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Arthur Rotramel
~~2607 So. Grant Street~~
~~Englewood,~~ Colorado
P.O. Box 25
Elizabeth, Co
646-4846

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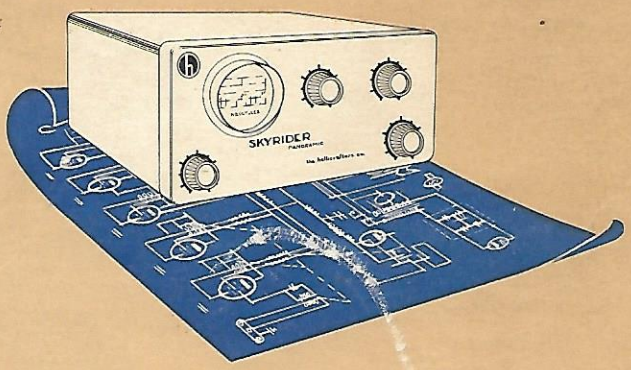
installation and operating instructions for skyrider panoramic model sp-44



MAY 1946 94-177

the hallicrafters co.
MANUFACTURERS OF RADIO AND ELECTRONIC EQUIPMENT, CHICAGO 16, U. S. A.

HALLICRAFTER SKYRIDER SP44

Arthur Rotramel
2837 So. Grant Street
Englewood, Colorado

107 WØZLO

INSTALLATION AND OPERATING INSTRUCTIONS FOR SKYRIDER PANORAMIC MODEL SP-44

Figure 1. Skyrider Panoramic Model SP-44 Front View.

The Model SP-44 Skyrider Panoramic is a device designed for operation in conjunction with a companion receiver for the purpose of monitoring up to 200 kilocycles of the radio spectrum visually and to analyze the characteristics from your own or other transmitter. Percent of modulation, distortion, carrier shift, parasitic radiations, key clicks, or practically any other trouble that is likely to occur in amateur transmitters can be identified with ease.

With the Model SP-44 Skyrider Panoramic you can keep track of all stations in a "round table" QSO and can locate operating frequencies which are comparatively free from QRM. A phone jack on the rear of the chassis permits audible monitoring of all signals within a 200 kilocycle range at one time. No modifications are necessary in your receiver in order to connect the adapter to a receiver and it in no way interferes with normal receiver operation. This adapter may be used with any receiver having an i-f frequency between 450 and 470 kilocycles.

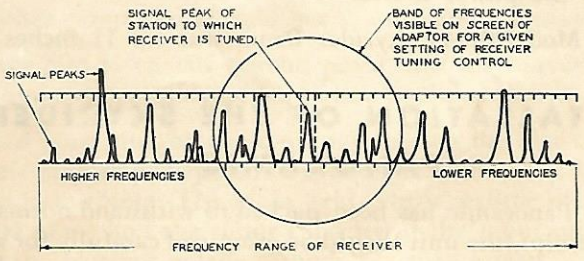


Figure 2. Portion of the Radio Spectrum.

All controls for operating the adapter are located on the front and controls for making any adjustments are located on the rear of the chassis.

An r-f input cable is provided for connecting the adapter to the companion receiver. It terminates in a small loop to fit over the plate pin of the receiver converter tube. It also has an alligator clip for connecting to the receiver chassis. In permanent installations, the r-f input cable may be terminated in a coaxial connector instead of the loop and alligator clip and the receiver may be equipped with a coaxial terminal. See Figure 3 view showing cable preparation for permanent installation.

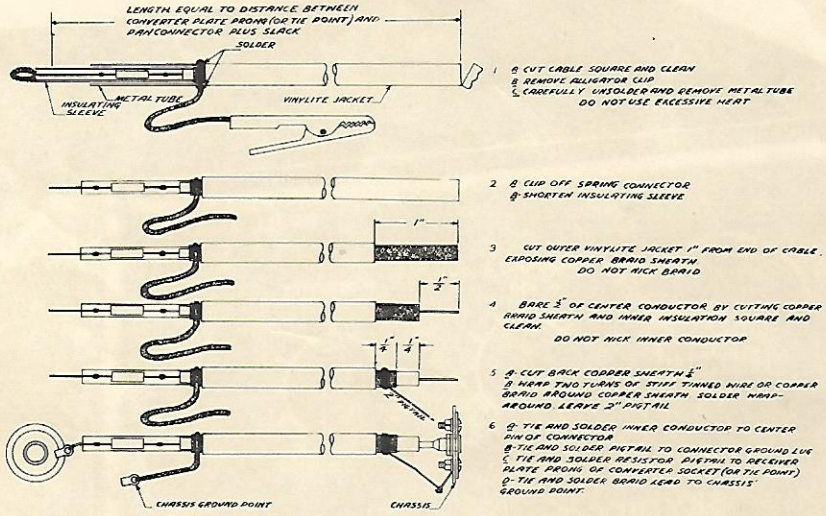


Figure 3. View Showing Cable Preparation for Permanent Installation.

