

1944-45



**JAMES  
MILLEN**  
**MANUFACTURING COMPANY, INC.**

*Radio Engineers and Manufacturers*

150 EXCHANGE STREET • MALDEN, MASS.



MILLEN RADIO PRODUCTS are well designed MODERN PARTS for MODERN CIRCUITS, attractively packaged, moderately priced, and fully guaranteed. They have been designed with a view toward easy and practical application as well as efficient performance. For instance, the terminals are located so as to provide shortest possible leads, mounting feet are designed for easy insertion of screws and socket contacts, so that the solder won't run down inside them and make impossible the insertion of the tube, etc. Thus our slogan, "Designed for Application."

THIS CATALOG describes and lists those of our standard parts normally carried in stock and intended primarily for the Amateur and Experimenter. Almost every week new parts are added to the line and described in our advertisements in QST, Electronics, etc., and in our regular ENGINEERING NEWS LETTERS directed to our

FRANCHISED DISTRIBUTORS. These distributors, in addition to carrying at all times a relatively complete stock of our products, regularly receive samples for display and engineering data on new Millen Products as soon as released. At the factory we too try to maintain a large stock of all regular catalog items so as to fill promptly the orders sent in by our distributors.

THE PRICES IN THIS CATALOG are strictly net. All discounts have already been deducted for your convenience. The code numbers used are all that it is necessary to give in placing an order. They fully describe each item and also are selected so as to count as only 'one word' when sent by telegraph. Most combinations of letters and numerals generally used for this purpose normally count as three words. Our distributors will gladly explain the system behind this code to those interested.

OUR EXPORT SALES OFFICE is located in New York City at 9 Rockefeller Plaza under the direction of Mr. C. Lohman Janik whose many years of experience in handling export sales and the shipment of radio and electrical apparatus enables us to handle export shipments quickly and efficiently with a minimum of expense and delay to our customers in all parts of the world. The central location of our export office in New York City enables us not only to give quick replies to our foreign correspondents but also to offer the facilities of our office and the services of its staff to our many friends and customers from other countries who normally visit this country through the great port of New York.

GOVERNMENT AND COMMERCIAL APPARATUS. In addition to our standard line of component parts distributed through our foreign and domestic dealers, we operate a special design and contract manufacturing department where we specialize in the development and manufacture of component parts and complete Transmitters, Receivers, Amplifiers, Control units, etc., for the different government departments and such commercial communication equipment manufacturers as the General Electric Company, The Western Electric Company, the United Aircraft Corporation, The Federal Telegraph Company, and many others. We are very much interested in receiving inquiries from commercial equipment manufacturers for this department.

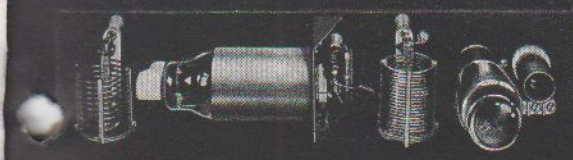
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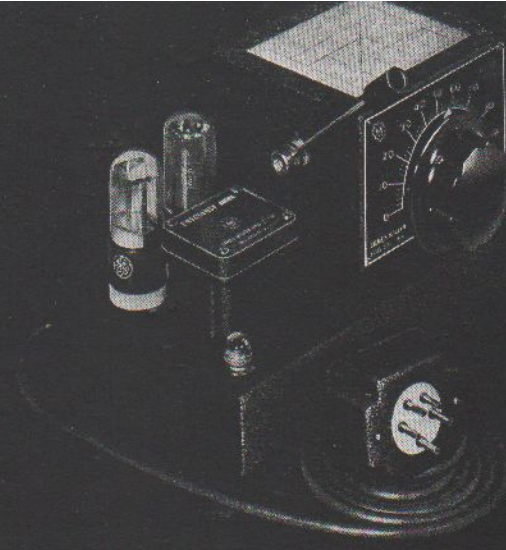
*Current Price Sheet Available at Your Dealer's*







90800



90700

## Amateur Band

# TRANSMITTER ACCESSORIES

### 50-Watt Transmitter — Exciter

USES 6L6 AND 807

*Compact relay rack mounting*

A Tri-tet circuit, which is used to obtain harmonic output, is reduced to the simple tetrode circuit for oscillator output at the crystal fundamental by short-circuiting the cathode tank circuit. Sufficient oscillator output at the fourth harmonic of the crystal frequency is obtainable to drive the 807, which may be operated as either a straight amplifier or frequency doubler, making it possible to obtain an output of 25 to 50 watts or more in four bands from a single crystal of properly-chosen frequency.

The entire unit is designed to operate from a single 250-ma. supply delivering up to 750 volts, the maximum voltage at which the 807 is designed to operate. A fixed bias of 45 volts is required for the 807 and the two heaters together consume 1.8 amperes at 6.3 volts. A single milliammeter with a scale of 200 ma. may be switched to read the plate current of either stage.

Because it is possible to double or quadruple frequency in the plate circuit of the oscillator and to double frequency in the plate circuit of the 807 as well, there are several possible combinations of coils and crystals which will produce the same output frequency.

90800, less tubes, but including one set of coils. *Net Price* .....

Additional coils, per set of three. *Net Price*

(*In ordering state band in which crystal operates and band in which output is desired*)

### Variarm — ECO

A GOOD ECO AT A LOW PRICE

**LOW DRIFT** — Less than 0.06% from cold start. Most drift in first 10 minutes.

**VIBRATION IMMUNE** — Shock mounted oscillator section; sturdy construction.

**NO HAND CAPACITY**

**CHIRPLESS KEYING** — Constant load on power supply.

**GOOD BAND SPREAD** — 100 dial divisions from 3500 to 3650 kc. "Variarm" vernier tuning.

**COMPLETE** — Vibrationless power supply, three tubes, output coupling units.

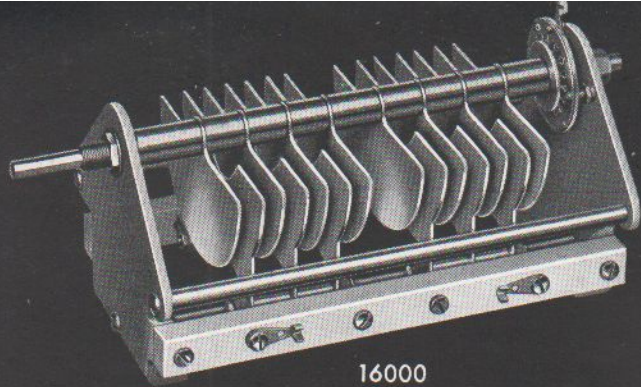
The Rice-Variarm was described in detail in a comprehensive article by Henry E. Rice, Jr., in *QST*. The Millen commercial models are:

No. 90700 has fundamental oscillator frequency range of from 3500 to 3650 Kc. "Convenient-to-change" taps on amplifier and link coils provide for output on 80 or 40. Complete with G.E. tubes, ready to use. *Net Price*

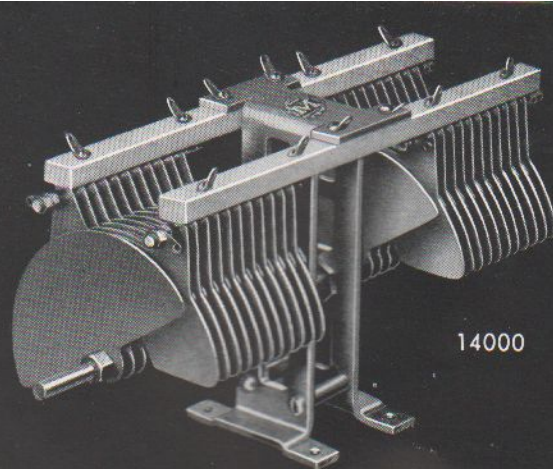
No. 90701 is the same as No. 90700 except fundamental oscillator frequency range of from 1750 to 2000 Kc., providing for output on 160 or 80. Complete with G.E. tubes, ready to use. *Net Price* .....



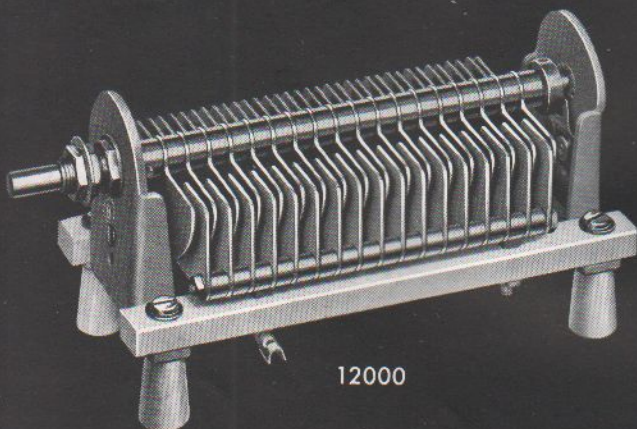




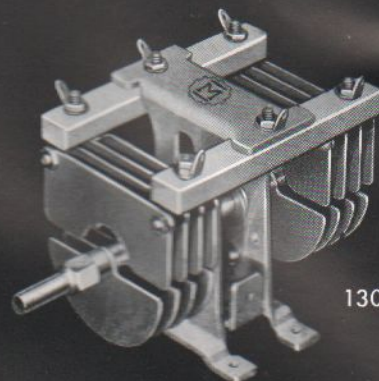
16000



14000



12000



13000

## Transmitting Condensers

Series 11000 and 13000 — Something new — different — permitting more efficient use of newer tubes — more compact and symmetrical circuit arrangements and consequent better neutralization. Center fed rotors for better high frequency current distribution. Isolantite insulation. "Designed for Application" — terminals in convenient places; inductance socket may be mounted on stator; RF choke on frame as shown. New type meter dial at one end and meter at other provide balanced front panel appearance. End drive or right angle drive. Rounded polished heavy gauge aluminum plates. Series 12000 is conventional design using same size plates for those who want a condenser for replacement purposes in existing equipment. The series 13000 condensers have same plate sizes as series 11000 and 12000. Heavy pressed aluminum mounting frame is employed in place of casting. Direct drive from end of rotor-shaft. The series 14000 transmitting condensers are essentially the same in general design as the 13000 except the rotor plate diameter is 3½" instead of 2". For single-ended applications connect sections in parallel to obtain advantage of center feed and elimination of shorted frame loops. We also specialize in the design and develop-

ment of transmitting condensers for all types of commercial applications. The condensers illustrated on this and the following page are merely the stock items that we constantly carry on hand. Our engineering department invites correspondence relative to the development of special variable capacitors to meet your particular application whether it be in the radio transmitter, diathermy or industrial heating oscillator fields. We are also prepared to furnish combination capacitor-inductor units for ultra high frequency oscillators and wave meters, either to our own design or to customers' specifications. Due to the fact that our own designs on this type equipment are still classified, it is not possible to publish specific data herewith at this time.

### 11000, 13000, 14000 SERIES CONDENSERS

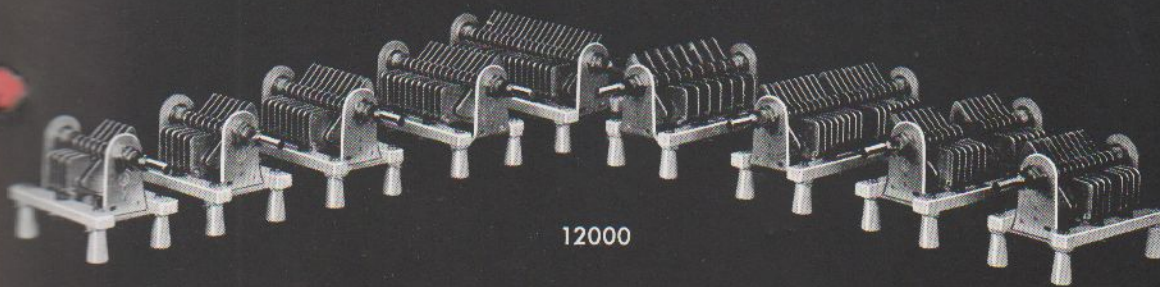
.077" air gap is for 3000 volt peak rating

#### MILLEN TYPE

Code	Capacity per side		Plates per side	Dimension "L"	Plate Thickness	Air Gap	Voltage Rating	Net Price
	Max.	Min.						
11035	36	4.6	9	3 1/4"	.040"	.077"	3000	
11050	51	6.5	12	5 1/2"	.040	.077	3000	
11070	74	9.5	17	5 1/2"	.040	.077	3000	
13035	35	4.9	9	3 1/2"	.040	.077	3000	
13050	49.5	6.3	12	5 1/2"	.040	.077	3000	
13070	71	7.3	17	5 1/2"	.040	.077	3000	
14200	204	10.7	16	6 1/2"	.050	.077	3000	
14100	90.5	12.9	15	11 1/2"	.050	.171	6000	
14050	50		9	6 1/2"	.050	.171	6000	
14060	60		15	11 1/2"	.050	.265	9000	







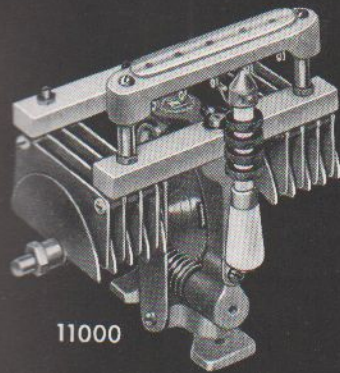
12000



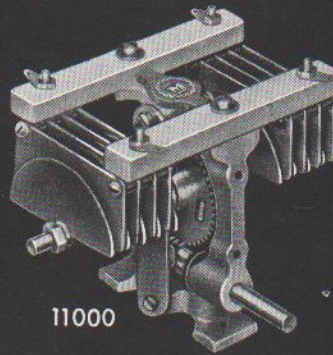
15001



15002



11000



11000



15005



15006

## Transmitting Condensers

The group illustration above of an assortment of capacitors in the 12000 series shows an earlier type end plate. Current production employs an improved reinforced end bracket as illustrated on page four. On page four also is illustrated the unique constant low impedance, multiple finger, high current rotor contactor developed in the 16000 series of transmitting capacitors listed below.

