Adventures of a IBM ThinkPad 701C Battery

Original at http://www.conradshome.com/thinkpad/701/battery/

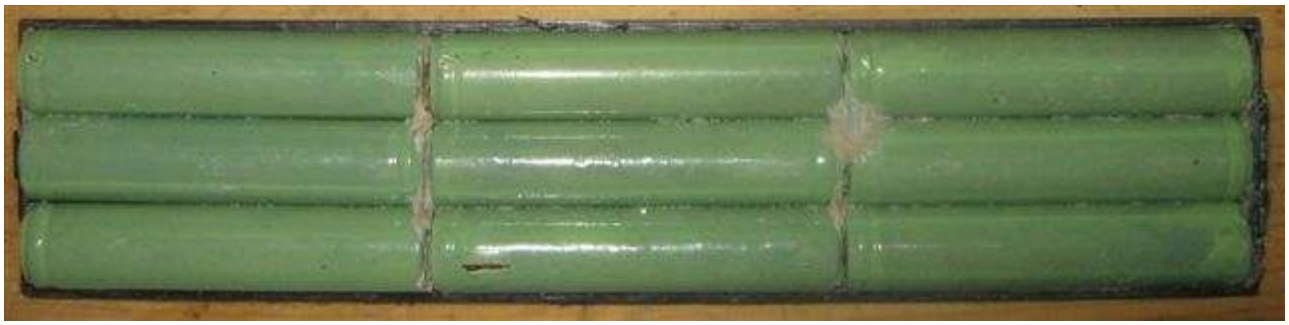
Revision 2.5.14.2011

Part 1 - Discovery and Research

I Recently aquired an IBM ThinkPad 701C. This is a 486DX4/75 laptop, read more about it on Think Wiki. Well it arrived via USPS, and i was pre-warned by the seller on EBay that they could not remove the battery, and there it was... an exploded battery pack.

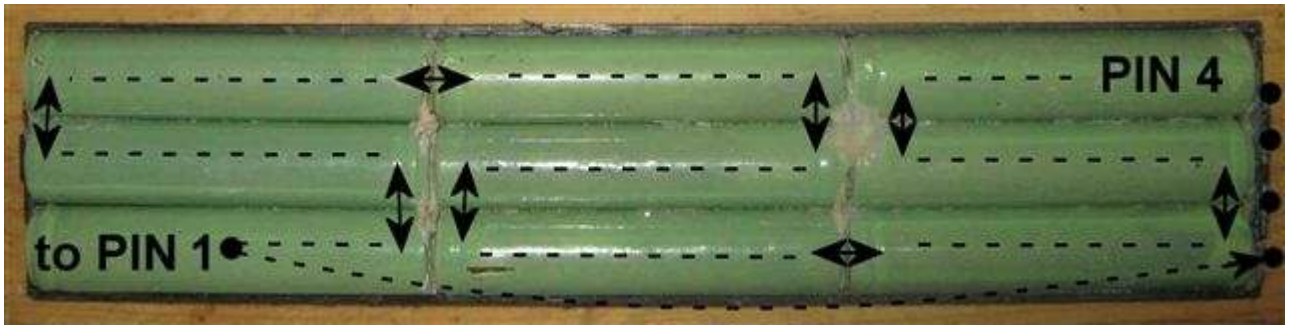
So, I did a bit of googling and read that the battery could be easily rebuilt, but the case was a pain to crack open (one poster claimed breaking it into 8 pieces). So I procedded to clean the battery up a bit, it had corrosion seeping out all over. I then peeled off what remained of the label and broke out a utility knife and started tracing the seam with it. This wasn't very effective, so i tried my trusty swiss army knife, the normal pocket knife blade.

Success! The knife was the way to go. After about 10 minutes of using the tip to scratch away at the seam, it basically fell open.



