Set No. 619

INSTRUCTIONS FOR THE

RADIOVISION

"COMMANDER" COMMUNICATIONS RECEIVER.

CONTENTS.

A. GENERAL DESCRIPTION.

The Commander Radio Receiver is a double superhetrodyne for C.W. or telephony reception, in the frequency range between 1.7 and 31 Mcs. This range is covered in four 'General Coverage' and five 'Bandspread' bands as follows :-

Range.	Bandspread.	General Coverage.
1	3.5 - 3.8 Mc.	1.7 - 4.0 Mc.
2	7.0 - 7.3 Mc.	4.0 - 7.6 Mc.
3	14.0 - 14.4 Mc.	7.6 - 15.0 Mc.
4	21.0 - 21.45 Mc.	None.
5	28.0 - 30.0 Mc.	15.0 - 31.0 Mc.

The receiver is designed for A.C. mains operation, 110 - 250 volts at 50-60 cycles per second. Total consumption is 90 watts.

Valve Complement.

RF Amplifier.	7H7
First Frequency Changer	X81 (Marconi - Osram)
1600 Kc. I.F. Amplifier.	7H7
Second Frequency Changer.	X81 (Marconi - Osram)
100 Kc. I.F. Amplifier.	7H7
Detector and Noise Limiter.	6H6GT.
A.V.C. and First A.F.	7R7
Output.	6F6G (KT63)
B.F.O.	6J5GT
Rectifier.	5V4G
Neon Voltage Regulator.	7475 (Mullard)

Two output circuits are provided: (a) for a 2-3 ohm loudspeaker. (b) for headphones of either high or low impedence. Maximum output obtainable into a 2.5 ohm resistive load is 3 watts. The loudspeaker is automatically silenced on plugging in headphones, which are entirely isolated from any high voltage circuits in the receiver.

The use of a high first-I.F. results in good image rejection with one R.F. stage, whilst the low second-I.F. produces a high degree of adjacent channel selectivity, which is variable in three switched positions.

The aerial input circuit is suitable for balanced or unbalanced inputs between 75 and 400 ohms.

Automatic Volume Control is applied to four stages for effective action, and is also used to operate the illuminated 'S' Meter.

Signal to Noise ratio is better than 20dB. for an input of 10 microvolts, with 30% modulation depth. On C.W. this figure is obtained with less than 3 microvolts input.

The Commander is available in two cabinet styles; a console desk model, and a more compact commercial type cabinet. The chassis are identical.

		Console.	Commercial.
Overall	(Width.	22 inches.	20 inches.
	(Height.	12⅛ inches.	11 inches.
	(Depth.	13¼ inches.	13½ inches.
Total Weight.		48 lbs.	47½ lbs.

B. INSTALLATION.

Facilities at the rear of the chassis are:-

"S" Meter Zero adjuster. ← 'S' Meter sensitivity adjuster
Transmitter-relay terminals.
Aerial input sockets.
Loudspeaker sockets.
Mains-voltage selector.
Mains-lead.

(a) Check that all valves are properly seated in their holders after transit.

(b) Set the mains voltage selector plug to the correct tapping for the supply.

(c) Connect a loudspeaker with a speech-coil impedence between two and three ohms to the sockets marked L.S., or alternatively, plug in the head-phones to the jack on the front panel. It is not recommended that the loudspeaker be placed on the top of the cabinet, as in some cases undesirable microphonic noises may result.

(d) For single-wire-feed, connect the aerial to 'A', and place the plug-lead provided into 'E'. For balanced inputs connect the feeders to 'A' and 'E', leaving the plug-lead free. Although not absolutely essential, it is recommended that an earth be connected to the tag provided.

(e) If it is desired to utilise the Receive/Stand-by switch to operate a transmitter switching relay, connection should be made to the terminals at the rear of the chassis. The maximum rating of this switch is 100v. at 100 mA.

The A.C.supply may now be connected and the receiver is ready for operation. In some cases of mains interference it may be found that reversing the connections to the supply will eliminate this.

C. OPERATING INSTRUCTIONS.

Twelve clearly marked controls are provided on the front panel as follows :-

- Large slow-motion tuning knob.
- Antenna trimmer.
- Oscillator trimmer (Amateur Bands only)
- Bandswitch.
- General Coverage/Amateur Band Switch.
- R.F.Gain control.
- A.F.Gain control, with Mains ON/OFF switch.
- Noise Limiter switch and clipping control.
- B.F.O.Pitch condenser.
- Phone/C.W.switch.
- Selectivity switch.
- Receive/Stand-by switch.

In addition to the above, the front panel carries the headphone jack and illuminated 'S' Meter.

After installation, switch on the A.C.supply by rotating the A.F.Gain control clock-wise, and allow a few minutes to warm up.

Select the required wave-band by means of the central bandswitch, and the push-pull amateur-band/general coverage switch. The five amateur bands use the red scales, and are obtained by pressing this latter switch inwards, whilst the ~~four~~ five general-coverage ranges are read off the black scales, with the band-spread switch button pulled outwards. Note that there is no general coverage range 4, and no bandspread range 'O'.

Telephony and M.C.W.Reception.

Set the Phone/C.W. switch to 'Phone', the selectivity switch to 'Broad', and the Stand-by/Receive switch to 'Receive'. Except with very strong signals (i.e. S9 + 20db or over), the R.F.Gain control should be advanced fully clock-wise to give maximum A.V.C. action, and to ensure correct reading of the "S" Meter.

Tuning is now accomplished on the main dial in accordance with the range selected by the band selector switches, and output level is adjusted on the A.F.Gain control.

The antenna trimmer should be tuned for maximum background noise, or, with a signal tuned in on the main dial, it may be peaked on the "S" Meter.

The oscillator trimmer is only in circuit on the amateur bands, and is used to set the calibration against an external frequency standard.

Calibration accuracy of the main dial is as follows:-

On general coverage ranges, better than 1 per cent. On bandspread, with the calibration accurately set at any point in an amateur band (by means of the oscillator trimmer), the scale is correct to better than 0.15%. These figures compare very favourably with many higher priced receivers, and in this connection it may be noted that the British Post Office requirements for amateur frequency standards is 0.1%.

When ignition or other impulse interference is experienced the noise-limiter may be switched into operation. On the initial switching the limiter will clip at 100% modulation depth, with progressively lower clipping levels as the control is rotated clockwise. The limiter is self-adjusting for different carrier levels.

If adjacent-channel interference occurs, the selectivity can be increased to "medium" or "sharp".. This will result in some attenuation of high modulation frequencies due to the extreme selectivity.

Slight detuning to one side or other of the carrier will often enable signals to be read more clearly through severe interference. This constitutes a simple form of single sideband reception, and may also be used to receive narrow-band frequency modulated signals.

To set the "S" Meter zero, first make sure that the R.F.Gain control is turned fully clockwise. Tune to a point where there is no signal, and adjust the preset control at the rear of the chassis with the aid of a screwdriver until the meter reads zero. If desired, the aerial may be removed whilst setting zero, in which case slight readings of background noise will be obtained when the aerial is reconnected. Each "S" unit represents approximately 6dB change of signal level. The S meter sensitivity may, however, be adjusted as desired, by the lower preset control at the rear of the chassis.

C.W. Reception.

Operation of the following controls is identical with that in telephony reception :-

Main Tuning.
Antenna trimmer.
Oscillator trimmer.
Bandswitch.
General Coverage/Amateur Band switch.
Receive/Stand-by switch.

Set the Phone/C.W.switch to C.W. and the B.F.O. pointer to Midscale. The A.F.Gain control should be operated near maximum and the output level controlled with the R.F.Gain control. This prevents blocking on strong signals, now that the A.V.C. is inoperative.

In C.W.reception the noise limiter may be used as a form of A.V.C., clipping all signals above a predetermined level. The control is best rotated fully clockwise for this effect.

The received C.W.signals should normally be tuned to maximum on the main tuning control, the pitch of the note being adjusted as desired on the "pitch" control.

The "sharp" and "medium" selectivity positions may be used as in telephony, to eliminate adjacent-channel interference.

With the pitch control detuned slightly, a pronounced single-signal effect is apparent, as on tuning through a signal on the main dial a beat note will be heard on one side of the carrier only, depending on which direction the pitch control is detuned. This is a demonstration of the high degree of selectivity, and is useful in eliminating strong interference on one side of the wanted signal.

The "S" Meter may be used to measure the carrier level of C.W.Signals, provided the B.F.O. is switched off during the measurement.

D. CIRCUIT DESCRIPTION.

The circuit employs ten valves, plus rectifier and neon voltage-regulator. (See valve list on page 1).

As described in the installation details, the aerial circuit may be used with balanced or unbalanced inputs between 75 and 400 ohms, although impedances outside this range will also give good results. The antenna trimmer is used to compensate for the detuning effects of non-resonant aerials. Use of a high-slope R.F.pentode and optimum coupling on the aerial coils ensures a very

favourable signal to noise ratio.

