

"TRADER" SERVICE SHEET
1299

THE Ferguson 383A "Fleur-de-Lis" is a 3-band A.M./F.M. table receiver designed to operate from A.C. mains of 200-250V, 50-60c/s. It employs an internal F.M. aerial and an internal ferrite rod A.M. aerial which is rotatable by means of a control at the rear of the cabinet.

It is fitted with five Mullard valves and a metal rectifier. Waveband ranges are: A.M., 188-545m, 1,160-1,940m; F.M., 88-101Mc/s.

Model 385RG "Favourite" is a 4-speed auto-radiogram version of the 383A. Except for the addition of an internal

speaker muting switch, it employs an identical chassis to that used in the 383A.

Model 382U "Firefly" is an A.C./D.C. version of the 383A. The differences between these two models are explained under "Associated Models" in column 6 below.

Release date, all models, August 1956.
Original prices: 383A, £18 19s 1d; 385RG, £40 3s 7d; 382U, £15 3s 3d.
Purchase tax extra.

CIRCUIT DESCRIPTION

A.M. aerial input is coupled via the common impedance of C17 to aerial tuning circuits L9, C18 (M.W.) and L9, loading coil L8, and C18 (L.W.). These circuits are coupled via I.F. transformer winding L7 to

FERGUSON

Covering A.M./F.M. Table Models 38

section b of V2 which operates as A.M. mixer.

V2a operates as A.M. oscillator whose output is externally coupled to V2b. Oscillator grid coil L10 is tuned by C26 for both M.W. and L.W. operation. Parallel trimming by C27 (M.W.) and C27, C28, C29 (L.W.). Series tracking by C30 (M.W. and L.W.). Reaction coupling from oscillator anode via C31, L11.

V3 is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings L14, L15 and L19, L20.

A.M. intermediate frequency 470kc/s.

Diode section c of triple diode triode valve V4 operates as A.M. signal detector. A.F. signal in its rectified output is developed across volume control R23, and is passed via C50 to triode section d of V4 which operates

