

JAMES MILLEN

MANUFACTURING

COMPANY, INC.



Radio Engineers and Manufacturers

COMMUNICATIONS RECEIVERS & TRANSMITTERS 1947-48



MILLEN RADIO PRODUCTS are divided, for cataloging purposes, into three groups, covered by three separate catalogs:

- I Component Parts
- II Communication Receivers and Transmitters
- III Laboratory and Measurement Equipment

THIS CATALOG describes and lists our line of communication receivers, transmitters, exciters and accessories. Our distributors carry in stock our complete line of component parts and amateur receivers and transmitters, but due to the engineering correspondence generally required in connection with the merchandising of the laboratory equipment (described in detail in Catalog III) these instruments are normally sold through our district offices or from the main sales office at the factory. Any of our distributors, however, will, upon request, be happy to place your order on the factory and thus secure for you any of the items they do not normally carry in stock.

MILLEN COMMUNICATION RECEIVERS AND TRANSMITTERS are mechanically engineered to bring out the best performance of which modern tubes and circuits are capable and at the same time give due consideration to such essentials, so often lacking in amateur band receivers, as stability, shipability, re-setability and general all around convenience of operation (for example, only one dial scale visible at once; tuning knob the most desirable height above operating table, etc.) Millen receivers and transmitters are not merely an assembly of standard components. The specially designed components and overall mechanical design are the result of basic design being controlled by mechanical engineers working in close co-operation with our electronic circuit group. Thus our slogan, "Designed for Performance."

MILLEN RADIO COMPONENTS 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; 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."

THE PRICES IN THIS CATALOG are strictly net for the eastern part of Continental U. S. A. (Prices on some items are slightly higher west of the Rockies and approximately 60% higher, because of customs duties, etc., in Canada.) All discounts have already been deducted for your convenience. The code numbers used are all that 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. All prices are subject to change without notice.

OUR DOMESTIC DISTRICT SALES OFFICES are maintained in all principal cities where full information about our products and policies may be promptly obtained by telephone or mail.

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.

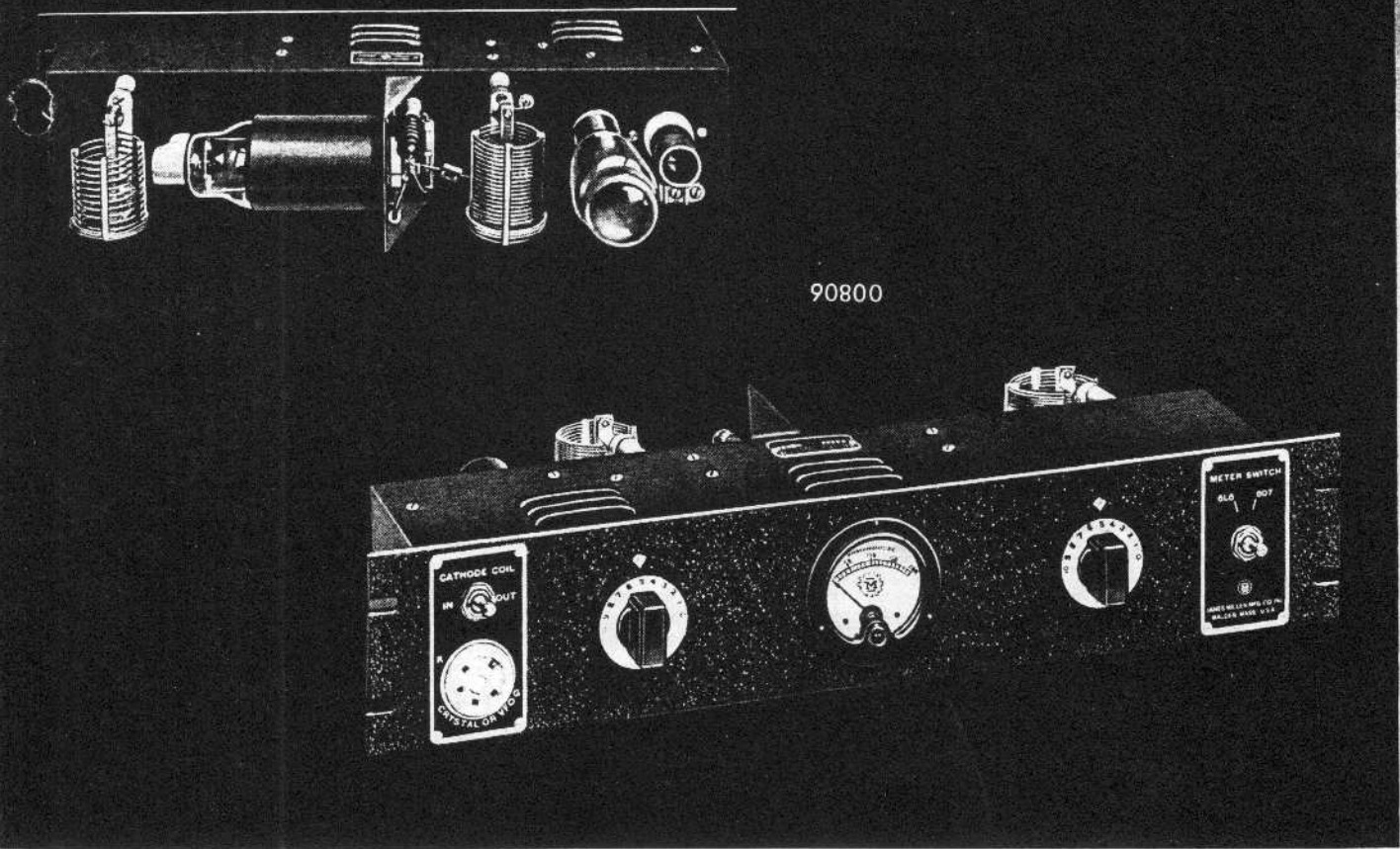
GOVERNMENT AND COMMERCIAL APPARATUS. In addition to our standard line of catalog items distributed through our foreign and domestic dealers, we operate a special design and contract manufacturing department where we specialize in the development and manufacture of component parts and complete Transmitters, 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 Radio Corporation of America, the Federal Telegraph Company, and many others. We are very much interested in receiving inquiries from commercial equipment manufacturers for this department.

OUR PRODUCTS ARE GUARANTEED in accordance with the terms of the standard uniform guarantee of the Radio Manufacturers Association, in which organization we hold membership.

PATENTS. Our products are manufactured under many patents and patent applications of our own as well as licenses from the principal pools. See special labels attached to products. Trademarks Reg. U. S. Pat. Office.

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50 Watt Transmitter—Exciter

The 90800 transmitter-exciter consists of a 6L6 tri-tet crystal oscillator-doubler or beam tetrode crystal oscillator, driving an 807 amplifier or frequency doubler. The 6L6 may also be used as a frequency doubler driven by a V.F.O. The transmitter can deliver 50 watts or more output in the 80, 40, or 20 meter amateur bands. By doubling frequency in the 807, the transmitter can deliver 20 watts or more output in the 10 or 11 meter amateur bands.

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.

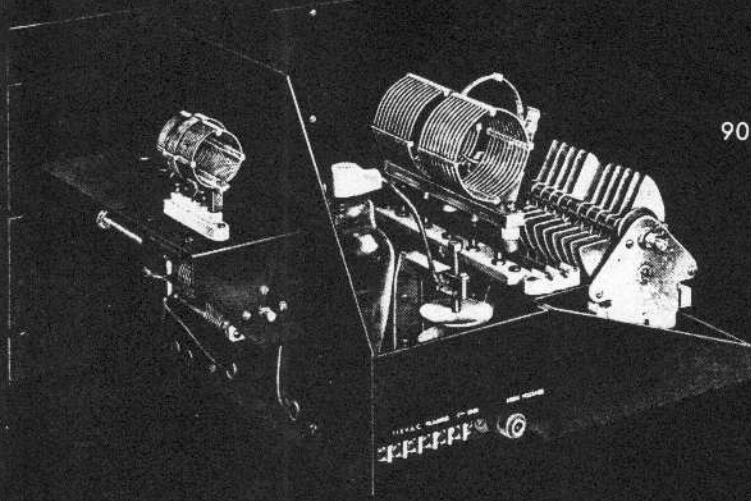
Because it is possible to double or quadruple frequency in the plate circuit of the oscillator and to double frequency in the plate circuit of the 807 as well, there are several possible combinations of coils and crystals which will produce the same output frequency.

The 90800 is normally supplied with a set of plug-in coils for operation with 10 meter output, using a 40 meter crystal. Additional coils for operation on 80, 40, or 20 meters are listed on page 5. The panel is standard 3½" x 19" rack mounting.

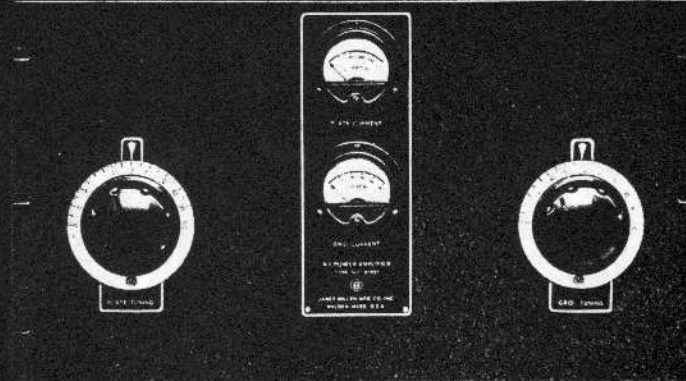
90800, less tubes and crystals, but including one set of coils. *Net Price* \$

Shipping Weight: 15 lbs.

