

K.W. ELECTRONICS SINGLE SIDEBAND RECEIVER.

K.W. 202.

INSTRUCTION MANUAL.

ISSUE 2.

SINGLE SIDEBAND RECEIVER

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GUARANTEE

K.W. 202 - COMMUNICATIONS RECEIVER

SECTION 1

GENERAL DESCRIPTION AND SPECIFICATION

Serial No
R190

1.1 Introduction

The K.W. 202 Receiver has been designed for optimum performance on SINGLE SIDEBAND SUPPRESSED CARRIER, with excellent results on C.W. and A.M. It operates on all Amateur Bands between 1.8 MHz and 30 MHz. The Receiver employs thirteen valves in a double-conversion superhet circuit, plus 12 diodes and one transistor. The K.W. 202 has a built-in power unit operating from a 200 - 240v 45-65 Hz AC Supply. An export model is available for 115 volt 60Hz operation.

A two-speed V.F.O drive is used to rotate the scale which is calibrated 0-500 KHz, and can be re-set for optimum read out accuracy. A plug-in CRYSTAL CALIBRATOR provides marker signals every 100 KHz for checking the dial calibration accuracy; (This is available as an optional extra). A built-in Q-MULTIPLIER improves the selectivity for CW operation, and has a NOTCH facility for rejecting unwanted heterodynes and certain interfering signals.

1.2 Specification

BANDS COVERED:	1.8 - 2.0, 3.5 - 4.0, 7.0 - 7.5, 14.0 - 14.5, 21.0 - 21.5, 28.0 - 28.5, 28.5 - 29.0, 29.0 - 29.5, 29.5 - 30.0 MHz.
STABILITY:	With constant input voltage to Receiver better than 200 Hz after warm-up period of 30 minutes.
POWER REQUIREMENTS:	200 - 240v AC 45-65 Hz 80 Watts (115v model also available).
CABINET DIMENSIONS:	Height: $6\frac{1}{4}$ " (15.8 cm) Width: $13\frac{7}{8}$ " (35.2 cm) Depth: $13\frac{1}{4}$ " (33.6 cm) $17\frac{3}{4}$ lbs. approx. (8 kg)
RECEPTION MODES:	SSB (either sideband selectable) AM CW
ANTENNA INPUT IMPEDANCE:	52/75 ohms. V.H.F. SO239 Socket.
SENSITIVITY:	Better than 1 uV for 500 mW output.
SIGNAL-PLUS-NOISE TO NOISE RATIO:	1 uV for 20 dB.

SELECTIVITY: Nominal 3.1 KHz at 6dB. 6 KHz at 60dB.
(3.1 KHz - 200 Hz using Q Multiplier).

S METER: Calibrated for 25 uV input signal to
antenna socket to equal S9. Approx.
5dB per 'S' Unit.

AUDIO OUTPUT IMPEDANCE: Loudspeaker 3-4 ohms. Headphones
500 ohms or higher.

AUDIO OUTPUT: Maximum 1.5 Watts.

1.3 Valve and Semi-conductor Complement

<u>SYMBOL</u>	<u>FUNCTION</u>	<u>TYPE</u>
V 1	RF Amplifier	EF183
V 2	First Mixer	6BE6
V 3	Second Mixer	6BE6
V 4	First IF Amplifier	6BA6
V 5	Second IF Amplifier	6BA6
V 6	Product Detector	12AX7
V 7	Audio Amplifier	ECL82
V 8	H.F. Oscillator	6AM6
V 9	V.F.O.	6U8
V10	B.F.O.	12AT7
V11	S Meter Amplifier	12AT7
V12	Stabiliser	OA2
V13	100 KHz Oscillator	6BA6
D1, 2	AGC Diodes	
D 3	Blocking Diode	
D 4	A.M. Detector	
D 5	Cal. Set	
D 6	Q Multiplier Zener	
D 7	Q Multiplier Rectifier	
D8-11	H.T. Rectifiers	BY236
D12	Bias Rectifier	BY236
F 1	Mains Fuse	1 amp.(234v) 2 amp.(117v)
LP1, 2	Dial Lamps	6.3v .15A LES

SECTION 2

CIRCUIT DESCRIPTION

2.1 RF and Mixer Circuits

The RF AMPLIFIER grid and anode tuned circuits are resonated by the PRE-SELECTOR capacitor, adjustable from the front panel. Tuned circuits L1 - L5 grid, L6 - L10 anode and L11 - L17 HF OSCILLATOR anode are selected by the wavechange switch. The RF input signal is amplified by the RF AMPLIFIER V1, coupled to the suppressor grid of the FIRST MIXER V2. HF OSCILLATOR injection voltage is coupled to the control grid of V2. Products of mixing are selected in the anode circuit of V2, tuned from 3.155 to 2.655 MHz which is the variable IF frequency. Signals are coupled to the suppressor grid of SECOND MIXER V3 with VFO injection voltage applied to the control grid of this valve.

2.2 Oscillator Circuits

1. HF Oscillator. High frequency crystal oscillator V8 provides injection voltage for the first mixer. The crystal oscillator output frequency is always 3.155 MHz higher than the lower edge of the selected band. On the 160, 80 and 40 metre bands the oscillator plate circuit is tuned to the crystal frequency. In the 20, 15 and 10 metre bands, the plate circuit is tuned to the second harmonic.
2. Variable Frequency Oscillator. The V.F.O operates in the range 2200 KHz to 2700 KHz. To obtain correct sideband switching the VFO must be moved in frequency by an amount equal to the spacing of the BFO crystals. The VFO is moved by this amount when switching to lower sideband, and is accomplished by switching a one turn link-coil in circuit by operation of reed relay RL1.
3. Beat Frequency Oscillator. The B.F.O is crystal controlled and furnishes injection voltage for the product detector. Crystals X10 and X11 provide the correct B.F.O frequency relationship to the mechanical filter passband to yield optimum audio response from the product detector. Crystal X10 is used for lower sideband reception, and X11 for upper sideband. Oscillator voltage is coupled to the cathode of V6, the product detector.
4. 100 KHz Crystal Calibrator. The 100 KHz crystal controlled oscillator, is available as an optional extra, it plugs into the eight pin socket at the top-rear of the receiver. The oscillator provides marker signals at multiples of 100 KHz. Variable capacitor C116 provides for exact adjustment of the crystal frequency against a known standard. The output of this oscillator is coupled to the receiver antenna circuits.

2.3 IF and Detector Circuits

The anode load of the second mixer is a MECHANICAL FILTER, with a nominal centre frequency of 455 KHz with a passband width at 6 dB

2.3 IF and Detector Circuits (Cont'd.)

of approximately 3.1 KHz. The signal from the mechanical filter is amplified by IF AMPLIFIERS V4 and V5, and applied through IFT4 to the AGC detector D1, 2 and to either the product DETECTOR V6 or AM DETECTOR D4 via the FUNCTION switch (S2). The output of the BFO is fed to the cathode of the product detector, the resulting mixing process produces the detected signal at audio frequencies. Output of the AGC detector is used to control the two IF amplifier tubes and the RF amplifier tube. The AGC is fast attack, slow release for SSB and CW, and fast attack fast release for AM operation.

2.4 "Q" Multiplier

The "Q" Multiplier operates at the 455 KHz IF. The PEAK circuit magnifies the "Q" of the IF tuned circuit to provide a greater degree of selectivity. The "High Q" circuit in the "Q" Multiplier can be switched to NULL to provide a 30db "slot" which can be "tuned" over the passband of the mechanical filter by the frequency control.

2.5 S Meter

The S Meter operates from the AGC line via S Meter amplifier V 11, the AGC threshold is approximately 1 microvolt. S9 on the S Meter is equal to an input signal at the 52 ohm antenna terminal of 25uV.

2.6 Audio Circuits

Audio voltage from the AM or PRODUCT detector is coupled to the AF GAIN control RV3, fed to the AF AMPLIFIER V7, amplified, and coupled via the audio output transformer T1 to the external 3-4 ohm loudspeaker. Audio voltage from the plate of V7 is taken to pin 3 of the external circuit socket for ANTI-TRIP operation in the transmitter.

Side-tone monitoring is provided by feeding audio into the external circuit socket from the K.W. 204 transmitter, and coupling it into the plate circuit of the product detector.

2.7 Wavechange Switch

The wavechange switch has nine positions, clearly marked on the front panel with the lowest frequency of each range. The switch selects the correct coils to tune the HF Oscillator, grid of R.F. Amplifier, and anode of R.F. Amplifier.

2.8 Pre-Selector

The pre-selector capacitor tunes the GRID and ANODE circuits of the RF Amplifier, and is adjustable from the front panel via a slow motion drive. The front panel is calibrated for the 160, 80, 40, 20, 15 and 10M bands.

Power Supply Unit

The built-in power unit provides heater, plate and bias voltages for the receiver. Transformer T2 has its primary tapped for operation from 200, 220 or 240v AC mains. Secondary one, feeds a bridge rectifier circuit using four silicon diodes D8-D11, which deliver + 235v.

WARNING

THE VOLTAGES IN THIS ARE DANGEROUS
AND EVERY CARE MUST BE TAKEN
TO AVOID CONTACT

DISCONNECT THE POWER LEAD BEFORE
CHANGING FUSE OR REMOVING CHASSIS

SECTION 3

INSTALLATION

3.1 Unpacking

Carefully unpack all items of the Receiver and inspect for any damage which may have occurred during transit. Examine all packing materials before discarding to ensure that no parts are inadvertently thrown away. Check all tubes and crystals for obvious damage and ensure that they are firmly seated in their respective sockets.

