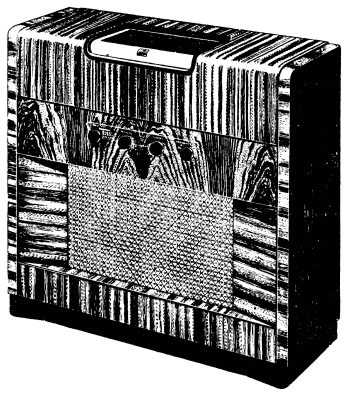
Private and Confidential

"HIS MASTER'S VOICE"

The Hallmark of Quality

For Trade Use Only



"His Master's Voice"
SERVICE MANUAL

for

FIVE-VALVE
DUAL-WAVE BATTERY RECEIVER
CONSOLE MODEL C41A

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THE GRAMOPHONE COMPANY LTD.
(Incorporated in England)
HOMEBUSH - - N.S.W.

TECHNICAL SPECIFICATION

BATTERIES:

The following batteries are required for the operation of this receiver:

1 — 1.5 Volt "A" Battery — Eveready Type 745.
2 — 45 Volt "B" Batteries — Eveready Type 770-P.

CONSUMPTION:

"A" Battery —
.3 Amp (Nominal)
Economy position .25 Amp (Nominal).

"B" Battery —
No Signal 14 Milliamps
Economy position 7 Milliamps.

FREQUENCY RANGE:

Broadcast: 540 Kc/s to 1600 Kc/s.
Short-Wave: 16.5 Metres to 51 Metres.

VALVE COMPLEMENT:

1R5	.....	Converter
1T4	.....	1st I.F. Amplifier
1T4	.....	2nd I.F. Amplifier
1S5	.....	Demod.,-AVC.,-Audio Amp.
3V4	.....	Power Output.

I.F. FREQUENCY:
457.5 Kc/s.

LOUDSPEAKER:
12in. Permagnetic. 2.7 ohms voice coil impedance at 400 cycles.

DIMENSIONS:

Width	.....	32 ins.
Height	.....	29½ ins.
Depth	.....	12 ins.

WEIGHT:

Receiver only:
Gross ..... 85 lbs. Nett ..... 76½ lbs.
Batteries:
Gross ..... 33 lbs. Nett ..... 32 lbs.

CIRCUIT DESCRIPTION

These models incorporate a 5-valve battery operated superheterodyne receiver for broadcast and short-wave reception.

FREQUENCY CHANGER

The aerial on the broadcast band is coupled to the signal frequency circuit by means of the iron dust core aerial transformer, L1-L2. For short-wave reception a short-wave aerial transformer, L5-L6, is switched into circuit.

A pentagrid converter, V1, is employed as frequency changer. Fixed padding capacitors are used on both bands. A variable padding adjustment is provided on the broadcast band by means of an iron dust bolt in the broadcast oscillator coil, L3-L4. A third position (fully clockwise) of the "Wave Change" Switch is called "Broadcast Economy."

I.F. AMPLIFIER

The converter valve is transformer coupled to the first I.F. Amplifier, V2, a variable mu R.F. pentode, which is in turn transformer coupled to the second I.F. amplifier valve, V3, of a similar type.

AUDIO AMPLIFIER,-AVC.,-DEMOD.

The second I.F. amplifier is transformer coupled to the diode pentode valve, V4. AVC potential for the converter and I.F. amplifiers is obtained from the diode load circuit. Demodulation of the I.F. signal is also effected by this diode, the audio signal being fed to the pentode section grid via a capacitor. The output of the pentode section is resistance-capacity coupled to the grid of V5, a power output pentode.

Tone control is effected at this stage by means of S2, which gives bass or treble cut as required by switching appropriate condensers into the audio input circuit.

POWER OUTPUT

The output of the power amplifier pentode is coupled to the speaker by transformer T1. Negative feedback voltage is taken from the secondary of T1 and fed via a condenser to the screen grid of V4.

POWER SUPPLY

Batteries are used for H.T. and filament supplies. The "Broadcast Economy" position of the wave-change switch alters the bias applied to the power output valve and reduces consumption of H.T. current but limits the audio output of the receiver slightly. It also disconnects one half of the two-section filament on the 3V4 valve and reduces consumption of the filament current.

