

AMSTRAD



CB900 / CB901
CITIZEN BAND TRANSCEIVER
SERVICE MANUAL

TECHNICAL SPECIFICATION

Type of Emission: F3
Channel Spacing 10 KHz
Frequency Composition: PLL Synthesizer
Power Source: 12V DC Negative or Positive Earth (nominal)
Operating Temperature Range: -5°C — $+45^{\circ}\text{C}$ nominal

Electric Specifications

Receiver Section

a. Receiver System	: Dual Conversion Superheterodyne
b. Intermediate Freq.	: 1st IF: 10.695 MHz 2nd IF: 455 KHz
c. Sensitivity	: $0.5\ \mu\text{V}$ (20 dB S/N) nominal
d. Adjacent Channel Selectivity (@+10 KHz)	: 45 dB for Standard less than $-10\ \text{dB}$ NQ level
e. Squelch Threshold Sensitivity	: (approx. 0.15 to $0.2\ \mu\text{V}$) $50\ \mu\text{V}$ maximum
f. Squelch Tight Sensitivity	: $60\ \text{dB}$ nominal
g. Spurious Response attenuation	: $45\ \text{dB}$ nominal
h. Image Rejection	: less than $20\ \text{nW}$
I. Receiver Spurious Emissions	: 4 watts at 4 ohm
J. Audio output power (@10% THD at 1 KHz)	: 2 watts at 8 ohm $+2$ dB per 6 dB/OCT at $0.3 - 3\ \text{KHz}$ -8
k. Audio Freq. Response	: Stand-by 0.25A nominal
i. Current Drain	: Receiving max. 0.8A nominal

Transmitter Section

a. RF output power	: 4 watts (MPT-1320)
b. Freq. Deviation (@1 KHz)	: $\pm 2.5\ \text{KHz}$ max.
c. Audio Freq. Response	: $+2$ dB per 6 dB/OCT -5 at $0.3 - 3.0\ \text{KHz}$ pre-emphasise
d. Spurious emission	: less than $50\ \text{nW}$
80 — 85 MHz	
87.5 — 118 MHz	
135 — 136 MHz	
174 — 230 MHz	
470 — 862 MHz	
Other Freqs.	: less than $0.25\ \mu\text{W}$
e. Adjacent channel power	: less than $10\ \mu\text{W}$
f. Current drain @12.0V	: 2A nominal

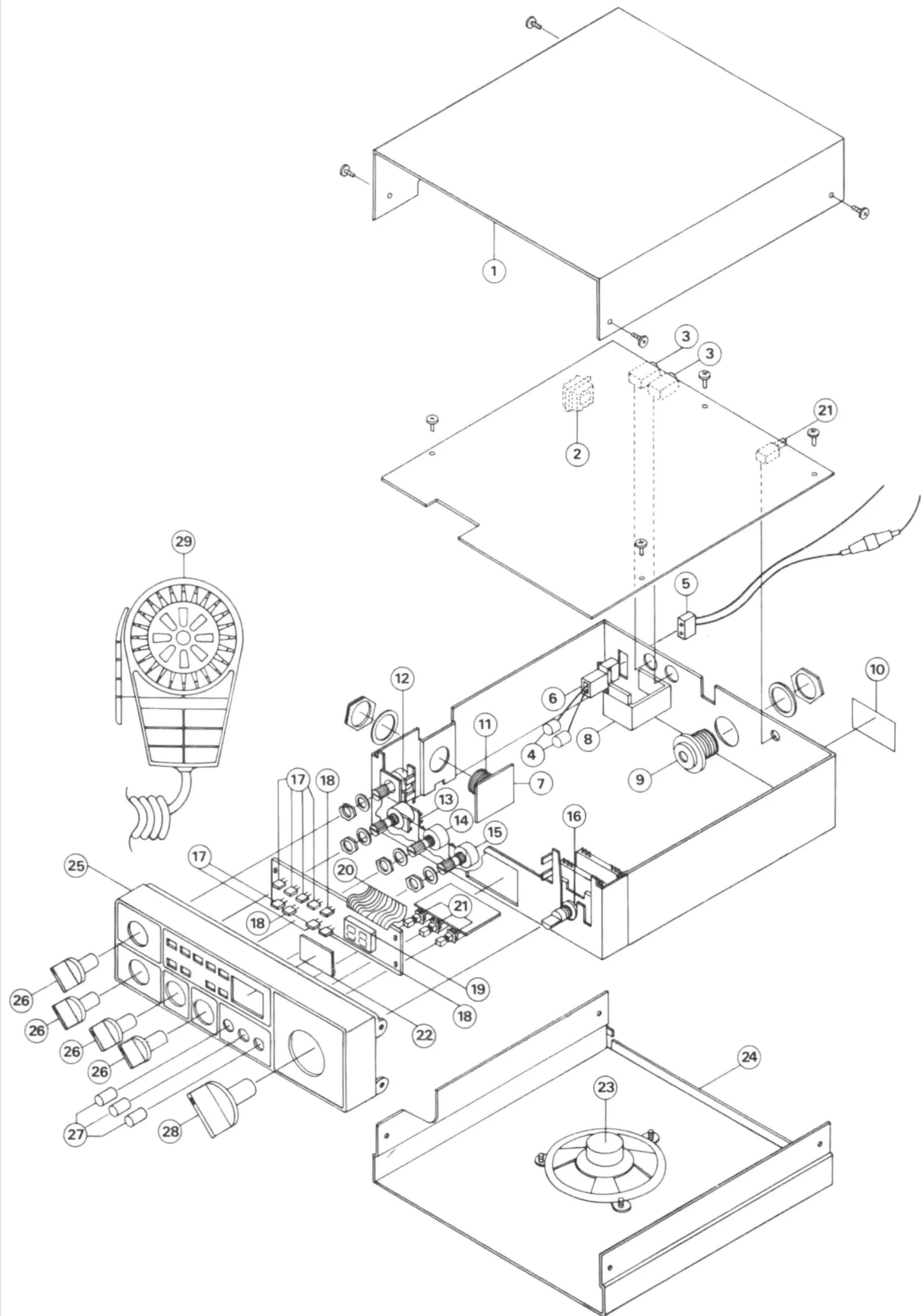
WARNING

Both transceivers covered by this manual conform to Home Office specification MPT 1320. It is recommended that anyone attempting to service this item familiarise themselves with the contents of MPT 1320 as the responsibility for keeping CB Transceivers within the specifications is placed on the owner and service agent of the item.