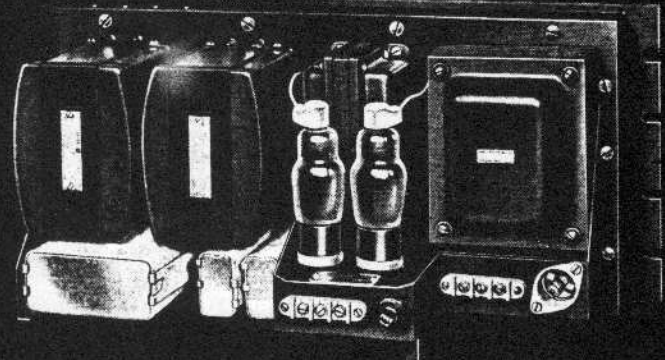




90881



90281



Transmitter Sub Units

Herewith is presented the first in a group of universal equipments for general laboratory and experimental use, as well as incorporation in the assembly of complete amateur and commercial transmitters. The units described herewith are also suitable for use with our basic No. 90800 universal exciter unit.

THE HIGH VOLTAGE POWER SUPPLY

The No. 90281 high voltage power supply has a d.c. output of 700 volts, with maximum current of 235 ma. In addition, AC filament power of 6.3 volts at 4 amperes is also available so that this power supply is an ideal unit for use with transmitters, such as the Millen No. 90800, as well as general laboratory purposes.

The power supply uses two No. 816 rectifiers and has a two section II filter with 10 henry General Electric chokes and a 2-2-10 mfd. bank of 1000 volt General Electric Pyranol capacitors. For convenience of operation, a dual AC input terminal arrangement is provided. First, there is the conventional AC cord and connector; second, there is, in parallel with this connector, a terminal block with extra connections for independent switching of rectifier filament and plate transformers.

The front panel carries the filament and plate toggle switches and their associates pilot lamps, for use when the remote switching system is not employed. The panel is standard 8 3/4" x 19" rack mounting.

No. 90281 — High Voltage Power Supply, 115 V
60/50 cycles, less tubes \$

Shipping weight: 60 lbs.

THE RF POWER AMPLIFIER

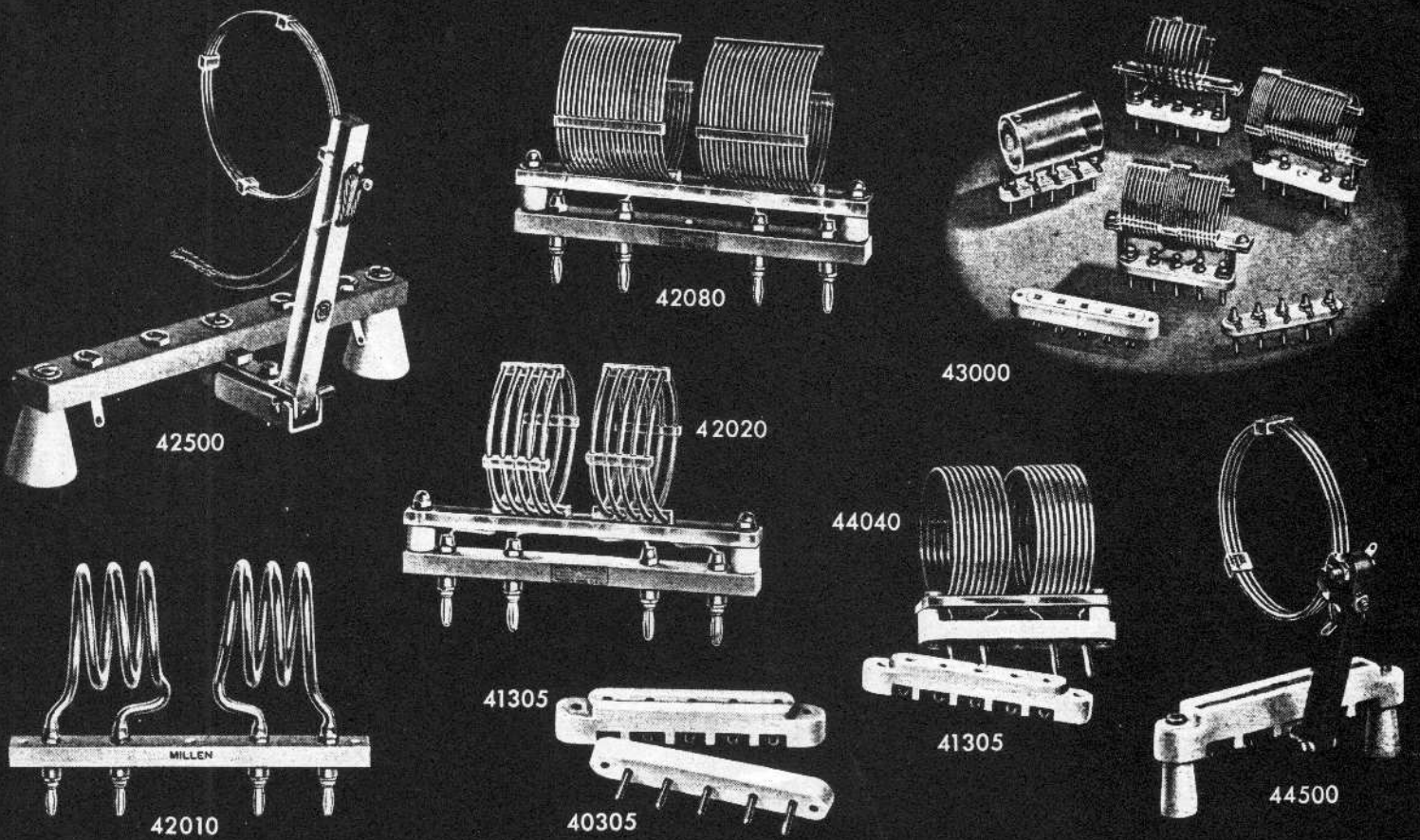
The No. 90881 universal RF power amplifier unit is designed for use with a pair of such tubes as 35Ts, T40s, T55, 11K151, RK35, etc., with a plate circuit power input on the order of 500 watts. As shipped, the unit is wired for use with the popular "812" tubes, but full instructions are furnished for altering any of the others. Individual grid and plate milliammeters of 100 and 500 ma range are mounted on the front panel, as well as the grid and plate circuit tuning controls.

Series 42000 "500 watt" plug-in air inductors with "swinging link" antenna coupling are furnished for the plate circuit and Series 43000 for the grid circuit. The plate tuning condenser is a No. 16060 with peak voltage rating of 6000. For low frequency operation, a G.E. 25 mmfd. vacuum capacitor can be used in parallel. The neutralizing capacitors are the No. 15011 disc type. The panel is standard rack type, 19 x 10 1/2."

No. 90881 — RF Power Amplifier, less tubes \$

Shipping Weight: 25 lbs.





Transmitting Inductors

A complete line of plug-in air wound inductors, coil forms, jack bars and sockets that have been "Designed for Application." The sockets are of the "straight line" type, facilitating symmetrical circuit arrangements and avoiding the undesirable bunching of leads, as when standard tube base socket-plug arrangements are used. Available in stock sizes for all amateur bands below 31 megacycles in wattage ratings of 75, 150 and 500. Also available on special order for any specified commercial frequency. 150 and 500 watt units have swinging link. 75 watt series available only with fixed link, center or end positioned or no link. Blank forms (not illustrated) of Quartz Q are available for the 75 watt (No. 43001) and 150 watt (No. 44001) series for experimental winding purposes.

PIN DATA CHART			
Code	Pin Dia.	Pin Spacing	Socket Mtg. Hole Spacing
42000	.175	1 $\frac{1}{4}$ "	6 $\frac{1}{2}$ "
43000	.120	$\frac{1}{2}$ "	2 $\frac{13}{16}$ "
44000	.125	$\frac{5}{8}$ "	3 $\frac{3}{8}$ "

PLUGS, SOCKETS AND SWING-LINKS

No. 40205	Midget 5-prong Steatite plug	.....
No. 41205	Midget 5-prong Steatite socket	.....
No. 40305	Medium 5-prong Steatite plug	.....
No. 41305	Medium 5-prong Steatite socket	.....
No. 42500	Large socket and "swinging link" for use with No. 42000 series inductors	.....
No. 44500	Medium 5-prong Steatite socket with 150 watt "swinging link" for use with No. 44000 series inductors	.....

500 WATT INDUCTORS

No. 42010	Ten meter band, 500 watt inductor	.....
No. 42020	Twenty meter band, 500 watt inductor	.....
No. 42040	Forty meter band, 500 watt inductor	.....
No. 42080	Eighty meter band, 500 watt inductor	.....

