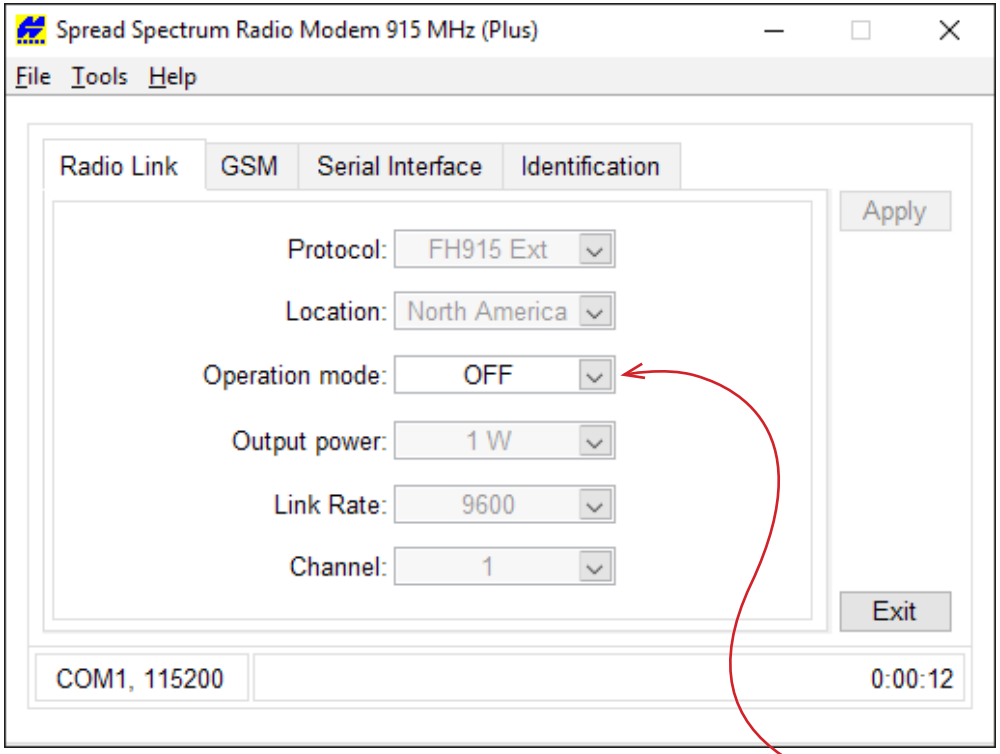
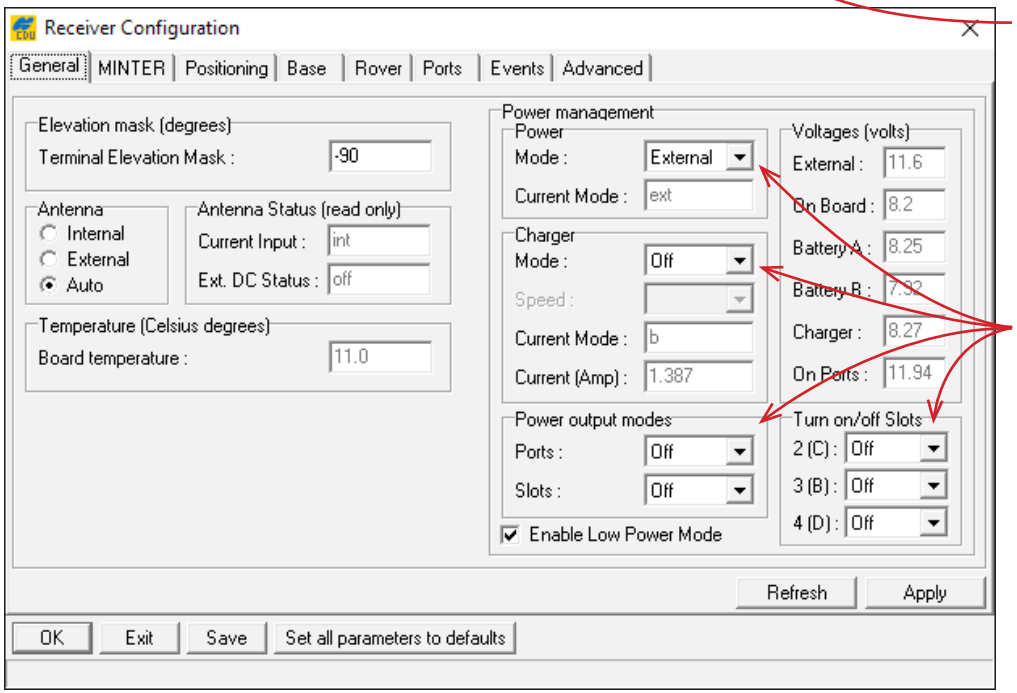
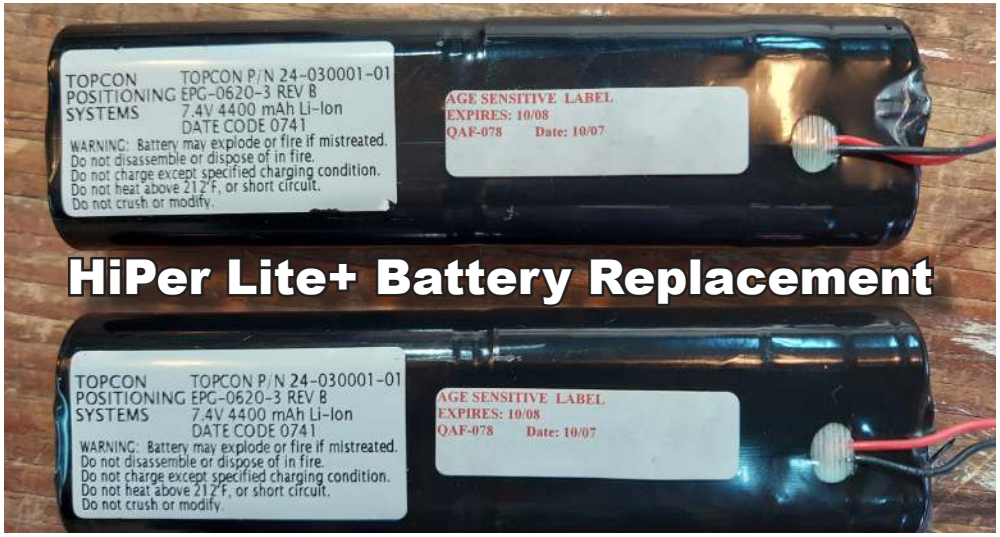






