

JOHNSON

VIKING I

TRANSMITTER KIT



**150 WATTS CW INPUT
135 WATTS AM PHONE INPUT
BANDSWITCHING 10-160 METERS**

E. F. JOHNSON COMPANY

a famous name in Radio!

WASECA, MINNESOTA



CATALOG 705

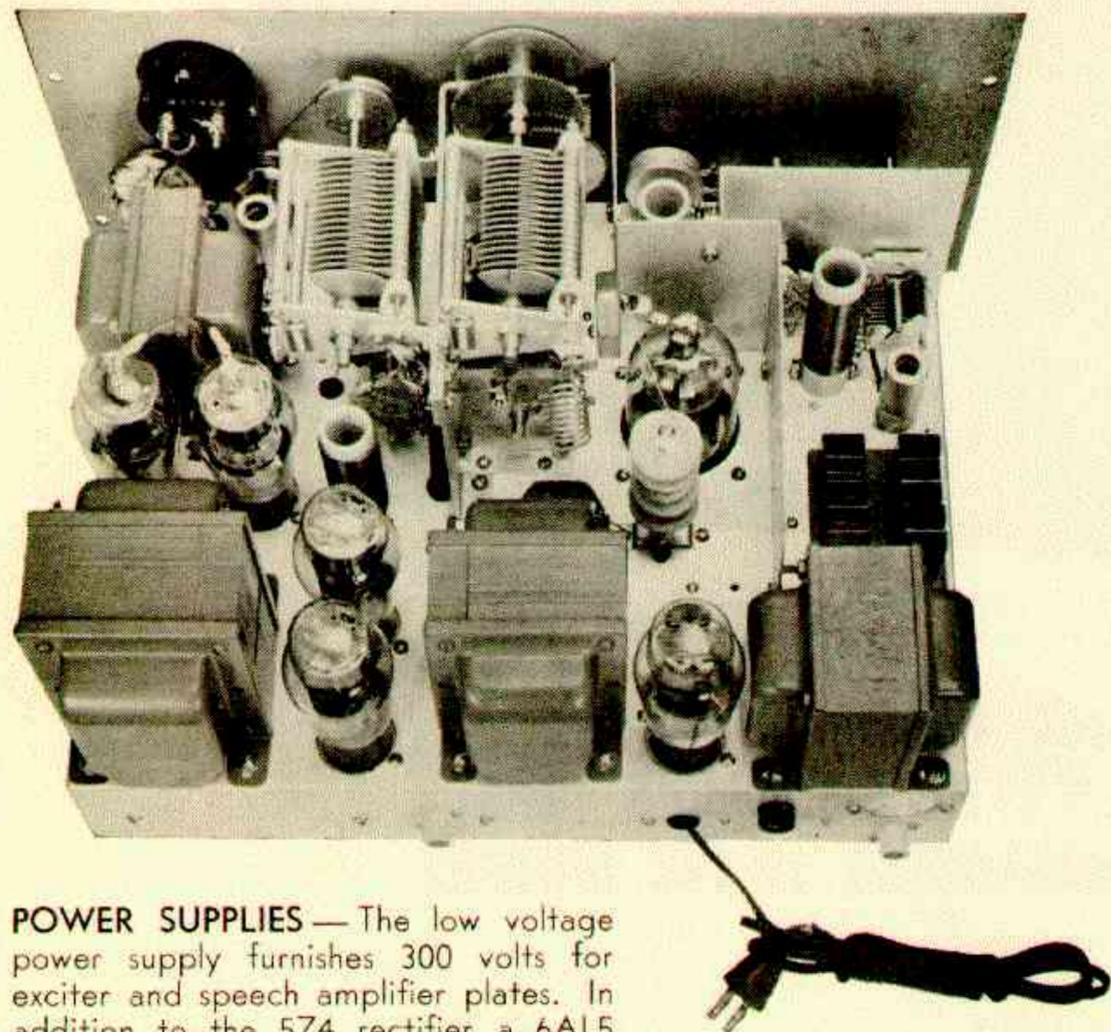
the JOHNSON VIKING I

- Amplitude Modulation
- Band Switching
- 100 Watts Phone Output
- 115 Watts CW Output
- VFO Input Provision
- Dual Power Supplies
- Self-Contained
- Pi-Network Coupling

