

EIGHT-valve (including rectifier and magic eye), three waveband AM/FM table model for operation on 100-120V, 200-250V 40-100c/s AC mains. Consumption 65 watts. Receiver was released in August, 1956, at 27gns. inclusive of tax.

Maker. Bush Radio, Ltd., Power Road, Chiswick, London, W4.

Service department. Kew Works, Mortlake Road, Kew, Richmond, Surrey.

Valves. All Mullard.

Circuit. When receiver is switched to MW or

LW, the circuit is a conventional seven-valve (including rectifier and magic eye) superhet with V2 (ECH81) acting as frequency changer, V3 (EF89) working as first IF amplifier, V4 (EF89) providing the second stage of IF amplification, V5 (EABC80) affording detection, AGC, and audio amplification, while V6 is a tuning indicator type EM81 and V7 (EL84) handles the output; full-wave rectification comes from V8 (EZ80).

On FM positions the circuit is modified by the addition of two further stages—V1 (ECC85) is VHF amplifier and mixer, V2 (ECH81) heptode

section provides the first stage of IF amplification, while the second stage is handled by V3 (EF89). V4 (EF89) provides the third stage of IF amplification and V5 (EABC80) acts as ratio detector and audio amplifier.

Wavebands. MW 1604-535kc/s (187-560m); LW 280-158kc/s (1070-1900m); FM 87.5-100mc/s (3.4-3m).

Intermediate frequencies. AM 470kc/s; FM 10.7mc/s.

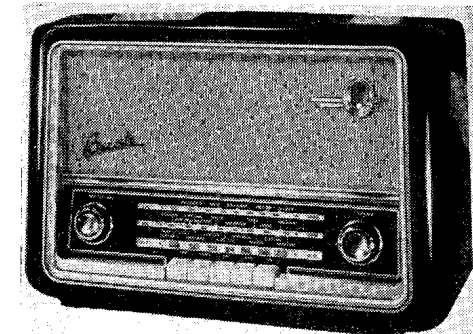
Tuning. FM oscillator and RF tuning is by iron dust cores moved by a cord drive system attached to spindle of AM tuning capacitor.

Aerials. For MW and LW reception an internal Ferrite rod is provided. Sockets enable an external aerial to be used if desired. FM reception is by means of a loaded dipole fitted to cabinet back, connection to receiver being via an 80-ohm line and two-pin plug. Provision is made for an external aerial.

Gramophone pickup sockets are fitted.