CONVENTIONAL SINGLE SECTION TYPE											
Code	Capacity per section		Number Plates			Thick-ness of Plates	Air Gap	Finish on Plates	Length Isolantite Bars	Voltage	Net Price
	Min.	Max.	Per Section	Rotor	Stator						
12935	9	37	13	7	6	.040"	.176"	Polished	3 1/16"	6000	
12936	9	37	13	7	6	.040	.176	Plain	3 1/16	6000	
12536	6	43	9	5	4	.040	.077	Plain	3 1/2	3000	
12551	7	55	12	6	6	.040	.077	Plain	3 1/2	3000	
12576	9	76	17	9	8	.040	.077	Plain	3 1/16	3000	
12510	12	101	23	12	11	.040	.077	Plain	3 1/16	3000	
12515	18	151	35	18	17	.040	.077	Plain	5 1/2	3000	
16550		50				.050	.171	Polished	4 1/4	6000	
16510		100				.050	.171	Polished	6 1/4	6000	
16520		200				.050	.171	Polished	10 1/8	6000	
16530		300				.050	.171	Polished	12 1/2	6000	
16559		60				.050	.265	Polished	6 1/4	9000	
16512		120				.050	.265	Polished	11 1/2	9000	

CONVENTIONAL DOUBLE SECTION TYPE											
Code	Capacity per section		Number Plates			Thick-ness of Plates	Air Gap	Finish on Plates	Length Isolantite Bars	Voltage	Net Price
	Min.	Max.	Per Section	Rotor	Stator						
12035	6	43	9	5	4	.040	.077	Polished	3 1/16"	3000	
12036	6	43	9	5	4	.040	.077	Plain	3 1/16	3000	
12050	7	55	12	6	6	.040	.077	Polished	5 1/2	3000	
12051	7	55	12	6	6	.040	.077	Plain	5 1/2	3000	
12075	9	76	17	9	8	.040	.077	Polished	5 1/2	3000	
12076	9	76	17	9	8	.040	.077	Plain	5 1/2	3000	
16030		30				.050	.171	Polished	4 1/4	6000	
16050		50				.050	.171	Polished	6 1/4	6000	
16100		100				.050	.171	Polished	10 1/8	6000	
16200		200				.050	.077	Polished	6 1/4	3000	
16029		30				.050	.265	Polished	6 1/4	9000	
16059		60				.050	.265	Polished	11 1/2	9000	

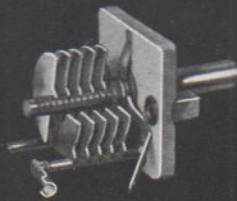
Compact new style transmitting condensers, dials, and the new types of tubes make necessary more compact and efficient neutralizing condensers. By eliminating all external supporting structures, we have arrived at the designs presented herewith. Numbers 15001, 15002 and 15003 are extremely compact and highly efficient. They use the ultra low loss QuartzQ as a dielectric. Due to the dielectric factor being approximately 3 and the puncture voltage being approximately 500 volts per mil (for thin sections) it can be appreciated how this efficient compact design is possible. Numbers 15005 and 15006 are of the telescoping cylinder type with air dielectric for use where high ambient temperatures preclude use of 15001 and 15002. The design is such that the inner cylinder largely shields the supporting Isolantite insulator so that the volume of solid dielectric in the electrostatic field is extremely small.

Code	Capacity Range	Peak Voltage	Net Price
15001	0.7 — 4.3	6000*	
15002	0.5 — 13.5	6000*	
15003	1.5 — 8.5	6000*	
15005	3.4 — 14.6	4000	
15006	2.8 — 9.1	6000	

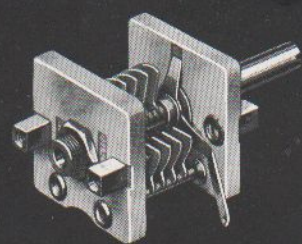
\* Max. recommended DC Plate Volts 1200



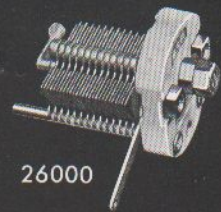




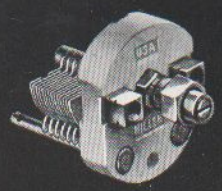
20000



21000



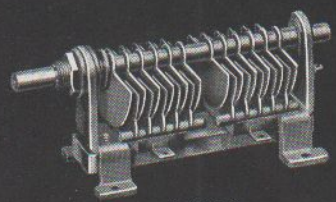
26000



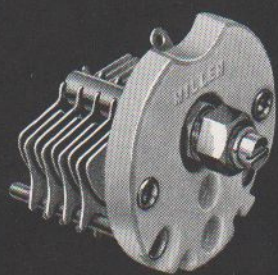
26000 LN



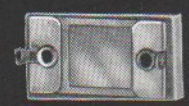
28030



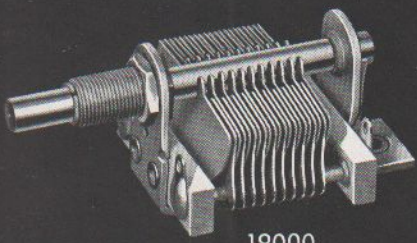
24000



17000



27000



19000



18000

## Receiving Condensers

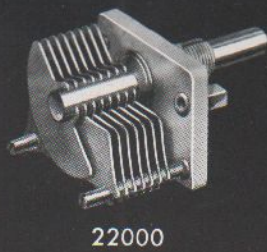
We illustrate and list herewith the more popular stock sizes of our wide variety of small variable air capacitors. The 17000, 18000, and 26000 series can be had on special order with lock nut construction by adding the symbol LN after the code number. With the exception of the 24000 series all others employ highest grade wax impregnated steatite end plates. The 24000 series employ QuartzQ insulation and are designed primarily for ultra high frequency applications. With the exception of the 18000 series all others employ brass plates with solder type construction heavily plated. The 18000 series employs aluminum plates with washer type construction. No. 28030 is a compression type mica dielectric padder condenser of conventional design which is inexpensive and handy for many uses where the extreme stability of the air padders is not required. The 27000 series are fixed silver on mica of high stability for use as oscillator padders, etc.

Code	Description	Net Price
17025	Large Air Padder, 25 mmfd SS	
17035	Large Air Padder, 35 mmfd SS	
17050	Large Air Padder, 50 mmfd SS	
17100	Large Air Padder, 100 mmfd SS	
17140	Large Air Padder, 140 mmfd SS	
17935	Large Air Padder, 35 mmfd DS	

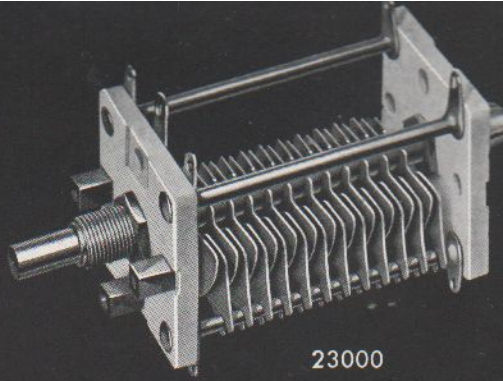
Code	Description	Net Price
18000	This series made to customer's specifications as to capacity, spacing and shaft length.	
19025	Open Frame Midget, 25 mmfd SS	
19035	Open Frame Midget, 35 mmfd SS	
19050	Open Frame Midget, 50 mmfd SS	
19075	Open Frame Midget, 75 mmfd SS	
19100	Open Frame Midget, 100 mmfd SS	
19140	Open Frame Midget, 140 mmfd SS	
19200	Open Frame Midget, 200 mmfd SS	
19325	Open Frame Midget, 325 mmfd SS	
19935	Open Frame Midget, 35 mmfd DS	
19950	Open Frame Midget, 50 mmfd DS	
20015	Steatite Ultra Midget, 15 mmfd SS	
20035	Steatite Ultra Midget, 35 mmfd SS	
20050	Steatite Ultra Midget, 50 mmfd SS	
20100	Steatite Ultra Midget, 100 mmfd SS	
20140	Steatite Ultra Midget, 140 mmfd SS	
20920	Steatite Ultra Midget, 20 mmfd DS	
20935	Steatite Ultra Midget, 35 mmfd DS	
21050	Steatite Ultra Midget, 50 mmfd SS	
21100	Steatite Ultra Midget, 100 mmfd SS	
21140	Steatite Ultra Midget, 140 mmfd SS	
21935	Steatite Ultra Midget, 35 mmfd DS	
24100	100 mmfd per section, single spaced	
24935	35 mmfd per section, double spaced	
26025	3.2-25 mmfd Air Padder	
26050	4-50 mmfd Air Padder	
26075	4.3-76 mmfd Air Padder	
26100	5-97 mmfd Air Padder	
26920	4.5-20 mmfd Air Padder, double spaced	
27010	10 mmf Silver on Mica Fixed	
27025	25 mmf Silver on Mica Fixed	
27050	50 mmf Silver on Mica Fixed	
27100	100 mmf Silver on Mica Fixed	



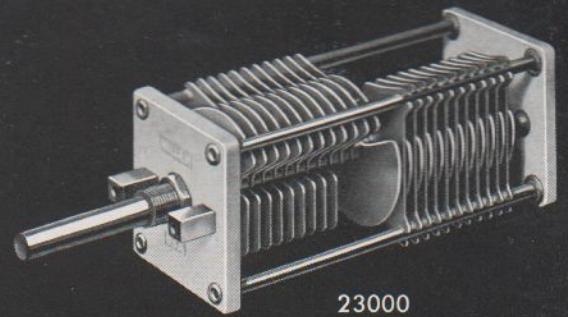




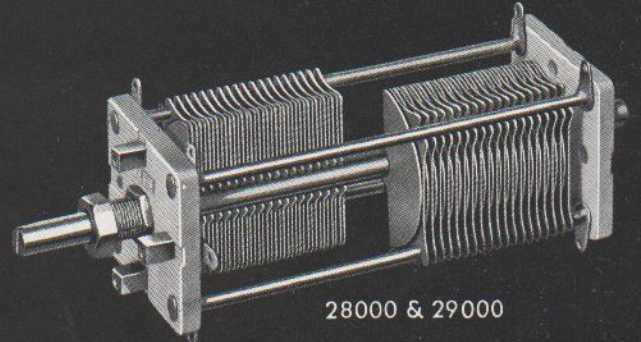
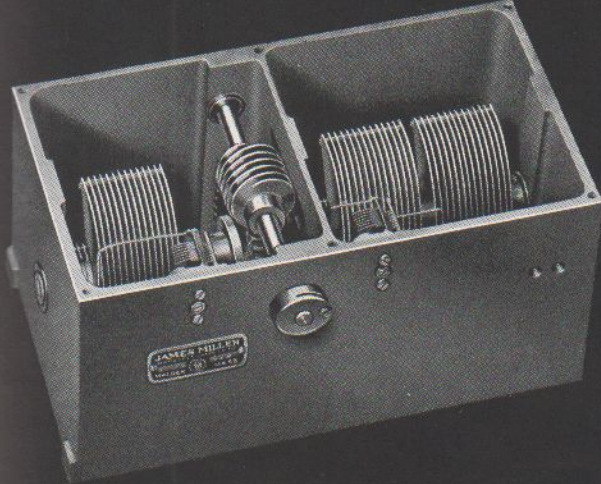
22000



