NATIONAL
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COMPUTATION NOTE BOOK

43-648

Course UHF RECEIVER

Name PROJECT NOTEBOOK - STARTED 6-4-59

Del Mar Engineering Laboratories

LOS ANGELES, CALIFORNIA

PROJECT COMPUTATION RECORD

SERIAL NO.

№ 62

#I

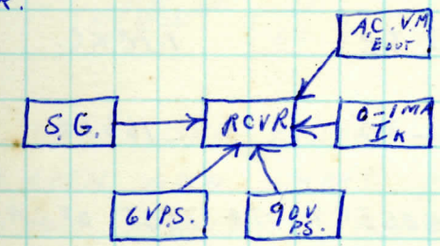
SELECTIVITY AND IMAGE RESPONCE CURVE ON R300A #31 RCVR.

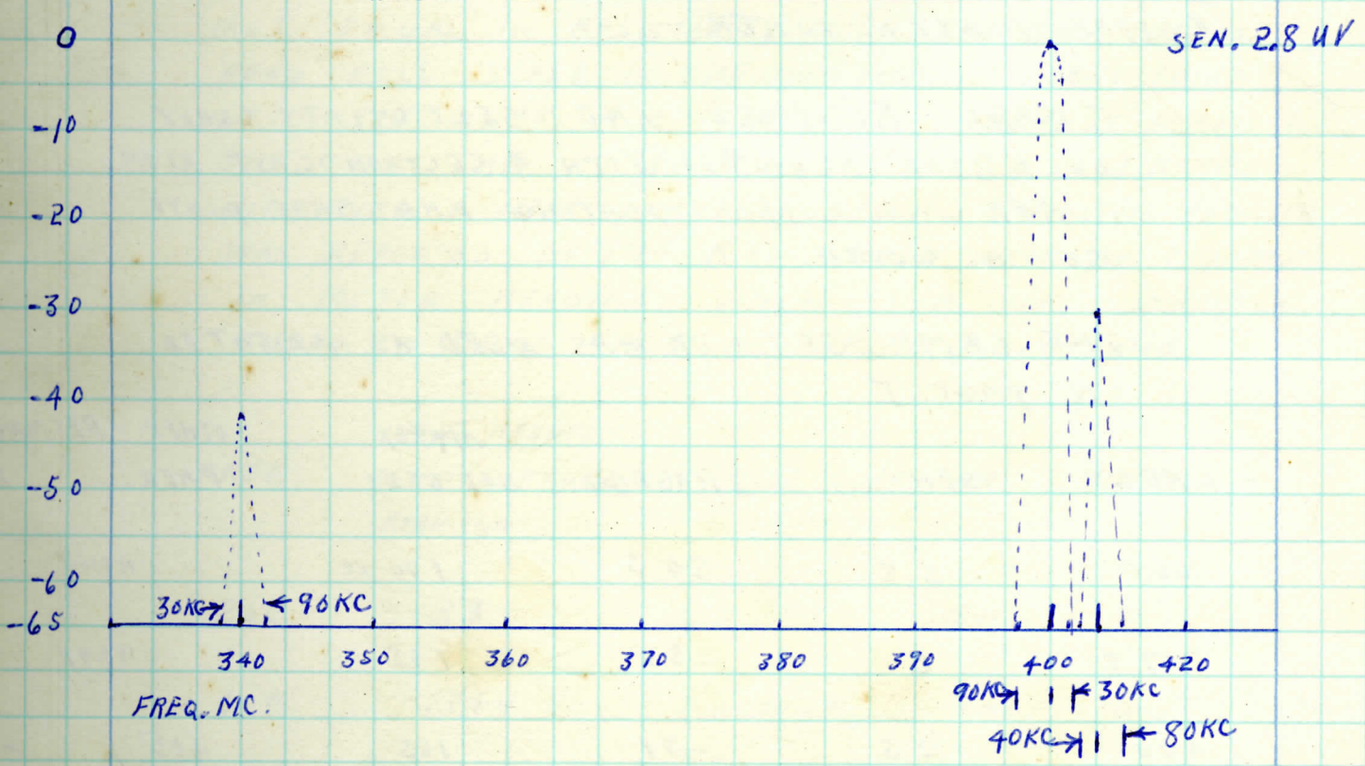
6-8-59

OBJECT

TO DETERIMINE THE SELECTIVITY AND IMAGE RESPONCES ON R300A WITH REGULAR 4 SECTION TUNER. ALL COVERS WERE IN PLACE AND RCVR. COVER ON.

THE EQUIPMENT USED WERE 6V POWER SUPPLY, MATTSON-CROWLEY POWER SUPPLY MODEL 113, HEWLETT-PACKARD 608C SIG. GEN. BALLENTINE MODEL 314 A.C. VOLT METER AND TRIPLETT 420-PL 0-1MA METER.





NOTE.

WITH THE SAME SET UP IMAGE REJECTION WAS MEASURED AT 260 AND 309.8 MC. THE IMAGE REJECTION AT 260 MC WAS -51 DB AND AT 309.8 IT WAS -47 DB. THERE WERE NO OTHER IMAGES ABOVE -65 DB AT EITHER FREQ.

II IMAGE RESPONCE AND SELECTIVITY TEST OF R 300 A RCVR #31 WITH 3 SECTION TUNER 6-8-59

TO TEST THE SELECTIVITY OF R300A RCVR WITH 3 SECTION BRASS TUNER, NO COVER WAS USED ON TUNER OR RCVR.

THE SAME SET UP WAS USED AS INDICATED ON PAGE I.

FREQ.	SEN. (uv)	IMAGE (DB)	APPROX. SEL (65DB)	OTHER RESPONCES FREQ.	DB
260	3	-34	170KC	NONE	
309.8	4	-32	172KC	390 440	-64 -53
400	1.6	-30	166KC	403	-30

III IMAGE RESPONCE AND SELECTIVITY TEST OF CAST COPPER PLATED TUNER.

IMAGE RESPONCE AND SELECTIVITY CURVE OF R300A RCVR #31 WITH 4 SECTION CAST ALUM. TUNER WITH COPPER PLATING AND BASE PLATE USED AS COVER.

THE SAME SET UP WAS USED AS INDICATED ON PAGE I.

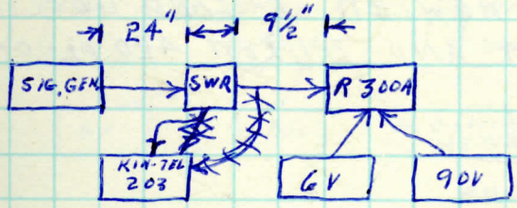
FREQ	SEN. (uv)	IMAGE (DB)	APPROX. SEL. 65DB	OTHER RESPONCES FREQ	DB
260	5.8	-54.5	170 KC	NONE	
309.8	6	-53	168	NONE	
400	2.5	-51	165	403	-38

IMPEDANCE AND STANDING WAVE RATIO

6-9-59

TO DETERMINE THE BEST IMPEDANCE MATCHING TO THE R300A RCVR.

THE HEWLETT-PACKARD 608C SIGNAL GEN., KIN-TEL MODEL 203, 6V POWER SUPPLY, MATTSON-CROWLEY MODEL 113 POWER SUPPLY AND STANDING WAVE RATIO BRIDGE. RG-58 A/U COAXIAL CABLE WAS USED.



