VIDOR LIMITED

WEST STREET, - ERITH - KENT

# Service Notes
# Model C.N. 420A

## All Dry Battery Superheterodyne 2 Band Attache Portable

SPECIFICATION.

VALVES :—
- Mullard :—
  - DK96 (V1) Frequency Changer.
  - DF96 (V2) I.F. Amplifier.
  - DAF96 (V3) Detector and L.F. Amplifier.
  - DL96 (V4) Power Output.

WAVEBANDS :—
- L.W. 1100—1870 Metres. (270—161 Kc/s).
- M.W. 187—550 Metres. 1605—545 Kc/s).

LOUDSPEAKER :—
- 5 inch permanent magnet moving coil type.
- Impedance at 1000 cycles—3 ohms.

CONTROLS :—
- Front of top panel—left to right :—
  - Volume
  - Wavechange
  - Tuning
- Lid operated :— On/Off switch.

PHYSICAL :—
- Height 4⅜ inches.
- Width 13¾ inches.
- Depth 9⅜ inches.
- Weight including batteries 13¾ lbs.

BATTERIES :—
- H.T. 90 V.
  - Vidor type L.5039.
- L.T. 1.5 V.
  - Vidor type L.5041.

CONSUMPTION :—
- H.T. 9.5 m.A.
- L.T. 132 m.A.

IMPORTANT.

This receiver uses valves having 25 m.A. filaments, and these must not be replaced by 50 m.A. types, nor must these valves be fitted to receivers designed for 50 m.A. types. This includes the previous model of this receiver known as C.N. 420.

# R.F. TESTS AND ADJUSTMENTS.

## GENERAL.

If the I.F. circuits have been disturbed, complete I.F. and R.F. alignment must follow. Whilst ganging, the input to the receiver from the test oscillator must be progressively reduced as the circuits are brought into line, so that the output does not exceed 50mW. An A.C. voltmeter across the loud-speaker speech coil may be used as output meter.

When alignment of the oscillator and aerial circuits is required the adjustments should be carried out with the receiver complete with batteries in their correct position, the lid open in its normal position and the panel raised to the minimum height required to reach the trimmers and oscillator coil dust core.

## I.F. ALIGNMENT.

Set wavechange switch to M.W., volume control to maximum, gang capacitor to minimum capacity position.

Inject a modulated signal of 475 Kc/s between rear section of gang capacitor and chassis.

Adjust iron dust cores in L8, L7, L4 and L3 in that order for maximum output.

Repeat for optimum results.

## POINTER ADJUSTMENT.

Rotate gang capacitor to maximum capacity position.

Move pointer along drive cord to align with 550 metres mark on scale.

## R.F. ALIGNMENT.

WARNING. When making R.F. adjustments do not connect generator directly to frame or gang capacitor.

### MEDIUM WAVE.

Set wavechange switch to M.W. position, volume control to maximum.

Set pointer to 500 metres on scale.

Inject a modulated signal of 600 Kc/s by clipping "hot" side of generator output to chassis.

Adjust iron dust core in L6 for maximum output.

Set pointer to 200 metres on scale.

Inject a modulated signal of 1500 Kc/s.

Adjust trimmer TC3 for maximum output.

Repeat both these operations for optimum results.

### LONG WAVE.

Set wavechange switch to L.W. position, volume control to maximum.

Set pointer to 1200 metres.

Inject a modulated signal of 250 Kc/s.

Adjust trimmer TC1 for maximum output.

## INSTALLING.

Open the lid of the receiver and unscrew the two knurled screws in the bottom corners of the front panel. Lift the front panel and ascertain that the valves are correctly inserted in their sockets and that the rubber retaining bands are in position. A diagram showing the location of the valves can be seen in the bottom of cabinet.

Insert the correct types of batteries in the spaces provided (see diagram in bottom of cabinet) and insert battery plugs. When the panel is closed and screwed down the receiver is ready for use.