OPERATING FREQUENCIES

Channel	1	27.60125MHz
Channel	2	27.61125MHz
Channel	3	27.62125MHz
Channel	4	27.63125MHz
Channel	5	27.64125MHz
Channel	6	27.65125MHz
Channel	7	27.66125MHz
Channel	8	27.67125MHz
Channel	9	27.68125MHz
Channel	10	27.69125MHz
Channel	11	27.70125MHz
Channel	12	27.71125MHz
Channel	13	27.72125MHz
Channel	14	27.73125MHz
Channel	15	27.74125MHz
Channel	16	27.75125MHz
Channel	17	27.76125MHz
Channel	18	27.77125MHz
Channel	19	27.78125MHz
Channel	20	27.79125MHz

Channel	21	27.80125MHz
Channel	22	27.81125MHz
Channel	23	27.82125MHz
Channel	24	27.83125MHz
Channel	25	27.84125MHz
Channel	26	27.85125MHz
Channel	27	27.86125MHz
Channel	28	27.87125MHz
Channel	29	27.88125MHz
Channel	30	27.89125MHz
Channel	31	27.90125MHz
Channel	32	27.91125MHz
Channel	33	27.92125MHz
Channel	34	27.93125MHz
Channel	35	27.94125MHz
Channel	36	27.95125MHz
Channel	37	27.96125MHz
Channel	38	27.97125MHz
Channel	39	27.98125MHz
Channel	40	27.99125MHz



CABINET PARTS LIST

Symbol	CB900 Part No.	Description	CB901 Part No.
1	920001	Top Cabinet	920001
2	920002	In-Line Choke	920002
3	920003	Speaker Socket	920003
4	920004	Ferrite Bead	920004
5	920005	12V DC Lead c/w Fuse Holder	920005
6	920006	12V DC Input Socket	920006
7	920007	Microphone Input P.C.B.	920007
8	920008	Audio Output I.C. Heatsink	920008
9	920009	Aerial Socket	920009
10	920010	Back Label	921010
11	920011	Microphone Socket	920011
12	920012	Tone Control	920012
13	920013	Volume On/Off Control	920013
14	920014	Squelch Control	920014
15	920015	RF Gain Control	920015
16	920016	Channel Select Switch	920016
17	920017	Red LED	920017
18	920018	Green LED	920018

Symbol	CB900 Part No.	Description	CB901 Part No.
19	920019	Display LED	920019
20	920020	Flexible Connector	920020
21	920021	Push Switch	920021
22	920022	Display Lens	920022
23	920023	Speaker	920023
24	920024	Bottom Cabinet	920024
25	920025	Front Panel	921025
26	920026	Rotary Knob	920026
27		Push Knob	921027
28	920028	Selector Knob	920028
29	920029	Complete Microphone	920029
	920030	Mic. PTT Switch	920030
	920031	Mic. Transducer	920031
	920032	Mic. 4 Pin Input Plug	920032
	920033	Unit Fixing Kit	920033
	920034	Mic. Fixing Kit	920034

ALIGNMENT INSTRUCTIONS

These alignment instructions if followed correctly will ensure that the unit performs to Home Office specification MPT1320. Amstrad Consumer Electronics PLC can accept no responsibility if any unit has been realigned not in accordance with the following instructions.

Alignment procedure

Measurement condition

Reference temperature: 25°C

Reference humidity: 65%

Note: Alignment should be performed at a room temperature of 5 – 35°C and a room humidity of 45 – 85%.

Power supply: DC 13.2V $\pm$ 1%.

Test Equipment Required.

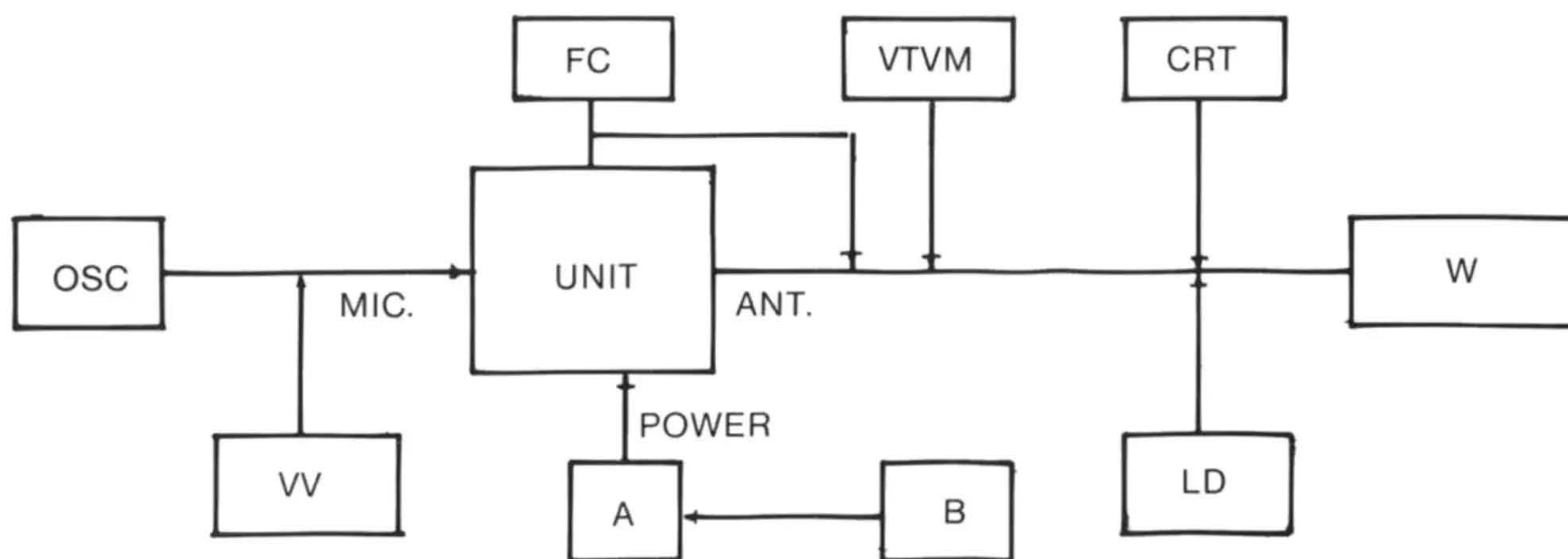
ITEM	SYMBOL	PARAMETERS
a) Audio signal generator	OSC	Sine wave, 10 Hz – 20 kHz.
b) Audio level meter	VV	1 mV measurable
c) DC Ampere meter	A	DC 3A
d) Regulated power supply	B	DC 0 – 20V, 3A or higher
e) Frequency counter	FC	0 – 40 MHz, high input impedance
f) RF VTVM	VTVM	Probe type
g) Oscilloscope	CRT	30 MHz, high input impedance
h) RF wattmeter	W	Thermo-couple type, 50 ohm, 15W
i) Standard signal generator	SG	100 kHz – 50 MHz, -10 -100 dB
j) Speaker dummy load	R	8 ohm, 5W
k) Circuit tester	T	DC 20 KOhm/V, high input impedance type
l) DC volt meter	DCV	0 – 20V
m) Spectrum analyser	SP	0 – 1000 MHz
n) Distortion meter	DM	
o) Linear detector	LD	

All test equipment must be properly calibrated.

