

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.

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**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

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## 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  $\pm 3$ 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.

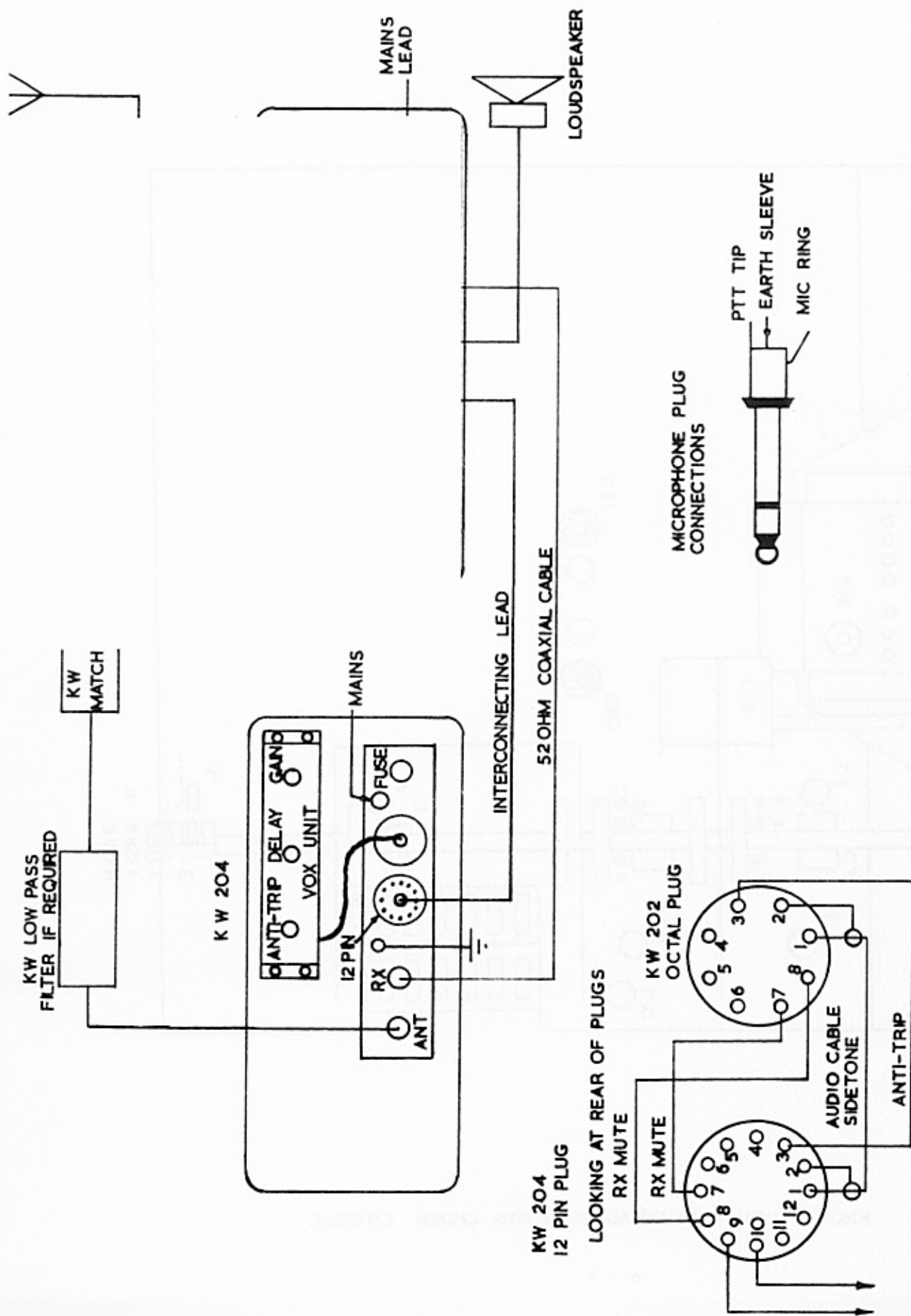


FIG 6-1 STATION INSTALLATION  
PAGE 6-1

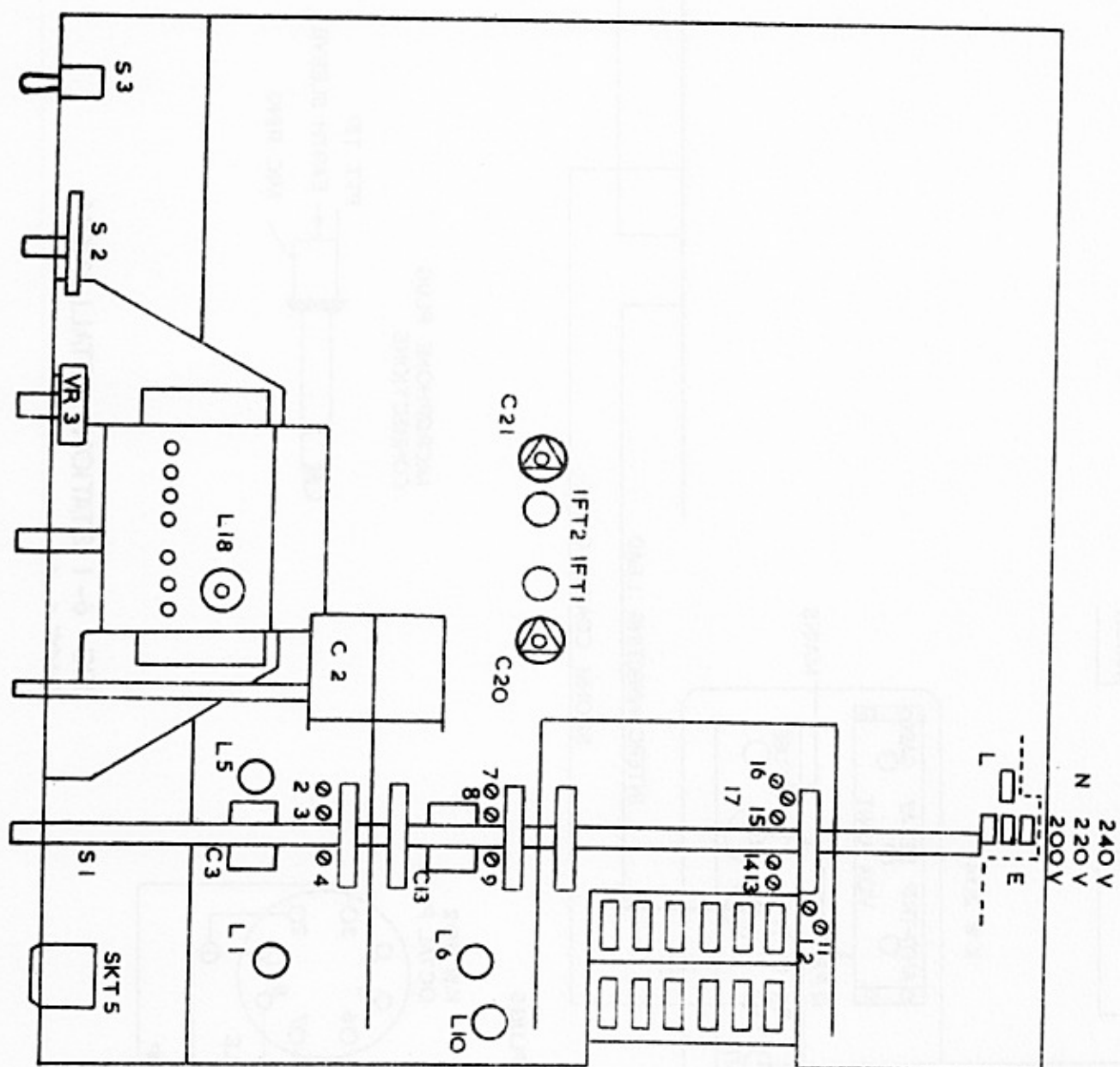


FIG. 6.2. LOCATION OF ADJUSTMENTS UNDER CHASSIS.

