

MARCONIPHONE

THE GREATEST

Marconi

NAME IN RADIO

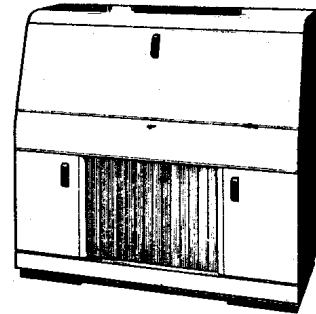
SERVICE DATA

ISSUE 1

MODEL ARG28AE

6 - VALVE CONSOLE AUTO-RADIOGRAM
FOR A.C. MAINS

MODEL ARG28AE



SPECIFICATION

PHYSICAL.

Height 36 inches (90.8 cm) } Overall.
Width 38 inches (96.52 cm) }
Depth 17½ inches (44.45 cm) }
Weight 96 lb. (43.58 kg.) }

MAINS SUPPLY AND CONSUMPTION.

100-130, 140-160 and 200-250 volts,
50 cycles A.C. only.

Consumption - 44 watts on Radio
52 watts on Gram.

VALVES.

V1 Z152 R.F. Amplifier.
V2 X150 Frequency Changer.
V3 W150 I.F. Amplifier.
V4 DH150 Detector, A.G.C. Rectifier
and A.F. Amplifier.
V5 N150 Output.
V6 U150 H.T. Rectifier.

SCALE LAMPS.

Two - 6.5 volts, 0.3 amp.

RATED OUTPUT.

4.5 watts maximum.

WAVE RANGES.

1 13.5 - 20.0 metres (22.22-150 Mc/s)
2 20.0 - 34.0 metres (15.00-8.82 Mc/s)
3 34.0 - 100 metres (8.82-3.0 Mc/s)
M 185 - 575 metres (1,622-521.7 kc/s)
L 725 - 2,000 metres (413.8-150 kc/s).

INTERMEDIATE FREQUENCY.

470 kc/s.

LOUDSPEAKER.

A 10-inch diameter, permanent magnet, moving coil type. The speech coil has a D.C. resistance of 2.25 ohms and an impedance of 3 ohms at 1,000 cycles.

EXTERNAL LOUDSPEAKER.

Sockets are provided at the rear of the instrument for connection of an additional low resistance loudspeaker. Required loudspeaker(s) selected by switch.

PICK-UP.

Type No.13 pick-up; D.C. resistance of coil 1.3 ohms.

MOTOR.