The electrical components of the Skyrider Panoramic are mounted on a cadmium plated steel chassis which is housed in an attractive cabinet equipped with rubber mounting feet for mounting on top of the receiver or table. A light shade is provided on the cathode ray tube to permit greater visibility.

A tube complement for the Model SP-44 Skyrider Panoramic is as follows:

Quantity	Tube Type	Function
1	6SG7	R.F. Amplifier
1	6SA7	Converter
1	6SG7	I-F Amplifier
1	6SQ7	Detector-video amplifier
1	6AC7	Reactor
1	VR-105	Voltage Regulator
1	6SN7	Saw tooth generator and amplifier
1	2AP1	Cathode ray tube
1	6X5	Low voltage rectifier
1	6X5	High voltage rectifier

The Model SP-44 Skyrider Panoramic is designed for operation from a 117-volt, 50-60 cycle, a-c source of power and the power consumption is approximately 55 watts. A line cord with plug is included for connection to the power source.

Overall dimensions of the Model SP-44 Skyrider Panoramic are 11 inches wide x 6-3/16 inches high x 10⅞ inches deep.

INSTALLATION OF THE SKYRIDER PANORAMIC

The Model SP-44 Skyrider Panoramic has been packed to withstand normal abuse in transit. It is recommended that, upon receipt, the unit should be examined carefully for any damage that might have occurred in transit and if any is found, the transportation company should be immediately notified.

PRE-INSTALLATION CHECK:

1. Insert the line cord plug into power outlet and turn the CENTERING control clockwise, thus turning the unit on. In a half minute or more a base line should appear on the screen. If it does not, see whether the tubes are lighted by looking through the rear of the cabinet, and if they are make the following adjustments:

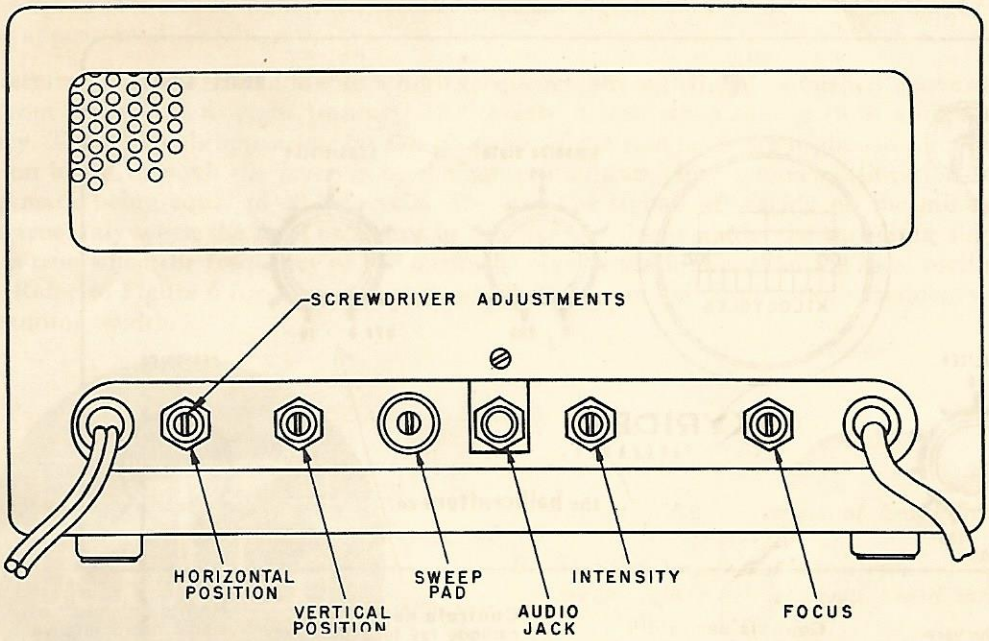


Figure 4. Skyrider Panoramic Model SP-44, view showing operating control functions.

A. Adjust the screw driver controls—Intensity and Focus, for optimum brightness and sharpness of the baseline on the cathode ray tube screen. Note: reduction of the intensity and proper adjustment of the focus control produces a sharp base line. Bring the cathode ray tube base line so that it coincides with the lowest horizontal line on the screen by means of the Verticle Position control. Then, if necessary, adjust the horizontal position control so that the baseline is approximately centered along the horizontal axis.

