

10

B-300 A

Del Mar Engineering Laboratories

LOS ANGELES, CALIFORNIA

PROJECT COMPUTATION RECORD

SERIAL NO. 8

WM Thornton

Operations

5/17/56 Check of PARAMI -

Towed radop with interrogator

Chase A/C with simulated missile

Gnd sta. with Brush + Digital recorder

Set up Gnd sta. ~~to~~ directly behind pt Dume & checked out at 1445

Contacted 22 A @ 1500 & instructed them to start operations

Radio Contact marginal

Interrogator started at 1510

Item 1 on test sheet

1508 + 1509 made broad side passes
est. nearest misses at 20'

1519 Item 1 passes

1523 Item II passes

1530 beam attack

11-1 signal becomes noisy at +1000 ft.

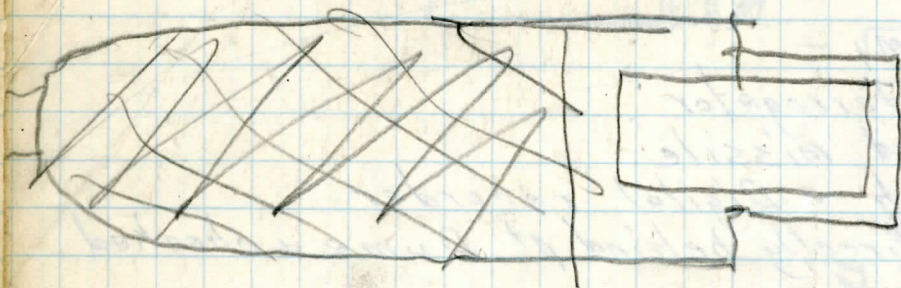
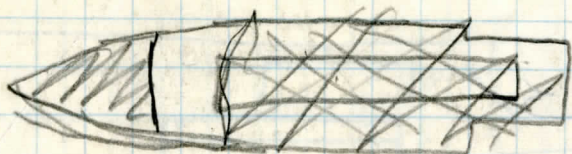
Poor communications signal

ETA 1640 for 2nd

~~1530~~ 1527 broke off for ~~the day~~ turn around & 2nd Mission

There is still rotational noise in ring around system

Signal ~~to~~ from interrogator becomes ~~marginal~~ Fades
at $\approx$ 3 mi.



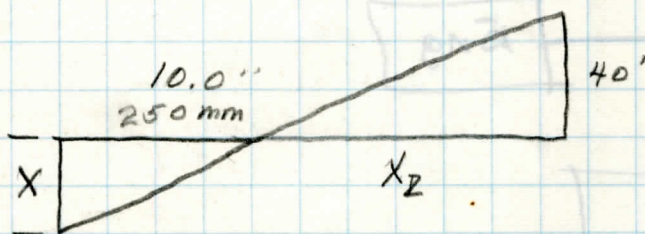
12:00

8:00

9:00

Contacted A/C at 1725
 Tgt. released & X mtr. started 1730
 500' cable out 1732
 Airspeed 80 mph-
 1734 - 1000' cable out
 Noise extremely bad on passed
 75 X started #1 passes at 1734
 1735.5 4 mls. out signal faded completely
 1737.0 Tgt. transmitter faded out
 1740 lost god pwr
 1743 restored "
 1750 cancelled mission

Stadiametric Ranging



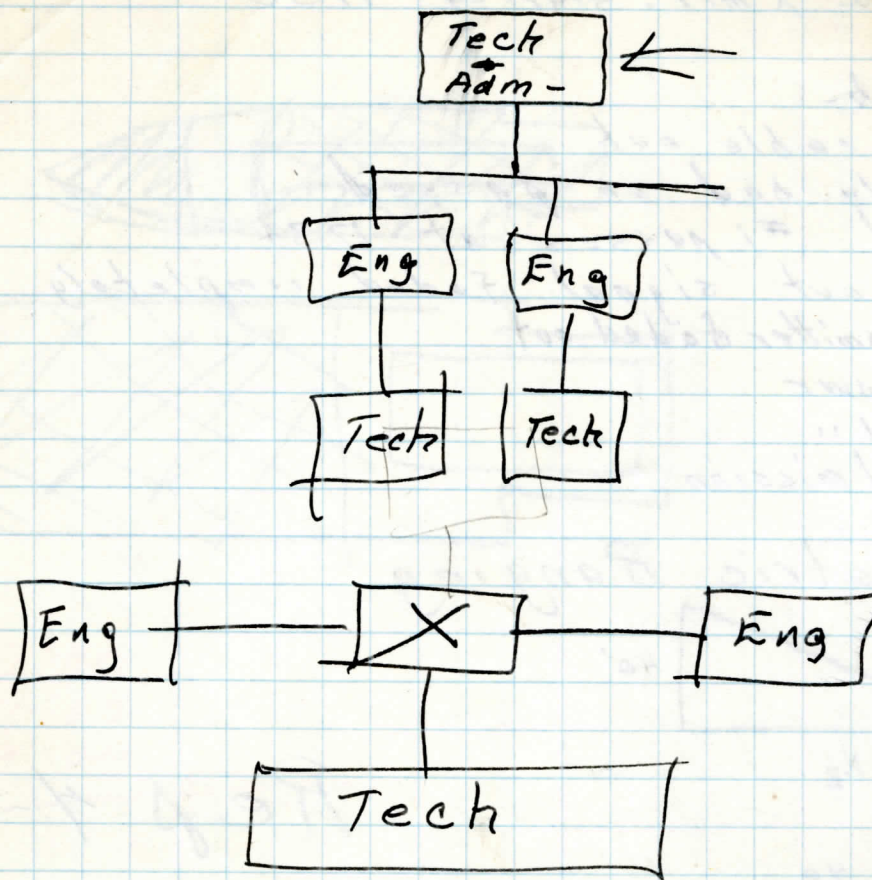
$$\frac{.051}{10} = \frac{40}{X}$$

$$\frac{.98}{132} = \frac{X}{7}$$

$$132X = 7 \times .98 \quad 132 \overline{) 6.85}$$

$$\begin{array}{r}
 7800 \\
 .051 \overline{) 400.000} \\
 \underline{357} \\
 430
 \end{array}$$

Rep 4-3996



CK of Sweep CKts -

#1 $B_+ = 300 + 150$ $B_- = 240$

$\frac{1}{2}$ 6ma. 5ma. 4.8ma

+ Sawtooth = 240

- 240 = 240

#2 +300 +150 -240
46ma. 4ma. 4.8ma.

Letitia

With strike Leo at 7.5
+ fac on lights overhead

Without Leo + Cover

CK of Lens Com Sys -

#1 16 fps f 1.5 Max int + sat amp Without lens & covered

#2 " " f 2 "

#3 " " f 2.8 "

#4 " " f 4.0 "

#5 " " f 5.6 "

#6 " " 8 "

#7 " " 11 "

#8 " " 16 "

#9 " " 22 "

#10 15 With strike Len at ~~f.8~~ f.8
+ foc on ^{floor} lights overhead

#11 3.5 "

#12 5.6 "

#13 18.0 "

#14 32 1.5 "

#15 " 3.5 "

#16 " 5.6 "

#17 " 11.0 "

#18 32 1.5 Without lens & Covered

3.5 "

5.6 "

11 "

Roll #1 Plus X

F 16 fps
#1 1.5

2'

1KC Prf sat pulse
6us sweep
lens on +
set at 3' + f 5.6

2	2.8	"	2'
3	5.6	"	2'
4	11.0	"	2'
5	22.0	"	2'
6+7	22	32	3'
8	11	"	3'
9	5.6	"	3'
10	2.8	"	3'
11	1.5	"	3'
12	2.0	"	10'
13	2.0	16	7'

moved pulse

Ran film off varying F stop
to Amplitude of pulse 16 fps

TriX

#1	F	16 fps	2'
1	1.5		
2	2.8	"	"
3	5.6	"	"
4	11.0	"	"
5	22.0	"	"
6	22.0	"	"
7	22.0	32	3
8	22.0	"	3
9	22.0	"	"
10	11.0	"	"
11	5.6	"	"
12	2.8	"	"
13	2.0	"	"
14	1.5	"	10

15 Varied Amplitude (pulse)
16 Duration
18 into Moved

Test Roll #3

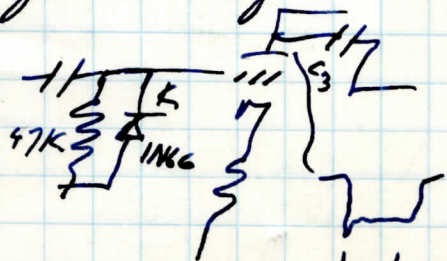
Plus X

#1	5.6	16 fps	5'
2	8	16 fps	5'
3	11	16 FPS	5'
4	16	16 FPS	5'
5	16	32 FP	8'
6	11	32 FPS	8'
7	8	32 FPS	8'
8	5.6	32 FPS	8'
9	4	32 FPS	8'
10	2.8	32 FPS	8'
11	Run off 11	16 FPS	

7/3/56

Hook Up on Mock Up.

Backswing on trigger was apparently cutting off sweep for its length could not be controlled. Apparently remedied by replacing shunting with diode - at same time increased C_3 to 100 μv . Ckt now functioned well & τ could be varied from $\frac{1}{2}$ to 20 μsec - After running an hour or so the pulse length had decreased to $\approx 4 \mu\text{s}$.



& was showing double pulses - replaced C_3 to 200 μv & length was returned to max of 7 μs .

Checked value of all resistors & no change - Allowed to cool for 10 min or so -

Panama City -

7/3/56

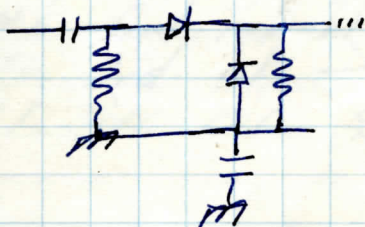
Film Test -

East. Cl. X

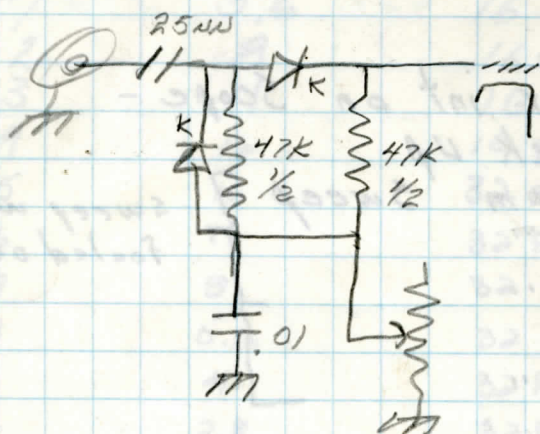
f

Max int on Scope -
E-H Mock up

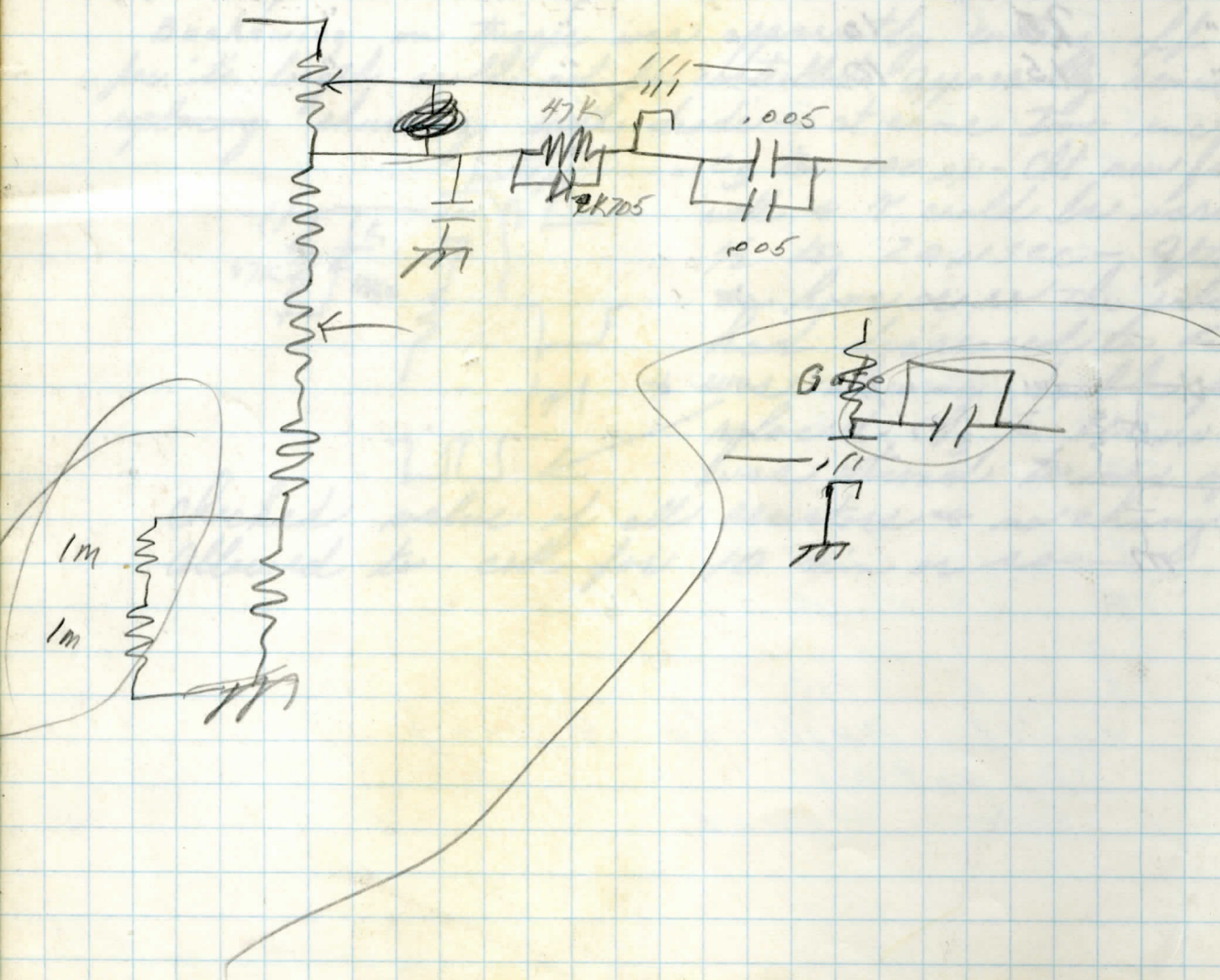
#1	30 FPS	1.5	10	Random	Sweep	
2	"	2.8	11	"	"	} sweep was fouled on these
3	"	1.5 5.6	10	"	"	
4	"	1.5	10	"	"	
5	"	2.8	10	"	"	7 u/sec swp
6	"	4.5	10	"	"	"
7	"	2.8	10	locked on	"	"
8	32	2.8	10	"	"	"
9	"	2.0	10	"	"	"
10	"	1.5	10	"	"	"



Trigger mod.



Other Mods. Aux cont.



1st Hot Mission against Banner
7/12/56 8.30 Lt Roope Tri-X A/C 206

P.F. 4 ~~th~~ Firing passes

Test Run in Docks #1 Strike area good - Sweep low and slightly out of focus - ~~Dot~~ of Hood above A/C

#2 Hood App in place still good strike scope low -

#3 On ramp O.K. & No sweep

#4 1st Pass No discernible sweep - Tgt. slightly high in frame
Camera B.S. off in Az - Rckts. 150' low good exp.

#5 2nd pass Tgt. low in frame - Rx. 30' low off in Az

#6 3rd " Tgt. ctr. Rx low in frame Rx 150' low

#7 4th " Tgt + Rx ctr in ch off in Az. Rx $\approx$ 25' lead shot
of tgt. cable.

#2 & 3 Missions Hot 7/12/56 1330 & 1530
Collins & Jones No swp good ex. 16 fps XX

#1 ~~Area~~ Insufficient leader - Apparently just run in air
to tgts -

#2 No tgts No swp exp. O.K.

#3 Tgt + Rx centered in Elev $\approx$ 55' in Az on cam. B.S.
Rx $\approx$ 30' under tgt exp. O.K.