Please read through to the end before taking anything apart!

Many thanks to Jon Payne for his outlined procedure at *Surveyor Connect* forum[1] for replacing the batteries in the Topcon HiPer Lite receivers. I followed Jon's outline, taking some photos along the way, while also adding a few notes where applicable.

Before replacing the (2) internal batteries[2] on just the base unit, using Modem-TPS[3], I turned off the radios on both the rover and the base. After the batteries have been replaced and fully charged, don't forget to attach the external antennas to the receivers and *then* turn the base and rover radios back on before doing RTK surveying. Alternatively, leave the radios turned off on both units if you plan on doing only static work and thereby appreciably extend the working time per charge cycle.

Before replacing the (2) internal batteries, using PC-CDU[4], I set the Power Mode to External and turned off the power to all of the ports and slots. I don't know if this is necessary, but was done out of precaution. As will be shown at the end of this process, these settings are automatically reset.

Both Modem-TPS and PC-CDU are being run on an older PC (running Windows 10) which has a 9-pin serial port, and the serial cable was connected to

1 https://surveyorconnect.com/community/postid/139397/

2 *Replace with Topcon Part Number 24-030001-01 (2 are required) like these* https://www.amazon.com/dp/B0925RG7X2?psc=1&ref=ppx_yo2_dt_b_product_details

3 http://www.phericle.com/weport_secure/html_production-TOPCON/library/downloads/software/MODEM_TPS/MODEM_TPS.zip

4 http://kb.unavco.org/kb/assets/13/PCCDU_MS_7_12.zip

the receiver's Port A.