2. Turn the SENSITIVITY control up to maximum (clockwise). The baseline may break up into "grass" deflections near each end which is due to noise pick up. This is not abnormal however. (Note:—the SCANNING WIDTH control must be turned to maximum and the CENTERING control may need adjustment to obtain noise at both ends of the screen. The base line should be clear from one end to the other.

3. Turn off the adapter a-c power by turning the CENTERING control counter-clockwise to OFF.

INSTALLATION.

1. Connect the Skyrider Panoramic to the companion receiver as follows:

A. Bring in r-f cable through back or top of receiver.

B. Remove converter tube from socket and push plate pin of tube through the spiral spring on cable. The spring should bind tightly.

C. Replace tube in socket being careful to avoid injuring the insulating sleeve on resistor pig-tail lead so that no short develops between the lead and chassis or other tube pins. (The input i-f transformer and other components could burn out if this happened.

D. Fasten alligator clip to chassis ground point near the converter tube. (Note: It is important that the resistor and clip assembly be kept close to the chassis to prevent oscillation.

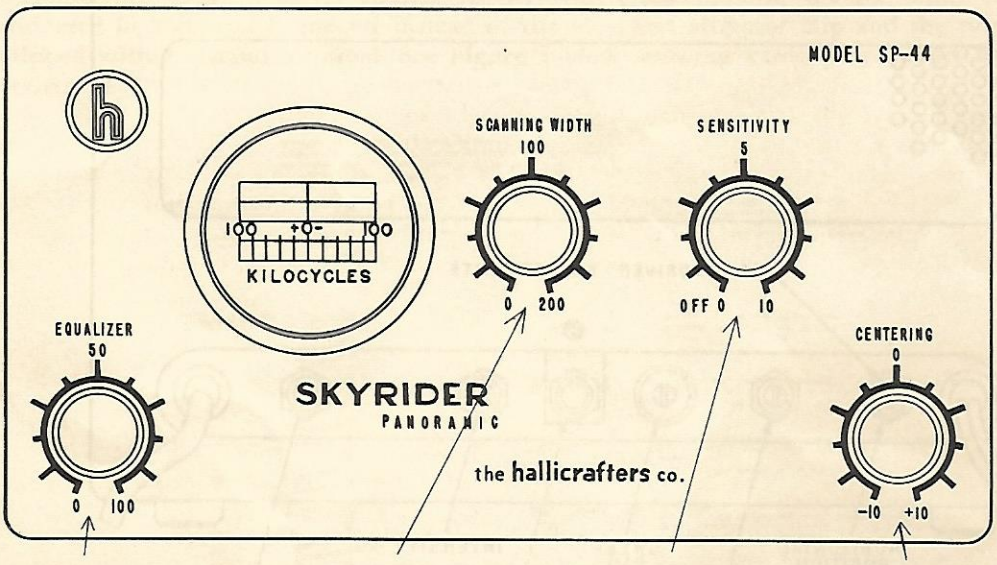
2. Insert a headset cord plug into the audio output jack on the rear of the unit (use crystal headphones because of their high impedance). If a speaker is to be used, connect it through an audio amplifier to the audio jack. (Note: The input grid return resistor of the audio amplifier must be approximately 500,000 ohms and the shunt capacity of the input must be held at a minimum to prevent distortion of the patterns on the cathode ray tube screen.

HOW TO OPERATE THE SKYRIDER PANORAMIC

Only the basic operating procedures are described in these instructions.

VISIBLE PANORAMIC

1. Turn on the Skyrider Panoramic and receiver and wait for the base line to appear.



Compensates for varying preselector characteristics of receiver.

Controls bandwidth coverage from 200 kc down to zero.

Controls height of cathode ray tube deflections and audio output level.

Maintains "pip" of signal heard through receiver over center zero mark also tunes adapter through 200 kc.

Figure 5. Skyrider Panoramic Model SP-44, view showing adjustment controls.

2. Set the companion receiver controls, where applicable, as follows:

SENSITIVITY	NEAR MAXIMUM
VOLUME	NORMAL
SELECTIVITY *switch*	NORMAL
A.V.C.	OFF
CRYSTAL PHASING	NOT USED
B.F.O.	OFF WHEN NOT RECEIVING CW.
A.N.L.	OFF
ANTENNA *trimmer*	NORMAL

3. Set the SCANNING WIDTH control for maximum sweep (200) and turn the SENSITIVITY control approximately half way clockwise.

Operating Hint: Always keep the SENSITIVITY control as low as possible so that the level of noise and spurious response is kept at minimum. This makes it easier to compare weak signals that are close to strong ones.

