



# RADIO CORPORATION PTY. LTD.

DIVISION OF ELECTRONIC INDUSTRIES LTD.

126-130 GRANT STREET, SOUTH MELBOURNE, S.C.4.

## TECHNICAL BULLETIN

BULLETIN CN-1.  
File:-Receivers AC  
Date: 1/12/46.  
Page 1.

SUBJECT-

Model "CN"

4 Tube Superheterodyne Dual Wave

Mantel Receiver

For operation from:-

200-250 Volts 50 Cycle AC. Mains.

This Bulletin Contains:-

1. Technical Specifications.
2. General Description.
3. Alignment Procedure.
4. Circuit Diagram.
5. Voltage Table.
6. Component Parts List.
7. Coil and IF. Transformer Connections.
8. Summary of Circuit Changes Made During Production.

**This Receiver is NOT in Production**  
**Information is for Service Purposes ONLY**



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SUBJECT-Technical Specifications-Model "CN"

### General Description (Contd.):--

Grid leak bias is used for the 1st audio stage and cathode bias for the output pentode.

The AVC. circuit employs the full voltage developed across the 1 megohm diode load resistor (volume control) to control the grids of the converter and IF. tubes after filtering with the usual resistance capacitive filter.

The secondary of circuit number 41 is a lorenz wound loop antenna transformer which enables the receiver to be used without external connections except for the power cord. A coupling system comprising the primary of the loop transformer, coupling choke (circuit number 42) and a 2,000 ohm resistor is provided so that an external aerial can be used where necessary.

The combination of coupling circuit and loop aerial becomes in effect, a normal antenna transformer and alignment can be carried out from the short aerial lead as with a normal receiver.

High tension which is filtered by 16 and 24 MFD. electrolytic condensers in conjunction with the speaker field coil is obtained from the half wave rectifier section of the 32L7GT tube.

### Shortwave Operation:--

Operation on the shortwave band is the same as on broadcast with the exception that no AVC. is applied to the converter.

SUBJECT-Technical Specifications-Model "CN"

Tube Complement:-

Type 6J8G Converter.  
Type 6U7G IF. Amplifier.  
Type 6B6G Diode Detector, AVC. and 1st Audio.  
Type 32L7GT Half Wave Rectifier and Beam Power Amplifier.

Intermediate Frequency:-455 Kc.

Broadcast Coverage:-

540 Kc. (Kilocycles) to 1650 Kc.  
555 M. (Meters) to 182 M.

Shortwave Coverage:-

7 Mc. (Megacycles) to 21 Mc.  
43 M. (Meters) to 14.28 M.

Power Consumption:-

40 Watts (approximately).

Power Output:-

Max. 1.5 Watts Undistorted .75 Watts.

General Description:-

The Mantel Model "CN" is a 4 tube dual wave superheterodyne receiver designed to operate from 200-250 volts 50 cycle AC. mains. The sensitivity on broadcast is 35 microvolts and 55 microvolts on shortwave for an output of 50 milliwatts with a 2,500 ohm load.

The circuit consists of tuned aerial and oscillator stages with a Triode Heptode tube type 6J8G as converter, followed by an IF. amplifier stage using a 6U7G tube. A 6B6G tube is used for diode detection, AVC. and 1st audio which is resistance capacity coupled to the pentode section of the type 32L7GT dual purpose tube.

Bias for the converter and IF. tubes is obtained from a common variable bias resistor circuit number 29.



