

ADVANCE SIGNAL GENERATOR

Type E2

Including E2/E, E2/NA

INSTRUCTIONS

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CONNECTOR TYPE PL.27

This connector, which has crocodile clips at one end, is to be used for A.F. testing and I.F. alignment.

CONNECTION TO POINTS OF HIGH POTENTIAL

It must be remembered that all outputs have low resistance paths to earth. Therefore if a signal is to be injected into apparatus at a point which has high potential to earth, a blocking condenser must be inserted in series with the generator output.

MAINTENANCE

To remove the instrument from the case proceed as follows:—

REMOVE THE DOME NUT FROM THE REAR OF THE CASE :
Lay the instrument on its back and remove the four screws in the corners of the panel, each a little at a time. The panel will be lifted from the case.

To Reassemble : Lay the case on its back and replace instrument. Engage the threads of the corner screws, stand the instrument upright and carefully screw up the panel evenly, making sure that the back chassis bolt appears through its clearing hole in the case. The dome nut must then be replaced.

The ECC91 valve is in an internal screening box holding the oscillator assembly. To open this box remove the pilot lamp-bracket and undo the self-tapping screws on the edges of the box. Care must be taken not to disturb the trimmers and coil assembly. The trimmers **MUST ON NO ACCOUNT** be adjusted, as this will make the frequency calibration incorrect. The ECC91 oscillator valve may be replaced without appreciable effect on the calibration. To ensure reliable screening **ALL** screws must be replaced when the screen is refitted.

In all cases of difficulty the instrument should be returned to the factory for repair or adjustment.

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Introduction

This Generator, with its wide frequency range and accurate attenuator system, will enable measurements on selectivity and sensitivity to be made on radio and television receivers with a degree of accuracy sufficient for all practical purposes. Provision is made for external modulation with low power input up to 10 kc/s. as well as for 400 c/s. 30% internal modulation. The frequency range covers 100 kc/s. - 100 Mc/s., thus embracing television and 90 Mc/s. communications bands on fundamentals.

Instructions

MAINS VOLTAGE

The instrument is available with any of three power supplies : i.e., for input of 105-125 volts, 210-250 volts 40-100 c/s., 110-125 volts, 140-160 volts, 220 volts, 40-100 c/s., or for input of 117 volts 25-60 c/s. The instrument with 105-125 volts, 210-250 volts inputs is normally despatched with the mains transformer set to operate at 210-250 volts and the tapping must be changed for 105-125 volts. To do this, remove the disc on the underside of the case, exposing the mains transformer. Tag 2 is connected to tag 3 for 210-250 volts inputs. For 105-125 volts, remove the connection between tag 2 and tag 3. Connect tag 1 to tag 2 and tag 3 to tag 4. Replace the cover disc.

ACCESSORIES SUPPLIED WITH THE INSTRUMENT

- 1 Terminal Pad and Dummy Aerial, Type TP.1B.
- 1 Shielded R.F. lead type PL.28, complete with plug and socket.
- 1 A.F. lead, type PL.27, complete with plug and crocodile clips.

VALVES, ETC.

- 1 Valve type ECC91 Mullard (6J6).
- 1 Valve type 6SN7GT.
- 1 Valve type 6X5G. (Not used on 117v. model.)
- 1 Pilot lamp type MES 11 mm. 6.5 volts.

FREQUENCY

A signal of any frequency between 100 kc/s. and 100 Mc/s. is obtainable to an accuracy of $\pm 1\%$ by means of a directly calibrated scale and a 6, wave-band selector switch ; the bands being :

- A. 30 - 100 Mc/s.
- B. 10 - 30 Mc/s.
- C. 3 - 10 Mc/s.
- D. 1 - 3 Mc/s.
- E. 300 - 1,000 kc/s.
- F. 100 - 300 kc/s.

FULL R.F.

At the "FULL R.F." socket output is approximately one volt uncontrolled by the attenuators. For the full output the load impedance should be not less than 1,000 ohms. A cover is fitted over the "FULL R.F." socket, this is to prevent radiation from the socket which would invalidate measurements at low signal level.

R.F. ATTENUATORS

When the "ATTEN. R.F." socket is used the "FULL R.F." socket must be closed with its cover.

