The 1937 Ultra-SKYRIDER receiver is a four band receiver tuning the frequencies as follows:

No. 1 Band - 53.6 Meters to 26.4 Meters (5.6 MC to 11.4 MC)
No. 2 Band - 28.5 Meters to 14. Meters (10.5 MC to 21.4 MC)
No. 3 Band - 15.1 Meters to 7.85 Meters (19.8 MC to 38.2 MC)
No. 4 Band - 8.1 Meters to 3.76 Meters (37. MC to 79.5 MC)

It includes four sets of separate and individual R.F., antenna and oscillator coils.

The approximate frequency range on the front panel of each band is indicated.

Band marked 5.5 MC to 11. MC - Covers 40 meter amateur ham band, domestic and foreign short wave broadcasts on 31 meter and 49 meters - general band to use for DX short wave listening, airplanes - also the commercial CW - Army and Navy stations - ship to shore telephone - time signals, weather reports - standard frequency transmissions by WWV.

Band marked 11 MC to 20 MC - Includes 20 meter amateurs - 25, 10, 17, and 15 meter broadcast stations, short wave, also trans-Atlantic telephone: commercial CW - Army and Navy.

Band marked 38 MC to 20 MC - Includes 10 meter amateur - 8 meter police - some commercial transmission - local short wave broadcasts - other service announced later as these frequencies become more popularly used.

Band marked 79 MC to 38 MC - Includes 5 meter amateur - 7½ meter police - Ultra high frequency broadcasting - remote pickups - experimental television - and other commercials services.

TO OPERATE

Connect the power plug into 110 volt, 60 cycle line unless otherwise specified. For general use an outside antenna of approximately 100 feet in length, will in the clear of all surrounding trees and obstructions should be used. Connect the speaker to the output terminals marked 500 ohm or 5,000 ohm depending upon which is the best match for your speaker. No D.C. flows through this circuit so that a magnetic, crystal, or dynamic speaker may be used. The speaker as supplied by Hallicrafters is to match the 5,000 ohm connections.

A doublet antenna may also be used. The two leads from the doublet antenna can be connected to the two insulated posts on the back of the chassis. Disconnecting jumper as shown in Fig. 1. Amateurs should be cautioned, however, that the usual doublet antenna is designed for short wave broadcasts reception only the lengths of the doublet are not necessarily right for amateur use. There are some antenna systems, that serve this purpose admirably. When

working on 5 and 10 meters it is often quite advantageous to use special types of antennas, some of the types of 5 meter antennas have been shown in Fig 2 It has been found from practice that no one type will work in all locations and it is advised that the user try several types in order to find out which works the most satisfactorly in his locatio n. The antenna as shown can be made of copper rod or wire and should be suspended vertically. There are other types of antenna which are being described in current magazines which can be used. In working with different types of antennas, it has proven helpful to connect a small variable condenser (100 mmf) in some cases directly across the feeder and in other cases in series with one of the feeders on both in order to better match the feeder to the radio set. When using an antenna with a single leadin it is usually best to connect it to the post marked "antenna" in Fig. 1, and connect a jumper as shown. Although under some conditions better results are obtained if the jumper is connected to the other post and the antenna is connected to the opposite binding post. If these are unavailable we recommend the ordinary flat top with straight leadin for good overall afficiency.

Consult Fig. 3. Turn the control marked "Tone Control" to the right. This connects the AC line to the power transformer. Make sure the crystal switch at the right is in the "out" position, which is with the switch down. The "send-receive" switch should be turned up. (Receive Position).

The wave change switch should be tuned to the band desired. Then with the band spread condenser set at 200 or miminum position, use the main tuning control, which is the knob on the left marked "band set", to the frequency desired within this band. The beat oscillator injection switch can be either "on" or "off". We commond it be "on" when attempting to locate weak phone stations and it MUST be on when listening to C.W.

On the main tuning dial there is a micrometer scale set under the dial light. This scale enables the operator to reset the main tuning dial accurately to within one-tenth of a division. Examples of the readings are shown in Fig 2. In the upper drawing the reading is 50.5. It will be noted that the 0 of the vernier is part way between 50 and 51, while the 5 point of the vernier lines up with a division on the main dial, thus showing .5 while in the lower figure it will be noted that the 0 of the vernier is part way between 20 and 21 and the 3 mark on the vernier line up with a mark on the main dialmaking the total reading 20.3. In the center figure the 0 itself lines up with a division on the main scale indicating no .0 and the dial reading as shown in the center figure is 70.0.