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SUBJECT--

Summary of Changes Made

During

The Production of this Receiver

20/3/41 to 20/3/42

- A. To provide increased stability a separate bias resistor and by pass condenser was used for the converter and IF. tubes instead of a common resistor and condenser as shown on the circuit. The converter tube still retaining the variable bias resistor.
- IF. tube bias resistor and condenser:--  
200 ohm wire wound resistor tol.  $\pm 10\%$   $\frac{1}{2}$  watt, part number PR176.  
.05MFD. paper condenser tol.  $\pm 20\%$  200V.DCW., part number PC102.
- Converter tube bias resistor and condenser:--  
500 ohm wire wound resistor, variable, part number PR201.  
.05MFD. paper condenser tol.  $\pm 20\%$  200V.DCW., part number PC102.
- B. The .005MFD. condenser circuit number 2 changed to a .002MFD. paper condenser tol.  $\pm 20\%$  600V.DCW., part number PC112 to improve tone.
- C. A 15MMFD. wire wound condenser part number PC196 was used across the oscillator trimmer on some receivers to provide a better peaking position for oscillator trimmer.
- D. 1.5 Megohm  $\frac{1}{2}$  watt resistors part number PR388 used in place of 1.75 megohm when the 1.75 megohm were not obtainable.
- E. An improved type wire wound trimmer part number PC663 (0-30MMFD) is to be used for replacement of the wire wound trimmers on the oscillator stages. When this trimmer is used the wire wound condenser (15 or 10MMFD) is not required across the B/cast. oscillator trimmer.

SUBJECT-Alignment Procedure-Model "CN"

Equipment:-

Signal Generator.  
Output Meter.  
Alignment Tool.  
Dummy Antenna:-  
    0.01MFD. Mica Capacitor.  
    200MMFD. Mica Capacitor.  
    400 Ohm Non Inductive Resistor.

Alignment Conditions:-

Output Level-50 Milliwatts.  
Load Impedance-2,500 Ohms.  
Volume Control-Maximum Volume (Fully Clockwise).

Dial Pointer Setting:-

Fully mesh the condenser gang plates, then set the pointer in line with the end of travel mark on the dial calibration near 550 Kc.

Alignment:-

Do not use an alignment tool with an iron point for aligning IF. transformers. A special tool part number PM581 is available from the factory or failing this an insulated rod with a small brass blade may be used.



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File:—Receivers A.C

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SUBJECT—Voltage Table—Model "CN"

### Equipment:—

DC. Volt Meter: 1,000 ohm per volt meter with 0-10 and 0-250 volt scales.

AC. Volt Meter: 0-10 and 0-250 volt scales.

### Conditions of Test:—

230 volt 50 cycle AC. input, primary tap adjusted to 220-250 volt position. Volume control full on, no signal, set tuned to 1000 Kc. Heater voltages measured across filaments. All other voltages measured from tube socket contacts to chassis.

| Tube                  | Fil.     | Plate | Screen  | Cathode | Osc. Plate |
|-----------------------|----------|-------|---|---------|------------|
| 6J8G                  | 6.3V.    | 108V. | 76V.  | 1.1V.   | 108V.      |
| 6U7G                  | 6.3V.    | 108V. | 76V.  | 1.1V.   | —          |
| 6B6G                  | 6.3V.    | 45V.  | —   | —       | —          |
| 32L7GT<br>(Pentode)   | } 32.5V. | 95V.  | 108V.   | 7V.     | —          |
| 32L7GT<br>(Rectifier) |          | 210V. | RMS. The initial surge voltage across the first electrolytic is 190V. dropping to normal operating value of 160V. |         |            |

DC. voltage across field coil is 52V.



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SUBJECT--Alignment Procedure--Model "CN"