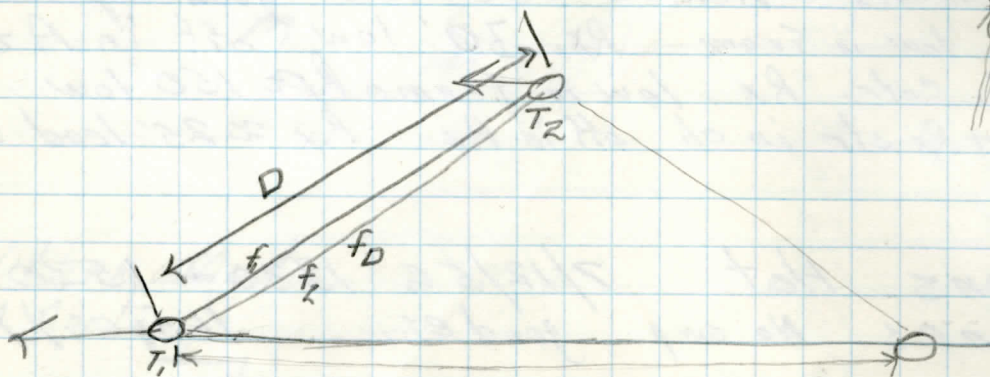
#4 No tgt - No sw.

#5 Gnd. run off "

#6 Gnd. ok. Sw low but vis. in str. area.

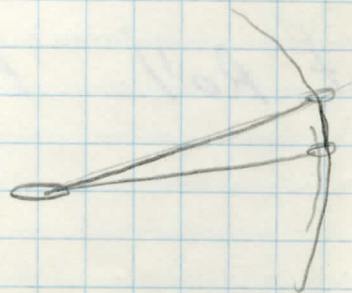
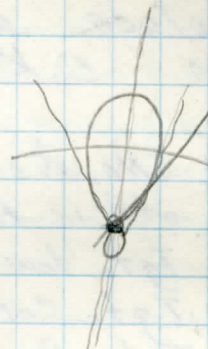
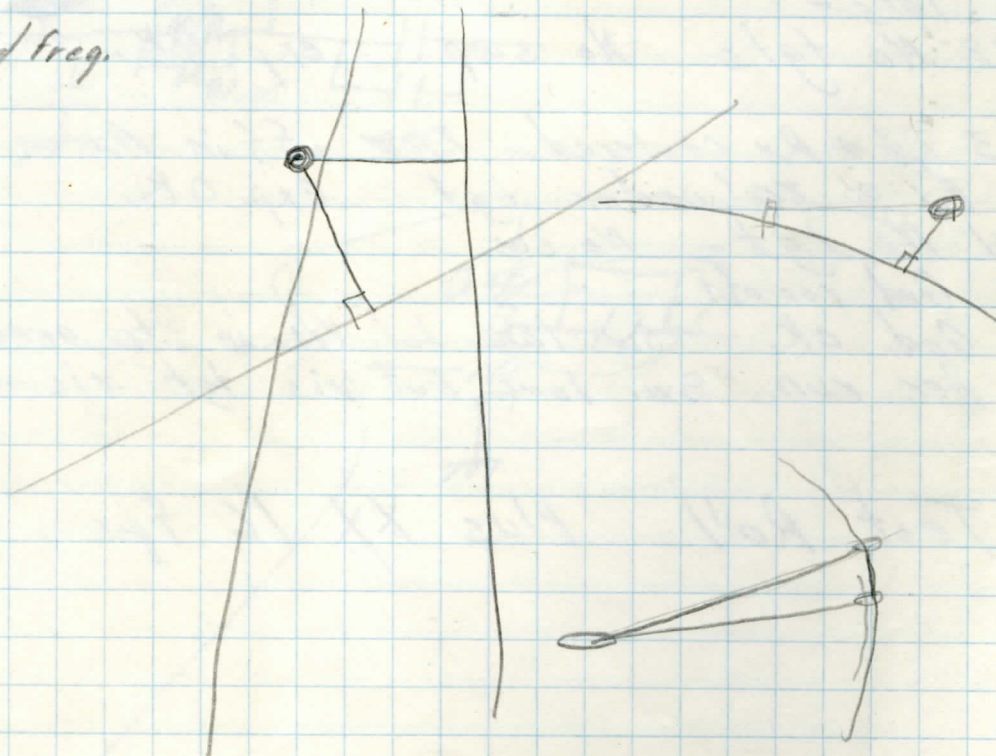
#7 Aer. run. Sw. low but vis tgt vis on sw Scintillation.

#4 Test Roll Plus XX 16 fps F 1.5 scope



$f_1 = \text{freq of } T_1$
 $f_2 = \text{" " } T_2$
 $f_D = \text{Space Controlled freq.}$

$\perp$



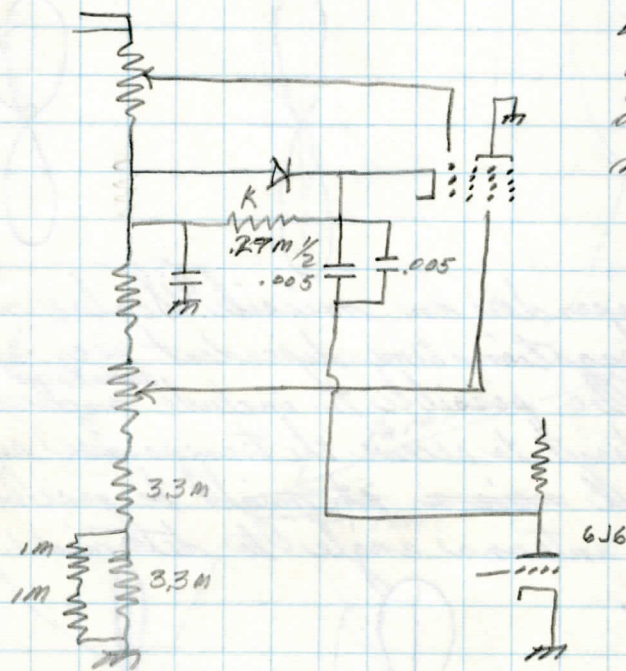
13783 Bernard Barnett

791 Cocco

4/14 Rotted 100C off 206 and took into mockup room.

Poor focus and intensity instability made K1194 P2 replacement necessary. Changed intensity mod. display to 'A' presentation since as regulation of H.V. is so poor as to render intensity modulation unworkable - Regulated neg. supply will be necessary for inter. mod. display. Made ^{the} changes in ckt. shown below.

Loaded camera with tri-X and made test run. Optics have apparently shifted so that scope trace has to be shifted almost past top of the aperture resulting most likely in decreased effective aperture. No attempts made to correct this.

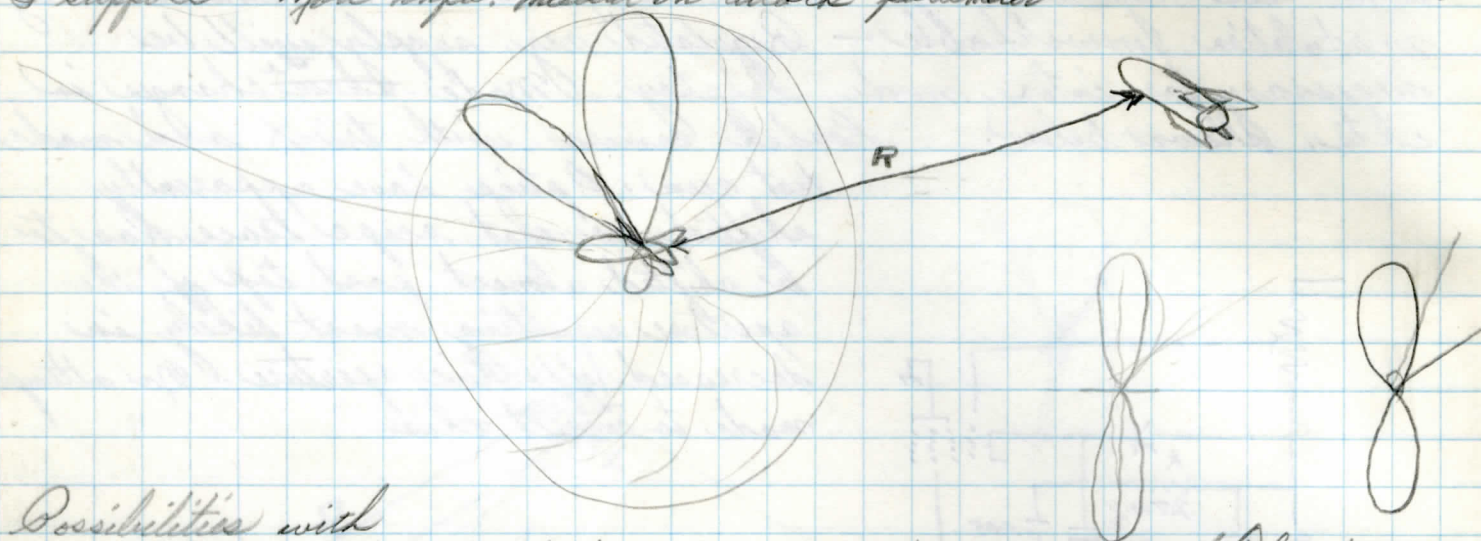


4/15 Called Barnett. May be possible to get him.

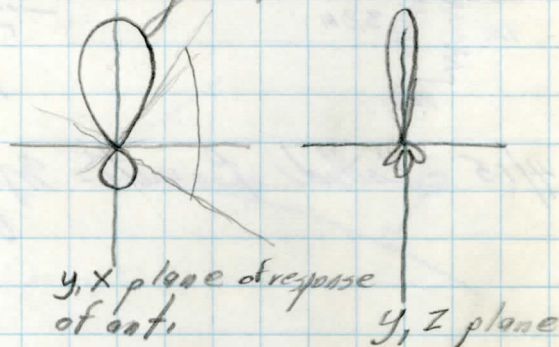
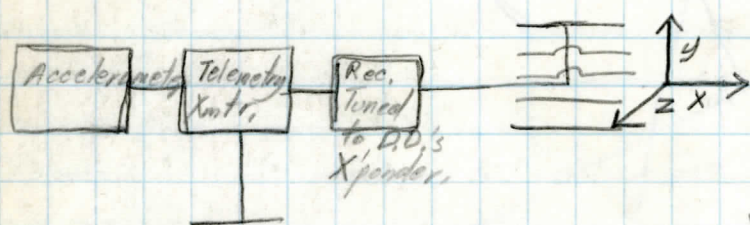
7/15/66

Schemes for use of Parami with Ding Dong.

Prob: determine miss distance ^{accurately} and elevation component of miss - roughly
I suppose - More info. needed on attack parameter

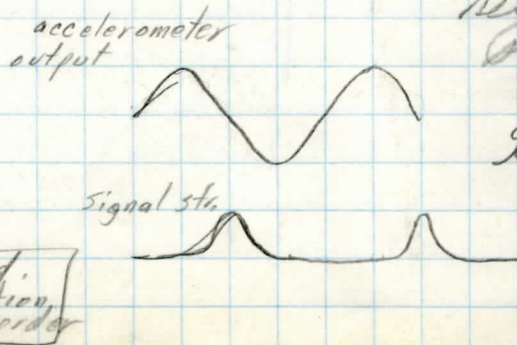


Possibilities with single interrogator on tgt. and transponder on missile. Scalar miss can be determined from freq. of propagation time dependent osc. If space limitations allow it might be possible to include an ^{auxiliary} directional antenna such as a Yagi in the target to receive the transponder's reply. Since tgt. rotates on its longitudinal ~~axis~~ it might be possible to correlate signal strength and antenna angle to determine roughly elev. $\angle$ of transponder.

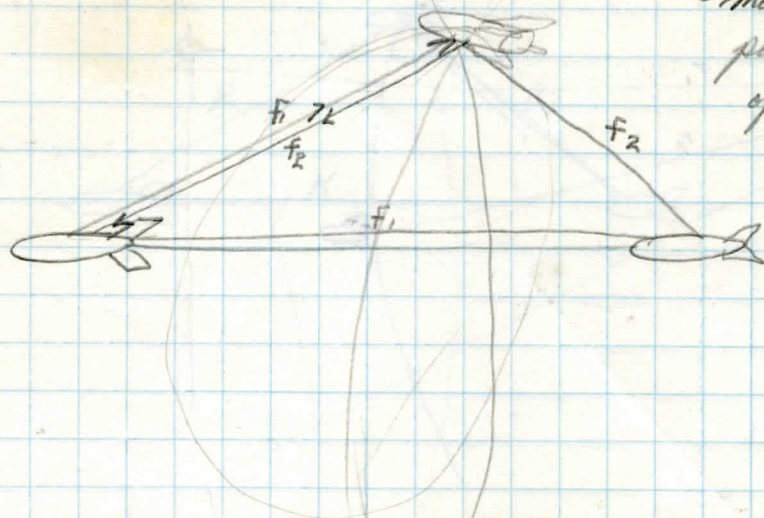


It is doubtful that a tgt. could accommodate the additional equipment especially a directional antenna. Since info. will have to be remotely recorded a dual channel telemetry rig and associated ground receiver will also be added to Parami installation.

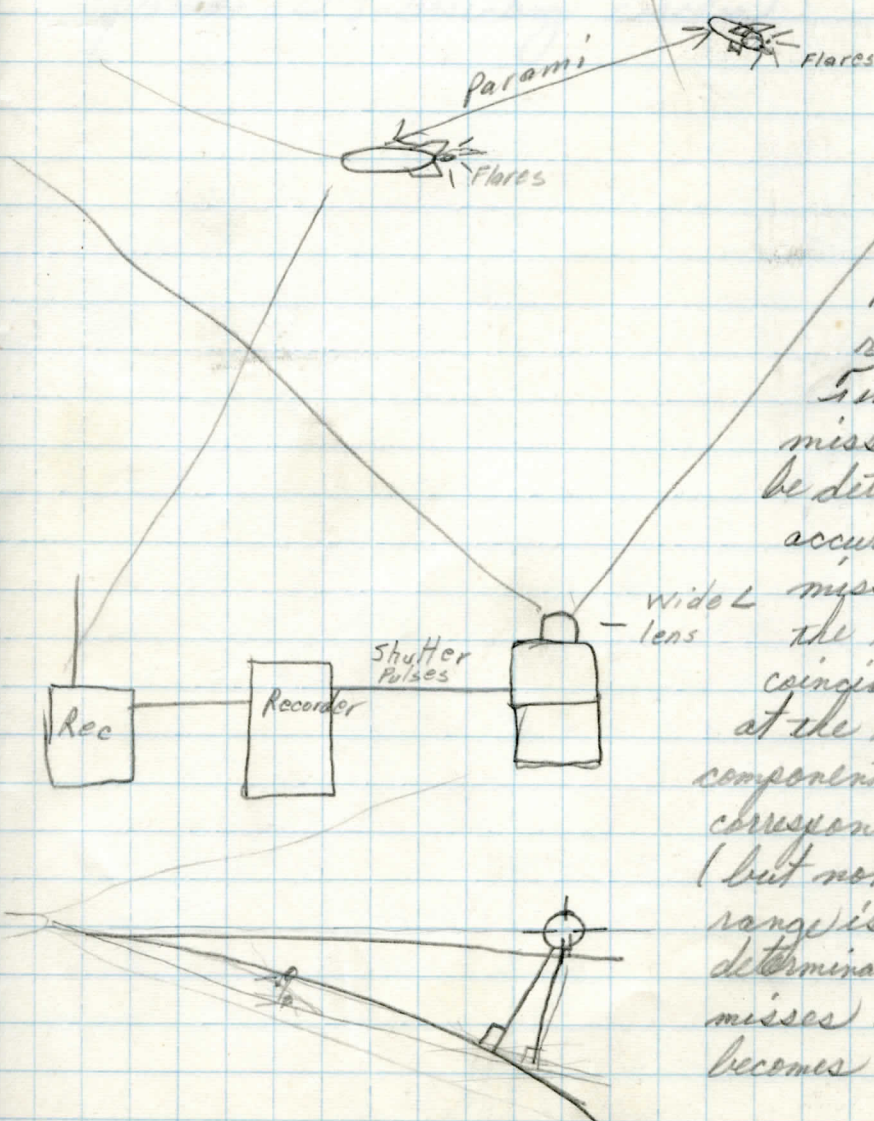
Hairy!



