

# **Wearable Products Combining Fashion and Technology**

Product Design Project III

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## **Approval sheet**

The project entitled "**Wearable products combining fashion and technology**" by **Krishna Kumar R.** is approved in partial fulfillment for the Masters Degree in Industrial Design course at Industrial Design Centre, Indian Institute of Technology, Bombay.

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## 1 Introduction

Man has been for ages carrying different objects with him, holding them, wearing them and taking them to where ever he goes. The advancements in technology has made it possible for him to carry various electronic devices with him. The birth of these portable devices posed a set of new questions on the relationship between an object and the person's body on or around which it is worn.

The future multimedia devices communicating via wireless network will be ubiquitous and built into the clothes and objects we wear every day. The family of these products will utilizes the latest advances in miniaturization and wireless connectivity technology to enable entertainment, business, and security-related communications and broadband applications. These

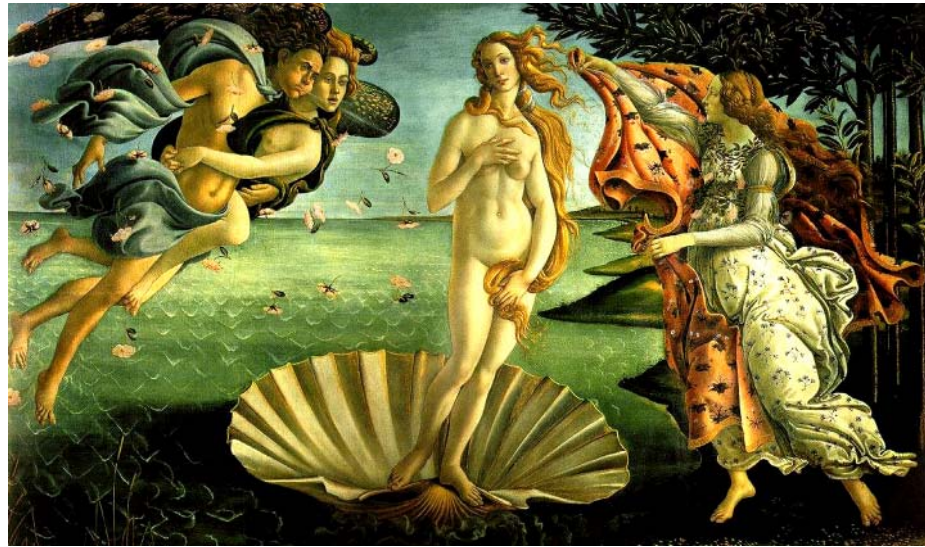


In the future our personality may be shaped and interpreted not only by the clothes and accessories we wear, but also by the way our fashion speaks to others.

modular devices would be wirelessly connected, allowing it to share information with other devices and the user, forming a seamless network. In these technology loaded devices, functional capabilities and features are often implemented without much regard for actual human needs and aspirations sometimes at the expense of user experience.

In an era where gadgets are transcending the limits as a device and getting closer to reflect a person himself, the significance of how a device relates to its user is of great importance. Can an object represent an individual's identity and personality? Can it establish itself as a signifier of the person himself through its distinct use and the value associated to it?

The project aims at the integration of digital technologies with contemporary fashion and focuses on the opposing notions of fashion accessory and a gadget.



Botticelli's The birth of venus.

## 2 Fashion trends

To understand the subtleties that lead to the development, growth and nourishment of a style it is important to know the socio-economic and political reasons that acted upon the society during that time. Such a study helps in the better understanding of the need and forces that will lead the development of newer products.

### 2.1 History of fashion

The church was at the height of its power, there was little demand for jewellery. The patrons of goldsmiths were the church and royalty, whose requirement was devotional and ceremonial. Before renaissance importance of piety and



Anton van Dashorst More (Spanish) known as Antonio Moro's the portrait of Queen Mary Tudor. Tight bodiced dress with sleeves and high neck jeweled pendant suspended from jeweled necklace, bracelets on both arms, jeweled girdle and several rings.

The passion for flowers is illustrated in this diamond and silver pendant. This pendant incorporates three of the most common motifs of the late 17th century; a bow, a cross and flowers.



spirituality were reflected in women's costumes which was plain, simple and concealed the body entirely. Renaissance as known today is the surge of energy in the economic, artistic and philosophical fields.

In the 15<sup>th</sup> century Italy became increasingly prosperous from banking and trading activities. A rising middle class gradually gained wealth and thoughts turned from spirituality to humanism. Body was admired and nudity was sensually portrayed. Clothes became more sumptuous and more revealing; these changes in fashion demanded a profusion of jewellery.

During the second half of 16<sup>th</sup> century most exotic and flamboyant jewellery was seen in European courts. Spain was at the heights of her power due to the huge gold sources discovered in the South American conquest. It was Spain that led Europe in fashion- European court reflected wealthy, formal and restrictive life of Spanish courts. Therefore the most exotic and flamboyant jewellery were found during this time.

In 17<sup>th</sup> century Europe exuberant luxury and flamboyant taste for exotic and fantastic style gave way to more elegant style. It was a century of wars. Jewellery and plates were melted down to pay for



Wide and enthusiastic interest in science reflected in the clocks and watches of the 17th century

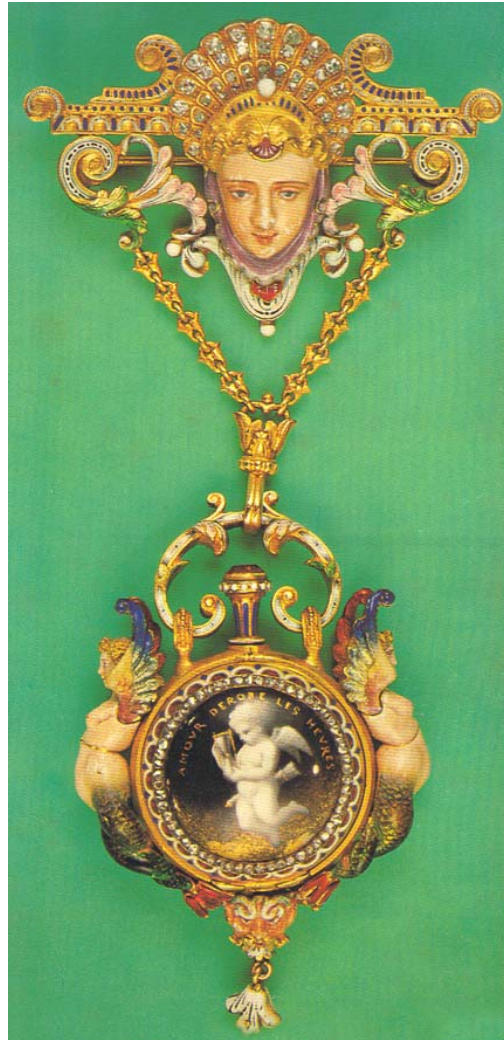


Memorial pendant of late 18th century.

arms. Dutch Netherlands were at height of power and creativity. In Holland (protestant country) power was in the hands of merchants and burghers who preferred sober restraint to lavish extravagance. A more sensual femininity took the place of formality and courtliness. Spanish ruffs, tight bodices, and huge farthingales gave way to softer fabrics damasks, silks and laces replaced heavy brocades, low necklines replaced high ones.

Heavier and symmetrical design gave way to more asymmetry and open form during the mid 18<sup>th</sup> century. Understanding of lapidary work was introduced by Mughals in Europe; brilliant cut with 58 facets exposed an unexploited property of gemstone. Sentimentality is reflected in the mourning jewellery that were designed in England. This is also seen in the French jewellery having hearts, bows and arrows.

France was the centre of fashion until French Revolution in 1789. The other major event that happened in the century was the beginning of Industrial Revolution. Women's jewellery was designed to be exclusively worn in the evenings, when the stones sparkled in the candlelight and were reflected in the mirrors which were an essential part of the interiors.



This mid 19th century magnificent Chatelaine watch shows taste for novelty - the wings of the mermaid are moveable.

A Rene Lalique with movable wings.



In the 19<sup>th</sup> century there was a profusion and variety of design in jewellery as in any other applied arts. It was during this time that the works of individual designers and jewellers were distinguished and recognised. The century's works were mainly concentrated on technical innovations rather than on aesthetic ideas. Flowers and animals appeared in different forms reflecting the taste for naturalism and also Victorian passion for novelties and curiosities. Diamonds started losing popularity and instead semiprecious stones and other materials like garnet, amber, cornelian and agate and Cut Steel became popular.

At the end of the century in Paris emerged a style that reflected a feeling of revolt against the repression and orthodoxy of the previous decades. The Art Nouveau style lasted from the 1890s to the First World War. Art Nouveau designers rejected the classical vocabulary of decoration, replacing it with motifs derived from nature, characterized by strong free flowing curves. Outstanding works were done by designers like Rene Lalique the French glass maker and Jean Dunand the Swiss Designer.

The years following the First World War the foggy splendour of post impressionism was replaced by strict



An Art Deco pendant with its strict geometry.

lines of cubism. Cubism in turn led to precise geometric forms and Walter Gropius' Bauhaus personified this comprehensive approach to design. Art Deco the style of the 20's and 30's had concise well defined lines and strict geometric harmony with straight lines and angles intersecting curves and circles. The use of vibrant and bold colours characterized this style.

## 2.2 Meanings of traditional jewellery

Jewellery establishes itself as a defining signifier of social status, categories and the power relationships within it. What people wear, and what they do to and with their body reflect how a cultural positioning of the person is established among his society. Most of the jewellery that is being sold is to celebrate an occasion or to announce an event; design is the least important aspect of such jewellery. It needs to be ostentatiously impressive and exorbitantly expensive. Jewellery also becomes a visible and tangible show of affection from one person to another. It could also become a reminder of others for the person who is wearing and viewing it. What a person wears is a loud assertion on his individuality. It also reflects the person's interests and helps enhance his personal attributes.

However the power an object has, particularly the one that is worn on and around the body, to exemplify and express many broader concepts has advanced the medium of jewellery from this traditional role. Contemporary jewellers seek to imbue objects with emotional meaning, and use the body and space around it to communicate the person to object relationship and the notions of personal significance to the wearer and observer.

### 2.3 Fashion statements

Makers of Contemporary Jewellery have questioned the aspects of its history, process, method, value systems and legitimisation to redefine its role in current cultures.

Dutch jewellers Gijs Bakker and his wife Emmy Van Leersum in the late 60's and early 70's went far to establish the basis of how the breadth of the potential role of contemporary jewellery is perceived today. They protested against the traditional qualities of jewellery relating to expensive materials, limited translation, and conservatism of form and placement on the body: the human body was glorified as important part of the jewellery. They designed a collection of collars and bracelets from aluminium. The

Experimental clothing by Emmy Van Leersum and Gijs Bakker. Holland, 1971



Shoulder piece in blue anodized aluminium.  
GijsBakker. Holland, 1967

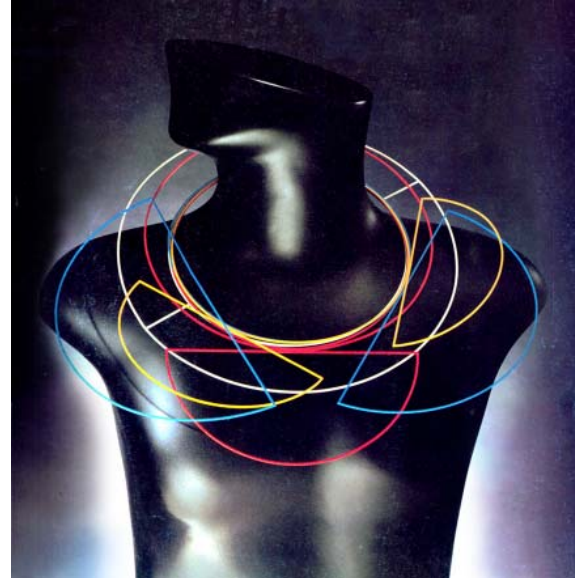
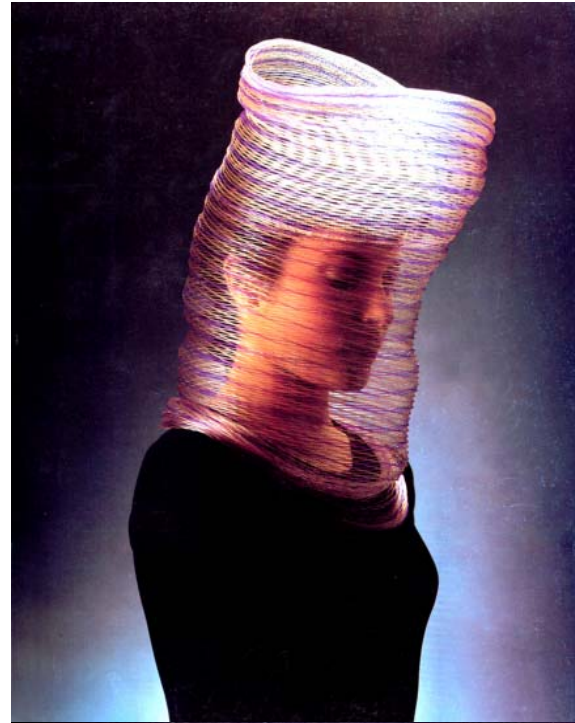




Top: Cotton on wireframe Susanna Heron. UK 1982

Top right: Neckpiece, veil Nylon monofilament, Caroline Broadhead. UK 1983

Right: Primary Orbits - Neckpiece, Neoprene over steel, David Watkins. UK 1983



usage of material being a deliberate social-aesthetic choice. In the 1970s and 1980s three names - Susanna Heron, Caroline Broadhead and David Watkins dominated and contributed new ideas to the field of jewellery. Susanna Heron in 1976 designed a collection of acrylic perspex bangles which was highly simplistic but had a character and verve, followed by a range of perspex works taking the theme of curve. Caroline Broadhead's design-bracelets and necklaces made with tufts of nylon held in a frame of boxwood combined elegance and simplicity. In the 1980s the works of Susanna Heron together with that of Caroline Broadhead and Julia Manheim from non-precious materials such as nylon explored the notions of wearability, the relationship of jewellery to the body, and the space around it.

David Watkins one of Britain's most mature new jewellery designers in terms of colour harmony and abstract composition has produced works which are very much his own, often large, of highly coloured metals.

Naturalism and preference for organic form has reflected in the terms 'body sculpture', 'sculptures to wear' and 'body art'. Notable works being done in the same by Arline Fisch, Barry Merritt and Marci Zelmanoff. American Marjorie



Schick is one of the most interesting practitioners of Body sculptures. Swiss born Otto Kunzli through his works have made the world look into the narrowness of the society in finding acceptable dressing and the limited conventions within which commercial jewellers work. His works have shown contempt to the conventional rules followed and presents to see for ourselves what is acceptable and what is not in our everyday life.

German jeweller Wilhelm Mattar's work is a mixture of the abstract and figurative, it also reflects a pinch of brutality which is discomfoting in jewellery. His works presents a version of punk who wore objects to establish a version of tribal identity.



Top left: Neckpiece, Painted wood, Marjorie Schick. USA 1983

Top right: Brooches, Wall Paper Hardfoam, Otto Kunzli. Germany 1983

Left: German-Japanese Friendship, Earpiece, Gold Steel, Wilhelm Mattars. Germany, 1982

### 3 User Survey

Qualitative responses were collected from a category of people. This category was predefined. A person between the age group of 18 to 25 and mostly students or has just finished their studies and got into some job. A party goer and an advocate of the good life, a person of socializing nature who has a lot of friends and who would likes to show off his accessories and gadgets and likes to be appreciated. A person who is easy with gadgets and has already used some of the available gadgets were preferred. It was also seen that these people were easy with computers and other electronic equipments.

The questions were defined to probe into the thinking of these people. These were such that would elucidate the various aspects in the making of a wearable product.

### 3.1 Questionnaire

#### About gadgets and equipment

What are the gadgets that you use regularly? Cell phones, game stations, video games, key chains....

What do you like most in your gadget?

How much did you spend on your gadget?

Why do you possess them?

What are the reasons for you to buy it?

How do you react to these gadgets?

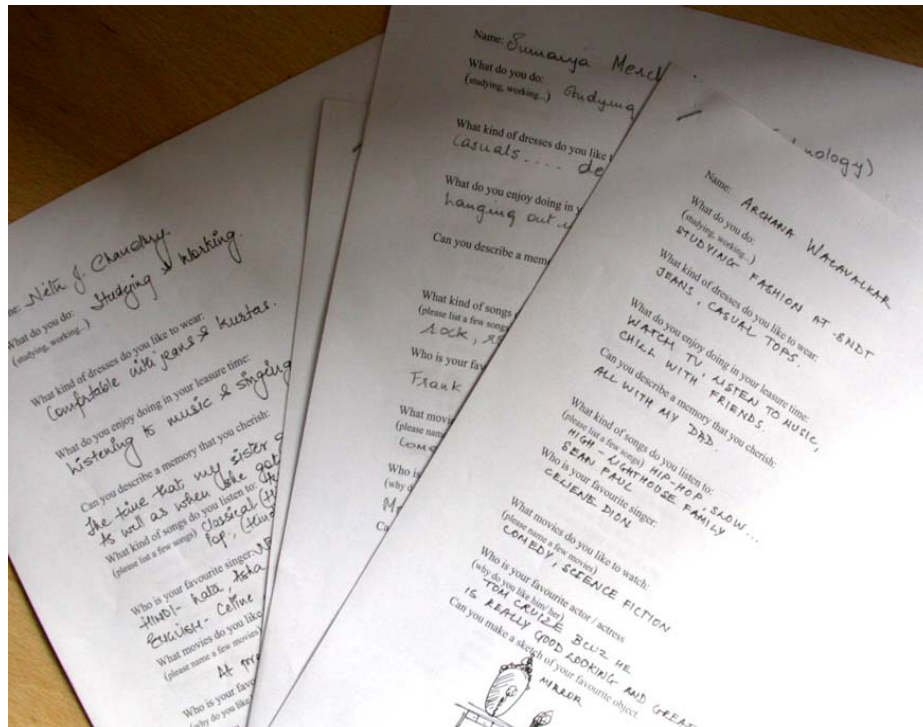
Do you feel these gadgets get outdated?

Did you come across any feature / gadget that was distinctly different? Or any thing that really fascinated you.

Do you like computer/ cell phone games? Which one describe.

#### Issues related to gadgets

- Size: Small/ Comfortable/ Big/ Too big
- Weight: Too light/ Appropriate/ Too heavy
- Grip: Think it's too small/ nice grip/ Material used:
- No. pad: Small no. pad/ Too big - can't reach the no.s/ Pressure required is more
- Battery life: Is it according to no. of hours?  
Is it according to no. of songs?  
Less/ reasonable/ good
- Time required for charging:
- Personalization done to the gadget:  
Covers - leather, plastic, cloth.....  
Rings, stickers.....
- Cost considerations:  
Looks, Design, Material
- Looks: Colour used - too flashy, decals on it? Material used/ Finishes/ Textures
- Storage: no. of songs/ no. of photographs (specs. if known).



