Viewstar Inc.

HF Linear Amplifier PT-1000A Instruction Manual

INDEX

1.0 SPECIFICATIONS

1.1 RF SPECIFICATIONS

Frequency Range

160 meters	1.8 to 2.0 MHz
80 meters	3.5 to 4.0 MHz
40 meters	7.0 to 7.3 MHz
30 meters	10.1 to 10.15 MHz
20 meters	14.0 to 14.35 MHz
17 meters	18.068 to 18.168 MHz
15 meters	21.0 to 21.45 MHz
12 meters	24.85 to 24.95 MHz
10 meters	28.0 to 29.7 MHz*

*Not Available in U.S.A.

FCC rules permit any properly licensed amateur to modify his own amplifier for 10 meter use. Consult the factory for details. If this modification is done with reasonable skill and care, the warranty will not be void.

Drive Power
40 W nominal to 60 W maximum, 50 W for full output

RF Input Power
SSB 1.2 KW PEP continuous
CW/RTTY/AM/ATV/FM 1.0 KW Average

Plate Voltage (Operate position)
3000 VDC

Efficiency
60% minimum on all bands.

Input Impedance
50 ohms. Tuned impedance matching circuit, SWR <1.5:1 (26 dB return loss)

Output Impedance
50 ohms SWR <2:1

Harmonic Suppression
40 dB minimum

Intermodulation Distortion Products
33 dB down minimum

1.2 GENERAL INFORMATION

Power Tube
Eimac 3-500Z zero bias triode

Circuit Type
Class AB_2 grounded grid

Tube Cooling
Pressurized plenum and chimney cooling system. 30 cubic ft. per minute. Low noise squirrel cage blower.

SSB, CW, RTTY, AM, ATV, FM

Duty Cycle
Continuous duty in SSB, CW modes
50% duty cycle other modes

ALC Circuit
Negative, adjustable to -30 VDC

Antenna Relay
DC relay for hum-free operation

Metering
1 Meter measures plate current
2nd Meter measures plate voltage, grid current or relative output power

Output Circuit
Pi-L network (silver plated air coil)

Input Circuit
Pi network input for each band for maximum drive and linearity.

Protective Devices
AC line fuses, cathode zener fuse

Safety Feature
Interlock for AC line input

Power Transformer
Special Hammond power transformer. Rated at 600 VA 60 Hz.

Dimensions
14" W x 7-1/2" H x 16-1/1" D (Overall)
(36 x 19 x 42 cm)

Weight
35 lb. (17 kg). Shipped in two cartons.

1.3 TUBE SPECIFICATIONS

Filament

Voltage	5.0V
Current	14.2A

Direct Interelectrode Capacitances
(grounded grid)

Input	8.3 pF
Output	4.7 pF
Feedback	0.07 pF

Frequency of Maximum Rating

CW	110 MHz
Operating Position	Vertical base down or up

Maximum Operating Temperature

Plate Seal	225 degrees C
Base Seals	200 degrees C
Cooling	Radiation and forced air
Base	5 Pin Special

Maximum Ratings

DC Plate Voltage	4000 Volts
DC Plate Current	0.40 Ampere
Plate Dissipation	500 Watts
Grid Dissipation	20 Watts

2.0 INTRODUCTION

he PT-1000A Linear Amplifier is a one stage, ass AB_2 Linear Amplifier using one, glass ope, high performance Eimac 3-500Z power ube. It is a completely self-contained table-top nit capable of 1200 watts PEP input, designed o provide reliable, stable, high RF output power. : is equipped with a pressurized plenum cooling ystem to ensure optimum operation for xtended periods of continuous use. The circuit nd components are conservatively designed and elected for effortless operation under all onditions.

2.1 FEATURES

2.1.1 Designed for SSB, CW, RTTY, AM, FM or ATV operation on the amateur bands between 1.8 MHz and 21 MHz.* (Including WARC bands and MARS operation). May be customer modified to cover the 28 MHz band. Please consult the factory.

*Canadian and other non-U.S.A. models supplied with 10 meter band included.

2.1.2 Can be modified for frequencies outside the amateur bands for commercial or military use. Please consult the factory.

2.1.3 Fast heating high performance 3-500Z triode ensures rapid turn-on time.

2.1.4 Continuous duty squirrel cage blower.

2.1.5 The Pi-L output circuit features:
a) Heavy duty rotary switch with silver plated contacts.
b) High quality, loading and plate tuning capacitors.

2.1.6 Pi network input for each band.

2.1.7 The power supply features a special heavy duty "continuous" rated 600 VA power transformer and computer grade filter capacitors for maximum realiability.

2.1.8 Power transformer transient protected.

2.1.9 By-Pass/Standby switch on front panel.

2.1.10 Adjustable ALC delay control.

2.1.11 Dual backlit meter system to monitor all critical voltages and currents.

2.1.12 Vernier tuning for smooth and accurate settings on all bands.

2.1.13 Safety interlock disconnects AC line voltage when the top cover is removed.

2.1.14 Grid overload protection circuitry.

3.0 INSTALLATION

PLEASE READ THE INSTRUCTIONS carefully and fully before attempting to operate the amplifier.

CAUTION: There are lethal voltages present inside the amplifier when the power is on. Two interlock switches will automatically disconnect the AC line voltage when the top cover is removed. Use the utmost caution and care if AC power must be on while the top cover is removed.