COMPONENT VALUES AND LOCALIZATION

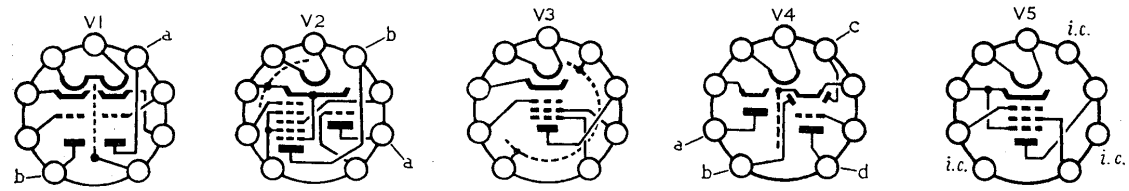
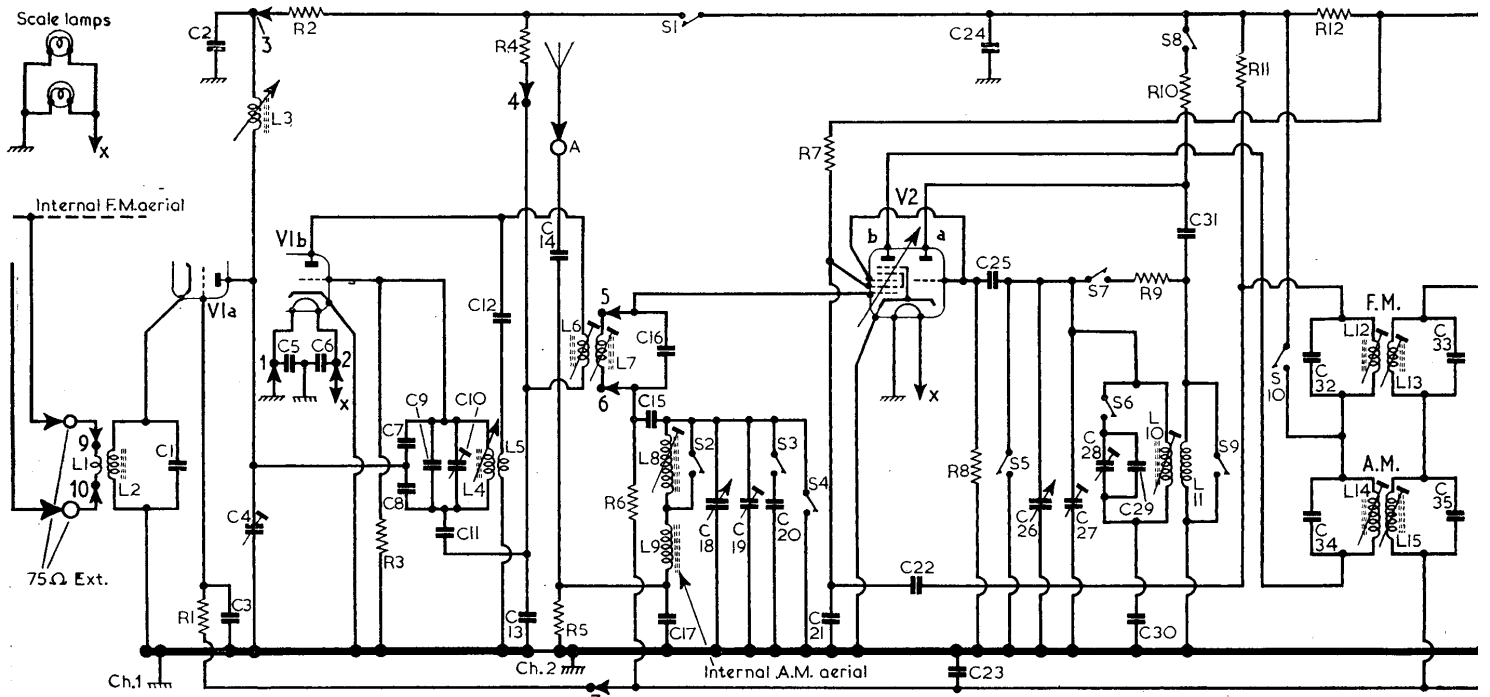
Capacitors		C14		A1		C28		H2		C42		B1		C56		C1	
C1	20pF	A1	C15	500pF	H3	C29	50pF	H2	C43	220pF	F3	C57	32μF	C1	C58	40μF	C1
C2	1,500pF	A1	C16	220pF	H3	C30	375pF	H2	C44	100pF	F3	C58	40μF	C1			
C3	220pF	A1	C17	33pF	H3	C31	390pF	H2	C45	400pF	F3						
C4	10pF	A1	C18	0.003μF	A1	C32	220pF	H3	C46	4μF	F2						
C5	0.001μF	A1	C19	528pF	G3	C33	12pF	B1	C47	500pF	G2						
C6	0.001μF	A1	C20	50pF	H2	C34	15pF	B1	C48	0.02μF	H2						
C7	10pF	A1	C21	165pF	H3	C35	220pF	B1	C49	0.01μF	E2						
C8	10pF	A1	C22	50pF	H2	C36	220pF	B1	C50	100pF	E2						
C9 ¹	18.7pF	A1	C23	0.005μF	H3	C37	0.005μF	G3	C51	0.02μF	F3						
C10	10pF	A1	C24	0.1μF	G3	C38	0.005μF	G3	C52	2,500pF	F3						
C11	10pF	A1	C25	0.005μF	H2	C39	12pF	B1	C53	0.001μF	F3						
C12	25pF	A1	C26	100pF	H3	C40	47pF	B1	C54	0.004μF	C1						
C13	85pF	A1	C27	528pF	G3	C41	50μF	F3	C55	50μF	F3						
				50pF	G2		220pF	B1		40μF	C1						

Resistors		A1		H3		A1		H3		G3		H3		H3		H2	
R1	680kΩ	A1	R2	10kΩ	H3	R3	680kΩ	A1	R4	15kΩ	H3	R5	3.3kΩ	A1	R6	2.2MΩ	H3
R7	47kΩ	G3	R8	47kΩ	H3	R9	68kΩ	H2									

¹Two capacitors, 4.7pF + 14pF, in parallel.

²May be 0.003μF.

³Approximate D.C. resistance.



Circuit diagram of the Fe be shown connected to the ferrite rod A.M. aerial at aerial carries both M.W. differences in early version showing the principal di app

383A Series

383A, 382U and 4-speed ARG Model 385RG

as A.F. amplifier. I.F. filtering by C43, R16, C49.

D.C. potential developed across R23 is fed back as bias via R17 to V2b and V3, giving automatic gain control.

Provision is made for the connection of a gramophone pick-up across the volume control circuit via R21 and switch S14, which closes in the gram position of the band control. S9, S11 also close in this position to prevent radio break-through.

