DYNATRON
SERVICE INSTRUCTIONS

DYNATRON

"NOMAD"

TRANSISTORISED PORTABLE RADIO

MODEL

TP 11.

Issued by—Service Department,
Dynatron Radio Limited,
Maidenhead, Berks.

Telephone Maidenhead 5150 (10 lines)
General Service Information Ext. 20.
Component Orders Ext. 21.

DYNATRON
"NOMAD"
Transistorised Portable Radio.
Model TP 11.

General Description

The Dynatron "Nomad" is a seven transistor, superheterodyne, portable receiver, operating on the medium and long-wave bands. A co-axial socket is provided, to enable the receiver to be connected to a car aerial.

CABINET :

Wooden cabinet covered with leather cloth, with a choice of four colours: Royal Red, London Tan, Marble Beige and Riviera Blue.

Dimensions: Height 8″
Width 12″
Depth 4½″

Weight: 7¾ lb. (including batteries).

TECHNICAL SUMMARY

BATTERIES :	Two Ever Ready 9 volt Type PP9 or equivalent, connected in series.		
AERIAL :	Two Ferrite Rods. Provision is made for connecting an external aerial by means of a co-axial socket.		
WAVEBANDS :	Medium Wave 185-565 metres (1620-530 kc/s). Long Wave 1050-1850 metres (285-162 kc/s).		
INTERMEDIATE FREQUENCY :	470 kc/s.		
FREQUENCY RESPONSE :	100 c/s to 10 kc/s.		
LOUDSPEAKER :	7″ x 4″ Elliptical, P.M. 35 ohms impedance.		
POWER OUTPUT :	500mW. (Class 'B' single-ended push-pull).		
		Ediswan	
TRANSISTORS :	TR1	PXA102	Self-Oscillating Mixer
	TR2	PXA101	I.F. Amplifier
	TR3	PXA101	I.F. Amplifier
	TR5	PXB103	Audio Driver
	TR4	PXB102	A.F. Amplifier
	TR6	PXC131)	Matched for push-pull output
	TR7	PXC131)	
DIODES :	D1	XD201	Provides damping for 1FT1
	D2	XD202	Detector

CIRCUIT DESCRIPTION

The medium wave aerial circuit is formed by Coil L1 and capacitors C2 and C2a, the long wave aerial circuit being formed by L2, C4 and C29. Waveband switching is achieved by means of switch S1 sections a, b and c.

The signal from the aerial coil is fed via switch S1 to the base of TR1 functioning as a self-oscillating frequency mixer, comprising transformer T1, tuned by C9 and padded by C8 for the medium waveband C30 and C3 for the long waveband.

The resultant I.F. output from TR1 is fed to the base of the 1st I.F. amplifier TR2, via transformer IFT1. Emitter bias for TR2 is provided by R7 and C12. Diode D1 provides variable damping for IFT1 to improve the A.G.C. function. A network consisting of R5, R11 and detector load R14, RV1 provides the necessary bias for A.G.C. action.

The output from the collector of TR2 is fed to IFT2; neutralising is achieved by R8 and C14. The secondary of IFT2 feeds the I.F. signal to the base of TR3, the second I.F. amplifier. Emitter bias for TR3 is provided by R13 and C21.

The output of TR3 feeds IFT3, neutralising being provided by R12 and C18. The secondary of IFT3 is fed to Diode D2 operating as a detector, the load of which is formed by an R.F. filter consisting of R14, C22, C23 and the volume control RV1.

The resultant audio signal is fed from the volume control via C24 to the base of TR4 an A.F. amplifier, base bias being provided by RV1, R30, R31. The emitter bias is provided by R.32. Switch S2 acts as a three position tone control switching in C28 or C33, which reduces negative feedback at the higher audio frequencies, and gives increased treble response.

The amplified A.F. voltage is developed across R35 and fed via C27 to the base of the audio driver stage TR5. Emitter bias of TR5 provided by R21 R16. Negative feedback is applied from the loudspeaker via network R26, R27, C34, C25. The output from the collector of TR5 feeds the driver transformer T2.