## **Personal**

What do you enjoy doing???

Music, reading, travel, games..... Describe:

Type of music, musicians you like most.

Do you like jewellery?

What type

What type of clothes do you wear?

Casuals, formals....

Do you use specific jewellery for certain occasions?

Like for marriages, party wear, college, office, casuals....

For how much time do you use your jewellery?

How do your friends react to your gadgets, style, clothes.....?



### 3.2 User Survey

#### **Heyden D'souza** Kalina

**Profile:**

Works in a call centre

Goes to parties

Huge friends circle

Owens a Nokia communicator, disk man

**Statement:**

*"I always wanted to buy it"* about the communicator.

**Inference:**

Looks forward to buying newer gadgets irrespective of its cost.

Does not use all the features of his gadgets.

Likes to experiment with his gadgets.

Listens to music while travelling.

#### **Archana Walavalkar** Santa Cruz

**Profile:**

18yrs, Student of Fashion Technology

Jeans and casual tops, chilling out with friends

Loves watching TV, listening to music.

Tom Cruize is the favourite actor.

**Inference:**

Likes to customize the gadgets and gives the product a personal touch by putting stickers, using cell phone holders of different colours etc.

Has a cdplayer, which she carries while travelling.

**Ram Brijesh**  
Powai

Profile:

25 yrs, Design student

Gadget freak, owns cell phone, digicam, digital recorder...

Likes to travel a lot, usually with his friends

Wears casuals

Statement:

*"i like to dig out my LKG photos and see it"*

Inference:

Treats his cell phone not just as a communication device but also as an entertainment device.

Cherishes the moments spend on his trips.

Has a huge collection of digital images taken during his travels.

Stores sound clips recorded at different occasions.

Listens to songs of his regional language while working.

**Sandra Serrao**  
Kalina

Profile:

3rd yr B.Com, N.M. College of commerce

Drives her car to college

Owens a cell phone

Likes simple and casual wear

Inference:

Does not like to use any heavy and bulky gadgets.

Likes to travel without carrying any gadgets but likes the feeling of being connected.

Uses hands- free while driving though she thinks it is a burden.

Does not like the traditional jewellery.



**Mark D'souza**  
**Santa Cruz**

**Profile:**

23 yrs, Design student

Always in casuals

Owns a cell phone which he rarely uses

Carries his hard disk mp3 player almost always

**Statement:**

*"Cant figure out one from the other without seeing it"* about the buttons on his hard disk player.

**Inference:**

Highly conscious about the need for an interface which would work without looking at it.

Thinks it is necessary to have a random set of music.

Serviceable and replaceable parts of a gadget should be easily accessible.

Lack of intuitive interfaces makes the gadget difficult to use especially when it comes to critical functions.

Accessories like battery chargers if possible need to be integrated in the product.

Dreams about a wireless world.

**Delton**  
**Santa Cruz**

**Profile:**

Final yr B.M.M

Follows the latest in fashion

Uses a Nokia cell phone

Huge friends circle

**Inference:**

Wears striking jewellery. Extensive use of fashion accessories.

Likes to be noticed. Likes the idea of a wearable gadget though he has never tried out one.



**Nitu J. Chaudhry**  
Byculla

**Profile:**

21yrs, Student of Fashion Technology  
Got a part time job  
Singer herself and listens to a lot of music  
Mad about the movie "Lord of the Rings"

**Inference:**

Likes to have flamboyant and colourful gadgets and accessories.  
Likes the way goggles and shades are treated.  
Movies are references for judging fashion trends

**Sumaya Merchant**  
Byculla

**Profile:**

19yrs, Student of Fashion Technology  
Likes casual dressing, denims and t-shirts  
Hangs out with friends  
Listens to music

**Inference:**

Use of dedicated device for a specific job is preferred.  
Does not like too flashy designs when it comes to fashion or gadgets.  
Not too comfortable with the complexities of the existing gadgets and is unaware of the full potential of the gadget.

**Diana Penty**  
**Santa Cruz**

Profile:

19yrs, BMM student at St. Xavier's  
Goes to discos and pubs  
Uses a Sony mp3 player  
Ardent Kurt Cobain fan

Statement:

*"Oh yea i love the light!!"* about her backlit Nokia cell phone.

Inference:

Carries the mp3 player almost everywhere she goes.  
Likes to have a rare piece of instrument.  
Quite aware of the functions that her cell phone offers.  
Happy with just separate gadgets for different functions.  
Thinks additional functions make it bulky.

### 3.3 Conclusions from user surveys

- o There is a lack of knowledge of the products capabilities other than the specific job it is expected to perform.
- o Due to the availability of digital equipments and deep penetration of computers there is an extensive use of digital data
- o Use of separate gadgets for any specific job is quite common.
- o People like to listen to music especially when they are travelling.
- o Users are mostly unaware about the existence of wearable products.
- o There is a lack of availability and choice of products in the range.
- o The owner develops an intimate relation with his gadget due to its usage.
- o The way a gadget is treated is very different from the way an accessory is treated.
- o Cost considerations become secondary when it comes to digital equipments.
- o The uniqueness of the product is valued and people have a desire to present and appreciate viewpoints.
- o Simple and elegant forms are preferred in products.

## 4 Listening to music

From the user surveys it came to the notice that most people like to listen to music. So a closer look into how and why people listen to music was done to get a better and broader picture of the act of listening and enjoying music.

### **When do people listen to music?**

The act of listening to music has many a facet to it.

For a person to enjoy a song it needs to be of his specific taste and also depends on the mood of the person and the environment in which he is. During work music is needed so that the ambient noise is levelled out or the distraction from surrounding is less. The playlist in most players are the outcome of this liking to have a sequential list of prioritized songs. Most

people don't like the breaks in between the songs in FM stations due to this reason.

People like to listen to music while they are working. While working the music is in the background, a specific song and the level of enjoyment it provides is less important. What is important is to have a set of music that is in pace with the pace of the work being done. There needs to be a random set of music or a playlist of songs of the same category.

During casual listening the songs are not so important. This kind of listening happens when one is not engaged in some act which needs concentration; say like waiting in a bus stop. All that is needed is any random music which need not be from a favourites list. People like to listen to certain FM stations at specific times because of the interesting ways in which the comparer of that particular station carries forward the event.

## 5 Existing Technology

Today's advancements in technology has lead to the mass manufacture of gadgets at extremely low costs which are of significant quality. There has also been a tremendous increase in the number of products available within a specific range.

A gadget can be defined as an electronic or digital appliance that has a lifespan, which is not dictated by its technological defect but by the usefulness and functionality becoming usurped by another newer, faster and better one. Gadgets do not score high or endure on a set of objects of personal significance. The sense of attachment these objects demand are minimal, therefore they are replaceable, transferable and sharable.



Philips bi-ampli radio



Transistor TI - 1954



Sony Walkman being launched in Yoyogi, Tokyo on June 22 1978.



First personal headphone stereo Walkman, the TPS-L.

## 5.1 Evolution of gadgets

How can an object, which uses digital capabilities, avoid becoming just another gadget? For an object to represent an individual's identity and personality it has to establish itself as a signifier of the person himself through its distinct use and the symbolism and value associated to it.

Jewellers and fashion designers have constantly been dealing the issues of wearability. It is only after the portable era and the birth of Sony's Walkman that posed a set of new questions on the relationship between an object and the person's body on or around which it is worn.

## 5.2 Trends in gadgets

The current trends in devices have been towards miniaturization and inclusion of additional functions on to one device. These trends are because people don't want to carry large devices or carry too many devices. As the functionality of these devices increases and the size reduces it become relatively difficult to use. These devices have been characterized by smaller screens, tiny input methods, multi modal inputs.

To avoid the difficulty of use of such devices, splitting the device seems a

logical solution to the whole issue where parts go to their appropriate locations like earphones near to the ear, microphone near mouth, keypad and navigation tools at our finger tips. The advancements in the field of Nano technology, genetic engineering and quantum computers where smaller devices working as separate units to create an invisible machine, will help solve the issues of bigger devices. The newer gadgets will have issues related to personalization and respect for privacy and also the power requirement of the device.

### 5.3 Specifications of gadgets available

An analysis of gadgets that make extensive use of technology to come up with a lot of never before functions gives us an idea on where these products are heading to. The specifications can be listed as:

#### Methods of communication

IrDA (Infrared Data Association),  
FireWire 400, USB 2.0, GSM,  
CDMA, Wireless LAN (802.11)

#### Storage

SRAM, Flash memory, MMC

#### Displays

TFT LCD, LCD with LED backlight.

## 6 Explorations done in the field

The relationship between an object and the user can take different perspectives. First is the intimate relationship that develops between an individual and an object. Here the attributes and qualities of the object are important as it helps the user relate to it more intimately.

The object acts as a link in the relationship between two people. The unique communication facilities offered by the device help develop a sense of attachment to the device. The popularity of cell phones attributes to the role they play in connecting people. The other role that it has played is to form an ice breaker and help strangers' start a conversation. The 'humming bird' is an example of it where the device starts beeping when a person



Above: IBM's Digital Jewellery  
Below: Philips New age Nomad - Wearable devices



who has the same device comes closer, it helps start a dialogue between the owners.

The object could give a person a newer or memorable experience; it could be one that is more of a self-indulgent event.

## 6.1 Research and Development

Cameron Miner is the founder of design lab and lead scientist on IBM's Digital Jewellery project. Their motto "if you have something with you all the time, you might as well be able to wear it" reflects their problem-solving approach towards design. Their narrow interpretation of jewellery has led to solutions nearing the quality of an accessory with a predictable form. The naivety and shallowness in case of the problems which are in need of solving has echoed in the design solutions.

Philips has provided concepts to integrate technology in home and clothing. They have a user-centred approach where expertise from the human sciences and technology through a multi-disciplinary, research-based approach makes it possible to come up with solutions that satisfy and anticipate people's needs and aspirations. Their dream of 'not to have easier tools but not to have to bother with tools at all' has led to the



Above: Nike-Philips portable sports audio.  
Below: Nokia imagewear - the medallion.



integration of functions into objects which are part of our life. Philips designs reflect an openness to form and mode of interaction, their devices have a playful ways of interacting with the systems. Their wearable device echoes qualities of a product rather than jewellery.

## 6.2 Wearable Products

The Philips – Nike partnership has worked out a new range of co-branded portable MP3 and MP3-CD players that have been specifically designed for athletic use through the integration of ergonomics, usability, portability and solid state technology.

Nokia Imagewear consisting of Nokia Medallions, the digital “locket” and Nokia Kaleidoscope, the small pocket viewer is the new product range from Nokia that combines style, design and wearability with easy to use technology. These products have been designed for people who want to stand out from the crowd. The Nokia Medallions can carry and displaying images reflecting your personal style or emotion. Nokia Kaleidoscope helps to upload digital images and easily store, carry and share them with friends and family.



IDEO's gesture based concepts for PDAs

### 6.3 Concepts

IDEO's proposal of wearable digital appliances includes cell phone rings, where the ear piece and mouth piece are embedded in finger jewellery, toe jewellery, which facilitates navigation around a city, through the use of satellites and a PDA power plant on a belt, a sports watch which supplies data of your performance, to upload to your PDA for analysis and a low powered ear mounted phone. The forms show a more imaginative interpretation of how a wearable digital device should be.

Motorola - FROG Design's Wearable Digital Assistant from the iDEN family



Frog Design and Motorola designed a set of wearable devices. There is a central device - the WDA - Wearable Digital Assistant that serves as the hub, and provides a wireless connection to an iDEN network. The other members of the family being - the Wristable that has same function and technical description as the WDA, but it is worn on the wrist, a goggle with an integrated heads-up display, a digital camera, ear bud and microphone and an Intelli-pen.

## 6.4 Experiments by designers

Ira Sherman made a collection of wearable technological devices in the 1990s highlighting the changing role of technology in our everyday life. His 'Arbitrator' holds an arguing couple together for a set period of time, encouraging discussion to rectify the problem, while all conversation and terms of agreement are recorded and documented. The devices he made frequently took the role of 'authoritarian' in the lives of human relationships.



Ira Sherman's 'Arbitrator' holds an arguing couple.

Christoph Zellweger in collaboration with industrial designer Peter Russell Clark developed a new category of 'light jewellery' for a London based company Scintillate. The aim of the project was to make light itself the jewellery and element of beauty, rejecting the use of precious metals and stones. The project reflected on the softening of technology for a more meaningful use.



Christoph Zellweger's and Peter Russell Clark's light jewellery

Nicole Gratiot Stober's glowing ring.



Nicole Gratiot Stober explored the possibilities of translating human communication through jewellery. The jewellery reacts to the interaction between people by a glow of light in response to a touch as if the object is returning your gesture, through sensors. The functionality of this object echoes how important is the sense of touch in human communication to one another.

## 7 Product brief

To design a product that

### *General considerations:*

Has got aesthetic qualities that parallel a fashion accessory more than a gadget.

Help reflect the person's attitude - a display of status.

Could be easily handled by a non gadget savvy person as well.

Would generate a sense of individual experience.

### *Primary requirements:*

A digital music player that can store and play songs.

One that has got an FM player in it.

One that fits or can be customized for a wide range of users.

***Secondary requirements:***

A product that could facilitate the person get the right song.

One which supports a playlist.

It should be able to remember and randomize a playlist.

## 8 Concept Generation

For the purpose of concept generation two distinctly different areas were chosen. They were traditional jewellery from north western part of India and science fiction movies. Traditional jewellery gives us an insight into the different ways in which an object can be worn on and around the body. A science fiction movie predicts and portrays a picture to where future technology is taking us to. It also tries to project the dreams of futurists.

Initial concepts were made looking into only one theme as such, later there was a conscious synthesis of the two themes to come up with an idea that takes the essence of the different themes chosen.

## 8.1 Traditional Jewellery

Traditional Indian jewellery has a different outlook altogether from the rest of the jewellery found. Its function is more to ornate and therefore highly embellished and has a loud presence.

There had been jewellery for both men and women. The kind of jewellery usually varied with the occasion for which it is worn, marriages and special occasions like festivals demanded the use of special jewellery.

The place where it is worn acted as a signifier of some occasion or important event in a persons life, the use of toe rings and green bangles by women to show their marital status is an example of such signifiers.

These jewellery also gives an alternative perspective into how an object is worn around the body. The placements of these also varied with its function and significance, the way a '*myan*' is worn is different from the way a '*kandora*' is worn.

There has been jewellery made for all occasions in various intensities starting from the simplest to the highly embellished and the costliest using the rarest of possible stones.



Teeka  
Combs, hooks  
Earrings - kudi  
dharnia (earring to hair )  
Kan  
Studs  
Nose rings - nathni

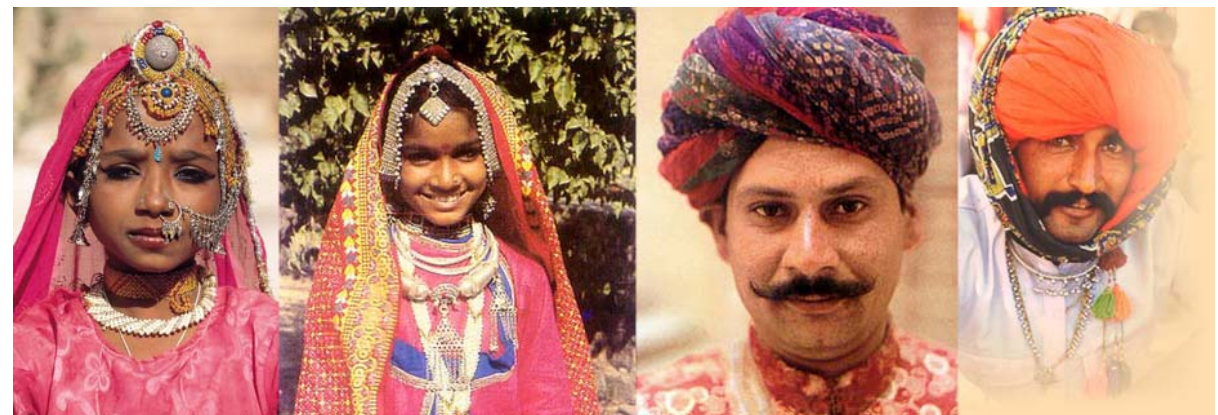
Chains - saals, mangalsutra with vati  
Haar - Lakshmi haar  
Necklace  
Chockers  
Brooches

Armlet  
Bracelet  
Rings  
Bangles - patliya  
Hip - Jhalla  
Belts - kamar patta, kandora

Anklet - ghongroo, payal, jhanjar  
Toe rings - jodvi



The jewellery made from gold or silver with lac inside give it the visual heaviness. The form is more predictable and is usually a play of circles and smooth curves. Repetition of elements is used to generate visual curiosity and gives it a sense of three dimensionality and depth. The use of colourful beads or stones is also frequently seen in these jewellery.



## 8.2 Sci-fi movies

Science fiction movies tend to predict the future trends in technology and the way humans react to it. It also reflects man's fear for the machines. The movies that were seen as reference to the project were:

### *Dune*

Frank Herbert's epic sci-fi novel is about a desert planet and the epic battle for the spice found on it that makes space travel possible.

### *Blade Runner*

A cyberpunk vision of the future where man develops the technology to create replicants – human clones used to serve in the colonies outside Earth but with fixed lifespan. In Los Angeles, 2019, Deckard a Blade Runner, a cop who specializes in terminating replicants, originally in retirement, is forced to re-enter the force when five replicants escape from an off world colony to Earth.

### *2001: A Space Odyssey*

Moon explorers encounter a monolith that points them to a destination near Jupiter. In flashback there is another monolith that plays a key role in human evolution. An expedition is launched to investigate the Jupiter possibility. Two young astronauts and a bunch spend months in space, passing their time partly in



communicating with the human-like brain of their ship's computer, HAL. HAL malfunctions and causes the death of all the suspended passengers as well as one of the "awake" astronauts; the other one barely survives and figures out how to disable HAL. He arrives alone at the Jupiter destination and undergoes a series of experiences.

### *Matrix Reloaded*

Neo, Morpheus, Trinity, and the rest of their crew continue to battle the machines that have enslaved the human race in the Matrix. As their quest unfolds, Neo learns more about his super-heroic abilities, including the ability to see the codes of the people and things around him. Simultaneously, now, more humans are waking up out of the Matrix and attempting to live in the real world. As their numbers grow, the battle moves to Zion the last real world city and centre of human resistance.

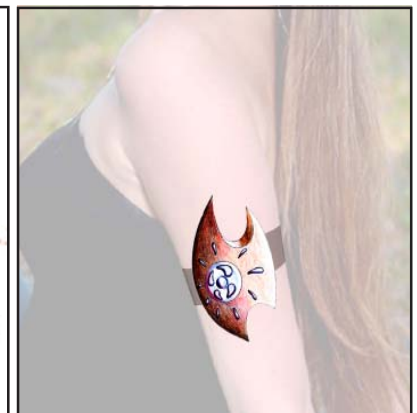
The common visual language like the use of straight lines and the complexities created due to repetition of a single form, in these movies which spread over three decades points towards a future that product that is technology intensive.



