Car radio Toyota part no 86120–30221

Service
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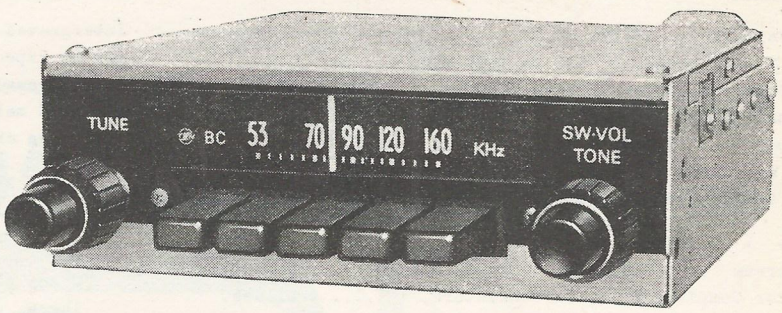
MS-85




# Service Manual

12 V

PRODUCED FOR AUSTRALIAN MOTOR INDUSTRIES LTD.

FOR

## TOYOTA CROWN

### 1976 MODEL MS85

**WARNING**

**CONNECT POWER LEAD OF RECEIVER TO POSITIVE BATTERY TERMINAL ONLY. RECEIVER WILL BE DAMAGED IF CONNECTED TO INCORRECT POLARITY.**

Subject to modification
3102 305 31951
August 1976
Printed in Australia

PHILIPS

CONCISE DATA.

Supply Voltage : 13.2V. DC.
Minimum Tuning Range : 525 to 1605 kHz.
Intermediate frequency : 455 kHz.
R.F. Sensitivity : 26 db or better (at 0.5 Watt output).
Power Output : 3.5 Watts Min. RMS (at T.H.D. = 10%).
Speaker Impedance : 4 ohms.
Current Consumption : Approx. 1 amp (at 0.5 watt output) Excluding dial lamps.
Polarity : Negative to earth only.
Metal Screws : I.S.O. Metric Standard.
Transistor Complement : 3 Transistors, 1 I.C., 4 Diodes.

CONDITIONS.

Receiver : Top lid removed.
Volume Control : Fully clockwise.
Tone Control : Fully clockwise.
Output Meter : Connected to receiver output (Speaker disconnected).
Output Level : 50mW. Audio.
Polarity : Negative to receiver chassis. Positive to receiver power lead.
Signal Generator Output : Kept to minimum.

ALIGNMENT PROCEDURE.

Equipment

Signal Generator : Modulated at 400 Hz.
Output Meter : 4 ohm impedance.
Generator Series Capacitor : 100nF (for I.F. Alignment).
Dummy Antenna : 85pF.
Aerial Trimmer Tool : 4802 395 57002.

I.F. ALIGNMENT.

NOTE THAT due to the inclusion of a ceramic I.F. filter in this receiver, proper peaking of the I.F. coils requires a dynamic alignment procedure. This can be achieved by the use of a wobbulator, or by simultaneously varying the signal generator frequency around 455 kHz. whilst peaking the I.F. coils, until maximum output is obtained.

BROADCAST ALIGNMENT.

Connect dummy antenna to antenna input socket.
Set output meter to 50mW range, 4 ohm impedance and connect to receiver output (speaker disconnected).

| STEP | PURPOSE | ADJUST | PROCEDURE |
|---|---|---|---|
| 1 | Tuning Frequency range. | T1 | 510 kHz must be received at left end of dial. |
| 2 | Tuning Frequency. | C9 | 1630 kHz must be received at right end of dial. |
| 3 | Repeat STEPS 1 & 2. | | |
| 4 | Tracking. | C1 & C5 | Peaking at 1400 kHz. |

CHECKING SERVICEABILITY OF I.C.

Intergrated circuits are inherently reliable devices and can be expected to give long life in normal service. DO NOT, assume that the I.C. is responsible for a reported malfunction until you have carried out the following check :-

Caution : Great care must be taken to ensure that the pins of the I.C. are not shorted together or to frame.

- Check current drawn by receiver. With serviceable lamps, reading should be typically 1 amp. (with no signal input).
- Turn Volume Control fully up. When wiper of Volume control is touched corresponding crackles should be heard from speaker.
- Measure D.C. Voltage on Pin 5 of I.C. This should be approximately 6 - 7 volts (or half the supply voltage).

