914 PC Bot Supercharger Powerpack – a permanent power mod

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I did some experiments with wireless power transmission for the purpose of charging or powering a robot. I used electromagnetic induction and found that in order to transmit large amounts of power I needed a large powerful electromagnet. A quick search on Google or Yahoo showed that you can't buy a magnet as powerful as the one I needed anyway, so I would just have to make do with a few hundred milliamps instead of 5 or so amps I needed.

On the 914pcbots.com forum aibo_rescue pointed out that common household electric kettles feature a quick release safety base that provides power the kettle. He pointed out that sort of base could have the potential to make a very good charger bay for a 914 robot.

After a few seconds thinking naaah, I then thought, actually that's a darn good idea! You could safely put full mains voltage into your robot and not only charge your robot batteries, but power the whole robot at the same time, in theory the robot could be turned on forever. Not only that, but when the robot had had enough it could easily drive off without getting magnetised, and best of all you could leave the charger plugged in all the time and it would only ever consume power when the robot was charging – very green!

Well I could hardly wait to build such a charger so that Saturday I rushed to my local supermarket and bought the exact same kettle shown in the picture. The very first thing I did was take the kettle apart.

Basically there are two connectors the bottom part is effectively a mains safety plug. The top bit takes in the mains and contains a thermal cut-out and circuit breaker switch. I removed the cut-out, since my robot wont by making my coffee just yet, and forced the switch into an always on state.

Bottom (mains end)

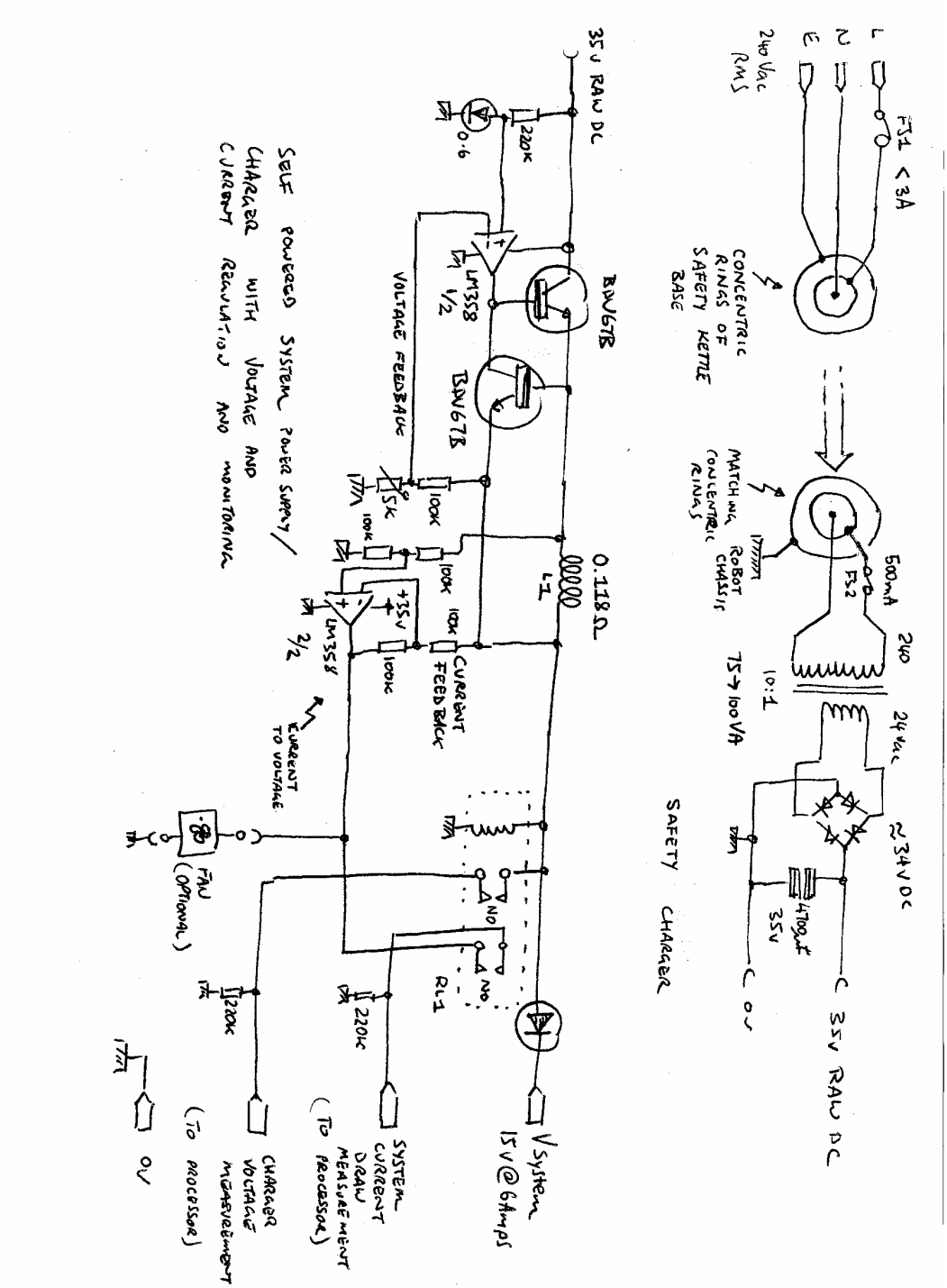
Top (robot end)

