'diamond-dot'

CAR RADIO DIVISION, ELECTRONIC INDUSTRIES LTD.

ASTOR HOUSE: 161-173 STURT STREET, SOUTH MELBOURNE Phone: 69 0300



# SERVICE DATA

# MODEL PD-C1C

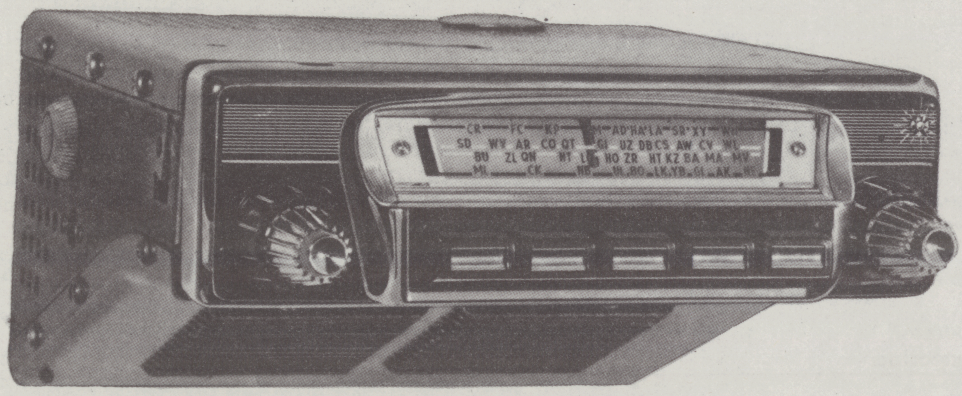
## 2 VALVE AND 4 TRANSISTOR SUPERHETERODYNE

## 12 VOLT CAR RADIO

## FITTED WITH PLUG TYPE POLARITY CHANGE-OVER FACILITY

### Push Button and Manual Tuning

### ESPECIALLY DESIGNED FOR UNIVERSAL INSTALLATIONS



| | | |
|---|---|---|
| TUNING RANGE | - | 525 - 1615 Kilocycles (approx.) |
| POWER OUTPUT | - | 2 Watts |
| OUTPUT IMPEDANCE | - | 15 Ohms |
| CURRENT CONSUMPTION | - | No Input - 900ma (includes dial lamp) |

SETTING THE PUSH BUTTONS

1. Turn receiver on - use higher than normal volume so that stations may be tuned accurately.
2. Unlock push buttons by pulling out.
3. Accurately tune station with the MANUAL TUNING knob.
4. Lock one push button to that station by pushing in firmly.
5. Repeat above procedure for remaining push buttons.
6. Push buttons may be re-set to new stations as often as desired.

NOTE: Subsequent push button tuning will only be as accurate as your initial manual set-up, so be precise.

## SETTING OF DIAL POINTER

Disconnect the IF attenuator.
Disconnect the generator cable from the dummy aerial, then connect 20 feet of aerial wire to the dummy aerial terminal.
Accurately tune the receiver to a station marked on the dial near 800 Kc/s.
Using spanner Part No. 4121-010-01 or a 3/32" hexagonal key wrench adjust the eccentric pointer arm pivot so that the pointer coincides with the centre of the tuned station call sign.
Check dial logging and if necessary re-adjust eccentric pivot of pointer arm.

NOTE: After this adjustment the eccentric section of pointer arm pivot must be within $\pm 90^{o}$ of the rear position when the pointer is set at the centre of the dial. Incorrect length of travel and logging will result if the eccentric section is outside these limits.

