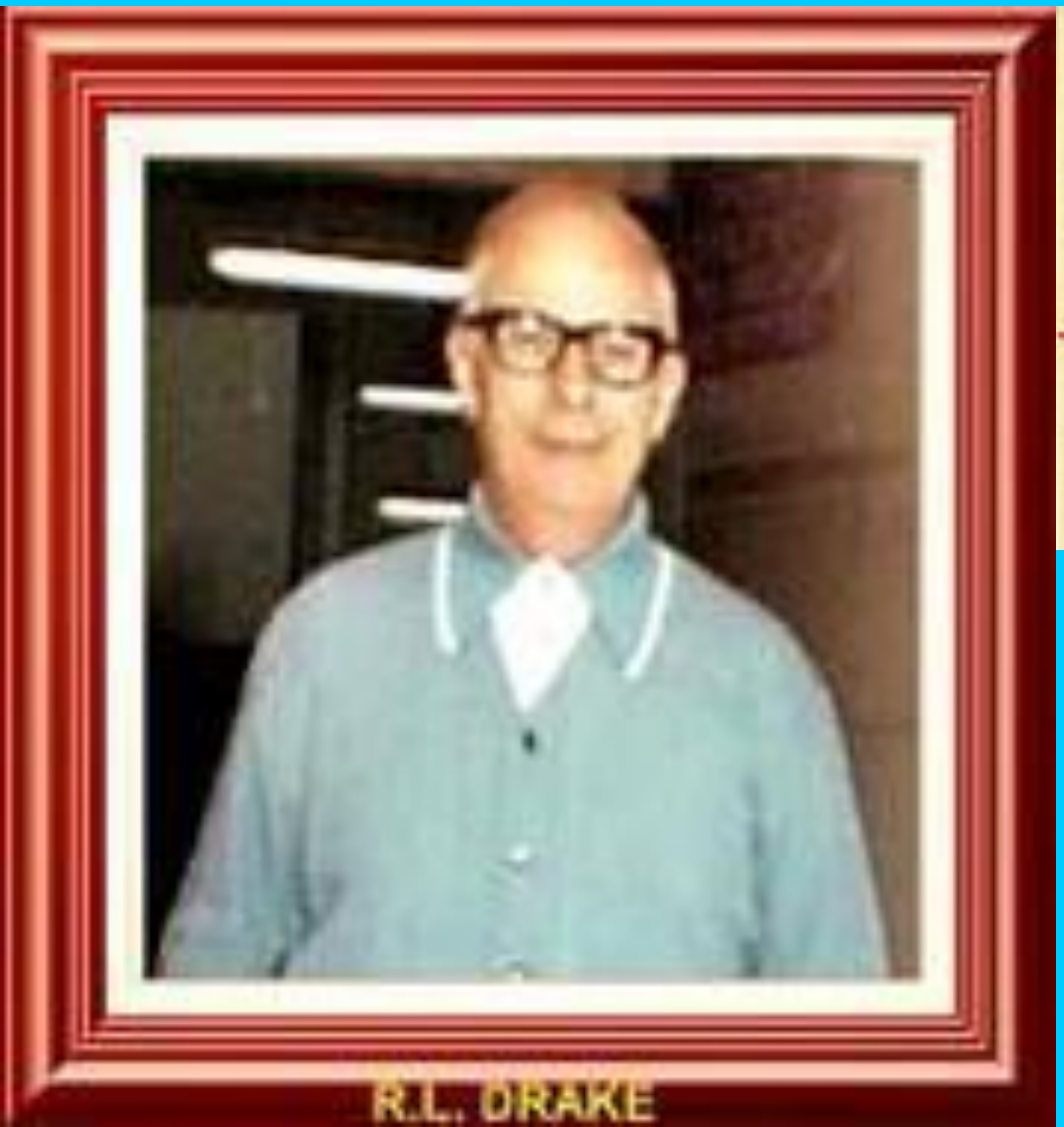
Central Electronics Event 2017
Jeff Covelli WA8SAJ

The R.L. Drake Co.
Started in 1942 during WW II
Manufacturing
<u>R.F. filters</u>
&
<u>Jamming</u>
devices for the military.

There was also a three tube receiver covering 70 to 150 MHz manufactured Model #BC-1225A

Robert Lloyd Drake (1970's)




R. R. 1, MIAMISBURG, OHIO

W8CYE

Amateur Radio Station ____ Confirming our QSO of ____

194__ at ____ M., ST. U. ____ Mc. ____ report was

Q S ____ Antenna ____ Receiver ____

Xmtr. ____ Watts input

Remarks ____

By "Mac" WØWBL

Pse QSL OM Tnx

R. L. Drake

R.F. Filters

DRAKE

BC-1225A

The Year
1946

After the war was over Bob Drake needed help to grow the company and he hired a young engineer

Milt Sullivan from the University of Cincinnati.

Milt Sullivan (K8YDO)
Drake's Chief Engineer
1946 to 1983 (37 Years Service)
Plus 4 Years Consulting for Drake

Milt's Job Application in 1946
Hired for 86 cents per Hour.

Date November 11, 1946

Applicant's Name Milton Arnold Sullivan, Jr.

Job Classification Title

Date to Begin Nov. 4, 1946

Hourly Rate .86

The above named applicant has been interviewed on the above date and hired in

Engineering Department.

E L Drake

Supervisor

R.L. Drake continued to manufacture accessories:

Chokes

R.F. filters

Q-multipliers

Phone-Patches

DRAKE

Chokes – Filters – Phone-Patch

1956

Bob Drake & Milt Sullivan

Came up with a fresh approach for an extremely stable SSB receiver that looked like a "bread box"

that could snuggle up next to the large receivers of the day; which could not detect SSB very well.

Drake tried to convince:

National

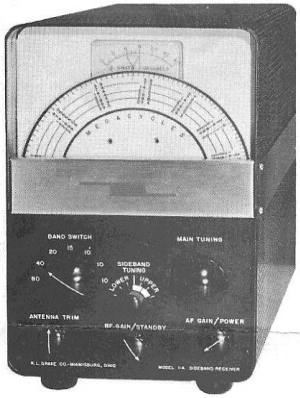
Hallicrafters

Hammarlund

Bob & Milt had a better idea for a great SSB receiver and they all declined ! !

(1956)
Drake
1-A
SSB Receiver

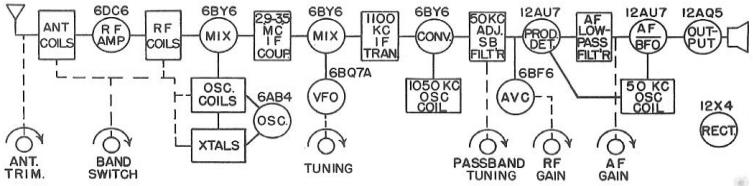
Milt's First Receiver Design

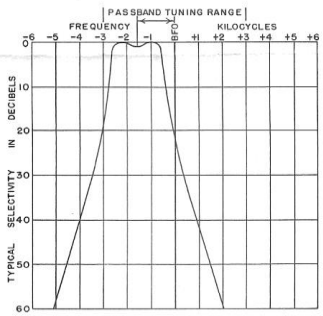


Model 1-A
$259.00

NEW

A SIDEBAND RECEIVER





FEATURES OF R. L. DRAKE COMPANY MODEL 1-A SIDEBAND RECEIVER

Crystal Controlled High Frequency Conferter -- Seven "ham" band tuning ranges
80, 40, 20, 15, 10, 10, 10

High Stability VFO -- New circuit does not need voltage regulator or filament ballast

Triple Conversion
Same tuning rate and stability on all bands -- each band 600 kc wide -- 10 meter band in three sections

Sideband Tuning -- 2.3 kc sideband filter tunes with front panel control through both sidebands

Sideband A.V.C. -- fast charge -- slow discharge -- full A.V.C. without pumping and clicking

Full tuning meter action on sideband

Muting and speaker connections arranged for best sideband and patch operation

Audio low pass filter built in for best signal to noise ratio

Product detector for distortion-free sideband reception

Inverse feedback audio for better low frequency response and minimum distortion

Built in the shape of a "scope" for portability and minimum desk space. Set it beside that old general purpose receiver.

Eleven tubes -- 6DC6 1st R.F. - 6BY6 1st mixer - 6BY6 2nd mixer
6BY6 3rd Converter - 12AU7 Product Detector
6BF6 A.V.C. amplifier and rectifier - 6AB4 crystal oscillator
6BQ7A V.F. oscillator - 12AU7 L.F. oscillator and 1st audio
12AQ5 output audio - 12X4 rectifier

Weight 17.5 pounds

Size 6-3/4 x 11 x 15"

Power consumption 45 watts at 115V A.C.

R. L. DRAKE COMPANY MIAMISBURG, OHIO

Milt's Pride and Joy !
The Drake 2-B & 2-BQ

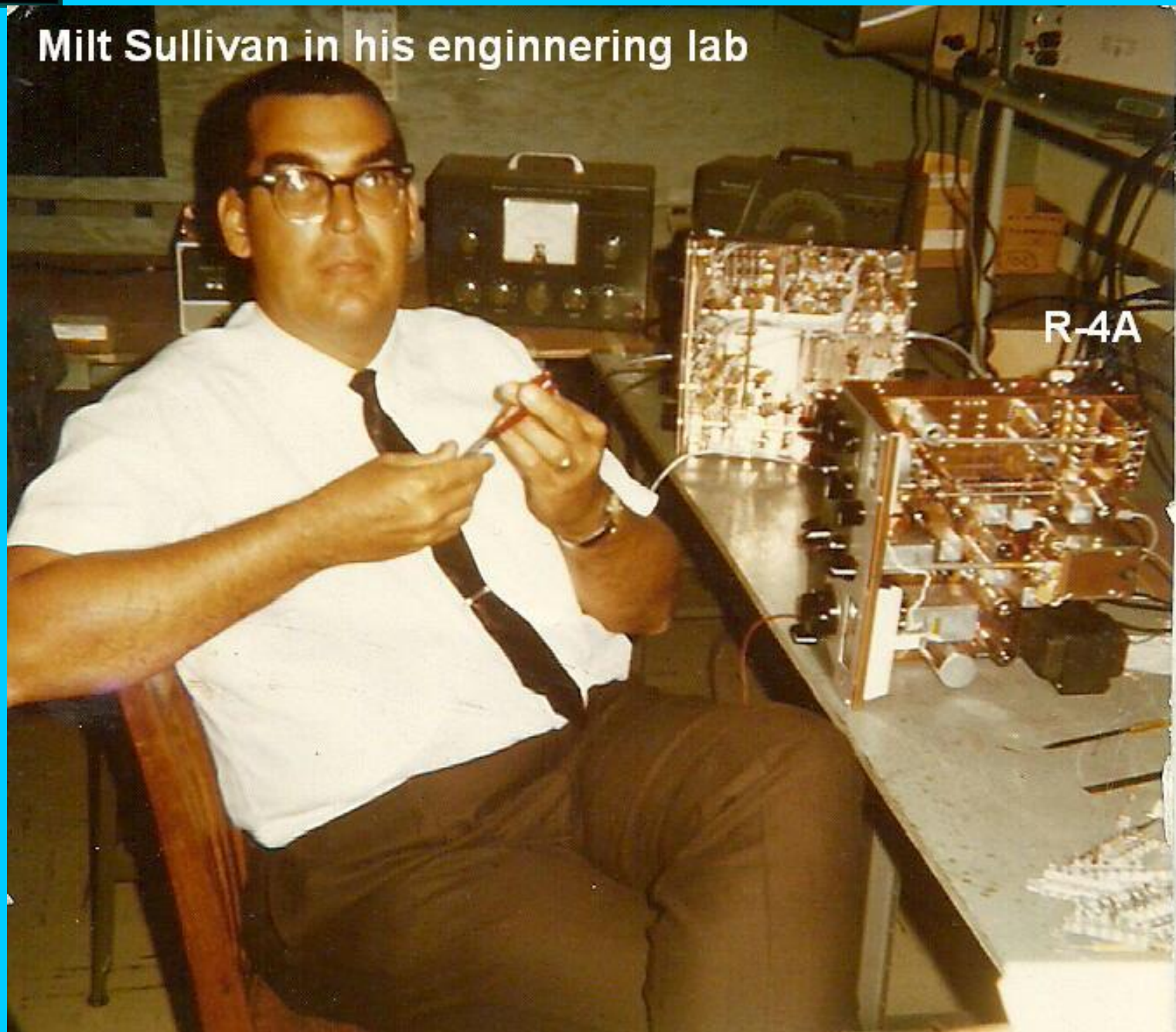
DRAKE

(1965)

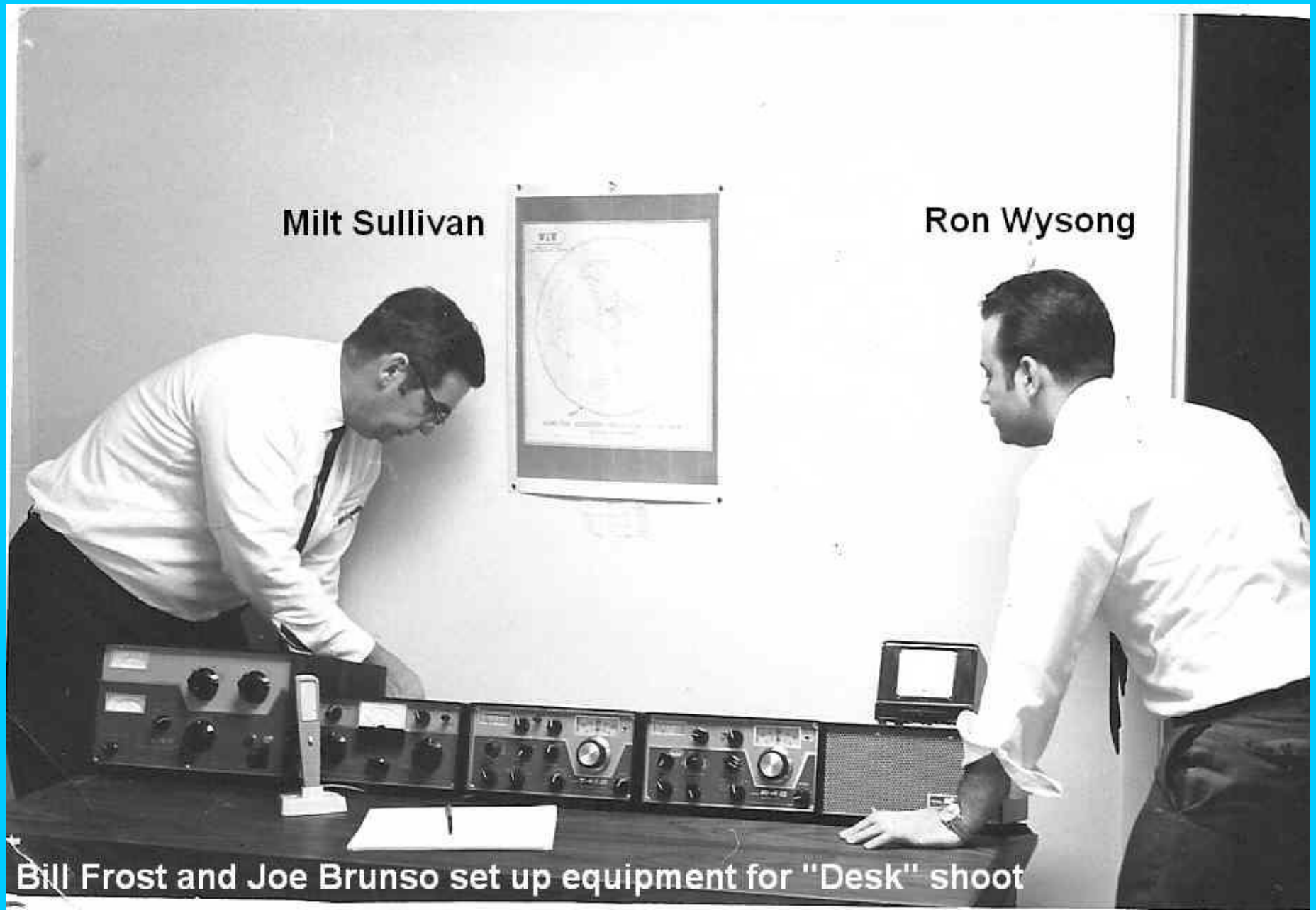
Drake

“A”

Line



Drake B-Line (1968)



Milt's File Box sent to me in 2015

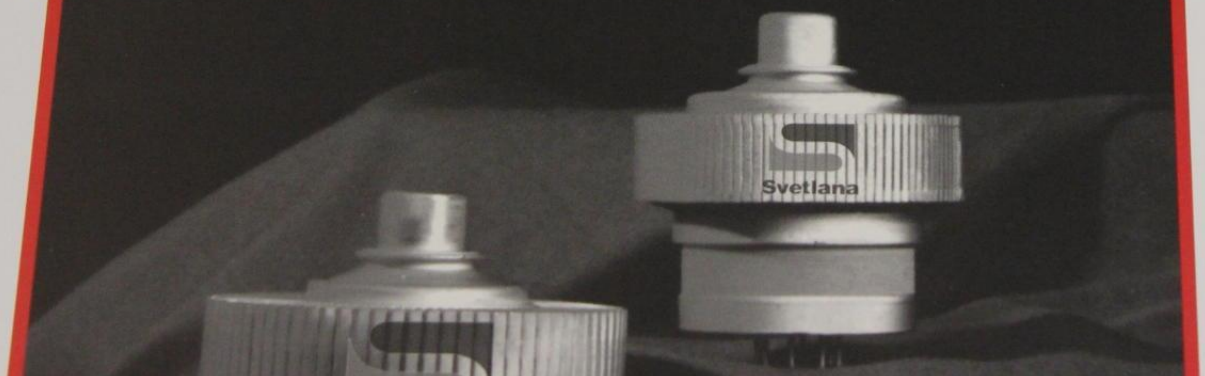
Thousands of Notes

QRP File (note the high power tube) !

onsior, *W6FR*
l Adobe Place
fornia 92635

QRP XMTR

Two New DX Winners



4CX250
Radial

DRAKE

Plenty of High Power notes !