(2) Theoretically possible with receiving equipment on a second
tgt. by time differential
measurements ^{determine} two
points in space of one
of which is the actual
position -

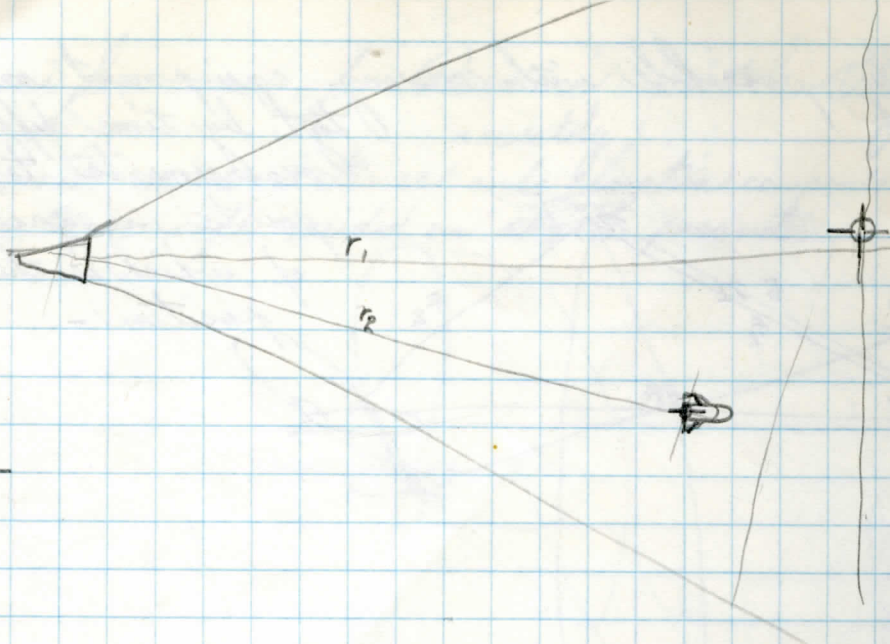


(3)

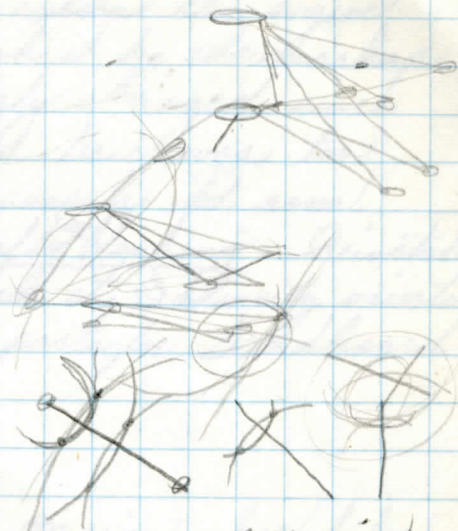
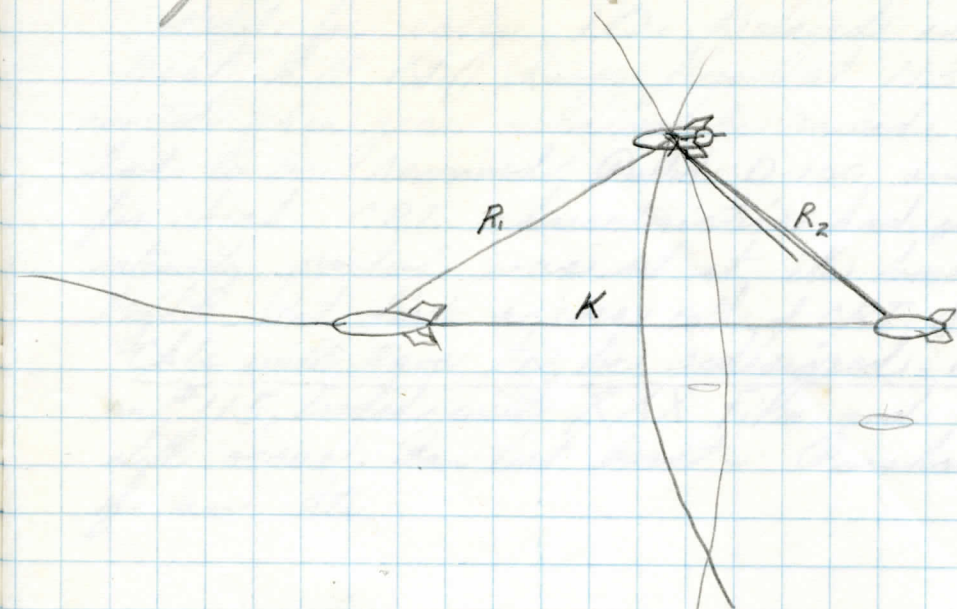


In this configuration
a camera mounted on a
chase or the firing A/C which
follows missile flight path,
photographs with flare augmen-
tation, azimuth and elevation
relation of missile and target.
Time of exposure is correlated with
miss distance. Elevation ^{at point of closest approach} can also
be determined with a high order of
accuracy if it is assumed the
missile trajectory is flat and that
the tracking camera's angle is
coincident with missile path. Since
at the ranges involved gravity acceleration
component may be large there will be
corresponding inaccuracies in Cl. Az. distance
(but not angular) determinations unless
range is known (camera, tgt. range). The
determination ^{should} be adequate for large
misses and for small miss the error
becomes correspondingly smaller.

u u u



Multiple Paramis:



Assuming that 'K' is accurately known two ² paramis towed on a longitudinal axis will render ranges which may be plotted as intersecting circles

7/16

Prof't. for early T.O. Delayed while planes were moved to
 Goat Hill. Lt. Reese flew at 1130 to check F.E.I. Mission
 aborted when gear could not be raised. Upon return the engine
 had to be removed. Pulled D-100 and took it by the shop for
 check. C.R.T. characteristics had obviously changed since
 intensity control was set at its limit and trace was too
 bright. Put diode across cath. of CRT. All components i/f'd. norm.
 Ckts will have to be redesigned - especially ^{4th} blocking. Reinstalled
 on #115, loaded with XXX Film and checked it. Intensity variations
 still occur. Ran test burst - Purchased parts for breadboard
 of new ckt.

7/17 06:30 preflt. for T.O. Col. Berry in 115. Mission aborted for various reasons. Checked D100 O.K. except for intensity variations. Left film in and ran off two bursts manually. Film counter at 50. Roope set up a mission at 1630. Col. Berry flew this mission at 1400. No decent passes. It manual pass locked on B-29. B-29 aborted as did 115. God and radar trouble. Called Joe & Kelly - It's very easy to be very wise and critical especially 2000 miles from a snarled gaggle - A few 12 hr days on that hot ramp would probably be an eye opener to a lot of people. Tried to call Max H. to get a progress report from Guma. Got an answer $\neq$ on the FC 50 radar's ability to record ~~quite~~ rockets. Use the parts of the old tank scores to get an A presentation only. GSA camera etc.

7/13 No flying today because of the U.S.M.C. demo. Reese will attempt to get off an F-1 flt. against a Radar. Picked up and checked out components necessary to make a scope unit. Called Col. Perkins to check on progress at Yuma according to him the coincidence ckt. is working and only needs test flts. for stat'n. He has been known to be overly optimistic before. Went to Oglin in an attempt to get the ungarbled word. Max Hill was unavailable but M. had just returned. Neither he nor Schauble knew current status of Yuma. It is their knowledge ~~unit~~ coincidence had not worked. The Oglin score (similar to our D 100 C) had had one unsuccessful flt.

7/19 Max called Jensen and Best. Yuma has had 3 successful (by their standards) flts, out of an undetermined no. of flts. Went over to S.H. and looked at

their film from dichroic set up. Looked good. Spent a good bit of time in film vaults looking at film from RDPFI using FCB radar. Rockeflowers easily recorded on +80% of passes. No doubt that rockets can be recorded. Their work was done with video of A-2403. I scrounged sufficient parts to const. rebuild both D-100-C's using 16m on N-G's dichroic mirror and 31P CRT's. Friends are handy gadgets. Joe called and told him of plans to modify, etc. Just one more junior exec. outburst from young Tom Edison or anyone else for that matter! 7/20 Started mods. on D-100-C. Worked until 2200. Got ~~lost~~ caught a number of times on the short. Nuisance. 7/21 Worked until the sheet metal shop quit at 1600. Will be impossible to complete unit today since the whole base has locked up.

7/21 Sunday -

7/22 Finished up sheet metal work and worked over the unit ~~completely~~ completely assembled unit. Had a longer F.L. lens for the scope collimator. Called Lamont at 2300+. Had pick a longer lens from Bauer. Heavy shaver.

7/23 Arr. brought over lens and finished job. No A/C in commission.

7/24 715 & 206 still out, also 753-221 & 218. Buried up to accept D100-218 came in late and we put D100C MKII on it. Looks good. Ran test film.

Received yesterdays test film - Strike area completely overexposed even at 64 FPS & F4.5. ~~Left~~ Light diff. is even greater than expected.

7/25 Preflight for D100 T.O. Looks good but A/C aborted for fuel quan. All other A/C avail also AOC.

7/26 All avail A/C AOC. Received test film late afternoon.

That run late in ~~evening~~ afternoon (after sundown) of 7/24 looked good. That run in Morning of 26 was badly overexposed except at small apertures est. F-11 thru F-22. At F-22 scope trace was still visible.

7/27 Sat and Sun spent with Lamont and Schauble et al 7/28 According to S. Yuma now has 5 passes on coincidence skt. GDB's unit is not being tested.

Mon 7/30 Preflt. for 1000 T.O. on 206. Plane off at 1100. Guessed at F on GSAP & F11. Everything looked O.K. 32 FPS. Camera has series 6 red filter plus nondescript polaroid. Plus X Films. Unloaded at 1200. Post flt. OK. ~~Returned~~ P.H. Jones. 1 pass at rag with 24RX. Weather moved in & flts Cnx. until

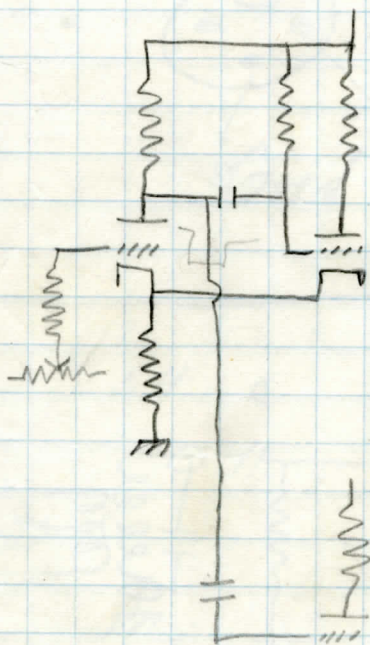
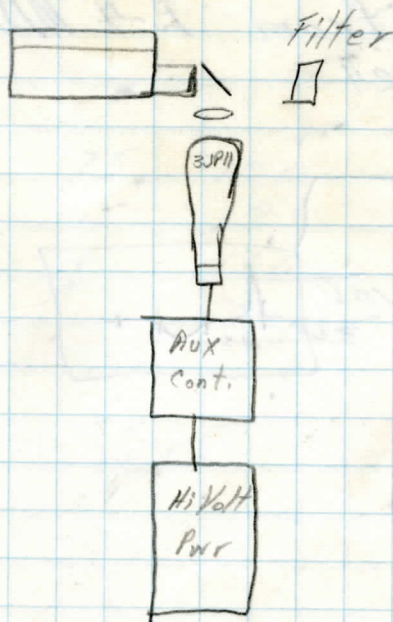
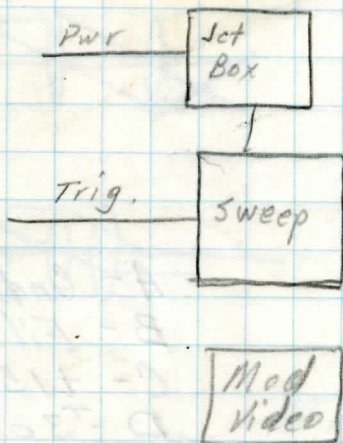
1500. Film rtd. ~~new~~ Exp. O.K. Sgt trace appeared. Better CRT focus is needed. Pulses too high which results in too high a writing speed. Something happened at during firing causing tgt. and main bang to disappear. Possible trigger trouble. Sgt. reappeared but not clearly discernible rockets. Need more gain. Sgt. was not saturated.

7/31 Changed video amp to mod. MK II video. XX Film 16 f.p.s. est. F-11 25A filt. + polaroid. Paul Jones on 0830 T.O. Preflt. O.K. using master trigger. Mission started for radar. Post + Pre flt. O.K. for 1500 mission. Hx, started other missions. Off at 1500 - Lt Romach to fire & chase. Same as 0830 mission. Chased Col. Berry on 1 & 2. Radar lock on doubtful. No. 3 O.K. 24 RX. Radop 1600 - 20A 360 HAD - 270° against cloud. Turn around - post & pre O.K. same as above. 1730 against 6X30 rag. clear sky SSW heading

7/30 One flt. for

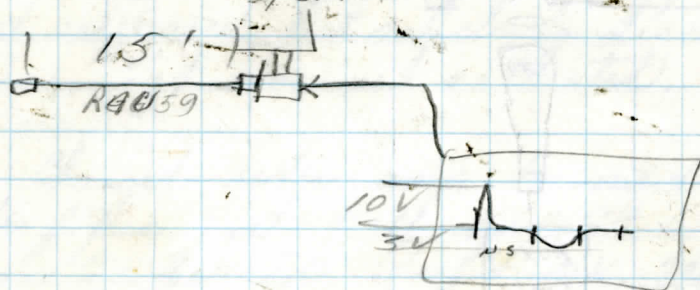
8/2 Davis 1200 1st 1 1/2 D.H. - 19000 6 Rx
2nd Dot on - 1900 6 Rx
3rd 2 Fire DOK c/ 1/2 over lead 12 Rx
XX 32 f.p.s. 2 red filters + polaroid

Layout for D100-C MKII



Master Trig. from E-4 MJ.

USM 27



1 - Brn.

2 - Purp.

3 - Red.

5 - Blu.

7 - BIK

8 - Yellow

10 - L. Gray

11 - D. Gray

14 - or.

