

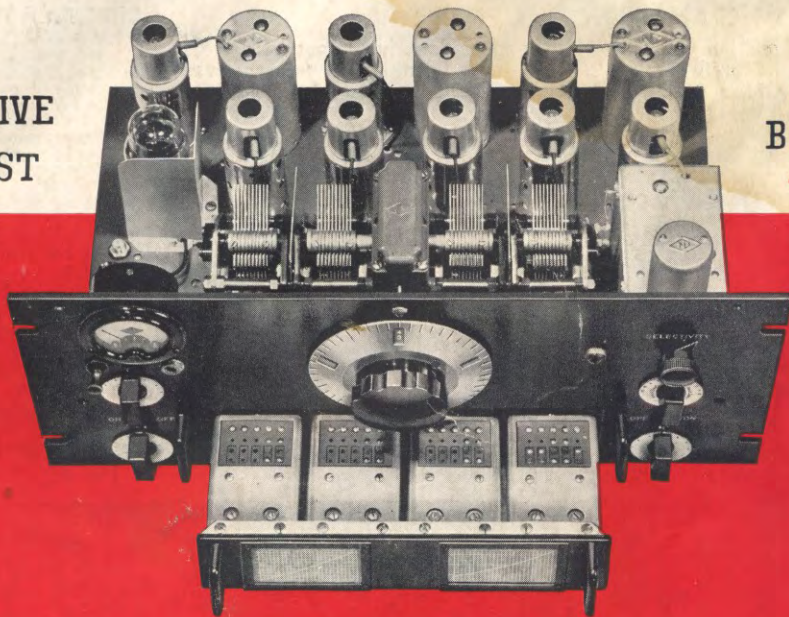
NATIONAL



RADIO PRODUCTS

DESCRIPTIVE
PRICE LIST

BULLETIN NO.
260



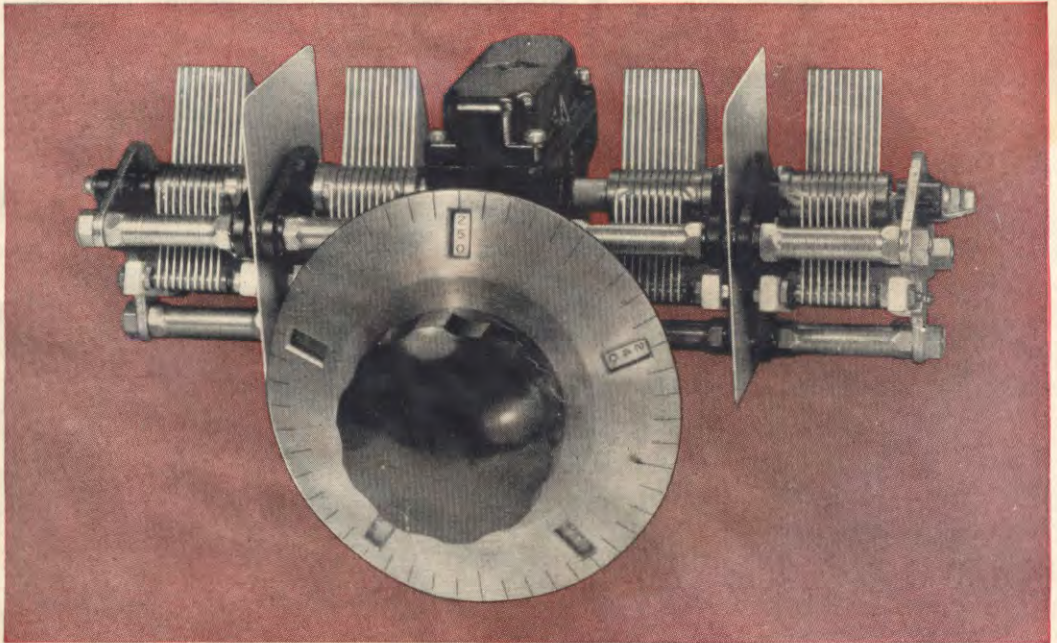
NATIONAL COMPANY INCORPORATED

61 SHERMAN STREET • MALDEN, MASSACHUSETTS

Engineers and Manufacturers

ESTABLISHED 1914

NATIONAL *Ganged* CONDENSER



PRECISION GANGED CONDENSER

The PW Precision Condenser has been particularly designed for use in H.F. circuits. It is available with 2, 3 or 4 ganged sections for use in receivers, and in a new single section model for use in laboratory equipment. The sizes available are listed at the right.

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 pre-loaded worm gear with 20 to 1 ratio. Each rotor is individually insulated from the frame, and each has its own individual rotor contact, of the multi-fingered brush type. Stator insulation is Steatite.

The Micrometer dial is of a new type and reads direct to one part in 500. Division lines are approximately $\frac{1}{4}$ " apart. As is evident from the illustration above, the dial is read in the usual way. However, 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. As the illustration shows, the numbers rotate with the division lines at the top of the dial, and change rapidly at bottom of the dial where they are out of the operator's line of sight. As the dial has only two moving parts, both rotating, the dial is very smooth in operation and does not interfere with delicate tuning adjustment.

The dial and enclosed worm drive is listed separately, for use in driving transmitting condensers and similar equipment.

SPECIFICATIONS

PW Ganged Condensers are available in 2, 3 or 4 sections, in either 160 or 225 mmf per section. Larger capacities cannot be supplied. The single-section PW condenser is supplied in capacities of 150, 200, 350 and 500 mmf, single spaced. Capacities up to 125 mmf can be supplied double spaced. The rotor is not insulated on the single section model.

Plate shape is straight-line-frequency when the frequency range is 2:1.

Single Section

PW-1 List Price \$13.50

Two Section

PW-2 List Price \$17.00

Three Section

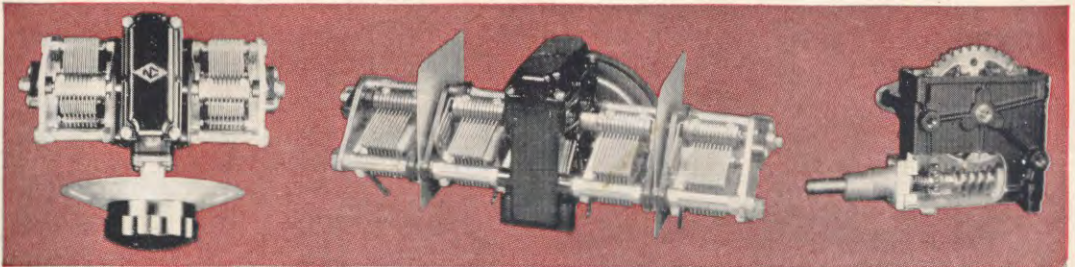
PW-3 List Price \$20.50

Four Section

PW-4 List Price \$24.00

Drive Unit with TX-9 Coupling

PW-0 List Price \$13.50



NATIONAL COMPANY, INC., MALDEN, MASS.

NATIONAL DIALS

"HRO" & "O" DIALS

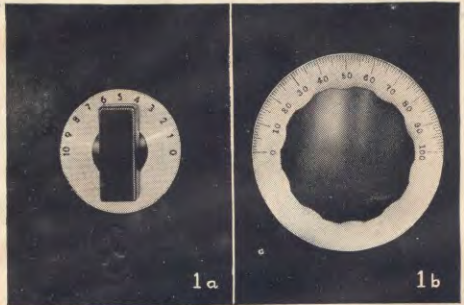
FIGS. 1a & 1b

The 1 5/8" dia. HRO dial (Fig. 1a) is etched nickel silver and fits 1/4" shafts. Reads from 0 to 10 over 180°, numbers increasing with clockwise rotation.

List Price, each \$.75

The insulated 3 1/2" dia. O dial (Fig. 1b) is circular-grained German Silver and fits 1/4" shafts. Available with 2 scale.

List Price, each \$ 1.50



"N" & "NW" DIALS

FIGS. 2 & 3

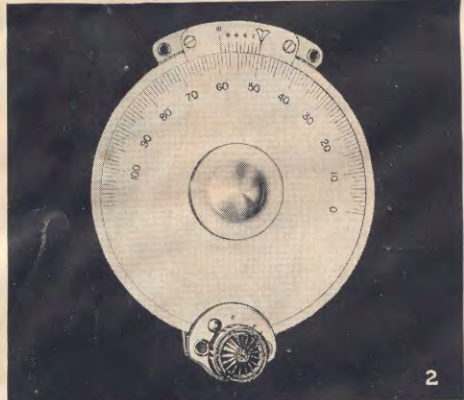
Precision Dials, Type N, have engine divided scales and verniers of solid German Silver. The Verniers are flush, eliminating errors from parallax.

The four-inch Type N dial (Fig. 3) employs a smooth and powerful planetary mechanism with a 5 to 1 ratio. It is available with either 2, 3, 4 or 5 scale.

List Price, each \$ 6.75

The six-inch Type NW dial (Fig. 2) has a variable ratio drive that is unusually powerful at all settings. It is recommended for use on large transmitters and precision instruments. Available with either 2, 3, 4 or 5 scale.

List Price, each \$ 15.00



"A" DIAL

FIG. 4

The original "Velvet Vernier" Dial, Type A, is still an unchallenged favorite for general purpose use. It is exceptionally smooth and entirely free from backlash. The mechanism is contained within the bakelite knob and shell. Ratio 5 to 1. Available with either 2, 4 or 5 scale in 4" diameter. Available with 2 scale in 3 3/8" diameter.

List Price, each \$ 3.00

"B", "BM", & "BX" DIALS

FIGS. 5, 6, 7

"Velvet Vernier" Dial, Type B (Fig. 7) provides a compact variable-ratio drive that is smooth and trouble free. The mechanism is inclosed in a black bakelite case, the dial being read through a window. Available with 1 or 5 scales.

List Price, each \$ 2.75

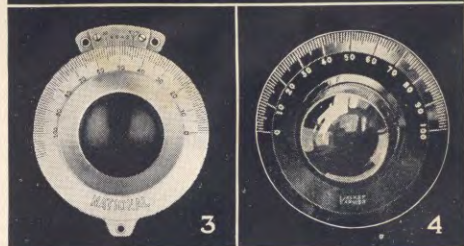
If illuminator is desired, add \$.50 to List Price.

The Type BX Dial (Fig. 6) is mechanically identical to the Type B Dial, but is equipped with an etched dial scale and vernier reading to 1/10 division. Available with 4 scale only.

List Price, each \$ 3.50

The Type BM Dial (Fig. 5) is a smaller version of the Type B Dial for use where space is limited. It is similar to the Type B Dial in appearance and mechanism, but does not have the variable-ratio device. Available with 1 or 5 scales.

