

Star Trek TOS communicator upgrade kit

Install instructions

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Package

Your package should include:

- Assembled TOS sound/motor/light board with LEDs and sound chip
- Moiré motor
- 9V snap connector
- wires for switch hookup
- secondary pushbutton switch
- Magnetic switch
- Small circular magnet

Tools

The tools you will need to complete the install:

- Soldering iron
- Wire strippers
- Dremel with cutting and sanding wheels
- Sandpaper
- Drill
- Super glue gel
- Epoxy
- Hot glue gun

Install

This install is delicate and needs to be done properly. Please follow all the steps to ensure that your board gets installed properly!!!!

COMM Prep

These steps are extra steps that you have to do above and beyond a static buildup. Do these first so they are out of the way when it comes time to install the electronics board.

- 1) Drill a hole where you want the moiré motor to be centered. This will be where the motor shaft extends to connect up to the moiré paper pattern and the mounting disc.
- 2) Cut the midplate metal cross member so you have more room to install your electronics. Below is a pic of this done on a roddenberry.com unit.



- 3) Drill out the holes for the 3 jewels. Drill the holes a little smaller than the jewel itself. Then glue the jewels down as you would in a static buildup. To have the LEDs shine through the jewels, you will ALSO have to take some sandpaper and rub off the reflective coating on the back side of each jewel!
- 4) Drill out a hole where the center knob on the speaker plate would reside. This will be for wiring to run the working knob wires.

Now your comm. is prepped for the electronic upgrade install.

Electronics install

The next step is to dremel out the motor shape in the top shell (if necessary). **You have to determine if you have thin comm. shells or thick ones.**

On some of the roddenberry.com units, the shells are very thin (not very deep), and you will have to cut out the motor shape in the top shell. On other kits (such as a JTK comm. kit), the shells are deep enough so that you do not have to dremel the motor shape out, just drill a hole for the motor shaft itself.

MOTOR INSTALL

To cut out the motor shape: Place the motor through the moiré hole cut in step 1). The motor will be sitting on the inside of the top comm. half. You should have the motor shaft pointing out where the moiré ring would typically go. Now try and sandwich both comm. halves together with the motor inside (also use the midplate, as if you were assembling the comm. up). If the comm. will not close flush, then you have thin shells and will have to dremel out the top comm. half in order to fit the motor in. If your comm. closes flush already, goto step 4) and just glue down the motor to the inside of the top comm. half.

- 1) For thin shelled comms, you have to dremel out the exact shape of the motor so it will sit up enough so the comm. shells can close flush. With the motor sitting in the drilled moiré hole, take a pencil and draw an outline of the motor on the inside of the top comm. half. This will help guide you while cutting.
- 2) Take a dremel sanding tool and drill bit and route out the shape of the motor, using the penciled outline as a guide. Work slowly! Check the shape by test fitting the motor often so you don't overcut. Once you are done cutting, place the motor through the cut out shape so it fits nicely. Below is a picture:



- 3) Now retest the comm. fitting by taking the 2 shells again (with the midplate) and trying to close them flush (as if you were assembling the comm.). The motor should sit up a small amount from the front of the comm. shell, and the 2 shells should now sit flush on the midplate (so you can close up the comm. later without problems).

