

WHAT IS GOING TO BE STUDIED?

My product study will focus on a "smallish stereo-headphone cassette player" (Klein's description of an unfamiliar product,) commonly known as the 'Sony Walkman.'

"The Walkman has always been about personal portable entertainment. Underlying this theme is a very strong message of personal music freedom. It gives consumers the freedom to define their music experience by choosing when, where and what to listen."

With Walkman, music moved out of the home and into the streets and became part and parcel of modern lifestyle. Music freedom was a message that everyone can relate to. Before long, the word "Walkman" became a household name and every portable device took the Walkman as a role model. The word "Walkman" can now be found in most modern dictionaries." <http://www.sony.ph>

WHY WAS THE TOPIC CHOSEN?

When choosing a product to base my study on, the first decision I made was to research a product that I use on a daily basis and was of interest to me. I was motivated to Study the 'Sony Walkman' when I was sitting in the 6th form common room. AS I looked around I saw many people with headphones in their ears. As my eyes followed the thin black wire coming from their ears, they soon settled on a device connected at the end. It amazed me how though the shape, style, materials, and colours varied from one device to another, the primary function of each walkman was the same: *to play cassettes anytime and anywhere.*

I began to think about how important the walkman is to both me and other people, in a day and age where we are dependant on music. Portable entertainment devices such as the walkman have become a commodity which we would find it difficult to survive without, and for this reason it would be an interesting product to study.

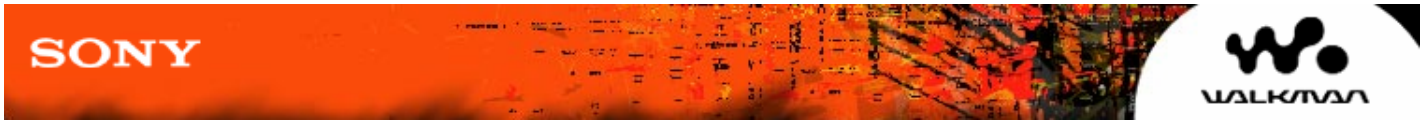
I chose to look at the Sony Walkman, as oppose to walkmans produced by other competing companies, as Sony was the creator of the original product.

WHAT DO I HOPE TO LEARN BY COMPLETING THE STUDY?

The purpose of this product study is to analyse and illustrate the design and manufacturing aspects of the 'Sony Walkman,' that have been involved in its evolution and development into a timeless design classic.

In order to learn about a design classic the following points should be researched:

- History of the product
- What the need was to be fulfilled which instigated the creation of the walkman
- The design inspiration
- The design decisions
- The factors involved in manufacturing
- Evolution of the product
- How it was/is marketed
- Technological developments and innovations



I will be looking at the following design and manufacturing issues in this study:

DESIGN ISSUES

- 1. Design Decisions
- 2. The Japanese influence on the design

MANUFACTURING ISSUES

- 1. Materials used to manufacture the Walkman casing
- 2. Process used to manufacture casing
- 3. Quality and Reliability in manufacture
- 4. Advances in manufacturing technology
- 5. Innovations in manufacture

WHAT DO I HOPE THE READER WILL LEARN FROM READING THIS STUDY?

Not only do I hope to inform the reader about the Sony walkman, its design and manufacturing issues, but I want them to develop an interest for the product. More so I wish to create an appreciation for the walkman, in which every time they see or use a walkman, they will remember and appreciate and understand the hard work that has gone into its creation and development.

WHAT METHODS/SOURCES OF INVESTIGATION WILL BE UNDERTAKEN TO OBTAIN THE RELEVANT INFORMATION?

To gather research I am hoping to gather information from a variety of sources, to avoid plagiarism and in an effort to learn more. This will include secondary information from:

- **Internet:** Vast amounts of detailed information is available, but the internet is time consuming as will have to search through it and cut it down to what is relevant.
- **Books:** These are little more difficult to track down, especially when specific information is required, although if it is found, it is worth it as books are a very good source of information.
- **Magazines/newspapers:** Current and up to date information.
- **Video:** I will watch a case study on the Sony Walkman in video format. This will provide me with overall information regarding manufacture, design as well as marketing aspects of the Walkman.

