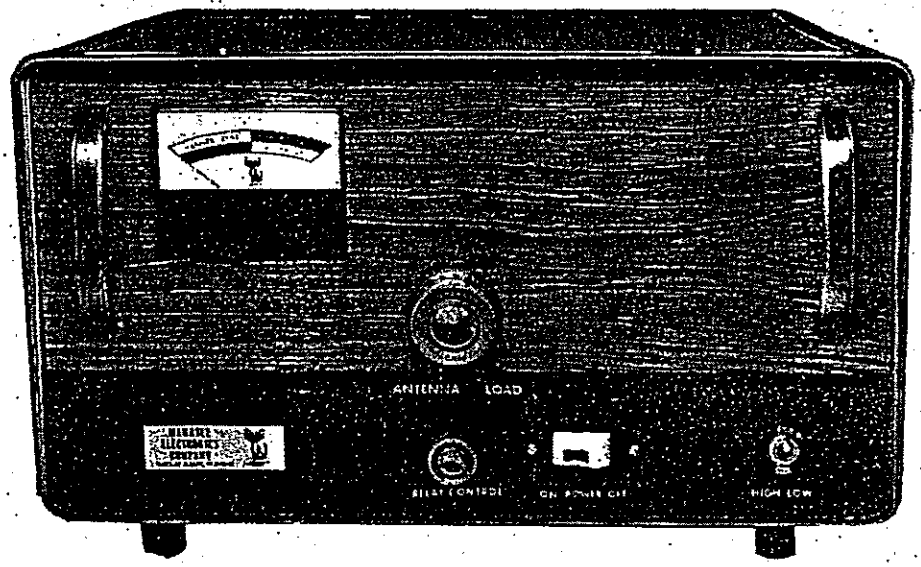
WAWASEE ELECTRONICS COMPANY, INC.

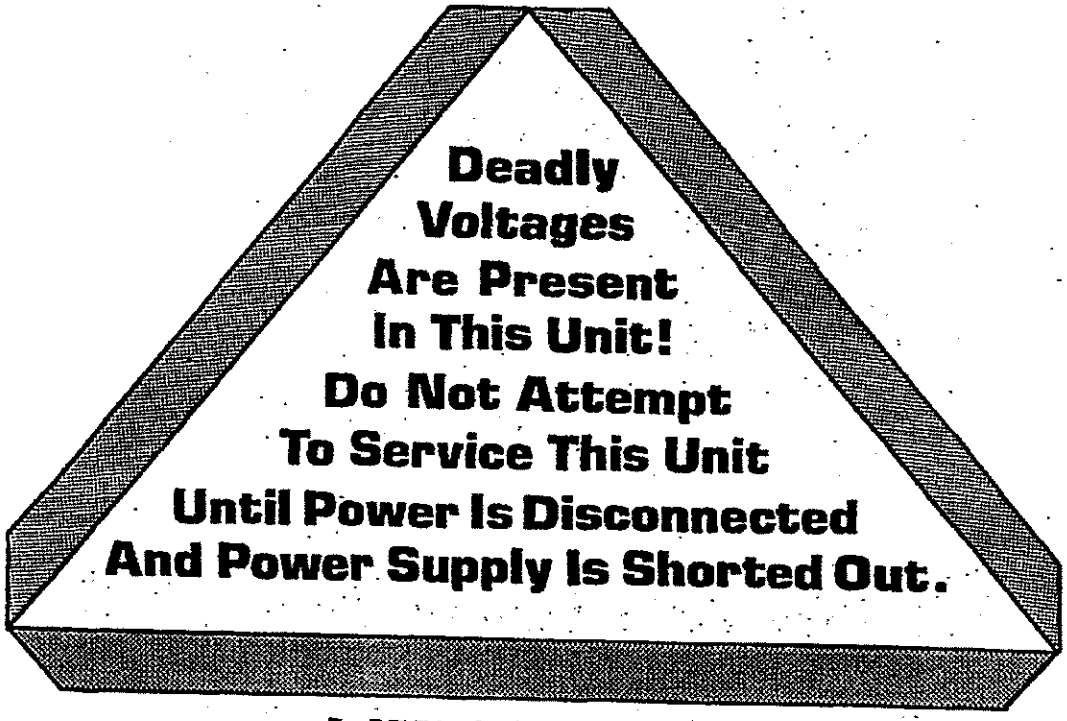
OPERATING INSTRUCTIONS



MODEL JB2000 10/80
BLACK CAT
LINEAR AMPLIFIER

PRICE $2.00

! WARNING !



