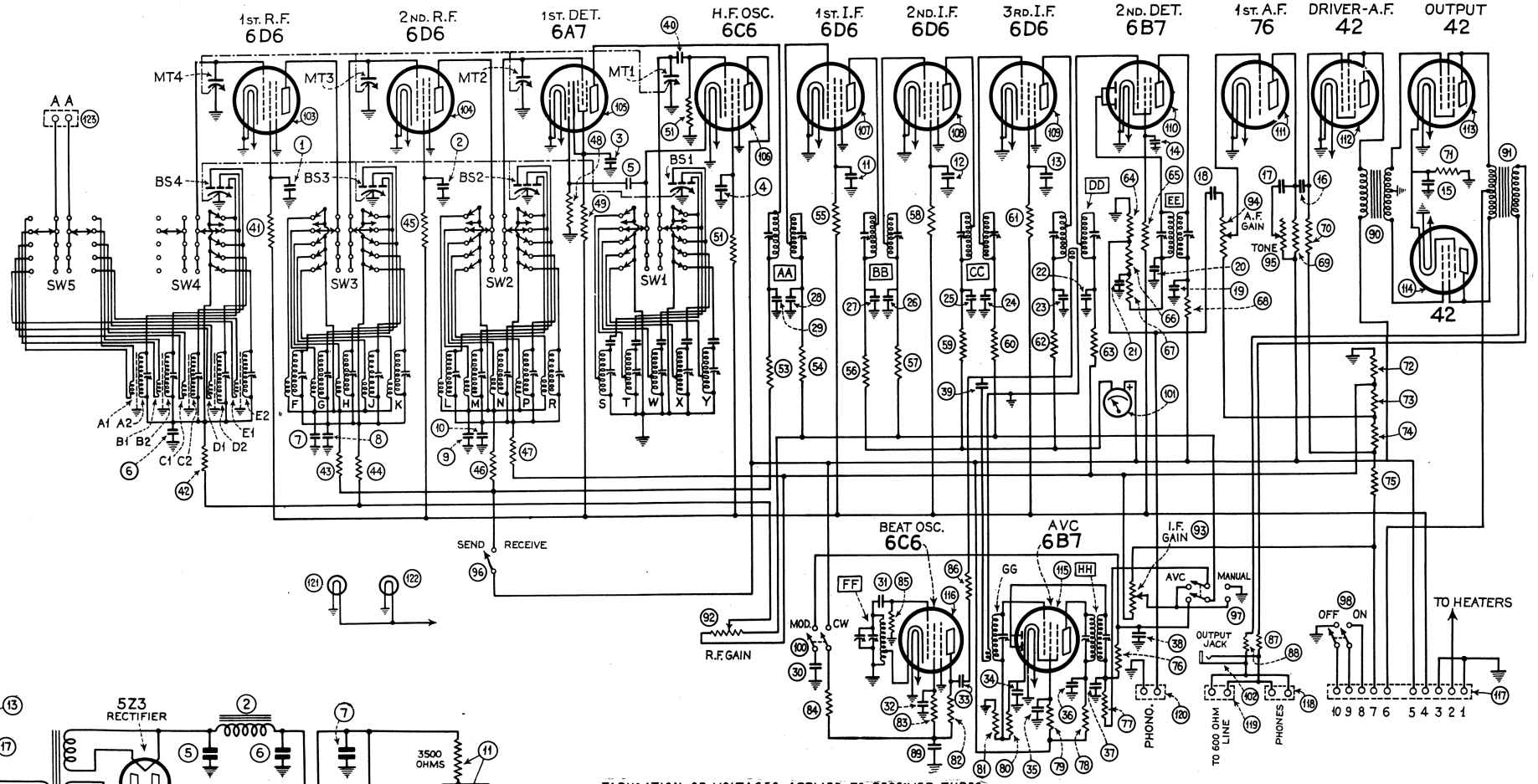
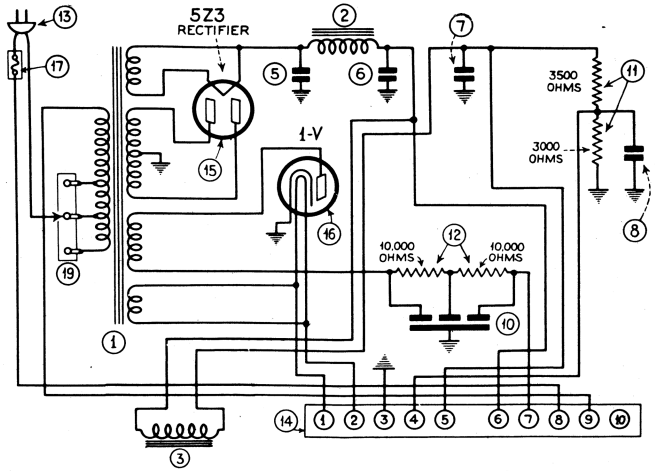
HAMMARLUND MFG. CO., INC.

MODEL Super Pro
Schematic, Voltage
Trimmers

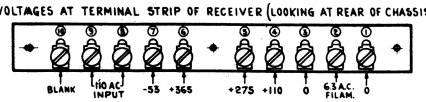




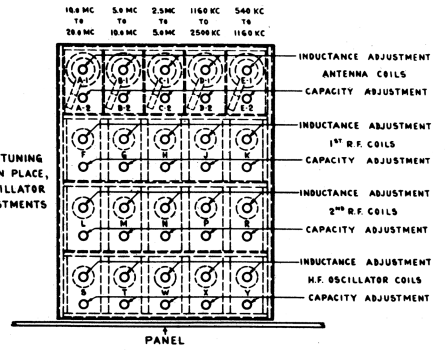
TABULATION OF VOLTAGES APPLIED TO RECEIVER TUBES

TUBE	FUNCTION IN RECEIVER	PLATE VOLTAGE	SCREEN VOLTAGE	CATHODE VOLTAGE	PLATE CURRENT MILLIAMPS
6-A-7	1ST DETECTOR	260	80	0	3.
6-C-6	HIGH FREQ OSCILLATOR	275	110	0	2.5
6-B-6	1ST RADIO FREQ	275	110	0	1.5
6-D-6	2ND " "	275	110	0	1.5
6-D-6	1ST INTERMEDIATE FREQ	275	110	0	2.
6-D-6	2ND " "	275	110	0	2.
6-D-6	3RD " "	275	110	0	2.
6-B-7	2ND DETECTOR	260	100	0	3.
6-B-7	AUTOMATIC VOLUME CONTROL	230	145	45	7.
6-C-6	BEAT OSCILLATOR	150	30	0	.4
76	1ST AUDIO	175	0	0	2.5
42	DRIVER	260	260	0	23.
42	CLASS A-B AUDIO	360	360	35	21.
42	" " "	360	360	35	21.