- Tube line-up:
- | | |
|-------------------------|---------------------|
| 6AU6 crystal oscillator | 6AU6 driver |
| 6AQ5 buffer/doubler | 807 pp modulators |
| 4D32 final amplifier | 5R4 HV rectifiers |
| 6AU6 voltage amplifier | 5Z4 LV rectifier |
| | 6AL5 bias rectifier |

The JOHNSON Viking I is more than a transmitter kit in the popular sense. It is a competently designed and engineered transmitter furnished unassembled but complete in every detail, including wiring harness and ample assembly instructions. Full output is available on amateur bands 160, 80, 40, 20, 15 and 11-10 meters. The complete output frequency range of the unit is:

| Band | Low Freq. Limit | High Freq. Limit | Band | Low Freq. Limit | High Freq. Limit |
|------|-----------------|------------------|------|-----------------|------------------|
| 160 | 1.8 mcs. | 2.4 mcs. | 20 | 9.8 mcs. | 15.0 mcs. |
| 80 | 2.9 mcs. | 4.4 mcs. | 15 | 15.0 mcs. | 21.8 mcs. |
| 40 | 5.2 mcs. | 8.0 mcs. | 10 | 21.0 mcs. | 30.0 mcs. |



POWER SUPPLIES — The low voltage power supply furnishes 300 volts for exciter and speech amplifier plates. In addition to the 5Z4 rectifier a 6AL5 diode rectifying the tapped secondary winding furnishes well regulated fixed bias for the final amplifier, modulator and the 6AQ5 buffer/doubler. The 600 volt supply with parallel 5R4 rectifiers furnishes plate and screen voltage for the 4D32 and 807 modulators. High vacuum rectifiers in both supplies eliminate the need for hash suppression and time delay circuits. Available for 115 volt 50/60 cycle ac operation only. Delivering full output on phone, line power consumption is 375 watts. Primary fusing protects the equipment from accidental overloads.

The JOHNSON transmitter has nearly uniform output throughout its range, exciter design such that a minimum number of crystals is required. The pi-section output stage enables the transmitter to be matched to antennas with impedances in the range of from 50 to 600 ohms without the necessity of an external antenna coupler. The final tank coil is a variable inductor with excellent insulation and wound with a variable pitch so that its Q is high throughout the entire range. The inductor, together with the band-switching exciter eliminates the necessity of changing coils entirely. Sufficient audio gain and power are available to 100% modulate the transmitter's maximum input using a crystal microphone.