The secondaries of T2 feed the bases of TR6 and TR7 connected in a single-ended class 'B' push-pull output circuit.

Base bias is provided by R22, R23, R24 and R25. R27 and R28 act as emitter current stabilising resistors. The loads of TR6 and TR7 are formed directly by the loudspeaker impedance (35 ohms). R36 is incorporated to balance the currents provided by the two batteries.

Switch S3a, S3b, functions as the ON/OFF switch, and is incorporated in the volume control RV1.

Co-axial input socket SK1 is connected to the tuned circuit by network C31, C32, to reduce the de-tuning effect due to aerial load capacity. To minimise the loss due to self-capacity the external aerial lead should be kept as short as possible.

CHANGING BATTERIES

(1) Switch off by turning the VOLUME control fully anti-clockwise until a click is heard.

(2) Open the rear hinged panel of the cabinet by applying pressure with the thumbs.

(3) Withdraw the batteries from their holders and remove leads.

(4) Connect the leads to the new batteries; RED to positive terminals, BLACK to negative terminals.

(5) Insert the new batteries into their holders; the terminals should face the sides of the case.

REMOVING CHASSIS FROM CABINET

(1) Switch off and unscrew the four retaining screws on the chassis flanges.

(2). Gently withdraw the complete chassis from the cabinet, removing the batteries from their holders at the same time. The loudspeaker leads are long enough to enable the chassis to be laid on a bench.

REMOVING LOUDSPEAKER FROM CABINET

Disconnect the leads from the speaker sockets, carry out the chassis removal instructions, then remove the four nuts securing the speaker. Pull speaker gently away from front panel.

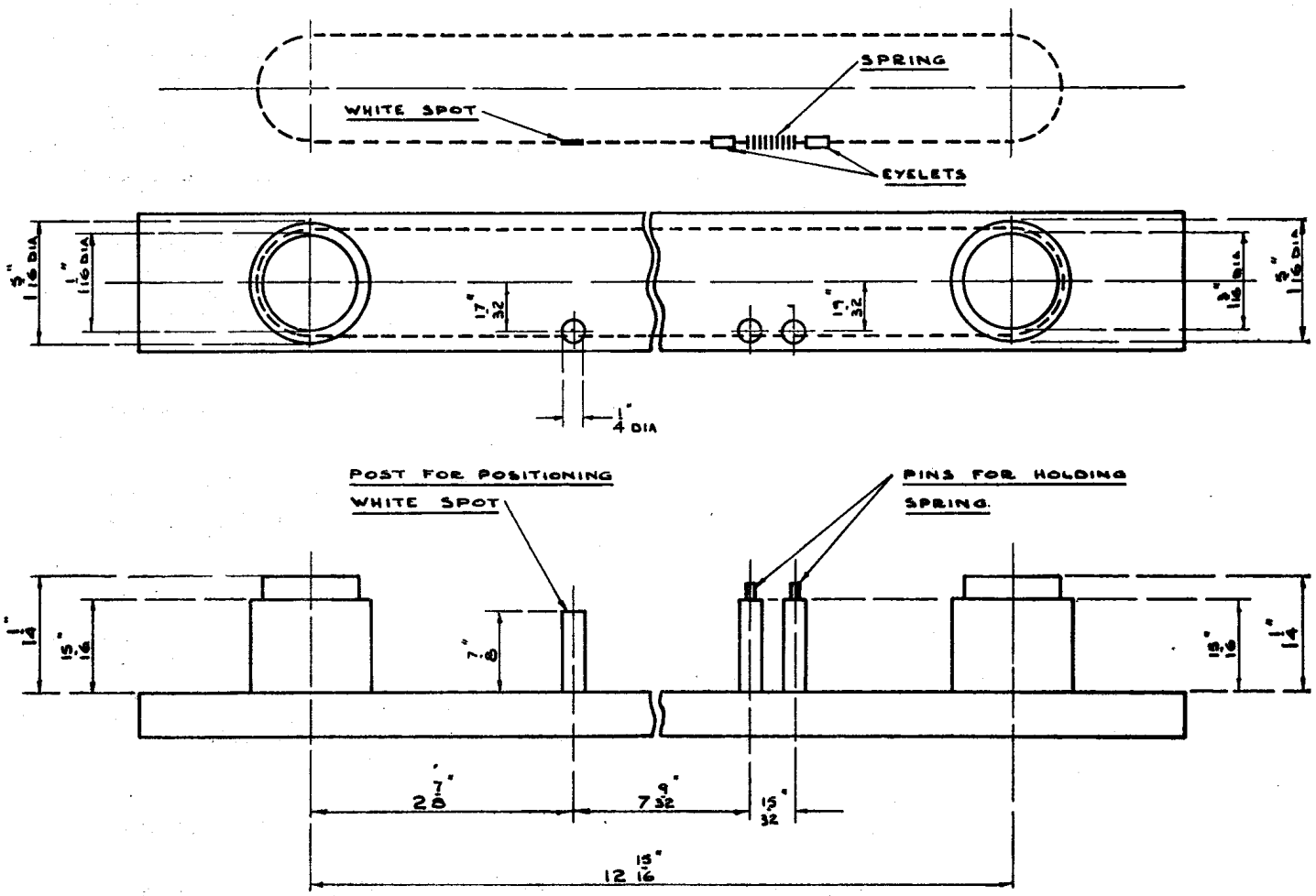
REPLACEMENT OF TUNING DRIVE CORD ASSEMBLY

