TECHNICAL SERVICE MANUAL

FOR

HF SSB TRANSCEIVER TYPE 7727

To be used in conjunction with Technical Service Manual for HF SSB Transceiver Type 7515.

CODAN PTY. LTD.
Graves Street,
NEWTON. S.A. 5074
(P.O. Box 96, CAMPBELLTOWN. S.A.)
Telephone: (08) 337 7000
Telex: Codan AA88155
Telegrams: Codan, Adelaide

CODAN PTY. LTD.
5 Bookham Street,
MORLEY. W.A. 6062
Telephone: (09) 276 3858
Telex: Radcoms AA92686
Telegrams: Radcomserv, Perth

CODAN PTY. LTD.
No. 4 Help Street,
CHATSWOOD. N.S.W. 2067
Telephone: (02) 419 2397
Telex: Codan AA22631
Telegrams: Codan, Sydney

Order Code :- 035

Handbook No. 55

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 : December 1977.

HF SSB TRANSCEIVER TYPE 7727

INDEX

1. GENERAL

1.1 Introduction
1.2 Specification
1.3 List of Options and Accessories
1.4 Abbreviations (Refer 7515 Technical Service Manual)

2. BLOCK DIAGRAM (Dwg. C03-00181) refer 7515 TSM.

The 7727 PA and RF input/output circuits differ from the 7515. Refer Para 5 Technical Description.

3. BRIEF DESCRIPTION Refer 7515 TSM.

The 7727 does not operate in the AM mode. References to AM operation do not apply.

4. SWITCHING Refer 7515 TSM.

The 7727 does not operate in the AM mode. References to AM operation do not apply.

5. TECHNICAL DESCRIPTION (Dwg. B04-00822)

5.1 Introduction
5.2 Transmit
5.3 Receive Refer 7515 TSM

6. SET UP PROCEDURE

6.1 Introduction Refer 7515 TSM.
6.2 Channel Set up Procedure
6.2.7 Test equipment required
6.2.8 General Notes
6.2.10 Transmitter adjustments

6.3 Pre-set Adjustments
- 6.3.6 Carrier Reinsertion
- 6.3.8 PA bias
- 6.3.9 ALC
- 6.3.11 Transmitter performance checks
- 6.3.12 Mute Adjustment

6.4 Crystal Compensation Data Refer 7515 TSM.

7. AC/DC PSU OPTION

The 7727 Transceiver may be operated in conjunction with the Type 7113 power supply with a suitable interconnecting lead.

8. MAINTENANCE

8.7 Replacment of PA transistors

9. PARTS LISTS - INDEX

9.5 Parts List (7727)
- 9.5.1 Main Frame
- 9.5.2 PA Assy.
- 9.5.3 PA Filter Assy.

10. LIST OF DRAWINGS

Block Diagram Refer 7515 TSM.	03-00181
Circuit Diagram Type 7727	04-00822

Component Layouts and Assembly Drawings :-

PA Assy	08-01290
PA Filter PCB Assy 1	08-01179
PA Filter PCB Assy 2	08-01180

1. GENERAL INFORMATION

1.1 Introduction

The Type 7727 transceiver is similar to the Type 7515, but with an increased power output of 100 W PEP. The differences apply primarily to the Power Amplifier and filter assemblies with minor changes to the remainder of the equipment.

This supplement covers only those areas where a difference exists and should be used in conjunction with the Type 7515 Technical Service Manual.

1.2 Specifications

1.2.1 General

Design figures are quoted with limit figures in brackets, all tests are carried out at 13.6 V DC input.

Frequency range :	2 - 11 MHz
Crystal capacity :	6
Channel capacity :	6 single frequency simplex, or 3 two frequency simplex, or any combination that does not exceed the crystal capacity.
Operating modes :	Single sideband (A3J) USB, LSB or both (1978)
Frequency stability :	± 50 Hz, in range 5°C to 55°C ± 60 Hz, in range 0°C to 60°C with ± 10% input voltage variation
Controls :	Power ON/OFF and VOLUME. Mode: USB, LSB, TUNE. CHANNEL SELECT. CLARIFIER. EMERGENCY CALL (RFDS) NOISE LIMITER ON/OFF MUTE ON/OFF
Indicators (illuminated) :	Power Transmit

1.2.1 (Cont.)

Connectors :	Side	Microphone
	Rear	Antenna
		Power input
		Extension L.S. (Optional)
RF input/output impedance :		50 ohms nominal. The transceiver will operate with a load impedance producing a VSWR of less than 2:1.
Input voltage :		Nominal 13.6 V DC. The transceiver will operate with input voltages between 10 V and 15V positive or negative ground, reverse polarity protection is provided
Power consumption :		Receive, 270mA no signal Transmit, A3J average 5A A3J two-tone 11A (nominal)

Environmental :

Ambient Temperature °C	-10 to +30	+30 to +60
Relative Humidity %	above 95	from 95 at 30°C to max. 50 at 60°C
Atmospheric Pressure	645 millibars (3600 m above sea level) with maximum temperature derated by 1°C for every 330 m above sea level.	

Cooling :	Convection	
Size :	Width :	27 cm (10.5")
	Height :	9 cm (3.5")
	Depth :	33 cm (13")
Weight :	4.4 kg (9.7 lbs)	

1.2.2 Receiver

Type :	All transistor, single conversion superheterodyne.
IF :	1650kHz

1.2.2 (Cont.)

	Sensitivity :	An aerial EMF of less than 0.5uV from a 50 ohm source will produce a signal plus noise/noise ratio of 10dB (A3J).
	Maximum input :	10V rms.
	Selectivity :	A3J, better than 70dB (60) -1, +5kHz better than 6dB (8), 300 - 2800Hz.
	Image Rejection :	Better than 60dB (55).
	Spurious Signal Rejection :	Better than 65dB (60).
*	Cross Modulation :	A signal 75dB (65), above a signal producing a 10dB S+ N/N ratio modulated 30% and removed at least 20kHz from the wanted signal will produce an increase in receiver noise of less than 3dB.
*	Intermodulation :	To produce a third order intermodulation product equivalent to a wanted signal producing a 10dB S + N/N ratio, two unwanted signals greater than 30kHz removed from the wanted signal must have a level greater than 65dB (60) above the wanted signal.
*	Blocking :	A signal 85dB (70) above a signal producing a 10dB S + N/N ratio and removed at least 20kHz from the wanted signal will cause a change in output level of the wanted signal of less than 3dB.
	AGC :	Less than 3dB (6) variation in output for signal strength variations between 3 microvolts and 100 millivolts.
	AF Power and Distortion :	2.5 Watts at less than 5% THD.
	AF Response :	300 - 2800Hz, $^{+0}_{-3}$dB

1.2.2 (Cont.)