Mary Gonsior, *W6FR*
418 El Adobe Place
Fullerton, California 92635

POWER ON A BUDGET

Using the Russian Svetlana 4CX1600B power tetrode in modern amplifier designs

Something new has been added for high-power linear amplifier designs. It's from Russia with love—a conservative legal limit, cost-effective power tetrode tube.

Background

There was a film some time ago titled, "The Russians are Coming." The introduction of a rather complete line of high quality RF amplifier tubes manufactured in St. Petersburg, Russia, which employ the modern external anode technology, makes this a reality. A very large company—Svetlana Electron Devices, Inc., privatized in 1992—now sells its products worldwide. Recent descriptions in *Communications Quarterly*[1] of two of their tubes, gave me the incentive to try one to revitalize my needy homebrewed Class AB1 amplifier. The application data and results are presented here.

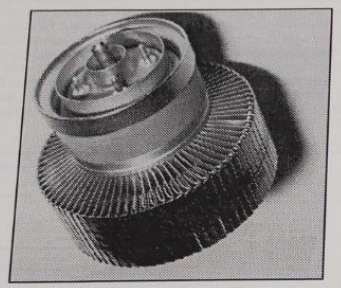


Photo A. Svetlana 4CX1600B. Photo by W6FR.

Svetlana 4CX1600B Characteristics

The tube, and its custom SK3A socket, are shown in **Photos A** and **B**. It's a ceramic-to-metal external anode tetrode whose original application was in a military transmitter, which owes its ruggedness and quality construction. (This tube was called the 4CX1600A, and a much smaller cooler.) Thanks to several design features, the 4CX1600B exhibits excellent performance when operated in class AB1 at relatively low anode voltage.

The anode was recently enlarged and is now essentially identical to the 8877 in size and configuration. Unfortunately, its matching chimney hasn't yet been modified to fit. To overcome this problem, I designed one of my own. I've been told that a compatible chimney will be available in the near future. For the general tube mounting outline, dimensions, and construction details of my homebrewed chimney, please refer to **Figure 1**.

Figure 2 shows the tube's specifications, along with my actual operating parameters, while running the tube as a grid driven amplifi-

QRP XMTR

4CX250BC/8 Radial Bear

The Svetlana 4CX250BC, compact metal/ceramic beam tetrode with a pl tion rating of 250 watts with for cooling. The 4CX250BC is inte Class AB SSB linear RF amplifi intended for stationary and m ment designs with power amp frequencies up to 500 MHz. T has an indirectly-heated oxide which operates at a low temp heater voltage for extended

The Svetlana 4CX250BC is r the Svetlana factory in St. Pe Russia, and is designed to b replacement for the 4CX25 manufactured in the Unite

R.L. Drake
Engineering Practices

Clean slate from the start.

Using as few parts without compromising performance.

Calculating <u>all cost</u> involved to produce a good quality product at a reasonable cost to the customer.

Extensive pre-testing of all components before installing them into a radio.

We make everything ourselves.

Nothing is brought from the outside.

The finished product had to fit within our machinery, tools, & production line.

The following was made from “nothing”:

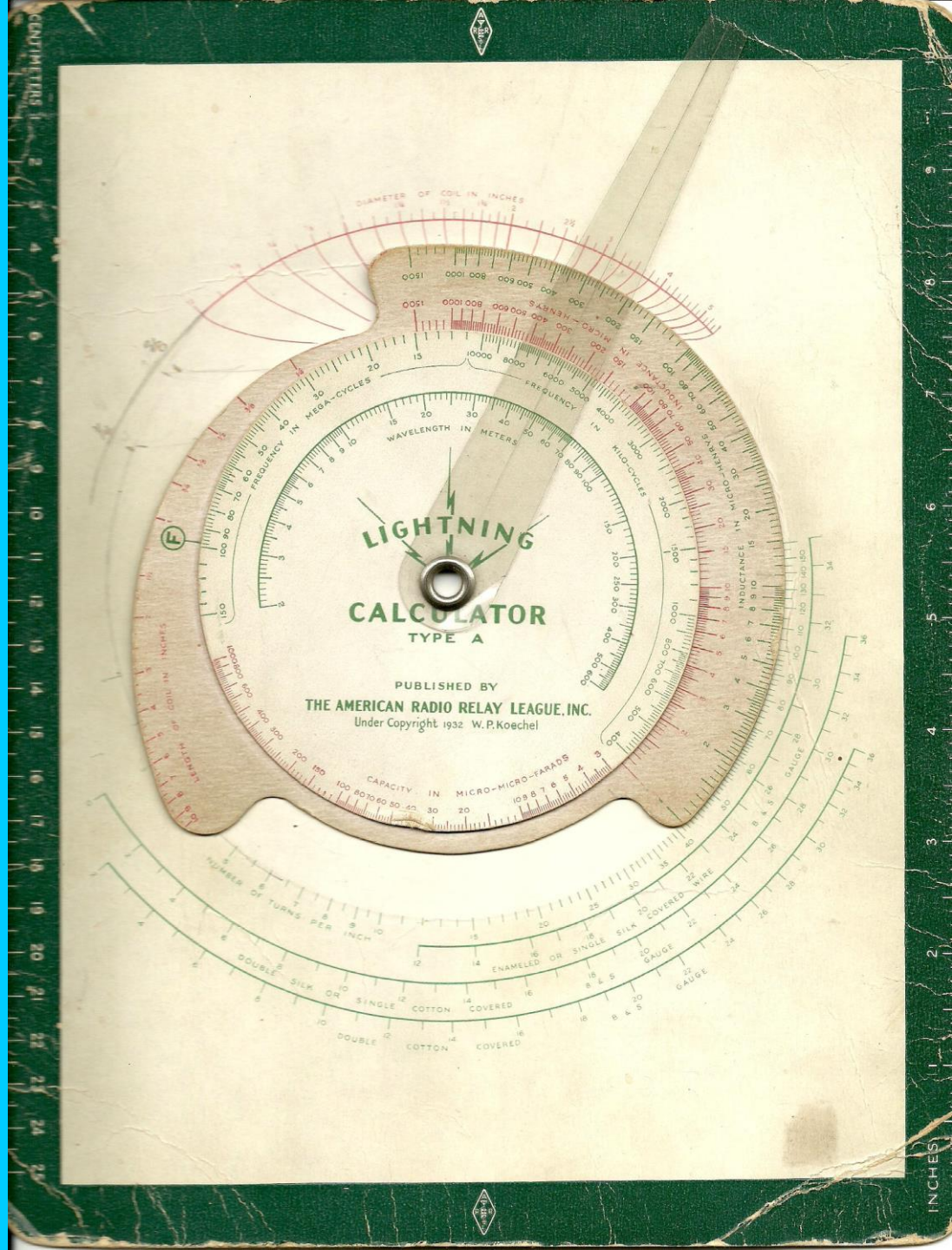
PTO, Crystal Filter, Pass-band Tuner, Cabinets.

DRAKE

Circa:1932 !

ARRL
LIGHTNING
CALCULATOR

This is for calculating
Inductance
Capacitance
Frequency
for Tuned Circuits

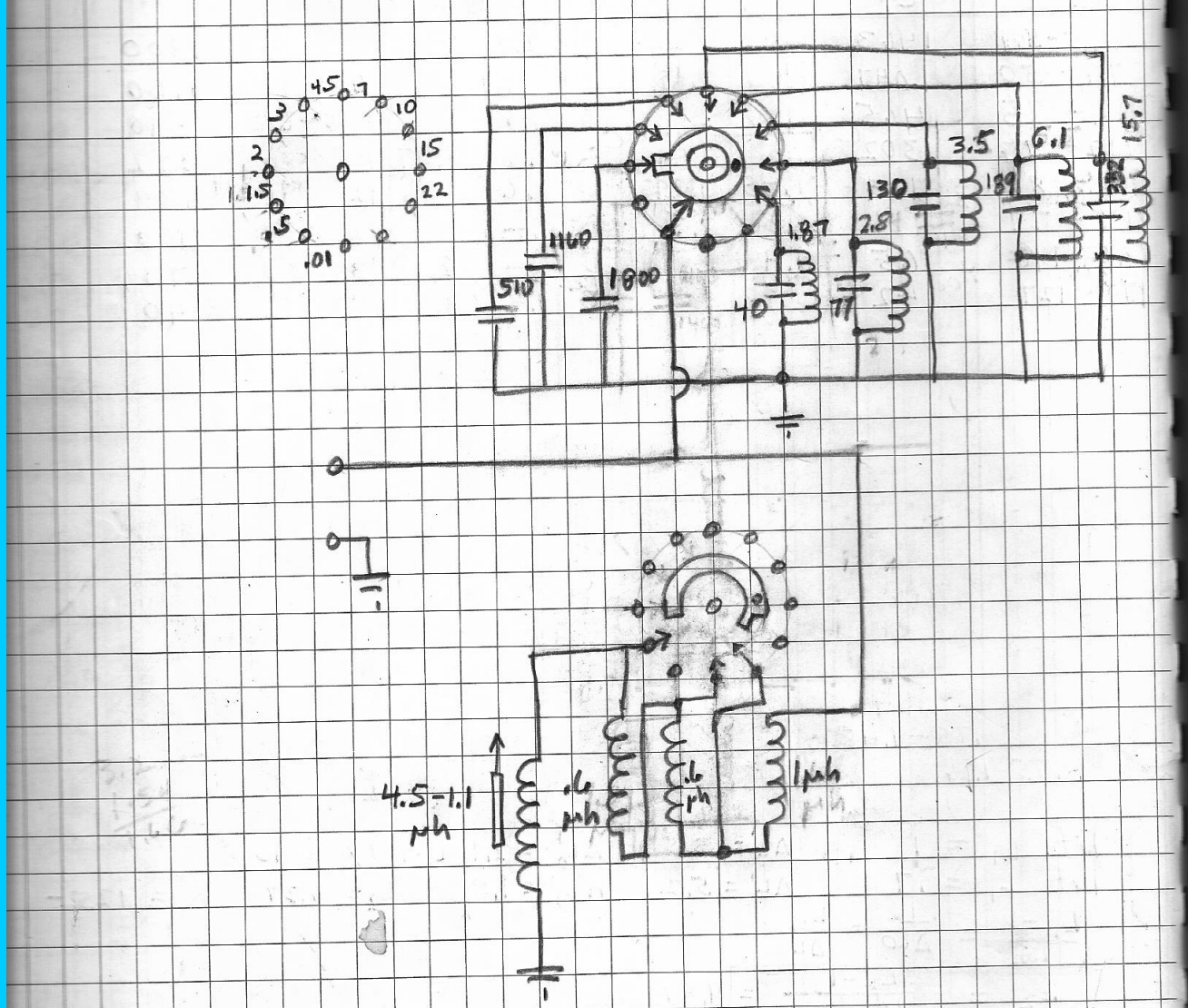


DRAKE

(1960's)

Drake TR-4 & T-4X

Inductance values on the Band-Switch



TR4 Inj plate clock. ~16µh
T4X 160M Gr. prestructor ~ 6µh (-10T = 3.6µh)(-13T=2.7µh)
" punk " ~ ~~2.5µh~~ 1.8µh
T4X Crystal Gr 20 Turn ~ 1. µh
1µh = 13 T 15/41 on QC Form
.6µh = 9 T 15/41 on QC Form

DRAKE

(1970's)

Drake R-4C

Pre-Selector Band-Pass Response

2.6 3 5.2

TITLE Preselector Response

Project No.

Book No.

Note: Std R4C ANT Coils std Ant windings

freq MHz	Insert Loss db	XMTR f	db	40db -f	40db +f	60db -f	60db +f
2	25	1.7	45	-.25	+.3	-.5	+1.0
2	25	2.3	40				
1.6	18 db	1.9	42	-.2	+.3	-.5	+1.0
2	10	1.7	48	-.18	+.22	-.5	+1.0
2	10	2.3	45				
3	20	2.7	41	-.28	+.35	-.64	+1.3
3	20	3.3	38				
3	7	2.7	40	-.3	+.42	-.84	+1.7
3	7	3.3	35				
4.4	17	4.1 (-.3)	35	-.4	+.5	-1.0	+1.7
6.5	12	6.2 (-.3)	30	-.6	+.7	-1.5	+2.4
8.8	10	8.3 (-.5)	35	-.8	+1.8	-2.2	+3.5
13.15	10	12.4 (-.75)	30	-2.0	+3.5	-3.0	+6.0
17.3	6	16.55 (-.75)	24	-2.2	+3.5	-6.0	+15
22.7	8	22.08 (+.625)	15	-3.2	+5.0	-7.5	+17.5

Note:
Tried Adding turns to Ant Link

Total turns 4 {2T at Top (slug end) 1T going up +1T going down}

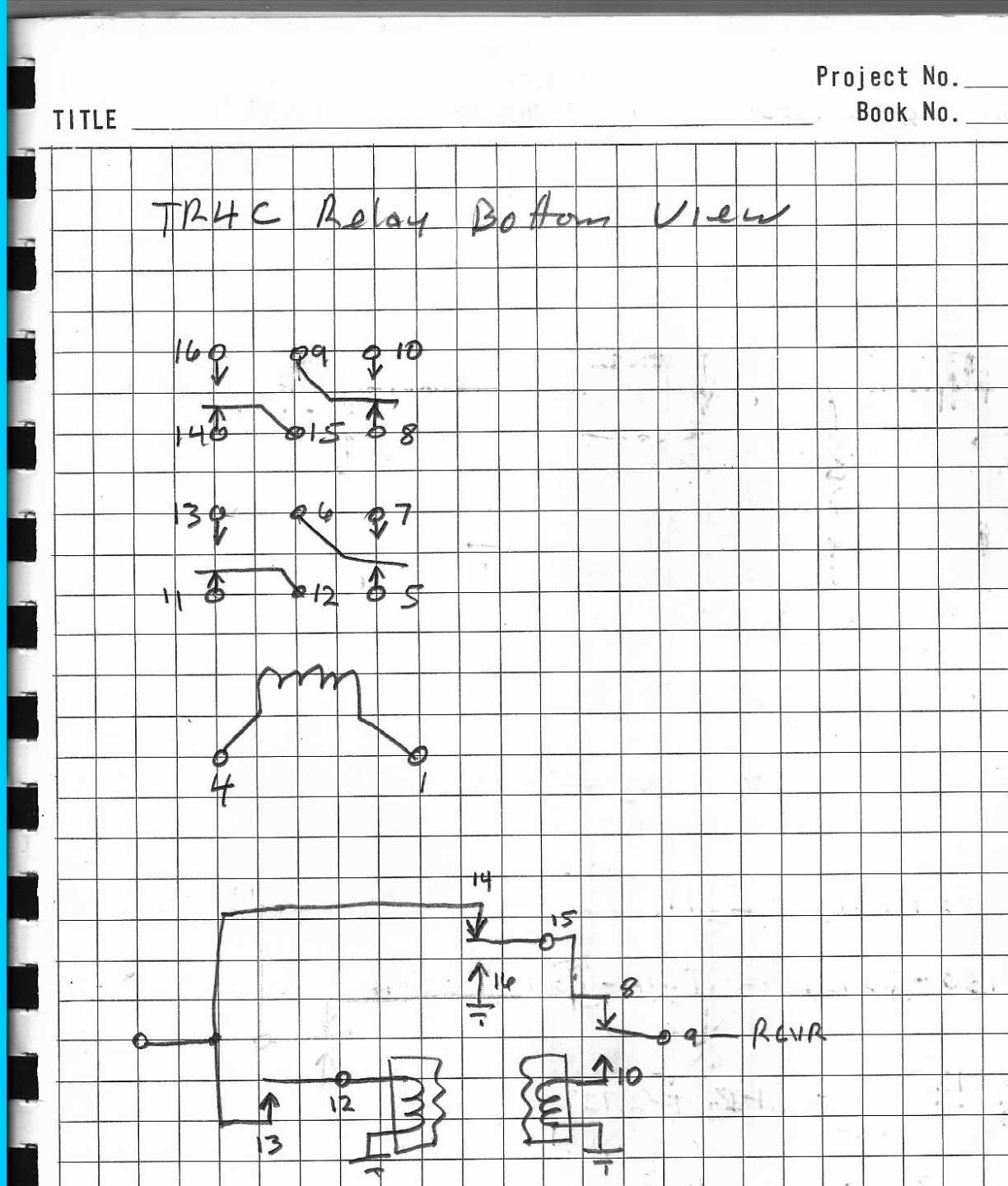
Better at 1.5 MHz 8 db insert loss
worse at 7-15 12 db
30 MHz 10 db

DRAKE

(1970's)

Drake TR-4C

Main Relay Bottom View



MN-7 & MN-2700

Band Switch RMS Voltage Breakdown

MN-7K / MN-2700 Project No. 11-14-77 Book No.