4. Tune the receiver slowly and soon one or more signals will appear on the cathode ray tube screen. The deflections move across the screen as the tuning dial on the receiver is rotated. The signal heard through the receiver should appear directly over the center or zero mark on the screen. If this does not happen, make the following adjustments:

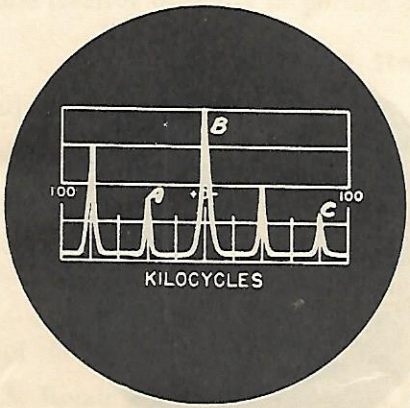
A. Tune either a voice or music modulated signal and center the deflection with the CENTERING control.

B. Slowly rotate the SCANNING WIDTH control to almost zero and maintain the broadening deflection centered.

C. Return the SCANNING WIDTH control to maximum. The deflection should remain over the zero mark on the screen, but if it shifts off center, adjust the Horizontal Position control for final centering. It may be necessary to maintain and restore the centered position as the equipment warms up.

D. Adjust the EQUALIZER control so that the height of a deflection "pip" remains as constant as possible as it passes across the screen while the receiver is tuned. Each band on the receiver may require a different setting of this control. In performing this adjustment and for general operation of the Panoramic Adapter, it is best to cut off the A.V.C. in the receiver since the signal appearing at the center of the screen may control the height of all other signals. Should the receiver be tuned to a strong signal, the weaker adjacent signals may be reduced in height or they will not appear at all.

As the receiver is tuned from a low to a high frequency, the signal deflections will move across the screen from left (plus) to right (minus). The reverse is true when tuning from a high to a low frequency. Those signals appearing on the plus side of the zero mark are higher in frequency than the station heard through the receiver by the amount indicated by the screen calibrations, each calibration mark being equal to 20 kilocycles. (Note:—The signals appearing on the minus side of zero are true only when the local oscillator in the receiver tracks above the incoming signal. The reverse is true when the frequency of the incoming signals are higher than the local oscillator frequency. Refer to Figure 6 for illustration showing the determination of a single frequency at maximum scanning width.

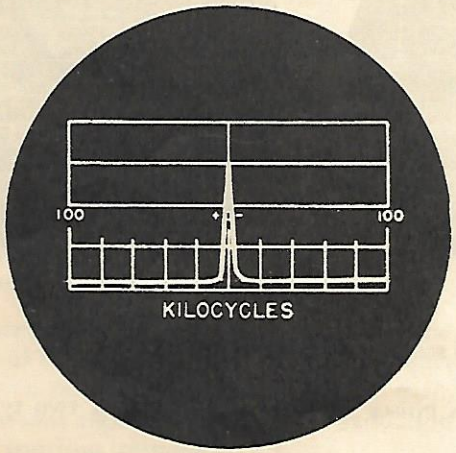


A—Signal 40KC above signal heard through receiver.
B—Signal heard through receiver.
C—Signal 80KC below signal heard through receiver.

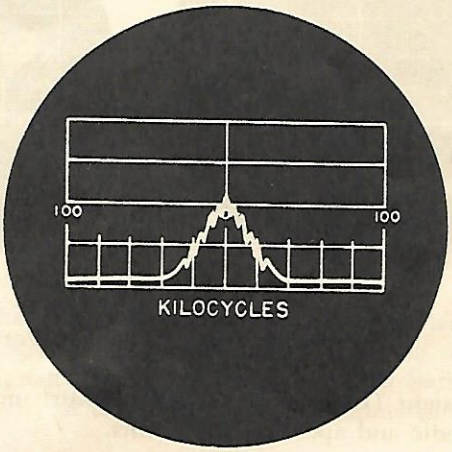
Figure 6. Illustration showing determination of a single frequency at maximum scanning width.

INTERPRETATION OF SIGNALS

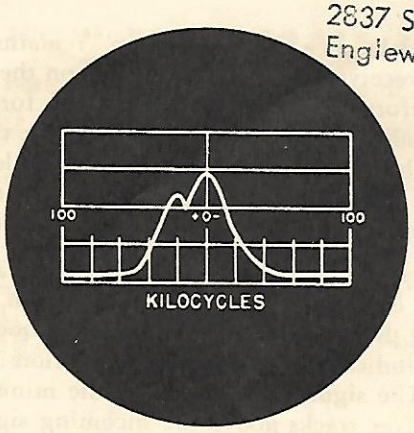
With a little experience it is possible to recognize visually the character of various types of signals without listening to them. However, the Skyrider Panoramic can show only what the radio receiver is able to receive and no more. A poorly adjusted receiver cannot be expected to give good results even with a perfectly adjusted adapter. The following illustrations show patterns of various signals received on the panoramic screen.