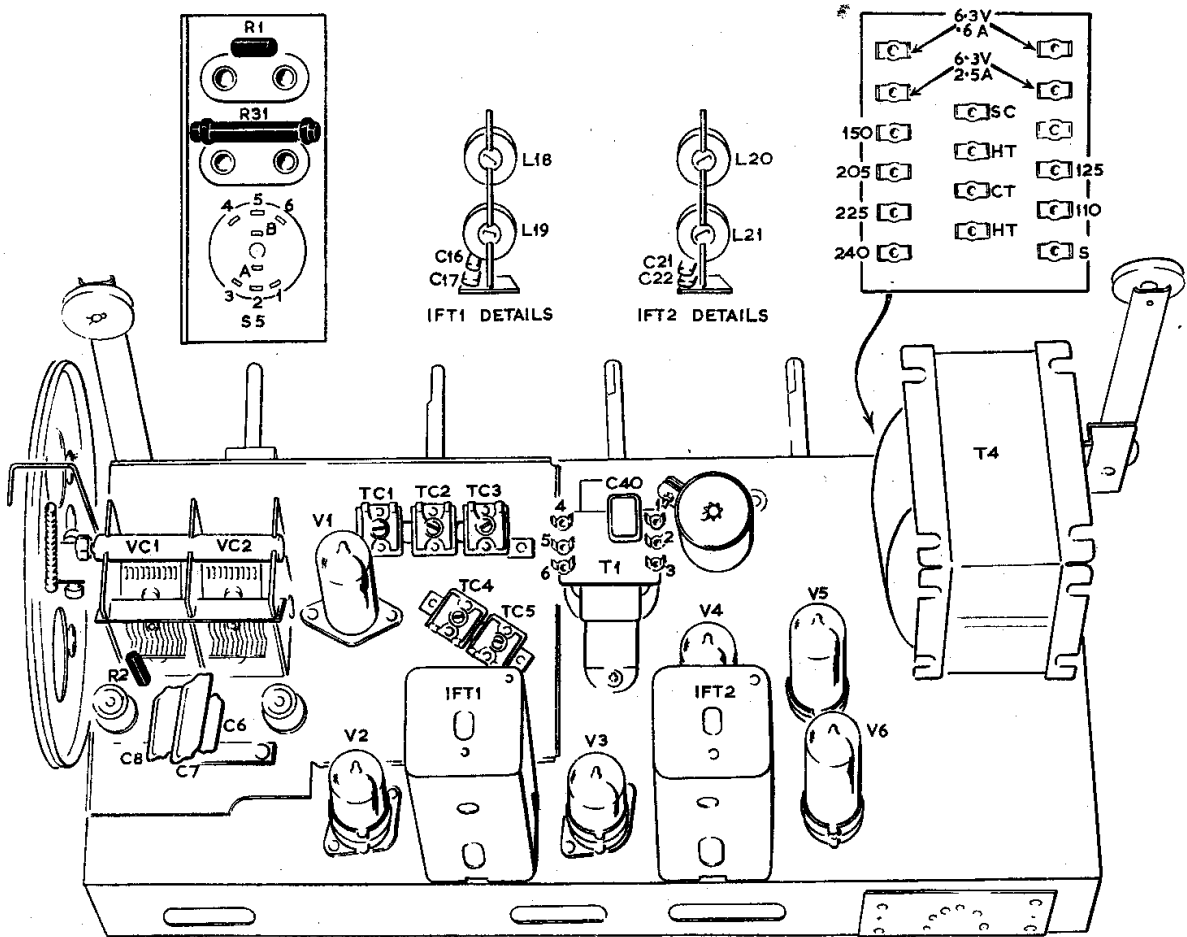
Type No.2 Synchronous rim-drive motor,
or
No.2 Squirrel Cage rim-drive motor.

AUTO-MECHANISM.

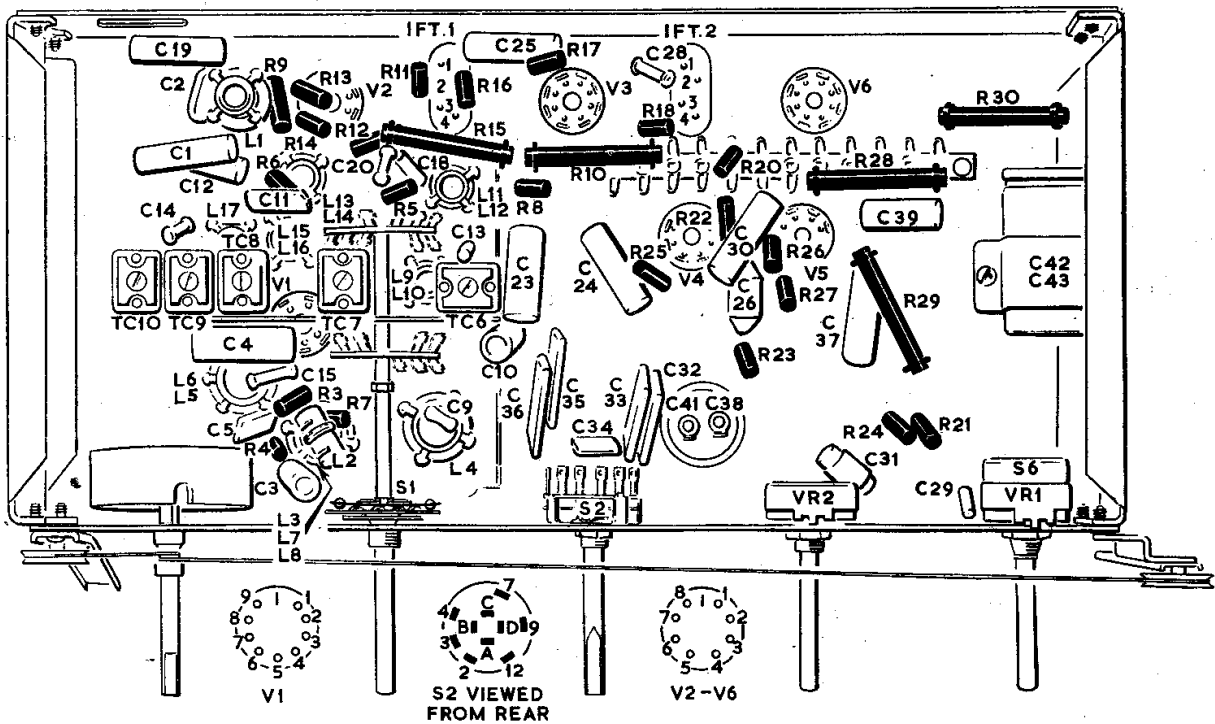
The auto-changing mechanism, type No.45000F or 47200AH (squirrel cage) plays one side of each of up to ten 10-inch or 12-inch records.

