

# Recent Equipment

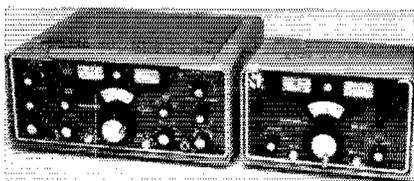


To acquaint you with the technical features of current amateur gear.

## Hallicrafters SR-400

### Transceiver and

### HA-20 Adapter



It would be easy to call the SR-400 transceiver a "baby brother" of the SR-2000<sup>1</sup> because in many ways it is identical with the latter. Aside from the final amplifier and power supply, the transmitting sections of the transceivers are the same. In the receiver line-up, the similarity is there but in the SR-400 additional selectivity for c.w. operation has been added, plus a "notch"-type filter. All in all, the SR-400 is designed with both the side-band and c.w. man in mind.

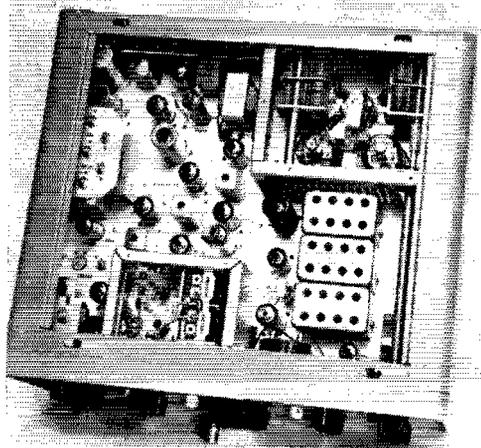
Frequency coverage of the transceiver takes in all of the 3.5-Mc. through 28.0-Mc. amateur bands in 500-ke. segments. The 28-Mc. band is covered in four sections of 500 ke. each. One

rotation of the tuning knob covers 25 kilocycles and the tuning dial is calibrated in 1-ke. divisions with a total of 100 ke. for the dial. The 1-ke. divisions are  $\frac{1}{8}$  inch wide. This dial drives a second dial which is calibrated in 50-ke. steps starting either from 0 or 500. For a band starting at a multiple of 1000 ke. the 0 is used, and for ones beginning at a 500-ke. point the dial starting at 500 would be used. A 100-ke. standard is supplied and a variable panel-mounted control is provided in order to set the band edges precisely. Fig. 1 is the block diagram of the transceiver as given in the SR-400 instruction manual.

The receiver is a dual-conversion unit, with the first i.f. tunable over 6.0 to 6.5 Mc. Incoming signals are amplified and then converted to the first-i.f. range using a crystal-controlled high-frequency oscillator. The signals are then converted down to 1650 ke. after being mixed with the v.f.o. output. The v.f.o. range is 4350 to 4850 ke.

Preceding the high-selectivity section of the i.f. there is a noise blanker to remove interfering noise of the "ignition" type. The first i.f. tube at 1650 ke., a 6GX6, is a combination noise blanker and i.f. amplifier stage. The signal is applied to grid No. 1 and the noise blanking pulses to grid No. 3. These pulses are formed by amplifying noise "spikes" in a 7059 pentode stage at the 6.0-Mc. i.f. The noise output from this stage is rectified and then applied to another 7059 for additional amplification before being fed to the noise blanker at 1650 ke. The noise blanker should prove of great value to any amateur using the SR-400 in a mobile installation or in a noisy location. In one test we tuned in a weak c.w. signal, about an S3, and then fed the hushy noise from the brush sparking of an electric drill into the receiver at an S9 noise level. When the noise blanker control was then adjusted, the noise was reduced to a point where the c.w. signal was 100 percent copy. Without the blanker it was impossible to copy any part of the c.w. signal.

<sup>1</sup> "Recent Equipment," *QST*, May 1967.



Covers for the v.f.o., lower left, and amplifier compartment, upper right, have been removed in this top view of the SR-400. The two dual variables in the amplifier compartment are the plate tuning and loading units. A screw-down perforated cover for the amplifier provides tight shielding of the circuit for TVI suppression.

The large shield cans contain the r.f., mixer and driver tuned coils. The ganged tuning capacitor for these circuits is mounted below deck, along with the band switch.



