January 26, 1970

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-1

SBM-220-1 Modification Kit

A few model SB-220 Linear Amplifier owners may encounter some unusual operating conditions, usually in RTTY service, which cause the zener diode [PN 56-75] in the bias supply to fail. This failure is evidenced by an idling plate current of around .3 amperes instead of the normal .09 to .12 amperes. The following step-by-step instructions are for replacement of this part with a 10-watt zener diode.

Parts List

Part No:	Parts per kit	Description
56-82	1	1N3996A Zener Diode, 5.1volt, 10 watt, with mounting hardware
344-2	1	length of black stranded wire
352-13	1	silicone grease pod
597-503	1	Instruction sheet

Step-By-Step Assembly

References to a "page" are to the Model SB-220 Assembly Manual dated 11-28-69.

Note: [S-] with a number, such as [S-3], means to solder the connection. The number tells how many wires are at the connection.

[ ] Refer to pictorial 4-20 [Fold-out from page 56] in your SB-220 Assembly Manual and remove the amplifier from its cabinet. Be sure to place a book under the amplifier.

[ ] Remove the top rear plate cover and the perforated top cover from the amplifier. Do not remove the screw from the phenolic spacer on the under side of the top cover.

[ ] Unsolder, remove and discard the zener diode and its two heat sinks from the circuit board. Clear the solder from the two holes from which the zener diode leads were removed.

[ ] Refer to figure 1 and make a cut in the fish paper along the edge of the capacitor bank bracket for at least a distance of 1 3/4" down from the top edge of the paper. Make another cut horizontally to the left [front] edge of the paper.

[ ] Remove the fish paper outlined by the cuts. Use a screwdriver, or similar object, to scrape clean the area around the hole in the RF shield exposed by the removed fish paper.

[ ] Remove the solder lug from the zener diode package. Bend up the end of the lug having the smaller hole [90 deg right angle].

WARNING: When you handle silicone grease in the following steps, make sure you do not get any in your eyes.

[ ] Cut the side of the silicone grease pod with a knife point so the grease can be squeezed out.

[ ] Remove the two mica washers from the zener diode package. Squeeze some silicone grease out of the pod and, with your finger, liberally coat both sides of each mica washer with the grease.

[ ] Refer to figure 2 and mount the zener diode. Make sure the nylon bushing surrounds the threaded stud of the diode as it passes through the RF shield and that the two mica washers are mounted against each side of the RF shield. Position the solder lug [with the attached wire] so it points down toward the chassis. Thighten the hardware snugly, but do not overtighten.

[ ] Use an ohmmeter to make sure there is infinity reading between the body of the zener diode and the RF shield. If only a fraction of an ohm resistance is obtained, the body of the diode [or the solder lug] is probably touching the RF shield. Bend the solder lug to clear the RF shield, or remove and reinstall the diode as necessary.

[ ] From the foil side of the circuit board, push the end of the 3" wire coming from the solder lug into the lower of the two holes vacated by the removed zener diode [S-1]. This hole is screened on the other side of the circuit board for the banded end of the diode.

[ ] Connect one end of the remaining 3" wire to the terminal extending from the center of the new zener diode [S-1]. Push the other end of this wire into the upper zener diode hole in the circuit board[S-1].

[ ] Trim off any excess wire lengths from the diode holes on the component side of the circuit board.

[ ] Carefully inspect the zener diode to make sure that it does not tough any metal other than the mounting hardware and the two connecting wires. The capacitor bracket may be bent slightly toward the rear panel, if necessary.

[ ] Replace the top rear cover and the perforated top cover on the amplifier. Use the sheet metal screws previously removed.

[ ] Refer to page 64 and replace the amplifier in its cabinet.

This completes the installation of the 10-watt zener diode.

