

OPERATING
ALIGNMENT & SERVICING
INSTRUCTIONS FOR
SKY CHAMPION
MODEL S-20R



the hallicrafters *co.*

CHICAGO U.S.A.

SKY CHAMPION MODEL S-20R

OPERATING INSTRUCTIONS

The Hallicrafters Co. believes that, without exception, the model S-20R receiver represents the best value in the communications field. This instruction booklet, when studied and carefully followed will help you to better understand and appreciate your Sky Champion so that you then will be able to obtain all of the characteristics of excellent performance for which this model is noted.

It is recommended that, upon receipt, the owner of the S-20R receiver carefully inspect the carton and then the receiver for any damage which might have occurred in transit. Should any signs of damage be apparent immediately file claim with the carrier accurately stating the extent of the damage.

ANTENNA

The Sky Champion has an antenna input circuit which will allow the use of either a doublet or Marconi (inverted "L") antenna. The approximate antenna input impedance of the S-20R is 400 ohms.

A very serviceable antenna will be the inverted "L", or Marconi type. This antenna should be approximately 75 feet long overall, including the lead-in to the set. Satisfactory operation of the Sky Champion is obtained throughout its tuning range with this type of antenna and because of that fact as well as its ease of construction it is highly recommended.

With the inverted "L" type of antenna terminal A_2 must remain connected to terminal G for best operation. While a ground connection is usually not necessary it might prove to be helpful in reducing noise. A cold water pipe or 6' foot rod driven in moist soil will be a very satisfactory ground when connected to the G terminal on the receiver. Connections to a radiator or gas piping are not recommended.

Should a doublet antenna be used it is suggested that a 400 ohm transmission line be constructed so that a most efficient transfer of energy is obtained. The commercially available all wave doublet antennas are usually provided with a coupling transformer which matches the transmission line to the receiver. This transformer connects to the A_1 and A_2 terminals on the antenna terminal strip. The half-wave length-doublet antenna cut for a particular frequency can be computed by the following formula.

$$\text{Length in feet} = \frac{463}{\text{Frequency in megacycles}}$$

or for example, a half wave 20 meter or 14 megacycle antenna would be

$$\frac{463}{14} \text{ or } 33.7 \text{ feet long overall}$$

This type of antenna is broken in the center with an insulator and has the transmission line connected to each resulting quarter wave section at that point. This antenna is a very good performer, in a direction broadside to its length, only on the relatively narrow group of frequencies for which it was cut. It does not function well on harmonic frequencies.

When using either type of doublet antennas the transmission line should be connected to binding posts A_1 and A_2 . The wire connecting the terminal A_2 to ground or G can be left connected if the performance of the receiver is improved.

FREQUENCY RANGE

The Sky Champion tunes from 550 kilocycles to 44 megacycles in four bands. The frequencies covered per band are as follows:

Band	Coverage
1	550 KC to 1,780 KC
2	1.74 MC to 5.4 MC
3	5.3 MC to 15.8 MC
4	15.5 MC to 44. MC

The main tuning dial, which appears behind the large escutcheon, is accurately calibrated in kilocycles on band #1 and in megacycles on the remaining three bands.

Note: The accuracy of the main dial calibration will hold only if the BAND SPREAD condenser is set at minimum capacity, or the position indicated by "O" on the Band Spread dial.

When first using the receiver, become familiar with its operation on the standard broadcast band, or Band #1, before tuning the short wave bands. You then will be able to fully appreciate the capabilities of the Sky Champion.

TUBE LINE-UP

6SK7	R. F. Amplifier	6F6G	Audio Frequency Power Amplifier
6K8	Converter and Oscillator	6H6	Automatic Noise Limiter
6SK7	1st I.F. Amplifier	6J5GT	Beat Frequency Oscillator
6SK7	2nd I.F. Amplifier	80	Rectifier
6SQ7	2nd Detector, A.V.C. and 1st stage of audio amplification		

CONTROLS AND OPERATION

Reading from left to right the functions of the various controls will be described.

The R.F. GAIN control adjusts the sensitivity of the receiver by varying the cathode bias on the R.F. and I.F. amplifiers. Maximum sensitivity will be obtained when this control is rotated to the right as far as it will go. When this has been done a switch will operate which turns on the calibrated "S" meter which may be obtained as a separate unit.

The BAND SWITCH selects the frequency range through which the receiver tunes.

When using the receiver for the reception of modulated, or telephone, signals it is advisable to have the AVC switch set at ON.

For code or C.W. reception, the Automatic Volume Control circuit should be disconnected by setting the A.V.C. switch at OFF. When this has been done the R.F. GAIN control should be manually adjusted so that the set will not overload or block on extremely strong signals.

The MAIN TUNING control adjusts the main dial of the receiver for reception on the desired frequency.

The TONE switch turns the receiver ON and OFF and in the HIGH position produces natural reproduction. In the MED. and LOW position, the highs are attenuated, a condition that will be helpful in receiving signals during certain types of interference.

The BAND SPREAD TUNING control allows smooth back-lash - free operation of the separate band spread condenser and dial.

The A.N.L. or automatic noise limiter switch will effectively minimize ignition and similar types of interference which are objectionable to short wave reception. Best results are obtained with the AUDIO GAIN control set near the minimum end.

The PITCH CONTROL and its associated BFO switch provide a beat note for the reception of C. W. signals. The PITCH CONTROL, when the B.F.O. switch is set at ON controls the frequency of the beat note which may be set to a pitch most pleasing to the listener.

The SEND-REC. switch removes plate voltage from the tubes in the receiver so that the set is inoperative during stand-by periods, but leaves the tube filaments hot for instant use.

Any type of high impedance headset, crystal or magnetic, may be plugged into the jack marked PHONES.

Unless otherwise specified the S-20R Receiver operates on 117 volts 50/60 cycle single phase current. A universal model is available on special order for operation on 110 or 250 volts, 25/60 cycle single phase current, at a slight increase in price.

