MAINTENANCE HANDBOOK

for

TRANSCEIVER TYPE 6924

CODAN PTY. LTD.
Graves Street,
NEWTON. S.A. 5074
P.O. Box 96, CAMPBELLTOWN. S.A. 5074)
Telephone : (08) 337 7000
Telex : 88155
Telegrams : Codan, Adelaide

CODAN PTY. LTD.
5 Bookham Street,
MORLEY. W.A. 6062
Telephone : (092) 76 3858
Telex : 92686
Telegrams : Radcomserv, Perth

CODAN PTY. LTD.
284 Victoria Avenue,
CHATSWOOD, N.S.W. 2067
Telephone : (02) 419 2397
Telex : 22631
Telegrams : Techimport, Sydney

Handbook No: 300

Handbook distribution is not recorded.

If you require this handbook to be kept up to date with amendments as they become available, either fill in the accompanying card and return, or notify us in writing stating EQUIPMENT TYPE NO. (including any suffixes), HANDBOOK CODE No. and HANDBOOK SERIAL No., also give FULL NAME or COMPANY NAME/DEPT and POSTAL ADDRESS, to which amendments are to be sent.

Always quote the handbook number in correspondence on technical matters concerning the maintenance of a unit.

On receipt of amendments, please insert them promptly.

Issue 1	September 1971
Issue 2	November 1972
Issue 3	November 1973

AMENDMENT RECORD

Enter below the amendment title and date of entry, and the name of the person entering the amendment.

Amend. No.	Amendment Title	Date Entered	By
1	RF Instability - Section 11.	Incorporated before issue	1
2	Miscellaneous A to F.	Incorporated	before issue 2
3	Excessive AGC release time constant.	Incorporated	before issue 3
4	DC Inverter	Incorporated	before issue 3
5	Failure to 'TUNE' in humid conditions	Incorporated	before issue 3
6	Loudspeaker size change	Incorporated	before issue 3
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			

25W HF SSB TRANSCEIVER TYPE 6924

HANDBOOK INDEX

10. List of Drawings

Dwg.	04-00009		Block Schematic
	08-00011	Sheet 2	PA, Reg. & Invertor
	08-00012	Sheet 2)	RF
	08-00012	Sheet 3)	
	08-00013	Sheet 2	Mic. Amp.
	08-00014	Sheet 2	P.A. Driver
	08-00015	Sheet 2	2nd IF Amp.
	08-00016	Sheet 2	Dual Xtal Osc.
	08-00017	Sheet 2	AF Amp.
	08-00018	Sheet 2	AM Filter
	08-00019	Sheet 2	Mother Board & SSB Filter
	08-00159		Dual Xtal Osc. with Clarifier
	08-00017	Sheet 2	AF Amp (early version)
	08-00108		C.W. Oscillator (Antartic use only).
	08-00213		AF Amp (later version).
	08-00452		Clarifier Control
	08-00453		Emergency Call
	08-00454		Emergency Call & Clarifier control
	03-00014		RF Chassis-general assembly

11. Amendments

11.1 RF Instability

11.2 Miscellaneous

11.3 Excessive AGC release time constant.

11.4 DC Inverter

11.5 Failure to 'TUNE' in humid conditions.

1 GENERAL INFORMATION

1.1 Introduction

The Type 6924 is intended for use as a portable HF transceiver for use with a wide range of aerial systems, and a versatile antenna tuning and loading arrangement enables efficient operation with a wide range of antennas. It is the design philosophy of this transceiver that the most common aerial system likely is a long wire of indeterminate length, and that pre-cut or pre-tuned aerials, although they will assist the overall performance of the transceiver, are liable to serious degradation when in the care of non-technical operators - particularly when frequently erected and dismantled, as is implicit in the operation of a portable or mobile station.

For protection in transit, the Type 6924 is completely protected by a clip-on lid with carry handle; the DC power cord, microphone and long-wire antenna supplied with the transceiver are held in a convenient internal pocket. The case and lid are of steel, and are protected against corrosion.

A common method of operation derives primary power from a 12 volt vehicle electrical system. In such circumstances, the vehicle body acts as a counterpoise to the antenna, as an RF path to the primary supply is provided via the battery leads. (NOTE: Users occasionally attempt to operate the transceiver from a "floated" 12 volt accumulator which is removed from a vehicle or any other electrical earth or counterpoise. The consequent poor performance can be rectified by connection of a good earth or counterpoise to the Earth terminal). Reverse battery connection will not damage the transceiver, which may be operated with either a negative or positive grounded vehicle electrical system without any adjustment. Supply voltages outside the specified limits will not cause damage to the transceiver.

Up to 10 crystal locked channels may be fitted (less if dual frequency simplex operation is required). All transmit/receive switching is performed by semiconductors; no relays are used and since all switching contacts are self-cleaning, problems due to dusty conditions are virtually eliminated. Automatic level control circuitry ensures that varying speech input levels produce a minimal change in transmitter power output. The circuit is all solid state, using silicon transistors; modular construction facilitates maintenance.

The transmitter is completely protected against any antenna condition ranging from absolute short circuit to completely open circuit and attempted operation of the transmitter under such conditions cannot cause damage.

Correct antenna tuning conditions are indicated by a front panel-mounted lamp. The brightness of this lamp does not vary greatly from one antenna or frequency to another; a comparison of relative operating efficiency can therefore be made.

A clarifier (fine tune) control can be fitted to operate on the receive mode only or on both transmit and receive modes. The clarifier range can be adjusted very easily during manufacture or set-up. When a clarifier is fitted for use within Australia, its range will be restricted as required by PMG Specification RB209 if operating on the receiver alone, and according to the requirements of PMG Specification RB209-0 if operating on both transmitter and receiver combined. On export equipment, clarifiers will normally be provided on receiver only, and the range approximately $\pm 0.003\%$ of suppressed carrier frequency.

1.1 (cont.)

Later models allow the fitment of any two of three operating modes: Upper Sideband, Lower Sideband, Compatible AM. In the two former, the appropriate crystal filter is selected; in the latter, the receiver operates to receive Amplitude Modulated Signals, and the transmitter operates in the Compatible AM (A3H) mode, which may be received intelligibly by either an AM receiver or an SSB (A3J) receiver.

Provision has been made for fitment of the Royal Flying Doctor Service Emergency Call System.

An Instruction Card fitted in the lid of the transceiver contains complete operating instructions plus details of channel frequencies fitted. Each transceiver delivered for operation in Australia is frequency checked by the APO in respect to channels fitted.

The Type 6924 may carry brand names "CODAN" or "EILCO". It is type approved under APO Specification RB209, and Approval Certificate No. 209005 has been issued.

1.2 Specification

GENERAL

Frequency Range:	2 - 10 MHz.
No. of Channels:	10 (single frequency simplex) or 5 (dual frequency simplex).
Operating Modes:	Single Side Band (A3J) (normally Upper Side Band, but Lower Side Band to special order). Compatible AM (A3H).
Frequency Stability:	$\pm$50 Hz, 5°C - 55°C $\pm$60 Hz, 0°C - 60°C.
Controls and Indicators:	Power On/Off and Volume; Channel Select; Mode (SSB, AM, Tune & Load); Aerial Tune; Aerial Load; Power Output Lamp; Push-to-talk (on microphone).
RF Input/Output Impedance:	Any practical aerial within the range of under 10 ohms to over 1000 ohms can be tuned and loaded.
Input Volts:	Operates over the range 10.5 to 16.0V DC. Positive or negative ground (case is electrically isolated). Reverse polarity protected.
Power Consumption:	Receive: 0.1A. Transmit: A3J average - 2A. A3H, A3J two-tone -4.2A.

1.2 (cont.)

Environmental:	Ambient Temperature °C	0 to +30	+30 to +60
	Relative Humidity %	above 95	declining to a max. 50 @ +60
	Atmospheric Pressure	700 Millibars (7500 ft. or 2500 m above sea level).	

Cooling: Convection.

Size & Weight: 12" L x 4.75" H x 8.5" D, 11.5 lbs. (30.5 cm L x 12.1 cm H x 21.6 cm D, 5.25 Kg.)

Finish Colours: Colours to B.S.381C:1964. Front Panel: Sky, No. 210 in semigloss stoved enamel. Case: Mid Bronze Green, No. 223 in Armorhide vinyl.

RECEIVER

Type: All transistor single conversion superheterodyne.

IF Frequency: 1650 KHz.

Sensitivity: An aerial EMF of less than 0.5 microvolt from a 50 ohm source will produce a signal + noise/noise ratio of 10 db (A3J).

Maximum Input: 10V RMS.

Bandwidth: Nominal 300 Hz to 3000 Hz $\pm$3 db; typically 300 Hz - 2800 Hz $\pm$3 db.

Selectivity: A3J, better than 55 db at -2, +4 KHz.
A3, better than 60 db at $\pm$14 KHz.

Image and Spurious Signal Rejection: Better than -60 db.

Cross Modulation:* A signal 75 db above a signal producing a 10 db S + N/N ratio modulated 30% and removed at least 20 KHz from the wanted signal will produce an increase in receiver noise of less than 3 db.

Intermodulation:* To produce a third order intermodulation product equivalent to a wanted signal producing 10 db S + N/N ratio, two unwanted signals greater than 30 KHz removed from the wanted signal must have a level greater than 60 db above the wanted signal.

1.2 (cont.)

Blocking:*	A signal 75 db above a signal producing a 10 db S + N/N ratio and removed at least 20 KHz from the wanted signal will cause a change in output level of the wanted signal of less than 3 db.
AGC:	Less than 3 db variation in output for signal strength variations between 3 microvolts and 10 millivolts.
AF Power Output & Distortion:	1.75 watts at less than 5% THD.
Clarifier Range: (When Fitted)	Nominal 0.0014% of SCF, continuously variable, (0.003% Export only).

TRANSMITTER

Type:	All solid state.
Power Output	SSB: 25 watts PEP. Compatible AM: Equivalent to 6 watts AM.
AF Bandwidth:	Overall response of the transmitter rises at approximately 6 db/octave from 300 Hz to 3000 Hz. At higher frequencies cutoff is very rapid.
Harmonic Emission:	Second harmonic: -40 db relative to PEP. Third or higher harmonics: -45 db relative to PEP.
Spurious Emissions:*	Spurious emissions are at least 40 db below mean power output.
Carrier Supression:*	In A3J mode, carrier supression is at least 50 db below reference level.
Unwanted Sideband:*	Unwanted sideband supression is at least 40 db below mean power output.
Intermodulation Products:*	Intermodulation products are at least 28 db below reference level.
ALC Range:	30 db change in input produces less than 1 db change in output.
Clarifier Range: (When Fitted)	Nominal 0.0014% of SCF, continuously variable.
Microphone:	Rocking armature with push-to-talk fitted to case.

* These parameters are measured in terms of Australian Post Office Specification RB209.

1.3 Options and Accessories

(a) Options to Type 6924

A	Fit AM compatibility.
BA	Fit operating channel. Single frequency simplex. (Specify frequency)
BB*	Fit operating channel. Two frequency simplex. (Specify transmit and receive frequencies).
CA	Fit clarifier control - receive only.
CB*	Fit clarifier control - transmit and receive.
E	Fit RFDS emergency call facility.
L	Fit for LSB operation in lieu of USB (standard fit).

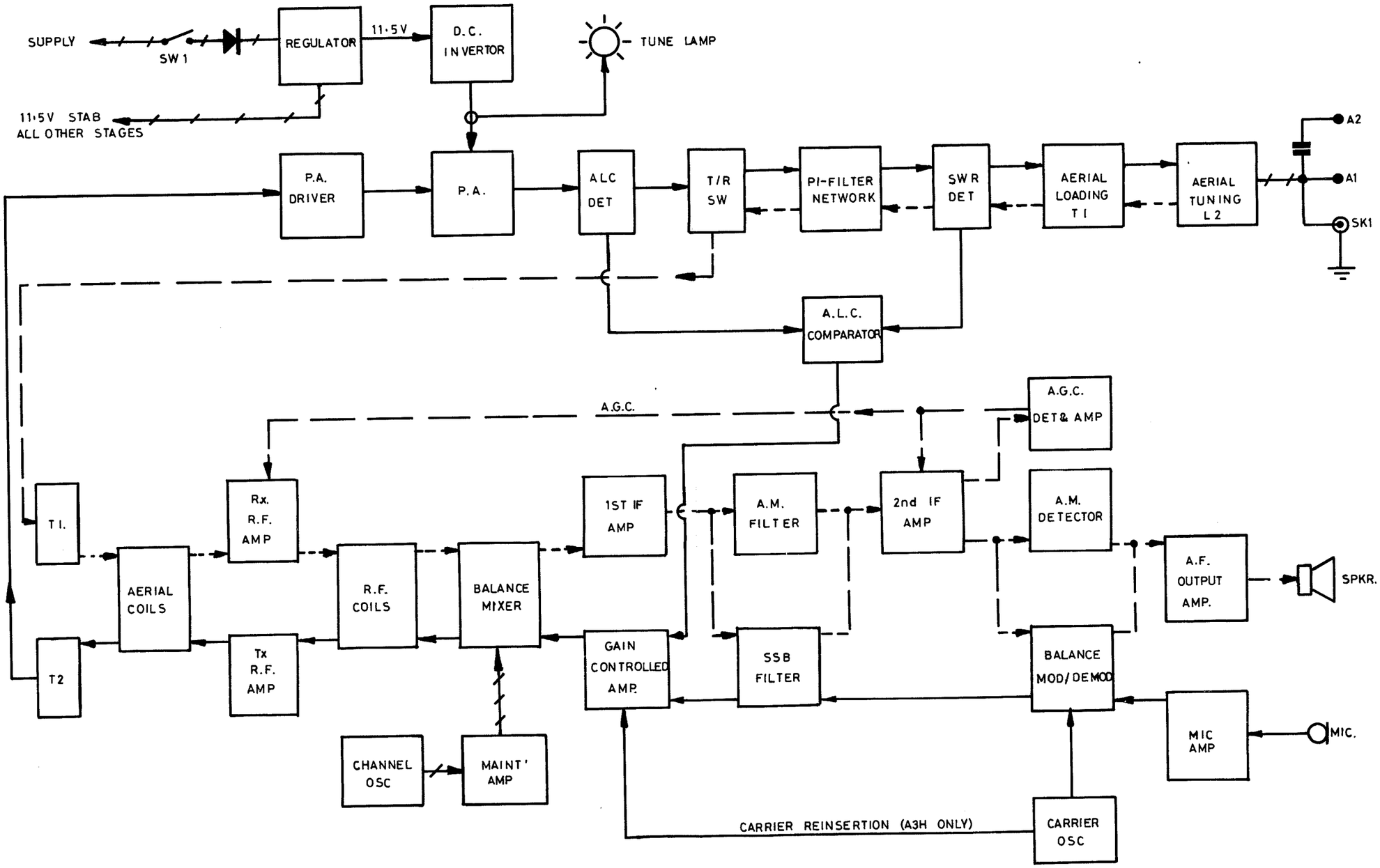
* The combination of options BB & CB is not admissible.

(b) Accessories

Order Code	
6924/005	Technical service manual.
103	Vehicle mounting kit.
203	Heavy duty carry bag.
500	AC Power Supply Type 7109.

A wide range of antennas to suit all applications is available. Ask for separate Data Sheets.

TYPE 6924 HF SSB TRANSCEIVER



2. SIGNAL PATH BLOCK DIAGRAM

TRANSMIT — — → RECEIVE ⟋⟋ COMMON

3 BRIEF DESCRIPTION

3.1 Introduction

The 6924 Transceiver uses the same crystal frequency conversions in the transmit and receive modes and therefore many circuits are common. The use of a circuit in the transmit or receive mode is determined by the PTT switch on the microphone. The type of signal - SSB (A3J) or AM (A3H) - is selected by the Mode switch. This switch also has a "Tune" position which places the 6924 into the transmit mode, thus enabling the Aerial circuits to be tuned and loaded to the aerial after each change of channel.

3.2 Transmit

3.2.1 Microphone Amplifier

Audio signals from the microphone are amplified to provide a constant level AF signal to the Balanced Modulator.

3.2.2 Carrier Oscillator

A temperature compensated crystal oscillator provides 1650 KHz to the Balanced Modulator at a constant level and, in the A3H mode, a fixed level of carrier re-insertion to the Gain Controlled Amplifier.

3.2.3 Balanced Modulator

In the Balanced Modulator the carrier is modulated by AF signals from the Microphone Amplifier which produces a double side band (DSB) signal, the carrier itself being cancelled. The DSB signal is passed via a diode gate to the single side band (SSB) Filter.

3.2.4 SSB Filter

The Crystal filter is designed to pass only the lower side band (LSB) of the DSB signal from the Balanced Modulator. It effectively eliminates the USB signal and further reduces residual carrier.

3.2.5 Gain Controlled Amplifier

This amplifies the LSB signal from the filter to the level required by the Balanced Mixer. A voltage, derived from the Automatic Level Control (ALC) Comparator is applied to this stage to control the gain, thus maintaining the correct drive level required. (ALC is explained later).

In the A3H mode, the carrier level with respect to the LSB is re-inserted at this stage. This level is preset in the Carrier Oscillator stage and is not affected by subsequent operations.

3.2.6 Channel Oscillator

These are independent Crystal Oscillators fitted in pairs on plug-in PC Boards; up to ten channels can be accommodated. The crystals are selected to be 1650 KHz higher than the wanted RF channel. They are temperature compensated in conjunction with the Carrier Reinsertion Oscillator to minimise frequency change with temperature (i.e., their frequency/temperature curves follow the same law as that for the carrier oscillator in order to maintain a constant frequency difference). The required Crystal Oscillator is selected by the Channel switch, and the oscillator outputs are commoned and fed to the Maintaining Amplifier which provides the DC bias to maintain the oscillator output at a constant level.

3.2.7 Maintaining Amplifier

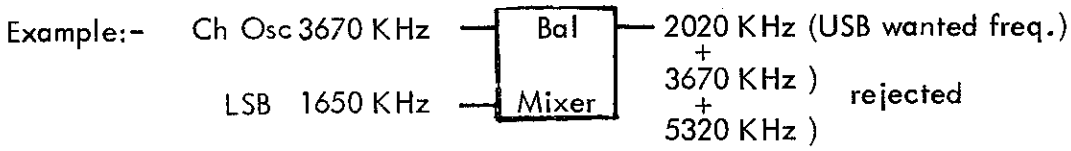
Receives the output from the operating Crystal Oscillator, measures the level and provides a DC bias for the oscillator to keep this level constant. It is also an effective buffer stage between the oscillator and the Balanced Mixer and provides the latter with a constant current source.

3.2.8 Balanced Mixer

This accepts the LSB signal from the filter and the output from the Channel oscillator. The required mixer product:

$$F_{rf}\ (USB) = F_{osc} - 1650\ KHz\ (LSB) \qquad \text{(note sideband inversion)}$$

is selected by the RF tuned circuit selected by the Channel switch. The Crystal oscillator frequency (reduced by cancellation in the mixer) and the unwanted mixer products are rejected by tuned circuits.



3.2.9 Transmit RF Amplifier

The RF tuned circuits at the input and output of the amplifier are selected by diodes switched into circuit by the Channel Switch. Its function is to amplify the RF USB signals from the balanced mixer to the level required by the PA Driver which is fed via transformer 2T2.

3.2.10 PA Driver

This amplifies the wanted USB signals to the drive level required by the Power Amplifier and provides a low impedance source suitable for feeding the co-axial connection to the Power Amplifier.

3.2.11 Power Amplifier

A two stage wide-band coupled Class B Linear PA, driven from the PA Driver, amplifies the signal to the power level required. RF energy is prevented from being fed back to the receiver input by the aerial change-over circuit 11TR15, 11D8, 11D9.

3.2.12 Pi-filter Network

The signal is coupled from the PA through the wide-band transformer T5 and passes through the Pi-filter (frequency selected by the Channel switch) to the Aerial Tuning Circuits.

3.2.13 Aerial Circuits

The aerial circuits match the low impedance output from the Pi-filter to the aerial, the "Tune" control resonating the aerial and the "Load" control adjusting the impedance transformation. Selection of the A1, A2 terminal or Coaxial socket is determined by the length and/or type of aerial.

3.3 Transmit/Receive Switching

Operated by the PTT switch (or mode switch in "Tune") the T/R switch provides the DC switching voltages which bias the diodes switching the various stages from the receive to the transmit function.

3.4 Receive

3.4.1 RF Amplifier

RF signals from the aerial are coupled from the Pi-filter through the aerial switching diodes 11D8, 11D9 (controlled by 11TR15) to the RF input transformer 2T1. Across the secondary of 2T1 are two diode protection gates to protect the RF amplifier from overload due to close proximity transmitters. The signals to the RF amplifier are coupled through the same RF tuned circuits as are used in transmit. The RF amplifier is an AGC controlled amplifier raising the signal to the level required by the balanced mixer.

3.4.2 Balanced Mixer

Operates exactly as in transmit except that the wanted mixer product is now LSB 1650 KHz which is developed across the secondary of 2T4.

Example:- 3670 KHz Osc - 2020 KHz USB RF = 1650 KHz LSB.

3.4.3 1st IF Amplifier

This is a non-gain-controlled amplifier providing the pre-filter amplification of the IF signal. The output is connected to both filters in the AM mode and blocked from the AM filter in the SSB mode by 2TR10.

3.4.4 AM Filter

Used only on receive in the AM mode; its 6 KHz bandwidth accepts AM and SSB signals, the filter shape factor providing the required AM selectivity.

3.4.5 SSB Filter

Passes only 3 KHz bandwidth LSB signals at the IF frequency of 1650 KHz, the filter shape factor providing the required SSB selectivity.

3.4.6 2nd IF Amplifier

Diode gates at the filter outputs select either AM or SSB signal input to the amplifier. This is a two stage amplifier, the first stage of which is AGC controlled. The amplifier output is fed to the AM Detector, Balanced Demodulator and AGC stages without mode switching.

3.4.7 AM Detector

A conventional diode detector, the output being fed to the Volume control. It is inhibited in the SSB mode.

3.4.8 SSB Demodulation

The same Balanced Modulator used in transmit. The Carrier Oscillator injection is used to demodulate the LSB IF signal; the AF is then passed to the Volume control. The Carrier Oscillator is inhibited in the AM mode making the Demodulator inoperative. An inhibit circuit 6TR5, 6D7, 6D8, prevents carrier or signal reaching the filters during receive.