Two rejector circuits, L5 and L10, are used to eliminate signals on 1600 Kc. (First I.F. frequency).

The first frequency-changer circuit is conventional. Voltage stabilization and temperature compensation are employed on the oscillator for maximum stability, and all components are of the highest quality to ensure low warm-up drift.

Bandspread arrangement.

On the ~~four~~ five General Coverage bands the three large sections of the main tuning condenser are in use. On bandspread these are switched out, and the smaller sections used, together with extra trimming condensers. The push-pull wafer type bandspread switch is mounted close to the tuning condenser and main band-change switch, to ensure short lead lengths. The 21 Mc.amateur band utilises the same coils as the 28 Mc. band, but with larger fixed capacities in parallel, in order to obtain a considerable degree of bandspread.

The oscillator trimmer control on the front panel is used on bandspread only, to enable the operator to set the amateur-band calibration accurately against an external frequency standard.

In the second frequency-changer circuit, careful attention has been paid to screening and earthing, in order to reduce any spurious responses to a minimum.

To obtain three degrees of selectivity, the coils of the sharp selectivity I.F.transformers (T3,T4), are switched in and out of circuit by the switch S2. Trimmers C13 and C14 enable adjustment to be made, so that the overall gain of the receiver is constant in all selectivity positions.

In the detector circuit a low value of diode-load is used to improve noise-limiter operation. T5 is a step-down transformer to match into this load. Section 'a' of V4 is the detector, whilst 'b' is the noise-limiter. Briefly, the operation of this circuit is as follows :-

With an incoming signal the cathode of diode 'a' becomes positive with respect to earth. Part of this positive potential is applied, via R18, C29, R19 (to remove any audio components) to the anode of 'b', which is therefore positive with respect to its cathode, and the

diode conducts. Modulation on the incoming signal is applied to the cathode of 'b' and thence to the A.F. circuits in the normal manner. In the event of a noise pulse arriving at diode 'a' a sudden large positive potential is applied to the cathode of 'b', but the anode remains at its steady value, due to the long time-constant of R18, C29 and R19. The noise-limiter diode is therefore rendered non-conducting and the noise pulse is not passed on to the audio circuits. The amplitude of the pulse required to block the diode is governed by the setting of R15, which varies the D.C. bias applied to the diode anode. Since this bias is also proportional to the incoming signal voltage, the circuit is self-adjusting for different signal levels. The setting of R15 determines the effective modulation depth at which clipping commences, and is adjustable from 100% to approximately 20%. Features of this noise limiter circuit are:-

(a) Series noise-limiter fed from a low value of diode load and at a high signal level for most effective operation.

(b) Negligible introduction of hum since the output is taken from the anode of the noise-limiter diode, and not from the cathode as is common practice.

(c) In the noise limiter 'OFF' position the A.F. output is taken direct from the diode-load, and the use of the tapping point between R16 and R17 ensures that there is no change in audio output as the limiter is switched on and off.

Automatic Volume Control is applied to four stages :-

R.F.Amplifier, 1600 Kc I.F., second frequency changer and 100 Kc. I.F. The diode section of V5 is used as the A.V.C. rectifier, delay voltage being developed across R26, the cathode-bias resistor.

In C.W. reception the Phone/C.W.switch applies H.T. to the B.F.O. and shorts the A.V.C. line to earth. The filter circuit L15, C20 prevents harmonics of the 100 Kc. B.F.O. from reaching other parts of the receiver.

During stand-by periods the cathodes of the three 7H7 valves are disconnected from earth, and the D.C. potential is removed from V5 screen-grid. The oscillators remain in operation in order to prevent 'stand-by' frequency drift.

The action of plugging headphones into the jack switches off the loudspeaker, and substitutes an internal three ohm resistive load. The phones are connected across this load, so that either high or low resistance types may be used.

E. ALIGNMENT.

Alignment of the tuned circuits of the Commander receiver should not be attempted unless the operator fully understands the function of each circuit element. The complete alignment is divided into eight stages :-

1. 100 Kc. I.F.Amplifier.
2. 1500 Kc. Second oscillator.
3. 1600 Kc. I.F.Amplifier.
4. H.F.Oscillator.
5. Aerial and Mixed Grid circuits.
6. I.F.Rejection.
7. B.F.O.
8. Bandspread.

Most of these adjustments can be performed without removing the receiver from its cabinet, but when removal is necessary it may be done quite simply, by taking out the four screws from the underside of the cabinet (holding the receiver chassis) and the five screws from the edge of the front panel. The chassis can then be slid from its cabinet.

For all the following adjustments set the R.F.gain control at maximum (clockwise rotation).

1. 100 Kc. I.F.Amplifier.

It is seldom likely that alignment of this portion will be necessary. Remove the set from the cabinet and connect a signal-generator to the grid of the second frequency-changer, V2. ~~In some models this necessitates removal of the screen around this valve and the selectivity switch. In others,~~ Connection may be made to the grid tag of the 1600 Kc. I.F.transformer, T2. Set the selectivity switch to "sharp", and feed in a signal at 100 Kc, so as to read about S4 on the Meter. Peak up the five dust-iron cores of T3, T4 and T5. Check on "Medium" and "Broad" selectivity that the "S" Meter reading does not alter. If the reading does vary, adjustment should be made to C13 and C14 on the selectivity switch until a constant "S" reading is obtained with all degrees of selectivity.

T5 will not need adjustment except in the case of an actual fault and it is possible to align T3 and T4 without removal from the cabinet. Feed a large 100 Kc. signal, (about 10 millivolts) into the aerial terminals. Tune to 1.7 Mc. and stop the first oscillator by connecting a clip-lead so as to short-circuit the tuning condenser, C91.

A reading should now be obtained on the "S" Meter, and the transformers may be peaked as before. C13 and C14 cannot be adjusted without removing the chassis from the cabinet.

Selectivity figures to be expected from the 100 Kc. amplifier are as follows :-

Broad	10	times	down	at	6	Kc.	off tune.
Medium	10	"	"	"	2½	Kc.	" "
Sharp	2	"	"	"	1	Kc.	" "
	10	"	"	"	1½	Kc.	" "
	100	"	"	"	2½	Kc.	" "
	1000	"	"	"	5	Kc.	" "

Overall selectivity of the receiver on broad position, including R.F. and 1600 Kc. stages, is ten times down at 4Kc. off tune.

Remove the short from C91.

2. 1500 Kc. Oscillator.

With the receiver tuned to 1.7 Mc. on sharp selectivity, feed into the grid of the first frequency-changer a signal of 1600 Kc. This may conveniently be done by connecting to the mixer grid tuning condenser, C70, above the chassis. Tune the dust-iron core of T9, under the rear right hand corner of the chassis, to peak on the "S" Meter.

3. 1600 Kc. I.F.Amplifier.

Using exactly the same set up as above, tune the four cores of T1 and T2 to peak on the meter.

4. H.F.Oscillator.

Since the frequency of the first oscillator determines the calibration accuracy of the receiver, alignment should be done with the aid of a crystal standard, or other source of accurately known frequency, fed into the aerial sockets. The ~~four~~ five General Coverage ranges must first be aligned. For the oscillator and signal frequency circuits, variable trimmers are provided for adjustment at the high frequency end of each range, with movable dust cores to align the coils at the low frequency end. The table below indicates the frequencies at which each circuit element should be adjusted.

5. Aerial and Mixer Grid Circuits.

When the oscillator has been aligned to agree with the general coverage scales, the ~~eight~~ six coils and ten ~~four~~ trimmers associated with the signal-frequency circuits may be adjusted according to the table. For this purpose the signal generator with dummy antenna should be fed to the aerial sockets. All adjustments should be done with a small input signal, the output reading about S4 on the meter.

For the aerial coils, set the antenna trimmer at midscale, and adjust the cores at the low frequency end of each range. There is no adjustment at the high frequency end of the ranges.

With the mixer grid coils, adjustment to the cores at the low, and the trimmers at the high frequency end of each range should be carried out.

(omit) ~~All the above General Coverage alignment is done from the top of the chassis.~~

General Coverage Alignment Table.

O. | 1·3 Mc. | C90 C70 none | 600Kc. L11 L6 L1

Range.	H.F.End.				L.F.End.			
	Frequency.	Osc.	Mixer	Aerial.	Frequency.	Osc.	Mixer.	Aerial.
1.	3.8Mc.	C92 C84	C64	none	1.9Mc.	L12 L11	L7	L2
2.	7.0Mc.	C94 C86	C66	none	4.4Mc.	L13 L12	L8	L3
3.	14.0Mc.	C96 C88	C68	none	8.0Mc.	L14 L13	L9	L4
4.	28.0Mc.	C97 C89	C69	none	17.0Mc.	L15 L14	L10	L5

The H.F. oscillator operates on the high side of the signal frequency, i.e. 1600 Kc. higher.

