

# Bristol Braille Technology

Discussions during January, 2011  
relating to the aims of the project

February 1, 2011

The following quotes are taken from a number of e-mails. They have been edited for spelling mistakes and reduced down to those paragraphs which relate particularly to the aims or the project.

There were a number of other e-mails of interest during this month that are not mentioned here because of this narrow focus. As such this should not be seen as complete, but as a rough overview.

This document will be updated later this month, or early next month, to incorporate any further exchanges relevant to the formal setting of Bristol Braille Technology's aims in the near future.

# 1 Initial communication

## 1.1 Ed Rogers, 21st January

In advance of the second BBT meeting (date as yet unset, please see online poll in previous e-mail sent by doodle), I think it would be advantageous to begin the discussion through e-mail.

The question we shall need to answer is; exactly what product are we aiming to make, for what people, at what cost per unit?

The answer to this question will have the consequence of deciding a number of future decisions. Specifically, about the direction BBT takes at key moments in technical development. For example, should the issue come up, whether to accept high power consumption or reduce the number of cells.

An obvious first market would be the individual, blind, British consumer. John Clarke has agreed to ask Alison Long, head of Product at the RNIB, about the ideal price point. RNIB Product have look previously, as an aspect of the Seika project, at the price of cell displays in some detail. It is also possible that there may be a comparable assistive technology which moved from being only available with governmental or charitable funding to being available to the common consumer.

It is my opinion that we should also aim to make a cell display affordable in India which is a good benchmark for much of the rest of the developing world. This, however, will likely be more difficult and perhaps not achievable in the short to medium term. Mr Krishnaswamy, an Indian inventor now working with Paul D'Souza, said in a previous e-mail to me that a price point of \$40 would make

it affordable to a great number of individual Indian consumers. I suspect this figure is impossible for now, within any BBT project. I shall consult Braille Without Borders and Mr Krishnaswamy on the issue of making it affordable for local Indian and other Asian (notably Tibetan) charity organisations instead.

## 2 Initial responses

### 2.1 Lee Sylvester, 21st

With regard to direction, I have been giving this a lot of thought.

A Braille device, when abstracted from its mechanical aspect, is wholly unremarkable. The majority of electronics companies around the world could design a device around Braille cells with little issue. What stands in the way of the production of these machines is quite simply the cost of the cell or the protection of designs for more affordable cells. As such, I think the role of BBT should be to:

- Create and protect a design for an affordable Braille cell.
- Continue to improve on the design or replace with a new design where one becomes apparent.
- Keep such designs open for production by the greater electronic communities.

Given this direction, the role of BBT remains focused on the least attainable facet without being overburdened by the tasks required to make a complete device. It also means that the likelihood of saturating the market with affordable Braille devices or displays for existing devices becomes more likely. Also, due to the success of the open source electronics community in general, the improvement of such a cell will occur faster as people are allowed to openly suggest or implement modifications which can be committed back to the project.

## 2.2 Keith Shaw, 21st, quoting Ed Rogers

The question we shall need to answer is; exactly what product are we aiming to make, for what people, at what cost per unit?

You are right on the mark! So many times I have seen projects flounder around - with the inevitable result that nothing useful ever gets completed. It usually comes down to either a weak product specification, or even no product specification! This was one of Deane Blazie's strengths - he figured out what he wanted in a product, brought it to the R&D group and then made sure that us guys didn't change anything related to the basic product specification. his track record says that he probably had the right approach...

...any input you might have on the matter of target price and market

Sorry, I'm no marketing whiz. But I think if you set \$200 for the price to the user it would be a spectacular achievement and not totally unrealistic. Of course I would not recommend this if you actually wanted to make some decent \$\$\$s (or pounds). Once the price point is set, I expect that you can back down on the size of the display, if need be. I would stick with 20+ cells if possible.

Which brings to mind a question: are you staying with standard Braille (6-dot) or trying for 8-dot Braille cells?

## 2.3 Keith Shaw, 21st, continuing from above

We shall certainly be avoiding 8 cell (sic) Braille. Firstly, its usage is not really required for the learning process

Agreed.

I'm also constantly reminded that, anywhere in the world, 80% of persons relying upon Braille are very happy with 6-dot raille.

according to Scott Wood from Action for Blind People, 8-dot might even be distracting).

I have heard this from many different sources.

Secondly, it would be difficult to see how we could use it without increasing the cost by a third.

Yep!

## 2.4 Peter Walters, 22nd

A sensible approach might be to gather the following statistics (if you haven't done so already)

The total number of blind people who can read Braille:

1. in the UK
2. in Europe
3. in North America
4. in the World

The will allow a rough estimate to be made of the size of the market(s) for a low(er) cost Braille reader, and following this the potential number of units which might be manufactured. Market size and production volume will have a huge influence on end-unit costs, according to the economics of scale of manufacturing, as is the case with any manufactured item.

It's a good idea to speak to the RNIB and other organisations to ask for their views on what they think might be an acceptable price for such a device.

However the determining factor will of course be the cost of the actuator technology, and this means that, at least for the foreseeable future, the cost might be nearer to £400 than \$40,

## **2.5 John Clarke, 24th**

I've emailed Steve Tyler (RNIB head of innovation and projects) with a brief report on the last BBT meeting, a request for help with price point figures, and a direct question asking whether RNIB want to be involved.