### 8.3 Preliminary explorations

Initial explorations were done to explore the possibilities of finding a novel way of wearing a gadget. The three areas that were explored were: a product that has a head-piece and an integrated ear-piece, the second one was to have a gadget that has all its components squeezed into an ear piece. The last one was to have a body piece, say one that you wear on your arm and a separate ear-piece.

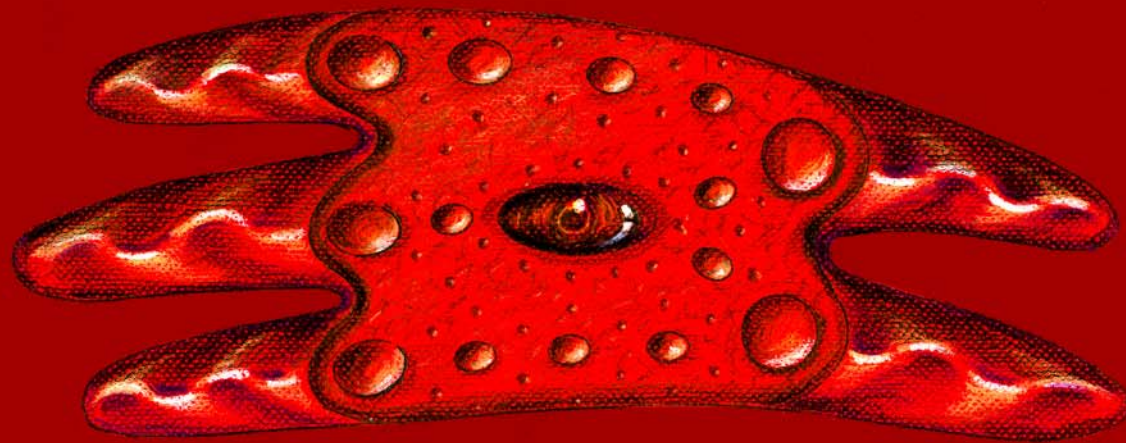
Taking into account the ease of use and the time duration over which the product needs to be worn final concepts were generated to have a body piece and a separate ear piece.



## 8.4 Preliminary concepts

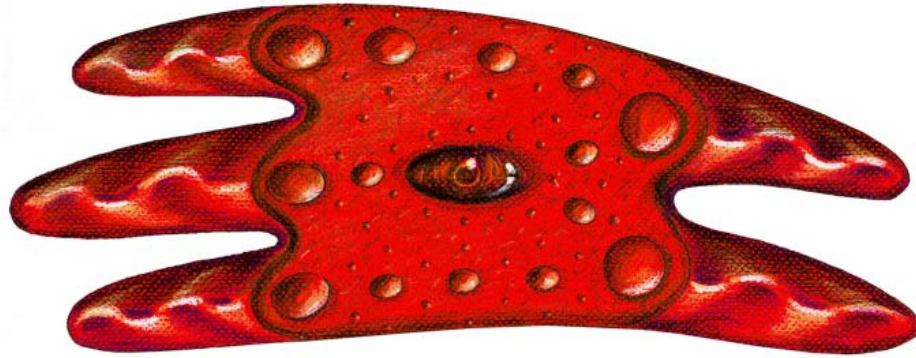
After the preliminary explorations on the possibilities of where and how to wear the product it was decided to further work on concepts that has a body piece and a separate ear piece. The main issues considered while deciding on further directions to take were battery life, weight of the product as the capacity and capabilities of the product increases, alternate ways of use of the product, issues related to sharing of the device, product fitting over a wide range of users due to the wide anthropometric difference, ease of controls when the product is place permanently in some part of the body and the occasion of wear.

# Concept 1

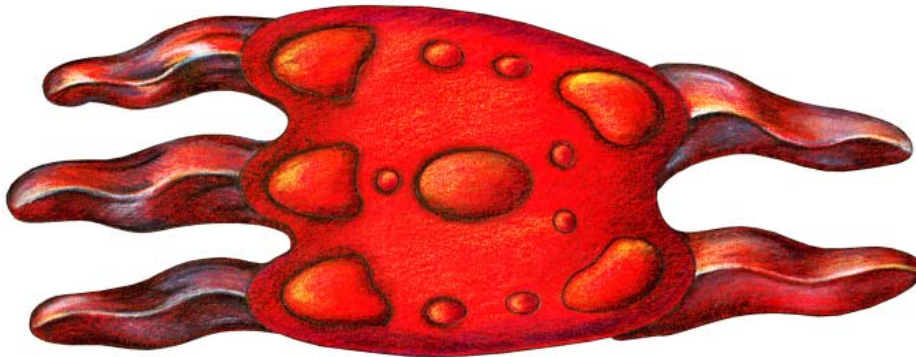


# Concept 1

variations



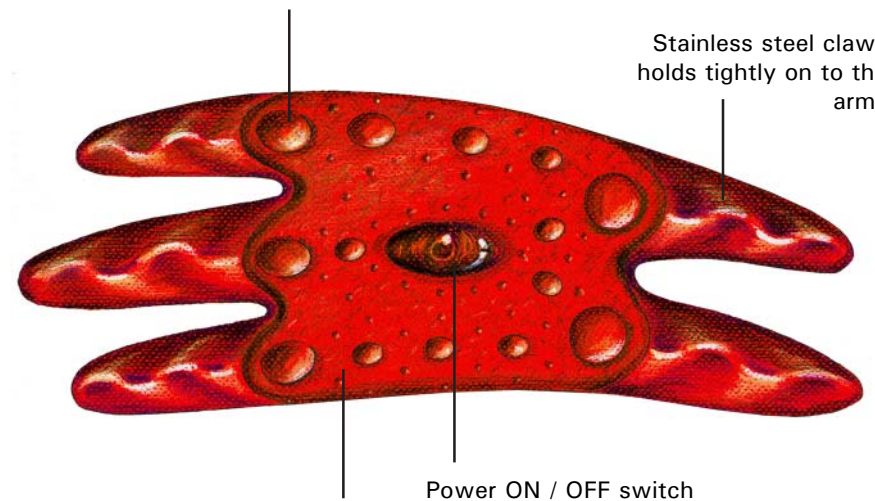
The concept was based on the idea that some thing clasps on to the body. There are stainless steel claws that holds the player on to the body, the circuitry and the battery is enclosed in leather. There are membrane buttons beneath the leather which is embossed to give a slight projection. The use of natural material like leather gives warmth to the product where as the steel claws gives it a chilling cold feeling.



features and functions

Surface of the leather is embossed to give the projection for buttons below

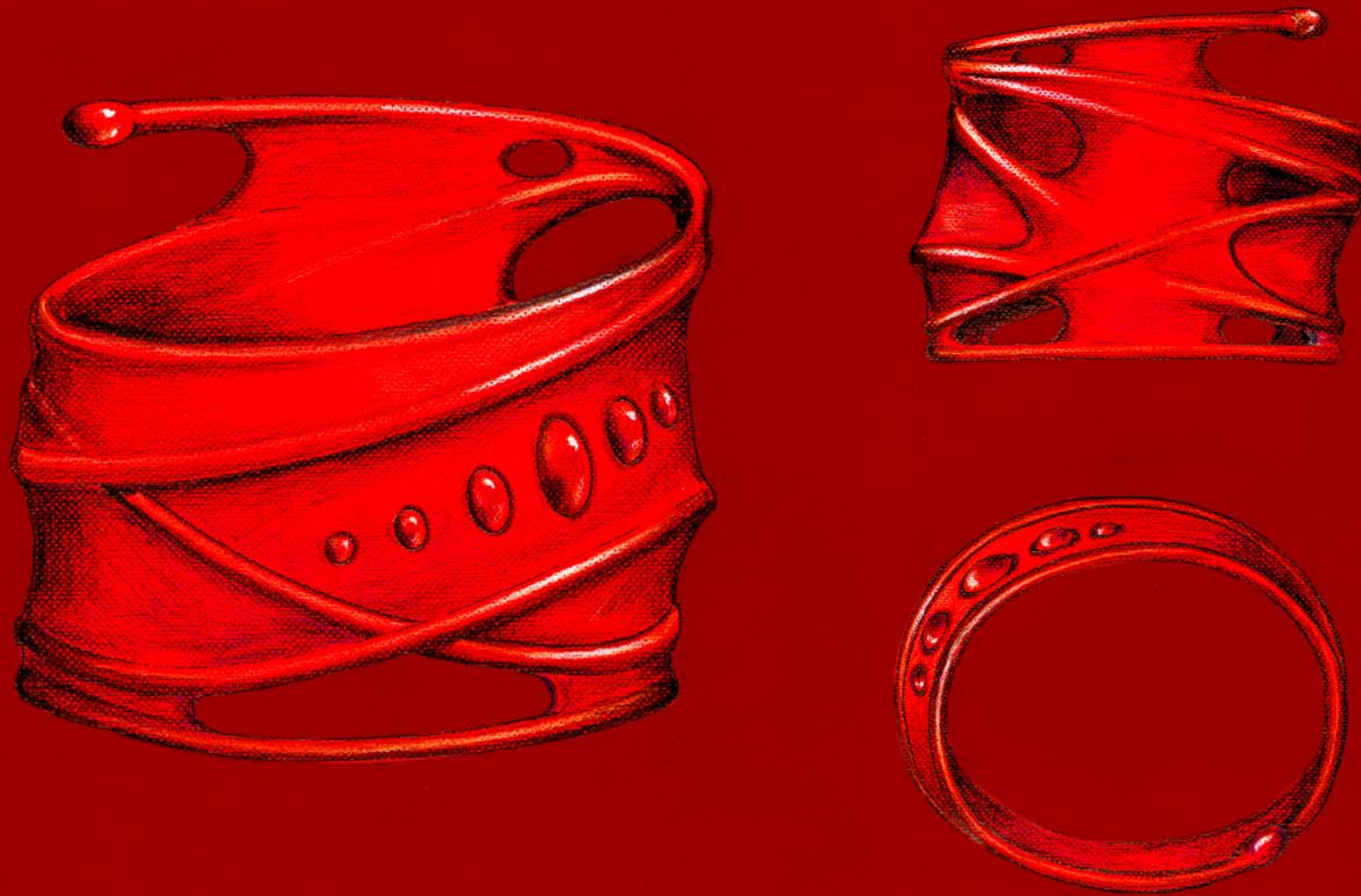
Stainless steel claws holds tightly on to the arms



Leather body that encloses the circuitry inside

Power ON / OFF switch

## Concept 2



# Concept 2

variations

A product that can be worn around the arms like jewelry was tried out. The continuous nature of the lines is broken by another line that crosses across and breaks the smooth flow. This concept was also based on the idea of having an interface that does not look like a conventional one. Here the battery is encased behind and the circuitry is in front, it has soft buttons of leather embossing with membrane switches inside. The stainless steel that runs across the form generates the continuity as well as the disturbance.

## features and functions

Antenna like projection giving a sense of connectivity

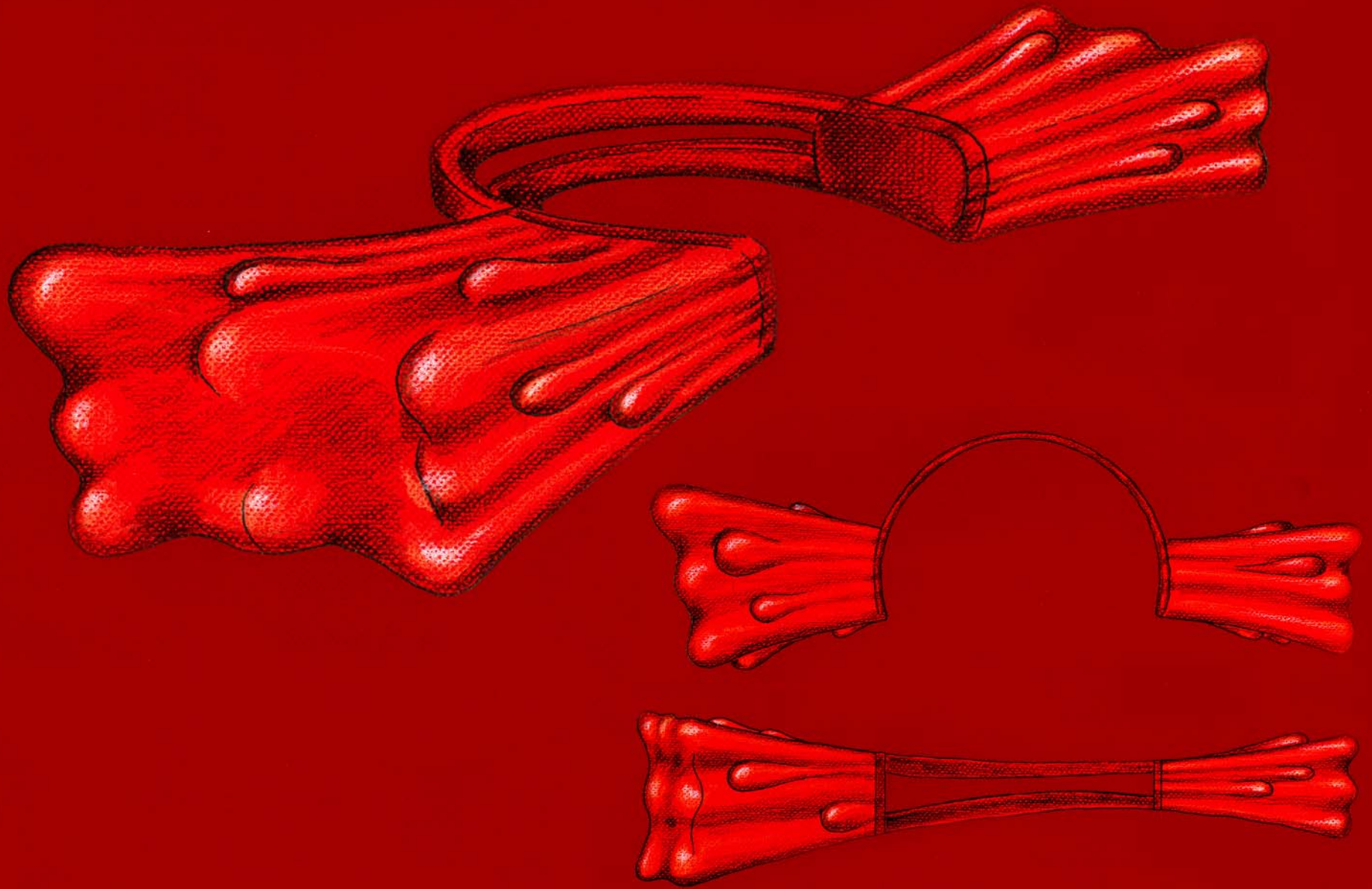
Battery space behind the circuitry space, connected through wires that run inside the steel rods

Embossed leather serves the purpose of buttons

Stainless steel rods curls around the leather pouch which encases the electronic circuitry

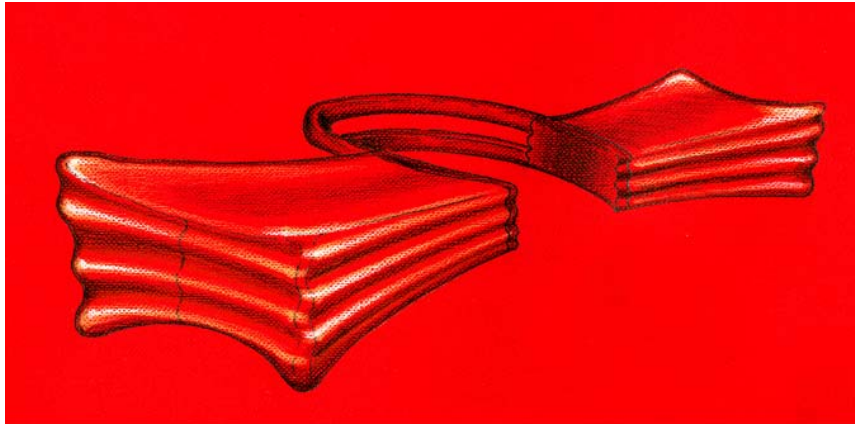


# Concept 3

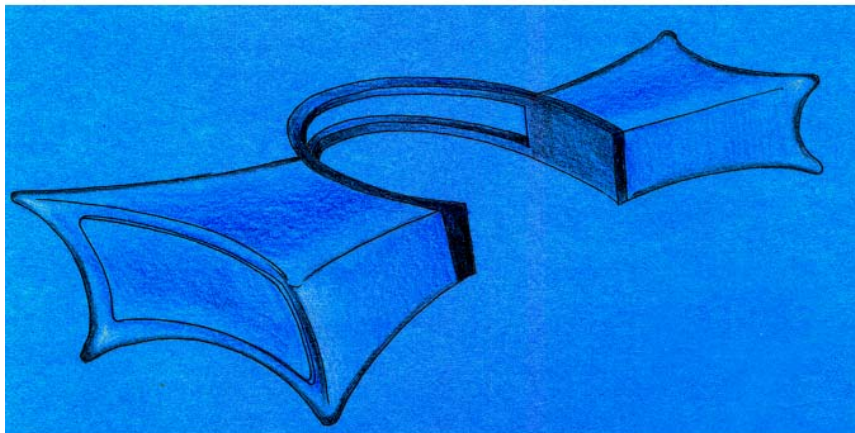


# Concept 3

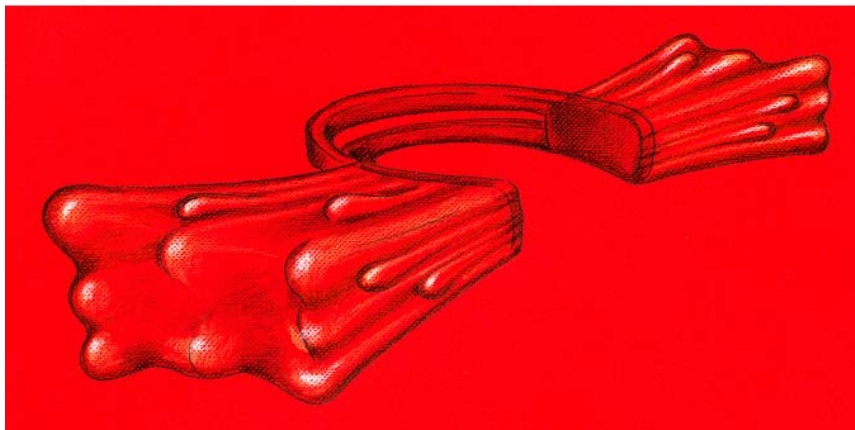
## variations



This concept was based on the idea keeping in mind that it would be worn around the arm. There is a connection that goes behind and is hidden; the only visible part would be the two sides that project from the arm. The idea of having buttons for a product is eliminated by giving membrane switches so that the product looks like an integrated form that is emerging out from the arm. The product functions without the use of displays.

