

the strength of any signal may be measured by throwing the AVC switch on and tuning for maximum meter deflection. The audio gain control does not have any effect on the R.F. adjustments or upon the meter reading, so that it may be retarded as much as necessary to prevent audio overload when making the preliminary adjustments.

If the signal being measured is extremely strong, however, or if local noise is exceptionally high, it may be impossible to bring the meter to 0. In this case, it is necessary to detune the receiver from the signal or to disconnect the antenna. The above procedure will hold true when checking either phone or c.w. stations. It is, however, impossible to obtain a continuous check on c.w. signals, as the beat oscillator must be off.

If it should happen that the S-meter network gets out of balance, the alignment procedure is as follows. Disconnect the antenna and turn off the AVC, set the R.F. gain control at  $9\frac{1}{2}$ , then, by means of a screw driver, adjust the control No. 17 (as shown in the top view) until the meter reads 0. This control is located in the chassis in back of the meter near the antenna binding post.

### Coil Ranges

Four plug-in coil assemblies are supplied as standard equipment for the HRO receiver, each

assembly consisting of three R.F. coils and one oscillator coil, all individually shielded and provided with built-in trimmer condensers. Calibration curves are mounted on the front of each assembly.

The four assemblies cover all frequencies between 1.7 and 30 megacycles, the division being as follows:

1.7 to 4.0 mc.  
3.5 to 7.3 mc.  
7.0 to 14.4 mc.  
14.0 to 30.0 mc.

Inspection of the coil terminal panels will show several small rectangular metal pieces. There are two of these pieces or terminal blocks on each of the coil panels. A small flat-head machine screw will be found in the left-hand terminal block of each coil, looking at the assembly from the front. With the screws in the left-hand position, the coil range will be that shown in the left-hand, or general coverage, chart. If it is desired to change the calibration to amateur band-spread, as shown on the right-hand chart, it is only necessary to move the four screws to the right-hand terminal block of each coil.

A complete description of the coils, tuning condensers, and the range changing system, is given in the last section of this booklet.

In addition to the coils furnished as standard equipment, other assemblies are available, covering frequencies from 2.05 mcs. to 50 kc. and are listed on the back cover of this manual.

## Alignment and Service Data

**T**HE four high-frequency coil assemblies are aligned in the laboratory to the individual receiver with which they are to be used. No coil adjustments of any kind should be necessary after the receiver is put into operation, but if coils are purchased separately the alignment should be checked in accordance with the following procedure.

The coil panel screws must be in the left-hand terminal blocks to give the full coverage range, as described in the preceding section. The tuning dial is turned to approximately 490 and a frequency meter, or accurate test oscillator, is set to the frequency indicated by the general coverage calibration chart. This will, incidentally, always be near the high-frequency edge of some amateur band. The oscillator coil trimmer, shown on the top view of the receiver as No. 8, is then adjusted so that the dial reading checks the calibration curve. Trimmers Nos. 2, 4 and 6 are then adjusted for maximum sensitivity. In adjusting these three trimmers, no signal is necessary, as the correct adjustment is that which will give maximum background or tube noise. This background noise should be fairly loud when the R.F. and audio gain controls are fully advanced,

the crystal filter being switched off. The tuning dial should then be rotated to the low-frequency end of the range. The background noise should not vary greatly as the dial is being turned. If it does, however, poor ganging is indicated.

The ganging is checked by pressing the outside rotor plate of the oscillator condenser sideways toward the stator, but not far enough to short the condenser. If sensitivity is increased, more inductance is needed in the oscillator coil. On the two low-frequency coil assemblies oscillator inductance is increased by loosening the nut which holds the inductance trimmer disc, inside the oscillator coil, so that the disc may move toward the back of the coil shield. If, however, sensitivity decreases when the oscillator rotor plate is bent toward the stator, the other condensers, particularly the first detector tuning condenser, should be tested the same way. If sensitivity decreases when the rotor plate is moved in, ganging is perfect and the general coverage range is completely adjusted. However, if sensitivity increases, the oscillator coil inductive trimmer must be adjusted to decrease inductance. In the case of the 14 to 30 and 7 to 14.4 megacycle coils, inductive trimming is accomplished by moving a