DISMANTLING

REMOVAL OF CHASSIS

(1) Disconnect battery plugs from batteries.

(2) Disconnect aerial, earth and speaker plug.

(3) Remove knobs.

(4) Remove two chassis fixing bolts.

(5) Withdraw chassis from cabinet.

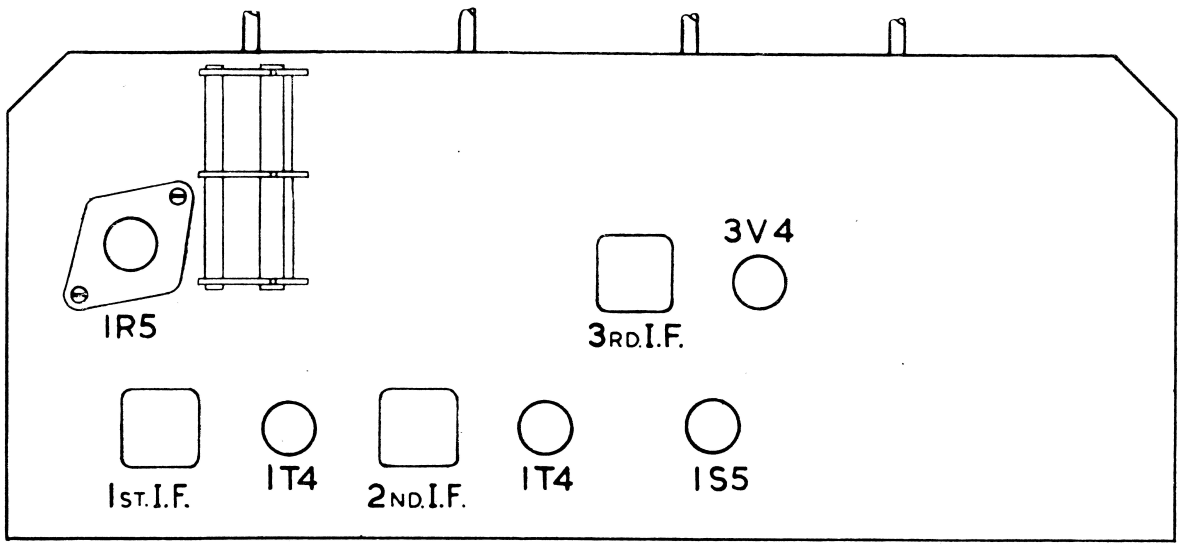
- MODEL C41A -

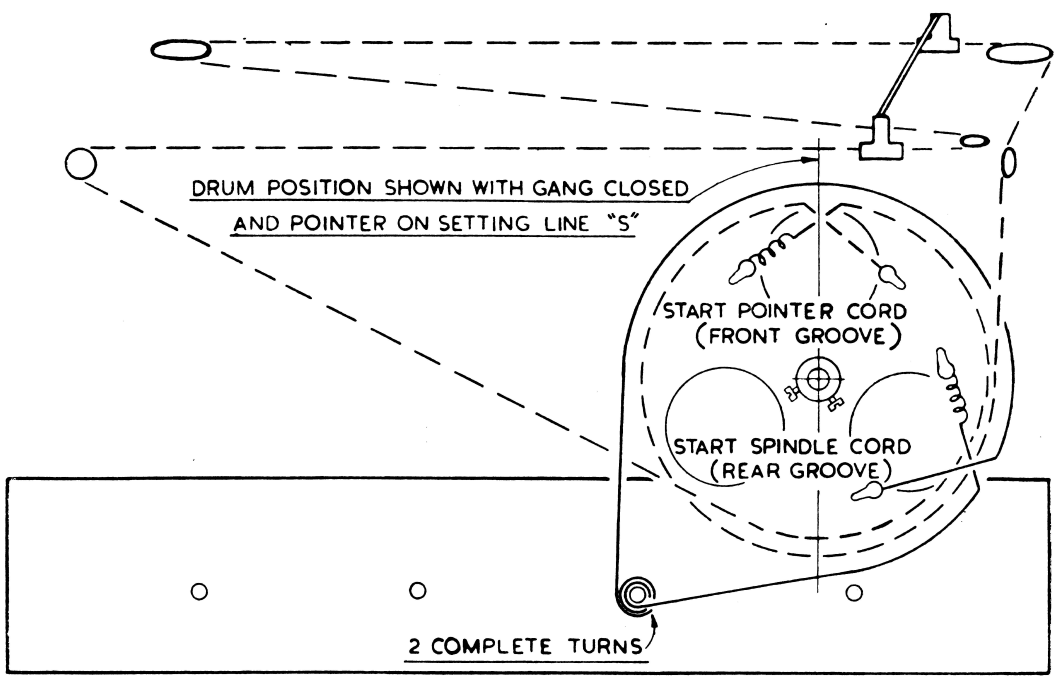
ALIGNMENT

I.F. 457·5 K.C.

B/C { OSC. 600 & 1500 K.C.
AER. ——— 1500 K.C.

S/W { OSC. 17·65 M.C.
AER. 17·65 M.C.





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RECEIVER ALIGNMENT PROCEDURE

In any case where a component replacement has been made in either tuned I.F. or R.F. circuits of a receiver, all circuits must be realigned, and even if only one coil has been serviced, the whole of the realignment should be done in the order given. An output meter should always be connected across the voice coil terminals of the speaker to indicate when the circuits are tuned to resonance. In carrying out the following operations, it is important that the input to the receiver from the signal generator should be kept low and progressively reduced as the circuits are brought into line, so that the output meter reading does not exceed about 0.5 volt.

I.F. ALIGNMENT

(1) Rotate the volume control fully clockwise, set the wave-change switch to "Broadcast" centre position and fully enmesh the tuning condenser vanes. Connect the output leads of signal generator to the fixed plates of the rear section of the2-gang tuning condenser through a 0.1 mF condenser.

(2) Tune signal generator to exactly 457.5 Kc/s.

(3) Adjust the I.F. transformer trimmer screws for maximum reading on output meter, commencing with the second I.F. transformer and following with the first.

(4) Continue this alignment on each transformer in turn until no greater output can be obtained. It is necessary to repeat this procedure twice to ensure correct alignment.