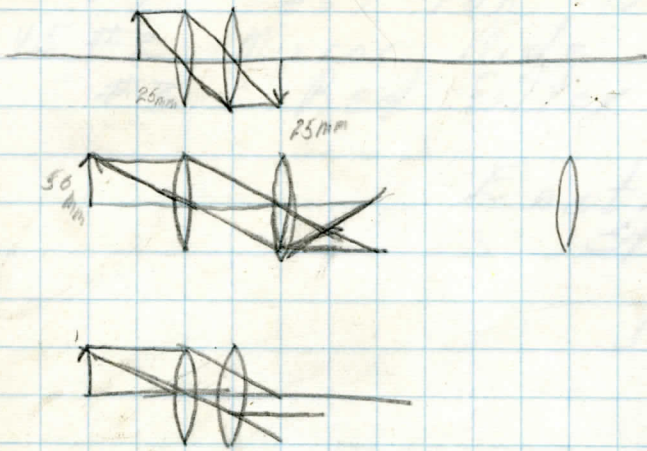
9 - WH

A - Gnd

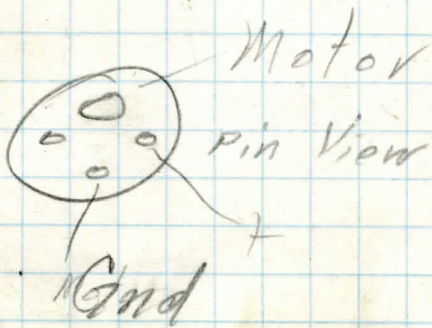
B - Fil

C - +150

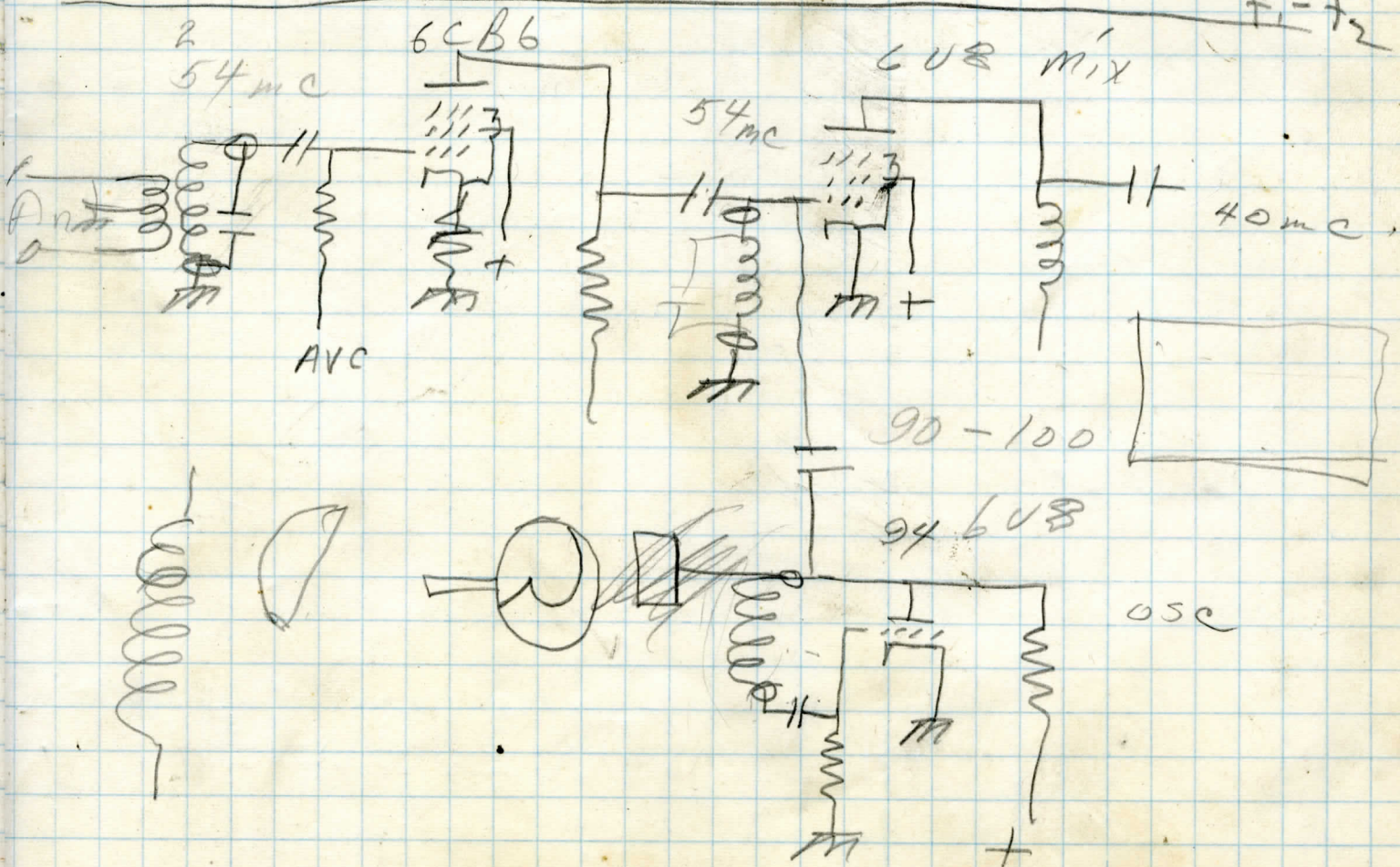
D - +300



75 100
125
150



f_1
 f_2
 $f_1 + f_2$ $f_1 + f_2$
 $f_1 - f_2$



7/25 Test film 16mm XX Rx, T. Mock up

G 5AP

#1 Test run trailer 16 fps
f 4.5 #2 Mirror Wide open "
#3 Red filter "

Eastman Kodak 66305
Stores Inc.

Jacksonville Elgin 57674

A R G spearman

Reqs. for D100 c MKIII
C.R.T. $\uparrow$
High definition $\leftrightarrow$ Aux Focus
Face Visible $\leftrightarrow$
Volt Reg. on grid $\leftrightarrow$
Clamps - Adel $\leftrightarrow$
Position controls $\leftrightarrow$
Video
 2×10^3 gain $\leftrightarrow$ 2×10^3
FTC in 1st stage 2×10^3
Pulse stretching held to min. .02

Wk.
Elec.

Sweep Fixed gate $\leftarrow$
Fixed rate $\leftrightarrow$
~~Dot~~ Gate-sharp cut off $\leftarrow$ Trig =

Size —

Some Cannon conn.

Optics
2" lens $\leftrightarrow$
F stops Visible
> 1/100 sec exp 1/100

Money Mail 

Fri # 21

Car driven to A.P. & ret. - rented car - bought lunch for
✓ Best ^{9.44} \$2.00 - Hotel, tips - Rented car -

Sat 22 - left Hotel - tips - Food & Drinks for ~~Paul~~ + MacGrew et al
✓ \$16.50 -

Sun 23 Food etc for Garst, McGrew ~~\$3.00~~ ^{\$5.25} - \$5.50
✓ 7.85

Mon - 24 ~~parking \$.35~~ ~~filters - \$5.43~~

9-25 - Lunch for Lt. Romack & other troops from Tyndall
✓ 3.00

9-25 Dinner for Paul Roos, Pat Brad. Hollywood. 2.50
✓

Fri - ~~cont~~ Arr. Yuma & showed Arking & Co. the scores.

Sat. Checked in at base and unsuccessfully attempted to find the door at airport - Made arrangements to install it on 221-Bomacki A/C - Sun -

Sun - no door

Mon²⁴ - still no door - Called Lopez for shipping # - found door -

Purchased filters. Photog. will be a problem -

Attempted to install #100B on door all went well until fairing installation was attempted (Screws would probably be better than screws for installation) the efforts of three big handed G.I.'s and myself were wasted until a ball ~~pen~~ hammer was used to open up the fairing enough to partially clear the electronics package - Sad show - Even after the bump this fairing could be installed only with great difficulty - 22 screws on the previous load up were easier - ~~Door sighted on~~ I installed & foresighted on on 221 & foresighted using optical sight. Bolts on stadia mount were useless on one side - too short - Left rear mtg. bolt on electronic pkg. must be redone - Optics have a number of problems - Strike area is not marked! Trouble here - Trace cannot be moved to top of aperture before fading - Check out routine until unit had run for $\approx$ 30 min. when trace ran free at high rate & short duration - Pulled pkg with difficulty - Coax connectors must be mtd. on top & subminiaturized - powr. plug ^{to electronics pkg.} must also be remounted topside. Take face must be made visually ~~available~~ accessible - After removing pkg. for checking during which no abnormalities were noted unit performed ~~it~~ perfectly - Reinstalled - Looked good! - I note cursedness of inanimate objects - Ran thru a roll of film - 40' - 16 Fps - Yellow filter - varied strike lens from F-22 to F 3.5 in steps with CRT lens at F 3.5 - 90° shutter - then varied CRT lens from 3.5 to 11 with strike lens at F 4.5 - after sundown - Reloaded for 0600 T.O.

run short burst - 16 f.p.s. - Yellow Filter - Factor 2 - 90° shutter
Closed up pairing with many caustic remarks from G.D. about Del
Mar's capacity for sheet metal work. Briefed Romack to run off
5 sec. bursts on gnd or T.O. & at 3K' interval locked on tgt
L ~~3K~~ 2X10³', run missions chasing if possible and/or necessary - to run off
remainder in chase - mission scheduled for 0600 - 9.5K' Del Mar Radar.
Camera was wired with trigger & mtr. ckt in 11 on manual switch
in cockpit -

Accessories for Tek- 502 dual beam-

7-20 It is desired to record arterial pressures, EK and EEG on this scope using one channel for EK and the other for EE and press. as desired. Max. sens. of the scope is .2 mv/cm A.C. or D.C. Q Statham P-23-d will be used as a manometer. Output of this unit is $\approx 50 \mu V/cm Hg/V_{exc}$ which with a $\geq 6V$ excitation will produce enough voltage to be used directly. EKG may also be recorded directly. This was demonstrated in the O.R. this morning. An amp. with a min. gain of 4 is necessary for sens of $50 \mu V/cm$.

Work was started on the unit below with +100 V. and -150 V. avail. from the scope. Both these voltages had ripple less than 1 mv. Ripple was not detectable on the fil supply to the 1st preamp. tubes, 4-6AV6's. Since this was supplied by a single 2N3010 which is rated at 2.A it seemed risky to draw additional current so the initial tests will be conducted with fil. batteries. The whole is to be housed in a 3 X 5 X 7" alum. Bud box.

7-21 Calculation of calibrating resistor R_c for S.G. from Statham data -

$$R_{out} = 300 \Omega$$

$$F_{cal fact} = 49.94 \mu V/V_{exc} / cm Hg \approx 50$$

$$5 \times 10^3$$

$$N = 0 \quad cm.Hg.$$

$$7.5$$

$$10.0$$

$$15.0$$

$$20.0$$

$$30.0$$

$$R_c = \left(\frac{10^6}{4NF} - .5 \right) R = \left(\frac{10^6}{200 \cdot N} - .5 \right) 3 \times 10^2$$

$$R_c = \left(\frac{5 \times 10^3}{7.5} - .5 \right) 3 \times 10^2 = (666.66 - .5) 3 \times 10^2 = 199,848.$$

$$\begin{array}{r} 7.5 \overline{) 50.66} \\ \underline{45.0} \\ 5.66 \end{array}$$

$$\begin{array}{r} 666.16 \\ \underline{3 \times 10^2} \\ 199.848 \end{array}$$

$$\begin{array}{l} 200 K \\ Br-wh \end{array}$$

$$R_c = \left(\frac{5 \times 10^3}{10} - .5 \right) 3 \times 10^2 = (499.5) 3 \times 10^2 = 149,850. = 150 K$$

$$Rd-wh$$

$$R_c = \left(\frac{5 \times 10^3}{15} - .5 \right) 3 \times 10^2 = 332.83 \times 3 \times 10^2 = 99,849. = 100 K$$

$$Red$$

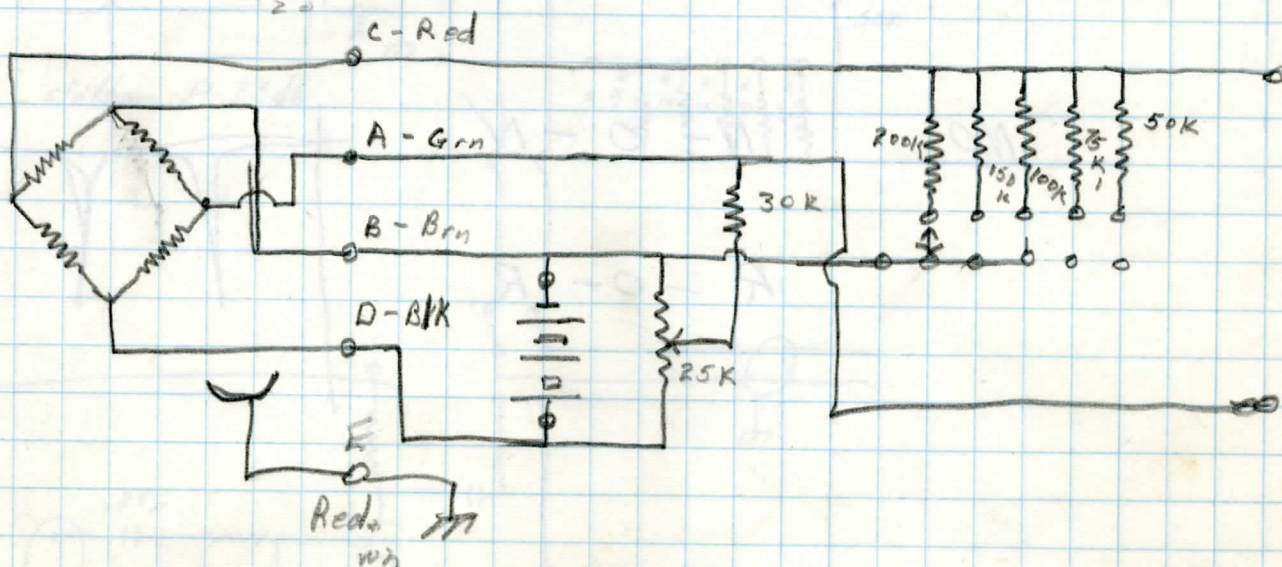
Tek Coupler

$$R_c = \left(\frac{5 \times 10^3}{20} - .5 \right) 3 \times 10^2 = 249.5 \times 3 \times 10^2 =$$

Gr Wh
74850- Ω
75 K- Ω

$$R_c = \left(\frac{5 \times 10^3}{30} - .5 \right) 3 \times 10^2 = 166.16 \times 3 \times 10^2 = 49848- $\Omega$$$

BK-Wh
50 K- Ω



The unit was constructed as shown and connected to the Tek scope using 6 volts of NiCad. The 1 m/sec scale was used and remained very stable. Electrical calib did not check with an Hg sphygmomanometer with readings less than calib. by several percent becoming larger at higher pressures.

		7-22			Posn. Res. Removed
Tek div	Calib	Tek Div. (minor)	Calib (elec)	(Press)	
0.	0	0	0		
6.	7.5	6	7.5	5.5	5.5
8.	10.	8	10.	7.	7.5
12.	15.	12.	15.	11.	11.5
16.	20.	16.	20.	15.	19.5
24.5	30.	24.	30.	22.5	23.0

Only 1 or 2 cm. offset was present

$$\frac{36}{300} = 13 \times 10^{-2} = .13$$

Scope drift

20 min Warm up +

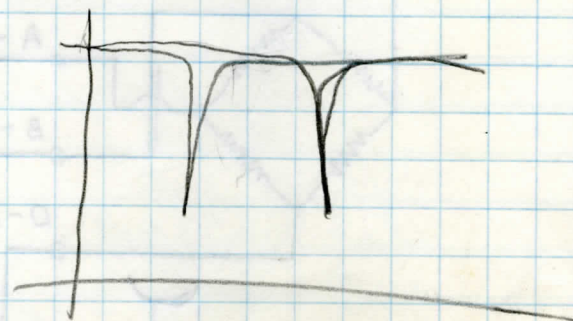
Bal precisely adj. input shld

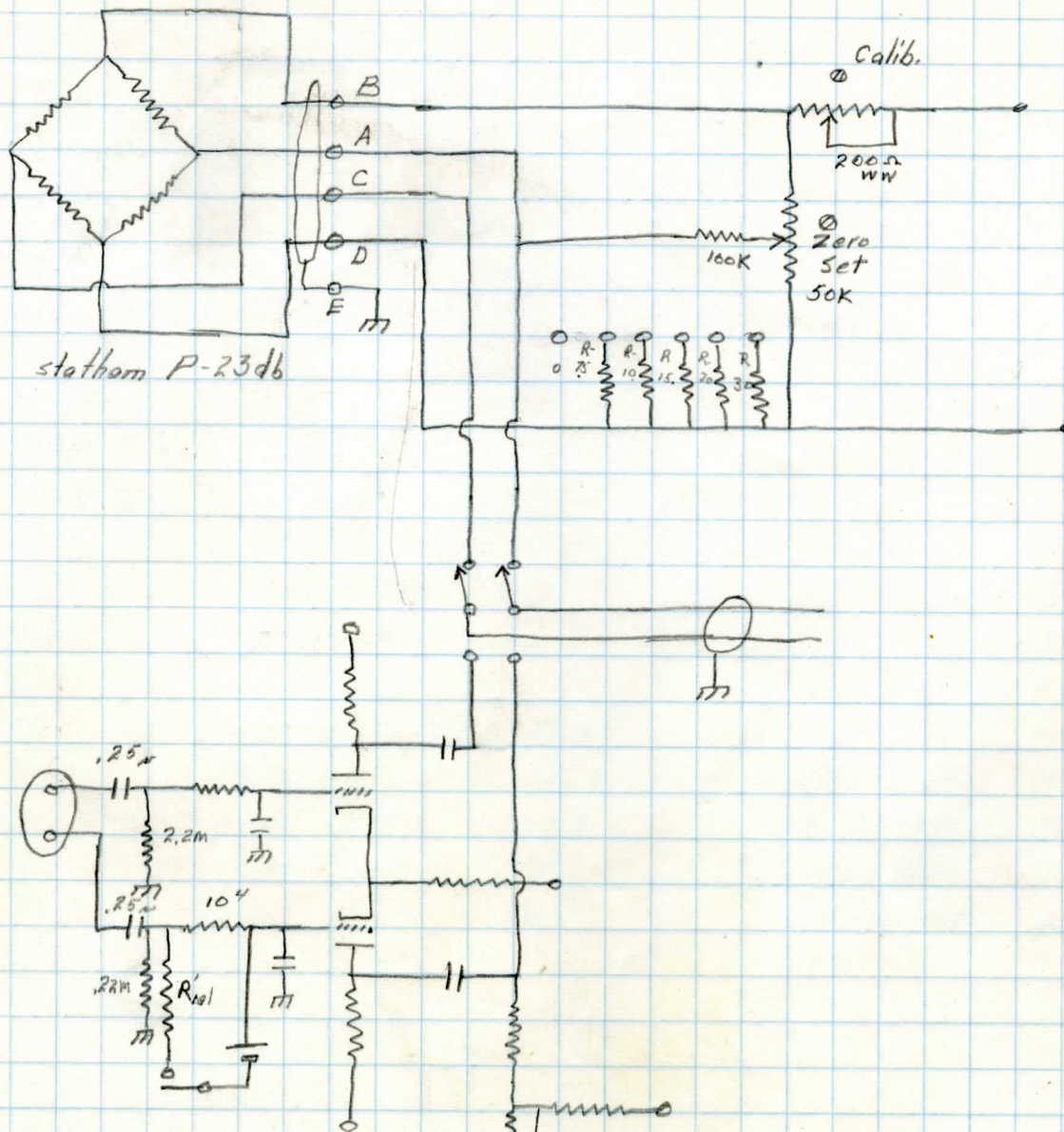
Time	#1 ^{Top} 1mv/cm	2mv/cm	#2 1mv/cm	2mv/cm
2050	0.0	0.0	0.0	0.0
2135	+7.0 div + 0.5 FF Scale		0.0	0.0
2220	+1.0	+6.0	-1.0	-7.0

