LK-800A

Instruction Manual

CARY®

of by from the fax-on-demand sys-

K4BWC BILL EDWARDS

AMP REPAIR CENTER

Amp Supply, Ameritron, Dentron, Heath, Drake, Etc.
40 years experience- Service manager with former amplifier manufacturer

OMEGA Electronics P. O. Box 579
101-D Railroad St. Knightdale, NC 27545
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1-800-900-7388

INTRODUCTION

The LK-800A Export Version Linear Amplifier is a compact 2500 Watt output 160-10 meter amplifier of modern design. It is a high performance piece of equipment requiring a minimum of maintenance through years of operation. The LK-800A was engineered conservatively, with American components and ingenuity. The unit is field-tested and rated for 2500 Watts PEP output continuous in SSB service and 2000 Watts CW output along with many MARS operating frequencies, without modifications.

Three EIMAC 3CX-800A7 triodes are employed, operating in grounded grid in conjunction with a solid state power supply. The LK-800 uses a double duty cooling system which allows cooling of the tubes in two automatic speeds.

Tuning the LK-800A is a simple procedure, since the unit is designed for long-term stability in virtually any operating situation. Tuned input and standard relay switching circuitry makes the LK-800A compatible with any solid state or tube transceiver or transmitter available. The LK-800A, despite its straight-forward design and minimal user required adjustment, is nonetheless a sophisticated electronic instrument. Therefore, if the unit is operated outside the parameters outlined in this owner's manual, it is possible that damage can result.

Please read this manual carefully before putting your LK-800A on the air.

WARNING

TO TAKE FULL ADVANTAGE OF THE LK-800A COOLING SYSTEM, IT IS REQUIRED THAT THE AMPLIFIER BE OPERATED WITH AT LEAST 2-1/2" CLEARANCE ON BOTH SIDES AND TOP OF THE UNIT. THE MOST IMPORTANT FACT TO REMEMBER IS THE COOL AIR FOR TUBE COOLING IS DRAWN IN FROM THE BOTTOM OF THE AMP!!! NEVER PLACE THE LK-800A ON CARPETING OR ANY RESTRICTIVE SURFACE!!!!!!!!

CAUTIONS

1. Make no attempt to put the LK-800A in service outside of the cabinet. Contact with high voltages in the Amplifier can be fatal: TO THE HUMAN BODY.

2. Never attempt to operate the LK-800A with drive power of more than 100 watts.

3. Never attempt to operate the LK-800A without first connecting it to an antenna with an SWR of less than 2:1, or a 50 Ohm dummy load of sufficient power handling capacity or serious damage may result to the amplifier.

4. Never run Amplifier from an extension cord.

5. Do not cover the top of the LK-800A with books, papers or other pieces of equipment or overheating may result.

6. Do not use different tuning procedures other than indicated in this manual.

7. When cleaning the LK-800A never blow high pressure air directly into the fan blades. Spinning the fan at higher speeds that it was designed for can cause damage and freeze the rotor assemble of the fan. Use a brush in cleaning the fan assembly.

SPECIFICATIONS

FREQUENCY COVERAGE: Ham bands 160 through 10 meters. Non-amateur frequencies between 1.8-4.0 and 6.5-22MHz may be covered with adjustment of the tuned imput.

TYPICAL OUTPUT: 2500 Watts on SSB, 2000 Watts CW.

DRIVE REQUIREMENTS FOR TYPICAL OUTPUT: 80 Watts PEP SSB, 60 Watts CW.

INPUT IMPEDANCE: 50 Ohms pi-network tuned input on each band.

OUTPUT IMPEDANCE: Adjustable pi-network matches 50 Ohm load with SWR not to exceed 2:1.

QSK FULL BREAK-IN: To be used with QSK equiped transceiver.

INTERMODULATION DISTORTION PRODUCTS: In excess of -35dB below 2.5KW PEP output.

HARMONIC SUPRESSION: In excess of -45dB.

POWER REQUIREMENTS: 234 Volts 50/60 Hertz 20 amps.

DIMENSIONS: 10" H X 17" W X 15" D

WEIGHT: RF Deck 38 lbs. Power PAC 68 lbs.

Specifications are subject to change without notice or obligation.

FRONT PANEL CONTROLS

ON-AC ROCKER SWITCH — Turns power on and off.

PLATE HIGH — Switch Plate Voltage to high for SSB & low for CW.

XMIT-STBY SWITCH — Turns the amp form standby to operate mode.

BAND SWITCH — Selects desired bands.

PLATE AND LOAD KNOBS — Tuning adjusts Pi-Network capacitors in tank circuit for proper resonance and loading on all bands.

PLATE CURRENT METER — Continuously monitors plate current of 3CX-800A tubes.

GRID-VOLT METER — Meter switch lever can monitor plate volts (0-3500 V or grid current (0-350 mA).

REAR JACKS

RF-IN — For connecting to exciter RF output.

RF-OUT — For connecting the LK-800A to an antenna.

RLY — For connecting to exciter auxiliary jack to activate T/R Relay.

KEY IN – QSK ONLY — Station key, must be a bug, hand key or a keyer with a reed relay.

KEY OUT – QSK ONLY — Hooks to the key jack on a QSK transceiver.

INSTALLATION

1. Make no attempt to put the Amplifier in service outside of the cabinet — contact with voltage in this Amplifier **CAN BE FATAL.**

2. Unpacking — Carefully remove you LK-800A from its packing carton, and examine it closely for signs of shipping damages. Should any damage by apparent, notify the delivery carrier immediately, stating the full extent of the damage.