THE SWR BRIDGE WOULD NOT BALANCE OUT BETWEEN THE OPEN AND SHORT POSITIONS AS INDICATED IT SHOULD IN THE AMATEUR'S HANDBOOK. SO R_1 AND R_2 ARE NOT EQUAL IN RESISTANCE. WHEN THE SWR WOULD READ FULL SCALE IN THE OPEN POSITION. EVERY THING LEFT THE SAME A 47Ω RESISTOR WAS PUT ACROSSED THE COAX THE METER WOULD ZERO OR VERY NEAR INDICATING A NEAR PERFECT MATCH. THEN THE RESISTOR WAS REPLACED BY THE R300A RCVR. WITH NO CHANGE IN METER READINGS WHEN RCVR WAS CORRECTLY TUNED TO SAME FREQ. AS SIGNAL GENERATOR.

FREQ.	INPUT NEEDED TO OBTAIN FULLSCALE READING	SCALE	47Ω LOAD	RCVR.
260	.83 V	0-3 MV	.06 MV	0
400	.74 V	0-100 mV	5 mV	6 mV

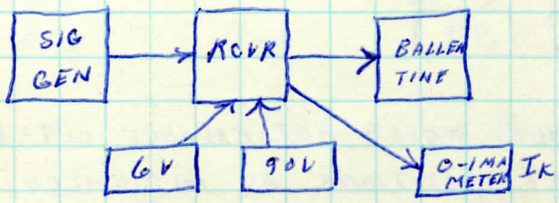
IF S.W.R. BRIDGE IS NEAR CORRECT THE RCVR. IS ABOUT THE SAME AS 47Ω LOAD RESISTOR, AND SEVERAL DIFFERENT VALUES OF RESISTANCE WERE TRIED.

JFD CHANGE IN TUNER

6-10-59

TO REDUCE THE TUNER SIZE A DIFFERENT JFD CAPACITOR WILL HAVE TO BE USED IN PLACE OF JFD VC1G TO ELIMINATE THE LONG EXTERNAL SHAFT FOR ADJUSTING IN THE OSC. SECTION.

RCVR #31 WAS USED TO RUN TEST TO MAKE SURE TUNER COVERED THE FREQ. RANGE WORKED PROPERLY. THE 6V POWER SUPPLY, MATTSON-CROWLEY 113 POWER SUPPLY, HEWLETT-PACKARD 608C SIG. GEN., BALLENTINE 314 AND TIPPETT 420 PL 0-1 MILL METER.



A JFD VG20G WAS USED, IT HAD THE RIGHT CAP RANGE .8-8.5 IT WAS PARALLED WITH A 1 mmf TCO CAP. AND A COIL WITH 3 turns WAS USED TO COVER THE FREQ. RANGE OF 230 TO 370 MC WHICH IT DID. WITH COVER OFF IT COVERED A RANGE FROM 190 TO 438 MC.

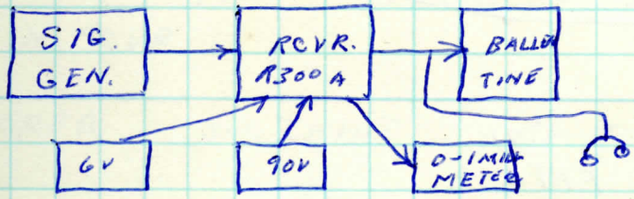
59

NEW TUNER FOR R300A

6-11-59

TO FIND A BETTER TUNER FOR FUTURE RCVR. WITH BETTER SEN., IMAGE REJECTION AND NO RESPONCES

EQUIPMENT USED FOR TESTING R300A #31 RCVR. 6V POWER SUPPLY, MATTSON-CROWLEY 113 POWERS SUPPLY, HEWLETT-PACKARD 608C SIG GEN. BALLENTINE 314 AND TRIPPLETT 420PL 0-1 MILL METER.



NEW TUNER 1/2" LONGER THAN PRODUCTION WITH COUPLING LOOPS 1/2" LONGER THAN " MODEL WITH MIXER COUPLING CLOSE 1/36" spacing. ALL OTHER COUPLING SPACES NORMAL.

TUNER CHECK OUT BEFORE INSTALLING IN RCVR.

	MILL-VOLTS	RESPONCES
260 MC	185	375MC .03MV
300	170	294 MC .12MV
400	130	NONE

TUNER AFTER INSTALLATION IN RCVR.

FREQ	SEN.	IMAGE	RESPONCES ABOVE 65DB.
260	1.6	-50	430-62 DB
309.8	1.8	-44	295-61DB, 297-38DB 450-61 DB
400	5	-14	NONE

NOTE: WITH NORMAL COUPLING IN MIXER STAGE.

