

Decca Communications Limited
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KW 1000

INSTRUCTION

MANUAL

ISSUE 3

K.W. 1000 LINEAR AMPLIFIER

THIS HANDBOOK SHOULD BE READ AND UNDERSTOOD BEFORE ATTEMPTING TO OPERATE THE EQUIPMENT IT DESCRIBES. FAILURE TO DO THIS WILL ALMOST CERTAINLY RESULT IN CATASTROPHIC DAMAGE FOR WHICH THE MANUFACTURER CAN IN NO WAY BE RESPONSIBLE.

DANGER

**DANGEROUS VOLTAGE ALWAYS PRESENT IN
THE EQUIPMENT WHEN CONNECTED TO THE
A.C. LINE SUPPLY.**

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K.W. 1000 LINEAR AMPLIFIER

1) INTRODUCTION

The KW 1000 Linear Amplifier is designed primarily for single-sideband and CW operation and is styled to match the "KW 2000" series of equipments. It can however, be used with other transmitters, exciters and transceivers of a similar power rating.

The Amplifier is of the "grounded-grid" type and is self-contained, complete with A.C. Mains power supply, control circuitry and metering. It features a built-in S.W.R. Bridge, a valuable aid in setting-up the equipment and continuously monitoring its performance. The control circuit has been arranged to allow the exciter unit to drive the antenna directly when the KW 1000 is switched to the OFF position. The S.W.R. Bridge has also been arranged to operate on feed-through power. Turning the power ON results in instantaneous boosted power whenever the exciter is in the "transmit" mode, whether it be by manual (MOX) or voice (VOX) operation. The Tl60L valves are instant heat and require no delay for cathode warm-up before the application of EHT.

The self-contained power unit uses voltage double technique to produce some 2.4 KV E.H.T. IT IS IMPORTANT TO OBSERVE THAT CONTACT WITH THIS VOLTAGE IS LETHAL AND EVERY CAUTION MUST BE TAKEN WHEN REMOVING THE PROTECTING COVERS AND WHEN SERVICING THE EQUIPMENT WITH THE COVERS REMOVED.

The amount of drive required from an exciter for maximum output of the KW 1000 is 40 watts under two-tone conditions on all bands.

It is not necessary to use an external relay to bring the Linear Amplifier into circuit as this is incorporated in the unit.

2) INSTALLATION

The KW 1000 is designed to operate from either 100/120 volt or 200/240v, 50/60 Hz A.C. Power Supply. The unit has the Power Transformer set for 240 volt A.C. operation when it leaves the factory, except for models despatched to North America, when it is set for 115 volts. For other voltages it is necessary to make internal changes to the transformer taps (see fig. 1).

To obtain access to the power transformer taps it is necessary to remove the chassis from the cabinet.

INSTALLATION (Continued)

Proceed as follows:

- 1) Remove screws and feet from underside of the cabinet. (remove the plugs in the front feet for access to the securing screws).
- 2) Chassis can now be withdrawn from the front of the cabinet by pushing from the rear.
- 3) Remove the perforated metal side and rear screen from the Power Unit. The tag-strip carrying the transformer taps is located at the rear of the Power Supply.

Exact voltage tappings are available at the transformer for 105, 110, 115, 120 volt input by paralleling Primaries A and B by means of two jumper wires, also 210, 220, 230, 240 volts by connecting Primaries A and B in series with a single link jumper wire. Other input voltages should be within 5% of voltage tapping used. (For the precise location and for the arrangement of the taps see Fig. 1). Due to the heavy requirements of this equipment, it should first be ascertained that the source is capable of supplying 15 amperes at 100/120 volt operation or 7.5 amperes at 220/240v operation. A separate EARTH (GROUND) should be taken to the "grounding-lug" situated on the rear of the unit. This should be securely connected to a convenient water supply pipe or separate ground stake. (DO NOT GROUND THE UNIT TO A GAS SUPPLY PIPE).

