COMMUNICATION AR-77 RECEIVER

THE ONLY RECEIVER WITH ALL THESE FEATURES

- Polystyrene Insulation
- Dual R-F Alignment
- Lower Circuit Noise
- Negative Feedback
- Stay-Put Tuning
- Uni-View Dial
- Accurate Signal Reset
- Calibrated Bandspread
- Variable Selectivity
- Diversity Reception
- Improved Image Rejection
- Improved Noise Limiter

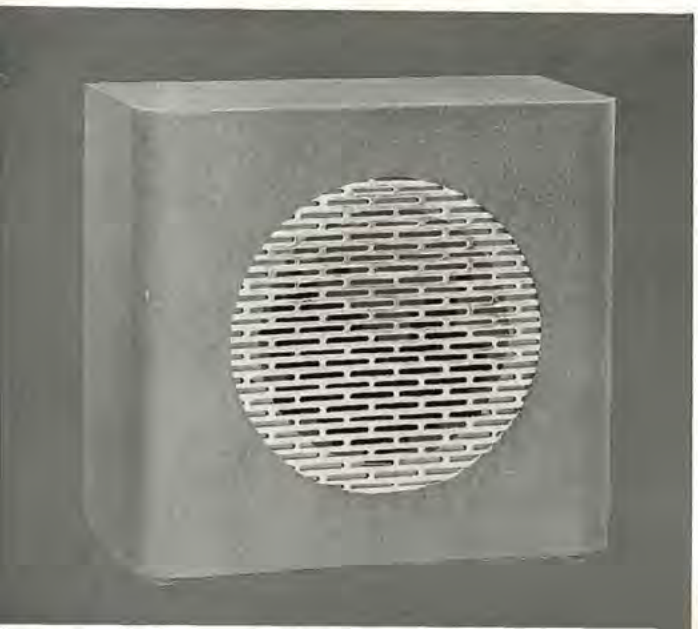
plus . . .

Antenna Trimmer, Pre-Selector Stage, 540-31,000 KC, 10 Tubes, Carrier Level Meter, Sensitivity Control, C-W Oscillator, Magnetite Core I-F Transformers, Audio Output 3 Watts, Headphone Jack, Standby Switch with Terminals for Relay, Modern Styling.

AR-77 COMMUNICATION RECEIVER

MODEL AR-77 GENERAL PURPOSE COMMUNICATION RECEIVER

Features *with performance* is the keynote of design in the RCA General Purpose Communication Receiver Model AR-77. All worth while features have been incorporated to provide the highest degree of successful reception for communication purposes. Emphasis has been placed on all the fundamentals of design in order to provide a truly high degree of owner satisfaction. These basic requirements are: (a) *signal-getting ability* of the electrical circuits and accessory aids to acquire the desired signal (b) *stability of tuning* adjustments to hold the signal and for accurate re-setability (c) *convenience of controls* (d) *size, shape and color* (e) *economy of ownership*. The detailed specifications which follow disclose how the AR-77 gives you all that could be desired at a price having the greatest value.



HIGH-QUALITY SPEAKER

This eight-inch permanent magnet dynamic loudspeaker housed in a metal cabinet to harmonize with the receiver is recommended for use with the AR-77. The strongly magnetized core and careful design of moving parts gives an unusually high degree of sensitivity and faithfulness of reproduction.

• SIGNAL-GETTIN

The average **Sensitivity** throughout the tuning range is about two microvolts for 2-to-1 signal-to-noise ratio. An optimum balance between maximum sensitivity and minimum circuit noise has been chosen to render the greatest usable sensitivity for weak signals.

Greater approach to constant sensitivity throughout each tuning range is achieved by dual alignment of each r-f circuit with **Air-Dielectric Trimmers** for the high-frequency end and **Inductance Adjustment** of the coils for the low end. This keeps the tracking of r-f, first detector and first heterodyne oscillator circuits uniform for best sensitivity and r-f selectivity.