I will also try to obtain information from a primary source by writing to Sony directly asking for information regarding the Sony Walkman.

All the sources of information that I am going to use will all focus on all the sections that I am covering. Information regarding the Walkman tends to be presented in a case study format, so it will be a matter of taking the most important and relevant parts of each source, analysing them and compiling my product study accordingly.

MY PROPOSED TIME/ACTION PLAN

	1	2	3	4	5	6	7	8
Objectives and Contents								
Plan of Action and Execution								
Analysis and Synthesis								
Conclusions & Evaluations								

BRIEF BACKGROUND OF THE SONY WALKMAN

The history of the Sony walkman dates back to the 1950's when Sony, then a small Japanese company, bought the rights to the transistor. They set to work immediately to prove that the transistor had many uses, and within 2 years had proven that transistors weren't limited to being used merely in hearing aids.

1950 saw Sony's first tape recorder, by the next year they had it into a suitcase making it suitable for portable domestic use. In 1954 Sony produced the first transistor radio, which by 1957 had been significantly reduced in size.

The development of the transistors was followed by the microchip in the 1980's. It was both the transistor and the microchip which made led to the creation of the innovative Walkman, and made its small compact size possible.



Walkman prototype with large headphones

The Sony Walkman was born out of attempts to create a portable tape player. Sony's objective was to develop a tape player that produced good quality stereo sound. This in itself was not a difficult problem to solve, but the main obstacle was the size restrictions; it would be difficult to build in speakers that produced sufficient quality stereo sound. The logical

solution was an external set of speakers, called headphones which were attached to the tape playing unit via a wire. Headphones at the time were large and cumbersome, so Sony created a small pair of headphones, which were ideal to be released with the very first walkman.

Once fully developed, the finished Walkman was presented to the sales and marketing division. They thought the idea of a tape recorder that didn't record would be pointless, and headphones would be deemed as annoying by customers. Little did they know, as luckily at the Sony Corporation,

managers were intrigued by the idea and decided to launch it despite the cynicism of the Sales and Marketing teams.

As a result the first 'Sony TPS-L2' unit, an adaptation of the 'Sony Pressman 100 Tape Recorder' went on sale in July 1979. In Australia and Scandinavia it was introduced as the 'Sony Freestyle', in the USA as the 'Sony Soundabout', and in the United Kingdom as the 'Sony Stowaway'. Soon after the initial launch, despite the country of purchase, the 'Freestyle', 'Soundabout', and 'Stowaway' all became collectively named the 'Sony Walkman'



WM TPS-L2

The Walkman was designed with young consumers who listen to music wherever they go, in mind. It was a successful attempt to allow the younger generation to carry their music with them, without disturbing others. Sony intended to attract other groups of consumers later on, who would find it useful and appealing, and by doing so create a market for themselves.

The release of the 'TPS-L2' unit was followed with the release of additional models that year. Competitors, who were usually quick to copy new Sony products, did not introduce to their own Sony Walkmans till a year later. As with the Sony marketing and sales division, they were skeptical about its success. When they finally released their own versions of the 'Walkman', the imitations were found to vary only superficially, from Sony's original established compact format.

Sony, by reconfiguring existing technology has created a stylish package that was portable, easy to operate and capable of delivering better sound than most domestic systems at the time. An innovative form of personal entertainment, which has been successful since in its release and is still popular today.

SONY WALKMAN A VISUAL HISTORY



1979



1981



1982



1983



1985



1986



1987



1988



1989



1991



1994



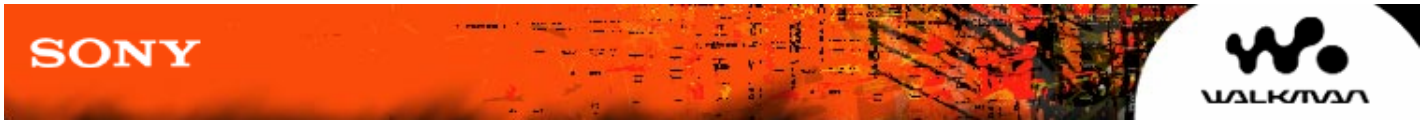
1996



1998



2000



DESIGN DECISIONS

As you can see above the Walkman has evolved significantly both aesthetically and technologically though the years. These changes have been influenced by many different factors, such as a series of technological innovations and feedback from users, since its launch in 1979. The following key changes were made due to user feedback.