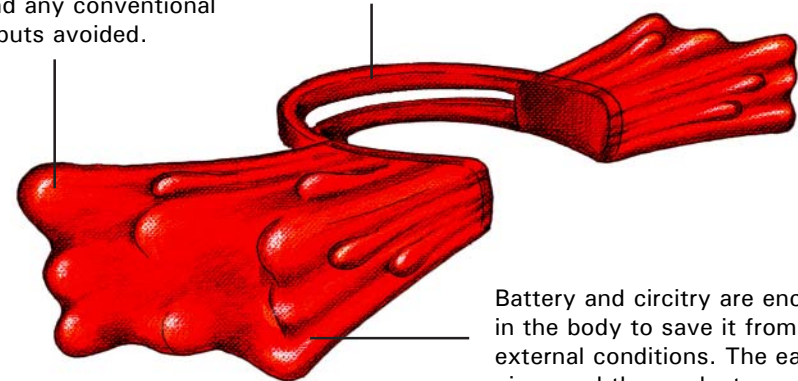


## features and functions



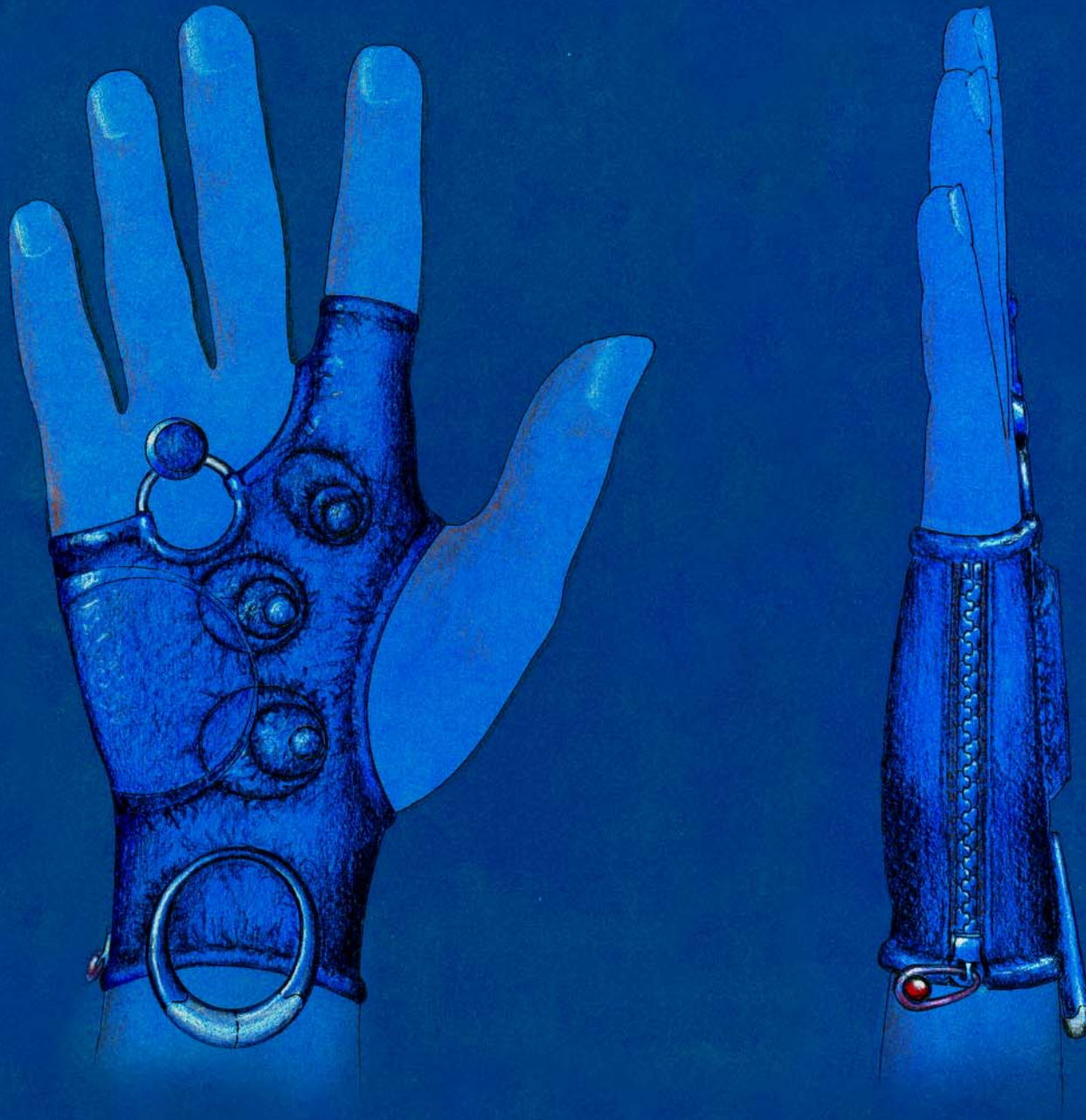
Soft buttons are used and any conventional inputs avoided.

Soft and rubbery felt is given to give a nice grip while wearing on the arm, groves are given to give ventilation and minimum surface contact



Battery and circuity are encased in the body to save it from external conditions. The ear-piece and the product communicates wirelessly.

# Concept 4



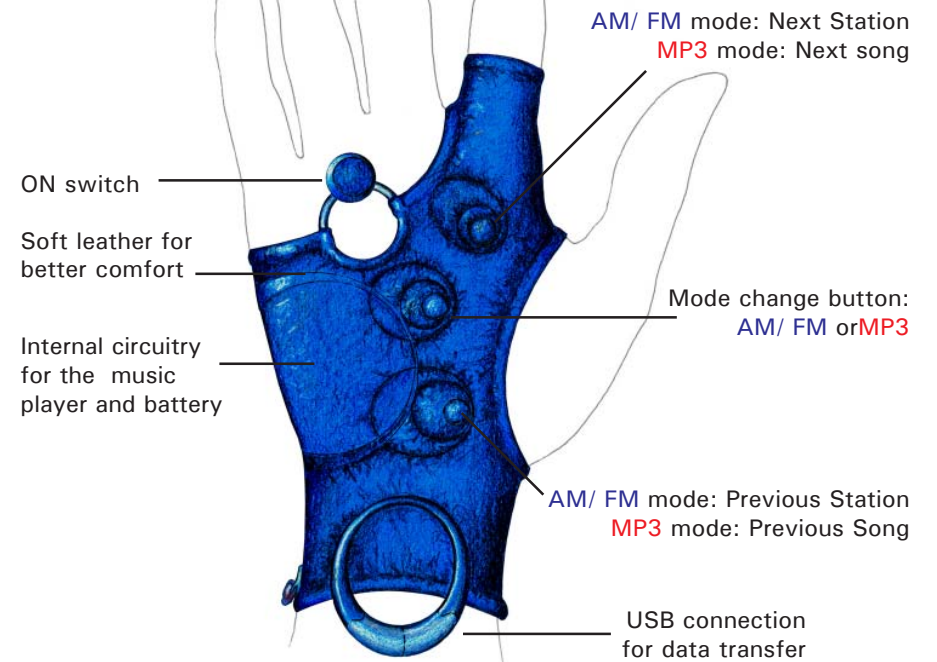
# Concept 4

variations

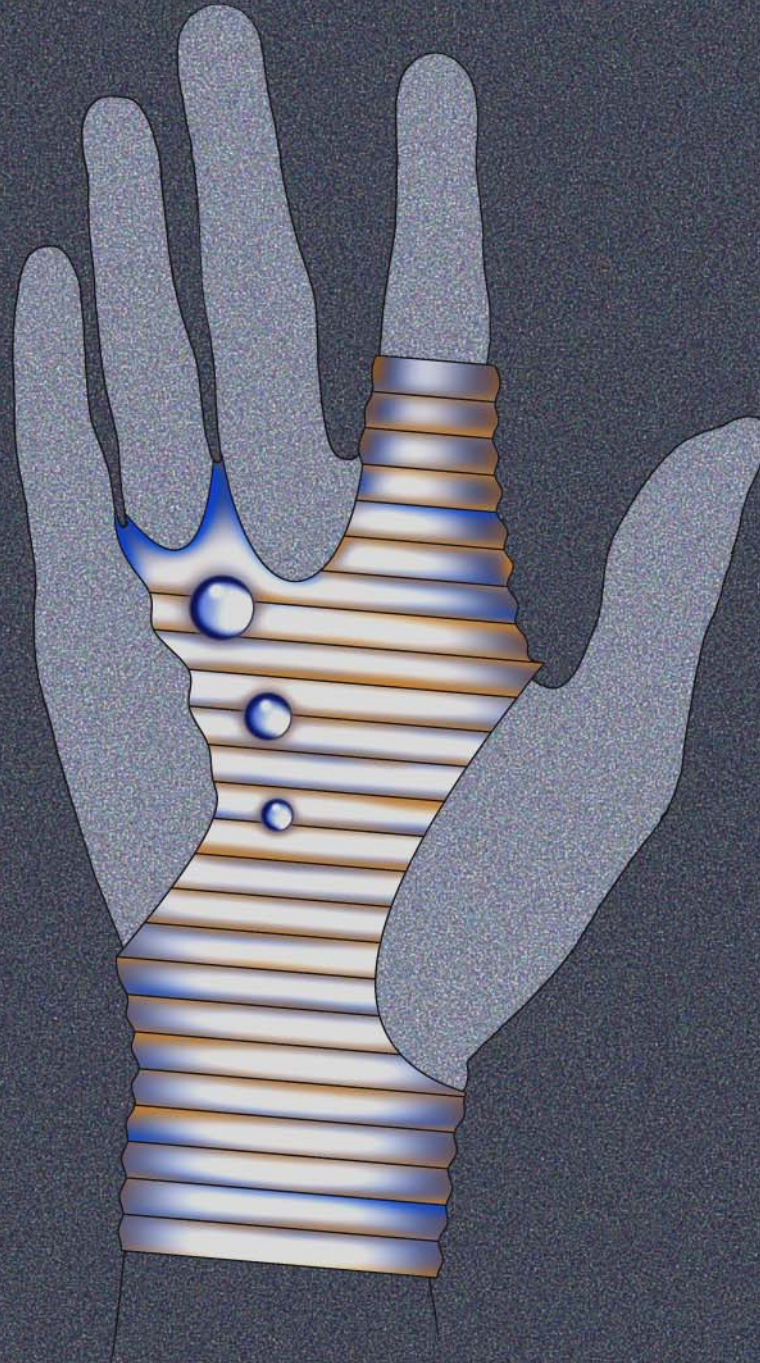
The context in which such a product is worn would be by bikers etc on travel. Leather is used to create the rugged and tough feel. The controls are beneath a layer of leather. The flow of eyes on the surface is channelized through the layout of circles. The circuitry is and power source is hidden inside the leather. The product connects to the source through wires.



## features and functions



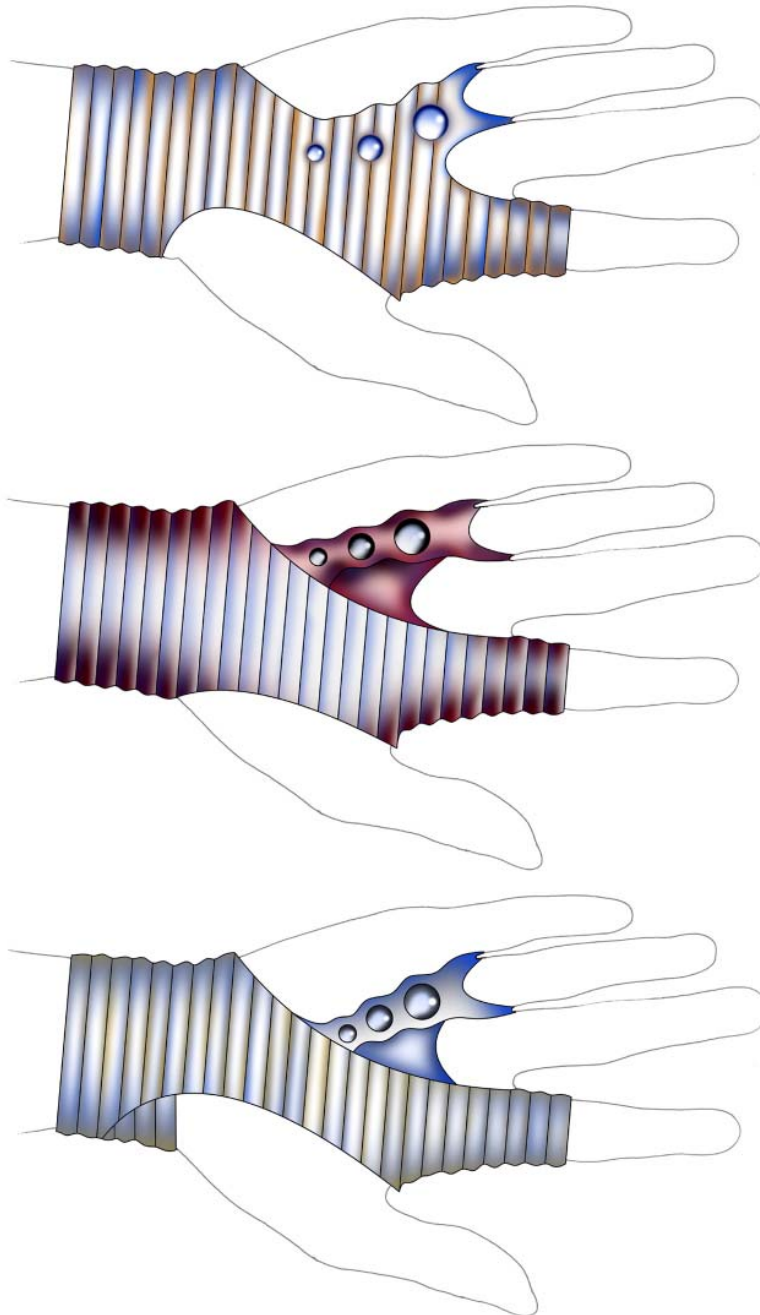
# Concept 5



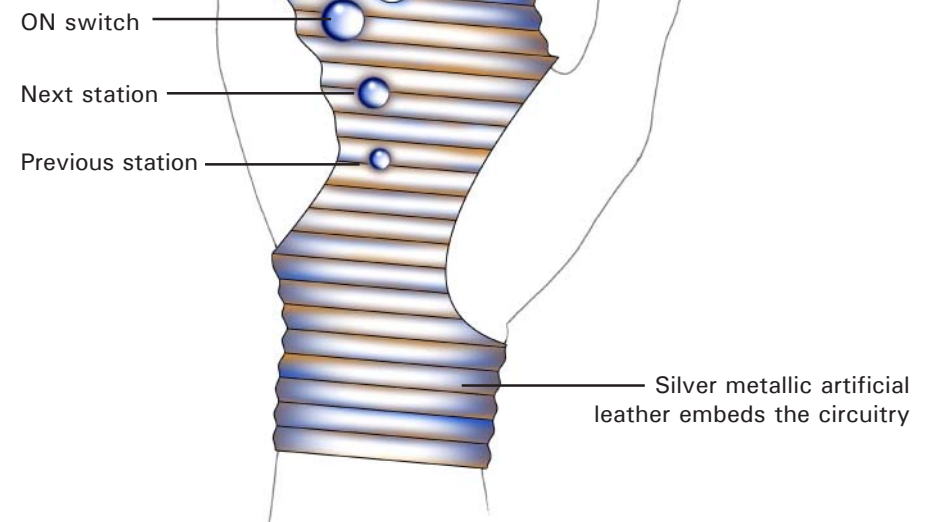
# Concept 5

variations

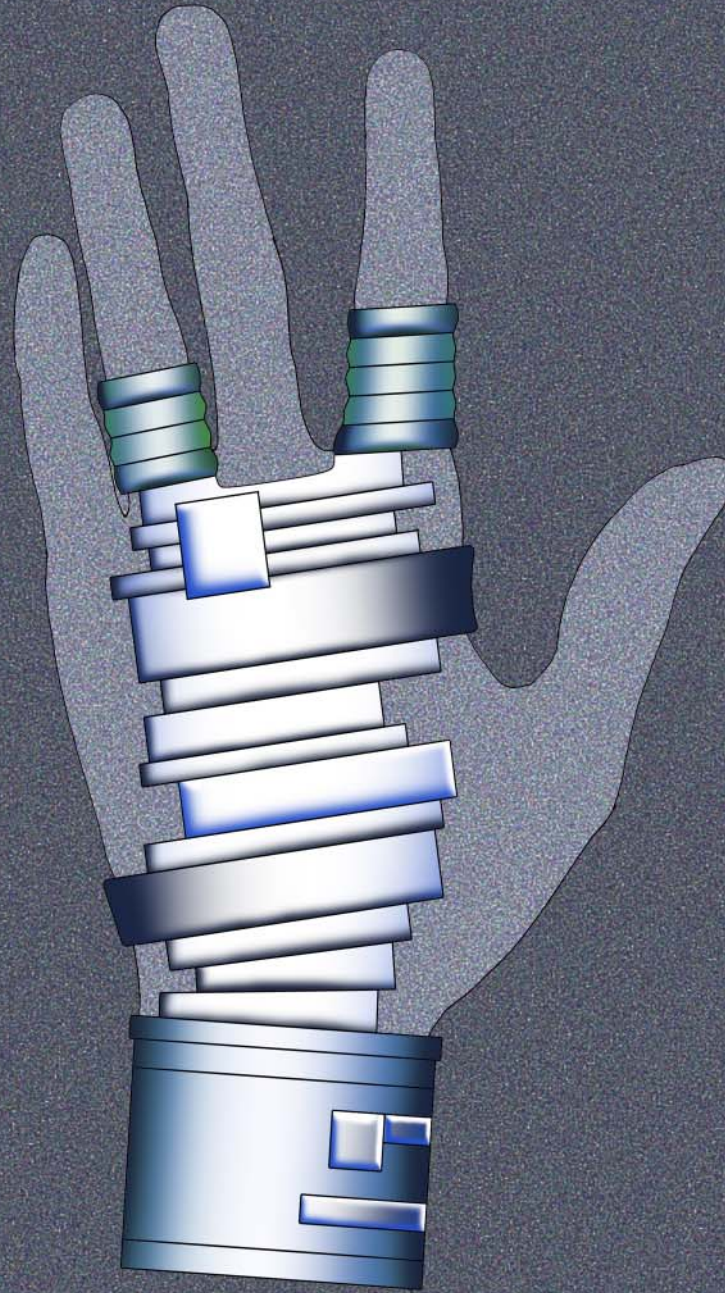
A soft feel is brought to the product by the use of white leather. The simplicity of the product is reflected in the simple straight lines. The circuitry is embedded in between the layers of the leather glove.