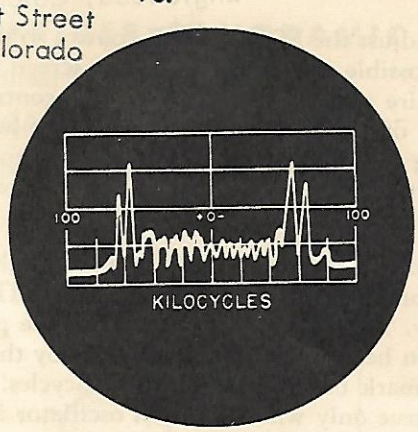
(Unmodulated Carrier)



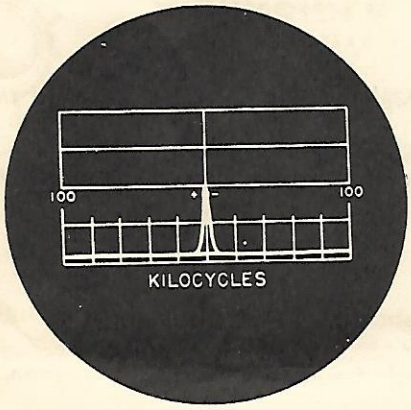
(Amplitude Modulated Carrier at Reduced Sweepwidth)



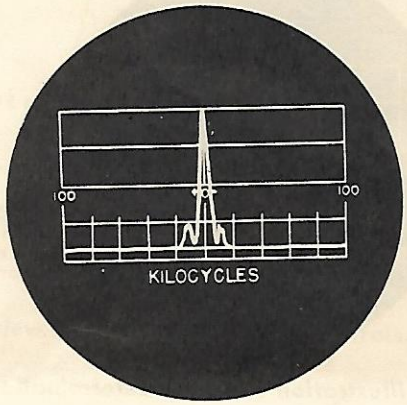
Single Side Band Signal



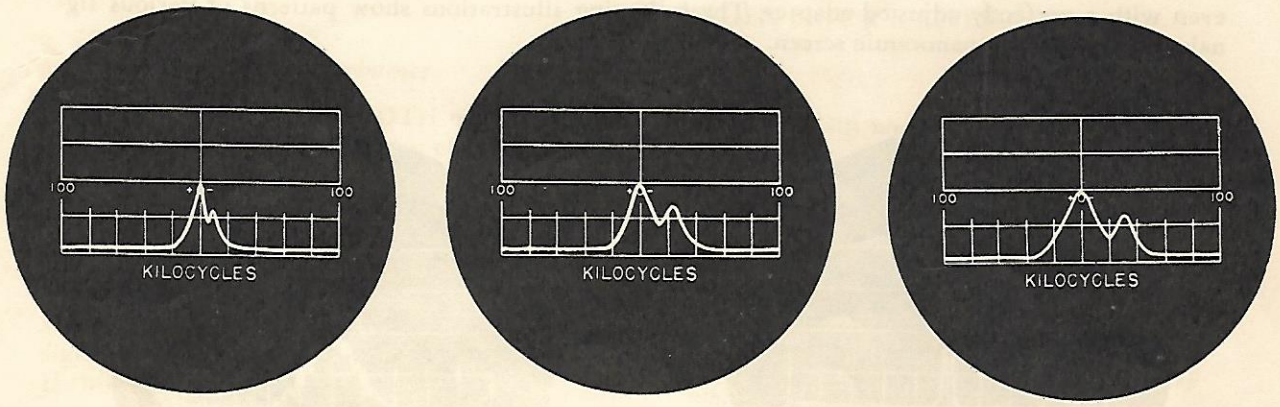
Frequency Modulated Signal at Reduced Sweepwith



CW Signal



MCW Signal at Reduced Sweepwith



Appearance of two interfering signals as scanning width is reduced.

Transient Disturbances:—Those disturbances received as noises in the receiver, are of two types, periodic and aperiodic transients.

Periodic transients, such as produced by automobile ignition, motors, vibrators, buzzers, etc., appear as signals moving along the frequency sweep base line in one direction or another. Thus, an automobile which is accelerating will produce a set of deflections which may move first in one direction, slow down, stop, and move in the opposite direction.