For most efficient operation on code, keep AVC switch in "off" position, audio gain 1/3 to 1/2 way up, sensitivity and volume should be controlled by R.F. gain control. With AVC "off" position the receiver will overload on a strong signal with R.F. gain advanced in full.

In receiving controlled carrier modulation p hone, the AVC switch should be in "off" position - it is advantageous to have AVC off when working with beat frequency oscillator.

The AVC should be on when receiving phone or short wave Broadcasts, unless maximum sensitivity is needed. When AVC switch is "on", R.F. gain control should be turned full clockwise to the RIGHT. Volume of receiver then should be controlled by audio gain. The R.F. gain control regulates the sensitivity of the receiver.

The weak oscillator is very convenient in locating distant or weak stations. (refer to any good radio log, set your band set knob according to the log). Turn on your BFO injection, and then turn the band set knob slowly to the RIGHT or left to the approximate place on the dial on which to station should come. When the set is tuned correctly and the station is on, the beat oscillator will produce a whistle or rushing noise. After the station is located, you of course must turn off the beat oscillator to eliminate the oscillator signal. (For CW code work the beat oscillator, of course, makes these signals audible, and the beat oscillator must be left on.)

The strength of the beat oscillator can be varied by the adjustment of the BFO injector. The further clockwise the knob is turned the stronger the oscillator. Use maximum strength for strong signals and minimum strength for very weak signals. The beat oscillator switch is on this control.

Even without crystal, the crystal phasing condenser will give some control over selectivity of the receiver. By setting crystal phasing condenser to the position of maximum baen ground noise, this will give greatest selectivity and sensitivity of receiver. (This applies only when crystal is not used. When crystal is used the position of maximum noise then becomes the position of minimum selectivity.)

The crystal circuit helps materially in phone reception, of course it is thoroughly known that it increases selectivity for CW reception. In receiving phone signals when using the crystal filter, it is recommended that this previously described position of minimum selectivity (maximum noise) be used first and then the phasing condenser tuned to the position of minimum noise (maximumselectivity), as long as the voice remains intelligible and satisfactory communication can be held.

It is found in many cases that the absolute position of the crystal phasing condenser, permits good phone performance as the crystal is used in the receiver. Of course, in CW use, the single signal position (mámimum noise position) of this phasing condenser is the one in which CW signals are copied to best advantage.

The "Send-Receive" switch, breaks the B supply, so that the tubes will not be paralyzed by a local transmitter.

The tubes used are ten of the METAL types as follows:-

6K7 - RF Amplifier - Pre-Selector
6L7 - 1st Detector - Mixer
6C5 - Signal Frequency Oscillator
6K7 - IF Amp lifier
6L7 - 2nd IF
6R7 - 2nd Detector - AVC - Beat Oscillator
6J7 - Noise Silencer Amp.
6Q7 - 1s t Audio - Noise Silencer
6F6 - 2nd Audio Power Output Stage
5Z4 - Rectifier

The antenna circuit is connected to the secondary of the R.F. coil by method of inductive coupling. Low impedance primaries are used in order to better match transmission lines. Soparate primaries are used for each band, both

leads of each coil are connected by switch to binding posts on the rear of the set. The unused coils are shorted out.

The plate circuit of 6K7 amplifier has a high impedance plate load which is made to resonate at the low frequency end of each band, thus raising the gain of this stage appreciably at the low frequency end while the low primary coils improve the gain at the high frequency end.

The 6L7 is used here as detector-mixer. The modulation from the oscillator circuit is supplied to this tube by use of an extra grid. Due to not having os oscillator plate current flowing in the first detector, the ratio of translation to no ise is considerably better than in composite tubes or in circuits where the cathodes of 2 tubes are connected together.

The 6C5 oscillator tube covers all four bands, and is of the hot cathode type.

By this means the oscillator generates a fairly constant voltage for impression on grid 3 of 6L7 over the full tuning range of the set.

CRYSTAL FILTER INPUT TRANSFORMER - this transformer is made up of 3 coils phased in such a relation that maximum signal is impressed upon the low inductance primary of 2nd IF transformer. The crystal and crystal phasing circuit is inserted between these transformers in crystal phasing condenser cause single signal action to take place - this action varies by the setting of crystal phasing condenser - when switch is at "out" position the signal is impressed directly on the second transformer.