3.1 UNPACKING

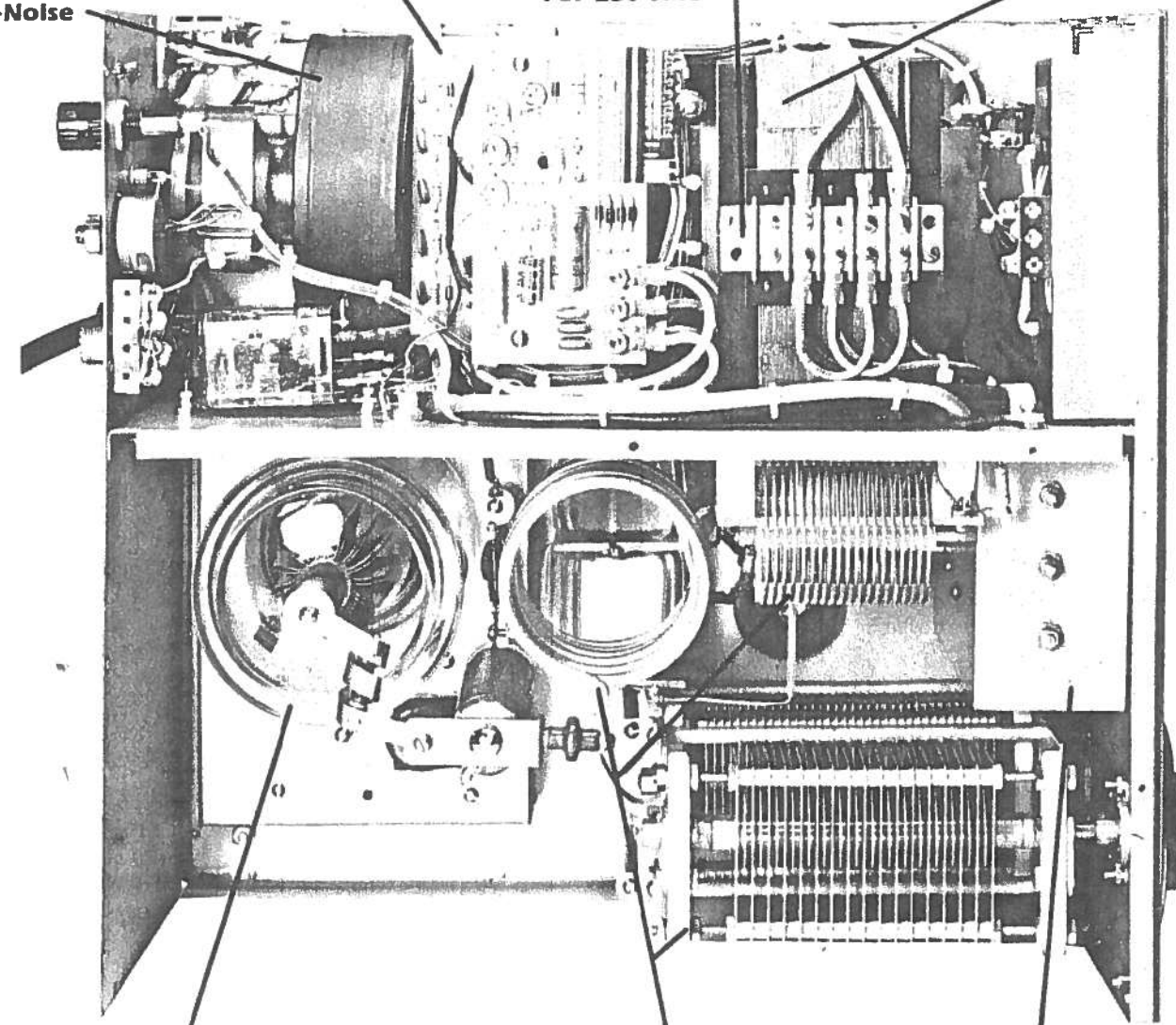
Remove the amplfier from the shipping carton and examine for damage, (notify the transport company immediately if any damage is present). Save the carton for future shipment to another location or storage. The 3-500Z triode tube is shipped separately and must be installed before operating the amplifier in any way.

The following accessories are included with your PT-1000A amplifier;

1. Instruction Manual
2. Warranty Card
3. 3-500Z Tube
4. Glass Chimney (packed in amplifier)
5. ALC Control Cable, Relay Control Cable.
6. Plate Cap Heat Sink
7. Extra Fuses (One Zener — AGC 1/2 and two MDA-15)

3.2 OPERATING LOCATION

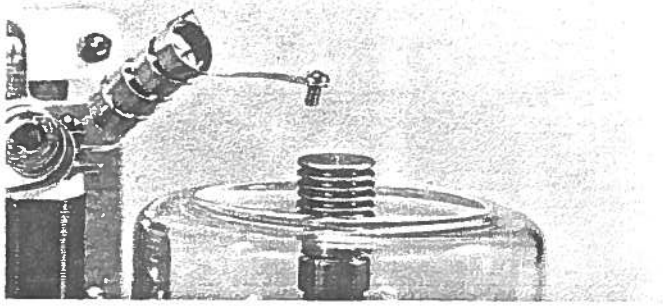
The amplifier must be located in an open area such that the flow of air from the top is unrestricted. Location should be as close as possible to a reliable 115/230 VAC source to minimize any AC voltage drop.


