

# BRIAN (SM) Construction Manual Addendum 1

This document is an addendum to the BRIAN (SM) Construction Manual. Its purpose is to document suggested changes to the construction of a BRIAN(SM) Allstar Node using a later version of the Baofeng BF888S PC board as shown in Figures 1 and 2.

Figure 1 shows the bottom view of the new PC board. It is labeled LT-666-LN-VER9 with a date of 2018-3-13. Comparing it to the board shown in the BRIAN Construction Manual reveals that it still has the same overall mechanical shape and configuration. However, the board wiring layout has been redone but (good news) the location of the pads we use to attach the jumper wires to connect to the BRIAN (SM) motherboard have not changed.

The change that affects BRIAN is that the frequency adjustment device is no longer a capacitor. It is now a potentiometer and has been moved to a new location on the board. Rather than trimming the frequency with a small variable capacitor, a potentiometer is now used to control the bias voltage to a variable capacitance diode to trim the crystal oscillator frequency. The bad news is the FREQ ADJUST clearance hole in the motherboard provided to adjust the old variable capacitor is no longer useable to adjust the potentiometer in a new location on the board.

Figure 2 shows the top view of the board. The board wiring layout has obviously been redone. Most notable is that the RDA AT1846S IC has been moved and provisions made for it to fit into an isolated cavity in the die cast chassis. This is why the frequency adjustment potentiometer is moved to a new location.

In order to accommodate the new FREQ ADJUST clearance hole location requirement, I investigated the possibility of drilling a new hole in the motherboard.

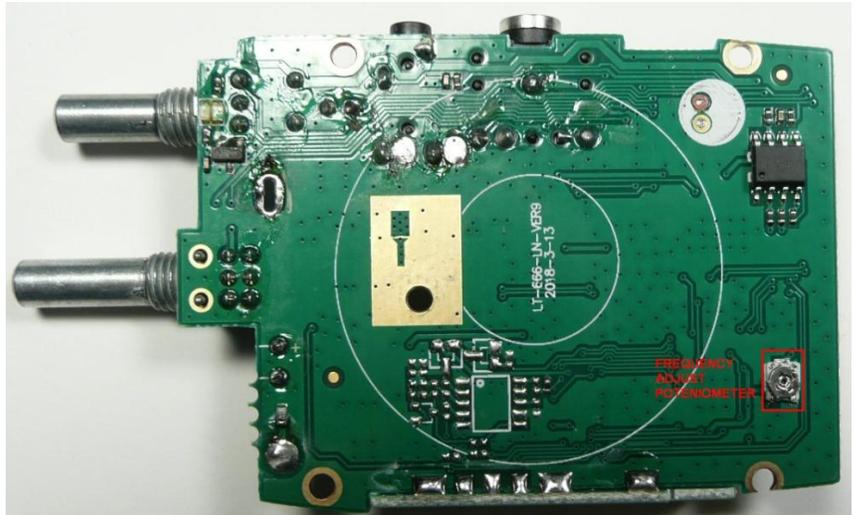


Figure 1 - VER9 BF888S Board Bottom View

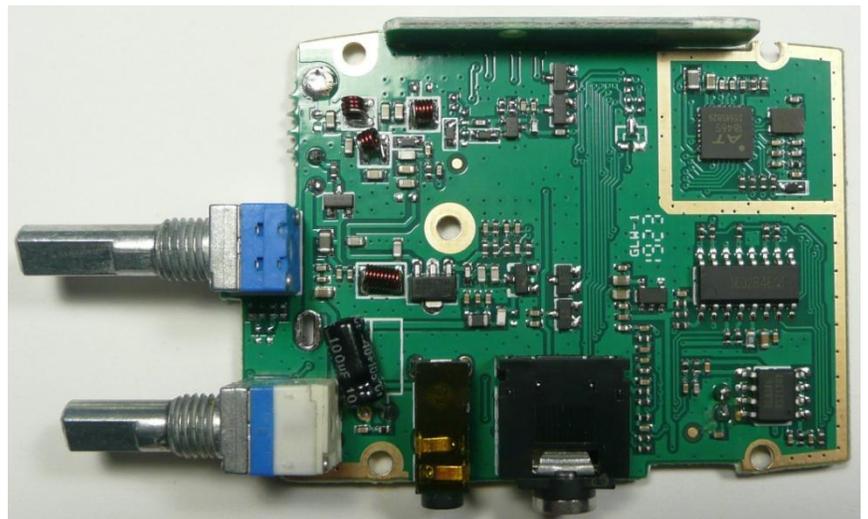


Figure 2 - VER9 BF888S Board Top View

Figure 3 shows the BRIAN motherboard with a new hole for access to the frequency adjustment potentiometer (red outline on board). It was drilled to a 1/8" diameter using successively larger drills starting with a small 1/32" drill. Locating this hole directly above the potentiometer is not possible because the potentiometer is located directly below a PC board trace (see arrow in Figure 3). The result is the adjustment tool (jewelers screwdriver) must be held at a slant angle while performing the adjustment. It can be done but it is difficult. So I looked more closely at the alternative of ensuring the frequency is correct before modifying the BF888S PC board.

