Radio Th. B

INSTRUMENT

by

ADVANCE

INSTRUCTIONS FOR TYPE No. 81A

ADVANCE COMPONENTS LTD.
HAINAULT, ILFORD, ESSEX

DIRECTORS : A. W. STAPLETON (MANAGING) - C. H. STAPLETON - E. BENZIMRA - S. GOODMAN, B.Sc., A.M.I.E.E.

Advance COMPONENTS LIMITED

ELECTRONIC ENGINEERS

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HAINAULT INDUSTRIAL ESTATE

TELEPHONE: HAINAULT 4444 TELEGRAMS: ATTENUATE · ILFORD

OUR REF. ..... YOUR REF. .....

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DATE.....

L O W F R E Q U E N C Y

S I G N A L G E N E R A T O R

TYPE 81/A.

I N S T R U C T I O N M A N U A L

"ADVANCE"

LOW FREQUENCY SIGNAL GENERATOR - TYPE 81/A.

The type 81/A is a wide range L.F. Oscillator providing a maximum output of 1 watt into 600 ohms over a frequency range of 15 c/s. to 200 kc/s.

The oscillator comprises a 12 BH7 and 6 AM6 used in a capacitive-resistive Wien bridge network.

The oscillator is stabilised by a thermistor in the anode circuit, a second thermistor provides temperature compensation of the oscillatory output voltage. This stabilisation ensures constancy of output from the oscillator.

The frequency is varied by means of a ganged variable condenser and the frequency reading is calibrated on a drum scale of eight inches in length; a logging scale with vernier is used in conjunction with the main scale.

The oscillatory voltage from the Wien bridge oscillator is fed via the set level potentiometer to the control grid of the two stage buffer amplifier.

The unit attenuator is connected between the buffer amplifier and output stage with the output level meter which consists of a moving coil meter and a rectifier bridge network across the whole of this attenuator. The unit attenuator is tapped off in one dB steps.

The amplified output of the buffer stage is resistive capacity coupled to the final output amplifier.

The application of negative feedback in the amplifier and output stages, together with stabilisation in the oscillator ensures a constant level with change of frequency. The output voltage is controlled by means of the unit and decade attenuators used together with the set level control. The outstanding feature of this instrument is the excellent arrangement of the output terminations and the very convenient mode of attenuator switching. The decade attenuators are balanced pi networks providing full output either balanced or unbalanced, connected to or isolated from earth.

SPECIFICATION

Frequency Range:

15 c/s. to 200 kc/s. in 4 bands.

Frequency Calibration Accuracy:

Ranges A, B and C ±(1% + 1 c/s.); Range D ± 2%
With logging scale which gives an effective scale length of 18 inches.

Frequency Stability:

Better than 0.1% at 1 kc/s. after warm-up period. With mains voltage variation of ± 10% drift is less than 0.04% at 1 kc/s.

Distortion:

Total harmonic and hum content compared with fundamental above 100 c/s.
Better than 40 db down (1%) with meter set a 1 mW reference level.
Better than 34 db down (2%) with meter set at +5 db(Max. output).
There is a slight increase in distortion below 100 c/s. and when the output terminals feed into a high impedance on the +20 db position of the decade attenuator.

Hum Level:

Hum and noise content is less than 0.25% of maximum output.

Output:

Calibrated in volts and watts, balanced or unbalanced.

Voltage:

20 mV to 25 V. R.M.S. into 600 ohms in six ranges indicated by the calibrated meter scales and 10 db attenuator.

Power:

0-1 watt into 600 ohms, indicated with reference to 1 mW level by 1 db and 10 db step attenuators from -35 db to +25 db; plus 5 db above reference level on the meter.

Amplitude Accuracy:

±1 db over complete frequency range.

Output Impedance:

600 ohms centre tapped, balanced or unbalanced terminations with respect to earth.
300 ohms unbalanced.
There is a rise in output impedance on the ±20 db position of the decade attenuator at the high frequency end of the 50-200 kc/s. band.

Attenuator Accuracy (at normal "set" level):

Decade Attenuator: ±1.5% of attenuator reading.

Units Attenuator: ±1% of attenuator reading ±0.15 db 20 c/s. to 200 kc/s.

Weight:

27½ lbs. (12.5 kg.)

Dimensions:

11¼ in. (28.5 cm.) wide; 15 in. (37.2 cm.) high: 8½ in. (21.6 cm.) deep.

CONTROLS AND CONNECTIONS

Mains Switch:

On right of instrument. A red indicator bulb on the left of the instrument indicates when power is on.

Range Switch:

On top right of instrument. Indicates which one of four ranges to read off drum dial.

Set level and output volts:

Top left of instrument. Is used as a set level control indicated by 1 mW. red line on meter scale when db's relative to 1 mW. are required. Is used as a voltage output control when volts into 600 ohms is required.

Units Attenuator:

Bottom left of instrument. Indicates ± 5 db relative to any setting of the decade attenuator. When reading volts into 600 ohms this control should be set to "read volts" position.