Resistance-capacitance coupling by R25, C52 and R26 between V4d and pentode output valve V5. Negative feed-back tone correction is introduced by feeding back a proportion of the voltage across T1 secondary winding c, that developed across R32, to V4d grid circuit. Additional tone correction by C53 across T1 primary winding b.

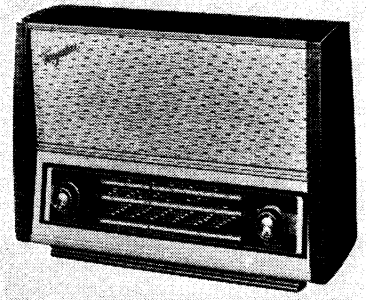
H.T. current is supplied by full-wave

bridge-connected rectifier MR1. Smoothing by electrolytic capacitors C55, C56, C57. Residual hum is neutralized by passing H.T. current through section a of T1 primary winding.

Operation on F.M.

75Ω balanced F.M. aerial input via coupling coils L1, L2 to earthed-grid R.F. amplifier V1a. Output of V1a, as developed across R.F. tuning circuit L3, C4, is coupled via C7, C8 to V1b which operates as oscillator/mixer valve.

Tuned oscillator grid circuit is formed by L4, C7, C8, C9, C10. Reaction coupling from oscillator anode via C12, L5. To prevent oscillator voltages from passing into the R.F. and aerial circuits and causing radiation interference, a bridge neutralizing circuit is formed between C7, C8, C11, C13 and the grid/



Appearance of the Ferguson 383A.

cathode inter-electrode capacitance of V1b. V1a anode is thus at zero oscillator potential. V2b and V3 form the two-valve F.M. intermediate frequency amplifier, which is coupled by L6, L7; L12, L13 and discriminator transformer L16, L17, L18 to diode sections a and b of V4 which operate in a ratio detector discriminator circuit.

F.M. intermediate frequency 10.7Mc/s.

Inter-electrode capacitances of V2b and V3 are neutralized by C22, C21 and C37, C36 respectively. A.F. output of ratio detector is developed across C40 and fed via de-emphasis circuit R19, C46 to volume control circuit.

Limiting is performed by R17 in V3 control grid circuit, S11 closing for F.M. operation; and by the fly-wheel effect of D.C. reservoir capacitor C45 in the ratio detector circuit. Limiting voltage developed across R17 is also fed back as an F.M. A.G.C. bias to V1b and V2b.

ASSOCIATED MODELS

385RG.—This is a 4-speed auto-radiogram employing a Garrard RC128/4 changer with a turnover crystal pick-up. Except for the addition of an internal speaker muting switch, the 385RG employs an identical chassis to that in the 383A.

382U.—This is an A.C./D.C. version of the 383A. The main differences between the two models are confined to the output and power supply stages. A diagram showing this section of the circuit appears at the head of columns 4 and 5 overleaf.

Other differences are as follows. R7 is 15kΩ, R10 is 15kΩ. C52 is 0.01μF. R28 is 270Ω. R31 and R32 are omitted and the lower end of R23 is connected to chassis. 0.02μF isolating capacitors are connected in series with the earth socket and the earthy pick-up socket. An 0.002μF capacitor is connected in series with the live pick-up socket.

DIVERGENCIES

The following differences occur between the sample receiver on which this Service Sheet was prepared and earlier versions.

In the A.M. aerial tuning circuit, the ferrite rod internal aerial carries both a M.W. and a L.W. winding, and a trimmer is connected across C20. These changes are indicated in the diagram below.

(Continued col. 1 overleaf)