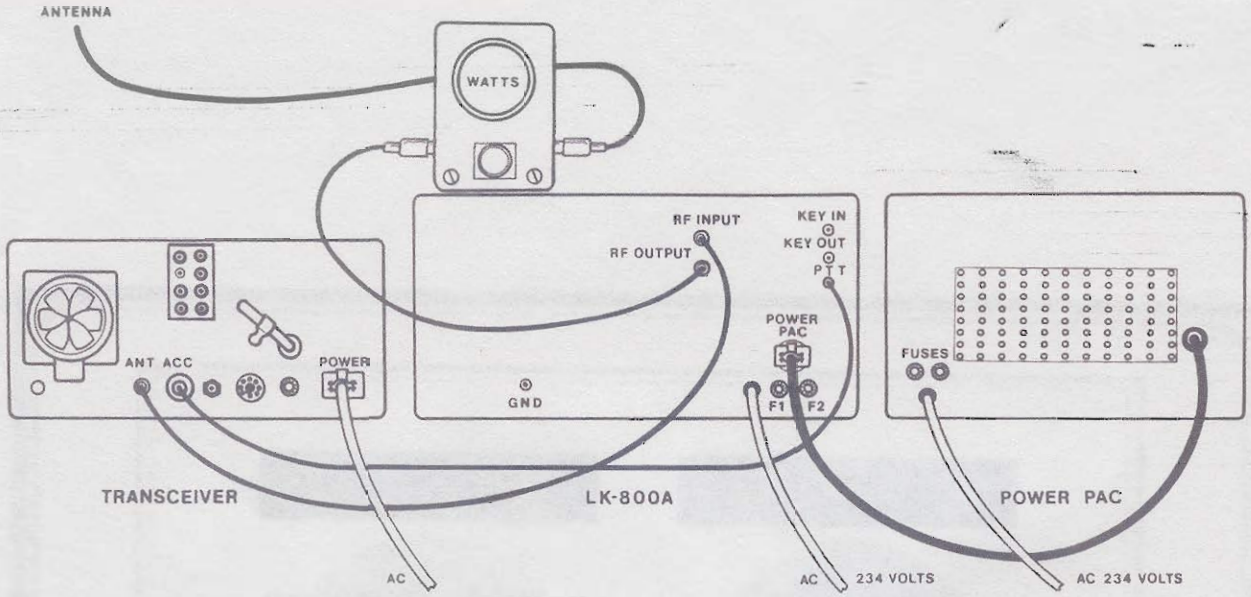
3. Fill out the enclosed warranty registration card and return to Cary RF Design.

4. Location — In general, the location of the LK-800A is not critical, however, there are certain consider ations which must be given to insure optimum performance. Extremely hot locations, such as near radiators or heating units should be avoided. Do not cover the top of the Amplifier case with books, papers, or other pieces of equipment, or overheating may occur. The sides of the Amplifier case must not be obstructed and should not be placed closer than 2-1/2 inches from a wall or the air inlet and outlet for the blower will be blocked and overheating of the Amplifier tubes may occur.

   THE BOTTOM OF THE LK-800A MUST BE CLEAR OF ANY OBSTRUCTIONS, AND REMEMBER NEVER PLACE AMPLIFIER ON CARPETING. THE AIR INLET FOR THE TUBE DECK IS ON THE BOTTOM!!!!!

5. Cable Installation — (See Diagram C) Using a 6' length, connect a 52-Ohm coaxial cable between your exciter's RF Output and the LK-800A rear panel RF Input connector. Next connect another short length of 52-Ohm coaxial cable (RG-8U or equivalent) from the RF Output connector to a suitable Wattmeter and Antenna system. Next, a piece of shielded cable should be installed between the RCA type jack on the rear panel marked RLY and the accessory contacts of your exciter. These should be normally open contacts that are Closed on TRANSMIT. (See your exciter operator's manual.) This completes hookup of the LK-800A.

DIAGRAM C



Antenna Requirements — The LK-800A has been designed for use with antennas resonant at the operation frequency and having approximate impedances within the limits of 30 to 75 Ohms. The normal output impedance of the LK-800A is 50 Ohms and the SWR of this load should never exceed 2:1. Although there are many types of antennas which will meet requirements the simplest is the one-half (1/2) wave dipole center fed with 52 Ohm coax. For a detailed discussion on the antennas, we suggest referring to an appropriate antenna book.

Most practical antennas exhibit an SWR range over a completeamateur band that exceeds 2:1. For this reason we recommend using an antenna matching network which will allow the LK-800A to work into a 50 Ohm resistive load for maximum power transfer into the antenna.

CAUTION

NEVER ATTEMPT TO OPERATE THE LK-800A WITHOUT FIRST CONNECTING IT TO AN ANTENNA OR 50 OHM DUMMY LOAD OF SUFFICIENT POWER HANDLING CAPACITY OR SERIOUS DAMAGE MAY RESULT.

Ground Requirements — The LK-800A should be attached to a good earth ground through as short and as large a ground strap as possible for best results. A ground post is provided on the rear of the LK-800A chassis for this purpose. It is always a good idea to connect the chassis of all associated equipment together and ground them at one point to avoid ground loops. We recommend that all of the equipment in your station be connected together and grounded at the Antenna Tuner.

TUNING PROCEDURE

***WARNING*: THIS UNIT IS SHIPPED READY FOR 234 VAC OPERATION ONLY.**

1. Set the Bandswitch to the desired band.

2. Set the Load Control on number shown on tuning chart.

3. Set the Plate Control on number shown on tuning chart.

4. Set the On/Ac Control to ON.

5. Set the Xmit/Stby Switch to XMIT.

6. Set meter switch to grid current. (This is read on Plate/Grid Current Meter.)

7. Insert a small amount of exiter drive until the plate current begins to rise to approximately 400-500 mA.

8. Rotate the Plate Control for maximum output on your station wattmeter.

9. Go between Plate and Load for maximum output.
   (Plate Voltage x Plate Current = Power Input)
   Example: Plate Current = 600 mA
   Plate Voltage = 2200 V DC
   .6 x 2200 V = 1320 Watts Input

10. Increase drive power. Repeat steps 8 through 10 until you obtain desired output.

11. During tune up alternately monitor Grid and Plate current.

12. Grid current can be reduced by slightly decreasing the Load control. Turn control to right, clockwise.

13. ALWAYS TUNE FOR MAXIMUM OUTPUT!

14. TUNE FOR MAXIMUM OUTPUT AT ALL TIMES!!!!!

WARNING

CURRENT LIMITATIONS FOR NORMAL OPERATION:

Plate Current ....not to exceed 1500 MA.
Grid Current ....Under tune up, RTTY, or SSTV, never to exceed 150 mA.
....on SSB voice peaks should average less than 100 mA while operating.
....on CW between 80 and 100 mA, depending on sending speed.

