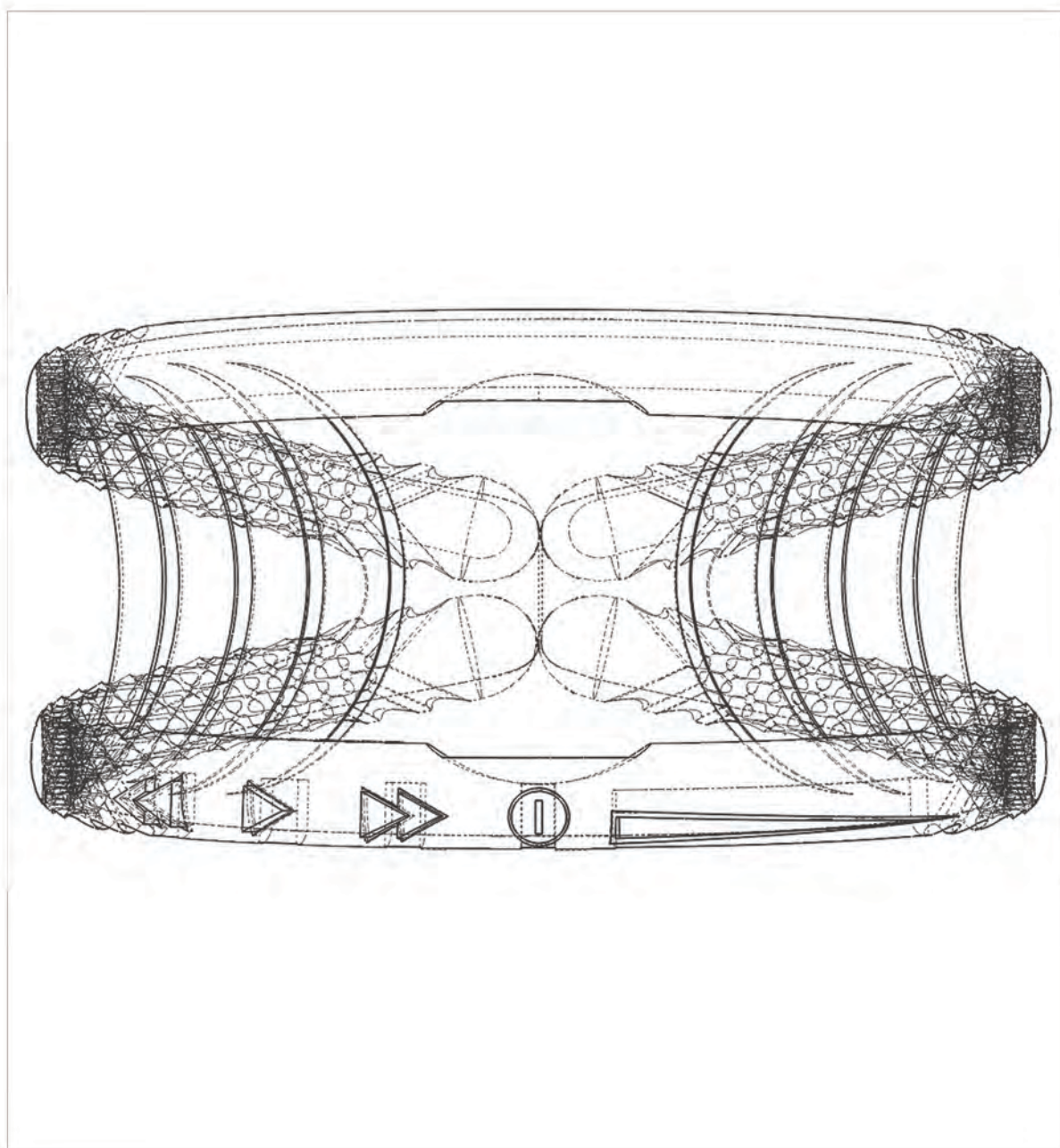


A faint, stylized illustration of a portable music player, possibly a Walkman, serves as the background. The device is shown in a perspective view, with its cassette deck and control buttons visible. Overlaid on this illustration is the text 'Touch Music' in a clean, sans-serif font. The word 'Touch' is positioned above 'Music', and both are centered horizontally. The overall aesthetic is minimalist and nostalgic.

