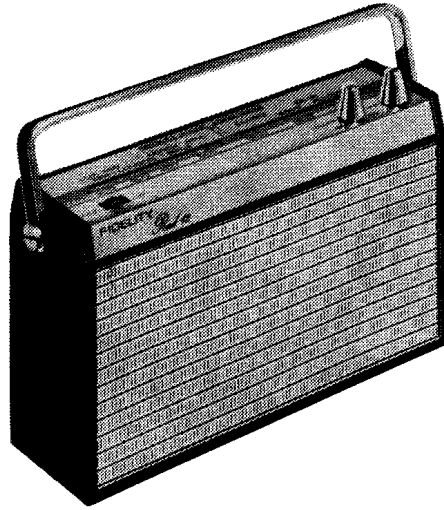


# E R T SERVICE CHART 1772



## FIDELITY RAD 12 PORTABLE RADIO

Additional copies of this chart 2s. 6d., including postage. Payment with order please to ERT, Dorset House, Stamford Street, London, SE1.

**FIDELITY RAD 12** is a battery operated portable radio receiver employing six transistors and a semiconductor diode. Wavebands covered are MW and LW, and reception is via an internal ferrite rod aerial assembly. A coupling coil terminated in a socket is fitted so that an external aerial may be used if required.

A normally closed miniature jack is also fitted. This enables an earphone or tape recorder—terminated in a suitable jack plug—to be used. When this facility is in use the internal speaker is muted.

**Battery.** PP9 or other 9V equivalent.

**Wavebands.** LW 1200–2000m, MW 188–555m.

**Transistors.** TR1 mixer/oscillator BF 194B, TR2 first IF amplifier BF195C, TR3 second IF amplifier BF 195D, TR4 AF amplifier/driver BC149, TR5 AC127 and TR6 AC128 complementary output pair.

**Diode.** D1 detector and AGC AA119 IF. 470kHz.

**Aerial.** Internal ferrite rod assembly.

**Speaker.** 3in. diameter approximately 17ohm impedance.

**Output.** 300mW.

**Outlet.** Miniature jack for earphone or tape recorder not less than 15ohm impedance.

**Price.** £10 10s.

**Manufacturer.** Fidelity Radio Ltd.

**Service department.** Fidelity House, Olaf Street, W11. Tel: 01-727 0131 (10 lines).

### DISMANTLING

To gain access to the foil side of printed panel and drive cord system, unscrew screw securing case back then pull fabric tab to remove. Unclip battery and disconnect loud-speaker (unplug tags). Unscrew and remove the two slotted screws securing the handle to the case.

The printed circuit and scale assembly may now be removed—complete—from the case.

For alignment purposes further disassembly is necessary as follows:

Pull off control knobs then unscrew and

remove the three cross-head screws securing the printed circuit panel to scale assembly. Care should be exercised when easing pointer assembly from the scale moulding.

When re-assembling, hinge the pointer moulding away and out from the printed circuit panel, locate pointers in scale moulding, hinge back ensuring that the groove in the pointer moulding locates on to edge of circuit panel. Note: the pointers should be set about half-way to avoid fouling components.

### SERVICE NOTE

Transistor voltages shown in the table were obtained from data supplied by the manufacturers. They were measured under quiescent conditions with a 20,000 ohm/V meter, and are all positive with respect to negative line.

### CIRCUIT DESCRIPTION

Signals induced in L2 (MW)—L2/L4 (LW)—are tuned by VC1 and coupled by L3 (MW)—L5 (LW)—to the base of mixer oscillator TR1.

The self-oscillating mixer incorporates an isolated tuned circuit L8 and VC2/TC2 for MW with added capacitance C5/TC3 for LW.

Oscillation is maintained by coupling the collector of TR1 to the emitter by L6 and L7.

Automatic bias—inherent with this type of coupling—takes the transistor to cut-off, and the resultant non-linear operation provides the characteristic for mixing.