## BROADCAST ALIGNMENT

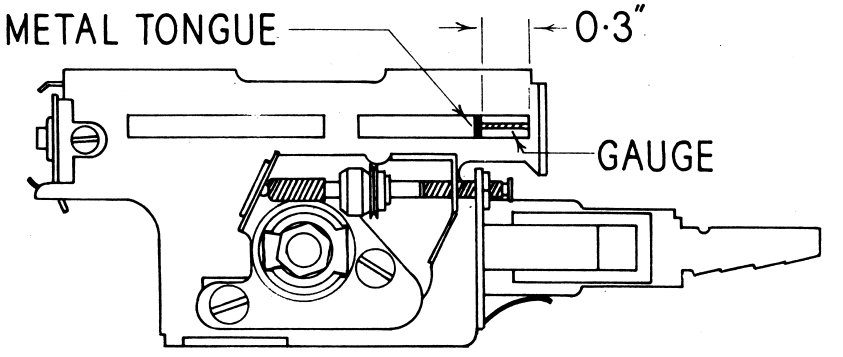
When iron cores or tuning unit coil assy. have been removed or replaced.

1. Before refitting the unit into the receiver turn the tuning control spindle until the perm. tuner carriage is against the high freq. end of travel stop. Adjust the iron cores so that the distance between the extreme end of the formers protruding through the end of the rubber grommets and the iron cores is between 1-3/8" and 1-17/32".

2. Fit and wire tuning unit into receiver.

3. Connect IF. attenuator between control grid of 12FR8 valve (pin 3) and chassis.

| | Generator Connection | Generator Frequency | Instructions |
|---|---|---|---|
| 4. | Aerial lead-in socket 65pF. dummy aerial in series. | 1615 Kc/s | Turn tuning to high freq. end of travel stop (cores full out) Adjust Osc. R.F. and aerial trimmer caps. for max. output. |
| 5. | Refer diagram. Place the 1200 Kc/s alignment gauge Part No. 4121-002-02 or alternatively a flat piece of metal 0·3" wide between the carriage tongue and frame. Gently turn tuning spindle until gauge is located squarely in slot. | | |




| | | | |
|---|---|---|---|
| 6. | As oper. 4 | 1200 Kc/s | With unit set as above, adjust Osc., Aerial and RF iron cores for max. output. |
| 7. | As oper. 4 | 600 Kc/s | Rock tuning control through signal, adjust osc., shunt coil iron core for max. output. |
| 8. | Turn tuning control to the low freq. end of travel (iron cores full in). Tune signal generator to receiver. Low freq. limit should be between 520 and 528 Kc/s. If receiver tunes outside these limits repeat operations 4, 5, 6, 7 and 8. | | |
| 9. | Repeat operation 5. | | |
| 10. | Align dial pointer. | | |

## AERIAL COMPENSATING ADJUSTMENT

After refitting the receiver to the vehicle, turn receiver "ON" and allow to operate for a few minutes.

Raise aerial to half fully extended height then tune the receiver to a barely audible distant station near 1200 Kc/s.

Adjust aerial trimmer, knob on passenger side of receiver, to maximum volume of the signal.

## OPERATION OF OUTPUT TRANSISTORS AS MATCHED PAIRS

The type AC128 transistors are operated in matched pairs, designated 2-AC128; replacements MUST be made accordingly and not as a single unit.

The transistor pairs are identified by a letter symbol stamped on to the top of transistor housing. Transistors which have different batch symbols must not be operated together.

## MEASUREMENT AND ADJUSTMENT OF COLLECTOR CURRENT

Disconnect the transformer lead from pin 1 of polarity socket.
Connect a piece of wire between pins 4 and 5 of the polarity socket.
Connect an 0-10mA D.C. meter in series with lead from output transformer and pin 1 of polarity socket.
Check the polarity of the polarity plug, then connect the receiver battery lead to the appropriate terminal of the 13·0V D.C. supply.
Switch receiver "ON" and turn volume control to minimum position.
Allow a minimum of one minute for thermal stabilization after initial switching on.
Adjust bias rheostat to obtain a reading of 5mA.

NOTE: It is essential that the supply source be maintained at 13 volts when measuring the collector current.
The bias rheostat should be adjusted if the output transistors (matched pair), the temperature compensating transistor or the type 12FX8 valve is replaced.

Disconnect shorting link from between pins 4 and 5 of polarity socket then reconnect transformer lead to pin 1.