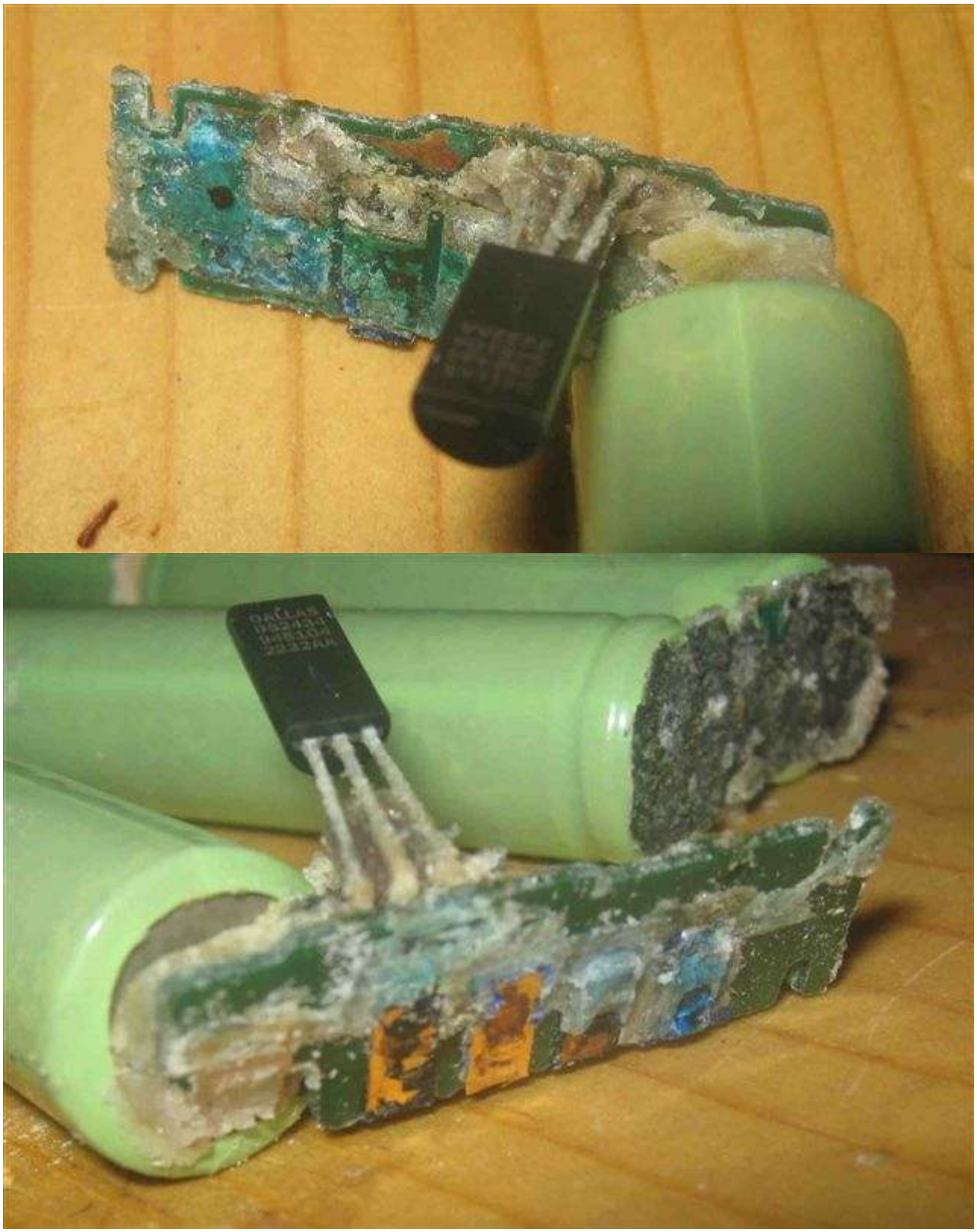
Those batteries are awefull long... But they are the same diameter as regular AA NiMH rechargable ones.

I pried the pack from the lower half of the case. The batteries are unlabled, but the battery pack is 9 cells totalling 10.8v @ 1.9A, this means 9 cells of 1.2v each and 1900mAh.