VOLTAGES AT TERMINAL STRIP OF RECEIVER (LOOKING AT REAR OF CHASSIS)

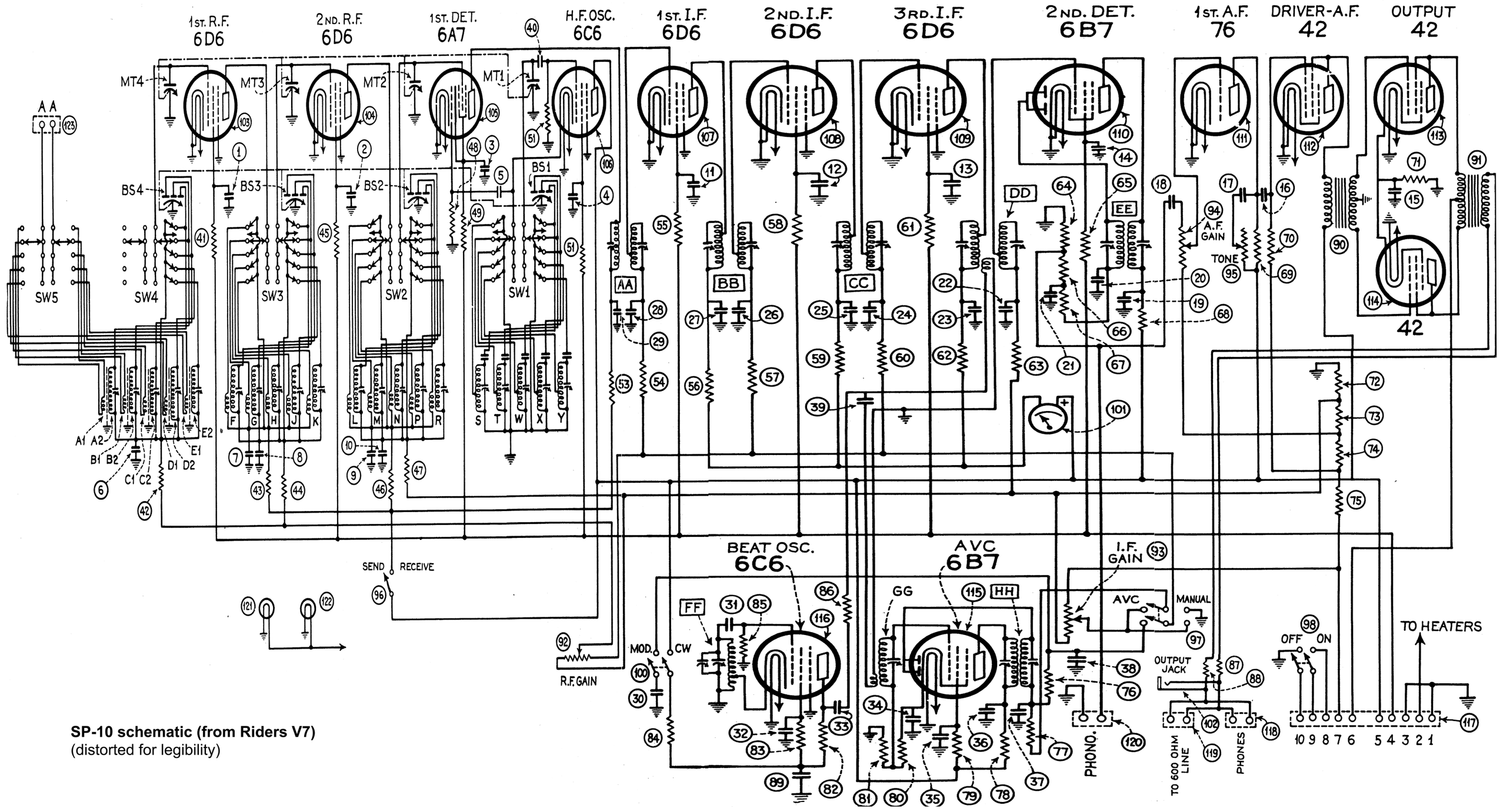


BOTTOM VIEW, MAIN TUNING UNIT, COVER PLATE IN PLACE, INDICATING H.F. OSCILLATOR AND R.F. COIL ADJUSTMENTS

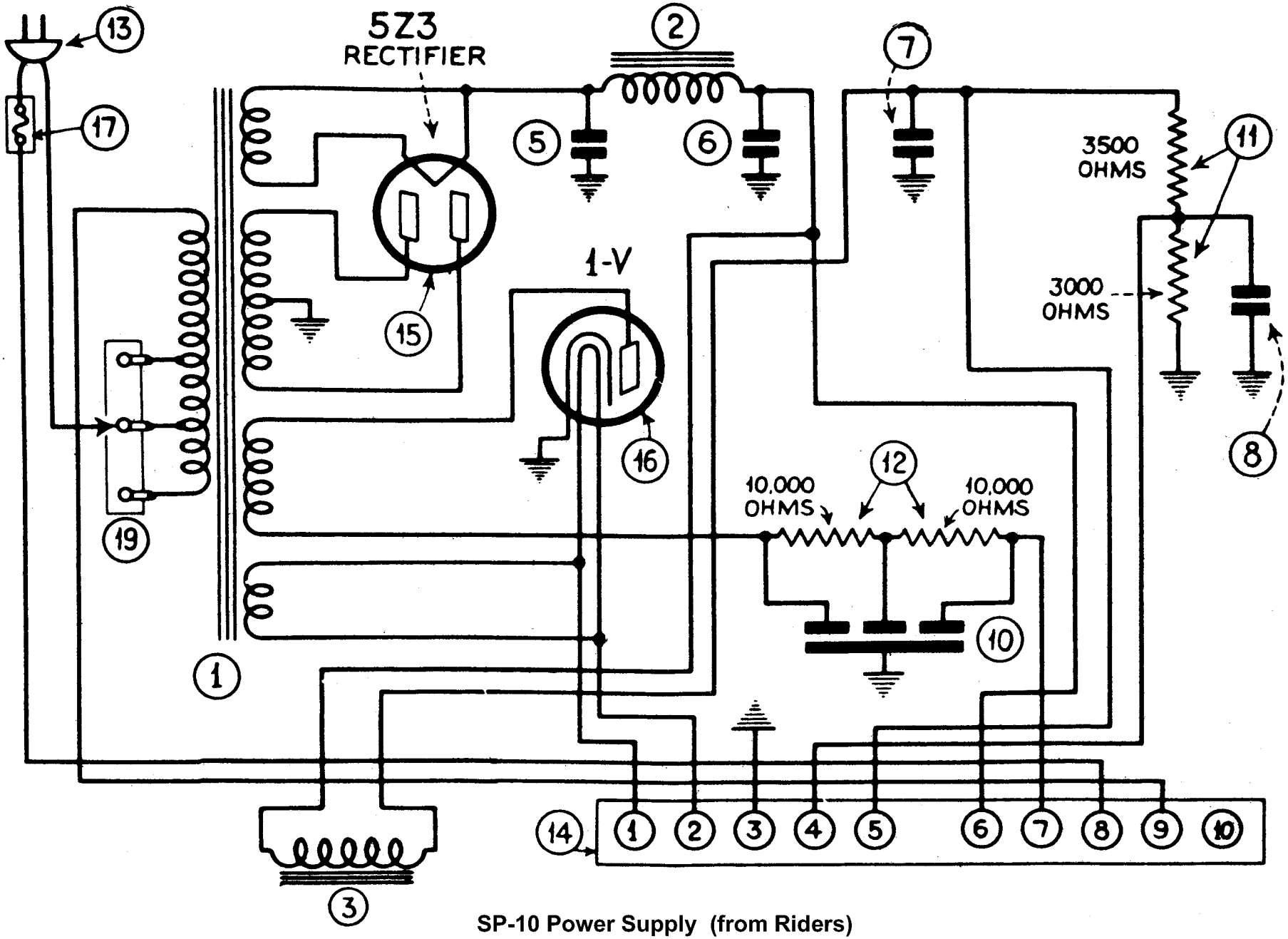


HAMMARLUND MFG. CO., INC.

MODEL Super Pro
Schematic



SP-10 schematic (from Riders V7)
(distorted for legibility)



SP-10 Power Supply (from Riders)

TABULATION OF VOLTAGES APPLIED TO RECEIVER TUBES

TUBE	FUNCTION IN RECEIVER	PLATE VOLTAGE	SCREEN VOLTAGE	CATHODE VOLTAGE	PLATE CURRENT MILLIAMPS.