Clarifier Range

CAN :	Nominal ±0.0007% of SCF or ±25Hz whichever is greater, continuously variable.
CAW : **	Nominal ±0.003% of SCF, continuously variable.

** Export Only

* These parameters are measured in terms of Australian P & T Department Specification RB209, RB209-0.

1.2.3 Transmitter

Type :	All solid state including power stages.
Power Output :	SSB (A3J) : 100 Watts PEP ± 1dB.
AF Response :	Overall response of transmitter rises at approximately 6dB/octave from 300Hz to 2800Hz. At higher frequencies cut-off is very rapid.
Harmonic Emissions :	55dB (45) below PEP.
Spurious Emissions :	Spurious emissions (not harmonics) separated from the carrier by more than 20kHz, 50dB (43) below PEP.
Carrier Supression :	50dB (40) below PEP.
Unwanted Sideband :	45dB (43) below PEP.
Intermodulation Products :	33dB (31) below PEP.
ALC Range :	30dB change in input signal produces less than 1dB change in output.
Clarifier Range :	As for Receiver Specifications above NOTE: Only available when Option CB fitted.
Microphone :	Rocking armature, with push-to-talk fitted to case.

1.3 List of Options and Accessories

(a) Options

Same as 7515 except option A(AM) is NOT available.

(b) Accessories

Same as 7515 except Code 501, AC Power Supply TYPE 7113 must be used, with the appropriate interconnecting cable.

5. TECHNICAL DESCRIPTION

Reference Dwg B04-00822

5.1 Introduction

All components on printed circuit boards are prefixed by a number.

The code is as follows :-

Prefix	PCB Number	Description
1	-	Frame assembly
2	07-00337	Main PCB Assy
3	07-00401	PA Assy
4	07-00409	4.6 to 11 MHz PA filters and Broadcast filter
6	07-00305	Emergency Call assy
7	07-00410	2 - 4.6 MHz PA filters

Example R47 on PCB 07-00401 becomes 3R47.

For clarity of reading the prefix has been omitted in the technical description when referring to components on a board under discussion. If reference is made to a component on another board, the prefix is added to the latter. The order of stages described follows the signal path.

5.2

5.2.1 to 5.2.10 Refer 7515 TSM.

5.2.11 Gain Controlled Amplifier and Input Stage

The DC supply is derived from the A rail via transistor switch TR9, TR10 which is controlled by the D rail.
R2 reduces the supply voltage to TR1 to approximately 9V.
The leakage inductance of T1 together with C1, C2 and C3 form a low pass filter to further attenuate any unwanted high frequency signals from the exciter.
The gain of TR1 is controlled to maintain the required PEP output by the ALC processor via emitter follower TR2 to pin 7. The output from pin 3 is fed via R4 and frequency compensating network R5, C7 to the bases of TR3 and TR4.
Negative feedback is applied around TR3 and TR4 by R7.

5.2.12 PA Driver

The PA driver consists of TR5, TR6 operating in push-pull class B. The bias voltage is provided by TR12 connected as a diode. The bias voltage (and hence the driver standing current) may be increased or reduced by the SOT resistor R44.
The network consisting of R54, C14 and L3 provides high frequency loading for TR5 and TR6.

5.2.13 PA

The DC supply to the PA is taken from the unregulated supply rail via a fuse. Supply is fed via T5 which provides the centre tap for the output transformer T7. TR7 and TR8 form a transformer coupled push-pull amplifier biased by a bias regulator via L5 and T3 to operate in Class B. Negative feedback is provided by T4, R16 and R17.

The bias supply consists of the feedback amplifier TR14 and Darlington transistor TR13. If the bias voltage tends to rise, TR14 passes more current and its collector voltage falls reducing the output voltage of TR15 and hence reducing the bias voltage.

TR14 is thermally bonded to the PA transistor heat sink and provides temperature compensation for the output transistors. Zener diode Z3 stabilises the current in TR14 against power supply variations. Fine adjustment of the bias voltage is provided by R51.

The DC component of the drive current (i.e. the collector current in TR13) passes through the TRANSMIT lamp and hence the lamp brilliance varies with power output. Zener diode Z4 protects the lamp from over voltage when the bias current exceeds the lamp rating. R53 may be fitted to increase or decrease the lamp sensitivity, as the bias current depends on the current gain of the PA transistors.

5.2.14 PA Filter Assemblies

Four separate low pass filters are provided to cover the frequency range of the transceiver and are selected by SW1 h & e.

5.2.15 ALC Detectors

A composite ALC signal is derived from three detectors.

(a) Voltage Detector
The voltage at the collectors of TR7 and TR8 is sampled by T6 and rectified by D2, R9 and C21 providing frequency shaping.

(b) Forward Power Detector
A voltage proportional to the forward power output is developed across T10 and the appropriate secondary of T9 and is rectified by D4.

(c) Reflected Power Detector
A voltage proportional to the reflected power is developed across T8 and the appropriate secondary of T9 and is rectified by D3

The three ALC voltages are OR-ed and used to generate the ALC voltage for the Gain Controlled Amplifier.

Under normal load conditions (50 ohms) the forward power detector produces the largest output and operates the ALC. When a mismatched load is applied which increases the PA collector swing the voltage detector output increases and takes control of the ALC, maintaining a constant voltage swing at the PA collector. If the load mismatch does not increase the PA collector voltage swing, the reflected power detector will take control of the ALC when the reflected power exceeds 5W (i.e. approximately 1.6:1 VSWR) and maintain the reflected power constant with increasing VSWR.

5.2.16 ALC Processor

A reference voltage, which is proportional to the supply voltage when the supply voltage is low, and constant when the supply voltage is high, is generated by R42, R43 and Z2. This voltage is fed to the inverting input of TR11b via R39, R37 and R35.
The ALC detector "peak" voltage is divided by R41 and R38 and applied to D8. The detector voltage is also fed to D7 via the "averaging" circuit R40, and C25. The "peak" and "average" voltages are OR-ed by D7 and D8 and applied to the non-inverting input of TR11b. Negative feedback is applied around TR11b by R33 to set its gain.
The output of TR11b is fed via D5 to emitter follower TR2 which in turn controls the gain of TR1. Diode D5 generates a fast attack and slow decay characteristic. R39 is selected to set the power output required.

