Lafayette

80 through 10 Meter
Stock No. 99-2501

Variable Frequency Oscillator

OPERATING MANUAL

TECHNICAL SPECIFICATIONS

FREQUENCY COVERAGE	80M 3.5 — 4.00 Mc. 40M 7.0 — 7.30 Mc. 20M 14.0 — 14.35 Mc. * 15M 21.0 — 21.45 Mc. * 10M 28.0 — 29.70 Mc. *
FUNDAMENTAL OSCILLATOR FREQUENCY	3.5 — 4.0 Mc for 80M and 10M bands. 3.5 — 3.65 Mc for 40M, 20M and 15M bands.
OUTPUT FREQUENCY	80M band: 3.5 — 4.00 Mc. 40M band: 7.0 — 7.30 Mc. 20M band: 7.0 — 7.30 Mc. 15M band: 7.0 — 7.30 Mc. 10M band: 7.0 — 8.00 Mc.
OUTPUT POWER	10 — 20 volts RMS.
OUTPUT IMPEDANCE	LOW 52 ohms, HIGH 50K ohms.
TUBE COMPLEMENT	V1 6AU6 Series-tuned Clapp Oscillator. V2 6AQ5 Output Amplifier. V3 VR150MT/OA2 Voltage Regulator.
POWER SOURCE	117 volts, 50 — 60 cps AC.
POWER CONSUMPTION	40 VA.
DIMENSIONS	Height 5¼"; Width 6½"; Depth 7½".
WEIGHT (Net)	6¼ lbs.

* The VFO scales for 20, 15 and 10 meter bands actually extend beyond these limits; however, only the amateur bands have been listed.

GENERAL DESCRIPTION

The No. 99-2501 is a rugged Variable Frequency Oscillator designed for dependable, stable operation on all bands from 80 through 10 meters, with sufficient output to drive any multi-stage transmitter of modern design.

For high stability, the VFO employs a series-tuned Clapp Oscillator, incorporating special temperature-compensating capacitors. The oscillator uses two fundamental tuning ranges to provide suitable outputs for five amateur bands. The fundamental tuning ranges are as follows:

(1) 3.50 — 4.00 Mc.

(2) 3.50 — 3.65 Mc.

The chart below shows how these basic tuning ranges are used:

FUNDAMENTAL OSCILLATOR TUNING	BAND	VFO OUTPUT
(1) 3.50 - 4.00 Mc	80 M	3.50 - 4.00 Mc (Fundamental used)
(2) 3.50 - 3.65 Mc	40 M	7.00 - 7.30 Mc (2nd Harmonic used)
(2) 3.50 - 3.65 Mc	20 M	7.00 - 7.30 Mc (2nd Harmonic used)
(2) 3.50 - 3.65 Mc	15 M	7.00 - 7.30 Mc (2nd Harmonic used)
(1) 3.50 - 4.00 Mc	10 M	7.00 - 8.00 Mc (2nd Harmonic used)

The output stage operates as an amplifier to provide a high output signal level for connection to the transmitter. The output terminates in two RCA-type phono jacks — one providing a low impedance output, the other a high impedance output.

The power supply uses a low-heat silicon rectifier in a half-wave circuit with good filtering. A voltage regulator tube maintains stability by eliminating any effect on the socillator due to line voltage variations.

Rigid mechanical construction has been employed throughout. Double-bearing construction is used on the tuning capacitor. All frequency determining components are enclosed in a separate compartment to maintain rigidity, shielding, and provide isolation from heat-producing elements in the circuit.

The No. 99-2501 is compatible with most amateur transmitters having a VFO input. Any questions regarding the compatibility of this VFO with units which do not have a VFO input should be directed to the transmitter manufacturer, who is best qualified to give such information.

INSTALLATION

POWER

The VFO operates from 105-120 volts, 50 — 60 cycles AC. Do not use on any other power source.

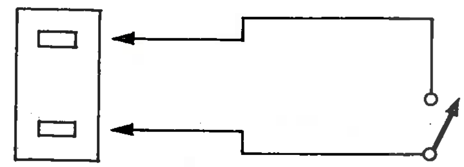
OUTPUT CONNECTIONS

The VFO is equipped with two outputs. One is a high impedance output, while the other is a low impedance output. In cases where it is necessary to use a connecting cable longer than 36 inches between the VFO and transmitter, use the low impedance output. For cable lengths of 36 inches or less, use the high impedance output. Note, however, that when using the low impedance output, it will be necessary to add a decoupling capacitor of about 2000$\mu\mu$f in series with the VFO input on the transmitter.