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6-D-6	2ND " "	275	110	0	1.5
6-D-6	1ST INTERMEDIATE FREQ	275	110	0	2.
6-D-6	2ND " "	275	110	0	2.
6-D-6	3RD " "	275	110	0	2.
6-B-7	2ND DETECTOR	260	100	0	3.
6-B-7	AUTOMATIC VOLUME CONTROL	230	145	45	7.
6-C-6	BEAT OSCILLATOR	150	30	0	.4
76	1ST AUDIO	175	0	0	2.5
42	DRIVER	260	260	0	23.
42	CLASS A.B. AUDIO	360	360	35	21.
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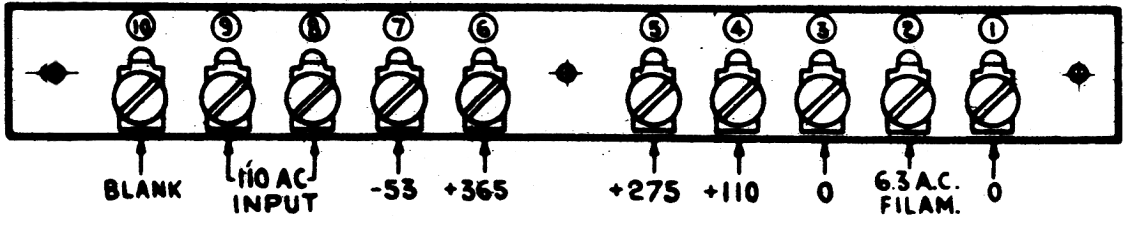
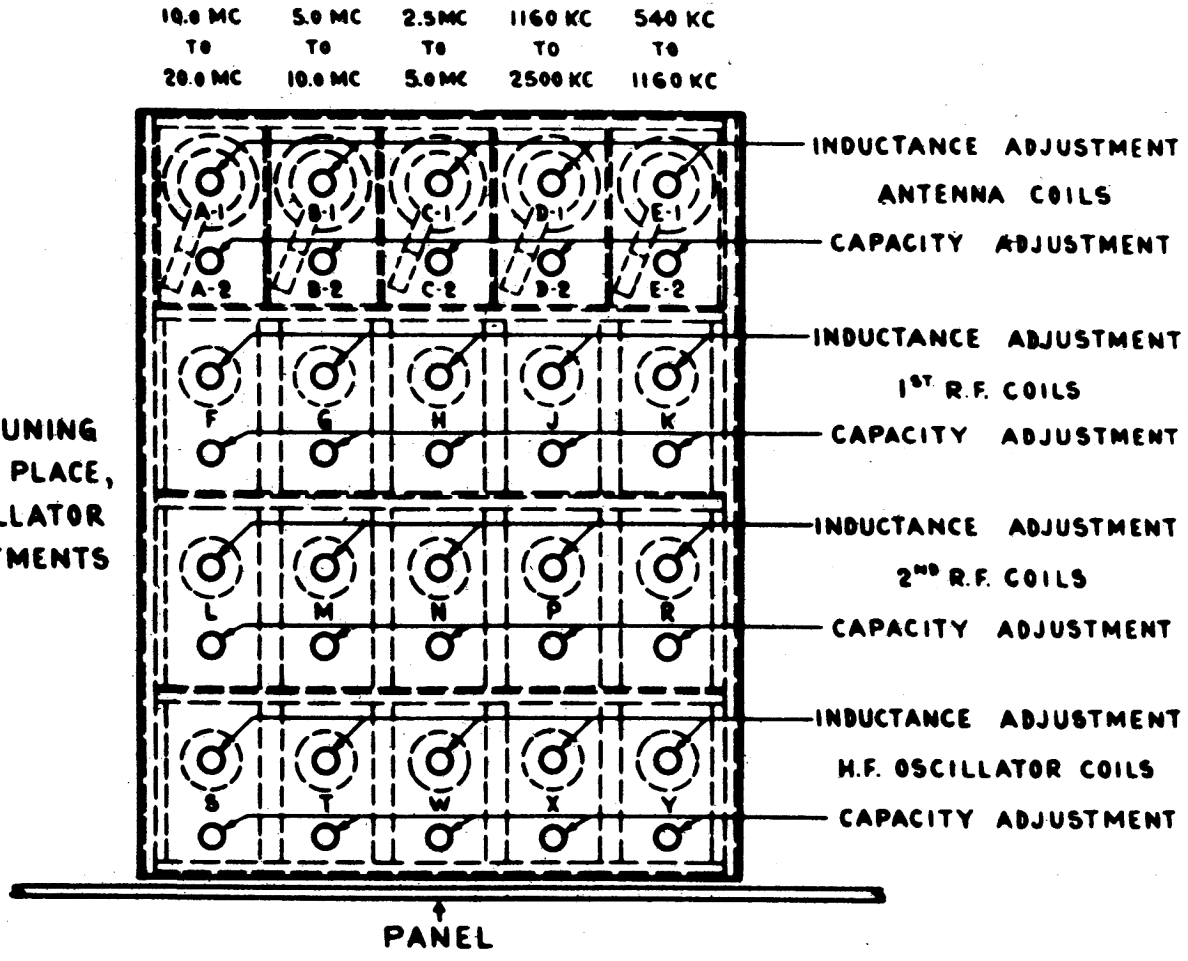
VOLTAGES AT TERMINAL STRIP OF RECEIVER (LOOKING AT REAR OF CHASSIS)



