

# *hallicrafters*

## PERFORMANCE SPECIFICATIONS

MODEL: SR-150

LATEST REVISION: 3 OCT 62

Code ident # 26916

Specification # 093-801691

### I. GENERAL

#### A. Power Requirements

Model PS-150-120 AC Power Supply operated from 117V 60 cps AC for all measurements. The SR-150 must function between 105v and 125v AC line input.

B. All tests marked with double asterisk (\*\*) are for type test purposes only.

C. Using the PS-150-12 power supply the SR-150 must function between 11.5v and 16.0v DC

### II. RECEIVER PERFORMANCE

A. Unless otherwise specified control settings shall apply as follows:

1. RF and AF gain set at maximum.
2. RIT at off.
3. Operation control at STANDBY.
4. Function switch at LSB.
5. Band selector as required.
6. Preselector tuned for max. audio output.
7. Transmitter RF level and AF level (mic. Gain) set at minimum.
8. FINAL TUNING control optional for receiver tests.
9. Off/Cal switch at off.
10. ANTENNA switch in separate position (use REC. ONLY input)

**PERFORMANCE SPECIFICATION FOR THE SR-150 continued**

- B. Standard audio output 500 milliwatts into 3.2 ohm load.**
- C. Antenna input impedance - 50 ohms (nominal). Audio output impedance 3.2 and 500 ohms.**
- D. Measurements made with Hewlett-Packard Model HP-606A**
- E. Test signal – unmodulated CW signal.**
- F. Frequency Data (1<sup>st</sup> I.F. = 6.0 to 6.5mc, 2<sup>nd</sup> I.F. = 1650 for all bands)**

<u>Band</u>	<u>Tuning Range</u>
3.5 MC	3.5 - 4.0 MC
7.0 MC	7.0 - 7.5 MC
14.0 MC	14.0 - 14.5 MC
21.0 MC	21.0 - 21.5 MC
28.0 MC	28.0 - 28.5 MC
28.5 MC	28.5 - 29.0 MC
29.0 MC	29.0 - 29.5 MC
29.5 MC	29.5 - 30.0 MC

- G. Overall Sensitivity Limits (gain check)**
  - 1. A 1.5 microvolt signal on the 3.5 and 7.0 mc bands shall produce 500mw audio output. A 1.0 microvolt signal shall produce 500 mw audio output on all other bands. (Adjust signal generator frequency for maximum recovered audio output.)**
  - 2. The gain variation on all bands except the 7.0 mc band shall not exceed 3 db. The gain variation on the 7.0 mc band shall not exceed 6 db. (measure input variation for constant output).**

- H. Overall Sensitivity Limits (20 db S/N)**

**A 1.0 microvolt unmodulated signal shall produce an audio output signal at least 20 db above the internal noise level of the receiver as the receiver is tuned through the signal. (check at least one spot on each band.)**

- I. The change in sensitivity between upper and lower sideband reception shall not exceed 2 db audio output. (1 microvolt signal input and AF GAIN adjusted for 100mw.)**

**\*\*J. Image and Spurious Responses**

**All frequencies other than the fundamental shall be down at least 55 db on all bands (except I.F. rejection).**

PERFORMANCE SPECIFICATION FOR THE SR-150 continued

**K. 1<sup>st</sup> I.F. Rejection Ratio (6.0 to 6.5 mc )**

<u>Band</u>	<u>Minimum Rejection</u>
3.5 mc	50 db (300 X)
7.0 mc	40 db (100 X)
14.0 mc	66 db (2000 X)
All other bands	70 db (3000 X)

**\*\*L. Tweets**

All “tweets” or “birdies” Within the amateur bands shall be less than 0.5 microvolt equivalent CW Signal.

**M. AGC Figure of Merit Limit**

1. Receiver tuned to 14.3 mc for the check.
2. Set signal generator for 5 microvolts unmodulated and tune for maximum audio output. Set receiver audio gain for 50 mw audio output.
3. Increasing signal input level 50db shall not increase audio output more than 10 db.

**N. “S” Meter Calibration Limits**

1. “S”meter shall be zero set before checking.
2. Receiver tuned to 14.3 mc for the check.
3. A meter reading of S-9 shall be obtained with a signal generator level between 25 and 100 microvolts.