TEST

1. Reinstall the ampliefier in your station.

2. Place the mode switch at CW/TUNE and turn the amplifier on.

3. Turn the exciter MIC/CW level fully counterclockwise.

4. Turn the exciter to tune to close the amplifier antenna relay.

5. The plate meter should read from .09 to .12 amperes.

February 11, 1971

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-2

= Arcing on Circuit Board

Under certain conditions it is possible arcing will occur between D-7 and D-14 outer foil pad and the adjacent metal spacer. A permanent change is being made to an insulated spacer at these two locations. The other two spacers must remain metal to provide grounding for the circuit board. This change should be made on all units serviced to avoid future trouble.

Change: PN 225-71 Metal Spacer to PN 255-42 Phenolic Spacer

April 18, 1972

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-3

Quieter Fan Motor

This Bulletin is obsolete and replaced by Bulletin No: SB-220-4

May 3, 1974

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-4

Fan and Motor Replacement

When ordering fan motor, be sure to order by part number from -08 level and above manuals. Fan motor [PN 420-86] and new fan blade [PN 266-296] must be ordered together because previous fan blade will not fit new motor. Follow the installation instructions given in most current manual.

September 11, 1974

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-5

Arcing Between Tuning Capacitor [C55} and Plate Coil Bracket

The spacing between the tuning capacitor [C55] and plate coil bracket has decreased due to a change in shape of the tuning capacitor. The smaller spacing has resulted in arcing between the bracket and capacitor. To prevent this arcing, the following change is being made:

Change: Plate Coil Bracket

From: PN 204-1042 To: PN 204-2102

The 204-1042 type bracket can be used if 1/8" of metal is removed from the gap of the bracket.

September 18, 1974

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-6

Mounting "Temple" Brand Electrolytic Capacitors

The "Temple" brand of 200 uF electrolytic capacitors used in this kit have a rim at the terminal end. Therefore, when capacitors of this type are installed, it will be necessary to mount them so that the rim will protrube from the capacitor mounting insulator.

February 11, 1976

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-7

Front Panel Will Not Fit

Some 26-145 air variable capacitors were supplied with oversize mounting feet. When installed, these capacitors will prevent the front panel from fitting flush against the chassis sheet metal.

These capacitors should be replaced with PN 26-145 capacitors whose mounting feet are not more that 1/2" long.

March 24, 1976
SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-8

Replacement Motor Mounting Hardware

Replacement fan motors in parts stock may not have the 8-32 mounting nuts supplied. Use PN 252-4 nuts, or the old hardware if the nuts are not supplied with the replacement part.

May 20, 1976
SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-9

Low Power Output or Open Filaments

Because of the high current flowing in the filament circuit of the 3-500Z triode, any low resistance due to a poor solder connection can result in relatively large voltage drops and heat being developed at the poor solder connection. After some period of operation the output power of the amplifier may begin to fall off, or the filament circuit may open.

In complaints of low power, check the filament circuit for solder joints that look "cold", and resolder as necessary; a .012 ohm resistance will result in over a 0.5V drop in filament voltage, with consequent losses in filament emission.

In cases of open tube filaments, pull the tube and resolder the tube filament pins, then recheck tube filament continuity. This may save a customer the cost of a new 3-500Z.

February 21, 1977
SB-220 Bulletin No:

2 KW Linear Amplifier SB-220-10

Grid Meter Pegs

++++Information not available at this time++++

March 1, 1977

SSB-220 Bulletin No:
2 KW Linear Amplifier SB-220-11

Band Switch Arc-Over

++++Information not available at this time++++

November 17, 1977

SSB-220 Bulletin No:
2 KW Linear Amplifier SB-220-12

Fan Motor [PN 420-86] Noisy

++++Information not available at this time++++

February 17, 1978

SB-220 Bulletin No:
2 KW LinearAmplifier SB-220-13

Quieter Fan Motor [PN 420-601]

A quieter fan motor is now available for this kit. This motor will replace PN 420-86.

The necessary mounting hardware and an instruction sheet are included with the PN 420-601 motor.