Decade Attenuator:

Bottom right of instrument. Indicates in conjunction with units attenuator db's relative to 1 mW. into 600 ohms, or is used as a scale indicator and multiplier when reading volts into 600 ohms.

Set Frequency Control:

Control on instrument below drum dial.
A conventional type full wave rectifier power supply is used to provide the type 81/A with the necessary voltages for operation. This is designed for operation at 110-125, 140-160 and 110-250 volts A.C. only at 40-100 c/s, the appropriate taps being provided on the transformer and made accessible by removing the cover plate mounted on the bottom of the instrument.

OPERATION

Frequency:

A signal of any frequency between 15 c/s. and 200 kc/s. is set, using the range switch in conjunction with the calibrated dial.

Continuous adjustment is by means of the slow-motion control situated centrally below the dial.

A logging scale with vernier is incorporated to enable the dial to be reset accurately to any previously used frequency.

Output:

Output into a 600 ohms load is taken from the two red terminals.

The load can be balanced or unbalanced. If balanced, the neutral should be connected to the black terminal situated between the red terminals and slightly above them. The earth terminal, which is the lowest black terminal, may be connected to any part of the external circuit as desired, or the output may be left floating.

Output into a 300 ohm load may be taken from one of the red terminals and the upper black terminal. The output circuit is so arranged that it is unnecessary to load the unused terminals.

The output is set in two different ways;-

1. Volts into 600 ohms.
   All appropriate control lettering is engraved in BLACK. Set the units attenuator to the "read volts" position, ie., +5 db. The control marked "read volts" is then used as a fine control to set the output as indicated on one of the two scales of the meter. The appropriate scale to read is then indicated on the decade attenuator by the BLACK engraving.

2. Decibels up and down on 1 mW. into 600 ohms.
All appropriate lettering is engraved in RED. To set to 1 mW. output, use "set level" control to set meter pointer to the red line marked 1 mW. Switch both attenuators to 0 db. Decibels up and down on this level are then set by switching the attenuator to the required figure indicated by the red engraving. A further +5 db can be obtained above ±25 db by adjusting the meter pointer to the +5 db red line. There is an increase in distortion at this setting. Total distortion is not more than 2%.
It should be noted that there is an increase in distortion if the output is unterminated on the 0-25 V.(+20 db) setting of the decade attenuator. Also the output impedance rises towards the upper end of the 50 to 200 kc/s band on the 0-25 V. (+20 db) setting of the decade attenuator.

MAINTENANCE INSTRUCTIONS

1. To remove instrument from its case, lay it face downwards on the guard handles and remove the two rear screws. Lay instrument with front panel up and remove 14 screws around edge of panel. Then lift instrument by means of guard handles vertically from the case.

2. Tube and pilot bulb replacements are then easily carried out.

3. To set output volts correctly a 600 ohm 1W. close tolerance resistor (1%) between the two red terminals and monitor the output voltage. Set dial to 1 kc/s. Set decade attenuator and "Adjust Volts" control to a convenient Output Voltage. (Note: The units attenuator must be set to the "Read Volts" position). Correct the voltage reading of the meter by means of "RV2" which is placed on the upper chassis.

4. To adjust balance of Output Transformer. Set attenuator to -30 db and frequency to 200 kc/s. Measure output volts loaded with one end of the load earthed and centre tap not employed. Measure loaded output volts with earth transferred to other end of the load resistor. Adjust C.29 until readings are identical. In all adjustments involving the use of a voltmeter or other device for monitoring the output volts the input impedance of the measuring device must be high compared with 600 ohms, e.g., 100 k.ohms.

FACTORY SERVICE

Our factory Service Department is at your service should you wish to obtain further repair information by telephone or letter. The type and serial number should always be quoted. We maintain an efficient Service facility, should you wish to return the instrument to our factory for repair.

The instrument is Guaranteed for a period of one year from its delivery to the purchaser for the replacement of defective parts other than valves (tubes) and fuses.

Valves (tubes) are subject to the manufacturer's guarantee.