3.2 Station Installation

Connect the receiver, transmitter and antenna as shown in Fig. 6 - 1. If the receiver is to be used by itself or with a transmitter other than the K.W. 204, check that pins 7 and 8 of the octal plug on the rear of the receiver are shorted together when on receive.

3.3 Antenna

The receiver is designed for an antenna input of 50-75 ohms from the co-axial line and the best results will be obtained when using this impedance. However, almost any type of aerial may be used, such as a long wire, etc. An Antenna Tuning Unit, such as the K.W. 107 or K.W. E-Z Match, when used with a long wire, will provide optimum performance.

Connect antenna to the PL259 - UHF type co-axial connector provided and plug-in to the SO239 - UHF socket at the rear of the chassis.

3.4 Loudspeaker

A 3-4 ohm speaker is required. The audio output from the receiver is brought out at the rear of the chassis on a 2-pin non-reversible socket. The matching K.W. Speaker Unit is provided with a lead, terminated with a 2-pin plug. A separate 2-pin plug is supplied for connection to a suitable speaker. DO NOT switch-on without a Speaker being connected.

3.5 "Anti-trip" and "Side-tone".

"Anti-trip and "side-tone" connections are provided for use with the K.W. 204 Transmitter, but may be suitable for other equipment. The "Anti-trip" connection is brought out to pin 3 on the octal socket, with an earth-return (ground) at pin 2. For CW monitoring, when transmitting on the K.W. 204, the audio side-tone output from the transmitter is connected to pin 1 on the K.W. 202 octal plug with an earth-return (ground) at pin 2.

3.6 Initial Checks

1. The receiver is designed to operate from 200-245v AC 45-65 Hz or to special order 100-120v 45-65 Hz. The Unit has the power transformer set for 240 volt AC or 120 volt AC operation

3.6 Initial Checks (Cont'd.)

when it leaves the factory; for lower voltage operation refer to Fig. 6 - 2 for tap changes.

2. Set the controls to the following positions.

'Q' Multiplier Switch	OFF
'Q' Multiplier Frequency	12 o'clock
PEAK	12 o'clock
NOTCH	12 o'clock
R.F. GAIN	FULLY CLOCKWISE
I.F. GAIN	FULLY CLOCKWISE
AUDIO GAIN	12 o'clock
CALIBRATOR SWITCH	OFF (UP)
CAL. SET	12 o'clock
FUNCTION SWITCH	OFF
WAVECHANGE SWITCH	3.5 MHz
PRE-SELECTOR	80M Segment
V.F.O.	200

3. Turn the Function Switch to L.S.B., and allow a few minutes for the set to warm up, mush or signals should now be heard, if not check,
- a) is loudspeaker or headphones connected.
 - b) are RF and IF gain controls fully clockwise.
 - c) is muting plug shorting pins 7 and 8 on octal socket.
4. Switch the CALIBRATOR on, and check calibration at 000, 100, 200, 300, 400 and 500 on the V.F.O. dial.

SECTION 4

OPERATION

4.1 General

After doing the initial checks as in Section 3, set the main controls to the following positions.

FUNCTION SWITCH	REQUIRED SIDEBAND
WAVECHANGE SWITCH	REQUIRED BAND
PRE-SELECTOR	REQUIRED BAND

1. It is normal practice to operate on lower sideband on the 160, 80 and 40 M bands, and upper sideband on 20, 15 and 10M Bands.
2. The Amateur bands in the U.K. are 1.8 - 2.0 MHz, 3.5 - 3.8MHz, 7.0 - 7.1 MHz, 14.0 - 14.35 MHz, 21.0 - 21.45 MHz and 28.0 - 29.7 MHz.

4.2 SSB Operation

Reception of single sideband with the K.W. 202 will be found to be quite simple, when a signal is heard, it may sound like "Donald Duck", slowly tune the VFO, using the outer VFO knob until the signal is intelligible, then adjust the pre-selector for maximum 'S' Meter reading. If very strong signals are being received, it may be advisable to reduce the level of signals getting to the grid of the RF Amplifier, this may be done by turning the RF GAIN control anti-clockwise. A reduction in receiver gain may be obtained by turning the IF GAIN control anti-clockwise, this will cause the 'S' Meter to read up scale. Adjust the AF GAIN control for a comfortable listening level.

4.3 AM Reception

AM signals should be received with the FUNCTION switch set at AM. This switches off the B.F.O., switches the product detector out of circuit and the AM detector in circuit. Tune signals in the normal manner, adjusting the gain controls as required. If there is heavy interference on the AM signal, then better results may be obtained by using the exalted carrier method of reception, switch to upper or lower sideband, and tune the VFO so that ZERO BEAT is obtained between the AM carrier and the B.F.O. crystal.

4.4 CW Reception

For reception of CW signals, switch to upper or lower sideband, and tune the VFO until the desired note is heard. When the K.W. 202 is used with the K.W. 204 Transmitter the Receiver should be switched to U.S.B. Improved selectivity may be obtained by using the Q MULTIPLIER. Switch the Q Multiplier to PEAK and with the PEAK potentiometer knob vertical, adjust the FREQUENCY control for a peak in signal level. It will be found that when operating on USB the frequency control will peak in the HF portion, and when on L.S.B. in the IF

4.4 CW Reception (Cont'd.)

portion. The selectivity can be varied by turning the **PEAK** control clockwise, until just before the Q Multiplier goes into oscillation.

4.5 "Q" Multiplier

The 'Q' Multiplier provides "peak" and "notch" facilities and these are selected at the function switch located at the top-right of the front panel. The "peak" facility is most useful for CW reception, but will also sharpen selectivity on SSB operation. "Notch" can be used as a means of reducing interference from a transmission which is very close in frequency, particularly when a heterodyne appears on the wanted SSB or AM signal.

1. "Notch" To familiarise the operator with the control of this circuit, the 100 KHz crystal oscillator can be used. Adjust the receiver in the normal manner and tune the VFO to a "beat note" of the Crystal Calibrator, at say, 14200 KHz. Note 'S' Meter reading.

Switch-on 'Q' Multiplier to "NULL" position. Adjust "Frequency" tuning control associated with 'Q' Multiplier, for a dip in the 'S' Meter reading. Carefully tune the "Notch" control for a further dip on the 'S' Meter reading. By further, careful adjustment of "Frequency" and "Notch" Controls the depth of the notch can be as much as 40 dB. After practise, apply these principals to "notching-out" an interfering signal.

2. "Peak" Turn 'Q' Multiplier function switch to 'PEAK'. Tune to a CW signal. Advance "Peak" control in a clockwise direction until a howl is heard in the speaker. Leave the "Peak" control in the threshold, just below the point where the howl commences - this is the most selective condition. Adjust the "Frequency" control, to peak the wanted CW signal. This can also be practised using the crystal calibrator as a signal source.

4.6 Calibration

The Receiver calibration may be checked against the optional 100 KHz crystal calibrator. Switch the calibrator ON, and check the calibration at 000, 100, 200, 300, 400 and 500 on the VFO dial. If exact calibration is required at any one point, then correct by using the CAL. SET control, the dial calibration should be correct within a tolerance of $\pm$ one division of the VFO dial. To read the receiver frequency, note the wavechange switch setting, and add the VFO dial reading, (e.g. 1.) wavechange switch 14.0 MHz VFO dial 059, frequency is 14.059 MHz. (e.g. 2.) 3.5 MHz band, VFO 270, frequency is 3.770 MHz.

4.7 'S' Meter

The 'S' Meter is provided to assist in tuning and to give an indication of relative signal strength. The Meter may be used on any type of signal, with the RF GAIN at Maximum. When adjusted at the factory the 'S' Meter reads S9 for an input of 25 uV. and is calibrated at 5 dB. each S point. The meter may be set to Zero by means of the potentiometer at the back of the printed circuit board (see fig. 6-3).

4.8 Muting

The Receiver is provided with an octal socket at the rear of the chassis for Muting purposes. When the octal plug is removed, it will be noted that pins 7 and 8 are linked. This link should be cut and a twisted pair of wires extended from pins 7 and 8 to the transmitter control relay, which must provide contacts that are 'open' on transmit and 'closed' on receive.

SERVICE INSTRUCTIONS5.1 General

This section covers maintenance and service of the K.W. 202 Receiver. It includes information on trouble analysis, signal tracing procedures, voltage and resistance measurements and alignment procedures. The usefulness of signal level and alignment data given depends upon the accuracy of the test equipment used. Minor adjustments in alignment may be made using the crystal calibrator as a signal source. Except for an occasional touch-up to compensate for possible component ageing, alignment normally will be necessary only if frequency determining components have been replaced. If servicing requires that the cabinet be removed, proceed as follows:

1. Disconnect all power and external connections.
2. Remove the two rear feet and the two front feet from the bottom of the cabinet.
3. From the rear, push the receiver chassis forward until the front panel protrudes from the cabinet about an inch.
4. Grasping the front panel at the edge, slide the receiver out of the cabinet.