List Price, each \$ 2.50

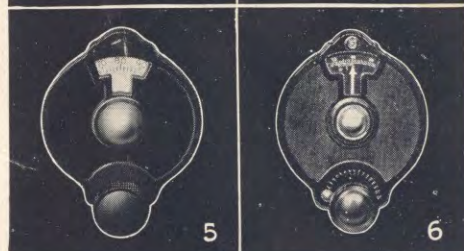


"H" DIAL

FIG. 8

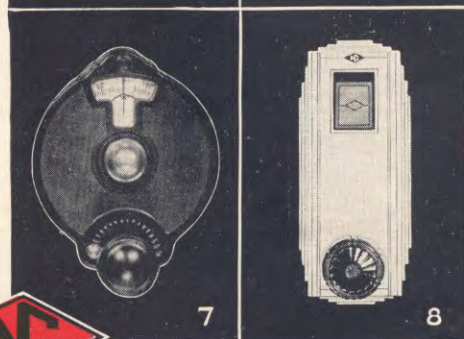
Projection Drum Dial, Type H, employs the proved and popular non-conducting cord drive with spring take-up. The dial scale is optically projected in illuminated figures on a ground-glass screen, considerably enlarged. Parallax is entirely absent. Condenser shaft must be parallel to panel. Available with either 2, 3 or 4 scale.

List Price, each \$ 5.50



DIAL SCALES

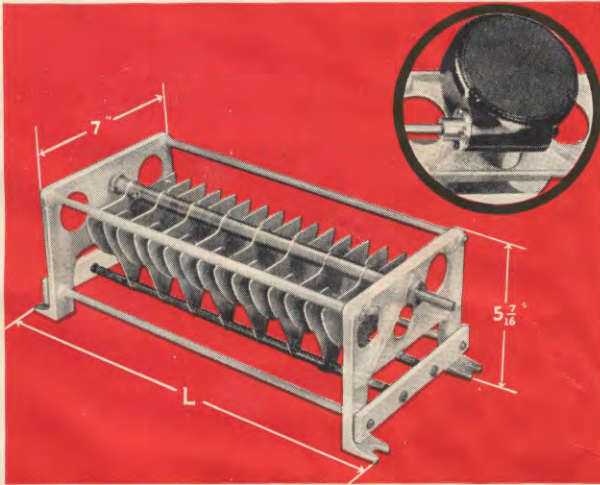
Scale Type	Divisions	Degrees Rotation	Direction of Condenser Rotation for increase of dial reading
1	0-100-0	180°	Either
2	0-100	180°	Counter Clockwise
3	100-0	180°	Clockwise
4	150-0	270°	Clockwise
5	200-0	360°	Clockwise
6	0-150	270°	Counter Clockwise



NATIONAL COMPANY, INC.



NATIONAL *Transmitting* CONDENSERS

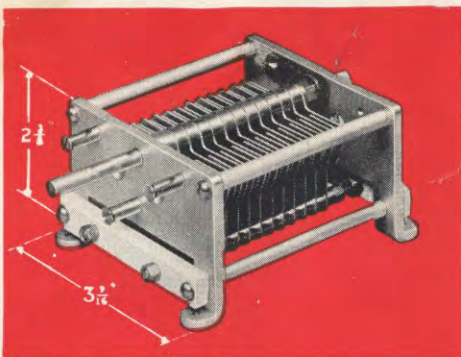


TML {Heavy Duty, Inexpensive}

The TML condenser is a 1 KW job throughout. Isolantite insulators, specially treated against moisture absorption, prevent flash-overs. A large self-cleaning rotor contact provides high current capacity. Thick capacitor plates, with accurately rounded and polished edges, provide high voltage ratings. Sturdy cast aluminum end frames and dural tie bars permit an unusually rigid structure. Precision end bearings insure smooth turning and permanent alignment of the rotor. End frames are arranged for panel, chassis or standoff mounting. And a PW-type self-locking right-angle drive unit can be easily added to provide precision tuning and convenient parallel-panel mounting.

Type PWL Drive Unit. **List Price, \$9.50 extra**

Capacity	Peak V.	Airgap	Length	Plates	Cat. Symbol	List Price
75 Mmf.	20,000	.719"	18 1/2"	17	TML-75E	\$23.50
150	15,000	.469"	18 1/2"	27	TML-150D	24.25
100	15,000	.469"	14 1/8"	19	TML-100D	21.50
50	15,000	.469"	8 3/4"	9	TML-50D	16.50
245	10,000	.344"	18 1/2"	35	TML-245B+	26.25
150	10,000	.344"	14 1/8"	21	TML-150B+	23.50
100	10,000	.344"	11 3/8"	15	TML-100B+	22.50
75	10,000	.344"	8 3/4"	11	TML-75B+	16.50
500	7,500	.219"	18 1/2"	49	TML-500A+	32.50
350	7,500	.219"	14 1/8"	33	TML-350A+	25.50
250	7,500	.219"	11 3/8"	25	TML-250A+	23.50
30-30	20,000	.719"	18 1/2"	7-7	TML-30DE	24.00
60-60	15,000	.469"	18 1/2"	11-11	TML-60DD	26.00
100-100	10,000	.344"	18 1/2"	15-15	TML-100DB+	28.50
50-50	10,000	.344"	14 1/8"	9-9	TML-50DB+	25.00
200-200	7,500	.219"	18 1/2"	21-21	TML-200DA+	32.50
100-100	7,500	.219"	11 3/8"	11-11	TML-100DA+	26.50



TMC {Moderate Power, Compact}

Also of new design, the 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 stand-off insulators. The plates are aluminum, with buffed edges. Insulation is Isolantite, located outside of the concentrated electrostatic field. The stator in the split stator model is supported at both ends.

Capacity	Peak V.	Airgap	Length	Plates	Cat. Symbol	List Price
50 Mmf.	3000	.077"	3"	7	TMC-50	\$4.00
100	3000	.077"	3 1/2"	13	TMC-100	4.25
150	3000	.077"	4 5/8"	21	TMC-150	4.75
300	3000	.077"	6 3/4"	39	TMC-300	5.50
100-100	3000	.077"	6 3/4"	13-13	TMC-100D	7.50



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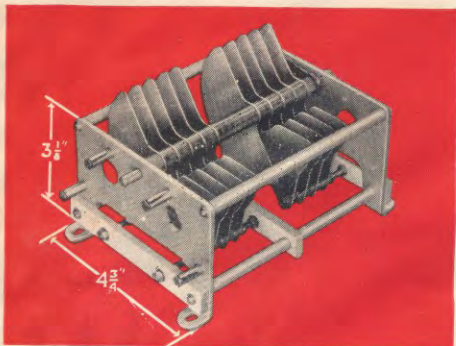
Only the most popular sizes of condensers, as carried in stock by our dealers, are listed above. Other sizes can be promptly supplied from standard parts on special order at the same price as the next largest size in the tables above.

A rotor shaft lock can be supplied for either the TMC or the TMA condensers. See page eleven for details.

NATIONAL *Transmitting* CONDENSERS

TMA {Heavy Duty}

Newly designed, the 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 Isolantite, located outside of the concentrated field.

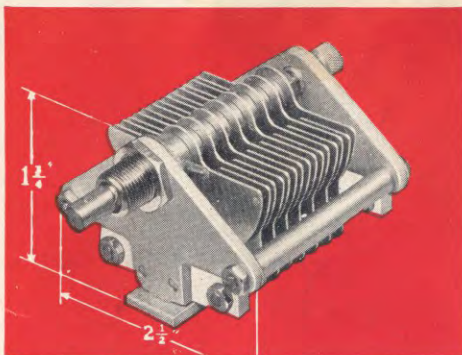


Capacity	Peak V	Airgap	Length	Plates	Cat. Symbol	List Price
300 Mmf.	3000	.077"	4 ⁹ / ₁₆ "	23	TMA-300	\$11.00
200-200	3000	.077"	6 ⁷ / ₈ "	16-16	TMA-200D	13.50
50	6000	.171"	4 ⁹ / ₁₆ "	8	TMA-50A	6.00
100	6000	.171"	6 ⁷ / ₈ "	17	TMA-100A	9.00
150	6000	.171"	6 ⁷ / ₈ "	23	TMA-150A	11.00
230	6000	.171"	9 ⁵ / ₁₆ "	35	TMA-230A	14.50
50-50	6000	.171"	6 ⁷ / ₈ "	9-9	TMA-50DA	10.00
100-100	6000	.171"	9 ⁵ / ₁₆ "	15-15	TMA-100DA	16.00
100	9000	.265"	9 ¹ / ₄ "	23	TMA-100B	12.00
150	9000	.265"	12 ¹ / ₂ "	35	TMA-150B	15.50
60-60	9000	.265"	12 ¹ / ₂ "	15-15	TMA-60DB	17.00
50	12000	.359"	7 ¹ / ₈ "	13	TMA-50C	7.25
100	12000	.359"	12 ⁷ / ₈ "	27	TMA-100C	13.00
40-40	12000	.359"	12 ⁷ / ₈ "	11-11	TMA-40DC	12.00

TMS {Low Power, Compact, Inexpensive}

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 Isolantite. Voltage ratings listed are conservative.



Capacity	Peak V.	Airgap	Length	Plates	Cat. Symbol	List Price
100 Mmf.	1000	.026"	2 ³ / ₄ "	10	TMS-100	\$2.25
150	1000	.026"	2 ³ / ₄ "	14	TMS-150	2.50
250	1000	.026"	2 ³ / ₄ "	23	TMS-250	2.75
300	1000	.026"	2 ³ / ₄ "	27	TMS-300	3.25
50-50	1000	.026"	2 ³ / ₄ "	5-5	TMS-50D	3.50
100-100	1000	.026"	2 ³ / ₄ "	9-9	TMS-100D	4.25
35	2000	.065"	2 ³ / ₄ "	8	TMSA-35	2.75
50	2000	.065"	2 ³ / ₄ "	11	TMSA-50	3.00

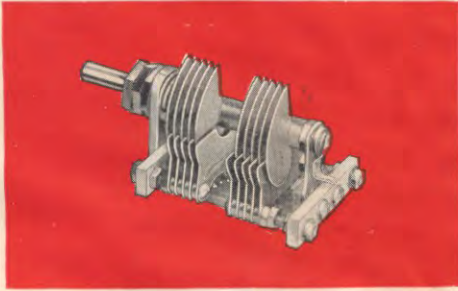
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A rotor shaft lock can be supplied for either the TMC or the TMA condensers. See page eleven for details.

NATIONAL *Receiving* CONDENSERS



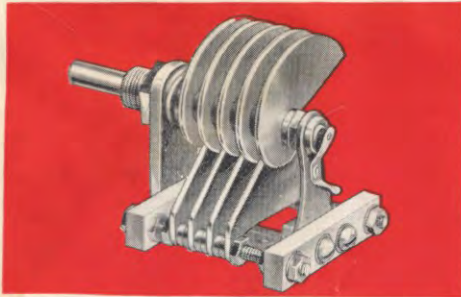
ST 180° Straight-Line-Wavelength

The ST Condenser has 180° Straight-Line-Wavelength plates. General construction is the same as the SE condenser although its overall height is less. For minimum overall length, a single bearing model—the STHS—is offered. All other models are double bearing. Two split-stator models are available.