3.4.9 A.G.C.

The peak envelope detector stage develops the DC bias voltage used to control the gain of the RF Amplifier and the 2nd IF Amplifier (first stage) in the AM and SSB modes.

3.4.10 A.F. Output Amplifier

A class B audio amplifier fed from the volume control with transformer output to the speaker. This stage is inhibited in the transmit mode.

3.5 Regulator

The polarity protected DC input from the battery is stabilised to 11.5V in this stage which then feeds the receiver and DC Inverter.

3.6 DC Inverter

11.5V input from the regulator drives the DC Inverter in the transmit mode to produce 28V DC required by the PA stage. The current output is monitored by the "Tune" lamp (indicating the current drawn by the class B PA) and is used to indicate 'tune' and 'load' at this stage.

3.7 ALC

Three DC voltages are derived from:

(1) RF voltage on the wide-band transformer 11T5.

(2) RF current in the Pi-filter network.

(3) SWR at the low impedance output from the Pi-filter.

The highest of these is fed to the ALC Comparator where it is compared with a reference delay voltage. The resultant DC output is used to control the gain of the Gain Controlled Amplifier which improves linearity, prevents overload and maintains peak envelope power (PEP).

3.8 Clarifier Control

This facility when fitted enables the operator to adjust the channel oscillator frequency slightly to compensate for slight frequency errors between transmitting and receiving stations and hence clarify the signal.

Two versions are available:-

(a) Receive clarifier only.

(b) Transmit and receive clarifier.

4 SWITCHING

4.1 General

The 6924 does not use relays. Switching is performed by diode gates operated from either the Mode switch, Channel switch, or PTT switch (frequency selection in the Pi-filter network excepted).

4.2 Switching Voltages

All switching voltages are designated by a letter tabulated below. The derivation of each voltage and its function follows the table.

Switch Voltage
A = + 11.5V Regulated
B = + 11.5V Regulated (via link on PCB 07-00010)
C = + Receive
D = + Transmit
E = + Receive AM only
F = + Receive SSB only
G = + except on AM receive
H = + except on AM transmit

N.B. A'; the prime indicates that voltage is carried on a wire in the loom; no prime (viz, A) indicates printed circuit track.

(i) A: is derived from the regulator and feeds directly to:

(a) A.F. Output Amplifier - supply.

(b) PTT Switch (HS1), to produce D on transmit.

(c) Mode Switch (SW4a) contacts 6 and 8.

(d) PCB 07-00010, to provide B.

(ii) B: is derived from A via the link on PCB 07-00010 (the link is used in another application of the 6924) and feeds directly to:-

(a) Maintaining Amplifier - supply via 2R55.

(b) Channel oscillator buffer amplifier collectors (all in parallel) via 2L14.

(c) T/R switch 9TR1 to produce C on receive.

(d) "Balanced Modulator to Filter" gate (6D7, 6D8, 6TR5) - supply via 6R27.

(e) Channel Switch (SW2d) contact 12 for channel switching.

(iii) C: is derived from B at the T/R switch, via 9TR1 conducting (its base grounded by 9R1). C is applied via 9R3 to 9TR3 base, saturates 9TR3 and grounds the D line and 9R1 which holds 9TR1 on. On transmit, the C line is grounded by 9TR2 (saturated by D via 9R2). C is fed to:-

4.2 (cont.)

(a) D.C. Inverter - inhibiting voltage on receive.

(b) 2nd IF Amplifier - supply.

(c) AGC Amplifier - supply.

(d) "Balanced Modulator to Filter" gate (6D7, 6D8, 6TR5), via 6R26 to inhibit the gate on receive (6TR5 saturated).

(e) Mode Switch (SW4a) contact 12 and via R2 to contact 7, used to produce E, F and H in the appropriate modes.

(f) "Aerial change-over" gate (11D8, 11D9, 11TR15), to open the gate on receive, via 11R17 and 11R18.

(g) 'Transmit/Receive' gates (2D5, 2D4, 2D26) on the RF tuned circuits.

(h) RF amplifier (2TR1) - supply.

(iv) D: is derived from A when the PTT switch is operated OR when the Mode Switch is in the 'TUNE' position (via contacts 8 and 9). On receive, the D line is grounded by 9TR3 (saturated by C via 9R3); D is fed to:-

(a) T/R switch, to inhibit and ground the C line. 9TR1 is cut off by D via 9R1 (inhibits C) and 9TR2 is saturated by D via 9R2 (grounds C line).

(b) DC Inverter start terminal, (fully described in the technical description).

(c) AM Detector, via 6D5 to inhibit 6D6 on transmit.

(d) T/R gates (2D4, 2D27 and odd numbered gates 2D7-2D25), on the RF tuned circuits.

(e) Transmit RF Amplifier - supply.

(f) Carrier Oscillator, as G via 6D5 (see G).

(g) "1st IF to AM Filter" gate 2TR10, via 2R56, blocking signal leakage through AM filter during transmit.

(v) E: is derived from C via the Mode switch in the AM position (contact 12 and 3). E is fed to:-

(a) "Filter to 2nd IF" gate, via 6R1 to enable 6D1 gate, block 6D2 gate, and thus selects AM filter output only.

(vi) F: is derived from C via the Mode switch in the SSB position (contacts 12 and 2) and is fed to:-

(a) "Filter to 2nd IF" gate, 6D3 via 6R3 and selects SSB filter output. It also enables gate 6D2 via 6R2 placing 6C3 in shunt across the AM filter output and blocks gate 6D1 effectively suppressing any leak through the AM filter.

(b) "1st IF to AM Filter" gate 2TR10. F via 2R48 saturates 2TR10 blocking signal input to the AM filter.

(c) Carrier Oscillator, as G via 6D4. (see G).

4.2 (cont.)

(vii) G: is derived from D via 6D5 on transmit OR F via 6D4 on receive SSB and is fed to:-

(a) Carrier Oscillator as supply; the oscillator is then active on all modes except receive AM.

(viii) H: is derived from A' via the Mode switch in the SSB position (contacts 4 and 6), OR from C via R2 on the Mode switch (contacts 4 and 7) in the AM position.

H is fed to:-

(a) Carrier Oscillator, via 6R39 to 6TR8 base. 6TR8 saturates and grounds the junction of 6C30 and 6C29 preventing carrier re-insertion.

The switching voltage table should be kept to hand when reading the Technical Description.

4.3 Channel Selection

The B voltage to the Channel Switch (SW2d) is fed to the selected contact and operates:-

(a) The desired Channel Oscillator.

(b) The desired Channel Circuit Gates, selecting the desired RF coils.

EXAMPLE : Select Channel 1 with the Channel Switch. The +ve B from contact 1 on SW2d will energise Channel Oscillator 1. It will also enable CH1 input RF coil (2L1) via the resistor, 2L1, 2D6 and 2D7.

On receive, the voltage from SW2d also enables 2D2 gate via 2T1, 2R2 to D (at earth) and 2D7 gate via 2L11, 2R4 to D, coupling the signal from 2T1 via 2L1 to RF Amplifier 2TR1. Gate 2D5 is inhibited by C via 2R3, 2T2 preventing loss of signal into the transmit circuits.

On transmit, the voltage from SW2d enables 2D5 gate via 2T2, 2R3 to C (at earth) placing 2L1 in the Transmit RF amplifier circuit. The D voltage inhibits the 2D7 and 2D2 gates (preventing RF loss into the receive circuit) and enables the 2D4 gate via 2R1 to C; 2C3 then decouples the receive input circuit. The +ve B from contact 1 on SW2d also enables the output RF coil 2L15 (CH1) via the 1K5 resistor, 2L15, 2D28 and 2D29. On receive, gate 2D28 is enabled via 2L13, 2R16 and gate 2D29 is enabled via 2R17, 2T3, and C enables gate 2D26 via 2R7, 2L12, 2R13, 1D26, 2L13, 2R16 thus coupling the signal from the RF amplifier via 2L15, 2D29 to 2T3 at the input of the balanced mixer. Gate 2D27 is inhibited and isolates the signal from the transmit circuits. On transmit D enables gate 2D27 via 2R14, 2R15, 2D27, 2L13, 2R16 (allowing the signal from the balanced mixer to pass to the Transmit RF Amplifier) and inhibits gate 2D26.

The voltage at the cathodes of 2D6, 2D7, 2D28 and 2D29 inhibits diode gates 2D8-2D25 and 2D30-2D47 isolating channel RF coils 2L2-2L10 and 2L16-2L24 (i.e. Channels 2-10). All other channels operate in an identical manner.

5 TECHNICAL DESCRIPTION

5.1 Introduction

All components on printed circuit boards are prefixed by one or two digits corresponding to the last digit or digits on the PCB number.

Example: R7 on PCB 07-00008 becomes 8R7.

For clarity of reading this prefix has been omitted in the technical description when referring to components on the board under discussion. If a signal is coupled from this board to a component on another board, the prefix is added to the latter to avoid confusion.

The order of stages described follows the signal path.

5.2 Transmit

5.2.1 Microphone Amplifier PCB 07-00009

RF pick-up on the microphone leads is decoupled by C6 & C7 at the input to the set. L1, L2 & C1 provide further RF filtering. The AF signals from the microphone are developed across R5 and R13 (AF load) at the inputs (pins 1 & 10) of the LM370 differential amplifier. R6 is adjusted on test to provide the correct offset voltage at the LM370 for minimum "thump" on compression. The DC supply (8V) for the LM370 is derived from D via R4 (active only on transmit). Output from the LM370 at pin 8 is DC coupled to the linear feedback amplifier TR5 & TR6, the feedback circuit C5, R10 and R9, C4 form an AC divider network. Output from TR6 collector passes through R12 & C20 to the balanced modulator; at the same time, AF is passed through C6 to the voltage doubling rectifier circuit D1, D2 charging C3 and thus providing a DC bias for the LM370 control gates. The compressor has inherently fast attach (less than 10mS) and slow release (2 sec) AGC action: R7 is used to minimise differences in release time between devices.

The overall effect of this stage is to provide up to 30dB compression of the AF signal. C2 limits the frequency response of the microphone amplifier. AF signals via C5 also appear across RV1 but the audio amplifier is inoperative on transmit. Access to the audio input circuit for measurement or signal injection is available at TP4 & TP5 on the mother board, the audio output (approx. 900mV) appears at TP6.

Biassing voltage for 6D6 is derived from D via 6D5, 6R15, 6R16, 9R12 & 9R11. This voltage blocks 6D6 during transmit to provide isolation between the input and output of the balanced modulator.

5.2.2 Carrier Oscillator part of PCB 07-00006

A 1650 KHz crystal oscillator is temperature compensated and frequency adjusted by C23a & C23b with C25 set at mid capacity. Fine frequency trimming is then made by C25 alone. D13 rectifies the RF at TR6 collector proportionally reducing the base bias thus reducing amplitude variations. C26 & C27 form a voltage divider feeding TR7 and provide a high impedance load for TR6. TR7 is a buffer amplifier which feeds the balanced modulator and carrier re-insertion to the Gain Controlled Amplifier (via C29 & C30). C29 adjusts the carrier re-insertion level. In the SSB mode, TR8 is saturated from H via R39, thus preventing carrier re-insertion.

RF output can be measured at TP1. The DC supply is derived from G (inoperative on AM receive).

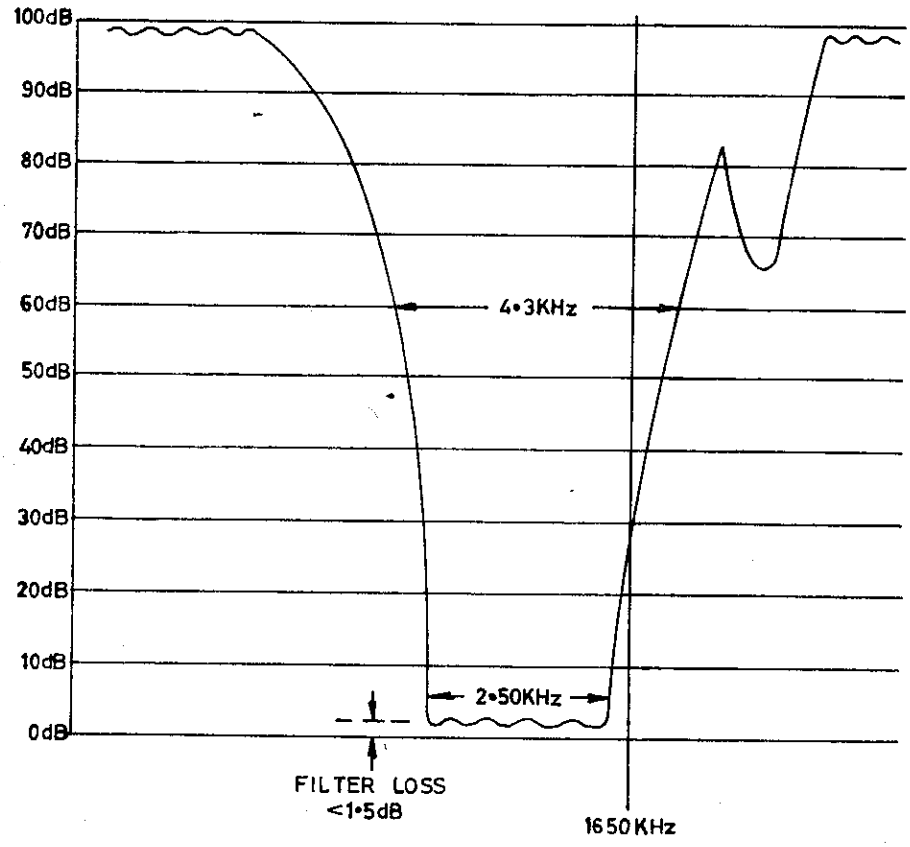
5.2.3 Balanced Modulator part of PCB 07-00006

Carrier oscillator output is fed to the junction of R28 & R29 connected across two arms of the diode ring D9-D12. Carrier balance is effected by C17 & C18. The diode ring is switched at carrier frequency, and also with audio applied across the opposite arms of the bridge, thus developing a DSB signal (1650 KHz + F_{af} and 1650 KHz - F_{af}) across the primary tuned circuit of T3. The bridge is balanced such that the carrier leak is approximately -40dB at this point. The DSB signals pass via T3, C16 to the "Balanced Modulator to Filter" gate (D7, D8 & TR5). On transmit, the diodes are conducting (via B, R27, D8, R14, T2 and D7, R25, 7FL1) and couple the DSB signal to the SSB Filter input. On receive, TR5 is saturated from C via R26 clamping the junction of D7 & D8 to common and thus closing the gate.

5.2.4 SSB Filter 7FL1 on PCB 07-00007

Designed to pass LSB signals only (300 Hz - 2.7 KHz below 1650 KHz) it attenuates the residual carrier a further 30dB and the USB at least 65dB.

Typical Filter Response. Fig. 1.



5.2.5 Gain Controlled Amplifier part of PCB 07-0002

LSB signals from the SSB Filter (7FL1) pass via R53 and C52 to the inverting input of TR11 (LM370), the non-inverting input accepting carrier re-insertion during A3H only. The DC supply and input bias is derived from D via R50, R51 and R52. The gain of TR11 is controlled by a DC voltage from the ALC Comparator via R49 to control pin 4. The amplified signal (and carrier in the A3H Mode) is passed via C47 to the tuned primary of T4, and can be measured at 2TP2. Any 1650 KHz signal leaking through the AM Filter is blocked by TR10 (operated via R56) during transmit hence improving carrier suppression.

5.2.6 Channel Crystal Oscillator PCB 07-00004

The Crystal oscillator TR1 (Channel 1) is temperature compensated and frequency adjusted with C4 set at mid-capacity by C1a, C1b and C1c. Fine frequency adjustment is then made with C4 alone. C5 and C6 form a voltage divider feeding the base of TR2. The output at the collector of TR2 is in parallel with the output circuit of all channel oscillators and is fed via the common line to the Maintaining Amplifier. A DC bias developed in the latter is fed to the base of TR1 to maintain the oscillations at the required level. The DC supply to the Oscillator is derived from B via SW2d active contact.

5.2.7 Maintaining Amplifier part of PCB 07-00002

Output from the Channel Oscillator is fed to the junction of L14, D48 and C36. The RF voltage is rectified by D48, filtered by C35 and fed to the base of TR3 via D49 to produce a voltage across R18 proportional to the RF amplitude. This voltage, amplified by TR3 provides the DC control for the base of the oscillator TR1 and tends to maintain constant the oscillator output of the active channel. The RF voltage is also coupled via C36 to the base of the common emitter amplifier TR4. L25 is a peaking inductor which raises the circuit impedance at nigher frequencies. The output from TR4 across R22 is fed to the Balanced Mixer via C38.

5.2.8 Balanced Mixer part of PCB 07-00002

Channel oscillator output from the Maintaining Amplifier is fed to the centre tap of T4 which is connected across the diode ring D50-D53. LSB signals (and carrier in the A3H mode) is also fed into the diode bridge through T4. The sum and difference products from the mixer are fed through the wideband transformer T3 and R17, C34 to the channel gates D29 to D47 (omitting even numbers). The required mixer product (RF USB) is developed across the appropriate RF tuned circuit (L15 to L24) via the corresponding gate selected by the Channel Switch. (See channel switching).

5.2.9 Transmit RF Amplifier part of PCB 07-0002

The DC supply is derived from D via R14 and is also used to open the input gate D27 via R15, D27, L13 and R16. The input signal from the RF tuned circuit via D27 is fed to the base of TR2 which amplifies the signal and passes it to T2 via C15. At the junction of C15 and C14, the diode D5 (opened by the channel selection voltage through the selected RF tuned circuit) connects the appropriate RF tuned circuit (L1-L10) as the collector load for TR2. T2 is a wide-band transformer which feeds the P.A. Driver (N.B. T2 secondary is returned to common on PCB 07-00010 only).

5.2.10 P.A. Driver PCB 07-00010

The DC supply is derived from D via R9. The RF signals from T2 are fed via C1 and R3 to the base of TR1. TR1 and TR2 amplify the signal which is fed to the base of TR3, which in turn drives the primary of T1. The DC voltage feedback to TR1 is via R5 and the AC voltage feedback is via R8. The signal at the secondary of T1 is fed via co-ax to the power amplifier.

5.2.11 Power Amplifier part of PCB 07-00011

Supply at 28V DC is derived from the DC Inverter which is active only during transmit. The RF signal from the PA Driver is fed to T3, the secondary of which provides an anti-phase drive to the bases of TR10 and TR11 (the first push-pull stage of the PA). Bias for this class B stage is developed across TR9 from the supply via R14 and R13. TR9 is used as a temperature compensator; increased conductivity in TR10 and TR11 due to a rise in temperature is offset by increased conductivity in TR9 also, which reduces the bias to TR10 and TR11. The centre tap of T3 is AC by-passed to common by C9. The amplified signal is developed across T4 primary which is centre fed at the centre tap by R14 to supply the collectors of TR10 and TR11. T3 and T4 are wide-band RF transformers. The signal output from T4 secondary, loaded by R15, is fed anti-phase to the bases of TR13 and TR14, the bias for which is developed across TR12 via R16. TR12 is a temperature compensator operating in the same manner as TR9. The power output from TR13 and TR14 is developed across T5 primary, which is centre fed by the DC supply to the collectors of TR13 and TR14. T5 also is a wide-band transformer.

5.2.12 P.A. Pi-Filter Network part of PCB 07-00011 and L1

The RF signal from the secondary of T5 is fed to the Pi-filter Network C18, C19, L8, L9, L1, L10, C22 and C23, adjusted to the required frequency by switching taps with SW2b. Input and output impedance is approximately 50 ohms. The filtered RF output is fed via T7 primary to the primary of T1 and to tap 5 on the secondary. Diode gate D8, D9 and TR15 (aerial change over) is inhibited by C and prevents RF passing to the receive circuits.

5.2.13 Aerial Circuits (front panel)

Aerials can be connected to terminals A, B, or SKT 1. Normally co-ax fed aerials are connected to SKT 1 and end fed aerials to A or B. A short aerial (at the frequency selected) appears capacitive and when connected to B, can be tuned to resonance by L2. A long aerial appears inductive and when connected to A it is placed in series with C3 to make it appear capacitive and can then be tuned to resonance by L2. The aerial impedance is then transformer matched to the Pi-filter output impedance by the load transformer T1. Tap 5 on T1 is connected directly to the Pi-filter output to feed nominal 50 ohm impedance aerials direct. Taps 1 and 4 on T1 are used to load aerials of a lower impedance and taps 6 to 11 load aerials of a higher impedance than 50 ohms.

Indication of 'load' and 'tune' is given by the "TUNE" lamp which monitors the current drawn by the class B PA stage. Maximum brilliance showing maximum current will only be achieved when the PA is fully loaded correctly tuned.

5.2.14 ALC Detectors part of PCB 07-00011

The ALC voltage is derived from three sources:-

(1) A sample of the RF voltage on T5 is taken from the one turn tertiary winding and rectified by D10. This provides the main controlling voltage fed to the ALC comparator which controls the "Gain Controlled Amplifier" to maintain PEP output from the transceiver.

(2) A sample of the RF current in the Pi-filter network which passes through T6 is rectified by D11 and when a fault or improper load condition occurs this voltage will exceed the voltage from (1) and reduce the drive to the P.A. via the ALC Comparator and Gain Controlled Amplifier.

5.2.14 (cont.)

(3) The current through T7 primary induces a voltage in its secondary in antiphase to the RF voltage developed across R21. When the voltage and current pin 'v' are in phase and of the correct magnitude, such as provided when the load is correctly tuned and matched, the voltages across R21 & R22 effectively cancel. Should the 'current induced voltage' across R22 exceed the voltage across R21 (e.g. aerial short circuit), or the voltage across R21 exceed the 'current induced voltage' across R22 (e.g. aerial open circuit), the resultant voltage fed via C21 or D12, and rectified will produce a DC voltage overriding the ALC voltage from D10 again reducing the drive to the PA as in (2). L6 completes the DC path for D12. L4, L5 and C8 form a RF filter for the ALC line. The highest voltage from (1), (2) or (3) takes control.