Switch Break down

REYNOLDS ALUMINUM Supply Company

PERFORMANCE AS PROMISED

ALUMINUM • STAINLESS STEEL • GALVANIZED STEEL

COMMERCIAL BUILDING PRODUCTS

Cent. Type 231

	Break Down Volts RMS
MN 2000 sw: Band sw rotor to frame (shaft)	2600
open contact to bladed contact	3200
open contact to open contact	3200
Ant sw: Oak Type HC / Cent. Type 300	
Ring blade to open contact	1750
blade to shaft	2200
contact to adj contact with blade in	1900
Blade front to blade rear	1100
Blade front: contact to Contact (No blade)	2750
contact to cont. with non shorting blade in	2500
blade to strut	2850

REYNOLDS ALUMINUM SUPPLY COMPANY
891 Redna Terrace, Cincinnati, Ohio 45215 • (513) 771-8940
Enterprise 8940 for Dayton & Columbus • 800-582-1637 Ohio

$L = 4.5 \times 10^{-6}$ H

$X_L = 100\ \Omega$ @ 3.5

$= 113$ @ 4.0

$I = 18 = \frac{V}{X_L}$

(3.5) $V = 1800$ Volts

$W = 3240$ watts

(4.0) $W = 2068$ watts

$R = 1000\ \Omega$ 3.5 MHz

$= 2000\ \Omega$ 4.0 MHz

$W = \frac{V^2}{R} = 6250$ watts

3225 watts

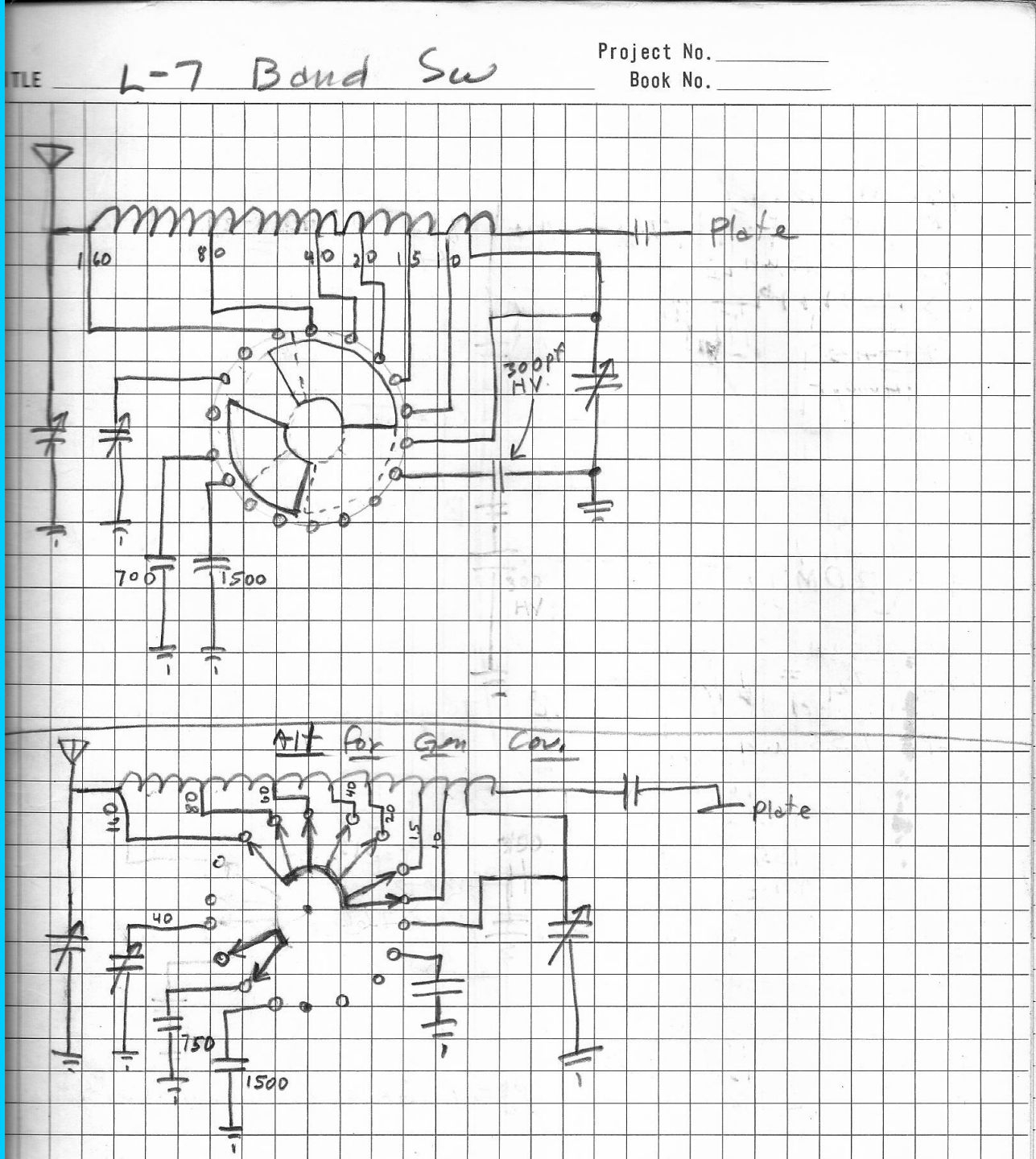
Type HO or 300 ok for 3000 watts output

DRAKE

(1977)

L-7 Amplifier

Tank Circuit Specs



DRAKE

(1978)

Drake L-7 Amplifier Pi-Network Notes

TITLE L-7 5-26-78 Project No. Book No.

Pi Network

	C_1	L	C_2	
1.8 - 2.0	761 - 527 pf	13.5	4050 - 2400	(1.5:
3.5 - 4.0	316 - 277 pf	7.5	2480 - 831	(2:1
7 - 7.3	158 - 152	3.75	1243 - 458	
14 - 14.35	79 - 78.4	1.8	618 - 211	
21 - 21.45	53 - 51.25	1.25	415 - 156	
28 - 29.7	40 - 37.4	.9	309 - 113	

A. Hi Band coil: 3.75 tapped at 1.8, 1.25, .9 μh
Lo Band Coil: 9.8 tapped at 3.75 μh

or

B. Hi Band coil 1.8 tapped at 1.25, .9
Lo Band coil 11.7 taped at 5.7, 1.95

Lo Band coil choices

2" Dia x 3½ winding 6T/in #10 AWG = 9.8
2½" Dia x 3" winding 6T/in #10 AWG = 11.7 μ
2½" Dia x 4" winding 5T/in #8 AWG = 11.7 μ

DRAKE

(1977)

Drake

L-7 Amplifier

Plate Tank Circuit "Q"

TITLE L7 Plate Tank Q

Project No. _____

Book No. _____

3.800 MHz
f_1 = 3930 (−450)
f_2 = 3645 (+450)
Δf = 285
$Q = \frac{3800}{285} = 13.3$

1.900 MHz
f_1 = 1955
f_2 = 1820
Δf = 135
$Q = 1900/135 = 14.1$

7.200 MHz
f_1 = 7480
f_2 = 6770
Δf = 710
$Q = 7200/710 = 10.14$

Moved top ↓
7400
7000
400 Q = 18

14.200 MHz
f_1 = 14700
f_2 = 13600
Δf = 1100
$Q = 14200/1100 = 12.9$

21.25 MHz
f_1 = 22000
f_2 = 20350
Δf = 1650
$Q = 21.25/1650 = 12.9$

28.500 MHz
f_1 = 29450
f_2 = 27550
Δf = 1900
$Q = 28500/1900 = 15$

28.000 MHz
f_1 = 28900
f_2 = 26700
Δf = 2200
$Q = 28000/2200 = 12.7$

21.000 MHz
f_1 = 21700
f_2 = 20200
Δf = 1500
$Q = 21000/1500 = 14$

21.500 MHz
f_1 = 22250
f_2 = 21550
Δf = 1700
$Q = 21.500/1700 = 12.6$

14.5 MHz
f_1 = 15000
f_2 = 13800
Δf = 1200
$Q = \frac{14.5}{1.2} = 12.1$

14.000 MHz
f_1 = 14500
f_2 = 13400
Δf = 1100
$Q = 14/1.1 = 12.7$

30.000 MHz
f_1 = 31100
f_2 = 28750
Δf = 2350
$Q = 30000/2350 = 12.8$

Explained to & Understood by me. | Date | Entered by | Date

(1977)

Drake L-7 Amplifier

Plate Transformer

Specifications & Cost

TITLE L-7 Plate Transformer

Project No. _____

Book No. _____

Drake Construction

Lamination E1-212 5 5/16 x 6 3/8 x 2 1/8 center leg

Stack 3 1/8"

gage = .018"

Weight of Core = .92 x 15.35 x 3.125/2.125 = 20.77 lbs

No Core pcs .018 ga = 160

Total weight of Transformer meas = 30.125 lb

weight of copper = 9.357 lb

Cost of Copper @ 1.30/lb = 12.16

cost of Core @ 91.50/mpcs = 14.64

$ 26.80

Cintran price $31.55

PS-7 Transformer

Lamination E1-212

Stack 1 1/2

gage = 018

Weight of Core = .92 x 15.35 x 1.5/2.125 = 9.97 lb

No core pcs = 70 pcs

Meas wt of Trans = 17.25 lb

weigh of copper = 7.28 lb

Cost of copper @ 1.30/lb 9.46

Cost of core @ 91.50/M 6.41

$ 15.87

Cintran price $ 21.50

DRAKE

(1970's)

Drake L-4B Amplifier

Plate Choke Specs

TLE Plate choke L4B Project No. ____ Book No. ____

f	Z	θ	R_s	X_s	I	Pd
34.7	1220	-61 ∪	591	1047	1.44	1590
34.5	1000 ∪	-77	225	974	2.0	900
30	1900	-87	99	1897	1.05	110
29.5	2500 ∩	-60	1250	2165	.8	800
29.4	1740	-42 ∪	1293	1164	1.15	1708
29.25	1080 ∪	-67	422	994	1.85	1447
28	1660	-89	29	1660	1.2	42
23.9	6200 ∩	-34	5140	3467	.32	535
23.8	4300	0				
23.75	1720	+14 ∩				
23.7	980	0				
23.65	720 ∪	-35				
21.3	2370	-89.5				
17.55	25,500 ∩	0				
17.25	2600	+67 ∩				
17.00	280 ∪	0				
14.3	3170	-89				
7.3	30,000	-89				
6.8	100,000 ∩	-87				
6.4	100,000	+85				
4.0	5800	+88				
3.5	4500	+88				
2.0	2070	+88				
1.8	1850	+88				
1.6	1610	+88				

			18.6	23.8	29.9	34.9
wire	short →					
Grip Dip		Mins	18.2 ,	23.8 ,	29.8 ,	34.8
ag wire	short →		18.6 ,	23.7 ,	29.9 ,	34.9
		Maxs	12.0 ,	19.7 ,	25.1 ,	30.4 , 35.5

DRAKE

(1970's)

Drake L-4B Amplifier

Out of Band Specs

TITLE L4B linear out of Band Project No. _____ Book No. _____

Band pos	f	input VSWR	Pin	"cw" Pout
80M	4000	1.85	130	920
	3750	1.2	130	920
	3500	1.7	125	900
	3352	2.0	108	800
	4500	3.4	65	520
	5000	7	30	150
40M	5000	3.9	38	260
	5500	5.6	25	240
	6000	2.2	74	500
	6500	1.75	115	820
	7000	1.3	125	930
	7.2	1.15	125	950
	7.5	1.45	125	950
	8.0	2.3	110	800
	8.5	3.3	55	450
	9.0	5.3	33	215
20M	14.2	1.25	115	900
	9.765	3.4	48	300
	10.0	3.6	46	310
	11.0	3.5	48	370
	12.0	2.7	70	600
	13.0	1.9	118	900
	14.0	1.3	115	900
	14.5	1.4	112	900
	15.0	1.85	110	820
	16.0	3.3	45	350
	17.0	6.5	25	180
15M	16.0	2.3	80	600
	17.0	2.1	92	720
	18.0	1.95	100	800
	19.0	1.80	90	780
	20.0	1.4	92	700
	21.0	1.4	92	800
	21.5	1.4	90	780
	22.0	1.5	90	780

Explained to & Understood by me, | Date | Entered by | Date

DRAKE

(1977)

Drake TR-7

PA Load Effect On Power

Project No. _____

TITLE TR-7 PA Load Effect on Pwr Book No. _____

Limits of Max output (Point where Pwr just starts to drop)

f	Z	Θ	upper SWR	R	X
3.8	34	+26	1.75	30.5	15
	58	-37	2.6	46	-35
	40	+30	1.75	34.6	20
	46	-37	2.4	37	-28
	92	+5	1.9	92	8
	26	-10	1.9	25.6	-4.5
	79	+26	1.7	66.5	37
	40	+35	1.7	32.8	23
	40	-32	2.45	34	-21.2
1.8	26	+23	2.0	24	10.2
	68	-29	2.25	59.5	-33
	31	+29	1.9	27	15
	57	-33	2.25	48	-31
	49	-34	2.4	40.6	-27.4
	83	-20	2.4	78	-26.4
	85	0	2.0	85	0
	68	+16	1.5	65.4	18.7
	34	+31	1.75	31	18.5
	60	+23	1.4	55	23.4
	22	+2	2.3	22	.8
	35	-30	2.3	30.3	17.5
7.2	46	+34	1.7	38.1	25.7
	38	-30	2.4	33	-19
	55	-35	2.5	45	-31.5
	74	+25	1.75	67	31.3
	91	+12	1.8	89	19
	95	-14	2.4	92	23
	96	0	2.0	96	0
	27	0	2.0	27	0

DRAKE

(1970's)

Drake

Cooling Fan

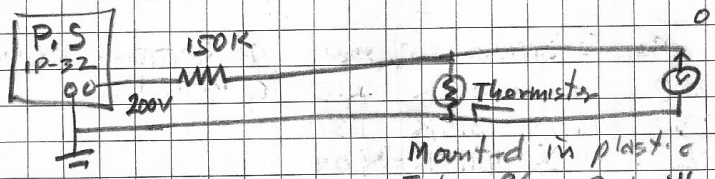
Specs

TITLE Cooling Fans

Project No. _____

Book No. _____

Note → Voltage is function of Air flow thru Tube



Mounted in plastic Tube 9/32 ID x 1 1/4 lg.

Fan Type	Voltage fan off	Voltage fan on	ΔV	HUM 1→10	Noise 1→10
IMC WS2107FL9	11.72	12.65			
IMC WS2107FL2	11.73	12.80			
Rotron WR2A1	11.72	12.88			
PAMOTOR 4500C	12.50	14.90		8	10
IMC WS2107-FL		14.83		5	8
TORIN TA450S		14.54		6	6
IMC WS2107-FL2		14.30		2	3
ROTRON WR2A1		14.27		4	4
IMC WS2107-FL9		14.07		1	1
ETRI 133-LY-21-52	12.13	14.23		3	2
ETRI	12.71	14.76			
FL-9	12.71	14.57			
FL-9	12.60	14.44			
Rotron WR2A1	12.30	14.33			
FL-9		14.12			
FL-2		14.16			
Rotron		14.20			
FL-2		14.16			
FL-9		14.02			
Rotron		14.09			
FL-2		14.09			
FL-2	12.04	14.07			
ETRI		14.02			
FL-9		13.86			

DRAKE

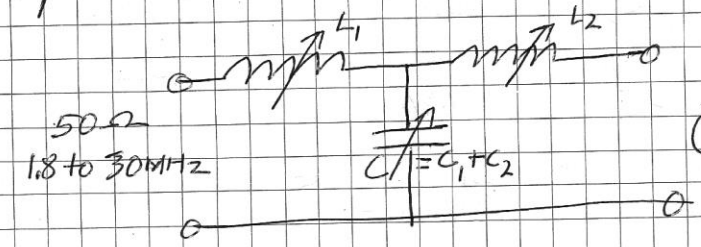
(1981)

Drake "NEW"

MN-7500 Antenna Tuner

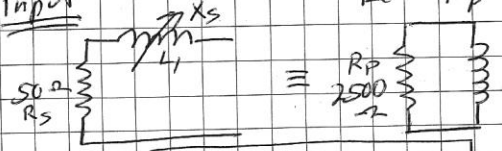
TLE Antenna Coupler MN-7500 Project No. Book No.

Proposed Circuit:



30Ω at 5:1 VSWR
(R = 10 to 250 Ω)

Input



Let $R_p = 2500\ \Omega$ $W = 1000$ V = 1581 RMS = 2213 Peak

$$R_p = \frac{R_s^2 + X_s^2}{R_s} \qquad X_p = \frac{R_s^2 + X_s^2}{X_s}$$

$X_s^2 = (R_p - R_s) R_s = (2500 - 50)\,50$

$X_s = 350\ \Omega$

$X_p = \frac{50^2 + 350^2}{350} = 357\ \Omega$

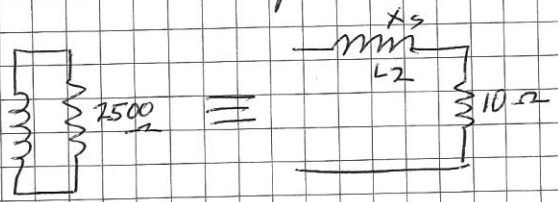
at 1.8 MHz

$L_1 = \frac{X_s}{2\pi f} = 30.9\ \mu h$ ←

$C_1 = \frac{1}{2\pi f X_p} = 248\ pf$

Output

$R_p = 2500$ $R_s = 10$ to $250\ \Omega$



Over

Explained to & Understood by me,	Date	Entered by	Date
		mas	9-14-81

DRAKE

(1981)

Drake MN-7500 Tuner

Knob Settings Specs.

