

OPERATING INSTRUCTIONS MODEL 640 TEST OSCILLATOR

CAUTION: This instrument is designed for use on 50-60 cycle current, 110-120 volts only.

1. These instructions are furnished to assist you in getting the most value from your investment in this instrument. In your own interest, read this information thoroughly. The accuracy and dependability of any piece of precision test equipment depends largely upon the care given it. This is especially true regarding a test oscillator. Do not subject the instrument to excessive jars or shocks. Avoid proximity to intense heat, steam or excessive moisture. The above conditions might possibly alter the calibration of the instrument.
2. These instructions relate entirely to the use of the instrument and matters pertaining to it's design, calibration etc. The most authoritative information on the actual work of aligning and adjusting a receiver is furnished by the manufacturer of that receiver. Correct procedure and the location of the various adjustments differ considerably for various makes of sets. The compilation of such data is not considered within the scope of these instructions. The service manuals should be consulted for the correct adjustment procedure for the particular set under test.
3. The model 640 is supplied complete with tubes installed and is ready to use. Three type 6C5 tubes are used for oscillator, modulator and rectifier.
4. The instrument supplies a radio frequency test signal which covers the range from 100 kilocycles to 32 megacycles. Six individual ranges selected by push buttons provide fundamental frequencies on all ranges. The output signal may be either modulated at 400 cycles (approx. 30%) or a continuous wave (unmodulated) signal selected. If desired an external audio voltage may be used to modulate the signal at any audio frequency. The 400 cycle audio voltage is also made available for external use.

OPERATING CONTROLS

5. FREQUENCY RANGE selection is provided by the six push buttons marked A, B, C, D, E, and F. The push buttons select the corresponding frequency range on the dial scale. For example, range "A" on the dial scale is selected by the push button marked "A" and provides test frequencies from 100 to 260 kilocycles.
6. The FUNCTION switch has three positions. In the first position the instrument is turned off. At the second position marked "MOD", a 400 cycle audio modulated signal is generated by the instrument. With the switch set at the third position (marked C.W.) a continuous wave unmodulated signal is generated by the instrument.
7. The OUTPUT RATIO and MICROVOLTS controls adjust the intensity or signal strength of the R. F. Output signal.
8. The MICROVOLTS control is variable and calibrated from 0 to 100 microvolts. This calibration is based on the average output of the instrument in the low frequency and broadcast bands with a line voltage of 115 volts applied. Considerable variation can be expected in the higher frequency bands due largely to the shunt impedance of the dummy antenna lead.
9. The OUTPUT RATIO control increases the output of the oscillator in direct ratio as marked. For example, with the "Microvolts" control at 5 and the "Output Ratio" control at 1000, a 5000 microvolt setting has been made. With the "Output Ratio" control set at the High position and the "Microvolts" control at 100, the entire maximum output of the oscillator is obtained.

10. R.F. OUTPUT jack. The dummy antenna lead furnished with the instrument is connected to this jack to provide the signal for alignment and test purposes. This jack provides the R.F. test signal when either a Modulated or C. W. (unmodulated) signal is desired.
11. 400 CYCLE OUTPUT jack. When the "Function" switch is set at the "MOD" position, a 400 cycle audio voltage may be obtained by connection to this jack. This signal may be used for testing audio sections of the receiver etc. This jack provides an audio voltage only and cannot be used for R.F. or I.F. stage alignment.