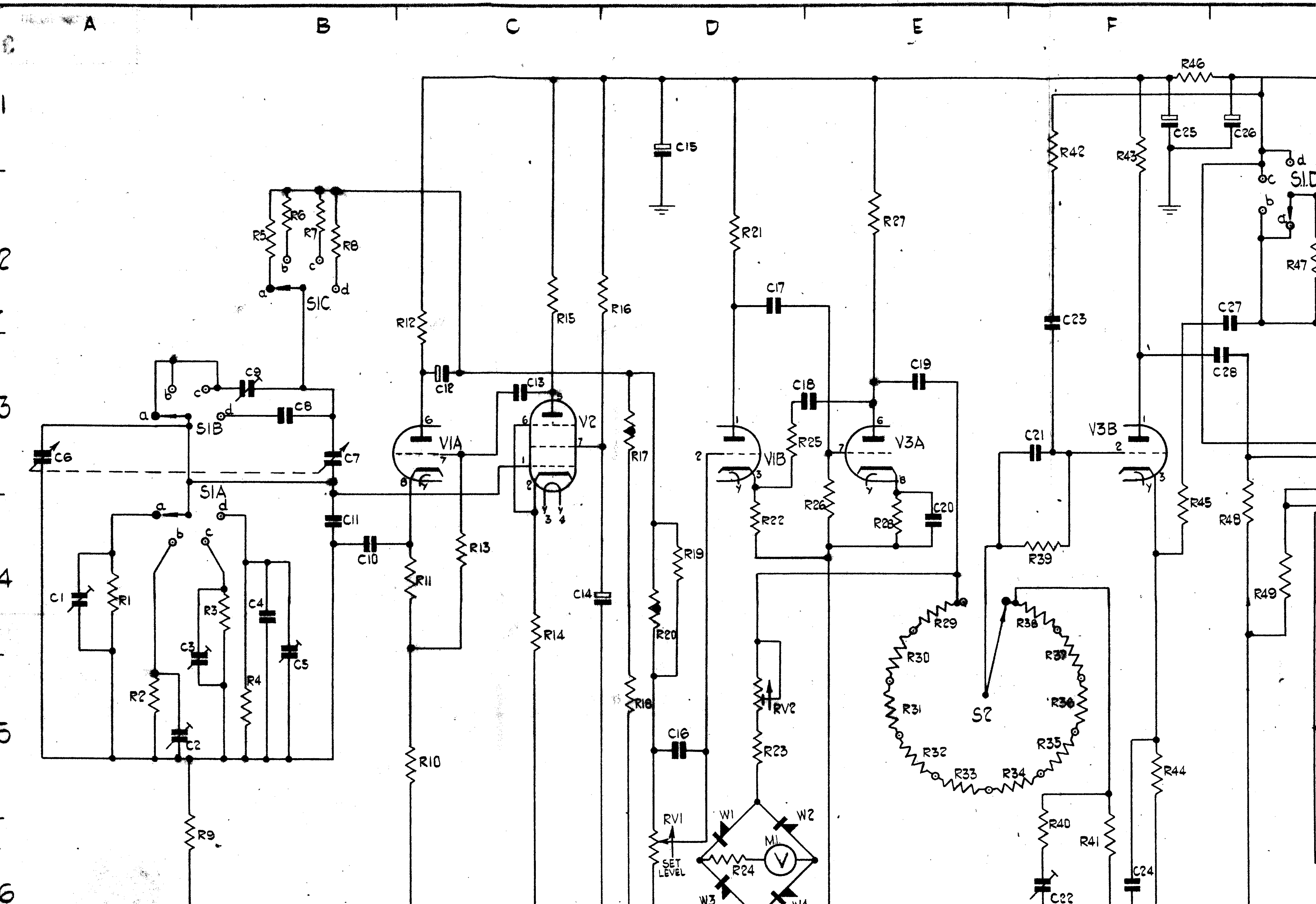
Equipment returned to us for servicing must be adequately packed, preferably in the special box supplied, and shipped with transportation charges pre-paid. We can accept no responsibility for instruments arriving damaged.

Should the cause of failure during the Guarantee period be due to misuse or abuse of the instrument, or if the Guarantee has expired, the repair will be charged and put in hand without delay unless you instruct otherwise.

OUR SALES, SERVICE AND ENGINEERING DEPARTMENTS
ARE AT YOUR SERVICE AT ALL TIMES.

WGC/FB.
2.12.59.

Roneo No.576.



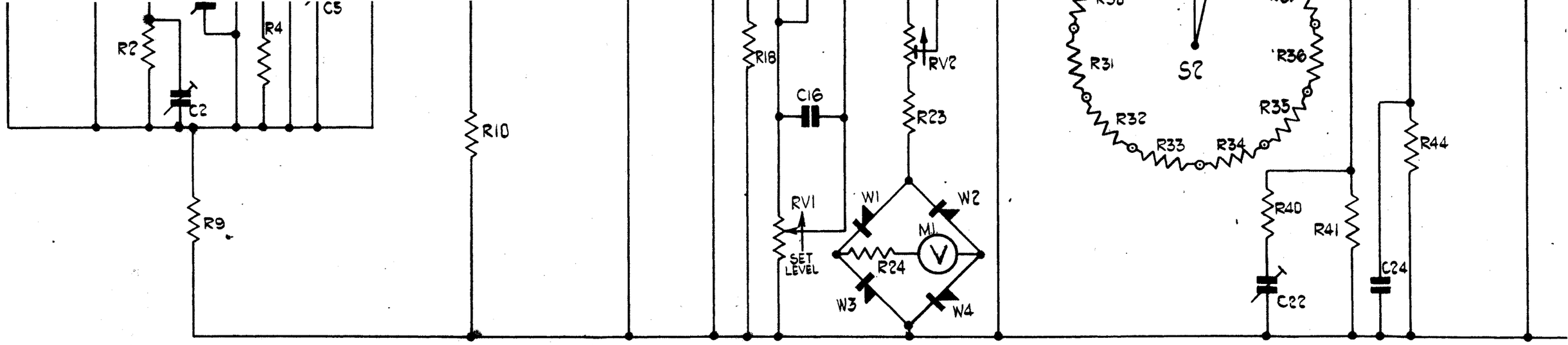
A
B
C
D
E
F
1
2
3
4
5
6
R46
C15
C25
C26
R42
R43
S1D
R5
R6
R7
R8
R21
R27
R47
S1C
C17
C27
R12
R15
R16
C23
C9
C8
C12
C13
C19
C28
C18
S1B
V2
V1A
V1B
V3A
V3B
C21
C6
C7
R17
R25
S1A
C11
R26
C20
R22
R28
R45
R48
C10
R13
R19
R39
R11
C1
R1
R3
C4
C14
R29
R38
R49
R14
R20
R30
R37
C3
C5
R2
R4
RV2
R31
S2
R36
R18
C16
C2
R10
R23
R32
R35
R44
R33
R34
R9
RV1
W1
W2
M1
R40
R41
SET LEVEL
R24
C24
W3
W4
C22