Computer Grade
Filter Capacitors.
Factory Wired for 110 VAC
May Be User Re-Wired
For 230 VAC
Special Hammond Power Transformer
Rated at 600 VA 60Hz Weight 20 lb.
Cooled by 30 cfm Low-Noise
Squirrel Cage Fan.
PI-L Output Network with Silver
Plated Air Coil.
PI Newtwork Input
For Each Band.
EIMAC 3-500Z Zero Bias Triodes
with Chimney Air Ducting.
Vernier Tuning for Accurate
Settings on All Bands.

For the power tube installation you will need:

One 3-500Z tube (packed separately)
One glass chimney (packed inside the amplifier)
One plate cap heat sink (provided in accessory kit)

1. Unpack all items and inspect for damage. Any damage should be reported to the carrier.
2. Remove all cabinet screws and remove cabinet.
3. Carefully install the power tube in its socket. Be very careful not to exert lateral or twisting pressure on the glass portion of the tube. It is very easily damaged. Excessive pressure can cause a hairline fracture in the tube's glass envelope, destroying the tube. The pins are also particularly delicate and can easily break if the tube is not inserted and removed very carefully.
4. Carefully set the glass chimney in place over the power tube making sure all holding clips are inside the chimney.
5. Set the plate cap heat sink in place on the anode connector of the power tube. Gently tighten the set screw.
6. Remove the screw and lock washer from the top of the heat sink and attach the parasitic choke. CAUTION: Hold the heat sink firmly when attaching this lead to avoid transferring any twisting pressure to the power tube.
7. This completes the power tube installation.
8. You are now ready to re-assemble the cabinet.
9. **Re-assemble the cabinet**
   Before re-assembly, note the red safety lock microswitches mounted at the side of the rear panel. When positioning the cabinet over the amplifier, listen for the click of the microswitches to ensure they are engaged.
10. Attach the two cabinet screws near the microswitches first, then install the remainder of the screws.



3.4 Cabling

All the following cables must be connected before the amplifier is operated.

3.4.1. **AC Power Cable:**
Your PT-1000A amplifier comes from the factory wired for operation from a 115 VAC single phase, 60 Hz power source. For 230 VAC operation, jumper connections on the power transformer terminal strip have to be changed. See Figure 1. *A 230 VAC plug is to be connected to the line cord. The green wire in the power cord is the ground wire and MUST BE CONNECTED TO THE GROUND PIN (GREEN SCREW) OF THE PLUG.

Figure 1

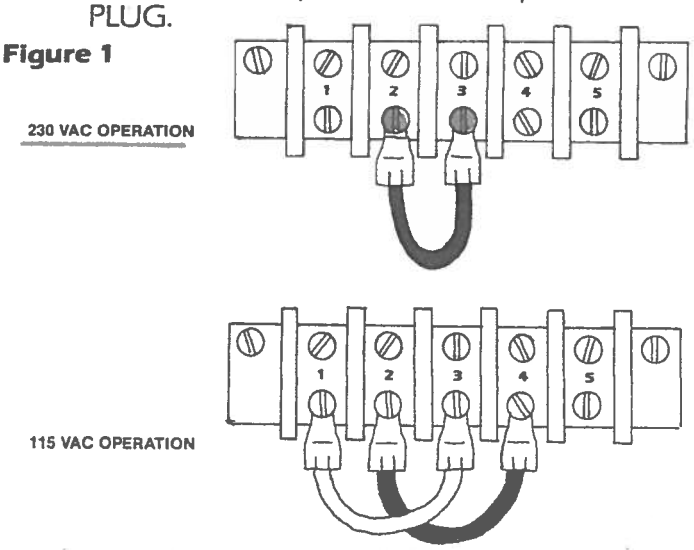


Figure 2 Tuning Chart (Typical Unit)

Frequency (MHz)	Tune Setting	Load Setting
1.8	74	24
2.0	28	50
3.5	78	16
4.0	55	39
7.2	37	54
14.2	28	78
21.2	16	85
28.0	7	89
29.7	2	90

CAUTION: The amplifier will be damaged if the green wire is connected incorrectly. Be sure to disconnect the AC plug before changing jumpers on the terminal strip.

3.4.2 **Antenna Coax:**

Use only RG 8/U coax (or its equivalent) to connect the PT-1000A to the antenna. The antenna connector mates with the connector marked RF OUT, on the rear panel of the amplifier.

> CAUTION: Do not operate the amplifier without a load or into a load with SWR greater than 2:1. Measure the antenna's SWR with an SWR meter or in-line Watt-meter and determine that the SWR is in fact less than 2:1.

With the STANDBY/OPERATE switch in the STANDBY position, (IN), the exciter output will bypass the amplifier and feed directly to the antenna.

3.4.3 **Input Cable:**

A cable must be connected from the output of your exciter to the RF IN connector on the back panel of the amplifier.