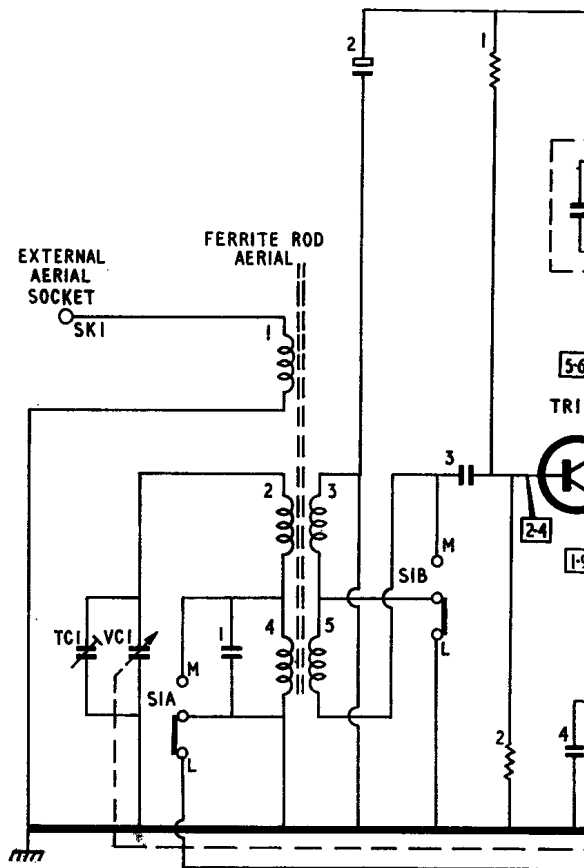
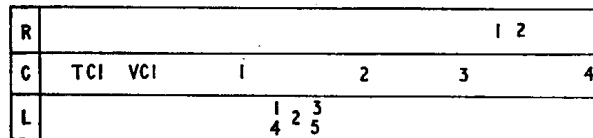
The tuned IF transformer in the collector circuit selects the difference signal (470kHz) and provides a band-pass coupling and impedance match to TR2 the first IF amplifier.

Circuit diagram of the RAD 12 shown with wavechange switch in the LW position

TRANSISTOR VOLTAGES				
No.	Type	E	B	C
TR1	BF194B	1.9	2.4	5.6
TR2	BF195C	0	0.65	5.6
TR3	BF195D	0	0.7	5.3
TR4	DC149	0	0.7	4.6
TR5	AC127	4.7*	4.8	9.0
TR6	AC128	4.7*	4.6	0

\* Measured at junction R17/R18

CAPACITORS		RESISTORS			
C1	39pF	A2	R1	18K	A2
C2	160µF	A2	R2	15K	A2
C3	10KpF	A2	R3	2K7	A2
*C4	22KpF	A2	R4	120K	A2
C5	120pF	A2	R5	47K	A2
C6	2µF	A2	R6	120K	A1
C7	10KpF	A1	R7	330K	A1
C8	100KpF	A1	R8	390	A1
C9	50KpF	A1	R9	27K	A1
C10	100KpF	A1	R10	1K5	A1
C11	10KpF	A1	R11	2K2	A1
C12	160µF	A1	R12	270K	A1
C13	100KpF	A1	R13	220K	A1
C14	320µF	A1	R14	1K5	A1
			R15	680	A1
			R16	47	A1
			R17	2.2	A1
			R18	2.2	A1
VARIABLES		VARIABLE			
VC1	180pF	A2	VR1	10K	A1
VC2	80pF	A2			
TC1	9pF	A2			
TC2	9pF	A2			
TC3	80pF	A2			



# FIDELITY RAD 12

# PORTABLE RADIO

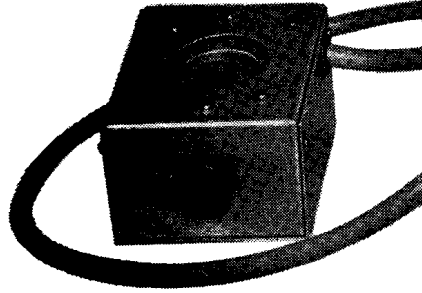
Additional copies of this chart 2s. 6d., including postage. Payment with order please to ERT, Dorset House, Stamford Street, London, SE1.