Capacity	Air Gap	Plates	Length	Cat. Symbol	List Price
15	.018"	3	1 $\frac{3}{16}$ "	STHS 15	\$1.40
25	.018"	4	1 $\frac{3}{16}$ "	STHS 25	1.50
50	.018"	7	1 $\frac{3}{16}$ "	STHS 50	1.60
35	.026"	8	2 $\frac{1}{4}$ "	ST 35	1.50
50	.026"	11	2 $\frac{1}{4}$ "	ST 50	1.80
75	.026"	15	2 $\frac{1}{4}$ "	ST 75	2.00
100	.026"	20	2 $\frac{1}{4}$ "	ST 100	2.25
140	.026"	28	2 $\frac{3}{4}$ "	ST 140	2.50
150	.026"	29	2 $\frac{3}{4}$ "	ST 150	2.50
200	.018"	27	2 $\frac{1}{4}$ "	STH 200	2.75
250	.018"	32	2 $\frac{3}{4}$ "	STH 250	3.00
300	.018"	39	2 $\frac{3}{4}$ "	STH 300	3.25
335	.018"	43	2 $\frac{3}{4}$ "	STH 335	3.50
50-50	.026"	11-11	2 $\frac{3}{4}$ "	STD 50	3.50
100-100	.018"	14-14	2 $\frac{3}{4}$ "	STHD 100	4.50

SS 180° Straight-Line Capacity

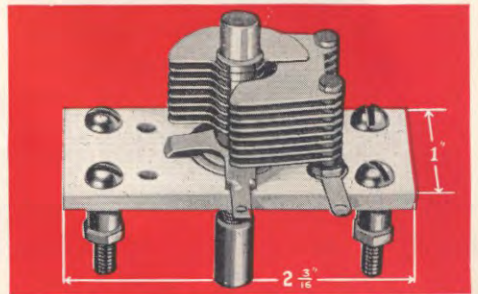
The SS Condenser has 180° Straight-Line-Capacity plates and except for this detail is the same in all other respects as the ST condenser. When ordering, substitute SS for ST under the catalog symbol column in the listing at the right.



Capacity	Air Gap	Plates	Length	Cat. Symbol	List Price
15	.055"	6	2 $\frac{1}{4}$ "	SEU 15	\$2.50
20	.055"	7	2 $\frac{1}{4}$ "	SEU 20	2.75
25	.055"	9	2 $\frac{1}{4}$ "	SEU 25	2.75
50	.026"	11	2 $\frac{1}{4}$ "	SE 50	3.00
75	.026"	15	2 $\frac{1}{4}$ "	SE 75	3.25
100	.026"	20	2 $\frac{1}{4}$ "	SE 100	3.50
150	.026"	29	2 $\frac{3}{4}$ "	SE 150	3.75
200	.018"	27	2 $\frac{1}{4}$ "	SEH 200	3.75
250	.018"	32	2 $\frac{3}{4}$ "	SEH 250	4.00
300	.018"	39	2 $\frac{3}{4}$ "	SEH 300	4.00
335	.018"	43	2 $\frac{3}{4}$ "	SEH 335	4.25

SE 270° Straight-Line-Frequency

The SE Condenser has 270° Straight-Line-Frequency plates. Insulation is Isolantite. All models have two rotor bearings, the front bearing being insulated to prevent noise. The rotor contact is through a constant impedance pigtail. The SEU models are suitable for high voltages as their plates are thick polished aluminum with rounded edges. The other SE models do not have this feature.



Capacity	Air Gap	Plates	Cat. Symbol	List Price
15 Mmf.	.017"	6	UM- 15	\$1.25
35	.017"	12	UM- 35	1.50
50	.017"	16	UM- 50	1.60
75	.017"	22	UM- 75	1.70
100	.017"	28	UM-100	1.90
25	.050"	14	UMA- 25	1.85
25	.017"	4-4-4	UMB- 25	1.85

UM (Ultra Midget)

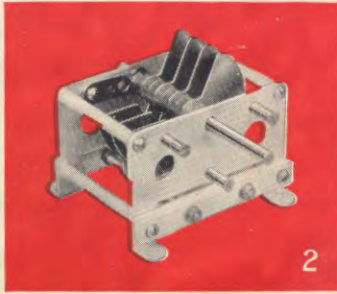
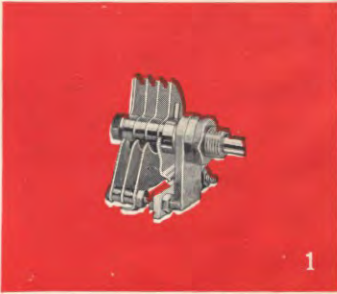
The UM Condenser is designed for ultra high frequency use and is small enough for convenient mounting in our square shield cans. They are particularly useful for tuning receivers, transmitters and exciters. Shaft extensions at each end of the rotor permit easy ganging when used with one of our flexible couplings. The UMB-25 Condenser is a balanced stator model, two stators act on a single rotor. The UM can be mounted by the angle foot supplied or by bolts and spacers, as illustrated.

NATIONAL COMPANY, INC., MALDEN, MASS.



If an extended shaft is wanted for ganging on either the ST or the SS Series of Condensers listed above, add the letter E to the standard catalog symbol. Prices are the same.

NATIONAL *Special Purpose* CONDENSERS



NEUTRALIZING CONDENSERS

STN (Fig. 1) A compact, rigid, and efficient condenser particularly suitable for neutralizing 245, 247, 210 and similar tubes in amplifier, buffer or doubler stages. Very low minimum capacity. Isolantite insulation. Maximum capacity 18 mmf. Peak voltage breakdown — 3000v. **List Price, \$2.00**

TCN (Fig. 2) A heavy duty neutralizing condenser having a peak voltage rating of 6000 volts. Suitable for use with 203A, 852, 204A and similar tubes. Maximum capacity 25 mmf. **List Price, \$3.50**

NC 800 (Fig. 3) A high voltage neutralizing condenser, suitable for use with the RCA-800. Insulation is Isolantite. For capacity-air gap relation see Figure 8. **List Price, \$3.00**

NC-150 (Fig. 6) A heavy duty condenser designed to neutralize such tubes as the HK 345, RK 36, 300 T and 852. The NC-500, a still larger condenser, is available for neutralizing the W.E. 251A and similar tubes. See Figure 8 for capacity-air gap relation.

Type NC-150
Type NC-500

List Price, \$6.00
List Price, \$10.00

GENERAL PURPOSE

EMC (Fig. 5) National EMC Condensers have high electrical efficiency, and calibrations may be relied on. Insulation is Isolantite, and Peak Voltage Rating is 1000 volts. Plate Shape is SLW.

Capacity	No. of Plates	Cat. Symbol	List Price
150	9	EMC 150	\$3.00
250	14	EMC 250	3.50
350	18	EMC 350	3.75
500	26	EMC 500	4.00
1000	56	EMC 1000	6.50

Split-Stator Models

350-350	18-18	EMCD-350	6.75
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PADDING CONDENSERS

National Air-Dielectric Padding Condensers (Fig. 4) are extremely compact and have a very low temperature coefficient. The aluminum shield is 1 1/4" diameter by 1 1/4"-1 1/2" high.

A very small mica Padding Condenser (Fig. 7) is also available, mounted on an Isolantite base and designed to be supported by the circuit wiring. The maximum capacity is 30 mmf., and the overall dimensions are 13/16" long x 9/16" wide x 1/2" high.

W 75 (75 Mmf. Air)

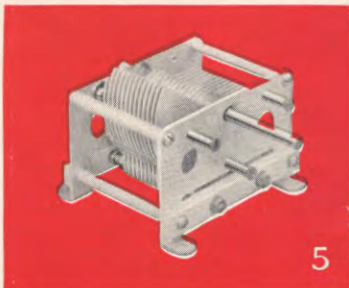
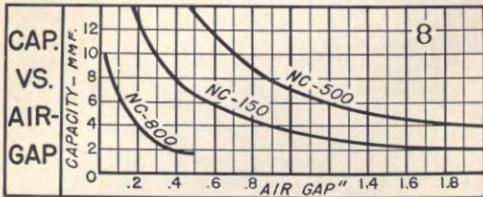
List Price, \$2.25

W 100 (100 Mmf. Air)

List Price, 2.50

M 30 (30 Mmf. Mica)

List Price, .30



NATIONAL COMPANY, INC., MALDEN, MASS.



PARTS

R.F. CHOKES

R-100. Isolantite mounting, continuous universal winding in four sections. For pigtail connections or standard resistor mountings. Inductance $2\frac{1}{2}$ m.h.; distributed capacity, 1 mmf.; D.C. resistance 50 ohms; Current rating, 125 M.A. For low powered transmitters and high frequency receivers.



List Price, \$.75



R-152, R-154, R-154U. These transmitter chokes have honeycomb coils (0.6 amps. rating) wound on Isolantite cores. The R-152 is designed for the 80 and 160 meter bands; inductance 4 m.h., D.C. resistance 10 ohms. The R-154 and R-154U give maximum impedance on the 20, 40 and 80 meter bands; inductance 1 m.h., D.C. resistance 6 ohms. The R-152 and R-154 are as illustrated. The R-154U does not have the small insulating pillar and the third mounting foot.

R-152 or R-154

List Price, \$2.25
List Price, 1.75

R-201. A two-section honeycomb-wound choke in R-39 case, suitable for output circuit of second detector in H.F. receivers (475 KC Intermediate Frequency). Inductance, approximately 12 m.h., D.C. resistance approximately 120 ohms.

List Price, \$1.25



TWIN DIODE TRANSFORMER

I.F.D. This transformer is designed for use in the new noise silencing circuits, and in detector and a.v.c. circuits where the secondary will be working into a diode detector tube. The primary is tuned by an air dielectric condenser with aluminum plates. The secondary is untuned, closely coupled, for push-pull output. The condenser and coils are mounted on an Isolantite base treated against moisture absorption.



I.F.D., 450-550 KC.

List Price, \$3.50

I.F. TRANSFORMER

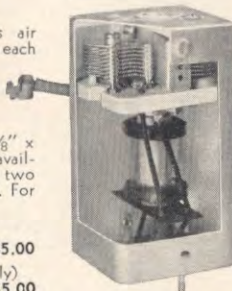
This new I.F. Transformer has air dielectric condensers (isolated from each other by an aluminum shield) and Litz wound coils mounted on an Isolantite base which is treated against moisture absorption. The aluminum shield can, housing the assembly, measures $4\frac{1}{8}$ " x $2\frac{3}{8}$ " x 2". These transformers are available with or without Iron Cores in two models 175 K.C. or 450-550 K.C. For Iron Core add \$.50 to list price.