The Model S-20R Receiver draws 65 watts of power from the source.

The Hallicrafters Co. reserves the right to make changes in design or to add improvements to instruments of their manufacture without incurring any obligation to install the same in any instrument previously purchased.

ALIGNMENT PROCEDURE

INTERMEDIATE-FREQUENCY ALIGNMENT

Have the controls set as follows:

A.F. and R.F. GAIN controls set for maximum volume.

B.F.O. switch set at OFF.

Set BAND SWITCH to #2 band.

Set main dial at 2 megacycles and band spread dial at zero.

Remove 6K8 grid cap and connect the hot lead of your 455 KC generator to this tube. Connect the ground terminal of the signal generator to the chassis of the receiver. Now feed a 455 KC signal into the receiver. Adjust all I.F. transformer trimmers for maximum gain (Transformers T₁, T₂ and T₃.)

R. F. ALIGNMENT.

Re-connect the grid cap to the 6K8 tube. Connect the hot lead of the generator to antenna terminal A₁ on the rear of the chassis through a 400 ohm resistor. Be sure a jumper is connected between terminals A₂ and G. Leave signal generator ground connected to the chassis of the receiver.

The location of the following trimmers and padders can be determined by referring to the top and bottom chassis views. All pad adjustments are for the low frequency end of each band while the trimmers are for the high frequency ends.

In order to get at the RF trimmers the guarantee card can be removed by placing a knife under the small snap fasteners holding it in place. So that most satisfactory adjustment of the trimmers and padders can be made, it is advisable to "rock" the condenser gang across the signal being delivered by the generator until that particular circuit has been accurately peaked at all frequencies except 1400 KC and 4 MC.

Bands	Trim at	Pad at
1	1400 KC Adjust C _A C _B C _C	600 KC Adjust Pad Band 1
2	4 MC Adjust C _D C _E C _F	2 MC Adjust Pad Band 2 (Top Chassis)
3	14 MC Adjust C _G C _H C _I	7 MC Adjust Pad Band 3
4	34 MC Adjust C _J C _K C _L	17 MC No pad adjustment on this Band

GUARANTEE

This receiver is guaranteed to be free from any defect in workmanship and material that may develop within a period of ninety (90) days from date of purchase, under the terms of the standard guarantee, as designated by the Radio Manufacturers Association. Any part or parts that prove defective within this period will be replaced without charge when subjected to examination at our factory, providing such defect, in our opinion, is due to faulty material or workmanship, and not caused by tampering, abuse or normal wear. All such adjustments to be made F.O.B. the factory.

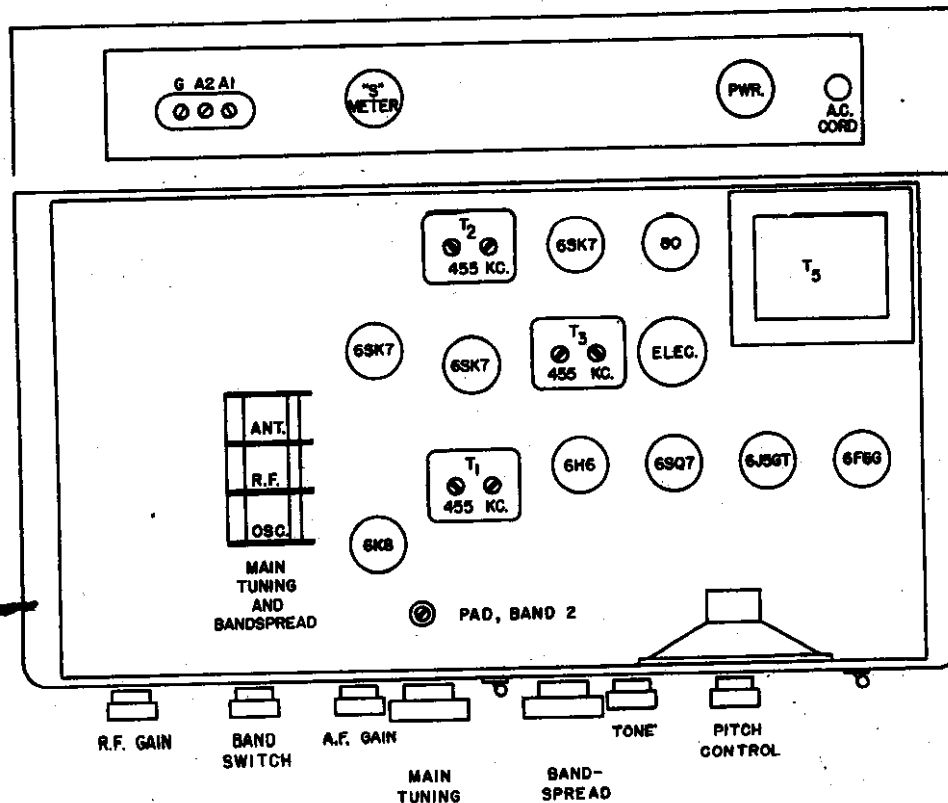
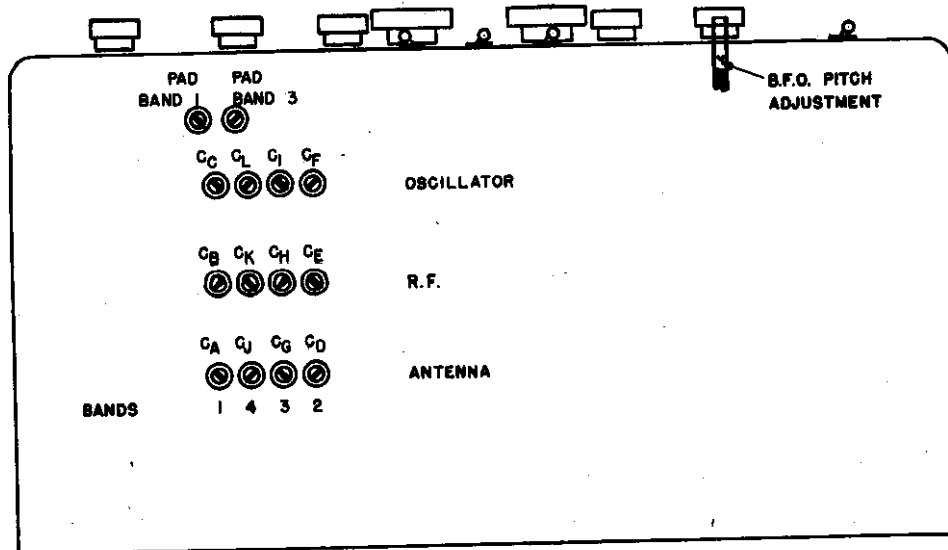
Should this receiver require any adjustments, your dealer or distributor has complete technical service in-

formation, or the factory will be glad to assist you in any problem direct.