400	8	-14	NONE

NOTE: GRAPHS ON FOLLOWING PAGES

SEN. CURVE

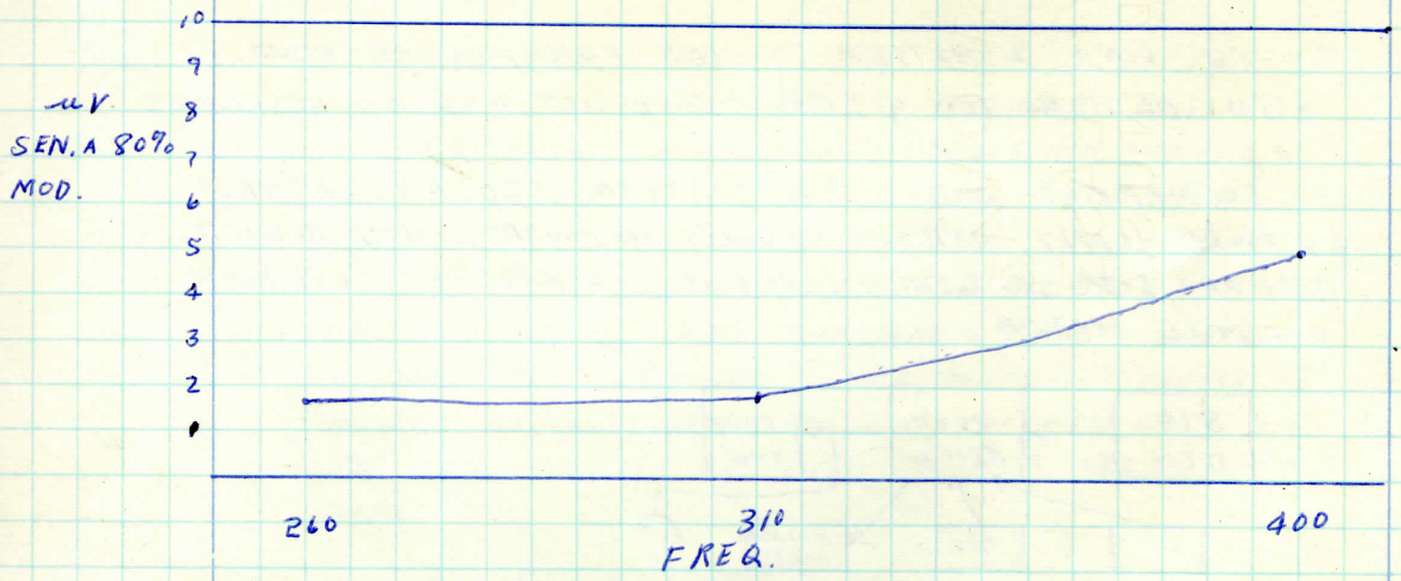
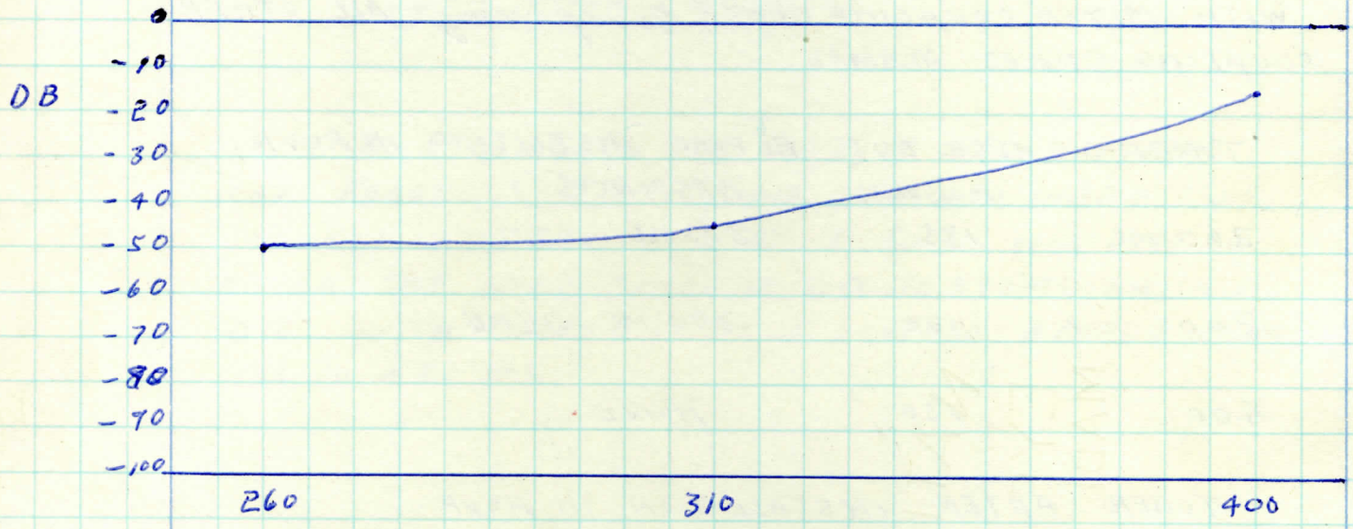
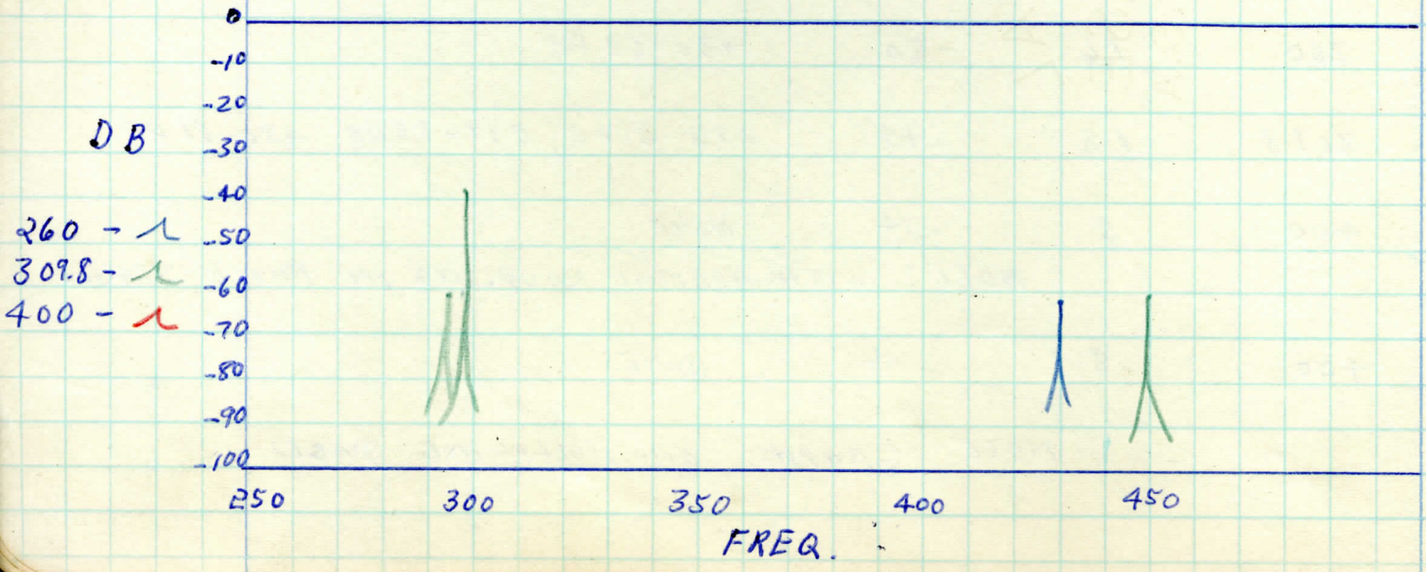


IMAGE REJECTION CURVE



SPURROUS RESPONCES



NEW TUNER WITH COUPLING LOOPS 1/4" LONGER THAN #31 6-15-59

TO CHECK OUT NEW TUNER WITH COUPLING SHORTENED 1/4" AND EVERY THING THE SAME AS BEFORE USEING NORMAL COUPLING BETWEEN ALL STAGES.

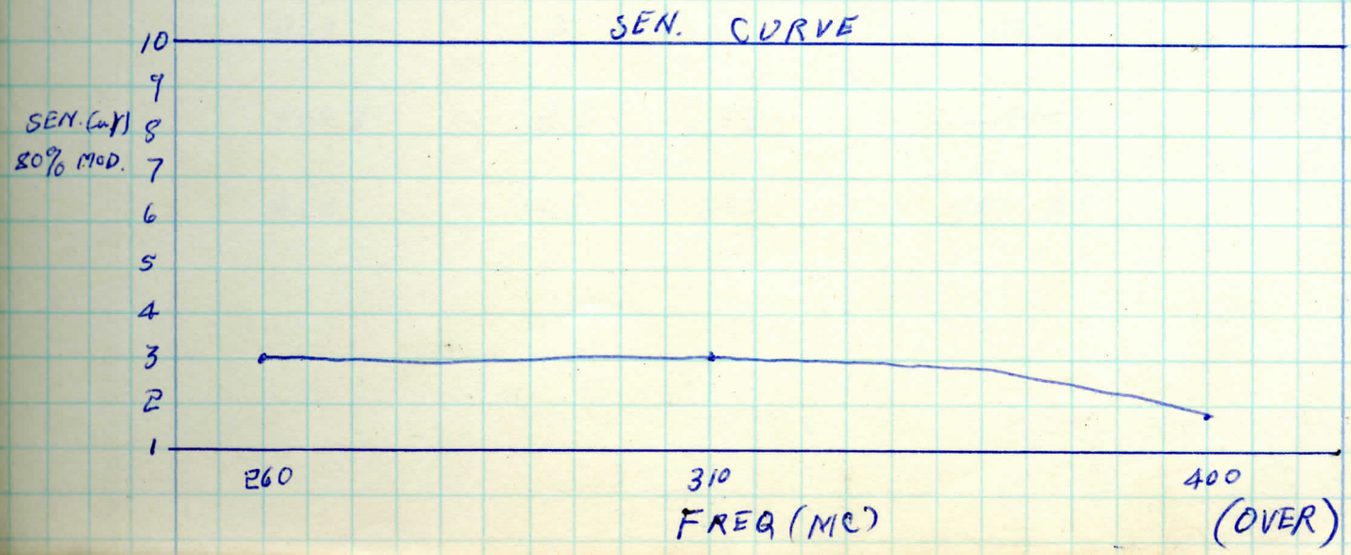
THE SAME EQUIPMENT USED AND SET UP AS USED ON PAGE 5.