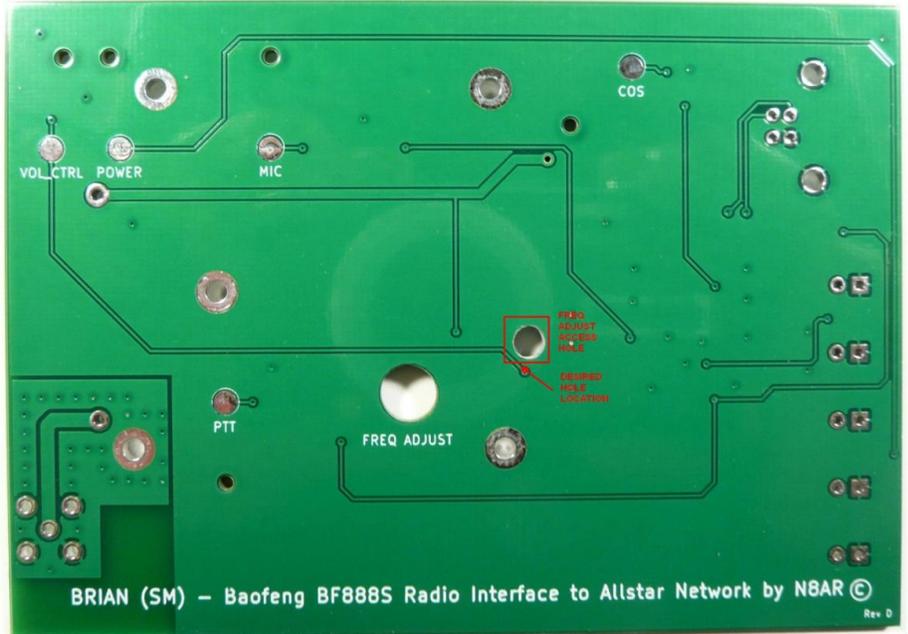


Figure 3 - BRIAN motherboard with new frequency adjustment hole

I observed that the potentiometer on the board I modified was fairly hard to turn so I think that, if caution is observed, its position would not be easily accidentally moved while working with the board to add the jumper wires and install it on the BRIAN motherboard. Therefore, rather than add a hole to the motherboard, I recommend that the frequency be checked after initial programming and before disassembling the BF888S.

If the frequency needs to be trimmed, do it after the casting containing the board is removed from the plastic case and the speaker is disconnected. A BF888S is shown disassembled to this level in Figure 4.

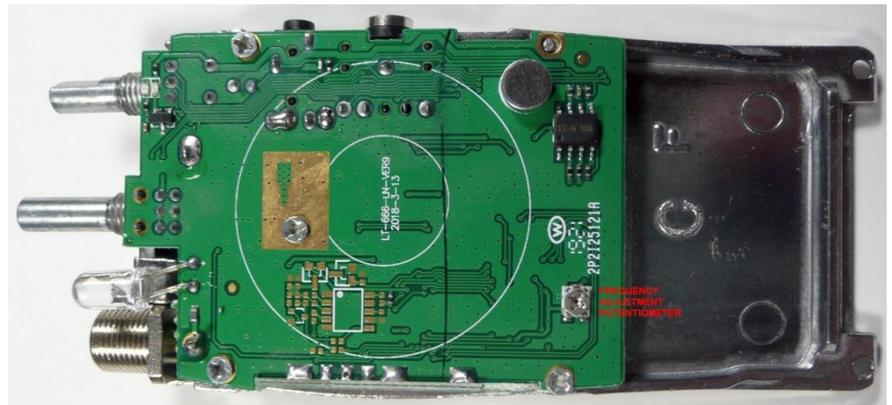


Figure 4 - BF888S disassembled enough to allow the frequency to be adjusted

The battery can be manually held in place while the unit is turned on, PTT activated and the frequency adjusted. NOTE: Be sure to install the antenna before transmitting.

