

hallicrafters

PERFORMANCE SPECIFICATIONS

MODEL: SR-2000

LATEST REVISION: 18 JAN 66

Code ident # 26916

Specification # 093-002154

I. GENERAL

- A. Power input 117V 50-60 cycles from a source capable of delivering 2300 watts at the specified voltage.**
- B. All tests marked with asterisk (*) are intended for type test purposes only.**
- C. A 51.5 ohm 1000 watt resistive load shall be used for transmitter tests.**
- D. A P-2000 power supply shall be used for all tests and measurements.**
- E. A ground wire must be connected between the SR-2000 and the P-2000 at all times. Use ground studs provided at the rear of each chassis. #14 gauge wire or larger should be used.**

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 switch at Rec.**
 - 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. Plate and load tuning, no requirements.**
 - 9. Off/Cal switch at off.**
 - 10. Noise blanker at min.**
 - 11. Meter switch at S/RFO.**
 - 12. Tuning as required.**

PERFORMANCE SPECIFICATIONS MODEL: SR-2000 Cont.

- 11. B. Standard audio output is 500 milliwatts into 3.2 ohm load.**
- C. Antenna input 50 ohms nominal.**
- D. Audio output impedance 3.2 ohm and 500 ohms.**
- E. Measurements made with HP 606A using un-terminated 50 coax cable.**
- F. Test signal unmodulated CW.**
- G. Frequency Data:**

- 1. Carrier: 1651.550 KC USB
1648.550 KC LSB**

2. <u>Band</u>	<u>Tuning Range</u>	<u>Het. Osc.</u>
3.5 MC	3.5 - 4.0 MC	10.0 MC
7.0 MC	7.0 - 7.5 MC	13.5 MC
14.0 MC	14.0 - 14.5 MC	10.25 MC X2
21.0 MC	21.0 - 21.5 MC	13.75 MC X2
28.0 MC	28.0 - 28.5 MC	17.25 MC X2
28.5 MC	28.5 - 29.0 MC	17.50 MC X2
29.0 MC	29.0 - 29.5 MC	17.75 MC X2
29.5 MC	29.5 - 30.0 MC	18.0 MC X2

- 3. First IF: 6.5 to 6.0 MC broadband.**
- 4. Second IF: 1650 KC**
- 5. VFO: 4850 – 4350 KC**

H. Overall Gain Limits (500 MW audio)

- 1. 3.5 and 7.0 MC Bands 2.0 microvolts.**
- 2. 14.0 and 21.0 MC Bands 1.0 microvolts.**
- 3. 28.0, 28.5, 29.0, and 29.5 MC Bands 2.0 microvolts.**
- 4. Gain variations across the band shall not exceed 7 db on the 7.0 MC band and 4 db on all other bands.**

I. Overall Sensitivity Limits (20 db S+N/N)

- 1. A. 1.0 microvolt signal shall produce an audio output signal at least 20 db above the internal noise level of the receiver at any frequency of each band.**

PERFORMANCE SPECIFICATIONS MODEL: SR-2000 Cont.

J. USB/LSB Audio Output

- 1. The change in audio output between upper and lower sideband shall not exceed 2 db.**

II. *K. Image and spurious responses

- 1. All frequencies other than fundamental and first IF (6.5 to 6.0 MC) shall be down at least 50db.**

L. First IF Rejection (6.5 to 6.0 MC)

- | | | |
|------------|----------------|----------------------|
| *1. | 3.5 MC | 56 db or more |
| 2. | 4.0 MC | 40 db or more |
| 3. | 7.0 MC | 40 db or more |
| *4. | 14.0 MC | 60 db or more |
| *5. | 21.0 MC | 60 db or more |
| *6. | 28.0 MC | 56 db or more |

The above based on 1.0 microvolt at signal frequency.

***M. Tweets**

- 1. All “tweets” or “birdies” within the amateur bands shall be less than 1.0 microvolt equivalent CW signal.**

N. AGC Figure of Merit Limit.

- 1. Use 5000 microvolts input with audio gain set for 500 milliwatts audio output for reference. Reduce input until audio drops 10 db.**
- 2. 14.3 MC 60db or more.**

O. “S” Meter Calibration limits

- 1. Generator input of 15 to 100 microvolts at the center of any band shall produce S9.**

P. Calibration Adj. and RIT Limits

- 1. The total range of each control shall be at least 4 KC.**
- 2. Clockwise rotation shall increase frequency.**
- 3. RIT switch shall turn on neon indicator.**

Q. Dial Calibration (LSB)

- 1. The error between adjacent 100 KC check points shall not exceed 1.0 KC**

PERFORMANCE SPECIFICATIONS MODEL: SR-2000 Cont.

11. Q. 2. With the dial calibration set to zero at the high frequency end of the dial, the error at any point shall not exceed 2.0 KC, except that error at low frequency end shall not exceed 1 KC.