Selectivity is variable in six steps employing an efficient i-f crystal filter circuit. A glance at the average K.C. bandwidth values, at two times down from the response at peak resonance, shows the degree of sharpness available for each step: (crystal out) 6 K.C., #2—3 K.C., #3—2 K.C., #4—500 cycles, #5—175 cycles, #6—80 cycles. Steps 2 to 4 inclusive, are of great aid in receiving 'phone signals through interference from other stations. Steps #5 and #6 provide that "razor-blade" sharpness for single-signal c.w. telegraph reception.

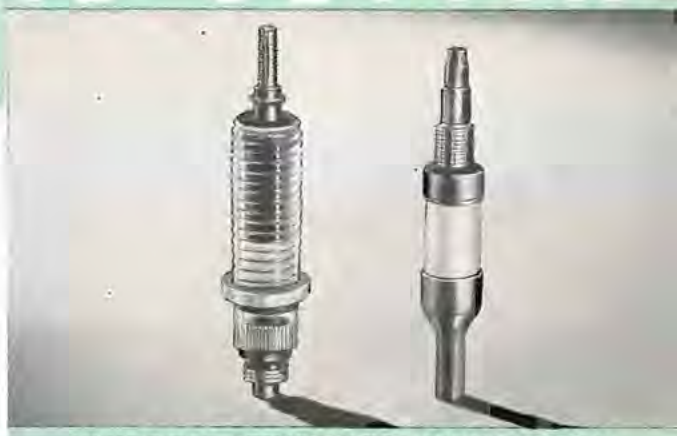
Image Rejection has been greatly improved by the accumulative benefits of excellent "front-end" (r-f) selectivity through having high Q circuits, optimum L/C ratio and proper shielding. Image ratio of approximately 40-1 at 30 m.c. is obtainable with proper input load.

The improved **Noise Limiter** circuit will be found most helpful for making signals intelligible through local interference caused by automobile ignition and other electrical impulses of high amplitude and short duration. With the variable adjustment of the limiter it is possible for the operator to attain a setting to gain maximum reduction of the interference.

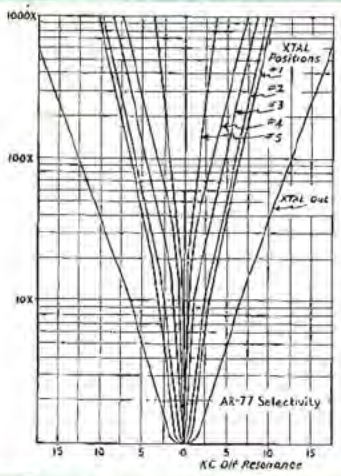
Uni-View Dials on the AR-77 enable the operator to tell at a glance what part of the radio spectrum the receiver is tuned to since only the calibration of the range in use is visible. An aperture in the slide-shutters moves up or down with the setting of the range switch. Ease of dial reading is of prime importance in a communication receiver when consideration is given to the sustained periods of tuning by the operator. Transparent lighting of the dials facilitates easy viewing and freedom from parallax.

Calibrated Bandspread for the 10, 20, 40 and 80-meter amateur bands has been provided and each calibration scale extends to nearly the full rotation of the dial, thereby spreading out the band calibration for "split-kilocycle" readings. Electrical bandspread is accomplished by a special three-gang, triple-section condenser connected in parallel with the three-gang, double-section main tuning condenser. Calibrated bandspread provides an easier way to locate signals in the amateur bands and to serve also as a check on the transmitter frequency.

The **Carrier Level Meter** serves two very useful functions: first, for peak tuning of desired signal, and second, to measure signal strength in terms of the popular "S" scale. The "S" units are calibrated 6 db