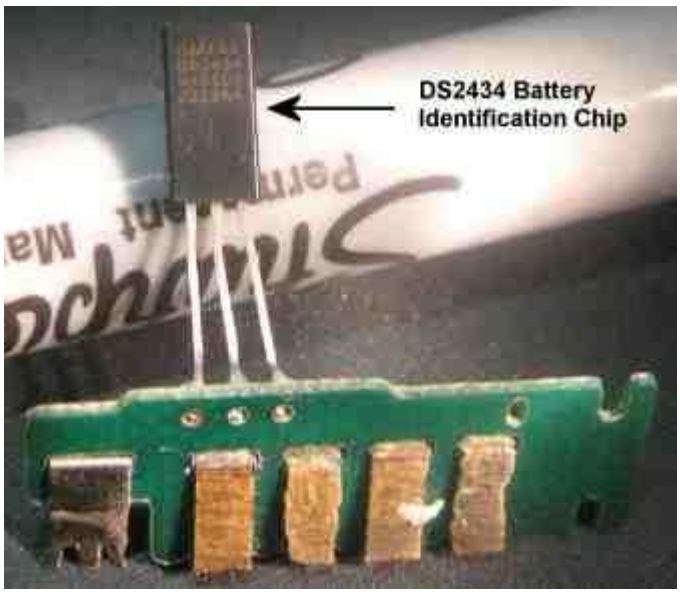
The energizers at my local Wal-Mart are 1.2v @ 2500mAh, that should work nicely and give an added boost to runtime :)

Now onto cleaning up the innards. It is a complete mess.



A half hour later and a few cans of my favorite beverage....

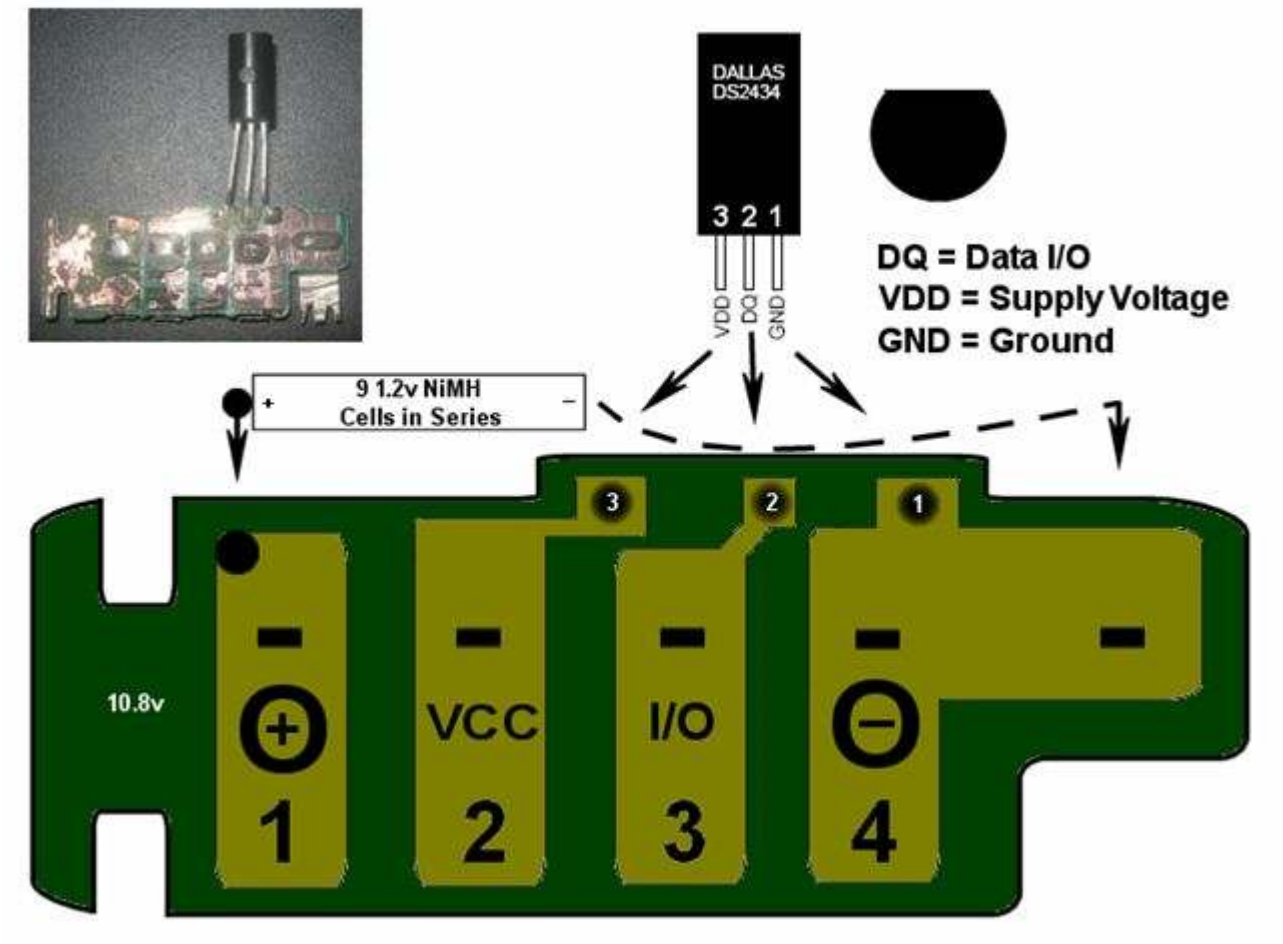
Hrm, the ThinkWiki shows this is a "dumb" battery... Guess i need to learn a bit more, because what is that chip there...



