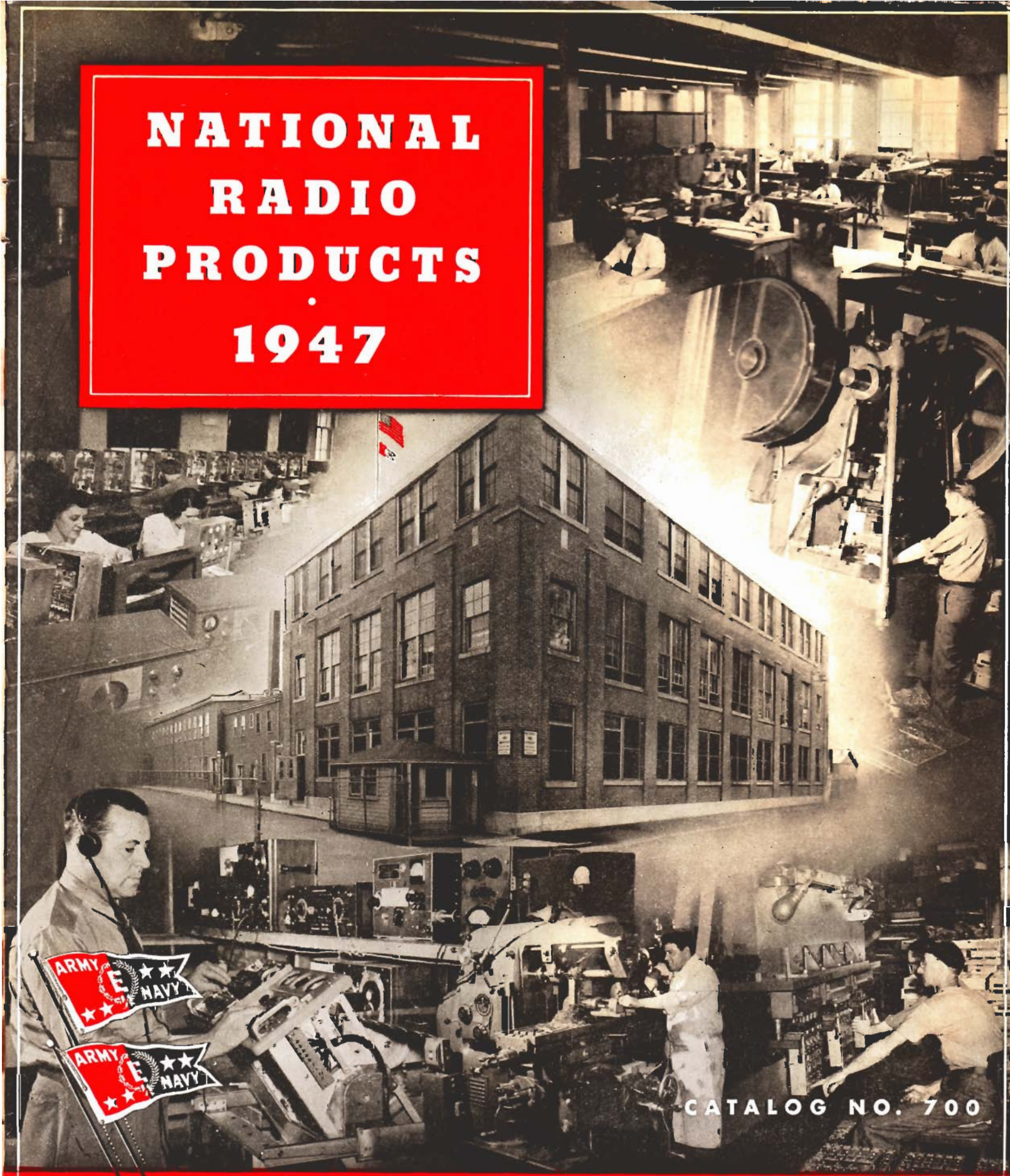
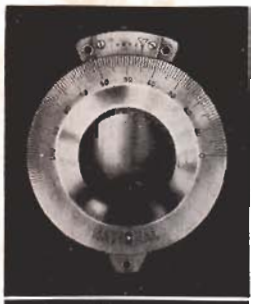
NATIONAL RADIO PRODUCTS 1947



CATALOG NO. 700

NATIONAL COMPANY, INC.

MALDEN, MASSACHUSETTS, U. S. A.



NATIONAL DIALS

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 ¼" shaft. **Specify scale.**

N Dial **List $**
AD Dial **List $**

"Velvet Vernier" Dial, Type B, has a compact variable ratio 6 to 1 minimum, 20 to 1 maximum drive that is smooth and trouble free. The case is black bakelite. 1 or 5 scale. 4" diam. Fits ¼" shaft. **Specify scale.**

B Dial **List $**

The original "Velvet Vernier" mechanism is now available in a metal skirted dial 3" in diameter. The planetary drive has a ratio of 5 to 1. It is available with 2, 3, 4, 5 or 6 scale and fits ¼" shaft.

AM Dial **List $**

The BM Dial is a smaller version of the B Dial (described in the opposite column) 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" diam. Fits ¼" shaft. **Specify Scale.**

BM Dial **List $**

INEXPENSIVE DIALS

TYPE R
List $
1⅝" Dia.

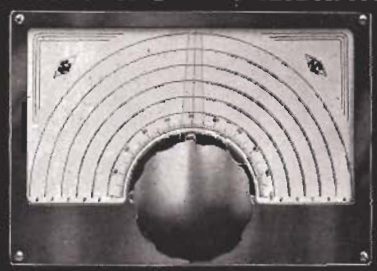
TYPE O
List $
3½" Dia.

TYPE K
List $
3½" Dia.

TYPE L
List $
5" Dia.

TYPE M
List $
5" Dia.

FOR INDIVIDUAL CALIBRATING



For experimenters who "build their own" and desire direct calibration. Fine for Freq. Monitors and VFO's

- **Dial bezel size 5" x 7¼"**
- **Five blank Ranges for direct calibration**
- **Employs Velvet Vernier Drive** ● **5 to 1 ratio**

TYPE ACN List $

R Dial scale 3 only but marked 10-0; O, K, L, M scale 2. All fit ¼" shafts.

KNOBS

HRK (Fits ¼" shaft) **List $**
Black bakelite knob 2⅜" diam.

HRP-P (Fits ¼" shaft) **List $**
Black bakelite knob 1¼" long and ½" wide. Equipped with pointer.

HRP List $
The Type HRP knob has no pointer, but is otherwise the same as the knob above.

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

The HRT is a new plastic tuning knob with a chrome plated appearance circle. The HRT knob fits a ¼" dia. shaft and is 2⅛" in dia. Black or Gray.

HRT Knob **List $**

The HRS Knobs are a new plastic knob with a 1⅜" dia. chrome plated skirt. HRS Knobs fit ¼" dia. shafts. Three types are available as follows: Black or Gray.

HRS-1 Knob ON-OFF through 30° rotation **List $**

HRS-2 Knob 5-0-5 through 180° rotation **List $**

HRS-3 Knob 0-10 through 300° rotation **List $**

ACCESSORIES

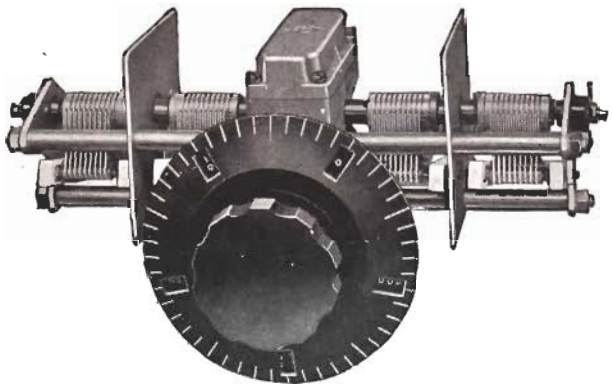
ODL **List $**
A locking device which clamps the rim of O, K, L and M Dials. Brass, nickel plated.

ODD **List $**
Vernier drive for O, K, L, M or other plain dials.

SB (Fits ¼" shaft) **List $**
A nickel plated brass bushing ½" diam.

RSL (Fits ¼" shaft) **List $**
Rotor Shaft Lock for TMA, TMC and similar condensers.

NATIONAL PRECISION CONDENSERS



The Micrometer dial reads direct to one part in 500. Division lines are approximately 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 mid-point 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.

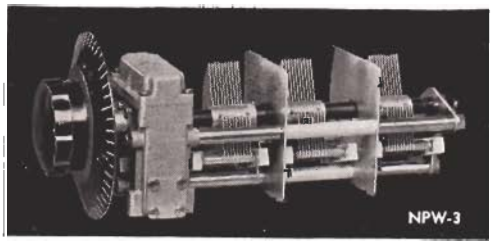
PW Condensers are available in 2, 3 or 4 sections, in either 160 or 225 mmf per section. Larger capacities cannot be supplied.

A single-section PW condenser with grounded rotor is supplied in capacities of 150, 200, 350 and 500 mmf, single spaced, and capacities up to 125 mmf, double spaced.

PW condensers are all with rotor shaft parallel to the panel.

PW-1R	Single section right	**List $**	**PW-3R**	Double section right; single left	**List $**
PW-1L	Single section left	**List $**	**PW-3L**	Double section left; single right	**List $**
PW-2R	Double section right	**List $**	**PW-4**	Double section each side	**List $**
PW-2L	Double section left	**List $**			
PW-2S	Single section each side	**List $**			

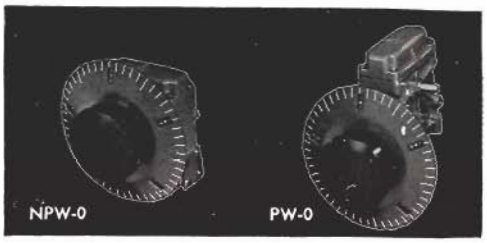
NPW MODEL with micrometer dial.