## PRODUCTION CHANGES

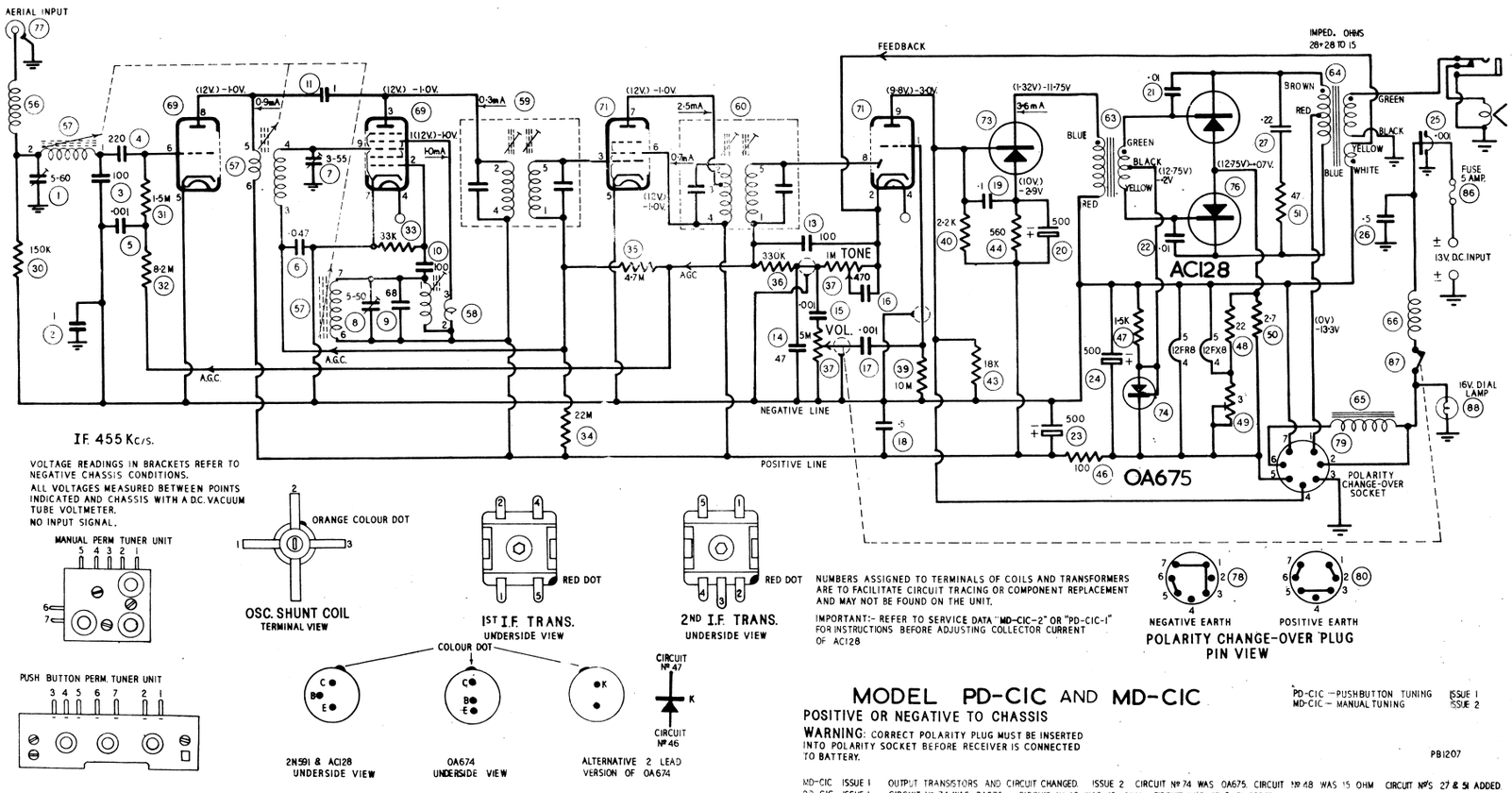
### AUDIO INSTABILITY

The ·22mF capacitor, circuit No. 27 and the 47 ohm resistor circuit No. 51 were added after the first production run.