Type IFC Transformer (air core)

List Price, \$5.00

Type IFCO Oscillator (air core only)

List Price, \$5.00



STANDARD CABINETS

The National Receiver Cabinets illustrated above, are for use in constructing special equipment. List Prices include sub-bases and bottom covers. Reading left to right:

Top Row	Width	Height	Depth	List Price
Type C-HWR	13 $\frac{1}{2}$ "	7"	7 $\frac{1}{4}$ "	\$5.00
Type C-FB7	11 $\frac{1}{2}$ "	8"	12"	7.00
Type C-SW3	9 $\frac{3}{4}$ "	7"	9"	5.50
Middle Row				
Type C-NC100	17 $\frac{1}{4}$ "	8 $\frac{3}{4}$ "	11 $\frac{1}{4}$ "	8.50
Type C-HRO	16 $\frac{3}{4}$ "	8 $\frac{3}{4}$ "	10"	8.50
Bottom Row				
Type C-One-Ten	11"	7"	7 $\frac{1}{4}$ "	4.50
Type C-PSK	6"	8"	12"	6.00
Type C-SRR	7 $\frac{1}{2}$ "	7"	7 $\frac{1}{2}$ "	3.50

TUBE AND COIL SHIELDS

The Aluminum Shields shown are from left to right:

Type	List Price
HRO coil shield, 2" x 2 $\frac{3}{8}$ " x 4 $\frac{1}{8}$ " high	\$.35
J30 coil shield, 2 $\frac{1}{2}$ " dia. x 3 $\frac{3}{4}$ " high	.35
B30 coil shield, 3" dia. x 3 $\frac{3}{4}$ " high	.50
B30 coil shield, with mounting base	.40
TS Tube Shield, with cap and mounting base	.40
T58 Tube Shield, with cap and mounting base	.40
T78 Tube Shield, with cap and mounting base	.40

The T58 and T78 fit such tubes as the 57, 58, 77, 78, etc.



CODE PRACTICE OSCILLATOR

This small audio oscillator is suitable for either code practice, or as an audio signal source for ICW on the Ultra High Frequency Bands.

A type 30 tube is used, and four flashlight cells in the case provide filament and plate current.

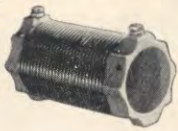
Type CPO, without batteries or tube. List Price, \$6.00



NATIONAL COMPANY, INC., MALDEN, MASS.



LOW-LOSS COIL FORMS



The transmitter coil forms listed below are low-loss ceramic coil forms designed for high efficiency and should not be confused with ordinary porcelain forms. A data sheet, supplied with each coil form, makes it extremely easy to

determine the correct wire turns to use on any of the amateur bands.

XR-10A, Low-Loss Ceramic, 20 or 40 meter.
List Price, \$1.50

XR-12A, Low-Loss Ceramic, 160 meter.
List Price, 2.25

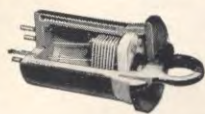
XR-13, Isolantite (1 3/4" dia. x 3 1/2" long).
List Price, 1.00

RECEIVER COIL FORM. These well-known R-39 forms are machinable, permitting the experimenter to groove and drill them to suit individual requirements. They are available in 4-, 5- and 6-prong types, and plug into the sockets shown on this page. Length, 2 1/4". Dia. 1 1/2". XR-4, XR-5, or XR-6. **List Price, \$.75**



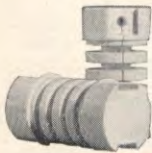
RECEIVER COIL FORM. Smaller in size than the R-39 forms listed above and made of Steatite, these forms are drilled for leads and left unglazed to provide a tooth for coil dope. They have 5 or 6 prongs.
Type XR-20. **List Price, \$.35**

PLUG-IN COIL FORMS. These R-39 coil forms, originally used in the FB-7, are designed for plugging-in through the front panel of a receiver, monitor, etc. A padding condenser mounts inside the coil, and a special bakelite sleeve protects the



winding. The coil shield listed is bolted to the back of the panel, and supports the Isolantite socket.

XR-39A Coil Form, Air Tuned. **List Price, \$4.75**
XR-39M Coil Form, Mica Tuned. **List Price, 3.65**
XCS Coil Shield and Socket. **List Price, 1.75**



COIL FORM. This Steatite Choke Coil Form is ideally suited for small choke coils and precision resistors. The winding is divided in four sections by partitions. A slot is provided for leading the wire from section, and to the terminals.
Type XT-8. **List Price, \$.50**

GRID GRIPS. This convenient little Grid-Grip is the most simple method of attaching a wire to the metal top-cap terminal of multi-element tubes. Easy to operate, never works loose, makes continuous electrical contact. Eliminates possibility of loosening cap on tube when removing lead. Made in three sizes.



Type 24 — to fit broadcast set tubes. **List Price, \$.05**
Type 12 — to fit large type tubes. **List Price, .10**
Type 8 — to fit metal tubes. **List Price, .05**



PLUG-IN BASE AND SHIELD

The low-loss R-39 base has prongs moulded in for easy plug-in mounting. This unit is ideal for mounting condensers and coils when it is desirable to have them shielded and easily removable from a circuit. Four mounting holes that match our UM condenser are provided. The Aluminum Shield can is 2" x 2 3/8" x 4 1/8". Two models are available.

Type PB-10 (either 5 or 6 prong). **List Price, \$.75**

COIL DOPE

National Coil Dope is a special Victron base R.F. lacquer prepared to give a low power factor. Used as a cement for holding windings in place, it does not spoil the low-loss properties of the coil form.
Per Can. **List Price, \$1.50**

VICTRON SHEET

The Loss Factor (0.2) of this non-hydroscopic material is 1/8 of "Low-Loss" rubber and 1/90 of the usual R.F. insulators. Its Power Factor is .06%-.08%. Ideal for mounting high frequency gear and it is readily drilled or sawed. In color it is a transparent amber.

12" x 6" x 3/16" thick sheet. **List Price, \$6.00**
12" x 6" x 1/8" thick sheet. **List Price, 5.00**
6" x 3" x 3/16" thick sheet. **List Price, 1.50**
6" x 3" x 1/8" thick sheet. **List Price, 1.25**

LOW FREQUENCY OSCILLATOR

COIL. Two separate inductances, closely coupled, in an aluminum shield. It is used in the SRR and other super-regenerative receivers for the interruption-frequency oscillator. Sec. Inductance 6.25 m.h. Tunes to 100 K.C. with .00041 Mfd.



Type OSR. **List Price, \$1.50**

MIDGET COIL FORM. Made of low-loss R-39, these small coil forms are designed with excellent form factor, contributing to high efficiency in H. F. circuits. Diameter, 1"; Length, 1 1/2"; Wall thickness, 1/16". They are available with 4 prongs, or plain.

Type XR-1, four prongs.
Type XR-2, without prongs.

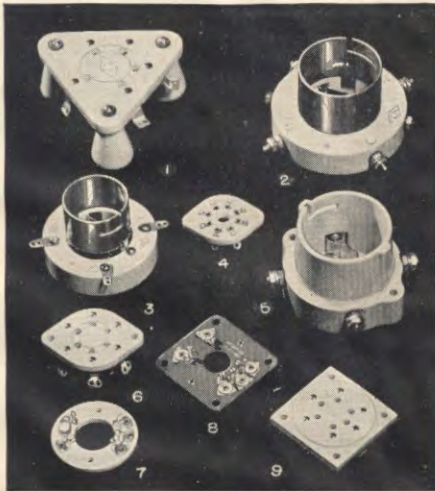


List Price, \$.50
List Price, .35

NATIONAL COMPANY, INC., MALDEN, MASS.



PARTS



LOW-LOSS SOCKETS

The sockets illustrated above will meet every amateur need.

1 is a wafer type Isolantite socket for power Pentodes such as the RK-28 and the RCA-803.

Type JX-100S, as illustrated. **List Price, \$3.60**
 Type JX-100, as above but without stand-off insulators. **List Price, \$3.00**

2 is a fifty watt socket with sturdy side wipe contacts and employs the conventional bayonet-lock metal shell.

Type XM-50. **List Price, \$1.75**

3 is a socket, similar in construction to the XM-50, designed for those tubes using the type UX base.

Type XM-10. **List Price, \$1.25**

4 is an Isolantite wafer socket for the Octal (metal) tubes.

Type 8 prong. **List Price, \$6.00**

5 is another 50 watt socket made entirely of low-loss Steatite and is for higher frequencies and voltages than the XM-50.

Type XC-50. **List Price, \$3.50**

6 is one of the complete line of National Isolantite Receiving Sockets that fit all standard receiving tubes. Types 4 prong, 5 prong, 6 prong, 7 prong — small, 7 prong — large. **List Price, \$.60 each**

7 is an Isolantite socket for the Triode Acorn tube. The socket contacts are of a new design providing very short leads and have a current path nearly independent of tube position.

Type XCA. **List Price, \$1.50**

8 is for the Pentode Acorn tube and is assembled, with the same type of contacts as the XCA, on a square copper base with built-in by-pass condensers for stable high frequency operation.

Type XMA. **List Price, \$1.50**

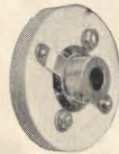
9 is a square Isolantite coil socket designed to fit National 6 pin coils. A wafer type socket, similar to figure 6, is also available to fit these same coil forms.

Type 6 prong Square Coil Socket

List Price, \$.75

Type 6 prong Wafer Coil Socket

List Price, .60



SHAFT COUPLINGS

The small coupling illustrated at the left has Steatite insulation, providing high electrical efficiency when used to isolate circuits.

Type TX-9. **List Price, \$1.00**

The small coupling illustrated at the right is well known and liked for its small size and freedom from backlash. Insulation is canvas bakelite.

Type TX-10. **List Price, \$.55**



FLEXIBLE SHAFT COUPLING



This flexible shaft, providing a driving means between offset shafts or shafts at angles up to 90 degrees, virtually eliminates mis-alignment problems. Available with either plain hubs or with Isolantite insulation. Hubs fit $\frac{1}{4}$ " shafts.

Type TX-11, hubs not insulated.
 Type TX-12, as illustrated.

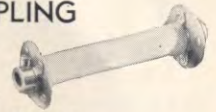
List Price, \$.60
List Price, 1.25

HIGH VOLTAGE COUPLING

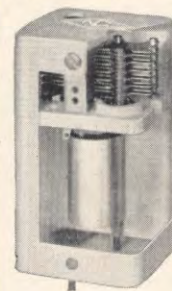
This coupling provides high insulation with compact size. The insulation is glazed Isolantite. TX-1 has a leakage path of 1", and TX-2 a leakage path of $2\frac{1}{2}$ ".

Type TX-1.
 Type TX-2.

List Price, \$1.00
List Price, 1.10



FIXED TUNED EXCITER TANK



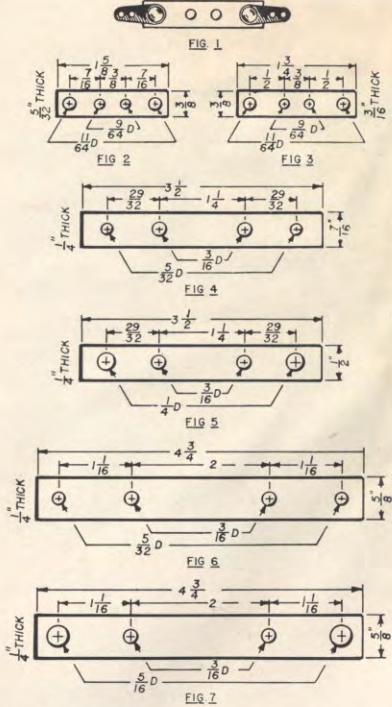
Mounted on the Isolantite base are two 25 mmf. condensers (2000 volts — isolated from each other by an aluminum shield) and an R-39 coil form ($1\frac{1}{2}$ " x 1" diameter). The assembly is enclosed in an aluminum can, 4" x $2\frac{3}{8}$ " x 2". This unit is also available with the Plug-In Base shown on page 9 which makes it ideal for conveniently and rapidly changing transmitting frequencies.