23000



23000



28000 & 29000

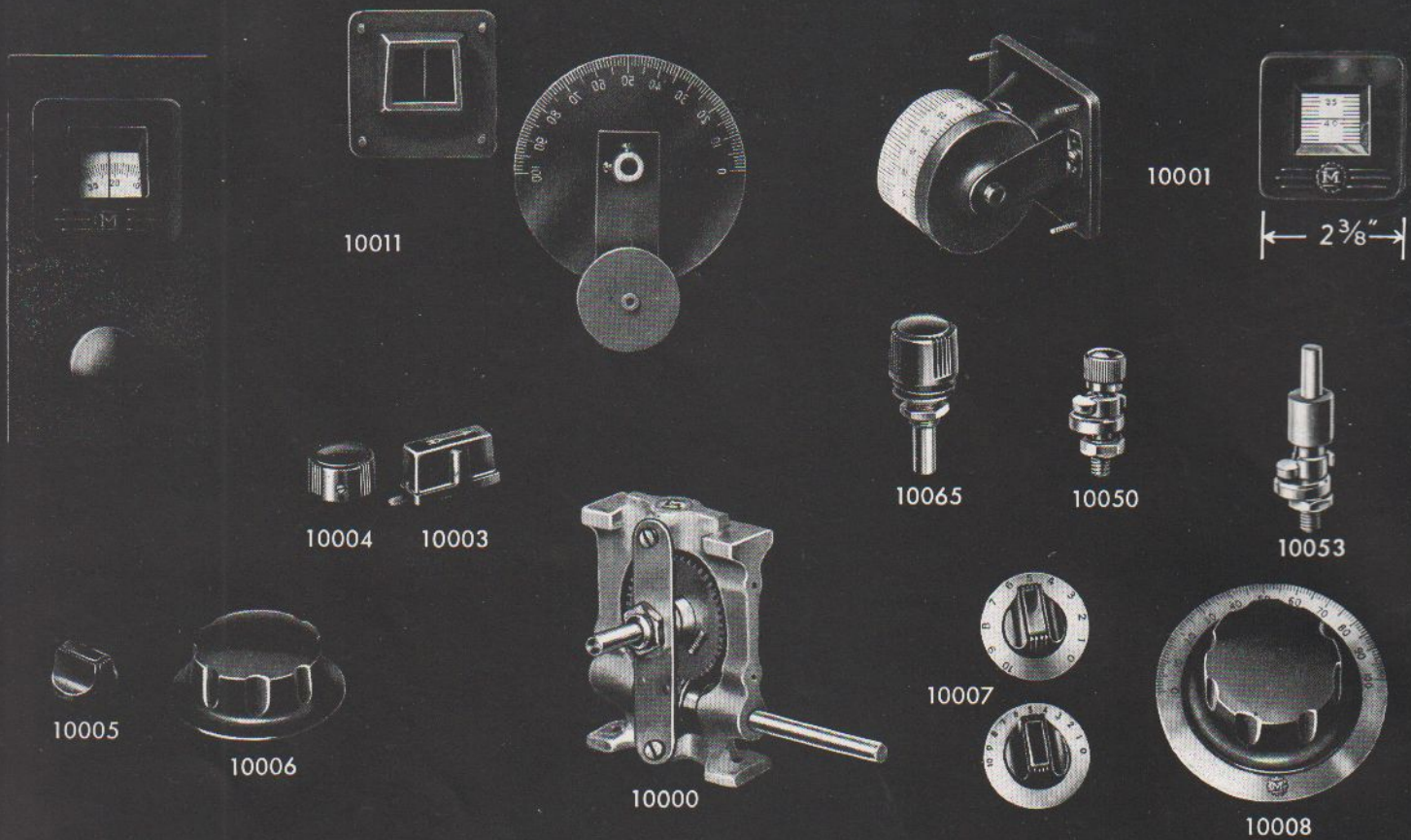
## Receiving Condensers

A wide variety of small capacitors can be assembled in the 22000, 23000, 28000 and 29000 series of condensers as indicated in the illustrations above. There are three different radii of rotor plates as well as the combinations possible by having either single or double end bearings, single or double spacing and single or dual stators. We list herewith the more popular stock sizes but are prepared to furnish any practical combination possible from standard parts. The condenser illustrated in the lower lefthand corner of the plate above is merely to indicate some of the special development and custom manufacturing work done in our condenser division on special customer orders. We also have many standard designs for which we are completely tooled but for lack of space are unable to illustrate and describe herewith. This is particularly true of the multiple gang precision units developed for our own and other high and ultra high frequency communication receivers.

Code	Description	Net Price
22915	Steatite Midget, 15 mmfd DS	
22935	Steatite Midget, 35 mmfd DS	
22950	Steatite Midget, 50 mmfd DS	
22075	Steatite Midget, 75 mmfd SS	
22100	Steatite Midget, 100 mmfd SS	
22140	Steatite Midget, 140 mmfd SS	
23925	Steatite Dual Midget, 25 mmfd per section DS	
23950	Steatite Dual Midget, 50 mmfd per section DS	
23075	Steatite Dual Midget, 75 mmfd per section SS	
23100	Steatite Dual Midget, 100 mmfd per section SS	
28000	Special High Capacity Type. To Customer specifications	
29000	Special Straight Frequency Line Type. To Customer specifications	







## Dials · Drives · Scales and Knobs

The right angle worm drive assembly as used on 11000 series condenser is also available for separate sale. Cast aluminum frame may be panel or base mounted. Std. ratio 16/1. Also 48/1 on special order. Spring loaded split gears eliminate backlash. Condensers, etc. attached to quarter inch shaft by means of flexible couplings (not furnished).

The small drum dial is designed to match in appearance the popular two and three-eighths inch square case meters. May be mounted in round panel hole in same manner as meter. Drum diameter approximately 2". May also be used as indicator for remote condensers, etc. by means of flexible shaft or string drives. Front plate molded of black bakelite. Illuminator comprises bayonet type socket and mounting clip complete with 6 volt bulb. May be used with either drum or disc dial.

The flat disc type dial with meter type escutcheon is for use with condensers such as 12000, 13000 or 14000 series where rotorshaft is perpendicular to front panel. Dial disc 3 $\frac{3}{4}$ " in diameter. Vernier ratio approximately 10 to 1. Drive shaft extends behind panel for addition of lead flywheel when the dial is used in receivers where inertia tuning is desired.

Heavy gauge nickel silver dials are of conventional style but with improved type knobs for use with series 14000, 13000 and 12000 condensers and associated equipment. Knobs are molded with large diameter solid bakelite hub which definitely insulates metal scales from instrument shaft. This feature is extremely important, from a safety angle. When used on receivers the shape of this new style knob will be found more

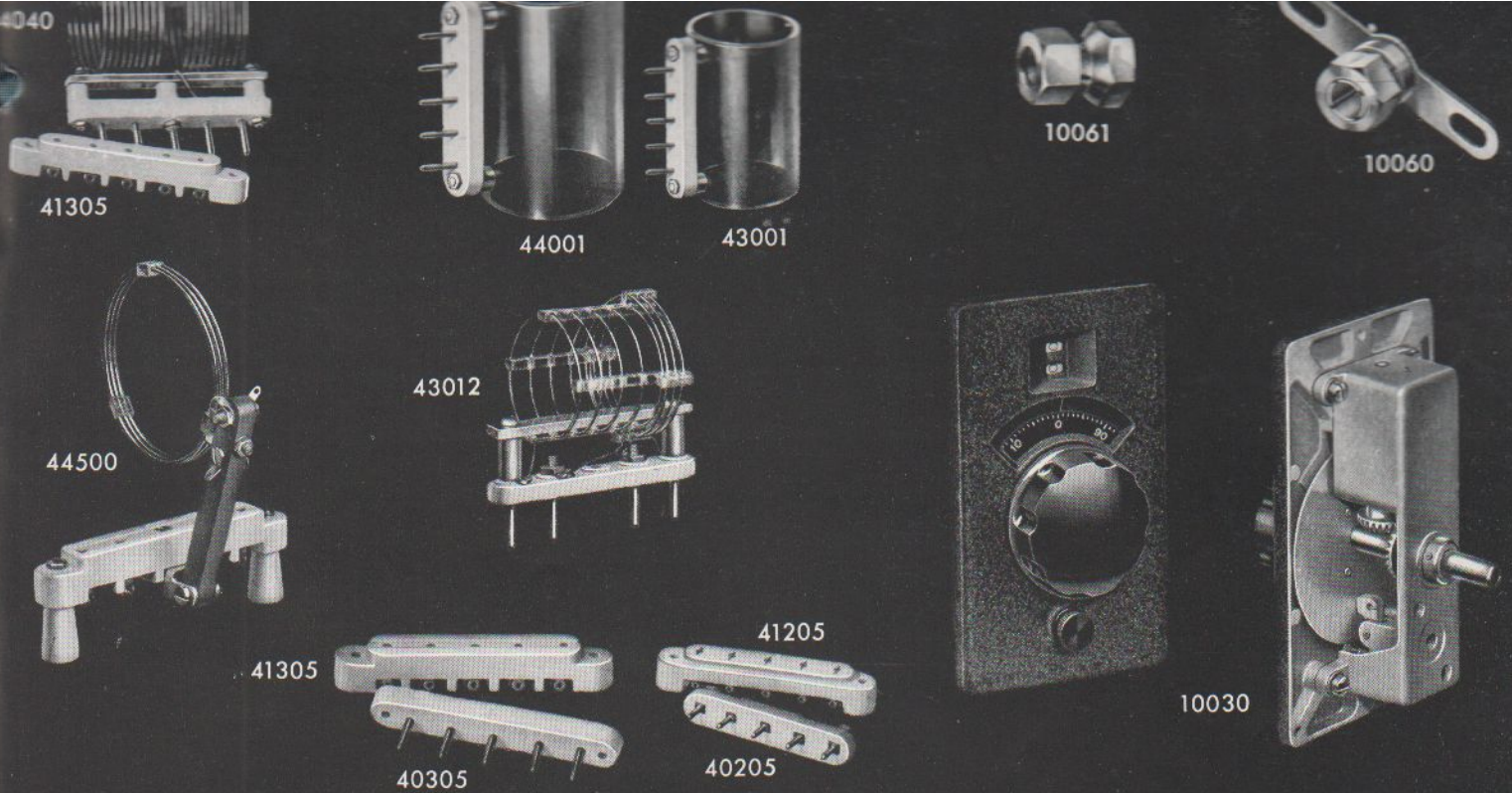
desirable than others heretofore available. They make for comfortable, easy, and accurate tuning.

10065 vernier drive is for use with 10008 dial; 10050 lock is also for use with dials such as 10007 and 10008. Vertical movement of clamping finger is designed to prevent detuning. Captive head. Nickel finish standard but Navy black copper oxide finish on special order.

Code	Description	Net Price
10000	Worm Drive Unit	
10001	Drum Meter Dial-0-100	
10003	Navy Type Bar Knob	
10004	Small Tuning Knob 1 $\frac{1}{8}$ " dia.	
10005	Small Control Knob 1" dia.	
10006	Large Tuning Knob 2 $\frac{3}{4}$ " dia.	
10007	1 $\frac{5}{8}$ " Nickel Silver Inst. Dial-0-10 over either 180° or 270°	
10008	3 $\frac{1}{2}$ " Nickel Silver Inst. Dial-0-100	
10011	Disc Meter Dial-0-100	
10036	Illuminator	
10045	Inertia Wheel	
10050	Dial Lock, Captive Head	
10053	Dial Lock, Sub Panel type	
10062	Drum Meter Dial Bezel Only	
10063	Disc Meter Dial Bezel Only	
10065	Vernier Drive Unit	







## Transmitting Coils · Forms · Locks

The midget series of airwound inductors are ideal for receiver and preselector use as well as oscillators, exciters, doublers and low power finals. Bar type Steatite plug and socket makes possible compact symmetrical circuit layout. Sockets mount conveniently directly on transmitting condensers. QuartzQ coil forms are easy to drill. Wire may be imbedded into form by use of QuartzQ coil dope. Standard tube socket pins have low contact resistance and carry high current. "100 watt" series has swinging link.

In connection with mobile equipment and also stationary equipment subject to vibration, part No. 10060 chuck type shaft lock will find many applications in connection with potentiometers, variable condensers, etc. Slots in mounting arm facilitate mounting on end plates on variable capacitors designed for standard 1/4" instrument shaft. Part 10061 is similar to part 10060 in function but was particularly designed as a combination mounting nut and lock for converting standard potentiometers and other single hole mounting type controls from "standard" to "locking" type. Standard finish used is nickel but either may be had with Navy black oxide finish on special order.

Part 10030 is an extremely sturdy instrument type indicator. Control shaft has 1 to 1 ratio. Veeder type counter is direct reading in 99 revolutions and vernier scale permits readings to 1 part in 100 of a single revolution. Has built-in dial lock and 3/8" drive shaft. May be used with multi-revolution transmitter controls, etc. or through gear reduction mechanism for control of fractional revolution, capacitors, etc. in receivers or laboratory instruments.