## DISMANTLING.

NOTE :— The ON/OFF switch is lid operated and battery current will be used all the time the lid is open. Always make sure the lid is closed and secured by both lid catches when not in use.

Normally it will be found that this receiver can be serviced without removing the chassis from the front panel. Should, however, it become necessary to remove same, proceed as follows :—

Pull off knob from tuning control.

Lift front panel.

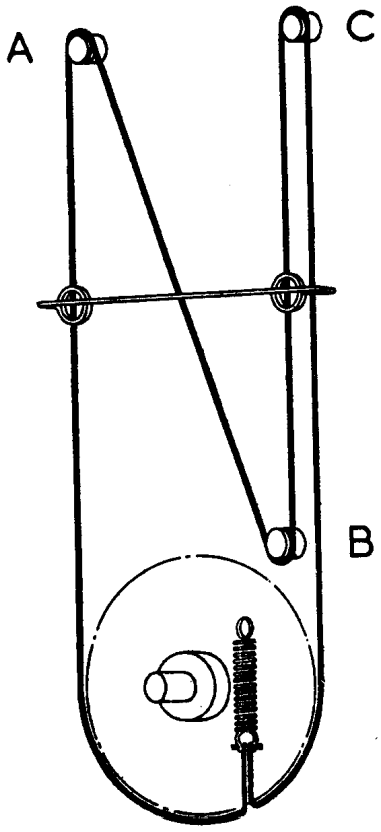
Unsolder screened lead to volume control.

Unsolder leads from chassis to output transformer mounted on loudspeaker.

Unsolder leads from lid switch and unscrew cable cleat holder cable form to back of cabinet.

Remove three nuts holding chassis to studs welded to front panel.

The chassis can now be removed.




## POINTER DRIVE.

Use only Python Flax, Braided No. 20, approximately 14 inches are required.

Rotate gang to maximum capacity position. Secure one end of drive cord to spring.

Anchor other end of spring to the lug projecting from centre of cord drum on gang. Keeping spring under slight tension, take cord through slot in periphery of drum and up to pulley A. Pass clockwise round A and diagonally across to pulley B, passing anti-clockwise round B and up again to pulley C. Pass clockwise round C down to the gang drum, take half a turn round the drum to the slot. Enter the slot and pass end of cord through spring and knot under tension. Attach pointer to cord as shown in the diagram.

# CIRCUIT DESCRIPTION.

## AERIAL CIRCUIT.

This receiver uses two high impedance frame aerials, fitted inside the hinged lid. With the wavechange switch in the long wave position the long wave aerial is in circuit and the medium wave aerial is open, while in the medium wave position the two frames are connected in parallel. The long wave frame is trimmed by capacitor C1 with trimmer capacitor TC1 in parallel. Both frames are tuned with the rear section of the gang condenser TC2. Signals from the aerials are fed to the signal grid G3 of the frequency changer via the coupling capacitor C2.

## FREQUENCY CHANGER.

A heptode type of mixer is used (DK96, V1). The oscillatory voltage for both medium and long waves is produced by L5, L6. In the long wave position a close tolerance capacitor C8 is switched across L6 to give the required long wave coverage, and it is therefore essential to align the medium wave band prior to long wave alignment. The oscillator circuit is coupled to grid 1 of the DK96 via a capacitor C6. The oscillator coil has an iron dust core for inductance adjustment, the padding capacitor is C7. Intermediate frequency is 475 Kc/s. A.G.C. is shunt fed to V1 via resistor R.1.

## I.F. AMPLIFIER.

The I.F. Amplifier (DF96, V2) is coupled to the frequency changer through the 1st I.F. Transformer (L3, L4) and is in turn coupled to the detector diode through the 2nd I.F. Transformer (L7, L8). A.G.C. is applied to the I.F. Amplifier from the junction of R5 and C11.

