

**NATIONAL TYPE
MB-40SL
MULTI-BAND TANK
9/29/1953**

1. GENERAL

The MB-40SL tanks is intended for use in grid circuits with approximately 20 Watts input and in final plate tank circuits of transmitters when the power input to the stage does not exceed 40 Watts loaded. The tuning range is from 3.2 to 9.0 Mc. and from 12.0 to 34.0 Mc. as illustrated in Figure No. 1. Sufficient overlap for the amateur bands is provided to care for differences in capacity due to layout, tubes, etc. Tuning any of these frequencies is obtained simply by turning the dial to the proper setting. A vernier dial calibrated from 0 to 100 with 180 degrees rotation, such as the National AM-2 or AM-3 is recommended for use with the MB-40SL. The dial should be set to read zero with the capacitor plates fully meshed. Starting with the dial reading zero, the tank will tune through the following bands in succession: 80, 20, 15, 40, 11 and 10 meters. No plug-in coils or bandswitching is necessary. The input or output is in the form of an electrostatically shielded coupled coil. The shield is grounded to the chassis when the capacitor frame is grounded or bypassed to ground. This shield helps reduce coupling at the harmonic frequencies due to capacity coupling.

The MB-40SL is designed for push-pull or single-ended circuits in all amateur bands between 10 and 80 meters. Output power can be taken from the variable shielded line when coupling to the antenna or when link coupling is employed between stages in the transmitter. The link is designed to work with an impedance of 300 Ohms, however for low impedance lines such as 50 or 70 Ohm coax, the link can be reduced to 3 or 4 turns. A good compromise can generally be made with all the available type tubes. The MB-40SL is particularly well suited for use with low impedance types. Popular tubes such as the 6L6, 6F6, 6V6 and 829 work well with the the MB-40SL, as well as many other types.

2. INSTALLATION

Figures 2 through 8 illustrate many of the suitable circuit arrangements. The rotor shaft of the tuning capacitor should be insulated at the front. An insulated coupling will satisfy this requirement. The feedthru insulator mounted in the center of the coil at the rear of the frame is the center-tap and should connect to B-plus through and RF choke or to the grid resistor, depending on the application; it should not be grounded or bypassed to ground. The other two feedthru insulators are the RF output terminals. Solder lugs are provided at both sides of the unit to facilitate connections to the tuning capacitor stators.

When the tank is used for a neutralized amplifier or as a coupling circuit between a single-ended amplifier and push-pull grids, a capacitor of a slightly greater capacity than

the output capacity of the tube should be connected between the open side of the tank circuit and the ground to balance the tube capacity appearing on the other side of the tuned circuit. The capacitor is necessary also to assure neutralization (where required) over a wide band of frequencies.

3. OPERATION

The operation of the MB-40SL is conventional in that the tank is tuned for minimum plate current (or maximum grid drive when used in the grid circuit) and the link is adjusted to result in proper loading as indicated by the rated loaded plate current for the particular tubes in use. The tank is tuned to two frequencies at each setting of the tuning capacitor. Both tuning ranges are tuned in the conventional manner with 3.2 and 12.2 Mc. near the maximum capacity setting of the capacitor and 9 and 34 Mc. near the minimum. A simple rule to follow to prevent tuning the tank to a multiple (i.e. doubling, tripling, quadrupling, etc) of the desired frequency is to tune to the point providing maximum dip at resonance with no load on the tank circuit. The link load should be checked roughly on the highest frequency band and then checked on the other bands to assure relatively constant power input on all bands. A compromise setting should be made if necessary.

Neutralizing of the amplifiers using this tank is conventional and the usual procedure can be followed. When single-ended operation is employed, the setting of the balancing capacitor is important. If the transmitter can be neutralized at frequencies corresponding to the maximum capacity of the tuning capacitor and is not neutralized at frequencies corresponding to minimum capacity, the balancing capacitor must be readjusted. If near the minimum tuning capacity setting it is necessary to decrease the neutralizing capacitor to obtain neutralization, the capacity of the balancing capacitor must be increased or vice-versa until neutralization is obtained at all frequencies. It is recommended that final setting of the neutralization and balancing capacitors be made at a frequency near the maximum capacity setting of the tuning capacitor and checked at other frequencies.

