

National

RADIO PRODUCTS

1948



NATIONAL COMPANY, INC.
MALDEN, MASSACHUSETTS, U.S.A.

NATIONAL RECEIVERS



NFM-07 Adapter

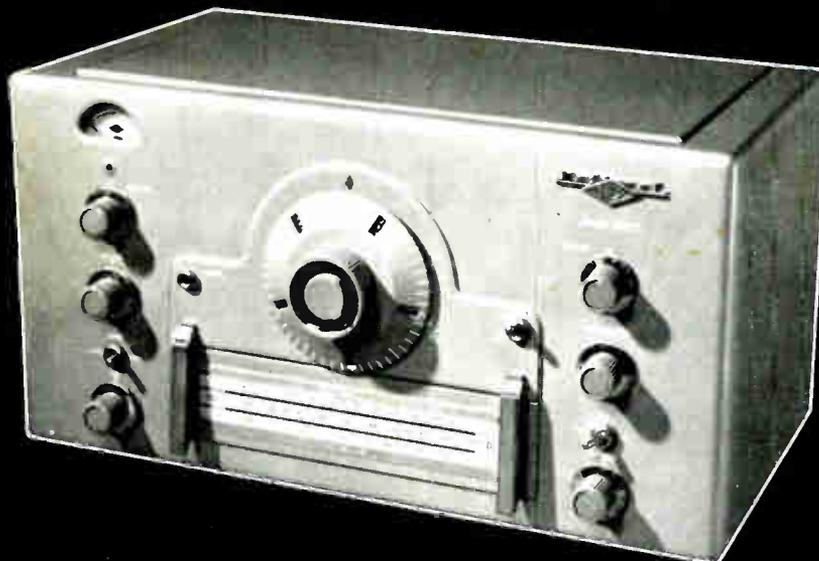
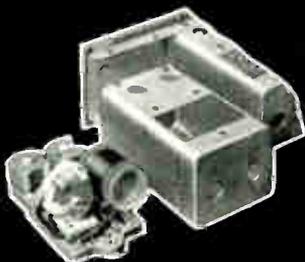


Table Model HRO-7



MCR 8" Speaker



Detail of Coil Set

Tuning Range — 50-430 Kcs.
and 480-30,000 Kcs.

HRO-7

The first HRO was built by National in 1934: it was a product unique in commercial receiver design. Fourteen years of severe use in government, commercial and amateur services have proved that many of the original features of that first HRO are essential to dependability in communications. Modern circuitry and cabinet design have been added to produce the HRO-7, a custom-built receiver using components of our own design and manufacture. Above all, the HRO-7 has that downright stability which has been characteristic of the entire HRO series.

The required complement of operating controls is on the panel, plus a head-phone jack and an S-meter. New features include automatic adjustable-threshold noise limiting — improved high frequency oscillator with regulated plate voltage — lever handles for coil-set changing — slide rule calibration on all coil sets — bandspread at 11 meters — accessory connector socket and phonograph switch on rear apron — tone switch on panel.

The circuit of the HRO-7 comprises two tuned r.f. stages, separate miniature tube h.f. oscillator, two stages of i.f. at 456 kc., combined 2nd detector — a.v.c., series valve a.n.l., 1st audio amplifier and audio output stage designed essentially for communications service, b.f.o. coupled to the 2nd detector, crystal filter network between 1st detector and 1st i.f. and voltage regulator for the high frequency oscillator.

The tuning system retains the time-proven micrometer-type dial with linear calibration from zero to 500 and an

effective scale length of approximately twelve feet. A National PW type gear drive unit drives the four gang precision tuning condenser to eliminate backlash (see page 31).

The HRO-7 is supplied with four coil sets covering 1.7 to 30.0 Mc. while six additional coil sets are available to cover frequencies from 50 to 430 kc., 480 to 2050 kc. and 30.0 to 35.0 Mc. Each of the four coil sets normally supplied covers two amateur bands and the spectrum between. By a simple change-over operation the amateur band at the high frequency end of each coil set can be expanded for band-spread operation to cover approximately 400 divisions of the dial. The limiter clips noise on both positive and negative peaks and provides a.v.c. for code reception as well as noise pulse limiting.

Two miniature tubes are employed in the HRO-7, a 6C4 high-frequency oscillator and an 0A2 voltage regulator, to give a high order of oscillator stability. An accessory connector socket is mounted at the rear of the receiver to permit connection of various accessories such as the NFM-07 narrow band F.M. adaptor, crystal calibrator or high-frequency converter. A 5 position switch provides a means of adjusting selectivity from broadcast to single-signal requirements. The new calibration charts on each coil set make correlation between dial reading and frequency accurate and speedy.

The HRO-7 is far more than a fine receiver: it is the best HRO type receiver ever built.

NATIONAL RECEIVERS

SPECIFICATIONS OF HRO-7

SELECTIVITY:

Voltage Ratio	Crystal Filter Out	Nominal Bandwidth
6 db.		3.0 kc.
60 db.		21.5 kc.
20 db., Selectivity at "5"	Crystal Filter In	200 cycles
20 db., Selectivity at "1"		6.0 kc.

SENSITIVITY: 1.0 microvolt or better throughout the normal frequency range.

AVC CHARACTERISTIC:

To ± 10 db. between 1.0 and 100,000 microvolts input.

IMAGE REJECTION: Better than 30 db. at 30 Mc.

SIGNAL-TO-NOISE RATIO: Exceeds 16 db. (ratio of output with 30% modulation ON/OFF) with 5 microvolts input.

INPUT IMPEDANCE: At antenna terminals — 500 ohms (average).

POWER INPUT: Using Type 697 Power Pack — 75 watts at 115 volts, 50/60 cycles, 1 phase a.c. Switch for 230-volt operation included.

POWER OUTPUT: Max. 3 watts. Output with negligible distortion 1.5 watts.

ACCESSORY CONNECTOR SOCKET: Makes available voltages and circuits as follows: — 6.3 v. a.c., 150 v. d.c. regulated, 240 v. d.c. unregulated, AVC voltage, phono/NFM-07 Adapter input and i.f. output voltage.

PHYSICAL DATA:

Table Model 19 $\frac{3}{4}$ " x 10 $\frac{3}{8}$ " x 12 $\frac{1}{8}$ ", 34 lbs., Gray Enamel finish (also on Speaker and table model Power Packs). Rack Model panel height 10 $\frac{1}{2}$ ", 35 lbs., depth behind panel 13 $\frac{3}{16}$ " overall, Black Wrinkle finish.

PRICES:

HRO-7T Table Model (with A, B, C, D coils, 697 & MCR) Net \$311.36

HRO-7R Rack Model (with A, B, C, D coils SPU-697 & RFSH-1) Net \$338.65

(Prices include applicable Power Pack and Speaker.)

ADDITIONAL COIL SETS

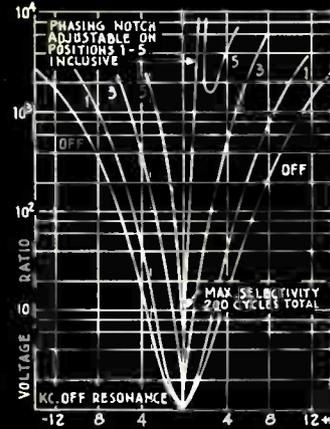
HRO-7E 900—2050 kc.....Net \$15.35	HRO-7J 50—100 kc.....Net \$27.91
HRO-7F 480—960 kc.....Net \$15.35	HRO-7AA 27.0-30.0 Mc. Net \$15.35
HRO-7G 180—430 kc.....Net \$20.93	HRO-7AB 30.0-35.0 Mc., Net \$22.50
HRO-7H 100—200 kc.....Net \$23.03	HRO-7AC 21.0-21.5 Mc., Net \$15.35

MATCHING UNITS

Type 697 115/230 v. a.c. Power Pack	Net \$20.36
Type 686S 6 v. d.c. Vibrator Power Pack	Net \$34.16
Type MCR 8" Speaker with matching transformer	Net \$12.00
Type NFM-07 Narrow Band FM Adapter	Net \$16.95
Type TB-4 Tilt Base	Net \$3.95

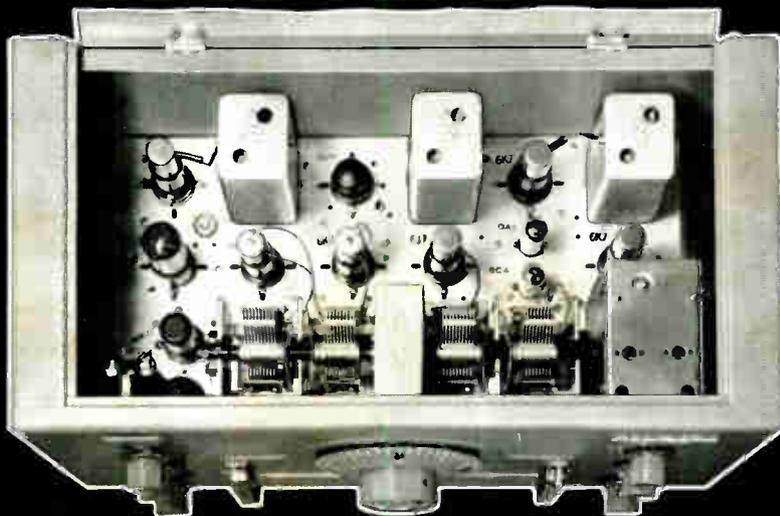
HRO-7

Crystal Filter Selectivity Curves



Power Pack

Top-of-Chassis View



NATIONAL RECEIVERS



HRO-7C DELUXE RECEIVER INSTALLATION

The HRO-7C is a Deluxe Receiving Installation consisting of an HRO-7R Receiver combined with the SPC-1 Unit (speaker, power supply and coil compartment) in an MRR-1 Table Rack. Chrome panel joint cover strips and side trim strips are included as shown. The receiver we have used in this assembly is the rack model of the latest and finest of a long line of National HRO receivers. Thus, the HRO-7C incorporates all the refinements covered in the complete specifications on pages 2 and 3 of this catalog.

HRO-7R Receiver with tubes and A, B, C, D Coil Sets Net \$279.00

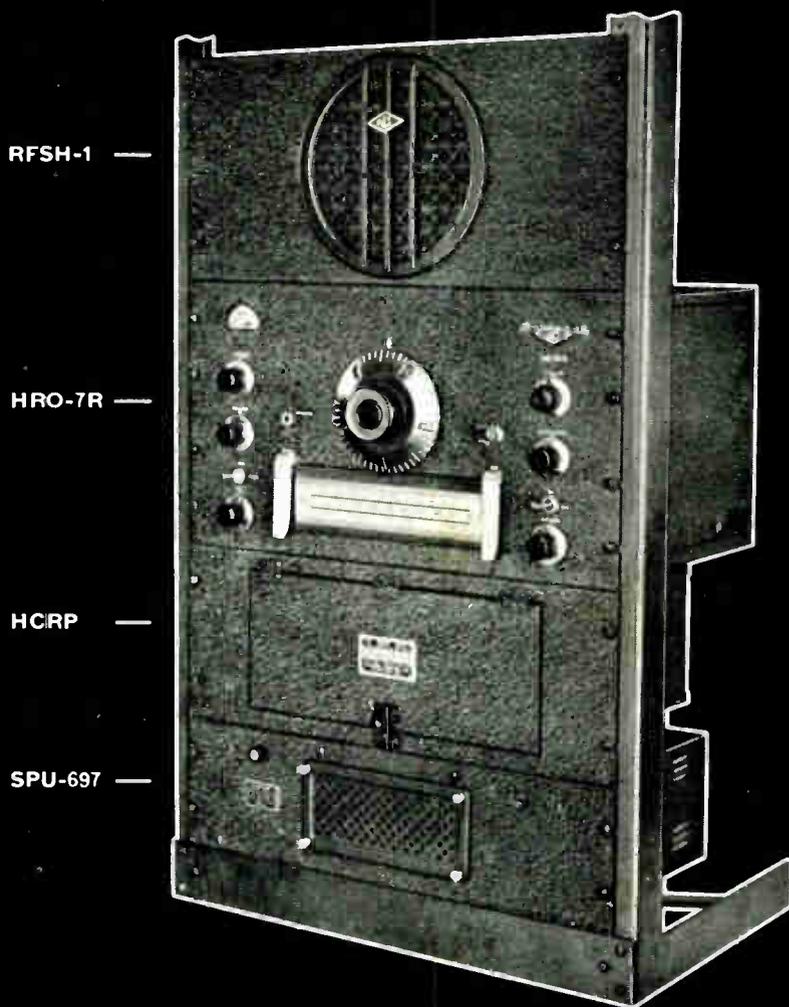
SPC-1 Unit Combination Net \$65.10

MRR-1 Table Rack, 26½" panel capacity, 29" high Net \$14.85

HRO-7C Receiver Installation complete as shown Net \$358.95

*Units are black wrinkle.

NATIONAL RECEIVERS



HRO TYPE RACK UNITS

The HRO series of Rack Units is shown above mounted in a typical relay rack installation: the rack is not a part of this listing. Starting at the top in the arrangement shown, the speaker is Type RFSH-1 8" with matching transformer included, the receiver is the same fine HRO-7R unit used in the HRO-7C Installation (page 4) and described in full on pages 2 and 3, the Type HCRP Coil Container holds five Coil Sets and the Type SPU-697 Power Supply furnishes 240 V., 85 Ma. and 6.2 V., 3.3 A. from 115/230 Volts, 50/60 cps. A-C. A vibrator supply is also available for operation from 6 volts D. C.

HRO-7R Receiver with tubes and A, B, C, D Coil Sets Net \$279.00

RFSH-1 Speaker Net \$21.70

HCRP Coil Container Net \$18.00

SPU-697 Power Supply Net \$37.95

SPU-686S Vibrator Power Supply Net \$45.00

*Panels are black wrinkle finish.

NATIONAL RECEIVERS



NFM-83 Adapter



10" PM Speaker



Accessory socket for NFM-83 Adapter inside on chassis.

Frequency Range 540 kc. to 31 mc. plus 48 to 56 mc. — calibrated electrical bandspread for 6, 10-11, 20, 40 and 80 meter amateur bands.

Two RF stages on all bands: Image rejection 40 db at 28 mc.

NC-183

Designed particularly for the discriminating radio amateur, the brilliant new National NC-183 is also ideal for the short wave listener who appreciates top-notch performance and skillful engineering. Sixteen tubes (including rectifier and voltage regulator) are employed in a modern high-gain superheterodyne circuit. The main tuning and bandspread dials are calibrated directly in frequency and both have auxiliary logging scales. Two stages of signal frequency amplification provide that extra measure of sensitivity and image rejection so often needed when receiving conditions are unfavorable and a panel controlled trimmer allows the operator to compensate for variations in antenna loading at any frequency.

The push-pull audio stage delivers 8 watts of undistorted audio power to an efficient ten-inch PM speaker. The wide range crystal filter with phasing control, adjustable-threshold automatic noise limiter, tone control and C.W. oscillator pitch control afford exceptional flexibility of performance characteristics, enabling the operator to cope with a wide variety of receiving conditions. Other features include: h.f. oscillator temperature-compensated on all bands; phonograph pick-up jack; accessory connector socket; illuminated signal strength meter with adjustable sensitivity; self-contained output transformer with 500 ohm and 8 ohm terminals; operates from 115 or 230 volts 50/60 cycles or, in emergency, from batteries or vibrator power supply; narrow band FM adaptor available (plugs into accessory socket inside the cabinet). Frequency coverage: 540 kc. to 31 Mc. and 48 to 56 Mc.

TUNING SYSTEM: The main tuning and bandspread capacitors are connected in parallel on all bands. This

permits bandspread tuning at any frequency within the tuning range. Two r.f. stages are used on all bands and the trimmer for the 1st r.f. stage is controlled from the front panel. Dial calibration is as follows:

Band	General Coverage	Bandspread
A		48 — 56 Mc.
B	12 — 31 Mc.	14.0 — 14.4 Mc. 27 — 30 Mc.
C	4.3 — 12 Mc.	7.0 — 7.3 Mc.
D	1.6 — 4.3 Mc.	3.5 — 4.0 Mc.
E	0.54 — 1.6 Mc.	

CRYSTAL FILTER: A new highly flexible crystal filter provides an adjustable selectivity characteristic with a wide range from broad-band broadcast requirements to sharp single-signal code reception. A phasing control permits attenuation of interfering signals.

NOISE LIMITER: A new concept in noise limiter design is included in the NC-183 Receiver. This new limiter could be termed "double action plus" and the noise limiting action is equally effective on either phone or code reception. A panel-mounted threshold control permits adjustment of the level at which limiting action starts.

NARROW BAND FM ADAPTER: The NFM-83 Adaptor pictured above makes the NC-183 an excellent receiver for narrow band FM. A 6H6 tube is employed as a noise suppressing ratio-type discriminator and a 6SK7 i.f. coupling stage eliminates undesirable loading of receiver circuits. Instant selection of AM or NFM by phono-radio switch.

CONTROLS: Main tuning; bandspread tuning; band switch; RF gain — AC on/off; AF gain; send/receive switch; AVC/MVC switch; tone; CWO switch; CWO pitch; limiter; selectivity; phasing; RF trimmer; radio/phono switch.

NATIONAL RECEIVERS

SPECIFICATIONS OF NC-183

SELECTIVITY: The selectivity switch of the wide range crystal filter permits a choice of six progressively narrower i.f. pass-bands. Maximum and minimum selectivity characteristics are as follows:

	BANDWIDTH	
	6 db. down	20 db. down
Selectivity Switch "OFF"	3.9 kc.	8. kc.
Selectivity Switch "5"	80 cycles	400 cycles

SENSITIVITY: Measured with a standard 300 ohm dummy antenna, sensitivity of the NC-183 is better than 1.5 microvolts for a 6 db. signal/noise ratio throughout the entire frequency range.

IMAGE REJECTION: Signal/image better than 40 db. at 30 megacycles.

TUBE COMPLEMENT: 4-6SG7 1st and 2nd r.f. Amplifiers, 1st and 2nd i.f. Amplifiers; 6SA7 1st Detector; 2-6J5 h.f. Oscillator and Phase Inverter; 2-6H6 2nd Detector-A.V.C. and Noise Limiter; 6AC7 A.V.C. Amplifier; 2-6SJ7 B.F.O. and 1st Audio; 2-6V6GT/G Audio Output; OD3/VR-150 Voltage Regulator and 5U4G Rectifier.

POWER INPUT: Approximately 125 watts at 115 v., 50/60 cycles, 1 phase a.c. (easily adaptable to 230 v. service as well as emergency operation from batteries).

AUDIO SYSTEM:

Undistorted Power Output — 8 watts.

Frequency Response:

Tone Control at 10 — 60 to 12,000 C.P.S.

Tone Control at 0 — 60 to 1,000 C.P.S.

Output Impedance:

Speaker Socket — 8 or 500 Ohms

Phone Jack — Not Critical

A high impedance phono input jack is provided at the rear of the receiver and the phono-radio switch and phono jack are on the front panel.

PHYSICAL DATA:

Table Model, 19³/₄" x 10¹/₈" x 15", 56 lbs., Gray Enamel finish.

Rack Model, 10¹/₂" panel height, 56 lbs., depth behind panel 17¹/₂" overall, Black Wrinkle finish.

PRICES:

NC-183T Table Model (with speaker)	Net \$269.00
NC-183R Rack Model (with speaker)	Net \$269.00
NFM-83 Narrow Band FM Adapter	Net \$ 16.95
TB-5 Tilt Base	Net \$ 3.95
NC-183TS (Table) or NC-183RS (Rack) Speakers	Net \$ 14.00

NC-183

16 tubes (including rectifier and regulator).

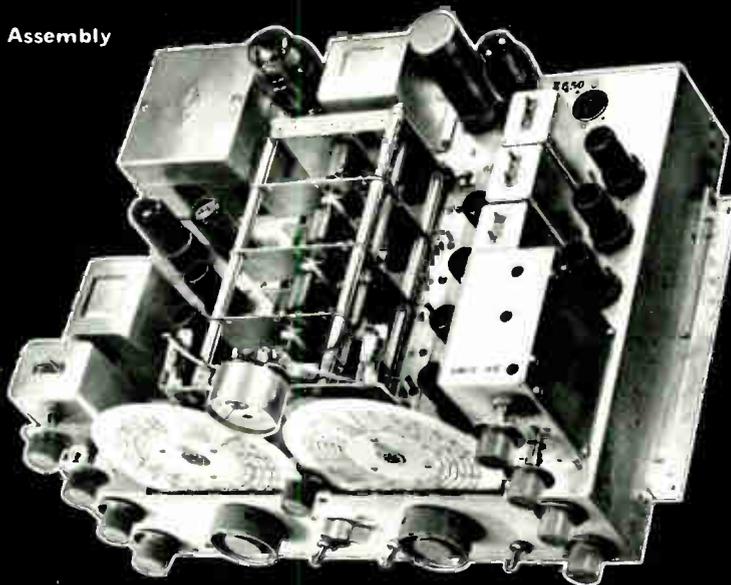
Full 8 watts push-pull audio output.

Adjustable threshold ANL — effective on both phone and CW.



Tilt Base for NC-183

Chassis Assembly

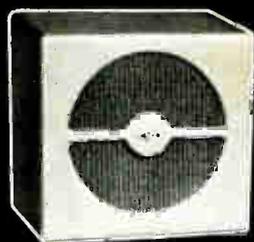


NATIONAL RECEIVERS

NC-173

Frequency Range 540 kc. to 31 mc. plus 48 to 56 mc. — calibrated electrical bandspread for 6, 10-11, 20, 40 and 80 meter amateur bands.

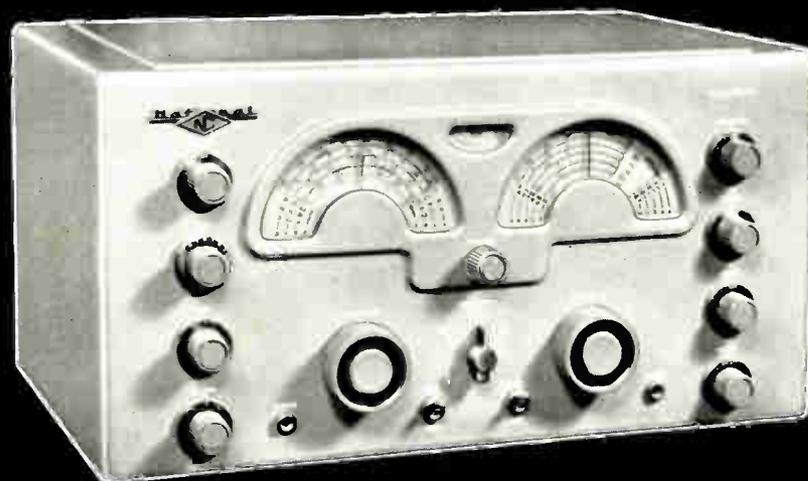
Instant selection of AM or NFM from front panel when using the NFM-73 Adapter.



PM Speaker



NFM-73 Adapter



The National NC-173 is the best all-around receiver in the moderate price field. It is engineered for the host of applications for which one stage of high gain r.f. amplification and 3.5 watts of audio output power are adequate. The Amateur will find this receiver chock-full of features to widen his scope of activity. The NC-173 has proved itself thoroughly dependable in a great many applications. Short wave listeners can now enjoy true world wide reception; all users can be proud of owning a mighty attractive piece of equipment, an excellent example of modern product design.

