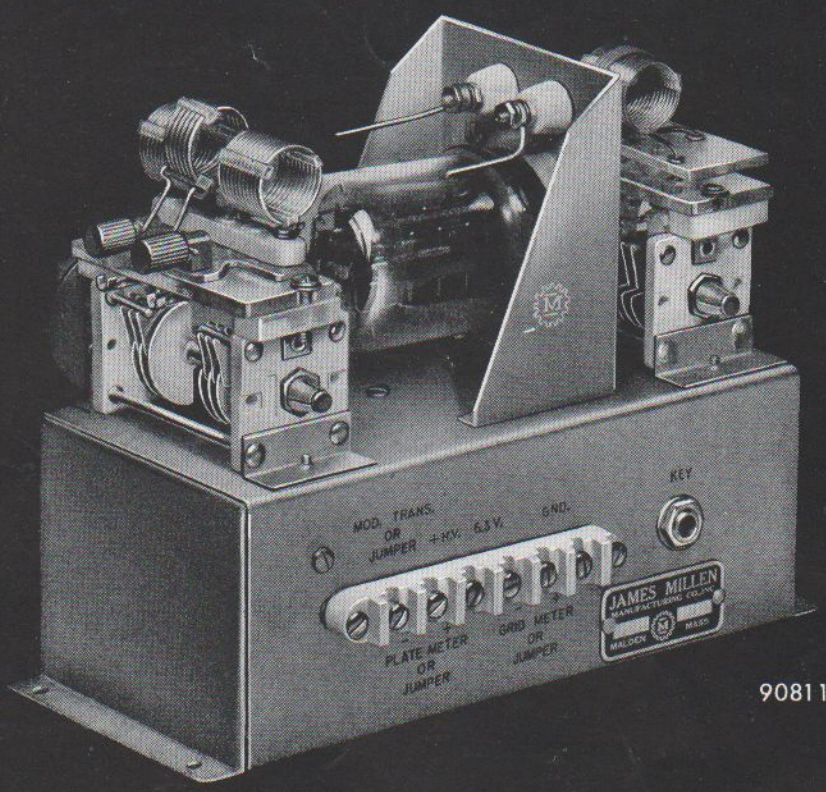


90811—High Frequency RF Amplifier

The No. 90811 High Frequency RF Amplifier is a physically small unit (8¾ inches long — 4 inches wide — 6¾ inches high) capable of a power output of 70 to 85 watts on 'phone or 87 to 110 watts on C-W on 20, 15, 11, 10, 6 or 2 meter amateur bands. Provision is made for quick band shift by means of the new No. 48000 series VHF plug-in coils. The No. 90811 unit uses either an 829-B or 3E29 tube in a push-pull circuit. External power supply, modulator, and grid and plate milliammeters may be connected to a terminal board on the rear of the unit. Output is taken from a low impedance variable link coil. Only approximately 0.8 watts is required to drive the unit to full power output. Low impedance input may be connected directly to the link terminals on the grid coil jack bar. The No. 90811 may be excited directly by a crystal oscillator or a low power VFO on 20, 15, 11, 10 or 6 meters.

The No. 90811 RF power amplifier unit is the same as used in the No. 90810 complete 2-6-10-11-15-20 meter crystal controlled transmitter. Can be panel or base mounted, Key jack on rear.

Power Supply Requirements —

400 to 750 volts at 180 to 275 Milliamperes.

Typical Operation Data:

Type Operation	*Cooling*	*Plate-Voltage*	*Plate Current Milliamperes*	*Power Output Watts*
AM 'Phone	Normal	600	150	70
C-W	Normal	750	160	87
AM 'Phone	Forced Air	600	200	85
C-W	Forced Air	750	200	110

All coils are supplied with links. The grid coil jack bar is supplied with 2 sets of link terminals. This enables the unit to be connected to both a 2 meter exciter and a lower frequency exciter. The No. 48000 coils provide correct selection of exeitation. The No. 90811 is normally supplied with grid and plate coils for 10 meter operation. —

Coils Available for 90811 are:

