

# **Harbach “Soft Key” (sk-220) Installation Instructions for the Heathkit SB-220**

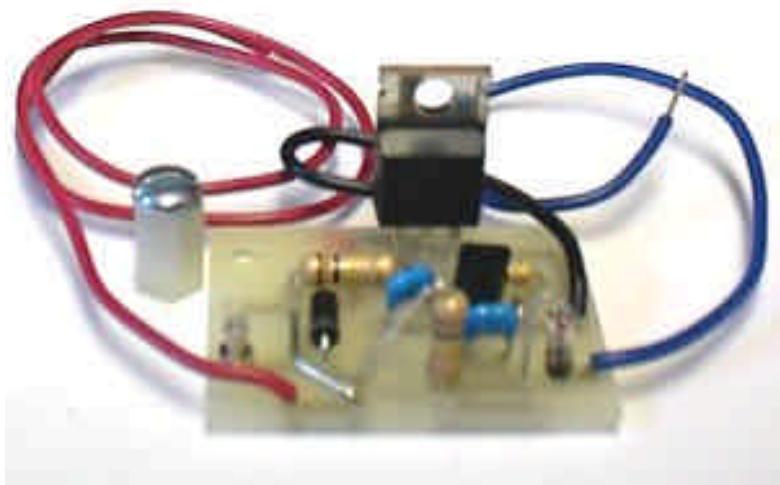


**Based on an install by  
W4HDM**

Installation & Photos by W4HDM  
Instructions from <http://www.harbachelectronics.com/>

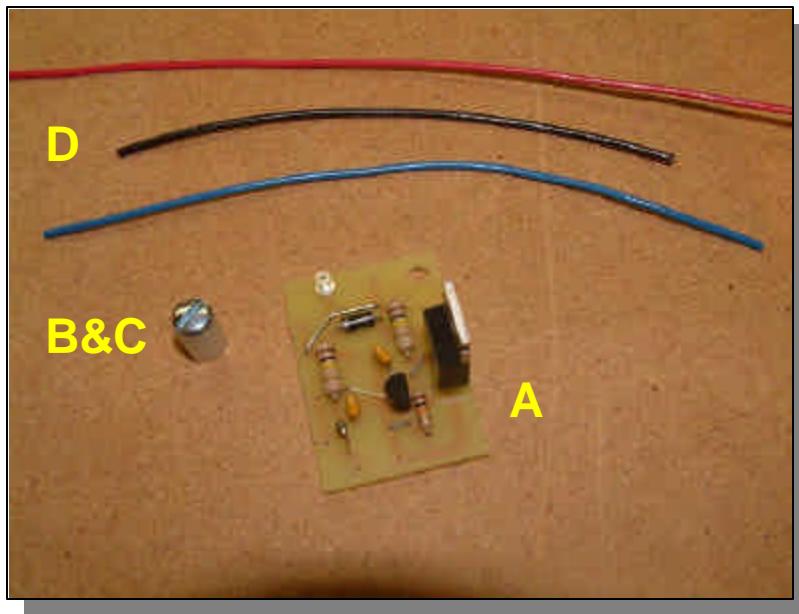
## SK-220 SOFT-KEY MODULE

The SK-220 is an easy to install interface module which allows your transceiver to key the SB-220 seeing only 0.7 volts at 1.5 mA. The original SB-220 circuit had +120 volts on the keying line.



# Parts

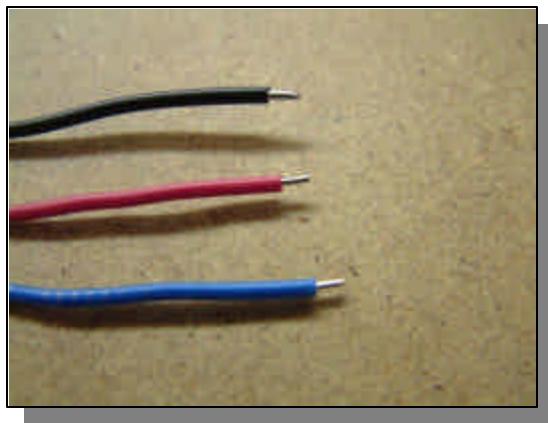
- A. (1) SK-220 "Soft Key" Circuit Board Assembly
- B. (1) 6-32 x ¼" Round Head Screw
- C. (1) Nylon Threaded Spacer
- D. (1) Each - Red, Dark Blue and Black Wires