## DETECTOR AND L.F. AMPLIFIER.

The tuned secondary of the 2nd I.F. Transformer feeds the diode of V3 (DAF96) VR1 being the diode load, and R6, C14 providing R.F. decoupling. The D.C. component of the voltage developed across R6 and VR1 is used for A.G.C. and is applied to the two previous stages through the filter R5 and C11. The pentode section of V3 functions as A.F amplifier and receives its signal via C15, the grid leak R7 providing bias.

## OUTPUT STAGE.

Resistance-capacity coupling (R9, C18, R11) is used between V3 and V4 (DL96). C17 provides further R.F. decoupling at the anode of V3. The anode of V4 is transformer coupled to the loudspeaker. Bias for V4 is provided by R10 in the H.T. negative line, the grid leak R11 being joined to the junction of R10 and the H.T. negative terminal of the battery.

# COMPONENT VALUES.

## RESISTORS.

| Circuit Ref. No. | Value | Tolerance | Wattage | Part No. |
|---|---|---|---|---|
| R1 | 470 K ohms | 20% | ¼ | 70065 |
| R2 | 27 K ohms | 20% | ¼ | 71977 |
| R3 | 33 K ohms | 20% | ¼ | 70058 |
| R4 | 47 K ohms | 10% | ¼ | 70417 |
| R5 | 2.2 M ohms | 20% | ¼ | 70069 |
| R6 | 100 K ohms | 20% | ¼ | 70061 |
| R7 | 4.7 M ohms | 20% | ¼ | 70071 |
| R8 | 4.7 M ohms | 20% | ¼ | 70071 |
| R9 | 1 M ohms | 20% | ¼ | 70067 |
| R10 | 560 ohms | 10% | ¼ | 70394 |
| R11 | 2.2 M ohms | 20% | ¼ | 70069 |

## VALVES.

| | | | |
|---|---|---|---|
| V1 | DK 96 | Mullard | 17012 |
| V2 | DF 96 | Mullard | 17013 |
| V3 | DAF 96 | Mullard | 17014 |
| V4 | DL 96 | Mullard | 17015 |

## CAPACITORS.

| Circuit Ref. No. | Value | Tolerance | Voltage Rating | Type | Part No. |
|---|---|---|---|---|---|
| C1 | 150 pF | 20% | 350 V. | S.M. | 15197 |
| C2 | 100 pF | 20% | 350 V. | S.M. | 15998 |
| C3 | 2 uF | | 200 V. | Elect | 14362 |
| or | 1 uF | 25% | 150 V. | Met. Pap. | 14227 |
| C4 | 65 pF | 3% | 350 V. | S.M. | 16108 |
| C5 | 65 pF | 3% | 350 V. | S.M. | 16108 |
| C6 | 100 pF | 20% | 350 V. | S.M. | 15998 |
| C7 | 635 pF | 2% | 350 V. | S.M. | 15521 |
| C8 | 515 pF | 1% | 350 V. | S.M. | 15982 |
| C9 | 0.05 uF | 20% | 350 V. | T.P. | 15933 |
| C10 | 0.05 uF | 20% | 350 V. | T.P. | 15933 |
| C11 | 0.05 uF | 20% | 350 V. | T.P. | 15933 |
| C12 | 65 pF | 3% | 350 V. | S.M. | 16108 |
| C13 | 65 pF | 3% | 350 V. | S.M. | 16108 |
| C14 | 100 pF | 20% | 350 V. | S.M. | 15998 |
| C15 | 0.001 uF | 20% | 350 V. | T.P. | 17017 |
| C16 | 0.05 uF | 20% | 350 V. | T.P. | 15933 |
| C17 | 200 pF | 20% | 350 V. | S.M. | 15984 |
| C18 | 0.01 uF | 20% | 350 V. | T.P. | 12944 |