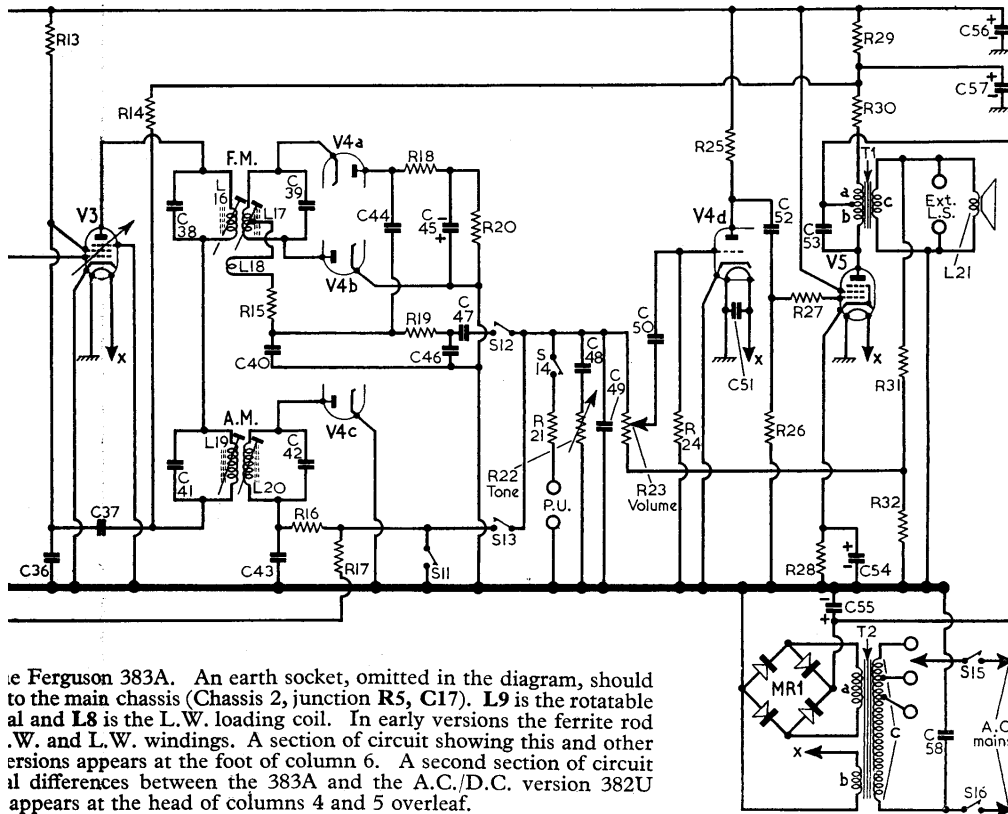
NOTATIONS

R10	27kΩ	H3	R24	6.8MΩ	F3	L4	—	A1	L18	—	B1
R11	3.3kΩ	G3	R25	220kΩ	F3	L5	—	A1	L19	5.5	B1
R12	1kΩ	G3	R26	470kΩ	F2	L6	—	A1	L20	5.5	B1
R13	47kΩ	G3	R27	4.7kΩ	F3	L7	—	A1	L21	2.5	—
R14	3.3kΩ	G3	R28	150Ω	F3	L8	—	A1	Miscellaneous ³		
R15	68Ω	G3	R29	680Ω	F2	L9	15.0	A1			
R16	100kΩ	F3	R30	820Ω	C1	L10	2.0	H2	T1	a	8.0
R17	2.2MΩ	H3	R31	820Ω	C1	L11	—	H2	T1	b	450.0
R18	820Ω	H3	R32	82Ω	E2	L12	—	B1	T1	c	—
R19	100kΩ	G2	Coils ³			L13	—	B1	T2	a	100.0
R20	27kΩ	F2	L1	—	A1	L14	5.5	B1	T2	b	—
R21 ⁵	470kΩ	H3	L2	—	A1	L15	5.5	B1	T2	c	38.0
R22	250kΩ	E2	L3	—	A1	L16	—	B1	MR1 ⁴	B250C75	E2
R23	500kΩ	E2				L17	—	B1			

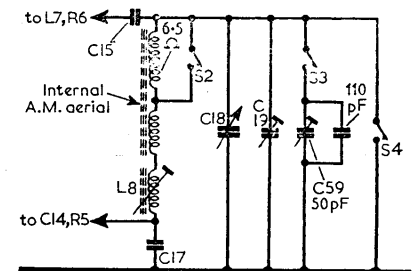
Resistance in ohms.