C = 0-830pf Max RMS V = 1750

TITLE MN7500 Knob Settings Project No. _____ Book No. _____

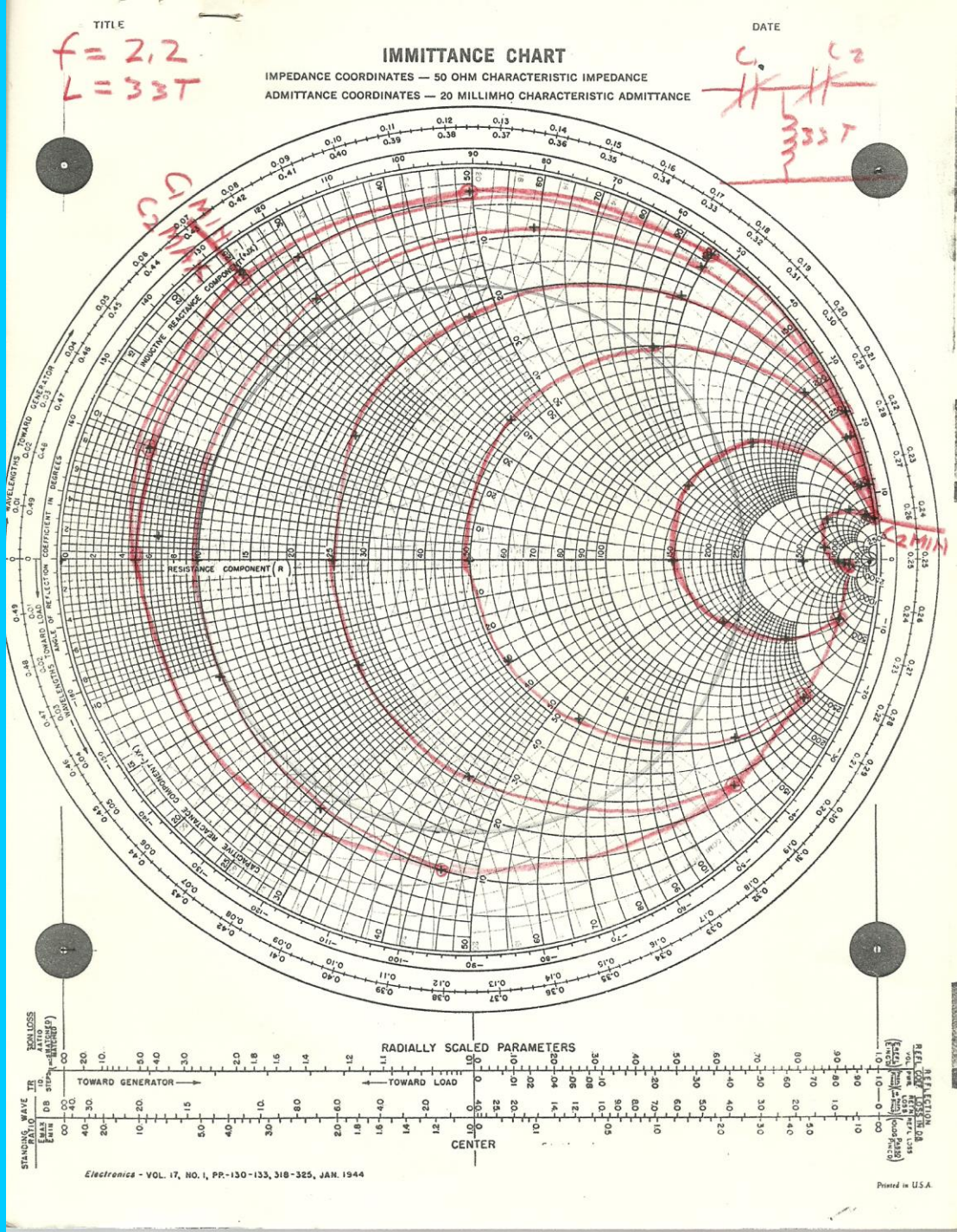
Freq	Ant Z	L_1 µh	T_1	C pf	0-10	L_2 µh	T_2	Rp	Max Pwr
1.8	10	30.95	42	805.7	.3	13.95	21	2500	1225W
	10	30.0		830	0	13.54		2355	
	50	30.45	42	495.1	4.2	30.95	42	2500	1225
	250	25.4	35	424	5.1	53.24	(64)	1700	1800
2.0	10	27.85	39	725.1	1.3	12.56	19	2500	1225W
	50	27.85	39	445.6	4.8	27.85	38	"	"
	250	27.85	39	318.3	6.4	(59.7)		2500	1225
	250	25	35	351.7	6.0	53	(64)	2025	1512
3.5	10	15.92	24	414.3	5.2	7.175	12.2	2500	1225
	50	"	"	254.6	7.2	15.92	24	"	"
	250	"		181.9	8.1	34.1	45	"	"
4.0	10	13.93	21.5	362.6	5.8	6.3	11	"	"
	50	↓	↓	222.8	7.6	13.93	21.5	"	"
	250	↓	↓	159.2	8.4	29.84	41	"	"
7.0	10	7.96	13.5	207.2	7.8	3.6	6.8	"	"
	50	↓	↓	127.3	8.8	7.96	13.8	↓	↓
	250	↓	↓	91	9.3	17.1	25	↓	↓
7.5	10	7.43	12.5	193.4	8	3.35	6.5	↓	↓
	50	↓	↓	118.8	9	7.43	12.5	↓	↓
	250	↓	↓	84.9	9.3	15.9	24	↓	↓
14.0	10	3.98	7.5	103.6	9.1	1.8	4	↓	↓
	50	↓	↓	63.66	9.6	3.98	7.5	↓	↓
	250	↓	↓	45.47	9.8	8.5	14	↓	↓
14.5	10	3.84	7.3	100	9.1	1.73	3.9	↓	↓
	50	↓	↓	61.47	9.6	3.84	7.3	↓	↓
	250	↓	↓	43.9	9.8	8.23	13.8	↓	↓
21	10	2.65	5.5	69.1	9.5	1.2	3	↓	↓
	10	2.4	5.0	77.1	9.4	1.07	2.5	2000	1,531
	50	↓	↓	47.3	9.8	2.4	5.0	↓	↓
	250	↓	↓	33.7	9.95	5.0	8.1	↓	↓
30	10	1.5	3.5	58.5	9.6	.07	0	1700	1,800
	10	1.86	4.1	48.3	9.8	.8		2500	1225 W
	50	1.5	3.5	35.8	9.93	1.5	3.5	1700	1800
	250	"	"	(25.4	>10)	3.2	6.3	"	"
	250	1.2	2.5	31	10	2.4		1100	2784

DRAKE

(1981)

Drake MN-7500 Tuner

Smith Chart Calculations



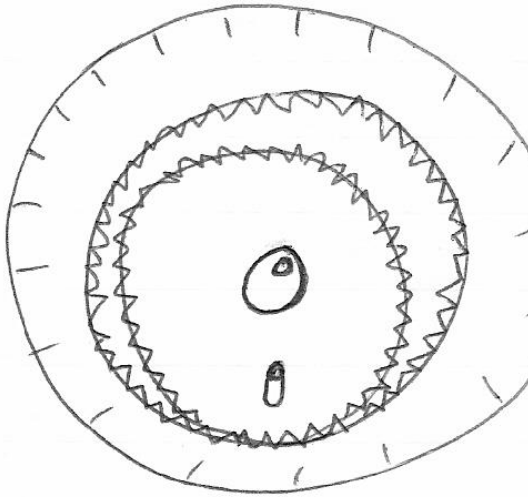
(1981)

Drake MN-7500 Tuner

Counter Dial Gear Calculations

Stock Drive Prod Cat.

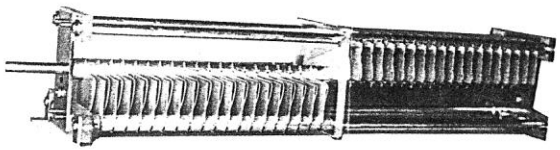
Pages	EXT (48 pitch)	INT	ratio
31,21	46	48	24:1
22	71	72	72:1
21,	70	~~68~~ 72	36:1
21,24,	80	~~96~~ 84	21:1
22	95	~~120~~ 96	96:1
		120	

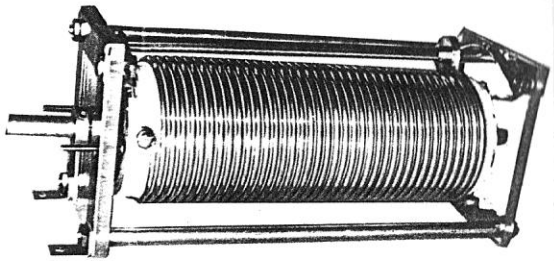


(1981)
Drake MN-7500 Tuner Roller Inductor From Murch Electronics

MURCH ELECTRONICS, INC. - COMPONENTS LIS

They are selling this outfit
But won't effect our order





CAPACITORS - Aluminum plates .032" thick with rounded edges - brass shafts - heavy brass contact springs - large ¼" tie rods

INDUCTOR - Ceramic inductor, wound with #8 wire - 3/8" dia. aluminum shafts - brass shaft & idler wheel - brass springs

ALL COMPONENTS ARE OF THE SAME RUGGED QUALITY USED IN THE ULTIMATE TRANSMATCH

Base Price $80.00

100- $ 68.00 ea
250- 60.00 ea -25%
500- 52.00 ea -35%
1000- -45%
2000-

TYPE	PK. V.	DIMENSIONS	RETAIL PRICE
A-CAPACITOR	4500	8¼" x 3¼"x 3"	$48.00 & Shipping
A-(SPLIT CAPACITOR)	4500	10" x 2¾"x 3	$56.00 & Shipping
B (SHOWN)	4500	14¼" x 2¾" x 3"	$68.00 & Shipping
INDUCTOR (SHOWN)	4500	10½" x 3" x 4½"	$80.00 & Shipping
4:1 BALUN		2" dia. x 2" h	$21.95 & Shipping

Wayne Murch

Send for price quotes on quantity.

Order From: Murch Electronics Inc., PO Box 69, Franklin, ME 04634 207-565-3319

VISA master charge

Drake

MN-5
500 Watt
Antenna Tuner

Economy Model

No Wattmeter
Small
Roller Inductor

$ 170.00

MN 5 Economy Match Box

Small meter for tuning (No wattmeter) 500 w PEP

Material removed from MN7500

ITEM	Price
Smaller v, Cap. (22S/25R) ½ length	.94
Smaller Roller Coils 6" vs 10"/#16 vs #12 wire	2.74
Meter-diff 50¢	7.76
Ant Sw/Knob	4.54
2 SO 239	.578
Push Sw	2.85
~~Pot~~	
PC Assy	
Vinyl Mat 3/5	1.227
DB shaft	.629
coupler	.1491
6.8 Megs	.1320
Sub. Panel Hdwr	.3027
Extrusion 3/5 Mat	.4033
Chassis 3/5 Mat	1.0222
Bottom 3/5 Mat	.4457
Remove from MN7500	23.719
Cost Material for MN-5 =	31.15
Labor Shop .67hr @ 7.50 = 5.025	
Labor Assy 2.5 @ 4.85 = 12.125	
Total DL	17.15
OH 2.17X	37.22
	85.51
G+A 17%	23.08
Prof 20%	27.15
min Dealer price	135.74
Am Net	171.00

ITEM	Price

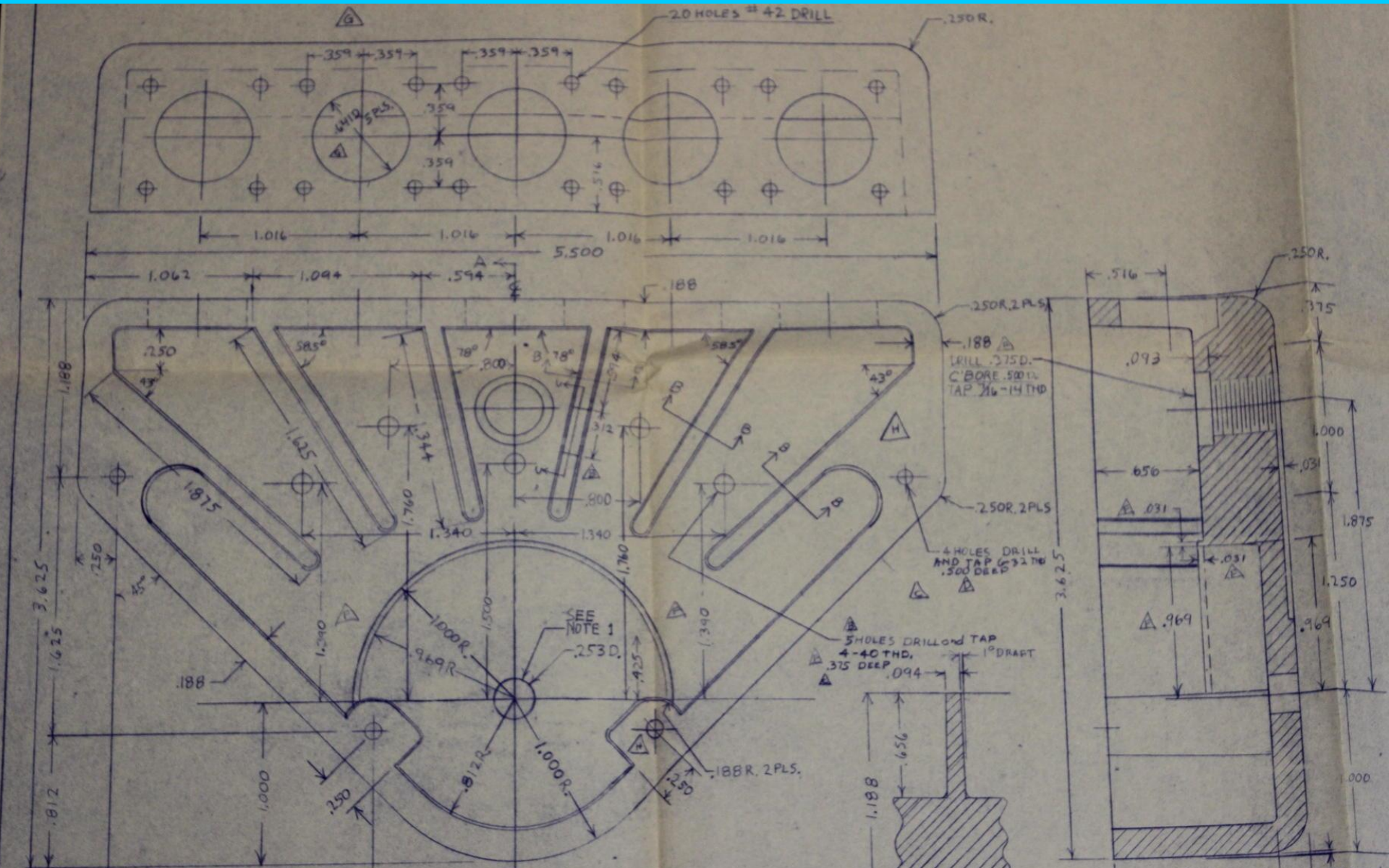
Milt retired from Drake in 1983 and stays on for 4 years consulting for Drake.

He also consulted for Lytton Industries, taught engineering for Wright State.

Consulted & Designed for Alpha-Delta

Milt Sullivan's Consulting & Designing for Alpha-Delta

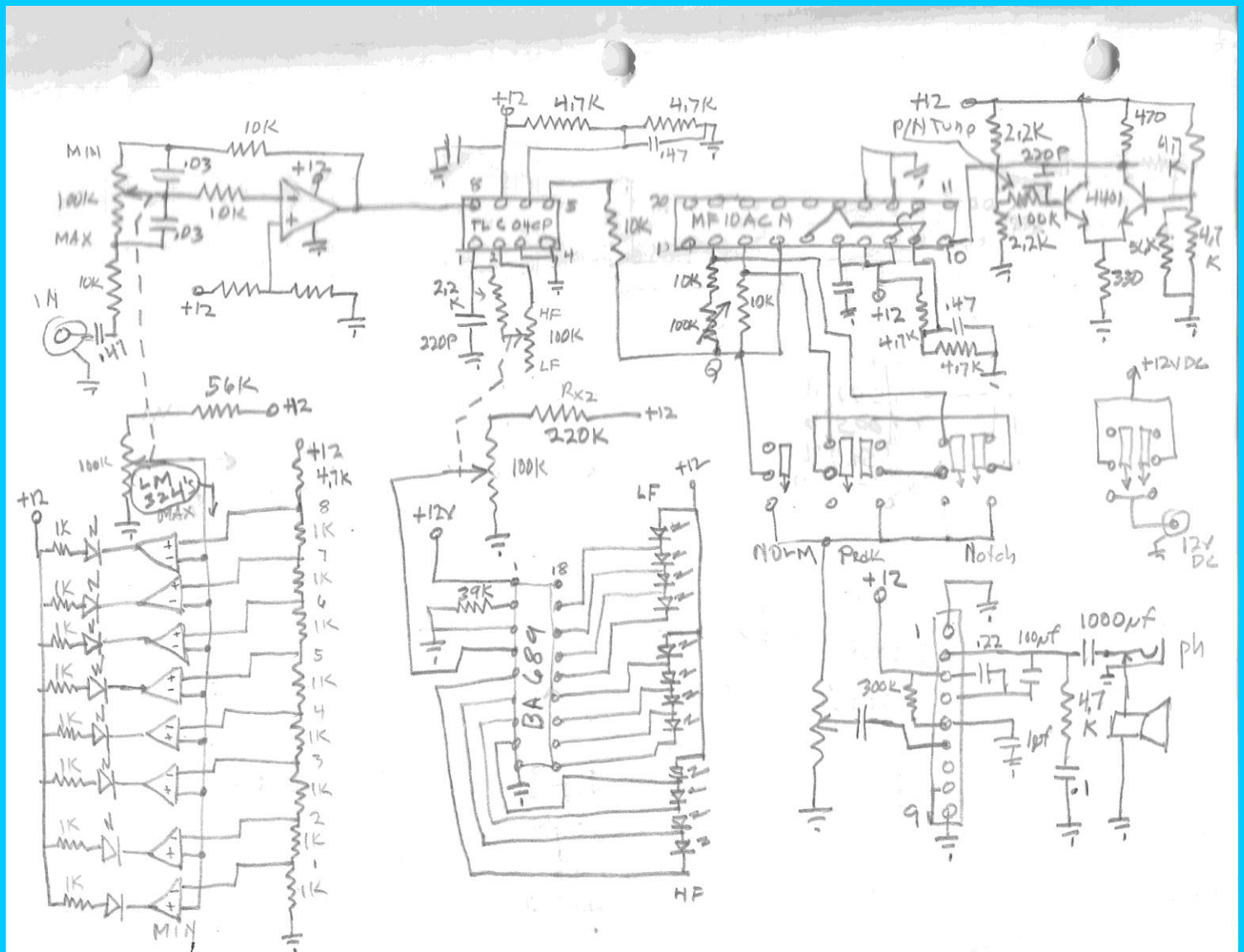
4-Position Coax Switch



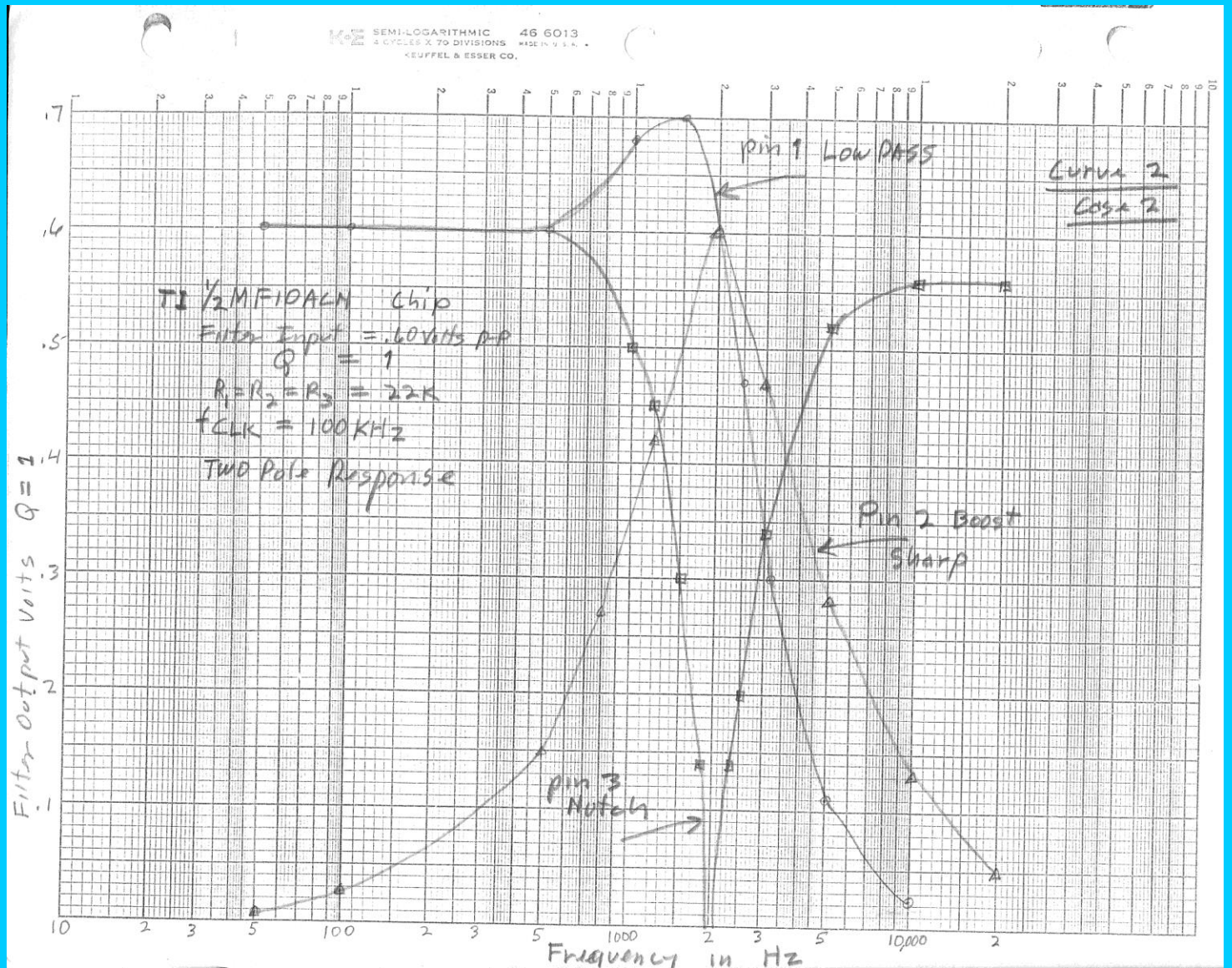
Milt's Notes for Alpha-Delta coax switch