## VARIABLE CAPACITORS.

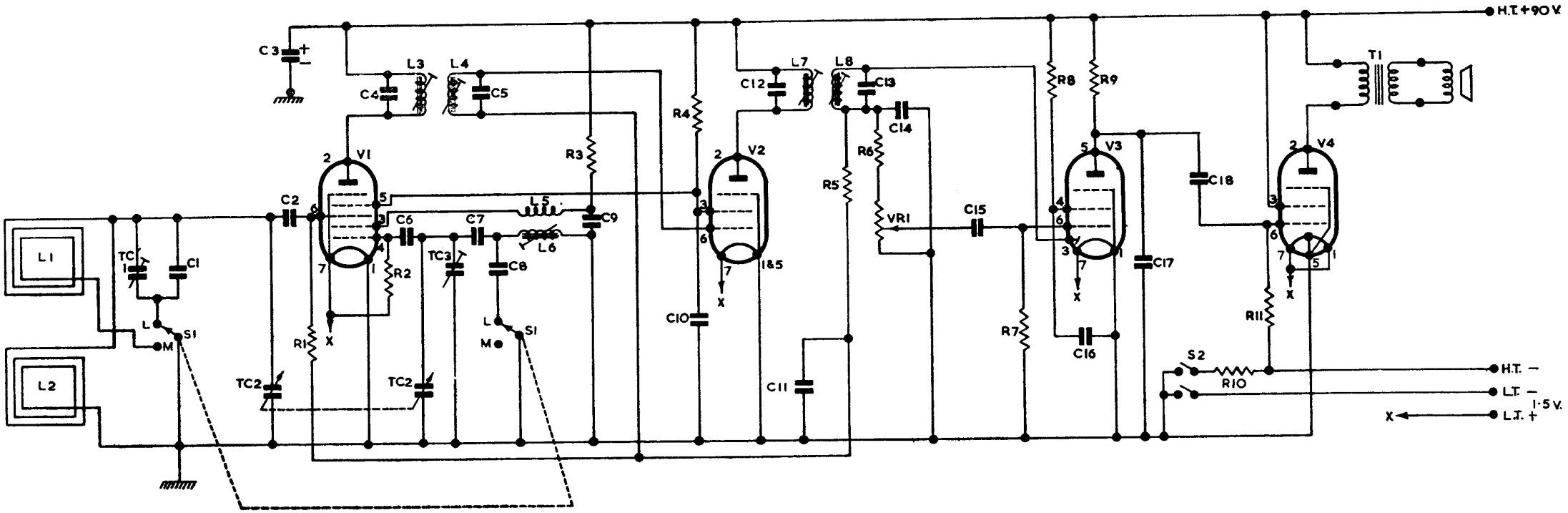
| | | | |
|---|---|---|---|
| TC1 | 3.5-70 pF | Squash Plate Trimmer | 15115 |
| TC2 | 523 pF | Swing 2 Gang | D 16538 |
| TC3 | 3.5-70 pF | Squash Plate Trimmer | 15115 |

## INDUCTORS.

| Circuit Ref. No. | Description. | Part No. |
|---|---|---|
| L1 | M.W. Frame Aerial | C 16458 |
| L2 | L.W. Frame Aerial | C 16457 |
| L3, L4 | I.F. Transformer | D 15286 |
| L5 | Osc. Anode Coil | |
| L6 | Osc. Grid Coil | D 15453 |
| L7, L8 | I.F. Transformer | D 15286 |

## MISCELLANEOUS.

| | | |
|---|---|---|
| T1 | Output Transformer. | |
| S1 | Wave Change Switch | D 16001 |
| S2 | On/Off Switch | D 15964 |




CIRCUIT DIAGRAM

## VALVE TABLE.

The following table indicates the approximate voltages and currents obtained on each valve, voltages stated were taken using a 500 ohms per volt meter on the 100 V range. Wavechange switch to M.W. and no signal.

Variations of ± 15% may be anticipated between models.

The figures given below were obtained with the following battery voltages :—

H.T. 90 volts.
L.T. 1.5 volts.