## features and functions



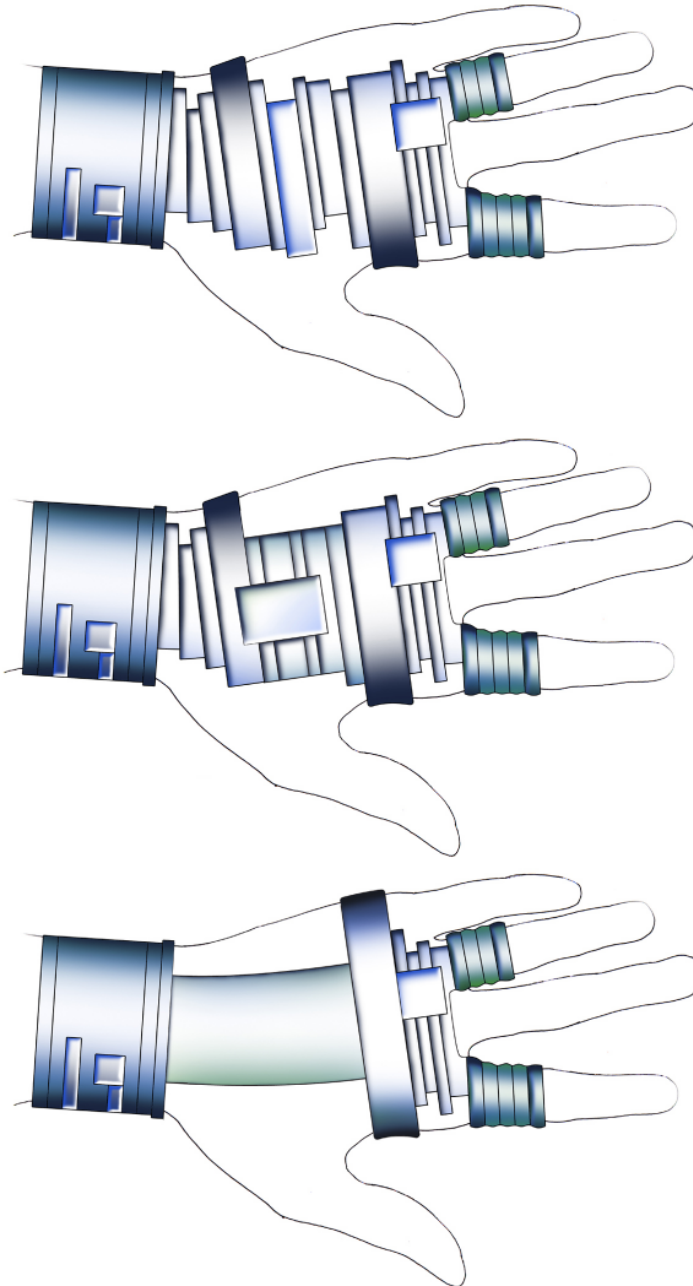
# Concept 6



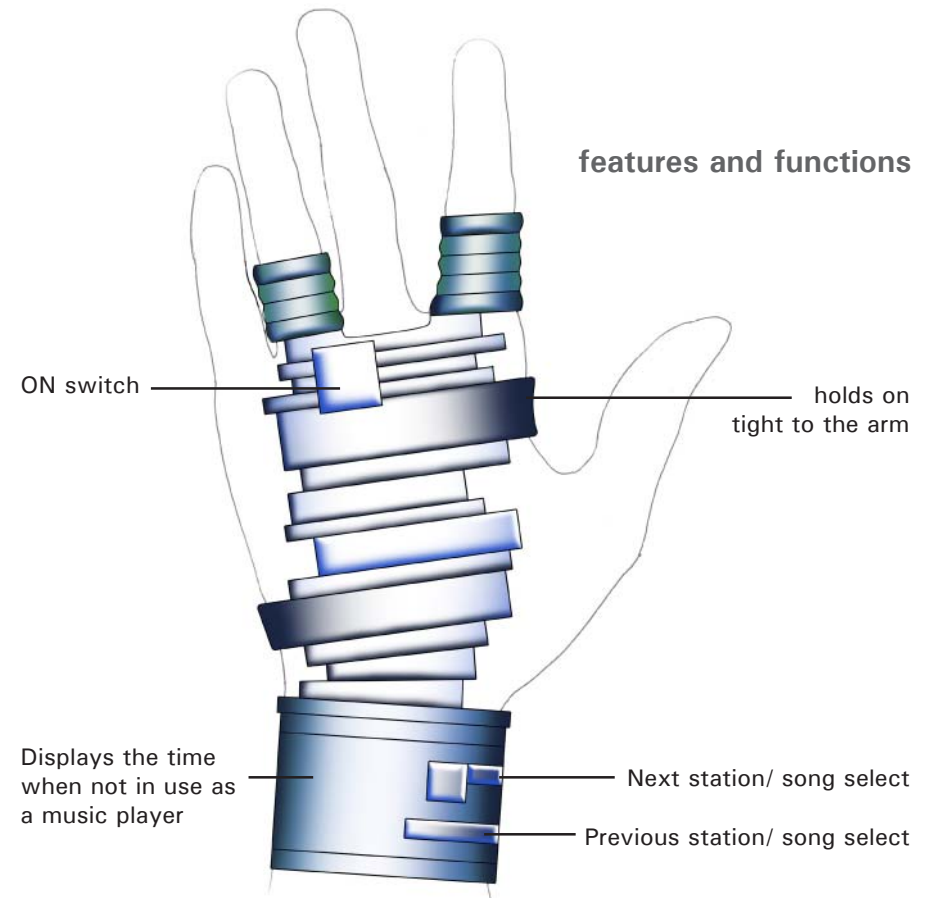
# Concept 6

variations

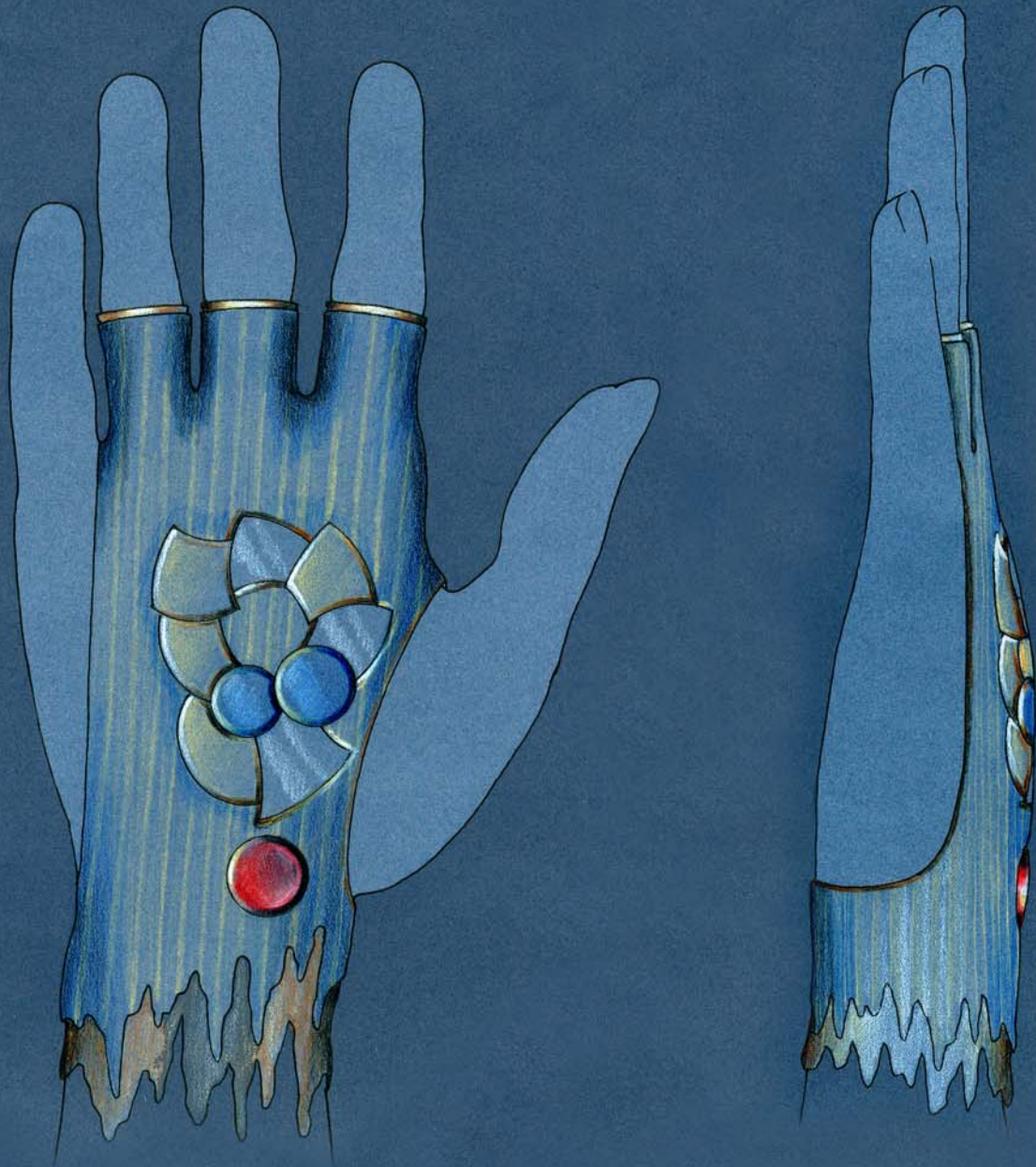
The use of leather and metal in combination brings in a sense of complexity. The ruggedness is brought about by the use of strict rectangular parts. The semi flexible part holds on the product tight to the arm. The display in the watch helps to select from a playlist of songs. The attached watch displays the time when not in use as a music player.



## features and functions



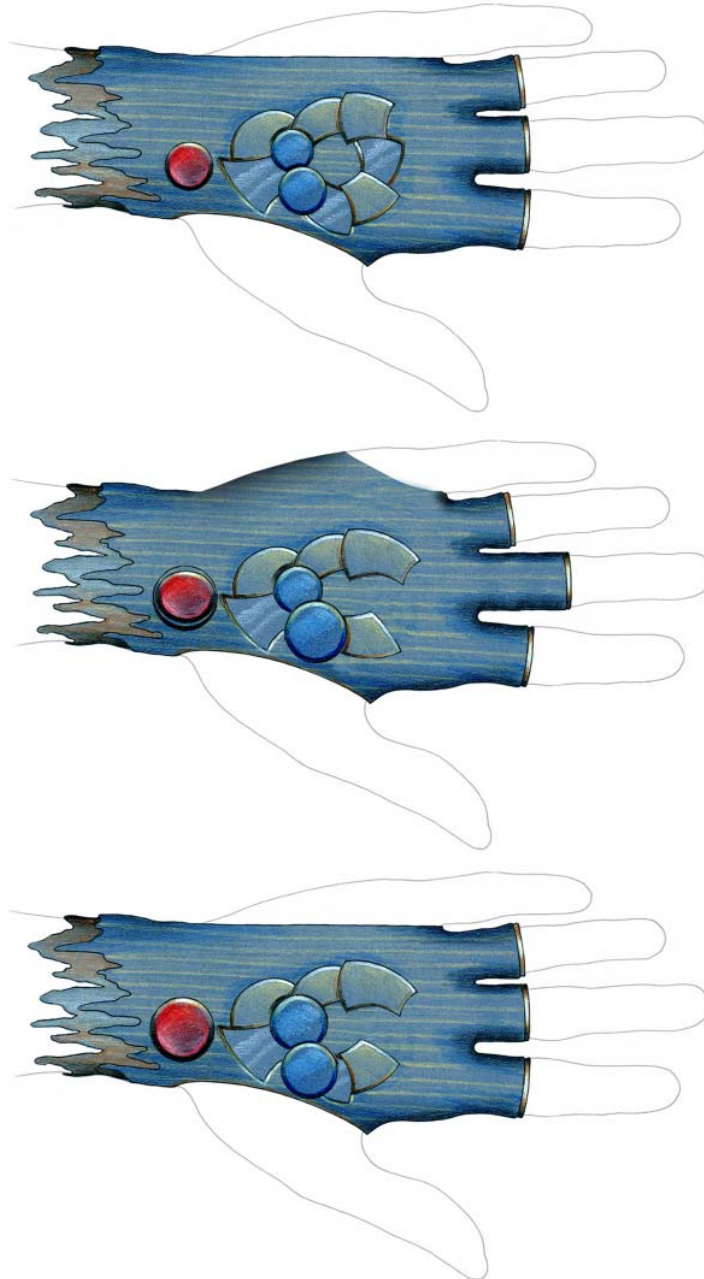
Concept 7



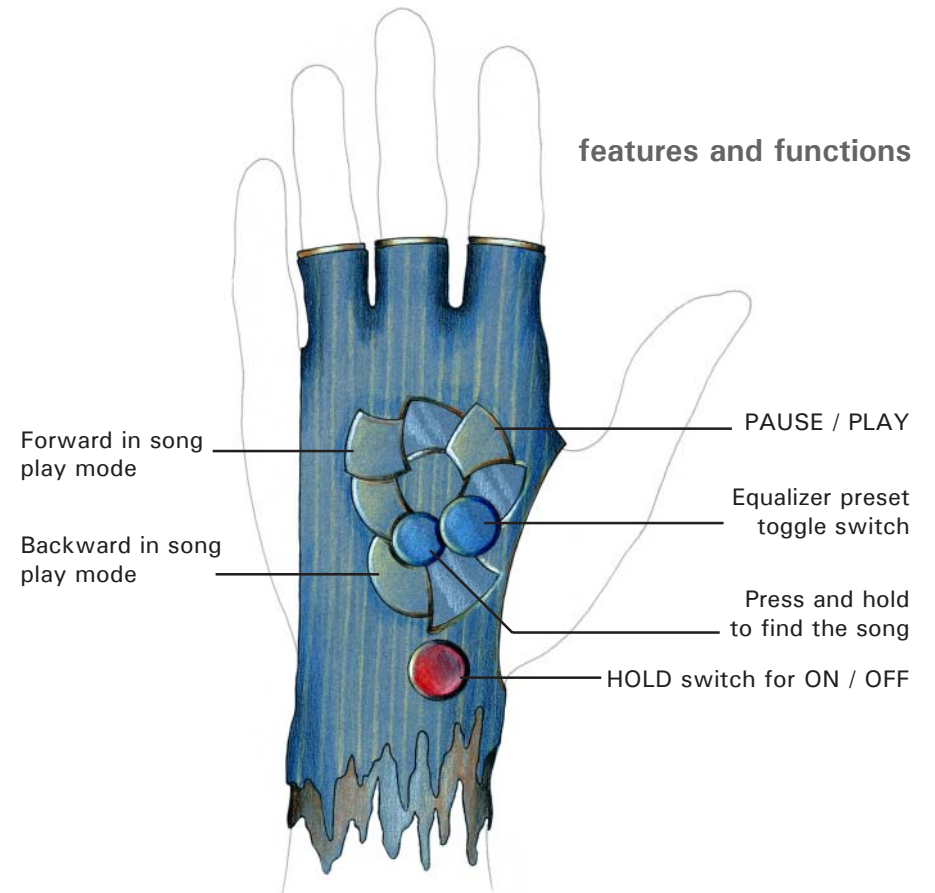
# Concept 7

## variations

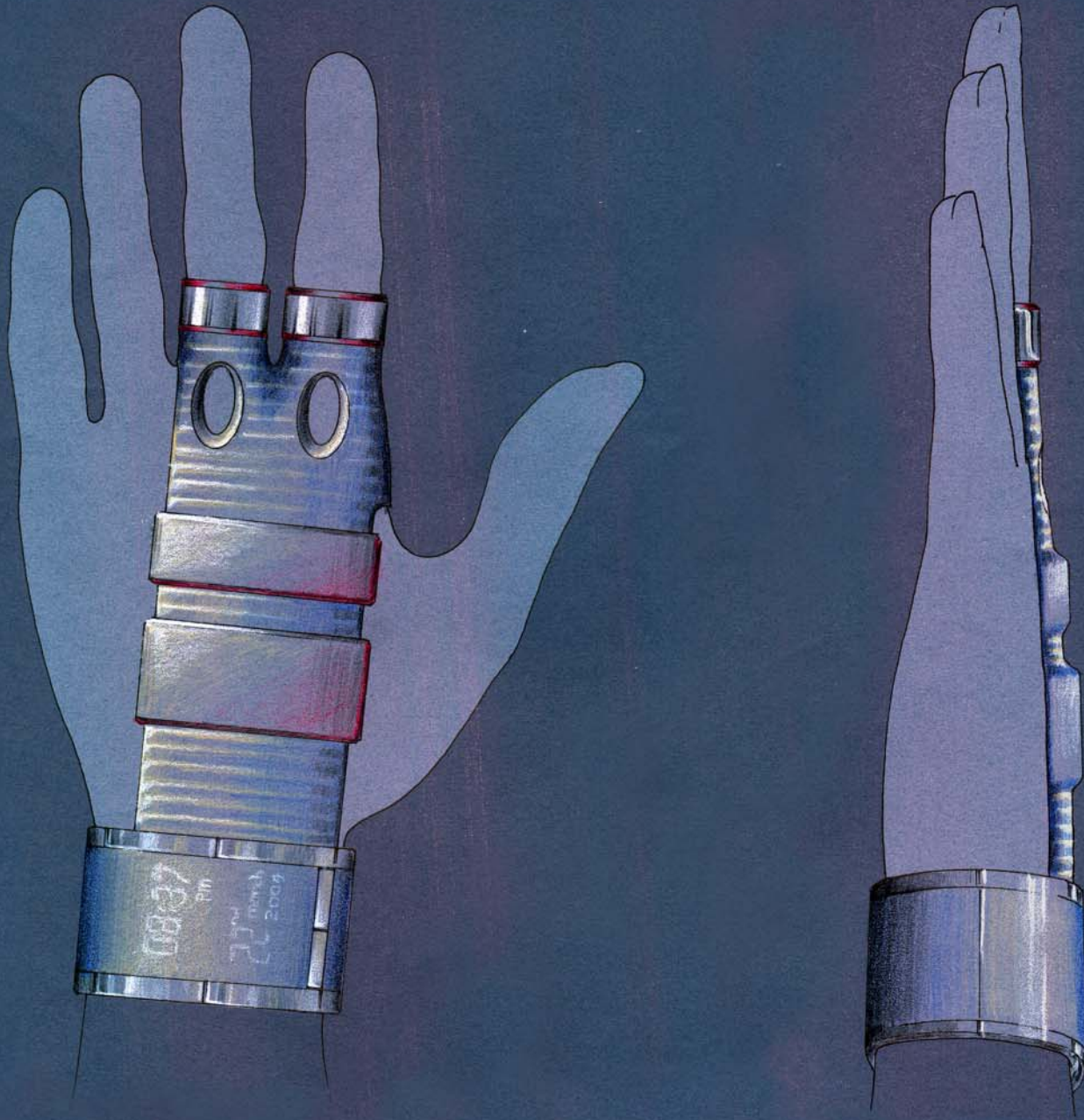
The straight lines and strict geometry is broken by random placement of the switches and controls. The edges of the glove are jagged as if torn out from a whole piece. The form conveys a feeling of restlessness and raw nature due to the varying edge treatment and the control. It looks as though there is a form yet to emerge from inside of the existing form. Smooth but striped artificial leather is used to amplify the straight lines