Similar to PW models, except that rotor shaft is perpendicular to panel.

NPW-3. Three sections, each 225 mmf. **List $**

GEAR DRIVE UNITS with micrometer dial



NPW-O **List $**

Uses parts similar to the NPW condenser. Drive shaft perpendicular to panel. One TX-9 coupling supplied.

PW-O **List $**

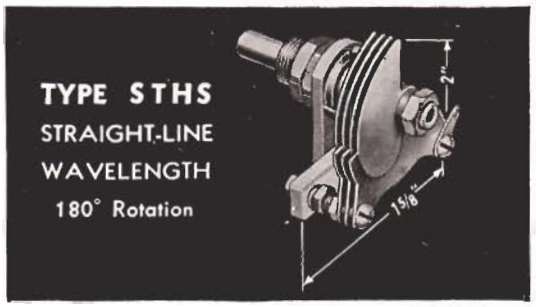
Uses parts similar to the PW condenser. Drive shaft parallel to panel. Two TX-9 couplings supplied.

MICROMETER DIAL

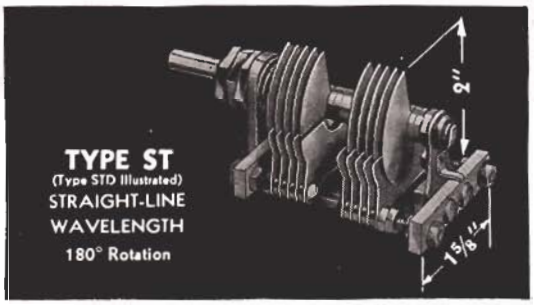
PW-D **List $**

Identical with the dials used on the condensers and drives above. 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 5/16" in diameter.

NATIONAL RECEIVING CONDENSERS

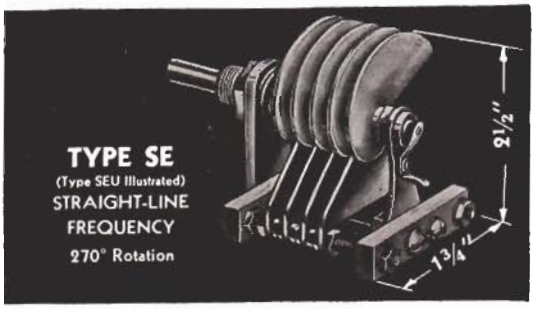


Capacity	Minimum Capacity	No. of Plates	Air Gap	Length	Catalog Symbol	List
SINGLE BEARING MODELS						
15 Mmf.	3 Mmf.	3	.018"	1 3/16"	STHS- 15	$
25	3.25	4	.018"	1 3/16"	STHS- 25	
50	3.5	7	.018"	1 3/16"	STHS- 50	
DOUBLE BEARING MODELS						
35 Mmf.	6 Mmf.	8	.026"	2 1/4"	ST- 35	$
50	7	11	.026"	2 1/4"	ST- 50	
75	8	15	.026"	2 1/4"	ST- 75	
100	9	20	.026"	2 1/4"	ST-100	
140	10	27	.026"	2 3/4"	ST-140	
150	10.5	29	.026"	2 3/4"	ST-150	
200	12.0	27	.018"	2 1/4"	STH-200	
250	13.5	32	.018"	2 3/4"	STH-250	
300	15.0	39	.018"	2 3/4"	STH-300	
335	17.0	43	.018"	2 3/4"	STH-335	
SPLIT STATOR DOUBLE BEARING MODELS						
50–50	5–5	11–11	.026"	2 3/4"	STD- 50	$
100–100	5.5–5.5	14–14	.018"	2 3/4"	STHD-100	



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.

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.



Capacity	Minimum Capacity	No. of Plates	Air Gap	Length	Catalog Symbol	List
15 Mmf.	7 Mmf.	6	.055"	2 1/4"	SEU- 15	$
20	7.5	7	.055"	2 1/4"	SEU- 20	
25	8	9	.055"	2 1/4"	SEU- 25	
50	9	11	.026"	2 1/4"	SE- 50	
75	10	15	.026"	2 1/4"	SE- 75	
100	11.5	20	.026"	2 1/4"	SE-100	
150	13	29	.026"	2 3/4"	SE-150	
200	12	27	.018"	2 1/4"	SEH-200	
250	14	32	.018"	2 3/4"	SEH-250	
300	16	39	.018"	2 3/4"	SEH-300	
335	17	43	.018"	2 3/4"	SEH-335	

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.

Capacity	Minimum Capacity	No. of Plates	Length	Catalog Symbol	List
150 Mmf.	9 Mmf.	9	2 15/16"	EMC-150	$
250	11	15	2 15/16"	EMC-250	
350	12	20	2 15/16"	EMC-350	
500	16	29	4 3/8"	EMC-500	
1000	22	58	6 3/4"	EMC-1000	

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.

NATIONAL MINIATURE CONDENSERS

PSR — See table —
Type PSR condensers are small, compact, low-loss units with silver plating on conducting parts. Their soldered construction makes them particularly suitable for applications where vibration is present. Adjustment is made with a screw driver. Steatite base.

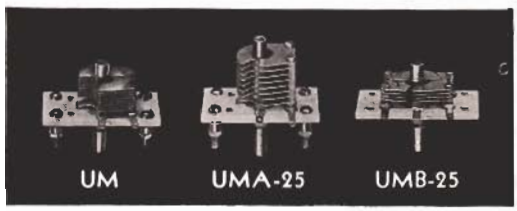
PSE — See table —
Type PSE condensers are similar to Type PSR, but are provided with a 1/4" diameter shaft extension at each end.

PSL — See table —
Type PSL condensers are similar to Type PSR, but are provided with a rotor shaft lock, so that the rotor can be clamped at any setting.

M-30 **List $**

Type M-30 is a small adjustable mica condenser with a maximum capacity of 30 mmf. Dimensions 13/16" x 9/16" x 1/2". Isolantite base.

W-75, 75 mmf. **List $**
W-100, 100 mmf. **List $**



Capacity	Catalog Symbol			List
25 mmf.	PSR-25	PSE-25	PSL-25	$
50	PSR-50	PSE-50	PSL-50	
75	PSR-75	PSE-75	PSL-75	
100	PSR-100	PSE-100	PSL-100	
140	PSR-140	PSE-140	PSL-140	

Capacity	Minimum Capacity	No. of Plates	Air Gap	Catalog Symbol	List
15 mmf.	1.5	6	.017"	UM-15	$
35	2.5	12	.017"	UM-35	
50	3	16	.017"	UM-50	
75	3.5	22	.017"	UM-75	
100	4.5	28	.017"	UM-100	
10	1	8	.042"	UM-10D	
25	3 4	14	.042"	UMA-25	
BALANCED STATOR MODEL					
25	2	4-4-4	.017"	UMB-25	$
50	5	8-8-8	.017"	UMB-50	

Small padding condensers having very low temperature coefficient. Mounted in an aluminum shield 1 1/4" in diameter. The **UM CONDENSER** is designed for ultra high frequency use and is small enough for convenient mounting in PB-10 and RO 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. See table for sizes.

Dimensions: Base 1" x 2 1/4", Mounting holes 5/8" x 1 3/4", Axial length 2 1/8" overall.

Plates: Straight line capacity, 180° rotation.

The UM-10D and UMA-25 condensers are double spaced versions of the UM condenser. The UMA-25 is assembled with nuts and bolts so that the capacity may be reduced if desired.

NATIONAL NEUTRALIZING CONDENSERS

NC-600U **List $**
With standoff insulator

NC-600 **List $**
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 **List $**

The Type STN has a maximum capacity of 18 mmf. (3000 V), making it suitable for such tubes as the 10 and 45. It is supplied with two standoff insulators.

NC-800A **List $**

The NC-800A disk-type neutralizing condenser is suitable for the RCA-800, 35T, HK-54 and similar tubes. It is equipped with a clamp to lock its setting. The chart below gives capacity and air gap for different settings.

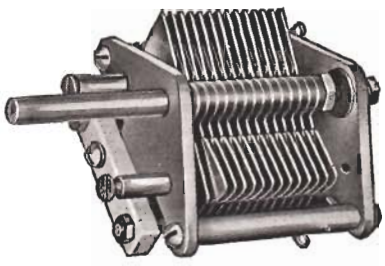
NC-75 **List $**
For 75T, 808, 811, 812 & similar tubes.

NC-150 **List $**
For HK354, RK36, 300T, 852, etc.

NC-500 **List $**
For WE-251, 450TH, 450TL, 750TL, etc.

These larger disk type neutralizing condensers are for the higher powered tubes. Disks are aluminum, insulation steatite.