E F G H I

ALTERATION

ISSUE.1. 7·9.59

R27 C19 V3A R28 C20 R29 R30 R31 R32 R33 R34 R38 R37 R36 R35 S2 R39 C21 V3B C23 R42 R43 R40 R41 C22 C24 R44 R45 C25 C26 R46 C27 C28 R47 R48 R49 T2 T3 S1D R50 R51 C29 C30 V4 S1E S1F S1G R72 V5 C31 C32 T1 210-250v 140-160v 105-125v 0v R70 R71 LP1 S3A S3B S3E S3F S3C S3D R53 R56 R59 R52 R54 R55 R57 R58 R60 R61 R63 R64 R66 R67 R69 R62 R65 R68 S3G S3H S3K S3L S3I S3J S4 T4



EVERY EFFORT IS MADE TO KEEP THIS CIRCUIT UP TO DATE BUT THE RIGHT IS RESERVED TO ADJUST THE VALUES OR AMEND THE CIRCUIT

RESISTORS

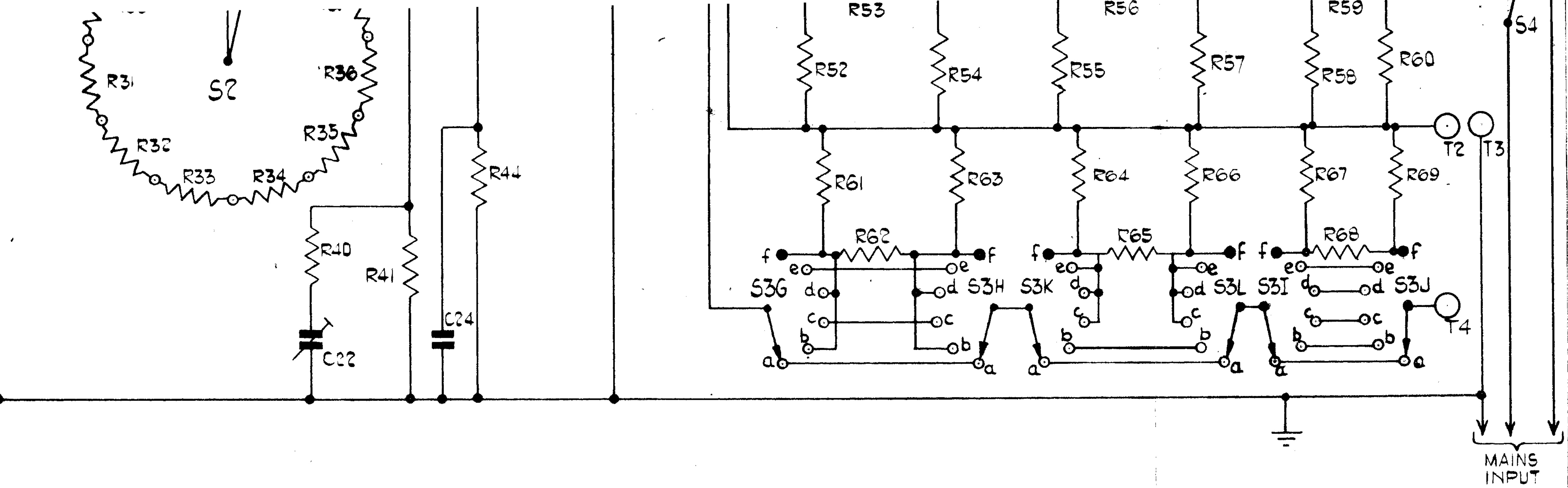
REF	DESCRIPTION	CIRC REF	P.Nº
R1	13M. H.S. WELWYN 1% C25 2W	A4	6700
R2	1M. H.S. WELWYN 1% C28 ½W	A5	6701
R3	70K. H.S. WELWYN 1% C22 ½W	B4	6702
R4	5·35K. H.S. WELWYN 1% C22 ½W	B5	9080
R5	13M. H.S. WELWYN 1% C25 2W	B2	6700
R6	1M. H.S. WELWYN 1% C22 ½W	B2	6701
R7	70K. H.S. WELWYN 1% C22 ½W	B2	6702
R8	5·35K H.S. WELWYN 1% C22 ½W	B2	9080
R9	150K H.S WELWYN 1% C21 ¼W	B6	12183
R10	680 ERIE 9 10% ½W	C5	7497
R11	270 ERIE 9 5% ½W	C4	1843
R12	10K ERIE 9 10% 1W	C2	434
R13	1M ERIE 9 10% ½W	C4	1131
R14	2·2K ERIE 9 10% ½W	C4	867
R15	100K ERIE 9 10% ½W	C2	1270
R16	220K ERIE 9 10% ½W	D2	6703
R17	THERMISTOR S.T.C. TYPE A1522/100	D3	6719
R18	33 ERIE 9 10% ½W	D5	11979
R19	22K ERIE 10% ½W	D4	1271
R20	THERMISTOR S.T.C TYPE A1451/100	D4	7811
R21	15K ERIE 9 10% ½W	D2	1177
R22	3·3K ERIE 9 10% ½W	D4	2736
R23	12K ERIE 9 10% ½W	D5	12278
R24	10K ERIE 9 10% ½W	D6	871
R25	22K ERIE 9 10% ½W	D3	1271
R26	1M ERIE 9 10% ½W	E4	1171