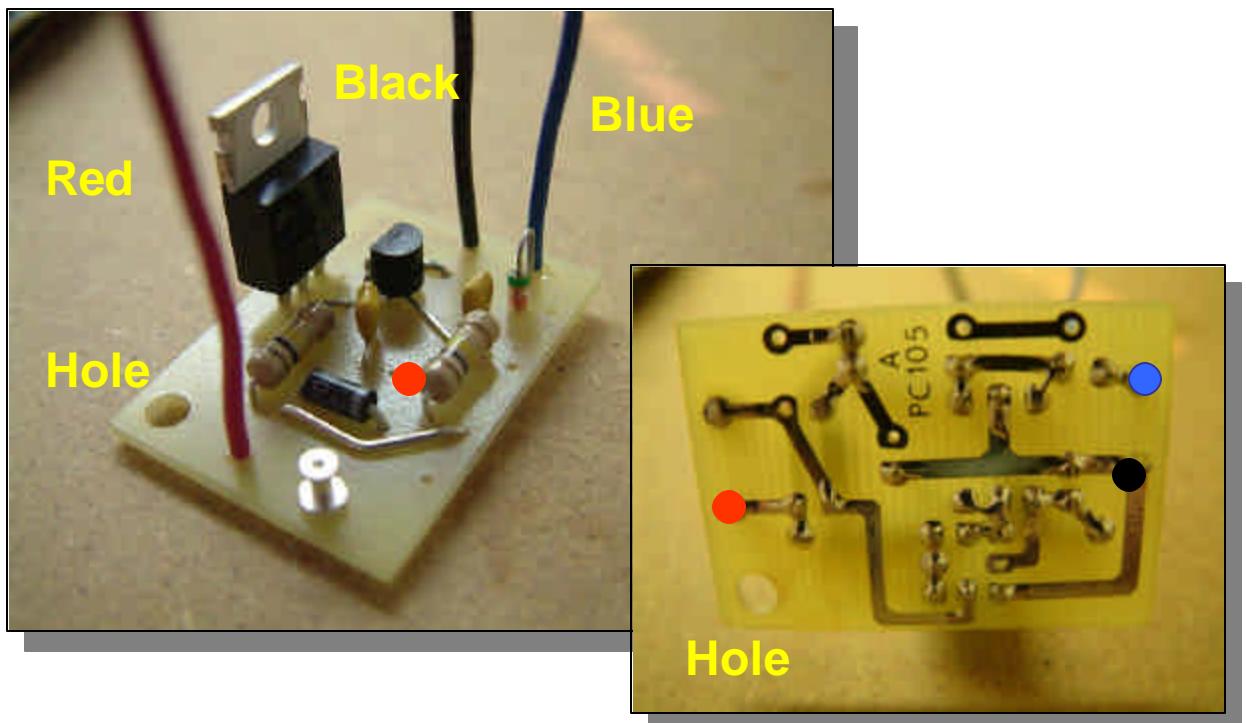
# Tools

Straight Head Screwdriver (long)  
Wire Cutters/Stripper  
¼" Socket w/Ratchet and Extension  
Soldering Iron  
Solder  
Flux  
Book

Your Soft Key board may not have the wires connected when you receive it. If not, strip about 1/8<sup>th</sup> of an inch back on each wire (both ends)



Insert wires from the top of the board and solder from the bottom. Dip the tips in flux and get a little solder on the tip of the iron. Then briefly touch the iron tip to the end of the wire sticking through the board. Do not overheat.

