

4 K U L T R A

LINEAR AMPLIFIER

OPERATING AND MAINTENANCE MANUAL



*Henry Radio*

## 4K ULTRA SPECIFICATIONS

TYPE AND FUNCTIONS  
OF EQUIPMENT

The 4K ULTRA is a 4000 watt input (2500 watts nominal output one stage linear amplifier, using a highly linear, grounded grid triode. The ULTRA operates on any frequency between 3.0 and 30.0 MHz.

TUBE COMPLEMENT  
FREQUENCY RANGE  
TUBE COOLING

One Eimac 8877 grounded grid triode.  
3.0 to 30.0 MHz.  
Forced air cooling.

TYPE OF EMISSION  
DUTY CYCLE  
POWER REQUIREMENTS  
DRIVE POWER REQUIRED  
INPUT POWER

SSB, CW, RTTY, AM, and FM.  
Continuous duty in all modes.  
230 VAC, 50/60 Hz, 25 amps, single phase.  
75-100 watts.

## OUTPUT POWER

4 kilowatts PEP SSB, 4 kilowatts CW, 3.2 kilowatts RTTY and FM, and 2 kilowatts for AM.  
2.5 kilowatts PEP nominal for SSB and CW.  
2.0 kilowatts nominal RTTY and FM.  
650 watts nominal AM.

PLATE POWER DISSIPATION  
INPUT IMPEDANCE  
OUTPUT IMPEDANCE  
HARMONIC AND OTHER  
SPURIOUS EMISSIONS

1500 watts.  
52 ohms.  
52 ohms unbalanced with SWR not to exceed 2:1.  
Second Harmonic: -60 db.  
Third Order Distortion: -35 db or better at full power output.

## NOISE LEVEL

-40 db or better below one tone carrier at 4 kilowatts input.

## ALC CIRCUIT

Prevents overdrive from today's high power exciters and boosts average talk power.

## PROTECTIVE DEVICES

There is an input line circuit breaker as well as a cathode fuse. The low voltage filament and relay supplies are fused also. There is a high voltage shorting switch on the RF deck.

## METERING

GRID METER: 0-100 ma grid current or 0-10 volts filament voltage.  
POWER-TUNE METER: 0-2500 watts forward power or 0-250 watts reflected power or center zero tune meter.  
PLATE METER: 0-1 amp plate current or 0-10,000 volts plate voltage.

## FRONT PANEL CONTROLS

Grid Meter, Tune Meter, Plate Meter, Tune Control, Tune Meter Switch, Load Control, Pushbutton Meter Switches, Stand-by Switch, Pilot Lights, Power Switch.

## REAR PANEL CONTROLS

ALC Adjust, ALC Output, Relay Control, RF Input, Cathode Fuse, and RF Output.

## DIMENSIONS

About 37" high x 21" deep x 16" wide.

## SHIPPING WEIGHT

Approximately 225 pounds.

## SPECIAL FEATURES

- Vacuum tune and load capacitors and a vacuum antenna relay.
- Continuously variable capacitive and inductive tuning elements to provide optimum input, output and load conditions for operation.
- Antenna transfers to the exciter when the power switch is off or when the standby switch is depressed.
- Self-contained Bird power output and SWR Bridge.
- Pi-L plate circuit with silver plated tank coil for greatest efficiency and maximum attenuation of unwanted harmonics.
- Resonant choke input and oil filter capacitor for superb dynamic regulation in the high voltage supply.
- Semi-conductor diode rectifiers for long life and reliability.
- High reliability mechanical power switch.
- DC relay system for hum-free operation.
- All aluminum cabinet to eliminate magnetic resonance.

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### WARRANTY

Henry Electronics warrants each new radio product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part in exchange for any part of any unit of its manufacture which under normal installation, use, and service discloses such defect, provided the unit, or part, is delivered by the owner to us intact, for our examination, with all transportation charges prepaid to our factory, within ninety days from the date of sale to the original purchaser and provided that such examination discloses in our judgment that it is thus defective. Should a malfunction be suspected, write in detail to our service department for suggestions concerning the operation, repair or return of your unit if it should prove necessary.

This warranty does not extend to any of our radio products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, or to use in violation of instructions furnished by us, nor extend to units which have been repaired or altered outside of our factory, nor in cases where the serial number thereof has been removed or defaced or changed, nor to units used with accessories not manufactured or recommended by us.

Any part of a unit approved for remedy or exchange hereunder will be remedied or exchanged by Henry Electronics without charge to the owner.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our radio products.

Henry Electronics reserves the right to make any improvements to its products which it may deem desirable without obligation to install such improvements in its previously manufactured products.

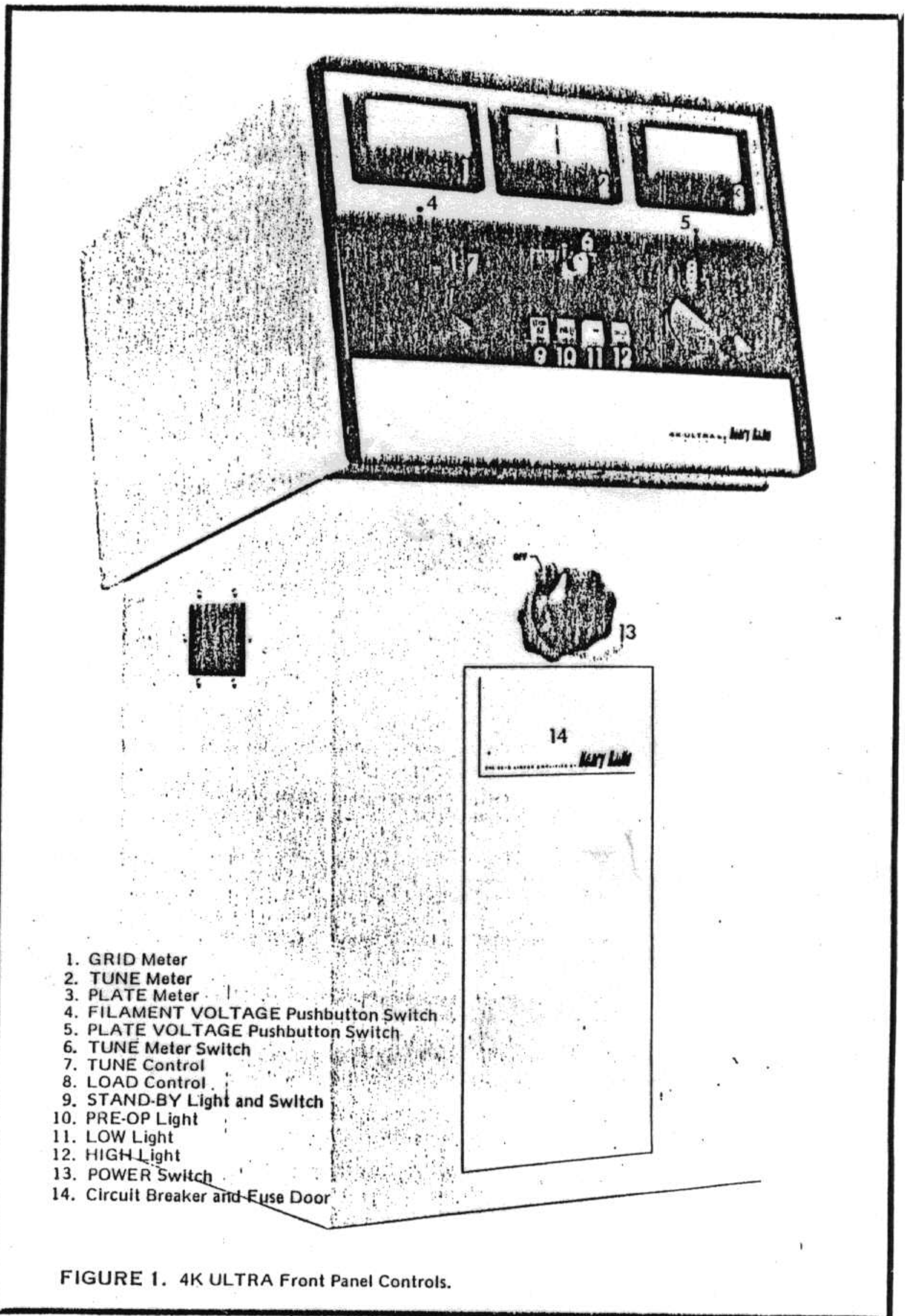


FIGURE 1. 4K ULTRA Front Panel Controls.

## 4K ULTRA OPERATING AND MAINTENANCE MANUAL

### SECTION 1 INTRODUCTION

The 4K ULTRA is a highly sophisticated one stage linear amplifier which employs an efficient Eimac 8877 grounded grid triode. The 4K ULTRA is capable of a nominal 2500 watts continuous output between 3 and 30 MHz. It will operate effectively on SSB, CW, AM, FM, and RTTY with any exciter capable of 75 watts output. It utilizes continuously variable capacitive and inductive tuning elements so the need for a bandswitch is eliminated.

#### CAUTION

Please read the entire manual before attempting to operate the amplifier. The 4K ULTRA is a sophisticated linear amplifier employing an Eimac 8877 tube. The 8877 has special operating parameters that must be met. The tube and the ULTRA can be damaged if the following cautions are not carefully observed.

LETHAL HIGH VOLTAGES ARE PRESENT INSIDE THE AMPLIFIER WHEN THE POWER SWITCH IS IN ANY POSITION OTHER THAN OFF.

THE 8877 MAY BE DAMAGED IF GRID CURRENT EXCEEDS 75-80 MA.

THE 8877'S PERFORMANCE IS VERY SENSITIVE TO FILAMENT VOLTAGE. BEFORE OPERATING THE ULTRA CHECK THE FILAMENT VOLTAGE AND ADJUST IT AS DESCRIBED IN SECTION 5.2.

THE 8877 REQUIRES 90 SECONDS WARMUP, REGARDLESS OF HOW LONG THE AMPLIFIER HAS BEEN TURNED OFF. Under normal operating conditions the delay relay will indicate the warmup period. However if the amplifier is turned off after it is warm and turned on again within a few seconds the delay relay will not indicate warmup. THE TUBE STILL REQUIRES 90 SECONDS WARMUP.

### SECTION 2 INSTALLATION

#### 2.1 UNPACKING

Remove the amplifier from its box and packing material and examine it carefully for visible damage. If the linear has been damaged in shipment, save the box and packing material and notify the transportation company immediately. It is a good idea to save the box and packing material in any case, because the box is expensive to replace and very useful for shipping or moving the amplifier. The ULTRA is shipped fully assembled, so to get on the air simply locate the amplifier in a proper location, be sure that the power transformer is wired for the proper line voltage (208 or 230), be sure that the filament voltage is correct, connect the cables, and be sure to fully understand the operating instructions.

The following accessories should be included with the ULTRA.

