

# BUILDING A TRAVEL CHARGER FOR YOUR DMR!

*Text & Photos by David Young.*



Last August, the British foiled a plot to plant explosives aboard 14 airliners. One result was in an instant, total ban on all cabin baggage, on flights to or from the UK. We were about to leave for London, then Paris and on to Wetzlar for the LHSA's convention. How would I carry my gear?

Just before we left, the restrictions were relaxed, ever so slightly. Still, I had to pack all my gear into a bag just 11"x14"x6" (28x35x15cm). Fitting an R8+DMR and three lenses (inc. the 80~200/f4 Vario), an image-bank and a few other accessories into it was a daunting task.

I had earlier used the same bag, with great success, for a trip to Costa Rica. At that time I was still shooting with the somewhat smaller LeiCanon 20D. More importantly, the 20D's charger is a mere 9x7x3.1cm or 200cc in volume. The DMR's charger (*with cord*) is a formidable 560cc... more if you don't wind the cord tightly. In that small bag, it took a big share of the space!

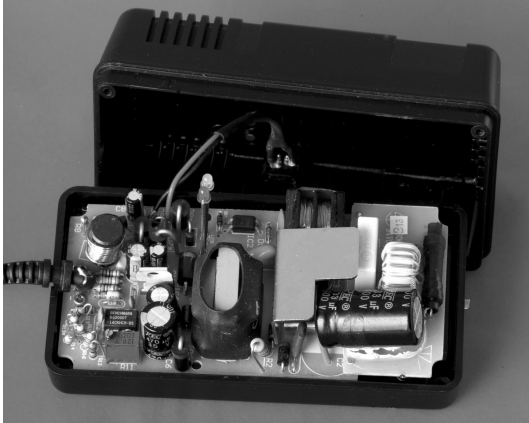
Of course, it would have been easier, had I put the charger in my checked luggage. But, if my luggage were to be lost (it happens!), my trip would be over, in the photographic sense. As a relatively seasoned traveller, I've learned to *never* put anything vital in checked luggage!

So, I disassembled the original charger, and built its circuitry into a much smaller, fisherman's fly box that is just 8x11x2.8cm. The result is a charger which, at 250cc, is 55% smaller than the original; and, at 170 grams, it's 28% lighter, as well!

The only real changes were to separate and rearrange the two original circuit boards, shorten the cord and remount the LEDs. The project took me a full day, but the total cost was well under \$10.

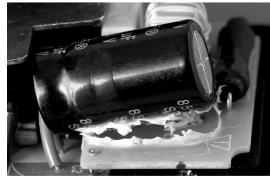
This is not a project for the faint of heart. But if you have a basic understanding of electricity and the ability to use a small 25W soldering iron, it becomes a time consuming but not difficult task. *But, be aware that attempting this will void the warranty on your charger and you do so at your own risk.* So, without further ado...

**Step 1:** In the bottom 4 corners you'll find four rubber plugs, which hide the screws. These can be popped out with the tip of a small knife blade. They have a slot style head, but with a ridge in the middle, so a standard screwdriver won't work. I used a pair of tiny, needle nosed pliers to coax them out. Now gently lift the top off, remembering that the 12V input is still wired to the top half!



Before proceeding further, make copious notes about which wires go where.

**Step 2:** Using a small, sharp, knife blade, carefully cut away the soft, flexible glue which holds the large capacitor to the smaller circuit board and lift it up, just a bit. You'll see that the small board is held to the larger board by three wires, soldered at both ends. Simply clip them with a small pair of wire cutters.

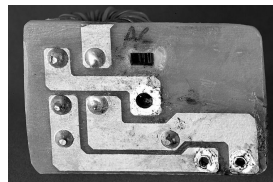


**Step 3:** Use Solder-Wick to remove the solder around the main AC pins. Don't worry about getting it all, as the solder does not hold them in. They've been peened tight and their tops must be ground off. I used a small, cone-shaped grinder on a Dremel tool. Do a very little at a time, so as to get them loose, without removing the printed circuitry.

