

PYE WESTMINSTER U.H.F. REMOTE MOUNT RADIOTELEPHONE

Type W15U

CAUTION

The transistors used in the transmitter Power Amplifier Unit of this equipment incorporate Beryllium Oxide the dust of which is TOXIC.

DO NOT tamper with the component parts or finish of these transistors.

This service manual is for the maintenance of Pye Telecommunications equipment. The performance figures quoted are typical and are subject to normal manufacturing and service tolerances.

The right is reserved to alter the equipment described in this manual in the light of future technical development.

service manual



issue 2

AMENDMENTS

ALL

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SUMMARY OF DATA

Service	F3	Control unit: 1½ lb (0.68 kg)
Operation	Single or 2 frequency simplex	(1) Duplex working version
Frequency range	450-470 MHz	(2) Up to 10 channel operation using non compensated oscillators or up to 6 channel operation using temperature compensated oscillators (20/30 kHz channel spacing only)
Channel spacing	20/30 kHz (V)	(3) 6V or 24V converter
Power supply	(1) 12V d.c. nominal (2) 6V d.c. nominal (with external 6/12V converter unit) (3) 24V d.c. nominal (with external 24/12V converter unit)	(4) Dual channel search
	Positive or negative ground conditions obtained via appropriately wired input socket.	(5) Tone lock encoder for transmitter
	Polarity protection (If input leads are reversed the polarity diode D1 prevents start relay from energising)	(6) Complete tone lock facility
Current consumption	Receive: 200mA Transmit: 1.4A single PA 1.7A double PA	
Temperature range	-30°C to +60°C	
Dimensions	Main unit 9⅞ in. wide x 15 in. deep x 3 in. high. (23.8 x 38 x 7.6 cm) Speaker unit 5⅝ in. wide x 2⅝ in. deep x 3⅝ in. high. (14.3 x 6.7 x 9.2 cm) Control unit 6¼ in. wide x 4 in. deep x 2 in. high. (15.8 x 10.1 x 4.7 cm)	20db quieting for 0.5µV (p.d.) signal input 12db SINAD for 0.4µV (p.d.) signal input. 2W with less than 10% distortion Spurious response Better than 85db below carrier attenuation Squelch Electronic - adjustable threshold setting down to 4db noise quieting signal level.
Weight	Main unit: 11½ lb (5.2 kg) Speaker unit: 1 lb (0.45 kg)	

INTRODUCTION

The Westminster W15U is a phase modulated u. h. f. radiotelephone designed for simplex communication between vehicles and a base station using either single or 2-frequency working.

The equipment operates on fixed frequencies in the range 450-470 MHz with a channel spacing which can be either 25 kHz or 50 kHz using non-compensated oscillators.

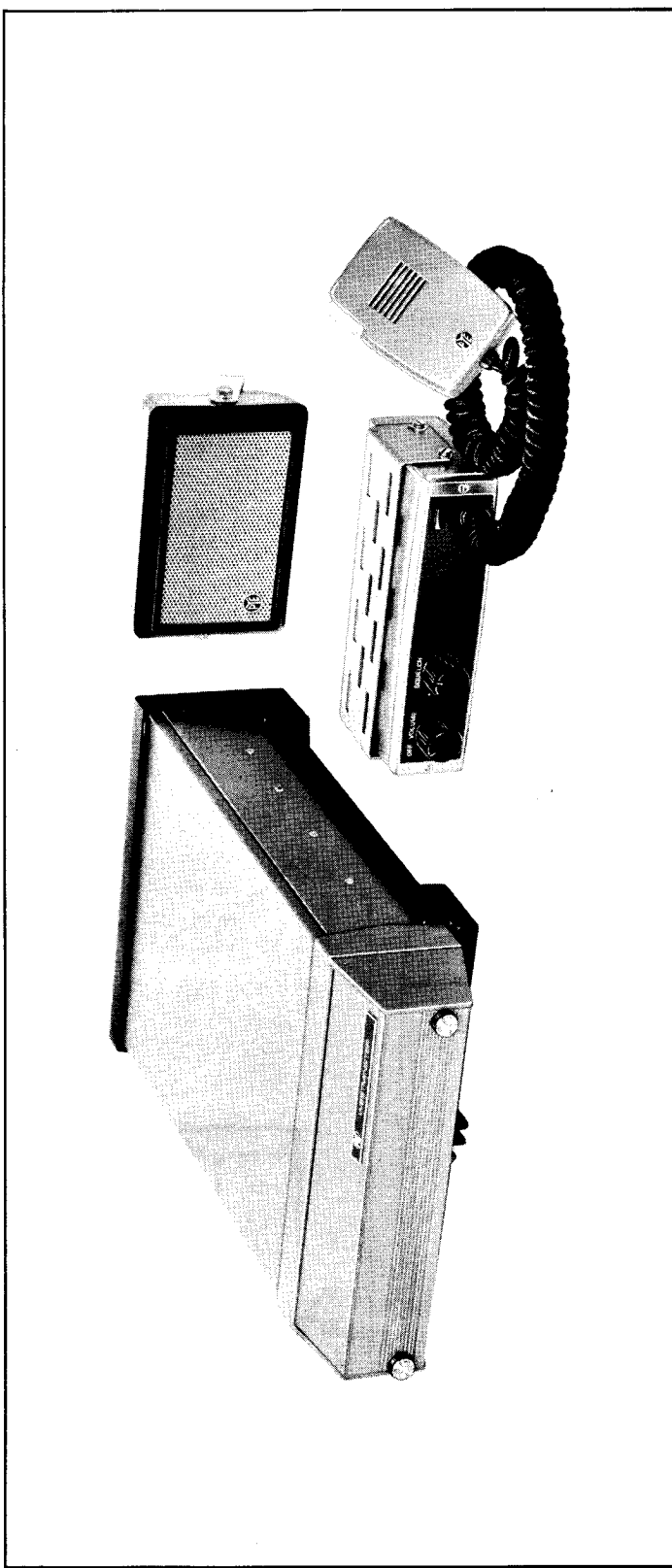
For operation in extreme climates, sealed temperature compensated oscillators are available for equipments designed for 25 kHz channel spacing.

Optional facilities available are duplex working, tone lock, dual search and multiple channels. A maximum of 10 channels

can be provided for equipments using non-compensated oscillators; the use of temperature compensated oscillators restricts the number of channels to a maximum of 6.

The transmitter-receiver and stowage cradle is normally fitted in the luggage compartment of the vehicle and remotely operated by the control unit which is housed in the radio slot in the dashboard. The loudspeaker and microphone are located adjacent to the control unit.

The equipment is designed to operate from a 12V d. c. supply system (positive or negative ground). External converter units, 6/12V and 24V/12V can be supplied for 6V and 24V systems.



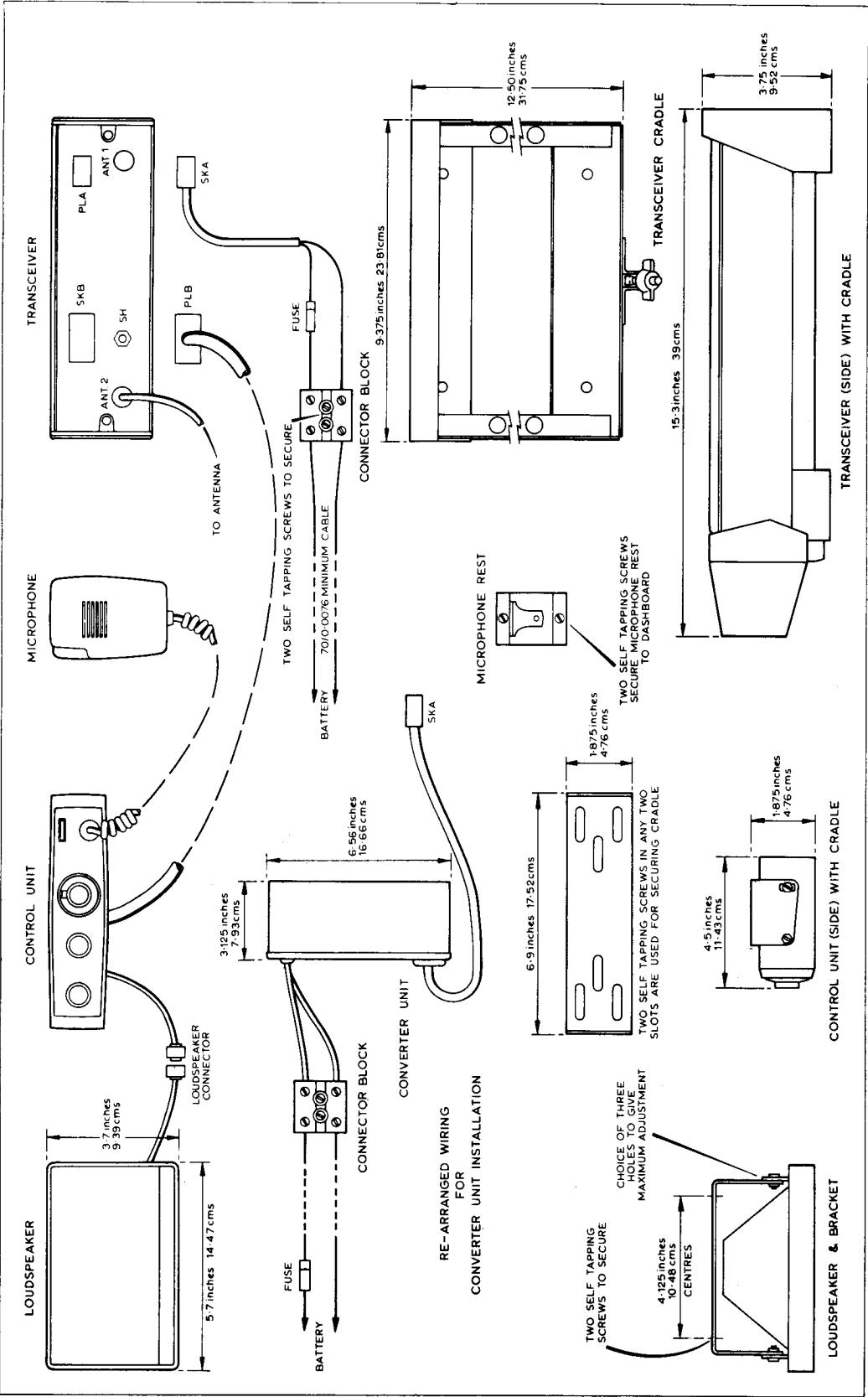


Fig. 1.1.1 Installation Detail

SECTION 1 — INSTALLATION

1.1 Preparation

Remove main unit from its cradle, release the 4 Dzus fasteners at the rear and withdraw the top and bottom covers from under the bezel flange. Examine for transit damage. Replace covers.

Remove the control unit from its cradle, release the two 2 B.A. bolts on the front panel, remove the cover and examine for transit damage.

Notes 1. When siting the control and main units it must be borne in mind that the control unit connecting cable is 20 feet long.

2. The socket (SKA) terminating the fused power lead assembly is normally wired for NEGATIVE ground supply systems and fused in the positive lead. For POSITIVE ground systems the socket must be wired as shown for SKA (2) in Fig. 1.2 and fused in the negative lead. The cable assembly length is 20 ins.

3. Details of the appropriate screws provided for fitting cradles etc. is given on the Contents List contained in the equipment package.

4. If a converter unit (6/12V or 24/12V) is to be used in the installation, refer to para 1.3.

Select a suitable site for the main unit in the vehicle luggage compartment or other convenient place. The main unit

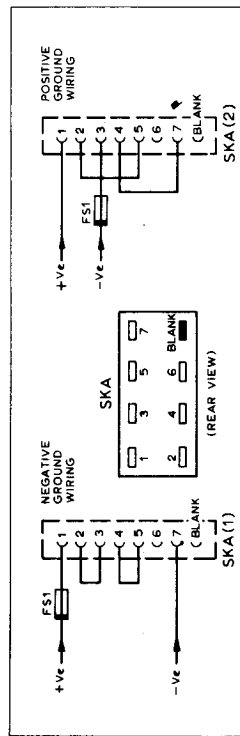


Fig. 1.2 Power Input Socket Wiring

can be mounted in any plane. Note the positions of the power plug (7-way) and control socket. Overall space requirements are shown in Fig. 1.1. Using the cradle as a template, drill and secure. Site the control unit at the dashboard. Drill and secure the cradle. Locate the microphone rest (or handset rest) and loudspeaker in suitable positions adjacent to the control unit cradle. Drill and secure. Locate the connector block adjacent to the main unit cradle. Drill and secure.

1.2 Cabling

Route the two 70/0.0076 supply cables (red and black) from the battery to the connector block. If drilling is required the holes must be suitably grommetted. Connect the ends to the battery and the connector block.

WARNING

The red supply cable must be connected to the positive terminal of the battery and the black supply cable to the negative terminal.

Check that the power lead assembly is fused in the live lead. Open the bayonet type fuseholder and examine the fuse for damage and correct rating (5A).

Connect the free ends of the assembly to the connector block in the correct polarity.

Route the control cable from the main unit site to the control unit site. Feed the control cable and the ignition switch fused lead through the aperture in control unit casing. Referring to the control unit wiring diagram, connect the 'push on' tabs to the numbered tags of the control unit 50-way terminal board including the ignition switch lead. Connect the ignition switch lead as shown in Fig. 1.3.

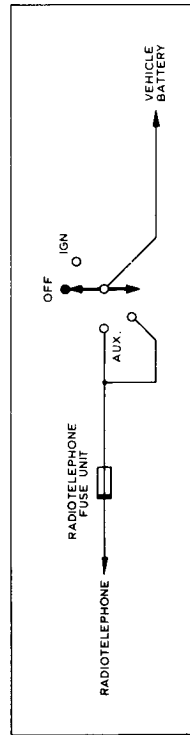


Fig. 1.3 Ignition Switch Wiring

Connect the flying leads to the loudspeaker leads. Replace control unit cover and fit in the cradle. Ensure facility switch is at OFF.

Slide main unit into its cradle and secure; connect control and power plug/socket.

Install the antenna as detailed in Para. 1.4. Connect feeder to antenna socket.

1.3 Converter Unit Installations

Where a converter unit is included in the equipment the installation procedure is changed as follows:-

Remove converter unit cover and examine for transit damage. Replace cover.

Note: In this installation the power lead and socket assembly does not incorporate a fuse - a separate fuse box is supplied.

Locate the fuse box adjacent to the battery.

Site the converter unit close to the main unit and the connector block within 36 ins. of converter unit. Drill and secure both items.

Connect 2 x 70/0.0076 leads from the battery terminals (wiring the fuse into the live lead) to the connector block. Connect the converter unit input lead to the connector block and the output socket to the main unit. Ignition key switching is not offered when converter units are used.

1.4 Antenna Installation

Select a convenient site as far from the engine compartment as possible and install the antenna as follows:-

At the selected site, drill out vehicle bodywork to $\frac{1}{2}$ in. (1.25 cm) diameter. Insert base insulator and gasket.

Bend up corners of grounding plate as shown in Fig. 1.5.

Plug Assembly

1. Remove all piece parts as shown.
2. Slide the clamp nut, flat washer, V-groove gasket and braid clamp over the antenna feeder outer sheath.
3. Cut off the outer sheath to $\frac{1}{2}$ inch from the end of the cable taking care not to damage the braid. Comb out the braid evenly.
4. Move the braid clamp along the feeder until the internal shoulder butts against the outer sheath.
5. Fold back the braid smoothly over the braid clamp without crossing the wires. Trim off the surplus braid.
6. Cut off the dielectric to $\frac{1}{4}$ inch from the braid clamp, taking care to avoid damaging the centre conductor.
7. Check the length of the protruding centre conductor to 1/16 inch from the end of the dielectric.
8. Tin the centre conductor. Avoid excessive heat.
9. Ensure that the slot in the male contact is in line to receive the cable.

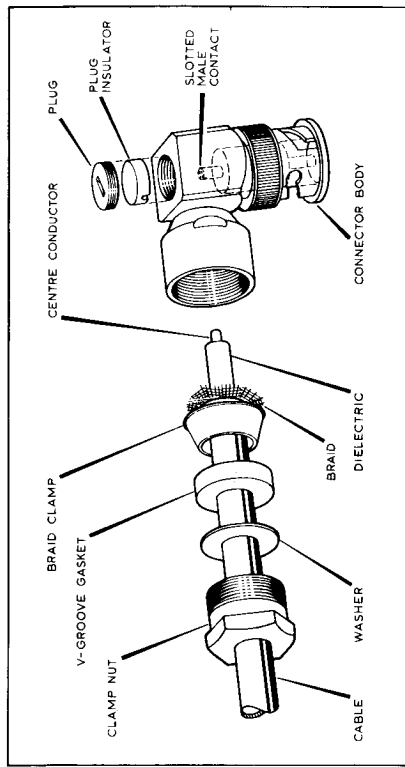


Fig. 1.4 Antenna Plug Assembly

10. Slide the V-groove gasket, flat washer and clamp nut up to the braid clamp. Ensure that the V-groove seats on the braid clamp.
11. Push the sub-assembly into the body as far as it will go.
12. Engage the clamp nut in the body and tighten the clamp nut. (For this operation hold the body and cable rigid and tighten the clamp nut until the required pull out tension is achieved).
13. Securely solder the centre conductor in the slit in male contact. Avoid excessive heat. Remove the surplus solder from the outside of the contact.
14. Replace the plug insulator and tighten up the plug.

1.5 Antenna Types

1. Type VA 460 (Standard)

Quarter wave stainless steel rod hinged at the insulating base

2. Type VA 460G (Optional item)

Three-quarter wave stainless steel rod with phasing coil inserted between quarter and half wave sections; hinged at base. Inherent gain is 3db over quarter wave antenna.

The method of mounting is the same for both types.

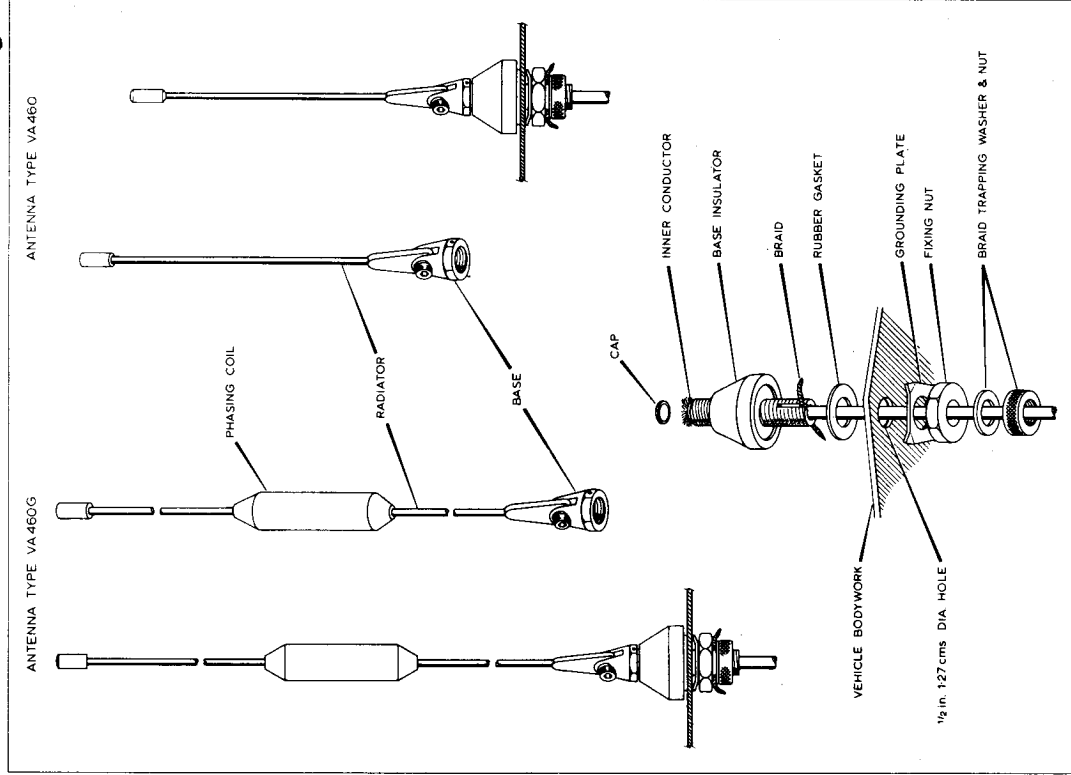


Fig. 1.5 Antenna Detail

1.6 INITIAL ADJUSTMENTS

WARNING

The transmitter should never be operated without it being connected to the antenna or a suitable dummy load.

Set the OFF/ON switch at ON and check that the ON lamp, lights.

Operate the microphone press-to-talk switch and check that the red TX lamp lights. (The ON lamp should stay alight.)

Receiver

With no incoming signal, turn the VOLUME and SQUELCH controls clockwise until the receiver noise is heard and then turn back the SQUELCH control until the receiver is just silenced.

If required, a less sensitive setting of the SQUELCH control may be obtained by turning the control further counter-clockwise.

1.7 FIELD TESTING PROCEDURE

WARNING

Under no circumstances should the settings of the transmitter or receiver crystal trimmers be altered without reference to a frequency substandard or to the base station equipment as described below.

Receiver

The Pye 455 kHz marker oscillator PT503 is suitable for checking the operating frequency against that of the base station.

1. Arrange for the base station to radiate a carrier.

2. Switch on the 455 kHz marker oscillator and hold it close to the mobile receiver Second I.F. Unit.
3. If a high audio beat note is produced, i.e. in excess of 1000 Hz for 20/30 kHz channel spacing or 2000 Hz for 40/60 kHz channel spacing, the mobile receiver crystal trimmer should be adjusted for zero beat.
4. This procedure should be repeated for each channel of a multiple channel equipment.

Transmitter

This procedure should be followed, using a crystal controlled marker oscillator having the same frequency as that of the base station receiver first or second i.f. If the base station has a second i.f. of 455 kHz the marker oscillator type PT503 can be used.

1. Arrange for the mobile transmitter to radiate a carrier.
2. Switch on the marker oscillator and hold it close to the appropriate mixer in the base station receiver.
3. If a high audio beat note is produced, i.e. in excess of 1000 Hz for 20/30 kHz channel spacing or 2000 Hz for 40/60 kHz channel spacing, the mobile transmitter crystal trimmer should be adjusted for zero beat as reported by the base station engineer. Adjustment must not be made to the base station receiver crystal trimmer without reference to a frequency substandard.
4. This procedure should be repeated for each channel of a multiple channel equipment.

This field testing procedure becomes increasingly important as the carrier frequency increases and the channel spacing decreases.

1.8 USE OF FIST MICROPHONE

To get the best results from the transmitter, hold the microphone 2 inches to 3 inches from the lips and speak across its face in a normal voice.

SECTION 2 — RECEIVER CIRCUIT DATA

2.3 Lists of Units

The receiver consists of the following units and chassis components:-

2.1 Introduction

Sections 2 and 3 consist mainly of summaries so arranged that all the information concerning a unit is presented on one page.

The information consists of:-

- Circuit Diagram
- Component Location Diagrams (Top and Bottom)
- Unit Location Diagram
- Unit features
- Parts List (shown on reverse side)

Typical voltages are shown on all circuits and also on Figs 6.1 and 6.2.

Circuit Notes are given at para. 2.4.

Information concerning Converter and Tone Lock Units (if fitted) will be found in the wallet at the back of this handbook.