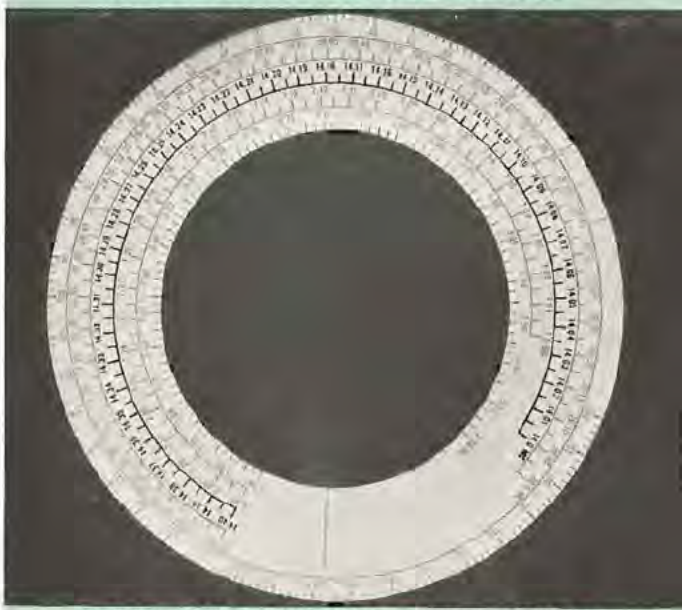


UNIFORM SENSITIVITY MAINTAINED



SELECTIVITY IN SIX STEPS

ONLY RANGE IN USE VISIBLE

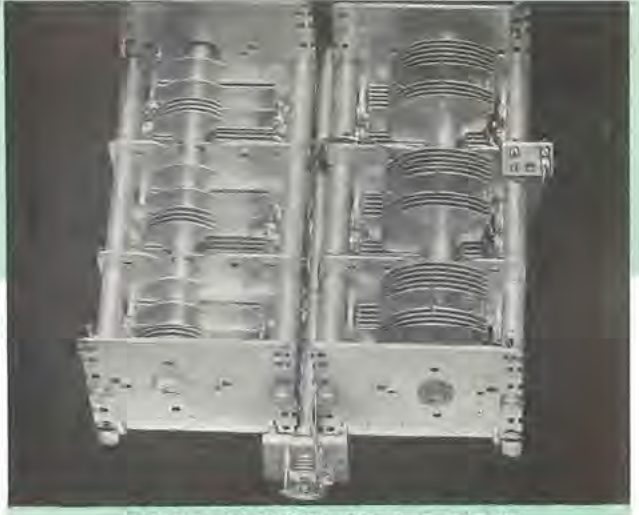


SPLIT "KILOCYCLE" CALIBRATION

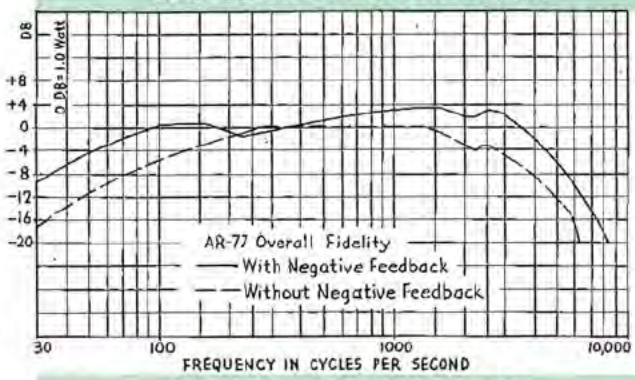
G ABILITY •

apart up to "S9". Calibration is extended above this point to 40 db. In practice, much attention is given to this meter as an aid in seeking a desired signal while tuning through a band.

Negative Feedback, a new feature for improved communication service, is incorporated in the AR-77. Negative feedback, or degeneration, is applied to the audio output stage. The effect acquired with this circuit is to smooth out the natural peaks and valleys of the audio response curve, including the fall-off at the upper and lower limits. The selectivity requirements of a communication receiver are necessarily such that the higher side-band frequencies of voice or entertainment-modulated signals are attenuated considerably. By increasing the response of the audio circuit through use of negative feedback, these higher audio frequencies are boosted so the overall response is appreciably flattened out. Having a communication receiver with improved fidelity enables the operator to pass better judgment on the quality of phone stations and to enjoy better entertainment reception during off-periods of operating. A switch is provided to apply negative feedback at will.



BANDSPREAD AT ITS BEST



BETTER REPRODUCTION

STABILITY OF TUNING ADJUSTMENTS

Stay-Put Tuning is a great relief from the common fault of most receivers—frequency drift. Considerable attention has been given in the AR-77 to remove, or compensate for, the causes of frequency drift. Reduction in the amount of heat generated in and around the chassis, which causes circuit constants to change, has been accomplished by (a) an over-sized power transformer so that losses are minimized; (b) elimination of needless audio power output. Through use of the new ultra-efficient **Polystyrene** insulation at strategic places keep the circuit losses and detuning effect of humidity at a minimum.