AMENDMENT No. 7, Maintenance Handbook for Transceivers Type 7515/7727 Sections

The following paragraphs should be substituted for those of the same number for use with 7515/7727 10-Channel series transceivers.

6.2 Channel Set Up Procedure 7515/7727 10-Channel

6.2.1 Components

The table below itemises all the components required to add one frequency to a 7515/7727/7727-T 10 Channel series transceiver. All the components are located on the Main P.C.B..

Table 6.1

Circuit Annotation	Component type	Qty (per freq)
2D 6-17, 20-31, 36-41, 73-92	Diode 23-10001	5
2R 47-52, 166-169	Resistor 470Ω 5% 1/3W	1
2C 37-42, 122-125	Capacitor 47nF 63V Ceramic	1
2L 2-7, 11-16, 19-26	RF Coil 44-70031	2
2C 8-13, 24-29, 126-133	Tuning Capacitor (ref table 6.3)	2
2X 2-11	Crystal (ref section 6.4)	1
2C 134-143	Compensation Capacitors (ref Section 6.4)	1-3
2C 134a-143a	Trimmer 2.5pF (e.g. Philips type 808)	1

6.2.1 Two Frequency Simplex

The transceiver has the capacity for ten crystals, all of which may be used for single frequency and two frequency simplex applications. For the two frequency simplex channels, two sets of components as per table 6.1 are required plus :-

(i) 1R3 & 1R4, both 22 ohms
(ii) Switch 14-00133

if a two frequency simplex channel is not already fitted.

6.2.2 Channel Crystal Assy.

Delete this paragraph.

6.2.4 Channel Switch Modifications

Delete this paragraph.

6. SET-UP PROCEDURE

6.1 Introduction
Refer 7515 TSM

6.2 Channel Set-up Procedure
Refer 7515 TSM

with the following changes :-

6.2.1 Two-frequency simplex

All six crystals may be used for single frequency simplex channels.

6.2.2 to 6.2.6 Refer 7515 TSM

6.2.7 (e) A power supply which can be set at 13.6 V ± 0.2V is required. A Type 7113 PSU may be used.

6.2.8 (a) Set the power supply to 13.6 V ± 0.2 V.

6.2.9 Refer 7515 TSM

6.2.10 (e) Switch to "TUNE" and operate the PTT button.

(h) The output voltage should be approximately 150 V pp.

6.3 Pre-set Adjustments

6.3.1 to 6.3.5 Refer 7515 TSM

6.3.6 Carrier Reinsertion

Although AM is not available in the 7727 the carrier level must still be set. (Used in the TUNE mode, for adjustment of antennas and antenna tuners.)

(a) Remove SK1 and monitor the exciter output (SK1/1 and 3) with the CRO. With the transceiver in the SSB transmit mode, apply a 1 kHz tone via the text unit and set the level so that the Microphone Amplifier is in compression by approximately 10dB. Note the level at SK1.

6.3.6 (Cont.)

(b) Remove the audio drive and switch to the TUNE mode. Adjust 2C82 "CARRIER LEVEL" until the output at SK1 is between 50% and 75% of the level noted in part (a).

6.3.7 Refer 7515 TSM

6.3.8 Driver and PA Bias

Ensure SK1 is disconnected from the MAIN PCB.

(a) PA Bias
Remove the PA FUSE link and insert a DC ammeter set to the 1A range. In the SSB mode, operate the PTT switch and observe the ammeter reading. Select a value for 3R51 such that the standing current is between 450 and 550 mA.

(b) Driver Bias
Remove the driver stage LINK and insert a DC ammeter set to the 100mA range. In the SSB mode, operate the PTT switch and observe the ammeter reading. Select a value for 3R44 such that the driver standing current is between 20 and 25 mA.

6.3.9 ALC

Replace SK1 and ensure that the RF dummy load is connected to the antenna socket. Connect the CRO and the distortion meter (6918A) RF input (through 47k ohms) across the dummy load. Connect the audio output of the distortion meter to the test unit (AF in). Select the lowest frequency channel on the transceiver. Switch to SSB and operate the PTT switch. Adjust the value of 3R39 to set the two-tone SSB output to 100 W PEP (i.e. 200 V pp). Check the IMD (Intermodulation distortion) on all channels.
The power output may be decreased if necessary to give -27dB IMD on the worst channel.

N.B. -27dB IMD on the HP6918A is relative to either tone and is equivalent to -33dB IMD with respect to PEP.

6.3.10 Refer 7515 TSM

6.3.11 (d) The power output on all channels should be 100 W PEP ± 1dB.

6.3.12 (f) Mute - Adjustment for AM does not apply.

8. MAINTENANCE

8.1 to 8.5 Refer 7515 TSM

8.6 PA Transistor Selection

The PA transistors are fitted in matched pairs to optimise amplifier performance. The gain grouping of the Motorola transistor type MRF421 is identified by a coloured dot. Only transistors of the same dot colour should be fitted.

8.7 Replacement of PA and Driver Transistors

It is neither necessary nor desirable to remove the PA assembly to replace either the driver or PA transistors. This avoids disturbing the thermal joint between the PA and the heatsink.

6BA x 3/8 inch cheese head screws are used to secure both the driver and PA transistor flanges, with the exception of the 6BA x 5/8 inch cheese head screw used to make the chassis connection for C20.

The leads of both driver and PA transistors are folded up at the ends to facilitiate removal with pliers.

8.7.1 Driver Transistor

(a) Unsolder the emitter end of R12, bend the resistor clear and remove the flange fixing screws.

(b) Using a de-soldering tool or "solder-wick" remove the bulk of the solder from each lead. Gently pull the lead away from the PCB while heating the joint. Clear away any excess solder from the emitter, base and collector pads.
Thoroughly clean the transistor mating surface on the mounting block with a cloth or tissue.

(c) Form the leads of the replacement transistors using the discarded transistor as a guide.

(d) Coat the transistor flange with a thin film of thermal compound (e.g. Jermyn Thermaflow A30).

8.7.1 (Cont.)