# Touch Music



Mp3 Player



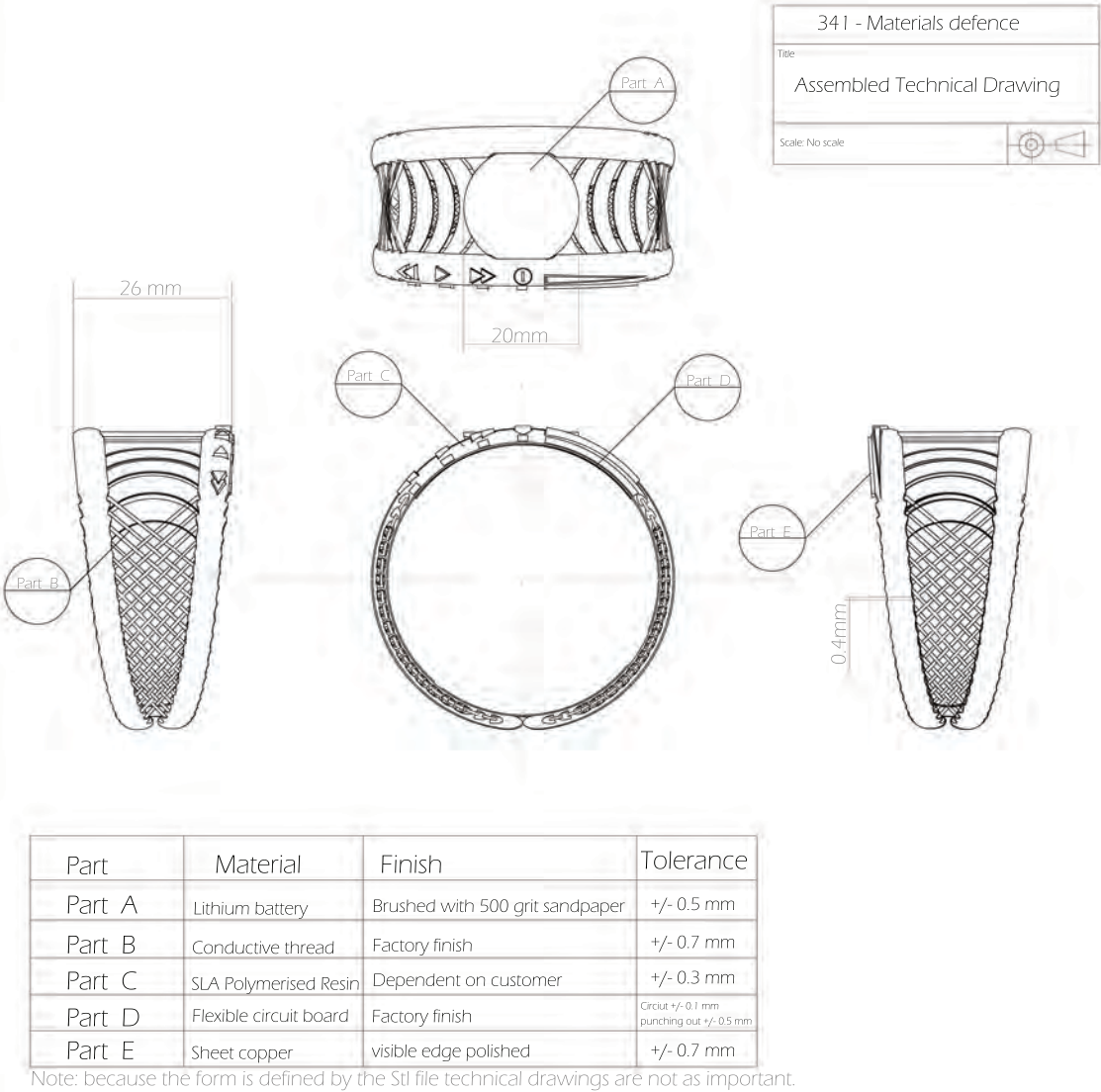
Context



Context

This mp3 player has been designed for the hearing impaired. People with hearing loss still enjoy listing to music through the vibrations thy can feel in their bodies. However this requires the music to be very loud and it is therefore obtrusive to hearing people. An mp3 player is personal and portable. To achieve this, my mp3 player creates a ‘visualization’ of the music on the ‘listeners’ arm through gentle electrical pulses.

The mp3 player is a made to order product using the benefits of both standardization and customization—a product which uses a standards base design but is customized to be unique to each customer. The rapid prototyped band of the mp3 player is made to fit the individual’s wrist. Also the finish can be chosen





Rapid prototyping (SLA) Stereolithography)

Rapid prototyping is the only manufacturing option for this design. Firstly because the shape is so intricate and small, other manufacturing options would not be able to achieve the form, and secondly each form produce is specific to a different customer, meaning the shape is changed each time it is made. Rapid prototyping allows for this change. SLA has flexible properties when it is printed thinly and will further mold to the shape of the wrist as it is worn.