5.2.15 ALC Comparator part of PCB 07-00002

The DC supply is derived from D via R50. The ALC voltage from the ALC Detectors is applied across R23 and R24 and 'peak' gated by D54, it is also fed via R25 to charge C40 and the 'average' value is gated by D55. The 'peak' and 'average' voltages gated by D54 and D55 are developed across R26 at the base of TR5. R32 and R33 form a voltage divider and provide a reference voltage at the base of TR6. If the output from TR5 emitter follower fed via R28 to R30 (TR6 emitter resistor) exceeds the voltage across R30 due to the reference voltage on TR6 base, it is amplified by TR6 and passed via R31 to the base of TR7. TR7 will conduct more readily increasing the voltage at pin 4 of TR11 (LM370) and reducing its gain. The standing current through TR7, R35 and R36, provide the 'normal' control voltage for TR11 (2.2V). Transient spikes at the base of TR5 are passed via C41 to the base of TR6, raising the bases of both transistors in parallel and effectively suppressing the transient. R35 and C42 provide fast attack and C42, R36 (in parallel with the internal resistance of TR11) provide slow release time constants.

5.3 Regulator part of PCB 07-00011

The regulator DC input is protected from polarity reversal of the battery by TR1. At low input voltages Z1 does not conduct, there is no voltage drop across R3 and TR1 base is held positive (i.e., TR1 cut off). TR2 base is held negative by R1 and conducts heavily increasing the base current of TR3 and TR4 which saturate producing negligible collector to emitter voltage drop (0.5V). The voltage across C2 and C24 is therefore at battery potential.

As the battery voltage increases to the point where Z1 conducts (adjusted to 11.5V by R4a and R4b), the current through R3 will reduce the base voltage of TR1. TR1 starts to conduct and the current diverted through TR1 decreases the base current of TR2. TR2 tends to cut-off and reduces the base current to TR3 and TR4, whose collector to emitter voltage drop increases. The excess battery voltage is dropped across the collector to emitter resistance of TR3 and TR4, maintaining the voltage across C2 and C24 at 11.5V which then supplies the receiver and the DC Inverter.

5.4 D.C. Inverter part of PCB 07-00011

11.5V DC from the Regulator is applied via the centre tap of the primary of T1 to the collectors of TR7 and TR8. On switching to transmit, D is applied to C4 and the positive pulse via R6 to TR8 base starts TR8 conducting. TR8 collector current through half the primary of T1 induces a voltage in the feedback winding in such a

5.4 (cont.)

direction as to cause the base current of TR8 to increase. TR8 saturates and applies the DC supply across the half of the primary winding of T1. When the flux in the core of T1 reaches saturation, the induced voltage across the feedback winding can no longer sustain the base current of TR7, and that transistor moves out of saturation. The decreasing collector current of TR7 now results in reversal of the polarity of the voltage across the feedback winding and this cumulative action results in TR7 being rapidly cut-off and TR8 switched-on. This cycling will continue at about 2 KHz. During transmit C holds TR5 and TR6 non-conducting via C3, R5 and R23.

The voltage at the secondary of T1 is bridge rectified by D4-D7, smoothed and filtered by C5, C6, L3 and C7 and supplies the P.A. The current drawn by the P.A. through T2 primary induces a current into the secondary which illuminates the "TUNE" lamp, previously described in the PA section.

On switching to receive, C is applied via C3/R26, R5 and R23 to the bases of TR5 and TR6. These transistors saturate and clamp the bases of TR7 and TR8 to common thus stopping the DC Inverter. D is grounded and C4 discharges via R6 and TR6. Diodes D2 and D3 to complete the feedback winding conduction loop which the current is flowing in the direction which inverse biasses TR7 or TR8. In similar fashion D1 is used to discharge C3 on switching from receive to transmit.

5.5 Receive

5.5.1 Aerial Input Circuits PCB 07-00011 and front panel

The aerial circuits are selected, tuned and loaded as in transmit. The received signals pass via C15, D9, D8 and C14 to the input transformer 2T1. TR15 is made conducting by C via R18 and C also enables D8 and D9 (the received signal gate) via R17, D8, D9, L7, TR15 and L4.

5.5.2 RF Amplifier part of PCB 07-00002

The received signals are developed across T1 secondary, D1 and D3 are used to prevent damage to TR1 which may result from severe overload. The signal is passed via D2 gate (open on receive) to the selected RF tuned circuit (L1-L10) and on through C17 to the base of TR1. The signals are amplified by the forward gain controlled RF Amplifier TR1 and pass via D26 (open on receive) to the second RF tuned circuit (L15-L24) selected and then via R17, C34 to T3 at the input to the Balanced Mixer.

5.5.3 Balanced Mixer part of PCB 07-00002

Operates as in transmit except that the required mixer product is developed across T4 tuned secondary.

Mode	Input signal	Required mixer product
A3 J	F_{rf} USB	$-F_{osc} = F_{if}$ LSB
A3H	F_{rf} carrier + USB	$-F_{osc}$ = 1650 KHz carrier + LSB
A3	F_{rf} carrier + USB + LSB	$-F_{osc}$ = 1650 KHz carrier + LSB + USB

5.5.4 1st IF Amplifier part of PCB 07-00002

The signals from T4 pass via C44 and R38 to the base of TR8, the first stage of the feedback amplifier pair TR8 and TR9. The signals are DC coupled to the base of TR9, DC feedback is via R43 and AC feedback is via C46 (R45 sets the stage gain). The output signals are passed via R54 to the SSB Filter in the SSB Mode and are blocked from the AM Filter by TR10 (saturated by F applied to TR10 base). In the AM Mode, signals also pass via R46 and R47 to the AM Filter (TR10 non conducting, F removed). Any signal through the SSB Filter not blocked by gate 6D3 are within the AM Filter pass-band.

5.5.5 AM Filter PCB 07-00003

This is a 1650 KHz $\pm$3 KHz filter and can therefore pass A3 and A3H signals. (The SSB Filter is described in the transmit mode).

5.5.6 2nd IF Amplifier part of PCB 07-00006

Signal input in the SSB mode is via D3 (opened by F via R3), C4, OR in the AM mode via D1 (opened by E via R1), C2, to R4 at the base of TR1. TR1 is a forward gain-controlled amplifier, and the amplified signal appears across the tuned primary of T1. TR2 is a conventional amplifier and accepts signals from T1 secondary via C9, the amplified signal appears across the tuned primary of T2.

5.5.7 AM Detection part of PCB 07-00006

D6 is a conventional diode envelope detector fed by T2, the AF voltage appearing across the diode load R16, 9R12 and 9R11. 7C5 passes the AF signal to 1RV1 (volume control). D6 is biassed off in the SSB mode by F via D4 and R15.

5.5.8 SSB Detection part of PCB 07-00006

IF signals from T2 are passed via R14, C16, (D8 gate inhibited on receive) and T3 to the balanced modulator/demodulator to be mixed with 1650 KHz from the carrier oscillator (injected as in transmit). The resultant AF signal from the diode ring (D9-D12) is passed via C20, 7C5, to 1RV1 (volume control). C19 limits the frequency response of the detector. In the AM mode the carrier oscillator is inhibited.

5.5.9 AGC Amplifier part of PCB 07-00006

The IF signal from T2 in all receive modes is passed via R18 to the base of TR3. TR3 will conduct only on positive half cycles which are greater than 1.2V p-p to produce a voltage across R20. A current now flows through TR3 charging C14 (and C13 via R17) and also driving TR4. The AGC line, in the absence of a signal, is held at approximately 3V by potential divider R24 and R23; this produces the desired static gain in both controlled stages. As the signal increases, the voltage across C14 increases almost linearly, but charging is modified by R19 which adds an exponential component to the charge rate. This ensures that the output control voltage remains sensitive to changes of signal at high input levels, as well as to signals not much higher than threshold level. The AGC loop gain is thus made more constant over the entire working range of signal levels, and changes in the relative attack and release times for the same step in input, are minimised for all signal levels. The attack time is very fast and is limited only by the quasi-constant network which charges C14. The release time is controlled by a double time constant of approximately 0.1 sec. and 5 secs. Wanted signals normally have time to charge C13 via R17, and when the signal is removed C13 discharges via R17, TR4 and R22 to hold TR4 conducting for the long release time. Short static crashes only have time to charge C14 (but not C13) which discharges quickly to produce the short release time. In this way, the time of receiver desensitisation due to static crashes is minimised whilst the longer time constant, applicable to the wanted signals prevents an upsurge in background noise between words and phrases.

5.5.9 (cont.)

The voltage across C14 controls the current through TR4 and increases the AGC voltage with increasing signal. The AGC voltage is applied to the RF Amplifier and the first stage of the 2nd IF Amplifier. The AGC loop gain is high and the RF output from T2 is held sensibly constant for 100dB change in signal input to the receiver.

5.5.10 Audio Output Amplifier PCB 07-00008

The DC supply A direct from the regulator is always 'on'. AF signals from 1RV1 are fed via R1 and C3 to the base of TR1. The amplified signal at the collector of TR1 drives the base of TR2. The varying current through TR2 and TR3 produces a voltage at the bases of TR4 and TR5. Complementary transistors TR4 and TR5 drive TR6 and TR7 in complementary symmetry. The AF output from TR6, TR7 is coupled to the loudspeaker output transformer T1, the AC circuit being completed by C7 which also provides a bypass for the emitter resistors R13, R14 of the preceding stage. Negative feedback is applied to the emitter TR1 via R8 and C6 and to TR4 and TR5 via R16 and R17. At the amplifier input, C1 and C3 controls the frequency response. During transmit, D is applied via D1, R2 and R7 to the emitter of TR1, this prevents TR1 conducting and inhibits the AF stage.

5.6 Clarifier Control PCB 07-00055 and part of PCB 07-00005

(i) The oscillator operates as described in para. 5.2.6, with the inclusion of a variable-capacity diode D1 in the voltage divider feeding the base of TR2. The capacity of this diode is in parallel with the fine frequency adjustment C4 and by varying the voltage across the diode via R4 the oscillator frequency may be changed.

(ii) The DC control for D1 is provided from PCB 07-00005. This board consists of a zener stabilised supply across which is placed the clarifier control RV2, the output from which is used to feed D1 on the oscillator.

(iii) The links on PCB 07-00005 are pre-set to enable the clarifier function to be used on receive only or transmit and receive.

6 SET UP PROCEDURE

6.1 P.A., DC Inverter and Regulator (07-00011), Sub Assembly

6.1.1 Equipment Required

(a) Signal generator (50 ohm) capable of 200 mV EMF @ 2 MHz.

(b) AVO Model 8 or similar 20,000 OPV multimeter.

(c) CRO with response to beyond 2 MHz.*

(d) VTVM, CRO with probe or other RF indicating device (hi-Z), with good response up to 10 MHz.

(e) Regulated power supply, 12.6V with current trip at 5A.

(f) 20 ohm 35W (or greater) DC load resistor.

(g) 3.8V 0.3A test lamp. (PHILIPS 7138D M.E.S.)

(h) Test heatsink (attached to TR12, TR13 and TR14)

*The CRO may require a differential input to measure wave forms if a fault condition should exist.

IMPORTANT! MOUNT TEST HEATSINK TO TR12, TR13 and TR14.

6.1.2 Procedure

1. Connect 3.8V 0.3A test lamp to pins "j" & "k".
2. Ensure inverter link from pins "e" to "m" is open circuit.
3. Observe correct polarity and apply 12.6V DC to the DC input pins marked + and -.
4. Measure voltage across C2 or C24 and add R4b across R4a of such a value as to adjust the regulated voltage to be 11.5V $\pm$0.1V.
5. Start the inverter by connecting pin "g" to pin "c" temporarily. (If the inverter does not start connect "g" to negative of C4).
6. Connect a 20 ohm load across C5, C6: the test lamp should light, measure the output voltage across the 20 ohm load.

   Accepted circuit parameters:-

   (A) Output voltage, 26.5V +1.0V -0.5V.

   (B) Input current, 4.25A $\pm$0.1A.

   (C) Rise and fall times on collectors of TR7 & TR8, 1-2 uS.

   (D) Feedback winding voltage, 13V P-P.

   (E) Voltage on bases of TR7 & TR8, forward 1.1V, reverse 0.95V.

   (C) (D) & (E) measurements would only be necessary if a fault condition is thought to exist. They are best made with a differential input to the CRO.

   (F) Transistor type 2N3055/10 may be fitted in positions TR7 and TR8, if so, measure the peak spike voltage between collectors. If above 45V peak to peak add C25 between collectors at the solder lug terminations.
   (C25=0.047 uF, 10%, 160V, Polyester).

   If parameters correct proceed :-

7. Disconnect the 20 ohm load.
8. Connect a meter to the test points "r" and "z" in series with the DC feed to TR13 & TR14.
9. Connect a link across pins "l" & "m".
10. Measure the current through the meter and adjust R25b to produce a current drain of 10 mA $\pm$0.5 mA. (If current $<$10 mA but $>$5 mA without R25b, then omit R25b).
11. Remove the meter and link "r" to "z".
12. Connect a 50 ohm RF load to the PA across C18 & C19, (pins "s" & "x").
13. Ensure that the nuts attaching TR12, TR13 & TR14 to the test heat-sink are firmly tightened.
14. Ensure that the PCB supporting screws are earthed to the heatsink effectively. (Flying leads fitted).
15. Connect a 50 ohm signal generator tuned to 2 MHz to pins "a" and "b".
16. After 2 mins. warm up adjust signal generator output such that 12.6V DC input current is 3A.

    Expected circuit parameters:-

    (F) Drive voltage approx. 200 mV r.m.s. (EMF in series with 50 ohm source).

    (G) P out approx. 6.5W.

    (H) ALC voltage at pins "p" & "w", 3.6V ("w" positive).

17. Adjust the RF drive voltage to produce 1.0V ALC with 50 ohm load, then measure ALC voltage under following conditions:

	LOAD	ALC Voltage	
(I)	50 ohm	1.0V	)
(J)	Short cct.	1.3V	) approx.
(K)	Open cct.	1.45V	)

18. Link C18 and C19 directly to C22 and C23 (not via L8, L9, L10) and remove 50 ohm load from C18, C19.
19. Connect 50 ohm load across T7 output and earth, (pins "v" & "x").
20. Adjust RF drive voltage to produce 1.0V ALC with 50 ohm load, then measure ALC voltage under following conditions:

	LOAD	ALC Voltage	
(L)	50 ohm	1.0V	)
(M)	Short cct.	6.2V	) approx.
(N)	Open cct.	3.5V	)

6.1.2 (cont.)

21. Connect pin "n" to pin "p".
22. Connect pin "g" to the case (-ve) of C4.
23. Measure across "e" (hot) and "f" with a VTVM or CRO and ensure the RF appears only when "g" is connected to "d" (i.e. T/R switch TR15 is working).
24. Remove links "n" to "p" and "g" to C4 (-ve).

6.2 6924 Set-Up Instructions

6.2.1 Test Equipment Required

1. Multimeter of at least 20,000 ohm/volt e.g. 'AVO 8'.
2. A calibrated CRO (10M ohm and 7pF input impedance with x 10 probe), and with Y amplifier frequency capability of at least the highest channel.
3. RF Power Meter 50 ohm capable of at least 15W dissipation.
4. Two AF signal generators together with a mixing box capable of providing tones at equal level or one of each tone in turn from an isolated source of 50 ohms at an adjustable level from 0-100mV emf; or EILCO Type 6918 SSB TEST SET.
5. RF signal generator covering the range of at least 1.5 MHz to 10 MHz capable of providing calibrated signals down to 1 uV emf from 50 ohms source (and amplitude modulated to at least 30% depth if AM facility is to be adjusted).
6. AC voltmeter of at least 1000 ohm input impedance, capable of measuring sinewave voltages from 100 mV to 10V rms (approx. -10 dbm to +10 dbm ref. 600 ohm) in the frequency range 50 Hz to 5 KHz.
7. Constant voltage power supply adjustable from at least 10V to 16V at 5 amps with some form of adjustable current trip or limit.
8. Frequency Counter capable of resolving frequencies in the range of 1-12 MHz $\pm$1 Hz.

6.2.2 General Notes

1. The voltage of the power supply must be set to 12.6V $\pm$0.6V for all tests and at current limit or trip point of 150 mA max. unless otherwise stated.
2. The mode switch must be in the SSB position for all tests unless otherwise stated.
3. The number preceding the component identification in the following description refers to the particular P.C.B. module as numbered on main circuit diagram.
4. It is assumed that the receiver prior to the test is complete except for the following omissions.
   (a) SELECT ON TEST resistors 11R4b, 11R19b, 2R32b, 7R6.
   (b) No tap links on pi-filter inductor 1L1.
   (c) All RF tuning capacitors.
   (d) PCB mounting screws removed on PCB No. 07-00002, 07-00003, 07-00009.

6.2.3 Procedure

1. Fit into appropriate positions on PCB 07-00002 one pair of RF coils type 4470031 (orange colour code) for each channel required. It is usual to designate channels from 1 to 10 in increasing order of frequency. Channel 1 coil (lowest frequency) will be located approximately in line with the Balanced Mixer coil cans as shown on Drg. No. 08-00012 Sheet 2 (L1 & L15).

2. Refer to Table 1 below and connect with a suitable link the appropriate diode junction point (corresponding to the channel being adjusted) to the coil tap as specified.

Table 1

Frequency	2-3.3 MHz	3.3-5 MHz	5-10 MHz
Aerial coil L1-L10	Tap 2	Tap 2	Tap 1
RF coil L15-L24	Tap 2	Tap 1	Tap 1

The positions of diode junction points and taps are illustrated on Drg. No. 08-00012 Sheet 2.

3. Refer to Table No. 2. Select styroseal capacitor of the nearest 20% preferred value and solder to the pins provided on the back of PCB 07-00002 and which are illustrated on Drg. No. 08-00012 Sheet 3.

Table 2

Frequency KHz	Capacitor pf (5% Styroseal)
1920 - 2100	680
2100 - 2400	560
2300 - 2600	470
2550 - 2750	390
2750 - 3050	330
3050 - 3350	270
3350 - 3750	220
3750 - 4100	180
4100 - 4500	150
4500 - 4850	120
4850 - 5400	100
5400 - 5800	82
5800 - 6450	68
6450 - 7100	56
7100 - 7700	47
7700 - 8500	39
8500 - 9500	33
9500 -10600	27

4. Turn on receiver and note the DC voltage across 11C2. Select a resistor (11R4b) in the region of 10K so that the voltage is adjusted to 11.5V. (Refer to 6.1.2 para. 1 to 4, this may have been done).

5. By reference to the temperature coefficient indication supplied with the 1650 KHz Crystals, select appropriate capacitor from Table No. 3 below to correct the crystal towards zero temperature coefficient. Insert capacitor in position of 6C23a and crystal into eyelet receptacle as indicated on Dwg. No. 08-00015 Sheet 2.

(This table will be issued as amendment sheets)

Select a capacitor (1 pf to 3.9 pf) and insert in position of 6C23b that will allow 6C25 when half in mesh to tune crystal to 1650 KHz to within 1 Hz as measured with a frequency counter connected to 6TP2 and using 6TP4 as a convenient return.

6. By reference to the temperature coefficient indication supplied with the required channel crystals, select a capacitor (39 pf) from Table No. 4 below to correct crystal towards zero temperature coefficient. Insert capacitor in the position of 4C1a and/or 4C8a as indicated by Dwg. No. 08-00016 Sheet 2. In the case when a capacitor of N1500 temperature coefficient is required, it occupies the position of 4C1c and/or 4C8c for one leg and the other leg is placed in a hold located obliquely as shown on Dwg. No. 08-00016 Sheet 2.

(This table will be issued as amendment sheets)

Insert crystal (or crystals if the particular P.C.B. module requires two crystals). Select a capacitor and insert in any remaining position of 4C1a, b or c and/or 4C8a, b or c that will allow 4C4 and/or 4C10 to tune crystals to nominal frequency approximately half in mesh (frequency measured with a counter connected to 2TP1 and using 2TP3 as a convenient return). (Approx. 3.9 pf N750).

Continue this procedure until all pairs of crystal (ie all modules) have been set. Secure each module in position with a 6BA x 3/8" cheese-head screw and nut.

7. Feed into the aerial terminals (or SK1), a signal at the desired channel frequency (channel switch pointing to the correct channel) from a 50 ohm generator, at a level high enough to produce a heterodyne which is within the receiver passband. The volume control is set for a convenient AF output level. Adjust the relevant RF coils in turn for maximum audio output, at the same time reducing the RF signal level to below the AGC threshold. Repeat until the best sensitivity is obtained.

8. Continue further with the above procedure applied to the four IF tuned circuits in turn, namely 2T4, 6T1, 6T2, 6T3. Since these tuned circuits are prealigned, little adjustment should be needed.

9. Using the same channel frequency as in 8 above (or any other channel to which the receiver is tuned), adjust the signal generator such that a tone of approximately 400 Hz is produced in the loudspeaker and using an RF input level at least 20 dB above AGC threshold.

   Rotate the volume control clockwise and check that the audio amplifier clips evenly and produces at least 13V p-p swing before clipping. Reset the volume control to a convenient output level. Note this level for reference in the next paragraph.

   Amplitude modulate the signal generator at 400 Hz to a modulation depth of 30% and turn the receiver mode switch to the AM position. Check that the resulting audio voltage level across the loudspeaker is attenuated by between 4 dB to 8 dB below the SSB audio level previously set.

10. Disconnect the yellow wire from pin "c" on the P.A. Board. Apply an AF signal of 1 KHz across 7TP4 & 7TP5 from an isolated source of 50 ohm at a level of approximately 2mV rms. Press the PTT button. With a CRO and DC voltmeter both connected to 7TP6 and 'COMMON', select a suitable value for 9R6 so that when the input level is increased by 20 dB from just below compression, the resultant DC offset shift is minimised: a small change is allowable providing that it is negative going and less than 200 mV.

    Secure PVC module with two 6BA x 3/16" cheesehead screws.

    N.B. In some cases the value of 9R6 may have been pre-matched with its mating LM370 consequently is already present on the PCB module and no further adjustment should be necessary.

11. Attach a suitable C.R.O. or VTVM with diode probe to pins a & b on PCB 07-00011 and adjust the sensitivity of the instrument to read 4.5V p-p (1.5V rms).

12. Reapply the audio tone as in (10) so that the microphone amplifier is held slightly in compression and retrim RF coils of each channel fitted, for a maximum voltage measured across pins "a" & "b" on PCB 07-00011. If an apparent overload occurs, reduce AF input.

13. Connect free yellow wire in loom to pin "c" on PCB 07-00011.

14. Connect a suitable 50 ohm RF load and power indicator of at least 15 watts rating to SK1. Turn the "Load" control to position 5 and the "Tune" control fully anticlockwise.

