SECTION 1

GENERAL DESCRIPTION

1.1 General

Introduction

Single-sideband communication is rapidly replacing double-sideband communication by virtue of the many advantages obtained. These advantages include, (1) an overall power gain of 9 db with respect to double sideband AM systems, (2) the most efficient utilization of the available frequency spectrum by its ability to apply two voice channels in the space normally occupied by one in a double-sideband system. Also, by the exalted-carrier detection which is inherently used in the single-sideband reception, harmonic distortion and cross modulation resulting from carrier fading are removed. When single-sideband reception is to receive double-sideband signals, all of the advantages of reduced fading distortion, together with reduction of interference, are also present. Interference or jamming may occur on a double-sideband signal such that one of the sidebands will be free of interference. Hence, if a single-sideband receiver is used, selection of the proper sideband may completely eliminate interference that might prevent reception altogether if double-sideband reception were used.

The Crosby single-sideband transmitter and receiver are the result of a long period of research devoted to the simplification of single-sideband communication. This simplification has resulted in compact equipment without the extreme complexity of operation that has been characteristic of single-sideband transmitting and receiving equipment.

Single-Sideband Receiver

The receiver is equipped to receive single-sideband suppressed-carrier transmissions and double-sideband AM with exalted carrier plus all of the standard commercial types of transmission, such as double-sideband AM by diode detection, and CW.

In the reception of single-sideband suppressed-carrier transmissions, a locally generated carrier along with the selected sideband signal are fed to a "triple-triode" product type of detector where the local carrier is combined with the sidebands and the heterodyne between the local carrier and sidebands is detected. For the reception of double-sideband AM with exalted carrier, the local carrier along with the selected sideband of the double-sideband AM signal are fed to the product detector, where the local carrier is combined with the desired sidebands and the heterodyne between the local carrier and sidebands is detected. In a like manner, the receiver is equipped to receive CW transmissions using the local carrier and product type detector.

When the Crosby Single-Sideband Receiver, Model 166 is set to either "USB" (upper sideband) or "LSB" (lower sideband), reception is by a pure heterodyne process. In this process, the only audio output is the beat note produced between the local carrier and the received sideband. This beat note will comprise the true detected audio output if the sideband is tuned to have the proper frequency spacing from the local carrier. Referring to Figure 1, the local carrier is introduced to one grid of the product detector directly from the local carrier oscillator. The frequency of the local oscillator is adjusted to be positioned on the skirts of the filter passband approximately 20 db below the maximum. This will produce an audio frequency response of approximately 300 cycles to 3100 cycles. The received sideband is introduced to another grid of the product detector from the I.F. sideband filter. When the tuning dial of the receiver is set properly so that the frequency spacing, "f", between the received sideband and the local carrier is proper, reception will be normal. If the receiver is tuned so that "f" is too great, the voice will sound high pitched and intelligibility will be lost. If the frequency spacing "f", is too small, the voice will sound low pitched and intelligibility will be lost. The proper spacing of the incoming sideband from the locally generated carrier, is determined by tuning until intelligibility is maximum and the voice sounds natural. With a little experience a listener will be able to quickly identify the proper tuning point and hold the signal in proper synchronism to produce normal intelligibility. A mistuning of more than about 25 cycles makes the voice sound unnatural and intelligibility begins to disappear. As experience is obtained in tuning single-sideband signals however, the amount of mistuning which may be tolerated without loss of intelligibility becomes considerably greater. The Crosby SSB Receiver provides a vernier tuning control in addition to the main tuning dial. This control allows an easy adjustment of about ±1000 cycles after the main tuning dial has been approximately positioned.

Figure 2 shows the position of the local carrier when the lower sideband is being received. In this case, the frequency of the local oscillator is adjusted to the high frequency side of the I.F. sideband filter so that when proper tuning is obtained, the lower sideband will pass through the sideband filter.

When tuning signals with a carrier present, such as ordinary AM transmission, and single-sideband-plus-carrier transmission, the proper tuning point can be found by tuning for zero beat between the incoming carrier and the local carrier oscillator. In this condition, the incoming carrier will appear on the side of the I.F. sideband filter so as to be reduced in strength approximately 20 db. There will, therefore, be an audible beat note between the incoming carrier and the local carrier (except at the zero-beat point), but since the local carrier predominates in amplitude, the receiver output will be the same type of single-sideband-received output as is obtained with the reception of single-sideband suppressed carrier transmission.

The detector used in the Crosby receiver is of the "product detector" type which consists of three triodes connected with their cathodes tied together through a common resistor. Two of the triodes act as cathode followers to drive the cathode of the third triode. The cathode followers are fed at their grids by the local carrier and received signal input. By properly adjusting the bias on the third triode, the detected output may be arranged so that the only detected output is that which represents a heterodyne between the carrier and signal applied at the input cathode followers. In this condition, no detection will result when the local oscillator is switched off. Such a detection system is not only the ideal for single-sideband reception, but is also ideal for telegraph (CW) reception since it eliminates key thumps and provides a "clean" linear detection with a smooth beat note output.

The Crosby receiver is also equipped to receive ordinary AM by diode detection on a separate detection system with automatic-volume-controlled gain. With this adjustment, the I. F.

bandwidth is somewhat narrow (3.1 kc) for double-sideband reception so that best reception is obtained by detuning the incoming carrier to one side of the I.F. filter to give a vestigial single-sideband reception with audio fidelity up to 3 kc. It is to be pointed out, however, that such diode detection loses the inherent advantages of exalted-carrier detection which are present when the signal is received in the "USB" or LSB" position. In these single-sideband detection positions, the carrier furnished to the product detector is from the local oscillator and detection is such that the harmonic distortion and cross modulation resulting from carrier fading, is removed. Thus, while the diode detection obtained with the receiver set for "AM" is a somewhat easier tuning adjustment, due to the elimination of the requirement of synchronizing the incoming carrier with the local oscillator, selective fading distortion may be present.

1.2 Essential Functions of the Crosby SSB Receiver

Tubes V301 and V302, 6BA6's (5749) are a two stage R. F. amplifier. Coupling between stages is accomplished by means of untuned primary to tuned secondary transformers. The input transformer primary has been adjusted for a 72 ohm balanced input. The output of V302 feeds the signal grid, pin 7, of converter V303, 6BE6 (5750). The local oscillator V201, 6C4 (6135) feeds grid, pin 1, of V303 and is a variable frequency oscillator adjusted to track with the R. F. tuning such that the gain variation across the entire band is flat within ± 2 db. Three bands are provided which allows tuning from 1.50 to 2.59 mc in Band A, 2.58 to 4.42 mc in Band B and 4.35 to 7.50 mc in Band C as selected by switch SW-1. For fixed frequency operation there is included a crystal oscillator V202, 6AU6 (6136) which offers a choice of three crystal controlled positions as selected by switch SW-2. Switch SW-2 also selects the VFO.

The output of the converter V303 feeds through a 455 kc bandpass transformer to I. F. amplifier V304, 6BA6 (5749). The output of V304 is fed through the Collins Mechanical Filter to a second I. F. amplifier V305, 6BA6 (5749) and the input of the product detector. The output of V305 is fed through a second 455 kc bandpass transformer to a diode detector. The overall selectivity of the I. F. section is flat within ±2 db from

453.5 kc to 456.6 kc, and 50 db down at 452 kc and 458 kc. Overall gain from antenna to detector input is better than 400,000 with a signal-to-noise ratio of 6 db at 2.0 microvolt input to the antenna.

For SSB reception, the output of the Collins filter is fed to the signal grid, pin 2, of V203, 1/2 12AU7 (5814A). The local carrier generated by oscillator V101, 12AU7 (5814A) is fed to the grid, pin 7, of V203, 1/2 12AU7. The signal on the common cathode resistor of V203 feeds the cathode, pin 3, of V204, 1/2 12AU7 (5814A) and appears detected on the plate load resistor of V204, pin 1. Tubes V203 and V204 are the product detector tubes. Bias for the third triode section of the product detector is obtained from a negative bias supply and applied to grid, pin 2 of V204. The detected output from the product detector is fed through a low-pass filter to switch SW-3 which selects the output as either LSB, USB or DSB. From switch SW-3, the detected audio output is fed to the grid, pin 7 of V204, 1/2 12AU7 (5814A). The output of V204 feeds final audio amplifier V205, 12AU7 (5814A) which supplies signals to the built-in speaker. A phone-jack is provided for head-phone reception.

For AM (DSB) operation, the output of the I.F. amplifier is fed to diode detector V306, 6T8, which also provides delayed AVC voltage back to V301, V302, V304 and V305. The AVC characteristic allows a 6 db variation in output from 200 millivolts to 1 microvolt input to the antenna.

Tube V403, 6AL5 (5726), is a bias supply rectifier, and supplies bias for the R. F. gain control which is manually operated in USB and LSB. Bias is also obtained for the product detector and the delayed AVC.

SECTION 2

OPERATION AND ALIGNMENT

2.1 Operating Instructions

A. For Single-Sideband Operation

1. Set sideband selector control SW-3 for desired sideband (USB - upper-sideband or LSB - lower-sideband).

2. Set RF and audio gain full clockwise rotation.

3. Set oscillator selector SW-2 to VFO, or to proper crystal controlled position. (Vernier tuning control to center.)

4. Set Bandswitch to proper position for frequency to be received (Band A covers 1.50 to 2.59 mc, Band B covers 2.58 to 4.42 mc and Band C covers 4.35 to 7.50 mc).

5. Adjust tuning dial to frequency desired.

6. For VFO operation follow steps 7 and 8. For crystal position follow steps 8 and 9.

7. Tune main tuning dial for proper intelligence of received signal.

8. Tune Vernier tuning for best sounding speech quality.

9. Adjust main tuning dial for maximum output signal.

10. Adjust audio gain to one-half full rotation.

11. Adjust RF gain for comfortable listening level.

    Note: Audio gain control must be maintained at a position of greater than one-half full rotation in order to prevent overloading the sideband grid of the detector.

B. <u>For AM Operation</u>

1. Set modulation selector to DSB.
2. Follow steps A2 through A5 above.
3. Adjust main tuning dial for clear signal.
4. Adjust audio gain for comfortable listening level.

C. <u>For CW Operation</u>

1. Set SW-3 to USB or LSB.
2. Follow steps A2 through A11 above.
3. Adjust Vernier tuning dial for desired beat frequency.

D. <u>For Exalted Carrier Reception of AM</u>

1. Set SW-3 to USB or LSB.
2. Follow steps as under A (Single-Sideband Operation).

2.2 Alignment Instruction

A. I. F. Alignment

1. Remove oscillator tube V201.
2. Connect signal generator to the grid, pin 7 of V303 and set to 455 kc.
3. Connect VTVM to grid, pin 2 of V203.
4. Turn unit on and allow to warm up for 10 to 15 minutes.
5. Modulation selector switch to LSB.
6. Standby receive switch to receive.
7. R. F. gain full clockwise rotation.
8. Adjust primary and secondary slug tuning of T13 for maximum indication on meter.
9. Move VTVM to the grid, pin 7 of V204.
10. Adjust primary and secondary slug tuning of T10 for maximum indication on meter.
11. Remove VTVM.