SERVICE DATA

CAUTION

EXTREME CARE MUST BE TAKEN WHENEVER MAKING ANY ADJUSTMENTS INSIDE *THE LK-800A*

Removing Top Cover — After completely disconnecting the LK-800A from power wait 30 minutes so all electrolytic capacitors have discharged through their bleeding resistors. The top cover can then be safely removed by taking out the top and side row of screws.

Cleaning Amplifier Compartment — Since the Amplifier compartment is forced-air cooled, it will collect particles of dust which must be removed periodically. The frequency of cleaning will be governed by how many hours the LK-800A is operated and by how clean the environment is. When the blower blade

accumulates a large of dust, the Amplifier should be cleaned. The best way to clean the LK-800A is to remove the top cover and blow the dust out with compressed air. If compressed air is not available, a soft-bristled one-inch paint brush can be used to brush the Amplifier clean.

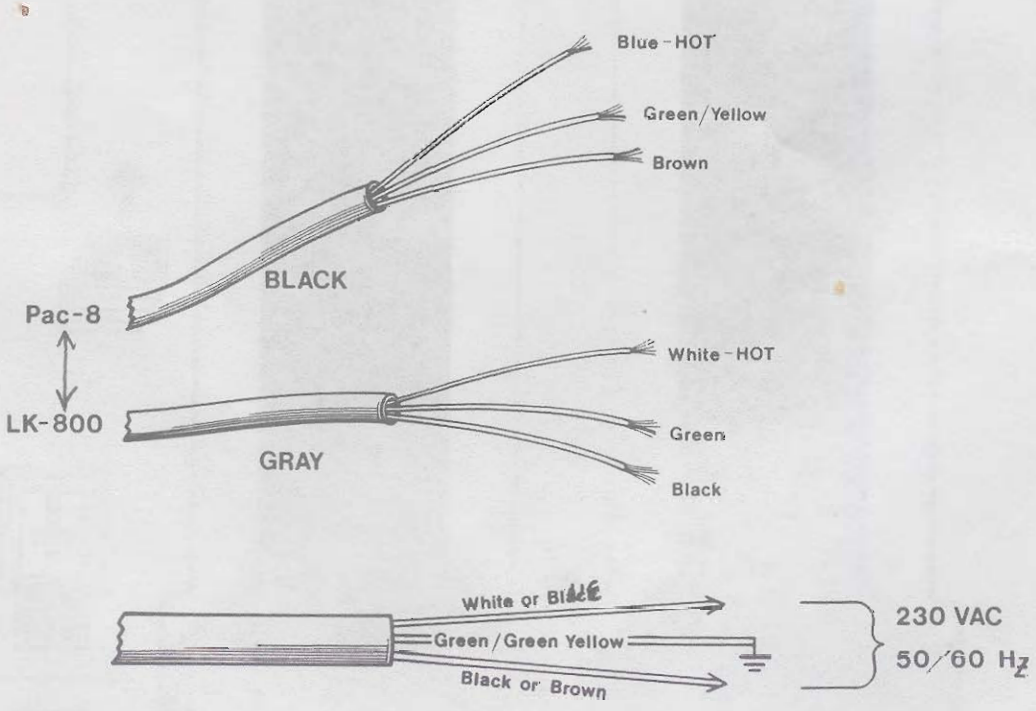
WARNING

DO NOT BLOW AIR DIRECTLY INTO THE FANS BLADES. USE A BRUSH IN CLEANING THE BLADES OF THE FAN.

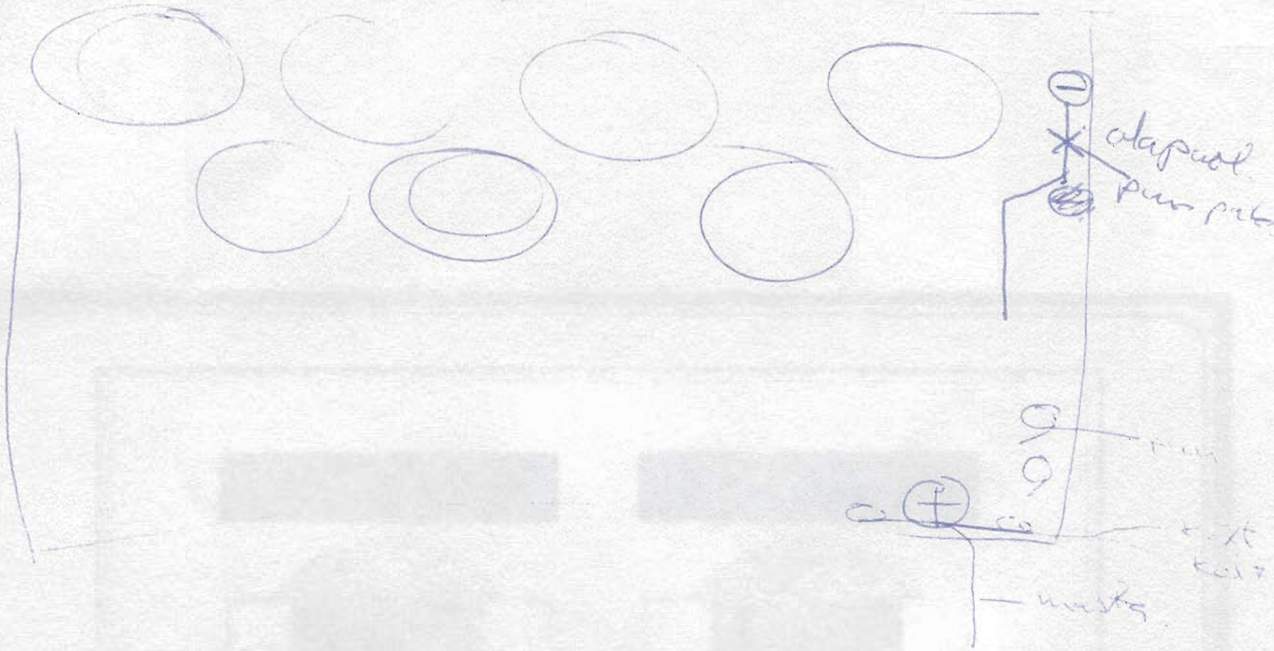
Tube Replacements — If it becomes necessary to replace the tubes in the LK-800A the same brand should be used. A new tube kit is available from Cary RF Design.