The frequency range of the NC-173 is exceptional in that it includes the conventional 540 kc. to 31 Mc. range plus the 48 to 56 Mc. portion of the spectrum which covers the Amateur six meter band. The tuning system employs separate directly-calibrated dial scales with associated control knobs for General Coverage and Bandspread tuning. Both dials are well-illuminated and have auxiliary linear scales for logging purposes. Calibrated bandspread tuning is provided for the main Amateur bands, i.e., 6, 10-11, 20, 40 and 80 meters. Band changing is accomplished by means of a highly efficient band-switch system.

Essentially, the circuit consists of one stage of radio frequency amplification, a first detector and a separate stabilized high frequency oscillator, two intermediate frequency amplifier stages, a diode type second detector, an audio limiter, a high gain type audio stage and an audio output stage plus a separate AVC amplifier, a stabilized beat frequency oscillator plus voltage regulator and rectifier stages. A crystal filter is connected between the first detector and first i.f. stage. Highlighted

in the above line-up are:

CRYSTAL FILTER: A new highly flexible crystal filter provides an adjustable selectivity characteristic with a wide range from broad-band broadcast requirements to sharp Amateur single-signal CW reception.

NOISE LIMITER: A new concept in noise limiter design is introduced in the NC-173 Receiver. This new limiter could be termed "double action plus" and the noise limiting action is equally effective on either phone or CW reception. A panel-mounted threshold control permits adjustment of the level at which limiting action starts.

VOLTAGE REGULATOR: A voltage regulator tube efficiently minimizes frequency drift in the high frequency oscillator and also in the beat frequency oscillator. This voltage control, plus temperature compensation, assures frequency stability for both phone and CW reception.

NARROW BAND FM ADAPTER: The NFM-73 Adapter shown below utilizes the same circuit as the NFM-83 described on page 6. This matching unit plugs into the accessory socket at the rear of the receiver.

CONTROLS: Main Tuning; Bandspread Tuning; Bandswitch; RF Gain — AC ON/OFF; AF Gain; Send-Receive; AVC-MVC; Tone; CWO; CWO Switch; Limiter; Phasing; Selectivity; RF Trimmer.

Additional refinements include an S-Meter with adjustable sensitivity, a continuously variable tone control and a phono input jack for connection to external apparatus such as a turntable pickup and the NFM-73 narrow band FM Adapter

NATIONAL RECEIVERS

SPECIFICATIONS OF NC-173

The AVC system, crystal filter network, noise limiter and tuning system are identical to those used so satisfactorily in the NC-183 (see pages 6 and 7). The panel of the NC-173 contains an illuminated S-meter calibrated in S units from 1 to 9 at approximately 5 db. per unit and above S9 from 0 to 40 db. There is also a pick-up jack on the panel which feeds into the high gain 6SJ7 1st audio stage; audio gain and tone controls are operative with this connection through the audio system which is essentially flat from 75 to 6000 c.p.s. Power output is about 3.5 watts with terminals for 8 and 500 ohm impedance loads on the rear apron. Inverse feedback is used to reduce audio hum to an exceptionally low level. The antenna input circuit of the NC-173 is arranged for single wire, balance feed or low impedance concentric line; average input impedance being roughly 500 ohms. The panel TRIMMER control readily compensates a wide range of antenna loading. The panel also contains a full complement of operating controls.

SELECTIVITY: The selectivity switch and characteristics of the NC-173 are identical to the NC-183 (see page 7 for complete details).

SENSITIVITY: 2.0 microvolts or better for a 6 db. signal/noise ratio throughout the frequency range.

IMAGE REJECTION: Signal/image 25 db. or better at 30 megacycles.

TUBE COMPLEMENT: 3-6SG7 r.f. Amplifier, 1st and 2nd i.f. Amplifiers; 6SA7 1st Detector; 6J5 h.f. Oscillator; 2 — 6H6 2nd Detector — A.V.C. and Noise Limiter; 6AC7 A.V.C. Amplifier; 2 — 6SJ7 B.F.O. and 1st Audio; 6V6GT/G Audio Output; OD3/VR150 Voltage Regulator and 5Y3GT/G Rectifier.

POWER INPUT: Approx. 80 watts at 115 v., 50/60 cycles, 1 phase a.c. (easily adaptable to 220/240 volt service as well as emergency operation from batteries).

PHYSICAL DATA: Table Model, 19 $\frac{3}{4}$ " x 10 $\frac{1}{8}$ " x 12 $\frac{1}{2}$ ", 46 lbs., Gray Enamel Finish.
Rack Model, 10 $\frac{1}{2}$ " panel height, 46 lbs., depth behind panel 14 $\frac{3}{4}$ " overall, Black Wrinkle Finish.

PRICES:

NC-173T Table Model (with speaker)	Net \$189.50
NC-173R Rack Model (with speaker)	Net \$189.50
NFM-73 Narrow Band FM Adapter	Net \$ 17.95
TB-3 Tilt Base (see illustration on page 3)	Net \$ 3.95
NC-173TS (Table) or NC-173RS (Rack) Speaker	Net \$ 10.00

NC-173

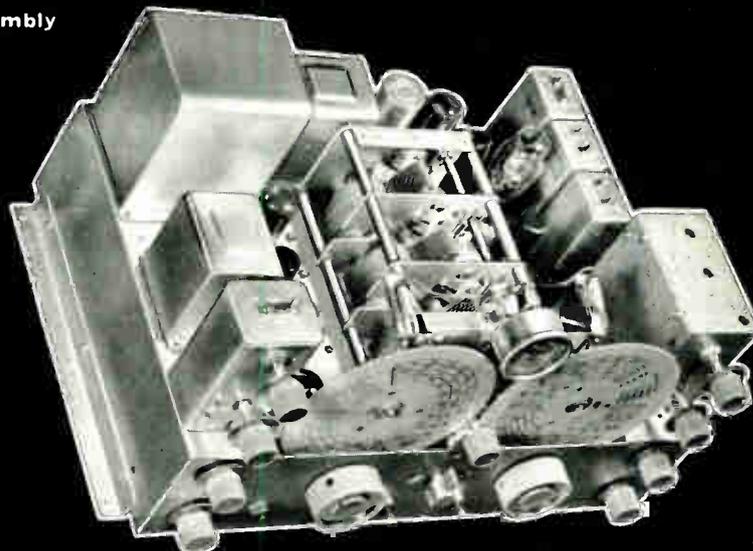
13 tubes (including rectifier and regulator).

S-meter for both phone and CW.

Regulated voltage used on HF oscillator and BFO.

Antenna trimmer on front of panel.

Chassis Assembly



NATIONAL RECEIVERS



SM-57 Signal Strength Meter.



Frequency range continuous from 550 kc. to 55 mc. — Bandsread at any point within this coverage.

For Amateurs — For SWLs — a neat 7 tube superheterodyne with BFO and ANL.

NC-57

The NC-57 is a compact superheterodyne receiver with self-contained speaker and power supply. This recent addition to the National line sets a new high for performance-per-dollar in the moderate price field. The frequency range is continuous from 540 kc. to 55 Mc. with bandsread tuning available throughout the entire range, a feature which is indispensable in the crowded high frequency bands. Front panel controls are held to a minimum consistent with ease of operation and full utilization of the circuit features of the NC-57.

Details of the NC-57 found only in larger and more expensive communications receivers:

1. Ample power output for the average room (3 watts into a 5" P.M. type speaker) with three position control for tone adjustment.
2. A separate RF GAIN control for adjustment of receiver sensitivity.
3. PITCH control to adjust beat note on CW (code) signals.
4. Voltage stabilized oscillator circuit which makes it possible to hold a short wave signal without regard to line voltage changes.
5. Automatic threshold noise limiter to minimize interference due to ignition noise, lighting, static, etc.
6. Band switching made easy by means of simple 5 position switch.
7. Receiver includes all necessary wiring to the accessory socket for plugging in the SM-57 Signal Strength Meter.
8. R.F. TRIMMER control on front panel provides means of matching receiver to various types of antennas for most efficient operation.

TUNING SYSTEM: The frequency range .54 to 55.0 Mc. is covered in five bands: A Band 35.0 — 55.0 Mc., B Band 13.5 — 35.0 Mc., C Band 4.65 — 13.5 Mc., D Band 1.6 — 4.65 Mc., and E Band 0.54 — 1.6 Mc. (standard A.M. broadcast band).

The main dial has five scales calibrated directly in megacycles. Amateur, Police and Foreign Broadcast Bands are identified by let-

ters A.M., P. and F., respectively. The amateur bands covered by the NC-57 are listed below with their respective receiver band locations and are spread on the 360°, 0-100 bandsread dial by means of the band-spread capacitor approximately as follows:

Amateur Band	Band (Meters)	Frequency	Divisions
A	6	50.0 — 54.0 Mc.	37
B	10, 11	27.16 — 29.7 Mc.	44
	15	21.0 — 21.5 Mc.	28
	20	14.0 — 14.4 Mc.	65
C	40	7.0 — 7.3 Mc.	47
D	80	3.5 — 4.0 Mc.	60

TUBE COMPLEMENT: 3 — 6SG7 r.f. Amplifier, 1st and 2nd i.f. Amplifiers; 6SB7-Y Converter; 6H6 2nd Det. — a.v.c. — a.n.l.; 6SN7GT/G 1st Audio — C.W.O.; 6V6GT/G Audio Output; OD3 Voltage regulator and 5Y3GT/G Rectifier.

ACCESSORY CONNECTOR SOCKET: An octal type socket is mounted at the rear of the NC-57 to permit convenient connection of external accessories. The following connections are available at this socket: B+ 250 v. unregulated, B+ 150 v. regulated, 6.3 v. a.c., audio input and ground.

POWER REQUIREMENTS: Approximately 70 watts, 105/130 v., 50/60 cycles a.c. The NC-57 is adapted for battery operation by means of a socket on rear apron, and from 6 volt storage battery when used with National 686S vibrator power supply.

The NC-57 measures 16 9/16" x 8 3/4" x 10 1/2" deep and weighs 25 lbs. (31 lbs. packed for shipment). The finish is an attractive and durable light gray enamel.

The SM-57 Signal Strength Meter has been designed as an accessory to be used in conjunction with the NC-57 in amateur stations or as a tuning indicator for short wave listeners.

NC-57 Receiver Net \$89.50
 SM-57 Tuning Meter Net \$14.95
 TB-2 Tilt Base (see illustration on page 3) Net \$ 3.95

NATIONAL RECEIVERS



The NC-33 is a real communications receiver covering all frequencies from 500 kc. to 35 Mc. It comes complete with speaker and AC/DC power supply in an attractive light-weight metal cabinet — carefully produced from components of good quality. It is simple to install and a pleasure to operate. This economical superheterodyne will serve well and reliably. The NC-33 is the perfect choice for your living room, playroom or den.

Here are some of the features of the NC-33 — details common to the larger communications receivers:

1. Choice of two audio output circuits, the efficient 5" PM speaker mounted behind the metal grille at the left of the panel and the PHONES jack. The latter is wired to silence the speaker when the plug is inserted, thus enabling the listener to enjoy reception without disturbing others in the same room.
2. Automatic noise limiter which can be switched in from the front panel to minimize objectionable interference originating from auto ignition systems, household appliances, static and the like.
3. Bandswitching from panel by means of a positive four-position lever-type switch knob.
4. Send/Receive switch — removes plate voltage when in SEND position thus silencing the receiver without allowing the tube heaters to cool.
5. CW oscillator built in for reception of code signals with PITCH control for adjustment of the beat note.
6. Ample selectivity for separating stations.
7. Calibrated electrical bandspread on all bands thus affording bandspread operation at any point within the frequency range of the receiver (see following paragraphs).

TUNING SYSTEM: The tuning range of the NC-33 is continuous from 500 kc. to 35 Mc. and is covered in four bands as follows:

Band	Frequency Coverage
A	12.0 — 35.0 Mc.
B	4.0 — 12.0 Mc.
C	1.42 — 4.2 Mc.
D	0.5 — 1.42 Mc.

The main dial has its four scales calibrated directly in megacycles with amateur, police and foreign broadcast bands clearly identified. Main tuning and bandspread tuning capacitors are connected in parallel on all bands. By this means, the 360°, 0-100 bandspread dial can be used to tune any portion of the frequency spectrum to which the main dial is set and stations can be separated and logged quite readily.

TUBE COMPLEMENT: A stage outline of the circuit employed in the Receiver is given below, together with the tube type associated with each stage.

Converter	12SA7
I.F. Amplifier (455 kc.)	12SG7
Second Det.-A.V.C.-A.N.L.	12H6
First Aud. o-C.W.O.	12SL7GT/G
Aud. o Output	35L6GT/G
Rectifier	35Z5GT/G

POWER REQUIREMENTS: Approximately 24 watts, 105/130 v., 50/60 cycles a.c. or 105/130 volts d.c.

The NC-33 measures 16 9/16" x 8 3/4" x 8 1/2" and weighs 17 lbs. (23 lbs. packed for shipment). The finish is durable gunmetal gray enamel.

PRICES:

NC-33 Receiver	Net \$65.95
TB-1 Tilt Base (see illustration on page 3)	Net \$ 3.95

Operates from 110-120 volts AC or DC.

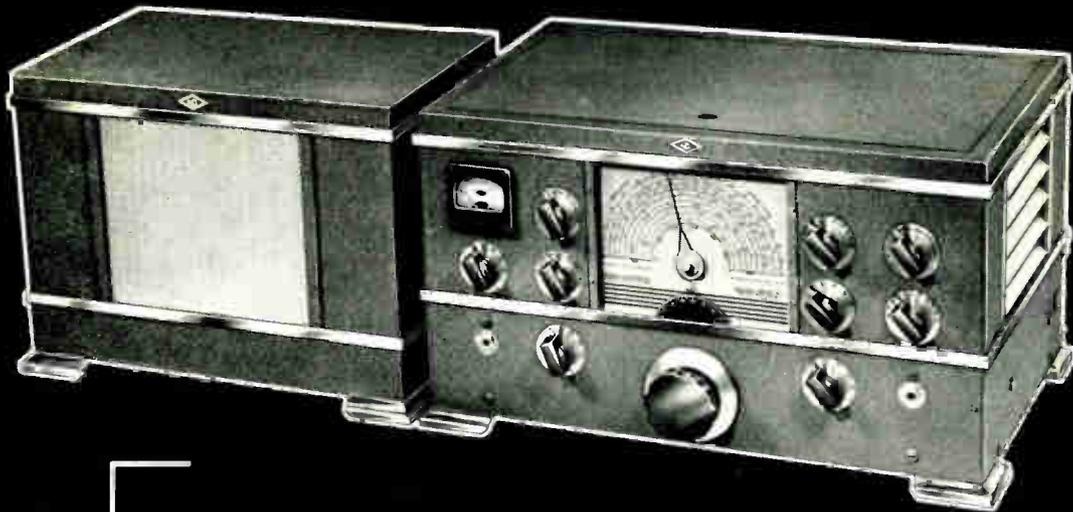
Frequency range continuous from 500 kc. to 35 mc. Bandspread on all bands — BC, amateur, police and foreign are plainly marked.

A compact five tube superhet with built-in 5" PM Speaker — in trim metal cabinet.

NC-33



NATIONAL RECEIVERS



The NC-2-40D is a professional communications receiver in every sense. Sturdy and dependable, it uses a cast aluminum coil set carriage for all tuned stages and a positive drive mechanism. All coils are on polystyrene forms with air trimmers used throughout. It is truly stable and selective.

NC-2-40D

Designed for the radio amateur, the NC-2-40D receiver is also suitable for general communications service in the 490 to 30,000 kc. range. Calibrated electrical bandspread tuning is provided for the 80, 40, 20, 11-10 meter Amateur bands. Features included are a full vision, easy to read, calibrated dial with 6 general coverage and 4 bandspread scales, a single tuning and band switching control knob, a stable high frequency oscillator circuit, a flexible crystal filter, a series valve noise limiter and an auxiliary numerical logging dial. These outstanding features plus conventional items such as a signal strength meter, phonograph or high level microphone pick-up jack, an automatic volume control circuit, a beat frequency oscillator for CW reception, a tone control, a phones jack, and a 115-230 volt a.c. change-over switch provide the operator with a means for coping with a wide variety of receiving conditions and requirements.

CONTROLS: Band Tuning and Band Switching; RF Gain Control; and Signal Strength Meter Switch; Audio Gain; B \pm ON/OFF; Selectivity; Limiter; Tone; CW Oscillator; Phasing.

TUBE COMPLEMENT: 6SK7 r.f. Amplifier; 6K8 1st Det.; 6J5 h.f. Oscillator; 6SK7 and 6K7 i.f. Amplifiers; 6SN7 C.W. Osc.; 3-6V6, AVC and push-pull Audio Output; 5Y3G Rectifier.

FREQUENCY RANGE:

General Coverage:
490 kc. — 30 Mc.
Band Spread:
27 — 30 Mc.
14 — 14.4 Mc.
7 — 7.3 Mc.
3.5 — 4 Mc.

SENSITIVITY: Less than 1 microvolt input produces a 6 db. signal/noise ratio.

SELECTIVITY:

Crystal Filter OFF
Voltage Ratio Nominal Bandwidth
6 db. 4.0 kc.
60 db. 22.0 kc.
Crystal Filter In — 20 db. Voltage Ratio
Position 1. 6.0 kc.
2. 4.0 kc.
3. 2.0 kc.
4. 1.0 kc.
5. Max. Selectivity...200 cycles.

AVC CHARACTERISTIC: Constant within \pm 3 db. from 10. to 100,000 microvolts input.

IMAGE REJECTION:

Above 50 db. up to 10 Mc.
Above 40 db. up to 15 Mc.
Above 30 db. up to 30 Mc.

AUDIO FIDELITY: The frequency response of the audio system is flat within \pm 2 db. from 50 cycles to 10,000 cycles.

POWER INPUT: Approximately 70 watts; either 110-120 or 220-240 volts 50/60 cycle, Phase a.c. A plug and socket is provided for convenient external connection for battery operation.

POWER OUTPUT: A 10,000 ohm output circuit delivers 8 watts with negligible distortion.

PHYSICAL DATA:

Table Model:
NC-2-40DT; 19 $\frac{1}{4}$ " x 10 $\frac{5}{8}$ " x 15 $\frac{1}{2}$ "; Weight — 60 Lbs., Finish — Gray Wrinkle; Enclosure — Cabinet.

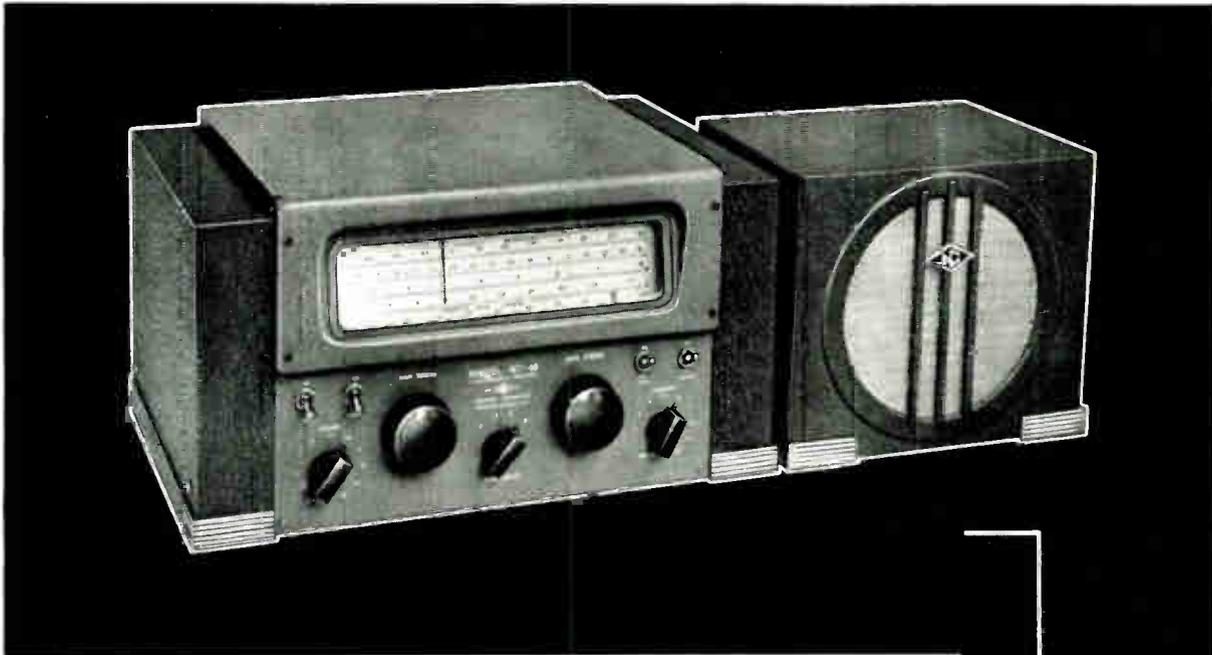
Rack Model:

NC-2-40DR; 19" x 10 $\frac{1}{2}$ " x 17 $\frac{1}{2}$ "; Weight — 65 Lbs.; depth behind panel 14 $\frac{7}{8}$ " overall; Finish — Gray Wrinkle; Enclosure — Dust Cover.

PRICES:

Rack or Table Model (with tubes) Net \$225.00
NC-2RS (Rack) or NC-2TS (Table) Speaker Net \$16.44

NATIONAL RECEIVERS



The NC-46 is a reliable radio receiver covering all frequencies from 540 to 30,000 kc., especially suitable for use in D.C. districts and on ships where 115 volts is available. This is an excellent quality AC-DC set employing 9 tubes plus rectifier. Electrical bandspread is provided for vernier tuning. The circuit consists of a 6K8 converter-oscillator stage, two 6SG7 IF stages, 6H6 detector-limiter stage, 6SF7 AVC amplifier, 6SJ7 CW Oscillator, 6SC7 Audio-Inverter, push-pull audio output stage with two 25L6GT tubes, and a 25Z5 Rectifier.

CONTROLS:

Main Tuning Dial; Bandspread Tuning Dial; Sensitivity Control; Volume Control; Tone Switch; C.W. Oscillator Switch; AVC Switch; Limiter Switch; Band Selector Switch; B+ Switch and Power Switch.

TERMINALS:

On Rear Panel; Phone Jack; B+ Terminals; 8 Ohm Spkr. Terminals; Ant. Terminal; Fuse extractor post.

FREQUENCY RANGE:

The Frequency Range of the NC-46 Receiver is 540. Kc. to 30. Mc. covered in four bands.

Band	General Coverage	Band Spread
A.	11.5 - 30.0 Mc.	3.5- 4.0 Mc; 70 dial div.
B.	4.4 - 12.0 Mc.	7.0- 7.3 Mc; 50 dial div.
C.	1.55 - 4.6 Mc.	14.0-14.4 Mc; 56 dial div.
D.	0.540- 1.6 Mc.	27.0-30.0 Mc; 60 dial div.

SENSITIVITY:

Approximately 5 microvolts input provides a 50 Milliwatt output over the entire range.