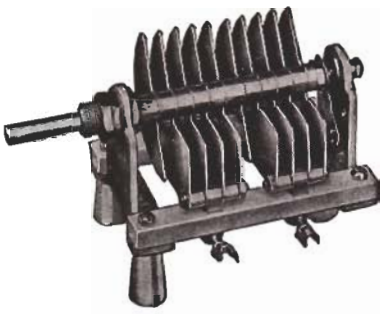
NATIONAL TRANSMITTING CONDENSERS



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	List Price
SINGLE STATOR MODELS							
100 Mmf.	9.5	3″	.026″	1000v.	9	**TMS-100**	
150	11	3″	.026″	1000v.	14	**TMS-150**	
250	13.5	3″	.026″	1000v.	22	**TMS-250**	
300	15	3″	.026″	1000v.	27	**TMS-300**	
35	8	3″	.065″	2000v.	7	**TMSA-35**	
50	11	3″	.065″	2000v.	11	**TMSA-50**	
DOUBLE STATOR MODELS							
50–50 Mmf.	6–6	3″	.026″	1000v.	5–5	**TMS-50D**	
100–100	7–7	3″	.026″	1000v.	9–9	**TMS-100D**	
50–50	10.5–10.5	3″	.065″	2000v.	11–11	**TMSA-50D**	



TYPE TMH

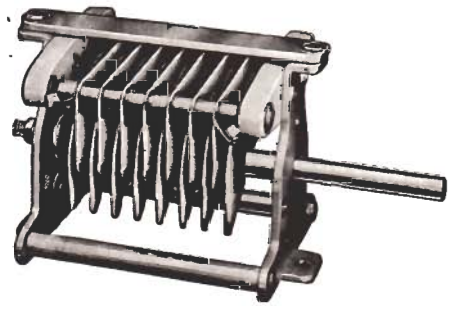
features very compact construction, excellent power factor, and aluminum plates .040″ thick with polished edges. It mounts on the panel or on removable stand-off insulators. Steatite insulators have long leakage path. Stand-offs included in listed price.

Capacity	Minimum Capacity	Length	Air Gap	Peak Voltage	No. of Plates	Catalog Symbol	List
SINGLE STATOR MODELS							
50 Mmf.	9	3¾″	.085″	3500v.	15	**TMH-50**	
75	11	3¾″	.085″	3500v.	19	**TMH-75**	
100	12.5	5⅛″	.085″	3500v.	25	**TMH-100**	
150	18	6½″	.085″	3500v.	37	**TMH-150**	
35	11	5⅛″	.180″	6500v.	17	**TMH-35A**	
DOUBLE STATOR MODELS							
35–35 Mmf.	6–6	3¾″	.085″	3500v.	9–9	**TMH-35D**	
50–50	8–8	5⅛″	.085″	3500v.	13–13	**TMH-50D**	
75–75	11–11	6½″	.085″	3500v.	19–19	**TMH-75D**	

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, (see page 10). For panel or stand-off mounting. steatite insulation.



Capacity	Minimum Capacity	Length	Air Gap	Peak Voltage	No. of Plates	Catalog Symbol	List Price
SINGLE STATOR MODELS							
35 Mmf.	7.5	2 7/32"	.047"	1500v.	7	TMK-35	
50	8	2 3/8"	.047"	1500v.	9	TMK-50	
75	9	2 11/16"	.047"	1500v.	13	TMK-75	
100	10	3"	.047"	1500v.	17	TMK-100	
150	10.5	3 5/8"	.047"	1500v.	25	TMK-150	
200	11	4 1/4"	.047"	1500v.	33	TMK-200	
250	11.5	4 7/8"	.047"	1500v.	41	TMK-250	
DOUBLE STATOR MODELS							
35–35 Mmf.	7.5–7.5	3"	.047"	1500v.	7–7	TMK-35D	
50–50	8–8	3 5/8"	.047"	1500v.	9–9	TMK-50D	
100–100	10–10	4 1/4"	.047"	1500v.	17–17	TMK-100D	
Swivel Mounting Hardware for AR 16 Coils						SMH	

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.

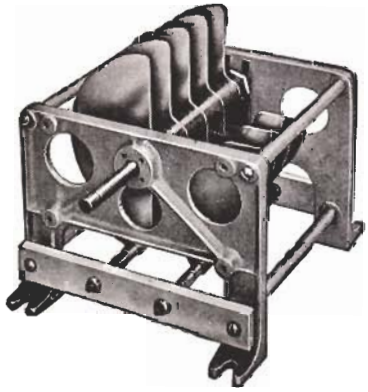
Capacity	Minimum Capacity	Length	Air Gap	Peak Voltage	No. of Plates	Catalog Symbol	List Price
SINGLE STATOR MODELS							
50 Mmf.	10	3"	.077"	3000v.	7	TMC-50	
100	13	3 1/2"	.077"	3000v.	13	TMC-100	
150	17	4 5/8"	.077"	3000v.	21	TMC-150	
250	23	6"	.077"	3000v.	32	TMC-250	
300	25	6 3/4"	.077"	3000v.	39	TMC-300	
DOUBLE STATOR MODELS							
50–50 Mmf.	9–9	4 5/8"	.077"	3000v.	7–7	TMC-50D	
100–100	11–11	6 3/4"	.077"	3000v.	13–13	TMC-100D	
200–200	18.5–18.5	9 1/4"	.077"	3000v.	25-25	TMC-200D	

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	List Price
SINGLE STATOR MODELS							
300 Mmf.	19.5	4 9/16"	.077"	3000v.	23	TMA-300	
50	15	4 9/16"	.171"	6000v.	7	TMA-50A	
100	19.5	6 7/8"	.171"	6000v.	15	TMA-100A	
150	22.5	6 7/8"	.171"	6000v.	21	TMA-150A	
230	33	9 5/16"	.171"	6000v.	33	TMA-230A	
100	30	9 1/4"	.265"	9000v.	23	TMA-100B	
150	40.5	12 1/2"	.265"	9000v.	33	TMA-150B	
50	21	7 1/8"	.359"	12000v.	13	TMA-50C	
100	37.5	12 7/8"	.359"	12000v.	25	TMA-100C	
DOUBLE STATOR MODELS							
200-200 Mmf.	15-15	6 7/8"	.077"	3000v.	16-16	TMA-200D	
180-180	10-10	12 3/4"	.140"	4000v.	24-24	TMA-180D	
50-50	12.5-12.5	6 7/8"	.155"	6000v.	8-8	TMA-50DA	
100-100	17-17	9 5/16"	.155"	6000v.	14-14	TMA-100DA	
60-60	19.5-19.5	12 1/2"	.249"	9000v.	15-15	TMA-60DB	
40-40	18-18	12 7/8"	.343"	12000v.	11-11	TMA-40DC	

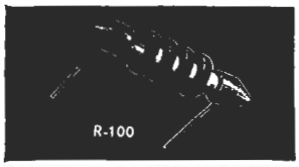


TYPE TML

condenser is a 1 KW job throughout. Steatite insulators, specially treated against moisture absorption, prevent flashovers. 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 stand-off mountings.

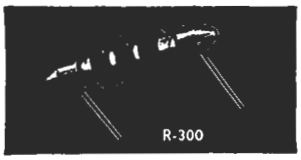
Capacity	Minimum Capacity	Length	Air Gap	Peak Voltage	No. of Plates	Catalog Symbol	List Price
SINGLE STATOR MODELS							
75 Mmf.	25	18 1/16"	.719"	20,000v.	17	TML-75E	
150	60	18 1/16"	.469"	15,000v.	27	TML-150D	
100	45	13 5/8"	.469"	15,000v.	19	TML-100D	
50	22	8 3/16"	.459"	15,000v.	9	TML-50D	
245	54	18 1/16"	.344"	10,000v.	35	TML-245B+	
150	45	13 5/8"	.344"	10,000v.	21	TML-150B+	
100	32	10 5/16"	.344"	10,000v.	15	TML-100B+	
75	23.5	8 3/16"	.344"	10,000v.	11	TML-75B+	
500	55	18 1/16"	.219"	7,500v.	49	TML-500A+	
350	45	13 5/8"	.219"	7,500v.	33	TML-350A+	
250	35	10 5/16"	.219"	7,500v.	25	TML-250A+	
DOUBLE STATOR MODELS							
30-30 Mmf.	12-12	18 1/16"	.719"	20,000v.	7-7	TML-30DE	
60-60	26-26	18 1/16"	.469"	15,000v.	11-11	TML-60DD	
100-100	27-27	18 1/16"	.344"	10,000v.	15-15	TML-100DB+	
60-60	20-20	13 5/8"	.344"	10,000v.	9-9	TML-60DB+	
200-200	30-30	18 1/16"	.219"	7,500v.	21-21	TML-200DA+	
100-100	17-17	10 5/16"	.219"	7,500v.	11-11	TML-100DA+	

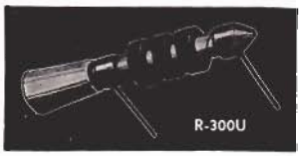
NATIONAL RF CHOKES



R-100 List $
R-100U List $
R-100S List $

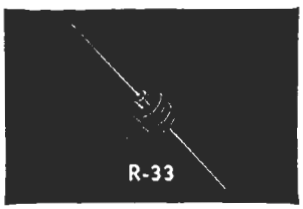
These RF chokes are identical electrically, but differ in mounting provisions. The R-100 employs pigtail leads; the R-100U has pigtail leads and a standoff insulator; the R-100S has cotter-pin lug terminals and a stand-off insulator. These chokes are available in 2.5, 5 and 10 millihenry sizes and are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





R-300 List $
R-300U List $
R-300S List $

RF chokes R-300, R-300U and R-300S 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 non-removable stand-off insulator and cotter-pin lug terminals. Inductance values of 0.5, 1.0, 2.5 and 5.0 millihenries are available with a current rating of 300 millamperes. R-300, R-300U and R-300S are identical electrically.



R-33 List $

The R-33 series chokes are 2-section RF chokes and available in 1, 10, 50, 100 and 750 microhenry sizes. They are rated at 33 milliamperes. The chokes are wound on a 5/8" long form and range in diameter up to 5/16" maximum diameter.

R-33G List $

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-152 List $

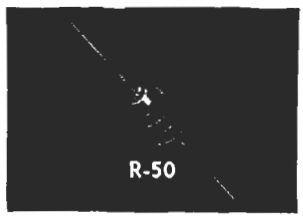
For the 80 and 160 meter bands. Inductance 4 m.h., DC resistance 10 ohms, DC current 600 ma. Coils honeycomb wound on Isolantite core.