Code	Description	Net Price
43161	Midget coils for each band. Mounted on No. 40205 plug. No. 1 at end of code means center link. No. 2, end link.	
43081		
43041		
43021		
43011		
43001	QuartzQ blank form and plug	
40205	Midget Plug	
41205	Midget Socket	
44160	"100 watt" coils for each band. Mounted on No. 40305 plug.	
44080		
44040		
44020		
44010		
44005	QuartzQ form 1 7/8" dia. x 3 3/4"	
44000		
44500		
44001		
40305		
41305	Intermediate size socket	

Code	Description	Net Price
10030	Instrument dial	
10060	Standard shaft lock	
10061	Combination shaft lock — mounting nut	







34154



34140



34400



34200



34600



34300



34103



34108



34100



34105



34101



34106



34800



34010



34102



34104



34107



34109

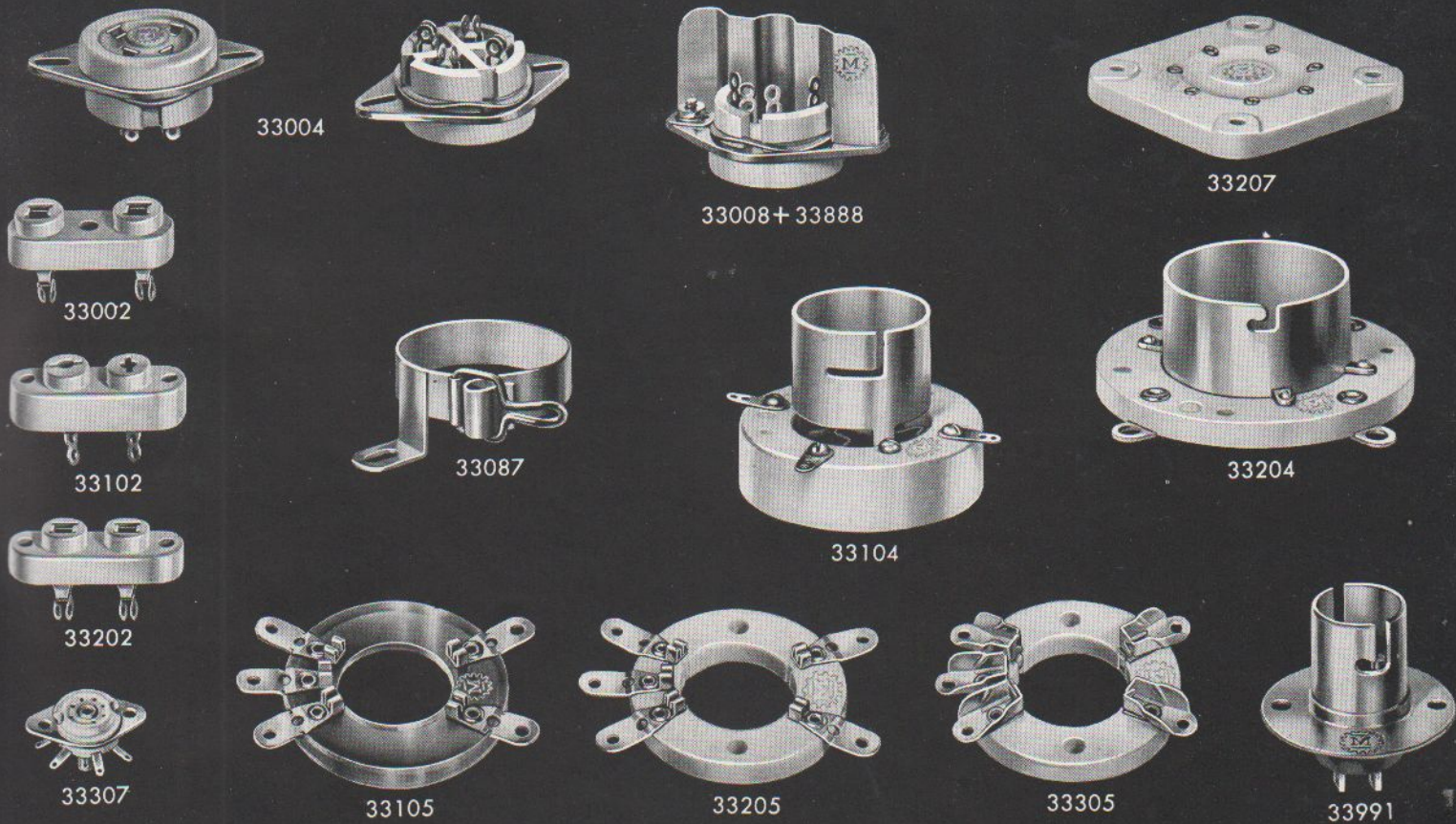
## RF Chokes

We specialize in the design and manufacture of RF chokes to meet all requirements. Our original design for model 34103 has been widely copied and has become relatively standard throughout the industry. The series of 34100 thru 34109 are variations of this original design to meet all types of applications. The 34200 series are single coil high inductance units wound on a low loss Steatite form. May be used in pairs for IF transformer, etc., applications. 34300 series are extremely compact low inductance units wound on molded bakelite form with self-supporting lead wires. 34400 series, compact low inductance multiple coil unit for single hole mounting. 34154 are for low power transmitting tube use.

Code	Inductance	Max. Amp.	Net Price
34100	2.5 mH	250 MA	
34101	2.5 mH	250 MA	
34102	2.5 mH	250 MA	
34103	2.5 mH	250 MA	
34104	2.5 mH	250 MA	
34105	1 mH	300 MA	
34106	1 mH	300 MA	
34107	1 mH	300 MA	
34108	1 mH	300 MA	
34109	1 mH	300 MA	
34010	Shielded 10 mH Receiving RF Choke		
34140	Universal air core transmitting choke		
34154	Amateur band air core 1 mH 600 MA		
34210	General purpose RFC 10 mH		
34225	General purpose RFC 25 mH		
34240	General purpose RFC 40 mH		
34280	General purpose RFC 80 mH		
34285	General purpose RFC 85 mH		
34300	Custom wound to specifications		
34400	Custom wound to specifications		
34600	Pulse line to specifications		
34800	Interruption Frequency Oscillator Coil		







## Sockets

We make a complete line of sockets for all types of tubes. Our sockets are not just another line of sockets but possess "designed for application" features. For instance, in the type 33004, 5 and 6 sockets, the steatite base extends much higher above and below the metal mounting plate than is generally customary so as to provide a long flash over path to ground. Likewise, insulating barriers are provided between all contacts, thus tubes can be operated at much higher voltage when using these sockets. The No. 33888 shield when used with our type 33008 octal socket very materially increases the isolation between the input and output circuit of single ended metal tubes and thus makes possible the use of these tubes at very much higher gain with high stability. Our type 33202 crystal holder socket has been especially designed for use with the Signal Corps type CR1 crystal holder now so much in general use. In our acorn tube line of sockets the 33305 uses a new style of edge grip, snap lock contact that prevents frequency jump, insures permanent low resistance contact and holds the tube firmly in place under conditions of high vibration.

In addition to the type 33087 series of tube base clamps for use with conventional tubes furnished in all sizes in which conventional tube bases are made, we also have, not listed, a series of hold-down "dogs" or clamps for use with metal tubes. They are available in two sizes. The standard No. 33085 for most metal tubes and the 33086 for larger metal tubes such as the 6L6, etc.

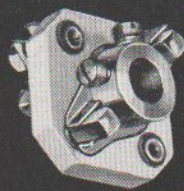
Code	Description	Net Price
33002	Crystal Socket, $\frac{3}{4}$ " spacing, .125 pins	
33102	Crystal Socket, $\frac{1}{2}$ " spacing, .095 pins	
33202	Crystal Socket, $\frac{1}{2}$ " spacing, .125 pins	
33004	Tube Socket, 4 prong	
33005	Tube Socket, 5 prong	
33006	Tube Socket, 6 prong	
33008	Octal Tube Socket	
33888	Shield for 33008	
33088	Metal Tube Clamp, small size	
33089	Metal Tube Clamp, large size for 6L6	
33087	Tube Base Clamp, standard size for $\frac{13}{8}$ " diameter base tubes, other sizes to order	
33105	Acorn Socket, Polystyrene Base	
33205	Same as 33105, Iso Base	
33305	Acorn Socket, new style contacts, Iso Base	
33104	'10 Type Tube Socket	
33204	'50 Type Tube Socket	
33207	Iso Wafer Type Socket for 829, etc.	
33307	Socket, Midget Type Tubes	
33991	Socket, Type 991 Regulator Tubes	



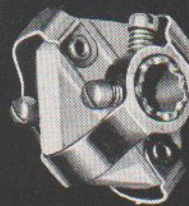




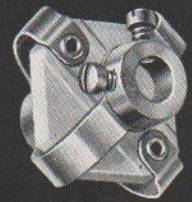
39005



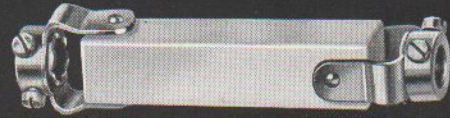
39006-7



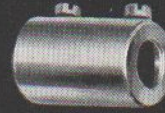
39002



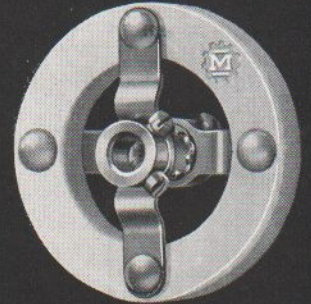
39008



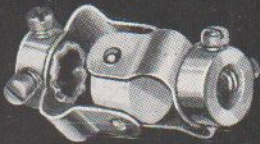
39011



39003



39009



39001



## Flexible Couplings

The 39001 is something new in flexible couplings. No backlash, yet angle drives with as much as 45°, may be obtained. Isolantite insulation. Ideally suited for driving type 10001 drum dial indicator under many conditions. Applied torque must be limited to an amount that will not displace ball pivot bearings. No. 39005 is a non-insulated Universal joint for large angle drives requiring relatively high torque. No. 39006 is another new and unique type of flexible coupling developed for use where shafts have end motion, slightly eccentric motion or end wobble. Also this type coupling permits small angle drives. Spring pinch forks eliminate backlash and are especially suitable for applications requiring disengagement without use of tools, of driving and driven equipment such as small loop antennas, etc. Available with either ceramic or linen base bakelite insulation. No. 39002 is the compact conventional type coupling. 39008 is the same style coupling with the hubs on the outside instead of the inside of the spring arms. 39009 is the

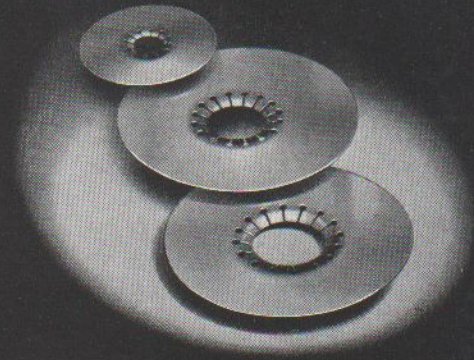
large diameter Isolantite ring type coupling for higher voltage application. No. 39011 is a high voltage version of 39001. All of these couplings are standard for 1/4" shaft and have slotted head hardened cup point set screws. On special order they can be furnished for other shaft diameters and with Allen head or Bristo set screws.

Code	Description	Net Price
39001	Truly Flexible Isolantite Coupling	
39002	Conventional Coupling	
39003	Solid Brass N.P. Coupling	
39004	Same as 39005 but with hubs "in"	
39005	Universal Joint, Non-insulated Coupling	
39006	Slide Action Coupling, Steatite Insulation	
39007	Slide Action Coupling, Bakelite Insulation	
39008	Same as 39002 except outside Hubs	
39009	High Voltage Ring Type Coupling	
39011	High Voltage "truly flexible" Coupling	





# Reserved for Classified Components including Sockets for Secret Tubes and "Radar Plumbing"



33446



32150



32101



32103



32100



32102

## Cavities · "Plumbing" · Bushings

During the War we have developed many new component parts such as ultra high frequency cavities, wave guides, sockets for secret tubes and many other items which we are not permitted to mention at this time, even by name, for security reasons. The space on this page is reserved for these items as soon as classification is removed. As we go to press the restrictions have just been lifted on the type GL 446 G.E. tube, known generally by the nickname of "lighthouse" and thus we can now list the beryllium copper cavity contact discs developed and manufactured by us under the No. 33446 for use with this tube. The discs are furnished unplated and unheat-treated so that they may readily be worked either by spinning or forming to the desired size and shape to provide the proper frequency and then heat treated, silver soldered into the resonator cavity and silver plated. Full instructions for heat treating are printed on the envelope containing the set of three

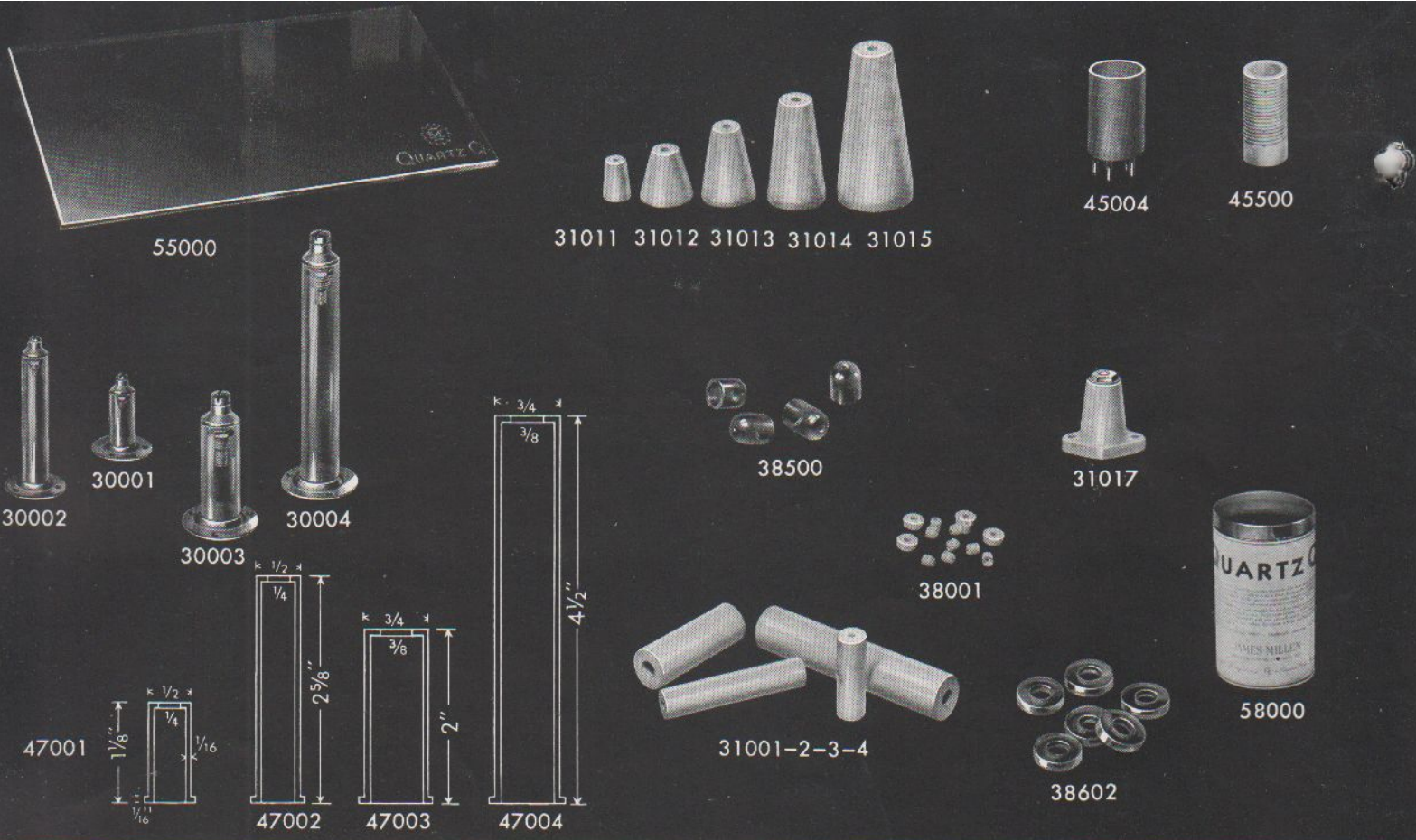
discs for making the plate, grid and cathode contacts.