At this point, you can remove the small board. Use more solder-wick to clean up the three holes where you clipped the wires and remove the remaining bits of wire. This is a good time to do the same thing with the other ends of the three wires, on the larger board.



Small board - Top View



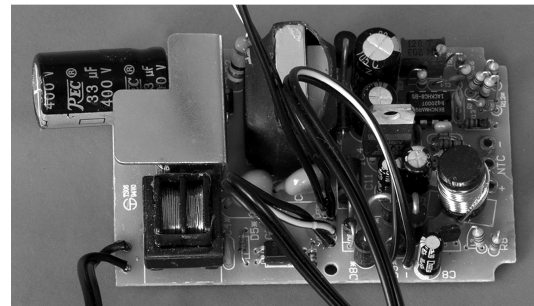
Bottom View

**Step 4:** Take some Solder-Wick and remove the fuse (it's the large tube, covered in black, shrink tubing.) from the board. Now, you can cut the board down to size. It's phenolic resin and can be easily snapped if you score it once or twice with a sharp knife blade. Smooth the rough edges with fine sand paper so it looks like this.

**Step 5:** Using Solder-Wick, remove the two LEDs from the center of the circuit board. Make note of their polarity. *Each one has a tiny flat side, on the moulded plastic part. The lead next to the flat is the negative lead.* Then unsolder and remove the red and black wires leading to the 12V DC input socket (in the cover). Lastly, unsolder and remove the three black wires that go to the battery.

Trim the battery wire to about 22cm. Carefully peel back the covering and strip the red and white leads. Then twist the braid to make a third wire. Solder these three leads back where they came from. *On my charger, the red lead went to the "-", the white lead to the center and the braid to the "+".* Now solder some leads of flexible wire to the holes where the LEDs and 12V input wires were found. *Be careful not to allow the solder from one to flow over onto another, or it could result in disaster, both for your charger and you're battery!* These can be any reasonable length. Later we'll shorten them, to fit.

Using a short (~3cm) length of wire, solder two wires between the pair of connectors, at the edge of the small board, and their corresponding holes on the large board. The single, third connector was only used for mechanical support and thus can be ignored. Your boards should now look something like this.



**Step 6:** Now we need to prepare your charger's new "home". Any small box will do, so long as it's just large enough to hold what you need; and no more. But you will have to be creative as to

where you put your pieces if your box is very much different from mine.

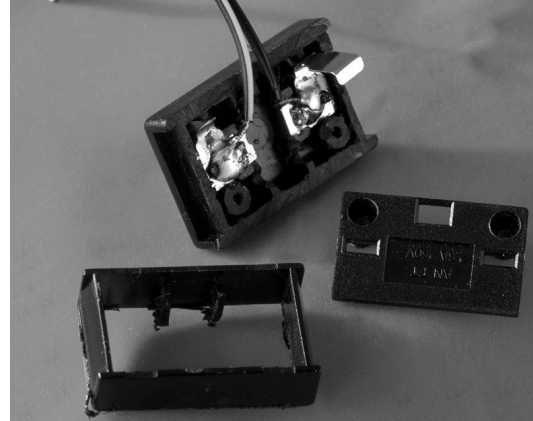
Remove the cover, if you can, (*on mine, it was simply a matter of pushing out the hinge pin with the end of a paper clip*) and draw some sort of grid on it, with a pencil. The intersections will be where you drill small holes for ventilation. *If possible, use a drill press for this, as drilling by hand is much less accurate and will give you a sloppy looking job.*

Now remove the DC connector from the top cover. I ended up breaking the glued in connector, but was able to fix it with epoxy. *You might find it simpler to use a standard DC connector from an electronics supply house. That way, you'll only have to drill a hole! Of course, you'd have to change the connector on the end of the DC cord, as well. . That's trivial, but you must observe the correct polarity!* I chose to do it the hard way, using a fine carving tool in my Dremel, to carve the hole.