TRANSMITTER ALIGNMENT

Test set-up

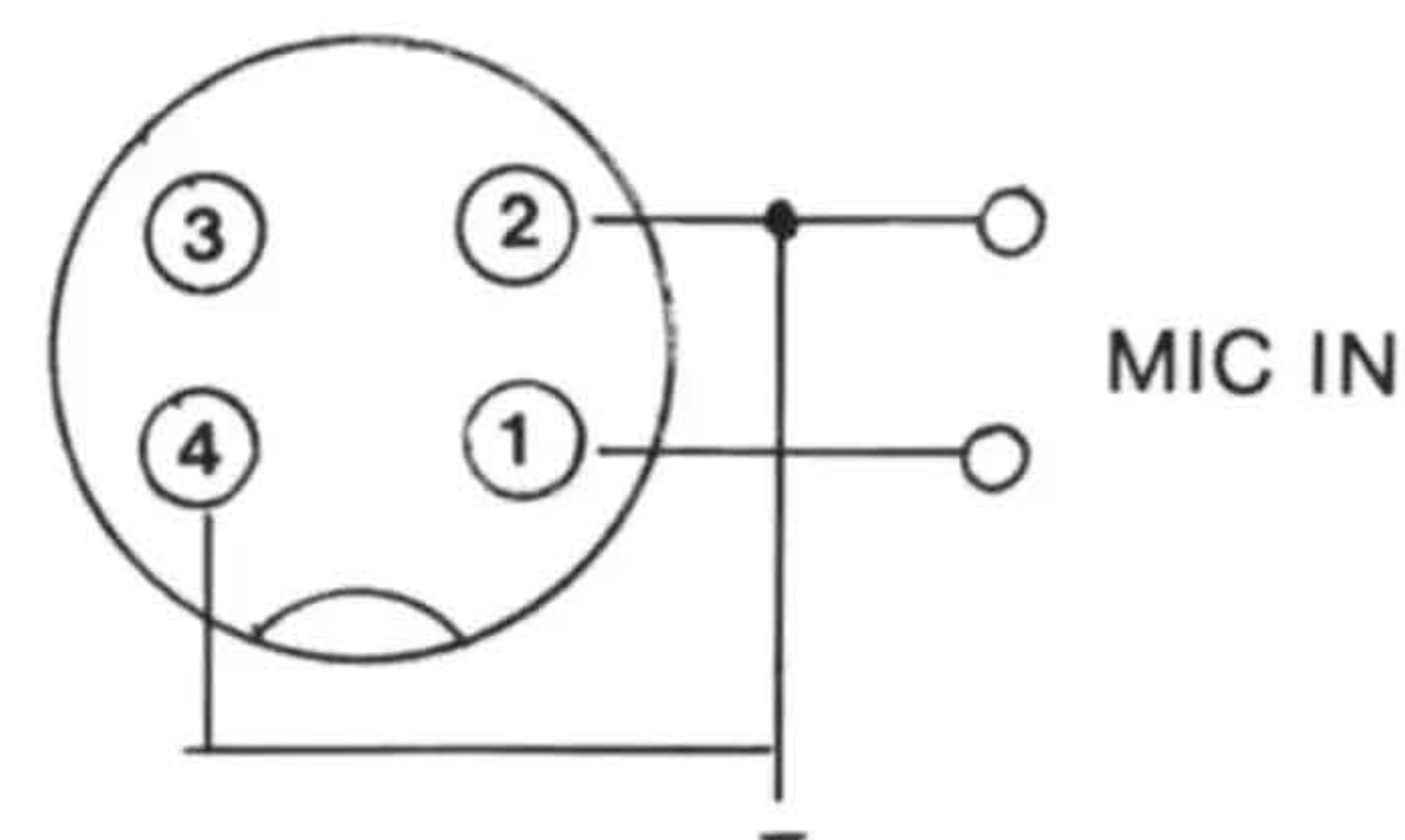
Connect testing equipment to the unit as shown:



Dummy microphone plug.

Set the unit to transmit mode by the dummy microphone plug wired as shown:

Transmit dummy microphone plug.