In addition to the complete line of conventional type steatite bushings illustrated herewith, we also have developed the 32150 thru-bushing which provides a low loss, compact, low price, high voltage thru-bushing for running leads through chassis partitions, shield cans, etc. Die-cast soft metal shoulder on extruded Isolantite tube. Fits  $\frac{1}{4}$ " hole in chassis and is locked in place by either drop of solder or crimping. Hole size in Isolantite tube takes up to No. 14 B & S wire.

Code	Description	Net Price
33446	Set of 3 Discs for GL 446 tube	
32100	Steatite Bushing for $\frac{3}{8}$ " hole	
32101	Steatite Bushing for $\frac{1}{2}$ " hole	
32102	Steatite Bushing for $\frac{1}{4}$ " hole	
32103	Steatite Bushing for $\frac{3}{4}$ " hole	
32150	Isolantite Thru-bushing for $\frac{1}{4}$ " hole	







## QuartzQ · Standoffs · Coil Forms

QuartzQ is a highly polymerized styrene which possesses remarkably low radio frequency losses (practically zero!) and high resistance to voltage breakdown. Its excellence as a high frequency dielectric is about the same as that of fused quartz. The use of this material in place of the more commonly employed dielectrics in condensers, coil forms, etc. will result in a substantial reduction in losses and consequent increase in "Q"—hence, the name QuartzQ. QuartzQ may be readily cut and drilled. Electrical Characteristics: power factor .02%; dielectric constant 2.6; loss factor .00053; dielectric strength 500v/mil. QuartzQ sheets may be cut into strips for condenser insulation, etc. Standoffs have fitted metal tops. May also be used for ultra low loss coil forms. QuartzQ beads are for construction of short concentric link lines; ideal for use between RF stages in transmitters.

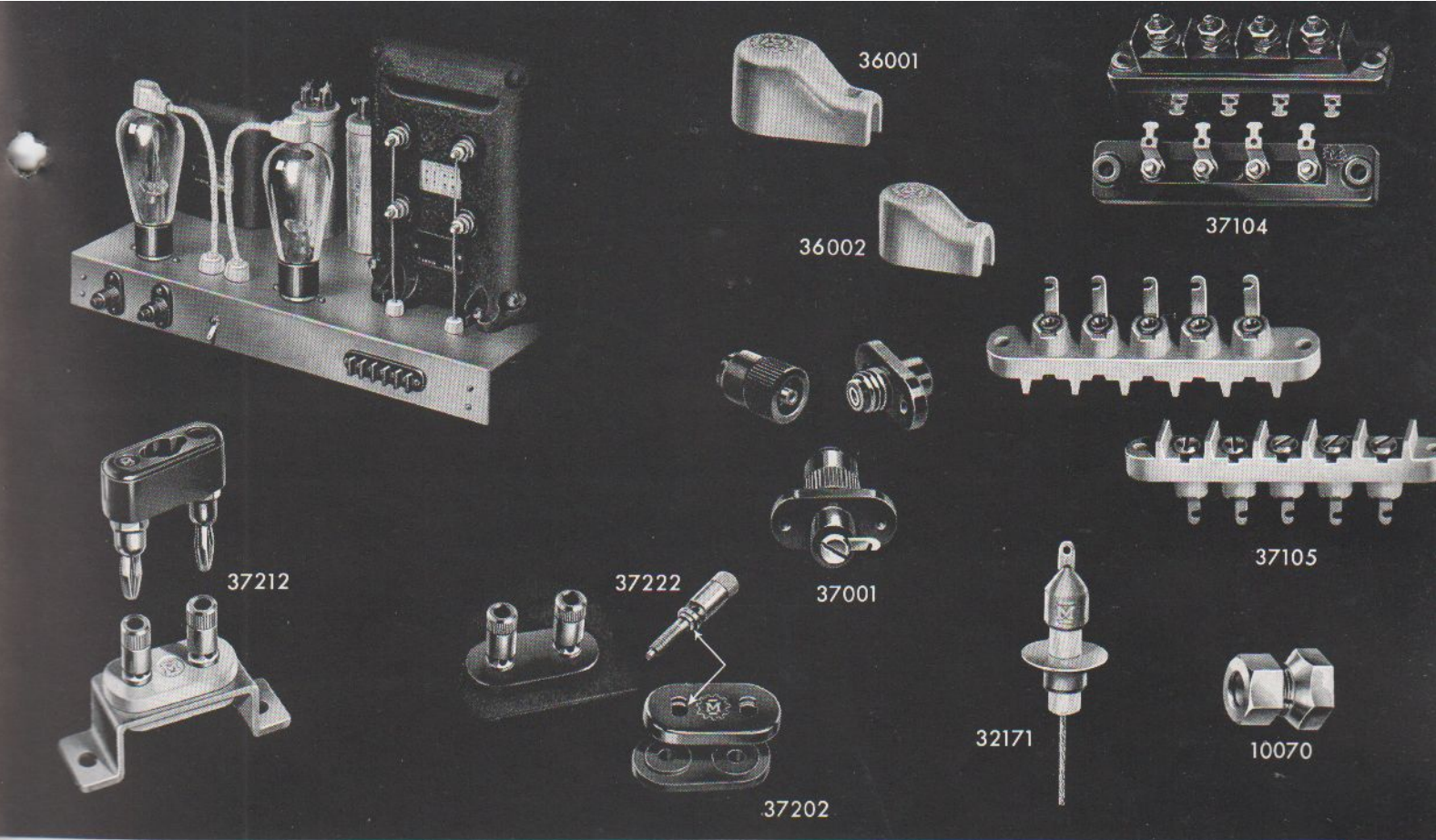
The series 45000 coil forms are of the popular mica base molded phenolic type. They are slightly longer than formerly available units of this type, so as to make easier the winding of low frequency coils. Also available with four- or five-prong base for increased number of circuit applications.

Ceramic standoffs are of the best grade steatite with clean accurately threaded holes. Should not be confused with porcelain units.

Code	Part	Size	Material	Net Price
55001	Sheet	3 x 6 x .1	QuartzQ	
30001	Standoff	1/2 x 1 3/8	QuartzQ	
30002	Standoff	1/2 x 2 7/8	QuartzQ	
30003	Standoff	3/4 x 2 7/8	QuartzQ	
30004	Standoff	3/4 x 4 7/8	QuartzQ	
31001	Standoff	1/2 x 1	Isolantite	
31002	Standoff	1/2 x 2 1/2	Isolantite	
31003	Standoff	3/4 x 2	Isolantite	
31004	Standoff	3/4 x 3 1/2	Isolantite	
31011	Cone	3/4 x 1 1/2	Steatite	
31012	Cone	1 x 1	Steatite	
31013	Cone	1 1/2 x 1	Steatite	
31014	Cone	2 x 1	Steatite	
31015	Cone	3 x 1 1/2	Steatite	
31017	Cone with base and jack	1 1/4" high	Steatite	
31018	Cone with base and screw top	1 1/4" high	Steatite	
38500	100 Beads	5/16" dia.	QuartzQ	
45000	Coil Form	1" dia. no p.	Low loss mica base Phenolic	
45004	Coil Form	1" dia. 4 p.	Low loss mica base Phenolic	
45005	Coil Form	1" dia. 5 p.	Low loss mica base Phenolic	
45500	Coil Form	5/8" dia.	Steatite	
47001	Coil Form	1/2" dia.	QuartzQ	
47002	Coil Form	3/8" dia.	QuartzQ	
47003	Coil Form	3/4" dia.	QuartzQ	
47004	Coil Form	3/2" dia.	QuartzQ	
46100	Coil Form	1 3/4" dia. no p.	QuartzQ	
58000	Coil Dope	2 oz.	QuartzQ	
38001	Isolantite 3/16" O.D. Beads (Pk. of 50)			
38601	QuartzQ washers, 1/2" O.D. x 1/8" ID, Thickness 0.1"			
38602	QuartzQ washers, 1/2" O.D. x 1/4" ID, Thickness 0.1"			







## Terminals · Binding Posts · Plate Caps

**TERMINALS.** Every day the importance of safety in the design of Radar and radio equipment is being more fully realized. High voltage power supply units have been particularly bad offenders in the past. Newly designed high voltage terminals, rectifier plate caps, bushings, and terminal panels presented herewith now make possible improved safety designs of complete units. Power unit in upper left corner of page illustrates how these parts may be used. Barrier between contacts on No. 37105 AC terminal panel not only prevents arc over but also accidental contact with metal terminals. Easy to mount. Only series of small round holes required in chassis. Extra terminals provide for relay connection for remote "push to talk" switching. No. 37001 high voltage terminal mounts with round holes. Insulated bushing extends thru chassis, all metal parts completely enclosed in bakelite case; tapered plug and socket "high area-heavy pressure" contact.

The 37222 binding posts and 37202 plates incorporate such unusual special features as: (1) the square shoulder on the mounting stud of the post which seats in the slot in the plate so as to prevent annoying loosening of the posts when operating the clamping head; (2) Captive head; (3) Long stud; (4) the telescoping boss and socket so as to permit the plates to grip tightly the thinnest chassis as well as the thickest panels without necessity of grinding or filing; (5) the availability of the plates in Steatite, mica filled natural bakelite, as well as standard black phenolic.

The 37212 is an unusually compact plug for use with the

37222 posts. Available in black, red, or brown mica filled bakelite.

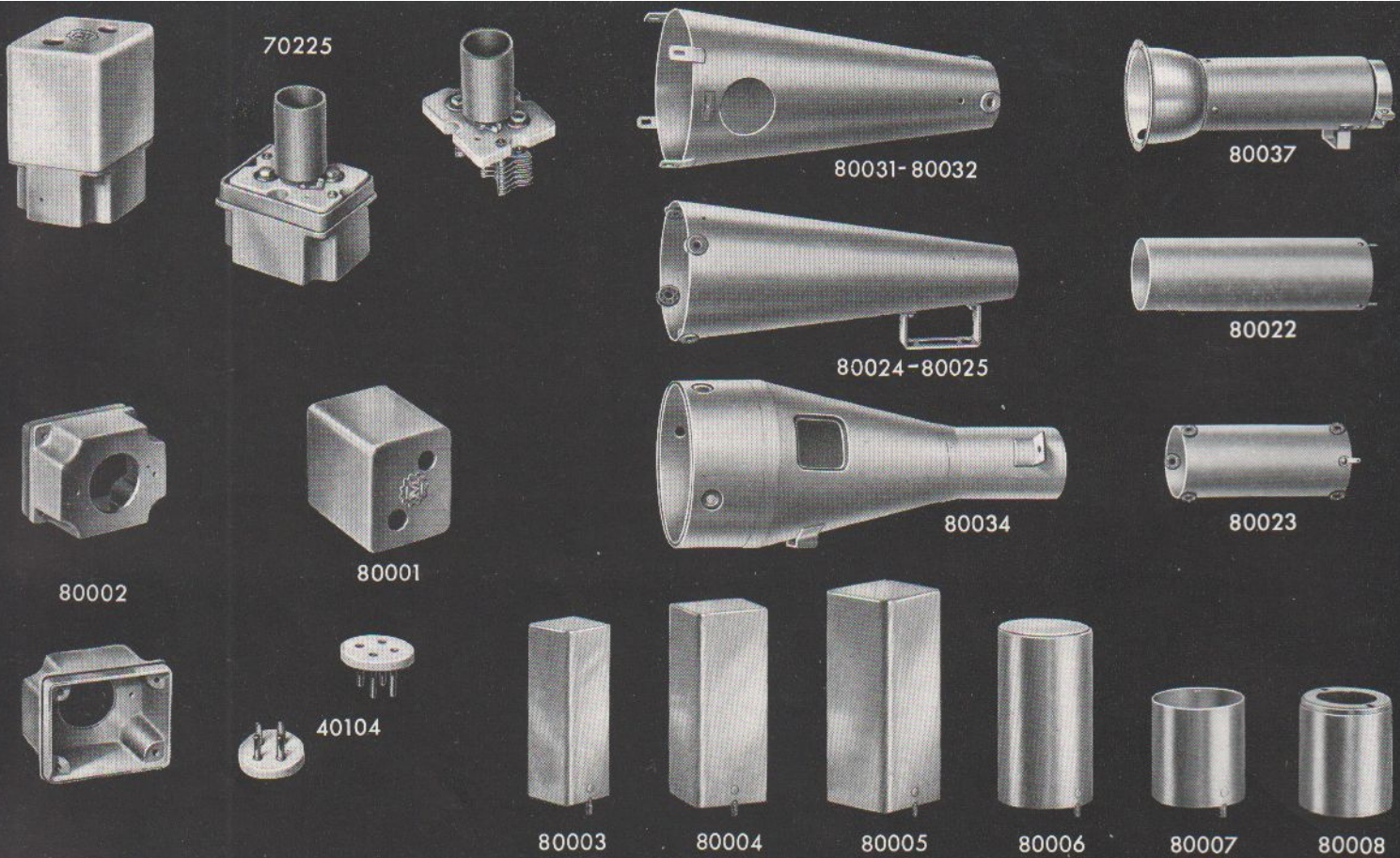
The plate caps 36001 and 36002 are steatite with spring connectors that will retain their tension under continuous high heat conditions encountered in operation.

