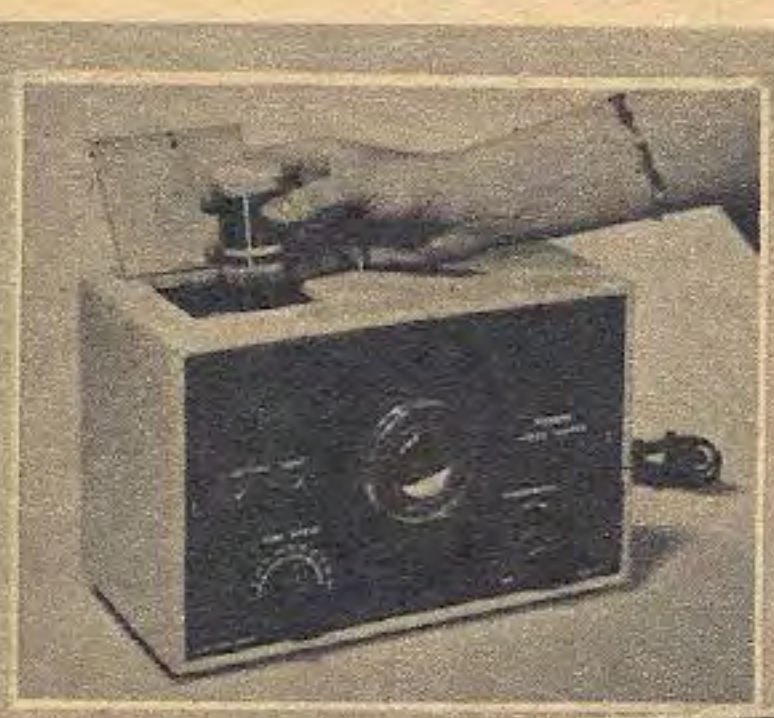
SWL EQUIPMENT ROUNDUP



1

1 Knight-Kit Ocean Hopper is a low-cost regenerative receiver with coverage from 165 kc to 35 mc. Plug-in coils provide band switching. The receiver kit sells for $16.95 and the package of 5 coils costs $2.49. Headphones also extra. Allied Radio, Chicago 80, Ill.

2

2 Space Spanner by Knight-Kit features a 2-position band switch to select the broadcast band or short wave (6.5 to 17 mc coverage). Regenerative circuit has a built-in loudspeaker with optional headphone listening. Kit is $19.95. Allied Radio, Chicago 80, Ill.

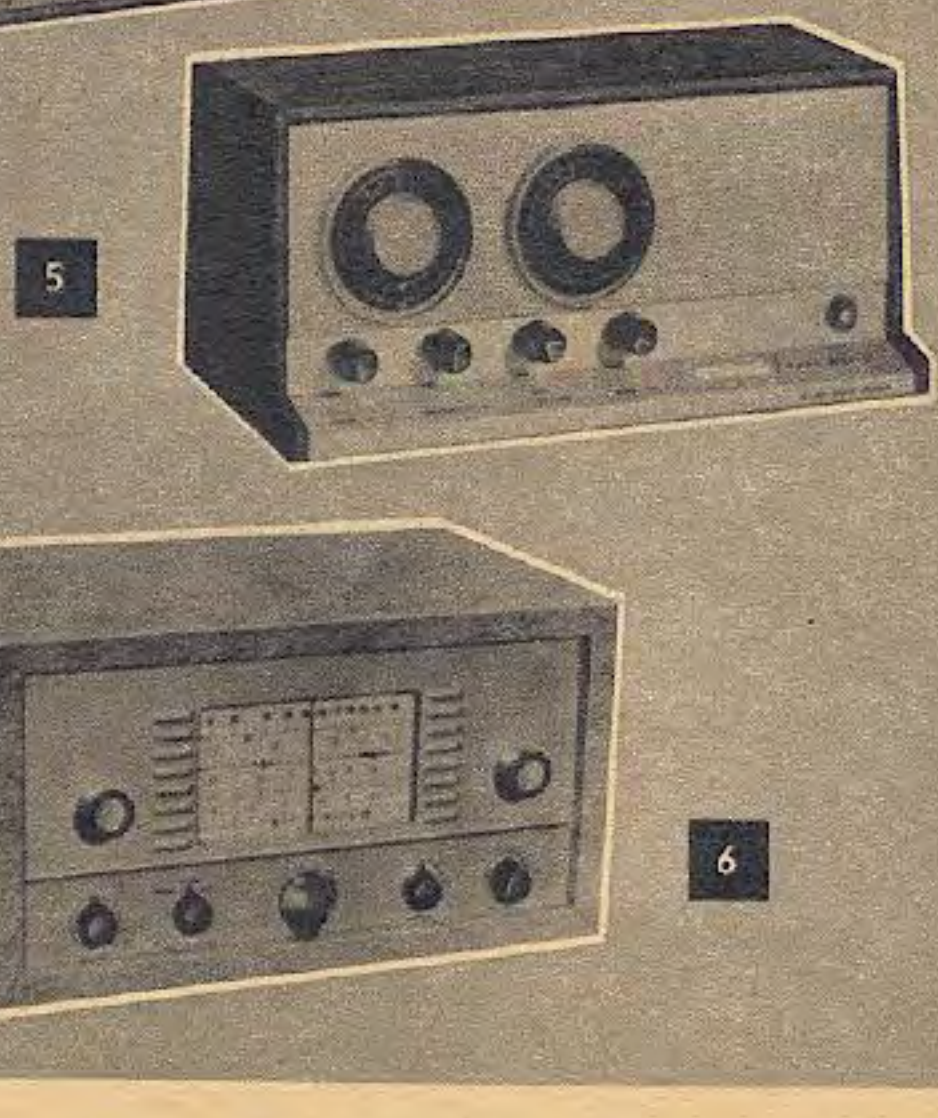
3

3 Knight-Kit DXer is a transistorized "portable" powered by 4 penlite cells. Covers BC band and SW from 7.5 to 17.5 mc. Circuit has 3 transistors. Comes with 25-ft. antenna, the headphones are extra. Kit is priced at $19.95. Allied Radio, Chicago 80, Ill.

3

4

4 Lafayette's Explor-Air is a regenerative receiver covering from the BC band to 30 mc in 4 bands switched on the front panel. The set has a built-in speaker and headphone jack. Price for the kit is $21.95 plus $2.75 cabinet. Lafayette Radio, Jamaica 33, N. Y.



5

5 Largest number of features among Knight-Kit's regen receivers are found in the Span Master, which has a built-in speaker, headphone jack, both coarse and fine regen controls. Covers BC band through 30 mc in 4 bands. $29.95. Allied Radio, Chicago 80, Ill.

6

6 Heathkit AR-3, a 5-tube superhet, is still available but is to be dropped in favor of GR-91 (see our preview in this issue). AR-3 covers 550 kc to 30 mc, has speaker, bandspread, noise limiter. Price is $29.95 for kit; cabinet $4.95. Heath Co., Benton Harbor, Mich.

EQUIPMENT SWL ROUNDUP

7

7 Philmore's CR-5AC is a superhet kit with S-meter, bandspread tuning and coverage from BC band to 30 mc. (See our kit report in this issue.) Philmore sells the CR-5AC kit for $39.95. Metal cabinet costs $7.95 extra. Philmore Mfg. Co., Richmond Hill 18, N. Y.

8

8 Heathkit's new GR-91 (see preview in this issue) is a 4-tube (plus rectifier) superhet with illuminated tuning meter, noise limiter, built-in speaker. Printed circuit construction. Covers 500 kc to 30 mc. Price is $39.95. Heath Co., Benton Harbor, Mich.

9

9 Realistic-9 is a transistor portable covering BC, long-wave and SW bands (6 to 18 mc). Powered by one 9-volt battery. Has 28½-inch telescoping whip antenna, provision for external speaker. Earphone included in price of $44.88. Radio Shack, Boston 17, Mass.

10

10 Brand-new Hallicrafters receiver is Sky Buddy II, covering BC band plus 2-5.5 and 6-16 mc SW bands. Three tubes plus diode, built-in speaker. Front panel has code (BFO) and headphone switches. Kit is $39.95; wired model $49.95. Hallicrafters Co., Chicago 24, Ill.

11

11 Conquest, small 7-transistor portable by Bulova, covers BC band plus 4 to 12 mc on short wave. Powered by 2 penlite cells. Whip antenna; earphone and jack for external speaker. Price is $49.95; deluxe model, $59.95. Bulova Watch Co., Flushing 70, N. Y.