³Siemens

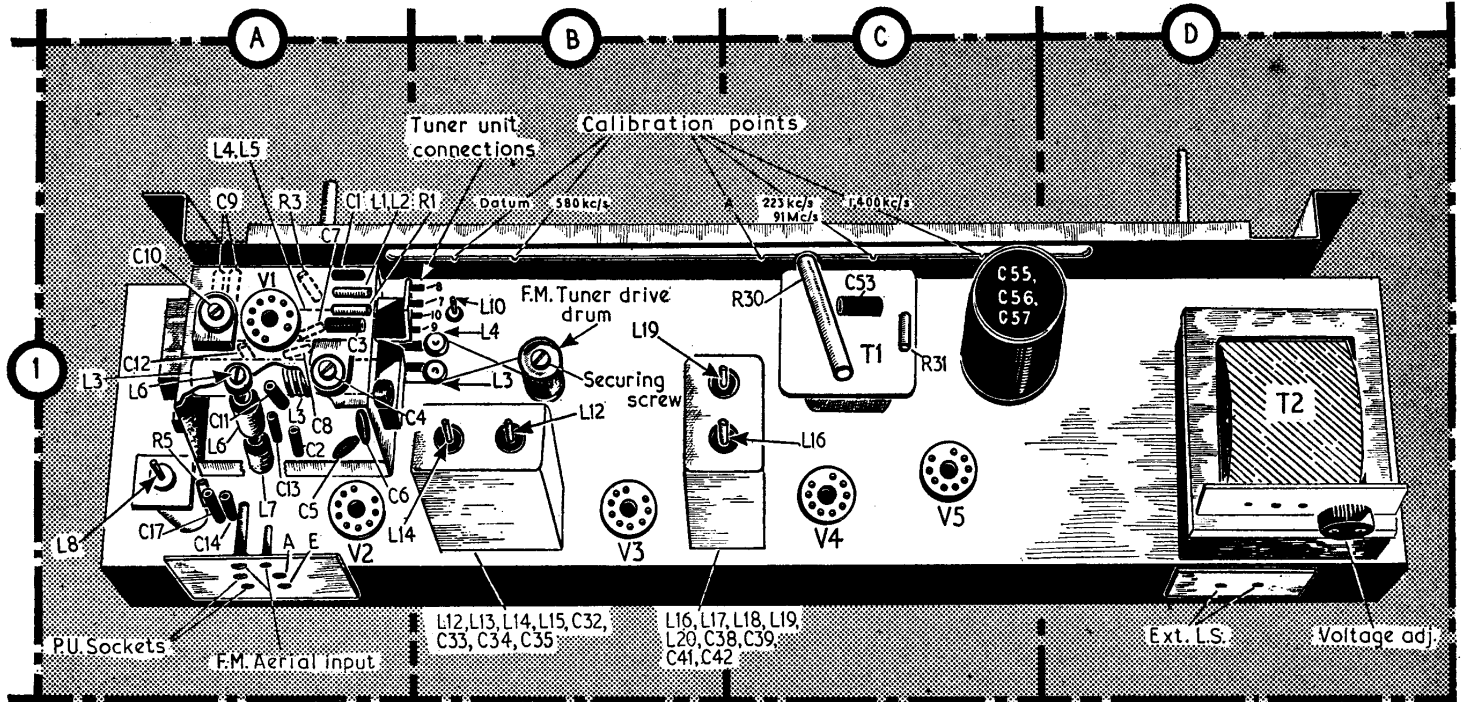
⁴May be 120kΩ; 120kΩ in model 382U.



in the Ferguson 383A. An earth socket, omitted in the diagram, should be connected to the main chassis (Chassis 2, junction R5, C17). L9 is the rotatable L.W. loading coil. In early versions the ferrite rod internal aerial carries both a M.W. and a L.W. winding. A section of circuit showing this and other differences appears at the foot of column 6. A second section of circuit showing differences between the 383A and the A.C./D.C. version 382U appears at the head of columns 4 and 5 overleaf.



Section of circuit showing differences in the A.M. aerial stage in early versions.



Plan illustration of chassis. The screening cover of the F.M. tuner unit in location A1 is removed and the chassis broken away to reveal hidden components.

Divergencies—continued

The top of C49 is connected to the junction of R16, S13 instead of to the top of R23. C48 is 0.003µF. R27 is omitted, C52, R26 being connected direct to V5 control grid.

GENERAL NOTES

Switches.—S1-S14 are the band/gram switches ganged in a single rotary unit beneath the chassis. This unit is indicated in the under-chassis illustration (location reference H3) and the switch contacts are identified in the diagram in column 4.

The associated switch table indicates the switch operations in the four control settings, starting with the control knob turned fully anti-clockwise. A dash indicates open, and C, closed.

A.M. Drive Cord.—About 48in of nylon-braided glass yarn is required for a new tuning drive cord. It should be run as indicated in the sketch of the tuning drive systems (foot of

columns 5, 6), starting with the gang at maximum capacitance and securing one end of the cord in the lower notch in the gang drum.

F.M. Drive Cord.—Should a breakage occur in any section of the F.M. drive cord a complete drive cord and core assembly should be obtained from the manufacturers to replace the broken one.

The new cord assembly can be inserted in the F.M. tuner unit by removing the two spindles with pulleys at the left-hand end of the F.M. tuner (viewed from rear of main chassis), and inserting the core with its slotted end outward into the left-hand end of L4, L5 former. The second core should then be inserted in the left-hand end of L3 former, and the pulley spindles replaced. The free ends of the F.M. drive cord may then be run as indicated in the sketch of the tuning drive systems at the foot of columns 5 and 6.