Note that it is necessary to have the correct fuse installed for the supply voltage in use. (10 AMP for 100-120v operation, 5 AMP for 200-230v operation). The power unit lead (line cord) should be connected to a suitable plug: the line cord colour coding is as follows:-

BROWN - LINE, BLUE - NEUTRAL, and GREEN/YELLOW - EARTH (GROUND)

Connect the exciter to the amplifier R.F. input socket by means of a short length of 52 ohm coaxial cable. Connect the Dummy Load or Antenna to the Antenna coaxial (SO 239) socket. The 2-Pin socket on the rear of the chassis should be connected by a pair of wires to the VOX relay contacts (Contacts to close on TRANSMIT) in the exciter.

3) OPERATION

Operating and tuning the KW 1000 is carried out entirely from the front panel, once the various connections detailed in the installation sections have been carried out.

OPERATION (Continued)

The various controls and meter functions are as follows:-

3a) MAINS (POWER) ON - OFF SWITCH & INDICATOR LAMP

Bottom "Rockette" switch; Power is switched ON when switch is depressed to the right and the associated indicator lamp situated immediately below the switch is illuminated.

3b) SWR BRIDGE SWITCH & INDICATOR LAMPS

Top "Rockette" switch; switches the Bridge to read FORWARD power when depressed to the right and REFLECTED power when depressed to the left. The associated lamps situated immediately above and below read FORWARD (FWD) and REFLECTED (REF) power respectively.

3c) BAND SWITCH

This switch is situated at the bottom right-hand corner of the front-panel and is labelled 10 - through - 80. It is used to set the amplifier to the desired operating Band. THIS SWITCH MUST NEVER BE OPERATED WITH DRIVE APPLIED TO THE AMPLIFIER AND SHOULD ONLY BE OPERATED AS PART OF THE TUNING-UP PROCEDURE.

3d) METER SWITCH

The meter switch is labelled BRIDGE-H.V.-PLATE I and is positioned at the Bottom-Centre of the front-panel. It indicates the meter reading as labelled; in the BRIDGE position it is used in conjunction with the "METER SENS" control to set the FORWARD power level to the SWR BRIDGE.

3e) "METER SENS"

This is adjacent to the METER SWITCH control and is used as indicated above.

3f) PA TUNE

This control is used for tuning the Amplifier plate circuit to resonance.

3g) PA LOAD

This control is used in conjunction with the P.A. TUNE to load the amplifier plate circuit to the optimum output level.

4) TUNING-UP

a) With the KW 1000 Power Switch in the "OFF" position, tune the exciter unit to its normal power output.

CAUTION A Dummy Load should be used while tuning-up any transmitter. This is especially true of a higher power linear amplifier and is extremely important, particularly during the time when the operator is becoming familiar with the use of a new piece of equipment. ALWAYS TUNE-UP INTO A DUMMY LOAD SO AS TO MINIMISE INTERFERENCE ON THE AIR.

TUNING-UP (Continued)

- b) Turn down the R.F. drive control on the exciter unit.
NOTE. On the "KW 2000" series and similar SSB units this is accomplished by reducing the Audio input to the exciter i.e. turn down the MIC GAIN.
- c) Set the BAND CHANGE SWITCH, the P.A. TUNE & the P.A. LOAD controls in the indicated positions for the BAND in use.
NOTE The BAND - CHANGE SWITCH must in NO circumstances be operated with POWER & DRIVE applied to the AMPLIFIER.
- d) Set the METER SWITCH to read PLATE I.
- e) Put the Power Switch to ON. The indicator lamp (Mains) situated below it should light if all is in order.
- f) Apply drive from the exciter sufficient to produce 250mA of PLATE I. Quickly rotate the P.A. Tune control for dip in the Plate current as indicated on the meter.
- g) Increase the R.F. Drive applied from the exciter. As each increase in the Drive level is made, check the P.A. TUNE Control for maximum dip. Should no dip be discernable, it is possible that the output loading is too heavy and this can be reduced by turning the P.A. LOAD control a few degrees in a clockwise direction. **NOTE.** The operating level of Drive required for normal operation is that level which drives the Linear Amplifier to its D.C. rated power input.
- h) Adjust the P.A. LOAD control in the direction which produces an increase in PLATE I. If there is no increase, return the control to its original position and re-dip the PLATE I with the P.A. TUNE control. By re-adjusting the P.A. TUNE control for a dip in PLATE I as the load is increased, a position of the P.A. LOAD control should be found which produces maximum R.F. output. R.F. Power output can be checked with the aid of the S.W.R. Bridge by switching the METER SWITCH to the BRIDGE position, selecting the BRIDGE to read FORWARD power ("FWD" indicator lamp should light). Adjust the METER SENS control for a convenient meter reading. Maximum Power Output will be coincident with maximum meter reading.