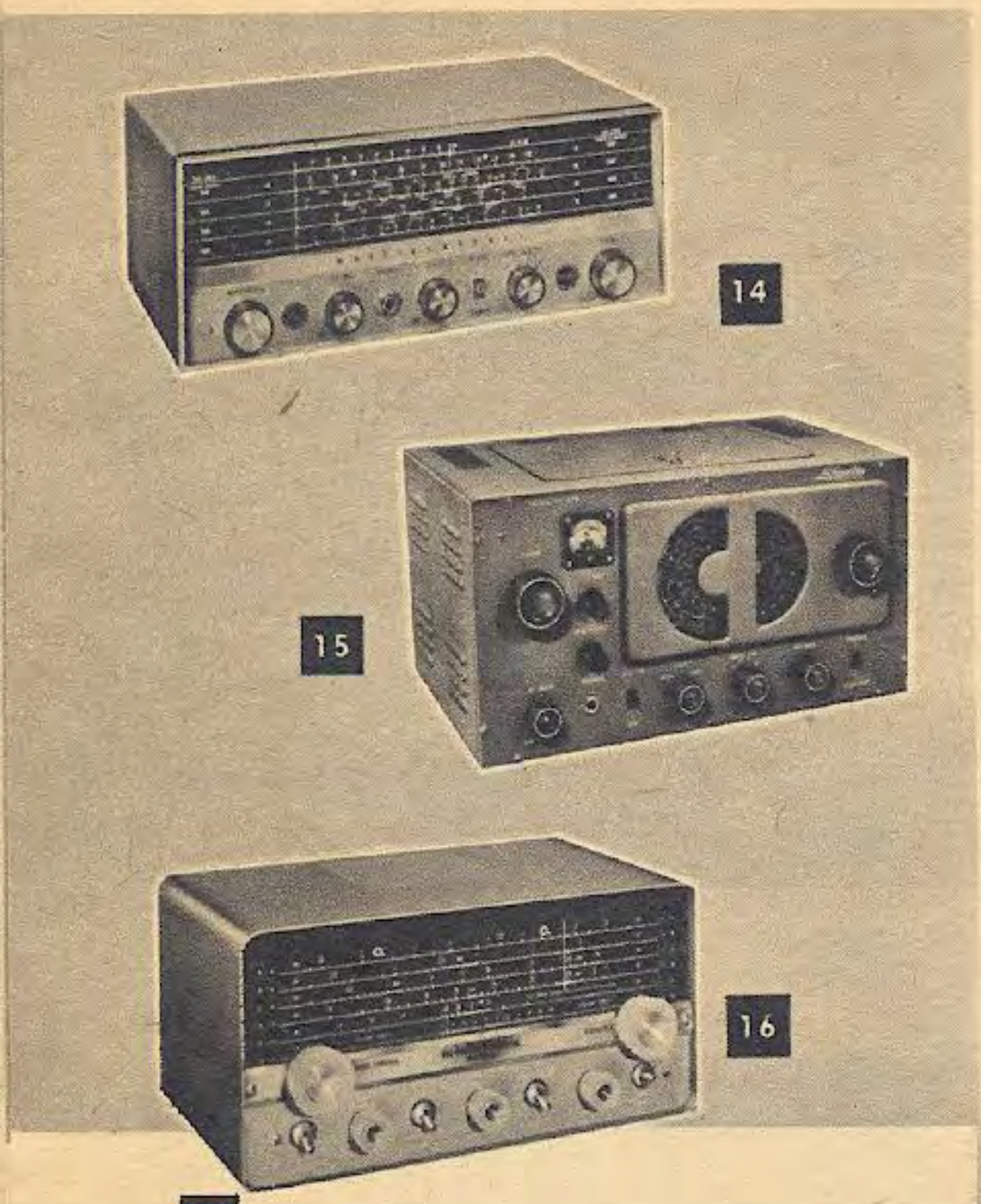
12

12 The National NC-60, a popular SWL rig, covers 540 kc to 31 mc in 4 switched bands. Five-tube circuit has built-in speaker, front-panel headphone jack and CWO on-off switch, bandspread tuning. The price is $59.95. National Radio, Melrose 76, Mass.

13

13 Knight-Kit R-55 is a superhet covering everything from the BC band to 36 mc and in addition the 6-meter ham band (50-54 mc). Main and bandspread tuning and provision for crystal calibrator. Kit is $67.50, calibrator $10.95. Allied Radio, Chicago 80, Ill.

SWL EQUIPMENT ROUNDUP



14

The famed Hallicrafters S-38 has given way to the new S-120, shown here. Hallicrafters' new rig covers the BC band up to 30 mc, has speaker, ferrite antenna, adjustable whip. Four tubes plus rectifier. The list price is $69.95. Hallicrafters Co., Chicago 24, Ill.

15

KT-200 by Lafayette is a 9-tube superhet covering 535 kc to 30 mc in 4 bands. Has built-in Q-multiplier for sharp selectivity, electrical bandspread, edgewise S-meter, noise limiter. Set is $79.95 wired, $64.50 as kit (without speaker). Lafayette Radio, Jamaica 33, N. Y.

16

Seven tubes and rectifier are in Hallicrafters S-107. Covers BC band plus 2.5 to 31 mc and 48 to 54.5 mc (the 6-meter ham band). Phono input is provided. Features include electrical bandspread and noise limiter. $94.95. Hallicrafters Co., Chicago 24, Ill.

17

Knight-Kit R-100 is a professional-quality receiver kit used by many amateurs (see kit report in this issue). R-100 covers 540 kc to 30 mc in 4 bands, has special bandspread on 80 to 10 meter ham bands, 12 front-panel controls. Basic kit $99.95; speaker kit $9.75; S-meter kit $12.95. Allied Radio, Chicago 80, Ill.

18

HE-30 by Lafayette is factory-wired superhet covering 550 kc to 30 mc in 4 bands. Built-in Q-multiplier, electrical bandspread, edgewise S-meter, noise limiter. Kit is $99.95; speaker (HE-11) is $7.95. Lafayette Radio, Jamaica 33, N. Y.

19

Arvin 9598 is a 7-transistor portable that covers long wave, BC band and SW from 2.1 to 6 mc in 3 switched bands. Telescoping whip antenna. List price of the set is $100. Arvin Industries, Columbus, Ind.

20

Ten transistors, 6 diodes are featured in GC-1, a portable, general coverage receiver by Heathkit. Five bands tune from 550 kc to 32 mc; 54-in. built-in whip; powered by 8 C cells or 117-v power supply that costs $9.95 extra. Mohican kit is $109.95, wired version is $193.50. Heath Co., Benton Harbor, Mich.

SWL EQUIPMENT ROUNDUP

21 Columbia's table-top model 625 is an AM-FM set which has an extra short-wave band covering 6 to 18 mc. Magic-eye tuning aid at upper right. The 8-tuber has a price of $119.95. Columbia Phonographs, New York 22, N. Y.

22 RCA's Strato-World 9-transistor portable operates on 9 size D cells. It covers the BC band plus 6 SW bands extending to 18.2 mc. Omnidirectional whip antenna telescopes to 48 inches. World map in lid gives global time zones. RCA, New York 20, N. Y.

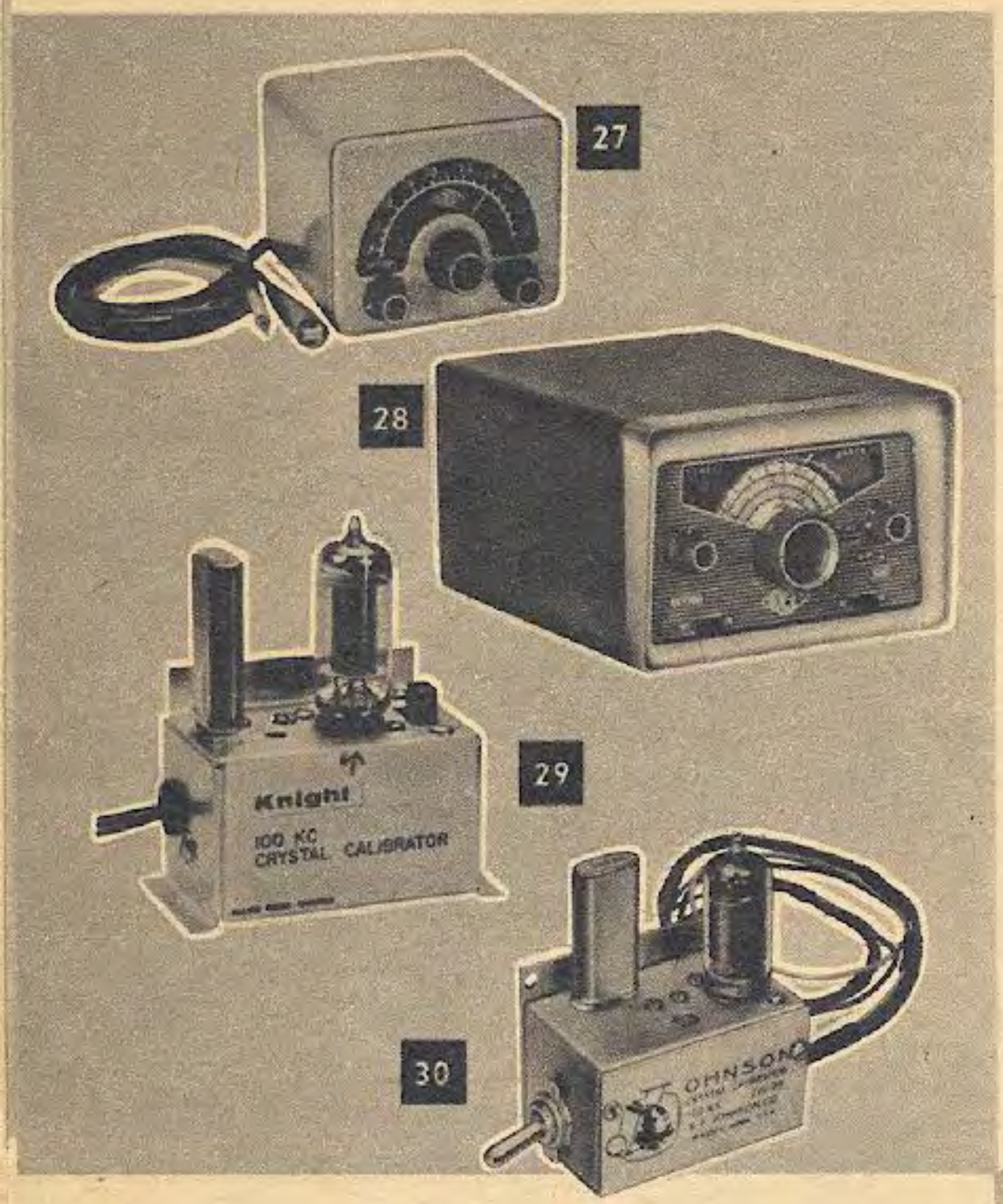
23 National's NC-190 is a double-conversion receiver covering 540 kc to 30 mc in 5 ranges. Has S-meter and bandspread, selectivity, antenna tuning controls on front panel. SSB/CW Automatic Gain Control. $219.95 plus $19.95 speaker. National Radio, Melrose 76, Mass.