Should it be necessary to return any part or parts to the factory, a "Return Material Permit" must be obtained in advance by first writing the Adjustment Department, who will issue due authorization under the terms of the guarantee.

The Hallicrafters Co. reserves the right to make changes in design or add improvements to instruments manufactured by them, without incurring any obligation to install the same in any instrument previously purchased.

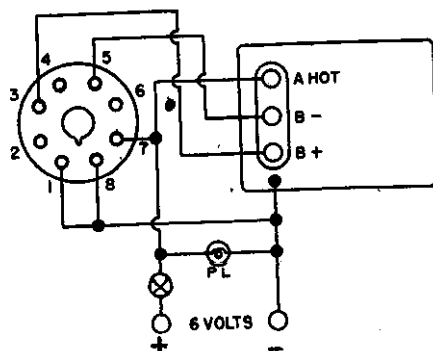
All Hallicrafters receivers are built under patents of Radio Corporation of America and Hazeltine Corporation.



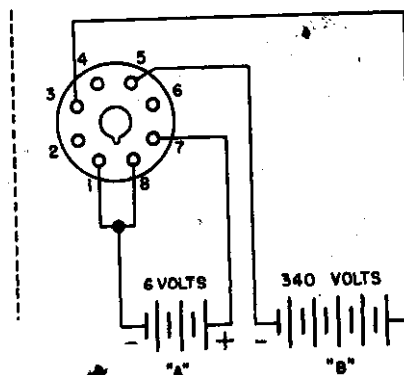
D C OPERATION

CONNECTIONS TO "PWR" SOCKET AFTER REMOVAL OF SHORTING PLUG

VIBRAPACK



BATTERIES



LIST OF REPLACEABLE PARTS

REF. SYMBOL	NAME OF PART AND DESCRIPTION	FUNCTION	MFR. CODE	CONTR.'S. PART NO.
R ₁	Resistor, 33 ohm $\pm$ 20%, $\frac{1}{2}$ watt, carbon, humidity resistant	Parasitic suppressor	ASA	RC21AE330M
R ₂	Resistor, 220 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon, humidity resistant	Cathode bias for tube V ₁	ASA	RC21AE221K
R ₃	Resistor, 100,000 ohm $\pm$ 20%, $\frac{1}{2}$ watt, carbon, humidity resistant	A.V.C. Filter	ASA	RC21AE104M
R ₄ R ₅	Resistor, variable, 10,000 ohm, carbon, type 35 Resistor, 150 ohm $\pm$ 20%, $\frac{1}{2}$ watt, carbon, humidity resistant	R-F gain control A.V.C. filter	CT ASA	25C029 RC21AE151M
R ₆	Resistor, 10,000 ohm $\pm$ 10%, 2 watt, carbon, humidity resistant	Plate circuit filter of tube V ₂	ASA	RC41AE103K
R ₇	Resistor, 47,000 ohm $\pm$ 20%, $\frac{1}{2}$ watt, carbon, humidity resistant	Grid bias for tube V ₂	ASA	RC21AE473M
R ₈ R ₉	Same as R ₂ Resistor, 22,000 ohm $\pm$ 10%, 2 watt, carbon, humidity resistant	Cathode bias for tube V ₂ Plate circuit filter for triode section of tube V ₂	ASA	RC41AE223K
R ₁₀	Resistor, 33,000 ohm $\pm$ 10%, 2 watt, carbon, humidity resistant	Screen supply filter for hexode section of tube V ₂	ASA	RC41AE333K
R ₁₁	Resistor, 10 ohm $\pm$ 20%, $\frac{1}{2}$ watt, carbon, humidity resistant	Parasitic suppressor	ASA	RC21AE100M
R ₁₂ R ₁₃	Same as R ₁ Resistor, 470 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon, humidity resistant	Parasitic suppressor Parasitic suppressor	ASA	RC21AE471K
R ₁₄ R ₁₅	Same as R ₁₃ Resistor, 330 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon, humidity resistant	Cathode bias for tube V ₃ Cathode bias for tube V ₄	ASA	RC21AE331K

LIST OF REPLACEABLE PARTS - Cont'd.