To improve audio stability in early production receivers these components may be wired between the collectors of the output transistors as shown in circuit diagram.

### TEMPERATURE COMPENSATING TRANSISTOR

Due to supply position the transistor type OA674 has been changed to type OA675. When changing to a type OA675, resistor 15 ohm circuit No. 48 is to be changed to 22 ohms.




| Circuit No. | Value | Capacitors Description | Tol ± | Rating D.C.W. | Part Number |
|---|---|---|---|---|---|
| 1 | 6-75pF | Trimmer, Compression | | | 4000-017-01 |
| 2 | 1mF | Metallised Paper | 20% | 200V | 4006-002-02 |
| 3 | 100pF | Polystyrene | 20% | 125V | 4004-008-03 |
| 4 | 220pF | Polystyrene | 20% | 125V | 4004-005-02 |
| 5 | ·001mF | Tubular Ceramic | | 500V | 4008-040-06 |
| 6 | ·047mF | Disc Ceramic | | 25V | 4008-057-03 |
| 7 | 3-55pF | Trimmer, Compression | | | 4000-022-01 |
| 8 | 5-50pF | Trimmer, Wire wound | | | 4000-012-01 |
| 9 | 68pF | Tubular Ceramic, N470 | 5% | 500V | 4008-027-02 |
| 10 | 100pF | Polystyrene | 5% | 125V | 4004-008-02 |
| 11 | 1pF | Disc, Ceramic, NPO | ·25pF | 500V | 4008-056-01 |
| 12 | | | | | |
| 13 | 100pF | Polystyrene | 20% | 125V | 4004-008-03 |
| 14 | 47pF | Polystyrene | 20% | 125V | 4004-009-01 |
| 15 | ·001mF | Tubular Ceramic | | 500V | 4008-040-06 |
| 16 | 470pF | Tubular Ceramic | 20% | 500V | 4008-052-05 |
| 17 | ·001mF | Tubular Ceramic | | 500V | 4008-040-06 |
| 18 | ·47mF | Disc Ceramic | | 25V | 4008-059-01 |
| 19 | ·1mF | Disc Ceramic | | 25V | 4008-004-04 |
| 20 | 500mF | Electrolytic | | 4V | 4005-014-12 |
| 21 | ·01mF | Polyester | 10% | 125V | 4009-014-01 |
| 22 | ·01mF | Polyester | 10% | 125V | 4009-014-01 |
| 23 | 500mF | Electrolytic | | 16V | 4005-014-13 |
| 24 | 500mF | Electrolytic | | 16V | 4005-014-13 |
| 25 | 3x·001mF | Feed thru | | | 4008-040-05 |
| 26 | ·5mF | Metallised paper | 20% | 200V | 4006-003-01 |
| 27 | ·22mF | Disc Ceramic | | 25V | 4008-053-01 |
| 28 | | | | | |
| 29 | | | | | |

| Circuit No. | Value Ohms | Resistors Description | Tol ± | Rating Watts | Part Number |
|---|---|---|---|---|---|
| 30 | 150K | Carbon | 10% | ½ | 4022-038-01 |
| 31 | 1·5M | Carbon | 10% | ½ | 4022-046-01 |
| 32 | 8·2M | Carbon | 10% | ½ | 4022-075-01 |
| 33 | 33K | Carbon | 10% | ½ | 4022-059-03 |
| 34 | 22M | Carbon | 10% | 1 | 4022-032-02 |
| 35 | 4·7M | Carbon | 10% | ½ | 4022-061-01 |
| 36 | 330K | Carbon | 10% | ½ | 4022-047-01 |
| 37 | Volume and tone controls, concentric shaft potentiometer | | | | |
| | Front section, 5M ohm | | | | |
| | Rear section, 1M ohm | | | | |
| | SP. ST switch attached | | | | 4030-010-04 |
| 38 | | | | | |
| 39 | 10M | Carbon | 10% | ½ | 4022-044-01 |
| 40 | 2·2K | Carbon | 10% | ½ | 4022-021-02 |
| 41 | | | | | |
| 42 | | | | | |
| 43 | 18K | Carbon | 10% | ½ | 4022-018-01 |
| 44 | 560 | Carbon | 10% | ½ | 4022-010-01 |
| 45 | | | | | |
| 46 | 100 | Carbon | 10% | ½ | 4022-062-01 |
| 47 | 1·5K | Carbon | 10% | ½ | 4022-007-01 |
| 48 | 22 | Carbon | 20% | 1 | 4022-033-05 |
| 49 | 3 | Wire Wound Potentiometer | | | 4035-004-01 |
| 50 | 2·7 | Wire Wound | 10% | ½ | 4024-043-01 |
| 51 | 47 | Carbon | 10% | ½ | 4022-041-01 |
| 52 | | | | | |
| 53 | | | | | |
| 54 | | | | | |
| 55 | | | | | |