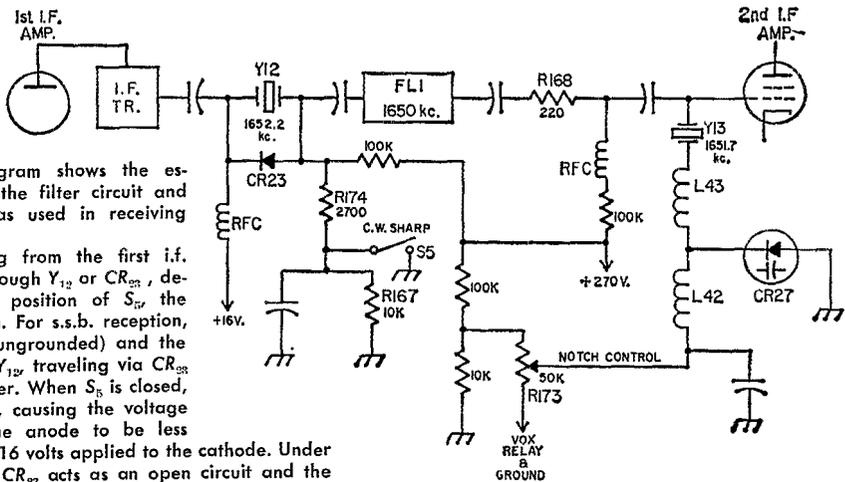


Fig. 2—This diagram shows the essential parts of the filter circuit and rejection notch as used in receiving with the SR-400.

Signals coming from the first i.f. stage are fed through  $Y_{12}$  or  $CR_{23}$ , depending on the position of  $S_5$ , the c.w. sharp switch. For s.s.b. reception,  $S_5$  is left open (ungrounded) and the signal bypasses  $Y_{12}$  traveling via  $CR_{23}$  to the 2.1-kc. filter. When  $S_5$  is closed,  $R_{174}$  is grounded, causing the voltage appearing at the anode to be less positive than the 16 volts applied to the cathode. Under these conditions,  $CR_{23}$  acts as an open circuit and the signals are routed through  $Y_{12}$ .

Connected in series from the grid lead of the second i.f. to ground is the notch circuit,  $Y_{13}$  and the Varicap,  $CR_{27}$ . When the notch control  $R_{173}$  is adjusted, the bias voltage on  $CR_{27}$  is varied. This changes the capacitance of the unit sufficiently to change the series resonance of  $Y_{13}$ , moving the resonance across the i.f. passband. The circuit is capable of up to 30-db. notch rejection.

the carrier-oscillator stage, carrier frequencies being provided for either upper or lower sideband, as desired. Output from the balanced modulator is directed to the 1650-kc. first i.f. amplifier and then through the 2.1-kc. lattice filter. From there, the signal is fed to the first transmitter mixer, a 7059 pentode section, along with a signal from the v.f.o. The signal is mixed with the v.f.o. frequency and converted to the 6-Mc. range. It is next amplified, and then in the second transmitter mixer it is combined with the output of one h.f. crystal oscillator for conversion to the desired amateur band. From there the signal is fed to the driver stage, a 12BY7A, amplified, and then to the final amplifier, a pair of 6HF5s.

The tank circuit for the 6HF5s is a conventional pi-network arrangement designed to work into a 50-ohm load. The manufacturer specifies that the tank circuit will handle non-reactive loads in the 40- to 70-ohm range.

For c.w., the transmitter second mixer and driver stages are keyed. Grid-block keying is used. Also keyed is a neon side-tone oscillator and amplifier. The side-tone signal is fed to the receiver audio stages and the speaker or headphones for monitoring purposes, and also to the second microphone-amplifier stage, the output of which operates the VOX circuits and antenna relay. The VOX circuit can be adjusted for hold-in periods for either phone or c.w. operation.

The rated power input of the transmitter is 400 watts p.e.p. for s.s.b. and 360 watts for c.w. In the metering setup, a single meter is used. When receiving, it is an S meter. On transmit, it can be used either to read relative r.f. out-

put, a.a.l.c. (amplified automatic level control) voltage, or amplifier plate current.

### Power Supplies

If you could obtain the transformers, it would be possible to build your own power supplies for the SR-400, since the power supply is a separate unit. The transceiver requires 750 volts d.c. at 500 ma., 280 volts d.c. at 100 ma., 12.6 volts a.c. at 5.0 amp., and a bias voltage of -80 to -135 volts. The PS-500A-AC supply designed for the SR-400 also includes a speaker.

The d.c.-to-d.c. converter for mobile operation (12.6 volts d.c. input) is designated the PS-500-DC. Output voltages and currents are

(Continued on page 156)

### Hallicrafters SR-400 Transceiver

Height: 6½ inches.  
Width: 15 inches.  
Depth: 13 inches.  
Weight: 18 pounds.  
Price Class: \$799.

### PS-500A-AC Power Supply

Price Class: \$119.

### PS-500-DC Power Supply

Price Class: \$149.

### HA-20 V.F.O. and S.W.R. Bridge

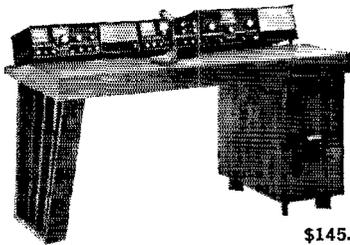
Height: 7 inches.  
Width: 10 inches.  
Depth: 7 inches.