Crystal filter output transformer has a set-up ratio so that the voltage impressed on grid of 6K7, I.F. Amplifier, is increased over the normal IF transformer connections. By the use of a transformer the grid circuit of this tube is tuned to the I.F. frequency so that greater selectivity is achieved, than if a choke coil is used to supply this tube.

The second transformer is of the expanding type that is a 3rd coil connected to the secondary is closely coupled to the primary. This coil can be cut "in" and "out" of the circuit by the use of the expander switch when it is cut in the circuit overcoupling results causing the circuit to become broad.

The Input transformer of the second stage IF is also of the expanding type. Two loads are brought from the secondary, one of which goes to the grid of the 6J7 noise amplifier, while the other lead goes to the grid of the 6L7 second stage IF amplifier.

The 6L7 I.F. Amplifier is coupled through an iron core transformer to the two diode plates of the 6R7.

The ratios of AC & DC diode load are proportionate as that 100% modulation can be handled with low percentage of distortion.

As will be noted from the circuit diagram (Fig 4) the AVC voltage and the audio voltage are taken off slightly below maximum point. This was done to reduce stray RF. in the circuit and to give better AVC action on the RF and IF stages.

The 6L7 triode section is used as the beat frequency oscillator - it is coupled to the diode section over the common resistor in the cathode circuit. Changes in line voltage and in tubes will not effect the frequency of beat oscillator. The frequency can be controlled by the use of the pitch control in order that a receiving operator can beat on either side of a signal getting further selectivity on code reception by choice of audio frequencies.

The strength of the beat oscillator is variable by use of the BFO injection control so that when receiving a very weak station, the strength of the beat oscillator can be a varied for optimum beat producing better signal to noise and signal to interference ratio. If a strong signal is being received, the oscillator should be at maximum strength. This will help eliminate interfering stations and make for ease of copying.

The 6L7 noise amplifier feeds into a single tuned iron core air tuned transformer The secondary of which is center tapped so that full wave detection in the diode section of the 6Q7 can be accomplished. The diode lead on this circuit is proportioned for a very short time interval and the output of this detector is connected to grid 3 of the 6L7 second stage IF amplifier. A control of this circuit is located on the front panel. The noise silencer being in the circuit to a greater degree as the control is turned clockwise. WHILE THE NOISE SILENCER REMOVES SOME NOISES-DO NOT EXPECT IT TO REMOVE ALL TYPES AND ALL NOISES.

Transformers used at intermediate frequencies are of iron core construction and are air trimmed. Greater selectivity and gain, due to better Q of the coil is achievable than by the use of air core coils.

The signal to noise ratio of iron core coils, due to a better Q, shows a marked improvement over other types of transformers.

AUDIO - FIRST STAGE AUDIO - is the Triode section of the 6Q7 - This section is a high MU triode. It is coupled to the diode section of the 6R7. As will be noted from the circuit no DC flows through the volume control, making the quiet operation.

TONE CONTROL - It will be noted that the tone control is connected on the plate of the 6Q7 and also on its grid circuit. When the control is full clockwise, the tone is normal. As the control is moved to the left up to one-half rotation the bass response is increaded without the cutting of high notes. Moved through the other half of the rotation the high notes are removed by use of a condenser on the plate without further increasing low note response.

OUTPUT STAGE - a 6F5 pentode, giving 3.5 watts output is connected to the speaker and headphone jack. This jack is arranged in circuit in such way that when phones are inserted the output transformer of the set is shorted. No DC flows through headphone circuit.