R27	15K ERIE 9 10% ½W	E2	1177
R28	3·3K ERIE 9 10% ½W	E4	2736
R29	2·72K ERIE 109 1% ¼W	E4	11901
R30	2·42K ERIE 109 1% ¼W	E4	11902
R31	2·16K ERIE 109 1% ¼W	E5	11903
R32	1·93K ERIE 109 1% ¼W	E5	11904
R33	1·72K ERIE 109 1% ¼W	E5	11905
R34	1·55K ERIE 109 1% ¼W	F5	11906
R35	1·34K ERIE 109 1% ¼W	F5	11907
R36	1·19K ERIE 109 1% ¼W	F5	11908
R37	1·09K ERIE 109 1% ¼W	F4	11909
R38	960 ERIE 109 1% ¼W	F4	11910
R39	47K ERIE 9 10% ½W	F4	2953
R40	100K ERIE 9 10% ½W	F6	1270
R41	7·9K ERIE 109 1% ¼W	F6	11911
R42	680K ERIE 9 10% ½W	F1	5024
R43	22K ERIE 9 10% ½W	F1	1271
R44	3·3K ERIE 9 10% ½W	F5	2736
R45	62K ERIE 9 5% ½W	F4	11758
R46	18K ERIE 9 5% ½W	F1	12185
R47	18K ERIE 9 5% ½W	G2	12185
R48	1M ERIE 9 10% ½W	G4	1171
R49	330 ERIE 9 10% ½W	G4	7678
R50	150 ERIE 9 5% ½W	H1	11929
R51	150 ERIE 9 5% ½W	G2	11929
R52	577 ERIE 109 1% ¼W	G5	11865
R53	427 ERIE 109 1% ¼W	H4	11864
R54	577 ERIE 109 1% ¼W	H5	11865
R55	367 ERIE 109 1% ¼W	H5	11867
R56	1·485K ERIE 109 1% ¼W	H4	11866
R57	367 ERIE 109 1% ¼W	I5	11867
R58	367 ERIE 108 1% ½W	I5	11868
R59	1·485K ERIE 109 1% ¼W	I4	11866
R60	367 ERIE 109 1% ¼W	I5	11867
R61	577 ERIE 109 1% ¼W	G5	11865
R62	427 ERIE 109 1% ¼W	H6	11864
R63	577 ERIE 109 1% ¼W	H5	11865
R64	367 ERIE 109 1% ¼W	H5	11867
R65	1·485K ERIE 109 1% ¼W	H6	11866
R66	367 ERIE 109 1% ¼W	I5	11867
R67	367 ERIE 108 1% ½W	I5	11868
R68	1·485K ERIE 109 1% ¼W	I6	11866
R69	367 ERIE 109 1% ¼W	I5	11867
R70	22 ERIE 9 10% ½W	I3	4413
R71	22 ERIE 9 10% ½W	I3	4413
R72	500 BIRCH W/WOUND 2W	I1	11759