Alpha-Delta VRC
Variable Response Console
Note the similar look to the
<u>Drake 2-BQ speaker</u> ! !

VRC Hand Drawn Schematic



VRC High & Low Pass Filters



Alpha-Delta VRC
Speaker 4-1/2 Inches

10" Square Frame Woofer

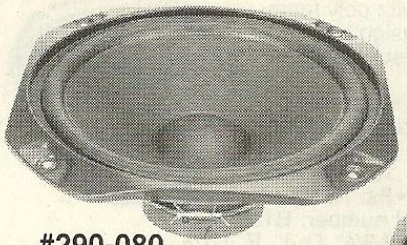
woofer with a paper cone and treated cloth surround. Black stamped frame and black cone. Perfect replacement for many name brand speaker systems that require square frame woofers. •Power handling: 40 watts RMS/70 watts max. •Voice coil diameter: 1-1/2 inches •Impedance: 8 ohms •Frequency response: 29-5000 •Magnet weight: 12 ozs. •Fs: 29 Hz •SPL: 92 dB 1W/1m •Vas: 5.37 •Qts: .33 •Qes: .38 •Qms: 2.37 •Xmax: .129 •Net weight: 3-1/2 lbs. •Manufacturer model number: E25FC92-54F •Dimensions: A: 10-1/4", B: 9-1/8", C: 4-1/2", D: 3-1/2", E: 1-3/8".

#290-080 .... $27.50 (1-3) .. $24.95 (4-UP)

12" Square Frame Woofer

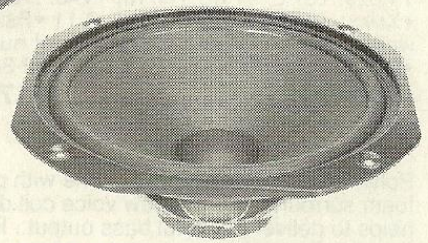
12" woofer with a paper cone and treated cloth surround. Black stamped frame and black cone. Perfect replacement for many name brand speaker systems that require square frame woofers. •Power handling: 50 watts RMS/80 watts max. •Voice coil diameter: 1-1/2 inches •Impedance: 8 ohms •Frequency response: 34-4000 Hz •Magnet weight: 14 ozs. •Fs: 34 Hz •SPL: 94 dB 1W/1m •Vas: 7.39 •Qts: .42 •Qes: .51 •Qms: 2.38 •Xmax: .129 •Net weight: 5 lbs. •Manufacturer model number: L30FC14-51F •Dimensions: A: 12", B: 10-3/4", C: 5", D: 4", E: 1-3/8".

#290-130 .... $35.80 (1-3) .. $32.80 (4-UP)



#290-080

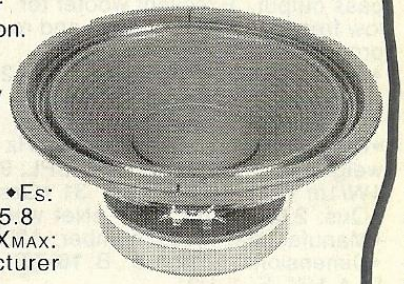
PIONEER



#290-130

10" Musical Instrument Speaker

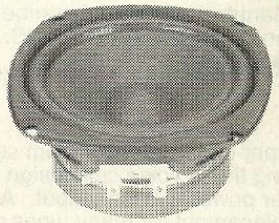
Ribbed paper cone with treated cloth accordion surround. Vented pole piece for heat dissipation and reduced distortion. Perfect replacement for many P.A. and musical type speakers. •Power handling: 100 watts RMS/200 watts max. •Voice coil diameter: 2 inches •Impedance: 8 ohms •Frequency response: 30-3000 Hz •Magnet weight: 40 ozs. •Fs: 30 Hz •SPL: 96 dB 1W/1m •Vas: 5.8 •Qts: .15 •Qes: .18 •Qms: 1.08 •Xmax: .129 •Net weight: 8 lbs. •Manufacturer model number: A25GC40-51F-Q •Dimensions: A: 10-1/8", B: 9-1/4", C: 5", D: 5-1/2", E: 1-3/8".



0-094 ..... $41.50 (1-3) $38.50 (4-UP)

4-1/2" Full Range

Paper cone with treated cloth surround. Open back and stamped basket. Perfect for bookshelf type speakers and car stereo installations. •Power handling: 20 watts RMS/30 watts max. •Voice coil diameter: 1 inch •Impedance: 8 ohms •Frequency response: 70-15000 Hz •Magnet weight: 9.3 ozs. •Fs: 70 Hz •SPL: 90 dB 1W/1m •Vas: .31 •Qts: .35 •Qes: .47 •Qms: 1.4 •Xmax: .043 •Net weight: 2 lbs. •Manufacturer model number: A11EC80-02F •Dimensions: A: 4-1/2", B: 4-1/8", C: 2-3/8", D: 3-1/8", E: 1".



#290-010 ..... $10.50 (1-3) $9.80 (4-UP)

8" Full Range

Paper cone with blue poly foam

Specs for 4-1/2 Inch Speaker DB Level VS Frequency

Not Just Guessing at How it Reacts ! !

Pioneer 4½ in ported 8×8×6 Cabinet

f	dB
54	55
60	60
75	55
79	60
88	66
94	70
118	73
137	74
142	76
160	76
165	80
177	90
186	90
207	86
235	84
255	88
265	80
270	76
277	80
290	83
300	80
310	74
315	80
325	84
360	85
375	78
390	85
410	76
432	89
452	85
490	85
520	93
545	85
610	87
650	83
680	90
720	95
730	91
800	94

f	dB
820	85
840	90
870	85
940	94
960	96
980	92
1030	94
1100	90
1180	86
1250	80
1250	70
1260	68
1300	76
1320	70
1360	79
1390	74
1420	82
1450	74
1460	84
1500	78
1580	82
1650	90
1760	80
1750	88
1860	92
1900	80
2000	84
2110	76
2160	84
2200	88
2260	70
2270	80
2290	86
2350	84
2390	80
2210	86
2460	86
2520	72
2550	82
2700	86
2850	92

f	dB
2950	70
3010	80
3020	87
3180	84
3620	86
4180	86
4440	88
5550	88
6500	90
7000	93
7900	88
8500	88
9300	85
10200	88
12000	87
12800	80
13900	70
14300	70
~~20,000~~	~~68~~
16100	60
17500	55

Some More of Milt's Great Work

(1998)

VSWR

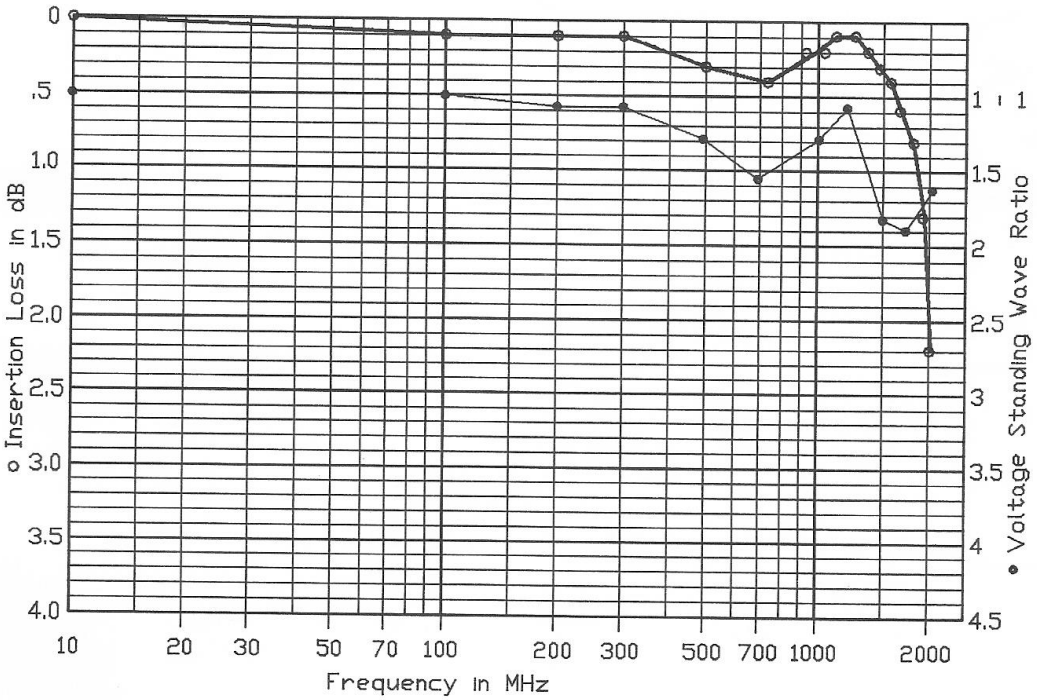
Measurements For The Trans-Trap

INSERTION LOSS/VSWR MEASUREMENTS

Corrected

ALPHA DELTA TRANSI-TRAP 2-17-98

MODEL #__RT/N-W/M___



Measurements made and certified by:

MILT SULLIVAN EE-Engineering Consultant
1303 Pilsdon Crest -- Mt. Pleasant,SC, 29464
Phone 803-884-1441 -- Fax 803-884-3254

Signed Milton A. Sullivan Date 2-17-98

On October 28, 2010
Milt Sullivan
died peacefully
at the age of 85

Drake Museum

Thank You

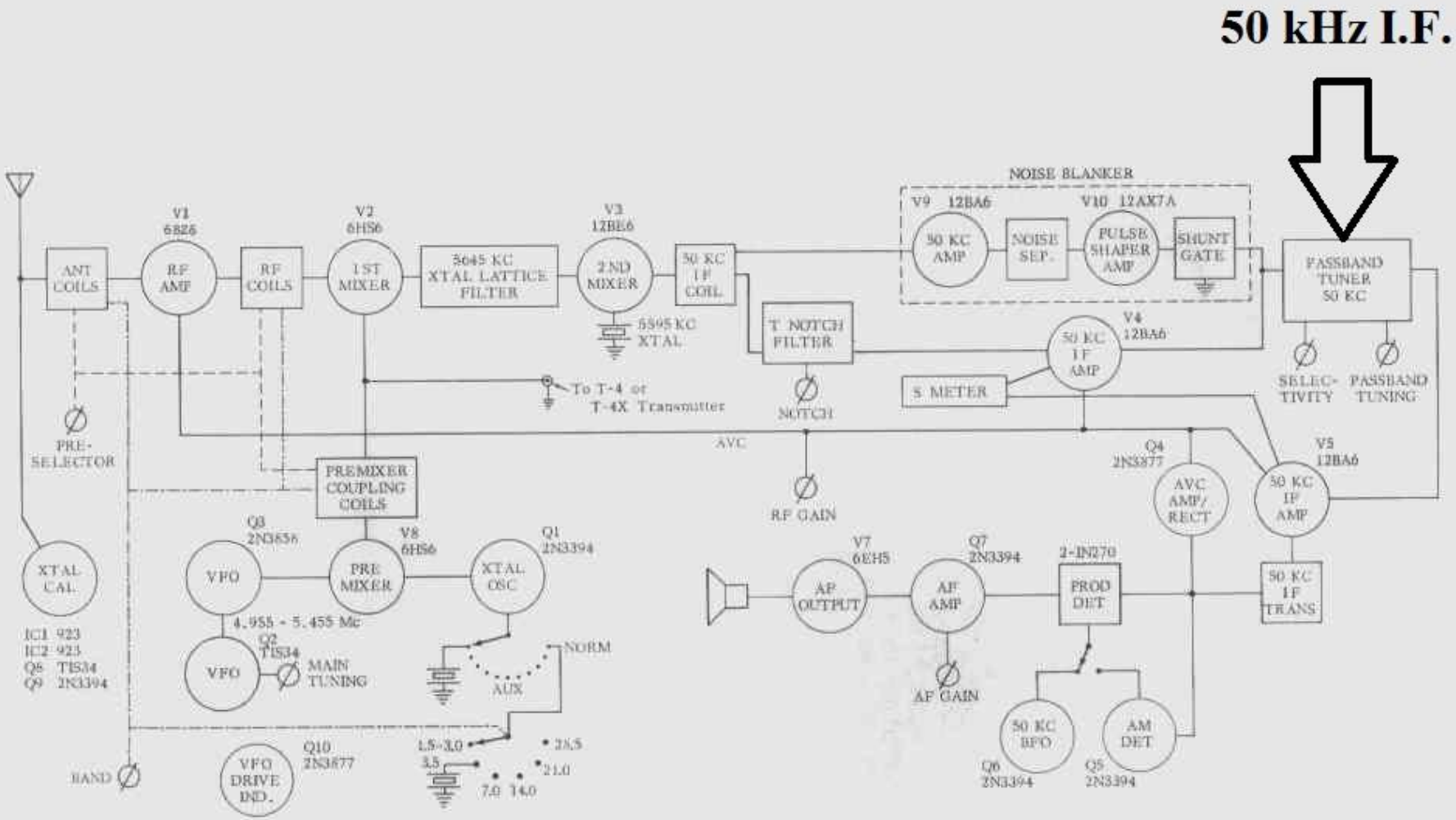
For Watching

Central Electronics Event 2017

Sweeping the I.F.'s for L/C and Crystal Filters Using a Tracking Generator Spectrum Analyzer & Audio Sweep Generator for Transmit Sweeps

Drake R-4B Receiver

R-4B Receiver Last 50 kHz I.F.