AERIAL.

An internal plate aerial is fitted for use on M.W. and L.W. bands.

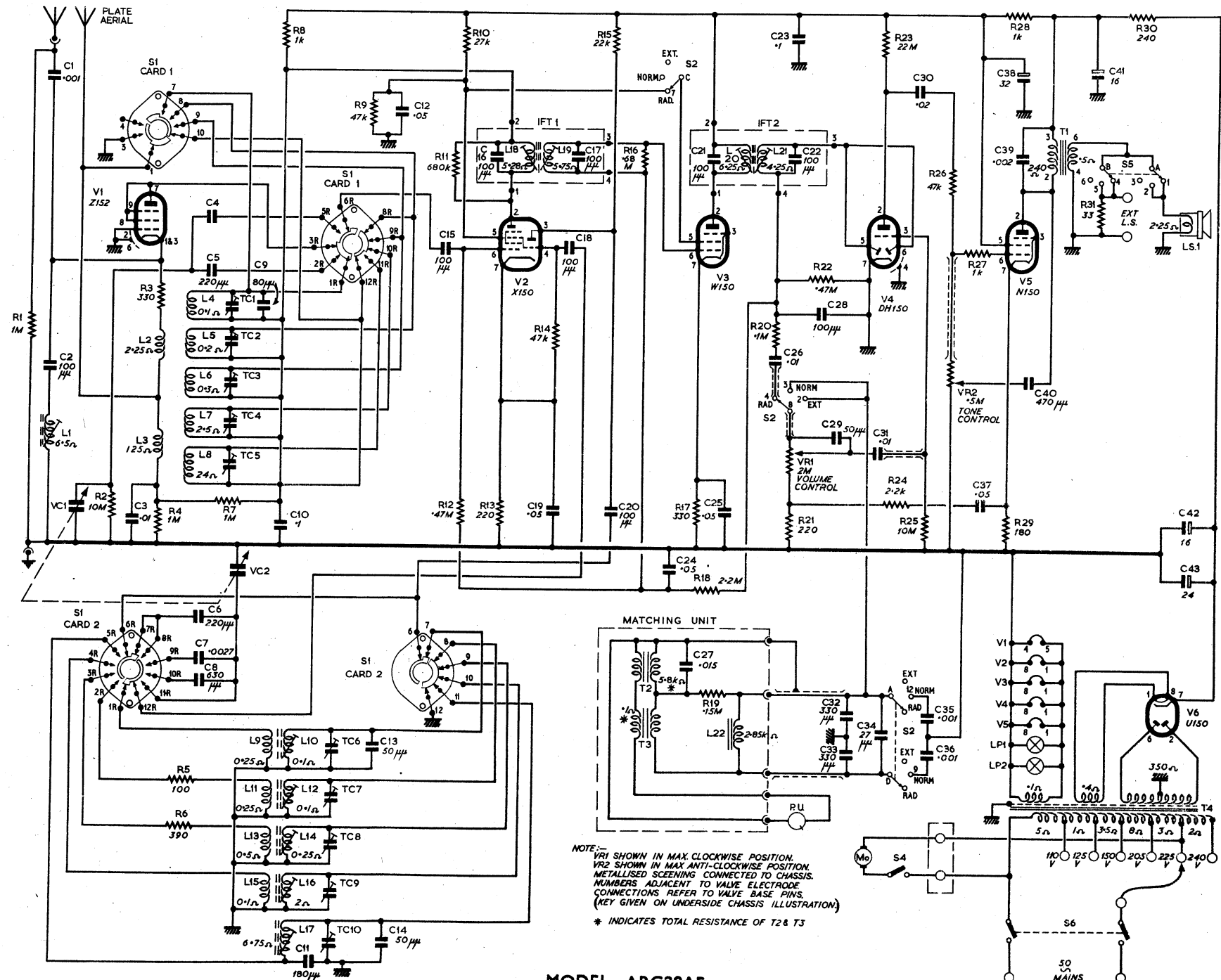


TOP-SIDE CHASSIS



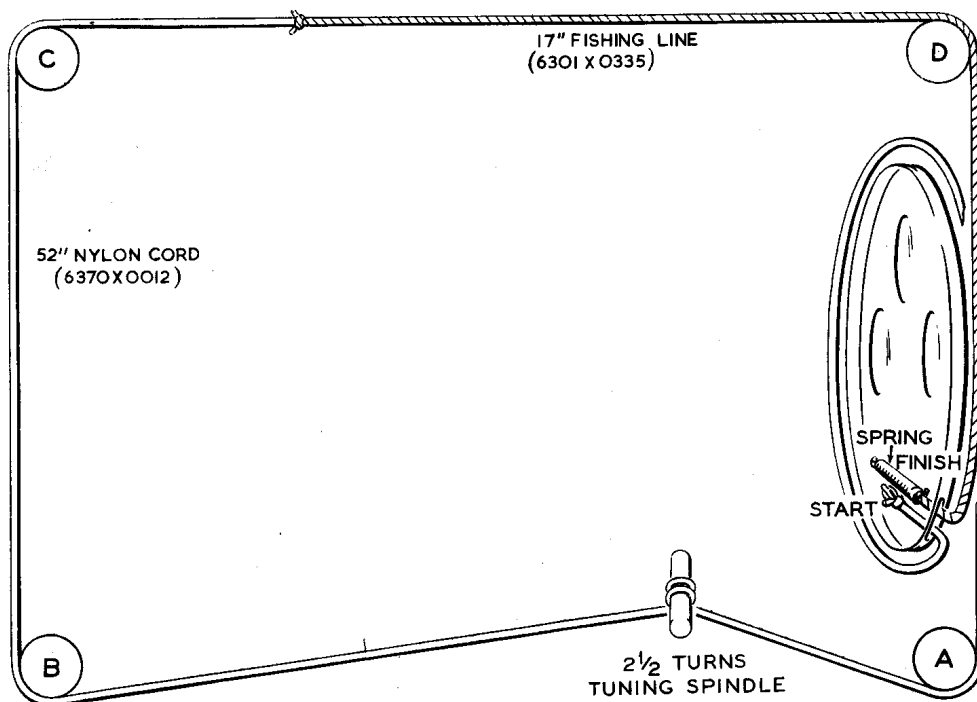
UNDER-SIDE CHASSIS

C	1,2	3	4,10,6	9	10	11	13,14,12	15	16	19,18,17	20	24,27	21,25	26,22,23	28,29,32,33	31,34	30,35,36	37	38,39,40	41	42,43	C	
R	1	2	3,4	5,6	7	8	9	11,10,12	15	14	15	17,18,19	15	16	20,21	22	23	24	25	26	27	28,29	R
MISC	L1	VC1	V1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L42, L43, L44, L45, L46, L47, L48, L49, L50, L51, L52, L53, L54, L55, L56, L57, L58, L59, L60, L61, L62, L63, L64, L65, L66, L67, L68, L69, L70, L71, L72, L73, L74, L75, L76, L77, L78, L79, L80, L81, L82, L83, L84, L85, L86, L87, L88, L89, L90, L91, L92, L93, L94, L95, L96, L97, L98, L99, L100, L101, L102, L103, L104, L105, L106, L107, L108, L109, L110, L111, L112, L113, L114, L115, L116, L117, L118, L119, L120, L121, L122, L123, L124, L125, L126, L127, L128, L129, L130, L131, L132, L133, L134, L135, L136, L137, L138, L139, L140, L141, L142, L143, L144, L145, L146, L147, L148, L149, L150, L151, L152, L153, L154, L155, L156, L157, L158, L159, L160, L161, L162, L163, L164, L165, L166, L167, L168, L169, L170, L171, L172, L173, L174, L175, L176, L177, L178, L179, L180, L181, L182, L183, L184, L185, L186, L187, L188, L189, L190, L191, L192, L193, L194, L195