This is caused by the fact that the Skyrider Panoramic is sweeping at a fixed rate (25 or 30 times per second), whereas the transient occurs at a variable rate. The images stand still on the screen when there is synchronium between the two. If the transient disturbance is synchronized with the 50 or 60 cycle line, the "noise" appears as a fixed signal which, however, only varies in height. Such deflections may appear like amplitude modulated signals or like steady carriers. Aperiodic transients, such as static, appear as irregular deflections and flashes along the whole frequency sweep axis.

Tube Noises—These are due to too great an amplification of the receiver, Skyrider Panoramic or both, appearing as varying irregularities along the frequency sweep axis. Proper adjustment of the SENSITIVITY controls should reduce or eliminate this disturbance.

(Example—If it is desired to observe 120 kilocycles of the band, any deflection 60 kilocycles from the center mark is selected.)

3. Rotate SCANNING WIDTH control counter-clockwise until selected deflection or pip just runs off screen.

4. Tune receiver to center of portion of band to be observed.

VISIBLE SINGLE SIGNAL OBSERVATION

1. Adjust the adapter and receiver as for visible panoramic operation.

2. Reduce SCANNING WIDTH to zero slowly while pip is maintained at center.

3. Adjust CENTERING or receiver tuning for maximum deflection or pip.

4. Adjust adapter SENSITIVITY control so that when no modulation is present, the straight horizontal trace is to coincide with the center-horizontal line on the screen.

5. For visual examination of any one signal on either side of the screen without affecting reception of the signal heard through the receiver. The following procedure can be used:

A. Rotate CENTERING control so that the signal to be examined is directly over the zero mark.

B. Reduce the SCANNING WIDTH control to zero.

C. Trim the CENTERING frequency control for maximum upward deflection of the signal trace.

Signals will appear in the following manner during this type of operation.

1. Constant carrier—The base line is elevated above its normal position.

2. An amplitude Modulated Carrier—The modulating waveform shows on the screen.

3. CW Signal—The base line rises and falls in step with the transmitter keying.

4. Synchronous Noise—The base line is broken up into "grass" deflections. Clear areas may be present.

5. MCW Signal—The baseline is elevated above its normal position and as the transmitter is keyed the baseline rises and falls back to the elevated position.

Images—If the receiver allows "images" to pass (due to poor image rejection of the R.F. circuits), these will be distinguished from normal signals by the fact that they move in an opposite direction when the companion receiver is tuned. Such images are most likely to appear on the higher frequency ranges of the receiver.

Harmonics—Harmonics produced in the receiver by the beat of very strong signals with harmonics of the oscillator, will be distinguished from other signals by the fact that they move on the screen more rapidly (with tuning) than the normal signals. (Twice as fast for second harmonic spurious signals.) Generally, a reduction in the sensitivity of the receiver will eliminate this type of spurious signal.)

Diathermy Apparatus—This type of apparatus when using an unfiltered or a-c supply will produce a periodic disturbance which will cause a deflection to appear on certain portions of the screen and disappear on other portions. This due to the fact that such equipment emits a signal pulsating in synchronism with the power line. On the other hand, the Skyrider Panoramic too, is sweeping

the spectrum in synchronism with the line but at a lower frequency (30 cycles). Only when a certain phase relationship exists, is it possible for the adapter to receive those pulses.

Spurious Signals.—If the signal strength exceeds a certain value, the deflection caused by any signal breaks up into a series of parallel deflections, somewhat similar to side bands. These spurious signals can take place either in the receiver or adapter on extremely strong signals. A slight reduction in the sensitivity of the adapter will eliminate this type of distortion.

AUDIBLE PANORAMIC

For 200 kilocycle monitoring—

1. Plug a pair of crystal phones or an audio amplifier into the audio output jack at the rear of the adapter chassis.

2. Adjust the adapter the same as for visible panoramic.

3. Tune the receiver to the center of 200 kilocycle portion of the band to be monitored.

4. Select desired station on cathode ray tube screen and tune in with the receiver.

5. Control the loudness of the buzz with the SENSITIVITY and SCANNING WIDTH controls.

For less than 200 kilocycle monitoring—

1. Tune receiver to any crowded band.

2. Select desired station shown as deflection or pip on screen.

AUDIBLE SINGLE SIGNAL OBSERVATION

This type of operation is used for listening simultaneously to a station heard through the receiver and to a second signal up to 100 kilocycles on either side of this station.

With the phones or audio amplifier plugged into the adapter and the equipment adjusted for visible panoramic:

1. Tune the receiver to any desired signal.

2. Tune the panoramic adapter to the second signal by first centering its deflection on the screen with the CENTERING control.

