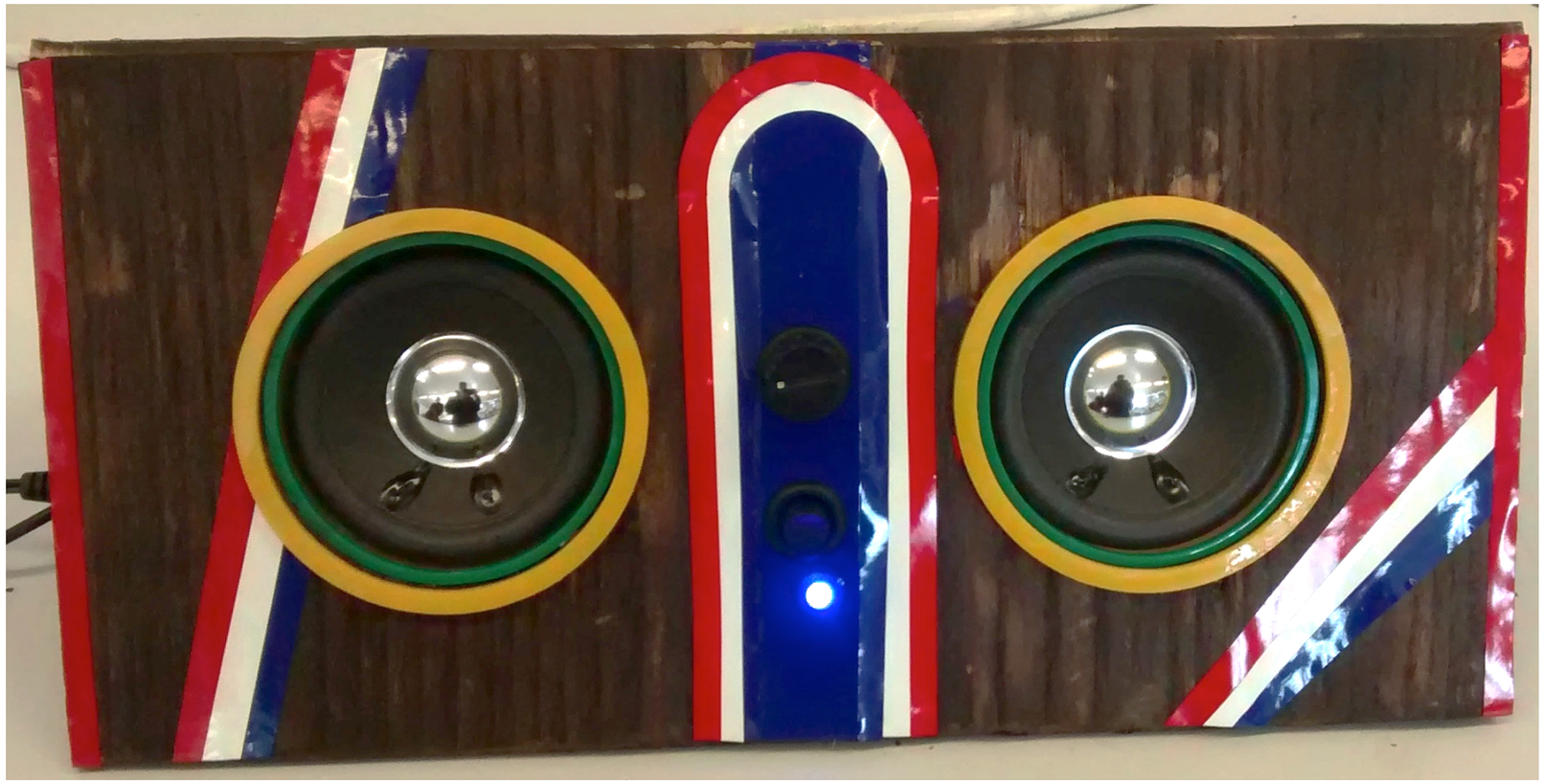

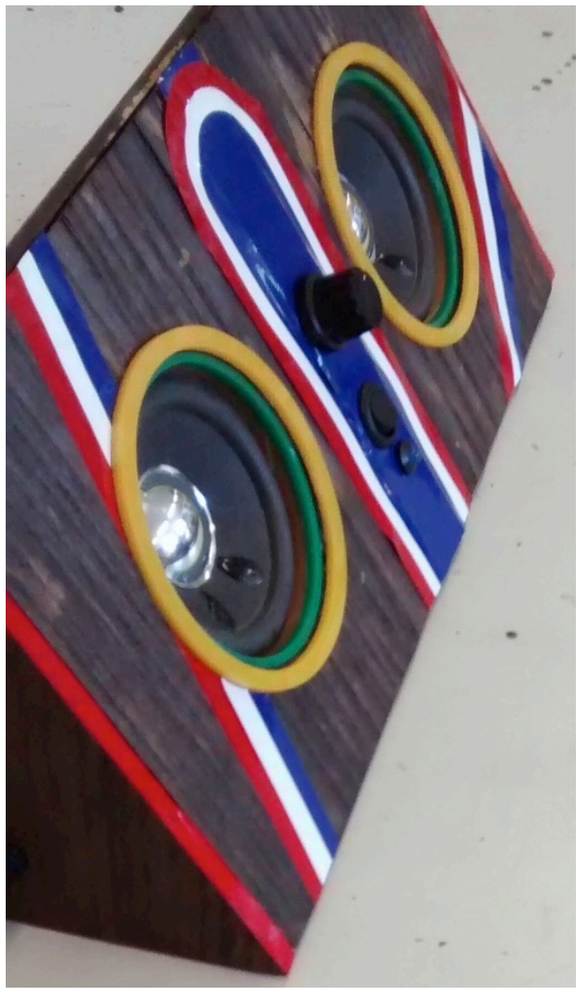

GCSE Coursework: Designer Influences

By Amar Gudka

Candidate Number:1461
Centre Number :14737

Contents

Evaluation
I used this slide to help me plan my project. Turning each tile from red to green to indicate when completed. This helped tremendously with my organisational skills.

Design Problem

The problems I plan to solve are:

- Lack of quality speakers- Many people have to suffer with not being able to afford good quality speakers due to the incredible prices. Often the cheaper speakers will not usually be loud enough and the clarity of sound will be poor. Furthermore, I believe there is sometimes a lack of new technologies being incorporated into speaker designs. I believe simple thing such as a docking station, volume control and LED lighting are essential in these modern times.
- Accessibility to music- Many people buy headphones so they can listen to personal music (which have there own great advantages). However, when in a group or at a party these are useless as they are not able to socialise and share their love for music. Furthermore, laptop and phone speakers are often too quiet on there own. By having speakers they will be able to sing and dance to loud music in there homes or when with friends without having to wear headphones.
- Awareness of the retro style- Many people buy speakers without caring about the design and solely look at the Specs. Furthermore, many design influences have died out due to modern technology. By bringing back the retro design and incorporating modern components into the design I hope to make customers gain an aesthetic appreciation for the design movement

Evaluation

These are suitable problems to solve because they are simple enough to make sure that the solutions can be included in the speaker. For example, buying a high quality amp to improve the quality of the speaker. These problems that will be solved satisfy my client because she feels that her issues with her current speakers will be addressed with the one I design.

Design Brief

Context: Designer Influences

The work of a specific artist/designer/chef or Art/Design Movement could be the source of ideas for a new range of products aimed at a design-conscious consumer market. When completing the task you should ensure that the designs developed into prototypes are not copies of existing work but reflect the general style of the chosen source and might be viewed as "in the style of…".

Design Task 3

A mail order company wishes to offer a range of products based upon 20th century design movements. You are required to choose one such movement and to design and make a product or range of products which reflect the essential features of the movement. You will need to investigate a specific target market. Products such as the following might be considered:

- Lighting
- Photo/mirror frames
- Soft furnishings
- MP3 player/radios
- Tableware
- Small scale storage units
- Clocks

My Client

The speaker will be designed for teenagers and students between the ages of 13 -24. My client will be my cousin and she is of the age of 19.

Task Analysis

People

I will be conducting a survey to find out the following:

- The tastes of the client. To include the clients likes and to adapt the product around the clients dislikes so that it suits the majority of people's needs.
- The technologies the clients want to be incorporated within the design.
- The portability of the speaker. So the size the clients want it to be. Whether they want it to be small or big but also whether they want it to be portable. I will be able to make the speaker a certain size so that is the right size for the clients.
- The age, gender and occupation of the clients and how they will use it.
- The price the clients are willing to pay so that I can choose the correct materials and that a profit can be obtained.

Places

I will conduct a survey to find out:

- The environment the speaker is likely to be kept
- How much space the speaker should take on a table or wherever it is placed
- Where the speaker will be used and for what purpose.

Products

I will be analysing existing products to:

- Improve on existing designs and by making it better and unique.
- Look at the retro design of speakers to give me ideas on how to include it in my design.
- See existing prices in the market and then to find a suitable price for my product.
- What are the common materials used in speaker making. This research should make the product become as durable and safe as possible.
- What the processes are in manufacturing a speaker.

Processes

I will be researching the manufacturing processes and materials to learn about the following:

- The properties of each materials. Which is best suited to be used in speaker making.
- The joining methods that could be used to make this speaker and what the client will prefer.
- The possible manufacturing processes. Which is the cheapest and safest way to make the speaker but also the most efficient way possible.

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Initial Specification

Time scale

- The project will take roughly 40 hours to complete
- I have until the end of the Easter term 2016 to complete the MP3 Speaker

Customer

- My MP3 Speaker will be focused for customers who are currently students.
- Studying at school and university

Purpose

- Raise awareness of the Retro design movement by reflecting the features of it.
- To help students enjoy music, especially at parties, through loud high quality speakers.

Aesthetics

- My MP3 Speaker will be based around the Retro design movement.
- However, I will make it an original and unique MP3 Speaker before the aesthetic design of this movement.

Materials

- Materials that will be used to make this MP3 Speaker will include wood as well as electronic wires, circuit boards and components.
- I would also like to veneer the product

Cost:

- The MP3 Speaker should cost around £50
- There is no specific budget for this project.

Manufacturing

- My MP3 Speaker will not be manufactured on a large scale, however it is likely to be made from a number of materials such as acrylic and plywood.

Function

- The function of my MP3 Speaker is to play loud high quality music when exercising or for other things such as dancing and playing an instrument.

Safety

- Safety will be a priority during the construction process of this MP3 Speaker. I will take numerous precautions to minimise the risk of injury to myself or others, including:
- Being careful when wiring up the MP3 Speaker (soldering and testing)
- To be careful when cutting and sanding if necessary

Ergonomics

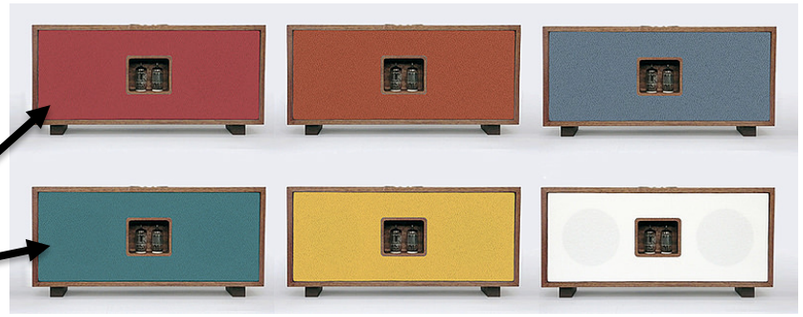
- I want it to be easy to use
- The size should be small enough to carry with two hands.
- The weight needs to be fairly light so that it can be easily moved

Evaluation

These are suitable specifications for my speakers. However, they need to be developed within a secondary specification. My client agrees and says they are a good starting point but she will like more.

Retro Design Movement

The use of the bright primary colours draws attention



Evaluation

This is a suitable design movement for speakers as many have been designed like this before. However, The retro design has not been used as much in recent times so it can be seen as original depending on the design. My client very much likes the design movement and thinks its much better than Bauhaus design movement because of the simplicity of it

- The retro style came about in the 1970's.
- It is a style that makes new products turn to trends of the past.
- These include products, fashions and artistic styles produced since the Industrial Revolution and modern times.
- Some characteristics of this design movement are the use of simple shapes, vivid graphics and pale colours.
- Older textures would be used. Therefore, there would be limited use of plastics and metals such as aluminium and a more frequent use of wood and leather.
- Badges and logos give it an authentic feel.
- The ideal aim is to bring back memories of the past.

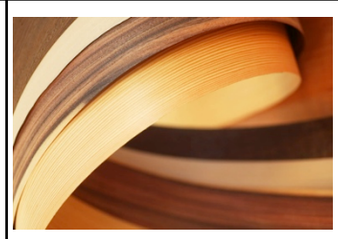
Veneered wood to give an older look

The use of the simple shapes give a distinct and vintage look

Material

Evaluation

These are suitable materials to use when building the speakers because the plywood, MDF and acrylic are pretty cheap and are supplied by my school. Furthermore, the retro design can be expressed by the vinyl and the veneer due to the variety colours of the vinyl and the authentic look the speaker will have if veneered. My client likes the selection of materials and would like to see all of them included because it can show a greater level of skill.

Material	Grain image	Board Uses	Example product
MDF - It has a smooth and even surface. It can be easily cut, painted or stained. Saw dust is used to manufacture this board. Can be made fire and water resistant. It is denser than plywood. When cut it releases toxins and lots of dust that can be harmful to the respiratory system. Can be produced in a number of thicknesses.		Used mainly for furniture, skirting and interior paneling due to its qualities that make it easy and convenient to use. It is very popular so it is very cheap. Used a lot in school projects. Can be unattractive so it is often veneered or painted on.	
Plywood - This is a very strong board which can be can be made by gluing layers of veneer or individual plies at 90 degrees to each other. This makes it extremely strong and less likely to split or wrap. Produced in different thicknesses.		Used mainly as a structural panel due to its strength. Also used in constructions of buildings such as walls, roofs and floors. Sometimes used for furniture making and boat building.	
Acrylic – It is a strong, versatile and flexible material. It is a thermoplastic so it can be re-heated and reshaped. It can be easily bent and used in different methods such as vacuum forming. It comes in sheets of different colours and thicknesses. It can be either translucent, transparent or opaque and is resistant to most acids and weather conditions.		Used in aquarium windows, aircraft canopies and helmet visors. It is being used more frequently in design of houses and furniture.	
Vinyl – It is a type of plastic made from crude oil and chloride. It is quite strong, durable and resistant to moisture and heat.Manufactured as a roll of sheet in variety of colours and either transparent or opaque. Vinyl is a very low cost material to produce and easily recycled.		It is used most commonly for flooring, siding, records and medical gloves. However, it can be combined with other additives and modifiers to be used In the manufacture of many different products such as the print on clothes.	
Veneer – It is a very thin sheet of natural wood. It is produced by peeling a layer off the trunk using a cutter while the trunk is rotating. Usually comes in rolls or sheets. It is very attractive and is used to disguise cheap manufactured boards. However, it is extremely fragile and very expensive.		Used for furniture, flooring, skirting and many other household items. Made to make things look luxurious and expensive.	

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Grammar School - Centre No. 14737

Joining Methods

Evaluation
Any of these joining method would be suitable for my speakers and my client does not mind have it its joined as long as it looks attractive.

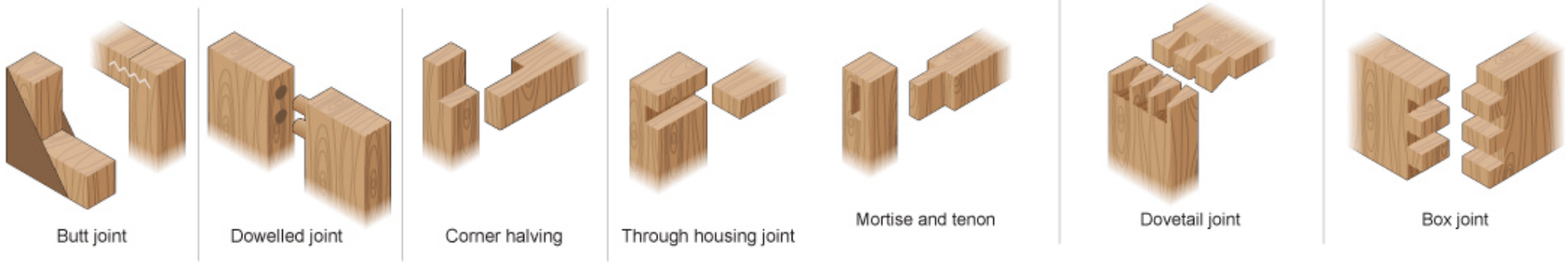
- Mechanical Joining

Screws are used to join together woods, plastics and metals. Using screws will allow us to join a product together and take it apart easily. However the screws can corrode as they are metal and joint will no longer hold. They are also difficult to hide and can be unattractive. Despite this they are used frequently because not only do they hold a strong joint but hey make it easy to package products when being transported in parts.

- Adhesive Bonding

Adhesives are used to join one piece of material to another. The advantages of this method is that the joint can be made extremely strong. However, using them can be time consuming due to that they usually take a long time to dry. Adhesives can also be harmful as they contain poisonous fumes and they can corrode the skin. They are also difficult to master as you have to ensure safety and to use the right amount of adhesive. Examples of adhesives are:

- PVA (polyvinyl acetate)
- Synthetic resin
- Epoxy resin
- Contact adhesive
- Acrylic cement



Frame Joints
These are strong, long-lasting and attractive joints of wood. Frame joints are usually at a right angle and are commonly found in furniture and other wooden frames.

- The simplest form of frame joint is a butt joint. Though easy to make it can be very weak due to only one point of contact between the wood. However it can be strengthened by reinforcing it with plate over the joint.
- A dowel joint is a butt joint strengthened by gluing a dowel into both parts. Dowelled joints don't make wood split as easy as screws or nails making them ideal for manufactured boards.
- Corner halving or lap joints are much stronger than butt joints because there are two contact points for gluing. The shoulder gives extra mechanical strength but can slide off each other if not glued or screwed.
- Through housing joints are used for shelves as they make it easy for the shelf to be moved to different heights. You can only slide it out as the housing blocks upward and downwards movement. However, in some cases it is also able to be lifted out due to only having the bottom housing.
- Mortise and Tenon joints are similar to bridle joints and are very strong because of the shoulders and it having several points of contact to be glued. There will only be lateral movement with this joint.
- Dovetail joints are very strong and attractive but are complex and difficult to cut. They are often used in high-quality furniture because they are virtually impossible to slide out. They can lock together without the need of glue.
- Box joints or finger joints are similar to the dovetail joint but are easier to make and don't lock together as well. They offer good contact for gluing and are often used in wooden boxes. They can be used if the product needs to be able to be easily assembled like a jigsaw and packed away as well.

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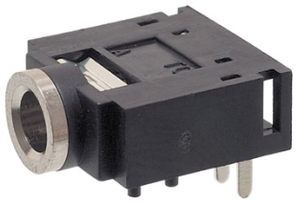
Components

Two way terminal block



3.5mm AUX connector

Potentiometer

DC Socket

Switch

<u>Polarity</u>

In DC circuits, the electrical current flows in one direction only. The electrons flow from positive to negative. This is important because we need to make sure we solder the components correctly so that they work properly. Most components are polarised (LED) and we can usually tell by using black and red wires or long and short legs.