Note: If the trimmer screws are screwed too far in, it may be possible to obtain a false peak due to coupling effects between the iron cores. Start alignment of each individual transformer by first screwing its core well out, and then advancing the core into the coil until resonance is obtained.

R.F. ALIGNMENT (BROADCAST)

(1) With controls set as for I.F. alignment, connect signal generator leads in series with a 200 mmF. condenser to the aerial and earth terminals of the receiver.

(2) Check that when the gang condenser is fully meshed the pointer coincides with the setting line, marked "S," on the extreme right of the dial scale. If necessary, the pointer may be adjusted to this position by loosening the dial pointer on the cord.

(3) Tune signal generator to 600 Kc/s.

(4) Rotate tuning knob until the pointer is exactly over 600 Kc/s calibration and adjust oscillator padder screw fo maximum response.

(5) Rotate the tuning knob until the pointer coincides with the 1500 Kc/s calibration mark and adjust the oscillator trimmer and aerial trimmer for maximum response.

(6) Repeat operations (3) to (5) inclusive for proper alignment.

R.F. ALIGNMENT (SHORT-WAVE)

(1) Set wave-change switch to "Short-wave" (anti-clockwise position). Remove the 200 mmF. condenser from the output lead of the signal generator and replace with a 400 ohm non-inductive resistor and connect to the aerial terminal as before.

(2) Rotate tuning knob until the pointer coincides with the 17 metres calibration mark on dial.

(3) Tune signal generator to 17 metres (17.65 Mc/s.).

(4) Adjust S-W oscillator trimmer for maximum output. Two settings will be found at which this trimmer will peak; care must be taken that the setting finally selected is that which gives the lower capacity. Failure to select the correct position of the two will cause serious tracking error and loss of sensitivity.