The use of a simple jig is recommended when measuring and connecting up a replacement drive cord. It can be quickly made up using a piece of wood approximately 16″ long with two pegs inserted 14½″ apart.

(1) Remove chassis from cabinet as described previously. Remove the four knobs from the front panel. Rotate the tuning control until the capacitor vanes are fully meshed.

(2) Unscrew the two screws and nuts securing the perspex scale. Remove scale.

(3) Referring to the sketch, select a 31″ length of cord. Secure one end of spring to the cord by means of a Ross Courtney clamp. Place cord over pegs and position spring in "Spring" zone.



(4) Tension cord (with zero spring deflection), and secure the free end to the spring by means of a Ross Courtney clamp, with the spring in correct position, paint or mark the cord at the position shown in sketch.

(5) Remove the cord from pegs, loop at mark and insert loop through the hole pierced in the side of the tuning drum rim. Place marked portion of cord over the retaining tag on drum.

(6) Wind right-handed cord twice round drum in a clockwise direction, and twice round tuning spindle in an anti-clockwise direction, pass cord over right-hand pulley, and feed round to left-hand pulley.

(7) Ensure that the capacitor vanes are fully meshed, place the tuning pointer on the drive cord, and line up pointer with the hole drilled in the chassis, above the drum. Rotate tuning spindle and check that cord is running smoothly. Replace scale and secure by means of two screws and nuts.

TEST SPECIFICATION FOR "NOMAD" MK. II

Static Voltages

		Emitter	Base	Collector	Collector I(mA)
TR1	PXA102	−1.41	−1.28	−7.9	0.43
TR2	PXA101	−0.80	−1.00	−7.0	1.0
TR3	PXA101	−1.20	−1.30	−8.2	1.15
TR4	XB102	−0.20	−0.30	−5.8	0.43
TR5	PXB103	+0.30	+0.20	−8.4	3.60
*TR6	PXC131	−0.01	−0.20	−8.8	1.20
*TR7	PXC131	+9.05	+8.88	0	1.20

* Quiescent condition

All voltages are measured with respect to chassis.

I.F. ALIGNMENT

Equipment required :
Signal Generator.
Output Power Meter (impedance of 35 ohms) or AVO Model 8.

(1) Connect the Signal Generator output in series with a 0.1 mfd capacitor between the base of TR1 and earth.