Aha, I guess even "dumb" batteries need to know voltage of the pack, what type of battery it is charging, and the

temperature. This is where the DS2334 comes in, such a cool little chip, read more about it in the PDF Data Sheet.

Here is a graphic I made in case i need to recreate this board...



But it appears to be in serviceable condition, The corrosion hadn't made its way up to the chip itself, just its pins.

Ok, off to Wal-Mart to buy 9 replacement batteries... "Part 2" to follow when i actually try to rebuild this battery pack :)

Then a "Part 3", Taking apart the rest of the laptop to clean the corrosion and replace the CMOS battery. So far I have only removed the 4 T1 torx screws and the T6 ones from the underside of the machine, it allowed me to get the battery out of the machine. Peering down into the machine it doesn't look

like any acid made its way outside of the battery compartment. The laptop still boots up fine (past the CMOS battery warning), and goes right into Windows 95A that the previous owner installed.

Part 2 - Putting it back together and testing

Ok, I didnt wind up buying the Energizers, Wal-Mart had some Rayovac ones that were much cheaper plus I had a coupon. 12 batteries wound up costing just under $17. This was one 8 pack (LD715-8OP) and a 4 pack (LD715-4OP).

These batteries only claim 1400mAh, but just from using them in my camera so far, I believe this rating to be more honest then the Energizers @ 2500mAh.

So now it was time to cut and tin a lot of jumper wires (i reccomend 22 gauge, 20 seemed to be a tad bulky in comparison to the original red wire in the pack.

Here is a shot of the lame soldering skills i posess...