! WARNING !

TABLE OF CONTENTS

SPECIFICATIONS

POWER INPUT	2000 watts PEP SSB, 1000 watts CW, AM, FM
BAND COVERAGE	80, 40, 20, 15, and 10 Meters
DUTY CYCLE	50%
MODULATION	SSB, CW, AM, FM
3rd ORDER DISTORTION	−40 DB
5th ORDER DISTORTION	−60 DB
REQUIRED MAXIMUM DRIVE	30 watts Dead Carrier, 100 watts PEP SSB
INPUT IMPEDANCE	50-72 ohms
OUTPUT IMPEDANCE	50-72 ohms
MAXIMUM V.S.W.R. ALLOWED	1.5 - 1
METERING	Plate Volts, Plate Current, RF Tuning Meter
POWER SUPPLY	Solid State Self-contained
AC POWER REQUIREMENTS	240 VAC, 50-60 CPS at 10 Amps 120 VAC, 50-60 CPS at 20 Amps
SIZE	17" wide x 13" long x 9½" high
TUBES	Two Zero Bias Triodes, Amperex 8802/3-500Z
WEIGHT	45 lbs. Shipping weight 48 lbs.
FRONT PANEL CONTROLS	On-Off, Relay Control, Band Switch, Plate Load, Antenna Load, and Meter Function
REAR PANEL CONNECTIONS	Output and Input
REAR PANEL CONTROLS	20 Amp Circuit Breaker

FCC regulations forbid the sale, offer for sales, or use of this unit in the 24 mhz to 35 mhz range.

INTRODUCTION

BAND COVERAGE AND POWER OUTPUT

The Black Cat JB 2000 10/80 (hereinafter referred to as the 10/80) is designed to offer the maximum in performance in a desk top linear amplifier. The 10/80 will furnish 2000 watts PEP single side-band power input on all frequencies alloted in the amateur bands at 80, 40, 20, 15, and 10 meters. The full 2000 watts PEP can be realized with only 100 watts PEP drive from the exciter. With AM exciters with 30 watts of drive, the unit is capable of 400 watts of carrier. And with 100% modulation it has a peak power of **1200 watts**, achieving **four** times the talk power over a conventional grounded grid amplifier. EXCITER DRIVES OF MORE THAN 30 WATTS AM, DEAD CARRIER, AND FM ARE NOT RECOMMENDED AND WILL VOID THE WARRANTY.

TUBE COMPLEMENT

Two zero bias triodes, amperex 8802/3-500Z are used in parallel for the power amplifier. These tubes feature quick heating, ready for use after a 30 second warm up.

POWER SUPPLY

The self-contained solid state power supply is capable of furnishing two ampere at 2500 VDC, allowing a lot of reserve. The circuit is a full wave voltage doubler type with an equivalent capacity of 53 MFD.

OUTPUT NETWORK

A pi matching network is used to match the output of the 10/80 to a coaxial antenna line. Antennas and loads having impedances in the range of 50 to 72 ohms may be matched by using the variable capacitor (antenna load) in the output of the pi network.

One big value of this type of tuning network is its ability to suppress harmonies thus helping eliminate any TVI.

METERING

The plate current (IP in amps) or plate voltage (EP in kilovolts) can be monitored by a front panel meter controlled by a switch. A unique feature of the 10/80 is a relative RF tuning meter calibrated to indicate proper operation of the linear amplifier.

CONTROLS

1. ON — POWER — OFF, turns the 10/80 on or off
2. BAND SWITCH, allows selection of designed band
3. PLATE LOAD, tunes plate circuit
4. ANTENNA LOAD, couples the load to the Pi network and is used for proper adjustment of the amplifier
5. METER FUNCTION, a three-way position switch which allows the selection of relative RF metering, plate voltage indication, or plate current indication on the front panel meter
6. RELAY CONTROL, part of an automatic keying solid state circuit. Rotation of the control in the clockwise direction increases delay to infinity thus allowing stand-by operation
7. CIRCUIT BREAKER, a 20 amp switch type devise to protect the unit
8. CONNECTIONS, output and input for connection to antenna and transceiver

INSTALLATION

CABINET REMOVAL AND REPLACEMENT

Set the unit on its face, remove the two sheet metal screws in the rear, and slide the cover off. Reverse the procedure to install cabinet on the amplifier.