Type FXT without plug-in base. **List Price, \$4.50**

Type FXTB with plug-in base (either 5 or 6 prong). **List Price, \$4.90**

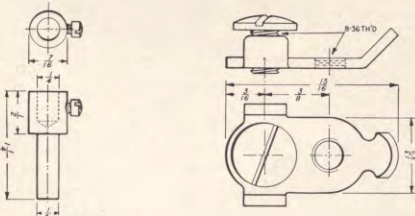


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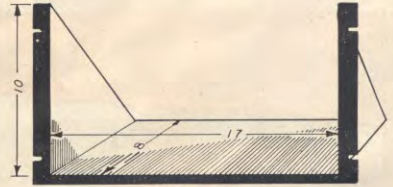


INSULATORS: A number of our standard condenser insulators are shown above. In addition to their obvious use as repair parts they may be used for a variety of other purposes such as supports for coils, spreaders, etc. The insulator shown in Fig. 1 is the same as Fig. 3, but has a metal solder lug riveted to each end. It is useful as a 5-meter lead-in spreader, or as a mounting for 5-meter inductances.

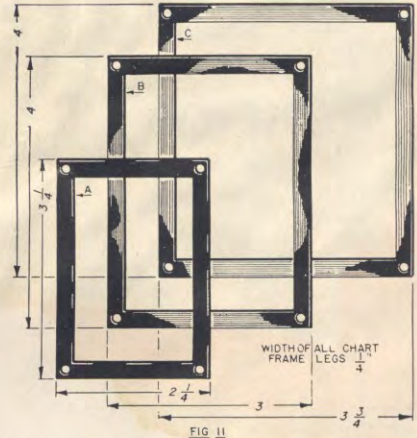
- | | | |
|------------------------------------|-------------------|--------------|
| Fig. 1. | List Price | \$.30 |
| Fig. 2. (Fits ST Condenser), each | | .15 |
| Fig. 3. (Fits SE Condenser), each | | .15 |
| Fig. 4. (Fits TMC Condenser), each | | .30 |
| Fig. 5. (Fits TMC Condenser), each | | .30 |
| Fig. 6. (Fits TMA Condenser), each | | .40 |
| Fig. 7. (Fits TMA Condenser), each | | .40 |



- | | | |
|-------------------------|-------------------|--------------|
| SHAFT EXTENSION. | List Price | \$.25 |
| SCREW LUG. | List Price | \$.15 |

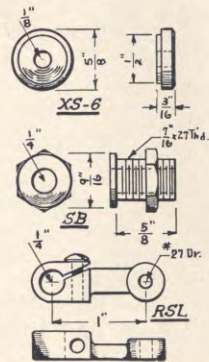


RELAY RACK SHELF: This recessed shelf will fit any standard relay rack, and is particularly useful for supporting portable equipment, instruments, test equipment, etc., Type RRS. **List Price \$4.00**



COIL CHART FRAMES: Nickel Silver Chart Frames are available in the sizes shown above. The largest frame is the same as that used on the AGS, the medium frame is the same size as that on the FB-7, and the smallest is the same as the HRO frame. Prices include celluloid sheet to protect the chart.

- | | |
|---------|--------------------------|
| Size A. | List Price, \$.50 |
| Size B. | List Price, .60 |
| Size C. | List Price, .70 |



H.F. BUSHING: This small Steatite bushing has many uses in Amateur equipment. Type XS-6 **List Price, \$.10**

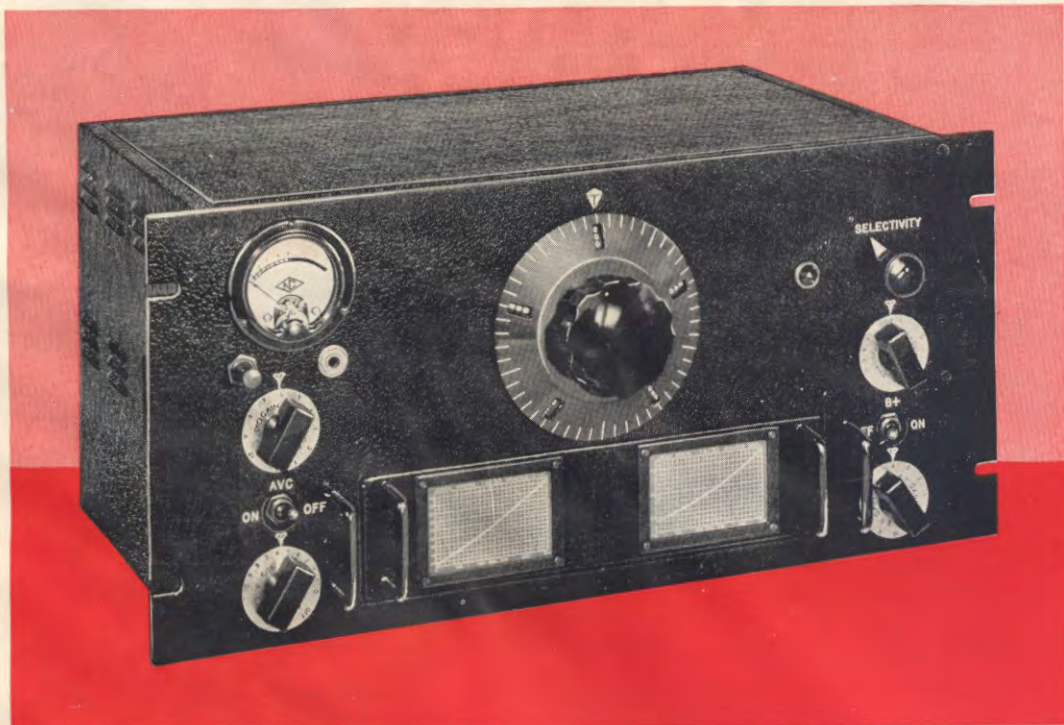
SHAFT BUSHING: A bushing that gives a professional touch to equipment where 1/4" shafts have to be brought through panels. Type SB **List Price, \$.25**

ROTOR SHAFT LOCK: This lock is designed to clamp securely either the TMA or the TMC rotor shafts. Type RSL **List Price, \$.85**

NATIONAL COMPANY, INC., MALDEN, MASS.



NATIONAL *High Frequency* RECEIVERS



STANDARD HRO RECEIVER

National has built into this receiver every feature the most advanced amateur requires.

The two preselector stages give remarkable image frequency suppression, weak signal response and high Signal-to-Noise Ratio. The two high gain I.F. stages employ Litz-wound coils and are tuned with air condensers. The useable sensitivity and selectivity are exceptional. Other circuit details are automatic and manual volume control, a vacuum tube voltmeter calibrated in "S" units for carrier intensities, a phone jack, a Send-Receive switch and a Lamb Single Signal crystal filter. This filter makes selectivity adjustable over a wide range and the circuits are so precisely balanced that heterodyning signals may be completely phased out.

Most notable among the mechanical details is the PW precision four-gang condenser, described in detail on page 2.

For best performance, a reliable speaker should be chosen with an input impedance of 7000 ohms. The Monitor speaker listed on page 17 is recommended or a similar speaker can be furnished in a cabinet to match the HRO at a list price of \$23.50.

OUTSTANDING FEATURES

- Nine Tubes, not including rectifier
- Single Signal (Crystal Filter)
- Ganged Plug-in-Coils, each coil shielded
- Strictly single control tuning
- Four gang PW condenser
- Micrometer Dial, tuning over 500 divisions
- "S" meter
- Two I.F. stages — Litz-wound coils, air condenser tuned
- Beat Frequency Oscillator for "Offset" C.W. Tuning
- Two Preselector Stages

STANDARD HRO Receiver, table model, complete with tubes and four sets of coils covering range 1.7 MC to 30 MC, but no speaker or power supply — 2½ volt A.C. or 6 volt battery model.

List Price, \$279.50

STANDARD HRO Receiver, relay rack model — 2½ volt A.C. or 6 volt battery model. **List Price, \$299.50**
Specify Grey or Black finish.

5897 AB Power Supply — less tube — for above receiver.

List Price, \$26.50

Shipping weights: Receiver 62 pounds, power supply 15 pounds.



NATIONAL COMPANY, INC., MALDEN, MASS.

NATIONAL *High Frequency* RECEIVERS

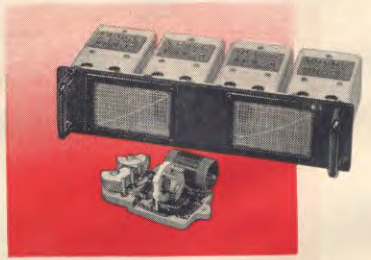
GANGED PLUG-IN COILS CALIBRATED BAND-SPREAD

The plug-in coils of the HRO are ganged for easy handling and individually shielded for stability. When these coils are used for general coverage, each of the 4 coils includes two amateur bands and the spectrum between. A simple switching device is provided which makes these same coils band-spread their respective amateur bands (except 160) over a span of 400 divisions on the dial. Each set of coils is accurately calibrated at the factory and the complete set of four coils, as supplied with each standard HRO, covers the range from 1.7 MC to 30 MC.

Additional sets of coils are available only as listed below.

100-200 KC
175-400 KC
500-1000 KC
900-2000 KC

List Price, \$30.00
List Price, 27.50
List Price, 20.00
List Price, 20.00



JUNIOR HRO RECEIVER

For those who require the high performance of the Standard HRO but do not need its extreme versatility, the HRO Junior is offered. The circuit and mechanical details of both receivers are identical in every respect, but the lower priced model has been greatly simplified by omitting the Lamb Single-Signal crystal filter, the "S" meter, and by designing coils for continuous band spread only.

Although these omissions do not greatly restrict its usefulness, they make it possible to price the HRO Junior at a very attractive figure.

HRO JUNIOR RECEIVER table model, complete with tubes and one set of coils, 10 to 20 meters (2 amateur bands) but no speaker or power supply — 2½ volt A.C. or 6 volt battery model.

List Price, \$165.00

Additional HRO Junior Coils (2 amateur bands per coil).