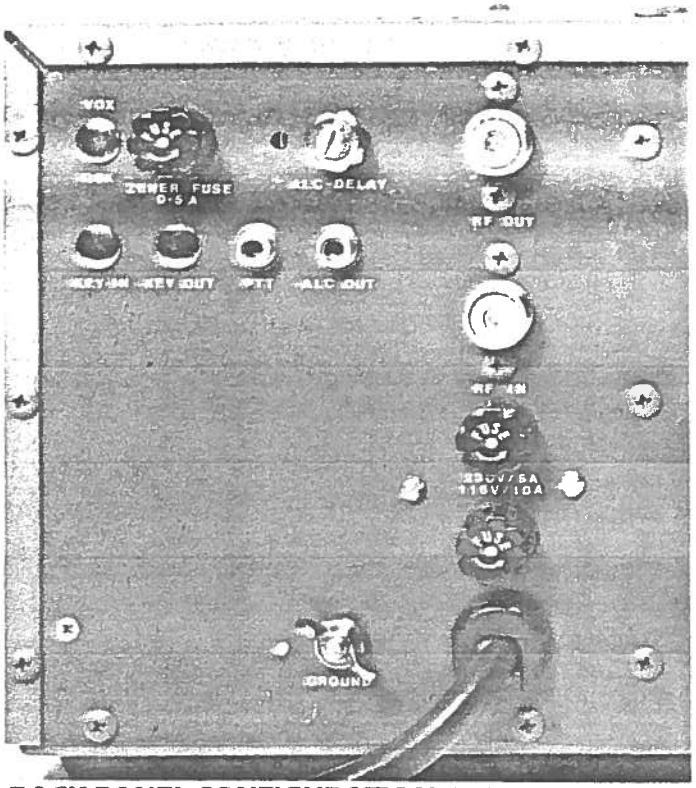
3.4.4 **ALC (automatic level control) Cable:**

Plug the ALC cable into the phono jack located on the back panel (marked ALC) and into the ALC feedback connection (or equivalent) on the exciter. If the exciter does not have provision for feedback of ALC voltage from the amplifier, then simply omit the use of the cable.

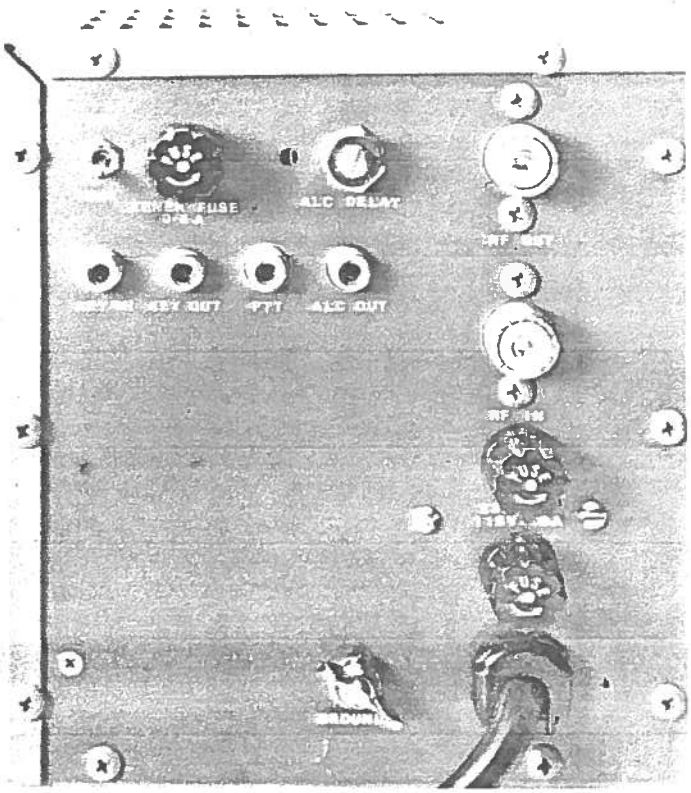
3.4.5 **Antenna Relay:**

A control cable should be plugged into the phono socket marked PTT on the back panel of the amplifier. This cable connects the keying signal from the exciter to switch the amplifier to the transmit condition and must be plugged into the socket or connector marked Antenna Relay (or equiv.) on the exciter. The exciter need only supply a shorting relay contact (during transmit) to key the amplifier.

> CAUTION: Do not apply any voltage to the PTT phono jack. The internal relay is activated by a self-contained power supply.



BACK PANEL CONFIGURATION WITHOUT QSK OPTION.



BACK PANEL CONFIGURATION WITH QSK OPTION

CONTROLS

4.1 FRONT PANEL CONTROLS:

4.1.1 **Off/On Power Switch:**
Used to turn the amplifier on and off.

4.1.2 **Multimeter Switch:**
Four section pushbutton switch selects the multimeter functions as described below. The STANDBY button is interlocked with the three multimeter buttons. When any one of these is pressed, the STANDBY button is released and the amplifier switches to the OPERATE mode.

HV: With this pushbutton depressed, the meter monitors the amplifier's plate voltage. The full scale reading in this mode is 4000 VDC. Normal plate voltage with the amplifier in the idle mode (no drive power) is about 3100 VDC. Line voltage variations will cause corresponding variations in the plate voltage. (Note: Reading for plate volts is X 1KV).

GRID: With this pushbutton depressed, the meter monitors the amplifier's grid current. The full scale meter reading in this mode is 200 ma DC. The nominal grid current during SSB on peaks is approximately 50 ma. Maximum grid current in SSB or CW single tone is 120 ma (marked on the dial as a red bar.)

RF: In this mode, the meter monitors the relative output power of the amplifier.

Standby:
This pushbutton allows the exciter bypass feature i.e. in the STANDBY position, button in, the power of the exciter bypasses the linear amplifier and appears unchanged at the output connector. In the OPERATE mode, button out, the linear amplifier is ready for transmitting.

This pilot light marked "Operate" indicates the status of the linear amplifier. In the "Operate" mode, the light is on. In the Standby mode, the light is off.

4.1.4 **Load Control:**
This control matches the amplifier's output network to the load. Refer to Figure 2 for the approximate initial settings for the frequency range desired. A load setting of 0 corresponds to the maximum load capacitor mesh and 100 represents minimum capacitor setting.