24 Philco T-9 Trans-World portable is all-transistorized unit that covers the BC band plus short wave to 18.2 mc. Powered by 6 D cells. Telescoping whip antenna. Time-zone map comes in lid, along with a listener's log book. $230. Philco, Philadelphia 34, Pa.

25 Zenith Royal 1000 Trans-Oceanic is 9-transistor portable that uses 9 size D cells. Covers BC band and 6 SW bands to 22.4 mc. It has ferrite and whip antennas, time-zone scale and logging chart, electrical bandspread. Retail price is $250. Zenith Corp., Chicago 39, Ill.

26 Hammarlund HQ-145X receiver has provision for crystal control on a single channel. The 11-tube superhet covers 540 kc to 30 mc in 4 bands, has dual conversion on 10 through 30 mc. Price with clock but without crystal is $279. Hammarlund Mfg. Co., New York 1, N. Y.

SWL EQUIPMENT ROUNDUP



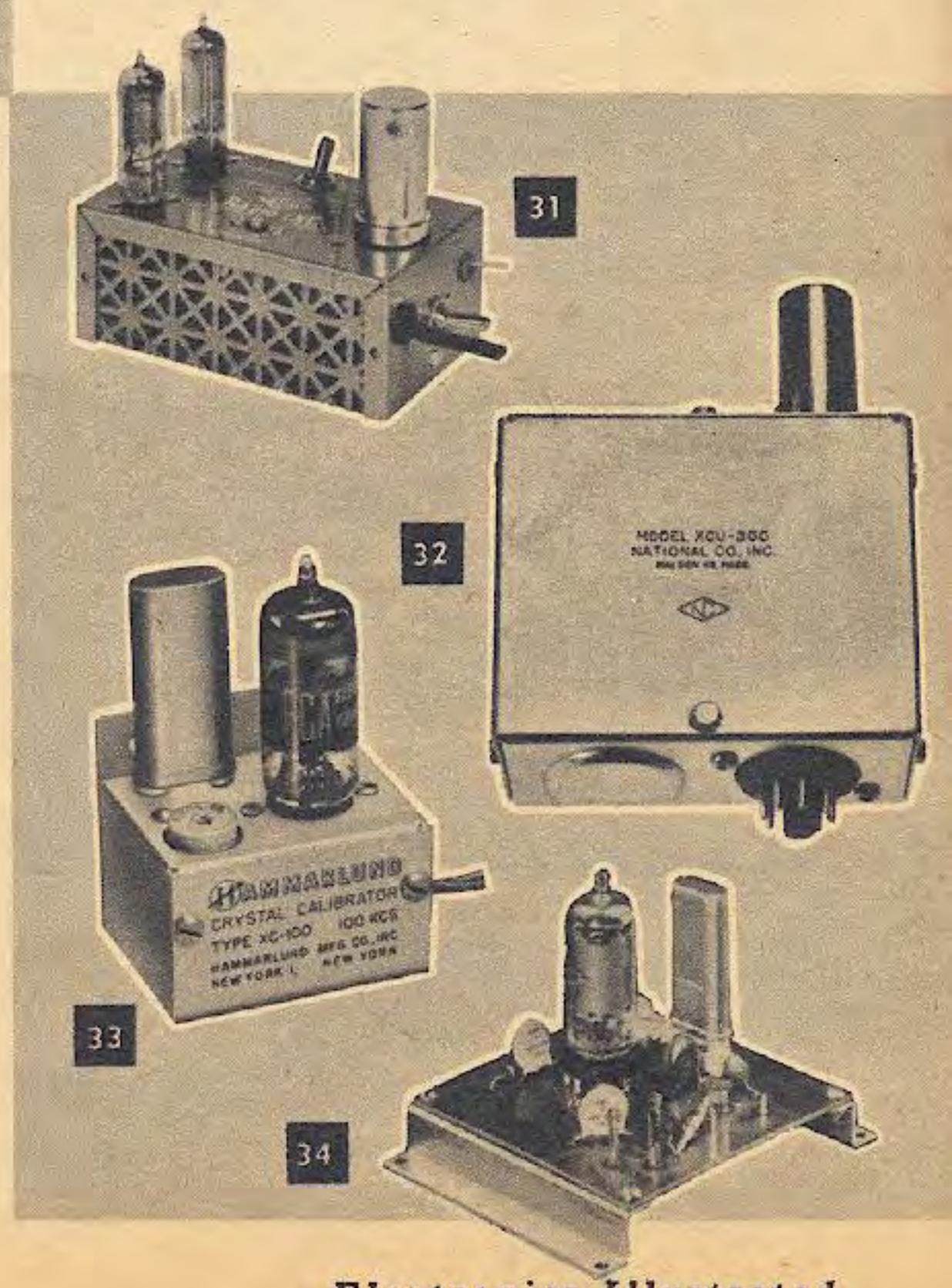
27 Marine band is covered by Gonset 3163 converter, made for use in car. It requires 12 volts, plays through AM radio, brings in ship-to-ship, ship-to-shore, Coast Guard, etc. between 1.6 and 3 mc. Has antenna tuner. Price is $29.50. Gonset Div., Burbank, Calif.

28 Gonset Super 12, a converter that works through car's AM radio, covers 19 and 49 meter shortwave bands and the major ham bands. Requires 12 volts; no internal connections to the automobile's radio. The price of the unit is $69.50. Gonset Div., Burbank, Calif.

CRYSTAL CALIBRATORS serve as frequency standards for SWLers. Most produce marker signals every 100 kc on the dial, permitting the user to locate stations and band edges with great accuracy. Some operate on 117 v., others take power from receiver. Most can fit inside receiver.

29 Knight-Kit 100-kc calibrator kit goes to 54 mc, requires 6.3 v. @ 0.15 amp and 150-300 v. DC @ 3-6 ma. Kit is $10.95. Allied Radio, Chicago 80, Ill.

30 Johnson calibrator goes to 55 mc, has 6BH6 tube, ceramic trimmer for zero beating of crystal to WWV. $17.95. E. F. Johnson Co., Waseca, Minn.