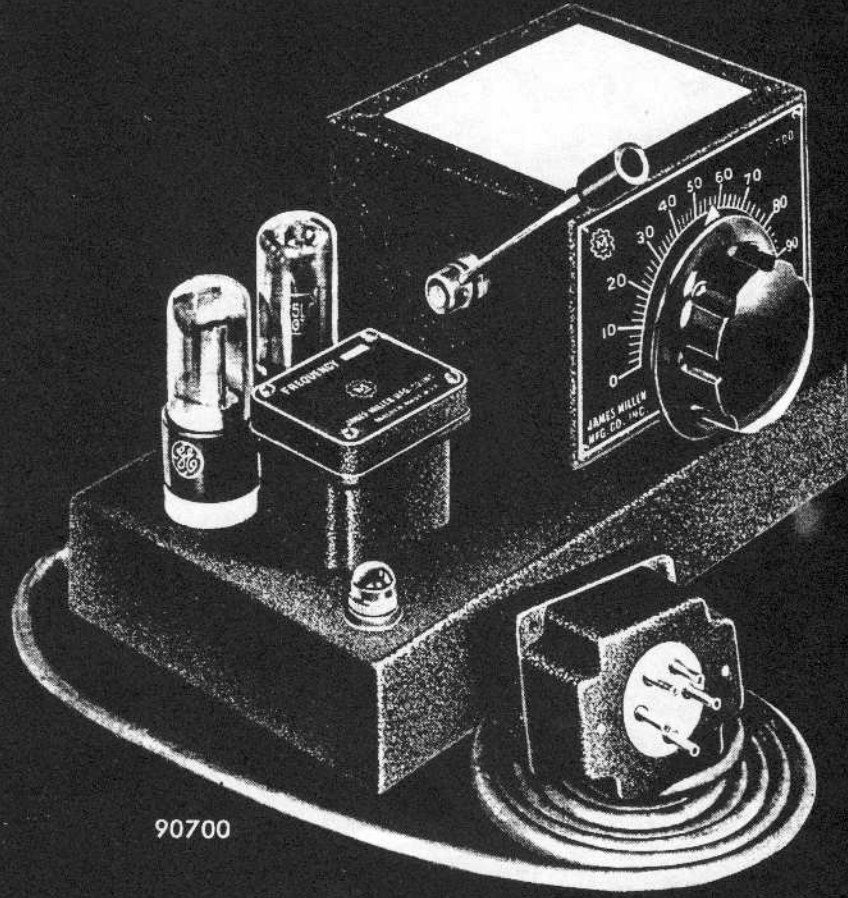
75 WATT INDUCTORS

No. 43001	Quartz Q blank form, 1 $\frac{3}{8}$ " dia. x 2" long	.....
No. 43011	Ten meter band, centre link, 75 watt inductor	.....
No. 43012	Ten meter band, end link, 75 watt inductor	.....
No. 43021	Twenty meter band, centre link, 75 watt inductor	.....
No. 43022	Twenty meter band, end link, 75 watt inductor	.....
No. 43041	Forty meter band, centre link, 75 watt inductor	.....
No. 43042	Forty meter band, end link, 75 watt inductor	.....
No. 43081	Eighty meter band, centre link, 75 watt inductor	.....
No. 43082	Eighty meter band, end link, 75 watt inductor	.....

150 WATT INDUCTORS

No. 44001	Quartz Q blank form 1 $\frac{7}{8}$ " dia. x 3 $\frac{3}{4}$ " long	.....
No. 44010	Ten meter band, 150 watt inductor	.....
No. 44020	Twenty meter band, 150 watt inductor	.....
No. 44040	Forty meter band, 150 watt inductor	.....
No. 44080	Eighty meter band, 150 watt inductor	.....





90700

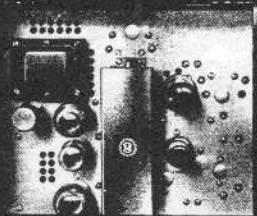
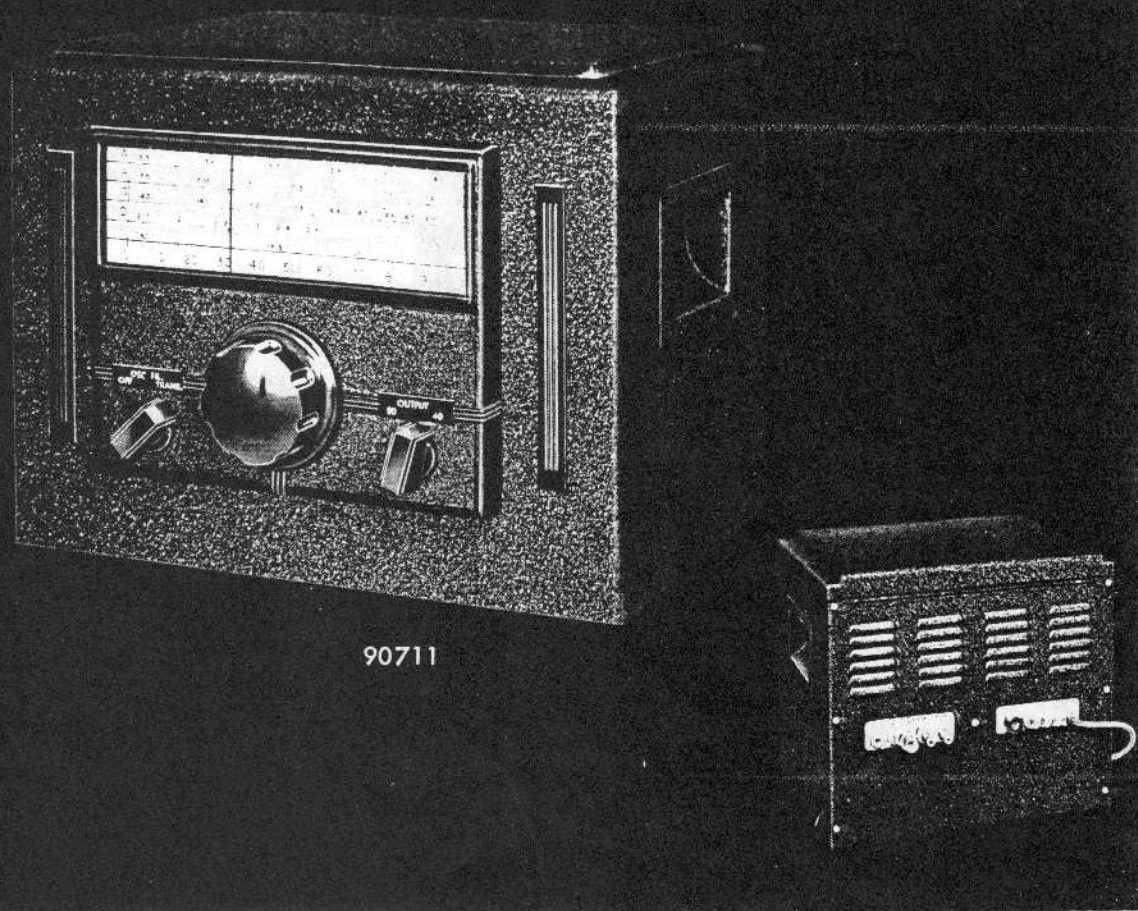
The No. 90700 and the 90701 electronic coupled oscillator units, as designed by Henry Rice, Jr., were originally described in detail in QST. The Millen commercial versions are constructed so as to take full advantage of the design. They are outstanding in performance, compact and inexpensive. The units are designed with high impedance output and plug in directly in place of the crystal for instant fingertip control of carrier frequency. No separate matching network is required. High capacity grid circuit and temperature compensation result in extremely low drift. Chirpless keying. Vibration immune. No hand capacity. Big band spread with band spread vernier. Accurate calibration. Easy to read curve. Built-in power supply, which operates at constant load under keying. Ideal for use with the 90800 Millen 50 watt transmitter-exciter unit. Use a 6K7 as the oscillator, a 25L6GT as the amplifier-buffer and a 25Z6GT as the rectifier.

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.
- 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 10. 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

Shipping Weight: 7 lbs.



The 90711 is a complete transmitter control unit with a stable gang-tuned electron-coupled oscillator and amplifier, a voltage-regulated power supply operating from 105-125 volt 50-60 cycles power line, high or low impedance output with enough power to drive any tube up to an 807, output on 80 or 10 meters, an accurately calibrated full-vision bandspread dial with calibrations for the 10, 15, 20 and 30 meter amateur bands, and provisions for controlling the complete transmitter from the oscillator panel.

This unit is unusually stable and drift-free because of its sturdy construction, high-capacitance oscillator grid circuit, untuned oscillator plate circuit, large temperature-compensated oscillator grid coil, temperature-compensated capacitors, regulated plate and screen voltages for the oscillator, and its adequate ventilation and carefully designed lay-out.

Convenience is another feature of the 90711. Good electrical bandspread is provided for *each* amateur band, not one band only! The dial is a Millen No. 10035 panel dial with a drive ratio of 13 to 1. The output may be coupled to a low impedance coupling link; or, by means of the plug-in adaptor for conversion to high impedance at the end of a low-impedance connecting cable, the output may be plugged into a transmitter crystal socket or connected directly to a grid. The output may be taken from a Millen No. 37212 type connector or from a coaxial connector. Band change, including bandspread change, is accom-

plished by turning a switch on the oscillator panel. (No plug-in coils!)

The keying is clean and free from all annoying chirp, quick drift, jump, and similar difficulties often encountered in keying variable frequency oscillators.

