TS level shifter



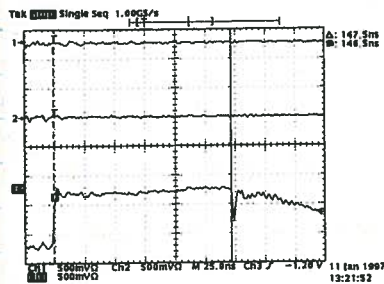
same
single sequence



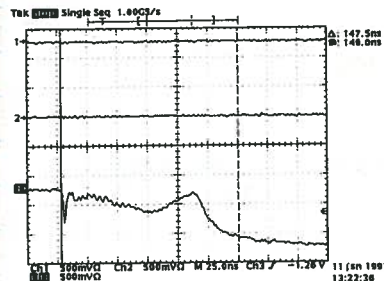
same
ADC gate not generated



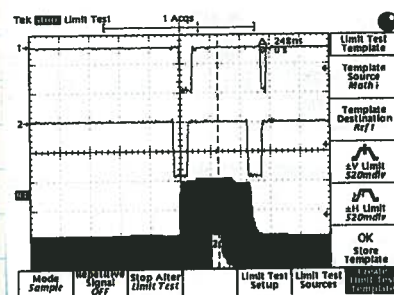
same
long run
got a haircut, lunch etc.



same setup
looking at ADC gate signal



same picture - rolled screen to
the left



trying to setup test template

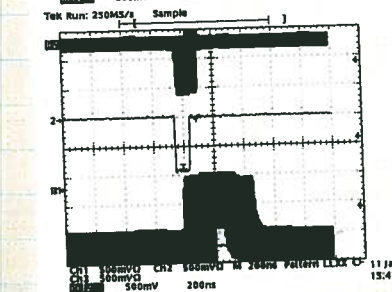
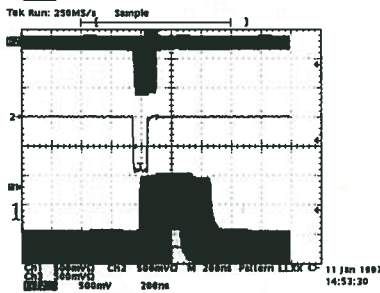
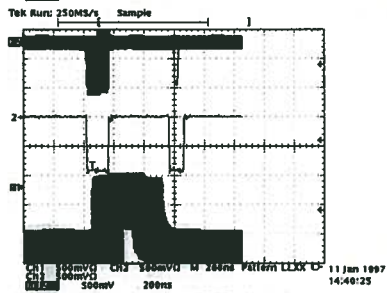
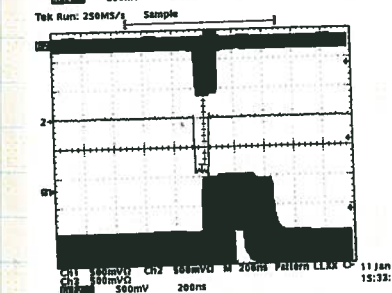
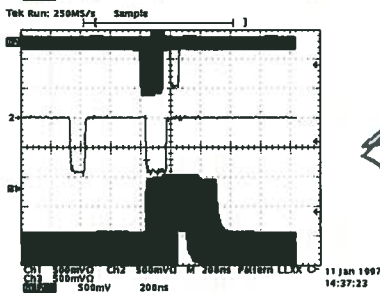
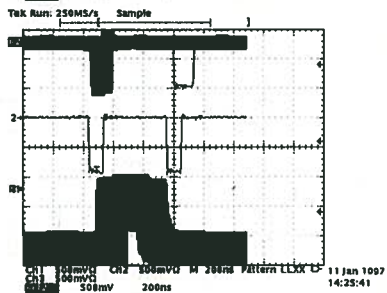
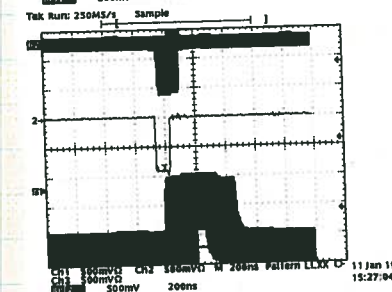
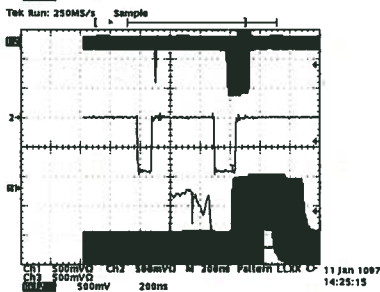
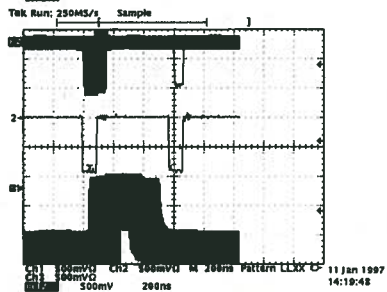
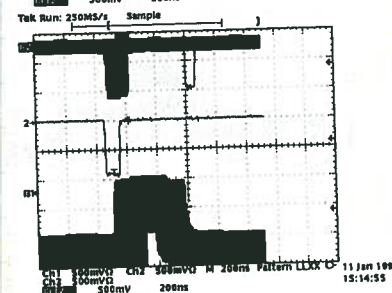
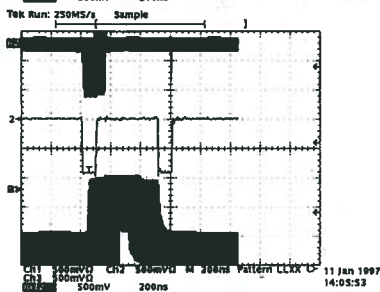
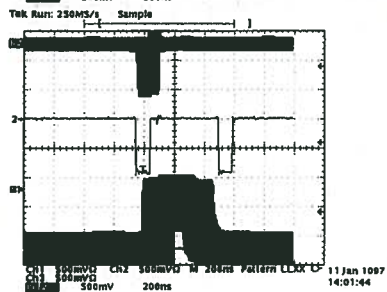
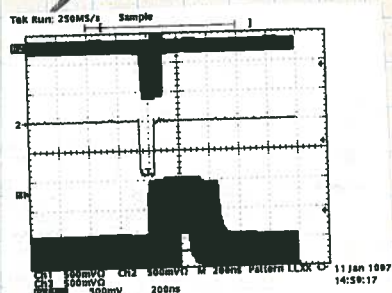
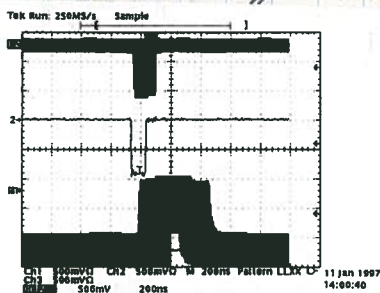
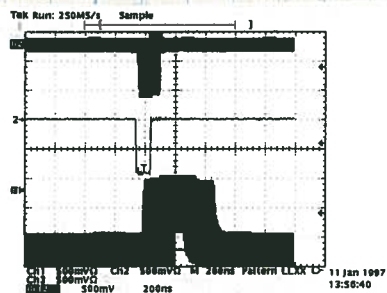
Is "ADC gate" really the AD_{gate}
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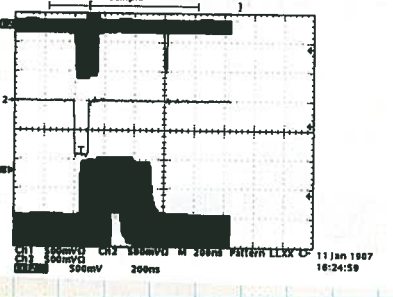
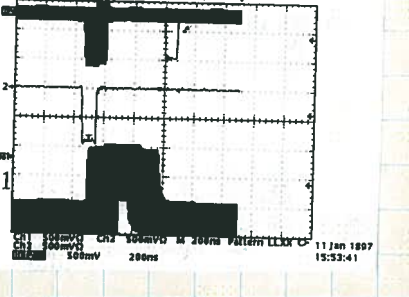
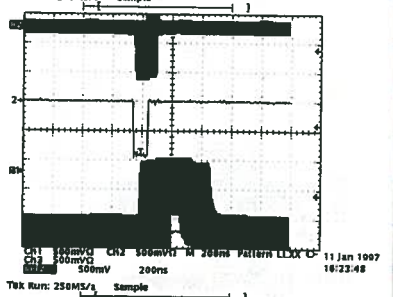
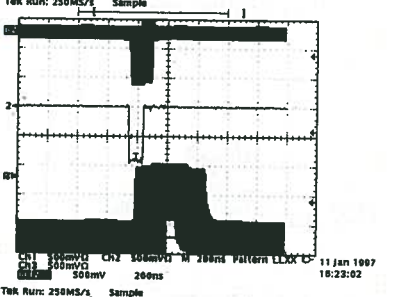
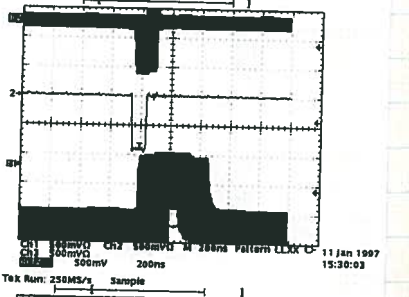
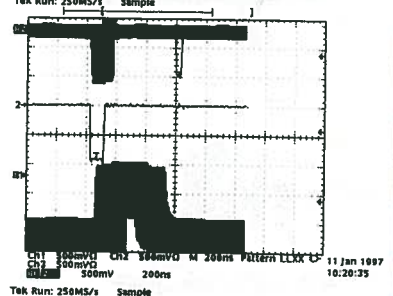
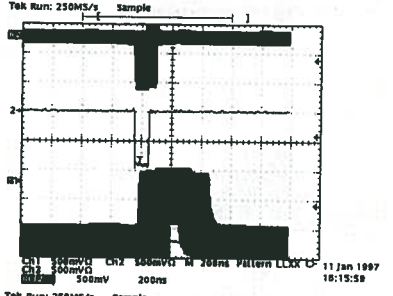
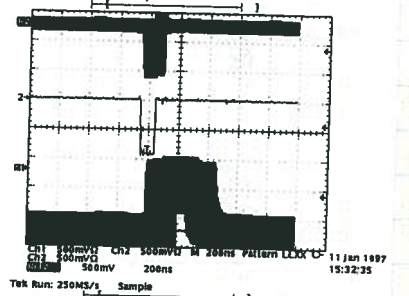
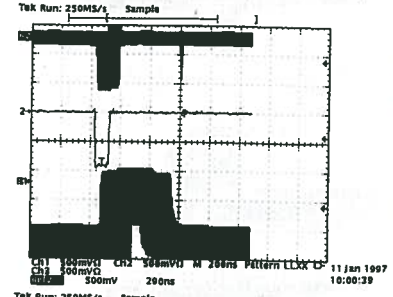
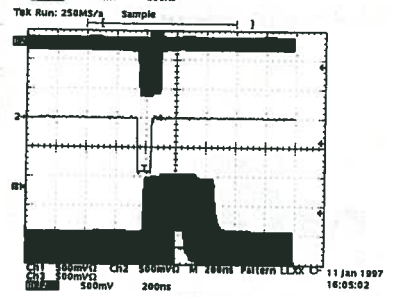
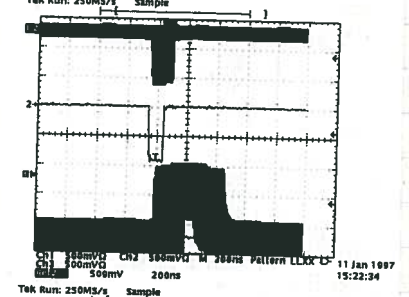
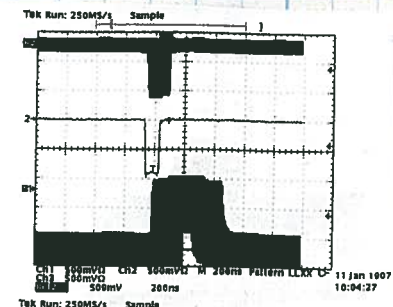
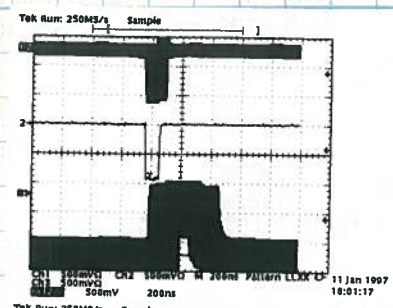
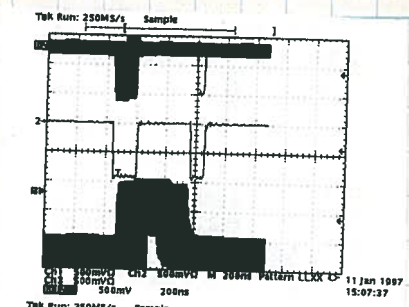
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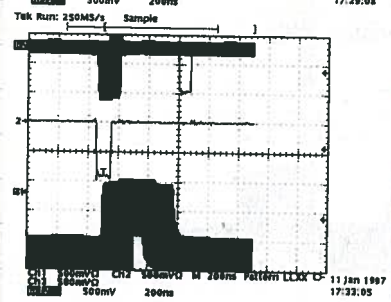
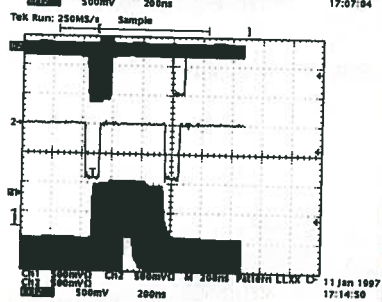
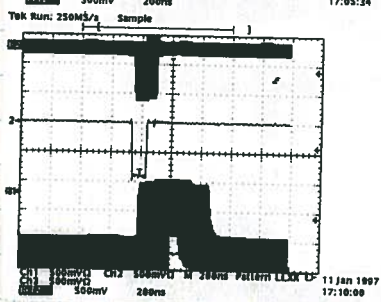
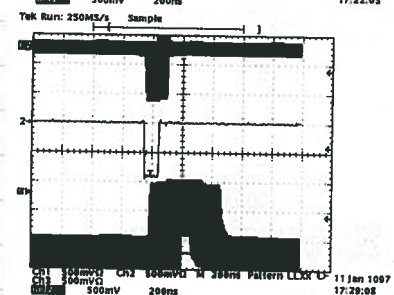
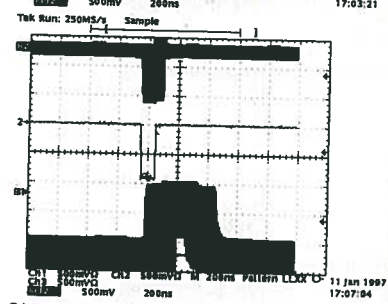
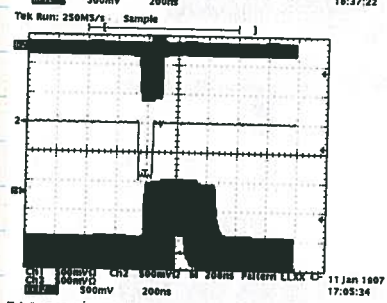
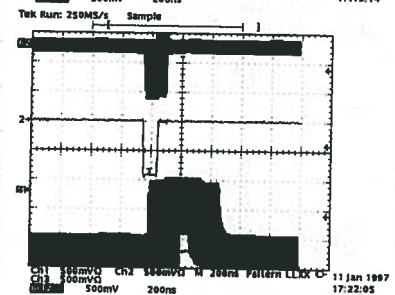
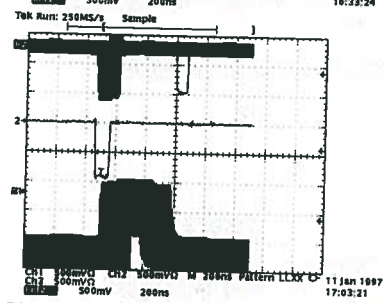
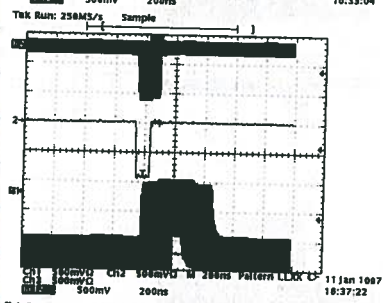
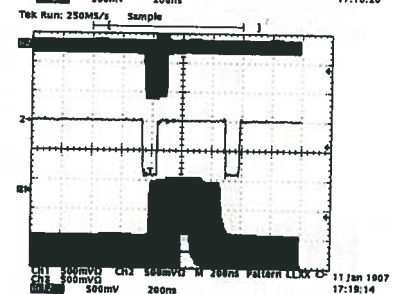
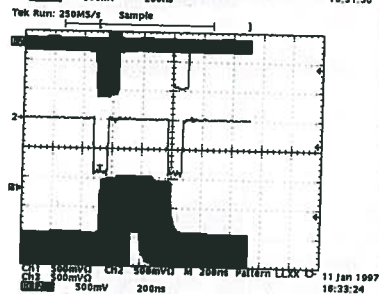
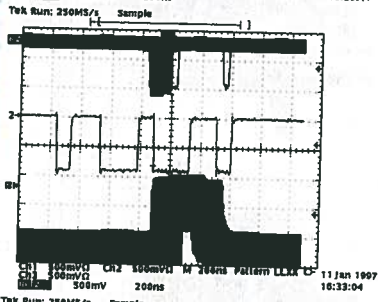
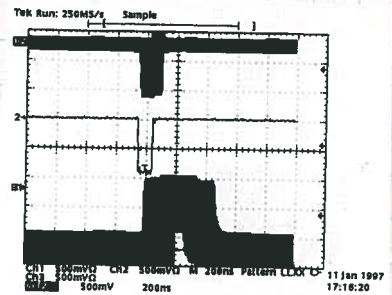
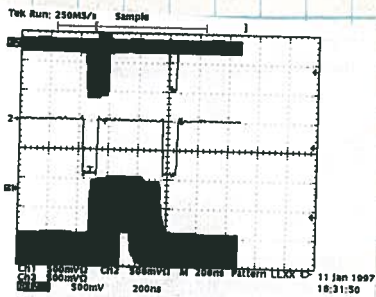
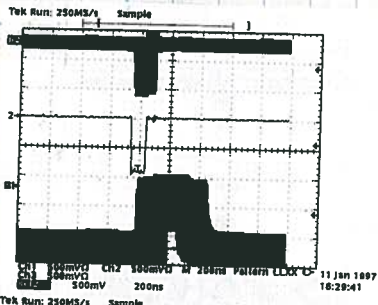
Fastbus Gate Timing Error Check

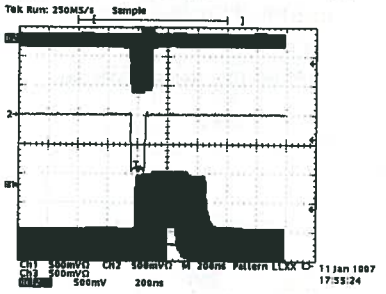
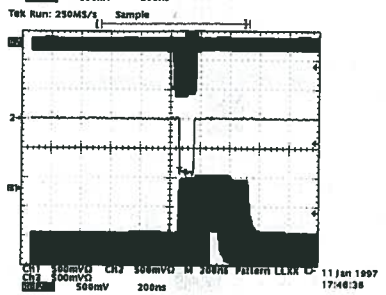
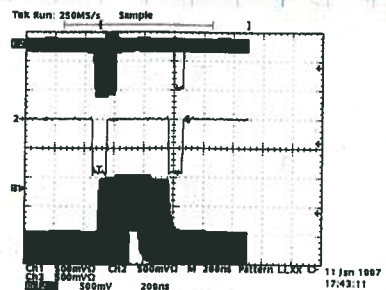
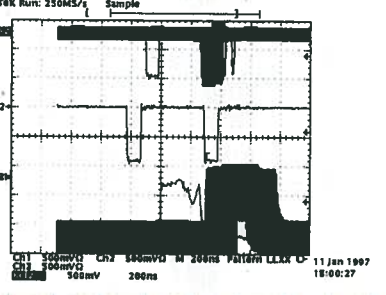
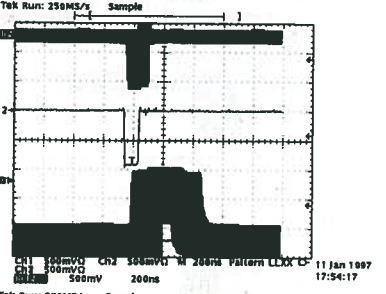
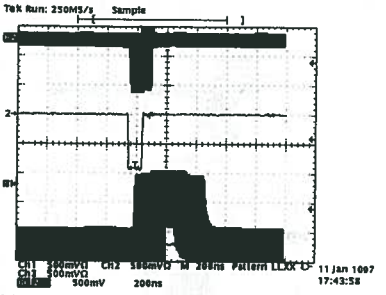
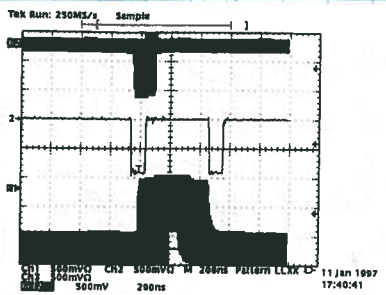
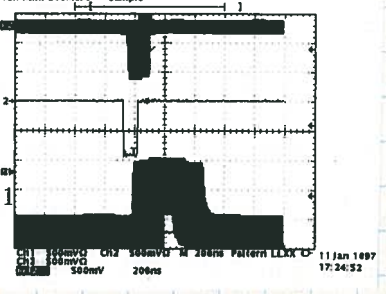
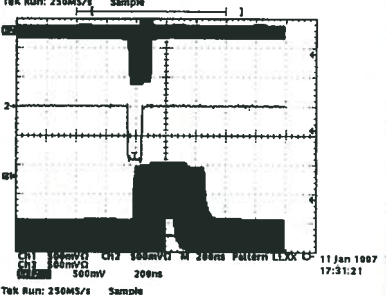
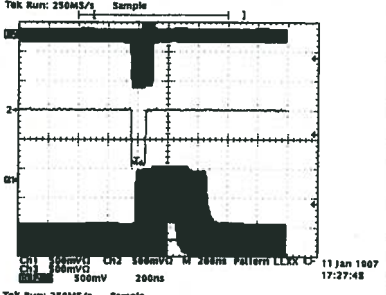
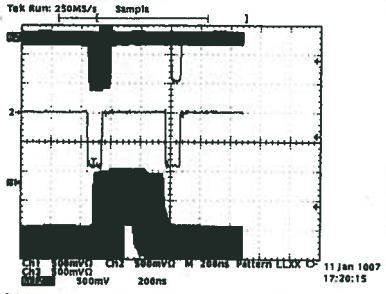
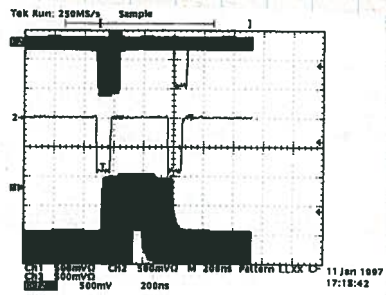
Trying to determine if a gate is generated on any afterpulses.

CH1 is MLI output pin 1
CH2 is discriminator output for S1/R
CH3 is twisted pair labeled "6" on 9U VME crate level shifter. AOK gate??







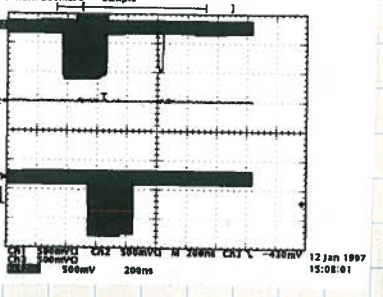
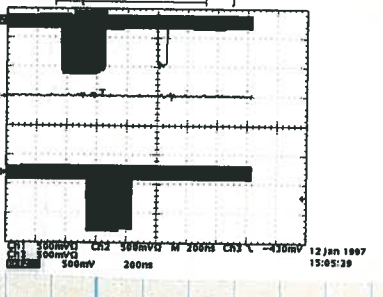
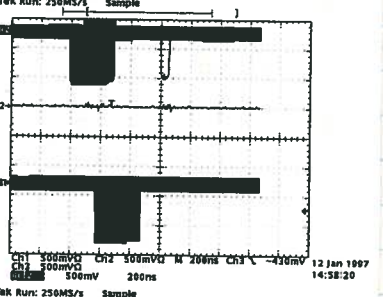
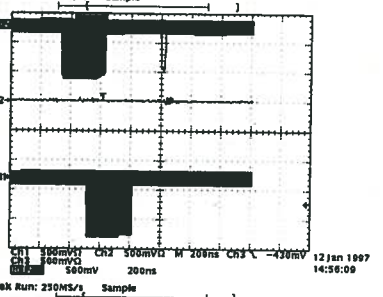
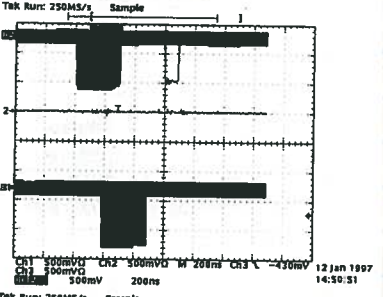
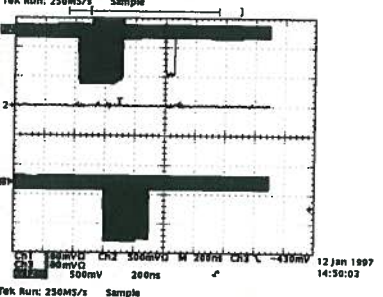
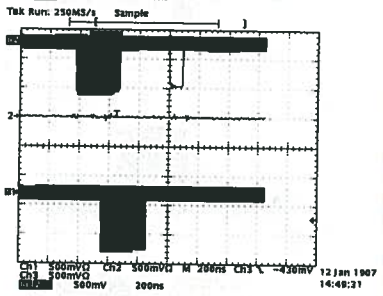
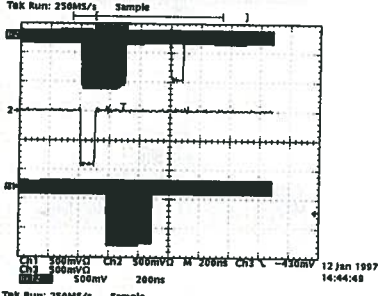
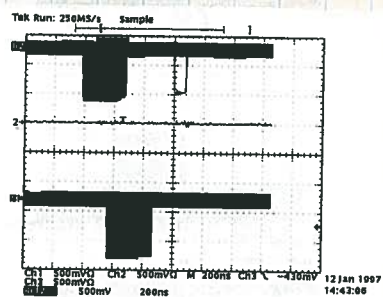
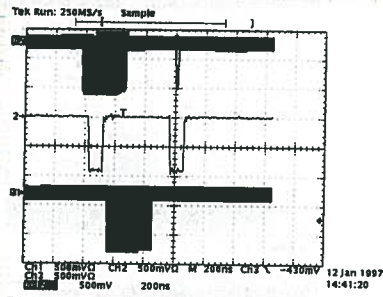


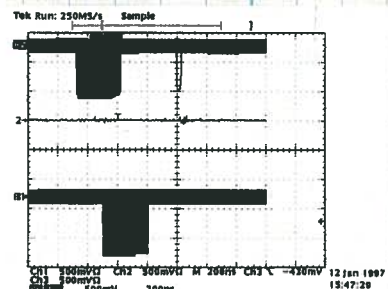
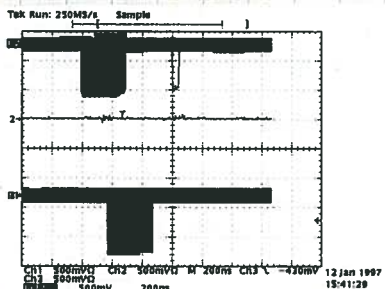
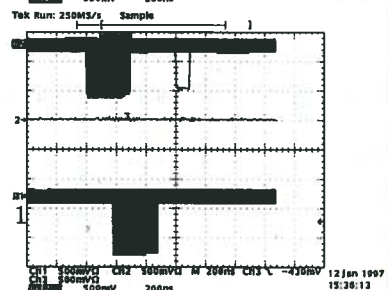
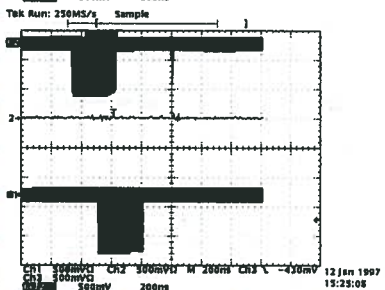
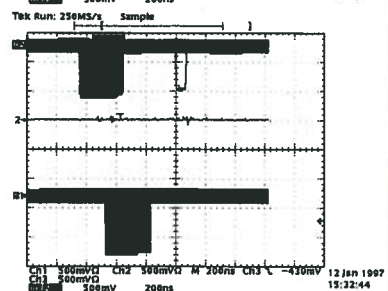
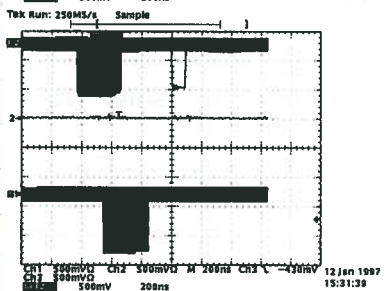
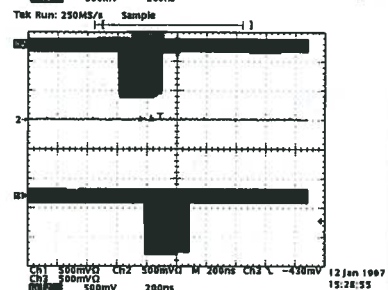
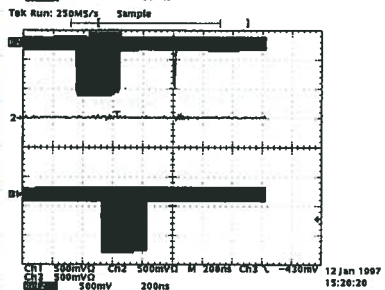
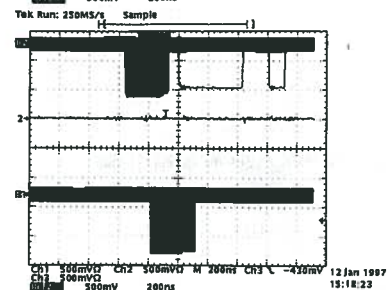
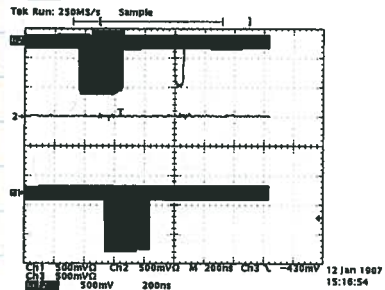
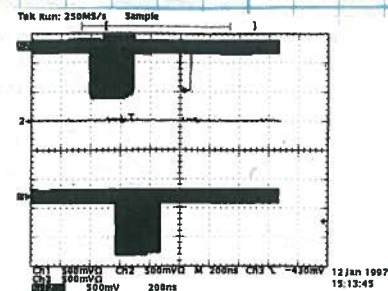
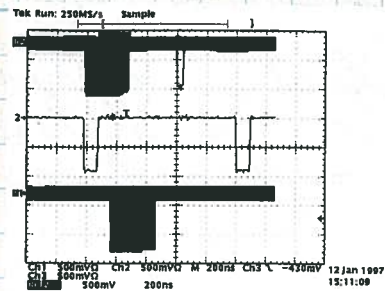
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First Look At TDC Stop Signal

CH1 is MLLU pin 2 output - FET probe ($\approx 8V$ offset)
 CH2 is discriminator output - FET probe ($\approx 8V$ offset)
 for scint. 511R
 CH3 is NIM pulse from fan-out used for TDC
 stop (cable pin labeled "1")

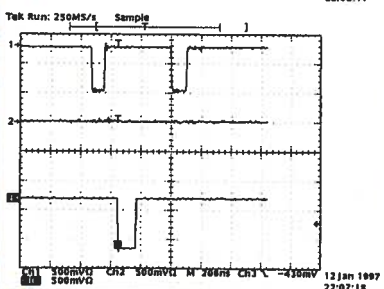
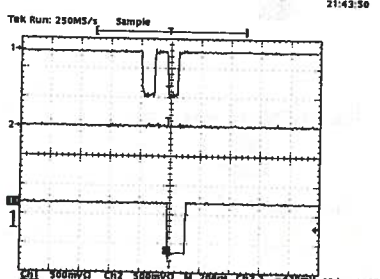
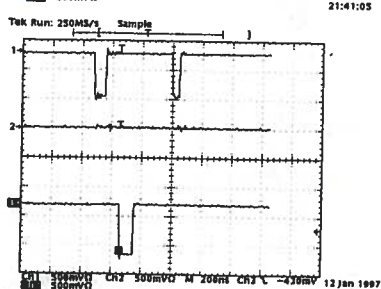
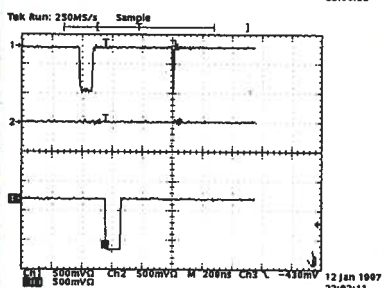
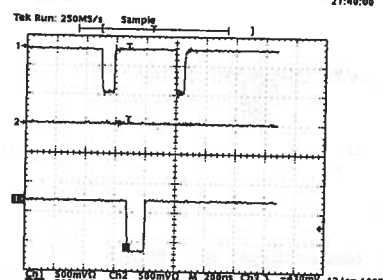
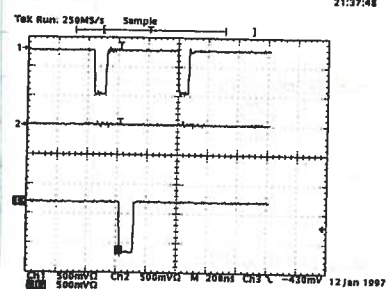
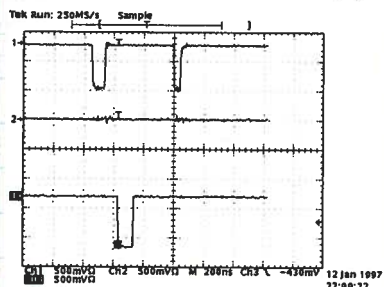
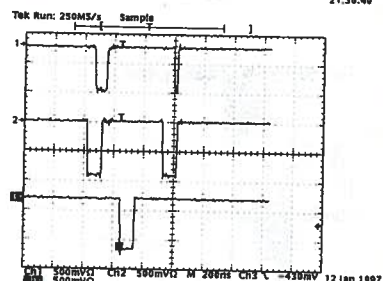
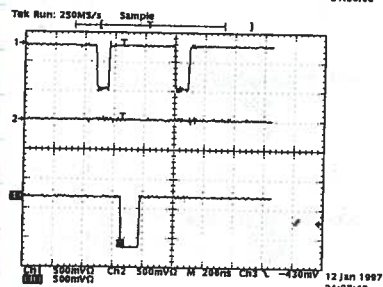
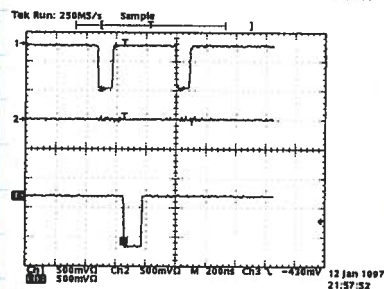
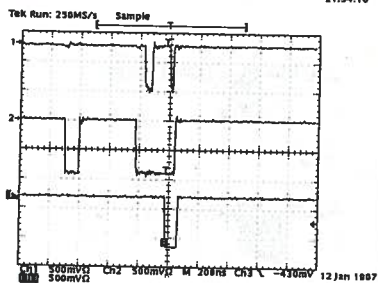
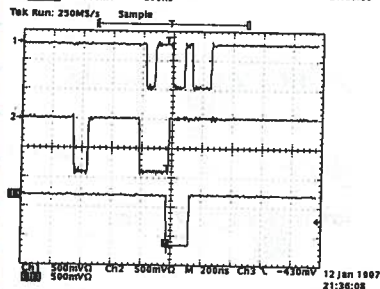
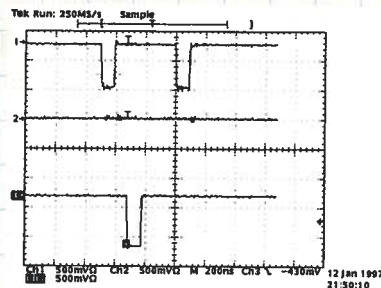
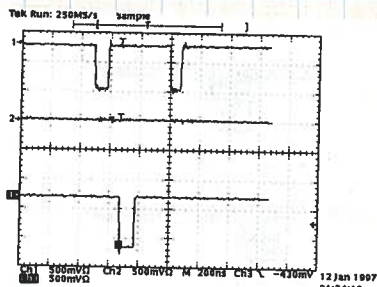
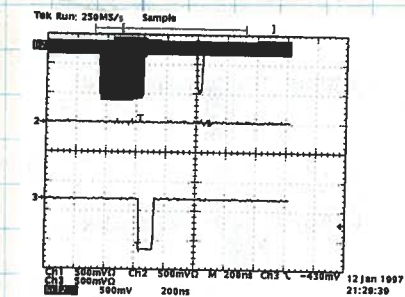
No source used.
 Only cosmic rays