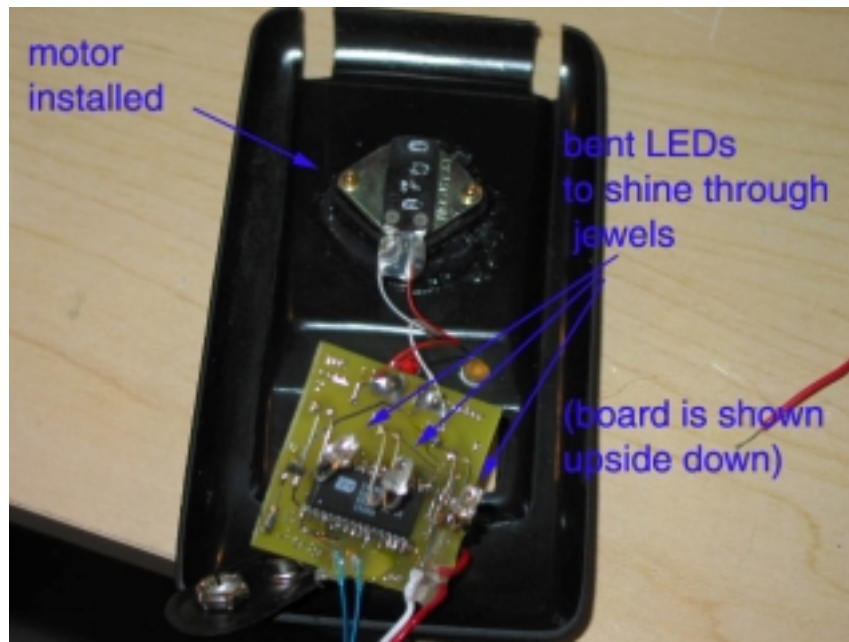


- 4) Hot glue the motor from the inside of the top comm. shell. If you hot glue the black plastic sheath that the motor is housed in, then you will be able to fine tune the motor's position. This is because the sheath moves up and down on the motor, which will provide you with some leeway. Here is a picture of the glued down motor. You can also see the properly drilled holes for the backlit jewels and the middle knob hole.



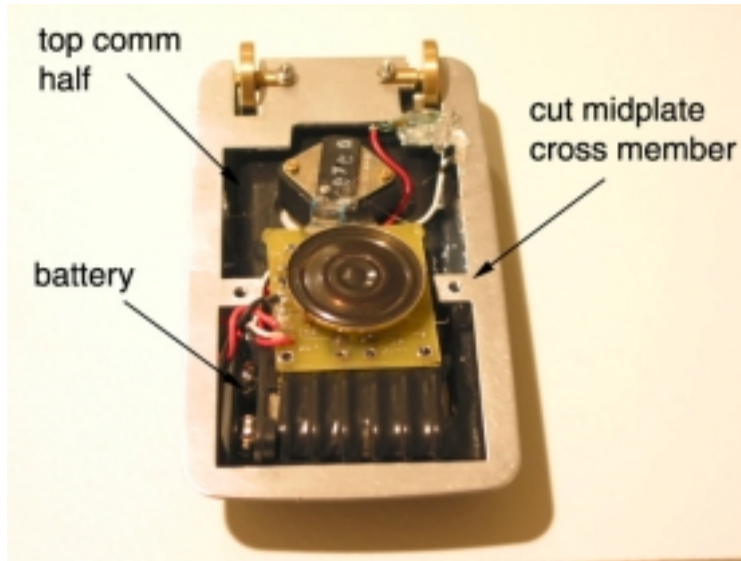
ELECTRONIC BOARD INSTALL

- 5) Fit the board down into the top comm. half. You will have to bend the LEDs so they shine through the drilled out jewel holes. Use a pair of small pliers to bend the LEDs up. Also position the board as close to the motor as possible. Below is a pic of the bent LEDs that will allow them to shine through the jewel holes. **The board is shown here for info only. It gets installed with the LEDs down (board turned over).**