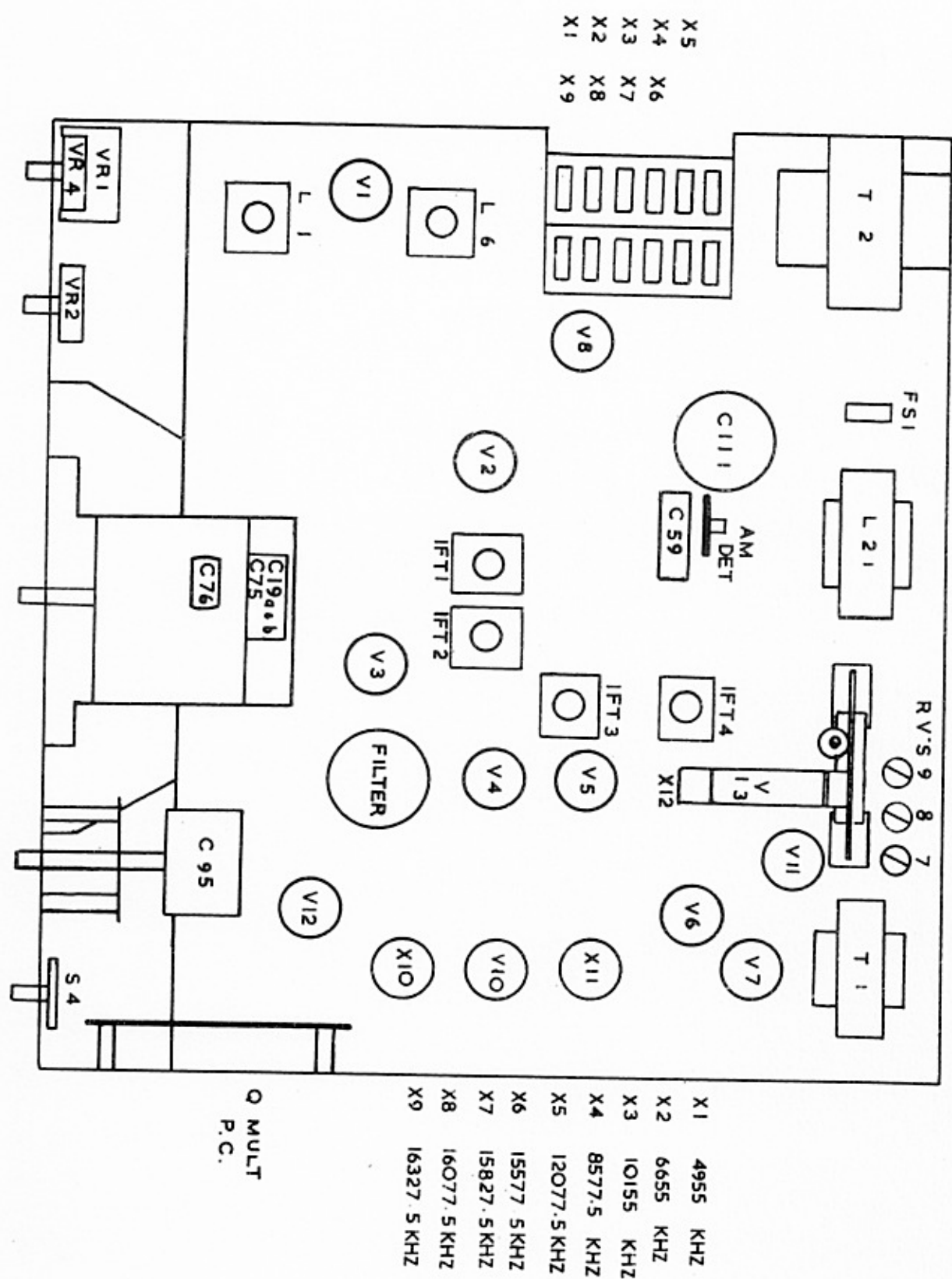


FIG.6.3. LOCATION OF VALVES AND CRYSTALS.