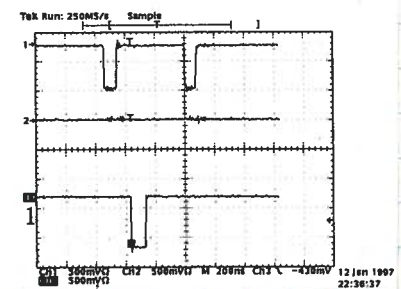
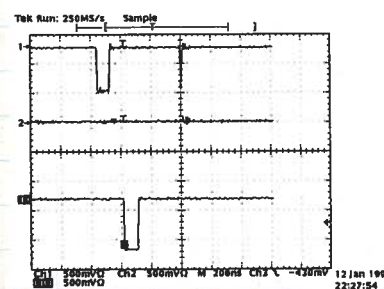
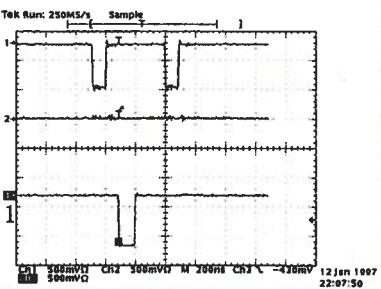
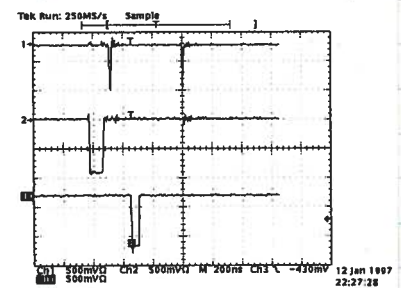
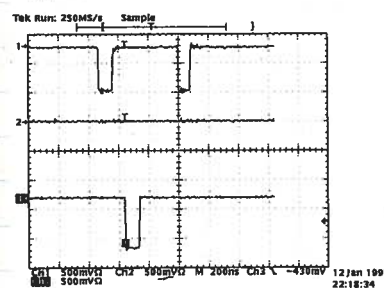
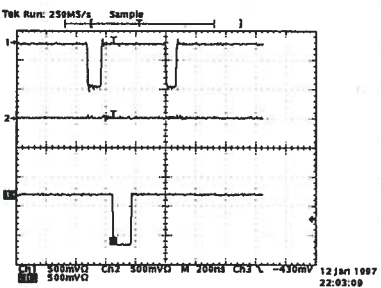
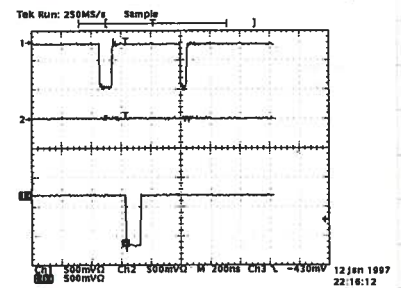
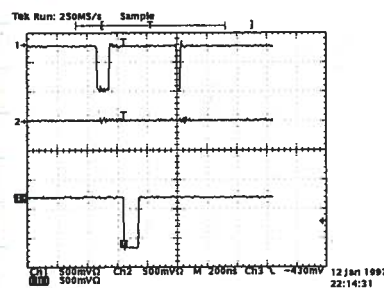
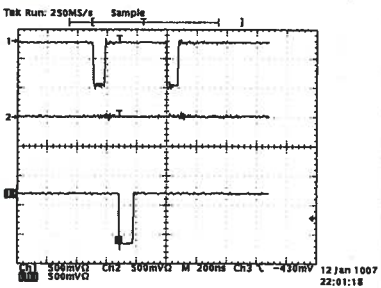
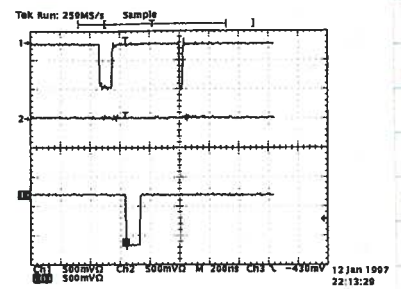
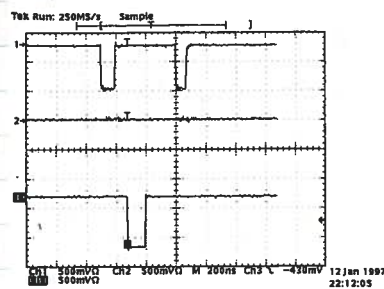
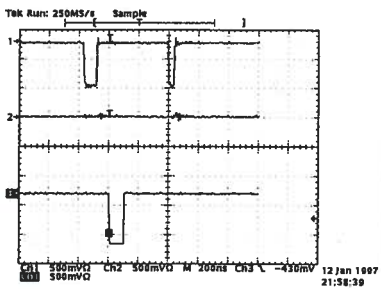
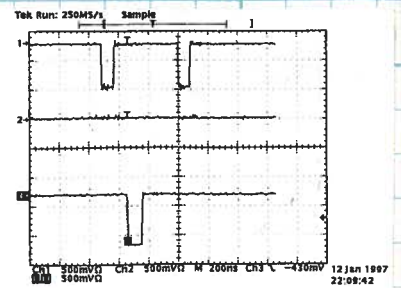
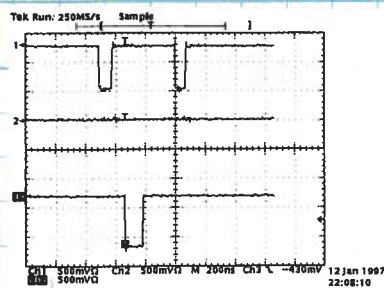
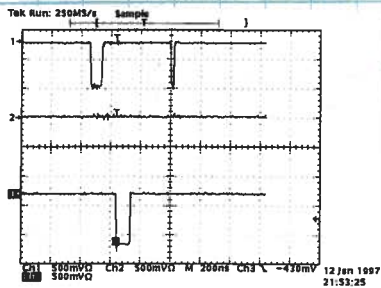


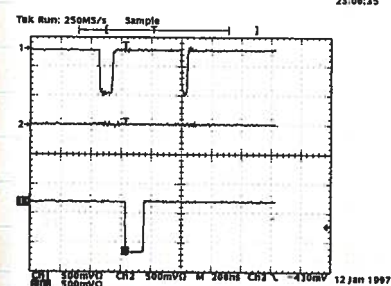
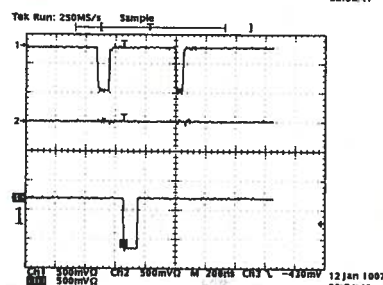
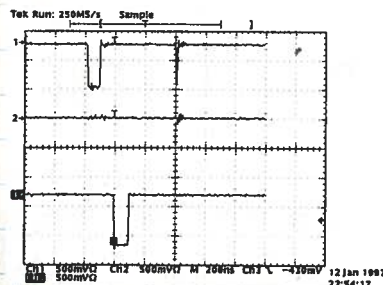
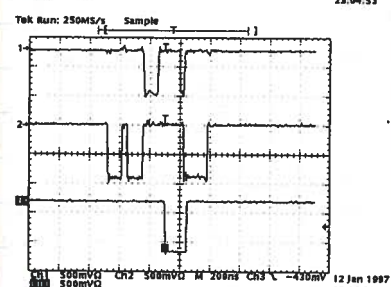
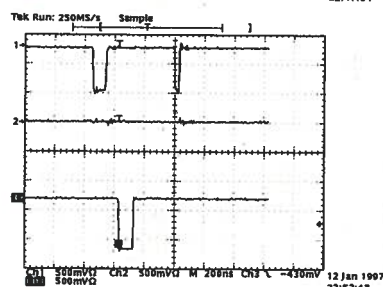
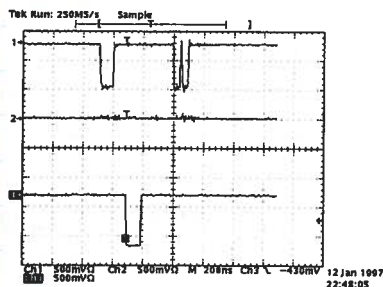
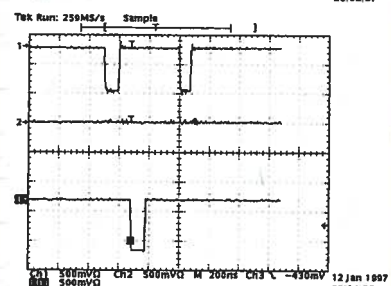
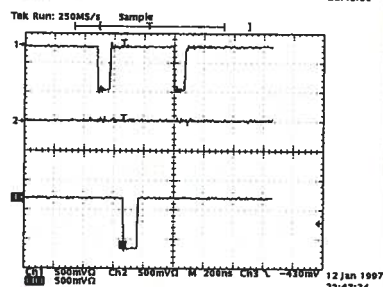
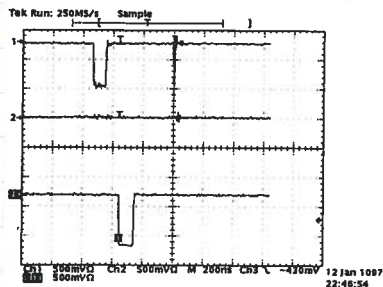
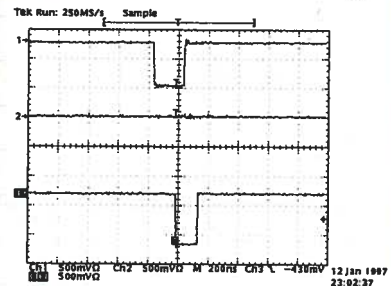
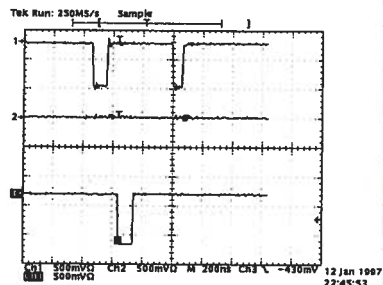
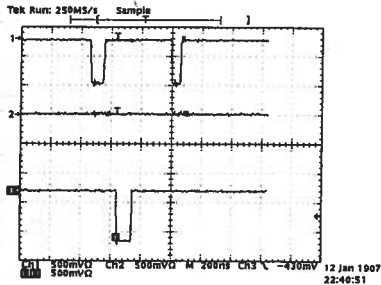
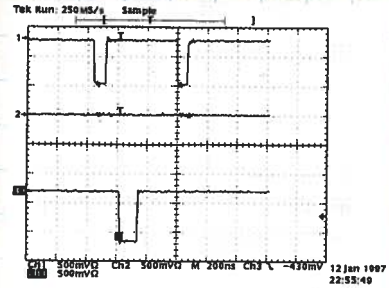
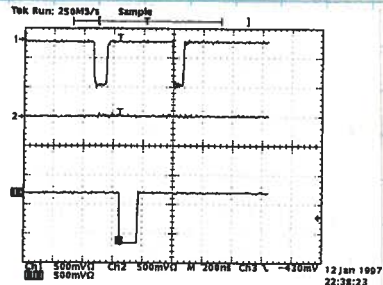
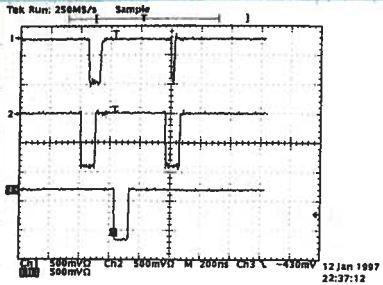


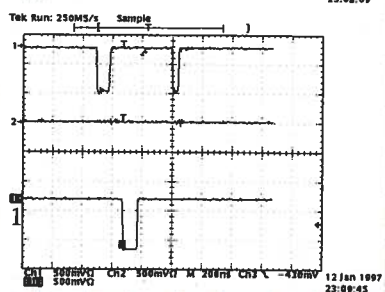
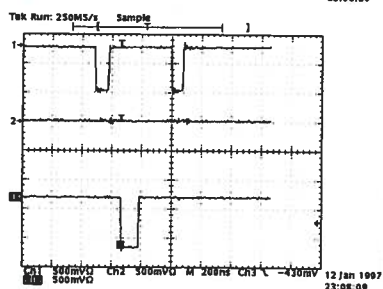
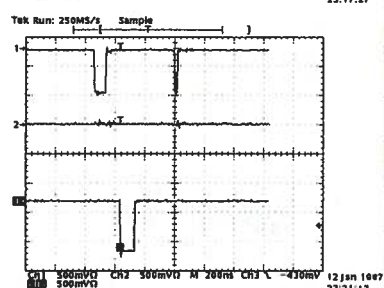
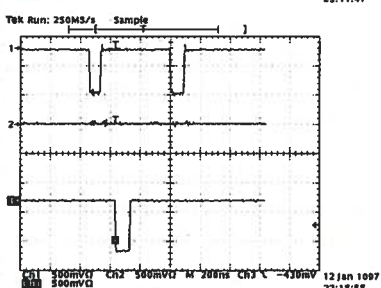
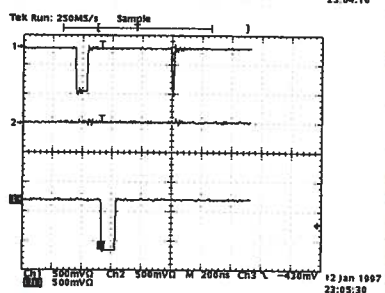
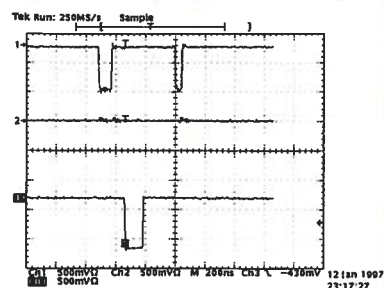
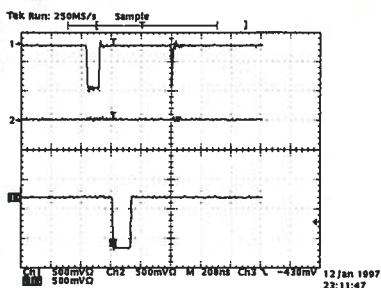
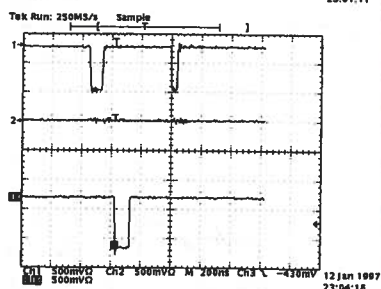
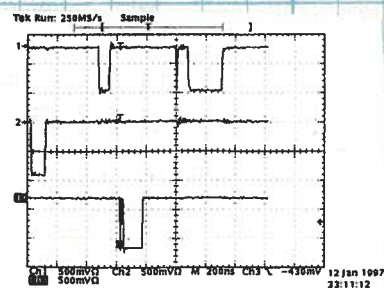
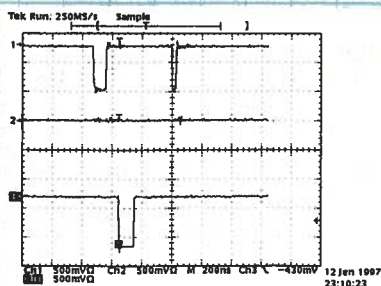
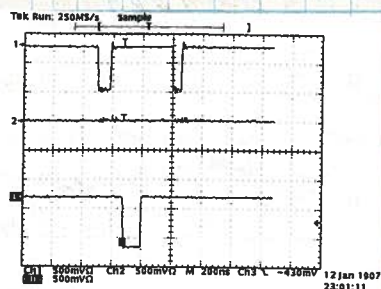
1/13
js

TDC stops And MLU Signals
 Using FET probes on CH1 & CH2. NIM pulse on CH3.
 CH1 output pin 1 of MLU (2373)
 CH2 output of 501/IR discriminator
 CH3 from fanout which also generates TDC stop









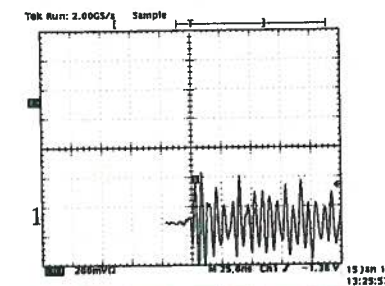
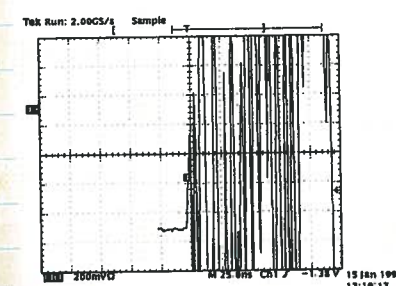
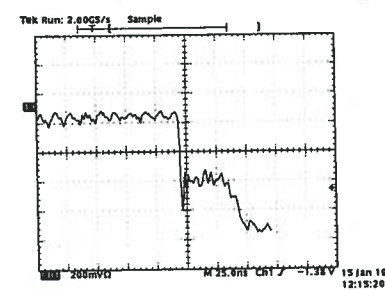
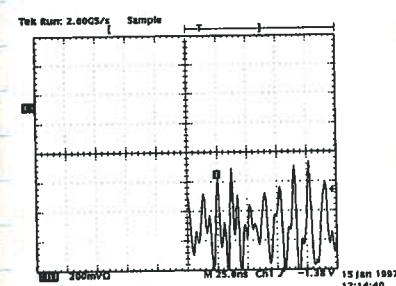
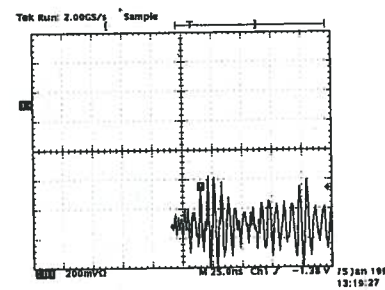
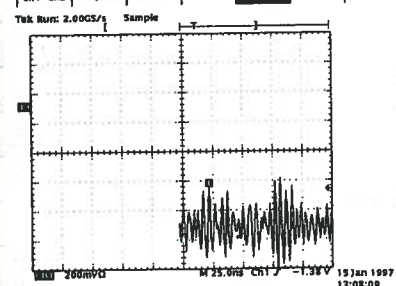
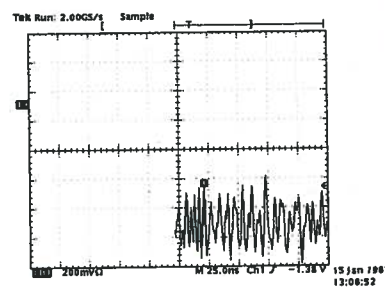
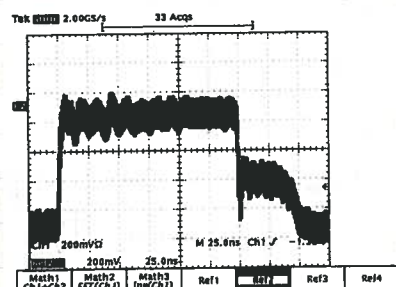
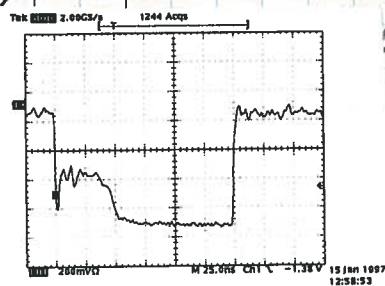
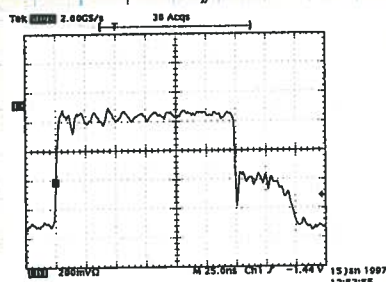
There do seem to be some unwanted gate timing errors. They would appear to be from the PNT after pulsing.

Also, there seems to be some width variation to the TDC stop signal. Is this present on the ADC gate signal?

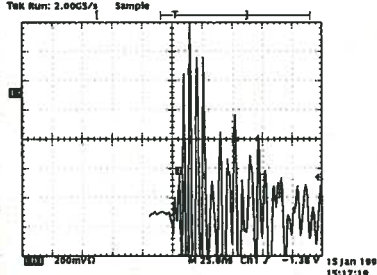
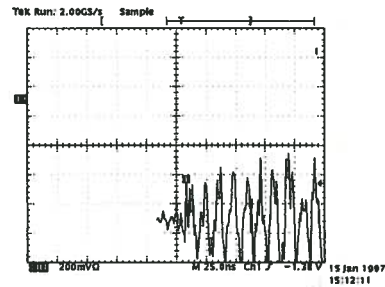
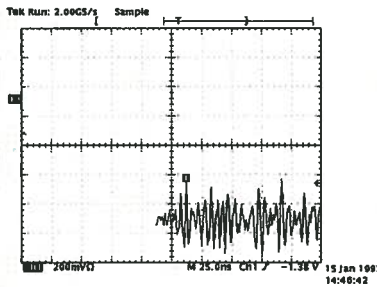
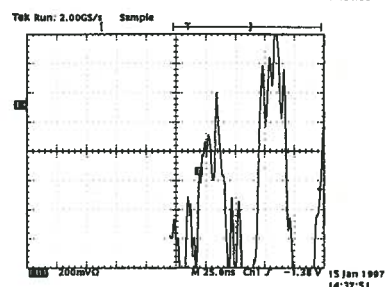
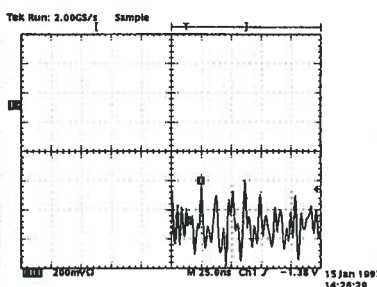
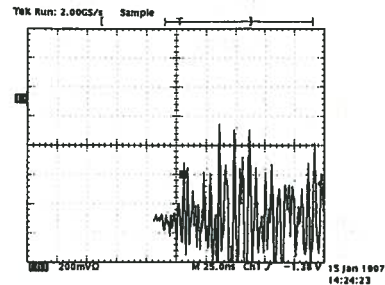
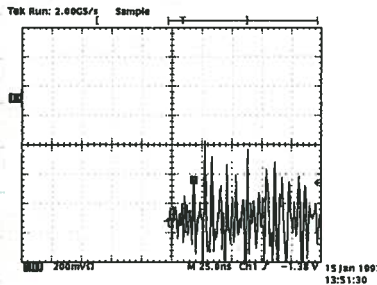
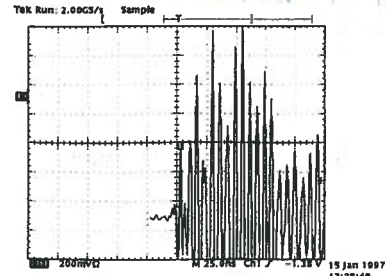
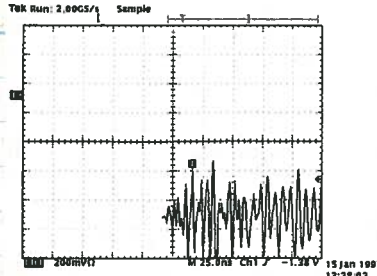
1/15 ADC Gate Pulse (For 1881M)

ADC gate pulse comes from a wire-wrapped level translator assembled by Jeff Wilcox. It sits in the 9U section of the trigger supervisor crate. Looking at the gate signal using an FET probe on the #754 scope. The upper photos are both sides of ECL gate. Third photo is reference for limit testing.

note strange behavior at the ends of the pulse.



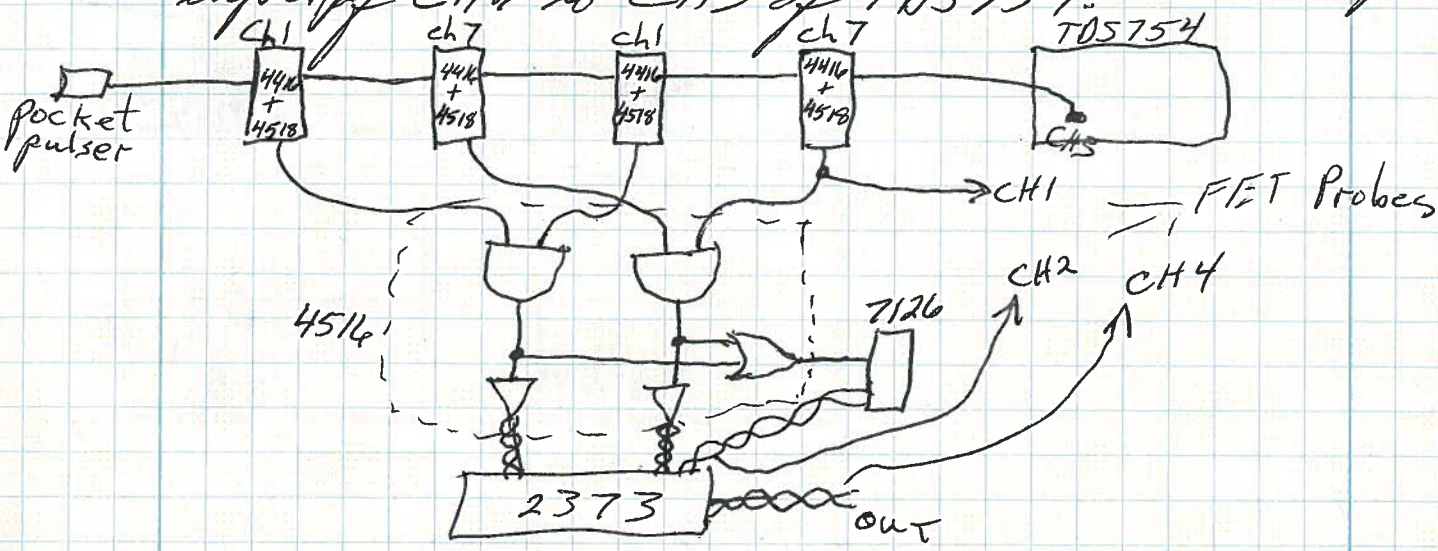
After 2 hours only noise pulses have exceeded the reference waveform. ADC pulse appears stable, to the limit of this test setup.



1/31/A

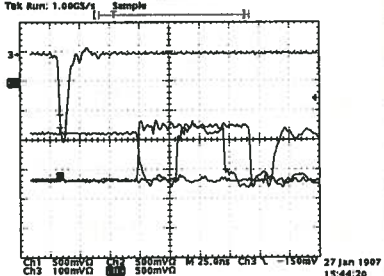
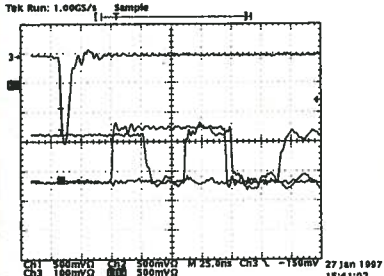
On 1/27, set the 2373 MLI up to run in pulsed mode.

To verify timing, ran a pocket pulser into ch1 the discrim. channels for 51/IL, 52/IL, 51/IR and then 52/IR. Went from analog out of CH1 to ~~analog~~ analog out of CH7 and analog in of CH7 to analog in of CH1 on other discrim. Took analog input of CH7 to CH3 of TDS754.



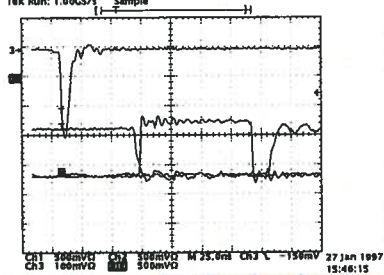
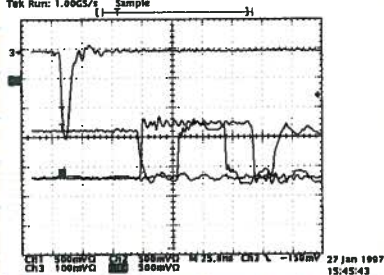
Discrim. output ~100ns wide. MLI out ~250ns
Strobe pulse delayed "sped up" by adding or removing R6174 at input to ~~7126~~ 7126 level translator.

H1 in
1/IR
rising
input
1



CH1 is output
of discriminator
(52/IR)

shorten
strobe
by
4ns

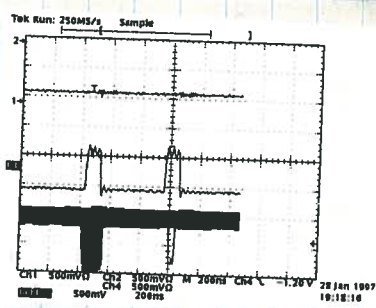


shorten strobe by an
additional 2ns
(6ns total)

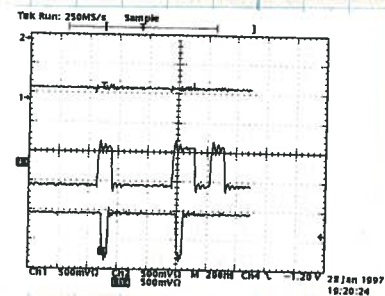
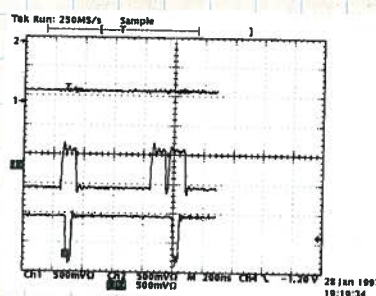
1/31/97

On 1/28 looked at MLU "double pulsing" from PMT after pulsing. Using cosmic, Discriminator output width is as we have been running them. (2/100ms+)
 CH2 - discrim output for S1/4
 CH1 - enable input of MLU (OR out of 4516 & 4564) (52/R fed into 4564, 4564 used to try to keep ADE gate timing ok)
 CH4 - MLU output
 all channels using FET probe

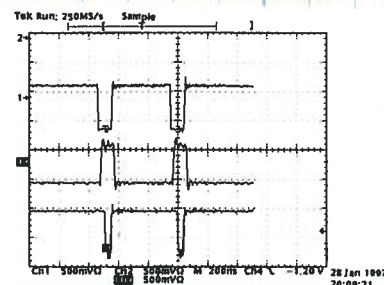
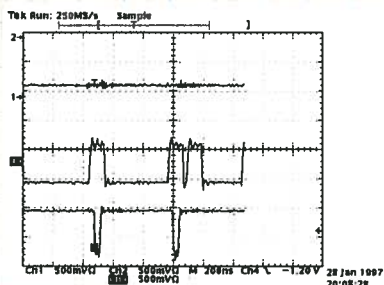
limit test
 retype →



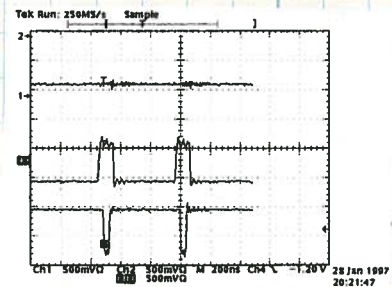
55 waveforms to disk over ~1 hr period.
 1st waveform →



typical
 waveforms →

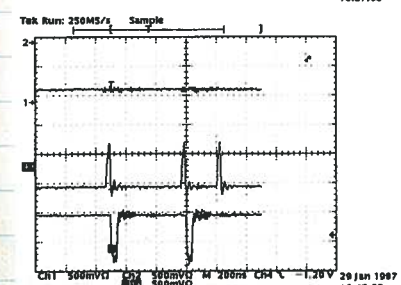
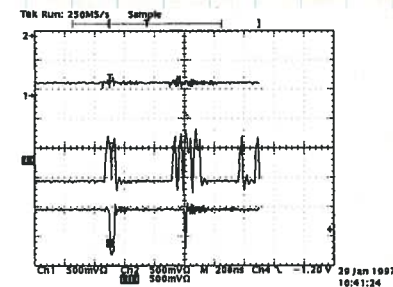
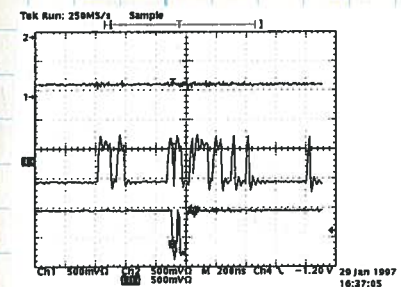
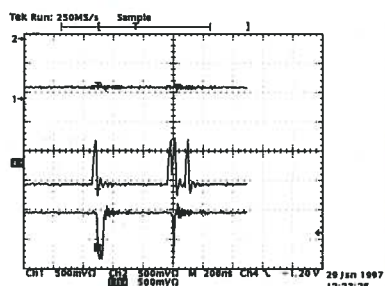
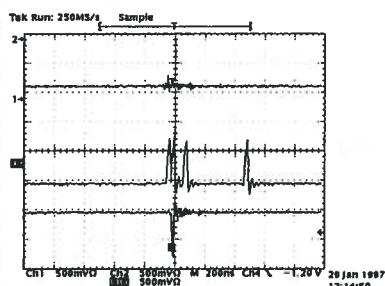
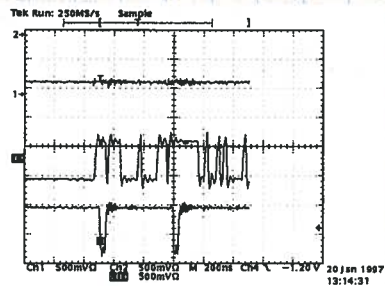
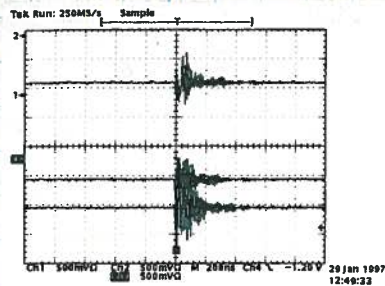


last
 waveform →



1/3/98

On 1/29 shortened the discriminator output pulse widths down to 25ms wide. All the rest is the same as p.93



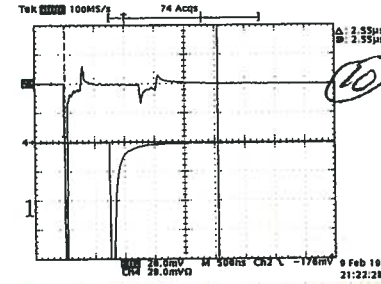
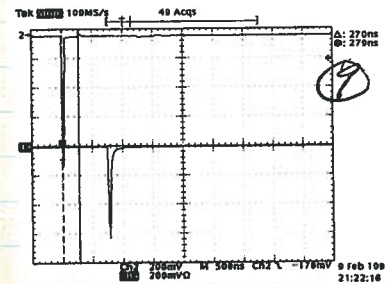
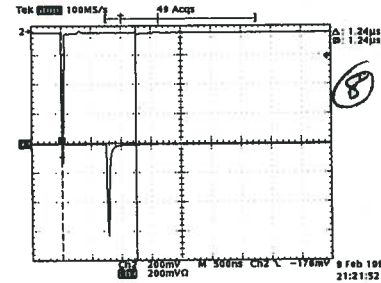
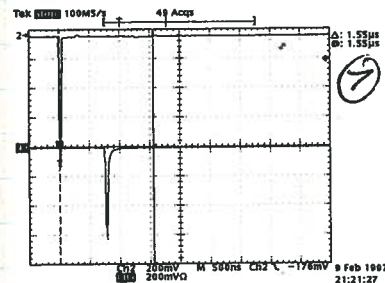
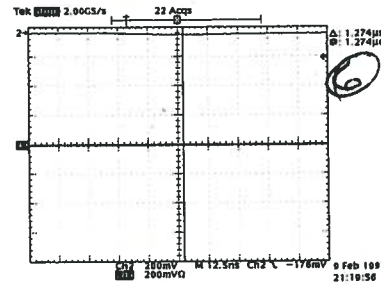
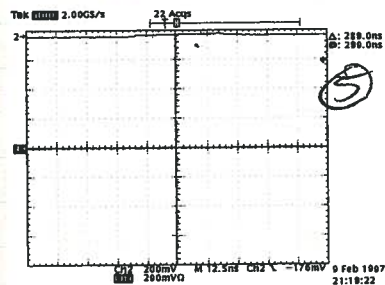
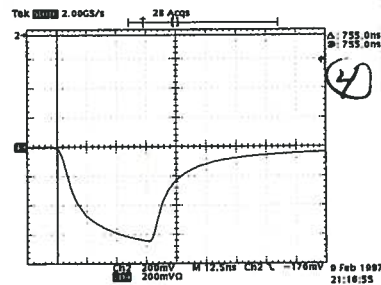
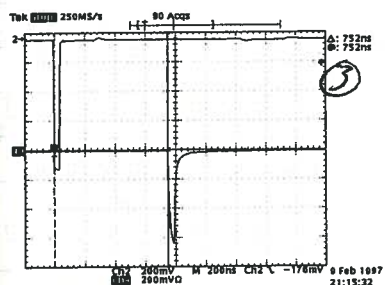
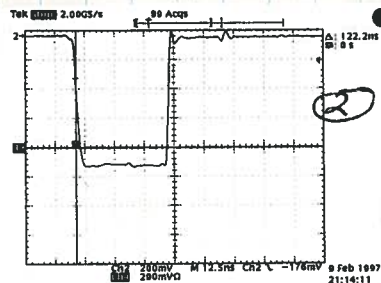
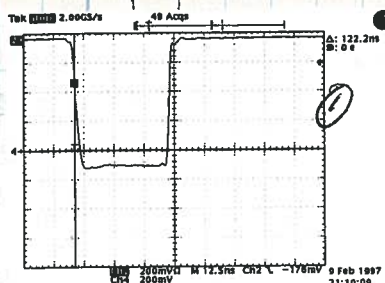
← 1st set of waveforms

33 waveforms over ~4 hrs.
26 of these are MLU with afterpulsing
7 are from noise
as in 1st photo

← last set of waveforms

First Look At Hadron Arm Delay Spool 2/9

Finally connected all the delay spools for the Hadron Arm. Looking at a spool with a 105' piece of IEEE 8013 on each end. Using an HP 8013B pulse generator and a TDS754A



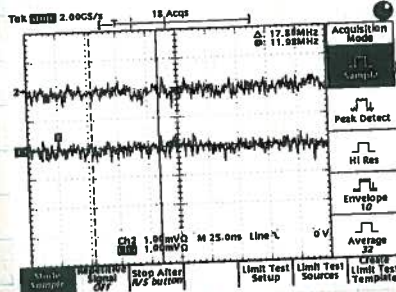
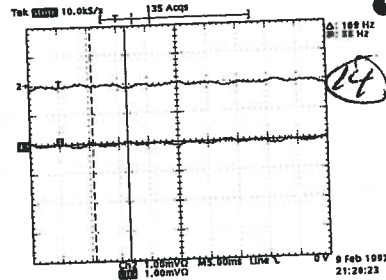
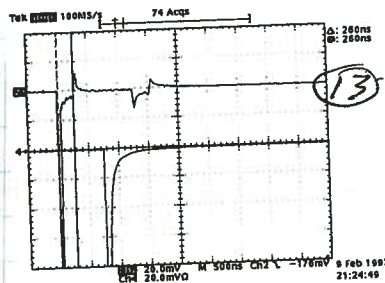
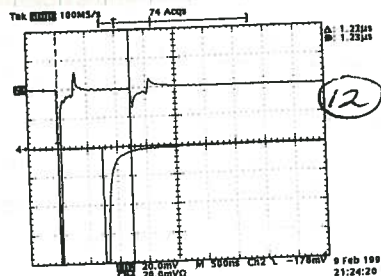
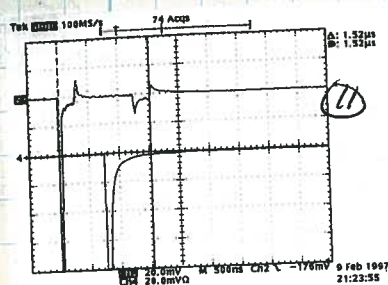
- ① 8013 straight into CH2
- ② 8013 with BNC "T" on CH2 and delay spool & cables connected.