After alignment of the signal frequency circuits on range five, it may be found that slight readjustment of the oscillator trimmer, C97 C89, is necessary.

On some models, it will be noted that C88 and C89 are both made up of two trimmers in parallel; a negative temperature coefficient ceramic type, and a positive coefficient air-spaced type. In cases where some frequency drift is noticed on ranges 3 or 5 after an initial fifteen to twenty minutes warm-up period, these

omit

trimmers may be adjusted to minimise this. If the drift necessitates retuning the dial to a slightly higher frequency as the set warms up, a little capacity should be removed from the air-spaced trimmer, and the ceramic capacity increased so that the calibration is unaltered. For drift in the reverse direction, the capacities should of course be adjusted in the opposite directions from those indicated above. The ceramic condensers are at maximum capacity when the black lines are adjacent. The air-spaced trimmers are at maximum when turned fully clockwise, so as to screw the plates together.

6. I.F. Rejection.

With the receiver tuned to 1.7 Mc., feed a 1600 Kc. signal into the aerial sockets and adjust L16 and L17 until the "S" Meter reads a minimum. L11 L17

7. Beat Frequency Oscillator.

Accurately tune in any signal in the "Sharp" selectivity position, with the aid of the "S" Meter. Switch to C.W. and set the pitch control midway. Adjust the core of the B.F.O. coil, T8, until zero beat occurs. Should a hetrodyne whistle be heard as the pitch control is rotated when no signal is being fed to the receiver, adjustment of the B.F.O. harmonic filter, ~~L16~~, will enable this to be eliminated. Once set in the factory, however, this coil should never need readjustment. L 18

8. Bandspread.

Bandspread alignment should be last, and must be done with the chassis fitted into the cabinet. Access to the trimmers is obtained via the removable plate underneath. It will not be possible to set the band-spread scales accurately unless the general coverage ranges are first aligned.

Each amateur band is trimmed at any one point on its scale, after which the calibration should hold within 0.15% at all other points in the band.

Set the front panel oscillator trimmer to the engraved mark, and feed into the receiver a signal of accurately known frequency. Tune to the range and frequency required, (bandspread switch pushed in), and adjust the appropriate trimmers for maximum signal, leaving the front panel trimmer untouched. No bandspread trimmers are required on the aerial circuits, as the small capacities necessary are provided by the antenna trimmer.

On the 21 Mc. band, care should be exercised to see that the oscillator is not set to the wrong side of the signal frequency, otherwise it will not be possible to align the scale accurately.

Bandspread Alignment Table.

Range.	Oscillator.	Mixer.
1.	~~C.04~~ C102 94	C.74 72
2.	~~C.05~~ C103 95	C.75 73
3.	~~C.06~~ C104 96	C.76 74
4.	~~C.08~~ C106 98	C.77 75
5.	~~C.00~~ 107 99	C.79 77

no aerial circuit trimmers.

sealed to prevent movement due to vibration.

F. LIST OF COMPONENTS.

RESISTORS.

Number.	FUNCTION.	Description.
R1	V1 Screen dropper.	47K. ½ watt.
R2	V1 A.V.C. decoupler.	470K. ½ watt.
R3	V1 Cathode bias.	200 ohm. ½ watt.
R4	Voltage stabilizer dropper.	10K. 5 watt. wire wound.
R5	V2 Anode, screen decoupler.	4700 ohm. ½ watt.
R6	V2 Screen dropper.	47K. ½ watt.
R7	V2 A.V.C. decoupler.	
R8	V2 Cathode bias.	
R9	V2 Oscillator grid-leak.	
R10	V2 Osc. Anode dropper.	15K. ½ watt.
R11	V3 Screen dropper.	47K. ½ watt.
R12	V3 Grid resistor.	470K. ½ watt.
R13	V3 A.V.C. Decoupler.	470K. ½ watt.
R14	V3 Cathode bias.	200 ohm. ½ watt.
R15	Noise Limiter Bias potentiometer.	50K. with SPDT switch.
R16	Detector-diode load.	33K. ½ watt.
R17	" " "	47K. ½ watt.
R18	Noise-Limiter bias decoupler.	1000K. ½ watt.
R19	" " " "	470K. ½ watt.
R20	AF Gain control.	500K. Log. with SPST switch.
R21	V5 Anode & screen decoupler.	47K. ½ watt.
R22	V5 Screen dropper.	1000K. ½ watt.
R23	V5 Anode load.	100K. ½ watt.
R24	A.V.C. Diode-load.	470K. ½ watt.
R25	A.V.C. Decoupler.	470K. ½ watt.
R26	V5 Cathode bias.	1.5K. ½ watt.
R27	V6 Cathode bias.	470. ohm. 1 watt.
R28	V6 Grid stopper.	10K. ½ watt.
R29	V6 Grid resistor.	470K. ½ watt.
R30	Output load.	3 ohm. 3 watt.
R31	H.T. Smoother.	300 ohm. 5 watt. wire-wound.
R32	" "	1K. 5 watt. wire-wound.
R33	V6 Screen dropper.	4.7K. ½ watt.
R34	V8 Anode dropper.	100K. ½ watt.
R35	V8 Grid-leak.	47K. ½ watt.
R36	S Meter bridge resistor.	47K. ½ watt.
R37	S Meter series resistor.	1K. ½ watt.
R38	S Meter set zero potentiometer.	2K. preset.
R39	RF Gain potentiometer.	10K. wire-wound.

Number.	FUNCTION.	Description.
R51	V10 Screen dropper.	47K. ½ watt.
R52	V10 A.V.C. decoupler.	470K. ½ watt.
R53	V10 Cathode bias.	200 ohm. ½ watt.
R54	V10 Anode decoupler.	4.7K. ½ watt.
R55	V11 Cathode bias.	200 ohm. ½ watt.
R56	V12 Oscillator grid-leak.	~~33K~~ 47K. ½ watt.
R57	V12 Oscillator anode decoupler.	1.5K. ½ watt.
R58	V11 A.V.C. decoupler.	470K. ½ watt. 1Meg ½
R59	V11 grid resistor	47K. ½ watt. 470K ½ watt

NOTE: The abbreviation K. refers to kilo-ohms. 1K. = 1000 ohms.

CONDENSERS.

C1	HT. Decoupler.	0.1 mFd. 350v.DC.
C2	V1 Screen decoupler.	0.01 mFd. 350v.DC.
C3	A.V.C. Decoupler.	0.01 mFd. 350v.DC.
C4	V1 Cathode decoupler.	0.01 mFd. 350v.DC.
C5	V2 Anode decoupler.	0.1 mFd. 350v.DC.
C6	V2 Screen decoupler.	0.1 mFd. 350v.DC.
C7	V2 A.V.C. decoupler.	0.01 mFd. 350v.DC.
C8	V2 Cathode decoupler.	0.1 mFd. 350v.DC.
C9	T3 Primary tuning.	1500 pFd. 1% silver-mica.
C10	T3 Secondary tuning.	1500 pFd. 1% silver-mica.
C11	IFT coupling.	8 pFd. 10% silver-mica.
C12	T4 Primary tuning.	1500 pFd. 1% silver-mica.
C13	Med. selectivity gain adjuster.	3-30 pFd. trimmer.
C14	Broad selectivity gain adjuster.	1-8 pFd. trimmer.
C15	T4 Secondary tuning.	1500 pFd. 1% silver-mica.
C16	V2 Oscillator tuning.	200 pFd. 10% mica.
C17	V2 Oscillator grid.	100 pFd. 10% mica.
C18	V2 Oscillator tuning.	500 pFd. 1% silver-mica.
C19	~~V2 Oscillator anode decoupler.~~	~~0.01 mFd. 350v.DC.~~
C20	IF Filter tuning.	250 pFd. 1% silver-mica.
C21	V3 Grid condenser.	50 pFd. 10% mica.
C22	BFO Injection.	20 pFd. 10% mica.

C14 Selectivity control 50 pFd. 10% mica.