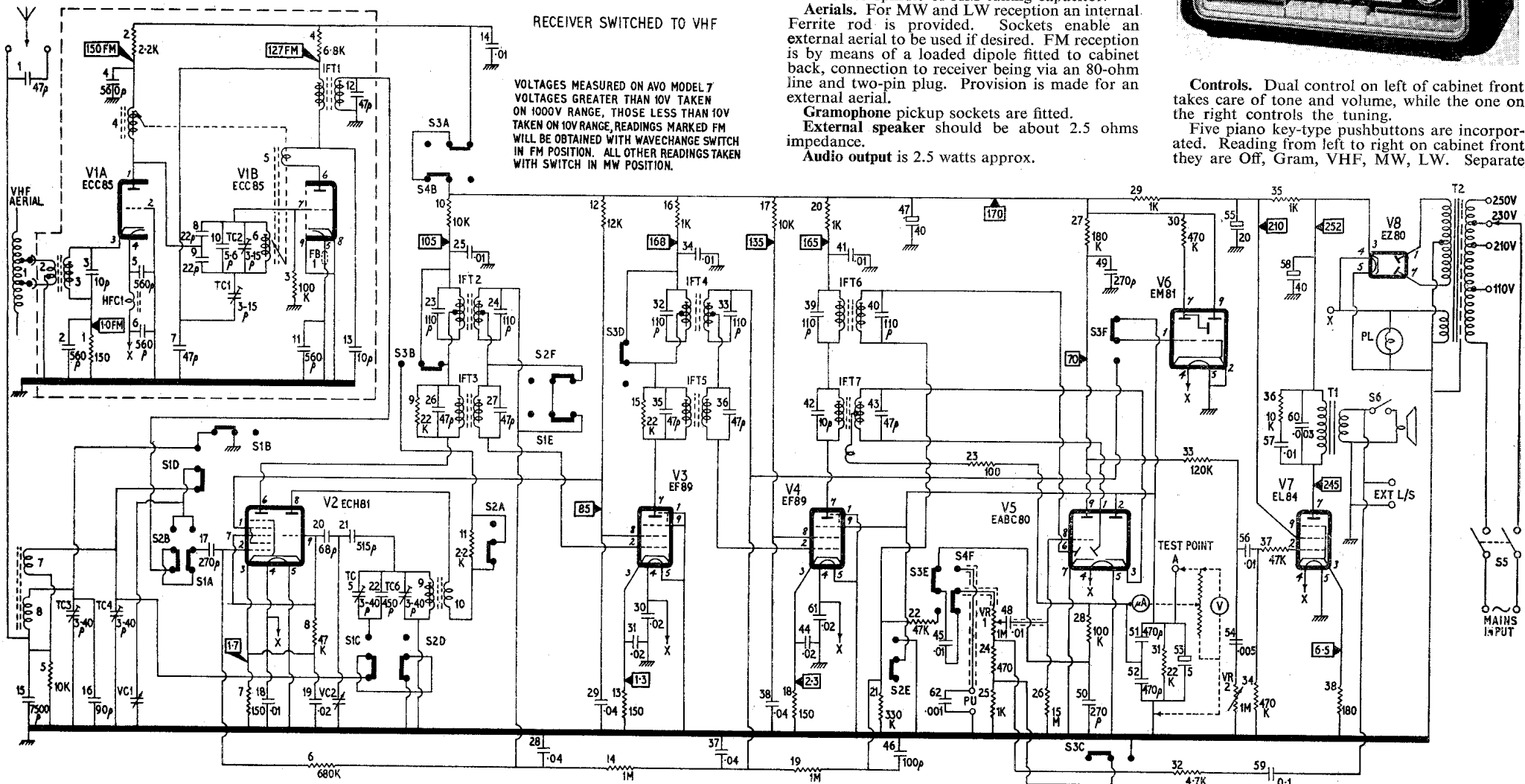
External speaker should be about 2.5 ohms impedance.

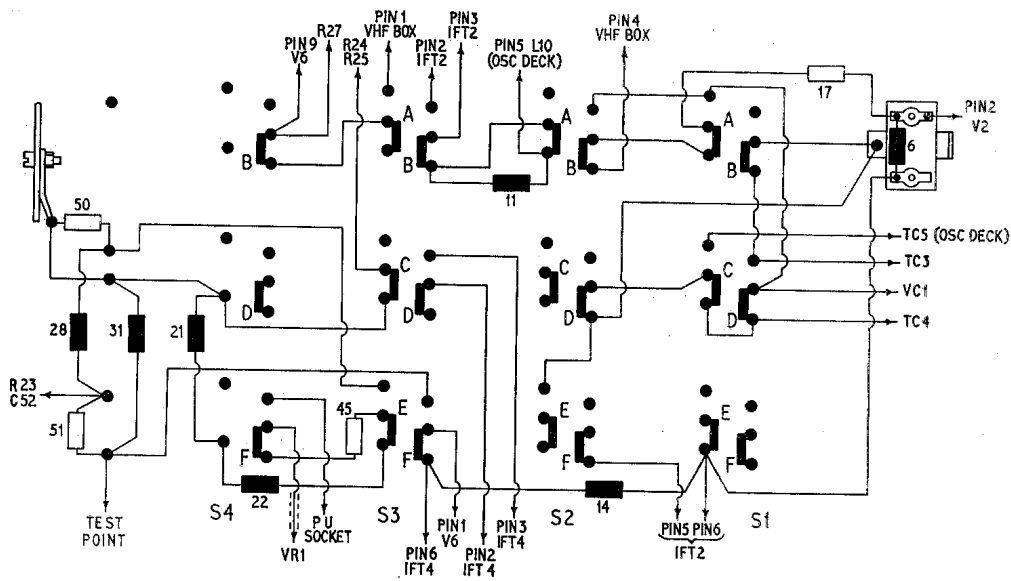
Audio output is 2.5 watts approx.