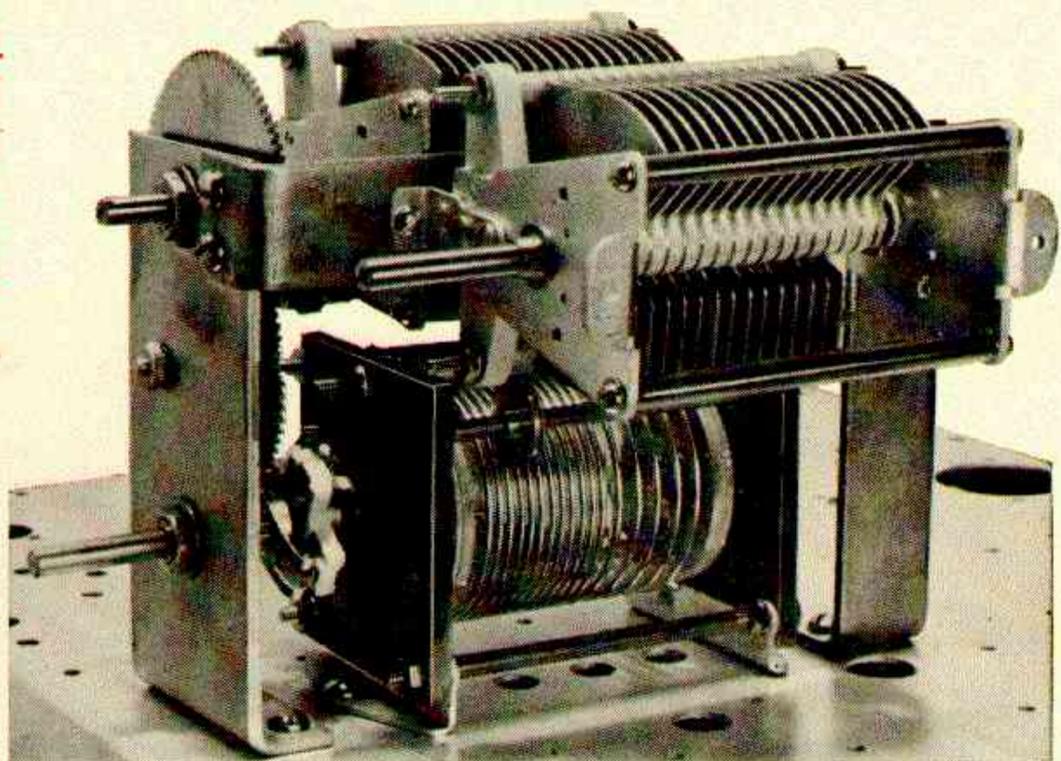
RF SECTION — The transmitter's rf section consists of a 6AU6 crystal oscillator driving a 6AQ5 buffer/doubler which in turn drives the 4D32 final amplifier. The oscillator utilizes a JOHNSON crystal selector assembly which permits the selection of any one of ten crystal frequencies from the front panel. An eleventh position on the crystal switch allows use of an external VFO. The 6AQ5 buffer/doubler output is adequate to drive the 4D32 to full output on all bands. A potentiometer in the screen of the 6AQ5 gives smooth front panel control of amplifier excitation. The fact that neutralization is not required, makes the versatile pi-section tank circuit the logical choice. The beam power 4D32 output tube requires only 600 volts plate voltage. Parasitics have been completely suppressed.

While not capable of as much input as a 4D32, an 829B will work very nicely in the final stage. It will deliver at least 95 watts of CW output, 85 watts on phone while input is kept within the manufacturers' ratings.

KEYING — Both the 6AQ5 buffer and the 4D32 final amplifier have fixed bias in excess of cut-off so that oscillator cathode keying may be used.

METERING — Metering of the transmitter is provided by a milliammeter used as a millivoltmeter and switched across permanently connected shunts so there is no possibility of circuits being opened accidentally by meter switching.

transmitter kit



Continuous Tuning Final Tank

SPEECH AMPLIFIER AND MODULATOR—The tube line-up of the speech amplifier is a 6AU6 driving a 6AU6 which in turn drives the transformer coupled push-pull 807 modulators. Frequency response has been limited to the center of the speech range. Degenerative feed-back and degeneration in the cathode of the second 6AU6 assist in keeping response substantially flat. The extremely simple design of the audio amplifier/modulator assures the realization of good audio quality. Full output of the modulator is also available at nominal 500 ohms impedance for driving a high power modulator.

EXCITER—A rather unique crystal oscillator circuit is used in the Viking I. In this oscillator a Pierce circuit uses the screen of the 6AU6 as a plate. The output of the oscillator is electron coupled to the plate of the 6AU6. This circuit has low crystal current and is a good frequency multiplier. The amount of excitation required from a VFO is slight.