OPERATING OF THE INSTRUMENT

12. **NOTE** - For best accuracy the instrument should be turned on and allowed to warm up for a few minutes before use. This will allow the circuits to assume a stable operating condition.
13. Set the "Function" switch to the "MOD" or "C.W." position depending upon whether a modulated or continuous wave (unmodulated) signal is desired.
14. Insert the dummy antenna output lead in the R.F. OUTPUT jack of the oscillator. Two clips are provided at the other end of these leads for connection to the receiver. The shielded lead is the ground lead and generally connects to the chassis ground of the receiver. The inside lead is the antenna or high lead.
15. The receiver manufacturer's service manual should be consulted for the type of dummy antenna connections recommended. In the absence of this information a 250 M.M.F. condenser should be connected in series with the antenna lead to the receiver at broadcast and lower frequencies. At the higher frequency ranges a better match between the oscillator output and the receiver antenna coil is obtained by connecting a 200 ohm resistor in series with the 250 M.M.F. condenser.
16. Set the oscillator to deliver the desired frequency on the dial scale. Select the "Frequency Range" button corresponding to the letter on the dial range being used.
17. The intensity of the output signal is controlled by the "Microvolts" and "Output Ratio" controls. To prevent AVC action and overloading of the receiver, the lowest possible signal voltage should be used which will permit proper alignment. An output meter or Cathode Ray oscillograph should be connected to the audio portion of the receiver to indicate output.
18. **CAUTION:** It is extremely important that the dummy antenna leads should not be connected directly to any circuit having C.C. or A.C. voltages present. In any case where voltage is on the circuit to which connections are made, a condenser must be used in series with the high lead of the dummy antenna. Voltage applied to the dummy antenna leads will be impressed on the R.F. Output circuit and if sufficiently high will cause the "Microvolts" control to be burnt out.

EXTERNAL AUDIO MODULATION

19. The instrument may be externally modulated at any audio frequency. The "Function" switch should be set to the "C.W." position and the modulating voltage applied to the 400 CYCLE OUTPUT JACK. An audio voltage between 5 and 10 volts will be sufficient to modulate the instrument.