**Safety:**  
Because the process of rapid prototyping is outsourced it is not necessary to worry about the safety precautions when manufacturing the part that is up to the company making the part.  
When cleaning the product standard safety precautions should be followed. (Do not swallow; wash your hands after cleaning off support material etc.) The material is not toxic to touch

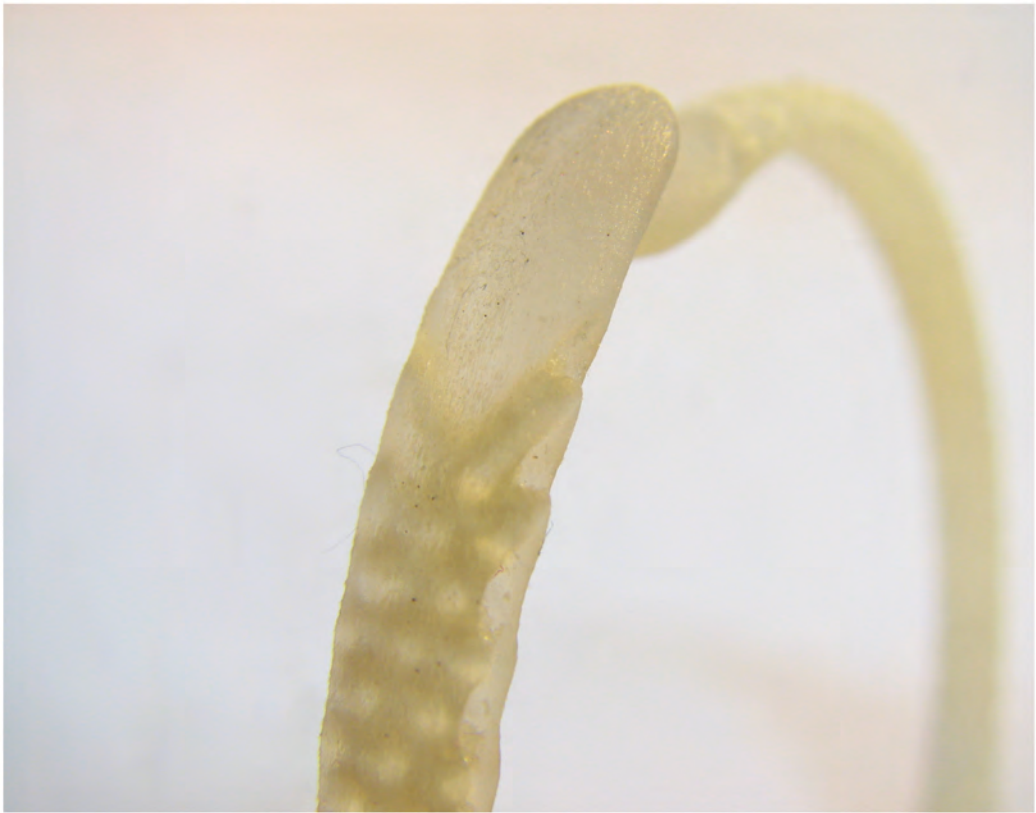
**Time:**  
Once the piece has been made and picked up it should take about 40 min to clean off the support material. This should be done over paper or a bin as it sticks to everything.