1	Instruction Manual	1	Large Bristol Wrench
1	Warranty Card	1	Small Bristol Wrench
1	UG 59 B/U Coax Connector	2	Switchcraft 25AK25 coax cables
1	RF Input Cable (phono-BNC)	10	3 AG, 3 Amp Fuses
5	8AG 1.5 Amp fuses		

#### 2.2 OPERATING LOCATION

The 8877 develops high temperatures during operation, so the ULTRA should be operated where it can be properly cooled. The main blower exhausts at the back of the amplifier. The amplifier should be placed far enough away from any wall, furniture, or surface to prevent the hot air from causing damage. There is also a small ventilating fan in the RF deck. Avoid placing any objects on top of the equipment which would obstruct the air flow to the RF section.

## 2.3 CABLING

The following cables should be connected before operation of the amplifier.

**ANTENNA**— Connect a suitable antenna or an adequate 52 ohm dummy load to the female RF output connector on the rear panel. This connector is an Amphenol type HN connector (1 on Figure 2). The mating HN male connector is supplied and for preparation instructions refer to Figure 3. NOTE: If a dummy load is used, it must be capable of handling 2500 watts continuous output.

**RF IN**— The RG-58A/U input cable connects to the RF IN connector on the back of the amplifier. This connector is the BNC jack. The other end of the cable is terminated by a phono plug and should be inserted in the RF output of the exciter. An adapter may have to be used if the exciter does not have a matching socket.

**RELAY**— The grey relay control cable should be plugged into the phono socket marked RELAY on the back panel of the amplifier. This cable activates the amplifier to a transmit condition. It requires only a shorting relay contact to ground to be activated.

### CAUTION

Do not apply any voltage to this relay control circuit. The amplifier's internal relay is activated by a self-contained 24 VDC supply.

The relay cable can be plugged directly into the socket marked ANTENNA RELAY on the exciter. When the ULTRA is excited by a driver unit without an antenna relay socket it may be necessary to examine the circuit diagram of the exciter to find an available unused relay contact that is normally open in the receive condition. All current SSB transmitters and transceivers have a relay contact at a terminal board or jack on the back panel.

**ALC (Automatic Level Control)**— Plug the grey ALC cable into the ALC OUT phono socket on the back panel of the ULTRA and into the ALC socket of the exciter. If the exciter does not have provision for feedback of ALC voltage from the amplifier, simply ignore the amplifier ALC socket and cable. Also set the ALC ADJ control on the rear panel to a fully counter-clockwise position (9 on Figure 2).

**POWER CABLE**— The ULTRA is shipped wired for operation from 230 VAC. A three conductor power cable is standard with the linear. To rewire the amplifier for 208 VAC operation, see paragraph 5.10 in Section 5. The power source should be 50/60 Hz capable of supplying 25 amps. Select a three prong power plug that matches the power receptacle at the operating position and fasten the plug to the cable. The black and white wires of the cable should be connected to the 230 VAC and the green wire should be the ground wire.

### CAUTION

The amplifier will be damaged if the green wire is connected incorrectly.

Be sure the POWER switch is in the OFF, fully counter-clockwise, position before plugging the amplifier into the power source.

## SECTION 3 OPERATING CONTROLS

### 3.1 FRONT PANEL CONTROLS

**GRID METER (1 on Figure 1)**—The GRID meter measures 0-100 ma of grid current in its normal position. When the FILAMENT VOLTAGE pushbutton is pushed in this meter measures 0-10 volts of filament voltage.

**TUNE METER (2 on Figure 1)**— This meter's functions depend on the position of the TUNE meter switch. See that description below.

**PLATE METER (3 on Figure 1)**— The PLATE METER measures 0-1 amperes of plate current in its normal position. When the PLATE VOLTAGE pushbutton switch is pushed in this meter measures 0-10,000 volts of plate voltage.

**FILAMENT VOLTAGE PUSHBUTTON SWITCH (4 on Figure 1)**— This push-button switch, which is located directly below the GRID meter, is depressed to measure filament voltage on a 0-10 volt scale.

**PLATE VOLTAGE PUSHBUTTON SWITCH (5 on Figure 1)**— This push-button switch, which is located directly below the PLATE meter, is depressed to measure plate voltage on a 0-10,000 volt scale.

**TUNE METER SWITCH (6 on Figure 1)**— This switch is a three position switch which selects the function of the center TUNE meter. The TUNE meter performs the following functions:

**REFLECTED**— The meter reads 0-250 watts reflected power on the left scale.

**TUNE**— The meter is used as a low power tuning indicator.

**FORWARD**— The meter reads 0-2500 watts forward power on the right scale.

**TUNE CONTROL (7 on Figure 1)**— This control simultaneously adjusts the input, output and tank circuits for resonant operation. Refer to Table 1 for approximate TUNE control settings.

**LOAD CONTROL (8 on Figure 1)**— This control adjusts the loading capacitor for optimum load conditions. Refer to Table 1 for approximate LOAD control settings.

**STAND-BY SWITCH AND LIGHT (9 on Figure 1)**— The STAND-BY switch is a push-on, push-off switch. When depressed it should light to indicate the STAND-BY mode. Also, when the STAND-BY switch is depressed the amplifier cannot be keyed. In the STAND-BY condition the exciter output will be switched through the amplifier directly to the antenna. Note that even in the STAND-BY position the TUNE meter will indicate the FORWARD and REFLECTED power of the exciter.

**PRE-OP LIGHT (10 on Figure 1)**— The PRE-OP light is illuminated when the POWER switch is in one of the PRE-OP positions.

**LOW LIGHT (11 on Figure 1)**— The LOW light is illuminated when the POWER switch is in the LOW position.

**HIGH LIGHT (12 on Figure 1)**— The HIGH light is illuminated when the POWER switch is in the high position.

**POWER SWITCH (13 on Figure 1)**— The POWER switch is a 5 position switch which is used to control the 230 VAC input and the HIGH and LOW plate voltage taps. The switch is wired as follows:

**POSITION 1 — OFF**

**POSITION 2 — PRE-OP (stop here momentarily before switching to LOW)**

**POSITION 3 — LOW (plate voltage is 3200 VDC)**

**POSITION 4 — PRE-OP (intermediate position to reduce surge as plate voltage is increased)**

**POSITION 5 — HIGH (plate voltage is 4000 VDC)**

Never move the power switch while the amplifier is keyed.

**CIRCUIT BREAKER AND FUSES (14 on Figure 1)**— The 25 amp circuit breaker and two 3 amp 3AG fuses are located behind the fuse door below the POWER switch.

### 3.2 REAR PANEL CONTROLS (See Figure 2)

**ANTENNA (1 on Figure 2)**— This Amphenol HN type connector should be connected to a suitable 52 ohm load. The mating male connector is supplied in the accessory package.

**C16 (2 on Figure 2)**— This capacitor, in conjunction with L9, is used to match the impedance of the amplifier to the exciter. The control is factory adjusted and should not be touched without referring to paragraph 5.8 in Section 5.

**8 AG 1.5 AMP (3 on Figure 2)**— The 8 AG 1½ ampere fuse is in the cathode return circuit of the 8877 tube. The schematic number of the fuse is F1.

**D4 (4 on Figure 2)**— The 1N2810 on the rear panel provides 12 volts cathode bias for the 8877 tube.

RELAY Control Jack (5 on Figure 2)— This phono jack should be connected to exciter relay contacts which are normally open during receive. The connecting cable is supplied in the accessory kit. The jack is used to control the amplifier's internal antenna relays.

RF IN (6 on Figure 2)— This socket is a BNC connector used to connect the ULTRA to the RF Output connector of the exciter. A cable with a phono plug at the other end is provided with the amplifier.

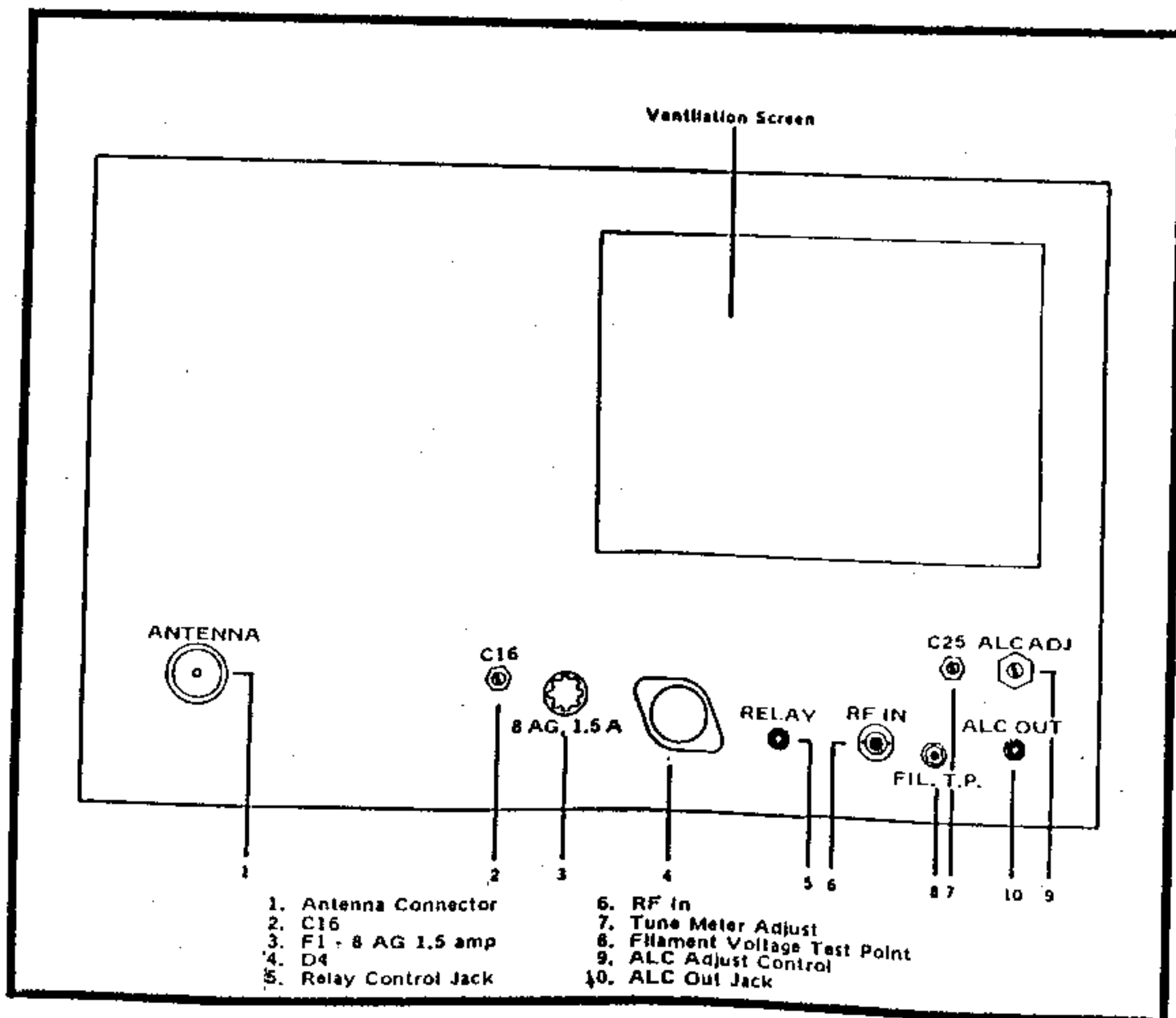
C25 (Tune Meter Adjust) (7 on Figure 2)— This capacitor is used to calibrate the TUNE function of the TUNE meter. The control is factory adjusted and should not be touched without referring to paragraph 5.7 of Section 5.