15. (a) For channels in the 2-2.8 MHz range, the total inductance of 11L8, 11L9, 1L1 and 11L10 is in circuit and no connections are made to SW2b.

15. (b) For channels in the 2.8-3.8 MHz range, a 10/.010" PVC insulated wire must be connected from the junction of 11L8 & 11L9 (located at point "U" on PCB 07-00011) to the contact on SW2b corresponding to the appropriate channel under alignment. Where there are several consecutive channels in this range, a link of tinned copper wire may be used to bridge the relevant contacts on SW2b.

    (c) For channels in the 3.8-4.6 MHz range, attach insulated wire as in (b) to the junction of 11L9 & 1L1 (located at point "t1" on PCB 07-00011) to the appropriate contact on SW2b. For frequencies as in (a), (b) & (c) above, tuning of the Pi-filter is considered complete after the above procedure is carried out.

    (d) For channels in the 4.6-10 MHz range, attach insulated wire as in (b) from a position on 1L1 as suggested in Dwg. No. 5 to the appropriate contact on SW2b.

16. After completing 15(d) above set the 12.6V power supply current trip to 5A. Either operate the PTT button with the "Mode" switch in the AM position or hold the "Mode" switch in the tune & load position and note the RF power output. Repeat the measurement with the connection to 1L1 displaced one or more turns each side of the recommended position, and continue this procedure until maximum power output is achieved. The power measured at this stage should be less than 12 watts.

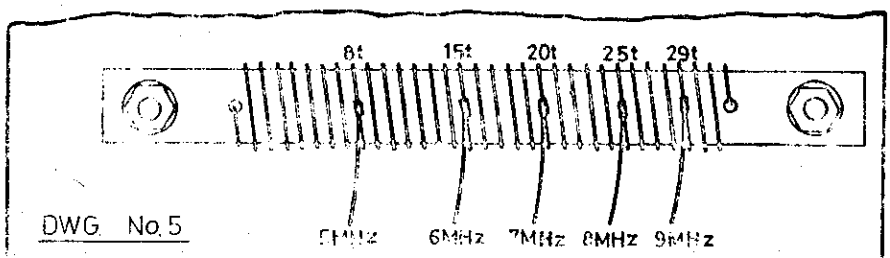
17. Apply two equal tones of 1 KHz & 2 KHz to 7TP4 & 7TP5 from isolated generator as used in part (10), such that the microphone amplifier is held slightly into compression (i.e. the RF power output stops rising with increase in applied audio).

18. Press PTT button and select the channel that gives the highest power reading. Select a resistor that when placed across 2R32a will increase this reading to 13 watts. Solder it in the position of 2R32b as indicated on Dwg. No. 08-00012 Sheet 2.

19. Secure in place PCB 07-00002 with two 6BA x $\frac{1}{2}$" cheese-head screws & nuts and two 6BA x 3/4" cheese-head screws & nuts, the latter fastening PCB 07-00003 as well as 07-00002. All four screws hold in position the RF shield 05-00052 between PCB 07-00002 and the RF divider plate.

20. Disconnect the yellow loom wire from pin "c" on the P.A. (07-00011) PCB. Connect a CRO or millivoltmeter to 7TP6. Adjust the level of the two tone input so that the AF voltage at 7TP6 is 6 dB less than the voltage measured at the threshold of compression. Disconnect the CRO or meter, reconnect the yellow wire to pin "c". Check the power output on all channels, it should not be less than 10W. If lower re-check the tuning of the RF coils of affected channels.

21. Connect a C.R.O. across the RF load and observe the envelope pattern with two audio tones applied as in (17) with the "Mode" switch in the AM position & PTT button pushed. Decrease the value of the carrier reinsertion trimmer 6C29 noticing the apparent modulation depth increasing as less carrier is reinserted.



6.2.3 (cont.)

Adjust 6C29 such that the ratio of envelope crest voltage to the minimum (there are two) envelope through voltage is between 10/1 and 20/1. Check the adjustment by carefully reducing the levels of the two tones simultaneously, watching that the modulation depth decreases to zero and does not appear to pass through 100% (two equal tones) in the process. If it does, 6C29 has been reduced beyond optimum point.

Check that residual noise on all channels is at least 40 dB below the level of PEP when two tones are removed.

22. Apply a sweep of less than 25 Hz rate to the antenna terminals, both in the SSB & AM receive modes, and observe the bandpass characteristic in both cases. Check that it is of the typical nature as stated in "General Information" and has no irregularities. The sweep output in both modes is detected with a diode peak envelope detector connected to 6TP6 using 6TP5 as a return.

23. Assemble transceiver in case.

24. Check that the receiver sensitivity and signal plus noise to noise ratio on all channels are within specification as stated in "General Information". Note that the "Tune" control must also be adjusted for best sensitivity.

25. Increase the RF signal from AGC threshold to a level of 80 dB above AGC threshold and check that the audio output change does not exceed 3 dB over this range.

26. Check that each channel produces the power level stated in "General Information".

    If para. 25 to 27 do not meet requirements, repeat tuning adjustments para. 7, at the same time checking as in para. 22.

6.3 6924 Addition of Extra Channels

6.3.1 Test Equipment

1. Calibrated RF Power Meter 50 ohm capable of at least 15 watt dissipation.
2. RF signal generator covering the range of at least 1 MHz - 10 MHz capable of producing calibrated signals down to 1 uV emf from a 75 ohm source.
3. CRO of at least 1M input resistance and less than 40pF input capacitance, preferably with x 10 probe, with Y amplifier capability of at least 10 MHz or a VTVM and diode probe with minimum sensitivity of 500 mV FSD.
4. AC voltmeter of at least 1000 ohm input impedance, capable of measuring sinewave voltages from 100 mV to 10V rms (approx. -10 dbm to +10 dbm ref. 600 ohms).
5. Constant voltage power supply adjustable from at least 10V to 16V at 5 amps with some form of adjustable current trip or limit.

6.3.1 (cont.)

6. Frequency counter capable of resolving frequencies in the range 1 MHz to 12 MHz $\pm$1 Hz.

6.3.2 Components

1. One pair of RF coils P/N 4470031 (Orange colour code) for each channel being added.

2. One pair of polystyrene capacitors, values selected as per Table No. 2 for each channel being added. Ceramic capacitors of temperature coefficient -150 ppm (N150) may be used in lieu of the polystyrene types.

3(a) One crystal to Eilco Specification 01-00010 of a frequency calculated from F_{scf} + 1650 KHz, and a selection of ceramic capacitors for each channel being added as per Table 3 in section 6.2.3 para. 5.

OR (b) One crystal as above complete with necessary compensating capacitors ex factory for each channel being added.

OR (c) One dual crystal oscillator assembly complete with factory pre-compensated crystal for the desired local oscillator frequency for each pair of channels being added.

In (a) & (b) above, there may be one unused section in the last dual crystal oscillator module in the transceiver to which the new crystal is being added. Extra pairs of channels under these conditions will require a complete dual oscillator assembly 08-00016 with or without both crystals fitted depending on the particular requirement.

6.3.3 Procedure

1. See set-up instructions 6.2.1.

2. See set-up instructions 6.2.2.

3. See set-up instructions 6.2.3.

4(a) If crystals only are available, see set-up instructions 6.2.3.

(b) If compensating capacitors are supplied pre-matched to the crystal, insert crystals in relevant channel positions and adjust each pair of trimmers 4C4 & 4C10 in turn to tune to nominal frequency as measured with a frequency counter connected to 2TP1 and using 2TP3 as a convenient return.

(c) If complete dual crystal oscillator modules are supplied, plug-in to relevant channel sockets and secure each with a 6BA x 3/8" cheese-head screw and nut. Adjust each pair of trimmers 4C4 & 4C10 in turn as in 6(b) above.

5. See set-up instructions 6.2.3 para. 7.

6. Disable the P.A. stage by disconnecting yellow wire on PCB 07-00011 pin 'c' (ensure that it does not short circuit to any other component).

7. See set-up instructions 6.2.3 para. 11.

8. Turn to Mode Switch the AM position, operate the PTT button and retrim both RF coils for maximum voltage measured across pins "a" & "b". Note that alternatively the Mode Switch may be switched to the Tune & Load position.
9. See set-up instructions 6.2.3 para. 13.
10. See set-up instructions 6.2.3 para. 14.
11. See set-up instructions 6.2.3 para. 15 a, b, c, & d.
12. See set-up instructions 6.2.3 para. 16 except that the power may be more than 12 watts.
13. See set-up instructions 6.2.3 para. 19.
14. Assemble transceiver in case.
15. See set-up instructions 6.2.3 para. 24.
16. See set-up instructions 6.2.3 para. 25.
17. See set-up instructions 6.2.3 para. 26.

NOTE

The foregoing procedures have used a 50 ohm non radiating dummy load. If it is required to transmit into an aerial, with the set out of its case (e.g. PMG frequency checking) it is imperative that a metal plate at least 10" x 5" be placed centrally under the set. With the front panel upper most this acts as an RF shield across the rear of the set.

7. MAINTENANCE

7.1 Removal of P.A. Sub-Assembly from 6924

1. Remove the set from the case (4 screws).

2. Remove the black RF cover plate from alongside the pi-tank coil L1. (2 x 6B screws and 3 6BA screws and nuts).

3. Unsolder the following loom wires from the PA sub-assembly, starting at the corner nearest the volume control.

Black	-	
Orange	+	
Red (2)	g	
Black	n	
White	d	
Yellow	c	Chan Osc Side
Pink	w	
Black	p	
Coax inner	a	
Coax outer	b	
White	e	
Green	f	
L1	t1	
Any wires	(s	
From Channel SW	(u	End
L1	t2	
Black	x	
Blue	v	
Yellow	j	RF Board side
Yellow	k	

4. Remove 2 x 6BA screws and nuts holding the black PA chassis to the main frame on the RF Board side of the set. Hinge open the set like a book to 90°, place a support under the front panel.

5. Remove 3 x 4BA screws, 2 x 4BA nuts, 1 x 6BA and 2 silver nuts from under the black PA chassis, but not the 2 x 4BA nuts holding L1.

6. Remove 1 x 6BA screw and nut holding front panel assembly to the PA chassis (nearest to SK1) and ease the front panel away from the PA chassis about $\frac{1}{4}$", at the aerial terminal side.

7. Lift the PA sub-assembly away from the PA chassis until the 5 screwheads are clear, then withdraw sub-assembly out from between front panel and the PA chassis.

8. Re-assemble in reverse order.

8. EMERGENCY CALL FACILITY

TO BE USED IN EMERGENCIES ONLY

8.1 Purpose

Operation of the front panel push-button, causes the 6924 to transmit a two-tone signal (880 Hz and 1320 Hz), and if maintained for 15 seconds this will be registered at the R.F.D.S. base station as an emergency call.

(a) By day - will receive priority and be answered by the base operator.

(b) By night - will start the base station transmitter and after 60 - 90 seconds this will radiate netting tones (800 Hz and 1600 Hz) for 15 seconds. It will also alert the DOCTOR or HOSPITAL who will answer the call when the net tones cease.

8.2 Operation

TR1 and TR2 are operational amplifiers set to oscillate at 880 Hz and 1320 Hz respectively by adjustment of R5b and R11b in the negative feed-back loops. Diodes in the positive feed-back loop maintain a constant output level and R1b OR R8b is adjusted on the highest output oscillator to equalise the oscillator amplitudes. The resultant two-tone output is fed via C6 to the microphone amplifier.

When push-button SW5 is operated grounding the bases of TR3 and TR4, TR3 extends the B rail supply to the oscillators and TR4 extends the B rail supply to the D rail, causing the 6924 to transmit.

8.3 Variations

Four variations of the 6924 with respect to the Emergency call PCB will be found since a common PCB and socket is utilised for Emergency call and Clarifier Control.

(a) Neither facility fitted

(b) Clarifier Control only. Sub-assembly 08-00452 Option CA or CB

(c) Emergency Call only. Sub-assembly 08-00453 Option E

(d) Emergency Call and Clarifier Control, Sub-assembly 08-00454, Options CA,E or CB,E.

If a new facility is to be fitted (b) (c) or (d), the appropriate sub-assembly indicated above may be inserted in the 10-way socket on the Mother Board. The socket may not be fitted on some models and it will be necessary to add the 10 way socket (10M54641 HL 10) to the position provided on the Mother Board.

Contd. 8.3 For facilities incorporating the Emergency call i.e. (c) or (d) it will be necessary to fit the push-button SW5 ('NKK' P/N SB-2011 c/w RED knob & Conical Nut) by drilling a $\frac{1}{4}$ inch diameter hole in the top left-hand corner of the front panel escutchen to coincide with the $\frac{1}{4}$ inch diameter hole prepared in the panel behind the escutchen.

On models prior to approximately S/N 1848, the hole already prepared in the front panel is approximately $\frac{1}{2}$ inch diameter. Consequently, for addition of push-button, the centre of the $\frac{1}{4}$ inch diameter hole drilled in the escutchen must coincide with the larger prepared hole in the front panel.

For identification of the button, a label is available (P/N 05-00672) which attaches to escutchen by means of the push-button retaining nut.

Connection to the push-button is made by cutting the brown looped wire (already in the loom) which exists near the push-button hole and soldering the wires to the push-button terminals (N/O & Common).

PARTS LISTS

Due to the continuous process of updating equipment and variations in component availability, minor component changes may be noted from those listed. Equipment performance is in no way adversely affected.

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
9.	PARTS LIST 6924			
9.1	CASE & LID ASSY. - complete sub-assy.	08-00025	1	
	Case	05-00043	1	
	Lid	05-00044		
	Strap Handle - Black plastic	'Sudhaus'	1	
	Handle retaining clips	EN-03-0/FM 021-0	2	
	Case clips & lugs	3417H	2	
	Steel screws 1/8" whit x 1/4" RH chrome		6	
	Steel dome nuts chrome 1/8" whit		6	
	Rivets, aluminium CSK.HD x 1/4"		6	
	Steel screws 5/32" whit x 3/8" CSK		2	
	Steel dome nuts 5/32" whit chrome		2	
	Shakeproof washers 1/8"		6	
	Instruction Card (Metal-cal)	12-00008	1	
9.2	MICROPHONE ASSY. - complete sub-assy.	08-00078	1	
	Microphone Case - Front Microphone Case - Rear Pressel (Press Button)	Weston Type 545-081	1	
	Cable - 4 conductor retractile 'Bly's' Type (charcoal grey)	4/X-HC-72"	1	
	Microswitch 'I.R.H' Type	MGA-200P	1	
	Microphone Insert 50 ohms 'S.T.C.' Type (rocking armature)	29-SU-8A	1	

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
	Grill 'Weston' Type	423-013	1	
	Clip - cable retaining 'Weston' Type	297-031	1	
	Screw self tapping $\frac{1}{2}$" x 4 Philips Panhead Weston	692-314	2	
	Screw - thread cutting 3/4" x 4 Pozidriv Philips Panhead Type Y 'Weston'	692-614	3	
9.3 BATTERY LEAD ASSY. - complete		08-00044		
	Battery clip 'Utilux' Type B143 (paired +ve & -ve)		2	
	Cable flat twin black PVC covered 3 mm auto cable - 16/.012"		6 ft.	
	Cable sleeving type E42626 $\frac{1}{2}$" x 1 mm 'Helerman'		1	
9.4 MAIN ASSEMBLY				
	R.F. Chassis Assembly	08-00006	1	
	Loom Wiring Assy.	08-00008	1	
	Aerial Loading Switch/ Transformer Assy.	08-00004	1	
	Handset Terminating Tag Strip Assy.	08-00007	1	
	Front Panel	05-00023	1	
	PCB Mounting Bar	05-00047	1	
	PCB Mounting Bar - Case Mounting	05-00048	1	
	P.A. Chassis	05-00041	1	
	End Plate	05-00040	1	

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
	Speaker Grill	05-00076	1	
	R.F. Shield	05-00052	1	
	Front panel escutcheon	12-00002	1	
	Knob pointer (large)	06-00013	1	
	Knob pointer (small)	06-00014	3	
	Knob round (small)	06-00015	1	
	Eilco/Codan Insignia		A.R.	
SW2	Channel Switch	14-00003	1	
	Channel Switch Kit	69003-090	1	
SW4	Function Switch 3 position or	14-00001	1	
	Function Switch 2 position (AM not required)	14-00004		
SW1 & RV1	Potentiometer + DPST P&P switch 10K ohm 20% 3/4" shaft	CTS45/10K/C	1	
1R1	Resistor 4M7 ohm 10% CR37 2322	212-12475	1	
1R2	Resistor 1K ohm 5% CR37 2322	212-13102	1	
1R3	Resistor 22 ohm 5% CR37 2322	212-13229	1	
1C1, 2	Capacitor 0.1 uF +80% -20% 25V	'CDR-C'	2	
1C3	Capacitor 33 pF 10% 2KV N750	'CDH-C'	1	
1C4, 5	Capacitor 0.047 uF +80% -20% 25V	'CDR-B'	2	
1C6, 7	Capacitor 1000 pF +50% -20% 500V	563-03102	2	

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
TR1	Transistor 2N441 Code: Orange or Green Dot	2N441	1	
	Transistor 2N441 Mounting Kit		1	
1L1	Inductor Tank Coil	44-70033	1	
1L2	Inductor Variable aerial tuning	44-80017	1	
LP1	Lamp MES 3.8V 0.3A	7138D	1	
LS1	Loudspeaker	C3D-15 ohm	1	
SKT1	Co-ax Socket	L734/S	1	
	Terminals (Red)	313184	2	
	Terminals (Black)	311147	1	
	Lamp Holder	733-8-1	1	
	'P' Clip 'Lektrokit' $\frac{1}{4}$"	LK2831	2	
	'P' Clip 'Lektrokit' 3/16"	LK2821	1	
	'P' Clip 'Lektrokit' 5/16"	LK2841	1	
	Grommet 9/16" Mounting	C116	1	
	Grommet 7/16" Mounting	C116A	1	
	Grommet 5/16" Mounting	C814	1	
	Plug Button Type 48186 Finish C810 (Black Enamel)		1	
	Co-axial Cable	16PK1/02	A.R.	
	Mic. Cable single screened 7/.0076" Black PVC sheath overall.	2SM-38PK1/ V11	A.R.	
	Emergency Call Switch 'NKK' Type SB-2011 c/w RED knob & Conical Nut OPT.		A.R.	
	Clarifier Control Pot. 50K Lin OPT.	CTS45	A.R.	
	Clarifier Control Amp.Assy OPT.	08-00109	A.R.	

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
9.5 RF CHANNEL SELECTION, 1ST IF & ALC				
	Complete sub-assy.	08-00012		
	PCB	07-00002		
C1	0.047 uF +80% -20% 25V CDR-B Ceramic			
C2	0.047 uF +80% -20% 25V CDR-B Ceramic			
C3	0.047 uF +80% -20% 25V CDR-B Ceramic			
C4-C13	Selected on test			
C14	39 pF 2% 63V N150 Ceramic			
C15	3300 pF 10% 100V Ceramic			
C16	0.047 uF +80% -20% 25V CDR-B Ceramic			
C17	3300 pF 10% 100V Ceramic			
C18	3300 pF 10% 100V Ceramic			
C19	0.047 uF +80% -20% 25V CDR-B Ceramic			
C20	3300 pF 10% 100V Ceramic			
C21	0.047 uF +80% -20% 25V CDR-B Ceramic			
C22	0.047 uF +80% -20% 25V CDR-B Ceramic			
C23	0.047 uF +80% -20% 25V CDR-B Ceramic			
C24-C33	Selected on test			
C34	3300 pF 10% 100V Ceramic			

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
C35	3300 pF 10% 100V Ceramic			
C36	3300 pF 10% 100V Ceramic			
C37	0.047 uF +80% -20% 25V CDR-B Ceramic			
C38	3300 pF 10% 100V Ceramic			
C39	3300 pF 10% 100V Ceramic			
C40	1 uF 35V TAG Tantalum			
C41	1000 pF 10% 100V Ceramic			
C42	1 uF 35V TAG Tantalum			
C43	0.047 uF +80% -20% 25V CDR-B Ceramic			
C44	1000 pF 10% 100V Ceramic			
C45	39 pF 2% 63V N150 Ceramic			
C46	0.047 uF +80% -20% 25V CDR-B Ceramic			
C47	1000 pF 10% 100V Ceramic			
C48	3300 pF 10% 100V Ceramic			
C49	1000 pF 10% 100V Ceramic			
C50	1000 pF 10% 100V Ceramic			
C51	0.047% +80% -20% 25V CDR-B Ceramic			
C52	1000 pF 10% 100V Ceramic			
T1	Ae input transformer	44 80022		
T2	RF output transformer	44 80023		
T3	Balanced modulator transformer RF side	44 80024		
T4	IF transformer assembly	44 70032		

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
TR1	BF196 Silicon transistor			
TR2	BF194			
TR3	AY1115			
TR4	AY1114			
TR5	BC148			
TR6	BC148			
TR7	BC148			
TR8	BF194			
TR9	AY1114			
TR10	BF194			
TR11	LM370 Yellow Dot I.C.			
Z1	BZY88C6V8 Zener diode			
R1	1 K ohm 5% all resistors CR25			
R2	1 K ohm 5% unless otherwise			
R3	1 K ohm 5% stated			
R4	1 K ohm 5%			
R5	2.2 K ohm 5%			
R6	220 ohm 5%			
R7	100 ohm 5%			
R8	1 K ohm 5%			
R9	390 ohm 5%			
R10	1 K ohm 5%			
R11	1.8 K ohm 5%			
R12	100 ohm 5%			

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
R13	3.3 K ohm 5%			
R14	100 ohm 5%			
R15	3.3 K ohm 5%			
R16	470 ohm 5%			
R17	1 K ohm 5%			
R18	470 K ohm 5%			
R19	820 ohm 5%			
R20	6.8 K ohm 5%			
R21	100 ohm 5%			
R22	1 K ohm 5%			
R23	1.5 K ohm 5%			
R24	3.3 K ohm 5%			
R25	10 K ohm 5%			
R26	100 K ohm 5%			
R27	3.3 K ohm 5%			
R28	2.2 K ohm 5%			
R29	10 K ohm 5%			
R30	3.3 K ohm 5%			
R31	22 K ohm 5%			
R32a	10 K ohm 5%			
R33	3.3 K ohm 5%			
R34	22 K ohm 5%			
R35	1 K ohm 5%			
R36	3.3 M ohm 10%			

CCT. REF	DESCRIPTION	PART NO.	QTY.	NOTES
R37	100 ohm 5%			
R38	1 K ohm 5%			
R39	22 K ohm 5%			
R40	15 K ohm 5%			
R41	680 ohm 5%			
R42	2K7 ohm 5%			
R43	10 K ohm 5%			
R44	2.2 K ohm 5%			
R45	68 ohm 5%			
R46	1 Kohm 5%			
R47	100 ohm 5%			
R48	3.3 K ohm 5%			
R49	10 K ohm 5%			
R50	47 ohm 5%			
R51	560 ohm 5%			
R52	560 ohm 5%			
R53	1.5 K ohm 5%			
R54	1.5 K ohm 5%			
R55	22 ohm 5%			
R56	3K3 ohm 5%			
R57	22 ohm 5%			
R58	10 K ohm 5%			
L1-L10	RF Coil Orange Dot Assembly CH 2-10 MHz	44 70031		
R59	100 K ohm 5%			Fitted only when required.

