



**DYNATRON RADIO LIMITED,
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General Service Information Ext. 20.
Component Orders Ext. 21.**

GENERAL DESCRIPTION

The 'Safari' is a transistorised battery-operated portable radiogram, containing a long and medium waveband radio chassis, a pick-up pre-amplifier and matching unit and a 4-speed auto-stop record player.

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TECHNICAL DATA

Operating

Controls: A full-length straight line dial, calibrated in metres with station names clearly marked, contains the following controls:—

- (1) Combined volume and tone controls.
- (2) Combined Off/Gram/Radio switch.
- (3) Waveband switch.
- (4) Tuning Control.

Transistors:

PXA102 Self-Oscillating Mixer.
PXA101 I.F. Amplifier.
PXA101 I.F. Amplifier.
XB102 A.F. Amplifier.
PXB103 Audio Driver.
PXC131 } Matched for push-pull
PXC131 } output.
XB103 Gram pre-amplifier.
XB102 Emitter Follower.

Diodes:

CG46 Provides damping for first I.F. transformer.
CG64H Detector.

Aerials:

Twin 10" Ferrite rod aerials.

Wavebands:

Medium: 190—550 metres.
Long: 1050—1800 metres.

Output:

Balanced transistors connected in push-pull provide 500mW output with negative feedback to input of driver.

Speaker:

7"×4½" elliptical unit with high flux permanent magnet.

Record Player:

A single turntable fitted with an automatic stop and capable of handling 7", 10" and 12" records. Speeds, 16⅔, 33⅓, 45 and 78 r.p.m., controlled by 4-position speed change wheel. Lightweight pick-up with turnover head fitted with sapphire styli for L.P. and standard records.

- Batteries:** Two 9-volt batteries (Ever Ready PP9's or equivalent) supply 18 volts to radio and gram sections. A third 9-volt battery provides power for the record player motor.
- Cabinet:** Constructed of strong wrapped round laminated wood. Covered with attractive leather cloth. Available in two colours: red and natural or tan and natural.
- Dimensions:** 16" wide × 14" deep × 8 $\frac{1}{4}$ " high.
- Weight:** 15 $\frac{1}{2}$ lb (including batteries).

REMOVING UNITS FROM CABINET

Motor Board

- (1) Remove loudspeaker cover. Remove two 4BA bolts securing loudspeaker housing to motor board.
- (2) Remove five wood screws securing motor board assembly to cabinet. Lift board up carefully from battery compartment side and slide away far enough to allow pick-up and motor supply leads to be disconnected.
- (3) Withdraw assembly from cabinet.
- (4) To remove record player from board, pull off the clips located on each retaining bolt.

Radio Chassis

- (1) Remove motor board as previously described. Disconnect leads from tags on speaker. Remove speaker and associated housing.
- (2) Disconnect pre-amplifier input and power plugs from chassis.
- (3) Unscrew the four self-tapping screws securing chassis to angle brackets. Remove chassis from cabinet. Disconnect coaxial aerial plug.

Pre-Amplifier Unit

- (1) Remove motor board as previously described.
- (2) Disconnect all associated plugs.
- (3) Remove two 4BA nuts securing sub-chassis to cabinet.

REPLACEMENT OF TUNING DRIVE CORD ASSEMBLY

The use of a simple jig is recommended when measuring and connecting up a replacement drive cord and can be quickly made as shown in the sketch at the rear of the manual.

- (1) Remove chassis from cabinet as described previously. Remove the four knobs from the front panel. Pull off brass trim strip.
- (2) Unscrew the two screws and nuts securing the perspex scale. Remove scale.
- (3) Rotate the tuning control until the capacitor vanes are fully meshed.
- (4) Referring to the sketch, select a 31 $\frac{1}{2}$ " 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.
- (5) 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.
- (6) 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.
- (7) Wind 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.
- (8) Ensure that the condenser 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 2 screws and nuts.
- (9) Replace tape on lower scale edge. Replace brass trim strip.
- (10) Replace the four knobs. Replace chassis in cabinet.