N₂

N-O-N

R-O-R





adj. R_{cal} as follows

to track $\pm$ P23D #1236 (Set 300Hg)

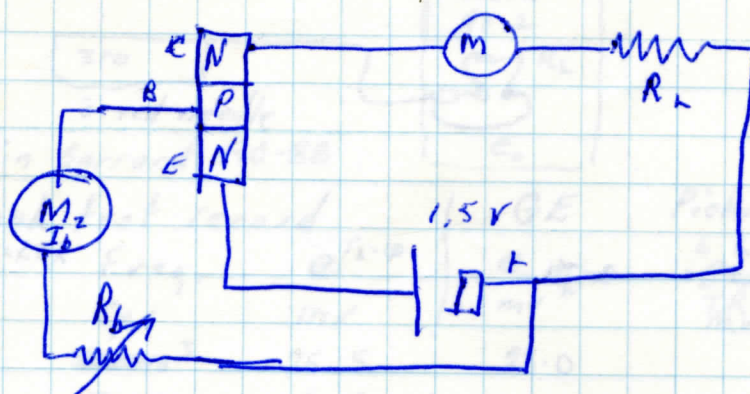
$R - 7.5 - 51.8 K \uparrow$
 $10 - 77.2 K$
 $15 - 102.2 K$
 $20 - 155.8 K$
 $30 - 205.6 K \downarrow$

$$\frac{E_1}{1.34} = \frac{10}{2.7 \times 10^6} = \frac{13.4 \times 10^6}{2.7 \times 10^6}$$

$$R'_{cal} \quad \frac{R'}{10^4} = \frac{1.34}{50 \times 10^{-6}}$$

$$R' = \frac{13.4 \times 10^3 \times 10^6}{50} = \frac{268 \times 10^9}{268 \times 10^5} = 10^4$$

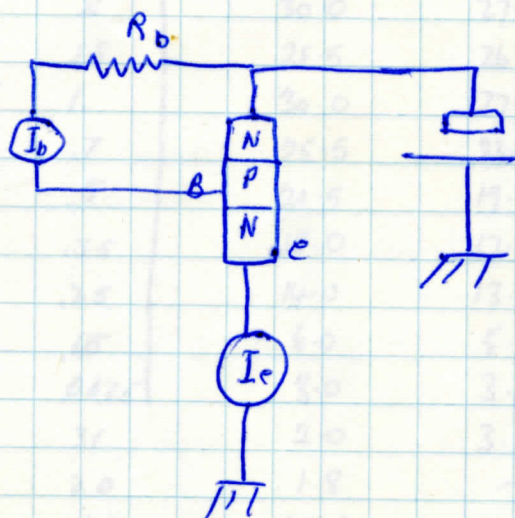
T-25

2N332 Trans β out Characteristics -

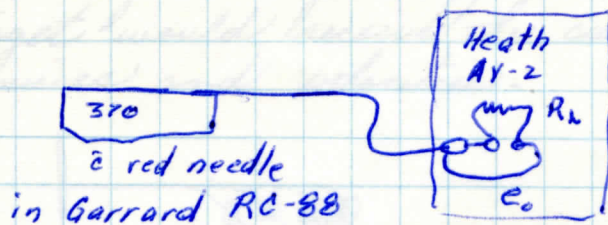
$$\beta = \frac{I_c}{I_b}$$

E_b	I_b	I_c	R_b	β
1.5	μA	μA	Ω	
	10	50	10^5	
	19	150	47×10^3	11.1
	28	260	$33 \times$	12.1
	40	470	$22 \times$	17.5
	56	760	$15 \times$	18.
	77	1100	$10 \times$	16.1

E_b	I_b	I_c	R_b	β	β
1.5	μA	μA	Ω		
	9	60	10^5		
	12	95	.68		
	19.5	170	.47		
	27.5	295	.33		
	40.0	505	.22		16.9
	55.0	800	.15		19.7
					12.6
					14.5



7-26 meas. of freq. response of Pickering 370



Cook test record			GE	Pickering
e _o r _k =27k	Freq.	e _o r _k =∞	e _o r _k =∞	e _o r _k =∞ + Electro T.R. m.v.
mV	Cps	mV	mV	
23.5	10 10 ³	25.5	23.0	
2.5	20x	3.5	-	
3.5	17x	8.0	4.0	
4.5	15	13.0	10.0	
8.5	12	23.0	14.0	
9.0	10	28.5	38.0	
15.5	9	28.0	34.0	
17.0	8	27.5	35.0	
18.5	7	28.0	31.0	
20.5	6	28.0	29.0	
23.5	5	30.0	30.0	
22.5	4	28.0	27.0	
24.5	3	29.5	28.0	
26.0	2	30.0	27.5	
25.0	1.5	28.5	26.0	
26.5	1	30.0	27.5	
23.0	.7	25.5	23.5	
18.5	.5	21.5	19.5	
16.5	.35	18.0	17.5	
12.5	.25	14.0	13.5	
5.5	.125	6.0	5.5	
3.0	.0625	3.0	3.0	
2.25	.31	2.0	3.0	
2.0	2.0	1.8	-	
27.0	1000	29.5	27.0	

all readings - 1.5 mV

10kc 29.5

10kc 6.0

R_L = ∞

10kc 26.5

10kc 11.0

71

219

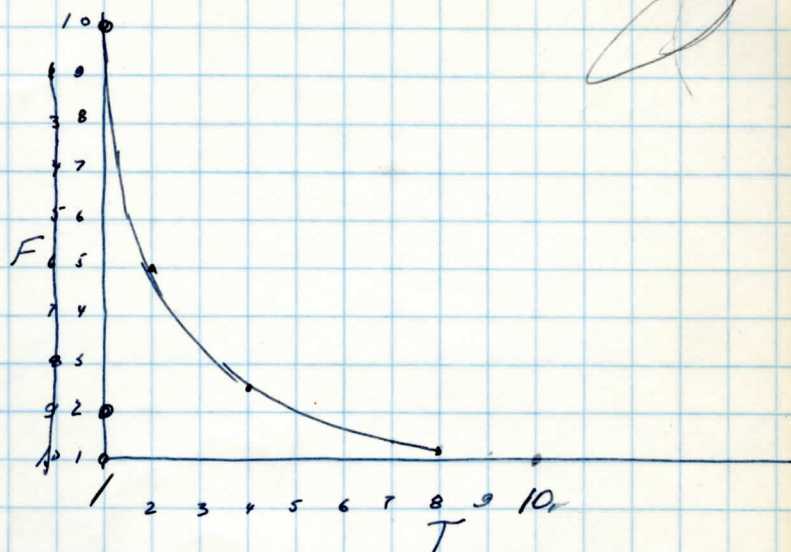
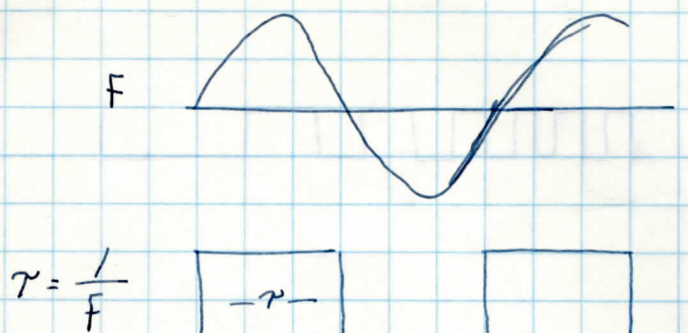
30- mV

24

104

219

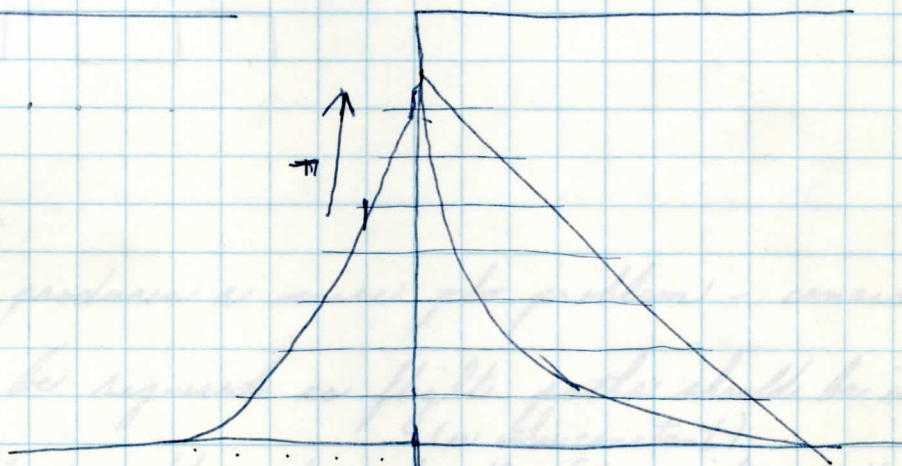
To obtain the analog of freq. use ^{time intervals} pulse width to obtain voltage.



$$e = F(\tau) = \frac{1}{F} \quad f = \frac{1}{T}$$

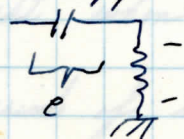


$f = 1$	$T = 1$
$F = 2$	$T = \frac{1}{2}$
$F = 3$	$T = \frac{1}{3}$
$f = 4$	$T = \frac{1}{4}$

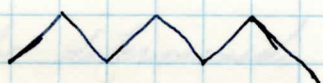
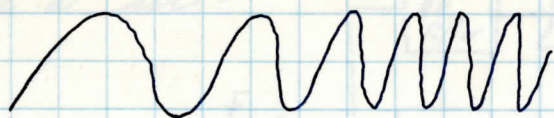


This exponential would further exaggerate the low freqs. Probably be best to try ~~no~~ a sync.

pulse gen - no - continue i this approach - linearity may be approximated by using a non-linear charging ckt!



$$\text{where } e = e_0 e^{-\frac{t}{RC}}$$



differentiation produces a noise problem - considerable smoothing will be required so flight paths should be investigated (or other constant)

Another possibility is determination of $\frac{1}{2} f_0$ points - Voltage

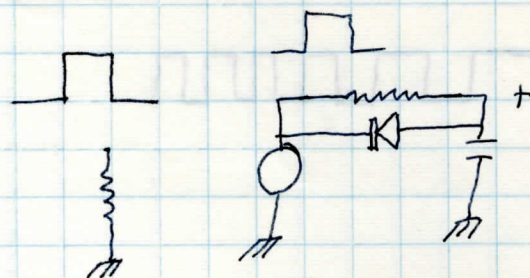


analogs of $\frac{1}{f}$ are generated, ~~such~~ value of f_0 is stored

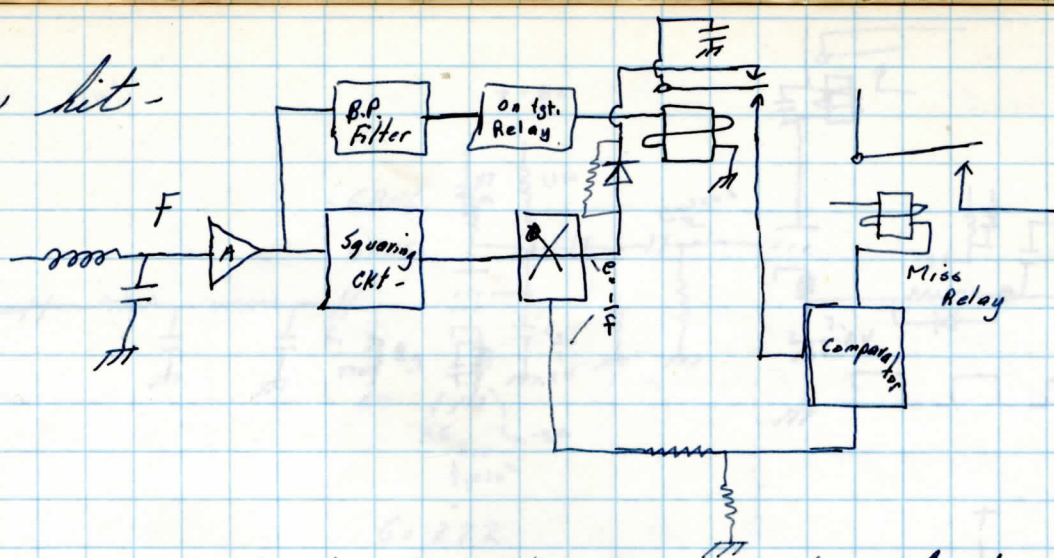
and compared to f , closing

a ckt. when $e_f/2 > e_{f_0}$ and opening it when $e_{f_0} > e_f/2$. The period of time is directly related to M.D. = $\sqrt{3/2} \wedge f_0 (t_2 - t_1)$.