## **2.6 Paul Kronenberg, Braille Without Borders, 27th**

Of course the credo for the Braille displays would be "the lower the cost the better".

The sales price of a Braille Display depends a little on the group that will be targeted.

If you want every blind child in the world to be able to afford one, the costs have to come down dramatically. Between 30 and 50 usd (And this is still a lot of money for blind children in developing countries)

If the Braille display should be available in classrooms/libraries/Braille printing presses, then the numbers will be less and the price would be a bit higher. app 100 to 150 usd.

We started an initiative called the CSI (Centre for Social Innova-

tion).

In this centre we very much believe in the following philosophy.

If someone, who is in a position he/she has not chosen to be in, needs any kind of aid to enable him/her to have access to education/information/society, then these products should be designed to serve the purpose, low maintenance (Best would be if the user can repair the device him/herself) and sold at a price which is affordable for the said individual. (No one chooses to be blind, to be in wheelchair, to be born in a developing country etc etc).

A way to make this happen is to create products in the "Open source Hardware or "Open Hardware" approach.

This means that any product can be opened, adjusted, improved by anyone under the condition that whomever opens the device is informed clearly that whatever he/she improved on it, the copyright of that particular idea will belong to society so no monetary gain can be made on this particular idea. In this way, ideas are free, the costs will then exist only of materials/labour and distribution. Of course a regular profit margin should be included to guarantee sustainability for the factory.

We have presented this idea to many people across the world and many people are sceptic about such an approach.

We however believe that if it works for open source software, it should also work for open source hardware. There are plenty of retired engineers, young students and not to forget the users of the products.. (In case of the blind and partially sighted, a potential 161 million worldwide!)

I hope this is some food for thought and that your approach is going into the same direction.

I am happy to look at the technical aspect of your product if you are willing to send me some of the technical details/design.

## **2.7 Paul, Kronenberg, 27th, continuing from above**

150 usd is a challenge but I am sure that if people focus only on finding solutions to realize this rather than losing energy on discussion why this is not possible we will definitely move in the right direction :-)

Yes, I am trying to support where I can to get the right people involved in the development of Paul de Souza's as well as NK's Natesan Braille Display..

All very challenging but at the same time very exciting!

Please do send me an e-mail so now and then with feedback and food for thought..

## 3 Specifically regarding open hardware

### 3.1 Tarim, 29th

Paul at Kerala talks about open source hardware (and I am in firm agreement with the principles he states.) [see above]

Legally, the situation is less clear (notably, Paul talks about copyrighting an idea - which, legally, is not possible.) Open source software works because it leverages copyright law - which can be applied to software, in a similar fashion, in most countries. With piece of open source software it actually depends on the copyright being held by the author or authors who then grant anyone the right to copy it *provided* they then allow anyone else to copy any derivative work in the same way. Thus, legally, people *have* to keep any modifications they make, "open".

Copyright does not apply to pieces of hardware; there is only a complex system of design rights and patents which apply differently in every country. So, although you can state principles of open source hardware (and many do) it is much harder to create a legally enforceable piece of open hardware design. There are people working on trying to have laws brought in, in various countries, which cater for this - but, to my knowledge, none are in place yet.

Take a look at some of the work of Forty-fires and their electric car for people who are also addressing this problem.

Just thought I should point out that believing in a philosophy of law can be slightly different to how the law works in practice.

### **3.2 Adrian Bowyer, 29th**

Open Source Hardware facilitated by copyright works very well - this is exactly how RepRap is run.

The reason for this is that there is no such thing as hardware these days; everything is software. Any physical artefact consists at its most fundamental level of the computer files that completely describe it and that automatically make it. Those are eminently copy-rightable, and that's the path by which you route the open-source licence.

### **3.3 Lee Sylvester, 30th**

One can also copyright by publication. If the schematics and description were published in some fashion describing the hardware implementation, then should the hardware copyright be objected, the publication copyright could be enforced. This ensures a two-fold protection on the technology on the whole. It also gives rise to the possibility of third world companies producing such hardware by being able to acquire the publication online (or other means as agreed by the group).

With regard to open source technologies and the requirement for changes to be submitted back to the project; this is only applicable to changes directly affecting the item in question. Where modularity is apparent or where additions are made that do not disrupt the particulars of the open source project, no information need be submitted back into the project. This is a benefit to poorer companies and countries, but allows for some misuse by more capable companies / countries. In such situations, a plea for support in ex-

change for afforded notability is often the answer, and could mean the advancement of the project from those larger companies.

### **3.4 N. Krishnaswamy, 30th**

Seeing this email discussion on the subject of Copyright/Open Source hardware/etc, I thought everyone involved in this exchange would be interested to have close look at the attached document on the Simputer GPL that provides a well crafted, legally sound model for what we may be looking for. For background on the Simputer one could visit [www.simputer.org/](http://www.simputer.org/)

(Referenced document enclosed with PDF)

### **3.5 N. Krishnaswamy, 31th, continuing from above**

I have no information on whether this license was ever tested out in any legal proceeding. But I do think it is a good enough model for people to take chances with whatever protection it really does provide. Basically simple publication does provide a fair measure of protection.

### **3.6 Keith Shaw, 31st**

I have found this whole discussion of an open source concept very interesting.

I might suggest that you prepare a summary, and with the proper permissions (PaulK, Adrian, NK), publish as part of the BBT initiative on your website. I note that British companies seem to be on the forefront with this concept?