If the above checks are satisfactory, I.C. is likely to be serviceable. If there is still doubt check sensitivity by injecting 5.0 mV audio signal to wiper of Volume Control.
Power output in 4 ohm lead should be approximately 50 milliwatts.

CHANGING FAULTY I.C.

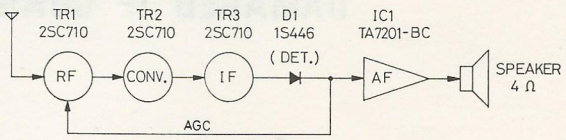
- Apply a soldering iron to each pin of the I.C. in turn, removing as much solder as possible. Carefully note connections and orientation of I.C.
- Withdraw I.C.
- Fit new I.C., ensuring orientation is correct. Solder connection as before, applying heat for a minimum time necessary to obtain well soldered joints.

WARNING :-

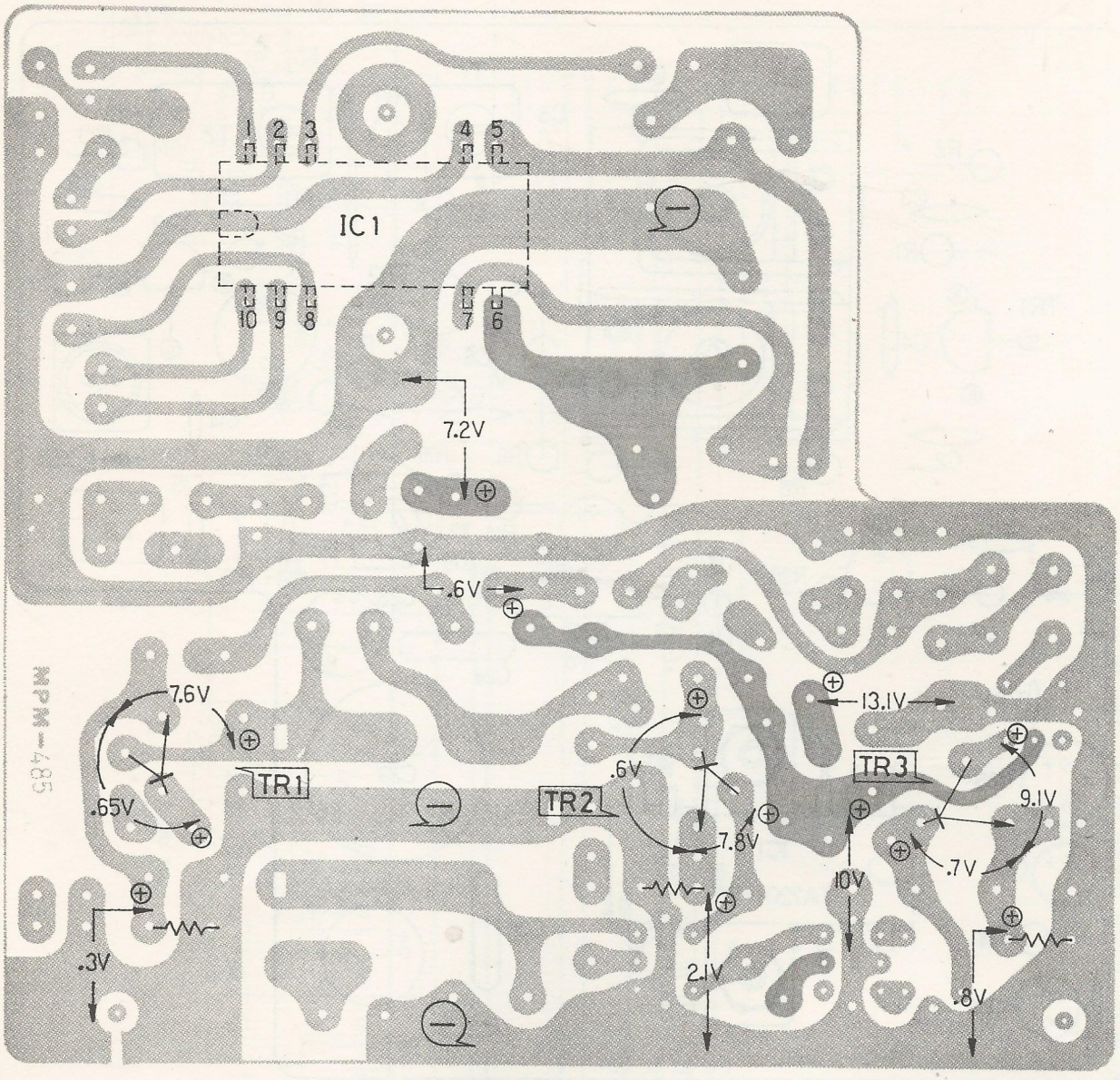
The battery lead of this receiver must be connected only to the Positive terminal of a battery.
Connection to incorrect polarity will damage receiver.
Connect receiver output socket only to 4 ohm load.