(e) Fit the transistors (check orientation) and tighten the flange fixing screws evenly.

(f) Carefully solder the transistor leads, this should be carried out quickly using a very hot tipped soldering iron.

(g) Reconnect R12.

(h) Adjust the bias current - refer para 6.3.8.

8.7.2 Output Transistor

(a) Unsolder the base ends of R16 and R17, bend them clear and remove the flange fixing screws. Bend C20 clear also.

(b) to (f) Follow steps (b) to (f) in para 8.7.1.

For para (f) - Silver loaded solder (e.g. "Capalloy" 62% tin, 36% lead and 2% silver) must be used to make the connection between the inner emitter leads and the ground plane. If silver loaded solder is not used the silver palladium terminations on chip capacitor C18 will dissolve. The chip capacitor may not be resoldered more than once or twice and small stocks of chip capacitors should be held if replacement of output transistors is undertaken.

(g) Reconnect R16 and R17 and ensure that C20 has been properly fitted.

(h) Readjust bias current - refer para 6.3.8.

9. PARTS LISTS - INDEX

9.1 Parts List (7303) as per 7515 TSM
9.2 Parts List (7515) as per 7515 TSM
9.3 Parts List (Common) as per 7515 TSM
9.4 Parts List (AC/DC PSU) as per 7515 TSM - does not apply
9.5 Parts List (7727)
- 9.5.1 Main Frame
- 9.5.2 PA Assy.
- 9.5.3 PA Filter Assy.

9.5 PARTS LIST (7727)

9.5.1 Main Frame

CCT REF	DESCRIPTION	MANUFACTURER	NOTES
	Main PCB Assy.	08-00946	
	P.A. Assy.	08-01177	
	Filter PCB Assy 1	08-01179	
	Filter PCB Assy 2	08-01180	
	Microphone Assy	08-00066	
	Battery Cable Assy	08-00987	
SW1	Switch	MSP	14-00085
SW2	Switch	MSP	14-00087
	Nylon Spacer	06-00265	
	Knob small round	06-00015	Option CAN, CBN CAW, CBW

For remainder of items in main assy refer 7515 T.S.M.

CCT REF	DESCRIPTION	MANUFACTURER	NOTES

9.5.2 P.A. Assy.

All components prefixed	3
Printed circuit board	07-00401
Complete sub-assy.	08-01171

CAPACITORS

C1	150pF	2%	100V	N750 Ceramic	Philips 632	
C2	270pF	2%	100V	N750 Ceramic	Philips 632	
C3	330pF	2%	100V	N750 Ceramic	Philips 632	
C4	0.047µF	+80% -20%	50V	Ceramic	ELNA TL	
C5	68µF	+50% -10%	16V	Electrolytic	Philips 015	
C6	4.7µF	20%	25V	Tantalum	ITT TAG	
C7	39pF	2%	100V	N750 Ceramic	Philips 632	
C8	330pF	2%	100V	N750 Ceramic	Philips 632	
C9	68µF	+50% -10%	16V	Electrolytic	Philips 015	
C10	0.047µF	+80% -20%	50V	Ceramic	Elna TL	
C11	0.047µF	+80% -20%	50V	Ceramic	Elna TL	
C12	0.047µF	+80% -20%	50V	Ceramic	Elna TL	
C13	0.1µF	20%	50V	Ceramic Chip	Vitramon	
C14	180pF	2%	100V	N750 Ceramic	Philips 632	
C15	NOT USED					
C16	0.1µF	20%	50V	Ceramic Chip	Vitramon	
C17	3300pF	10%	100V	Ceramic	Philips 630	
C18	0.47µF	20%	50V	Ceramic Chip	Vitramon	
C19	68µF	+50% -10%	16V	Electrolytic	Philips 015	
C20	0.047µF	10%	100V	Polyester	Elna Greencap	Must be an Elna Greencap 100V
C21	180pF	2%	100V	N750 Ceramic	Philips 632	
C22	3300pF	10%	100V	Ceramic	Philips 630	
C23	0.047µF	+80% -20%	50V	Ceramic	Elna TL	
C24	1000pF	10%	100V	Ceramic	Philips 630	
C25	1µF	20%	35V	Tantalum	ITT TAG	
C26	10µF	20%	25V	Tantalum	ITT TAG	
C27	0.047µF	+80% -20%	50V	Ceramic	Elna TL	
C28	10µF	20%	25V	Tantalum	ITT TAG	

CCT REF	DESCRIPTION			MANUFACTURER NOTES
9.5.2	P.A. Assy (Cont.)			
	RESISTORS			
R1	15	5%	1/3W	Philips CR25
R2	180			Philips CR25
R3	10K			Philips CR25
R4	470			Philips CR25
R5	220			Philips CR25
R6	220K			Philips CR25
R7	5.6K			Philips CR25
R8	1K			Philips CR25
R9	100			Philips CR25
R10	10			Philips CR25
R11	100			Philips CR25
R12	1			Philips CR25
R13	1			Philips CR25
R14	1			Philips CR25
R15	1			Philips CR25
R16	6.8	5%	1/2W	Philips CR37
R17	6.8	5%	1/2W	Philips CR37
R18	4.7	5%	1/3W	Philips CR25
R19	39	5%	1/3W	Philips CR25
R20	220	5%	1W	Philips CR68
R21	150	5%	1/3W	Philips CR25
R22	1K			Philips CR25
R23	330			Philips CR25
R24	330			Philips CR25
R25	39			Philips CR25
R26	270			Philips CR25
R27	NOT USED			
R28	NOT USED			
R29	NOT USED			
R30	NOT USED			
R31	NOT USED			
R32	220	5%	1/3W	Philips CR25
R33	68K			Philips CR25
R34	NOT USED			
R35	15K	5%	1/3W	Philips CR25
R36	100K			Philips CR25