Tubes:

6SK7	Oscillator
6L6	Amplifier
5Y3-GT	Rectifier
VR-150	Voltage Regulator
VR-75	Voltage Regulator

<i>Transmitter Output Band</i>	<i>90711 Output Band</i>
30 meters	30 meters
10 meters	30 meters
20 meters	10 meters
15 meters	10 meters
10 meters	40 meters

Power Supply 105-125 volts 50-60 cycles 60 watts
 Size 12 $\frac{3}{4}$ inches wide x 12 inches deep overall x 11 inches high
 Weight 28 pounds

No. 90711 Variable Frequency Oscillator

Complete with tubes and impedance adaptor \$

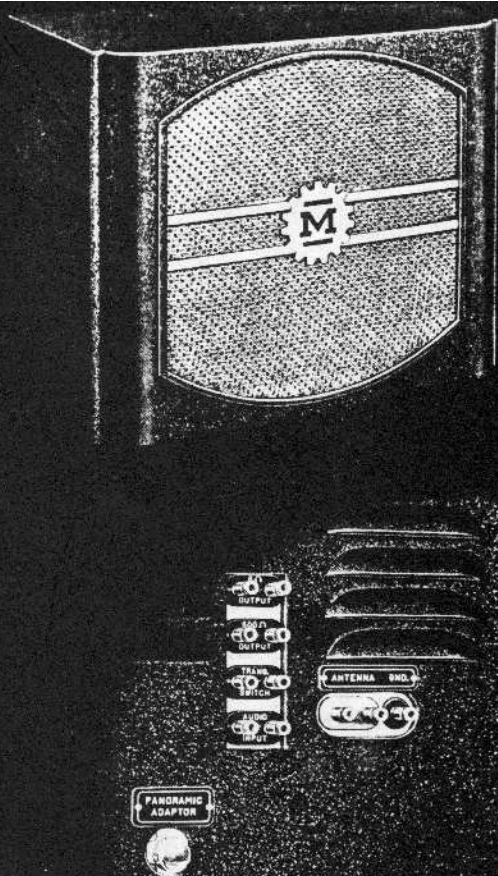
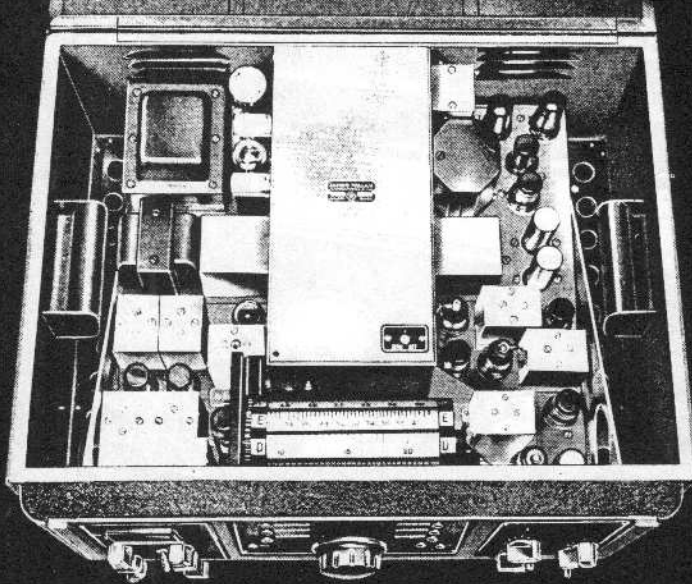


The 501 is a semi-custom built receiver. It possesses every mechanical as well as circuit design refinement that we feel desirable where the utmost in performance as well as ease of operation and dependability of operation are of more importance than price. Such a receiver can only be produced in limited quantity by skilled craftsmen working under laboratory rather than production line conditions. The performance, however, fully justifies the limited quantity and relatively high price. The outstanding attention to all design and workmanship details assures lasting top-flight performance for many years. The unusual grouping of the controls, the sloping center panel section, the micro-touch, finger-tip control power band shifting, the power tuning, the precision calibrated dial, the convenient-level, big tuning knob with its combined BFO control are but a few of the more obvious reasons why this receiver is such a joy to operate.

OUTSTANDING FEATURES

1. Micro-touch finger-tip control power band shifting.
2. Micro-touch finger-tip control motor tuning.
3. Sensitivity such that an input of less than one microvolt produces a usable signal throughout entire tuning range.

4. Individual full vision calibrated dial for each range. Only one range calibration visible at a time.
5. Selective — 150 cycle to 12 kc band width.
6. Calibrated Band Spread — Band spread range selected by push button. Band spread calibrations do not depend on setting of general coverage.
7. Stable — Positive resetability — Sturdy construction. Calibration remains accurate.
8. 2 — 6AK5 tuned RF amplifier stages.
9. 5 band widths with crystal filter allow proper selectivity on both phone and C-W signals.
10. Typewriter can be operated adjacent to receiver with no oscillator shift.
11. Frequency range 550 kc to 44.5 mc. — Continuous in 5 bands.
12. 3 high gain I. F. amplifiers — Double Conversion.
13. Separate band spread ranges for amateur 80, 40, 20, 15 and 10-11 meter amateur bands.
14. Handsome laboratory instrument styling.
15. Accurately set high permeability core IF transformers.
16. Good signal to noise ratio.
17. Effective Lamb type 3 stage adjustable noise limiter greatly increases usable sensitivity.
18. Automatic volume control on C-W as well as phone operation allows greater usable sensitivity.
19. Oscillator does not "pull" to strong signals because of superior mixer system.
20. Broadcast band in one range.
21. Built-in 500 kc calibrating crystal oscillator.
22. Same tuning control for general coverage and for band spread.
23. Transmit-receive lever-type switch.
24. Phone jack silences speaker. Comfortable volume for ear phone reception and for speaker reception at same audio gain control setting.
25. "S" meter calibrated in "S" units and db above 89.



26. Separate radio-frequency and audio-frequency gain controls.
27. Spring-return switch near main tuning dial allows convenient switching of beat-frequency oscillator while tuning for DX phone stations.
28. Input terminals to audio amplifier available at rear of cabinet.
29. All power supply filtering is inside receiver. It is not necessary for speaker to be plugged in for operation of receiver.
30. Power switch independent of all other controls.
31. Tone control.
32. Separate matched metal housing with 12 inch speaker.
33. High-fidelity push-pull 3 watt audio output stage.
34. High-fidelity i.f. for broadcast band.
35. 8 ohm balanced output for use in recording.
36. 600 ohm balanced output.
37. Jack for use with pan-adaptor.
38. Crystal phasing control.
39. Oscillator compensated for frequency drift.
40. Antenna input trimmer on front panel.
41. Separate a.v.c. amplifier.

TUBE LINE-UP

6AK5	.....	First Radio-Frequency Amplifier
6AK5	.....	Second Radio-Frequency Amplifier
6I7	.....	Mixer — First Detector
6SJ7	.....	High-Frequency Oscillator
6SK7	.....	First I.F. Amplifier
6K8	.....	Converter — Second Detector
6I7	.....	Second I.F. Amplifier
6SJ7	.....	Noise Amplifier
6K8	.....	Calibrator Oscillator
6SK7	.....	Third I.F. Amplifier
6SK7	.....	A.V.C. Amplifier
6SK7	.....	Beat-Frequency Oscillator
6H6	.....	Third Detector — A.V.C. Rectifier
6SJ7	.....	Audio Amplifier

- | | | |
|--------|-------|---------------------------------|
| 6J5 | ..... | Audio Phase Splitter |
| 2 6V6 | ..... | Push-Pull Audio Power Amplifier |
| 5Y4-G | ..... | Rectifier |
| VR-150 | ..... | Voltage Regulator |
| 2 1N31 | ..... | Crystal Diode Noise Rectifiers |

CABINET SIZE

- 22 inches long
- 19 inches deep — including knobs
- 12 3/8 inches high

RACK PANEL SIZE

- 19 inches long
- 10 1/2 inches high

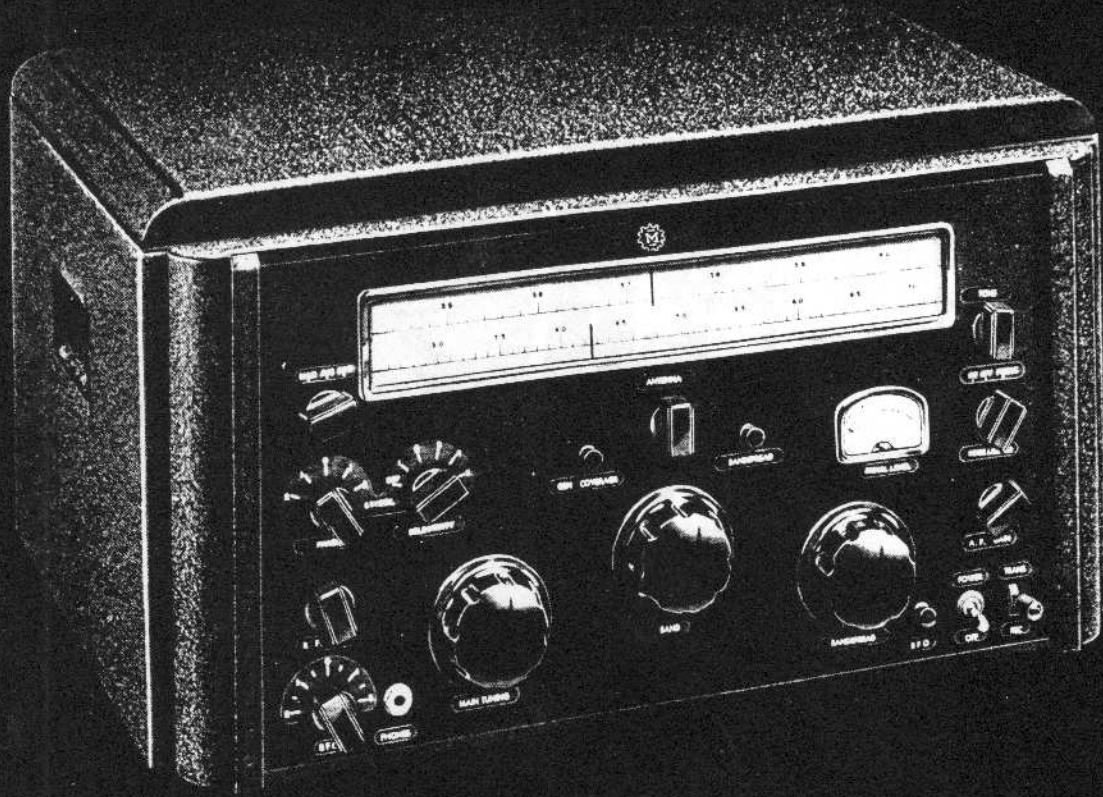
WEIGHT

- Receiver 107 pounds
- Overall shipping weight 135 pounds
- Speaker 17 pounds
- Overall shipping weight 23 pounds

POWER REQUIREMENTS

- 115 volts — 50-60 cycles
- 175 watts

No. 91501 Communication Receiver complete with full set of tubes and loud speaker in separate case. \$



Designed for Performance not only means the most modern of circuits, but even more so, a mechanical design that permits the operator to secure with ease and dependability all the performance of which the circuit is capable. A receiver so designed will not be obsolete in a single season, but will enjoy many years of commercial life as it continues, year after year, to give top performance. The basically sound mechanical engineering behind the 201, as with all *Millen* products, means: first, that the receiver will reach the customer in as perfect electrical circuit alignment as when it left the calibration table at the Malden laboratory; second, that it will retain this same peak alignment through years of service and third, it will be a pleasure to operate. Consider these outstanding mechanical design features:

Sliding carriage coil switching — has all the advantages of plug-in coils with the convenience of coil switching. The coil catacomb is sturdy cast aluminum.