③ same as ② but expanded time scale

- ⑤ time of first "bump"
- ⑥ time of 2nd "bump"

⑦ ⑧ & ⑨ expanded scale checking time of "bumps"

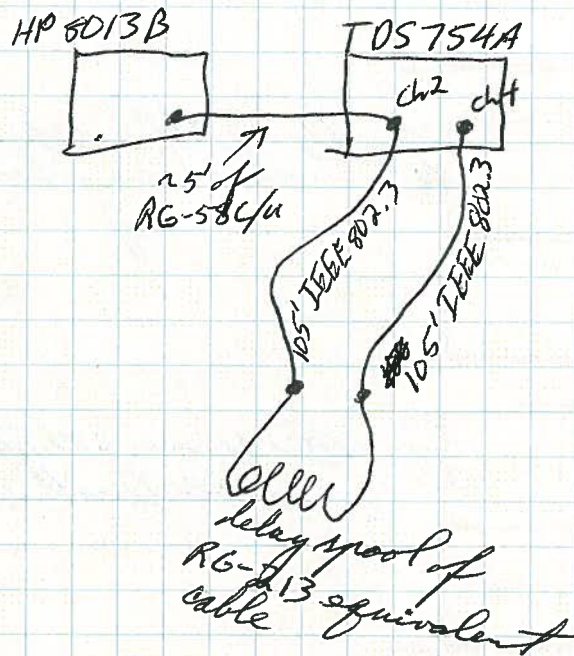
⑩ same setup changed vertical scale



11 12 & 13 checking time with changed vertical scale

14 Trigon line. CH2 & CH4 are @ 50Ω. Are the two ends of spool plus 105' of IEEE 802.3 on each end. Looking for pickup. Scope set to AVG 32

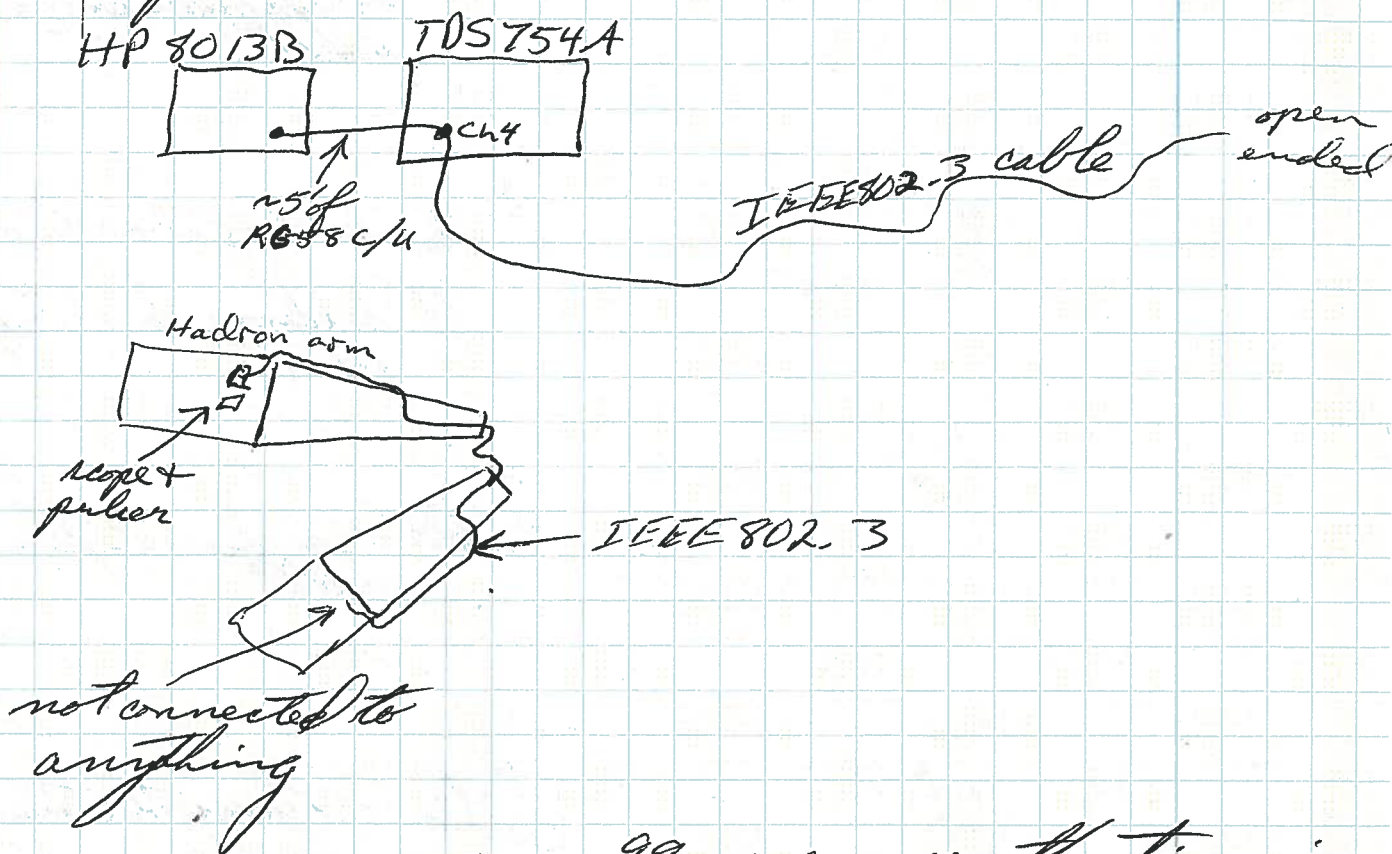
15 same setup except in "sample" mode



Distance Between Trigger Electronics

2/12

Cables for the trigger coincidence are run from the 2nd level platform, down behind the shielding house doors, into cable trays, out across the first, up the other spectrometer, up behind the shield house doors, to the upper platform. A few days ago I pulsed one of the IEEE 802.3 cables & looked at the reflection.

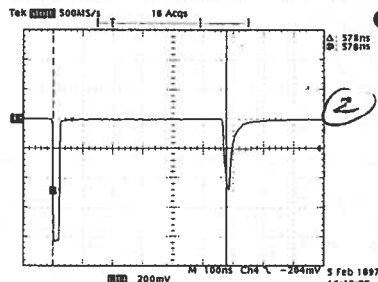
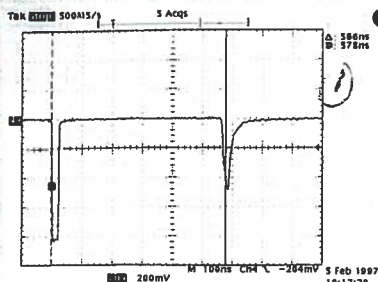


on p. 99 we can see the time is

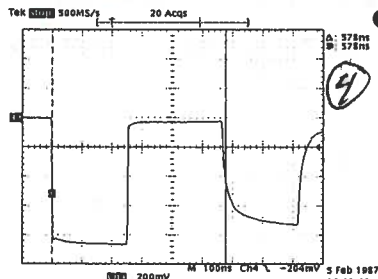
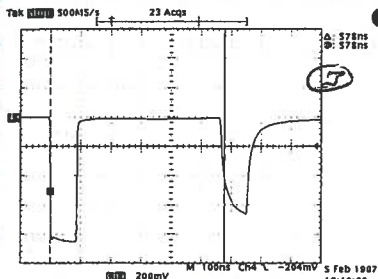
$$\frac{282.5}{2} = 141.25$$

283 ns of IEEE 802.3

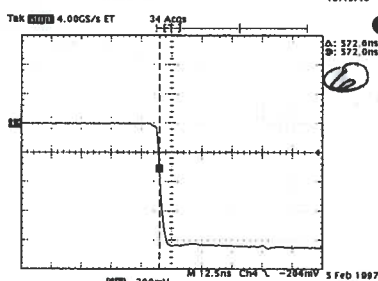
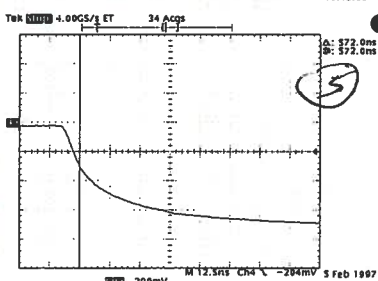
It may be possible to cut a few ns off that, but not much.



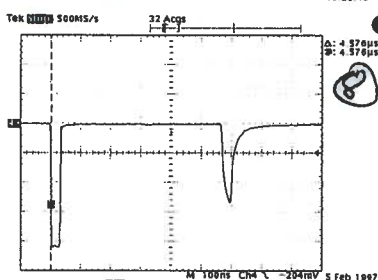
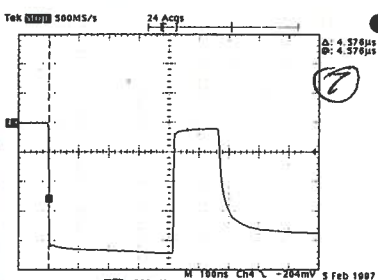
① & ② Delay in a multibit



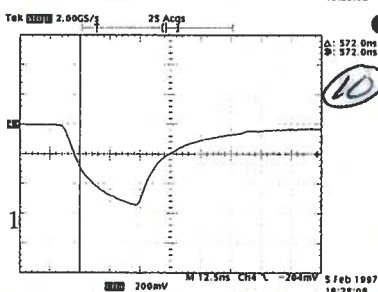
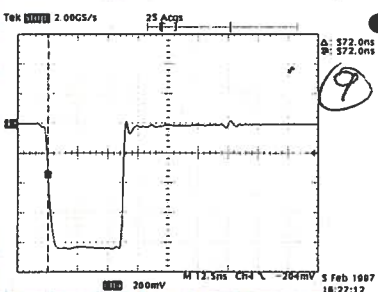
③ & ④ Checking baseline shift and pulse height vs. pulse width



⑥ leading edge of input pulse
⑦ leading edge of reflected pulse



⑦ & ⑧ Baseline shift vs. pulse width



⑨ input used to determine time

⑩ pulse after reflection

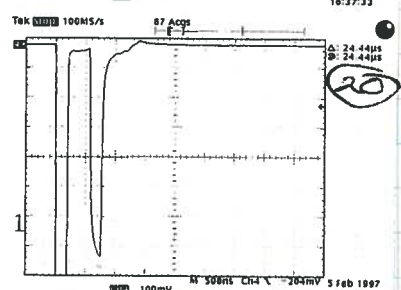
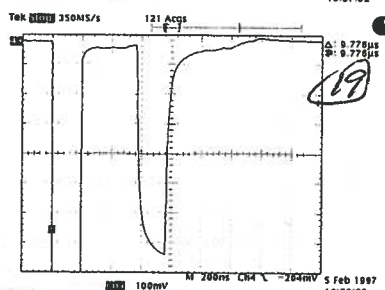
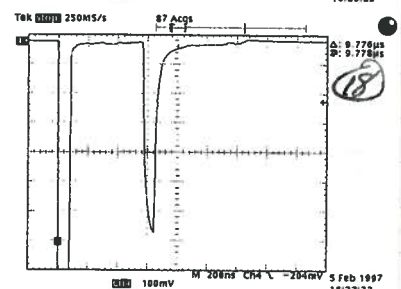
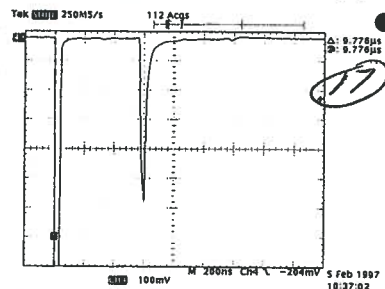
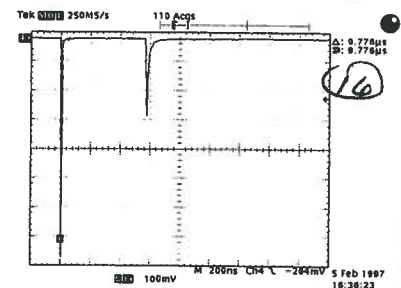
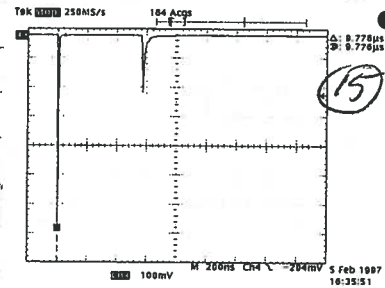
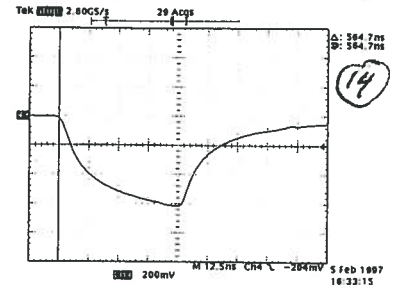
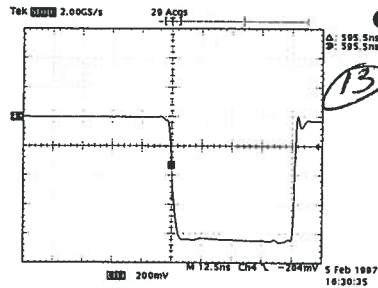
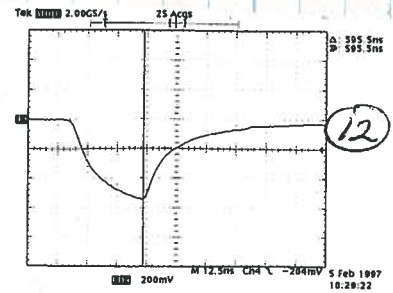
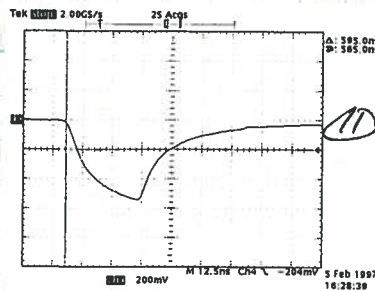
⑪ Round trip is
565 ns

⑫ pulse width does
agree with input
pulse width (wheew!)

⑬ & ⑭ checking
delay a second
time. Checking if
pulse width agrees.
It does

⑮ → ⑰ baseline
vs pulse width.
But it's not so interesting
cause it's an unterminated
line

⑳ same as ⑱. Changed
time scale

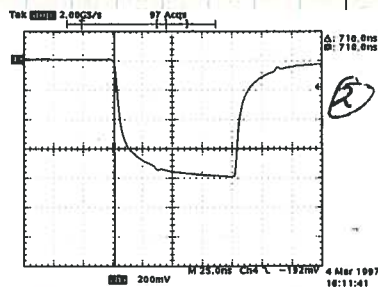
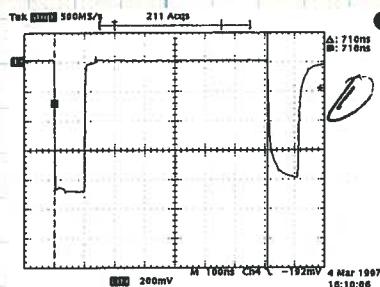
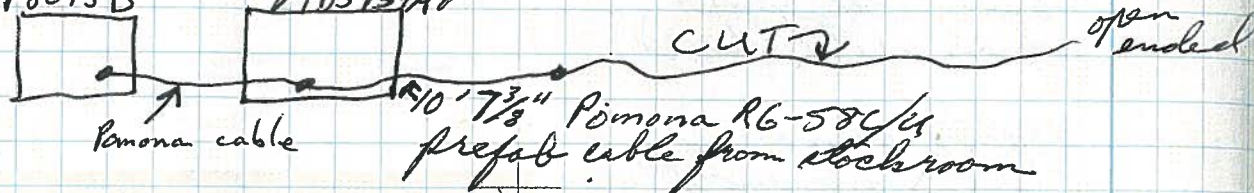


3/8/97 Transit Times Between Spectrometers

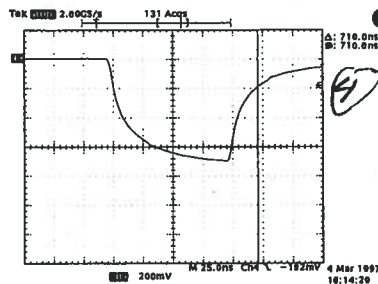
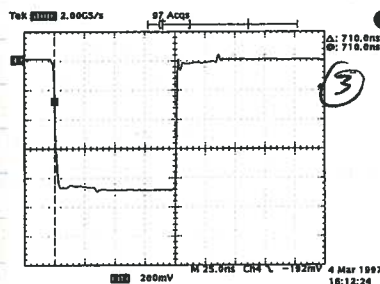
RG-213 and IEEE802.3 cable follow the route shown on p. 97 of this notebook.

HP8013B

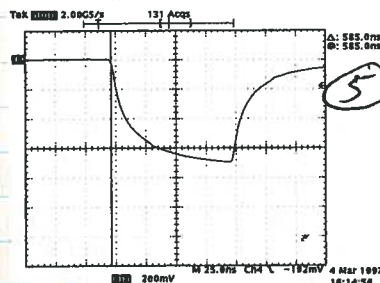
TDS754A



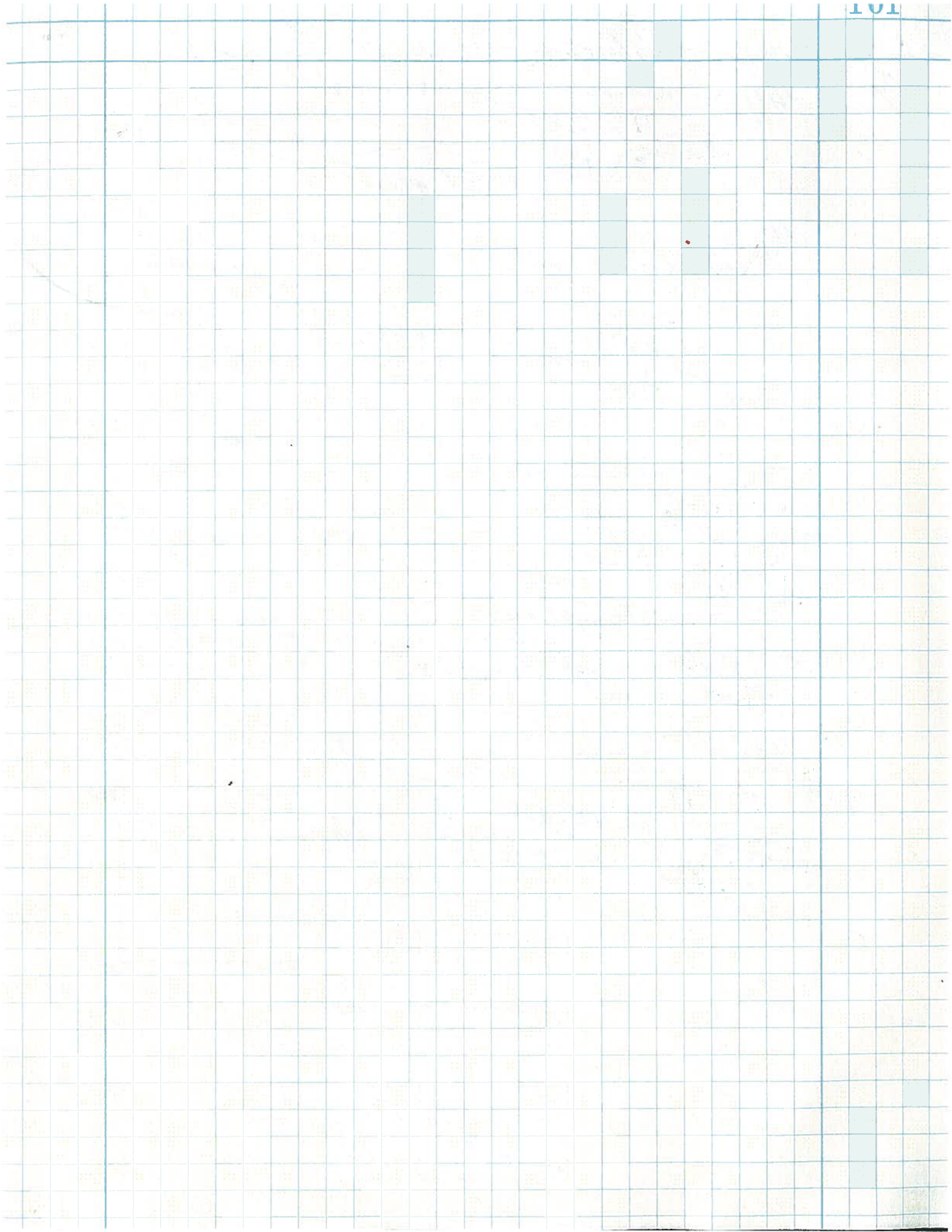
①, ② + ③ are the RG-213



④ + ⑤ are IEEE802.3



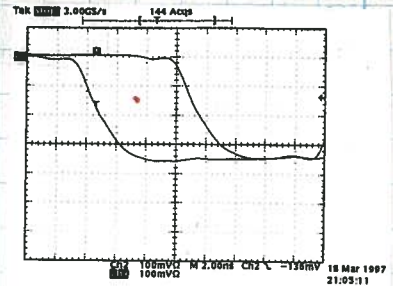
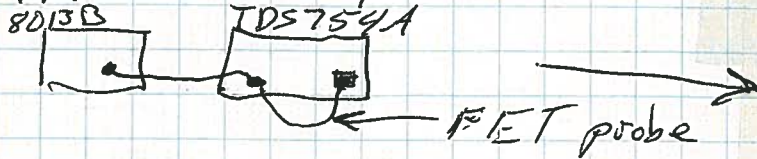
Time of transit for Pomona cable was not recorded
This was done prior to trimming cable to the same
length in time.



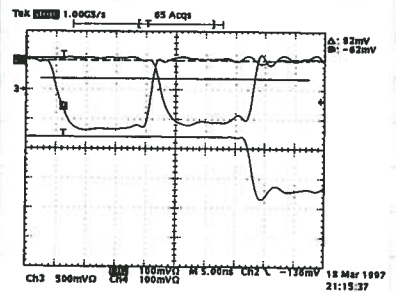
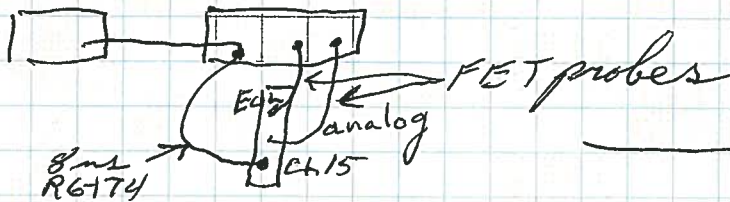
3/18
JS

Trigger Module Transit Times

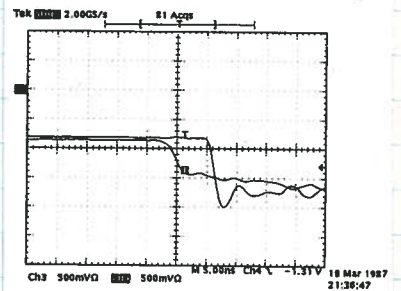
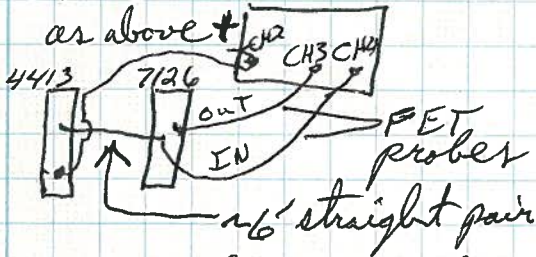
4413 Probe delay measurement



4413 threshold is 63mV

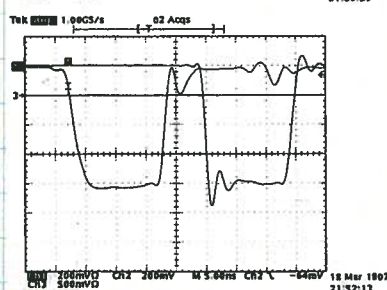
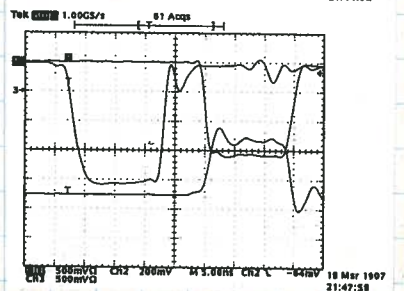
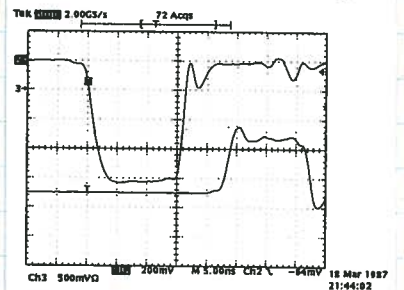
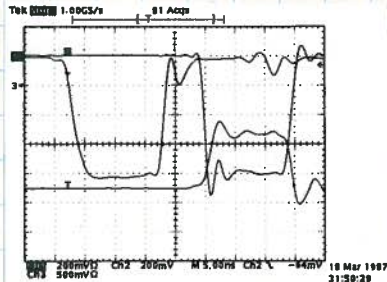
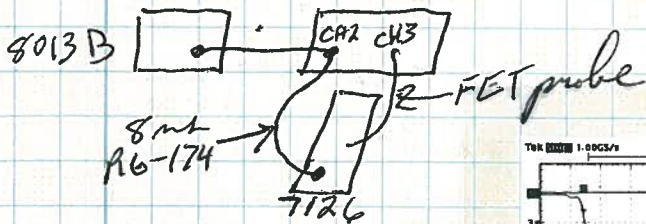


7126 ECL in ECL out as above



FET probes are right on input & output pins

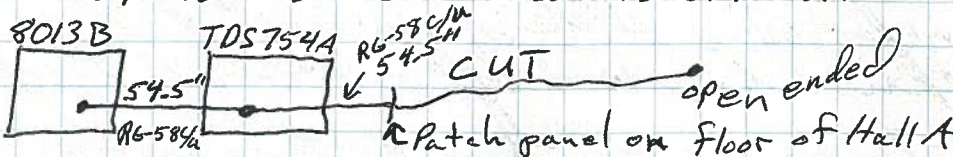
7126 NIM to ECL



R6-213 Patch Cable Transit Times

R6-213 times are measured in Hall A.

4/3/97
JS



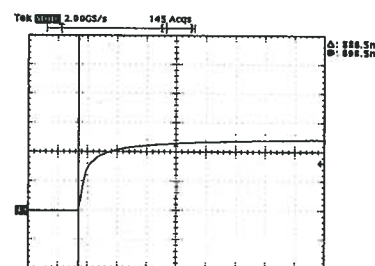
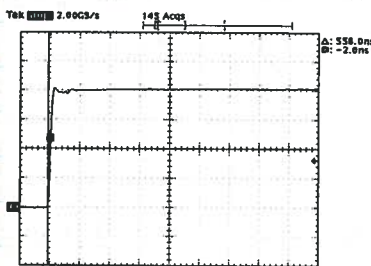
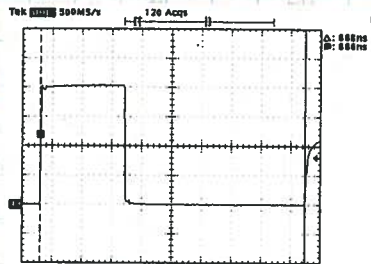
From Hall B measurements nominal
vp is 1.527 ns/ft

input pulses
↓

reflected
↓ pulses

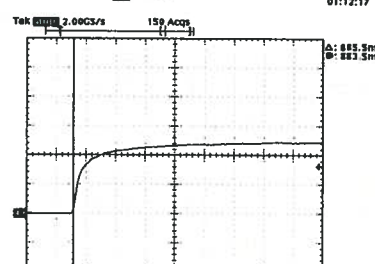
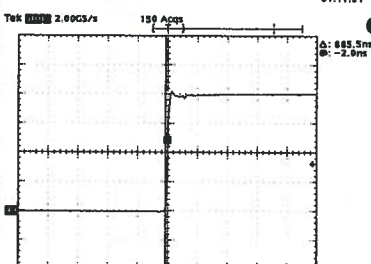
$$\frac{888.5}{2} \times \frac{1}{1.527} = 291'$$

cable 16
from patch panel
to e-shielding
house
(rear of detector
frame)



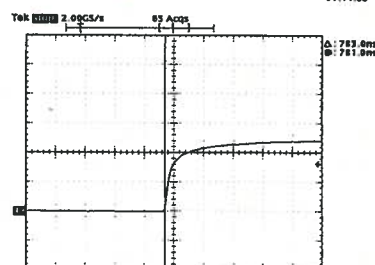
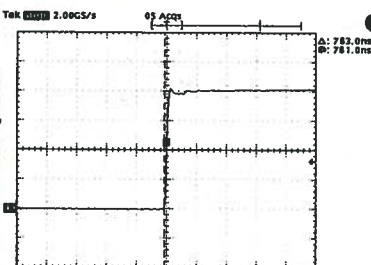
$$\frac{885.5}{2 \cdot 1.527} = 290'$$

cable 12
from patch
panel to H
shielding house
(rear of detector frame)



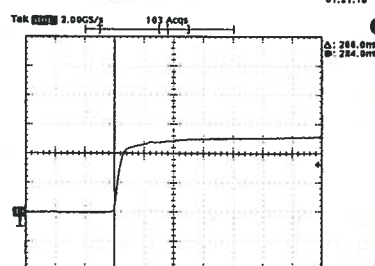
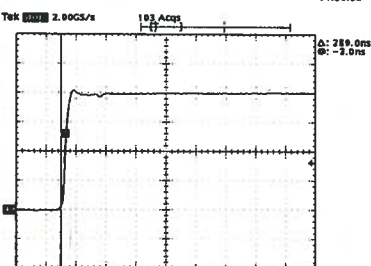
$$\frac{783.0}{2 \cdot 1.527} = 256'$$

cable 1
from patch panel
up to patch panel
in the counting
house



$$\frac{286}{2 \cdot 1.527} = 94'$$

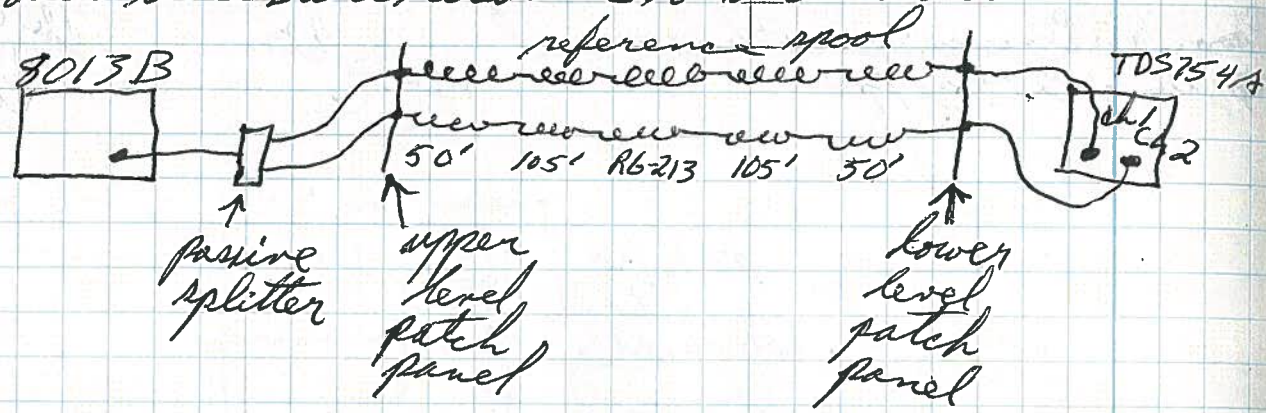
cable 12
from patch
panel to the
nose of harm
box beam



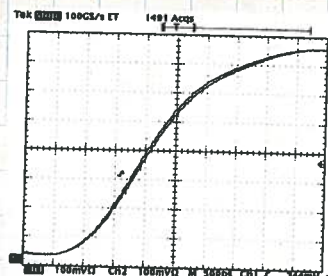
4/6/97 Hadron Arms Analog Delays: Relative Timing

JS

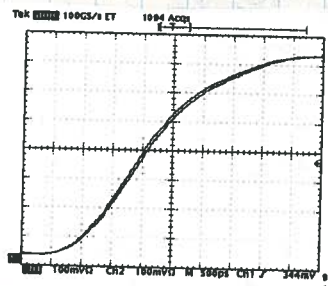
The reference cable is connected to position 1 of panel A. (upper left connector of top panel)
 All times are relative to this cable

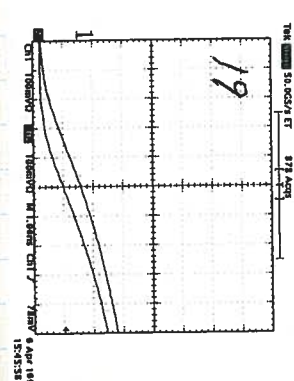
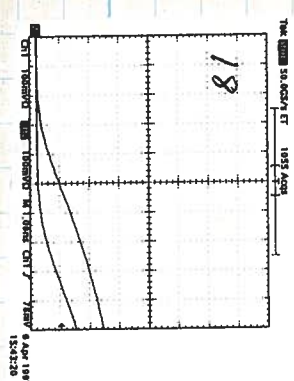
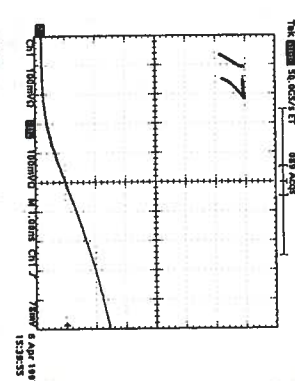
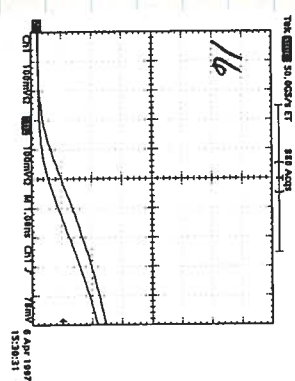
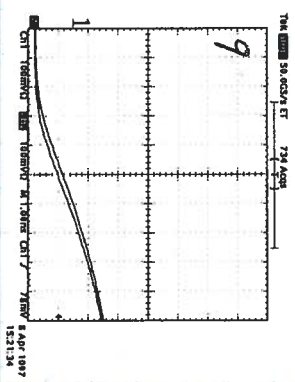
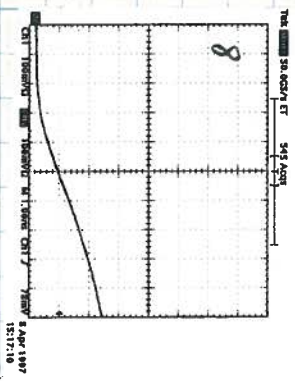
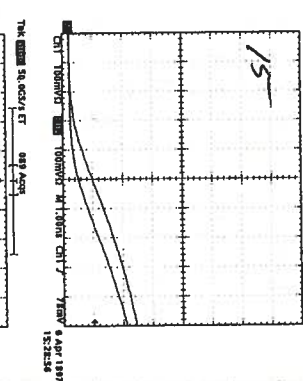
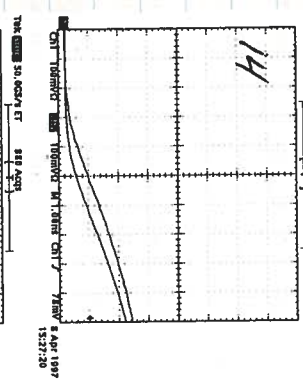
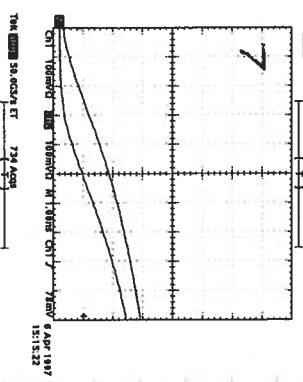
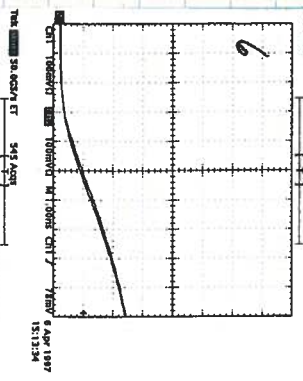
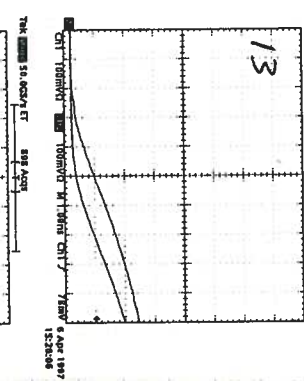
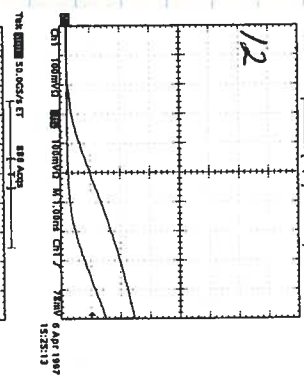
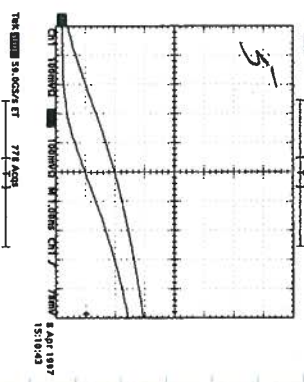
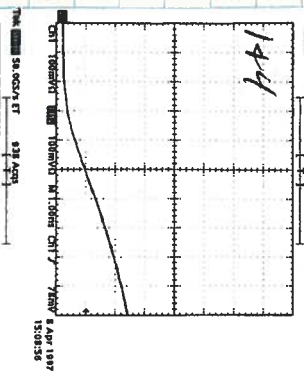
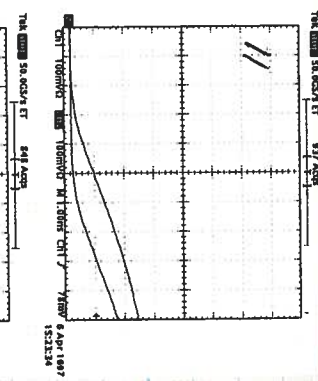
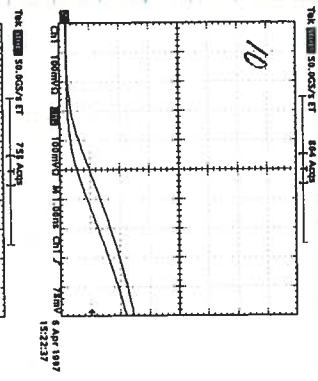
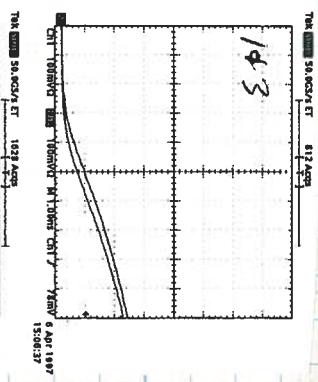
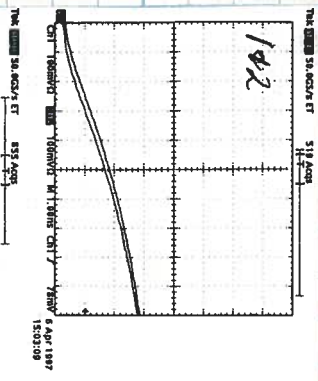


Splitter and associated cables are the same ones used for trimming the RG-213 spools. Timing is checked by feeding cables from passive splitter directly to scope. Then the two cables that go from the lower patch panel to the scope are also added in. In both cases CH2 is slightly behind (trace is to the right of) CH1.