CAPACITORS		RESISTORS	
C1	39pF	A2	R1 18K
C2	160µF	A2	R2 15K
C3	10KpF	A2	R3 2K7
C4	22KpF	A2	R4 120K
C5	120pF	A2	R5 47K
C6	2µF	A2	R6 120K
C7	10KpF	A1	R7 330K
C8	100KpF	A1	R8 390
C9	50KpF	A1	R9 27K
C10	100KpF	A1	R10 1K5
C11	10KpF	A1	R11 2K2
C12	160µF	A1	R12 270K
C13	100KpF	A1	R13 220K
C14	320µF	A1	R14 1K5
			R15 680
			R16 47
			R17 2.2
			R18 2.2
VARIABLES		VARIABLE	
VC1	180pF	A2	VR1 10K
VC2	80pF	A2	
TC1	9pF	A2	
TC2	9pF	A2	
TC3	80pF	A2	

# COLOUR AND MONOCHROME

# TUBE TESTER

The V31A Tube Tester is intended for the rapid testing of C.R.T.'s. The heater current is accurately maintained while tests are being made. Inter-electrode leakage is measured with the tube at operating temperature. The beam current is collected at the first anode, avoiding a difficult connection to the final anode. Comparisons may be made between the performances of the Red, Green and Blue guns.



PRICE **£46**

- FOR MONOCHROME AND COLOUR TUBES
- TESTS C.R.T.'s IN SITU
- NOT NECESSARY TO REMOVE E.H.T. CAP
- TESTS RED, GREEN AND BLUE GUNS INDIVIDUALLY
- MEASURES INTER-ELECTRODE LEAKAGE
- ACCURATELY MEASURES BEAM CURRENT
- REACTIVATION PROCESS TO PROLONG LIFE