12-inch full vision dial which changes with band changing. Precision detent on general coverage condenser which results in positive resetability on band spread ranges.

22 to 1 gear ratio on band spread dial.

13 to 1 gear ratio on general coverage dial.

Smooth, free-running, inertia-loaded dial drive with no backlash.

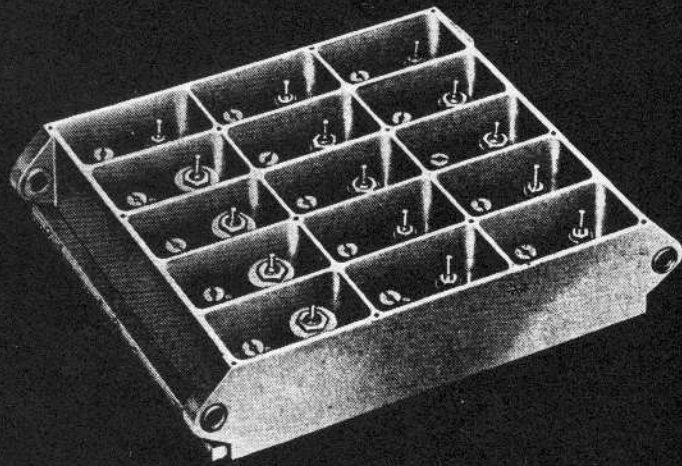
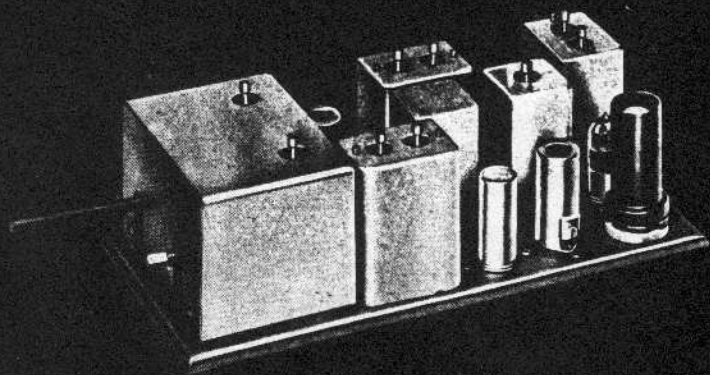
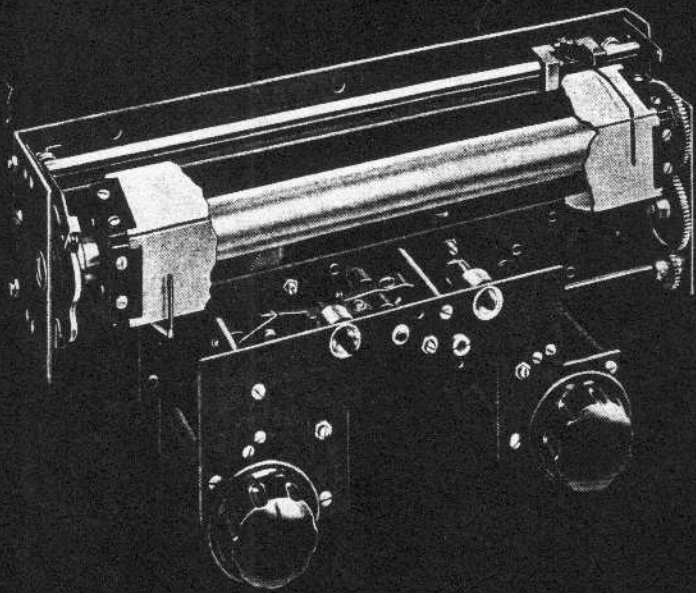
Panel may be rack mounted.

The circuit design takes advantage of recent advances. Double conversion is a "must" in a modern receiver. Modern minia-

ture tubes are used where their obvious advantages can be utilized. Miniature tubes are not used in places where they offer no advantage over conventional tubes. The new high transconductance 6AK5 tube is used to provide high gain in the RF amplifier. Three of the war-born crystal diodes are used to give this receiver 13 tube performance with only 11 tubes. Crystal diode noise limiters used in the DFP 201 receiver are far more effective than tube limiters.

OUTSTANDING FEATURES

1. Double conversion — No images in 10 and 11 meter bands.
2. Crystal controlled second high frequency oscillator.
3. Sliding carriage coil switching — short leads result in improved high-frequency performance.
4. Sturdy cast aluminum coil catacomb.
5. 12-inch full vision dial.
6. Individual full vision calibrated dial for each frequency range. Only one general coverage frequency range visible at a time. Dial changes with band change.
7. Selective — 200 cycle to 5 KC band width.
8. Calibrated band spread — Positive resetability results from accurately set detents on general coverage condenser.
9. Stable, sturdy construction. Calibration remains accurate.
10. 6AK5 tuned RF amplifier.
11. 5 band widths with crystal filter allow proper selectivity on both phone and C-W signals.
12. Typewriter can be operated adjacent to receiver with no oscillator shift.
13. Frequency range 550 KC to 31.5 MC. Continuous in 5 bands.



- 15. Band spread on 80, 40, 20, and 10 and 11 meter amateur bands.
- 16. 22 to 1 gear ratio on band spread dial.
- 17. 13 to 1 gear ratio on general coverage dial.
- 18. Smooth, free-running, inertia-loaded dial drive with no backlash.
- 19. Accurately set high permeability core IF transformers.
- 20. Automatic noise limiter for phone operation.
- 21. Slot type noise limiter for C-W operation.
- 22. Built-in band edge calibrating crystal oscillator.
- 23. Transmit-receive lever type switch.
- 24. Phone jack silences speaker.
- 25. "S" meter calibrated in "S" units and db above S9.
- 26. Separate radio-frequency and audio-frequency gain controls.
- 27. Spring-return switch near main tuning dial allows convenient switching of beat-frequency oscillator while tuning for DX phone stations.
- 28. Input terminals to audio amplifier available at rear of cabinet.
- 29. All power supply filtering is inside receiver. It is not necessary for speaker to be plugged in for operation of receiver.
- 30. Power switch independent of all other controls.
- 31. Tone control.
- 32. Separate matched metal housing with 12-inch speaker.
- 33. Four watts audio output.
- 34. Output impedance — 8 ohms and 500 ohms.
- 35. Crystal phasing control.
- 36. Oscillator compensated for frequency drift.
- 37. Antenna input trimmer on front panel.
- 38. Panel may be rack mounted.

TUBE LINE-UP

- 6AK5 Radio Frequency Amplifier
- 6BE6 Mixer — First Detector
- 6BA6 First High-Frequency Oscillator

- 6BE6. Converter — Second Detector — Second High-Frequency Oscillator
- 6BA6 First Intermediate Frequency Amplifier
- 6BA6 Second Intermediate Frequency Amplifier
- 6AT6 Third Detector — AVC Rectifier — First Audio Amplifier
- 6V6 Audio Power Amplifier
- 6BA6 Beat-Frequency Oscillator
- 1N34 Crystal Diode Automatic Phone Noise Limiter
- 2-1N34 Crystal Diodes — CW — Slot Type Noise Limiter
- 5Y3-GT Rectifier
- VR-105 Voltage Regulator

CABINET SIZE

- 22 inches long
- 17 inches deep including knobs
- 12 3/4 inches high

RACK PANEL SIZE

- 19 inches long
- 10 1/2 inches high

WEIGHT

- Receiver 79 pounds
- Overall shipping weight 115 pounds
- Speaker 17 pounds
- Overall shipping weight 23 pounds

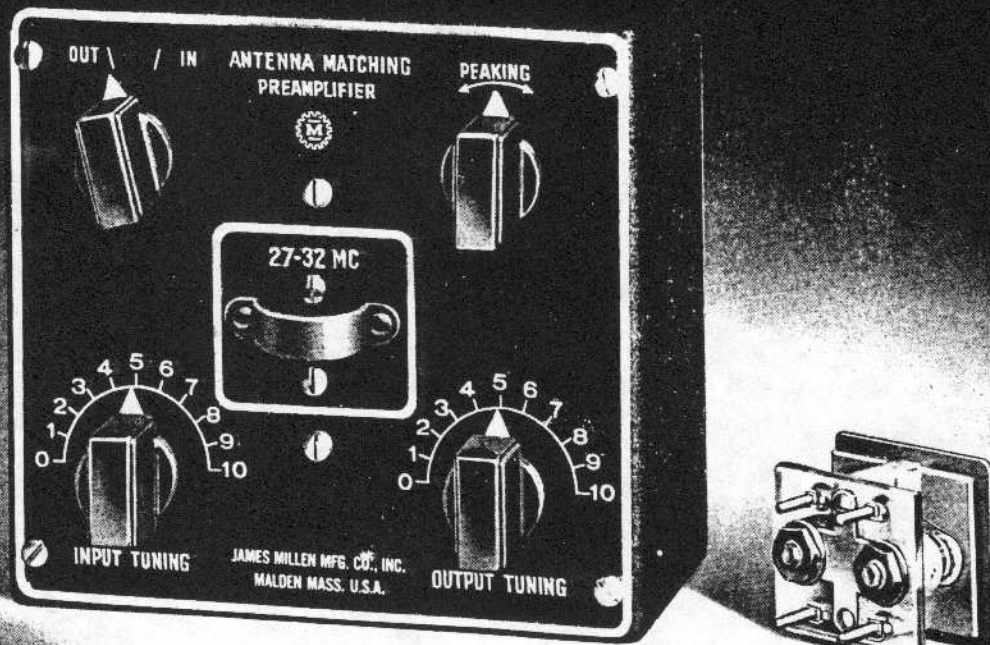
POWER REQUIREMENTS

- 115 volts — 50/60 cycles
- 83 watts

- No. 91201 Communication Receiver complete with full set of tubes, less speaker \$
- No. 91001 12 inch speaker in separate case . . \$

DESIGNED for PERFORMANCE





92101

The No. 92101 is an electronic impedance matching device and a broad-band preamplifier combined into a single unit, designed primarily for operation on the 6 and 10 meter bands. Coils are also available for the 20 meter band.