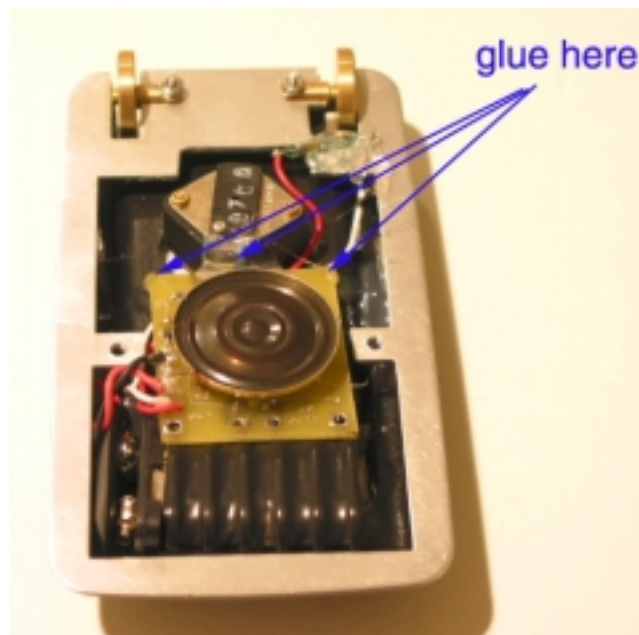


The following steps are crucial to getting the board to sit correctly!!

- 6) Now take the rechargeable battery and place it underneath the electronics board on the top half of the comm. This will allow the board to “sit up”, riding on the battery. Place the midplate over the top comm. half to make sure the board has enough clearance between the cross member that you already removed. If it does not, sand the edges of the midplate cross member until the board clears both sides of it.



- 7) Now, take the bottom comm. half and place it over the midplate. See if the comm. will sandwich shut. It might not sandwich flush if your shells are thin, but if it is within 0.25", the back screws will be able to pressure fit everything.
- 8) If step 7) is ok, move on. To step 9). If the comm. will not close flush, then you can move the speaker around a bit to gain some more room. Place the battery as close to the bottom of the midplate as possible. **This will take some tweaking to get right based on your shell depth!!**
- 9) Now, carefully hot glue the top of the board to the top of the comm. half. Use enough glue in the corners so the top of the board is secured. Also glue the motor terminals (with the wires) coming out so to protect the wires from coming loose.



- 10) After the glue has dried, try to refit the bottom comm. half onto the midplate. The bottom should still fit with a small gap (or no gap). You can attempt to position the battery better to MINIMIZE the gap on the lower shell half. Not to worry, a small gap will be typical, but it will disappear once you screw

down the back of the comm. half. This will act as a pressure fit. **But, you don't want too much pressure or the electronics can be damaged!!**

If your comm. is not fitting together, try to move the speaker and/or battery around to get a better fit. **TAKE YOUR TIME!!**

NOTE: If you need to remove any hot glue, use rubbing alcohol. This will take off the hot glue without any damage.

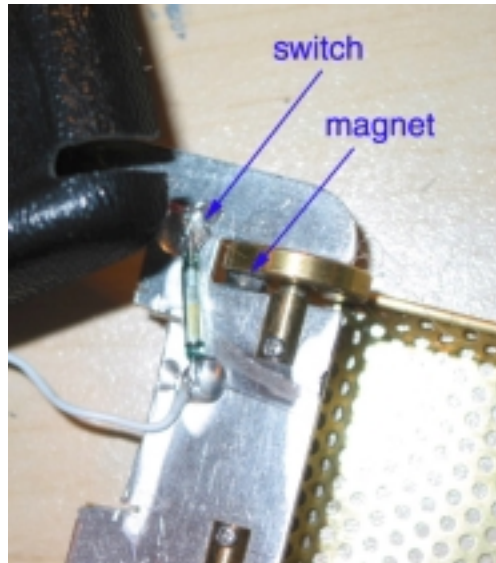
Too much pressure when you finally seal the unit can cause the electronics to behave badly. This is most likely a problem in the thinner rodd.com units only. If you have thicker shell halves, you shouldn't be seeing this problem!

- 11) If the gap between the comm. halves is too much, try moving the speaker around to find a better position for it. Moving it to the deepest part of the bottom comm. half will help. Even positioning it by the motor can help. Here is an old install pic that shows the speaker in this configuration. **The below pic is only used to show an alternate speaker location!! After you find a good location for the speaker, you can use some hot glue to secure it.**