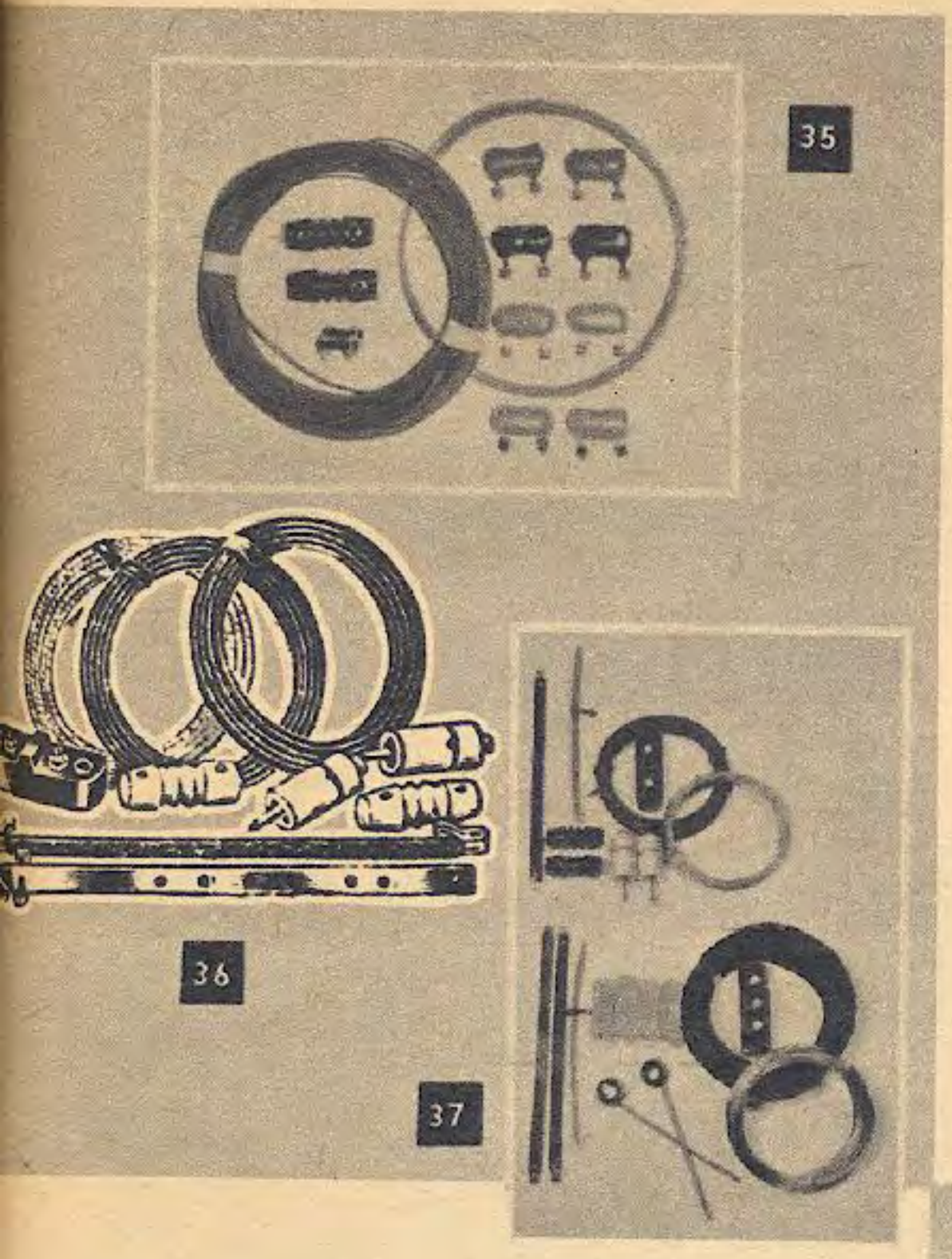
31 Bud FCC90B calibrator produces 100-kc check points to 30 mc, operates on 117 v. AC, has 2 tubes. Price of unit is $20.48. Bud Radio, Cleveland 3, Ohio.

32 National offers 3 crystal calibrators ranging in price from the XCU-300 (shown) at $23.95 to $34.95. All are 100 kc. National Radio, Melrose 76, Mass.

33 Hammarlund XC-100 calibrator employs a quartz crystal and 6BZ6 pentode, provides 100-kc signals. $15.95. Hammarlund Mfg. Co., New York 1, N. Y.

34 International Crystal 100-kc FO-1L calibrator has printed circuit board. It sells for $12.95 as kit, $15.95 wired. Intl. Crystal, Oklahoma City, Okla.

SWL EQUIPMENT ROUNDUP



35

35 Mosley SWL-7 dipole trap antenna kit is resonant on 7 bands (11, 13, 16, 19, 25, 31, 49 meters), measures 40 feet in length. Kit includes traps, wire, lead-in, insulators. $14.75. Model RD-5 is antenna kit for ham bands. Mosley Electronics, Bridgeton, Mo.

36 Allied short-wave antenna kit includes bare copper wire, lead-in, ground wire, insulators, lightning arrester, clamp, etc. Deluxe kit price is $2.04. Standard kit costs $1.03. Allied Radio, Chicago 80, Il.

37 Consolidated SWL antenna kits include low-cost No. 507 (top), a 50-footer selling for $1.49, and No. 615, a 100-footer usable as dipole, double-dipole, inverted L, etc. It sells for $4.26, all hardware included. Consolidate Wire, Chicago 16, Ill.

38

39

40

38 Mastercrafters 24-hour clock for the listening shack has a south polar map projection to indicate time anywhere in the world. Face is 8 inches in diameter; AC operation. Price is $8.47. A 12-hour model of the clock is available. Mastercrafters, Chicago 12, Ill.

39 Recorded samples of what is to be heard on short-wave bands is offered by Hallicrafters for 25¢. Features bits of plane, ship and ham transmissions, President Eisenhower's voice being transmitted from satellite. 45 rpm. Hallicrafters Co., Chicago 24, Ill.

40 A description of how short-wave signals behave is contained in paperback book, Shortwave Propagation, by Stanley Leinwoll, as well as time chart in foreground. The book lies on a National NC-188 receiver. $3.90. John F. Rider, Inc., New York 11, N. Y.

Heath's New Receiver Kit

THE POPULAR Heathkit AR-3 SWL receiver is now being replaced by a new Heathkit, the GR-91. Although the new kit was not available for test building before press time, EI presents a preview of the GR-91.

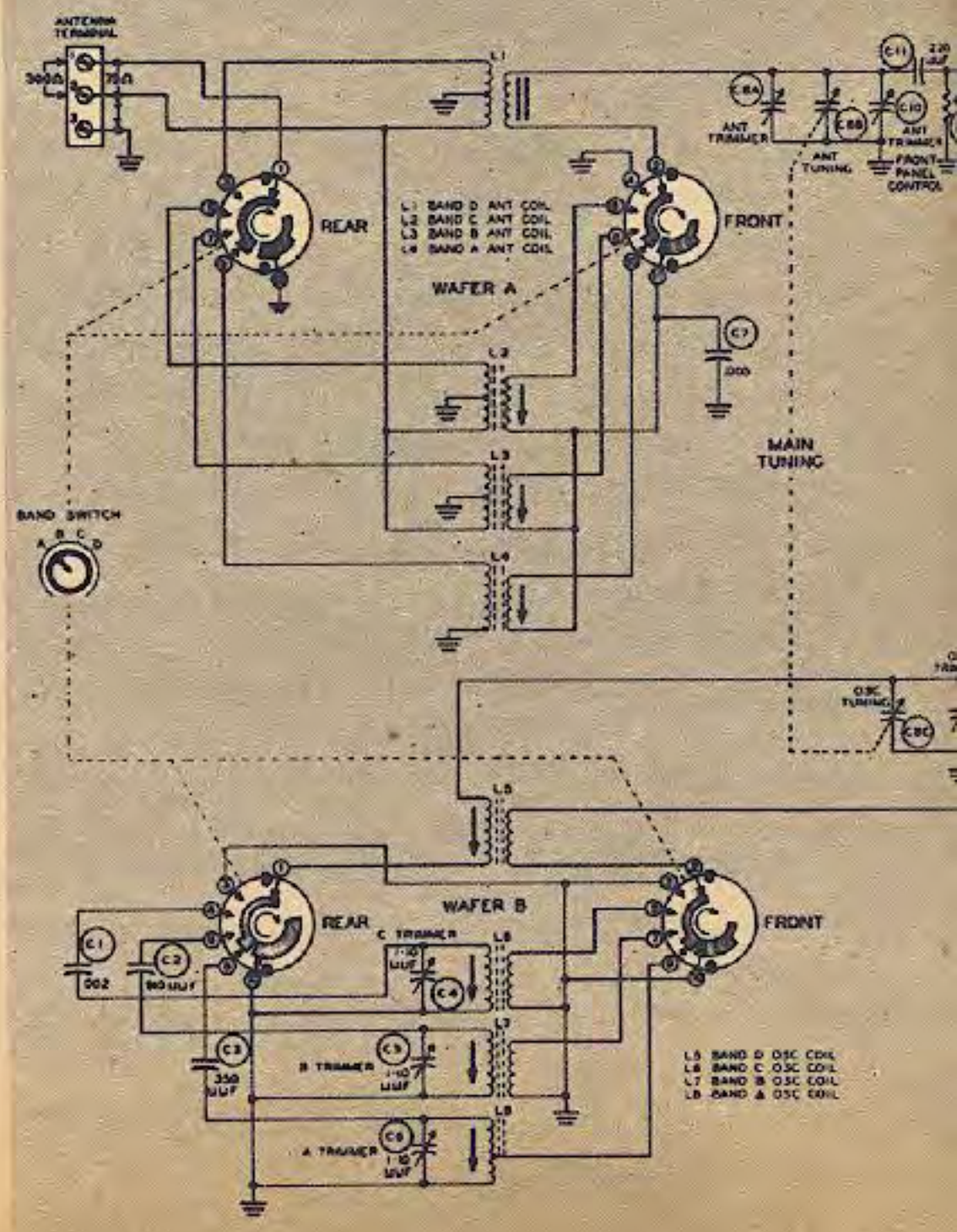
Heathkit's new entry in the field presents a striking design with a pleasing, functional appearance. First to be noted is an illuminated tuning meter above the main tuning knob. Its job is to indicate the relative signal strength of each station. Six other knobs grace the front panel. From the left they read *audio gain, BFO control, AM-STBY-CW, band switch* and *ant. trimmer*. The bandspread control is located logically beneath the tuning knob. The rear chassis sports a noise limiter on-off switch, headphone jack, antenna input (you have a choice of 300 or 75 ohms) and a Q-multiplier input jack.