REMARKS :- Always adjust antenna trimmer (C1) positioned on tuning control shaft with radio installed in car.

**BLOCK DIAGRAM**



# CHECK POINTS ON PC BOARD



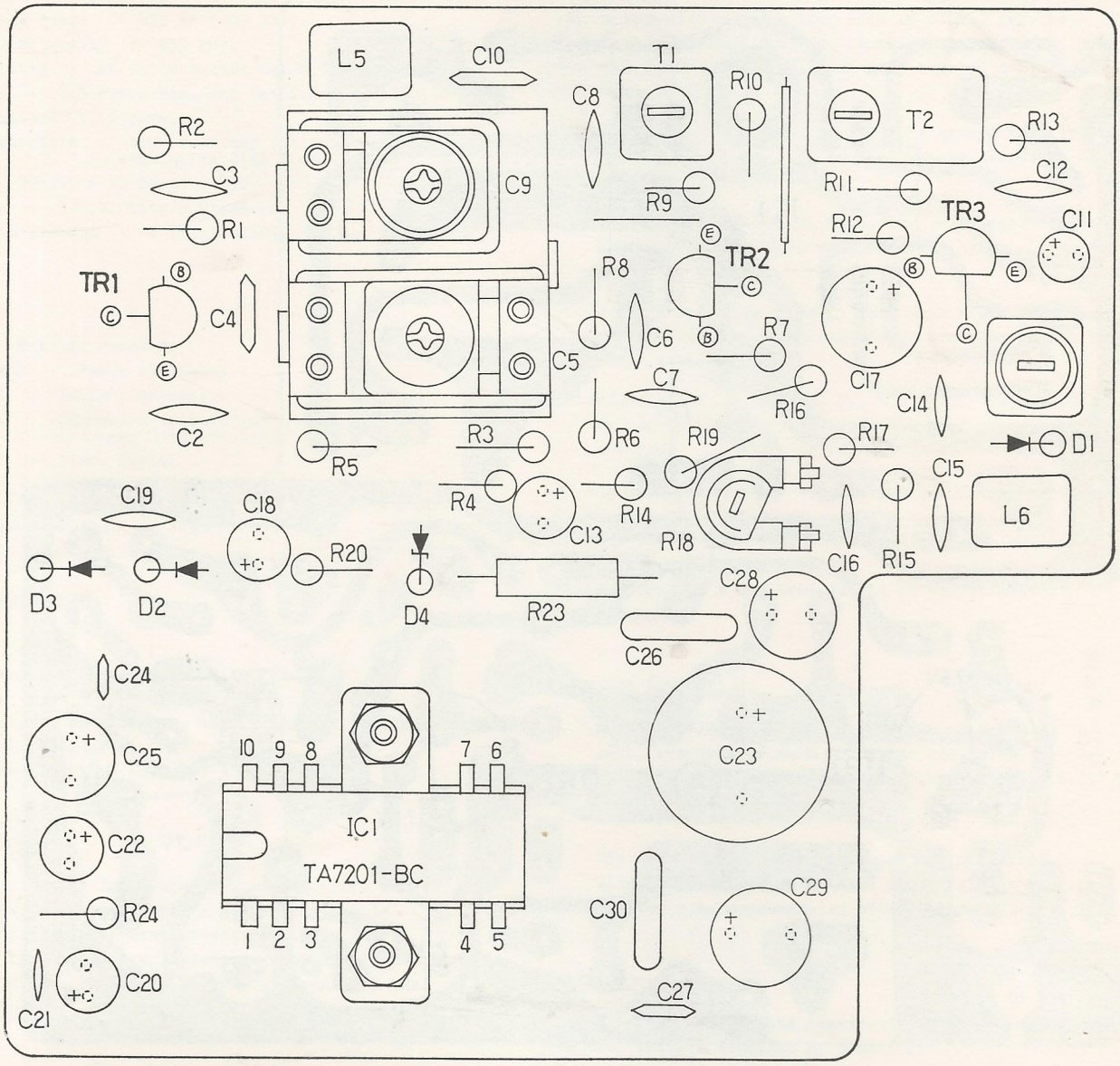

| IC \ Pin No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| IC 1 | 2.9V | 3.4V | 1.4V | — | 6.8V | 13.1V | 12.2V | 4.0V | 8.2V | 1.3V |

**NOTES:** 1. DC voltages measured with 25,000 ohm per volt meter, power supply set at +13.2 VDC no signal input.

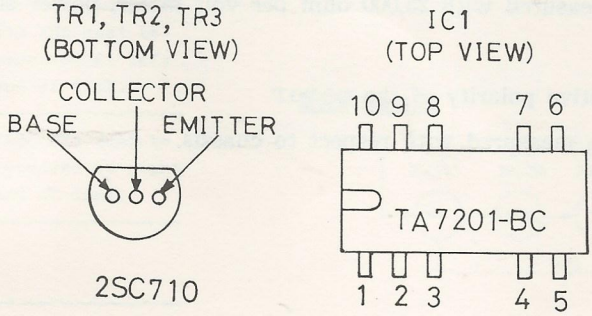
2. ⊕ denotes positive polarity of the meter