<u>Resistors</u>

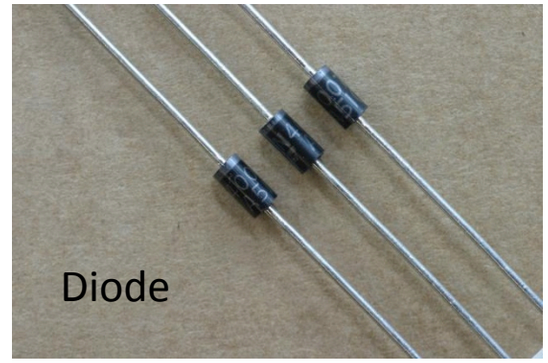
We use resistors because the limit the amount of current flowing through the circuit. If too much current flows the circuit will heat up and possibly melt. In turn, the voltage will be reduced. If we use DC power we are supplying about 1500W to the speaker. Current and Voltage multiply to equal Watts. My speakers are only 10W each so it is important to step down both the current and voltage in order to reduce the power output.

<u>Capacitors</u>

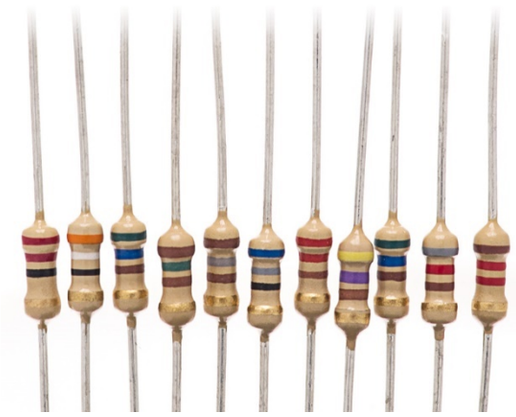
A capacitor stores electrical energy temporarily. The power source actually powers the capacitors and not the speakers. Then, the capacitors send power to the speakers. This is because the capacitors are more reliable and efficient.

Evaluation

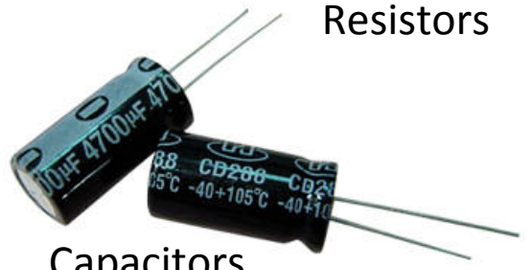
These are essential components to use when building the speakers as without them the speaker would not work. Furthermore, I think the added possibilities with the kit used like the potentiometer show that my speaker will have great potential. My client likes the range of components chosen and thinks that it will not be too complex to make as long as other thinks aren't added like Bluetooth or a docking station.



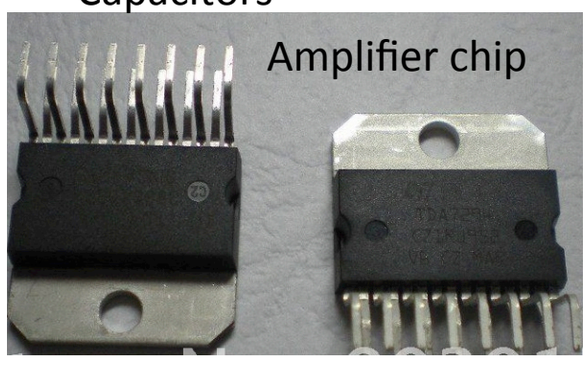
Light **E**mitting **D**iode



Resistors

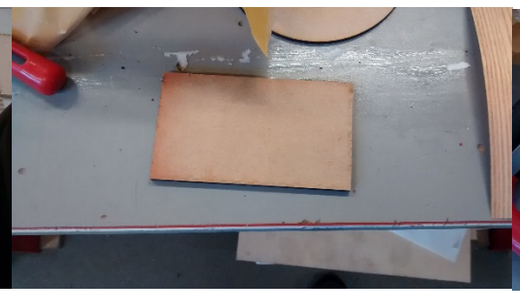


Capacitors



Veneering

Veneer comes in long sheets and need to be cut to size using a scalpel. We tape it to the desk as it is very fragile and it comes rolled up so isn't flat.



We use veneer to cover unattractive and boring wooden panels. This adds a more realistic look and makes it look more expensive.

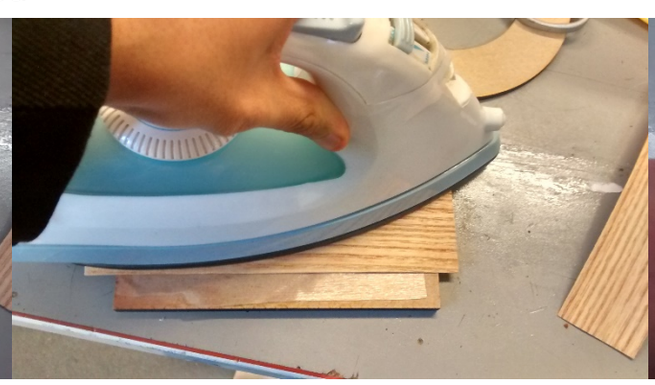
Here we have the iron-on glue which sticks veneer to wood. It is easier to use than PVA as it can be cut to size and only glues the veneer to the board when heated

The roller evens out the glue and makes sure there are no bumps and everything is stuck down

The Iron provides the heat source to melt the iron-on glue. It must be used carefully as it can leave burn marks on the veneer.

Cut glue sheet to the desired size. Place on top of the wood.

Cut veneer to the desired size. Place on top of the iron-on glue.



Place a hot iron on top of the veneer. Allow glue to melt and work your way across the veneer from side to side. It is vital that you cover the whole of the veneer but be careful as veneer can slip and move out of position.

After it is stuck down use the roller to even all the glue and to make sure the veneer sticks down. You can also use this to correct any changes in position of the veneer. After this you can use the iron and roller again to make sure the glue has melted the whole way through and everything is stuck down

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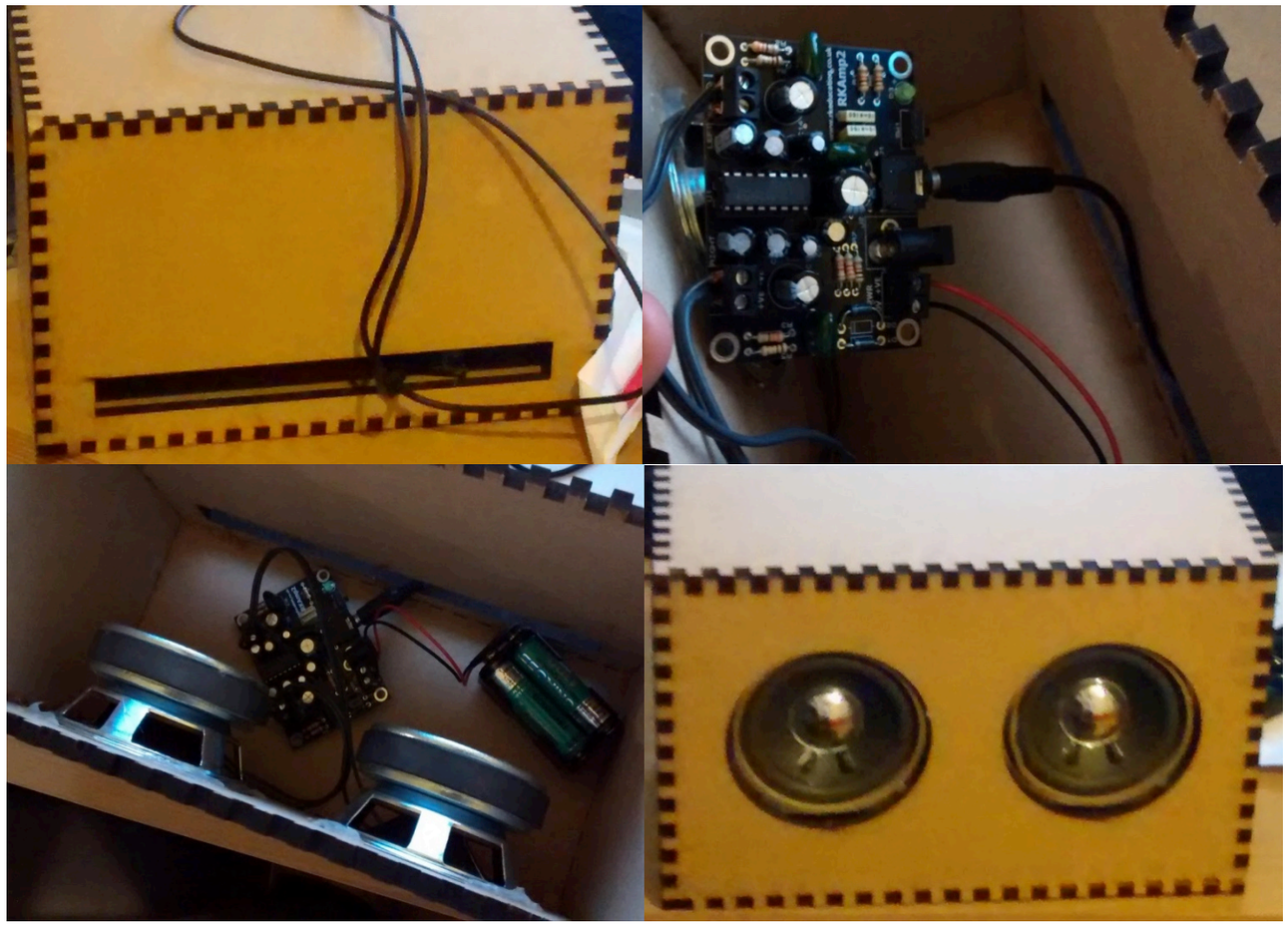
Product Disassembly

In 2014, I was in Yr.9 when I created my first speaker. This project inspired me to do it again but improve on the design I had previously made. My speaker was a laser cut cuboid box. I felt that the MDF was a cheap and unattractive finish. In hindsight, I feel I should have painted the product to at least make it more exciting. This is why I have decided to challenge myself and create a design that has a unique shape and will incorporate the colours of the retro design. Furthermore, I plan to veneer the project in order to give it a professional finish.

In my previous project I used 5W speakers running via batteries. I have decided that I will upgrade my new speakers by making it 10W and running on mains electricity. Furthermore, I will include a switch and a charging dock if time permits.

In my previous project I decided to have big holes and glue the speaker in. This time I will make it professionally done by screwing in the speakers and making small holes so that only the certain wires, switches and LED can be seen. Moreover, rather than having the top come of easily I would like to make a panel that can screw into place.



Evaluation

Making a speaker in Yr.9 will help me to create this new project with more efficiency. This is because I now have the experience to make a speaker. It will also help me because I will have learnt from my mistakes. For example, I made the holes for the speaker too big. Now, I will measure the diameter of the speakers and any components before I drill holes. My client likes the fact that I have made speakers because it shows that I can make the best possible product for her.

Questionnaire

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Target Audience – User

1. Gender

Male ☐ Female ☐

2. Age group

13-15 ☐ 16-19 ☐ 20-24 ☐

3. Occupation

School ☐ College ☐ University ☐ Internship ☐

4. Where the speaker will be used

Lounge ☐ Bed side ☐ Studio ☐ Office ☐

5. Speakers main purpose

Partying ☐ Singing ☐ Dancing ☐ Listening ☐

6. Price

£21-£30 ☐ £31-£40 ☐ £41-£50 ☐ £50+ ☐

Function

1. What size do you want the speaker?

Small ☐ Medium ☐ Large ☐

2. Do you want the speaker to be portable?

Yes ☐ No ☐

3. What type of speakers would you like?

Mono ☐ Stereo ☐ Component ☐

4. What power source would you like it to use?

Mains ☐ Batteries ☐ Solar ☐

5. What would you like to connect your device with?

Audio jack ☐ Apple dock ☐ Android dock ☐

Aesthetics

1. What material would you like it to be made of?

Wood ☐ Plastic ☐ Metal ☐

2. How would you like the speaker to be joined together?

Frame joints ☐ Glue ☐ Screws ☐ Nails ☐

3. What kind of finish would you like the speaker to have?

Stain ☐ Polish ☐ Veneer ☐ Varnish ☐ Paint ☐

4. How many retro colours would you like the speaker to have?

3 ☐ 4 ☐ 5 ☐

5. What shape would you like the speaker to take?

Spherical ☐ Pyramid ☐ Prism ☐

Evaluation

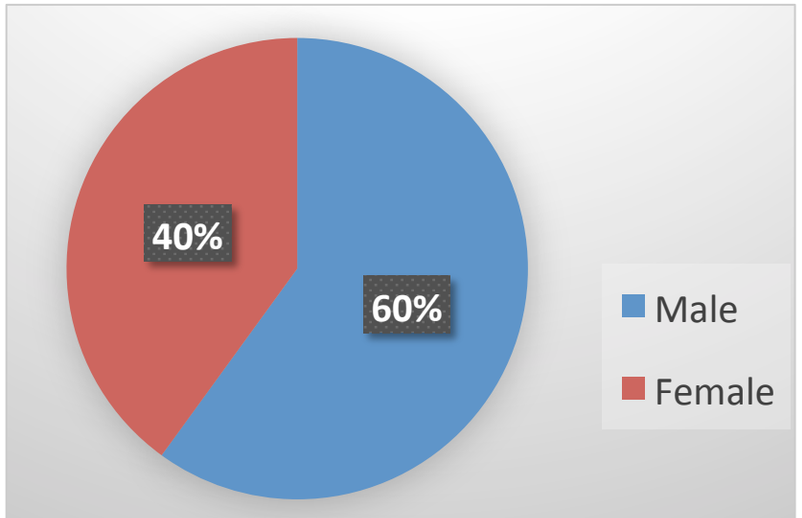
I believe this is the most suitable questionnaire as it will help me to decide the best target audience and any responses for the function and aesthetics will improve my specification. However, a good questionnaire needs to survey a variety and a good number of people. This is why I will need to survey at least 15 people of different backgrounds within the target audience. My client likes the questionnaire that I have created and it will help her to give more feedback on how to improve my product according to what people like.

Results

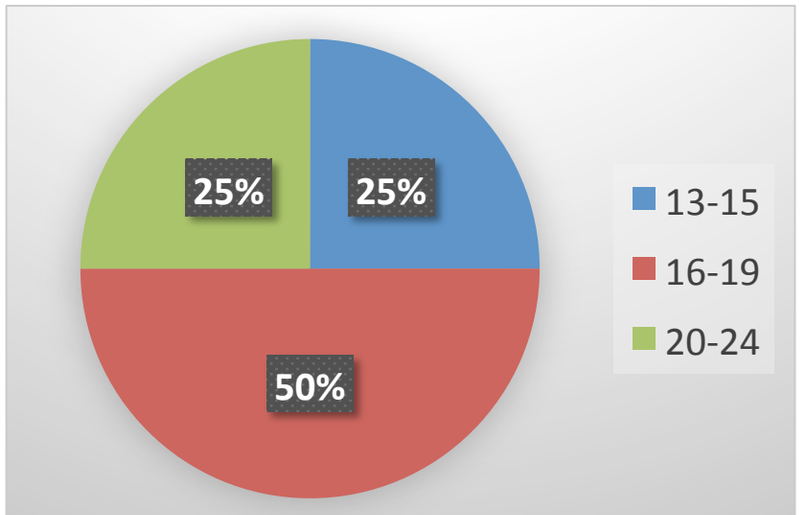
(A group of 20 people surveyed)