| Circuit No. | Miscellaneous | Part Number |
|---|---|---|
| 56 | Spark filter choke 6·8uH | 4048-032-01 |
| 57 | Push button permeability tuning unit | 4050-042-01 |
| | Consists of: | |
| | Iron sleeve (1) Oscillator coil | 4065-020-01 |
| | Iron sleeve (2) Aerial, R. F. coil | 4065-021-01 |
| | Iron Core (3) | 4065-033-01 |
| | Coil Assy. | 4036-064-01 |
| | Includes: | |
| | Aerial coil | 4036-032-01 |
| | Oscillator coil | 4036-033-01 |
| | R. F. transformer | 4043-032-01 |
| 58 | Oscillator shunt coil | 4043-025-01 |
| 59 | No. 1 I. F. Transformer 455 Kc/s | 4044-013-01 |
| 60 | No. 2 I. F. Transformer 455 Kc/s | 4044-017-01 |
| 61 | | |
| 62 | | |
| 63 | Driver transformer - 3900 to 170 + 170 ohms imped. | 4042-057-01 |
| 64 | Speaker transformer - 28 + 28 to 15 ohms imped. | 4042-039-01 |
| 65 | Filter choke, iron cored | 4048-025-01 |
| 66 | Spiral filter choke, air cored | 4048-031-01 |
| 67 | | |
| 68 | | |
| 69 | R. F. Amplifier - mixer oscillator valve type 12FX8 | 4124-042-01 |
| 70 | | |
| 71 | I. F. Amplifier and audio amplifier detector valve type 12FR8 | 4124-043-01 |
| 72 | | |
| 73 | Audio Driver transistor type 2N591 | 4128-017-02 |
| 74 | Temperature compensating transistor type 0A675 | 4127-039-01 |
| 75 | | |
| 76 | Push-pull output transistors type 2-AC128 (matched pair) | 4128-035-01 |
| 77 | Socket - aerial lead-in | 7222-037-01 |
| 78 * | Polarity Plug - NEGATIVE TO CHASSIS | 7171-017-01 |
| 79 | Polarity change-over socket | 7222-043-01 |
| 80 * | Polarity Plug - POSITIVE TO CHASSIS | 7171-018-01 |
| 81 | | |
| 82 | | |
| 83 | Speaker - 5" Dia. permag. type 5F08/87/15 | 4056-006-19 |
| 84 | Socket - external speaker connection | 7222-033-01 |
| 85 | | |
| 86 | Fuse - 5amp | 4071-001-02 |
| 87 | Switch - part of circuit No. 37 | |
| 88 | Dial lamp - 16 volt min. bay base G 3½ bulb | 4068-003-03 |