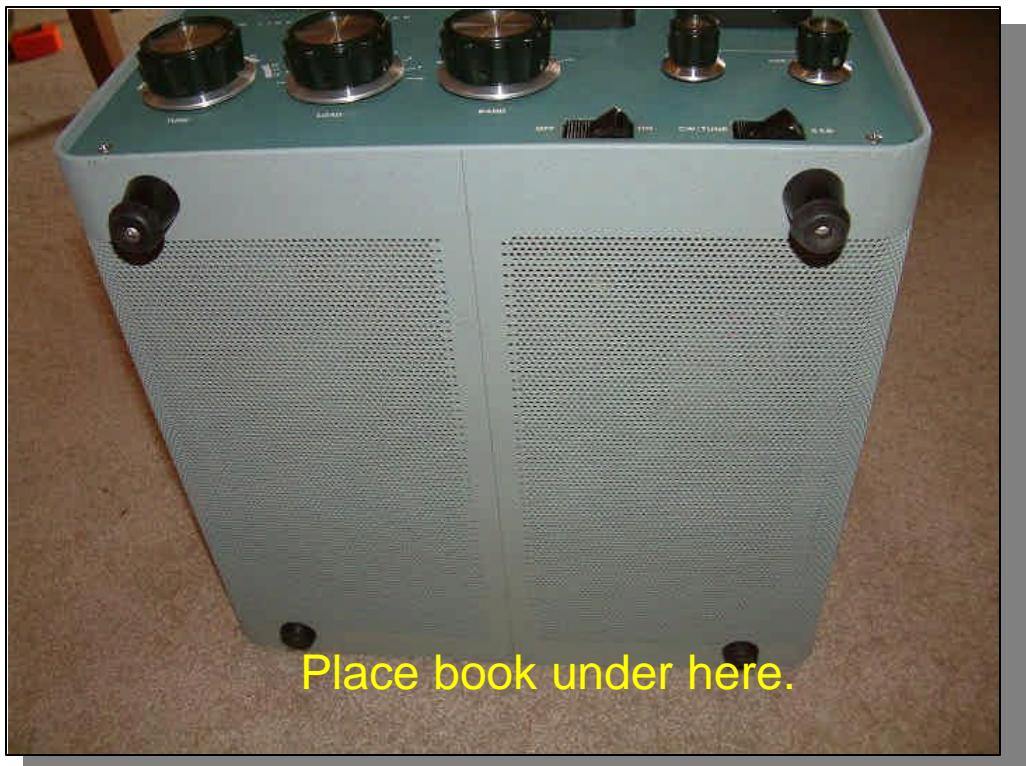


# Instructions

The following instructions are from Harbach Electronics website.  
Any of my comments will be in **red** text.

To start the installation, read these instructions very carefully.

Now unplug the amplifier  
and remove any input, output and control cables that may be  
connected to the back of the  
amplifier. Place the amplifier on a book, front panel up, and  
remove the bottom screws holding the feet and case in place.  
**This removes any pressure from the screws caused by the  
weight of the amp, if you do not do this it will cause difficulty, if  
not damage, while removing the screws.**



W4HDM "SoftKey" Install

Lift the case up and remove it from the amplifier.

Place the amplifier on the bench with the front panel facing you.



Leave this screw, it does not prevent the cover from coming off. It holds the shaft that shuts the unit down if the cover is removed while powered up. Your amp may not have this, but it should.

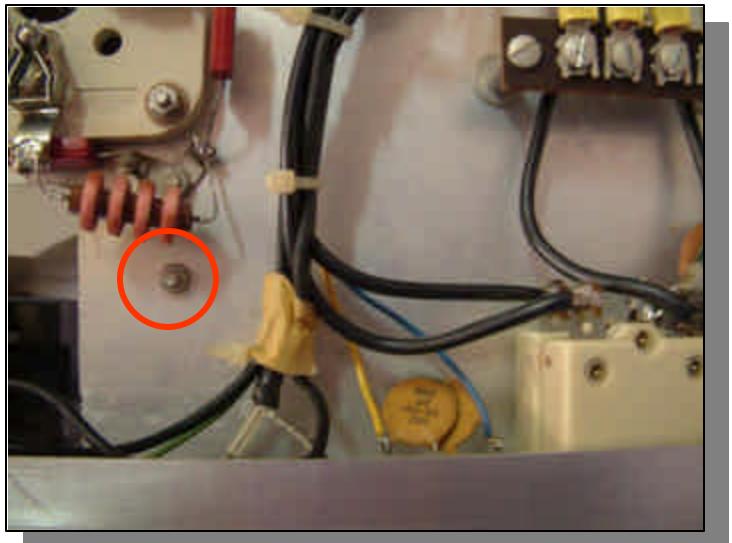
Remove the perforated top shield.

Rotate the amplifier onto its side with the transformer down (it is more stable this way).

**CAUTION: Do not handle the amp by the aluminum rails on the bottom side of the amp! They bend easily.**

You are now ready to proceed with the installation.

From the bottom of the chassis, locate the 6-32 nut (**1/4"**) that is between the tube socket and the rear panel. It secures a screw that holds the RF shield (above the chassis) to the main chassis.



Locate the screw in the tube compartment that is held in place by this nut (it is near the corner of this compartment at the rear). Loosen this screw and remove the nut and lock washer from the underside of the chassis.

Screw the threaded nylon spacer from the SK-220 kit onto the screw (freed in the previous step) and tighten well without stripping the threads in the spacer.