TRANSMITTER ALIGNMENT

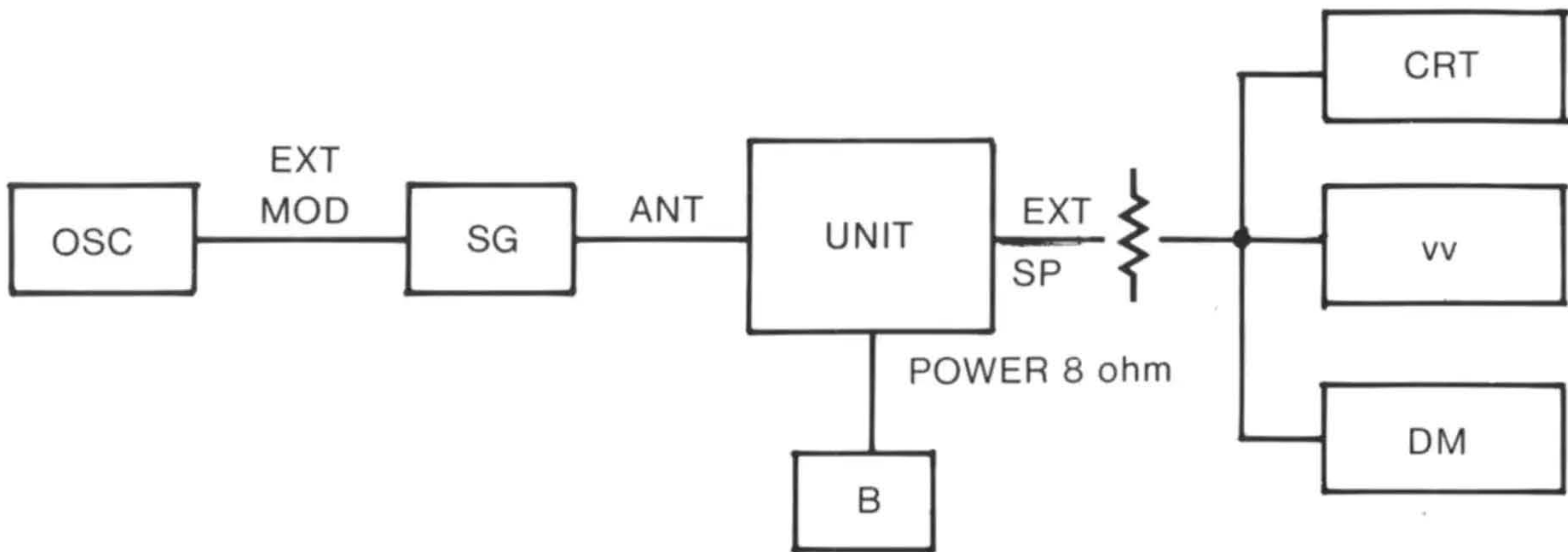
	FUNCTION	SIGNAL IN	SIGNAL OUT	METHOD	REMARKS
1	Crystal oscillator alignment - 10.240MHz.		Frequency counter at junction C23/Pin 11 U1 with 100p Ceramic Cap in series.	Adjust L2 for 10.240000MHz $\pm$ 50Hz.	Use non-metallic trimming tool.
2	VCO alignment (REF) (Channel 1)		Circuit tester between C9 & ground. Set to 12V DC range.	Select Channel 1. Adjust T1 to give 2.0V DC.	Use non-metallic trimming tool.
3	VCO alignment (Channel 1).	Dummy microphone plug.	Circuit tester between C9 & ground. Set to 12V DC range.	Select channel 1. Set unit to transmit mode via dummy plug. Adjust CT1 to give 2.0V DC.	Use non-metallic trimming tool.
4	REPEAT STEPS 2 AND 3 UNTIL NO FURTHER IMPROVEMENT				
5	VCO alignment (Channel 40).	Dummy microphone plug.	Circuit tester between C9 & ground. Set to 12V DC range.	Select channel 40. Set unit to transmit. Check voltage for 4-5V DC.	If this voltage incorrect recheck steps 2-5. VCO alignment is now complete. Disconnect the meter.
6	RF Power alignment (Channel 20)	Dummy microphone plug.	RF Meter and 'Scope to aerial socket.	Select channel 20. Set 10 dB atten. switch at 'IN' position. Preset cores of T2, T3 & T4 3 turns inside from top. Preset core of L4 1 turn counter-clockwise from the bottom. Preset core L8 1 turn outside the top. Set unit to transmit mode via dummy plug. Adjust T2, T3, T4, L4, L8 IN ORDER for max output on 'scope & max reading on meter.	1. Use non-metallic trimming tool.
7	REPEAT STEP 6 IN CORRECT ORDER 3 TIMES TO CHECK CORRECT LEVELS.				
8	RF Power check (Channel 20).	Dummy microphone plug.	RF Meter and 'Scope to aerial socket.	Select channel 20. Set unit to transmit. Check power output is between 3.7W & 4.00W & that current drain is less than 1.6A.	If either of the readings on step 8 or 9 are incorrect check steps 6-9. If steps 8 & 9 still incorrect the fault must be cleared.
9	REPEAT STEP 8 ON CHANNEL 1 & CHANNEL 40.				
10	RF Power check (10dB attenuation channel 20).	Dummy microphone plug.	RF Meter and 'Scope to aerial socket.	Select channel 20. Put attenuation switch to 'out' position. Set unit to transmit. Check output power is between 0.2W & 0.4W and current drain is less than 0.7A.	1. Use non-metallic trimming tool.
11	REPEAT STEP 10 ON CHANNEL 1 & CHANNEL 40.				
12	Frequency alignment.	Dummy microphone plug.	Frequency counter at aerial socket with 100p Ceramic Cap. in series.	Select channel 20. Set unit to transmit. Adjust L2 to show 27.79125MHz.	
13	REPEAT STEP 12 ON ALL CHANNELS. FREQUENCY MUST BE CORRECT TO $\pm$ 300 Hz.				
14	Modulation alignment (Channel 20).	30mV @1.25 kHz audio applied at mic. socket.	Linear detector at aerial socket.	Select channel 20. Set unit to transmit. Adjust RV3 for $\pm$ 1.5kHz deviation.	
15	Modulation alignment (Channel 20).	3mV @1.25kHz audio applied at mic. socket.	Linear detector at aerial socket.	Select channel 20. Set unit to transmit. Check deviation for between $\pm$ 0.8kHz & $\pm$ 1.0kHz.	
16	RF Meter alignment (10dB switch 'out').	Dummy microphone plug.	Monitor signal LEDs.	Set unit to transmit. Adjust RV1 to light red LED No.5.	
17	RF Meter alignment (10dB switch 'in').	Dummy microphone plug.	Monitor signal LEDs.	Set unit to transmit. All LEDs should now be lit.	