| Operation | Generator Frequency | Generator Connection               | Dummy Antenna  | Instructions   |
|-----------|---------------------|------------------------------------|--|--|
| 1.        | 455 Kc.             | To control grid of IF. tube.       | 0.01MFD. mica capacitor in series with generator.        | Turn wave change switch to B/cast position. Gang plates full out. Leave grid clip on tube. Peak 2nd IF. transformer primary and secondary.       |
| 2.        | 455 Kc.             | To control grid of converter tube. | 0.01MFD. mica capacitor in series with generator.        | Gang plates full out. Leave grid clip on tube. Peak 1st IF. transformer primary and secondary.   |
| 3.        | 1400 Kcs.           | To antenna lead.                   | 200MMFD. mica capacitor in series with generator.        | Turn gang and dial pointer to 1400 Kc. Adjust B/cast oscl. trimmer for logging and peak B/cast aerial trimmer.                                   |
| 4.        | 600 Kcs.            | To antenna lead.                   | 200MMFD. mica capacitor in series with generator.        | Turn gang and dial pointer to 600 Kc. Adjust B/cast series padder for maximum output rocking gang to and fro through the signal while adjusting. |
| 5.        | 21 Mc.              | To antenna lead.                   | 400 Ohm non-inductive resistor in series with generator. | Turn gang full out and peak S/wave oscl. trimmer.  |
| 6.        | 18 Mc.              | To antenna lead.                   | 400 Ohm non-inductive resistor in series with generator. | Turn gang and dial pointer to 18 Mc. readjust S/wave oscl. trimmer for logging and peak S/wave aerial trimmer.                                   |

Broadcast coverage after alignment 540-1650 Kc.  
Shortwave coverage after alignment 6.9-21 Mc.

SUBJECT-Component Parts List-Model "CN"

Circuit

| <u>No.</u> | <u>Part Name</u>                               | <u>Tol.±</u> | <u>Rating</u> | <u>Part No.</u>              |
|------------|--|--------------|---------------|------------------------------|
| 1.         | .002MFD. Paper Condenser                       | 20%          | 600V. DCW     | PC112                        |
| 2.         | .005MFD. Paper Condenser                       | 20%          | 600V. DCW     | PC252                        |
| 3.         | .02MFD. Paper Condenser                        | 20%          | 400V. DCW     | PC111                        |
| 4.         | .05MFD. Paper Condenser                        | 20%          | 200V. DCW     | PC102                        |
| 5.         | .05MFD. Paper Condenser                        | 20%          | 400V. DCW     | PC109                        |
| 6.         | .05MFD. Paper Condenser                        | 20%          | 400V. DCW     | PC109                        |
| 7.         | .1MFD. Paper Condenser                         | 20%          | 200V. DCW     | PC218                        |
| 8.         |  |              |               |                              |
| 9.         | .00005MFD. Mica Condenser                      | 10%          | 1000VT.       | PC141                        |
| 10.        | .00025MFD. Mica Condenser                      | 10%          | 1000VT.       | PC126                        |
| 11.        | .0005MFD. Mica Condenser                       | 10%          | 1000VT.       | PC144                        |
| 12.        | .0031MFD. Mica Condenser                       | 5%           | 1000VT.       | PC278                        |
| 13.        | 16MFD. Electrolytic Condenser                  | 20%          | 350VP.        | PC283                        |
| 14.        | 24MFD. Electrolytic Condenser                  | 20%          | 350VP.        | PC276                        |
| 15.        | 10MMFD. Wire Wound Condenser                   |              |               | PC266                        |
| 16.        | 2 Gang Varb. Condenser                         |              |               | PC253                        |
| 17.        | Padder Cond. (B/cast.) 150-500MMFD.            |              |               | PC164                        |
| 18.        | Loop Trimmer-B/cast.                           |              |               | PC250                        |
| 19.        | Aerial Trimmer-S/wave.                         |              |               | PC224                        |
| 20.        | Oscillator Trimmer-B/cast.                     |              |               | PC356<br>changed to<br>PC367 |
| 21.        | Oscillator Trimmer-S/wave.                     |              |               | PC356<br>changed to<br>PC367 |
| 22.        |  |              |               |                              |
| 23.        | 1.75 Megohm Carbon Resistor                    | 10%          | 1/2 Watt      | PR248                        |
| 24.        | 500,000 Ohm Carbon Resistor                    | 10%          | 1/2 Watt      | PR245                        |
| 25.        | 250,000 Ohm Carbon Resistor                    | 10%          | 1/2 Watt      | PR249                        |
| 26.        | 50,000 Ohm Carbon Resistor                     | 10%          | 1/2 Watt      | PR160                        |
| 27.        | 10,000 Ohm Carbon Resistor                     | 10%          | 1/2 Watt      | PR164                        |
| 28.        | 2,000 Ohm Carbon Resistor                      | 10%          | 1/2 Watt      | PR253                        |
| 29.        | 500 Ohm Wire Wound Resistor                    | 10%          | 1 Watt        | PR201                        |
| 30.        | 300 Ohm Wire Wound Resistor                    | 5%           | 3 Watt        | PR206                        |
| 31.        | 150 Ohm Wire Wound Resistor                    | 10%          | 1/2 Watt      | PR237                        |
| 32.        | 1 Megohm Carbon Potentiometer                  |              |               | PR367                        |
| 33.        | 10 Megohm Carbon Resistor                      | 10%          | 1 Watt        | PR236                        |
| 34.        |  |              |               |                              |
| 35.        | 1st IF. Transformer                            |              |               | PT386                        |
| 36.        | 2nd IF. Transformer                            |              |               | PT387                        |
| 37.        | {Power Transformer (Dial lamps parallel wired) |              |               | PT237                        |
|            | {Power Transformer (Dial lamps series wired)   |              |               | PT438                        |
| 38.        | Oscillator Coil B/cast.                        |              |               | PT423                        |
| 39.        | Oscillator Coil S/wave.                        |              |               | PT246                        |
| 40.        | Antenna Transformer S/wave.                    |              |               | PT384                        |
| 41.        | Loop Antenna Coil                              |              |               | PT424                        |
| 42.        | Antenna Coupling Loading Coil                  |              |               | PT425                        |