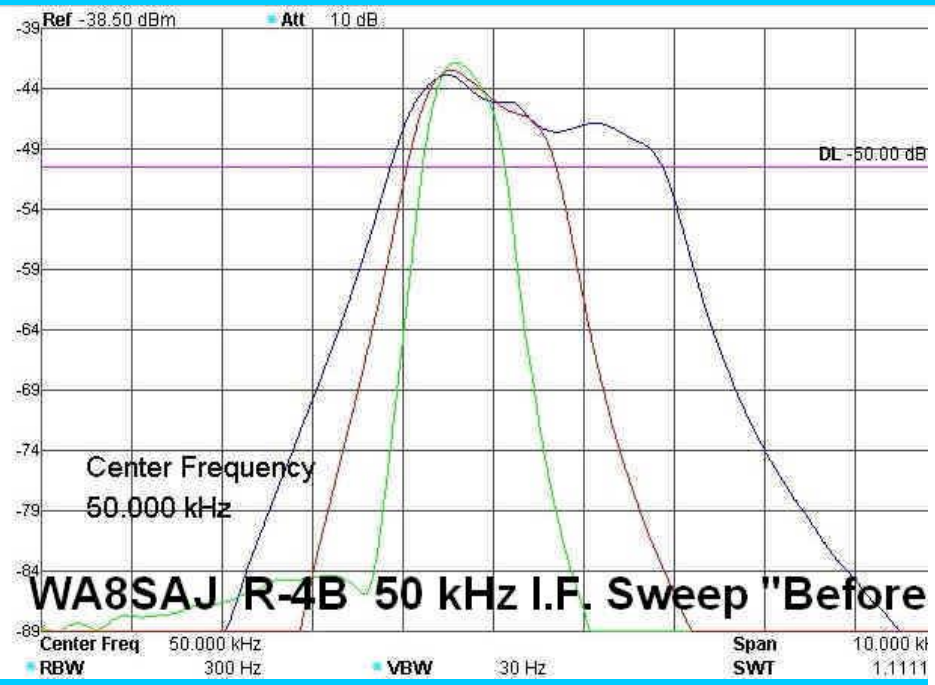
R-4B Sweeps

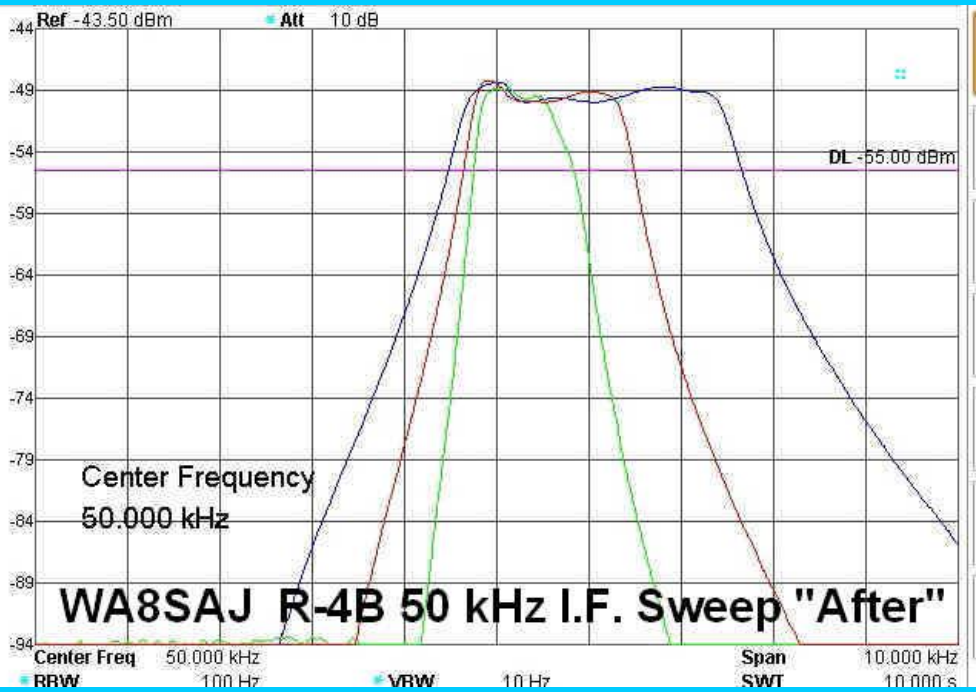
400 Hz

1.2 kHz

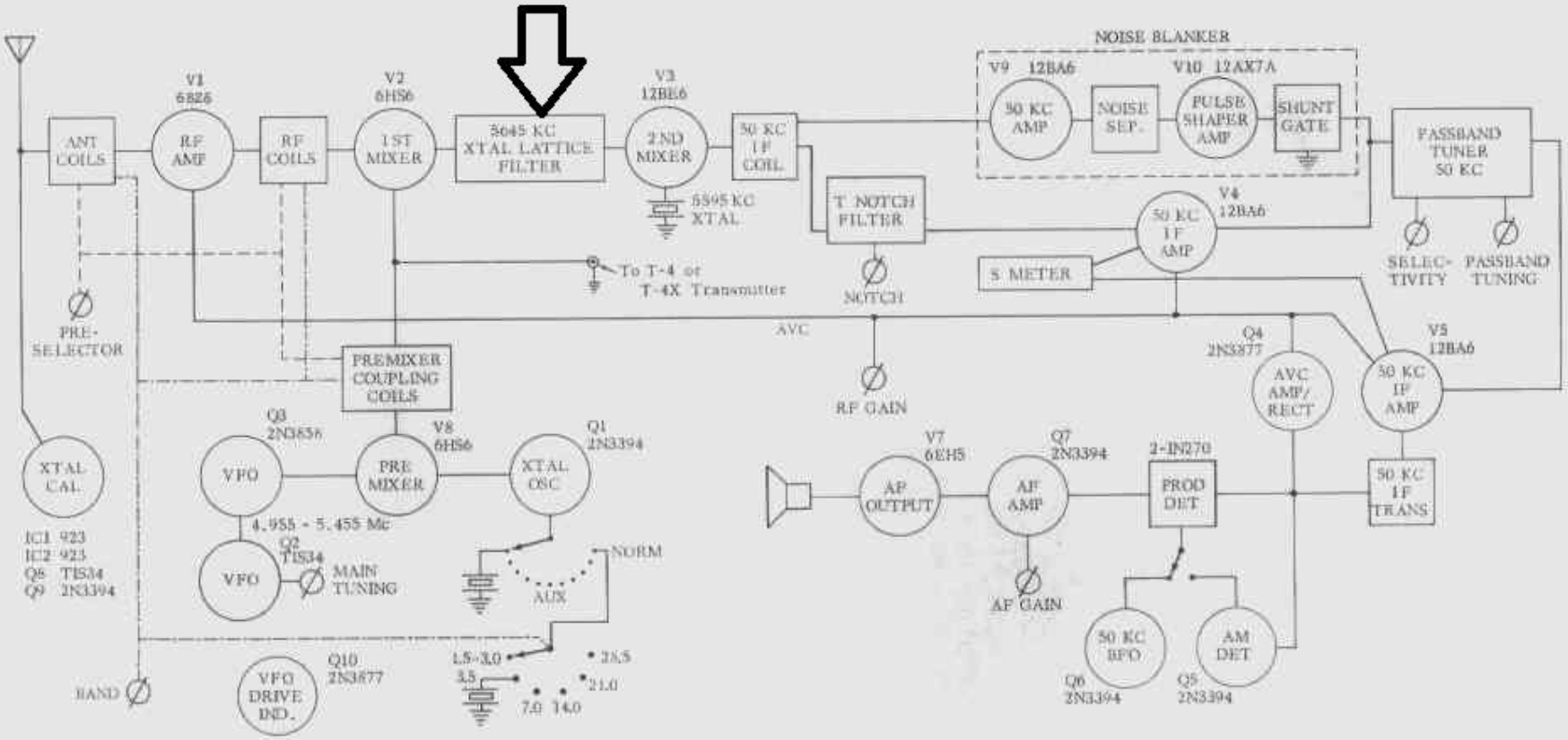
2.4 kHz

Before ***After***

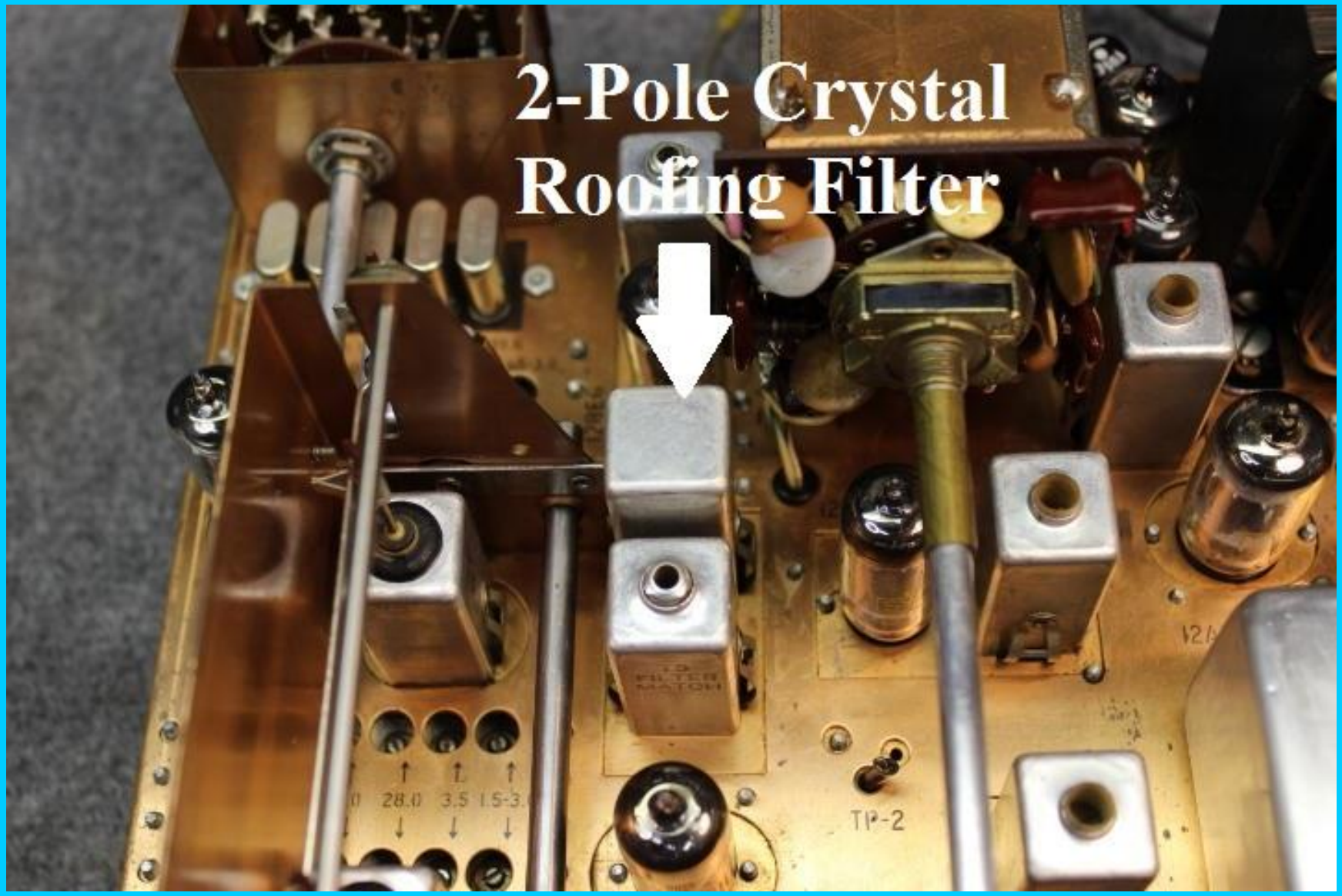




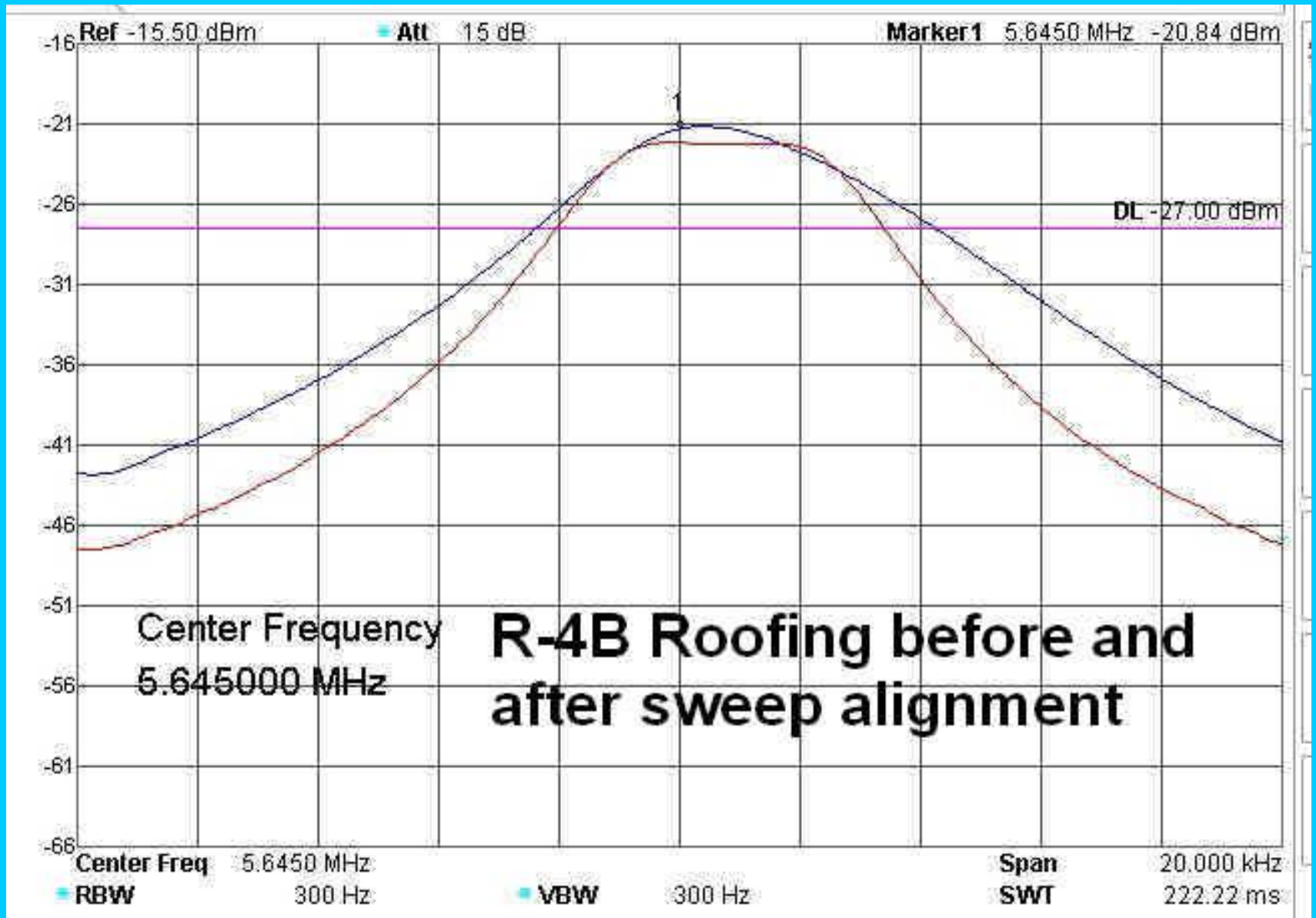
5646 2-Pole Roofing Filter



R-4B 2-Pole Crystal Filter

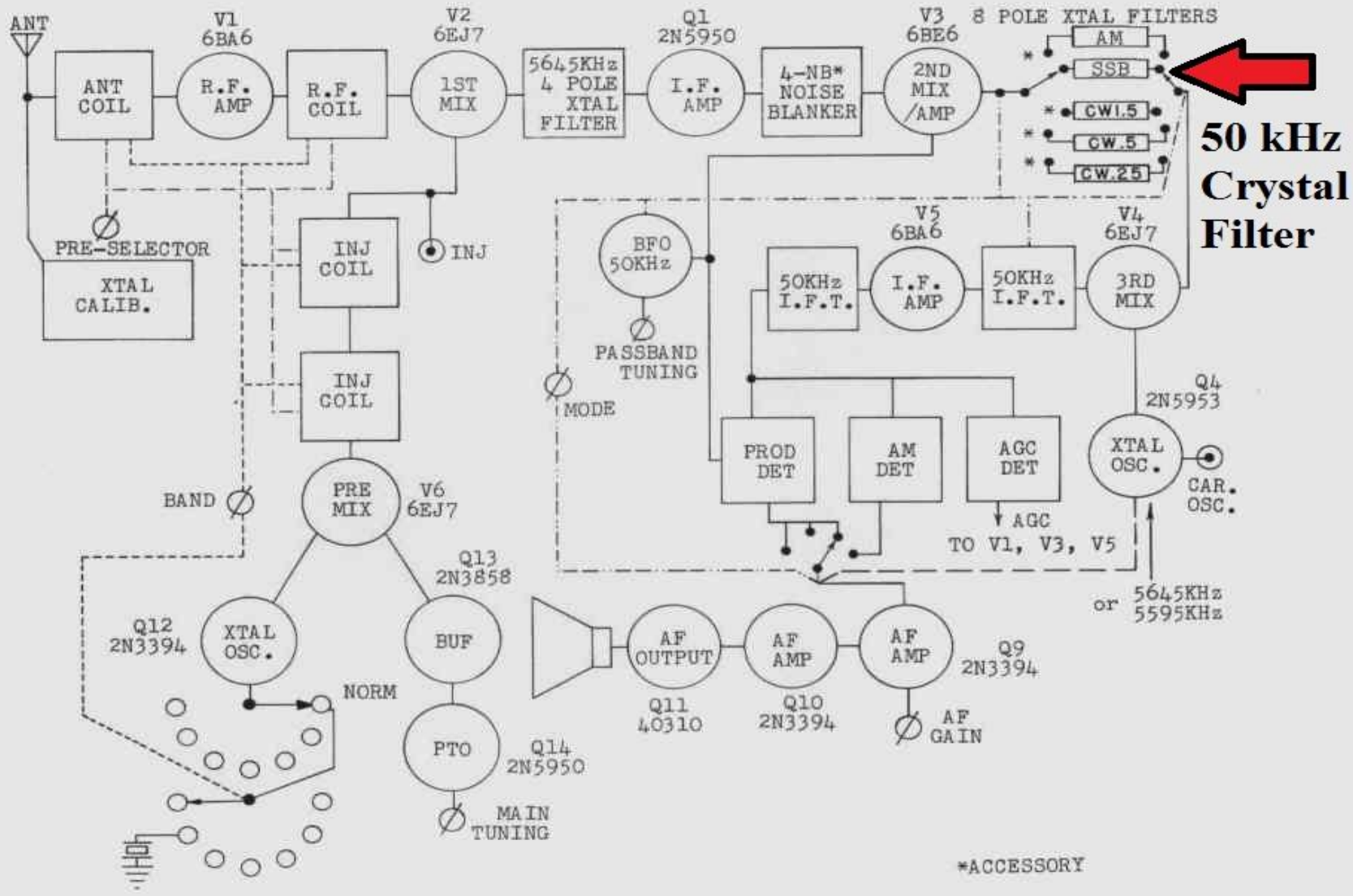


R-4B Sweep at 5645 kHz



Drake R-4C 50 kHz I.F. Using Crystal Filters

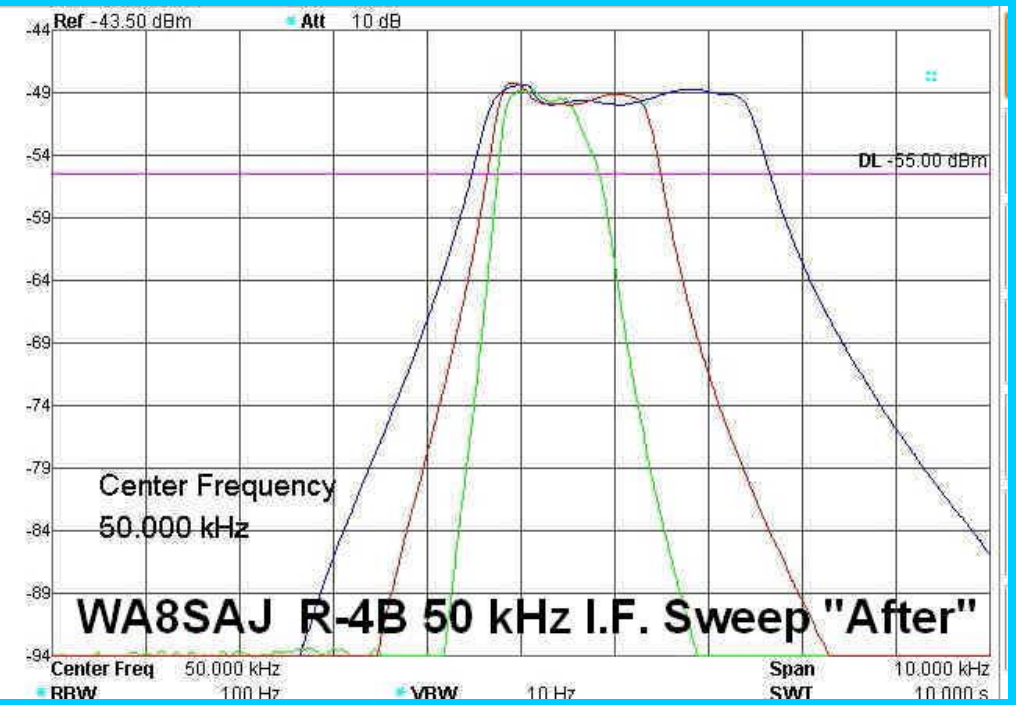
R-4C 50 kHz I.F.