Target Audience – User

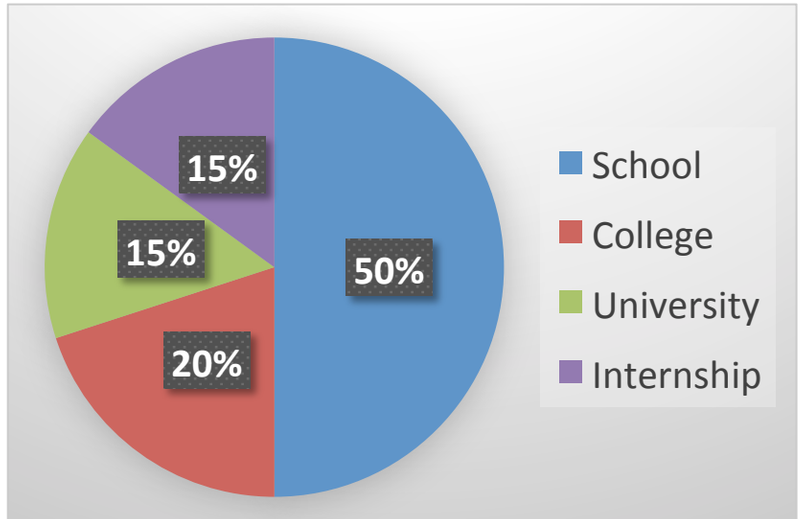
1. Gender



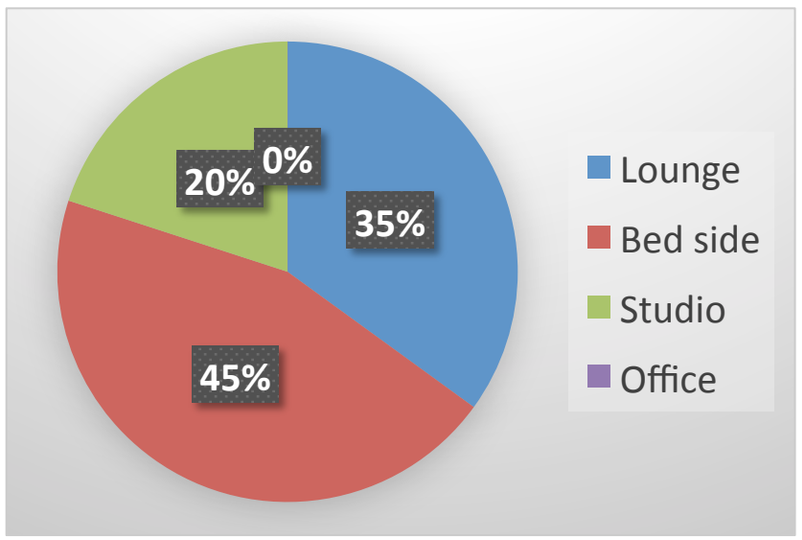
2. Age group



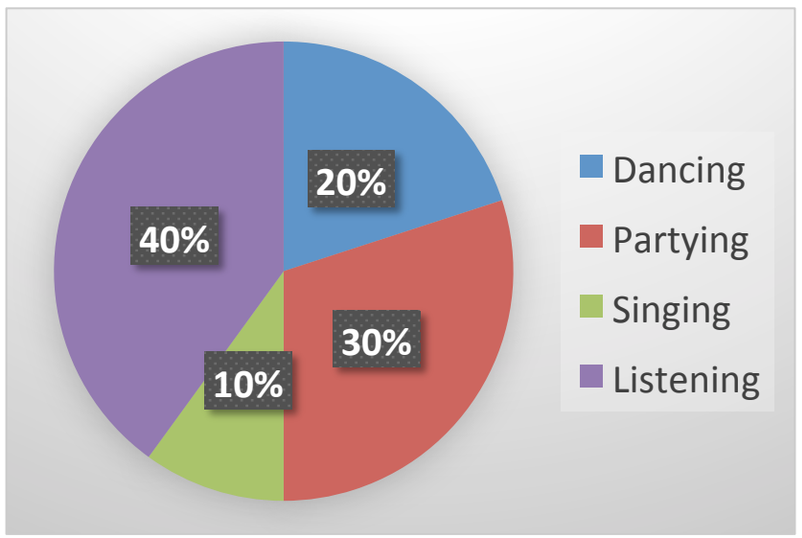
3. Occupation



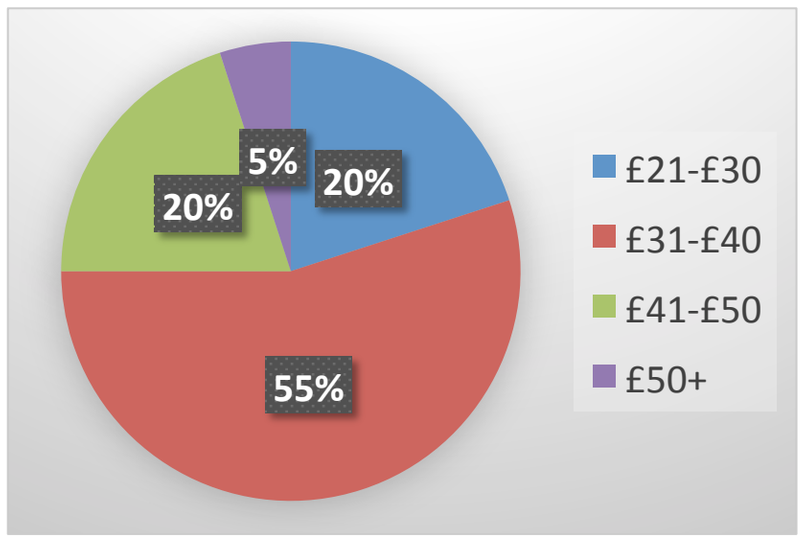
4. Where the speaker will be used



5. Speakers main purpose



6. Price



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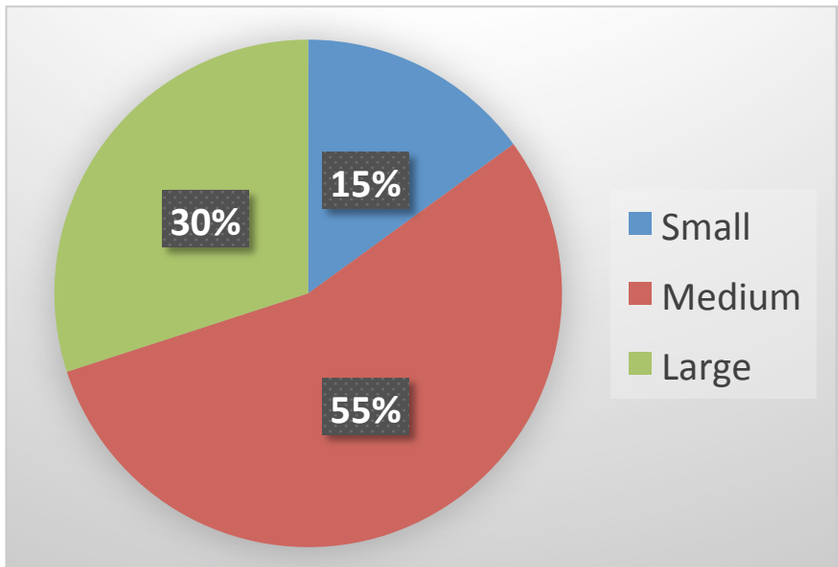
Results

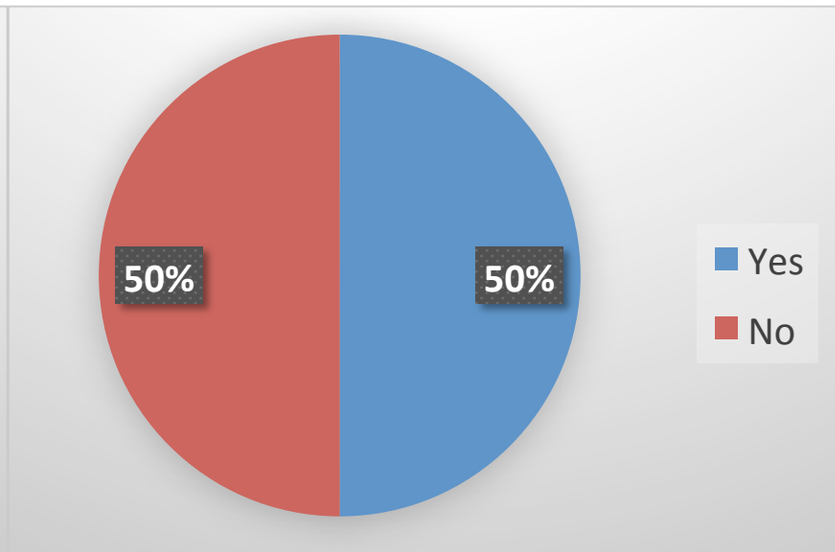
(A group of 20 people surveyed)

Functions

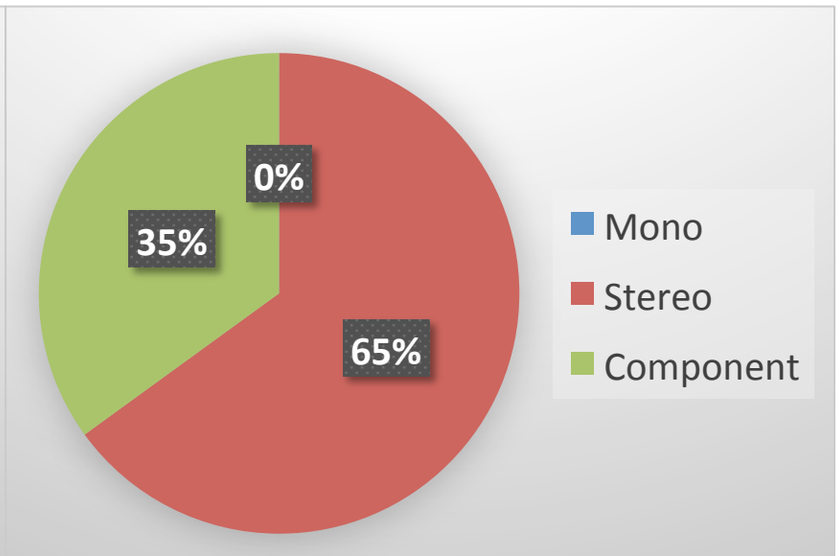
1. What size do you want the speaker?



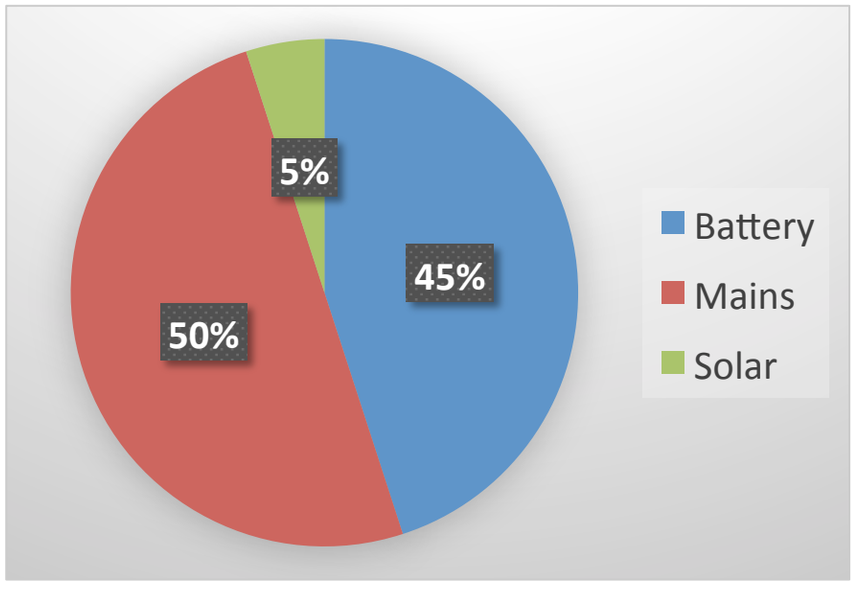
2. Do you want the speaker to be portable?



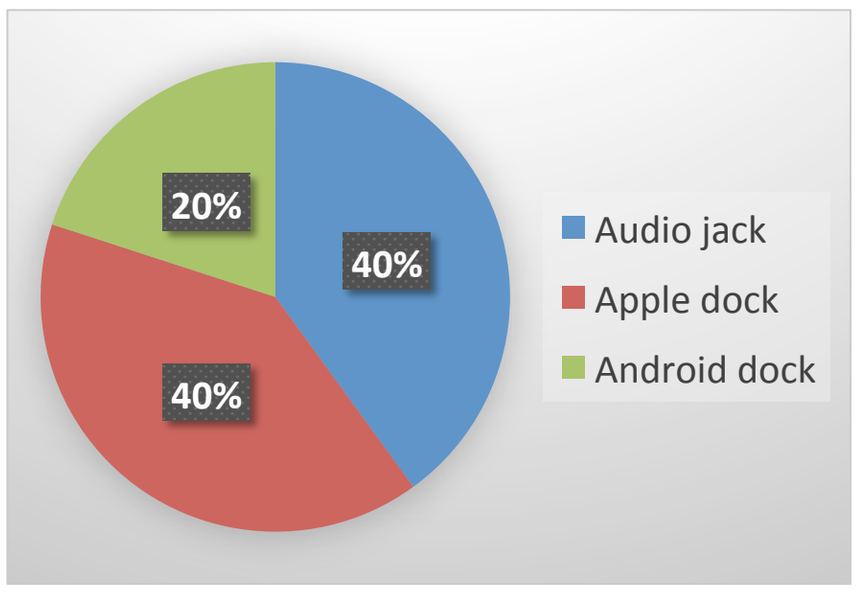
3. What type of speakers would you like?



4. What power source would you like it to use?



5. What would you like to connect your device with?



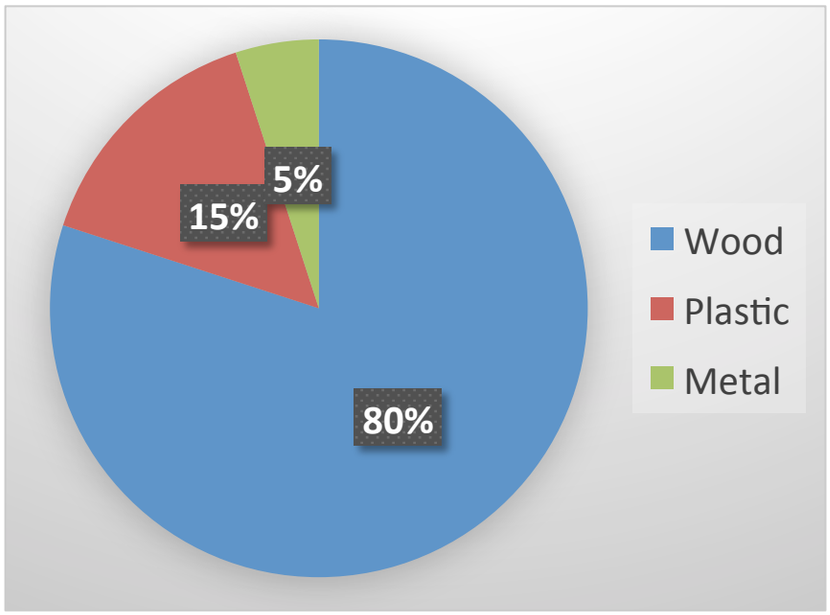
Amar Gudka - Candidate No. 1461 Sutton
Grammar School - Centre No. 14737

Results

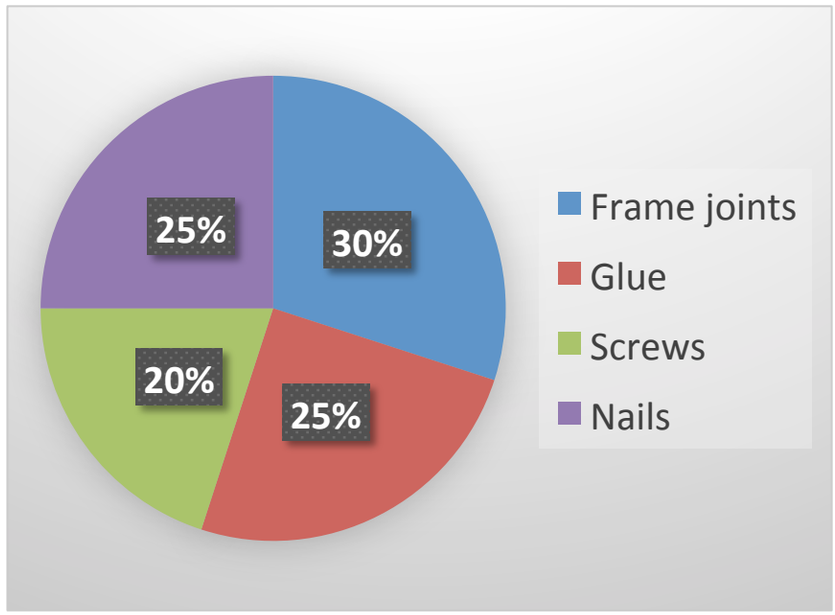
(A group of 20 people surveyed)

Aesthetics

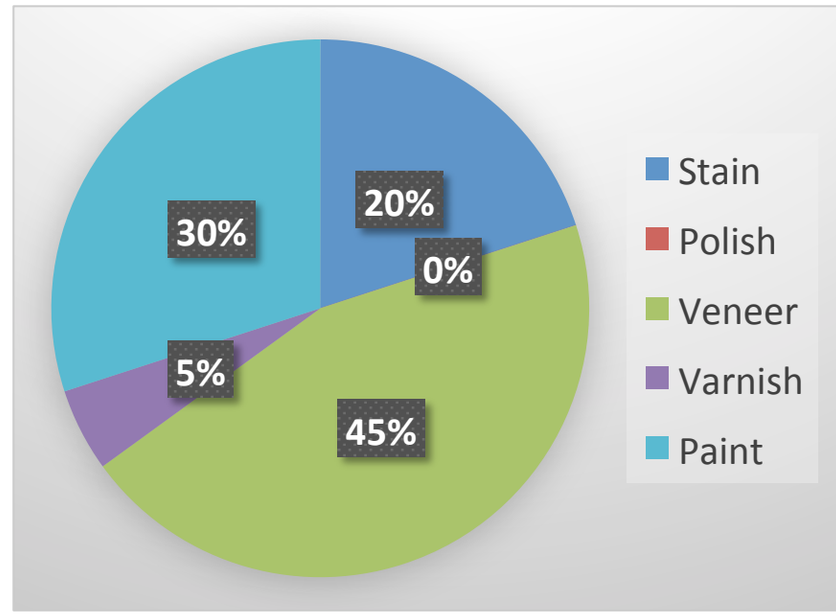
1. What material would you like it to be made of?



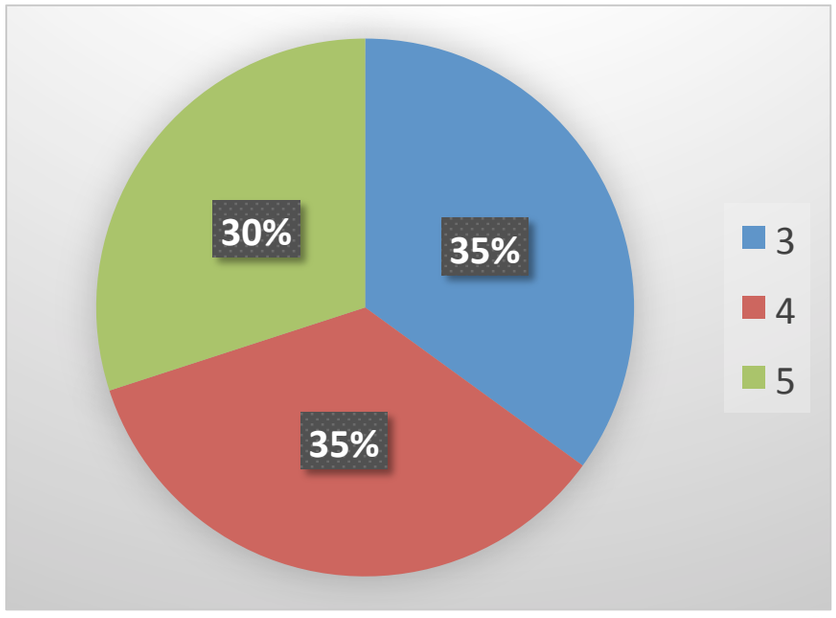
2. How would you like the speaker to be joined together?



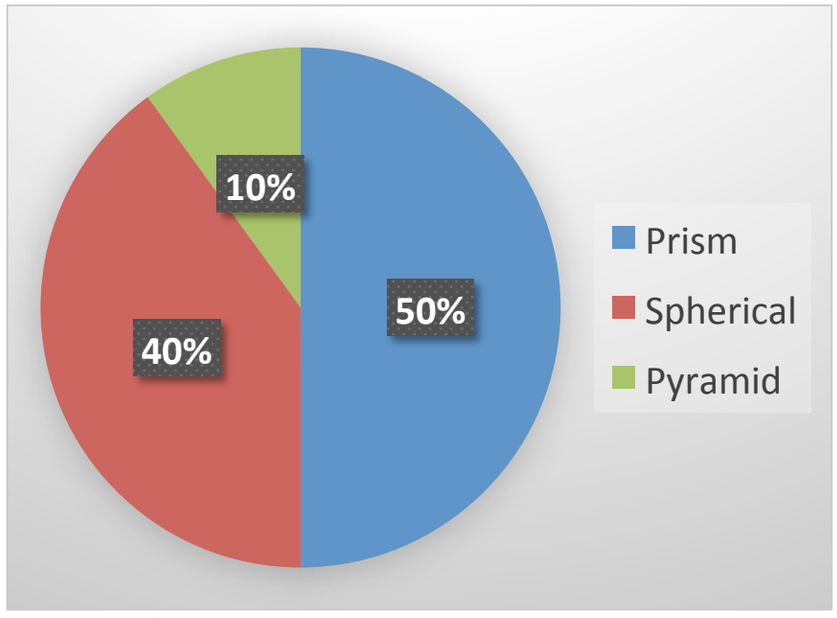
3. What kind of finish would you like the speaker to have?



4. How many retro colours would you like the speaker to have?



5. What shape would you like the speaker to take?



Amar Gudka - Candidate No. 1461 Sutton Grammar School - Centre No. 14737

Existing Product Analysis

SoundLink® Bluetooth® speaker III-£259.95

- This speaker is a portable speaker designed for the enjoyment of music with friends. For example, at a party or a long coach journey.
- It produces a rich high quality sound. The speaker has been designed to have a louder output and a deeper bass than previous models. This makes it ideal for use in a dance studios for dancers.
- It has Bluetooth capabilities with up to 14 hours of music from rechargeable lithium-ion battery. It also has an Aux input, volume control and a USB port for updates.
- The model is aesthetically pleasing as it has curved edges and a thin profile that can easily fit into a backpack. It can also be fitted with a colourful case to improve attractiveness. The control panel is made from silicon to make it dust proof and it has metal grills to increase the durability and to stop it from getting fingerprints.