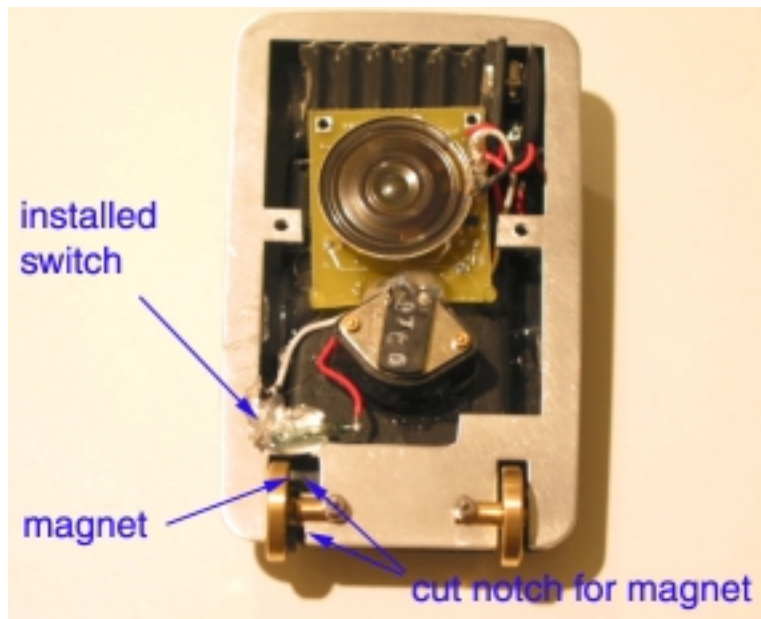


MAGNETIC SWITCH INSTALL

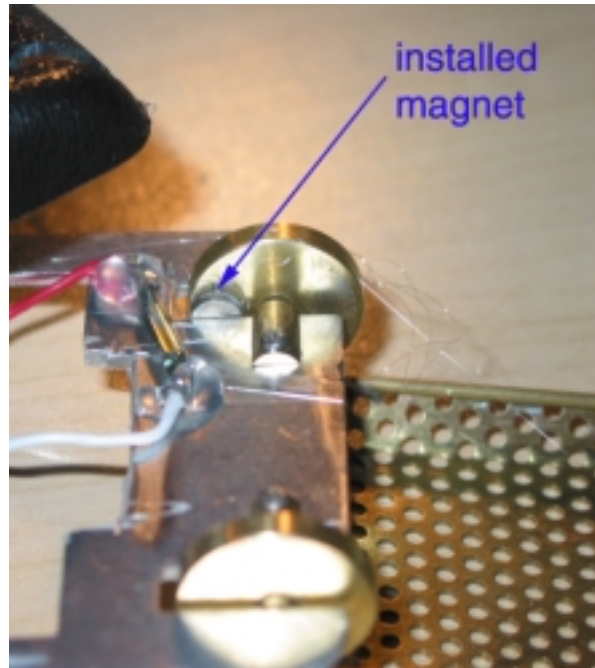
- 12) Take the magnetic switch that is connected to the power wires and run it up to the midplate next to one of the wheels. Test out the switch by bringing the magnet close to the switch. The circuit should come on. Position the switch close enough to one of the grill wheels so that the board comes on when the magnet is on the inside of one of the wheels. Hot glue the switch in place.



- 13) You may have to cut a larger notch out of the comm. halves and the midplate in order to fit the magnet. The magnet should ride on one of the wheels and be able to pass through the midplate and the comm. shells without any impedance. Most of the roddenberry.com kits will need extra filing on the midplate and the comm. halves in order to have the magnet pass through without “catching”.



- 14) To install the magnet, place the back comm. shell on the midplate and remove the top comm. half (so you can see what you are doing). To get the on/off switch to work, you want the magnet to activate the switch when the grill is in the full open position. So, with the bottom comm. half in place, flip open the grill and mark on the wheel where the magnet should go so it activates the switch when the grill is fully open (which is when the grill is touching the bottom comm. plate).
- 15) Now glue (or epoxy) the magnet to that location of the grill wheel. When you flip open the grill again, the magnet should be in a location close to the switch, which will activate the comm.! **Take your time with this step so you do it right. Measure twice, cut once!** Next is a picture of the installed magnet.