5.2 Trouble Analysis

1. Most cases of trouble can be traced to defective valves. Many valve checkers cannot duplicate the conditions under which the valves work in the Receiver. Substitution of new valves will sometimes clear an obscure case of valve trouble. Intermittent trouble conditions in valves can usually be discovered by lightly tapping the envelope. Occasionally valve pins or socket terminals will become dirty or corroded causing an intermittent condition. When this situation is suspected, remove the valve and apply a few drops of contact cleaner to the valve pins. Replace the valve and work it up and down in the socket a few times. Shorted valves or capacitors will often cause associated resistors to overheat and crack, blister or discolour. Making the measurements listed in Table 6-1 will help to isolate this type of trouble to a particular stage or component. A logical process of elimination in conjunction with a study of the main schematic diagram and block diagram will aid in isolating trouble. For example -
2. If the receiver 'S' Meter functions properly, and there is no audio output, then the fault will either be in the B.F.O. (V10), the PRODUCT DETECTOR (V6) or the AF AMP and OUTPUT VALVE (V7).
3. If no signal is received, and "mush" can be heard, then the fault will be in either the VFO (V9), HF OSCILLATOR (V8), 2ND MIXER (V3) 1ST MIXER (V2) or the RF AMPLIFIER (V1).

5.3 Signal Tracing Procedures

Table 6-2 lists significant test points, normal signal test points and normal signal levels. Figs. 6-2 and 6-3 show location of adjustments. Voltages given in the tables are nominal and may vary plus or minus 20 per cent. A signal generator with an accurately calibrated output

5.3 Signal Tracing Procedures (Cont'd.)

attenuator must be used to provide the RF signal source indicated. Be careful each time to set signal generator to frequency shown in table. Oscillator output voltages must be measured with a valve voltmeter and RF probe.

1. For audio-measurements, use an audio oscillator as the signal source and an a-c VVM or audio wattmeter to monitor receiver output. Set AF GAIN at maximum, and terminate the 3 ohm AUDIO output with a three ohm resistive load.
2. Oscillator injection voltages are measured with VVM with an RF probe.
3. To check RF signal levels, connect DC VVM to the receiver AGC line. Set RF and IF GAIN fully clockwise. Static DC voltage on the AGC line should be approximately 0.3 volt. Connect the RF signal generator to the point indicated in the table, and vary the generator dial to produce maximum AGC voltage, and compare with the value listed in the table.

5.4 Voltage and Resistance Measurements

Table 6-1 lists voltage and resistance measurements with the receiver on upper sideband. Voltages and resistances given in the tables are nominal and may vary plus or minus 20 per cent.

5.5 Alignment Procedure

1. Complete alignment of the K.W. 202 requires the use of the following equipment.
 - a) SIGNAL GENERATOR (S.G.) covering 455 KHz to 30 MHz with output impedance of 52 ohms.
 - b) AUDIO OSCILLATOR
 - c) AUDIO WATTMETER
 - d) VALVE VOLTMETER (VTVM) with RF PROBE - TYPE USED AIRMEC 314.
 - e) MULTIMETER. TYPE USED AVO MODEL 8.
 - f) Non metallic hexagonal trimming tool.
2. Before attempting to align the K.W. 202 please read the instructions very carefully.
3. Dissolve the fixative holding the cores in the pre-selector coils with acetone, do not force the cores as the coils may become distorted. It is advisable to dissolve the fixative one band at a time.
4. Set the receiver up as follows:

AF GAIN	NORMAL LISTENING LEVEL
RF GAIN	FULLY CLOCKWISE (F.C.)
IF GAIN	F.C.
PRE-SELECTOR	80m LOWER EDGE OF SEGMENT

5.5 Alignment Procedure (Cont'd.)

4. (Cont'd.)

FUNCTION SWITCH	L.S.B.
BANDSWITCH	3.5 MHz
V.F.O.	000
Q MULTIPLIER	OFF

5. Plug the Signal Generator into the co-axial socket. Allow ten minutes for warm-up.

6. B.F.O. Output Level

Check the output of the B.F.O. with the VTVM and R.F. probe connected to pin 8 of V6. A voltage of 0.8v should be obtained on both sidebands.

7. V.F.O. Output Level

Check the output of the V.F.O. with the VTVM and R.F. probe connected to pin 1 of V3. A voltage of 1.5v should be obtained. If a lower level is obtained this will be due to a faulty 6U8 V9, or 6BE6 V3.

8. H.F. Oscillator Level

Connect the Multimeter set to 10v negative range, to pin 1 of V2. Adjust inductances for peak reading on band segments as follows. It will first be necessary to loosen the cores in the inductances with acetone. See fig. 6-2 for location of adjustments.

BAND	CRYSTAL FREQUENCY	L	AVO READING
1.8	4955	L11	1.0v
3.5	6655	L12	1.5v
7.0	10155	L13	2.5v
14.0	2 x 8577.5	L14	2.5v
21.0	2 x 12077.5	L15	2.5v
28.5	2 x 15827.5	L16	0.8v
29.5	2 x 16327.5	L17	0.8v
28.0	2 x 15577.5	See Below	
29.0	2 x 16077	See Below	

On the 28.0 and 29.0 MHz range, a small link coil is wired between the 28.5/28.0 MHz switch contact and also between the 29.5/29.0 MHz switch contacts, these coils should not require adjustment.

5.6 Pre-Selector 3.5 MHz Band

1. Connect the VTVM reading D.C. NEGATIVE to the AGC line. See Fig. 6-2 for test point. With no signal input a voltage of 0.3v will be obtained.

5.6 Pre-Selector 3.5 MHz Band (Cont'd.)

2. Check that the PRE-SELECTOR pointer is at the lower edge of the 80m segment, and that the receiver is on 3500 KHz.
3. Adjust the output of the Sig. Gen. to 50uV, so that there is an input to the receiver of 25 microvolts at 3500 KHz, rock the S.G. dial until the signal is heard and a peak reading on VTVM is obtained.
4. Adjust bottom core of L1 and core of L6 (see fig. 6-2 for location) for a peak in VTVM reading. Note: L1 has two cores in it, the bottom core is for tuning L1 and the top core for L1 trap.

5.7 IF Trap

Adjust frequency of S.G. to 3155 KHz and increase output by 54db i.e. 25uV to 12.5mV, rock dial about 3155 KHz until signal is heard (note a 3155 KHz signal is heard because the VFO is on 2700 KHz and the difference between 3155 KHz and 2700 KHz is 455 KHz which is the IF frequency). Adjust the top core of L1 for a reduction in VTVM reading. Level should go below that obtained with the 25uV signal at 3500 KHz. NOTE: L1 trap core is the top core of L1.

5.8 455 KHz IF Transformers

1. Tune the receiver to 3750 KHz, retune S.G. to 3750 KHz, adjust output of S.G. for an input to the receiver of 25uV.
2. Peak top and bottom cores of IFT3 and IFT4 for a peak S Meter or VTVM reading.
3. The adjustment of the top core of IFT3 will be very 'flat'.
4. Adjust C91 and L19 located on the Q Multiplier board, for a peak in S Meter reading.

5.9 V.I.F. Transformers

1. Tune receiver to 4.0 MHz, retune S.G. to 4.0 MHz, adjust output for an input to receiver of 25uV.
2. Peak core of IFT1 and IFT2.
3. Change frequency of receiver and S.G. to 3.5 MHz.
4. Adjust the concentric trimmers on IFT1 and IFT2 for peak S Meter or VTVM reading.
5. Continue to adjust the core of IFT1 and IFT2 at 4.0 MHz and the concentric trimmers at 3.5 MHz until the AGC level is flat within ± 3 db over the band.

5.9 V.I.F. Transformers (Cont'd.)

6. Retune receiver and S.G. to 3750 KHz.

5.10 'S' Meter Calibration

1. Adjust the S Meter linearity pot. RV8 so that the wiper is in the centre of the track.
2. Tune slightly off the 3750 KHz signal so that it cannot be heard.
3. Adjust the S METER ZERO pot RV9 so that the S Meter reads ZERO.
4. Tune back to 3750 KHz signal for maximum S Meter reading.
5. Adjust the S METER SENSITIVITY pot. RV7 so that the S METER reads S9 for an input of 25uV.
6. Increase the input to 2.5mV. Adjust the S METER LINEARITY pot, for an S METER reading of S9 + 40db.
7. Decrease input to 25uV.
8. Off tune from 3750 KHz signal.
9. Re-adjust S METER ZERO pot. for S METER ZERO.
10. Re-tune on to 3750 KHz for maximum S METER reading.
11. Re-adjust S METER SENSITIVITY pot. for S9.
12. Increase input to 2.5mV.
13. Re-adjust S METER LINEARITY pot. for S9 + 40db.
14. Repeat 8, 9, 10, 11, 12, 13 until S METER reads ZERO with no input, S9 with 25uV S9 + 40db with 2.5mV.

5.11 VFO Calibration

1. Tune the receiver to 4000 KHz using the 100 KHz calibrator as the signal source. Check the accuracy of the 100 KHz signal against a known accurate 100 KHz signal, zero beat by adjusting C116.
2. Check the tracking of the VFO at each 100 KHz point. If it is overtaking at 3.5 MHz reduce the capacity of C76 by inserting a probe through the hole in the top of the VFO and turning the Philips trimmer anti-clockwise.
3. Reset the VFO dial at 4.0 MHz and adjust the core of L18 (see fig. 6-2) for zero beat. Repeat the above adjustments until the tracking is correct.
4. If the VFO is undertracking, increase the capacity of C76 by turning the Philips trimmer clockwise. Re-adjust at 4.0 MHz for zero beat. Repeat until the tracking is correct.