Evaluation of the product

This is a very satisfying speaker for the client. It has a lot of quality and would be an ideal speaker. However, it is very expensive and doesn't please my client due to the materials used. It does not fit the design movement and it would be better if made out of wood

Existing Product Analysis

MARLEY™

GET TOGETHER ™ HEMP® £129.99

This speaker is a portable speaker designed for the enjoyment of music with friends. For example, at a party or a long coach journey.

- These component speakers have high-output woofers that produce an output that will fill any room, while the tweeters ensure all sound stay crisp and clear. This makes it ideal for use in a dance studios for dancers.
- It has Bluetooth capabilities with many hours of music enjoyment from rechargeable lithium-ion battery. It also has an Aux input, volume control and a USB.
- The model is aesthetically pleasing due to its curved edges and bulkiness that makes a presence. The exclusive REWIND™ fabric cover and natural bamboo front and back adds a touch of originality and attractiveness to the speaker

Evaluation of the product

This is a very satisfying speaker for the client. It has a lot of quality and would be an ideal speaker. However, it is very expensive and it is slightly to big for the client because the size makes it slightly less portable. Despite this the client believes the speaker to be worth it due to the original looks and the materials used.

X-Mini™ CLEAR Custom 2.1 Audio System - £139.03

This speaker is a portable speaker designed for the enjoyment of music with friends. For example, at a party or a long coach journey.

- Most portable speakers use a single or dual amplifier to produce the full audio spectrum. However, the new X-mini is equipped with X-mini's trademark TRI-AMP technology (three individually designated amplifiers to deliver a much better sound separation). It also has two ceramic drivers and a 70mm subwoofer.
- It has Bluetooth and NFC capabilities with up to 10 hours of music playback from rechargeable lithium-ion battery. It also has an Aux input, volume control and a USB port. You can also charge your phone from it.
- The model is pleasing as it has curved edges, a compact design and a transparent back design making it unique. It showcases almost no wires and a component free layout The control panel is made from plastic to make it dust proof and it has metal grills to increase the durability and to stop it from getting fingerprints. It has 3 lighting modes which glow through the transparent back to enhance the visuals of the speaker

Evaluation of the product

This is a very satisfying speaker for the client. It has a lot of quality and would be an ideal speaker. However, it is very expensive and doesn't please my client due to the materials used. It does not fit the design movement and has a very futuristic look. The back lighting makes it unique and the way that there are hardly any wires and components makes it very impressive.

Summary of results and research

- Of those surveyed most were male and between the ages of 16 and 19.
- Most would be willing to spend over £30 but not many would spend more than £40.
- It seems the main purposes is recreational use of the speakers because most want it for listening to music and partying in the house and in some cases outdoors.
- Many do not want a small speaker because I'd imagine they would worry that it will compromise the size of the output. Most wanted a medium sized speaker.
- When discussing portability it was split evenly. This may be because some will use it mostly when travelling and other mostly in there homes.
- It was also pretty much split evenly when discussing powers sources; slightly leaning to mains power because it probably give the best power output consistently.
- From my result, it seems quite a few people have apple devices however many do not which is why they have opted for an audio jack to suit both apple and android devices.
- As I predicted most people wanted it veneered and made of wood. Furthermore, it was split when asking about joining methods. This means that any joining option is feasible. Also the people questioned did not seem to mind a few retro colours being added.
- Finally when question about the shape not many wanted a pyramid shape and wanted the speaker to be either spherical or a type of prism.

- From my research I have found that plywood or MDF would be ideal materials for this project. Acrylic and vinyl are other materials that can be utilised.
- The joining methods are simple enough to be use; whichever are chosen. However, this depends on which design idea is chosen.
- Through my research of existing speaker, I have found out that high quality speakers are very expensive and they all have there own qualities that make them unique and original.
- Veneering will be very complex and difficult due to the fragility of the material.
- The components and kit will be similar to my yr.9 amp. However, it will have a bigger power output and maybe volume control.

Evaluation

My client found some of the results of the question very interesting because they were very different to what she assumed would be what everyone wanted. Moreover, my client thinks this has helped with decisions on what to include and what not to. With this and my research conducted I will now create a secondary specification for designing my speaker.

Secondary Specification

Time scale

- The project will take roughly 40 hours to complete
- I have until the end of the Easter term 2016 to complete the MP3 Speaker

Customer

- My MP3 Speaker will be focused for customers who are currently students.
- Studying at school and university

Purpose

- Raise awareness of the Retro design movement by reflecting the features of it.
- To help students enjoy music, especially at parties, through loud high quality speakers.
- I will make it portable so it can be listened to when travelling but also in the homes.

Aesthetics

- My MP3 Speaker will be based around the Retro design movement by making it look pre 21st century and adding retro colours
- However, I will make it an original and unique MP3 Speaker before the aesthetic design of this movement.

Materials

- Materials that will be used to make this MP3 Speaker will include wood as well as electronic wires, circuit boards and components.
- I would also like to veneer the product

Cost:

- The MP3 Speaker should cost around £40 due to the results of the questionnaire.
- There is no specific budget for this project.

Manufacturing

- My MP3 Speaker will not be manufactured on a large scale, however it is likely to be made from a number of materials such as acrylic, plywood, MDF and vinyl.
- As the project is likely to be veneered we will need sufficient amounts of the same veneer.
- The components will need to be soldered correctly in order for it to work as efficiently as possible.

Function

- The function of my MP3 Speaker is to play loud high quality music when exercising or for other things such as dancing and playing an instrument.
- It will include a mains power source, AUX input and volume control.

Safety

- Safety will be a priority during the construction process of this MP3 Speaker. I will take numerous precautions to minimise the risk of injury to myself or others, including:
- Being careful when wiring up the MP3 Speaker (soldering and testing)
- To be careful when cutting and sanding if necessary
- Being careful when using the laser cutter and the iron on method of veneering.

Ergonomics

- I want it to be easy to use
- The size should be small enough to carry with two hands.
- The weight needs to be fairly light so that it can be easily moved
- It will be made at a medium size. Of up to 300mm by 200mm by 300mm

Social, Moral, Cultural and Environmental Issues

- I will make sure that no symbols or words that may be seen as offensive towards a certain group of people or religion will be on this product.
- I will try to use as many natural materials and make sure that the speaker uses a low amount of energy as resources and energy needs to be saved. However, I will make sure this does not comprise the ability of the speakers.
- I won't waste materials as veneers and other materials can be expensive.

Reliability

- The product will be tested and prototypes will be made so that changes can be made.
- B is

Evaluation

My client is satisfied with the improved specification.

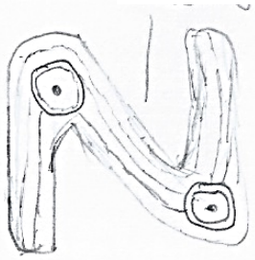
Thumbnails

Evaluation

These are credible ideas and show a variety of possibilities. However, although my client likes the ideas she is worried they are too complex. Furthermore, she believes they are diverging away from the idea of a speaker. For example, the speaker with storage does not need to have storage; it should solely be a speaker. With this feedback I will make sure my ideas are just focused on being just speakers.

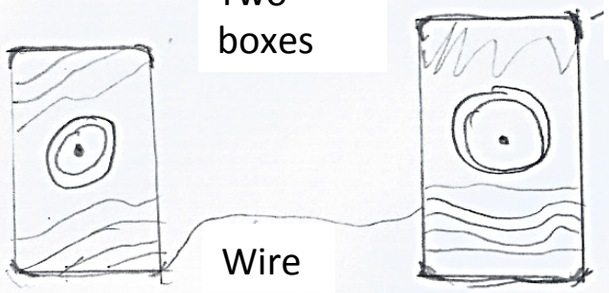
Thumbnails

Storage



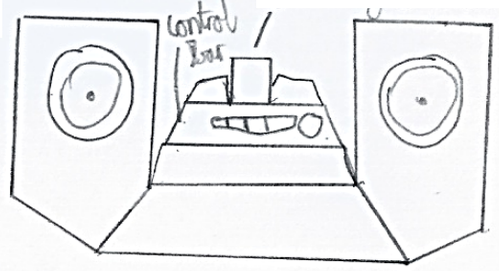
Two boxes

Curved Edges



Wire

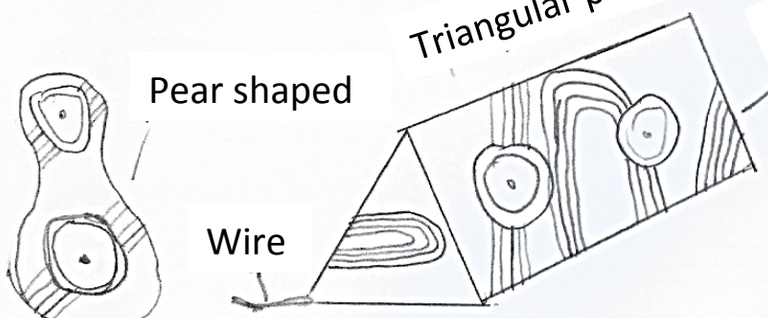
Docking Station



Triangular prism

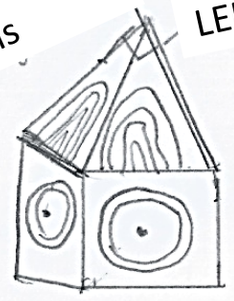
Retro design patterns

LED light



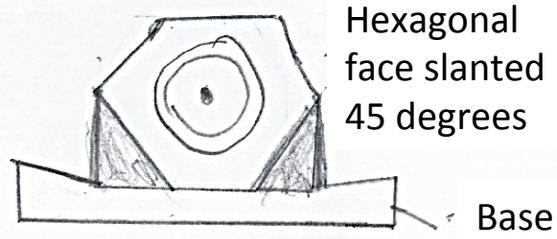
Pear shaped

Wire



Hexagonal face slanted 45 degrees

Base

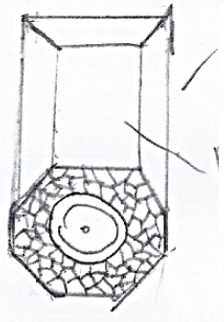


Controls

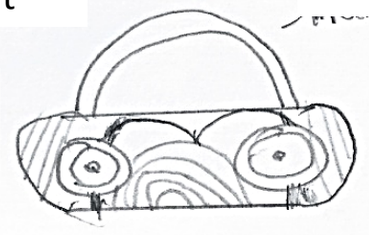
Tube shaped

Wall mount

Photo frame



Handle

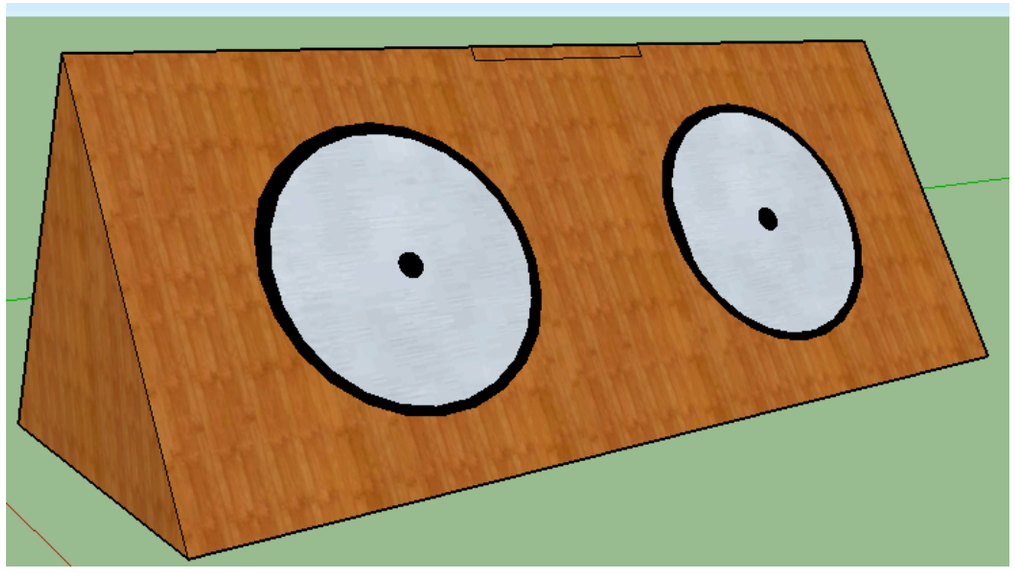


Key

Speaker

Amar Gudka - Candidate No. 1461 Sutton Grammar School - Centre No. 14737

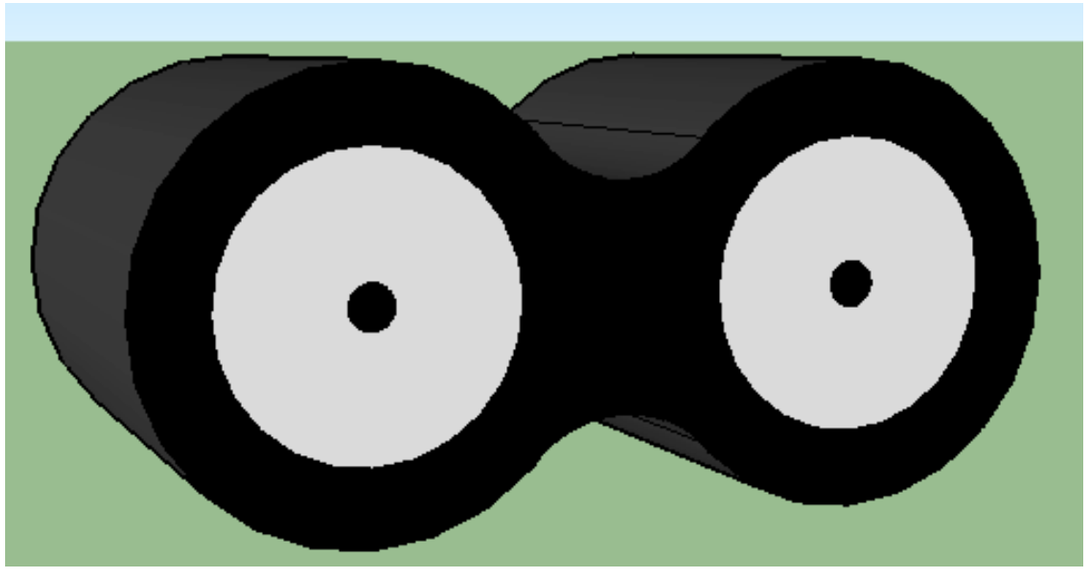
Initial idea 1



This initial idea takes the shape of a triangular prism. It will be able to stand vertically as well as horizontally. As it will be powered by mains the wire will probably come out from the back. It will be made out of wood and stained black or veneered. Also the docking station will be on the left triangle and can only be used when speaker is vertical.

Evaluation
My client likes the unique design of this product. However, she is not sure about the stability when vertical.

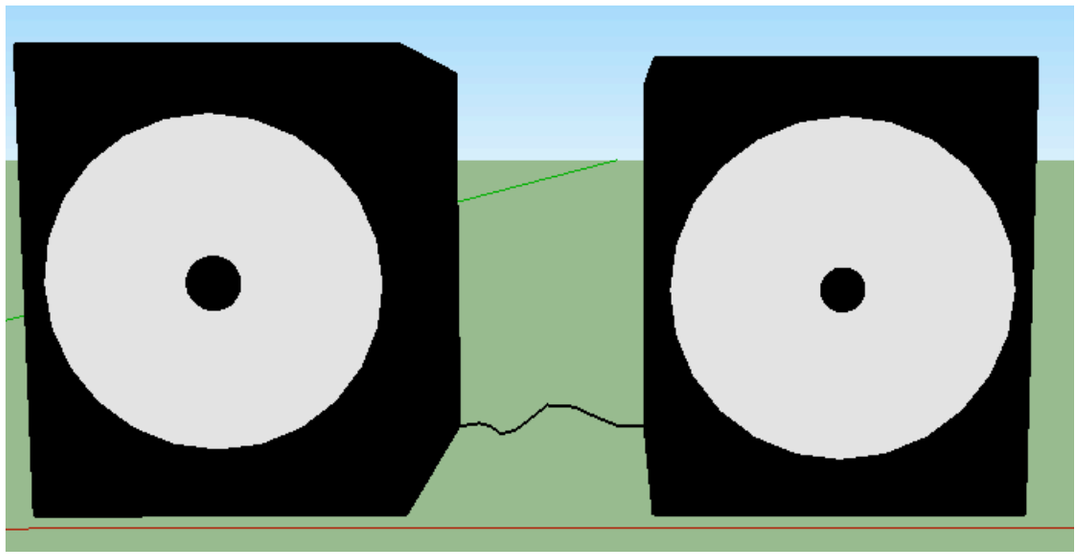
Initial idea 2



This initial idea takes the shape of two cylinders joined together by another curved piece of plastic. It will be able to stand horizontally only. As it will be powered by mains the wire will probably come out from the back. It will be made out of black plastic as it is easier to bend than wood. Also the docking station will be on one of the cylinders.

Evaluation
My client likes the complex design of this product. However, she is interested in how the design movement will be included.

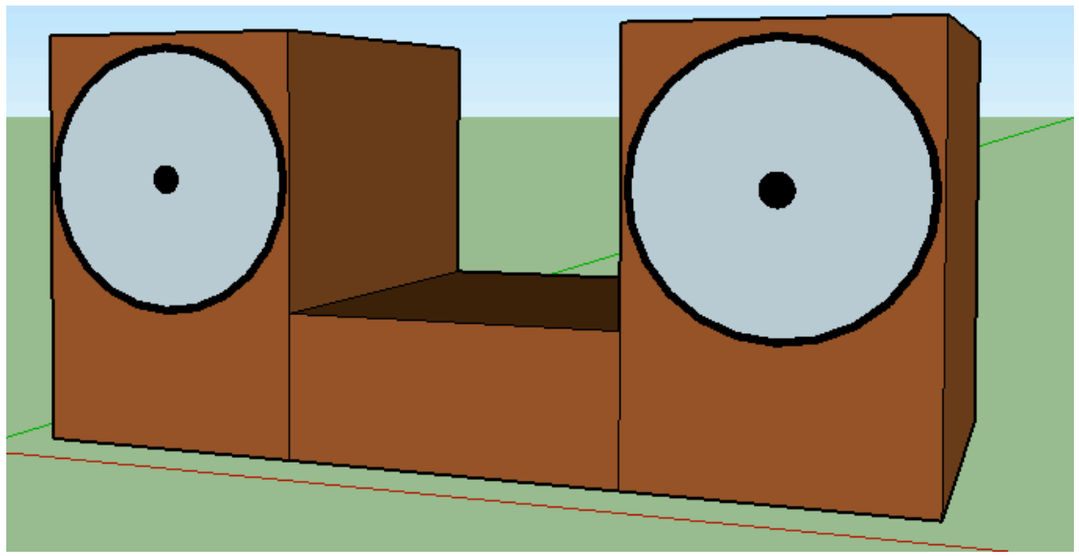
Initial idea 3



This initial idea takes the shape of two boxes joined together by a wire. It will be able to stand vertically only and you can use one of or both speakers at a time. As it will be powered by mains the wire will probably come out from the back. It will be made out of wood and stained black of veneered. Also the docking station will be on top of one of the boxes.