Number.	FUNCTION.	Description.
C23	T5 Primary tuning.	1000 pFd. 1% silver-mica.
C24	V3 Screen decoupler.	0.1 mFd. 350v. DC.
C25	V3 A.V.C. decoupler.	0.01 mFd. 350v. DC.
C26	V3 Cathode decoupler.	0.1 mFd. 350v. DC.
C27	Detector-diode decoupler.	100 pFd. 10% mica.
C28		100 pFd. 10% mica.
C29	Noise limiter bias decoupler.	0.1 mFd. 350v. DC.
C30	A.V.C. feed.	100 pFd. 10% mica.
C31	V5 Anode decoupler.	2 mFd. electrolytic.350v.DC.
C32	V5 Screen decoupler.	0.01 mFd. 350v. DC.
C33	V5 - V6 coupling condenser.	0.002 mFd.10% mica.
C34	V4 - V5 coupling condenser.	0.002 mFd.10% mica.
C35	V5 Cathode decoupler.	25 mFd. electrolytic.25v.DC.
C36	HT. smoothing.	16 mFd. " 500v.DC.
C37	HT. smoothing.	8 mFd. " 500v.DC.
C38	V6 Screen decoupler.	8 mFd. " 500v.DC.
C39	V7 Reservoir.	16 mFd. " 500v.DC.
C40	V8 Grid condenser.	200 pFd. 10% mica.
C41	T8 Tuning.	250 pFd. 1% silver-mica.
C42	V8 Anode decoupler.	0.1 mFd. 350v. DC.
C43	BFO Pitch control.	50 pFd. variable.
C44	RF Gain control bypass.	25 mFd. electrolytic. 25v.DC.
C45	~~V6 Anode~~ A.V.C. Decoupler.	0.01 mFd. 350v.DC.
C46	Mains RF bypass.	0.01 mFd.1000v.DC.
C51	Range 2 aerial coil fixed trim.	30 pFd. 10% silver-mica.
C52	Range 3 " " " "	20 pFd. 10% silver-mica.
C53	V10 screen decoupler.	0.01 mFd. 350v.DC.
C54	V10 Grid condenser.	50 pFd. 10% mica.
C55	1600 Kc. rejector tuning.	250 pFd. 1% silver-mica.
C56	V10 cathode decoupler.	0.01 mFd. 350v.DC.
C57	Antenna Trimmer.	50 pFd. variable.
C58	RF tuning, general coverage.	9 - 275 pFd. six-gang.
C59	RF tuning, bandspread.	5 - 15 pFd. six-gang.
C60	RF bandspread fixed trimmer.	8 or 10 pFd. silver-mica.
C61	21 Mc. band fixed trimmer.	75 pFd. 10% mica.
C62	V10 A.V.C. decoupler.	0.01 mFd. 350v.DC.
C63	V10 Anode decoupler.	0.01 mFd. 350v.DC.
C64	Range 1 mixer trimmer.	3. - 30 pFd. air dielectric.
C65	Range 2 fixed mixer trimmer.	30 pFd. 10% silver-mica.
C66	Range 2 mixer trimmer.	3 - 30 pFd. air dielectric.
C67	Range 3 fixed mixer trimmer.	30 pFd. 10% silver-mica.
C68	Range 3 mixer trimmer.	3 - 30 pFd. air dielectric.
C69	Range 5 mixer trimmer.	3 - 30 pFd. air dielectric.
~~C70~~	~~Mixer tuning, general coverage.~~	~~9 - 275 pFd. six-ga~~
C70	Range 0 mixer trimmer.	3 - 30 pFd. air dielectric.
C71	Range 0 A.V.C. condenser.	.01 mFd. 350v. DC.

Number	FUNCTION.	Description.
C71	Mixer tuning, bandspread.	5 - 15 pFd. six-gang.
C72	Range 1 bandspread trimmer.	1 - 8 pFd. air dielectric.
C73	Range 2 bandspread trimmer.	1 - 8 pFd. air dielectric.
C74	Range 3 bandspread trimmer.	1 - 8 pFd. air dielectric.
C75	Range 4 bandspread trimmer.	3 - 30 pFd. air dielectric.
C76	Range 4 bandspread fixed trim.	30 pFd. 10% silver mica.
C77	Range 5 bandspread trimmer.	1 - 8 pFd. air dielectric.
C78	V11 Cathode decoupler.	.01 uFd. 350v. DC.
C79	V11, 1600 kc. rejector tuning.	250 pFd. 1% silver mica.
C80	Range 1 oscillator padder.	2[illegible] pFd. 1% silver mica.
C81	Range 2 oscillator padder.	1000 pFd. 1% silver mica.
C82	Range 3 oscillator padder.	2000 pFd. 1% silver mica.
C83	Range 5 oscillator padder.	1000 pFd. 1% silver mica.
C84	Range 1 oscillator trimmer.	5 - 40 pFd. Neg.temp.ceramic.
C85	Range 2 oscillator fixed trim.	5 pFd. 1% silver mica.
C86	Range 2 oscillator trimmer.	5 - 40 pFd. neg.temp.ceramic.
C87	Range 3 oscillator fixed trim.	15 pFd. Neg. temp. ceramic.
C88	Range 3 oscillator trimmer.	5 - 40 pFd. neg.temp. ceramic.
C89	Range 5 oscillator trimmer.	5 - 40 pFd. neg.temp. ceramic.
C90	Oscillator anode decoupler.	.01 uFd. 350v. DC.
C91	Oscillator tuning gang, coverage.	9 - 275. pFd. six-gang.
C92	Oscillator tuning, bandspread.	5 - 15 pFd. six-gang.
C93	Oscillator trimmer, (front panel.	2 - 4 pFd. variable.
C94	Range 1 bandspread trimmer.	1 - 8 pFd. air dielectric.
C95	Range 2 bandspread trimmer.	1 - 8 pFd. air dielectric.
C96	Range 3 bandspread trimmer.	1 - 8 pFd. air dielectric.
C97	Range 4 fixed bandspread trim.	30 pFd. 10% silver mica.
C98	Range 4 bandspread trimmer.	3 - 30 pFd. air dielectric.
C99	Range 5 bandspread trimmer.	1 - 8 pFd. air dielectric.
C100	Range 1 Aux Padder.	1 - 8 pFd. air dielectric.

TRANSFORMERS.

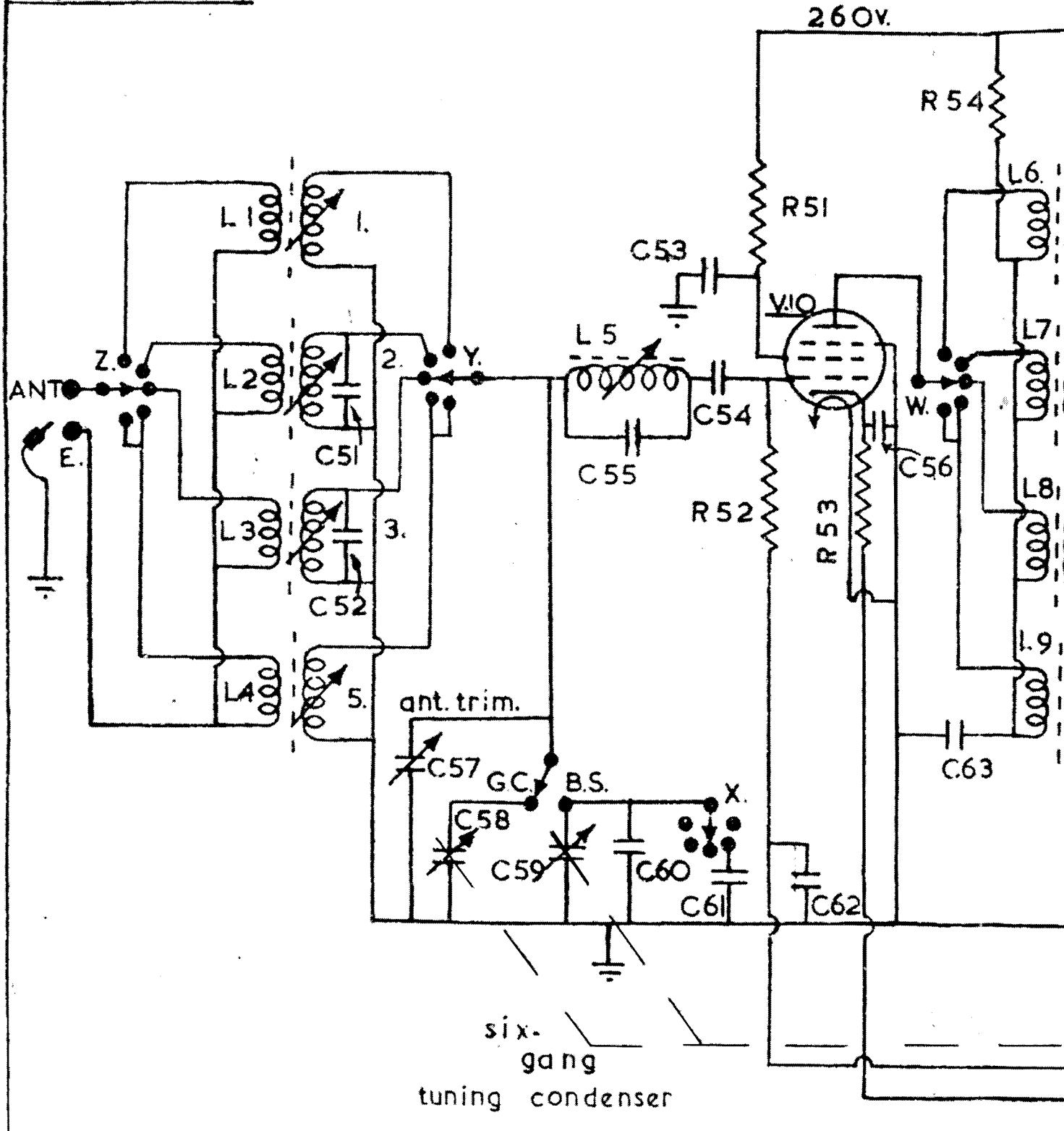
T1	First IFT.	1600 Kc. permeability tuned.
T2	Second IFT.	1600 Kc. permeability tuned.
T3	Sharp selectivity IFT	100 Kc. loose coupled
T4	Sharp selectivity IFT.	permeability tuned.
T5	Diode IFT.	100 Kc. [illegible] to diode load.
T6	Output.	7000 to 3.5 ohms.
T7	Mains transformer.	Input 11[illegible],22[illegible],220,240v. 50-60 cy. Outputs 5v. 2 amps. 6.3v. 4 amps. 300 v. .125 ma.
T8	BFO Oscillator assembly	100 Kc.
T9	Second mixer oscillator assembly.	1500 Kc.