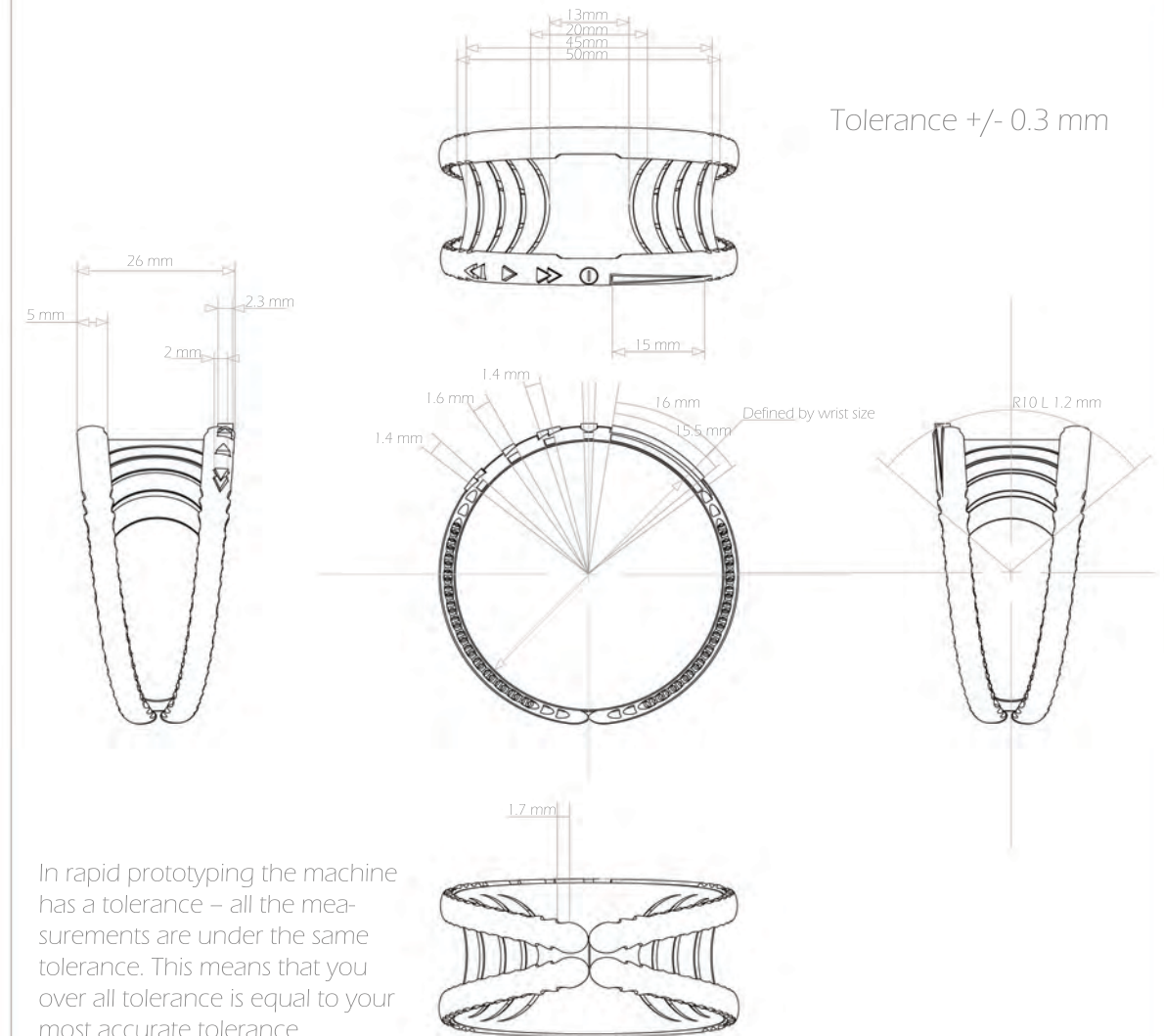
**Cost:**  
From Arthur Mahon at the victoria university shop : \$98 Full tray \$120 Empty tray  
From ARRK : \$235

**Finish**  
The finish is dependent on the customer. They can choose from:

- Fished to 1000 grit sand paper then sprayed with clear
- Fished to 1000 grit sand paper, dusted with either copper or brass dust, then sprayed with clear lacquer
- Cleaned dyed with any colour from the Dylon cold range, then sprayed with two coats of clear lacquer, sanded and sprayed again.

**Safety:**  
When using clear coat and the powders mask and goggles should be worn and is should be done in a vented room.  
When sanding goggles and mask should be worn.  
When dyeing gloves and goggles should be worn





In rapid prototyping the machine has a tolerance – all the measurements are under the same tolerance. This means that you over all tolerance is equal to your most accurate tolerance.

Note: this part is not defined by the technical drawing but by the cad file.

Copper controls

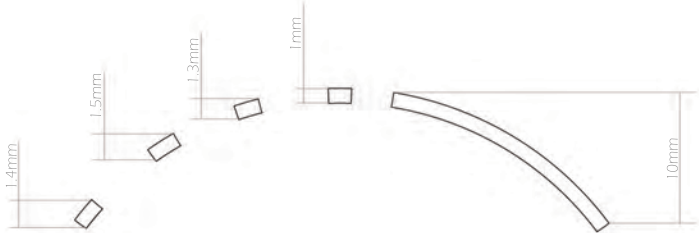
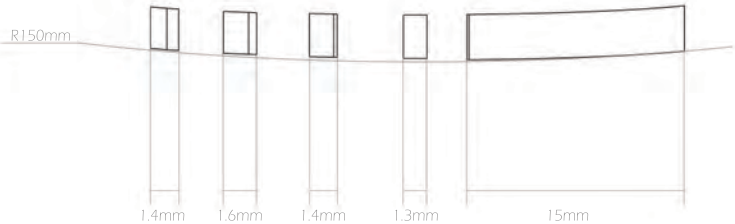
Because theses controls use such a small amount of copper the best place to get the copper is from a scrap metal place. This is possible because it is not necessary to have large sheets of perfect material this can use lost of small parts. It also allows me to get smaller sizes and is using recycled materials.