With sufficient drive the AMPLIFIER may be loaded to a maximum of 525mA. of plate current (RED LINE ON METER) for C.W. or SSB operation (EHT will fall to 1.8 kv). For AM the loading should not be in excess of 275mA. For RTTY the Plate current should be 325mA.
NOTE. Always finish the tune-up process by checking for dip in PLATE I with the tune control.

TUNING-UP (Continued)

For best linearity the loading of the Amplifier should be increased just beyond the point of maximum power output. Proper loading of the Amplifier occurs when the power output drops approximately 5% from the maximum with the loading on the over-coupled side.

5) FURTHER OPERATIONAL NOTES

It may be necessary to slightly retune the exciter for maximum drive to the Amplifier on the various bands. When switching to straight through reduced power operation, the exciter unit should normally not require any re-tuning.

When modulating the KW 1000 in SSB Service, the PLATE I swing should be between 300 and 400mA. on voice peaks.

DO NOT decrease the loading of the Amplifier to reduce plate power input. The Amplifier must be loaded for maximum D.C. input consistent with maximum R.F. power output. The drive of the exciter should be reduced if less plate power input to the Amplifier is desired. This will assure maximum linearity.

While the loading and tuning adjustments may be used to reduce a small impedance difference between the Amplifier and the antenna system, it is highly desirable to have the standing wave ratio of the Antenna System as low as possible to provide best performance. With an appreciable standing wave ratio the tuning indications will vary widely from those marked on the front panel. Should the Antenna S.W.R. be in excess of 2:1 and the Amplifier is to be run at its full D.C. Power input it is recommended that an Antenna tuning unit or an impedance matching device be used to provide a better match. Failure to improve the matching will result in shortened life of the P.A. tubes and probably flash-over of the Loading capacitor when driving the Amplifier to maximum Power.

The Antenna System S.W.R. can be checked at the exciter power level on the built-in Bridge, with Linear Amplifier switched OFF. This is preferable as the operator will almost certainly be familiar with operation of the exciter as opposed to the Linear which is newly acquired.

ALWAYS LEAVE FREE ACCESS FOR AIR ABOVE AND BELOW THE AMPLIFIER.

CHASSIS REMOVAL

This can be done by removing the screws and the feet from the underside of the cabinet. Remove the plugs in the front feet for access to the securing screws. ALWAYS remove the Power Plug from the Supply Socket. Chassis can now be withdrawn from the front of the cabinet by pushing from the rear.

6)

MAINTENANCE

The KW 1000 Linear Amplifier is designed to give years of trouble free service. Under normal conditions, it requires little attention. Because the equipment is ventilated by a fan, dust may accumulate on the switches and other components within the enclosure. It is suggested, therefore, that the unit be removed from the cabinet and cleaned every six months or more frequently if in a dusty location. The preferred method of cleaning is to use a vacuum cleaner while dusting with a clean brush.