Considerable flexibility is realized from the exciter design even though only two tubes are used and the circuit band-switching. On the 160, 80, and 40 meter bands the 6AQ5 is used as a buffer, as a doubler or tripler on 20, 15 and 10 meters. If crystals are used in the manner recommended below and their frequencies properly chosen, there is almost no possibility of obtaining output from the exciter which falls outside the amateur bands.

VFO REQUIREMENTS—When used with an external VFO the transmitter is very easy to drive. Only six volts of 7.5 mc. RF is required for full output at 30 mcs., less for the 14 and 7 mc. bands. Two volts of 1.75 mc. VFO output is ample excitation for 1.75 and 3.5 mc. output.

An octal socket on the rear of the chassis provides 6.3 volts ac at 0.6 amperes for VFO filaments and 300 milliamperes at 300 volts dc unregulated for VFO plate voltage. The 240-122 Viking VFO simply plugs into the transmitter and is ready to operate. The VFO may be keyed from the transmitter.

| Xtal Freq. | Output Band | | | | | | |
|-------------|-------------|----|----|----|----|----|----|
| | 160 | 80 | 40 | 20 | 15 | 10 | 11 |
| 1.8-2.0 mc | ✓ | ✓ | ✓ | | | | |
| 3.5-4.0 mc | | ✓ | ✓ | ✓ | ✓ | | |
| 7.0-7.3 mc | | | ✓ | ✓ | ✓ | ✓ | |
| 14-14.4 mc | | | | ✓ | | ✓ | |
| 6.7-6.85 mc | | | | | | | ✓ |

The chart above indicates the crystals which may be used for full output on the amateur bands covered by the transmitter.

Economy of space without appreciable loss of efficiency is the virtue of variable inductor tuning of the amplifier. Separate coils, sufficiently large to handle the final's circulating current, would consume a prohibitive amount of cabinet space. Plug in coils would compromise the transmitter's flexible design. The final tank tuning condenser is ganged to the variable inductor maintaining a nearly constant L/C ratio across the tuning range. Additional series inductance is switched into the circuit in order to cover the 160 meter band. The output coupling condenser consists of a 350 mmf. variable and additional fixed capacity which can be switched in parallel so that low impedance loads can be matched to the amplifier. The maximum capacity of the coupling capacitor is 2,000 mmf. The output terminal is a chassis type coaxial connector.