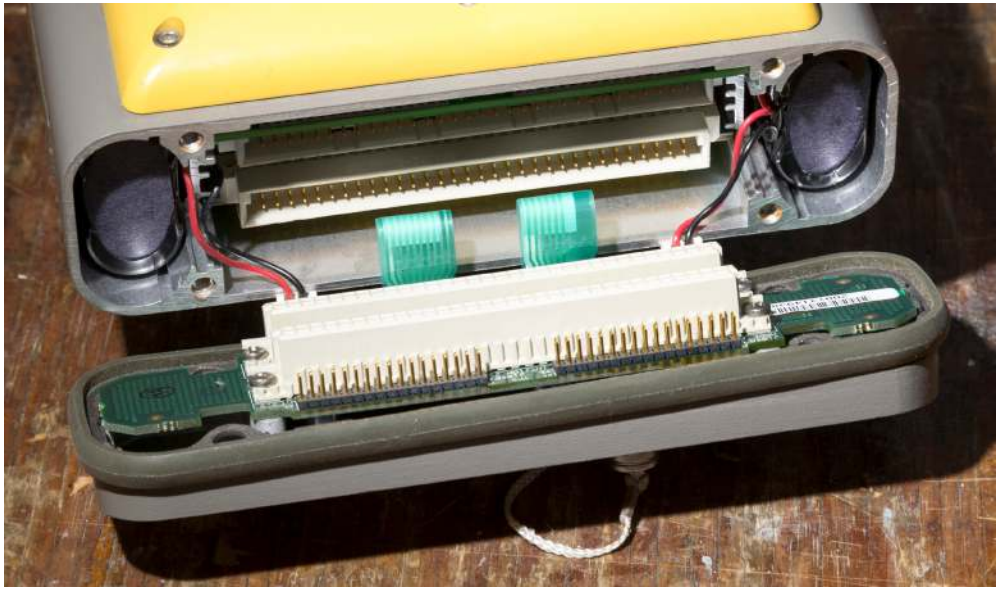
Using a 3mm Allen wrench, loosen and remove the (4) screws which hold in place the MINTER front panel. Pay attention to the amount of torque that's required to remove the screws and approximate that torque when you are putting things back together as much as practicable, taking care not to over torque and ruin the rubber gasket.

These screws may have had some form of sealant applied to them at the factory, the residue of which can be seen in the photo above. I debated putting some type of sealant on the screws after the batteries had been replaced and the MINTER panel was put back into place, but wasn't sure what would be best. I ended up using a little bit of silicone sealant applied just to the underside of the screw head with a paper clip, immediately wiping the squeeze out with a tissue.

Face plate Removal

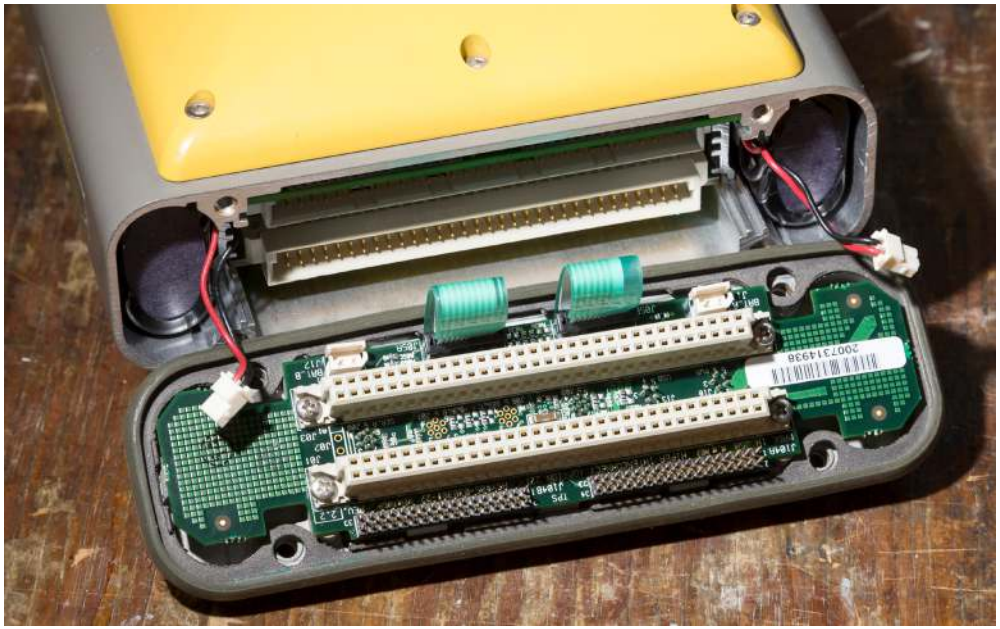
The numerous MINTER panel's pins need to be freed from their sockets on the receiver while keeping the gasket held in place against the face plate. This will help maintain the gasket's original position and shape while providing for a good grip. Holding the face plate by the rubber gasket, slowly begin pulling the front assembly away from the receiver working evenly with a slight back and forth rocking.