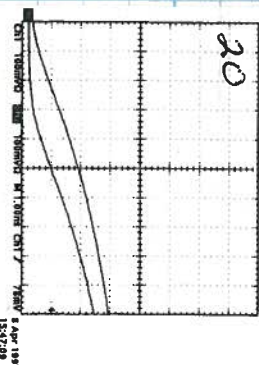


↖ cables that go to scope on right side of diagram at the top of the page

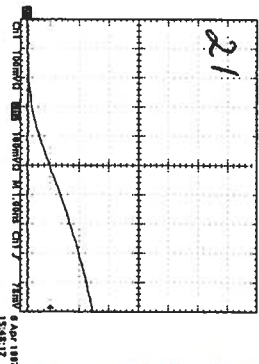




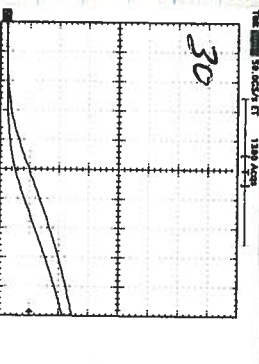
THE 50.000/4 ET 792.000



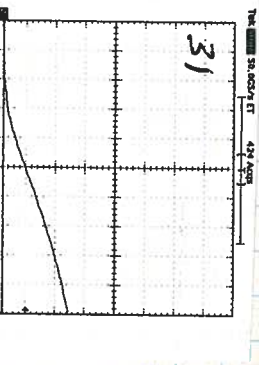
THE 50.000/4 ET 639.000



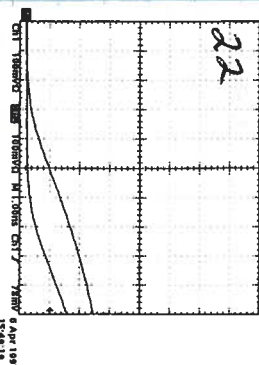
THE 50.000/4 ET 1399.000



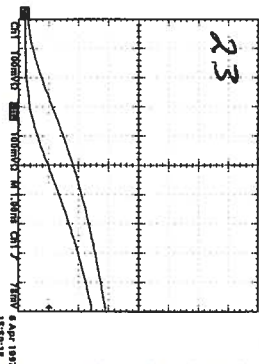
THE 50.000/4 ET 439.000



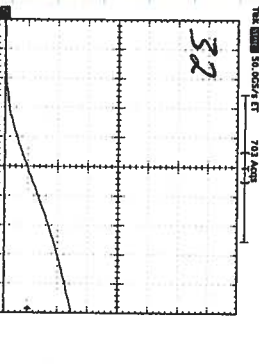
THE 50.000/4 ET 889.000



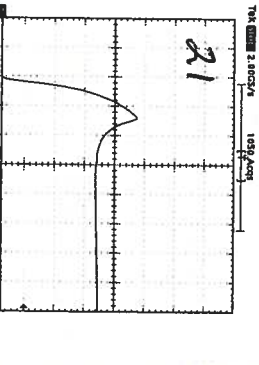
THE 50.000/4 ET 799.000



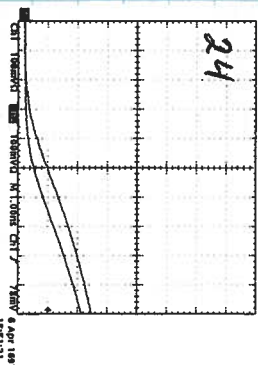
THE 50.000/4 ET 792.000



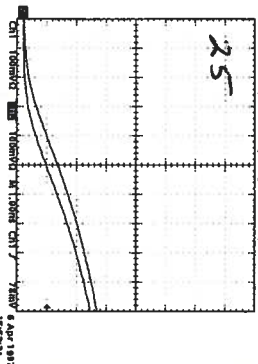
THE 50.000/4 ET 1099.000



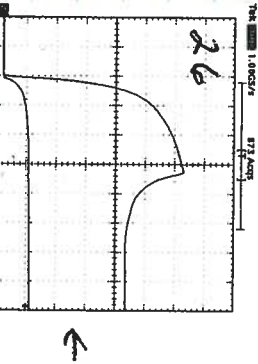
THE 50.000/4 ET 597.000



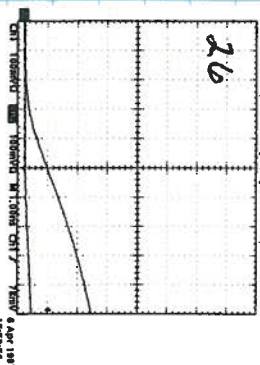
THE 50.000/4 ET 699.000



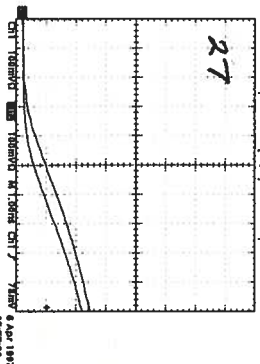
THE 50.000/4 ET 877.000



THE 50.000/4 ET 729.000



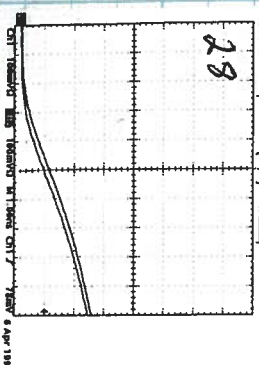
THE 50.000/4 ET 897.000



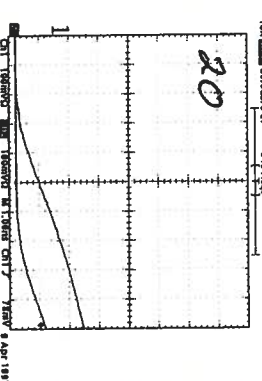
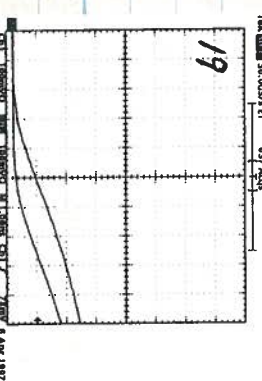
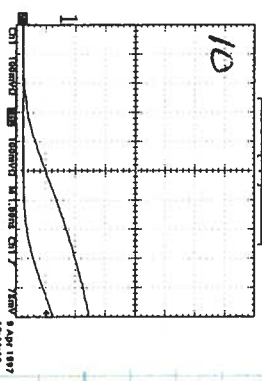
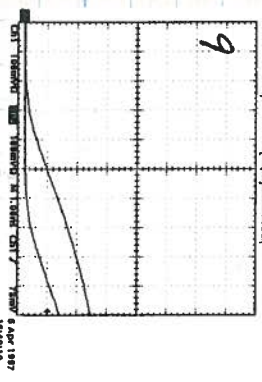
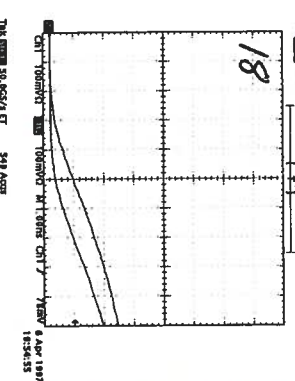
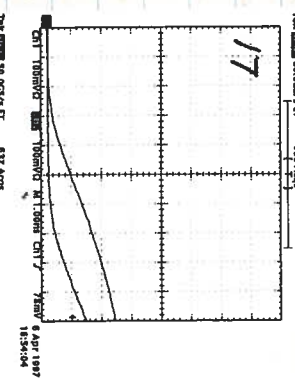
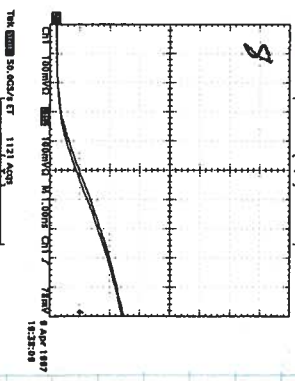
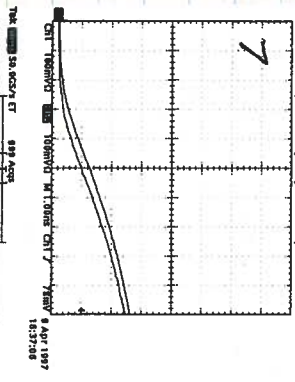
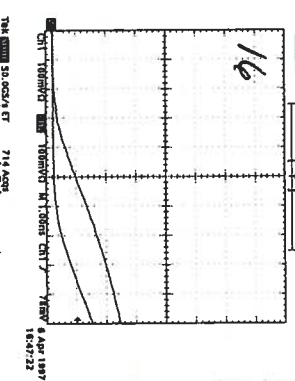
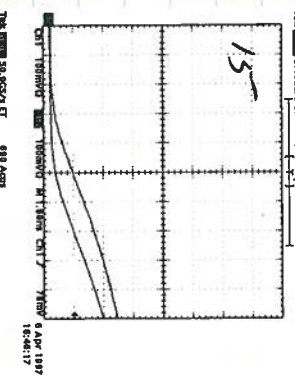
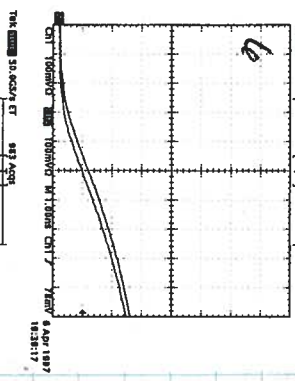
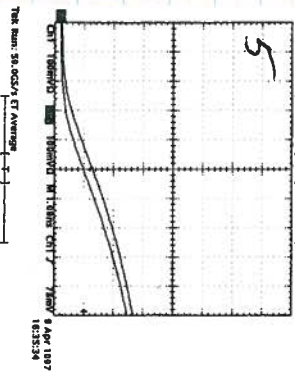
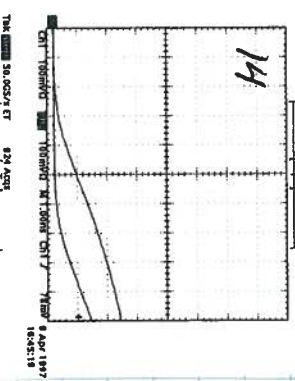
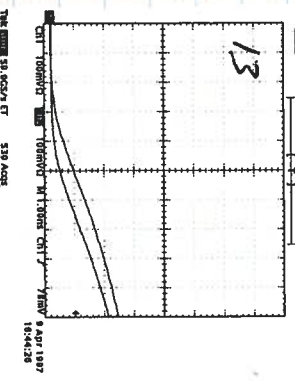
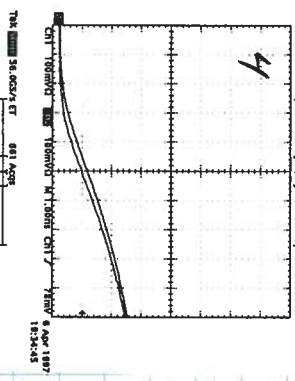
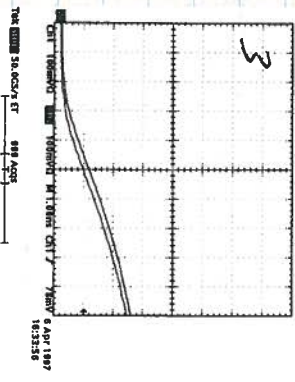
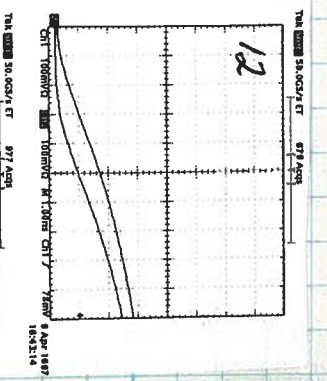
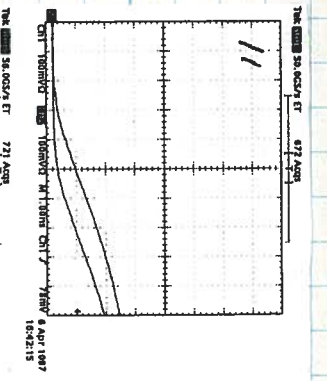
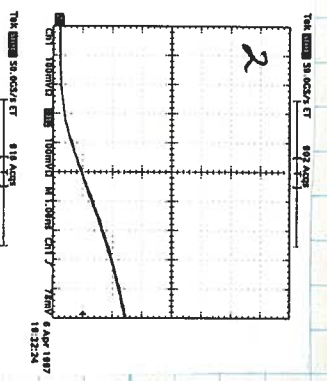
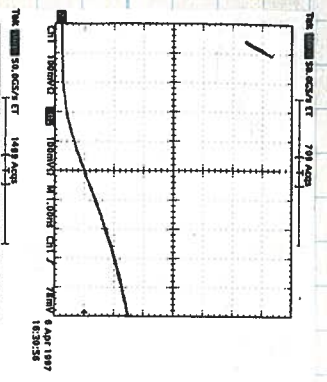
THE 50.000/4 ET 989.000



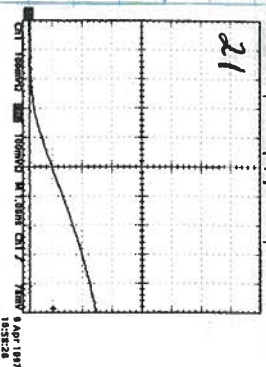
THE 50.000/4 ET 1089.000



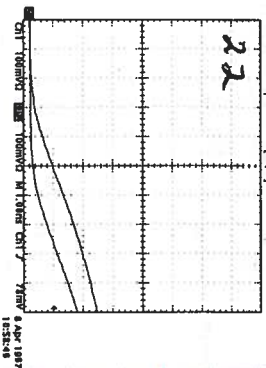
dead short on
upper platform?
(looking at the 2
bad leader)



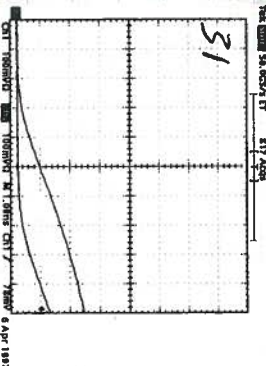
THE EDDY 30.000/4 ET 279 ACRES



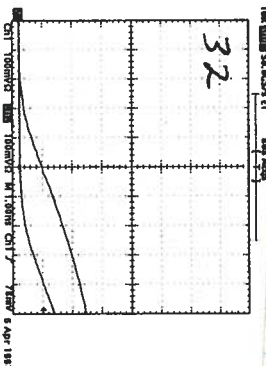
THE EDDY 30.000/4 ET 462 ACRES



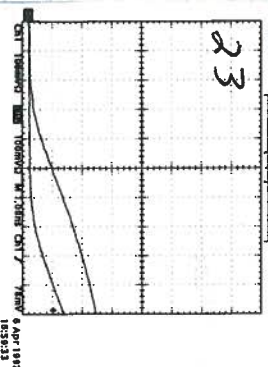
THE EDDY 30.000/4 ET 517 ACRES



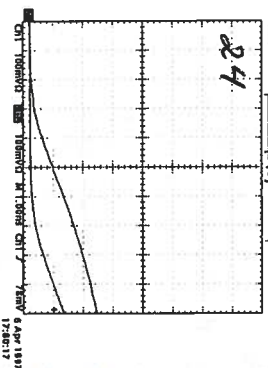
THE EDDY 30.000/4 ET 568 ACRES



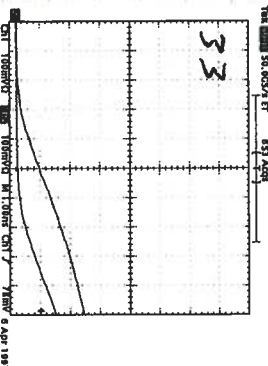
THE EDDY 30.000/4 ET 719 ACRES



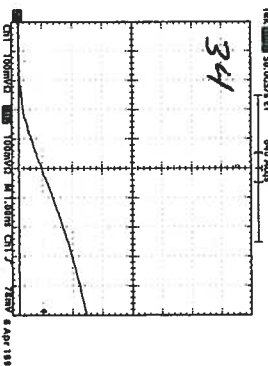
THE EDDY 30.000/4 ET 597 ACRES



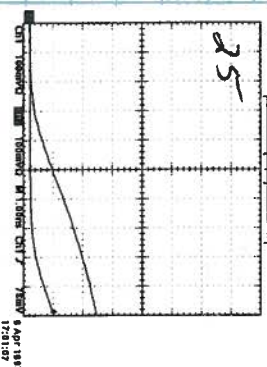
THE EDDY 30.000/4 ET 652 ACRES



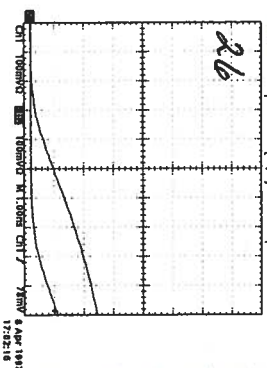
THE EDDY 30.000/4 ET 646 ACRES



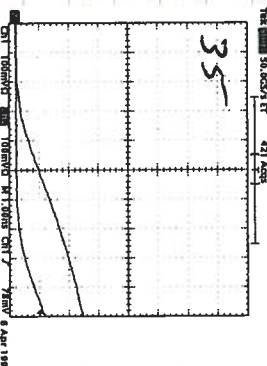
THE EDDY 30.000/4 ET 684 ACRES



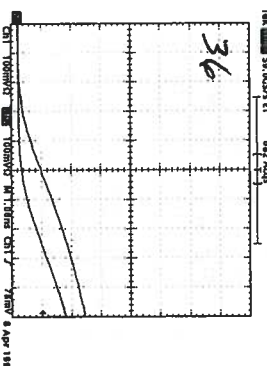
THE EDDY 30.000/4 ET 729 ACRES



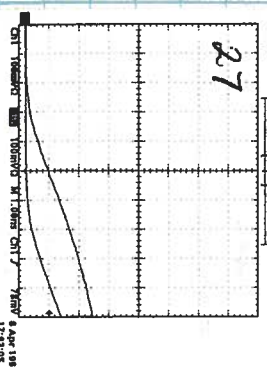
THE EDDY 30.000/4 ET 421 ACRES



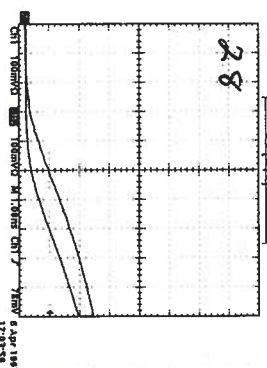
THE EDDY 30.000/4 ET 466 ACRES



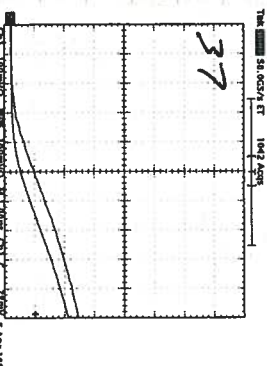
THE EDDY 30.000/4 ET 665 ACRES



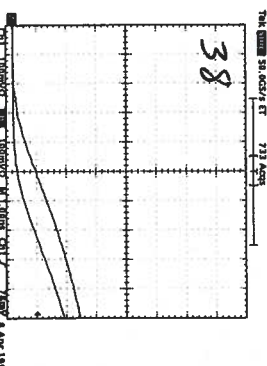
THE EDDY 30.000/4 ET 693 ACRES



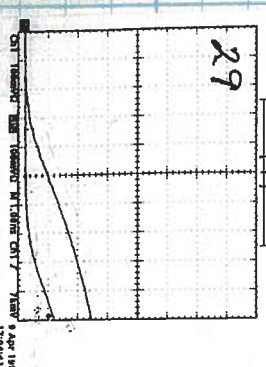
THE EDDY 30.000/4 ET 1042 ACRES



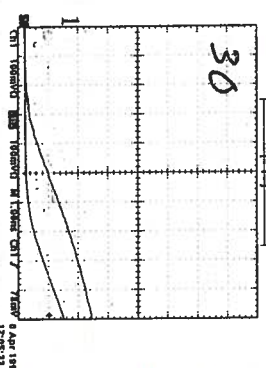
THE EDDY 30.000/4 ET 722 ACRES



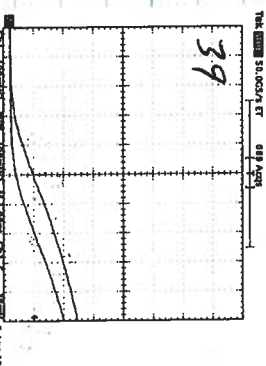
THE EDDY 30.000/4 ET 813 ACRES



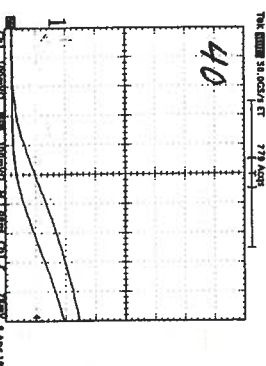
THE EDDY 30.000/4 ET 1194 ACRES

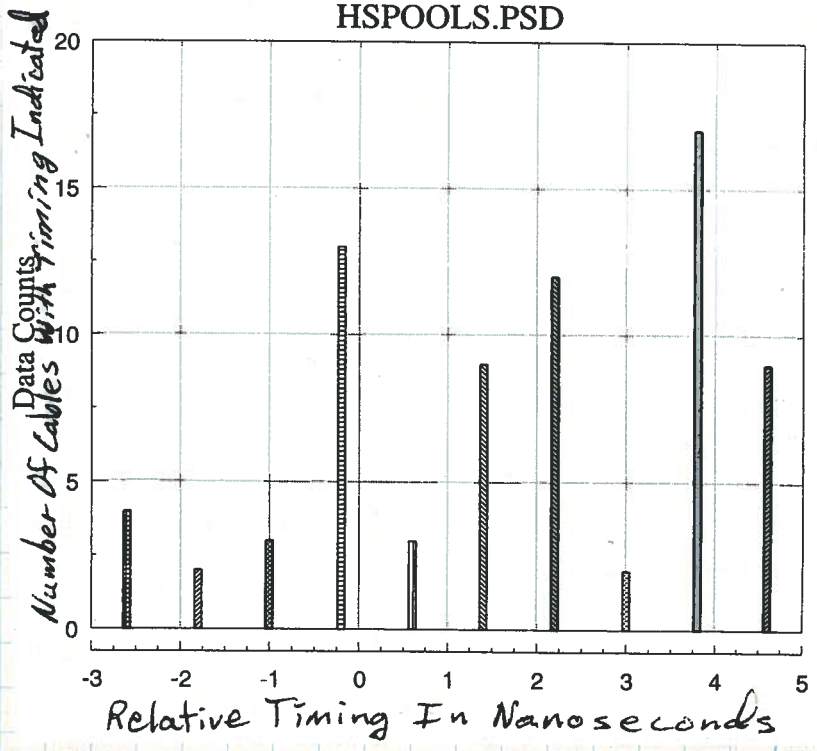
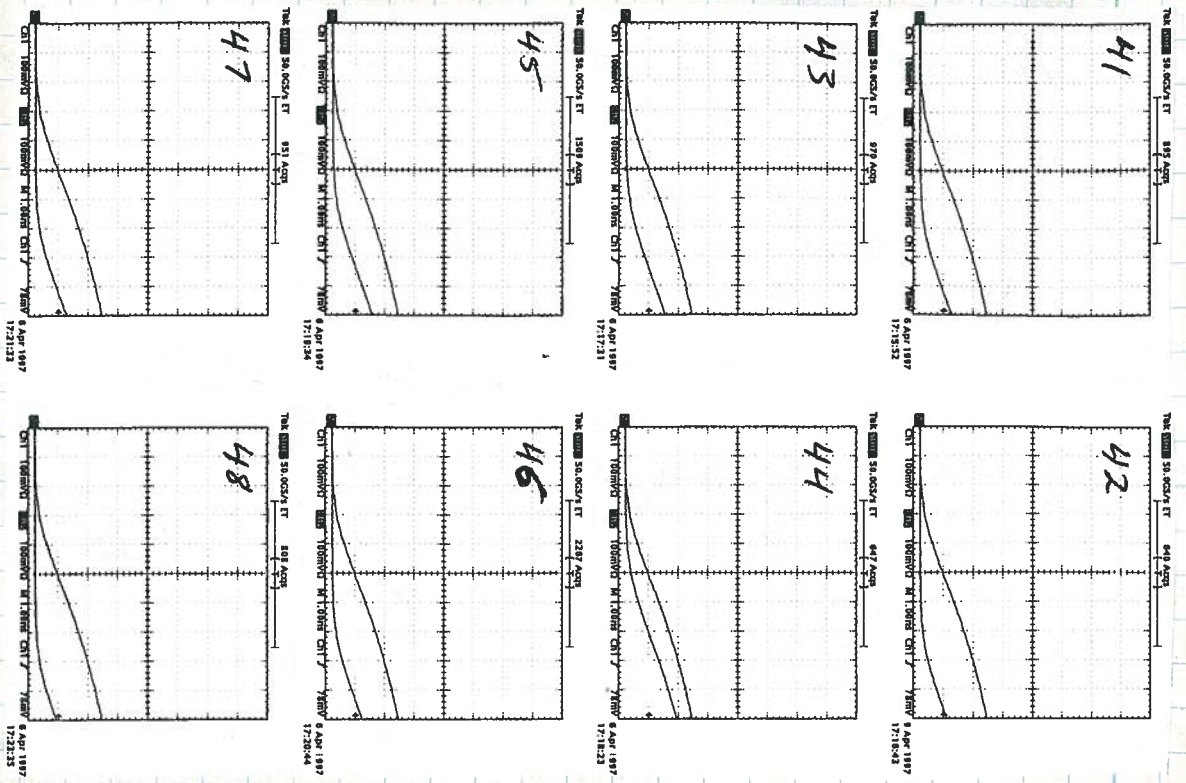


THE EDDY 30.000/4 ET 882 ACRES



THE EDDY 30.000/4 ET 773 ACRES





4/14
JA

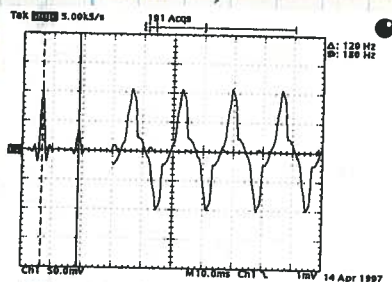
AC Currents on Hadron Arm

Using TH5720 STD and A621 (1000A AC probe)

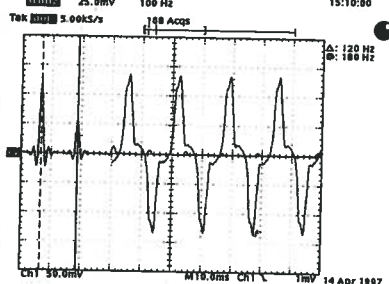
A621 does 100, 10 and 1mV/A

Switched to TDS7544 to write to disk
selected MATH2 as FFT of CH1

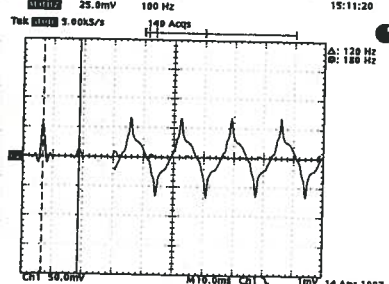
First look at AC currents at junction
box at rear of detector frame. Only checked
the orange jacketed wires. Also checked
current on GND wire from breaker
panel on 1st platform ~~the~~ (lower
platform).



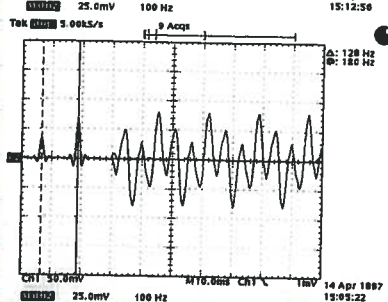
47.8mV_{rms}
@ 1mV/A
black
taped wire



61.25mV_{rms}
@ 1mV/A
red
taped cable



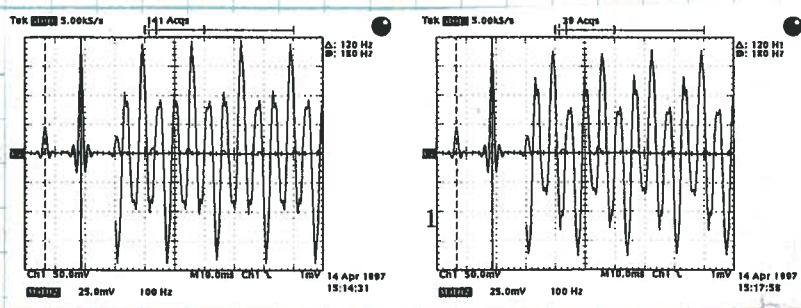
29.92mV_{rms}
@ 1mV/A
blue
taped wire



34.6mV_{rms}
@ 1mV/A
white
taped cable

rms measurements
were made on 4/15
using TH5720. I
remembered late on 4/14
that I could do rms
measurements.
Also, verified current
probe setting.

$\pm 50 \text{ mV/div}$
 0 mV/A get
 $\pm 3 \text{ div} \times 80.1 \text{ mVrms}$
 $8.03 \text{ mVrms} @ 1 \text{ mV/A}$



at 50 mV/div & 1 mV/A
 get $\pm 3 \text{ div} \times$
 84.5 mVrms

grad from panel

← 8amps rms or ground??

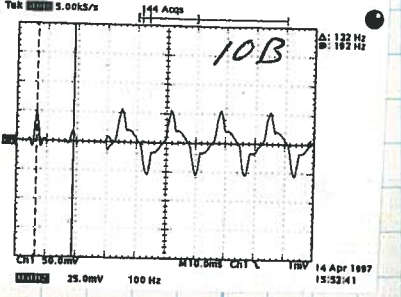
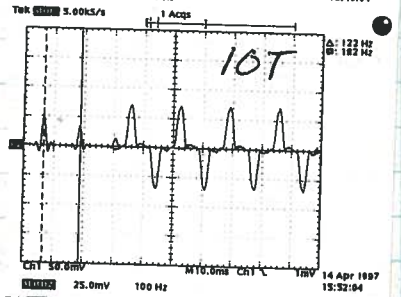
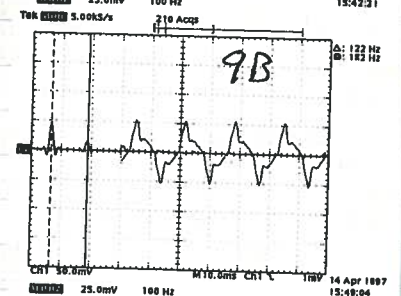
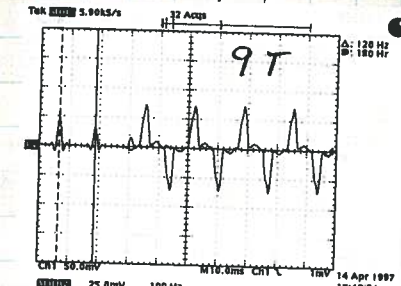
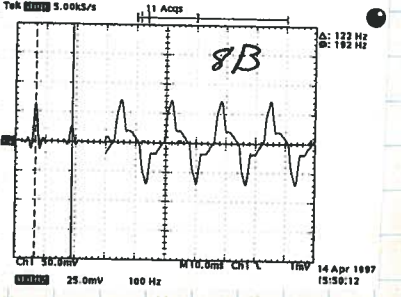
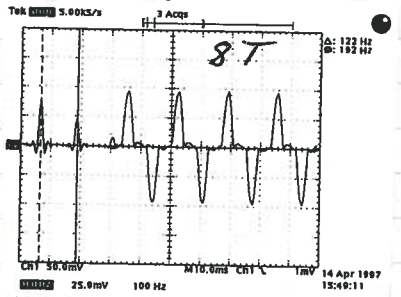
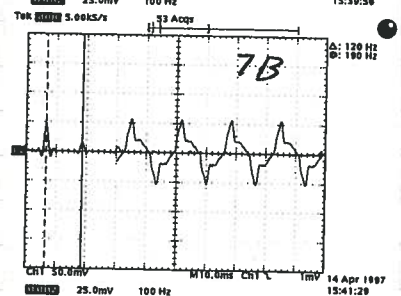
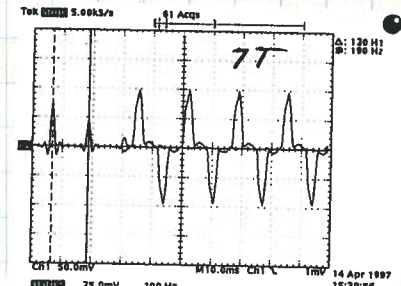
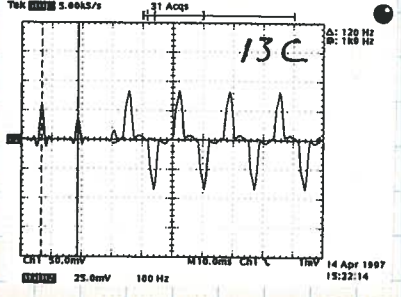
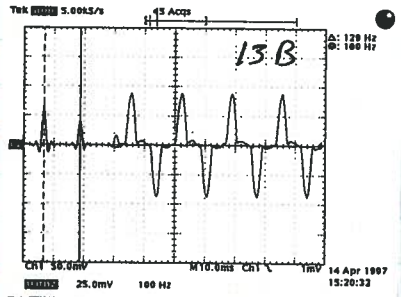
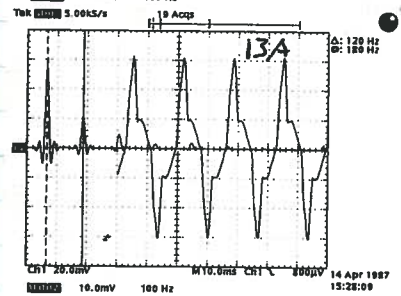
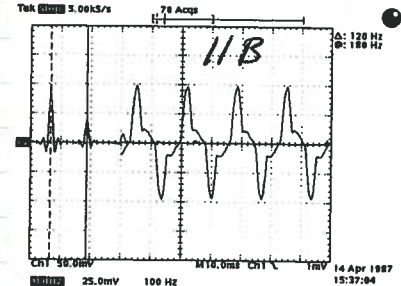
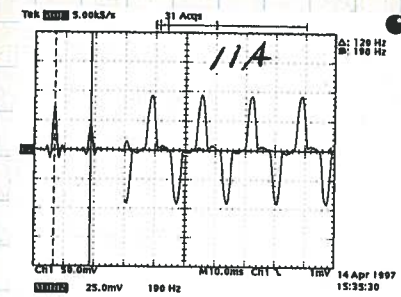
7T, 8T, 9T, 10T &
 11A were

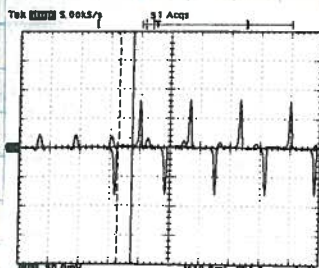
upper plug in
 duplex
 receptacle
 supply was
 plugged
 into.

13A, B & C
 were
 labeled as
 such on
 power
 cords.

10 mV/A
 for all
 FPP
 stuff

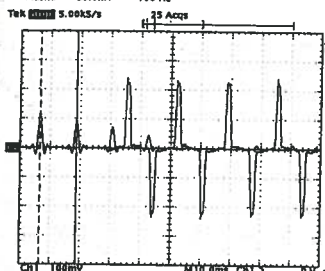
Checked currents drawn by
 FPP LV supplies. Did not
 check the two at the top of
 the detector support frame.