R-154 List $
R-154U List $

For the 20, 40 and 80 meter bands. Inductance 1 m.h., DC resistance 6 ohms, DC current 600 ma. Coils honeycomb wound on Isolantite 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.

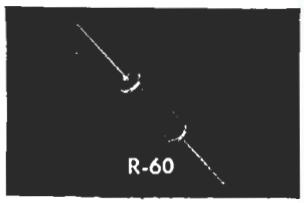
R-175 List $

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, 80 and 160 meter bands. Inductance 225 μh, distributed capacity 0.6 mmf., DC resistance 6 ohms, DC current 800 ma., voltage breakdown to base 12,500 volts.



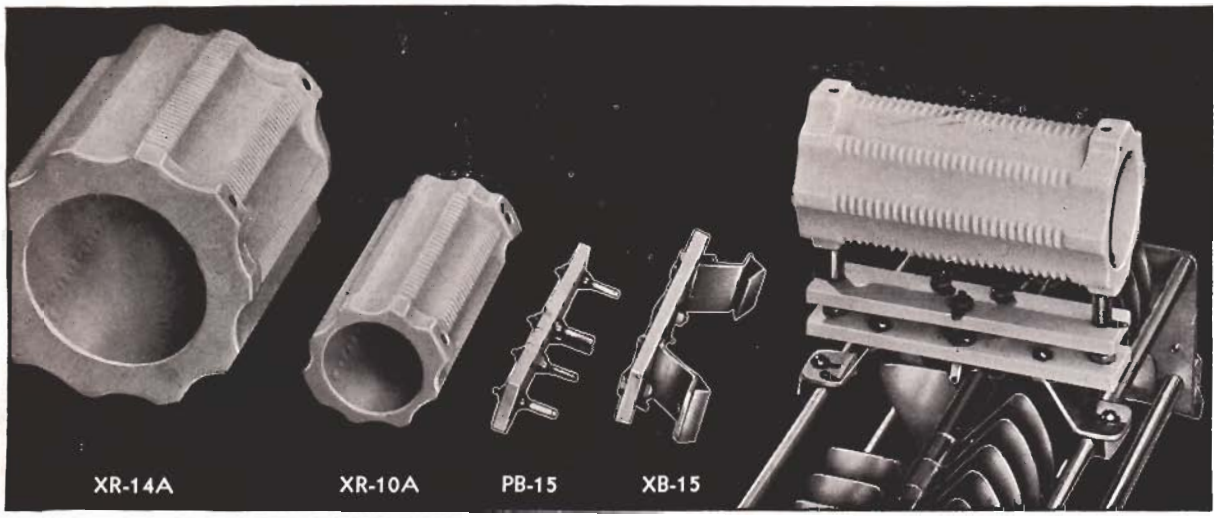
R-50 RF Choke List $

The R-50 series chokes are 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 15/16". The 10 millihenry R—50-1 choke is wound on an iron core.



R-60 RF Choke List $

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.



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, has a winding diameter of 5", a winding length of 3¾" (30 turns total) and is intended for the 80 meter band. The smaller form, Type XR-10A, has a winding length of 3¾" and a winding diameter of 2½" (26 turns total). It is intended for the 20 and 40 meter bands.

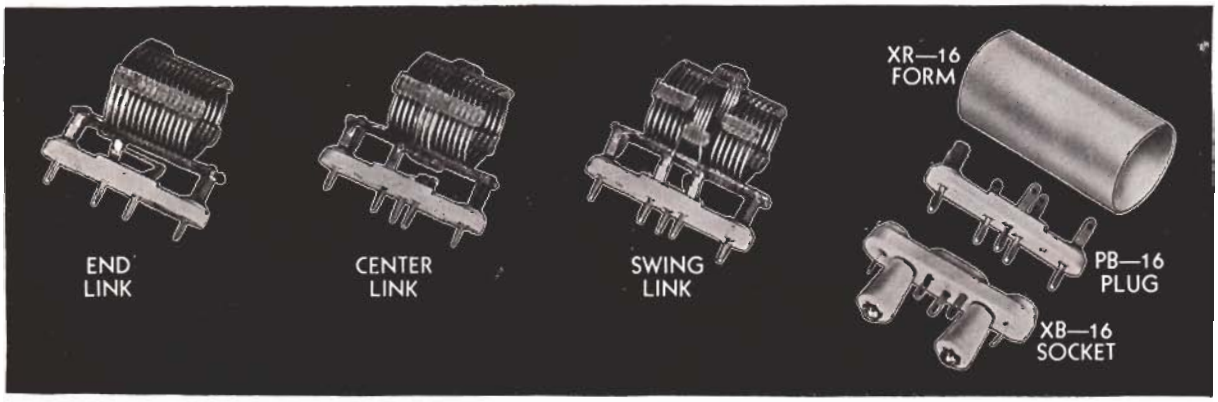
Either coil form fits the PB-15 plug. For higher frequencies, the plug may be used with a self-supporting coil of copper tubing. The XB-15 Socket may be mounted on breadboards or chassis, as well as on the TMA Condenser.

SINGLE UNITS

XR-10A, Coil Form only	**List $**
XR-14A, Coil Form only	**List $**
PB-15, Plug only	**List $**
XB-15, Socket only	**List $**

ASSEMBLIES

UR-10A, Assembly (Including small Coil Form, Plug and Socket)	**List $**
UR-14A, Assembly (Including large Coil Form, Plug and Socket)	**List $**



EXCITER COILS AND FORMS — TYPE AR-16 (Air Spaced)

These air-spaced coils are suitable for use in stages where the plate input does not exceed 50 watts and are available in the sizes tabulated below. Capacities listed will resonate the coils at the low frequency end of the band and include all stray circuit capacities. All have separate link coupling coils and all fit the PB-16 Plug and XB-16 Socket.

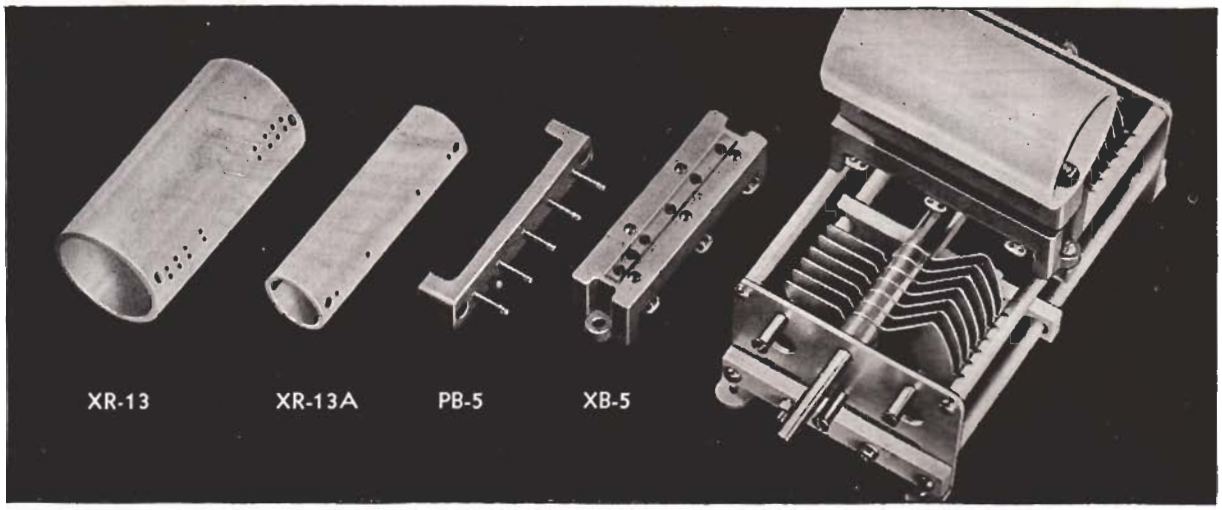
The XR-16 Coil Form also fits the PB-16 Plug and XB-16 Socket. It has a winding diameter of 1¼" and a winding length of 1¾".

Band	End Link	Cap Mmf	Center Link	Cap Mmf	Swinging Link	Cap Mmf
6 meter	AR16-6E	25	AR16-6C	25		
10 meter	AR16-10E	20	AR16-10C	20	AR16-10S	25
20 meter	AR16-20E	26	AR16-20C	26	AR16-20S	40
40 meter	AR16-40E	33	AR16-40C	33	AR16-40S	55
80 meter	AR16-80E	37	AR16-80C	37	AR16-80S	60
160 meter	AR16-160E	65	AR16-160C	65		

XR-16, Coil Form only **List $**
PB-16, Plug-in Base only **List $**
XB-16, Plug-in Socket only **List $**
AR-16, Coils — Any type (see table). Include PB-16 Plug as illustrated **Each, List $**

Exciter coil on TMK condenser

NATIONAL PARTS



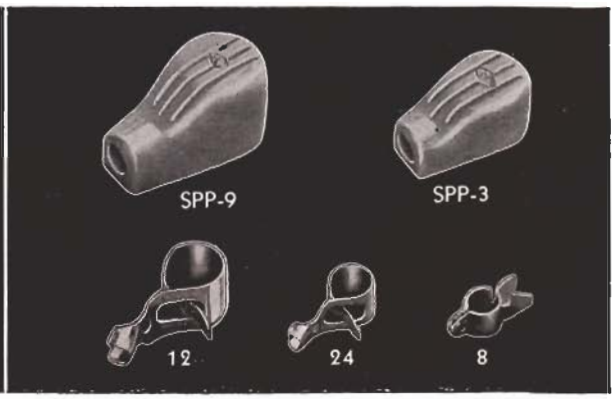
BUFFER COIL FORMS

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 Isolantite, left unglazed to provide a tooth for coil dope. The larger form, Type XR-13, is 1¾" in diameter and has a winding length of 2¾". The smaller form, Type XR-13A, is 1" in diameter and provides a winding length of 2¾". Both forms have holes for mounting and for leads.