REF. SYMBOL	NAME OF PART AND DESCRIPTION	FUNCTION	MFR. CODE	CONTR.'S. PART NO.
R ₁₆	Resistor, 1000 ohm $\pm$ 20%, $\frac{1}{2}$ watt, carbon, humidity resistant	Plate circuit filter for tube V ₄	ASA	RC21AE102M
R ₁₇	Resistor, 2.2 meg ohm $\pm$ 20%, $\frac{1}{2}$ watt, carbon, humidity resistant	A.V.C. filter	ASA	RC21AE225M
R ₁₈	Resistor, 1 meg ohm $\pm$ 20%, $\frac{1}{2}$ watt, carbon, humidity resistant	Plate circuit filter of A.N.L. tube V ₇	ASA	RC21AE105M
R ₁₉	Same as R ₇	Diode filter for diode section for tube V ₅	ASA	RC21AE101M
R ₂₀	Resistor, 100 ohm $\pm$ 20%, $\frac{1}{2}$ watt, carbon, humidity resistant	Cathode bias for tube V ₅	ASA	RC21AE101M
R ₂₁	Same as R ₃	Diode filter for Diode section for tube V ₅	ASA	RC21AE274K
R ₂₂	Resistor, 270,000 ohm $\pm$ 10%, $\frac{1}{2}$ watt, carbon, humidity resistant	Diode filter for diode section for tube V ₅	ASA	RC21AE274K
R ₂₃	Same as R ₂₂	Diode filter for diode section for tube V ₅	ASA	RC41AE471K
R ₂₄	Same as R ₂₂	Plate circuit load for triode section of tube V ₅	ASA	RC41AE471K
R ₂₅	Resistor, 470 ohm $\pm$ 10%, 2 watt, carbon, humidity resistant	Cathode bias for tube V ₆	ASA	RC41AE471K
R ₂₆	Resistor, 470,000 ohm $\pm$ 20%, $\frac{1}{2}$ watt, carbon, humidity resistant	Grid return for tube V ₆	ASA	RC21AE474M
R ₂₇	Resistor, 4,700 ohm $\pm$ 20%, $\frac{1}{2}$ watt, carbon, humidity resistant	Tone control network	ASA	RO21AE472M
R ₂₈ R ₂₉	Resistor, variable, $\frac{1}{2}$ meg ohm, type 35 Resistor, 15,000 ohm $\pm$ 10%, 2 watt, carbon, humidity resistant	Audio gain control Plate circuit filter for tube V ₈	CT ASA	25C018 RC41AE153K

LIST OF REPLACEABLE PARTS - Continued

REF. SYMBOL	NAME OF PART AND DESCRIPTION	FUNCTION	MFR. CODE	CONTR'S PART NO.
R ₃₀ R ₃₁	Same as R ₇ Resistor, 12,000 ohm $\pm$ 10% 2 watt, carbon, humidity resistant	Grid return for tube V ₈ Voltage divider	ASA	RC41AE123K
R ₃₂	Resistor, 10,000 ohm $\pm$ 20%, 4 watt, carbon, humidity resistant	Voltage divider	ASA	RC65CE103M
R ₃₃	Same as R ₁₈	A.V.C. decoupling		
C ₁	Capacitor, variable, 3 section, each section contains main tuning, section of min. cap. 12.5 mmfd. - max. cap. 410 mmfd. and bandspread section with 20 mmfd. effective capacity change (Hallcrafters #48C112); assembled to each of two rotor drive shafts is a drive pulley (Hallcrafters #28A002).	Main tuning capacitor	OM	48B045
C ₂		Band spread tuning Capacitor		
C _{3A}	Capacitor, dual, adjustable, 600 to 1050 mmfd., ceramic (Part of transformer T ₂)	Primary tuning of transformer T ₂		44A038
C _{3B}	Capacitor, dual, adjustable, 150 to 600 mmfd., ceramic (Part of transformer T ₂)	Secondary tuning of transformer T ₂		44A038
C ₄	Capacitor, 0.05 mfd. -10 $\pm$ 40%, 200 V. D-C, paper, type 284	Cathode by-pass for tube V ₁	A	46AU503J
C ₅	Capacitor, 25 mmfd. $\pm$ 20%, 500 V. D-C, ceramic, type 811-068	Capacity coupling in transformer T ₁₀	CPL	47A035
C ₆	Capacitor, 5-6.5 mmfd., 500 V. D-C, ceramic, type A-N750	Capacity coupling in transformer T ₁₁	MT	47A005
C ₇	Capacitor, 2200 mmfd. $\pm$ 20%, 500 V. D-C, mica, humidity resistant	Cathode by-pass for tube V ₂	ASA	OM30A222M
C ₈ C ₉	Same as C ₄ Capacitor, 0.02 mfd. -10 $\pm$ 40%, 600 V. D-C, paper, type P8958	Cathode by-pass for tube V ₂ Screen circuit by-pass	SP	46AV203J

LIST OF REPLACEABLE PARTS - Continued

REF. SYMBOL	NAME OF PART AND DESCRIPTION	FUNCTION	MFR. CODE	CONTR.'S. PART NO.
C10	Capacitor, 0.05 mfd. -10 + 40%, 400 V. D-C, paper, type 484	Plate circuit filter of tube V ₂	A	46AW503J
C11	Capacitor, 0.02 mfd. -10 + 40%, 200 V. D-C, paper, type 284	A.V.C. by-pass	A	46AU203J
C12	Same as C ₄	Cathode by-pass for tube V ₃		
C13	Same as C ₄	Cathode by-pass for tube V ₄		
C14	Same as C ₉	Plate circuit filter for tube V ₄		
C15	Twisted leads to form small capacity	B.F.O. coupling to diode section of tube V ₅		
C16	Capacitor, 47 mmfd. ± 20%, 500 V. D-C, mica, humidity resistant	Diode filter for diode section of tube V ₅		
C17A	Capacitor, dual, adjustable, 100 mmfd. (nominal), 500 V. D-C (test), mica, ceramic base. (Part of transformer T ₃)	Primary tuning of transformer T ₃	ASA	CM20A470M
C17B	Same as C17A (Part of transformer T ₃)	Secondary tuning of transformer T ₃		44A098
C18	Same as C16	Diode filter for diode section of tube V ₅		
C19	Same as C ₉	Coupling between tube V ₅ and tube V ₆		
C20	Capacitor, 30 mfd. -10 + 65%, 25 V. D-C, electrolytic, type D8219	Cathode by-pass for tube V ₆	SP	45A034
C21	Capacitor, 0.1 mfd. -10 + 40%, 400 V. D-C, paper, type 484	Screen circuit filter for tube V ₆	A	46AV104J
C22	Capacitor, 0.01 mfd. -10 + 40%, 800 V. D-C, paper, type 884	Plate circuit by-pass for tube V ₆	A	46A023
C23	Same as C ₉	Tone control capacitor		