Evaluation
My client thinks this idea is unoriginal and boring. Furthermore, she does not like the fact a loose wire will be showing

Initial idea 4



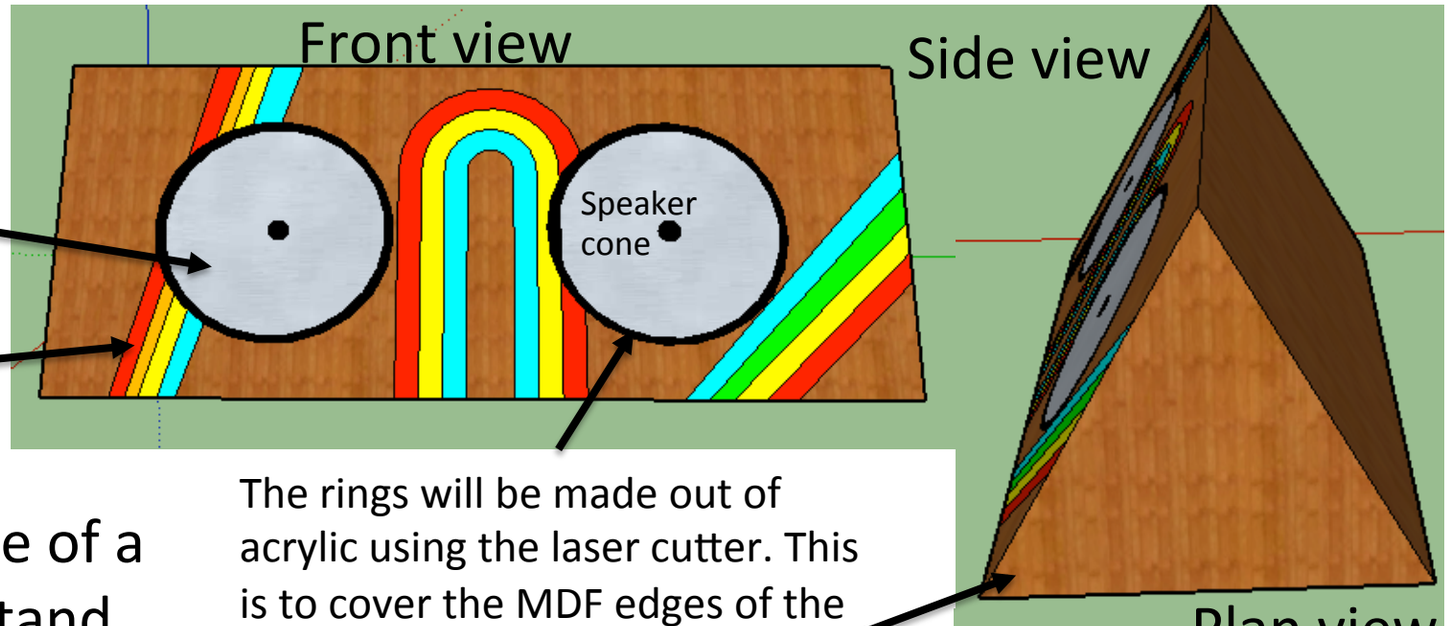
This initial idea takes the shape of two boxes joined together a box. It will be able to stand vertically only. As it will be powered by mains the wire will probably come out from the back. It will be made out of wood and stained black of veneered. Also the docking station will be on the cuboid in between the two speakers.

Evaluation
My client is worried about the size of the project and believes it will be hard to use on the go. Furthermore, she doesn't like the shape of the design and thinks it will be easy to build.

Developed idea 1

The speakers will be screwed in to the back so the screws don't show

Here the retro patters will be made out of vinyl because it is very thin and easily cut.



The rings will be made out of acrylic using the laser cutter. This is to cover the MDF edges of the speaker.

The panels will be cut out and sanded down to meet the angle. Here it will be joined by glue (PVA).

The back panel will be made of a thinner piece MDF and screwed on. This is to allow the client to get to the PCB to fix it if needed

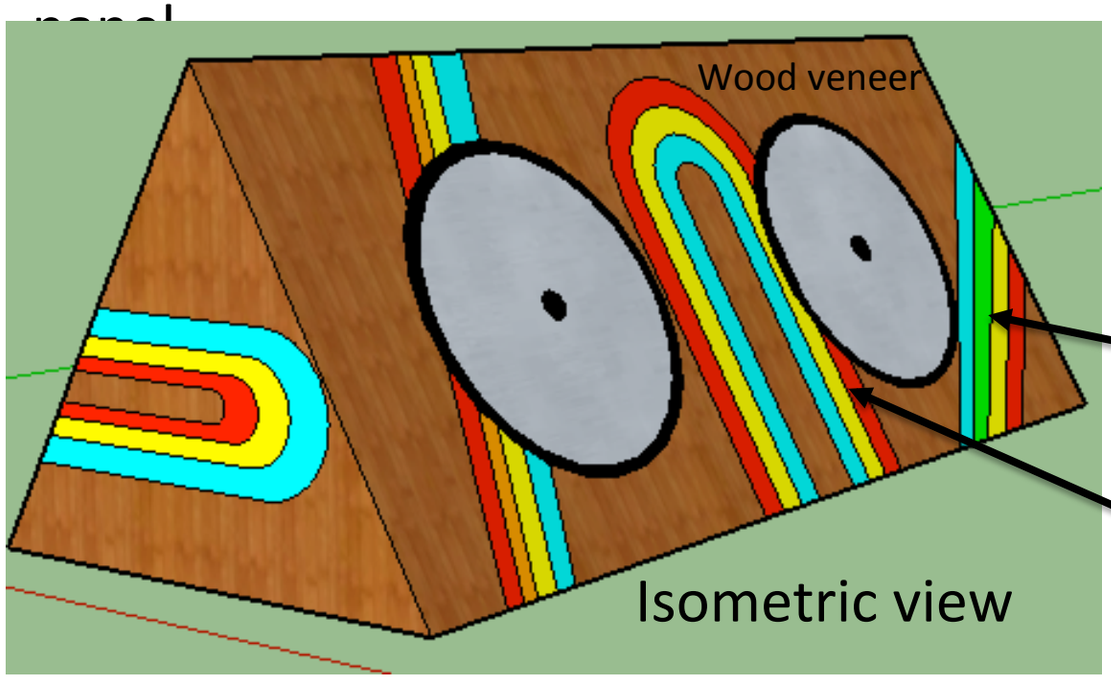
All holes will be laser cut or drilled through

Here the retro design has been used to enhance the colour of the speaker.

Evaluation

My client likes the added colour that improves the design movement influence.

This developed idea takes the shape of a triangular prism. It will be able to stand vertically as well as horizontally. As it will be powered by mains the dc input will probably come out from the left triangle. It will be made out of wood and veneered. The switch and volume control will probably be on the front panel



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Developed idea 2

The speakers will be screwed in to the back so the screws don't show

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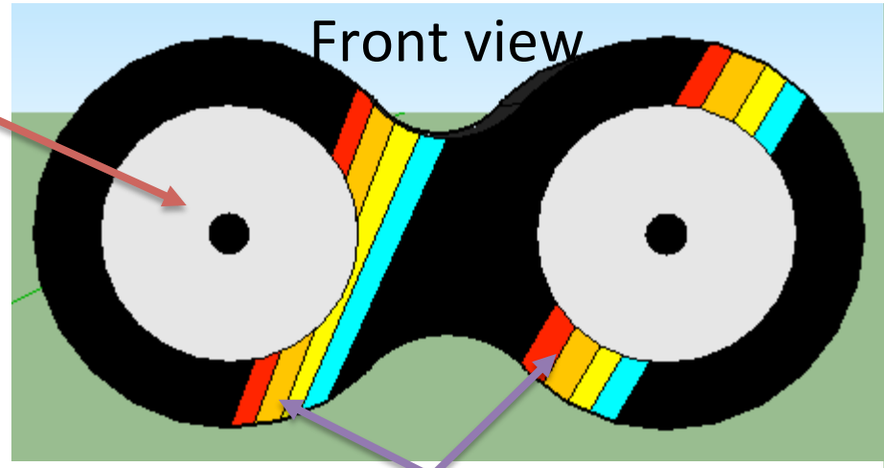
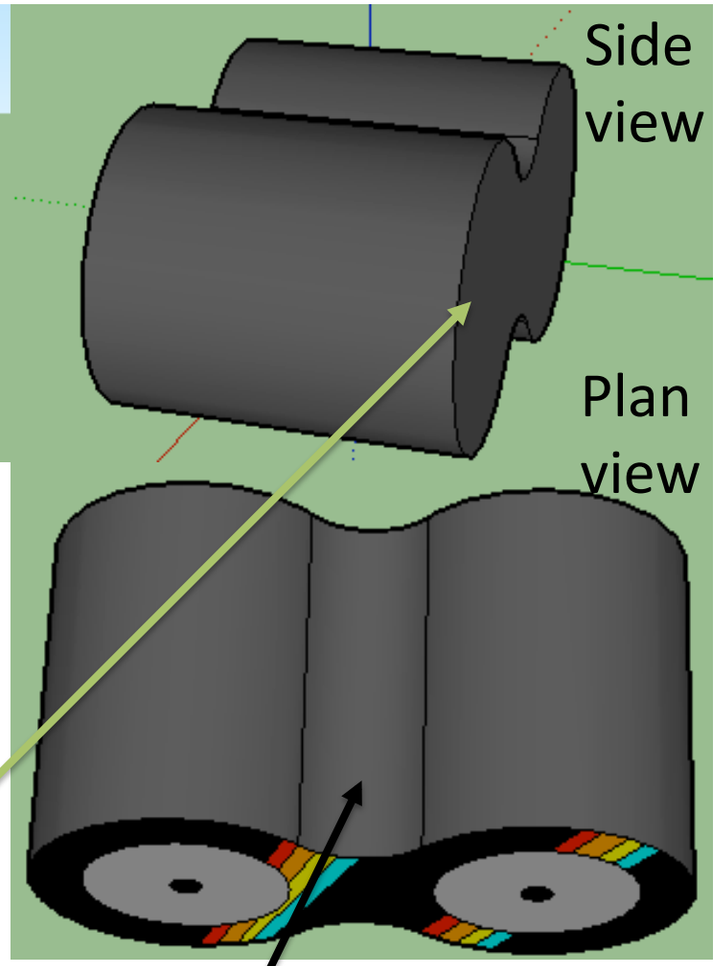




The design will be joined using glue and screwed.

Here the retro design has been used to enhance the colour of the speaker. Here the retro patters will be made out of vinyl because it is very thin and easily cut.

Evaluation

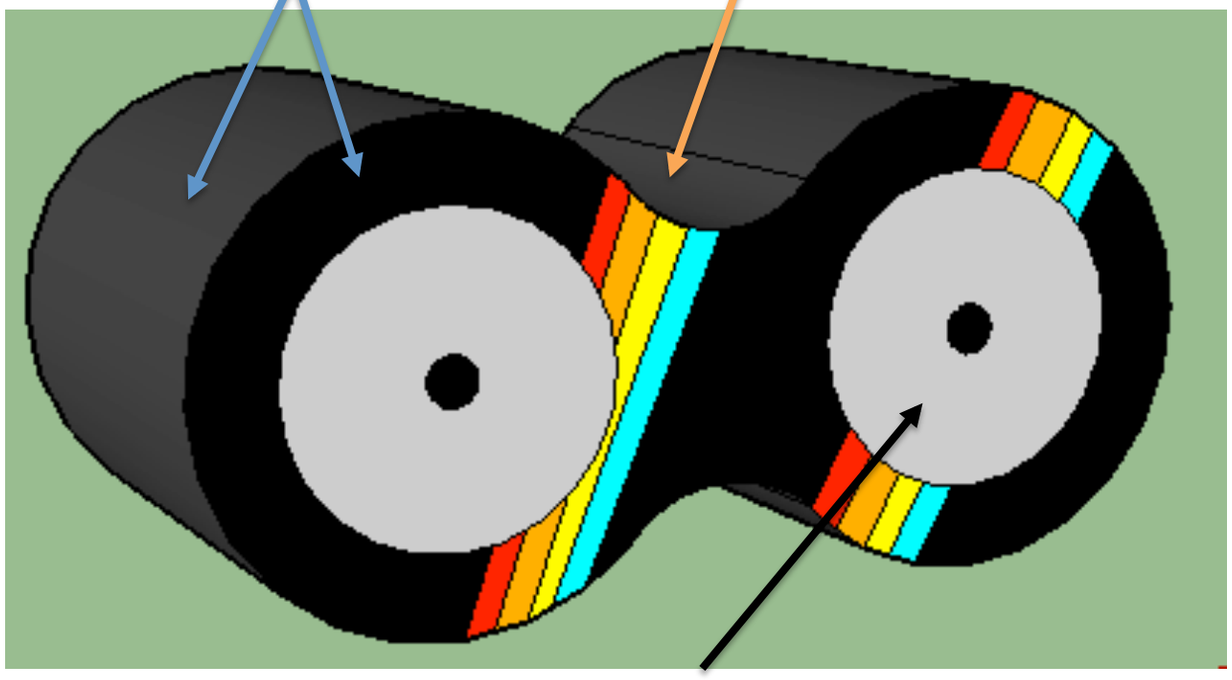
My client likes the added colour that improves the design movement influence. However, the method of joining may make the product look unattractive according to my client.

MDF will be veneered onto. The front panel will be made of acrylic.

Aux input to come out from here

The back panel will be made of a thinner piece MDF and screwed on. This is to allow the client to get to the PCB to fix it if needed

Laser cut MDF cones joined by a curved piece of acrylic



All holes will be laser cut or drilled through

This idea takes the shape of two cylinders joined together by a curved piece of plastic. It will be able to stand horizontally only. As it will be powered by mains the wire will probably come out from the back. It will be made out of MDF using a laser cutter. From here I aim to veneer on top using a dark wood such as black ash. Also the docking station will be on one of the cylinders.

Final idea

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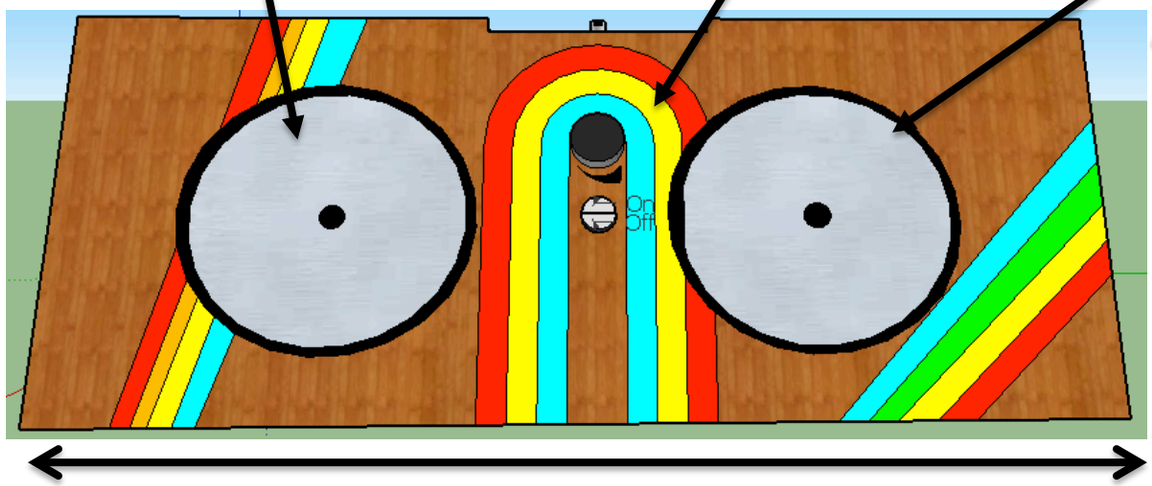
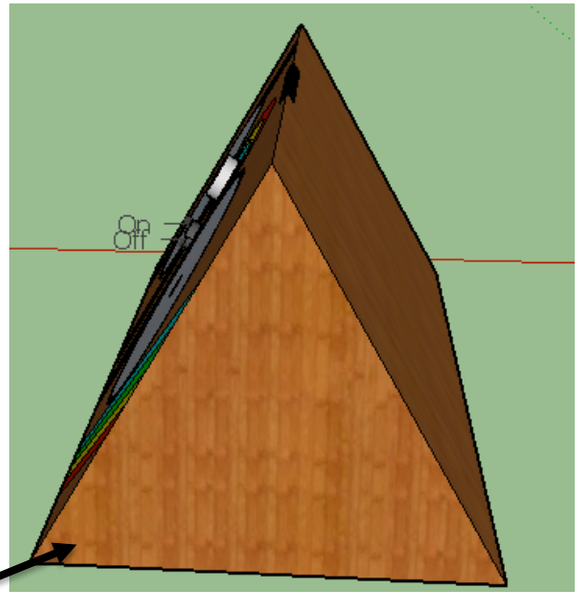
Evaluation
My client is satisfied with the design. However, the aux input at the top may not be a good idea because the device may no be stable and the wood may be too thin to make a dock there; according to my client.

The speakers will be screwed in to the back so the screws don't show

Here the retro patters will be made out of vinyl because it is very thin and easily cut.

The rings will be made out of acrylic using the laser cutter. This is to cover the MDF edges of the speaker.



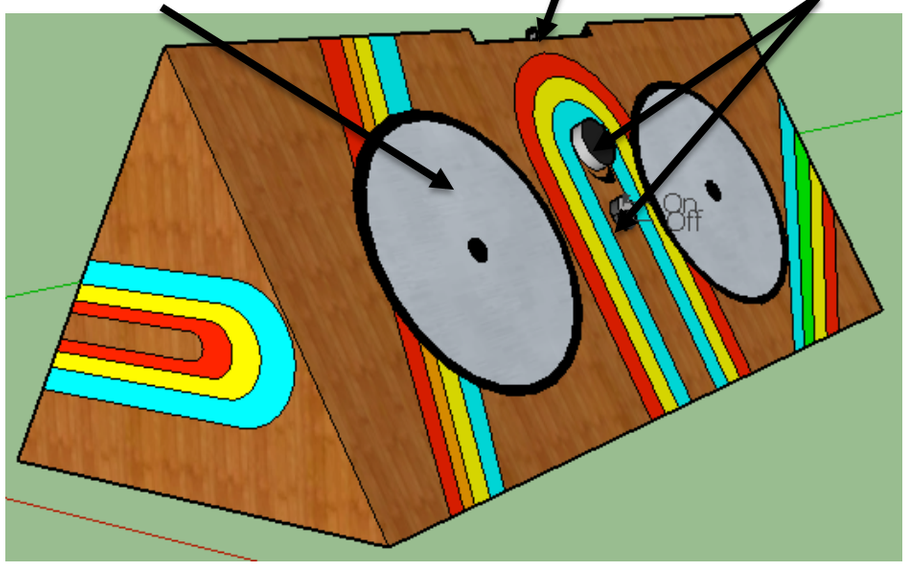


The panels will be cut out of plywood and sanded down to meet the angle. Here it will be joined by glue (PVA).