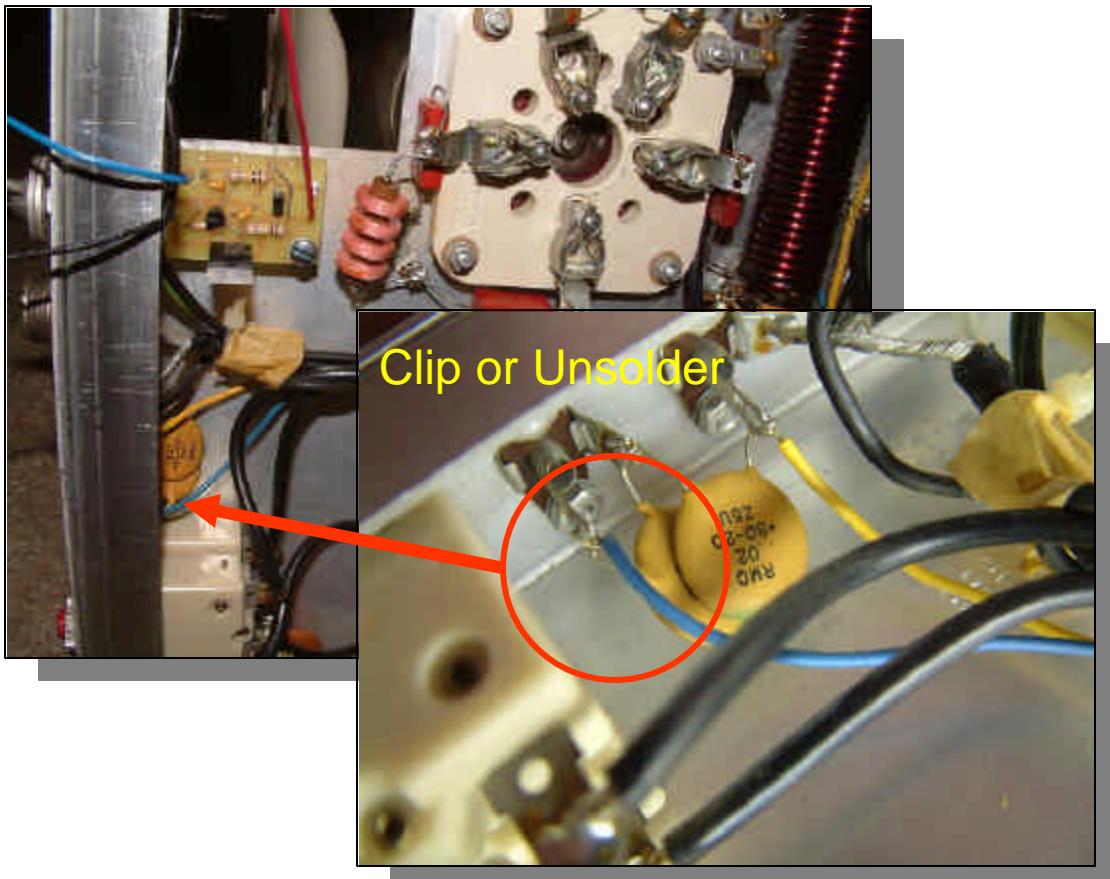
Note: Before this step remove the screw that came with the spacer before tightening it down on the existing screw or it will not tighten down.



Harbach's instructions say to mount the unit next.

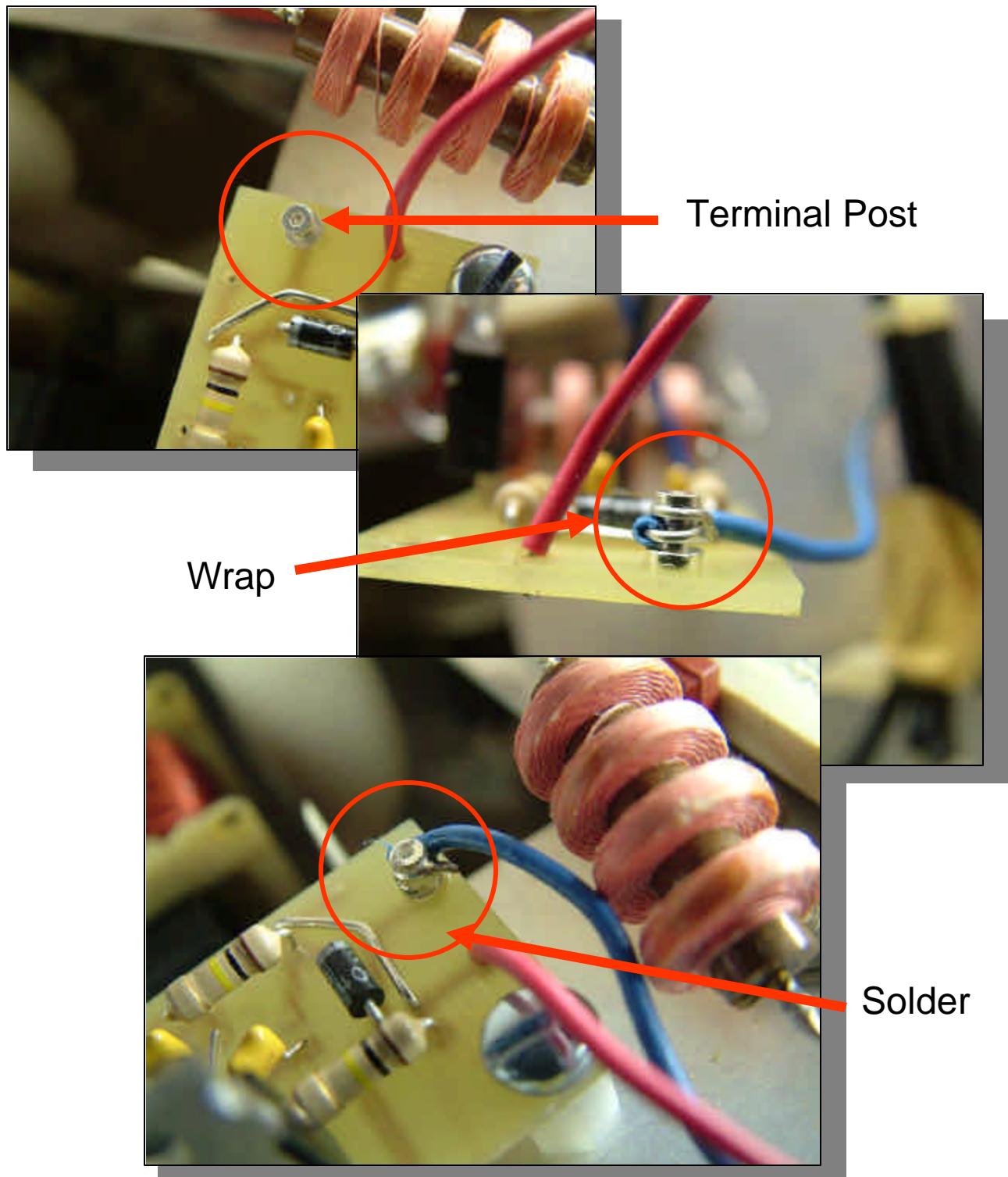
Rather than work in a tight space I have changed  
The order slightly. Hold off on mounting the unit.