B. Detector Alignment

1. Connect VTVM to the grid, pin 2 of V205.
2. Plug headphones into jack provided.
3. Alternately change SW-3 from USB to LSB positions and adjust slug T101 for approximately equal signal output as shown on VTVM.

4. Alternately change SW-3 from USB to LSB positions and adjust USB and LSB crystal trimmer capacitors to approximately equal audio tone on the headphones achieving as high a tone as possible. *

5. Modulate signal generator with 400 cycle tone.

6. Short carrier grid, pin 7, of V203.

7. Adjust bias control on V9 for a null in the 400 cycle tone heard in headphones, approximately -1V.

8. Remove short on grid, pin 7 of V203.

9. Remove signal generator.

C. <u>R. F. Alignment</u>

1. Bandswitch in Band A position.

2. Tuning dial set at 1.50 mc. Vernier dial set at zero.

3. Modulation selector switch to LSB.

4. R. F. gain full clockwise rotation.

5. SW-2 to V. F. O.

6. Remove oscillator tube V201.

7. Connect signal generator, set at 1.50 mc with 10 microvolt output, to antenna terminals.

8. Connect VTVM to the grid, pin 7 of V303.

9. Adjust tuning slug in secondary of T1, T4 and T7 (in that order) for maximum indication on meter.

10. Set signal generator at 2.55 mc.

* For precise adjustment follow Par. D. Page 2.7

11. Tuning dial at 2.55 mc (Band A).

12. Adjust trimmer condensers across T1, T4 and T7 (in that order) for maximum indication on meter.

13. Repeat steps 2 through 12.

14. Set Bandswitch to Band B.

15. Set tuning dial to 2.60 mc.

16. Set signal generator at 2.60 mc.

17. Adjust tuning slug of T2, T5 and T8 for maximum indication on meter.

18. Set tuning dial to 4.40 mc.

19. Set signal generator to 4.40 mc.

20. Adjust trimmer condensers across T2, T5 and T8 for maximum indication on meter.

21. Repeat steps 14 through 20.

22. Set Bandswitch to Band C.

23. Set tuning dial to 4.40 mc.

24. Set signal generator at 4.40 mc.

25. Adjust tuning slug of T3, T6 and T9 for maximum indication on the meter.

26. Set tuning dial to 7.40 mc.

27. Set signal generator to 7.40 mc.

28. Adjust trimmer condensers across T3, T6 and T9 for maximum indication on meter.

29. Repeat steps 22 through 28.

30. Remove VTVM and connect to the grid, pin 1 of V304.

31. Replace oscillator tube V201.

32. Set Bandswitch to Band A.

33. Set signal generator and tuning dial to 1.50 mc.

34. Adjust slug T10 for maximum indication on meter.

35. Set signal generator and tuning dial to 2.55 mc.

36. Adjust trimmer condenser on T10 for maximum indication on meter.

37. Repeat steps 33 through 36.

38. Set Bandswitch to Band B.

39. Set signal generator and tuning dial to 2.60 mc.

40. Adjust slug of T11 for maximum indication on meter.

41. Set signal generator and tuning dial to 4.40 mc.

42. Adjust trimmer of T11 for maximum indication on meter.

43. Repeat steps 39 through 42.

44. Set Bandswitch to Band C.

45. Set signal generator and tuning dial to 4.40 mc.

46. Adjust slug of T12 for maximum indication on meter.

47. Set signal generator and tuning dial to 7.40 mc.

48. Adjust trimmer condenser across T12 for maximum indication on meter.

49. Repeat steps 45 through 48.

50. Remove VTVM.

D. Sideband Oscillator Crystal Alignment

Each receiver is furnished with USB and LSB crystals matched to the particular Collins filter so that the signal carrier frequency is properly positioned approximately 20 db down on the low side of the audio frequency pass-band of the filter. Altering the settings of the USB and LSB crystal trimmer capacitors should only be attempted when equipment is available to accurately measure the audio frequency output in cycles per second along with the level of audio output. In such case the frequency counter or meter is shunted across the output meter at pin 2 of V205. As the frequency of the signal generator is slowly varied from one side of the pass-band to the other, the crystal trimmer capacitors are adjusted so that 250 cycle response is 6 db down from audio pass-band maximum. The slug of T101 is at the same time tuned to yield approximately equal response in audio level at the frequency of 455 kc. Should it become necessary to change the Collins filter for any reason, the pass-band of the replacement filter must be accurately determined and suitable side-band crystals matched to the filter so that the crystal frequencies will lie 20 db down on the skirt of the audio pass-band curve. Crystal tolerance will ordinarily be ±.005%.

SECTION 3

INSTALLATION

3.1 Installation

A. Unpacking. Refer to packing slip for a list of all equipment supplied on order. The equipment should be unpacked carefully to avoid damage.

B. Position. The receiver and transmitter have been designed to operate side-by-side in a horizontal line. The positioning is universal, that is, the transmitter can be positioned either to the right or left of the receiver.

C. Connections. Connect a 72 ohm balanced antenna to transmitter antenna terminals on front panel. Plug cable attached to transmitter in socket provided on receiver. Set receiver "receiver stand-by" switch in "standby" position. Apply power to units after making preliminary adjustment as listed under Section 2.

SECTION 4

PARTS LIST

C 101	50 MMF, Silver Mica, El-Menco CM-15-E-500-J
C 102	500 MMF, Mica, El-Menco CM-19-501-M
C 103	470 MMF, Silver Mica, El-Menco CM-19-471
C 104	.01 MF, Disc Ceramic, Aerovox Hi-Q
C 105	.05 MF, Paper, Sprague, Telecap 4TM-S5
C 106	7-45 MMF N500, Ceramic Trimmer, Erie TS-2A-7
C 107	Same as C-106
C 201	33N750 MMF Centralab TCN-33
C 202	4th Section, 10-219 MMF, Radio Condenser Co. Type 421
C 203	100 MMF, Silver Mica, El-Menco CM-15-E-101-J
C 204	620N750 MMF Centralab TCN-620
C 205	Same as C-106
C 206	200 N750 MMF Centralab TCN-200 in parallel with 750 N750 MMF Centralab TCN-750
C 207	Same as C-106
C 208	470 N750 MMF Centralab TCN-750 in parallel with 750 N750 MMF Centralab TCN-750

C 209	Same as C-106
C 210	.005 MF, Disc Ceramic, Aerovox Hi-Q
C 211	1000 MMF Silver Mica, El-Menco CM-19-102-M
C 212	Same as C-104
C 213	Same as C-104
C 214	33 MMF, Silver Mica, El-Menco CM-15-E-330-J
C 215	Same as C-214
C 216	Same as C-104
C 217	Variable, Hammarlund HF-35
C 218	10 MF, 350 WVDC, Sprague Atom, TVA-1604
C 219	Same as C-104
C 220	Same as C-104
C 221	Same as C-101
C 222	Same as C-203
C 223	10 MF, 50 WVDC, Sprague Atom, TVA-1304
C 224	Same as C-104
C 225	Same as C-223
C 226	0.1 MF, Paper, Sprague Telecap 4TM-P1
C 227	3 MMF, Silver Mica, El-Menco CM-15-C-030-M

C 301	Same as C-214
C 302	1st Section part of C-202
C 303	Same as C-106
C 304	Same as C-106
C 305	Same as C-106
C 306	Same as C-104
C 307	Same as C-104
C 308	Same as C-104
C 309	Same as C-104
C 310	Same as C-214
C 311	2nd Section, part of C-202
C 312	Same as C-106
C 313	Same as C-106
C 314	Same as C-106
C 315	Same as C-210
C 316	Same as C-104
C 317	Same as C-104
C 318	Same as C-104
C 319	Same as C-104
C 320	Same as C-214
C 321	3d Section Part of C-202

C 322	Same as C-106
C 323	Same as C-106
C 324	Same as C-106
C 325	Same as C-210
C 326	Same as C-104
C 327	Same as C-104
C 328	Same as C-104
C 329	Same as C-104
C 330	Same as C-104
C 331	Same as C-203
C 332	Same as C-203
C 333	Same as C-104
C 334	Same as C-104
C 335	Same as C-104
C 336	130 MMF, Silver Mica, El-Menco CM-15-E-131-J
C 337	Same as C-336
C 338	Same as C-104
C 339	Same as C-104
C 340	Same as C-104
C 341	Same as C-104

C 342	Same as C-203
C 343	Same as C-203
C 344	Same as C-203
C 345	150 MMF, Silver Mica, El-Menco CM-15-E-151-J
C 346	Same as C-105
C 347	Same as C-105
C 401, 402	20-20-20 MF Electrolytic, Sprague Twistlok TVL-3870
C 403	0.25 MF, 400 WVDC, Sprague 4TM-P25
C 404	16 MF, Electrolytic, Sprague TVA-1607
C 405	Same as C-226
C 406	Same as C-105
C 407	0.25 MF, 200 WVDC, Sprague Telecap 2 TM-P25
C 408	Same as C-404
F 401	Fuse, 3A., 250V., Littiefuse 3AG
L 201	10 MH, RF Choke, Miller 4540
L 202	2.5 MH, RF Choke, Miller 4537
L 203	50 MH, Audio Filter, Caddell-Burns 407F

L 401	Power Filter Choke, UTC-S1498
NE 401	Neon bulb NE-51
R 101	100K ohms, 1/2 W, Carbon, Allen-Bradley EB
R 102	2700 ohms, 1/2 W, Carbon, Allen-Bradley EB
R 103	Same as R-102
R 104	82K ohms, 1/2 W, Carbon, Allen-Bradley EB
R 105	Same as R-102
R 201	47K ohms, 1/2 W, Carbon, Allen-Bradley EB
R 202	100 ohms, 1/2 W, Carbon, Allen-Bradley EB
R 203	Same as R-101
R 204	470K ohms, 1/2 W, Carbon, Allen-Bradley EB
R 205	1000 ohms, 1/2 W, Carbon, Allen-Bradley EB
R 206	22K ohms, 1/2 W, Carbon, Allen-Bradley EB
R 207	33K ohms, 1/2 W, Carbon, Allen-Bradley EB

R 208	Same as R-102
R 209	Same as R-201
R 210	Same as R-102
R 211	820 ohms, 1/2 W, Carbon, Allen-Bradley EB
R 212	250K ohms, 2 W, Linear Potentiometer, Ohmite CU 2541
R 213	220K ohms, 1/2 W, Carbon, Allen-Bradley EB
R 214	470 ohms, 1/2 W, Carbon, Allen-Bradley EB
R 215	2700 ohms, 1 W, Carbon, Allen-Bradley GB
R 216	Same as R-102
R 217	Same as R-207
R 301	39 ohms, 1/2 W, Carbon, Allen-Bradley EB
R 302	Same as R-204
R 303	Same as R-205
R 304	Same as R-207
R 305	Same as R-102
R 306	Same as R-301
R 307	Same as R-205
R 308	Same as R-301

R 309	Same as R-204
R 310	Same as R-205
R 311	Same as R-207
R 312	Same as R-102
R 313	Same as R-301
R 314	Same as R-205
R 315	Same as R-301
R 316	Same as R-204
R 317	150 ohms, 1/2 W, Carbon, Allen-Bradley EB
R 318	5600 ohms, 1/2 W, Carbon, Allen-Bradley EB
R 319	Same as R-102
R 320	Same as R-102
R 321	Same as R-205
R 322	Same as R-207
R 323	Same as R-102
R 324	Same as R-205
R 325	68 ohms, 1/2 W, Carbon, Allen-Bradley EB
R 326	Same as R-207
R 327	Same as R-102