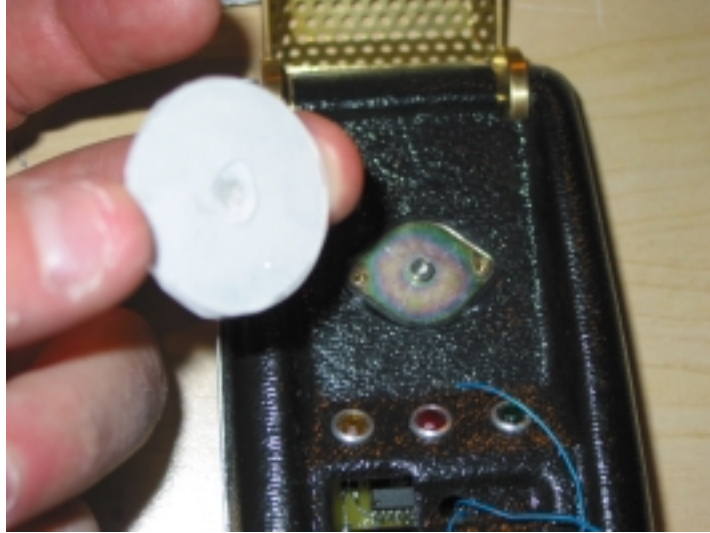


TOP SHELL INSTALL

- 16) Now you are ready to secure the top shell to the midplate. Take the midplate (which now has the magnetic switch attached) and place it on the top comm. half so it is centered to your liking. Make sure the bottom comm. half still fits flush with the midplate too.
- 17) Take some epoxy and run it along the inside edge of the top comm. half. Secure this to the metal midplate and let it dry overnight! Wipe up any excess epoxy on the midplate. Use a small vise to provide pressure if necessary. You want the top comm. half to be secure so it doesn't pop off at a later time.

MOIRE INSTALLATION

- 18) Prepare the moiré ring for installation. Cut the paper moiré to the proper shape. Also, take the clear disc (on a rodd.com unit) and cut it so it is much smaller than the moiré ring (to prevent it from rubbing!). Place it in the moiré ring with the transparency to make sure the disc and paper moiré do not rub.
- 19) You can drill out a small centered hole in the clear disc so the motor shaft will engage the disc in that nub. Here is a picture:



- 20) Now take a small bead of super glue (or epoxy) and glue the paper moiré to the clear plastic disc. You are ready to glue the moiré ring onto the motor.
- 21) **THE NEXT STEPS ARE VERY IMPORTANT.** Take the moiré disc and place it on the motor shaft. Now take the moiré ring and place it over the disc. **MAKE SURE** the moiré ring sits flush on the top comm. half. If it does not, you may have to sand down the motor shaft a little.
- 22) If the motor shaft needs sanding, **BE CAREFUL.** The motor is very delicate. You need to shave a small amount of shaft off until the moiré ring will fit flush onto the comm. You need to do this properly in order for the moiré disc to spin without getting caught up on the inside of the ring! I use a small sanding disc with a dremel tool to lightly sand down the motor shaft.
- 23) Now you can epoxy the moiré disc to the motor shaft. Make sure you center the disc on the shaft. Use strong epoxy or other glue so the disc doesn't jar loose later down the line. Also make sure the disc goes on straight and has no pitch to it when on the motor shaft. **DO NOT glue the shaft to the motor body** (just put glue on the shaft nub), or you will have glued the motor down so it wont turn. Let this dry overnight!