Trouble shooting — Careful consideration has been given to the design of the LK-800A to keep maintenance problems to a minimum. However, it is possible that some problem will arise which cannot be cured by tube substitution. If this occurs, we suggest that you contact your dealer's service department, describing your problem in detail. Include full information concerning external connections, control settings, associated equipment, antenna, being sure to indicate the serial number of the LK-800A. Do not return equipment to the factory without prior authorization.

Returning the LK-800A to the factory service — Obtain a return authorization from the customer service department. Cary RF Design will assume no responsibility if the transportation company refuses to pay a damage claim due to improper packing or lack of insurance. Be certain to remove the tubes prior to shipping and return the tubes in a separate carton.



ONE EACH AC CORD FROM PAC AND LK-800 DECK THERE MUST RUN IN PARALLEL WITH EACH LEG OF THE AC LINE



CARY
Audio Design
INC.

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Office of the United Nations High Commissioner for Refugees (UNHCR)
Visoko povjereništvo Ujedinjenih Naroda za izbjeglice

CARL-HEINZ IKÄHEIMO
RADIO OPERATOR

Mail address:
U N H C R
Kupska 2
1000 Zagreb
CROATIA

E-mail: CARL@ATSARAJEVO.automail.

UNHCR

Sarajevo 13/05/96

Dear John!

I got the original manual for you. I also will try to find information about some modifications what they have done in Finland.

Life is now OK here in Sarajevo

Please keep me informed if you are planning to be active also on e-mail.

My best regards 73/88's

Carl

LK-800A 9/18/96

Amp Repair Center
Knightdale, NC 919-266-7373
K4BWC, Bill Edwards

There is a thermostat under the jacket of the rear tube & when temp reaches 135° a gray line from TS to fan shorts out a 300 ohm 25W resistor & fan speeds up.

Bill suggests putting a switch on back panel & switching this line manually. He also said at 700 watts should never need the high speed. He also said the 300Ω resistor is mounted on the fan along with a 400 ohm resistor that switches in MOMENTARILY when amp is started, do not short out this resistor.

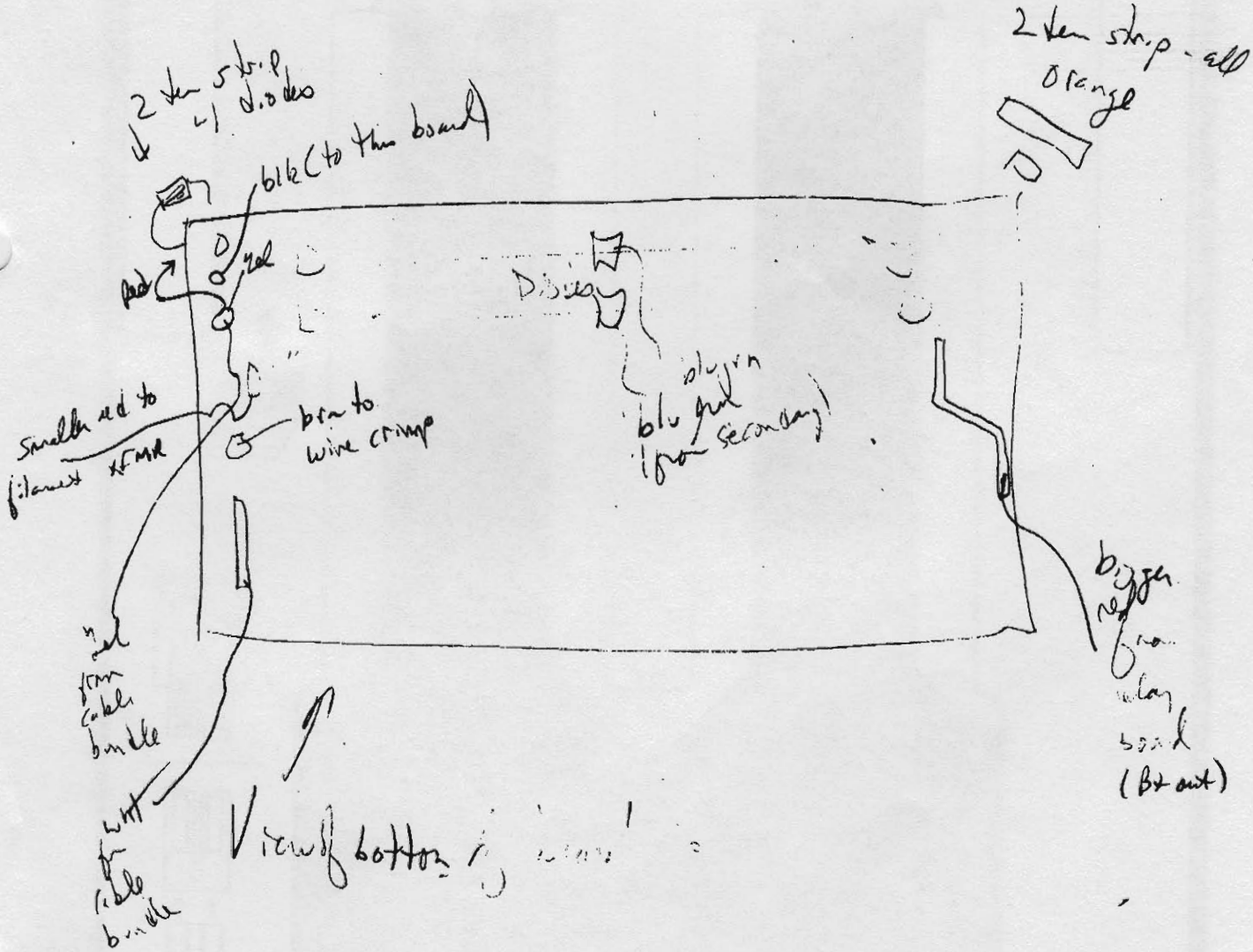
He said if one tube fails - take it out and run on the other 2.