10070 is a watertight packing gland for use with  $\frac{1}{4}$ " shafts when it is necessary to bring controls through watertight shield compartments. 32171 isolantite bushing for use as terminal under such conditions. Tinned thin soft copper shoulder wafer soldered to case or shield for watertight joint.

Code	Description	Net Price
10070	Watertight Gland	
32171	Watertight Terminal	
36001	Ceramic Plate Cap, $\frac{9}{16}$ " for 866, etc.	
36002	Ceramic Plate Cap, $\frac{3}{8}$ " for 807, etc.	
37001	Black or Red Bakelite Safety Terminal	
37501	Low Loss Mica Bakelite Safety Terminal	
37104	Four Terminal, Black Bakelite	
37105	Five Terminal, Steatite	
37202	Steatite, Black or Brown Bakelite, Plates, Pr.	
37211	Bracket	
37212	Plug, Black, Red or Brown	
37222	Binding Posts, Nickel Plated, Pr.	







## Shields • Tuned Exciter Tanks

Something radically new in compact fixed-tuned exciter tank design. Die cast aluminum base with removable cover admits ready access to coil for changing turns after being mounted on chassis and wired into circuit. Eliminates all of the difficulties in this respect in connection with early designs. Condenser, dual, double space 25 mmfd. Electrostatic shield between condensers. Isolantite base. Standard socket mounting hole in die cast base. Type 40104 or 40105, Isolantite tube base may be mounted in casting so that it will become "plug-in". Coil form is standard type 45000 of mica base low loss molded phenolic. The Isolantite wafer pin bases are ideal for ultra high frequency coils, plug-in fixed condensers, tapped resistors and other such uses. The cast aluminum condenser case may also be used for plug-in shielded coils in receivers, for shielding tube sockets, etc. The series of shield cans illustrated are those used for our IF transformers, etc. Heavy extruded aluminum. No. 80008 is designed for shielding the small transmitting pentodes.

Code	Description	Net Price
70225	Complete (Unwound) (No base plug)	
80001	Extruded Aluminum cover	
80002	Cast Aluminum base only	
40104	4 Prong Isolantite base plug	
40105	5 Prong Isolantite base plug	

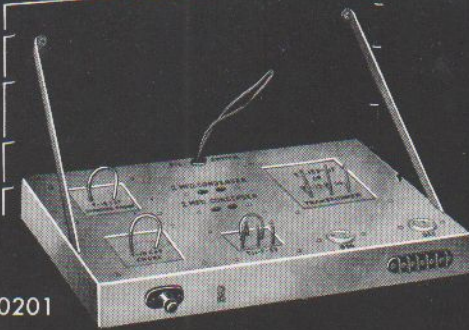
We specialize in the design and manufacture of high permeability shields for use with cathode ray tubes for the minimization of the effect of undesired stray magnetic fields. Standard stock sizes are available in different materials for all standard types of cathode ray tubes for use under normal conditions. We are also prepared to custom build this type of shield to special requirements on short notice. For most applications the single layer nicoloi shield is completely adequate. In cases where still more effective shielding is required we can furnish either dual nicoloi or single mu-metal types. Illustrated above are a few of the most generally used models.

Code	Description	Net Price
80003	Square $1\frac{1}{16} \times 4$	
80004	Oblong $1\frac{1}{16} \times 1\frac{7}{8} \times 4\frac{1}{2}$	
80005	Square $2 \times 4\frac{7}{8}$	
80006	Round $2\frac{1}{8} \times 4$	
80007	Round $2\frac{1}{8} \times 2\frac{3}{8}$	
80008	Round $2\frac{1}{8} \times 2\frac{3}{8}$	
80022	Nicoloi Shield for 3" tubes	
80023	Nicoloi Shield for 3" tubes	
80024	Mu-Metal Shield for 1802	
80025	Nicoloi Shield for 1802	
80031	Nicoloi Shield for 5CP1	
80032	Mu-Metal Shield for 5CP1	
80037	Nicoloi Shield for 3BP1	

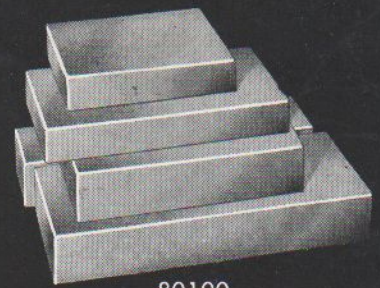




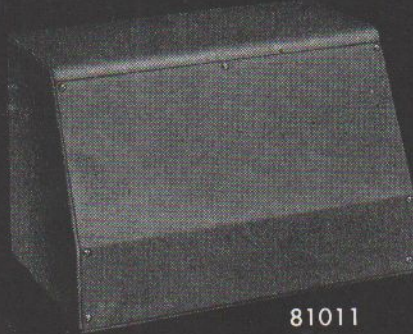
80201



80100



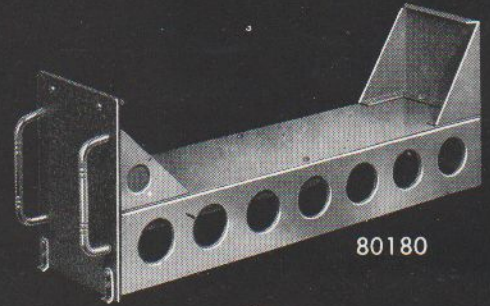
81011



80560



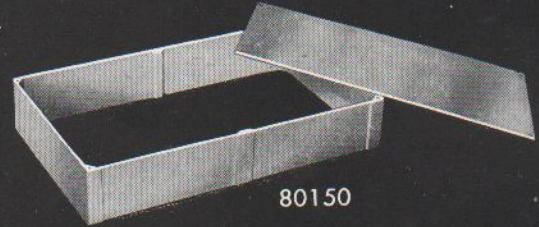
80180



81001



80150



80300



## Prewired Foundation Units • Chassis • Panels

**PREWIRED HIGH VOLTAGE TRANSMITTER POWER PACK CHASSIS.** Again, something entirely new! Not only is the headache work of cutting square holes, etc. in what is generally a rather necessary but uninteresting part of the transmitter construction eliminated, but also the wiring. After all, power supply circuits are pretty well standardized and leave little room for experimentation in themselves. Each size chassis can be used for more than one rating of pack by use of proper size power transformer. Designed with a view to "safety"; heavy steel baffle welded in base isolates input line circuits from high voltage leads. Furnished with insulated safety output terminal, AC input terminal block, tube socket, safety rectifier cap, etc. AC terminals on block for remote or relay control of high voltage. Complete except for tubes, transformer, chokes, filter condensers and bleeder. All mounting holes for Thordarson units. Other makes may be used by drilling additional holes.

**RUGGED CAST ALUMINUM CHASSIS.** A little expensive, from some points of view, but can be used over and over again in different jobs by merely replacing sheet aluminum top. Easy to use as all drilling, etc. is done on flat top plate before mounting on cast frame. Ideal for ECOs, receivers, etc. where stability is important. Only available, at present, in one stock size, but others will be added to the line if demand warrants.

**PANELS.** Fine grain black wrinkle finished  $\frac{1}{8}$ " thick steel panels. Standard relay rack punchings and sizes. Nothing new or novel. Just the conventional at the standard price! Uniform finish makes group of panels always match.

**PLAIN STEEL CHASSIS.** Light gauge, easy to drill. Baked black wrinkle finish.

Code	Part	Size	Net Price
80201	Complete Prewired Foundation Unit	Panel 19 x 10 $\frac{1}{2}$ Chassis 17 x 12 Power Ratings: 600 or 750V at 300MA 750 or 1000V at 300MA 1000 or 1250V at 300MA 1250 or 1500V at 300MA	
80205	Complete Prewired Foundation Unit	Panel 19 x 12 $\frac{1}{2}$ Chassis 17 x 14 Power Ratings: 2000 or 2500V at 300MA	
80100	Steel Chassis	5 $\frac{1}{2}$ x 9 $\frac{1}{2}$ x 1 $\frac{1}{2}$	
80101	Steel Chassis	7 x 9 x 2	
80102	Steel Chassis	7 x 13 x 2	
80103	Steel Chassis	7 x 15 x 3	
80104	Steel Chassis	4 x 17 x 3	
80105	Steel Chassis	7 x 17 x 3	
80106	Steel Chassis	10 x 12 x 3	
80107	Steel Chassis	10 x 14 x 3	
80108	Steel Chassis	10 x 17 x 2	
80109	Steel Chassis	10 x 17 x 3	
80150	Aluminum Chassis	17 x 10 x 3	
80301	Steel Panel	19 x 1 $\frac{3}{4}$ x $\frac{1}{8}$	
80303	Steel Panel	19 x 3 $\frac{1}{2}$ x $\frac{1}{8}$	
80305	Steel Panel	19 x 5 $\frac{1}{4}$ x $\frac{1}{8}$	
80307	Steel Panel	19 x 7 x $\frac{1}{8}$	
80308	Steel Panel	19 x 8 $\frac{3}{4}$ x $\frac{1}{8}$	
80310	Steel Panel	19 x 10 $\frac{1}{2}$ x $\frac{1}{8}$	
80501	Steel Brackets	3 $\frac{1}{2}$ x 1 $\frac{1}{2}$ x 12	
80560	Instrument Handle, leather, with gunmetal finished hardware		
81001	Speaker Cabinet, for 6" diam. speaker		
81011	Cabinet, 14" long, 9" deep, 9" high		
80180	ATR Chassis $\frac{1}{2}$		
80181	ATR Chassis $\frac{3}{4}$		
80182	ATR Chassis full		

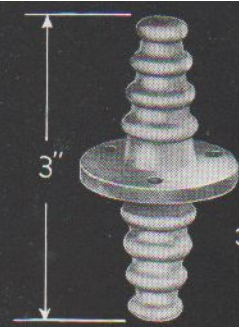






35103

35151



32300



50110



35206

35202



32201



32205



32204



32203



32202



90721

## Antenna Devices · Safety Relays · Hetrofil\*

The small No. 35202 steatite spreader has many possibilities for use inside the radio shack as well as out. When used with a pair of No. 16 tinned wires the spreaders are easily, neatly, and ruggedly locked in place by means of a drop of solder on the wire at each side of the hole. This arrangement makes an efficient, neat 500 ohm line for use between the receiver, the transmitter and the antenna change over relay. Diameter is only 1/4". Design feature of the lead-in bowl hardware is the screw-driver slot at ends of rods to permit holding while tightening nuts. Isolantite bushing 32300, while perhaps a little high priced for many amateur applications, has the very desirable feature of being made from solid pieces of Isolantite and will stand up under very severe conditions. Much used on certain types of government, commercial, and diathermy work.

An extremely unique device is the No. 50006 vacuum enclosed delay relay. Available with either 6 or 110 volt heater winding. Takes approximately 30 seconds for bimetallic snap disc to operate. Due to snap action of the contact and vacuum, the relay can easily handle 1 kilowatt. Time action adjustable over limited range by heater voltage variation. Ideal for aircraft installations. Standard 4 prong base.

The HETROFIL is a device which provides means directly in the audio output of a communications receiver to reject or suppress an interfering signal or audio beat note. Thus, if two CW stations are being received simultaneously the HETROFIL may be adjusted so as to reject either of the signals and accept the other. It may be used externally as a separate unit or built into a complete receiver. When used with a receiver without the modern type crystal filter it has all of the advantages of the phasing control of the crystal circuit and at the

same time is much easier and quicker to operate. The HETROFIL may be used with any type of receiver and provides a means of selective control for TRF receivers comparable to the crystal filter used in superheterodynes and at a much lower cost. A technical paper fully describing this device appeared in the September 1939 issue of QST. Manufactured under license from the inventor, Dr. R. W. Woodward.