FIL. T. P. (Filament Voltage Test Point) (8 on Figure 2)— This green tip jack is provided as a test point in case the internal filament meter ever requires recalibration. It may also be used if external metering of the filament voltage is ever desired. A 0-10 VAC voltmeter is required for an external meter, however the voltage at the test point is .4 volts higher than the actual voltage (see Section 5.4).

ALC ADJ (ALC Adjust) (9 on Figure 2)— This screw driver control adjusts the ALC circuit for proper operation. Refer to Section 5.3 for instructions on ALC adjustment.

ALC OUT (10 on Figure 2)— This Jack is for connection to exciters which have ALC provisions. If the exciter does have ALC circuits which are intended for use with an external amplifier, they should be used to full advantage as they help prevent overdriving the amplifier. An ALC control cable is included in the accessory kit.

FIGURE 2. 4K ULTRA Rear Panel Controls





### 3.3 INTERNAL CONTROLS (See Figure 4)

**FILAMENT TRANSFORMER TAP SWITCH (1 on Figure 4)**— This switch selects between 6 primary taps on the filament transformer to compensate for the voltage differences at different operating positions.

**FILAMENT VOLTAGE METER ADJUST (2 on Figure 4)**— This control adjusts the FILAMENT VOLTAGE meter reading. It has been factory adjusted and should not be moved without referring to paragraph 5.4 in Section 5.

**GRID CURRENT METER ADJUST (3 on Figure 4)**— This control adjusts the reading on the GRID meter. It has been factory adjusted for a correct reading and should not be moved without referring to paragraph 5.5 in Section 5.

**PLATE CURRENT METER ADJUST (4 on Figure 4)**— This control adjusts the reading on the PLATE meter. It has been factory adjusted for a correct reading and should not be moved without referring to paragraph 5.6 in Section 5.

**GRID METER TEST POINT (5 on Figure 4)**— The ULTRA is shipped with a shorted phono plug in this test point. The amplifier will not operate without that plug. The test point is used to calibrate the GRID meter and the shorting plug should only be removed when calibrating the meter. The meter has been factory adjusted. The procedure for calibration is described in paragraph 5.5 in Section 5.

**L9 (6 on Figure 4)**— This variable inductor is used for adjusting the inductive matching network on the input of the amplifier to match the exciter. Calibration procedures are described in paragraph 5.8 in Section 5.

**CONTROL PANEL PLUG (Not Pictured)**— This is a 25 pin miniature plug, located on the left-front quarter of the amplifier underneath the RF deck chassis. This plug should never be disconnected. The plug is attached to the wire harness between the power supply and the front panel.

**RF DECK PLUG (P2 on Figure 5)**— This 12 pin Jones plug, located on the right-rear quarter of the bottom of the RF deck, connects the power supply wiring harness to the RF deck. The plug must be disconnected before removing the RF deck from the cabinet.

**HIGH VOLTAGE PLUG (P1 on Figure 5)**— This large, red, pin-type plug is located in the left-rear quadrant of the bottom of the RF deck. Unplug this connector whenever you are working on the amplifier RF section. The high voltage from the power supply is lethal and should be disconnected from the RF deck whenever the top covers of the amplifier are removed.

## SECTION 4 OPERATION

### 4.1 PRELIMINARY SETTINGS

Be sure the POWER switch is in the OFF position. Flip the circuit breaker on and depress the STAND-BY switch. Turn the TUNE meter switch to the center position (TUNE).

Turn the POWER switch clockwise to the PRE-OP position and wait momentarily before switching to the LOW position. Make sure the fan and blower are operating. Note that during the 90 second warm-up period the STAND-BY light is continuously flashing. The amplifier will not operate until the light stops flashing. The time delay relay prevents the possibility of drive being applied before the warm-up period is complete.

Check the filament voltage by depressing the small push-button under the GRID meter. The proper filament voltage is 5 volts  $\pm$  5% (the tolerance range is indicated on the meter face). The meter reads 10 volts full scale and should be approximately center scale when the correct filament voltage is obtained. If the filament voltage is not 5 volts  $\pm$  5%, refer to paragraph 5.2 in Section 5.

Turn the STAND-BY switch off (extended), key the amplifier with the exciter, and check the PLATE idling current. It should be approximately 100-150 ma in the LOW position and 200-300 ma in the HIGH position.

Tune the exciter for the desired operating frequency. Note that the STAND-BY switch is a push-on, push-off type switch. When the STAND-BY switch is depressed, the exciter output will be coupled directly to the antenna and will bypass the amplifier input circuits.

#### CAUTION

Do not operate the amplifier in an off-resonance condition for any length of time.

### 4.2 SSB AND CW OPERATION

Select the desired operating frequency and obtain the approximate TUNE and LOAD settings from Table 1. Then set the TUNE and LOAD controls to a slightly lower figure than the given settings. This enables the operator to tune the amplifier while moving the controls in a clockwise direction only. The SWR of the antenna will change the TUNE and LOAD settings, so the values given in Table 1 are only approximate. The amplifier will be impossible to drive unless the TUNE control is set, because the input tuning is ganged.

When the STAND-BY light stops flashing, the TUNE meter should be in the TUNE position and the POWER switch should be in the LOW position— as indicated by the pilot light on the front panel. Next, apply drive from the exciter until the PLATE meter indicates 500 ma.

Turn the TUNE control clockwise for a dip on the PLATE meter (Also the TUNE meter). After the dip has occurred, turn the LOAD control slowly until the TUNE meter returns to the center zero. If the dip occurs left of zero on the TUNE meter, increase the loading by turning the control clockwise. If the dip occurs right of zero on the TUNE meter, decrease the loading by turning counter-clockwise. The TUNE meter needle should move in the same direction as the LOAD control. Make sure the PLATE meter still reads 500 ma. If the plate current is not 500 ma, readjust the exciter drive for a PLATE meter reading of 500 ma. Repeat this procedure (dip the TUNE, zero with LOAD, adjust drive) until the TUNE meter indication is zero at the dip. When this is accomplished the final amplifier should be in resonance.

With the amplifier still in the LOW position, increase the exciter drive for a PLATE meter reading of 800 ma. At this point the approximate output is 1600 watts. If high power operation is desired, turn the POWER switch to the HIGH position. With slightly more drive the PLATE meter will read approximately 1 amp and the output will be approximately 2500 watts. Note that there is an intermediate PRE-OP position between the LOW and HIGH position. This intermediate position minimizes the surge as the plate voltage is increased by turning the POWER switch from LOW to HIGH. The plate voltage is approximately 3200 volts in the LOW position and 4000 volts in the HIGH position.

For SSB operation, voice peaks should be limited to approximately 400 ma PLATE current in the LOW position and to approximately 500 ma in the HIGH position. Reduce the exciter drive if the current is too high. In any case the GRID current should never exceed 75-80 ma.

Make a note of the final TUNE and LOAD readings to make future tune up easier.

#### DANGER

NEVER EXCEED 75-80 MA. GRID CURRENT AS DAMAGE TO THE 8877 TUBE MAY RESULT, Do not move the power switch with the amplifier keyed.

For CW operation the plate current will be approximately 800 ma in the LOW position for 1600 watts output and will be approximately 1 amp in the HIGH position for 2500 watts output.

### 4.3 FM AND RTTY OPERATION

The ULTRA should be tuned exactly as described in paragraph 4.2 above for FM, AM, and RTTY operation. For intermittent, light duty operation in these modes, you can operate in the HIGH position. However for continuous duty, key down operation you should operate in the LOW position.

### 4.4 AM OPERATION

Load as above, then reduce exciter drive to produce 625 plate ma. or no more than 2000 watts input, do not operate AM in HIGH position.

#### 4.5 POWER READINGS

The TUNE meter switch has positions for FORWARD POWER and REFLECTED POWER readings on the TUNE meter. The internal Bird power sensor is accurate to within  $\pm 5\%$  of the power reading. The sensor needs no adjustment.

With the TUNE meter switch in the FORWARD POWER position the TUNE meter indicates output power into the load. The scale reads 0-2500 watts to the right of the center zero. When the TUNE meter switch is in the REFLECTED POWER position the TUNE meter indicates power reflected from the load. The scale reads 0-250 watts to the left of the center zero. For an output power of 2500 watts, a reflected power reading of 250 watts indicates an SWR of about 2:1.

#### CAUTION

The amplifier may be damaged if operated into a load with SWR exceeding 2:1.

Use the TUNE meter to check the SWR of the load before operating the amplifier. Measure forward and reflected power using the exciter only (with the ULTRA off or in the STAND-BY mode). Use Table 2 to determine the SWR.

#### 4.6 ALTERNATE TUNING METHOD

It is possible to tune the amplifier without using the TUNE meter. The following method may be used for tuning after the operator has become familiar with the 4K ULTRA controls and tuning characteristics.

Select the desired operating frequency and obtain the approximate TUNE and LOAD settings from Table 1, or from your own notes. Then set the TUNE and LOAD controls to a slightly lower figure than the given settings. This enables the operator to tune the amplifier while moving the controls in a clockwise direction only. The amplifier will be impossible to drive until the tune control is set because the input tuning is ganged.

When the STAND-BY light stops flashing, turn the TUNE meter switch to the FORWARD POWER position. The POWER switch should be in the LOW position as indicated by the pilot light on the front panel. Apply drive from the exciter until the PLATE meter indicates 400-500 ma. Turn the TUNE control clockwise for a maximum dip on the PLATE meter. A dip is realized when minimum PLATE current is indicated. Next, increase exciter drive for 75 ma of grid current. Turn the LOAD in a clockwise direction until the PLATE meter indicates 800 ma. Again tune for a dip by turning the TUNE control clockwise until a minimum dip is indicated. Turn the LOAD control in a clockwise direction until the PLATE meter indicates 800 ma. Repeat this process until the meter indication is 800 ma at the dip. The amplifier is still in the FORWARD POWER position, so the TUNE meter will indicate forward power in watts and should read approximately 1600 watts.