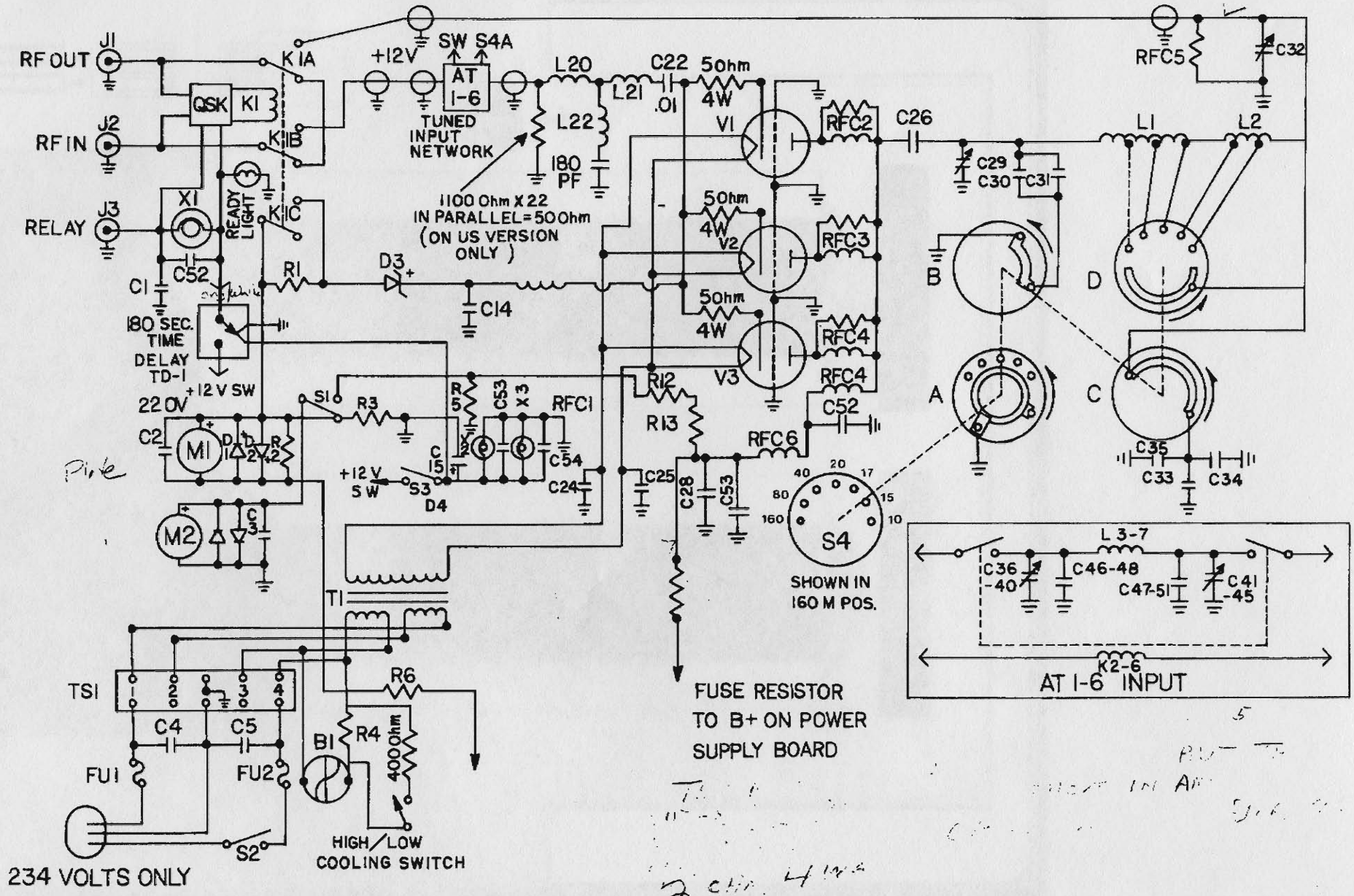
If 20M fails to work as happened once it must be the contacts on the band switch. No fixed Caps on 20M, just the variable Caps.

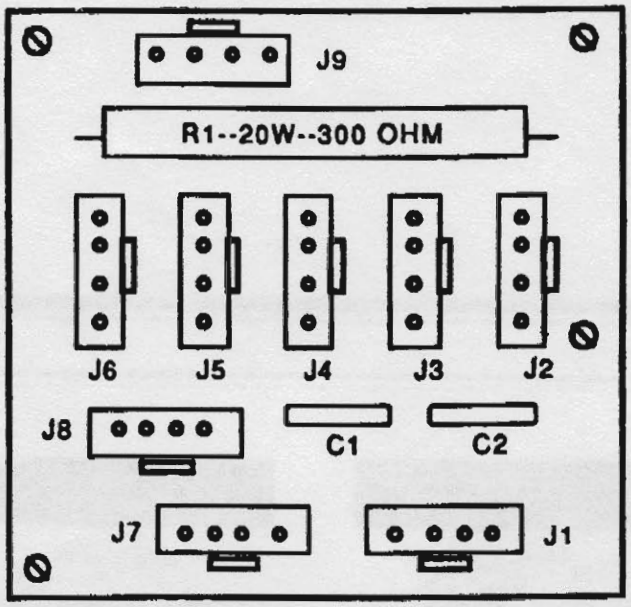
He is mailing a manual to me $15 VISA

Apparent Pwr Supply Failure

- 21 Oct 01
- Blows one of the primary fuses
- Transformer is good
- Removed one tube, but 4 pins are broken off
- One tube here is good - could not get the other to seat in the socket




J1
RF OUT
J2
RF IN
J3
RELAY
K1A
K1B
K1C
QSK
K1
X1
READY LIGHT
C1
C52
180 SEC. TIME DELAY TD-1
+12 V SW
220V
C2
M1
D1
D2
R2
M2
C3
S1
R3
+12V
SW S4A
AT 1-6
TUNED INPUT NETWORK
1100 Ohm X 22 IN PARALLEL = 50 Ohm (ON US VERSION ONLY)
L20
L21
L22
180 PF
C22
.01
50ohm 4W
V1
V2
V3
RFC2
RFC3
RFC4
C26
RFC5
C32
L1
L2
C29
C30
C31
B
D
A
C
C35
C33
C34
D3
C14
R1
R5
C53 x3
RFC1
C54
C24
+12 V SW
S3
D4
C15
R12
R13
RFC6
C25
C28
C53
S4
40
20
17
80
15
160
10
SHOWN IN 160 M POS.
L3-7
C36 -40
C46-48
C47-51
C41 -45
K2-6
AT 1-6 INPUT
T1
TS1
C4
C5
FU1
FU2
S2
234 VOLTS ONLY
B1
R4
400 Ohm
R6
HIGH/LOW COOLING SWITCH
FUSE RESISTOR TO B+ ON POWER SUPPLY BOARD