CCT REF	DESCRIPTION			MANUFACTURER	NOTES
9.5.2	P.A. Assy. (Cont.)				
	RESISTORS (Cont.)				
R37	1K			Philips CR25	
R38	3.3K			Philips CR25	
R39	SOT			Philips CR25	Set Power output
R40	10K			Philips CR25	
R41	1.5K			Philips CR25	
R42	820			Philips CR25	
R43	1K			Philips CR25	
R44	SOT			Philips CR25	Set Driver Bias
R45	3.3			Philips CR25	
R46	220	5%	1W	Philips CR68	
R47	100	5%	1/3W	Philips CR25	
R48	120			Philips CR25	
R49	100			Philips CR25	
R50	820			Philips CR25	
R51	SOT			Philips CR25	Set PA Bias
R52	560			Philips CR25	
R53	SOT	5%	1/2W	Philips CR37	Set Tx Lamp
R54	33	5%	1/3W	Philips CR25	
	INDUCTORS				
L1	15µH Inductor			4480044	
L2	15µH Inductor			4480044	
L3	Inductor			Philips	Inductor made from screening beads
L4	15µH Inductor			4480044	
L5	15µH Inductor			4480044	
	DIODES				
D1-D5	To Spec. 23-10002				
D6	NOT FITTED				
D7, D8	To Spec. 23-10002				

CCT REF	DESCRIPTION			MANUFACTURER	NOTES
9.5.2	P.A. Assy. (Cont.)				
	DIODES (Cont.)				
Z1	NOT USED				
Z2	BZX79C6V8			Philips	
Z3	BZX79C5V6			Philips	
Z4	IN5338B 5V1		5%	I.R.	
	TRANSFORMERS				
	Output Transformer Assy.			08-01178	
T1	Input			448 0087	
T2	Interstage			448 0074	
T3	Driver			448 0089	
T8	Reverse Power Voltage			448 0097	
T9	SWR Current			448 0099	
T10	Forward Power Voltage			448 0098	
	TRANSISTORS				
TR1	SL610C			Plessey	
TR2	BC548			Philips	
TR3	BF199			Philips	
TR4	BF199			Philips	
TR5	BLY87CF			Philips	
TR6	BLY87CF			Philips	
TR7	MRF421)			Motorola	Philips BLY568CF may be substituted with other component changes
	)	Matched pair			
TR8	MRF421)			Motorola	
TR9	TIP32A			Texas	
TR10	BC338			Philips	
TR11	LM358N		Mini Dip	National	
TR12	BD135	C/W	Mica Washer	Philips	
TR13	BD675	C/W	Mica Washer	Philips	
TR14	BC548			Philips	
	RELAY				
A/1	Relay	12V	1 C/O 320Ω	Siemens	V23027-A002-A101

CCT REF	DESCRIPTION				MANUFACTURER	NOTES

9.5.3 P.A. Filter Assy

9.5.3.1 P.A. Filter Assy 1.

All components prefixed 4
Printed circuit board 07-00409
Complete sub assy. 08-00839

CAPACITORS

C1	1800pF	5%	125V	Polystyrene	Philips 425)	
C2	2200pF	5%	125V	Polystyrene	Philips 425)	
C3	1000pF	5%	125V	Polystyrene	Philips 425)	Broadcast Station Filter
C4	6800pF	5%	63V	Polystyrene	Philips 424)	
C5	1500pF	5%	125V	Polystyrene	Philips 425)	
C6	270pF	5%	500V	Polystyrene	Philips 427)	
C7	39pF	5%	500V	Ceramic	Philips 555)	
C8	100pF	5%	500V	Polystyrene	Philips 427)	
C9	100pF	5%	500V	Polystyrene	Philips 427)	
C10	150pF	5%	500V	Polystyrene	Philips 427)	7-11 MHz Filter
C11	100pF	5%	500V	Polystyrene	Philips 427)	
C12	47pF	5%	500V	Ceramic	Philips 555)	
C13	39pF	5%	500V	Ceramic	Philips 555)	
C14	27pF	5%	500V	Ceramic	Philips 555)	
C15	390pF	5%	250V	Polystyrene	Philips 426)	
C16	100pF	5%	500V	Polystyrene	Philips 427)	
C17	220pF	5%	500V	Polystyrene	Philips 427)	
C18	100pF	5%	500V	Polystyrene	Philips 427)	
C19	220pF	5%	500V	Polystyrene	Philips 427)	4.6-7 MHz Filter
C20	180pF	5%	500V	Polystyrene	Philips 427)	
C21	68pF	5%	500V	Polystyrene	Philips 427)	
C22	68pF	5%	500V	Polystyrene	Philips 427)	
C23	47pF	5%	500V	Ceramic	Philips 555)	

RESISTORS

R1	10K	5%	1/3W		Philips CR25

CCT REF	DESCRIPTION	MANUFACTURER NOTES

9.5.3 P.A. Filter Assy

9.5.3.1 P. A. Filter Assy 1 (Cont.)

INDUCTORS

L1	5.6μH	4470188
L2	3.8μH	4470101
L3	Filter	4470181
L4	Filter	4470182
L5	Filter	4470183
L6	Filter	4470179
L7	Filter	4470180

CCT REF	DESCRIPTION	MANUFACTURER NOTES

9.5.3 P.A. Filter Assy.

9.5.3.2 P. A. Filter Assy. 2

All components prefixed 8
Printed circuit board 07-00410
Complete sub assy 08-00840

CAPACITORS

C1	390pF	5%	250V	Polystyrene	Philips 426)	
C2	330pF	5%	250V	Polystyrene	Philips 426)	
C3	270pF	5%	500V	Polystyrene	Philips 427)	
C4	220pF	5%	500V	Polystyrene	Philips 427)	3-4.6 MHz Filter
C5	330pF	5%	250V	Polystyrene	Philips 426)	
C6	270pF	5%	500V	Polystyrene	Philips 427)	
C7	220pF	5%	500V	Polystyrene	Philips 427)	
C8	68pF	5%	500V	Polystyrene	Philips 427)	
C9	470pF	5%	250V	Polystyrene	Philips 426)	
C10	470pF	5%	250V	Polystyrene	Philips 426)	
C11	390pF	5%	250V	Polystyrene	Philips 426)	
C12	470pF	5%	250V	Polystyrene	Philips 426)	
C13	270pF	5%	500V	Polystyrene	Philips 427)	2-3 MHz Filter
C14	470pF	5%	250V	Polystyrene	Philips 426)	
C15	470pF	5%	250V	Polystyrene	Philips 426)	
C16	330pF	5%	250V	Polystyrene	Philips 426)	
C17	100pF	5%	500V	Polystyrene	Philips 427)	