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## TECHNICAL BULLETIN

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SUBJECT-Component Parts List-Model "CN"

### Circuit

| <u>No.</u> | <u>Part Name</u>  | <u>Tol.±</u> | <u>Rating</u> | <u>Part No.</u> |
|------------|---|--------------|---------------|-----------------|
| 43.        |   |              |               |                 |
| 44.        |   |              |               |                 |
| 45.        | Wave Change Switch  |              |               | PM626           |
| 46.        | Valve Shield  |              |               | PM217           |
| 47.        | 6J8G tube   |              |               |                 |
| 48.        | 6U7G tube   |              |               |                 |
| 49.        | 6B6G tube   |              |               |                 |
| 50.        | 32L7GT tube   |              |               |                 |
| 51.        | Dial Lamp 6.3V. .3A Min. Screw Base, T3 $\frac{1}{4}$ Bulb. |              |               | PM140           |
| 52.        | Socket-8 pin  |              |               | PM532           |
| 53.        | Dynamic, Speaker 900 Ohm Field 2,600 Ohm Input              |              |               | PM375           |
| 54.        | 1st IF. Primary Adj. Screw                                  |              |               |                 |
| 55.        | 1st IF. Secondary Adj. Screw                                |              |               |                 |
| 56.        | 2nd IF. Primary Adj. Screw                                  |              |               |                 |
| 57.        | 2nd IF. Secondary Adj. Screw                                |              |               |                 |
| 58.        |   |              |               |                 |
| 59.        |   |              |               |                 |
| 60.        | Chassis Assembly  |              |               | 4/246           |
| 61.        | S/W Switch Actuating Lever Assembly                         |              |               | A101/246        |
| 62.        | Manual Drive Shaft Assembly                                 |              |               | A110/246        |
| 63.        | Dial Drum   |              |               | A107/246        |
| 64.        | Speaker Mount Bracket                                       |              |               | 23/246          |
| 65.        | Dial Frame Assembly   |              |               | A115/246        |
| 65A.       | Dial Frame  |              |               | 11/246          |
| 66.        | Jockey Pulley   |              |               | 41/246          |
| 67.        | Dial Pointer Assembly                                       |              |               | A106/246        |
| 68.        | Terminal Lug Assembly                                       |              |               | 62/30A          |
| 69.        | Condenser Mount Plate                                       |              |               | 5/246           |
| 70.        | Dial Glass Reading  |              |               | 36/246          |
| 71.        | Dial Lamp Socket Assembly RH.                               |              |               | A109/246        |
| 72.        | Dial Lamp Socket Assembly LH.                               |              |               | A108/246        |
| 73.        | Pointer Runner Strip  |              |               | 22/246          |
| 74.        | Loop Aerial Mount Bracket                                   |              |               | 16/246          |
| 75.        | Loop Anchor Strip   |              |               | 24/246          |
| 76.        | Knob Spring Insert  |              |               | 86/71           |
| 77.        | Junction Strip Assembly                                     |              |               | A103/509        |