CAPACITORS

C.1.	WIRE TRIMMER	A4	10177
C.2.	WIRE TRIMMER	A5	10177
C.3.	WIRE TRIMMER	B4	10177
C.4	75pF SILVER MICA LEMCO 1510 1%	B4	12187
C.5.	3-30pF CONCENTRIC TRIMMER-MULLARD	B5	1620
C.6.	532pF } 2 GANG POLAR E24 TYPE C16	A3	11859
C.7.	532pF } -02/342	B3	
C.8.	75pF SILVER MICA LEMCO 1510 1%	B3	12187
C.9	3-30pF CONCENTRIC TRIMMER- MULLARD	B3	1620
C10	·1 PLESSEAL 20%	B4	11860
C11	15 pF ±1% SILVER MICA	B4	12191
C12	30 PLESSEY CE 1619 WIRE ENDS 250v WKG.	C3	12189
C13	·1 PLESSEAL 20%	C3	11860
C14	30 PLESSEY CE 1619 WIRE ENDS 250v.WKG.	D4	12189
C15	16+16 HUNTS JE413 ELECT. 350v.D.C. WKG.	D1	7014
C16	3pF PEARL TYPE CERAMIC	D5	4843
C17	·1 PLESSEAL 20% 350v. D.C. WKG.	D2	11860
C18	·1 PLESSEAL 20% 350v. D.C. WKG.	E3	11860
C19	·5 PLESSEAL 20% 350v D.C. WKG.	E3	12096
C20	200pF LEMCO 1106 INSUL. 5% 350v. D.C. WKG.	E4	11931
C21	200pF LEMCO 1106 INSUL. 5% 350v. D.C. WKG.	F3	11931
C22	3-30pF CONCENTRIC TRIMMER- MULLARD	F6	1620
C23	·1 PLESSEAL 20% 350v. D.C. WKG	F2	11860
C24	75pF SILVER MICA L		
C25	16 } PLESSEY C		
C26	16 } ELECT. 350v		
C27	·1 PLESSEAL 20%		
C28	·1 PLESSEAL 20%		
C29	450pF TRIMMER C		
C30	3-30pF CONCENTR		
C31	16 } PLESSEY CE 6		
C32	16 } ELECT. 350		

MISCELL

RV1	25K COLVERN CL		
RV2	25K COLVERN CL		
S1.	FREQUENCY RANGE		
S.2	ATTENUATOR UNI		
S.3	ATTENUATOR DEC		
S.4	MAINS-ARCO-ELECT		
W1 -W4	CRYSTAL B.T.H		
V.1.	12BH7		
V.2	EF91-6AM6		
V.3	12AU7		
V.4	6BW6		
V.5	EZ80		
T.1.	MAINS TRANSFORM		
T.2	L.F O/P TRANSF		
T.3	H.F O/P TRANSF		
M.1	METER 100μA E		
LP.1	LAMP FLASHLIGHT		



RVED TO ADJUST THE VALUES OR AMEND THE CIRCUIT WITHOUT NOTICE.

DESCRIPTION	CIRC REF	P. Nº	REF.	DESCRIPTION	CIRC REF	P. Nº
ERIE 109 1% ¼W	I5	11867	C24	75pF SILVER MICA LEMCO 1510 1%	F6	12187
ERIE 108 1% ½W	I5	11868	C25	16 } PLESSEY CE 6003	F1 }	11863
ERIE 109 1% ¼W	I6	11866	C26	16 } ELECT. 350v WKG	G1 }	
ERIE 109 1% ¼W	I5	11867	C27	·1 PLESSEAL 20% 350v. DC. WKG.	G2	11860
ERIE 9 10% ½W	I3	4419	C28	·1 PLESSEAL 20% 350v. DC. WKG.	G3	11860
ERIE 9 10% ½W	I3	4419	C29	450pF TRIMMER CYLDON 26	H2	12686
BIRCH W/WOUND 2W	I1	11759	C30	3-30pF CONCENTRIC TRIMMER – MULLARD	H2	1620
			C31	16 } PLESSEY CE 6003	I1 }	11863
			C32	16 } ELECT. 350v. WKG.	I1 }	
CAPACITORS						
TRIMMER	A4	10177				
TRIMMER	A5	10177		MISCELLANEOUS		
TRIMMER	B4	10177	RV1	25K COLVERN CLR 3001/11 POT.	D6	11858
SILVER MICA LEMCO 1510 1%	B4	12187	RV2	25K COLVERN CLR 901 POT.	D5	6814
CONCENTRIC TRIMMER-MULLARD	B5	1620	S.1	FREQUENCY RANGE SELECTOR		A11694
2 GANG POLAR E24 TYPE C16 }	A3	11859	S.2	ATTENUATOR UNITS		A11696
-0C/342 }	B3		S.3	ATTENUATOR DECADE		A11695
ILVER MICA LEMCO 1510 1%	B3	12187	S.4	MAINS-ARCO-ELECTRIC 8040/BT/13 ON/OFF		12180
CONCENTRIC TRIMMER- MULLARD	B3	1620				
.ESSEAL 20%	B4	11860	W1 }	CRYSTAL B.T.H – CG6E		5871
1% SILVER MICA	B4	12191	-W4 }			
SSEY CE1619 WIRE ENDS 250v WKG.	C3	12189				
SSEAL 20%	C3	11860	V.1	12BH7		12602
SSEY CE1619 WIRE ENDS 250v.WKG.	D4	12189	V.2	EF91-6AM6		7312
UNTS JE413 ELECT. 350v D.C. WKG.	D1	7014	V.3	12AU7		11683
ARL TYPE CERAMIC	D5	4843	V.4	6BW6		8251
SSEAL 20% 350v. D.C. WKG.	D2	11860	V.5	EZ80		11986
SSEAL 20% 350v. D.C. WKG.	E3	11860				
SSEAL 20% 350v D.C. WKG.	E3	12096	T.1	MAINS TRANSFORMER		MT.355
LEMCO 1106 INSUL.5% 350v. D.C.WKG.	E4	11931	T.2	L.F O/P TRANSFORMER		MT.354
LEMCO 1106 INSUL.5% 350v. D.C.WKG.	F3	11931	T.3	H.F O/P TRANSFORMER		MT.353
CONCENTRIC TRIMMER-MULLARD	F6	1620	M.1	METER 100µA E.T.I 325		11937
SEAL 20% 350v. DC. WKG	F2	11860	LP.1	LAMP FLASHLIGHT 6·5V ·3A		879