### 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.

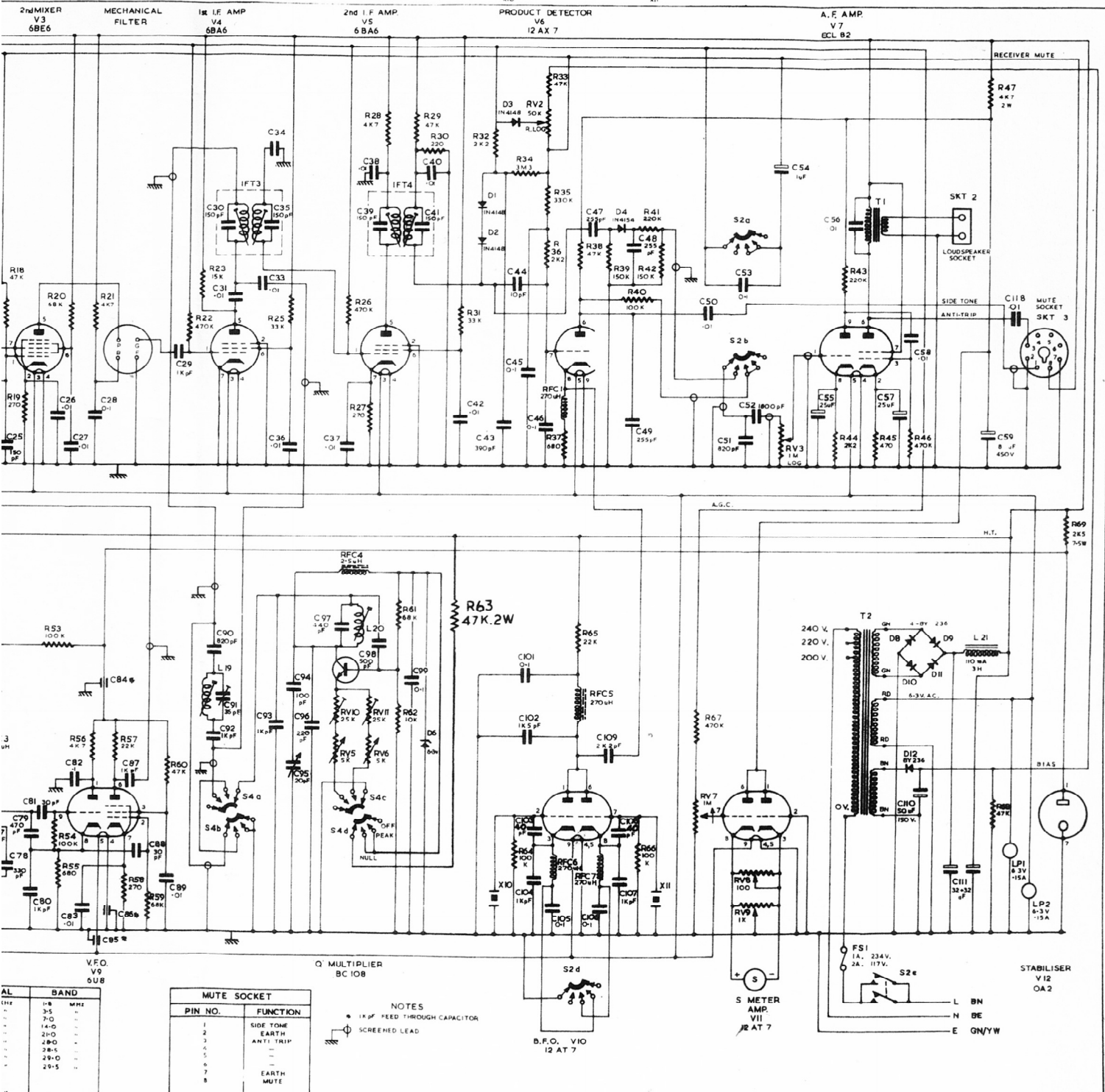
### SERVICE QUERIES

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																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	V25	V26	V27	V28	V29	V30	V31	V32	V33	V34	V35	V36	V37	V38	V39	V40	V41	V42	V43	V44	V45	V46	V47	V48	V49	V50	V51	V52	V53	V54	V55	V56	V57	V58	V59	V60																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
TPB	IFT3	S4a	S4b	S4c	S4d	S4e	S4f	S4g	S4h	S4i	S4j	S4k	S4l	S4m	S4n	S4o	S4p	S4q	S4r	S4s	S4t	S4u	S4v	S4w	S4x	S4y	S4z	S5a	S5b	S5c	S5d	S5e	S5f	S5g	S5h	S5i	S5j	S5k	S5l	S5m	S5n	S5o	S5p	S5q	S5r	S5s	S5t	S5u	S5v	S5w	S5x	S5y	S5z	S6a	S6b	S6c	S6d	S6e	S6f	S6g	S6h	S6i	S6j	S6k	S6l	S6m	S6n	S6o	S6p	S6q	S6r	S6s	S6t	S6u	S6v	S6w	S6x	S6y	S6z	S7a	S7b	S7c	S7d	S7e	S7f	S7g	S7h	S7i	S7j	S7k	S7l	S7m	S7n	S7o	S7p	S7q	S7r	S7s	S7t	S7u	S7v	S7w	S7x	S7y	S7z	S8a	S8b	S8c	S8d	S8e	S8f	S8g	S8h	S8i	S8j	S8k	S8l	S8m	S8n	S8o	S8p	S8q	S8r	S8s	S8t	S8u	S8v	S8w	S8x	S8y	S8z	S9a	S9b	S9c	S9d	S9e	S9f	S9g	S9h	S9i	S9j	S9k	S9l	S9m	S9n	S9o	S9p	S9q	S9r	S9s	S9t	S9u	S9v	S9w	S9x	S9y	S9z	S10a	S10b	S10c	S10d	S10e	S10f	S10g	S10h	S10i	S10j	S10k	S10l	S10m	S10n	S10o	S10p	S10q	S10r	S10s	S10t	S10u	S10v	S10w	S10x	S10y	S10z	S11a	S11b	S11c	S11d	S11e	S11f	S11g	S11h	S11i	S11j	S11k	S11l	S11m	S11n	S11o	S11p	S11q	S11r	S11s	S11t	S11u	S11v	S11w	S11x	S11y	S11z	S12a	S12b	S12c	S12d	S12e	S12f	S12g	S12h	S12i	S12j	S12k	S12l	S12m	S12n	S12o	S12p	S12q	S12r	S12s	S12t	S12u	S12v	S12w	S12x	S12y	S12z	S13a	S13b	S13c	S13d	S13e	S13f	S13g	S13h	S13i	S13j	S13k	S13l	S13m	S13n	S13o	S13p	S13q	S13r	S13s	S13t	S13u	S13v	S13w	S13x	S13y	S13z	S14a	S14b	S14c	S14d	S14e	S14f	S14g	S14h	S14i	S14j	S14k	S14l	S14m	S14n	S14o	S14p	S14q	S14r	S14s	S14t	S14u	S14v	S14w	S14x	S14y	S14z	S15a	S15b	S15c	S15d	S15e	S15f	S15g	S15h	S15i	S15j	S15k	S15l	