If HIGH power operation is desired, turn the POWER switch to the HIGH position. With slightly more drive the PLATE meter will indicate approximately 1 amp and the FORWARD power meter will indicate approximately 2500 watts output. Readjust TUNE and LOAD if it is necessary.

When SSB operation is used, voice peaks should be limited to approximately 400 ma. PLATE current in the LOW position and approximately 500 ma. PLATE current in the HIGH position. In any case the grid current should never exceed 75-80 ma. Refer to 5.3 for instructions on proper ALC set-up.

#### DANGER

NEVER EXCEED 75-80 ma. GRID CURRENT AS DAMAGE TO THE 8877 TUBE MAY RESULT.

## SECTION 5 MAINTENANCE AND ADJUSTMENTS

### CAUTION

LETHAL HIGH VOLTAGES ARE PRESENT INSIDE THE AMPLIFIER WHEN IT IS TURNED ON. EXERCISE EXTREME CAUTION IF IT IS NECESSARY TO WORK INSIDE THE AMPLIFIER WHEN IT IS NOT TURNED OFF.

### 5.1 GENERAL MAINTENANCE

The air filter on the back of the power supply section should be cleaned periodically with soap and water. Rinse it with clean water in a direction opposite of the air flow arrow printed on the filter. When the filter is dry, spray it sparingly with a light machine oil.

The blower and fan do not require any lubrication.

In humid climates, the tuning drive chain should be lubricated periodically with a heavy bearing grease such as GC Lubriplate. Use only a small amount.

To replace the pilot light bulbs, pull the lens cap out of the front panel and remove the bulb. The replacement bulb should be a type 327, 28 volt lamp.

To replace the dial light bulbs, remove the RF top and sub-top and unscrew the defective bulb from its holder. The replacement bulb should be a type 6S6, 115 volt bulb. The two bulbs are wired in series so that when one bulb fails, both lamps will not light.

### 5.2 FILAMENT VOLTAGE ADJUSTMENT

#### CAUTION

Remove the back panel of the power supply and disconnect the high voltage plug from the bottom of the RF deck.

The filament voltage adjust switch is shown as number 1 on Figure 4. Remove the top of the amplifier and then its sub-top. Turn the POWER switch to the LOW position and switch S2 until the reading on the filament voltage meter is between 4.75 and 5.25 VAC. There is a jack on the rear panel so that an external meter can be connected for monitoring the filament voltage. The external meter should read .4 volt higher than the panel meter because of the voltage drop in the filament choke.

### 5.3 ALC ADJUSTMENT

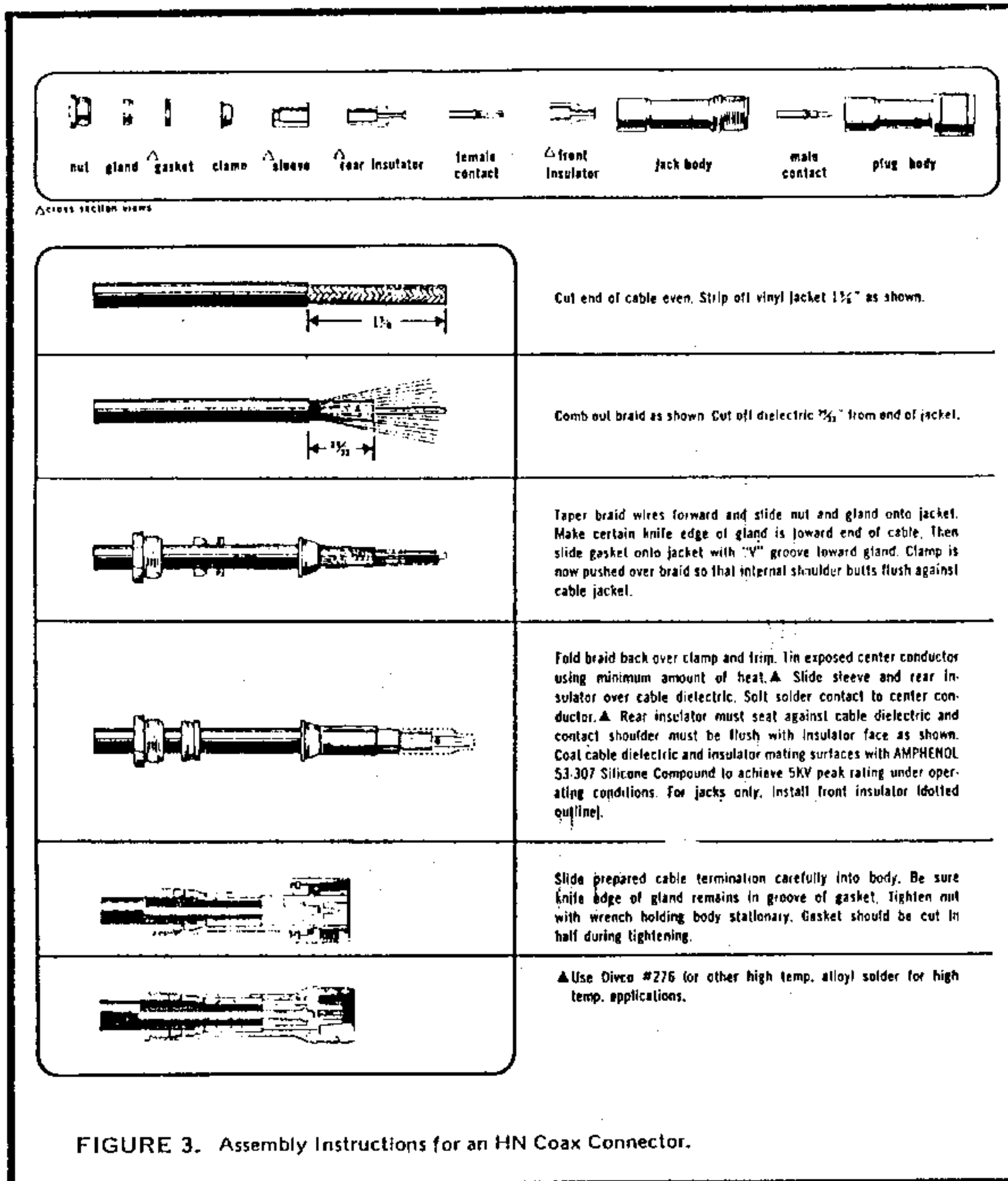
If the exciter has provisions for ALC feedback, use the ALC cable supplied in the accessory bag to connect the exciter ALC jack to the ALC OUT (10 on Figure 2) on the rear panel of the 4K ULTRA. Tune the amplifier for high power operation as described in Section 4.2. Increase the exciter's drive for a GRID meter reading of 70 ma. Turn the ALC control (9 on Figure 2) clockwise until the grid current just begins to decrease. Tighten the locknut to hold the ALC ADJUST potentiometer in position. If the exciter does not have provisions for ALC feedback, the ALC ADJUST control on the 4K ULTRA should remain in a fully counterclockwise position.

### 5.4 ADJUSTMENT OF THE FILAMENT METERING CIRCUIT

#### CAUTION

Remove the back panel of the power supply and disconnect the high voltage plug from the bottom of the RF deck.

Remove the top cover and the sub-top of the amplifier. Turn the POWER switch to the LOW position. Connect an accurate AC voltmeter to the green tip jack on the rear panel of the ULTRA (8 on Figure 2). Depress the pushbutton switch under the GRID meter and adjust the filament voltage metering potentiometer (2 on Figure 4) until the reading on the test meter is .4 volts higher than the reading on the FILAMENT VOLTAGE meter.



## 5.5 GRID CURRENT METERING ADJUSTMENT

### CAUTION

EXERCISE EXTREME CAUTION BECAUSE THE HIGH VOLTAGE IS EXPOSED DURING THIS ADJUSTMENT.

Remove the top cover and then the sub-top. Remove the shorting plug from the grid metering test in the RF deck (5 on Figure 4). Connect a 0-500 ma meter (a Triplett 630 or its equivalent) to this test point. The circuit requires a 0-500 ma range even though the measurement is only 50 ma. With the POWER switch in the LOW position, increase the exciter drive until the test meter indicates 50 ma. Adjust the grid metering potentiometer (3 on Figure 4) until the GRID meter reading coincides with the test meter reading.

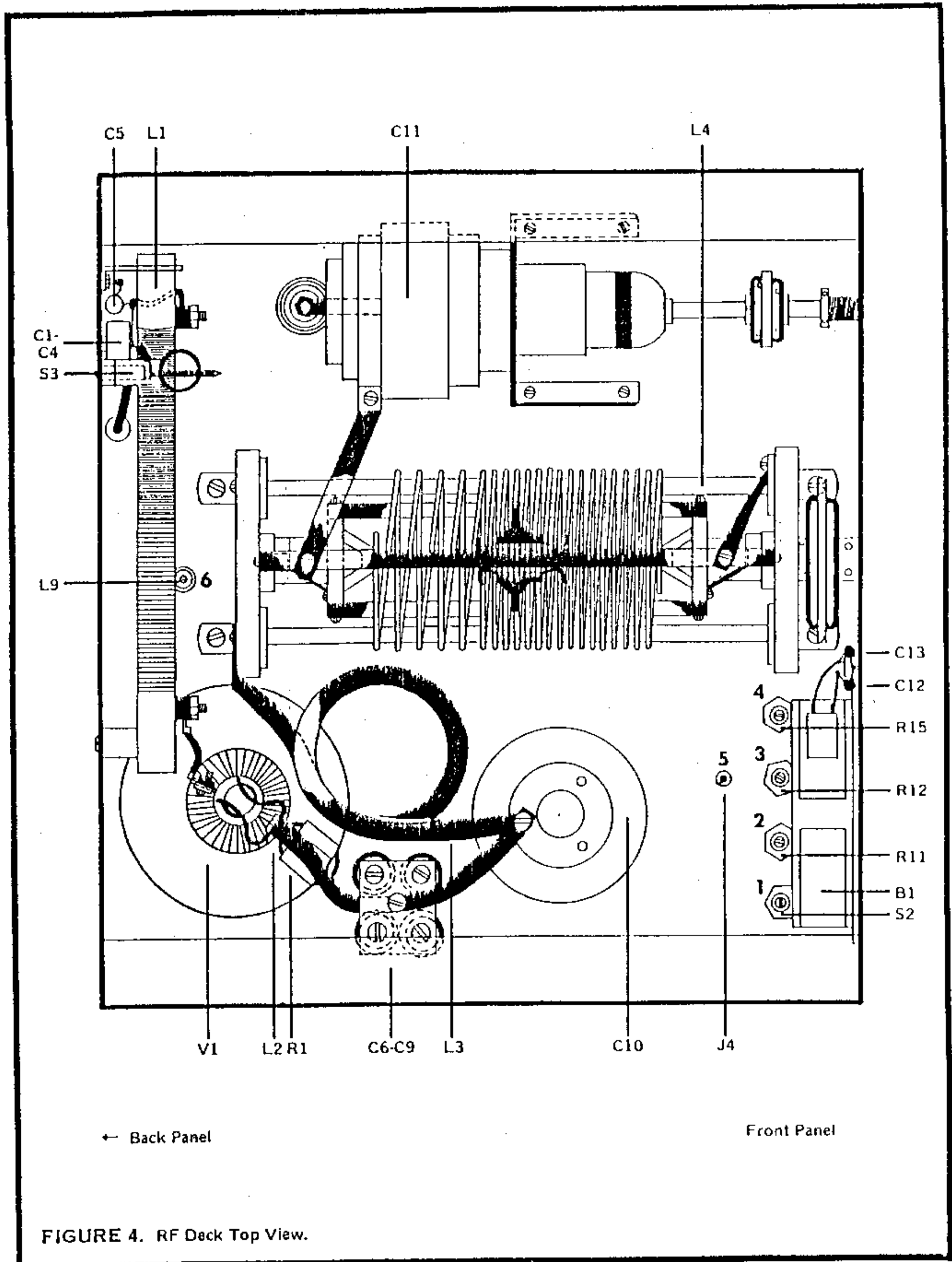


FIGURE 4. RF Deck Top View.