2.2 Unit Identification

Each unit is silk screened with a prefix number which is shown in paragraph 2.3. This number is also repeated on each unit circuit diagram. All chassis mounted components are prefixed with the symbol 'O'. It is stressed that these identity numbers are solely for inter-unit reference within this manual. The Complete Assembly Part No. (shown on each Unit Parts List), is the true identification for all other purposes.

Establishments handling U.H.F., V.H.F. FM and V.H.F. AM equipment (or any two of these generic types) should exercise extreme care when reassembling particularly where RF Units (1) and Audio Units (8) are involved. All units (8) are physically identical as are all V.H.F. units (1).

(a) Units

- U. H. F. Amplifier (16)
- 10.7 MHz I. F. Amp and 2nd Mixer (2)
- 455 kHz I. F. Amp and Discriminator (3)
- 1st Oscillator (non compensated) (11) -single, 3, 6 or 10 channels
- or (11) single or up to 6 channels
- 1st Oscillator (Temperature compensated) (5)
- Oscillator Multiplier (6)
- 2nd Oscillator (7)
- Squelch (8)
- Audio (9)
- Regulator
- Loudspeaker Unit (external)

(b) Chassis Components

These are detailed in Section 3A Parts List and shown in the associated unit circuit diagrams.

Note: Both transmitter and receiver use the same Oscillator type, Board No. 11.

To avoid delays and possible errors in the supply of spare parts the reference numbers shown in these parts lists should be quoted in all orders.

The right is reserved to fit alternative types of semi-conductors with equal or improved performance to those quoted in the Parts Lists.

2.4 CIRCUIT NOTES

Voltage Analysis

The typical voltage readings were made using an Avometer Model 8 (2000Ω/volt).

Conditions of Test

- 1. Supply voltage at standard test voltage.

Receiver

13.8V d.c. }

for nominal 12 volt

Transmit

13.8V d.c. }

equipments
- 2. All voltage readings positive with respect to the negative supply line measured with VOLUME control at zero and SQUELCH control at maximum clockwise position unless otherwise stated.
- 3. Voltages greater than 10V measured on 25V range.
Voltages less than 10V measured on 10V ranges unless otherwise stated.

Legend

- S = SQUELCH control at maximum counterclockwise position.
- U = SQUELCH control at maximum clockwise position.
- T = Transmit condition.

Component Symbols

Resistor symbol  

Diode symbol  

Capacitors prefix 'C' or plain outline

Inductors prefixed 'L' or 'T'

2.5 Circuit Summary

The receiver employs a double superheterodyne circuit. Two stages of r.f. amplification at carrier frequency are followed by the first mixer, heterodyned by the first local oscillator to produce an i.f. of 10.7 MHz. This output is applied to the 10.7 MHz crystal filter and passed through a single amplifier before mixing with the second oscillator output at the second mixer base. After passing through the 455 kHz filter, amplification and limiting take place before application to the Foster Seeley type discriminator circuit.

The audio output is then passed to the audio stages via the squelch unit switched pre-amplifier; in the absence of a signal, noise is routed to the squelch unit input to silence the receiver. The transformerless a.f. amplifier uses a complementary pair circuit to drive the single ended push-pull amplifier.

The Voltage Regulator Unit provides a stabilised 9.5V supply to all units except the u.h.f. head, oscillator/multiplier and audio. The Audio, Oscillator/Multiplier and U.H.F. Head Units are powered by the 12V nominal supply.

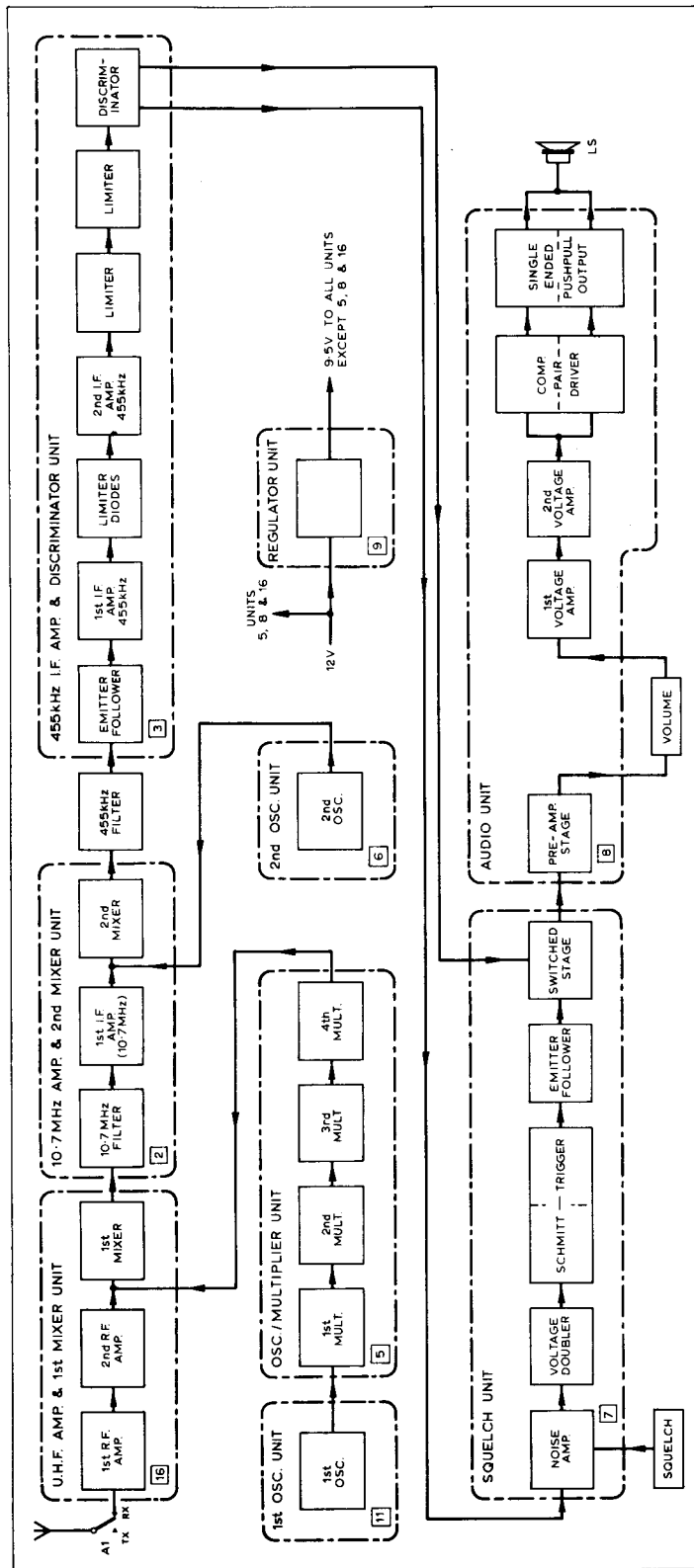
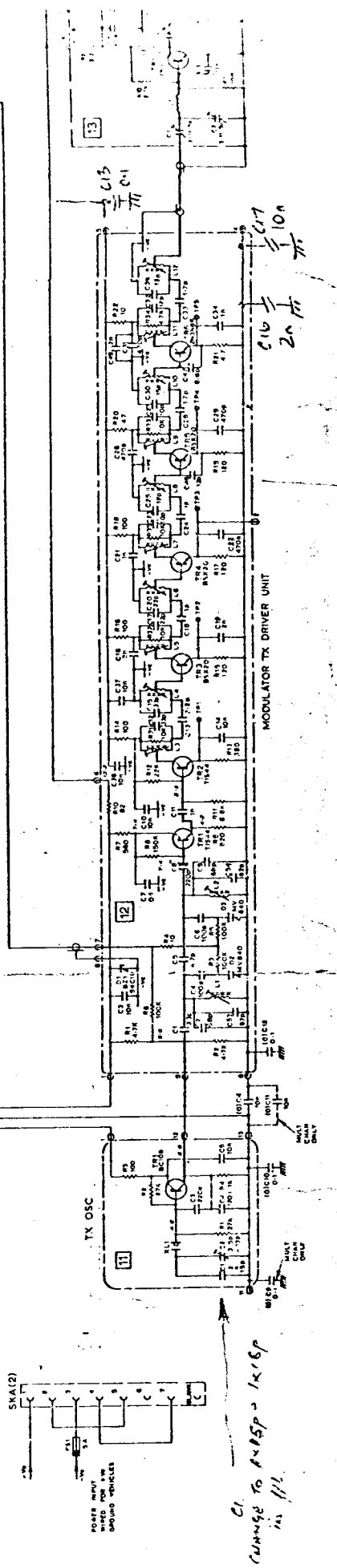
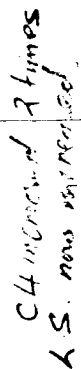


Fig. 2.1 Receiver Block Diagram

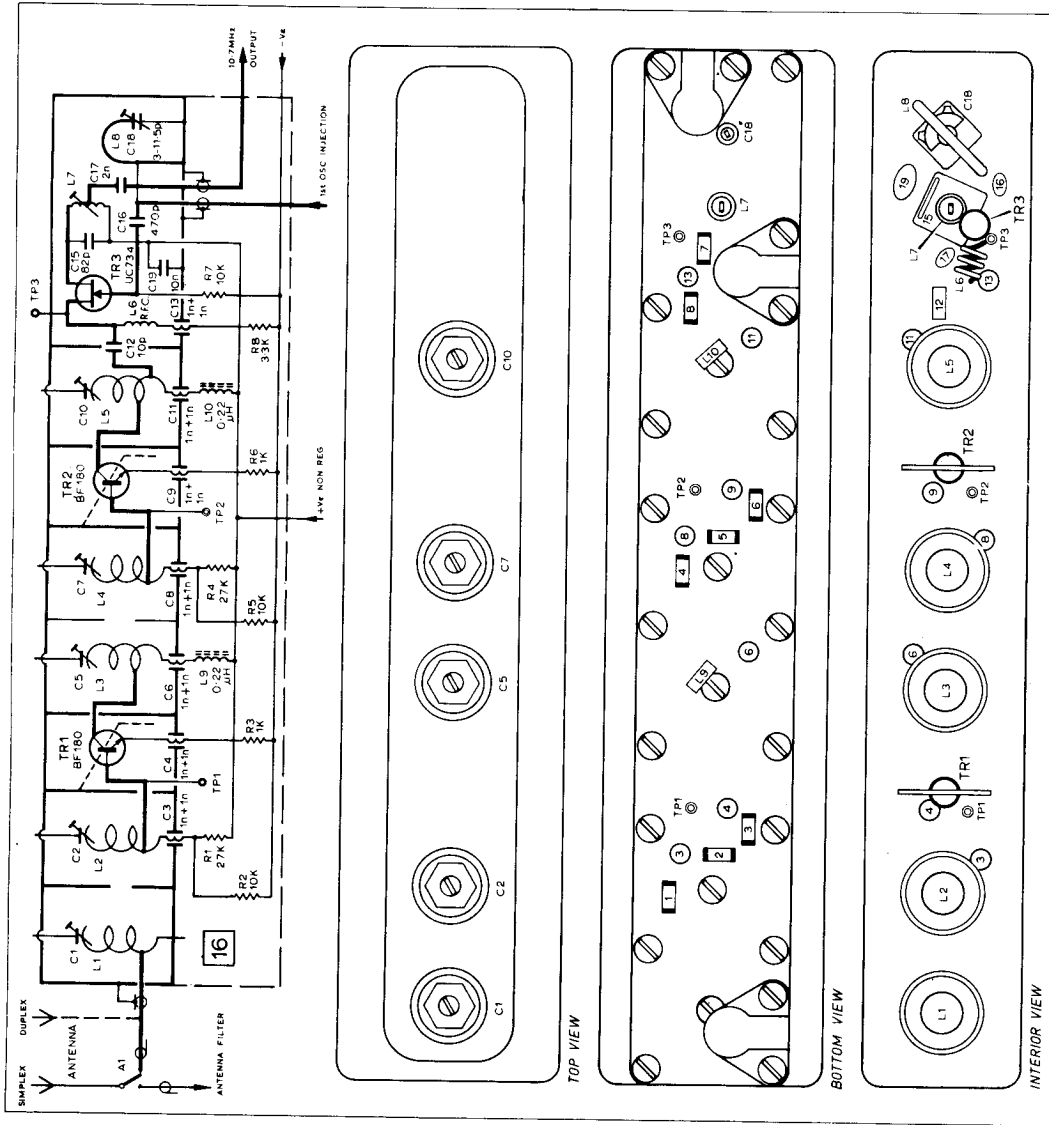


2.6 UHF AMPLIFIER (16)

13

2.6 UHF Amplifier (16)

Circuit	2 r.f. amplifiers (TR1 TR2) and f.e.t. mixer (TR3); antenna matching and interstage coupling by tuned helical cavities which behave in similar fashion to open circuit $\frac{1}{4}$ λ lines.
Power supply	Unregulated 12V
Injection	439.3-459.3 MHz applied to TR3 gate circuit from oscillator multiplier.
Mixing and output	Carrier applied to TR3 source mixes with the oscillator frequency at gate to produce the 1st i.f. of 10.7 MHz.
Test points	TP1 TR1 base TP2 TR2 base



Code	CAPACITORS	Part No.
*C1		BT07160
*C2		BT07160
C3	InF+InF	PN26598
C4	InF+InF	PN26598
*C5		BT07160
C6	InF+InF	PN26598
*C7		BT07160
C8	InF+InF	PN26598
C9	InF+InF	PN26598
*C10		BT07160
C11	InF+InF	PN26598
C12	10pF	PN09057
C13	InF+InF	PN26598
C14	Not used	
C15	82pF	PP08203
C16	470pF	PN22401
C17	2nF	PN33301
C18	3-11.5pF	PV05164
C19	10nF	PN 50301

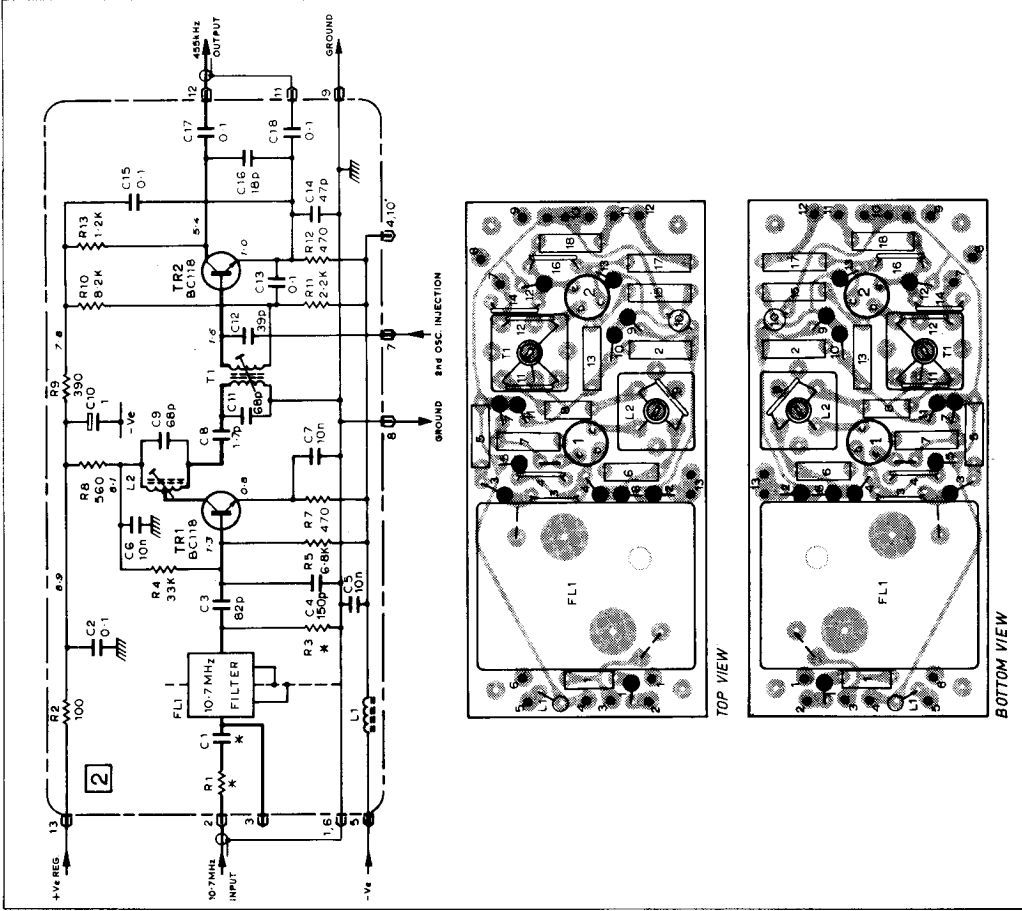
* Indicates tuning spindle

Code	RESISTORS	Part No.
R1	27kΩ	PM01453
R2	10kΩ	PM01448
R3	1kΩ	PM01436
R4	27kΩ	PM01453
R5	10kΩ	PM01448
R6	1kΩ	PM01436

Code	RESISTORS (cont.)	Part No.
R7	10kΩ	PM01448
R8	3.3kΩ	PM01442
SEMICONDUCTORS		
TR1	BF180	FV05155
TR2	BF180	FV05155
TR3	UC734	FV09244
INDUCTORS		
L1		AT31624
L2		AT31624
L3		AT31624
L4		AT31624
L5		AT31624
L6		AT31226/4
L7		AT31785/2
L8		AT32958/5
L9	0.22μH	FT05611
L10	0.22μH	FT05611
TEST POINTS		
TP1-3		FJ00010

COMPLETE ASSEMBLY PART NO. AT10824

2.7 10.7 MHz I.F. AMPLIFIER (2)



Circuit

Filter matching input network R1 C1, 10.7 MHz Filter, one stage of amplification (TR1) and 2nd Mixer (TR2). Top capacity interstage coupling is used between TR1 & TR2

Regulated 9.5V

11.155 MHz applied at pin 7

10.7 MHz at pins 1 & 2

455 kHz at pins 12 & 11

Power supply

Injection frequency

Input frequency

Output frequency

10.7 MHz I. F. AMPLIFIER

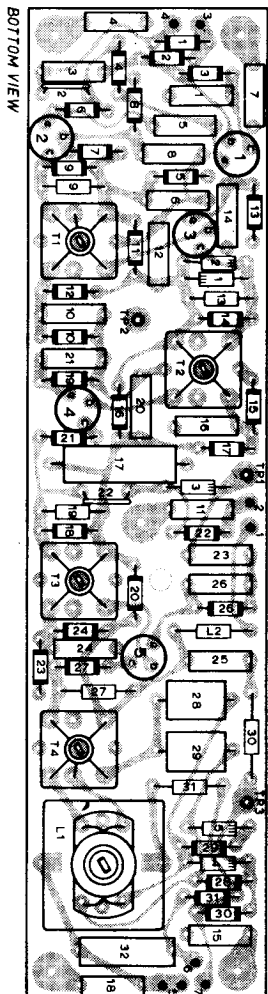
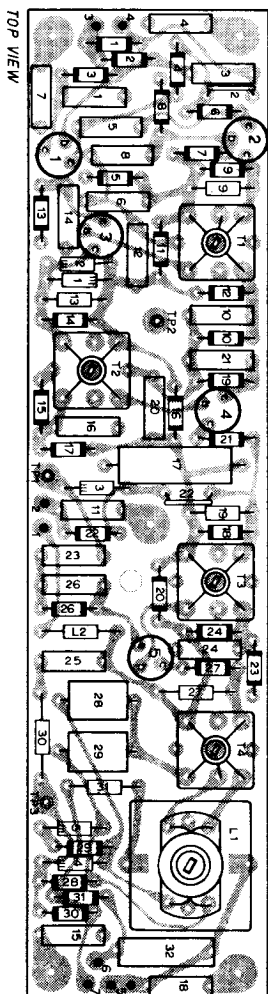
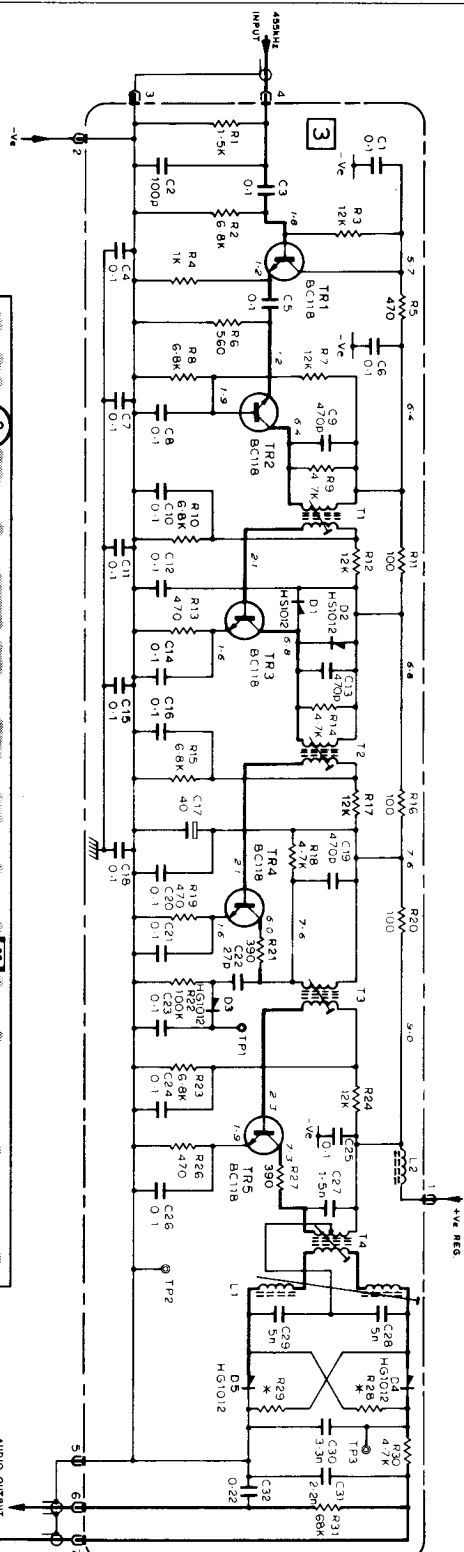
Code	CAPACITORS	Part No.	Code	RESISTORS (Cont)	Part No.
C1	33pF	(20/30 kHz) PP06174	R4	33k Ω	PM01454
C2	22pF	(40/60 kHz) PP05619	R5	6.8k Ω	PM01446
C3	0.1 μ F	PQ32000	R6	Not used	
C4	82pF	PP08200	R7	470 Ω	PM01432
C5	150pF	PP09405	R8	560 Ω	PM01433
C6	10nF	PQ25000	R9	390 Ω	PM01431
C7	10nF	PQ25000	R10	8.2k Ω	PM01447
C8	1.7pF	PQ25000	R11	2.2k Ω	PM01440
C9	68pF	PN00151	R12	470 Ω	PM01432
C10	1 μ F	PN07654	R13	1.2k Ω	PM01437
C11	68pF	PS13067		SEMICONDUCTORS	
C12	39pF	PN07654	TR1	BC118	FV07766
C13	0.1 μ F	PP06405	TR2	BC118	FV07766
C14	47pF	PQ32000		INDUCTORS	
C15	0.1 μ F	PP06671			
C16	18pF	PQ32000	L1	470 μ H	FT05597
C17	0.1 μ F	PP05410	L2		AT31785/1
C18	0.1 μ F	PQ32000	T1		AT31651/9
RESISTORS					
R1	120 Ω	(20/30 kHz) PM01425			
R2	Not used	(40/60 kHz)			
	100 Ω	PM01424			
R3	1k Ω	(20/30 kHz) PM01436			
	2.2k Ω	(40/60 kHz) PM01440	FL1	(Crystal)(20/30 kHz) FC03200	
				(Crystal)(40/60 kHz) FC03205	
				FILTER	

COMPLETE ASSEMBLY PART NO.