BOTTOM VIEW, MAIN TUNING UNIT, COVER PLATE IN PLACE, INDICATING H.F. OSCILLATOR AND R.F. COIL ADJUSTMENTS



SCHEMATIC DESIGNATION	DESCRIPTION – RECEIVER PARTS		PART NUMBER
A1	Antenna Input Coil Assembly	2.5 to 5.0 M.C.	SA 46
A2	Antenna Output Coil Assembly	2.5 to 5.0 M.C.	SA 46 A1
B1	Antenna Input Coil Assembly	5.0 to 10.0 M.C.	SA 47
B2	Antenna Output Coil Assembly	5.0 to 10.0 M.C.	SA 47 B1
C1	Antenna Input Coil Assembly	10.0 to 20.0 M.C.	SA 48
C2	Antenna Output Coil Assembly	10.0 to 20.0 M.C.	SA 48 C1
D1	Antenna Input Coil Assembly	1160 to 2500 K.C.	SA 49
D2	Antenna Output Coil Assembly	1160 to 2500 K.C.	SA 49 D1
E1	Antenna Input Coil Assembly	540 to 1160 K.C.	SA 50
E2	Antenna Output Coil Assembly	540 to 1160 K.C.	SA 50 E1
F	1st. R.F. Coil Assembly	2.5 to 5.0 M.C.	SA 46 A2
G	1st. R.F. Coil Assembly	5.0 to 10.0 M.C.	SA 47 B2
H	1st. R.F. Coil Assembly	10.0 to 20.0 M.C.	SA 48 C2
J	1st. R.F. Coil Assembly	1160 to 2500 K.C.	SA 49 D2
K	1st. R.F. Coil Assembly	540 to 1160 K.C.	SA 50 E2
L	2nd. R.F. Coil Assembly	2.5 to 5.0 M.C.	SA 46 A3
M	2nd. R.F. Coil Assembly	5.0 to 10.0 M.C.	SA 47 B3
N	2nd. R.F. Coil Assembly	10.0 to 20.0 M.C.	SA 48 C3
P	2nd. R.F. Coil Assembly	1160 to 2500 K.C.	SA 49 D3
R	2nd. R.F. Coil Assembly	540 to 1160 K.C.	SA 50 E3
S	High Frequency Osc. Coil Assembly	2.5 to 5.0 M.C.	SA 46 A4
T	High Frequency Osc. Coil Assembly	5.0 to 10.0 M.C.	SA 47 B4
W	High Frequency Osc. Coil Assembly	10.0 to 20.0 M.C.	SA 48 C4
X	High Frequency Osc. Coil Assembly	1160 to 2500 K.C.	SA 49 D4
Y	High Frequency Osc. Coil Assembly	540 to 1160 K.C.	SA 50 E4
AA	1st. I.F. Transformer Coil Assembly		SA 38
BB	2nd. I.F. Transformer Coil Assembly		SA 39
CC	3rd. I.F. Transformer Coil Assembly		SA 39
DD	2nd. Detector Input Coil Assembly		SA 40
EE	2nd. Detector Output Coil Assembly		SA 41
FF	Beat Osc. Coil Assembly		SA 44
GG	A.V.C. Input Coil Assembly		SA 42
HH	A.V.C. Output Coil Assembly		SA 41
1-2-3-4-34 11-12-13- 14-22-32-35	Capacitor Fixed Tubular Type	.05 MFD 200 Volts	3816
6-8-10-18 38-39	Capacitor Fixed Tubular Type	.02 MFD 200 Volts	3814
7-9-16-33	Capacitor Fixed Tubular Type	.02 MFD 400 Volts	3815
17-19-23-25 27-36-89-29	Capacitor Fixed Tubular Type	.05 MFD 400 Volts	3817
24-26-28	Capacitor Fixed Tubular Type	.01 MFD 200 Volts	3813
30-124	Capacitor Fixed Tubular Type	.25 MFD 200 Volts	3819
5-20-21	Capacitor Fixed Mica Type	60 MMFD	3903
31	Capacitor Fixed Mica Type	.0001 MFD	3913
40	Capacitor Fixed Mica Type	.0001 MFD	3929
37	Capacitor Fixed Mica Type	.003 MFD	3902
15	Capacitor Fixed Tubular	50 MFD 50 Volts	3835
52	Capacitor Fixed Tubular	.25 MFD 400 Volts	3820
41-45-55-58- 61-65	Resistor 10,000 Ohms, Metallized Carbon Type 1 Watt		3802
42-44-47-48 54-57-60- 63-64	Resistor 100,000 Ohms, Carbon Type 1/3 Watt		3811
69-84	Resistor 50,000 Ohms, Carbon Type 1 Watt		3803
51	Resistor 50,000 Ohms, Metallized Carbon Type 1/3 Watt		3917
43-46-49-50 53-56-59-62 68-78-82	Resistor 5,000 Ohms, Carbon Type 1 Watt		3801
66-67-70	Resistor 200,000 Ohms, Carbon Type 1/3 Watt		3812
71-80	Resistor 750 Ohms, Wire Wound, 10 Watt		3836
72	Resistor 300 Ohms, Metallized Carbon Type 1 Watt		3806
73	Resistor 600 Ohms, Carbon Type 1 Watt		3807
74	Resistor 1100 Ohms, Carbon Type 1 Watt		3808
75	Resistor 3,000 Ohms, Carbon Type 1 Watt		3809
76-77-83	Resistor 500,000 Ohms, Carbon Type 1 Watt		3805
79	Resistor 60,000 Ohms, Carbon Type 1 Watt		3804
81	Resistor 4,000 Ohms, Carbon Type 1 Watt		3810
*87-88	Resistor 300 Ohms, Carbon Type 3 Watt		3914
90	Audio Input Transformer		2985
91	Audio Output Transformer		2986
92	Radio Frequency Gain Control 1 megohm		3890