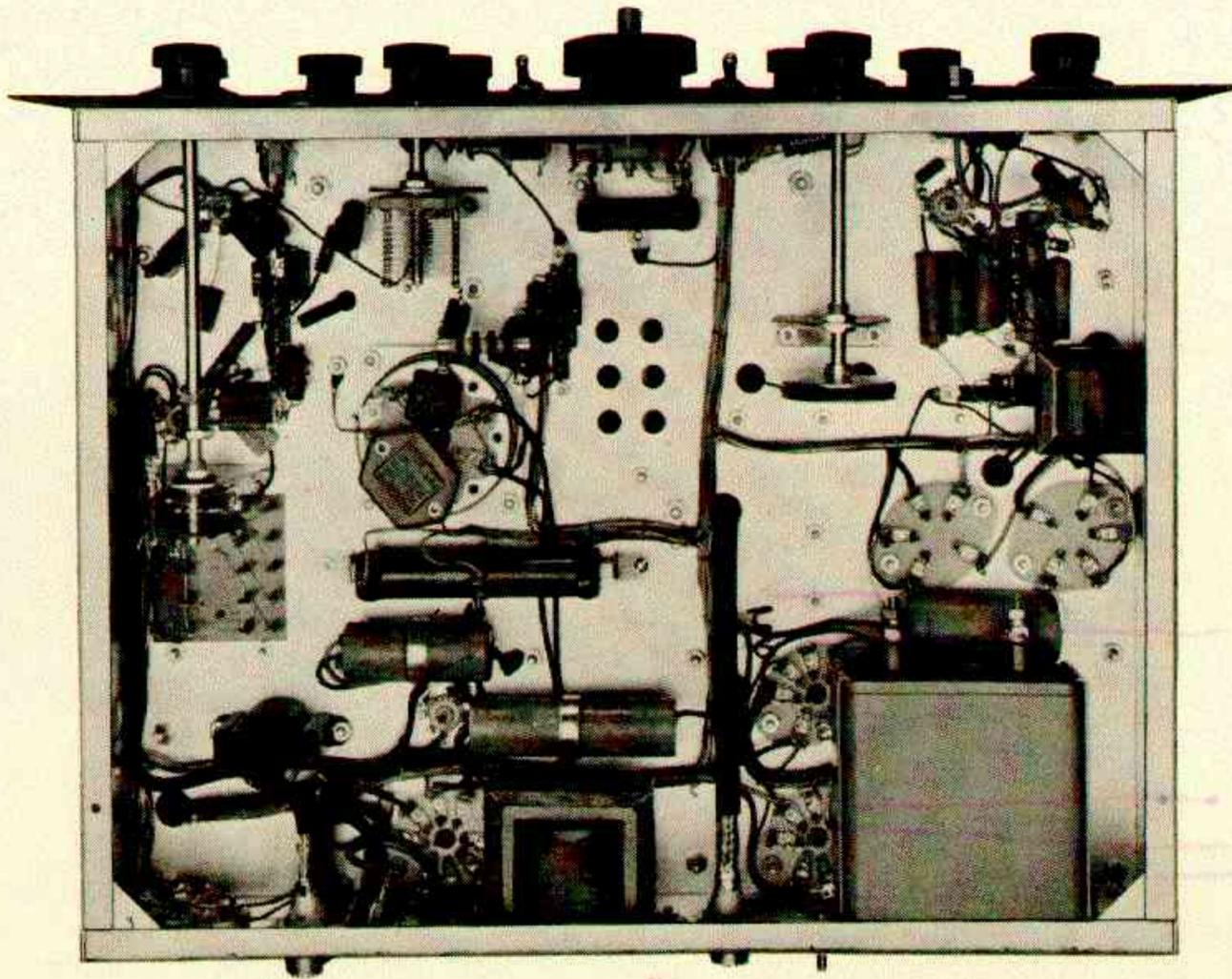
ANTENNAS—The pi-section tank circuit of the Viking I can be loaded into random length single wire antennas permitting operation on several bands without any change in the antenna system. The coupler is designed to match low impedance loads such as are encountered when using coaxial transmission lines as well as the high impedance of an end fed half wave.

ASSEMBLY—Here is a kit where either the novice or the "old timer" can get performance equal to that of our laboratory models. It was designed as a kit and no particular skill or dexterity is required in its assembly. A wiring harness containing all the ac and dc power leads is furnished reducing the possibility of incorrect wiring and giving the appearance of a factory assembled job. RF leads are short and direct. The 13 x 17 x 3 chassis and panel are punched at the factory. No drilling or other metal work is required. Complete to the last detail the parts furnished include brackets, dial cord, solder lugs, washers, spacers, wire, grommets and all other small hardware items.