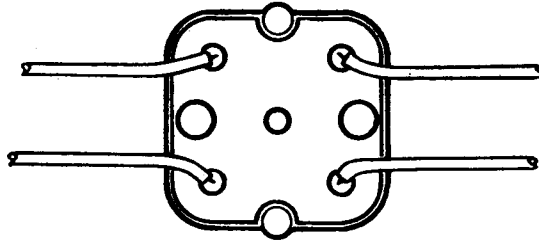
### Cabinet Fittings

| <u>Cabinet</u>         | <u>Cabinet Back</u>    | <u>Knobs</u>           |
|------------------------|------------------------|------------------------|
| <u>Colour-Part No.</u> | <u>Colour-Part No.</u> | <u>Colour-Part No.</u> |
| Walnut 1/246-1         | Walnut 2/246-1         | Walnut 22/81-4         |
| Green 1/246-2          | Green 2/246-2          | Green 22/81-3          |
| Blue 1/246-3           | Blue 2/246-3           | Blue 22/81-7           |
| Champagne 1/246-4      | Champagne 2/246-4      | Champagne 22/81-6      |

SUBJECT-Coil and IF. Transformer connections.

(Diode return) Black

Green (Diode)



(Plate) Blue

Red (B+)

----- 2nd IF. Trans.

Primary: Common-red  
" 230V. Tap-green } All pri. leads out one side  
" 250V. Tap-black } of winding

HT. Secondary: Both leads-blue  
Static Shield-yellow  
Fil: Earth lead-black  
" Tap (pilot lamps) green  
" Inside-red

Note:-The HT. sec. and fil. earth leads were later joined together internally and brought out as one lead (black).

----- Power Trans. PT237

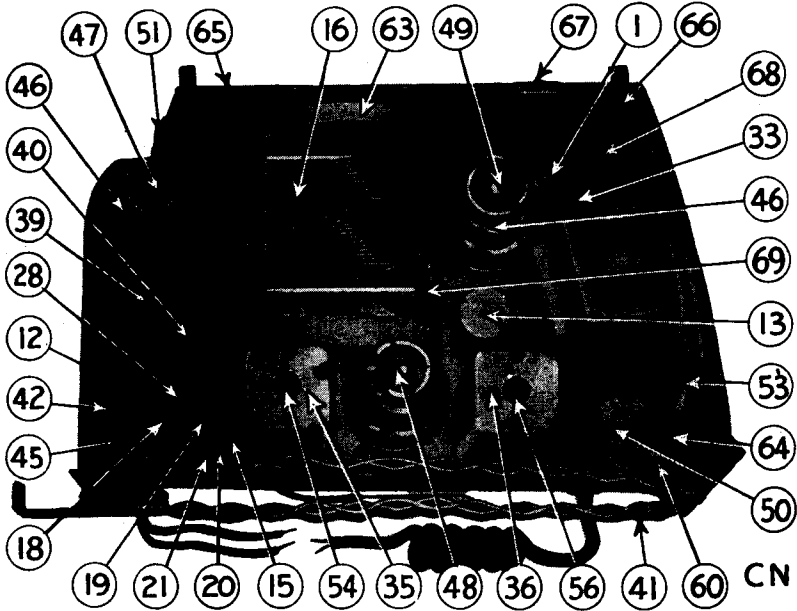
Primary: Common-red  
" 230V. Tap-green  
" 250V. Tap-black