VENTILATION

Locate the 10/80 in a position where there is sufficient air circulation at the rear. Leave at least three inches between surrounding equipment. If air cannot

circulate freely use an external fan for ventilation. In normal operation the 10/80 will not heat up with prolonged periods of operation, PROVIDING A DUTY CYCLE OF 50% IS MAINTAINED. DO NOT PLACE BOOKS, PAPERS OR OTHER EQUIPMENT ON TOP OF THE 10/80 CASE.

INPUT POWER

The 10/80 is designed for use with exciters in the 30 watt AM range, 100 watts PEP SSB. Do not operate with higher wattage exciter unless a suitable attenuation pad is used to lower the level of drive to what is recommended. One connection between the exciter and 10/80 is required, use 52 ohm RG 58/U cable three feet or longer.

Because of the high power output of the 10/80, only those antennas rated for 2000 watts PEP are permissible for full performance. RG 8/U cable should be used to an antenna whose impedance is 52 ohms; 72 ohms load use 72 ohm cable.

Connect exciter to marked input, connect antenna or suitable load to marked output.

OPERATION

The following procedure is general and should be used until you become familiar with operation.

1. Set the band switch to the desired band.
2. Position the plate load control according to Chart A.

Band	*Plate Load Approx. Position*
80 Meters	5 o'clock
40 Meters	2 o'clock
20 Meters	1 o'clock
15 Meters	11 o'clock
10 Meters	1 o'clock

Chart A

3. Set antenna load control according to Chart B.

Band	*Antenna Tuning*
80 Meters	2 o'clock
40 Meters	2 o'clock
20 Meters	12 o'clock
15 Meters	12 o'clock
10 Meters	12 o'clock

Chart B

4. Set the plate meter switch to IP.
5. Rotate the relay control fully clockwise (stand-by) and tune exciter in a normal manner.
6. Reduce exciter power to zero.
7. Turn the 10/80 on and rotate relay control fully counter-clockwise.
8. Increase the exciter output to obtain about 650 to 675 milliamperes of plate current on the meter.
9. Adjust the plate load control until a dip occurs in plate current.
10. Switch the meter function to RF.
11. The most linear operation of the amplifier is indicated in the GREEN or left side of the meter. This reading is made with unmodulated carrier only.
12. Proper operation of the antenna load control is achieved by adjusting for maximum dead carrier, maintaining the needle on the panel meter in the green or left of center. After achieving peak power reading rotate the antenna load control counter-clockwise or to the left A VERY SMALL AMOUNT reducing the meter reading. This will give maximum talk power and a clean signal.
13. THE WARRANTY WILL BE VOID IF YOU OPERATE THE AMPLIFIER WITH THE NEEDLE IN THE RED SECTION OR RIGHT HALF OF THE METER ON A DEAD CARRIER. The needle moving backward is an indication of too much drive and improper tuning of the antenna load control. This is also caused by improper or false 52-72 ohm loads and high SWR.
14. REMEMBER A POWERFUL DEAD CARRIER SAYS NOTHING ONLY THE SIDEBAND POWER IS WHAT TALKS.
15. To operate for SSB the amplifier must be first tuned the same as in the AM mode of operation. The panel meter will indicate proper tuning only for AM, FM, and CW. Once properly tuned for AM, SSB can be used with no further adjustments, other than setting the relay control for proper relay delay for SSB.

16. To help aid in tuning SSB a monitoring scope such as our model 2000PM Catalyzer meterscope or a Heathkit SB610 can be used. PEAK READING power meters such as B & W model 374 and Bird model 4314 also aid in tuning both AM and SSB.

IN CASE OF DIFFICULTY

In case your 10/80 does not function properly, we recommend the following steps to be taken:

1. Check all auxiliary equipment for malfunction. This means:
   a. exciter
   b. connecting cables
   c. proper antenna system
   d. power watt meter accuracy, is it capable of measuring 2000 watts modulated peak power?
2. Check for debris that may have fallen into case. If after a thorough check and after applying your best efforts, your 10/80 does not function properly, consult the factory for advice.
3. The 120 VAC line voltage must not drop below 115 VAC for full output. Lower voltage will give lower output.

Write or call the factory, stating your name, date your 10/80 was purchased and serial number. Give all particulars of the problem, they will try to advise if possible. If this fails, write or call for a return authorization. You must pay shipping charges to the factory, we will prepay shipping to you. Remove all tubes and pack the 10/80 and tubes against shipping damage. ANY TUBES BROKEN IN SHIPPING WILL BE CHARGED TO THE CUSTOMER AT FACTORY COST. The carrier is not responsible for damage if in his opinion the unit was improperly packed. The ninety day warranty does not apply to tubes at any time. SO HANDLE WITH CARE. Every 10/80 is completely factory checked with the tubes sent with the unit. Ship to the factory by UPS delivery whenever possible.