(5) Adjust S-W aerial trimmer for maximum output whilst "rocking" the gang condenser slightly to obtain the true resonance point.

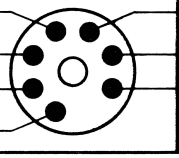
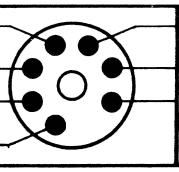
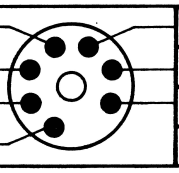
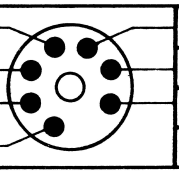
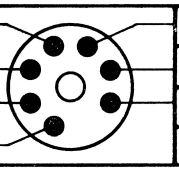
(6) Note that the signal is still tuned in correctly on the dial; if not, readjust S-W oscillator trimmer slightly until dial reads correctly, and repeat operation (5).

ADDITIONAL DATA

Any further service information desired may be obtained by addressing an enquiry to the "Service Department, The Gramophone Co. Ltd., 2 Parramatta Road, Homebush, N.S.W."

VOLTAGE TABLE

- VOLTAGES AND CURRENTS ARE WITH THE RECEIVER OPERATING WITH BATTERY TERMINAL VOLTAGES OF 1·5V AND 90V RESPECTIVELY, AND TUNED TO A POINT OF NO RECEPTION.
- VOLTAGE READINGS TAKEN WITH METER RESISTANCE OF 1000 OHMS PER VOLT.
- VOLTAGE AND CURRENT READINGS WITHIN ±15%.
- RESISTANCE READINGS ARE APPROXIMATE

VOLTS TO CHASSIS	CURRENT MA	RESISTANCE TO CHASSIS	VALVE ELECTRODE	BOTTOM VIEW FOR VALVE SOCKET	VALVE ELECTRODE	VOLTS TO CHASSIS	CURRENT MA	RESISTANCE TO CHASSIS
			V1	1R5	CONVERTER			
—	—	100KΩ	OSC. GRID #1		FILAMENT —	NIL	—	NIL
66	2·78	INFIN	SCREEN GRID #2&#4		GRID #3	—	—	2·6MΩ
66	1·07	INFIN	PLATE		FILAMENT +	1·5	50	—
NIL	—	NIL	FILAMENT —					
			V2	1T4	I.F. AMPLIFIER			
			NO CONN.		FILAMENT —	NIL	—	NIL
20	0·15	INFIN	SCREEN GRID		GRID	—	—	2·5MΩ
78	0·39	INFIN	PLATE		FILAMENT +	1·5	50	—
NIL	—	NIL	FILAMENT —					
			V3	1T4	I.F. AMPLIFIER			
			NO CONN.		FILAMENT —	NIL	—	NIL
20	0·19	INFIN	SCREEN GRID		GRID	—	—	2·5MΩ
86	0·56	INFIN	PLATE		FILAMENT +	1·5	50	—
NIL	—	NIL	FILAMENT —					
			V4	1S5	DEMOD — A.V.C. — A.F. AMPLIFIER			
5·0	0·025	INFIN	PENTODE SCREEN		PENTODE PLATE	6·0	0·07	INFIN
—	—	550KΩ	DIODE PLATE		PENTODE GRID	—	—	10MΩ
			NO CONN.		FILAMENT +	1·5	50	—
NIL	—	NIL	FILAMENT —					
			V5	3V4	POWER			
			NO CONN.		FIL. TAP. GRID 3	NIL	NORM. 100 ECON. 50	NIL
86	1·57	INFIN	SCREEN GRID		GRID	—	—	2MΩ
84	7·07	INFIN	PLATE		FILAMENT +	1·5	50	—
NORM. 1·5 ECON. NIL	NORM. 50 ECON. NIL	—	FIL. (— SERIES)					

REMARKS:—

TOTAL H.T. CURRENT (NORMAL).	= 13·9 MA	(AVERAGE)
TOTAL H.T. CURRENT (ECONOMY POSITION).	= 6·4 MA	
BACK BIAS VOLTAGE [H.T.— TO GROUND] (NORMAL)	= 4·7 VOLTS	
BACK BIAS VOLTAGE (ECONOMY POSITION)	= 6·7 VOLTS	