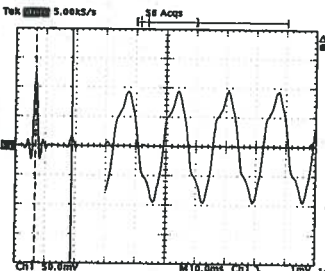
Slow
Controls
VME
Crate

Math2 25.0mV 100 Hz M10.0ms CH1 L 14 Apr 1997 18:20:20



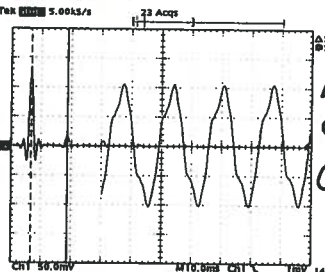
Trigger
Supervisor
Crate

CH1 100mV 100 Hz M10.0ms CH1 L 14 Apr 1997 18:20:20



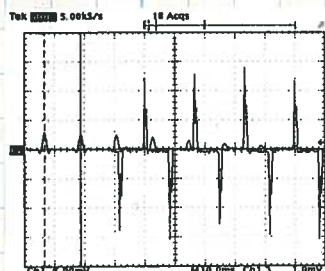
Upper
CAMAC
Crate

CH1 50.0mV 100 Hz M10.0ms CH1 L 14 Apr 1997 18:20:10



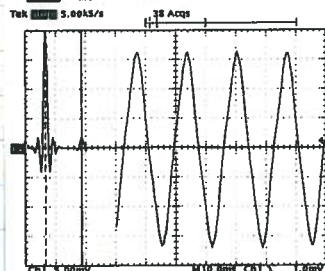
Lower
CAMAC
Crate

CH1 50.0mV 100 Hz M10.0ms CH1 L 14 Apr 1997 18:22:17



Fermilab
Scaler

CH1 2.50mV 100 Hz M10.0ms CH1 L 14 Apr 1997 18:28:30



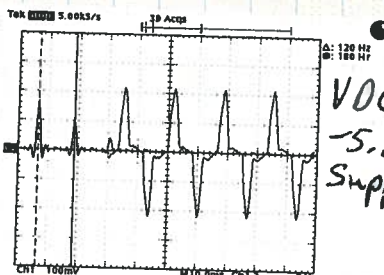
NIM
Fan
Unit

CH1 2.50mV 100 Hz M10.0ms CH1 L 14 Apr 1997 18:42:17

Checked some more stuff in the
Hadron Arm Trigger Electronics.
10mV/A for probe setting.

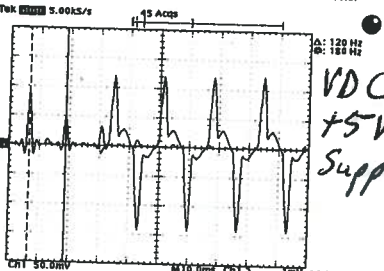
Unfortunately, I did not check the
currents for the safety grounds.

The rectangular window on FFT?
See Valhalla Scientific, International
Electrotechnical Commission Harmonic
And Flicker
Testing



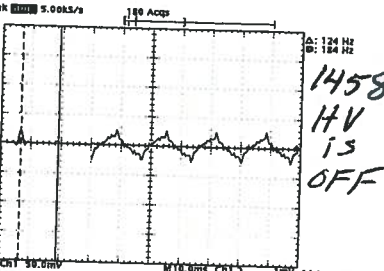
VDC
-5.2V
Supply

CH1 50.0mV 100 Hz M10.0ms CH1 L 14 Apr 1997 18:10:27



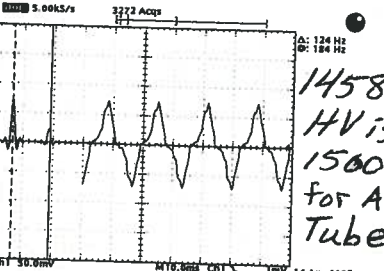
VDC
+5V
Supply

CH1 50.0mV 100 Hz M10.0ms CH1 L 14 Apr 1997 18:08:52



1458
HV
is
OFF

CH1 25.0mV 100 Hz M10.0ms CH1 L 14 Apr 1997 17:48:57



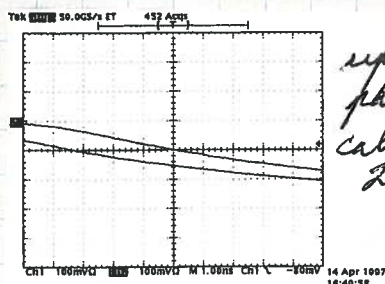
1458
HV is
1500V
for All
Tubes

CH1 25.0mV 100 Hz M10.0ms CH1 L 14 Apr 1997 18:02:22

Timing of Four Repaired Cables (Delay) 4/14/97

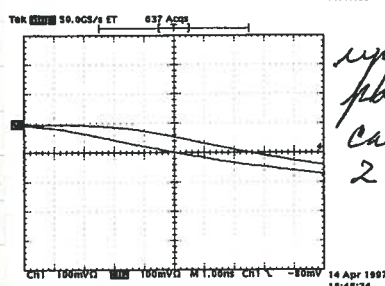
Thomette repaired the 4 bad delay cables on the Hadron Arm (see pgs 104-109 this volume).

The times are as noted below.



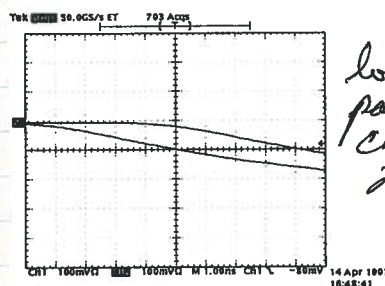
upper
panel
cable
21

dead short on 50' patch cable at connector on 2nd level platform.



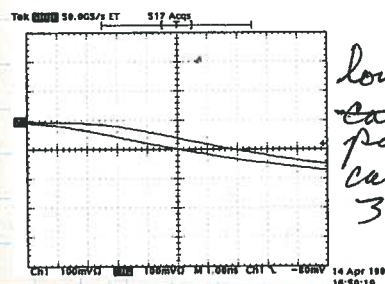
upper
panel
cable
26

intermittent short at connector at rear of detector support frame.



lower
panel
cable
21

dead short at connector.



lower
cable
panel
cable
34

piece of stray wire in connector at delay pool. attend by connector for cable 167

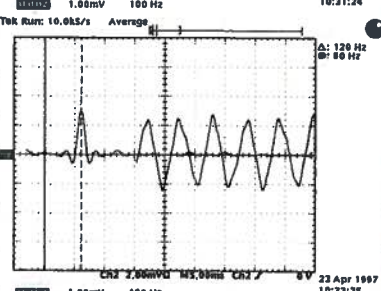
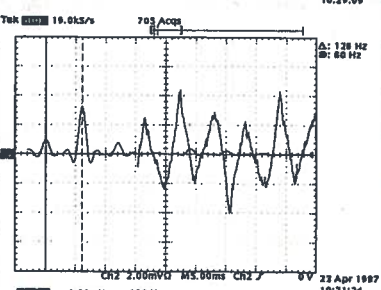
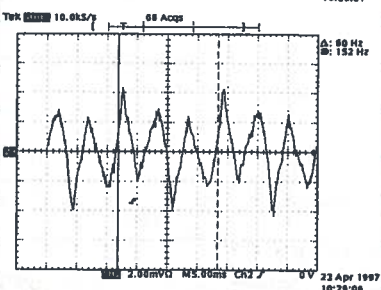
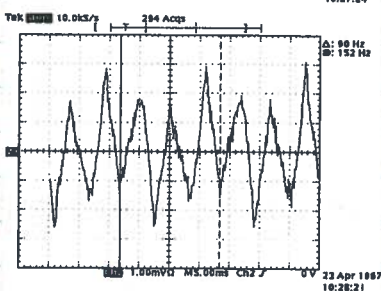
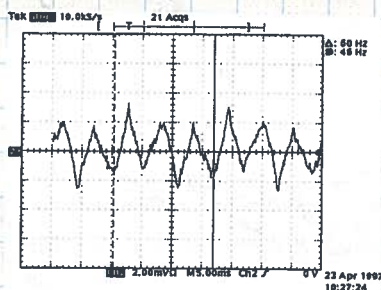
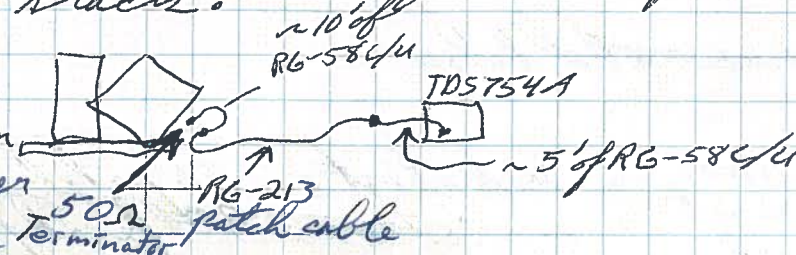
Cables were repaired on 4/14.

1/25 JS

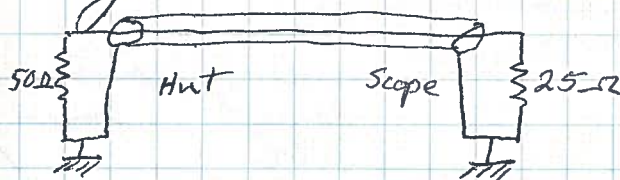
Hall Floor to Detector Stack Noise

Two days ago, I checked noise on an RG-58C/U patch cable from the floor up to the detector stack.

start, 50Ω termination in resting on painted corner frame (at a detector support or weld).

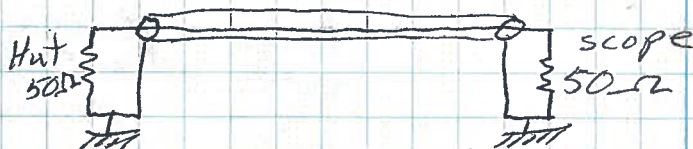


scope set to 50Ω & a 50Ω terminator is being used $\Rightarrow$ 25Ω termination.



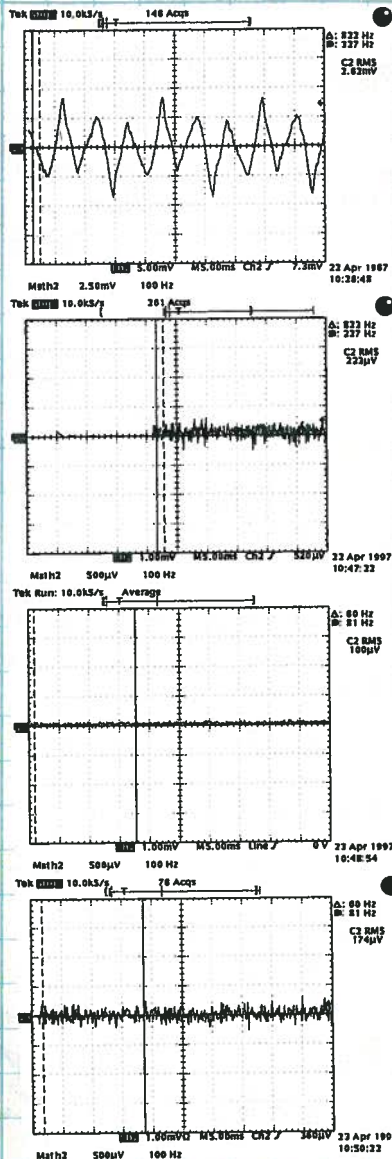
Same as above. At increased vertical scale.

Extra 50Ω terminator has been removed. 50Ω termination.

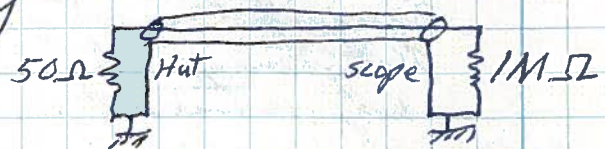


FFT. Only internal 50Ω termination.

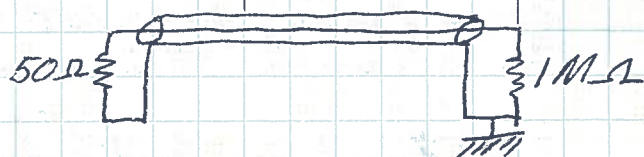
FFT with 16 waveform averaging.



Internal termination only. Set to $1M\Omega$.
Sampling Mode.

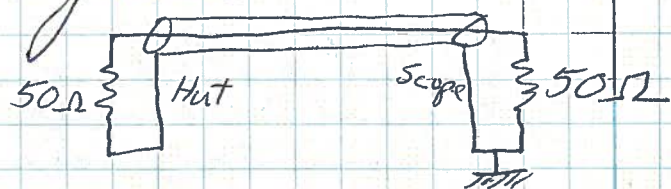


Went up to Shield House and set cable so
the 50Ω terminator was dangling in
free air. $1M\Omega$ termination.



Set to $AVG=16$. $1M\Omega$ termination.

sampling mode. 50Ω termination



5/4/97 Photovoltaic Cells & Laser Tests

Photovoltaic cells are mounted on aluminum & on small Newport translation & rotation stages. Translational stage has micrometer adjustment. Rotational stage has 1° markings & manual adjustment.

Laser is $\sim 9'3''$ from PVCs.

With laser @ 5.00V on supply (DC). PVC on right, looking from laser, has spot centered. 25.90 on micrometer. For reference - this is purple tan twisted pair.

- .45 mA from front to backside & - .273V } measured w/ stat
Micrometer set to 5.00 } 8060A

- .430 mA on left side PVC & - .261V
+ of meter on front side wire
- (common) on back side wire

@ $V_{\text{supply}} = 4.75V$ get - .432 mA on left side PVC
4.50V - .432 mA
4.00V - .433 mA

Circuit hooked up and position of PVC is adjusted to give $\sim 9V$ output. 5 mill adjustment of micrometer gives $\sim 1V$ change on output.

Check I_{out} & V_{out} of the remaining 10 PVCs w/ V_{diode} @ 5.00V

PVC	Voltage	Current	
1	- .219 - .225	- .41 - .43	
2	- .223 - .226	- .42 - .44	.407 - .441 using micromet
3	- .224 - .226	- .42 - .45	
4	- .195 - .198	- .38 - .40	
5	- .202 - .207	- .40 - .42	
6	- .185 - .189	- .41 - .43	
7	- .203 - .207	- .39 - .41	
8	- .186 - .191	- .40 - .42	
9	- .267 pretty steady	- .44	
10	- .183 - .189	- .39 - .41	

- .441 on right & - .438 on left

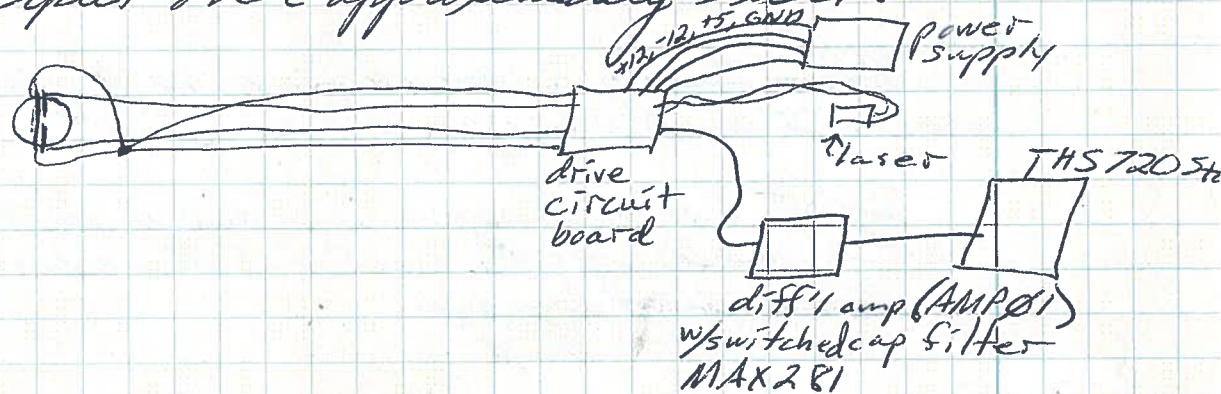
Photovoltaic Cells & Laser Tests

5/7

Output of PVC circuit was drifting on 5/4
I quit running because I couldn't figure out
why. I used a heat gun to both cool & heat
every part of the setup. No effect.

On 5/5 (I'd let the setup run overnight) the
drift was much less. I suspected the
mounting arrangement for the laser. It
was only taped in place.

Today I used some of the Newport mounts to
secure both the laser and the PVCs. The
setup showed no appreciable shift in
output over approximately 3 hrs.

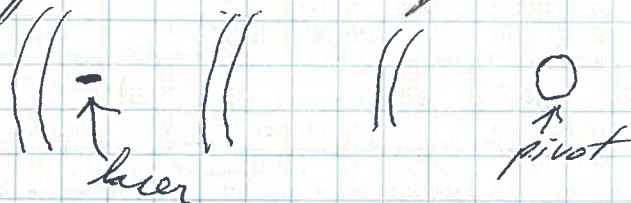


5/9
 EF
 ML
 ML

Laser for Floor Tilt in Hall A

Set up one of the Bosh laser Ed bought.
 Moving electron arm from 16° to 100° .

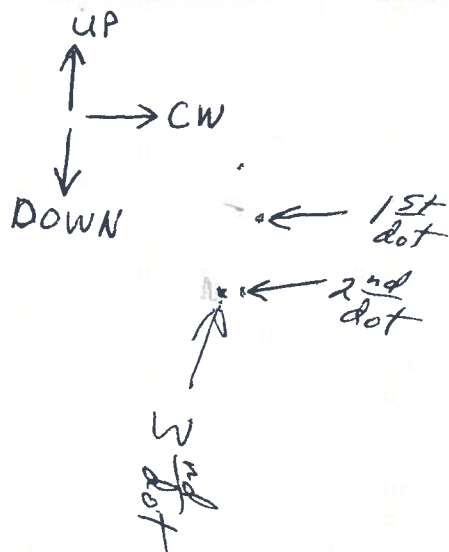
Set laser on floor and direct it at the far wall. Beam passes underneath yoke around pivot. Laser is between outer 2 circumferential plates for wheels, approximately 25% of the way in from the outer plate.



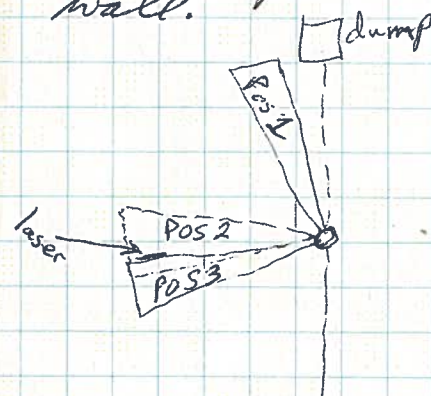
spot on wall

When laser is positioned no E-arm will pass over it and stop just beyond it.

A dot & piece of paper is taped to the far wall. A dot is made at the center of the laser spot. Center is determined by eye.



From the piece taped to the wall.



spot on wall

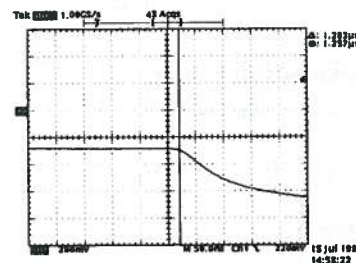
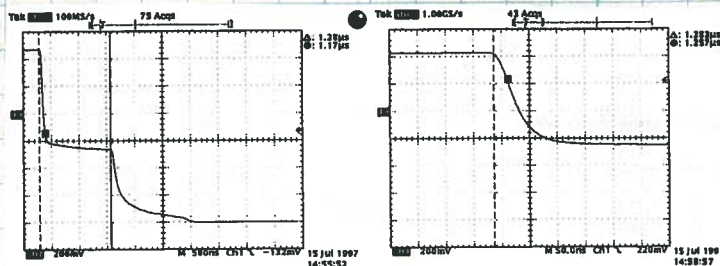
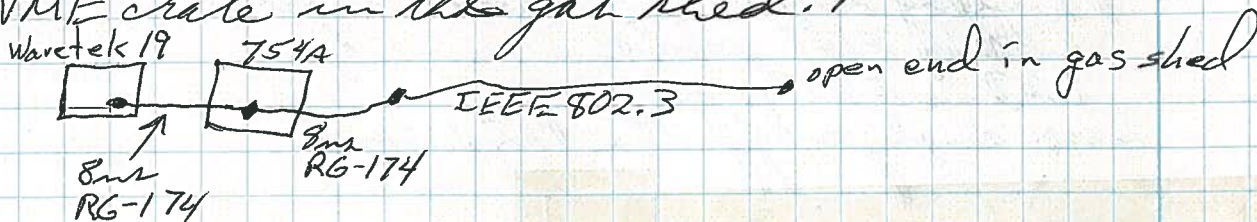
position 2 was shot through the 1st set of bogies (fortuitous positioning - we'd stopped to inspect something)

For 3rd position we had to overshoot 100° by about $\frac{1}{4}^\circ$. Laser just grazed the bogie guard at 100° . Then spectrometer was moved back.

With only 2 points we cannot make a distinction between floor sinking and the floor tilting

Hall to Gas Shed Ethernet Cable Length 7/15

Measuring time of transit for ethernet cable from rack 1475 B03 (rack with patch cables) to VME crate in the gas shed.



$$\frac{50'}{66.5\text{ms}} = \frac{l}{\left(\frac{1283}{2}\right) - 16} \leftarrow \text{should be } \frac{(1283-16)}{2}$$

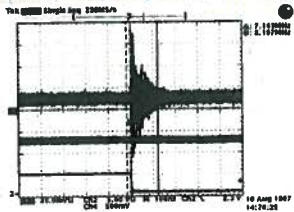
$$l = 470 \text{ feet}$$

10/6/97

3/10/97
JS

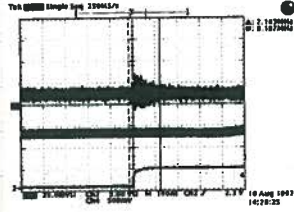
Check of Laser Alignment Obstacle Detector

Receiver module and laser setup in the EEL
highbay
Analog output of receiver is fed to CH4 on Smu of RG174
CH1 is FET probe
CH2 is FET probe
Laser supply is off the +12V rail

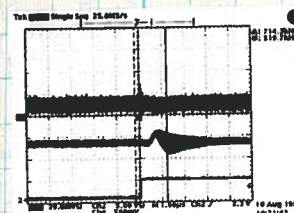


CH1 is PVC with red wire attached
CH2 is one S+H block

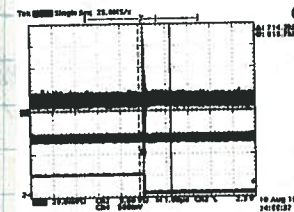
looking at input to opamp



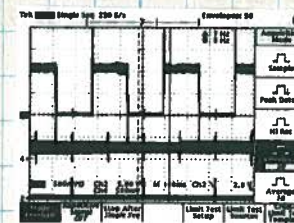
same as above except trigger on opposite slope



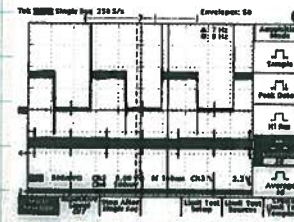
same as above
time base changed



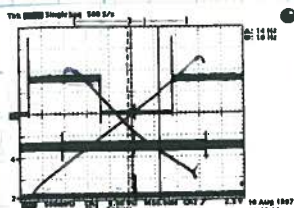
same as above
trigger opposite slope



CH1 is amp output - orange wire - non-inverted
signal

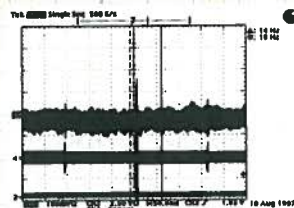
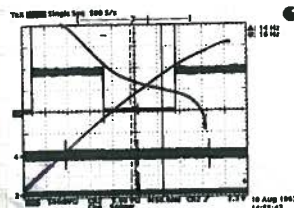


amp output - yellow wire - to inverter

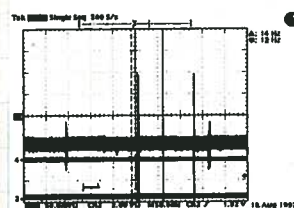


> laser bumped between these two - readjusted
ignore both of these!

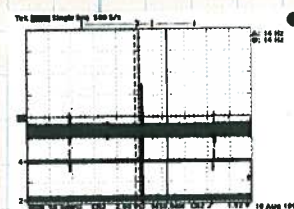
Bypass capacitor on laser supply wires does not seem to make a difference



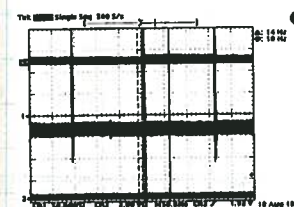
Laser switched to a DC 5V supply (not pulsed)
spot ~ centered



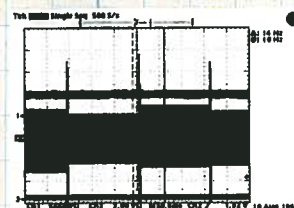
spot is centered on one side (on one PVC)
CH1 has a 1V offset



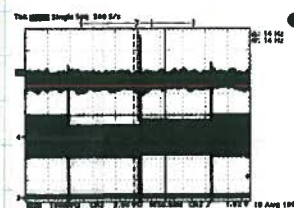
spot is centered on the other PVC
CH1 is on the orange wire
1V offset



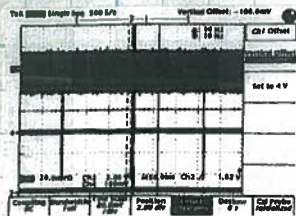
CH4 vertical scale is expanded



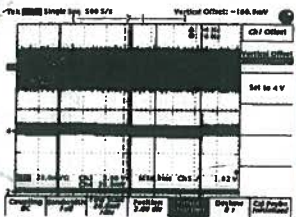
spot ~ centered
CH4 on expanded scale



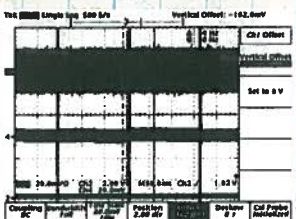
CH1 is on expanded scale



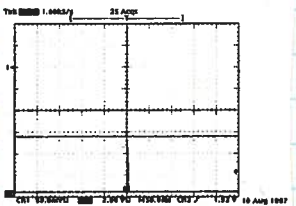
Output of an original PVC across $1.61K\Omega$ resistor. 5VDC on laser
offset is 160mV
Laser is ~ centered on PVC $\frac{.16V}{1.61K} = 100\mu A$



same as above
CH4 scale expanded
PVC in circuit is blocked from light
(notebook placed in front of receiver tube)



same as above (notebook still in front of receiver)
offset is at 162mV



zero offset - avg @ 16 traces

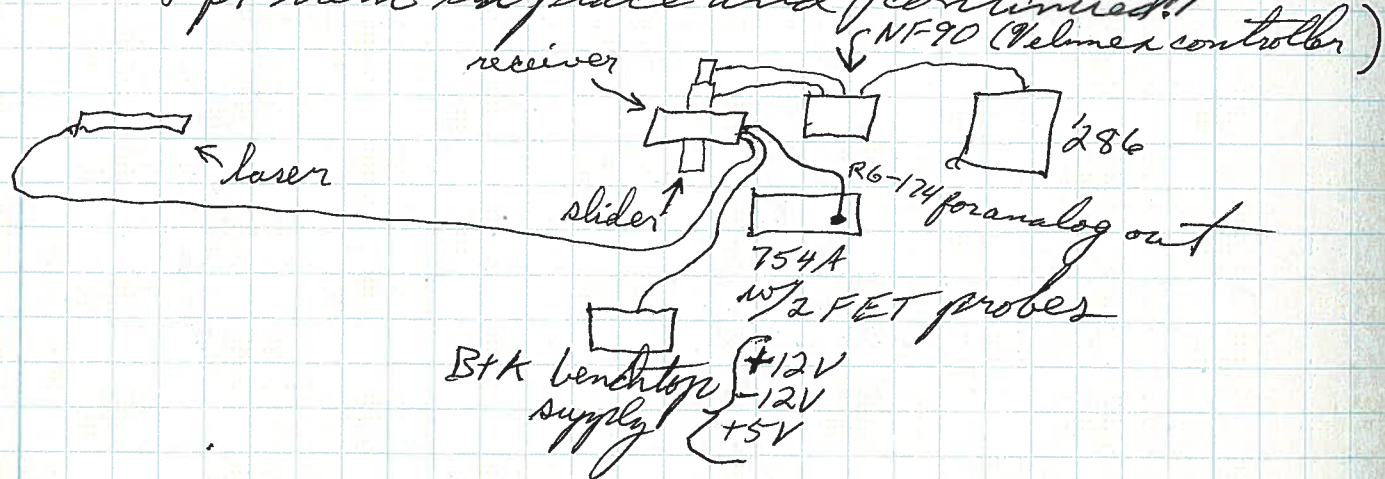
8/13/97 Laser Align/Obst. Detector Stability
 Looking at the short term stability of the setup.

Receiver set up on one end of EEL megganine, & a Velmax slider.
 Laser at other end of megganine; at max length of power cord.

Bypassed laser with 10uF at the power connector on the laser module.

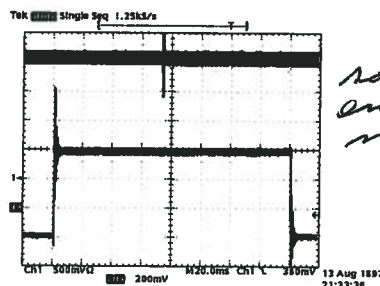
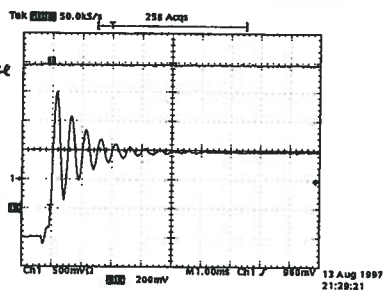
Put 10uF to GND between 10uF & inputs of 1458.
 Trying to reduce noise in system.

The capacitors did not have any dramatic effects.
 Left them in place and continued.



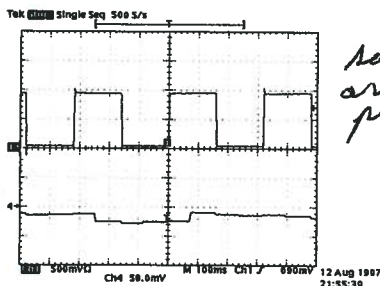
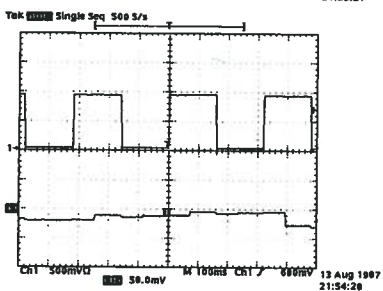
Laser reconnected to +5 VDC of receiver unit.
 it had been on +12V previously.

ch1 in
orange wire
from 9458
(note
ringing)



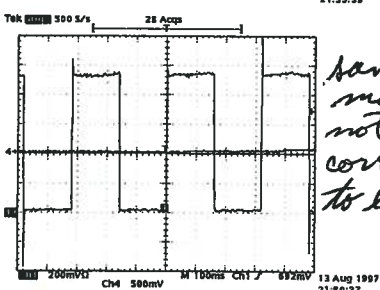
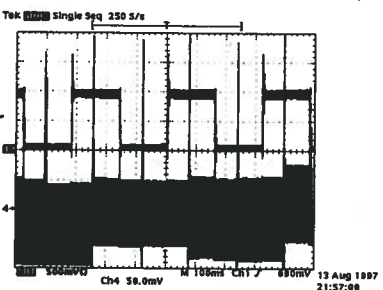
same in
envelope
mode (30)

avg of
16
with spot
centered



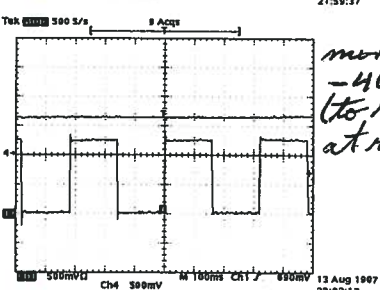
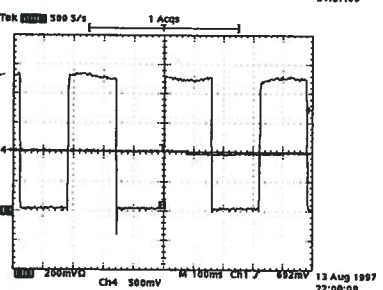
same
as
previous

same
except
envelope
(30)
(30 traces)



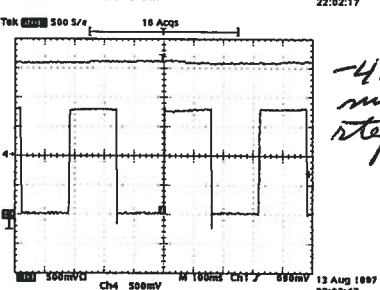
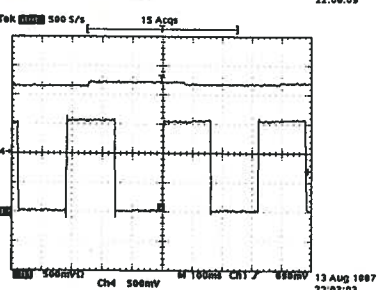
sample
mode
note level
corresponding
to laser only

same



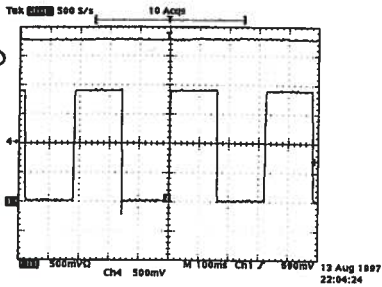
moved receiver
-400 steps
(to right - looking
at rear of receiver)

-480
more
steps

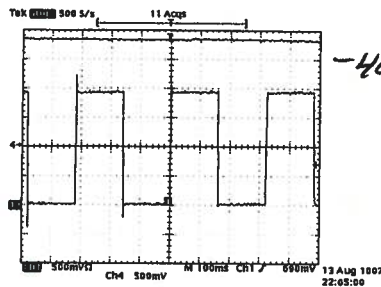


-400
more
steps

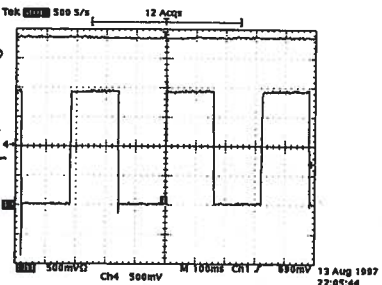
-400



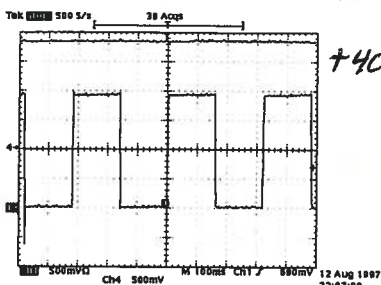
-400



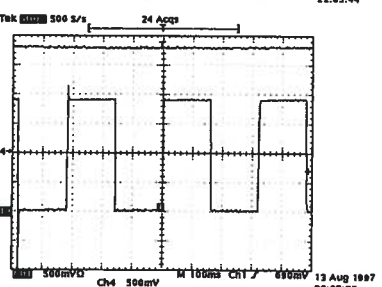
-400
more
steps
spot is just
fast split



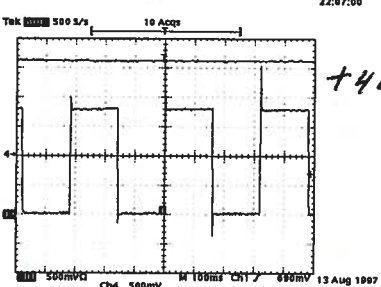
+400



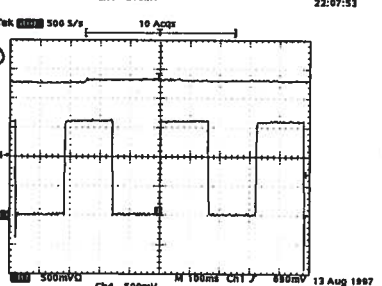
+400



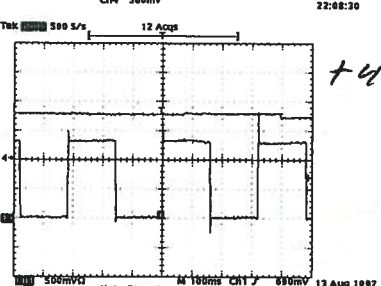
+400



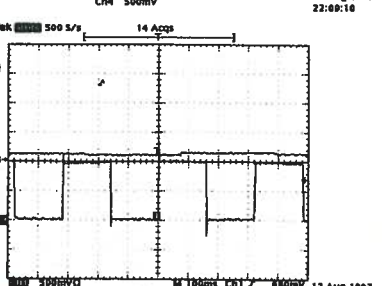
+400



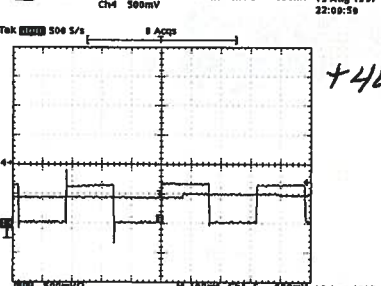
+400



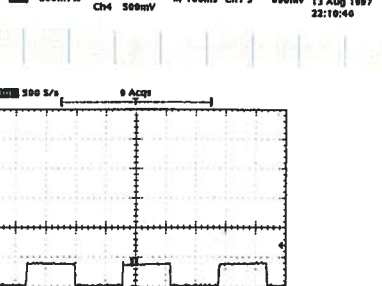
+400



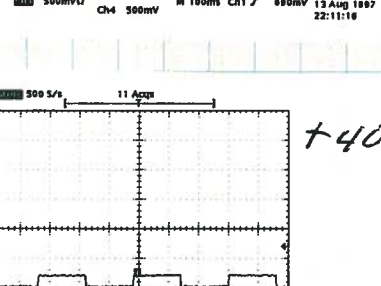
+400



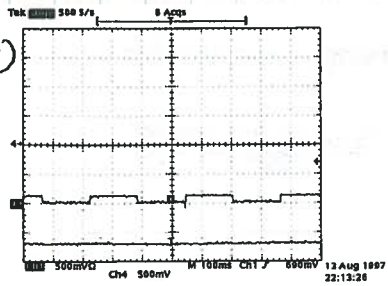
+400



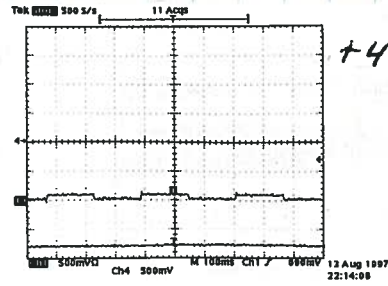
+400



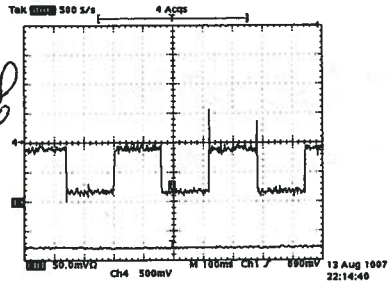
+400



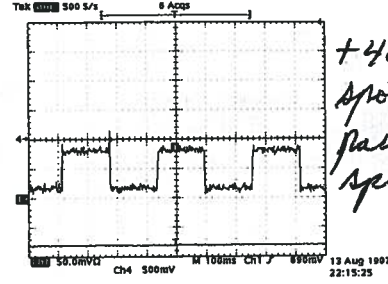
+400



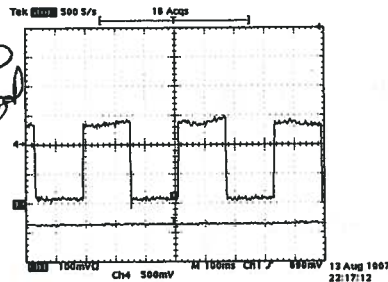
same
just
changed
vertical
scale



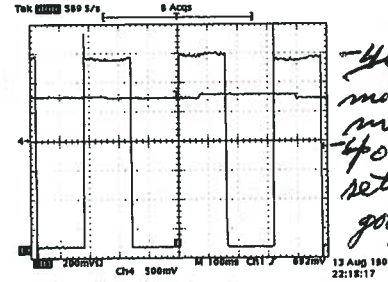
+400
spot is just
past the
split



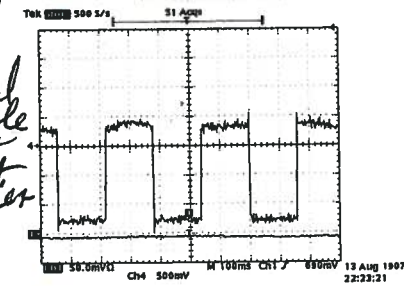
-400
+ changed
vertical
scale



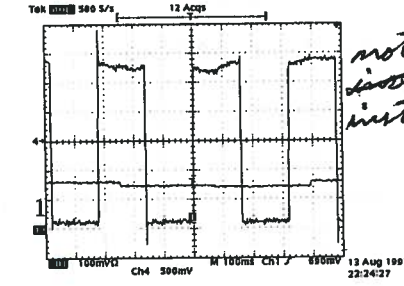
-400
many
more than
400 - controller
setting got
goofed up