20/30 kHz Channelling AT26849/1
 40/60 kHz Channelling AT26849/2

2.8 455 KHz IF UNIT (3)

17



455 KHz I.F. Unit(3)

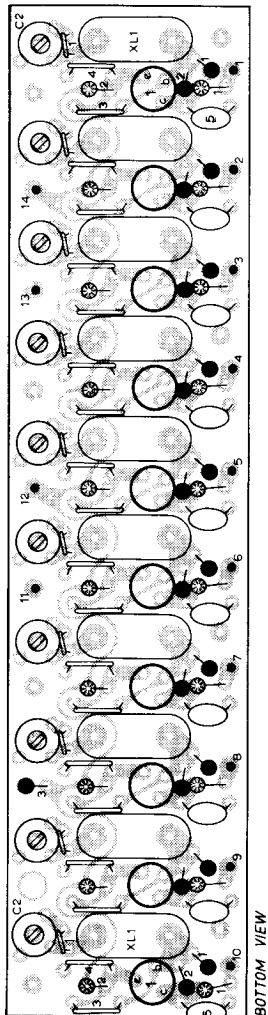
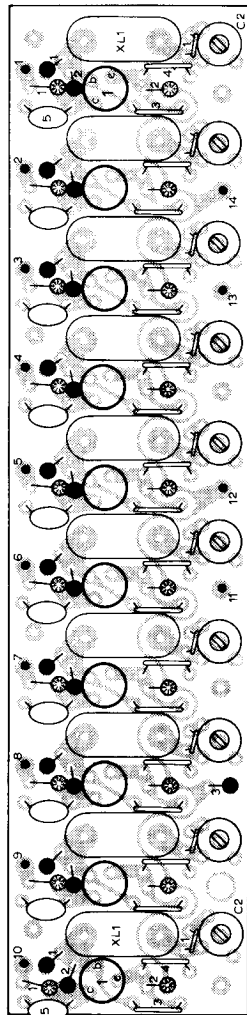
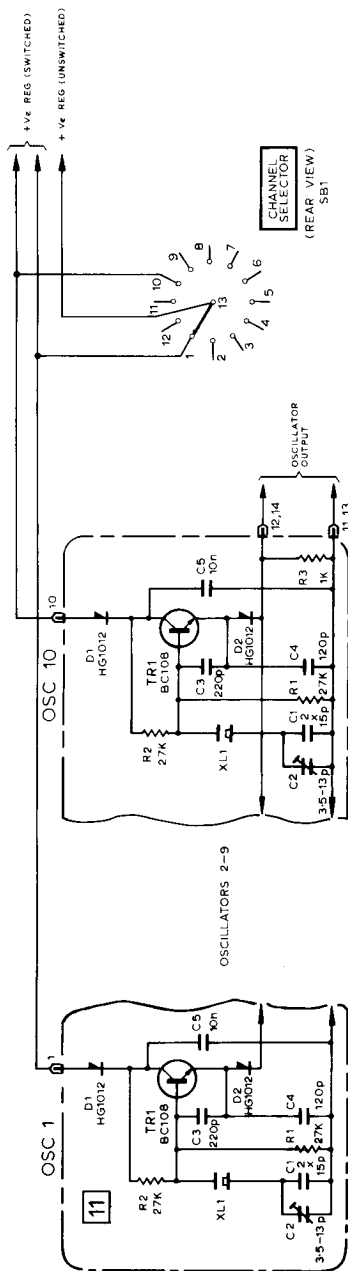
Circuit	Emitter follower TR1; two 455 kHz amplifiers TR2, TR3; two limiters TR4 TR5 and a Foster Seeley type discriminator D4, D5. The diodes D1 D2 in the 2nd amplifier collector prevent ringing at high signal levels.		
Supply voltage	Regulated 9.5V d. c.		
Input	455 kHz at pins 4 and 3		
Outputs	1. Noise; filtered and applied via pin 7 to the squelch noise amplifier. 2. Audio; integrated by C31, R31 before application via pin 6 to the squelch switched amplifier.		
Test points	TP1	Alignment check point	
	TP2	Negative line	
	TP3	Discriminator balance point	

455kHz Filter Unit

This unit determines the selectivity of the receiver for the required channel spacing. It is a sealed unit connected between the 10.7 MHz and 455kHz I.F. Units.

Code	CAPACITORS	Part No.	Code	RESISTORS	Part No.	Code	SEMICONDUCTORS	Part No.
C1	0.1 μ F	PQ32000	R1	1.5k Ω	NG15203	TR1	BC118	FV07766
C2	100pF	PP08527	R2	6.8k Ω	NG68203	TR2	BC118	FV07766
C3	0.1 μ F	PQ32000	R3	12k Ω	NG12303	TR3	BC118	FV07766
C4	0.1 μ F	PQ32000	R4	1k Ω	NG10203	TR4	BC118	FV07766
C5	0.1 μ F	PQ32000	R5	470 Ω	NG47103	TR5	BC118	FV07766
C6	0.1 μ F	PQ32000	R6	560 Ω	NG56103	D1	HS1012	FV09656
C7	0.1 μ F	PQ32000	R7	12k Ω	NG12303	D2	HS1012	FV09656
C8	0.1 μ F	PQ32000	R8	6.8k Ω	NG68203	D3	HC1012	FV09002
C9	470pF	PQ11366	R9	4.7k Ω	NG47203	D4	HC1012	FV09002
C10	0.1 μ F	PQ32000	R10	6.8k Ω	NG68203	D5	HC1012	FV09002
C11	0.1 μ F	PQ32000	R11	100 Ω	NG10103	INDUCTORS		
C12	0.1 μ F	PQ32000	R12	12k Ω	NG12303	L1		278646
C13	470pF	PQ11366	R13	470 Ω	NG47103	L2	470 μ H	FT05597
C14	0.1 μ F	PQ32000	R14	4.7k Ω	NG47203	T1		AT31662/1
C15	0.1 μ F	PQ32000	R15	6.8k Ω	NG68203	T2		AT31662/1
C16	0.1 μ F	PQ32000	R16	100 Ω	NG10103	T3		AT31662/1
C17	40 μ F	PS30030	R17	12k Ω	NG12303	T4		AT31662/3
C18	0.1 μ F	PQ32000	R18	4.7k Ω	NG47203	TEST POINT		
C19	470pF	PQ11366	R19	470 Ω	NG47103	TP1-3		FS40821
C20	0.1 μ F	PQ32000	R20	100 Ω	NG10103	COMPLETE ASSEMBLY PART NOS.		
C21	0.1 μ F	PQ32000	R21	390 Ω	NG39103	20/30 kHz channelling		
C22	27pF	PP05869	R22	100k Ω	NG10403	AT26799/1		
C23	0.1 μ F	PQ32000	R23	6.8k Ω	NG68203	+0/60 kHz channelling		
C24	0.1 μ F	PQ32000	R24	12k Ω	NG12303	AT26799/2		
C25	0.1 μ F	PQ32000	R25	Not used				
C26	0.1 μ F	PQ32000	R26	470 Ω	NG47103			
C27	1.5nF	PQ15514	R27	390 Ω	NG39103			
C28	5nF	PQ21014	R28	10k Ω	NG10303			
C29	5nF	PQ21014	(20/30 kHz)		PM01437			
C30	3.3nF	PR07014	(40/60 kHz)		NG10303			
C31	2.2nF	PR05007	(20/30 kHz)		PM01437			
C32	0.22 μ F	PQ33069	(40/60 kHz)		NG47203			
			R30	1.8k Ω	NG68303			
			R31	4.7k Ω				
				68k Ω				

2.9 RECEIVER OSCILLATOR MULTIPLE CHANNEL (11) (NON - COMPENSATED)



Receiver 1st Oscillator –Multiple Channel Unit (Non-Compensated)

Multiple Channel Unit	May consist of 1, 3, 6 or 10 individual oscillators assembled as a single unit. (10 channel unit shown)
Circuit	Capacity trimmed crystal oscillator. The output of the working oscillator is taken from the common emitter resistor (R3).
Supply voltage	Regulated 9.5V d.c.
Output frequency	Crystal fundamental
Channel selection	By selector switch which applies the regulated 9.5V to the transistor of the selected oscillator.
Isolation	Diodes (D2) in the emitters of the non-working oscillators are reverse biased by the common resistor R3. Complex d.c. paths between receiver and transmitter oscillators are inhibited by the collector diodes (D1)

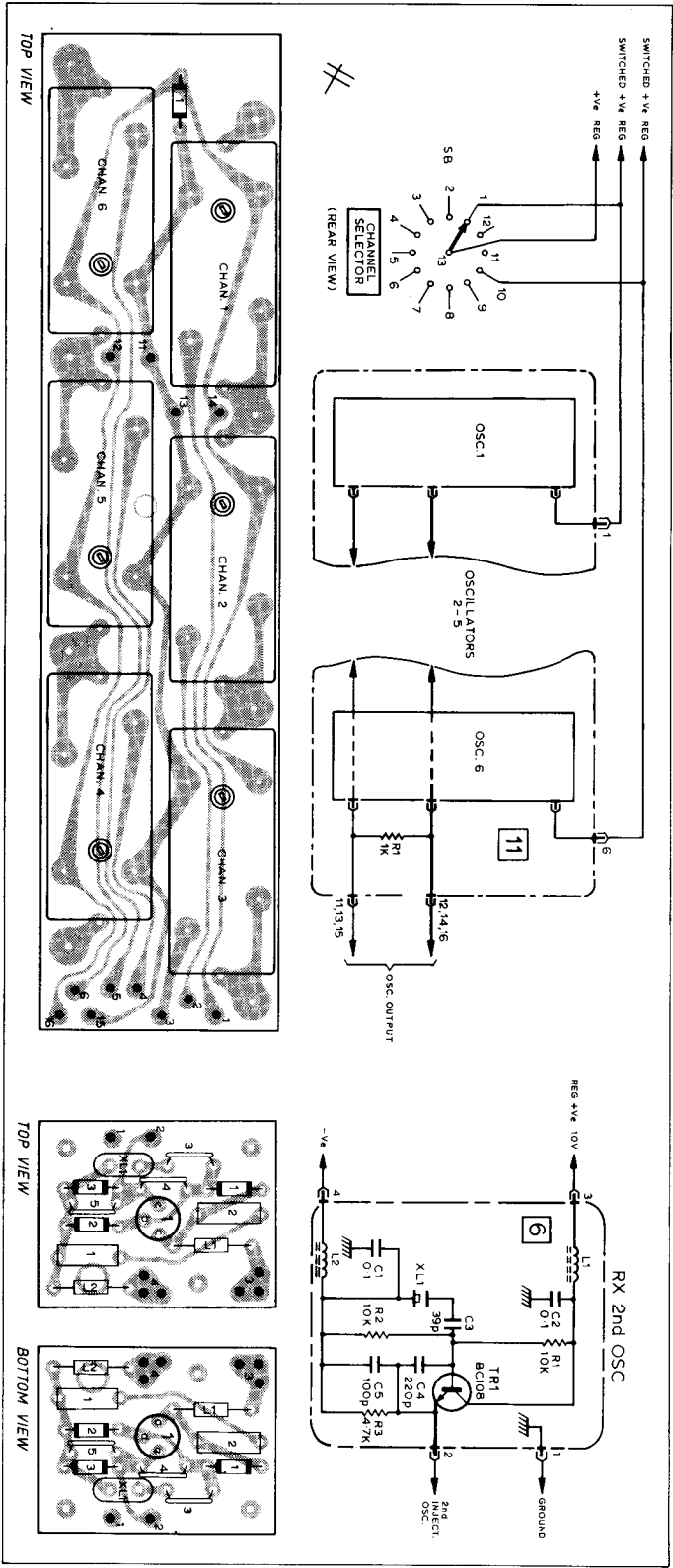
RECEIVER OSCILLATOR-MULTIPLE CHANNEL (U.H.F.)

Code	CAPACITORS	Part No.	COMPLETE ASSEMBLY PART Nos.	
C1	15pF	PN10316	3-Channel Unit	AT26818/1
	15pF	PN10316		
C2	3.5-13pF	PV05122		
C3	220pF	PP10054		
C4	120pF	PP08869		
C5	10nF	PN50301	6-Channel Unit	AT26819/1
	RESISTORS			
R1	27kΩ	PM01453	10-Channel Unit	AT26820/1
R2	27kΩ	PM01453		
R3	1kΩ	PM01436		
	SEMICONDUCTORS			
TR1		BC108		
D1		HG1012		
D2		HG1012		
	CRYSTAL			
XL1	To specification			

Note: With the exception of R3, the above items are repeated in each oscillator according to the number of channels. R3 is the common output resistor

2.9 COMPENSATED (1st) OSCILLATOR — SINGLE AND MULTIPLE CHANNEL

2.10 2nd OSCILLATOR (6)



General
This is a sealed unit plugged into a mating base board. It may consist of up to 6 units according to the number of channels required.

Supply voltage
Regulated 9.5V d.c.

Output frequency
Crystal fundamental
In multiple channel units the output is developed across an external resistor (R1)

2nd Oscillator Unit

Circuit

Supply voltage

Output frequency

Crystal controlled oscillator
Regulated 9.5V d.c.
Crystal fundamental normally 455 kHz above 1st I.F. (See Crystal Information)
Taken from pins 2 and 1; applied to 2nd mixer at pin 2

2.10(a) CRYSTAL INFORMATION

1st Local Oscillator Unit

Carrier Frequency (fc)	450-470 MHz
Crystal Frequency (fx)	$\frac{fc - 10.7}{36}$ MHz
Crystal Frequency Range	12.2027-12.7583 MHz

2nd Oscillator Unit

Carrier Frequency (MHz)	Crystal Frequency (MHz)		Specification Number
	Standard	Alternative*	
450-470	11.155	10.245	P52J

* Used when the carrier frequency is within ±100 kHz of a harmonic of the standard 2nd local oscillator frequency, i.e. 457.355 MHz and 468.510 MHz.

RECEIVER 2nd OSCILLATOR UNIT

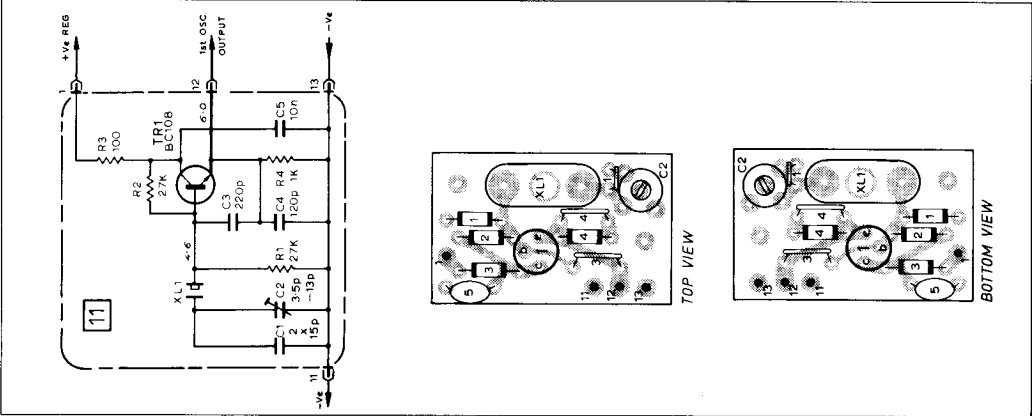
Code	CAPACITORS	Part No.	Code	SEMICONDUCTOR Part No.
C1	0.1μF	PQ32000	TR1	BC108 FV05800
C2	0.1μF	PQ32000		
C3	39pF	PP06405		CHOKES
C4	220pF	PP10054		
C5	100pF	PP08508	L1	470μH FT05597
			L2	470μH FT05597
				CRYSTAL
			XL1	Frequency to order
R1	10kΩ	PM01448		COMPLETE ASSEMBLY PART No.
R2	10kΩ	PM01448		AT26806/1
R3	4.7kΩ	PM01444		

RESISTORS

2.9(a) RECEIVER 1st OSCILLATOR (11) SINGLE CHANNEL

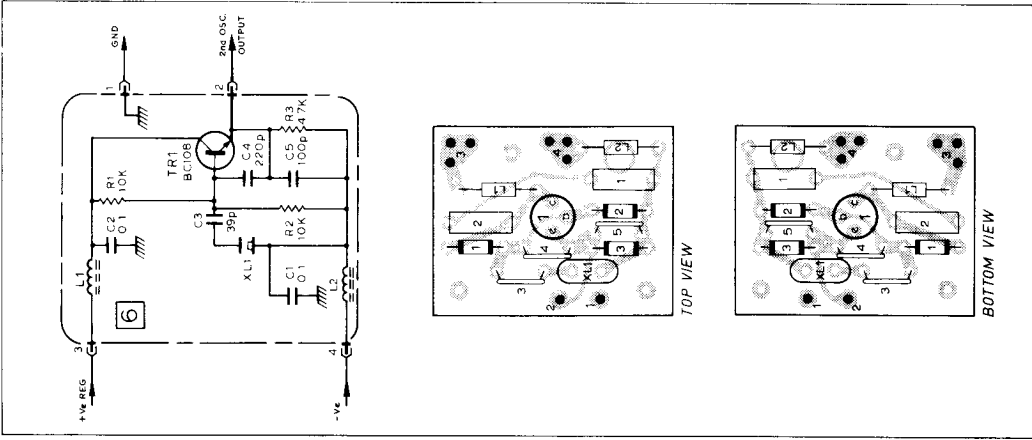
1st Oscillator Unit

- Circuit
 - Supply voltage
 - Output
 - Multiple Channel Units
- Crystal oscillator with variable capacity trimming. Regulated 9.5V d.c.
- At crystal frequency: developed across R4 and
- Details of these units are given at para. 2.9.



2.10 2nd OSCILLATOR (6)

- Circuit
 - Supply voltage
 - Output frequency
- Crystal controlled oscillator
- Regulated 9.5V d.c.
- Crystal fundamental nominally 455 kHz above 1st I.F. (See Crystal Information)
- Taken from pins 2 and 1; applied to 2nd mixer at pin 2



2.10(a) CRYSTAL INFORMATION

1st Local Oscillator Unit

Carrier Frequency (fc)	450-470 MHz
Crystal Frequency (fx)	$\frac{fc - 10.7}{36}$ MHz
Crystal Frequency Range	12.2027-12.7583 MHz

2nd Oscillator Unit

Carrier Frequency (MHz)	$\frac{\text{Crystal Frequency (MHz)}}{\text{Standard Alternative}}$ *	Specification Number
450-470	11.155 10.245	P52J

* Used when the carrier frequency is within ± 100 kHz of a harmonic of the standard 2nd local oscillator frequency, i. e. 457.355 MHz and 468.510 MHz

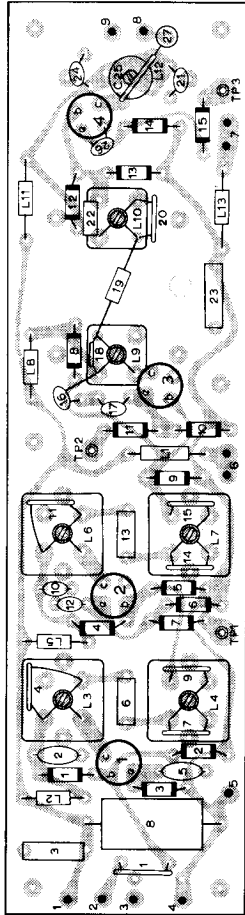
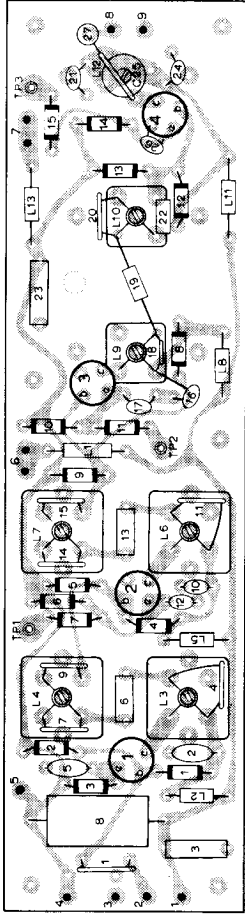
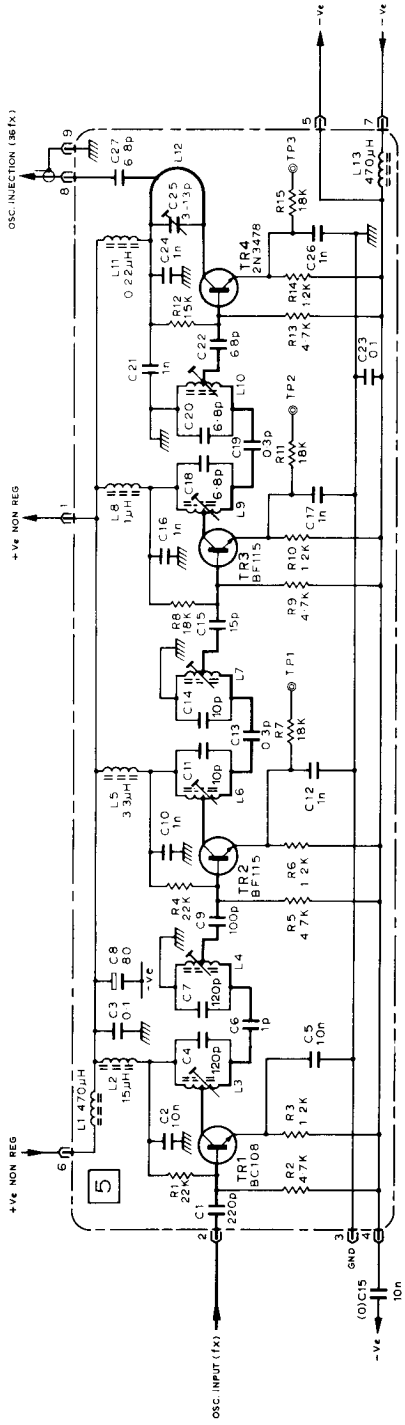
RECEIVER OSCILLATOR (U. H. F.)