**O. P. Calibration Adj. Limits (RIT control at OFF)**

1. The total range of each control shall be at least 3 KC.
2. Clockwise rotation shall increase frequency.

**P. Dial Calibration (LSB)**

- 1. The error between adjacent 100 KC check points shall not exceed 1.0 KC**
- 2. With the dial calibration set to zero at the high frequency end of the dial, the error at any point shall not exceed + or - 3.0 KC.**
- 3. Band to band calibration error shall not exceed + or - 2 KC.**

**Q. RIT Control (RIT control at on)**

- 1. The RIT control shall affect receiver frequency only. Clockwise rotation shall increase receiver frequency.**
- 2. The RIT control frequency range shall be + or - 3 kc minimum.**

**\*\*R. Overall Frequency Drift Limits (Lower Sideband Reception)**

- 1. After a 15 minute warmup, the total drift during the first hour shall not exceed 500 cps.**
- 2. During the next 4 hours the frequency drift shall not exceed 200cps.**

**S. Audio Performance**

- 1. The hum level shall be less than 2.5 microwatts with the AF GAIN control set a minimum. (Measure at 3.2 ohm terminals.)**
- 2. Audio distortion shall not exceed 10% at one watt output. Receiver shall be tuned to xtal marker at 3800 kc and a 1000 cps beat note generated for the test.**

**T. Sideband Switching Frequency Error Limits.**

- 1. The test shall be performed at 14.3 mc.**
- 2. The VFO sideband corrector capacitor shall be set for no more than 15 cps change in carrier frequency between sidebands.**

**U. Mechanical Stability**

**There shall be no evidence of instability or microphonics under any condition of normal use.**

**III. TRANSMITTER PERFORMANCE**

**A. Unless otherwise specified control settings shall apply as follows:**

- 1. Receiver RF and AF gain no requirements.**
- 2. RIT switch at off.**
- 3. Operation switch at manual.**
- 4. Function switch at LSB.**
- 5. Band selector as required.**
- 6. Preselector adjusted for maximum drive.**
- 7. RF level and mic gain as specified.**
- 8. FINAL TUNING as required.**
- 9. Calibrator switch at off.**
- 10. ANTENNA switch position optional.**

**B. RF Output Impedance and Metering**

**50 ohm, non-reactive to 30 mc (Bird Wattmeter load or equal) and peak reading voltmeter calibrated in RMS volts (HP Model HP-410B or equal).**

**C. Final Amplifier Bias**

**The bias adjustment shall be set for zero signal, final amplifier plate current of 70 milliamperes, (controls set for manual/SSb operation).**

**D. Neutralization and Stability Check**

- 1. Neutralization shall be adjusted so that final amplifier plate current dip and maximum power output coincide on the 21 mc band.**
- 2. The transmitter shall show no self-oscillation tendencies at any in band PRESELECTOR and FINAL TUNING control settings on any band with output load removed.**

**E. Carrier Balance Limits**

- 1. Carrier balance adjustment shall be capable of at least -50 db below maximum output level on either sideband on any band.**
- \*\*2. Carrier level shall not exceed -40 db below maximum output level for one hour after a 15 minute warmup from start with equipment at room temperature (25°C). Line voltage shall be held constant at 117v during the test.**
- \*\*3. Carrier level shall not exceed -46 db below maximum output level when the supply voltage is changed from 105v to 125v AC. (Balanced at 117v line).**

**F. Microphone Input Sensitivity**

1. **TEST FREQUENCY – 1000 cps**
2. **SSB operation, MIC GAIN control at maximum.**
3. **An audio level no more than 4 mv or less than 1 mv shall be required to produce the minimum specified SSB output in the phone portion of any band.**

**G. RF Power Output Limits (SSB operation)**

1. **Two note input approximately 1000 cps and 2000 cps. Each signal level 4 mv. MIC GAIN control adjusted for required level.**
2. **Output Limits (peak En velope Power for a Minimum of -28 db 3<sup>rd</sup> and 5<sup>th</sup> order distortion products.)**  
  
**3.8 mc - - - - 75 W min.**  
**7.3 mc - - - - 75 W min**  
**14.3 mc - - - - 70 W min**  
**21.3 mc - - - - 60 W min**  
**28.8 mc - - - - 50 W min**
3. **Unwanted Sideband level shall be 50 db or more below PEP output (600 cps to 3000 cps).**

**H. RF Power Output Limits (CW operation)**

1. **The keying envelope shall be smoth with no sharp peaks in leading edge or training edge transients.**
2. **With the RF LEVEL control set at minimum, There shall be no more than 2 watts output on any band.**
3. **Output Limits**  
  
**3.5 mc - - - - 75 W min**  
**7.0 mc - - - - 70 W min**  
**14.0 mc - - - - 70 W min**  
**21.0 mc - - - - 60 W min**  
**28.0 mc - - - - 50 W min**

**I. Overall Audio Frequency Response (SSB)**

1. **Audio input as required. MIC GAIN control set at maximum.**
2. **0 db (reference) 1000 cps 50 volts rms RF output.**
3. **Response Limits (either sideband).**
  - 3 db limit at 400 to 600 cps. With 100 cps max. difference between usb and lsb.
  - 3 db limit at 2700cps to 3200 cps
  - Pass band peak to valley ratio shall be less than 2 db.