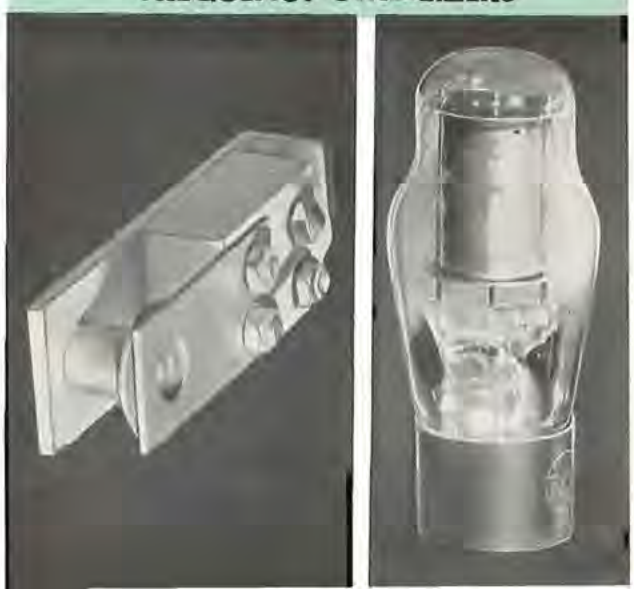
A **Temperature Compensated** trimmer condenser in the h-f oscillator circuit stabilizes the frequency from effects of temperature, especially for the initial changes when the receiver is first turned on.

Voltage Regulation of the plate supply to the oscillator and first detector circuits prevents the frequency of these circuits from being changed by the effects of sudden shifts in line voltage.

Accurate Reset of "logged" stations is greatly enhanced by use of the Vernier index scale provided for both the main tuning and the calibration-spread dials. The arbitrary scale of 0-200 on the outer edge of each dial and the Vernier index allows the operator to read accurately to one part in 2000. Where close settings of the dial are necessary, this scale will be found very helpful. For example, to have the calibrated bandspread read accurately, the main tuning dial should always be reset to the same point within one-tenth of a division —such close setting is practical on the AR-77. By plotting a curve from points taken during standard frequency transmissions, close interpolations can be made for frequency settings.

ACCURATE RESET

FREQUENCY STABILIZERS



CONVENIENCE OF CONTROLS

The two tuning controls have 2⅜" diameter knobs with knurled circumferences permitting easy rotation with the index finger while the hand rests on the desk. Long periods of tuning are thus possible without fatigue. The B.F.O. switch simultaneously removes the A.V.C. bias and turns on the oscillator for c-w telegraph reception. The most frequently used controls are placed along the lower edge of the panel within easy reach. The standby and audio volume controls have been placed at each end so they may be reached quickly without confusion. Bar-type knobs are employed on the accessory controls where the angular position may be determined at a glance to observe the settings. Technical symbols or abbreviations have been used to identify the controls. Such identification serves as a ready "cue" to their function and enhances the appearance of the panel by keeping the lettering at a minimum.

SIZE, SHAPE AND COLOR

The overall dimensions are: width, 20⅛"; height, 10½"; depth, 11⅝". The chassis can be installed on a standard 19-inch rack by attaching a special front panel and mounting supports that are available for this purpose.

The metal cabinet is shaped with curved vertical corners at the front for graceful appearance. All dial scale openings are grouped together on a recessed sub-panel behind a non-breakable window to give a pleasing focal point during the tuning operations.

The top of the cabinet is flat and free from any projections so other equipment may be placed on top of the receiver if desired. A hinged lid permits easy access to the interior. A removable cover on the bottom of the cabinet eliminates the need of removing the chassis for alignment or servicing.