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
L11	1 mH Inductor	2422/535/00102		
L12	1 mH Inductor	2422/535/00102		
L13	1 mH Inductor	2422/535/00102		
L14	1 mH Inductor	2422/535/00102		
L15-L24	RF Coil Orange Dot Assembly CH 2-10 MHz	44 70031		
L25	15 µH Inductor	44 8007		
D1-D55	AN2001 Silicon diode			
D56-D65	AN2001 Silicon diode. Fitted as required.			

9.6 AM FILTER

	Complete sub-assy.	08-00018		
	PCB	07-00003		
C1	Capacitor 47 pF 5% 100V		1	
C2	Capacitor 47 pF 5% 100V		1	
FL1	1650 KHz AM Filter PYE	1-65A-1		

9.7 CRYSTAL OSCILLATOR (DUAL) - OBSOLETE, see 9.15

	Complete sub-assy.	08-00016		
	PCB	07-00004		
R1	220 ohm 5% CR25 carbon film			
R2	220 K ohm			
R3	10 ohm			
R4	47 K ohm			
R5	4.7 K ohm			
R6	100 ohm			

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
R7	220 ohm			
R8	220 K ohm			
R9	47 K ohm			
R10	4.7 K ohm			
R11	100 ohm			
TR1-TR4	BF194			
X1	Channel Xtal to Eilco Spec. 01-00010.	Specify SCF		
X2	Channel Xtal to Eilco Spec. 01-00010.	"		
C1a	Selected on test			
C1b	"			
C1c	"			
C2	Deleted			
C3	1000 pF 5% 50V polystyrene			
C4	20 pF trimmer			
C5	82 pF 2% 63V N150 ceramic			
C6	1000 pF 5% 50V polystyrene			
C7	3300 pF 10% 100V ceramic			
C8a	Selected on test			
C8b	"			
C8c	"			

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
C9	1000 pF 5% 50V polystyrene			
C10	20 pF trimmer			
C11	82 pF 2% 63V N150 ceramic			
C12	1000 pF 5% 50V polystyrene			
C13	3300 pF 10% 100V ceramic			
C14	100 pF 2% N750 ceramic			
C15	100 pF 2% N750 ceramic			
L1	1 mH inductor			
L2	1 mH inductor			

9.8 2ND IF AMP, MOD/DEMOD

	Complete sub-assy.	08-00015
	PCB	07-00006
R1	10 K ohm 5% all resistors CR25.	
R2	10 K ohm 5%	
R3	10 Kohm 5%	
R4	820 ohm 5%	
R5	2.2 K ohm 5%	
R6	100 ohm 5%	
R7	1 K ohm 5%	
R8	390 ohm 5%	
R9	220 ohm 5%	
R10	8.2 K ohm 5%	

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
R11	1 K ohm 5%			
R12	100 ohm 5%			
R13	330 ohm 5%			
R14	820 ohm 5%			
R15	12 K ohm 5%			
R16	4.7 K ohm 5%			
R17	10 Kohm 5%			
R18	3.3 K ohm 5%			
R19	1 Kohm 5%			
R20	1 Kohm 5%			
R21	100 ohm 5%			
R22	1 K ohm 5%			
R23	2.7 K ohm 5%			
R24	10 K ohm 5%			
R25	820 ohm 5%			
R26	10 K ohm 5%			
R27	4.7 K ohm 5%			
R30	100 K ohm 5%			
R31	100 K ohm 5%			
R32	100 K ohm 5%			
R33	3.9 K ohm 5%			
R34	47 K ohm 5%			

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
R35	10 K ohm 5%			
R36	220 ohm 5%			
R37	1 K ohm 5%			
R38	47 K ohm 5%			
R39	3.3 K ohm 5%			
R40	47 ohm 5%			
R41	100 ohm 5%			
R42	47 ohm 5%			
T1-T3	IF transformer 1650 KHz	44-70032		
C1	3300 pF 10% 100V ceramic			
C2	1000 pF 10% 100V ceramic			
C3	0.047 uF +80% -20% 25V CDR-B ceramic			
C4	1000 pF 10% 100V ceramic			
C5	0.047 uF +80% -20% 25V CDR-B ceramic			
C6	3300 pF 10% 100V ceramic			
C7	1000 pF 10% 100V ceramic			
C8	0.047 uF +80% -20% 25V CDR-B ceramic			
C9	0.015 uF 10% 100V polyester			

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
C10	0.047 uF +80% -20% 25V CDR-B Ceramic			
C11	0.047 uF +80% -20% 25V CDR-B Ceramic			
C12	1000 pF 10% 100V ceramic			
C13	10 uF 25V TAG tantalum			
C14	1 uF 35V TAG tantalum			
C15	0.047 uF +80% -20% 25V CDR-C ceramic			
C16	3300 pF 10% 100V ceramic			
C17	20 pF trimmer			
C18	Selected on test			
C19	0.015 uF 10% 100V polyester			
C20	2.5 uF +100% -10% 16V electrolytic			
C21	0.047 uF +80% -20% 25V CDR-B ceramic			
C22	100 pF 5% 50V ducon polystyrene			
C23a	Selected on test			
C23b	"			
C24	0.047 uF +80% -20% 25V CDR-B ceramic			
C25	20 pF trimmer			
C26	82 pF 2% 63V N150 ceramic			
C27	1000 pF 5% 50V polystyrene			
C28	1000 pF 10% 100V ceramic			
C29	20 pF trimmer			
C30	10 pF 2% 63V ceramic			

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
C31	0.047 uF +80% -20% 25V CDR-B ceramic			
C32	3300 pF 10% 100V ceramic			
C33	0.047 uF +80% -20% 25V CDR-B ceramic			
D1-D5	AN2001 silicon diode			
D6	0A91 germanium			
D7-D13	AN2001 silicon diode			
L1	1 mH inductor			
L2	1 mH inductor			
TR1	BF196 silicon transistor			
TR2	BF194			
TR3	BF194			
TR4	AY1115			
TR5	BF194			
TR6	BF194			
TR7	BF194			
TR8	BF194			
X1	1650 KHz Xtal to Eilco Spec. 01-00010.			

9.9 MOTHER BOARD

	Complete sub-assy.	08-00019
	PCB	07-00007

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
C1	1500 uF +50% -10% 16V electrolytic			
C2	0.47 uF 10% 200V polyester			
C3-C4	68 pF 5% 630V styroseal (Pye Filter)			
or				
C3-C4	100 pF 5% 630V styroseal (Hy-Q Filter)			
C5	0.47 uF 10% 200V polyester			
FL1	1650 KHz SSB filter	QF 1B65		
R1	1 M ohm 5% CR37			
R2	10K ohm 5% CR25			
SK1	PCB socket 0.1" pitch	10M54641HL85		
SK2	" "	10M54641HL7		
SK3	" "	10M54641HL14		
SK4	" "	10M54641HL14		
SK5	" "	10M54641HL7		
SK6	" "	10M54641HL8		
SK7	" "only if req'd.	10M54641HL10		
SK8	" "	10M54641HL8		
SK9	" "	10M54641HL17		
	Polarising Keys	C8319	7	

9.10 AUDIO OUTPUT AMPLIFIER - OBSOLETE, see 9.20

	Complete sub-assy.	08-00017
	PCB	07-00008

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
C1	3300 pF 10% 100V ceramic			
C2	0.1 uF +80% -20% 25V CDR-C ceramic			
C3	0.015 uF 10% 100V polyester			
C4	10 uF +50% -10% 16V electrolytic			
C5	0.01 uF +80% -20% 25V CDR-A ceramic			
C6	39 pF 20% 100V polystyrene			
C7	1000 uF +50% -10% 10V electrolytic			
D1	AN2001			
R1	6.8 K ohm 5% all resistors CR25			
R2	470 ohm 5%			
R3	180 K ohm 5%			
R4	180 K ohm 5%			
R5	470 K ohm 5%			
R6	22 K ohm 5%			
R7	47 ohm 5%			
R8	5.6 K ohm 5%			
R9	1 K ohm 5%			
R10	1.2 K ohm 5%			
R11	2.2 K ohm 5%			
R12	1 K ohm 5%			
R13	47 ohm 5%			

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
R14	47 ohm 5%			
R15	1 K ohm 5%			
R16	100 ohm 5%			
R17	100 ohm 5%			
T1	Audio output transformer	4430579		
TR1	BC148 silicon transistor			
TR2	AY1115			
TR3	BC148			
TR4	2N3568			
TR5	2N3638			
TR6	TIP32			
TR7	TIP31			
	Transistor mounting pads	TS01	2	
	TIP transistor mounting kit		2	

9.11 MICROPHONE AMPLIFIER & T/R SWITCH

	Complete sub-assy.	08-00013		
	PCB	07-00009		
C1	0.047 uF +80% -20% 25V CDR-B ceramic			
C2	3300 pF 10% 100V ceramic			
C3	1 uF 35V TAG tantalum			
C4	2.5 uF +100% -10% 16V electrolytic			
C5	3300 pF 10% 100V ceramic			

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
C6	0.1 uF +80% -20% 25V CDR-C ceramic			
C7	200 uF +50% -10% 10V electrolytic			
D1-D2	AN2001			
L1	1 mH inductor			
L2	1 mH inductor			
R1	2.2 K ohm 5% all resistors CR25			
R2	4.7 K ohm 5%			
R3	4.7 K ohm 5%			
R4	330 ohm 5%			
R5	68 ohm 5%			
R6	Selected on test			
R7	3.3 M ohm 10%			
R8	22 K ohm 5%			
R9	470 ohm 5%			
R10	5.6 K ohm 5%			
R11	1 K ohm 5%			
R12	2.2 K ohm 5%			
R13	68 ohm 5%			
TR1	2N3638			
TR2	BC148			

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
TR3	BC148			
TR4	LM370			
TR5	BC148			
TR6	AY1115			

9.12 PA DRIVER

	Complete sub-assy.	08-00014
	PCB	07-00010
C1	1000 pF 10% 100V ceramic	
C2	0.047 uF +80% -20% 25V CDR-B ceramic	
C3	0.047 uF +80% -20% 25V CDR-B ceramic	
R1	18 K ohm 5% all resistors CR25	
R2	22 K ohm 5%	
R3	1 K ohm 5%	
R4	220 ohm 5%	
R5	120 ohm 5%	
R6	120 ohm 5%	
R7	1 K ohm 5%	
R8	2.2K ohm 5%	
R9	22 ohm 5%	
T1	Output transformer 300 ohm: 75 ohm	44-80022

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
TR1	BF194 silicon transistor			
TR2	AY1114			
TR3	TT3642			
	Transistor mounting pads McMurdo	TS01		

9.13 PA, DC INVERTOR & REGULATOR

	Complete sub-assy.	08-00011		
	PCB	07-00011		
C1	0.047 uF +80% -20% 25V CDR-B ceramic			
C2	125 uF +50% -10% 16V electrolytic			
C3	125 uF +50% -10% 16V electrolytic			
C4	125 uF +50% -10% 16V electrolytic			
C5	400 uF +50% -10% 40V electrolytic			
C6	400 uF +50% -10% 40V electrolytic			
C7	50 uF +50% -10% 40V electrolytic			
C8	3300 pF 10% 100V ceramic			
C9	0.047 uF +80% -20% 25V CDR-B ceramic			
C10	0.047 uF 10% 250V polyester			
C11	1000 pF 10% 100V ceramic			
C12	0.047 uF +80% -20% 25V CDR-B ceramic			

CCT .REF.	DESCRIPTION	PART NO.	QTY.	NOTES
C13	0.047 uF 10% 250V polyester			
C14	3300 pF 10% 100V ceramic			
C15	0.015 uF 10% 100V polyester			
C16	1000 pF 10% 100V ceramic			
C17	0.01 uF +80% -20% 25V CDR-A ceramic			
C18	470 pF 5% 630V styroseal			
C19	470 pF 5% 630V styroseal			
C20	1000 pF 10% 100V ceramic			
C21	3300 pF 10% 100V ceramic			
C22	470 pF 5% 630V styroseal			
C23	470 pF 5% 630V styroseal			
C24	125 uF +50% -10% 16V electrolytic			
C25	0.047 uF 10% 160V polyester			See para 6.1.2 (b) (F).
R1	1 K ohm 5% CR25			
R2	47 ohm 10% 5W IRC type PW5			
R3	220 ohm 5% CR25			
R4a	820 5% CR25			
R4b	Selected on test			
R5	150 ohm 5%			
R6	330 ohm 5%			
R7	18 ohm 5% CR37			
R8	18 ohm 5% CR37			
R9	18 ohm 5% CR37			
R10	18 ohm 5% CR37			
C26	27pF 5% 100V ceramic			
C27	0.047uF +80%-20% 25V ceramic			

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
R11	22 ohm 5% CR25			
R12	22 ohm 5% CR25			
R13	10K ohm 5% CR25			
R14	33 ohm 5% CR25			
R15	22 ohm 5% CR25			
R16	470 ohm 10% 5W IRC type PW5			
R17	1 K ohm 5% CR25			
R18	10K ohm 5% CR25			
R19a	150 CR25			
R19b	Selected on test			
R20	1 K ohm CR25			
R21	1 K ohm CR25			
R22	680 ohm CR25			
R23	150 ohm CR25			
R24	10 ohm CR25			
R25	10 ohm CR25			
R25b	Selected on test			
R26	10K ohm CR25			
D1	AN2001 silicon diode			
D2	BY126/200			
D3	BY126/200			
D4	EM402			
D5	EM402			
D6	EM402			

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
D7	EM402			
D8-D12	AN2001			
L1	20 uH	44 80027		
L2	20 uH	44 80027		
L3	4 uH	44 80026		
L4	15 uH	44 80007		
L5	15 uH	44 80007		
L6	1 mH			
L7	1 mH			
L8	1.5 uH	44 70034		
L9	0.6 uH	44 70035		
L10	0.4 uH	44 70036		
T1	Inverter transformer	44 20519		
T2	Tuning indicator transformer	44 80025		
T3	PA input transformer	44 80018		
T4	PA interstage transformer	44 80019		
T5	PA output transformer	44 80020		
T6	PA current transformer	44 80021		
T7	VSWR current transformer	44 80021		
TR1	AY1115 silicon transistor			
TR2	TIP32			
TR3	2N3055/BDY20 (Gy, Bl or Ye dot)			

CCT. REF.	DESCRIPTION	PART NO.	QTY.	NOTES
TR4	2N3055/BDY20 (Gy, Bl or Ye dot)			
TR5	2N3568			
TR6	2N3568			
TR7	2N3055/BDY20 (Bl or Ye dot)			
TR8	2N3055/BDY20 (" " ")			
TR9	TT3642			
TR10	TT3642			
TR11	TT3642			
TR12	TIP31			
TR13	2N5102			
TR14	2N5102			
TR15	2N3568			
	Heatsink for inverter and regulator transistor	05-00087	1	
	Mounting Bar, PA	05-00054	1	
	Spacer 0.235"	05-00055	1	
	Spacer 3/8"	05-00053	2	
	Spacer 0.25" OD x 0.15" ID x 0.390" nylon	06-00022	2	
	Heatsink (TO5) Augat 'Total'	9017-1P1U	2	
	Mtg. bush transistor TS01		8	
	Mica insulators	T03	4	
	Transistor Mounting Pads	TS01	3	
	Solder Lug	S262/LS/173/437	2	

CCT REF.	DESCRIPTION			MANUFACTURER	NOTES

9.14 CLARIFIER CONTROL & EMERGENCY CALL ASSEMBLIES

All Components Prefixed 5

	Complete Sub-assy (Clarifier + E/C)			08-00454
	(Clarifier only)			08-00452
	(E/C only)			08-00453
	Printed Circuit Board			07-00005
C1	0.01 uF	10%	100V	Elna 'Greencap'
C2	4.7 uF	20%	35V	STC 'TAG' M
C3	330 pF	5%	100V	Ducon DFB 112
C4	0.01 uF	10%	100V	Elna 'Greencap'
C5	330 pF	5%	100V	Ducon DFB 112
C6	4.7 uF	20%	35V	STC 'TAG' M

D1-D8, AN206 (OR Equiv.)

R1a	10K Ohms	5%	1/3W	Philips CR25
R1b	Select-on-test		1/3W	Philips CR25
R2	100K Ohms	5%	1/3W	Philips CR25
R3	100K Ohms	5%	1/3W	Philips CR25
R4	33K Ohms	5%	1/3W	Philips CR25
R5a	120K Ohms	5%	1/3W	Philips CR25
R5b	Select-on-test		1/3W	Philips CR25
R6	4.7K Ohms	5%	1/3W	Philips CR25
R7	4.7K Ohms	5%	1/3W	Philips CR25
R8a	10K Ohms	5%	1/3W	Philips CR25
R8b	Select-on-test		1/3W	Philips CR25
R9	68K Ohms	5%	1/3W	Philips CR25
R10	33K Ohms	5%	1/3W	Philips CR25
R11a	82K Ohms	5%	1/3W	Philips CR25
R11b	Select-on-test		1/3W	Philips CR25
R12	4.7K Ohms	5%	1/3W	Philips CR25
R13	4.7K Ohms	5%	1/3W	Philips CR25

CCT REF.	DESCRIPTION	MANUFACTURER	NOTES
R14	82K Ohms 5% 1/3W	Philips CR25	
R15	22K Ohms 5% 1/3W	Philips CR25	
R16	470 Ohms 5% 1/3W	Philips CR25	
R17	8.2K Ohms 5% 1/3W	Philips CR25	
R18	10K Ohms 5% 1/3W	Philips CR25	
R19	470K Ohms 5% 1/3W	Philips CR25	
R20	5.6K Ohms 5% 1/3W	Philips CR25	
R21	5.6K Ohms 5% 1/3W	Philips CR25	
R22	12K Ohms 5% 1/3W	Philips CR25	
R23	10K Ohms 5% 1/3W	Philips CR25	
R24	220 Ohms 5% 1/3W	Philips CR25	
R25	Select-on-test 1/3W	Philips CR25	
TR1	Integrated Circuit uA741C	Fairchild	
TR2	Integrated Circuit uA741C	Fairchild	
TR3	Transistor AY1115	Fairchild	
TR4	Transistor 2N3638	Fairchild	
Z1	Zener Diode BZY88 C8V2	Philips	
	McMurdo Stake	McMurdo 5011-02-08	
	Transistor Mounting Pad	McMurdo TS01	

CCT REF.	DESCRIPTION	MANUFACTURER	NOTES

9.15 CRYSTAL OSCILLATOR DUAL

	Complete sub-assy	08-00159
	Printed circuit board	07-00055

R1	220K	Ohm	5%	CR25	
R2	220	"	"	"	
R3	10	"	"	"	
R4	220K	"	"	"	
R5	47K	"	"	"	
R6	4K7	"	"	"	
R7	100	"	"	"	
R8	220K	"	"	"	
R9	220	"	"	"	
R10	220K	"	"	"	
R11	47K	"	"	"	
R12	4K7	"	"	"	
R13	100	"	"	"	
C1	S.O.T.				
C2	1000pF		5%	50V	
C3	2-22pF	Trimmer		100V	
C4	3300pF		10%	100V	
C5	56pF		2%	63V	N150
C6	3300pF		10%	100V	
C7	3300pF		10%	100V	
C8	S.O.T.				
C9	S.O.T.				
C10	1000pF		5%	50V	
C11	2-22pF	Trimmer		100V	
C12	3300pF		10%	100V	
C13	56pF		2%	63V	N150
C14	3300pF		10%	100V	
C15	3300pF		10%	100V	
C16	S.O.T.				
TR1-TR4	BF194				
L1-L2	1mH inductor				
X1-X2	Crystal to EILCO Spec. 01-00010				Hy-Q

CCT REF.	DESCRIPTION				MANUFACTURER	NOTES
9.16	AUDIO AMP ASSEMBLY					
	Complete sub-assy				08-00213	
	Printed circuit board				07-00008	
R1	6K8	Ohm	5%	CR25		
R2	470	"	"	"		
R3	180K	"	"	"		
R4	180K	"	"	"		
R5	470K	"	"	"		
R6	22K	"	"	"		
R7	47	"	"	"		
R8	5K6	"	"	"		
R9	1K	"	"	"		
R10	1K2	"	"	"		
R11	2K2	"	"	"		
R12	1K	"	"	"		
R13	47	"	"	"		
R14	47	"	"	"		
R15	1K	"	"	"		
R16	100	"	"	"		
R17	100	"	"	"		
C1	3300pF		10%	100V		
C2	0.1uF +80%-20%			25V		
C3	0.015uF		10%	100V		
C4	15uF +50%-10%			16V		
C5	0.01uF +80%-20%			25V		
C6	39pF		20%	100V		
C7	1000uF +50%-10%			10V		
TR1	BC148					
TR2	AY1115					
TR3	BC148					
TR4	2N3568					
TR5	2N3638					
TR6	TIP32					
TR7	TIP31					
D1	AN2001					
T1	Transformer output audio				44-30588	

CCT REF.	DESCRIPTION				MANUFACTURER	NOTES
9.17	C.W. OSCILLATOR					
	Complete sub-assy				08-00279	
	Printed circuit board				07-00100	
R1	1K	Ohm	5%	CR25		
R2	100K	"	"	"		
R3	47K	"	"	"		
R4	100K	"	"	"		
R5	100K	"	"	"		
R6	3K9	"	"	"		
R7	10K	"	"	"		
R8	15K	"	"	"		
R9	47K	"	"	"		
R10	100	"	"	"		
R11	3K9	"	"	"		
R12	47K	"	"	"		
R13	220	"	"	"		
R14	1K	"	"	"		
C1	330pF		5%	100V		
C2	0.01uF		10%	160V		
C3	0.047uF		10%	250V		
C4	0.47uF		10%	200V		
C5	10uF +50%-10%			25V		
TR1	BC148					
TR2	uA741 I.C.					
TR3	AY1115					
TR4	AY1115					
D1-D3	AN206 or equivalent					
Z1	BZY88 C5V6					
RLA	Relay V23154-N0179-B110 4C				Siemens	

11 AMENDMENTS.

11.1 RF Instability.

6924 with Serial Nos. below 1300 may have a tendency to RF instability when being re-adjusted particularly at frequencies near to 10 MHz.