Millen Part No.	*Amateur Band Meters*	*Circuit*	*Link*
48021	20	Grid	Fixed
48015	15	Grid	Fixed
48011	11–10	Grid	Fixed
48006	6	Grid	Fixed
48002	2	Grid	Fixed
	(*Above grid coils mount in Millen 41407 socket*)		
48121	20	Plate	Variable
48115	15	Plate	Variable
48111	11–10	Plate	Variable
48106	6	Plate	Variable
48102	2	Plate	Variable
	(*Above plate coils mount in Millen 41403 socket*)		

No. 90811, RF Amplifier, complete with one set of inductors for 10 meter amateur band, but less tube.

Weight: 4¾ pounds.

90711

90711—Variable Frequency Oscillator

The 90711 is a complete transmitter control unit with 6SK7 temperature-compensated, electron coupled oscillator of exceptional stability and low drift, a 6SK7 broad-band buffer or frequency doubler, a 6AG7 tuned amplifier which tracks with the oscillator tuning, and a regulated power supply.

Output sufficient to drive an 807 is available on 160, 80, and 40 meters and reduced output is available on 20 meters. Low impedance output terminals are on the rear of the chassis. A cable and adaptor provide output at high impedance on 160, 80, 40, or 20 meters.

A switch on the front panel selects the frequency range to be covered. Good band spread with a separate dial scale for each band is provided on the 80, 75, 40, 20, 15, 11, and 10 meter bands. The full-vision illuminated vernier dial has a separate scale for each of the seven bands plus a 0 to 100 scale. The dial is completely and accurately calibrated and has a drive ratio of 13 to 1.

Close frequency setting is obtained by means of the vernier control arm at the right of the dial. A switch, separate from the tuning range switch, selects the output band. This enables any tuning range to be used with any output band.

A function switch on the front panel can turn on the oscillator alone, the entire VFO, or can select remote control so that the VFO can be controlled by the station master transmit-receive switch.

Since the output is isolated from the oscillator by two stages, absolutely zero frequency shift occurs when the output load is varied from open circuit to short circuit.

Two key jacks are provided: one for amplifier keying, and one for oscillator keying for break-in operation.

The entire unit is unusually solidly built so that no frequency shift occurs due to vibration.

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
6SK7 — Buffer — Amplifier or Frequency Doubler
6AG7 — Amplifier
5Y3-GT — Rectifier
VR-150 — Voltage Regulator

Tuning Range:

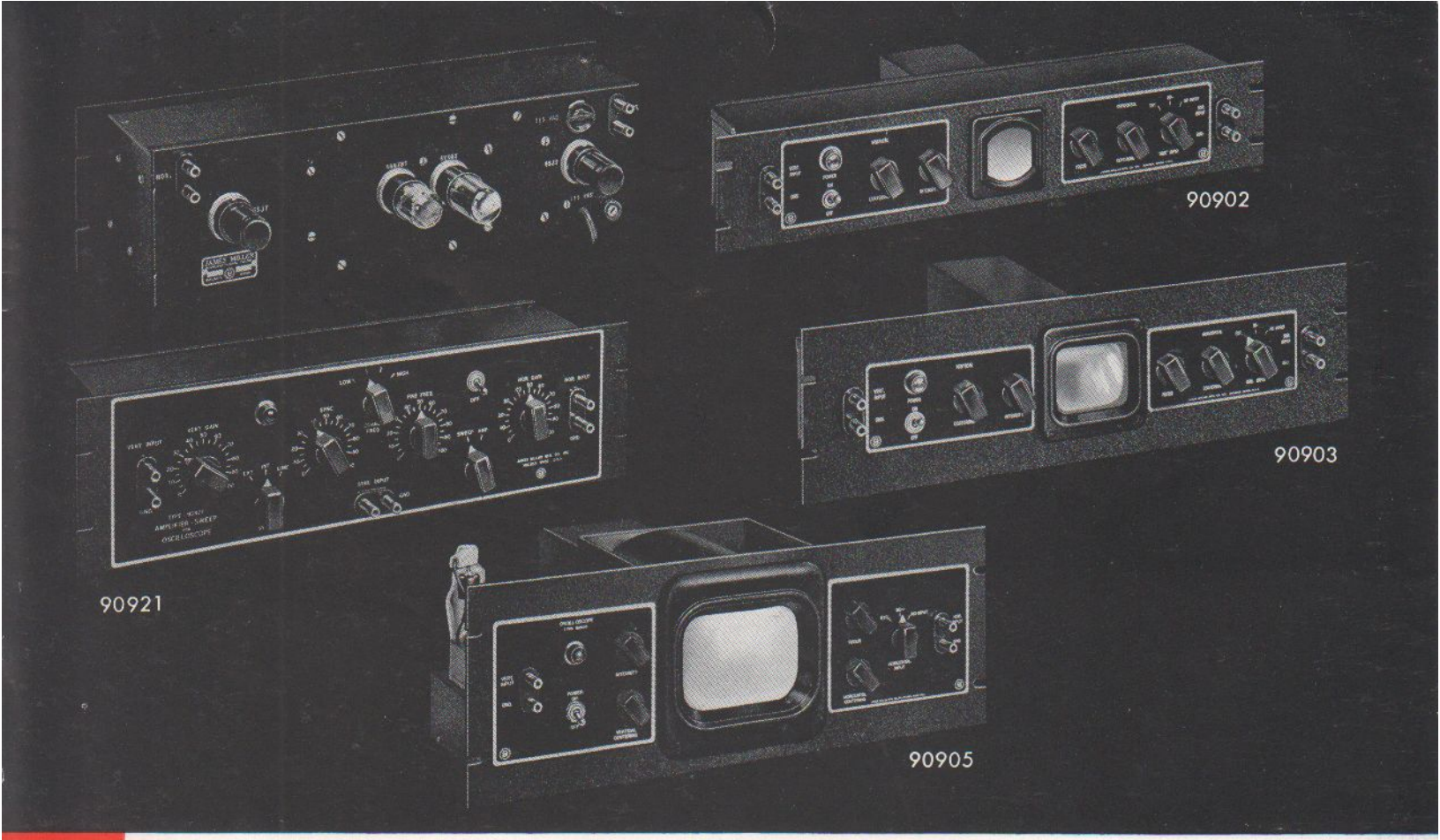
80 meters — 3490 KC to 3730 KC
75 meters — 3720 KC to 4010 KC
40 meters — 6980 KC to 7440 KC
20 meters — 13,975 KC to 14,425 KC
15 meters — 21,000 KC to 21,600 KC
11 meters — 26,960 KC to 27,430 KC
10 meters — 28,000 KC to 30,000 KC

Power Supply 105–125 volts 50/60 cycles — 60 watts

Size 12¾ inches wide x 12 inches deep overall x 9¼ inches high

Weight 25½ pounds

No. 90711 Variable Frequency Oscillator
Complete with tubes and impedance adapter.



Basic Units

Herewith 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 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 less tubes, 115 V 60 cycle AC supply ..... $

No. 90903: Three inch oscilloscope less tubes, 115 V 60 cycle AC supply ..... $

No. 90905: Five inch oscilloscope less tubes, 115 V 60 cycle supply ..... $

THE AMPLIFIER-SWEEP

The Millen 90921 Amplifier-Sweep is an accessory which may be used with any basic oscilloscope. It contains a 6SJ7 amplifier for the signal voltages to be applied to the oscilloscope vertical deflection plates, a 6SJ7 amplifier for the horizontal deflection signal, a sawtooth sweep generator whose output may be applied to the horizontal amplifier, and an internal power supply. The response of each amplifier is flat within 2 db from 15 cycles to 125 kilocycles. The gain of each amplifier is approximately 30 db. Maximum undistorted output from each amplifier is approximately 70 volts peak to peak. The sawtooth sweep generator uses a "hard" tube oscillator to generate a linear sweep covering 15 cycles to 40 kilocycles in four overlapping ranges. The 90921 was designed especially for use with the Millen 90902, 90903 and 90905 basic oscilloscopes.