3. IC pin voltages measured with respect to chassis.

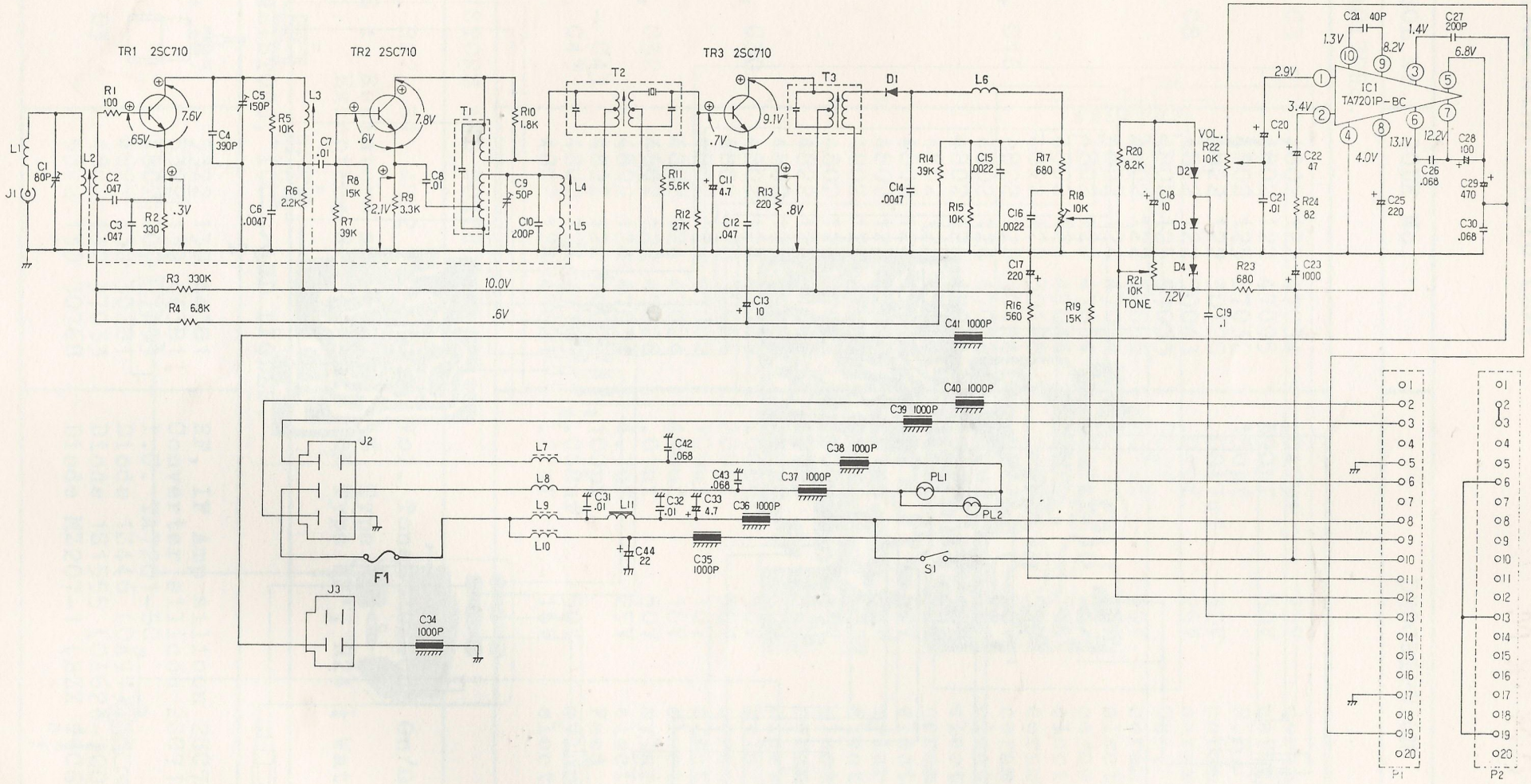
## PARTS LOCATION ON PC BOARD




## IC & TRANSISTOR BASE CONNECTIONS



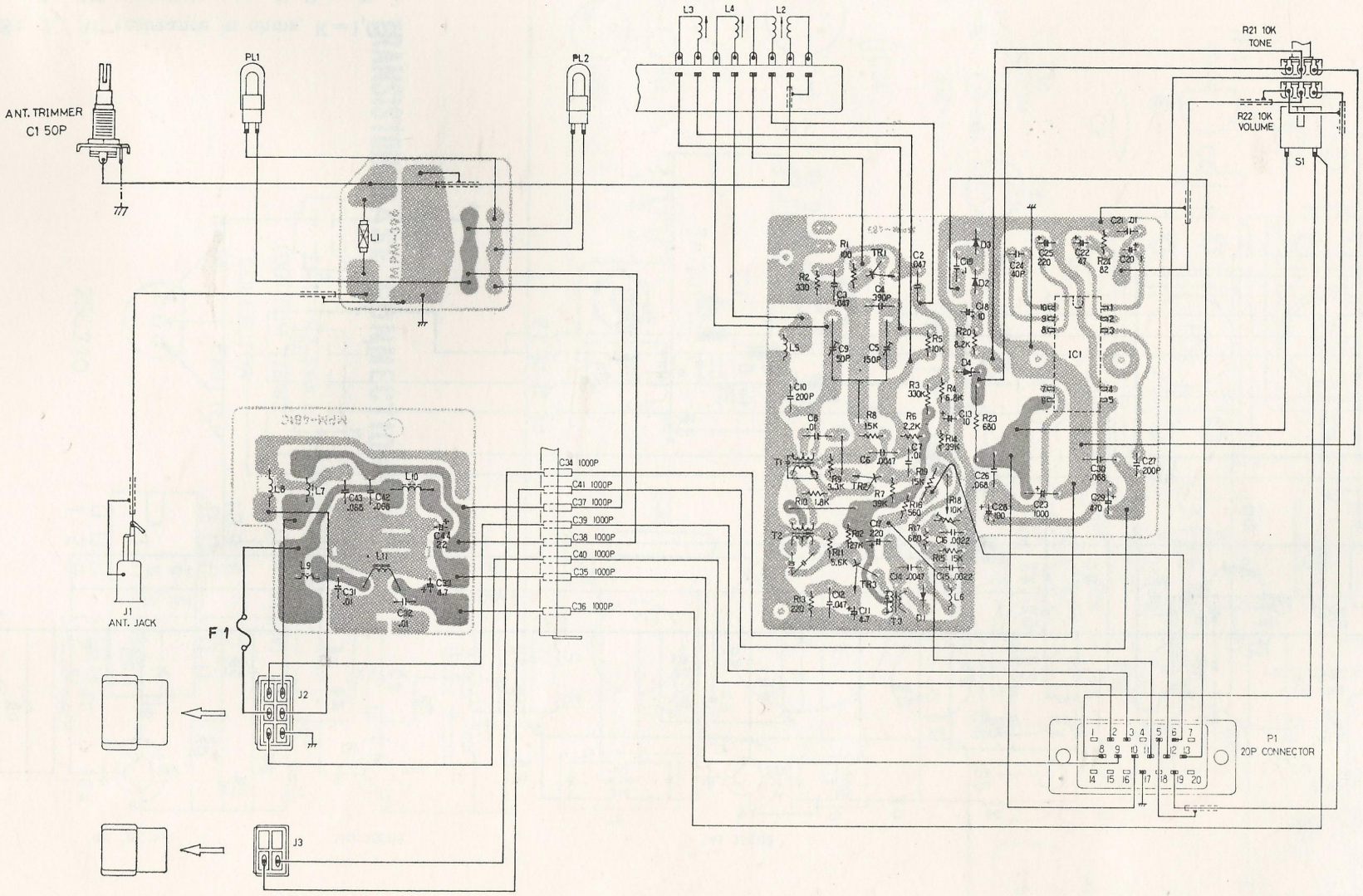
# SCHEMATIC




**NOTES:**

1. All resistance in ohms, K=1,000.
2. All capacitance in $\mu$F, P=$\mu\mu$F.
3. DC voltages measured with 25,000 ohm per volt meter, power supply set at +13.2 VDC, no signal input.
4. IC pin voltages measured with respect to chassis.

# WIRING ON PC BOARD




**NOTES:** 1. All resistance in ohms, K=1,000.

2. All capacitance in $\mu$F, P=$\mu\mu$F.

## REPLACEMENT PARTS LIST

| SYMBOL No. | CODE No. | DESCRIPTION | | |
|---|---|---|---|---|
| CAPACITORS. | | | | |
| C2, C3 | 4802 122 47054 | .047pf | 25V | ceramic. |
| C4 | 4802 122 47095 | 390pf | 50V | ceramic. |
| C5 | 4802 125 57032 | 150pf | | R.F. Trimmer. |
| C6 | 4822 122 30128 | .0047uf | 50V | ceramic. |
| C7, C8 | 4822 122 30043 | .01uf | 25V | ceramic. |