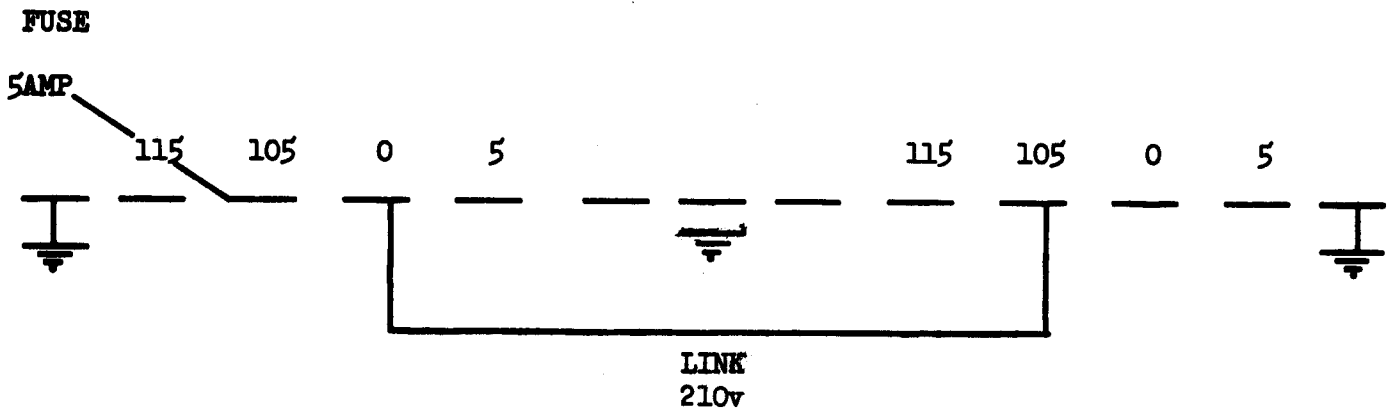
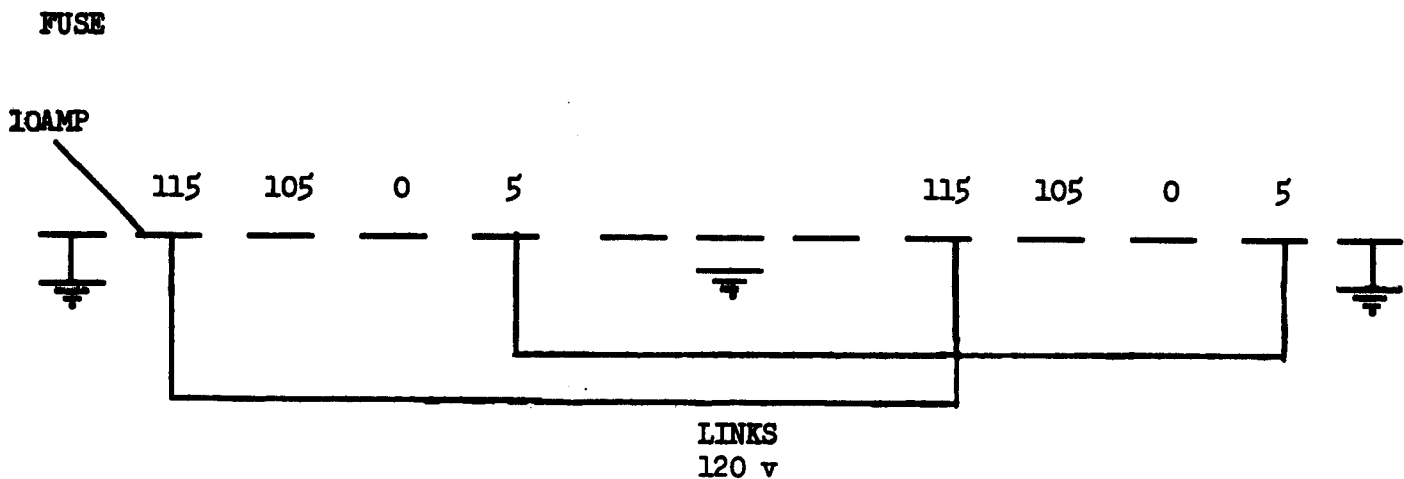
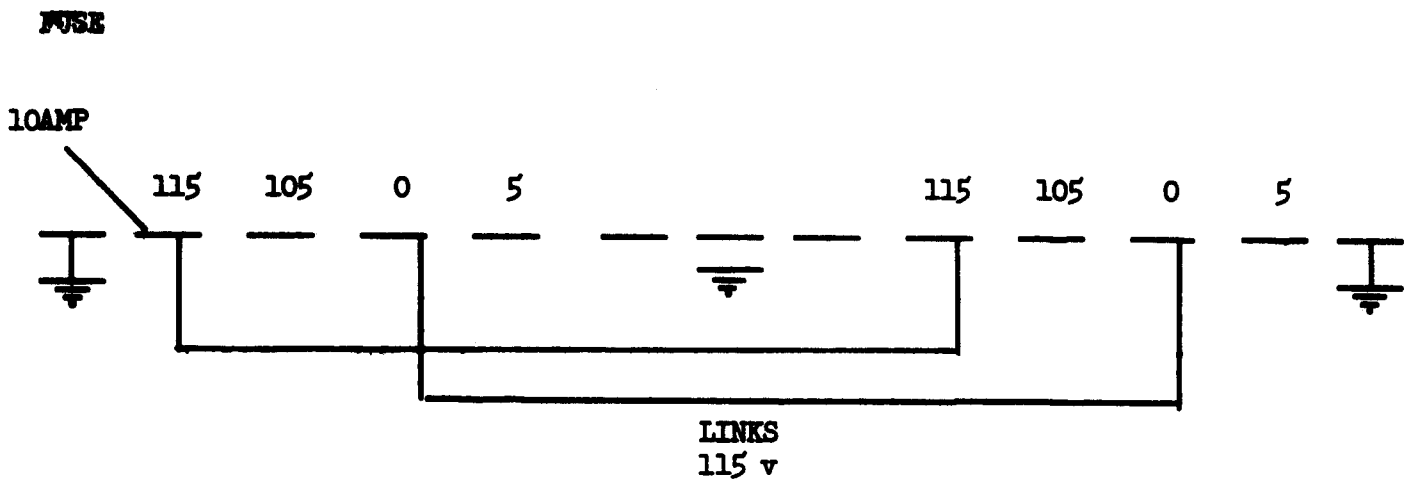
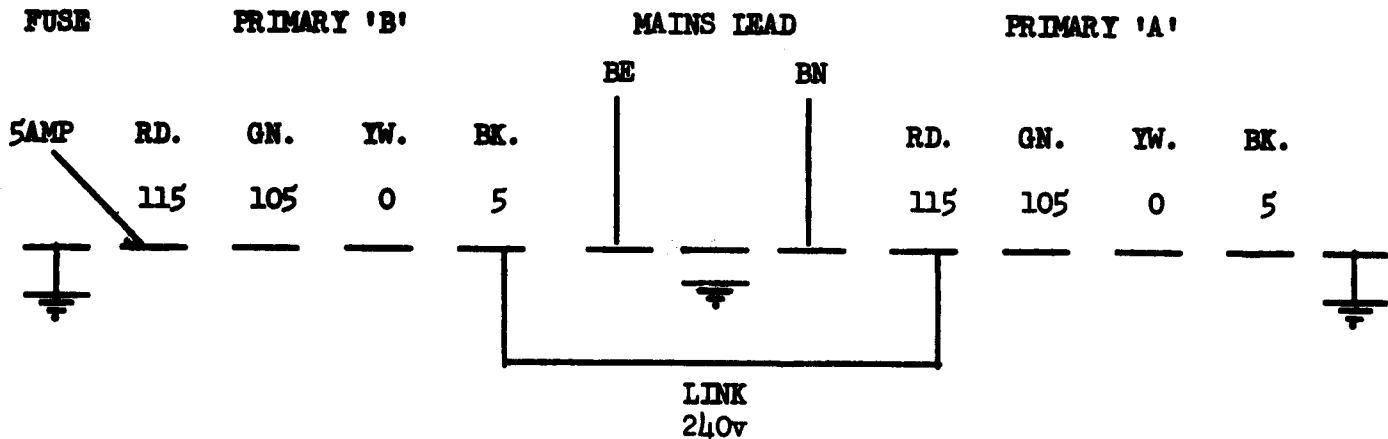
While the unit is out of its cabinet inspect the relay contacts for burning or pitting. To clean the contacts use a burnishing tool or the finest sandpaper. DO NOT USE EMERY OR "CROCUS" CLOTH. After burnishing or sandpapering, clean thoroughly with carbon tetrachloride or other suitable cleaning agent.