S15m	S15n	S15o	S15p	S15q	S15r	S15s	S15t	S15u	S15v	S15w	S15x	S15y	S15z	S16a	S16b	S16c	S16d	S16e	S16f	S16g	S16h	S16i	S16j	S16k	S16l	S16m	S16n	S16o	S16p	S16q	S16r	S16s	S16t	S16u	S16v	S16w	S16x	S16y	S16z	S17a	S17b	S17c	S17d	S17e	S17f	S17g	S17h	S17i	S17j	S17k	S17l	S17m	S17n	S17o	S17p	S17q	S17r	S17s	S17t	S17u	S17v	S17w	S17x	S17y	S17z	S18a	S18b	S18c	S18d	S18e	S18f	S18g	S18h	S18i	S18j	S18k	S18l	S18m	S18n	S18o	S18p	S18q	S18r	S18s	S18t	S18u	S18v	S18w	S18x	S18y	S18z	S19a	S19b	S19c	S19d	S19e	S19f	S19g	S19h	S19i	S19j	S19k	S19l	S19m	S19n	S19o	S19p	S19q	S19r	S19s	S19t	S19u	S19v	S19w	S19x	S19y	S19z	S20a	S20b	S20c	S20d	S20e	S20f	S20g	S20h	S20i	S20j	S20k	S20l	S20m	S20n	S20o	S20p	S20q	S20r	S20s	S20t	S20u	S20v	S20w	S20x	S20y	S20z	S21a	S21b	S21c	S21d	S21e	S21f	S21g	S21h	S21i	S21j	S21k	S21l	S21m	S21n	S21o	S21p	S21q	S21r	S21s	S21t	S21u	S21v	S21w	S21x	S21y	S21z	S22a	S22b	S22c	S22d	S22e	S22f	S22g	S22h	S22i	S22j	S22k	S22l	S22m	S22n	S22o	S22p	S22q	S22r	S22s	S22t	S22u	S22v	S22w	S22x	S22y	S22z	S23a	S23b	S23c	S23d	S23e	S23f	S23g	S23h	S23i	S23j	S23k	S23l	S23m	S23n	S23o	S23p	S23q	S23r	S23s	S23t	S23u	S23v	S23w	S23x	S23y	S23z	S24a	S24b	S24c	S24d	S24e	S24f	S24g	S24h	S24i	S24j	S24k	S24l	S24m	S24n	S24o	S24p	S24q	S24r	S24s	S24t	S24u	S24v	S24w	S24x	S24y	S24z	S25a	S25b	S25c	S25d	S25e	S25f	S25g	S25h	S25i	S25j	S25k	S25l	S25m	S25n	S25o	S25p	S25q	S25r	S25s	S25t	S25u	S25v	S25w	S25x	S25y	S25z	S26a	S26b	S26c	S26d	S26e	S26f	S26g	S26h	S26i	S26j	S26k	S26l	S26m	S26n	S26o	S26p	S26q	S26r	S26s	S26t	S26u	S26v	S26w	S26x	S26y	S26z	S27a	S27b	S27c	S27d	S27e	S27f	S27g	S27h	S27i	S27j	S27k	S27l	S27m	S27n	S27o	S27p	S27q	S27r	S27s	S27t	S27u	S27v	S27w	S27x	S27y	S27z	S28a	S28b	S28c	S28d	S28e	S28f	S28g	S28h	S28i	S28j	S28k	S28l	S28m	S28n	S28o	S28p	S28q	S28r	S28s	S28t	S28u	S28v	S28w	S28x	S28y	S28z	S29a	S29b	S29c	S29d	S29e	S29f	S29g	S29h	S29i	