Code	CAPACITORS	Part No.
C1	15pF	PN10316
	15pF	PN10316
C2	3.5-13pF	PV05122
C3	220pF	PP10054
C4	120pF	PP08869
C5	10nF	PN50301
RESISTORS		
R1	27kΩ	PM01453
R2	27kΩ	PM01453
R3	100Ω	PM01424
R4	1kΩ	PM01436
Code	SEMICONDUCTOR	Part No.
TR1	BC108	FV05800
CRYSTAL		
XL1	Frequency to order	
COMPLETE ASSEMBLY PART NO.		
AT26817/1		

RECEIVER 2nd OSCILLATOR UNIT

Code	CAPACITORS	Part No.
C1	0. 1μF	PQ32000
C2	0. 1μF	PQ32000
C3	39pF	PP06405
C4	220pF	PP10054
C5	100pF	PP08508
SEMICONDUCTOR		
TR1	BC108	FV05800
CHOKES		
L1	470μH	FT05507
L2	470μH	FT05597
Code	RESISTORS	Part No.
R1	10kΩ	PM01448
R2	10kΩ	PM01448
R3	4. 7kΩ	PM01444
CRYSTAL		
XL1	Frequency to order	
COMPLETE ASSEMBLY PART Nos		
	11.155 MHz	AT26806/1
	10.245 MHz	AT26806/3

2.11 OSCILLATOR MULTIPLIER UNIT (5)



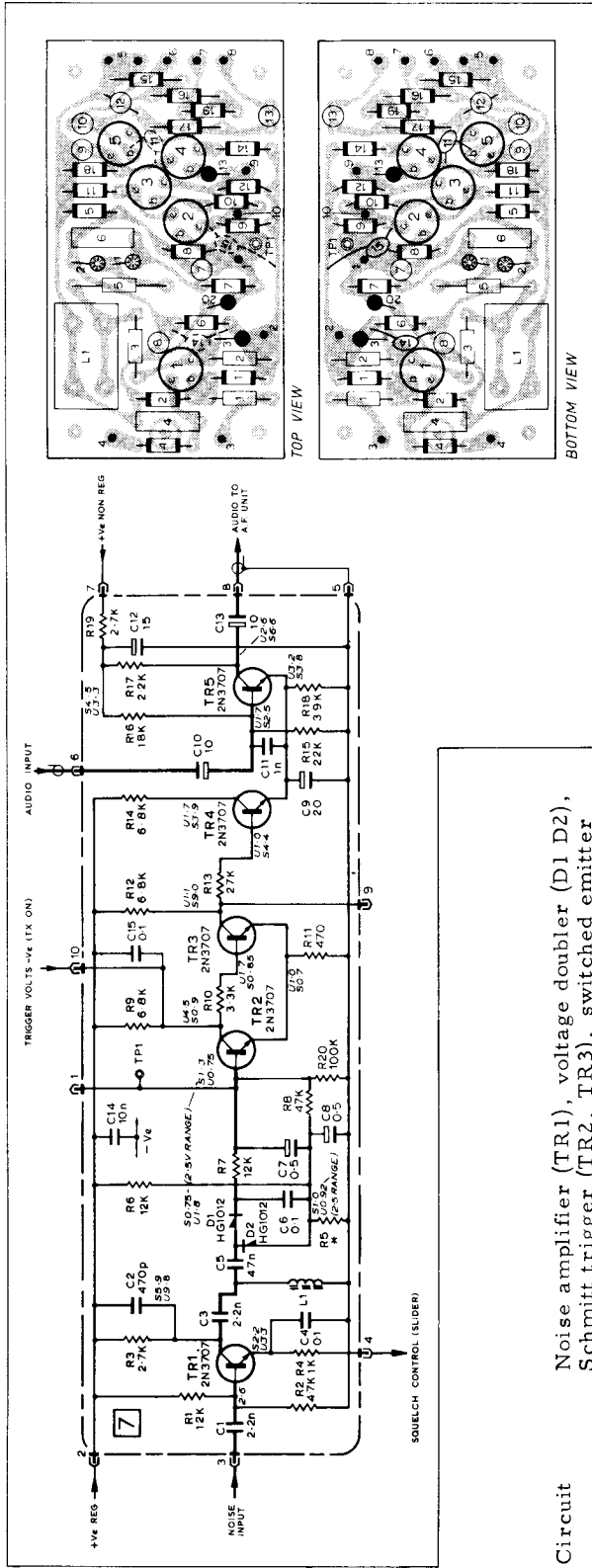
Oscillator Multiplier Unit

Circuit	4 stages of multiplication (TR1-TR4); top capacity coupled band pass circuits are used for inter-stage coupling throughout.			
Power supply	12V d. c. nominal.			
Input frequency	Crystal fundamental at pins 2 and 4.			
Output frequency	439.3 - 459.3 MHz at pins 8 and 9.			
Test points	TP1	TR2 emitter } Alignment checkpoints TR3 emitter } TR4 emitter }		
	TP2			
	TP3			
Multiplication factors	TR1	TR2	TR3	TR4
	x2	x3	x3	2
				Total
				x36

Code	CAPACITORS	Part No.
C1	220pF	PP10054
C2	10nF	PN50301
C3	0.1μF	PQ32000
C4	120pF	PP08869
C5	10nF	PN50301
C6	1pF	PN00020
C7	120pF	PP08869
C8	80μF	PS36014
C9	100pF	PP08527
C10	1nF	PN26350
C11	10pF	PP04503
C12	1nF	PN26350
C13	0.3pF	PN00001
C14	10pF	PP04503
C15	15pF	PP05015
C16	1nF	PN26350
C17	1nF	PN26350
C18	6.8pF	PP02601
C19	0.3pF	PN00001
C20	6.8pF	PP02601
C21	1nF	PN26326
C22	6.8pF	PN05128
C23	0.1μF	PQ32000
C24	1nF	PN26350
C25	3.5-13pF	PV05122
C26	1nF	PN26350
C27	6.8pF	PN05145

Code	RESISTORS (cont.)	Part No.
R11	18kΩ	PM01451
R12	15kΩ	PM01450
R13	4.7kΩ	PM01444
R14	1.2kΩ	PM01437
R15	18kΩ	PM01437
SEMICONDUCTORS		
TR1	BC108	FV05800
TR2	BF115	FV05154
TR3	BF115	FV05154
TR4	2N3478	FV07567
INDUCTORS		
L1	470μH	FT05597
L2	15μH	FT05614
L3		AT31775/3
L4		AT31775/4
L5		FT05613
L6		AT31775/3
L7		AT31775/4
L8	1μH	FT05612
L9		AT31765/1
L10		AT31765/2
L11	0.22μH	FT05611
L12		AT32966
L13	470μH	FT05597
TEST POINTS		
TP1		FS40821
TP2		FS40821
TP3		FS40821
COMPLETE ASSEMBLY PART NOS.		
AT26900/1		

2.12 SQUELCH UNIT (7)



Circuit

Noise amplifier (TR1), voltage doubler (D1 D2), Schmitt trigger (TR2, TR3), switched emitter follower (TR4) and audio pre-amplifier (TR5).

Supply

- (1) Regulated 9.5V d.c. to all stages less TR5
- (2) Unregulated 12V d.c. (via Unit 8) to TR5

Input s

- (1) Noise; pin 3
- (2) Audio; pin 6

Standing bias

Applied to noise amplifier via SQUELCH control; derived from Regulator; determines noise level for Schmitt trigger operation.

Trigger

- 1. Rx. Derived from noise amplifier voltage doubler. The voltage doubler circuit is raised above ground so that the rectified noise voltage approximates to trigger volts

Voltage

Trigger backlash
Switching voltage

Test point

- 2. Tx. TR2 collector connected to -ve via 9R1 9D1 to silence the receiver during transmission.

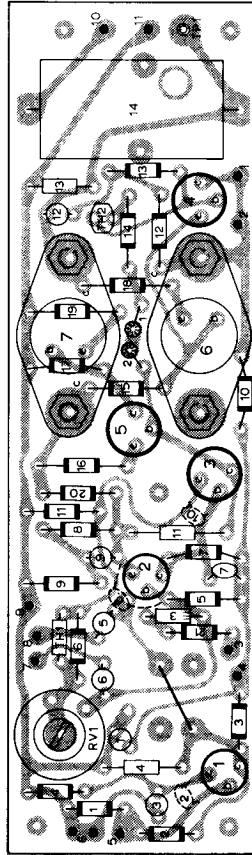
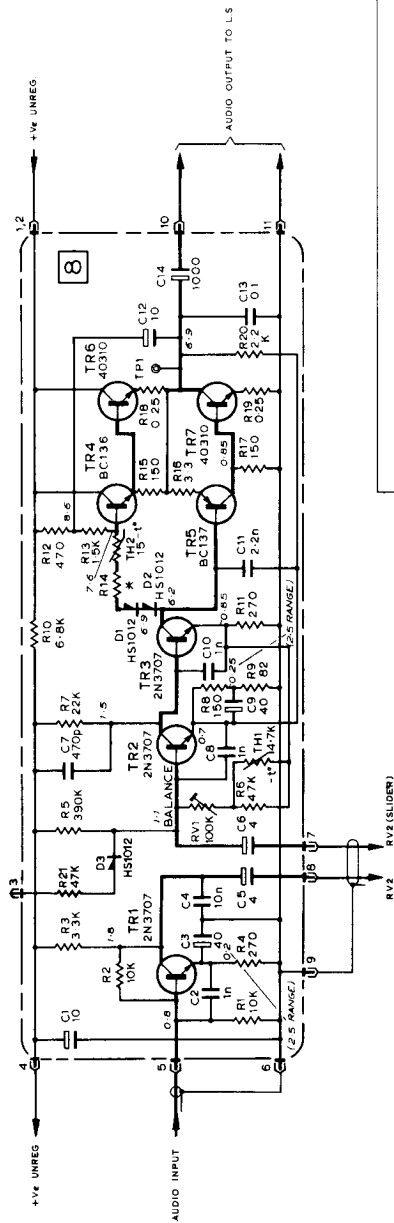
3db minimum

Taken from TR3 collector to switch on emitter follower (TR4); common emitter resistor biases audio pre-amplifier emitter cutting off the audio output

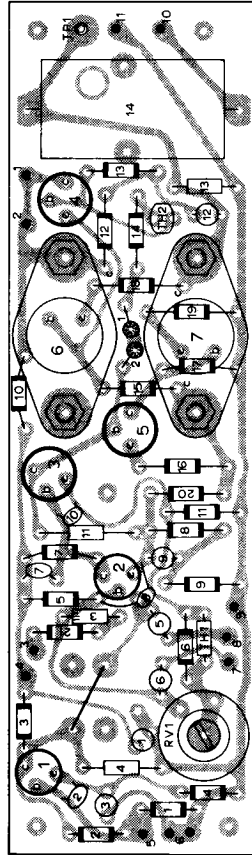
TP1 - in TR2 base for setting-up.

[illegible]

2.13 RECEIVER AUDIO UNIT (8)



TOP VIEW



BOTTOM VIEW

WARNING

QUIESCENT CURRENT - TR6, TR7

The quiescent current of these transistors must not exceed 50mA. This can be checked as follows:-

Break the connection at Pin 2.

Connect an appropriate meter between Pin 2 and the lead to Pin 2. The current reading should be between 25 and 50mA. Should the reading exceed 50mA the resistor R14 must be replaced with a value which produces a current of 25 to 50mA.

A full range of values for R14 is given in the parts list overleaf.

Receiver Audio Unit

Circuit

RC amplifier (TR1) is coupled via the VOLUME control to a transformerless amplifier consisting of:-

2 amplifiers (TR2 TR3) in cascade; a complementary pair Class B phase inverter (TR4 TR5) directly coupled to a single-ended Class B output pair (TR6, TR7). Positive feedback from output to TR4 is provided by C12.

Supply Voltage

Unregulated 12V d.c. nominal

Temperature compensation and stabilisation

- (1) Diodes D1 D2 (thermally connected to TR6 TR7) in series with TH2 and R14 form a compensating bias network for quiescent current
- (2) Loop from output to TR2 emitter
- (3) Loop from TR3 emitter to TR2 base with TH1 to compensate balance

Input

Audio (across pins 4 and 5) from Squelch Unit.

Output

2 watts maximum

Balance

The d.c. voltage level at the output centre point should be half of the supply voltage. Adjusted by BALANCE control RV1.

Test point

TP1 at output centre point (for balance check)

RECEIVER AUDIO UNIT

Code	CAPACITORS	Part No.	Code	RESISTORS	Part No.
C1	10μF	PS99505	R1	10kΩ	PM01448
C2	1nF	PN26326	R2	10kΩ	PM01448
C3	47μF	PS99509	R3	3.3kΩ	PM01442
C4	10nF	PR14083	R4	270Ω	PM01429
C5	4.7μF	PS99504	R5	390kΩ	NE39490
C6	4.7μF	PS99504	R6	47kΩ	NE47390
C7	470pF	PN22401	R7	22kΩ	NE22390
C8	1nF	PN26326	R8	150Ω	NE15190
C9	47μF	PS99509	R9	82Ω	NE82090
C10	1nF	PN26326	R10	6.8kΩ	NE68290
C11	2.2nF	PR05007	R11	270Ω	NE27190
C12	10μF	PS99505	R12	470Ω	NE47190
C13	0.1μF	PQ32000	R13	1.5kΩ	NE15290
C14	1000μF	PS51080	*R14	120Ω	NE12190
SEMICONDUCTORS					
TR1	2N3707	FV09879		127Ω	PL41708
TR2	2N3707	FV09879		130Ω	NE13190
TR3	2N3707	FV09879		133Ω	PL41709
TR4	BC136	FV07795		140Ω	ND14122
TR5	BC137	FV09899		147Ω	PL41710
TR6	40310	FV07594		150Ω	NE15190
TR7	40310	FV07594		154Ω	PL41711
D1	HS1012	FV09656	R15	150Ω	NE16190
D2	HS1012	FV09656	R16	160Ω	PL41712
D3	HS1012	FV09656	R17	162Ω	PL41713
TEST POINT				169Ω	NE18190
				180Ω	NE20190
				200Ω	NE22190
				220Ω	NE15190
			R15	150Ω	PL21103
			R16	3.3Ω	NE15190
			R17	150Ω	PL21149
			R18	0.25Ω	PL21149
			R19	0.25Ω	NE22290
			R20	2.2kΩ	PM01456
			R21	47kΩ	PL05623/5
TP1		FS40821	RV1	100kΩ	
COMPLETE ASSEMBLY PART NO.					
			TH1	4.7kΩ	PL23057
			TH2	.15Ω	PL23058

AT26800

SECTION 3 — TRANSMITTER CIRCUIT DATA

3.1 Introduction

Sections 2 and 3 consists mainly of summaries so arranged that all the information concerning a unit is presented on one page.

The information consists of:-

- Circuit Diagram
- Component Location Diagrams (Top and Bottom)
- Unit features
- Parts List (shown on reverse side)

Typical voltages are shown on all circuits and also on Figs. 6.1 and 6.2.

Circuit Notes are given at para. 2.4.

Information concerning converter and/or Tone Lock units (if fitted) will be found in the wallet at the back of this handbook.

3.2 Unit Identification

Each unit is silk screened with a prefix number which is shown in Para. 3.3. This number is also repeated on each unit circuit diagram. All chassis mounted components are prefixed with the symbol 'O'. It is stressed that these identity numbers are solely for inter-unit reference within this manual. The Complete Assembly Part No. (shown on each Unit Parts List), is the true identification for all other purposes.

Establishments handling U.H.F., V.H.F. FM and V.H.F. AM equipment (or any two of these generic types) should exercise extreme care when reassembling.

3.3 Lists of Units

The transmitter consists of the following units and chassis components:-

(a)	Transmitter	Prefix
	Audio	(10)
	1st Oscillator (non-compensated)	(11) 1, 3, 6, or 10 channels
	1st Oscillator (compensated)	(11) up to 6 channels
	Modulator Driver	(12)
	Power Amplifier	(13)
	Antenna Filter	(14)
	Fist Microphone (External item)	
(b)	Chassis Components	

These are detailed in section 3A Parts List.

Note: Both transmitter and receiver use the same oscillator type.

To avoid delays and possible errors in the supply of spare parts the reference numbers shown in these parts lists should be quoted in all orders.

The right is reserved to fit alternative types of semi-conductors with equal or improved performance to those quoted in the Parts Lists.

3.4 Circuit Summary

The fundamental frequency generated by the crystal oscillator is modulated by the amplified and limited output from the a.f. unit at the phase modulator. After 4 stages of multiplication, the phase modulated output, now at half carrier frequency, is amplified by the driver stage before application to 3 stages of power amplification. Tuned helical resonators filter the output.

A zener diode in the Modulator/Driver Unit stabilises the supply (at 10V) to the modulator stages, and Audio Unit.

3.5 Switching

With the exception of the crystal oscillator all stages of the transmitter are connected to the d.c. supply when the OFF/ON switch is ON. This unit is connected to the supply via the microphone press-to-talk switch which also operates the antenna changeover relay and the red TX lamp.

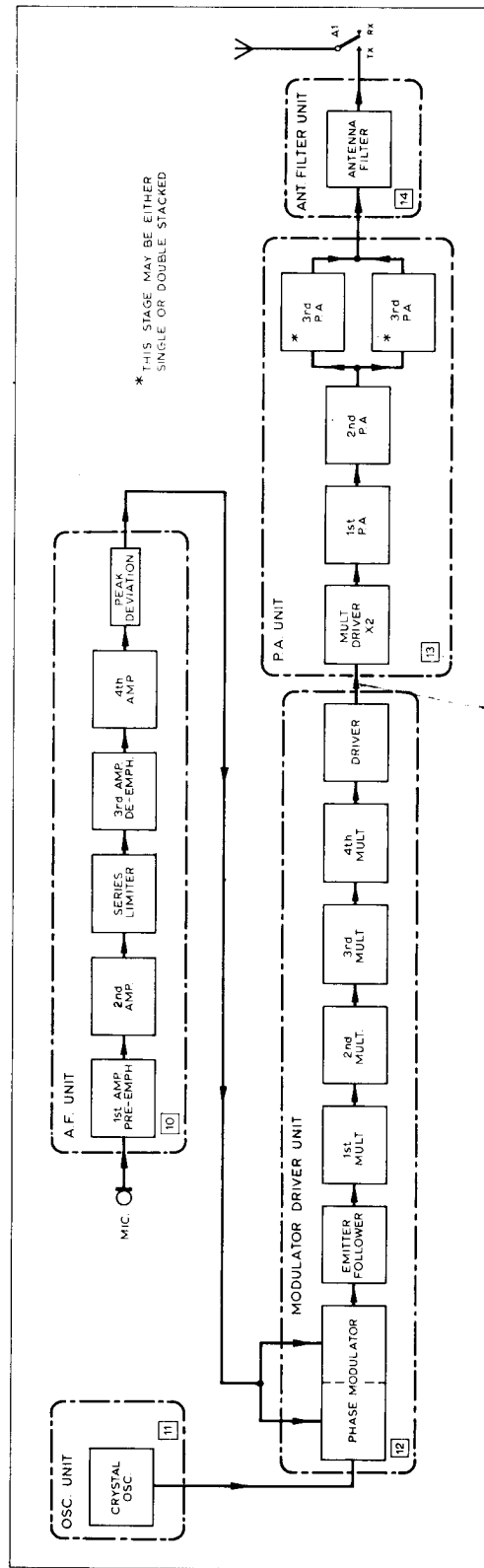
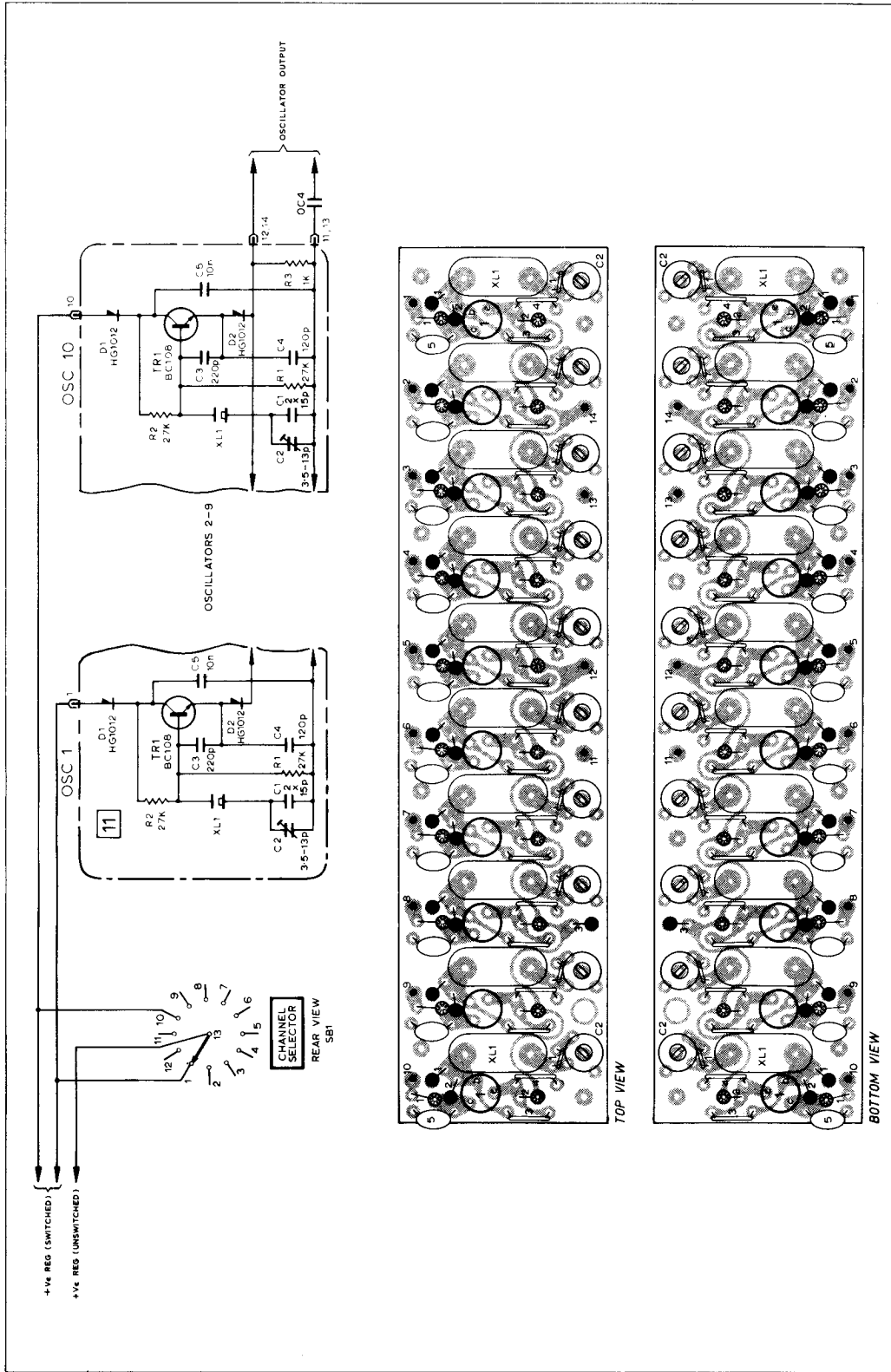


Fig. 3.1 Transmitter Block Diagram

3.6 TRANSMITTER OSCILLATOR - MULTIPLE CHANNEL(11)



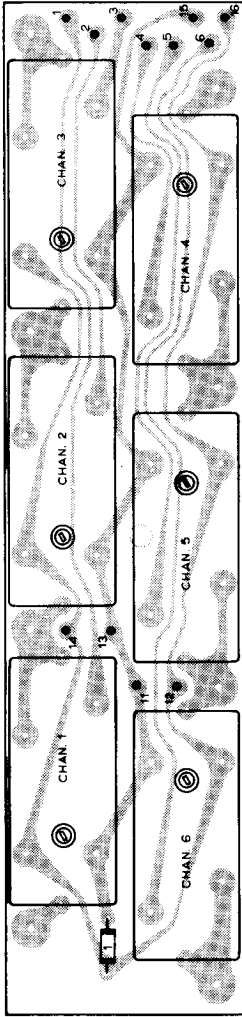
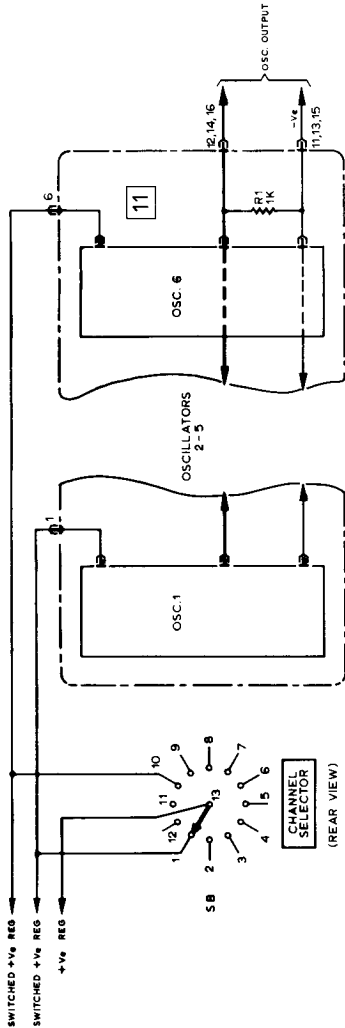
Transmitter Oscillator — Multiple Channel Unit (non compensated)

Multiple Channel Unit	May consist of 1, 3, 6 or 10 individual oscillators assembled as a single unit. (10 channel unit shown)
Circuit	Capacity trimmed crystal oscillator. The output of the working oscillator is taken from the common emitter resistor (R3).
Supply voltage	Regulated 9.5V d. c.
Output frequency	Crystal fundamental
Channel selection	By selector switch which applies the regulated 9.5V to the transistor of the selected oscillator.
Isolation	Diodes (D2) in the emitters of the non-working oscillators are reverse biased by the common resistor R3. Complex d. c. paths between receiver and transmitter oscillators are inhibited by the collector diodes (D1)
Switching	Negative supply to the common line is completed by the press-to-talk switch.