Cost

\$5.50 per kg



341 - Materials defence	
Title	Copper Controls
Tolerance +/- 0.4 mm	



## Battery

This is a 3 volt lithium button battery. This was chosen because it was extra thin.

The battery is finish by sanding the top with 500 grit sand paper.

### Cost:

This can be obtained from Jay car for \$3.15 each as long as more than 15 is purchased at a time. Total cost for 15 = \$37.80 (+gst) (product # SB2529)

Or from Deal extreme you can buy 20 for \$6.53 making each battery cost \$0.33 (product name 2032 x 20 pcs Cell Batteries)

Safety: When sanding be careful not to rupture the battery. If this occurs immediately wash hands and contaminated areas and carefully dispose of battery.

Time: 20 min to sand.





## Graphite

There were several options for graphite: mined, synthetic, and recycled. Ideally I would have liked to use recycled graphite but it was difficult to find suppliers and the one I found sold it in metric tonnes.

I could get both synthetic and mined graphite from Stanford materials or Tianjin Chino Minerals trading corp. or many others. However these large suppliers had large minimum orders. Also buying in this bulk size would mean packaging the graphite for the individual, adding to the cost.

Instead the Graphite Store sells 1lb containers of natural (mined) graphite.

Cost: 5 cases of 12 1lb container (60 containers) = \$777.65  
Making one container = \$12.96



Safety for consumer: do not use on broken skin. Be careful with powder and do not inhale large quantities

Environmental: mined graphite is slightly less damaging to the environment than synthetic graphite. Mining uses lots of energy and destroys a large surrounding environment. However synthetic graphite uses large amounts of energy, causes pollution, and also includes the environmental cost of getting the Petroleum coke which turned into graphite.





#### Flexible circuit board

A flexible circuit board was chosen over a rigid one because there is no place in the design to fit a rigid circuit board. It was chosen over internal wiring because it is thinner, more accurate, and more durable. It is also easier to manufacture.

Flexible circuit boards can be sourced from Entech Electronics (NZ company)

#### Cost:

Tooling would cost \$440

Printing 100 would cost \$324.50

Individual board would cost \$7.65

Note: additional printings would not require redoing the tooling.

Safety: beware of paper cuts.



## Finish

Clear lacquer can be obtained from most hardware stores. It usually cost about \$15 and would coat approximately 50 mp3 players.

Dylon can be perchance from from many chemists and most textile and craft shops. Dylon costs \$4.90

copper and brass dust can be supplied from. Top mark Products (NZ Company) for \$20.80 per 100 g container. 100g would cover approximately 400 mp3 players. Making it \$0.052 per player

Because this is an extra and would not always be used a surcharge would need to be added to cover the cost of stocking the material.

Time: to sand and clear coat the takes 2hrs not including the second drying time which is approximately another 30 min. to dye the resin another 40 min needs to be added (including drying time)

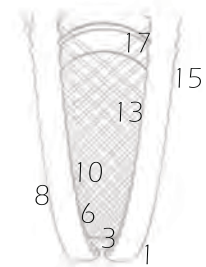


## Conductive thread

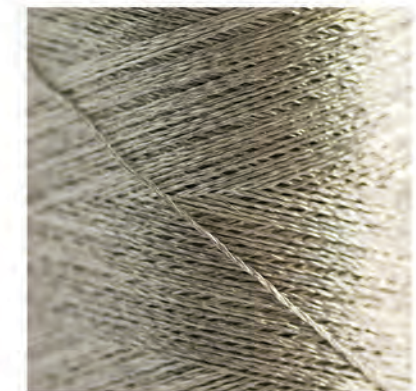
The electricity is transferred form the electronics to the graphite through conductive thread. Durafil-conductive looked promising as a supplier. Their conductive thread is white and they can then dye it you choice of colour. However they did not reply to my enquires in to price and from their web site it look like the minimum purchase would be much larger than I would want.

Instead I opted for Sparkfun electronics who sold silver conductive thread.

Cost  
\$19.95 For 150 Yards (130ish m) this would do 130 mp3 players.  
\$0.15 per player.



Put the thread through specified holes then just follow the thread round





### Graphite stencils

I chose to use Self adhesive vinyl as a stencil because it is very flexible and it easily adheres to the skin.

Cost  
\$130 for 50 m role 610 mm wide.

AUT Laser cutting  
Cost \$ 10 for A2 Sheet under 30 min

When divided out it would cost about \$1.03 per stencil