* Polarity plugs - 1 NEG and 1 POS supplied in package 7001-020-01

| Part No. | Mechanical |
|---|---|
| 7222-013-01 | Socket (2) 9 pin valves |
| 7231-123-01 | Terminal strip (1) 8 lug, type 1E4E1 |
| 7231-202-03 | Terminal strip (1) 4 lug, type 2E1 - flat |
| 7231-102-01 | Terminal strip (1) 3 lug, type 1E1 |
| 7231-201-01 | Terminal strip (1) 3 lug, type 2E |
| 7231-011-01 | Terminal strip (1) 2 lug, type E1 |
| 7231-351-01 | Terminal strip (1) 18 lug, flat |
| 7230-002-01 | Insulating strip - 18 lug terminal strip |
| 7111-007-01 | Heat sink (4) Output transistors, (1) Driver transistor |
| 7198-576-11 | Screw (4) ¼" x 1/8" Whit. Phillips hd. - heat sink mount |
| 7261-133-01 | Washer (4) flat steel - heat sink mount |
| 7262-008-01 | Washer (4) shakeproof 1/8" int. - heat sink mount |
| 7148-302-11 | Nut (4) 1/8" Whit. hex. - heat sink mount |
| 7198-931-11 | Screw (2) ¼" x 1/8" Whit. sems - tuner mount, front |
| 7204-027-04 | Screw (2) ¼" x No. 6 hex.hd. - **tuner** mount, rear |
| 7261-020-07 | Washer (2) flat steel - tuner mount rear |
| 7204-576-12 | Screw **(4)** 3/8" x No. 4 Phillips hd. - transformer mount |
| 7152-751-01 | Speednut (4) No. 4 - transformer mount |
| 7261-157-02 | Washer (2) flat steel - speaker trans. mount |
| 7201-577-12 | Screw (2) ¼" x No. 6 Phillips hd. - choke mount |
| 7102-024-01 | Gasket - speaker |
| 7198-177-19 | Screw (4) 3/8" x 5/32" Whit. - speaker mount |
| 7261-180-02 | Washer (4) flat steel - speaker mount |
| 7148-303-11 | Nut (4) 5/32" Whit.hex. - speaker mount |
| 7113-004-01 | Socket - dial lamp |
| 7086-125-04 | Eyelet - dial lamp socket |
| 7031-009-01 | Bush - dial lamp socket |
| 7055-013-01 | Clip (2) I. F. transformer mount |
| 7224-303-01 | Spindle assembly - tuning |
| | Consists of: |
| 7224-300-01 | Spindle |
| 7031-039-01 | Bush |
| 7071-027-02 | Disc |
| 7261-028-01 | Washer, type 'C' |
| 7262-016-02 | Washer (1) shakeproof ¼" int - speaker socket |
| 7132-003-02 | Cover-top |
| 7132-004-02 | Cover-bottom |
| 7201-577-12 | Screw (16) ¼" x No. 6 Phillips hd. - covers to can |
| 7201-527-09 | Screw (4) x No. 6 Phillips csk.hd. - covers to can |
| 7262-024-02 | Washer (2) shakeproof 3/8" int. - spindle bushes |
| 7150-057-01 | Nut (2) 3/8" x 32 T.P.I. hex. - spindle bushes |
| 7055-425-02 | Spacer ring (2) control bush lock nuts |
| 7065-025-01 | Cover (1) feed thru capacitor |
| 7071-013-01 | Disc (1) insulating - feed thru cover |
| 7032-003-02 | Cover (1) polarity plug access hole |
| 7152-752-01 | Speednut (2) No. 6 captive - sides of receiver |
| 7065-011-01 | Cap (1) fuse holder |
| 7086-125-04 | Eyelet (2) fuse holder cap and body |
| 7113-001-01 | Body (1) fuse holder |
| 7225-012-02 | Spring (1) fuse holder |
| 7215-010-01 | Shield (1) lamp |
| 7173-004-03 | Pointer Assembly |
| 7124-057-01 | Knob (1) aerial compensator |
| 7124-060-01 | Knob (5) push button tuner |
| 7124-227-01 | Knob (2) tuning and volume, front |
| 7124-226-01 | Knob (2) tuning and tone, rear |
| 7150-854-32 | Barrel Nut (2) |
| 7261-484-02 | Washer (2) chrome-barrel nuts |
| 7005-004-01 | Dial background - moulded |
| 7070-030-01 | Dial - group of four readings |
| 7198-150-18 | Screw (2) ¼" x 3/32" Whit.rd.hd. - dial fastening |
| 7084-017-52 | Escutcheon - front of receiver |
| 7084-198-02 | Escutcheon assembly - ASTOR |
| | Includes: |
| 7032-001-03 | 'ON' indicator - red |
| 7081-002-01 | Diamond Dot |
| 7008-122-01 | Metcal - ASTOR |
| 7148-001-01 | Nut (2) 3/32" Whit.hex. |
| 7084-198-01 | Escutcheon assembly - BMC |
| | Includes: |
| 7032-001-03 | 'ON' indicator - red |
| 7081-002-01 | Diamond Dot |
| 7008-028-22 | Metcal - BMC |
| 7008-021-01 | Badge - BMC |
| 7148-001-01 | Nut (2) 3/32" Whit.hex. |