Number.	FUNCTION.	Description.
COILS.		
L1	Range 1 RF	32 microhenry.permeability tuned.
L2	Range 2 RF	4.1 " " "
L3	Range 3 RF.	1.44 " " "
L4	Range 5 RF	0.4 " " "
L5	1600 Kc. IF rejector.	40 " " "
L6	Range 1 mixer grid.	32 " " "
L7	Range 2 mixer grid	4.1 " " "
L8	Range 3 mixer grid	1.44 " " "
L9	Range 5 mixer grid	0.4 " " "
L10	1600 Kc. IF rejector.	40 " " "
L11	Range 1 oscillator	14.2 " " "
L12	Range 2 oscillator.	2.36 " " "
L13	Range 3 oscillator.	1.05 " " "
L14.	Range 5 oscillator.	0.31 " " "
L15.	1600 Kc. BFO harmonic rejector.	40 " " "
SWITCHES.		
S1	Receive/Stand-by.	2-pole, 2-way rotary.
S2	Selectivity.	1-pole. 3-way rotary.
S3	Noise Limiter ON/OFF	1-pole, 2-way, on R15.
S4	Mains ON/OFF	1-pole, 1-way, on R20.
S5	Phone/CW.	2-pole, 2-way rotary.
(Phone Jack)	Output load switching	One make, one break.
G.C/BS.	General Coverage/Bandspread.	3-pole, 2-way, push-pull wafer.

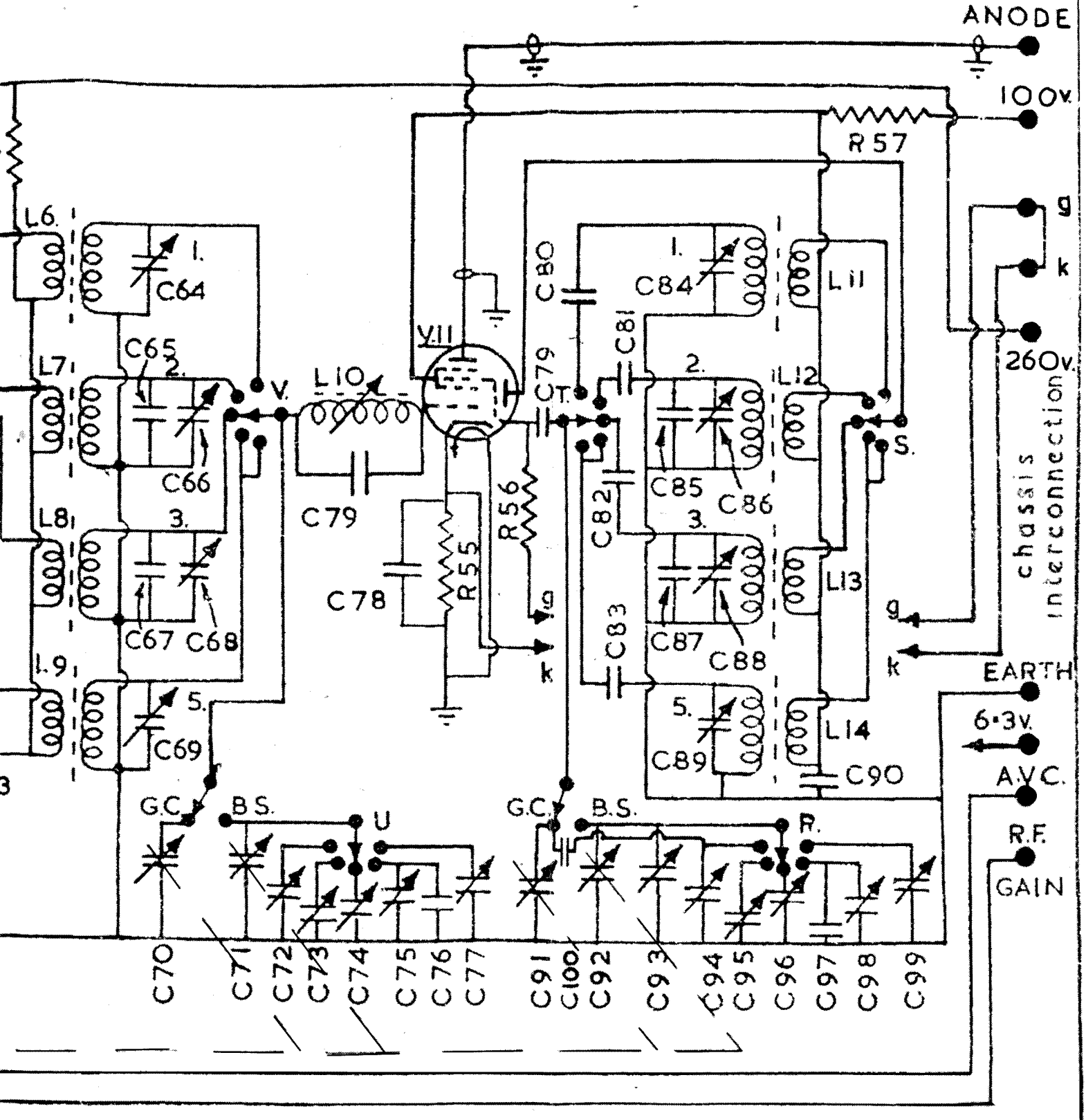
BAND SELECTOR. (R.S.T.U.V.W.X.Y.Z., 9-pole. 5-way, rotary, 6 wafers.

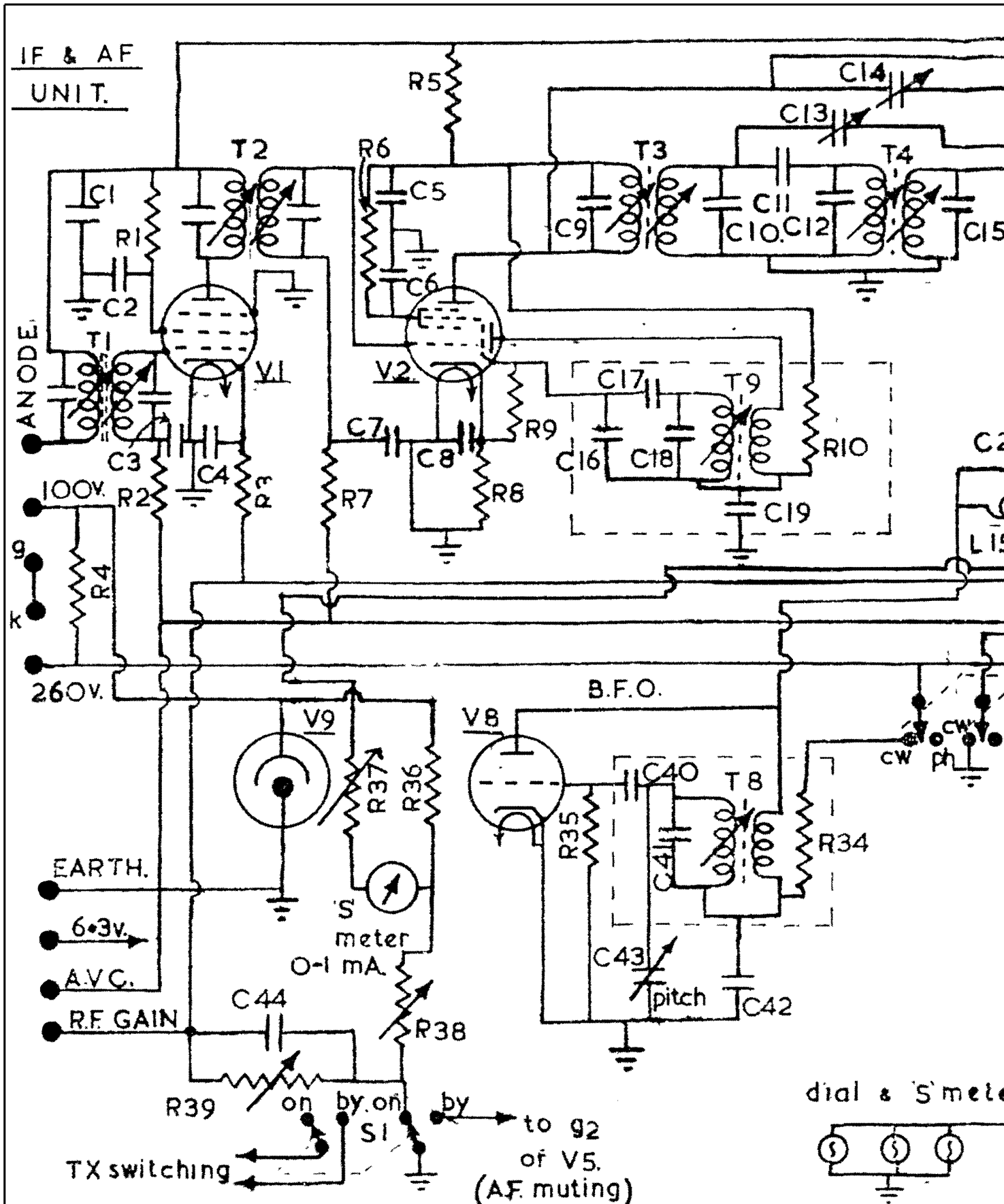
R	Oscillator bandspread section.
S	Oscillator anode section.
T	Oscillator grid section.
U	Mixer bandspread section.
V	Mixer grid section.
W	RF Anode section.
X	RF bandspread section.
Y	RF grid section.
Z	Antenna coupling.