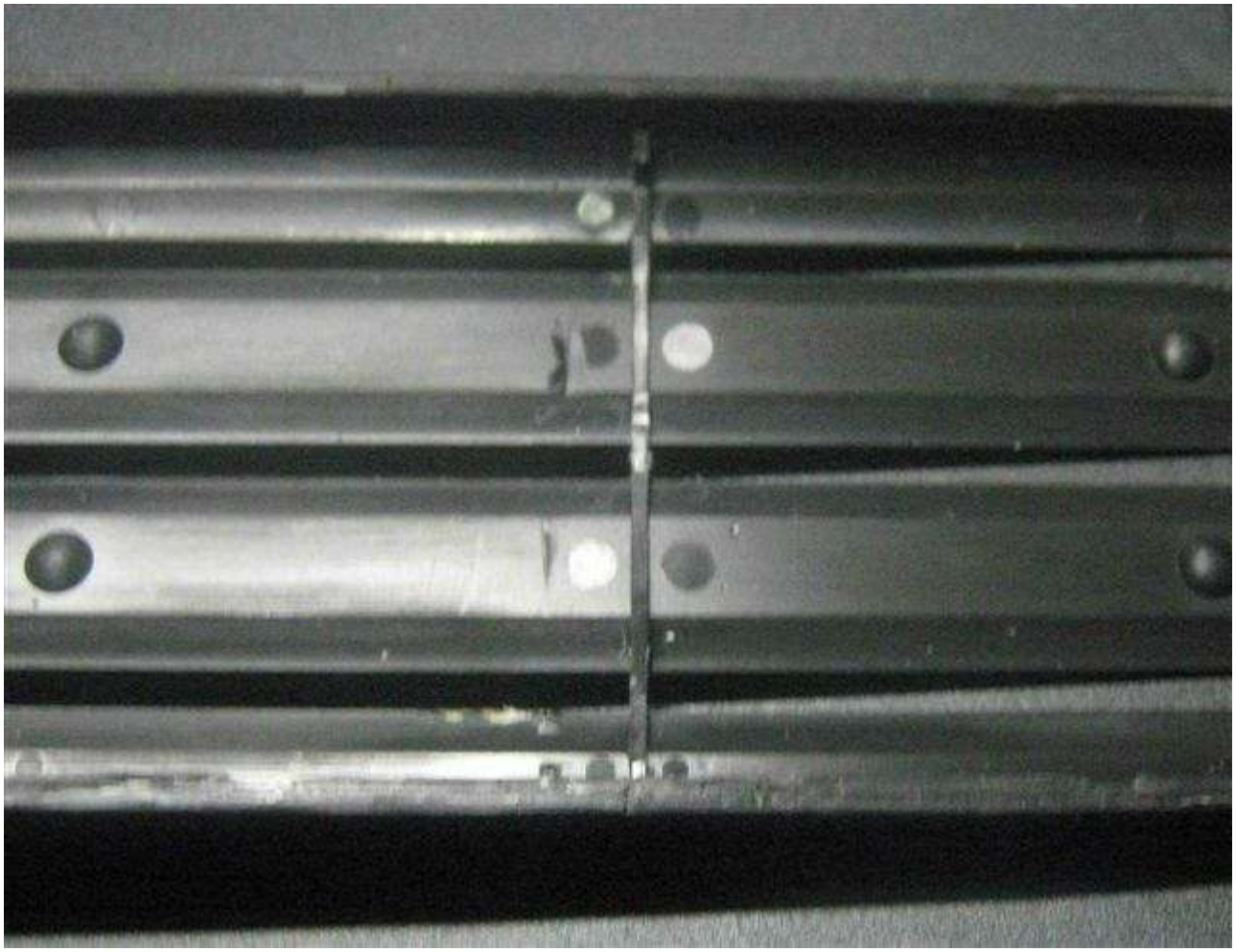
Be VERY carefull to only apply heat to the batteries for as short of a time as possible, I did all my soldering in 3 steps...

1. pre-solder the ends of the batteries
2. tin the ends of the jumpers
3. solder the jumpers onto the batteries

By doing this, it allowed ample time for the batteries to cool off before soldering the jumpers onto them.

With all the batteries soldered, I noticed the wires holding

them together took up more room in the case then the original tabs (duh :P)... so i had to trim the "bridges" out of the covers...