Static Shield-yellow (habitual wire)  
HT. Secondary-blue  
Filament-yellow  
Filament-Tap-green

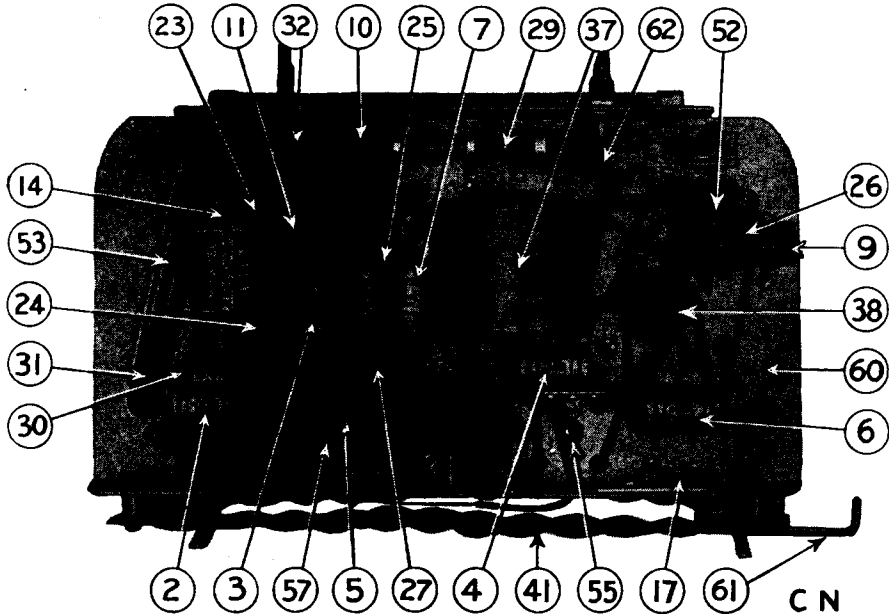
Note:-HT. sec. and fil. earth leads joined internally and brought out as one lead (black).

----- Power Trans. PT438

SUBJECT--Top View of Chassis--Model "CN"



Bottom View of Chassis--Model "CN"





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BULLETIN CN-2

File:- Receivers AC.  
A/c.

Date: 2/12/46.

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## TECHNICAL BULLETIN

SUBJECT—Substitute Rectifier/Output Tube – Receiver Type “CN”

The four tube midget dual wave receiver Model “CN” may use a type 117L7/M7GT tube in place of the 32L7GT tube providing the following alterations are made.

1. The wiring of the socket to suit a 117L7/M7GT tube is the same as for a 32L7GT tube except for the amplifier grid and screen connections as shown below.

### Socket Connections

| 32L7GT                   | 117L7/M7GT               |
|--------------------------|--------------------------|
| Pin 1. Rectifier Cathode | Pin 1. Rectifier Cathode |
| Pin 2. Heater            | Pin 2. Heater            |
| Pin 3. Amplifier Plate   | Pin 3. Amplifier Plate   |
| Pin 4. Amplifier Screen  | Pin 4. Amplifier Grid    |
| Pin 5. Amplifier Grid    | Pin 5. Amplifier Screen  |
| Pin 6. Rectifier Plate   | Pin 6. Rectifier Plate   |
| Pin 7. Heater            | Pin 7. Heater            |
| Pin 8. Amplifier Cathode | Pin 8. Amplifier Cathode |

2. The power transformer part number PT237 or PT438 must be replaced with a different power transformer part number PT825 the physical dimensions being identical.

The wiring of this transformer PT825 is the same as for PT237 and PT438 except for the following:-

- (a) The 6J8G, 6U7G and 6B6G tube filaments are connected in series and wired to the LT. secondary tap. (yellow lead)
- (b) The 117L7/M7GT tube filament is wired across the full LT. secondary winding.
- (c) Transformer lead colours and positions are shown below.