4.1.5 **Tune Control:**
The TUNE control is a vernier dial connected to an air variable capacitor in the RF section. The disc dial is screened 100 to 0 indicating that maximum capacitance is at 100 and minimum at 0. Approximate setting for the tune control settings for the amateur bands are given in Figure 2 for your convenience.

4.1.6 **Band Switch:**
The band switch selects the applicable input and output circuits for the PT-1000A to operate in any one of the following bands:

(a)	160 meters	1.8 to 2.0 MHz
(b)	80 meters	3.5 to 4.0 MHz
(c)	40 meters	7.0 to 7.3 MHz
(d)	30 meters	10.1 to 10.15 MHz
(e)	20 meters	14.0 to 14.35 MHz
(f)	17 meters	18.068 to 18.168 MHz
(g)	15 meters	21.0 to 21.45 MHz
(h)	*12 meters	24.85 to 24.95 MHz
(i)	*10 meters	28.0 to 29.7 MHz

*(Not available in U.S.A.)

NOTE: The amplifier has the capability to transmit on many frequencies outside the above bands by switching the amplifier to the band closest in frequency to the desired operating frequency. For services other than amateur use, this may be applicable.

CAUTION: Never move the band switch while the linear amplifier is keyed or operating.

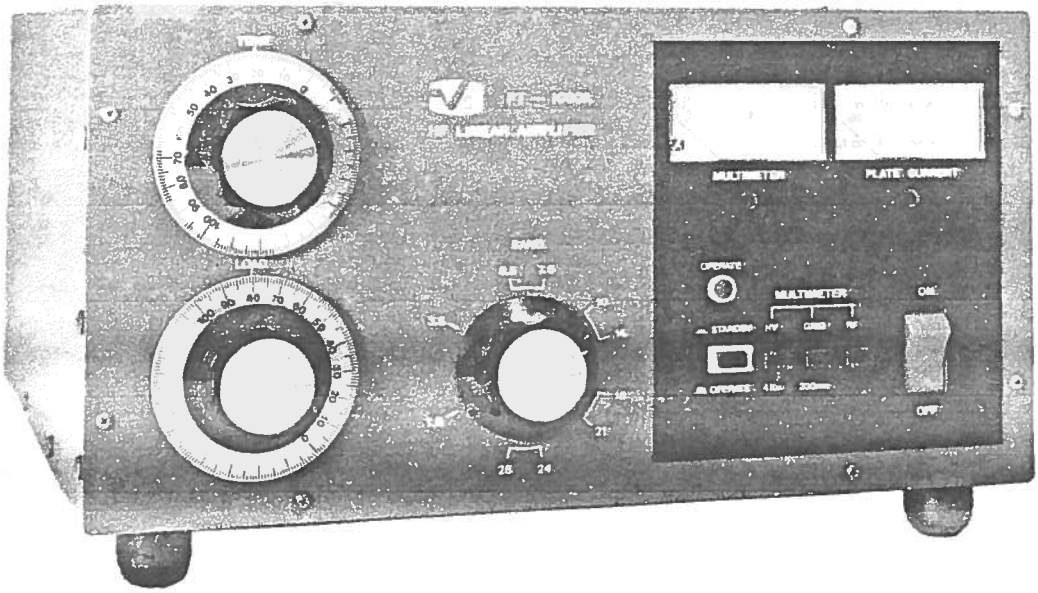
(See also Section 3.4, Cabling)

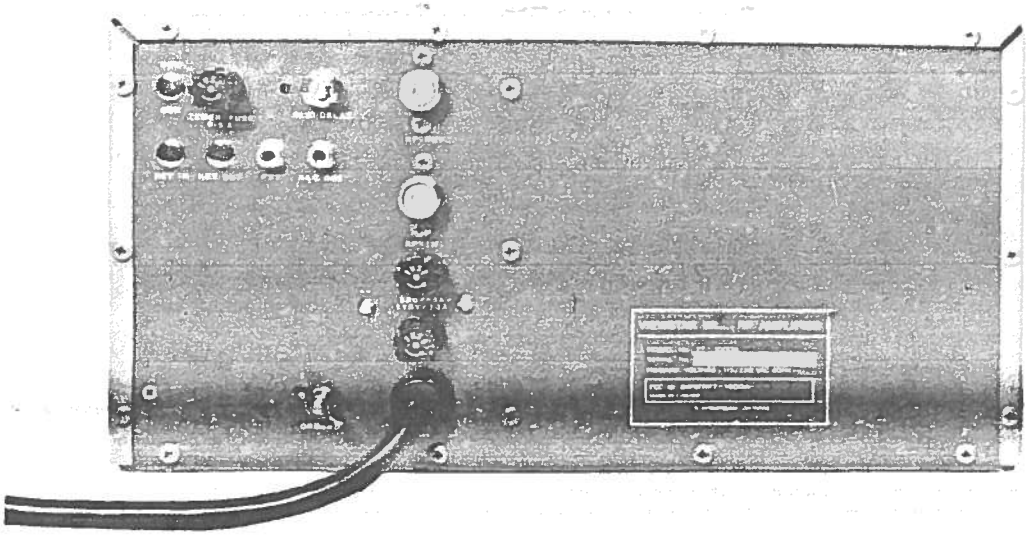
4.2.1 **Zener Fuse:**
Protects the cathode circuit from overcurrent. It is a 1/2 amp fast-blo type of fuse.