5.12 ULSB Switching

1. Re-tune receiver to 3800 KHz, zero beat USB.
2. Switch to LSB, adjust L18 LINK by inserting a probe through the lower hole in the VFO box for ZERO BEAT, (when receiver is switched to LSB, R1 relay closes completing the circuit of L18 link to earth, causing the frequency of the V.F.O. to increase by an amount equal to the spacing of the carrier crystals, approximately 3KHz).
3. Switch back to USB and check that ZERO BEAT is still maintained, repeat (2) until switching between USB and LSB ZERO BEAT is maintained.
4. Leave function switch on USB.

5.13 Pre-Selector 29.5 MHz Band

1. With VTVM connected to AGC test point, tune the receiver to 30000 KHz.
2. Adjust the pre-selector so that the pointer is on the upper edge of the 10m segment.
3. Tune the S.G. to 30000 KHz output 50uV, rock the dial until the signal is heard.
4. Adjust the cores of L2 and L7 for a peak VTVM reading, final adjustment VTVM should read 2.5v for 25uV input.

5.14 Pre-Selector 21.0 MHz Band

1. Adjust the pre-selector so that the pointer is in the centre of the 15m segment.
2. Tune the receiver to 21250 KHz.
3. Tune the S.G. to 21250 KHz output 50uV - rock the dial until the signal is heard.
4. Adjust the cores of L3 and L8 for a peak VTVM reading, VTVM should read 2.5v for 25uV input.

5.15 Pre-Selector 14.0 MHz Band

1. Adjust the pre-selector so that the pointer is in the centre of 20m segment.
2. Tune the receiver to 14250 KHz.
3. Tune the S.G. to 14250 KHz output 50uV, rock the dial until the signal is heard.
4. Adjust the cores of L4 and L9 for peak VTVM reading, VTVM should read 2.5v or better.

5.16 Pre-Selector 7.0 MHz Band

1. Adjust the pre-selector so that the pointer is in the centre of 40m segment.
2. Tune the receiver to 7250 KHz.
3. Tune the S.G. to 7250 KHz output 50uV, rock the dial until the signal is heard.
4. Adjust the cores of L5 and L10 for peak VTVM reading, VTVM should read 2.5v or better.

5.17 Pre-Selector 1.8 MHz Band

1. Adjust the pre-selector so that the pointer is on the lower edge of the 160m segment.
2. Tune the receiver to 1800 KHz.
3. Tune the S.G. to 1800 KHz output 50uV, rock the dial until the signal is heard.
4. Adjust C3 and C13 for peak VTVM reading, VTVM should read 2.5v for 25uV input.

5.18 Pre-Selector Coil Cores

After adjusting the pre-selector cores, re-seal the cores in the coils using polystyrene cement.

5.19 Field Alignment

If a signal generator is not available, the K.W. 202 may be aligned using the 100 KHz calibrator, a 52 ohm dummy load, and the S Meter. It is important when doing the front end alignment that the antenna socket is terminated with a 52 ohm load.

TABLE 6 - 1

VOLTAGE AND RESISTANCE MEASUREMENTS

AF GAIN
RF GAIN
IF GAIN
FUNCTION
BAND

F.C.C.
F.C.
F.C.
U.S.B.
2.5 MHz

CALIBRATOR OFF
Q MULTIPLIER OFF
PEAK VERTICAL
NOTCH VERTICAL
Q FREQUENCY VERTICAL

UNPLUG RECEIVER FROM MAINS FOR RESISTANCE MEASUREMENTS.

VALVE		1	2	3	4	5	6	7	8	9
V1	DCV	0.2	-0.2	-	-	0	-	215	60	0
RF AMP.	ACV	-	-	-	6.3	0	-	-	-	-
EF 183	Ohm	47	1.6m	-	-	0	-	4.2K	149K	0
V2	DCV	-3	1	-	-	215	55	0		
1st MIX	ACV	-	-	6.3	0	-	-	-		
6BE6	Ohm	47K	270	0	0	7.4K	70.7K	100K		
V3	DCV	-1.1	1	-	-	215	50	0		
2nd MIX	ACV	-	-	0	6.3	-	-	-		
6BE6	Ohm	47K	270	0	0	7.4K	70.7K	100K		
V4	DCV	-1.4	0	-	-	60	50	0		
1st IF	ACV	-	-	6.3	0	-	-	-		
6BA6	Ohm	1.9m	0	0	0	12.7K	35.7K	0		
V5	DCV	-1.1	0	-	-	150	130	3		
2nd IF	ACV	-	-	6.3	0	-	-	-		
6BA6	Ohm	1.9m	0	0	0	7.4K	35.7K	270		
V6	DCV	-	-	-	-	-	140	-1	0.6	-
PROD. DET	ACV	-	-	-	-	6.3	-	-	-	0
12AX7	Ohm	-	-	-	-	0	54.2K	3.63m	680	0
V7	DCV	0	17.5	0	-	-	200	220	1	80
AF AMP.	ACV	-	-	-	6.3	0	-	-	-	-
ECL 82	Ohm	0	470	470K	0	0	3.5K	2.7K	2.2K	227K
V8	DCV	-2.5	0	-	-	200	0	150		
HF CSC.	ACV	-	-	0	6.3	-	-	-		
6AM6	Ohm	100K	0	0	0	7.4K	0	54.4K		
V9	DCV	115	0	85	-	-	80	1.25	4.5	3
VFO	ACV	-	-	-	0	6.3	-	-	-	-
6U8	Ohm	9.9K	68K	52.2K	0	0	27.2K	270	680	100.6K

TABLE 6 - 1 (Cont'd.)

VALVE		1	2	3	4	5	6	7	8	9
<u>V10</u>	DCV	100	-.35	0	-	-	100	0	3.5	-
BFO	ACV	-	-	-	6.3	6.3	-	-	-	0
12AT7	Ohm	25.7K	100K	INFIN	0	0	24.7K	100K	0	0
<u>V11</u>	DCV	180	0	2.5	-	-	180	0	2.5	-
S AMP.	ACV	-	-	-	0	0	-	-	-	6.3
12AT7	Ohm	7.4K	0	250	0	0	7.4K	500K	250	0
<u>V12</u>	DCV	150	0	0	0	150	0	0		
STAB.	ACV	-	-	-	-	-	-	-		
OA2	Ohm	5.7K	0	0	0	5.7K	0	0		
<u>V13</u> ON	DCV	0	0	-	-	200	65	0		
100KHz OFF	DCV	0	0	-	-	215	215	60		
CALIB'R.	ACV	-	-	6.3	-	-	-	-		
6BA6	Ohm	1m	0	0	0	104K	224K	0		

TRANSISTOR LEAD CONNECTIONS. Q MULTIPLIER ON

TRANSISTOR		EMITTER	BASE	COLLECTOR
Q MULTIPLIER	DCV	0.4	0.7	6.2
BC 108	Ohm	7.5K	10K	78K

All Measurements W.R.T. Chassis

H.T. To Chassis 2.7K

Bias to Chassis 35 K

TABLE 6 - 2

Band	3.5 MHz
AF Gain	F.C.
Function	L.S.B.
RF Gain	F.C.
Q Mult.	OFF
Cal.	OFF

Signal Levels

SIGNAL INJECTION POINT	GENERATOR OUTPUT f	GENERATOR OUTPUT V	NORMAL INDICATION
AF AMP. V7 Pin 3	1700 Hz	8.6v	1.5w AF O/P
ECL 82 V7 Pin 1	1700 Hz	200mV	1.5w AF O/P
PROD.DET V6 Pin 8 12 AX 7	453 KHz	BFO INJECTION	0.8v RF
2nd IF V5 Pin 1 6BA6	455 KHz	100mV	3.0v AVC
1st IF V4 Pin 1 6BA6	455 KHz	1.5mV	3.0v AVC
2nd MIX V3 Pin 5 6BE6	455 KHz	2.5mV	3.0v AVC
V3 Pin 7	455 KHz	1.0mV	3.0v AVC
V3 Pin 7	2855 KHz	1.5mV	3.0v AVC
V3 Pin 1	2400 KHz	VFO INJECTION	1.5v RF
1st MIX V2 Pin 5 6 BE6	2855 KHz	2.0mV	3.0v AVC
V2 Pin 7	2855 KHz	2.0mV	3.0v AVC
V2 Pin,1	2855 KHz	2.0mV	3.0v AVC
V2 Pin 1	6655 KHz	HF OSC. INJECTION	3.5v RF
RF AMP. V1 Pin 7	3800 KHz	1.5mV	3.0v AVC
EF183 V1 Pin 2	3800 KHz	100uV	3.0v AVC
ANT	3800 KHz	50uV	3.0v AVC

Signal Generator termination impedance 52 ohms.
Injection via 0.01 uF condenser except Antenna Measurement.