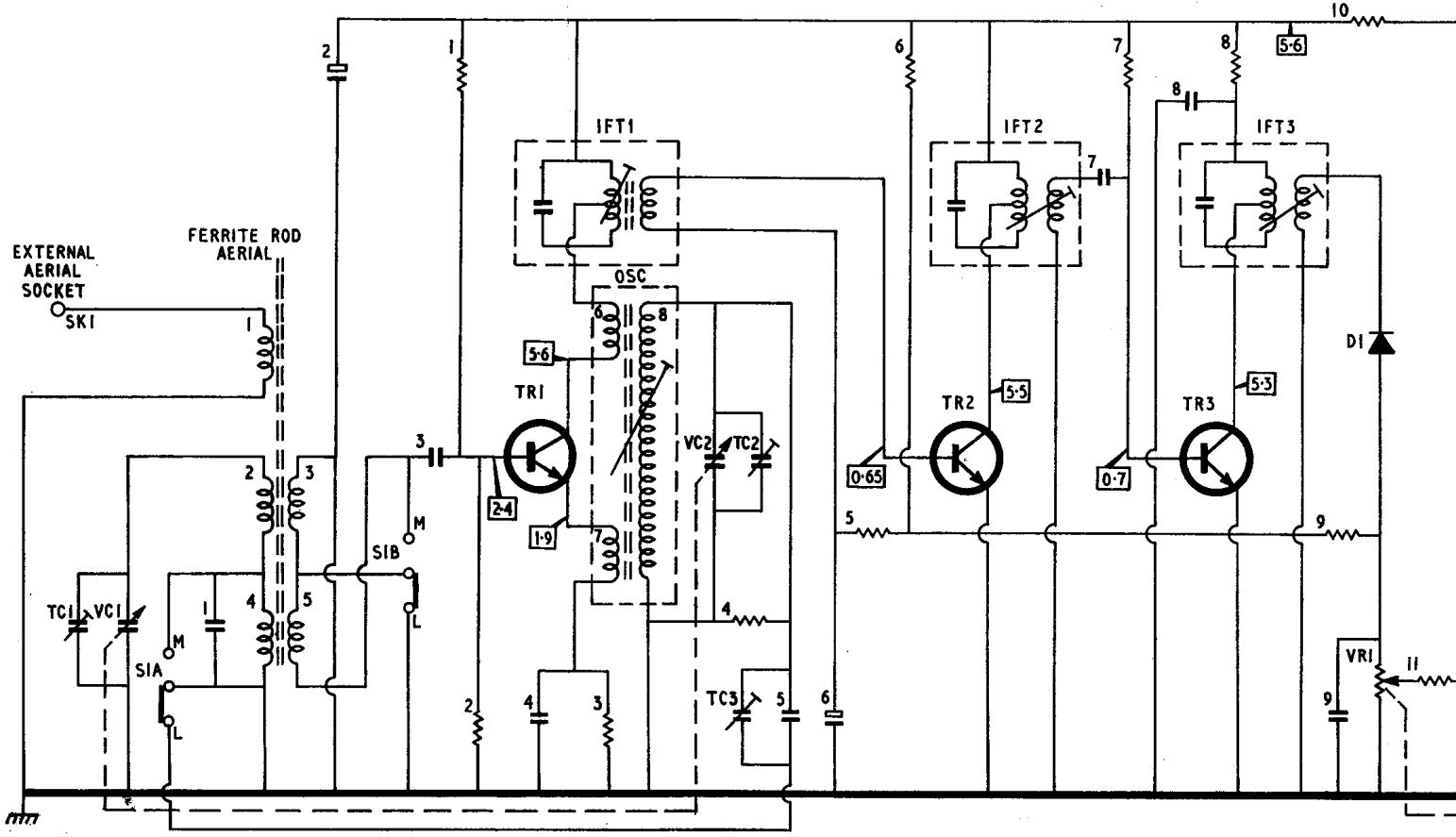
### SPECIFICATION

- BASE BOX — B8H. B12A. B
- HEATER VOLTAGE — 4.0V. 6.3V. 12V.
- HEATER CURRENT — ACCURATELY MAINTAINED
- LEAKAGE — 300V D.C. TEST
- EMISSION — BEAM CURRENT
- REACTIVATE — FACILITY FOR REACTIVATION
- SUPPLY — 220-240V A.C.
- DIMENSIONS — 35 CM. WIDE

**VIDEO CIRCUITS**  
LONDON

104 SALISBURY ROAD  
Telephone: 01-449 3087.

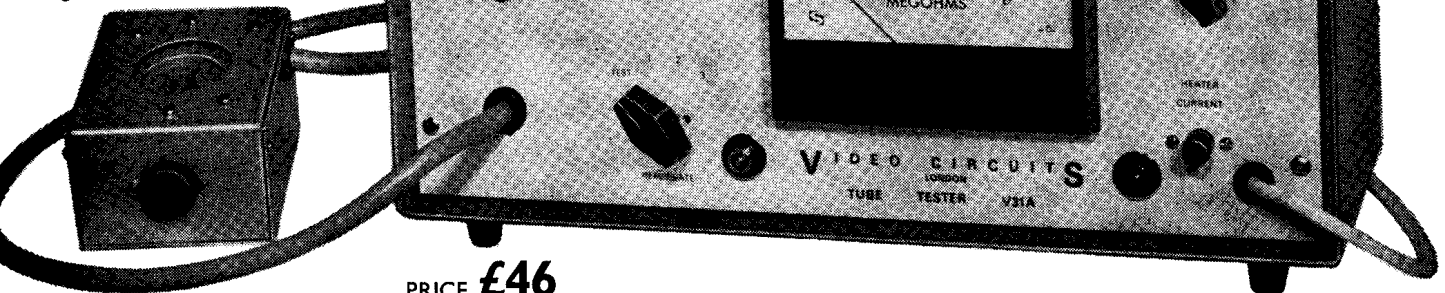
R			1	2		3		4		5	6		7		8		9	10	VRI	11
C	TC1	VC1	1	2	3	4		VC2	TC2	5	6		7	8	9	10				
L			1	2	3					6	7	8								



# COLOUR AND MONOCHROME

# TUBE TESTER TYPE V31A

V31A Tube Tester is intended for rapid testing of C.R.T.'s. The heater current is accurately maintained while tests are being made. Inter-electrode leakage is measured with the tube at operating temperature. Beam current is collected at the final anode, avoiding a difficult connection to the final anode. Comparisons may be made between performances of the Red, Green and Blue guns.