4.2.2 **ALC Adjust:**
Controls the delay of the PT-1000A's ALC circuit.

Two fuses for the 115/230 VAC line input. They are MDA ceramics and must not be substituted by any other types.

4.2.4 **GROUND:** This lug is provided to ground the amplifier. It should be connected to a good earth ground to minimize radiated interference or the danger of electrical shock.





NOTE: Use a 50 ohm dummy load only for all the following adjustments.

5.1 PRELIMINARY SETTINGS

	SETTING
1. STANDBY/OPERATE switch	STANDBY (IN)
2. ON/OFF	OFF

Activate the ON switch and the meters should light. Look into the interior of the amplifier to make sure that the tube filament is lit and that there is a flow of air from the top of the cabinet. This can be done by putting your hand over the tube from the top to feel the flow of air.

5.2 OPERATION

The 3-500Z requires no warm-up time.

1. Set the BAND switch to the desired band.
2. Pre-set the TUNE and LOAD vernier dials to that referred to in calibration chart, Figure 2.
3. Push the HV pushbutton on the MULTIMeter switch bank. The meter should read approximately 3 indicating a plate voltage of 3000 VDC.
4. Push GRID on the MULTIMETER switch bank. (Normal operating position).

5.2.1 SSB/CW/RTTY Operation:

1. With the exciter adjusted for zero output, press the PTT switch of the exciter causing the PT-1000A and the exciter to go into the transmit mode.
2. The amplifier's plate current meter should register approximately 60 ma.
3. Increase the RF output of the exciter until the amplifier's grid current is about 40 ma. Adjust the TUNE control for a minimum plate current reading indicating resonance. If the LOAD control is set properly, the plate current will be approximately 200 ma. If the plate current is less than 200 ma, increase the load slightly by moving the LOAD control to a higher number on the dial. If the plate current is more than 220 ma, decrease the load slightly by lower number on the dial. Do not forget to re-dip the TUNE control each time the LOAD control is changed.

   Check that the grid current reading is approximately 40 ma. If not, re-adjust the exciter output to give the required 40 ma ± 10% grid current reading. Under normal conditions, there will be some interaction between the TUNE control, the LOAD control and the grid current.

   NOTE: The tuning, loading and exciter control adjustments may have to be repeated several times until the ratio of 40 ma grid to 200 ma plate current is obtained. Note that at higher frequencies, the adjustments are sharper while at lower frequencies they are broad.

4. To verify the peak power condition, increase the RF output of the exciter for a plate current reading of 400 ma. With the full drive, the grid current should be 120 ma. Single tone adjustments while tuning should be made such that the grid current NEVER exceeds 120 ma. This very quickly reduces the life of the tubes. (Use of a dummy load for these measurements is preferred).

5. Release the PTT switch of the exciter to allow the amplifier and exciter to go into the unkeyed status. Place the exciter into the SSB mode and while speaking into a microphone, adjust the audio gain control for voice peak plate current readings of around 200 ma. (Since the meter is average reading and cannot follow the peaks (which are about 400 ma), the meter will indicate the highest average plate current). The grid current peaks, should be around 50 ma. Check for proper drive with a monitor scope if one is available.

3-500Z tube to show colour, glowing a pale red with 200 ma of plate current and a brighter cherry red at 400 ma. When operated in this manner, the tube is within its ratings and can be operated in this way only if the plate circuit is at resonance (plate current dipped to a minimum with tune control). The amplifier should never be operated for any length of time in an off resonance condition.

CAUTION: Under no circumstances should the plate current exceed 400 ma nor the grid current exceed 120 ma.

5.2.2 **AM Operation:**
Do not apply modulation. Tune the amplifier as per 5.2.1, Step 4 with plate current at 320 ma max. and grid current at approximately 60 ma. Reduce the carrier output so that plate current is 1/2 of previous reading. Grid current will be approximately 30 ma. Apply 1000 Hz tone at 100% modulation. Plate current should not exceed previous maximum value. If it does, reduce the mic. gain, as necessary. If an oscilloscope or modulation monitor is available, check that the modulation does not exceed 100%.

5.2.3 **ALC Adjustment:**
Loosen the ALC control lock nut. The control should be in the fully clockwise position. Drive the amplifier to the desired output level and then rotate the ALC control (CCW) until the grid current just begins to decrease.

5.2.4 **Power Readings:**
When the RF push-button is depressed, the MULTIMETER reads the relative output power into a dummy load or antenna. The amplifier should never be operated into a load with an SWR greater than 2:1. The SWR should be regularly checked when connected to an antenna. If VSWR of less than 2:1 cannot be achieved, a Viewstar

or equivalent, should be connected between the amplifier and the antenna.

NOTE: In PT-1000A amplifiers from serial #5008 onward, the unit will have a grid protection circuit installed. If during tune up or normal operation a momentary grid current of 200 ma is exceeded, the amplifier will shut down and automatically switch to the bypass mode. The operate pilot lamp will be extinguished. To restore amplifier operation, reduce input drive to the unit, press the standby/operate switch to standby and then back to operate.

WARRANTY

All goods sold hereunder are warranted to be free from defects in material and workmanship, for a period of one year from date of shipment, and this express warranty is in lieu of and excludes all other warranties whether expressed or implied by operation of law or otherwise including any warranty on the merchantability or fitness or a particular purpose. Defective material may be returned to the seller after inspection by the seller and upon receipt of definite shipping instructions by the seller. Goods so returned will be replaced or repaired without charge, but the seller shall not be liable for loss, damage or expense directly or indirectly arising from the use of material or from any other cause, the exclusive remedy against the seller being to require the replacement or repair of defective material or workmanship or from any other cause shall be deemed waived by the purchaser unless made in writing prior to the expiry date of the warranty.