The gain which can be achieved by this unit depends upon how well the antenna is matched to the receiver, the gain being greater where the mismatch is most serious. The amount of gain varies, with makes of receivers and types of antennas. With most receivers, this occurs at the 20, 10 and 6 meter bands and in most cases is considerably above 30 decibels. This gain comes about in two ways. The No. 92101, once it is tuned, automatically matches your receiving antenna to your receiver. In the usual ham shack, this problem is not given much consideration but a tremendous gain can be obtained by a proper match. This problem is doubly important on the 6 and 10 meter bands, as at these frequencies the input impedance of any receiver may vary widely from that desired. Tests show that the average gain experienced, merely by properly matching the receiving antenna, is from several db to as high as 30 db! In addition to this gain, the 6AK5 miniature tube serves as a broad-band RF amplifier, giving an additional gain in the order of 30 decibels. This remarkable gain is made possible through the electrical characteristics of the 6AK5. This tube has a transconductance of 5000 micromhos, which means that a voltage gain of approximately 35 can be achieved with a plate load of 7000

ohms, as used in the 92101. This amount of gain has been available with former tubes only on very narrow band widths and with higher noise levels. The Millen No. 92101 antenna matching preamplifier is a result of combined engineering efforts on the part of the General Electric Company and the James Millen Manufacturing Company. The original model was described in detail in the G.E. Ham News, Vol. 1, #4, November-December, 1946.

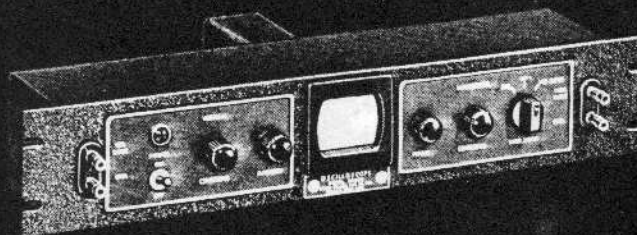
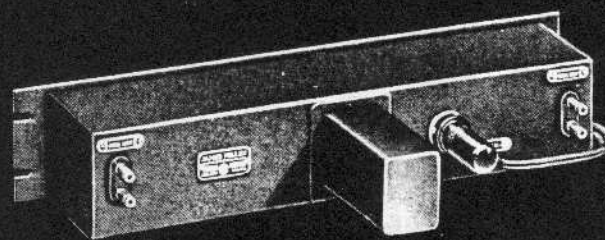
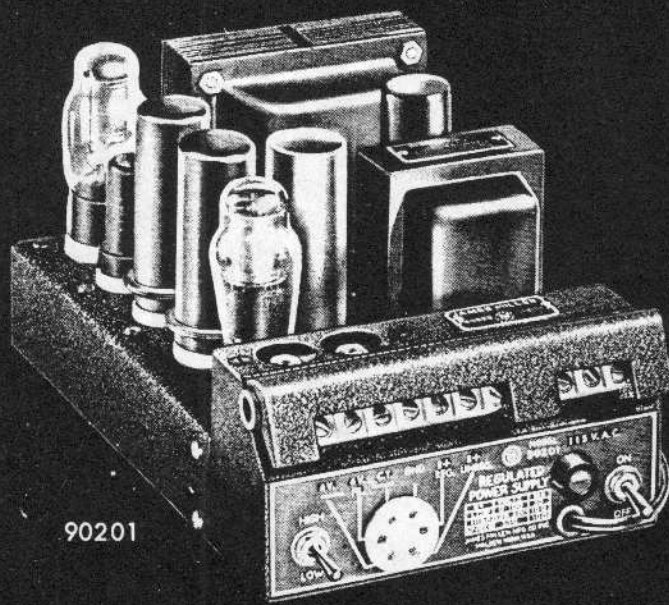
The No. 92101 is extremely compact, the case measuring only 6¼" x 5¾" x 3". The band changing inductor unit plugs into the opening in the front of the panel. Cable plug is provided for securing power requirements of 20 MA at approximately 180 volts or more DC (plate voltage not critical) and 175 MA at 6.3 volts AC for the 6AK5 tube from the receiver. Coaxial connectors and plugs are furnished for the antenna and receiver connections. Overall Size — 6¼" x 5¾" x 4¼"

Weight — 3 lbs.

No. 92101 Antenna matching preamplifier complete with coil unit for 27-32 mc, power cable, input and output connectors, less tube \$

No. 46906 Inductor unit for use with 92101 antenna matching preamplifier for range 48 to 55 mc \$

No. 46920 Inductor unit for use with 92101 antenna matching preamplifier for range 13 to 15 mc \$



ewith is presented a group of units designed for either of two purposes. That is, general laboratory and experimental use in their normal form as complete self contained portable equipments of their respective types, or else as basic unit components for actual permanent incorporation into more involved specialized complete equipments. The group includes such items as oscilloscopes, power units, IF strips, video amplifiers, filters, and delay lines, etc.

THE REGULATED POWER UNITS

The 90200 series of Regulated Power Supplies is a specific example of such basic components. One use for which these power supplies have been designed is to serve as compact easy to use universal type of general purpose laboratory instruments for temporary or permanent table top use. The high voltage output is obtained either through a live prong connector plug or from a barrier type terminal strip protected by a hinged safety cover. Convenient switches, AC cord, and fuse receptacle combined with compactness contribute to ease of use.

The second application for which this series of Regulated Power Supply units has been designed is as a "DC Package" for directly mounting in a permanent place in the larger chassis of any special equipment being constructed. Then the designer and builder of such an apparatus may concentrate his abilities and time upon that part of his project to which he alone can best contribute without the necessity of devoting effort and time to a power source that can better be purchased in ready to use form.

The power units are fastened to an equipment chassis by means of four 1/4-20 machine screws into heavy tapped corner plates welded securely to the underside of the power unit. Required chassis space: 7 1/2" x 11", and overall height of 5 7/8". The weight is 15 lbs. The outputs are:

Regulated voltages: 4 to 115 at 30 mA, and 100 to 200 at 85 mA.

Unregulated voltages: 240 volts at 150 mA., 6.3 AC volts at 2 amp. C.T.

The tubes required are: 5Y4-1, 6L6-2, 6SJ7-1, VR75-1, VR105-1.

No. 90201 Regulated Power Unit, complete with tubes for 115 V 60 cycle input \$

THE OSCILLOSCOPES

The 90902, etc., series oscilloscopes in their packaged form are entirely adequate for many laboratory, as well, as industrial and communication uses. As a transmitter modulation monitor, no additional equipment or accessories are required. The well known trapezoidal monitoring patterns are secured by feeding some modulated carrier voltage from a pick up loop directly to the vertical plates of the cathode ray tube and some audio modulating voltage to the vertical plates.

