

SK-220 SOFT KEY v3.1 ASSEMBLY & INSTALLATION INSTRUCTIONS

WARNING: Voltages inside the amplifier CAN & WILL KILL YOU! You MUST know how to work around HIGH VOLTAGE safely. If you do not, get assistance from someone who does. You MUST also be able to read your specific amplifier schematic and understand the design, theory and wiring of your amplifier to properly perform this upgrade.

SK-220 SOFT-KEY ASSEMBLY

- () **Read, re-read and fully understand these instructions prior to beginning this upgrade.** Make sure to perform the steps in the order they are listed. Also, be sure to label wires as they are disconnected from various points inside the amplifier. This will help when the time comes to re-attach the wires that will be disconnected during installation of the kit.
- () Go through the Bill of Materials (BOM) and compare that list with the parts in the kit to make sure all parts are present. If you are missing any parts, please contact Harbach Electronics, LLC.
- () Assemble the SK-220 according to the parts layout pictorial (top view of circuit board). There is no right or wrong assembly sequence, just be sure to observe correct polarity of diodes D1-D3 and the correct orientation of Q1-Q2.
- () After assembly, the connection wires can be soldered to the circuit board. Strip approximately ¼" of insulation from both ends of each wire and tin both ends. Solder one end of each wire to the SK-220 as shown on the parts layout pictorial.

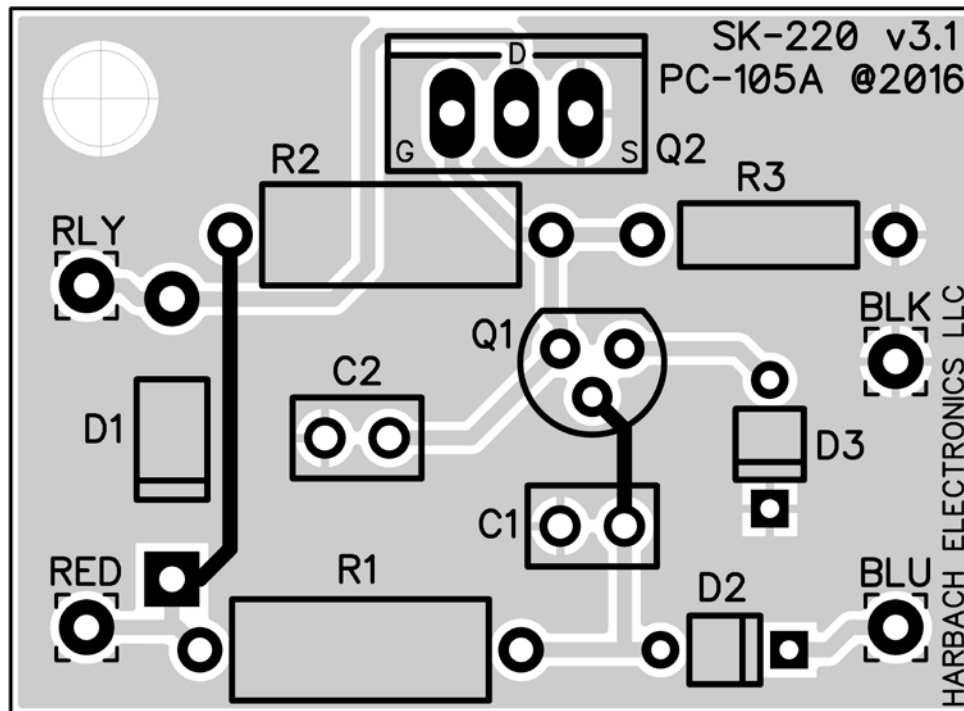
SK-220 SOFT-KEY INSTALLATION

- () Unplug the amplifier power cord from the AC mains and let any high voltage stored in the electrolytic capacitors bleed down. Verify the HV has bled down as shown on the HV meter. 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. Lift the case up and remove it from the amplifier. Place the amplifier on the bench with the front panel facing you. Remove the perforated top shield. Rotate the amplifier onto its side with the transformer down (it is more stable this way).
- () **Be sure that all high voltage has been properly bled to ground before removing any covers or putting your hands inside the amplifier. You CAN BE KILLED by the high voltages inside this equipment!**
- () From the bottom of the chassis, locate the #6-32 nut that is between the tube socket and the rear panel. This nut 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 without stripping the threads in the spacer.
- () Mount the assembled SK-220 onto the nylon spacer using the supplied #6-32x¼" screw. 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.

- () 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 ¼" of insulation from this wire. Pass the wire under the nearby wire harness, bringing it over near the SK-220 circuit board.
- () Solder the **BLUE** wire to the wire pad labeled **RLY** on the circuit board.
- () 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. Solder this **RED** wire to the terminal closest to the front panel. Also connected to this terminal are the "+" lead of a 20µF capacitor, a 22KΩ 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.

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 circuitry.

SK-220 SOFT-KEY PCB PARTS LAYOUT (PCB-105A)



SK-220 BILL OF MATERIALS (BOM)

Verification	Part Number	Quantity	Description	Designation
[]	PCB-105A	1	SK-220 Soft-Key PCB v3.1	N/A
[]	CAP-106	2	0.1 μ F 50VDC Capacitor	C1, C2
[]	DIO-101	1	1N4005 Diode	D1
[]	DIO-105	1	1N60A Diode	D2
[]	DIO-106	1	1N4148 Diode	D3
[]	SMI-101	1	PN2222A NPN Transistor	Q1
[]	SMI-102	1	IRF610 N-Channel MOSFET	Q2
[]	RES-116	2	100K Ω 1/2W Resistor	R1, R2
[]	RES-115	1	10K Ω 1/4W Resistor	R3
[]	SCR-105	1	#6-32 x 1/4" Steel Machine Screw	N/A
[]	SPA-102	1	#6-32 1/4" x 3/8" Nylon Hex Spacer	N/A
[]	WIR-106	5"	#20 Stranded Black Wire	N/A
[]	WIR-107	7"	#22 Stranded Blue Wire	N/A
[]	WIR-108	12"	#22 Stranded Red Wire	N/A

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