NOTE:
The 3-500Z tube is warranted on a one year prorata basis. Any warranty claims must be accompanied by the tube warranty claim form packaged with your new tube. All claims must be filed with tube manufacturer. Warranty claims on the amplifier must be accompanied by proof of purchase and purchase date.

Specifications and/or changes/improvements to the product are subject to change without notice or obligation.

Circuit Designation	Description
[illegible]	Silver Mica Capacitor
C2	Silver Mica Capacitor
C3	Silver Mica Capacitor, 270 PFD, 500V
C4	Silver Mica Capacitor, 150 PFD, 500V
C5	Silver Mica Capacitor, 120 PFD, 500V
C6	Silver Mica Capacitor, 100 PFD, 500V
C7	Silver Mica Capacitor, 1450 PFD, 500V
C8	Silver Mica Capacitor, 520 PFD, 500V
C9	Silver Mica Capacitor, 270 PFD, 500V
C10	Silver Mica Capacitor, 56 PFD, 500V
C11	Silver Mica Capacitor, 47 PFD, 500V
C12	Silver Mica Capacitor, 15 PFD, 500V
C13	Silver Mica Capacitor, .01 MFD, 500V
C14	Film Capacitor, .1 MFD, 250V
C15	Disc Ceramic Capacitor, .01 MFD, 1.4KV
C16	Silver Mica Capacitor, 10 PFD, 500V
C17	Silver Mica Capacitor, 68 PFD, 500V
[illegible]	Disc Ceramic Capacitor, .02 MFD, 100V
C19	Disc Ceramic Capacitor, .005 MFD, 100V
C20	Disc Ceramic Capacitor, .01 MFD, 100V
C21	Disc Ceramic Capacitor, .01 MFD, 1.4KV
C22	Disc Ceramic Capacitor, .01 MFD, 1.4KV
C23	Disc Ceramic Capacitor, .01 MFD, 5KV
C24	Disc Ceramic Capacitor, .001 MFD, 6KV
C25	Transmitting Ceramic Capacitor, 300 PFD, 6KV
C26	Air Variable Capacitor, 220 PFD, 4.5KV
C27	Transmitting Ceramic Capacitor, 1300 PFD, 2KV
C28	Air Variable Capacitor, 1000 PFD, 2.5KV
C29	Disc Ceramic Capacitor, .01 MFD, 100V
C30	Disc Ceramic Capacitor, .01 MFD, 100V
C31	Film Capacitor, .1 MFD, 250V
C32	Film Capacitor, .1 MFD, 250V
C33	Film Capacitor, .1 MFD, 250V
34	Electrolytic Capacitor, 470 MFD, 40V, AX
35	Disc Ceramic Capacitor, .001 MFD, 1.4KV
[illegible]	Disc Ceramic Capacitor, .001 MFD, 1.4KV
37	Disc Ceramic Capacitor, .001 MFD, 1.4KV
38	Disc Ceramic Capacitor, .001 MFD, 1.4KV

Circuit Designation	Description
C39	Disc Ceramic Capacitor, .001 MFD, 1.4KV
C40	Disc Ceramic Capacitor, .001 MFD, 1.4KV
C41	Disc Ceramic Capacitor, .001 MFD, 1.4KV
C42	Disc Ceramic Capacitor, .001 MFD, 1.4KV
C43	Disc Ceramic Capacitor, .001 MFD, 1.4KV
C44	Disc Ceramic Capacitor, .001 MFD, 1.4KV
C45	Electrolytic Capacitor, 220 MFD, 385V
C46	Electrolytic Capacitor, 220 MFD, 385V
C47	Electrolytic Capacitor, 220 MFD, 385V
C48	Electrolytic Capacitor, 220 MFD, 385V
C49	Electrolytic Capacitor, 220 MFD, 385V
C50	Electrolytic Capacitor, 220 MFD, 385V
C51	Electrolytic Capacitor, 220 MFD, 385V
C52	Electrolytic Capacitor, 220 MFD, 385V
C53	Electrolytic Capacitor, 220 MFD, 385V
C54	Electrolytic Capacitor, 220 MFD, 385V
C55	Transmitting Ceramic Capacitor, .001 MFD, 6KV
C56	Disc Ceramic Capacitor, 4.7 PFD, 100V
C57	Electrolytic Capacitor, 1000 MFD, 16V, AX
R1	Resister, Carbon, 47 KΩ, ¼W, 5%
R2	Resister, Carbon, 15 KΩ, ¼W, 5%
R3	NOT USED
R4	Potentiometer, Locking, 100 KΩ
R5	Resistor, Carbon, 270 KΩ, 1W, 5%
R6	Resistor, Carbon, 47 KΩ, ½W, 5%
R7	Resistor, Carbon, 2.2 KΩ, ¼W, 5%
R8	Resister, Carbon, 47 KΩ, ¼W, 5%
R9	Resistor, Wirewound, 10 Ω, 5W
R10	Resistor, Carbon, 1MΩ, ½W, 5%
R11	Resistor, Carbon, 1MΩ, ½W, 5%
R12	Resistor, Carbon, 1MΩ, ½W, 5%
R13	Resistor, Carbon, 1MΩ, ½W, 5%
R14	Resistor, Carbon, 1MΩ, ½W, 5%
R15	Resistor, Carbon, 1MΩ, ½W, 5%
R16	Resistor, Carbon, 1MΩ, ½W, 5%
R17	Resistor, Carbon, 1MΩ, ½W, 5%
R18	Resistor, Carbon, 1MΩ, ½W, 5%
R19	Resistor, Carbon, 1MΩ, ½W, 5%