TUNER CHECK OUT BEFORE INSTALLING IN RCVR.

FREQ	SIG. INPUT	RESPONCES
260	275	266 -.03
330	235	341 -.07
400	135	407.5 -.32

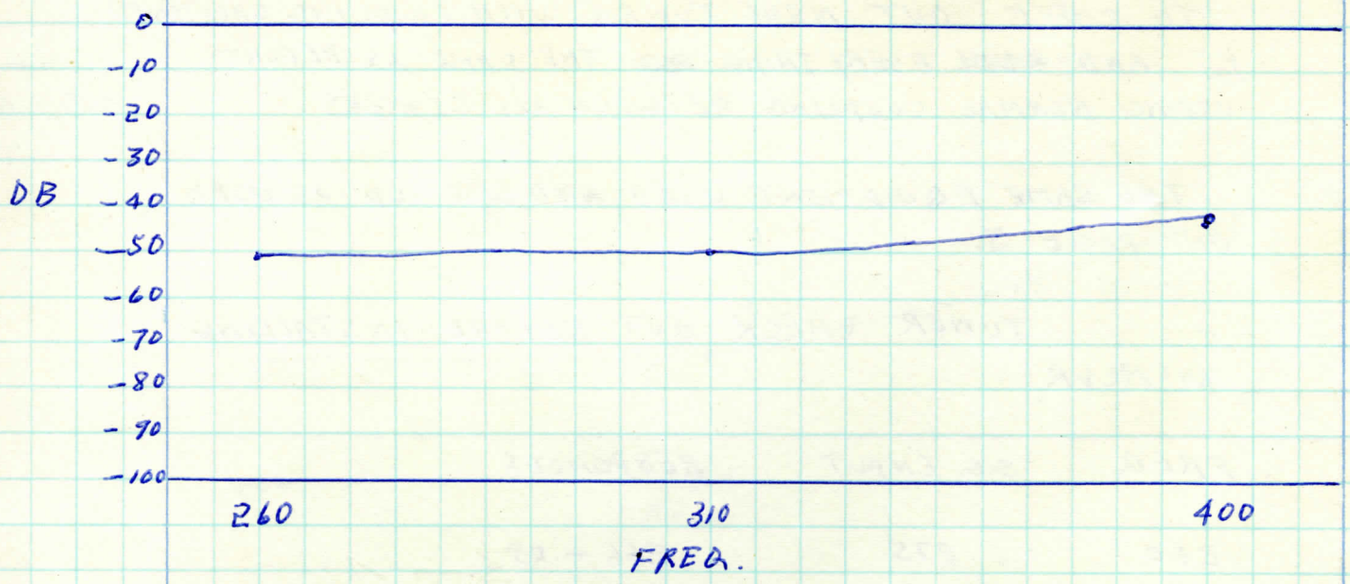
AFTER INSTALLATION IN RCVR. FOR NORMAL CHECK OUT.

FREQ.	SEN.	IMAGE	RESPONCES ABOVE -65 DB
260	3	-51	431 -63 DB
309.8	3	-50	NONE
400	1.8	-43	403 -41 DB

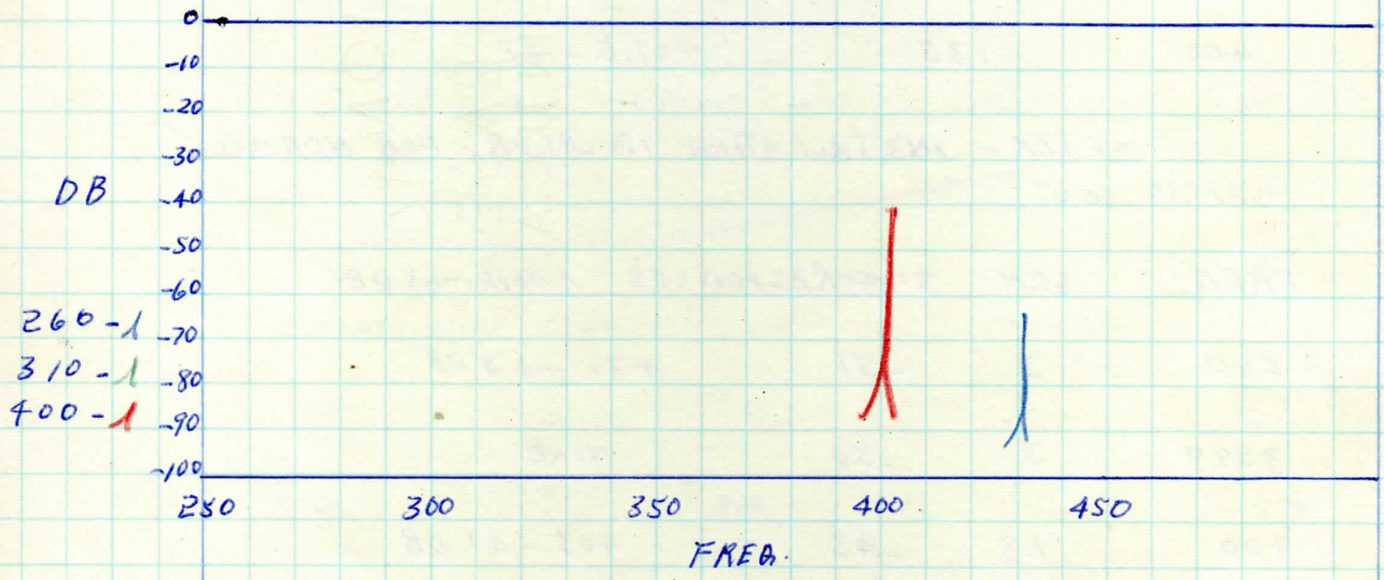


(OVER)

IMAGE REJECTION ~~GRAW~~ CURVE



SPORROUS RESPONCES



6-16-59

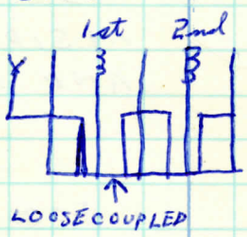
CHECK OUT OF NEW TUNER

THE SAME EQUIPMENT WAS USED AS INDICATED ON PAGE 5.

THE TUNER WAS #31 + 1/2" LONGER ALL COUPLING LOOPS WERE 1/4" LONGER AND 1/2" LONGER ON OSC AND MIXER.

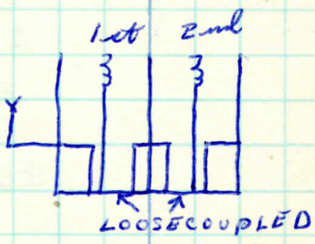
FREQ (MC)	SEN. (uV)	IMAGE (DB)	RESPONCES
260	2.8	-51	NONE
309.8	2.5	-49	NONE
400	2.2	-48	403-26 DB

SAME AS ABOVE WITH 1st. R.F. STAGE LOOSE COUPLED TO 2nd RF STAGE



400	1.6	-41	403-28
309.8	2	-52.5	NONE
260	2.8	-54	NONE

SAME AS ABOVE WITH LOOSE COUPLING BETWEEN 1st and 2nd R.F. STAGES.