SELECTIVITY:

The total bandwidth is approximately 4.5 Kc. at 6 db. down and approximately 70 db. attenuation 10 Kc. off resonance is obtained.

POWER INPUT:

Operation from 110/130 volts A.C. or D.C. Normal power consumption 65 watts.

POWER OUTPUT:

Approximately 4 watts undistorted.

PHYSICAL DATA:

NC-46 Receiver: 9 7/16" high by 17 3/8" wide by 12 3/8" deep, Weight 32 lbs., Gray Wrinkle Finish.

NC-46TS 6" PM Speaker; 8 7/8" high x 10-7/16" wide x 7 1/2" deep, Weight 8 lbs., finish matches receiver.

PRICES:

NC-46 Table Model Complete with Tubes
Net \$97.50
NC-46TS Table Model SpeakerNet \$ 9.90

ANTENNA SUGGESTIONS: When contemplating the purchase of a communications receiver such as the NC-46, it is well to keep in mind that a suitable antenna can help considerably in getting the most out of the reception of foreign stations. In general, the most practical antenna for use where the receiver is to be used over its entire frequency range is a single wire from 50 to 75 feet in length. If reception on one frequency or a narrow band of frequencies is contemplated, best results will be obtained by the use of a folded doublet or half-wave dipole type designed for the operating frequency.

The NC-46 is a reliable radio receiver which will operate on either AC or DC. Its wide frequency range, 540 kc. to 30 mc., and full 4 watts of audio output from nine tubes makes this an exceptional general purpose receiver and a favorite on ship-board.

NC-46



NATIONAL RECEIVERS



Power Pack



HFS Frequency Range - 27-250 Mc.

A worthy successor to the famous National I-10, the new model HFS Receiver/Converter is a unique and extremely versatile instrument. The unusual frequency range of 27 to 250 megacycles, selectivity characteristics particularly suited to the constantly increasing occupancy of these frequencies and high usable sensitivity are but a few of the features which make model HFS the logical choice for amateurs, laboratories, news services, public utility and airline personnel, or any application requiring compact, dependable VHF receiving equipment.

The circuit of this new receiver/converter is basically superheterodyne-superregenerative with its i.f./converter output channel at 10.7 megacycles. Thus, it is equally adaptable for use as a complete VHF receiver for AM, FM (by slope detection) and CW signals or as a converter in conjunction with any conventional superhet receiver capable of tuning 10.7 mc. When used in the latter manner, the result is dual conversion type operation with excellent image rejection at all frequencies from 27-250 megacycles; all features of the receiver to which the HFS is connected become operative for VHF reception. The HFS will also serve as the front end of a high fidelity FM broadcast

(wide-band) installation simply by connecting the converter output to a 10.7 mc. FM i.f. channel and suitable amplifier-speaker system.

For maximum stability and flexibility, power for the HFS is furnished by a separate unit and where a 115/230 volt 50/60 cycle source is available the National 5886 Power Supply is employed. The HFS may also be powered by the National 686S Vibrator Power Supply and a storage battery or a combination of "B" batteries and storage battery. The 686S operates from 6 volts D.C. and provides all voltages required.

A storage rack for the complete complement of coils is provided inside the receiver cabinet.

The HFS can be used for AM, FM and CW reception. It can also be used as a VHF converter with receivers tuning to 10.7 Mc. The HFS is a quality VHF receiver for fixed-station AC use — or from a 6 volt battery in portable or mobile service.

HFS

SPECIFICATIONS OF THE MODEL HFS

TUNING SYSTEM:

A two-gang main TUNING capacitor, a panel-controlled TRIMMER capacitor and six sets of plug-in coils are used to tune the Receiver in six bands as follows:

Band	Frequency Coverage
A	178 — 250 Mc.
B	120 — 178 Mc.
C	80 — 120 Mc.
D	56 — 80 Mc.
E	41 — 60 Mc.
F	27 — 42 Mc.

(See pages 31 and 33 for details of the type PW-O drive and HFS front end assembly.)

CONTROLS:

TUNING Dial, TRIMMER Control, REGEN Control, AUDIO GAIN Control, INT-EXT (external position connects the i.f. output to the output receptacle and disconnects the second

detector and audio stages) Switch, Converter-Output Control (on rear apron) and B+/OFF Switch.

TUBE COMPLEMENT:

6AK5 1st Det.; 9002 h.f. Osc.; 6SG7 i.f. Amp.; 6SK7 2nd Det.; 6J5 1st Audio; 6V6GT/G Audio Output and 6J5 Converter Output.

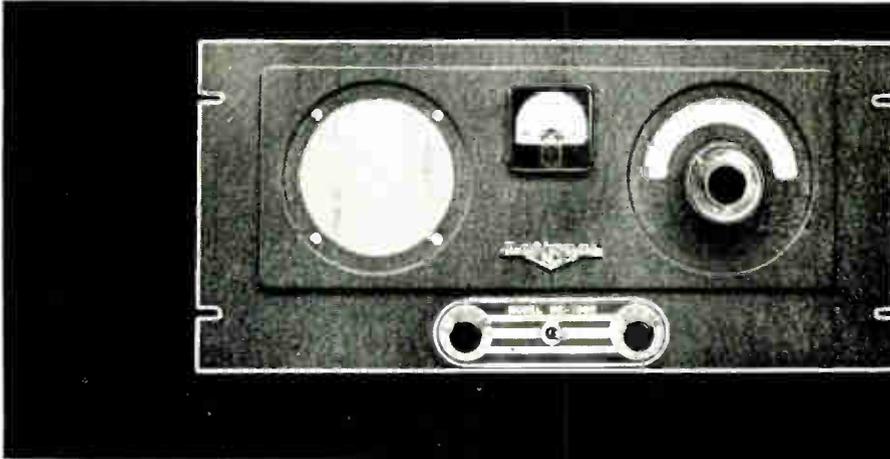
PHYSICAL DATA:

The HFS measures 16-9/16" x 8-3/4" x 8-1/2", weighs 19 lbs. (25 lbs. packed for shipment) and the finish is smooth gray enamel.

PRICES:

Model HFS Receiver (including complete set of coils)	Net \$125.00
Type 5886 Power Supply 115/230 v. 50/60 cycle a.c. ...	Net \$ 22.43
Type 686S Vibrator Power Supply 6 v. d.c.	Net \$ 34.16
TB-1 Tilt Base (see page 3)	Net \$ 3.95

NATIONAL RECEIVERS



NC 108R

The new National NC-108 FM Receiver/Tuner is a nine-tube plus rectifier and tuning indicator (the rack model employs a tuning meter) superheterodyne with ratio type FM detector. The frequency range is 87-109 mc. and the dial is calibrated in both megacycles and channels. There is a built-in 5" PM speaker for monitoring and VOLUME and TONE controls are operative on both self-contained and external audio systems. The NC-108 is designed primarily to serve

as the nucleus of a high fidelity installation for the reception and reproduction of FM broadcast entertainment. It can be used in conjunction with any public address or other audio amplifier-loud speaker system or with any conventional broadcast or short wave receiver. The built-in speaker can be switched on or off from the front panel as desired. The NC-108 may also be used as an FM receiver complete in itself—the monitoring speaker affords thoroughly enjoyable listening.

SPECIFICATIONS OF NC-108

TUBE COMPLEMENT:

6BA6 r.f. Amplifier; 6AG5 Mixer; 6C4 Heterodyne Osc.; 3-65G7 1st, 2nd and 3rd i.f. Amplifiers; 6H6 Ratio discriminator; 6SJ7 1st Audio; 6V6GT/G Monitor power amplifier; 6U5/6G5 Tuning indicator (on table model only) and 5Y3GT Rectifier.

SENSITIVITY:

With 22.5 kc. deviation, a 7 microvolt signal gives 8 volts of audio at output terminals with less than 2% distortion.

SELECTIVITY:

I.F. bandwidth 150 kc. at 3 db. down and 600 kc. at 60 db. down.

IMAGE REJECTION:

Approximately 40 db.

FIDELITY:

Overall response flat within ± 2 db. from 50

to 18,000 cycles. Standard RMA de-emphasis can be cut in or out as desired.

AUDIO OUTPUT:

Maximum audio voltage delivered to output terminal is approximately 10 volts. Input circuit of the following amplifier should be high impedance.

POWER REQUIREMENTS & PHYSICAL DATA:

Both the NC-108R and NC-108T operate from 110/125 V. 50/60 cycles A.C.

NC-108R panel height 8 $\frac{3}{4}$ ", 25 lbs. net (31 lbs. packed for shipment), depth behind panel 8 $\frac{3}{4}$ " overall, Black Wrinkle finish.

NC-108T 16-9/16" x 8 $\frac{3}{4}$ " x 8 $\frac{1}{2}$ ", 24 lbs. net (30 lbs. packed for shipment), smooth Gray Enamel finish.

NC-108R Rack ModelNet \$115.00

NC-108T Table ModelNet \$ 99.50

TB-1 Tilt Base for the Table Model Net \$ 3.95

The NC-108 FM Receiver-Tuner is skillfully engineered and is a quality product in every detail: read the specifications. It is ideal for use with any high fidelity audio amplifier and has built-in speaker for monitoring.



NC 108T

NATIONAL DIALS

N Dial Net \$4.50
AD Dial Net \$3.00

The four-inch N and AD Dials have engine divided and die stamped scales respectively. The N Dial has a decimal vernier; the AD Dial employs a pointer. The planetary drive has a ratio of 5 to 1, and is contained within the body of the dial. 2, 3, 4 or 5 scale. Fits 1/4" shaft. Specify scale.

B Dial Net \$2.70
"Velvet Vernier" Dial, Type B, has a compact variable ratio 6 to 1 min., 20 to 1 max. drive that is smooth and trouble free. The case is black bakelite. 1 or 5 scale. 4" dia. Fits 1/4" shaft. Specify scale.

BM Dial Net \$2.10
The BM Dial is a smaller version of the B for use where space is limited. The drive ratio is fixed. Although small in size, the BM Dial has the same smooth action as the larger units. 1 or 5 scale. 3" dia. Fits 1/4" shaft. Specify scale.

AM Dial Net \$2.25
The original "Velvet Vernier" mechanism in a metal skirted dial 3" in dia. ratio 5 to 1. It is available with 2, 3, 4, 5 or 6 scale and fits 1/4" shaft.

P Dial Net \$1.00
The new P dial is the same as the AM except direct drive.
Type O, 3 1/2" dia., scale 2, with HRK knob, fits 1/4" shafts. Net \$1.00
Type L, same as O except 5" dia., scale 2 only. Net \$1.95
Type K, same as O except less knob, complete with ODD vernier drive, scale 2 only. Net \$1.50
Type M, same as K except 5" dia., scale 2 only. Net \$2.25

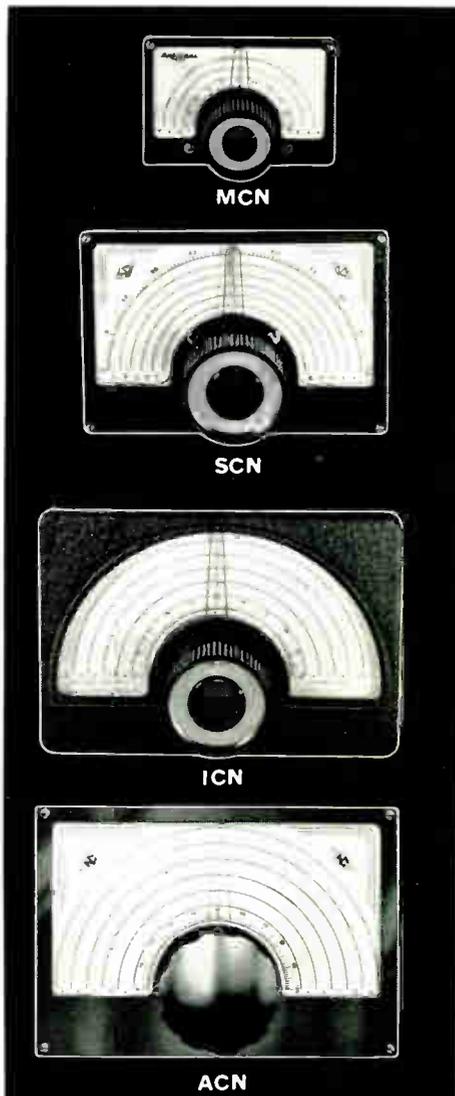
The dials at the right are for individual calibration; all four employ the noted 5:1 drive ratio Velvet Vernier mechanism and are of excellent quality.

MCN Dial Net \$2.70
The MCN dial has been scaled down to lend itself ideally to mobile installations and small converters and tuners. It may also be mounted on the standard 3 1/2" rack panel where such mounting may be desirable. The dial provides three calibrating scales and a 0-100 logging scale. On the rear side of the dial, the mechanism extends 1/4" below the dial frame. 2 3/4" H. x 3 7/8" W.

SCN Dial Net \$3.00
The SCN dial provides the same dial scales as the ACN dial but in a reduced size. It is used where economy of panel-mounting space is desirable and where a smaller dial would be out of proportion with the size of the panel. 4-7/16" H x 6 1/4" W.

ICN Dial Net \$6.00
The ICN dial meets those hundreds of requests from amateurs the world over for an illuminated ACN dial. Two dial lights mounted on the top corners of the dial provide efficient and even illumination on all bands. The dial window has been blanked out in semi-circular shape to prevent shadow casting. Dial scales are the same as those used on the ACN dial. 5 1/8" H. x 7 1/4" W.

ACN Dial Net \$3.30
The ACN is the original of this type dial, a National design for the benefit of experimenters who "build their own" and desire direct calibration 5" H. x 7 1/4" W.



DIAL SCALES			
Scale	Divisions	Rotation	Direction of Condenser Rotation for increase of dial reading
1	0-100-0	180°	Either
2	0-100	180°	Counter Clockwise
3	100-0	180°	Clockwise
4	150-0	270°	Clockwise
5	200-0	360°	Clockwise
6	0-150	270°	Counter Clockwise

NATIONAL RF CHOKES



- R-100 Net \$.35
- R-100U Net \$.42
- R-100S Net \$.42
- R-100ST Net \$.40

These RF chokes are identical electrically, but differ in mounting provisions. The R-100 employs pigtail leads; the R-100U has pigtail leads and a removable stand-off insulator; the R-100S has cotter-pin lug terminals and a non-removable stand-off insulator; the R-100ST has a 6-32 threaded stud at each end. These chokes are available in 2.5, 5 and 10 millihenry sizes and are rated at 125 milliamperes.

- R-33 Net \$.35

The R-33 series chokes are 2-section RF chokes available in 10, 50, 100 and 750 microhenry sizes. Also available in this series is a single layer solenoid choke of 1 microhenry inductance. All are rated at 33 milliamperes. The chokes are wound on a 5/8" long form and range in diameter up to 5/16" maximum.

- R-50 Net \$.35
- R-50-1 Net \$.53

The R-50 series chokes are 3 and 4-section RF chokes and available in 0.5, 1, 2.5, and 10 millihenry sizes. They are rated at 50 milliamperes. The chokes are wound on a 1" long form and have a maximum diameter of 15/32". The 10 millihenry R-50-1 choke is wound on an iron core.

- R-33G Net \$3.60

The R-33G choke is a 2-section 750 microhenry RF choke hermetically sealed in glass with a current rating of 33 milliamperes. The choke body is 1" long by 5/8" diameter.

- R-60 Net \$.35

The R-60 choke is a high current RF choke (500 milliamperes) available in 2 and 4 microhenry sizes. The choke is 1 1/8" long by 5/16" diameter.

- R-300 Net \$.38
- R-300U Net \$.42
- R-300S Net \$.42
- R-300ST Net \$.40

These RF chokes are similar in size to R-100 series but have higher current capacity. The R-300U is provided with a removable stand-off insulator at one end. The R-300S has a non-removable stand-off insulator and cotter-pin lug terminals. The R-300ST has a 6-32 threaded stud at each end. Inductance values of 0.5, 1.0, 2.5 and 5.0 millihenries are available with a current rating of 300 milliamperes. R-300, R-300U, R-300S and R-300ST are identical electrically.

- R-152 Net \$1.75

For use in the range between 2 and 4 Mc. Ideal for high power transmitter stages operated in the 80 meter amateur band. Inductance 4 m.h., DC resistance 10 ohms, DC current 600 ma. Coils honeycomb wound on steatite core.

- R-154 Net \$1.75
- R-154U Net \$1.40

For the 20, 40 and 80 meter bands, inductance 1 m.h., DC resistance 6 ohms, DC current 600 ma. Coils honeycomb wound on steatite core. The R-154U does not have the third mounting foot and the small insulator, but is otherwise the same as R-154. See illustration.

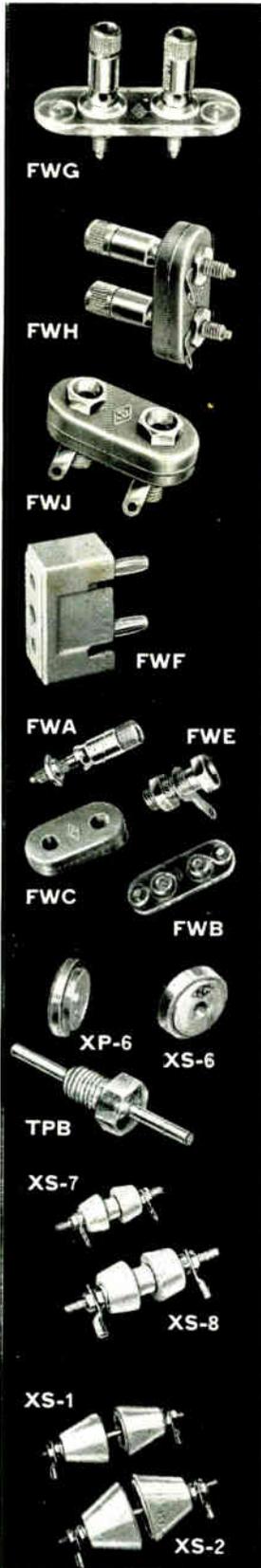
- R-175 Net \$2.25

The R-175 Choke is suitable for parallel-feed as well as series-feed in transmitters with plate supply up to 3000 volts modulated or 4000 volts unmodulated. Unlike conventional chokes, the reactance of the R-175 is high throughout the 10 and 20 meter bands as well as the 40 and 80 meter bands. Inductance 225 μ h, distributed capacity 0.6 mmf., DC resistance 6 ohms, DC current 800 ma., voltage breakdown to base 12,500 volts.



Manufacturers: We have facilities for quantity production of RF chokes of practically any type. Send us your specifications.

NATIONAL COMPONENTS



FWG Net \$.60

A Victron terminal strip for high frequency use. The binding posts take banana plugs at the top, and grip wires through hole at the bottom, simultaneously, if desired.

FWH Net \$.66

The insulators of this terminal assembly are molded R-39 and have serrated bosses that allow the thinnest panel to be gripped firmly, and yet have ample shoulders. Binding posts same as FWG above.

FWJ Net \$.54

This assembly uses the same insulators as the FWH above, but has jacks. When used with the FWF plug (below), there is no exposed metal when the plug is in place.

FWF Net \$.70

This molded R-39 plug has two banana plugs on $\frac{3}{4}$ " centers and fits FWG, FWH or FWJ above. Leads may be brought out through the top or side.

FWA, Post Net, each \$.20

Brass Nickel Plated

FWE, Jack Net, each \$.15

Brass Nickel Plated

BWA (not illustrated) Net \$.10

Standard banana plug, silver plated to reduce contact resistance in r.f. circuits.

BWE (not illustrated) Net \$.15

Matching jack for BWA, silver plated.

FWC, Insulator Net, per pair \$.24

R-39 Insulation.

FWB, Insulator Net, each \$.15

Polystyrene insulation.

XS-6 Net, each \$.12

A low-loss steatite bushing for $\frac{1}{2}$ " holes. Passes 6-32 screw.

XP-6 Net, box of ten \$.51

Same as above but polystyrene.

TPB Net, per dozen \$.75

A threaded polystyrene bushing with removable .093 conductor moulded in, $\frac{1}{4}$ " diam., 32 thread.

XS-7, ($\frac{3}{8}$ " Hole) Net \$.36

XS-8, ($\frac{1}{2}$ " Hole) Net \$.48

Steatite bushings. Prices include male and female bushings with metal fittings.

XS-1, (1" Hole) Net \$.72

XS-2, ($1\frac{1}{2}$ " Hole) Net \$.81

Prices listed are per pair, including metal fittings. Insulation steatite.

AA-3 Net \$.36

A low-loss steatite spreader for 6 inch line spacing. (600 ohms impedance with No. 12 wire.)

AA-5 Net \$.30

A low-loss steatite aircraft-type strain insulator.

AA-6 Net \$.54

A general purpose strain insulator of low-loss steatite.

GS-1, $\frac{1}{2}$ " x $1\frac{3}{8}$ " Net \$.24

GS-2, $\frac{1}{2}$ " x $2\frac{7}{8}$ " Net \$.30

GS-3, $\frac{3}{4}$ " x $2\frac{7}{8}$ " Net \$.60

GS-4, $\frac{3}{4}$ " x $4\frac{7}{8}$ " Net \$.75

GS-4A, $\frac{3}{4}$ " x $6\frac{7}{8}$ " Net \$ 1.05

Cylindrical low-loss steatite standoff insulators with nickel plated caps and bases.

GSJ, (not illustrated) Net \$.10

A special nickel plated jack top threaded to fit the $\frac{3}{4}$ " diameter insulators GS-3, GS-4 & GS-4A.

GS-10, $\frac{3}{4}$ " high Net, box of ten \$.90

GS-10S (not illustrated) but same as GS-10 except includes threaded stud in top end. Net, box of ten \$ 1.00

GS-5, $1\frac{1}{4}$ " high Net \$.30

GS-6, 2" high Net \$.42

GS-7, 3" high Net \$.75

These cone type standoff insulators are of low loss steatite. They are molded with a tapped hole in each end for mounting as follows:

GS-5, 8-32 tap $7/16$ " deep;

GS-6 & GS-7, 10-24 tap $11/16$ " deep;

GS-10, 6-32 tap $1/4$ " deep and GS-10S as noted above.

GS-8, with terminal Net \$.54

GS-9, with jack Net \$.75

These low-loss steatite standoff Insulators are also useful as lead-through bushings.

XS-3, ($2\frac{3}{4}$ " hole) Net \$ 3.60

XS-4, ($3\frac{3}{4}$ " hole) Net \$ 4.35

Prices are per pair and include nickel plated spindles, lugs and hardware. These low-loss steatite bowls are ideal for lead-in purposes at high voltages.

XS-5, Without Fittings Net, each \$ 4.95

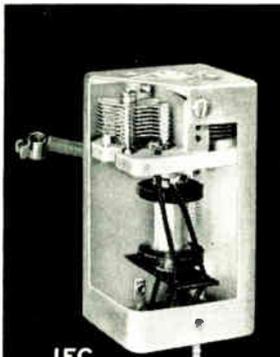
XS-5F, With Fittings Net, per pair \$ 10.20

These big low-loss bowls have an extremely long leakage path and a $5\frac{1}{4}$ " flange for bolting in place. Insulation steatite. Fittings include nickel plated brass spindles, lugs, nuts and washers.