3. Gradually turn the SCANNING WIDTH control to zero at the same time the deflection is restored to center, should it shift sidewise.

4. Trim the CENTERING control for maximum volume and thereafter—

5. Use the SENSITIVITY control to obtain the desired audio level.

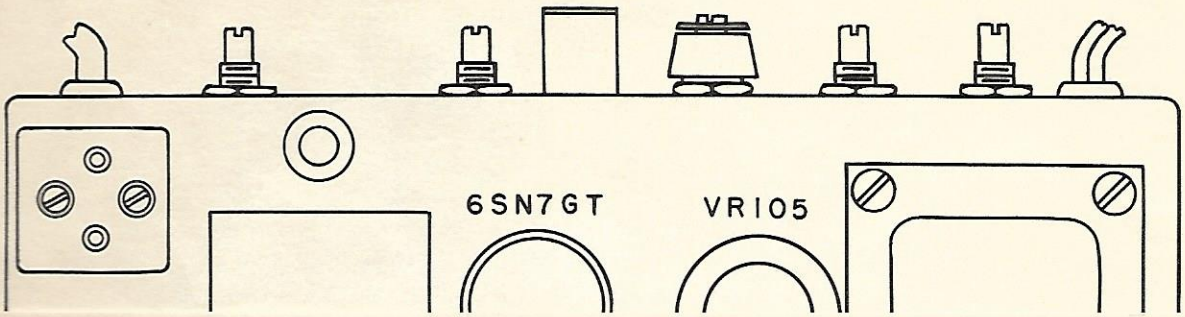
Other stations may be tuned in on the adapter, one at a time, simply by turning the CENTERING control while the SCANNING WIDTH control is set at zero. However to tune in signals of known frequency, it is best to restore the adapter to visible panoramic operation and select the deflection of a signal whose frequency is known with respect to the station heard through the receiver. The same procedure described in the paragraph above, is used to tune in this signal through the adapter.

OWNER'S MAINTENANCE

REPLACING TUBES:—It will be necessary to remove the adapter chassis in order to replace tubes. This can be accomplished by removing the three screws which hold the cover to the front panel and one screw at the rear. When replacing tubes, check the tube type carefully and replace with the correct type. Refer to the top view of the adapter chassis and to the illustration below for the correct location of each tube. Use precaution when replacing cathode ray tube.

PERIODIC ADJUSTMENTS:—This adapter has been carefully adjusted at the factory and should not require any further adjustments until it requires new tubes in the r-f amplifier and converter stages or shows signs of loss in sensitivity or requires service work on these stages. Adjustment should not be attempted by inexperienced persons as maximum performance is obtained only by intelligent alignment.

In the event your Skyrider Panoramic requires service or repairs, contact your nearest Hallicrafter's distributor, who is authorized to handle service and repairs of Hallicrafter's products after warranty has run out.



Arthur Rotramel
2837 So. Grant Street
Englewood, Colorado
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REMOVAL AND INSERTION OF THE CATHODE-RAY TUBE.

a. TUBE REMOVAL.

(1) Remove the rubber strip around the tube shield. Seize one side of its seam, underneath the shield, and gently pull it away from the front of the panel.

(2) Push the shield slightly forward through the panel.

(3) Carefully pry the tube out of its socket with a screwdriver.

(4) Remove the grommets at the rear end of the shield.

(5) Tilt the rear end of the shield upward and remove the tube.

b. TUBE INSERTION.

(1) Place the tube into the shield. Position the Panoramic screen in the shield.

(2) Insert the shield into the front panel.

(3) Place the rubber grommet in the side holes of the shield. The *long* end of the grommet goes inside the shield.

(4) Line up the shield and tube key with the socket.

(5) Insert the tube into the socket. To do this, hold the socket bracket and gently push on the *center* of the Panoramic screen.

(6) Ease the rubber strip into the clearance between the shield and front panel. Start at the bottom of the shield and gradually work the strip completely around the shield.

(7) Fit the Panoramic screen snug against the tube by gently pushing the shield back into the chassis.

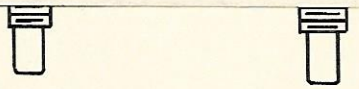

Figure 7. Skyrider Panoramic Model SP-44, top view showing tube locations.