R 328	270K ohms, 1/2 W, Carbon, Allen-Bradley EB
R 329	180K ohms, 1/2 W, Carbon, Allen-Bradley EB
R 330	Same as R-204
R 331	10K ohms, 1/2 W, Carbon, Allen-Bradley EB
R 332	1 meg 1/2 W, Carbon, Allen-Bradley EB
R 333	Same as R-204
R 334	3.3 meg 1/2 W, Allen-Bradley EB
R 335	Same as R-207
R 336	Same as R-213
R 337	56K ohms, 1/2 W, Carbon, Allen-Bradley EB
R 401	Same as R-204
R 402	2500 ohms, 5W, W.W., Sprague Koolohm 5KT
R 403	22K ohms, 2 W, Carbon, Allen-Bradley GB
R 404	Same as R-201
R 405	Same as R-201
R 406	100K ohms, 2W., Linear Potentiometer, Ohmite CU 1041
R 407	12K ohms, 1/2 W, Carbon, Allen-Bradley EB

R 408	Same as R-328
R 409	18K ohms, 1/2 W, Carbon, Allen-Bradley EB
R 410	330K ohms, 1/2 W, Carbon, Allen-Bradley EB
R 411	100K ohms, 2 W, Linear Potentiometer, Ohmite CLU 1041
R 412	100K ohms, 1/2 W, Built into socket
Speaker	Oxford 3CMS
SW 1	Switch Index Assembly, Centralab P-272
SW 1A	Switch Section, Centralab SSD
SW 1B	Switch Section, Centralab SSD
SW 1C	Switch Section, Centralab SSD
SW 1D	Switch Section, Centralab SSD
SW 2	Switch, Rotary, Centralab PA-2011
SW 3	Switch, Rotary, Centralab 2515
SW 4	DPST, Toggle Switch, ICA1298
SW 5	Switch, Rotary, Centralab 1460
T 1	R F Input Transformer Band A
T 2	R F Input Transformer Band B

T 3	R. F. Input Transformer Band C
T 4	R. F. Amplifier Transformer Band A
T 5	R. F. Amplifier Transformer Band B
T 6	R. F. Amplifier Transformer Band C
T 7	R. F. Amplifier Transformer Band A
T 8	R. F. Amplifier Transformer Band B
T 9	R. F. Amplifier Transformer Band C
T 10	H. F. Oscillator Transformer Band A
T 11	H. F. Oscillator Transformer Band B
T 12	H. F. Oscillator Transformer Band C
T 13	I. F. Transformer, Caddell-Burns 406C
T 14	Mechanical Filter, Collins F455C31
T 15	Same as T-13
T 101	SSB Oscillator Coil, Caddell-Burns 403C
T 201	Audio Output Transformer, Freed RGA-9
T 401	Power Transformer, UTC-S1497
V 101	Tube, 12AU7, 5814-A
V 201	Tube 6C4, 6135
V 202	Tube 6AU6, 6136

V 203	Tube 12AU7, 5814-A
V 204	Tube 12AU7, 5814-A
V 205	Tube 12AU7, 5814-A
V 301	Tube 6BA6, 5749
V 302	Tube 6BA6, 5749
V 303	Tube 6BE6, 5750
V 304	Tube 6BA6, 5749
V 305	Tube 6BA6, 5749
V 306	Tube 6T8
V 401	Tube 5Y3GT, 6087
V 402	Tube OA 2
V 403	Tube 6AL5, 5726

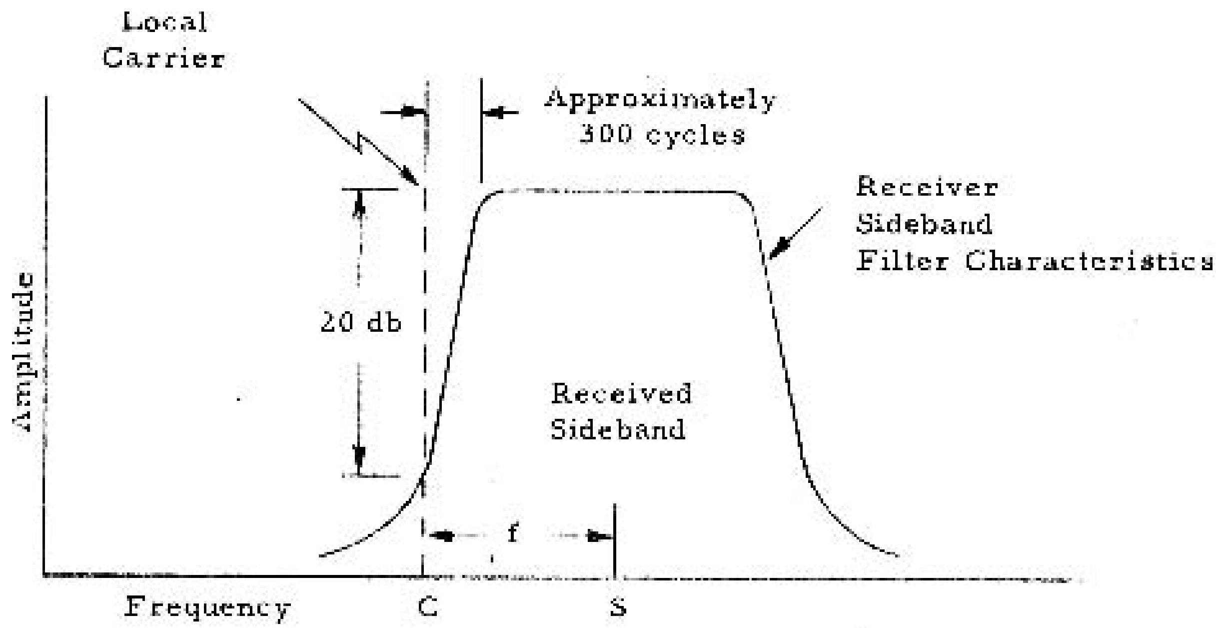


FIGURE 1

UPPER SIDEBAND RECEPTION

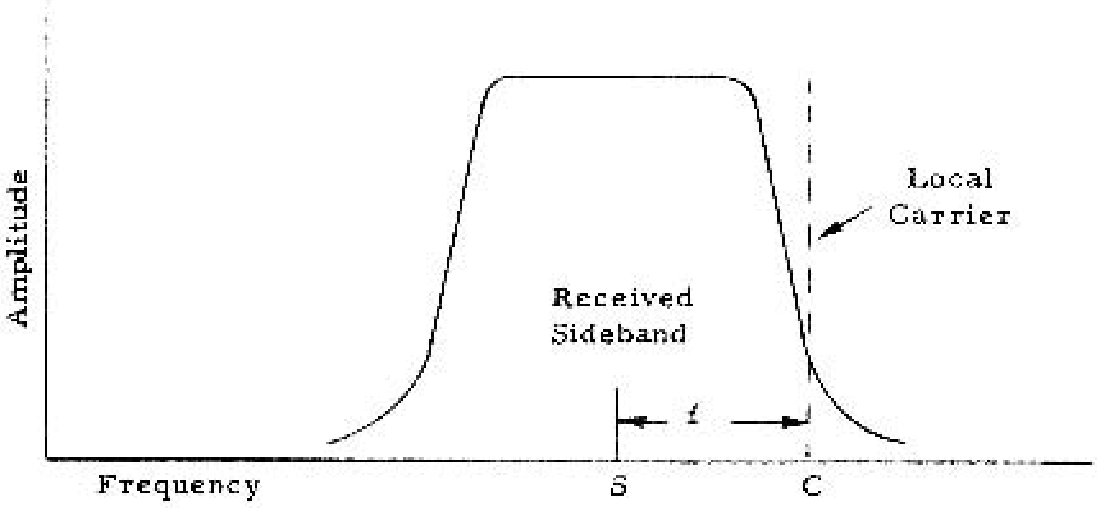
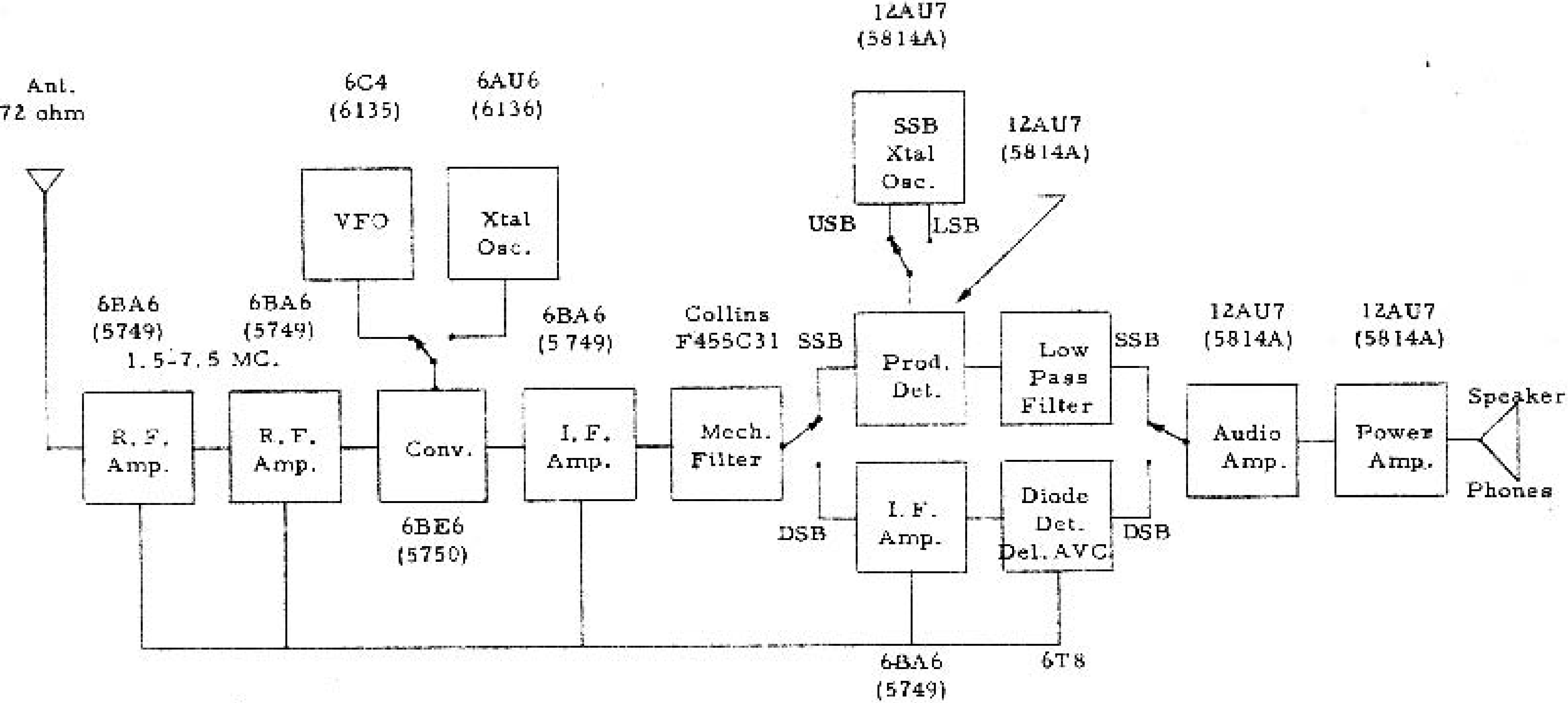