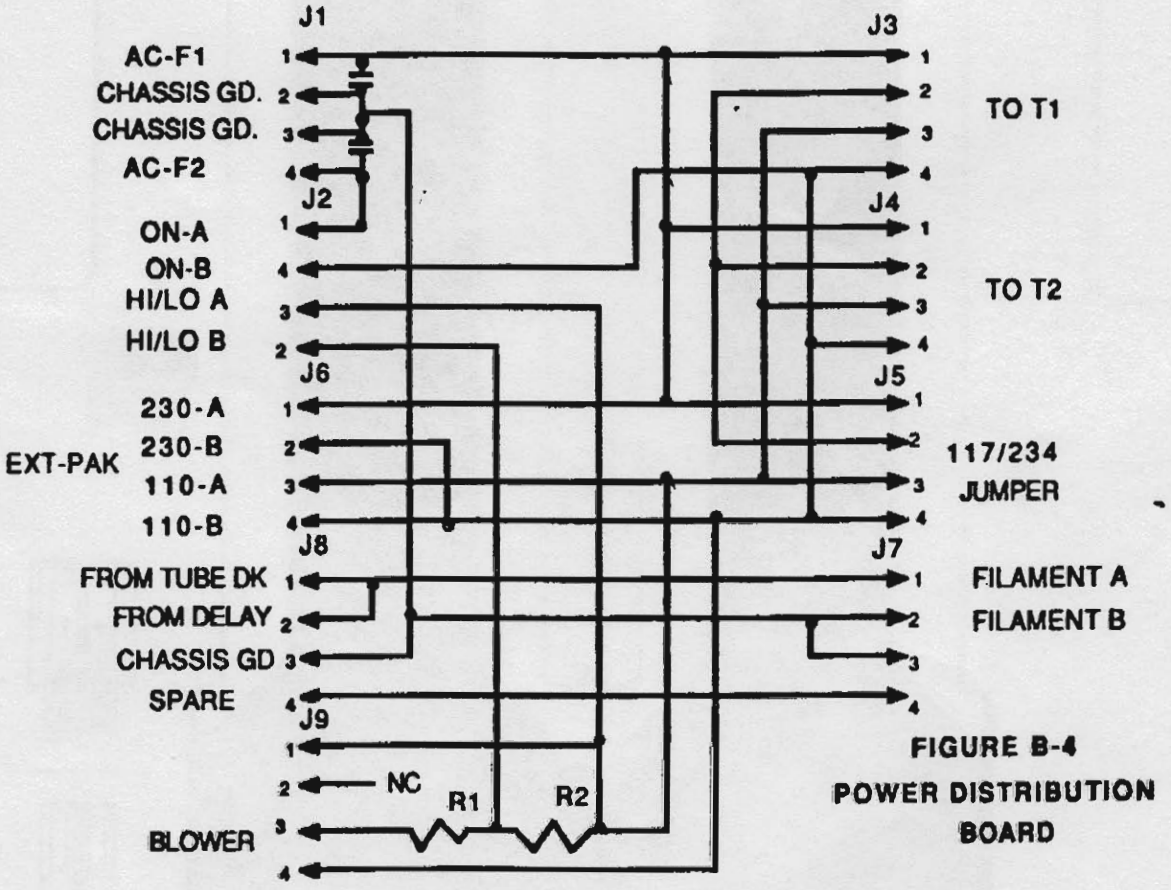


FIGURE B-4
POWER DISTRIBUTION BOARD

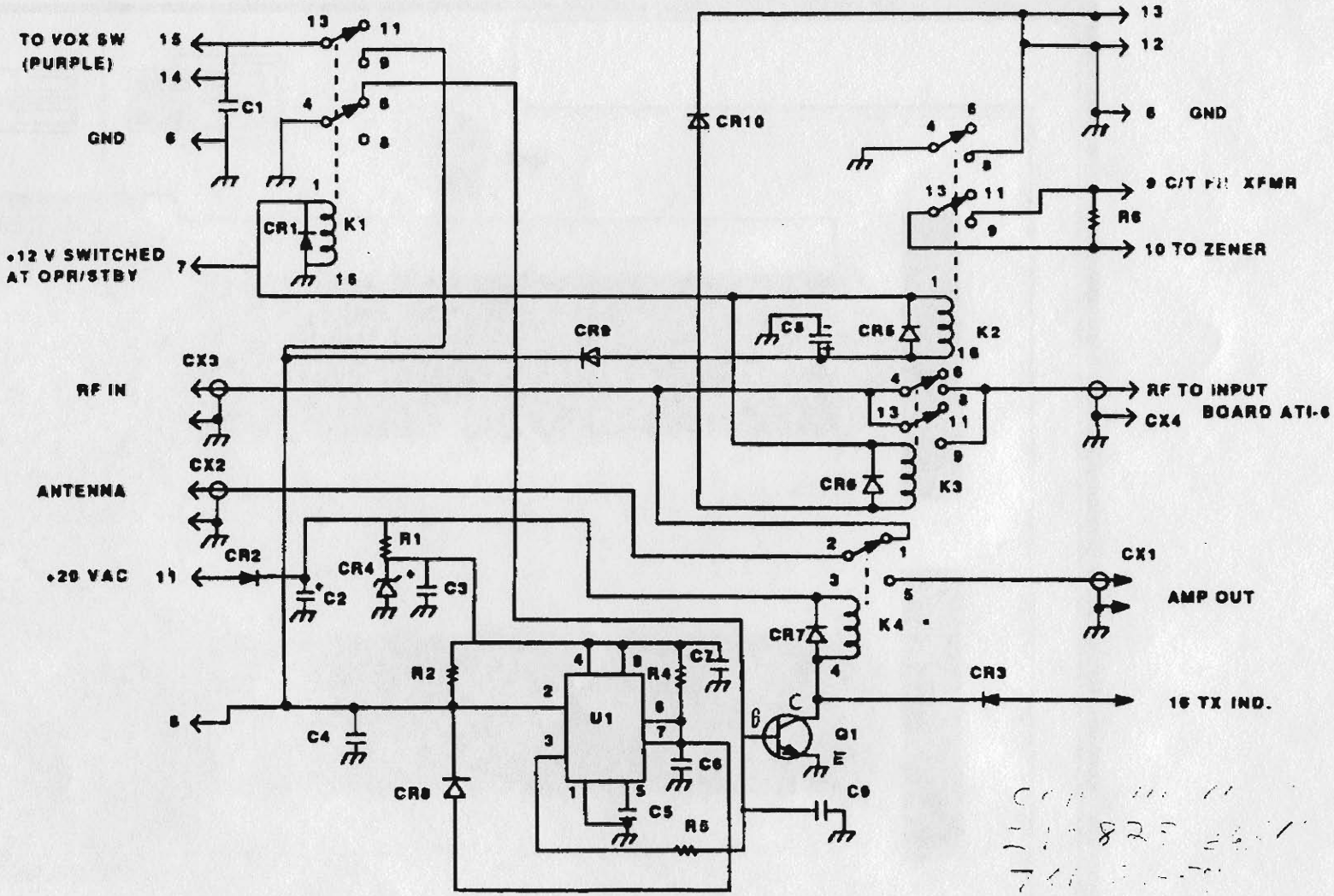
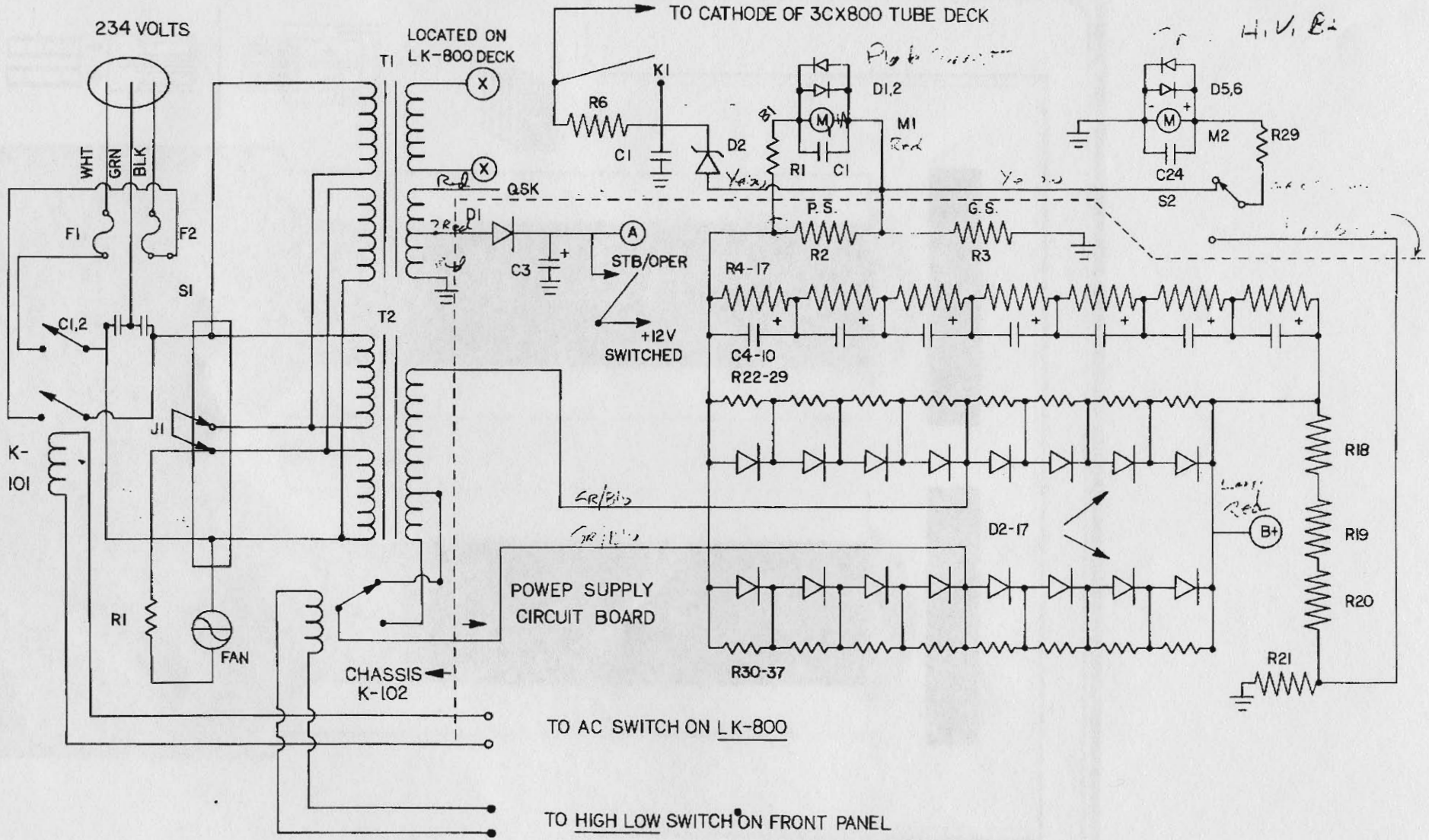


FIGURE B-6 QSK BOARD


234 VOLTS
WHT
GRN
BLK
F1
F2
S1
C1,2
K-
101
T1
LOCATED ON
LK-800 DECK
T2
J1
R1
FAN
CHASSIS
K-102
TO CATHODE OF 3CX800 TUBE DECK
K1
R6
C1
D2
D1
C3
QSK
STB/OPER
+12V
SWITCHED
D1,2
M1
R1
C1
P.S.
R2
G.S.
R3
R4-17
C4-10
R22-29
D2-17
D5,6
M2
R29
C24
S2
R18
R19
R20
R21
R30-37
B+
POWEP SUPPLY
CIRCUIT BOARD
TO AC SWITCH ON LK-800
TO HIGH LOW SWITCH ON FRONT PANEL