PRICE **£46**

FOR MONOCHROME AND COLOUR TUBES  
 TESTS C.R.T.s IN SITU  
 NOT NECESSARY TO REMOVE E.H.T. CAP  
 TESTS RED, GREEN AND BLUE GUNS INDIVIDUALLY  
 MEASURES INTER-ELECTRODE LEAKAGE  
 ACCURATELY MEASURES BEAM CURRENT  
 REACTIVATION PROCESS TO PROLONG LIFE

### SPECIFICATION

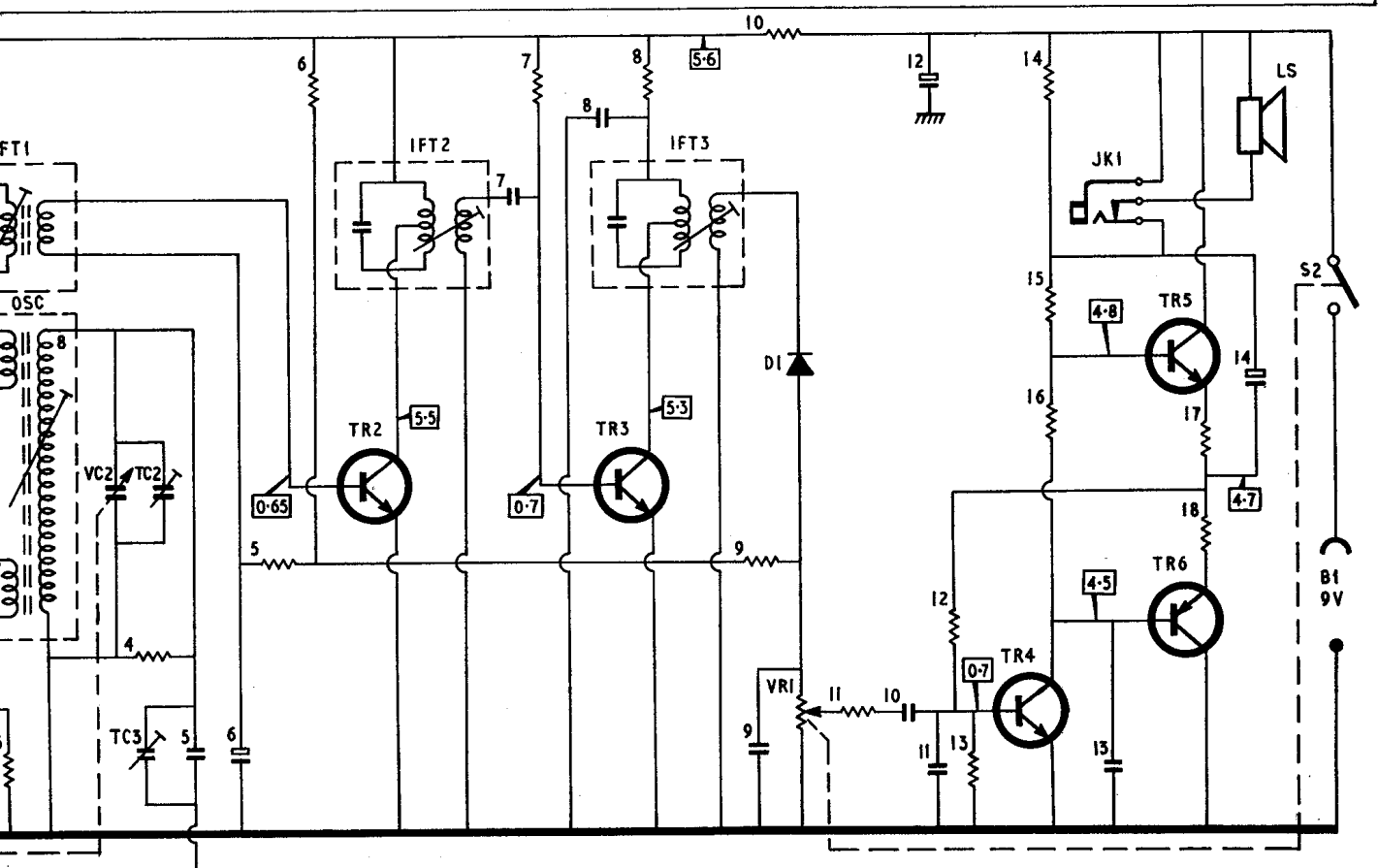
- BASE BOX — B8H, B12A, B14G. BASES.
- HEATER VOLTAGE — 4.0V, 6.3V, 12.6V.
- HEATER CURRENT — ACCURATELY SET WITH RHEOSTAT AND 0.1 AMP METER
- LEAKAGE — 300V D.C. TEST VOLTAGE BETWEEN SELECTED ELECTRODE & ALL OTHERS
- EMISSION — BEAM CURRENT SCALE INDICATES TUBE CONDITION
- REACTIVATE — FACILITY FOR EXTENDING LIFE OF TUBES THAT ARE NOT EXHAUSTED
- SUPPLY — 220-240V A.C.
- DIMENSIONS — 35 CM. WIDE, 15 CM. HIGH, 15 CM. DEEP