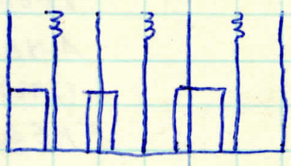


260	3	-55	NONE
309.8	2.5	-52	NONE
400	1.8	-43	403-27

CHECK OUT OF #31 TUNER + ½" IN LENGTH 6-17-5

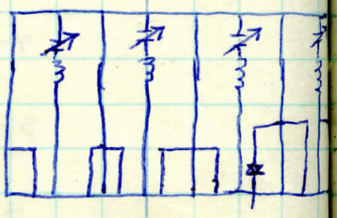
SAME EQUIPMENT AND SET UP USED AS INDICATED ON PAGE 5.

LOOSE COUPLING USED BETWEEN 1st AND 2nd RF stages AND MIXER LOOSE COUPLED.



FREQ.	SEN.	IMAGE	RESPONCES
260	3.5	-56	NONE
309.8	2.7	-53	NONE
400	2	-43	403-30

SAME AS ABOVE BUT WITH MIXER CRYSTAL INSIDE TUNER. AND COUPLING LOOP BETWEEN OSC AND MIXER ½" LONGER THAN #31 TUNER.



400	2.3	-49	403-27
309.8	2.7	-53	NONE
260	2.6	-58	NONE

SAME AS ABOVE BUT WITH COVER SOLDERED IN PLACE ON 1st RF STAGE.

260	2.6	-57	NONE
309.8	2.6	-54	NONE
400	1.8	-49	403-28 DB

17-59

CHECK OUT OF #31 TUNER + 1/2" 6-18-59

TO DETERMINE IF RESPONCE AT 403 IS FROM TUNER.

EQUIPMENT USED R300A RCVR, 6V POWER SUPPLY MATTSON-CROWLEY 113 POWER SUPPLY, HEWLETT-PACKARD 608C AND 608D SIG. GENERATORS, BALLENTINE 314 AND TRIPPLET 420PL 0-1 MILL METER.

OSC. IN RCVR. WAS DISABLED AND 608D SIGNAL GEN. WAS CONNECTED TO OSC. SECTION OF TUNER OUT PUT OF SIGNAL GEN. COULD NOT BE ADJUSTED WELL BUT THE PROPER AMOUNT OF CRYSTAL CURRENT WAS OBTAINED.

FREQ	SEN.	IMAGE	RESPONCES
400	2.7	-48	NONE
309.8	3.7	-55	NONE
260	5	-61	NONE

THE RESPONCES WERE COMING FROM LOCAL OSC.

THE LOCAL OSC. WAS HOOKED UP AND CHECKS WERE RUN AT THE FOLLOWING FREQ.

XTAL. FREQ	FREQ	SEN.	RESPONCES.	7TH HAR. OF XTAL.	$f_s - f_o$
61.75	400	1.8	403-28 DB -70	432-30 = 402	3
58.5	381	2	379-33 DB -62	409-30 = 379	-2
51.110	336.6	2.5	328-46 DB	357.7-30 = 327.7	-8.6
50.5	333	2.7	324-61 DB	353-30 = 323	-9
46.633	309.8	3	312-77 DB	326-15 = 311	+2.2
38.33	260	2.7	NONE		

TUNER CHECK OUT. #31 TUNER + 1/4" 6-22-59

A TUNER 1/4" LONGER THAN #31 AND THE COUPLING LOOPS ARE THE SAME AS #31 TUNER WITH OSC. IN PUT IN LINE WITH OTHER LOOPS.
THE SAME EQUIPMENT AND SET UP WAS USED ON PAGE #5.

(MC) FREQ	(uV) SEN.	DB IMAGE	RESPONCES
400	2	-60	403-42
309.8	4	-47	NONE
260	5.5	-51	430-57

SAME AS ABOVE BUT WITH OSC. INPUT MOVED 3/8" LONGER.

260	3.5	-52	430-60
309.8	3.4	-46	NONE
400	2.5	-44	403-42

SAME AS ABOVE WITH COUPLING LOOP MOVED TO POSITIONS TO OBTAINE GREATER SEN. AND MOVE IMAGE REJECTION AND ELIMINATE SPURIOUS RESPONCES DOWN. OSC. INPUT WAS MOVED TO 1/2" LONGER THAN #31

400	4.7	-42DB	403-28DB
309.8	4	-50DB	NONE
260	3.3	-56DB	NONE

THIS TYPE TUNER 1/4" LONGER WAS DISCONTINUED BECAUSE GOOD RESULTS COULD NOT BE OBTAINED IN REGUARD TO SEN., IMAGE, AND RESPONCES.

22-59

NEW TUNER TO BE USED 6-23-59

THE TUNER THAT WILL BE USED HAS THE FOLLOWING COUPLING AND SIZE.

TUNER IS ½" LONGER THAN #31 PRODUCTION MODEL ALL COUPLING LOOPS ARE ¼" LONGER THAN #31 EXCEPT THE COUPLING LOOP BETWEEN OSC. AND MIXER WHICH IS ½" LONGER THAN #31 WITH OSC. INPUT ½" LONGER THAN #31 TUNER.

THE COUPLING BETWEEN THE 1st AND 2nd R.F. STAGES ARE LOOSE COUPLED TO BRING IMAGE DOWN. AND MIXER CRYSTAL IS PLACED IN SIDE TUNER.

THE FOLLOWING MEASUREMENTS WERE MADE USEING THE SAME SET UP AS INDICATED ON PAGE 5.

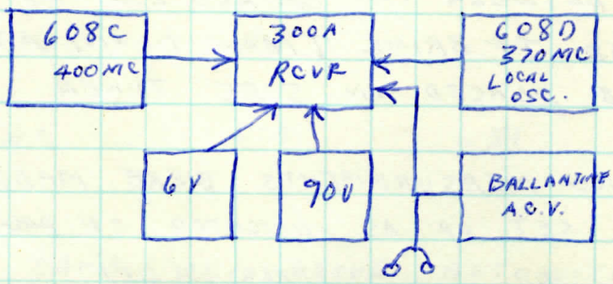
(MC) FREQ	(μv) SEN.	DB IMAGE	(FREQ) (DB) RESPONCES
260	2.6	-57	NONE
309.8	2.6	-54	NONE
400	1.8	-49	403-28 DB

NOTE: AN ALUM. CASTING WILL MADE TO SEE IF IT WILL WORK IN PLACE OF .015 BRASS.

CHECKS TO SEE IF RESPONCES ARE COMING FROM TUNER OR OSC. 6-23-59

THE LOCAL OSC. WAS DISCONECTED AND 608D WAS USED AS LOCAL OSC.

EQUIPMENT USED HEWLETT-PACKARD 608C AND 608D SIG. GEN., MATTSON-CROWLEY 113 POWER SUPPLY, 6V REGULATED POWER SUPPLY, BALLANTINE AC. METER AND TRIPLETT 4203-PL.



WITH RCVR TUNED TO 400 MC AND 370 MC FREQ INJECTED IN TO OSC. STAGE OF TUNER. THE FOLLOWING RESPONCES.

