

# Parts Lists for “Extreme Business Cards”

Prices are typical prices from the UK/US, but all prices in US dollars  
 Prices assume you will buy a batch of 50 or 100 at a time to make up multiple cards

## Parts List for “Torch” Business Card

Item	Typical Price	Sourcing Suggestions
CR2032 Battery	\$0.16	EBay has best price – you can find someone to sell you 100 for around \$16.50 including postage. Otherwise, go to somewhere like <a href="http://www.rapidonline.com">www.rapidonline.com</a> in the UK or <a href="http://www.digikey.com">www.digikey.com</a> in the US
Coin Cell Holder	\$0.32	Again, look at eBay – can get 50 shipped for around \$16.00, but would need to change the PCB design. I used one from <a href="http://www.rapidonline.com">www.rapidonline.com</a> – part number 18-3580, which works out closer to \$0.50, but you have to buy 100 for this price. If I made these commercially, I would ditch the holder, produce PCBs with the coin cell sunk into them, and weld directly to the cells – check out <a href="http://www.philpem.me.uk/elec/welder">http://www.philpem.me.uk/elec/welder</a> to see how someone else did it. You shouldn't solder to coin cells, as they may leak or explode.
3mm High Intensity LED	\$0.15	EBay, eBay, eBay! – again you can use other suppliers, but you can get some ultra bright 3mm LEDs very cheaply here – have used some suppliers like “TopBright LED Store” for \$15 for 100, including shipping – and these are for White ones which tend to be a little more expensive.
Switch	\$0.16	I used 78-1136 from <a href="http://www.rapidonline.com">www.rapidonline.com</a> for 8p each in 100's – Any 6mmx6mm ones should work fine with the existing layout – if you can get non-surface-mount ones cheaper, just splay the legs out and solder them surface-mount style
56/68 Ohm Resistor	\$0.01	I use 72-2567 from <a href="http://www.rapidonline.com">www.rapidonline.com</a> , but any supplier will do.

## Parts List for "Dialler" Business Card

Item	Typical Price	Sourcing Suggestions
2xCR2016 Batteries	\$0.18 each	Again – try eBay for cheapest price – to get this price you will have to buy 100, and handle welding of them (see note above). For the proto I used 18-0467 from <a href="http://www.rapidonline.com">www.rapidonline.com</a> which is around one pound each (ouch!) You could of course save money and not have to weld them by using coin cell holders like in the first project, but this increases overall thickness.
PIC 10F200 Microcontroller	\$0.49	Try <a href="http://www.microchip.com">www.microchip.com</a> or buy from a dealer like <a href="http://www.farnell.com">www.farnell.com</a> in the UK or <a href="http://www.digikey.com">www.digikey.com</a> in the US.
Piezo Disk	\$0.16	I used 35-0200 from <a href="http://www.rapidonline.com">www.rapidonline.com</a> - 8p for 100+, and not much more for lower quantities.
Blank PVC Cards	\$0.16 each	I bought a pack of 100 for 7.95 pounds (\$16) from <a href="http://www.digitalid.co.uk">http://www.digitalid.co.uk</a> , but they are cheaper if you buy larger quantities – you will find them from a multitude of shops specialising in ID card printing supplies on the web, and yet again, you can get them on eBay!

## If you want to try making the PCBs yourself ....

Item	Typical Price	Sourcing Suggestions
Presensitised PCB	\$0.15 / square inch	Try suppliers already mentioned for all of these – Rapid, Farnell, Digikey etc. Another option in the UK which has some great PCB stuff is <a href="http://www.mega.uk.com">www.mega.uk.com</a> . You only need single sided laminate – I find the FR4 (fibreglass) laminate is much easier to cut – just use an old chunky paper guillotine. They even have some paper-thin polyester material which I made a prototype from – let your imagination run wild with some flexible PCBs! If you are serious about doing this cheaply, you can coat your own PCBs as well.
Developer	\$3.00	Smaller packet makes up 1 litre so can do quite a few boards – buy in bulk to save more.
Etchant	\$3.00	Pellets of Ferric Chloride to make up ½ litre, so does a good few boards as well. Personally, I use a combination of 8 Parts water, 1 part Hydrochloric Acid, and 1 Part 100vol Hydrogen Peroxide – much cleaner, and cheap to make, but the raw

		ingredients (particularly the HCl) are nasty – don't mix this up unless you know what you are doing! (If you don't know you have to add the acid to the water and not the other way around, you don't know what you are doing!) I have access to a chemical lab, so can get these quite easily. A more dilute version of HCl is available at hardware stores (called 'Muriatic Acid'), and Peroxide you can probably get from a Chemisty/Pharmacist/Drug Store/Whatever you call this type of place in your country!
Tinning Solution	\$20	Makes 1 litre – expensive, but makes the board look nice – I would leave this out if the board is encapsulated as in the dialler. I am working on a "squeegee" method of tin plating with cheap solder at the moment – more about that later (perhaps an instructable!) if anyone is interested.
500W Halogen light	\$30	Try your local hardware megastore chain. Produces enough UV to expose a board in a few minutes.

### Other useful items for making the "Dialler"

Item	Typical Price	Sourcing Suggestions
PVC Cement	\$10 for a pot	Expensive, but lasts for a long time if you don't let it dry out. Actually melts the plastic, so forms an incredibly strong bond. Try your local hardware store or buy online.
Spray on Glue	\$3-\$8 / can	I use "3M Display Mount" – expensive, but last forever – try somewhere like <a href="http://www.staples.com">www.staples.com</a> or buy online. Make sure it doesn't dissolve your ink, particularly if you use an inkjet.
PIC Kit 2 Programmer	\$35	Try <a href="http://www.farnell.com">www.farnell.com</a> or <a href="http://www.digikey.com">www.digikey.com</a> – you could probably order it directly from Microchip as well.
5 way 0.1" Header Strip	\$0.08	I used part 22-0510 from <a href="http://www.rapidonline.com">www.rapidonline.com</a> , or cut down a larger strip
OHP Transparency	\$0.20	1 sheet does around 9 overlays for the cards, or an unlimited amount of PCBs. Try <a href="http://www.staples.com">www.staples.com</a> etc, or eBay.