S29j	S29k	S29l	S29m	S29n	S29o	S29p	S29q	S29r	S29s	S29t	S29u	S29v	S29w	S29x	S29y	S29z	S30a	S30b	S30c	S30d	S30e	S30f	S30g	S30h	S30i	S30j	S30k	S30l	S30m	S30n	S30o	S30p	S30q	S30r	S30s	S30t	S30u	S30v	S30w	S30x	S30y	S30z	S31a	S31b	S31c	S31d	S31e	S31f	S31g	S31h	S31i	S31j	S31k	S31l	S31m	S31n	S31o	S31p	S31q	S31r	S31s	S31t	S31u	S31v	S31w	S31x	S31y	S31z	S32a	S32b	S32c	S32d	S32e	S32f	S32g	S32h	S32i	S32j	S32k	S32l	S32m	S32n	S32o	S32p	S32q	S32r	S32s	S32t	S32u	S32v	S32w	S32x	S32y	S32z	S33a	S33b	S33c	S33d	S33e	S33f	S33g	S33h	S33i	S33j	S33k	S33l	S33m	S33n	S33o	S33p	S33q	S33r	S33s	S33t	S33u	S33v	S33w	S33x	S33y	S33z	S34a	S34b	S34c	S34d	S34e	S34f	S34g	S34h	S34i	S34j	S34k	S34l	S34m	S34n	S34o	S34p	S34q	S34r	S34s	S34t	S34u	S34v	S34w	S34x	S34y	S34z	S35a	S35b	S35c	S35d	S35e	S35f	S35g	S35h	S35i	S35j	S35k	S35l	S35m	S35n	S35o	S35p	S35q	S35r	S35s	S35t	S35u	S35v	S35w	S35x	S35y	S35z	S36a	S36b	S36c	S36d	S36e	S36f	S36g	S36h	S36i	S36j	S36k	S36l	S36m	S36n	S36o	S36p	S36q	S36r	S36s	S36t	S36u	S36v	S36w	S36x	S36y	S36z	S37a	S37b	S37c	S37d	S37e	S37f	S37g	S37h	S37i	S37j	S37k	S37l	S37m	S37n	S37o	S37p	S37q	S37r	S37s	S37t	S37u	S37v	S37w	S37x	S37y	S37z	S38a	S38b	S38c	S38d	S38e	S38f	S38g	S38h	S38i	S38j	S38k	S38l	S38m	S38n	S38o	S38p	S38q	S38r	S38s	S38t	S38u	S38v	S38w	S38x	S38y	S38z	S39a	S39b	S39c	S39d	S39e	S39f	S39g	S39h	S39i	S39j	S39k	S39l	S39m	S39n	S39o	S39p	S39q	S39r	S39s	S39t	S39u	S39v	S39w	S39x	S39y	S39z	S40a	S40b	S40c	S40d	S40e	S40f	S40g	S40h	S40i	S40j	S40k	S40l	S40m	S40n	S40o	S40p	S40q	S40r	S40s	S40t	S40u	S40v	S40w	S40x	S40y	S40z	S41a	S41b	S41c	S41d	S41e	S41f	S41g	S41h	S41i	S41j	S41k	S41l	S41m	S41n	S41o	S41p	S41q	S41r	S41s	S41t	S41u	S41v	S41w	S41x	S41y	S41z	S42a	S42b	S42c	S42d	S42e	S42f	S42g	S42h	S42i	S42j	S42k	S42l	S42m	S42n	S42o	S42p	S42q	S42r	S42s	S42t	S42u	S42v	S42w	S42x	S42y	S42z	S43a	S43b	S43c	S43d	S43e	