FREQ	SEN.	IMAGE	RESPONCES
400MC	2.2 uv	-49 DB	401.5 -92 DB
			404.5 -91 DB

USEING THE SAME SET UP AS ABOVE EXCEPT SIGNAL FOR LOCAL OSC. THE SIGNAL WAS INJECTED INTO GRID OF 5703 AND THE FOLLOWING RESULTS WERE OBTAINED

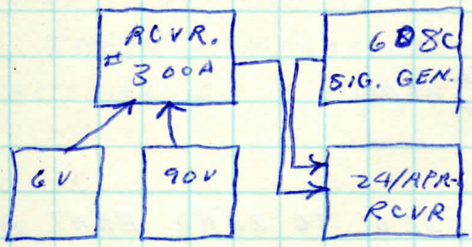
FREQ	SEN.	IMAGE	RESPONCES
400 MC	3.1 (uv)	-49 DB	401.5 - 82 DB
			404.5 - 81 DB

CHECK OF FREQ COMING FROM LOCAL OSC. 6-23-59

RCVR. WAS TUNED TO 400 MC USEING 61.750 MC CRYSTAL

EQUIPMENT USED. HEWLETT-PACKARD 608C, MX-24/APR-1 RADIO RCVR., MATTSON-COWLEY 113 POWER SUPPLY, AND 6V REGULATED POWER SUPPLY.

THE RCVR. WAS TUNED TO 400MC AND THE MX-24/APR-1 WAS USED AS A DETECTOR AND THE HEWLETT-PACKARD 608C WAS USED AS AN OSC. TO ZERO BEAT AGINST THE FREQ. FROM THE OSC. IN RCVR #300A.



THE FOLLOWING FREQ. WERE FOUND

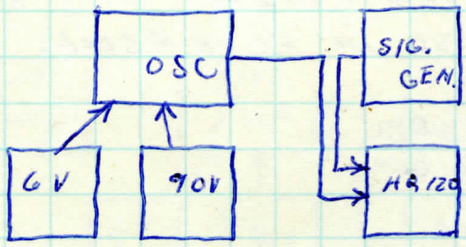
(HARMONIC)	WITH 6AF4A FREQ. (MC)	WITH 6AF4A REMOVED FREQ. MC.	
2	123.6	123.6 (2 RESPONCES)	(NOTE) TOO CLOSE TO MEASURE
3	185.5 (2 RESPONCES) (NOTE) TOO CLOSE TO MEASURE	164	
4	247.5	171	
5	309	185.5 2 RESPONCES)	(NOTE) TOO CLOSE TO MEASURE
	323	247.5	
	330	309	NOTE: THESE DOUBLE RESPONCES COULD BE TUNED OUT BY ADJUSTING THE LAST OSC. STAGE.
6	370	323	
	380	341.5	
	420	370	
	460	380	
		420	
		460	

6-24-59

CHECK OF 6111 STAGE FOR RESPONCES

TO DETERMINE WHAT FREQ. IF ANY ARE COMING FROM THE 6111 STAGE OF OSC. THE OSC. WAS REMOVED FROM RCVR. AND 5703 STAGE WAS DISABLED.

THE FOLLOWING EQUIPMENT WAS USED HEWLETT PACKARD 608D SIG. GEN., HAMMARLAND HQ-120 MATTSON COWLEY POWER SUPPLY AND 6V REGULATED POWER SUPPLY.



THE 608D WAS USED TO ZERO BEAT AGINST THE SIGNAL FROM OSC. AND HQ 120 WAS USED AS A DETECTOR.

WITH 61.75 CRYSTAL IN OSC THE FOLLOWING FREQ WERE FOUND.

12.1, 15.15, 15.65, 15.9, 16.55, 17.75, 19.95, 20.85, 21.15, 21.75, 22.7, 25.4, 27.3, 28.1, 29, 29.95, 30.2, 30.65, 30.85 AND 30.9

WITH 58.5 CRYSTAL

14.78, 18.25, 19.8, 19.85, 20.0, 21.0, 23.75, 23.95, 25.45 29.45, 29.51, 29.55, 29.7, 29.75 AND 29.95.

WITH 51.110 CRYSTAL

7.4, 25.8, 25.95, 26.18 AND 26.25

ALL THESE FREQ. WERE FOUND BELOW 31 MC WHICH WAS THE UPPER LIMIT OF HQ 120 RCVR.

CHECK OF OSC. WITH 680 Ω RES. 6-25-59

REPLACED WITH 470 Ω RESISTORS.

SAME SET UP WAS USED AS INDICATED ON PAGE #16

R 202 AND R204 WERE CHANGED TO 470 Ω RES. AND THE FOLLOWING FREQ WERE FOUND WITH 51.110 CRYSTAL IN OSC.

7.4, 25.8 25.95 26.18 AND 26.25.

THESE RES. CHANGES ONLY LOWERED THE OSC. OUT PUT. BUT DID NOT CHANGE ANY FREQ PRESENT. ONLY THERE AMPLITUDE WHICH APPEARED TO BE ~~[illegible]~~ LOWERED THE SAME AS OSC. OUTPUT.

CHECK OF OSC. WITH 680 Ω RES. BACK IN OSC. AND A 68 Ω RES. ~~[illegible]~~ PLACED IN GRID LEAD TO GROUND.

SAME EQUIPMENT USED AS INDICATED ON PAGE #16
58.5 CRYSTAL WAS USED. AND TEST POINT 1 = .24 MA

THE FOLLOWING FREQ. WERE FOUND.
15.1, 17.97, 18.25, 19.8, 19.85, 20.0 20.1 23.75
23.95, 25.45, 29.45, 29.51, 29.55, 29.75, 29.95

THE AMPLITUDE OF THESE FREQ. WERE LOWERED AND THREE OTHER CRYSTALS WERE USED. TO FIND ~~[illegible]~~ TEST POINT 1 READINGS.

FREQ MC	TP-1
61.75	.24
58.5	.24
50.5	.27
38.33	.27

THE 68 Ω RESISTOR HAS LEVELED OUT THE READINGS OVER THE ENTIRE FREQ. RANGE OF OSC.

OSC. CHECKS WITH CAP. CHANGES 6-26-5

TO TRY AND ELEMINATE UNWANTED FREQ. WITH CAP. CHANGES. C204 = 25 mmf.

THE SAME EQUIPMENT AND SET UP WAS USED AS INDICATED ON PAGE 16.

C204 = 20 mmf AND CRYSTAL FREQ = 58.5 TP-1 = .3

FREQ. PRESENT WERE 29.95, 29.75, 29.55, 29.51, 29.45, 25.45, 23.95, 23.75, 20.1, 20.0, 19.85, 19.8, 18.25, 17.97 AND 15.1.

NEXT A 15 mmf CAP. WAS USED IN PLACE OF 25 mmf C-204. TP-1 = .23.

FREQ. PRESENT WERE THE SAME AS ABOVE BUT WITH LOWER OUTPUT.

NEXT A 33 mmf WAS USED IN PLACE OF THE 25 mmf. TP-1 = .32

FREQ. PRESENT WERE THE SAME AS ABOVE.

NEXT A 39 mmf WAS USED IN PLACE OF THE 25 mmf.

THE OSC. COULD NOT BE PEAKED UP TO WORK PROPERLY.

26-59

OSC. CHECKS WITH A COIL ACROSSED XTAL 6-29-30

A 1uh COIL WAS PLACED ACROSSED THE CRYSTAL TO SEE IF IT ELEMINATED THE UNWANTED FREQ.

THE SAME SET UP WAS USED AS INDICATED ON PAGE 16.

A 58.5 CRYSTAL WAS USED WITH A 1uh COIL PLACED ACROSSED IT.