Unsolder (or cut very near the solder connection) the **BLUE** wire that  
goes to the center pin  
of the antenna relay jack on the back panel.



Strip about  $\frac{1}{4}$ " of insulation from this wire. Pass the wire under the  
nearby wire harness,  
bringing it over near the SK-220 circuit board.

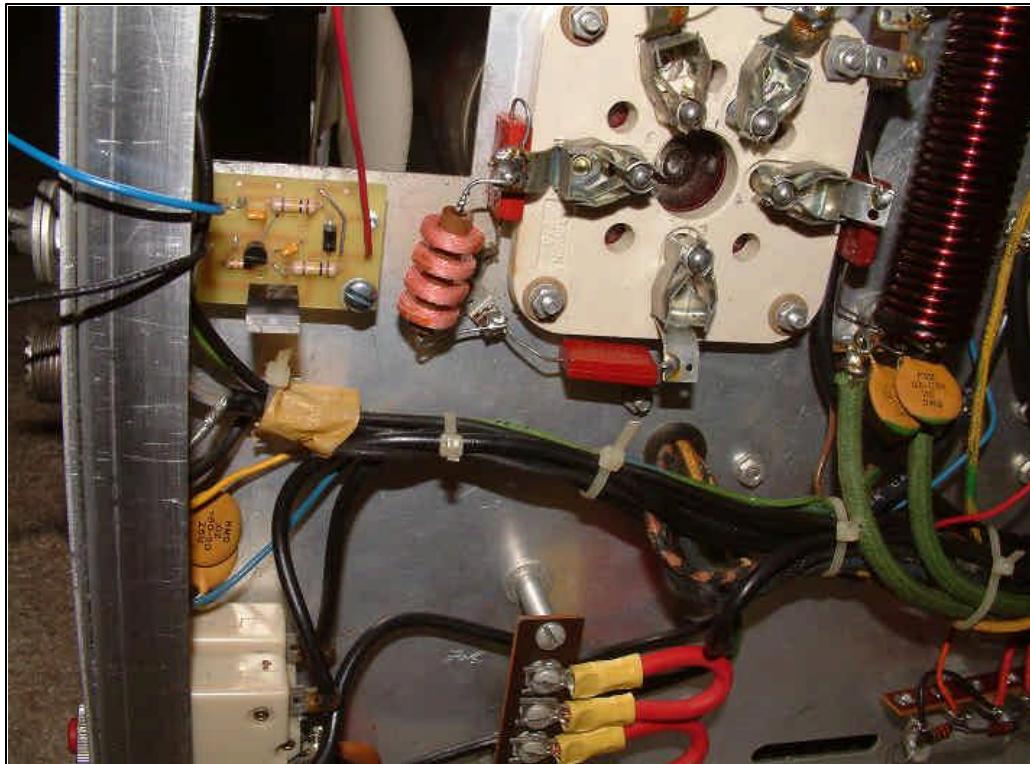
Wrap and solder this **BLUE** wire to the terminal post  
on the SK-220 circuit board.