, L196, L197, L198, L199, L200, L201, L202, L203, L204, L205, L206, L207, L208, L209, L210, L211, L212, L213, L214, L215, L216, L217, L218, L219, L220, L221, L222, L223, L224, L225, L226, L227, L228, L229, L230, L231, L232, L233, L234, L235, L236, L237, L238, L239, L240, L241, L242, L243, L244, L245, L246, L247, L248, L249, L250, L251, L252, L253, L254, L255, L256, L257, L258, L259, L260, L261, L262, L263, L264, L265, L266, L267, L268, L269, L270, L271, L272, L273, L274, L275, L276, L277, L278, L279, L280, L281, L282, L283, L284, L285, L286, L287, L288, L289, L290, L291, L292, L293, L294, L295, L296, L297, L298, L299, L300, L301, L302, L303, L304, L305, L306, L307, L308, L309, L310, L311, L312, L313, L314, L315, L316, L317, L318, L319, L320, L321, L322, L323, L324, L325, L326, L327, L328, L329, L330, L331, L332, L333, L334, L335, L336, L337, L338, L339, L340, L341, L342, L343, L344, L345, L346, L347, L348, 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NOTE:-
 VR1 SHOWN IN MAX. CLOCKWISE POSITION.
 VR2 SHOWN IN MAX. ANTI-CLOCKWISE POSITION.
 METALLISED SCREENING CONNECTED TO CHASSIS.
 NUMBERS ADJACENT TO VALVE ELECTRODE CONNECTIONS REFER TO VALVE BASE PINS.
 (KEY GIVEN ON UNDERSIDE CHASSIS ILLUSTRATION)
 * INDICATES TOTAL RESISTANCE OF T2 & T3

MODEL ARG28AE



DISMANTLING

REMOVAL OF CHASSIS.

1. Disconnect the instrument entirely from the mains supply.
2. Pull off the five control knobs (spring fixing) and remove felt washers from spindles.
3. Remove the aerial, earth and external loudspeaker plugs from their sockets.
4. Pull off the loudspeaker switch knob (spring fixing).
5. Remove the back panel from the radio compartment (7 screws).
6. Unscrew the cleat securing the mains lead to the cabinet at rear of chassis.
7. Release the internal aerial lead from the screw at the left side of the compartment.
8. Unscrew the three cleats securing the red and black loudspeaker leads around the top and side of radio compartment.
9. Slacken the three screws securing the rear control panel then move down and slip free.

10. Disengage cursor from the drive cord.
11. Remove the two scale lamps.
12. Open the door of the record compartment and remove the two chassis fixing screws thus revealed.
13. Remove the back panel from the loudspeaker compartment (8 screws) and remove other two chassis fixing screws.
14. The chassis can now be withdrawn from the cabinet as far as the remaining leads will permit; if found necessary proceed further, as given below :-
15. Withdraw the 4-pin plug from the pick-up matching unit.
16. Remove the motor mains lead from the motor and remove pick-up leads.
17. Unsolder the two leads from the loudspeaker.