If the M.D. is greater than some given period a relay will close giving a miss - Anything less will



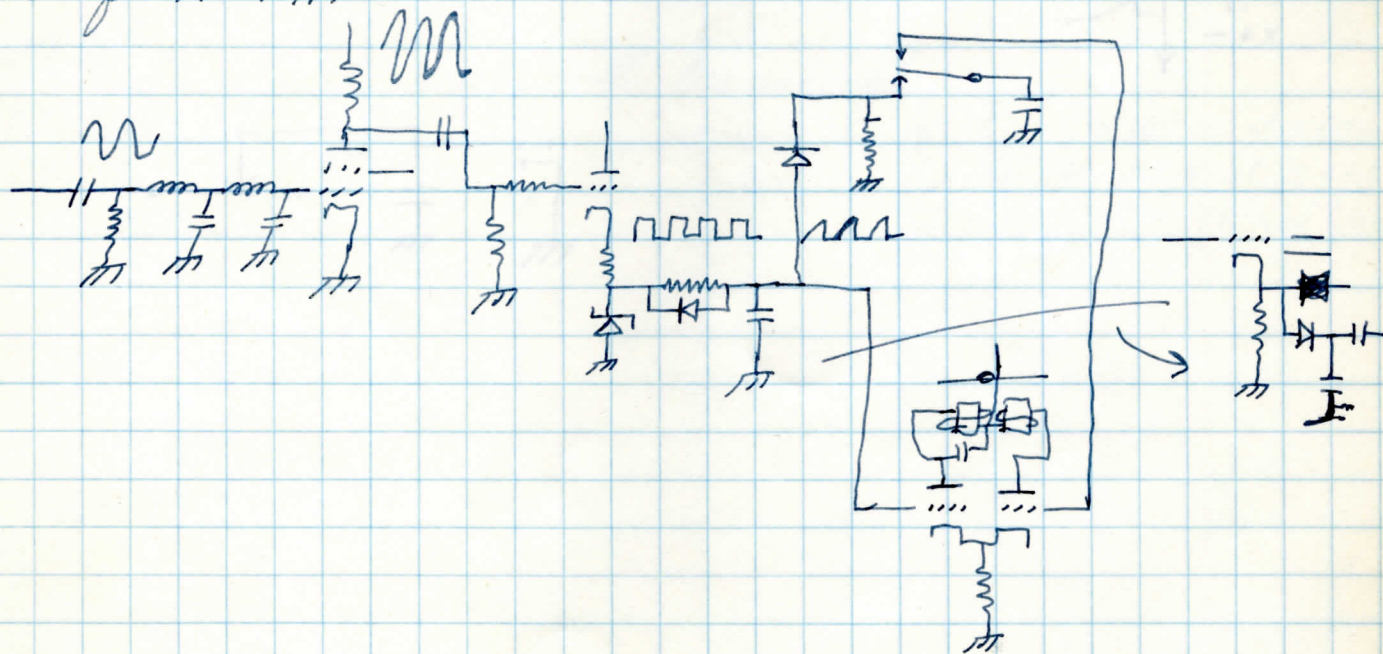
be a hit -

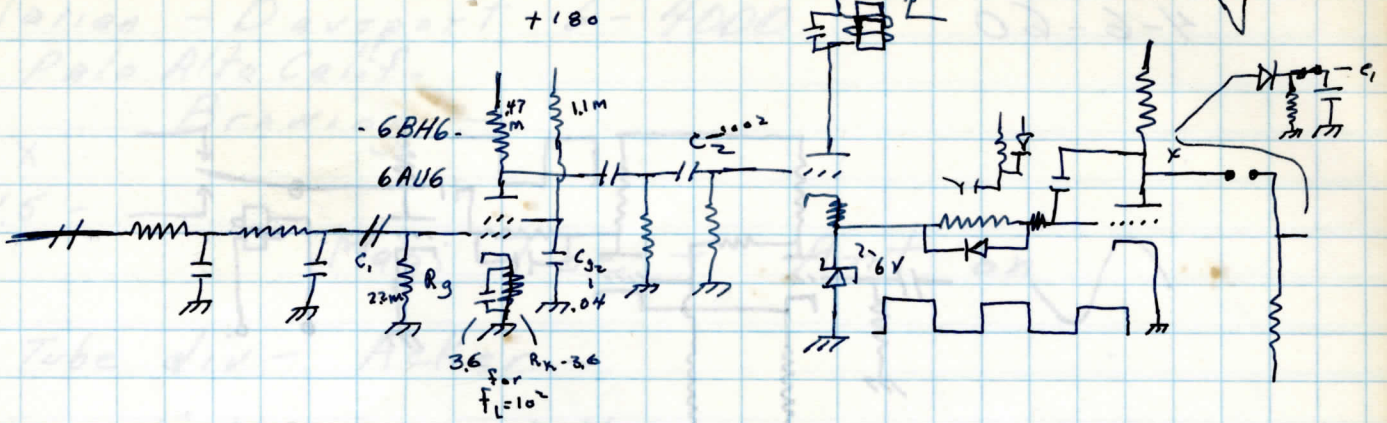


Assuming a speed of 10^3 M/s for missile velocity relative to Tgt - F_0 will then equal $\frac{2V}{\lambda}$ or for $f_{trans} = 5 \times 10^8$

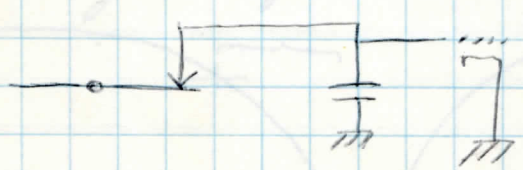
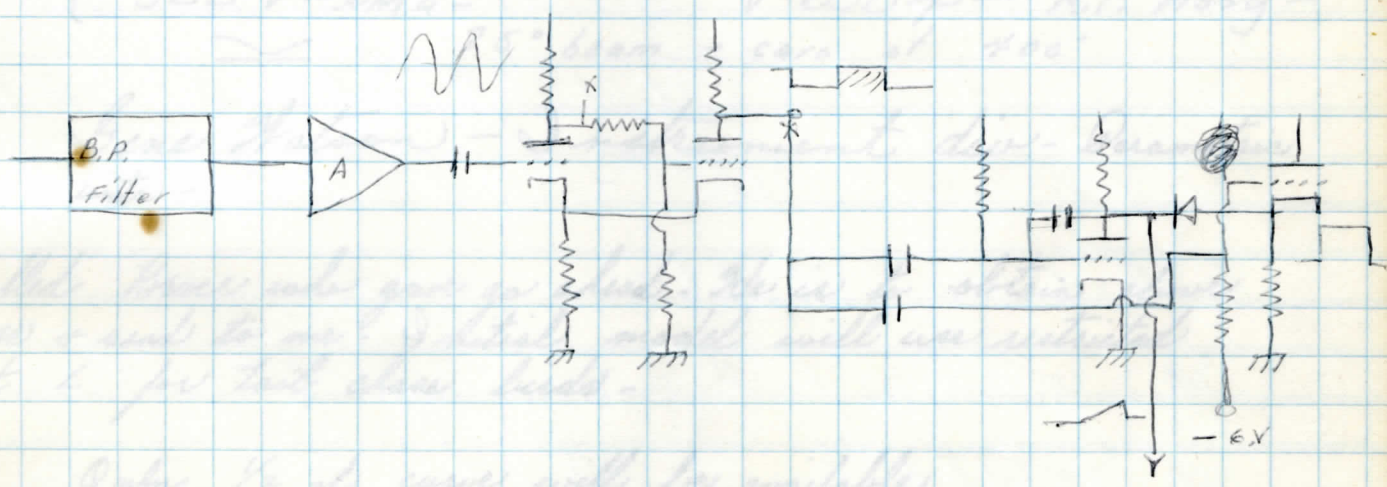
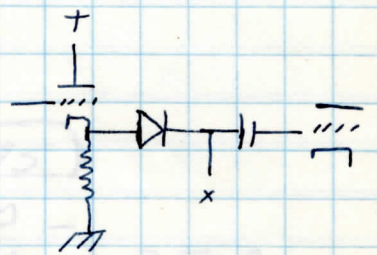
$$\lambda = \frac{3 \times 10^8 \text{ M/sec}}{5 \times 10^8 \text{ n/sec}} \quad f_0 = \frac{2 \times 10^3}{3/5} = \frac{10}{3} \times 10^3 \text{ or } \approx 3 \text{ K.C.}$$

Amplifier A should then have a pass band of say 1 to 4 K.C. and a gain of 100. Input must be determined by experiment but should be on the order of $\frac{1}{10}$ Volt.



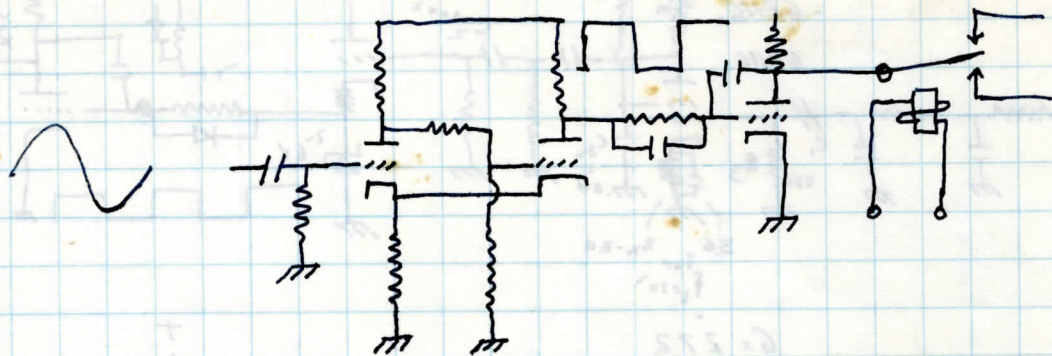


$G = 272$
 $E_{o, max} = 72 V$



if E_o is $5 \times 10^3 V$ at $5000 Hz$
 E_o is $60 \times 10^3 V$ at $10 kHz$
 $T = \frac{1}{f} \times 10^3 = 10 \times 10^{-3} sec$

4-6-60



Varian - Davenport 6-4000
Palo Alto Calif.
Browning -

x

VSWR 1.5 -

Magi Tee - Ant on

Tube div - Acker -

Radiation - Cordell
div - Kent 

Stock { 10 K.M.C. - duplexer
20 mW -
300 V - 30 mA -

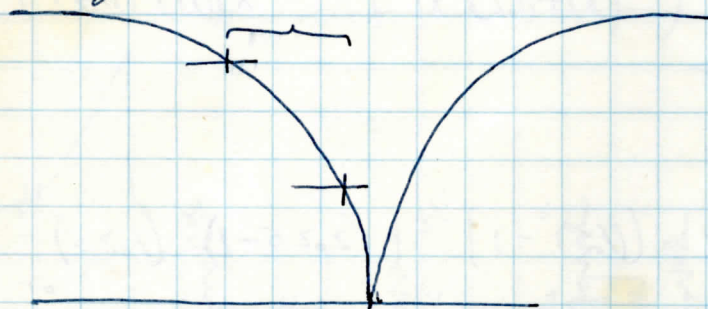
275
300 -

V-8304 - R.F. Assy -
25° beam - cars at 400'

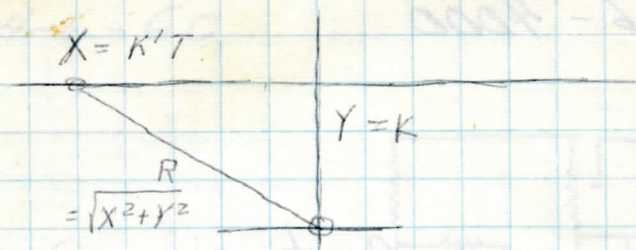
Gene Watson - Instrument div - Parametric
units -

Called Bruce who gave go ahead - He is to obtain above
mixes & send to me - Initial model will use restricted
ant L for tail chase birds -

Only 1/2 of curve will be available



if F_D is 3×10^3 N at 500 MC.
 F_D is 60×10^3 N at 10 KMC
 $T = \frac{1}{6} \times 10^{-4} = 16 \times 10^{-6}$ Sec



$$\frac{dR}{dt} = d(X^2 + Y^2)^{1/2}$$

$$= \frac{1}{2}(X^2 + Y^2)^{-1/2} 2X$$

$$= \frac{X}{R}$$

plot normalized about fgt axis.

for error of 1% in variation from f_∞

at f_∞ $X = R$ letting $X = \text{unity}$ R must be $1 \pm .01$ for 1%

or $\sqrt{1.01} = 1.005$ or $\sqrt{1.01} = 1.005$

check $(1.01^2 - 1)^{1/2} = (1.01 - 1)^{1/2} = .01^{1/2} = .1$

check $(1.01^2 - 1)^{1/2} = (1.01 - 1)^{1/2} = .01^{1/2} = .1$ or $X = 10Y$

for 5% error $((1.05)^2 - 1)^{1/2} = (1.05 - 1)^{1/2} = (.05)^{1/2} = .223$

or $Y = .22X$ $X = 4.5Y$ for 30' $X_{min} = 13.5$

$\frac{X}{R} = .5$ $X = 1$ $R = 2$ $(2^2 - 1)^{1/2} = (4 - 1)^{1/2} = (3)^{1/2} = 1.73$

or $Y = 1.73X$ check $\frac{X}{(X^2 + (1.73X)^2)^{1/2}} = \frac{X}{X(1 + 3)^{1/2}} = \frac{1}{2}$

$\frac{1}{(1+3)^{1/2}} = \frac{1}{2}$

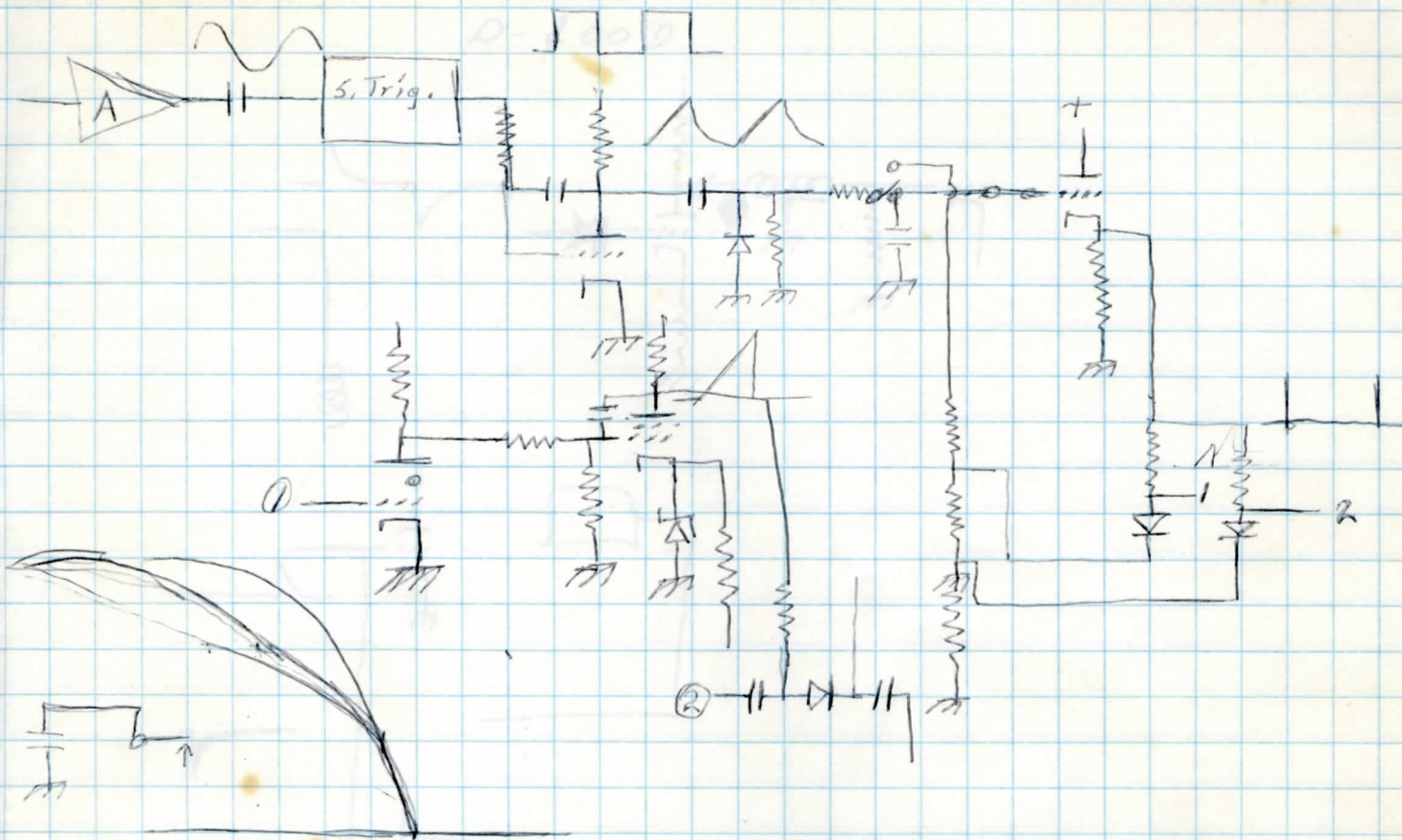
for $\frac{X}{R} = \frac{2}{3}$ $\frac{1}{3^{1/2}} = ((1.5)^2 - 1)^{1/2} = (2.25 - 1)^{1/2} = (1.25)^{1/2} = 1.15X$
or $X = .87$