Circuit breaker

Thermal cut-out

So that's what's so special about those kettles, it boils down to a nice connector. Next I did a few calculations and went out to my local electronics store and bought a metal box and a transformer.

I came up with this circuit for the charger/power regulator. With those values and an 80VA 15v transformer you can easily provide enough power to both power and charge your robot. Mine is set up to output up to 6Amps at 15volts, but it's all tweakable.

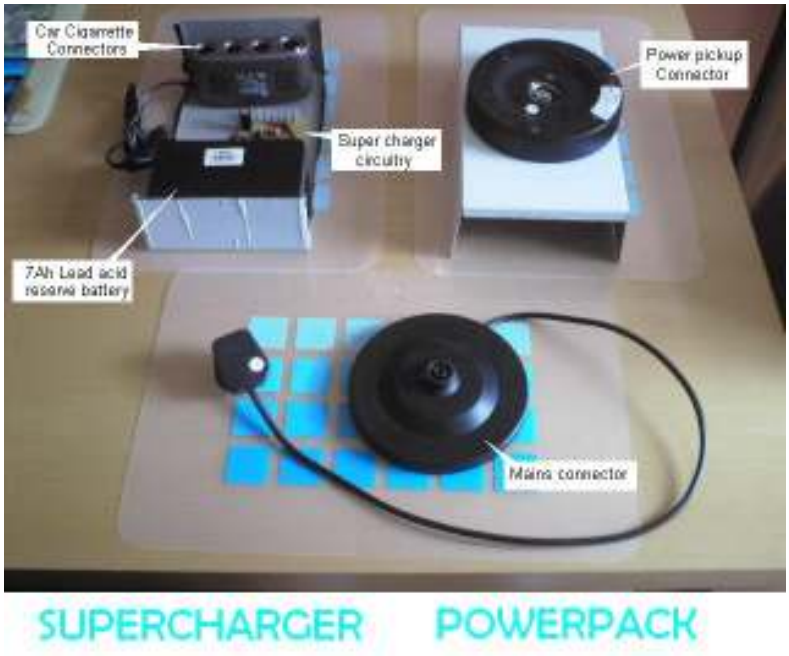


The fan is optional and its speed is proportional to the current drawn by the system. I used analogue electronics because I was in a rush.

That's me doing current and voltage measurements.

What I was really planning to do was add in a second reserve battery so add ons to the robot such as vacuum cleaners could get their power from that. I was going to use car cigarette connectors for those peripherals. I didn't bother with the extra battery in the end because really there no need.

So I built the thing and tested it.



That's my 914 being totally powered by the power pack. The batteries are actually disconnected.

SUPERCHARGER POWERPACK

By the way I got the name for this project from an episode of Lost In Space. It was the one where the B9 robot's batteries died, he needed a new '**supercharger powerpack'** – I'm pretty sure that's not going to happen to my robot.

See? Now the charger is a permanent part of my robot. I just need to put in some AI so it can find the base unit. I haven't done anything in the way of navigation with my robot yet because I was waiting to have a decent charging solution ready first. Now I have one I think it's about time for an AI project…