Power Supply
- 105–125 volts — 60 cycles
- Power consumption — 32 watts
- Fuse size — 1 ampere

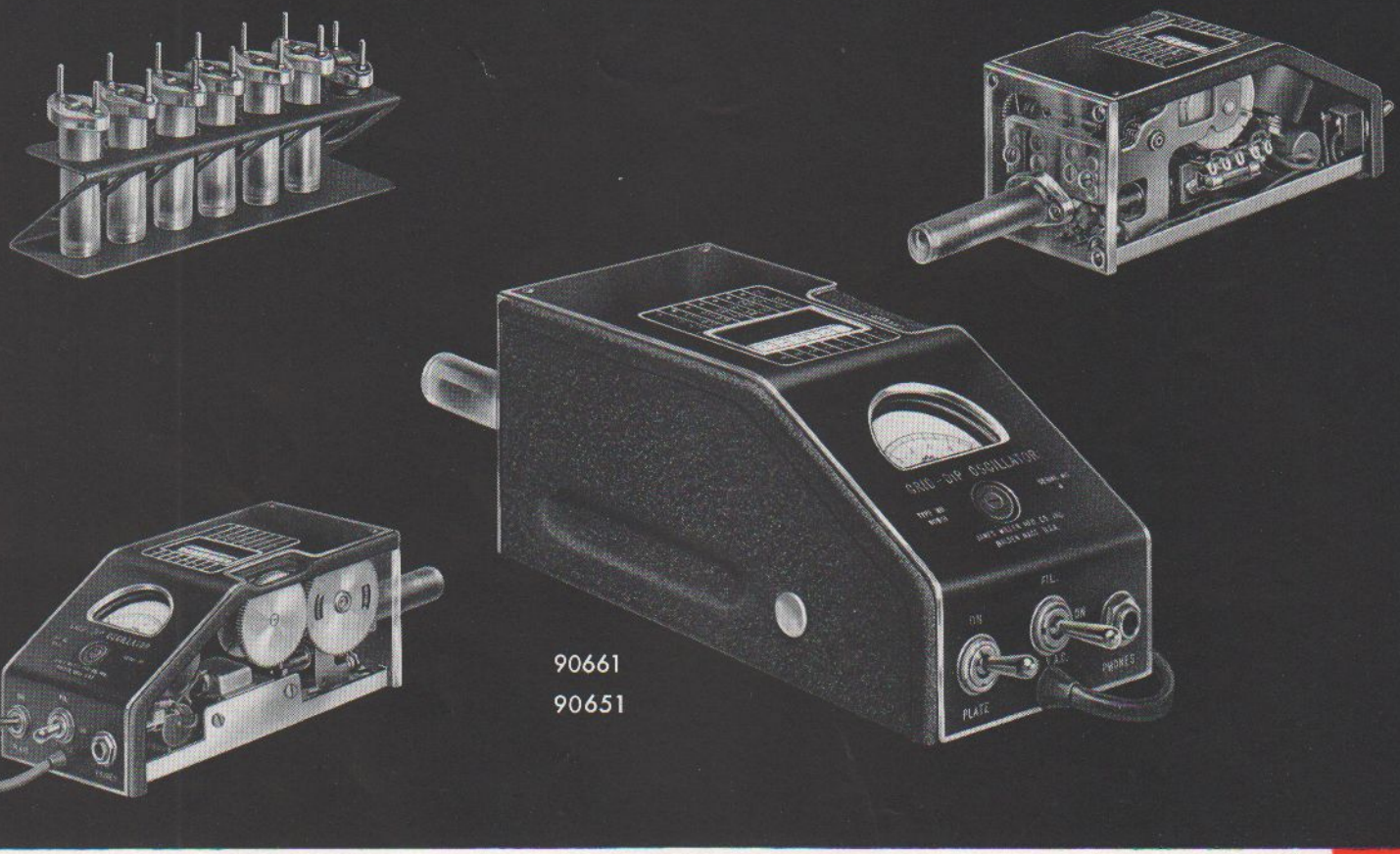
Physical Dimensions
- Height ..... 5¼ inches
- Width ..... 19 inches
- Depth (overall including tubes) ..... 8⅜ inches
- Weight ..... 13 pounds