The back panel will be made of a thinner piece MDF and screwed on. This is to allow the client to get to the PCB to fix it if needed

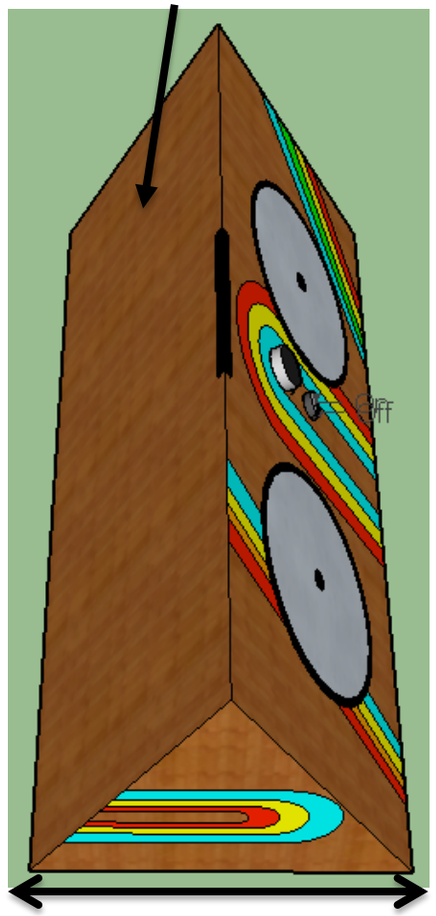
All holes will be laser cut or drilled through

Aux input, volume control and switch



Here the retro design has been used to enhance the colour of the speaker. It will also have a volume control dial and will be priced at £39.99

This developed idea takes the shape of a triangular prism. It will only able to stand horizontally. As it will be powered by mains the dc input will come out from the left triangle. It will be made out of wood and veneered. The switch and volume control will be on the front panel.



Card model 1.0

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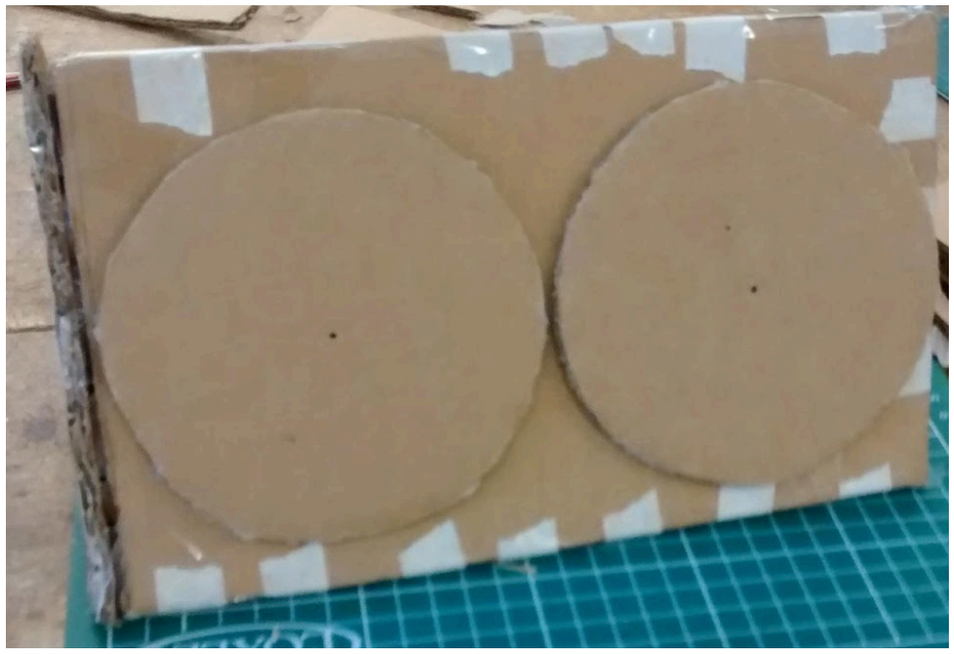
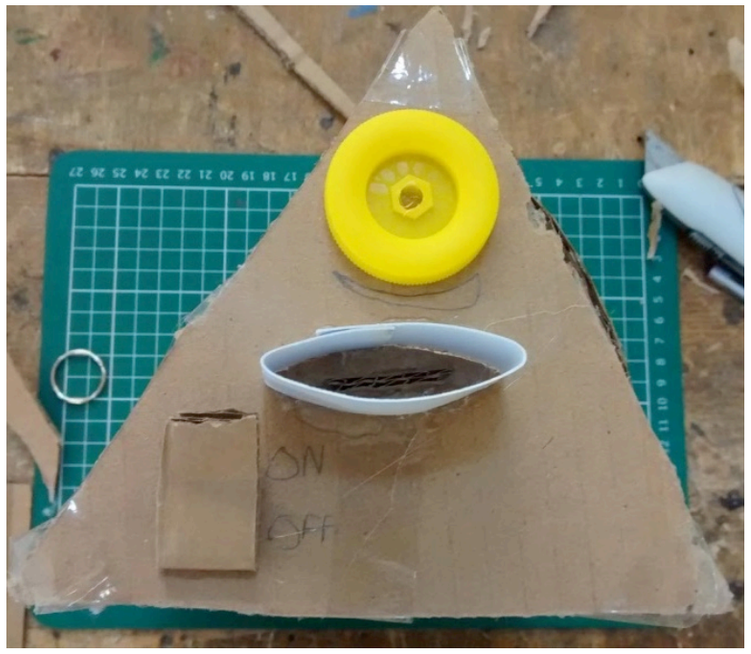
From this card model I found out that when stood vertically it is less stable and not attractive. This is because all the controls would have to be on the top side. I have also felt the weight of the speaker cones and they are very heavy.

Evaluation

Here, my client was right about It being unstable vertically.

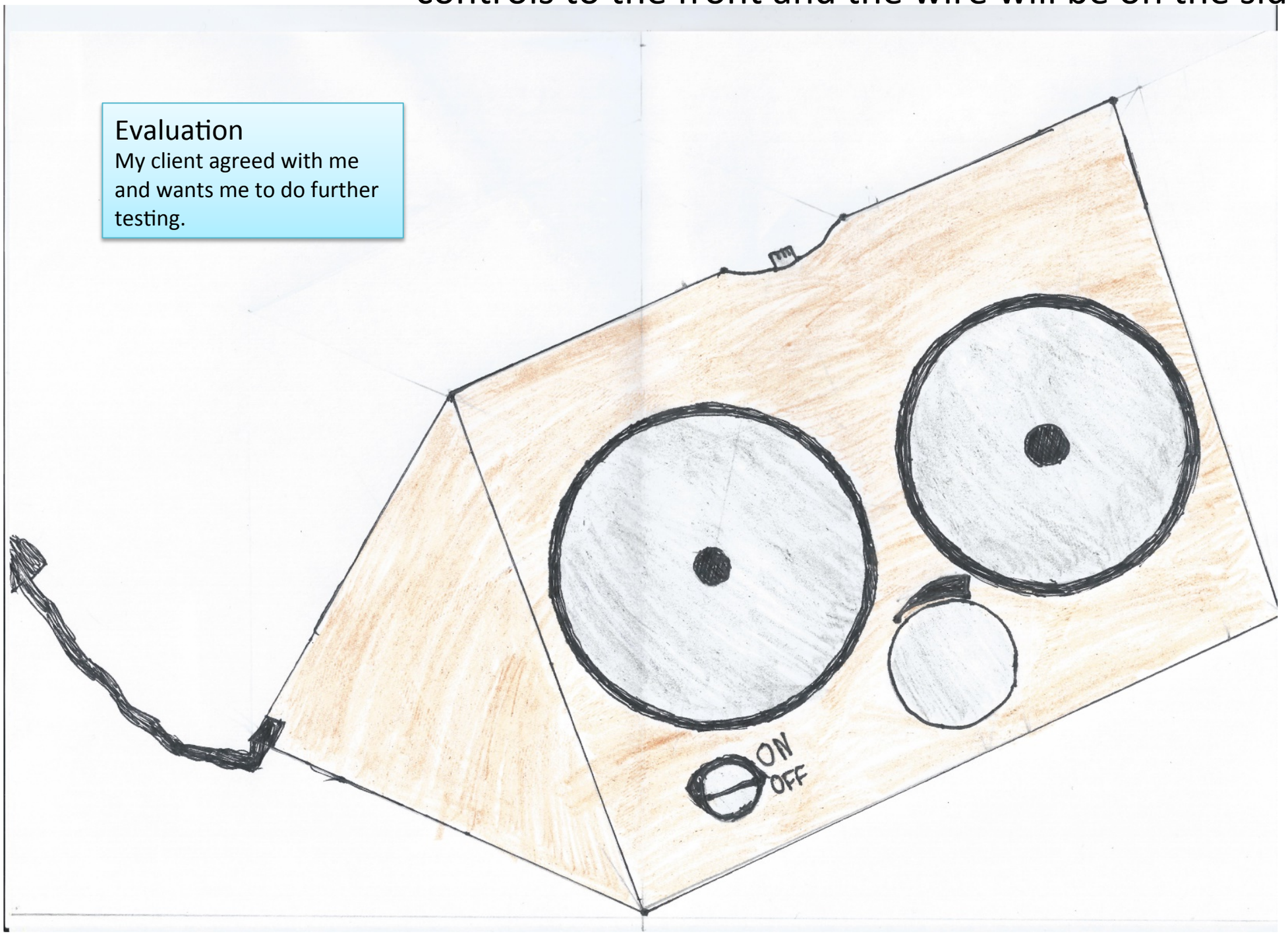




Sketch model 2.0

This sketch has shown me the model needs to bigger compared to the speaker cones. I have moved the controls to the front and the wire will be on the side

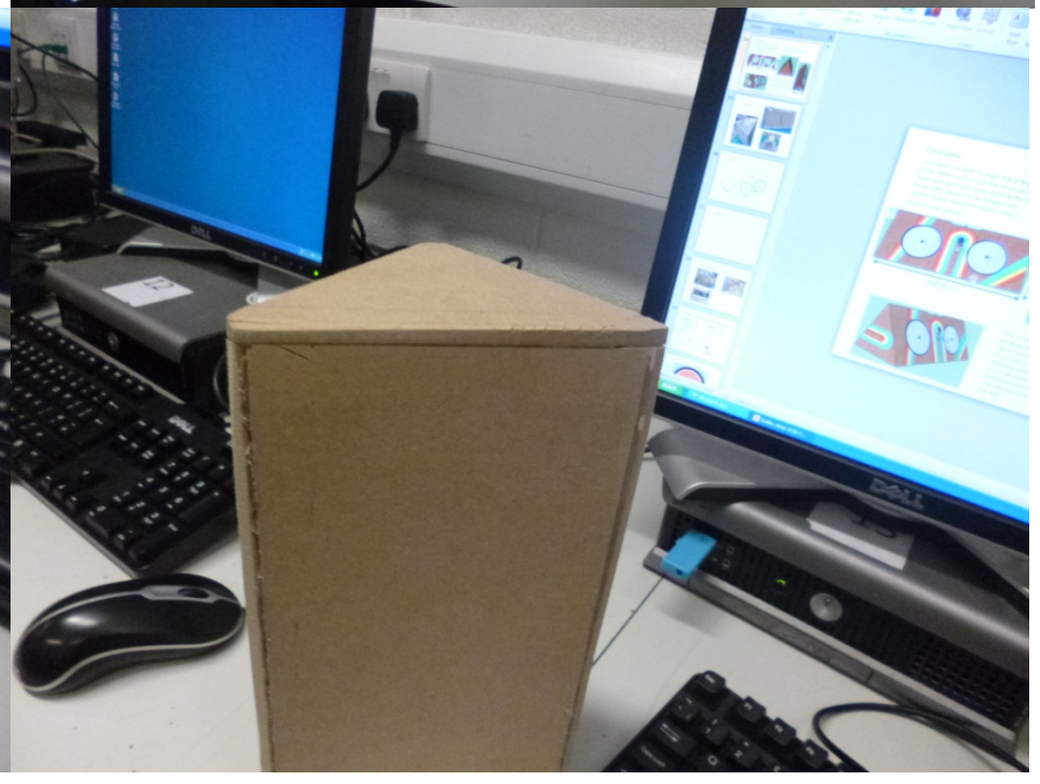
Evaluation
My client agreed with me and wants me to do further testing.



MDF model 3.0

Evaluation
My client believes I am making progress. I have also been reminded that it essential to get into the speaker in order to fix the PCB when it is broken

Using this model I can make a speaker in proportion to this one because although slightly small it seems to be a good size in comparison to its portability. One problem is that the back panel will need to be screwed and this method doesn't cater for it yet.



Final size MDF model 4.0

Evaluation

This model really helped me when creating my speaker. This is because I was able to test gluing, sanding, drilling and laser cutting. This allowed me to make mistakes and fix them before I ruined my final product.

From this MDF model this is a good size and it fits all the components in it. I have also learnt how to glue it together and the angle that needs to be sanded down. I have also solved the problem of the back panel. Previously it could only be glued in but now it will be cut slightly bigger so that it can be screwed onto the side triangles.

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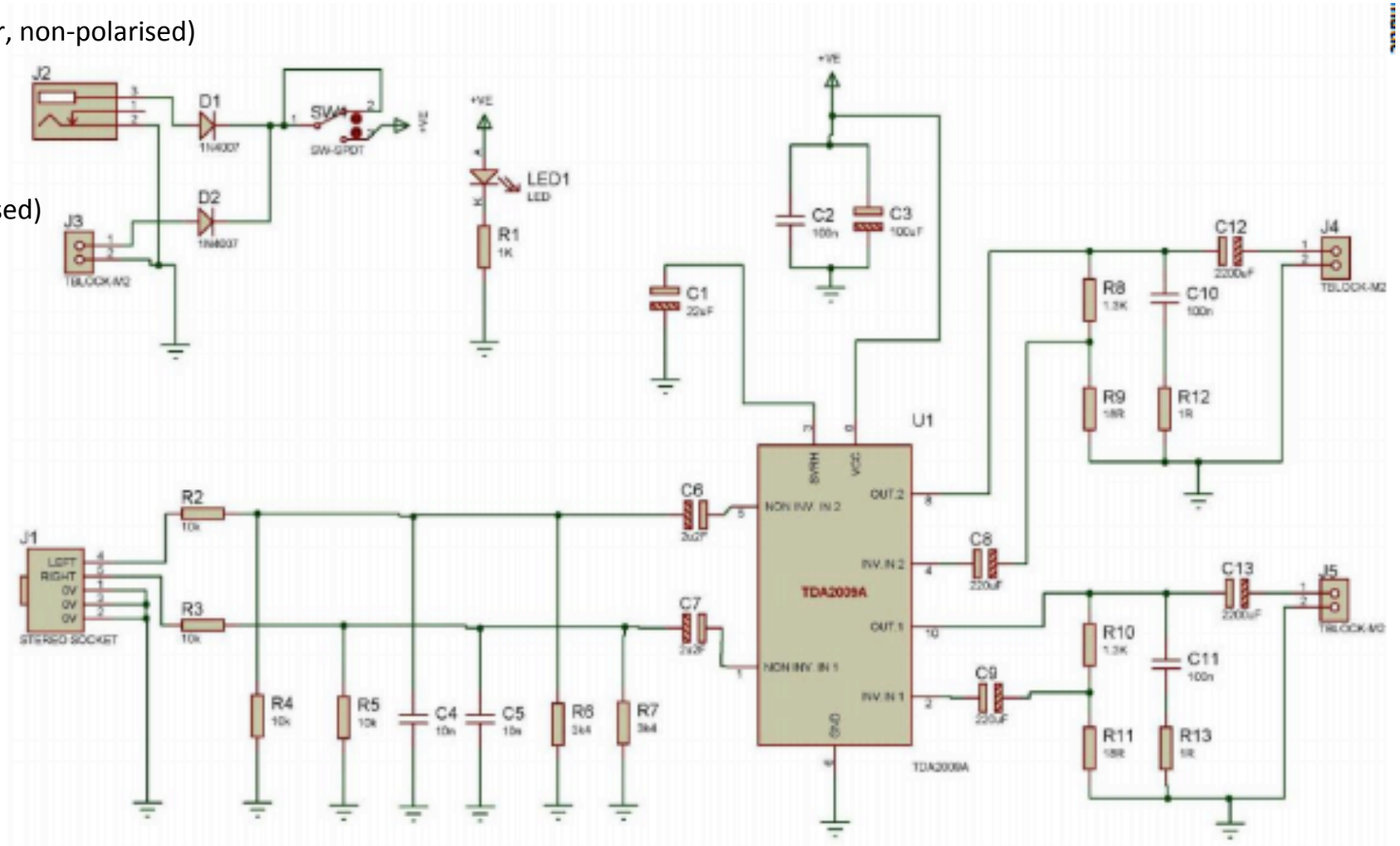
Components and Circuit Diagram

Component List

C1 – 22uF 25V electrolytic radial capacitor
C2 – 100nF capacitor (2.5mm pitch small box capacitor, non-polarised)
C3 – 100uF 25 electrolytic radial capacitor
C4, C5– 10nF capacitor (box capacitor, non-polarised)
C6, C7 – 2.2uF electrolytic capacitor
C8, C9 - 220uF 25VDC electrolytic radial capacitor
C10, C11 – 100nF capacitor (box capacitor, non-polarised)
C12, C13 - 2200uF 25VDC electrolytic radial capacitor
D1, D2 – 1N4001
IC1 – TDA2009a stereo amplifier I.C.
LED1 –3mm LED
J1 – PCB mount 3.5mm stereo connector
J2 – 2.1mm DC socket
J3, J4, J5 (PWR, LEFT & RIGHT)– 2 way terminal blocks
R1 – 1k (brown black red)
R2, R3, R4, R5 – 10k (brown, black, orange)
R6, R7 – 3k3 (orange, orange, red)
R8, R10 - 12K (brown, red, orange)
R9, R11 – 18R (brown, grey, black)
R12, R13 - 1R (brown, black, gold)
SW1 – ultra miniature slide switch
(Potentiometer added to the 3.5mm AUX cable)



If batteries are used a minimum voltage of 4.5 and a maximum of 24 is required

If mains is used a plug that has a maximum output of 24 volts is required

I have also added volume control using a potentiometer which is basically a variable resistor.

Flowcharts of making process-PCB

Start

Place the components in their places on the PCB by following the instructions

Are you happy that they are in the correct places?

No

Yes

Solder all resistors, terminal blocks, AUX connector and capacitors

Using fly leads solder the switch, LED, and DC socket

Solder on the chip to the PCB. Glue a heat sink to the chip

Connect the speaker cones and solder potentiometer to the AUX cable.

Are you happy that everything is soldered correctly?

No

Yes

Connect to DC supply and test the speaker

Does it work and does the volume control work?

Yes

Finish

No

Check for faults, re-solder

Test again

Does it work?

Yes

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Flowcharts of making process-Model

Start

Laser cut and cut out all pieces of wood

Are you happy with the sizes?

No

Yes

Drill/laser cut holes for the switch, speaker cones, LED, DC input, AUX cable, Screws and Volume control

Laser cut the acrylic rings and cut out vinyl patterns

Sand down panels to correct angles

Veneer the panels

Are you happy all pieces are ready to be assembled?

No

Yes

Glue panels together, stain the wood, screw in speaker, fit in other components, glue on acrylic, stick on vinyl and screw on back panel.

Does the design meet the criteria?

No

Find problems

Fix problems

Does it meet criteria?