Here is a picture of a moiré disc installed and the top shell glued to the midplate:



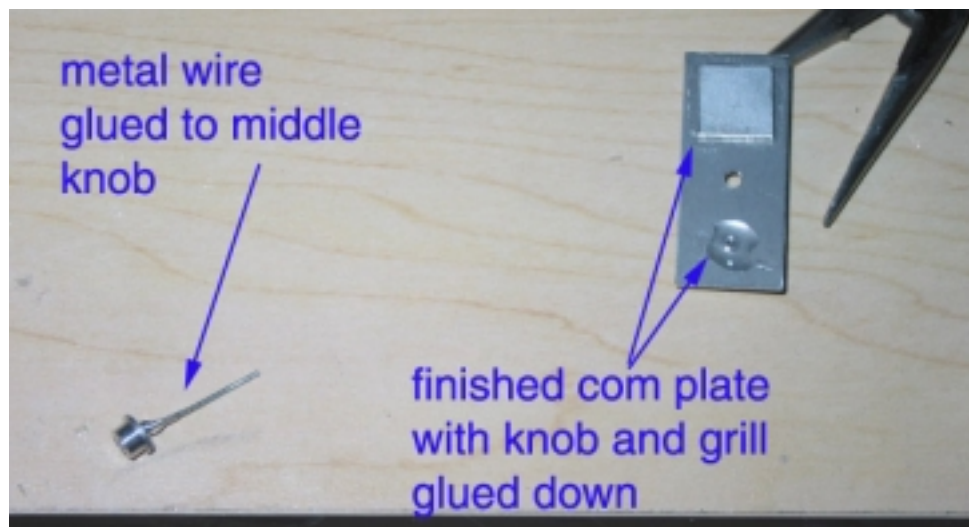
- 24) After drying, turn on the comm. and make sure the moiré disc spins correctly. Also make sure the disc is well secured on the shaft.
- 25) Now you can attach the moiré ring to the top comm. half. First put the moiré ring on the top shell and hold it in place. Turn on the comm. for at least 30 seconds and make sure the moiré does not get snagged on the ring. The moiré disc should freely spin with no interference from the ring. If it does snag, you will have to remove the ring and cut the moiré disc more or reposition the ring so this does not happen. TAKE YOUR TIME.
- 26) When the moiré is spinning well, you can glue the moiré ring down. Put a small amount of glue on the moiré ring and glue it down to the top shell. While you are waiting for the glue to take hold, turn on the comm. again and make sure that the disc spins freely. The disc will make one revolution in 30 sec, so you can tell in 30 sec if any part of the disc is getting caught up on the ring.

WORKING KNOB INSTALL

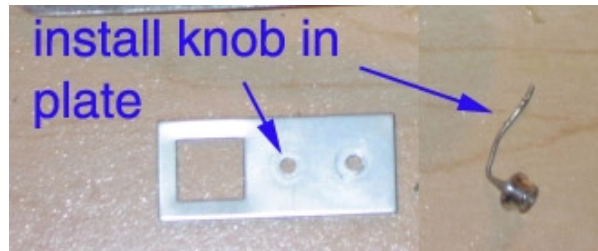
NOTE: If you DO NOT want to wire up the working knob, your other choice is to use the included pushbutton to activate the sounds. The pushbutton can be installed in the bottom comm. half by drilling a small hole and exposing the pushbutton so you have access to it. Then you can attach the 2 switch wires to the pushbutton. The button install should be somewhat easier to do than the working knob. It is left up to the user on which method they would like to use! The pushbutton install list starts at step 37).

Below is a description of the working knob since it is more difficult to get installed.