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. Wave-band switching is achieved by means of switch SW1 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 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 achieved by R8 and C14. The secondary IFT2 feeds the I.F. signal to the base of TR3, the second I.F. amplifier, Emitter bias for TR3 being 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 detector via the Radio/Gram switch SW2c to the volume control and via C24 and R29 to the base of TR4 on A.F. amplifier. Base bias for TR4 is obtained by R13 and R31. The tone control RV2 applies C36 either to the base, to provide top cut, or the emitter for top lift.

The amplifier 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.

The pick-up output is amplified by TR8 and fed to SW2c via emitter follower TR9. The signal is then fed to volume control RV1 after which it is amplified in the same manner as for radio operation.

Base bias is provided by R22, R23, R24, R25. R27, R28 act as emitter currents 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.

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

SAFARI

TEST SPECIFICATION

Audio Tests

Equipment Required: Power output meter of 35 ohms impedance.
Audio signal generator.
C.R.O.

Maximum Power Output & Sensitivity

- (1) Connect output leads to power meter and C.R.O. Connect audio generator across volume control.
- (2) Turn selector switch to **Radio**, set volume control to maximum, and tone control to maximum treble position.
- (3) Inject a signal at 1 kc/s and adjust the input to give maximum output without peak clipping. The required input for maximum output of 500mW should be approximately 55 mV.
- (4) Connect the audio generator to pick-up sockets. Turn selector switch to **Gram**.
- (5) Repeat the above test. The required input to produce maximum output should be approximately 200 mV.

Tone Control

- (1) Connect audio generator to pick-up sockets. Turn selector switch to **Gram**.
- (2) Inject a signal of 10 kc/s and adjust for maximum output.
- (3) Turn tone control fully anti-clockwise. The output power should decrease by approximately 30 dB.

I.F. Alignment and Sensitivity

Equipment Required: Signal generator CW/AM.
Power output meter.

- (1) Connect signal generator, via a 0.1 μ F capacitor, between the base of TR1 (PXA102) and earth. Connect output leads to output meter.
- (2) Turn wavechange switch to MW and tune to 500 metres. Set volume control to maximum and tone control to minimum treble position.
- (3) Inject a signal at 470 kc/s modulated 30% at 400 c/s. Adjust in the following order: IFT3, IFT2 secondary, IFT2 primary, IFT1 secondary, IFT1 primary, for maximum output, reducing input as necessary to maintain output at less than 50 mW.
- (4) Repeat alignment until no further improvement can be attained.
- (5) Sensitivity—Adjust the input to give an output of 50 mW. The required input to produce an output of 50 mW should not be greater than 20 mV.

R.F. Alignment

Equipment Required: Signal generator CW/AM
Power output meter.
Shielded radiating loop.