The 90921 Amplifier-Sweep is designed to mount in a Standard rack panel

Tube Complement
- 1-6SJ7 — Vertical Amplifier
- 1-6SJ7 — Horizontal Amplifier
- 1-6SN7-GT — Sweep Generator
- 1-5Y3-GT — Rectifier

Gain of each amplifier — approximately 30 db
Frequency Response — Flat within 2 db — 15 cycles to 125 kilocycles
Sweep Frequencies — 15 cycles to 40 kilocycles
Maximum D.C. to amplifier input — 400 volts
Maximum undistorted amplifier output — approximately 70 volts peak to peak

No. 90921 Amplifier-Sweep less tubes ..... $



Grid Dip Meters

The No. 90661 Industrial Grid Dip Meter and its companion, No. 90651 standard Grid Dip Meter, are calibrated stable rf oscillator units with a meter to read grid current. The frequency-determining coil is plugged into the unit so that it may be used as a probe.

These instruments are complete with a built-in transformer type A.C. power supply and internal terminal board to provide connections for battery operation where it is desirable to use the unit on antenna measurements and other usages where A.C. power is not available. Compactness has been achieved without loss of performance or convenience of usage. The incorporation of the power supply, oscillator and probe into a single unit provides a convenient device for checking all types of circuits. The indicating instrument is a standard 2 inch General Electric instrument with an easy to read scale. The calibrated dial is a large 270° drum dial which provides seven direct reading scales, plus an additional universal scale, all with the same length and readability. Each range has its individual plug-in probe completely enclosed in a contour fitting polystyrene case for assurance of permanence of calibration as well as to prevent any possibility of mechanical damage or of unintentional contact with the components of the circuit being tested.

The No. 90661 and No. 90651 Grid Dip Meters may be used as:

1. A Grid Dip Oscillator
2. An Oscillating Detector, or
3. A Signal Generator
4. An Indicating Absorption Wavemeter

The most common usage of the Grid Dip Meter is as an oscillating frequency meter to determine the resonant frequencies of de-energized tuned circuits.

There are many applications of these Grid Dip Meters:

1. Aligning receiver tuned circuits
2. Determining frequency of transmitter tuned circuits with power off
3. Transmitter neutralization
4. Finding of parasitic oscillations
5. Pretuning wave traps
6. Indication of circuit Q
7. Measurement of self-resonant frequency of rf chokes
8. Measurement of inductance and capacity
9. Measurement of antenna resonant frequency
10. Adjustment of tuned feeders
11. Tuning beam antennas, etc.

The No. 90661 Industrial Grid Dip Meter is completely calibrated for laboratory use and incorporates features desired for both industrial and laboratory application, such as a 3 wire grounding type power cord. The Industrial Grid Dip Meter and its associated coils are furnished in a suitable carrying case.

The No. 90651 standard model Grid Dip Meter is a somewhat less expensive version of the Grid Dip Meter. The calibration, while adequate for general usage, is not as complete as in the case of the industrial model. It is supplied without grounding lead and without carrying case.

The No. 90661 Industrial unit is available direct from the Instrument Division. The Standard Model 90651 is carried in stock by franchised distributors.

Frequency Range: 1.7 to 300 megacycles in seven overlapping ranges

Size of Grid Dip Meter only (less probe): 7 in. x 3 3/16 in. x 3 3/8 in.