Yes

Yes

Finish

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Cutting and Costing List

Part Name	Part No.	Material	Quantity	Length mm	Height mm	Thickness mm	Illustration
Back panel	1	MDF	1	312	150	3	
Front and bottom panel	2	Plywood	2	300	250	6	
Triangle panels	3	MDF	2	150	130	6	
Acrylic Cuts	4	Acrylic	8	80	80	3	
Vinyl Cuts	5	MDF	12	N/A	N/A	N/A	On CAD
Veneer Cuts	6	Veneer	5	312, 300, 150	150, 250, 130	0.1	

Part	Price
MP3 Kit + DC Plug	£10
Veneer	£12.50
Woods	£2.50
Vinyl	No cost
Acrylic	No cost

Manufacture process

Process	Tools and Equipment	Risk Assessment	Safety Procedures
Soldering	• Soldering iron • Soldering Stand • Solder • Sponge • Wire strippers	• Hot soldering iron can burn you and it could potentially start a fire. • Solder is an alloy of tin and lead. Of which lead is poisonous.	• Don't touch the soldering iron • Return the soldering iron to its stand when not in use • Turn it off and unplug when not in use • Do not ingest
Laser Cutting	• Laser Cutter CadCam technology • Extractor fan • Ethos CAD software	• Toxic fumes and particulates • Burns to skin and eyes • Electric failure could cause a fire/electric shock	• Make sure the ventilation is on when in use. Don't open until 2 minutes after wood is cut • Make sure guard is closed and not open when cutting • Make sure maintenance is up to date
Marking out and cutting	• Pencil • Ruler • Scalpel • Mat	• Cutting oneself using the scalpel. Blade can snap • Tools could fall off the work bench onto the fall	• Use a safety ruler when cutting with scalpel • Ensure all tools are placed in the middle of the work bench
Cutting	• Scroll saw • Goggles	• Injuries using the saw • Work may slip and bits may fly	• Ensure guard is down • Hold work firmly down • Wear goggles to avoid any flying bits hitting the eye • Keep hands away from the blade
Sanding	• Belt Sander • Goggles	• Grazing hand while sanding • Lots of particulates flying around	• Wear goggles to avoid sawdust getting in eyes • Avoid putting hands near the belt sander and switch off when not in use • Wash hands thoroughly after

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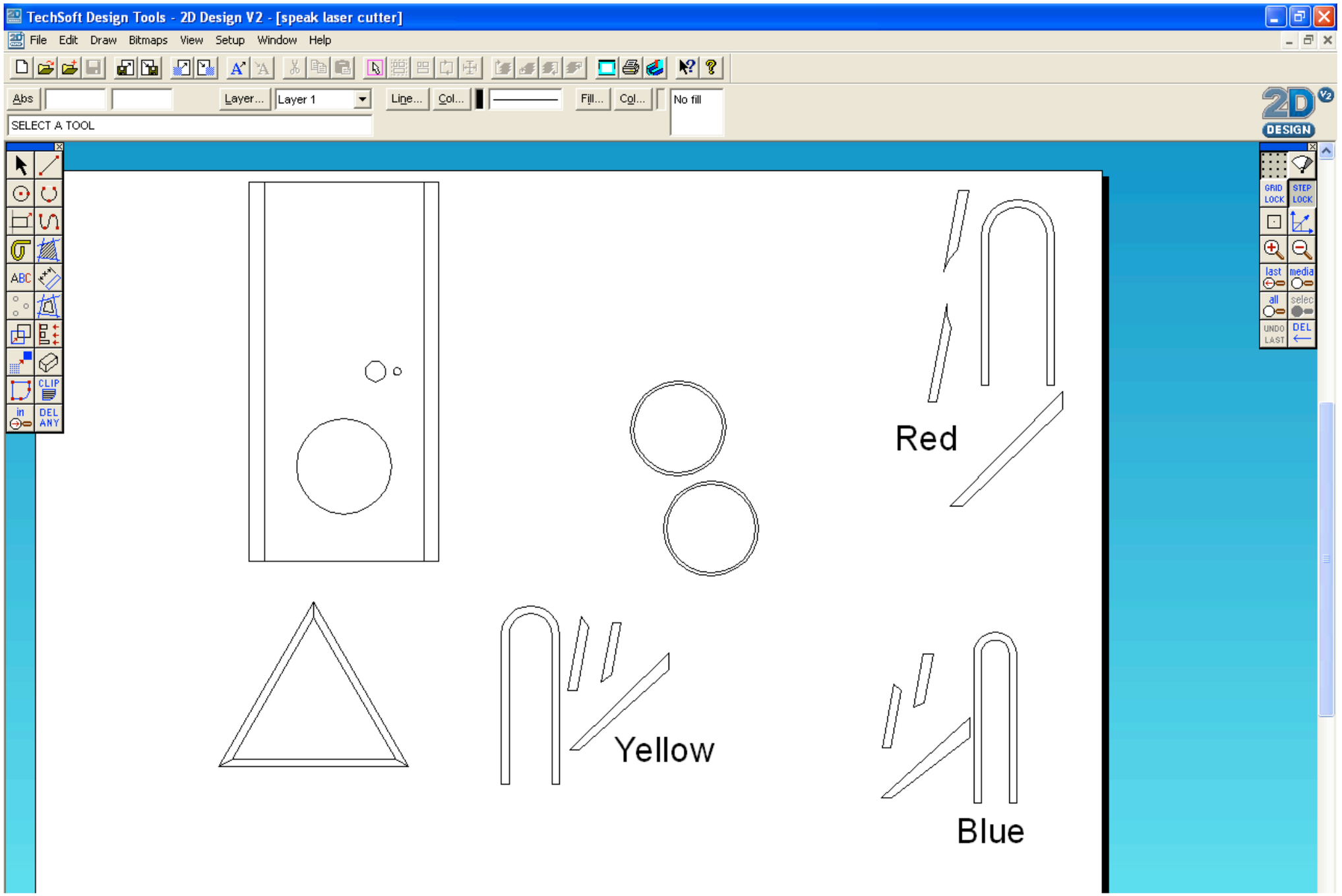
Manufacture process

Process	Tools and Equipment	Risk Assessment	Safety Procedures
Drilling	• Drill • Drill bits • Clamp	• Loose objects can be caught in the drill • Drill bit becoming loose • The work can spin with the drill at a high speed	• Take off loose objects and tuck in loose clothing • Wear googles • Tighten drill bit • Clamp down work
Vinyl Cutting	• Vinyl cutter Roland CAMM • 2D Design CAD software	• Cutting hand with the blade • Trapping fingers • Plastic getting stuck	• Keep hands away from the cutter • Keep loose objects away from the cutter • Only hold the plastic away from the cutter
Veneering	• Iron • Iron on glue film • Roller	• Burning oneself with the iron • Melting glue on hand • Hot surface can cause a fire	• Keep iron off when not in use • Only iron onto veneer and don't touch the veneer
Gluing	• PVA • Spreader • Clamp	• Toxic when ingested • Irritates skin • Inhalation • Gets on clothes	• Keep room well ventilated • Don't put hands in mouth • Wash with warm soapy water if on skin • Wear an apron
Screwing	• Screwdriver • Screws	• Stabbing oneself with the screwdriver • Poking out your eye • Screwing a screw into ones hand	• Don't point screwdriver up towards the eye • Keep screwdriver secure so it doesn't slip and stabs oneself • Make sure that the screw will be going into the wood
Staining	• Stain • Paintbrush • Newspaper	• Getting stain on clothes, skin and workbench • Inhaling fumes of the dye	• Wear an apron and stain over newspaper. • Stain in a well ventilated room • Wash hands with warm soapy water to remove the stain from skin.

CAD using 2D design



I used 2D design CAD software to design my patterns and also to work out the angles needed to create the triangular prism in regards to sanding the angle down.
For anything that needed laser cutting the 2D design file would be converted to an Ethos software file for convenience.

Logo Design

Inspired by retro colours and shapes. Patterns at bottom are offset to add originality.

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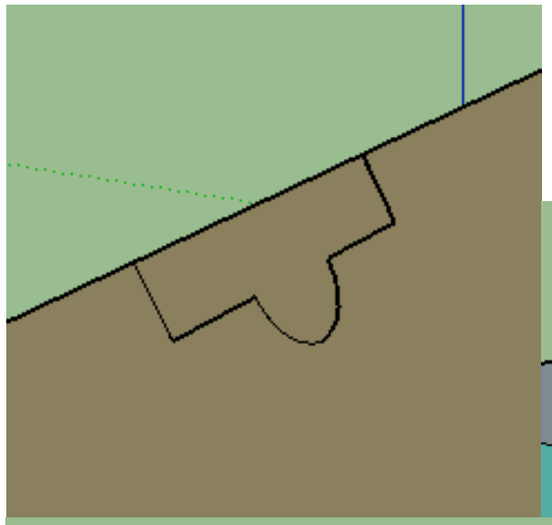
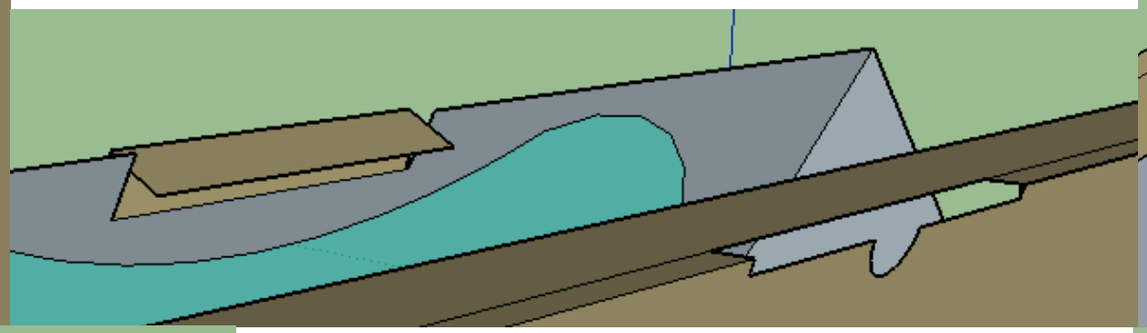
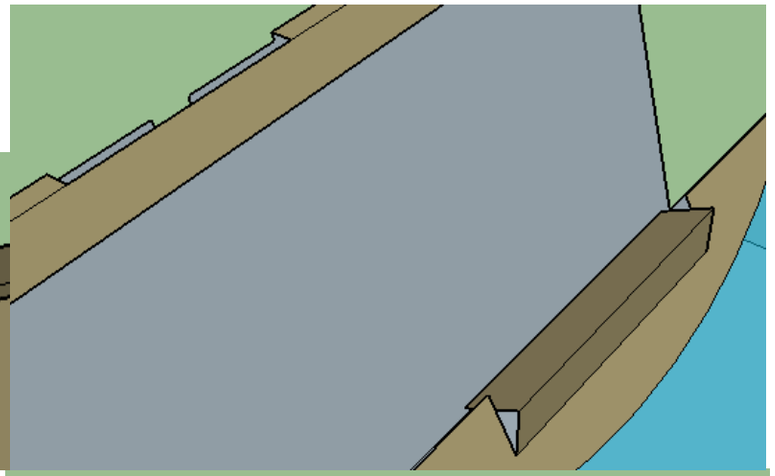
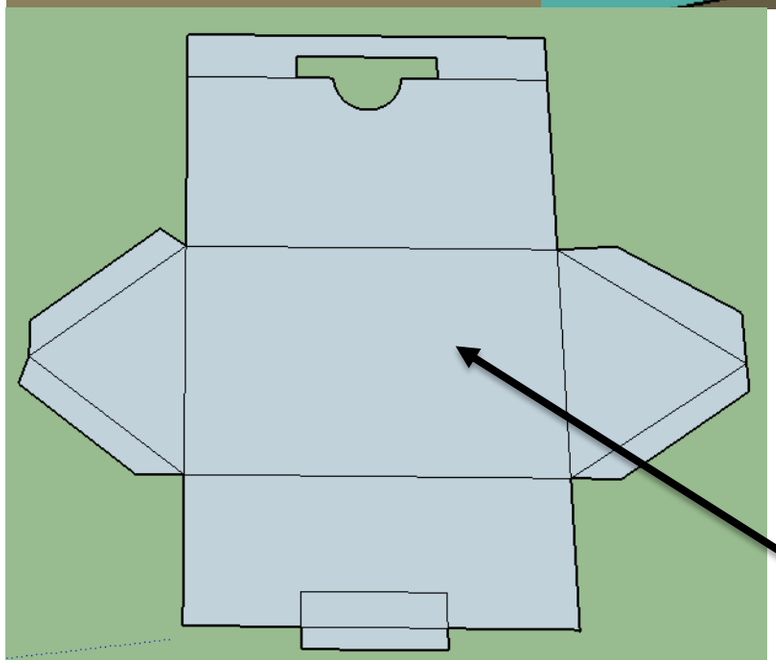
Packaging



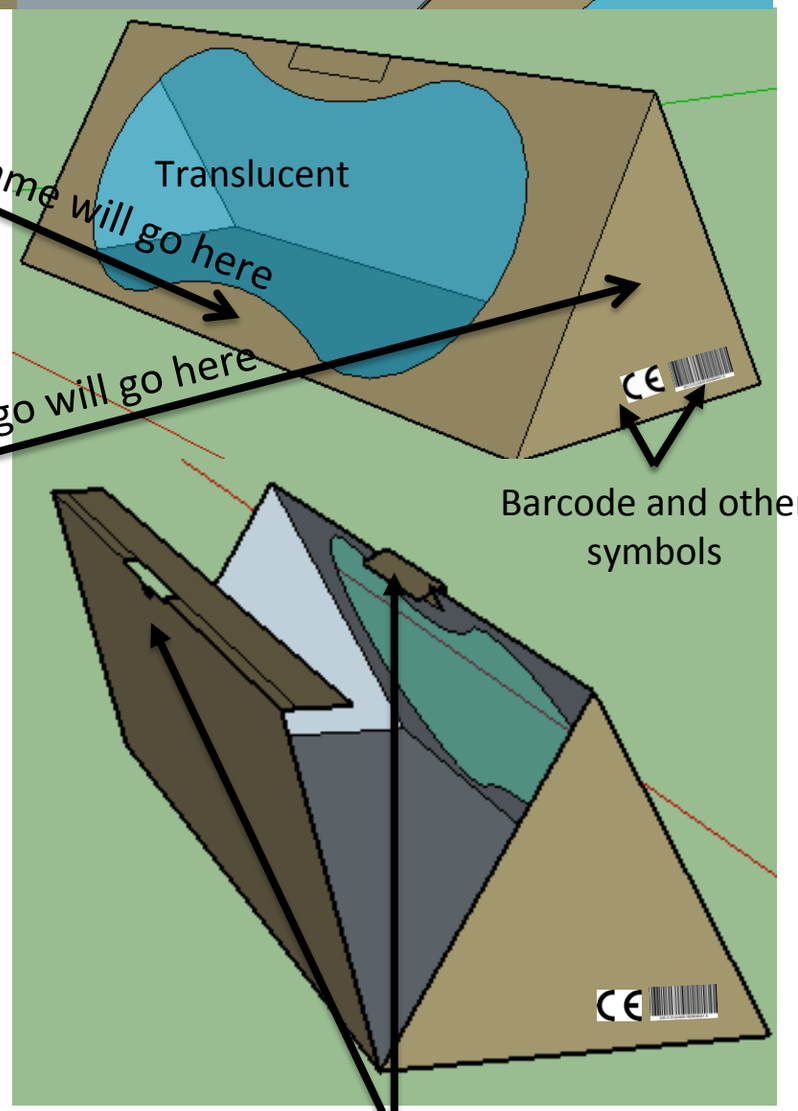






The packaging will be a cut net that can be folded and glued together

Retro MP3 Speaker



Open and close the packaging

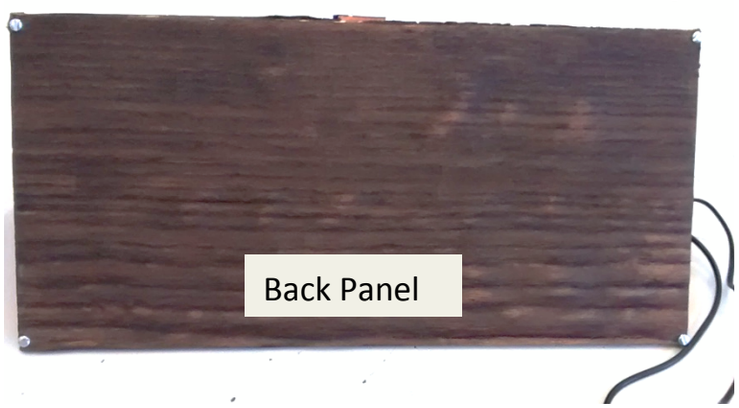
My packaging will be made of cardboard and a translucent plastic so that the speaker can be seen. My packaging will be used to protect the product from being damaged as it will have the speaker encased in not only cardboard but also solid foam. It will also be used for easy distribution and will have labels to provide information. For example it will have a Barcode and other symbols that are necessary to show the products price, that it is fragile, the packaging is recyclable and any quality and safety standards that the product has passed. It will also have my logo and contact details for any customer help needed. These will all be printed on. Enclosed in this will be the Speaker, Aux cable, DC power supply and a leaflet on how to work the speaker.

Final Model

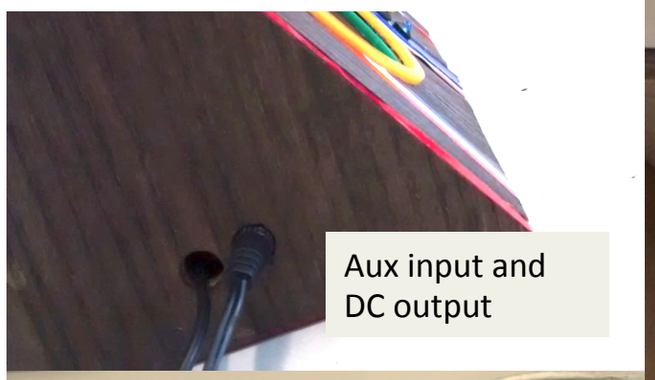

The vinyl and acrylic

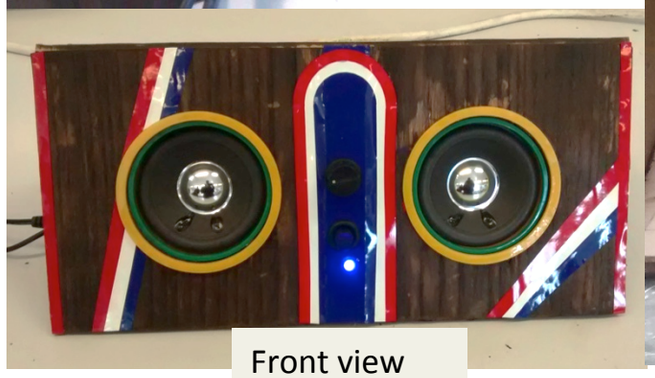
Evaluation
I am very pleased with the outcome and my client really liked how it came out.


assembled and stained


Back Panel

The Green box is the Potentiometer. There is a heat sink attached to the Amp chip to stop it from overheating. The purple wire leads to the LED and the black to the switch.