SINGLE UNITS
XR-13, Coil Form only **List $**
XR-13A, Coil Form only **List $**
PB-5, Plug only **List $**
XB-5, Socket only **List $**

ASSEMBLIES
UR-13A, Assembly (including small Coil Form, Plug and Socket) **List $**
UR-13, Assembly (including large Coil Form, Plug and Socket) **List $**



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 **List $**
FXTB-5, with 5 prong base **List $**
FXTB-6, with 6 prong base **List $**

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 2⅜" x 4⅛".

PB-10-5, (5 Prong Base & Shield) **List $**
PB-10-6, (6 Prong Base & Shield) **List $**
PB-10A-5, (5 Prong Base only) **List $**
PB-10A-6, (6 Prong Base only) **List $**

SAFETY GRID AND PLATE CAPS

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

SPP-9 **List $**
Ceramic insulation. Fits 9/16" diameter.

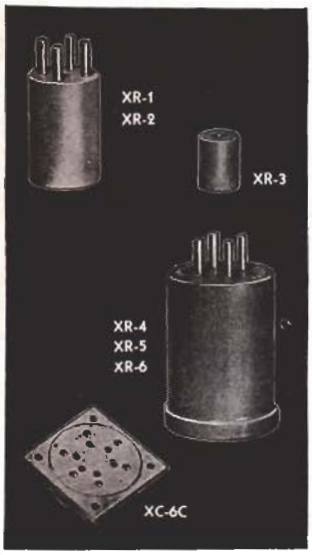
SPP-3 **List $**
Ceramic insulation. Fits ⅜" diameter.

GRID AND PLATE GRIPS

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.

Type 12, for 9/16" Caps **List $**
Type 24, for ⅜" Caps **List $**
Type 8, for ¼" Caps **List $**

NATIONAL PARTS



COIL FORMS

XR-1, Four prong, **List $**
XR-2, without prongs **List $**
Molded of R-39, permitting them to be grooved and drilled. Coil form diameter 1", length 1½".

XR-3 **List $**
Molded of R-39. Diameter 9/16", length ¾". Without prongs.

XR-4, Four prong, **List $**
XR-5, Five prong, **List $**
XR-6, Six prong, **List $**
Molded of R-39, permitting them to be grooved and drilled. Coil form diameter 1½", length 2¼". A special socket is required for the six-prong form.

XC6C, Special six-prong socket for XR-6 Coil Form, **List $**

COIL SHIELDS

RZ, coil shield **List $**
1⅜" square x 4" high.

RS, coil shield **List $**
1 1/16" x 1⅞" x 3½" high.

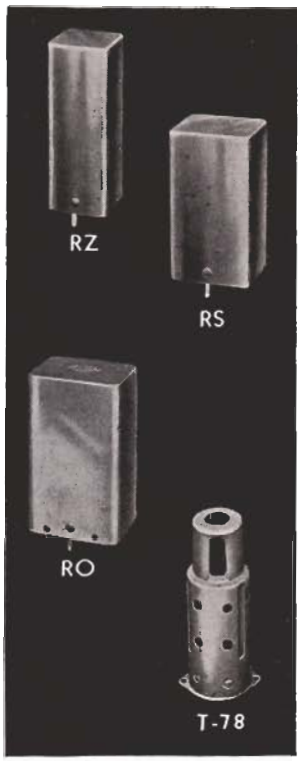
RO, coil shield **List $**
2" x 2⅜" x 4⅛" high.

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 **List $**

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.

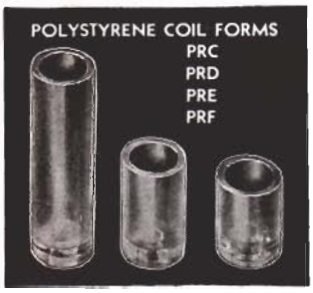


OSCILLATOR COIL

OSR **List $**
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.

JACK SHIELD

JS-1, Jack shield **List $**
For shielding small standard jacks mounted behind a panel, or on the ends of extension cords.



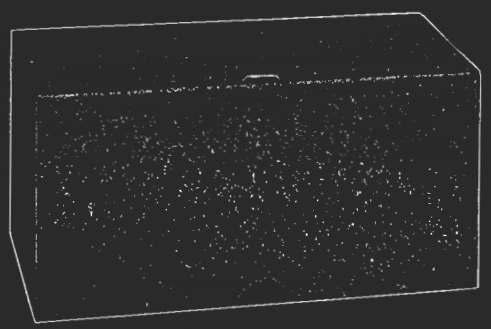
H. F. COIL FORMS

Symbol	Outside Diameter	Length	List
PRC-1	⅜"	⅜"	$
PRC-2	⅜"	½"	
PRC-3	⅜"	¾"	
PRD-1	½"	½"	
PRD-2	½"	1"	
PRE-1	9/16"	¾"	
PRE-2	9/16"	1"	
PRE-3	9/16"	2"	
PRF-1	¾"	¾"	
PRF-2	¾"	1¼"	

NATIONAL CABINETS

The National Cabinets listed below are the same as those used in National Receivers, except that they are supplied in blank form. They are made of heavy gauge steel, and the paint is unusually well bonded to the metal. Sub-bases and bottom covers are included in the price.

	Width	Height	Depth	List Price
Type C-SW3	9¾"	7"	9"	
Type C-NC100	17¼"	8¾"	11¼"	
Type C-HRO	16¾"	8¾"	10"	
Type C-One-Ten	11"	7"	7¼"	
Type C-SRR	7½"	7"	7½"	



NATIONAL CABINETS

NATIONAL PARTS

I. F. TRANSFORMERS

IFC, Transformer, air core
List $

IFCO, Oscillator, air core
List $

Air dielectric condensers isolated from each other by an aluminum shield. Litz wound coils on a moisture proofed ceramic base. Shield can 4½" x 2⅜" x 2". Available for either 175 KC or 450-550 KC. Specify frequency.

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.

IFJ, with variable coupling
List $

IFK, with fixed coupling
List $

IFL, IFM, IFN and IFO transformers operate at 10.7 Mc. and designed for use in AM or FM Superheterodyne receivers. The transformer cans are 1⅜" square and stand 3⅛" 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.

IFL FM Discriminator
List $

IFM IF Transformer **List $**

IFN IF Transformer **List $**

IFO FM Ratio Discriminator
List $

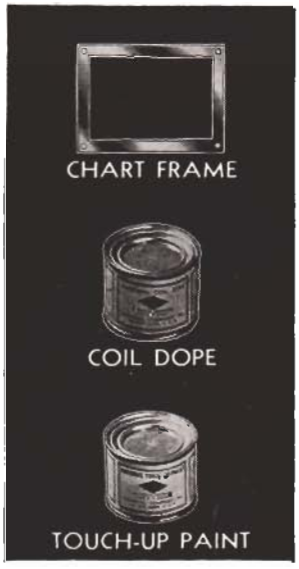


CHART FRAME

The National Chart Frame is blanked from one piece of metal, and includes a celluloid sheet to cover the chart. Size 2¼" x 3¼", with sides ¼" wide.

Type CFA **List $**

COIL DOPE

CD-1, ¼ pint can **List $**
Liquid Polystyrene Cement — is ideal for windings as it will not spoil the properties of the best coil form.

TOUCH-UP PAINT

A high quality air-drying paint that may be applied with a brush. It is especially suited to touching up places on radio equipment where the paint may have become marred through abrasion.

CP-1, gray **List $**
CP-2, black **List $**

SPEAKER CABINETS

NDC-8 for 8" speaker
List $

NDC-10 for 10" speaker
List $

NDC-2 for 10" speaker
List $

These metal speaker cabinets are acoustically correct. They are lined with acoustic felt, and are of welded construction to eliminate rattles. Finish is black wrinkle on NDC-8 and NDC-10. NDC-2 is finished in gray wrinkle to match the NC-2-40D receiver.

NATIONAL LOW-LOSS SOCKETS AND INSULATORS

XLA List $

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 List $

An internal shield fitting the XLA socket and suitable for tubes such as the 956.

XLA-C List $

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

XCA List $

A low-loss socket for acorn triodes.

XMA List $

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

XM-10 List $

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

XM-50 List $

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

JX-50 List $

Without Standoff Insulators

JX-51 List $

A low loss wafer socket for the 813 and other tubes having the Giant 7-pin base.

HX-100S List $

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.

GS-1, ½" x 1⅜" List $

GS-2, ½" x 2⅞" List $

GS-3, ¾" x 2⅞" List $

GS-4, ¾" x 4⅞" List $

GS-4A, ¾" x 6⅞" List $

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

GSJ, (not illustrated) List $

A special nickel plated jack top threaded to fit the ¾" diameter insulators GS-3, GS-4 & GS-4A.

GS-5, 1¼" List, each $

GS-6, 2" List, each $

GS-7, 3" List, each $

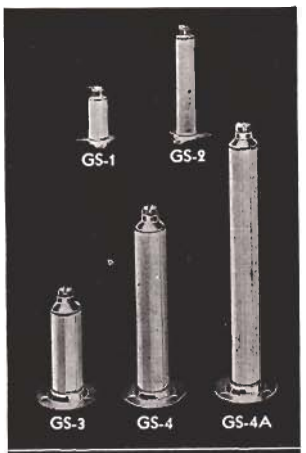
GS-10, ¾", package of 10 List $

These cone type standoff insulators are of low-loss steatite. They have a tapped hole at each end for mounting.