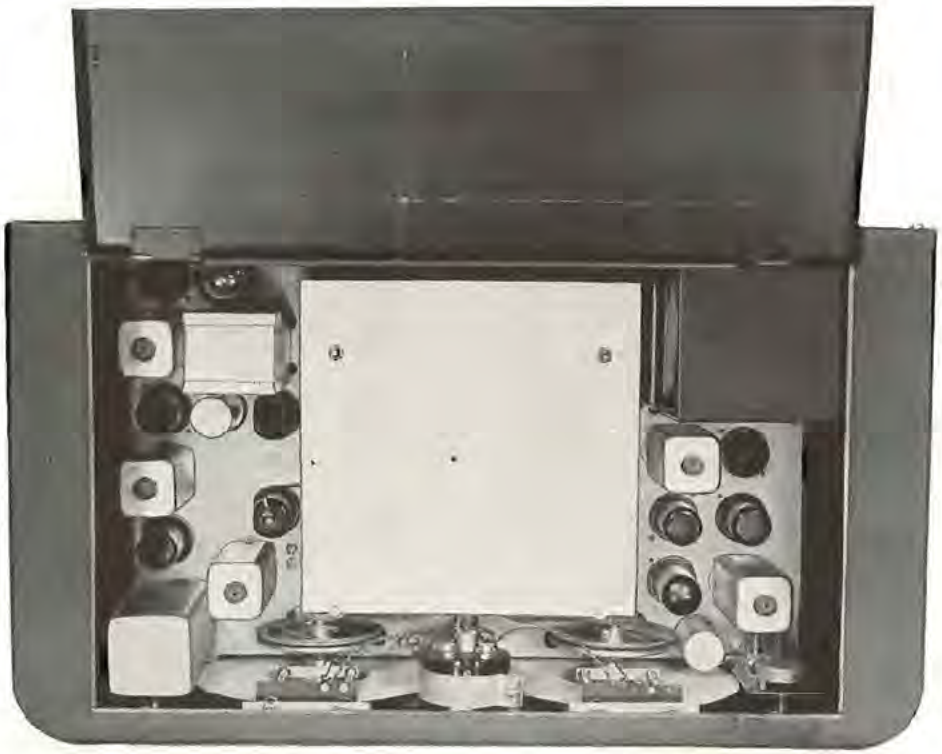
The headphone jack is reached by an opening in the right side of the cabinet. All terminals are mounted on the exposed rear apron of the chassis which facilitates quick installation.

Symmetry of plan has been achieved in the design of the cabinet and a durable wrinkle finish of umber gray has been placed on the surfaces which receive the greatest wear. The lighter, smooth, umber gray finish between the polished metal trim completes the color scheme.

The factor of "eye appeal" is of importance when the constant view by the operator is considered. The effects of size, shape and color have been given careful attention in the design of the AR-77.

ECONOMY OF OWNERSHIP

The value of the AR-77 is evident by the complement of features available in this instrument including many not obtainable elsewhere. Maximum performance is assured by the design and testing technique of RCA's skilled engineers and personnel with long experience in manufacturing radio equipment. Lowest maintenance cost is assured through the use of high-grade materials throughout. Operating expense is exceedingly low, as the power consumption is only 70 watts. The large number of distributors handling RCA products means convenient and quick service to the customer. RCA assists its distributors in serving their customers to their complete satisfaction. You get more than just a receiver in the AR-77 —you get a complete service.



TECHNICAL SPECIFICATIONS

CIRCUIT: 10-tube Superheterodyne, one tuned r-f stage, two 455 K.C. magnetite core i-f stages with variable selectivity crystal filter, automatic volume control, two a-f stages with degeneration in output stage (negative feedback), regulation of voltage to h-f oscillator and first detector screen, temperature-drift compensation of h-f oscillator.

FREQUENCY RANGE: 540 to 31,000 K.C. (555 to 9.67 meters) divided into six ranges with individual coils.

TUBE COMPLEMENT: 3 RCA 6SK7's as r-f and i-f amplifiers; 1 RCA 6K8 first detector and h-f oscillator; 1 RCA 6H6 second detector and noise limiter; 1 RCA 6SQ7 a.v.c. and a-f amplifier; 1 RCA 6F6 audio output; 1 RCA 6SJ7 beat frequency oscillator; 1 RCA 5Z4 rectifier; 1 RCA VR-150 voltage regulator.

INSULATION: Polystyrene for the two highest frequency r-f ranges and the i-f transformers. Ceramic insulation for r-f tube sockets, tuning condensers, range switch and r-f trimmers. High-grade bakelite used elsewhere.