NATIONAL COMPONENTS

I. F. TRANSFORMERS



IFC
IFCO



IFL
IFM
IFN
IFO



OSR



AR-2

IFC, Transformer, Net \$4.25
IFCO, Oscillator, Net \$4.25
Litz coils wound on a polystyrene form and ceramic insulated air-dielectric trimming condensers make these transformers inherently stable and exceptionally retentive of tuning. The 4 1/2" x 2 3/8" x 2" shield can has two 6-32 spade bolts for mounting. Available for either 175 KC or 450-550 KC. Specify frequency.
IFL FM Discriminator

Net \$6.90

IFM IF Transformer Net \$6.45

IFN IF Transformer Net \$6.45

IFO FM Ratio Discriminator

Net \$6.98

IFL, IFM, IFN and IFO transformers operate at 10.7 Mc. and are designed for use in FM Superheterodyne receivers. Coils are precision wound on grooved polystyrene forms and tuning is accomplished by movable iron cores. Bandwidth is not affected by tuning slug position. The transformer cans are 1 3/8" square and stand 3 1/8" above the chassis. Two 6-32 spade bolts are provided for mounting.

The IFL transformer is a 10.7 Mc. FM discriminator transformer suitable for use in conventional FM receiver discriminator circuit and is linear over a band of ±100 Kc.

The IFM transformer is a 10.7 Mc. IF transformer with a 150 Kc. bandwidth at 1.5 db attenuation. Approximate stage gain of 30 is obtained with IFM Transformer and 6SG7 tube.

The IFN transformer is a 10.7 Mc. IF transformer with a 100 Kc. pass band at 1.5 db attenuation. Approximate stage gain of 30 is obtained with IFN Transformer and 6SG7 tube.

The IFO transformer is a 10.7 Mc. FM discriminator transformer of the ratio type and is linear over a band of ±100 Kc.

IFJ, with variable coupling
Net \$8.25

IFK, with fixed coupling
Net \$7.25

15 Mc. IF transformers suitable for ultra high frequency superheterodynes. They are made in two models with and without variable coupling. Approximate stage gain of 10 is obtained with IFJ or IFK Transformer and 6AB7 tube.

SA:4842 Net \$4.50

A 456 kc. discriminator transformer for narrow band frequency modulation. This unit is the nucleus of the NFM adapter described by Harrington and Bartell in November 1947 QST. Two slug-tuned secondaries are employed and discrimination is accomplished by resonating one at approximately 10 kc. above, the other at approximately 10 kc. below the center frequency of the i.f. channel.

CD-1, 1/4 pint can Net \$.95
Liquid Polystyrene Cement — is ideal for windings as it will not spoil the properties of the best coil form.

COILS AND COIL FORMS

AR-2 High Frequency Coil
Net \$1.13

AR-5 High Frequency Coil
Net \$.97

The AR-2 and AR-5 coils are high Q permeability tuned RF coils on low loss mica-filled bakelite forms. The AR-2 coil tunes from 75 Mc. to 220 Mc. with capacities from 100 to 10 mmfd. The AR-5 coil tunes from 37 Mc. to 110 Mc. with capacities from 100 to 10 mmfd. The inductive windings supplied may be replaced by other windings as desired to modify the tuning range.

XR-50 Net \$.60

These mica-filled bakelite coil forms may be wound as desired to provide a permeability tuned coil. The form winding length is 11/16" and the form winding diameter is 1/2 inch. The iron slug is 3/8" dia. by 1/2" long.

OSR Net \$1.80

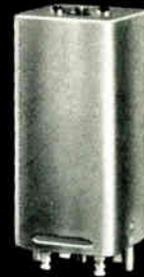
A shielded oscillator coil which tunes to 100 kc. with .00041 mfd. Two separate inductances, closely coupled. Excellent for interruption-frequency oscillator in super-regenerative receivers.

Symbol	Outside Diameter	Length	Net
PRC-1	3/8"	3/8"	.15
PRC-2	3/8"	1/2"	.15
PRC-3	3/8"	3/4"	.15
PRD-1	1/2"	1/2"	.15
PRD-2	1/2"	1"	.15
PRE-1	9/16"	3/4"	.18
PRE-2	9/16"	1"	.18
PRE-3	9/16"	2"	.24
PRF-1	3/4"	3/4"	.24
PRF-2	3/4"	1 1/4"	.30

These small coil forms are of molded polystyrene, open at one end and closed at the other except for a hole which permits mounting by a single 6-32 screw. A size for every application.



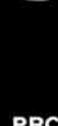
IFJ
IFK



SA-4842



CD-1



PRC

PRD

PRE

PRF

NATIONAL COMPONENTS



COIL FORMS

XR-1, Four prong, Net \$.35

XR-2, without prongs
Net \$.25

Molded of R-39 mica-filled bakelite, permitting them to be grooved and drilled. Coil form diameter 1", length 1 1/2".

XR-3 Net \$.20

Molded of R-39. Diameter 9/16", length 3/4". Without prongs.

XR-4, Four prong, Net \$.51

XR-5, Five prong, Net \$.51

XR-6, Six prong, Net \$.60

Molded of R-39, permitting them to be grooved and drilled. Coil form diameter 1 1/2", length 2 1/4". A special socket, XC-6C, is required for the six-prong form.

COIL SOCKET

XC-6C Net \$.51

Special six-prong steatite socket for XR-6 Coil Form.

CRYSTAL SOCKETS

SC-1 Net \$.32

SC-2 Net \$.32

SC-3 Net \$.32

The SC-1, SC-2 and SC-3 are crystal mounting sockets for crystal holders with mounting pins spaced 0.500", 0.486" and .750" respectively and pin diameters of 1/8", 3/32" and 1/8" respectively. Steatite Insulation. Single 4-36 or 4-40 screw mounting for SC-1 and SC-2; single 6-32 screw mounting for SC-3.

COIL SHIELDS

RZ, coil shield Net \$.35
1 3/8" square x 4" high.

RS, coil shield Net \$.35
1-7/16" x 1 7/8" x 3 1/2" high.

RO, coil shield Net \$.35
2" x 2 3/8" x 4 1/8" high.

National coil shields are formed from a single piece of pure aluminum. They are mechanically strong and have ample thickness to mount small parts on the walls.

The RZ, RS and RO coil shields are supplied with two threaded studs extending downward from the open end for attaching to the chassis.

T-78, tube shield complete
Net \$.27

National tube shield type T-78 is a three-piece pure aluminum shield suitable for shielding glass tubes with ST-12 bulb, such as the 6C6 and 6D6 tubes.

JACK SHIELD

JS-1, Net \$.30

For shielding small standard jacks mounted behind a panel, or on the ends of extension cords. Indispensable for reducing hum pickup.

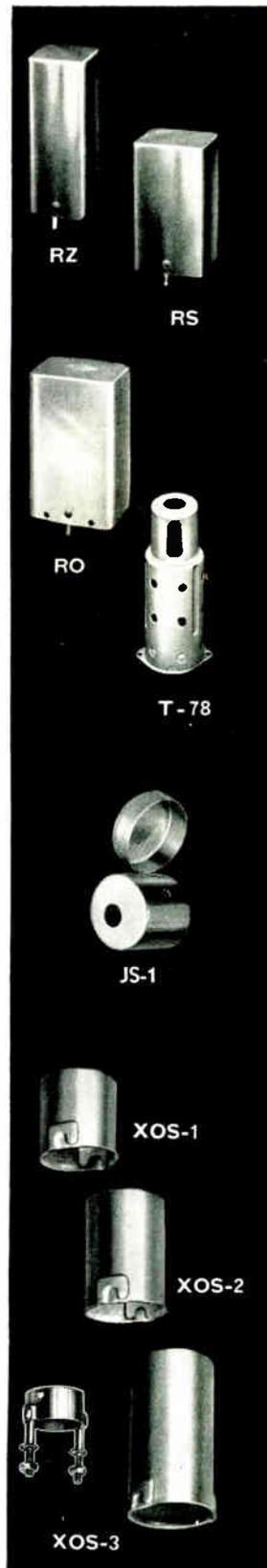
TUBE SHIELDS

XOS-1 For 1-3/16" high tube body. Net \$.48

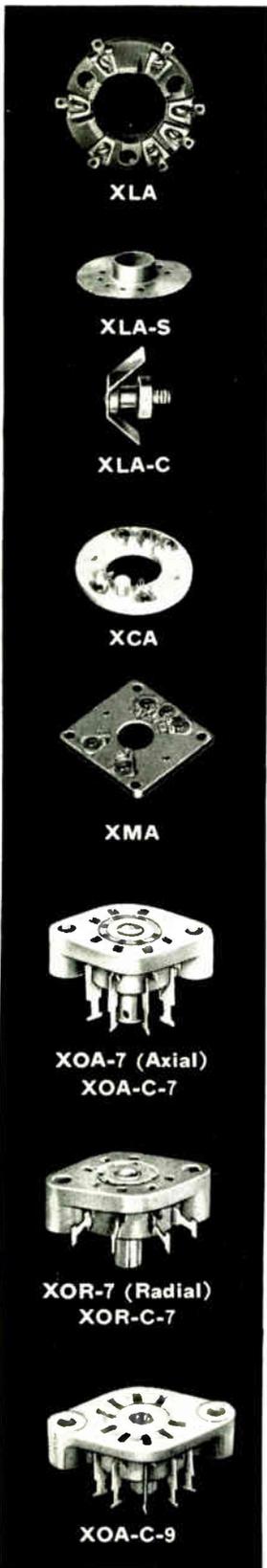
XOS-2 For 1 1/2" high tube body. Net \$.48

XOS-3 For 2" high body. Net \$.48

The XOS tube shield is a two piece shield for the Miniature Button 7 Pin base tubes. The shield is available in three sizes corresponding to the 1-3/16", 1 1/2" and 2" tube body heights. The shield contains a spring which centers tube in shield and holds tube and shield firmly in place. The two 4-40 spade bolts serve to mount the XOA or XOR Socket and the XOS tube shield. See page 22 for listing of National miniature sockets.



NATIONAL SOCKETS



XLA Net \$.99
A low-loss socket for the 6F4 and 950 series acorn tubes for frequencies as high as 600 Mc. Conventional by-pass condensers may be compactly mounted between the contact terminals and the chassis. Low contact resistance, short and direct leads and low and constant inductance are features.

XLA-S Net \$.36
An internal shield fitting the XLA socket and suitable for tubes such as the 956.

XLA-C Net \$.36
This miniature by-pass condenser may be mounted inside the socket, directly below the contact. Capacities of 50 or 100 mmf. available.

XCA Net \$.99
A low-loss steatite socket for acorn triodes. Pin grips are designed to accept tube prongs with minimum strain but exert maximum pressure when seated.

XMA Net \$ 1.32
For pentode acorn tubes, this socket has built-in by-pass condensers. The base is a copper plate.

XOA-7 (mica-filled bakelite) Net \$ 5.00

XOA-C-7 (ceramic) Net \$ 5.00

XOR-7 (mica-filled bakelite) Net \$ 5.00

XOR-C-7 (ceramic) Net \$ 5.00
These high quality sockets for the 7 pin miniature tubes have silver plated beryllium copper contacts that correctly grip the tube pins close to the base of the tube to provide the short leads and low inductance so necessary in ultra-high frequency design.

A novel feature of these new sockets is the interchangeability of the contacts, which are easily removed for replacement. This permits the use of a mixture of axial (XOA) and radial (XOR) type contacts in the same socket to obtain the shortest possible leads, or minimum size in tight places. The above sockets all mount with two 4-40 screws on .875" centers. Chassis cutout should be 3/4" dia. Shields for use with these sockets are on page 21.

XOA-C-9 (ceramic) Net \$ 5.77

XOR-C-9 (ceramic) Net \$ 5.77
These sockets are for the new 9-pin miniature tubes. The XOR-C-9 (not illustrated) has radial contacts. Both have all of the features described above for the 7-pin types

and they also mount with 4-40 screws. Mounting center dimension is 1 1/8", the chassis cutout should be 13/16" dia.

CIR SERIES SOCKETS

Any Type Net \$ 3.30
Always a popular National component, type CIR Sockets feature low-loss steatite insulation, a contact that grips the tube prong for its entire length, and a metal ring for six position mounting.

XC-4, 5, 6, 7S, 7L and CIR-4, 5, 6, 7S and 7L all have 1-27/32" mounting centers. CIR-8E has slotted holes in plate but will mount on 1-27/32" center. CIR-8 and XC-8 have 1 1/2" mounting centers.

XC SERIES SOCKETS

XC-4 Net \$.36
XC-5 Net \$.39
XC-6 Net \$.42
XC-7S Net \$.45
XC-7L Net \$.45
XC-8 Net \$.39

National wafer sockets have exceptionally good contacts with high current capacity together with low loss steatite insulation. All types have a locating groove to make tube insertion easy. The XC-6 is ideal for use with AR-17 coils shown on page 24.

HX-29 Net \$ 8.11

A low-loss wafer socket with steatite insulation for the popular 829 and 832 tubes.

JX-51 Net \$ 8.11

A low loss steatite wafer socket for the 813 and other tubes having the Giant 7-pin base. (not illustrated)

XM-10 Net \$ 9.90

A heavy duty metal shell socket for tubes having the XU 4-pin base.

XM-50 Net \$ 1.20
(see XM-10 for style)

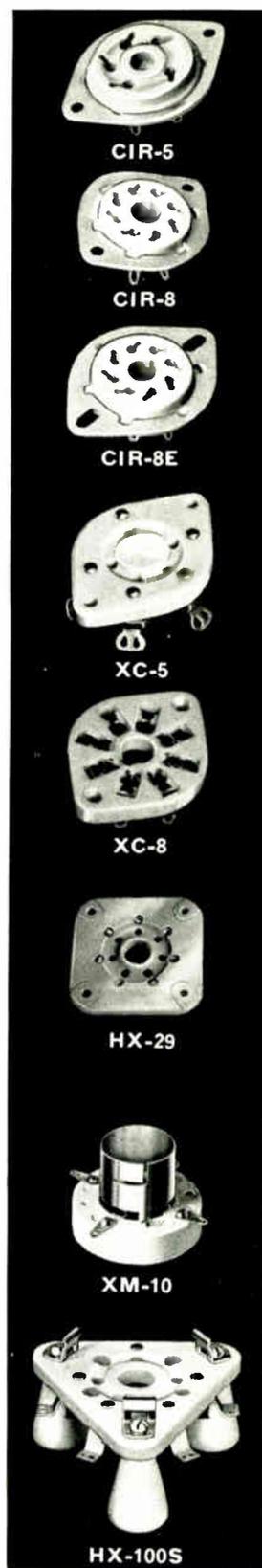
A heavy duty metal shell socket for tubes having the Jumbo 4-pin base ("fifty watters").

HX-100S Net \$ 1.65

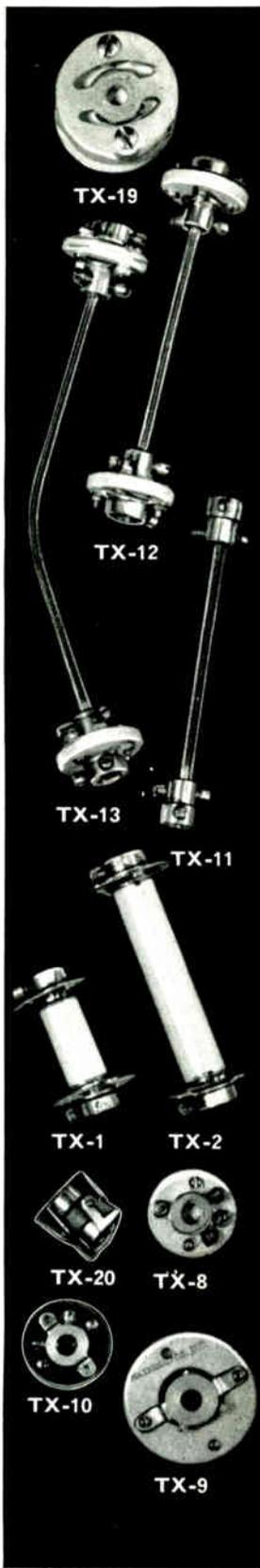
With Standoff Insulators
A low loss wafer socket suitable for the type 4-125-A, 4-250-A and other tubes using the Giant 5-pin base. Shield grounding clips are supplied which mount on the chassis with the socket mounting screws to ground the tube shield at three points. Air holes are provided in the socket to permit forced air cooling.

HX-100 Net \$.99

Same as above less standoff insulators.



NATIONAL COMPONENTS



SHAFT COUPLINGS

TX-19 Net \$1.25

A steatite insulated flexible coupling for 1/4" shafts. Conservatively rated at 5000 volts peak. Diameter 1 3/8", length 1". Length and flashover voltage can be increased by turning collars outboard.

TX-11 Net \$.42

The flexible shaft of this coupling connects shafts at angles up to 90 degrees, and eliminates misalignment problems. Fits 1/4" shafts. Length 4 1/4".

TX-12, Length 4 5/8" Net \$.90

TX-13, Length 7 1/8" Net \$1.05

These couplings use flexible shafting like the TX-11 above, but are also provided with steatite insulators at each end.

TX-1, Leakage path 1" Net \$.65

TX-2, Leakage path 2 1/2" Net \$.75

Flexible couplings with glazed steatite insulation which fit 1/4" shafts.

TX-20 Net \$1.25

A small bakelite insulated flexible coupling of the "Hooke's joint" type. Accommodates up to five degrees angular misalignment as well as 1/64" offset of centers. For 1/4" shafts.

TX-8 Net \$.60

A non-flexible rigid coupling with steatite insulation. 1" diam. Fits 1/4" shaft.

TX-10 Net \$.40

A very compact insulated coupling free from backlash. Insulation is canvas bakelite. 1-1/16" diam. Fits 1/4" shaft.

TX-10F (Not illustrated) Net \$.45

A new version of the TX-10 which employs thin canvas bakelite strips for flexibility.

TX-22 (not illustrated) Net \$.40

A non-insulated coupling identical to TX-10 except of all metal construction. Makes good electrical connection between coupled shafts.

TX-9 Net \$.75

This small insulated flexible coupling provides high electrical efficiency when used to isolate circuits. Insulation is steatite. 1 5/8" diam. Fits 1/4" shaft.

TX-21 (not illustrated) Net \$.40

Similar to TX-10 except 13/16" long and couples 1/4" shaft to 5/32" shaft.

SAFETY GRID AND PLATE CAPS

SPP-9 Net \$.21
Ceramic insulation. Fits 9/16" diameter.

SPP-3 Net \$.21
Ceramic insulation. Fits 3/8" diameter.

National Safety Grid and Plate Caps have a ceramic body which offers protection against accidental contact with high voltage caps on tubes.

GRID AND PLATE GRIPS

Type 12, for 9/16" Caps Net \$.06

Type 24, for 3/8" Caps Net \$.03

Type 8, for 1/4" Caps Net \$.03

National Grid and Plate Grips provide a secure and positive contact with the tube cap and yet are released easily by a slight pressure on the ear.

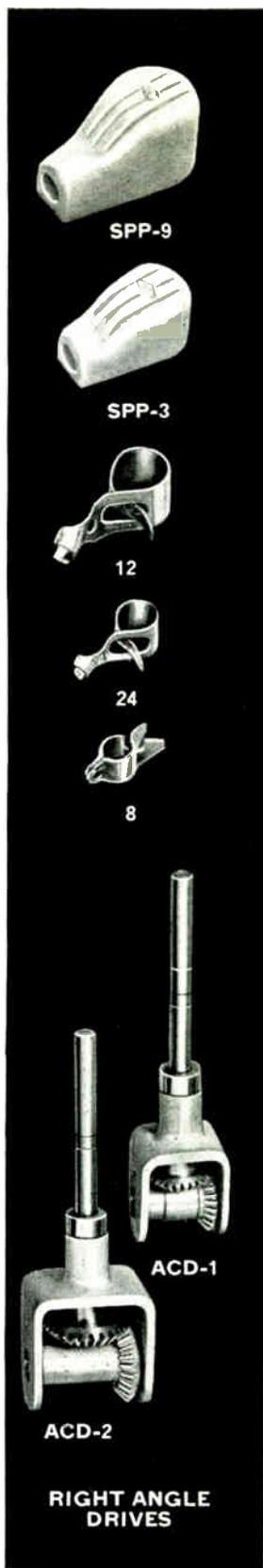
RIGHT ANGLE DRIVES

ACD-1Net \$3.75

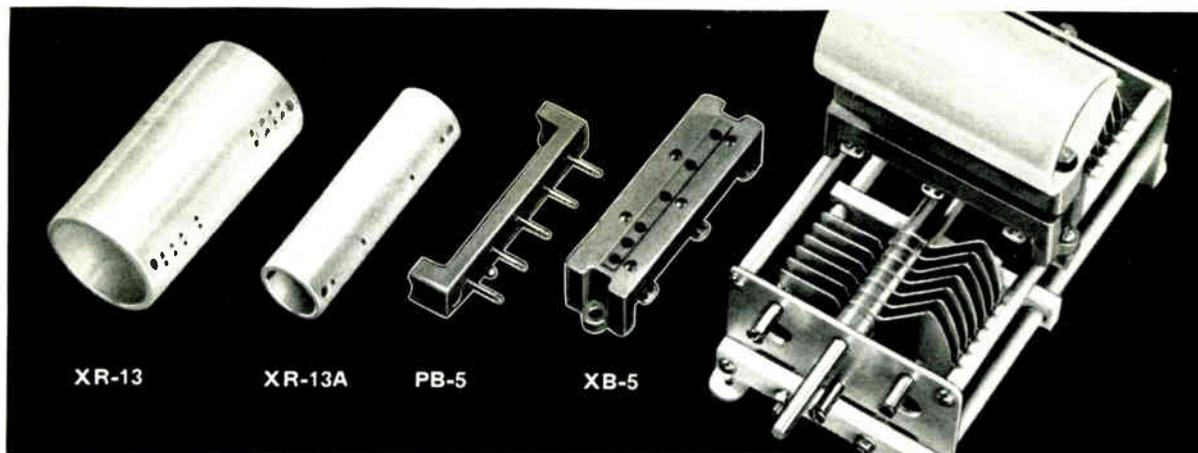
ACD-2Net \$3.90

ACD-3Net \$3.90

These sturdy drives were developed for use with the new National AMT condensers (see page 26). They are as compact as the torque requirements will allow and have nickel plated cast frames and bronze gears which operate smoothly without chatter or binding. The ACD-1 has 32 pitch gears and a 1/4" dia. dial shaft and drives 1/4" shafts. ACD-2 has 24 pitch gears (for heavier service) and 1/4" dia. shaft driving 1/4" shafts. ACD-3 is the same as ACD-2 except that it drives 3/8" diameter shafts.



NATIONAL COMPONENTS



BUFFER COIL FORMS

National Buffer Coil Forms are designed to mount directly on the tie bars of a TMC condenser using the PB-5 Plug and XB-5 Socket. Plug and Socket are of molded R-39.

The two coil forms are of steatite, left unglazed to provide a tooth for coil dope. The larger form, Type XR-13, is 1 3/4" in diameter and has a winding length of 2 3/4". The smaller form, Type XR-13A, is 1" in diameter and provides a winding length of 2 3/4". Both forms have holes for mounting and for leads.