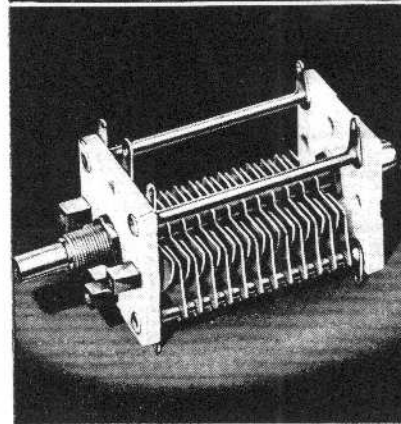
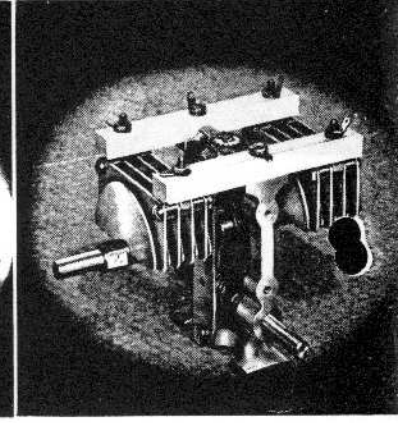
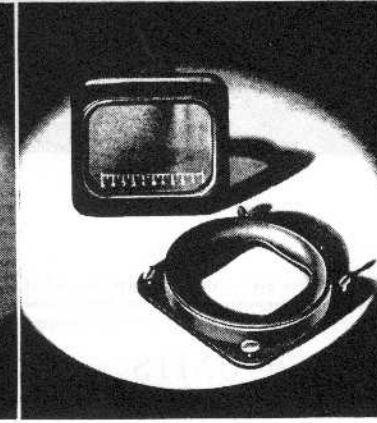
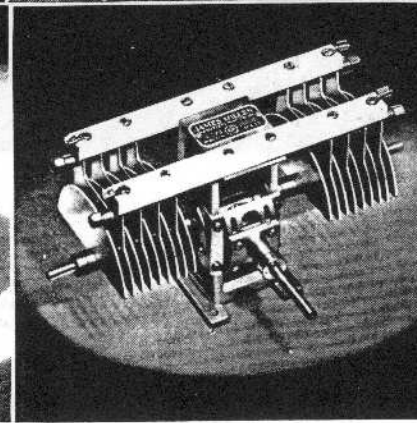
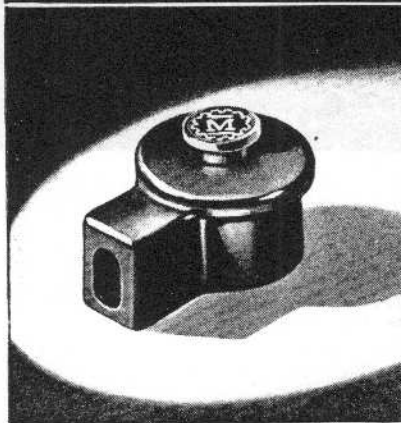
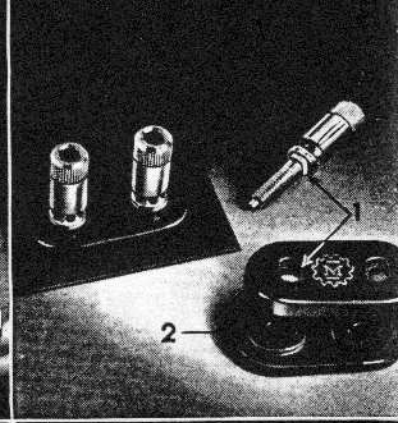
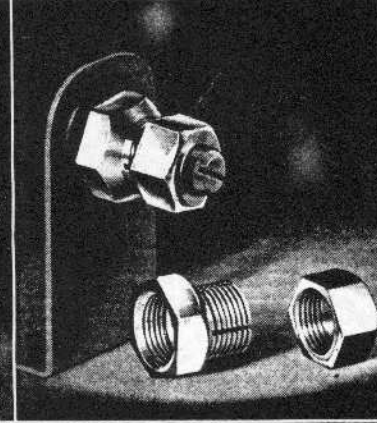
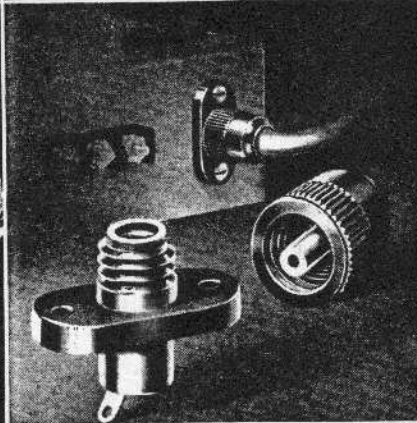
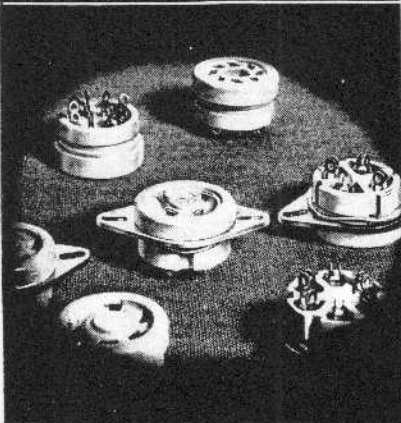
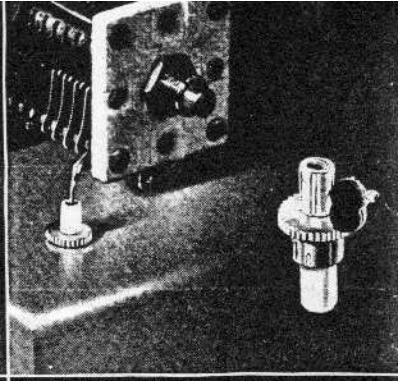
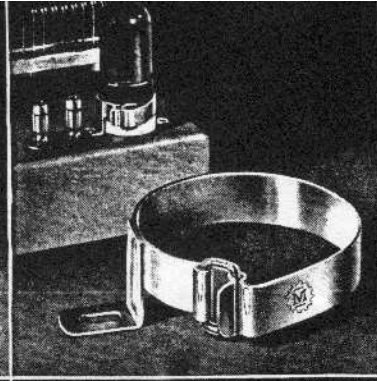
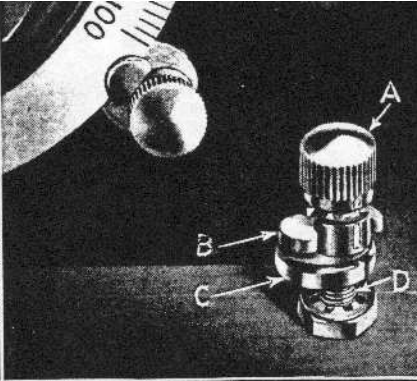
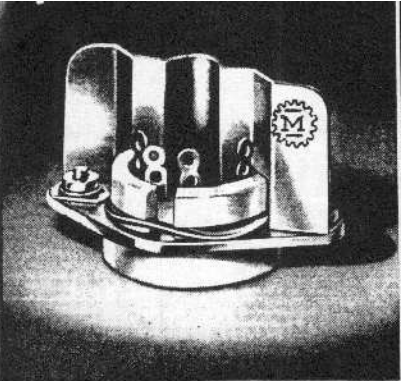
By the addition of such units as sweeps, pulse generators, amplifiers, servo sweeps, etc., all of which can be conveniently and neatly constructed on companion rack panels, the original basic scope unit can be expanded to serve any conceivable application.

Here again the research engineer is freed of the drudgery of such time consuming mechanical construction as mounting the cathode ray tube, providing proper and adequate magnetic shielding, building the high voltage power supply, providing proper safety features, etc., and other such details of the basic scope before being able to proceed with his specialized work. Available in several models, as follows:

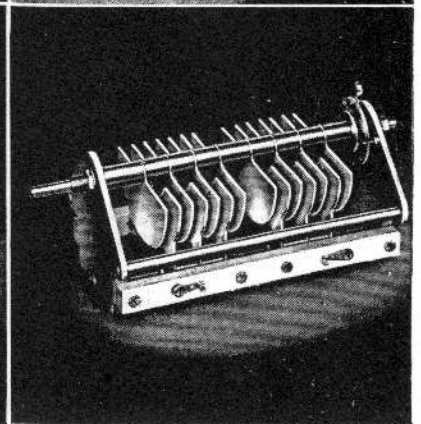
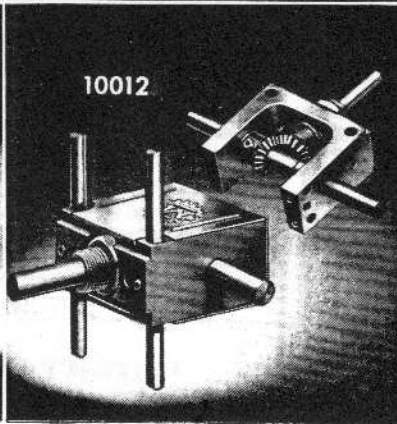
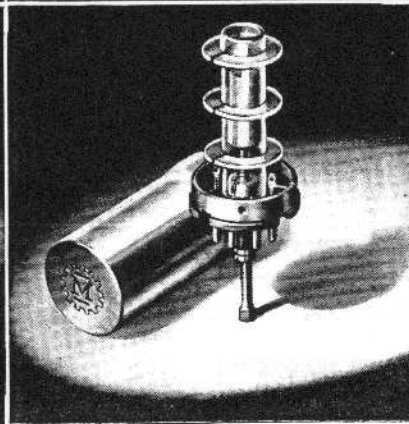
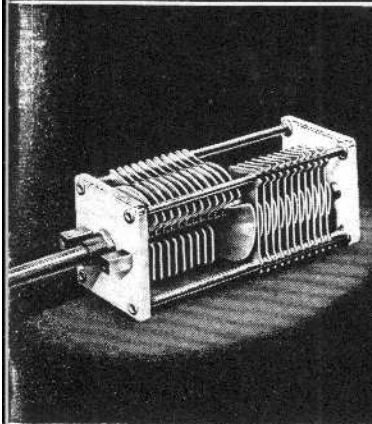
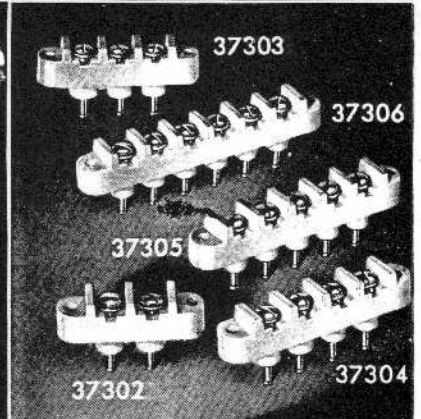
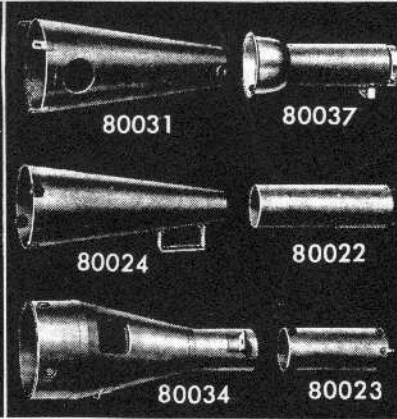
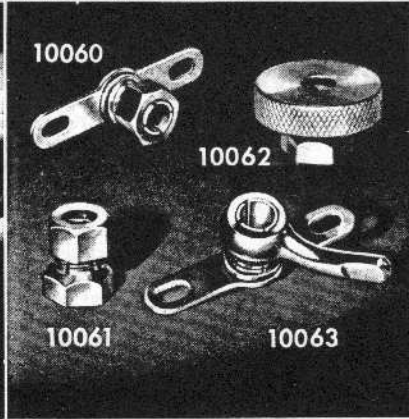
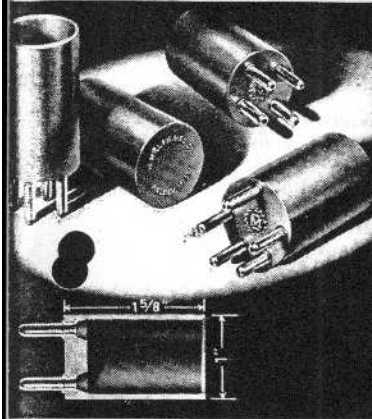
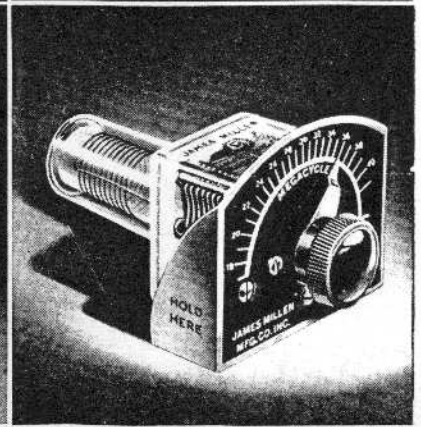
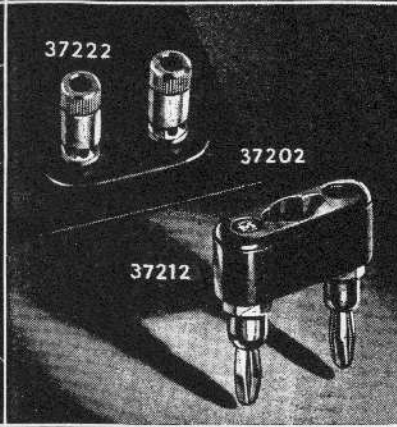
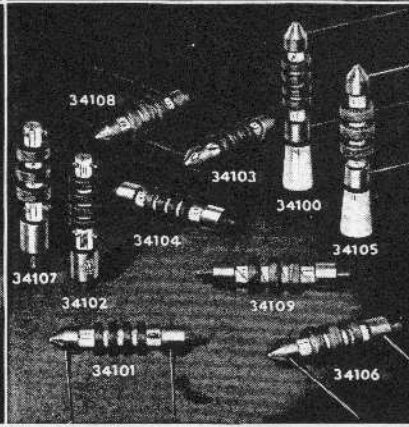
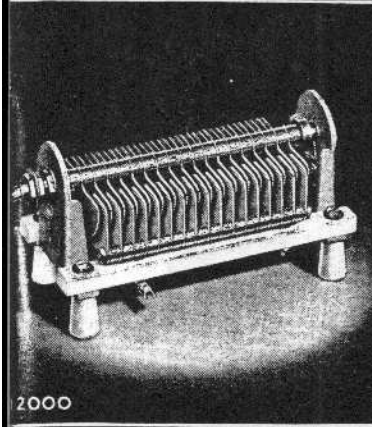
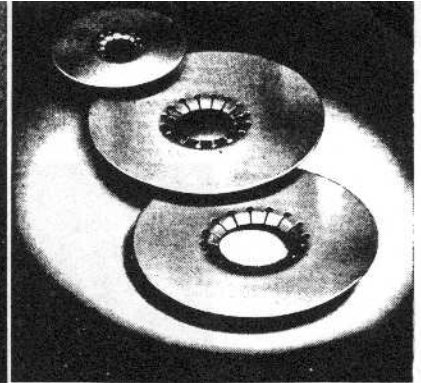
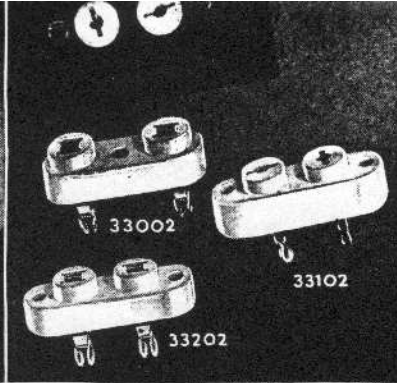
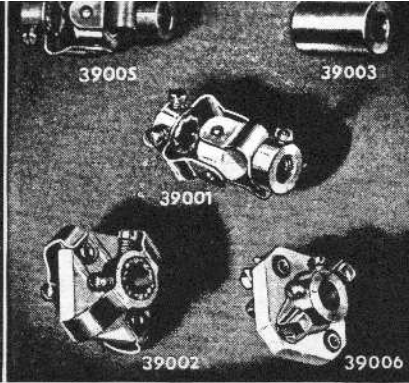
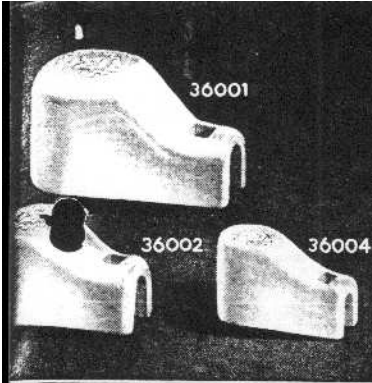
No. 90902: Two inch oscilloscope complete with tubes for 115 V 60 cycle AC input, 3 1/2" x 19" Panel, 8" deep. Weight 13 lbs. \$

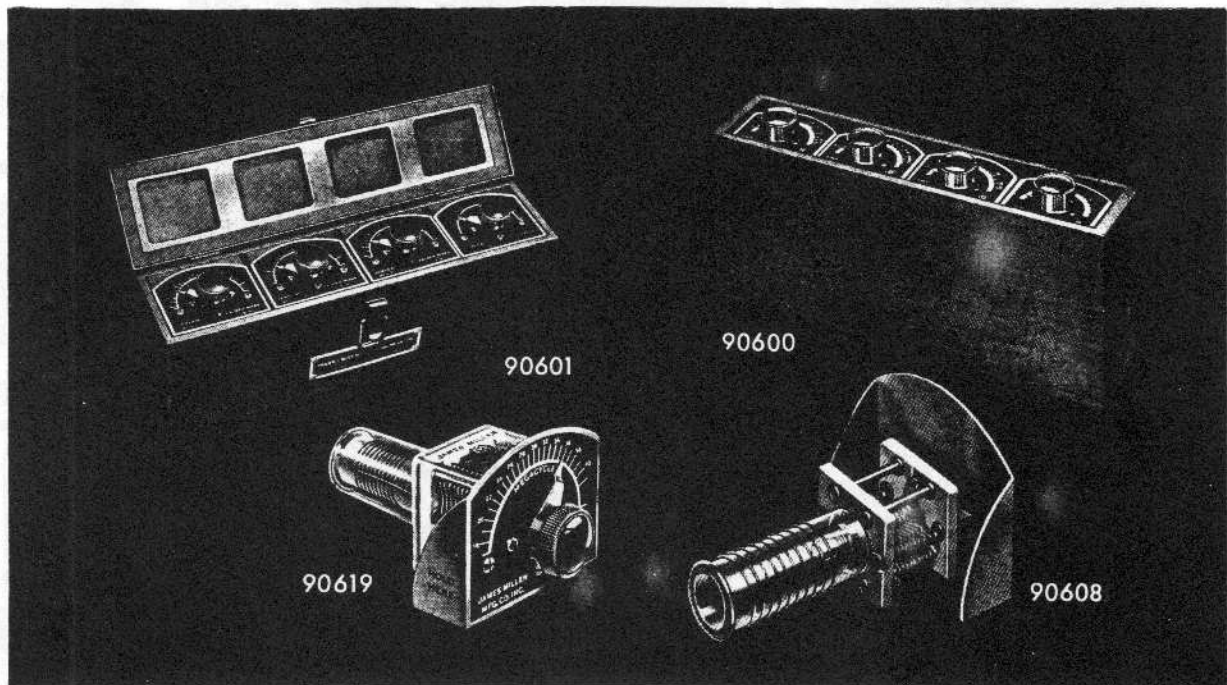
No. 90903: Three inch oscilloscope complete with tubes for 115 V 60 cycle AC input, 3 1/2" x 19" Panel, 13" deep. Weight 14 lbs. \$

No. 90905: Five inch oscilloscope complete with tubes for 115 V 60 cycle input, 7" x 19" Panel, 18" deep. Weight 17 lbs. \$



Herewith are illustrated just a few of the many exclusive Millen "Designed for Application" line of MODERN PARTS for MODERN CIRCUITS, which are fully listed and described in our general component parts catalog. A copy is available either through your distributor or direct from any of our district offices, or the factory.





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; parasites; 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
90601	Range 160 to 210 mc.	
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 mc.	
90609	Range 130 to 170 mc.	
90610	Range 105 to 150 mc.	
90619	Range 350 to 1000 kc. — Neon Indicator	
90620	Range 150 to 350 kc. — Neon Indicator	
90625	Range 2 to 6 mc. — Neon Indicator	
90626	Range 3.5 to 15 mc. — Neon Indicator	
90600	Complete set of 90605 thru 90608, in case	
90601	Complete set Field type Frequency Meters in metal carrying case 1.5 to 10 mc.	

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