The receiver input from the T/R switch is earthed at point 'f' (green wire), this should be disconnected and earthed on the pad at point 'b' on the PA Assy., (approx. $\frac{1}{2}$" to the left).

11.2 Miscellaneous amendments to Issue 1.

(A) PARAGRAPH 6.1.2 (12)

Amend pins "z" & "x" to read (pins "s" & "x").

(B) PARAGRAPH 6.1.2 (6)

After 'Accepted Circuit parameters':-
6A to 6E add new paragraph as follows:-

(F) Transistor Type 2N3055/10 may be fitted in positions TR7 and TR8, if so, measure the peak spike voltage between collectors. If above 45V peak to peak, add C25 between collectors at the solder lug terminations. (C25=0.047 uF, 10%, 160V, Polyester)

(C) PARAGRAPH 9.13

Add C25, 0.47 uF, 10% 160V, Polyester, Qty. 1 in the NOTES column add:- see para 6.1.2 (6). (F).

(D) DRAWING C04-0009

Refer to the terminals of the PA, DC INVERTOR & REGULATOR PCB (07-00011).

(i) The terminal to the left of terminal "b" should be marked "a". (Co-ax centre).

(ii) The terminal to the right of terminal "m" should be marked "l" (Link positive).

(iii) The terminal below "e" should be marked "f". (Ground)

(E) PARAGRAPH 9.5

(i) L15 - L25, amend to read L15 - L24
(ii) Add L25, 15uH Inductor part number 44 80007

(F) PARAGRAPH 5.2.4

Insert new Fig. 1. Typical Filter Response to replace existing figure.

(G) PARAGRAPH 4.2

Line 10. Amend to:-
H = + except on AM transmit

Complete the AMENDMENT RECORD (Page 3) and file this page after Paragraph 11.1

AMENDMENT No. 3 Maintenance Handbook for Transceiver Type 6924

11.3 Excessive AGC release time constant

Fault	Some transceivers may have an excessive release time constant on the AGC action.
Cause	Due to production spreads of transistor characteristics, higher than normal gain of TR4 will reflect a higher impedance across C14, thereby increasing the AGC release delay.
Modification	A resistor of 220K ohm (5% Philips CR25) soldered in parallel with C14 on the copper side of PCB (07-00006)
Documentation	Record this amendment in the Amendment Record page and file this amendment sheet at the rear of the handbook.

AMENDMENT NO. 4. Maintenance Handbook for
Transceiver Type 6924

11.4 DC Inverter

Fault	On some transceivers the DC Inverter may fail to stop upon release of the PTT button, or may restart during receive.
Cause	Insufficient current to saturate TR5 and TR6 and keep the bases of TR7 and TR8 clamped to common (see para 5.4)
Modification	Change R26 from 10K ohms to 1K ohm (Philips CR25,5%) on PA Regulator and DC Invertor PCB 07-00011, DWG D08-00011.
Documentation	Record this amendment in the Amendment Record page and file this amendment sheet at the rear of the Handbook.

AMENDMENT No. 5, Maintenance Handbook for
Transceiver Type 6924.

11.5 Failure to 'TUNE' in humid conditions.

Fault — No RF output from the transceiver in the 'TUNE' mode when operated in humid conditions.

Cause — In some transceivers which are fitted with gold plated P.C.B.'s, humid conditions may give rise to a leakage current between the "H" switching rail and adjacent P.C. tracks. This supplies base current to and switches on transistor 6TR8, preventing carrier re-insertion. (This transistor is normally held conducting in the SSB mode only).

Modification

A resistor (10K ohm 5% Philips CR25) soldered between the "H" rail and common (not chassis).
Leakage current via the resistor will reduce 6TR8 base current sufficiently to cause no problem.

The resistor is best mounted on the rear of the mother board between TP9 and common (refer to dwg. 08-00019).

Documentation

Record this amendment in the Amendment Record page and file this amendment sheet after Amendment 11.4.

AMENDMENT No. 6, Maintenance Handbook for
Transceiver Type 6924

11.6 Loudspeaker size change

Fault — Capacitors C2 and C24 on the PA printed circuit board fouls the loudspeaker.

Cause — Loudspeaker magnet now produced by the manufacturer has increased protrusion.

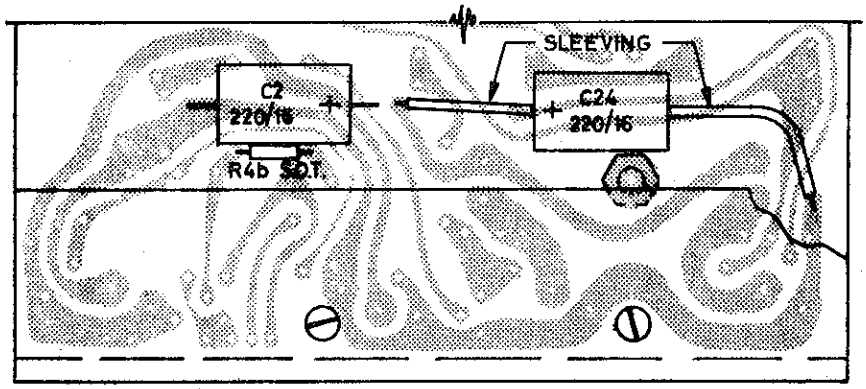
Modification — Re-locate C2 and C24 on reverse side of printed circuit board as shown on drawing below.
Ensure that the capacitor leads are soldered to the copper track on both sides of the board.

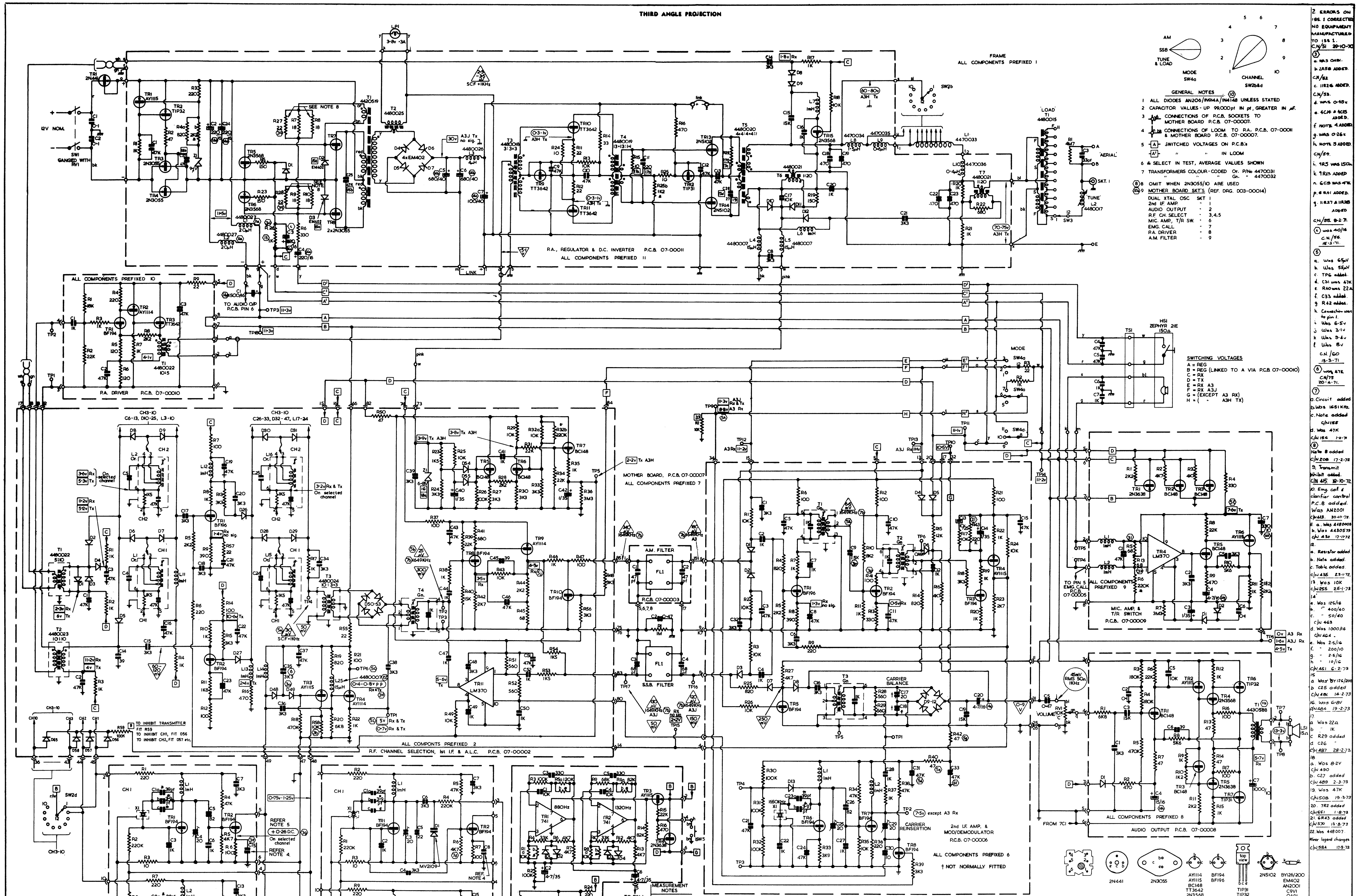
This modification will be effected at the factory if the new speaker is fitted in production. It will only be required in the field if a replacement speaker of the new type is fitted.

Documentation

Record this amendment in the Amendment Record Page and file this amendment sheet after Amendment 11.5

P.A. REG. & DC INV. P.C.B. ASSY.
P.C.B. 07-00011 ISS.1-5





GENERAL NOTES (10)

1 ALL DIODES AN206/IN914A/IN4148 UNLESS STATED
2 CAPACITOR VALUES - UP 99,000pf IN pf, GREATER IN µF.
3 CONNECTIONS OF P.C.B. SOCKETS TO MOTHER BOARD P.C.B. 07-00007.
4 CONNECTIONS OF LOOM TO P.A. P.C.B. 07-00011 & MOTHER BOARD P.C.B. 07-00007.
5 [A] SWITCHED VOLTAGES ON P.C.B.'s
[A'] " " IN LOOM
6 * SELECT IN TEST, AVERAGE VALUES SHOWN
7 TRANSFORMERS COLOUR-CODED Or. P/No 4470031
" " " Gn. " 4470032
(8) 8 OMIT WHEN 2N3055/10 ARE USED
(12b) 9 MOTHER BOARD SKT'S (REF. DRG. D03-00014)

DUAL XTAL OSC	SKT	1
2nd I.F. AMP.	"	1
AUDIO OUTPUT	"	2
R.F. CH. SELECT	"	3,4,5
MIC. AMP., T/R SW.	"	6
EMG. CALL	"	7
P.A. DRIVER	"	8
A.M. FILTER	"	9

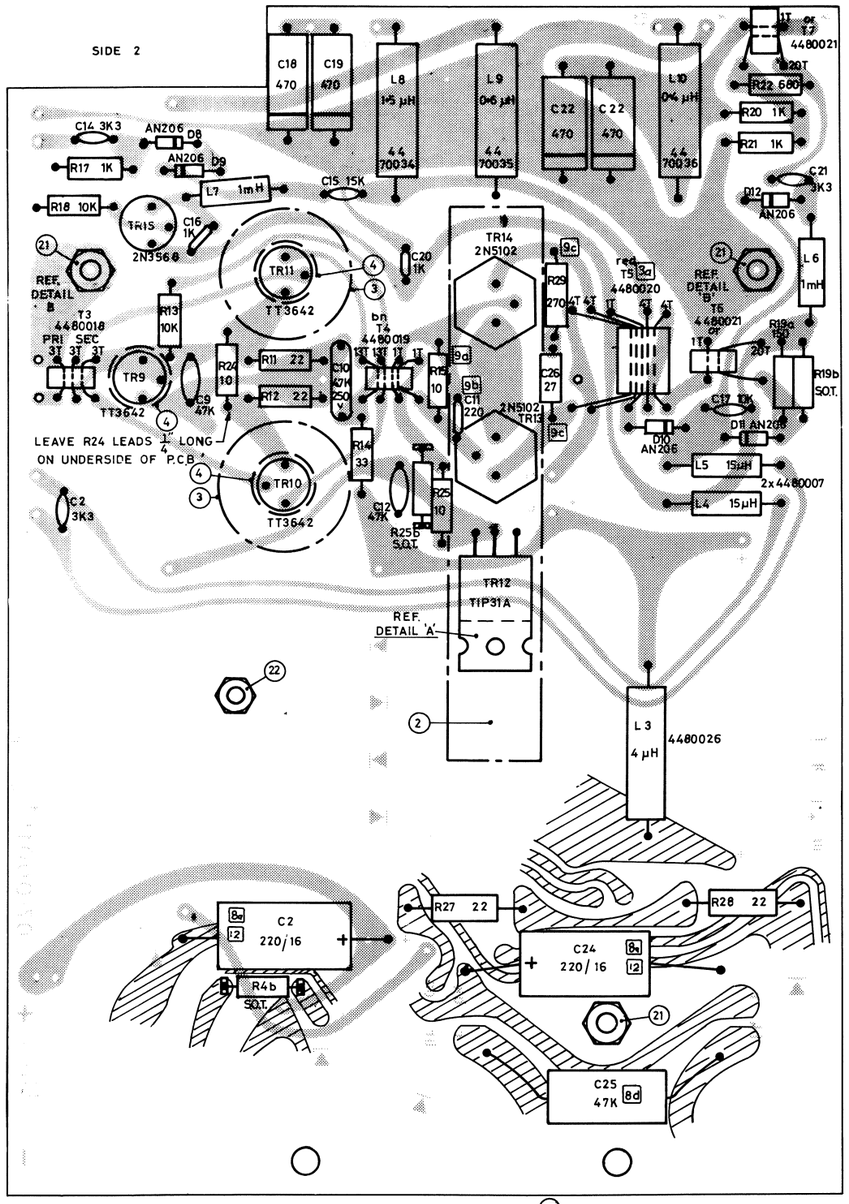
MEASUREMENT NOTES

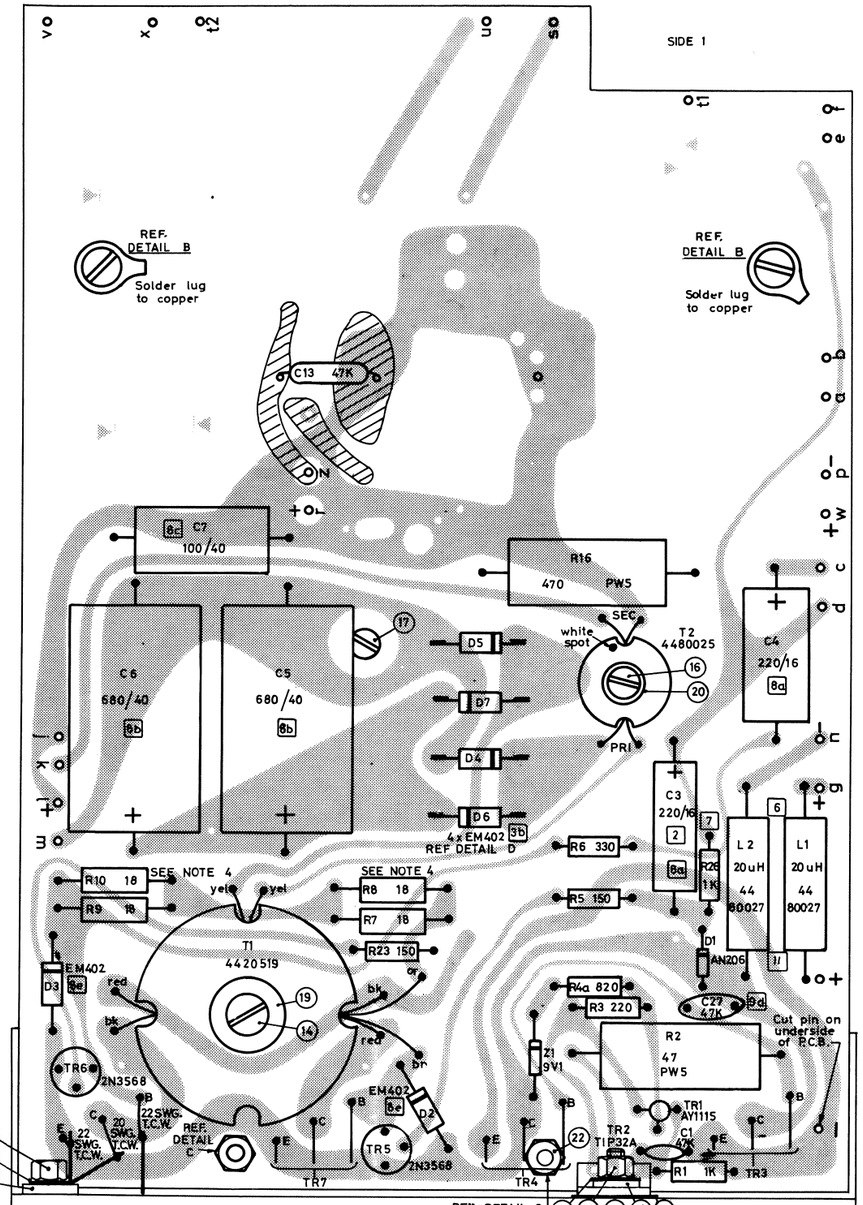
1. THE VOLTAGES GIVEN ARE MEASURED WITH RESPECT TO THE MOTHER BOARD COMMON UNLESS OTHERWISE SHOWN.
D.C. VOLTAGES SHOWN [---v] ARE MEASURED WITH AN 'AVO MODEL 8' (20KΩ/V) & ARE POSITIVE W.R.T. COMMON.
A.C. " " (---v) " " " " CRO PROBE OF 10MΩ & 7pf AND ARE EXPRESSED IN P-P UNITS.
ALL MEASUREMENTS SHOWN WITH D.C. SUPPLY OF 12·6v.
ALL VOLTAGES & CURRENT SHOWN AS MEASURED ON A3H Tx CAN BE MEASURED INSTEAD ON A3J Tx AS IN 2 BUT WITH THE INVERTER RUNNING.
2. VOLTAGES SHOWN ▽ ARE MEASURED P-P AS ABOVE ON A3J Tx WITH AN ISOLATED I/P OF 2mV R.M.S. E.M.F. FROM A 50Ω SOURCE OF 1KHz APPLIED AT 7TP4 & 7TP5. THE D.C. INVERTER IS DISABLED BY DISCONNECTING YELLOW WIRE ON PIN 'c' ON P.A. P.C.B.
3 VOLTAGES SHOWN △ REFER TO THE E.M.F. VOLTAGE OF A 50Ω SIGNAL GENERATOR APPLIED AT THAT POINT WITH RESPECT TO COMMON WHICH JUST STARTS TO ALTER THE VOLTAGE AT 7TP15 IN Rx MODE.
(3f) 4 THESE CAPACITORS TO BE FITTED ONLY WHEN CRYSTAL FREQUENCY 12MHz OR ABOVE. (100pF)
(3h) 5 MEASURE D.C. WITH C.R.O. (RF AT THIS POINT) -OR- USE AVO.8 WITH 1K RESISTOR IN SERIES WITH +VE. LEAD
(7c) 6 FREQUENCIES SHOWN AT MONITOR POINTS ARE FOR S.C.F. U.S.B. OPERATION (L.S.B. FILTER)

(12c) CLARIFIER TYPE	OPTION CODE	R17	R18	R21	R23	R25	D5	D6	D8
WIDE RX & TX	CB (EXPORT ONLY)	—	—	LINK	2K7	33K	—	—	—
NARROW RX & TX	CB	—	—	5K6	10K	—	—	—	—
WIDE RX	CA (EXPORT ONLY)	8K2	10K	LINK	2K7	33K	✓	✓	✓
NARROW RX	CA	8K2	10K	5K6	10K	—	✓	✓	✓

6924 TRANSCEIVER
CIRCUIT DIAGRAM

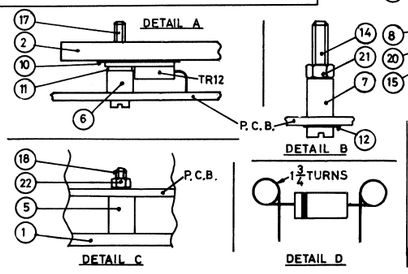
B 04-00009
19 20 21 22





P.C.B. 07-00011 ISS 6

1	PA. HEATSINK 05-00087	1	12	LUG TUCKER LS173/437 (MODIFY AS SHOWN)	2
2	TRANSISTOR MTG. BAR 05-00054	1	13	LUG TUCKER LS130/390	4
3	HEATSINK AUGAT 9017-1P1U	2	14	BOLT 4BA x 1" C.H.	3
4	TRANSISTOR MTG. PAD TSO1	3	15	" 6BA x 3/8" C.H.	9
5	SPACER NYLON 06-00022	2	16	" " 1/2" "	1
6	" 05-00055	1	17	" " 3/4" "	1
7	" 05-00053	2	18	" " 3/4" CSK.	2
8	MICA	4	19	WASHER 4BA LARGE	1
9	INS BUSH } 56201a	8	20	" 6BA SMALL	14
10	MICA } SUPPLIED WITH	4	21	NUT 4BA	3
11	INS BUSH } TIP31A TIP32A	2	22	" 6BA	12