FIGURE 2

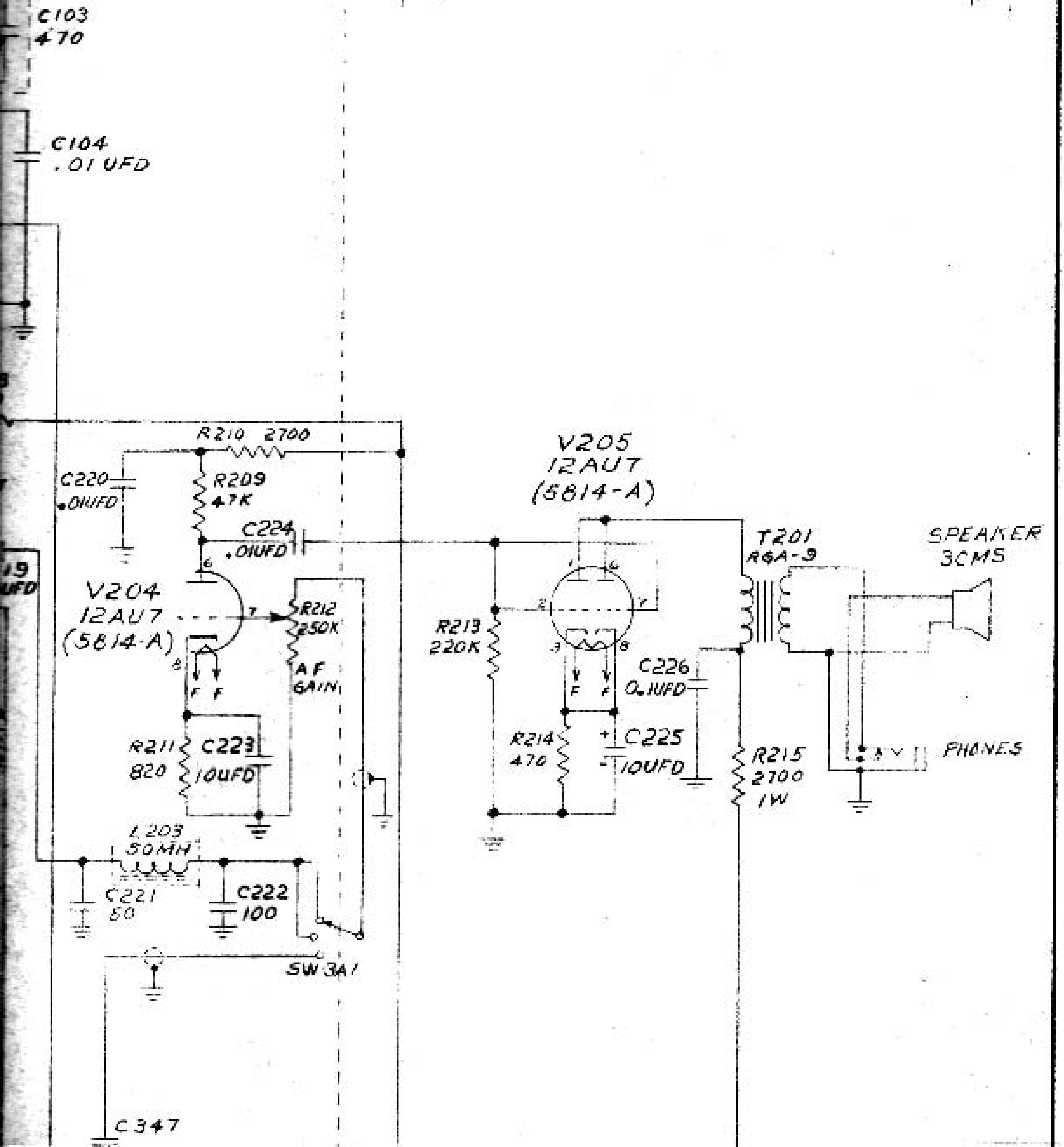
LOWER SIDEBAND RECEPTION

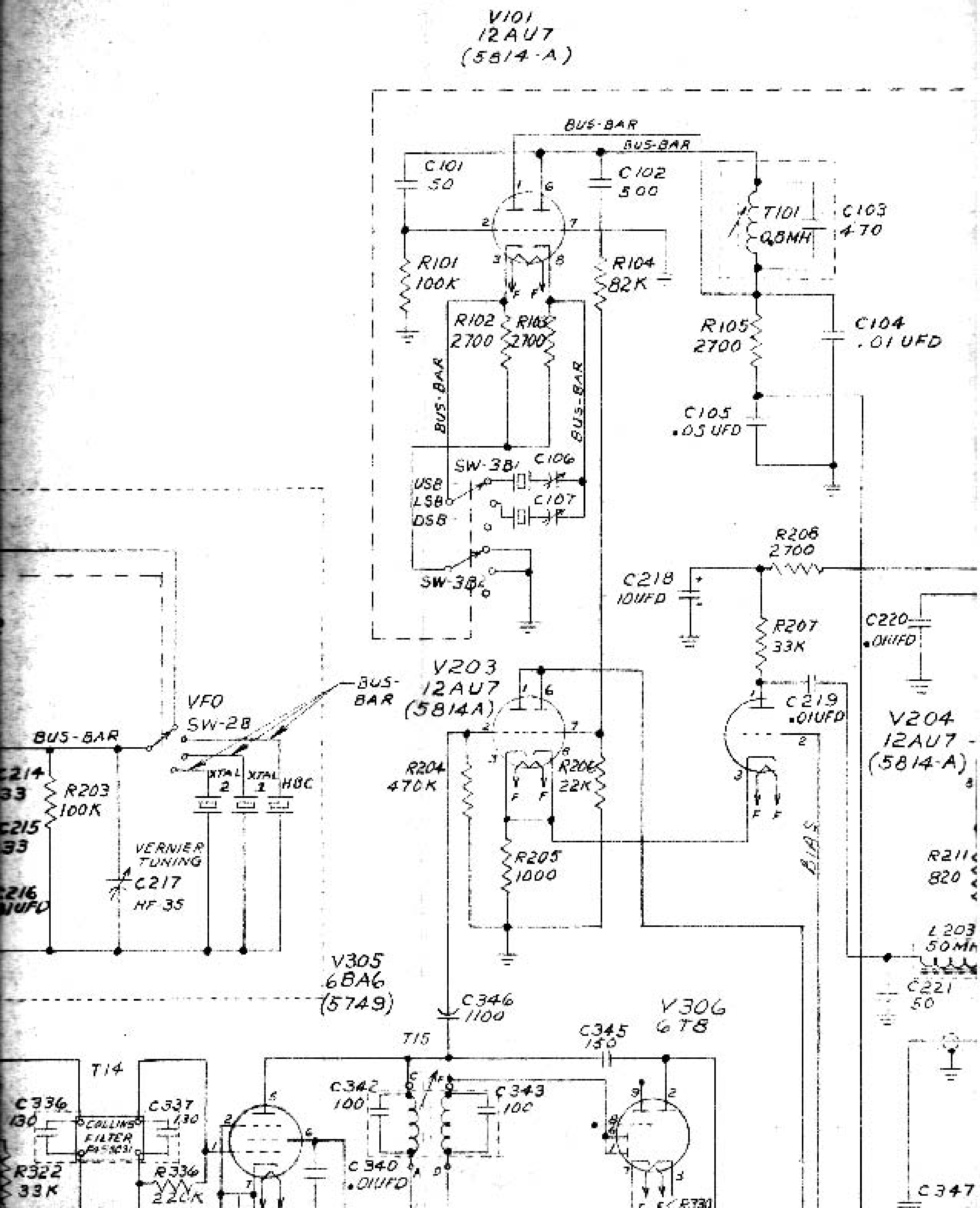
Crosby Laboratories, Inc.
Hicksville, N. Y.