$\frac{X}{R} = \frac{1}{3}$ $(3^2 - 1)^{1/2} = (9 - 1)^{1/2} = (8)^{1/2} = 2.83$ $X = 2.83X$ or $X = .353$

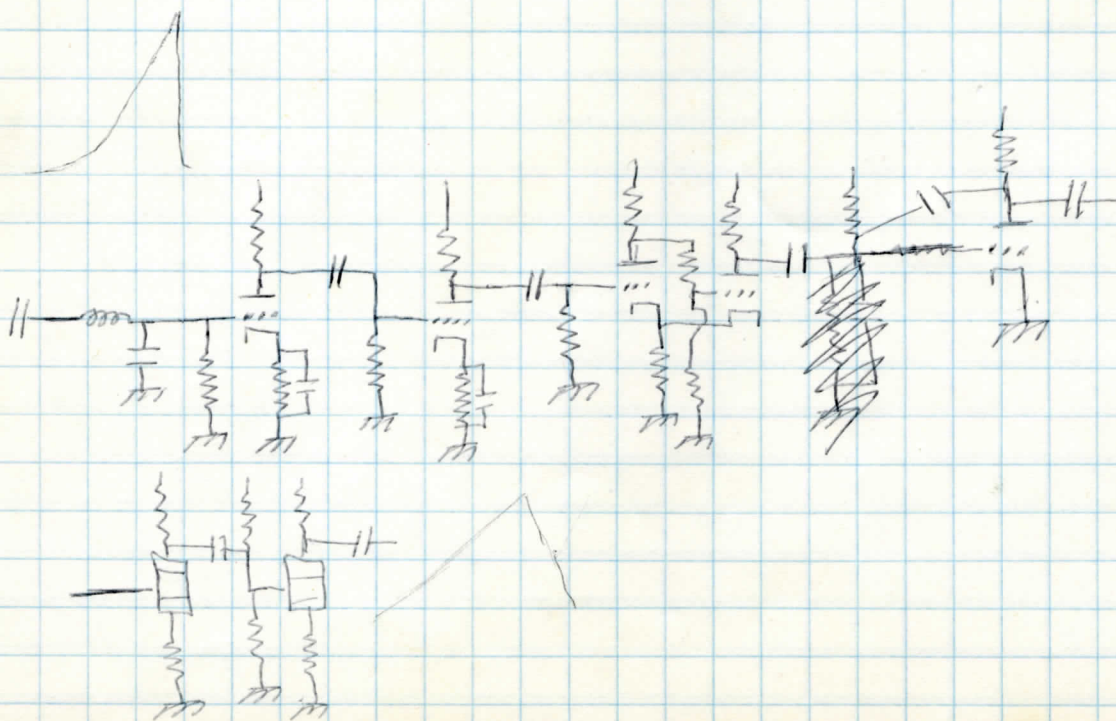
take lowest possible freq 10 Kc , $= 10^{-4} \text{ sec}$

at speed of 10^3 M/sec this is 1 M

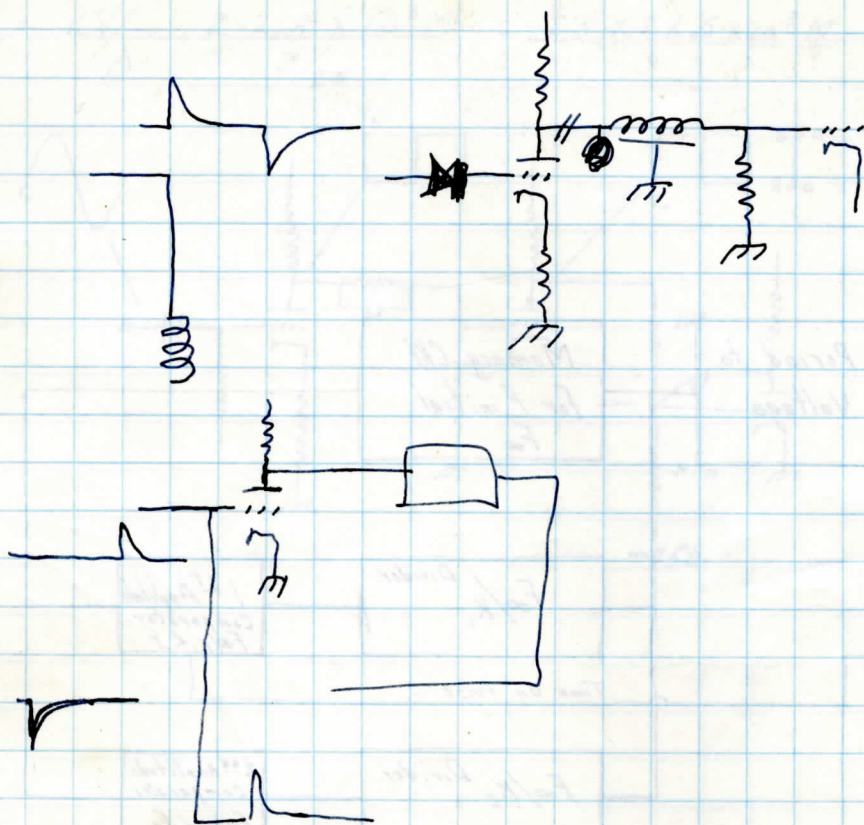
For a miss of 30' is $Y = 30$

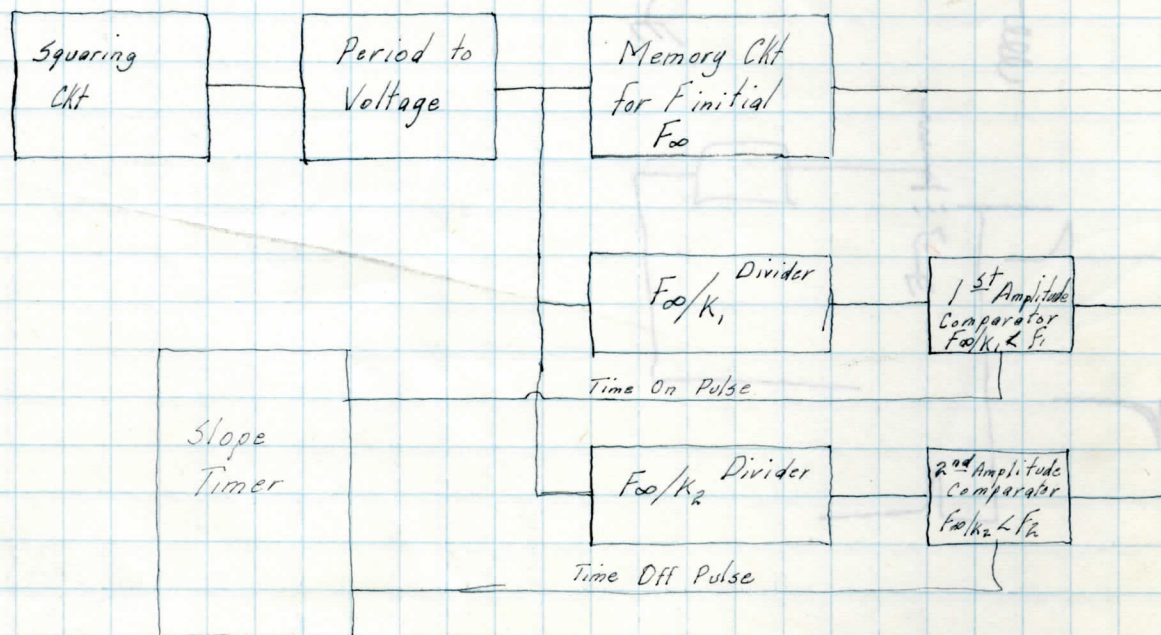


C say 150 V- sweep - 50 V. say 1 V/H for diode



D-200-D

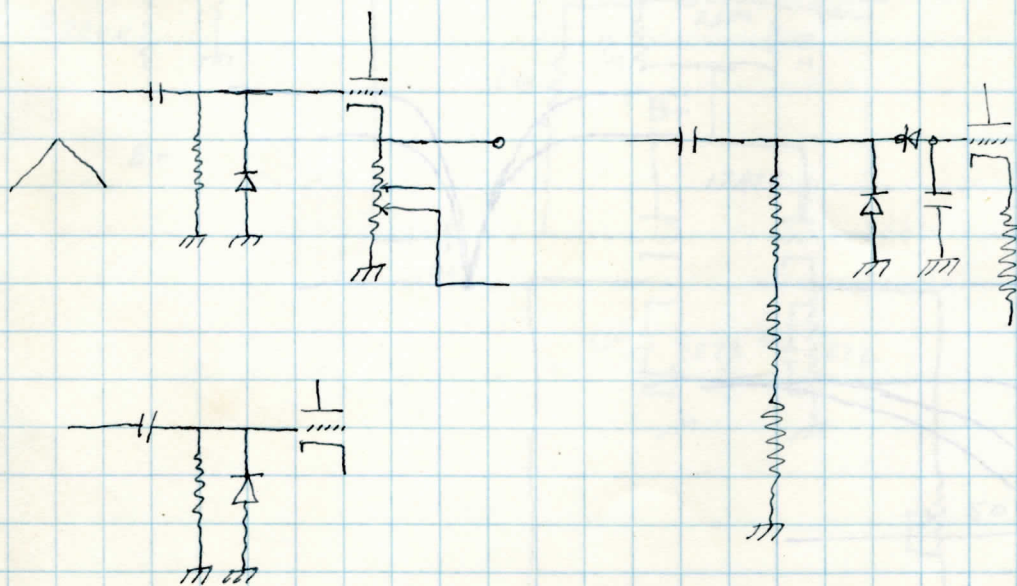
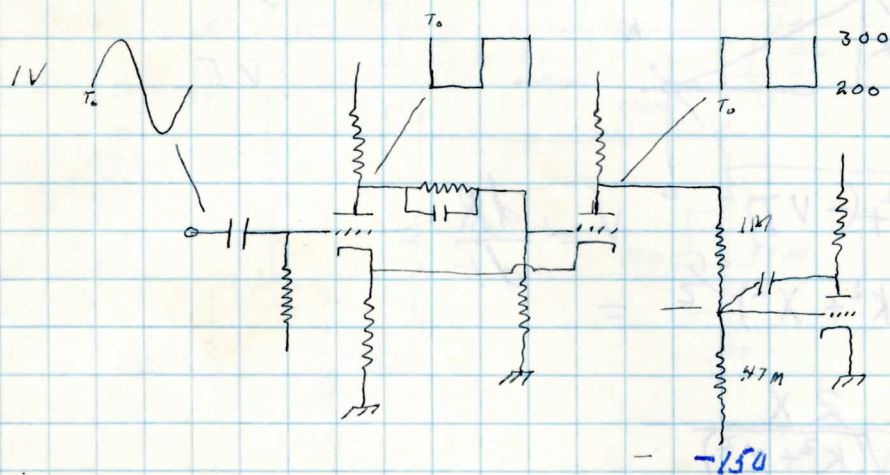


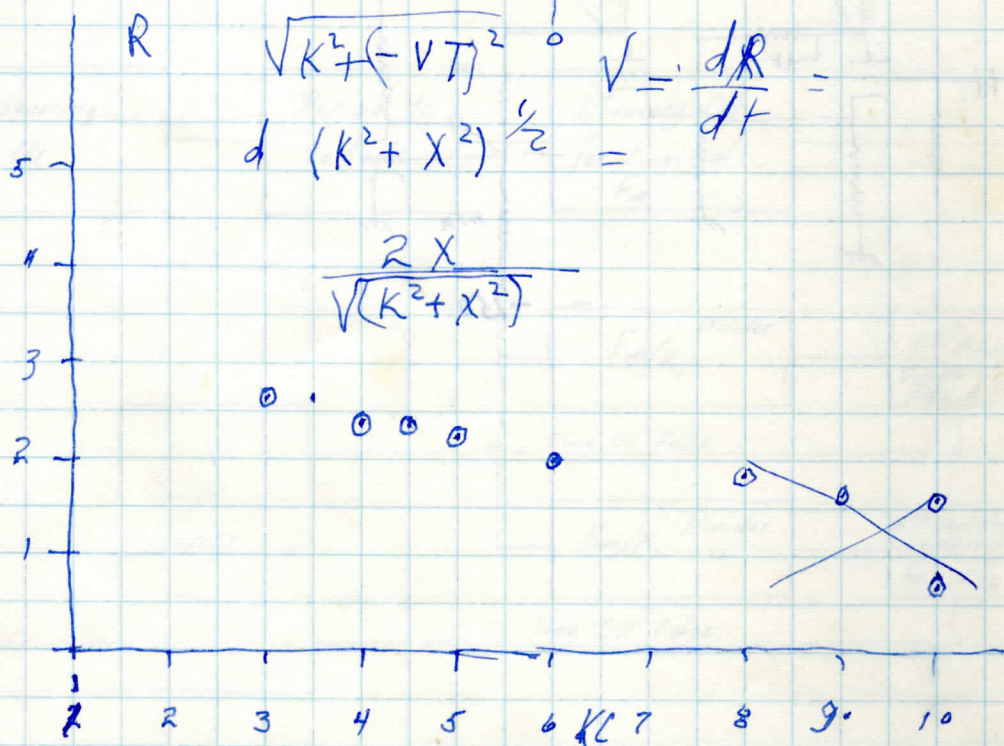
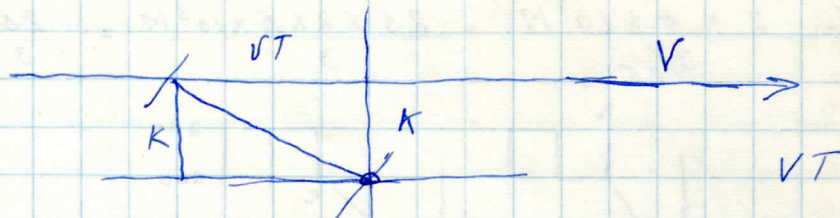


7-26-60

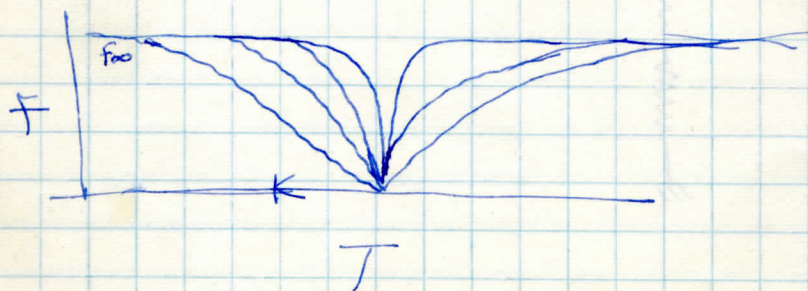
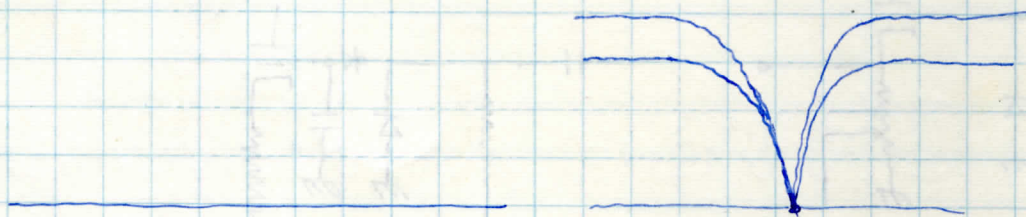
Attempt to use the GL 6442 at ≈ 2.5 K.M.C. $\bar{\nu}$ and amp. of $G = 10^3$

$$\text{Typical } F_{\text{Doppler}} = \frac{2V}{\lambda} = \frac{2 \times 0.5 \times 10^3 \text{ M}}{3/25} = \frac{25 \times 2 \times 0.5 \times 10^3 \text{ M}}{3} = \frac{25 \times 10^3}{3} \approx 8 \text{ K.C.}$$