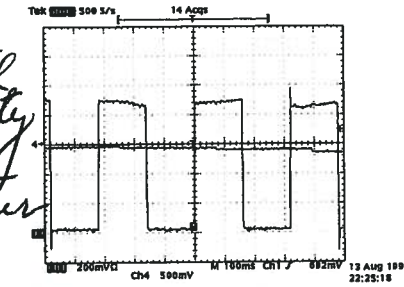
moved
back
peak level
not stable
even at
low
intensities



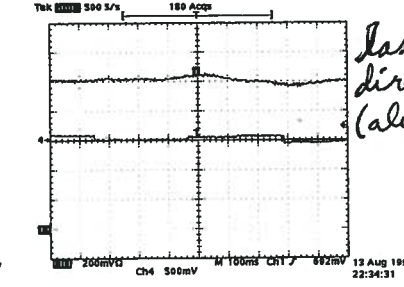
note
instability level
instability



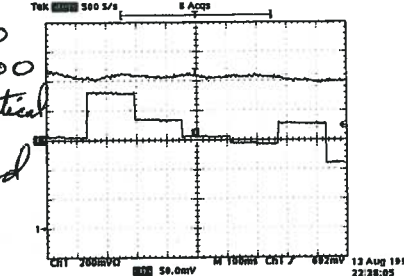
note
level
instability
same as
previous



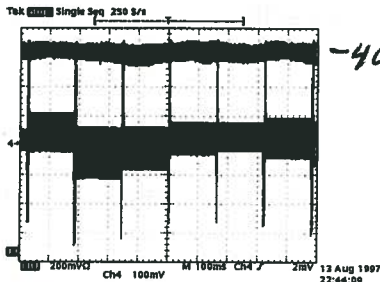
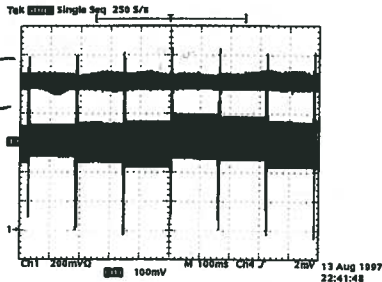
Laser connected
directly to 5VOC
(always on)



+400
then -400
+ Ch 4 vertical
scale
changed

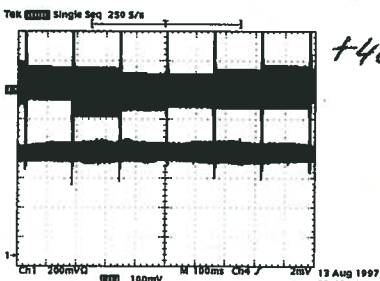
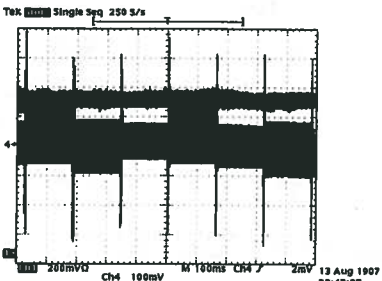


Same except envelope mode (16)



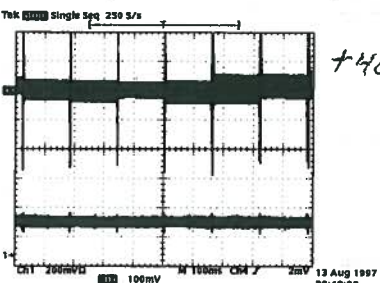
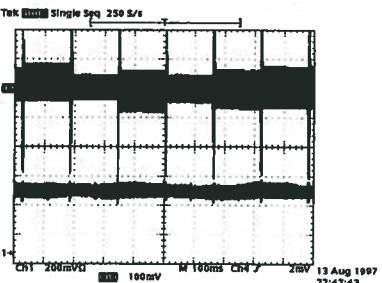
-400 steps

+400 steps



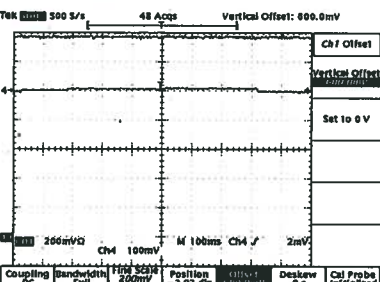
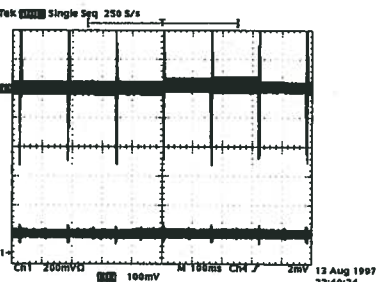
+400

+400



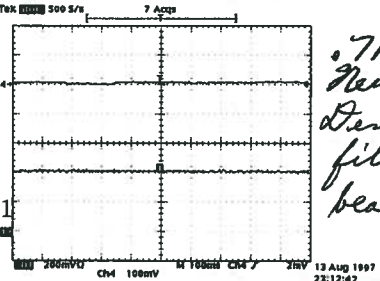
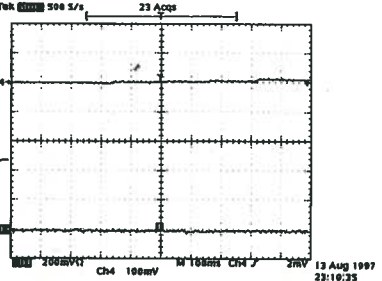
+400

+400



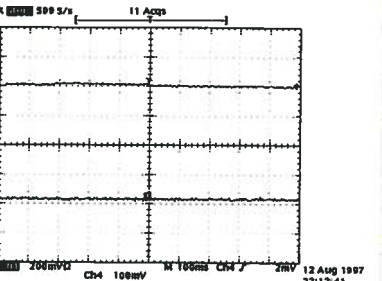
spot centered on PVC
600mV offset on CH4

.5ND filter in beamline



.7ND Neutral Density filter in beamline

1.0ND filter in beamline



Photovoltaic Cells - Current & Voltage 8/15
checking current & voltage generated when
laser is shined on the PV's.

11	-.217	-.481
12	-.227	-.483
13	-.229	-.469
14	-.242	-.470
15	-.175	-.460
16	-.252	-.471
17	-.247	-.484
1	-.250	-.468

pair them up as 11 & 12
13 & 14
1 & 16

9/18
~~9/18~~
~~9/18~~

Electron Arm Delay Spool Measurements

same setup as used on p. 104 of this volume.

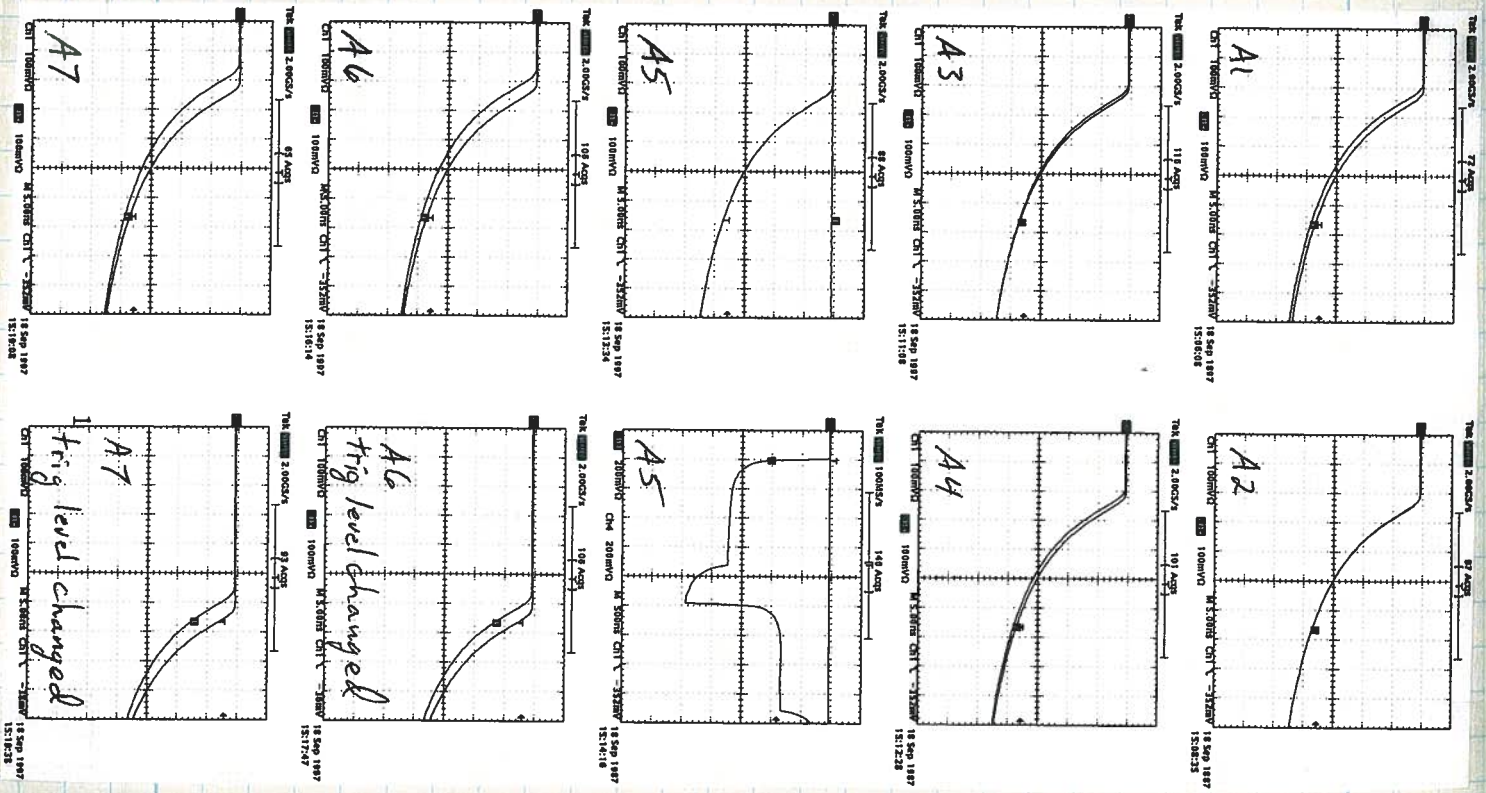
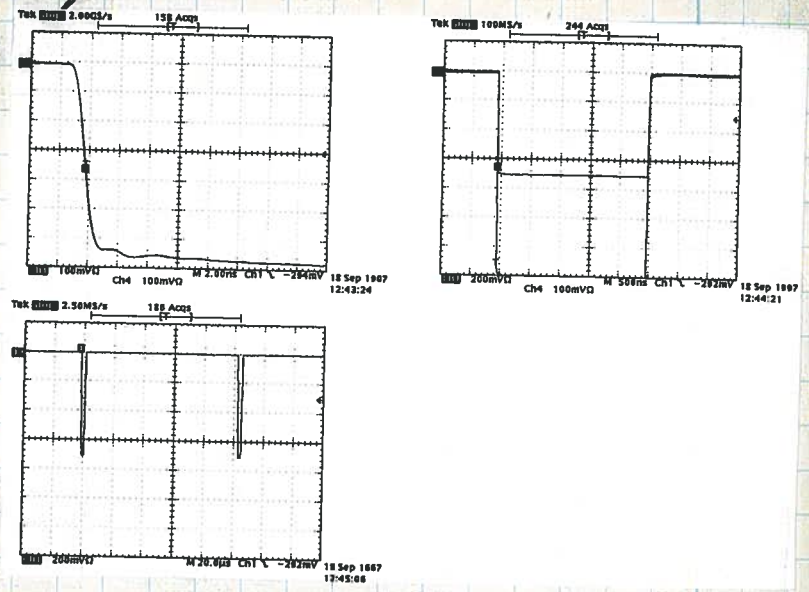
same equipment except the pulser is a HP

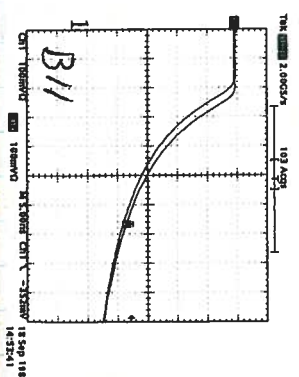
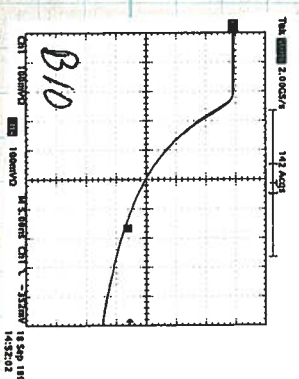
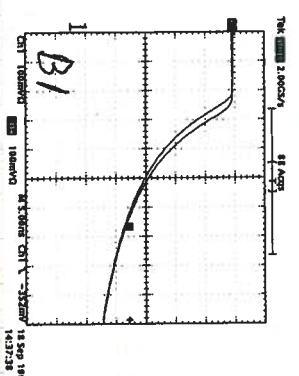
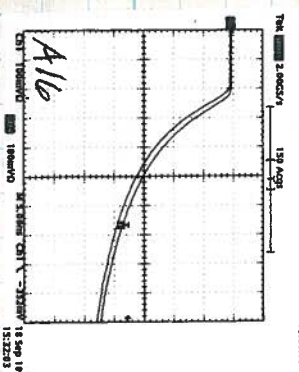
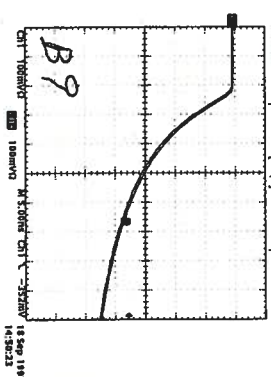
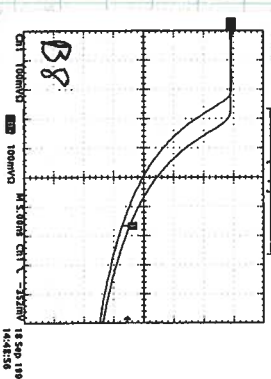
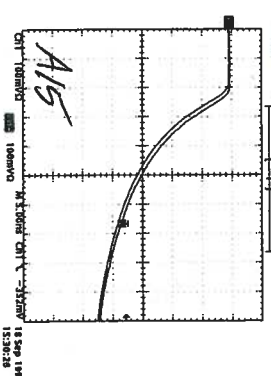
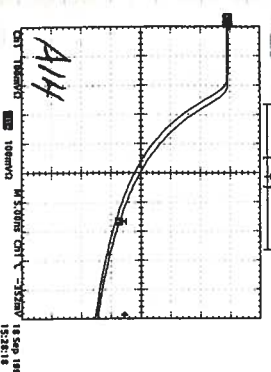
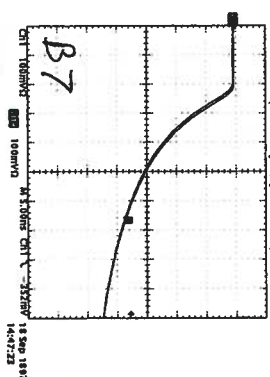
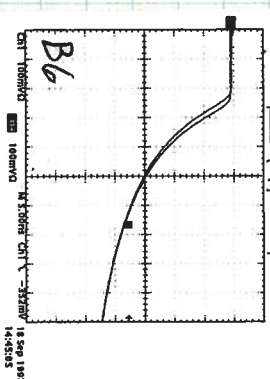
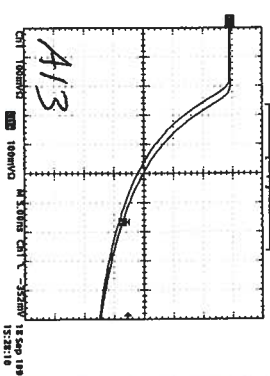
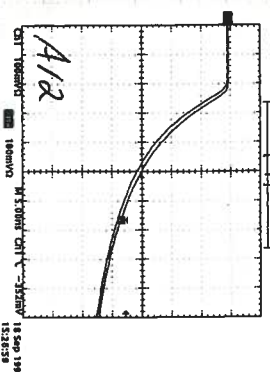
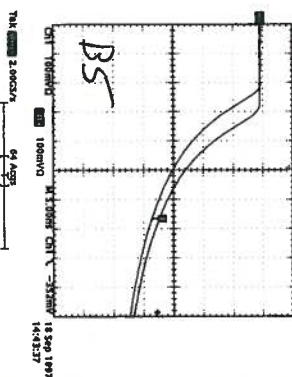
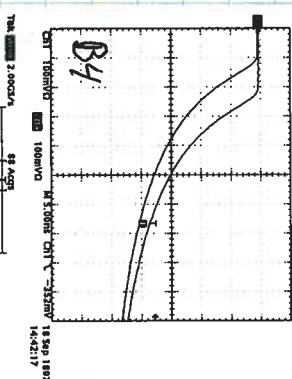
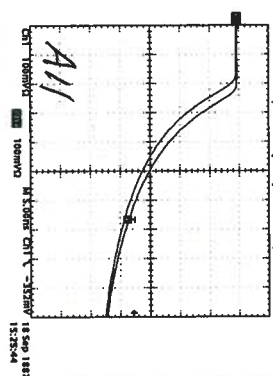
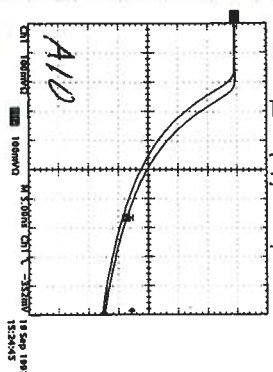
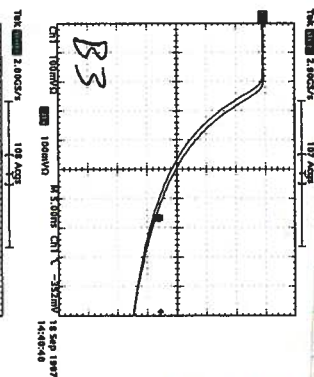
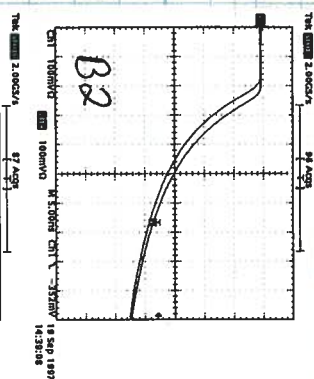
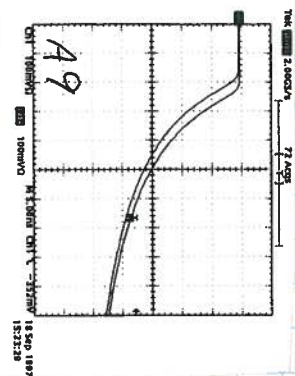
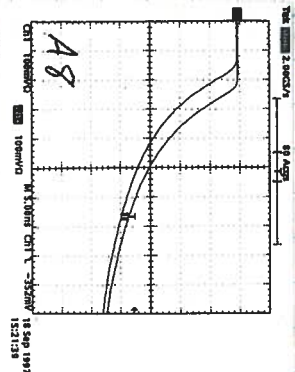
The pulser is set up as ∇

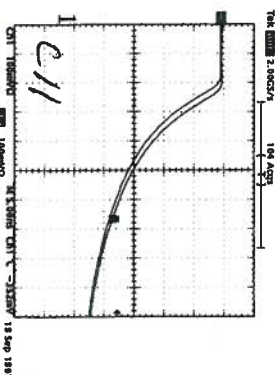
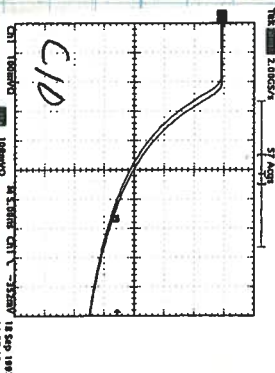
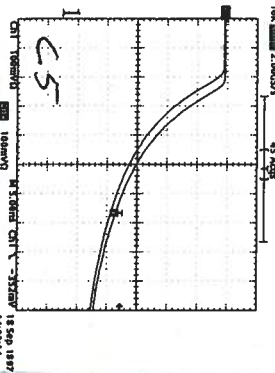
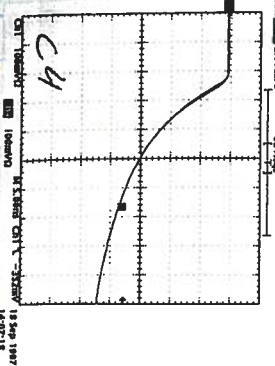
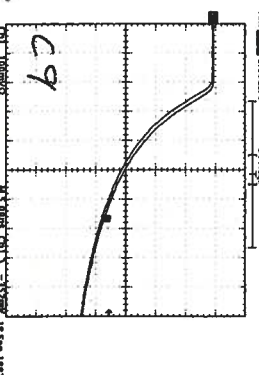
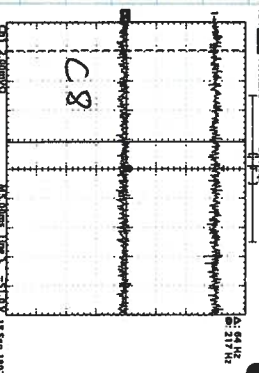
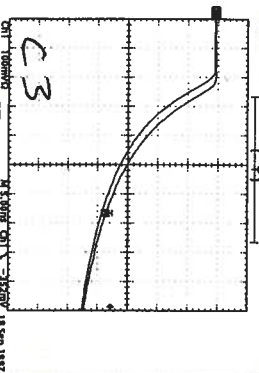
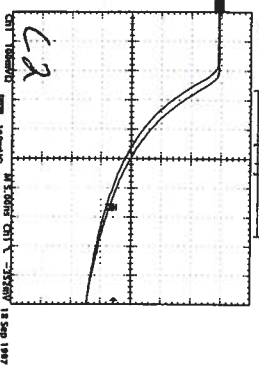
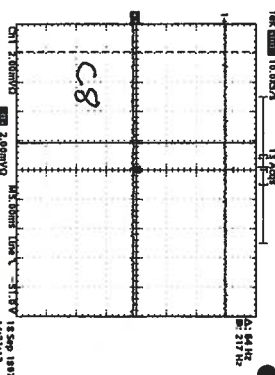
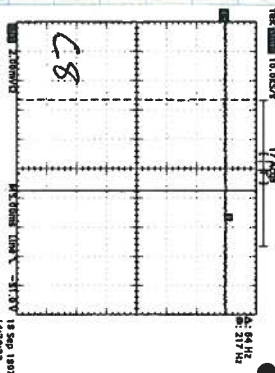
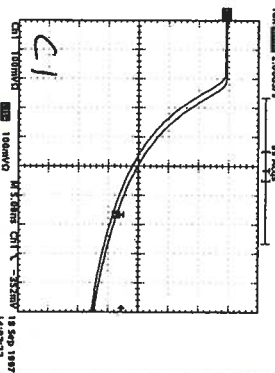
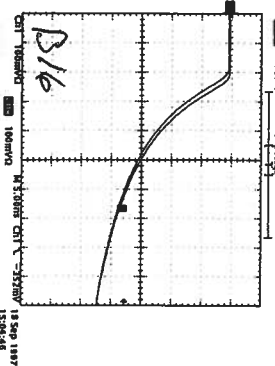
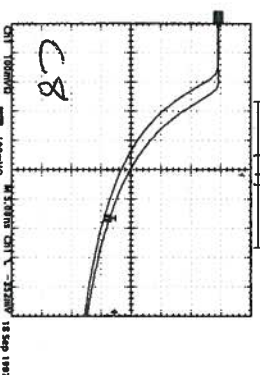
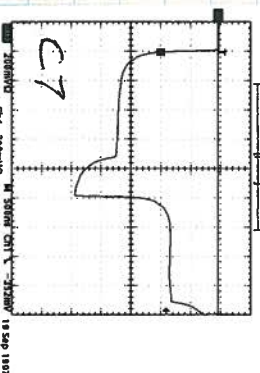
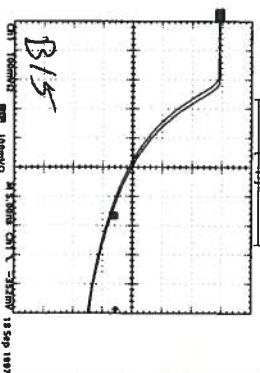
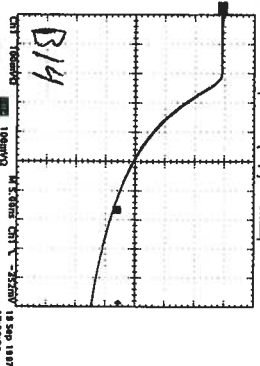
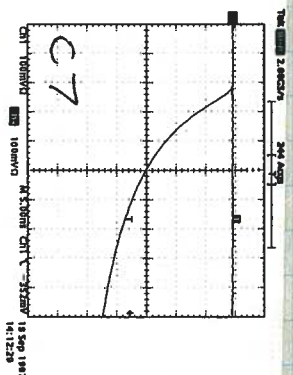
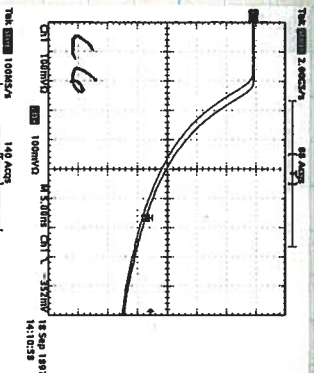
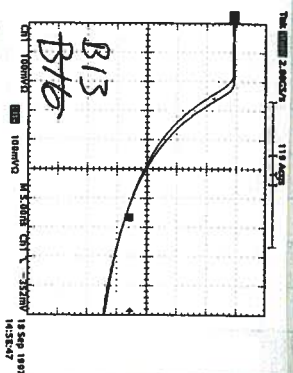
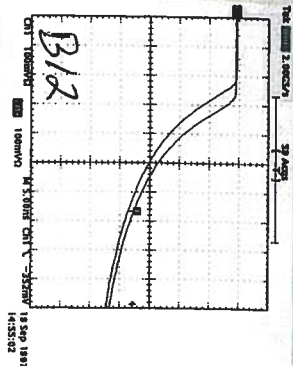
scope set to AVG 16

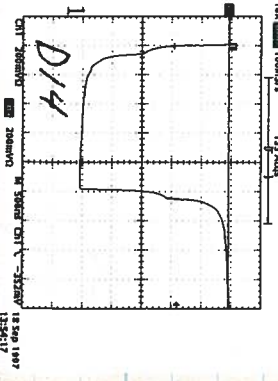
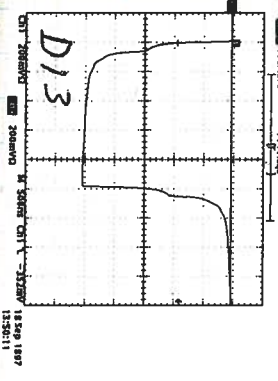
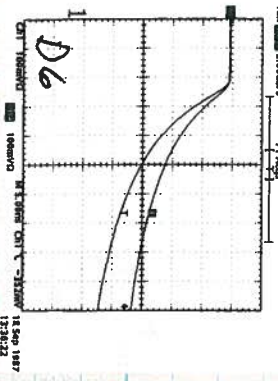
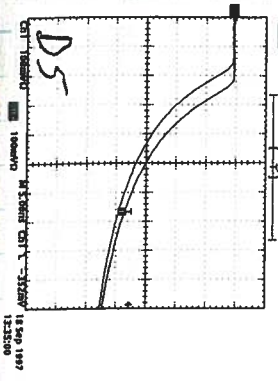
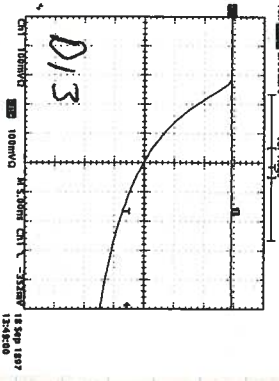
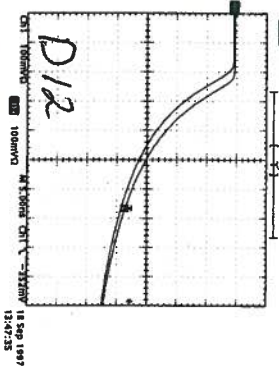
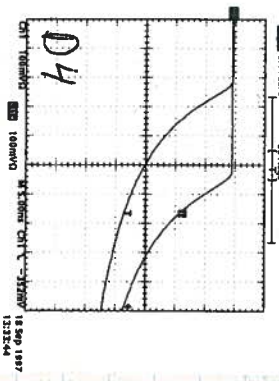
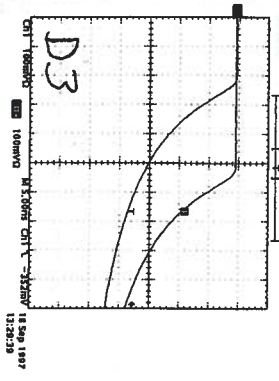
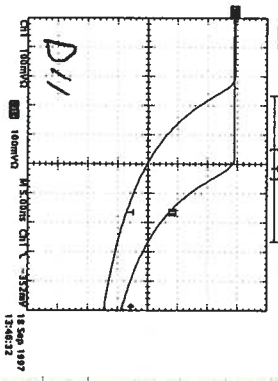
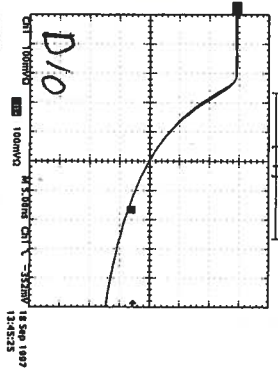
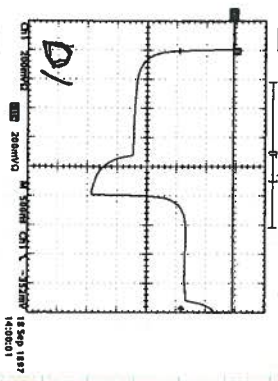
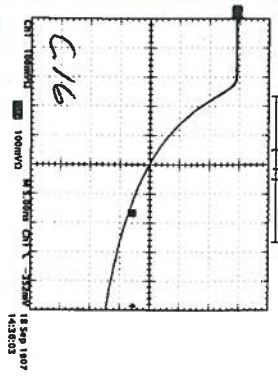
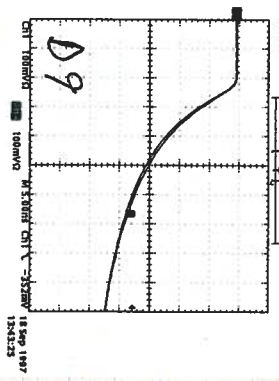
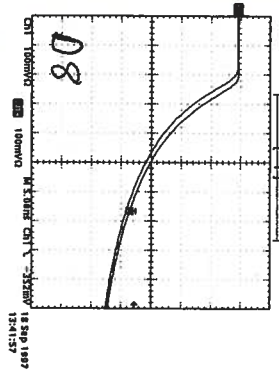
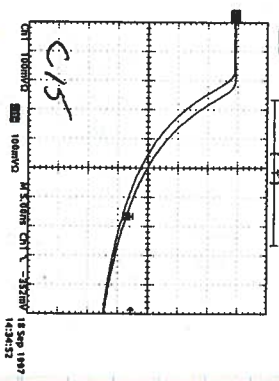
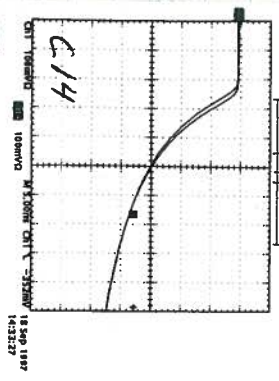
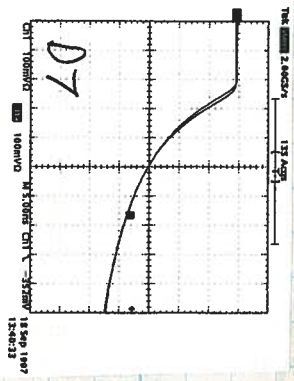
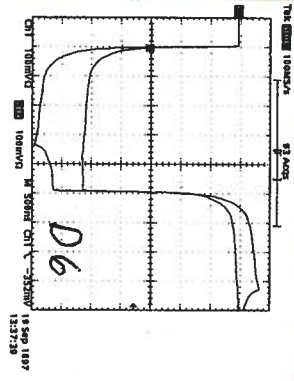
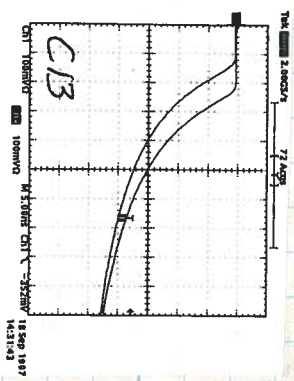
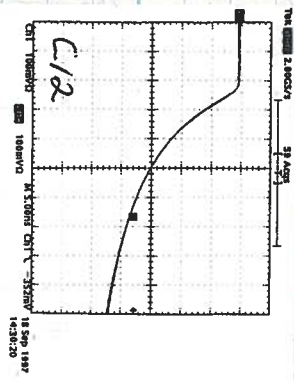
start with the lower pen
 on the upper platform &
 the lower platform. All
 four rows are used

D2 is used as the reference
 delay. Connected to CH 1
 and adjusted to pass through
 center of display. So, reference
 crosses at center.









7/22
JH
MK

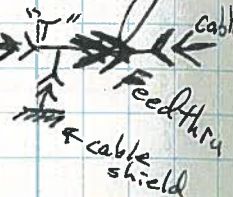
Electron Arm Delay Spool Measurements (Cont.)

Same equipment and setup as on p. 130.

Using the same reference spool

In general, two setup files are used to display the traces. They have been saved as NORM.SET and E.SET.

Trying to establish an identification template for problems with the delays. Reference spool is D2 on ALFRED. For an open cable one of the connectors is removed from the feedthru on the panel. For a short a "T" with a shorting cap is put in series with the cable at the panel. Delay with open or short is Delay Under Test. Looking at what is response of reference delay.