GS-8, with terminal List $

GS-9, with jack List $

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



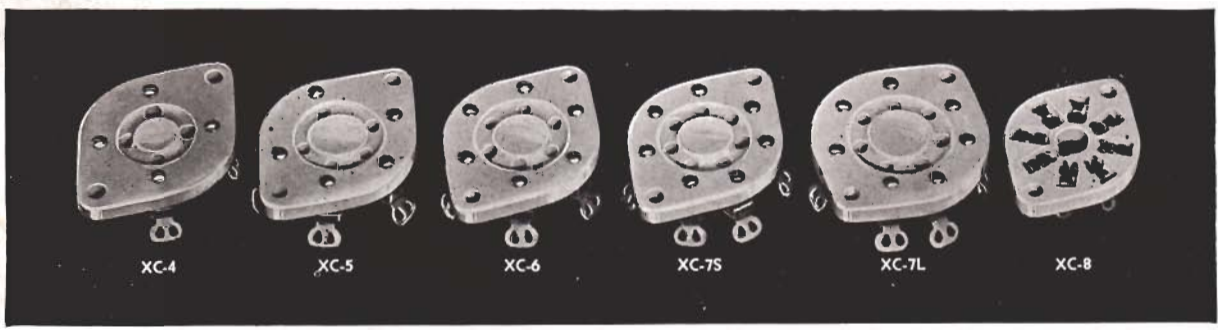
HX-29 List $

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

XC Series Sockets

XC-4	List $
XC-5	List $
XC-6	List $
XC-7S	List $
XC-7L	List $
XC-8	List $

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.



NATIONAL LOW-LOSS SOCKETS AND INSULATORS

FWG **List $**

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 **List $**

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 **List $**

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 **List $**

This molded R-39 plug has two banana plugs on ¾" centers and fits FWH or FWJ above. Leads may be brought out through the top or side.

FWA, Post **List, each $**
Brass Nickel Plated

FWE, Jack **List, each $**
Brass Nickel Plated

FWC, Insulator **List, per pair $**
R-39 Insulation

FWB, Insulator **List, each $**
Polystyrene insulation

CIR Series Sockets

Any Type **List $**

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.

AA-3 **List $**

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

AA-5 **List $**

A low-loss steatite aircraft-type strain insulator.

AA-6 **List $**

A general purpose strain insulator of low-loss steatite.

XS-6 **List, each $**

A low-loss steatite bushing for ½" holes.

XP-6 Same as above but polysterene.
List, box of ten $

TPB **List, per dozen $**

A threaded polystyrene bushing with removable .093 conductor moulded in, ¼" diam., 32 thread.

XS-7, (⅜" Hole) **List $**
XS-8, (½" Hole) **List $**

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

XS-1, (1" Hole) **List $**
XS-2, (1½" Hole) **List $**

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

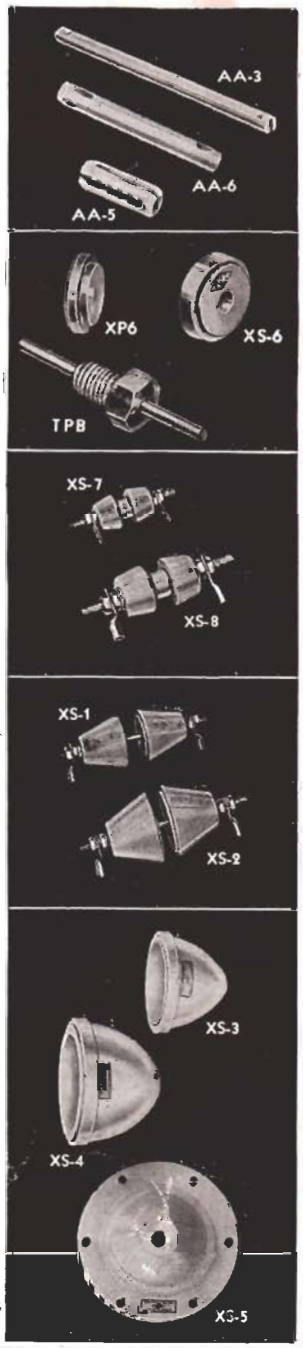
XS-3, (2¾" Hole) **List $**
XS-4, (3¾" Hole) **List $**

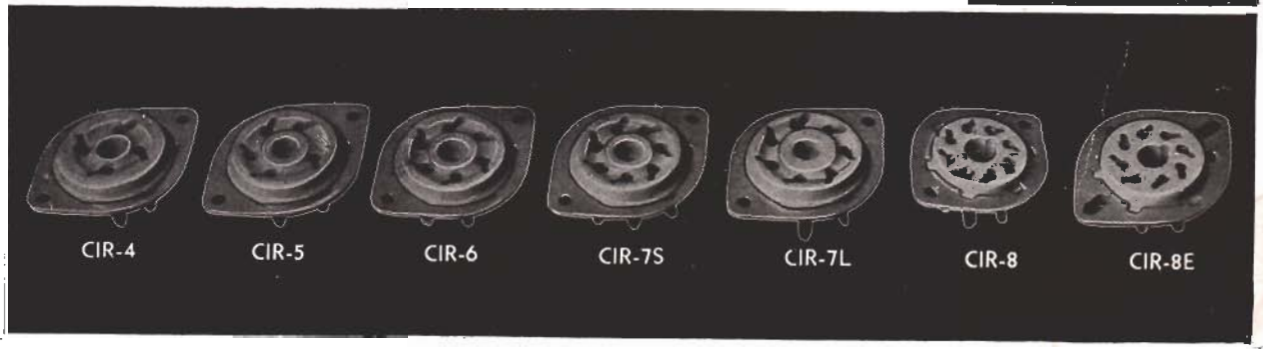
Prices are per pair, including metal fittings. These low-loss steatite bowls are ideal for lead-in purposes at high voltages.

XS-5, Without Fittings
List, each $

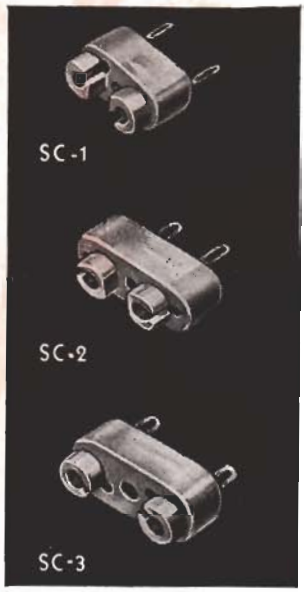
XS-5F, With Fittings
List, per pair $

These big low-loss bowls have an extremely long leakage path and a 5¼" flange for bolting in place. Insulation steatite.





NATIONAL PARTS LOW-LOSS SOCKETS



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 1/16", 3/32" and 1/8" respectively. Steatite Insulation. Single 4-36 or 4-40 screw mounting for CS-1 and CS-2; single 6-32 screw mounting for CS-3.

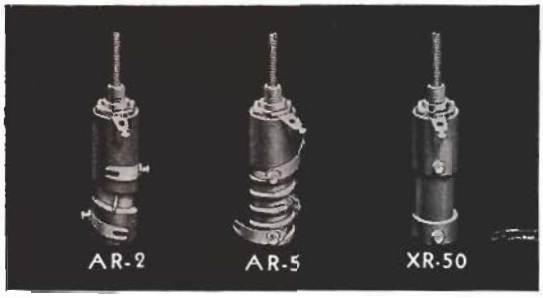
SC-1 **List $**
SC-2 **List $**
SC-3 **List $**

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

AR-2 High Frequency Coil List $
AR-5 High Frequency Coil List $

The XR-50 coil forms may be wound as desired to provide a permeability tuned coil. The form winding length is 1 1/16" and the form winding diameter is 1/2 inch. The iron slug is 3/8" dia. by 1/2" long.

XR-50 **List $**



The XOA Socket is a socket for the Miniature Button 7 Pin base tubes. Low loss mica filled bakelite insulation. Mounts with two 4-40 screws. Socket contacts extend axially from base of socket.

XOA **List $**

The XOR Socket is the same as the XOA Socket except that the contacts extend radially from base of socket.

XOR **List $**

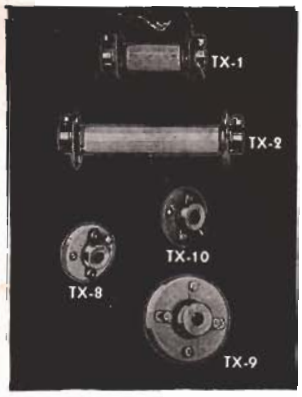
The XOS tube shield is a two piece shield for the Miniature Button 7 Pin base tubes. The shield is available in three sizes corresponding to the 1 3/16", 1 1/2" and 2" tube body heights. The shield contains a spring which centers tube in shield and holds tube and shield firmly in place. The two 4-40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

XOS-1 For 1 1/16" high tube body **List $**

XOS-2 For 1 1/2" high tube body **List $**

XOS-3 For 2" high body **List $**

NATIONAL SHAFT COUPLINGS



TX-1, Leakage path 1" **List $**

TX-2, Leakage path 2 1/2". **List $**

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

TX-8 **List $**

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

TX-9 **List $**

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-10 **List $**

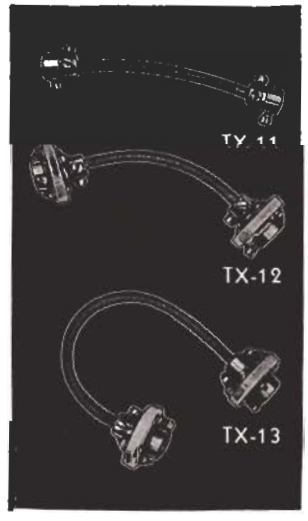
A very compact insulated coupling free from backlash. Insulation is canvas Bakelite. 1 1/16" diam. Fits 1/4" shaft.