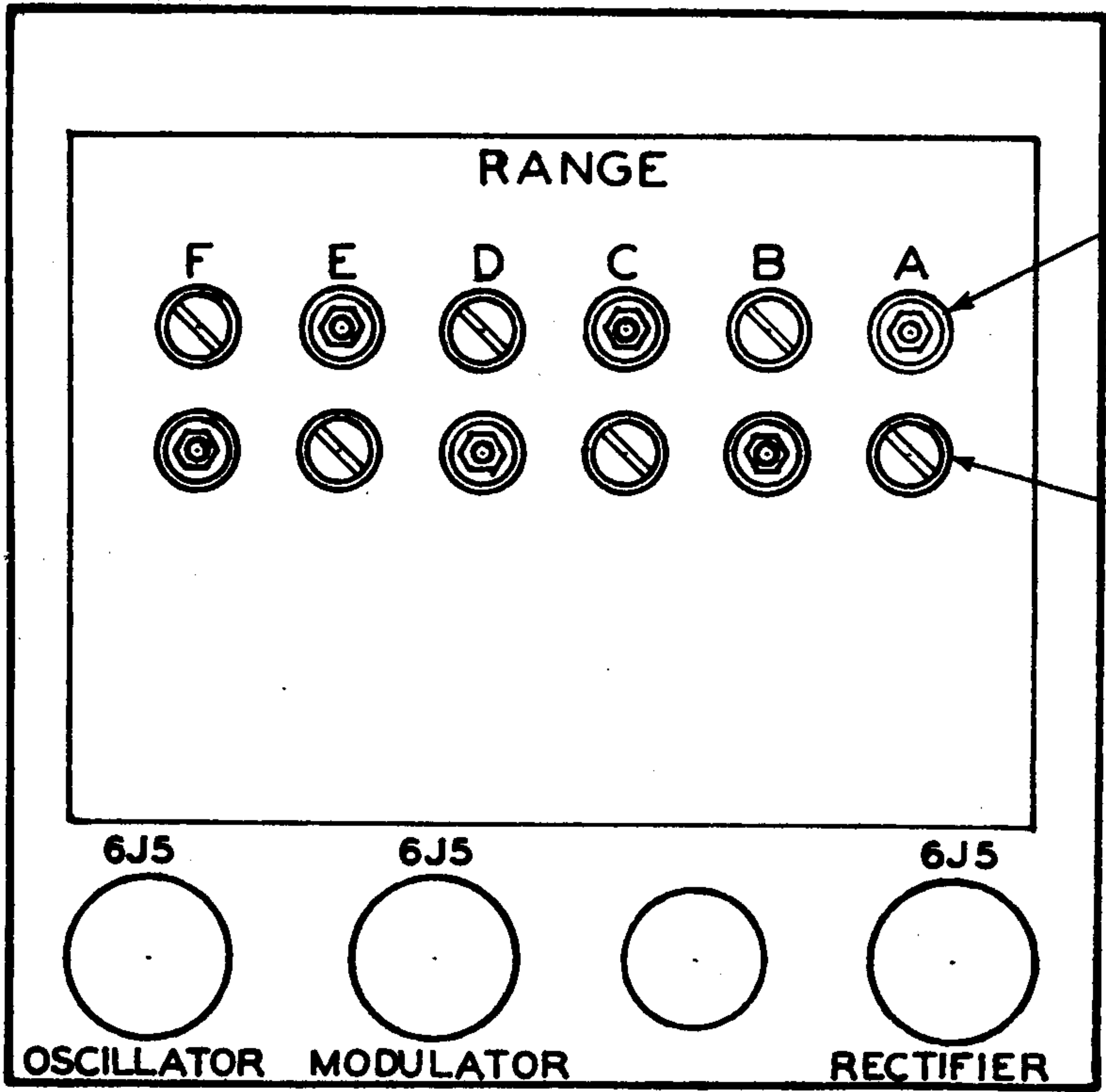
CALIBRATION

20. This instrument has been carefully calibrated at the factory to an accuracy of plus or minus $\frac{1}{2}\%$ of the indicated frequency on all ranges. The best quality materials have been used and under normal conditions the instrument should maintain its calibration accuracy for long periods of time. The following information is included in case recalibration becomes necessary and the owner does not wish to return the instrument to the factory.
21. For recalibration, the instrument must be removed from the front of the case. To replace tubes, the back of the case only need be removed.
22. Six coils are used in the instrument to cover the six fundamental ranges on the dial scale. Each coil has its own inductance trimmer and padding condenser. The inductance trimmer is an iron core located in the top of each coil. The coils are wound on special forms of the plug-in type and are located in the coil shield in the rear of the instrument. Do not remove the coil shield when making calibration adjustments.
23. The drawing on page 4 shows the location of the various coils and trimmer adjustments. To recalibrate any band the trimmer condenser for that band is FIRST adjusted at the high frequency end. Then if the calibration is off at the low frequency end of the band it will be necessary to adjust the iron core in the top of the coil. If the iron core is adjusted, again check the trimmer condenser at the high frequency end of the band.
24. By the above two adjustments each coil can be made exact at the high and low frequency ends of the range. The accuracy of the calibration throughout the intermediate points on the dial scale depends upon the capacity curve of the main variable condenser. The capacity curve of the condenser has been carefully adjusted at the factory. Do not attempt to bend plates or adjust the capacity of this condenser in any way. If the trimmer adjustments have been properly made at the high and low frequency ends of each range, the intermediate points will fall well within the accuracy limits of the instrument.

GENERAL INFORMATION

25. The following should be included in the original shipment of the instrument.
 - 1 - Registration Card
 - 1 - Guarantee Certificate
 - 1 - Set of Operation Instructions
 - 1 - Set of Operation Instructions
 - 1 - Dummy Antenna Lead
26. Mail the Registration Card for your instrument promptly, giving correct name and address, so that additional technical bulletins from our factory will be properly delivered. Notify us of a change of address, listing model number and serial number of your instrument in the notice.
27. Repairs and adjustments will be made under the terms and conditions stated in the guarantee furnished with this instrument. The instrument should not be returned to our factory except where we authorize such return to be advisable. When corresponding concerning this instrument, always mention model number and serial number. Be certain to describe fully and accurately the information desired.