3. Band to band calibration error shall not exceed + or – 2 KC.

***R Overall frequency drift limits**

1. After a 15 minute warm-up, the total drift during the first hour shall not exceed 250 CPS.

2. No more than 100 CPS per hour after the first hour.

S. Audio Performance

1. Total harmonic distortion shall not exceed 10% at 1 watt output.

2. The hum level shall be less than 2.5 Microwatts with the AF gain at minimum.

T. Sideband Switching Frequency Error Limits

1. RIT control off.

2. Cal. Adj. at mid frequency range.

3. Check at 14.3 MC with 100 KC calibrator.

4. The error shall be 15 CPS or less between USB and LSB.

U. Mechanical Stability

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

V. 100 KC Crystal Calibrator

1. 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 oscillator frequency to exact zero beat.

II. W. “S” Meter

1. The “S” meter shall function in the RFO/S and AALC positions of the meter switch, not in the screen MA position.

2. The meter shall be set to zero in transmit function (no signal, High voltage off) with the meter zero pot. The meter shall then be set to approximately “S1” in receive function (no signal and RF gain control at minimum) with the AGC threshold pot.

11. X. Noise Blanker

- 1. Tune the receiver to 7.2 MC.**
- 2. Connect receiver input (Ant.) to the Cal. Output terminal of a Tektronix scope, (Mod. 541, 581, 585 or equivalent) and set the square wave output to 100V peak to peak (Max.)**
- 3. Peak the SR-2000 preselector for maximum "S" meter indication approximately S9.**
- 4. Set audio output for 500 MW (noise).**
- 5. Advance the noise blanker control to maximum (full clockwise). The "S" meter should drop to S1 or below and the audio output should decrease 12 db or more.**

Y. Blower

- 1. The blower must start at 105V line when the unit is switched from off to receive.**
- 2. There shall be no excessive vibration or mechanical hum from the blower under any operating condition.**

***Z Adjacent Channel Desensitizing**

- 1. Two signal generators required.**
- 2. 100 ohm series dummy in each generator lead.**
- 3. #1 generator is set to 14.300 MC with 10 microvolt output. The preselector should be tuned for maximum at 14.300 MC.**
- 4. #2 generator is set to 14.280 MC.**
- 5. The receiver is tuned to generator #1 at 14.300MC.**
- 6. #2 generator output is increased until the receiver output decreases 3 db.**
- 7. 10,000 microvolts or more shall be required to desensitize the receiver 3 db.**

***AA Receiver Spurious (20 M)**

- 1. Two signal generators required.**
- 2. 100 ohm series dummy in each generator lead.**
- 3. #1 generator is set to 14.447 MC with a 500 microvolt output.**
- 4. The receiver is tuned to 14.270 MC and adjusted for a 1.0 microvolt reference.**

5. #2 generator is set to 14.550 MC
6. #2 generator output is increased until a spurious output equal to 1.0 microvolt is heard at 14.270 MC.
7. 10,000 microvolts or more shall be required to produce a 1.0 microvolt spurious signal.

CAUTION HIGH VOLTAGE

III. TRANSMITTER SECTION

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. (MOX)
4. Function switch at LSB.
5. Band selector as required.
6. Preselector as required.
7. RF level and mic gain as specified.
8. Plate tuning as required.
9. Loading as required.
10. Calibrator switch at off.
11. Noise blanker at min.
12. Meter switch as specified.
13. P-2000 Hi/Lo power switch at Lo power.

B. Final amplified bias adj.

1. The bias adjustment shall be set for zero signal plate current of 225 MA + or – 5% as indicated on the P-2000 plate current meter.

C. Neutralization and Stability

1. Final plate current dip and maximum power output shall coincide at the following frequencies:

75M 3.9 MC

40M 7.25 MC

20M 14.25 MC

15M 21.3 MC

10M 28.75 MC

PERFORMANCE SPECIFICATIONS MODEL: SR-2000 Cont.

III. C. 2. In SSB mode with no signal input and with the preselector properly tuned on any Band there shall be no indication of instability or regeneration with any combination of settings of the plate tuning and loading controls. This check shall be made with the output load removed.

D. Carrier Balance

1. The carrier balance adjustment shall be capable of balancing the carrier to at least -60 db below maximum output level on either sideband.

*2. The carrier level shall remain at least -50 db below maximum output for 1 hour after a 15 minute warm-up.

*3. The carrier level shall remain at least -50 db below maximum output when the line voltage is changed from 117V to 125V or from 117V to 105V (Balanced at 117V)

E. Microphone input sensitivity (1000 cps)

1. Mic gain at maximum, USB or LSB.

2. An audio level of no more than 5 MV or less than 2 MV shall be required to produce the minimum specified SSB output in the phone portion of any band.