INDUCTORS

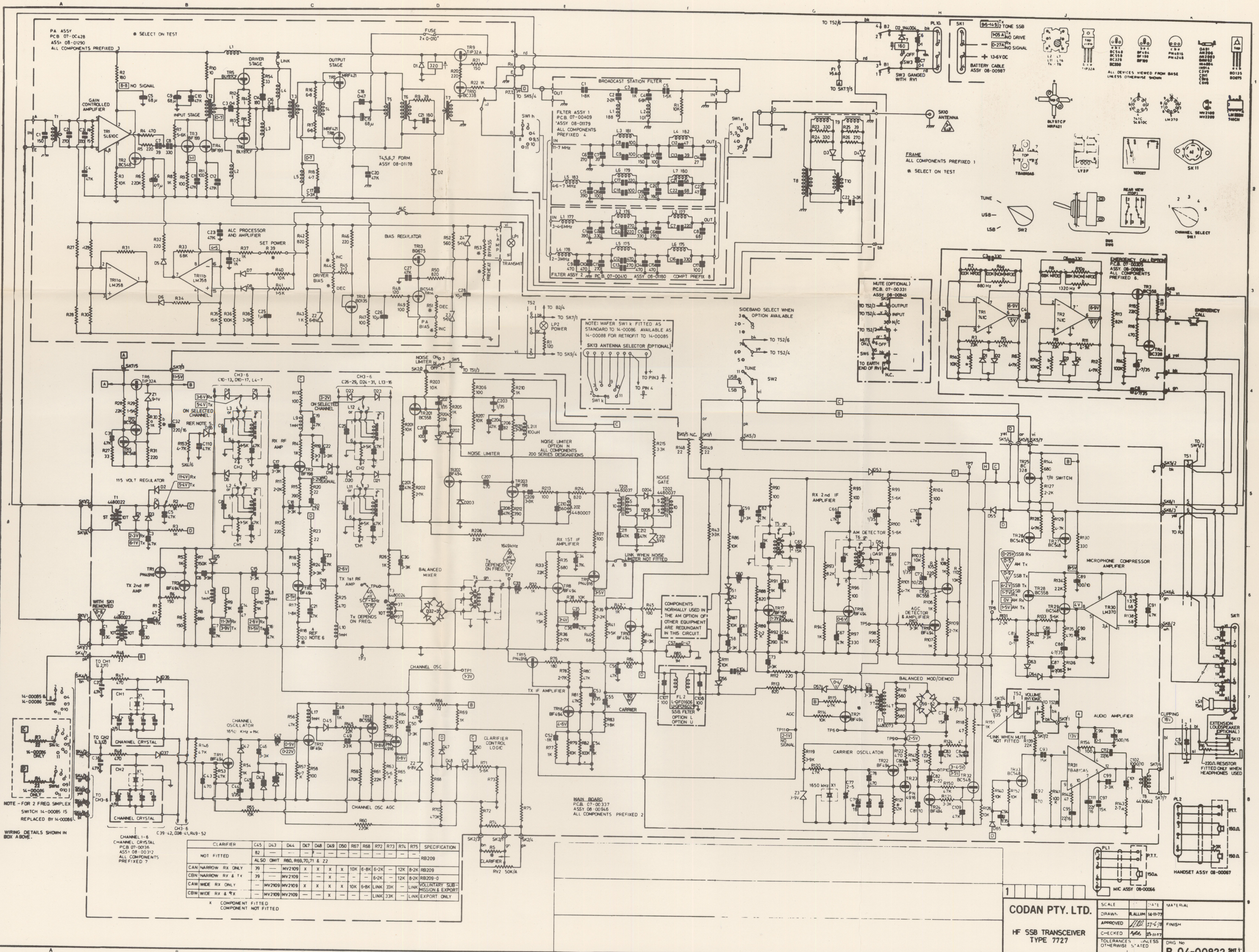
L1	Filter	4470177
L2	Filter	4470176
L3	Filter	4470177
L4	Filter	4470178
L5	Filter	4470174
L6	Filter	4470175

10. LIST OF DRAWINGS

Block Diagram Refer 7515 T.S.M.	03-00181
Circuit Diagram Type 7727	04-00822

Component Layouts and Assembly Drawings :-

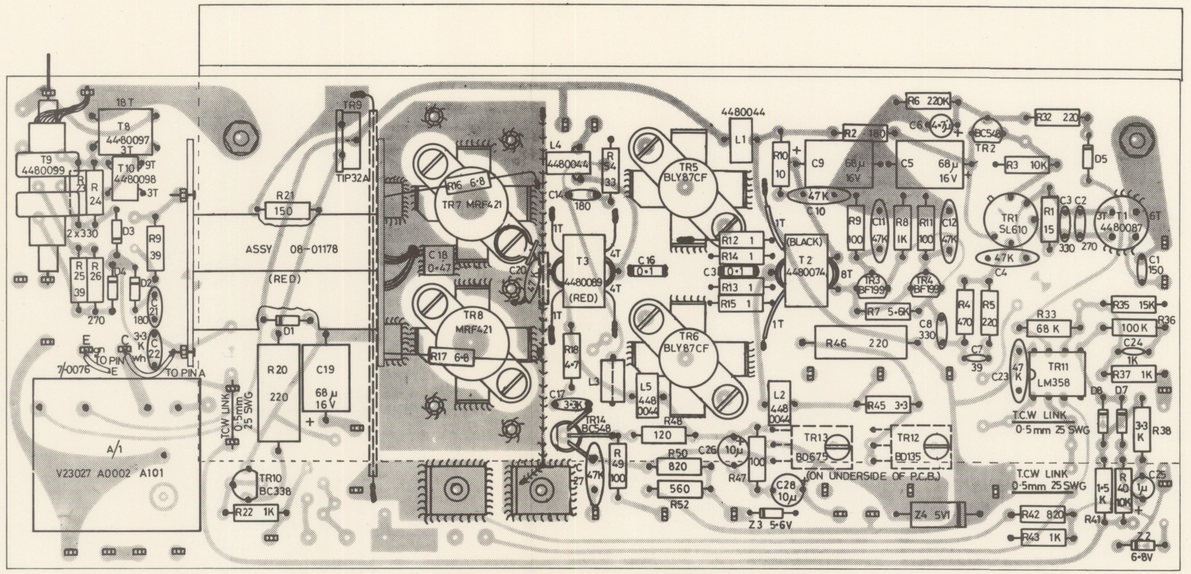
P.A. Assy	08-01177
P.A. Filter PCB Assy 1	08-01179
P.A. Filter PCB Assy 2	08-01180