M.W. Alignment

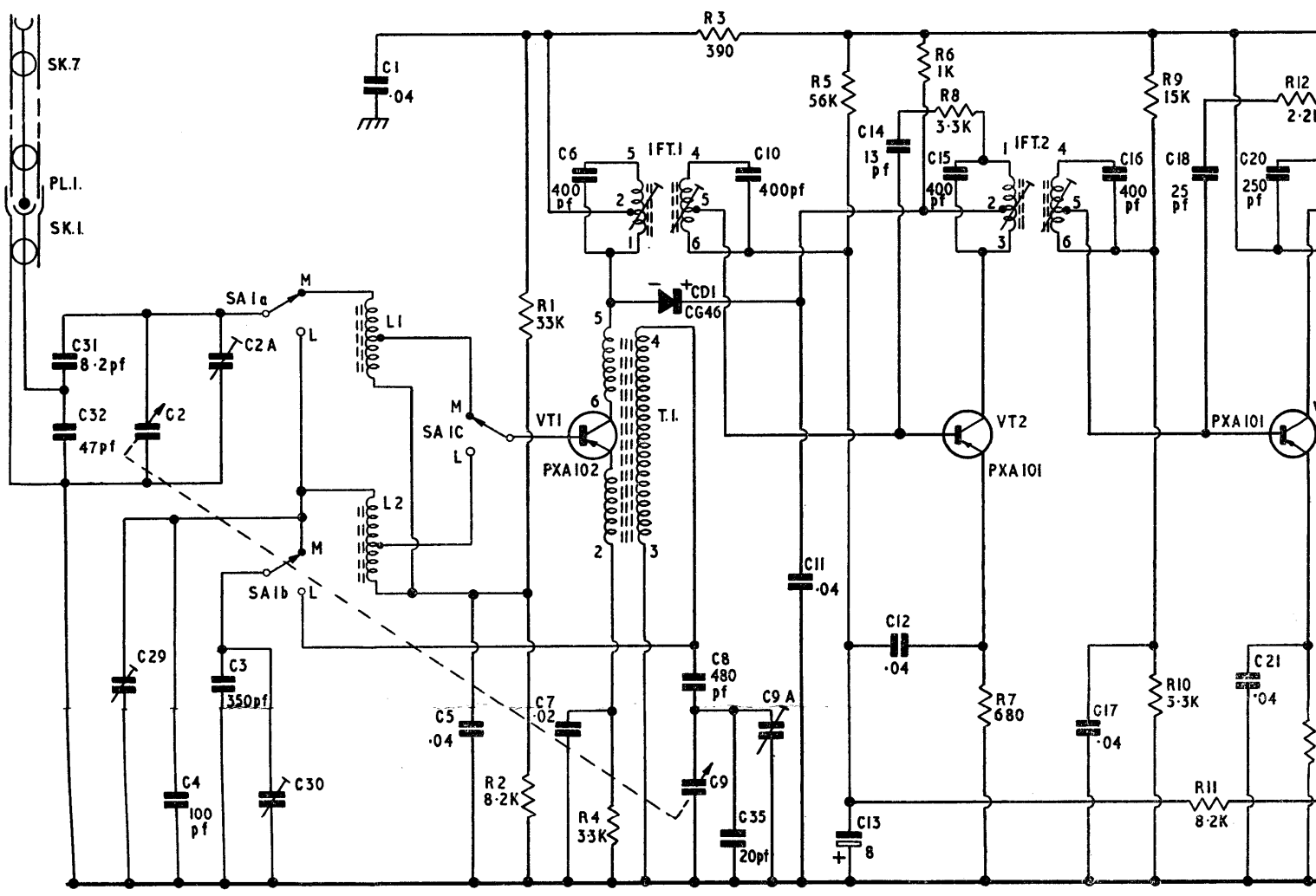
- (1) Rotating the tuning control until the ganged capacitor is fully meshed; and check that the pointer coincides with the end of the scale slot.
- (2) Turn wavechange switch to MW, volume control to maximum, tone control to minimum treble position. Adjust the input to maintain an output to less than 50 mW.
- (3) Inject a signal at 520 kc/s via shielded radiating loop. Tune to the L.F. end of the scale and adjust the core of oscillator coil T1 for maximum output.
- (4) Inject a signal at 1620 kc/s. Tune to the H.F. end of the scale and adjust C9A for maximum output.
- (5) Inject a signal of 400 Kc/s. Tune in received and adjust L1 for maximum output.

- (6) Inject a signal at 1500 kc/s. Tune in receiver and adjust C2A for maximum output.
- (7) Repeat (5) and (6) until no further improvement can be achieved.
- (8) Check scale calibration at 1500 kc/s (200m), 1000 kc/s (300m), 666 kc/s (450m); error should not exceed the width of the pointer.

L.W. Alignment

- (1) Turn wavechange to LW. Tune receiver to 1500 metres.
- (2) Inject a signal at 200 kc/s (or use BBC Light programme). Adjust C30 for maximum output.
- (3) Inject a signal at 167 kc/s. Tune receiver and adjust L2 for maximum output.
- (4) Inject a signal at 250 kc/s. Tune receiver and adjust C29 for maximum output.
- (5) Repeat (3) and (4) until not further improvement can be attained.