F. RF Power Output Limits (SSB)

1. Two tone input. Each signal level 5 MV.

2. Mic gain control set as required.

3. Output limits PEP for a minimum of 28db third and fifth order distortion products.

	<u>Lo Power</u>	<u>Hi Power</u>
3.9 MC	500 W	950 W
7.25 MC	450 W	850 W
14.25 MC	450 W	850 W
21.3 MC	450 W	850 W
28.75 MC	400 W	750 W

G. RF Power Output Limits (CW) (Low Power Only)

1. Check at low frequency end of each band.

2. Adjust final loading for 15 MA screen current at Max. power out.

3. Minimum limit - 400 W output on all bands.

4. The keyed envelope shall be smooth with no sharp peaks on the leading edge and no trailing edge transients.

PERFORMANCE SPECIFICATIONS MODEL: SR-2000 Cont.

- III. G. 5. With the RF level control set at minimum, there shall be no more than 50 W output on any band.
- 6. Minimum and maximum output levels shall be the same in tune or CW functions.
- H. CW Side-Tone
 - 1. The side-tone signal shall function in CW operation only. (with key closed).
 - 2. The side-tone frequency shall be 800 CPS + or – 30%
 - 3. The side-tone shall produce at least 1.4 MW output at the 3.2 ohm speaker terminals (phone jack).
- I. Overall Audio Frequency Response (SSB)
 - 1. Audio input as required. Mic gain control set at “8”.
 - 2. 0 db (reference) 1000 cps, 50 volts RF output
 - 3. Response limits (either sideband)
 - 6 db at 500 CPS or lower
 - 6 db at 2400 CPS or higher
 - 4. Pass band peak to valley ratio shall be 2db or less.
 - 5. Output (At 1000 CPS) differences between sidebands shall be 2 db or less.
- J. Unwanted Sideband Rejection
 - 1. The unwanted sideband shall be -50 db or more from 500 to 2500 CPS.
- K. VOX sensitivity Limit
 - 1. Audio Input – 1000 CPS
 - 2. With the VOX gain set at maximum, the delay at minimum and QT gain at minimum no more than 4 MV shall be required to close the VOX relay.
- L. QT Sensitivity Limit
 - 1. Adjust VOX sensitivity for 4 MV to close VOX relay (QT gain at Minimum).
 - 2. With 100 KC oscillator on, adjust receiver for 250 MW audio output (approximately 1000 CPS note). Set QT gain to Maximum.
 - 3. VOX sensitivity should decrease 8 db or more.

PERFORMANCE SPECIFICATIONS MODEL: SR-2000 Cont.

***M. VOX Delay**

- 1. With the delay set at full clockwise (min. delay) the VOX drop-out time shall be between .05 and .2 sec.**
- 2. With the delay set at counter-clockwise (max. delay) the VOX drop-out time shall be between .7 and 2.0 sec.**

N. AALC Operation (standard two tone input)

- 1. Tune the transmitter for 14.3 MC (SSB)**
- 2. Set the meter switch to AALC**
- 3. Advance the mic gain control to maximum.**
- 4. The meter shall read up scale to at least S5**

O. RFO Metering

- 1. With two tone input, the meter shall indicate at least S5 in low power on any band and at least S7 in high power.**
- 2. In CW or tune, the meter shall indicate at least S7 in low power on any band.**

***P. Spurious Output**

- 1. All spurious outputs shall be down 50db or more from maximum transmitter output except harmonics.**
- 2. All harmonics shall be 40 db or more below maximum output.**

Q. Life Test

- 1. Use SSB on any band with 50 ohm resistive load.**
- 2. Mic input shall be single tone audio (1000 CPS)**
- 3. Tune transmitter and adjust output to 200 watts with P-2000 set for low power**
- 4. The transmitter shall be keyed with the PTT line at the rate of 1 minute on (transmit) and 4 minutes off (receive) for a period of at least 12 hours.**
- 5. The SR-2000 shall operate normally at completion of life test.**

R. Air Test

- 1. An air test shall be made on at least one band using a suitable antenna.**

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. Dial and meter lighting shall be uniform, without bright or dark spots.
- E. There shall be no indication of backlash in the VFO tuning mechanism.
- F. All cores in RF coils are to be lubricated with Biwax #7022 wax (034-000422)
- G. Lubrication
 - 1. Light oil for all nyliners used on the main chassis, panel and VFO.
 - 2. Grease (093-000542) for all VFO gears, also for VFO knob handles.

V. ACCESSORY SOCKET

- A. The 11 pin accessory plug with a jumper between pins #2 and #10 must be plugged into the accessory socket for normal operation of the SR-2000.
- B. External VFO (HA-20) input.
 - 1. Tune the transmitter to 3850 KC Use CW and adjust the output to 200 watts.
 - 2. Remove the 11 pin accessory plug with jumper.
 - 3. Connect a signal generator as follows: Ground lead to pin #10 hot lead to #11 through a 1000 ohm resistor.
 - 4. Tune the signal generator to 4.5 MC and set the output to 2.0V.
 - 5. The transmitter output shall be between 160 and 250 watts.
- C. Voltages at accessory socket
 - 1. Pin #4: LSB -15V USB +150V
 - 2. Pin #6: REC 0V XMIT -90V
 - 3. Pin #7 REC -90V XMIT 0V
 - 4. Pin #8: -90V

Credits and Disclaimer:

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