Scale Lamps.—Those fitted in the A.C. models are 6.3V, 0.3A lamps with small clear spherical

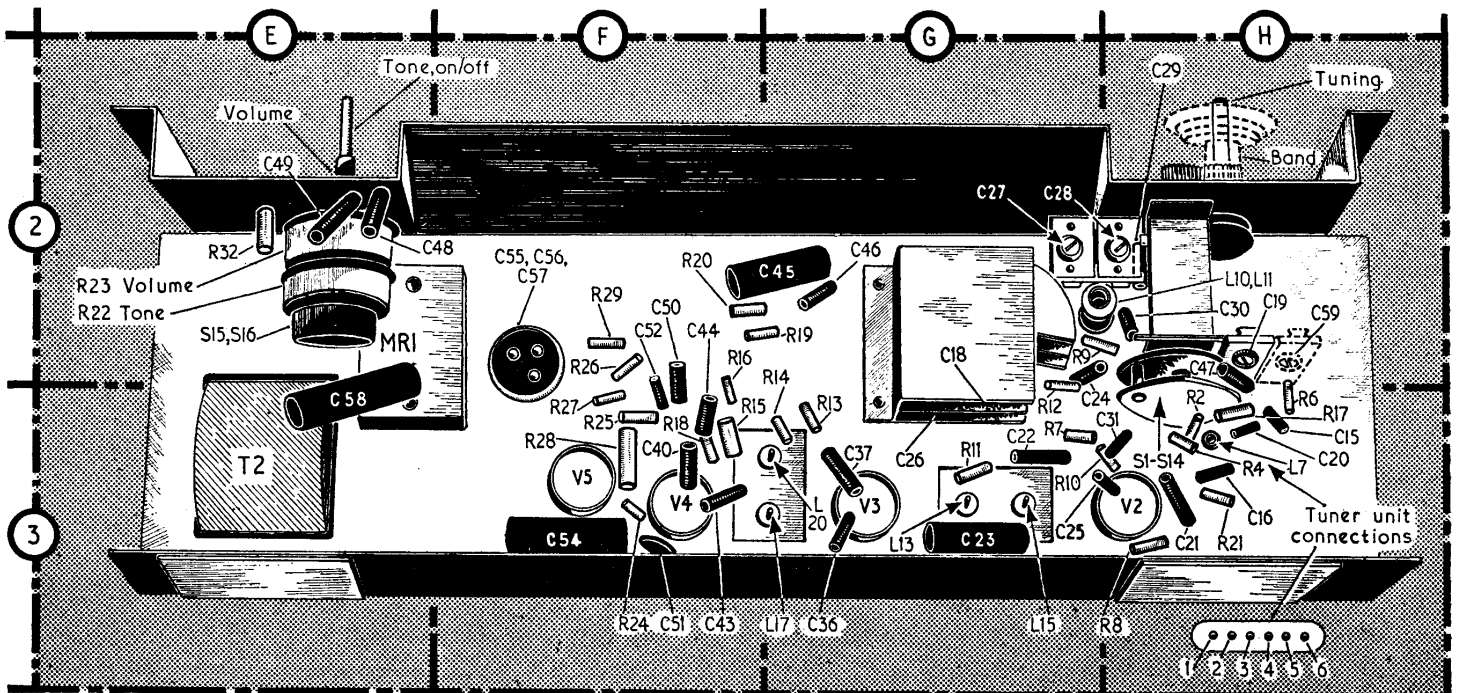
bulbs and M.E.S. bases. In the A.C./D.C. model 382U either 22V, 0.1A lamps (each shunted with thermistor) or 12V, 0.1A lamps (single thermistor shunting both lamps) are fitted.