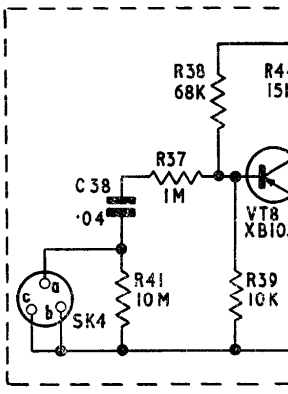
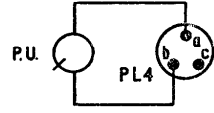
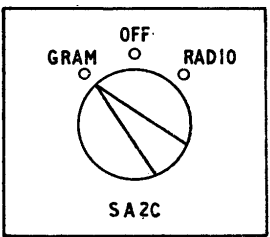
R					1		3		5	6	8		9	37	10	38		
C	31	2	2A	1	5	6				8	10	11	12	15	16	18	20	
MISC.	SK7 PL1 SK1	29	30	SA1a SA1b	L1 L2	SA1c	VT1 VT8	IFT1 TI	CD1	9A	35	13	17	38	21	41	11	39



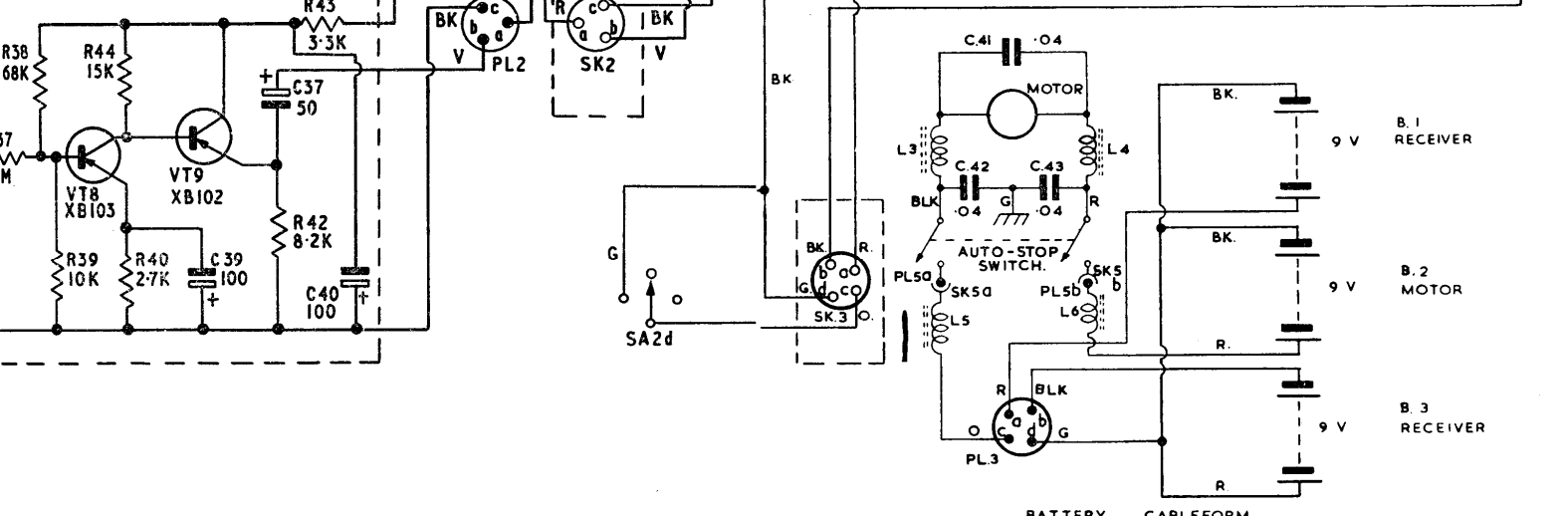
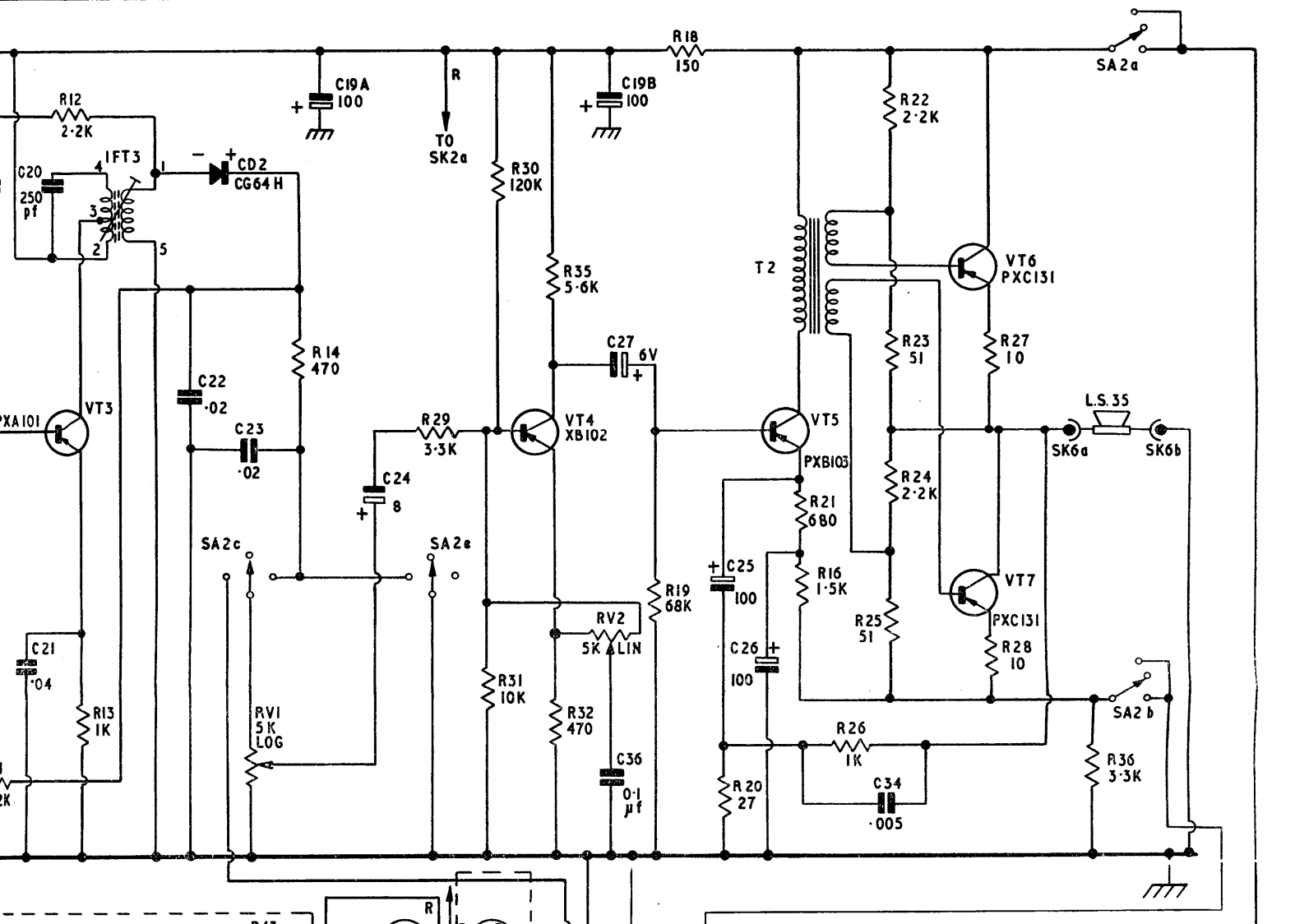
STATIC VOLTAGES