\* Reg. U. S. Pat. Office.

Code	Description	Net Price
35103	Steatite Antenna Insulators	
35151	Steatite Antenna Insulators	
35206	Steatite Feeder Spreader 6"	
35202	Steatite Feeder Spreader 2"	
32300	Isolantite Bushing	
32201	Steatite Bushings and Hardware 1 1/4" hole	
32202	Steatite Bushings and Hardware 1 3/8" hole	
32203	Steatite Bushings and Hardware 2 5/8" hole	
32204	Steatite Bushings and Hardware 3 5/8" hole	
32205	Steatite Bushings and Hardware 3 5/8" hole	
50006	Delay Relay 6V. Cold Open	
51006	Delay Relay 6V. Cold Closed	
50110	Delay Relay 110V. Cold Open	
51110	Delay Relay 110V. Cold Closed	
90721	Hetrofil	







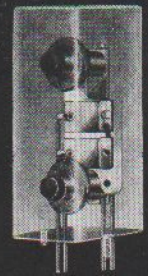
63456



60456



67456



64456



62456



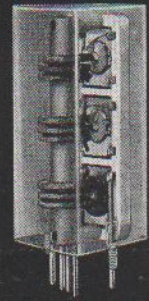
77083



79040



77866



66150

## IF Transformers · Wave Traps · Hash Filters

The "hash" filters are designed to eliminate the interference caused by mercury vapor types of rectifier tubes. The type 77083 is for use with type 82 or type 83 tubes. The type 77866 is for use with 866s. Wound on Isolantite cores. They should be connected in each plate lead as close to the tube as possible.

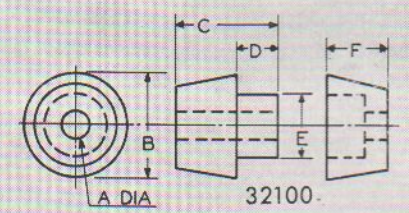
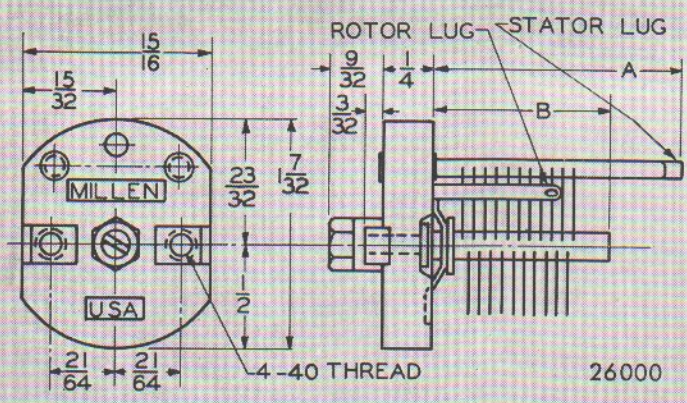
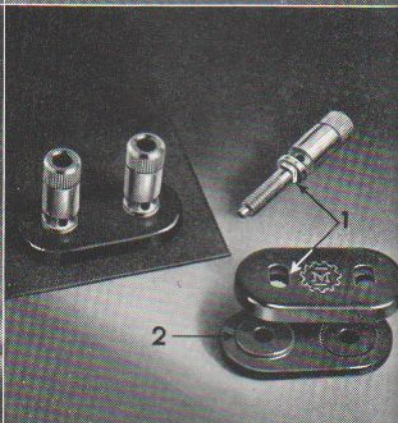
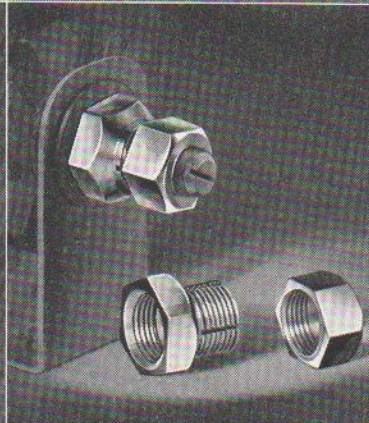
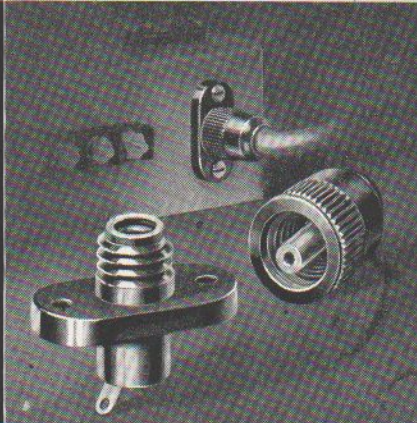
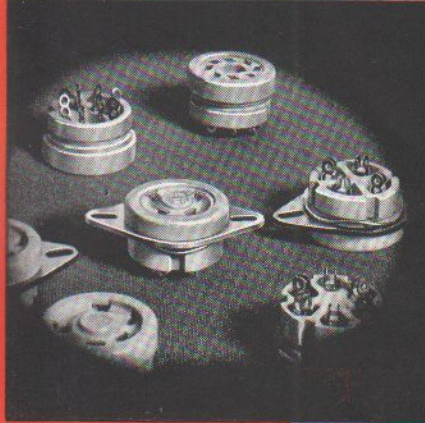
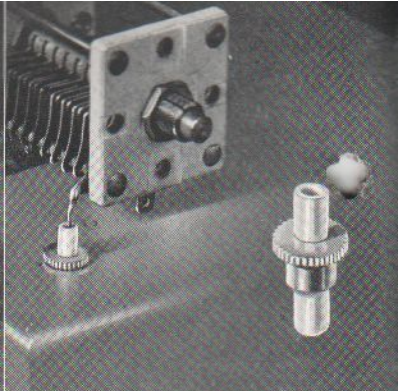
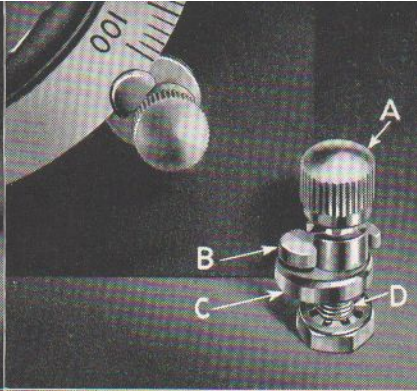
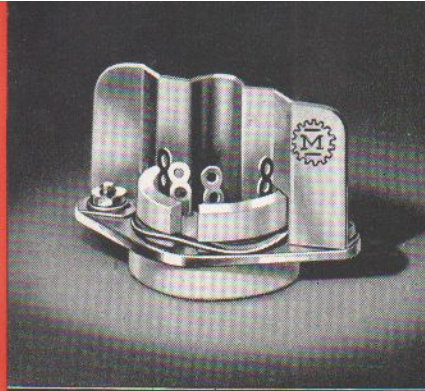
Wave traps afford practical and inexpensive means of combating BCL interference complaints. Available for all amateur bands.

Our line of IF transformers is extremely complete and covers air core air tuned, iron core air tuned, permeability tuned, as well as inexpensive mica tuned iron core units. Both mica tuned and air condenser tuned IF and discriminator units are available for FM receivers. No. 66150 is a compact triple tuned unit which has an unusually straight sided response curve so as to reduce inter-channel interference to a minimum. This type transformer is used in some of the newer receivers now under development. Air dielectric condenser tuned beat frequency oscillator units are available for all standard IF frequencies. Each BFO unit contains the grid condenser and the grid leak inside the shield. The large size heavy wall extruded aluminum shield cans, high Q condensers and coils result in the over all Q of all transformers being extremely high for their particular type.

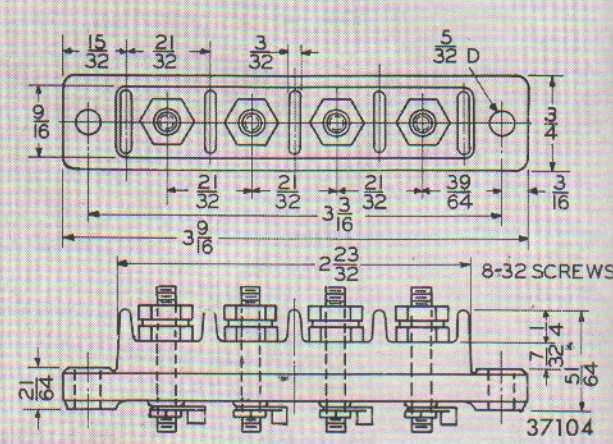
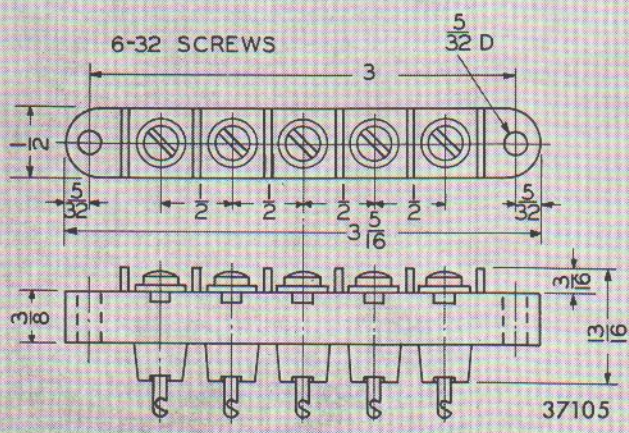
Code	Description	Net Price
79020	14mc Band Wave Trap	
79040	7mc Band Wave Trap	
79080	3.5mc Band Wave Trap	
79160	1.7mc Band Wave Trap	
77083	"83" Hash Filter 250MA	
77866	"866" Hash Filter 500MA, PR.	
77872	"872" Hash Filter, PR.	
<i>Air Trimmed</i>		
60456	456 Interstage (2) Air Core	
60455	456 Interstage (1) Air Core	
60454	456 Diode Air Core	
63456	456 BFO Air Core	
60501	5000 Interstage (2) Air Core	
60502	5000 Diode Air Core	
60503	5000 FM Interstage Air Core	
60504	5000 FM Disc Air Core	
63503	5000 BFO Air Core	
62456	456 Interstage Iron Core	
62454	456 Diode Iron Core	
62161	1600 Interstage Iron Core	
62162	1600 Diode Iron Core	
63163	1600 BFO Air Core	
<i>Mica Trimmed</i>		
67456	456 Interstage Iron Core	
67454	456 Diode Iron Core	
67503	5000 FM Interstage Air Core	
67504	5000 FM Disc Air Core	
<i>Permeability Tuned</i>		
64456	456 Interstage (2)	
64454	456 Diode (2)	
65456	456 BFO	
<i>Triple Tuned</i>		
66456	456 Interstage	
66454	456 Diode	