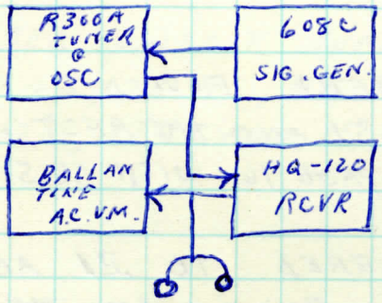
THE FOLLOWING FREQ. WERE FOUND.
29.95, 29.75, 29.55, 29.51 AND THE REST WERE THE SAME AS BEFORE ON PAGE 16 WITH 58.5 XTAL.

TP-1 OUTPUT WAS LOWERED TO .21 AND OSC WAS INSTALLED IN R300A RCVR. AND RETUNED TO 400MC. THE RESPONCE WAS STILL THERE AT 403 MC ONLY 31 DB DOWN. FOR THIS TEST THE SAME SET UP WAS USED AS INDICATED ON PAGE 5.

CHECK TO SEE IF DETECTOR IS EFFECTING 6-30-59
OR CAUSEING RESPONCES

TO REMOVE DETECTOR AND DEMODULATOR FROM RCVR. AND USES HQ-120 RCVR. HOOKED TO MIXER CRYSTAL THROUGH COAXIAL CABLE AND USE AS A DETECTOR.

EQUIPMENT USED HEWLETT-PACKARD 608C, HAMMARLAND HQ-120 RCVR, BALLANTINE 314 AC VOLTMETER



THE HQ-120 WAS ZERO BEAT TO 30MC WITH 608C SIGNAL GEN., THE BALLANTINE WAS USED TO MEASURE SIGNAL AMPLITUDE. THE FOLLOWING FREQ. WERE FOUND. RCVR TUNED TO 400 MC.

FREQ	INPUT	OUTPUT	
400	315 mv	1VAC	
400.873	140 mv	1VAC	MAIN SIGNAL
402.5	10.5 mv	1VAC	
403	30 mv	1VAC	
340	14 mv	1VAC	IMAGE

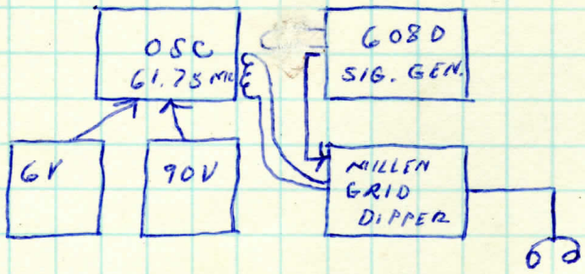
THE RESPONCES ARE ~~[illegible]~~S PRODUCED BY THE LOCAL OSC. WITH THE DETECTOR REMOVED THE RESPONCES ARE IN THE SAME PLACES. SEVERAL DIFFERENT VALUES OF COUPLING CAP. WERE USED IN THIS TEST BUT THEY WOULD INCREASE OR DECREASE THE RESPONCES AND THE MAIN SIGNAL WOULD FOLLOW.

59

CHECK OF OSC. ALONE. FROM 30MC AND UP 7-1-59

A CHECK FOR DIFFERENT FREQ. WAS MADE WHEN THE OSC. TUNED TO 61.75MC AND THE 5703 STAGE NOT OPERATING.

EQUIPMENT USED HEWLETT-PACKARD 608D, MILLEN GRID DIPPER, 90V BATTERIES AND 6V REGULATED SUPPLY. THE 608D SIG. GEN. WAS USED TO ZERO BEAT AGAINST THE GRID DIPPER WHICH WAS USED AS A DETECTOR.



FREQ. FOUND WERE 61.75 ANOTHER RESPONCE 2.5MC HIGHER

" " " 123.6 " " 2.5MC "

" " " 185.5 " " 2.5MC "

THESE RESPONCES WERE VERY STRONG BUT WERE NOT UP TO MAIN SIGNAL LEVEL.

7/23/59

Ae Tuner After Blasting interior + plating with Silver. Mixer diode inside Mixer Section. Normal Coupling.

Freq.	Sens.	Image	Responses
400	2	-58 db	99.5 - 62 db 133 - 59 db 200 - 53 db 402 - 62 db 403 - 39 db
309.8	2.5	-50 db	103 - 57 db 154.5 - 52 db
260	2.7	-55 db	65 - 60 db 86.5 - 59 db 129 - 51 db

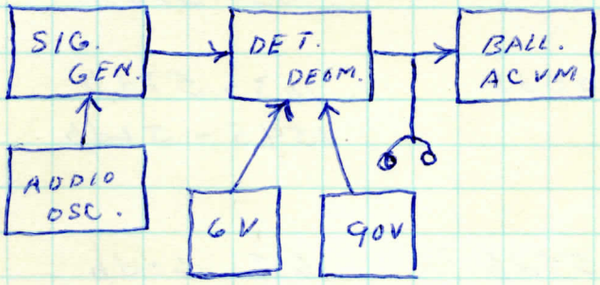
L 202 wound opposite direction, Same As Above otherwise.

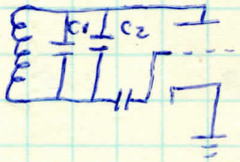
260	4.5	-55 db	65 - 59 db 86.5 - 54 db 129 - 50 db

COLD TEST: R300A DETECTOR AND DEMODOLATOR 7-28-59

TO DETERMINE THE AMOUNT OF FREQ CHANGE AND ELIMINATE SAME.

EQUIPMENT USED HEWLETT PACKARD 608D SIG. GEN., BALLANTINE 314 AC. VOLTMETER, 6V POWER SUPPLY, 90V BATTERIES AND SIMPSON MODEL 388 THERM-O-METER AND HEATH KIT AUDIO OSC. MODEL AQ-1.





C_1 = 27 mmf TCO
C_2 = 1.5 mmf TCO

NO. 1 DETECTOR, NO. 24 DEMODULATOR

FREQ (MC)	AMB. TEM.	UNIT. TEM.	SEN (uv)	AUDIO FREQ. (~)
30.000	84°	84°	1.6	1030
30.000	60°	60°	1.6	1000
30.000	40°	40°	1.6	985
30.000	20°	21°	1.6	970
29.996	0°	2°	1.6	970
29.990	-20°	-18°	1.6	980
29.990	-40°	-37°	1.6	990
29.987	-50°	-46°	1.6	990
29.984	-65°	-65°	1.6	1000

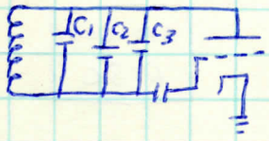
-59

COLD TEST R300A DETECTOR AND DEMODULATOR 7-29-59

TO ELIMINATE FREQ. DRIFT WITH TEMP. CHANGE

SAME EQUIPMENT AS USED ON PAGE 28.

NO. 1 DETECTOR AND NO. 24 DEMODULATOR



C_1 = TCO-27 mmf
C_2 = TCO-1 mmf
C_3 = TCB-1 mmf

FREQ. (Mc)	AMB. TEMP.	UNIT. TEMP	SEN. (μv)	AUDIO FREQ. (cy)
30.000	77°	81°	1.6	1030

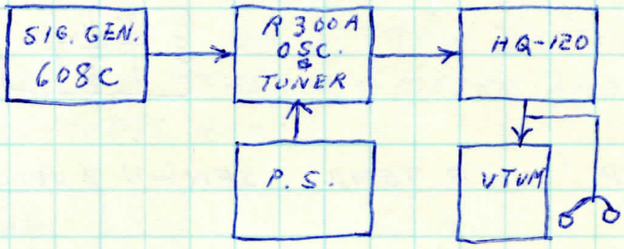
TCO
TCO

OSC. CHECKS

8-10-59

TO TRY AND ELEMINATE RESPONCES COMING FROM OSC.