FIRST ANGLE (ENGLISH) PROJECTION

Unlimited Dimensions to be within

No. off per Assy.

Scale | Finish | Part No.

Dr'n. | Material

Ch'd. | First | SG.81 A

Date 2·9·59 | Description | CIRCUIT DIAGRAM

DRAWING No. C 13558

ADVANCE COMPONENTS LTD.

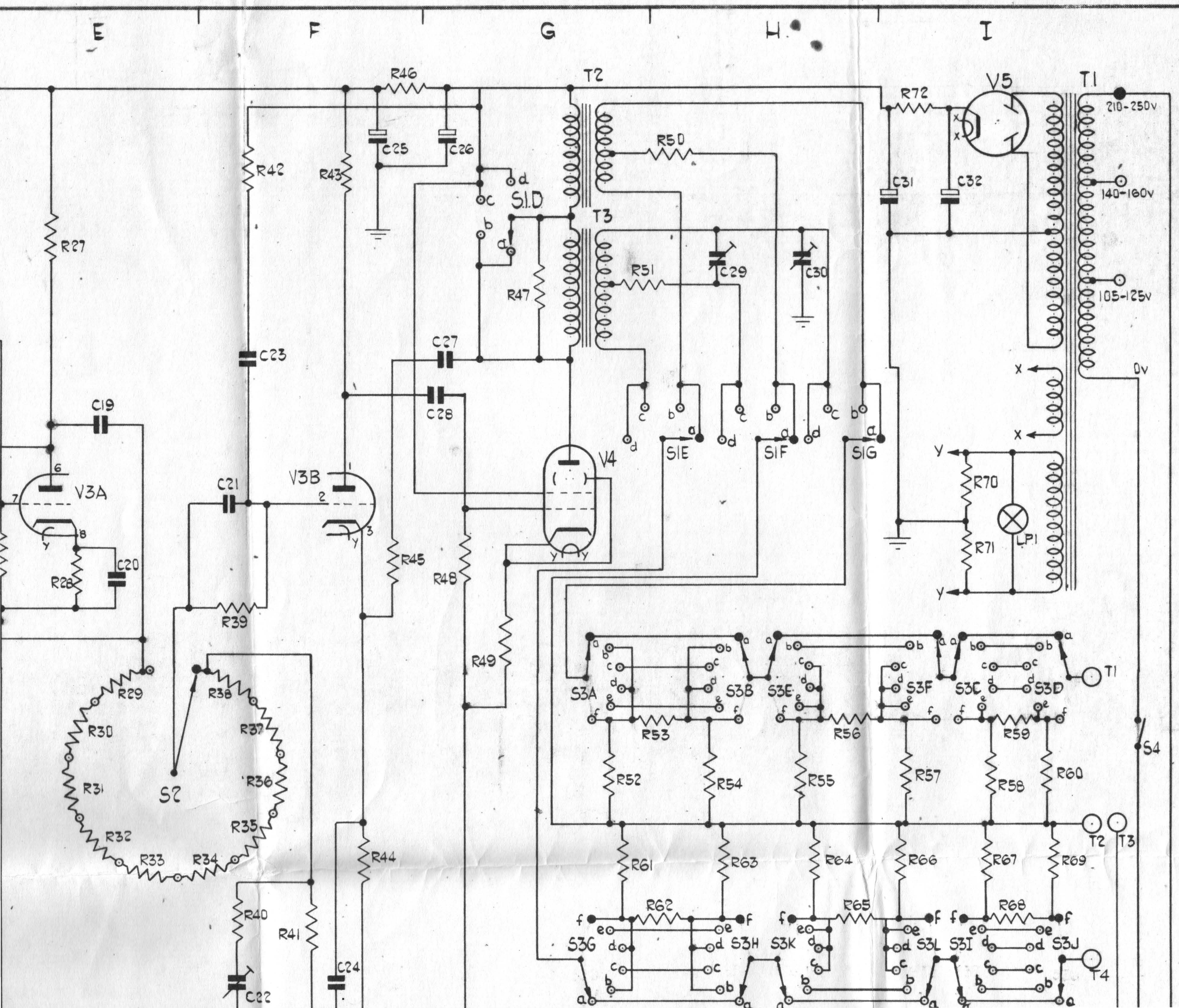
E F G H I

ALTERATION

ISSUE.1. 7·9·59

RADIO SPARES
2 MAR 1960
COMPONENTS LTD

R27 C19 V3A V3B C21 C20 R28 R39 R29 R30 R31 R32 R33 R34 R35 R36 R37 R38 S2 C22 R40 R41 C24 R44 R45 R46 R42 R43 C25 C26 C23 C27 C28 R48 R49 T2 R50 S1D T3 R47 R51 C29 C30 V4 S1E S1F S1G R72 V5 C31 C32 T1 210-250v 140-160v 105-125v 0v R70 R71 LP1 S3A S3B S3E S3F S3C S3D R53 R56 R59 R52 R54 R55 R57 R58 R60 R61 R63 R64 R66 R67 R69 R62 R65 R68 S3G S3H S3K S3L S3I S3J T4 S4



ALTERATION	
ISSUE.1.	7.9.59

DRAWING OFFICE
24 MAR 1960
ADVANCE COMPONENTS LTD.

E F G H I

ALTERATION

ISSUE.1. 7·9·59

DRAWING OFFICE
24MAR1960
ADVANCE COMPONENTS LTD.

R27 C19 V3A R28 C20 R29 R30 R31 R32 R33 R34 R35 R36 R37 R38 S2 C21 V3B R39 C23 R40 R41 C22 C24 R44 R45 R48 R49 R42 R43 R46 C25 C26 C27 C28 T2 R50 S1D T3 R47 R51 C29 C30 V4 S1E S1F S1G R72 V5 C31 C32 T1 210-250v 140-160v 105-125v 0v R70 R71 LP1 S3A S3B S3E S3F S3C S3D R53 R56 R59 R52 R54 R55 R57 R58 R60 R61 R63 R64 R66 R67 R69 R62 R65 R68 S3G S3H S3K S3L S3I S3J S4 T2 T3 T4