TRANSMITTER OSCILLATOR-MULTIPLE CHANNEL (U.H.F.)

Code	CAPACITORS	Part No.	COMPLETE ASSEMBLY PART Nos.
C1	15pF	PN10316	3-Channel Unit AT26818/1
	15pF	PN10316	
C2	3.5-13pF	PV05122	
C3	220pF	PP10054	
C4	120pF	PP08869	6-Channel AT26819/1
C5	10nF	PN50301	
RESISTORS			
R1	27kΩ	PM01453	10-Channel Unit AT26820/1
R2	27kΩ	PM01453	
R3	1kΩ	PM01436	
SEMICONDUCTORS			
TR1	BC108	FV05800	
D1	HG1012	FV09002	
D2	HG1012	FV09002	
CRYSTAL			
XL1	To specification		
Note: With the exception of R3, the above items are repeated in each oscillator according to the number of channels. R3 is the common output resistor			

3.6 COMPENSATED OSCILLATOR – SINGLE & MULTIPLE CHANNEL (11)



General

This is a sealed unit plugged into a mating baseboard. It may consist of up to 6 units according to the number of channels required.

Supply voltage

Output frequency

3.7 CRYSTAL INFORMATION

Carrier Frequency (fc)	450 - 470 MHz
Crystal Frequency (fx)	fc 32 MHz
Crystal Frequency Range	14.0625 - 14.6875 MHz

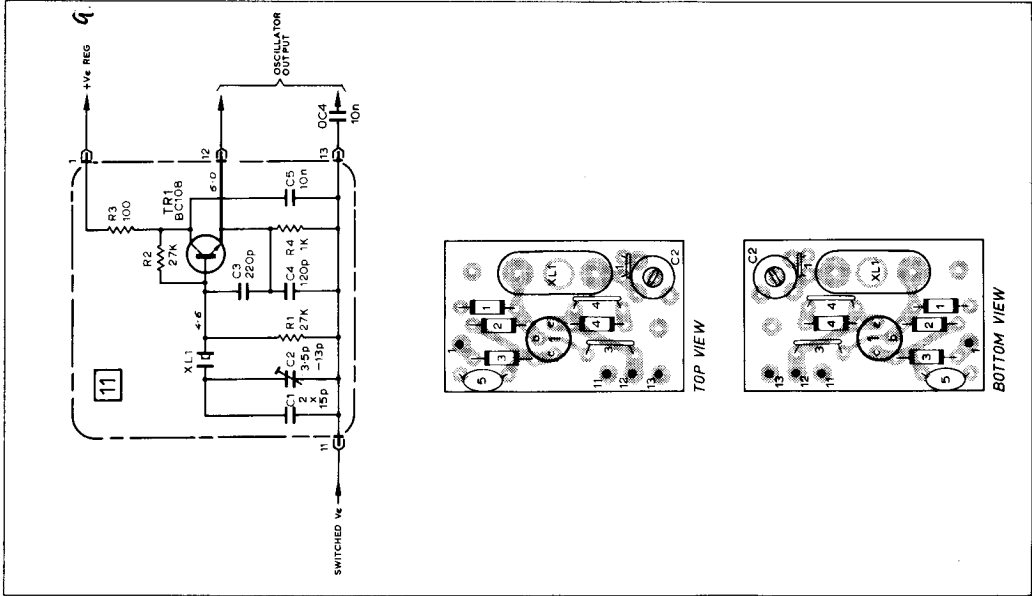
TRANSMITTER OSCILLATOR (TEMPERATURE COMPENSATED)

* Temperature compensated oscillator Type E100
(frequency to order.)

Baseboard Assembly (for above) AT26797
(includes R1 1k Ω Pt.No. NE10290)

* When ordering please specify exact frequency

3.6(a) TRANSMITTER OSCILLATOR — SINGLE CHANNEL (11)



Single Channel

Circuit

Capacity trimmed crystal oscillator (TR1)

Supply voltage

Regulated 9.5V d. c.

Output

At crystal frequency; developed across R4 and applied to Driver Modulator

Switching

Negative supply to pin 11 is completed by the press-to-talk switch

3.7 CRYSTAL INFORMATION

Carrier Frequency (fc)

450 - 470 MHz

Crystal Frequency (fx)

$\frac{f_c}{32}$ MHz

Crystal Frequency Range

14.0625 - 14.6875 MHz

TRANSMITTER OSCILLATOR (U.H.F.)

Code	CAPACITORS	Part No.
C1	15pF	PN10316
	15pF	PN10316
C2	3.5-13pF	PN05122
C3	220pF	PP10054
C4	120pF	PP08869
C5	10nF	PN50301

RESISTORS

R1	27kΩ	PM01453
R2	27kΩ	PM01453
R3	100Ω	PM01424
R4	1kΩ	PM01436

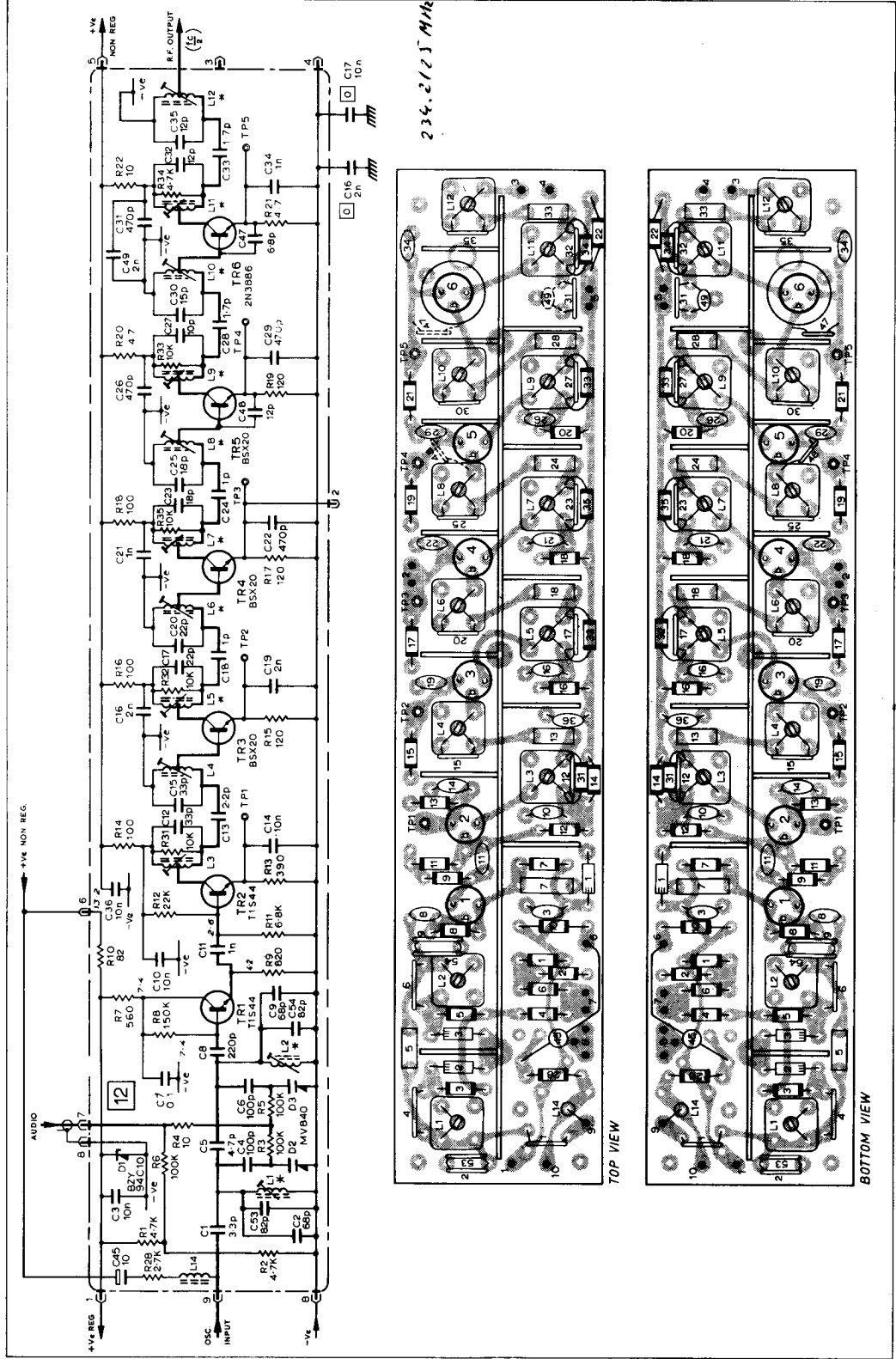
Code	SEMICONDUCTORS	Part No.
TR1	BC108	FV05800

CRYSTAL

XL1	Frequency to order
-----	--------------------

COMPLETE ASSEMBLY PART NOS.
AT26817/1

3.8 MODULATOR DRIVER (12)



Modulator Driver Unit

Circuit 2 tuned phase modulation stages (D2, D3),
emitter follower (TR1), 4 multiplier stages
(TR2-TR5) each stage top capacity coupled,
and a driver stage (TR6).

- Supply voltage 1. Unregulated 12V to TR2-TR6
 2. Regulated 10V (derived from R10 and
 zener diode D1) to D2, D3 and TR1;
 D2 and D3 are biased by the divider
 network R1, R2. This supply is also
 applied to transmitter audio.

Output 250mW at half carrier frequency across
pins 3 and 4.

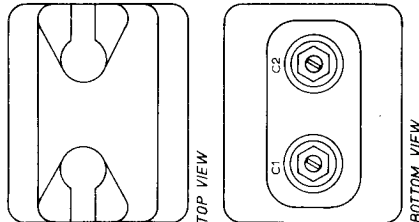
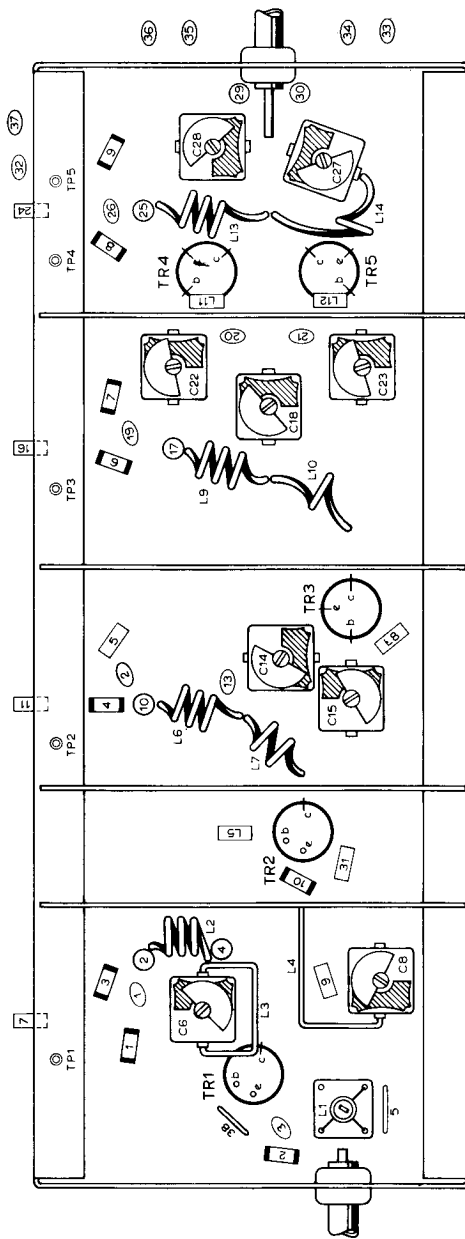
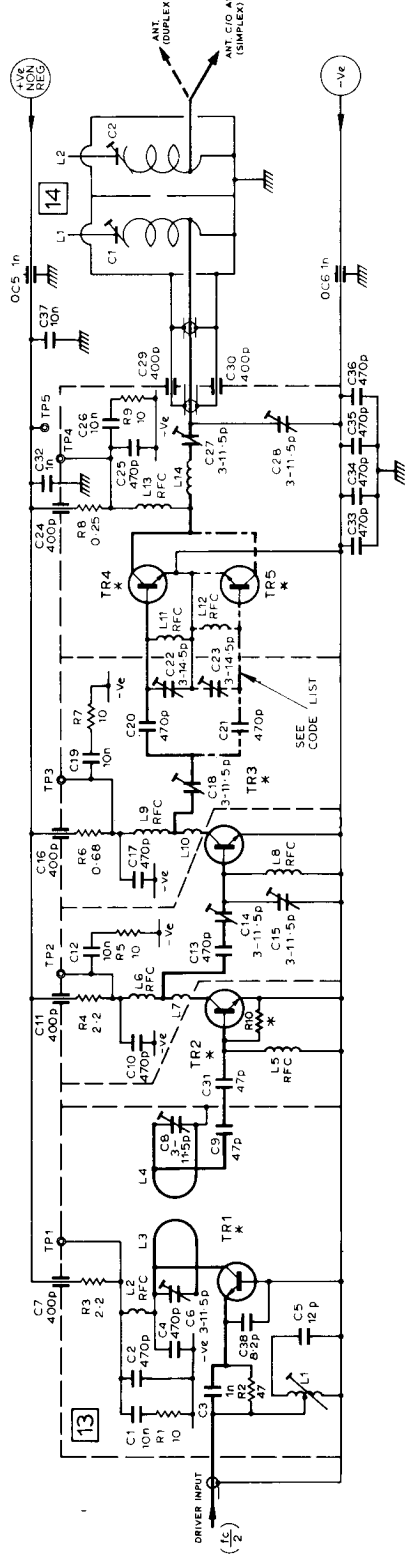
- Test Points TP1 Low level stages
 TP2 1st multiplier stage Checking
 TP3 2nd multiplier stage and
 TP4 3rd multiplier stage alignment
 TP5 4th multiplier stage

MULTIPLICATION FACTORS

Freq. (MHz)	TR2	TR3	TR4	TR5	Total
450-470	x2	x2	x2	x2	16

COMPLETE ASSEMBLY PART NO. AT26826/24

3.9 POWER AMPLIFIER UNIT (13) AND ANTENNA FILTER UNIT (14)



AND ANTENNA FILTER UNIT (14)

Power Amplifier Unit

Circuit

Frequency doubler TR1, 1st Amplifier TR2, driver TR3, output stage TR4 (or TR4 and TR5 - see Note).

Note: This unit is fitted with either TRW or Mullard transistors. When TRW types are used the output stage consists of a paralleled pair (TR4, TR5). A single transistor (TR4) stage is used when Mullard types are employed.

WARNING

Under no circumstances are mixed combinations of TRW and Mullard transistors to be fitted to this unit.

Power Supply

12V d.c. nominal.

Output power

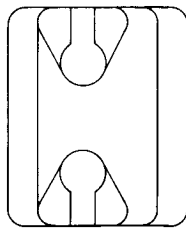
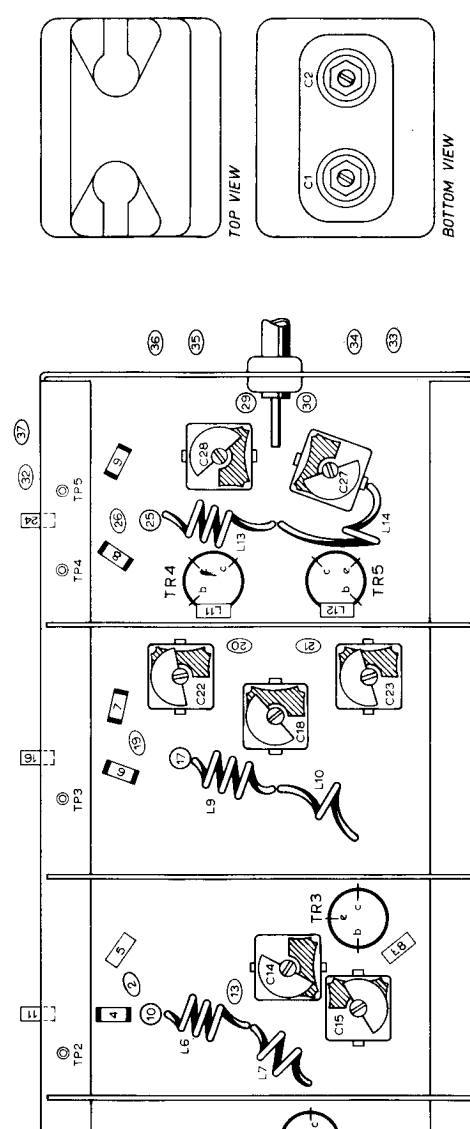
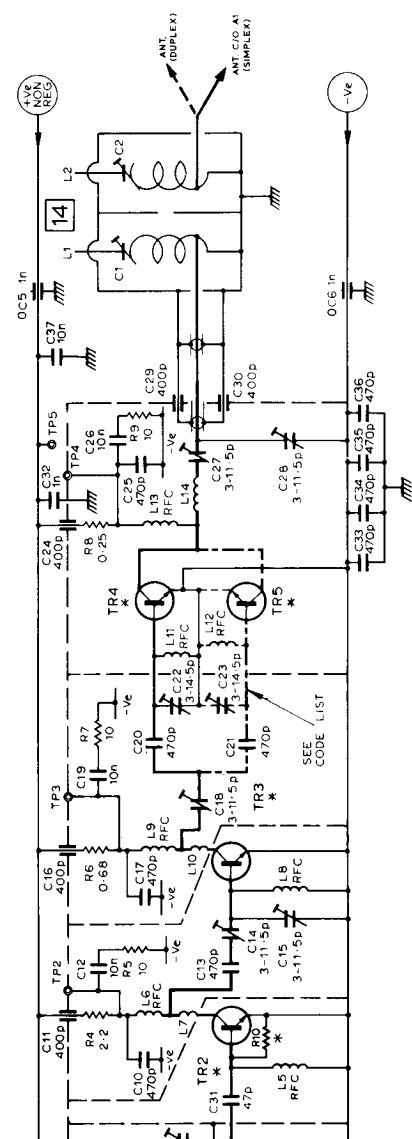
4.5W minimum at antenna socket.

Test points

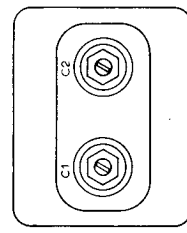
- TP1 Output stage of Mod./Driver Unit (12TR6) and P.A. Frequency doubler stage.
- TP2 1st Amplifier
- TP3 Driver stage
- TP4 Final P.A.
- TP5 Positive line

Antenna Filter Unit

This unit consists of 2 helical resonators tuned to carrier frequency to filter out spurious emissions from the transmitter output.