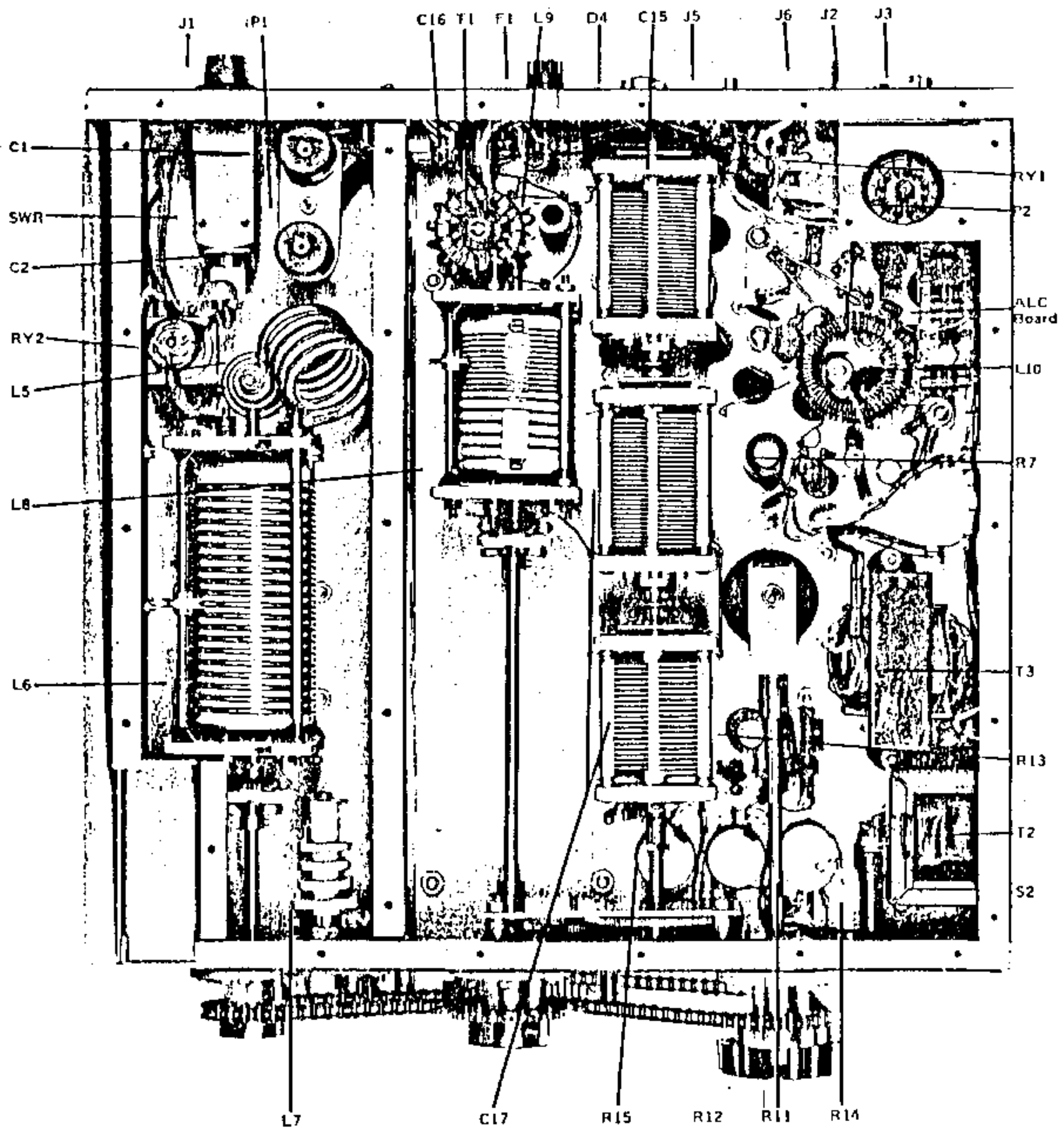
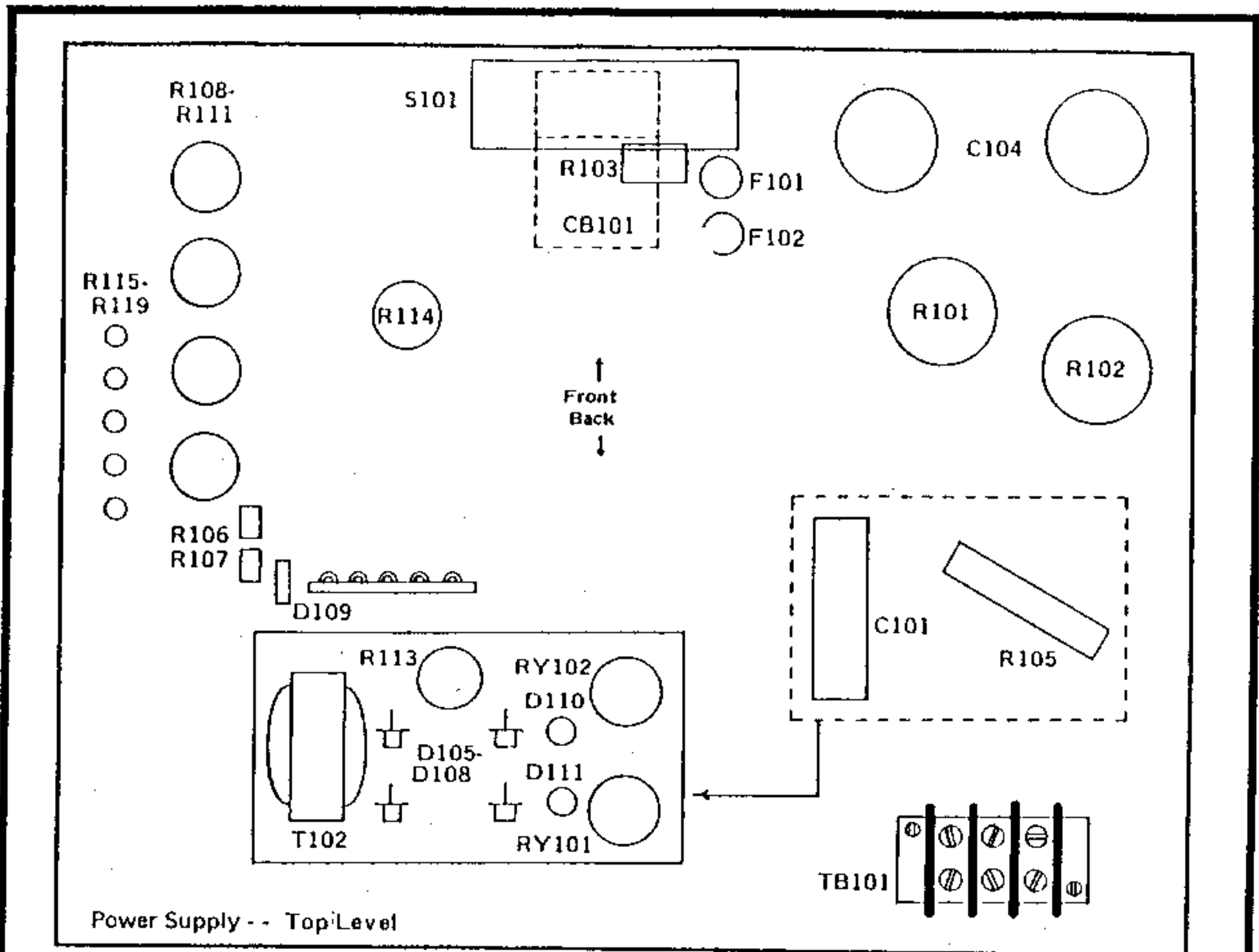


FIGURE 5. RF Deck Bottom View.