SINGLE UNITS

XR-13, Coil Form only	Net \$.75
XR-13A, Coil Form only	Net \$.60
PB-5, Plug only	Net \$.51
XB-5, Socket only	Net \$.51

ASSEMBLIES

UR-13A, Assembly (including small Coil Form, Plug and Socket)	Net \$ 1.65
UR-13, Assembly (including large Coil Form, Plug and Socket)	Net \$ 1.65



PLUG-IN BASE AND SHIELD

The low-loss R-39 base is ideal for mounting condensers and coils when it is desirable to have them shielded and easily removable. Shield can is 2" x 2 3/8" x 4/8".

PB-10-5, (5 Prong Base & Shield)	Net \$.75
PB-10-6, (6 Prong Base & Shield)	Net \$.75
PB-10A-5, (5 Prong Base only)	Net \$.51
PB-10A-6, (6 Prong Base only)	Net \$.51

FIXED TUNED EXCITER TANK

Similar in general construction to National I.F. transformers, this unit has two 25 mmf., 2000 volt air condensers and an unwound XR-2 coil form.

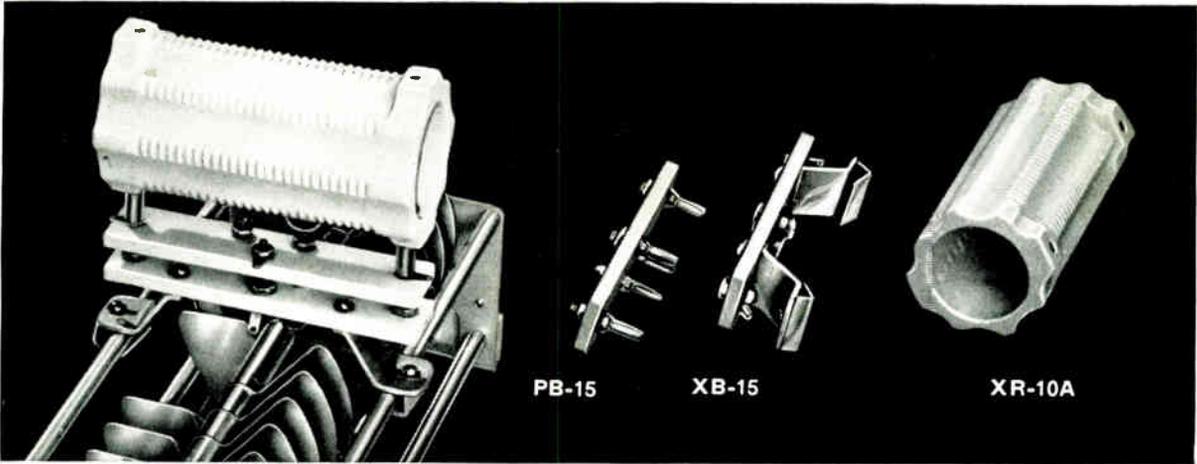
FXT, without plug-in base	Net \$ 3.45
FXTB-5, with 5 prong base	Net \$ 3.90
FXTB-6, with 6 prong base	Net \$ 3.90

AIR WOUND EXCITER COILS

The small coils illustrated above and tabulated with the original AR-16 exciter coils (on page 25 facing) make the AR line complete in that these new units are ideal for use where the r.f. wiring goes below chassis. The new AR-17s plug into standard 6 contact sockets such as National CIR-6 or XC-6 (see page 22). Both types, ruggedly constructed, have steatite and polystyrene insulation and are for use in stages where the plate power input does not exceed 50 watts. All have center tapped link coupling coils which may be grounded for harmonic reduction.

PB-10-6, PB-10A-6 and FXTB-6 require National XC-6C socket (see page 21).

NATIONAL COMPONENTS



TRANSMITTER COIL FORMS

The Transmitter Coil Forms and Mounting are designed as a group, and mount conveniently on the bars of a TMA condenser. The larger coil form, Type XR-14A, (not illustrated) has a winding diameter of 5", a winding length of 3 3/4" (30 turns total) and is intended for the 80 meter band. The smaller form, Type XR-10A, has a winding length of 3 3/4" and a winding diameter of 2 1/2" (26 turns total). It is intended for the 20 and 40 meter bands.

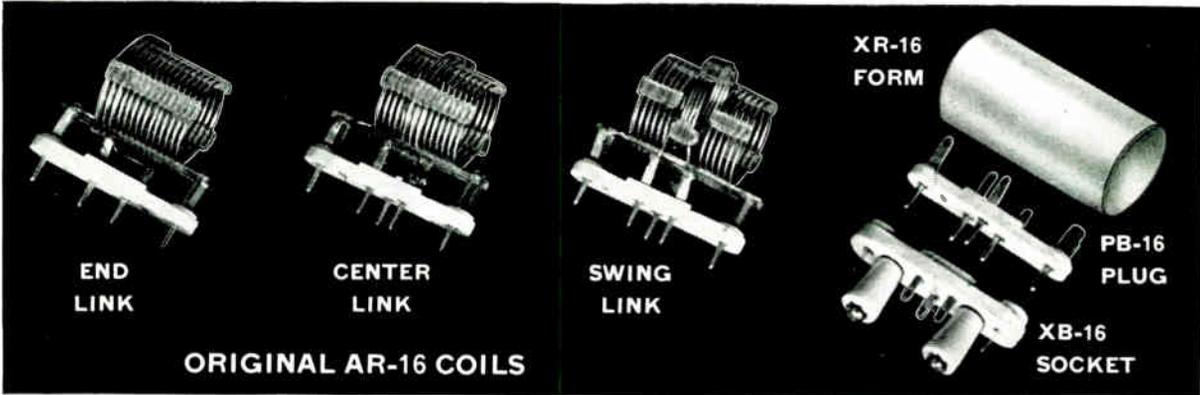
Either coil form fits the PB-15 plug. For higher frequencies, the plug may be used with a self-supporting coil of copper tubing. The XB-15 Socket may be mounted on breadboards or chassis, as well as on the TMA Condenser.

SINGLE UNITS

XR-10A, Coil Form only Net \$.99
 XR-14A, Coil Form only Net \$ 2.40
 PB-15, Plug only Net \$ 1.05
 XB-15, Socket only Net \$ 1.20

ASSEMBLIES

UR-10A, Assembly (including small Coil Form, Plug and Socket) Net \$ 3.24
 UR-14A, Assembly (including large Coil Form, Plug and Socket) Net \$ 3.60



EXCITER COILS AND FORMS

The coils, form and mounting socket shown above are the original AR-16 type. The table below includes the new AR-17 coils described on page 24. Tuning capacities listed in the table below will resonate the tank at the low frequency end of the band and include all stray circuit capacity. For the experimenter who desires a solid form, with suitable tap holes, the XR-16 Coil Form also fits the PB-16 Plug and diameter of 1 1/4" and a winding length of 1 3/4".

AR-16 and AR-17 Coils, any type Net \$ 1.25 PB-16, Plug-in Base Net \$.45
 XR-16, Coil Form Net \$.42 XB-16, Special Socket Net \$.45

Note: Swinging link models are supplied with link winding at center unless otherwise specified; for swinging link at end of coil add suffix "E" to swinging link designations (AR16-10SE, AR17-80SE, etc.).

Band	End Link	Cap. Mmf.	Center Link	Cap. Mmf.	Swinging Link	Cap. Mmf.
6 meter	AR16-6E, AR17-6E	25	AR16-6C, AR17-6C	25		
10 meter	AR16-10E, AR17-10E	20	AR16-10C, AR17-10C	20	AR16-10S, AR17-10S	25
15 meter	AR16-15E, AR17-15E	25	AR16-15C, AR17-15C	25	AR16-15S, AR17-15S	30
20 meter	AR16-20E, AR17-20E	26	AR16-20C, AR17-20C	26	AR16-20S, AR17-20S	40
40 meter	AR16-40E, AR17-40E	33	AR16-40C, AR17-40C	33	AR16-40S, AR17-40S	55
80 meter	AR16-80E, AR17-80E	37	AR16-80C, AR17-80C	37	AR16-80S, AR17-80S	60



NATIONAL CONDENSERS AND COILS

NEW CONDENSERS — AMT

Introducing a new line of condensers designed for modern tubes and modern circuits. National announces the AMT series. The AMT is a larger and sturdier model of the TMK condenser. The frame is extremely rigid, with mounting feet a part of the end plates. Heavy steatite insulation is used throughout.

A solid aluminum tie bar runs across the top of the condenser for added rigidity and acts as a mounting for AR-18 series coils in the double stator models. Carefully rounded and polished .064" thick aluminum plates are used throughout.

The double stator models are available in either standard end drive (D series) or center-drive (DG series) with 1/4" dia. shaft extension. The center drive condenser allows maximum flexibility in circuit layout and makes an ideal drive for rack panel mount and "dish" type construction.

NEW COILS — AR-18

Air-wound 500 watt coils designed to mount on the split stator models of the new National AMT condensers. The AR18-C coils have fixed center links and require the XB18-C socket. The AR18-S coils are designed to accommodate the swinging link furnished with the XB18-S socket. Link windings of both models have a center tap which may be grounded for harmonic reduction. Plugs and jacks are silver plated to insure low contact resistance. Insulation, steatite. The sockets are 7/4" in length.

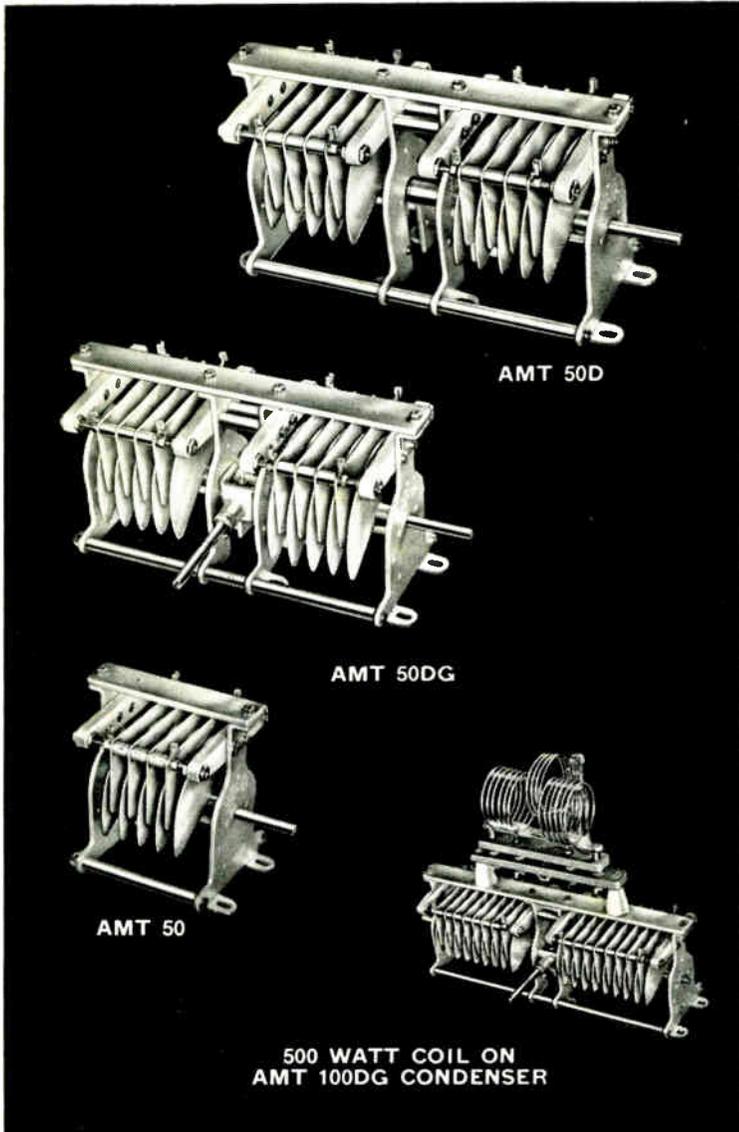
AR18-C Coil (fixed center link) Net \$
any type

XB18-C Socket with 2 GS-5
insulators Net \$

AR18-S Coil (for swinging center
link) Net \$

XB18-S Socket with swinging link and
2 GS-5 insulators Net \$

(See your National distributors for prices)



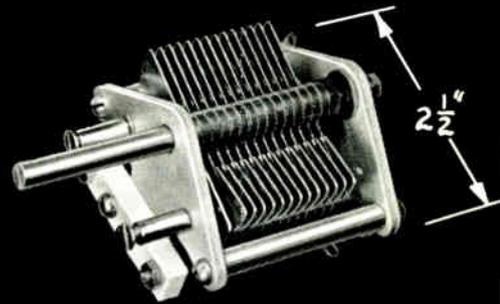
Band	Fixed Center Link AR-18 Type	Max. Cap. of Tuning Condenser Mmfd.	Swinging Center Link AR-18 Type
6 meter	AR18- 6C	50-50	AR18- 6S
10 meter	AR18-10C	50-50	AR18-10S
15 meter	AR18-15C	50-50	AR18-15S
20 meter	AR18-20C	50-50 or 100-100	AR18-20S
40 meter	AR18-40C	50-50 or 100-100	AR18-40S
80 meter	AR18-80C	100-100	AR18-80S
	Use XB 18-C socket		Use XB 18-S Socket

Maximum Capacity	Minimum Capacity	Length	Air Gap	Peak Voltage	No. of Plates	Catalog Symbol	Net
SINGLE STATOR MODELS							
50	13	4 3/4"	.177"	6000	9	AMT-50	\$5.20
100	20	6 3/4"	.177"	6000	17	AMT-100	6.10
DOUBLE STATOR MODELS D—End drive DG—Center drive							
50-50	13-13	9 3/4"	.177"	6000	18	AMT-50D	7.00
100-100	20-20	13 3/4"	.177"	6000	34	AMT-100D	9.00
50-50	13-13	9 3/4"	.177"	6000	18	AMT-50DG	10.75
100-100	20-20	13 3/4"	.177"	6000	34	AMT-100DG	12.75

NATIONAL TRANSMITTING CONDENSERS

TYPE TMS

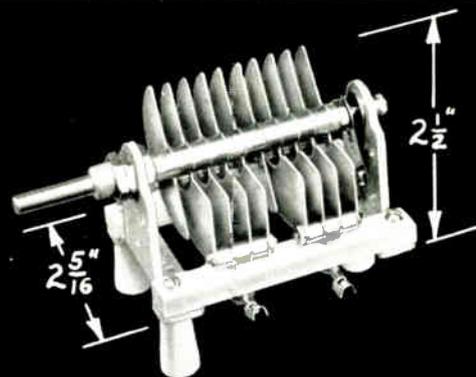
is a condenser designed for transmitter use in low power stages. It is compact, rigid, and dependable. Provision has been made for mounting either on the panel, on the chassis, or on two stand-off insulators. Insulation is steatite. Voltage ratings listed are conservative.



Capacity	Minimum Capacity	Length	Air Gap	Peak Voltage	No. of Plates	Catalog Symbol	Net
SINGLE STATOR MODELS							
100 Mmf.	9.5	3"	.026"	1000v.	9	TMS-100	\$2.60
150	11	3"	.026"	1000v.	14	TMS-150	2.80
250	13.5	3"	.026"	1000v.	22	TMS-250	3.30
300	15	3"	.026"	1000v.	27	TMS-300	3.80
35	8	3"	.065"	2000v.	7	TMSA-35	3.90
50	11	3"	.065"	2000v.	11	TMSA-50	4.40
DOUBLE STATOR MODELS							
50-50 Mmf.	6-6	3"	.026"	1000v.	5-5	TMS-50D	\$3.00
100-100	7-7	3"	.026"	1000v.	9-9	TMS-100D	3.20
50-50	10.5-10.5	3"	.055"	2000v.	11-11	TMSA-50D	4.40

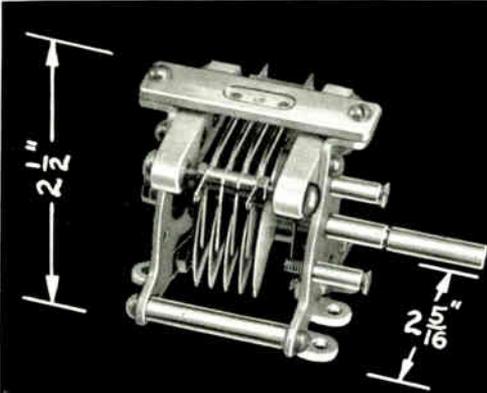
TYPE TMH

features very compact construction, excellent power factor, and aluminum plates .040" thick with polished edges. It mounts on the panel or on removable stand-off insulators. Steatite insulators have long leakage path. Stand-offs included in listed price.



Capacity	Minimum Capacity	Length	Air Gap	Peak Voltage	No. of Plates	Catalog Symbol	Net
SINGLE STATOR MODELS							
50 Mmf.	9	3 3/4"	.085"	3500v.	15	TMH-50	\$3.95
75	11	3 3/4"	.085"	3500v.	19	TMH-75	4.15
100	12.5	5 1/8"	.085"	3500v.	25	TMH-100	4.35
150	18	6 1/2"	.085"	3500v.	37	TMH-150	4.95
35	11	5 1/8"	.180"	6500v.	17	TMH-35A	4.25
DOUBLE STATOR MODELS							
35-35 Mmf.	6-6	3 3/4"	.085"	3500v.	9-9	TMH-35D	\$4.15
50-50	8-8	5 1/8"	.085"	3500v.	13-13	TMH-50D	4.35
75-75	11-11	6 1/2"	.085"	3500v.	19-19	TMH-75D	4.95

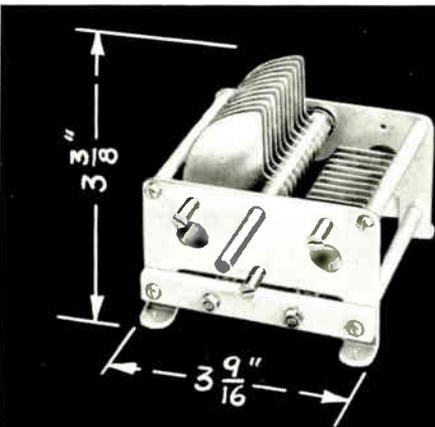
NATIONAL TRANSMITTING CONDENSERS



TYPE TMK

is a new condenser for exciters and low power transmitters. Special provision has been made for mounting AR-16 coils in a swivel plug-in mount on either the top or rear of the condenser. For stand-off or panel mounting, steatite insulation.

Capacity	Minimum Capacity	Length	Air Gap	Peak Voltage	No. of Plates	Catalog Symbol	Net
SINGLE STATOR MODELS							
35 Mmf.	7.5	2 $\frac{7}{32}$ "	.047"	1500v.	7	TMK-35	\$3.45
50	8	2 $\frac{3}{4}$ "	.047"	1500v.	9	TMK-50	3.55
75	9	2 $\frac{11}{16}$ "	.047"	1500v.	13	TMK-75	3.80
100	10	3"	.047"	1500v.	17	TMK-100	3.95
150	10.5	3 $\frac{5}{8}$ "	.047"	1500v.	25	TMK-150	4.65
200	11	4 $\frac{1}{4}$ "	.047"	1500v.	33	TMK-200	5.25
250	11.5	4 $\frac{7}{8}$ "	.047"	1500v.	41	TMK-250	5.75
DOUBLE STATOR MODELS							
35-35 Mmf.	7.5-7.5	3"	.047"	1500v.	7-7	TMK-35D	\$3.80
50-50	8-8	3 $\frac{5}{8}$ "	.047"	1500v.	9-9	TMK-50D	3.95
100-100	10-10	4 $\frac{1}{4}$ "	.047"	1500v.	17-17	TMK-100D	5.25
Swivel Mounting Hardware for AR 16 Coils						SMH	\$.10



TYPE TMC

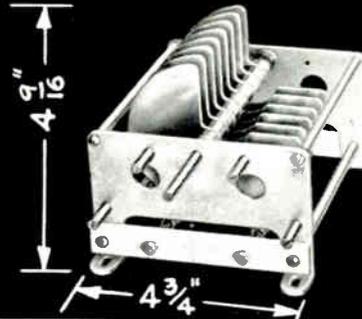
is designed for use in the power stages of transmitters where peak voltages do not exceed 3000. The frame is extremely rigid and arranged for mounting on panel, chassis or standoff insulators. The plates are aluminum with buffed edges. Insulation is steatite. The stator in the split stator models is supported at both ends.

Capacity	Minimum Capacity	Length	Air Gap	Peak Voltage	No. of Plates	Catalog Symbol	Net
SINGLE STATOR MODELS							
50 Mmf.	10	3"	.077"	3000v.	7	TMC-50	\$3.60
100	13	3 $\frac{1}{2}$ "	.077"	3000v.	13	TMC-100	4.25
150	17	4 $\frac{5}{8}$ "	.077"	3000v.	21	TMC-150	5.25
250	23	6"	.077"	3000v.	32	TMC-250	5.70
300	25	6 $\frac{3}{4}$ "	.077"	3000v.	39	TMC-300	6.10
DOUBLE STATOR MODELS							
50-50 Mmf.	9-9	4 $\frac{5}{8}$ "	.077"	3000v.	7-7	TMC-50D	\$4.35
100-100	11-11	6 $\frac{3}{4}$ "	.077"	3000v.	13-13	TMC-100D	5.95
200-200	18.5-18.5	9 $\frac{1}{4}$ "	.077"	3000v.	25-25	TMC-200D	7.25

NATIONAL TRANSMITTING CONDENSERS

TYPE TMA

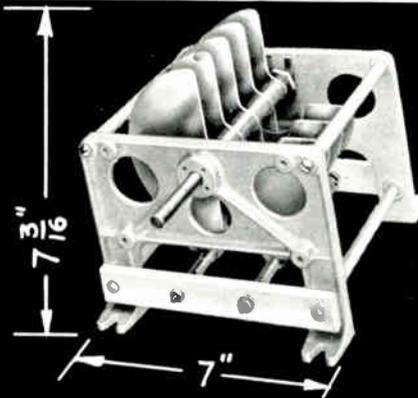
is a larger model of the popular TMC. The frame is extremely rigid and arranged for mounting on panel, chassis or stand-off insulators. The plates are of heavy aluminum with rounded and buffed edges. Insulation is steatite located outside of the concentrated field.