The signal is controlled by two attenuators. The output from the oscillator section is fed to the non-inductive "VOLTAGE OUTPUT" potentiometer. The output from this is fed to the "MULTIPLIER," a five-step attenuator calibrated: X1, X10, X100 μ V. and X1, X10, m.V. Thus, multiplying the indication of

the two controls, output varies from 1 microvolt to 100 millivolts. The output impedance is 75 ohms except on step X10 mV., when it varies from 65-75 ohms according to the setting of the "VOLTAGE OUTPUT" attenuator.

Accuracy of Step Attenuator $\pm(3\text{db} + 3\mu\text{V})$.
Accuracy of Maximum Output $\pm 3\text{db}$.

TERMINATION PAD TYPE TP.1B.

In order that the outputs referred to are obtained it is necessary for the output to be correctly terminated with a 75 ohm load. Such a load is provided by the connector type P.L.28 and the Termination Pad type T.P.1B. The following outputs are obtainable from the TP.1B.:—

1. Output impedance 37 ohms and voltage as indicated.
2. Output impedance 10 ohms and voltage one-tenth of that indicated.
3. Output impedance that of a standard all-wave dummy aerial and voltage one-tenth of that indicated.

Refer to circuit diagram for circuit of TP.1B.

At frequencies above 10 Mc/s. the connection from the pad to the receiver should be as short as possible, and not more than three inches.

AUDIO FREQUENCY

When the "MOD" switch is in the "INT" position the carrier output is modulated 30% at 400 c/s. The A.F. control, which is combined with the mains on-off switch, varies A.F. voltage (400 c/s. available at the A.F. socket) from 0-50 volts, into high impedance.

When the "MOD" switch is in the "CW-EXT" position the carrier is normally unmodulated. For external modulation inject an A.F. signal from an external source into the A.F. socket WITH THE A.F. CONTROL AT **MAXIMUM**. External modulation is obtainable from 10 c/s. to 10 kc/s.

The maximum undistorted modulation is 80% at low frequencies, falling off as the frequency rises.

For modulation frequencies less than 1/50th of the carrier maximum modulation is 80% at 4,000 c/s., falling to 40% at 10 kc/s.

Modulation depth % $\simeq (15 \times \text{input volts})$.
Input impedance = 50,000 ohms.

CIRCUIT CODE (cont.)

C 16.	....	1,000pF	....	....	....	....	± 10% Mica
C 17.	....	1,000pF	....	....	....	....	" "
C 18.	....	0.005μF	....	....	....	....	" "
C 19.	....	0.005μF	....	....	....	....	" "
C 20.	....	0.005μF	....	....	....	....	" "
C 21.	....	40pF	....	....	....	....	± 20% Ceramic
C 22.	....	16μF	....	....	....	....	Electrolytic
C 23.	....	24μF	....	....	....	....	"
C 24.	....	16μF	....	....	....	....	"
C 25.	....	200pF	....	....	....	....	± 10% Mica

L 1.	Coil Osc.	L 5c.	Coil Coupling.
L 1c.	Coil Coupling.	L 6.	Coil Osc.
L 2.	Coil Osc.	L 6c.	Coil Coupling.
L 2c.	Coil Coupling.	L 7.	H.T. R.F. Choke.
L 3.	Coil Osc.	L 8.	H.T. R.F. Choke
L 3c.	Coil Coupling.	L 9.	L.T. R.F. Choke.
L 4.	Coil Osc.	L 10.	L.T. R.F. Choke.
L 4c.	Coil Coupling.	L 11.	Mains R.F. Choke.
L 5.	Coil Osc.	L 12.	Dummy Aerial Inductance.

S1.A	} Band	S2.A	} Mod.	
S1.B		S2.B		} Switch
S1.C		S.3		

V 1.	ECC91—R.F. Osc.	V 3.	6X5G—Rectifier.**
V 2.	6SN7GT—Modulator.		