Power Supply - - Bottom Level

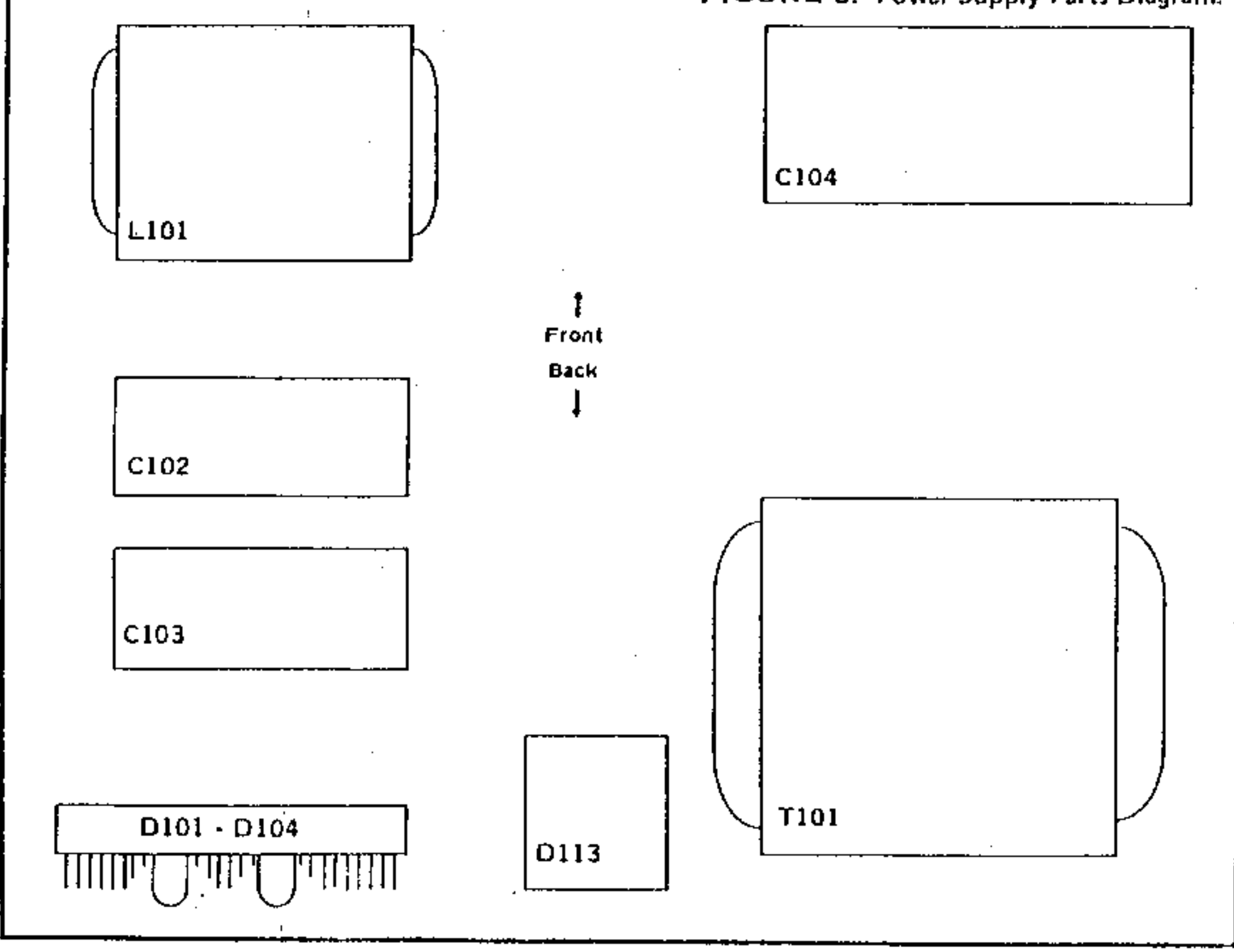


FIGURE 6. Power Supply Parts Diagram.



## 5.6 PLATE CURRENT METERING ADJUSTMENT

### CAUTION

EXERCISE EXTREME CAUTION BECAUSE THE HIGH VOLTAGE IS EXPOSED DURING THIS ADJUSTMENT.

Remove the top cover and then the sub-top. Remove the rear panel of the power supply section. Insert a 0-1 DC amp meter in series with the high voltage connector (9 on Figure 4). Turn the POWER switch to the LOW position and apply drive until the test meter shows .5 amp. Turn the plate metering adjustment potentiometer until the 4K ULTRA PLATE meter reading coincides with the test meter reading.

## 5.7 TUNE METER ADJUSTMENT

The TUNE meter is factory adjusted and should not need recalibration. If it does however, tune the amplifier for operation at 14 MHz using the alternate tuning procedure described in Section 4.6. With the POWER switch in the LOW position, set the exciter drive for a PLATE meter reading of 500 ma and turn the TUNE METER switch to the TUNE position. Adjust the tune meter adjustment control on the bottom of the RF deck for a TUNE meter reading of zero (center).

## 5.8 TRACKING ADJUSTMENT

Remove the top cover and then the sub-top. Insert an SWR bridge between the 4K ULTRA and the exciter.

### CAUTION

DURING THIS ADJUSTMENT THE 4K ULTRA IS OPERATED AT FULL POWER. THERE IS AN EXTREMELY HIGH RF FIELD PRESENT IN THE VICINITY OF THE INDUCTIVE TRACKING ADJUSTMENT. A PLASTIC OR NONCONDUCTING TOOL MUST BE USED TO MAKE THIS ADJUSTMENT. DURING THE ADJUSTMENT THE HIGH VOLTAGE WILL BE EXPOSED. THE HIGH VOLTAGE IS LETHAL.

Tune the 4K ULTRA for high power operation on 29 MHz into a 2500 watt dummy load. Alternately adjust L9 and C16 for minimum reflected power to the exciter (as indicated by the SWR bridge).

## 5.9 OVERLOAD SENSING RESISTOR

If the circuit breaker opens during normal operation, move the slider on R112 (See Figure 5) down towards the chassis by no more than  $\frac{1}{4}$  inch. If the circuit breaker continues to open, some other malfunction should be suspected.

## 5.10 208 VAC OPERATION

To rewire the amplifier for 208 VAC operation, locate the power transformer, T101. Move the wires on terminal 3 to terminal 2 (on the primary). Also move the wire on terminal 5 to terminal 4. Be sure to check and, if necessary, readjust the filament voltage.

## 5.11 REMOVING THE CABINET

In these instructions the screw descriptions are abbreviated as follows: PH - Phillips Head, CS - counter sunk, and BH - binder head.

### PULLING THE RF DECK

1. Lift the 4K ULTRA's gray top screen after unscrewing its four 8/32 PH CS screws.
2. Remove the fourteen 6/32 PH CS screws along the top of the gold anodized sub-top. Then unscrew the five 6/32 PH CS screws holding the sub-top to the rear panel. Lift the sub-top from the amplifier.

3. Set the LOAD control to 00.0 and loosen ~~the~~ **two number 8 spline set screws** on the driven side of the LOAD shaft coupler.
4. Repeat step 3 with the TUNE control.
5. Remove the two 10/32 PH BH screws ~~from the underside~~ of the front RF deck overhang.
6. Unscrew the two 6/32 PH CS screws holding ~~the~~ **RF chassis** to the cross-member at the top rear of the wraparound.
7. Remove the back panel of the power supply section by unscrewing the six 8/32 PH BH screws holding it to the chassis.
8. Reach into the power supply section and ~~unplug~~ **unplug the high voltage connector** (see Figure 5). Also unplug the 12-pin harness plug from the ~~bottom of the~~ **RF deck**.
9. Slide the RF chassis backwards out of ~~the wraparound~~.

#### REMOVING THE RF DECK WRAPAROUND

1. Remove the RF deck as described above.
2. Disconnect the wires from the terminals ~~on the blower~~. Make a note of the wire colors and terminal numbers so that the blower can be ~~correctly rewired~~.
3. Unscrew eight of the 11 PH CS screws which ~~connect the wraparound to the power supply cabinet~~. Three of the screws connect a stiffening brace ~~for the wraparound~~. These screws need not be removed.
4. Unplug the 25-pin control panel plug. ~~This connector is keyed for proper reconnection~~. Be sure the plug is inserted properly when it is reconnected.
5. Lift the wraparound off of the power supply cabinet. The blower will lift off with it.

#### REMOVING THE POWER SUPPLY SIDES

1. Unscrew the three 10/32 PH BH screws ~~along the top of each side of the power supply~~ (six screws if removing both sides).
2. Tip the power supply carefully and ~~remove the three PH BH screws along the bottom of each side of the power supply~~ (six screws if removing both sides).
3. Carefully lift, or if necessary pry, the ~~sides away from the chassis frame~~.

Be sure to follow all of the steps in the ~~reverse order~~ when reassembling the amplifier. We do not recommend removing the front panel of the ~~power supply~~. Most of the amplifier's components can be serviced without removing that ~~panel~~.

### 5.12 ORDERING SPARE PART

All orders for replacement, or spare, parts should include the type of equipment, the serial number of the amplifier, the schematic number of the ~~part~~, and the Henry part number. This information will insure quick and correct service.

The tube life is warranted for 1000 hours on a ~~pro-rated~~ basis. All warranty claims must be accompanied by a completed Eimac warranty claim ~~form~~. All warranty claims must be filed with the company from which you purchased the tubes.

Should it ever be necessary to ship the 4K ULTRA, be sure to repack it in its original box and packing material. If the original box is not available, ~~pack the amplifier~~ in a box or crate strong enough to withstand the equipment's weight and large enough to allow several inches of packing protection between the side of the box and the side of the amplifier. Should it ever be necessary to return the unit to Henry Radio for any reason, be certain to return it prepaid and include a complete description of its problems.

## SECTION 6 PARTS LIST

SCHEMATIC NO.	DESCRIPTION	NUMBER
ALC Board	ALC Circuit Assembled Module	81 00400
B1	BLOWER: RF deck cabinet fan, 65 cfm, 115 VAC, 1900 RPM	00 02450
B101	BLOWER: Main blower, 230 VAC, 325 cfm, 1500 RPM.	00 49101
Box	Shipping box and packing for the 4K ULTRA.	57 40000
Bearings	Bearings	28 01606
Bearings	Bearings	28 01602
Cabinet	CABINET: RF Deck <b>Includes:</b>	48 00400
	Bottom Plate	48 05126
	Black Panel Trim	48 05205
	Cabinet Top	48 05208
	Escutcheon	48 05206
	Meter Panel	48 05204
	Rear Air Exhaust Screen	48 05004
	Rear Panel	48 05109
	Sub Top	48 05113
	Wrap-Around	48 05204
	CABINET: Power Supply <b>Includes:</b>	48 00401
	Back Panel	48 05104
	Black Plastic Handles	36 00404
	Feet Mounting Spacers	48 05001
	Front Panel	48 05202
	Fuse Door	48 05203
	Left Side Panel	48 05200
	Metal Air Filter	56 00300
	Power Cord Bushing and Lock Nut	36 12345
	Plastic Feet	36 00402
	Right Side Panel	48 05201
C1 through C4	CAPACITOR: High Voltage Cartwheel, 500 pf, 20 KV	08 00502
C5	CAPACITOR: Ceramic disc, .0047 uf, 6 KV, 20%.	08 60047
C6 through C9	CAPACITOR: Ceramic transmitting, 200 pf, 7.5 KV.	08 85722
C10	VARIABLE CAPACITOR: Glass vacuum, TUNE control,	09 15400
C10	10-400 pf, 15 KV, 42 amps.	
	VARIABLE CAPACITOR: Ceramic vacuum, LOAD control,	09 02500
	25-2500 pf, 5 KV, 60 amps.	
C12 and C13	CAPACITOR: Ceramic feedthrough, 200 pf, 500 volt, 20%.	08 00202
C14	CAPACITOR: Ceramic feedthrough, 470 pf, 500 volt.	08 20470
C15	VARIABLE CAPACITOR: Air variable, 800 pf, 7.5 KV.	09 00800
C16	VARIABLE CAPACITOR: Tune control tracking, 3.9 to 75 pf,	09 00075
	850 volt, air variable.	
C17	VARIABLE CAPACITOR: Air variable, 1300 pf, 7500 volts.	09 01300
C18 and C19	CAPACITOR: Ceramic disc, .01 uf, 600 V, GMV.	08 06103
C20	CAPACITOR: TUNE meter drive capacitor, 1 pf, 500 V.	48 04900
C21 and C22	CAPACITOR: Ceramic disc, .01 uf, 150 V, 20%.	08 10103
C23 and C24	CAPACITOR: Same as C18.	
C25	VARIABLE CAPACITOR: Air, 3.2 to 50 pf, 850 V.	09 00050
C26	CAPACITOR: Silver mica, 47 pf, 500 V, 5%.	08 15470
C27	CAPACITOR: Same as C18.	
C28	CAPACITOR: Same as C26.	
C28A through C38	CAPACITOR: Same as C18.	
C39	CAPACITOR: Electrolytic tubular, 100 uf, 30 V.	08 03012
C40 through C53	CAPACITOR: Same as C18.	
C54 and C55	CAPACITOR: Same as C12.	
C101	CAPACITOR: Electrolytic tubular, 500 uf, 50 V, 20%.	08 01390
C102 and C103	CAPACITOR: Oil filled, .1 uf, 7.5 KV, filter capacitor.	08 17500
C104	CAPACITOR: Oil filled, 15 uf, 5 KV.	08 00244
CB1	CIRCUIT BREAKER: 250 VAC, 25 amps.	12 11305
Cable	CABLE: Relay control and ALC control. 6' male to male phono.	04 25025
Cable	CABLE: Power cable, 7 feet, 3 conductor, 10 gauge, 300 volt.	04 21030
Cable	CABLE: RF input, 10' BNC connector to phono plug.	04 00010
Chain	CHAIN: TUNE control drive chain.	28 00025
Chassis—RF deck	CHASSIS: RF deck.	48 00402
Chassis—P.S.	CHASSIS: Power Supply Frame and Bottom Plate.	48 05300
Counter dials	COUNTER DIALS: TUNE and LOAD controls.	28 00209
Coupler	COUPLER: Part of TUNE control.	28 14251
Coupler	COUPLER: Part of TUNE control.	28 39016
Coupler	COUPLER: Ceramic part of TUNE control.	28 14250
Coupler	COUPLER: Off center shaft coupling.	44 39006
D1 and D2	DIODE: Hot carrier diode, type HP-82.	73 28004
D3	DIODE: Silicon rectifier, axial lead, 200 PIV, 1 amp.	73 10458
D4	DIODE: Silicon, 12 V, 1 amp.	73 02810
D101 through D104	DIODE: Rectifier, 15,000 PIV, 1.2 amp.	73 15000
D105 through D108	DIODE: Auto diode, 50 volt, 2 amp.	73 00100
D109	DIODE: Silicon	