Capacity	Minimum Capacity	Length	Air Gap	Peak Voltage	No. of Plates	Catalog Symbol	Net
SINGLE STATOR MODELS							
300 Mmf.	19.5	4 3/16"	.077"	3000v.	23	TMA-300	\$7.60
50	15	4 3/16"	.171"	6000v.	7	TMA-50A	4.95
100	19.5	6 1/4"	.171"	6000v.	15	TMA-100A	5.85
150	22.5	6 3/8"	.171"	6000v.	21	TMA-150A	6.45
230	33	9 3/8"	.171"	9000v.	33	TMA-230A	7.95
100	30	9 1/16"	.265"	9000v.	23	TMA-100B	8.50
150	40.5	12 1/2"	.265"	9000v.	33	TMA-150B	9.95
50	21	7 1/8"	.359"	12000v.	13	TMA-50C	5.55
100	37.5	12 3/8"	.359"	12000v.	25	TMA-100C	8.95
DOUBLE STATOR MODELS							
200 200 Mmf.	15-15	6 7/8"	.077"	3000v.	16-16	TMA-200D	\$9.40
180-180	10-10	12 1/2"	.140"	4000v.	24-24	TMA-180D	12.90
50-50	12.5-12.5	6 7/8"	.155"	6000v.	8-8	TMA-50DA	6.75
100-100	17-17	9 3/16"	.155"	6000v.	14-14	TMA-100DA	8.75
60-60	19.5-19.5	12 1/2"	.245"	9000v.	15-15	TMA-60DB	8.95
40-40	18-18	12 7/8"	.342"	12000v.	11-11	TMA-40DC	8.50

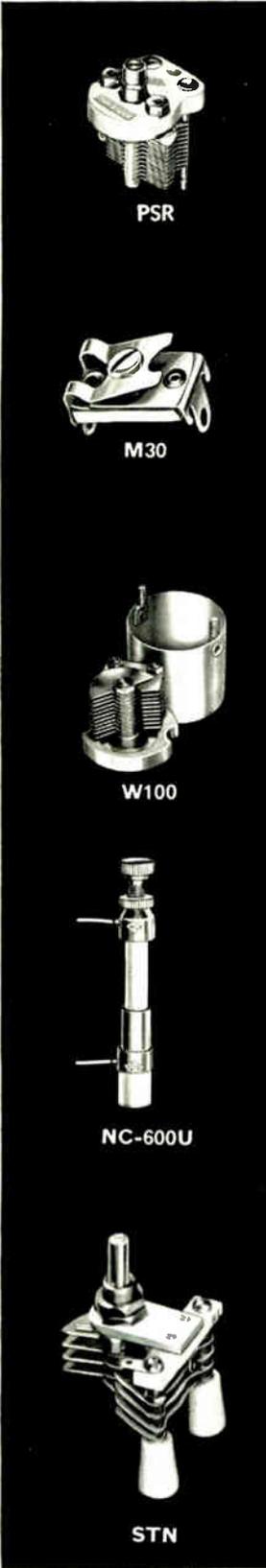
TYPE TML

is a heavy duty job throughout. The frame structure (rugged aluminum castings with dural tie bars) and precision bearings assure permanent rotor alignment. All plates are extra thick with rounded and polished edges. This, plus specially treated steatite insulators and a husky self-cleaning rotor contact, provides high flashover, current and voltage ratings.



Capacity	Minimum Capacity	Length	Air Gap	Peak Voltage	No. of Plates	Catalog Symbol	Net
SINGLE STATOR MODELS							
75 Mmf.	25	18 1/16"	.719"	20,000v.	17	TML-75E	\$18.35
150	60	18 1/16"	.469"	15,000v.	27	TML-150D	18.50
100	45	13 5/16"	.469"	15,000v.	19	TML-100D	16.60
50	22	8 3/16"	.469"	15,000v.	9	TML-50D	11.50
245	54	18 1/16"	.344"	10,000v.	35	TML-245B	20.15
150	45	13 5/16"	.344"	10,000v.	21	TML-150B	18.35
100	32	10 15/16"	.344"	10,000v.	15	TML-100B	17.55
75	23.5	8 3/16"	.344"	10,000v.	11	TML-75B	12.80
500	55	18 1/16"	.219"	7,500v.	49	TML-500A	24.60
350	45	13 5/16"	.219"	7,500v.	33	TML-350A	19.65
250	35	10 15/16"	.219"	7,500v.	25	TML-250A	18.35
DOUBLE STATOR MODELS							
30-30 Mmf.	12-12	18 1/16"	.719"	20,000v.	7-7	TML-30DE	\$18.55
60-60	26-26	18 1/16"	.469"	15,000v.	11-11	TML-60DD	20.15
100-100	27-27	18 1/16"	.344"	10,000v.	15-15	TML-100DB	12.35
60-60	20-20	13 5/16"	.344"	10,000v.	9-9	TML-60DB	19.15
200-200	30-30	18 1/16"	.219"	7,500v.	21-21	TML-200DA	24.60
100-100	17-17	10 15/16"	.219"	7,500v.	11-11	TML-100DA	20.15

NATIONAL CONDENSERS



MINIATURE CONDENSERS:

Type PS variable condensers are compact silver plated units of soldered construction for use as semi-fixed bandsets or padders. Base is steatite — bearing is "snug" but smooth. PSR models are screwdriver adjust type; PSE have 1/4" diameter shafts both ends; PSL are similar to PSR but include rotor shaft lock.

Type M-30 Net \$2.22
The M-30 is a tiny (13/16" x 9/16" x 1/2") mica trimmer — 30 mmf. max. — steatite base.

Type W-75, 75 mmf. Net \$1.60

Type W-100, 100 mmf. Net \$1.76

Small air-dielectric padding condensers having a very low temperature coefficient. They are mounted in 1 1/4" diameter aluminum shields and have 1/4" hex heads for socket-wrench adjustment.

The UM condensers are low-loss, aluminum plate staked construction miniature variables designed for UHF converters, VFOs and the like — minimum capacity is exceptionally low. The UMs can be mounted in PB-10 or RO shield cans and have 1/4" dia. shafts front and rear for ganging (see pages 21, 23 and 24 for shield cans and couplings). Plates: straight-line-cap., 180° rotation. Dimensions: Base 1" x 2 1/4", mtg. holes on 3/8" x 1-23/32" centers, 2-5/16" max. length.

The UMB-25 and UMB-50 are differential (balanced stator) models. UM-10D and UMA-25 are double-spaced and the latter is bolted construction for experimental capacity reduction. Hardware for panel or chassis mounting is supplied with all UM condensers.

Capacity	Catalog Symbol			Net
25 mmf.	PSR-25	PSE-25	PSL-25	\$1.70
50	PSR-50	PSE-50	PSL-50	1.85
75	PSR-75	PSE-75	PSL-75	2.00
100	PSR-100	PSE-100	PSL-100	2.15

Capacity	Minimum Capacity	No. of Plates	Air Gap	Catalog Symbol	Net
15 mmf.	1.5	6	.017"	UM-15	\$1.02
35	2.5	12	.017"	UM-35	1.15
50	3	16	.017"	UM-50	1.25
75	3.5	22	.017"	UM-75	1.45
100	4.5	28	.017"	UM-100	1.60
10	1	8	.042"	UM-10D	1.40
25	3.4	14	.042"	UMA-25	1.75

BALANCED STATOR MODEL

25	2	4-4-4	.017"	UMB-25	\$2.40
50	5	8-8-8	.017"	UMB-50	2.70

NEUTRALIZING CONDENSERS:

NC-600U Net \$3.38

With standoff insulator

NC-600 Net \$3.32

Without insulator

For neutralizing low power beam tubes requiring from .5 to 4 mmf., and 1500 max. total volts such as the 6L6. The NC-600U is supplied with a GS-10 standoff insulator screwed on one end, which may be removed for pigtail mounting.

STN Net \$2.07

The Type STN has a maximum capacity of 18 mmf. (3000 V), making it suitable for such tubes as the 809. It is supplied with two standoff insulators.

NC-800A Net \$3.00

The NC-800A disk-type neutralizing condenser is suitable for the T40, 35TG, 808 and similar tubes. It is equipped with a clamp for locking. The chart below gives capacity and air gap for different settings.

NC-75 Net \$3.60

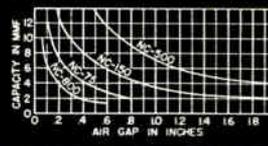
For 812, 75TH and similar tubes.

NC-150 Net \$5.25

For RK36, 100TH, HK354, 250TH, etc.

NC-500 Net \$8.75

For WE-251, 304TH, 833A and the like. These large disk-type neutralizing condensers are for the higher powered tubes. Disks are aluminum, insulation steatite.

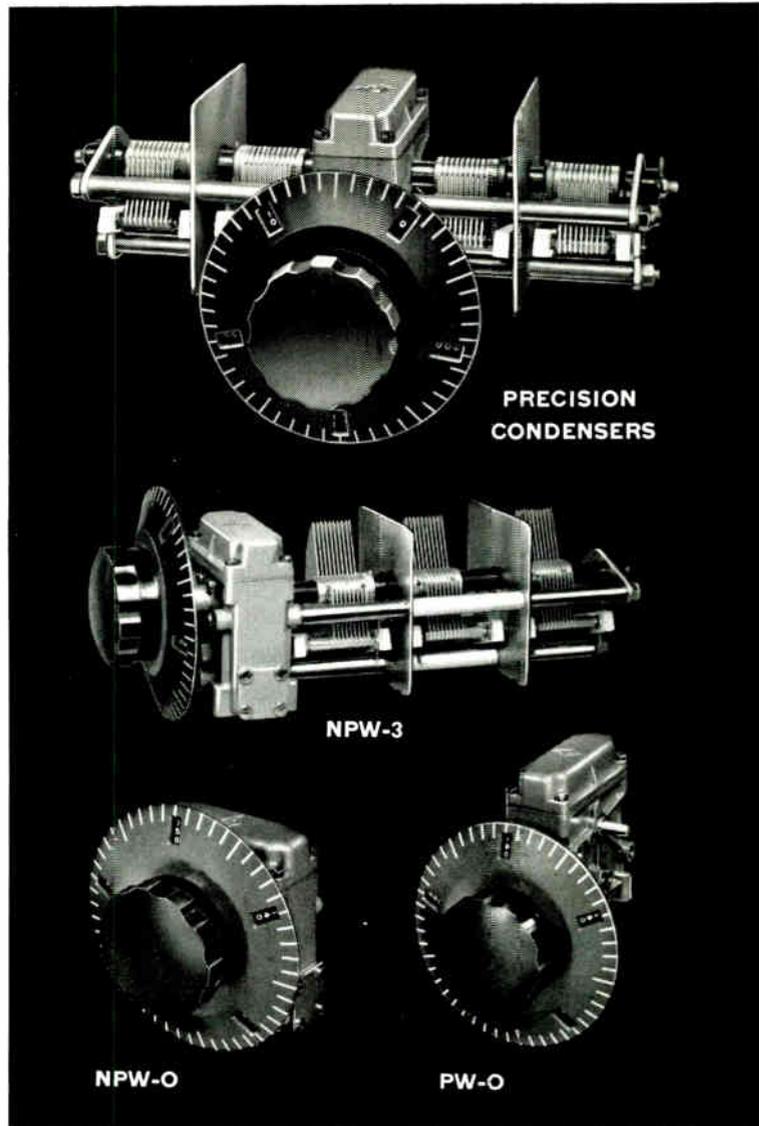


NATIONAL PRECISION CONDENSERS

Originally developed for the famous HRO and NC-100 receivers, National PW and NPW condensers and drive units are well known to professional and amateur radio men throughout the world. Sturdily constructed of the finest materials and carefully adjusted by skilled hands, they have become "standard specifications" for applications requiring smooth, precise control and high re-set accuracy.

The Micrometer Dial reads direct to one part in 500. Division lines are approximately $\frac{1}{4}$ " apart. The dial revolves ten times in covering the tuning range, and the numbers visible through the small windows change every revolution to give consecutive numbering by tens from 0 to 500. The condenser is of extremely rigid construction, with four bearings on the rotor shaft. The drive, at the midpoint of the rotor, is through an enclosed preloaded worm gear with 20 to 1 ratio. Each rotor is individually insulated from the frame, and each has its own individual rotor contact. Stator insulation is steatite. Plate shape is straight-line frequency when the frequency range is 2:1.

PW Condensers are available in 1, 2, 3 or 4 sections, in either 160 or 225 mmf per section. Larger capacities cannot be supplied.



PW-1R	Single section right	Net \$13.50
PW-1L	Single section left	Net \$13.50
PW-2R	Double section right	Net \$18.00
PW-2L	Double section left	Net \$18.00
PW-2S	Single section each side	Net \$18.00
PW-3R	Double section right; single left	Net \$24.00
PW-3L	Double section left; single right	Net \$24.00
PW-4	Double section each side	Net \$27.00

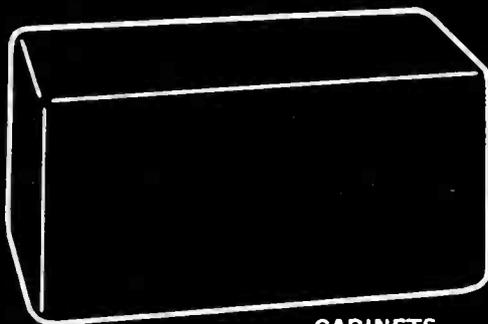
NPW-3 Three sections, each 225 mmf.Net \$24.00
Similar to PW models, except that rotor shaft is perpendicular to panel.

NPW-O Net \$9.00
Uses parts similar to the NPW condenser. Drive shaft perpendicular to panel. One TX-9 coupling supplied.

PW-O Net \$9.90
Uses parts similar to the PW condenser. Drive shaft parallel to panel. Two TX-9 couplings supplied.

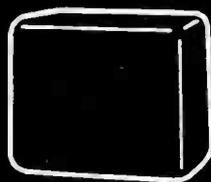
PW-D Net \$5.25
The Micrometer Dial used on the condensers and drives above is available separately. It revolves ten times in covering the complete range and as there is no gear reduction unit furnished, the driven shaft will revolve ten times, also. The PW-D dial fits a shaft $\frac{5}{16}$ " in diameter.

NATIONAL CABINETS AND SCOPES

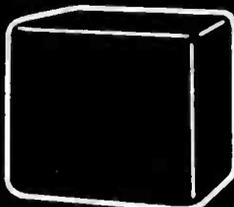


CABINETS

	Width	Height	Depth
Type C-HRO-7	19 $\frac{3}{4}$ "	10"	10"
Type C-NC-183	19 $\frac{3}{4}$ "	10 $\frac{1}{8}$ "	15"
Type C-NC-173	19 $\frac{3}{4}$ "	10 $\frac{1}{8}$ "	12"
Type C-NC-57	16 $\frac{1}{2}$ "	8 $\frac{3}{4}$ "	10 $\frac{1}{2}$ "
Type C-NC-33	16 $\frac{1}{2}$ "	8 $\frac{3}{4}$ "	8 $\frac{1}{2}$ "



NDC-07



NDC-83

These metal cases are the same as those used to house the latest National receivers. They are supplied in blank form, are made of heavy gauge steel with rounded corners and the light gray enamel finish is sprayed and baked; see table for sizes and National distributor for prices.

SPEAKER CABINETS

NDC-07 Net \$6.60
NDC-83 Net \$7.50

These speaker cabinets were designed to match the cases described above: corner contour and baked enamel finish are the same. NDC-07 takes 8" speakers and NDC-83 takes the 10" size. Both are of welded construction, are lined with acoustic material complete with attractive grille over the speaker opening.

OSCILLOSCOPES

CRU — Table Model Oscilloscope, with tubes. Net \$39.90
CRU-P — Rack Panel and Control Plate (to rack mount CRU Scope). Net \$ 2.85

The National CRU Oscilloscope is a compact inexpensive instrument for the progressive amateur or experimenter. It uses a 2" screen tube and has INTENSITY, FOCUS and SWEEP controls in addition to the A.C. ON/OFF and 60 cycle/external sweep switches. See your distributor for further details.

PSG (including mounting hardware) Net \$1.05

This metal grille measures 7 $\frac{1}{2}$ " x 3 $\frac{1}{2}$ " and is ideal for use over a large panel cut-out in all type power supplies.

CFA Net \$3.35

The National chart frame is blanked from one piece of metal, and includes a celluloid sheet to cover the chart. Size 2 $\frac{1}{4}$ " x 3 $\frac{1}{4}$ ", with sides $\frac{1}{4}$ " wide. Durable finish.

PH-1 (chrome plated handle) Net \$.45

An attractive and rugged pull handle of cast zinc alloy with 10-32 tapped holes on 3 $\frac{3}{4}$ " mounting centers. Right size and finish for dressing up equipment around the station.

PH-2 (telephone black handle) Net \$.25

Same as PH-1 but with black finish.

CP-1, dark gray Net \$.40

CP-2, black Net \$.40

A high quality air-drying paint that may be applied with a brush.

CP-3, light gray, matches newest National receivers — for spraying and baking. Net \$.50



PSG



CFA



PH-1



CP-1

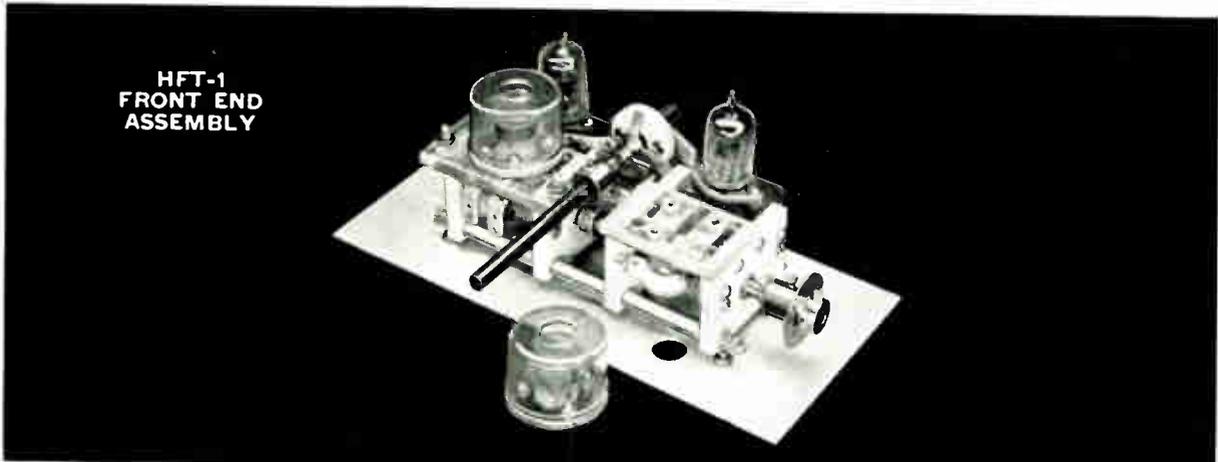


CRU



CRU WITH CRU-P PANEL

NATIONAL ASSEMBLIES



**HFT-1
FRONT END
ASSEMBLY**

FRONT END ASSEMBLY

For the experimenter who likes to build his own receivers, HFT-1 is the complete "front end" for a VHF superheterodyne. This is the tuning assembly used in the National HFS Receiver-Converter described on Page 14—frequency coverage and coil sets available are the same. Output of the HFT-1 is at 10.7 megacycles and National IFM or IFN transformers are recommended for the i.f. channel.

The ideal oscillator-mixer unit for that FM broadcast receiver. Build your next VHF receiver around the HFT-1 and save tedious hours of coil pruning and tracking adjustments.

HFT-1 (with one set of coils—specify range)
Net \$39.50

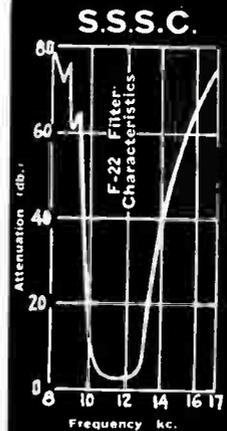
Additional coils (per pair—specify range)
Net \$3.24

MULTI-BAND TANK ASSEMBLY

Designed to meet amateur requirements for greater simplicity in multi-band transmitters, the unique MB-150 Multi-Band Tank illustrated below tunes all amateur bands from 80 through 10 meters with 180° rotation of the shaft; the coils are never changed. The unit is built around an essentially "multiple-tuned" circuit, i.e. a circuit which tunes to two harmonically unrelated frequencies at the same time. Thus, it becomes possible to cover a wide frequency range and yet maintain a reasonably constant L/C ratio. Three coils, four capacitors and an RF choke are combined to make up a compact tank 3" wide x 8 1/4" high (including the GS-10 standoffs) x 9" long overall including the 1/4" dia. shaft and output terminals. Features of the MB-150 are as follows:

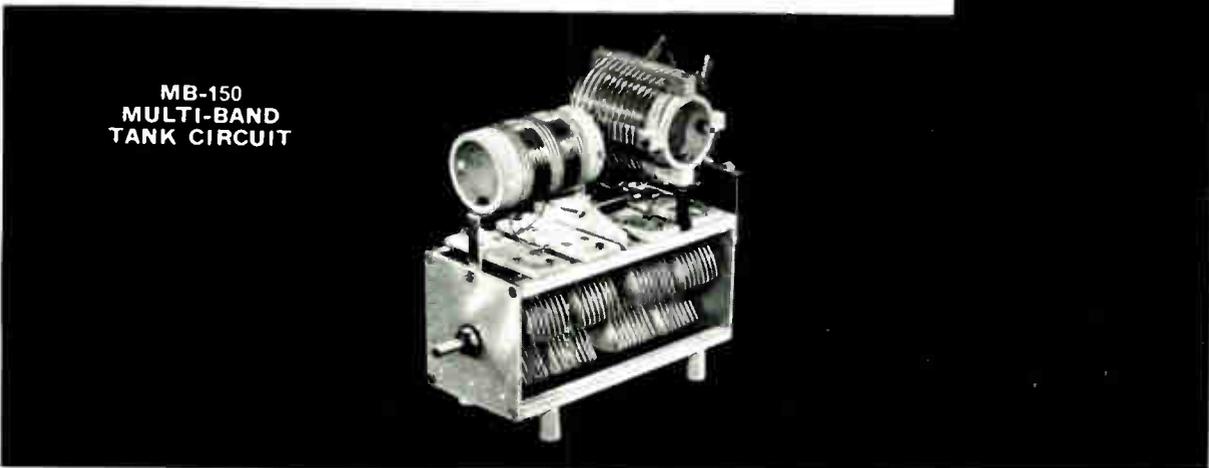
- (1) For use as the all-band plate tank in push-pull or balanced single-ended stages running up to 150-watts input (1500 volts peak). It is ideal for a pair of 80's or 809s or a single 829B.
- (2) Separate link coupling coil has special clips which adjust to match impedances up to 600 ohms directly. Output couples into a higher powered amplifier, an antenna or an antenna tuning network.
- (3) Fast band changing is accomplished without handling coils, thus removing one of the danger points in the amateur station.