In the event continued operational difficulties of the unit are experienced the facilities of the factory service department are at your disposal. NO UNITS MODIFIED OR TAMPERED WITH WILL BE ACCEPTED FOR REPAIR AND WILL BE RETURNED.

REPLACEMENT PARTS

All components supplied with your 10/80 have been selected and rated to meet the design objectives; occasionally a component will be faulty and replacement will be necessary. In this case our ninety day warranty will replace this to the original customer only, the warranty is not transferable. Please do the following if replacement parts are necessary.

1. Write Wawasee Electronics Co., Inc. giving your name, the serial number and date of purchase also defect encountered.
2. Wawasee Electronics Co., Inc. will replace faulty components promptly free of charge (except tubes replaced at factory cost).
3. Return faulty component if asked to do so (parts will not be replaced without faulty part returned).
4. This policy does not cover parts that have been broken or damaged through carelessness or improper operation.
5. All out of warranty parts are sent COD, UPS, CASH or contracted in advance.

Please direct all inquiries to:

WAWASEE ELECTRONICS CO., INC.
P.O. Box 36
Syracuse, Indiana 46567
Phone 219/457-3191

WARRANTY

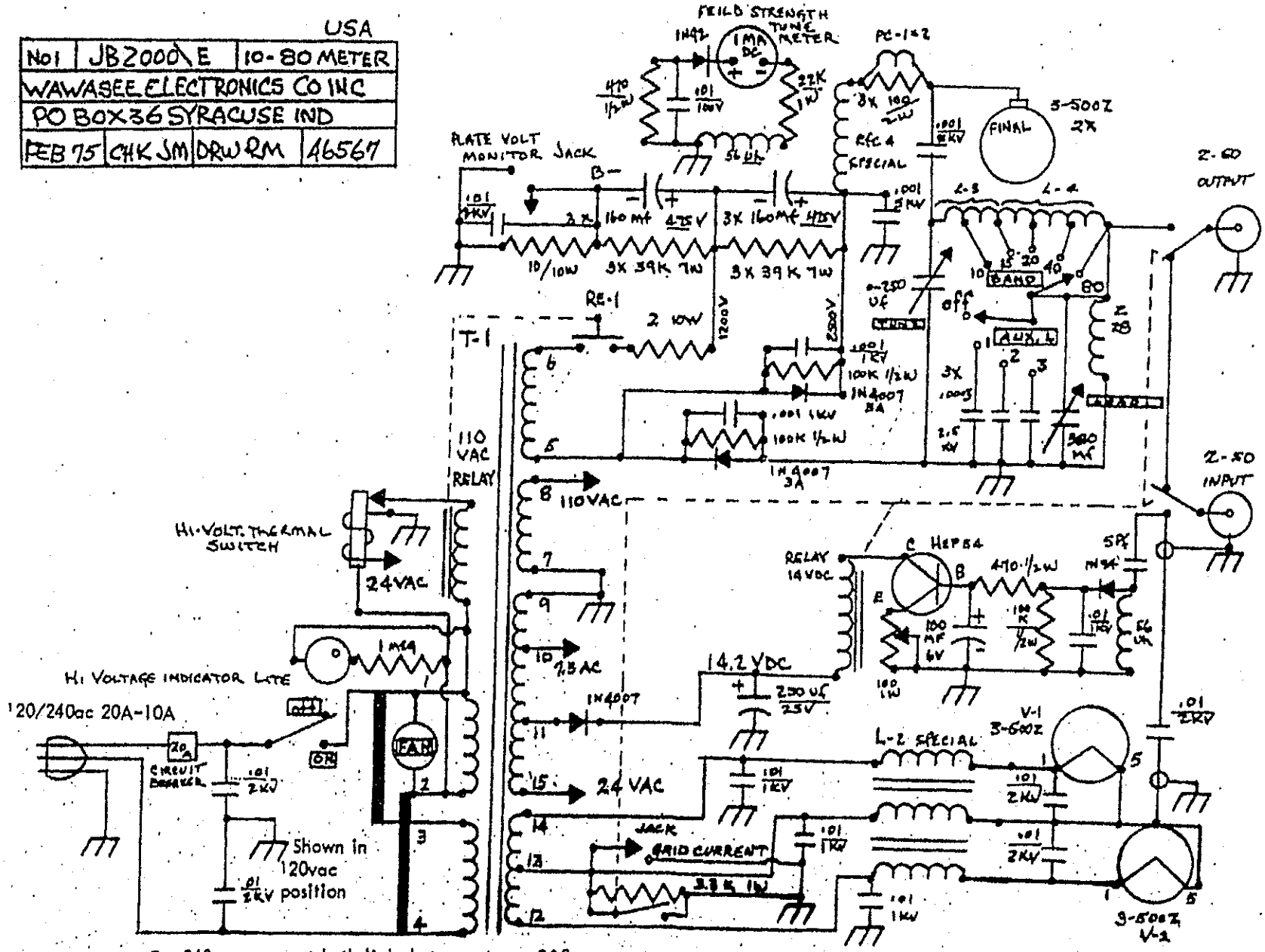
Wawasee Electronics Co., Inc. warrants that all parts in the 10/80 amplifier are free of defects in material and workmanship under normal use and service for ninety days. The two tubes are excluded from the warranty but will be replaced if necessary at factory cost. Wawasee Electronics Co., Inc. will replace any part (except tubes) upon verification of the defective part.