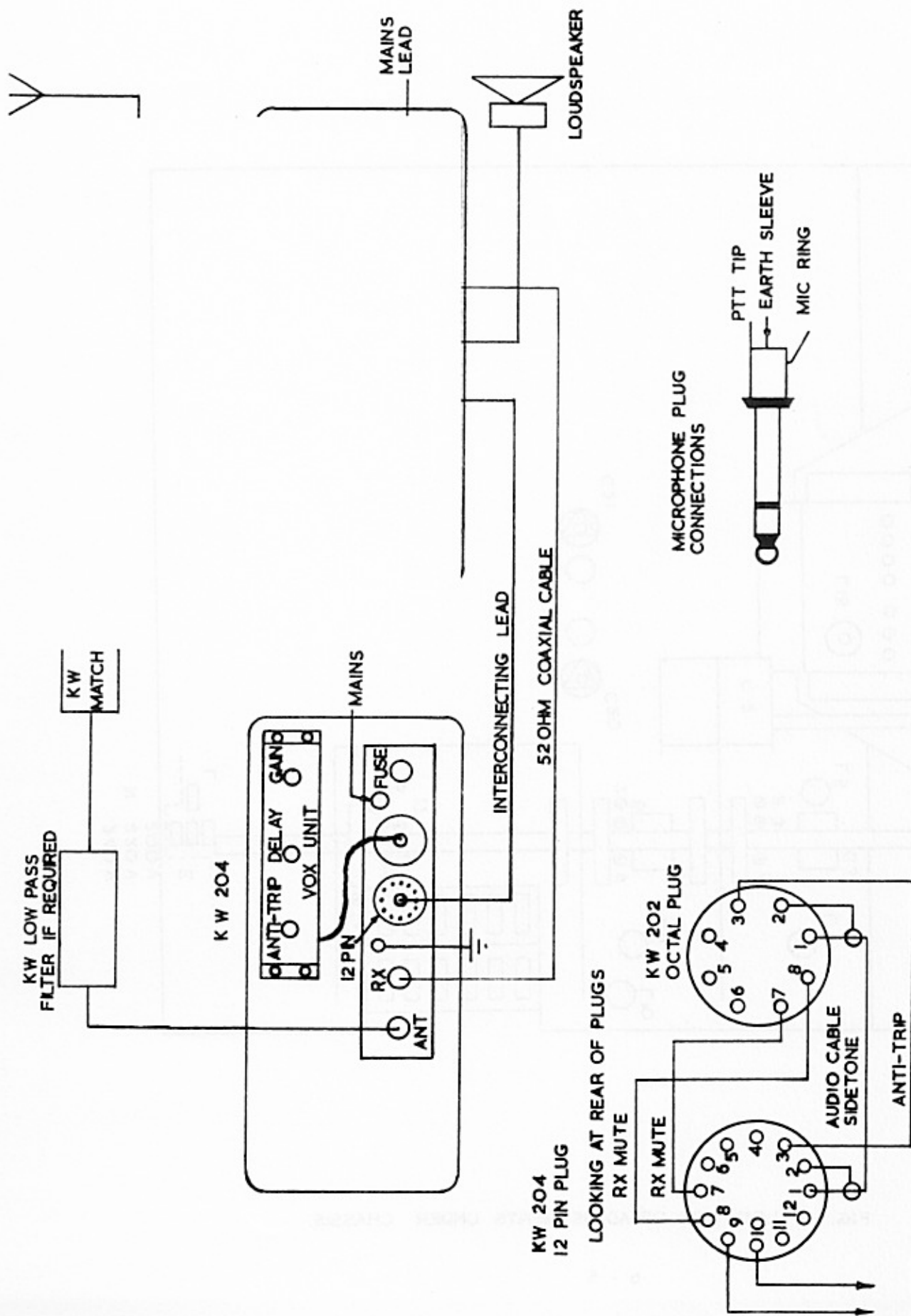


FIG 6-1 STATION INSTALLATION

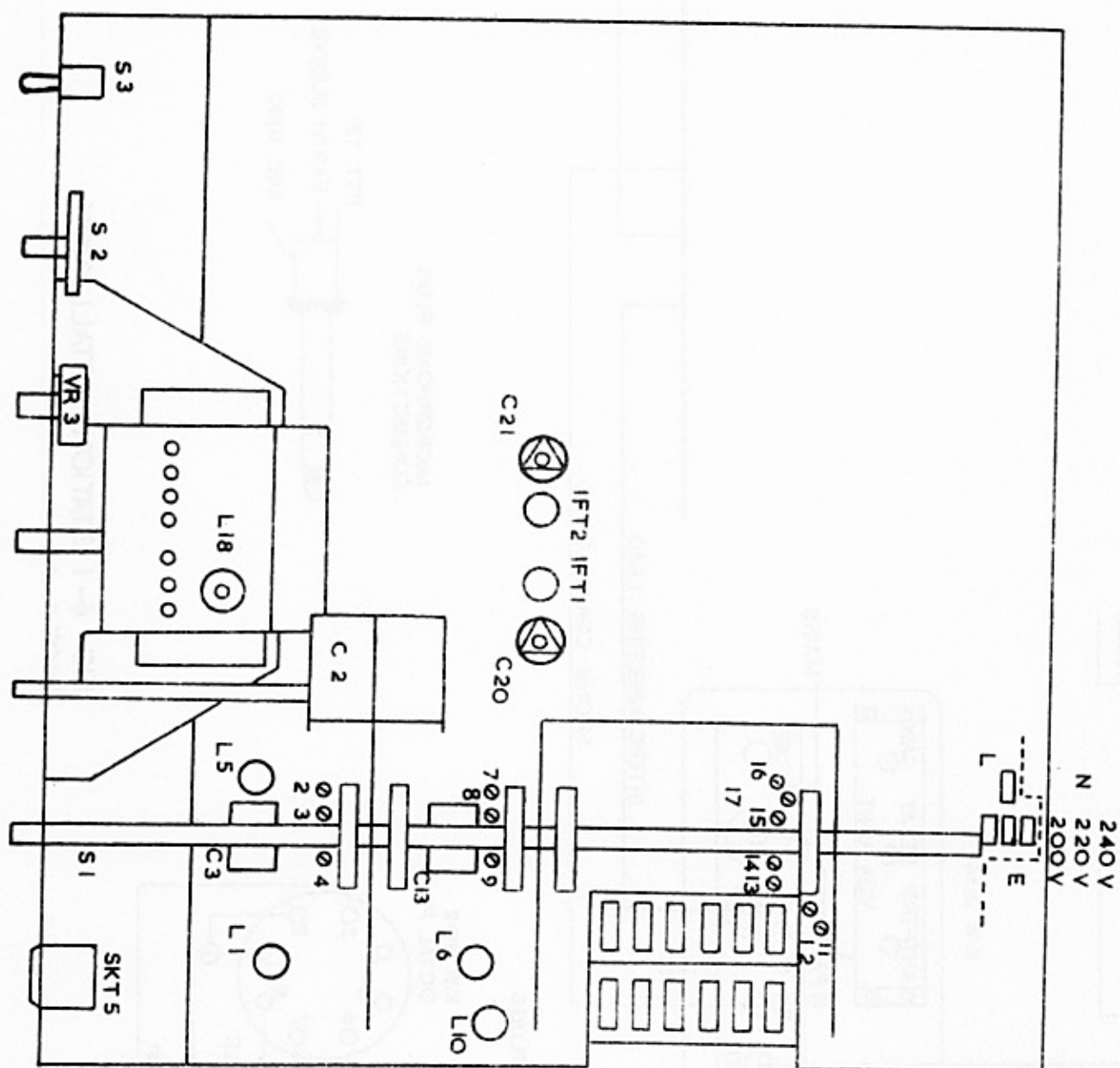


FIG. 6.2. LOCATION OF ADJUSTMENTS UNDER CHASSIS.

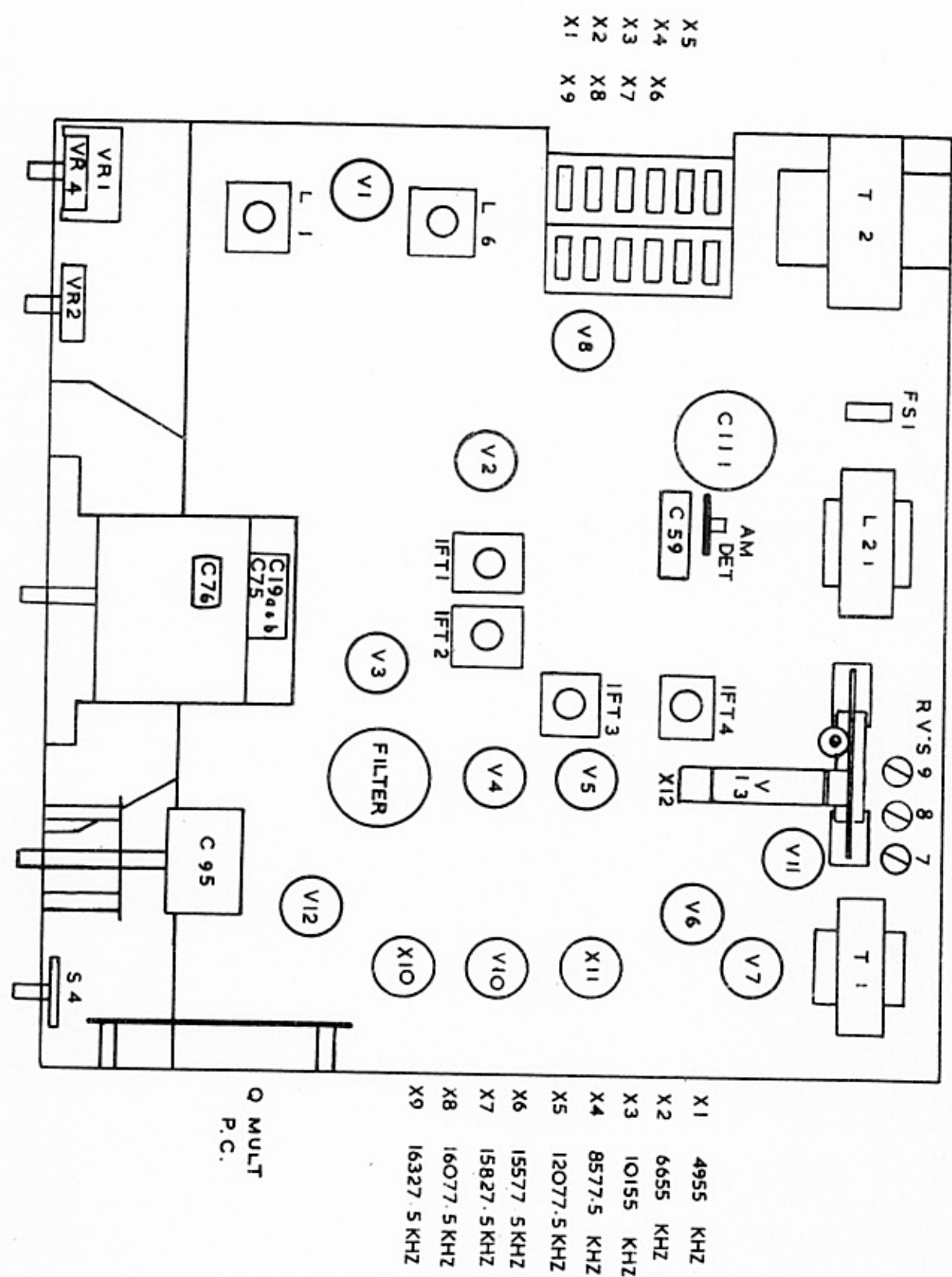


FIG.6.3. LOCATION OF VALVES AND CRYSTALS.