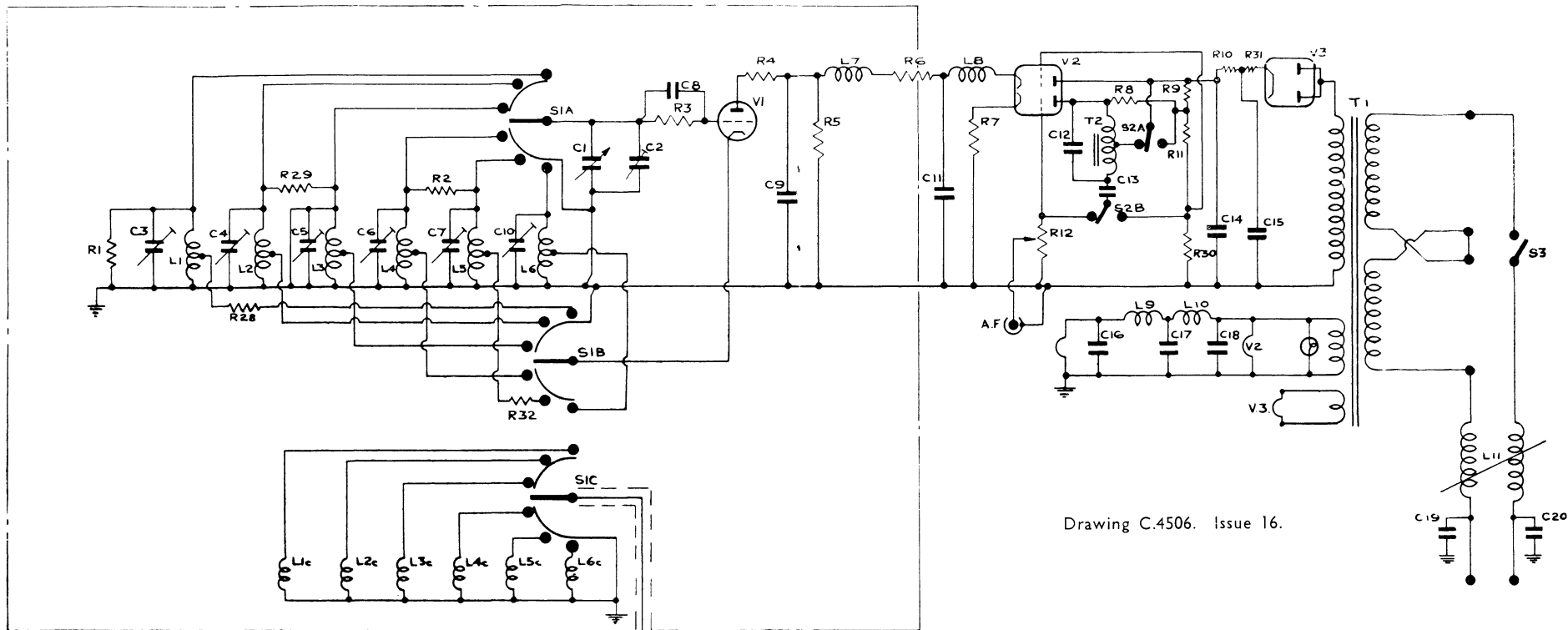
T 1.	Mains Transformer.	T 2.	Modulator Transformer.
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** Not used for 117 volts 25-60 c/s. supply.