EQUIPMENT USED HEWLETT PACKARD 608C, HAMMARLAND HQ-120 RECEIVER AND HEATHKIT VTVM V-7A.



OSC. NORMAL WITH SHIELD BETWEEN 6111 AND 5703 STAGES.

NOTE: ALL READINGS ARE ON DBM SCALE OF 608D

FREQ.	SEN.	RESPONCES
400	85	402.5 -31 DB

SAME AS ABOVE WITH 4 TURN 1/8" DIA. COIL BETWEEN 6111 PLATE AND TUNED CKT.

400	85	402.5 -35 DB

SAME AS ABOVE WITH A 1 mf CAP. ADDED TO GROUND FROM 6111 PLATE.

400	85	402.5 -38 DB

SAME AS ABOVE WITH THE ONE TURN IND. REPLACED WITH A STRAIGHT BUSS WIRE.

400	85	402.5 -50 DB

NOTE; BY DIPPING SIGNAL ON RESPONCE THE RESPONCE WAS DOWN -62 DB.

OSC. SAME AS ABOVE.

309.8	76	310.5 -62 DB

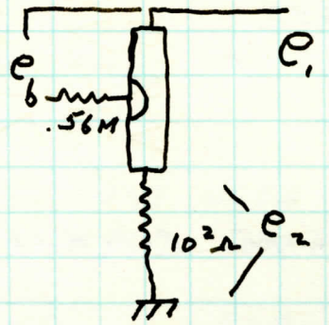
OSC SAME AS PAGE 30

FREQ.	SEN.	RESPONCES
260	62	NONE

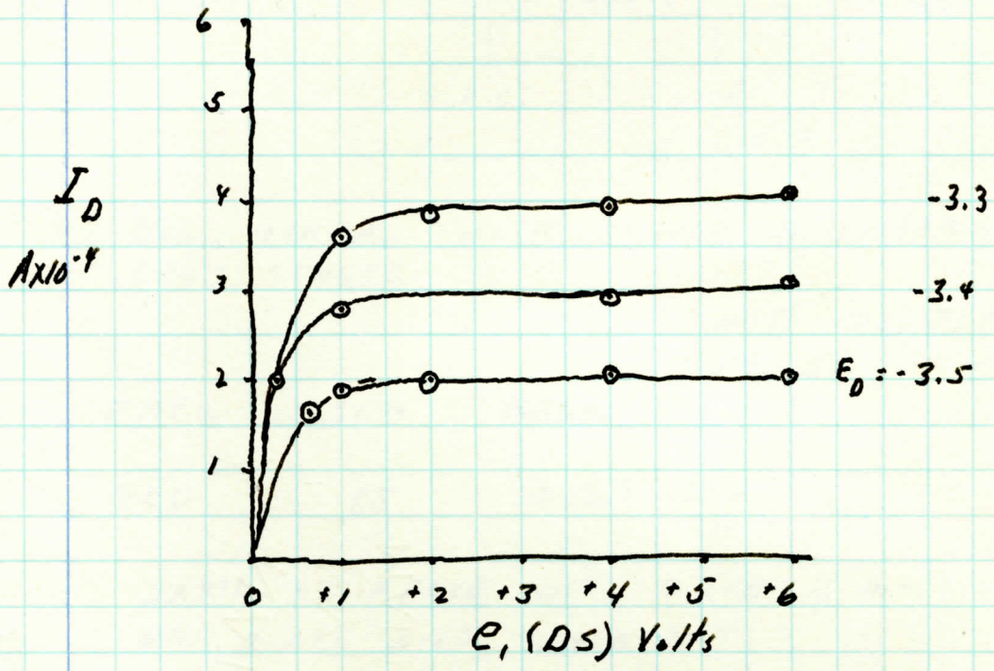
WITH STRAIGHT BUSS WIRE REPLACED WITH ONE TURN IND.

260	65	NONE

Device: Mot. plastic



$I = \frac{e}{r} = \frac{10^{-2}v}{10^2\Omega} = 10^{-4}A$



Amplifier design c̄ FET's

Seems safe to assume Hi Z in-

Gain at VLF and temp var. are unknown-

$E = IR$

$\frac{1}{.2X} = 500\mu mho$

$$Z_{out} = \frac{\Delta e_o}{\Delta i_o} = \frac{1}{10^{-5}} = 10^5 \Omega \quad \Big| \begin{array}{l} I_D = 2\times10^{-4} \\ E_{DS} = 1\text{-}2\,V \\ E_g = -3.5 \end{array}$$

$$G_m = \frac{\Delta i_o}{\Delta e_g} \Bigg| = \frac{.9\times10^{-4}}{10^{-1}} = .9\times10^{-3} = 900\,\mu mho \quad \Bigg| \begin{array}{l} E_{DS} = 2.0 \\ E_g = -3.5V \end{array}$$

For $A = 10$ $\quad A = g_m R_L \quad R_L = \frac{10}{9\times10^{-4}} \approx 1.1\times10^4\,\Omega$

$E_{R_L} = 10^4 \times 10^{-4} = 1.V$

Although FET's with sharper cut off, lower pinch off + possibly higher g_m's may be found the requirement for opposite polarity supply for bias, reasonably high load resistors and accompanying large drop, and degeneration for temp. stability all are incompatible c̄ a low voltage low current ckt. Insulated gate FET's may be operated at 0 or + biases c̄ + supplies but large supplies and currents are required. Future developments may make these units more attractive transistors c̄ high β at low I_c have reasonably high Z_{in} now - With $\beta = 200$ an emitter of $\frac{10^6}{2\times10^2} = .5\times10^4 = 5K$ for 1 meg. in is required. Looking at temp. in

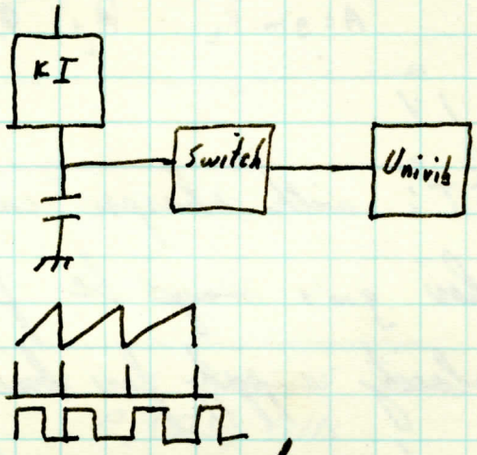
$100\mu A/30°$

$\frac{100}{30} = 3\mu A/°C$

$30\mu A/V$

$.3\mu A/mV$

a MOS FET, the vos. is 3μA/°c at low voltages (null is 6.V) and gm. is .3μA/mV at some point. The present SCO sets limits on the amp. and should be approached first. In the crystal mode some form of switching will be required so the linear pulse rate with a pulse stretcher should be considered.



A constant ~~bandwidth~~ pulse will lend itself to additional discrimination.

X'tal. Rcvr + X mtr.

$X_1 - 119.15$
108.4
10.75

Freq	300	600	1200	2 400	4.8	9.6
80	0	.82	.4			
85	0	1.3	1.1			
95	.98					
105	1.9	Limits	Limit			
115	1.89	@ 90db	93db	90db		
90	.270					
75		.002				
		Thresh 77	Thr-78	Thresh 78		