Arthur Rotramel
2837 So. Grant Street
Englewood, Colorado

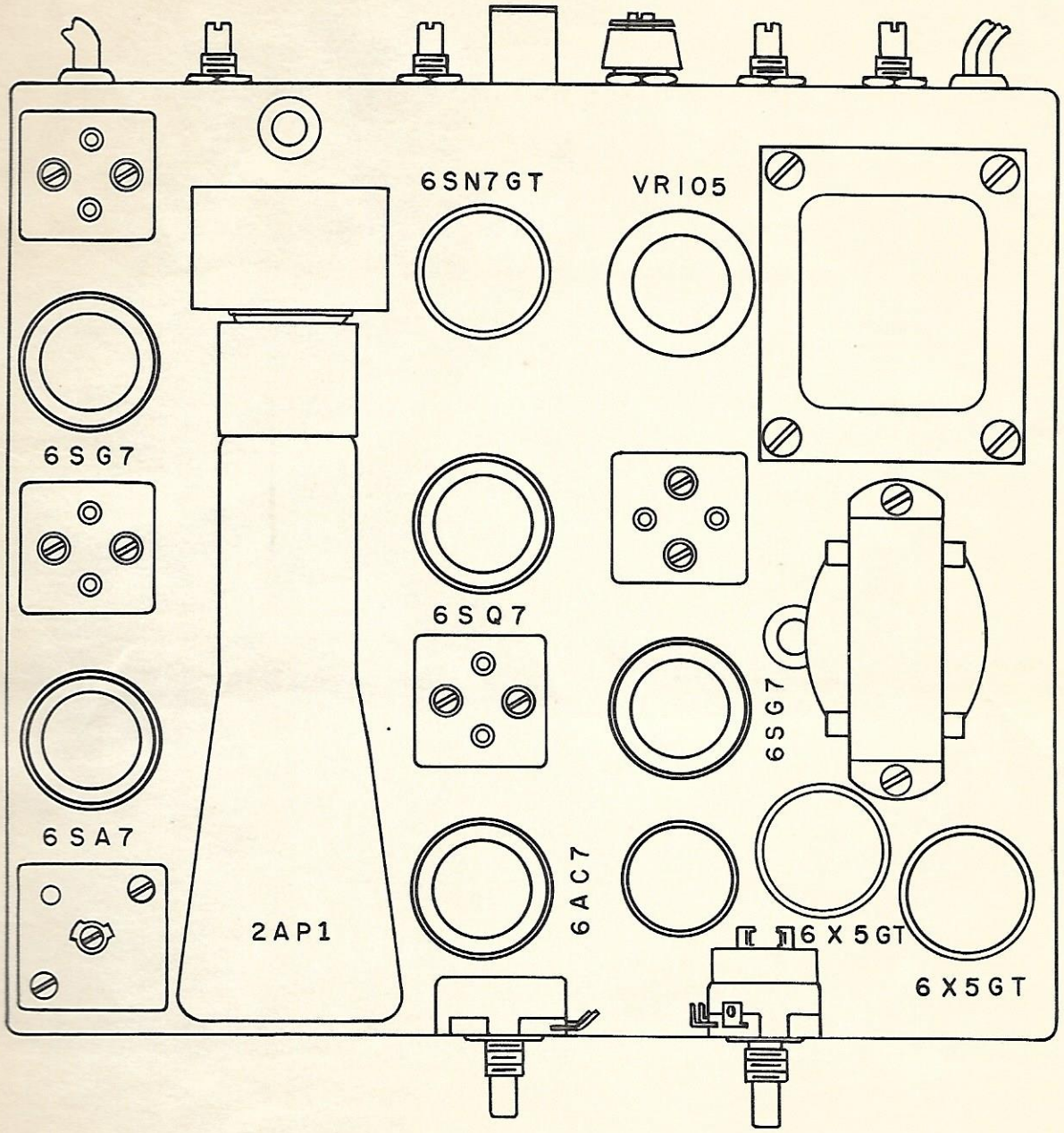

Figure 7. Skyrider Panoramic Model SP-44, top view showing tube locations.

Arthur Rotramel 107
~~2837 So. Grant Street~~
~~Englewood,~~ Colorado
P.O. Box 25
Elizabeth,
646-4846

Warranty

The Hallicrafter's Company warrants each new radio product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part in exchange for any part of any unit of its manufacture which under normal installation, use and service discloses such defect, provided the unit is delivered by the owner to us or to our authorized radio dealer or wholesaler from whom purchased, intact, for our examination, with all transportation charges prepaid within ninety days from the date of sale to original purchaser and provided that such examination discloses in our judgment that it is thus defective.

This warranty does not extend to any of our radio products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, or to use in violation of instructions furnished by us, nor extend to units which have been repaired or altered outside of our factory, nor to cases where the serial number thereof has been removed, defaced or changed, nor to accessories used therewith not of our own manufacture.

Any part of a unit approved for remedy or exchange hereunder will be remedied or exchanged by the authorized radio dealer or wholesaler without charge to the owner.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our radio products.