LIST OF REPLACEABLE PARTS - Continued

REF. SYMBOL	NAME OF PART AND DESCRIPTION	FUNCTION	MFR. CODE	CONTR.'S. PART NO.
C24	Same as C ₉	Audio coupling between diode and triode section of tube V ₅		
C25	Capacitor, 0.01 mfd. $\pm 10 + 40\%$, 400 V. D-C, paper, type 484	D-C blocking capacitor in plate circuit of tube V ₈	A	46AW103J
C26	Capacitor, 100 mmfd. $\pm 20\%$, 500 V. D-C, mica, humidity resistant	Grid circuit coupling of tube V ₈	ASA	CM20A101M
C27	Same as C ₂₂	A-C line filter		
C28	Capacitor, triple unit, 30-10-10 mfd. $\pm 10 + 40\%$, 450 V. D-C, electrolytic. (30 mfd. unit)	Power supply filter	A	45A062
C29	Same as C ₂₈ (10 mfd. unit)	Power supply filter		
C30	Same as C ₂₁	Screen supply filter		
C31	Same as C ₄	Plate circuit by-pass of tube V ₇		
C32	Same as C ₂₈ (10 mfd. unit)	Plate circuit filter for hexode section of tube V ₂		
C33	Capacitor, 105 mmfd. $\pm 10\%$, ceramic 500 V. D-C, type 813-034L	Plate blocking capacitor for triode section of tube V ₂	CRL	47A024
C34	Same as C ₃₃	Primary tuning of transformer T ₁₄		
C35A	Capacitor, one section of dual unit, adjustable $\pm 10\%$, 2100 mmfd. $\pm 3\%$, 500 V. D-C (test), mica, ceramic base	Transformer T ₁₅ secondary padding capacitor	UE	44B025
C35B	Capacitor, one section of dual unit, adjustable $\pm 10\%$, 430 mmfd. $\pm 3\%$, 500 V. D-C (test), mica, ceramic base	Inductor L ₁ padding capacitor	UE	44B025
C36	Capacitor, adjustable $\pm 10\%$, 1300 mmfd. $\pm 3\%$, 500 V. D-C (test), mica, ceramic base	Transformer T ₁₆ padding capacitor	UE	44A024

LIST OF REPLACEABLE PARTS - Continued

REF. SYMBOL	NAME OF PART AND DESCRIPTION	FUNCTION	MFR. CODE	CONTR.'S. PART NO.
C ₃₇	Same as C ₇	Grid blocking capacitor for triode section of tube V ₂		
C ₃₈	Capacitor, pair of twisted leads	Neutralizing for band 3 to attenuate coupling between H.F. oscillator and mixer stage		
C ₃₉	Capacitor, 470 mmfd. $\pm$ 10%, 500 V. D-C, mica, humidity resistant	Tuning capacitor across secondary of L ₂	ASA	CM20A471K
C ₄₀ C ₄₁	Same as C ₄ Capacitor, temperature compensating, type S-2739	A.V.C. filter Temperature compensating capacitor in H.F. oscillator circuit	UE	44A062
C ₄₂	Same as C _{3A} (Part of transformer T ₁)	Primary tuning of transformer T ₁		
C _{42B}	Same as C _{3B} (Part of transformer T ₁)	Secondary tuning of transformer T ₁		
C ₄₃	Capacitor, 270 mmfd. $\pm$ 20%, 500 V. D-C, mica, humidity resistant	Plate by-pass on tube V ₅	ASA	CM20A271M
C _{44A}	Capacitor, one section of 4 units, adjustable, 4 mmfd., mica, type 18-F97-PT2	Transformer T ₆ secondary trimmer	TR	44B046
C _{44B}	Capacitor, one section of 4 units, adjustable, 18 mmfd., mica, type 18-F97-PT2	Transformer T ₇ secondary trimmer	TR	44B046
C _{44C}	Capacitor, one section of 4 units, adjustable, 25 mmfd., mica, type 18-F97-PT2	Transformer T ₈ secondary trimmer	TR	44B046
C _{44D}	Capacitor, one section of 4 units, adjustable, 11 mmfd., mica, type 18-F97-PT2	Transformer T ₉ secondary trimmer	TR	44B046
C _{45A}	Capacitor, one section of 4 units, adjustable, 2.5 to 50 mmfd., mica, type 18F97	Transformer T ₁₀ secondary trimmer	TR	44B043

LIST OF REPLACEABLE PARTS - Continued

REF. SYMBOL	NAME OF PART AND DESCRIPTION	FUNCTION	MFR. CODE	CONTR.'S. PART NO.
C _{45B}	Same as C _{45A}	Transformer T ₁₁ secondary trimmer	TR	44B043
C _{45C}	Capacitor, one section of 4 units, adjustable, 1.5 to 30 mmfd., mica, type 18F97	Transformer T ₁₂ secondary trimmer		
C _{45D}	Same as C _{45A}	Transformer T ₁₃ secondary trimmer		
C _{46A}	Same as C _{45A}	Transformer T ₁₄ secondary trimmer		
C _{46B}	Same as C _{45A}	Transformer T ₁₅ secondary trimmer		
C _{46C}	Same as C _{45C}	Transformer T ₁₆ secondary trimmer		
C _{46D} C ₄₇	Same as C _{45A} Capacitor, 0.02 mfd. $\pm$ 10%, 400 V. D-C paper dielectric, type 484	Inductor L ₁ trimmer	A	46AW203E
T ₁	Transformer, intermediate frequency, 455 kc., primary 1040 mh., secondary 1040 mh tapped, air core, shielded, type 4823	Transformer T ₁₄ secondary padding capacitor	GU	50B072
T ₂	Transformer, intermediate frequency, 455 kc., primary 1040 mh., secondary 1040 mh tapped, air core, shielded, tropicalized, type 4823	First I-F transformer		
T ₃	Transformer, intermediate frequency, 455 kc., primary 965 mh, secondary 965 mh, air core, shielded, type 530	Second I-F transformer	GU	50B179
T ₄	Transformer, part of speaker assembly 85B007 matches single 6V6G to voice coil	Second detector transformer	SWI	50B067
T ₅	Transformer, standard; primary 117 V. A-C, single phase, 50/60 cycles, secondary 6.3 V. A-C @ 3.3 amperes, 5.0 V. A-C @ 2.0, amperes 680 V. A-C center tapped; type 7058	Transformer for speaker LS ₁	AR	52C026
		Power transformer	GT	