RECEIVER ALIGNMENT

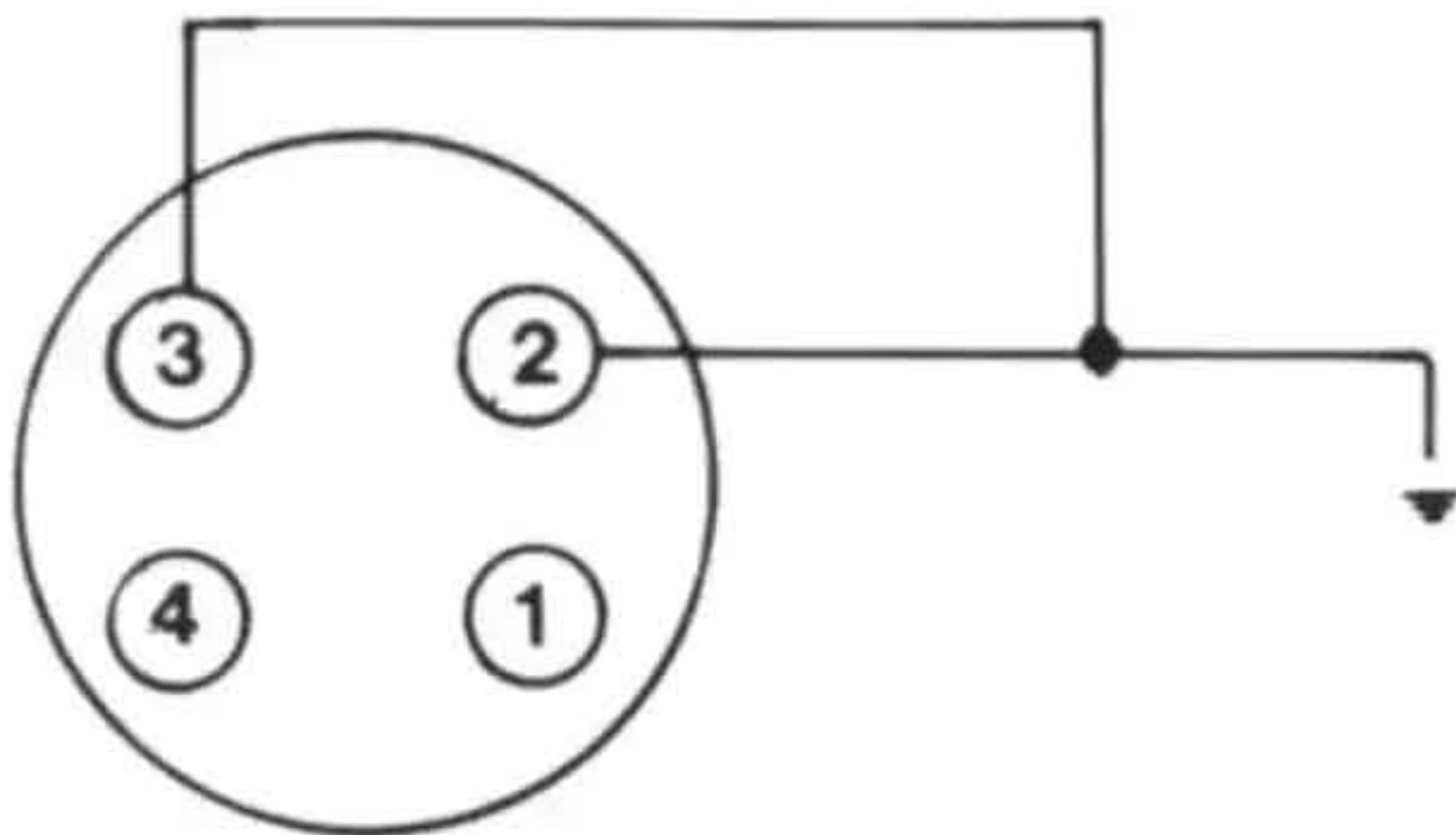
	FUNCTION	SIGNAL IN	SIGNAL OUT	METHOD	REMARKS
1	Receiver sensitivity alignment (Channel 20).	Signal generator at aerial socket.	DV Volt meter at RV2. Set meter to 3V range.	Select channel 20. Inject sig of 27.79125MHz with RF input sig of 4uV @ 1kHz ± 1.5kHz deviation. Adjust T5, T6, T7, T8, T9, & T10 for max meter reading IN CORRECT ORDER.	1. Use non-metallic trimming tool.
2	REPEAT STEP 1 3 TIMES KEEPING TO CORRECT ORDER				
3	Receiver sensitivity alignment.	Signal generator at aerial socket.	DV Volt meter at RV2. Set meter to 3V range.	Reduce RF input signal to zero. Adjust T11 for max noise output at speaker. Apply 1MV RF input sig and readjust T11 for max audio output and min distortion.	Reference measurements should now be: input 0.5uV. (sig gen -6dB atten) = 0dB for S/N ratio.
4	Squelch alignment.	Signal generator at aerial socket.	Monitor speaker.	Set squelch control full on. Set RF gain control full on. Apply 7uV RF sig with 1kHz ± 1.5kHz deviation. Adjust RV5 so that output from speaker just disappears.	
5	S meter alignment.	Signal generator at aerial socket.	Monitor signal LEDs.	Set Select channel 20. Apply 100uV from sig gen. Adjust RV 2 so that green LED lights.	

RECEIVER ALIGNMENT

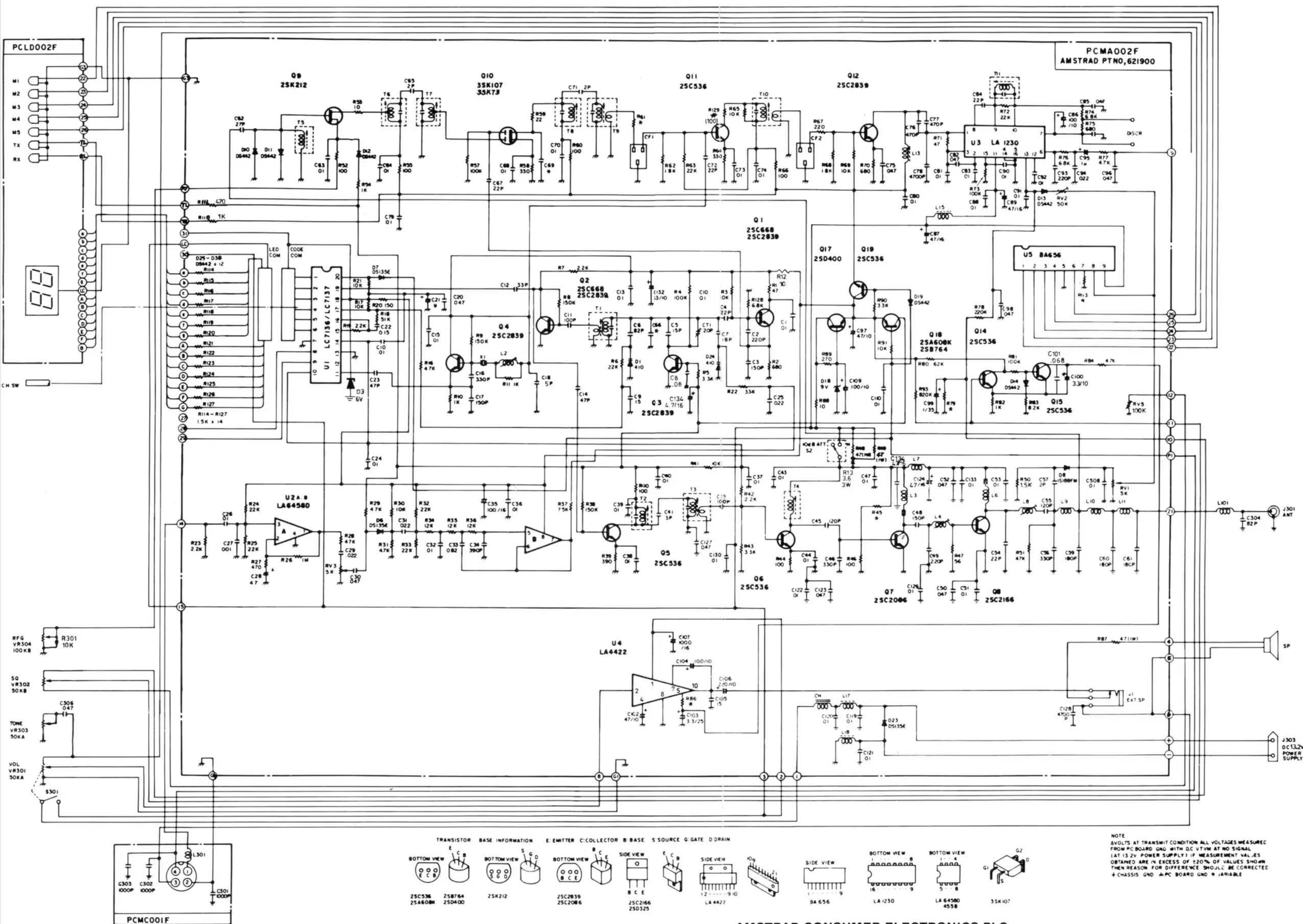
Test set-up
Connect testing equipment to the unit as shown:



Dummy microphones plug.
Set the unit to receive mode by the dummy microphone plug wired as shown:



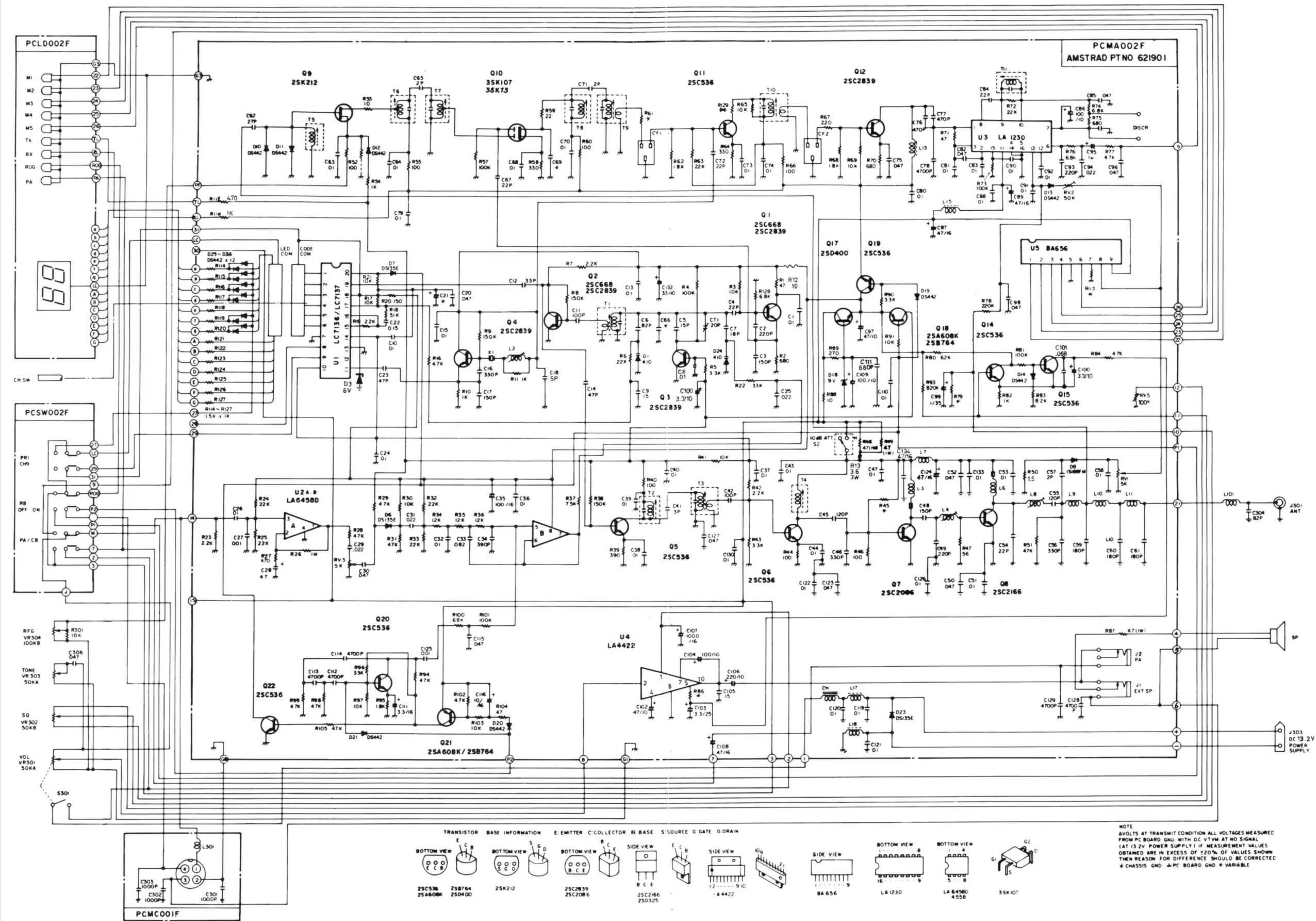
CB900 CIRCUIT



AMSTRAD CONSUMER ELECTRONICS PLC
MANUFACTURERS OF HI-FI AND AUDIO EQUIPMENT
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In keeping with our policy of continually improving our service, and the technical quality of our products, we reserve the right to change component types, manufacturers, sources of supply or technical specification at any time.

CB901 CIRCUIT DIAGRAM



ELECTRICAL PARTS LIST

This parts list covers both the CB900 and the CB901.
If you are referring to the CB900 circuit there will parts in this list not in the circuit.

Value	Circuit Reference	Part No.
Resistors (all 1/4 watt/5%)		
47ohm	R1, 7, 104	10020
68k	R2, 70, 75	10105
10k	R3, 17, 21, 30, 41, 65, 69, 91, 97, 103, 301	10085
100k	R4, 57, 73, 81, 101	10109
3.3k	R5, 43, 90	10073
22k	R6, 24, 25, 32, 33, 63, 72	10093
2.2k	R7, 19, 23, 42	10069
150k	R8, 9, 38	10113
1k	R10, 11, 54, 82, 110	10061
10k	R12, 53, 88	10008
4.7k	R16, 28, 29, 31, 77, 84, 94, 98, 99, 105	10077
51k	R18	10102
150ohm	R20	10036
33k	R22, 96	10097
1M	R26	10147
470ohm	R27, 111	10048
12k	R34, 35, 36	10087
75k	R37	10106
390ohm	R39	10046
100ohm	R40, 44, 46, 52, 55, 60, 66, 129	10032
56ohm	R47	603404
1.5k	R50, 114-127	10065
47k	R51, 102	10101
330ohm	R58, 64	10044
1.8k	R62, 68, 95	10067
220ohm	R67	10040
6.8k	R74, 76, 128	10081
220k	R78	10117
62k	R80	920100
8.2k	R83	10083
270ohm	R89	10042
820k	R93	10130
Resistors (1 watt)		
47ohm	R48, 49, 87	920101
Resistors (3 watt)		
3.6ohm	R130	920102
Resistors (preset)		
5k	RV1, RV3	920141
50k	RV2	920142
100k	RV4	920103