| C9 | 4802 125 57033 | 50pf | | Osc. Trimmer. |
| C10 | 4802 122 37066 | 200pf | 50V | ceramic. |
| C11 | 4802 124 47034 | 4.7uf | 25V | electrolytic. |
| C12 | 4802 122 47054 | .047uf | 25V | ceramic. |
| C13 | 4802 124 47044 | 10uf | 16V | electrolytic. |
| C14 | 4822 122 30128 | .0047uf | 50V | ceramic. |
| C15, C16 | 4822 122 30114 | ,0022uf | 50V | ceramic. |
| C17 | 4802 124 47018 | 220uf | 16V | electrolytic. |
| C18 | 4802 124 47044 | 10uf | 16V | electrolytic. |
| C19 | 4802 122 47055 | .1uf | 12V | ceramic. |
| C20 | 4802 124 47037 | 1uf | 50V | electrolytic. |
| C21 | 4802 122 47028 | .01uf | 50V | mylar. |
| C22 | 4802 124 47061 | 47uf | 6.3V | electrolytic. |
| C23 | 4802 124 47051 | 1000uf | 16V | electrolytic. |
| C24 | 4822 122 31069 | 40pf | 50V | ceramic. |
| C25 | 4802 121 47006 | 220uf | 10V | electrolytic. |
| C26, C30 | 4802 121 47169 | .068uf | 50V | mylar. |
| C27 | 4802 122 37066 | 200pf | 50V | ceramic. |
| C28 | 4802 124 47002 | 100uf | 10V | electrolytic. |