SCHEMATIC NO.	DESCRIPTION	NUMBER
D110 and D111	DIODE: Zener, 12 volt, 5 watt.	73 02516
D112	DIODE: Silicon rectifier, 1 amp, 1000 PIV.	73 00509
D113	DIODE: Cascading, transient suppressor, 240 VAC	73 00240
F1	FUSE: 250 VAC, 8AG, 1.5 amp.	24 80150
F101 and F102	FUSE: 250 VAC, 3AG, 3 amp.	24 30301
Fuse Holder	FUSE HOLDER: 3AG size, extractor post fuse holder.	25 34204
Fuse Holder	FUSE HOLDER: 8AG size, extractor post fuse holder.	25 37201
Gear	GEAR: Tank coil driven gear.	28 25201
Gear	GEAR: TUNE control drive gear.	28 25101
Gear	GEAR: TUNE control driven gear.	28 25201
Gear	GEAR: Input coil driven gear.	28 25321
Gear	GEAR: Tensioner idler gear.	28 25101
Gear	GEAR: L-section coil driven gear.	28 25201
Gear	GEAR: Input capacitor driven gear.	28 64160
Gear	GEAR: Input capacitor drive gear.	2806436
Gear	GEAR: Input capacitor reduction gear.	28 64112
Gear	GEAR: Input capacitor reduction gear.	28 06420
Gear	GEAR: TUNE capacitor bevel drive gear.	28 00463
Gear	GEAR: TUNE capacitor bevel driven gear.	28 64192
Gear	GEAR: LOAD capacitor driven gear.	28 64192
Gear	GEAR: LOAD capacitor idler gear.	28 06496
Gear	GEAR: LOAD control drive gear.	28 06460
J1	JACK: RF OUT, type HN coax connector.	16 00059
J2	JACK: ALC OUT, chassis jack.	16 35010
J3	JACK: Filament voltage test point, chassis pin jack.	16 15804
J4	JACK: Grid meter test point, chassis jack, male.	16 35010
J5	JACK: Relay Control, chassis jack, male.	16 35010
J6	JACK: RF IN, type BNC coax connector.	16 00657
Knob	KNOB: POWER switch, black plastic.	36 00300
Knob	KNOB: TUNE and LOAD controls, black plastic.	36 22562
Knob	KNOB: TUNE meter switch, black plastic.	36 00500
L1	INDUCTOR: Plate choke, radio frequency, wound on ferron rod.	85 33333
L2	INDUCTOR: Parasitic choke, silver flashed copper strap.	48 05101
L3	INDUCTOR: PI-section padding coil, 1.2 uh.	32 04000
L4	INDUCTOR: Variable, Tank coil, 13.5 uh, 10 amps.	32 22603
L5	INDUCTOR: L-section padding coil, .9 uh.	32 04001
L6	INDUCTOR: Variable, L-section coil, 8 uh.	32 22925
L7	INDUCTOR: RF choke, 1 mh, 500 ma, modified	85 02753
L8	INDUCTOR: Input coil, variable, 10 uh.	32 22921
L9	INDUCTOR: Input coil, variable, 2 uh.	32 04002
L10	INDUCTOR: Filament choke, torroidal wound.	85 11111
L11 through L13	INDUCTOR: RF choke, 2.5 mh, ferrite core, 160 ma	85 06302
L101	INDUCTOR: Filter choke, 4 h, 1.5 amp.	85 92093
Light socket	LIGHT SOCKET: Candelabra screw base, bracket down.	41 14762
M201	METER: Plate meter, 0-1 amp, or 0-10,000 volts.	52 09991
M202	METER: Tune meter, center zero, 0-2500 watts or 0-250 watts.	52 15023
M203	METER: Grid meter, 0-100 ma, or 0-10 volts.	52 09990
Manual	MANUAL: Operating and Service Manual.	92 40000
Meter Board	Meter Multiplier Board Assembled Module.	81 00401
P1	PLUG: High voltage plug, pin type.	16 40002
P2	PLUG: RF deck - power supply harness plug, 11 pin.	16 07812
P3	PLUG: Cabinet fan plug, 2-pin.	16 01302
P4	PLUG: Grid meter test point, jumpered phono plug.	16 03504
P201	PLUG: Power supply front-panel control plug.	
PL201	LIGHT: High, light assembly with 327 bulb.	40 00212
PL202	LIGHT: Low, light assembly with 327 bulb.	40 00214
PL203	LIGHT: Pre-op, light assembly with 327 bulb.	40 00215
PL204	LIGHT: Stand-by, part of S204, with 327 bulb.	76 03228
PL205 and PL206	LIGHT: Pilot lights for TUNE and LOAD dials, type 6S6.	40 00606
Bulbs	Pilot light Bulbs, type 327.	40 00327
R1	RESISTOR: Carbon, 150 ohm, 2 watt, 10%.	68 61500
R2 and R3	RESISTOR: Carbon, 39 K ohm, 1 watt, 10%.	68 40393
R4	RESISTOR: Carbon, 1 K ohm, 1 watt, 10%.	68 20013
R5	RESISTOR: Carbon, 68 K ohm, 1 watt, 10%.	68 20683
R6	POTENTIOMETER: 100 K ohm, 2 watt, linear.	60 01011
R7	RESISTOR: Vitreous enamel, 10 K ohm, 25 watt, 5%, wire wound.	68 90103
R8	RESISTOR: Vitreous enamel, 200 ohm, 20 watt, 5%, wire wound.	68 02022
R9	RESISTOR: Carbon, 10 ohm, 1 watt, 10%.	68 20100
R10	RESISTOR: Carbon, 4.7 K ohm, 1 watt, 10%.	68 20472

SCHEMATIC NO.	DESCRIPTION	NUMBER
R11	POTENTIOMETER: Filament voltage adjust, wire wound, 2000 ohm, 5 watt, 10%.	60 00202
R12	POTENTIOMETER: Grid current adjust, wire wound, 500 ohm, 5 watt, wire wound.	60 00043
R13	RESISTOR: Vitreous enamel, 5 ohm, 25 watt, 5%, wire wound.	68 90050
R14	RESISTOR: Vitreous enamel, .5 ohm, 10 watt, 5%, wire wound.	68 80059
R15	POTENTIOMETER: Plate current adjust, same as R12.	
R16	RESISTOR: Carbon, 470 ohm, 1 watt, 10%.	68 24700
R17	RESISTOR: Carbon, 220 ohm, 1 watt, 10%.	68 22200
R18	RESISTOR: Carbon, 470 ohm, 1/2 watt, 10%.	68 44700
R19	RESISTOR: Carbon, 120 ohm, 2 watt, 10%.	68 61200
R101 and R102	RESISTOR: Heating element balast resistor.	68 00415
R103	RESISTOR: Vitreous enamel, 10 ohm, 10 watt, 5% wire wound.	68 80100
R104	RESISTOR: Vitreous enamel, 50 ohm, 25 watt, 5%, wire wound.	68 95000
R105	RESISTOR: Vitreous enamel, 120 ohm, 10 watt, 5%, wire wound.	68 80120
R106 and R107	RESISTOR: Carbon, 470 K, 2 watt, 10%.	68 64703
R108 through R111	RESISTOR: Vitreous enamel, 75 ohm, 100 watt, 5%, wire wound.	68 00203
R112	RESISTOR: Vitreous enamel, 75 ohm, 25 watt, 5%, wire wound.	68 90750
R113	RESISTOR: Vitreous enamel, 15 ohm, 25 watt, 5%, adjustable.	68 90157
R114	RESISTOR: Vitreous enamel, 10 ohm, 50 watt, 5%, wire wound.	68 05010
R115-R119	RESISTOR: Precision, wire wound, 2M ohm, 2 watt, 1%.	68 00026
R120	RESISTOR: Carbon, 10 K ohm, 2 watt, 10%.	68 60103
R201	RESISTOR: Vitreous enamel, 150 ohm, 50 watt, 5%, wire wound.	68 05150
RY1	RELAY: Antenna input, DPDT, 12 VDC, 1.2 watts.	64 11000
RY2	RELAY: Antenna output, SPDT, 26.5 VDC, vacuum.	64 00008
RY101	RELAY: Flasher, 26 volt, 120 seconds.	64 26090
RY102	RELAY: Time delay, 26 volt, 120 seconds.	64 26120
	Relay Power Supply Module, Assembled	81 00402
	Relay Sockets, 8-pin.	16 07808
S1	SWITCH: High voltage shorting switch, with shorting strap.	48 05900
S2	SWITCH: Filament voltage tap switch, 5-position, non-shorting.	76 01401
S3	SWITCH: High voltage shorting switch.	
S101A	SWITCH: Power switch, 5-position, single pole, non-shorting, ceramic switch.	76 00412
S101B and C	SWITCH: Power switch, 5-position, single pole, non-shorting, ceramic switch.	76 20000
S102	SWITCH: Air flow switch, blower activated protective switch.	76 00002
S201	SWITCH: Plate voltage switch, SPDT, push button, momentary.	76 00933
S202A and S202B	SWITCH: Tune meter switch, 2P3T, miniature phenolic switch.	76 01003
S203	SWITCH: Filament switch, same as S201.	
S204	SWITCH: Stand-by switch, DPDT, push button switch and light.	76 03228
SK101	SOCKET: Power supply to front panel control, 25-pin miniature.	16 00251
SK102	SOCKET: Power supply to RF deck control, 12-pin socket.	16 08612
SK103	SOCKET: High voltage socket, pin type.	16 40000
SK203	SOCKET: Blower control, 2-pin Jones type.	16 03020
Socket	SOCKET: Ceramic socket for R101 and R102.	16 19062
Socket	SOCKET: Transistor socket for D4.	74 00450
SWR	POWER SENSOR: Calibrated forward (0-2500) and reflected (0-250), 2-30 MHz power sensor.	56 04145
T1	TRANSFORMER: 4:1 matching input balun.	84 40000
T2	TRANSFORMER: Voltage booster, 220 VAC primary, 12 VAC secondary.	84 76364
T3	TRANSFORMER: Filament, 220 VAC primary, 5 volt secondary.	84 76480
T101	TRANSFORMER: Plate, 208-240 VAC primary, for 3200 or 4200 VAC secondary, with center tap.	84 75448
T102	TRANSFORMER: Relay, same as T2.	
TB101	TERMINAL BOARD: AC input, 3-terminal.	80 14203
TB102	TERMINAL BOARD: Blower control, 4-terminal.	80 14204
V1	ELECTRON TUBE: Type 8877, grounded grid triode.	88 08877
	Tube socket	89 33207
	Tube Plate Connector	89 03160
	Tube chimney	89 00806
	Tube Grid Ring	89 05700
	Tube B+ Connector	89 23584
Wiring Harness	WIRE HARNESS: Meter control	04 00400
Wiring Harness	WIRE HARNESS: RF deck	04 00401