MB-150 Multi-Band Tank Assembly
Net \$18.75



**THE F-22
SIDE-BAND
FILTER**

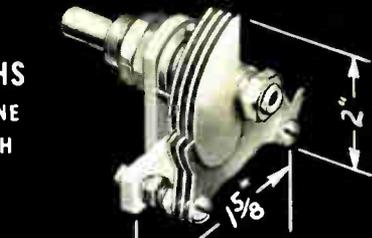
The heart of a single sideband transmitter — a sharply attenuated filter — has built-in balanced input and output transformers —



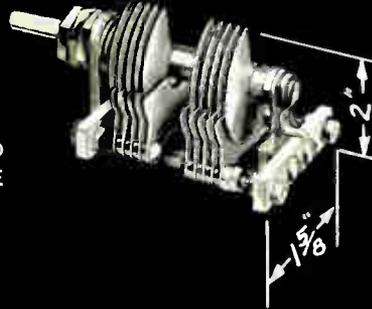
**MB-150
MULTI-BAND
TANK CIRCUIT**

NATIONAL RECEIVING CONDENSERS

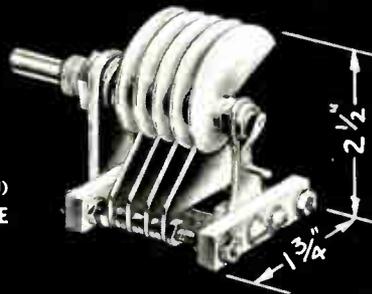
TYPE STHS
STRAIGHT-LINE
WAVELENGTH
180° Rotation



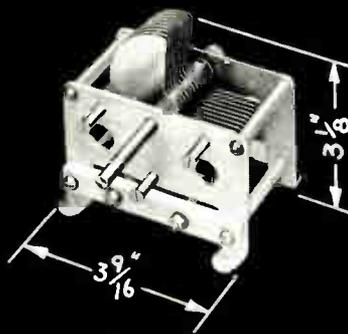
TYPE ST
(Type STD Illustrated)
STRAIGHT-LINE
WAVELENGTH
180° Rotation



TYPE SE
(Type SEU Illustrated)
STRAIGHT-LINE
FREQUENCY
270° Rotation



TYPE EMC
STRAIGHT-LINE
WAVELENGTH
180° Rotation



The **ST Type** condenser has Straight-Line Wavelength plates. All double-bearing models have the front bearing insulated to prevent noise. On special order a shaft extension at each end is available, for ganging. On double-bearing single shaft models, the rotor contact is through a constant impedance pigtail. Steatite insulation.

Capacity	Minimum Capacity	No. of Plates	Air Gap	Length	Catalog Symbol	Net
SINGLE BEARING MODELS						
15 Mmf.	3 Mmf.	3	.018"	1 5/16"	STHS-15	\$1.65
25	3.25	4	.018"	1 3/16"	STHS-25	1.90
50	3.5	7	.018"	1 3/16"	STHS-50	2.10

NOTE — Type **SS** Condensers, having straight-line capacity plates but otherwise similar to the Type **ST**, are available. Capacities and Prices same as Type **ST**.

SPLIT STATOR DOUBLE BEARING MODELS						
50-50	5-5	11-11	.026"	2 1/4"	STD-50	\$3.60
100-100	5.5-5.5	14-14	.018"	2 3/4"	STHD-100	3.90
DOUBLE BEARING MODELS						
35 Mmf.	6 Mmf.	8	.026"	2 1/4"	ST-35	\$1.85
50	7	11	.026"	2 1/4"	ST-50	1.90
75	8	15	.026"	2 1/4"	ST-75	2.00
100	9	20	.026"	2 1/4"	ST-100	2.10
140	10	27	.026"	2 3/4"	ST-140	2.30
150	10.5	29	.026"	2 3/4"	ST-150	2.30
200	12.0	27	.018"	2 1/4"	STH-200	2.50
250	13.5	32	.018"	2 3/4"	STH-250	2.70
300	15.0	39	.018"	2 3/4"	STH-300	2.90
335	17.0	43	.018"	2 3/4"	STH-335	3.10

TYPE SE — All models have two rotor bearings, the front bearing being insulated to prevent noise. A shaft extension at each end, for ganging, is available on special order. On models with single shaft extension, the rotor contact is through a constant impedance pigtail. The SEU models (illustrated) are suitable for high voltages as their plates are thick polished aluminum with rounded edges. Other SE condensers do not have polished edges on the plates. Steatite insulation.

15 Mmf.	7 Mmf.	6	.055"	2 1/4"	SEU-15	\$2.80
20	7.5	7	.055"	2 1/4"	SEU-20	2.95
25	8	9	.055"	2 1/4"	SEU-25	3.10
50	9	11	.026"	2 1/4"	SE-50	2.30
75	10	15	.026"	2 1/4"	SE-75	2.40
100	11.5	20	.026"	2 1/4"	SE-100	2.60
150	13	29	.026"	2 3/4"	SE-150	2.75
200	12	27	.018"	2 1/4"	SEH-200	2.80
250	14	32	.018"	2 3/4"	SEH-250	3.00
300	16	39	.018"	2 3/4"	SEH-300	3.25
335	17	43	.018"	2 3/4"	SEH-335	3.50

TYPE EMC — A general purpose condenser available in large sizes and having Straight-Line wavelength plates. They are similar in construction to the TMC Transmitting condenser, and have high efficiency and rugged frames. Insulation is Steatite, and Peak Voltage Rating is 1000 volts. Same sizes available with straight line capacity plates, type DXC condenser.

Capacity	Minimum Capacity	No. of Plates	Length	Catalog Symbol	Net
150 Mmf.	9 Mmf.	9	2 15/16"	EMC-150	\$4.50
250	11	15	2 15/16"	EMC-250	4.75
350	12	20	2 15/16"	EMC-350	6.00
500	16	29	4 3/8"	EMC-500	6.75
1000	22	56	6 3/4"	EMC-1000	10.35

NATIONAL COMPANY REPRESENTATIVES

To save time, expense and prevent greater possibility of damage in shipment on repair or modification of National Company equipment, we have carefully selected and established a few Authorized Service Stations throughout the country. These Authorized Service stations have been thoroughly investigated and are equipped with suitable gear manned by responsible technicians who have a satisfactory knowledge of communications equipment. They are kept up to date and supplied by the factory with the latest data and parts for the maintenance and repair of National equipment, and are prepared to turn out work which you will find to be the equivalent of a factory repair job.

Any repairs or modifications to be made on your National equipment can now be handled by the nearest Authorized Service Representative. New equipment requiring service during the warranty period should be referred to the dealer from whom it was purchased in order to secure the necessary authorization for such work. As the following list is subject to change, the Service Representative should first be contacted by letter or phone before shipping any equipment to him. Names and addresses are as follows:

NATIONAL COMPANY, INC., SERVICE REPRESENTATIVES

Mr. W. O. Watts
11th & Highview
Manhattan Beach, Calif.

Winsby-Fleming
2573-94th Avenue
Oakland 3, Calif.

Stafford Electronics
1423 Curtis Street
Denver 2, Colorado

Radio Communication Laboratories
P. O. Box 711
Municipal Airport
Atlanta, Georgia

Mr. W. Ben Wimberly
8114 Knox Avenue
Skokie, Illinois

G. E. Dammann Company
15 South Michigan Avenue
Villa Park, Illinois

Electronic Radio Laboratory
12436 Jos. Campau
Detroit, Michigan

Eastern Radio Corporation
637 Main Avenue
Clifton, New Jersey

Engineering Products Company
4905 Ross Avenue
Dallas, Texas

Beacon Radio
142 East 4th Street
St. Paul 1, Minnesota

United Electric Service
1160 John Street
Seattle 22, Washington

Sentinel Laboratories
1019-23 Appletree Street
Philadelphia, Pennsylvania

Radio Electronic Company
607 Main Street West
Rochester 8, New York

Radio Electronic Service, Inc.
2866 Farnam Street
Omaha, Nebraska

Winters Radio Laboratory
11 Warren Street
New York 7, N. Y.

NATIONAL COMPANY, INC., SALES REPRESENTATIVES

Mr. Herb Becker
1406 S. Grand Avenue
Los Angeles 15, California

Mr. Edward Braddock
111 South Broad Street
Philadelphia 7, Pennsylvania

L. A. Chambers Company
565 W. Washington Blvd.
Chicago 6, Illinois

Arthur S. Detsch Company
234 Sherlock Building
Portland 4, Oregon

Lynch & Gentry
136 Liberty St., Rm. 705
New York, N. Y.

Mr. Arthur H. Lynch
P. O. Box 466
Fort Meyers, Florida

Mr. J. U. McCarthy
1725 Hillcrest Avenue
St. Paul, Minnesota

Mr. R. C. Merchant
4829 Woodward Avenue
Detroit, Michigan

Patterson & Company
1124 Irwin-Keasler Bldg.
Dallas 1, Texas

C. L. Pugh Company
1670 Doone Road
Columbus 8, Ohio

Mr. S. W. Simberkoff
347 Fifth Avenue
New York, N. Y.

Maitland K. Smith Company
317 Forrest Avenue, N. E.
Atlanta, Georgia

W. Clif McCloud & Company
711 Colorado Building
Denver 2, Colorado

Clyde H. Schryver Sales Company
108 Waltower Building
Kansas City 6, Missouri

Mr. William P. Ready
61 Sherman Street
Malden 48, Massachusetts

All prices listed in this Catalog are effective June 1, 1948 and subject to change without notice.



INDEX

Receivers	2-15
Knobs and Accessories	16
Dials	17
RF Chokes	18
Components	19-21 & 23-25
Sockets	22
Transmitting Condensers & Coils	26-29
Miniature & Neutralizing Condensers	30
Precision Condensers	31
Cabinets and Oscilloscopes	32
Assemblies	33
Receiving Condensers	34
National Company Representatives	35



NATIONAL COMPANY, Inc.
MALDEN, MASSACHUSETTS

PORT OF NEW YORK
AUTHORITY BUILDING
NEW YORK 11, N. Y.

DAVEGA

EXECUTIVE OFFICES:
76 NINTH AVENUE
CHELSEA 3-5200

STORES CORPORATION

Communications Division • 63 Cortlandt St., New York 7, N. Y. • CHelsea 3-5212

SIXTY - EIGHT YEARS OF DEPENDABLE SERVICE TO OUR PATRONS

Dear Sir:

Thank you for this opportunity to be of service. Enclosed please find literature covering communication equipment, that you requested. Our stock of this apparatus is second to none and we pride ourselves on our ability to expedite any order of yours promptly.

The hundreds of thousands of customers who patronize our 23 stores, have always found our prices reasonable. The Davega organization is known throughout the world for giving any order, large or small, swift and dependable attention.

Please do not hesitate to call on us for any additional information you may require. We will be pleased to offer you our lowest quotation on any material you may find of interest.

For your convenience we are enclosing a self-addressed envelope.

Thanking you again, I remain

Very truly yours,

DAVEGA STORES CORPORATION


A. J. Mollinger, Manager
COMMUNICATIONS DIVISION

AJM/sb
Enc.

NEW YORK STORES

63 CORTLANDT STREET
200 BROADWAY
831 BROADWAY
18 WEST 34TH STREET
111 EAST 42ND STREET
152 WEST 42ND STREET
125 WEST 125TH STREET
825 EIGHTH AVENUE
2369 BROADWAY

BRONX STORES

2860 THIRD AVENUE
31 EAST FORDHAM ROAD

BROOKLYN STORES

360 FULTON STREET
924 FLATBUSH AVENUE
1304 KINGS HIGHWAY
5108 FIFTH AVENUE

ASTORIA STORE

31.55 STEINWAY STREET

FLUSHING STORE

39-11 MAIN STREET

JAMAICA STORE

163-24 JAMAICA AVENUE

WHITE PLAINS, N. Y.

175 MAIN STREET

HEMPSTEAD, L. I.

45 MAIN STREET

PATERSON, N. J.

185 MAIN STREET

JERSEY CITY, N. J.

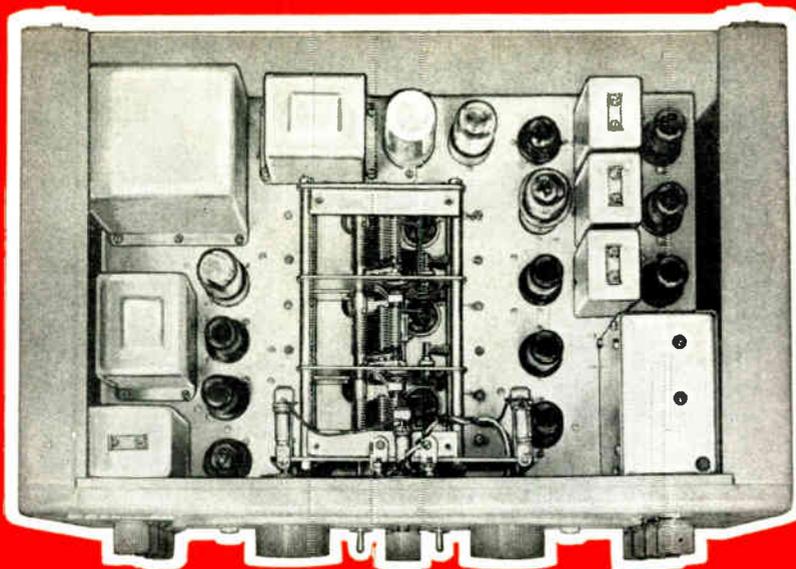
30 JOURNAL SQUARE

NEWARK, N. J. STORE

MILITARY PARK BUILDING
60 PARK PLACE

NATIONAL

NC-173



SIGNAL STRENGTH METER

A signal strength meter is associated with the AVC circuit. The S-Meter scale is calibrated in S units from 1 to 9 with approximately 5 db per S unit and in db above S-9 from 0 to 40 db. The "no signal" S-Meter reading does not require adjustment. If it is necessary to compare strong signals which cause the S-Meter to read off scale, the S-Meter sensitivity may be reduced by retarding the RF Gain control. The S-Meter can be used on both phone and code signals.

TONE CONTROL

The Tone control is a variable control functioning to adjust the tonal output of the audio amplifier. Maximum tone control action reduces the audio fidelity so that essentially the audio tones from 75 to 1200 cycles per second only are passed.

ANTENNA INPUT

Tuning of the first RF stage on all bands can be readily adjusted to compensate for a wide range of antenna loading conditions by means of the panel mounted antenna compensating capacitor. The input circuit is suitable for use with a single wire antenna, a balanced feed line or a low impedance (70 ohm) concentric transmission line. The average input impedance is roughly 500 ohms.

AUDIO OUTPUT

Two audio output circuits are provided. A head-phone jack is mounted on the front panel and an output terminal strip is mounted at the rear of the Receiver and has terminals for both 8 and 500 ohm load impedances. Audio output power is approximately 3.5 watts. Inverse feedback is used to reduce audio hum to an exceptionally low level.

POWER INPUT

Approximately 83 volt-amperes; 110/120 volt, 50/60 cycle, single-phase AC (adaptable to 220/240 volt operation as well as operation from batteries).

PICK-UP JACK

A pick-up jack is mounted on the front panel and can be used to connect auxiliary apparatus, such as a phonograph pickup, to the audio system of the Receiver. The audio system of the Receiver is essentially flat from 75 to 6000 cycles per second. This input circuit is high impedance and feeds into the high gain 6SJ7 first audio amplifier stage. The Audio Gain and Tone controls are operative with this connection.

LOUD SPEAKER

The loud-speaker supplied with the table model NC-173 is of the permanent magnet field type and is mounted in a cabinet finished to match the Receiver. The loud-speaker impedance is 8 ohms and connects to the 8 ohm Receiver output circuit.

TUBE COMPLEMENT

The NC-173 is supplied complete with tubes which are employed as follows:

R.F. Amplifier	6SG7
First Detector	6SA7
H.F. Oscillator	6J5
First I.F. Amplifier	6SG7
Second I.F. Amplifier	6SG7
Second Det. — AVC Det.	6H6
AVC Amplifier	6AC7
Beat Frequency Oscillator	6SJ7
Limiter	6H6
1st. Audio	6SJ7
Audio Output	6V6GT/G
Voltage Regulator	OD3/VR-150
Rectifier	5Y3GT/G

CONTROLS

Main Tuning; Bandsread Tuning; Band Switch; RF Gain-AC ON/Off; AF Gain; Send-Receive; AVC-MVC; Tone; CWO; CWO Switch; Limiter; Phasing; Selectivity; RF Trimmer.

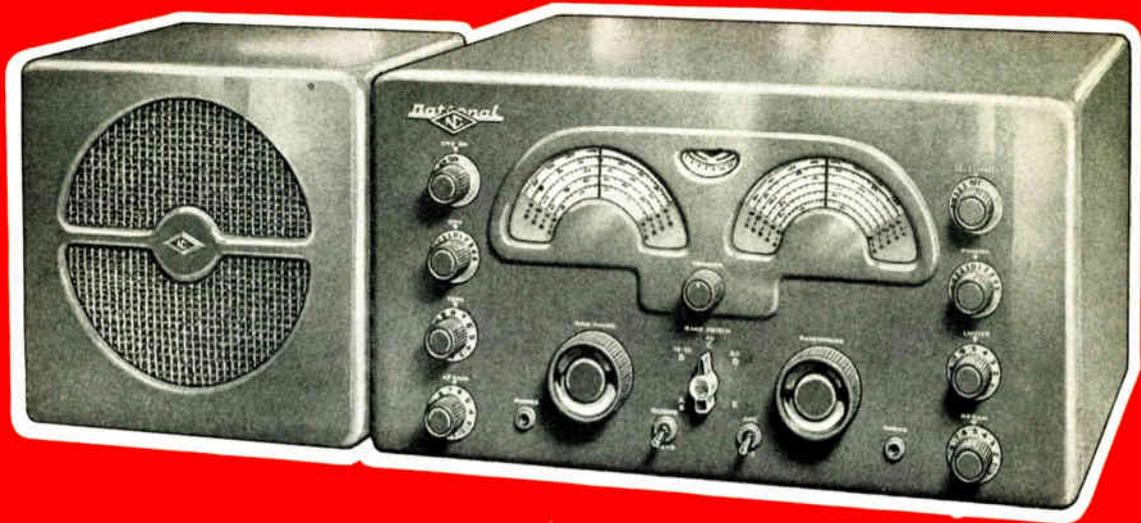
Receiver — \$179.50

Speaker — \$10.00



NATIONAL COMPANY INC., MALDEN, MASS.

"YOU'LL HEAR THE WHOLE WORLD TALKING"



DESCRIPTION

The new NC-173 is a truly versatile Receiver engineered to fulfill a wide variety of applications. The Amateur will find this Receiver chock-full of features which greatly widen his scope of activity. Commercial Installations will realize in this Receiver a dependable performer under the most adverse receiving conditions. Short Wave Listeners can enjoy world-wide reception as well as the standard broadcast band with a minimum of tuning adjustments and a maximum of life-like reproduction. The distinctive appearance of the NC-173 exterior will add attractiveness to any type of installation.

The frequency scope of the NC-173 is exceptional in that it includes the conventional 540 kc. to 31 mc. range plus the 48 to 56 mc. portion of the spectrum which covers the Amateur six meter band. The tuning system employs separate directly-calibrated dial scales with associated control knobs for General Coverage and Bandsread tuning. Both dials are well-illuminated and have auxiliary linear scales for logging purposes. Calibrated bandsread tuning is provided for the main Amateur bands, i.e., 6, 10-11, 20, 40 and 80 meters. Band changing is accomplished by means of a highly efficient band-switch system.

A complement of 13 tubes (including rectifier and voltage regulator) in a superheterodyne circuit is used to provide such features as an RF amplifier stage, a separate AVC Amplifier and a double-diode noise limiter. Essentially the circuit consists of one stage of radio frequency amplification, a first detector and a separate stabilized high frequency oscillator, two intermediate frequency amplifier stages, a diode type second detector, an audio limiter, a high gain type audio stage and an audio output stage plus an automatic volume control amplifier, a stabilized beat frequency oscillator, a voltage regulator and rectifier stages. A crystal filter is connected between the first detector and first IF stage.

Highlights of the NC-173 Receiver are:

VOLTAGE REGULATOR

A voltage regulator tube efficiently minimizes frequency drift in the high frequency oscillator and also in the beat frequency oscillator. Frequency stability is thereby assured for both phone and code reception.

AVC AMPLIFIER

The use of an AVC amplifier separate from the regular IF channel provides excellent AVC action. With this system AVC can be used for both phone and code reception.

CRYSTAL FILTER

A new highly flexible crystal filter provides an adjustable selectivity characteristic with a wide range from broad-band broadcast requirements to sharp single-signal code reception. A phasing control permits attenuation of interfering signals.

NOISE LIMITER

A new concept in noise limiter design is introduced in the NC-173 Receiver. This new limiter could be termed "double action plus" and the noise limiting action is equally effective on either phone or code reception. A panel-mounted threshold control permits adjustment of the level at which limiting action starts.

TUNING SYSTEM

The main tuning capacitor and the bandsread tuning capacitor are connected in parallel on all bands. This arrangement permits bandsread tuning on any frequency within the range of the receiver if desired. Separate knobs with associated dial scales are used to operate these two capacitors to tune the frequency range of the Receiver in five bands as follows:

Band	General Coverage	Bandsread
A		48 — 56 Mc.
B	12 — 31 Mc.	27 — 30 Mc. 14.0 — 14.4 Mc.
C	4.3 — 12 Mc.	7.0 — 7.3 Mc.
D	1.6 — 4.3 Mc.	3.5 — 4.0 Mc.
E	0.54 — 1.6 Mc.	

NATIONAL COMPANY INC., MALDEN, MASS.

"YOU'LL HEAR THE WHOLE WORLD TALKING"



SPECIFICATIONS

The National NC-33 is an AC-DC superheterodyne radio receiver having a complement of five tubes plus a rectifier with a continuous frequency range of from 500 KC to 35000 KC. The receiver is designed to provide reception of A.M. voice or music and code telegraphy signals throughout its entire frequency range. The NC-33 is one of the few general purpose communication receivers that tunes to the ship calling frequency and the International SOS band. For ease of operation, front of panel controls are minimized consistent with efficient utilization of the circuit employed. The separate bandspread control knob and 0-100 dial scale make possible fine vernier type tuning for any portion of the frequency spectrum covered by the receiver. The usefulness of this feature is outstanding on crowded bands such as the amateur or shortwave foreign broadcast bands.

CIRCUIT

A stage outline of the circuit employed in the NC-33 is given below together with the tube associated with each stage.

Converter	12SA7
I. F. Amplifier	12SG7
Second Det. — A.V.C. — A.N.L.	12H6
First Audio — C.W.O.	12SL7GT/G
Audio Output	35L6GT/G
Rectifier	35Z5GT/G

TUNING SYSTEM

The two-gang main tuning capacitor, the two-gang bandspread capacitor and four sets of coils are used to cover the frequency range of the NC-33 in four tuning bands as shown in the following table. The main tuning and bandspread tuning capacitors are connected in parallel on all bands.

BAND

Frequency Coverage

A	12.0 — 35.0	MC
B	4.0 — 12.0	MC
C	1.42 — 4.2	MC
D5 — 1.42	MC

The main dial has four scales accurately calibrated directly in megacycles. The respective scales are marked with heavy black scorings to clearly locate for the operator such short wave features as the Amateur, Police and Foreign Broadcast bands. These locating markers are identified by letters AM, P and F, respectively.

AUDIO OUTPUT

Two audio output circuits are provided.

- (1) The loudspeaker in the NC-33 is a 5 inch P.M. type capable of faithfully reproducing the ample 1½ watt audio volume delivered by the receiver.
- (2) A phone jack is mounted on the front panel and is wired so as to silence the loudspeaker when headphones are used. The headphone load impedance is not critical, permitting the use of a wide range of headphone types, including crystal types.

POWER SUPPLY

The NC-33 receiver is designed to operate from a 105/130 volt, 50/60 cycle, A.C. source of supply or a 105/130 volt D.C. source of supply. Normal power consumption is approximately 24 watts at 115 volts. By use of a dropping wire resistor in series with the power cord, the receiver will operate on a 220/240 volt D.C. source of supply.



NATIONAL COMPANY, INC., MALDEN, MASS.

"YOU'LL HEAR THE WHOLE WORLD TALKING"

Now! BIG RECEIVER QUALITY IN
THE LOW-PRICED FIELD !!