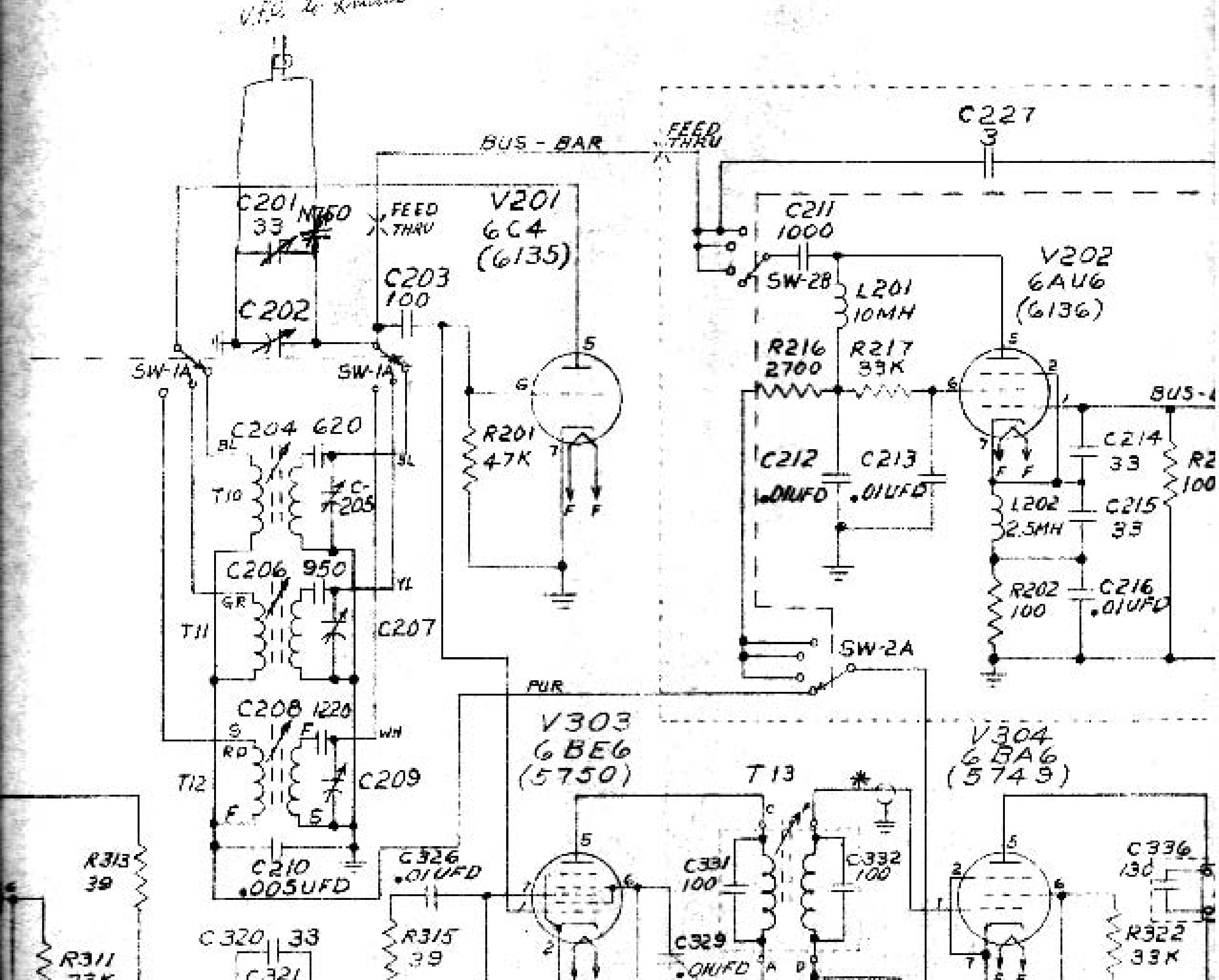
Block Diagram
SSB Receiver
Type 166

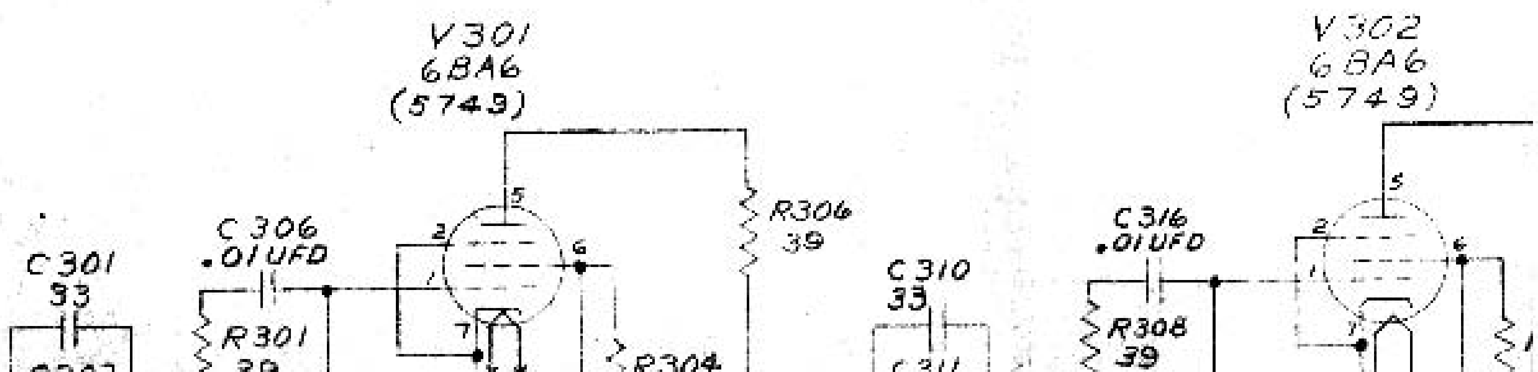
	REVISIONS		
SUB	DESCRIPTION	APPR	DATE
B	REVISED & REDRAWN	[illegible]	[illegible]
C	XTAL. OSC., V306 & BIAS CKTS CHANGED	[illegible]	3-8-55
D	CHANGED FUSE POS. & C346	[illegible]	4-4-55
E	R335, 6 & 7 ADDED C401 CHD. FROM 20UFD.	[illegible]	4-27-55



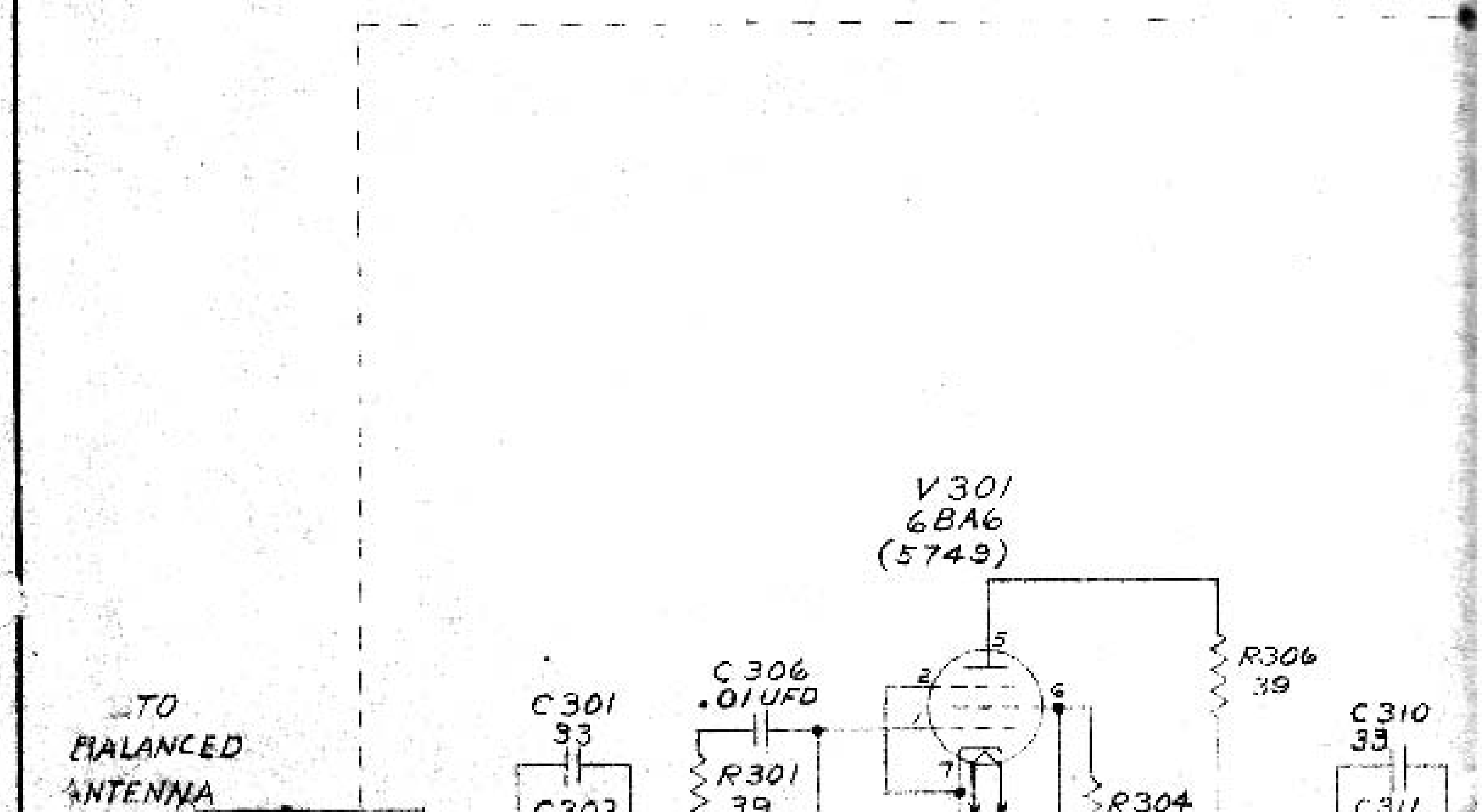


V101
12AU7
(5814-A)
BUS-BAR
BUS-BAR
C101
50
C102
500
T101
0.8MH
C103
470
R101
100K
R104
82K
R102
2700
R103
2700
R105
2700
C104
.01 UFD
C105
.05 UFD
BUS-BAR
BUS-BAR
SW-3B1
C106
C107
USB
LSB
DSB
SW-3B2
R208
2700
C218
10UFD
R207
33K
C220
.01UFD
V203
12AU7
(5814A)
C219
.01UFD
V204
12AU7
(5814-A)
VFO
SW-2B
BUS-BAR
BUS-BAR
XTAL 2
XTAL 1
HBC
R203
100K
C214
33
C215
33
C216
UFD
VERNIER
TUNING
C217
HF 35
R204
470K
R206
22K
R205
1000
BIAS
R211
820
L203
50MH
C221
50
V305
6BA6
(5749)
C346
1100
V306
6T8
C345
150
T15
T14
C336
130
C337
130
COLLINS
FILTER
C342
100
C343
100
C340
.01UFD
R322
33K
R336
220K
C347


V.F.O. to transmitter
BUS - BAR
FEED THRU
C227
3
C201
33
N750
FEED THRU
V201
6C4
(6135)
C211
1000
V202
6AU6
(6136)
C202
C203
100
SW-2B
L201
10MH
SW-1A
SW-1A
5
G
R216
2700
R217
33K
6
2
1
BUS-
C204
620
R201
47K
7
F F
C212
.01UFD
C213
.01UFD
C214
33
C215
33
L202
2.5MH
T10
C-205
BL
BL
C206
950
YL
GR
T11
C207
R202
100
C216
.01UFD
SW-2A
PUR
C208
1220
WH
V303
6BE6
(5750)
V304
6BA6
(5749)
T12
C209
T13
C210
.005UFD
C326
.01UFD
C331
100
C332
100
C336
130
R313
39
R311
33K
C320
33
C321
R315
39
C329
.01UFD
R322
33K



V301
6BA6
(5749)
C306
.01UFD
R306
39
C301
33
R301
R304
C310
33
C316
.01UFD
V302
6BA6
(5749)
R308
39


V301
6BA6
(5749)
R306
39
C306
.01 UFD
C301
33
TO
BALANCED
ANTENNA
R301
39
C310
33
R304

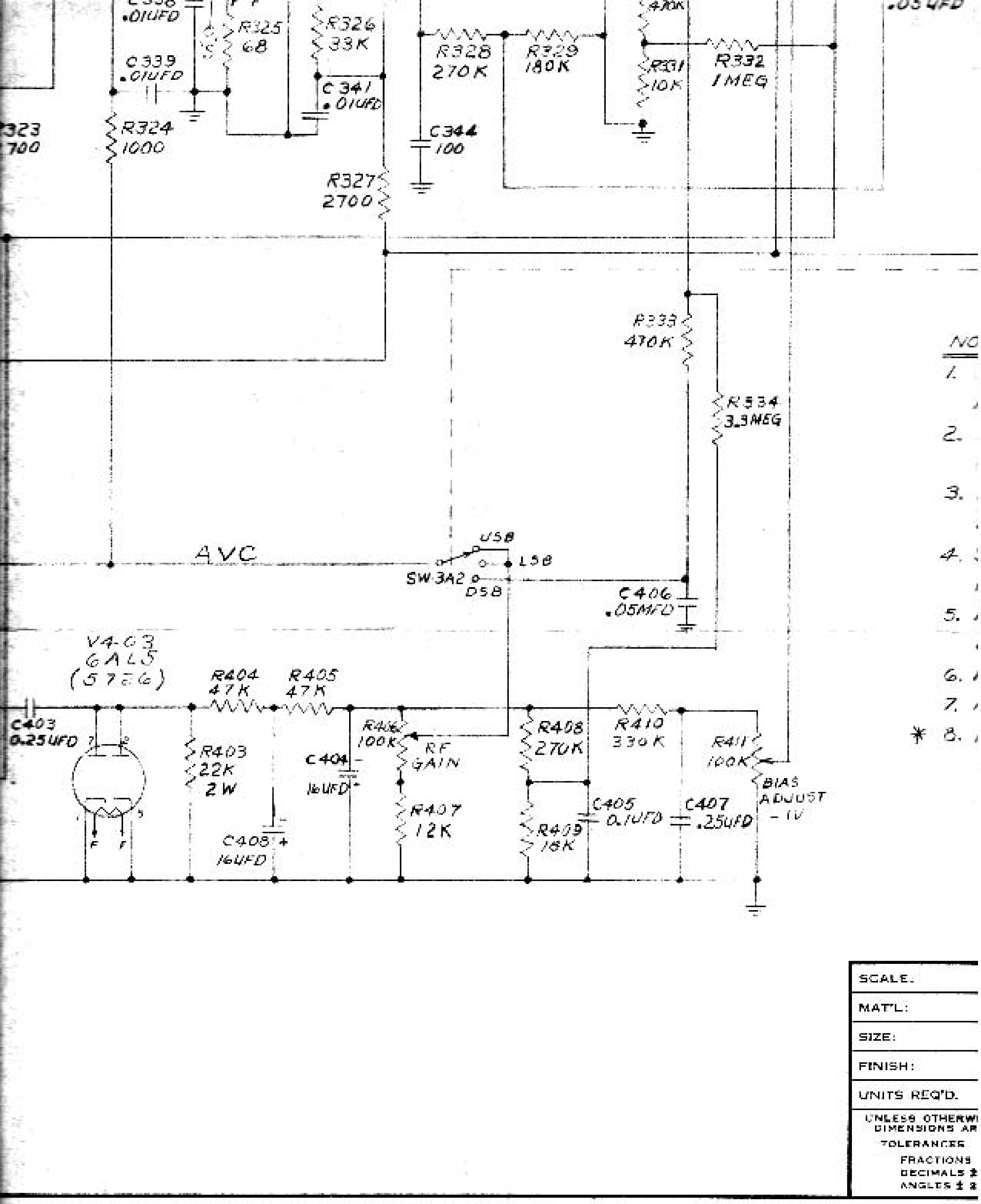
NOTES:

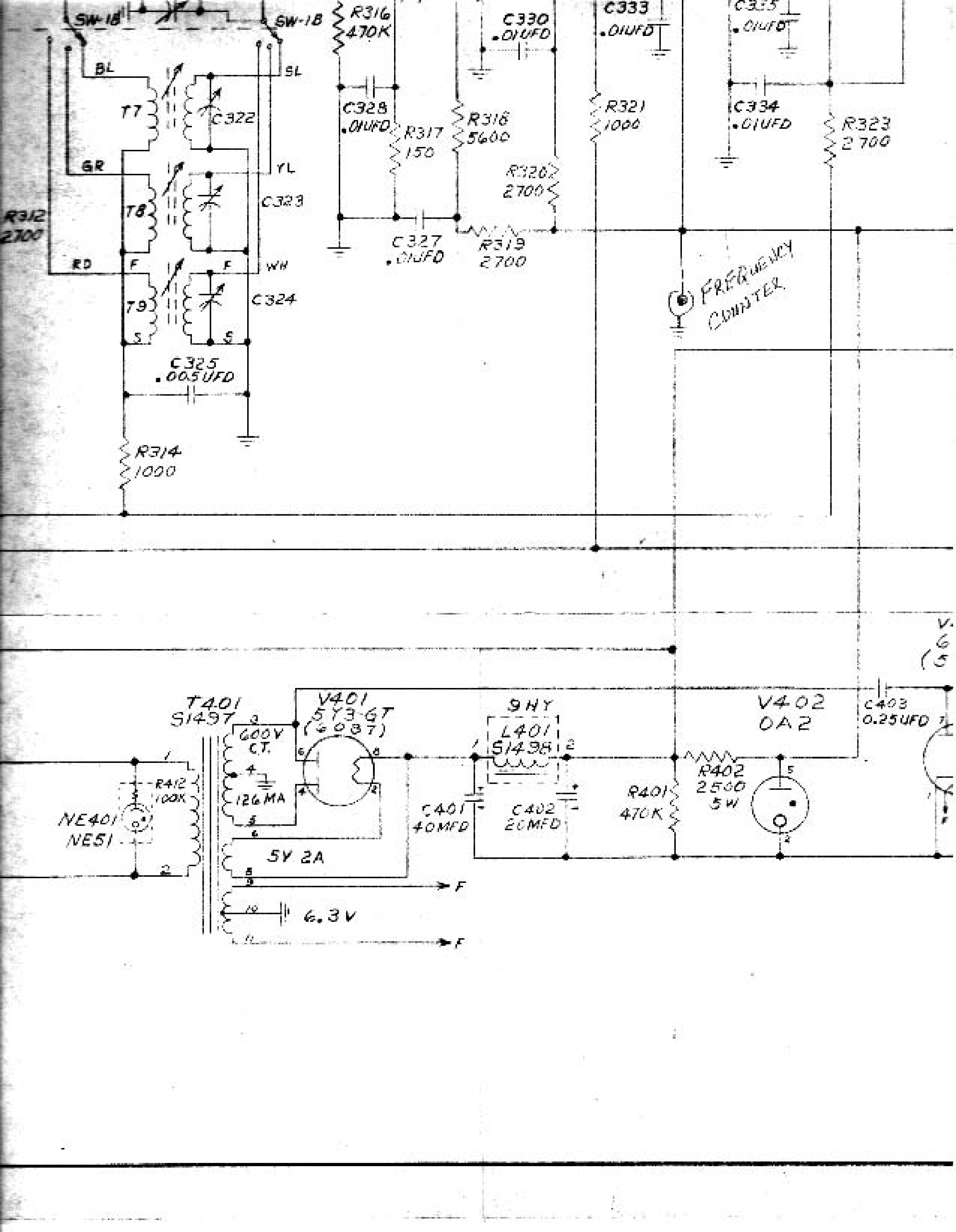
1. RESISTANCE IS IN OHMS & ALL FIXED RESISTORS ARE RATED ½ WATT UNLESS OTHERWISE SPECIFIED.
2. CAPACITANCE IS IN UUF UNLESS OTHERWISE SPECIFIED
3. MAIN TUNING CAPACITORS ARE 10-219 UUF PER SECTION. TRIMMER CAPACITORS ARE N500 7-45 UUF
4. SWITCH SECTIONS ARE LETTERED FROM FRONT TO REAR A, B-& NUMBERED 1, CLOSE TO CHASSIS, 2 AWAY FROM CHASSIS
5. IN OSC., C204 IS 620UUF N750, C206 IS PARALLEL 750 UUF N750 & 200 UUF N750, C208 IS PARALLEL 750 UUF N750 & 470 UUF N750 COND.
6. RF COILS: PRIMARY WOUND ON TOP END OF FORM
7. NE401 IS TYPE NE-51 PANEL-LITE