- Elimination of the hot button (gets rid of tape signal and general crackling.)
- Removal of second headphone socket
- Water proof models (sport and shower walkmans)
- Children's version (for the 'my first Sony' line)
- Shock resistance (reduction of cassette window)
- Different colours
- Direction mode button (to play the other side of the tape without stopping and opening the unit)
- Improved ergonomics and tactile feel
- Rounded edges to carry the Walkman more comfortably in the pocket or in the hand
- Alarm clock (in the more recent models)
- Comfortable headphones

Significant technological changes that in some way influenced the design, shape and function are:

Microelectronics (reduction in size)

- Automatic tape selector (elimination of normal selection buttons)
- Liquid crystal displays (technical look)
- Digital electronics (allow radio stations to be preset into memory)
- DCS Digital Cassette System (Removal of front window. Information about how much tape has been played can be seen on LCD)
- Mega Bass (enhance bass and variable frequency modifier)

DESIGN JAPANESE INFLUENCE

The Walkman was conceived in Japan. Instead of being influenced by the west when designing the Walkman, Sony stayed close to home for design inspiration. Sony designers drew upon traditional elements of Japanese design:

- Compact size
- Aesthetic simplicity
- Attention to detail
- Miniaturisation

and incorporated them into the Walkman. They had a wonderful vision of a purely Japanese product.

Japan has always had a historical obsession with 'small,' 'miniaturisation' has always been the key concept of the Walkman. This can be seen in many aspects of Japanese culture, e.g. 'bonsai trees' and 'mini rock gardens.' These also show a need for a controlled environment, and a careful use of space. These factors have been incorporated into the Walkman, as has the idea of it being 'small yet powerful,' in the same way as a bonsai tree or rock garden.



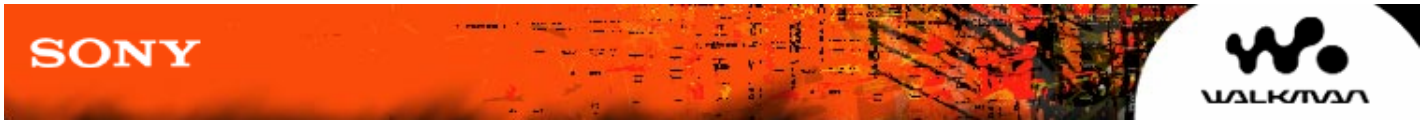
When the Walkman was created designers wanted to borrow the idea of entering one's own personal space from zen meditation, and incorporating it into the product. The idea was to capture this by allowing the listener to create their own emotional personal space. As Japan is a densely populated country, it's easier to create emotional personal space, as physical personal space is hard to come by.



In the UK we have a more visual approach to design, whereas in Japan design philosophy is geared more towards touching, holding and getting a real feel for the product

Japanese design uses very simple colours, especially black. Walkmans are still made in dark blues, blacks and greys to reflect this, but sporty and children's models use more vivid colours. Japanese design also lends itself to the shape of the Walkman. The linear form and straight lines come from traditions such as 'tatami mats.' Although the edges were made round after a while, so the Walkman doesn't stick out of the pocket.





DESIGN POLICY

At Sony, functional and operational elements of design are very important. The walkman was designed to create and respond to consumer needs in a flexible manner. There were three elements of the organization of the design of the Walkman, which the key to its success:

1. Design functions are given higher importance than production activities.
2. Designers have easy access to senior managers.
3. Designers are kept in touch with cultural trends and practices. They draw inspiration from art, architecture, technology, fashion, pop etc.

The Walkman was not designed to be merely a plain box that played music but a highly personal possession.

MANUFACTURE

Developing the innovative Sony Walkman was only the first step in its success. The next step was developing an innovative method of manufacture.