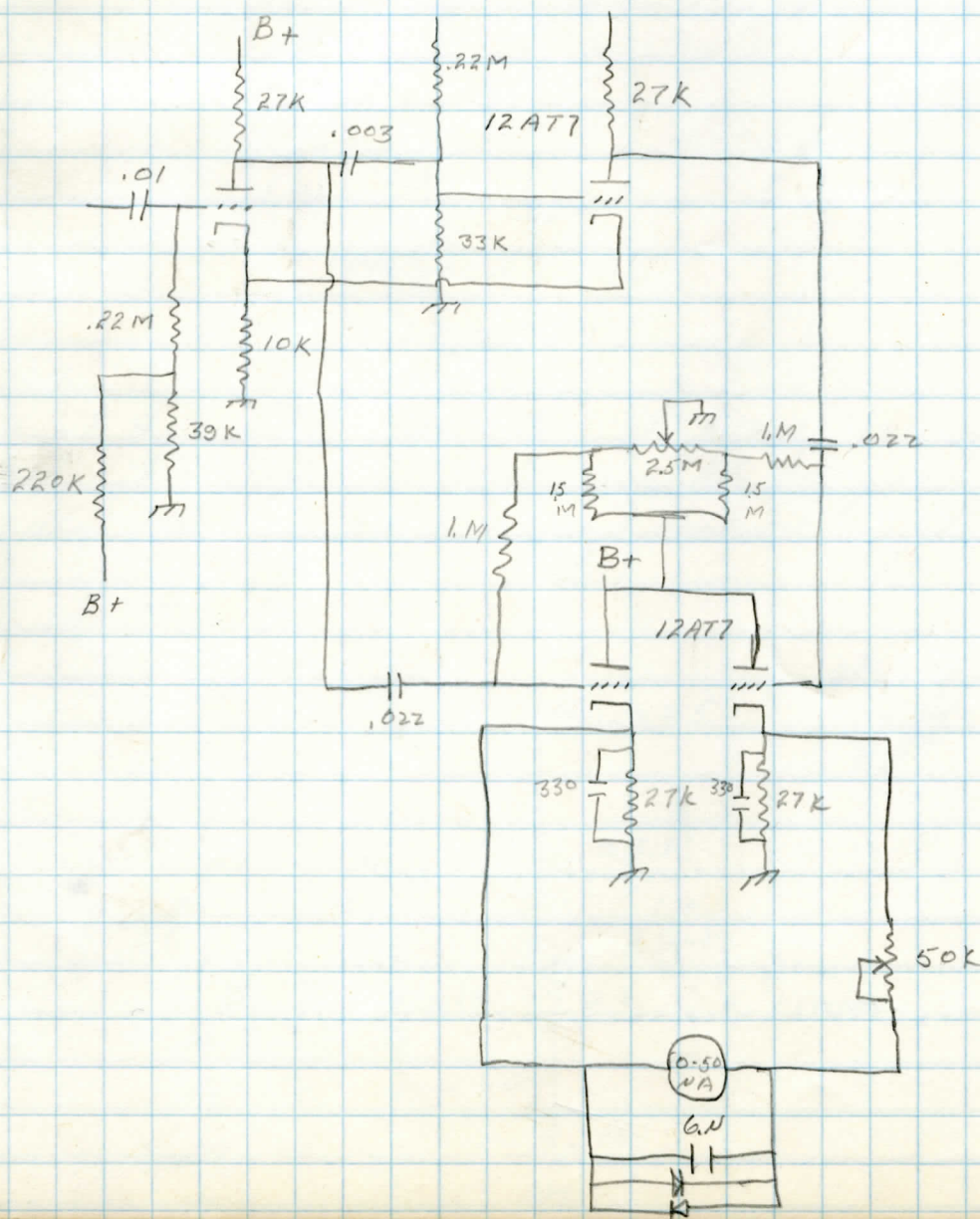
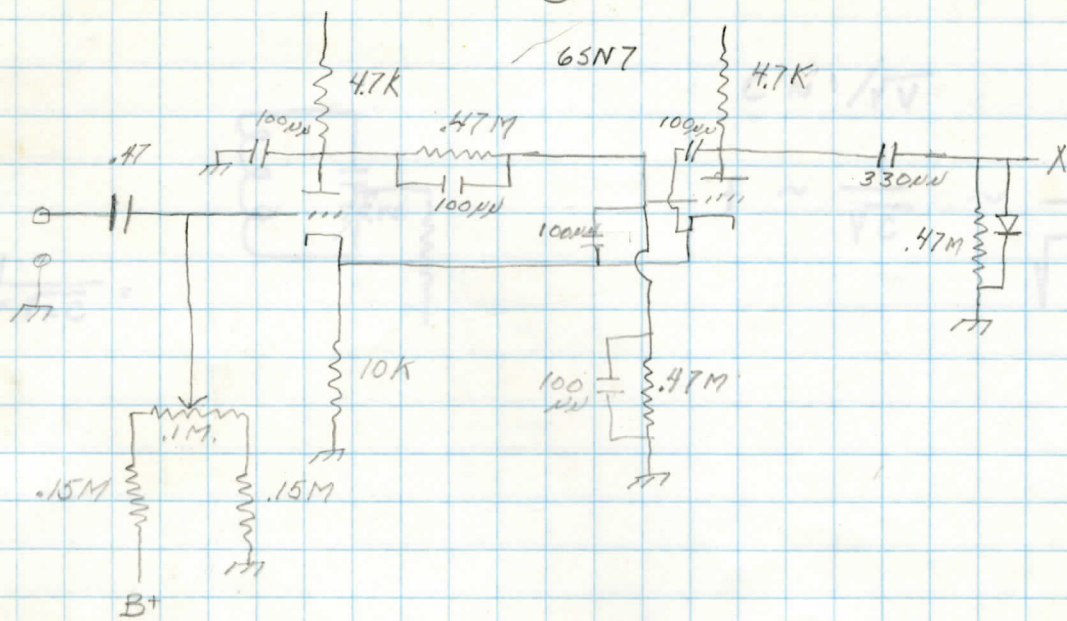




$$\xi = K \frac{V}{\lambda}$$



6.2 Period to Voltage - V.C. diode Capacitor



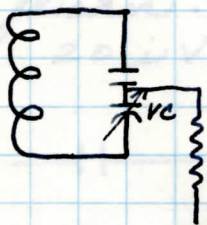
6.2.63 BFO SCO ± V.C. diode capacitor

V = applied Volt.

$$C \sim 1/\sqrt{V}$$

$$f \sim \frac{1}{\sqrt{C}} \sim \frac{1}{\sqrt{1/\sqrt{V}}} \sim \sqrt[4]{V}$$

$$f = \frac{1}{2\pi \sqrt{LC}}$$



One method used in application of SC (osc.) then
50 Hz. and direct A.C. coupling. The initial stage
could be tuned on. Resonance is better.
It should tune at 50 Hz.



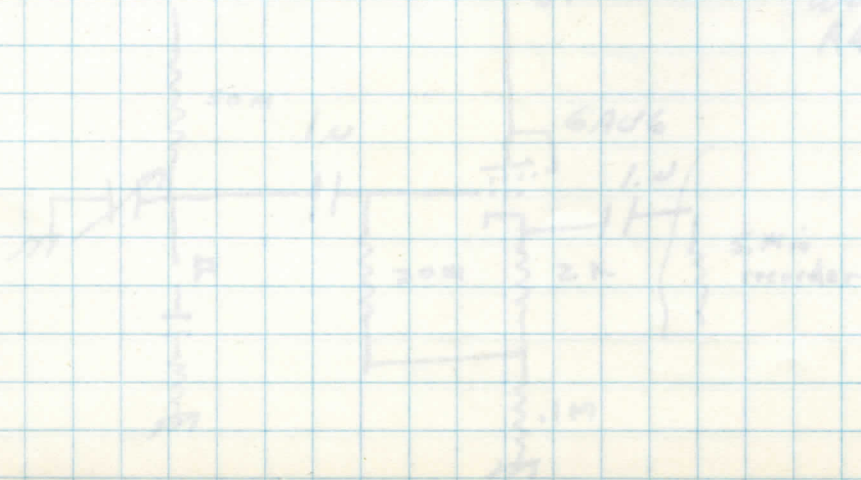
2. at 100 Hz. 100 Hz. 3. if tuned in at 50 Hz.
adjustable slope detection would be possible. The response
and delay would be very small. Length of prop. wave.

Last trial:

100 Hz

600 Hz

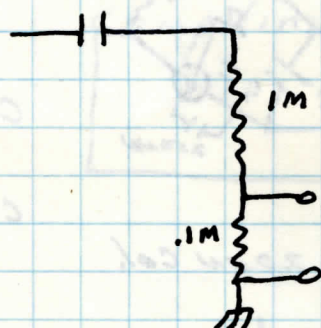
shows well a little
drift as signal time
the are bad.



Pulse Pickup Transducer - Hi-Z cap. for L.F.

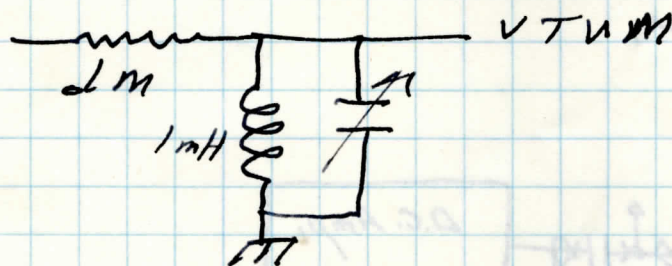
A variety of cathode followers gave a variety of excessive flicker? effects - Input $Z = 100,000 \Omega$
gain $\approx 20 \mu V$

Transducer:



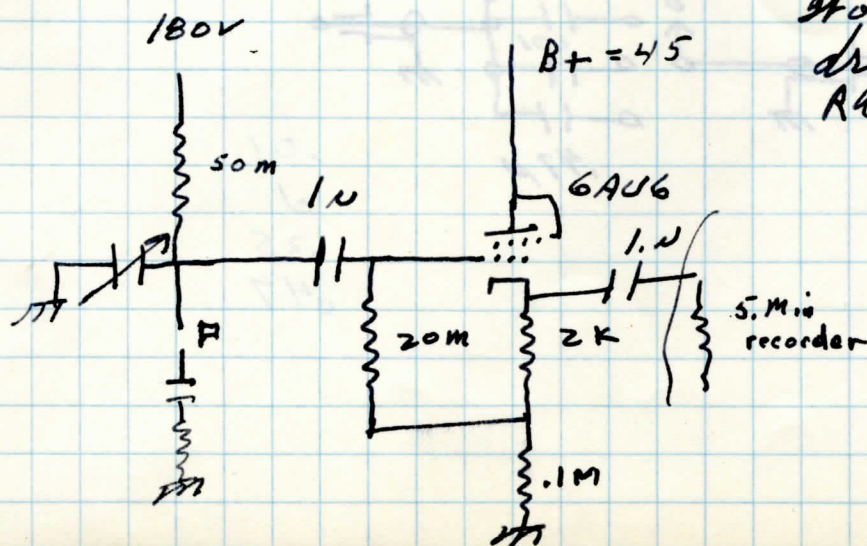
$C = .0715$
cap. change is prob.
less than 0.1%

One method used is application of D.C. (180V.) thru
50 mcg. and direct A.C. coupling - This limits L.F. resp. -
Could not be tuned on Boonton Q meter -
1 mH should tune at $\approx 20 KC$ -

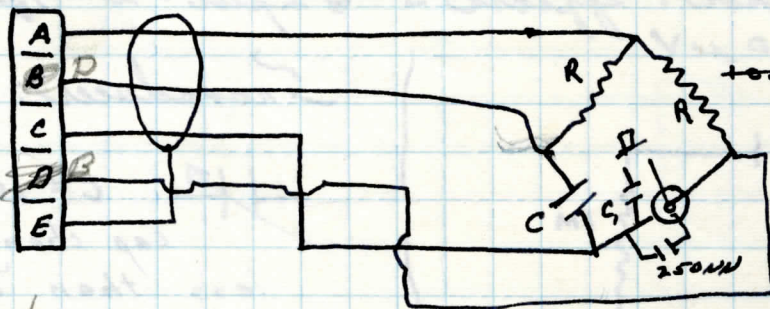


$\approx 0.7 Hy$ UTC ML 3 it tunes in at $\approx 590 \Omega$.
Although slope detection would be possible the requirements
on the osc. would be very severe amplitude & freq. unscr.

Last trial:



works well $\bar{c}$ little
drift or noise. Two
RC's are bad -



$R = 180 \Omega$ Res

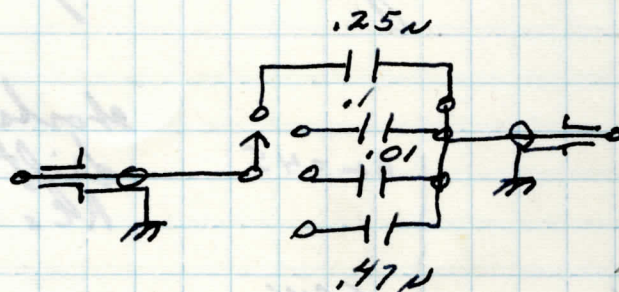
$C = \text{Cap. of transd-}$

$C = 2 \times 0.47 \mu$

$C_1 = 20 \mu\text{N Col.}$

interchange B + D

When this arrangement was used to the Sanborn carrier amp. (2400 ν) a stable recording resulted. A second channel was used as an A.C. channel as below.



0.01
0.01
0.25
0.47

Calibration of Infraction-

22 μ cap- Cal-
" "
1/1000" incr-
cal $\approx$.01-.01-.25-.50 μ
couplin

Run 1- cal $\times 10^3$
" 2 cal $\times 5$
" 3 " $\times 200$

Run 4

DC. Att $\times 2$ ~~$\times 10$~~
AC. $\times 20$

Student flowmeter
" recorder

pressure
pneumotach
force
time
temp.

Multiplier

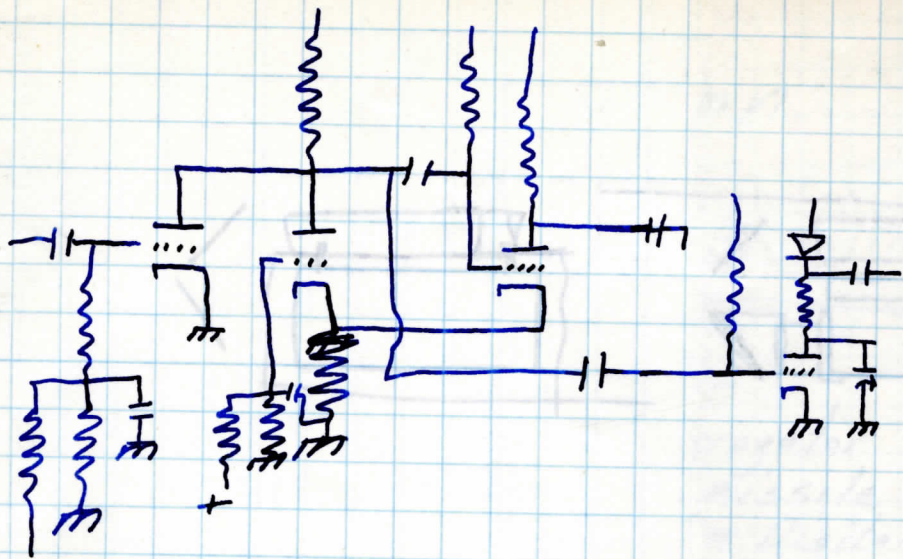
Flowmeter

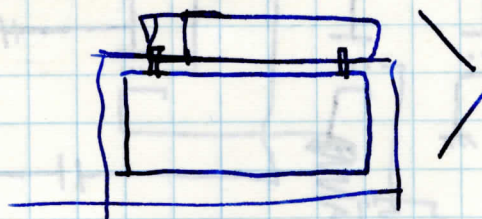
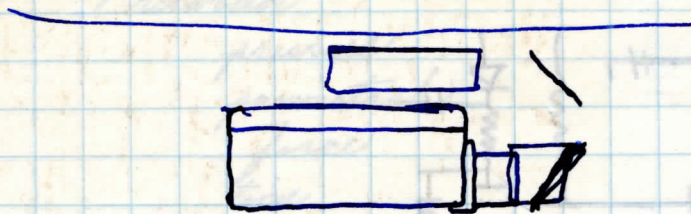
Chemical analyzer

Monitor

Short range radar

Models





Thermistor

Thermistor

Chemical analyzer

Monitor

Short range radar

Model