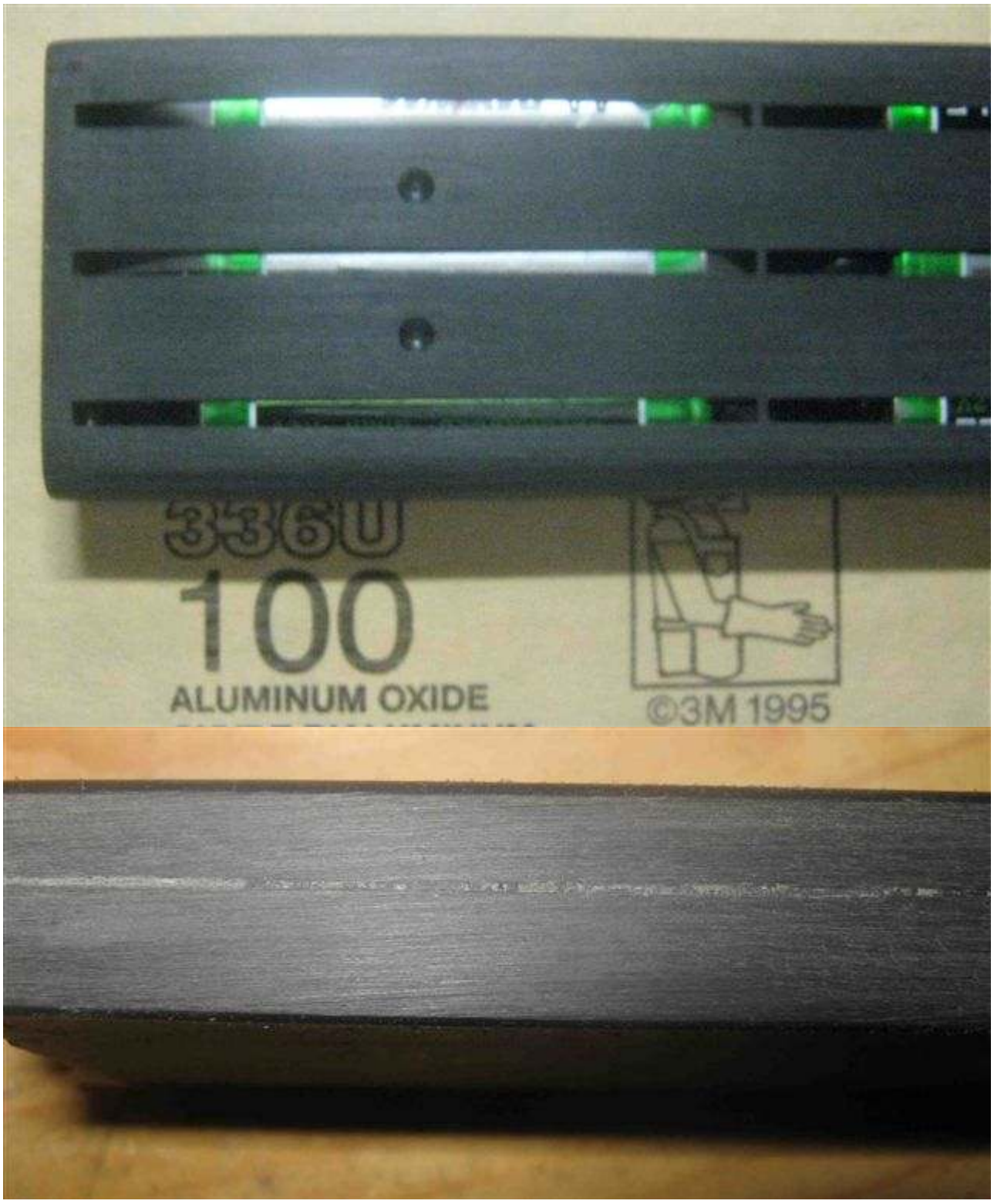


This allowed the 2 halves to fit together nicely.

I then used some scotch tape i had laying around to tightly bind the 2 halves together, then ran supergule around the seams in between the tape, once this dried, i went back and glued the portions previously covered by tape...