Once loosened, and before pulling the face plate assembly away from the receiver's housing, position the receiver allowing the face plate to rest on the work bench. As it splays open to reveal its connectors, pay attention to how the batteries' 2 pair of wires are positioned as well as how the two ribbon cables are tucked beneath the lower printed circuit board. You'll want to keep this image in mind during reassembly.



Although the photo above doesn't show it because the front face plate MINTER assembly has been fully opened, the battery wires and the ribbon cables had been tucked beneath the lower printed circuit board. These (2) pair of battery wires are all that's left tethering the assembly to the receiver.

Unplug their connectors from their sockets on the MINTER circuit board by firmly and gently pulling away while carefully keeping the gasket in place.



There's likely no need to pull either of the two printed circuit boards out from their slots formed by the rails in the receiver's housing; however, note that each battery has glued onto its outward face a strip of semi-dense foam. The foam is only attached to the battery keeping the battery snugly in place just by friction. Just keep this in mind as you pull out the batteries.

In addition to pulling on the battery's wires, I used a small screw driver wiggled beneath the exposed edge of the shrink wrapping to help coax the batteries out.

A few photo before the new batteries were inserted.

Preparing the new batteries

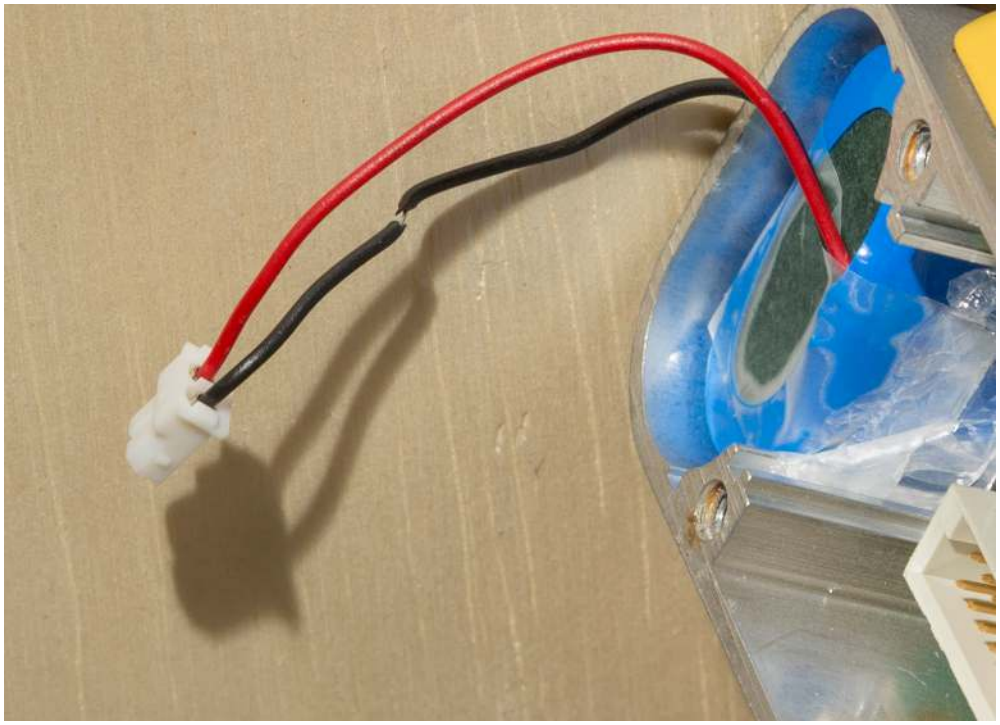
The length of the wires are longer on the replacement batteries than the original wires by about 3 cm and there's no foam tape stuck to the new batteries.