GUARANTEE

This equipment is conditionally guaranteed by us for a period of six months from the date of purchase by the actual user. In the event of any failure during this period, due to faulty workmanship or material, the dealer from whom the equipment was purchased should be notified. The dealer reserves the right to make a reasonable charge for labour, obtaining from us any necessary part for replacement free under this guarantee.

Equipment should not be returned to us direct without prior arrangements having been made. Equipment returned must be sent carriage paid by the sender and well packed. If rail transport is used, the package should be consigned at Railway Company's Risk rate. We also reserve the right to make a charge for labour, handling expenses and return carriage.

Any interference or alteration to equipment, without our consent, renders this guarantee void. The guarantee does not apply to equipment purchased second-hand or at less than our standard list price. The guarantee is not transferable.

Valves used in this equipment are guaranteed by the valve manufacturer for a period of three calendar months from the date of purchase. This guarantee is only given in respect of faulty workmanship and material and does not cover misuse or consequential damage. Claims under this guarantee will only be considered if the valve is returned to the valve manufacturer through the dealer from whom the equipment was purchased supported by proof of the date of purchase of the equipment as issued by K.W. Electronics Ltd. To ensure proper examination, the right is reserved to break open any valve, if necessary, without obligation to return or replace.

Please complete and return the Guarantee Card within one month of the date of purchase.

REPAIRS UNDER GUARANTEE

If the material or equipment was purchased direct from K.W. ELECTRONICS LTD., and you wish to return it for service under guarantee, you should write to the address shown below giving full particulars including the details listed. Upon receipt of such notice, K.W. will promptly advise you respecting the return. Failure to secure our advice prior to forwarding of the goods or failure to provide full particulars may cause unnecessary delay in handling of your returned merchandise.

ADDRESS

K.W. ELECTRONICS LTD.
SERVICE SECTION
VICEROY WORKS
R/O 23 HIGH STREET
CRAYFORD
KENT

Tel: CRAYFORD 22040

INFORMATION NEEDED

- (a) Type number, name and serial number of equipment.
- (b) Date of delivery of equipment.
- (c) Nature of trouble.
- (d) Number of hours of service.
- (e) Cause of trouble if known.

If the equipment was purchased from an Agent it should be returned to the Agent for service.

OUT OF GUARANTEE REPAIRS

If you wish to return your equipment for repairs, write to the above address giving full particulars including the details listed. Upon receipt of such notice, K.W. will advise you respecting return. Do not send goods without first obtaining our advice.

INFORMATION NEEDED

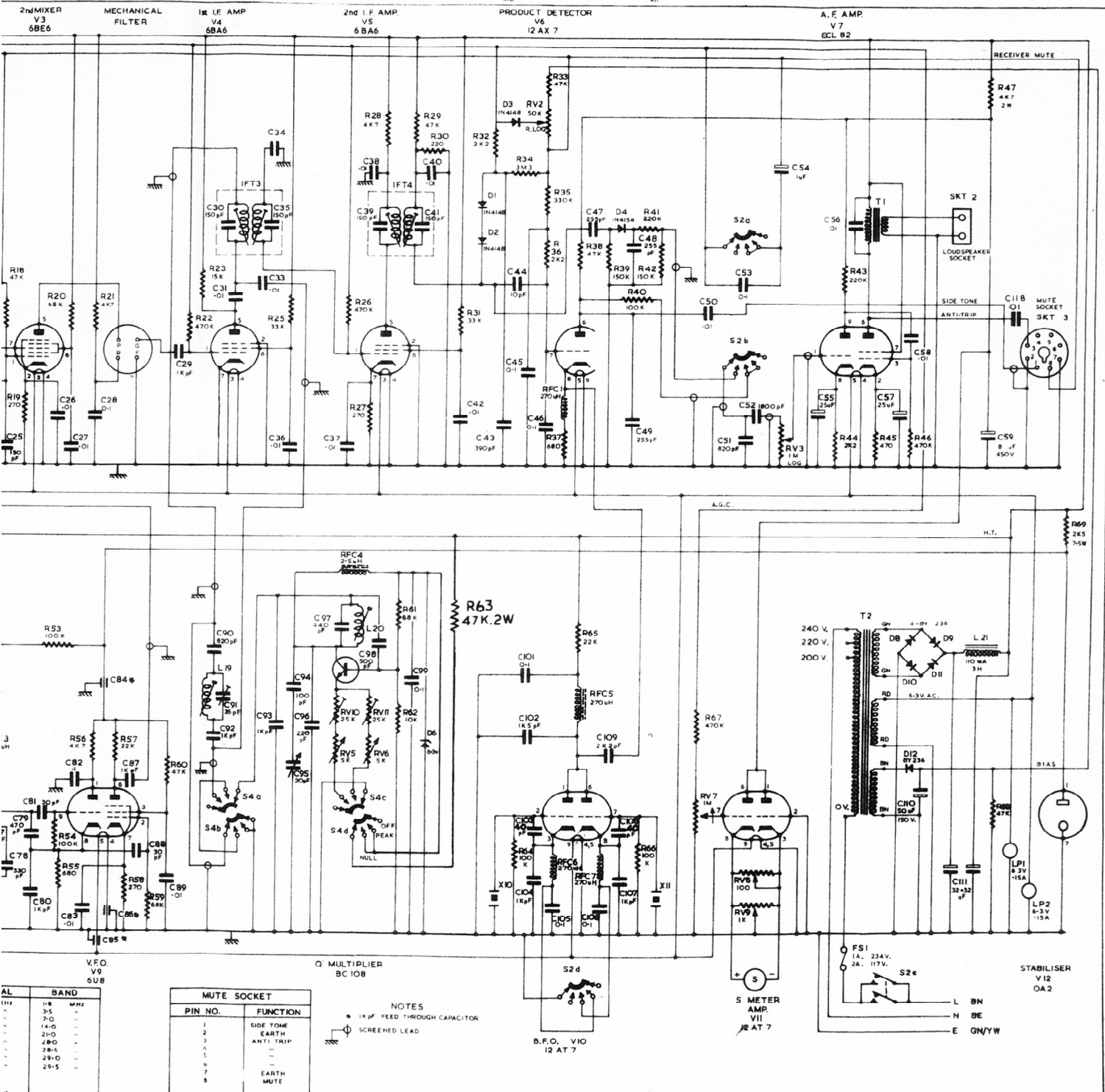
- (1) Type number, name and serial number of equipment.
- (2) Number of hours of service.
- (3) Complete instructions detailing work to be performed.
- (4) Your return address.
- (5) Method of shipment by which the equipment should be returned.
- (6) Special instructions.

SERVICE QUERIES

Any technical queries regarding K.W. Electronics Equipment should be addressed to our Crayford works and marked "For the attention of Service Section".