The foregoing warranty shall apply to the original buyer only and is not transferable, and shall be in lieu of all other warranties, expressed or implied, and of all other obligations or liabilities on the part of Wawasee Electronics Co., Inc. In no event shall Wawasee Electronics Co., Inc. be liable for any anticipated profits, consequential damages, loss of time or other losses incurred by the buyer in connection with the purchase, or operation of the 10/80 amplifier. No replacement of parts damaged by the buyer in the course of handling or improper operation will be made.

FCC regulations forbid the sale, offer for sales, or use of this unit in the 24 mhz to 35 mhz range.

USA

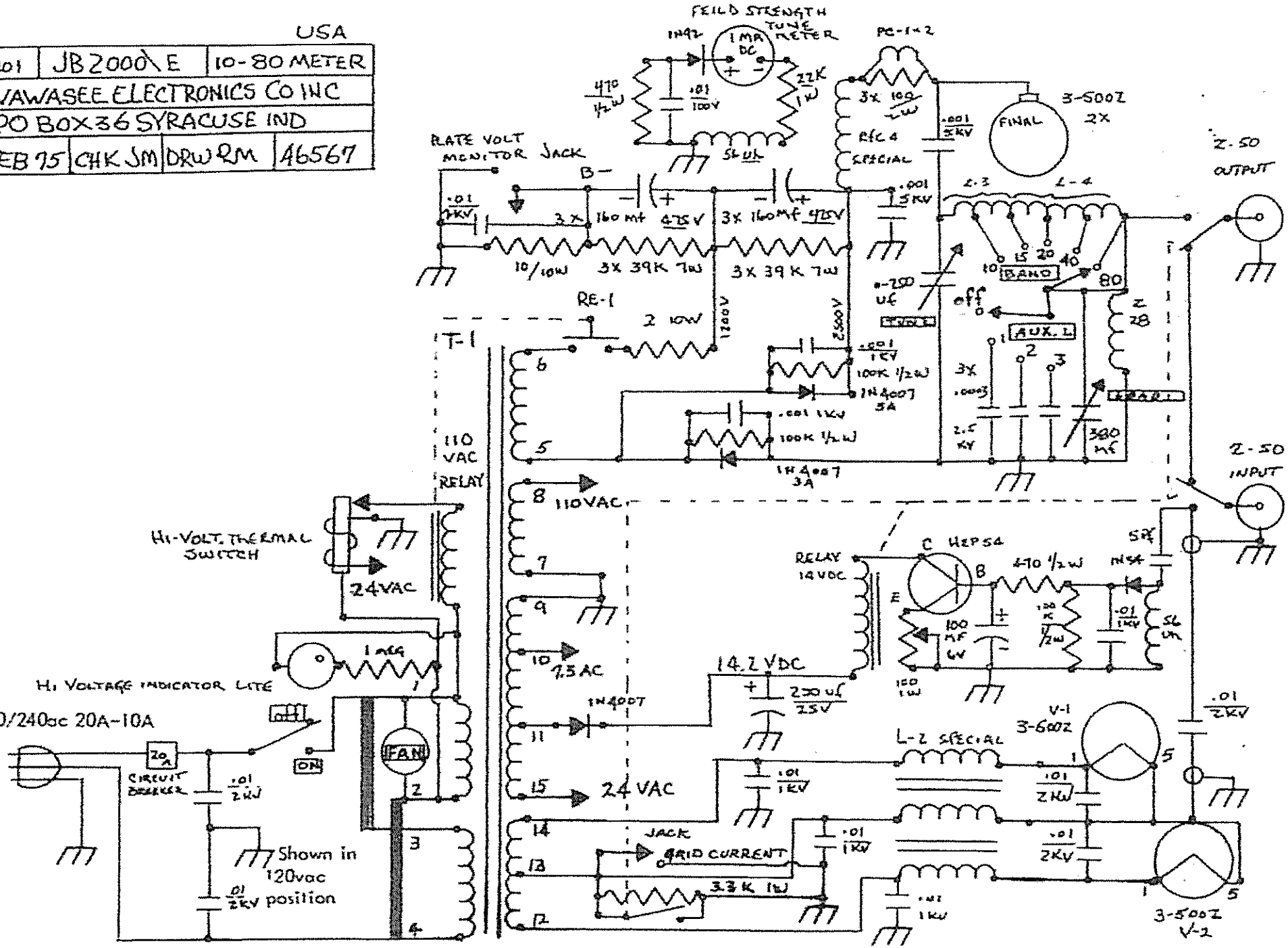
No1	JB2000\E	10-80 METER
WAWASEE ELECTRONICS CO INC		
PO BOX 36 SYRACUSE IND		
FEB 75	CHK JM DRW RM	46567