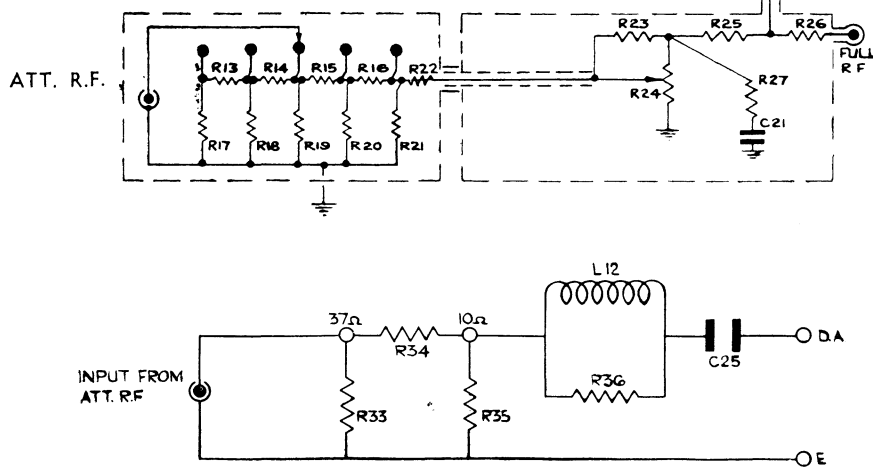
CIRCUIT CODE

R 1.	39,000 ohms	± 10% ¼W.	R 18.	91 ohms	± 5% ¼W.
R 2.	4,700	" ± 20% "	R 19.	91	" " "
R 3.	15,000	" ± 10% "	R 20.	91	" " "
R 4.	22	" ± 20% "	R 21.	220	" " "
R 5.	33,000	" " "	R 22.	120	" " "
R 6.	1,000	" " "	R 23.	180	" " "
R 7.	3,300	" ± 10% "	R 24.	91	" Low Inductance Potentiometer 3W
R 8.	100,000	" " "	R 25.	100	" ± 5% ¼W.
*R 9.	100,000	" " "	R 26.	56	" ± 10% "
R 10.	1,000	" ± 10% ½W.	R 27.	82	" ± 5% "
R 11.	2.7M	" ± 10% ¼W.	R 28.	1,000	" ± 10% "
R 12.	50,000	" Carbon Potentiometer	R 29.	100,000	" " "
R 13.	750	" ± 5% ¼W.	R 30.	1M	" ± 10% "
R 14.	750	" " "	R 31.	560Ω	" ± 20% "
R 15.	750	" " "	R 32.	22Ω	" ± 10% "
R 16.	750	" " "	R 33.	270	" ± 1% ⅛W.
R 17.	82	" " "	R 34.	100	" ± 1% "
* This value may be adjusted.			R 35.	11	" ± 2% "
			R 36.	390	" ± 10% ¼W.

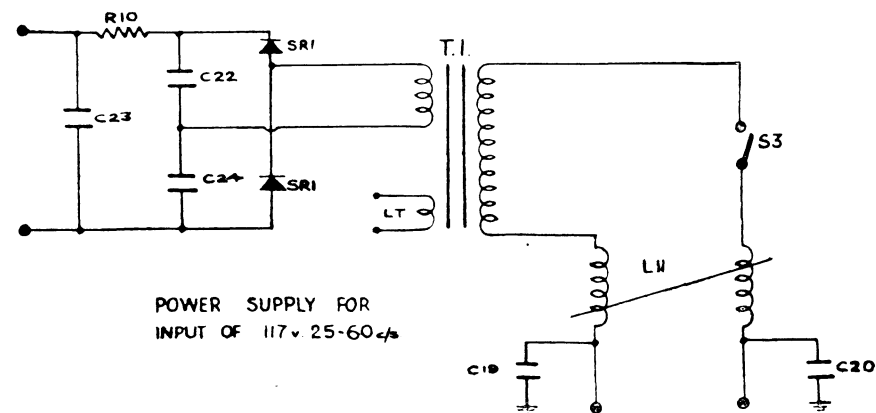
C 1.	....	528pF	....	....	....	Variable Condenser
C 2.	....		....	....	....	Wire Trimmer
C 3.	....		....	....	....	" "
C 4.	....		....	....	....	" "
C 5.	....		....	....	....	" "
C 6.	....		....	....	....	" "
C 7.	....		....	....	....	" "
C 8.	....	100pF	....	....	....	± 5% Mica
C 9.	....	1,000pF	....	....	....	± 20% "
C 10.	....		....	....	....	Wire Trimmer
C 11.	....	1,000pF	....	....	....	± 20% Mica
C 12.	....	0.05μF	....	....	....	Paper tubular 500V wkg.
C 13.	....	0.05μF	....	....	....	" " " "
C 14.	....	16μF	....	....	....	350V Electrolytic
C 15.	....	16μF	....	....	....	" "



Drawing C.4506. Issue 16.



NOTE.—Every effort is made to keep this drawing up to date, but the right is reserved to adjust the values or amend the circuit without notice.



POWER SUPPLY FOR
INPUT OF 117 V 25-60 cps

CIRCUIT DIAGRAM T.P.I.B. DRAWING A.S.K. 1263. ISSUE 1.