As might be expected from its price of $39.95, the GR-91 makes a few tubes do a lot of work. Basically, four AC/DC types are used in a superheterodyne configuration. The power supply is *not* AC/DC, however, and this is important. An isolation transformer is used to feed both the series-connected filament string and a silicon rectifier, eliminating shock hazard to external ground.

The departure from the standard broadcast superhet design starts right at the antenna, where a four-position band switch selects the antenna coil providing the band coverage desired. An antenna trimmer (C10—one of the front panel controls) adjusts the tuning circuit to an exact impedance match to your antenna for maximum signal gain.

A 100-ohm resistor (R1) in series with the grid of the 12BE6 mixer-converter tube serves as a parasitic suppressor. A bandspread capacitor also shunts the main tuning capacitor and serves as an electrical vernier control.

The oscillator section of the tube is standard except



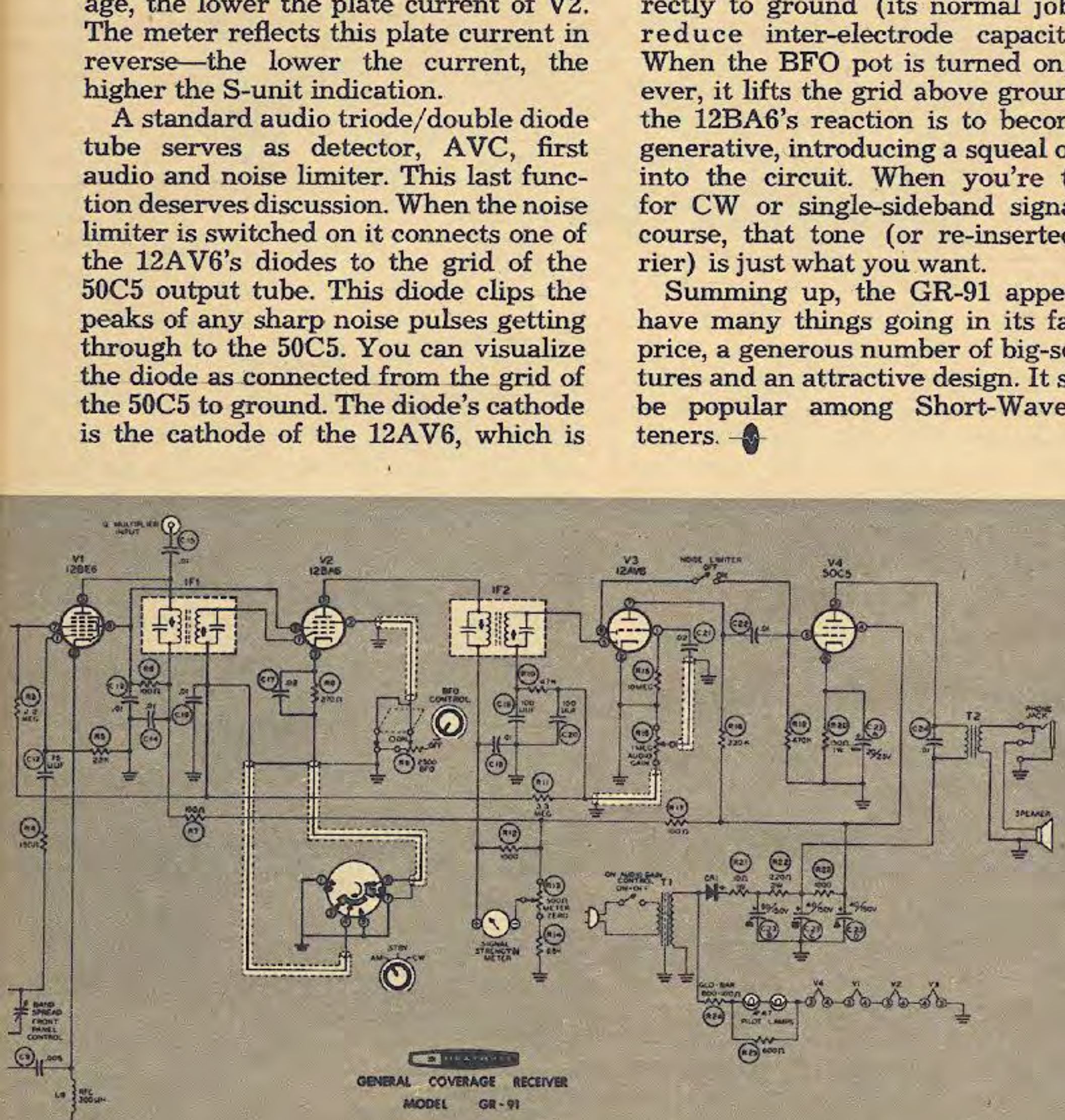
for the separate oscillator coil for each band. In common with almost all SWL and communications receivers, the GR-91 covers from 550 kc to 30 mc in four bands.

The IF stage is conventional and uses a 12BA6 tube (V2). The signal strength meter responds to the plate current of V2, which is under direct control of the Automatic Volume Control (AVC) voltage developed by the carrier of the incoming signal. Therefore, the stronger the carrier, the greater the AVC voltage, the lower the plate current of V2. The meter reflects this plate current in reverse—the lower the current, the higher the S-unit indication.

A standard audio triode/double diode tube serves as detector, AVC, first audio and noise limiter. This last function deserves discussion. When the noise limiter is switched on it connects one of the 12AV6's diodes to the grid of the 50C5 output tube. This diode clips the peaks of any sharp noise pulses getting through to the 50C5. You can visualize the diode as connected from the grid of the 50C5 to ground. The diode's cathode is the cathode of the 12AV6, which is connected to ground. This type of noise limiter is fairly effective in subduing atmospheric and similar types of interference.

The Beat Frequency Oscillator (BFO) control is a clever bit of circuitry. Although not a new idea, it does its job effectively with minimum hardware. The control consists merely of a potentiometer connected from the suppressor grid of the 12BA6 IF tube to ground. In normal operation, the suppressor grid is always connected directly to ground (its normal job is to reduce inter-electrode capacitance). When the BFO pot is turned on, however, it lifts the grid above ground and the 12BA6's reaction is to become regenerative, introducing a squeal or tone into the circuit. When you're tuning for CW or single-sideband signals, of course, that tone (or re-inserted carrier) is just what you want.

Summing up, the GR-91 appears to have many things going in its favor—price, a generous number of big-set features and an attractive design. It should be popular among Short-Wave Listeners.



Schematic of Heathkit's new GR-91 receiver shows four AC/DC type tubes used in a superhet configuration. Note isolation transformer (T1) in power supply.

Philmore CR-5AC

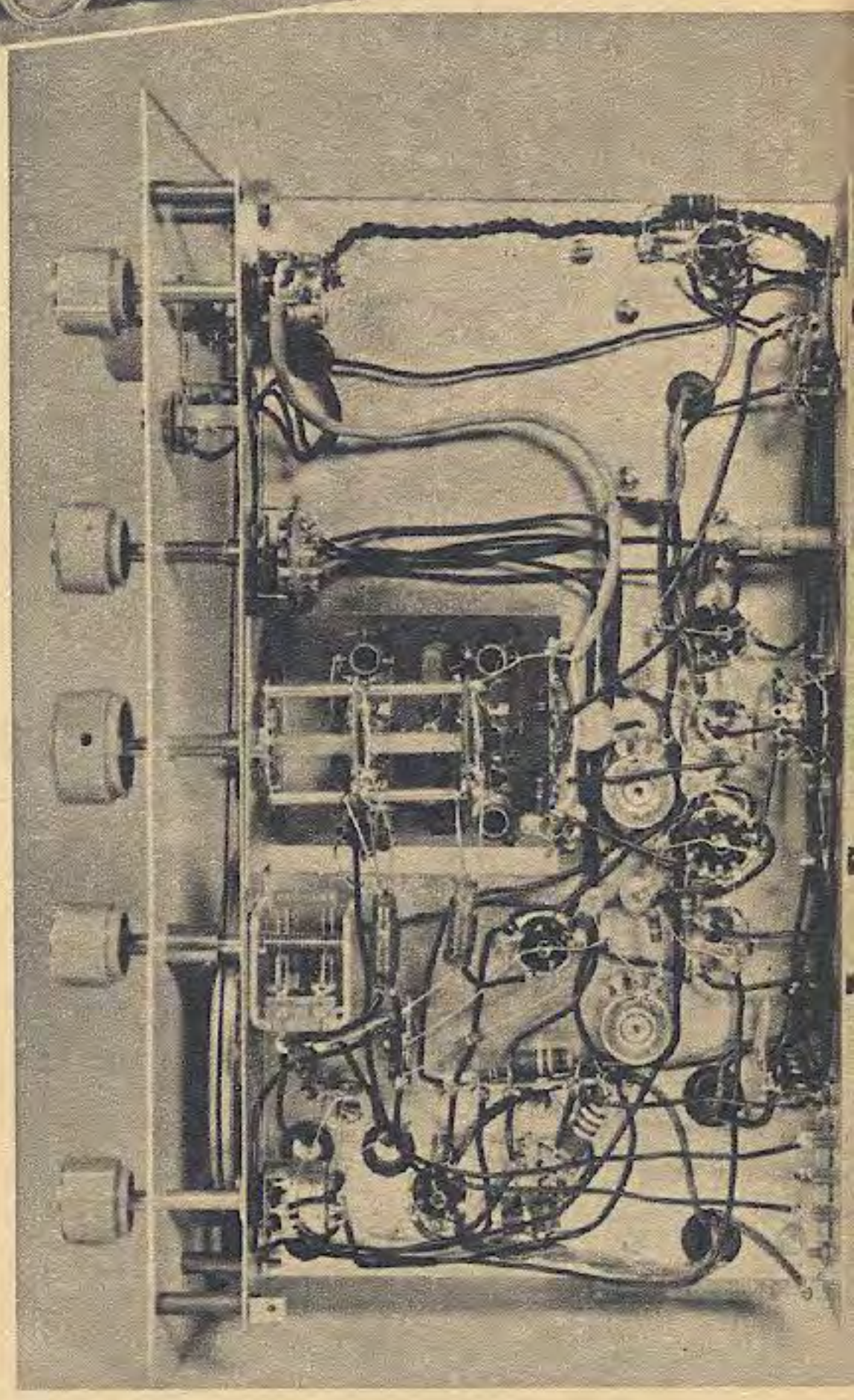
THE Philmore Model CR-5AC is a relatively inexpensive four-band, AC-operated superheterodyne receiver, available as an easy-to-build kit. Frequencies covered range through the broadcast band to 30 mc. The unit includes a self-contained speaker and such necessary SWL features as a noise limiter, bandspread, BFO, S-meter, etc.