PARTS LIST

RESISTORS

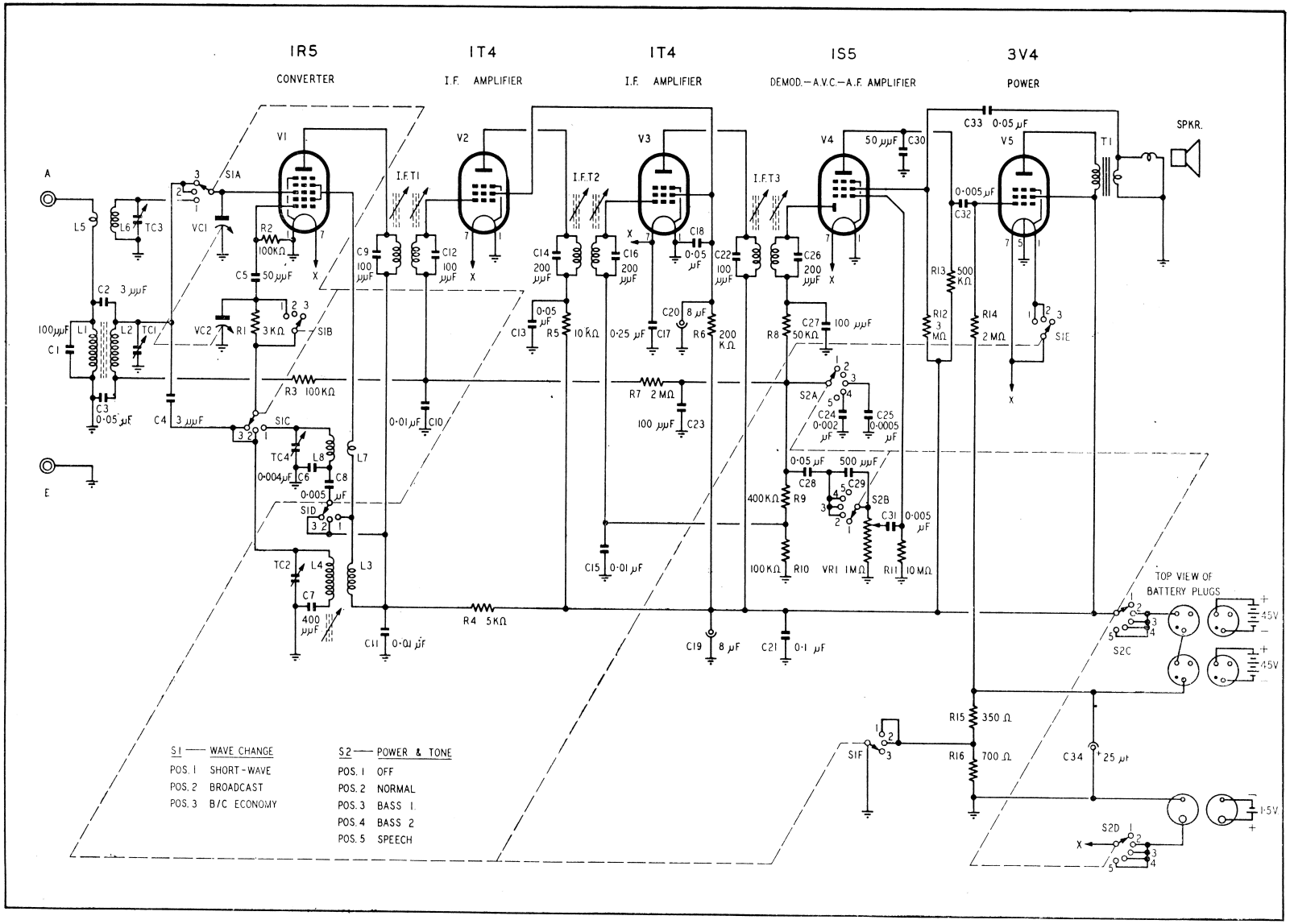
REF.	PART No.	DESCRIPTION
R1	AF2X	3,000 ohms ½ watt ± 10%
R2	J2X	100,000 ohms ½ watt ± 10%
R3	J2X	100,000 ohms ½ watt ± 10%
R4	X3X	5,000 ohms 1 watt ± 10%
R5	F3X	10,000 ohms 1 watt ± 10%
R6	L3X	200,000 ohms 1 watt ± 10%
R7	DH2X	2 megohms ½ watt ± 10%
R8	H2X	50,000 ohms ½ watt ± 10%
R9	AU3X	400,000 ohms 1 watt ± 10%
R10	J2X	100,000 ohms ½ watt ± 10%
R11	DJ3X	10 megohms 1 watt ± 10%
R12	AL3X	3 megohms 1 watt ± 10%
R13	O3X	500,000 ohms 1 watt ± 10%
R14	DH2X	2 megohms ½ watt ± 10%
R15	DLW2X	350 ohms ½ watt ± 10%
R16	DRW2X	700 ohms ½ watt ± 10%