This package contains a genuine Philips carbon potentiometer. This product has been tested three times and complies with international standards. It is guaranteed for long life performance.

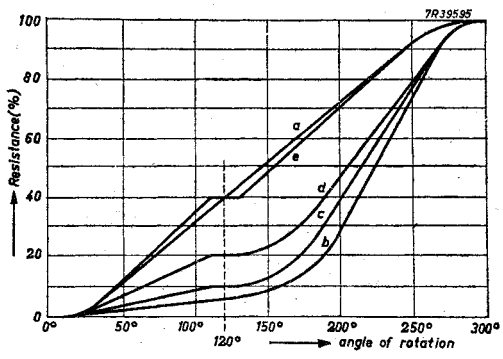
E 098 C./.. . ..

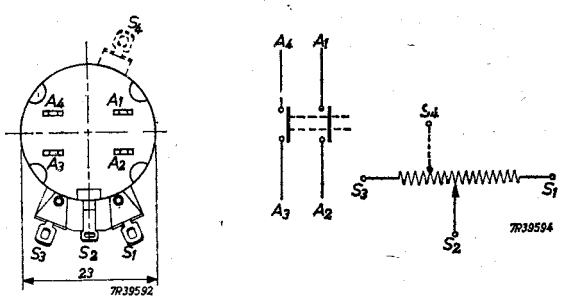
G - without switch
D - with rotary double pole switch 1.5 A, 250 V
K - with push-pull double pole switch 1 A, 250 V
L - with push-pull double pole switch 2 A, 250 V

Length of spindle in mm

C - 6 mm Ø spindle
E - 1/4" Ø spindle

Resistance	Grading	Curve
01 - 1 kΩ	linear	a
02 - 2 kΩ	linear	a
03 - 5 kΩ	linear	a
04 - 10 kΩ	linear	a
05 - 20 kΩ	linear	a
06 - 50 kΩ	linear	a
07 - 50 kΩ	logarithmic	b
08 - 100 kΩ	linear	a
09 - 100 kΩ	logarithmic	b
10 - 200 kΩ	linear	a
11 - 200 kΩ	logarithmic	b
12 - 500 kΩ	linear	a
13 - 500 kΩ	logarithmic	b
14 - 50 + 450 kΩ	logarithmic	c
15 - 1 MΩ	linear	a
16 - 1 MΩ	logarithmic	b
17 - 0.2 + 0.8 MΩ	logarithmic	d
18 - 2 MΩ	linear	a
19 - 2 MΩ	logarithmic	b
20 - 0.4 + 1.6 MΩ	logarithmic	d
22 - 0.1 + 0.9 MΩ	logarithmic	c
23 - 40 + 160 kΩ	logarithmic	d
24 - 0.4 + 0.6 MΩ	linear	e
25 - 4 + 16 kΩ	logarithmic	d
26 - 1 kΩ	logarithmic	b
27 - 2 kΩ	logarithmic	b
28 - 5 kΩ	logarithmic	b
29 - 10 kΩ	logarithmic	b
30 - 20 kΩ	logarithmic	b
32 - 0.2 + 1.8 MΩ	logarithmic	c





Push-pull switch

Rotary switch