Manufacturer: The Hallicrafters Co.,  
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tions and measurements. They told me that they would contact me in a few days after they had made some investigations of their own.

A week later, I was invited to the Reynolds facility and brought the Ferris 32-B with me. Mr. Smith escorted me through the plant and told me that his people had found one area which, as he put it, "was under suspicion." The area turned out to be an outdoor cable test facility. At this area, cables are strung outdoors (lengths of 50 feet or so) and various potentials are applied to them. Some of the cables had been under continuous test, with 5 to 15 kv. applied, for several years. As we approached the area, you could hear the hiss of corona. I set up the Ferris at 7 Mc. and got a reading of about 10,000  $\mu$ v./meter at a distance of about 100 feet from the test cage. Mr. Smith had an employee shut the line down and, as the man threw the switch off, the reading on the Ferris went from 10,000  $\mu$ v. to 1.5  $\mu$ v./meter! Mr. Smith told me that the test would be stopped immediately and steps would be taken to insure that they did not radiate noise in the future.

Needless to say, everyone was quite happy and the Reynolds people expressed some concern over the incident. Someone said, "This time, we interfered with a ham operator, but what could have happened if we had interfered with airport communications and the like?" (Philadelphia International Airport is about six miles northeast.)

And now, at my QTH, it is quiet as a graveyard. I can hear things over the long path again, and I will be breathing down the neck of W3WJD during the '69 ARRL DX smash. — Harold C. Ritchey, W3WFG, 208 W. Front St., Chester, Penna. 19013.

### Recent Equipment

(Continued from page 61)

the same as from the a.c. supply, except that the heaters run off the 12-volt car battery.

#### The Model HA-20 Adapter

Available as an accessory is the HA-20, a separate v.f.o. Also included in this unit is an s.w.r. bridge which can be used either for monitoring the feed-line match or as an output indicator.

The HA-20 v.f.o. dial is exactly the same as the one in the SR-400. When the HA-20 is used it is possible to transmit and receive on frequencies as much as 500 kc. apart. Also—and this one is really weird—it is possible to receive on two different frequencies at the same time. In many instances a DX operator desires to monitor both his own transmitting frequency and that of the DX station he is trying to work. It takes a little getting used to, but the HA-20 does just that.

The s.w.r. bridge is of the Monimatch type, with the bridge itself a separate unit that can

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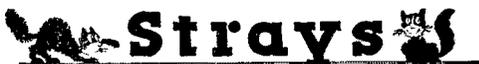
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be remotely mounted in the feed line. The HA-20 has its own built-in power supply. The unit also can be used with the SR-2000.

**General**

In testing the SR-400 in the ARRL lab, we found that the transceiver met, or bettered, all of the manufacturer's specifications for performance. Hallicrafters rates the transceiver at 200 watts output on s.s.b. and c.w. on 80, 40 and 20, and slightly lower than that figure for 15 and 10 meters. In the unit we tested, output was about 190 watts on the two higher bands and slightly over 200 watts on the other bands. The c.w. note was perfectly free from any trace of click or chirp.—*W1ICP*.



**Danger, High Voltage!**

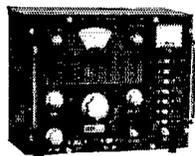
Another tragic story involving the danger of electricity. Here it is, as related by Lewis Kline, WN3KKB:

"My brother was erecting a vertical antenna and needed three guy wires to secure it to the house. Two of the Nylon guy wires were connected when a gust of wind blew the third guy onto a power line close by. My brother and a friend tried to reach the guy with a hammer handle to pull it free, but they still couldn't reach it. The friend was sent for a wooden broom handle but, in the meantime, my brother reached into the attic window and pulled out a metal curtain rod and told the friend to wait, that he had found something just as good. Thinking the Nylon guy was a non-conductor, my brother reached out with the metal curtain rod to knock the guy wire free of the power line; 4000 volts jumped to the rod and electrocuted him. Please convey to all of your readers this message: Please take your time and think things out when working near power lines and save yourself a terrible tragedy."

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The second annual Old Old Timers Club QSO Party will be held on January 24, 25 and 26, 1969, with the New Orleans, La. chapter as sponsor. This affair is for members only and all are urged to make their plans to participate. Log sheets, rules, suggested frequencies and other information will be published in the *Spark Gap Times* or contact the party chairman, J. L. "Bob" Robertson, W5BUK, 2609 Halsey Avenue, New Orleans, La. 70114. S.a.s.e., please.

<sup>1</sup> EDITOR'S NOTE: Some Nylon line has a metal strand running down its center.



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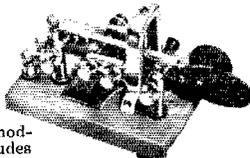
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