April 14, 1978

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-14

Short Motor Leads

The leads of the fan motor [PN 420-601] currently being shipped are too short to reach lug AW. The lead length is sufficient to reach lug 2 of terminal strip AE.

When replacing the older motor [PN 420-86], unsolder one motor lead at

lug 2 at terminal strip AE. Clip the other motor lead [to lug AW] about 5 inches from motor. Install new motor and reconnect one lead to terminal strip AE, lug 2.

Shorten remaining motor lead as necessary to connect to existing lead going to lug AW. Use wire nut [PN 432-199] for the connection. Refer to the excerpt from the manual insert [PN 591-2585].

April 17, 1978

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-15

Low Output Power on 10 Meters

Check for three [3] turns of wire, instead of four [4] turns, on the parasitic suppressors, PC1 and PC2 [PN45-53].

If the coils have four [4] turns, they will be resonant at 10 meters, causing low power output on this band. Replace the suppressor, or remove one [1] turn as necessary.

Also, when loading on 10 meters, start with the load control at '4'.

May 15, 1979

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-16

Sheet Metal Screws Will Not Tighten

If the perforated covers will not secure properly due to enlarged sheet metal holes, install a 6-32 speednut [PN 252-22] over the lip and surrounding hold. The 6-32 X 3/8" sheet metal screw [PN 250-8] will then tighten securely.

Using the speednuts does not noticeably degrade the products' shielding capabilities.

July 31, 1979

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-17

Ordering New Fan Motor [PN 420-601] or Tuning Capacitor [PN 26-164]

When the customer needs a replacement motor or tuning capacitor for the

older motor [PN 420-86] or capacitor [PN 26-131], he must order using the old part number in order to receive instructions and additional hardware to mount these new parts.

July 31, 1979

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-18

Presetting of Load Control on 10 Meters

When tuning up on 10 meters, preset the load control to about 7-8. In some units, full power output cannot be obtained at the '4' setting in the tune-up procedure in the manual. Make the load control setting correction to Bulletin No: SB-200-15.

July 31, 1979

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-19

Filament Transformers Keep Burning Out on 220 Volts

If the filament transformers keep buring out on 220 volts, and are okay on 120 volts, check for an open primary on the high-voltage transformer, T1. Since all primaries are cross connected, this will cause high current on one side of filament transformer, T2, primary, burning it out. Isolate all primaries and ohm out.

January 21, 1980

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-20

Linear's Relay Damages ICOM-701's

++++Information not available at this time++++

January 21, 1980

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-21

Apparent Self-Oscillation When Used with Kenwood Transceivers

++++Information not available at this time++++

March 7, 1980

SB-220 Bulletin No:

2 KW Linear Amplifier SB-220-22

Interfacing the Linear to Kenwood Exciters

++++Information not available at this time++++

September 2, 1980

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-23

RFC 6 Overheats and Circuit Breakers Trip

++++Information not available at this time++++

November 30, 1982

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-24

Breakdown of C56

[[See SB-220-25]]

++++Information not available at this time++++

June 13, 1983

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-25

Part # 21-792 for C56 Not Available

[[[Supercedes SB-220-24]]]

++++Information not available at this time++++

April 6, 1984

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-26

Interfacing The Linear To Kenwood Exciters

The ALC voltage to Kenwood transceivers and transmitters should not exceed -8 volts. To Ensure the proper voltage to the Kenwood, add:

An 8 volt zener diode [PN 56-621] across the ALC connector onthe back of the amplifier. Connect the banded end of the diode to the ground lug.

Adding a control in the ALC line (as instructed in previous bulletins) to control the level of ALC voltage doesn't always work. This control loads the ALC line so much that very little ALC voltage is developed, resulting in the exiter overdriving the linear, In units which have the control installed and the operation is still unsatisfactory, return the ALC circuit to its original design and install the zener diode.