Value	Circuit Reference	Part No.
Capacitors Ceramic		
0.01mfd	C1, 8, 10, 13, 15, 24, 26, 32, 36, 37, 38, 39, 40, 43, 44, 47, 51, 53, 58, 63, 64, 68, 70, 73, 74, 79, 80, 81, 83, 88, 90, 91, 92, 110, 119, 120, 121, 122, 126, 133	24011
220pF	C2, 49, 93	400107
150pF	C3, 17, 48	610123
22pF	C4, 54, 67, 72, 84	24021
15pF	C5	610122
82pF	C6, 304	24012
100pF	C11, 42	24016
33pF	C12	24029
47pF	C14, 23	24002
330pF	C16, 46, 56	24003
5pF	C18	960302
0.047mfd	C20, 30, 50, 52, 75, 82, 85, 98, 115, 123, 306	24015
0.022mfd	C25, 29, 31, 94, 96	24013
0.001mfd	C27, 125	24027
390pF	C34	920104
3pF	C41	960301
2pF	C57, 65, 71	24017
180pF	C59, 60, 61	920105
27pF	C62	24029
470pF	C76, 77	24004
4700pF	C78, 112, 113, 114, 129, 130	24009
1000pF	C301, 302, 303	24027
Capacitors Mylar		
15pF	C9	920105
0.15mfd	C22, 105	960309
0.082mfd	C33	920106
0.068mfd	C101	500310
Capacitors Electrolytic (all 16V)		
4.7mfd	C28	20049
100mfd	C35, 86, 104, 109	20028
47mfd	C87, 89, 97, 102, 108, 124, 134	20027
3.3mfd	C100, 111	20146
220mfd	C106	20029
1000mfd	C107	20118
10mfd	C116	20024
Capacitors Electrolytic (25V)		
33mfd	C103	20039
Capacitors Electrolytic (50V)		
1mfd	C95, 99	20062

Circuit Reference	Description	Part No.
Transistors		
Q1-4, 12	2SC668/ 2SC2839/ BF595/BF273	50014
Q5, 6, 11, 14, 15, 19, 20, 22	2SC536/BC237	50016
Q7	2SC2086	920107
Q8	2SC2166/ BD243B/BD599	920108
Q9	2SK212	920109
Q10	3SK107/3SK73	920110
Q17	2SD400/BC338	920111
Q18,21	2SA608K/ 2SD764/ BC213/BC205	920113
Integrated Circuits		
U1	LC7136/7	920114
U2	LA6458D	920115
U3	LA1230	920116
U4	LA4422	910401
U5	BA656	709100
Diodes		
D1, 24	ITT410	920117
D3	6.2V Zener	920118
D6, 7, 23	DS135E/IN4001	15008
D8	IS118 FM	920112
D10-14, 19-21, 25-36	DS442/IN914	15010
D18	9.0V Zener	920119
Transformers		
T1	HTX 479 (white)	920120
T2	HTX 453 (white)	920121
T3, 6, 7	HTX 464 (red)	920122
T4	HTX 455 (red)	920123
T5	HTX 462 (green)	920124
T8, 9	HTX 459 (green)	920125
T10	HTX 460 (black)	920126
T11	HTX 461 (black)	920127
Coils		
L2	HTX 480 (brown)	920128
L3, 6, 9-12	HTX 477	920129
L4	Peaking Coil (yellow)	920130
L7	HTX 473	920131
L8	Peaking Coil (black)	920132
L13	150uH Coil	920133
L15	2.2uH Coil	920134
L16	10uH Coil	920135
L17, 18	Peaking Coil	920136
L101, 301	Aerial Coil	920137
Ch	In-Line-Choke	920002
Miscellaneous		
XTL	Crystal Oscillator	920138
CT1	20p Ceramic Trimmer	920139
CF1	Ceramic Filter (10.7MHz)	993034
CF2	Ceramic Filter (455kHz)	920140

IC Pin Voltages**U1 – LC7136/7**

Pin	Rec	Trans
1 -	0V DC	-3.7V DC
2 -	0V DC	-5.3V DC
3 -	5.85V DC	5.85V DC
4 -	0V DC	-0.5V DC
5 -	5.85V DC	5.85V DC
6 -	0V DC	0V DC
7 -	0V DC	0V DC
8 -	0V DC	0V DC
9 -	0V DC	0V DC
10 -	0V DC	2.9V DC
11 -	0.3V DC	0.3V DC
12 -	2.9V DC	2.9V DC
13 -	0V DC	0V DC
14 -	0V DC	2.9V DC
15 -	1.3V DC	1.3V DC
16 -	1.3V DC	1.3V DC
17 -	2.35V DC	2.2V DC
18 -	5.85V DC	5.85V DC
19 -	0.3V DC	0.3V DC
20 -	5.7V DC	0V DC

U2 – LA6458D

1 -	4.1V DC	0.9V DC
2 -	1.4V DC	12V DC
3 -	4.1V DC	4.1V DC
4 -	0V DC	0V DC
5 -	3.55V DC	3.55V DC
6 -	4.35V DC	4.35V DC
7 -	4.35V DC	4.35V DC
8 -	8.8V DC	8.8V DC

U3 – LA1230

1 -	2.6V DC	2.6V DC
2 -	2.6V DC	2.6V DC
3 -	2.6V DC	2.6V DC
4 -	0V DC	0V DC
5 -	0V DC	0V DC
6 -	5.8V DC	4.8V DC
7 -	4.8V DC	4.8V DC
8 -	5.2V DC	6.5V DC
9 -	5.35V DC	5.35V DC
10 -	5.35V DC	5.35V DC
11 -	12.0V DC	12.0V DC
12 -	4.9V DC	4.9V DC
13 -	1.7V DC	2V DC
14 -	0V DC	0V DC
15 -	4.8V DC	4.4V DC
16 -	0V DC	0V DC

U4 – LA4422

1 -	12V DC
2 -	0V DC
3 -	0V DC
4 -	6.4V DC
5 -	1.1V DC
6 -	0V DC
7 -	10.2V DC
8 -	0V DC
9 -	0V DC
10 -	6V DC

U5 – BA656

1 -	1.9V DC	-0.9V DC
2 -	1.8V DC	-0.8V DC
3 -	1.8V DC	-0.4V DC
4 -	0V DC	-1.1V DC
5 -	0V DC	0V DC
6 -	0V DC	1.0V DC
7 -	0.9V DC	1.9V DC
8 -	0.3V DC	2.1V DC
9 -	12V DC	12V DC