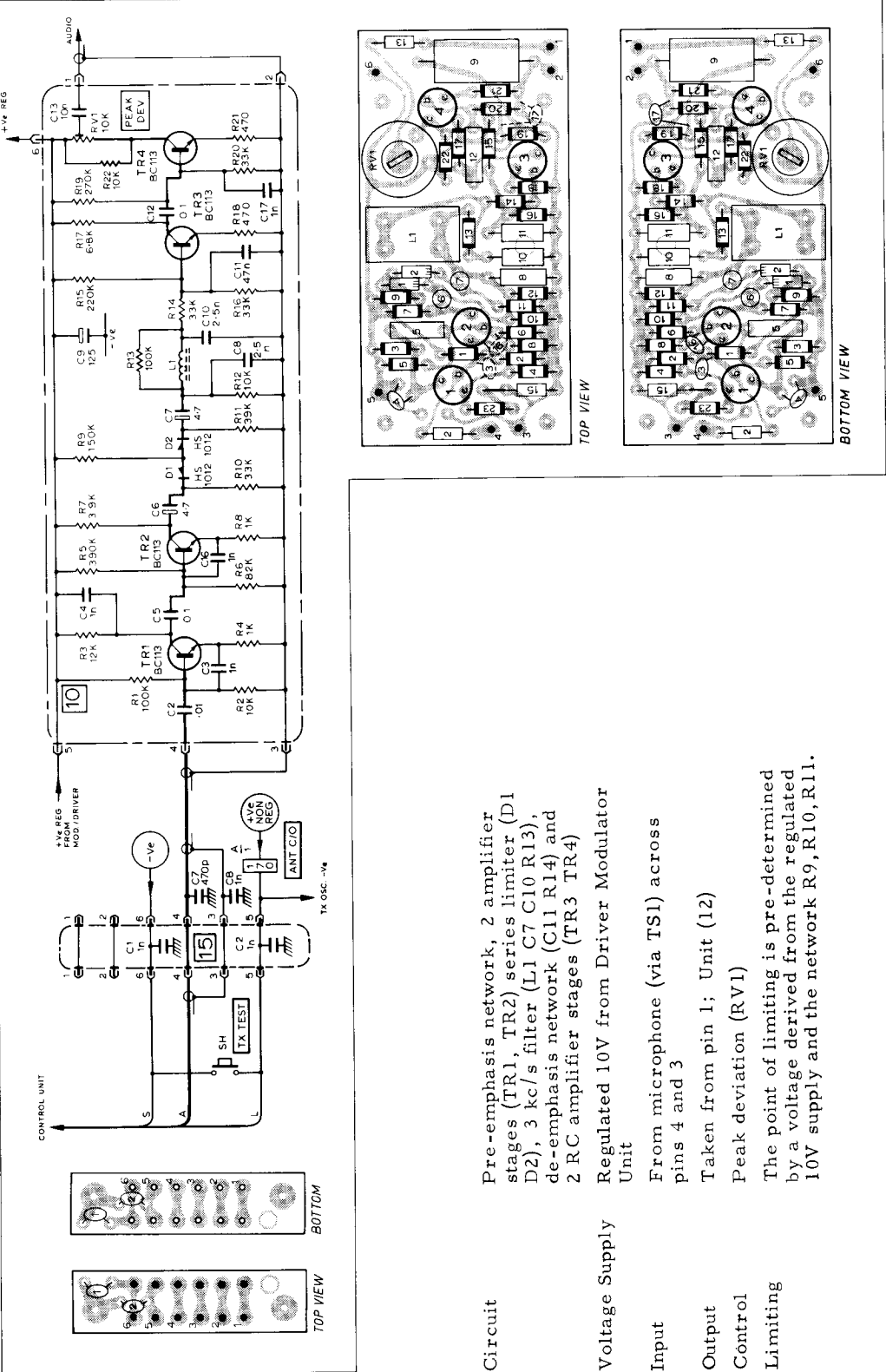
TOP VIEW



BOTTOM VIEW

[illegible]

3.10 TRANSMITTER AUDIO UNIT (10)



Code	CAPACITORS	Part No.	Code	RESISTORS (cont.)	Part No.
C1	Not used		R8	1kΩ	PM01436
C2		0.01μF	R9	150kΩ	PM01462
C3		1nF	R10	33kΩ	PM01454
C4		1nF	R11	39kΩ	PM01455
C5		0.1μF	R12	10kΩ	PM01448
C6		4.7μF	R13	100kΩ	PM01460
C7		4.7μF	R14	82kΩ	PM01459
C8		2.5μF	R15	220kΩ	PM01464
C9		125μF	R16	33kΩ	PM01454
C10		2.5μF	R17	6.8kΩ	PM01446
C11		47nF	R18	470Ω	PM01432
C12		0.1μF	R19	270kΩ	PM01465
C13		10nF	R20	33kΩ	PM01454
C14			R21	470Ω	PM01432
C15	Not used		R22	10kΩ	PM01448
C16	1nF		RV1	10kΩ	Pot. (Dev.) PL05615/2
C17	1nF				
INDUCTOR					
L1		AL51090	TR1	BC113	FV07769
			TR2	BC113	FV07769
			TR3	BC113	FV07769
			TR4	BC113	FV07769
			D1	HS1012	FV09656
			D2	HS1012	FV09656
SEMICONDUCTORS					
R1	100kΩ				
R2	10kΩ				
R3	12kΩ				
R4	1kΩ				
R5	390kΩ				
R6	82kΩ				
R7	3.9kΩ				

COMPLETE ASSEMBLY PART NO. AT26906/8

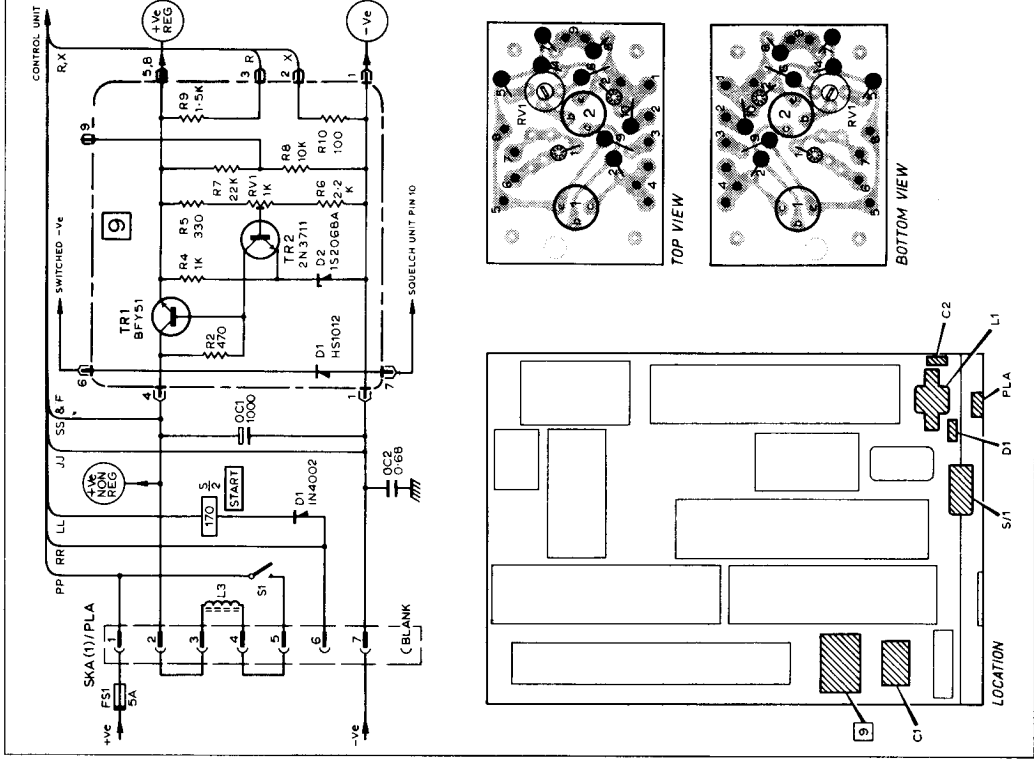
SECTION 3A
POWER SUPPLY AND REGULATOR UNIT(9)

Non-Regulated Supply

- Input Supply 12V d.c. nominal source
- Fusing Single 5A fuse (FS1) in live lead
- Terminations SKA - 7-way socket connected to battery leads
- PLA - 7-way plug on equipment
- Note: There are two versions of SKA
- SKA (1) wired for negative ground equipments
- SKA (2) wired for positive ground equipments

- Alternator Whine Suppression The wiring of SKA ensures that the filter choke L1 is always in the live lead
- Equipment Units Receiver: U.H.F. amp., oscillator/multiplier, audio amplifier and regulator
- Transmitter: Modulator/Driver, Power Amplifier
- Miscellaneous: Relays A/1 and S/1, control unit indicator lamps

- Standard Test Voltage Switching 13.8V d.c. measured at the power input to the cable fitted to SKA.
- Receive The START relay S/1 is energised by the vehicle d.c. supply when the control unit combined OFF/ON volume control is set to ON. The positive line to the equipment is completed by contact S1 to supply all units in the transceiver excepting the transmitter oscillator. The control unit ON lamp lights indicating the receive condition.



Transmit

Operating the microphone press-to-talk switch completes the negative line to the transmitter oscillator. The TX lamp lights indicating the transmit condition.

Note: In installations using converter units the transceiver relay S/1 is inoperative. Its function is performed by the converter unit START relay S/2.

Regulator Unit

Circuit

The series regulator transistor TR1 is controlled by the stabiliser circuit TR2, R4 and D2. RV1 in TR2 base circuit provides a fine control for the regulated output.

Input
12V d.c. nominal

Output
1. Regulated 9.5V d.c.

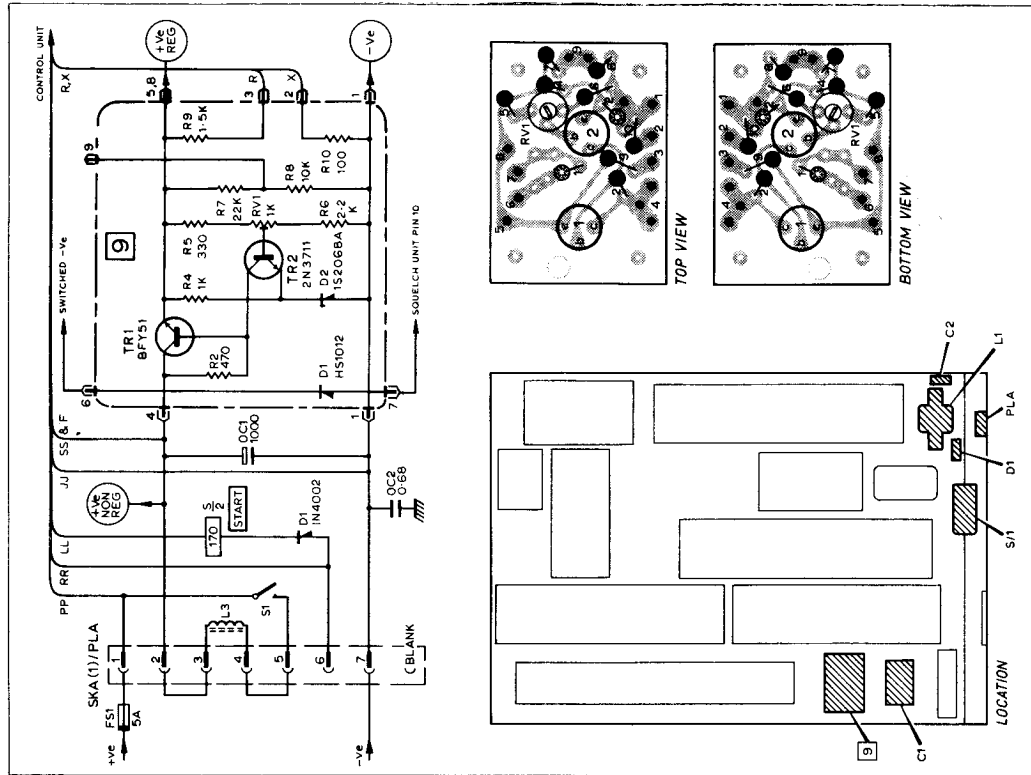
2. Squelch bias voltage (controlled by SQUELCH potentiometer)

Note: In simplex equipments, the squelch trigger voltage required under transmit conditions is routed via pin 7, D1 and pin 6. D1 isolates Squelch and Mod/Driver Units on receive.

Units supplied Receiver: 10.7 MHz I.F., 455 kHz. I.F., 1st Oscillator, 2nd Oscillator, Squelch

Transmitter: 1st Oscillator

Note: The transmitter A. F. Unit and the modulation stages of the Modulator/Driver Unit are supplied with a regulated 10V derived from R10, D1 in the Modulator/Driver Unit.



REGULATOR

Code	CAPACITOR	Part No.
C1	Not used	
RESISTORS		
R1	Not used	
R2	470Ω	NE47190
R3	1kΩ	NE10290
R4	330Ω	NE33190
R5	2.2kΩ	NE22290
R6	22kΩ	NE22390
R7	10kΩ	NE10390
R8	1.5kΩ	NE15290
R9	100Ω	NE10190
R10		
RV1	1kΩ Pot.	PL03324

SEMICONDUCTORS

TR1	BFY51	FV05115
TR2	2N3711	FV09880
D1	HS1012	FV09656
D2	IS2068A	FV09632

CHASSIS MOUNTED COMPONENTS

Code	CAPACITORS	Part No.	Code	MISCELLANEOUS	Part No.
C1	1000μF (Input)	PS51080	L1		AL51088
C2	0.68μF (Input -ve line)	PQ35811	D1	IN4002	FV07703
C3	0.68μF (Rx A. F. pin 1)	PQ35811	PLA	7-way	FP16816
C4	10nF (Tx osc. pin 13)	PN50301	Socket Assys.:		
C5	1nF (P. A. +ve line)	PN26569	SKA1	7-way negative ground	AT10762
C6	1nF (P. A. -ve line)	PN26569	SKA2	7-way positive ground	AT10762/1
C7	470pF (Mic. board pin 4)	PN22400	SKB	38-way	FC10474
C8	1nF (Mic. board pin 3)	PN26350	SH	Tx. Test	FS01574
C9	1nF (Tx osc. pin 11)	PN26350	A1	170Ω Antenna c/o	FR02090
C10	0.1μF (Tx osc. pin 11)	PQ32000	S1	170Ω Start	FR02693
C11	0.1μF (Tx osc. pin 13)	PQ32000	Antenna connector		
C12	10nF (Mod/Driver pin 8)	PN50301		455 kHz filter (25kHz)	AT10752/2
C13	0.1μF (Mod/Driver pin 5)	PQ32000		455 kHz filter (50kHz)	AT10752/3
C14	1nF (Tx A. F. pin 2)	PN26569	FS1	5A Fuse	FF00823
C15	10nF (Rx Osc. pin 11)	PN50301	MICROPHONE CONNECTOR BOARD		
C16	2nF (Mod. -ve line)	PN33301	C1	1nF	PN26350
C17	10nF (Mod. -ve line)	PN50301	C2	1nF	PN26350
COMPLETE ASSEMBLY PART NO. AT26786					

COMPLETE ASSEMBLY PART NO. AT26848

SECTION 4 — SERVICING

4.1 Test Equipment Required

Power supply unit delivering 3A at 11 to 16V.

Avometer Model 8

Signal Generator (Marconi TF1064B/6 or TF1066A/2)

A. F. Oscillator (Marconi TF1101-O/P impedance 2.2k Ω)

Resistor 1.8k Ω (used in series with TF1101 output)

A. F. output meter (Marconi TF893A)

Marker Oscillator 455 kHz (Pye PT 503)

Diode Probe (100k Ω) See Fig. 4. 2

Deviation Meter (Marconi TF2300)

R. F. Power output meter (Bird Termaline 6154)

Trimming tools.

4.2 Mechanical Detail

General

The equipment is arranged so that the transmitter units are on the upper side of the chassis and the receiver units are on the underside. Inter-unit wiring is mainly terminated by taper pins which mate with corresponding sockets on the printed circuit boards. The P. C. B. s are bolted to threaded pillars formed on the chassis.

U. H. F. Amplifier

This consists of an aluminium alloy casting containing the components and a cover secured by 4 BA bolts which screw into formed threaded pillars in the casting. Access to 5 of the trimming controls is available only from the transmitter side of the equipment.

455 kHz filter

This is secured to a bracket by four 6 BA bolts which screw into threaded recesses.

Antenna c/o relay

This is secured to the main chassis by two 6 BA screws.

Note: Wiring details of the relay and filter are given in the Interconnection Diagram (Fig. 6.3)

Casing Covers

These are secured by the flanged fascia at the front and two pairs of Dzus fasteners at the rear.

Control Unit

Access to the chassis is obtained by releasing the two 6 BA bolts on the fascia and removing the cover.

The 50-way tagstrip is arranged in banks and all connections to the tags are made by push-on tab connectors except for tags 1 to 6 which are soldered joints. The tags are identified by the baseboard marking; the mating tab connectors are fitted with identifying sleeves.

The channel selector knob is provided with a skirt engraved with the channel numbers. The backplate is illuminated and located on the escutcheon by two integral pins. All knobs are secured by 1/16 inch recessed hexagonal grub screws.

RECEIVER PERFORMANCE CHECKS

4.3 Quieting

With the signal generator switched off, set the SQUELCH control fully clockwise. Adjust the VOLUME control to give a noise output reading of at least 20db greater than the minimum db scale reading.

Switch on the signal generator (connected to the antenna socket) and adjust the output until the output reading is 20db below that obtained with the signal generator switched off.

Check that the signal generator output is not greater than 1 μ V e. m. f.

4.4 Signal to Noise

Inject an r. f. signal of 2 μ V e. m. f. modulated at 1000 Hz (deviation ± 2.5 kHz for 25 kHz channelling, ± 7.5 kHz for 50 kHz channelling)

Adjust VOLUME control for an indicated output of 100mW and note the db reading. Set the signal generator to C. W. and note the new db reading.

Check that the difference is not less than 25db.

4.5 Squelch

(a) Sensitivity

Check the squelch control range from threshold maximum setting as follows:-

With the signal generator connected to the antenna socket, inject an r. f. C. W. signal. Check that the level required to open the squelch is at least 3db below the 20db quieting level.

Turn the SQUELCH control fully counterclockwise and check that the squelch opens on an r. f. C. W. signal not exceeding 4 μ V e. m. f.

(b) Threshold

Inject an r. f. signal modulated at 1000 Hz (± 5 kHz deviation for 25 kHz channelling, ± 15 kHz for 50 kHz channelling)

Check that the squelch opens within 3db of the C. W. opening level.

(c) Range

With no signal applied, check that the squelch will open and close by adjustment of the SQUELCH control when the applied voltage (measured at the input power socket) is in the range of 11 to 16V.

4.6 Audio Output

Inject an r. f. signal of 2mV modulated at 1000 Hz (deviated ± 2.5 kHz for 25 kHz channelling ± 7.5 kHz for 50 kHz channelling). Set VOLUME control to maximum. Check that output indicated is 200mW. (2W actual).

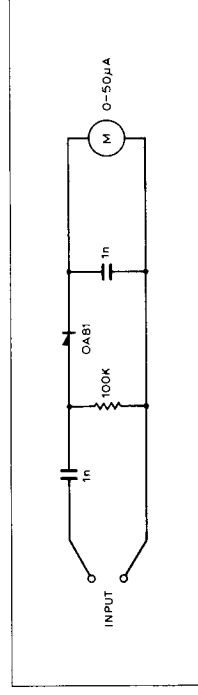


Fig. 4.2 Diode Probe

4.7 Receiver Alignment Procedure

Preparation and Initial Checks.

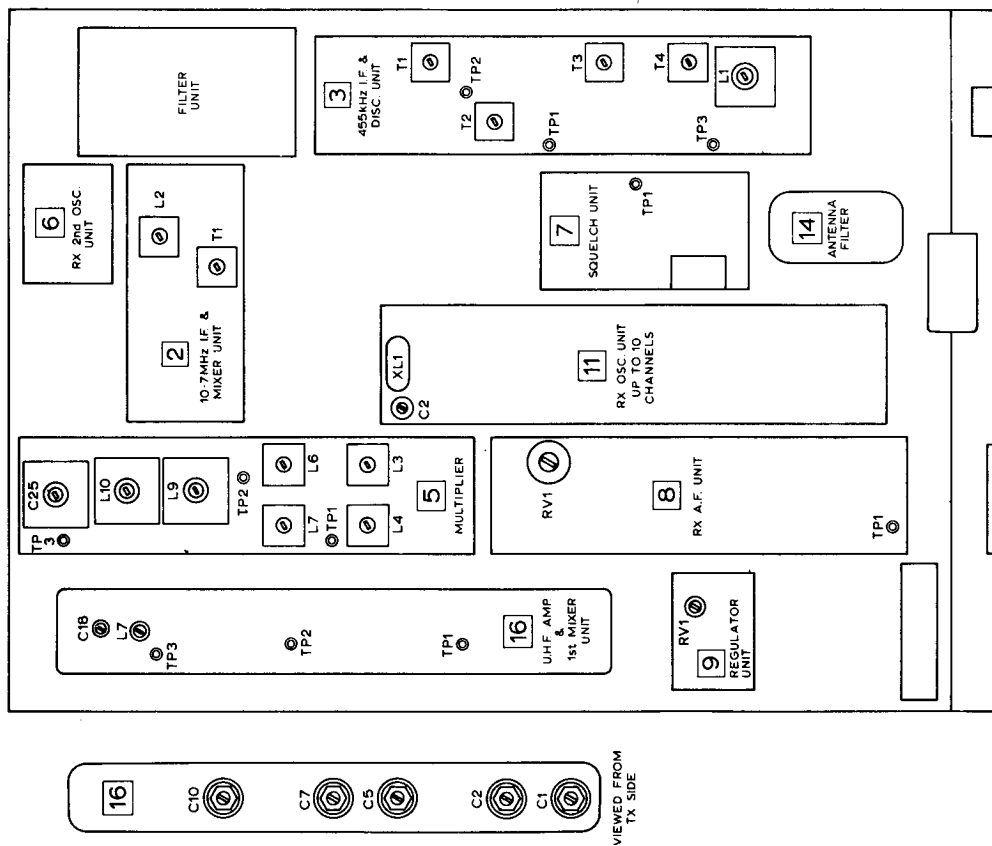
- Using the multimeter, check that the reading between
(a) each supply line and chassis } is greater than
(b) supply lines } $5M\Omega$
 - Set the VOLUME control fully counter-clockwise and the SQUELCH control fully clockwise.
 - Connect the negative lead of the $20k\Omega/V$ meter to TP2 of the 455 kHz I. F. unit (3). (The connecting points for the positive lead are shown in the Alignment Chart.)
 - Connect a suitable signal generator (tuned to the working frequency) to the antenna socket.
 - Connect the A. F. output meter (set to 30Ω) in parallel with the loudspeaker.
- Note. With the output meter set to 30Ω in parallel with the L.S., the o/p meter reading will be one tenth of the true output appearing across the L.S.)
- Ensure that the input to the receiver is 13.8V d.c.
 - At the Audio Board (8) measure voltage between TP1 and negative line. Ensure reading is 6.9V - adjust RV1 for correction if necessary.

Multiple Channel Equipments

These equipments should be aligned on the channel nearest to the mid-point of the frequency range covered by the receiver. The performance of the remaining channels should be checked after the alignment.

STEP	BOARD	TUNE	TEST POINT	ADJUSTMENT
1				Carry out Preparation and Initial checks
2	5	L3, L4	5TP1	Tune for maximum
3	5	L6, L7	5TP2	Tune for maximum
4	5	L9, L10	5TP3	Tune for maximum
5	16 5	C18 C25	Junction C16/R7	Using the probe, tune 5C25 and 16C18 for maximum - not less than 0.5V
6	16			Set signal generator to C.W. with an output of 10mV. Disconnect probe. Connect meter leads positive TP1 negative to 3TP2.
7	16	C10, C7, C4, C2 C1 L7	3TP1	Adjust in sequence for maximum reducing signal generator output to maintain reading of approx 0.9V. (L7 core must be near base of former.)
8				Holding the 455 kHz marker oscillator adjacent to the 455 kHz I. F. Unit, tune signal generator for zero beat. Set output level to 2mV. Connect positive lead of meter to 3TP3 and negative to 3TP2.
9	3	L1	3TP3	Balance discriminator by adjusting for null reading. Switch off signal generator.
10	7	SQUELCH control	7TP1	Rotate in counter-clockwise direction for reading of 1V.
11	3	T3, T4	7TP1	Adjust for maximum but maintain reading between 1.1V and 1.3V by adjustment of SQUELCH control.
12				Switch on signal generator. Check frequency as above. Adjust output to 0.7V.
13	3 2	T2, T1 T1, L2	3TP1	Tune in sequence for maximum
14	16	C10, C7 C5, C2 C1, L7	3TP1	Tune in sequence for maximum
15	3		3TP3	Check that the meter shows null reading. If not, repeat operations 7 to 11.
16	16 5	C18 C25	-	Tune in sequence for maximum quieting as shown on A. F. output meter.
17				Carry out performance checks.

STEP	BOARD	TUNE	TEST POINT	ADJUSTMENT
1				Carry out Preparation and Initial checks
2	5	L3, L4	5TP1	Tune for maximum
3	5	L6, L7	5TP2	Tune for maximum
4	5	L9, L10	5TP3	Tune for maximum
5	16	C18	Junction	Using the probe, tune 5C25 and 16C18 for maximum - not less than 0.5V
6	5	C25	C16/R7	Set signal generator to C. W. with an output of 10mV. Disconnect probe. Connect meter leads positive TP1 negative to 3TP2.
7	16	C10, C7, C4, C2, C1, L7	3TP1	Adjust in sequence for maximum reducing signal generator output to maintain reading of approx 0.9V. (L7 core must be near base of former.)
8				Holding the 455 kHz marker oscillator adjacent to the 455 kHz I. F. Unit, tune signal generator for zero beat. Set output level to 2mV. Connect positive lead of meter to 3TP3 and negative to 3TP2.
9	3	L1	3TP3	Balance discriminator by adjusting for null reading. Switch off signal generator.
10	7	SQUELCH control	7TP1	Rotate in counter-clockwise direction for reading of 1V.
11	3	T3, T4	7TP1	Adjust for maximum but maintain reading between 1.1V and 1.3V by adjustment of SQUELCH control.
12				Switch on signal generator. Check frequency as above. Adjust output to 0.7V.
13	3	T2, T1	3TP1	Tune in sequence for maximum
14	16	C10, C7, C5, C2, C1, L7	3TP1	Tune in sequence for maximum
15	3		3TP3	Check that the meter shows null reading. If not, repeat operations 7 to 11.
16	16	C18	-	Tune in sequence for maximum quieting as shown on A. F. output meter.
17				Carry out performance checks.

