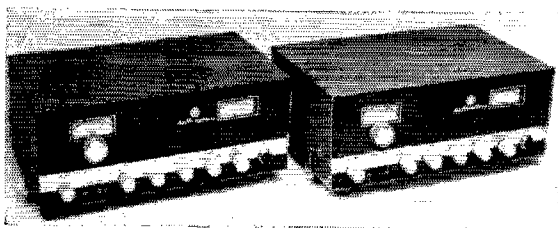


• Recent Equipment —

The Hallicrafters

SR-42 and SR-46

V.h.f. Transceivers



THROUGH s.s.b. is becoming more widely used in v.h.f. communication all the time, there is still plenty of interest in a.m. rigs, particularly the compact variety usable for either home-station or mobile work. The Hallicrafters SR-42 and SR-46 are moderately-priced a.m. transceivers for 144 and 50 Mc., aimed at this considerable market. They are almost identical units of a size and shape that is convenient for car use, equipped with power supplies that can work from either 115 volts a.c. or 12 volts d.c.

The only difference between the SR-42 and 46 that can be seen from the outside is the lettering on the panels, and it takes a fairly careful inspection of the interior to tell which unit you have before you. In performance and operation they are very much alike, as well, but a close look at the block diagrams in Fig. 1 will disclose differences as well as similarities.

Circuitry

First let's take similarities. They're both a.m. transceivers, with double-conversion receivers and crystal-controlled transmitters of about 5 watts output. The basic circuits are similar, except that the SR-42 has one more tube in the transmitter portion, to get to the higher frequency. The receiving lineups are almost identical, from the output of the first mixer on. Both convert the signal to 20.15 Mc. therein, and follow with a crystal-controlled oscillator-mixer converting again to 1650 kc. Next are two i.f.

amplifier stages, using 12BA6s, followed by a 12AL5 diode detector and automatic noise limiter, and two audio stages. The first audio amplifier is one half of a 12AT7, the other half of which serves as a microphone amplifier in transmitting. A 12AQ5 is a common second audio amplifier and modulator.

In both receivers the tuning range is broken up into two 2-megacycle segments, a step that will appeal to anyone who has tried to tune a 4-megacycle band with appreciable receiver selectivity. It just can't be done with any ordinary tuning mechanism, and the tuning device in these transceivers is about as "ordinary" as they come. It is a friction-drive dial of just about the ultimate simplicity, but it does the job smoothly and without noticeable backlash. The tunable oscillator range can be shifted two megacycles higher in frequency by a front-panel control that puts another coil across the oscillator tuned circuit.

The r.f. amplifier stage is a 13CW4 Nuvistor in both units. A double-tuned coupling circuit between this single stage and the mixer provides a certain amount of band-pass effect, and helps to improve the rejection of out-of-band signals. It should be of interest to the many v.h.f. men who have fiddled with inductive neutralizing circuits to note that a version of the capacitive-bridge system commonly used in transmitters is employed in these front ends. A 22-pf. bypass is used at the low end of the grid coil, and the neutralizing capacitor is 3.9 pf., connected from plate to the top side of the grid-coil bypass. A.v.c. is applied to the r.f. stage, and to the 12BA6 1650-kc. i.f. stages.

The crystal oscillator in the transmitters is the triode portion of a 7059, in an overtone circuit in which the low side of the crystal is returned to a capacitive feedback network in the plate circuit. Crystals between 24.0 and 24.666 Mc. are used in the SR-42 and 25 to 27 Mc. in the SR-46. The manufacturer doesn't mention it in the instruction books, but this circuit allows overtone operation with active 8-Mc. crystals. Not all surplus crystals will "take off" with the feedback provided, but most of the considerable batch we tried did. Where they do oscillate, they provide the same output and at least as good stability as the 24 to 27-Mc. overtone crystals specified. Watch out for any that are near band edges, however. The frequency may not work



Interior of the SR-46 Transceiver. Appearance of the SR-42 is identical, except for one more tube in the right front portion of the chassis. Tuning is by means of a rim-drive vernier dial, left.