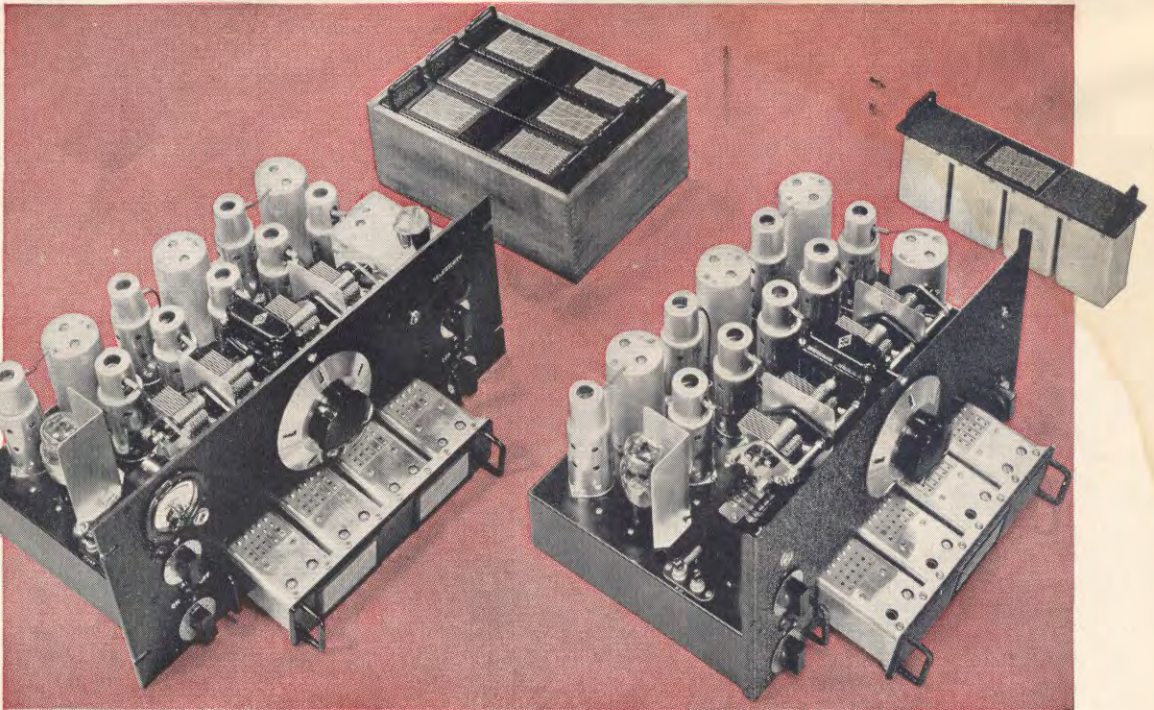
List Price, 16.50

5897 AB Power Supply — less tube — for above receiver.

List Price, 26.50

THE STANDARD HRO

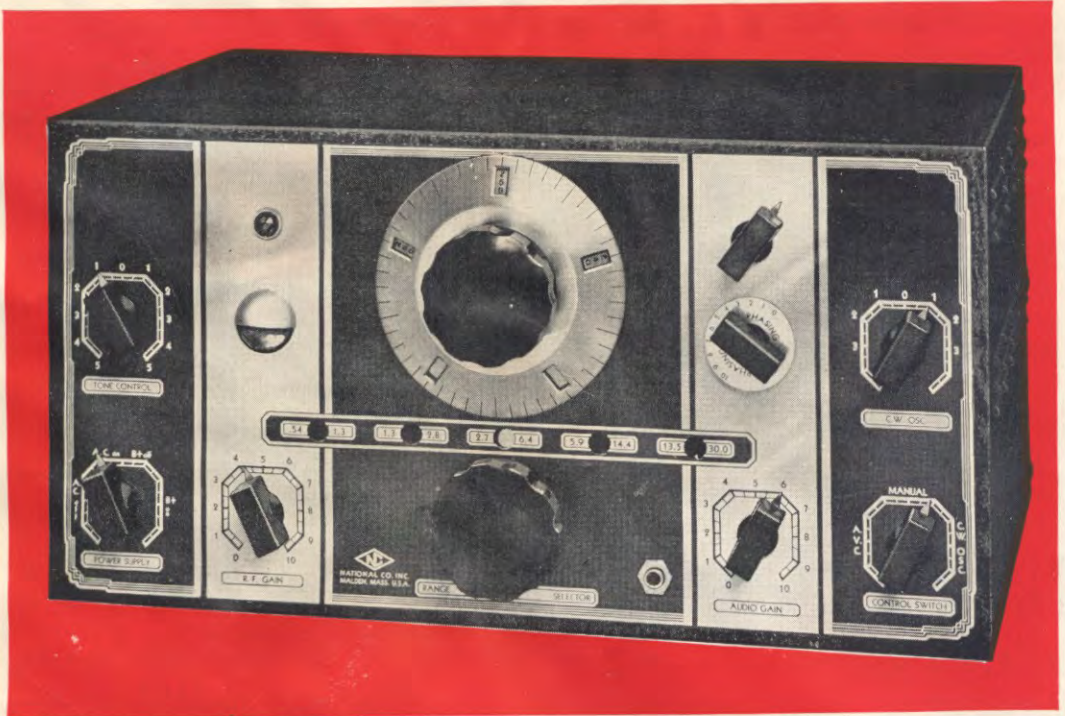
THE HRO JUNIOR



NATIONAL COMPANY, INC., MALDEN, MASS.



NATIONAL *High Frequency* RECEIVERS



NC-100 RECEIVER

This receiver is a 12 tube superheterodyne covering the range of 540 KC to 30 MC. Except for the speaker, the NC-100 is self-contained in a table model cabinet which is readily adaptable to relay rack mounting by brackets supplied at a slight additional charge.

One stage of R.F. and two stages of I.F. are used. Low-loss insulation and high-Q coils give ample sensitivity and selectivity. The crystal filter built into the NC-100 X models, has variable selectivity and phasing controls. Separate R.F. and Audio Gain Controls permit complete control of the receiver. A 6E5 tuning indicator tube, with provision for signal strength measurement, provides an added convenience. Other controls are Tone, C.W. Oscillator, AVC with amplified and delayed action, a B+ switch, and a Phone Jack. A self-contained power supply provides all necessary voltages including speaker field excitation.

The range changing system is unique in that it combines the mechanical convenience of a coil switch with the electrical efficiency of plug-in coils. The coils are, in effect, automatically plugged in. A twist

of the Range Selector Knob brings the desired set of coils into position and plugs them in. This mechanism is well supported by the PW Dial and Drive, direct reading to one part in 500. Station logging is consistent and calibration permanent.

NC-100 Receiver — complete with tubes, built in power supply and 10" dynamic speaker chassis.
List Price, \$188.33

NC-100 S Receiver — Same as above but with 12" Rola G12 High Fidelity Speaker.
List Price, \$210.83

NC-100 X Receiver — Same as NC-100 but with crystal filter and variable selectivity and phasing controls.
List Price, \$225.83

NC-100 XS Receiver — Same as NC-100 X but with 12" Rola G-12 High Fidelity Speaker.
List Price, \$248.33

DCS Metal Cabinet for 10" Speaker, same finish as receiver.
List Price, \$8.50

RRA Relay Rack Adapters, designed for mounting any of the NC-100 Receivers in a standard relay rack.
List Price, per pair, \$2.50



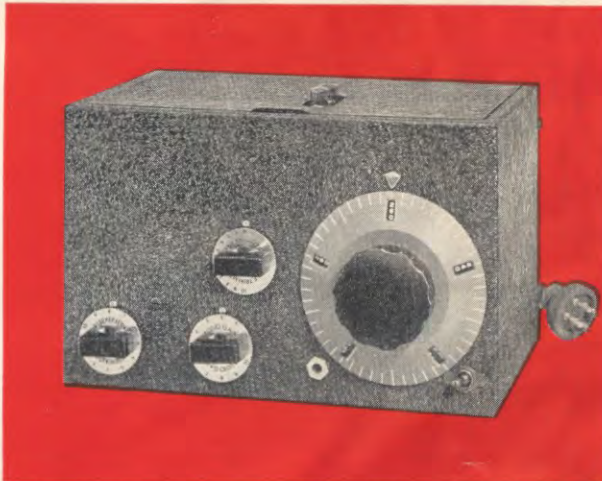
NATIONAL COMPANY, INC., MALDEN, MASS.

An engineering bulletin describing the above receivers in detail will be mailed on request.

PAGE FOURTEEN

NATIONAL *Ultra High Frequency* RECEIVERS

ONE-TEN RECEIVER



The One-Ten Receiver fulfills the need of the experimenter for an adequate receiver to cover the immense and ever more valuable field between one and ten meters. Designed chiefly for the experimenter, this receiver has been engineered for maximum sensitivity, high signal-to-noise ratio, a wide frequency range, ease of operation and with particular consideration for the characteristics of experimental high frequency transmitters.

A four tube circuit is used, composed of one tuned R.F. stage, a self-quenching super-regenerative detector, transformer coupled to a first stage of audio which is a resistance coupled to a power output stage. Six sets of plug-in coils are used. The popular PW-0 drive and dial are employed as the main tuning control. Three small dials control detector regeneration, audio gain and alignment of the R.F. circuit. A "B+" switch and

a head-phone jack are mounted on the front panel. Voltage dividers are built in, necessitating only one B voltage lead. The receiver is designed for operation from the National 5886 A B power unit. Batteries may be used if desired (Heater 6 volts, B supply 180 volts). Tubes required: 954-R.F.; 955-Detector; 6C5-1st Audio; 6F6-2nd Audio.

Tubes can be supplied at standard prices

Type 110 Receiver and 6 sets of coils, without tubes, speaker or power supply.

List Price, \$65.00

Type 5886 Power Supply for above receiver, less tube.

List Price, \$26.50

Shipping Weights: Receiver 16 lbs., Power Supply 17 lbs.

SW-3 High Frequency RECEIVER

The SW-3 Receivers employ a circuit consisting of one R.F. stage transformer coupled to a regenerative detector and one stage of impedance coupled audio. This circuit, as incorporated in the SW-3, with thorough shielding, grooved R-39 coil forms, Isolantite insulated condensers and tube sockets, etc., provides maximum sensitivity and flexibility with the smallest number of tubes and the least auxiliary equipment. The single tuning dial operates a precisely adjusted two gang condenser; the regeneration control is smooth and noiseless, with no backlash or fringe howl; the volume control is calibrated from one to nine in steps corresponding to the R scale, and is connected in the R.F. amplifier circuit; — the features all contribute to the efficiency and ease of operation so essential to equipment of this type.

The receiver especially suitable for installations where space is limited as in semi-portable or mobile stations, on yachts, etc.

Available in three models — ACSW-3 for AC operation — 6DCSW3 for 6 volt DC operation — 2DCSW3 for 2 volt DC operation. AC Models use "60" Series Coils. DC Models use "10" Series Coils.

Tubes required — 2 Volt AC Model; two 58, one 27 — 6 Volt DC Model; two 36, one 37 — 2 Volt DC; two 32, one 30.

SW-3, any model, without coils, phones, tubes or power supply.

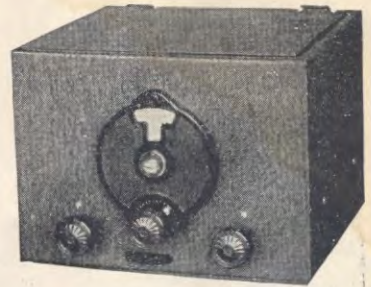
List Price, \$32.50

Shipping weight 17 pounds

5880-AB Power Supply, 115 V, 60 cycle, without 80 Rectifier.