LIST OF REPLACEABLE PARTS - Continued

REF. SYMBOL	NAME OF PART AND DESCRIPTION	FUNCTION	MFR. CODE	CONTR'S. PART NO.
*T ₅	Transformer, universal; primary 110/130/150/220/250 V. A-C, single phase, 25/60 cycles, secondary 6.3 V. A-C @ 3.3 amperes, 5.0 V. A-C @ 2.0 amperes, 680 V. A-C center tapped; type 9360	Power transformer	GT	52C027
T ₆	Transformer, 15.5-44 megacycle range, air core, special	Antenna stage transformer, band 4	SWI	51B233
T ₇	Transformer, 5.3-15.8 megacycle range, air core, special	Antenna stage transformer, band 3	SWI	51B214
T ₈	Transformer, 1.74-5.4 megacycle range, air core, special	Antenna stage transformer, band 2	SWI	51B096
T ₉	Transformer, 550-1780 kilocycle range, air core, special	Band 1, antenna stage transformer	SWI	51B230
T ₁₀	Transformer, 15.5-44 megacycle range, air core, special	Band 4, converter stage transformer	SWI	51B234
T ₁₁	Transformer, 5.3-15.7 megacycle range, air core, special	Band 3, converter stage transformer	SWI	51B215
T ₁₂	Transformer, 1.74-5.4 megacycle range, air core, special	Band 2, converter stage transformer	SWI	51B095
T ₁₃	Transformer, 550-1780 kilocycle range, air core, special	Band 1, converter stage transformer	SWI	51B231
T ₁₄	Transformer, 15.5-44 megacycle range, air core, special	Band 4, oscillator stage transformer	SWI	51B759
T ₁₅	Transformer, 5.3-15.7 megacycles range, air core, special	Band 3, oscillator stage transformer	SWI	51B236
T ₁₆	Transformer, 1.74-5.4 megacycles range, air core, special	Band 2, oscillator stage transformer	SWI	51B094

* This Transformer supplied with universal model

LIST OF REPLACEABLE PARTS - Continued

REF. SYMBOL	NAME OF PART AND DESCRIPTION	FUNCTION	MFR. CODE	CONTR.'S. PART NO.
L ₁	Inductor, 550-1780 kilocycle range, air core, special	Band 1, oscillator stage inductance	SWI	51B232
L ₂	Inductor, resonant frequency 455 kilocycles, air core, type 469	Beat frequency oscillator inductance	SWI	54B011
SW _{1A}	Switch, dual unit; section 1A, single pole three position; section 1B, SPST, toggle action, current rating 10 amperes @ 10 volts / 3 amperes @ 125 volts / 1 ampere @ 250 volts; type SBD	Tone control circuit switch	SC	60A040
SW _{1B}				
SW ₂	Switch, SPST, toggle, current rating 3 amperes @ 250 volts, type 20994AC	A-C line switch	HH	60A116
SW ₃	Same as SW ₂	Standby switch		
SW ₄	Same as SW ₂	B.F.O. switch		
SW ₅	Same as SW ₂	A.N.L. switch		
SW ₆	Switch, SPST, toggle action, located on back plate of r-f gain control, R ₄	A.V.C. switch	MA	62B004
SW _{7A}		"8" meter switch		
SW _{7B}		Antenna stage transformer primary winding selector		
SW _{7C}	Switch, 3 section, 4 position, wafer, type B-111996	Antenna stage transformer secondary winding selector		
SW _{7D}		Converter stage transformer primary winding selector		
SW _{7E}		Converter stage transformer secondary winding selector		
SW _{7F}		Oscillator stage transformer primary winding selector		
		Oscillator stage transformer secondary winding selector		
		Oscillator stage transformer secondary winding selector		

LIST OF REPLACEABLE PARTS - Continued

REF. SYMBOL	NAME OF PART AND DESCRIPTION	FUNCTION	MFR. CODE	CONTR'S. PART NO.
PL ₁	Plug, 2 prong utility type, part of lime cord assembly	A-C line connection	E	87A078
PL ₂	Plug octal, male, black bakelite, type CP-8	Shorting plug for A-C operation	AP	35A003
SO ₁	Socket, octal, female, molded bakelite, type MIP-8	Power connection for D-C operation	AP	6A050
SO ₂	Socket, 5 prong, female, bakelite, type MIP-5	Connection for external "S" meter	AP	6A100
J ₁	Jack, single circuit with switch contact, type 2A	Headset outlet	U	36A002
LM ₁	Lamp, 6.3 V. @ 250 milliamperes, bayonet base, type 44	Main tuning dial illumination	GE	39A003
LM ₂	Same as LM ₁	Bandspread dial illumination		
LS ₁	Speaker, 5 inch, transformer matches single 6F6G to output coil, 1400 ohm field, type 53-V-27	Loudspeaker	AR	85B007
V ₁	Tube, pentode, type 6SK7	R-F amplifier	RCA	90X6SK7
V ₂	Tube, triode - hexode, type 6K8	Converter and high frequency oscillator	RCA	90X6K8
V ₃	Same as V ₁	1st I-F amplifier		
V ₄	Same as V ₁	2nd I-F amplifier		
V ₅	Tube, duo-diode; triode, type 6SQ7	2nd detector A.V.C., 1st A-F amplifier	RCA	90X6SQ7
V ₆	Tube, pentode, type 6F6-G	A-F power amplifier	RCA	90X6F6-G
V ₇	Tube, twin diode, type 6H6	A.N.L.	RCA	90X6H6
V ₈	Tube, triode type 6J5GT	B.F.O.	RCA	90X6J5GT
V ₉	Tube, duo-diode, type 80	Rectifier	RCA	90X80