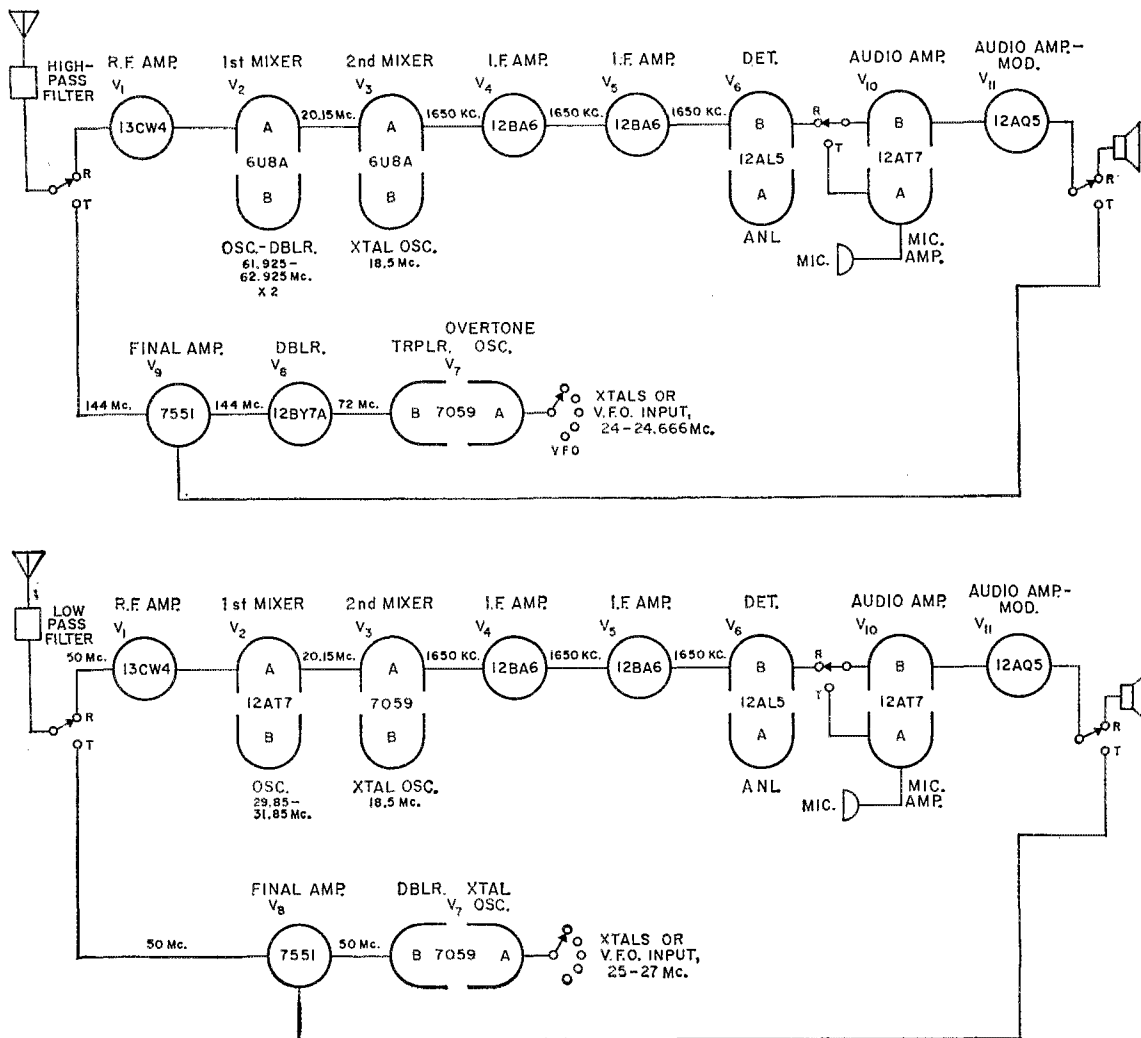


Fig. 1—Though the photographs make the SR-42 and SR-46 appear practically identical, block diagrams of the two units show that there are quite a few differences.

out to exactly three times that marked on the crystal holder.

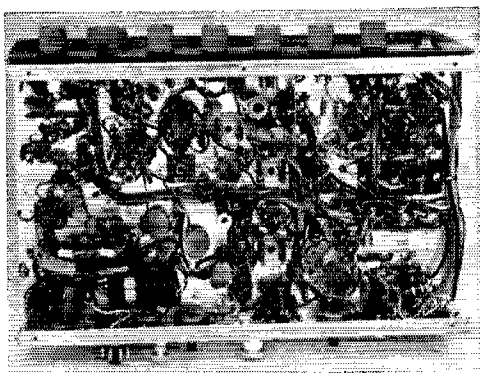
The output amplifier in the transmitter is a 7551, running straight through, driven from the pentode portion of the 7059 in the 50-Mc. rig, and a 12BY7A doubler in the 144-Mc. one. Provision is made for external v.f.o. in both transmitters. The output of the v.f.o. should be in the 24 to 27-Mc. range.