List Price, \$26.50

Shipping weight 18 pounds



General Coverage Coils

Catalog Number	Range	List Price Per Pair
10 or 60	9. to 15. meters	\$5.00
11 or 61	13.5 to 25. meters	5.00
12 or 62	23. to 41. meters	5.00
13 or 63	40. to 70. meters	5.00
14 or 64	65. to 115. meters	5.00
15 or 65	115. to 200. meters	5.00
16 or 66	200. to 360. meters	5.50
17 or 67	350. to 550. meters	5.50

Five additional sets of coils are available to cover up to 3000 meters

Band Spread Coils

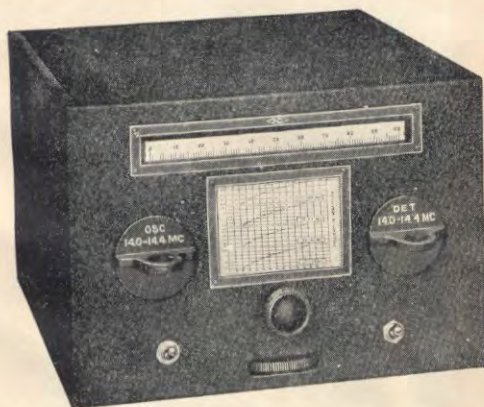
10A or 60A	— 10 meter band	\$5.00
11A or 61A	— 20 meter band	5.00
13A or 63A	— 40 meter band	5.00
14A or 64A	— 80 meter band	5.00
15A or 65A	— 160 meter band	5.00

NATIONAL COMPANY, INC., MALDEN, MASS.



NATIONAL High Frequency RECEIVERS

FB-7 Amateur RECEIVER



The FB-7 is a seven tube receiver having exceptional sensitivity, selectivity and stability. Ample sensitivity and selectivity are assured through the use of a circuit employing two stages of high-gain air-tuned I.F. amplification. There is no pulling-in or blocking by strong local signals, and frequency drift in both high frequency and beat oscillators has been virtually eliminated. Variation of the volume control has no appreciable effect on the pitch of C.W. signals, even at 14 mc.

A Single-Signal (crystal filter) unit is available, and may be added to the receiver at any time.

Every effort has been made to promote ease of operation. Tuning is strictly single-control, and calibration is permanent. The coils plug-in from the front of the panel without disturbing shielding. Tuning curves are mounted on the front panel. Switches for the C.W. oscillator, and for cutting B voltages during transmission are conveniently located. A phone jack is located in the second detector output circuit.

Tubes required. 2.5-volt type: one 56, one 57, two 58's, one 59, two 24's. 6-volt type: one 37, one 77, two 78's, one 89, two 36's. Power supply requires one type 80 rectifier.

FB-7-A, without coils, speaker, tubes or power supply. **List Price, \$62.50**

FBX-A, as above, but with single-signal (crystal filter) unit, without coils, speaker, tubes or power supply. **List Price, \$86.50**

Shipping weight 23 pounds

5897 AB Power Supply for 2-volt FB receivers, high voltage for maximum audio power, 115-volt, 60 cycles, less tube. **List Price, \$26.50**

Shipping weight 18 pounds

General Coverage Coils

Catalog Number	Range	List Price Per Pair
FBA	34 Mc to 18 Mc	\$10.00
FBA	19.5 Mc to 11.4 Mc	10.00
FBB	11.7 Mc to 7 Mc	10.00
FBC	7.3 Mc to 4 Mc	10.00
FBD	4.9 Mc to 2.4 Mc	10.00
FBE	2.5 Mc to 1.5 Mc	10.00
FBF	1.5 Mc to 0.9 Mc	10.00

Band Spread Coils

AB-10	— 10 meter band	\$12.00
AB-20	— 20 meter band	10.00
AB-40	— 40 meter band	10.00
AB-80	— 80 meter band	10.00
AB-160	— 160 meter band	10.00

HFC 56 MC CONVERTER

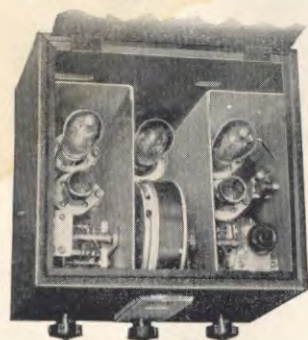
Type HFC Converter is designed for use on the 28 and 56 MC bands, which are spread over 90 dial divisions. A regenerative detector results in high gain and high conversion efficiency. This, and other features, result in exceptional weak signal response, greatly improve signal-to-noise ratio, and definitely eliminate image frequencies. Isolantite insulation is used throughout the HF circuits except the coil forms, which are moulded R-39.

The output of the first detector is coupled through a high gain I.F. Transformer to a low impedance output coupling tube which insures efficient signal transfer to the antenna circuit of the B.C. Receiver, which should be of the TRF Type. Tubes required: two 24's, one 27 or two 36, one 37.

135 Volts B supply is required, which may be obtained from B batteries or from any of the National Power Units. A filament supply of either 2½ Volts (AC) or 6 Volts (AC or DC) depending on tubes used, is also required.

Type HFC Converter, with both 28 and 56 MC Coils, but without tubes or power supply. **List Price, \$39.50**

Shipping weight 18 pounds



KNOB

This large, 2⅜" diameter, fluted knob is standard equipment on the NC-100. It fits ¼" shafts.

Type HRK

List Price, \$85



SCREEN GRID DETECTOR COUPLING UNIT. This impedance coupling unit, when employed to couple the output of a screen grid detector to an audio amplifier tube, will give from two to three times as much amplification as resistance coupling. Plate choke, 700 henries. Coupling condenser, .01 mfd. Grid leak, 250,000 ohms.

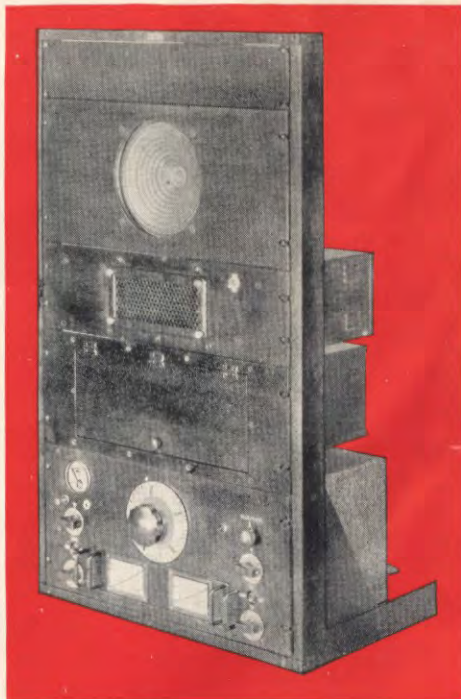
Type S-101

List Price, \$5.50

NATIONAL COMPANY, INC., MALDEN, MASS.



NATIONAL RELAY RACKS & POWER UNITS



RELAY RACK UNITS

At the left is illustrated a convenient Relay Rack assembly featuring the HRO. A brief description of the other units follows: (The units are described in order, starting at the bottom of the rack.)

1. The rack illustrated is the small National Bench-type rack, which will receive all standard panels up to its capacity, Type LRR. *Shipping wt. 28 lbs.* **List Price, \$22.50**

2. HRO Receiver, see pages 12 and 13.

3. Coil Rack. A convenient storage space for HRO coils, equipped with a hinged door. Type HCRP. *Shipping wt. approx. 15 lbs.* **List Price, \$27.50**

4. Rack mounted packs either single or double, and for either 2½ volt or 6 volt tubes.

Type GRSPU, single. *Shipping wt. 39 lbs.* **List Price, \$49.50**

Type GRDPU, double. *Shipping wt. 48 lbs.* **List Price, \$79.50**

5. This Monitor Speaker Panel employs a dynamic speaker of the permanent magnet type, requiring no power supply. The speaker is mounted on a standard panel (8¾" x 19") and is provided with an impedance matching transformer and connecting cord.

Monitor Speaker Panel, Type RFS. **List Price, \$30.00**

6. Blank Panels, finished in leatherette enamel and made of 3/16" aluminum are available at the following prices:

1¾" wide	List Price, \$3.25
3½" wide	List Price, 4.50
5¼" wide	List Price, 5.75
7" wide	List Price, 7.00
8¾" wide	List Price, 8.25
10½" wide	List Price, 9.50

STANDARD RELAY RACKS

This six foot rack, built to Government Specifications and drilled and tapped to receive standard panels of all sizes, is of steel, finished in black gloss Duco. Relay Rack, Type RR. **List Price, \$65.00**

POWER UNITS

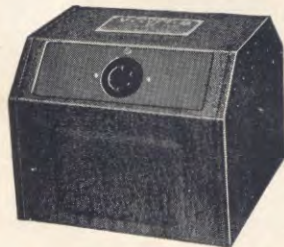
National Power Units have exceedingly low inherent hum, employing a double section filter using good quality chokes and ample condenser capacity. The power transformer has an electrostatic shield between the primary and other windings in order to isolate line disturbances. A special R.F. filter is a feature of all National Power Packs designed for short wave use, and is one of several factors contributing to the complete elimination of so-called "tunable hums" frequently encountered in short wave reception.

Power units for National Receivers are equipped with a receptacle for plugging in the power cable from the set and have filament windings specially wound to compensate for voltage drop in the power cable. Proper filament voltage is extremely important, and unless the above power supplies are used, filament voltage should be carefully checked at the socket terminals. For convenience these power supplies are listed with the receivers they are designed for. National also supplies a general purpose power unit. This unit provides four B voltages, the three intermediate taps being adjustable. Voltages are as follows: 22-45V for detector, 45-90V for R.F., 90-135V for A.F., and 180 Volts (35 M.A.) for power tube.

Type 3580, without 80 rectifier tube.

List Price, \$16.50

Shipping weight 17 pounds



NATIONAL COMPANY, INC., MALDEN, MASS.



PARTS

VARI-GAP CRYSTAL HOLDERS

This novel holder permits front-of-panel tuning of the crystal over a range of one part in 600 without loss in output. A controlled frequency range of 6 K.C. on the 80 meter band (and if doubling is used, 12 K.C. on the 40 meter band, 24 K.C. on the 20 meter band and etc.) can be expected of this holder when used with a 3550 K.C. Hollister special cut crystal.

The completely enclosed crystal holder is R-39 with 5 contact prongs molded in for handy plug-in socket mounting. All parts in contact with the crystal are chromium plated. A locking device is provided for fixed frequency operation. Altho not shown in the illustration, the holder is supplied with all parts necessary for front-of-panel control, including a six inch length of flexible shafting, connecting hubs, a 0-10 Dial and Knob, and a thru-panel bushing.

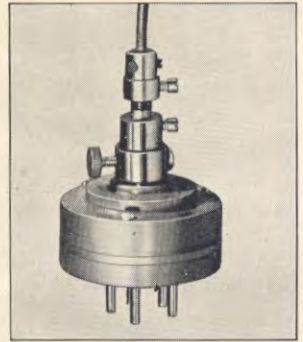
Only specially selected zero temperature coefficient crystals should be used for this application as some crystals will not oscillate satisfactorily under the conditions imposed. X and Y cut crystals cannot be used.