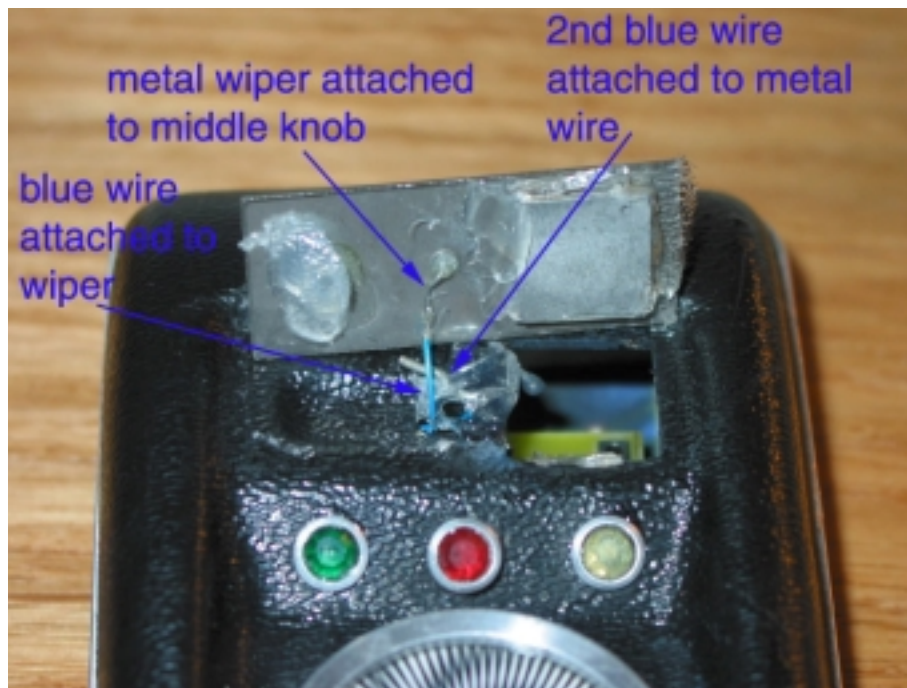
- 27) Run the wires for the working knob through the drilled hole for the knob that you did before. Getting the knob to work takes some fiddling since you don't have much room to work with.
- 28) Epoxy the outer knob to the com plate since this is not used. Also glue down the speaker grill to the com plate.
- 29) Take a small piece of metal wire (included) and epoxy it to the inside of the remaining knob. This will act as a "wiper" shaft that will make up the ad-hoc button using the knob. Below is a pic of the com plate and the remaining knob with glued wire.
- 30) Let the knob dry for several hours until the glue is fully cured.



- 31) Now take another small piece of wire and solder it to one of the switch wires (**the blue or white wires that are unconnected on your board**). Cut the wire down so you have a reasonable amount to work with. One wire will act as the “second” side of the makeshift button.
- 32) Insert the middle knob into the com plate and bend the knob wire so it secures the knob in the plate, but also can move back and forth in a “wiping” motion. Here is a pic of a bent wire ready for install into the com plate.



- 33) Solder the other wire to the wiper on the knob. Now, when you twist the knob and it makes contact with the other piece of wire (attached to the second wire), you have made your button. Hot glue the small piece of wire down on the top shell half so it can come into contact with the knob wiper. Here is a picture of the installed knob and the glued down wire connections.



- 34) Test fit the com plate onto the top comm. half. You should be able to twist the button clockwise a small amount to make the “wiper” contact the other wire. The red LED will extinguish each time you make contact. TAKE YOUR TIME and tweak the working of the knob so it is reliable. It just takes some proper positioning to get right. The wires are also delicate, so the less you bend the better the install will go.



- 35) Once you have the knob working reliably, go ahead and glue down the com plate. Retest the knob so it is still working correctly.
- 36) Take the bottom comm. half and screw it down (CAREFULLY) to the midplate. Your comm. should close flush without putting undo pressure on the internal guts. Open the comm. and watch it come to life!!

PUSHBUTTON INSTALL

- 37) If you want to use a pushbutton instead of the working knob, it is easy to install. Take the included pushbutton and drill out a hole the size of the button.
- 38) A good place to mount the button is on the bottom comm. half where your index finger would normally sit when you hold the comm. in one hand. Solder the 2 switch wires to the pushbutton and test the button out.
- 39) Hot glue the pushbutton to the inside of the comm. half so the button is exposed to the outside of the comm. The button should be inconspicuous since it is small and the same color as the comm. shell.

YOU ARE DONE.

Enjoy!

COMM Operation

When you flip open the grill to full position, the communicator will automatically come on. The familiar chirp sound will play out, and the LEDs will light. After the chirp is done, the moiré motor will spin up and rotate the moiré at the proper 2 rpm.