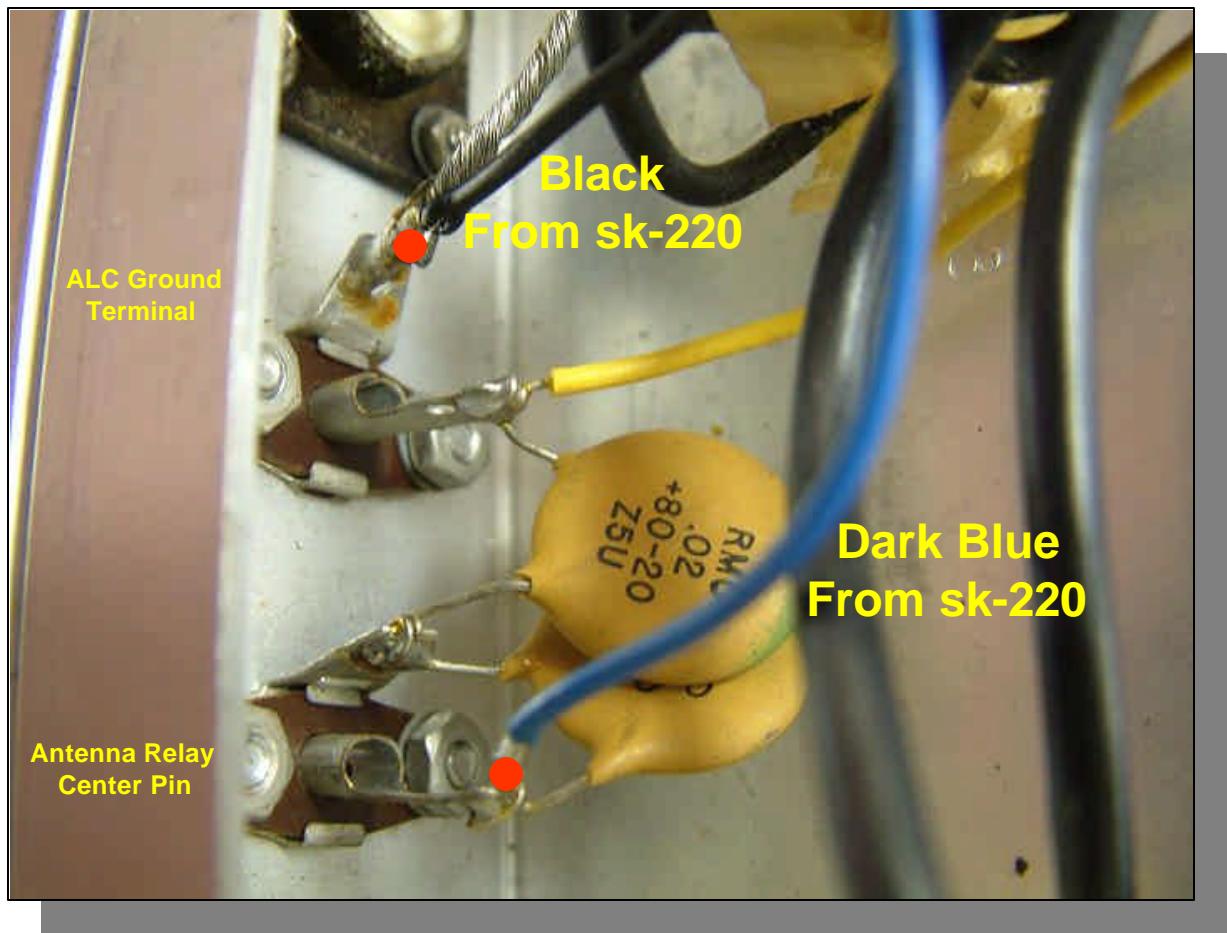
Mount the SK-220 circuit board onto the nylon spacer using the supplied 6-32 x ¼" screw.

Note: You may need to use the existing washer that was with the old nut, before it will tighten down.

Position the board so that it is parallel with the fan cut out edge and the large transistor is away from the cut out edge.