Circuit Features

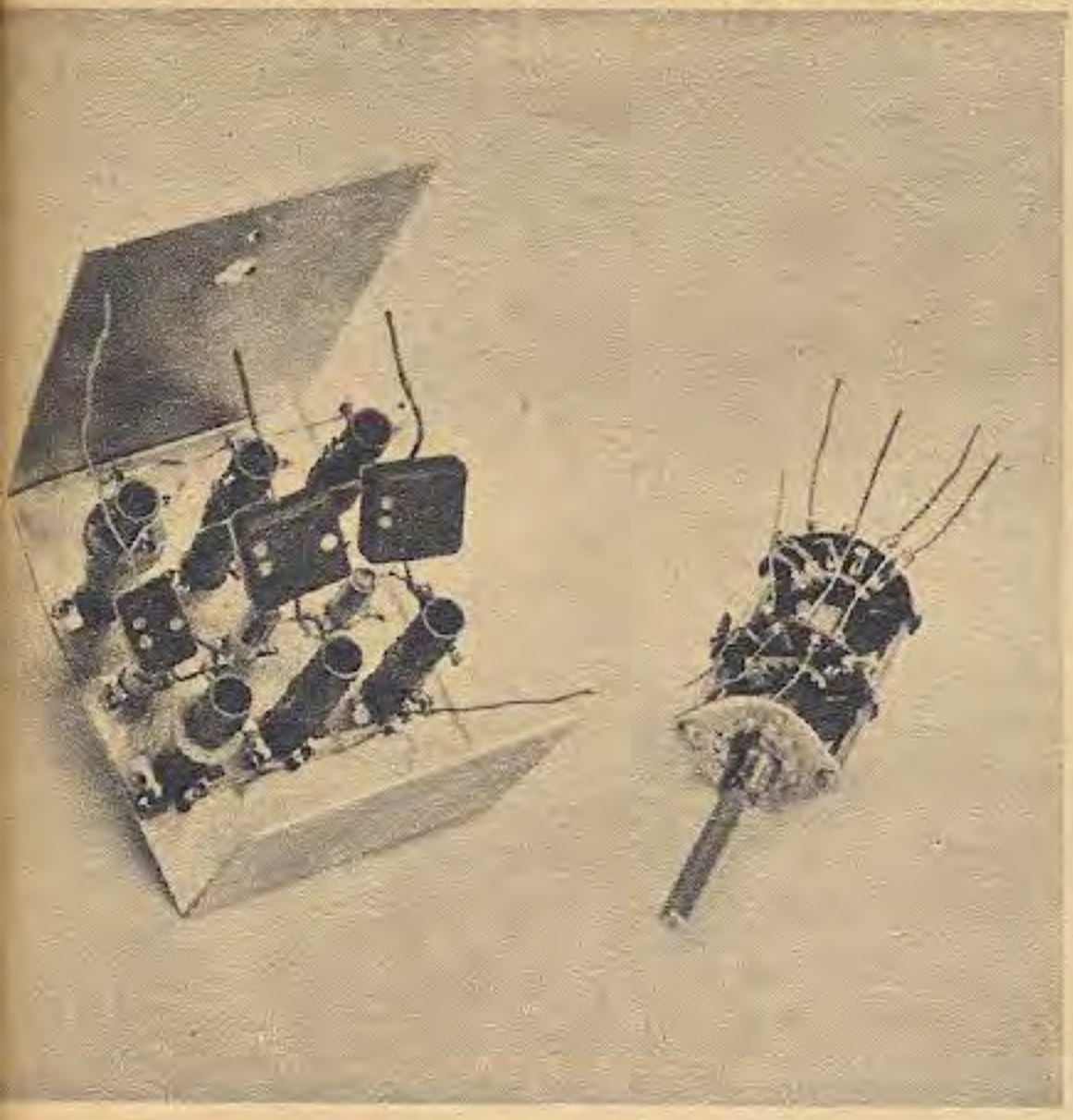
When the receiver's RF gain control is rotated counter-clockwise from the full *on* position, the AVC line is shorted to ground and the receiver gain is manually controlled. Without this defeat position, weak signals would be lost.

When the function switch is in the **CW** position, the BFO is activated. A reflex configuration is employed, where the first audio triode (6AV6) doubles in brass as an RF oscillator. The oscillator frequency is adjusted (by the BFO coil slug) to beat with the IF frequency, yielding an audio-frequency tone.

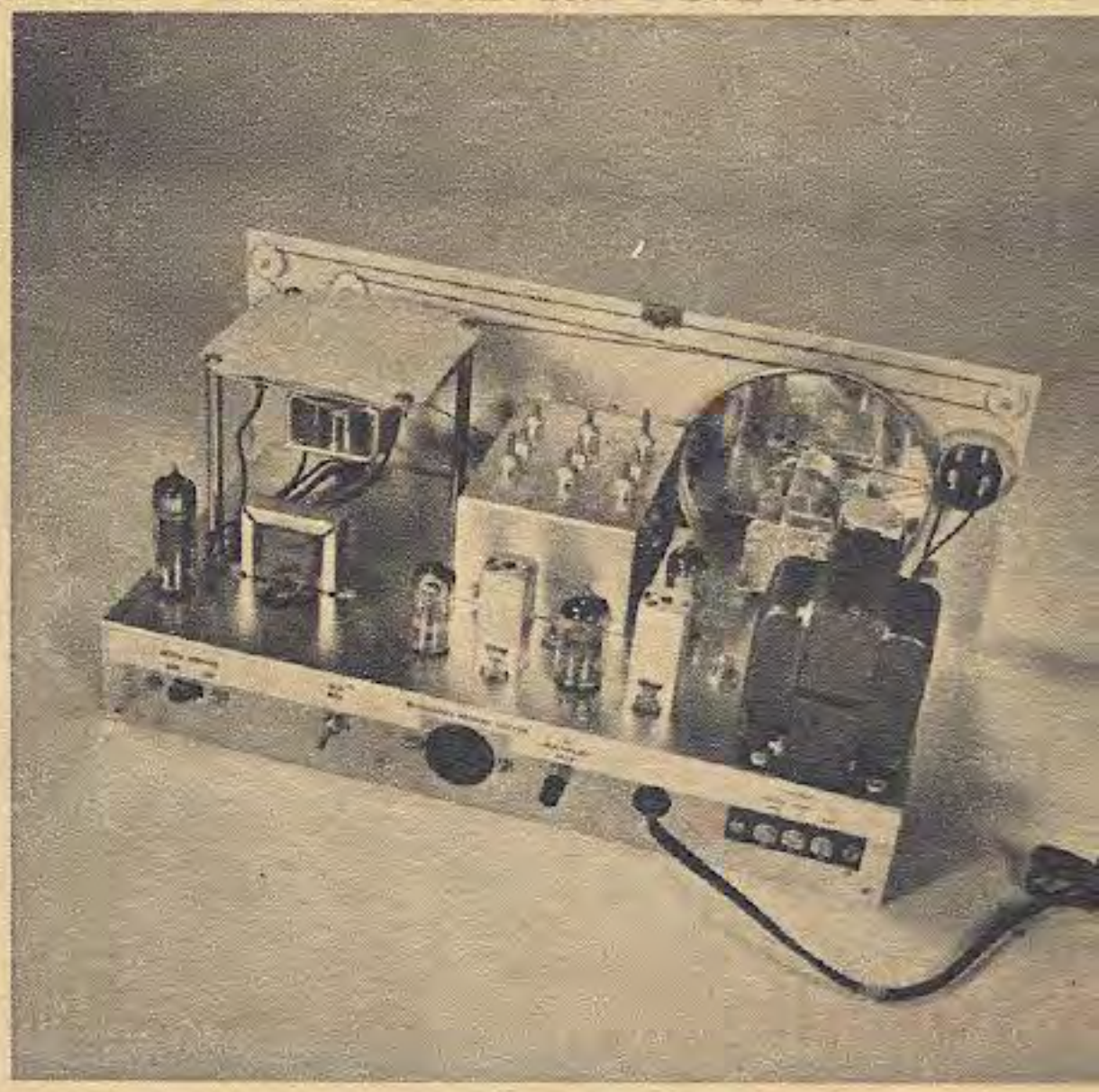
The S-meter circuit in the Philmore is, in effect, a miniature vacuum-tube voltmeter which reads the AVC voltage. The triode section of the 6AZ8 triode-pentode tube serves as one leg of a bridge configuration; the dynamic resistance of this tube is controlled by the