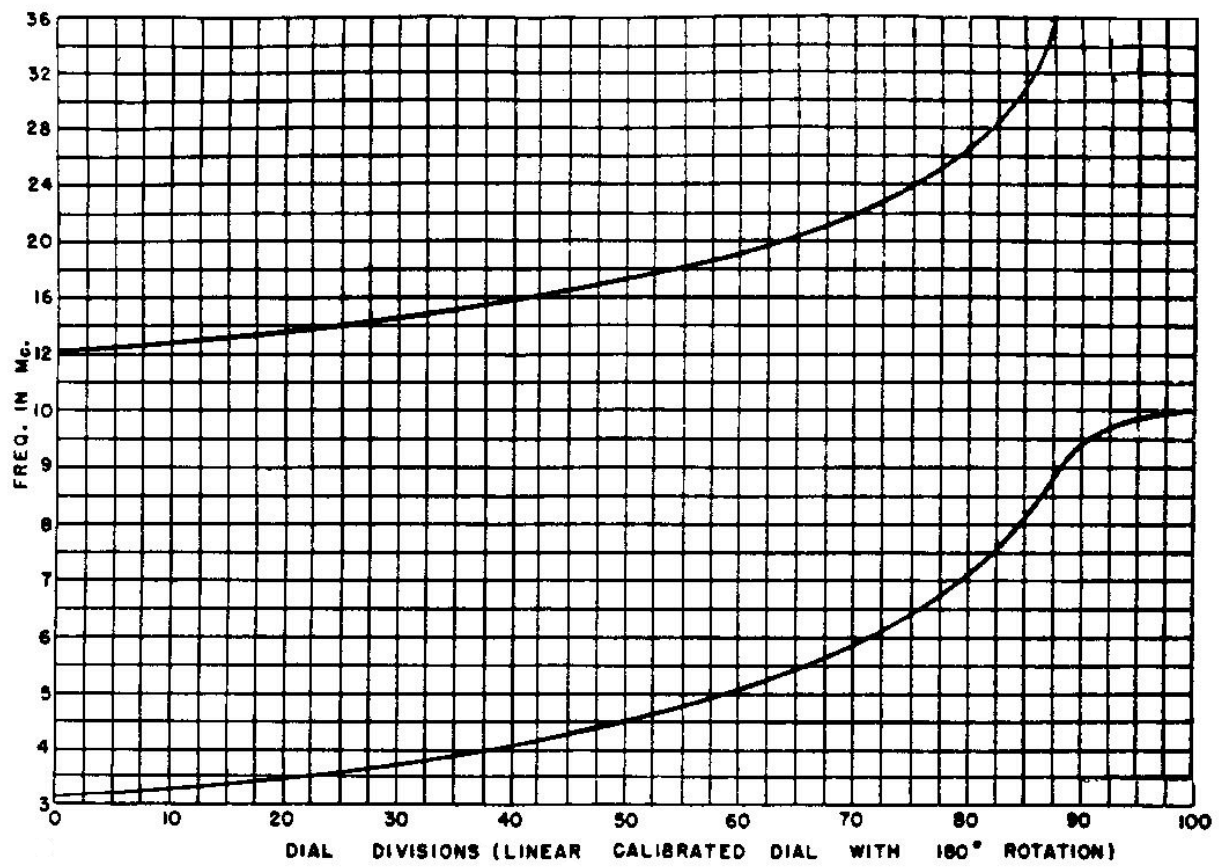


Figure No. 1. Frequency Characteristic

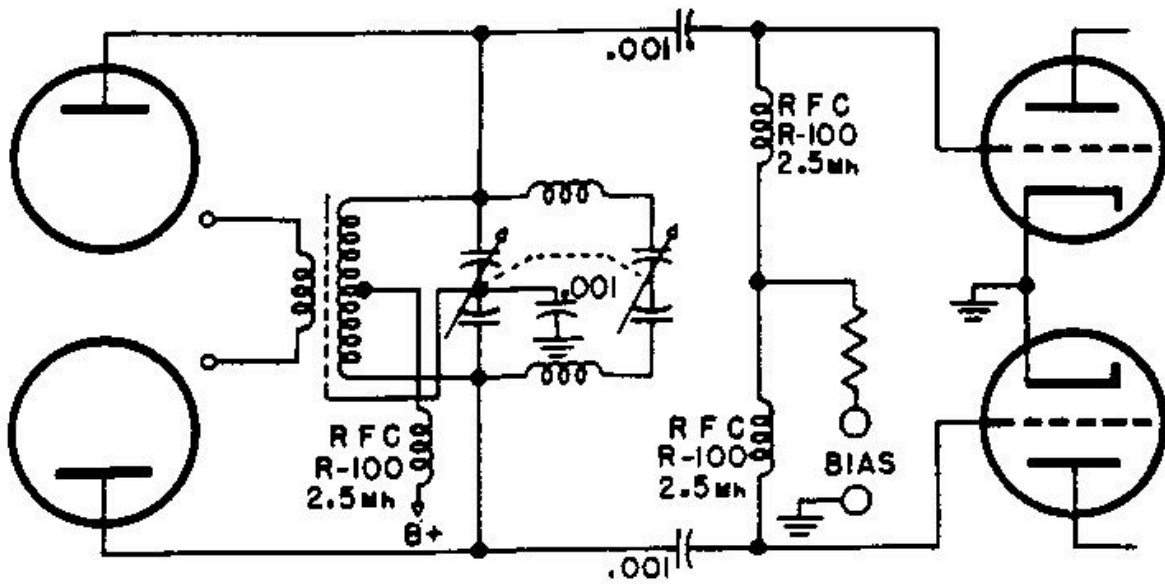


Figure No. 2. Push-Pull Plates to Push-Pull Grids