SCHEMATIC DESIGNATION	DESCRIPTION – RECEIVER PARTS	PART NUMBER
93	Int. Frequency Gain Control 50,000 Ohms	3891
94	Audio Frequency Gain Control 250,000 Ohms	3889
95	Tone Control 50,000 Ohms	3888
96	Send-Receive Switch	2988
97	A.V.C. Manual Switch	2990
98	Off-On Switch	2983
99	Speaker – Phone Switch	2990
100	C W – Mod Switch	2983
101	Tuning Meter	3894
*102	Output Jack	3892
103-104-107 108-109	Tube Socket 6D6	3821
105	Tube Socket 6A7	3822
106-116	Tube Socket 6C6	3823
110-115	Tube Socket 6B7	3824
111	Tube Socket 76	3825
112-113-114	Tube Socket 42	3826
117	Connecting Terminal Strip	3838
118	Phones Terminal Strip	3850
119	Speaker or Output Terminal Strip	3843
120	Phonograph Terminal Strip	3849
121-122	Pilot Light Mazda #40 6.3. Volts	3920
123	Antenna Terminal Strip	3842
MT4 MT1 MT2 MT3	Main Tuning Condensers	SA 6
BS 1-2-3-4	Band Spread Condensers	SA 7
SW 1-2-3-4-5	Band Change Switch	SA 2
* -----	Signal Corps Name Plate	3893

SCHEMATIC DESIGNATION	DESCRIPTION – MISCELLANEOUS PARTS	PART NUMBER
-----	Speaker Voice Coil Connecting Cable	SA 65
-----	Speaker Field Coil Connecting Cable	SA 66
-----	Metal Dust Cover Standard Model	2975
-----	Operating Knobs Large	3856
-----	Operating Knobs Small	3857
-----	Panel Cap Nuts	2951
-----	Dust Cover Thumb Screws	2952
-----	Meter Clamp	3926
-----	Main Tuning Dial Assembly	SA 25
-----	Band Spread Dial Assembly	SA 27
-----	Selectivity Control Shaft Assembly	SA 68
-----	Selectivity Control Cam Lever Assembly	SA 30
-----	Audio Gain Control Shaft	SA 70
-----	Beat Oscillator Control Shaft	SA 71
-----	Beat Oscillator Control Shaft Coupling	SA 69
-----	Band Switch Knob and Dial Assembly	SA 74
-----	Connecting Cable	SA 35
* -----	Emergency Battery Connecting Cable	SA 67

SCHEMATIC DESIGNATION	DESCRIPTION – POWER SUPPLY PARTS	PART NUMBER
1	Power Transformer 110 Volts – 60 Cycle A.C.	2980
2	1st. Filter Choke	2981
* 3	2nd. Filter Choke	2982
4	Fuse Block	3859
5	Filter Condenser 4 MFD Electrolytic – 500 Volt	3833
6-7-8	Filter Condenser 16 MFD Electrolytic – 450 Volt	3832
10	Filter Condenser 8-8-7-MFD Electrolytic – 450 Volt	3834
11	Resistor Voltage Divider–6500 Ohm Wire Wound 30 Watts	3854
12	Resistor Grid Bias 20,000 Ohms Wire Wound 15 Watts	3855
13	A.C. Input Cord and Plug	P.S.Cord
14	Connecting Terminal Strip	3838
15	Tube Socket 5Z3	3828
16	Tube Socket 1-V	3827
17	Fuse 2 AMP	3921
19	Line Voltage Adjusting Strip	3840
20	Speaker Field Terminal Strip	SA 35
-----	Dust Cover Standard Model	2975
-----	Dust Cover Rack and Panel Model	2976

** Army Models Only*

HAMMARLUND MFG. CO., INC.

MODEL Super Pro
Alignment, Part 1

VOLTAGES :-

ALL MEASUREMENTS WERE MADE ON A 120 VOLT A.C. POWER SUPPLY LINE WITH LINE VOLTAGE ADJUSTMENT SET AT THE 125 VOLT TAP. R.F.-I.F. AND AUDIO GAIN CONTROLS SHOULD BE SET AT MINIMUM. THE A.V.C. MANUAL SWITCH SHOULD BE IN THE MANUAL POSITION, THE CW-MOD SWITCH IN THE C.W. POSITION, AND THE "SEND-RECEIVE" SWITCH IN THE RECEIVE POSITION. D.C. VOLTAGE READINGS WERE OBTAINED WITH A VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT USING THE CHASSIS AS A COMMON TERMINAL. VOLTAGES WITHIN ±10% OF THE VALUES GIVEN SHOULD BE CONSIDERED SATISFACTORY. THE 6.3 VOLT A.C. FILAMENT READING IS OBTAINED BETWEEN CHASSIS AND TERMINAL No 2 ON STRIP. TERMINAL No 10 ON STRIP IS BLANK EXCEPT WHEN USED FOR BATTERY OPERATION IN WHICH CASE IT PROVIDES A SHORT TO CHASSIS WITH POWER SWITCH IN "ON" POSITION AND OPEN WHEN POWER SWITCH IS IN THE "OFF" POSITION.

1 – TEST OSCILLATOR – An accurately calibrated instrument producing modulated signals covering a range of 465 K.C. to 20 M.C. This test oscillator should have an output of the order of 100 micro-volts and an output impedance of 100 Ohms for best results when aligning the R.F. and H.F. Oscillator circuits. For I.F. alignment these values are not critical. The frequency calibration of the test oscillator is extremely important, if the receiver alignment is to be correct.

2 – OUTPUT METER – This meter should respond to the modulation frequency of the test oscillator and should provide at least half-scale deflection for one volt.