Controls. Dual control on left of cabinet front takes care of tone and volume, while the one on the right controls the tuning.

Five piano key-type pushbuttons are incorporated. Reading from left to right on cabinet front they are Off, Gram, VHF, MW, LW. Separate





CONNECTIONS TO PIANO-KEY SWITCH UNIT

IF transformers are employed for AM and FM and the appropriate set is selected by the piano keys.

Scale lamp is rated 6.5V 0.3A.

Removal of chassis from cabinet is by taking out the four chassis fixing bolts under cabinet and the two bolts holding chassis fixing brackets to left and right inside walls of cabinet. Remove Ferrite rod by gently dislodging rubber grommets from metal brackets, loosen the nut holding cleat at top left corner of speaker and slip tuning indicator leads out from under it. These leads are then long enough for chassis to be removed. If, however, it is required that chassis be entirely separated from cabinet, tuning indicator should be grasped firmly in the hand and its holder levered clear of the locating notch in the baffle—sliding it downward clear of the spring. Finally, unscrew the spade tags connected to pins 1 and 2 of output transformer T1.

Removing VHF box from chassis requires that first the five connections to the box be unsoldered, then tuning capacitor set to minimum and the spring on drive drum unhooked. Next, remove cord drive from drum and release and remove screw and washer from pivoted adjuster on drum. Unbolt and remove drive drum and remove cord from around brass boss.

Remove the three bolts holding box to L-shaped bracket and also the bolt underneath chassis.

Removal of oscillator deck is by removing black lead from S1C, green lead from stator VC2 and the other green lead from pin 7 V2; also remove blue lead from pin 8 V2, pink lead from S2A. Unbolt and remove oscillator deck.

PRACTICAL HINTS

Replacing VHF tuning cord drive. Should a breakage occur in either cords or cores, it is recommended by Bush Radio that the complete assembly (AP24888) should be obtained and fitted

as follows: Remove front side of VHF box by withdrawing the fixing screws. Set tuning capacitor to minimum, unhook spring from drive drum, remove cord drive from drum. Next, release and remove screw and washer from pivoted adjuster on drum. Unbolt and take off drive drum.

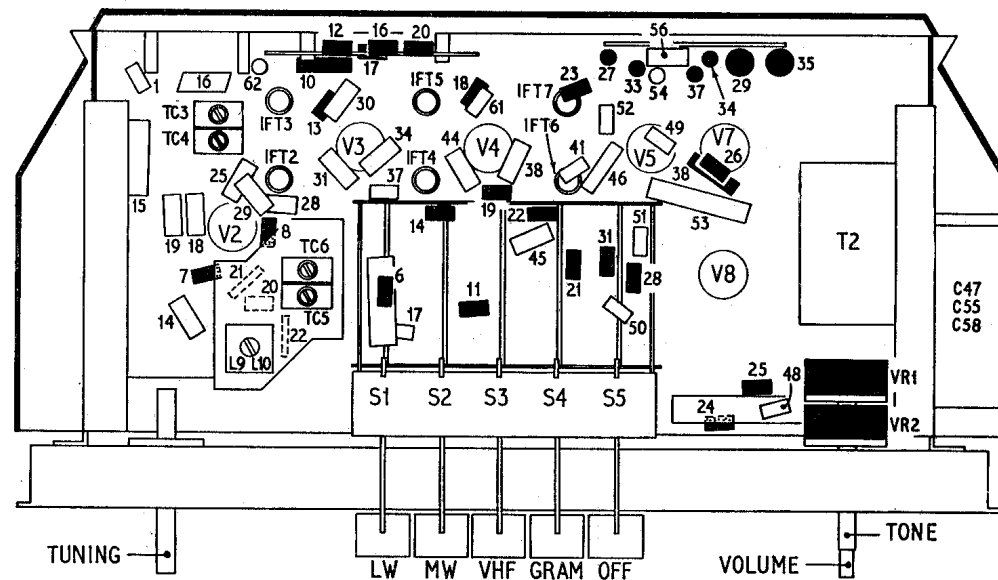
Thread assembly of tuning cores (see illustration) through coil formers and hook spring to its anchorage. Then take one turn in clockwise direction around tuning capacitor spindle and slip loop in the cord over the brass boss.