Now we can get to the differences, of which there are more than meet the eye of the casual viewer of the two transceivers. As already mentioned, the SR-42 has a 12BY7A doubler stage following the oscillator in the transmitter. In the receivers the tunable oscillator in the SR-46 is one half of a dual triode. It tunes 29.85 to 31.85 Mc. for the lower half of the 50-Mc. band, or 2 Mc. higher for the upper half. In the SR-42 an oscillator-doubler is used for injection. The

pentode portion of a 6U8A tunes 61.925 to 62.925 Mc. (or 62.925 to 63.925 Mc.) with its plate circuit doubling to furnish injection to the triode of the 6U8A, which is the first mixer. This oscillator-doubler helps to give the SR-42 its quite good stability.

The crystal-controlled second mixer-oscillator is a 6U8A in the SR-42 and a 7059 in the SR-46. Both are triode-pentodes.

It will be seen from the foregoing description, and from the block diagrams, that the front-end circuitry of the receivers is quite simple. This would leave them open to considerable spurious-signal trouble, but for the inclusion of a high-pass filter in the antenna circuit of the SR-42, and a low-pass filter similarly in the SR-46. Neither unit is completely devoid of interference from f.m. and TV stations in locations close by such installations, but they do pretty well, on the



Bottom view of the SR-42 transceiver.

whole. Should there be any problem in this respect it could very likely be taken care of by insertion of a coaxial or strip-line filter in the antenna lead to the unit. Such filters are easy to make, and some are now becoming available commercially.

Operation

Send-receive control is entirely by means of the push-to-talk button on the microphone. There is no provision for direct switching otherwise. The automatic noise limiter is just that — it's in there all the time. Reflecting on long experience with such rigs this latter point seems to be no handicap. How often is the noise limiter ever turned off on a v.h.f. receiver, when there is provision for doing so?

The transceivers come through equipped for a.c. operation only. A "mobile kit" including the vibrator, a fused battery cable, and a carrying-mounting handle is an extra-cost option. In the units tried we encountered quite a bit of vibrator hash, using the same vibrator unit in both rigs. Replacing the vibrator made things considerably better, and an inexpensive transistorized vibrator substitute cleaned up this trouble completely.

The selectivity of the double-conversion receivers is considerably better than that of early transceivers made for the v.h.f. market. We wondered if this would not show up some drift or other oscillator-instability problems, par-

ticularly in mobile work, but such has not been the case. The voltage on the receiver tunable oscillators is zener-regulated, and this seems to take care of the fluctuations that occur in mobile work between engine-running and engine-off conditions very nicely.

Performance of the receivers is more than adequate for matching the effective range of the low-powered transmitters, the Nuvistor front ends providing noise figures more than good enough. The transmitters operate well, on the whole, though both are incapable of 100 percent modulation, especially on the negative peaks. This is a common failing in v.h.f. amplifiers, and the SR-42 and 46 are neither better nor worse than most in this respect. We did note a tendency to self-oscillation with a crystal that is sufficiently inactive to operate properly. The transmitter appears to tune up normally under these circumstances, and unless you check the output frequency carefully, or monitor the signal quality with a selective receiver, you might not be aware of this lack of crystal control. There is no problem with a good crystal in place, however.

Your reviewer found only one thing lacking: provision for transmission and reception of c.w. Usually we are told that this is omitted because the stability is not good enough for satisfactory c.w. work. This does not hold for the SR-46, at least. We took the liberty of breaking the cathode return in the transmitter of the 50-Mc. unit, and we tried running in a 1650-ke. signal for a beat oscillator. The result was not the best c.w. in the world, but it wasn't the worst, either. We'd make the keying modification, and find room somewhere for a transistor b.f.o., if we were going to be using the equipment for long.

— W1HDQ

Hallicrafters SR-42 and SR-46 Transceivers

Height: 5½ inches.

Width: 12½ inches.

Depth: 8¾ inches.

Weight: 17 pounds.

Power requirements: 115 volts a.c., 65 watts, or 11 to 16 volts d.c., 5 amperes.

Price Class: \$189, less mobile kit.

Clegg SS Booster

ON a.m., speech clipping without increasing the bandwidth is a relatively simple way to improve the signal's effectiveness, because it can be done at audio frequencies. On single sideband speech clipping without increasing the bandwidth becomes a little more complicated, because it must be done at radio frequencies. The increase in average power output is quite striking, however, and is obvious to anyone who can read a scope or a meter.