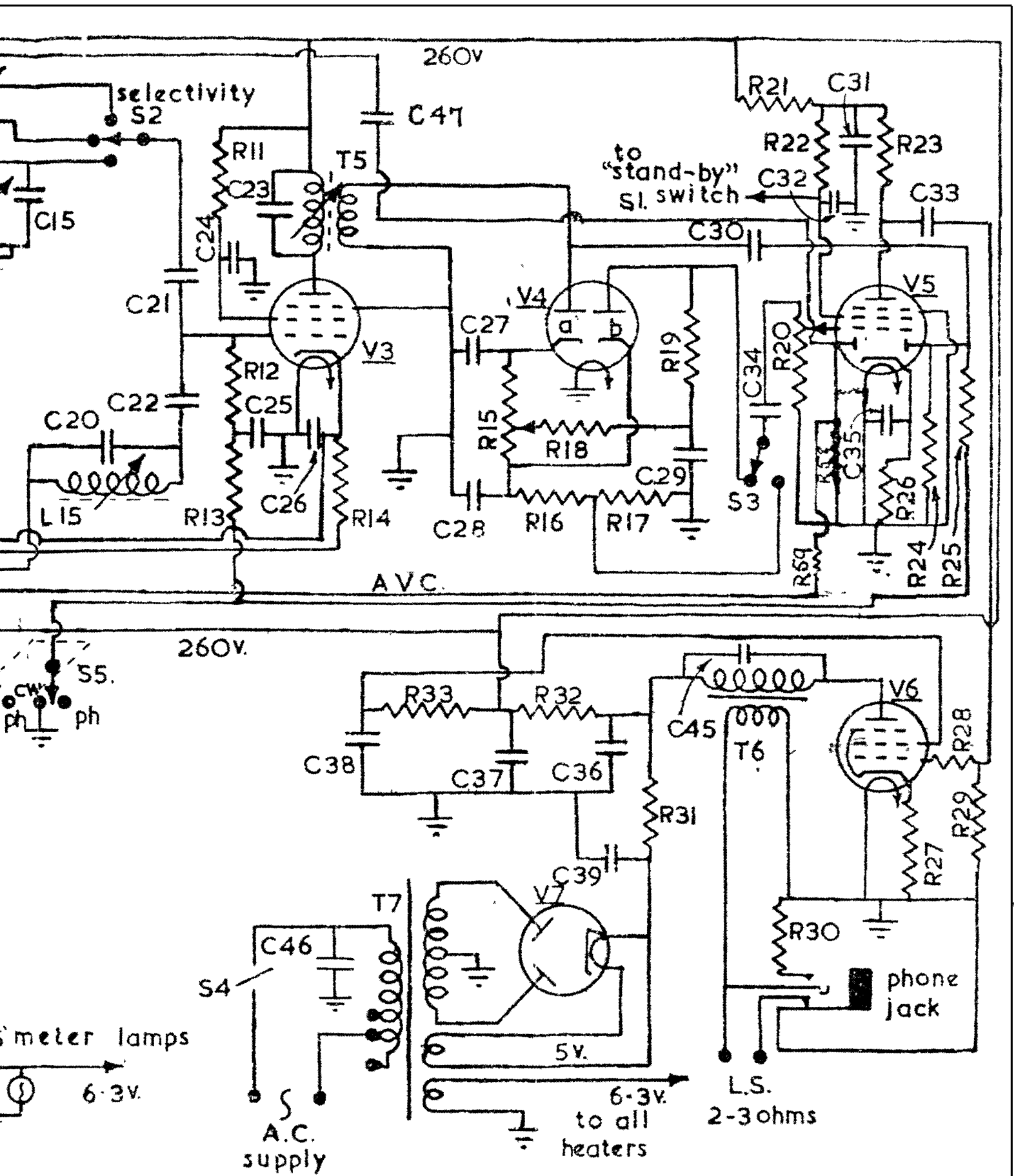
RADIOVISION (LEICESTER)



(R) LTD. COMMANDER RECEIVER.

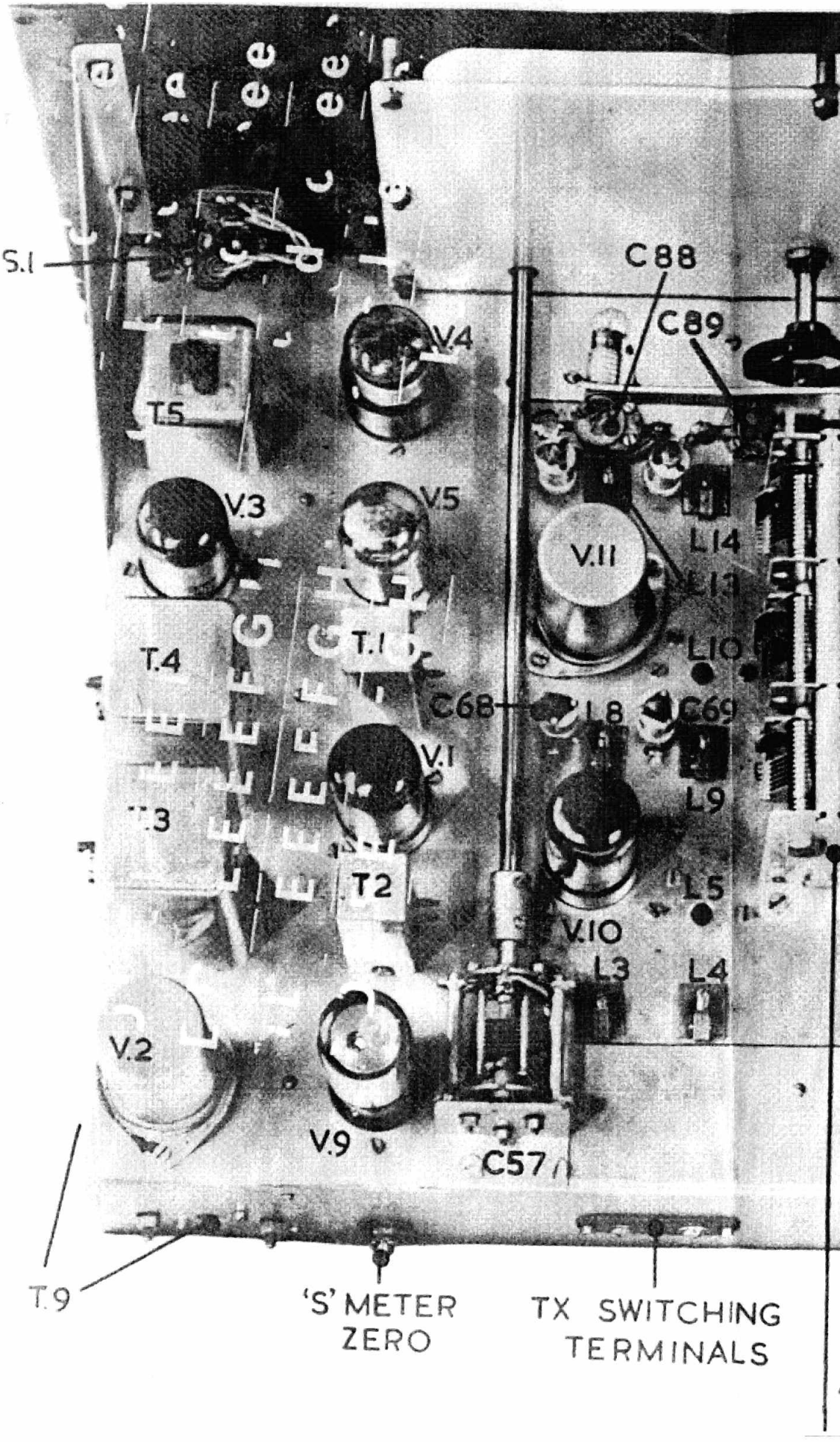



IF & AF
UNIT.
R5
C14
C13
T2
R6
T3
T4
C1
C5
C9
C11
C10
C12
C15
R1
C2
C6
ANODE
T1
V1
V2
C17
T9
R9
C7
C8
C16
C18
R10
C3
C4
R2
R7
R8
C19
100V.
g
k
R4
260V.
B.F.O.
V9
V8
R37
R36
C40
T8
cw
ph
R35
R34
C41
EARTH.
'S'
meter
O-1 mA.
6·3v.
A.V.C.
C43
pitch
C42
R.F. GAIN
C44
R38
R39
on
by
on
by
S1
to g2
of V5.
(A.F. muting)
TX switching
dial & 'S' mete