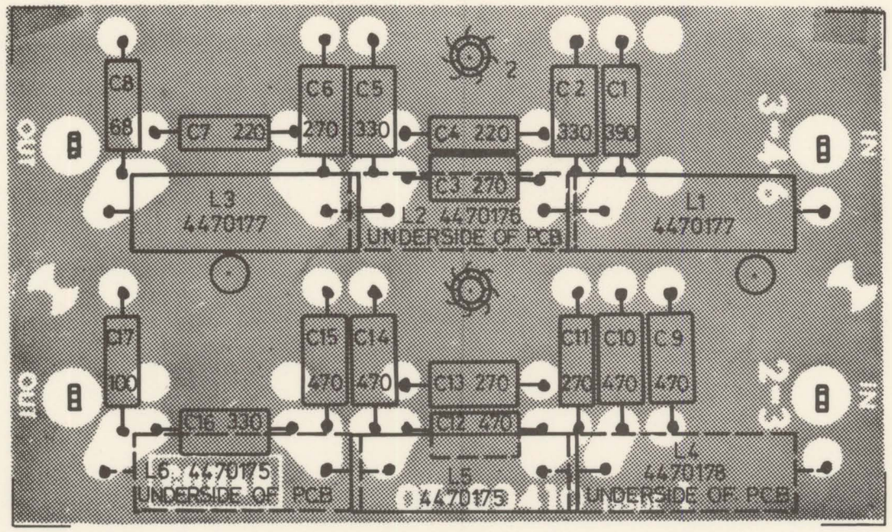
CLARIFIER		C45	D43	D44	D47	D48	D49	D50	R67	R68	R72	R73	R74	R75	SPECIFICATION
NOT FITTED		82	—	—	—	—	—	—	—	—	—	—	—	—	RB209
		ALSO OMIT R60, R69,70,71 & Z2													
CAN	NARROW RX ONLY	39	—	MV2109	X	X	X	X	10K	6·8K	6·2K	—	12K	8·2K	RB209
CBN	NARROW RX & TX	39	—	MV2109	—	—	X	—	—	—	6·2K	—	12K	8·2K	RB209-0
CAW	WIDE RX ONLY	—	MV2109	MV2109	X	X	X	X	10K	6·8K	LINK	33K	—	LINK	VOLUNTARY SUBMISSION & EXPORT
CBW	WIDE RX & TX	—	MV2109	MV2109	—	—	X	—	—	—	LINK	33K	—	LINK	EXPORT ONLY

X COMPONENT FITTED
— COMPONENT NOT FITTED

CODAN PTY. LTD.	SCALE	DATE	MATERIAL
	DRAWN R.ALLUM	14-11-77	
HF SSB TRANSCEIVER TYPE 7727	APPROVED	27-6-78	FINISH
	CHECKED	23-11-77	
	TOLERANCES UNLESS OTHERWISE STATED FRACT 1/64 DEC ·005		DRG No B 04-00822 SHT 1 OF 3

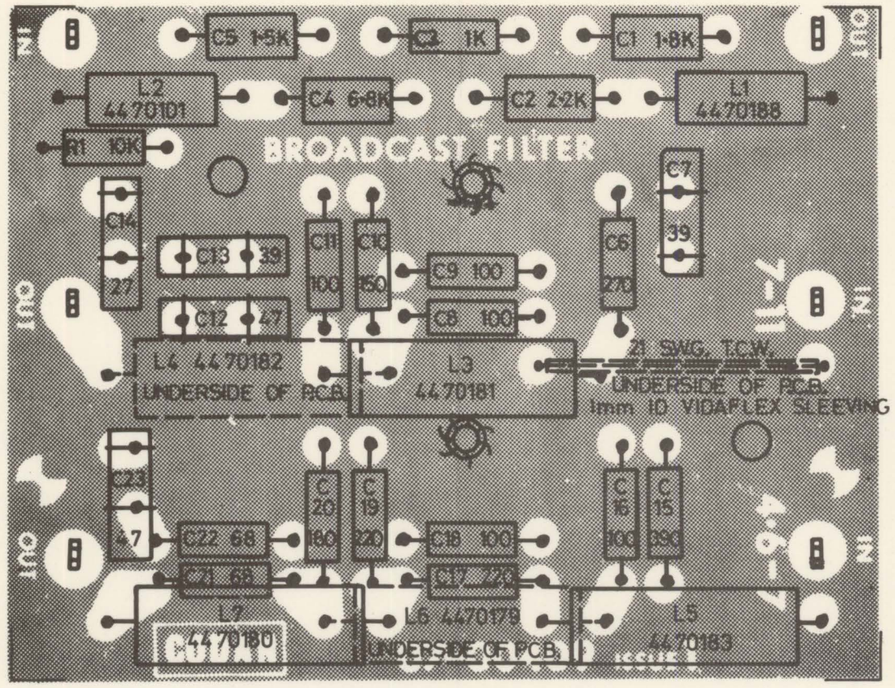


P.C.B. 07-00428 ISS 2.



07-00410 ISS 1

P.A. FILTER P.C.B. ASSY. 2 08 – 01180 ISS. 1



07-00409 ISS 1

P.A. FILTER P.C.B. ASSY. 1 08 – 01179 ISS. 1

CIRCUIT NOTES

1. Capacitor values up to 99,000 are expressed in pF, values greater are expressed in uF.
2. ⊕ connection of PCB and cableform sockets.
   ⊕ connection of cableform to PCB pins.
3. [D] control voltages.
4. * "Select on test" component.
5. Transformer colour code: or = (orange) Part Number 4470031
   gn = (green) . Part Number 4470032

MEASUREMENT NOTES

1. The voltages given are measured with respect to the negative rail unless otherwise shown. Voltages are typical and may vary between units. Signal voltages will vary with channel frequency.

   DC voltages shown [...V] are measured with an "AVO Model 8" (20K ohm/V) and are positive with respect to the negative rail.

   AC voltages shown [...V] are measured with an oscilloscope probe 10M ohm and 7pF expressed in P-P units.

   All measurements are made with a DC supply of 13.6 volts.