| C29 | 4802 124 47024 | 470uf | 16V | electrolytic. |
| C31, C32 | 4802 122 47028 | .01uf | 50V | mylar. |
| C33 | 4802 124 47034 | 4.7uf | 25V | electrolytic. |
| C34 - C41 | 4822 122 70022 | 100pf | | Feed Thru. |
| C42, C43 | 4802 121 47169 | .068uf | 50V | mylar. |
| C44 | 4802 124 47021 | .22uf | 16V | electrolytic. |
| RESISTORS AND CONTROLS | | | | |
| R21, R22, S1 | 4802 102 27059 | Vol. Tone | 10K OHM | On/Off Switch. |
| NOTE : | Resistors are $\frac{1}{8}$ Watt, 5% Type 'C'<br>Excepting R23 $\frac{1}{2}$ Watt, 10% Type 'S', R24 $\frac{1}{4}$ Watt, 5% Type 'C'. | | | |
| TRANSISTORS, I.C., AND DIODES. | | | | |
| TR1, TR3 | 5322 130 44381 | RF, IF Amp silicon 2SC710-D (2N1308). | | |
| TR2 | 5322 130 44381 | Converter silicon 2SC710-D (2N1308). | | |
| IC1 | 4802 209 87059 | I.C. TA7201-BC. | | |
| D1 | 4822 130 30281 | Diode 1S446 (OA91). | | |
| D2, D3 | 4802 130 37033 | Diode 1S1555 (OA626-100). | | |
| D4 | 5322 130 30768 | Diode MZ207-1 (BZX 79C6V8). | | |