LIST OF REPLACEABLE PARTS - Continued

FOR TROPICALIZED RECEIVERS USE THE ABOVE PARTS LIST EXCEPT FOR THE FOLLOWING ITEMS:

REF. SYMBOL	NAME OF PART AND DESCRIPTION	FUNCTION	MFG. CODE	CONTR.'S. PART NO.
C ₄	Capacitor, 0.05 mfd. -10 + 20%, 200 V. D-C, paper, type 342	Cathode by-pass for tube V ₁	MIC	46AE503H
C ₅	Capacitor, 24 mmfd. $\pm$ 5%, 500 V. D-C, ceramic, negative 750 mmfd/mmfd/degree C temp. coeff.	Capacity coupling in trans- former T ₁₀	ASA	CC20UK240J
C ₆	Capacitor, 5 mmfd. $\pm$ 1%, 500 V. D-C, ceramic, negative 750 mmfd/mmfd/degree C temp. coeff.	Capacity coupling in trans- former T ₁₁	ASA	CC20UK050F
C ₉	Capacitor, 0.015 mfd. -10 + 20%, 600 V. D-C, paper, type 342	Screen circuit by-pass for tube V ₂	MIC	46AG153H
C ₁₀	Capacitor, 0.1 mfd. -10 + 40%, 400 V. D-C, paper, type 342	Plate circuit filter of tube V ₂	MIC	46AF104J
C ₁₁	Capacitor, 0.02 mfd. -10 + 40%, 200 V. D-C paper, type 342	A.V.C. by-pass	MIC	46AE203J
C ₂₀	Capacitor, 20 mfd. -10 + 75%, 25 V. D-C, dry electrolytic, type 1B113	Cathode by-pass for tube V ₆	IC	46A011
C ₂₁	Capacitor, 0.1 mfd. -10 + 40%, 400 V. D-C, paper, type 342	Screen circuit filter for tube V ₆	MIC	46AF104J
C ₂₂	Capacitor, 0.01 mfd. -10 + 20%, 800 V. D-C, paper, type 345	Plate circuit by-pass for tube V ₆	MIC	46AN103H
C ₂₅	Capacitor, 0.01 mfd. -10 + 20%, 400 V. D-C, paper, type 342	D-C blocking capacitor in plate circuit of tube V ₈	MIC	46AF103H
C ₃₃	Capacitor, 110 mmfd. $\pm$ 20%, 500 V. D-C, ceramic, negative 750 mmfd/mmfd/degree C temp. coeff.	Plate blocking capacitor for triode section of tube V ₂	ASA	CC25UK111M

LIST OF REPLACEABLE PARTS - Continued

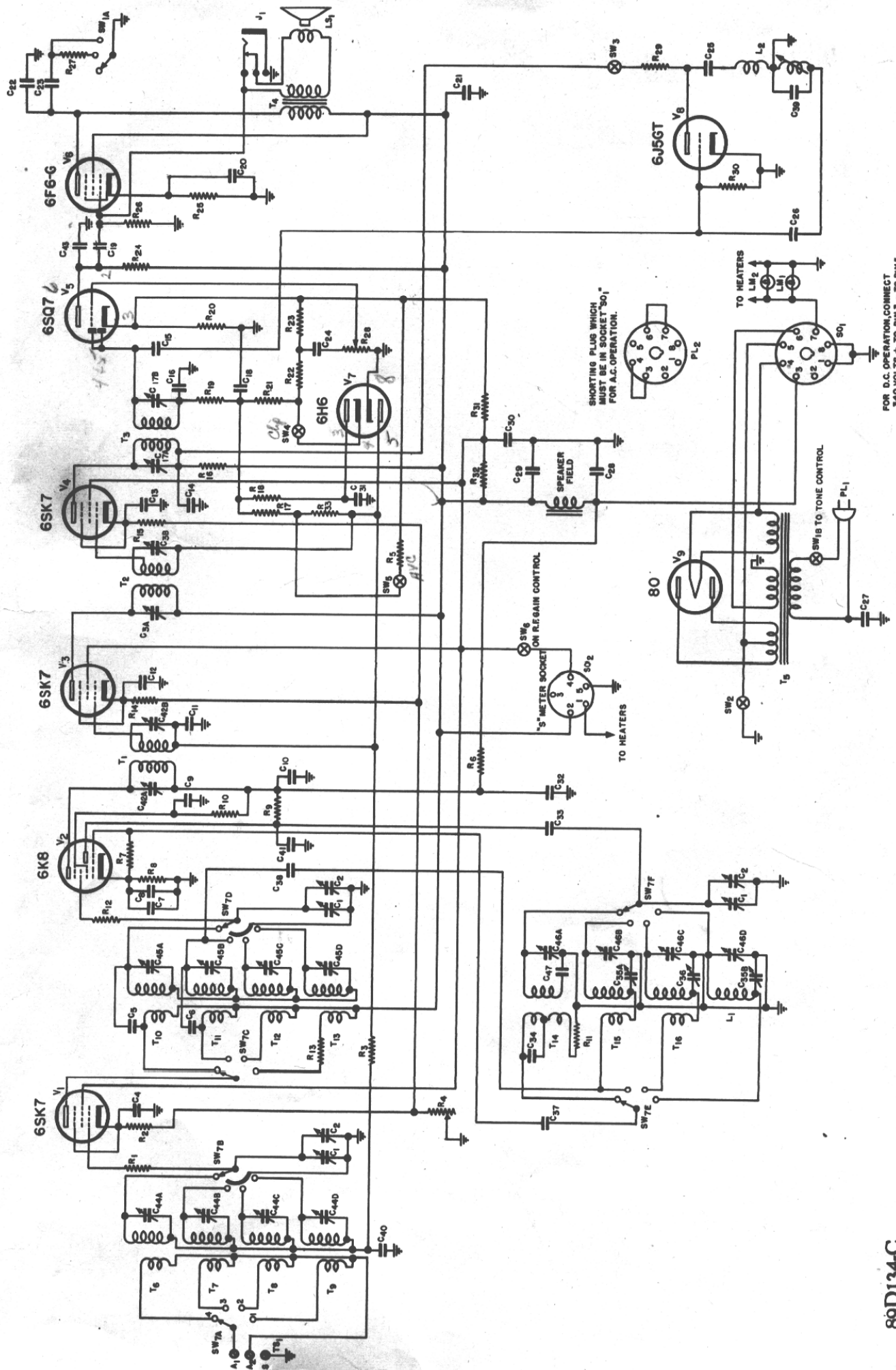
REF. SYMBOL	NAME OF PART AND DESCRIPTION	FUNCTION	MFR. CODE	CONTR.'S. PART NO.
C47	Capacitor, 0.02 mfd. -10 + 20%, 400 V. D-C, paper, type 342	Transformer T ₁₄ secondary padding capacitor	MIC	46AF203H
T5	Transformer, universal; primary 110/130/150/220/250 V. A-C, single phase, 25/60 cycles, secondary 6.3 V. A-C @ 3.3 amp., 5.0 V. A-C @ 2.0 amp., 225 V. D-C @ 80 ma., out of a single section condenser input filter consisting of a type 80 rectifier, a 30 mfd capacitor and a 1400 ohm D-C resistance field, type 9G69	Power transformer	GT	52C112
T6	Transformer, 15.5-44 megacycle range, air core, tropicalized, special	Antenna stage transformer, band 4	SWI	51B775
T7	Transformer, 5.3-15.8 megacycle range, air core, tropicalized, special	Antenna stage transformer, band 3	SWI	51B774
T8	Transformer, 1.74-5.4 megacycle range, air core, tropicalized, special	Antenna stage transformer, band 2	SWI	51B773
T9	Transformer, 550-1780 Kilocycle range, air core, tropicalized, special	Band 1, antenna stage transformer	SWI	51B772
T10	Transformer, 15.5-44 megacycle range, air core, tropicalized, special	Band 4, converter stage transformer	SWI	51B771
T11	Transformer, 5.3-15.7 megacycle range, air core, tropicalized, special	Band 3, converter stage transformer	SWI	51B770
T12	Transformer, 1.74-5.4 megacycle range, air core, tropicalized, special	Band 2, converter stage transformer	SWI	51B769
T13	Transformer, 550-1780 kilocycle range, air core, tropicalized, special	Band 1, converter stage transformer	SWI	51B768
T15	Transformer, 5.3-15.7 megacycles range, air core, tropicalized, special	Band 3, oscillator stage transformer	SWI	51B767