(2) Connect the receiver output leads to the Power Meter.

(3) Turn wavechange switch to M.W.

(4) Tune to 500 metres.

(5) Set Volume control to maximum, and Tone control to LOW.
Inject a 470 kc/s signal modulated 30% at 400c/s.
Adjust IFT3, IFT2 secondary, IFT2 primary, IFT1 secondary, IFT1 primary in this order for maximum output, reducing the input as necessary to maintain output at less than 50 mW, to avoid activating the A.G.C. circuit. Repeat alignment until no further improvement can be made.

I.F. ALIGNMENT ALTERNATIVE METHOD

The procedure is the same as for the above except that an AVO 8 is used in place of a power meter. The AVO should be set to the 2.5 A.C. volts range and connected across the speaker terminals. The input of the Signal Generator should be adjusted so that the meter reading does not exceed 2 volts.

SENSITIVITY CHECK

(1) Connect up as for I.F. alignment and adjust input to give an output of 50 mW.
(2) Input figure required to give output of 50 mW should not be greater than 20μV.

SENSITIVITY CHECK - ALTERNATIVE METHOD

(1) Connect up as for I.F. alignment.
(2) With the Signal Generator output set to 200μV the reading on the AVO should be 2.0 volts on the 2.5 volts A.C. range.

OSCILLATOR ALIGNMENT M.W.

Use shielded coil for signal source.
(1) Turn wavechange switch to M.W. Tune the receiver to 500 metres, set Signal Generator to 600 kc/s, adjust core of T1 for maximum output.
(2) Tune receiver to 200 metres, set Signal Generator to 1500 kc/s, adjust C9A for maximum output.
(3) Repeat 1 and 2 until no improvement in calibration can be made.
(4) Check calibration at 330 metres (Home service). Error should not exceed the width of the tuning pointer.

OSCILLATOR ALIGNMENT L.W.

(1) Turn wavechange switch to L.W. Tune to 1500 metres.
(2) Adjust C30 for maximum signal from the long wave "Light Programme".

AERIAL COIL ALIGNMENT M.W.

(1) Set Signal Generator to 600 kc/s.
(2) Tune receiver for maximum output.
(3) Slide M.W. aerial coil (L1) on rod for maximum output.
(4) Set Signal Generator to 1500 kc/s.
(5) Tune receiver for maximum output.
(6) Adjust C2A for maximum output.
(7) Repeat 1-6 until no improvement can be made.
(8) Fix coil to Ferrite Rod with adhesive tape.

AERIAL COIL ALIGNMENT L.W.

(1) Set Signal Generator to 165 kc/s.
(2) Tune receiver for maximum output.
(3) Slide L.W. aerial coil (L2) along rod for maximum output.
(4) Set signal generator to 250 kc/s.
(5) Tune receiver for maximum output.
(6) Adjust C29 for maximum output.
(7) Repeat 1-6 until no improvement can be made.
(8) Fix coil in place on Ferrite Rod with adhesive tape.

AUDIO TESTS

Equipment required :
Oscilloscope.
Output power meter, (35 ohms impedance).
Audio Signal Generator (600 ohms impedance).