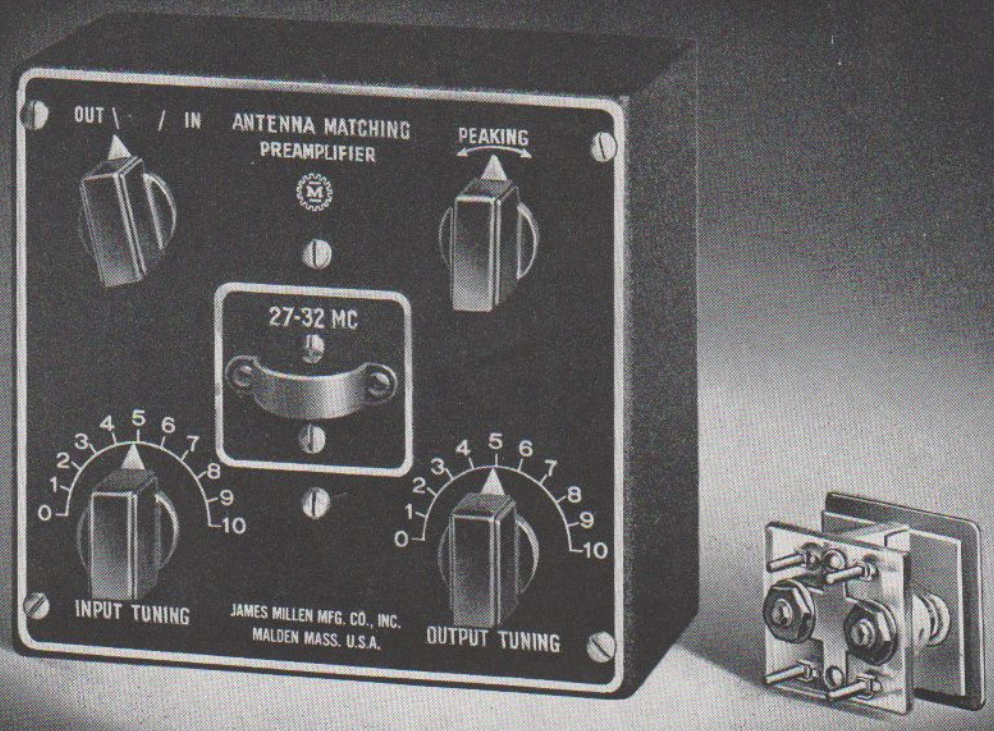
Shipping Weight:

No. 90661 ..... 7 lbs.

No. 90651 ..... 3½ lbs.

No. 90661 Industrial Grid Dip Meter
Complete with 7 inductors, rack, tube and carrying case 50–60 cycles
115 Volt A.C. ..... $

No. 90651 Grid Dip Meter
Complete with 7 inductors, rack and tube 50–60 cycles 115 Volt A.C. . $



92101

No. 92101 Antenna Matching Preamplifier

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, power, input and output connectors, less tubes and inductors $