CIRCUIT ALIGNMENT

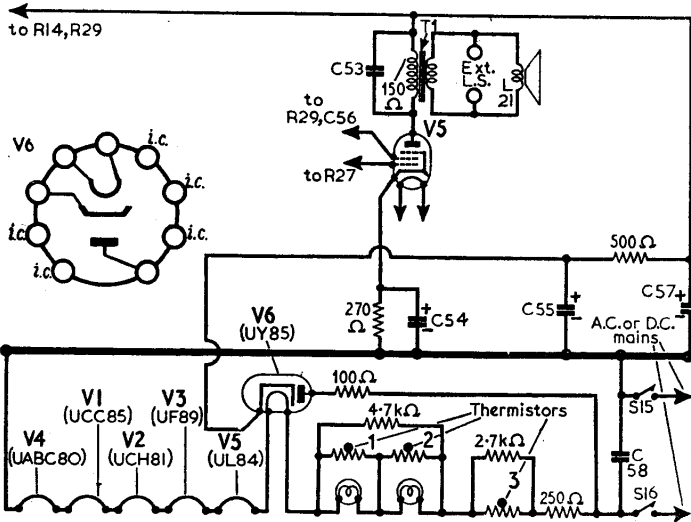
Equipment Required.—An accurately calibrated A.M./F.M. signal generator with an output impedance of 75Ω and covering the frequencies of 200-1,500kc/s (30% modulated), 10.7Mc/s (deviated by 25kc/s) and 91Mc/s (deviated by 25kc/s); an 0-250mW output meter; an 0.01µF capacitor; a 500pF capacitor.

A.M. Stages

1.—Switch receiver to M.W. and turn gang to minimum capacitance. Connect sound output meter across external speaker sockets. Connect signal generator output, via the 0.01µF capaci-



Underside illustration of chassis. F.M. tuner connections are identified here in location H3 and in location B1 in the plan view.



Section of circuit showing differences in the power supply section of the 382U as compared with the 383A. Thermistors 1, 2 and 3 are Varite type V1010. Scale lamps are rated at 22V, 0.1A. In some models the lamps are rated at 12V, 0.1A and are shunted by a 4.7kΩ resistor and a single V1010 thermistor.

- tor in the live lead, between chassis and control grid (pin 2) of V2b.
- 2.—Feed in a modulated 470kc/s signal and adjust the cores of L20 (location reference G3), L19 (B1), L15 (G3) and L14 (B1) for maximum output, reducing the output of the signal generator as the circuits come into line to prevent A.G.C. operation.
 - 3.—As the tuning scale is fixed to the cabinet, calibration points are marked on the scale backing by means of a series of notches on the backing plate itself. These calibration notches are identified in the plan illustration of the chassis (location references B1, C1). Check that with the gang at maximum capacitance the cursor coincides with the datum point on the scale backing plate.
 - 4.—Switch receiver to M.W. and loosely couple output of signal generator via a loop of wire to ferrite rod aerial L9.
 - 5.—Tune receiver to 1,400kc/s, feed in a 1,400kc/s signal and adjust C27 (G2) and C19 (H2) for maximum output.
 - 6.—Tune receiver to 580kc/s, feed in a 580kc/s

- 7.—Repeat the adjustments in operations 5 and 6.
- 8.—Switch receiver to L.W., tune to 223kc/s, feed in a 223kc/s signal and adjust C28 (H2) for maximum output. In receivers fitted with C59 (H2) this should also be adjusted for maximum output. In receivers not fitted with C59, the core of L8 (A1) should be adjusted for maximum output.

F.M. Stages

- 9.—Switch receiver to F.M. and turn gang to minimum capacitance. Connect output of signal generator, via the 0.01μF capacitor in the live lead, between chassis and control grid (pin 2) of V3. When making following adjustments, adjust output of signal generator to maintain 100mW on output meter.
- 10.—Feed in a 10.7Mc/s signal deviated by ±25kc/s and adjust the cores of L17 (G3), L16 (B1) for maximum audio output.
- 11.—Transfer live signal generator lead with 0.01μF capacitor to control grid (pin 2) of V2b. Adjust the cores of L13 (G3) and L12 (B1) for maximum audio output.
- 12.—Transfer live signal generator lead, via the 500pF capacitor, to tuner unit connection 3 (H2). Adjust the cores of L7 (H3) and L6 (A1) for maximum audio output.
- 13.—Transfer signal generator leads, discarding 500pF capacitor, to F.M. aerial sockets. Tune receiver to calibration point A (centre notch) on plate (C1), and holding the tuning drive in this position, slacken the securing screw on the F.M. tuner drive drum (B1) and turn the drum fully anti-clockwise.
- 14.—Tighten securing screw, making sure that F.M. drive cord is still secured under screw washer and that the F.M. drive cord tension is maintained.