SYMBOLD - MODEL S-10

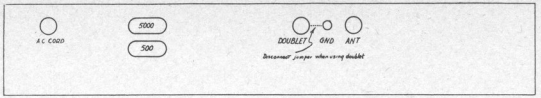
Resistors

No.	Value Ohms	Rating Watts	Tol.	Part#
R1	100	1/3	10%	2208
R2	100,000	1/3	20%	2093
R3	10,000	RF Gain		2511
R4	100,000	1/3	20%	2093
R5	1000	1/3	20%	2033
R6	600	1/3	10%	2308
R7	1500	1/3	20%	2039
R8	50,000	1/3	20%	2084
R9	10,000	2	20%	2433
R10	10,000	2	20%	2433
R11	50,000	1	20%	2082
R12	30,000	2	10%	2436
R13	100,000	1/3	20%	2093
R14	300	1/3	10%	2220
R15	1000	1/3	20%	2033
R16	1500	1/3	20%	2039
R17	100,000	1/3	20%	2093
R18	300	1/3	10%	2220
R19	1000	1/3	20%	2033
R20	1000	1/3	20%	2033
R21	50,000	1	20%	2082
R22	10,000	Noise Silencer		2511
R23	1500	1/3	20%	2039
R24	100,000	1/3	20%	2093
R25	1 Meg	1/3	20%	2108
R26	30,000	1/3	20%	2078
R27	1500	1/3	20%	2039
R28	500,000	1/3	20%	2084
R29	500,000	Volume Control		2512
R30	50,000	1/3	20%	2084
R31	1 meg	Tone Control		2513
R32	500,000	1/3	20%	2102
R33	1000	1/3	20%	2033
R34	50,000	1/3	20%	2084
R35	40,000	1/3	20%	2081
R36	500,000	BFO Injection		2514
R37	50,000	1/3	20%	2084
R38	100,000	1/3	20%	2093
R39	500	Candohm	10%	2419
R40	250000	1/3	20%	2099
R41	100,000	1/3	20%	2093

SYMBOLS - MODEL S-10

Condensers

NO.	Value	Type	Rating Volts	Tol.	Part #
C1	.002	Mica	600	5%	4312
C2	.002	Mica	600	20%	4013
C3	.002	"	600	20%	4013
C4	.002	"	600	20%	4013
C5	.002	"	600	5%	4312
C6	.05	Paper	400	20%	4105
C7	.002	Mica	600	20%	4013
C8	.05	Paper	400	20%	4105
C9	.002	Mica	600	20%	4013
C10	.002	"	600	20%	4013
C11	.002	"	600	20%	4013
C12	.01	Paper	400	5%	4114
C13	.01	"	200	5%	4115
C14	.05	"	200	20%	4104
C15	.05	"	400	20%	4105
C16	.01	"	400	5%	4114
C17	.01	"	200	5%	4115
C18	.00005	Mica	600	20%	4001
C19	10 mfd	Elec.	50V		4203
C20	.01	Paper	400	5%	4114
C21	.00005	Mica	600	20%	4023
C22	.05	Paper	200	20%	4104
C23	.0005	Mican	600	20%	4009
C24	.004	Paper	400	20%	4018
C25	.05	Paper	200	20%	4104
C26.	.01	"	200	20%	4100
C27	.01	"	200	20%	4100
C28	.00025	Mica	600	20%	4007
C29	.0001	"	600	20%	4003
C30	.01	Paper	400	5%	4114
C31	.05	"	200	20%	4104
C32	.05	"	400	20%	4105
C33	.00025	Mica	600	20%	4007
C34	.01	Paper	400	20%	4101
C35	.05	"	400	20%	4105
C36	.1	"	400	20%	4101
C37	16 mfd	Elec	350		4216
C38	16 mfd	"	350		4216
C39	10 mfd	"	50		4203
C40	.005	Paper	600	20%	4020
C41	.01	Paper	400	20%	4101
C42	.0005	Var. Mica			4402
C43	.0005	" "			4403
C44	.0005	" "			4402
C45	.000015	Mica	600	20%	4022
C46	.0001	"	600	20%	4003
C47	Front Sec. Var. Cond.				48-010
C48	Middle " " "				48-010
C49	Rear " " "				48-010
C50	25 mmf	Var. Air.			48-012
C51	5 mmf	" "			48-013