Underchassis view of completed receiver shows the open, easy-to-build type of construction used.



Coils are installed on a sub-chassis. Entire sub-assembly is then mounted by the bandswitch.



Chassis before being installed in the cabinet. Speaker at upper left is mounted on stand-offs.

AVC voltage applied to its grid. Any change in the AVC voltage is reflected in a change in the meter reading. Two S-meter controls are moved—one to balance the bridge (set to zero) and the other to adjust the sensitivity of the meter. The S-meter is connected so that it can provide signal indication with the AVC switch on or off.

Kit Construction

The kit was, in general, fairly easy to build, but a little caution is in order for the beginner. A few more pictorials would have been helpful. The wiring and mounting of the bandswitch and coil sub-assembly, for example, were obscure because of the absence of a specific pictorial.

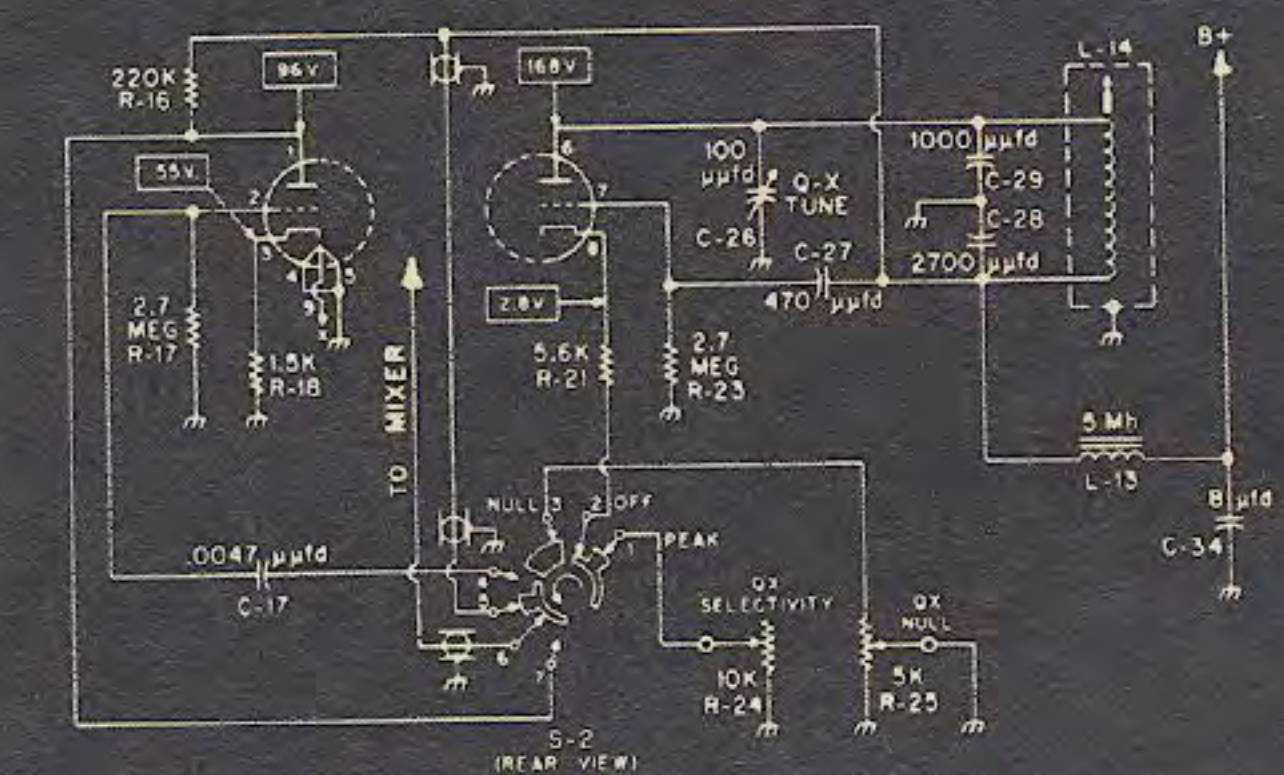
This kit has a trick that deserves mention. Special standoffs are used to mount the set's speaker. But since the speaker mounting is one of the last steps, Philmore has the chassis so arranged that the standoffs serve as props when you're working on the underside of the chassis. Anyone who has struggled to prop up a chassis to get at the underchassis wiring knows what this means.

Although some of the steps may cause a bit of head-scratching, no serious problems will arise. The chassis is compact, but there is plenty of space to get around in. The point-to-point wiring is well described and there are fold-out pictorials of the chassis mounting and wiring. About seven hours of careful work will find you with a completed kit ready for alignment.

Alignment, Performance

Careful alignment is a must if you want to realize the good performance this unit is capable of. All that is required is an RF signal generator, since the S-meter serves as an indicating meter. There are many good inexpensive RF generators in kit form, but if you don't wish to purchase one you probably can borrow or rent the instrument from a local serviceman. The minor trouble involved will be more than made up for by the hours of enjoyment you can derive from this kit.

The Philmore CR-5AC communications receiver kit should be of interest to many people. Good performance, simple alignment procedures, many features and price of $43.95 (plus $7.95 for steel cabinet) make this unit a good buy for the SWLer.



Q-multiplier circuit, built in the Knight-Kit may be used to peak the desired signal or "notch" an interfering signal. Circuit is tunable and both the amount and width of the notch or hump are set by panel controls.