ANT
V1 6BA6
V2 6EJ7
Q1 2N5950
V3 6BE6
8 POLE XTAL FILTERS
AM
SSB
CW1.5
CW.5
CW.25
50 kHz Crystal Filter
ANT COIL
R.F. AMP
R.F. COIL
1ST MIX
5645KHz 4 POLE XTAL FILTER
I.F. AMP
4-NB* NOISE BLANKER
2ND MIX /AMP
PRE-SELECTOR
XTAL CALIB.
INJ COIL
INJ
BFO 50KHz
V5 6BA6
V4 6EJ7
50KHz I.F.T.
I.F. AMP
50KHz I.F.T.
3RD MIX
PASSBAND TUNING
MODE
INJ COIL
Q4 2N5953
PROD DET
AM DET
AGC DET
XTAL OSC.
CAR. OSC.
BAND
PRE MIX
V6 6EJ7
AGC
TO V1, V3, V5
Q13 2N3858
or 5645KHz 5595KHz
Q12 2N3394
XTAL OSC.
BUF
AF OUTPUT
AF AMP
AF AMP
Q9 2N3394
NORM
Q11 40310
Q10 2N3394
AF GAIN
PTO
Q14 2N5950
MAIN TUNING
*ACCESSORY

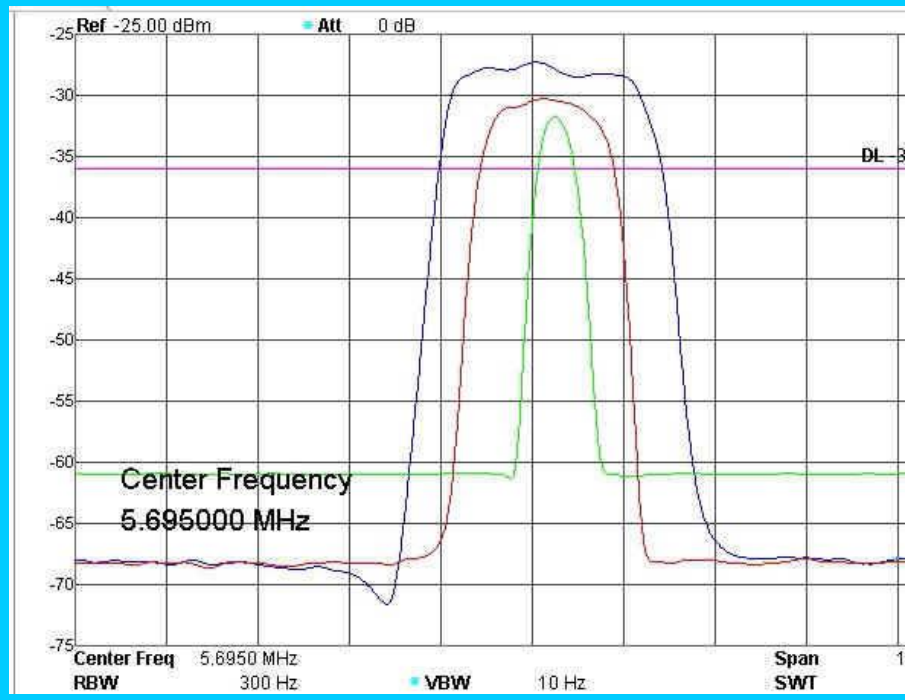
R-4C Crystal Filter 50 kHz

L / C vs. Crystal in the Last I.F.