LIST OF REPLACEABLE PARTS - Continued

REF. SYMBOL	NAME OF PART AND DESCRIPTION	FUNCTION	MFG. CODE	CONTR.'S. PART NO.
T ₁₆	Transformer, 1.74-5.4 megacycles range, air core, tropicalized, special	Band 2, oscillator stage transformer	SWI	51B766
L ₁	Inductor, 550-1780 kilocycle range, air core, tropicalized, special	Band 1, oscillator stage inductance	SWI	51B765
L ₂	Inductor, resonate frequency 455 kilocycles, air core, tropicalized, type 469 modified	Beat frequency oscillator inductance	SWI	54B027
SO ₁	Socket, octal, female, high dielectric black bakelite, type MIP-8	Power connection for D-C operation	AP	6A035
SO ₂	Socket, 5 prong, female, high dielectric black bakelite, type MIP-5	Connection for external "8" meter	AP	6A186
LS ₁	Speaker, 5 inch, tropicalized transformer matches single 6F6G tube to voice coil, 1400-ohm field, tropicalized cone and voice coil, 5 ohm voice coil, type 53-V-27 tropicalized	Loudspeaker	AR	85C028

INDEX TO PARTS MANUFACTURERS

<u>Symbol</u>	<u>Manufacturer</u>	<u>Symbol</u>	<u>Manufacturer</u>
A	Aerovox New Bedford, Mass.	IC	Industrial Condenser Corp. Chicago, Ill.
AP	American Phenolic Chicago, Illinois	MA	P.R. Mallory Co. Indianapolis, Indiana
AR	Ariston Mfg. Co. Chicago, Illinois	MIC	Micamold Radio Corp. Brooklyn, N.Y.
ASA	Any manufacturer meeting the applicable American Standard Association specification	MT	The Muter Co. Chicago, Illinois
CRL	Centralab Milwaukee, Wis.	OM	Oak Mfg. Co. Chicago, Ill.
CT	Chicago Telephone & Supply Co. Elkhart, Indiana	RCA	R.C.A. Mfg. Co. Inc. Harrison, N.J.
E	Essex Wire Co. Chicago, Illinois	SC	Stackpole Carbon Co. St. Mary's, Penn.
ER	Erie Resistor Co. Erie, Penn.	SP	Sprague Electric Co. North Adams, Mass.
GE	General Electric Co. Schenectady, N.Y.	SWI	S.W. Inductor Chicago, Illinois
GT	General Transformer Corp. Chicago, Illinois	TR	Tele-Radio New York, N.Y.
GU	E.I. Guthman Chicago, Illinois	U	Utah Radio Products Co. Chicago, Illinois
HH	Arrow Hart & Hegeman Elec. Co. Hartford, Conn.	UE	Underwood Elec. Co. Chicago, Illinois



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6 VOLTS + TO PIN 7, - TO PIN 8

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Mr. Halligan decided that it would be in keeping with the Hallicrafters policy to produce the finest communications receiver possible to sell just below \$50.00. It is the *new S20R Sky Champion.*

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Of course it retains all the essential features of the former model such as a Stage of Pre-Selection; Sponge Mounted Speaker; Beat Frequency Oscillator; Continuous Coverage from 545 kc to 44 mc, etc.

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