3 – INSULATED SCREW DRIVER (9/64" wide – .025" thick at bit)

PRELIMINARY PROCEDURE

Place the "ON-OFF" switch in the "ON" position and allow the receiver to warm up approximately one hour before beginning adjustments. Turn the knurled thumb nuts located on the tops of coil assemblies D.D.-E.E. and H.H. until the tops of the thumb nuts are flush with the tops of the threaded rods. Connect the output meter to the "PHONES" terminals located at the rear of the receiver chassis.

I.F. - A.V.C. - BEAT OSC. ALIGNMENT

Adjust the test oscillator to 465 K.C. and connect the output to the control grid of the 1st Detector tube (6A7) through a fixed condenser. Front panel controls should be set as follows:

R.F. Gain Control MINIMUM (turn full left)
I.F. Gain Control MINIMUM (turn full left)
A.V.C. – MANUAL switch on "MANUAL"
C.W. – M.O.D. – switch on "MOD"
PHONES – SPEAKER Switch on "PHONES"
SEND-RECEIVE Switch on "RECEIVE"
BAND SWITCH on 540-1160 K.C.
AUDIO GAIN CONTROL MAXIMUM (turn full right)
TONE CONTROL (turn full left)
SELECTIVITY (turn full left)
BAND SPREAD DIAL set on 100

MAIN TUNING DIAL set near low frequency end of scale, being careful not to conflict with a powerful local signal. Adjust the I.F. gain control so that a reading of approximately one volt is obtained on the output meter. As the various circuits are adjusted for resonance reduce the I.F. gain control to prevent overloading. Adjust the two trimmer capacitors in each of the following coil assemblies for peak voltage readings on the output meter – A.A. – B.B. – C.C. – D.D. – E.E. Then adjust the trimmer capacitor on coil assembly G.G. to minimum (dip) reading on the output meter. Now reduce the A.F. gain to nearly zero and throw the A.V.C. switch to A.V.C. Then adjust the I.F. gain Control until the panel meter reads between 2 and 3. Then adjust the capacitors on H.H. for minimum panel meter reading. There should be a pronounced dip of the panel meter as each of these adjustments is made. It is advisable to switch over to "SPEAKER" at frequent intervals during alignment to make sure there is no overloading. If everything is operating properly the output meter reading will also dip to minimum as the capacitors on coil assembly H.H. are adjusted.

Set the A.V.C.-MANUAL Switch on MANUAL, the C.W.-MOD-switch on C.W. and adjust the trimmer capacitors on coil assembly F.F. for zero beat. For this adjustment the Beat oscillator control knob, on the front panel should be adjusted half-way, or with the stop pin on shaft vertical or pointing upwards. This completes the alignment of the I.F. – A.V.C. and Beat Oscillator circuits all of which are accessible on top of the receiver chassis. After these adjustments have been made, the entire procedure should be repeated to insure accuracy. The knurled thumb nuts on coil assemblies D.D. – E.E. and H.H. should now be returned to their original settings by turning them to the right until the tops of the thumb nuts are 7/16" below the tops of the threaded rods.

CRYSTAL FILTER I.F. ALIGNMENT

The above procedure for aligning the I.F. circuit also applies to receivers with crystal filters, except that the test oscillator must be accurately set to the frequency of the crystal. This can be accomplished by setting the frequency of the test oscillator (when connected to the grid of the first detector) for maximum response with the crystal in circuit and the crystal selectivity control set at maximum. When the frequency of the test oscillator has been correctly adjusted to that of the crystal the I.F. circuits can be tuned as described above with the crystal cut out of circuit. Unless this procedure is carefully carried out, maximum crystal efficiency will not be obtained, since the peak of the I.F. selectivity curve must coincide exactly with the resonant peak of the crystal.

H.F. OSCILLATOR AND R.F. ALIGNMENT

Connect the output of the test oscillator to the "A.A." terminal strip. Keep the output meter in the same position as previous test. The controls on the front panel should be set as follows:

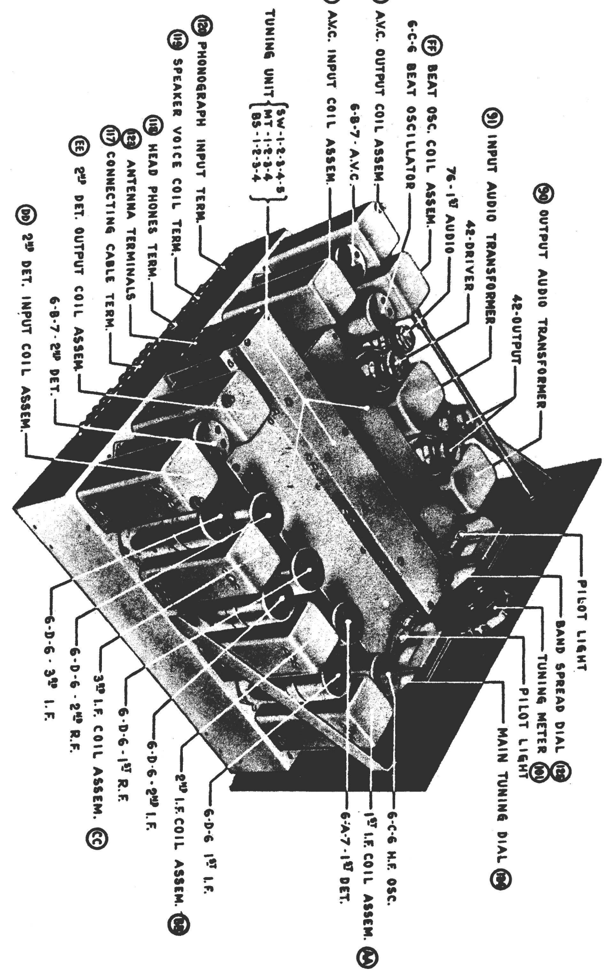
Band Change Switch on 540 – 1160 K.C.
Main Tuning Dial on 1100 K.C.
Band spread Dial on 100
R.F. Gain Control "Full On"
I.F. Gain Control "To Produce appropriate output meter reading"
Audio Gain Control "Full On"
Tone Control "Turn Full left"
C.W. – MOD switch on "MOD"
A.V.C.-MANUAL Switch on "MANUAL"
SEND – RECEIVE Switch on "RECEIVE"
PHONES-SPEAKER Switch on "PHONES"

Turn the receiver over, bottom side up, placing a small block of wood under the rear of the switch section to protect the shield cans and tubes. The main tuning unit bottom plate should remain in place while H.F. oscillator and R.F. adjustments are being made. In order to facilitate the alignment of these stages, we have indicated in dotted lines, the coil positions beneath the bottom cover plate, together with all capacity and inductance adjusters. Capacity adjusting condensers are located on the coil bases and inductance adjusters extend through the top of each coil. The coil markings correspond to the designations on the schematic wiring diagram. Set the test oscillator to produce a 1100 K.C. signal. Adjust the trimmer capacitor "Y" until a peak reading is obtained in the output meter. Now set the main tuning condenser dial to 600 K.C. and adjust the test oscillator for a 600 K.C. signal. Turn the inductance adjustment on coil "Y" for a peak reading on the output meter. As these two adjustments react on each other it will be necessary to repeat them until no further change in either capacity or inductance is necessary. This realignment should only be done after making sure that the calibration of main dial is incorrect.