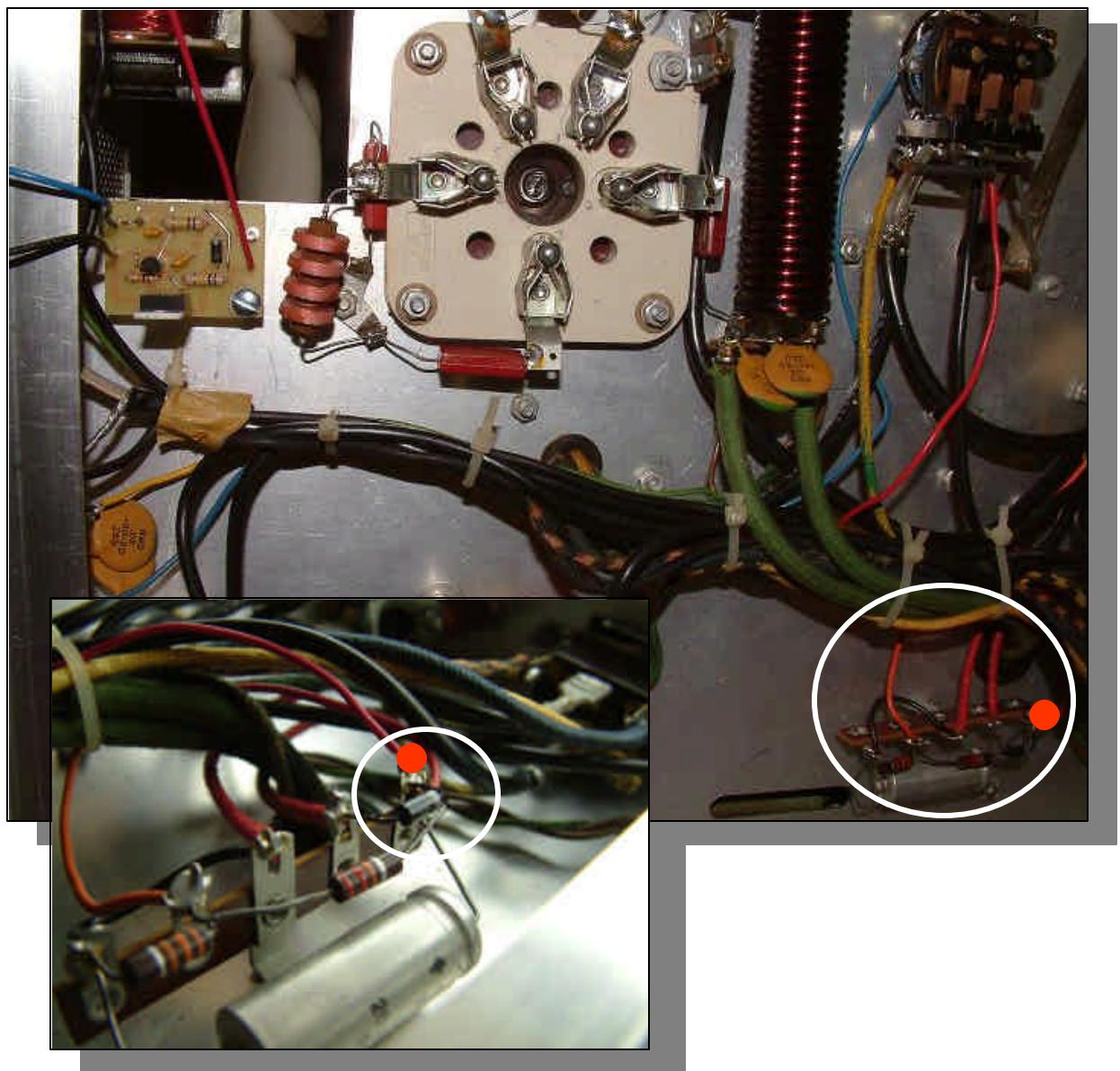
Pass the **BLACK** wire from the SK-220 circuit board under the wire harness and solder it to the ground lug on the ALC jack on the rear panel.



Pass the **DARK BLUE** wire from the SK-220 circuit board under the wire harness and solder it to the center pin of the antenna relay jack on the rear panel.

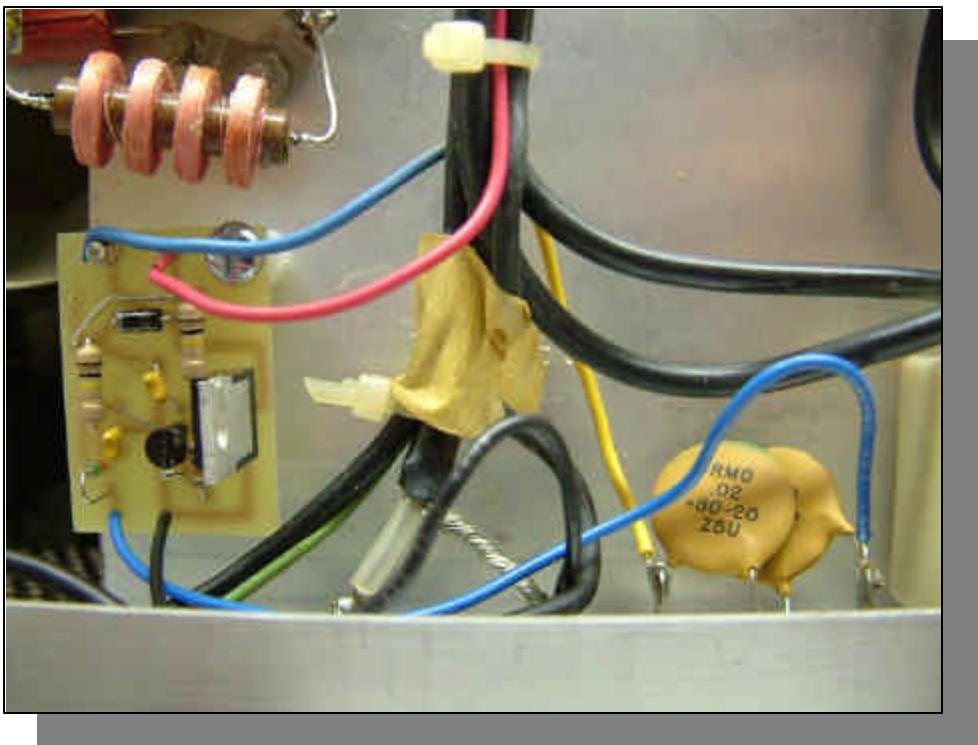
Pass the **RED** wire from the SK-220 circuit board under all of the wiring toward the front of the chassis to the terminal strip that holds the +110 VDC supply. **Run it through existing tie straps if possible for a neater job.**

Solder this **RED** wire to the terminal closest to the front panel. Also connected to this terminal are the "+" lead of a 20mF capacitor, a 22K resistor, a diode lead and a red wire going to the antenna relay.