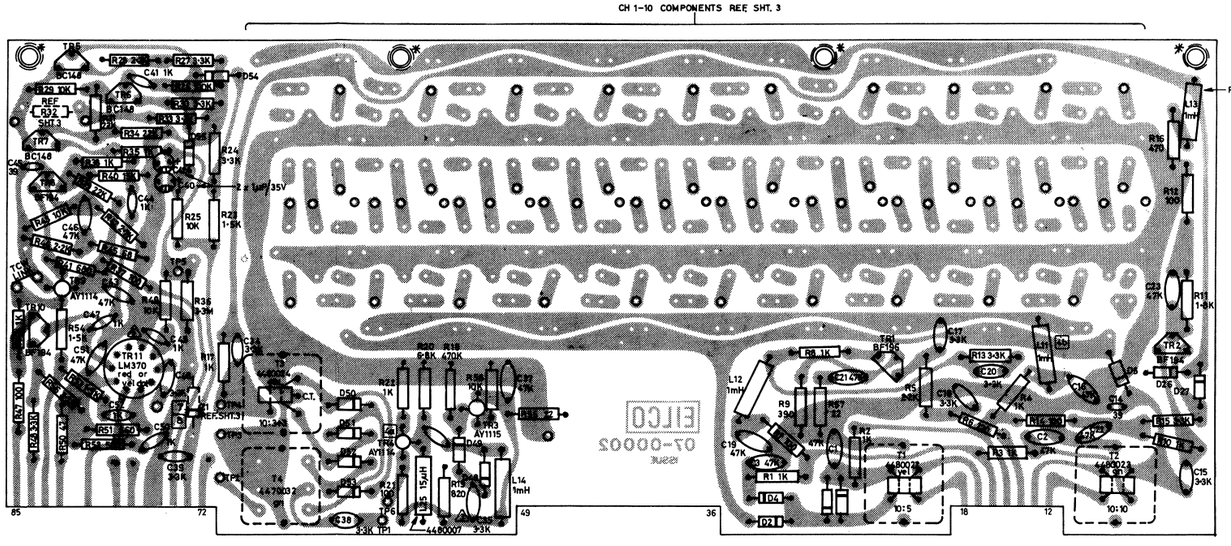


NOTES

1. SMALL 6BA WASHER (20) REPLACES SOLDER LUG (13) ON OTHER MTG. BOLT 'y'
2. WHERE WIRES ACT AS PIN THRU'S BOTH SIDES TO BE SOLDERED
3. O DENOTES 'MULLARD PINS'
4. OMIT WHEN 2N3055/10 ARE (5) USED

P.A. REG. & D.C. INV. P.C.B. COMPONENT LAYOUT 08-00011 ISS. 12

2. was 40/16
c/N 56. 15-2-71
3a. was 4480080
b. " EM404
Also ref SHT 1
c/N 8 17-3-71
4. Colour codes added T3 4 5 6 & 7
c/N 17 5-7-71
5. Note 4 added
c/N 208 12-2-72
6. L1 & L2 was 4480003
C/N 430 17-11-72
7. Was 10K
c/N 255 25-1-73
8.
a. Was 12 S/16
b. " 400/40
c. " 50/40
C/N 463
d. C25 added
e. Was BY126
C/N 481 13-2-73
9.
a. Was 22Ω
b. " 1K
c. C26. R29 added
c/N 489 28-2-73
10. P.C.B. was 155.4 Redrawn
C/N 525 9-8-73
11. L1 & L2 was 4480003
c/N 582 14-9-73
12. C2, C24 was on side 1
C/N 622 11-3-74



2. Ref. SHT 1. C/N 69 2-4-71.
3. Was 4.7K C/N 75 20-4-71
4. a. Was AY1115. b. Was L1. C/N 9 18-5-71.
5. Colour code added. C/N 18 6-7-71.
6. Artwork change C/N 186 23-8-72.
7. Was 6·8V C/N 484 19-2-73
8. Was fitted durrng production C/N 490 1-3-73
9. Note 6 added C/N 486 19-3-73
10. Ref SHT 3
11. 1020 links replaced with copper track. P.C.B was iss. 5 C/N 523 13-6-73

P.C.B. 07-00002
ISSUE 6

NOTES:—

1. ✱ ATTACH SPACER 06-0025 (0·280") AS PER DRG E08-00010
2. COMPONENTS ARE TO BE SOLDERED ON BOTH SIDES OF P.C.B. WHERE APPLICABLE.
3. ○ DENOTES MULLARD PINS
4. AFTER SOLDERING, CUT MULLARD PINS AT TEST POINTS 1,2&6 ON COPPER SIDE.
5. AFTER SOLDERING, CUT LUGS ON CANS FOR T1,2 & 4 ON COPPER SIDE.

[9] 6 L13 MUST BE PHILIPS 2422-535-00102 L11,12 & 14 MAY BE PHILIPS OR EQUIV.

TRANSFORMER LEAD IDENTIFICATION:—

T1	5T	SHORT
	10T	LONG
T2	10T	SHORT
	10T	LONG
T3	10T	SHORT
	6T (3x3)	LONG

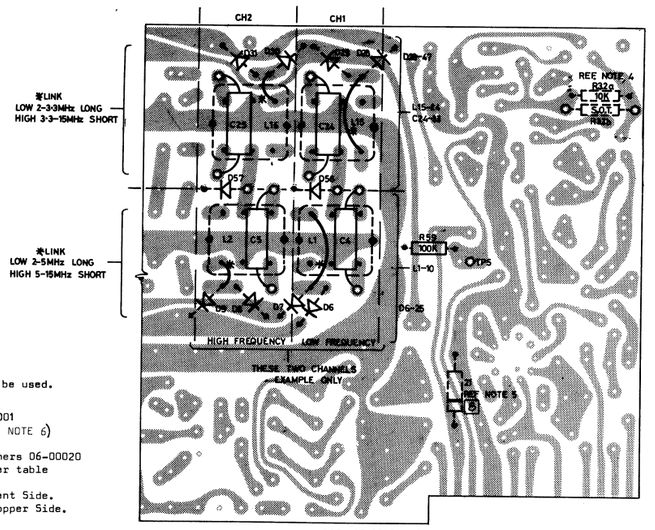
R.F. CH. SEL., 1st I.F. & A.L.C P.C.B. ASSY. COMPONENT LAYOUT

08-00012 ISS. 11

TUNING CAPACITOR VALUE/FREQUENCY TABLE

FREQ. RANGE (kHz)	CAPACITOR (pF) (TYPE)	
1920 - 2100	680	DFB120
2100 - 2400	560	DFB118
2300 - 2600	470	DFB116
2550 - 2750	390	DFB114
2750 - 3050	330	DFB112
3050 - 3350	270	DFB110
3350 - 3750	220	DFB108
3750 - 4100	180	DFB106
4100 - 4500	150	DFB104
4500 - 4850	120	DFB102
4850 - 5400	100	DFB100
5400 - 5800	82	DFB0182
5800 - 6450	68	DFB0168
6450 - 7100	56	DFB0156
7100 - 7700	47	DFB0147
7700 - 8500	39	DFB0139
8500 - 9500	33	DFB0133
9500 - 10600	27	DFB0127
10600 - 11700	120	DFB102
11700 - 12750	100	DFB100
12750 - 14000	82	DFB0182
14000 - 15000	68	DFB0168

Capacitor Type: Ducon DFB 100V ± 5%
Alternatively Ceramic N150 Series may be used.



2. Ref. SHT 1. C/N 69 2-4-71.
3. Ref. SHT 2. C/N 75 20-4-71
4. Ref. SHT 2. C/N 9 18-5-71.
5. Ref. SHT 2. C/N 18 6-7-71.
6. Redrawn due to artwork changes. C/N 186 16-10-72
7. Ref SHT 2
8. Note 5 & Z1 added C/N 490 1-3-73
9. Ref SHT 2. 10. 10·6-15 MHz details added C/N 225 10-4-73
11. Minor note corrections. P.C.B was iss. 5 C/N 523 13-6-73

NOTES: 1. For each channel:— 4 Diodes AN2001
2 Coils (REF NOTE 6)
2 Cans 7150
2 Rubber Washers 06-00020
2 Caps, as per table

2. Coils & Diodes mounted on Component Side. Capacitors & Links mounted on Copper Side.

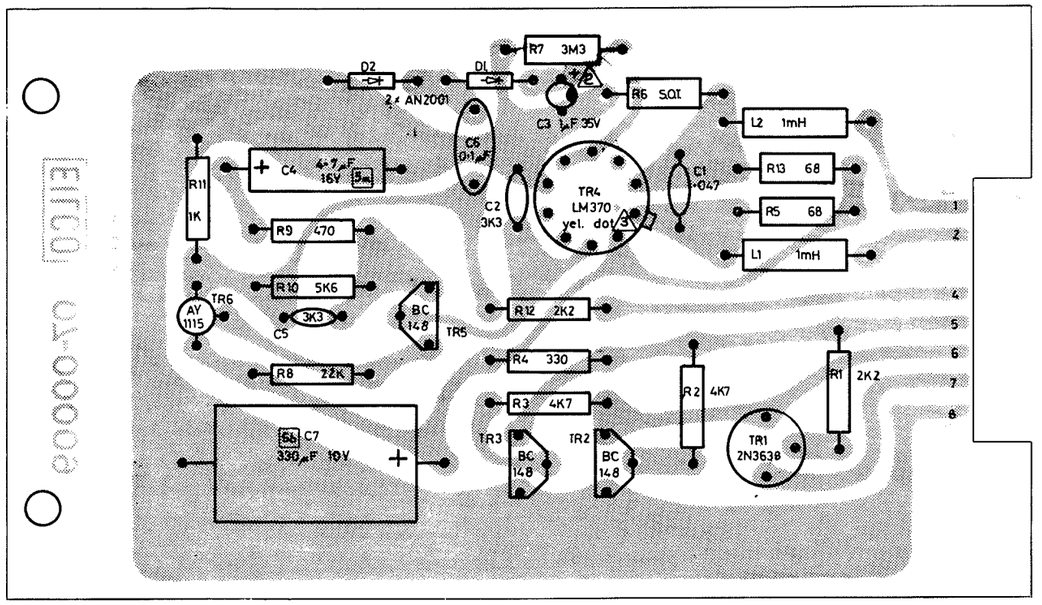
3. TO INHIBIT TRANSMITTER
Fit R59
To inhibit CH1 fit D56
To inhibit CH2 fit D57 etc.

4. **R32a & b**
Fit for :- 6924, 7005
Omit for :- 6801

[8] 5. Z1
BZY88 C6V8 for:- 6924, 7005
BZY38 C8V2 for:- 6801

6. For freq up to 10.6 MHz Use coil 4470031 (or);
Freq Above 10.6 MHz Use coil 4470074 (bn)

R.F. CH. SEL., 1st I.F. & A.L.C P.C.B. ASSY
R.F. CH. SEL. COMPONENT LAYOUT
08-00012 ISS. 11



2. Copper added R7 to C3 Also ref. SHT. 1 C/N 61 18·3·71

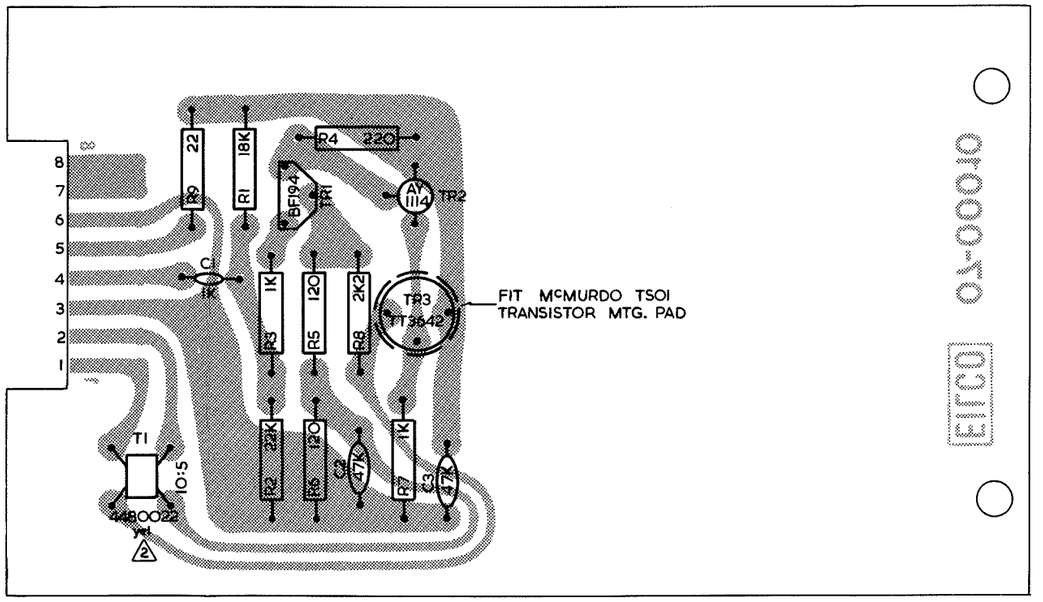
3. TR4 colour code added. C/N 15 5·7·71

4. Skt cutout reduced C/N 383 12·10·72

5. a. Was 2·5/16 b. " 200/10 C/N 451 2·2·73

P.C.B. 07-00009 ISS 6

MIC. AMP & T/R SWITCH P.C.B
COMPONENT LAYOUT **08-00013** ISS. 5

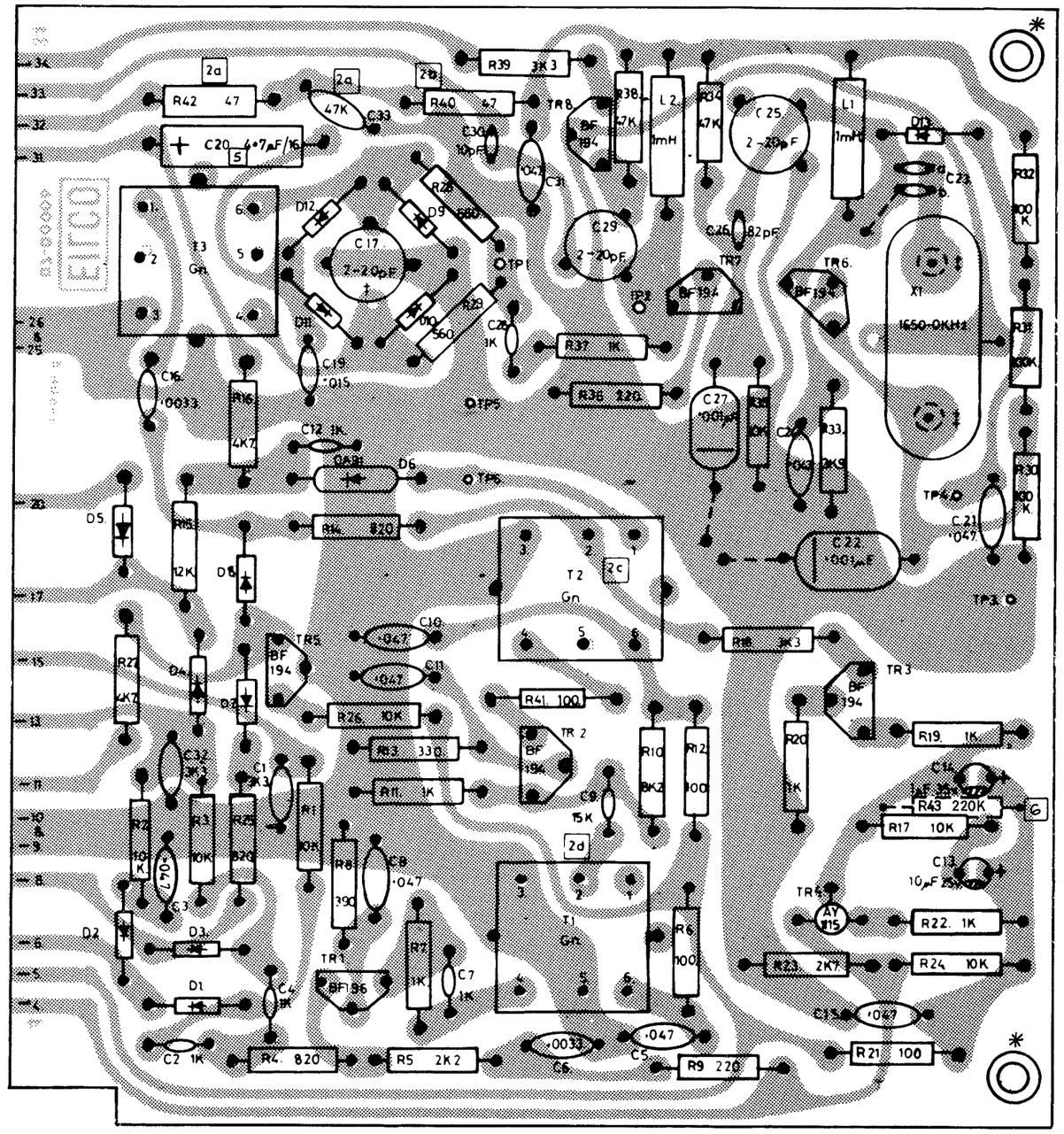


2. Colour code added. C/N 16 6-7-71

3. Ref SHT. 1

P.C.B. 07-00010 ISS.1

P.A. DRIVER P.C.B
COMPONENT LAYOUT **08-00014** ISS. 3



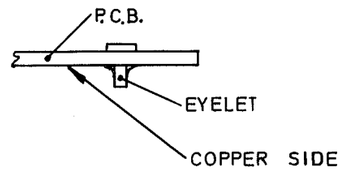
P.C.B. 07-00006
ISS 4

2

a. Added.
b. Was 22.
c. R18 was to pin 1 T2.
d. C9 was to pin 1 T1
Also ref SHT 1
C/N 61 18·3·71
3. Ref. SHT 1
C/N 71 3·4·71.
4. Ref SHT 1.
C/N 14 6·7·71.
5. Was 2·5/16
C/N 451 2·2·73
6. R43 added.
C/N 570 14·8·73

NOTES:—

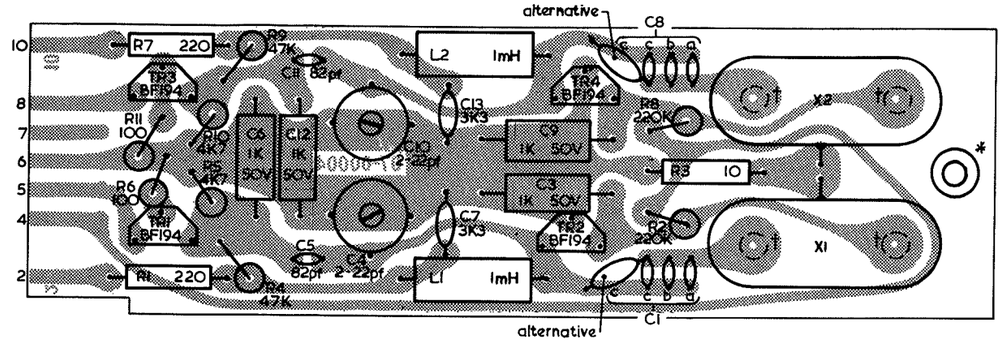
1. ALL DIODES AN2001 UNLESS SHOWN.
2. ALL TP'S MULLARD PINS. DT2207
* 3. ATTACH SPACER 06-0024 (·160") AS PER DRG E08-00010
4. FIT & SOLDER TUCKER EYELET E070/145 AS DETAILED.



† 5. NOT NORMALLY FITTED

2nd IF. AMP MOD./DEMOD. PCB ASSY
COMPONENT LAYOUT

08-00015 ISS. 6

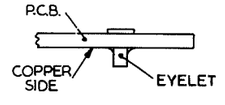


2 was 07-00010
C/N664 12-3-72

P.C.B 07-00004 ISS1
2

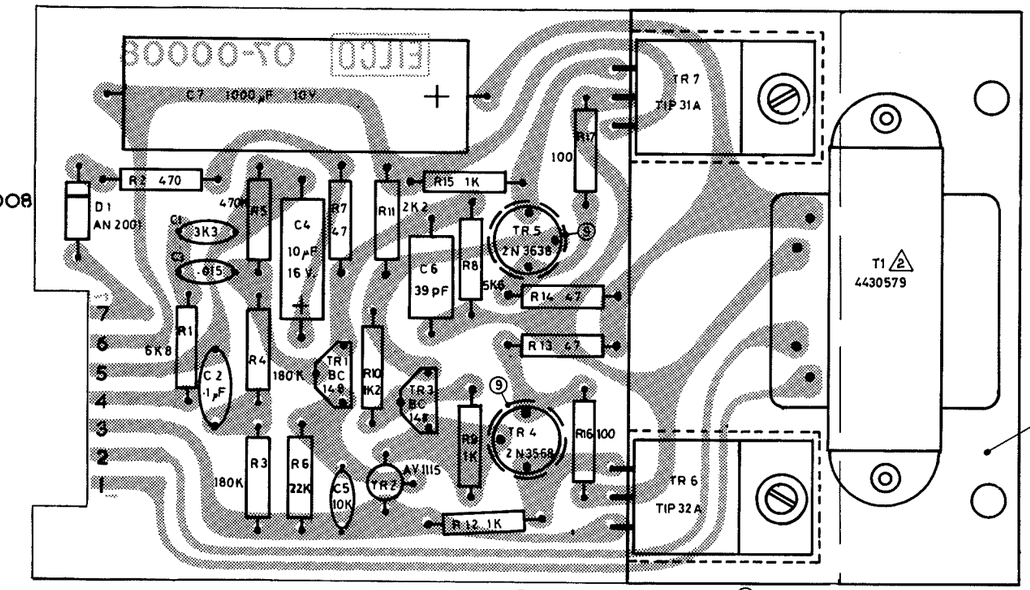
*ATTACH SPACER 06-00024 (·160")
AS PER DRG. E08-00010.

†FIT & SOLDER TUCKER EYELET E070/145
AS DETAILED.