Turn the main tuning dial to 1100 K.C. and set the test oscillator for 1100 K.C. signal. Adjust each capacitor on coil "R" – "K" – "E2" in

MODEL Super Pro
Alignment, Part 2
Socket, Chassis

HAMMARLUND MFG. CO., INC.



the order named, for peak reading on the output meter. The I.F. gain control should be adjusted so that no overloading occurs and an appropriate reading on the output meter is maintained. Now set the main tuning dial at 600 K.C. and the test oscillator on the same frequency and turn the "inductance adjustments" on coil "R" - "K" - "E1" for peak reading on the output meter. These adjustments are also interlocking and should be repeated until no further improvement can be noticed. This completes the H.F. Oscillator and R.F. coil alignment for the frequency range of 540 to 1160 K.C.

The alignment procedure of the H.F. Oscillator and R.F. coils in the remaining frequency ranges is exactly the same as outlined for the 540-1160 K.C. band, test oscillator frequencies and main tuning dial settings vary as follows:

RANGE	CAPACITY ADJUSTING FREQUENCY	COILS	INDUCTANCE ADJUSTING FREQUENCY	COILS
1160 to 2500 K.C.	2500 K.C.	X-P-J-D2	1200 K.C.	X-P-J-D1
2.5 to 5.0 MC	5.0 MC	W-N-H-C2	2.5 MC	W-N-H-C1
5.0 to 10.0 MC	10.0 MC	T-M-G-B2	5.0 MC	T-M-G-B1
10.0 to 20.0 MC	20.0 MC	S-L-F-A2	10.0 MC	S-L-F-A1

The capacity and inductance adjustments in each band should be rechecked until no further peak changes are noted. The receiver will then be completely aligned. On the three highest frequency bands, care should be exercised to avoid adjusting the H.F. oscillator coils to an image frequency.

The check on the alignment of the receiver on all bands is now complete and if instructions have been carefully carried out optimum performance should be obtained.

HAMMARLUND MFG. CO., INC.

MODEL Super Pro
Circuit Data
Operating Notes

OPERATING THE RECEIVER

The receiver may now be operated by tuning the OFF-ON SWITCH.

The receiver is equipped with every conceivable control to permit the operator to obtain maximum performance under a wide variety of receiving conditions. The numerous control knobs and switches appearing on the panel, may, at first glance, seem confusing, but in reality their actual manipulation is quite simple and after the receiver has been used for a very short time, no difficulty will be experienced in obtaining the most efficient results.

An AVC-MANUAL switch is provided to enable the operator to use either AVC or MANUAL volume control. For stations transmitting a continuous carrier such as a telephone station, the AVC position is generally the best. In this case, the manual I.F. gain control serves to limit the maximum sensitivity and prevents the high noise level present when the receiver is adjusted to maximum gain with no incoming signal. When the switch is set on MANUAL, the I.F. GAIN control adjusts the gain of the receiver to a given point, which remains fixed regardless of the intensity of the signal being received. When AVC is used a minimum reading on the TUNING METER indicates the signal has been tuned in properly.

The BEAT OSCILLATOR adjustment is brought out on the panel and may be adjusted to give any beat note frequency desired. For C.W. reception, be sure that the signal is tuned to its maximum strength, and then adjust the beat oscillator to the desired frequency.

DO NOT CHANGE THE TUNING TO PRODUCE THE DESIRED BEAT FREQUENCY. The only time the tuning is adjusted to change the beat frequency is after the station is properly tuned in, and has drifted in frequency so as to change the tuning as well as the beat note.

The BEAT OSCILLATOR may also be used for locating the carrier of distant broadcast or phone signals by tuning to the lowest pitch beat note (Zero Beat) with the CW-MOD. switch in the CW position. For this purpose the BEAT OSCILLATOR control should be adjusted in the centre.

A SEND RECEIVE switch is placed on the panel and is used when transmitting on approximately the same frequency as that to which the receiver is tuned. This switch disconnects the plate supply to the R.F. amplifiers and first detector. With this switch in the send position, it is usually possible to use the receiver to monitor the transmissions, although in low powered transmitters it may be necessary to keep this switch in the receive position and reduce the R.F. GAIN, as the shielding and filtering in the receiver is sufficient to keep out any except extremely strong signals from a transmitter located a few feet away.

The frequency band desired for operation may be selected by means of the BAND CHANGE SWITCH located directly beneath the tuning meter. The main tuning dial shutter will at the same time automatically indicate the frequency band, in use. The calibration of the MAIN DIAL is correct only when the BAND SPREAD DIAL is set at 100, except in the two low-frequency ranges from 540 to 2500 K.C. In these two ranges the BAND SPREAD CONDENSER is automatically disconnected by the BAND CHANGE SWITCH. Therefore, with the BAND SPREAD DIAL set at 100, the receiver is a fully calibrated SINGLE DIAL instrument.

In the three high frequency bands tuning is sufficiently smooth on the main dial to permit its use almost entirely for selecting the desired signal and perhaps it would be more simple to disregard the band spread dial until the desired signal is picked up, and then use the band spread dial for the purpose of obtaining a very fine vernier adjustment.

If band spread operation is desired in any of the three high frequency bands, the MAIN TUNING DIAL should be adjusted to the HIGH FREQUENCY limit of the band desired. It will then be possible to tune down over the band by means of the band spread dial only, thereby permitting extremely fine tuning. Lower BAND SPREAD DIAL settings indicate lower frequencies.

THE BAND SPREAD DIAL is not used on the two lowest frequency bands, as the tuning is sufficiently fine on the main tuning dial.