104 SALISBURY ROAD, BARNET, HERTS.

Telephone: 01-449 3087.

**VIDEO CIRCUITS**  
 LONDON

4	5	6	7	8	9	10	VRI	11	12	13	14	15	16	17	18
VC2	TC2	5	6	7	8	9	10	11	12	1	13	14			
TC3															



**E**  
**R**  
**T**  
**SERVICE CHART**  
**1772**  
**FIDELITY RAD 12**

Rectifier D1 in the demodulator circuit has a small forward bias applied via the potential divider R6, R9 and VR1. This bias tends to offset the non-linearity attendant in the diode characteristic when driven to cut-off.

IF filtering is carried out by C9, R11 and C11 with VR1 having the dual role of volume control for AF and diode DC load across which is developed the AGC voltage.

The negative going AGC voltage is applied as reverse bias to TR2. The AF being filtered by R5 and C6.

AF driver transistor TR4 feeds in a phase signal to each of the complementary push-pull output pair TR5 and TR6, and negative feed-back, both AC and DC, is provided by R12 to the base of TR4.

**ALIGNMENT**

**Equipment required.** An AM signal generator, an output meter and isolating capacitor and an RF coupling coil.

In order to gain access to cores and trimmers the chassis must be removed from the case. With the template provided, mark off alignment points on the circuit panel, then check that with the tuning gang fully open—minimum capacitance—the pointer moulding lines up with end-of-scale marker 1 as illustrated.

Connect output meter across speaker tags via an isolating capacitor, and rotate

volume control to maximum. Maintain input signal level so that the output signal is approximately 50mW at all times.

**IF.** Short-circuit L8 so that the oscillator is rendered inoperative. Switch receiver to MW, rotate tuning gang to maximum capacitance and feed in a 470kHz AM signal to junction VC1/L2. Adjust IFT3, IFT2 and IFT1 in that order for maximum output. Reduce signal input and repeat. Remove short circuit from L8.

**RF.** Terminate signal generator in RF coupling coil and loosely couple to ferrite rod aerial assembly.

Switch receiver to MW, tune to 500m—calibration mark 4—and feed in a 600kHz AM signal. Adjust L8 and the position of L2/L3 on ferrite rod for maximum output.

Tune receiver to 200m—calibration Mark 2—and feed in a 1500kHz AM signal. Adjust TC2 and TC1 for maximum output.

Repeat the 500m and 200m adjustments. Disconnect signal generator.

Switch receiver to LW, tune to 1500m—calibration mark 3—and adjust TC3 for maximum output of the BBC broadcast signal.

Retune receiver to calibration mark 4 and adjust position of L4/L5 on ferrite rod for maximum output of the Allouis broadcast signal.