Transistor	Emitter	Base	Collector
TR1. PXA102	-1.41	-1.28	-7.9
TR2. PXA101	-0.80	-1.00	-7.0
TR3. PXA101	-1.20	-1.30	-8.2
TR4. XB102	-0.20	-0.30	-5.8
TR5. PXC103	+0.30	+0.20	-8.4
TR6. PXC131	-0.01	-0.20	-8.8
TR7. PXC131	+9.05	+8.88	0
TR8. XB103	-0.65	-0.64	-2.4
TR9. XB102	-2.40	-2.40	-6.2

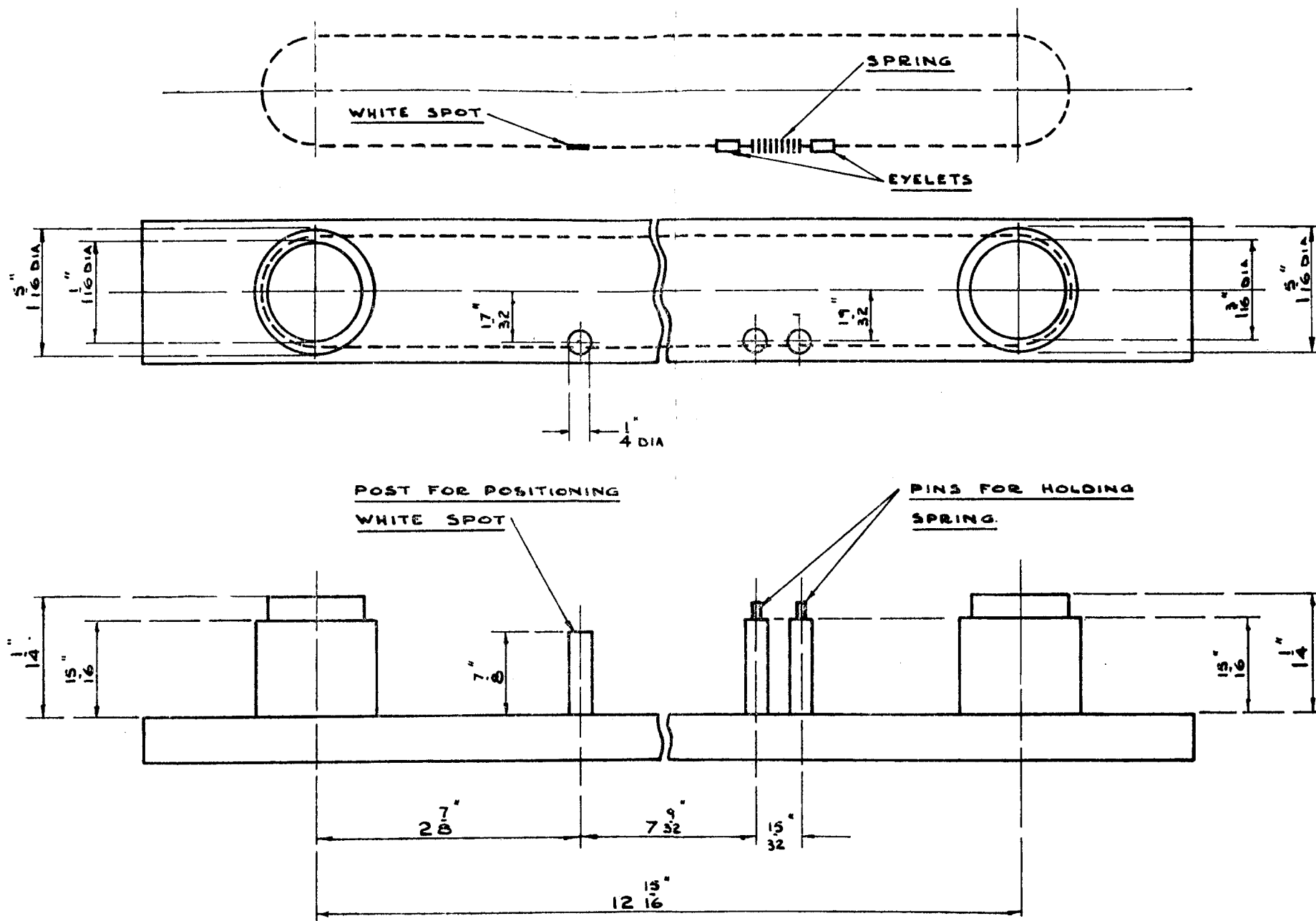
All voltages measured with respect to chassis.



9	10	38	12	44	40		43	14		29	30	35	18		21	25	22	23		27						
11	39	13					42			31	32		19		20	16	26	24		28	36					
20							19A		24			19B		25	26	41	34									
21		39	22	23	40	37					27	36														
VT3	VT8	IFT3	VT9	CD2	SA 2C	SK2a		PL2	SK2	SA2e	RV2	VT4	SA2d	SK3	PL3	T2	VT5	PL5a	SK5a	SK5b	PL5b	VT6	SK6a	SA2a	SK6b	SA2b



BATTERY CABLEFORM



SKETCH SHOWING JIG FOR DRIVE CORD MEASUREMENT AND ASSEMBLY

See page 5 for instructions