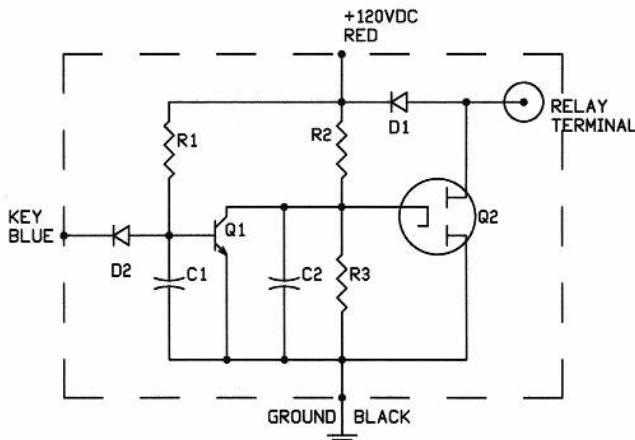


Dress all wires close to the chassis.  
Replace the perforated cover and top rear plate cover. Reinstall the 15 sheet metal screws holding these pieces in place. **DO NOT** over tighten these screws, as it is fairly easy to strip the screw threads in the aluminum underneath.  
Use the book to hold the amplifier while you reinstall the case and feet. Note: You may as well order the replacement feet (BF-101) from Harbach while you are at it (if you do not mind that they are brown) they are inexpensive and will not mash like the originals.

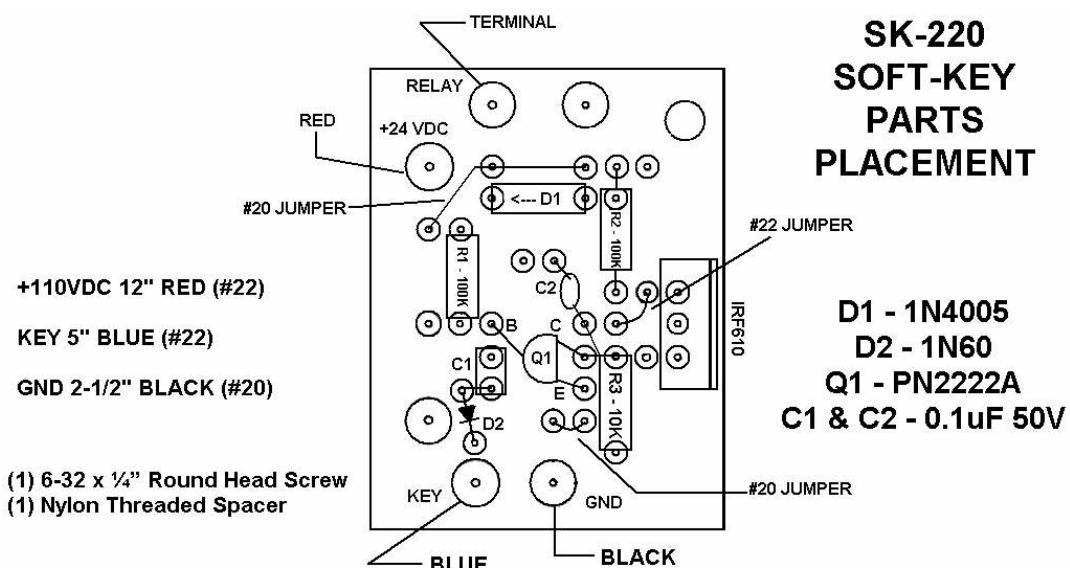
This completes the installation of the SK-220 "Soft Key" module. You may not **SEE** any difference in the operation of your exciter or amplifier, but you will know that you have reduced the stress on the exciter's keying relay by many orders of magnitude.



# SK-220 "SOFT KEY" MODULE



R1 & R2 100KW ½W 5%  
 R3 10KW ¼W 5%  
 C1 & C2 0.1mF 50VDC CERAMIC  
 D1 1N4005 (1A 600 PIV)  
 D2 1N60 GERMANIUM  
 Q1 MPS2222  
 Q2 IRF610 HEXFET (N-CHANNEL)



## SK-220 SOFT-KEY PARTS PLACEMENT

D1 - 1N4005  
 D2 - 1N60  
 Q1 - PN2222A  
 C1 & C2 - 0.1uF 50V

## HARBACH ELECTRONICS

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