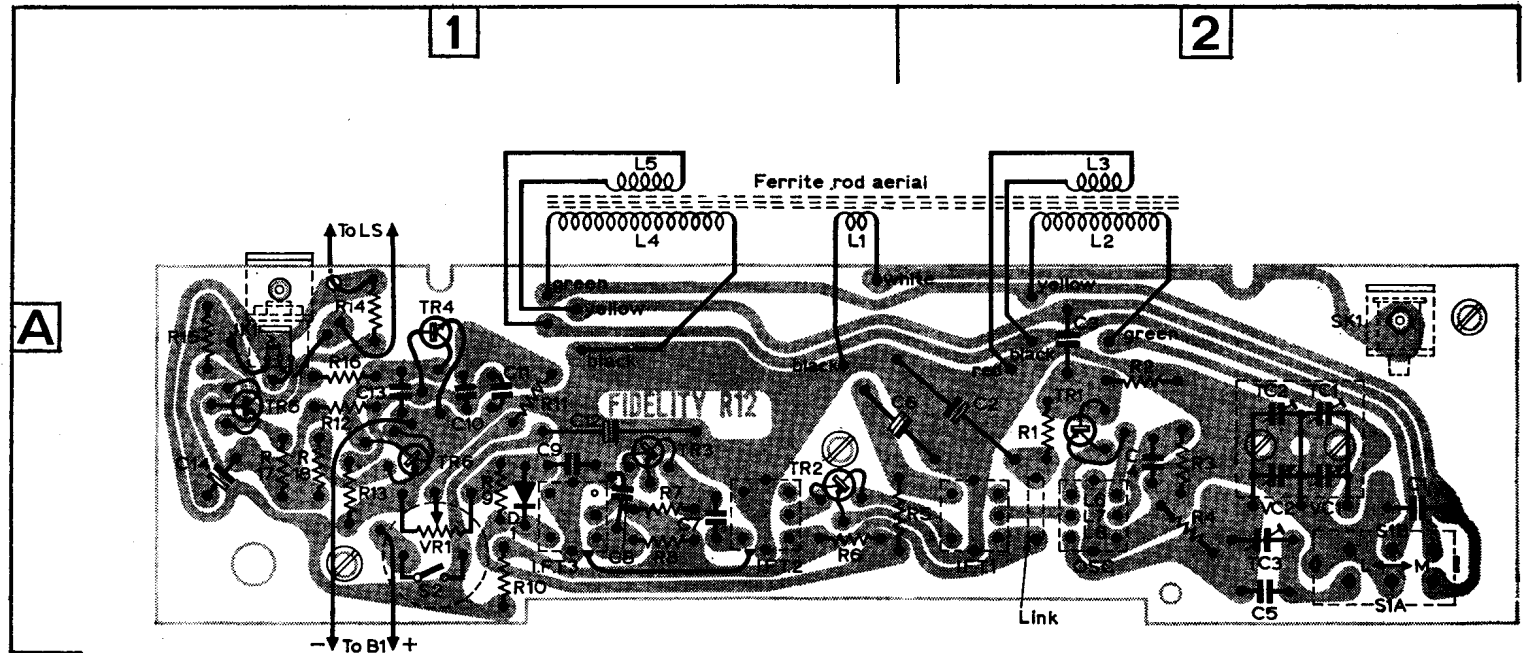
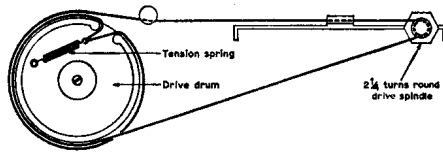
**KNOW ALL THE ANSWERS**

**E**RT provides the latest news about products, events and technical developments in the radio and electrical industry.

Service managers and engineers can have ERT delivered to their home address each week. Annual subscription is £4 15s. which includes weekly service chart supplements, servicing directory, spring and autumn price lists, hi-fi and electrical contracting sections, etc.

As ERT is supplied to the trade only, orders should be accompanied by your firm's letter head or trade card. Send to Circulation Department, ERT, 40 Bowling Green Lane, London EC1.

**Drive cord assembly**



**Component locations viewed through the panel from the foil side**

Template for use in marking off alignment points on the recess in the printed circuit panel. The pointer moulding is shown on mark 1, minimum capacitance