TX-11 **List $**

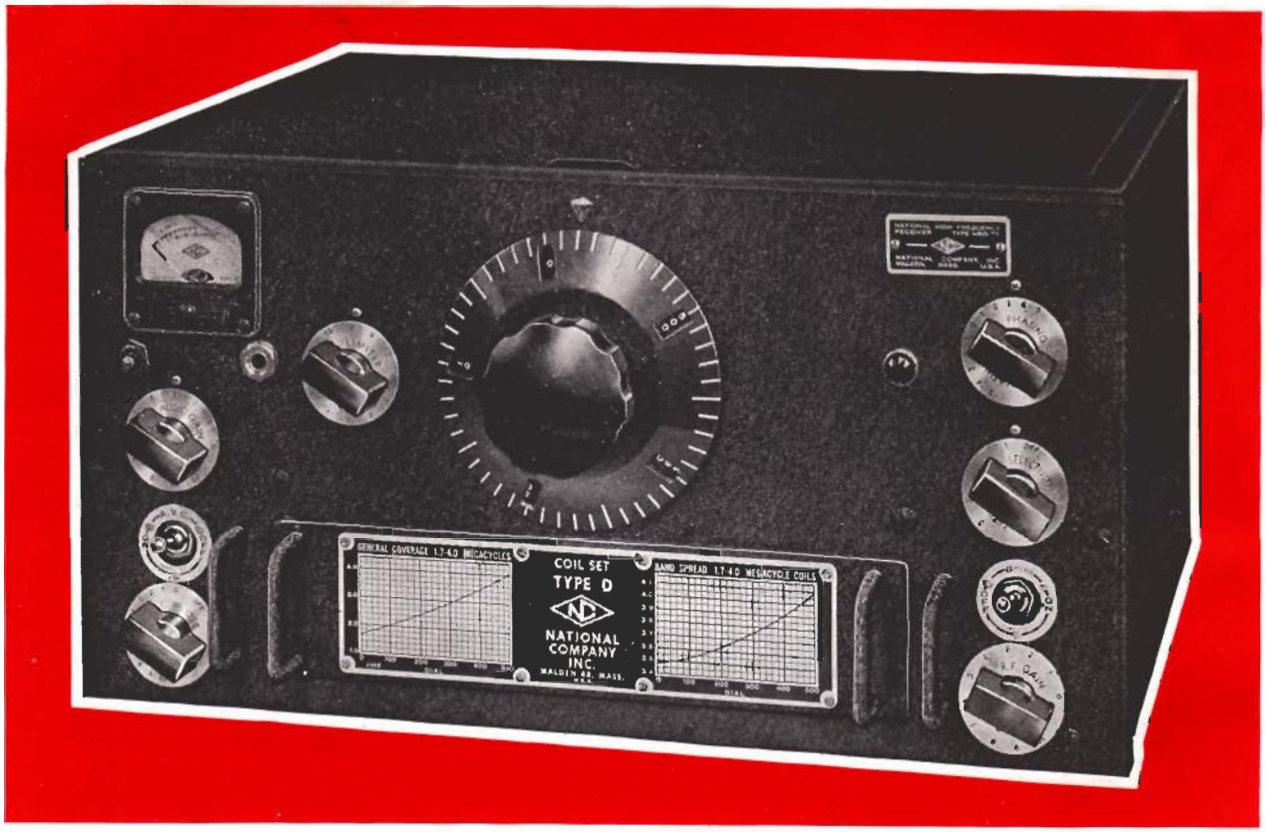
The flexible shaft of this coupling connects shafts at angles up to 90 degrees, and eliminates misalignment problems. Fits 1/4" shafts. Length 4 1/4".

TX-12, Length 4 5/8" **List $**
TX-13, Length 7 1/8" **List $**

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



NATIONAL HRO-5A1



DESCRIPTION

The development of the National HRO-5A1 Radio Receiver brings the famous HRO series to a new high in receiver performance.

Items characterizing the HRO-5A1 Receiver are as follows: Two R.F. preselector stages; separate mixer and local oscillator tubes; two I.F. stages with a crystal filter employing phasing and selectivity controls; combined second detector AVC and second audio stage; first audio stage; double action limiter stage; audio output stage; C.W. oscillator with pitch control; and a signal strength meter Metal tubes, first used in the HRO-5, are also employed in the HRO-5A1. The Loud Speaker and Power Unit are separate units. The data listed below indicates the versatility and the extremely high standards of performance to be found in the HRO-5A1.

CONTROLS

Main Tuning Dial: AVC Switch: B+ ON-OFF; Audio Gain; R.F. Gain; C.W. Oscillator Pitch Control; Selectivity Control; Phasing Control; S-Meter Switch; Limiter Control.

SPECIFICATIONS

Frequency Range:

The Frequency Range of the HRO-5A1 with the 4 Coil Sets normally supplied is 1.7 — 30.0 MC. Each Coil Set covers the frequencies listed below:

Coil Set	General Coverage	Bandspread
D	1.7 — 4.0	3.5 — 4.0
C	3.5 — 7.3	7.0 — 7.3
B	7.0 — 14.4	14.0 — 14.4
A	14.0 — 30.0	28.0 — 30.0

NATIONAL Coil Sets to cover the low frequency range of the receiver are available as follows:

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.

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-5A1 is 1. microvolt or better throughout the normal frequency range.

POWER INPUT:

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

POWER OUTPUT:

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

PRICES

Table Model (with tubes & A,B,C,D coils) **List $**
Rack Model (with tubes & A,B,C,D coils) **List $**
Table Model MCS Loud Speaker **List $**
Rack Model RFSH Loud Speaker **List $**
Table Model 697 Power Unit **List $**
Rack Model SPU-697 Power Unit **List $**

NATIONAL NC-173

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 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.

A complement of 13 tubes in a superheterodyne circuit is used to provide such features as an RF Amplifier stage, a separate AVC Amplifier, a voltage regulator for circuit stabilization 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, a stabilized beat frequency oscillator, a voltage regulator and rectifier stages. A crystal filter is connected between the first detector and first IF stage. Highlighted in the above line-up are:

Crystal Filter — A new highly flextble crystal filter providing an adjustable selectivity characteristic with a wide range from broad-band broadcast requirements to sharp Amateur single-signal CW reception. A phasing control gives phasing action for the attenuation of interfering singals.

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. Frequency stability is thereby assured for both phone and CW reception.

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 phonograph.

Controls —

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

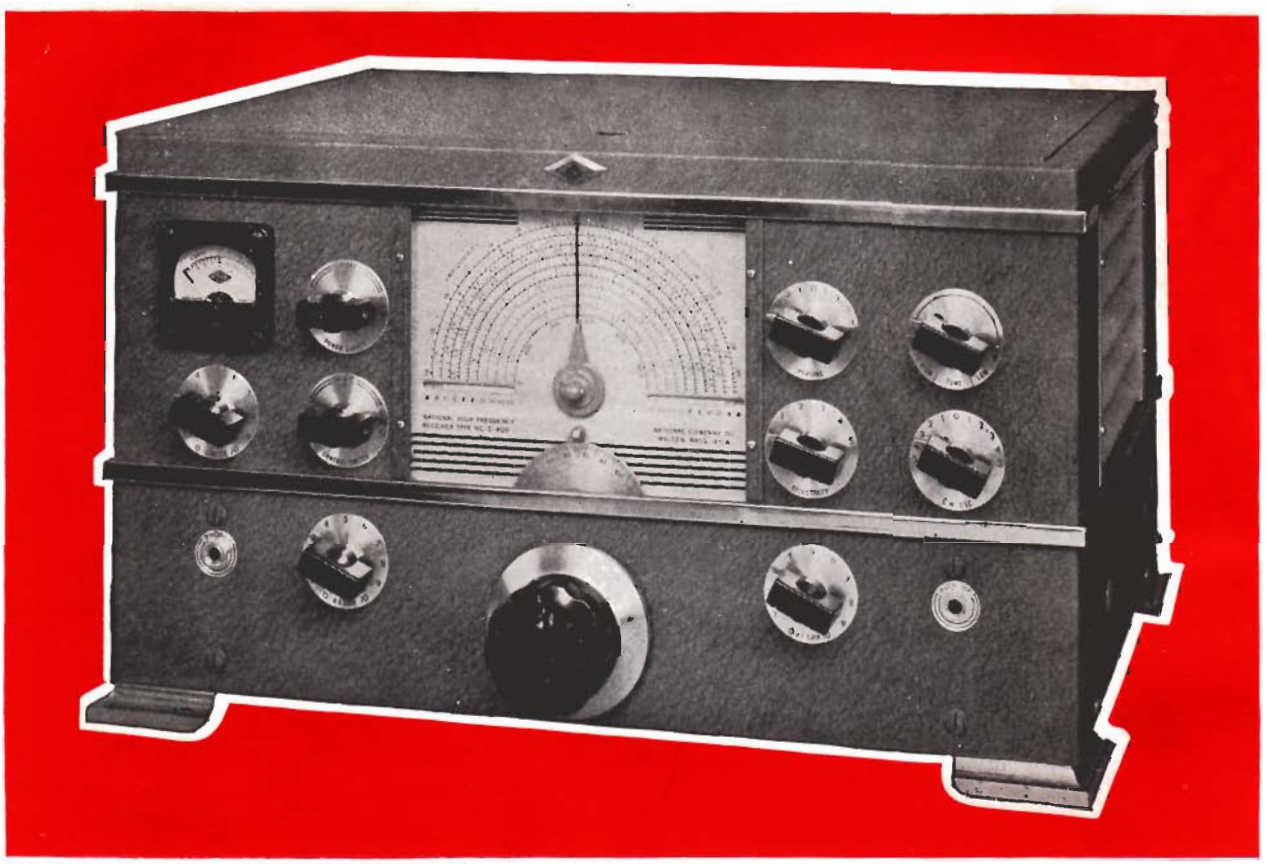
Power Input —

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

Prices —

NC-173T Table model Receiver....**List $**
NC-173R Rack model Receiver.....**List $**
NC-173TS Table model Speaker....**List $**
NC-173RS Rack model Speaker....**List $**

NATIONAL NC-2-40D



DESCRIPTION

Designed for the radio amateur, the NC-2-40D series of superheterodyne receivers are 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 radio 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; R.F. Gain Control and Signal Strength Meter Switch; Audio Gain; B+ ON/OFF; Selectivity; Limiter; Tone; C.W. Oscillator; A.V.C.; Phasing.