THIRD ANGLE PROJECTION

R0	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
R50	R51	R52	R53	R54	R55	R56	R57	R58	R59	R60	R61	R62	R63	R64	R65	R66	R67	R68	R69	R70	R71	R72	R73	R74	R75	R76	R77	R78	R79	R80	R81	R82	R83	R84	R85	R86	R87	R88	R89	R90	R91	R92	R93	R94	R95	R96	R97	R98	R99																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30	C31	C32	C33	C34	C35	C36	C37	C38	C39	C40	C41	C42	C43	C44	C45	C46	C47	C48	C49	C50	C51	C52	C53	C54	C55	C56	C57	C58	C59	C60	C61	C62	C63	C64	C65	C66	C67	C68	C69	C70	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91	C92	C93	C94	C95	C96	C97	C98	C99	C100	C101	C102	C103	C104	C105	C106	C107	C108	C109	C110	C111	C112	C113	C114	C115	C116	C117	C118	C119	C120	C121	C122	C123	C124	C125	C126	C127	C128	C129	C130	C131	C132	C133	C134	C135	C136	C137	C138	C139	C140	C141	C142	C143	C144	C145	C146	C147	C148	C149	C150	C151	C152	C153	C154	C155	C156	C157	C158	C159	C160	C161	C162	C163	C164	C165	C166	C167	C168	C169	C170	C171	C172	C173	C174	C175	C176	C177	C178	C179	C180	C181	C182	C183	C184	C185	C186	C187	C188	C189	C190	C191	C192	C193	C194	C195	C196	C197	C198	C199	C200	C201	C202	C203	C204	C205	C206	C207	C208	C209	C210	C211	C212	C213	C214	C215	C216	C217	C218	C219	C220	C221	C222	C223	C224	C225	C226	C227	C228	C229	C230	C231	C232	C233	C234	C235	C236	C237	C238	C239	C240	C241	C242	C243	C244	C245	C246	C247	C248	C249	C250	C251	C252	C253	C254	C255	C256	C257	C258	C259	C260	C261	C262	C263	C264	C265	C266	C267	C268	C269	C270	C271	C272	C273	C274	C275	C276	C277	C278	C279	C280	C281	C282	C283	C284	C285	C286	C287	C288	C289	C290	C291	C292	C293	C294	C295	C296	C297	C298	C299	C300	C301	C302	C303	C304	C305	C306	C307	C308	C309	C310	C311	C312	C313	C314	C315	C316	C317	C318	C319	C320	C321	C322	C323	C324	C325	C326	C327	C328	C329	C330	C331	C332	C333	C334	C335	C336	C337	C338	C339	C340	C341	C342	C343	C344	C345	C346	C347	C348	C349	C350	C351	C352	C353	C354	C355	C356	C357	C358	C359	C360	C361	C362	C363	C364	C365	C366	C367	C368	C369	C370	C371	C372	C373	C374	C375	C376	C377	C378	C379	C380	C381	C382	C383	C384	C385	C386	C387	C388	C389	C390	C391	C392	C393	C394	C395	C396	C397	C398	C399	C400	C401	C402	C403	C404	C405	C406	C407	C408	C409	C410	C411	C412	C413	C414	C415	C416	C417	C418	C419	C420	C421	C422	C423	C424	C425	C426	C427	C428	C429	C430	C431	C432	C433	C434	C435	C436	C437	C438	C439	C440	C441	C442	C443	C444	C445	C446	C447	C448	C449	C450	C451	C452	C453	C454	C455	C456	C457	C458	C459	C460	C461	C462	C463	C464	C465	C466	C467	C468	C469	C470	C471	C472	C473	C474	C475	C476	C477	C478	C479	C480	C481	C482	C483	C484	C485	C486	C487	C488	C489	C490	C491	C492	C493	C494	C495	C496	C497	C498	C499	C500	C501	C502	C503	C504	C505	C506	C507	C508	C509	C510	C511	C512	C513	C514	C515	C516	C517	C518	C519	C520	C521	C522	C523	C524	C525	C526	C527	C528	C529	C530	C531	C532	C533	C534	C535	C536	C537	C538	C539	C540	C541	C542	C543	C544	C545	C546	C547	C548	C549	C550	C551	C552	C553	C554	C555	C556	C557	C558	C559	C560	C561	C562	C563	C564	C565	C566	C567	C568	C569	C570	C571	C572	C573	C574	C575	C576	C577	C578	C579	C580	C581	C582	C583	C584	C585	C586	C587	C588	C589	C590	C591	C592	C593	C594	C595	C596	C597	C598	C599	C600	C601	C602	C603	C604	C605	C606	C607	C608	C609	C610	C611	C612	C613	C614	C615	C616	C617	C618	C619	C620	C621	C622	C623	C624	C625	C626	C627	C628	C629	C630	C631	C632	C633	C634	C635	C636	C637	C638	C639	C640	C641	C642	C643	C644	C645	C646	C647	C648	C649	C650	C651	C652	C653	C654	C655	C656	C657	C658	C659	C660	C661	C662	C663	C664	C665	C666	C667	C668	C669	C670	C671	C672	C673	C674	C675	C676	C677	C678	C679	C680	C681	C682	C683	C684	C685	C686	C687	C688	C689	C690	C691	C692	C693	C694	C695	C696	C697	C698	C699	C700	C701	C702	C703	C704	C705	C706	C707	C708	C709	C710	C711	C712	C713	C714	C715	C716	C717	C718	C719	C720	C721	C722	C723	C724	C725	C726	C727	C728	C729	C730	C731	C732	C733	C734	C735	C736	C737	C738	C739	C740	C741	C742	C743	C744	C745	C746	C747	C748	C749	C750	C751	C752	C753	C754	C755	C756	C757	C758	C759	C760	C761	C762	C763	C764	C765	C766	C767	C768	C769	C770	C771	C772	C773	C774	C775	C776	C777	C778	C779	C780	C781	C782	C783	C784	C785	C786	C787	C788	C789	C790	C791	C792	C793	C794	C795	C796	C797	C798	C799	C800	C801	C802	C803	C804	C805	C806	C807	C808	C809	C810	C811	C812	C813	C814	C815	C816	C817	C818	C819	C820	C821	C822	C823	C824	C825	C826	C827	C828	C829	C830	C831	C832	C833	C834	C835	C836	C837	C838	C839	C840	C841	C842	C843	C844	C845	C846	C847	C848	C849	C850	C851	C852	C853	C854	C855	C856	C857	C858	C859	C860	C861	C862	C863	C864	C865	C866	C867	C868	C869	C870	C871	C872	C873	C874	C875	C876	C877	C878	C879	C880	C881	C882	C883	C884	C885	C886	C887	C888	C889	C890	C891	C892	C893	C894	C895	C896	C897	C898	C899	C900	C901	C902	C903	C904	C905	C906	C907	C908	C909	C910	C911	C912	C913	C914	C915	C916	C917	C918	C919	C920	C921	C922	C923	C924	C925	C926	C927	C928	C929	C930	C931	C932	C933	C934	C935	C936	C937	C938	C939	C940	C941	C942	C943	C944	C945	C946	C947	C948	C949	C950	C951	C952	C953	C954	C955	C956	C957	C958	C959	C960	C961	C962	C963	C964	C965	C966	C967	C968	C969	C970	C971	C972	C973	C974	C975	C976	C977	C978	C979	C980	C981	C982	C983	C984	C985	C986	C987	C988	C989	C990	C991	C992	C993	C994	C995	C996	C997	C998	C999	C1000	C1001	C1002	C1003	C1004	C1005	C1006	C1007	C1008	C1009	C1010	C1011	C1012	C1013	C1014	C1015	C1016	C1017	C1018	C1019	C1020	C1021	C1022	C1023	C1024	C1025	C1026	C1027	C1028	C1029	C1030	C1031	C1032	C1033	C1034	C1035	C1036	C1037	C1038	C1039	C1040	C1041	C1042	C1043	C1044	C1045	C1046	C1047	C1048	C1049	C1050	C1051	C1052	C1053	C1054	C1055	C1056	C1057	C1058	C1059	C1060	C1061	C1062	C1063	C1064	C1065	C1066	C1067	C1068	C1069	C1070	C1071	C1072	C1073	C1074	C1075	C1076	C1077	C1078	C1079	C1080	C1081	C1082	C1083	C1084	C1085	C1086	C1087	C1088	C1089	C1090	C1091	C1092	C1093	C1094	C1095	C1096	C1097	C1098	C1099	C1100	C1101	C1102	C1103	C1104	C1105	C1106	C1107	C1108	C1109	C1110	C1111	C1112	C1113	C1114	C1115	C1116	C1117	C1118	C1119	C1120	C1121	C1122	C1123	C1124	C1125	C1126	C1127	C1128	C1129	C1130	C1131	C1132	C1133	C1134	C1135	C1136	C1137	C1138	C1139	C1140	C1141	C1142	C1143	C1144	C1145	C1146	C1147	C1148	C1149	C1150	C1151	C1152	C1153	C1154	C1155	C1156	C1157	C1158	C1159	C1160	C1161	C1162	C1163	C1164	C1165	C1166	C1167	C1168	C1169	C1170	C1171	C1172	C1173	C1174	C1175	C1176	C1177	C1178	C1179	C1180	C1181	C1182	C1183	C1184	C1185	C1186	C1187	C1188	C1189	C1190	C1191	C1192	C1193	C1194	C1195	C1196	C1197	C1198	C1199	C1200	C1201	C1202	C1203	C1204	C1205	C1206	C1207	C1208	C1209	C1210	C1211	C1212	C1213	C1214	C1215	C1216	C1217	C1218	C1219	C1220	C1221	C1222	C1223	C1224	C1225	C1226	C1227	C1228	C1229	C1230	C1231	C1232	C1233	C1234	C1235	C1236	C1237	C1238	C1239	C1240	C1241	C1242	C1243	C1244	C1245	C1246	C1247	C1248	C1249	C1250	C1251	C1252	C1253	C1254	C1255	C1256	C1257	C1258	C1259	C1260	C1261	C1262	C1263	C1264	C1265	C1266	C1267	C1268	C1269	C1270	C1271	C1272	C1273	C1274	C1275	C1276	C1277	C1278	C1279	C1280	C1281	C1282	C1283	C1284	C1285	C1286	C1287	C1288	C1289	C1290	C1291	C1292	C1293	C1294	C1295	C1296	C1297	C1298	C1299	C1300	C1301	C1302	C1303	C1304	C1305	C1306	C1307	C1308	C1309	C1310	C1311	C1312	C1313	C1314	C1315	C1316	C1317	C1318	C1319	C1320	C1321	C1322	C1323	C1324	C1325	C1326	C1327	C1328	C1329	C1330	C1331	C1332	C1333	C1334	C1335	C1336	C1337	C1338	C1339	C1340	C1341	C1342	C1343	C1344	C1345	C1346	C1347	C1348	C1349	C1350	C1351	C1352	C1353	C1354	C1355	C1356	C1357	C1358	C1359	C1360	C1361	C1362	C1363	C1364	C1365	C1366	C1367	C1368	C1369	C1370	C1371	C1372	C1373	C1374	C1375	C1376	C1377	C1378	C1379	C1380	C1381	C1382	C1383	C1384	C1385	C1386	C1387	C1388	C1389	C1390	C1391	C1392	C1393	C1394	C1395	C1396	C1397	C1398	C1399	C1400	C1401	C1402	C1403	C1404	C1405	C1406	C1407	C1408	C1409	C1410	C1411	C1412	C1413	C1414	C1415	C1416	C1417	C1418	C1419	C1420	C1