CONTROLS: (Front panel) crystal selectivity (x), crystal phasing (ø), standby (T-R), sensitivity (S), main tuning (~), range switch (R), r-f trimmer (Y), bandspread (~), negative feedback (NFB)—automatic volume control (AVC)—beat oscillator (BFO), audio volume and power switch (V), heterodyne pitch (H), noise limiter (N); (Chassis) carrier-level meter zero-set.

TERMINALS: Antenna and ground or transmission line, transmitter relay, speaker, a.v.c. (for diversity connection), headphone jack, power cord.

DIAL: Main tuning and calibration spread driven by 18.6 to 1 combined split-gear and cord drive. Calibration in megacycles with arbitrary scale 0-200 divisions and Vernier index. Shutter masks all but calibration in use.

RANGE SWITCH: Multi-point rotary switch with self-cleaning contacts and ceramic insulation.

POWER SUPPLY: Integral with receiver for operation from standard AC sources (a) 105-125 volts, 50/60 cycles; (b) 105-130, 140-160, 195-250 volts, 50/60 cycles. Special power packs available for 105-125 volts, 25/60 cycles, 117 or 234 volts DC.

CARRIER LEVEL METER: Damped D'arsonval movement, calibrated in 6 decible steps to "S9" and to 40 db beyond.

SPEAKER: 8" dynamic, permanent magnet, voice coil impedance 2.2 ohms at 400 cycles. Overall dimensions (mounted)—width 11½", height 10½", depth 6".

TERMINAL IMPEDANCE: Antenna input 50-500 ohms (transmission line or Marconi antenna). Audio output 2-3 ohms at 400 cycles.

SELECTIVITY: K.C. bandwidth (2 times down) Pos. #1=6 kc., #2=3 kc., #3=2 kc., #4=500 cyc., #5=175 cyc., #6=80 cyc. See curves.

SENSITIVITY: Average about 2 microvolts for 2-to-1 ratio of signal-to-noise, 30% modulation.

A.V.C. CHARACTERISTIC: (Average values microvolts input=audio voltage output) 2=0.25, 10=0.4, 100=0.7, 1000=1.1, 10,000=1.6, 100,000=2.0.

IMAGE RATIO: At 30 M.C. approximately 40-1 with 50-ohm input load, 20-1 with 300-ohm input.

DIVERSITY RECEPTION: For modulated signals only with two or more AR-77's. Special equipment required for c-w telegraph signals.

TROPIC TREATMENT: All component parts adequately protected for tropical service by impregnation and use of moisture-resistant insulation.

SIZE: Overall dimensions—(Cabinet) width 20⅛", height 10½", depth 11⅝". Rack mounting panel—width 19", height 12$\frac{1}{32}$", thickness $\frac{3}{16}$".

ACCESSORIES: The AR-77 is supplied complete with tubes and built-in power supply. The following additional items may be purchased separately:

	RCA Stock No.
Loudspeaker (illustrated)	MI-8303
Panel and supports for rack mounting receiver	MI-8304
Panel for rack mounting speaker	MI-8305
Power Pack, 105-125 V., 25/60 cycles	MI-8307-1
Power Pack, 117 or 234 V., DC	MI-8307-2
Headphones	MI-5803
Phone plug	MI-6216
Audio Coupling Transformer for 500-ohm line	MI-4904

SHIPPING INFORMATION

	NET	GROSS (Domestic Packing)	GROSS (Export Packing)
Receiver	48½ lbs.	57 lb. 23" x 15¼" x 13½"	74 lb. 25" x 17¼" x 15½"
Speaker	8 lb.	10½ lbs. 12⅞" x 6¾" x 14⅜"	14⅞" x 8¾" x 16½"
Receiver and Speaker			89½ lbs. 31½" x 17¼" x 15½"

MODEL AR-77 (105-125 V., 50/60 cycles) NET PRICE, F.O.B. FACTORY $139.50

SPEAKER FOR AR-77 (MI-8303) NET PRICE, F.O.B. FACTORY $8.00

RCA MANUFACTURING COMPANY, INC.

Camden **New Jersey, U. S. A.**

Form 151407

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