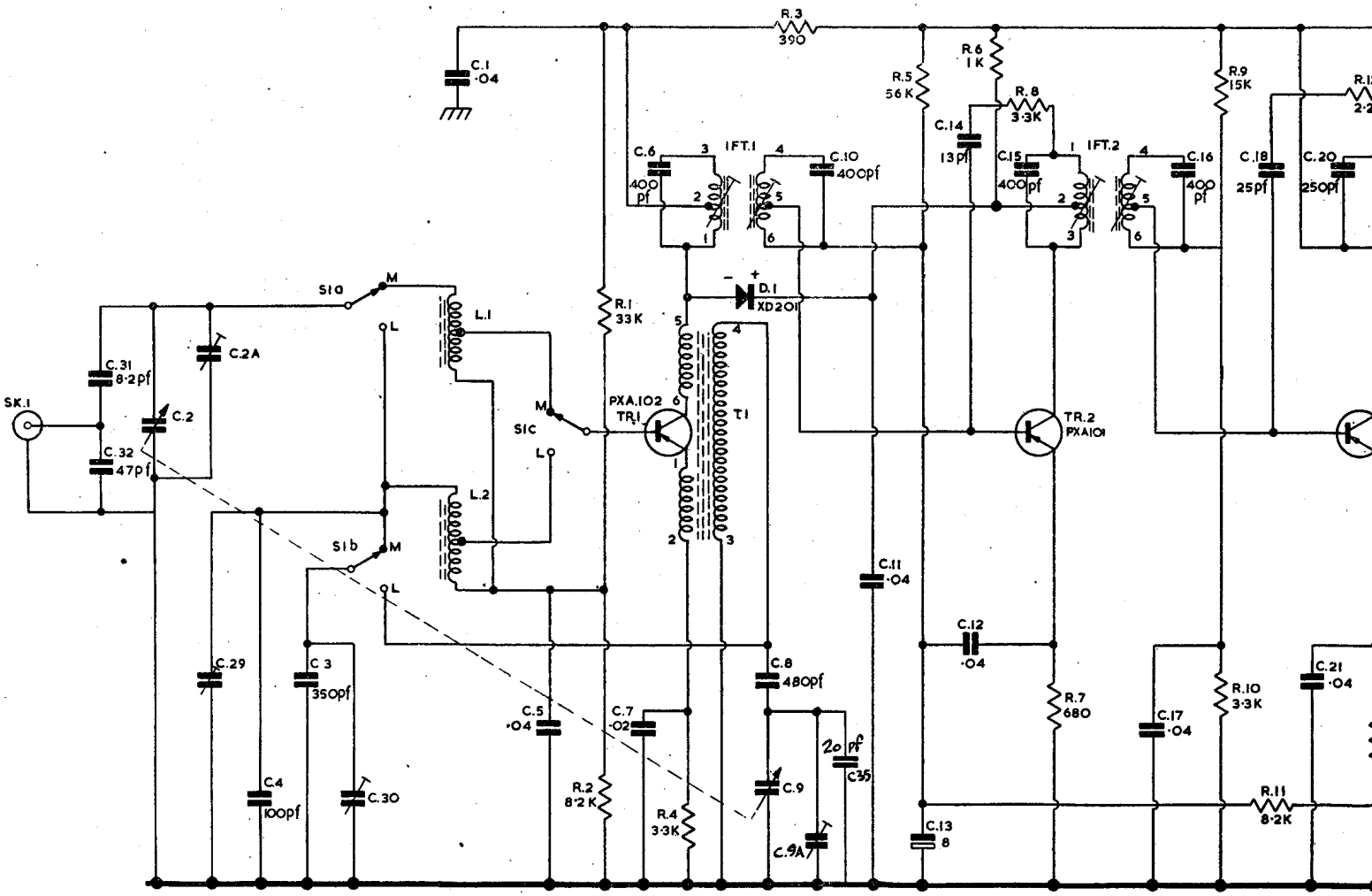
(1) Maximum output power and sensitivity test.
(a) Connect output leads to power meter and oscilloscope.
(b) Connect audio generator across volume control.
(c) Set volume control to maximum, set tone control to LOW.
(d) Inject 1 kc/s signal, and adjust input to give maximum output without peak clipping, as indicated on the oscilloscope.

The maximum power should be approximately 500 mW.