AL	BAND	FREQ.	WAVELENGTH
1	1-5	1.5	200
2	5-10	5	60
3	10-15	10	30
4	15-20	15	20
5	20-25	20	15
6	25-30	25	12
7	30-35	30	10
8	35-40	35	9

PIN NO.	FUNCTION
1	SIDE TONE
2	EARTH
3	ANTI TRIP
4	—
5	—
6	—
7	EARTH
8	MUTE

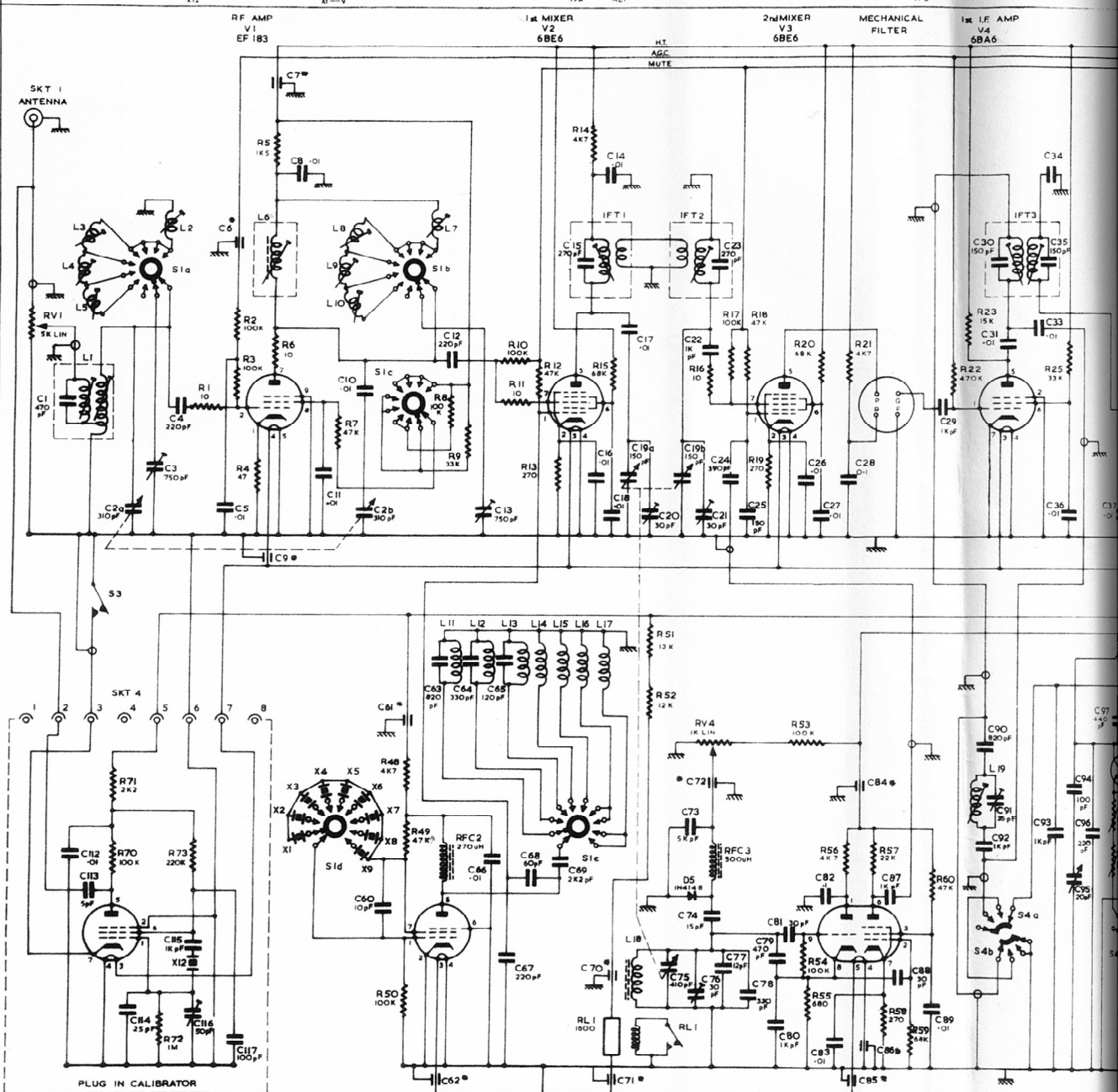
NOTES
 * 1K P.F. FEED THROUGH CAPACITOR
 SCREENED LEAD

3	11-10-71	AM.SHT. 4349. C/N. 607	MATERIAL	TOLERANCES	K. W. ELECTRONICS DARTFORD KENT
2	7-6-71	AM.SHT. 4349. C/N. 574	FINISH		
1	22-4-71	ORIGINAL ISSUE	SCALE		
ISSUE	DATE				
DIMENSIONS IN INCHES					TITLE K W 202 RECEIVER CIRCUIT DIAGRAM W.E.F. R178 DRG. NO. D.1025/2

DRAWING NO
D 1025/2

THIRD ANGLE PROJECTION

R & RV	R69 R70 R71 R72 R73 R74 R75 R76 R77 R78 R79 R80 R81 R82 R83 R84 R85 R86 R87 R88 R89 R90 R91 R92 R93 R94 R95 R96 R97 R98 R99 R100
CAPS.	C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28 C29 C30 C31 C32 C33 C34 C35 C36 C37 C38 C39 C40 C41 C42 C43 C44 C45 C46 C47 C48 C49 C50 C51 C52 C53 C54 C55 C56 C57 C58 C59 C60 C61 C62 C63 C64 C65 C66 C67 C68 C69 C70 C71 C72 C73 C74 C75 C76 C77 C78 C79 C80 C81 C82 C83 C84 C85 C86 C87 C88 C89 C90 C91 C92 C93 C94 C95 C96 C97 C98 C99 C100
L, V, T, & D.	L1 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
SKT, X, SW, RL, RFC, ETC	SKT 1 SKT 2 SKT 3 SKT 4 SKT 5 SKT 6 SKT 7 SKT 8 SKT 9 SKT 10 SKT 11 SKT 12 SKT 13 SKT 14 SKT 15 SKT 16 SKT 17 SKT 18 SKT 19 SKT 20 SKT 21 SKT 22 SKT 23 SKT 24 SKT 25 SKT 26 SKT 27 SKT 28 SKT 29 SKT 30 SKT 31 SKT 32 SKT 33 SKT 34 SKT 35 SKT 36 SKT 37 SKT 38 SKT 39 SKT 40 SKT 41 SKT 42 SKT 43 SKT 44 SKT 45 SKT 46 SKT 47 SKT 48 SKT 49 SKT 50 SKT 51 SKT 52 SKT 53 SKT 54 SKT 55 SKT 56 SKT 57 SKT 58 SKT 59 SKT 60 SKT 61 SKT 62 SKT 63 SKT 64 SKT 65 SKT 66 SKT 67 SKT 68 SKT 69 SKT 70 SKT 71 SKT 72 SKT 73 SKT 74 SKT 75 SKT 76 SKT 77 SKT 78 SKT 79 SKT 80 SKT 81 SKT 82 SKT 83 SKT 84 SKT 85 SKT 86 SKT 87 SKT 88 SKT 89 SKT 90 SKT 91 SKT 92 SKT 93 SKT 94 SKT 95 SKT 96 SKT 97 SKT 98 SKT 99 SKT 100



CIR. REF.	POSITION SHOWN	ACTION
S1	1-8 MHz	WAVECHANGE
2	OFF	FUNCTION
3	OFF	100 KHz
4	OFF	Q MULT

CIR. REF.	FUNCTION	VALUE
RV1	R.F. GAIN	5K LIN
2	I.F. GAIN	50K R LOG
3	A.F. GAIN	1M LOG
4	CAL SET	1K LIN
5	Q MULT PEAK	5K LIN
6	Q MULT NOTCH	5K LIN
7	S MTR. SENS.	1M
8	S MTR. LIN.	100A
9	S MTR. ZERO	1K

CIR. REF.	CRYSTAL	BAND
1	455.5 KHz	1-8 MHz
2	855.5	3-5
3	1015.5	7-10
4	1577.5	14-20
5	2077.5	21-30
6	3577.5	28-40
7	5577.5	28-40
8	10077.5	28-40
9	10327.5	28-40
10	15.8	15.8
11	15.8	15.8
12	10.0	10.0

MUTE SOCKET	PIN NO.	FUNCTION
1	1	SIDE TONE
2	2	EARTH
3	3	ANTI TRIP
4	4	—
5	5	—
6	6	—
7	7	EARTH
8	8	MUTE

APFD
CHECKED
DRAWN
BLD/CO 10/16/73

3
2
1
ISSUE