REMOVAL OF H.F. UNIT.

All coils, trimmer and padder condensers, together with the waveband switch, ganged tuning condenser and R.F. amplifier valve V1, are assembled on a separate sub-chassis which is sprung-mounted on the main chassis.

If necessary, this complete H.F. assembly can be removed from the main chassis to facilitate servicing.

Proceed as follows :-

1. Remove the chassis (see above).
2. Unsolder the black lead from C2.
3. Unsolder the following connections from valve V2 :-
 - (a) The Black lead from pin 8 (this lead goes to V1).
 - (b) The black lead from pin 6 (this lead goes to C15).
 - (c) Condenser C18 from pin 4.
4. Unsolder condenser C20 from card 2 (6R) of the waveband switch.
5. Unsolder the black lead from L4 (the other end goes to R8, 1,000 ohms).
6. Unsolder the two braided earth leads, one from the anchor tag on the sub-chassis adjacent to L13/14, and the other from the anchor tag on the main chassis, adjacent to C23.
7. Remove the four 4 BA nuts and washers from the top of the sub-chassis.
8. Free the cord drive by releasing the spring from the anchor tag on the condenser drum and remove the latter from the condenser spindle (2 screws).
9. Lift off the sub-chassis.

When refitting the condenser drum ensure that the 15 Mc/s mark coincides with the calibration pointer when the gang condenser is set to maximum capacity.

REMOVAL OF AUTO-MECHANISM.

1. Disconnect the instrument entirely from the mains supply.
2. Secure the record retaining arm, and the pick-up on its rest.
3. Remove the back panel from the loud-speaker compartment (8 screws).
4. Unsolder the two pick-up leads from the tag panel on the underside of the mechanism plate.
5. Unsolder the mains lead from the tag panel on the underside of the motor.
6. Remove the four fixing screws from corners of the mechanism plate.
7. Lift out the auto-mechanism, grasping the record support pedestal.

I.F. AND R.F. ALIGNMENT.

GENERAL.

For I.F. and R.F. alignment the chassis must be removed from the cabinet. The iron-dust cores of all the permeability tuned coils are secured with wax to ensure that they maintain their original settings, and re-adjustment should only be necessary where a coil or its associated circuit has been disturbed.

If the I.F. circuits have been disturbed, complete I.F. and R.F. alignment must follow. All wavebands can be ganged independently, without affecting the other bands. The oscillator tracks at a higher frequency than the signal on all wavebands.

Whilst ganging, the input to the receiver must be progressively reduced as the circuits are brought into line, so that the output does not exceed 500 mW (1.58 volt across speech coil).

An A.C. voltmeter (rectifier type) connected across the loudspeaker speech coil may be used as an output meter.

INTERMEDIATE FREQUENCY.

Set Waveband switch to "M", the Volume and Tone Controls fully clockwise, and the gang condenser to minimum capacity.

1. Inject a modulated signal at 470 kc/s, via a 0.05 mfd condenser into the grid of V3 (pin 6) and the earth socket.
2. Adjust cores L21, L20 in that order for maximum output.
3. Inject a modulated signal at 470 kc/s, via a 0.05 mfd condenser, into the grid of V2 (pin 6) and the earth socket.
4. Adjust cores L19, L18 in that order for maximum output.
5. Retrim cores L21 and L20 if necessary.
6. Inject a modulated signal at 470 kc/s into the aerial and earth sockets.
7. Adjust core L1 for minimum output.

RADIO FREQUENCY - SETTING THE POINTER.

For R.F. alignment, the calibration scale printed on the condenser drum should be used. With the gang condenser at maximum capacity, the calibration pointer should coincide with the datum mark at the low frequency end of the calibration scale (15 Mc/s). If adjustment is necessary, bend pointer to correct position.

NOTE :- The alignment points are marked as triangles on the wavescale.

LONG WAVES.

Set Volume and Tone Controls fully clockwise, and Waveband Switch to "L". Inject test signal into aerial and earth sockets via L.W. dummy aerial.