When repositioning the drive drum the gap in the edge of it (through which drive cord passes) should be immediately above the visible part of VHF tuning cord when gang is at maximum capacity. Make sure that pointer coincides with the dots at right-hand end of scale. Reset pivoted adjuster as described in VHF alignment procedure below.

Replacing tuning capacitor cord drive requires that first control knobs be removed. After which, the screws securing scale-retaining clamps at either end of scale should be withdrawn. Then, tilt scale forward till it clears control spindles and carefully withdraw—avoiding the piano keys.

Diagram shows position of drive drum with tuning capacitor at maximum. Length of glass nylon cord is approximately 48in.

Pass cord around pulley 1 counter-clockwise, then round pulley 2 clockwise, next round pulley 3 counter-clockwise, then round pulley 4 clockwise. Next, take four turns clockwise round tuning knob spindle, then counter-clockwise round pulley 5, then clockwise around drum to the opening. Take the other end of cord from pulley 1 around drum counter-clockwise and clench both ends in the clip; hook clip to spring and attach other end of spring to lug on drum. Then set pointer to dots at right-hand end of scale and clench the two lugs over drive cord.



C11 in VHF box is short-circuited, since this box is also used on other models and in this instance is not required.

Connections to mains transformer

External connections are made to the tags on the base of the transformer as follows:

Tag No. 1 to chassis; tag 2 to pin 4, V7; 3 to pin 7, V8; 4 to pin 5, V8; 5 to pin 1, V8; 6 to S5; and 7 to S5.

ALIGNMENT

Remove receiver from cabinet and allow about 15 minutes for set and signal generator to warm up. IFT7 secondary is at bottom of can, all other IFTs have secondaries at the top. A non-metallic trimming tool should be used.

AM circuits

IF stages. Switch to MW, set pointer to 300 metres, inject 470kc/s (modulated 30 per cent at 400c/s) between pin 2 V4 and chassis; connect output meter to secondary T1—disconnect the speech coil.

Tune secondary and then primary of IFT6 for maximum audio output.

Inject same signal at pin 2 V3.

Tune secondary and then primary of IFT4 for maximum output.

Transfer signal to pin 2 V2.

Tune secondary and then primary of IFT2 for maximum output.

RF stages. Inject signals at pin 2 V2 and align as follows:

Opera-tion	Wave-band	Generator (kc/s)	Receiver Calibration	Adjust for Maximum Audio Output
1	MW	600	500m	L9 & 10 (osc.)
2	MW	1,500	200m	TC6 (osc.)
3	Repeat operations 1 and 2—check calibration			
4	LW	214	1,400m.	TC5 (osc.)

For the following adjustment of TC4 and TC3 (trimmers on Ferrite rod aerial) couple the generator by means of a single turn loop of wire approximately 5in. in dia., positioned 12in. to 18in. away from receiver.