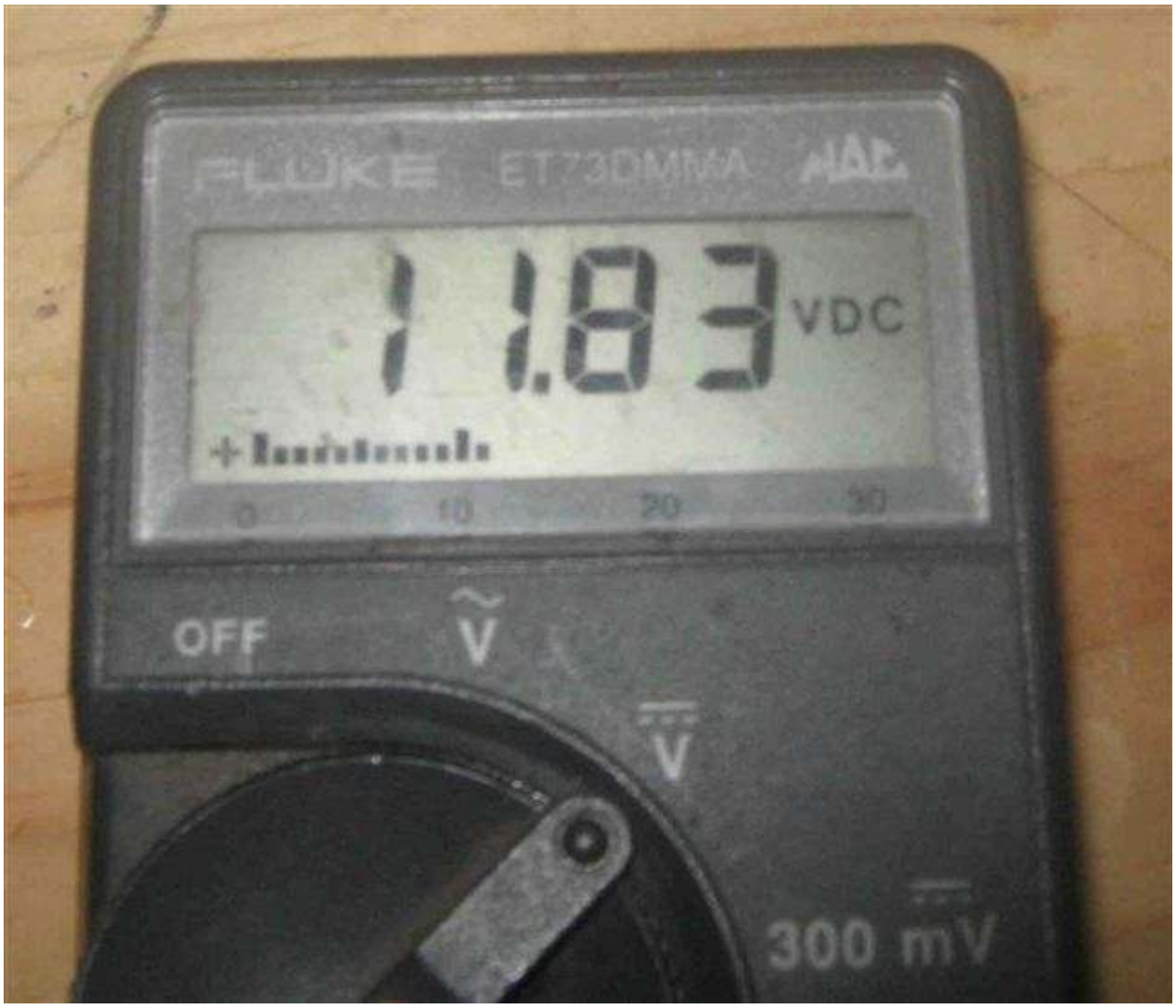
This looked really crappy, so i broke out some 100 grit sandpaper (just general purpose aluminum oxide paper) and proceeded to sand the case...

About a half hour later, it looked nice to me :)


336U
100
ALUMINUM OXIDE
©3M 1995

I then ran a scotchbrite pad (think the green side of those common green/yellow kitchen sponges) over the whole thing, this cut down the scratches from the 100 grit and made it look pretty nice and feel quite slick. It slipped NICELY into the ThinkPad :)

