PHILCO MODEL 016 SIGNAL GENERATOR

Model 016 is an A.C.-D.C. operated push-button controlled signal generator that provides accurate standard I-F and R-F signals. The signals supplied by this generator cover the standard padding frequencies used in aligning all commercial radio receivers. Six push-buttons are provided and operate on two frequency bands. These bands are controlled by the "I.F.-R.F." band selector switch. Each button is preset at the factory to a standard frequency setting. Any of the frequency settings, however, can be changed by removing the escutcheon plate which covers the twelve compensators, and resetting the compensators (I.F. or R.F.) opposite the button to be changed. The fundamental R-F and I-F frequencies covered by each button are as follows:

I-F FREQUENCIES:

Button	Range	Standard Setting
No. 1	155 to 390 K.C.	175 K.C.
No. 2	155 to 390 K.C.	260 K.C.
No. 3	220 to 450 K.C.	350 K.C.
No. 4	240 to 570 K.C.	455 K.C.
No. 5	240 to 570 K.C.	460 K.C.
No. 6	290 to 620 K.C.	470 K.C.

R-F FREQUENCIES:

Button	Range	Standard Setting
No. 1	560 to 630 K.C.	580 K.C.
No. 2	850 to 2000 K.C.	1000 K.C.
No. 3	1100 to 2400 K.C.	1400 K.C.
No. 4	1300 to 2800 K.C.	1600 K.C.
No. 5	1300 to 2900 K.C.	2500 K.C.
No. 6	1800 to 3300 K.C.	3000 K.C.

NOTE—Short-wave frequencies of 5.0-7.5 and 10.0 Megacycles are obtained by using the harmonics of the fundamental frequency of push-button No. 5. Short-wave frequencies of 6.0, 9.0, 12, 15, and 18 M.C. can also be obtained by pressing push-button No. 6 and using the harmonics of the fundamental frequency of this push-button.

POWER SUPPLY:

The signal generator is designed to operate on a 115-volt A-C or D-C power supply. The power circuit is thoroughly shielded and filtered to prevent leakage into the power line of the signal produced by generator.

ATTENUATOR:

The signal strength of the R-F and I-F frequencies is controlled from a maximum to a minimum value by a "High-Low" output switch (lower left corner of generator) and a continuously variable "attenuator" control (lower right corner of generator). The output circuit is designed so that no damage will result should either one of the generator output leads come in contact with the A-C line, as might happen in connecting to some A.C.-D.C. sets. In addition, variation of the attenuator controls will not affect the frequency of the signal.

OPERATION:

1. Setting the Controls:
   a. Insert power cord into a 115-volt A-C or D-C power receptacle.
   b. Connect the clip of the generator shielded output wire to the circuit to be tested. Connect the ground wire of the generator output cable to the radio chassis or ground terminal. When connecting the output cable, the point of connection and dummy aerial should be used as specified in the manufacturer's padding procedure of the receiver to be adjusted.
   c. Slide the "I.F.-R.F." switch to the position desired, depending on which circuit in the receiver is to be adjusted.
   d. Press "IN" the push-button controlling the frequency required.
   e. Slide the "High-Low" output switch (lower left corner) to the "UP" position. In this position, the maximum signal output of the generator is obtained. This is the desired position for preliminary padding of a receiver. For final, accurate padding, slide the "High-Low" switch to the "Down" position for a weak signal.
   The strength of the signal output in either position of the "High-Low" switch is controlled from maximum to minimum by the variable attenuator located on the lower right side of the generator.
2. Aligning I-F Circuits:
   When adjusting the I-F circuits, a .1 mfd. condenser should be connected between the shielded output lead and the point in the I-F circuit where the signal is to be applied. It is advisable, however, in all cases, that the value of the coupling capacity be as specified in the manufacturer's padding procedure of the receiver being adjusted.
3. Aligning R-F Circuits:
   In aligning the R.F. circuits of receivers designed for a standard type aerial, connect a 200-mmfd. condenser between the output lead of the signal generator and the aerial terminal of the receiver. When aligning the short-wave band, replace the above condenser with a 400-ohm carbon resistor.
4. Aligning Receivers with Special Aerial Circuits:
   When aligning receivers designed for a doublet aerial system or any aerial using a matched transmission line (such as the Philco High Efficiency Aerial), the signal generator output cable should

be connected as follows: Connect the high side (shielded wire) of the signal generator output cable through a 100-ohm resistor to the ungrounded terminal of the transmission line on the radio. Connect the ground wire of the output cable to the radio chassis ground post.

5. Aligning Loop Aerial Radios:

To align radios using a loop aerial, a test loop should be connected to the output cable of the signal generator. The test loop can be made from a few turns of wire wound approximately 12 inches in diameter, or a Philco Auxiliary Loop Aerial, Part No. 45-2808, can be used for this purpose.

After the test loop is connected to the output cable of the generator, it should be placed approximately one foot from the loop aerial of the receiver.

CHECKING SET FOR CORRECT PADDING:

A rapid check is easily made to determine if the high-frequency circuits of a radio are correctly padded to the true signal and not to the image signal by merely tuning the radio to the harmonics of the No. 6 R-F button (6.0-9.0-12.0-15.0-18.0 megacycle) and noting that the signals appear at their correct dial positions.