In order to connect the VFO to your transmitter, you have been supplied with a short length of coaxial cable, terminated at one end with an RCA-type phono plug. A plus matching the transmitter VFO input should be attached to the free end of the cable.

REMOTE SOCKET

The VFO may be operated remotely by means of an external switching device connected to the remote socket. The external switch (relay, etc.) is connected by means of a standard AC line cord and plug so that the plug pins are shorted when VFO operation is desired. This plug is then inserted into the REMOTE socket and the FUNCTION switch left in the STANDBY position. In this manner, closing of the external switch will activate the B+ supply and produce instantaneous VFO operation.



LOCATION

Install the VFO as close to the transmitter as possible. Avoid very warm locations and allow at least one inch between the rear of the VFO and a wall.

DIAL CALIBRATIONS

The VFO dial uses five calibrated scales for tuning on 80, 40, 20, 15 and 10 meters. The calibrations indicate the RF carrier frequency of the transmitter output stage, not the VFO output.

The table below shows how each scale is calibrated:

VFO Scale	Major Calibrations Every	Minor Calibrations Every
80 M	100 Kc	20 Kc
40 M	50 Kc	10 Kc
20 M	100 Kc	20 Kc
15 M	100 Kc	20 Kc
10 M	500 Kc	100 Kc

OPERATING INSTRUCTIONS

1. Set the VFO Function switch to STANDBY and set Band switch to the desired band of operation.

2. Place the transmitter in the Standby position and allow both units to warm up for 30 minutes.

3. Tune the VFO to the desired frequency as indicated on the calibrated dial. Refer to the next chart which shows the actual VFO output frequencies for various dial settings. Also indicated is the transmitter multiplication necessary in each case to produce an RF carrier output which matches the VFO dial tuning. If operation on 14.00 Mc were desired, for example, the VFO band switch should be set to "7-14-21" and the VFO tuned to 14 on the 20M scale. The output frequency of the VFO would actually be 7.00 Mc. However, setting the band switch on the transmitter to 20M operation will normally provide a doubling action and thus produce a 14.00 Mc RF carrier output.

4. Set the VFO to SEND.

5. Switch the transmitter to its operating position and follow the manufacturers recommended tuning procedure.

CHART

AMATEUR BAND	VFO BAND SWITCH	VFO DIAL SCALE	ACTUAL VFO OUTPUT FREQ.	MULTIPLICATION REQUIRED BY TRANSMITTER
80 M	3.5	3.50 - 4.00 Mc*	3.50 - 4.00 Mc	None
40 M	7-14-21	7.00 - 7.30 Mc	7.00 - 7.30 Mc	None
20 M	7-14-21	14.00 - 14.35 Mc*	7.00 - 7.175 Mc	X2
15 M	7-14-21	21.00 - 21.45 Mc*	7.00 - 7.15 Mc	X3
10 M	28	28.00 - 29.70 Mc*	7.00 - 7.425 Mc	X4

* The VFO scale calibrations actually extend beyond these band limits. However, the ranges shown cover only the amateur bands, which are indicated by heavy white lines on the VFO scales.

VFO OUTPUT ADJUSTMENT

TC3 (output adjustment) may be peaked for maximum VFO output as follows. Set the VFO and transmitter for 10 meter operation. Set the VFO dial to 29.7 Mc, and tune TC3 for maximum oscillator or grid drive on the transmitter.

FUSE

The AC power input to the VFO is fused for 1 amp. This fuse is located next to the AC power transformer and is accessible from the
plastic cover to remove the fuse from its holder.
rear of the VFO. Simply remove the transparent
Replace only with a fuse of the same rating.

VFO CALIBRATION

The VFO has been carefully aligned at the factory and should therefore offer accurate calibration at all dial settings. Remember, however, that it is always the operator's responsibility to guard against operation outside of the amateur band limits.