* 8. MAKE LEAD SHORT AS POSSIBLE USE RG-62/U

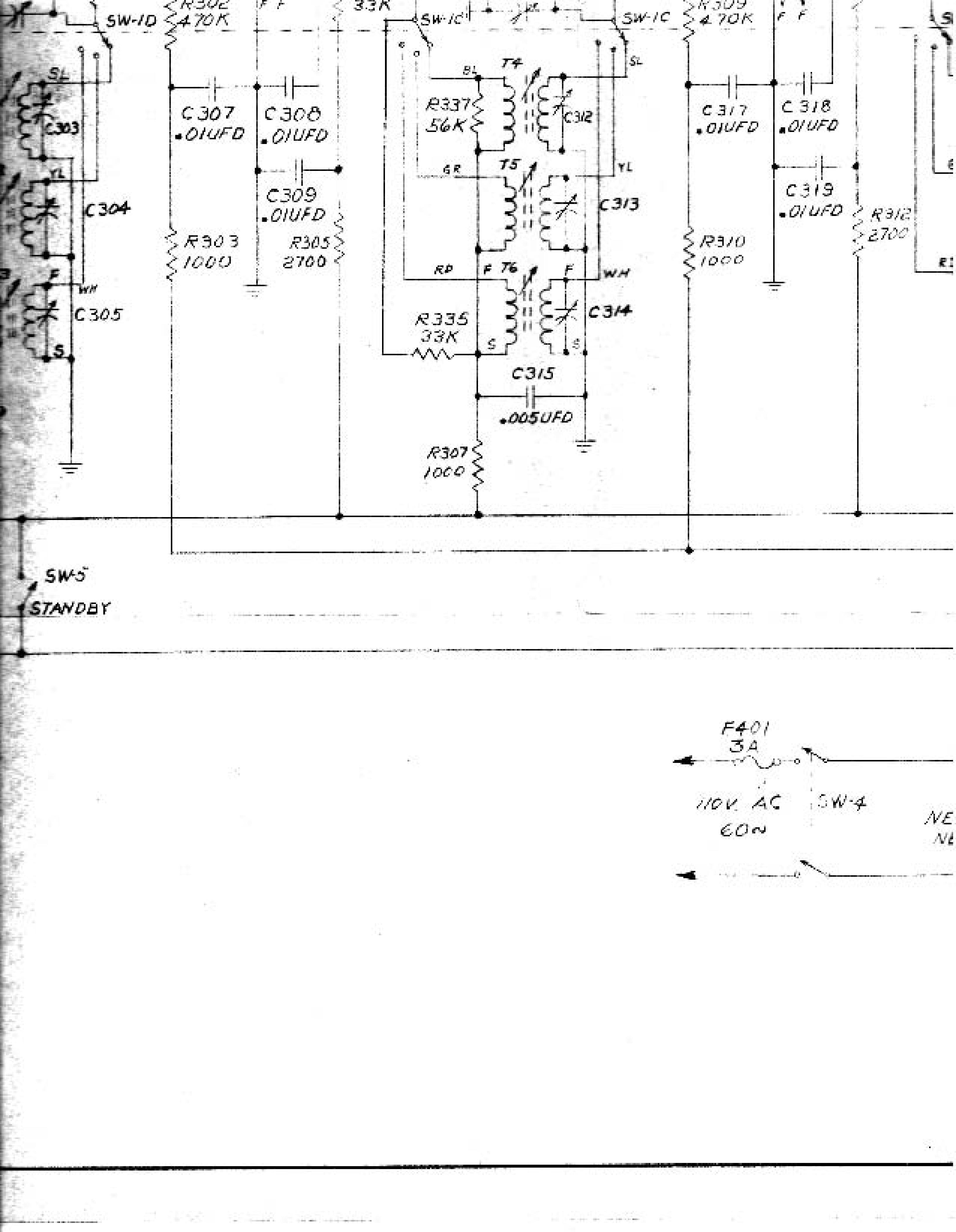
S
UST
V

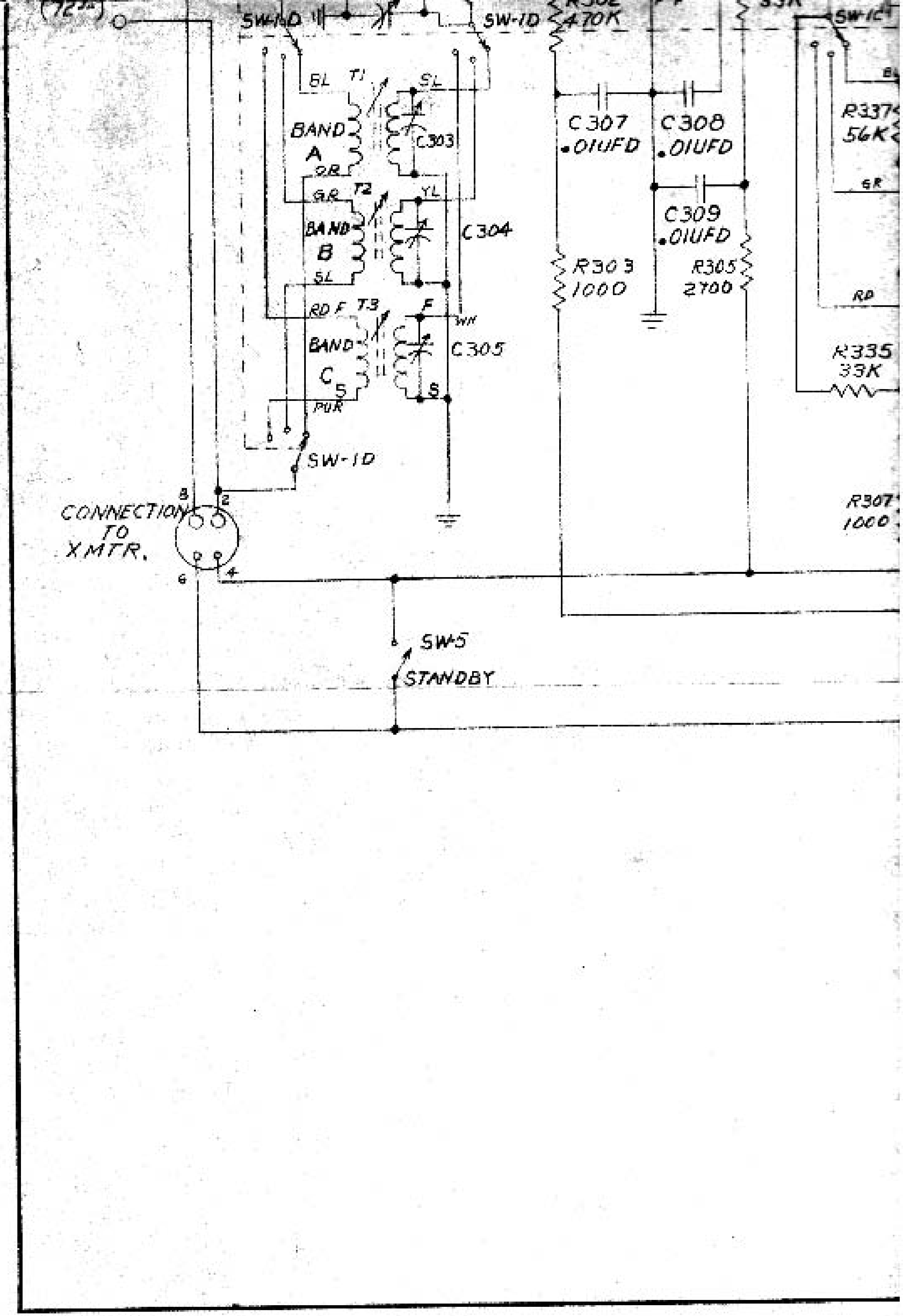
SCALE:	**CROSBY LABORATORIES INC.** HICKSVILLE, N. Y.	APPROVAL: R.F. Biloon
MAT'L:		DESIGN: [signature]
SIZE:		CHECK: [signature]
FINISH:	SSB RECEIVER TYPE 166	DRAWN: R. HEKMAN 14-55
UNITS REQ'D.		WT. PER UNIT:
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES FRACTIONS ± 1/64 DECIMALS ± .005 ANGLES ± 2°	REF. DWGS.	DWG. NUMBER: CL-180 — REV.: E


.01UFD
R325
68
R326
33K
C339
.01UFD
C341
.01UFD
R328
270K
R329
180K
470K
R331
10K
R332
1MEG
.05UFD
R323
2700
R324
1000
C344
100
R327
2700
R333
470K
R334
3.3MEG
AVC
USB
LSB
SW-3A2
DSB
C406
.05MFD
V4-03
6AL5
(5726)
C403
0.25UFD
R404
47K
R405
47K
R403
22K
2W
C404
16UFD
R406
100K
RF
GAIN
R407
12K
C408
16UFD
R408
270K
R409
18K
C405
0.1UFD
R410
330K
C407
.25UFD
R411
100K
BIAS
ADJUST
-1V
NO
1.
2.
3.
4.
5.
6.
7.
8.
SCALE:
MAT'L:
SIZE:
FINISH:
UNITS REQ'D.
UNLESS OTHERWI
DIMENSIONS AR
TOLERANCES
FRACTIONS
DECIMALS ±
ANGLES ± 2



SW-1B
SW-1B
R316
470K
C330
.01UFD
C333
.01UFD
C335
.01UFD
BL
SL
T7
C322
C328
.01UFD
R317
150
R318
5600
R321
1000
C334
.01UFD
R323
2700
GR
YL
R320
2700
R312
2700
T8
C323
C327
.01UFD
R319
2700
RD
F
F
WH
T9
C324
FREQUENCY
COUNTER
C325
.005UFD
R314
1000
T401
S1497
V401
5Y3-GT
(6087)
600V
C.T.
126 MA
5V 2A
6.3V
9 HY
L401
S1498
V402
0A2
C403
0.25UFD
R412
100K
NE401
NE51
C401
40MFD
C402
20MFD
R401
470K
R402
2500
5W

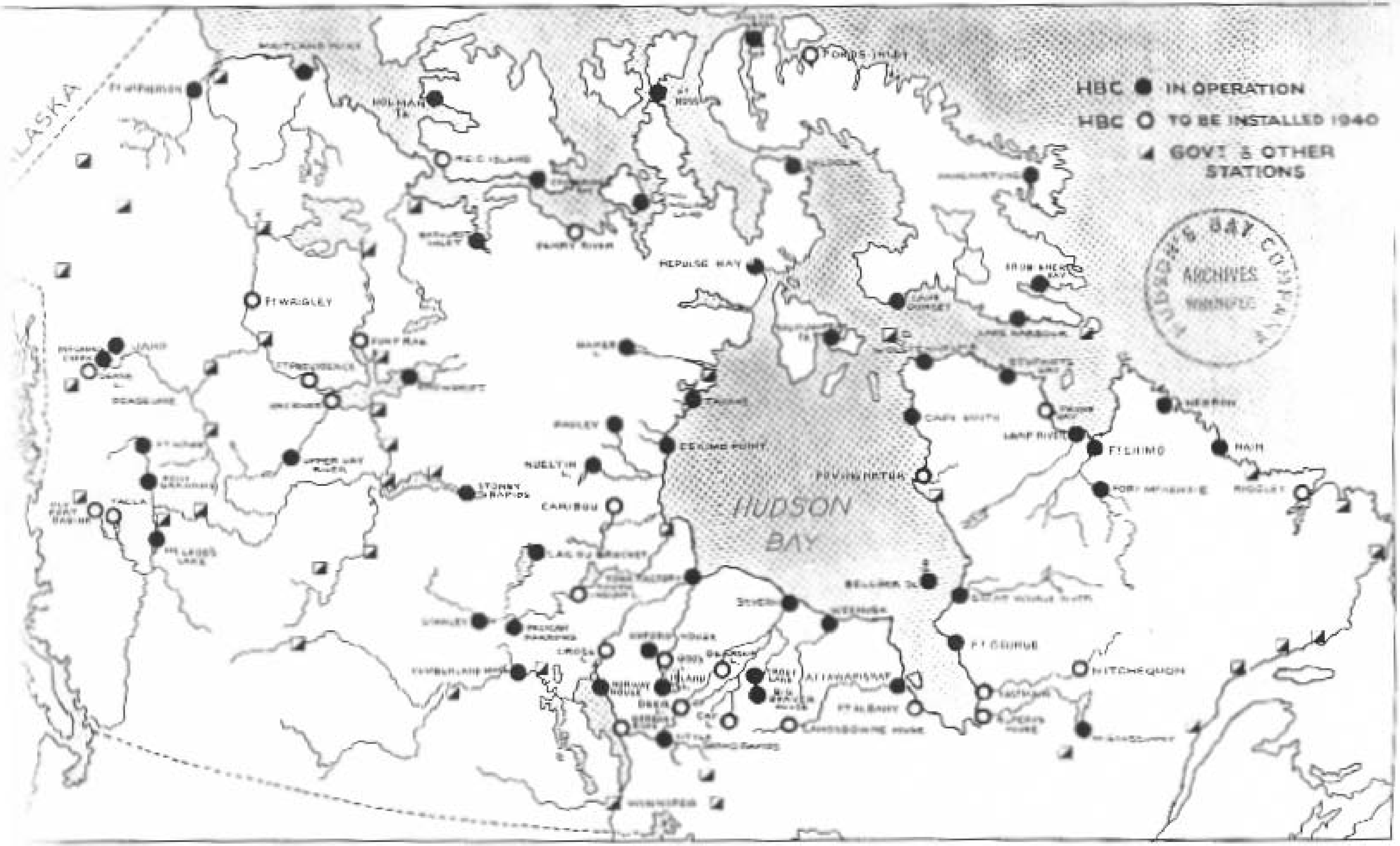

SW-1D
R302
470K
33K
SW-1C
SW-1C
R309
470K
SL
C303
YL
C304
WH
C305
F
S
C307
.01UFD
C308
.01UFD
C309
.01UFD
R303
1000
R305
2700
BL
T4
R337
56K
C312
GR
T5
C313
RD
F
T6
WH
C314
R335
33K
S
C315
.005UFD
R307
1000
C317
.01UFD
C318
.01UFD
C319
.01UFD
R310
1000
R312
2700
SW-5
STANDBY
F401
3A
110V. AC
60~
SW-4



SW-1D
SW-1D
R302
470K
33K
SW-1C
BL
T1
SL
BAND
A
C303
GR
GR
T2
YL
BAND
B
C304
SL
RD F
T3
F
WH
BAND
C
C305
S
S
PUR
SW-1D
C307
.01UFD
C308
.01UFD
C309
.01UFD
R303
1000
R305
2700
R337
56K
GR
RD
R335
33K
R307
1000
8
2
CONNECTION
TO
XMTR.
6
4
SW-5
STANDBY