When a set is incorrectly padded to the image frequency, the next lowest signal will be much weaker in strength and approximately ½ megacycle off frequency.

This check is easily made since the signal generator need only be set but once.

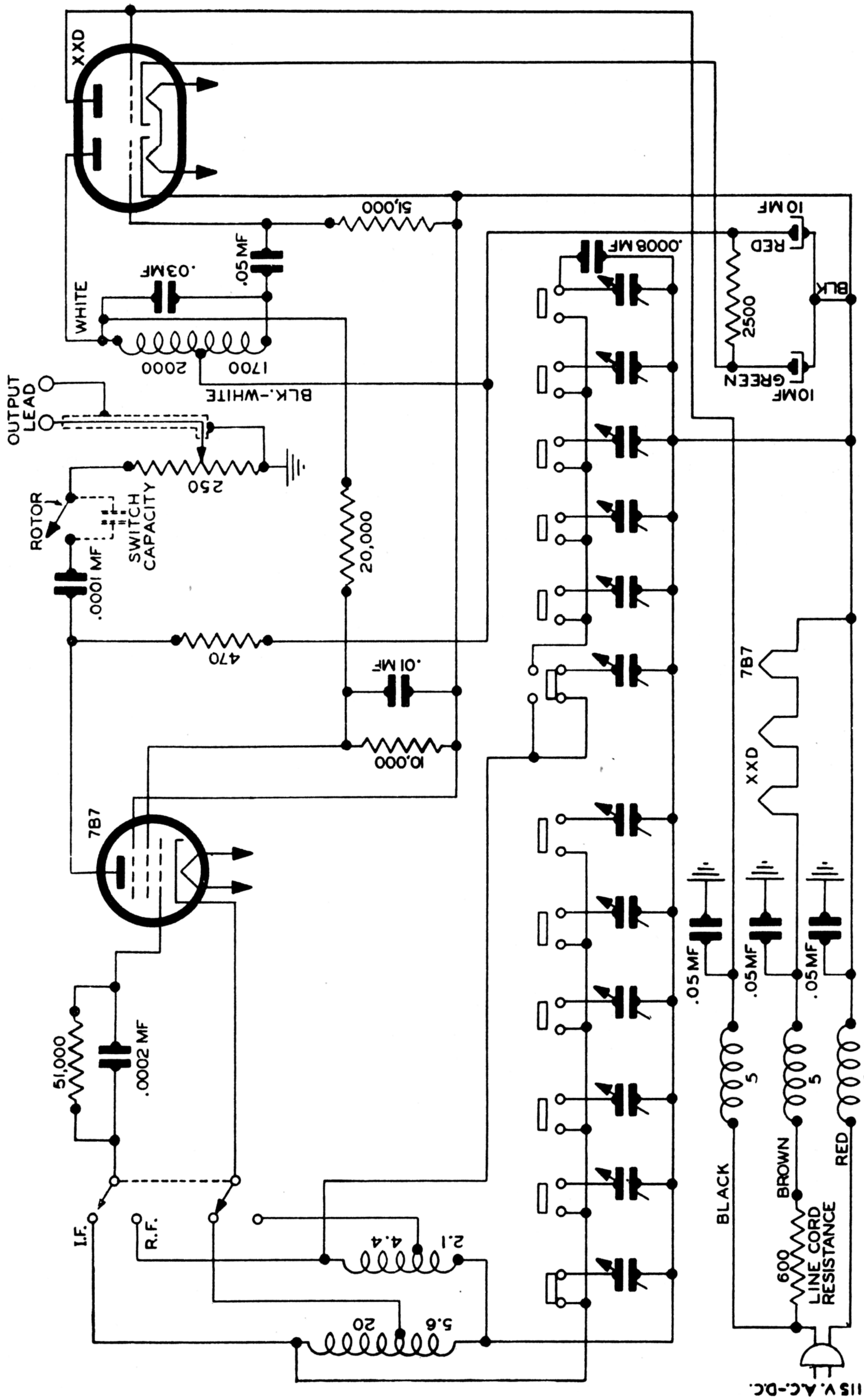
CHANGING FREQUENCIES OF PUSH-BUTTONS:

The push-buttons are preset at the factory to standard I-F and R-F frequencies. These frequencies, however, can be changed to other values within the limits as listed above. To do this, proceed as follows:

1. Connect the output cable of the signal generator to the aerial connection of a radio set. Remove the escutcheon from the push-buttons. A row of padders will be found on each side of the push-buttons.
2. The left-hand row of padders control the frequency range of the I-F band, and the right-hand row of padders, the R-F band.
3. To change the frequency of any push-button, insert an insulated padding screw driver into the I-F and R-F padder screw adjacent to each push-button, and turn in the direction necessary to obtain the frequency desired.
4. When doing this, the radio receiver dial should be turned to the frequency desired, or to a harmonic of the frequency in case of I-F frequency. To do this correctly, a radio receiver that is calibrated accurately should be used.

FAILURE IN OPERATION:

If instrument fails, check for faulty 7B7 or XXD tube, open or shorted 10-mfd. filter condenser, open modulating transformer, open 2500-ohm filter resistor, open oscillator transformer, shorted trimmers, or open 600-ohm line-cord resistor.



PHILCO MODEL 016 SIGNAL GENERATOR (SCHEMATIC DIAGRAM)