| SYMBOL No. | CODE No. | DESCRIPTION |
|---|---|---|
| COILS AND TRANSFORMERS. | | |
| L1 | 4802 157 57046 | Choke R.F. 6.2uH. |
| L2, L3, L4 | 4802 158 97002 | Coil Asy. |
| L5 | 4802 153 17106 | Coil 6.2uH. |
| L6 | 4802 158 17041 | Choke R.F. 1mH. |
| L7, L9 | 4802 157 57047 | Choke Filter 50uH. |
| L8 | 4802 158 17082 | Coil 0.6uH. |
| L10 | 4802 158 17083 | Choke Filter 100uH. |
| L11 | 4802 158 17076 | Choke Filter 2.7mH. |
| T1 | 4802 152 27033 | Trans. Osc. |
| T2 | 4802 218 17011 | Ceramic filter 455 kHz. |
| T3 | 4802 153 17143 | Trans. I.F. 455 kHz. |
| MISCELLANEOUS ELECTRICAL. | | |
| J1 | 4802 267 17001 | Antenna Socket. |
| J2 | 4802 321 27155 | Terminal and Lead asy., 'A' Supply. |
| J3 | 4802 321 27156 | Connector and Lead asy., Speaker. |
| P1 | 4802 267 67001 | Connector 20P. |
| P2 | 4802 263 67004 | Connector 20P Shorting. |
| PL1, PL2 | 4822 134 40301 | Lamp dial light. |
| | 4802 255 27008 | Lamp socket. |
| | 4802 480 37017 | Filter lamp. |
| | 4802 210 17066 | Line Filter. |
| | 4802 210 17067 | Push Button tuner asy., (including coil assembly and aerial trimmer). |
| | 4802 410 27059 | Push button knob. (replacement). |
| | 4802 535 77062 | Tuning shaft including Aerial trimmer (replacement). |
| | 4802 214 57046 | P.C. Board assembly main. |
| | 4802 214 57047 | P.C. Board wiring. |
| MISCELLANEOUS MECHANICAL. | | |
| | 4802 331 57006 | Dial plate. |
| | 4802 466 77026 | Back plate. |
| | 4802 450 87076 | Pointer dial plate. |
| | 4802 413 37132 | Knob tone control. |
| | 4802 413 97132 | Knob volume control. |
| | 4802 253 47011 | Fuse 5 amp. |
| | 4802 256 47001 | Fuse holden socket and cover. |
| RADIO ACCESSORIES. | | |
| | 4802 240 47014 | Speaker assembly. |
| | 4802 121 97022 | Suppressor. |
| | 4802 505 17016 | Nut hexagon 9mm. |
| | 4802 532 17014 | Washer plate. |
| | 4802 505 17021 | Nut Lock. |