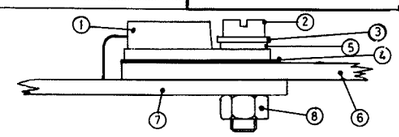
DUAL XTAL OSC P.C.B
COMPONENT LAYOUT **08-00016** ISS. 2

P.C.B. 07-00008
ISS 2



2.
Delete 7005
T1 P/N
C/N183 17-2-72

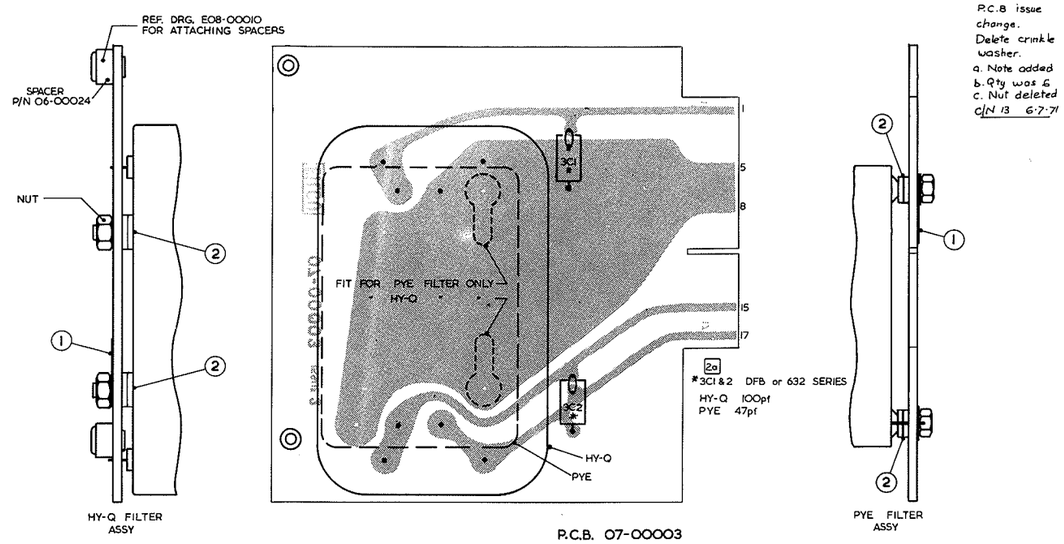
	DESCRIPTION	QTY
1	TR 6 & 7	
2	BOLT 6BA X $\frac{3}{8}$" CH	2
3	WASHER 6BA SMALL	2
4	MYLAR STRIP } SUPPLIED WITH	2
5	INS. BUSH } TIP31A TIP32A	2
6	HEATSINK ASSY. 08-00005	1
7	P.C.B. 07-00008	1
8	NUT 6BA	2
9	TSO1 MOUNTING PADS	2



TIP31A / TIP32A
ASSY

AUDIO AMPLIFIER P.C.B
COMPONENT LAYOUT **08-00017** ISS. 2

2.
P.C.B issue
change.
Delete crinkle
washer.
a. Note added
b. Qty was 6
c. Nut deleted
C/N 13 6-7-71



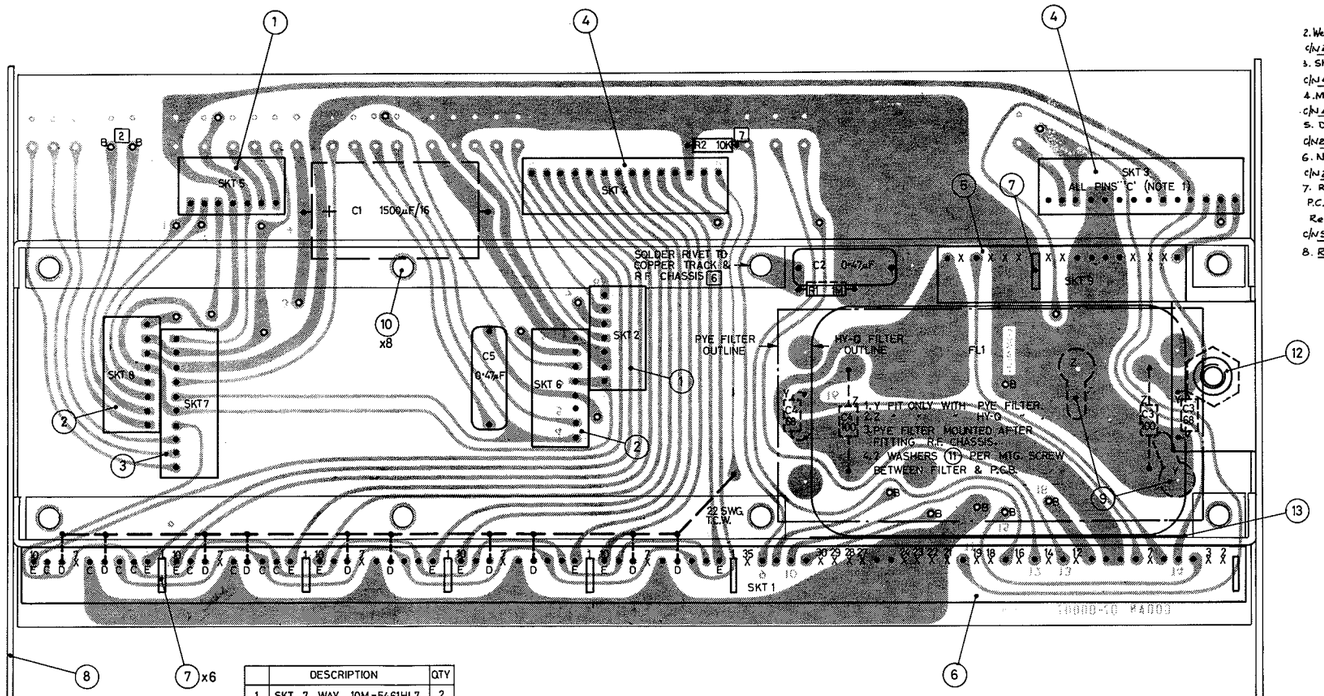
P.C.B. 07-00003
ISS 2

	DESCRIPTION	QTY.
1	TUCKER LUG LS6BA/312ORD.	1
2	6BA WASHER SMALL	4 2b
3	2c	

ALL OTHER COMPONENTS SUPPLIED WITH FILTER

A.M. FILTER P.C.B COMPONENT LAYOUT 08-00018 ISS. 2

2. Were MULLARD pins
C/N 203 19-11-71
3. SKT No added
C/N 435 23-11-72
4. Minor assy mods
C/N 464 2-2-73
5. Detail added
C/N 223 11-4-73
6. Note added
C/N 230 6-7-73
7. R2 added.
P.C.B was ISS 5.
Redrawn.
C/N 551 17-8-73
8. Ref SHT 1

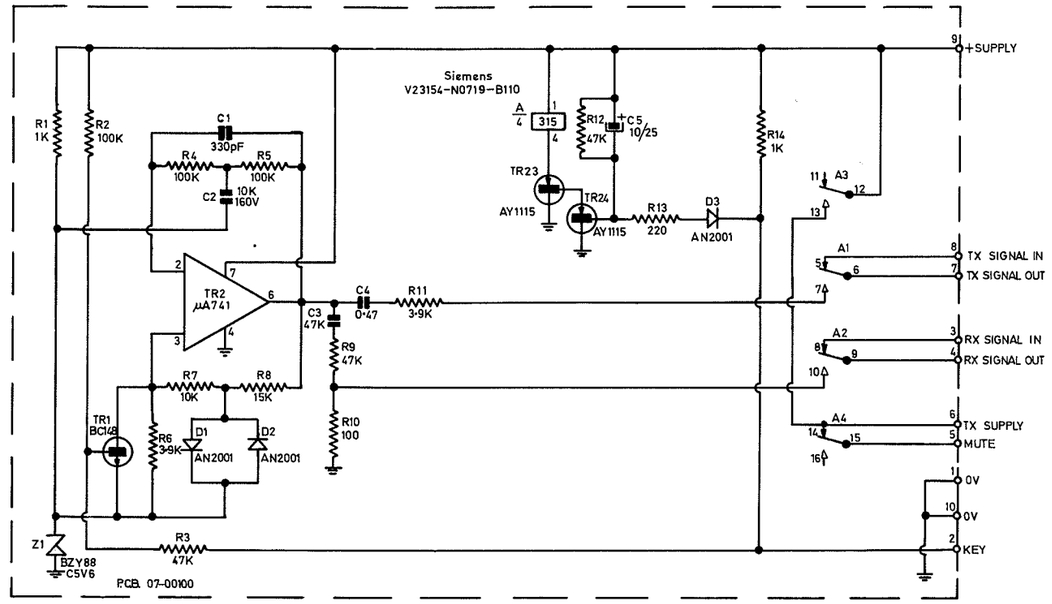


	DESCRIPTION	QTY
1	SKT 7 WAY 10M-5461HL7	2
2	" 8 " " 8	2
3	" 10 " " 10	1
4	" 14 " " 14	2
5	" 17 " " 17	1
6	" 85 " " 85	1
7	KEY C8319	7
8	R.F. CHASSIS 08-00006	1
9	SOLDER LUG LS6BA/312ORD	1
10	POP RIVET TLP/D321	8
11	WASHER 6BA SMALL PYE / HY Q	8 / 6
12	ROOTNUT 4BA	1
13	PRESPHAN 3" x 1½"	1

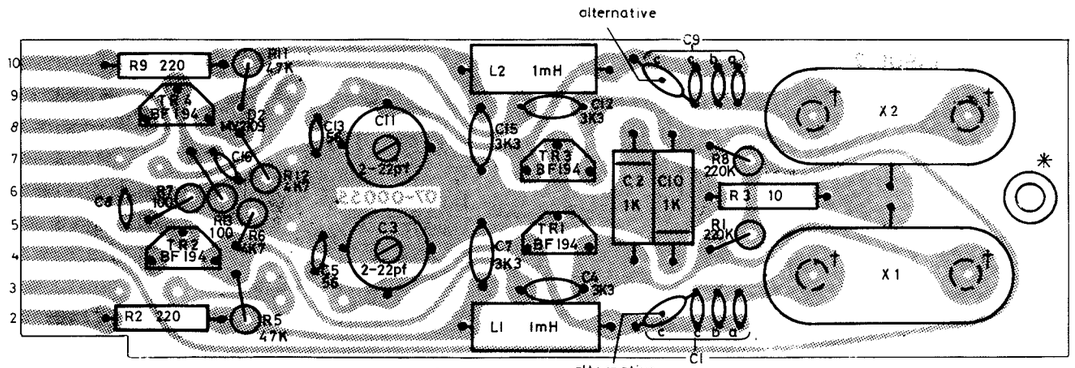
P.C.B. 07-00007 ISS. 6

NOTES.
1. ○ MULLARD PIN DT2207.
   ○A " " " - CUT OFF ON COPPER SIDE.
   ○B VERO PIN 11034 - FIT FROM COPPER SIDE.
   ●C SKT PINS CUT OFF ON COPPER SIDE.
   ●E " " " " " LEAVING PIN ⅛" LONG. 5
2. D BEND PINS 45° & SOLDER TO 22SWG. T.C.W.
3. BEFORE FITTING SKTS (5) & (6) CUT OFF PINS MARKED 'X' AS CLOSE AS POSSIBLE TO SHOULDER OF PIN.
4. SKTS (5) & (6) - REMOVE PINS & FIT KEYS (7) WHERE SHOWN.

MOTHER P.C.B ASSY. COMPONENT LAYOUT 08-00019 ISS. 8



C.W. OSCILLATOR **04-00108** ISS. 1



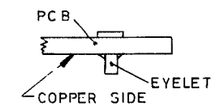
PCB 07-00055 **ISS 2**

2.
Clarifier compts
R4,10,C6,14,D1,2
C5,13 Was 22pf.
deleted.
C/NASI 2.2.73

AS PER DRG E08-00010

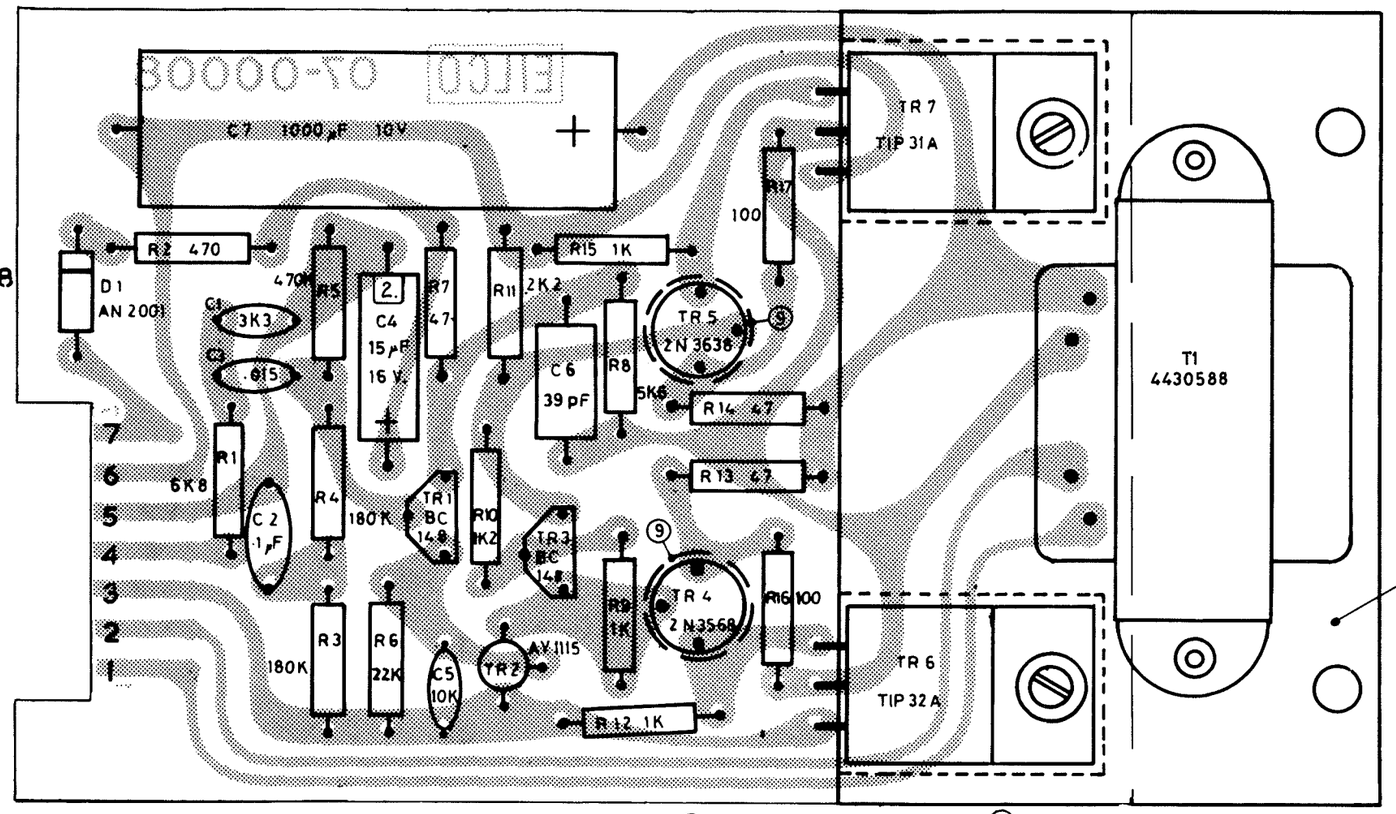
† FIT AND SOLDER TUCKER EYELET E070/145 AS DETAILED

C8 AND C16 FITTED ONLY WHEN CRYSTAL FREQUENCY IS ABOVE 12MHz.



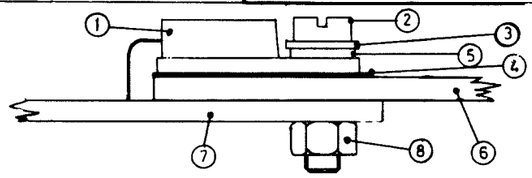
DUAL XTAL OSC P.C.B. COMPONENT LAYOUT **08-00159** ISS. 2

P.C.B. 07-00008
ISS 2



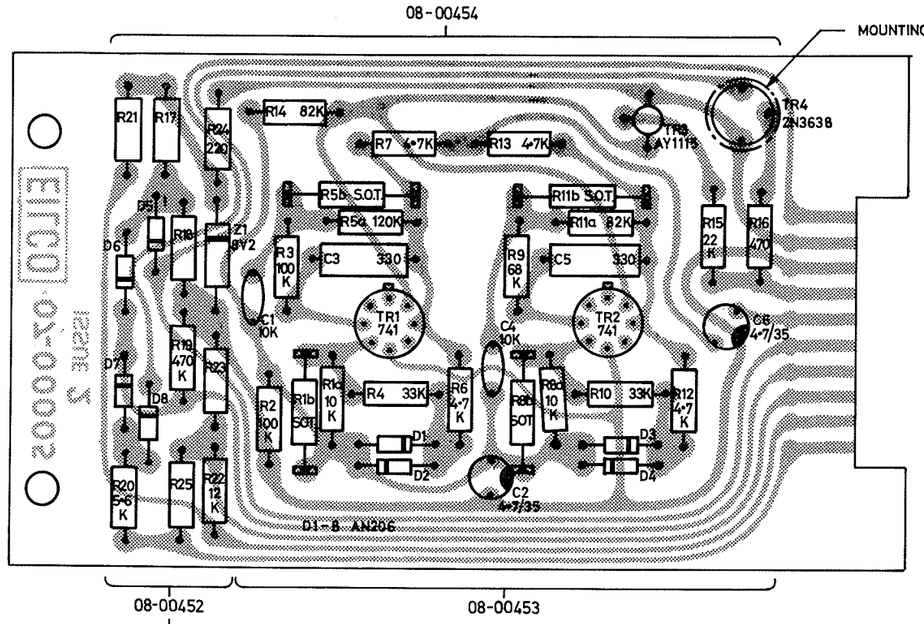
2. Was 10/16
C/N 451 8·3·74

	DESCRIPTION	QTY
1	TR 6 & 7	
2	BOLT 6BA X $\frac{3}{8}$" CH	2
3	WASHER 6 BA SMALL	2
4	MYLAR STRIP } SUPPLIED WITH	2
5	INS. BUSH } TIP31A TIP32A	2
6	HEATSINK ASSY. 08-00005	1
7	P.C.B. 07-00008	1
8	NUT 6BA	2
9	TSO1 MOUNTING PADS	2



TIP31A / TIP32A ASSY

AUDIO AMPLIFIER P.C.B.
COMPONENT LAYOUT **08-00213** ISS. 2



2. R19 was 470Ω
C/N 227 27-4-73

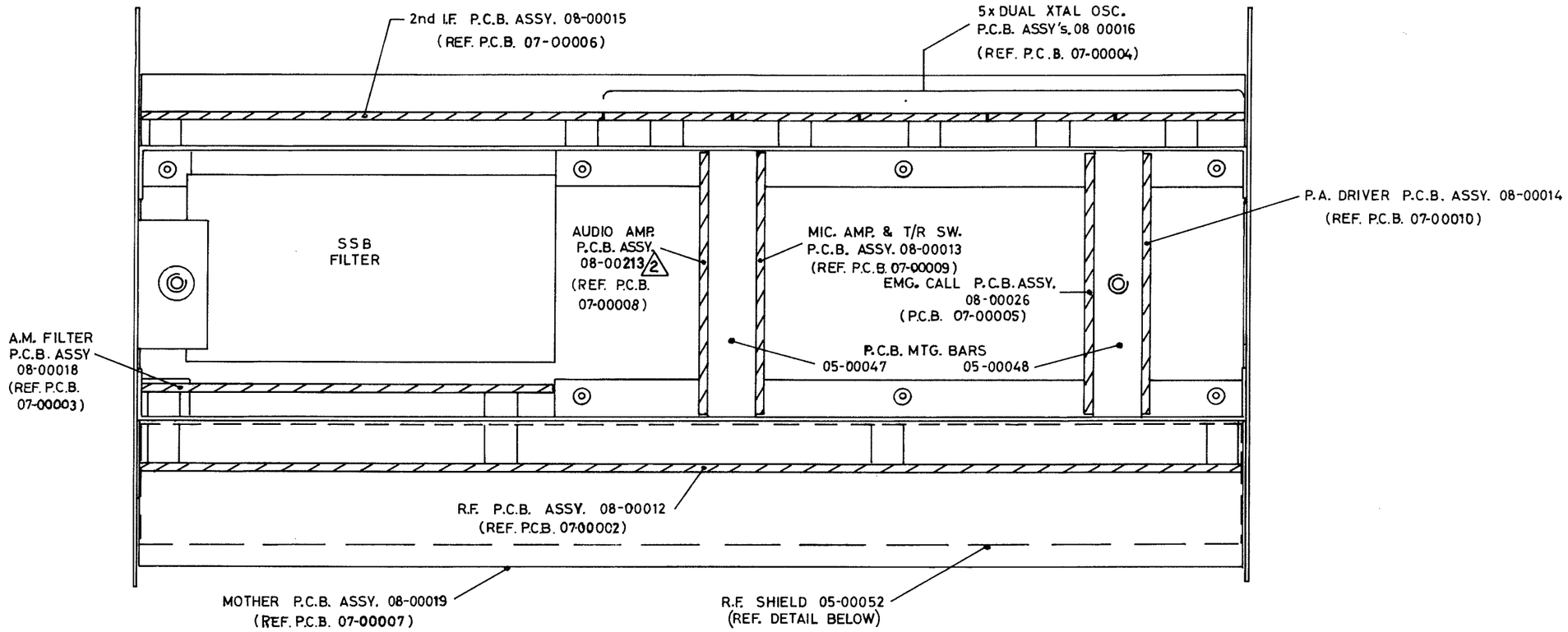
P.C.B. 07-00005 ISS 2

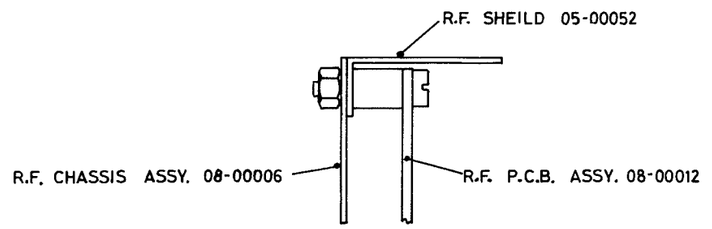
CLARIFIER TYPE	OPTION CODE	R17	R18	R21	R23	R25	D5	D6	D8
WIDE RX & TX	CB (EXPORT ONLY)	—	—	LINK	2·7K	33K	—	—	—
NARROW RX & TX	CB	—	—	5·6K	10K	—	—	—	—
WIDE RX	CA (EXPORT ONLY)	8·2K	10K	LINK	2·7K	33K	✓	✓	✓
NARROW RX	CA	8·2K	10K	5·6K	10K	—	✓	✓	✓

⊏⊐ McMURDO PINS 5011-02-08

EMERGENCY CALL AND CLARIFIER CONTROL COMPONENT LAYOUT

08-00452/454 ISS. 2





R.F. CHASSIS LAYOUT **03-00014** ISS. 2