VIEWED FROM
TX SIDE

4.8 TRANSMITTER ALIGNMENT PROCEDURE

50

WARNING
When carrying out the Alignment Procedure, the operating switch should be released on completion of each adjustment.

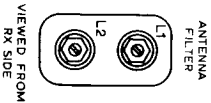
Preparations and Initial Checks

- 1. Using the multimeter, check that the reading between
 - (a) each supply line and chassis is greater than 5MΩ
 - (b) supply lines (meter positive to positive line, negative to negative line) is 15 to 30Ω.
 - 2. Connect r.f. power output meter to Antenna socket.
 - 3. Set the external Power Supply Unit to 13.8 V d.c. measured at input power lead.
 - 4. Set VOLUME control to minimum. Ensure that the loud-speaker is connected to the Receiver Audio output pins.
 - 5. If a multiple channel equipment is being aligned, select the centre frequency.
 - 6. Set the d.c. output from Regulator Unit (8) to 9.5 V by adjustment of 8RV1.
 - 7. All readings taken using standard meter leads except where 'Probe' is specified. Diagram of diode probe is shown at Fig. 4.2.
 - 8. Minimum readings are shown for all Modulator Driver and P.A. Unit testpoints.
- Modulator/Driver Unit (12)
- | | Typical Reading |
|---|-----------------|
| 1. Connect PROBE to Pin 9, press microphone switch and check for reading of | 0.5V |

- 2. Transfer PROBE to C1/L1 connection and tune L1 for maximum
Typical Reading 0.5V
- 3. Transfer PROBE to C5/L2 connection and tune L2 for maximum
0.3V
- Connect multimeter (10V range) positive to T.P. negative lead to negative supply line.
- 4. T.P. 1 Check reading (Tx button not operated) and note reading
- 5. T.P. 1 Tune L3 for minimum reading. Retune L1 L2 for maximum reading must be 0.3V greater than the reading at 4 above
Minimum Reading
- 6. T.P. 2 Tune L4 for maximum reading. Retune L3 for maximum reading. Tune L5 for minimum reading
1.5V
- 7. T.P. 3 Tune L6 for maximum reading. Retune L5 for maximum reading. Tune L7 for minimum reading
2.0V
- 8. T.P. 4 Tune L8 for maximum reading. Retune L7 for maximum reading. Tune L9 for minimum reading
1.3V
- 9. T.P. 5 Tune L10 for maximum reading. Retune L9 for maximum reading. Tune L11 for minimum reading
0.30V

WARNING

It is emphasised that the reading shown for each testpoint is the minimum acceptable at that testpoint. The equipment may operate satisfactorily with minimum readings at up to 3 of the testpoints but if minimum readings are attained at more than 3 T.P.'s, the equipment is faulty.



Typical
Reading

0.5V

0.3V

Minimum
Reading

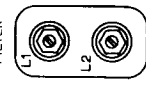
1.5V

2.0V

1.3V

0.30V

ANTENNA
FILTER



VIEWED FROM
RX SIDE

P.A. Unit (13)

Set Power Supply Unit to 13.8V at input power lead to equipment.

Set for minimum capacity: C14 C18 C27.

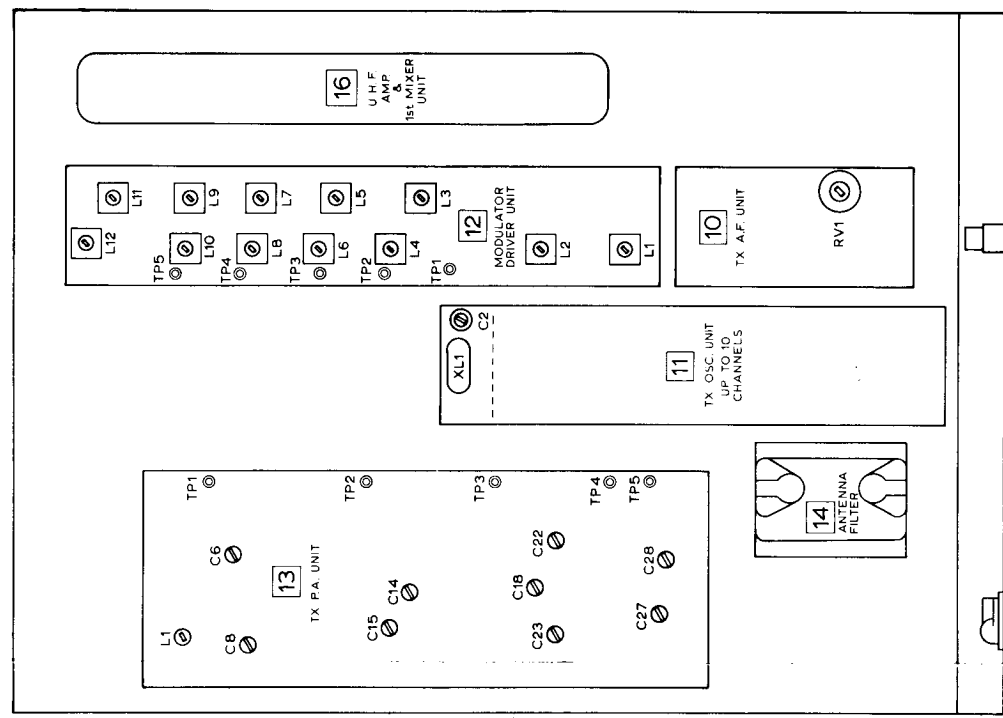
Set for mid-capacity: C6 C8 C15 C22 C23 C28.

Connect multimeter positive to positive line (T.P.5) and negative to T.P.'s (Range 250μA).

Minimum
Reading
55μA

1. T.P. 1 Tune L11 & L12 Driver/Mod. Unit and L1 P.A. Unit for maximum reading
2. T.P. 2 Tune C6 C8 for maximum reading
3. T.P. 3 Tune C14 for maximum reading
4. T.P. 4 Tune C18 for maximum reading
5. If no reading on output meter, connect diode probe to output socket
Tune L1 L2 Antenna Filter (14) for maximum
- * 6. Reconnect output meter, tune C22 C23 (approx. equal capacity for maximum reading at TP4.
7. Retune C18 for maximum reading.
8. T.P. 3 Tune C15 for maximum reading, retune C14 for maximum. 80μA
9. T.P. 2 Retune C6 C8 for maximum reading 70μA
10. Tune C28 for maximum R.F. output.
11. Retune L1 L2 (Antenna Filter) C27 C28 for maximum R.F. output.
If the output exceeds 7W, the value of R10 must be reduced to 27Ω. 4.5W

- † 12. T.P. 4 Reading to be (a) Single stage 100μA
(b) Double stage



P.A. Unit (13)

Set Power Supply Unit to 13.8V at input power lead to equipment.

Set for minimum capacity: C14 C18 C27.

Set for mid-capacity: C6 C8 C15 C22 C23 C28.

Connect multimeter positive to positive line (T.P. 5) and negative to T.P. 's (Range 250 μ A).

1. T.P. 1 Tune L11 & L12 Driver/Mod. Unit and L1 P.A. Unit for maximum reading
Minimum Reading 55 μ A

2. T.P. 2 Tune C6 C8 for maximum reading

3. T.P. 3 Tune C14 for maximum reading

4. T.P. 4 Tune C18 for maximum reading

5. If no reading on output meter, connect diode probe to output socket

Tune L1 L2 Antenna Filter (14) for maximum

* 6. Reconnect output meter, tune C22 C23 (approx. equal capacity for maximum reading at TP4.

7. Retune C18 for maximum reading.

8. T.P. 3 Tune C15 for maximum reading, retune C14 for maximum.

9. T.P. 2 Retune C6 C8 for maximum reading

10. Tune C28 for maximum R.F. output.

11. Retune L1 L2 (Antenna Filter) C27 C28

for maximum R.F. output.
If the output exceeds 7W, the value of R10 must be reduced to 27 Ω .

† 12. T.P. 4 Reading to be

(a) Single stage
(b) Double stage

100 μ A

Modulator/Driver Unit.

Repeat operations 9 to 4 in that order for maximum output.

* If a single stage output is used, the reference to C23 should be ignored.

† Reading for single stage output equipment will be provided when available.

Note: The test point readings depend upon the efficiency of the transistors in use and it does not necessarily follow that high TP readings will give a proportionately higher output. The TP readings for 7W output can be lower than those for 4.5W.

Transmitter Audio Unit (10)

1. Connect output of A.F. Generator via 1.8k Ω resistor, and millivolt meter to mic. input connections. Set level to 100mV. at kHz.

2. Loosely couple deviation meter to Tx. output.

3. Adjust RV1 Tx. Audio Board (10) for peak deviation

$\pm$ 5kHz V sets
 $\pm$ 15kHz N sets

4. Reduce output from Generator to give 50% deviation. Input should be between 10 and 25mV.

5. Observe waveform from deviation meter L.F. output on oscilloscope for linearity and distortion.

Change of Frequency

1. Retune Driver/Modulator L8 L10 L12

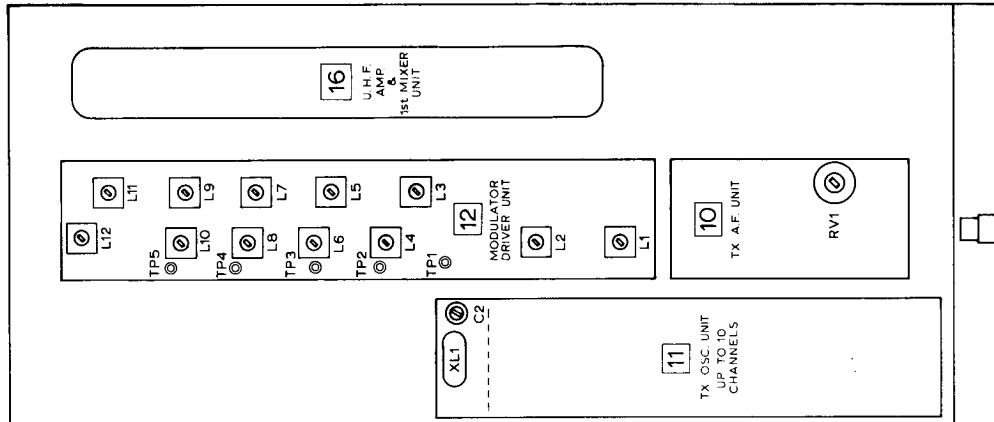
2. Carry out Alignment Procedure

3. Loosely couple a frequency counter to the r.f. output.

4. Tune transmitter oscillator C1 of the appropriate channel to the exact operating frequency.

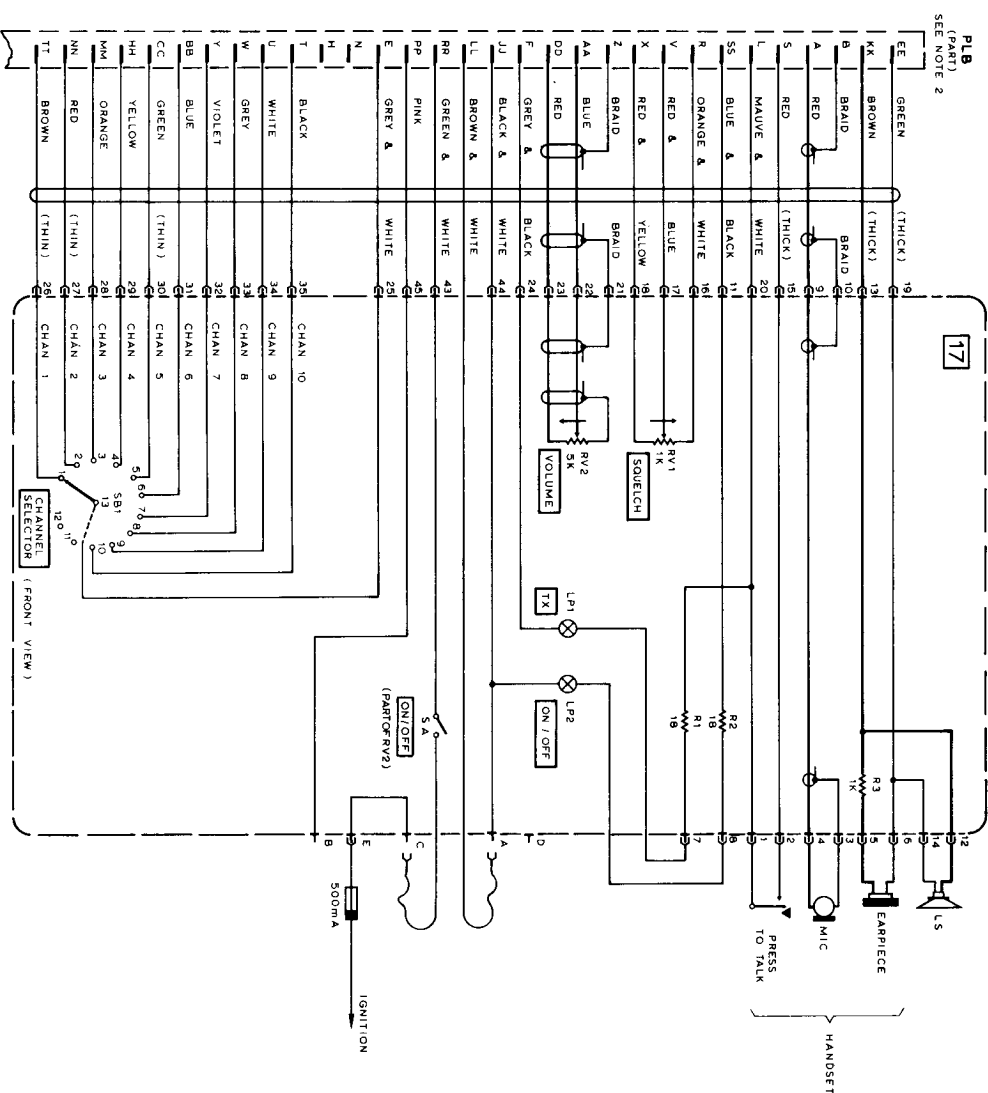
5. Check that the power output has not been reduced.

6. Carry out Field Testing Procedure (Para. 1.7)



5.1 CONTROL UNIT (17)

SECTION 5 – CONTROL UNIT



NOTES

1 VOLTAGE SELECTOR CONNECTIONS

12V +ve OR -ve GROUND { BROWN / WHITE TO TAG A
GREEN / WHITE TO TAG B
6/12V OR 24/12V CONVERTOR { BROWN / WHITE TO TAG D
GREEN / WHITE TO TAG B

IGNITION SWITCHING (IGNITION WIRED TO TAG E)

12V +ve GROUND { BROWN / WHITE TO TAG A
GREEN / WHITE TO TAG B

12V -ve GROUND { BROWN / WHITE TO TAG A
GREEN / WHITE TO TAG C

2 EXTRA FACILITY PINS ARE FITTED AS PART OF PLB AND SHOULD BE WIRED AS FOLLOWS -

C GREEN / BLUE TO TAG 39
D YELLOW / BLUE TO TAG 40
N RED / BLACK TO TAG 37
M ORANGE / BLACK TO TAG 36
H GREEN / YELLOW TO TAG 41
P RED / GREY TO TAG 38

Control Unit (17)

Controls SQUELCH RV1
VOLUME RV2) single assembly
OFF/ON SA) multiple channel only
CHANNEL SB1

Indicators Tx on LP1 red
ON (receiver) LP2 green - single channel
white - multiple channel
(illuminates channel no.)

Connectors PLB 38-way plug - Control (to main unit SKB)
TSA 50-way tag strip - 1 to 45 internal connections
(tags 36 to 43 not used),
A to E voltage selection

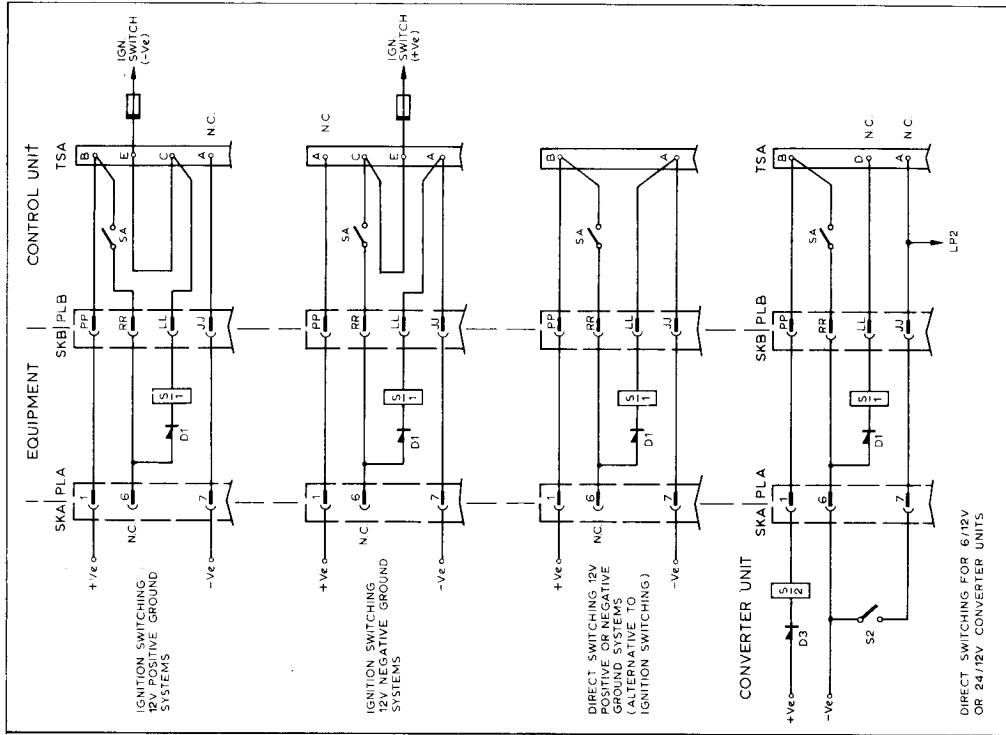
Switching Receive
The START relay S/1 is energised by the vehicle d.c. supply when the control unit facility switch is set to ON. The positive line to the equipment is completed by the contact S1 to supply all units in the transceiver except for the transmitter oscillator. The control unit ON lamp lights indicating the receive condition.

Transmit
Operation of the press-to-talk (or Tx TEST) switch completes the negative line to the transmitter oscillator. The Tx lamp lights indicating the transmit condition.

Note: In installation using converter units the transceiver relay S/1 is not used. Its function is carried out by the converter unit START relay S/2.

NOTES

- 1 VOLTAGE SELECTOR CONNECTIONS
- 12V +Ve OR -Ve GROUND { BROWN / WHITE TO TAG A
GREEN / WHITE TO TAG B
- 6/12V OR 24/12V CONVERTOR { BROWN / WHITE TO TAG D
GREEN / WHITE TO TAG B
- IGNITION SWITCHING (IGNITION WIRED TO TAG E)
- 12V +Ve GROUND { BROWN / WHITE TO TAG C
GREEN / WHITE TO TAG B
- 12V -Ve GROUND { BROWN / WHITE TO TAG A
GREEN / WHITE TO TAG C
- 2 EXTRA FACILITY PINS ARE FITTED AS PART OF PLB AND SHOULD BE WIRED AS FOLLOWS -
- C GREEN / BLUE TO TAG 39
D YELLOW / BLUE TO TAG 40
N RED / BLACK TO TAG 37
M ORANGE / BLACK TO TAG 36
H GREEN / YELLOW TO TAG 41
FF GREY / YELLOW TO TAG 38
P RED / GREY TO TAG 42



Code	PARTS LIST	Part No.
R1	18Ω	PM00204
R2	18Ω	PM00204
R3	1kΩ	PM00225
RV1	1kΩ SQUELCH	PL07520
RV2	5kΩ VOLUME	PL09036
SA	OFF/ON (part of RV2)	FS07077
SB1	Channel selector	FC10473
PLB	Plug (38 way)	AT10803
	Tagboard assy	FL01063
LP1	Tx 12-14V 0.75W	FL01063
LP2	ON 12-14V 0.75W	FF00814
LS	500mA Fuse (ignition)	AT10877/2
	Loudspeaker assy	29660/22
	Microphone and lead assy	AT29663
	Handset and lead assy	AT29663

COMPLETE ASSY PART NOS.

Channels	Fist Mic	Handset
1	AT04608/9	AT04608/13
3, 6, or 10	AT04608/12	AT04608/16

Control Unit (17)

Controls	SQUELCH	RV1	
	VOLUME	RV2	single assembly
	OFF/ON	SA	
Indicators	CHANNEL	SB1	multiple channel only
Indicators	Tx on	LP1	red
	ON (receiver)	LP2	green - single channel
			white - multiple channel (illuminates channel no.)

Connectors PLB 38-way plug - Control (to main unit SKB)
TSA 50-way tag strip - 1 to 45 internal connections (tags 36 to 43 not used), A to E voltage selection

Switching Receive
The START relay S/1 is energised by the vehicle d.c. supply when the control unit facility switch is set to ON. The positive line to the equipment is completed by the contact S1 to supply all units in the transceiver except for the transmitter oscillator. The control unit ON lamp lights indicating the receive condition.

Transmit
Operation of the press-to-talk (or Tx TEST) switch completes the negative line to the transmitter oscillator. The Tx lamp lights indicating the transmit condition.

Note: In installation using converter units the transceiver relay S/1 is not used. Its function is carried out by the converter unit START relay S/2.