For 240vac connect both links between term. 2&3.

USA

No1	JB2000\E	10-80 METER
WAWASEE ELECTRONICS CO INC		
PO BOX 36 SYRACUSE IND		
FEB 75	CHK JM DRW RM	46567



For 240vac connect both links between term. 2&3.

INTRODUCTION

BAND COVERAGE AND POWER OUTPUT
The Black Cat JB 2000 10/80 (hereinafter referred to as the 10/80) is designed to offer the maximum in performance in a desk top linear amplifier. The 10/80 will furnish 2000 watts PEP single side-band power input on all frequencies allotted in the amateur bands at 80, 40, 20, 15, and 10 meters. The full 2000 watts PEP can be realized with only 100 watts PEP drive from the exciter. With AM exciters with 30 watts of drive, the unit is capable of 400 watts of carrier. And with 100% modulation it has a peak power of **1200 watts,** achieving **four times** the talk power over a conventional grounded grid amplifier. EXCITER DRIVES OF MORE THAN 30 WATTS AM, DEAD CARRIER, AND FM ARE NOT RECOMMENDED AND WILL VOID THE WARRANTY.

TUBE COMPLEMENT
Two zero bias triodes, amperex 8802/3-500Z are used in parallel for the power amplifier. These tubes feature quick heating, ready for use after a 30 second warm up.

POWER SUPPLY
The self-contained solid state power supply is capable of furnishing two ampere at 2500 VDC, allowing a lot of reserve. The circuit is a full wave voltage doubler type with an equivalent capacity of 53 MFD.

OUTPUT NETWORK
A pi matching network is used to match the output of the 10/80 to a coaxial antenna line. Antennas and loads having impedances in the range of 50 to 72 ohms may be matched by using the variable capacitor (antenna load) in the output of the pi network.

One big value of this type of tuning network is its ability to suppress harmonics thus helping eliminate any TVI.

METERING
The plate current (IP in amps) or plate voltage (EP in kilovolts) can be monitored by a front panel meter controlled by a switch. A unique feature of the 10/80 is a relative RF tuning meter calibrated to indicate proper operation of the linear amplifier.

CONTROLS
1. ON–POWER–OFF, turns the 10/80 on or off
2. BAND SWITCH, allows selection of designated band
3. PLATE LOAD, tunes plate circuit
4. ANTENNA LOAD, couples the load to the Pi network and is used for proper adjustment of the amplifier.
5. METER FUNCTION, a three-way position switch which allows the selection of relative RF metering, plate voltage indication, or plate current indication on the front panel meter.
6. RELAY CONTROL, part of an automatic keying solid state circuit. Rotation of the control in the clockwise direction increases delay to infinity thus allowing stand-by operation.
7. CIRCUIT BREAKER, a 20 amp switch type devise to protect the unit.
8. CONNECTORS, output and input for connection to antenna and transceiver.

INSTALLATION

CABINET REMOVAL AND REPLACEMENT
Set the unit on its face, remove the two sheet metal screws in the rear, and slide the cover off. Reverse the procedure to install cabinet on the amplifier.

VENTILATION
Locate the 10/80 in a position where there is sufficient air circulation at the rear. Leave at least three inches between surrounding equipment. If air cannot circulate freely use an external fan for ventilation. In normal operation the 10/80 will not heat up with prolonged periods of operation, PROVIDED A DUTY CYCLE of 50% IS MAINTAINED. DO NOT PLACE BOOKS, PAPERS OR OTHER EQUIPMENT ON TOP THE THE 10/80 CASE.