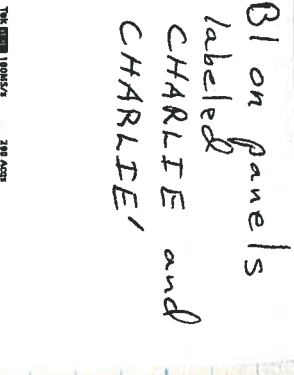
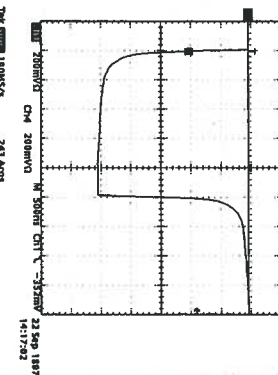
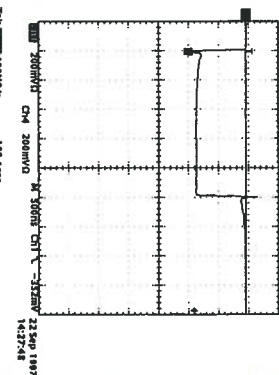
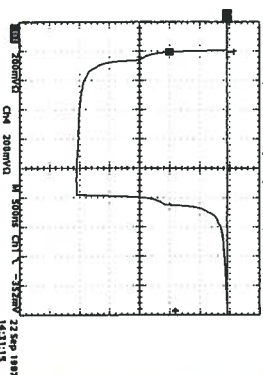
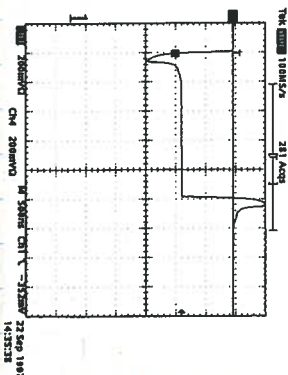
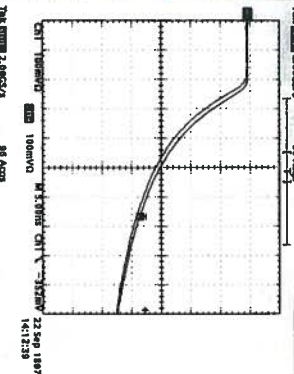
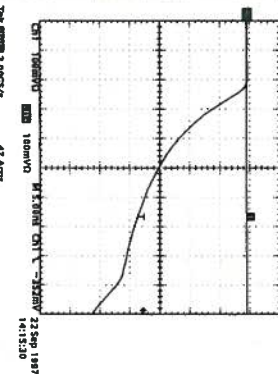
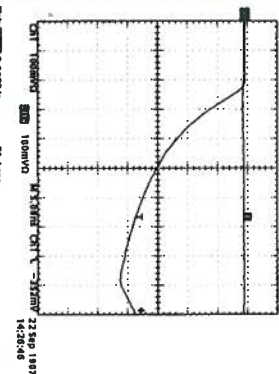
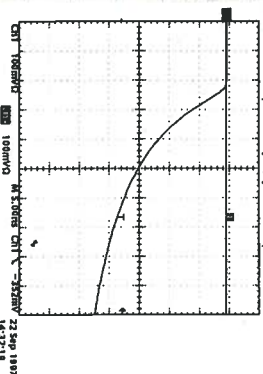
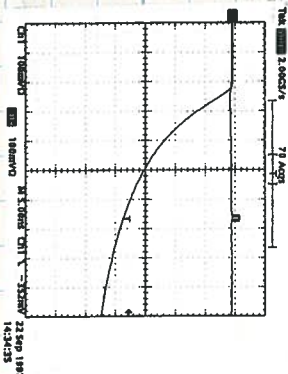
Short in DUT
at rear of
Det. Stack
panel

Open in DUT
at rear
panel on
Det. Stack
(50' from lower
platform
panel to this
panel)

Short in
DUT at
lower
platform
panel

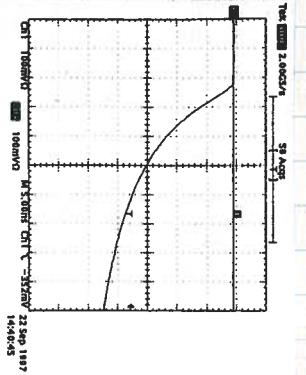
Open
connection
at lower
platform
panel

all is
fine

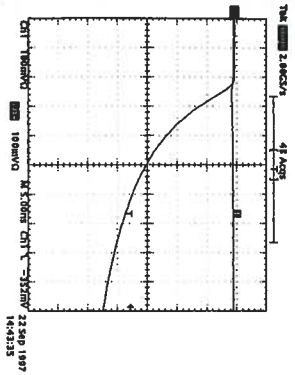


BI on panels
labeled
CHARLIE and
CHARLIE!

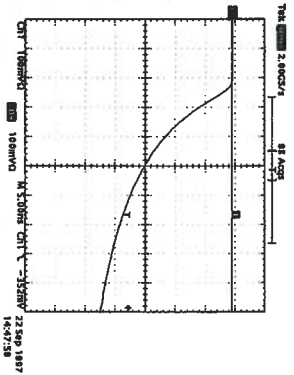
open in DUT
at rear of
det. stack
panel 50,
from upper
platform
panel



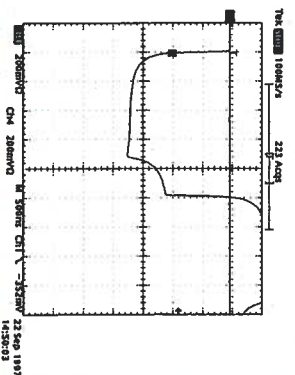
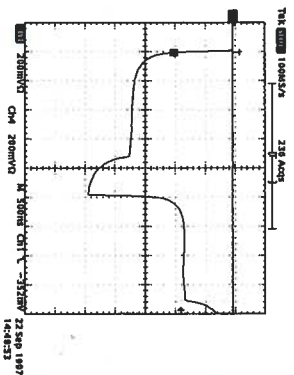
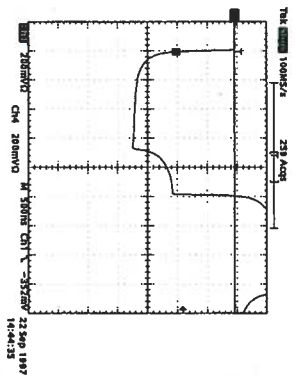
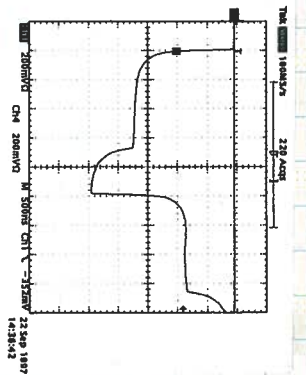
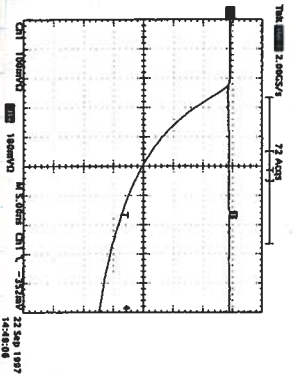
short in DUT
at rear of
det. stack
panel 50,
from upper
platform
panel



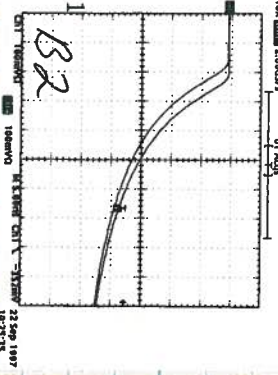
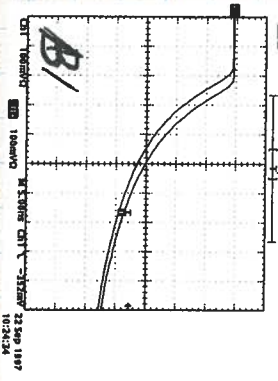
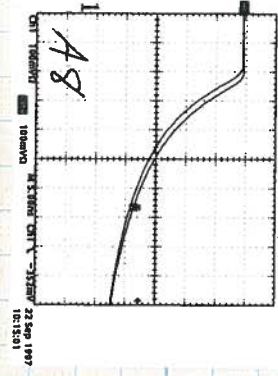
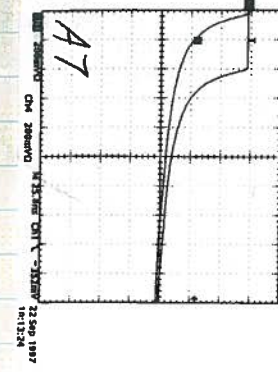
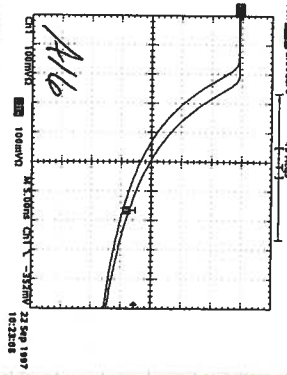
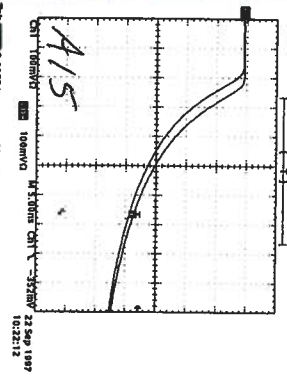
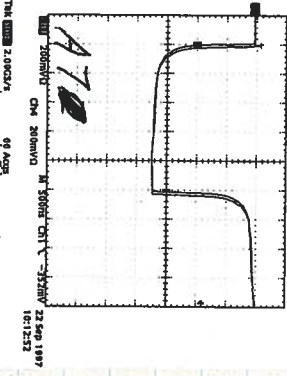
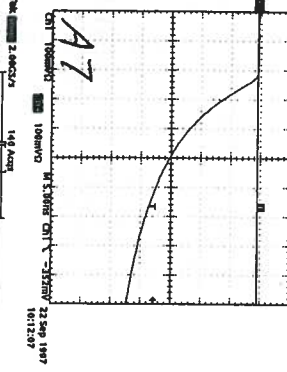
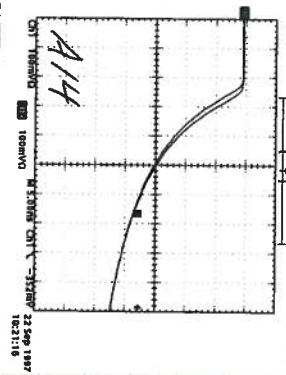
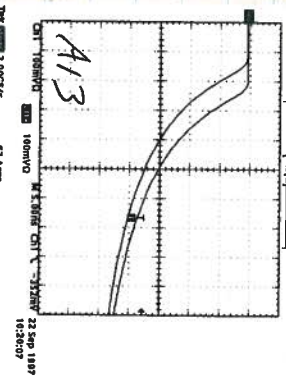
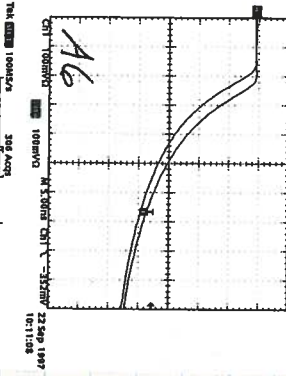
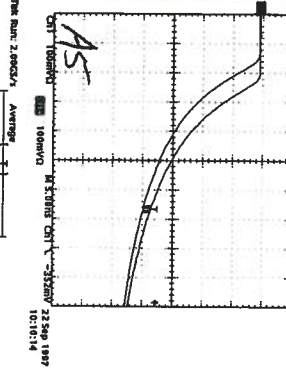
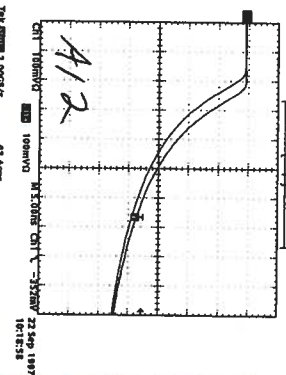
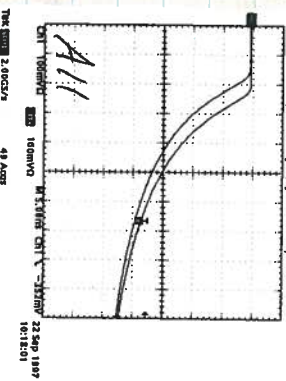
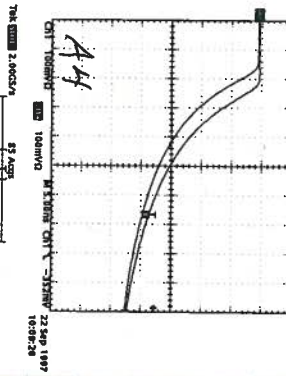
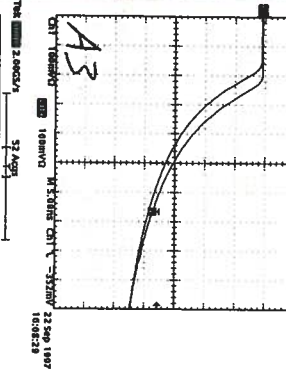
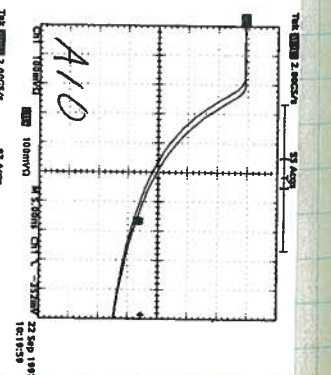
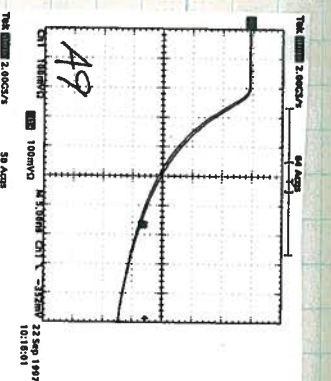
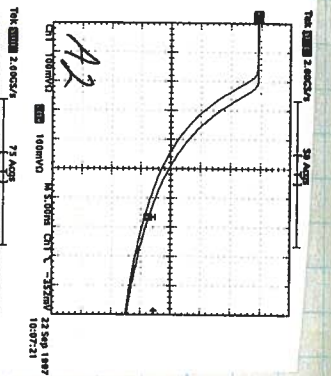
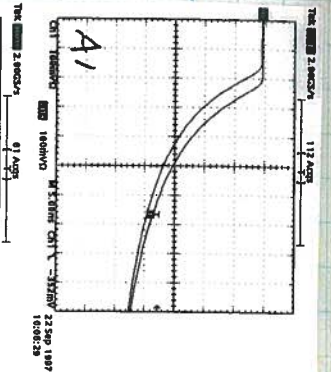
Open in DUT
at upper
platform
panel

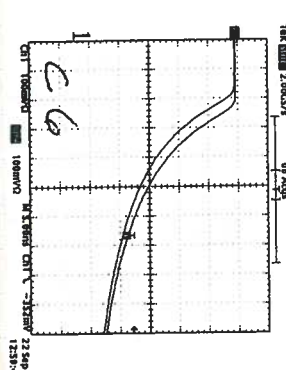
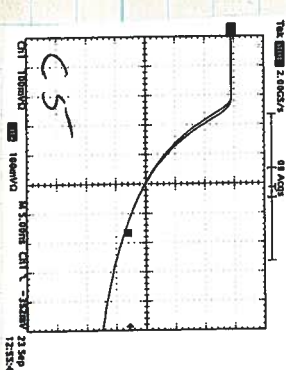
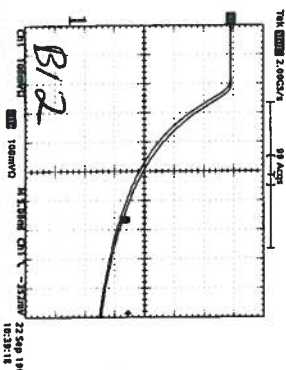
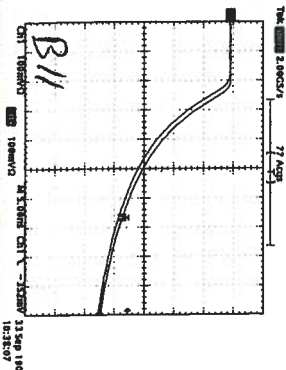
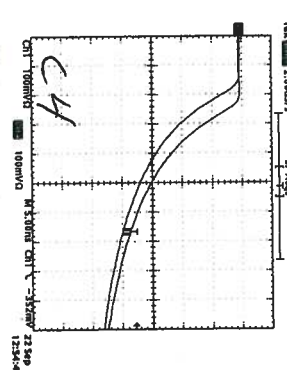
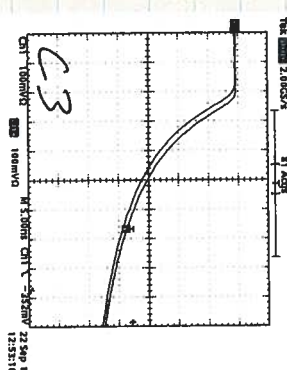
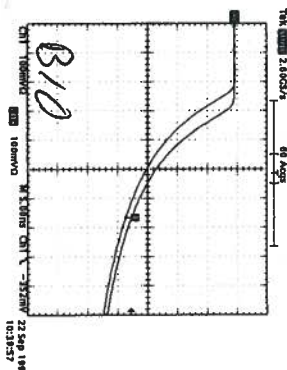
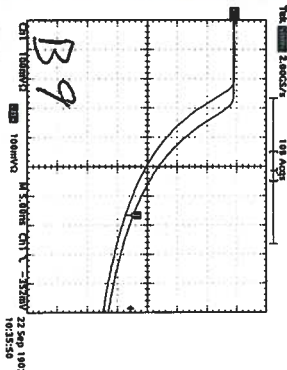
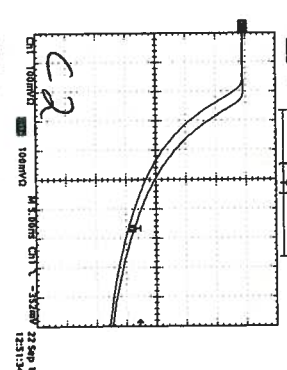
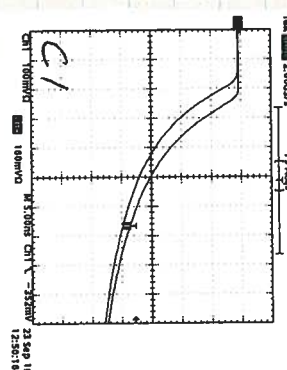
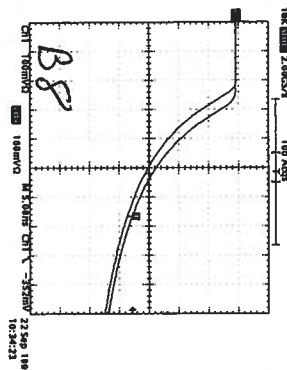
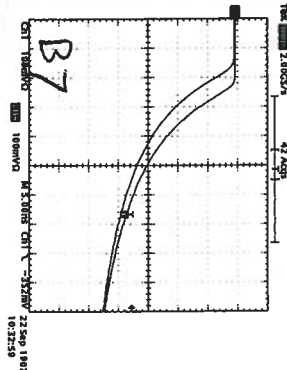
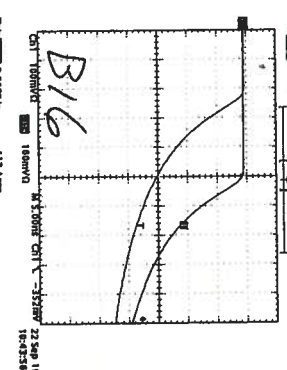
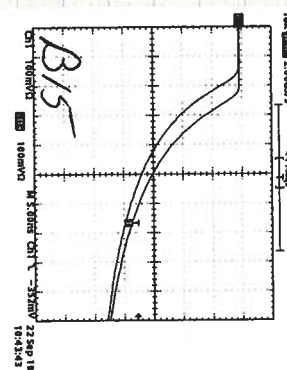
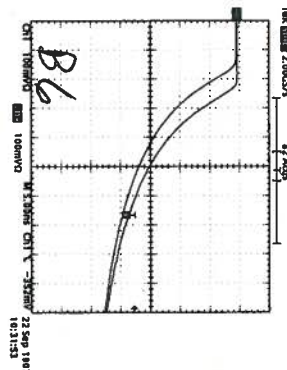
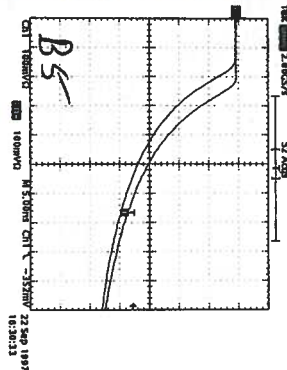
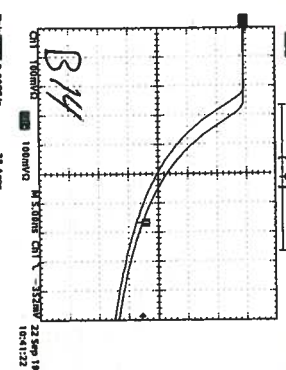
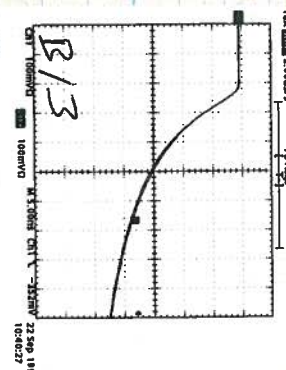
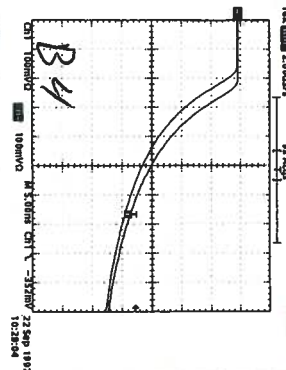
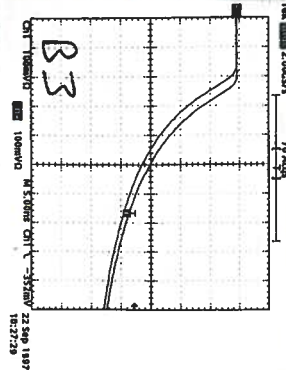


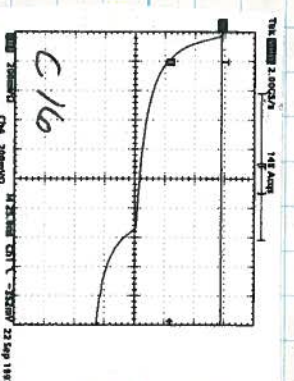
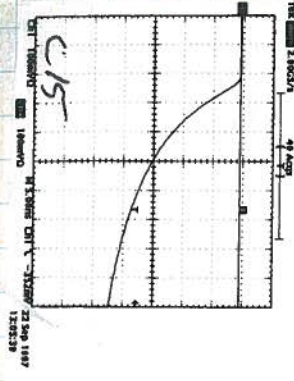
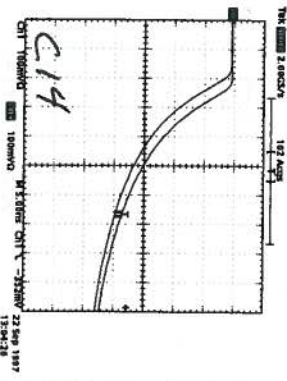
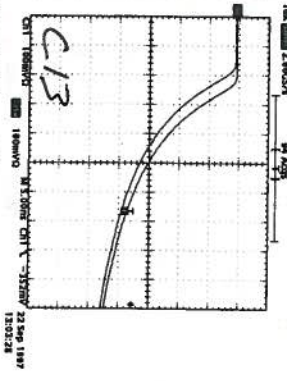
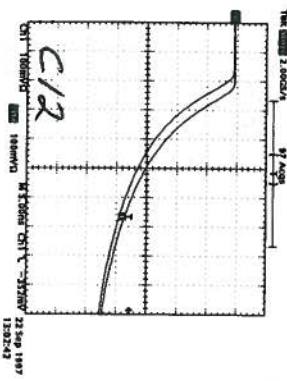
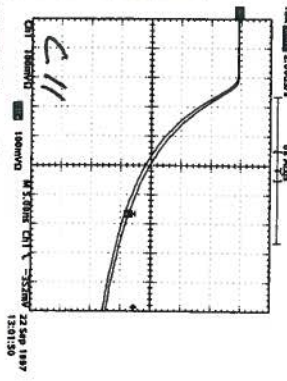
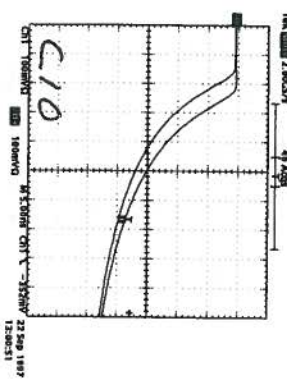
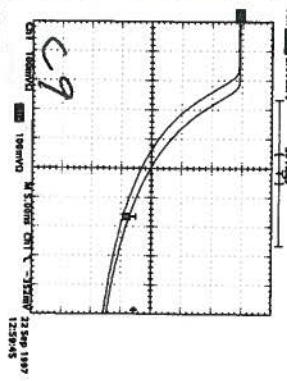
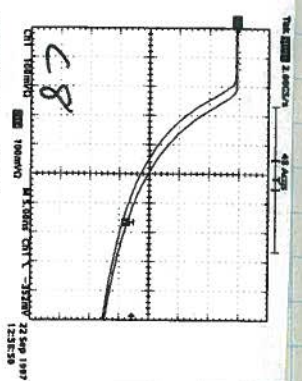
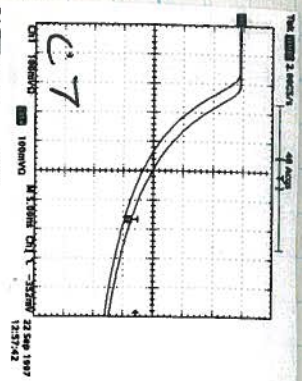
short in DUT
at upper
platform
panel



Looking at the delays on the panels I have called EUNICE and EUNICE'

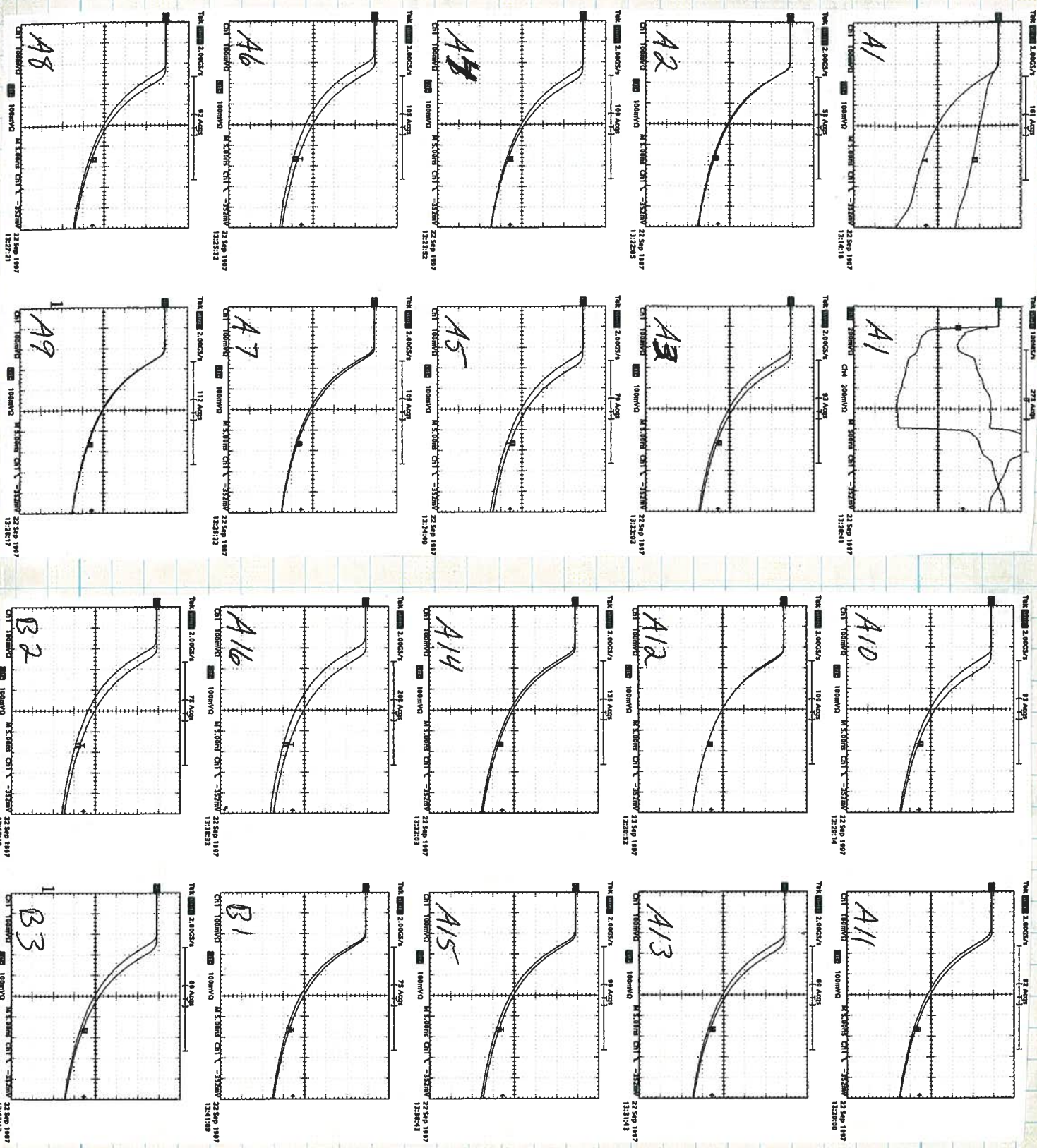


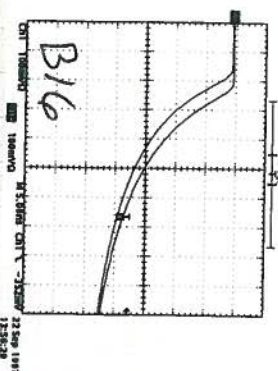
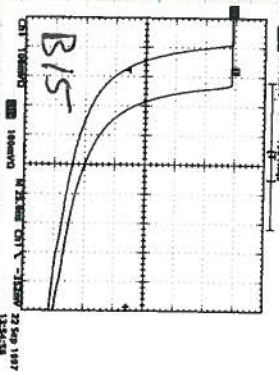
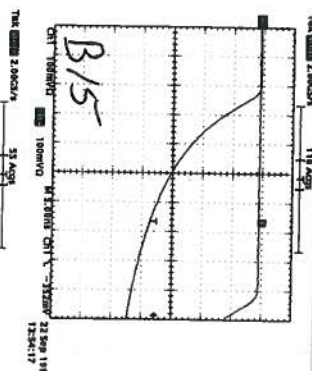
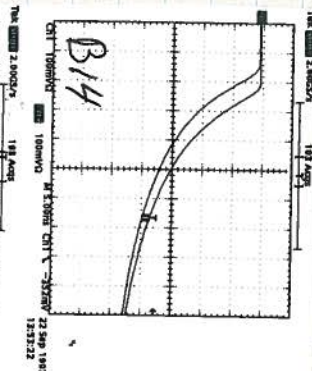
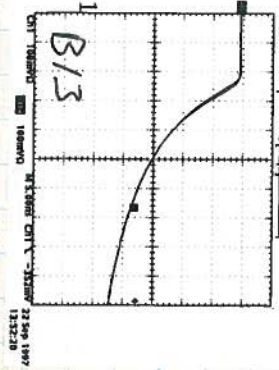
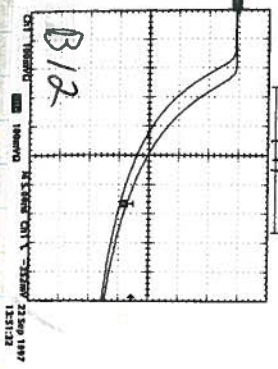
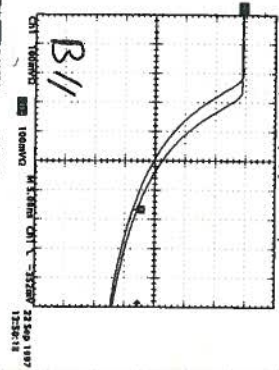
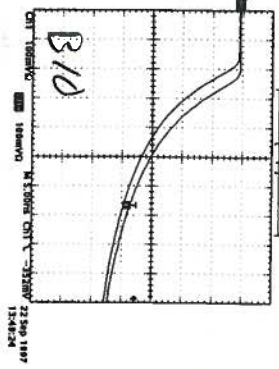
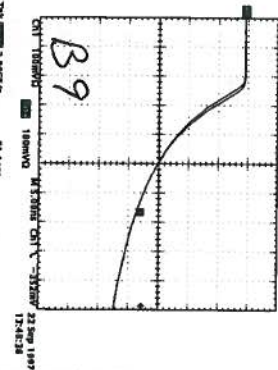
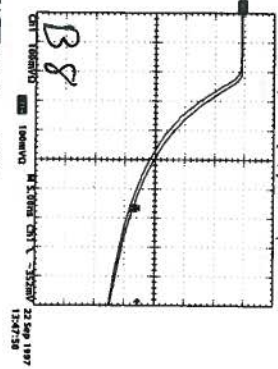
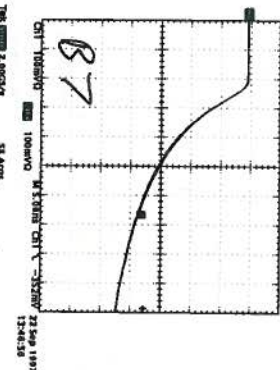
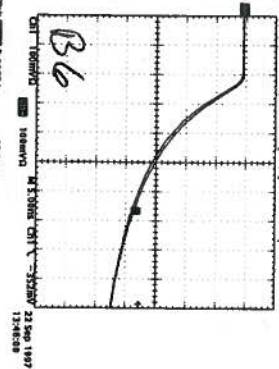
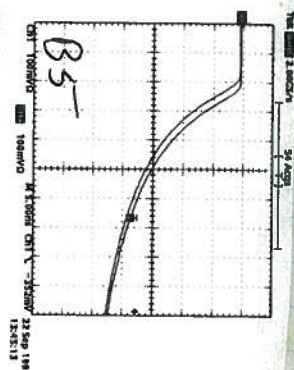
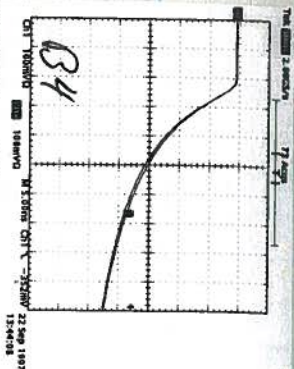




C15 & C16 have no delay
 good connected to them.
 No 105' cable at ramp track

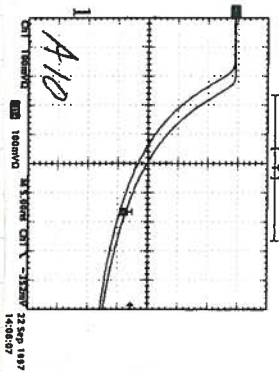
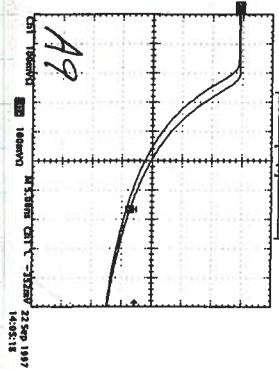
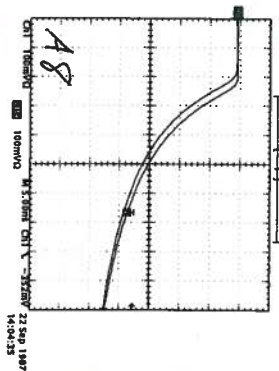
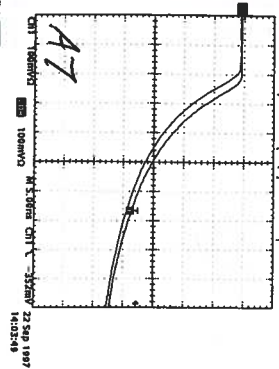
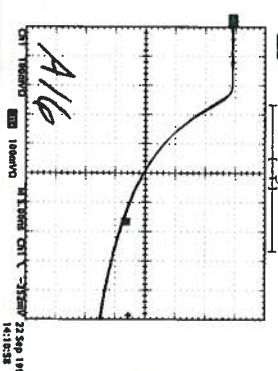
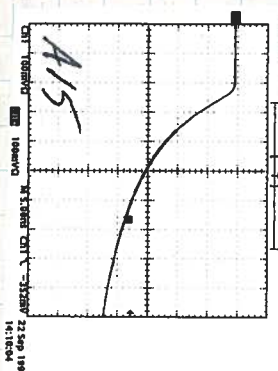
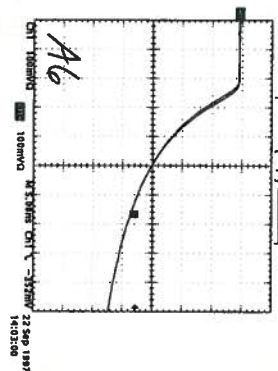
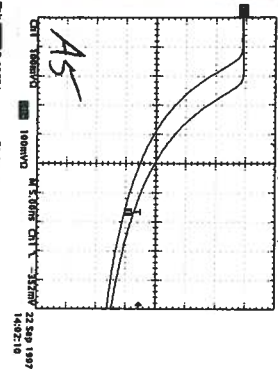
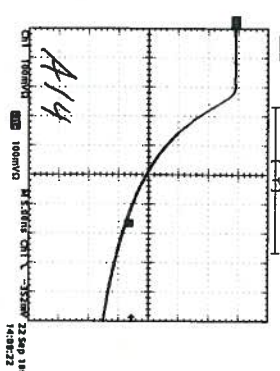
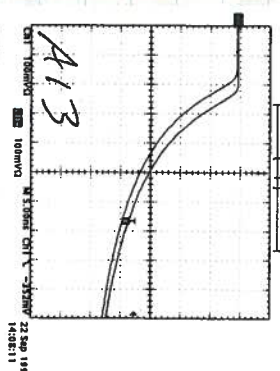
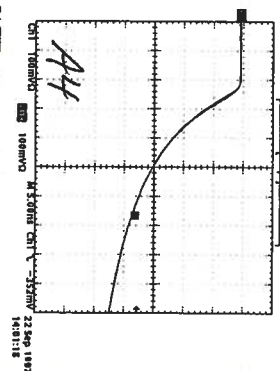
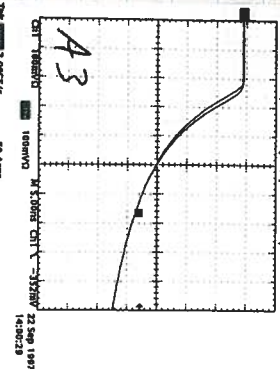
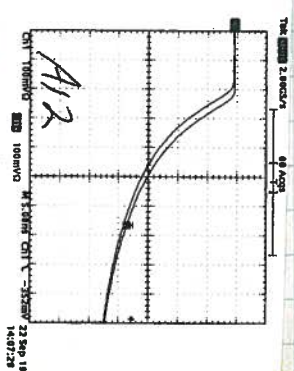
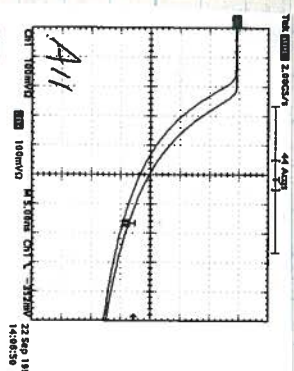
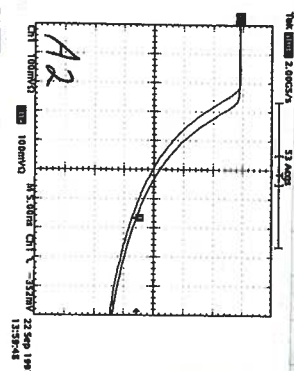
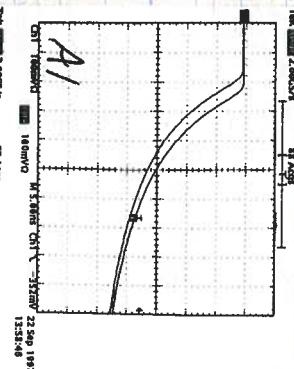
looking at the delays on the panels I have labeled DEX and DEX'