GAIN ADJUSTMENTS:

The R.F. GAIN CONTROL will generally be at maximum, unless the signal being received is very strong, and causes overloading of the first detector. This overloading will be made apparent by a considerable amount of distortion. In this case, reduce the R.F. GAIN. This overloading will rarely be present on the high frequency bands, where the maximum R.F. gain is generally desired.

The AUDIO GAIN should be operated at or near its maximum setting, except when using A.V.C. The AUDIO GAIN should be full on at all times when the receiver is being used for C.W. reception except when using A.V.C. and the proper signal level obtained by the manipulation of the I.F. gain.

In C.W. reception, it will sometimes be found advantageous to reduce the R.F. GAIN when there is interference from a strong station operating very close to the desired signal.

The SELECTIVITY adjustment may be set at any desired point, depending upon conditions. For C.W. reception, it is usually desirable to adjust for maximum selectivity. It should be borne in mind at all times that the atmospheric disturbances and other noises of that character will vary in direct proportion to the width of the response curve of the receiver.

If the receiver becomes completely inoperative, it may be due to a shorted filter or by-pass condenser or an open resistor. By measuring voltages and comparing them with the tabulations in the chart, the defective parts can be easily determined. We do not believe that detailed continuity tests should be described since most operators are familiar with the ordinary procedure for determining defective component parts. In both receiver and power supply units, the bottom cover plates may be removed so that all parts are accessible. Values of any resistor or capacitor may be obtained by locating the number on the schematic wiring diagram, and referring to the parts list.

GENERAL DESCRIPTION

The receiver consists of two major units — the receiver proper and the power supply unit. Both units are supplied with dust covers and suitable for rack or table mounting.

The main tuning unit houses the MAIN TUNING and BAND SPREAD condensers and their respective dial assemblies — the BAND CHANGE SWITCH — and all ANTENNA COUPLING — R.F. and H.F. OSCILLATOR coil assemblies. The BAND CHANGE switch, an exclusive Hammarlund development, embodies the well known knife switch principle and is located in the center of the unit. In the development of this switch, which presents a radical departure from switches commonly used for band changing, considerable thought was given to efficient operation over long periods of active use, and the elimination of faulty switch contacts, which would affect the sensitivity and selectivity of the receiver. All contacts are silver plated phosphor bronze so constructed that a six point contact is provided at each connection. This switch covers the range of 20 mc. to 540 kc. in 5 bands, and also connects the proper band spread condensers into each of the 3 high frequency circuits, and short circuits all coils not actually in use. When the switch is turned the next contact is made before the previous one is broken, thereby eliminating sparking. The switch dial may be turned in either direction, a very convenient feature.

The MAIN TUNING and BAND SPREAD condenser assemblies are located on the left and right hand side respectively of the BAND CHANGE SWITCH when facing the panel. Each tuning gang is controlled by a single control and dial located on the front panel. They are rigidly constructed and so designed that they will not get out of alignment during normal operation.

The MAIN TUNING and BAND SPREAD DIALS are plainly readable through well illuminated escutcheons. Both dials have an easy vernier tuning action without backlash. The main tuning dial is directly calibrated in megacycles in ranges of 2.5 to 5.0; 5.0 to 10.0; 10.0 to 20.0; and in kilocycles from 1160 to 2500 and 540 to 1160. The MAIN TUNING DIAL is equipped with an ingenious mechanical shutter which operates in synchrony with the BAND CHANGE SWITCH, so that only the frequency band in actual use is visible to the operator.

The POWER SUPPLY unit contains a properly filtered rectifier for furnishing D.C. plate voltages and A.C. filament voltage for operating the receiver. A separate rectifier is incorporated for supplying grid bias. All component parts are designed to have a high safety factor. A three terminal strip is located beneath the chassis to permit operation on power supply lines of 105 - 115 - 125 volts, 50-60 cycle alternating current. A cord and plug is provided for connecting the power unit to a wall outlet or receptacle. A connecting cable is furnished for connecting the receiver and power supply units. A special cable for emergency battery operation is also provided.

CONNECTING RECEIVER

The receiver is so designed that it may be located in any convenient position, as a table model or in a standard 19" telephone relay rack. Dust covers may be removed for the insertion of tubes by removing the thumb nuts on both receiver and power supply units.

Tubes:- The receiver has been designed and tested for the following R.C.A. tubes or their equivalent:-

5 - 6D6)		
2 - 6C6)		
1 - 6A7)	Receiver	
2 - 6B7)		
1 - 76)		
3 - 42)		
1 - 5Z3)		
1 - 1-V)	Power supply	

Care should be taken that the proper tube is inserted in each socket. The type numbers on the tubes should correspond with the markings on the sockets. After the tubes have been correctly inserted the dust covers may be replaced.

The receiver may now be placed in the location previously decided upon and the antenna connections made. The antenna input has been designed to couple either to a balanced transmission line having an impedence of approximately 300 ohms, or to a conventional single wire antenna and ground. In the former case both feeders should be connected to the two antenna terminals located at the rear of the receiver marked "A-A". If a single wire type of antenna is used the lead-in should be connected to one of the terminals marked "A" and the other "A" terminal connected to a good ground. It is not essential to ground the receiver chassis, but it may readily be accomplished by inserting a ground lead under one of the thumb screws holding the dust cover in place at the rear of the receiver.

The RECEIVER and POWER SUPPLY units are connected by a cable. The spade lugs on the terminal strips at each end of the cable should be inserted in the corresponding terminals of the receiver and power supply, with the spade lugs pointing downward.

The output connections to the receiver may be made to the terminals marked "SPEAKER" on the rear of the receiver chassis, or to the pin jacks marked "PHONES". The output of the receiver has been designed to match a load impedence of approximately 600 ohms. A PHONE JACK is provided on the front panel of the receiver connected in parallel to the 600 ohm output terminals.

With the OFF-ON SWITCH in the OFF position, plug the power supply cord in the 60 cycle alternating current supply line. DO NOT ATTEMPT TO OPERATE ON DIRECT CURRENT — OR ALTERNATING CURRENT OTHER THAN 50-60 CYCLES OF THE PROPER VOLTAGE, unless the power supply unit is marked for 25-40 cycle A.C. operation.

An extra connecting cord is supplied with each receiver for emergency battery operation. One end of this cord has a terminal strip that connects to the receiver and the other end has color coded wires for battery connections. The following batteries are required for emergency operation:-

5 - 45 volt "B" batteries
1 - 45 volt "C" battery
1 - 6 volt "A" storage battery.