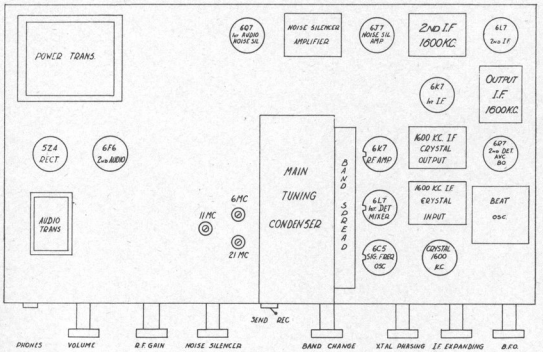


FIG. 1

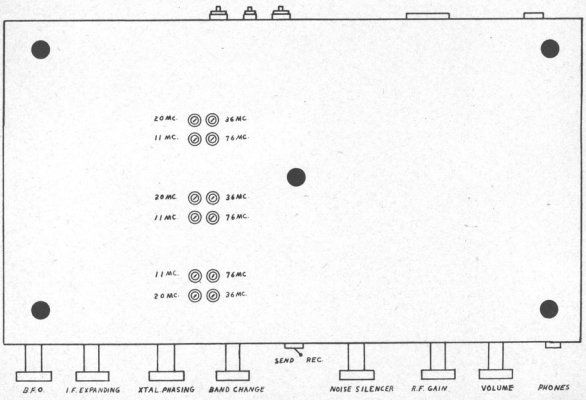
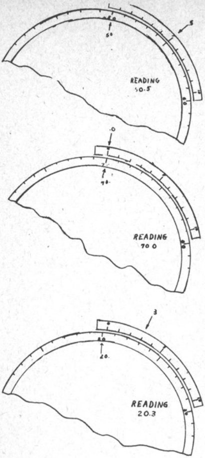


FIG. 5



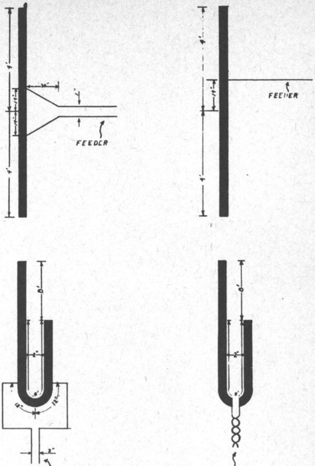


FIG. 2

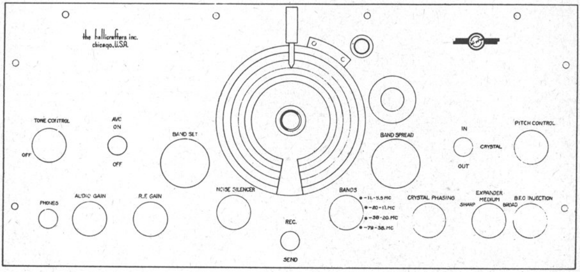


FIG. 3

THE HALLICRAFTERS INC. CHICAGO, ILL.	
Model S-10	
Model	
Drawn By — J.H.B.	Date — Sept. 11, 1936
Checked By —	Date — Sept. 11, 1936
Approved By —	Date — Sept. 11, 1936
Revised —	

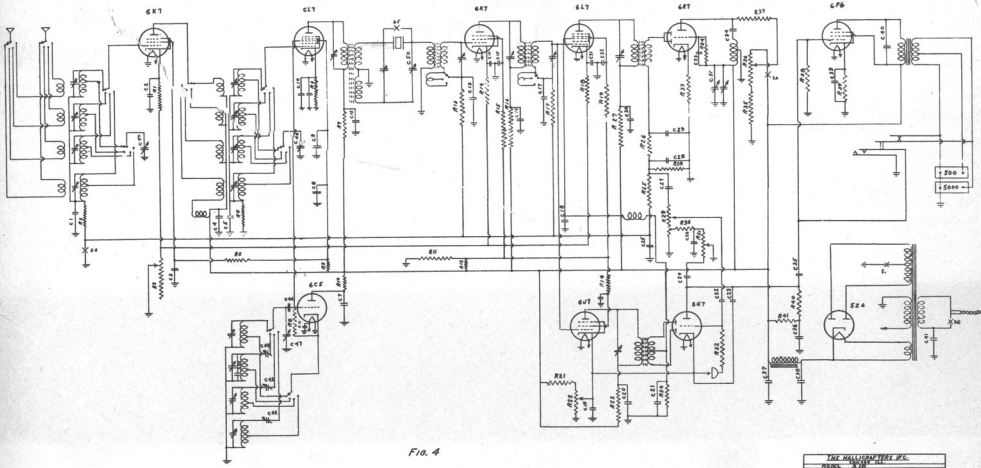


FIG. 4

THE HALLICRAFTERS INC.
CHICAGO, U.S.A.
MODEL S-38
DRAWN BY CW DATE 1 SEPT 1938
CHECKED BY
APPROVED BY
REVISED