No. 46906 Inductor Unit, range 48–55 mc. . . . . $

No. 46910 Inductor Unit, range 27–32 mc. . . . . $

No. 46920 Inductor Unit, range 13–15 mc. . . . . $

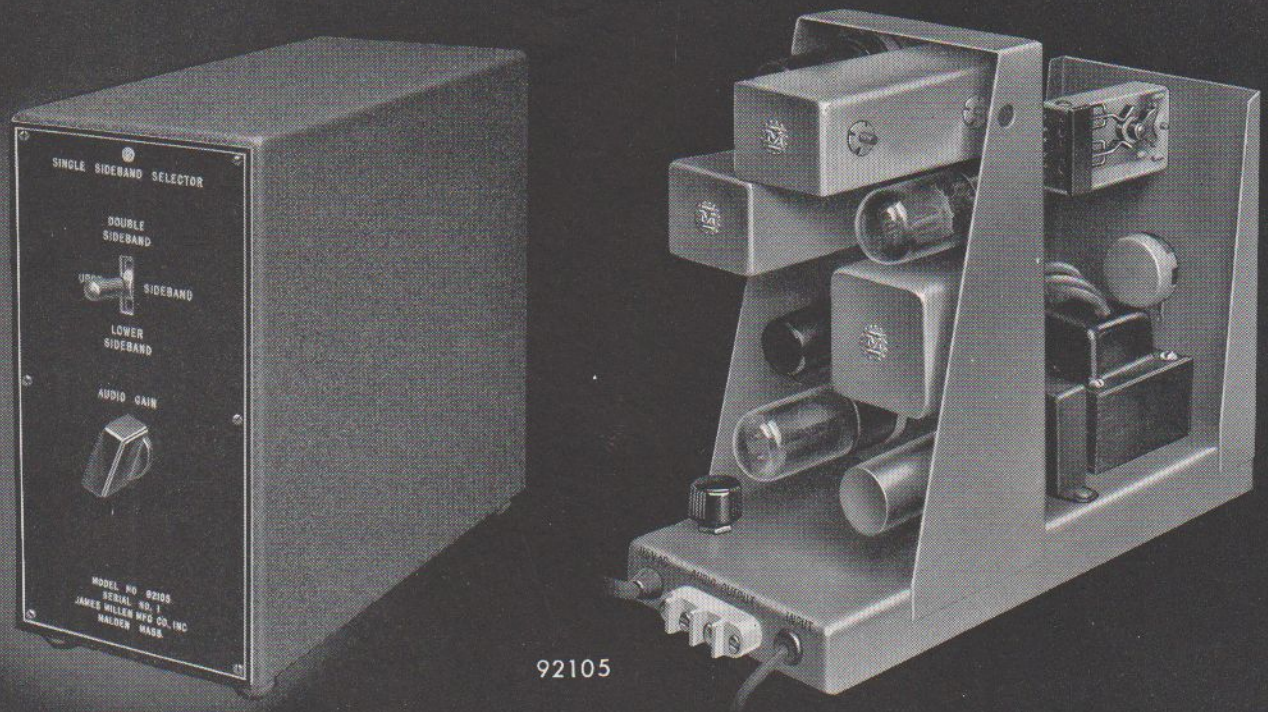
No. 46992 Inductor Unit, for television channel No. 2. . . . . $

No. 46993 Inductor Unit, for television channel No. 3. . . . . $

No. 46994 Inductor Unit, for television channel No. 4. . . . . $

No. 46995 Inductor Unit, for television channel No. 5. . . . . $

No. 46996 Inductor Unit, for television channel No. 6. . . . . $



92105—Single Sideband Selector

The No. 92105 is a crystal controlled low frequency converter designed to adapt communication receivers for selectable single sideband reception (SSSR). SSSR operates with a conventional carrier and double sideband, eliminating by selection either of the sidebands and working on the remaining sideband, plus carrier. Such single sideband selection reduces interference, both from the standpoint of noise, and heterodyne signals, due to the reduction of the receiver band width to approximately 25% normal. SSSR provides many of the advantages of single sideband reception on all signals without limiting it to signals from transmitters with a suppressed carrier, and requiring receivers with carrier insertion.

The Millen No. 92105 single sideband selector is designed and developed in conjunction with the McLaughlin Research Laboratory, who are well known for their extensive pioneer work, including wartime developments in this field, see technical articles in October 1947 and April 1948 Q.S.T.

The No. 92105 single sideband selector is contained in a cabinet approximately the same height and depth as the average communication receiver. In normal use it is placed alongside the receiver and is readily connected to the receiver without circuit changes, or in any other way interfering with the normal operation of the receiver. The circuit of the No. 92105 utilizes two crystals, four tubes complete with their own power supply, RF and AF gain controls, and telephone type lever switch for shifting between upper and lower sidebands. The standard model is furnished with a pair of crystals of proper frequency for operation with communication receivers having IF channels of from 455–456 kc. Special models with proper crystals for use with receivers having IF frequencies other than 455–456 can be furnished on special order.

Tubes:

1 — 6SA7 Converter
1 — 6SK7 IF Amplifier
1 — 6SN7GT Detector and Audio Amplifier
1 — 5Y3GT Rectifier

Power Supply: 105–125 volts 50/60 cycles

Size: 8¾ inches high 4½ inches wide 10 inches deep

Weight: 13 pounds

No. 92105 Single Sideband Selector complete with tubes, input cable, and crystals for use with receivers with 455/6 kc intermediate frequency . . . . . $