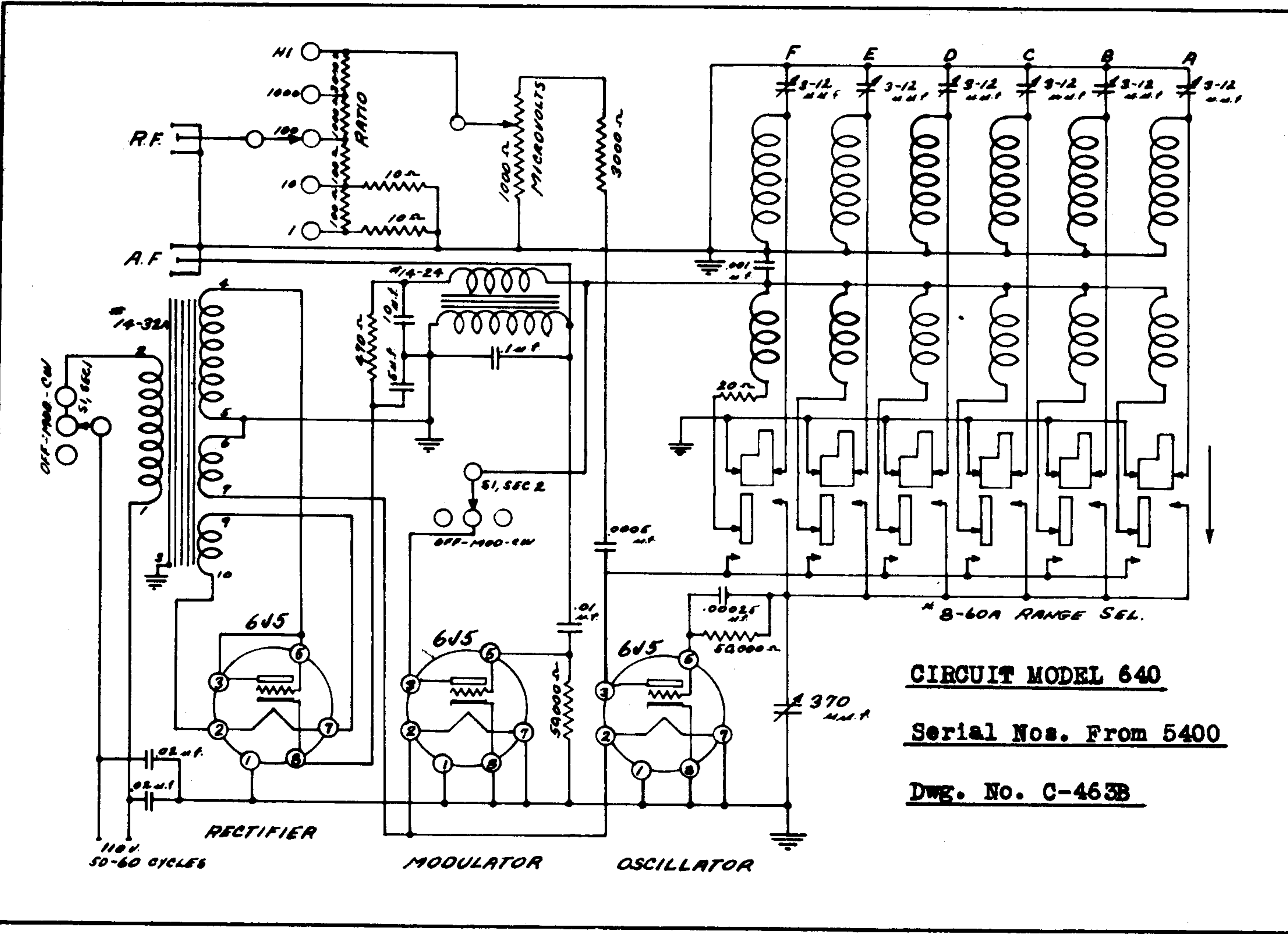
The Jackson Electrical Instrument Co.
18 S. Patterson Blvd.
Dayton, Ohio



ADJUST IRON CORE AT LOW FREQUENCY END OF RANGE

ADJUST TRIMMER COND. AT HIGH FREQUENCY END OF RANGE

REAR VIEW OF CHASSIS



CIRCUIT MODEL 640

Serial Nos. From 5400

Dwg. No. C-463B