## features and functions

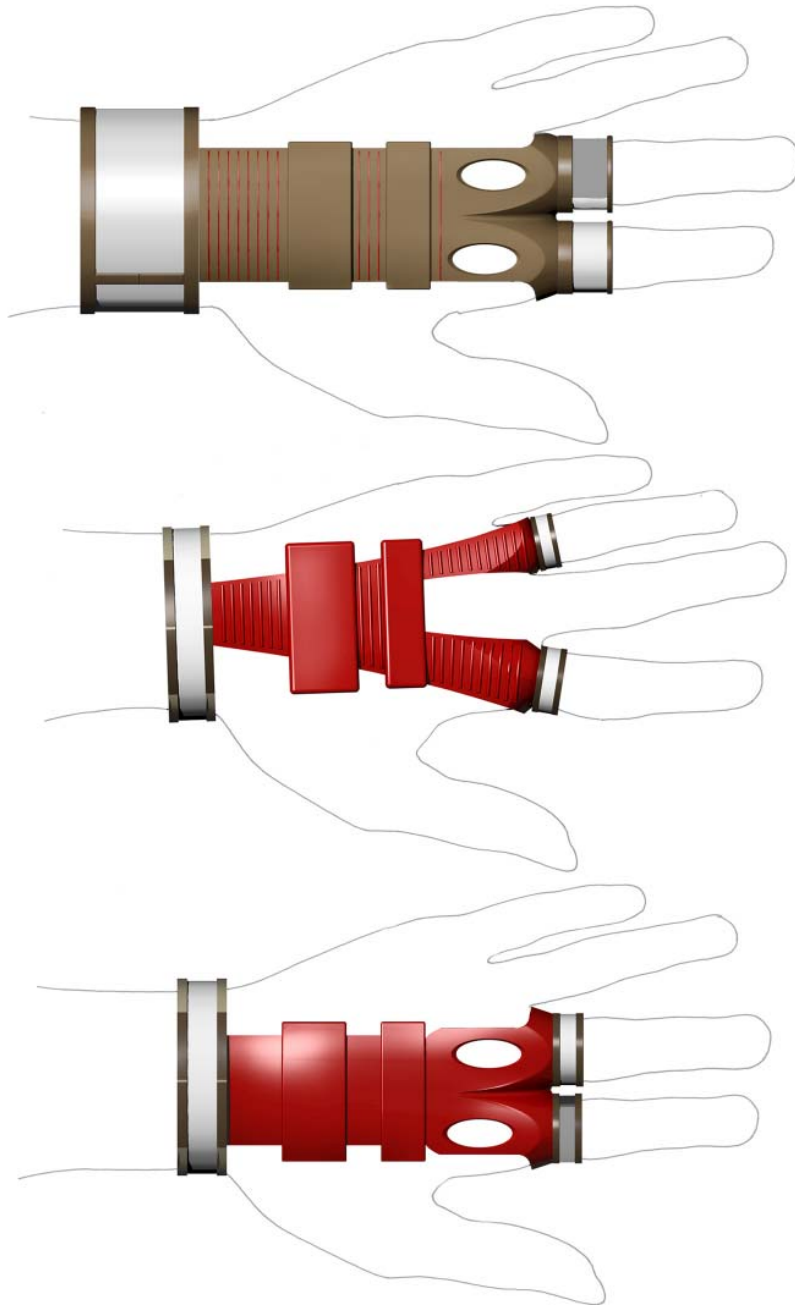


# Concept 8

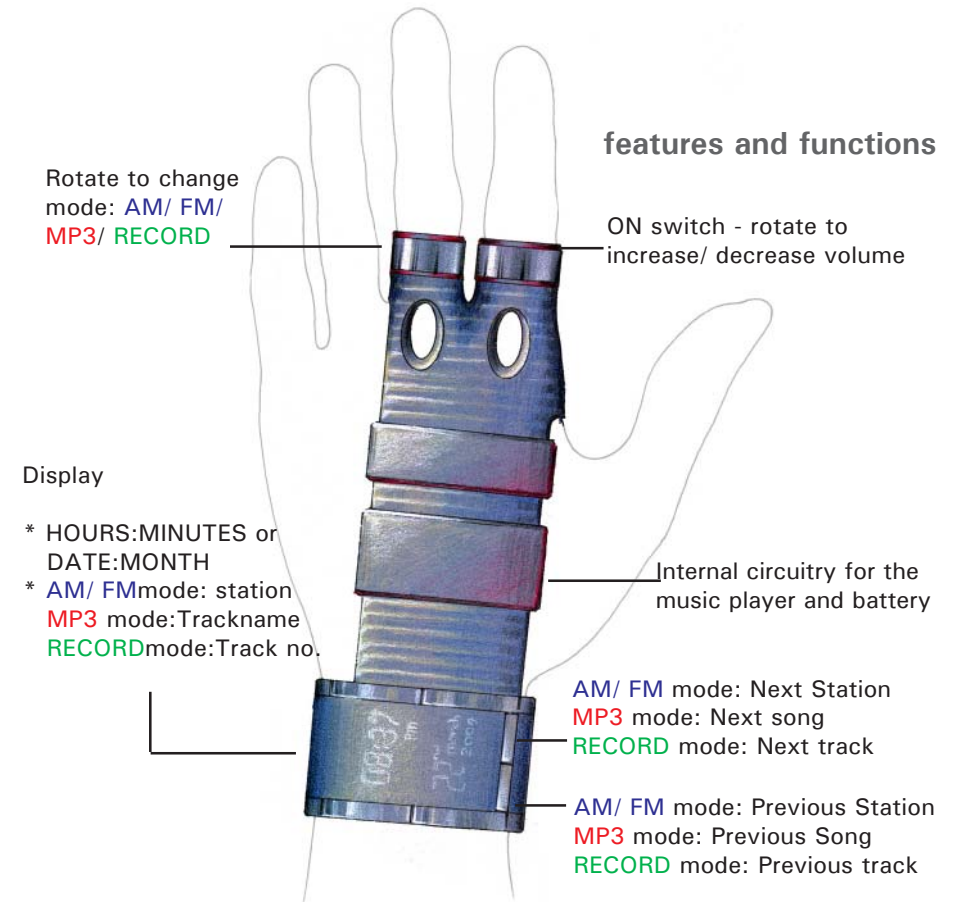


# Concept 8

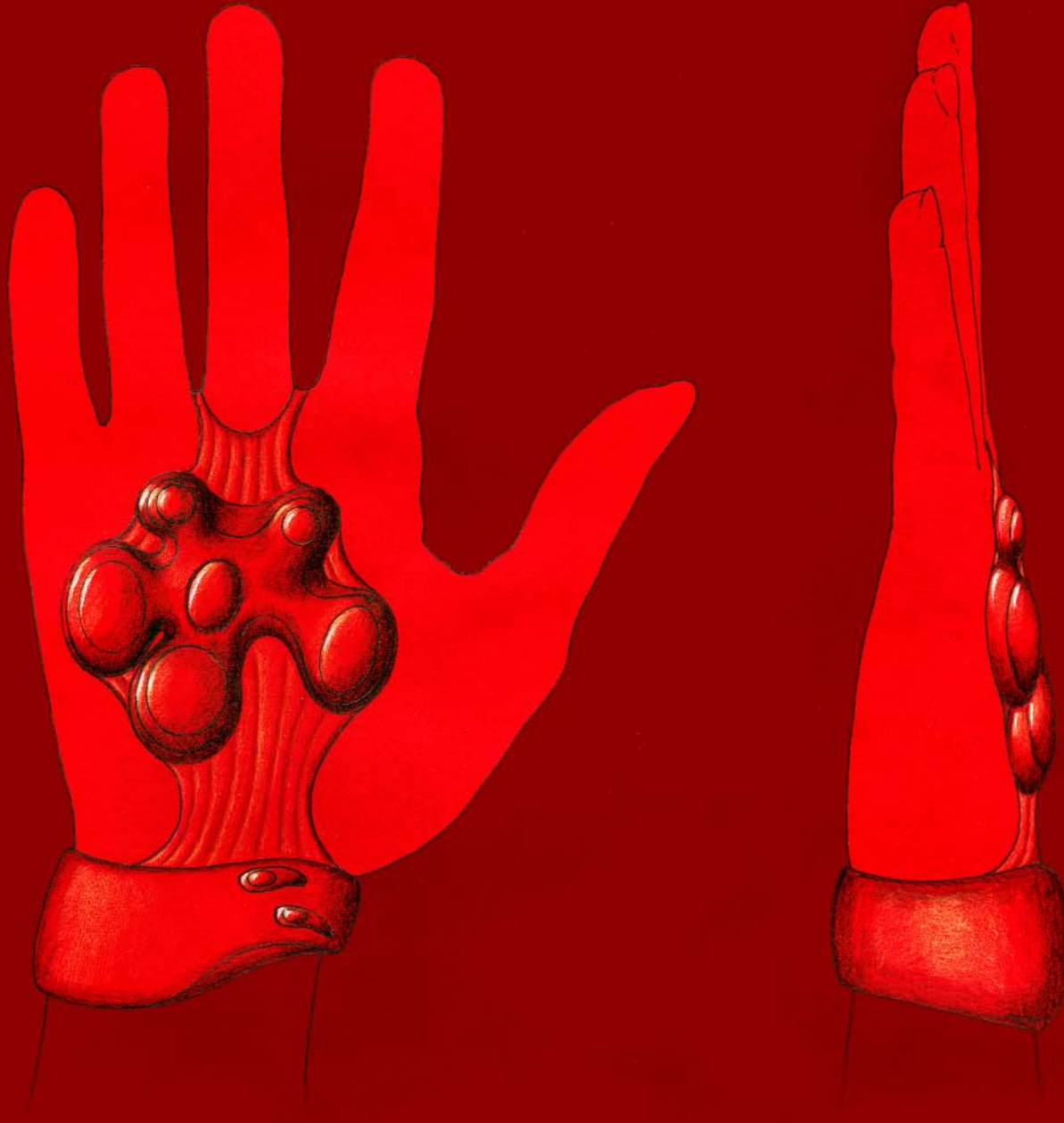
variations



The straight lines and strict geometry is used to give a 'techno' look. The variations are tried in which the flow of hand is tried out. The basic form is made in artificial leather with the circuitry embedded in between and a bracelet which easily snaps on to the hand. The controls are brought to the fingers for easy access. There is a time display and a listing of song being played.

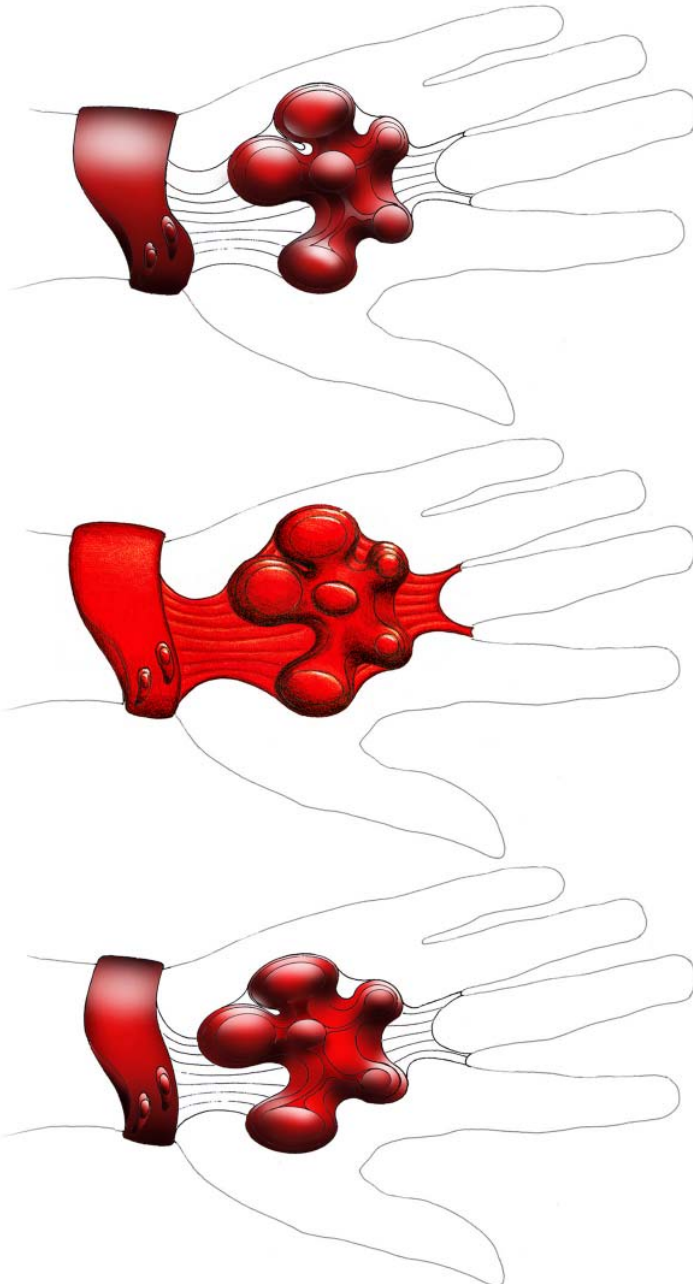


# Concept 9



# Concept 9

variations



The playfulness and fluidity of contemporary jewellery and smooth lines found in the science fiction visualizations are used to generate this form. There is a watch like part which has the display and it is connected to the player through a flexible member which also acts as the communication channel between the player and the display. A soft feel is given to the product and all distinct demarcation between the product and the button is avoided. The modularity of the product allows a lot of choice in terms of colours and placements.



Ear piece

## features and functions

Surround sound ON/ OFF

\* Press and Hold for power ON / OFF  
 \* Press for mode change :  
 AM/ FM/ MP3/ RECORD

AM/ FM mode: Next Station

MP3 mode: Next song

RECORD mode: Next track

AM/ FM mode: Previous Station

MP3 mode: Previous Song

RECORD mode: Previous track

Display

\* HOURS:MINUTES or  
 DATE:MONTH

\* AM/ FM mode: station

MP3 mode: Track name

RECORD mode: Track no.

Press and Hold to send:  
 MP3 mode: Current song  
 RECORD mode: Current Track

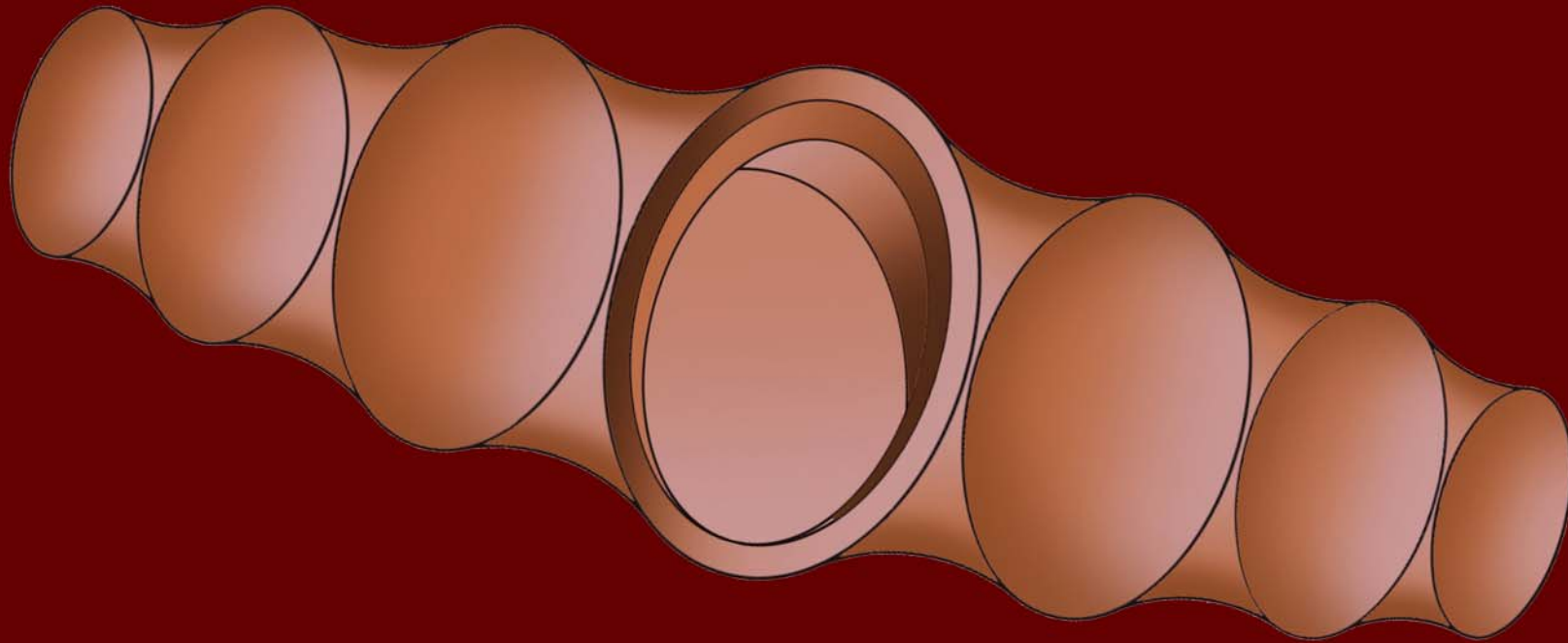
Press:  
 Preset Equalizers  
 Jazz/Rock/Pop/Classical

Press  
 MP3 mode :  
 FIND with voice tag  
 RECORD mode :  
 START/STOP new recording  
 (auto sequencing of tracks)

Adjustment for TIME / MINUTE  
 or DATE / MONTH

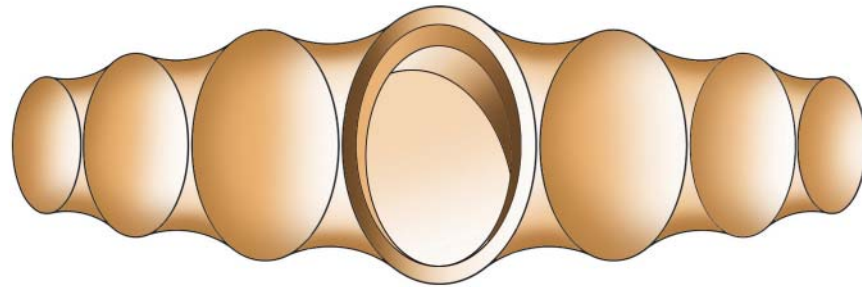
YES / NO interface  
 Eg: RECEIVE SONG?  
 SEND TRACK?