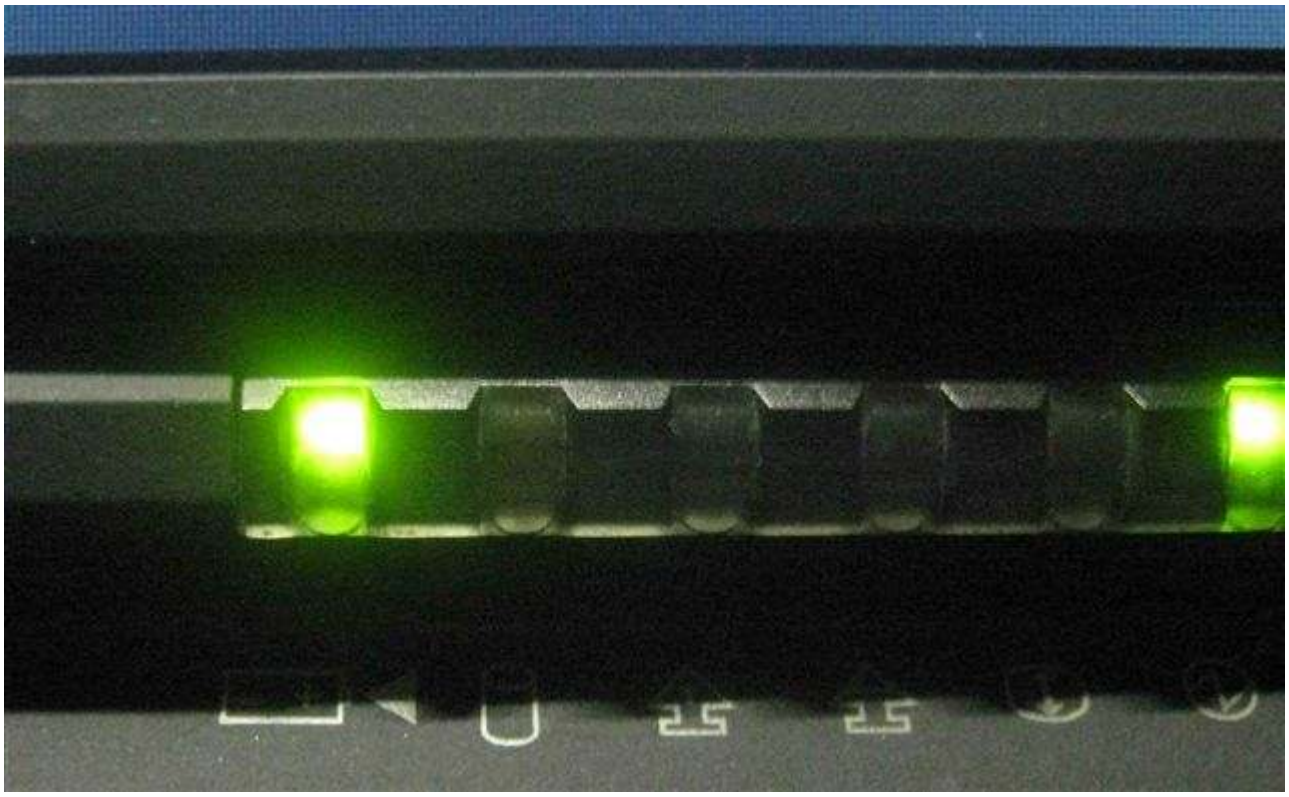
Oh, i also broke out the multi-meter and measured pins 1 and 4 beforehand (these are supposed to be pre-charged batteries), the meter read 11.83v, IBM says 11v is "optimal" in the hardware reference.



I then fired up the Windows 95A that came installed when i bought it... hit Fn+F2 and the battery meter popped up...

Wow! 2:32 minutes... so I let it run while i organized photos for this page, it actually shut down at 5% after about 2:45 minutes.

Then i broke out the charger and plugged it in...



Whee... charging... then i finally went to sleep... the machine arrived about 5:30pm the day before, I am very obsessive and it was now 5:32AM... OCD (Obsessive Compulsive Disoreder) anyone?

Ok, done, well sorta. The old battery when it exploded had corroded the pins inside the laptop for the battery. Pin 1 broke off after removing/inserting the battery. I apparently used up the last flex it had in it when i re-inserted the battery the 1st time :P

So I broke out the soldering iron and rigged a new connection, it works, but not being a spring is dodgy at best. No point in replacing the bad CMOS battery at this point. And I had promised my wife to slow my E-Bay buying down... A new motherboard typically sells for about $50 with shipping... but my OCD kicked in again and I said to myself, "I'll just do a quick search and see.", well... there is a "Buy Now" for $10 with $15 shipping, my daughter was standing there and said "CLICK IT NOW"... I was already moving the mouse to the

"Buy Now" button :P

So, stay tuned for "Part 3" when the motherboard comes in when I'll tear the rest of the machine down and replace the faulty motherboard :)