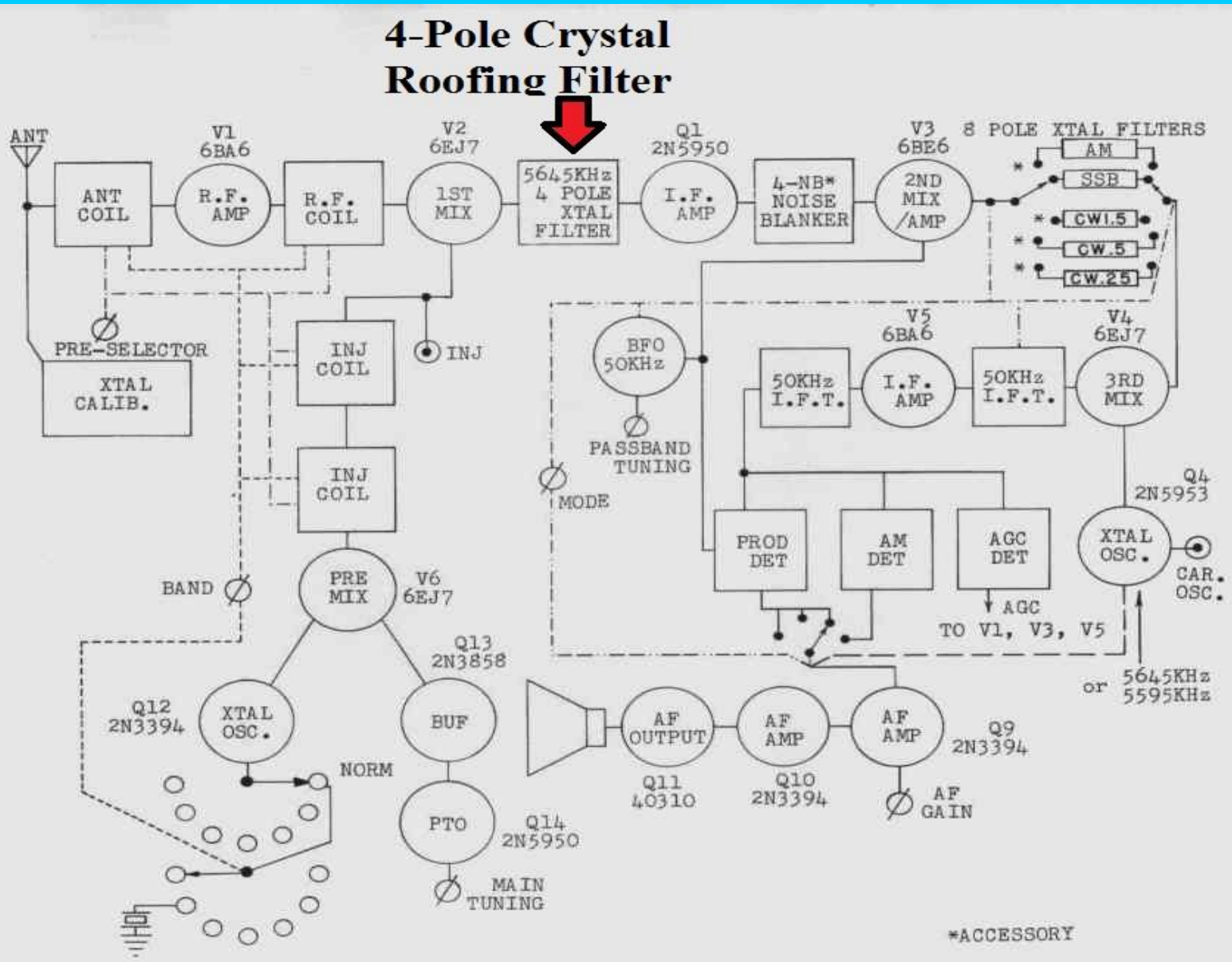
R-4B L / C Filters



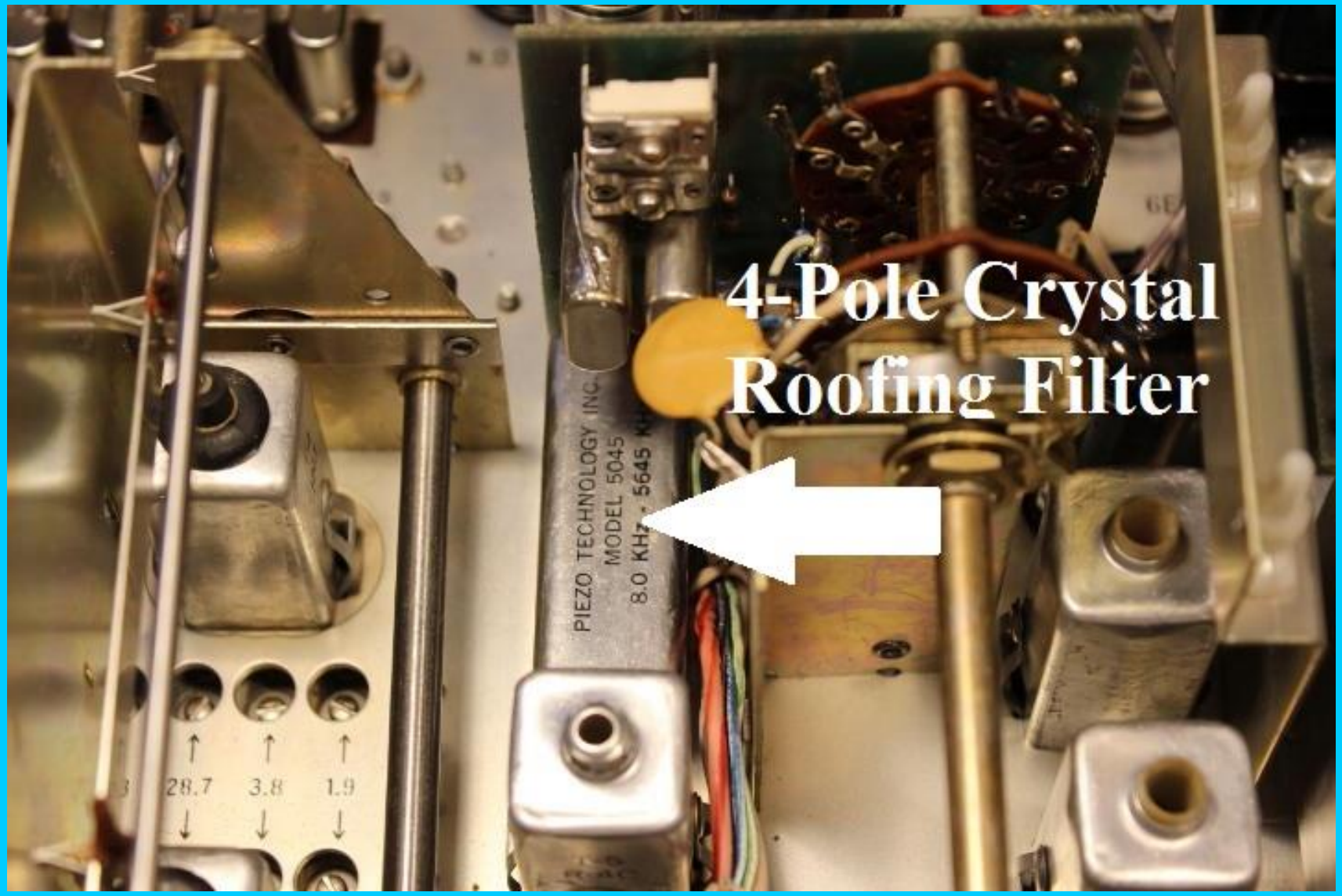
R-4C Crystal Filters



R-4C 4-Pole Roofing Crystal Filter

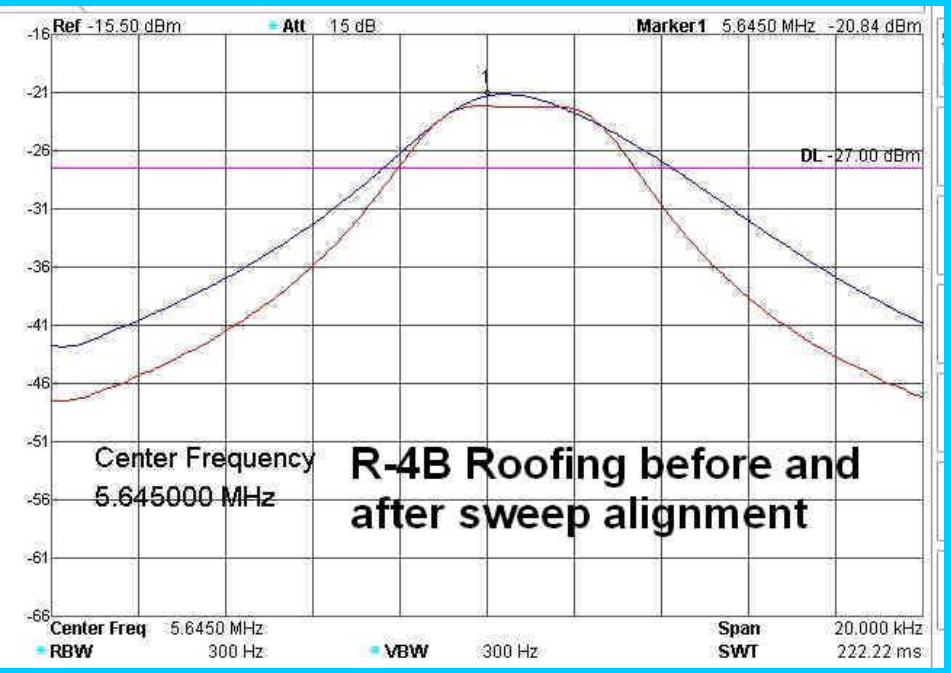


R-4C Roofing Filter



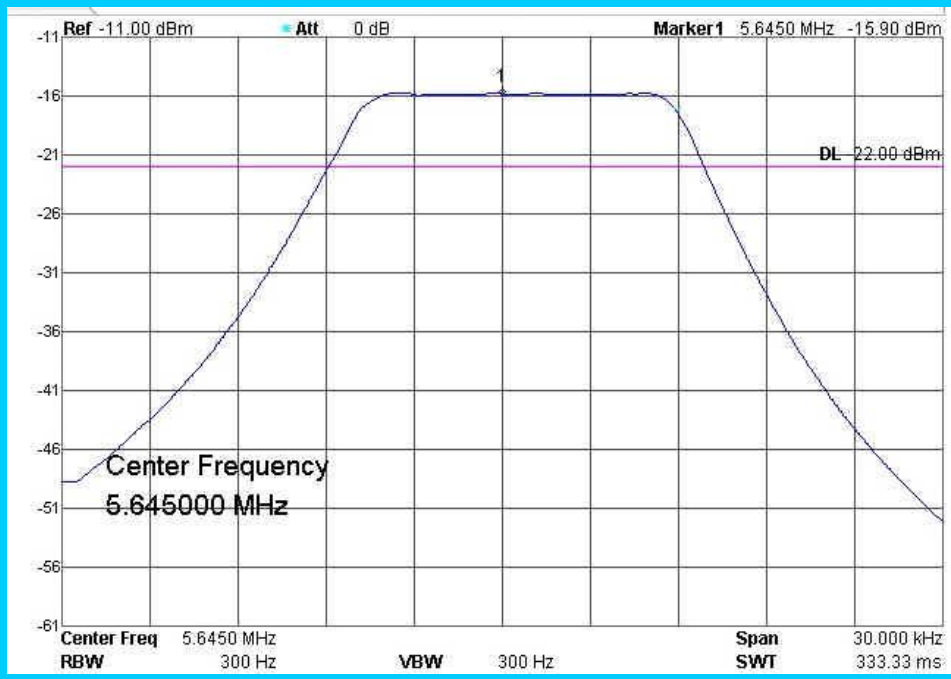
2-Pole Crystal Roofing Filter

R-4B Roofing Filter



4-Pole Crystal Roofing Filter

R-4C Roofing Filter

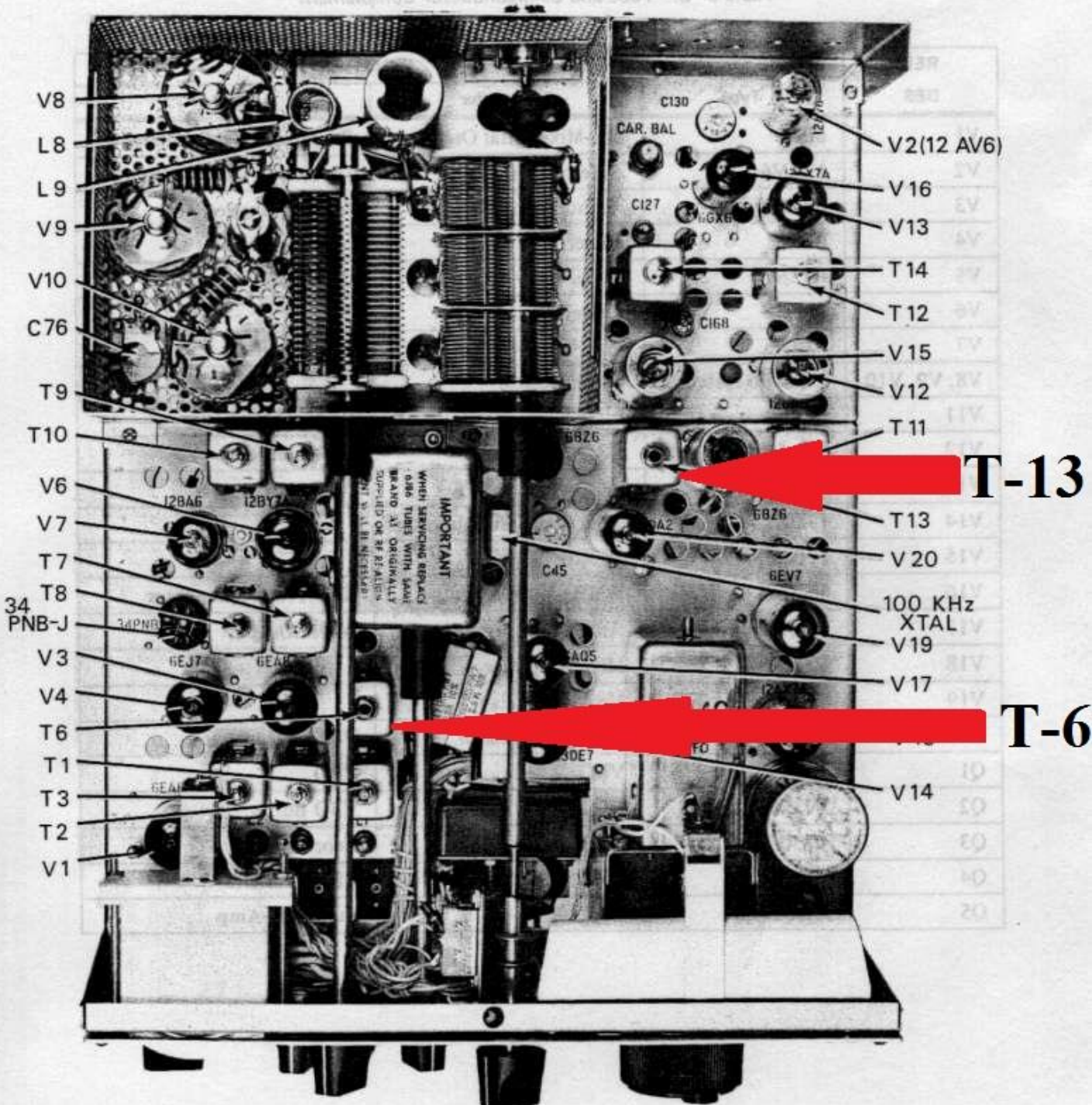


Drake TR-4CW / R.I.T. Filter Alignment

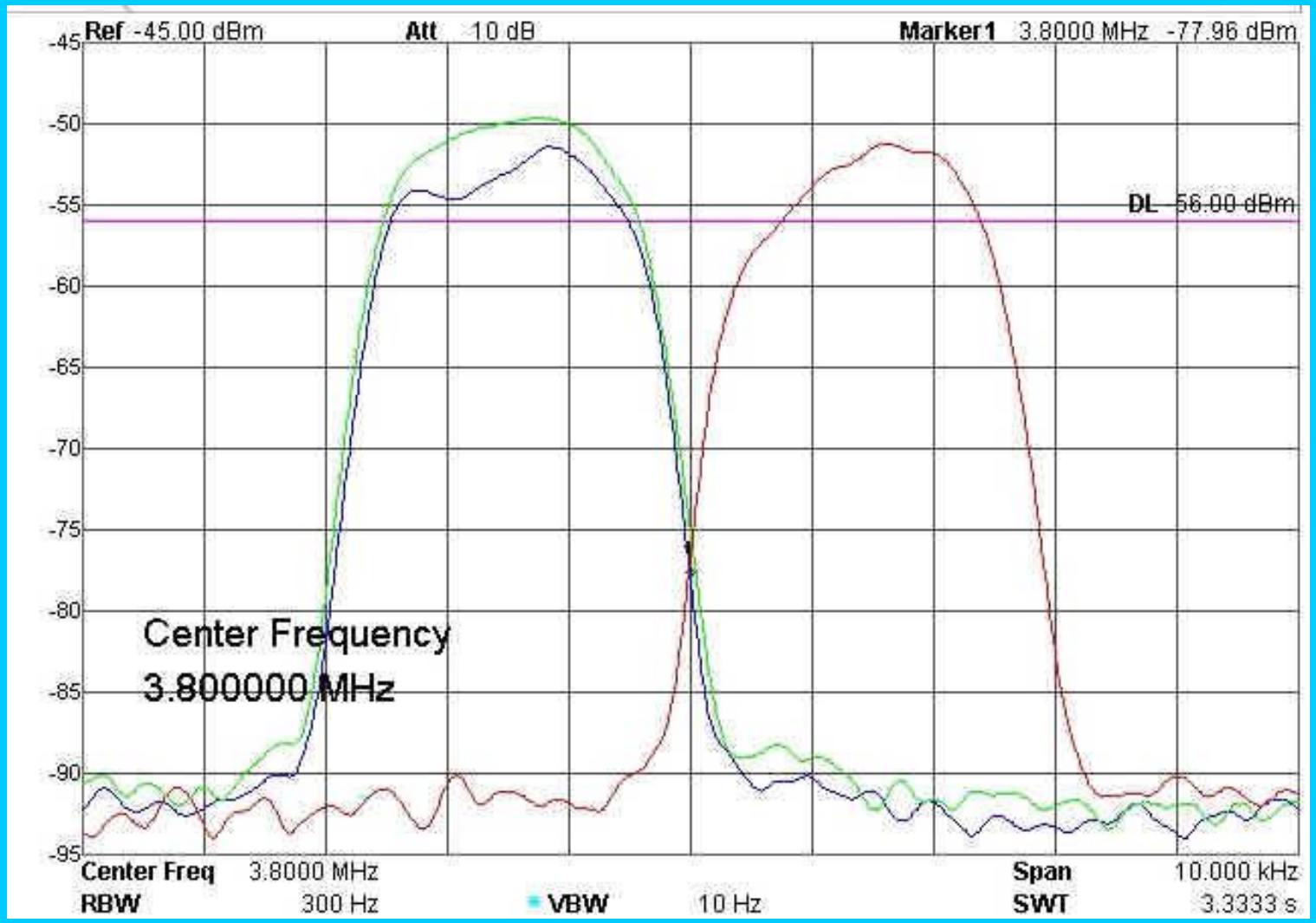
DRAKE

TR-4CW

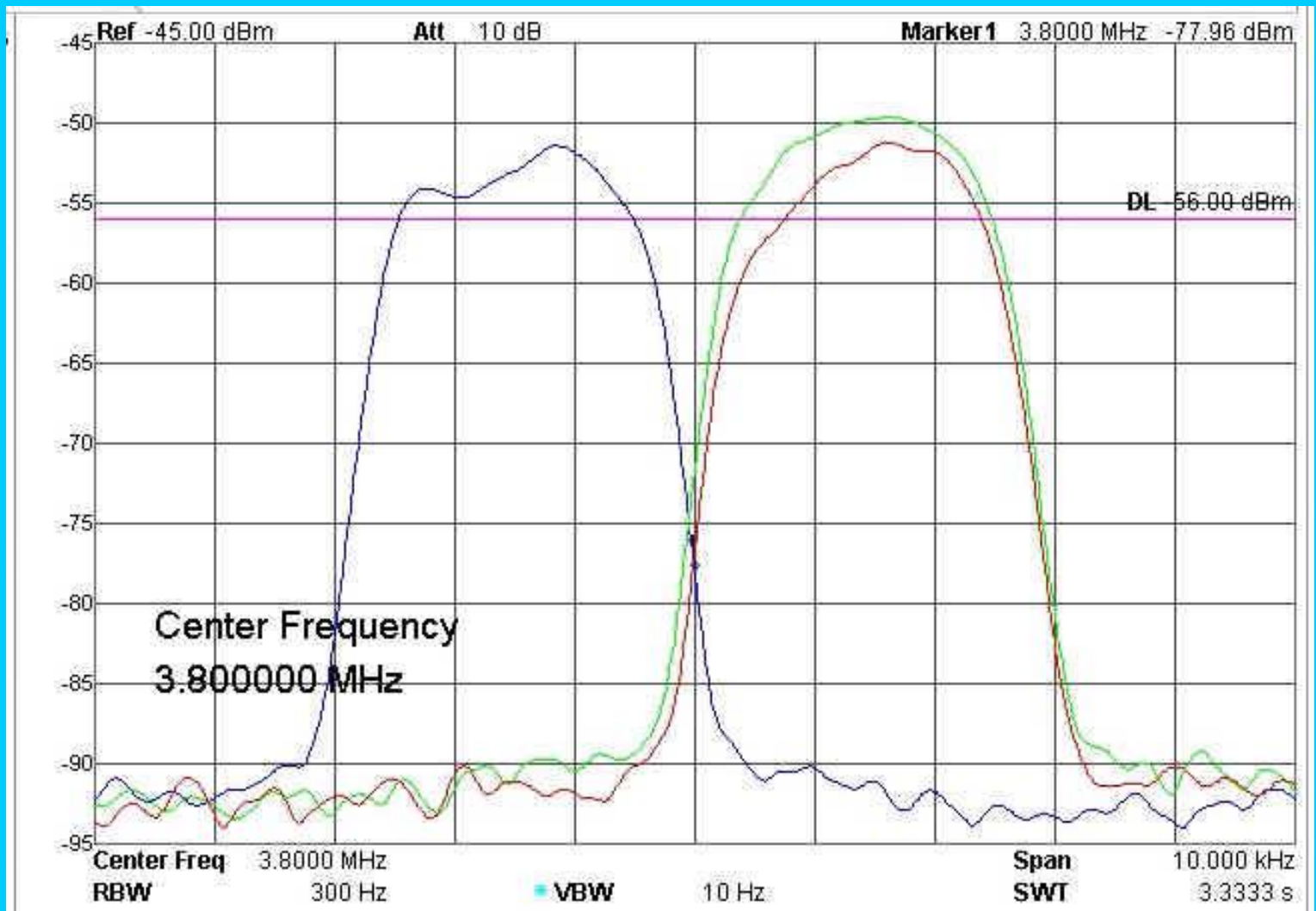
Filter Matching Transformers



LSB Before & After Alignment



USB Before & After Alignment

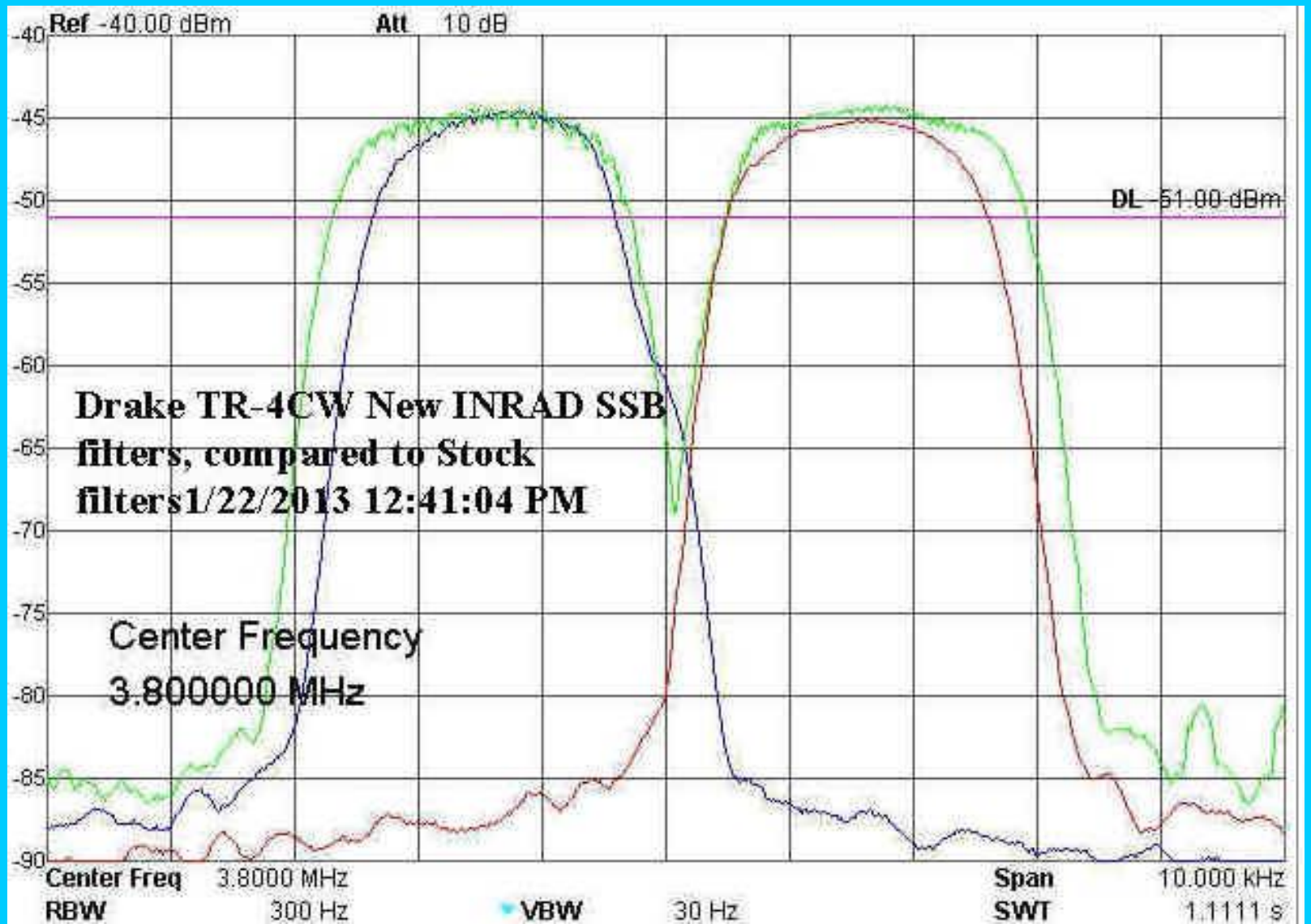


TR-4CW
Stock 2.1 kHz Wide
SSB Crystal Filters
vs.
INRAD
2.5 kHz Wide
SSB Crystal Filters

TR-4 INRAD Filters

Comparison of the old and new filters

TR-4C Filter Comparison



SSB Filter Comparison

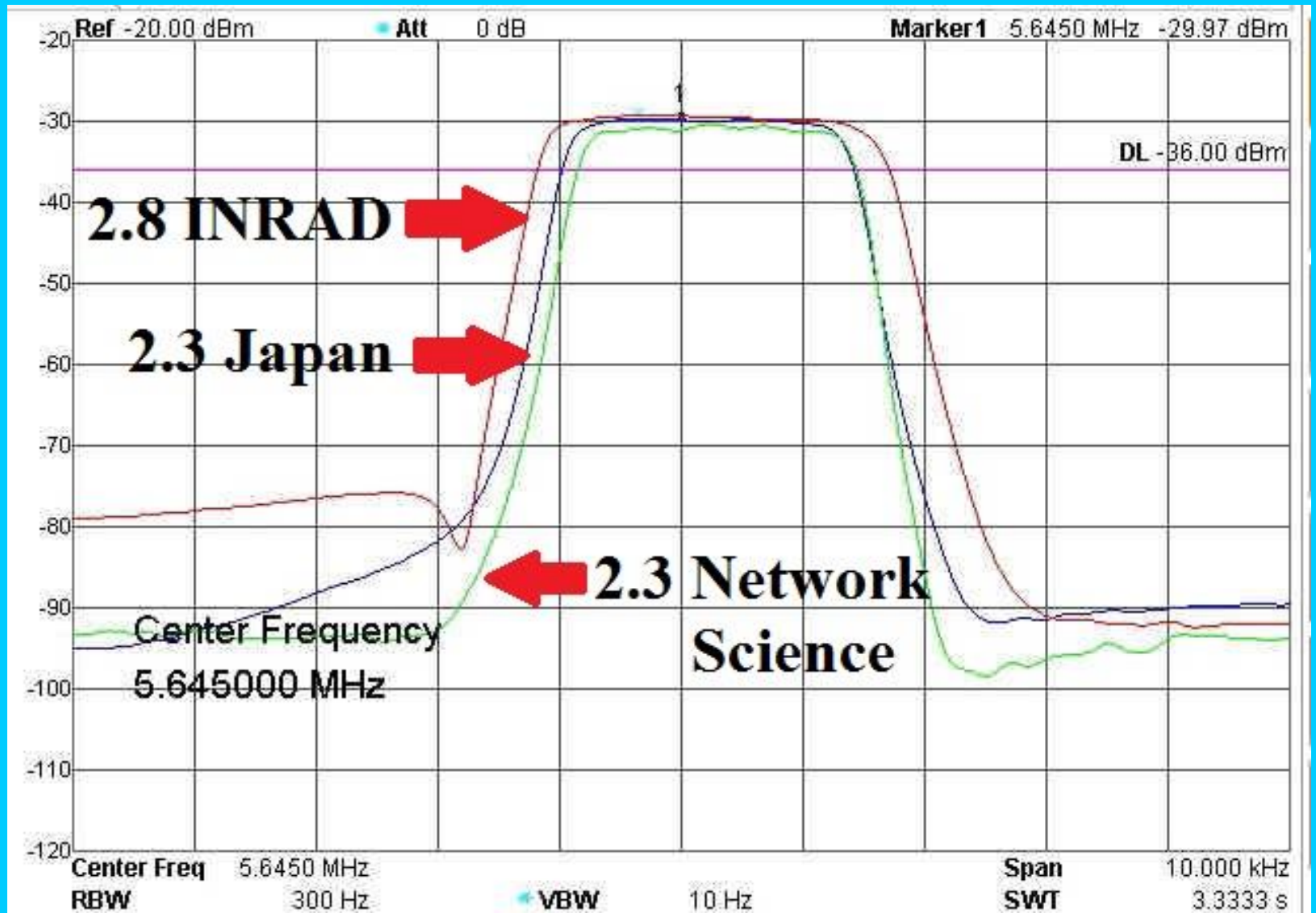
Stock

VS

New Imported SSB Filters

TR-7 Filters

2.3 Network Science - 2.3 Japan - 2.8 INRAD



Thank You

For Watching