INPUT POWER
The 10/80 may be operated at 220 VAC 10 amps single phase or 120 VAC 20 amps single phase. A TERMINAL BLOCK PROVIDES EASY CONVERSION TO THE DIFFICULT LINE VOLTAGES. THE UNIT IS SHIPPED IN THE 120 VAC MODE.

CONNECTIONS
The 10/80 is designed for use with exciters in the 30 watt AM range, 100 watts PEP SSB. Do not operate with higher wattage exciter unless a suitable attenuation pad is used to lower the level of drive to what is recommended. One connection between the exciter and 10/80 is required, use 52 ohm RG 58/U cable three feet or longer.

Because of the high power output of the 10/80, only those antennas rated for 2000 watts PEP are permissible for full performance. RG 8/U cables should be used to an antenna whose impedance is 52 ohms; **72 ohms load use 72 ohm cable.**

Connect exciter to marked input, connect antenna or suitable load to marked output.

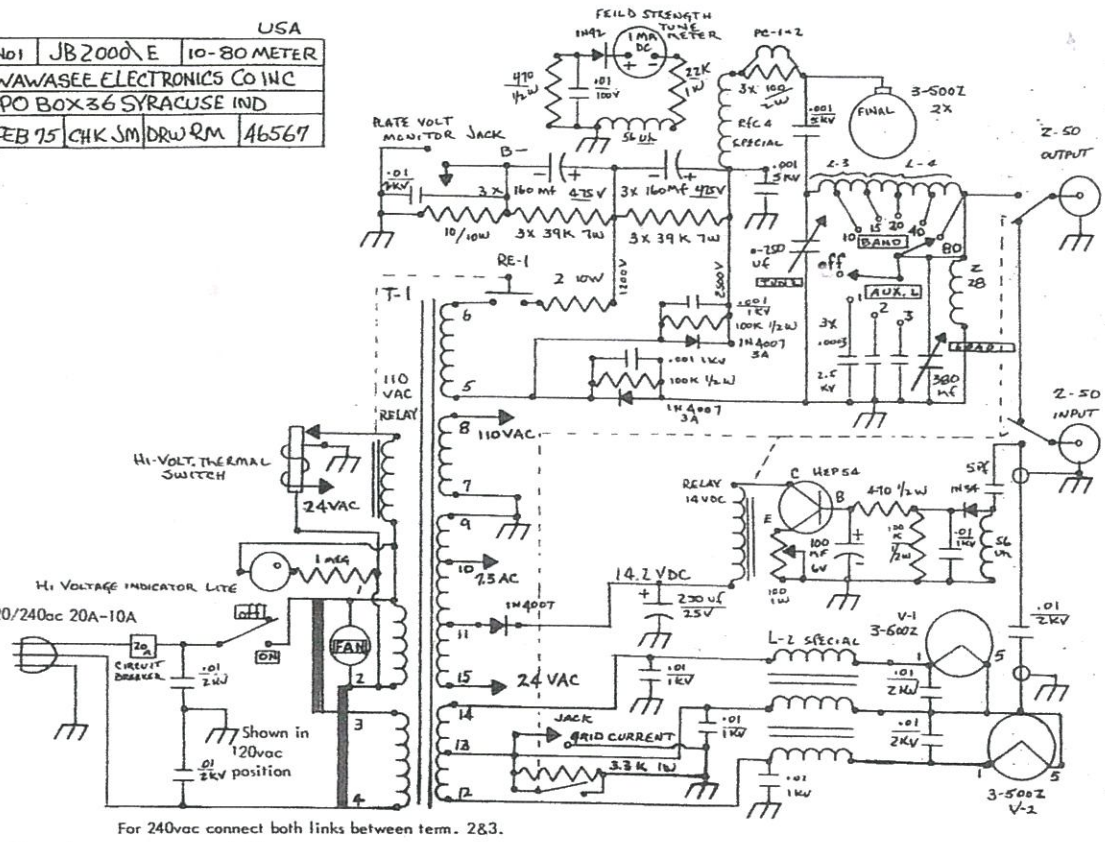
OPERATION

The following procedure is general and should be used until you become familiar with operation.