Twice a year, a drop of light machine oil should be applied to the bearings of the fan-motor.

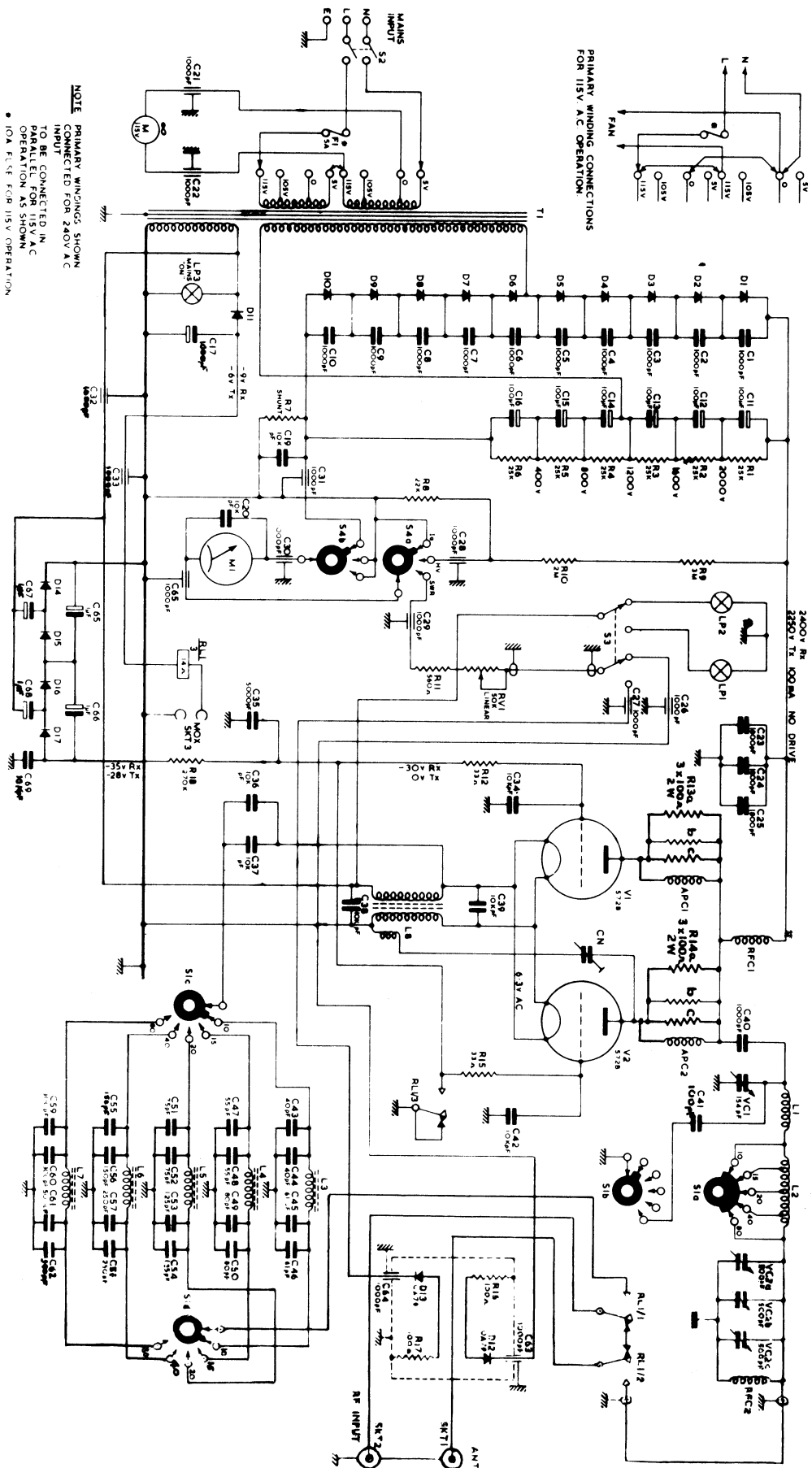
Most troubles, should they occur, can be readily located by the average radio amateur. A schematic diagram of the Amplifier is included with this manual and parts placement of the Main components within the enclosures is self-evident with the assistance of the schematic.

Should difficulty be experienced with the equipment, K.W. Electronics Ltd. should be contacted for advice or to arrange for factory service.

LINE INPUT CONNECTIONS
TO POWER TRANSFORMER



KW 1000 CIRCUIT DIAGRAM



KW 1000 CIRCUIT DIAGRAM