S43f	S43g	S43h	S43i	S43j	S43k	S43l	S43m	S43n	S43o	S43p	S43q	S43r	S43s	S43t	S43u	S43v	S43w	S43x	S43y	S43z	S44a	S44b	S44c	S44d	S44e	S44f	S44g	S44h	S44i	S44j	S44k	S44l	S44m	S44n	S44o	S44p	S44q	S44r	S44s	S44t	S44u	S44v	S44w	S44x	S44y	S44z	S45a	S45b	S45c	S45d	S45e	S45f	S45g	S45h	S45i	S45j	S45k	S45l	S45m	S45n	S45o	S45p	S45q	S45r	S45s	S45t	S45u	S45v	S45w	S45x	S45y	S45z	S46a	S46b	S46c	S46d	S46e	S46f	S46g	S46h	S46i	S46j	S46k	S46l	S46m	S46n	S46o	S46p	S46q	S46r	S46s	S46t	S46u	S46v	S46w	S46x	S46y	S46z	S47a	S47b	S47c	S47d	S47e	S47f	S47g	S47h	S47i	S47j	S47k	S47l	S47m	S47n	S47o	S47p	S47q	S47r	S47s	S47t	S47u	S47v	S47w	S47x	S47y	S47z	S48a	S48b	S48c	S48d	S48e	S48f	S48g	S48h	S48i	S48j	S48k	S48l	S48m	S48n	S48o	S48p	S48q	S48r	S48s	S48t	S48u	S48v	S48w	S48x	S48y	S48z	S49a	S49b	S49c	S49d	S49e	S49f	S49g	S49h	S49i	S49j	S49k	S49l	S49m	S49n	S49o	S49p	S49q	S49r	S49s	S49t	S49u	S49v	S49w	S49x	S49y	S49z	S50a	S50b	S50c	S50d	S50e	S50f	S50g	S50h	S50i	S50j	S50k	S50l	S50m	S50n	S50o	S50p	S50q	S50r	S50s	S50t	S50u	S50v	S50w	S50x	S50y	S50z	S51a	S51b	S51c	S51d	S51e	S51f	S51g	S51h	S51i	S51j	S51k	S51l	S51m	S51n	S51o	S51p	S51q	S51r	S51s	S51t	S51u	S51v	S51w	S51x	S51y	S51z	S52a	S52b	S52c	S52d	S52e	S52f	S52g	S52h	S52i	S52j	S52k	S52l	S52m	S52n	S52o	S52p	S52q	S52r	S52s	S52t	S52u	S52v	S52w	S52x	S52y	S52z	S53a	S53b	S53c	S53d	S53e	S53f	S53g	S53h	S53i	S53j	S53k	S53l	S53m	S53n	S53o	S53p	S53q	S53r	S53s	S53t	S53u	S53v	S53w	S53x	S53y	S53z	S54a	S54b	S54c	S54d	S54e	S54f	S54g	S54h	S54i	S54j	S54k	S54l	S54m	S54n	S54o	S54p	S54q	S54r	S54s	S54t	S54u	S54v	S54w	S54x	S54y	S54z	S55a	S55b	S55c	S55d	S55e	S55f	S55g	S55h	S55i	S55j	S55k	S55l	S55m	S55n	S55o	S55p	S55q	S55r	S55s	S55t	S55u	S55v	S55w	S55x	S55y	S55z	S56a	S56b	S56c	S56d	S56e	S56f	S56g	S56h	S56i	S56j	S56k	S56l	S56m	S56n	S56o	S56p	S56q	S56r	S56s	S56t	S56u	S56v	S56w	S56x	S56y	S56z	S57a