NOTES

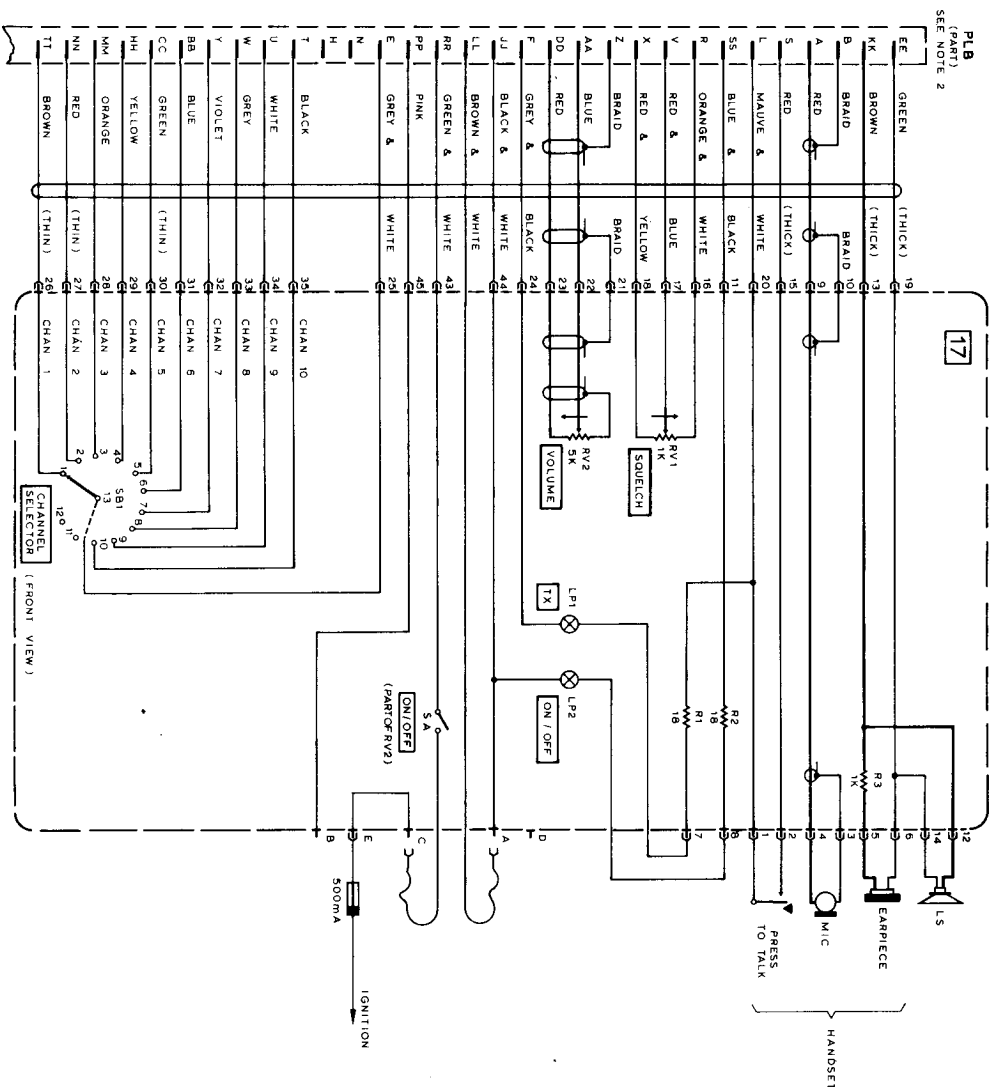
- VOLTAGE SELECTOR CONNECTIONS

12V +Ve OR -Ve GROUND	{ BROWN / WHITE TO TAG A GREEN / WHITE TO TAG B
6/12V OR 24/12V CONVERTOR	{ BROWN / WHITE TO TAG D GREEN / WHITE TO TAG B
IGNITION SWITCHING (IGNITION WIRED TO TAG E)	{ BROWN / WHITE TO TAG C GREEN / WHITE TO TAG B
12V +Ve GROUND	{ BROWN / WHITE TO TAG A GREEN / WHITE TO TAG C
- EXTRA FACILITY PINS ARE FITTED AS PART OF PLB AND SHOULD BE WIRED AS FOLLOWS -

C	GREEN / BLUE TO TAG 39
D	YELLOW / BLUE TO TAG 40
N	RED / BLACK TO TAG 37
M	ORANGE / BLACK TO TAG 36
H	GREEN / YELLOW TO TAG 41
FF	GREY / YELLOW TO TAG 38
P	RED / GREY TO TAG 42

5.1 CONTROL UNIT (17)

SECTION 5 – CONTROL UNIT



NOTES

1 VOLTAGE SELECTOR CONNECTIONS

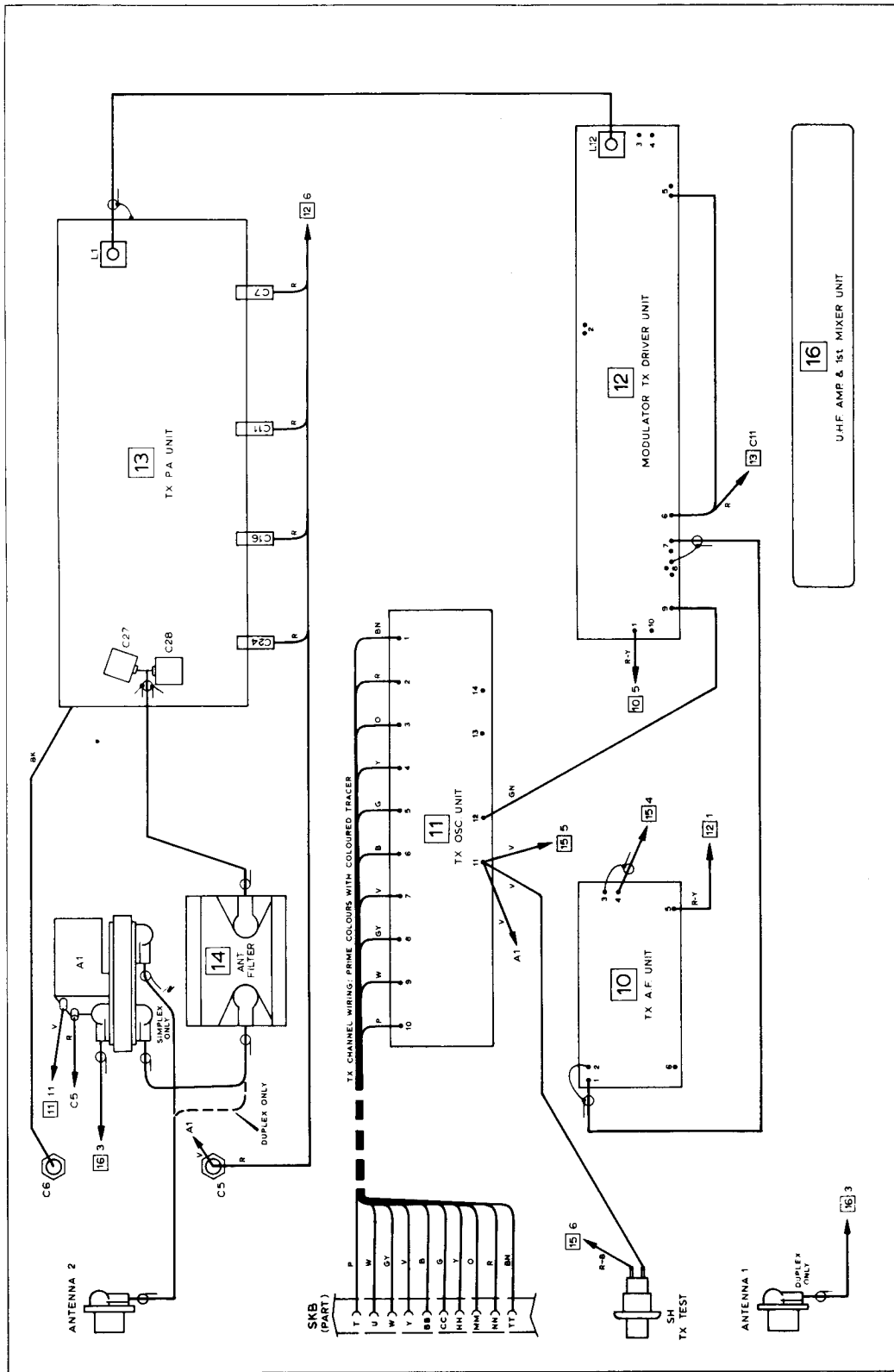
12V +ve OR -ve GROUND { BROWN / WHITE TO TAG A
GREEN / WHITE TO TAG B
6/12V OR 24/12V CONVERTOR { BROWN / WHITE TO TAG D
GREEN / WHITE TO TAG B

IGNITION SWITCHING (IGNITION WIRED TO TAG E)

12V +ve GROUND { BROWN / WHITE TO TAG C
GREEN / WHITE TO TAG B
12V -ve GROUND { BROWN / WHITE TO TAG A
GREEN / WHITE TO TAG C

2 EXTRA FACILITY PINS ARE FITTED AS PART OF PLB AND SHOULD BE WIRED AS FOLLOWS -

C GREEN / BLUE TO TAG 39
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H GREEN / YELLOW TO TAG 41
FF GREY / YELLOW TO TAG 38
P RED / GREY TO TAG 42



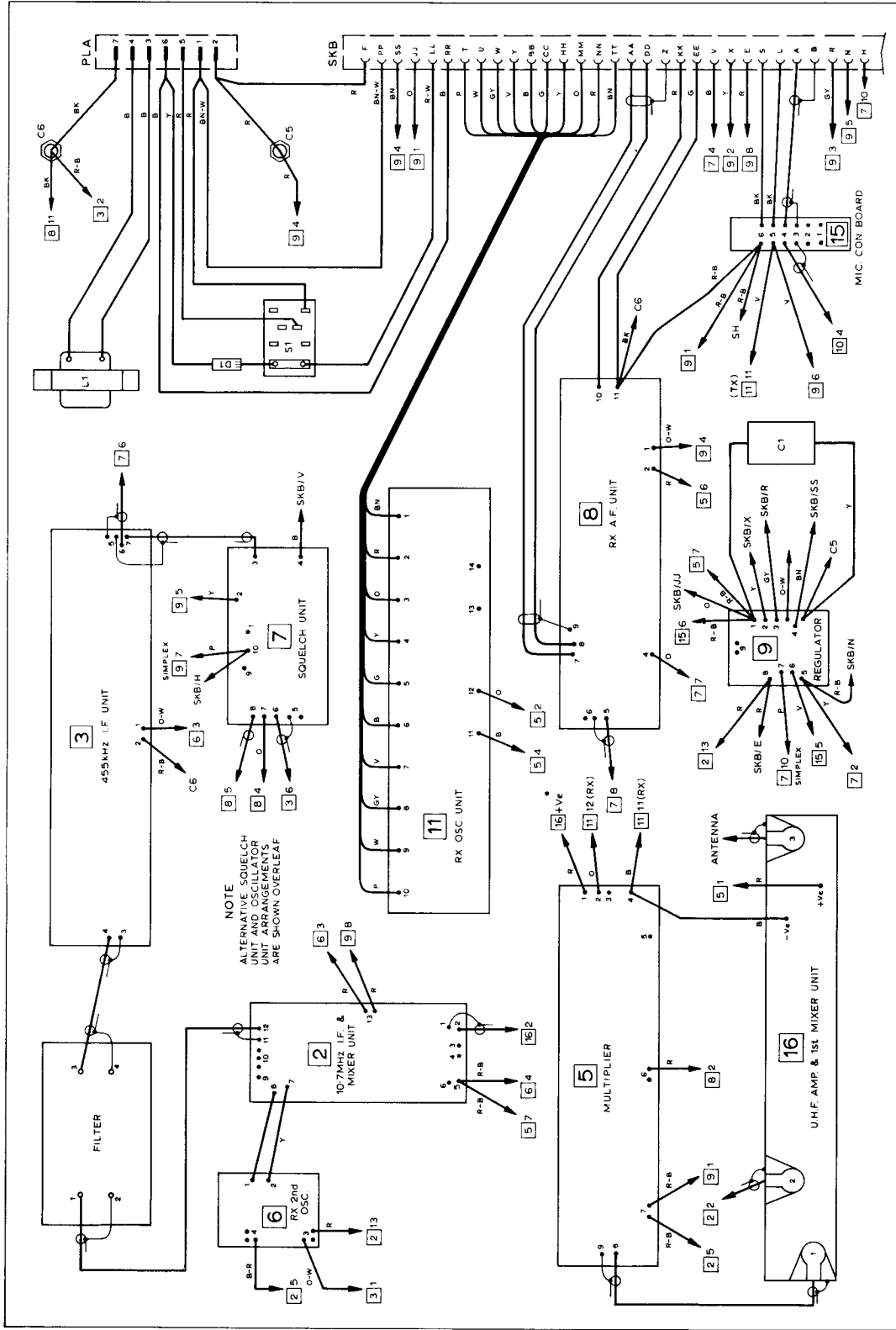
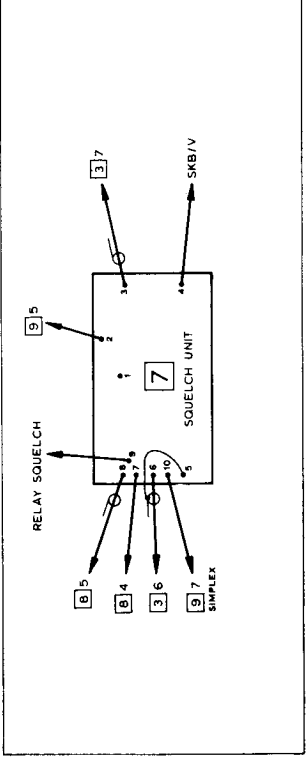
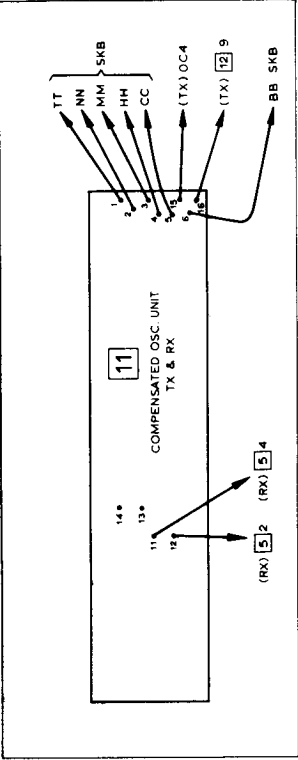


Fig. 6.3 Inter Unit Wiring and Unit Location Diagram



MECHANICAL ITEMS

Installation

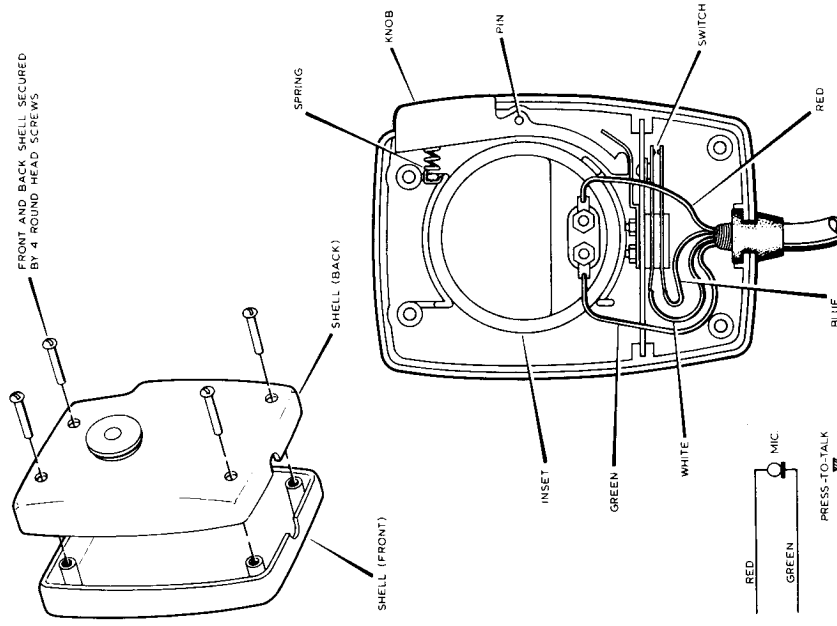
- Cradle AT10835
- Loudspeaker assembly 276296/5
- Microphone rest 276661
- Handset rest FH00530
- Connector block BT30080
- Power lead assemblies:-
 - Negative ground AT10762
 - Positive ground AT10762/1
- Fuse 5A FF00823
- Antenna rod $\frac{1}{4}$ wave FA00658
- Antenna plug FP00166
- Ignition switch lead and f/holder AT10800
- Fuse 500mA FF00814

Main Unit

- Wrapper AT10834/1
- Cover (Plain) AT10756/5
- Cover (Printed) AT10756/6
- Screw assembly (covers) AT10766
- Sub-panel assembly AT10796/A
- Front panel assembly AT10797
- Front cover assembly AT10798
- Bracket Assembly AT10799
- Pivot pin (front panel) BT04712
- Sub-chassis assembly AT10873
- Chassis assembly AT10753/1
- Special screws:-
 - Sub-panel/wrapper BT08218
 - Front panel/cover BT08216
- Spring (front cover) BT26892
- Brackets:-
 - Antenna c/o relay BT10561
 - Filter BT10562
- Pillars (Osc. board) 231351
- Pillars (R.F. board) 231286

Clips:-

- Front panel BT16576
- Chassis wiring BT16577
- Chassis grounding BT16579
- R.F. board 204548
- Tie wrap FC13600
- Pad (antenna relay) BT24635
- Strap (relay bracket) BT27011
- Antenna socket FS40805
- Tag (ant. skt.) FT00076
- Solder tags FT00033
- Crystal retainers:-
 - Receiver, 1-chan BT25144
 - 3-chan AT10868
 - 6-chan AT10869
 - 10-chan AT10870
- Transmitter,
 - 1-chan BT25113
 - 3-chan AT10865
 - 6-chan AT10866
 - 10-chan AT10867
- L. S. lead assy AT10765/4
- Control Unit - see para 5.1



Microphone Detail

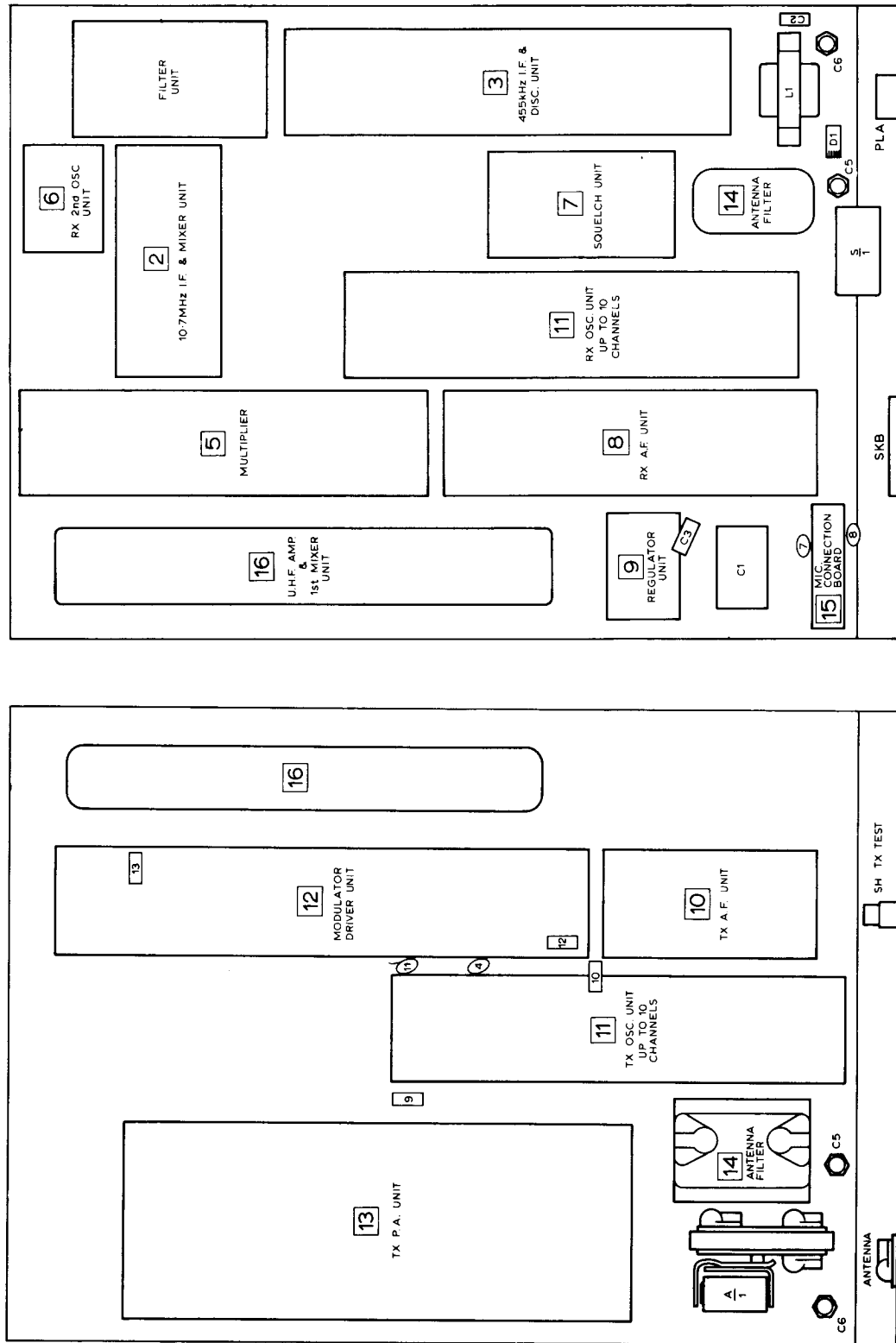
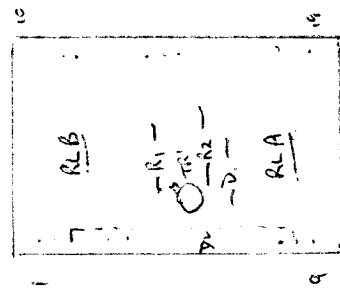
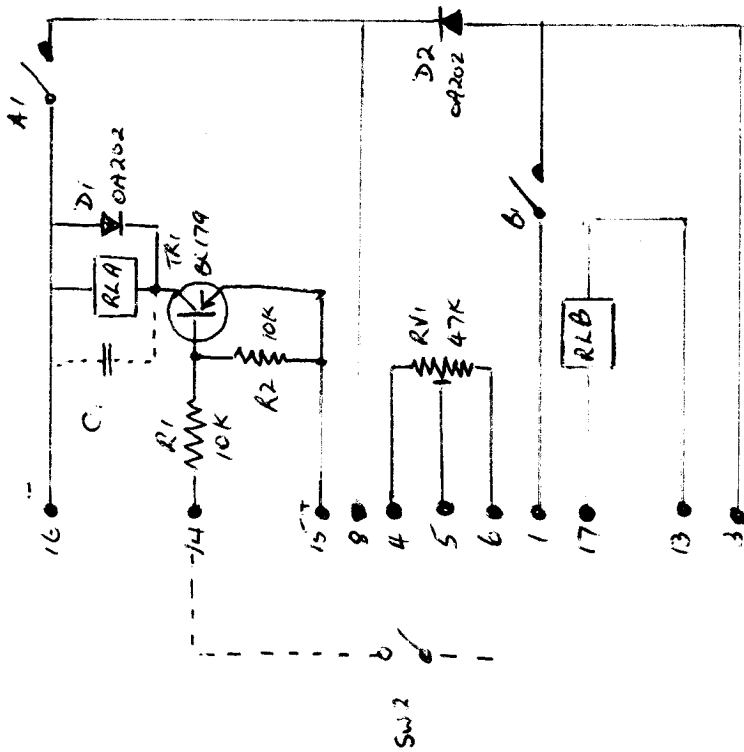


Fig. 6.5 Unit Location Diagram



1. -VE FROM RX AF CARD 9
3. PTT TO MIC CARD 5
4. SGRNS
5. TALK/THRO AUDIO TO MIC CARD 4
6. RX AUDIO FROM RX AF CARD 8
8. VHF LINK PTT TO CONTROL CABLE 'B'
13. UHF PTT FROM CONTROL CABLE 'L'
14. MUTE VOLTS FROM SQ CARD 9 VIA SW2
15. +VE REG VOLTS FROM SQ CARD 2
16. -VE FROM SQ CARD 5
17. +VE NON REG VOLTS FROM RX AF CARD 1

NOTE LEAD REMOVED FROM PIN 10 SQ CARD SW2 - TALK THRU ON/OFF

C1 10µfd TANTALUM TO PREVENT RELAY CHATTER.

UHF/UHF CROSSBAND EQUIP.

K4XL's BAMA

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