Q1

E -	3.3V DC	3.3V DC
B -	2.9V DC	2.9V DC
C -	8.6V DC	8.6V DC

Q2

E -	0V DC	0V DC
B -	0.3V DC	0.7V DC
C -	2.8V DC	7.2V DC

Q3

E -	0V DC	0V DC
B -	0V DC	0.8V DC
C -	5.8V DC	0V DC

Q4

E -	4.25V DC	4.25V DC
B -	3.3V DC	3.3V DC
C -	8.7V DC	8.7V DC

Q5

E -	0V DC	1.5V DC
B -	0V DC	1.5V DC
C -	0V DC	6.4V DC

Q6

E -	0V DC	1.1V DC
B -	0.1V DC	1.4V DC
C -	12V DC	9.6V DC

Q7

E -	0V DC	0V DC
B -	0V DC	-0.15V DC
C -	12V DC	8.3V DC

Q8

E -	0V DC	0V DC
B -	0.1V DC	-0.8V DC
C -	12V DC	8.3V DC

Q9

S -	7.45V DC
D -	0.3V DC
G -	0V DC

Q10

S -	0.2V DC
D -	7.7V DC
G1 -	0V DC
G2 -	0V DC

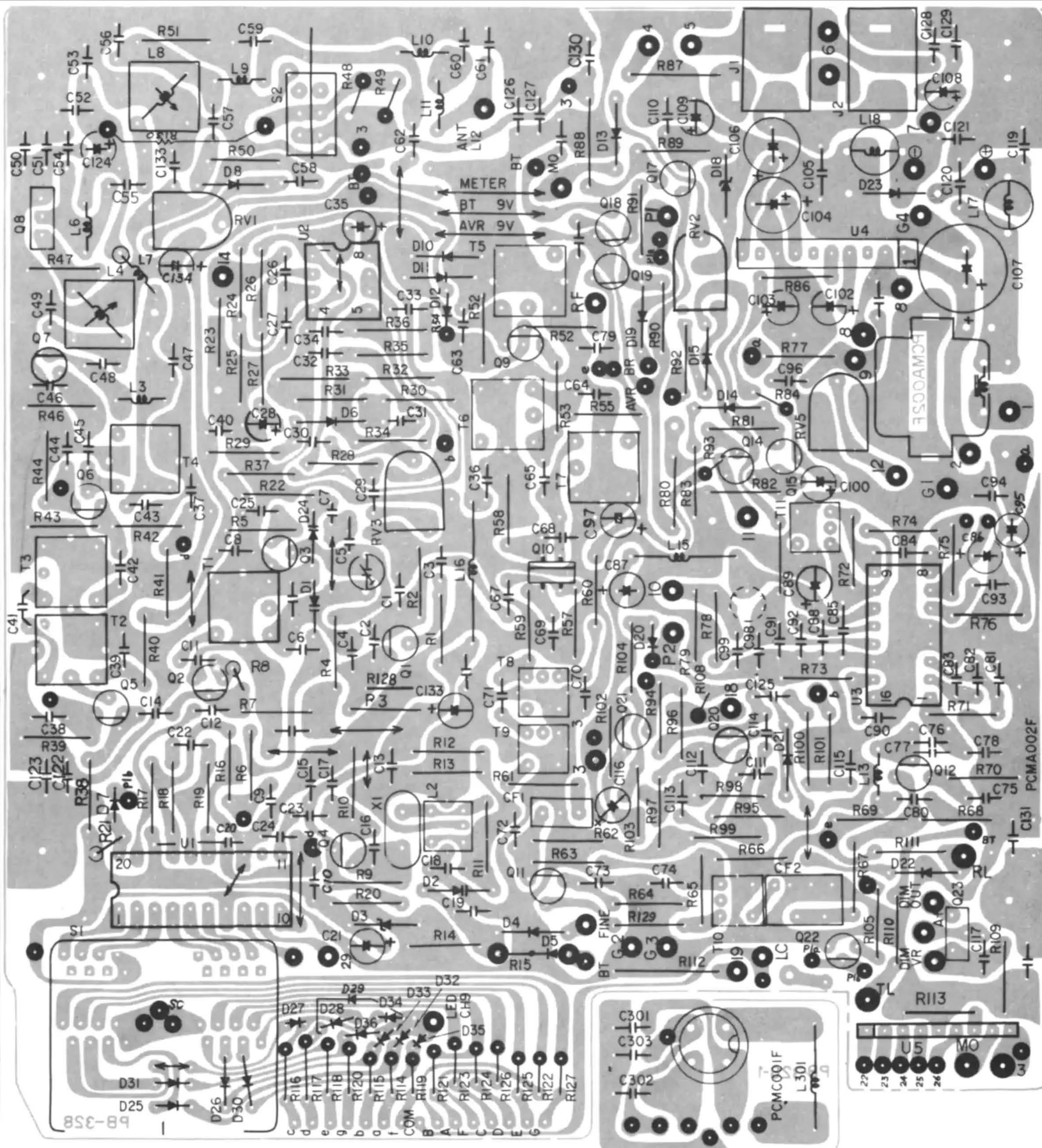
Q11

E -	0.55V DC
B -	1.25V DC
C -	7.2V DC

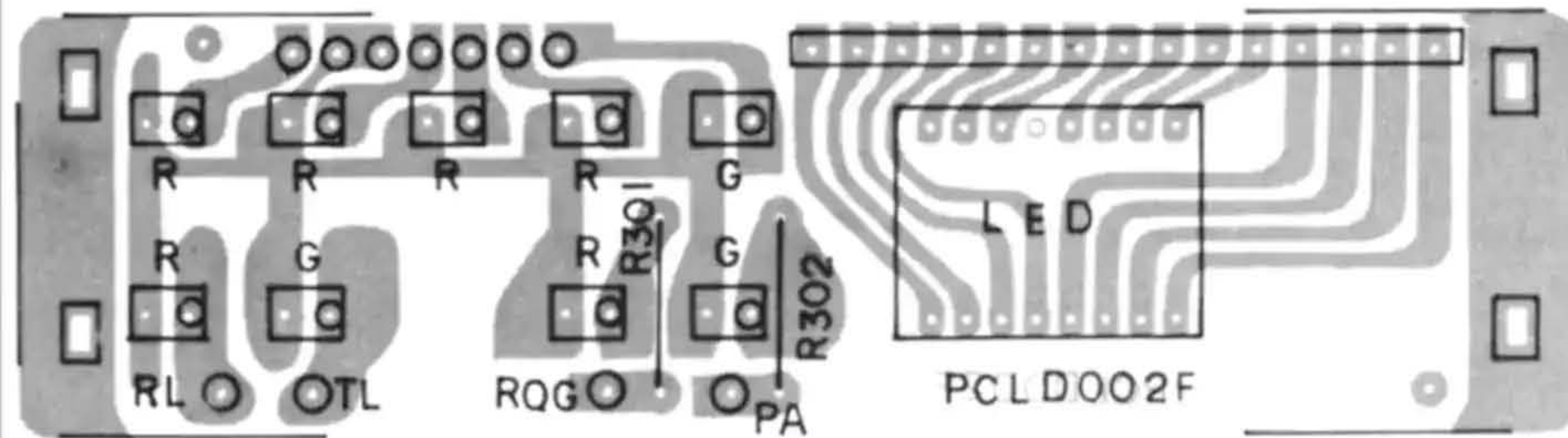
Q12

E -	1.25V DC
B -	0.55V DC
C -	7.75V DC

Voltages taken on AVO 8 MkV
In-Line choke clamp used as reference ground.



DISPLAY PCB



SWITCH PCB (901 ONLY)