- 15.—Turn gang to maximum capacitance, feed in a 91Mc/s signal, deviated by ±25kc/s, and adjust C10 (A1) for maximum audio output. Do not subsequently readjust C10 unless operations 14, 15, 16 and 17 are repeated in full.
- 16.—Slacken securing screw on the F.M. tuner drive drum and rotate tuning control until cursor coincides with 91Mc/s calibration point on scale backing plate.
- 17.—Rotate F.M. tuner drive drum by hand until the 91Mc/s is received and then tighten securing screw, checking drive cord tension as in operation 14. Finally, adjust C4 (A1) for maximum audio output at 91Mc/s.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturers' information. With the A.C. models, they were measured with the receiver operating from A.C. mains of 225V, and with the voltage adjustment set to the 220-230V tapping. With the A.C./D.C. model, they were measured with the receiver operating from A.C. mains of 240V, and with the voltage adjustment set to the 230-250V tapping. Except where otherwise indicated, the receiver was switched to M.W.

Voltages were measured on the 10V, 250V and 1,000V ranges of a Model 8 Avometer, chassis being the negative connection in every case.

A.C. Models

Valve	Anode		Screen	
	V	mA	V	mA
V1 ECC85	a ..	135*	6.5*	—
	b ..	148†	4.5*	—
V2 ECH81	a ..	95	5.0	—
	b ..	230	1.9	65
V3 EF89	..	215	9.7	80
V4 EABC80	a-c ..	—	—	—
	d ..	80	0.7	—
V5 EL84‡	..	258	38.0	238
MR1 B250C75	..	240§	—	—

*Receiver switched to F.M.
†Receiver switched F.M.; connect meter to V1b anode via 2MΩ resistor; switch meter to 100V range and multiply reading by two.
‡Cathode voltage 6.8V.
§A.C. reading measured across winding a on T2; total H.T. current 62mA (A.M.), 73mA (F.M.).

A.C./D.C. Model

Valve	Anode		Screen	
	V	mA	V	mA
V1 UCC85	a ..	101*	5.0*	—
	b ..	110†	3.0*	—
V2 UCH81	a ..	94	5.3	—
	b ..	169	3.1	85
V3 UF89	..	188	8.4	70
V4 UABC80 (d)	..	73	0.5	—
V5 UL84‡	..	205	47.0	180
V6 UY85	..	232§	—	—

*Receiver switched to F.M.
†Receiver switched to F.M.; connect meter to V1b anode via 2MΩ resistor; switch meter to 100V range and multiply reading by two.
‡A.C. reading; total cathode current 76mA (A.M.), 78mA (F.M.).
§Cathode 13.7V

Switch Table and Diagram

Switch	Gram	F.M.	M.W.	L.W.
S1	—	C	—	—
S2	—	C	—	—
S3	—	C	—	—
S4	—	C	—	—
S5	—	C	—	—
S6	—	C	—	—
S7	—	C	—	—
S8	—	C	—	—
S9	C	C	C	C
S10	—	C	—	—
S11	—	C	—	—
S12	—	C	—	—
S13	—	C	—	—
S14	C	—	—	—

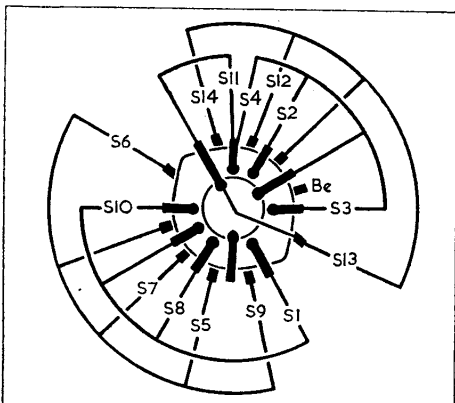
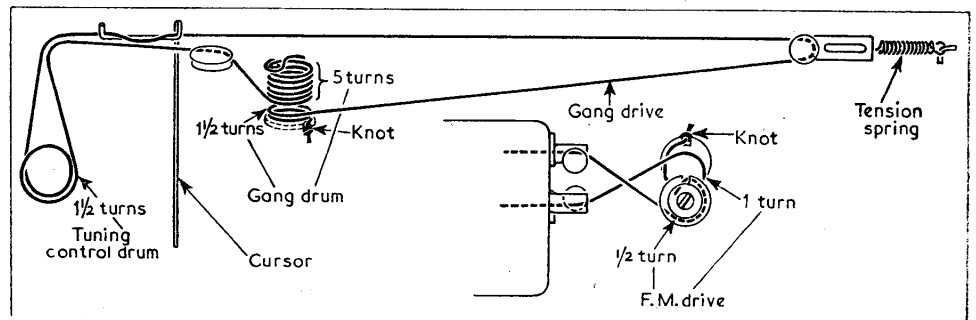


Diagram of band/gram switch unit.



Sketch of A.M. and F.M. tuning drive systems as seen from rear of upright chassis.