# Concept 10

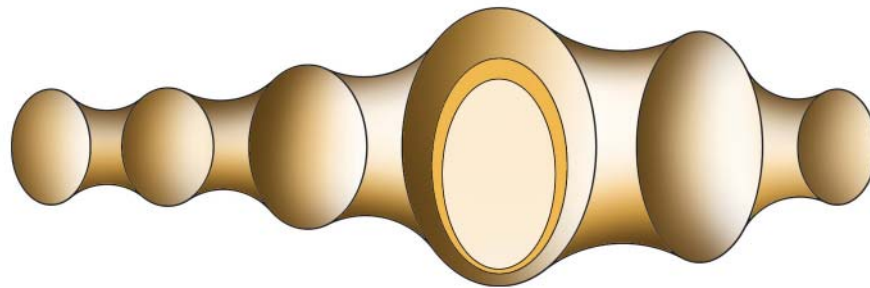


# Concept 10

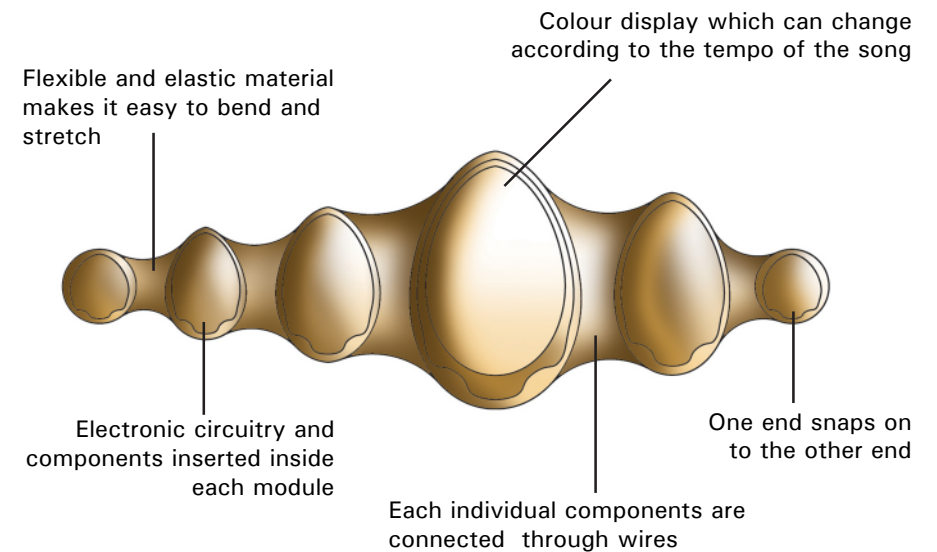
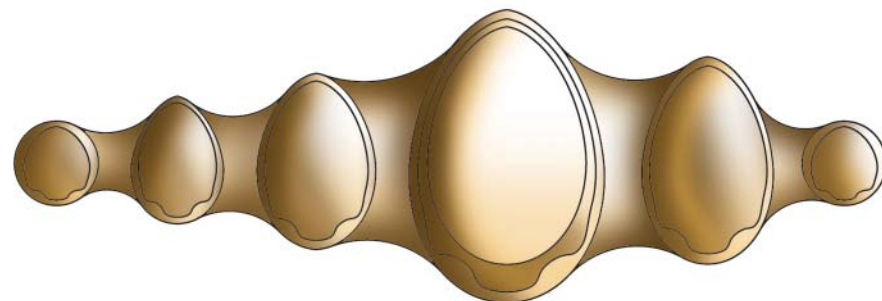
variations



The circular and repeated forms of jewellery reflects in the form. The individual pieces are connected by flexible links to continue the flow of the form. The predictability of the form makes it more familiar to the onlooker. Alternate use of the product both in arms and wrist is possible by the use of elastic links. In order to maintain the smooth flow of the form on its surface the controls are taken to a layer below the surface and input is made possible by the use of membrane switches.



features and functions

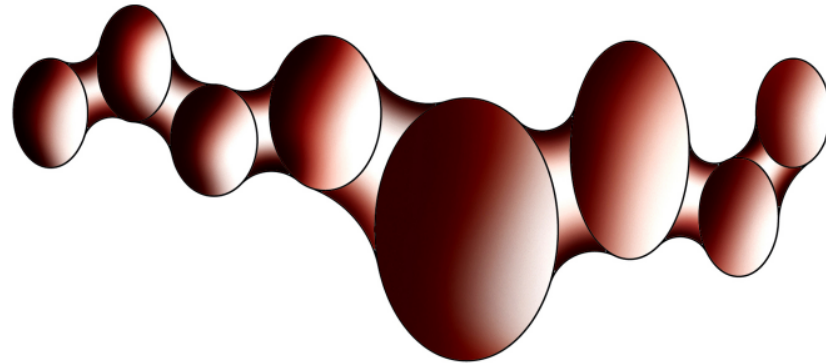


# Concept 11

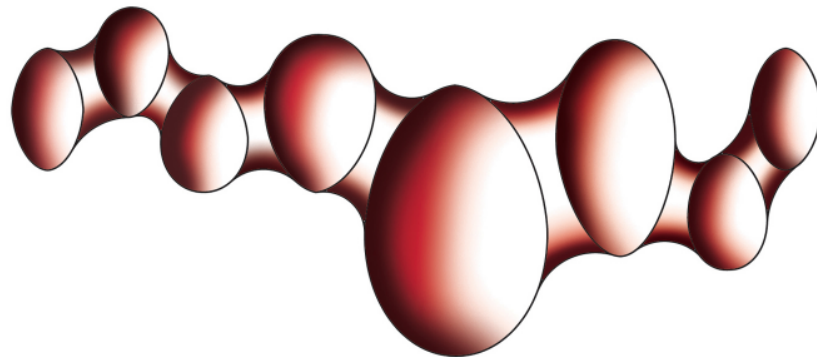


# Concept 11

variations

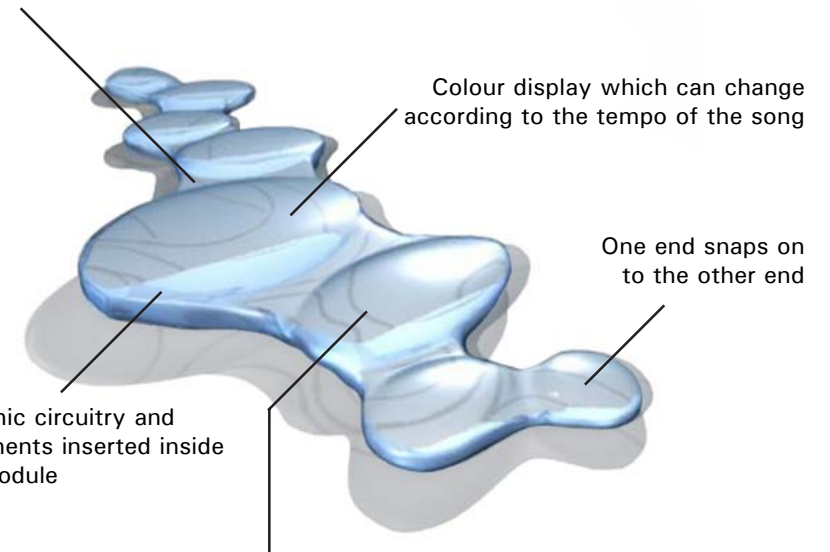


A more dynamic and active form was tried out keeping the basic modules almost same, but with slight variations to give a feel of direction and flow. The individual components in the module were placed in different orientations to give the overall form an integrated feel. Here again the flexibility and stretch ability of the connecting member allows to wear it in different manners like a watch on the wrist or like an arm band or even like a belt with connecting accessories.



## features and functions

Flexible and elastic material makes it easy to bend and stretch

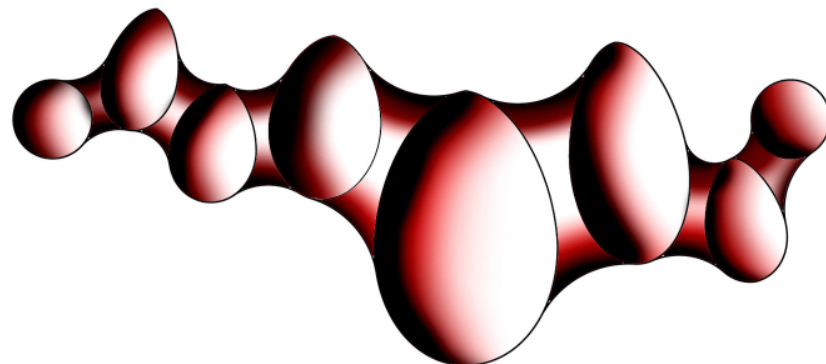


Colour display which can change according to the tempo of the song

One end snaps on to the other end

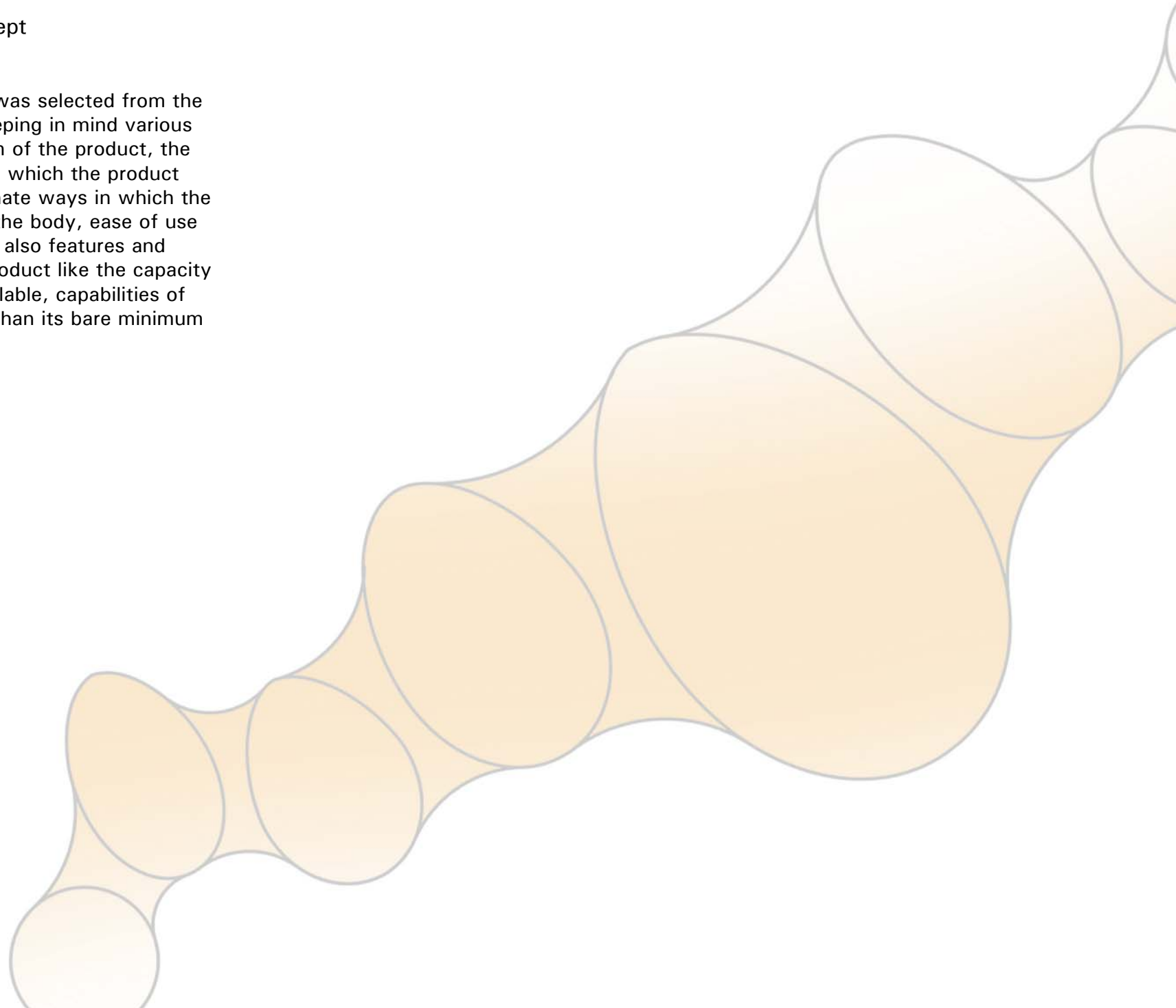
Electronic circuitry and components inserted inside each module

Use of membrane switches makes it possible to have a flushed surface.

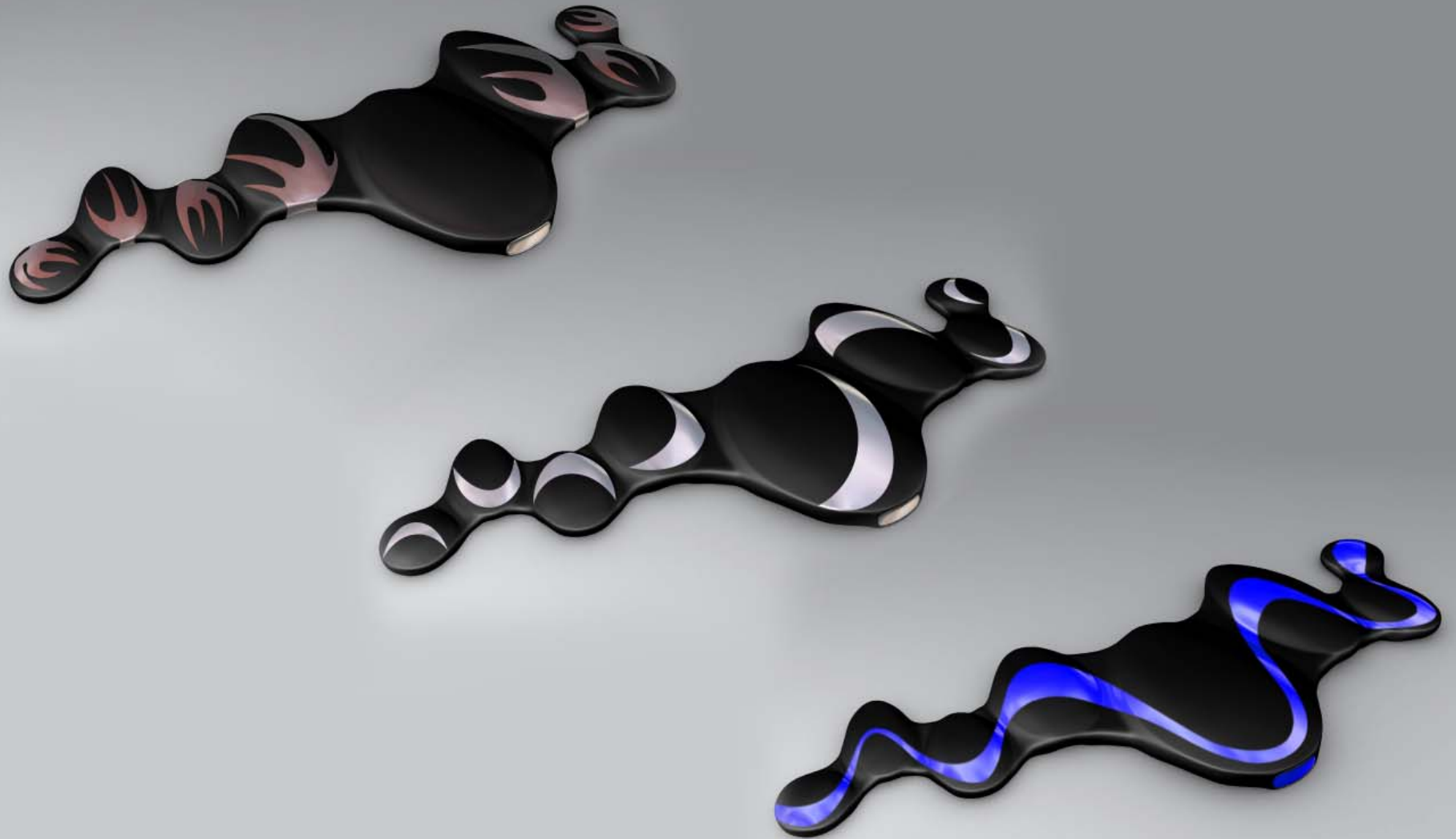


## 8.5 Final Concept

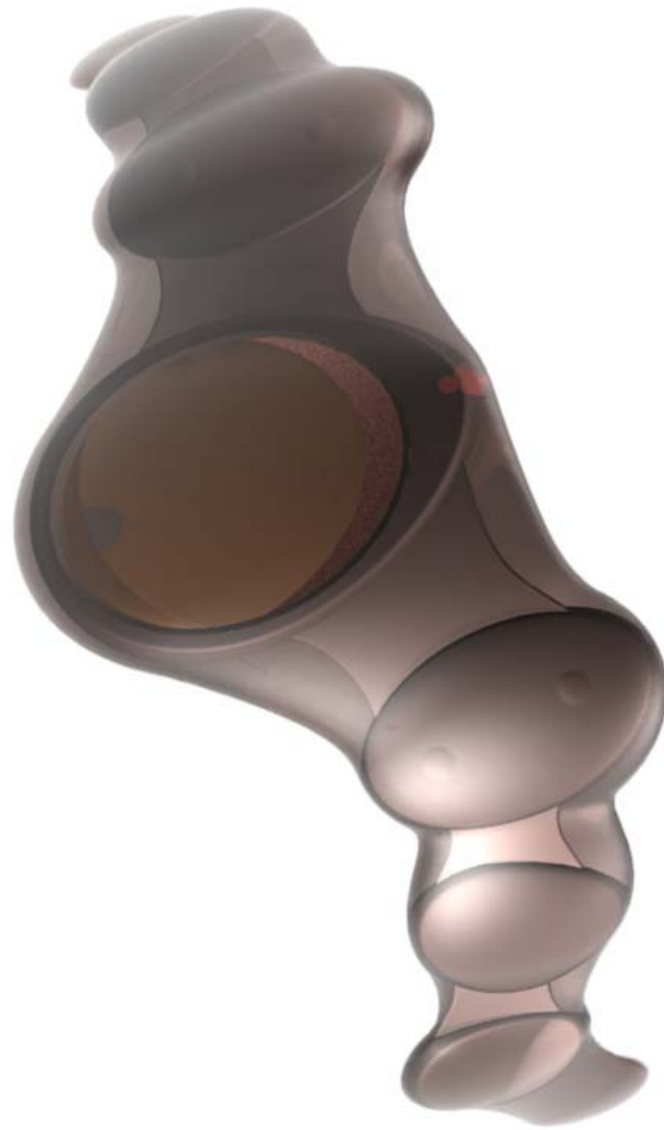
The final concept was selected from the initial concepts keeping in mind various issues like the form of the product, the various contexts in which the product can be used, alternate ways in which the product fits on to the body, ease of use of the product and also features and functions of the product like the capacity of the storage available, capabilities of the product other than its bare minimum functional needs.