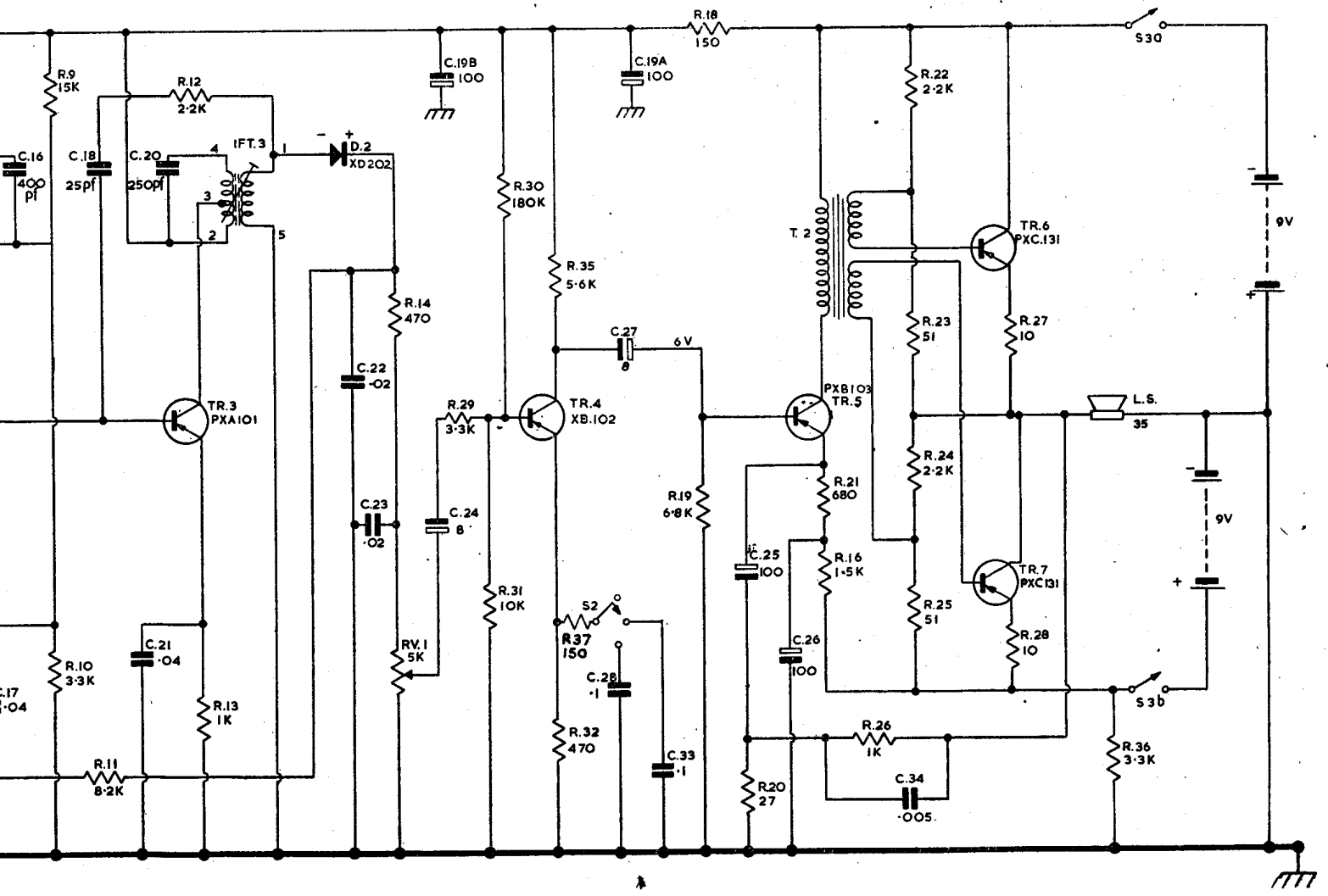
The required input should be approximately 55 mV.

(2) Audio Frequency Response.
Condition of test as for maximum power test.
(a) Adjust input to give output of 50 mW at 1 kc/s.
(b) Maintain input level constant and inject inputs of 100 c/s, 5 kc/s, 10 kc/s, the change of output should not be greater than :—

100 c/s — 2.5dB.
5 kc/s — 2.5dB.
10 kc/s — 0.5dB.



TP 11 CIRCUIT DIAGI



1 CIRCUIT DIAGRAM

COMPONENT LAYOUT