CONDENSERS

REF.	PART No.	DESCRIPTION
C1	D0243P	100 mmF. ± 10%
C2	D0243BU	3 mmF. ± 0.5 mmF.
C3	C0013M	0.05 mF. 200V. wkg.
C4	D0243BU	3 mmF. ± 0.5 mmF.
C5	D0243Q	50 mmF. ± 10%
C6	D0243CQ	4,000 mmF. ± 100 mmF.
C7	D0243AM	400 mmF. ± 5 mmF.
C8	D0243C	0.005 mmF. ± 10%
C9	D4405W	100 mmF. ± 5%
C10	C0013AQ	0.01 mF. 200V. wkg.
C11	C0013AQ	0.01 mF. 200V. wkg.
C12	D4405W	100 mmF. ± 5%
C13	C0013M	0.05 mF. 200V. wkg.
C14	D4405AC	200 mmF. ± 5%
C15	C0013AQ	0.01 mF. 200V. wkg.
C16	D4405AC	200 mmF. ± 5%
C17	C0013P	0.25 mF. 200V. wkg.
C18	C0013M	0.05 mF. 200V. wkg.
C19	C0014AZ	8 mF. 350 P.V.
C20	C0014AZ	8 mF. 350 P.V.
C21	C0013Q	0.1 mF. 200V. wkg.
C22	D4405W	100 mmF. ± 5%
C23	D0243P	100 mmF. ± 10%
C24	D0243H	0.002 mF. ± 10%
C25	D0243L	500 mmF. ± 10%
C26	D4405AC	200 mmF. ± 5%
C27	D0243P	100 mmF. ± 10%
C28	C0013M	0.05 mF. 200V. wkg.
C29	D0243L	500 mmF. ± 10%
C30	D0243Q	50 mmF. ± 10%
C31	D0243C	0.005 mF. ± 10%
C32	D0243C	0.005 mF. ± 10%
C33	C0013M	0.05 mF. 200V. wkg.
C34	C0014CF	25 mF. 40P.V. Electro.

MISCELLANEOUS

REF.	PART No.	DESCRIPTION
TC1	D2395	Trimmer Condenser
TC2	D2395	Trimmer Condenser
TC3	D2395	Trimmer Condenser
TC4	D2395	Trimmer Condenser
L1-2	D1614D/2	B/C Aerial Coil
L3-4	D2224	B/C Oscillator Coil
L5-6	D2321/1	S/W Aerial Coil
L7-8	D2527	S/W Oscillator
S1	D2673	5-Pole 3-Position Switch
S2	D2531	4-Pole 5-Position Switch
T1	D2530	Output Transformer
IFT1	D2528	1st I.F. Transformer
IFT2	D2529	2nd I.F. Transformer
IFT3	D2418	3rd I.F. Transformer
VR1	D2526	1 Megohm Potentiometer
VC1 & VC2	C0159A	Tuning Condenser, 2-gang
	D3129	12in. Permagnetic Speaker
	C0469B	Dial Glass



CIRCUIT DIAGRAM OF MODEL C41A.