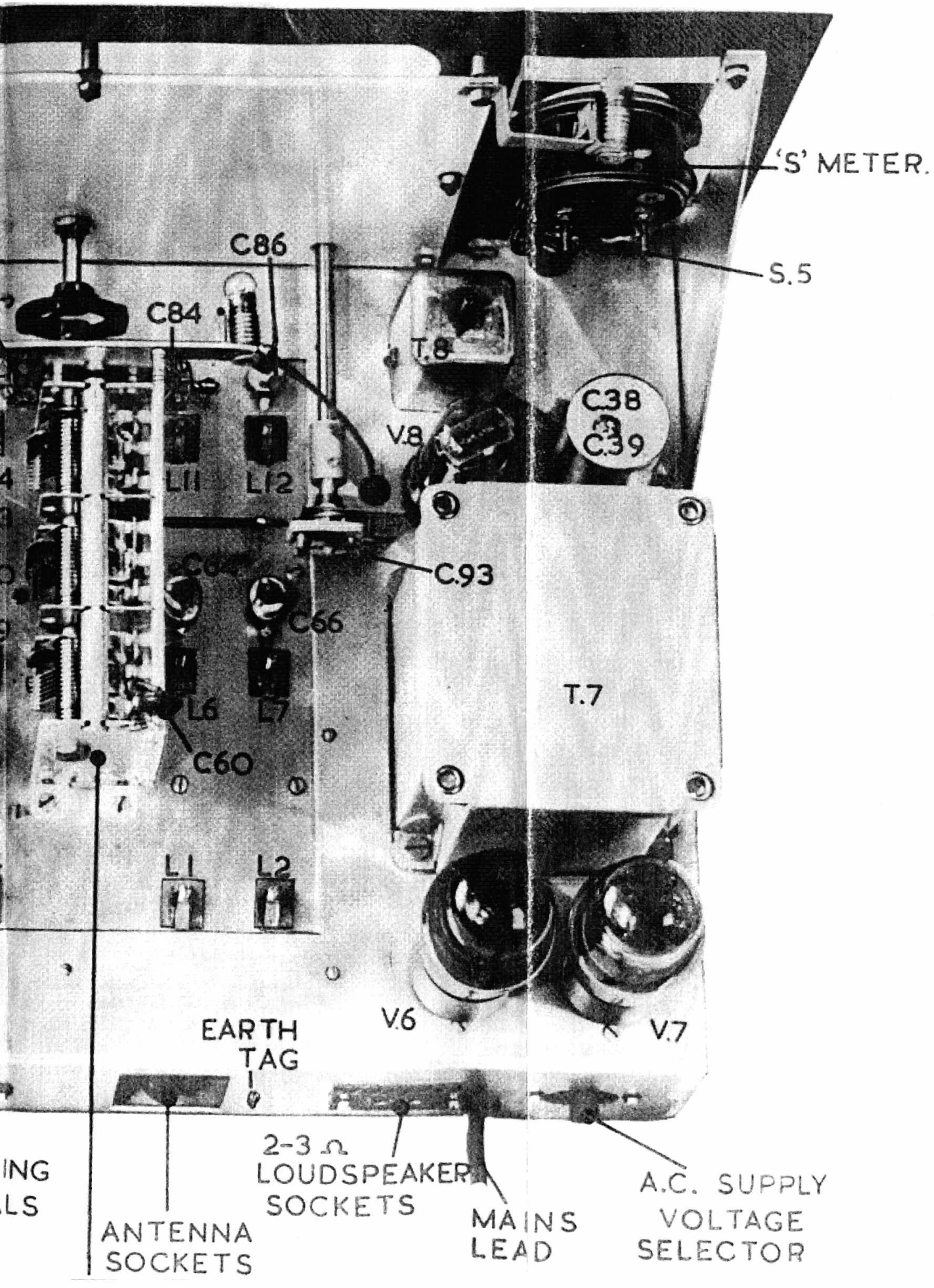

260v
selectivity
S2
C47
R11
T5
C23
C24
C15
C21
V3
R12
C22
C20
C25
C26
L15
R13
R14
C27
V4
a
b
R19
R15
R18
C29
C28
R16
R17
S3
R21
C31
R22
R23
to "stand-by" S1. switch
C32
C33
C30
V5
C34
R20
C35
R33
R26
R24
R25
R69
AVC.
260v.
S5.
cw
ph
ph
R33
R32
C38
C37
C36
C45
T6
V6
R28
R31
C39
R29
R27
V7
T7
R30
C46
S4
phone jack
meter lamps
6·3v.
5v.
6·3v. to all heaters
L.S. 2-3 ohms
A.C. supply