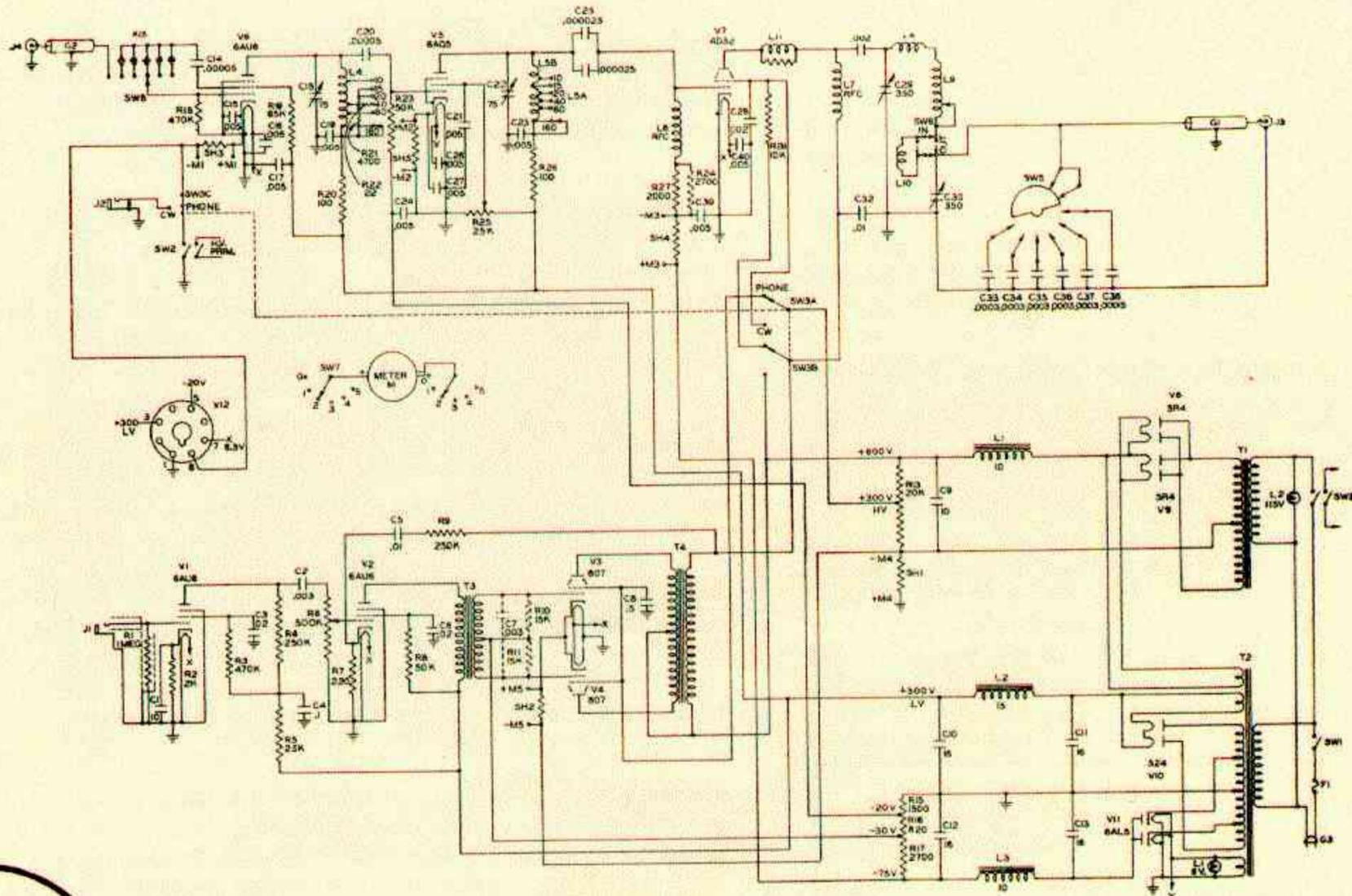
APPEARANCE—Microphone input connector, keying jack and all controls are conveniently located on the front panel. The VFO input receptacle, extractor fuse post and output terminal are located on the rear of the chassis. The transmitter is housed in a dark maroon wrinkle finished desk cabinet, 11³/₈" x 15" x 21". Panel is 8³/₄" x 19" with matching two tone finish. The skirted knobs furnished were designed especially for the kit and accent its finished, commercial appearance.