April 26, 1985

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-27

T2 Overheats And Fails When Operating On 220 Volt Line

When the linear amplifier is wired for 220 volt AC line operation, and the contacts on SW2 [PN 61-45] or a high voltage transformer winding opens, excessive current will flow through the primary of low voltage transformer T2 [PN 54-238],
causing it to fail. To prevent this failure, the black-green lead and the black-yellow lead of T2 are lifted and connected together with a wire nut.

To do this, refer to the drawing at the right and remove the black-green lead at lug 3 of terminal strip AE [the lead from T2 at grommet AK] and the black-yellow lead at lug 2 of SW2. Connect these wires together with a wire nut [PN 432-199].

Make this wiring change on units you receive for service which are wired for 220 volt AC operation. Let the customer know that this wiring change has been made. If he wants to operate on 120 volts AC, he'll have to reconnect these wires as shown in the assembly manual.

October 25, 1985

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-28

PN 21-79 Capacitor at C7 Unavailable

The .001 uF, 6000 volt ceramic capacitor used at C7 is not available from our vendors. Until an exact replacement capacitor is obtained from other sources, two 5000 pF, 3000 volt ceramic capacitors [PN 21-116] will be connected in series at C7. A bulletin will be issued to notify you when the [PN 21-79] capacitors are once again available.

December 23, 1986

SB-220 Bulletin No:

L5 Mounting Clip Won't Fit Hole In Coil Shield Panel

The 80 meter input coil [PN 40-1012] at L5 now supplied by our vendor has a coil clip that is too large in diameter to fit the mounting hole in the coil shield panel. The coil clip on the new coil is .417" in diameter; the old clip is .406" in diameter. This difference is less than 1/64 of an inch. The .406" diameter clip is no longer being manufactured.

The new coil can be installed in either of two ways:

1) Remove the coil clip from the old coil being replaced and use this clip to replace the clip on the new coil. The old and new coils have the same diameter coil form.

2) If the old clip isn't available, enlarge the mounting hole in the coil shield panel about 1/64" larger in diameter.

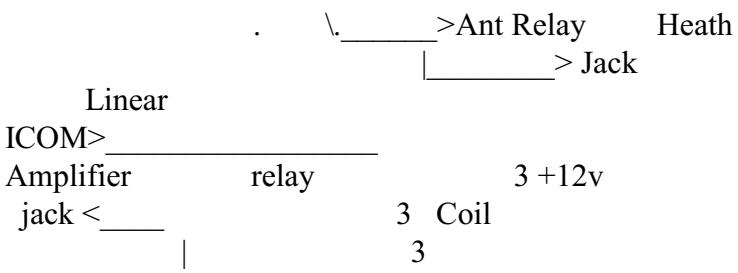
When the new [PN 40-1012] coils are placed in Parts Replacement stock, customers who order the new coil will also be sent an instruction sheet [PN 597-4650] to tell them to use the clip from the old coil or to enlarge the mounting hole.

January 16, 1987

SB-220 Bulletin No:
2 KW Linear Amplifier SB-220-30

ICOM Transmitter Anternna Relay Contacts Fail When Connected To Antenna Relay Jack On Heath Linear Ampliers

The 120 VDC at the Linear Amplifier antenna jack exceeds the 24 VDC maximum rating of the antenna relay contacts in the ICOM transmitter. This excess voltage causes the relay contacts in the ICOM transmitter to weld together. To prevent this, connect the ICOM transmitter to the Linear Amplifier using a 12 VDC as shown in the drawing below.



((Sorry for the poor drawing - just another reason to get the scanner working))

A relay box for this purpose is available for ICOM America, Inc.

Thats everything I hold up to 1989 that covers the SB-220 . Enjoy!

---

73 de Joe W7LPF/4 [NNN0KUU]
QWCA - SOWP - NCVA - FISTS - RCC
Gordonsville, Va 22942 [Orange Co]