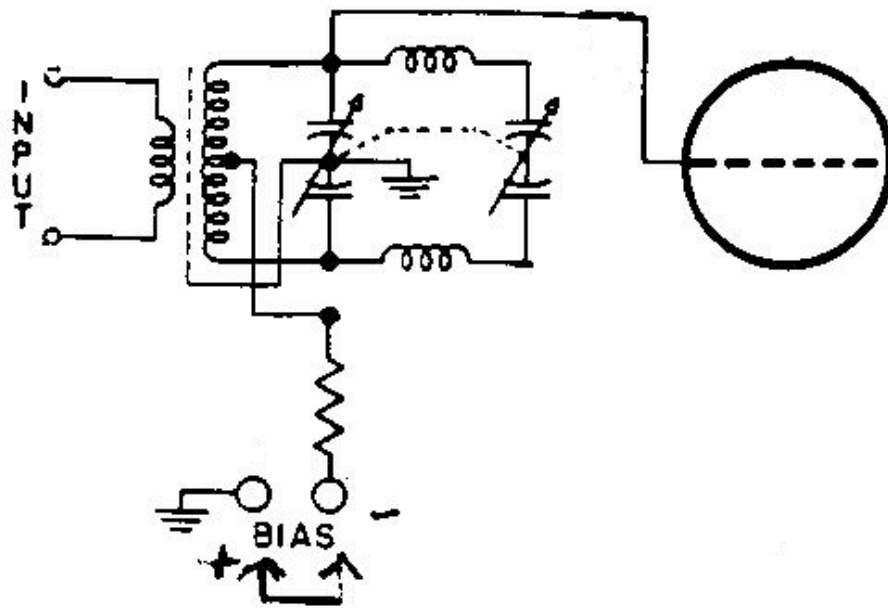


Figure No. 3. Single Grid, Link Coupled

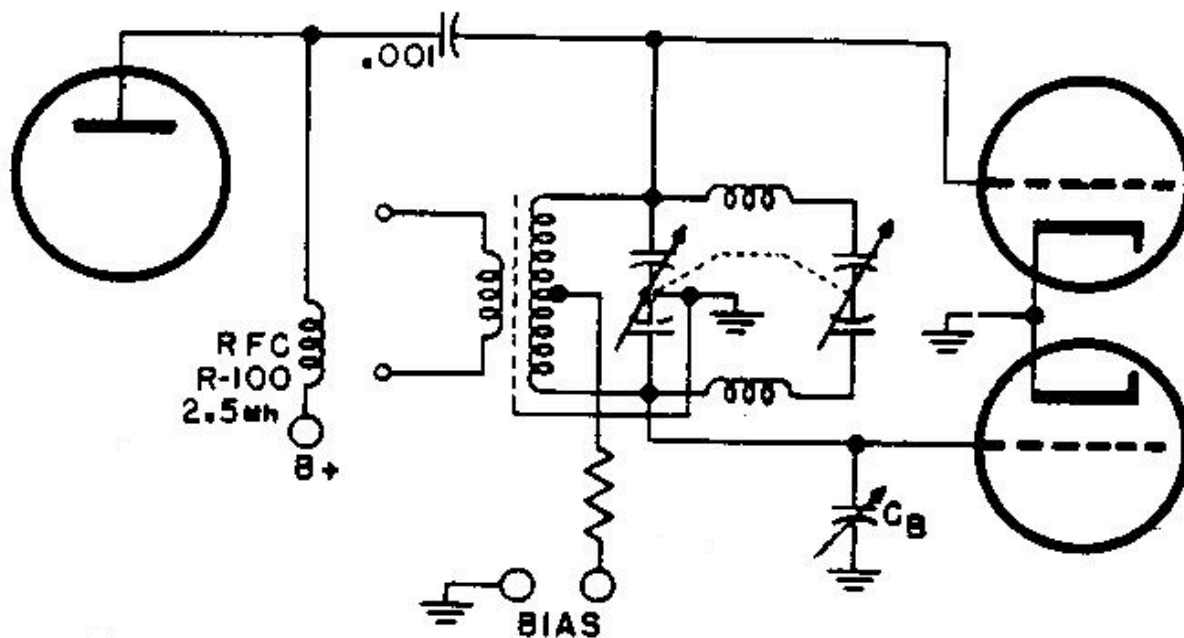


Figure No. 4. Single-Ended to Push-Pull Grids

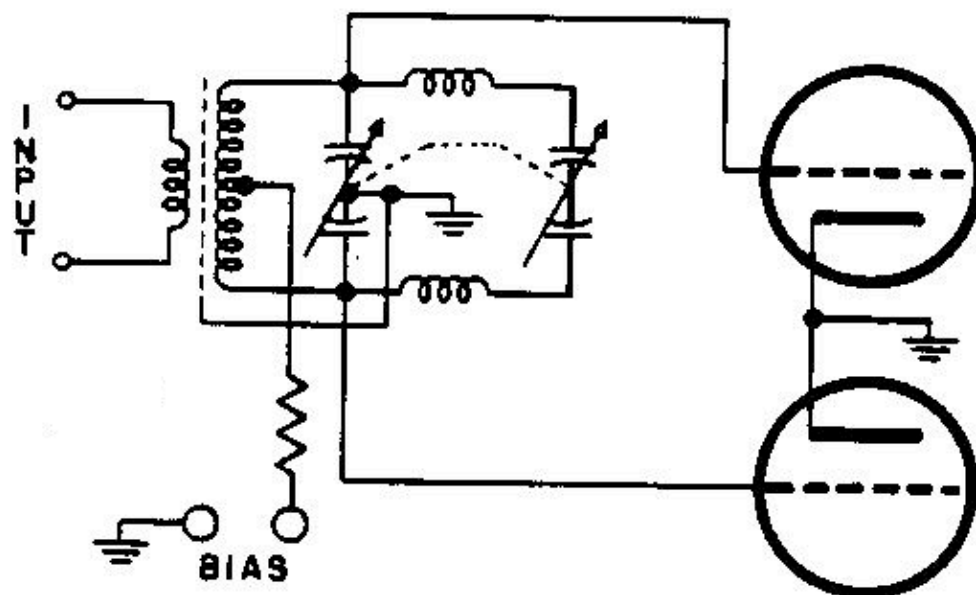