Amateur Net complete less tubes, crystals, key, mike

\$209⁵⁰



Chassis bottom view



Schematic Diagram



E. F. JOHNSON COMPANY

WASECA, MINNESOTA

The New Johnson Viking VFO Kit

COMPANION UNIT FOR VIKING 1
OR ANY OTHER TRANSMITTER

FEATURES:

- ★ Accurate Frequency Calibration (All Bands—160 thru 10 meters)
- ★ 5" Calibrated Dial with 6:1 Reduction
- ★ High Stability—Cleanest Keying
- ★ Simple Assembly—Build It in an Evening



Here's good news to all amateurs—the JOHNSON VFO KIT, for use with the Viking 1 or other transmitters. The new JOHNSON VFO is a precision instrument engineered to the same high standards of appearance and performance which characterize the Viking 1 Transmitter.

ADEQUATE OUTPUT

More than adequate VFO output is provided to drive the Viking 1 and other transmitters, to full excitation on all bands, 10 thru 160 meters. VFO output is 8 to 10 volts on the 7.0 to 7.425 MC range and 5.5 to 7.5 volts on the 1.75 to 2.0 MC range.

The transmitter oscillator stage is utilized as an isolating RF amplifier or frequency doubler when it is driven by the VFO.

TUBE COMPLEMENT

The tube complement consists of a 6AU6 electron coupled oscillator and an 0A2 regulator. Good isolation between the oscillator and output circuit, and nearly perfect screen grid voltage regulation account for very clean keying and overall stability of the VFO. Tank circuits are temperature compensated.

SEPARATE OSCILLATOR TANKS

Two entirely separate oscillator tanks are used so that a frequency multiplication of only four need be used to cover the 10 meter band with maximum frequency calibration spread and accuracy, minimum frequency drift, and unusually excellent keying characteristics.

TWO CONTROLS

1. A frequency control driving a 5" dial calibrated directly **in frequency**—including all bands 160 meters thru 10 meters. A smooth drive with a 6:1 reduction makes frequency setting easy.
2. A bandswitch control with four positions:

| Plate Off | VFO Output |
|-----------------------|--------------|
| 160, 80, 40 meters | 1.75–2.00 mc |
| 40, 20, 15, 10 meters | 7.0–7.425 mc |
| 11 meters | 6.7–7.0 mc |

Has built-in tilting bracket

Keying can be done in three different ways:

1. Keying with VFO alone
2. Keying the transmitter alone
3. Keying both the VFO and transmitter simultaneously.

The latter is highly satisfactory and provides perfect "break-in" operating conditions on all bands.

POWER SUPPLY REQUIREMENTS

All voltage requirements are amply supplied from the VFO supply socket on the Viking 1 Transmitter. No other power supply required. All necessary cables and plugs are furnished. If the JOHNSON VFO is used without the Viking 1, power supply requirements are 250 to 300 v, unregulated at 15 ma and 6.3 v at .3 amp., ac or dc, which is usually available from existing transmitter power supplies.

BUILD IT IN AN EVENING

Assembly is very simple. A special tank assembly board is provided so that component mounting and wiring will be exactly like the original model, resulting in nearly perfect tracking of frequencies with the calibration markings over the whole dial range. Instruction manual contains complete details and schematics for use with transmitters other than the Viking 1.

EASILY CALIBRATED

Frequency calibration is simple. A 5" dial graduated directly with frequency markings is provided. The oscillator tank frequencies are adjusted to the dial calibration by means of JOHNSON miniature air variable condenser paddlers at the low ends and similar miniature variables used as trimmers on the high ends of the frequency ranges.

Frequency adjustment instructions are provided for three methods of calibration:

1. Using a secondary standard signal generator.
2. Using crystals in transmitter as frequency standards.
3. Using WWV signal at 10 mc.

A receiver with a BFO is the only additional equipment required for the original calibration.

JOHNSON VIKING VFO KIT, complete, less tubes, in dark maroon finished cabinet to match Viking 1. Size 7"x6⁷/₈"x6¹/₁₆". Amateur Net. . . . \$42.75

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E. F. JOHNSON CO., WASECA, MINNESOTA