Figure 5 shows another potential problem that I discovered. In the new board layout, I noticed that the PC trace distributing power to the BF888S board is now routed closer to the two mounting holes nearest the external speaker jack. This trace is insulated from the conductive aluminum spacers by the thin epoxy solder mask applied when the bare PC board is fabricated. The 3/16" diameter, 1/4" long spacers we use to mount the BF888S board to the BRIAN motherboard could possibly short to this trace if the epoxy solder mask was missing or failed.

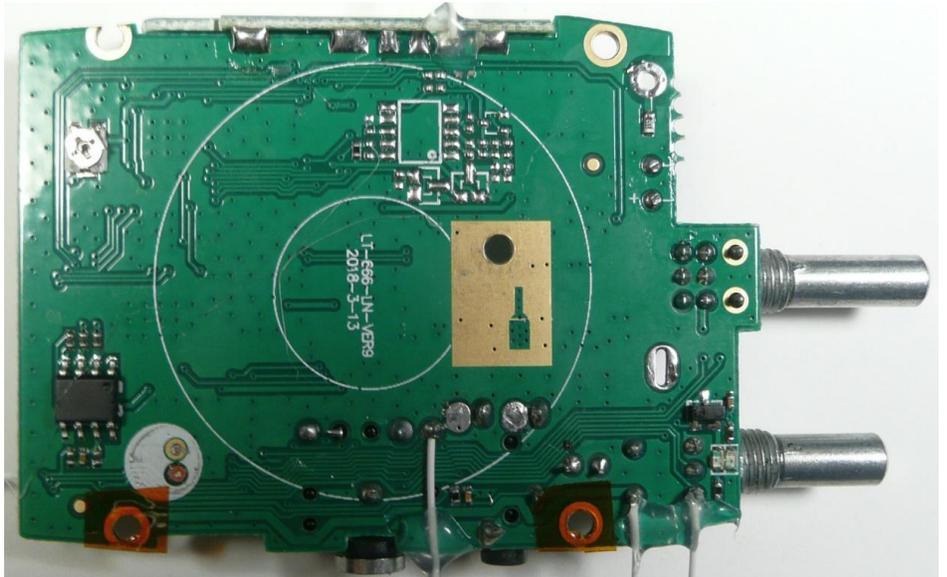


Figure 5 - Kapton tape installed at two mounting holes

Therefore, I suggest that small pieces of Kapton tape be applied to these two mounting points as shown in Figure 5. I will add a small piece of tape to the BRIAN (SM) kit to use for this purpose. Clear the mounting holes using an exacto knife after applying the tape.

As shown in Figure 5, the jumper wires are still attached to the solder pads in the same locations shown in the BRIAN Construction Manual.

One final suggestion has to do with fit-and-finish. I found that there are enough threads to re-use one of the small "nuts" used on the frequency selection switch. This nut nicely fills the gap between the knob and the plastic end cap.

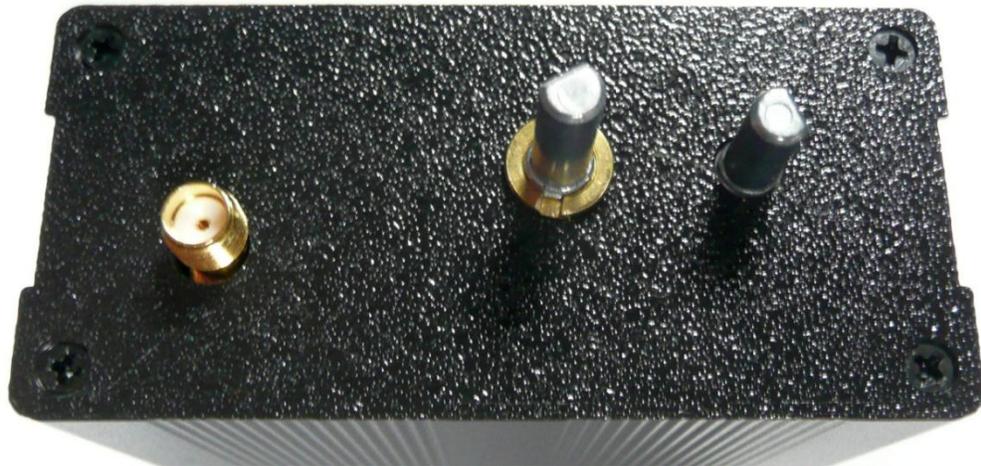


Figure 6 - Re-use the mounting nut on the frequency selection switch