1-888-7373

OMEGA Electronics

P.O. BOX 579 (Mail Only))
101-D RAILROAD ST. (Shipping)
KNIGHTDALE, N.C. 27545-0579
(919) 266-7373 Fax: (919) 250-0073

Invoice

DATE	INVOICE #
10/20/97	10970019

BILL TO

JOHN THOMPSON
W1BIH
P.O. BOX 1
TORRINGTON, CT 06790

P.O. NO.	TERMS	PROJECT
	Visa/MC/Disc	

QUANTITY	DESCRIPTION	RATE	AMOUNT
6	RESISTOR, POWER, 10 WATT @ 2.2 OHM - BILL SAYS OK.	4.55	27.30
2	CHOKE, RF, 300 MA	4.75	9.50
3	RESISTOR, SHUNT, 0.15 5 WATT PREC.	5.95	17.85
1	SHIPPING & HANDLING US PRIORITY MAIL	4.50	4.50
	JOHN "C32" IS THE C2 CAP IN THE PI-NETWORK. I DID NOT SEND THEM. IF YOU STILL WANT THEM PLEASE LET ME KNOW.		
	4788 8504 0104 1296 04/99		

RF deck measures 8½"H x 15½"W x 17¼"D.
manual says it weighs 38 lbs.
PS deck measures 10½"H x 12½"W x 12"D
manual says wt. is 68 lbs.

73 AND THANKS FOR YOUR BUSINESS

Total $59.15

CARY LK-800A Serial # 902904
SAME AS OLD AMP LK-800A

Table 4-2
TROUBLE SHOOTING CHART(CONT'D)

SYMPTOM	CAUSE	REMEDY
Amplifier will not transmit	Improper tuning	Normal operation for ALO equipped amplifiers, the ALO stops amplifier operation when the amplifier is mistuned. Place exciter in receiver mode. Consult the Tuning Chart applicable to your model type and preset the Load and Tune controls as specified then tune the amplifier as directed in the tuning procedure
	RF input/output cables reversed	Refer to figure 2.8.1 for details
	QSK control lines incorrect	Refer to figure 2.6.1 for correct connection
	Low/No Drive	Transmitter has no output Wrong band selected on transmitter
	QSK/VOX switch in QSK position	Place QSK/VOX switch on the rear apron to VOX position
	Low power output	Wrong band selected on amplifier Check Tune and Load presets on tuning chart and reset if necessary One or more 3-500Z tubes weak or defective

Can't find any other switch on mine any

Date sent:	**Fri, 19 Dec 1997 03:20:12 +0200**
From:	**Jack Schuster <jsschuster@snet.net>**
Send reply to:	**jsschuster@snet.net**
Organization:	**None**
To:	**John Thompson <w1blh@compsol.net>**
Subject:	**[Fwd: Re: Amplifier Problem]**

Return-Path: <oh2mm@mikropc.fi>
Received: from laika.eunet.fi (laika.eunet.fi [192.26.119.1])
by daisy.snet.net (8.8.7/8.8.7/SNET-1.5) with ESMTP id SAA04270
for <jsschuster@snet.net>; Thu, 18 Dec 1997 18:05:05 -0500 (EST)
Received: from mikropc.fi (uucp@localhost) by laika.eunet.fi
(8.8.5/8.8.3) with UUCP id BAA15025 for jsschuster@snet.net; Fri, 19
Dec 1997 01:05:23 +0200 (EET) Received: by mikropc.fi (2.01/Intro)
via UUCP; Thu, 18 Dec 1997 23:12:45 EST
for jsschuster@snet.net
From: oh2mm@mikropc.fi (Ville Hiilesmaa)
Subject: Re: Amplifier Problem
Date: Thu, 18 Dec 1997 23:12:45 EST
Message-Id: <3499f43d.mikropc@mikropc.fi>
To: jsschuster@snet.net

Hi, Jack!
Thanks for your message!
Yes, I have had the same problem with that particular
resistor. I'm sure you are talking about the so-called
fuse resistor which is in series with the plate voltage
line. The resistor has a value of two (2) ohms. Its
purpose (according to the local amp guru's) is to protect
against high surge currents in the plate circuit. It protects
the diodes and also the tubes. I had that resistor burned a
couple of years ago and replaced it with another 2 ohm resistor
capable of taking the average plate current. I guess a 2 ohm
4 watt resistor is appropriate. I tried to find another "fuse"
resistor for replacement but never found one. The local guru's
advised me to use any 2 ohm 4 watt resistor which I did and the
amp is now working OK.
I guess it's advisable to have a few of these resistors
handy. If you burn one, replace it, if you burn another one
think about why was it burned...

It's always advisable to connect the RF deck ONLY of the Gary (LK-800) with the plate power supply disconnected to warm up the tubes and let them dry before letting the hihg voltage enter the plate circuitry.

Please give my best to Dan and his XYL Maryann while in Florida. Please tell'em that I really appreciated their hospitality while staying in their place a copule of years ago.

Good luck in the contest! Hope you make the #1 agn!
73! Ville

NOTES JACK MADD
RE. AMP

them, couldn't find any reason - worked FB with new resistors. They went a third time. While I admit I was sick of working on it - I was wondering why they were going up in smoke, and I agreed to try one more time to figure it out. I found that the antenna relay contacts were intermittent and when they didn't make good contact on XMIT, there was no load and the resistors went. I could in this case - remove the relay, put an ohm-meter across the contacts, push the armature so they closed, and see that intermittently there was no continuity!

It's possible that the antenna relay we just replaced in the LK800 is acting up the same way. One thing that always bothered me was I believe we only measured about 12V driving that relay, but there was a 24V coil that we removed originally and replaced it with another 24V coil relay. If it really has 12V by design, that relay isn't going to pull in as firmly as it ought to. It might be interesting to see what that amp repair guy from Amp Supply says about it, but my suggestion is to bring an open frame 12V coil replacement with you, with 10AMP contacts, just in case! Time to get rolling here so 73 161 - best to Mary. By the way, we stopped in a beautiful town in Ga one night, Thomasville Ga.

Parasitic suppressor
Use 100 ohm 2W. metal film resistor and choke of 3 turns of #18 nichrome or 5.5 wire with a 7 mm inside dia.
per ARRL HB - do not let resistor go thru the center of coil.