Drill a hole for the leads from the AC pins, in a spot which will not interfere with the circuit boards, once they are installed. And remember to make a slot in the bottom, to let the cord out! I drilled a hole, trimmed it with a knife and smoothed with a small piece of sandpaper, to make the slot. If you're going to place your LED's on the top, with the DC connector, you'll need to drill a couple of holes for them, as well. Originally, I put new LED's on the front cover, but I was unhappy with the need to flex the leads when the box was opened and closed. So, later, I moved them to the top. Not as pretty, but much more reliable.

**Step 7:** Choose the plug that fits your wall socket (several came with your charger) and



remove the two small rubber plugs on the bottom. Underneath are two screws. Remove these and throw away the bits that fall out. Using a fine cut-off disc on my Dremel, I carefully cut away most of the base, ending up with a plate just under .5cm deep. The remaining spring clips can be easily broken off by simply flexing them a few times. Then, push any remaining "lip" into the recess below, with a small screwdriver. Solder two leads to the remaining metal and you're ready to assemble your charger!

**Step 8:** Install your DC connector and then push the leads from your AC plug through the hole you made for them. I tried to fasten the AC plug with 5 minute Epoxy, but it would not hold, so I used Methylene Chloride, a solvent that "welds" styrene plastics. *You can buy a small bottle from your local plastics shop for a couple of dollars and it will last you a lifetime.* Wet both sides and wait for it to get sticky ... just a few seconds. Then hold together until it dries... about 2 minutes. However, it will not develop full strength for about 24 hours. If, during handling, something pops off, just wet it down and do it again!

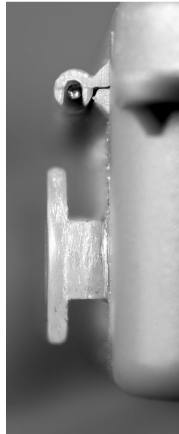


For extra strength I recessed two screws into the connector and used coarse thread, self tapping screws into the case.



Both circuit boards were held in place with a hot glue gun. Mount your LEDs and secure them with 5 minute epoxy. Connect all your wires, checking the polarity and you're done! *(If you connect the LED's backwards, no harm will come, but they will not work. If you connect the DC leads wrong, it could be disaster. Make notes before you disconnect anything!)*

**Step 9:** Of course, it's possible to simply hang the battery from the cord, but it's hard on the cord, and looks ugly, to boot! I made a holder from three small pieces of leftover styrene plastic dividers from a cheap parts case I'd bought. I cut them slightly oversized, and hand sanded them, to fit the battery.



The pieces were held together, and to the case, with Methylene Chloride. Because it's impossible to get a perfect finish this way, I sanded all the rough edges with a fine sandpaper, and then did the top surface with a coarser (100-125 grit) to give it a matte finish, which tends to hide the imperfections.

**Step 10:** The last trick is to secure the large capacitor & the coil on the smaller board with some hot-melt glue. I also used the glue-gun to make a strain relief for the battery connector cord.

Now you have a smaller, lighter easier to pack charger that works just like the original, because, except for the case it is the original!



A similar trick could be done with the M8's charger - which Leica source from the same firm. Because of the moulded battery holder on top, it might be more of a challenge, the space saved would be even greater!

## You will need:

- 1] 20 to 25W soldering Iron.
- 2] Fine, rosin core solder.
- 3] Solder-braid (*I prefer Chem-Wick™*)
- 4] Methylene Chloride (*available from a plastics supply store*) & fine paint brush
- 5] 5 Minute Epoxy Glue
- 6] A pair of fine, needle nosed pliers
- 7] A Dremel Tool with assorted bits and grinding wheels.
- 8] A "hot glue" gun and some glue sticks.