5	MW	1,500	200m	TC4 (aerial)
6	LW	214	1,400m.	TC3 (aerial)

FM circuits

Equipment required. Signal generator producing

10.7mc/s and 87.5-100mc/s; Avo model 8 or DC valve-voltmeter; two 47K ½ watt matched resistors; one 1K ½ watt resistor.

IF stages. Switch set to FM band, connect the two 47K resistors in series between test point A and chassis, and the Avo (10V DC range) or valve voltmeter across the two resistors. Apart from the discriminator (IFT7) primary, correct peak for all cores is the first one as the core enters the winding.

Adjust, if necessary, the position of IF cores as follows: IFT3, IFT5—primary and secondary cores to be ½in. inside coil former; IFT7 primary core should be ½in. inside former, while secondary core should be ½in. inside.

Inject 10.7mc/s unmodulated at pin 2 V3, set volume control at minimum, and adjust input level to give an output of 4V DC across voltmeter—maintaining this figure throughout the procedure.

IFT7 primary. Adjust for maximum DC output.

Connect 1K damping resistor across secondary of IFT5 and adjust primary for maximum DC output. Transfer damping to primary and adjust secondary for maximum DC output.

Transfer signal to pin 2 V2, connect 1K damping resistor across secondary of IFT3 and tune primary for maximum output. After which, connect damping across primary and adjust secondary for maximum DC output. Remove damping.

Readjust primary of IFT7 for maximum output.

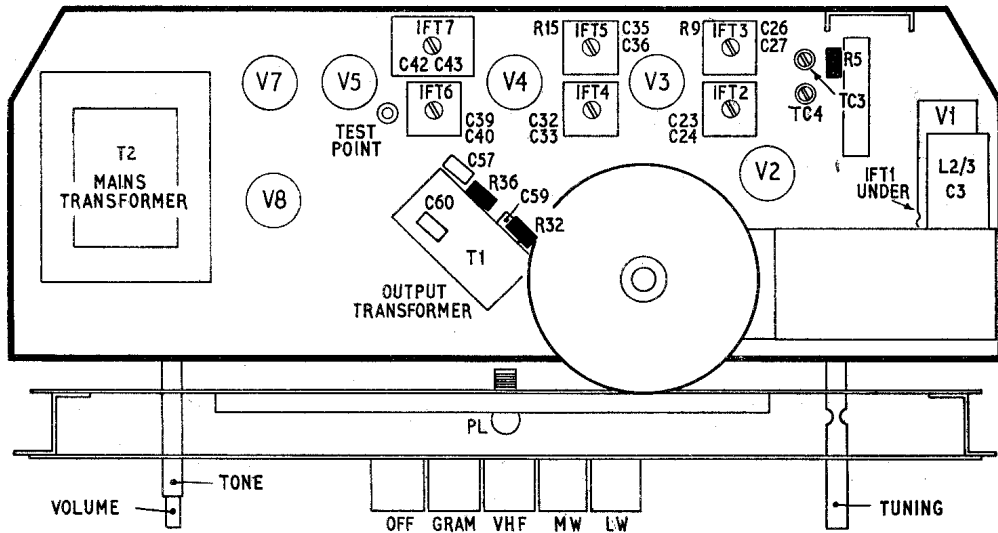
Connect Avo (50 microamp range) or microammeter between junction of the two 47K resistors and point B on circuit diagram.

IFT7. Tune secondary for zero reading on meter—zero response will only occur when the secondary is in balance, off tune will produce either positive or negative output. The Avo has a reversing button to allow reading of either, but with a microammeter the connections will require reversing.

Note. It is essential that maximum DC output coincides with minimum response on the microammeter.

Transfer signal input to VHF aerial sockets and adjust secondary of IFT1 for maximum DC output.

RF stages. Set signal generator and auxiliary pointer to 88mc/s. Slacken the locking screw on pivoted adjuster and rotate arm for maximum DC output—this adjusts cores of L4 (RF) and L5/L6 (osc.). Tighten locking screw.