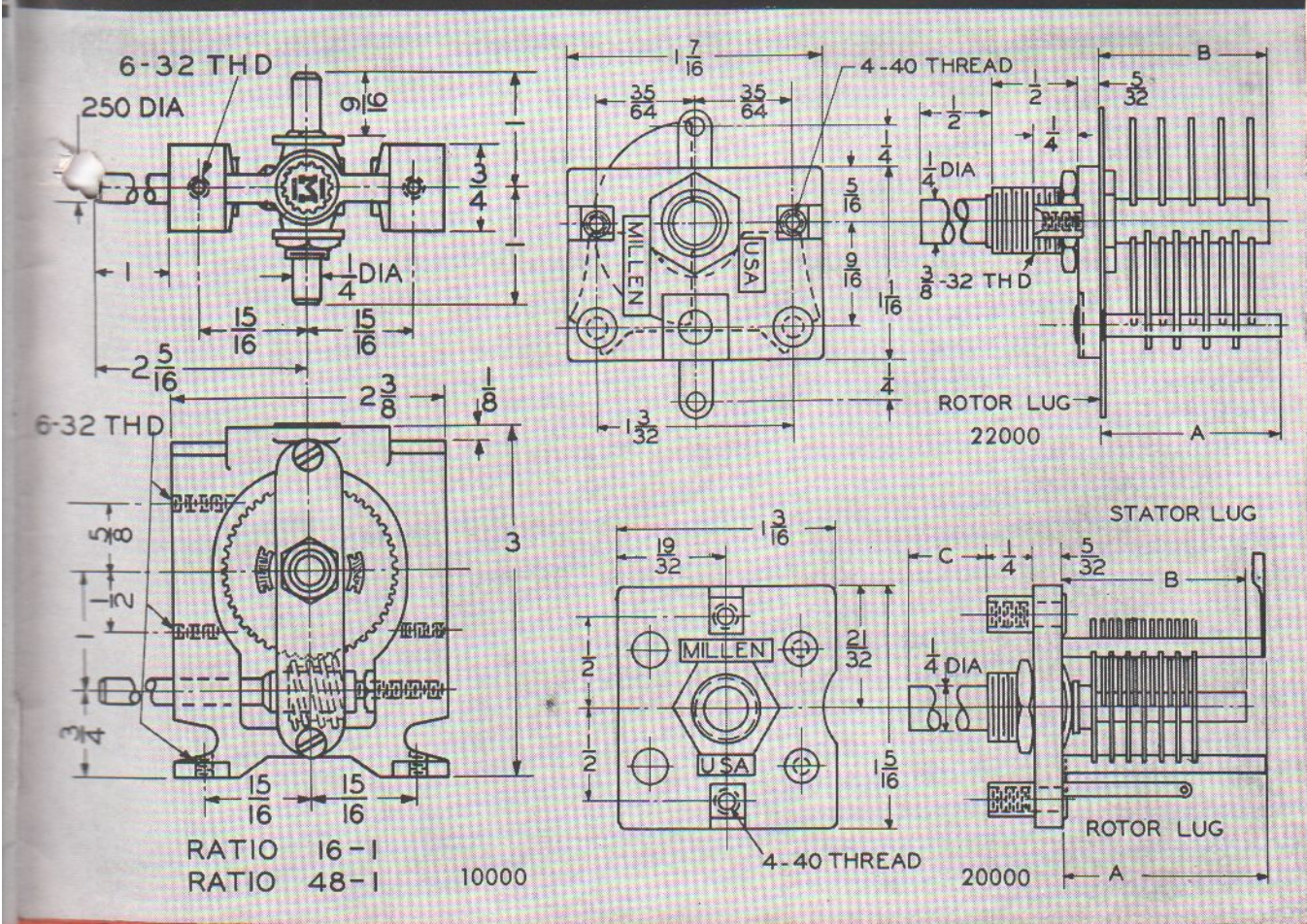
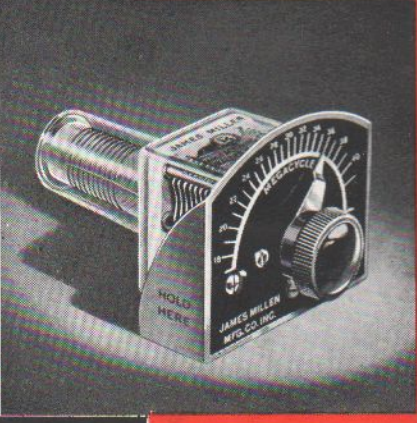
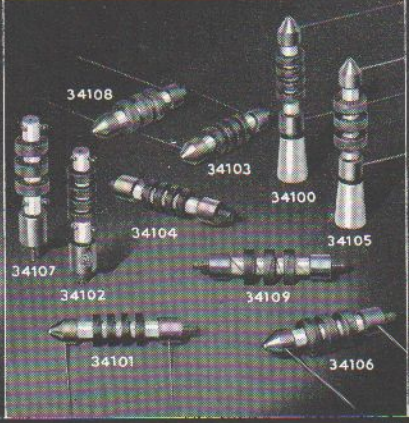
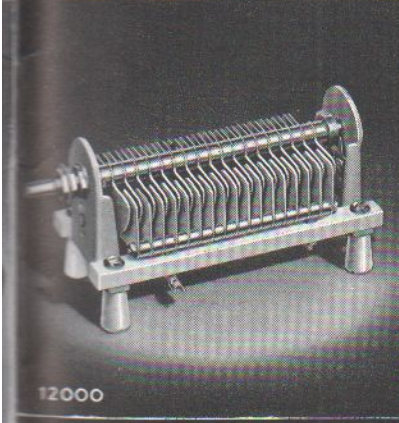
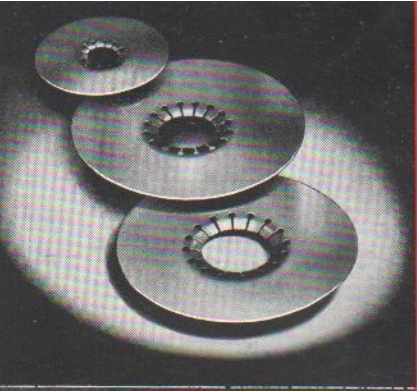
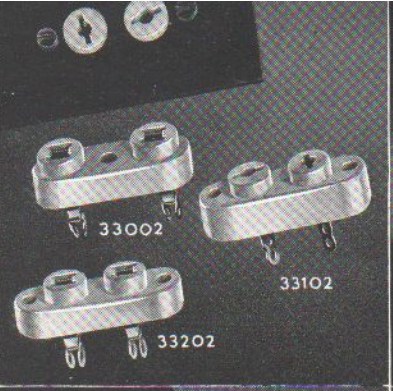
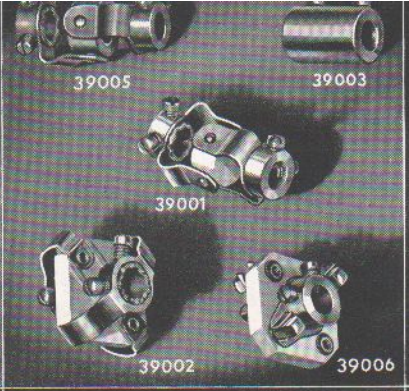




DIMENSIONS	A	B	C	D	E	F
CODE 32100	$\frac{5}{32}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{3}{8}$
CODE 32101	$\frac{3}{16}$	$\frac{7}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
CODE 32102	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{8}$
CODE 32103	$\frac{3}{16}$	$\frac{1}{8}$	$\frac{5}{16}$	$\frac{9}{16}$	$\frac{3}{4}$	$\frac{3}{4}$









# Classified

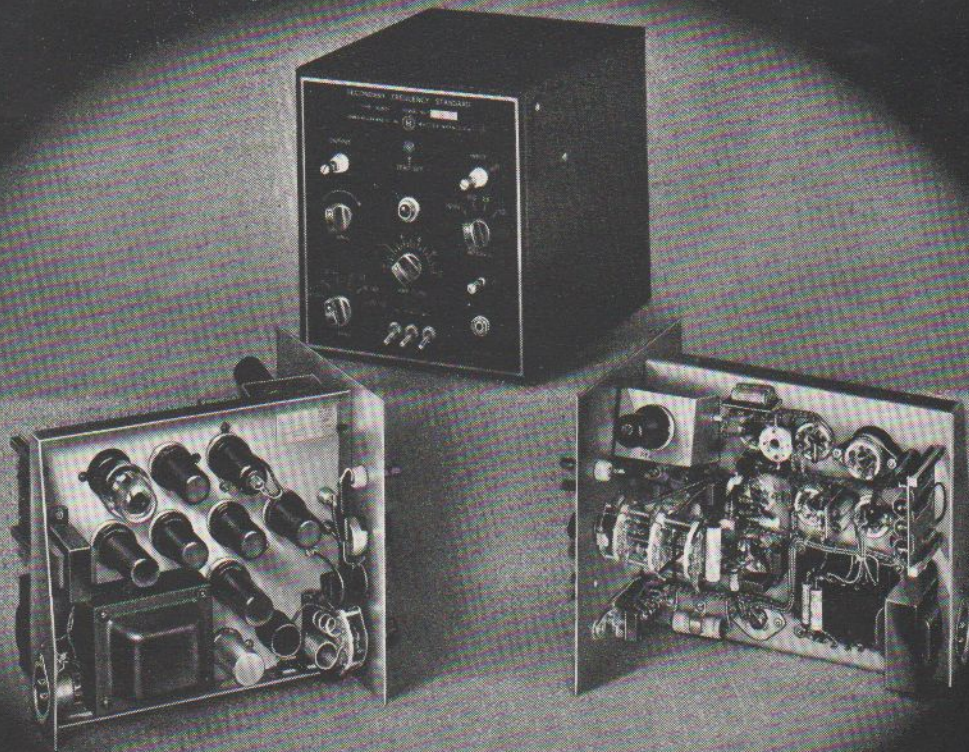
## Synchrosopes

At the present time all of our instruments in the synchroscope, pulse transmission, measurement and ultra high frequency determination fields are classified and no printed details may be listed. Those interested in this type of equipment and having proper clearance will be given full details upon proper application. A few of the more generally used instruments in this category are tabulated herewith:

<i>Code</i>	<i>Description</i>	<i>Net Price</i>
P4	Synchroscope complete with tubes	
P4E	Same as P4 but plus video amplifier	
90630	Ultra High Frequency Calibrator. Cavity type with amplifier. AC operated. Complete with tubes	
90631	Ultra High Frequency Wave Meter, cavity type	







## Secondary Frequency Standard

A Precision Frequency Standard for both Laboratory and production uses. Designed around the GE G-18 and G-51 crystal, so as to have a frequency temperature coefficient of less than 1 cycle/Mc/C°. The crystal is sealed in Helium in a standard metal tube envelope. Adjustable output provided at intervals of 10, 25, 100, and 1000 KC with magnitude useful to 50 MC. Harmonic amplifier with tuned plate circuit and panel range switch. 900 cycle modulator, with panel control switch. Panel plate supply control switch. In addition to Oscillators, Multi-vibrators, Modulators, and Amplifiers, a built-in Detector with 'phone jack and gain control on the panel is incorporated. Easily adjusted to WWV. Self-contained AC power supply with VR 150-30

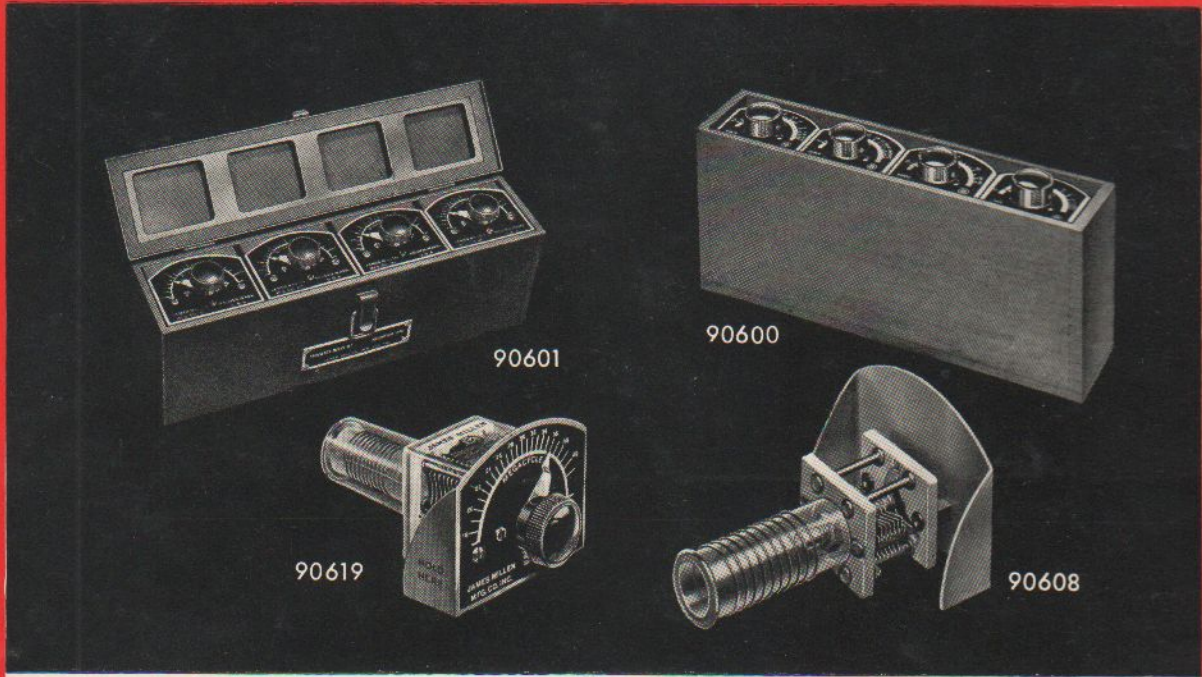
voltage regulator. Used in quantity by Signal Corps, Navy, FCC, British and all large government prime contractors such as GE, RCA, Western Electric, Sperry, Westinghouse, etc. Cabinet size 9" x 9<sup>5</sup>/<sub>8</sub>" x 10<sup>1</sup>/<sub>2</sub>", weight 20 lbs. Compact, dependable, stable, trouble-free.

• • • • •

Code	Description	Net Price
90505	115 volt 60 cycle AC operated. Secondary Frequency Standard complete with GE Crystal and all tubes	
90507	220 volt 50/60 cycle AC operated. Secondary Frequency Standard complete with GE Crystal and all tubes	







## Midget Absorption Frequency Meters

Many amateurs and experimenters do not realize that one of the most useful "tools" of the commercial transmitter designer is a series of very small absorption type frequency meters. These handy instruments can be poked into small shield compartments, coil cans, corners of chassis, etc., to check harmonics; parasitics; oscillator-doubler, etc., tank tuning; and a host of other such applications. Quickly enables the design engineer to find out what is really "going on" in a circuit.

Types 90605 thru 90609 are extremely small and designed primarily for engineering laboratory use

where they will be handled with reasonable care. The most useful combination being the group of four under code No. 90600 and covering the total range of from 3.0 to 140 megacycles. When purchased in sets of four under code No. 90600 a convenient carrying and storage case is included. Series 90601 are slightly larger and very much more rugged. They are further protected by a contour fitting transparent polystyrene case to protect against damage and dirt. This latter series is designed primarily for field use and are not quite as convenient for laboratory use as the 90605 thru 90608 types. All types have dials directly calibrated in frequency.

Code	Description	Net Price
90605	Range 3.0 to 10 mc.	
90606	Range 9.0 to 23 mc.	
90607	Range 23 to 60 mc.	
90608	Range 50 to 140	
90600	Complete set of 90605 thru 90608, in case	
90601	Complete set Field type Frequency Meters in metal carrying case 1.5 to 40 mc.	

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