**J. VOX Sensitivity Limits**

1. **Audio input - 1000 cps**
2. **With VOX sensitivity at maximum and the delay control set  $\frac{1}{4}$  turn from minimum delay, no more than 5 mv rms shall be required to close the vox relay.**

**K. Anti-Trip Sensitivity Limits**

1. **Receiver adjusted to provide 250 mw 1000 cps audio output for the test.**
2. **The VOX sensitivity shall be reduced to 250 mv RMS to close the VOX relay or block the relay operation completely.**

**L. Operation of VOX Delay Control.**

**VOX relay delay shall increase with clockwise rotation of the DELAY control set at approximately  $\frac{1}{2}$  rotation.**

**M. Output Level Meter Check**

1. **Test at 50 watts output on any band.**
2. **The S meter shall indicate no less than S-8 or more than 50 db over S-9**

**N. Automatic Audio Level Control Check**

1. **Test Conditions**
  - SSB operation with two tone (1000 cps and 2000 cps) input level as required to produce slight flat topping of oscilloscope display.**
2. **Removal of AALC tube V5 (6EA8) shall produce measurable increase in envelope flat topping or excessive flat topping indicating AALC operation.**

**O. Spurious Output**

1. The transmitter shall be tuned and operated in SSB mode at 7 mc. Two tone input level shall be adjusted for slight flat topping to produce PEP output signal.
2. Disable the heterodyne oscillator tube ( V8, 12ST7 ) and measure the 6.5 mc spurious signal present. (do not remove the oscillator tube to disable.) Residual 6.5 mc spurious signal shall be 46 db or more below PEP output.
- \*\*3. All other spurious signals shall be 50 db or more below PEP output, except harmonics which shall be down 36 db or more.

**P. Controls and Outlets**

All controls and outlets shall be tested for proper operational functions.

**Q. Crystal Calibrator**

The 100 kc crystal oscillator shall be set to zero beat with WWV or equal frequency standard. The trimmer range shall be sufficient to permit setting the frequency to exactly zero beat.

- R.** The transceiver is to be supplied with the heterodyne oscillator crystal for the 28.5 mc ten meter band segment only. The units shall be tested for proper operation on the 28 mc, 29 mc and 29.5 mc segments.

**IV. MECHANICAL INSPECTION**

- A. On all panel control knobs the maximum play measured both in a direction perpendicular to the panel and parallel to the panel shall not exceed 1/32 inch.
- B. All controls shall operate smoothly, without binding, throughout their range of adjustment.
- C. All rotary switches shall have positive detent action.
- D. There shall be no perceptible wobble or vertical movement in the tuning dial when viewed through the dial window.
- E. Dial and meter lighting shall be uniform, without bright or dark spots.
- F. There shall be no indication of backlash in the VFO tuning mechanism.
- G. VFO Assembly

Two bushings (077-002851) are to be hand reamed, after staking, to 0.2945 I.D.



**H. Front Panel**

The holes for the **FINAL TUNING** and **PRESELECTOR** shafts are to be hand reamed to 0.587 min. I.D.

**I. All cores in RF coils are to be lubricated and locked after final adjustment using a wax bearing Hallicrafters part number 034-000422 (Biwax #7022 manufactured by Biwax Corporation, Skokie, Illinois.)**

**V. LUBRICATION**

**A. VFO Assembly**

**1. Light oil (3 in 1 type)**

- a. Four nyloners, 077-202301, located in bushings 077-002851.
- b. Two nyloners, 077-202301, located in pinion of dial disc, 026-001087.

**2. Grease (093-000542)**

- a. Spur gear, 026-001088 and 026-00089
- b. Gear Bushings 077-002850
- c. Gear pinion 026-001087

**B. Chassis Assembly**

**1. Grease (093-000542)**

- a. Rear end of preselector outer shaft, 074-002791-02, and preselector inner shaft, 074-002756-03
- b. Shaft, outer final tune, 074-002756-02
- c. Handle knob, 030-000793, and screw machine, 003-007550

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