# ALIGNMENT PROCEDURE

## EQUIPMENT

Signal Generator - modulated 400 cps
Output Meter - 15 ohms impedance
Generator Series Capacitor - ·01mF Part No. 4003-031-02 for IFT alignment
IF attenuator - Part No. 4121-014-01
Dummy Aerial - 65pF Part No. 4121-009-01
Alignment Tools

(a) Hexagonal Tip Type: Part No. 4121-017-01 for IF. T. alignment
(b) Tuning Unit Iron Core Adjustor: Part No. 4121-008-01
(c) Flat Metal Blade Type: Part No. 4121-016-01
(d) Alignment Gauge: Part No. 4121-003-02 for tuner 1200 Kc/s position.

## CONDITIONS

Loosen screws fastening flat cover to receiver. Remove cover.

Volume Control - maximum (fully clockwise)
Tone Control - maximum treble (fully clockwise)
Output Level - 25 milliwatts, speaker voice coil connected
Output Meter Connection - Socket at rear of receiver. Plug, Part No. 7171-015-02 is available.
Supply Voltage and connection - 13·0V. D. C. Check polarity plug and set plug to suit supply source. Connect appropriate supply lead to chassis and other lead to fuse holder lead.

## INTERMEDIATE FREQUENCY TRANSFORMER ALIGNMENT

IMPORTANT: It will be found that maximum output peaks will be obtained at two positions of the IF. transformer adjustable cores, the correct setting is the one where the cores are furthest apart.

NOTE: The final peaking of the cores nearest top of the IF transformers should be performed last. This is necessary so that the upper cores will not be disturbed when withdrawing the hexagonal alignment tool.

Insert ·01mF capacitor in series with generator "hot" lead. Turn tuning control until perm. tuner iron cores are out of the coil formers.

| Oper. No. | Generator Connection | Generator Frequency | Instructions |
|---|---|---|---|
| 1. | To control grid of 12FX8 valve (pin 9) | 455 Kc/s | Adjust 2nd IF trans. pri. and sec. iron cores for maximum output. |
| 2. | As Oper. 1 | 455 Kc/s | Adjust 1st IF trans. pri. and sec. iron cores for maximum output. |

## BROADCAST ALIGNMENT

When tuning coils assy. and iron cores are in original factory sealed condition.

| Oper. No. | Generator Connection | Generator Frequency | Instructions |
|---|---|---|---|
| 1. | Aerial lead-in socket, 65pF dummy aerial in series | 1615 Kc/s | Turn tuning control to high frequency end of travel (iron cores full out.) Adjust osc. trimmer capacitor for max. output. |
| 2. | As oper. 1 | 525 Kc/s | Turn tuning control to low freq. end of travel (iron cores full in). Adjust osc. shunt coil iron core for maximum output. |

NOTE: Repeat operation No. 1. if the iron core in the osc. shunt coil is adjusted more than one half turn.

3. Connect IF attenuator between the control grid of 12FR8 IF valve, pin No. 3 and chassis.

| | | | |
|---|---|---|---|
| 4. | As oper. 1. | 1200 Kc/s | Tune receiver to generator. Adjust R. F. and Aerial trimmer capacitors for max. output. |