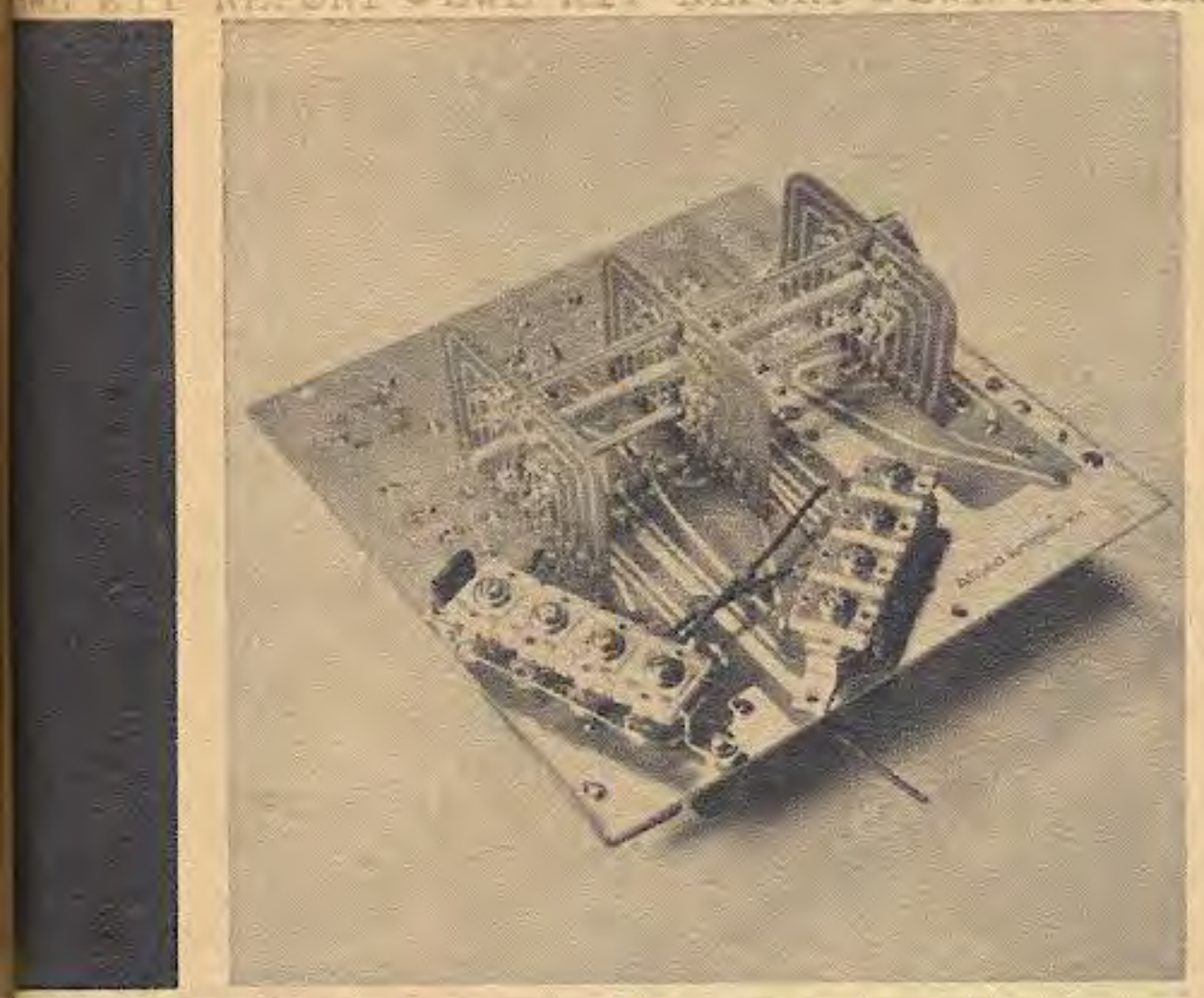
Knight-Kit R-100

IS it possible to build a professional communications receiver from a kit that is the equal of a factory-wired job? The answer to the question, if you choose a Knight-Kit R-100, is an unqualified yes. Here's a receiver that combines the professional features and quality found in the $200 price range with the saving inherent in kit construction.

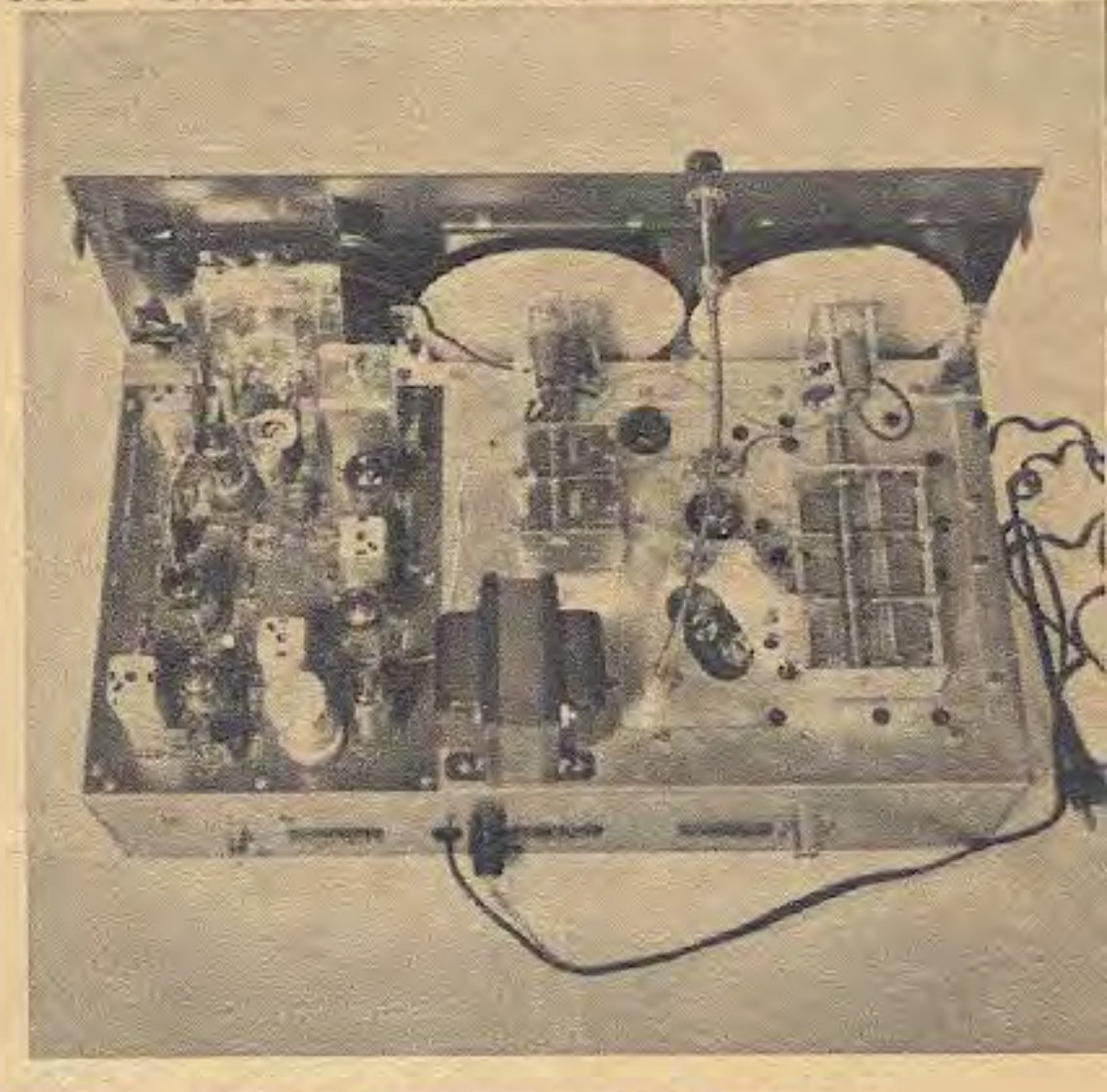
In addition to all the usual conveniences of the lower-priced communications receivers, the R-100 boasts a built-in Q multiplier, better than 1% calibration accuracy, an effective noise limiter and several other DX-pulling features. More on this later.

Construction is relatively easy despite the complexity of this nine-tube kit. A printed-circuit band-switch and the two printed-circuit boards which contain almost all the stages can take credit for this. The PC boards insure proper component positioning as well as correct lead length—a critical matter at the higher RF frequencies. Large fold-out pictorials and many insert detail drawings insure that the novice can find his way as easily as a more experienced kit-builder.

Here are a couple of hints that may help you along with the R-100. When involved with the under-chassis wiring (after the PC boards are mounted)



Printed circuit bandswitch assembly shown mounted on separated PC board. Coils and other components are mounted on board's reverse side.



Completed receiver. Three-gang main tuning capacitor is at right, bandspread capacitor center. Other PC boards are mounted beneath the chassis.

we found the work went a lot easier with the chassis propped up at its four corners on wood blocks, books or anything else handy. These corner props avoid damage to top-of-chassis components and you'll find everything is far more accessible than if you stand the chassis on its side as Knight suggests.

So much emphasis has been given to the fragility of printed circuit boards that some builders are almost afraid to put a soldering iron to them. Knight points out that too little heat is as bad as too much. The boards are not *that* delicate and they should be soldered in the accepted fashion; use as much heat as is necessary to insure good solder flow—but use a standard brand solder.

Despite all the aids found in this kit, don't think its construction is a one-evening job. This is a professional-caliber unit and hence contains an awful lot of circuitry. It's best to take it slow and easy. We spent about nine hours on this kit before we reached the alignment procedures.

The R-100 Circuit employs nine tubes in an AC-operated superhet design. The frequency range of .54-30 mc is divided among four bands with calibrated bandspread available on the 10, 15, 20, 40 and 80-meter ham bands.

The Knight-Kit includes such special items as a tuned RF amplifier and a voltage-regulated B+ supply for the oscillator tube (which is separate from the mixer tube). This type of arrangement gives maximum oscillator stability.

The Q-multiplier circuit inserts at the plate of the mixer tube. This is actually a variable bandwidth control which in the *peak* position will let you pin-point a desired signal and lift it out of the mud of adjacent interference. Or with the *QX* set for the *null* position you can tune in adjacent QRM and suppress it to the tune of about 60 db. Another interesting feature is the R-100's delayed AVC action. Unlike the usual AVC circuit which has a tendency to suppress weak signals, the Knight-Kit's AVC doesn't get into the act until a full two-volt signal reaches it. In other words, AVC action is there—but only when required. Of course, the AVC also can be switched out if desired.

Proper instrument alignment is necessary for maximum performance and Knight's instruction book makes no bones about it. Only an RF signal generator and a VTVM or VOM (of at least 5000 ohms/volt AC sensitivity) is re-

[*Continued on page* 107]

Continued from page 81

quired. If you've purchased the kit with the S-meter (an optional accessory) the generator alone will suffice.

After alignment, we hooked up an antenna and, at first hearing, it seemed as if every ham in the world had his rig on. Signals were heard all over the bands (the fact that it was on a week end may have had something to do with this).

This Knight receiver passed its tests with flying colors, from a kit project right up to its on-the-air performance. The handsome professional appearance and the relatively low price of $99.95 all contribute to making Allied Radio's Knight-Kit R-100 a good buy.

Accessories available include an S-meter for $12.95, a speaker in a matching enclosure for $9.75, and a 100-kc crystal calibrator kit (for internal mounting) for $10.95.