All the features of the comm. are operated using the middle knob! All you have to do is turn the knob CLOCKWISE for about $\frac{1}{4}$ of a turn. When you have made contact with the internal switch, the red LED will go out. This tells you that the switch has been hit. The three crew voices, motor speed, and blink mode are all accessed by how long you hold the knob. You can start counting to yourself once you see the red LED extinguish.

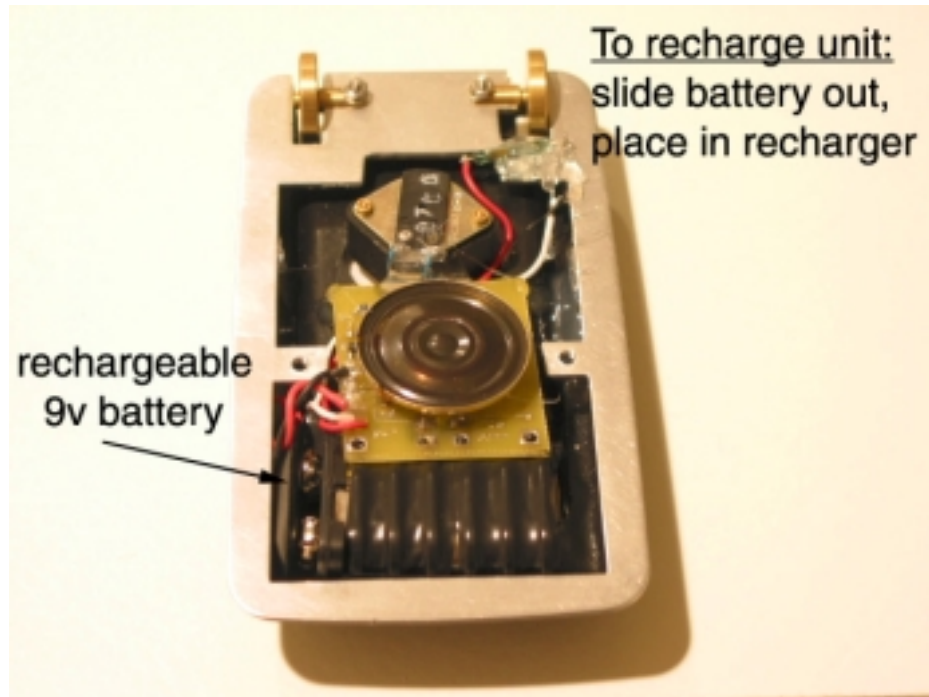


Here is a table of comm. features based on how long the knob is held in place (the red LED is unlit):

<u>Knob held in position for:</u>	<u>Comm response:</u>
Less than $\frac{1}{2}$ sec.	Uhura responds
Greater than $\frac{1}{2}$ sec but less than 2 sec.	Spock responds
Greater than 2 sec but less than 3 sec.	Scotty responds
Greater than 3 sec but less than 4 sec.	Toggles the blinking mode for the red LED
Greater than 4 sec.	Speeds up the moiré motor. You can speed up the motor up to 8 times. The motor speed goes from 2 rpm to 2.2 rpm. After 8 times doing this feature, the speed goes back to 2 rpm and the cycle starts over.

Recharging the battery

To recharge the battery in your comm., unscrew the 2 bottom screws from the comm. bottom half. The internal guts should look like this:



All you have to do is carefully slide out the 9V battery (it slides out easiest if you pull toward the bottom of the communicator. Carefully unhook the 9V snap connector. Now take the battery and place it in the included recharger. The recharging should take about 6-12 hours for the low trickle charger included. Please read the instructions included with the recharger!

Note: The included battery is a nickel-metal hydride battery. Only use a proper NiMH charger with the battery!!

Once the battery is recharged, reseal the battery in the comm. case as shown above. Connect it up and make sure it works. Replace the cover and you are done!

Note: When replacing the back cover, make sure the battery fits as flat as possible. The back comm. cover should go on as flush as possible. Seating the battery just right will reduce any stress on the delicate board electronics when it is screwed back together!! Screw the back cover back on.

Enjoy!