SPECIFICATIONS

Frequency Range:

General Coverage:

490 KC. to 30 MC.

Band Spread:

27 to 30 MC.
14 to 14.4 MC.
7 to 7.3 MC.
3.5 to 4 MC.

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

SENSITIVITY

Less than 1 microvolt input produces a 6 DB signal to noise ratio.

POWER INPUT

Approximately 70 watts; either 110- 120 or 220-240 volts 50/60 cycle, 1 Phase A.C. A plug and socket is provided for convenient external battery connection as necessary for battery operation.

POWER OUTPUT

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

PRICES

Rack or Table Model (with tubes)	**List $**
Rack or Table Model Speaker	**List $**

NATIONAL NC-46

DESCRIPTION

The National NC-46 is a 105 to 130 Volt AC-DC receiver which provides 3 watts of audio output. The Receiver tunes the Broadcast and Short Wave bands and employs 10 tubes. 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.

SPECIFICATIONS

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.	28.0-30.0 Mc; 40 dial div.
		14.0-14.4 Mc; 56 dial div.
B	4.4 -12.0 Mc.	7.0- 7.3 Mc; 50 dial div.
C	1.55 - 4.6 Mc.	3.5- 4.0 Mc; 70 dial div.
D	0.540- 1.6 Mc.	

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.

Automatic Volume Control:
The Receiver output with AVC operating varies less than ±4 db. with inputs ranging from 10 to 100,000 microvolts.

DIMENSIONS

NC-46 Receiver: 9 7/16" high by 17 3/8" wide by 12 3/8" deep.
Weight 32 lbs.
NC-46TS Speaker: 8 7/8" high x 10 7/16" wide x 7 1/2" deep.
Weight 8 lbs.

PRICES

NC-46 Table Model Complete with Tubes **List $**

NC-46TS Table Model Speaker- **List $**

NATIONAL HRO-5C

Description

The HRO-5C is a Deluxe Receiver Installation consisting of an HRO-5A1 Receiver with SPC Unit (power unit, coil container and loud-speaker) in a MRR Table Rack. Chromium-plated appearance strips and side trim strips are included.

The HRO series of receivers is an honored product of the National Company. The HRO-5A1, newest and finest of these receivers, features a number of additional refinements among which are a new highly efficient noise limiter and a redesigned flexible crystal filter. Circuit revisions have been made to further improve the performance standards of this outstanding Receiver. For a detailed description of the HRO-5A1 Receiver supplied on the HRO-5C Deluxe Installation, see page 17 in this catalog.

HRO-5A1 Receiver, with tubes and A, B, C, D Coils — **List $**

SPC Unit Combination — **List $**

MRR Table Rack 24½" Panel Capacity — **List $**

HRO-5C Deluxe Receiver Combination — **List $**

NATIONAL 1-10A RECEIVER

The 1-10A is an improved superregenerative Receiver covering all wave lengths from 1 to 11 meters. The 1-10A is designed for use in both Amateur and Commercial services and the natural advantages inherent in a superregenerative receiver make this one of the simplest and most reliable receivers for use on these wave lengths. This Receiver is suitable for the reception of voice and tone modulated code signals. The 1-10A is supplied in a table mounting model which through virtue of its compact size can be handily used for portable operations.

The circuit of the 1-10A Receiver employs 4 tubes and consists of one stage of tuned RF, a self-quenching superregenerative detector transformer coupled to a first stage of audio which, in turn, is resistance coupled to a power output stage. Receiver controls are held to a minimum and include Audio Gain, Regeneration, RF Trimmer and Main Tuning Controls. Plug-in type coils are used to tune the frequency range of the Receiver in six tuning bands. The location of these coils in the receiver make them readily accessible for interchanging. Tuning is accomplished by a two-gang variable capacitor geared to a micrometer dial which reads directly from 0 to 500 and has a linear scale length of approximately 12 feet, requiring ten revolutions to cover any one band. The scale length plus the vernier action of the Main Dial gives the operator the equivalent of continuous bandspread tuning on all bands.

The 1-10A Receiver is designed for operation from National type 5886 Power Unit, all voltage dividers, etc., being built in so that but one B voltage lead is necessary. The 5886 Power Unit operates on 105-120 volts, 50-60 cps. This Power Unit furnishes 6.3 volts at 1.6 amperes to the heater circuit and 180 volts at 35 milliamperes to the plate and screen circuits. A 3 volt C battery, mounted in the receiver, is used to supply bias to the RF tube. The 1-10A Receiver may be operated from batteries by connecting suitable batteries to the pins of the 4 prong power plug.

Tubes

RF Amplifier	954
Detector	955
First Audio	6J5
Second Audio	6V6

Price List

1-10A Receiver, table model, complete with tubes and 6 sets of plug-in coils. **List $**

5886 Power Unit, 105-120 volt, 50-60 cps. **List $**

MCS 8" PM loud-speaker with impedance matching transformer. **List $**

NATIONAL CRU OSCILLOSCOPE

CRU

Description

The CRU Oscilloscope is a compact inexpensive instrument whose capabilities make it outstanding in its field. Amateurs and electronic experimenters will recognize this 2" scope as an indispensible item of equipment to guarantee the efficient operation of their stations. Put the CRU scope to work in your station and watch it:

Measure Percentage Modulation.

Check distortion, excitation, overmodulation, etc., by the Trapezoidal pattern method.

Monitor RF and Audio circuits continuously while you are on the air.

Test Audio and RF circuits where extreme sensitivity is not required.

The circuit of the CRU is simple yet ample having a self contained power supply and controls for brilliancy and focus, a potentiometer for controlling the amplitude of the horizontal deflection as well as a built-in 60 cycle sweep. Approximately 100 volts dc. will give a 1" deflection on the CRU screen.

Tubes

Cathode-Ray	2AP1-A
Rectifier	6X5

CRU WITH THE CRU-P PANEL

Controls

A.C. ON/OFF: the A.C. line switch.

Intensity: A potentiometer controlling the brilliancy of the pattern.

Focus: A potentiometer controlling the clarity of the scope image.

Sweep: A potentiometer controlling the length of the pattern.

"Ext."—"60 cycle": A two position switch, which when on "Ext." connects the horizontal deflection plates to the horizontal terminal strip at the rear of the cabinet. In the "60 cycle" position the 60 cycle A.C. sweep is connected to the horizontal deflection plates.

BSW: A pair of insulated beam switch control terminals permitting connection to a switch or relay so that a trace appears on the screen only during transmission periods.

Prices

CRU-Table Model Oscilloscope, Less tubes **List $**

CRU-P Rack Panel and Control Plate (to rack mount CRU Oscilloscope) **List $**

NATIONAL POWER SUPPLIES

National Power Supplies are specially designed for high frequency receivers, and include efficient filters for RF disturbances as well as for hum frequencies.

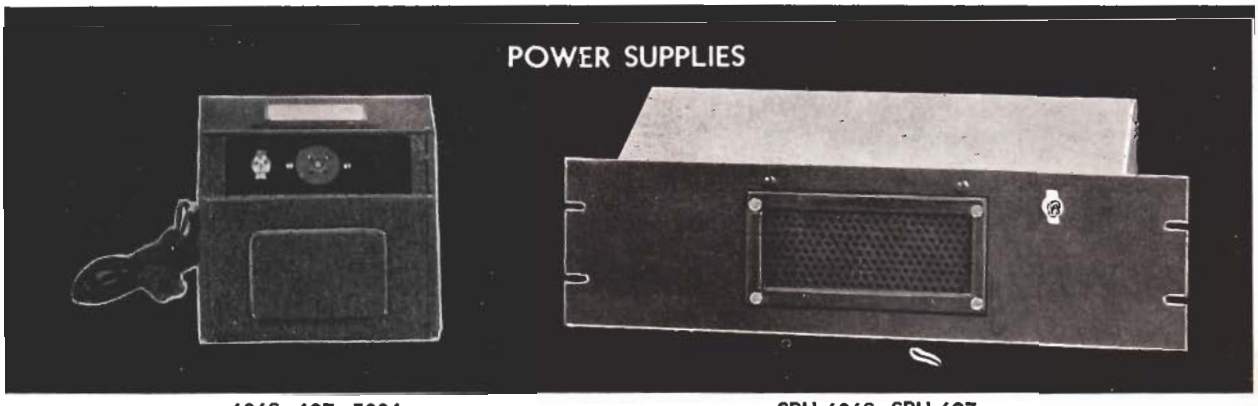
686S, Table model (165 V., 50 MA.), for operation from 6.3 volts DC, with vibrator. **List $**

SPU-686S Rack Model **List $**

697 Table Model (240V., 70 Ma. and 6.3 V., 3.4 A.), for operation from 115/230 Volts, 50/60 cps. A.C. **List $**

SPU-697 Rack Model **List $**

5886 Table Model (155 V., 50 Ma. and 6.3 V., 2.5 A.) for operation from 115 Volt, 50/60 cps. A.C. **List $**



686S, 697, 5886 **SPU-686S, SPU-697**

NATIONAL COMPANY

61 SHERMAN STREET, MALDEN, MASSACHUSETTS, U.S.A.

CATALOG NO. 700