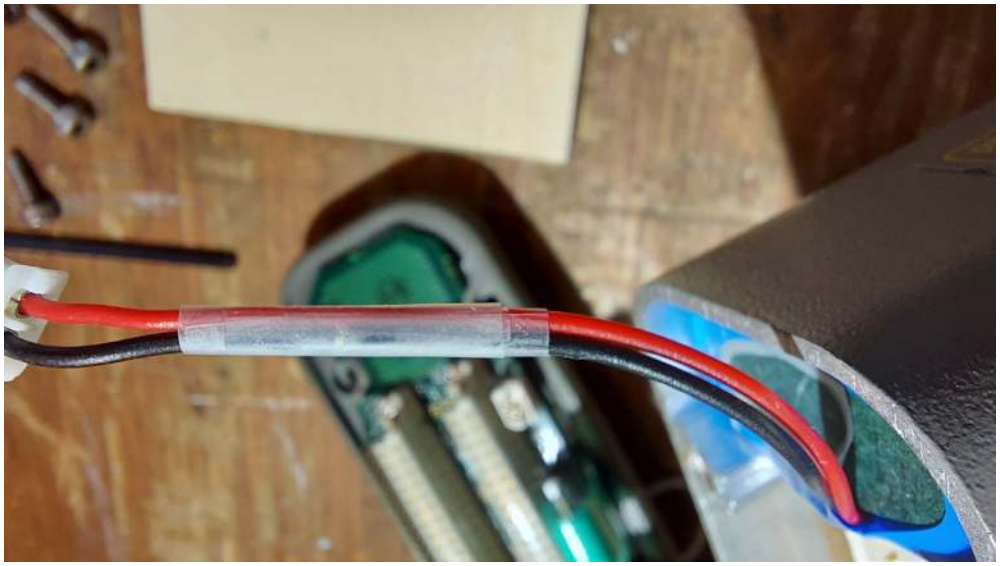
If they're used as is, they will be loose, rattling and freely sliding in their compartments. In lieu of the foam tape, I cut an old bubble-pack bag, basically making a strip narrower than the width of the battery. The length of the strip is less than twice the battery's length. Then I wrapped the battery with the bubble side touching the battery and with the smooth side facing outward before taping it across the end of the battery.

Note, this was a used bubble-pack bag and ended up being thin enough to work perfectly without having to selectively pop any of the bubbles in order to make the fit snug, and yet not make the battery's insertion difficult.

Be mindful of where the wires get placed

As mentioned by others, and as I found out too, it is easy to nick the wire's shielding on the sharp edges of the various components such as the plastic housing of the pin connectors, aluminum rails, and PCBs as seen in the photo below.





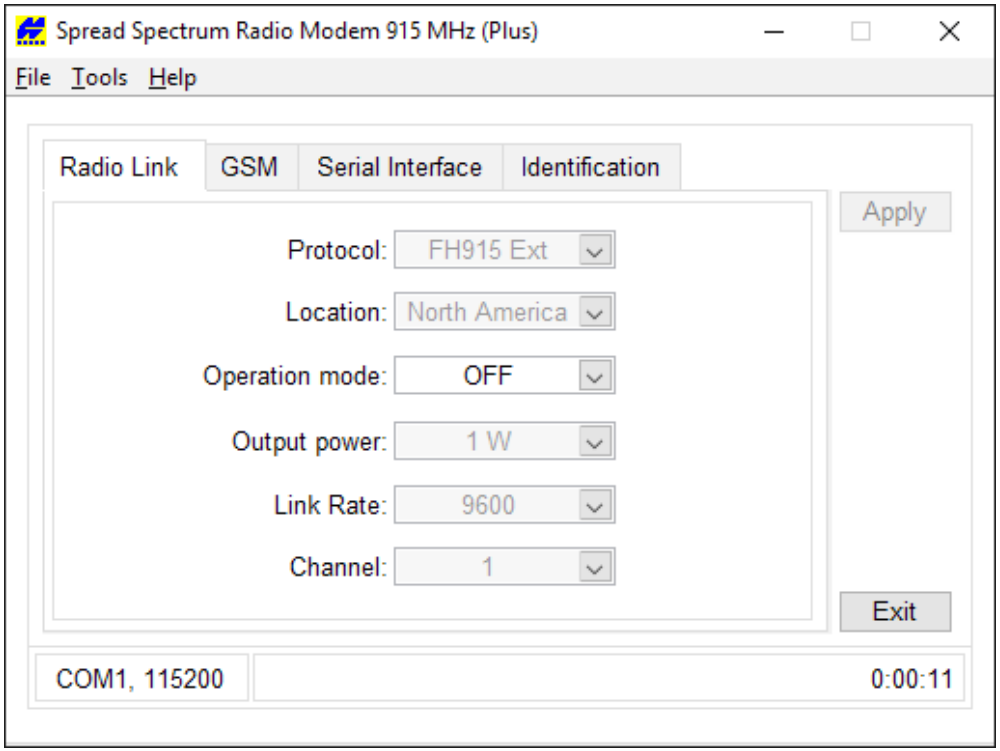
Fortunately, the nick was limited to the shielding and the wires inside were intact allowing for a mending rather than having to replace the wire.