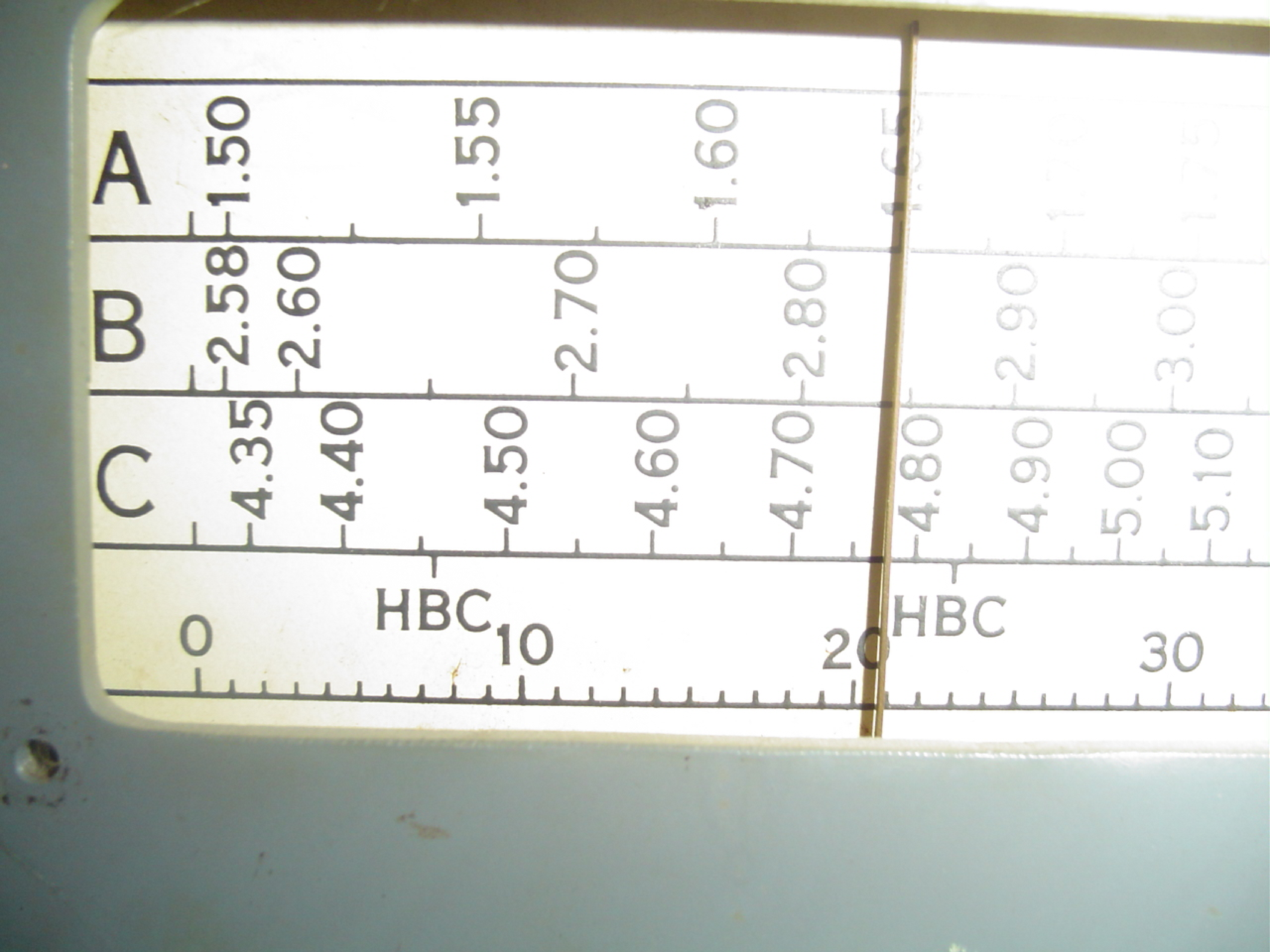
K+E

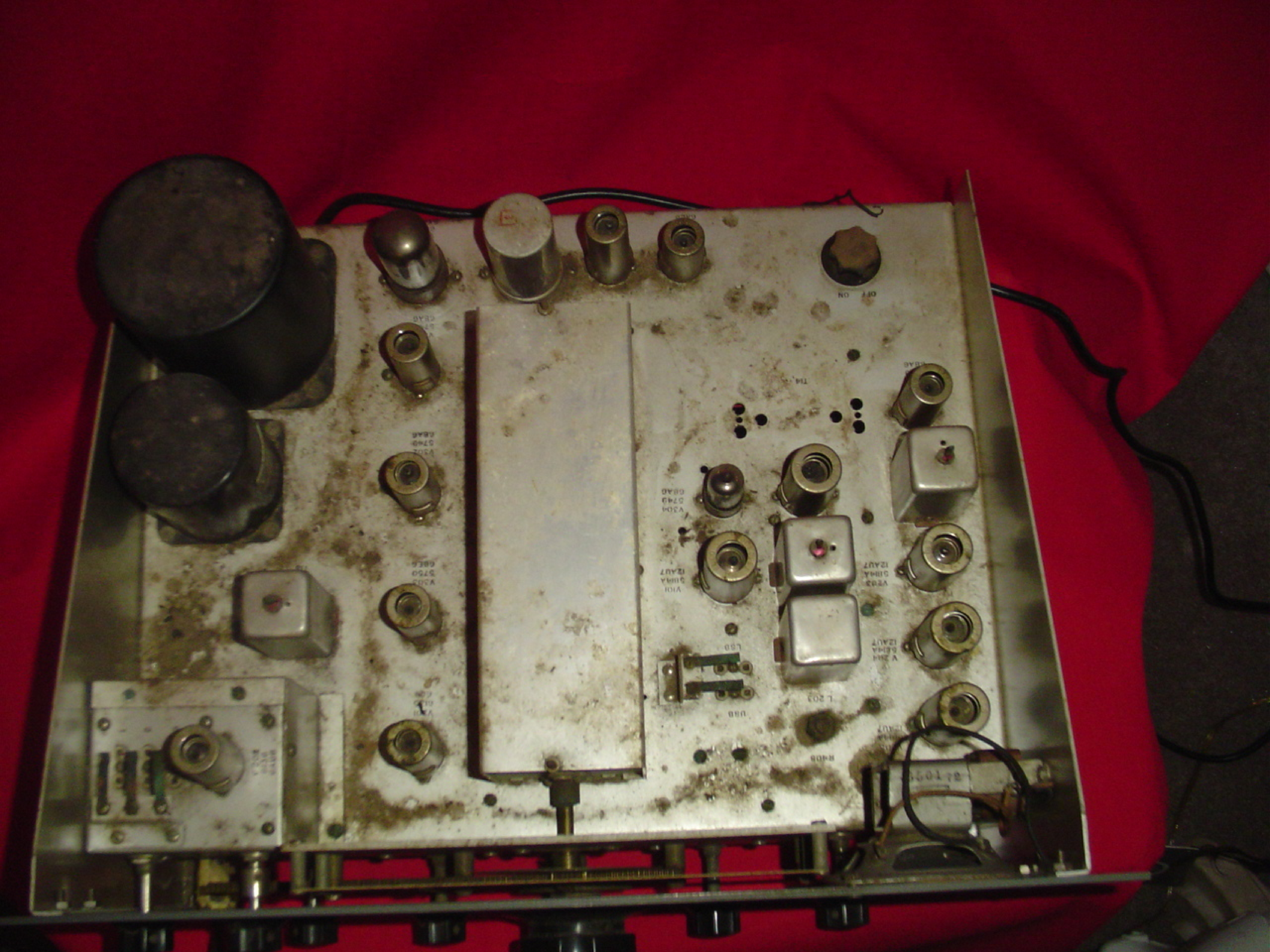

CROSBY
SSB RECEIVER
TYPE 166
XTAL
VFO 1 2 3
VERNIER TUNING
MAIN TUNING
BAND SELECTOR
A B C
RF GAIN
POWER ON
RECEPTION SELECTOR
USB LSB DSB
AF GAIN
PHONES

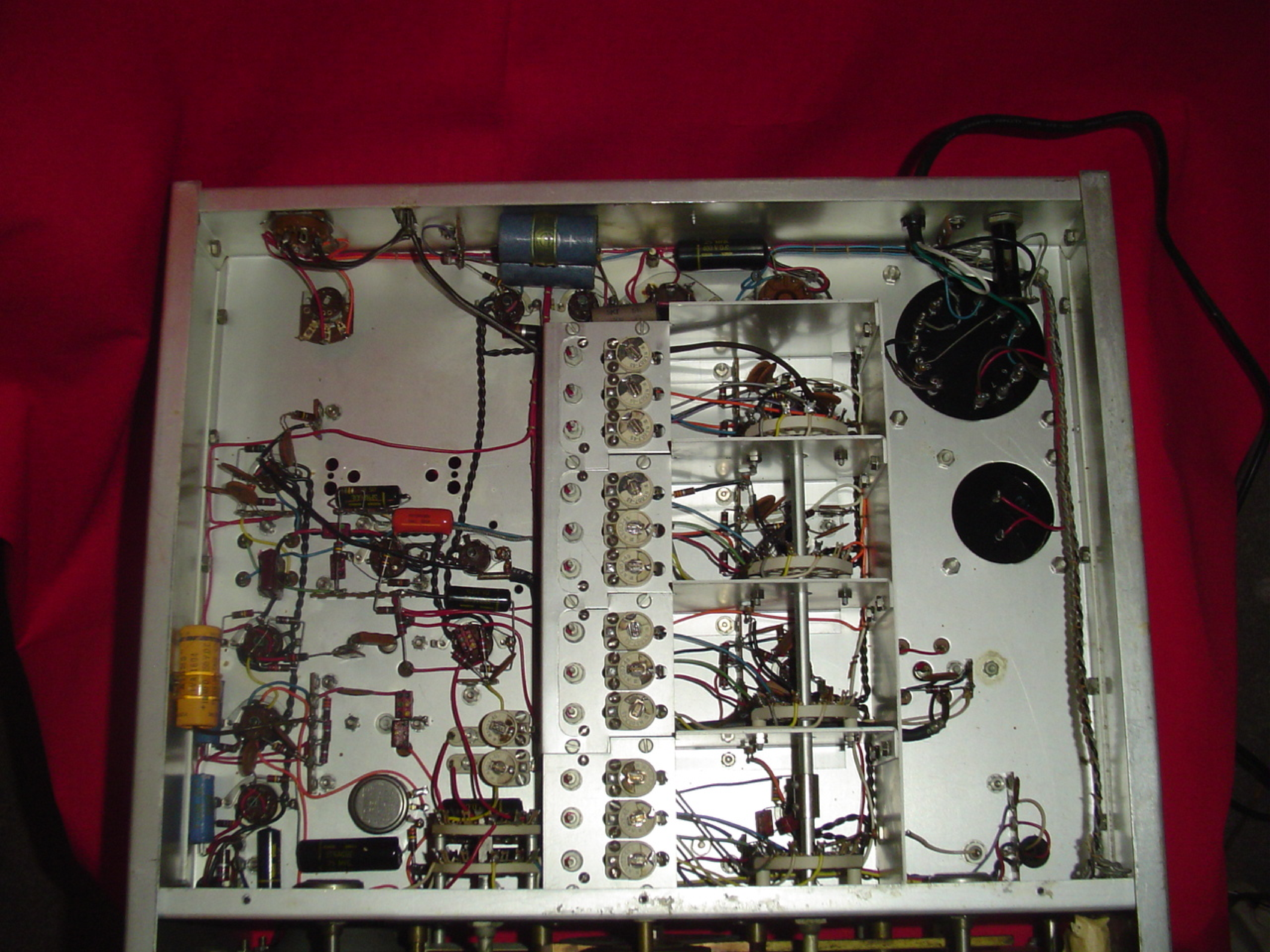


Radio Stations of the H B C Fur Trade Private Commercial System, 1940.

The Beaver June 1940


A
1.50
1.55
1.60
B
2.58
2.60
2.70
2.80
2.90
3.00
C
4.35
4.40
4.50
4.60
4.70
4.80
4.90
5.00
5.10
HBC
HBC
0
10
20
30






TRANS
CONN
ANT


V304
5749
6BA6
V306
6T8
V305
5749
6BA6
T14
OFF ON
V403
5726
6AL5
V402
OA2