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
9	40-45	40	8
10	45-50	45	7

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

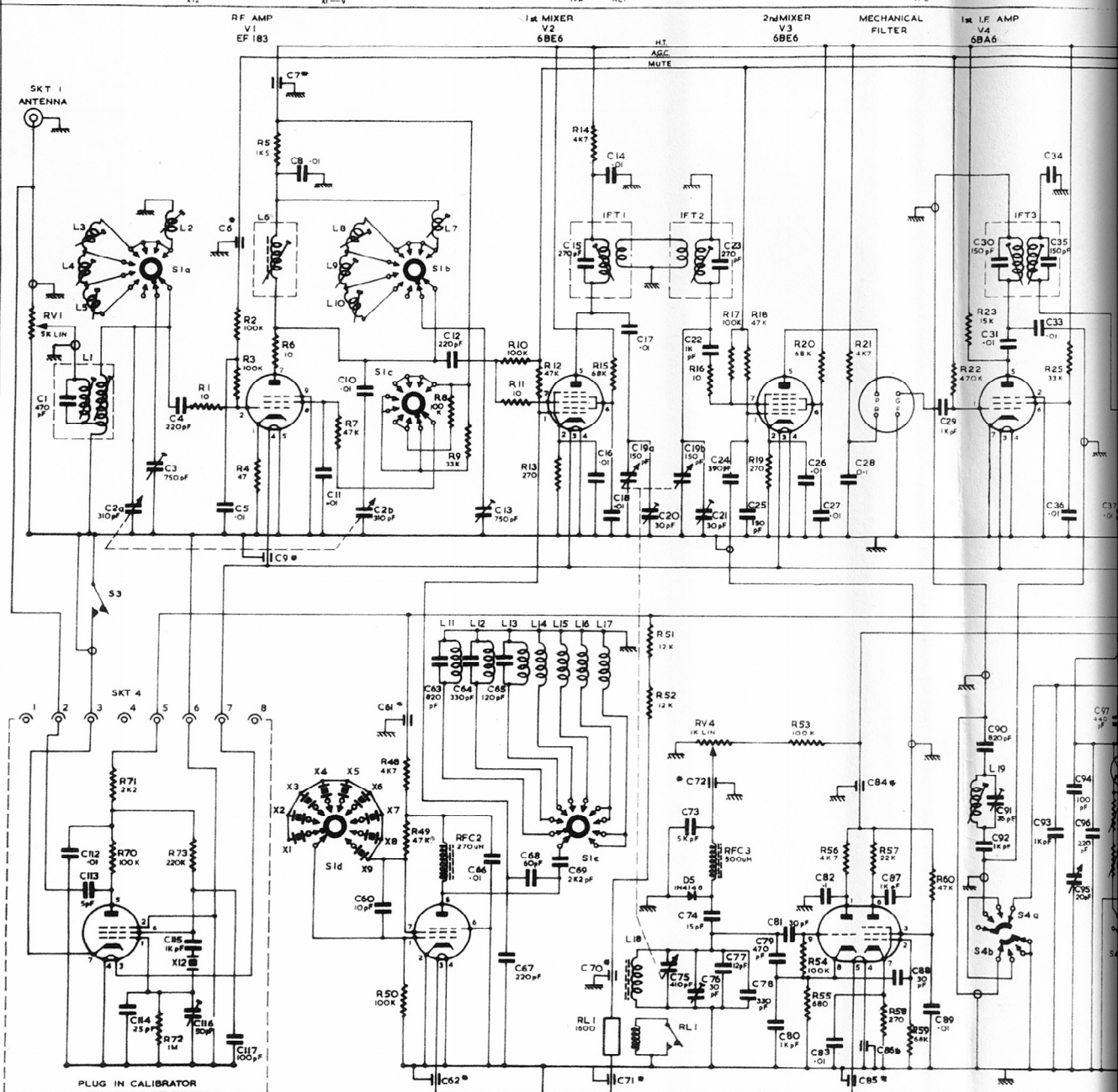
NOTES  
 \* 1K P.F. FEED THROUGH CAPACITOR  
 SCREENED LEAD

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		FILE K W 202
1	22-4-71	ORIGINAL ISSUE	SCALE		RECEIVER CIRCUIT DIAGRAM
ISSUE	DATE				W.E.F. R178
					DWG. NO. D.1025/2
					STABILISER V12 OA2

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
R1	R.F. GAIN	5K LIN
R2	I.F. GAIN	50K R LOG
R3	A.F. GAIN	1M LOG
R4	CAL SET	1K LIN
R5	Q MULT PEAK	5K LIN
R6	Q MULT NOTCH	5K LIN
R7	S MTR. SENS.	1M
R8	S MTR. LIN.	100A
R9	S MTR. ZERO	1K

CIR. REF.	CRYSTAL	BAND
X1	455.5 KHz	1-8 MHz
X2	855.5 KHz	3-5 MHz
X3	1015.5 KHz	7-10 MHz
X4	1577.5 KHz	14-20 MHz
X5	2077.5 KHz	21-30 MHz
X6	3577.5 KHz	28-40 MHz
X7	5077.5 KHz	28-40 MHz
X8	10077.5 KHz	28-40 MHz
X9	10327.5 KHz	28-40 MHz
X10	15.8 MHz	15.8 MHz
X11	15.8 MHz	15.8 MHz
X12	10.0 MHz	10.0 MHz

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		3
CHECKED		2
DRAWN		1
BLD/CO	10/10/71	ISSUE