VFO ALIGNMENT

OSCILLATOR ALIGNMENT

Equipment Required:

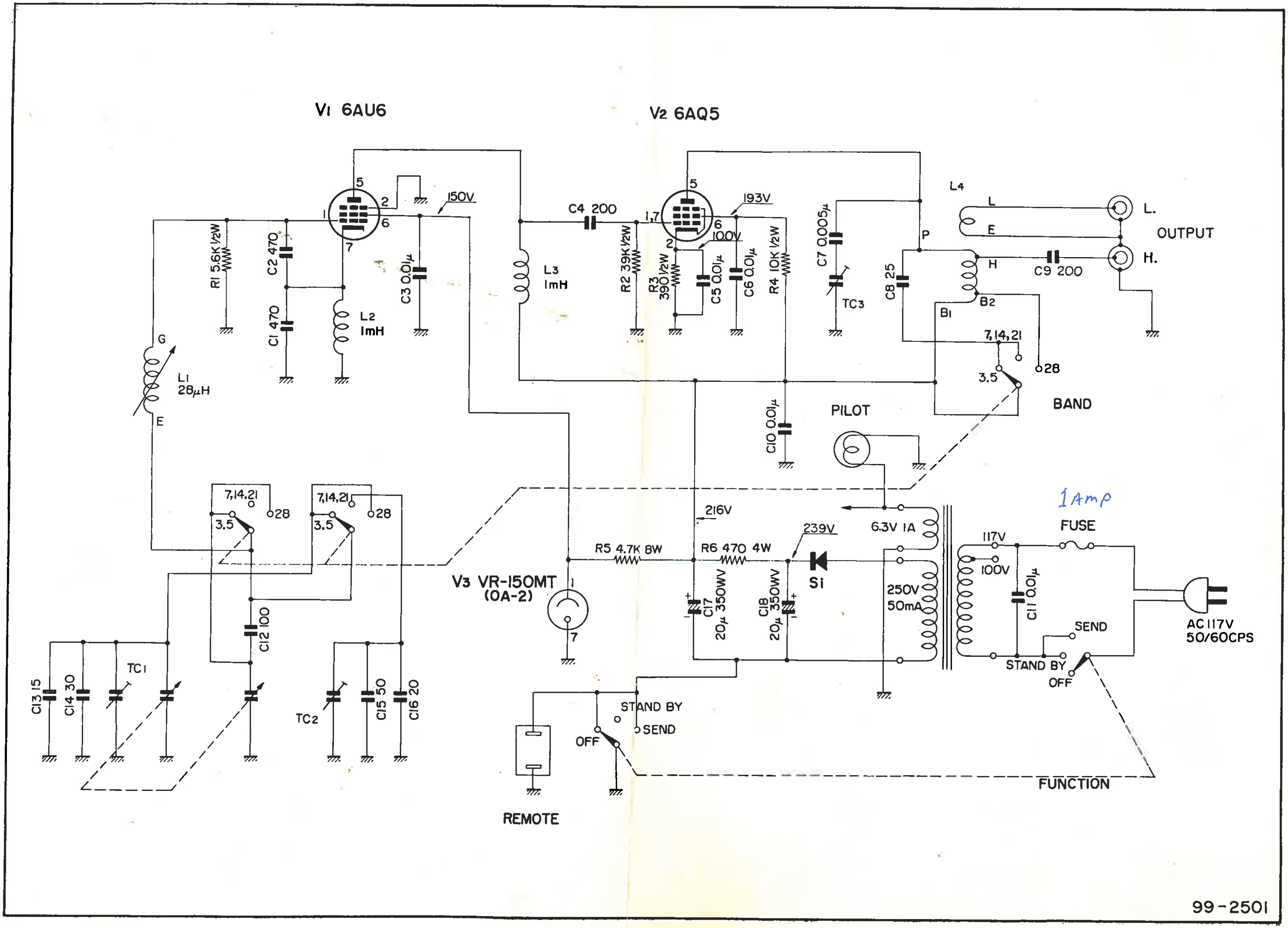
(a) A non-metallic alignment tool.

(b) A communications receiver capable of tuning 3.0 — 4.0 Mc within ±1 Kc or better (a 100 Kc crystal calibrator will be useful).

(c) A 100-ohm 2-watt resistor for an RF load, which should be inserted in the "LOW" output jack.

	Tune VFO To	Band Switch	Tune Receiver To	Adjust For "Zero Beat"
1.	3.5 Mc	3.5	3.5 Mc	L1
2.	4.0 Mc	3.5	4.0 Mc	TC1
Repeat steps 1 and 2 until calibration is correct at both ends of scale				
3.	7.0 Mc	7. 14. 21	3.5 Mc	TC2

SCHEMATIC DIAGRAM



99-2501

Specs:
Drift 0–1 hour (warm-up) up to 800 hz/hour
after 1 hour warm-up ≅ 200 hz/hour

Model HA-90

LAFAYETTE
RADIO ELECTONICS
CORPORATION

111 JERICHO TURNPIKE
SYOSSET, L. I., NEW YORK

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