THE NEW
NATIONAL
NC-33
\$65⁹⁵
AMATEUR NET

Here's the receiver you've been waiting for! A real communication receiver covering all frequencies from 500 kcs to 35 mcs, the brand new NC-33 offers the same fine workmanship that distinguishes National's more expensive receivers. Dollar for dollar, feature for feature, it's better built, better looking, better performing! See it — compare it — today at your dealer's. You'll decide it's the perfect choice for your shack, living room, playroom or den!

- Operates from 110-120 volts AC or DC. Ideal for shipboard and other uses where DC only is available.
- Electrical bandspread on all bands! Broadcast, amateur, police and foreign bands plainly marked.
- Automatic noise limiter assures optimum reception under all operating conditions.
- CW oscillator with pitch control provides superb CW reception.
- Lightweight — easy to carry.

National
©  EST. 1914
NATIONAL COMPANY, Inc.
MALDEN, MASSACHUSETTS

"YOU'LL HEAR THE WHOLE WORLD TALKING"

THE NEW



NC-183

Communications RADIO RECEIVER



TABLE MODEL NC-183 AND SPEAKER

Designed particularly for the discriminating radio amateur, the new National NC-183 is also ideal for the short wave listener who appreciates top-notch performance and skillful engineering. Sixteen tubes (including rectifier and voltage regulator) are employed in a modern high-gain super-heterodyne circuit. The main tuning and bandsread dials are calibrated directly in frequency and both have auxiliary logging scales. Two stages of signal frequency amplification provide that extra measure of sensitivity and image rejection so often needed when receiving conditions are unfavorable and a panel controlled trimmer allows the operator to compensate for variations in antenna loading at any frequency.

The push-pull audio stage delivers 8 watts of undistorted

audio power to an efficient ten-inch PM speaker. The wide range crystal filter with phasing control, adjustable-threshold automatic noise limiter, tone control and C. W. oscillator pitch control afford exceptional flexibility of performance characteristics, enabling the operator to cope with a wide variety of receiving conditions. Other features include: HF oscillator temperature-compensated on all bands; phonograph pick-up jack; accessory connector socket; illuminated signal strength meter with adjustable sensitivity; self-contained output transformer with 500 ohm and 8 ohm terminals; operates from 115 or 230 volts 50/60 cycles or, in emergency, from batteries or vibrator power supply; narrow band FM adaptor available (plugs into accessory socket *inside the cabinet*). Frequency coverage: 540kc. to 31mc. and 48 to 56mc.

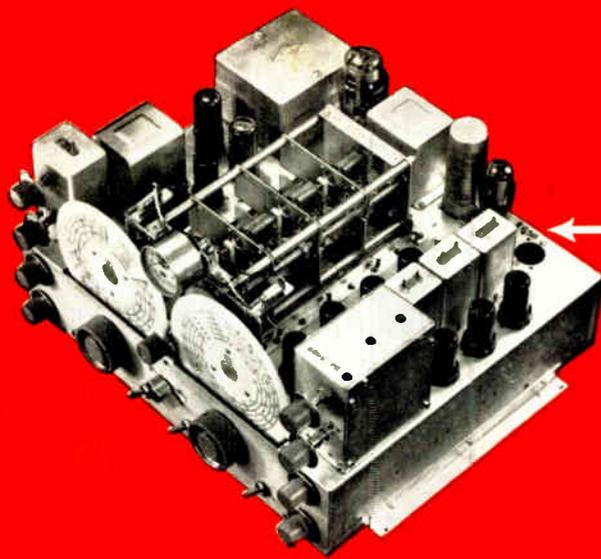
ENGINEERED, MANUFACTURED AND GUARANTEED BY A COMPANY WITH AN
ESTABLISHED REPUTATION FOR BUILDING THE WORLD'S FINEST
COMMUNICATIONS RECEIVERS.

NATIONAL COMPANY, INC., MALDEN, MASS.

"YOU'LL HEAR THE WHOLE WORLD TALKING"

World Radio History





NFM-83 Adaptor

TUNING SYSTEM

The main tuning and bandspread tuning capacitors are connected in parallel on all bands. This arrangement permits bandspread tuning at any frequency within the range of the receiver. Two RF stages are employed on all bands and the trimmer for the 1st RF stage is controlled from the front panel. Dial calibration is as follows:

Band	General Coverage	Bandspread
A		48 — 56 Mc.
B	12 — 31 Mc.	27 — 30 Mc. 14.0 — 14.4 Mc.
C	4.3 — 12 Mc.	7.0 — 7.3 Mc.
D	1.6 — 4.3 Mc.	3.5 — 4.0 Mc.
E	0.54 — 1.6 Mc.	

SENSITIVITY

Measured with a standard 300 ohm dummy antenna, sensitivity of the NC-183 is better than 1.5 microvolts for a 6 db signal/noise ratio throughout the entire frequency range.

SELECTIVITY

The selectivity switch of the wide range crystal filter permits a choice of six progressively narrower IF passbands. Maximum and minimum selectivity characteristics are as follows:

	Bandwidth	
	6 db down	20 db down
Selectivity Switch "Off"	3.9 KC.	8. KC.
Selectivity Switch "5"	80 cycles	400 cycles

IMAGE REJECTION

Signal/image better than 40 db at 30 megacycles.

AUDIO SYSTEM

Undistorted Power Output	8 Watts
Frequency Response	12,000
Tone Control at 10	60 to 10,000 C.P.S.
Tone Control at 0	60 to 12,000 C.P.S.
Output Impedance	1,000
Speaker Socket	8 or 500 Ohms
Phone Jack	Not Critical

A high impedance phono input jack is provided at the rear of the receiver and the phono-radio switch and phone jack are on the front panel.

TUBE COMPLEMENT

The NC-183 is supplied complete with tubes which are employed as follows:

First R.F. Amplifier	6SG7
Second R.F. Amplifier	6SG7
First Detector	6SA7
H.F. Oscillator	6J5
First I.F. Amplifier	6SG7
Second I.F. Amplifier	6SG7
Second Detector—A.V.C. Detector	6H6
A.V.C. Amplifier	6AC7
Beat Frequency Oscillator	6SJ7
Noise Limiter	6H6
First Audio	6SJ7
Phase Inverter	6J5
Audio Output (2)	6V6GT/G
Voltage Regulator	OD3/VR-150
Rectifier	5U4G

CONTROLS

Main tuning; bandspread tuning; band switch; RF gain — AC on/off; AF gain; send/receive switch; AVC/MVC switch; tone; CWO switch; CWO pitch; limiter; selectivity; phasing; RF trimmer; radio/phono switch.

NARROW BAND FM ADAPTOR

The NFM-83 adaptor pictured above makes the NC-183 an excellent receiver for narrow band FM. A 6H6 tube is employed as a noise suppressing ratio-type discriminator and a 6SK7 if coupling stage eliminates undesirable loading of receiver circuits. Instant selection of AM or NFM by means of phono-radio switch.

FINISH

Table Model: Gray enamel.
Rack Model: Black wrinkle.

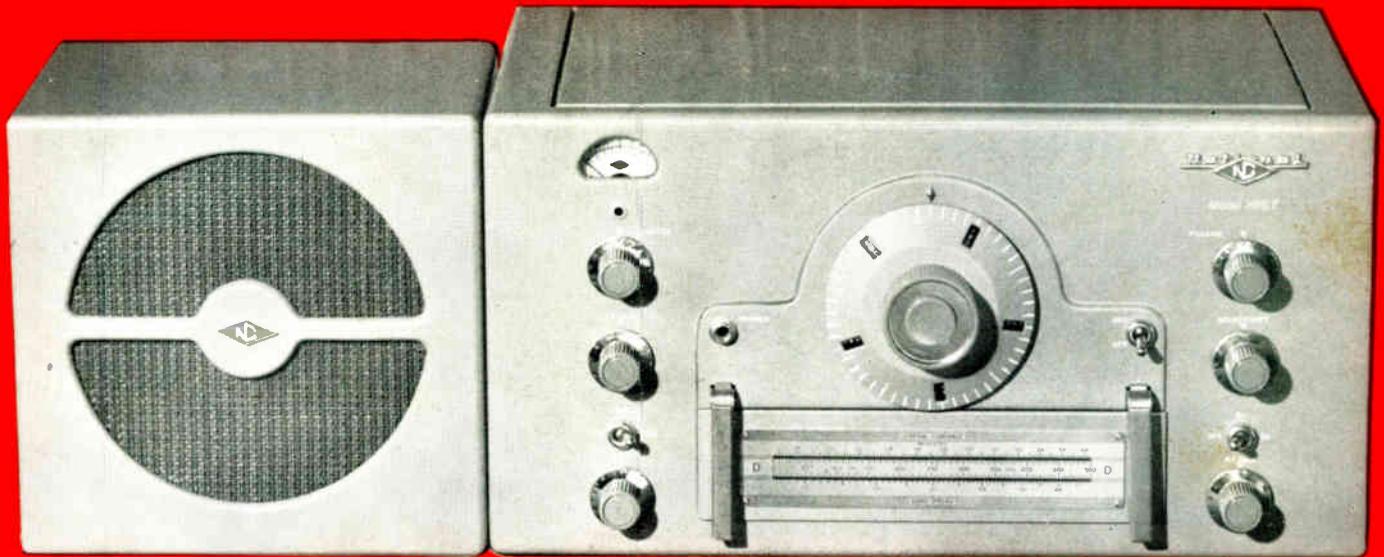
PRICES

NC-183T Table Model (with speaker)	\$269.00
NC-183R Rack Model (with speaker)	\$269.00
NFM-83 Narrow Band FM Adaptor	\$16.95



NATIONAL COMPANY, INC., MALDEN, MASS.

"YOU'LL HEAR THE WHOLE WORLD TALKING"



First introduced in 1934, the HRO combined many features unique in the commercial receiver design. Experience gained through gruelling use in many government, commercial and amateur services all over the world, has indicated that certain of these features are essential to the stability and dependability that have characterized the HRO type receiver for many years. The HRO-7 combines a thoroughly modernized cabinet design and time-proven features of past HRO series with the addition of laboratory circuit features which result in a truly new model HRO. As in past models, the HRO-7 is a custom-built receiver embodying components of our own design and manufacture.

Outstanding features of the new HRO-7 are:

- Automatic, adjustable-threshold noise limiter for use on C.W. or phone
- Improved high-frequency oscillator
- Voltage regulator
- Front-of-panel tone switch
- Lever-type handles for coil sets
- Slide-rule type calibration on coil sets
- Bandsread on 11-meter band
- Accessory connector socket
- Radio-phonograph switch

The circuit employed on all bands of the HRO-7 comprises two tuned stages of R.F. amplification, a tuned first detector, a high-frequency oscillator employing a tube separate from the first detector tube, two stages of I.F. amplification operating at 456 kilocycles, a combined second detector-automatic volume control stage, an automatic adjustable-threshold series valve noise limiter, a first audio amplifier stage, an audio output stage and a beat frequency oscillator coupled to the second detector to provide C.W. reception. A crystal filter is connected between the 1st detector and 1st IF stage and a voltage regulator tube is used to regulate the plate supply to the high-frequency oscillator tube. An S-meter is associated with the A.V.C. circuit to provide a means of measuring the signal strength of incoming signals.

The tuning system of the HRO-7 maintains the highly successful features — the micrometer type Main Tuning dial and plug-in coil sets. The Main Tuning dial has an effective scale length of approximately twelve feet with a linear calibration from zero to 500. This dial drives the four gang main tuning capacitor through a worm drive having a reduction ratio of approximately 20 to 1. Back lash is eliminated by use of a spring-loaded split worm wheel which assures positive drive in either direction at all times. The HRO-7 is normally supplied with four coil sets covering frequencies from 1.7 to 30.0 Mc. while five additional coil sets are available to cover frequencies from 50 to 430 Kc. and 480 to 2050 Kc. Each of the four coil sets normally supplied covers two amateur bands and the frequencies between. By a simple change-over operation the amateur band at the high frequency end of each coil set can be expanded for bandsread operation to cover approximately 400 of the 500 divisions of the Main Tuning dial.

A new, automatic, adjustable-threshold noise limiter effectively reduces interference caused by external noise pulses on both phone and code reception. This noise limiter is the double action type, i.e., clipping noise on both positive and negative peaks. Two miniature type tubes are employed in the HRO-7, namely, a 6C4 high-frequency oscillator and a OA2 voltage regulator, to give a high order of oscillator stability. An accessory Connector Socket is mounted at the rear of the Receiver to permit connection of various accessories such as a narrow-band F.M. adaptor, crystal calibrator, record player, microphone or high-frequency converter. A 5 position switch for crystal filter operation provides a means of adjusting the selectivity characteristic of the HRO-7 from broad-band broadcast to Amateur single-signal requirements as well as a means for the reduction of interfering heterodynes. Lever-type handles are mounted on the front panel of the Receiver to facilitate coil-set changing. The new calibration charts on each coil set make correlation between dial reading and frequency accurate and speedy.

NATIONAL COMPANY INC., MALDEN, MASS.

"YOU'LL HEAR THE WHOLE WORLD TALKING!"



NATIONAL HRO-7

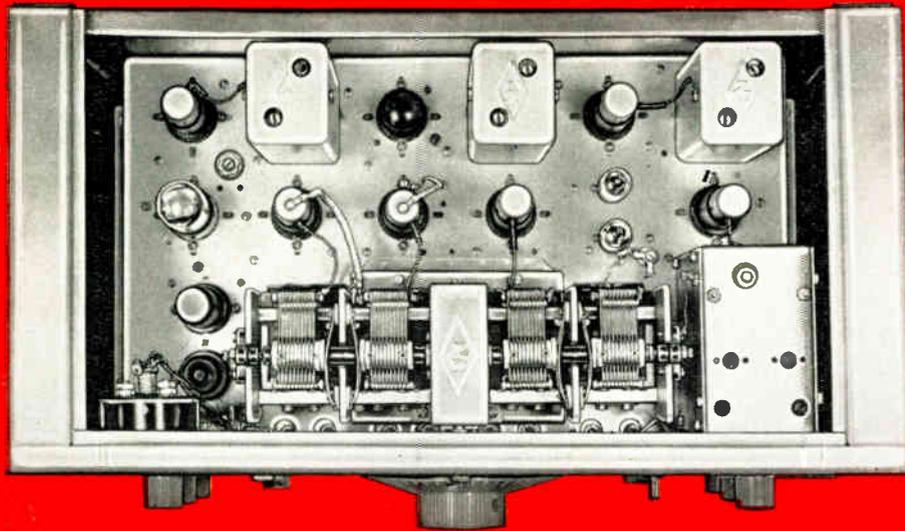


Table Power Pack

SELECTIVITY:

	Crystal Filter Out	
Voltage Ratio		Nominal Bandwidth
6 DB.		3.0 KC.
60 DB.		21.5 KC.
	Crystal Filter In	
Max. Selectivity	20 DB.	200 Cycles
Min. Selectivity	20 DB.	6.0 KC.

SENSITIVITY:

The sensitivity of the HRO-7 is 1. microvolt or better throughout the normal frequency range.

AVC CHARACTERISTIC:

Within ± 10 DB. between 1. and 100,000 microvolts input.

IMAGE REJECTION:

Increases from better than 30 DB. at 30 MC. to better than 120 DB. at 175 KC.

SIGNAL-TO-NOISE RATIO:

Exceeds 16 DB. (ratio of output with 30% modulation ON/OFF) with 5 microvolts input.

INPUT IMPEDANCE:

At antenna terminals — 500 ohms (average).

POWER INPUT:

Using Type 697 Power Pack; 75 watts at 115 volts, 50/60 cycles, 1 phase AC. Switch for 230v. incl.

POWER OUTPUT:

Maximum output 3 watts. Output with negligible distortion 1.5 watts.

ACCESSORY CONNECTOR SOCKET:

Makes available voltages and circuits as follows:— 6.3v. a.c., 150v. d.c. regulated, 240v. d.c. unregulated. AVC voltage, phono input circuit, and I.F. output voltage.

TUBES:

First R.F. Amplifier	6K7
Second R.F. Amplifier	6K7
First Detector	6J7
High Frequency Oscillator	6C4
First I.F. Amplifier	6K7
Second I.F. Amplifier	6K7
Diode Detector—A.V.C.	6H6
Noise Limiter	6H6
First Audio Amplifier	6SJ7
Audio Output	6V6GT/G
Beat Frequency Oscillator	6J7
Voltage Regulator	0A2

ADDITIONAL MATCHING UNITS:

NATIONAL Type 697 Power Pack	
Net Price	\$20.36
NATIONAL Type MCR 8" Speaker with 7000 ohm matching transformer included. Net Price—	\$12.00.
NATIONAL Coil Sets to cover the low frequency range of the receiver: Prices on application.	
Type J 50 — 100 KC.	Type F 480 — 960 KC.
Type H 100 — 200 KC.	Type E 900 — 2050 KC.
Type G 180 — 430 KC.	

DIMENSIONS:

Table Model:
19 $\frac{3}{4}$ " x 10 $\frac{3}{8}$ " x 12 $\frac{1}{8}$ "; Weight 51 lbs.: Mounting, Gray enamel finish: Cabinet enclosure.
Rack Model:
Rack and panel models are available on order. Black wrinkle finish.

PRICES:

Table Model (with tubes & A,B,C,D coils)	
Net Price	\$311.36*
Rack Model (with tubes & A,B,C,D coils)	
Net Price	\$338.65*

*Prices include applicable power supplies and speaker.



NATIONAL COMPANY INC., MALDEN, MASS.

"YOU'LL HEAR THE WHOLE WORLD TALKING!"

THE NEW



NC-57



FEATURES OF NATIONAL NC-57

1. Engineered, manufactured and backed by a manufacturer with an established reputation for building the world's finest communications receivers.
 2. Greatest frequency range of any receiver in its class. Continuous coverage from 540 to 55,000 kc. includes all amateur bands up to and including the new 50 megacycle band.
 3. Self-contained speaker and power supply.
 4. Sensitivity, selectivity and stability on short wave broadcast 'phone reception and code signals.
 5. Bandspread of any station or signal for fine tuning.
 6. Stabilized oscillator circuit to enable you to hold the short wave signal without regard to line voltage changes.
 7. Ample power output for the average room and three position tone control to adjust tone to your liking.
 8. Variable C.W. oscillator control to vary pitch of beat note on code signals.
 9. Automatic threshold noise limiter to minimize interference due to ignition noise, lightning, static, etc.
 10. Band switching made easy by means of simple 5 position switch.
 11. R.F. Gain Control permits adjustment of receiver sensitivity to meet varying conditions.
 12. R.F. trimmer provides means of matching receiver to various types of antenna for most efficient operation.
 13. Ample selectivity for separating stations close to one another.
 14. Provision for plugging in earphones to front panel of receiver to enable listener to enjoy reception without disturbing others in the room.
 15. Receiver includes all necessary wiring and socket to plug in signal strength meter.
- Also available is a signal strength meter for plugging into receiver when used to receive amateur stations or for tuning indicator for short wave listeners.

NATIONAL COMPANY, INC., MALDEN, MASS.

"YOU'LL HEAR THE WHOLE WORLD TALKING"

SPECIFICATIONS

The NC-57 is a superheterodyne radio receiver, having a complement of seven tubes plus a voltage regulator and rectifier, with a continuous frequency coverage of from 540 kilocycles to 55 megacycles. This receiver is designed to provide reception of A.M. voice or music and C.W. or M.C.W. code telegraph signals throughout its entire frequency range. Front panel operational controls are held to a minimum consistent with good operation and full utilization of the circuit features contained in the NC-57. The separate bandspread control knob and dial scale make possible fine, vernier type tuning for any portion of the frequency spectrum covered by the receiver. The usefulness of this feature is outstanding on crowded bands such as the amateur or short wave foreign broadcast bands. The NC-57 employs a voltage regulator tube to assure a high order of stability in the high frequency and beat frequency oscillator circuits.

CIRCUIT

A stage outline of the circuit employed in the NC-57 is given below together with the tube associated with each stage.

R.F. Amplifier	6SG7
Converter	6SB7-Y
First I.F. Amplifier	6SG7
Second I.F. Amplifier	6SG7
Second Det. — A.V.C. — A.N.L.	6H6
First Audio — C.W.O.	6SN7GT/G
Audio Output	6V6GT/G
Voltage Regulator	OD3/VR-150
Rectifier	5Y3GT/G

TUNING SYSTEM

A three gang main tuning capacitor, a three gang bandspread tuning capacitor, a panel mounted trimmer control and five sets of coils are used to tune the frequency range of the receiver in five tuning bands as shown on the following table. The main tuning capacitor and bandspread capacitor are connected in parallel on all bands.

Band	Frequency Coverage
A	35.0 — 55.0 mc.
B	13.5 — 35.0 mc.
C	4.65 — 13.5 mc.
D	1.6 — 4.65 mc.
E	0.54 — 1.6 mc.

It will be noted that Band E encompasses the entire standard broadcast band.

The amateur bands covered by the NC-57 are listed below with their respective receiver band locations and are spread on the 360°, 0-100 bandspread dial by means of the bandspread capacitor approximately as follows:

Band	Amateur Band (Meters)	Frequency	Divisions
A	6	50.0 — 54.0 mc.	37
B	10, 11	27.16 — 29.7 mc.	44
	15	21.0 — 21.5 mc.	28
	20	14.0 — 14.4 mc.	65
C	40	7.0 — 7.3 mc.	47
D	80	3.5 — 4.0 mc.	60

The main dial has five scales accurately calibrated directly in megacycles. The respective scales are marked with heavy black scorings to clearly locate for the operator such short wave features as the amateur, police and foreign broadcast bands. These locating markers are identified by letters AM., P. and F., respectively.

AUDIO OUTPUT

Two audio output circuits are provided:

- (1) The loudspeaker in the NC-57 is a 5 inch P.M. type capable of faithfully reproducing the ample 3 watt audio volume delivered by the receiver. An output transformer to match the impedance of the output tube is mounted on the loudspeaker.
- (2) A phone jack is mounted on the front panel and is wired so as to silence the loudspeaker when headphones are used. The headphone load impedance is not critical permitting a wide variety of headphones, including crystal types, to be used.

POWER SUPPLY

The NC-57 receiver is designed for operation from a 105/130 volt, 50/60 cycle, source of supply. Normal power consumption is approximately 84 watts. The built-in A. C. power supply provides all voltages required by the heater and B supply circuits — 2.7 amperes at 6.3 volts and 100 milliamperes at 250 volts, respectively.

The NC-57 is readily adaptable to battery operation and a battery socket is provided at the rear. The receiver will operate on a 6 volt storage battery when used in conjunction with our 686S vibrator power supply.

ACCESSORY CONNECTOR SOCKET

An octal type socket is mounted at the rear of the NC-57 to permit convenient connection of external accessories. The following connections are available at this socket: B+ 250V unregulated, B+ 150V regulated, 6.3V. A.C., audio input, and ground.

The SM-57, an illuminated tuning meter calibrated in S units, is available as an accessory at additional cost. This unit is designed to plug into the accessory connector socket.

NC-57 Receiver—Price \$89.50
SM-57 Tuning Meter—Price \$14.95

NATIONAL COMPANY, INC., MALDEN, MASS.
"YOU'LL HEAR THE WHOLE WORLD TALKING"