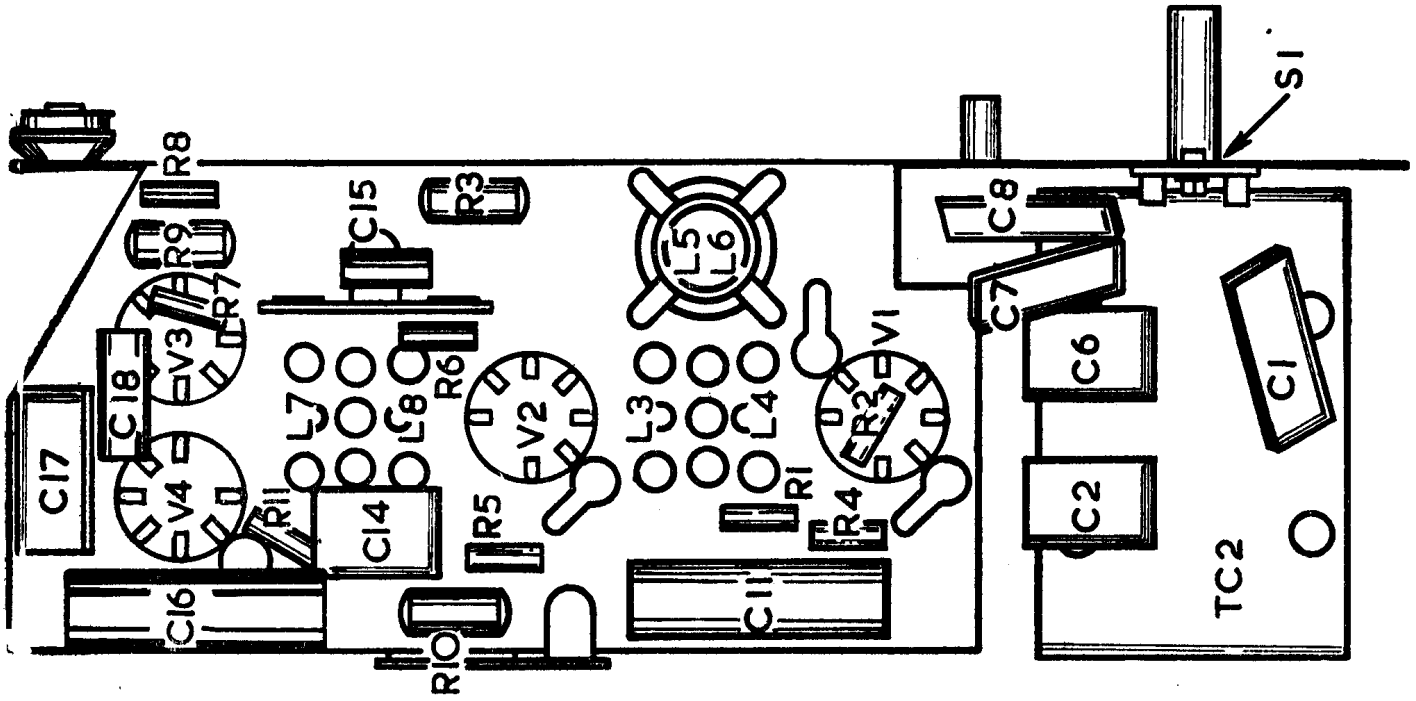
| VALVE. | | |
|---|---|---|
| V1 DK96 | Va | 84.5 V. |
| | Vg2 | 24 V. |
| | Vg4 | 42 V. |
| | Ia | .14 mA. |
| | Ig2 | 1.68 mA. |
| | Ig4 | .03 mA. |
| V2 DF96 | Va | 84.5 V. |
| | Vg2 | 42 V. |
| | Ia | 1.1 mA. |
| | Ig2 | .36 mA. |
| V3 DAF96 | Ia | 45 A. |
| | Ig2 | 12 A. |
| V4 DL96 | Va | 81.5 V. |
| | Vg2 | 84.5 V. |
| | Ia | 5.1 mA. |
| | Ig2 | 1.0 mA. |
| | Vg1 | 5.3 V. |

TOTAL NOMINAL H.T. CURRENT. 9.5 mA.