Figure No. 5. Balanced Input, Push-Pull Link Coupled

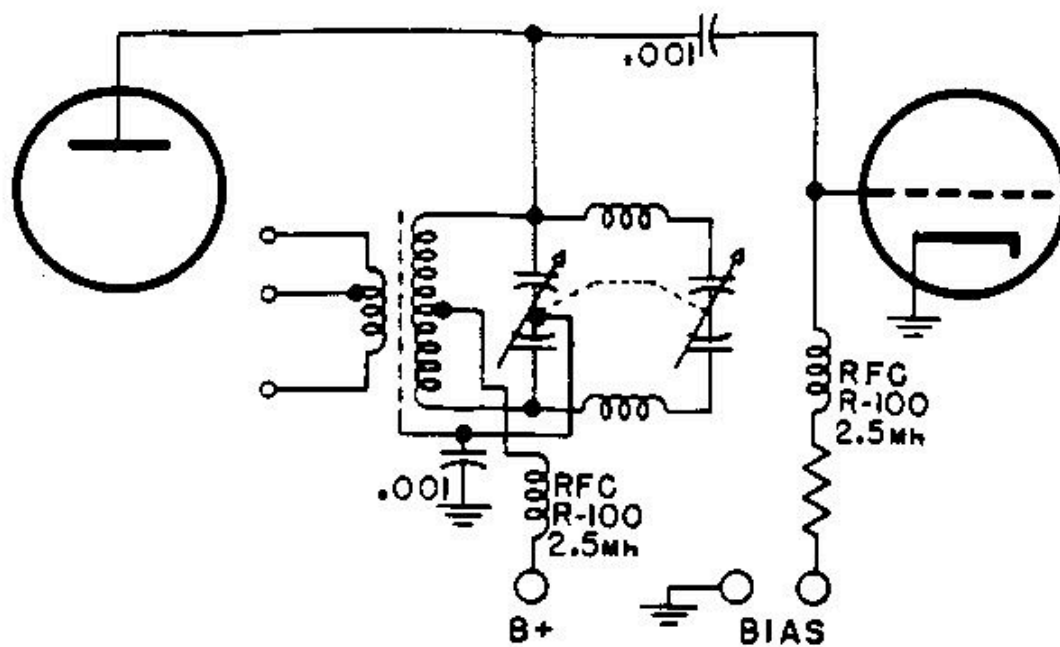


Figure No. 6. Single-Ended Plate Capacitively Coupled to Single Grid