R20	Resistor, Carbon, 270 KΩ, 1W, 5%
R21	Resistor, Carbon, 270 KΩ, 1W, 5%
R22	Resistor, Carbon, 270 KΩ, 1W, 5%
R23	Resistor, Carbon, 270 KΩ, 1W, 5%
R24	Resistor, Carbon, 270 KΩ, 1W, 5%
R25	Resistor, Carbon, 270 KΩ, 1W, 5%
R26	Resistor, Carbon, 270 KΩ, 1W, 5%
R27	Resistor, Carbon, 270 KΩ, 1W, 5%
R28	Resistor, Carbon, 270 KΩ, 1W, 5%
R29	Resistor, Carbon, 270 KΩ, 1W, 5%
R30	Resistor, Carbon, 270 KΩ, 1W, 5%
R31	Potentiometer, 1.0 KΩ
R32	Resistor, Carbon, 10 KΩ, ¼W, 5%
R33	Resistor, Wirewound, 10 Ω, 5W
R34	Potentiometer, 10 KΩ
R35	Resistor, Carbon, 3.3 KΩ, ¼W, 5%
R36	Resistor, Carbon, 27 KΩ, 1W, 5%
R37	NOT USED
R38	Resistor, Carbon, 2.2 KΩ, 1W, 5%
R39	Resistor, Carbon, 5.1 Ω, 2W, 5%
R40	Potentiometer, 470 Ω
R41	Resistor, Carbon, 220 Ω, ¼W, 5%
R42	Resistor, Carbon, 220 Ω, ¼W, 5%
R43	Potentiometer, 1.0 KΩ
R44	Resistor, Carbon, 220 Ω, ¼W, 5%
VDR1	Resistor, Voltage Dependant, 250V
VDR2	Resistor, Voltage Dependant, 250V
CR1	Diode, IN914
CR2	Diode, IN914
CR3	Diode, IN914
CR4	Diode, IN4007
CR5	Diode, IN4007
CR6	Diode, IN4007
CR7	Diode, IN4007
CR8	Diode, IN4007
CR9	Diode, IN4007
CR10	Diode, IN4007
CR11	Diode, IN4007
CR12	Diode. IN4007
CR13	Diode. IN4007
CR14	Diode, IN4007
CR15	Diode, IN4007
CR16	Diode, IN4007
CR17	Diode, IN4007
CR18	Diode, IN4007
CR19	Diode, IN4007
VR1	Diode, Zener, IN2972B
L1	Inductor, Toroidal, 1.8 MHz
L2	Inductor, Toroidal, 3.5 MHz
L3	Inductor, Toroidal, 7.0 MHz
L4	Inductor, Toroidal, 14 MHz
L5	Inductor, Toroidal. 21 MHz
L6	Inductor, Air, 28 MHz
L7	Choke, Filament, 15 amps.
L8	Choke, 100 μH, 750 MA
L9	Choke, 10 μH, 1.5 amps.
L10	Inductor, 28 / 21 / 14 MHz
L11	Inductor, 7.0 / 3.5 MHz
L12	Inductor, 1.8 MHz
L13	Inductor, Loading
T1	Transformer, Power
Q1	Transistor, 2N222A
Q2	Transistor, 2N222A
Q3	Transistor, 2N5064
F1	Fuse, (230VAC), 8 AMP. SLO BLO (115VAC), 15 AMP. SLO BLO
F2	Fuse, (230VAC), 8 AMP. SLO BLO (115VAC), 15 AMP. SLO BLO
F3	Fuse, 0.5 A, FAST BLO
B1	Blower, 115VAC, 30 CFM
V1	Tube, 3-500Z
M1	Plate Current Meter, 5 MA. Movement
M2	Multimeter, 200 μA Movement
I1	Pilot Light, 14V, .08A
I2	Pilot Light, 14V, .08A
I3	Pilot Light, 28V, Green
PS1	Parasitic Suppressor Assy.
K1	Relay, 3PDT, 24 VDC
$S1_{A,B}$	Switch, Rotary, 2P6T
$S1_C$	Switch, Rotary, SP6T
$S1_D$	Switch, Rotary, SPST
$S1_E$	Switch, Rotary, SP6T, Shorting

Circuit Designation	Description
	Switch, Micro, SPDT
S3	**Switch, Micro, SPDT**
S4	Switch, Rocker, DPST
S5	Switch, Push-Button, 4 Section, DPDT
TB1	Terminal Strip, 5 Position
J1	Connector, UHF Type, Female, Bulkhead
J2	Connector, UHF Type, Female, Bulkhead
J3	Connector, Phono Type, Female, Panel Mount
J4	Connector, Phono Type, Female, Panel Mount

NOTE: C1 through C12 Values may vary from unit to unit as determined by test.

Frequency (MHz)	Tune Setting	Load Setting
1.8	74	24
2.0	28	50
3.5	78	16
4.0	55	39
7.2	37	54
14.2	28	78
21.2	16	85
28.0	7	89
29.7	2	90