1. Set the band switch to the desired band.
2. Position the plate load control according to Chart A reverse side.
3. Set antenna load control according to Chart B reverse side.
4. Set the plate meter switch to IP.
5. Rotate the relay control fully clockwise (stand-by) and tune exciter in a normal manner.
6. Reduce exciter power to zero.
7. Turn the 10/80 on and rotate relay control fully counter-Clockwise.
8. Increase the exciter output to obtain about 650 to 675 milliamperes of plate current on the meter.
9. Adjust the plate load control until a dip occurs in plate current.
10. Switch the meter function to RF.
11. The most linear operation of the amplifier is indicated in the GREEN or left side of the meter. This reading is made with unmodulated carrier only.
12. Proper operation of the antenna load control is achieved by adjusting for maximum dead carrier, maintaining the needle ion the panel meter in the green or left of center. After achieving peak power reading rotate the antenna load control counter-clockwise or to the left A VERY SMALL AMOUNT reducing the meter reading. This will give maximum talk power and a clean signal.
13. THE WARRANTY WILL BE VOID IF YOU OPERATE THE AMPLIFIER WITH THE NEEDLE IN THE RED SECTION OR RIGHT HALF OF THE METER ON A DEAD CARRIER. The needle moving backward is an indication of too much drive and improper tuning of the antenna load control. This is also caused by improper or false 52-72 ohm loads and high SWR. Operation above 550 M.A. on I.P. position of plate meter switch is not recommended. OPERATION ABOVE THIS FIGURE IS AT THE **OWNER'S RISK!**

    Do not detune plate control or antenna load control to lower I.P. Always reduce I.P. by lowering your drive wattage!
14. REMEMBER A POWERFUL DEAD CARRIER SAYS NOTHING ONLY THE SIDEBAND POWER IS WHAT TALKS.
15. To operate for SSB the amplifier must be first tuned the same as in the AM mode of operation. The panel meter will indicate proper tuning only for AM, FM, and CW. Once properly tuned for AM, SSB can be used with no further adjustments, other than setting the relay control for proper relay delay for SSB.
16. To help aid in tuning SSB a monitoring scope such as our model 2000SW Catalyzer meterscope or a Heathkit SB610 can be used. PEAK READING power meters such as B & W model 374 and Bird model 4314 also aid in tuning both AM and SSB.

USA		
NO1	JB2000\E	10-80 METER
WAWASEE ELECTRONICS CO INC		
PO BOX 36 SYRACUSE IND		
FEB 75	CHK JM DRW RM	46567



For 240vac connect both links between term. 2&3.

SPECIFICATIONS

POWER INPUT .... 2000 watts PEP SSB, 1000 watts CW, AM, FM
BAND COVERAGE..... 80, 40, 20, 15, and 10 Meters
DUTY CYCLE..... 50%
MODULATION ..... SSB, CW, AM, FM
3rd ORDER DISTORTION ..... –40 DB
5th ORDER DISTORTION ..... –60 DB
REQUIRED MAXIMUM DRIVE.....
30 watts Dead Carrier, 100 watts PEP SSB
INPUT IMPEDANCE..... 50-72 ohms
OUTPUT IMPEDANCE..... 50-72 ohms
MAXIMUM V.S.W.R. ALLOWED ..... 1.5 - 1
METERING..... Plate Volts, Plate Current, RF Tuning Meter
POWER SUPPLY..... Solid State Self-contained
AC POWER REQUIREMENTS .. 240 VAC, 50-60 CPS at 10 Amps
120 VAC, 50-60 CPS at 20 Amps
SIZE ..... 17" wide x 13" long x 9½" high
TUBES.....Two Zero Bias Triodes, Amperex 8802/3-500Z
WEIGHT.....45 lbs. Shipping weight 48 lbs.
FRONT PANEL CONTROL ..... On-Off, Relay Control, Band Switch, Plate Load, Antenna Load, and Meter Function
REAR PANEL CONNECTIONS ..... Output and Input
REAR PANEL CONTROLS .....20 Amp Circuit Breaker

WARNING!!

DEADLY VOLTAGES ARE PRESENT IN THIS UNIT!

DO NOT ATTEMPT TO SERVICE THIS UNIT UNTIL POWER IS DISCONNECTED AND POWER SUPPLY IS SHORTED OUT.

CHART A

Band	*Plate Load Approx. Position*
80 Meters	5 o'clock
40 Meters	2 o'clock
20 Meters	1 o'clock
15 Meters	11 o'clock
10 Meters	1 o'clock

CHART B

Band	*Antenna Tuning*
80 Meters	2 o'clock
40 Meters	2 o'clock
20 Meters	12 o'clock
15 Meters	12 o'clock
10 Meters	12 o'clock