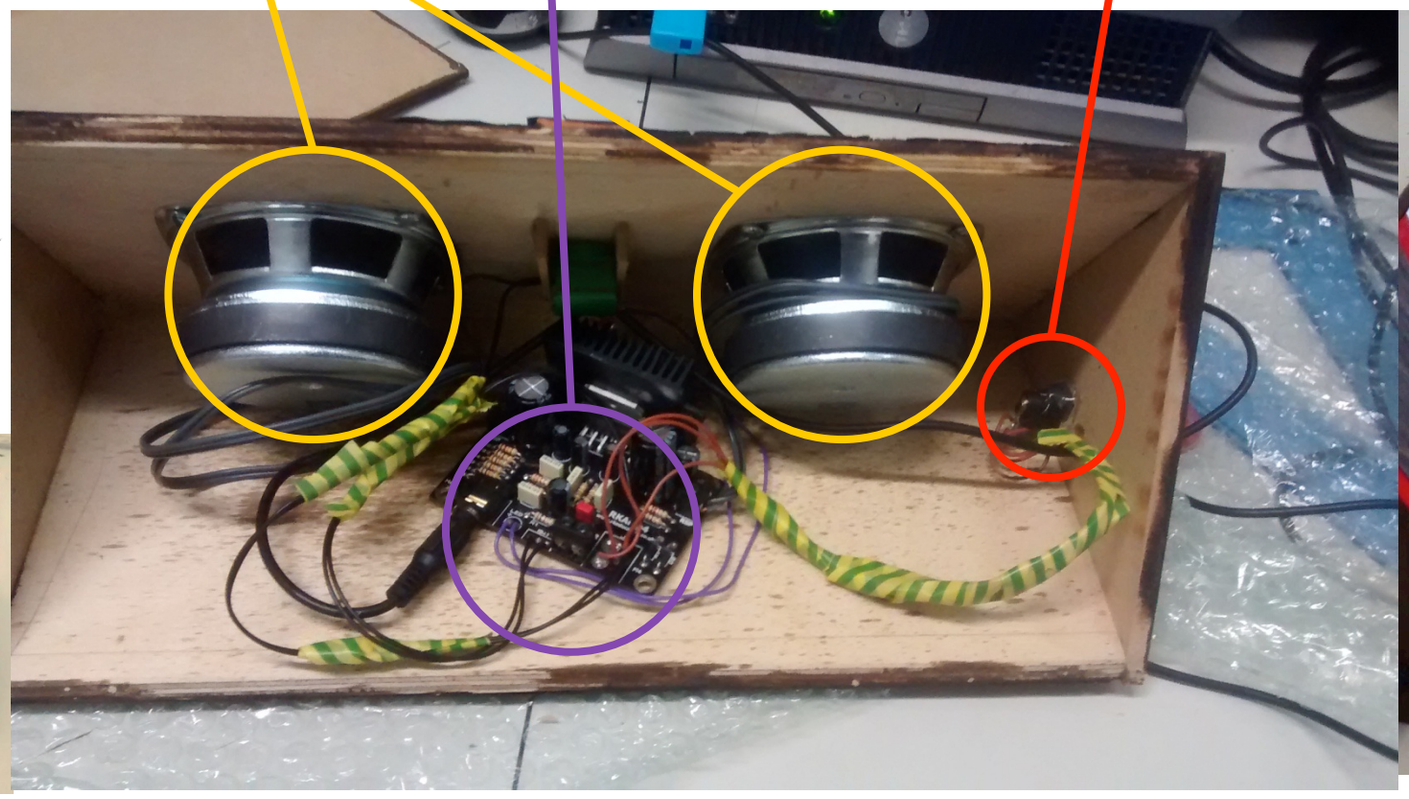

Aux input and DC output

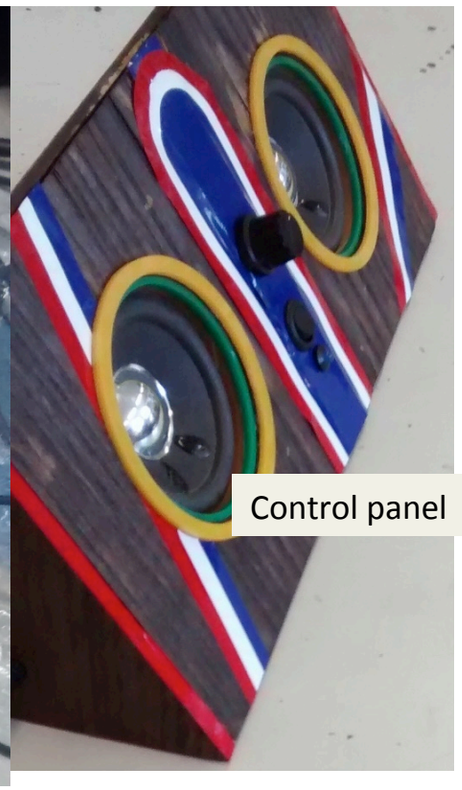

Front view

Speaker cones

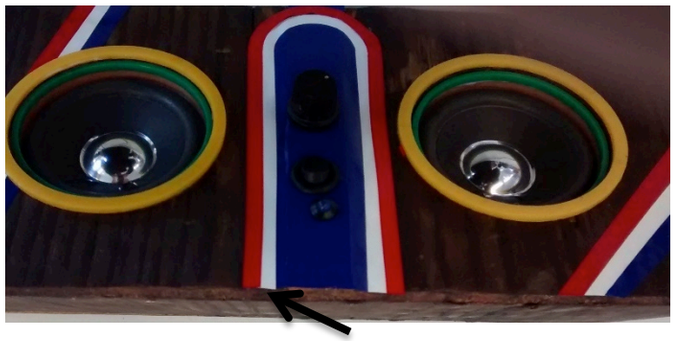
PCB

DC socket

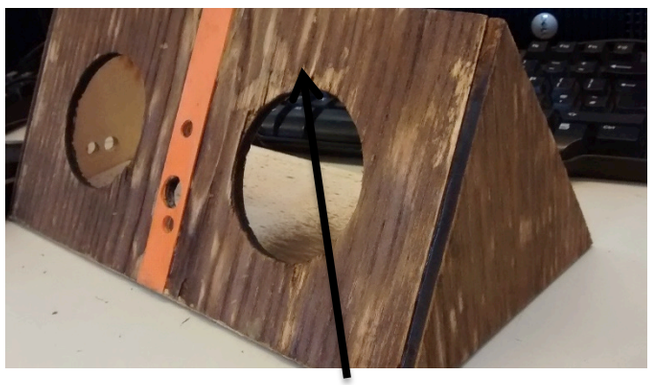



Control panel

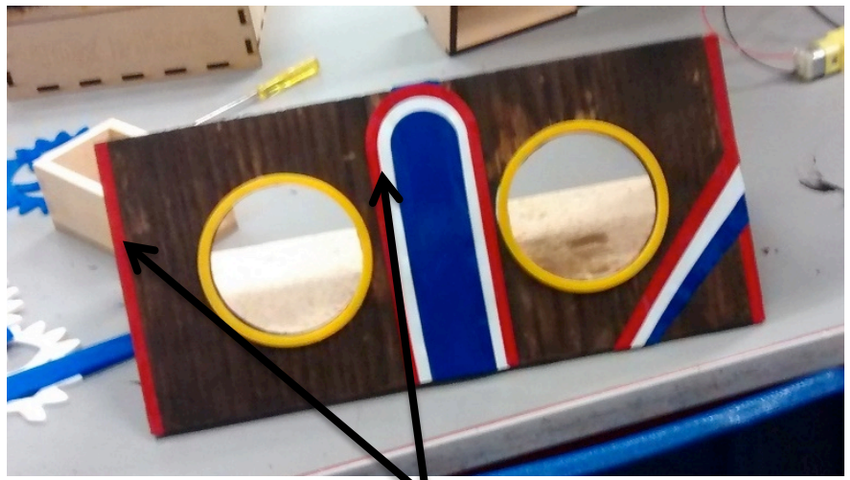
Fault Findings and Testing



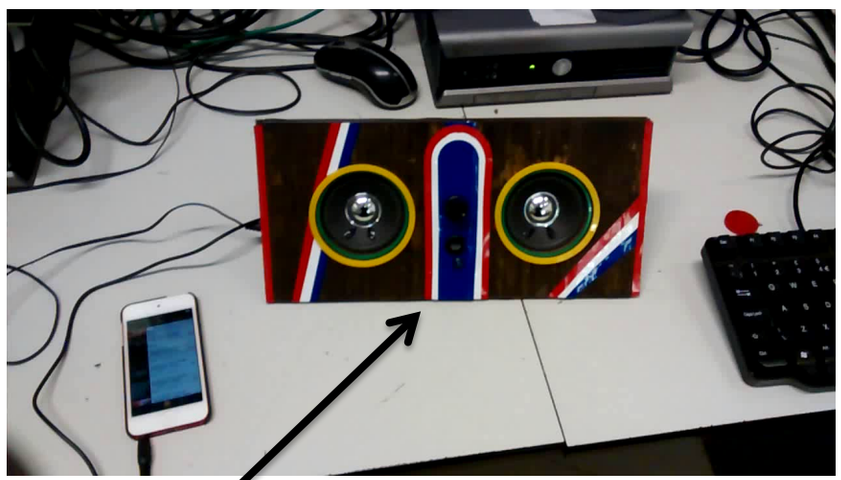
I found out that the was a gap between the joints of the front and bottom panel. This could have been down to sanding down the angle. Therefore I had to used would filler to fill it



I had many problems with the veneer. Firstly it was too thick meaning it was very difficult to cut and split often. It also wasn't very flat and was bumpy so it had to be soaked which discoloured it so had to be stained. Furthermore, when staining on top of it; it left patches that was unstained. Therefore, I had to rub it with white spirit and sand it down. This partially worked by making the patches darker.



I knew that the edges wouldn't look good when joined. So I included vinyl stripes to cover the edges. The vinyl patterns and acrylic rings do well as it distract the slightly lighter patches of the stain. There were also a few cracks in the veneer so next time I will try to be extra careful when veneering it.



Testing stability, sanding, drilling, joining and back panel.

Testing the veneering showed that with a roller and iron on glue was the most effective method.

Testing the staining showed that no patches were left. Next time I should test staining when glued to MDF because the stain may have reacted with the glue.

Video to show the speaker works

Evaluation

Research

My research satisfied the design movement and taught me the processes in making the product. My client was very pleased with the research done and believes this was vital to making the speaker. I think the most valuable research was looking at existing products as it allowed me to keep on path with what a speaker needs to but also on how to make it unique.

Initial, Developed and Final Ideas

My thumbnails allowed me to consider different ideas. However, I went too far and tried to make my speaker too complex by adding to many ideas. My client helped by showing me on what I should do when making my initial ideas. I used Google Sketch Up to make them and then developed it considering improvements. I added my design movement to the ideas. This helped to keep my product to the task. My final Idea was my strongest as it had measurements and I knew what and how I was going to make it. My client really liked the idea.

Final model

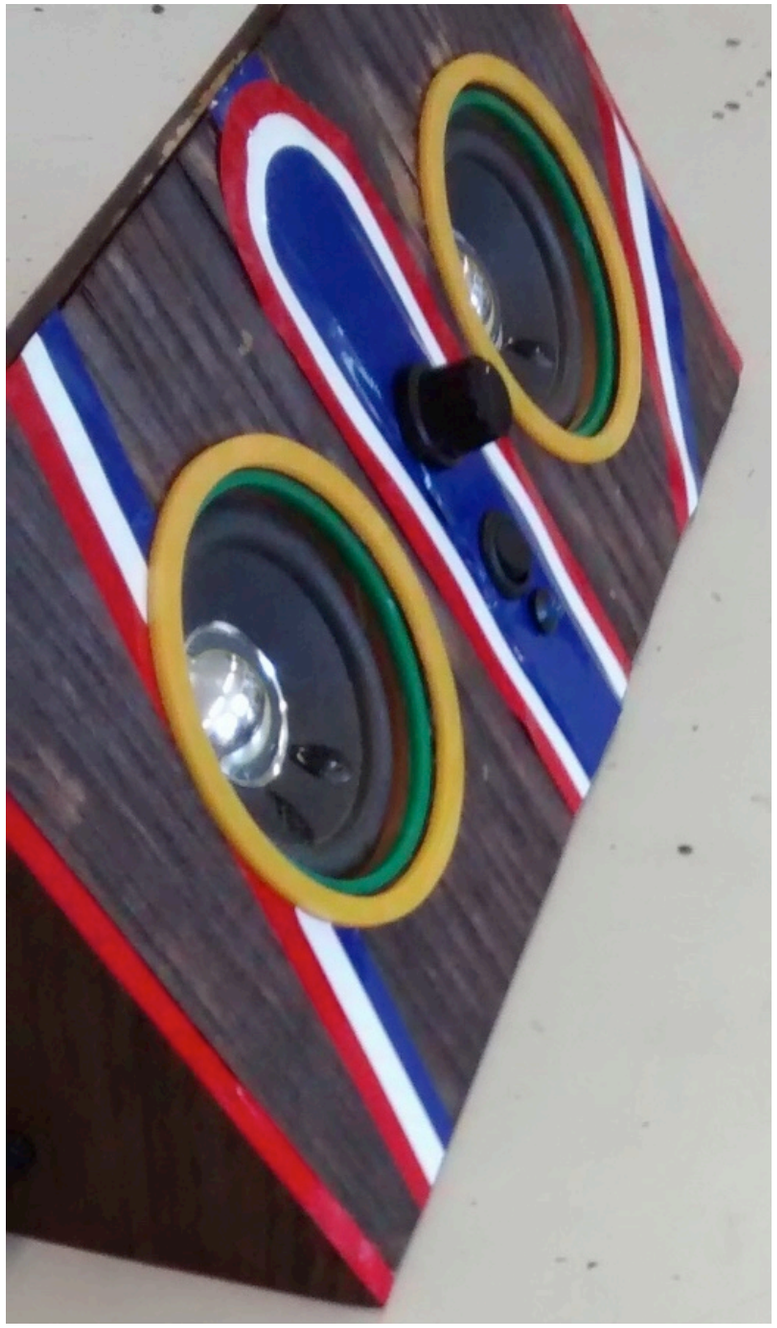
The product looks very professional and is very similar to the Google Sketch Up design. I had to change the location of the AUX input. This made it more suitable for connecting a device and I think that it is now better because the device would have probably been unstable when sat on top. I also decided to use less vinyl to allow more veneer to show. I also had to change the colour of the yellow vinyl to white as the yellow vinyl was out of stock.

What I would do differently, if I were to repeat the project

If I made another speaker I would choose a higher quality veneer to reduce the number of cracks and time taken in manufacturing the product. Next time I will also take more care when sanding so that no gaps or holes are produced and wood filler wouldn't be necessary. Finally, I will try to make my speakers rechargeable and Bluetooth so that no wires can be seen.

Client Feedback

My client really likes the appearance of the speaker. She thought the vinyl patterns, acrylic rings and veneer work really well together. She also recognized I had trouble with the veneer and thinks I did well to deal with and fix the issue. My client is very satisfied with the outcome and performance of the speakers. She thought it is very loud and still has quality when turned up high. Although it does start to crackle towards the very maximum which is expected. My client finds it very easy to operate and would 100% recommend it to others.



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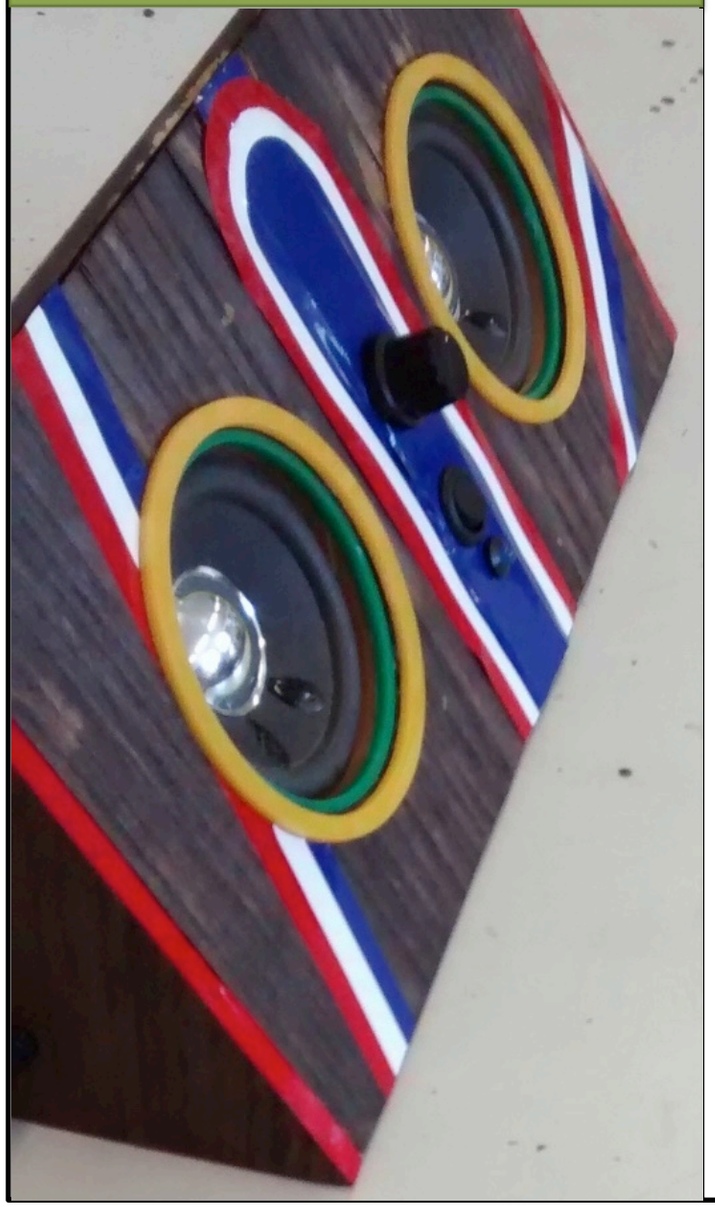
Consumer Feedback

Question	Consumer 1	Consumer 2	Consumer 3	Consumer 4	Consumer 5
Out of 10, how satisfied are you with the appearance of the speaker?	9/10	10/10	8/10	9/10	7/10
Out of 10, how satisfied are you with the performance of the speaker?	8/10	9/10	8/10	10/10	9/10
Out of 10, how easy is it operate the speaker?	9/10	10/10	9/10	10/10	10/10
Would you buy the product?	Yes	Yes	Yes	Yes	Yes
Would you recommend the product to a friend?	Yes	Yes	Yes	Yes	Yes

Leaflet

MP3 Speaker



This speaker takes after the iconic retro design movement. Using veneer, vinyl and acrylic we have designed an authentic and unique speaker unit. This speaker comes with two 10W speakers, DC power supply, Volume control and an AUX input.

Simply plug in, switch on and choose a song to get the ultimate musical experience!

Designer: Amar Gudka
Tele no: +(44)208 669 3290
E-mail: Amar@gudka.net

Cost

We produce the best bargain for quality. Our price will beat any others for the production of high quality speaker. The next best is £100 more expensive! We price our speakers at £39.99 which is both affordable and

★★★★★

"Finally a cheap yet quality speaker!"

Our Pledge

We promise that our speakers are made using the highest of quality materials. Each speaker is handcrafted by our very own highly skilled designers. We will always try never to disappoint and if you aren't satisfied we will promise to repair your speaker. This will also come with 3 years warrantee.