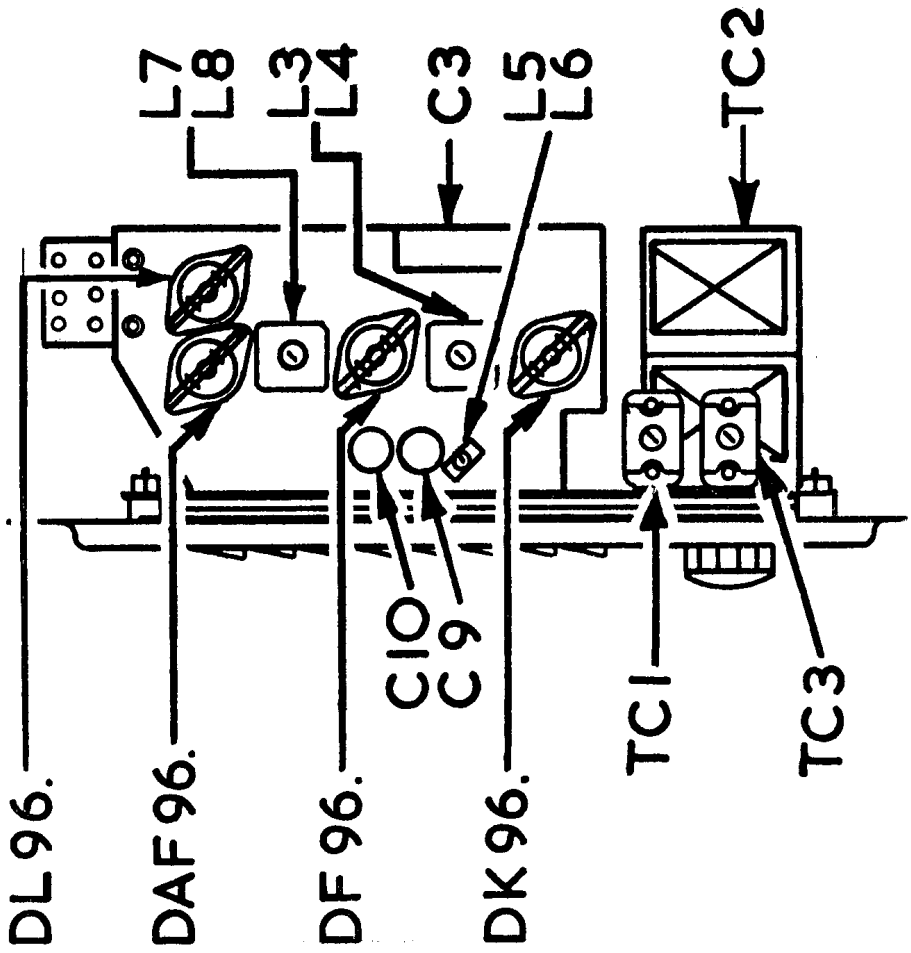
TOTAL NOMINAL L.T. CURRENT. 132 mA.

## NOMINAL D.C. RESISTANCE OF INDUCTANCES.

| Circuit Reference. | Description. | Part No. | D.C. Resistance. |
|---|---|---|---|
| L1 | MW Frame Aerial. | | 1.9 ohms. |
| L2 | LW Frame Aerial | | 14.5 „ |
| L3 } L4 } | 1st I.F. Transformer. | | 20.5 „ / 20.5 „ |
| L5 } L6 } | Oscillator Coil | | 1.1 „ / 1.5 „ |
| L7 } L8 } | 2nd I.F. Transformer. | | 20.5 „ / 20.5 „ |
| T.1. | Output Transformer. | | 463 „ |




UNDER VIEW OF CHASSIS




TOP VIEW OF CHASSIS

---

Should it be necessary to write to the makers, the serial number and catalogue number together with date and place of purchase must be quoted.

**VIDOR LIMITED, WEST STREET, ERITH, KENT.**