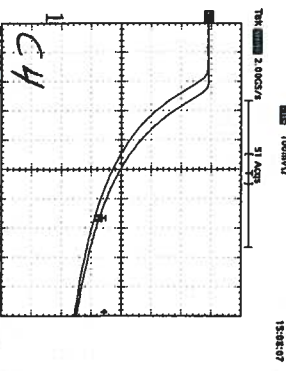
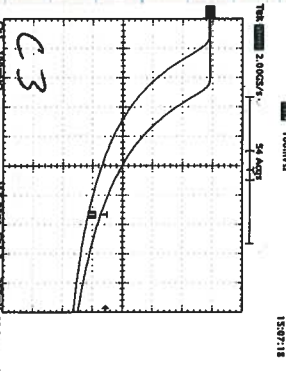
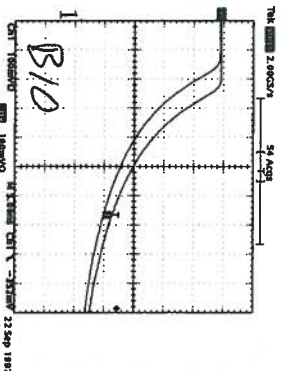
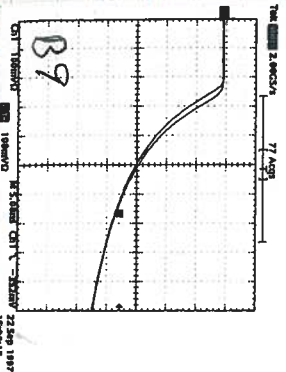
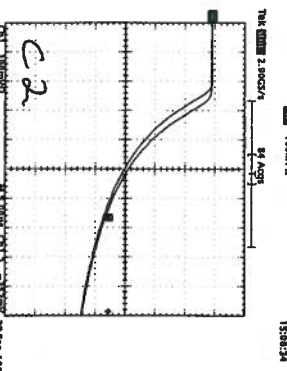
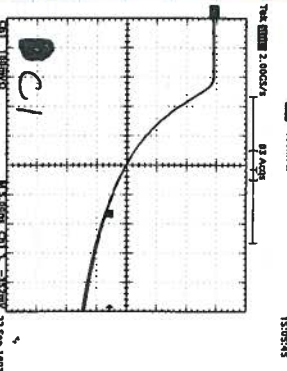
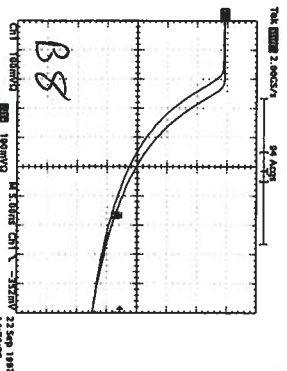
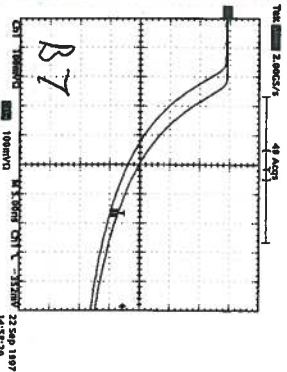
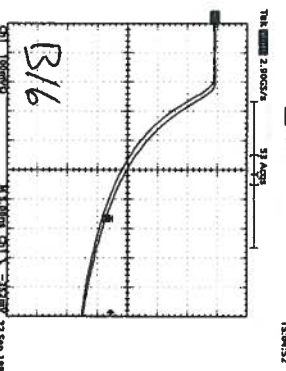
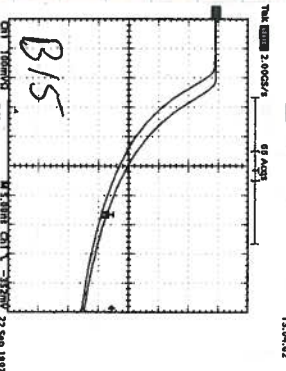
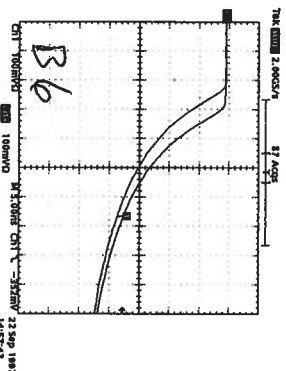
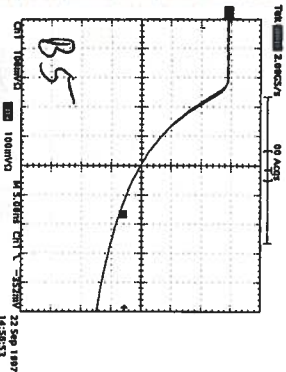
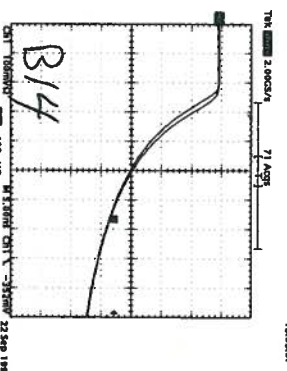
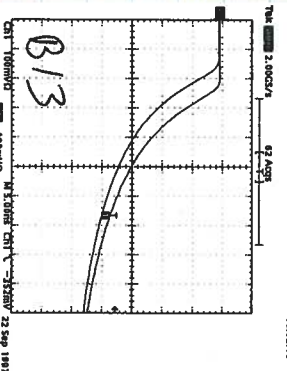
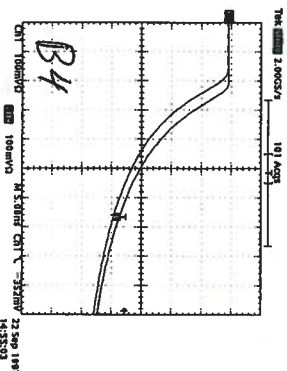
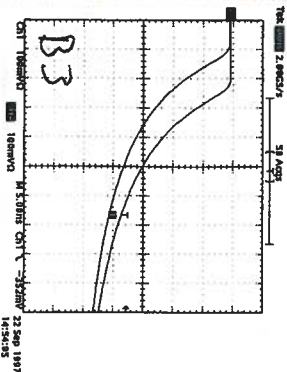
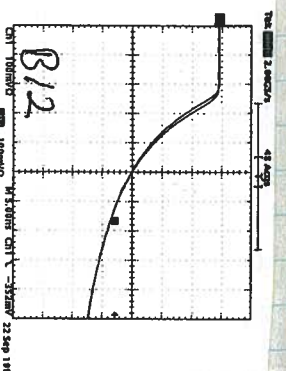
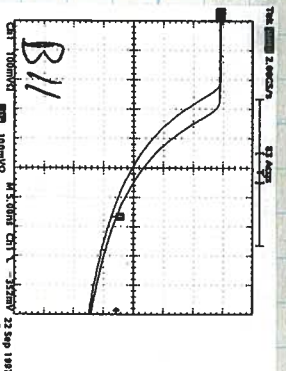
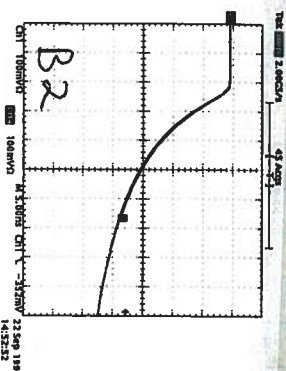
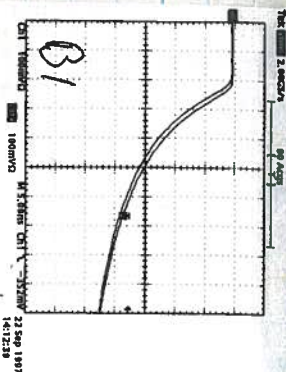


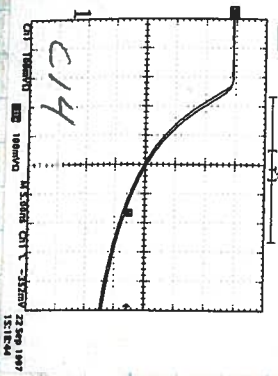
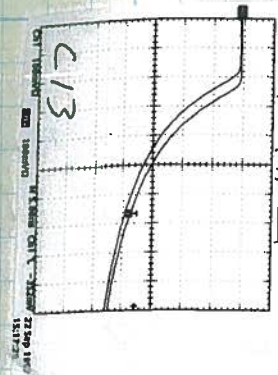
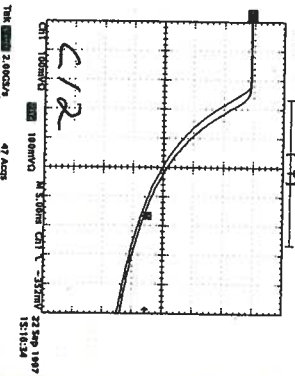
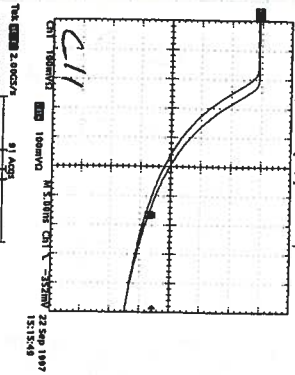
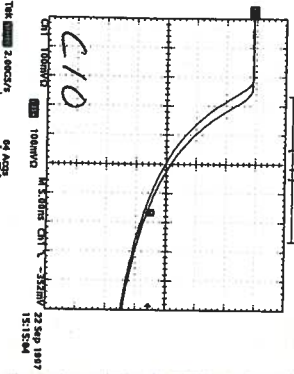
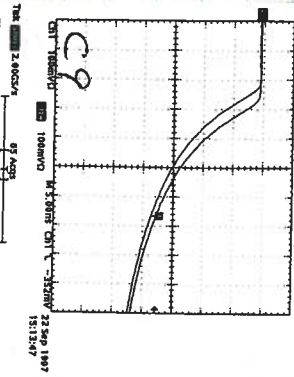
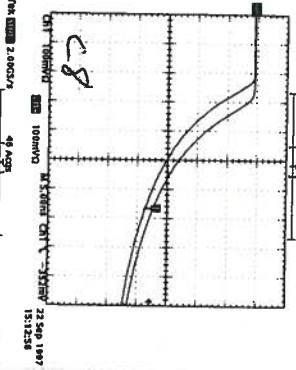
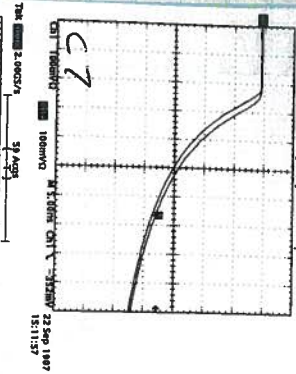
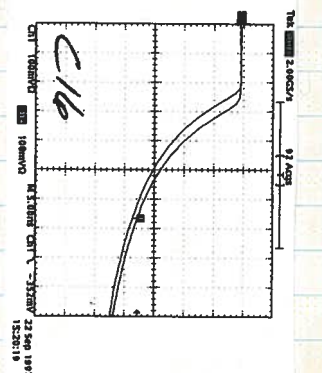
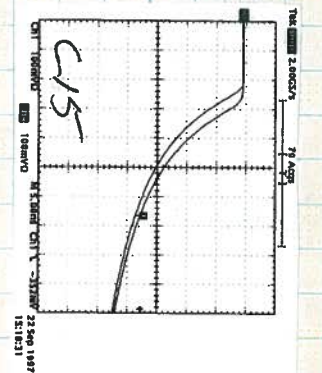
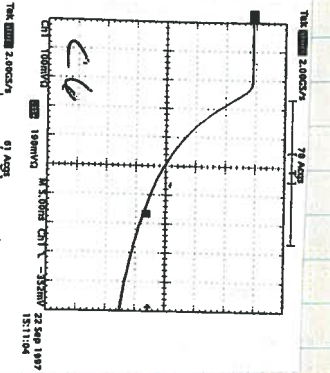
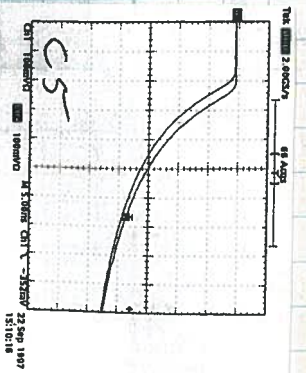


Looking at the delays on the panels I have
labelled CHARLIE and CHARLIE'

1411



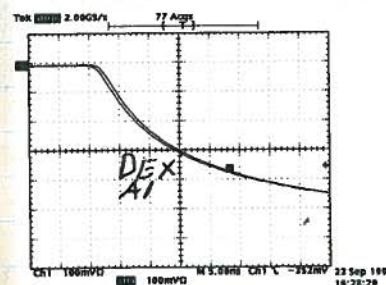
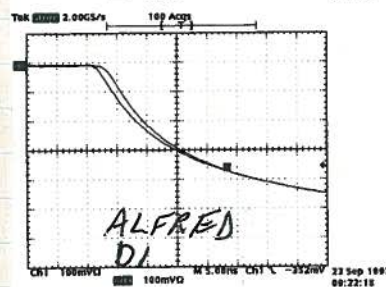
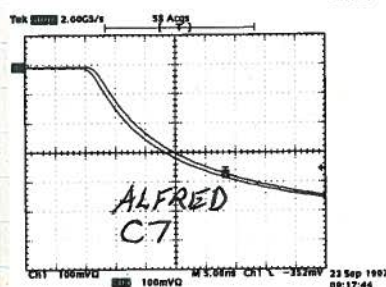
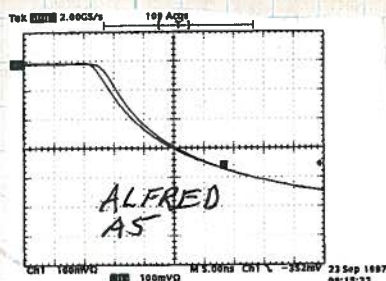




9/23
144

Repairs of Some Delay Cables

Pictures are of relative delays after repair of cable
Reference delay is ALFRED D2, again.



cables for there two were swapped at the rear of the detector with .50' cables which go from rear to upper platform were swapped at the rear panel.

This cable was ok when I hooked it up again. Wiggling the connector at the upper platform did not produce any effect. Perhaps we were looking at the wrong cable previously?

Bad BNC feed thru on panel on lower platform. Feed thru broke off when I tried to unplug the .50' cable. Put on a new feed thru.

Repairs of some Delay Cables

9/24

Some of the RG-213 delay spools appear to be too long. Cables were trimmed in 2 steps. First, a rough cut and then trimmed to final length. These seem to not have gotten the final trimming.

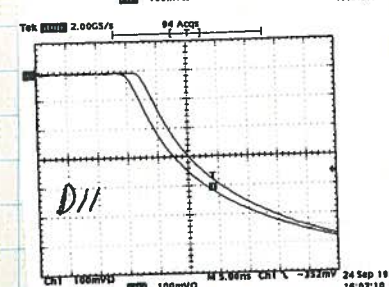
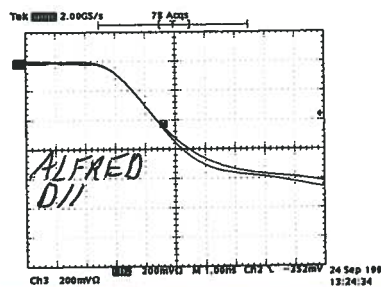
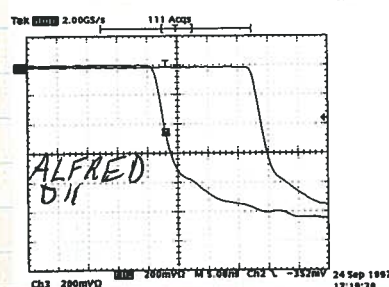
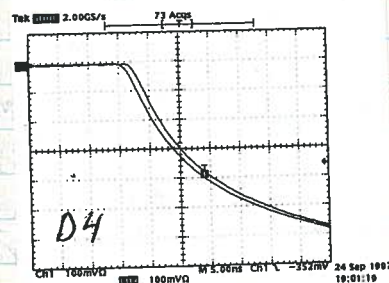
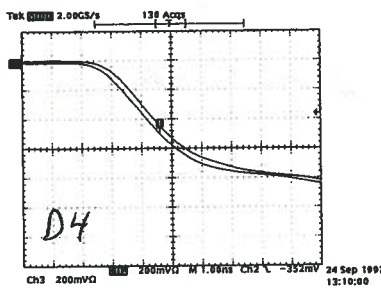
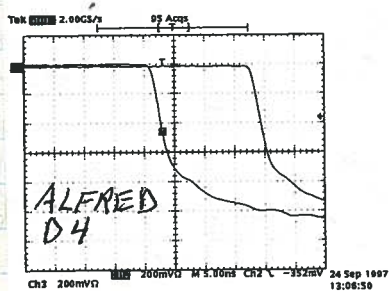
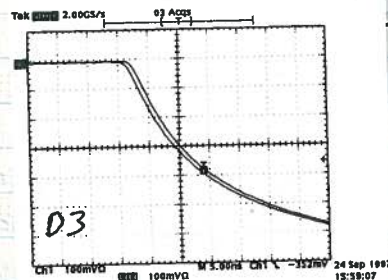
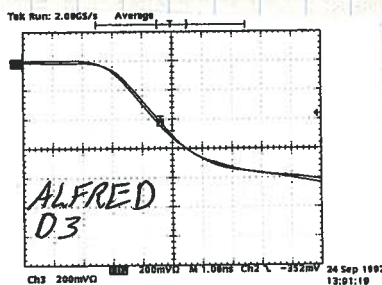
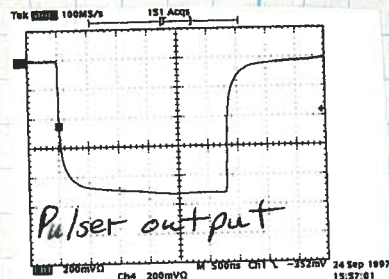
Used RG-213 spool for ALFRED D2 as the reference spool. Pulsed one end of spools and looked at other ends using 2 FET probes on the scope. Pulser is backdoor, has a "T" with a 50Ω terminator on its output to back terminate the cable. Pulser output was changed a little

Analogy delay with all cables connected (50110512) 50 +100 +50

spool before trimming ↘

spool after trimming ↘

forgot to get this picture

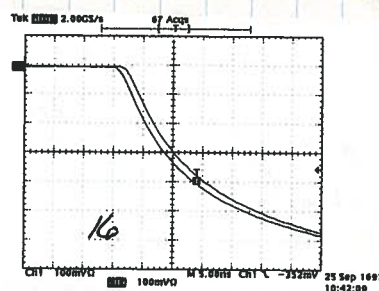
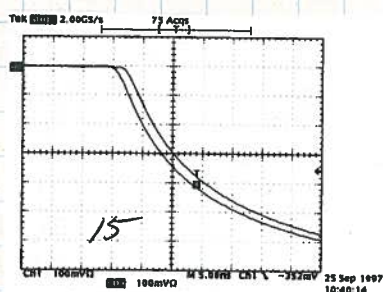


relative to ALFRED D2 total delay ↗ ↗ no 50Ω back termination on the

25 + 26 Repairs of Some Delay Cables

On the left hand side of the shield house, looking from the pivot, 9 N-series bulkhead jacks did not have BNC adapters. There were 5 105' cables that were not plugged in: 364, 365, 366, 367 and 368. I took the BNC adapters off a panel on the hall floor. This was done a few days ago.

Hannette made four more 105' cables. We fed them through the hut wall and hooked them up. They are now in the panel called Eunice 15 & 16. Delays are relative to ALFRED D2 delay.



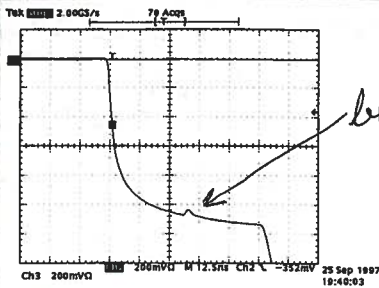
Three more cables on the right hand side need to be trimmed.

The first picture is of the small bump caused by the scope input. Although channels 1 and 4 are not displayed, the outputs of the splitter go to "T"s on the channels and then to the reference pool and the pool to be trimmed. Picture is with connection to RG-213 pool to be trimmed open.

reference pool was spool of RG-213 connected to caller (105') 271 and 272

RG-213 spool before trimmed
 RG-213 spool after trimmed

Total delays after trimmed



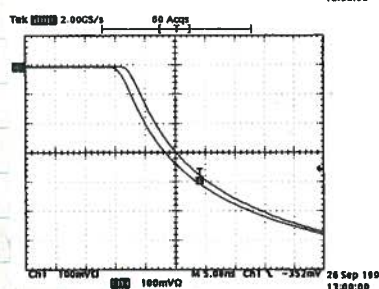
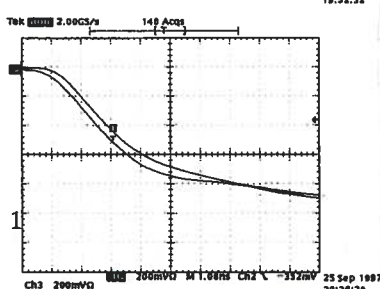
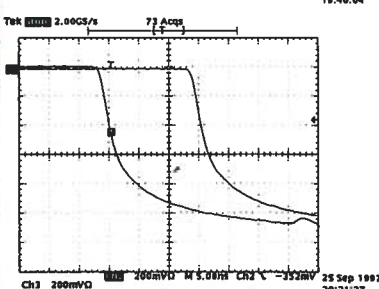
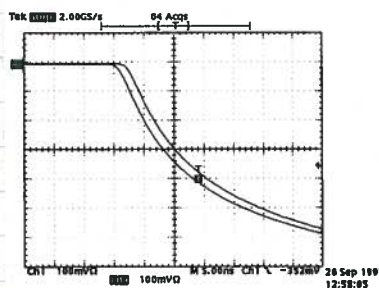
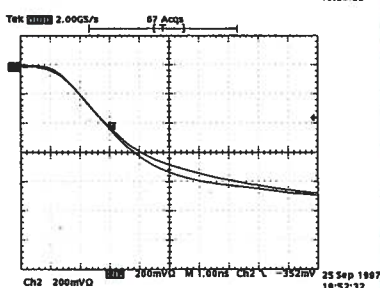
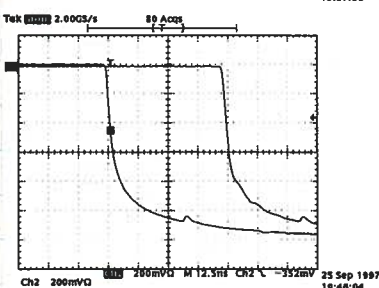
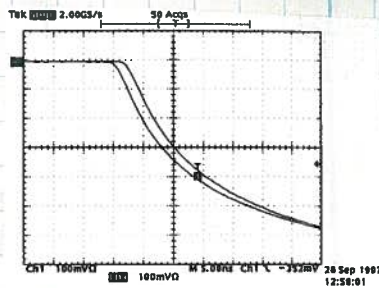
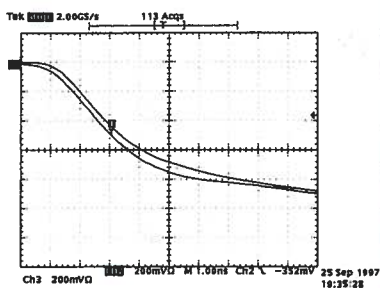
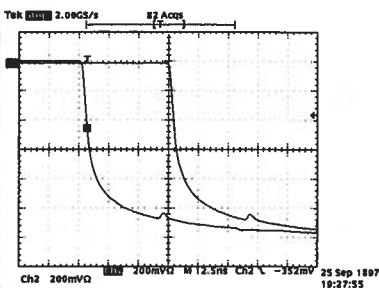
bump (ref spool only)

relative to ALTERED D2 total delay

Panel DEX B15 cable 273 (105')

Panel UNICE A7 5' cable 290

Panel UNICE B16 5' cable 339



12/1
JS

Maryland Summing Module Current Draw

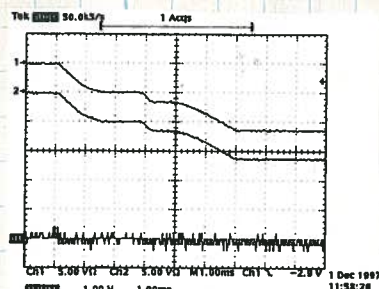
Current drawn by the Maryland Summing Module is looked at.
A 0.1 Ω resistor is soldered in the $-12V$ line of a NIM power extension cable I put together.

Each module has on $+6V$ line 220 μF - ferrite bead - 220 μF
 $-6V$ same
 $+12V$ 10 μF - ferrite bead - 10 μF
 $-12V$ same

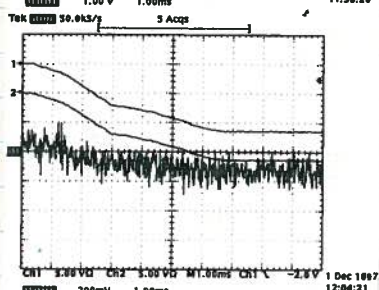
there are 18 of 4.7 μF electrolytics
 63 of 1.0 μF ceramics

4.7 μF s are on $\pm 12V$ lines $\Rightarrow$ 42.3 μF per line
 can't be sure about the ceramics

Using FET probe on the TDS 754. CH1 is supply r/f of 0.1 Ω resistor. CH2 is module r/f.
 M1 is supposed to be CH1 - CH2. Crate unloaded.
 (only this module)

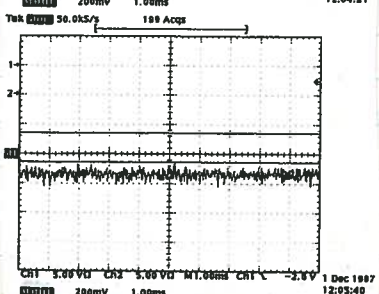


sample mode



set to average 4 traces

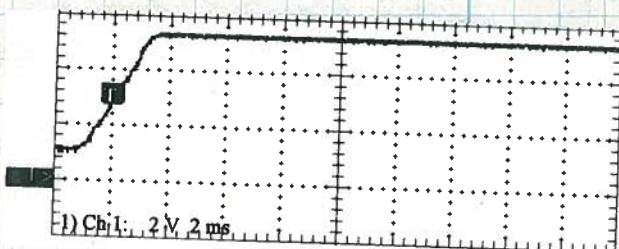
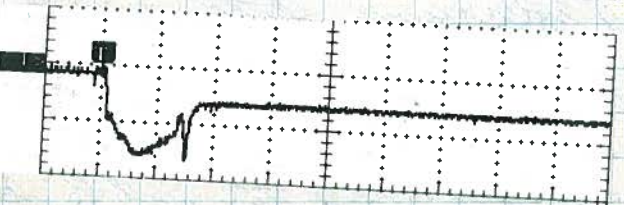
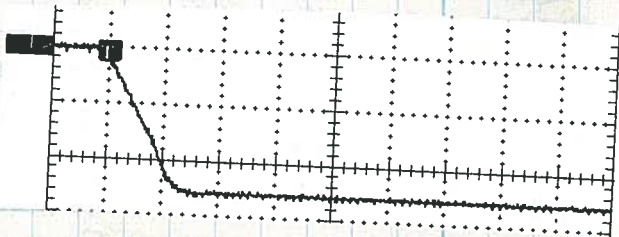
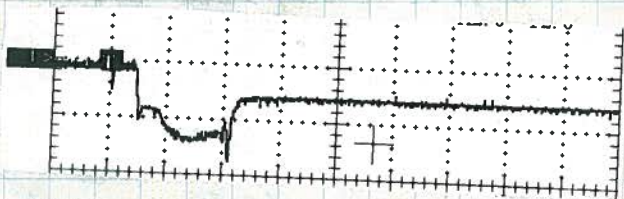
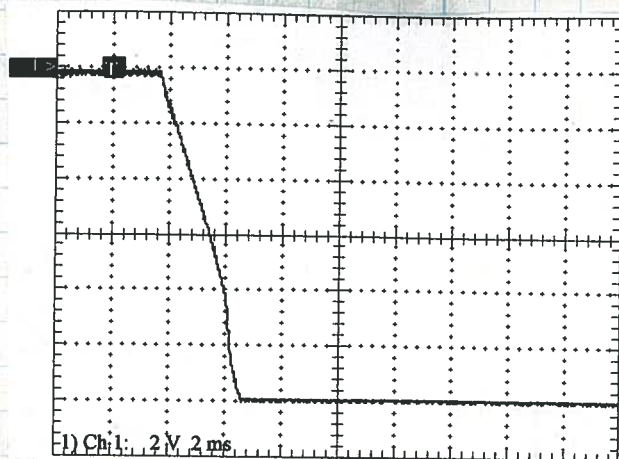
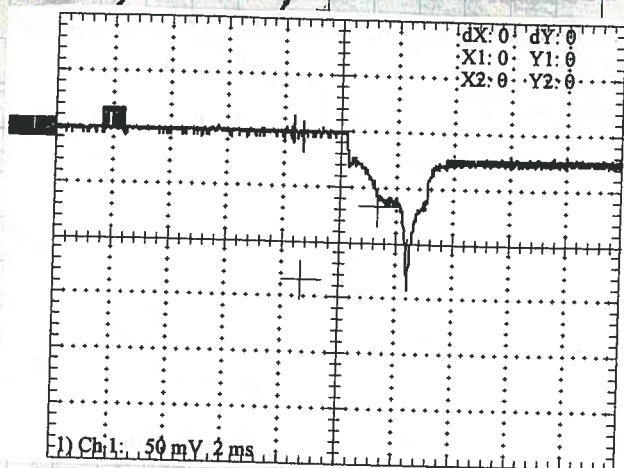
the scale for M1 seems off. I must not have something set correctly.



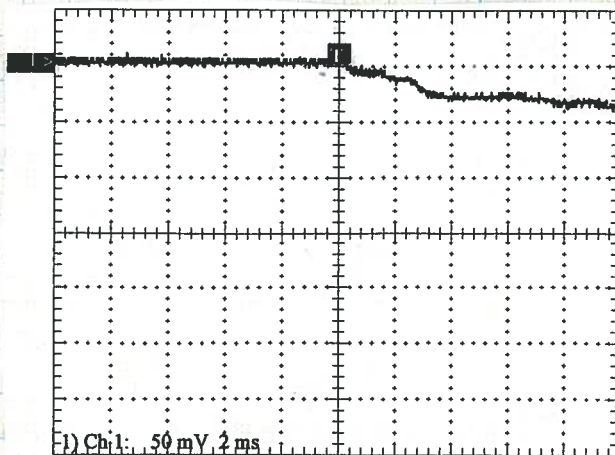
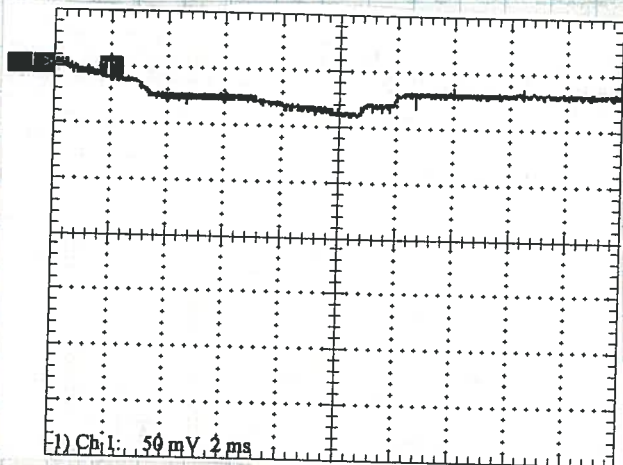
quiescent voltages
 average of 4 traces

Checking quiescent voltage across 0.1 Ω resistor with Fluke DMM gives 26 mV $\Rightarrow$ 26 A on $-12V$ line

Switched to THS 720 scope. Scope is floating so
 can connect probe across resistor directly.
 Scope set to BW limited. Voltage across resistor & voltage after
 ferrite bead to ground of NTM module.



Voltage across resistor with crate loaded.



12/10/97
JS

Sparky the Hall Rover

Radio controlled car purchased from Radio Shack

Testing suitability for pulling PMTs around the hall to investigate background radiation

I anticipate boosting the transmitter's power will cause interference in the hall.

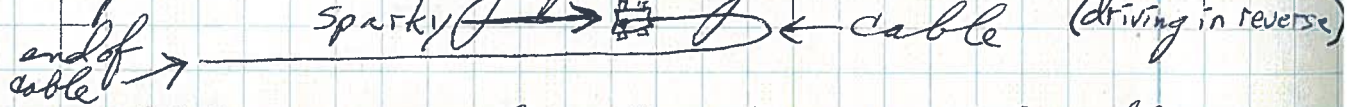
I tried to trace out the circuit for the controls on the car. Saved as CAR.54H under ACCEL. Perhaps we can use infrared or pipe the RF over the HV cable to the car.

~100 feet of RG-58/U and red RG-59U are laid out on the walkway of the highbay. Cable tied the cables to the car. Will drive car in reverse to keep the car from "popping up."

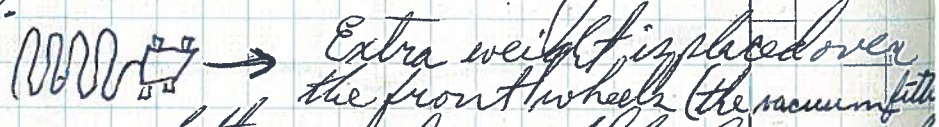
Wheels slip on the floor when energized. Put some stainless steel vacuum fittings on the car to increase the weight.

Sparky pulls the cable ~3'! No problem!

Sparky turned around and driven to the other end of the walkway, pulling the cable behind him.



Cable arranged on floor at one end of walkway so that as it is pulled down the walkway it will neatly unfold.



Cable is tied to the rear of the car. Car will be driven forward, in order to make steering easier.

Sparky pulls cable all the way from the mail stop station to the exit door on the side of the EEL highbay by cable center. The ~100ft pull.

Sparky driven out the door with the cable still dragging behind. Starts to lose traction just before going out the door. Extra drag as the cable rubs against a pillar. Put a gas cylinder cap on sparky for extra weight.



The car pulls the cable down the walkway toward cab center. Car driven directly across the roadway onto the grass. The car makes it off the grass before getting bogged down. It's been raining lightly all day. It gets bogged down trying to climb out of the culvert just past the roadway. Car is bashed up and driven back up the walkway toward the EEL. About 3' of cable still remained inside the EEL building. Drove the car up the walkway and turned left to go around to the parking lot. After turning the corner the car started to get bogged down. As the cable rounded the building it rubbed against the building corner and a downspout. When I tugged on the cable I found a fair amount of resistance. The car was picked up, turned around and driven back to the doorway.

The car seems satisfactory for driving around the open floor in the hall. It will have difficulty pulling cable around obstacles.

Sparky Current Draw.

12/14

JF

A set of red LEDs have been mounted under the body of the car. A row of 5 red LEDs, a 51- Ω 18W resistor is in series with the LEDs. The 5 LEDs are in series hookup.

Current draw is checked by putting a jumper across the black (-) connector pins and a Wavetek DMM across the red (+) connector pins as an ammeter.

With the car switched ON and no IR signal transmitter the DMM reads 93.9 mA.

The car is set upside down, wheels in the air. No load on the wheels. In LOW gear, in forward or reverse, the car draws ~ 0.48 A. In HIGH gear it draws about 0.56 A. The initial current draw can read as high as .95 A just at the start.

When turning left or right the car draws about 0.10 A, up to 0.30 A at the start.

If I put my hand on the 4 wheels for friction the

current draw gets up to 1.75 A. The car is in LOW gear.

The voltage drop on the 51Ω resistor on the right side LED is 1.736 V when car is idle. Drop on the left side 51Ω is 1.709 V.

Measured ~~with~~ resistance of right side 51Ω is 51.6Ω . Left side 51Ω is 50.6Ω .

$$1.736 \text{ V on } 51.6\Omega \Rightarrow 34 \text{ mA}$$

$$1.709 \text{ V on } 50.6\Omega \Rightarrow 34 \text{ mA}$$

$$93.9 \text{ mA} - 68 \text{ mA} = 25.9 \text{ mA for receiver}$$