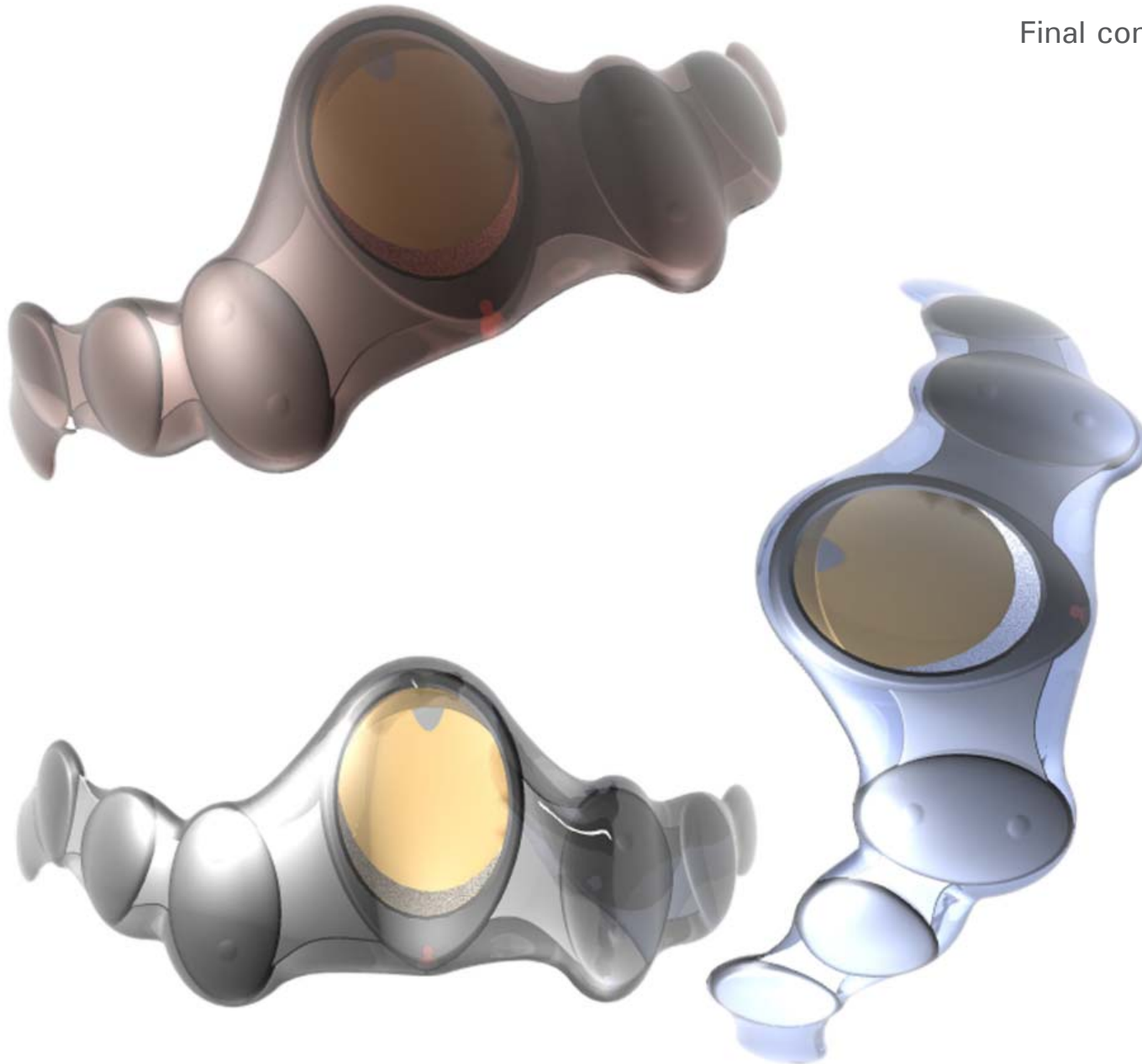
Final concept variation



Final concept variation



Final concept variation



The display normally shows the time. Pushing the Scroll button up or down takes you through the available modes - Mp3 player or Voice Recorder or FM Radio. A mode is selected by clicking the scroll button.

Volume Up/ Down Button

Volume ON/OFF

Volume High/Low

Preset Equalizer mode

Scroll and Click Button

Display area

Displays Key association of scroll button

Preset Equalizer change button

Mute button



## 8.6 Interface

### Main Menu



The display shows the time on top and MP3 Player mode below it. This mode can be selected by clicking the scroll button.



The Voice Recorder mode can be selected by clicking the scroll button once the mode is reached by scrolling.



The FM radio mode is reached by scrolling down from the voice recorder mode and clicking it.

In MP3 mode the songs and soundtracks are stored in a sequence. By clicking the scroll button the MP3 mode gets activated. Once inside this mode songs can be played from a selected playlist or the plalist can be randomized to fit the mood.



## Interface Mp3 Player



Once inside the MP3 mode it shows the playlist of songs in the player. The scroll bar can be used to navigate through the list. A song can be selected from the list by clicking the scroll button.



The currently playing song title and a play icon is displayed on the screen.



The volume controls in the MP3 mode remain same and can be increased by pressing the top left button.



There is also provision for four preset equalizer selections.



The scroll button can be used to rewind the song when it is in play mode by pressing it downwards.



The different presets are Soft Rock, Rock, Heavy Metal, Classical, Speech, Techno.



The same button is used to forward the song by pressing it upward.



The bottom right button: the mute button can be used to stop the music when needed.



The player comes out of the MP3 mode if the scroll button is kept pressed.

In Voice Recorder mode speech or any voice data can be recorded in stereo or mono mode and also in various other modes like speech, hall etc.



## Interface Voice Recorder



Once you enter the Voice Record mode it goes to a Record New Sound, pressing the scroll button starts recording the sound.



When it is recording a sound piece it shows the track on which it is getting recorded. It also indicates the mode in which the sound is getting recorded.



Once the scroll button is pressed the recording stops and the player asks for the confirmation of saving the recorded piece.

In FM Radio mode the player plays a set of pretuned FM stations. The Radio stations are digitally tuned and saved in different preset stations.



## Interface FM Radio



Once the scroll button is pressed and the radio mode is set it starts playing the last played station.



FM stations can be changed by scrolling up or down the scroll button.



The other functions of the player like the volume control, equalizer controls and mute is mapped n to the same buttons as the MP3 players.

# References

The Pleasure of Jewelry and Gemstones

Joseph Sataloff and Alison Richards  
Octopus Books

The New Jewelry trends + traditions

Peter Dormer and Ralph Turner  
THAMES AND HUDSON

Pushing Functionality into Even Smaller Devices

Cameron miller

Craft Knowledge for the Digital Age - How the jeweller can contribute to designing wearable digital communication devices.

Jayne WALLACE and Mike PRESS  
Sheffield Hallam University,  
Art and Design Research Centre, Sheffield S11 8UZ, UK.

# Appendix

## Existing products



### Casio Wrist Camera WQV-10

**Recording Format:** CASIO original (conversion to BMP or JPEG when uploading to a computer) to built-in 1MB memory (100 images)

**Recording Element:** 1/14-inch monochrome CMOS sensor

**Total Pixels:** 28,000

**Lens:** F2.8 fixed;  $f = 1.1\text{mm}$ / Focusing Distance 30cm to  $\infty$

**Monitor:** 120x 120 dots (14,400); monochrome with 16 grayscales); 20 x 20mm screen size

**Infrared Communication:** Casio original system for image data exchange with a computer, data exchange with another Wrist Camera

**Data Speed:** 115,200 BPS

**Communication Distance:** 10cm maximum

**Dimensions/Weight:** 40(W) x 52(H) x 16(D) mm / 32g

**Power Requirements:** CR2032 battery



### OnHand PC

**Processor:** 16bit-CPU MN10200

**Memory:** 128kB-SRAM/2MB-Flash Memory

13,000 records of 111 character (average address record consisting of the name, address and two phone numbers).

**Display:** 102 x 64 pixel STN LCD display with EL backlight, viewable screen size is 1.1" x 0.75". 5 lines of 20 characters.

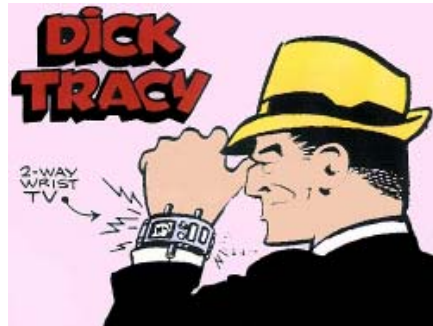
**Interface:** RS232 Serial Com Port to PC at 38,400 bps or Infrared to PC at 9,600 bps; Cross onHand to onHand communication at 38,400 bps

**Battery:** 2 CR2025 coin-type lithium ion batteries

**Battery Life:** 90 days

**Size:** 2" x 2.25".

**Weight:** 52 grams



Dick Tracy with his 2-way TV and above the new Net Dick Tracy Wrist watches by FOSSIL



### iPod small/ mini

**Storage:** 4GB - 40GB

**Battery:** 8 hours

**Skip protection** Up to 25 minutes

**Display:** 1.67-in/ 2in (diagonal) grayscale LCD with LEDbacklight

**Ports:** Dock connector, remote connector, stereo minijack

**Connectivity:** FireWire 400 and USB 2.0 through dock connector

**Charge time:** 3 hours (1-hour fast charge to 80% capacity)

**Audio support:** AAC (16 to 320 Kbps), MP3 (32 to 320 Kbps), MP3 VBR, Audible, AIFF (Mac only) and WAV

**Size:** 3.6x2.0x0.5 in/ 4.1x2.4x0.62 in/ 4.1x2.4x 0.73 in

**Weight:** 104 g - 176 g

**Included accessories:** Earbud headphones, belt clip, AC adapter, FireWire cable, USB 2.0 cable, 4-pin-to-6-pin FireWire adapter, dock, remote, carrying case, AC adapter

**Optional accessories:** in-ear headphones; earbud headphones and remote.

### FOSSIL wrist watch Net Dick Tracy FX3002 with MSN® Direct service

**Dimensions:** 1.8"L x 1.5"W x .5" DMSN Direct service with Microsoft's Smart Personal Objects Technology (SPOT), people can customize the information that is delivered to their watch. They can get the latest news, weather, event listings, appointment reminders, personal messages.....

Philips Key 8 Digital Still Camera



### Philips Key 8 Digital Still Camera

**Storage:** 128 MB

**Mode:** VGA picture capture, Hi-res 1.3 mega pixel output.

**Magnesium:** Light and durable magnesium body

**Data transfer:** USB

**Dimensions:** 86 mm x 28 mm x 18 mm

**Weight:** 30 g

**Battery:** built-in rechargeable lithium.

**Sensor resolution:** 307,200 pixels.



### Nokia Kaleidoscope 1

**Weight:** < 75 g

**Dimensions:** 70 x 36 x 36 mm

**Virtual Display:** 270 x 228 pixels; 32,768 colors (15 bits)

**Memory:** 2 MB SRAM, 2 MB flash memory can store up to 24 images of VGA size (640 x 480 pixels), slot for MMC card (32 x 24 x 1.4 mm) 24 images

**Interface:** Infrared, supports IrOBEX 1.3 Send and Receive

**Image Formats:** JPEG, GIF, PNG (still images)

**Operating Time:** About 50 minutes of active image viewing

**Battery:** Rechargeable nickel metal hydrid (NiMH) battery Images need to be transferred via infrared from a compatible mobile device, PC, Nokia Medallion I or II, or other Nokia Kaleidoscope.

### Nokia Medellion 1

**Weight:** 34 g (not including strap)

**Dimensions:** 42 x 53 x 12.7 mm (not including strap)

**Display:** 96 x 96 pixels, 4096 colors, 16.7 x 16.7 mm

**Memory:** 2 MB SRAM, 1 MB flash memory

**Operating Time:** Up to 15 hours Operating

**Battery:** 80 mAh rechargeable lithium-ion

**Compatible Phones:** Nokia 3200/3650/6220/6600/6650/7600/7650 phones, and the Nokia 9210 / 9210i communicators

### Nokia Medellion II

**Weight:** < 60 g (not including strap)

**Dimensions:** 42 x 32 x 13 mm (not including strap)

**Display:** 96 x 96 pixels, 4096 colors, 16.7 x 16.7 mm

**Memory:** 2 MB SRAM, 1 MB flash memory

**Operating Time:** Up to 15 hours

**Battery:** 80 mAh rechargeable lithium-ion



### Nike-Philips Portable Sports Audio 256max

**Storage:** 256 mb, 6 hours of music.

**No look buttons** for "blind operation". Solid state means no moving parts for **Skip free audio**

**Smart Wire Management-** Magnetic anchors let you position the remote control for easiest access. The magnetic butterfly clip stows the slack and routes the chords.



### Sony NW-MS11

**Memory:** 128MB MagicGate Memory Stick - 120 minutes at 132kbps, 160 minutes at 105kbps, 240 minutes at 66kbps

**Display:** one-line, backlit LCD

**Interface:** USB cable

**Battery:** rechargeable NH-14WM(A) rechargeable Ni-MH battery(1.2V/1350mAh) with 10 hrs playback

**Dimensions:** 1-1/2"W x 3-1/4"H x 3/4"D

**Weight:** 2.35 oz. with battery and MagicGate Memory Stick



### Samsung YEPP

**Memory:** 256MB embedded memory Built-in microphone records in WAV format at 32Kbps (128MB holds approximately 512 minutes of voice recordings) Sub-minijack input for recording audio as MP3 / FM tuner with 20 presets / Records FM audio as MP3

**Display:** 2-line, backlit LCD displays MP3 ID3 info

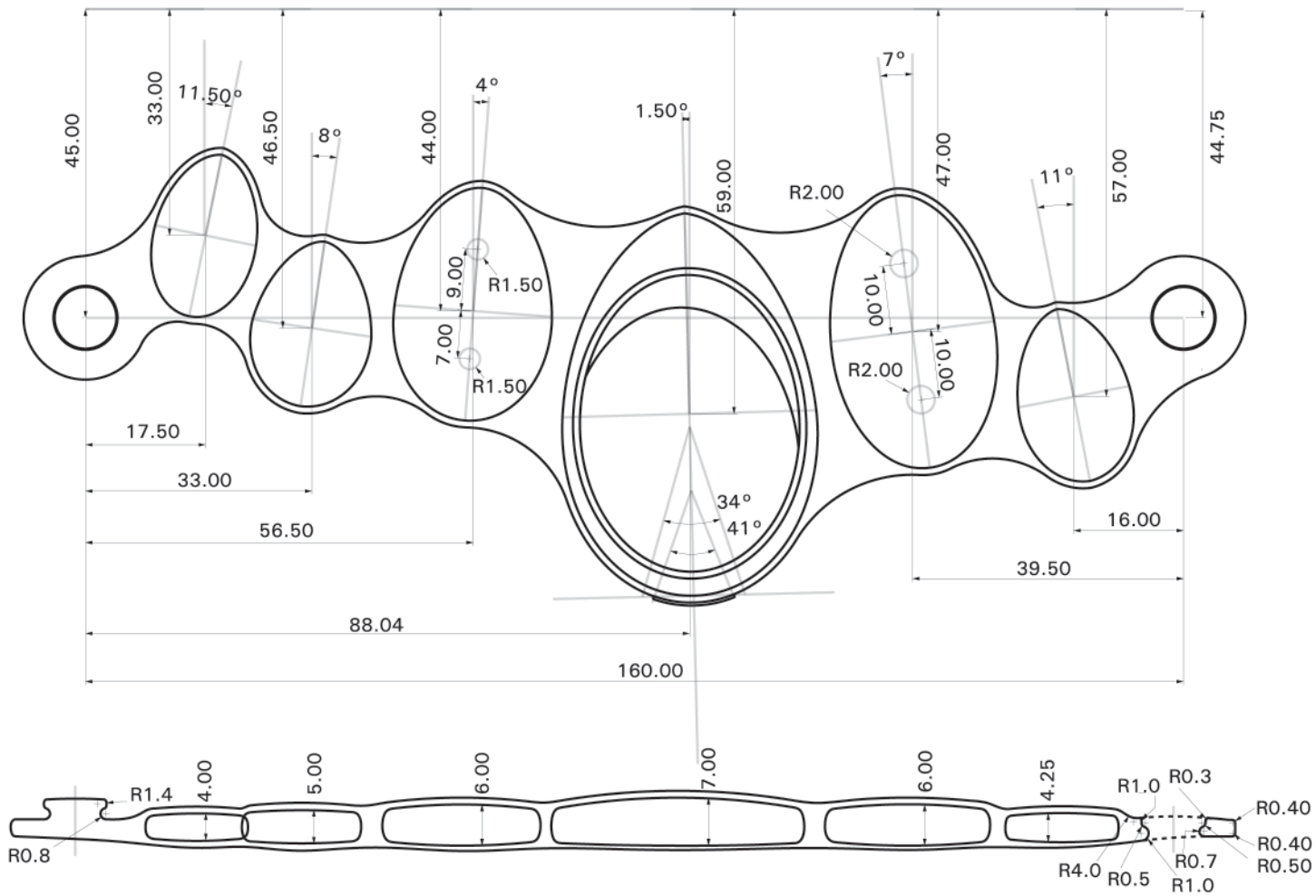
**Interface:** USB interface (cable included)

**Battery:** "AAA" alkaline battery up to 15 hours playback

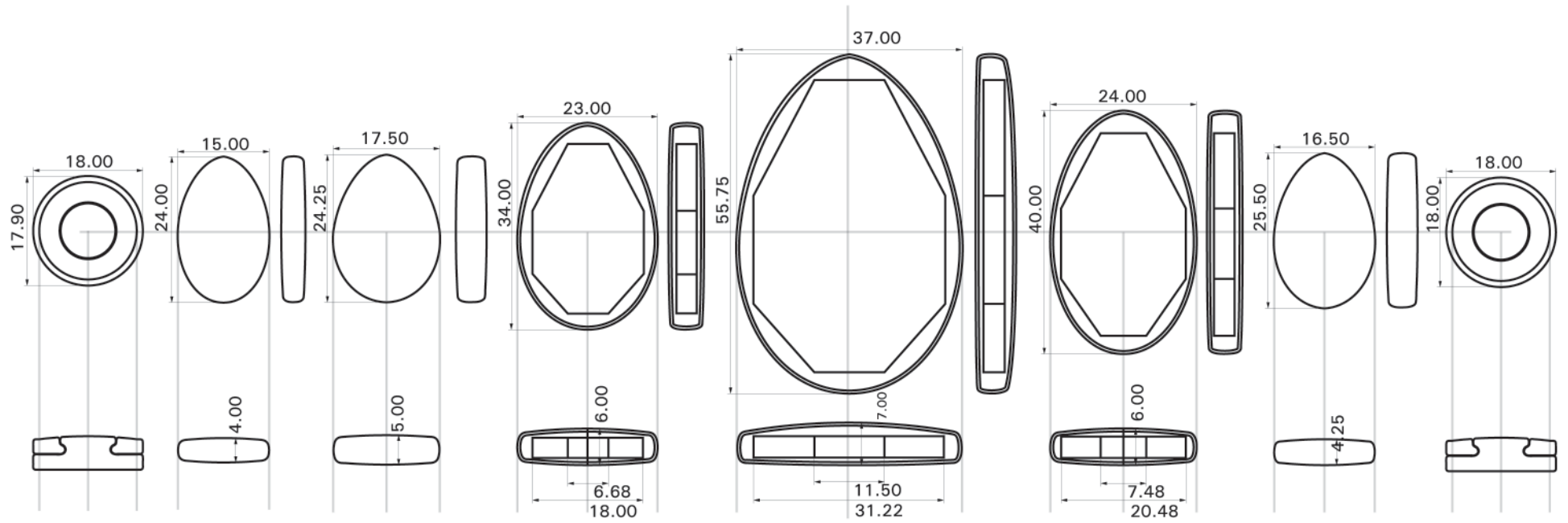
**Dimensions:** 1-1/16"W x 3-1/2"H x 1-1/16"D

**Weight:** 1.6 oz. without battery

# **Dimensional drawing**



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