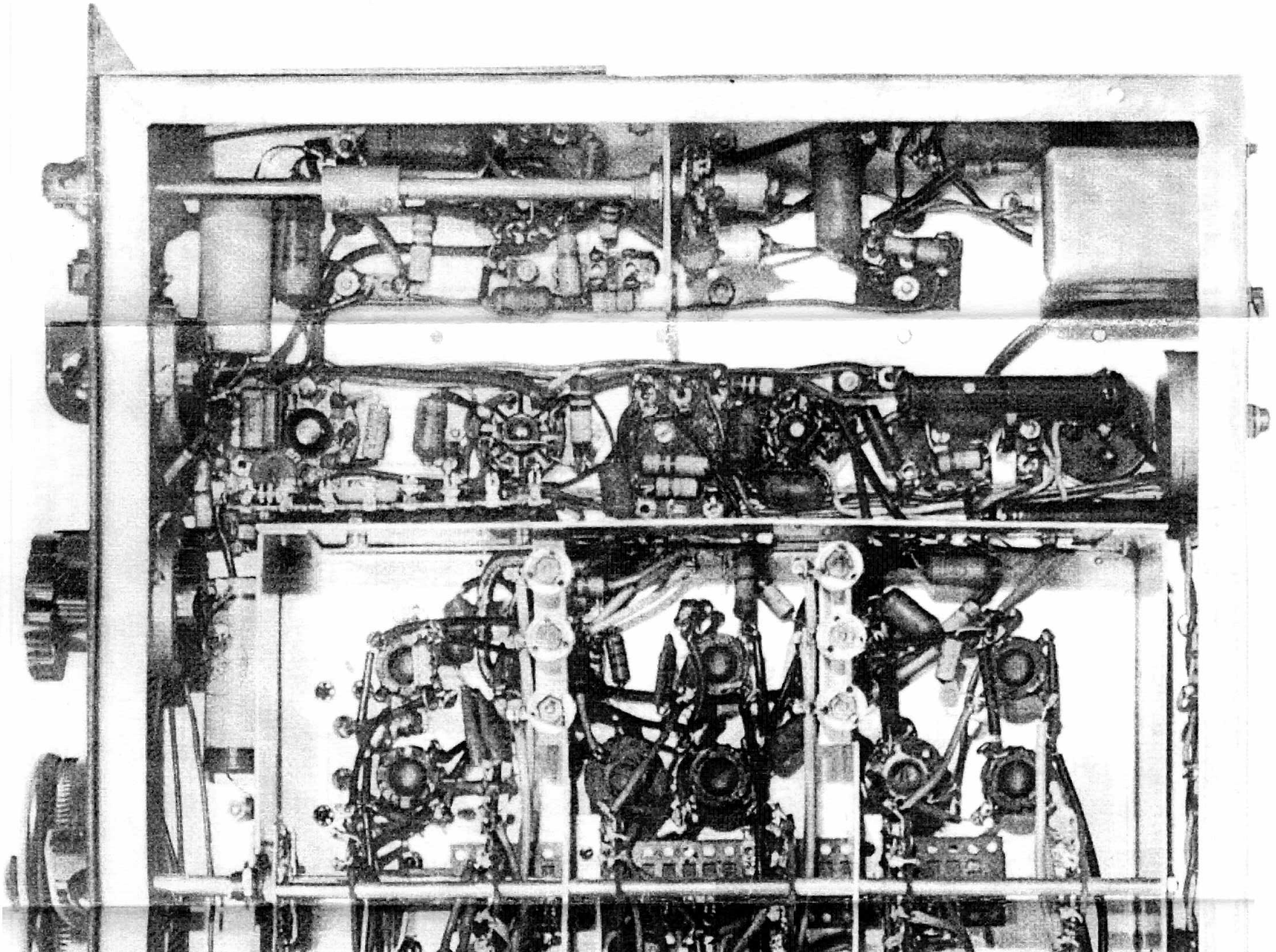
COMMANDER

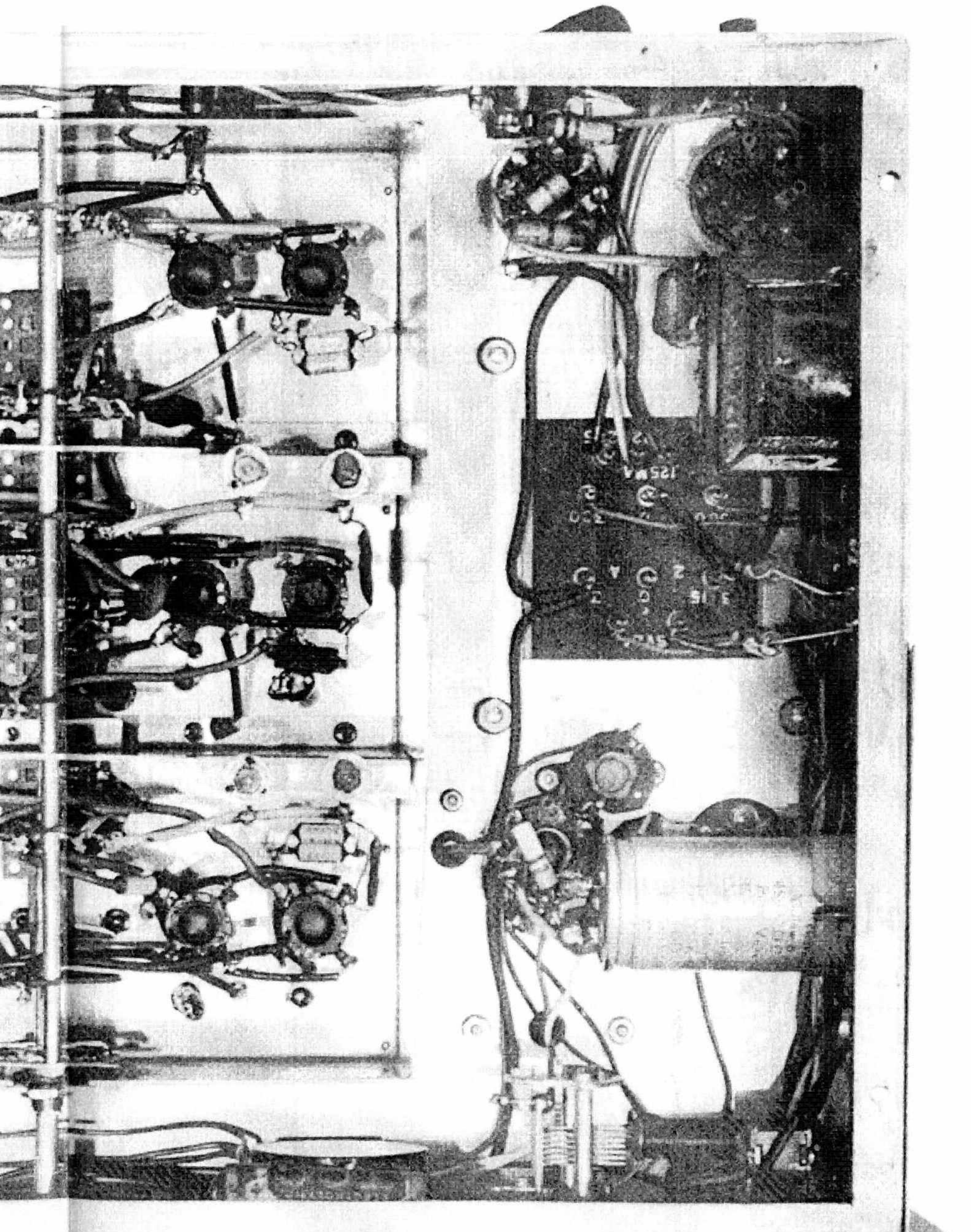
TOP-CHASS



NDER RECEIVER
CHASSIS VIEW.

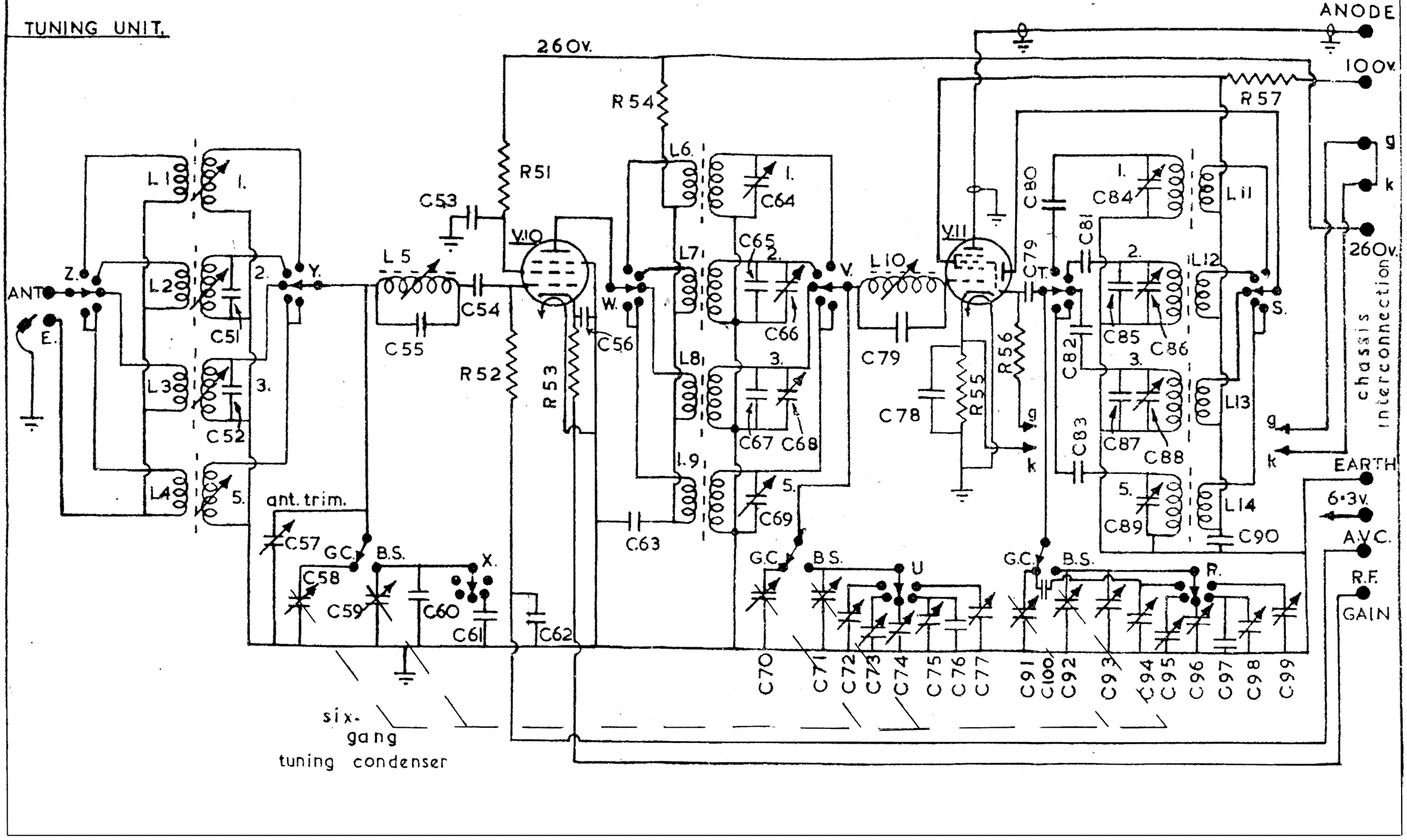






RADIOVISION (LEICESTER) LTD. COMMANDER RECEIVER.

TUNING UNIT.



IF & AF UNIT.

ANODE

100v.

260v.

EARTH.

6·3v.

A.V.C.

R.F. GAIN

TX switching

AVC

B.F.O.

'S' meter O-1 mA.

selectivity

S2

S5.

cw ph

to "stand-by" S1. switch

S3

pitch

dial & 'S' meter lamps

6·3v.

to g2 of V5. (A.F. muting)

S4

A.C. supply

5v.

6·3v. to all heaters

L.S. 2-3 ohms

phone jack