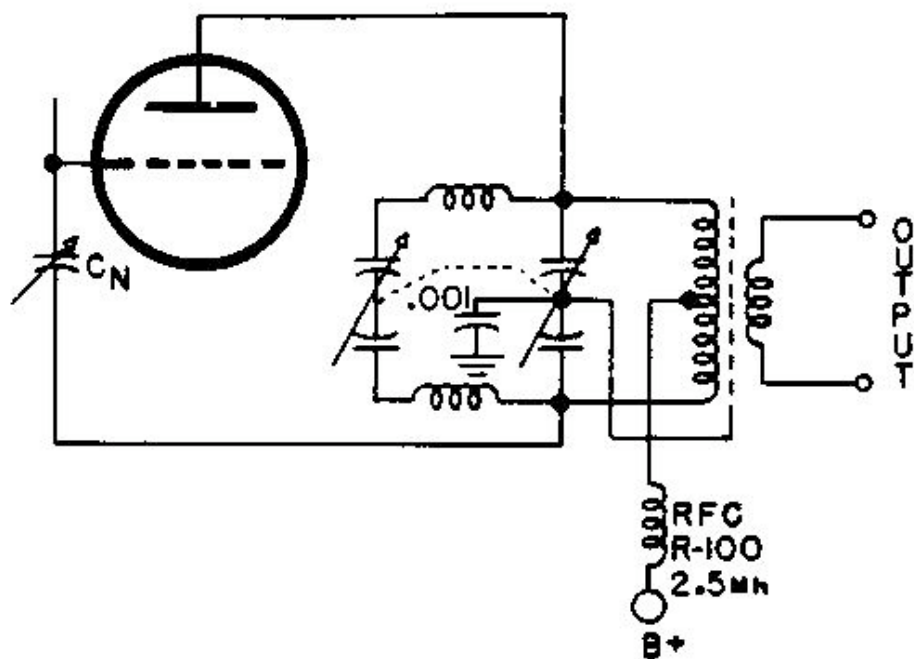


Figure No. 7. Single Tube Balanced Neutralized

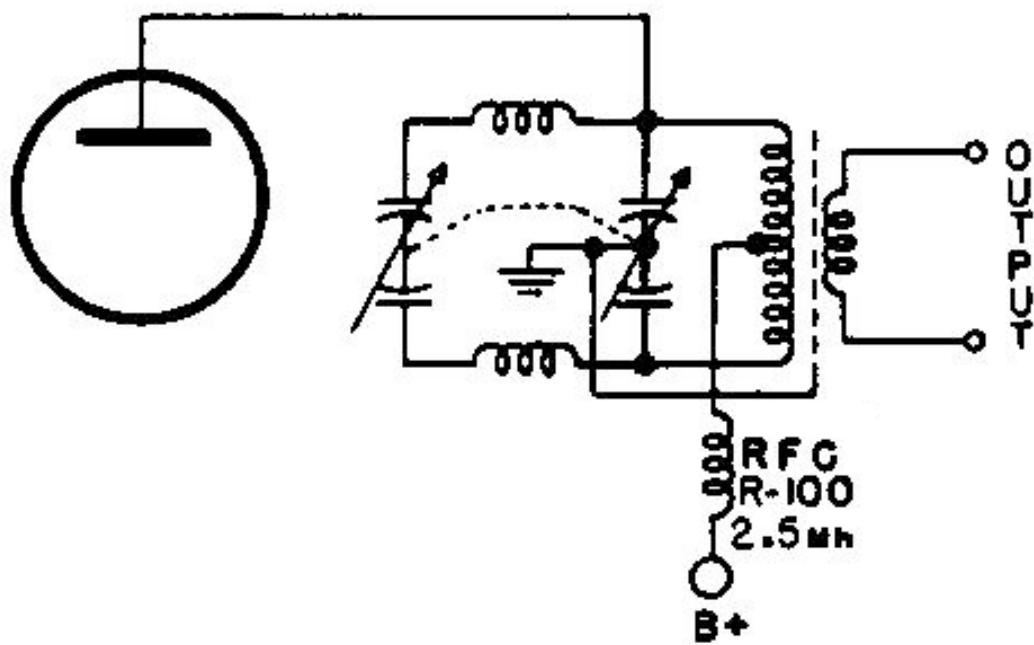


Figure No. 8. Single-Ended Tube (or Parallel Tubes)