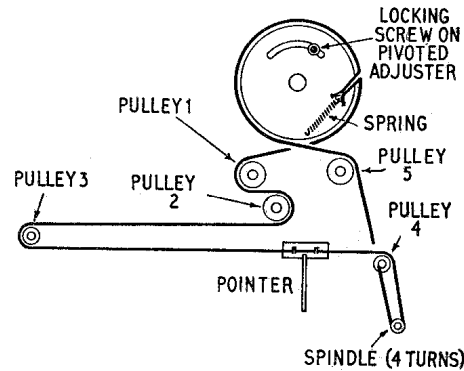


Set signal generator and auxiliary pointer to 94mc/s, adjust L2/L3 (aerial) for maximum DC output.

Check calibration.

TC1, oscillator bridge balancing trimmer and TC2 oscillator trimmer, should not be adjusted, because they have been set at the factory and require special alignment gear for their adjustment.

Note. Replacement of V1 may cause slight changes in oscillator calibration. If so, the pivoted adjuster should be reset as detailed above.



COMPONENT RATINGS

Capacitors

Silvered ceramic 750V: C1 7 (N750) 8 (P100) 9 (P100) 10 (N750) 20 46.

Silvered ceramic 500V: C17 49-52.

Silvered ceramic 350V: C2 4-6 11.

Silvered mica 350V: C3 12 16 21-24 26 27 32 33 35 36 39 40 42 43.

Metallized paper 400V: C14 18 25 30 34 41 62.

Metallized paper 300V AC: C60.

Metallized paper 200V: C28 29 37 38.

Metallized paper 150V: C19 31 44 59 61.

Paper tubular 500V: C54 57.

Paper tubular 350V: C45 48 56.

Electrolytic 350V: C47 55 58.

Electrolytic 50V: C53.

Resistors

6 watt: R29 35.

1/2 watt: R10 38.

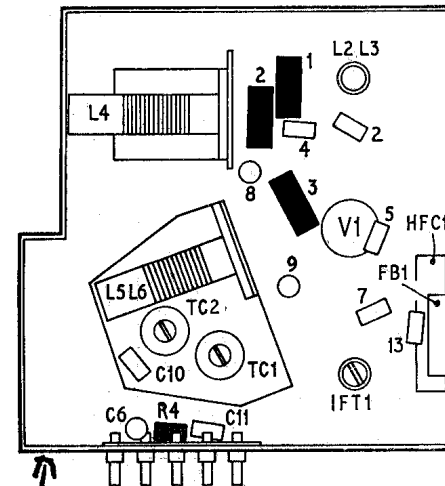
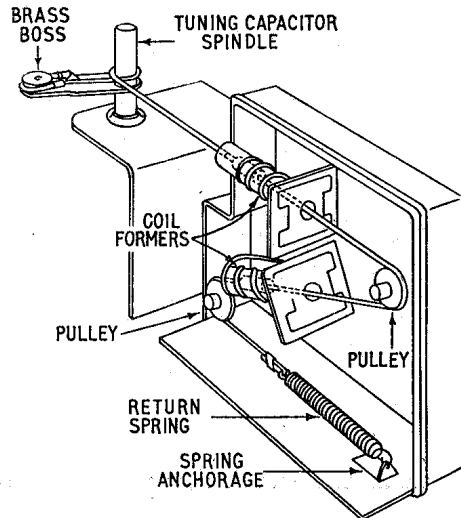
All others 1/4 watt.

Variable resistors

VR1, VR2.

INDUCTORS

L	Ohms	IFT	Ohms
8	13	6	Pri. 14
9	4		Sec. 14
10	1	T	
IFT		1	Pri. 380
2	Pri. 14		Sec. Very low
	Sec. 14	2	Pri. 20
4	Pri. 14		Sec. 220
	Sec. 14		All others less than 0.5 ohm.



AIF UNIT FROM CHART 1085