2. AC voltages shown ▽ are expressed in P-P units measured as above in the SSB Transmit mode.

   The voltages shown for the Main PCB Assy are obtained with a single tone input from an isolated source (i.e. transformer coupled - see drg. 04-00316) which produces approximately 0.9V P-P at test point TP8 (corresponds to onset of compression in the Microphone Amplifier). Remove connector SK1 for these measurements to disable the PA.

   The voltages shown for the PA Assy are obtained with a two-tone input under the same conditions as above. The figures indicate the range of voltages to be expected when delivering 100 watts PEP to a 50 ohm load (corresponds to 200 P-P envelope voltage). Due to ALC action a single tone will not drive the PA to its full voltage swing capability. A single tone input will give approximately 0.8 times the voltages shown for a two-tone input.

PA VOLTAGES (Typical)

Freq.	TR7/8	TR5/6			TR3/4	Battery
MHz	Coll.Vpp	Coll.Vpp	Base Vpp	Emitt.Vpk	Coll.Vpp	Curr. Amps
2	24	6	0.66	0.17	5.2	10.2
4	24	6	0.8	0.19	6.2	10
6	25	6.6	0.92	0.22	8	10.7
8	25	8	1.1	0.27	8.4	10.7
10	25	10.4	1.4	0.33	10.4	12.4

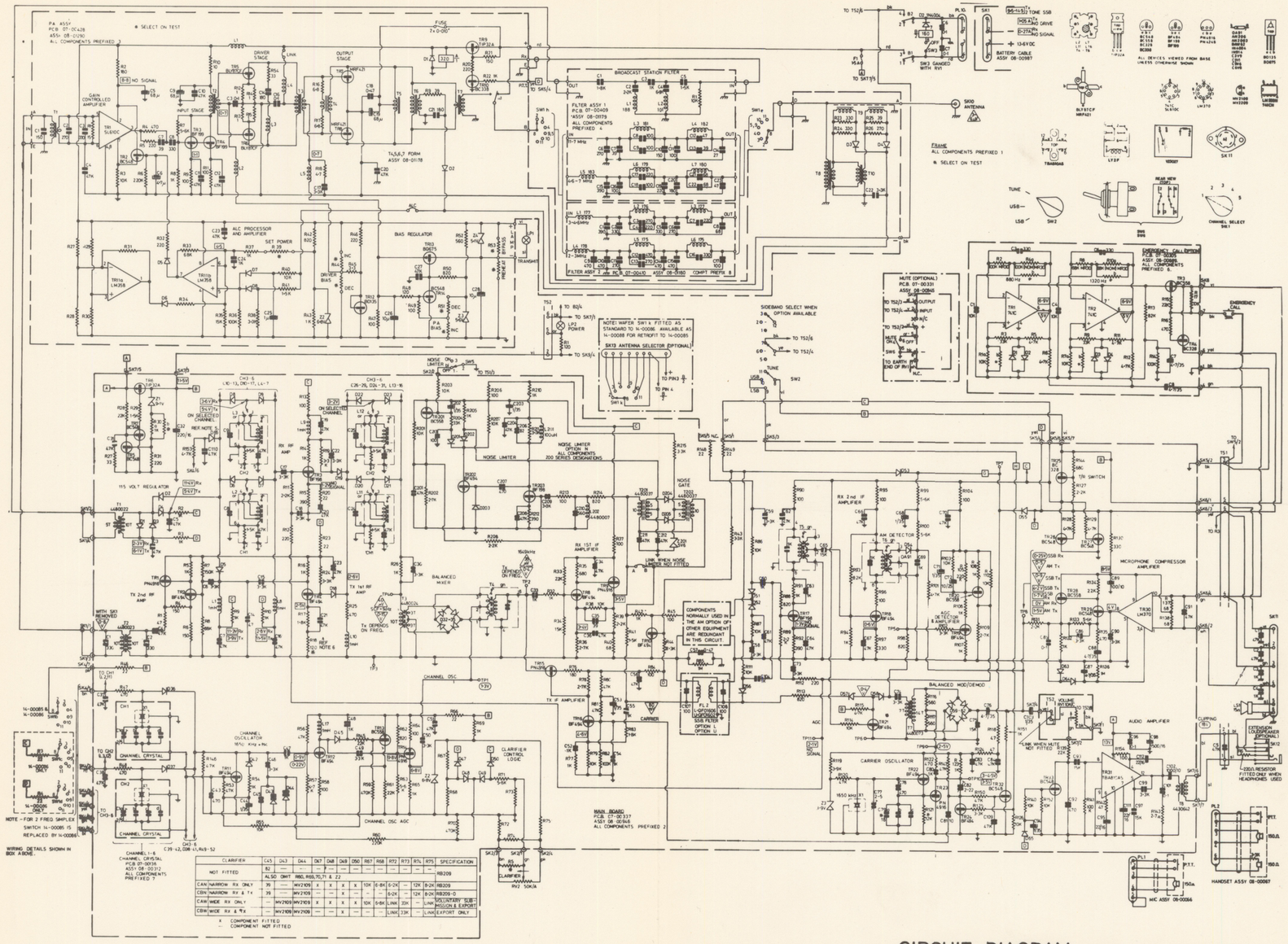
Note:
1) Use low capacitance probe to measure voltage at TR3/4 collectors, ⩽ 7pF.
2) Use an earth as close as practicable to point of measurement. Wind excess probe earth lead around probe to minimise loop area.
3) ALC voltage is 7.6 V pk for two tone input.

3. Voltages shown ⚠ refer to the emf of a 50 ohm signal generator, applied at that point with respect to the negative rail, which causes the AGC voltage at test point 2TP11 to increase by 0.3 volts from its no signal value in the receive mode.
4. Frequencies shown at monitor points are for USB operation (LSB filter).

CONTROL RAIL VOLTAGES

Control Rail	Test point	SSB Rx	SSB Tx	TUNE Rx	TUNE Tx
B	SK5/7	11.5	11.5	11.5	11.5
C	SK5/6	11.5	0	11.5	0
D	SK5/4	0	11.5	* 0	11.5
G	TP7	10.4	10.7	0	10.7
H	SK5/3	11.5	11.5	11.5	0

5. For unused channels, link the lugs of SW1b corresponding to these channels to the channel 6 lug (SW1b/11). If all 6 channels are used omit components 2R153, 2C110 and 2D66.
6. Resistor 2R18 may be selected to set exciter gain.



CIRCUIT DIAGRAM TYPE 7727

04-00822 ISS. 1