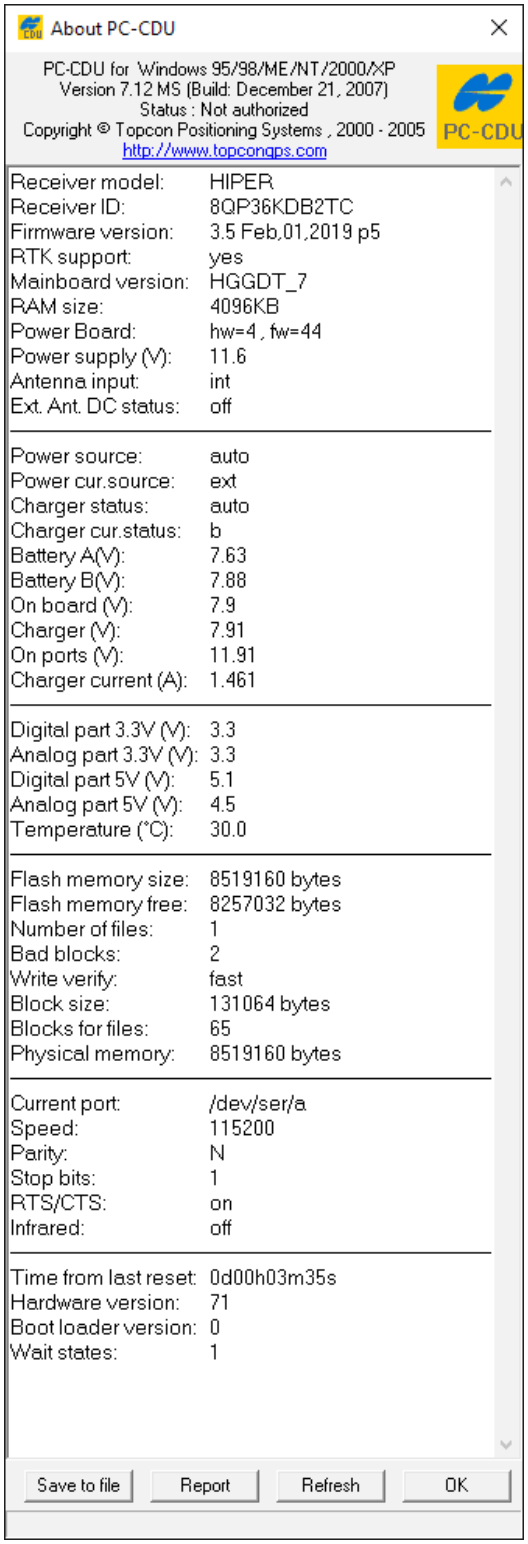
The surplus length of the wires needs to be tucked beneath the lower printed circuit board and at the same the ribbon cables get likewise tucked away. Once you're certain of the placement of the wires and cables, bring the face plate MINTER assembly squarely aligned with the receiver and begin inserting the pins into their sockets.

At the same time as you're gently pushing the pins in, pay attention to keeping the rubber gasket aligned and in the correct position as the front plate assembly fully seats itself with the receiver. Once the pins are in contact, don't be surprised seeing the BATT LED begin flashing on for a second.

Before re-installing the screws; ***and without any sealant just yet***, make certain the gasket is uniform in appearance all around. The screws ought to drop into place with little to no effort if everything is properly aligned. Finish seating the pins by fully screwing the assembly together.

Connect the serial cable to the PC and receiver, and the power supply/ charger to the receiver before powering on the receiver. Using Modem-TPS and PC-CDU, confirm that the radio is still off and if the Power Management





settings have all been reset to their default settings. Then turn off the receiver and allow the new battery to fully charge. These screenshots were taken right after the batteries had been replaced and prior to charging.

Once you're sure everything is working in good order, remove the (4) screws while leaving the face plate MINTER assembly fully seated and in place. Then rim the underside of the screw heads with a small bead of sealant and re-tighten the screws being careful to not over tighten. Wipe any excess sealant off immediately.