Type CHV (without crystal)

List Price, \$9.50

Type CHV (with 80 meter Hollister Crystal that will double into the 20 Meter Phone Band)

List Price, \$32.50



VERTICAL TYPE CRYSTAL HOLDERS

These holders mount the crystal in a vertical position and crystals may be changed readily. The metal cover is used for protection and shielding only. The holder body is R-39 with two prongs molded-in for easy plug-in mounting. The three models available are as follows:

Type CHR, Resonator type, for use in receivers.

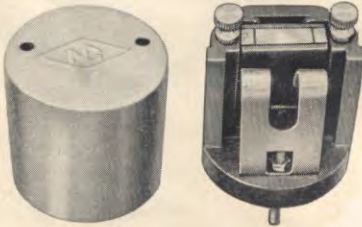
List Price, less crystal, \$2.50

Type CHS, Pressure-Constant Air Gap type, for use in transmitters.

List Price, less crystal, \$2.50

Type CHT, Pressure type (no air gap), for use in transmitters.

List Price, less crystal, \$2.50



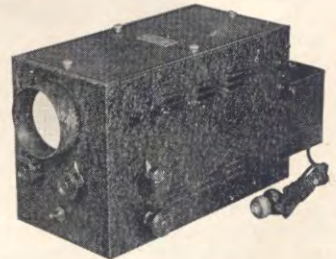
CATHODE RAY OSCILLOSCOPE

This Oscilloscope gives instantly a graphic picture of operating conditions in your transmitter, such as percentage modulation, signal distortion and peak voltage. The unit is self-contained, power supply and controls are built in. The tube used is the 3 inch diameter RCA-906. An audio signal from the transmitter is used for a linear sweep, as the trapezoid pattern thus obtained is more easily interpreted. The conventional linear sweep may be added at any time. However, a 60 cycle sweep is provided for use when direct connection to the transmitter is not desired. A bulletin describing the Oscilloscope in detail will be sent on request.

Type CRO, without tubes

List Price, \$29.50

Tubes required: one RCA-906, one 80. Shipping Weight 23 pounds.

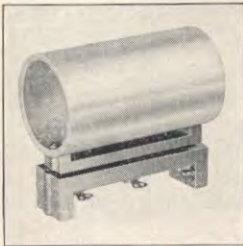


BUFFER COIL FORM AND SOCKET

At the left below is the Buffer Coil Form Assembly. The Isolantite Coil Form (drilled for leads) is 1 3/4" diameter x 3 1/2" long and may be used as shown or mounted on stand-offs. The upper right figure is the molded R-39 coil plug with five tube prongs for easy wiring and plug-in mounting, designed to be easily attached by two screws to the Coil Form. The Coil Plug may also be used as a base for air-wound plug-in coils, the tube prongs serving as coil anchoring points. The lower right figure is the molded R-39 Socket employing five sturdy side-wipe contacts, three on one side and two on the other for symmetrical wiring of the buffer circuit.

Type UR 13 Buffer Coil Form Assembly
Type XR 13 Coil Form only
Type PB 5 Plug only
Type XB 5 Socket only

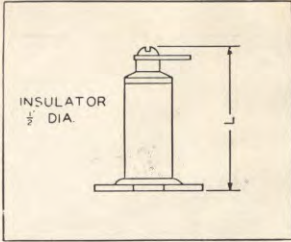
List Price, \$2.95
List Price, 1.00
List Price, .75
List Price, .75



NATIONAL COMPANY, INC., MALDEN, MASS.

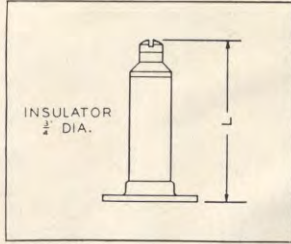
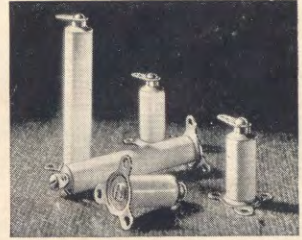


H. F. DIELECTRICS



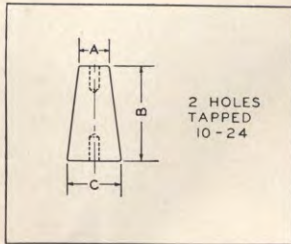
STAND-OFF INSULATOR. This well-known little insulator is now offered in two lengths. Long and slender, the larger model is shaped for extreme electrical efficiency. It is an excellent core for H.F. solenoid chokes. (Isolantite)

Type GS-1 (L = 1 $\frac{3}{8}$ ") . . . List Price, \$.25
 Type GS-2 (L = 2 $\frac{7}{8}$ ") . . . List Price, \$.35



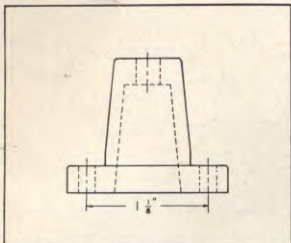
STAND-OFF INSULATOR. Metal mounted like the smaller units, these heavy Isolantite stand-offs combine electrical efficiency with strength and convenience. The insulator is $\frac{3}{4}$ " diameter and is available in two lengths.

Type GS-3 (L = 2 $\frac{7}{8}$ ") . . . List Price, \$.80
 Type GS-4 (L = 4 $\frac{7}{8}$ ") . . . List Price, \$1.00



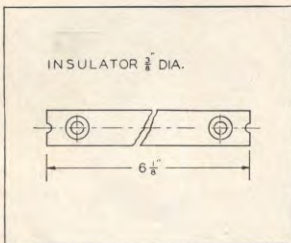
STAND-OFF INSULATOR. This popular style of insulator is offered in three sizes, all of low-loss Steatite. The smallest model is tapped 8-32 each end, the larger 10-24.

Type GS-5 (A = $\frac{1}{2}$ " , B = $1\frac{1}{4}$ " , C = 1") List Price, \$.25
 Type GS-6 (A = $\frac{5}{8}$ " , B = 2" , C = $1\frac{1}{8}$ ") List Price, \$.35
 Type GS-7 (A = $\frac{3}{4}$ " , B = 3" , C = $1\frac{1}{2}$ ") List Price, \$.65



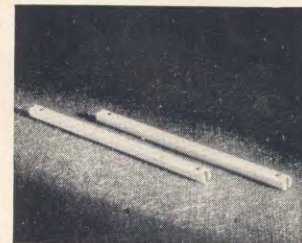
STAND-OFF INSULATOR. Another small insulator suitable for a variety of applications. Being made of Steatite, it is eminently suited for Low Loss H.F. circuits. It is available in a special model with a jack for mounting plug-in inductances.

GS-8 List Price, \$.25
 GS-9 (with jack) List Price, \$.35



SPREADER: The unusual efficiency of these Steatite spreaders will more than justify their slight extra cost. The six inch line spacing when used with No. 12 wire will give feeders having a surge impedance of 600 ohms.

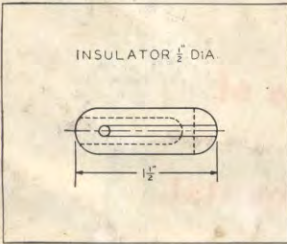
Type AA-3 List Price, \$.30



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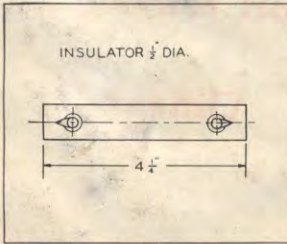
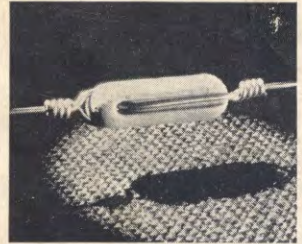


H. F. DIELECTRICS



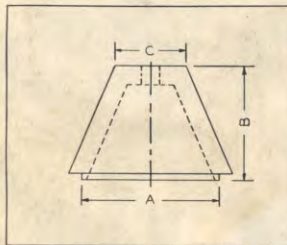
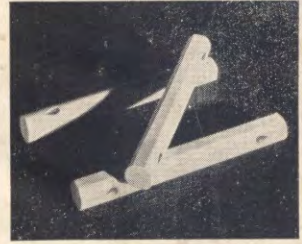
STRAIN INSULATOR. This aircraft-type insulator, in spite of its short leakage path, has a variety of uses in small portable, mobile and police installations. Being loaded in compression, the insulator provides great mechanical strength.

Type AA-5 List Price, \$.20



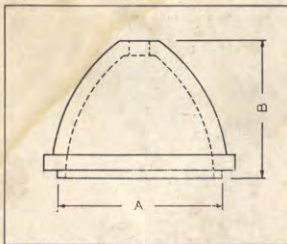
ANTENNA INSULATOR. This insulator is particularly suited for general use by the amateur. Its length provides ample leakage path, while its cross-section provides ample strength for all but the heaviest loads. The use of Steatite assures excellent electrical performance.

Type AA-6 List Price, \$.25



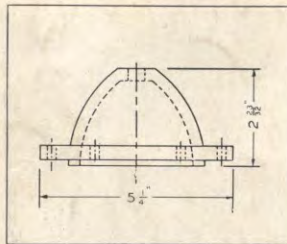
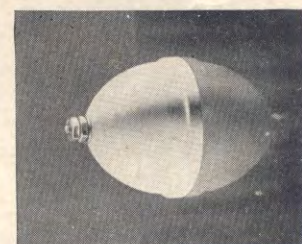
H.F. BUSHING. This small Steatite bushing has a variety of uses in transmitter construction, not only as a neat and efficient means of bringing H.F. leads through partitions, but as a support for coils, etc. Each pair of cones includes suitable metal fittings.

Type XS-1 (A = 1", B = 1 1/16")
per pair List Price, \$.60
Type XS-2 (A = 1 1/2", B = 1 3/16")
per pair List Price, \$.80



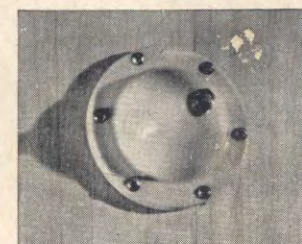
H.F. BUSHING. Larger in size than the bushings described above, and shaped to conform to the lines of electrical stress, these Steatite insulators are suitable for higher H.F. voltages. Prices are per pair, with metal fittings.

Type XS-3 (A = 2 3/4", B = 2 5/16")
List Price, \$ 3.30
Type XS-4 (A = 3 3/4", B = 2 25/32")
List Price, \$ 6.00



H.F. BUSHING. A heavy bowl-type lead-in, suitable for large transmitters, this Steatite insulator provides a weatherproof joint for antenna lead-in purposes. Leakage Path 3 1/4".

Type XS-5 each List Price, \$ 7.50
Type XS-5, with fittings, per pair
List Price, \$15.50



NATIONAL
61 SHERMAN STREET



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MALDEN, MASS.