3800 Load  
10.2 - 45.0

TABLE 1. TUNE AND LOAD SETTINGS

The figures inserted at the factory are approximate settings for a 52 ohm load.

MHZ	TUNE CONTROL	LOAD CONTROL	OUTPUT WATTS
3	02.4	19.2	
4	10.9	39.0	
5	16.3		
6	19.8		
7	22.3	52.5	
8	24.2		
9	25.8		
10	27.0		
11	28.1		
12	29.0		
13	29.5		
14	30.5	64.0	
15	31.2		
16	31.8		
17	32.3		
18	32.7		
19	33.2		
20	33.6		
21	34.1	70.0	
22	34.4		
23	34.8		
24	35.3		
25	35.7		
26	36.1		
27	37.0		
28	37.5	73.6	
29	37.9		
30	38.4	44.4	

Notes: The settings shown above are approximate and should only be used as a guide to begin tuning the amplifier.

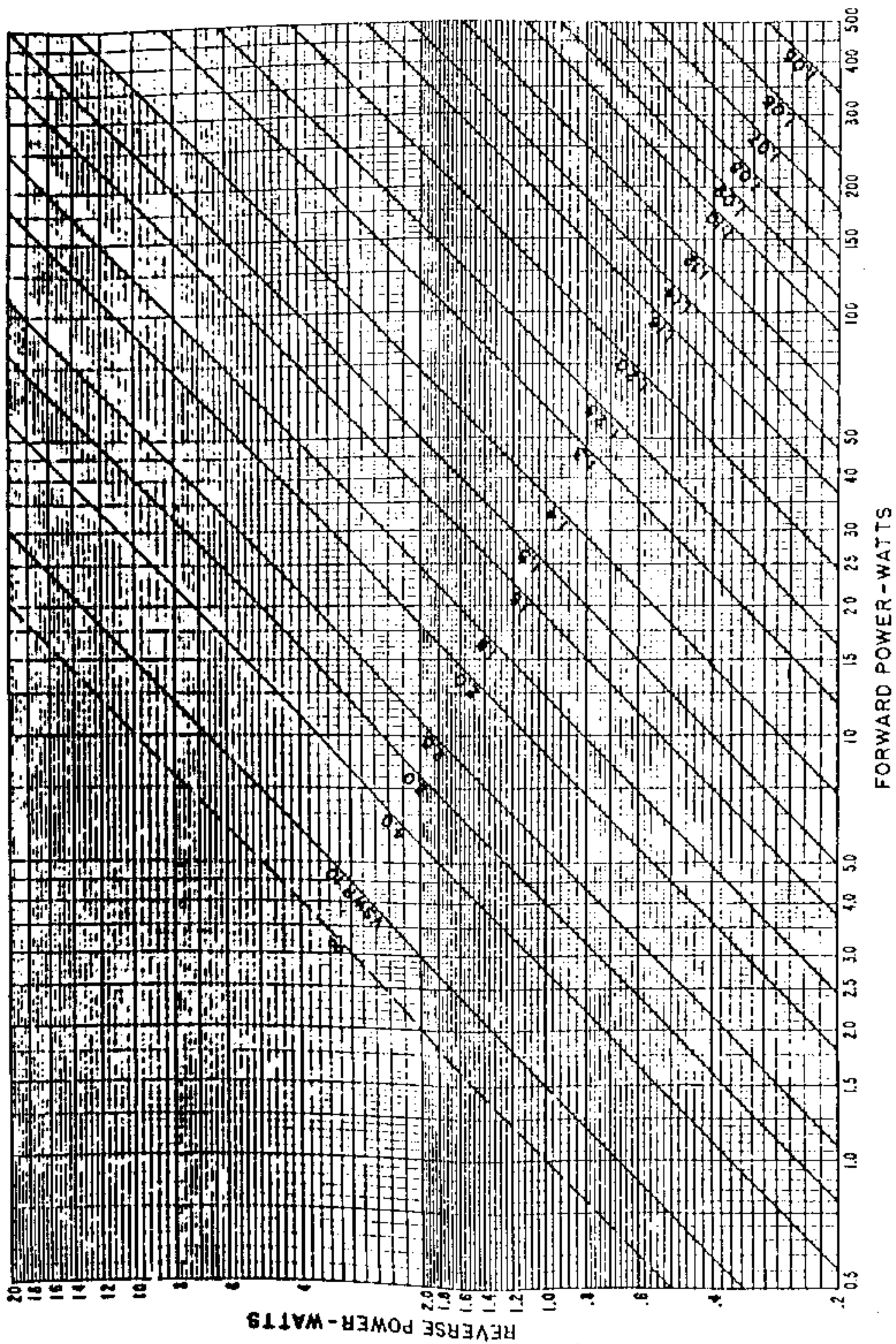
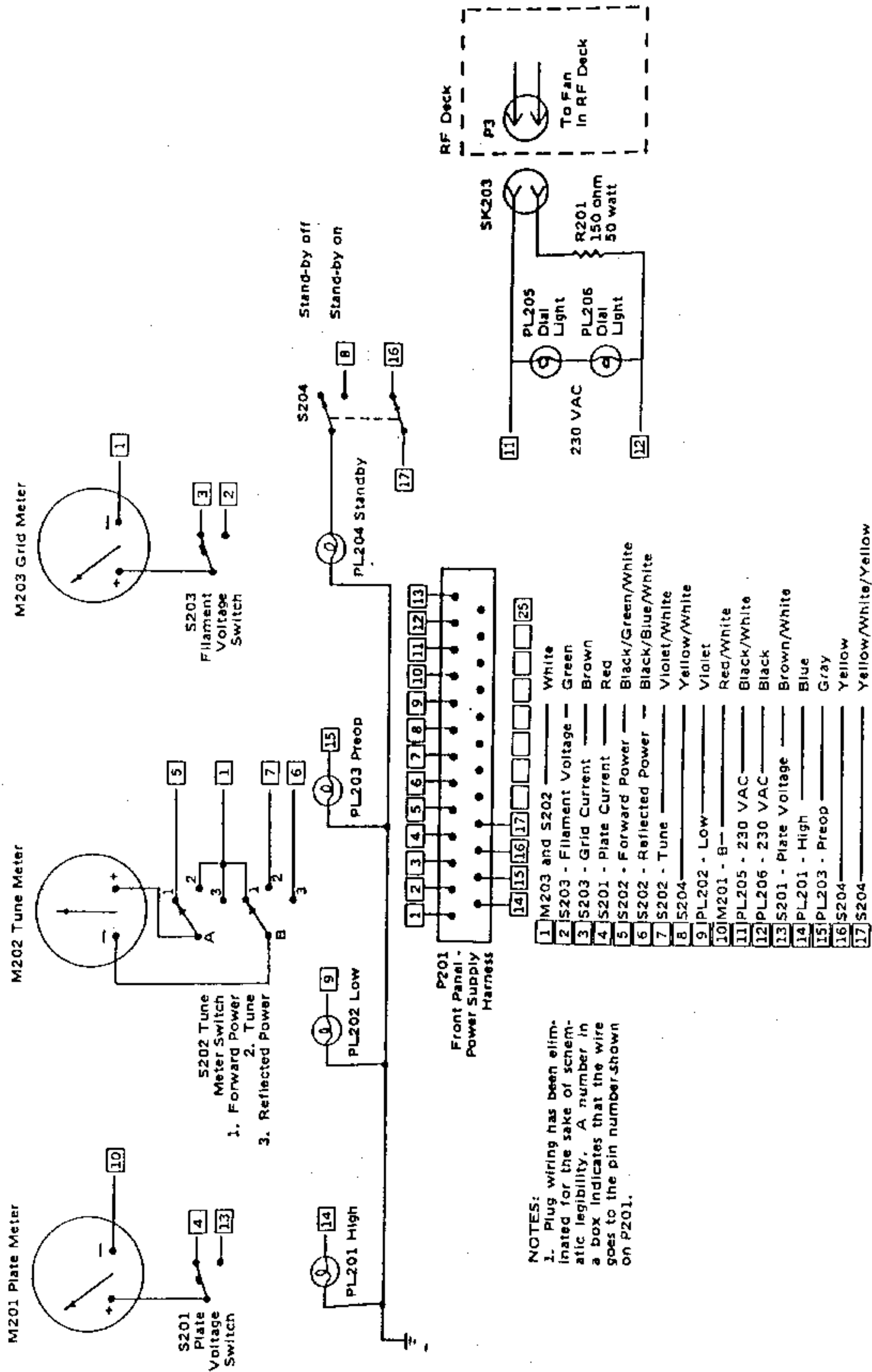


TABLE 2. Power Values vs. VSWR



HENRY 4K ULTRA FRONT PANEL