Op. No.	Scale or Drum Pointer Setting.		Tune Test Oscillator to kc/s	Operation.
	kc/s	Metres		
1	400	750	400	Tune TC10 for maximum output.
2	160	1,875	160	Tune Ll7 for maximum output.
3	-	-	-	Repeat operations 1 and 2.
4	400	750	400	Tune TC5 for maximum output.

MEDIUM WAVES.

Controls as before, but with Waveband Switch set to "M". M.W. dummy aerial to be used.

Op. No.	Scale or Drum Pointer Setting.		Tune Test Oscillator to kc/s	Operation.
	kc/s	Metres		
1	1,500	200	1,500	Tune TC9 for maximum output.
2	600	500	600	Tune Ll6 for maximum output.
3	-	-	-	Repeat operations 1 and 2.
4	1,500	200	1,500	Tune TC4 for maximum output.

SHORT WAVE 3.

Controls as before, but with Waveband Switch set to "3". S.W. dummy aerial to be used.

Op. No.	Scale or Drum Pointer Setting.		Tune Test Oscillator to Mc/s.	Operation.
	Mc/s	Metres		
1	7.5	40	7.5	Tune TC8 for maximum output.
2	3.5	85.7	3.5	Tune Ll4 for maximum output.
3	-	-	-	Repeat operations 1 and 2.
4	7.5	40	7.5	Tune TC3 for maximum output.

SHORT WAVE 2.

Controls as before, but with Waveband Switch set to "2". S.W. dummy aerial to be used.

Op. No.	Scale or Drum Pointer Setting.		Tune Test Oscillator to Mc/s.	Operation.
	Mc/s	Metres		
1	15	20	15	Tune TC7 for maximum output.
2	9.6	31.25	9.6	Tune Ll2 for maximum output.
3	-	-	-	Repeat operations 1 and 2.
4	15	20	15	Tune TC2 for maximum output.

SHORT WAVE 1.

Controls as before, but with Waveband Switch set to "1". S.W. dummy aerial to be used.

Op. No.	Scale or Drum Pointer Setting.		Tune Test Oscillator to Mc/s.	Operation.
	Mc/s.	Metres		
1	21.6	13.89	21.6	Tune TC6 for maximum output.
2	15	20	15	Tune LL0 for maximum output.
3	-	-	-	Repeat operations 1 and 2.
4	21.6	13.89	21.6	Tune TC1 for maximum output.

VALVE TABLE.

The following table indicates the approximate voltage readings obtained on each valve when the instrument is connected to a 220-volt 50 cycle mains supply, with the voltage adjustment plug fitted into the "225" socket; and operating at a point of no reception on the Short Wave band - S2, no aerial connected and the Volume Control set to maximum. Variations of ± 15 per cent may be anticipated between models. Higher or lower mains voltage will produce a corresponding variation in meter readings in approximate proportion to the change in mains supply.

A high resistance voltmeter should be used to measure voltages. Values stated below were obtained using a meter with a resistance of 500 ohms per volt.

VALVE	ANODE Volts to Chassis		SCREEN Volts to Chassis	CATHODE Volts to Chassis
	V1 (Z152)	197		197
V2 (X150)	Mx. 197	Osc. 77	75	1.6.
V3 (W150)	208		75	1.4
V4 (DH150)	74		-	-
V5 (N150)	222		208	5.4
V6 (U150)	238 A.C.		-	248

Smoothed H.T. 208 V.

Voltage across R30, 13V.

Total H.T. Current, 58 mA.

Voltage across R28, 27 V.

Total Mains Current, 215 mA (A.C.).

NOTE: Readings for valve V1 will be obtained on the three Short Wave bands only, this valve being non-operative on the Medium and Long Wave bands. As a consequence, on the latter two bands all other voltages will be slightly higher, and conversely all current readings slightly lower than quoted above.

SPARE PARTS LIST.

A comprehensive spare parts list will be issued at a later date and will be obtainable from E.M.I. Sales & Service Ltd., Technical Information Division, Sheraton Works, Wadsworth Road, Greenford, Middlesex, England.

The Company reserves the right to make any modification without notice.