Three steps in the manufacturing that determined whether or not the walkman would be successful if it was mass produced:

Sony took its first step to setup manufacturing facilities for the Walkman, in Japan, where their people could directly oversee efforts to improve the process. Step two utilizes the creativity and resourcefulness of employees, in finding way of improving the production at the manufacturing stages by eliminating waste and simplifying the production process.

When managers are sufficiently satisfied with the production line the final step involves automating as many tasks as possible, maintaining product quality and reducing labour costs. The production process used to manufacture the Sony Walkman, has been refined to a point of neatness, technicality and precision.

The concurrent engineering and precision manufacturing approaches are important in producing compact, lightweight and highly reliable Walkmans.

QUALITY AND RELIABILITY

The teams of engineers and inventors at Sony have revised components from existing products in the development and manufacture of the walkman, to cut costs and achieve a high quality in new Walkman models.

Another measure used to maintain quality and ensure reliability of the Walkman is by identifying basic failure mechanisms at the prototyping stages. This allows time for the problem to be solved and the failure mechanisms to be understood, by carrying out stress tests using heat, environment and time, before money is put into producing the product in mass.

CASING MANUFACTURE

The style of casing used to house the Sony Walkman varies from one model of walkman to the other, therefore Sony needs to adopt an economically efficient method of production, using an equally suitable material, which produces the best result.

ACRYLONITRILEBUTADIENESTYRENE

Many of the original models of Walkman, and the cheaper and sports range of Walkman models, are made from a thermosetting plastic called Acrylonitrilebutadienestyrene, generically known as ABS. ABS is used in the production of Walkmans for a variety of reasons.

- ABS forms to a high definition: this is vital because the casing is what the consumer sees when they buy the product and each time they use it, so its important that the casing looks faultless, not tacky and of a high quality.
- ABS is shock resistant: another vital material quality as if the product is going to be used a lot it needs to endure small daily shocks and protect the internal components, as well as the tape, without breaking itself.
- ABS is durable: Sony has a good reputation of manufacturing high quality products with a long life; it's important the material doesn't wear out and become useless in a short period of time.

INJECTION MOLDING

Injection molding is used in the manufacture of the ABS casing of the Sony Walkman. It is a production process for producing large quantities of a product, most commonly in a production line. The production process is an important consideration when choosing a manufacturing process for the walkman, as they are produced on a large scale, and there are a variety of standards the product must meet. Injection molding is used to mould the housing of the Walkman into shape for 2 main reasons:

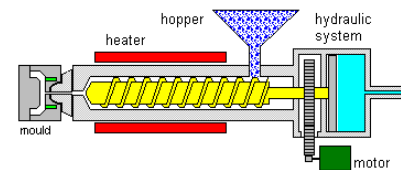
- It can be used for complex moldings
- Produces an excellent surface finish improving to the Walkman's aesthetic appeal

The injection molding process requires substantial investment to initially set up and maintain, although it becomes economically efficient after a short period in mass production as it gives a low unit cost.

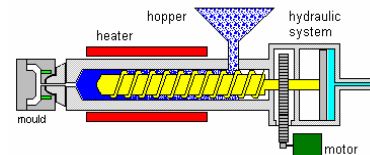
INJECTION MOLDING PROCESS

Granulated or powdered thermoplastic material is heated, melted and then forced under pressure into a mould. Once in the mould the plastic cools, forming a component that is identical to the shape of the mould cavity.

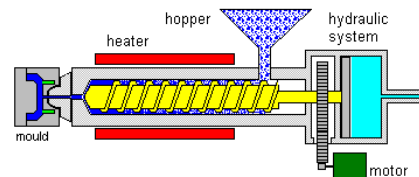
1. Plastic powder or granules are fed from a hopper into a hollow steel barrel which contains a rotating screw. The barrel is heated which melts the plastic material as it is carried along the barrel by the screw towards the mould.



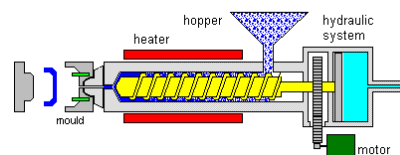
2. The screw is forced back as the melted plastic collects at the end of the barrel.

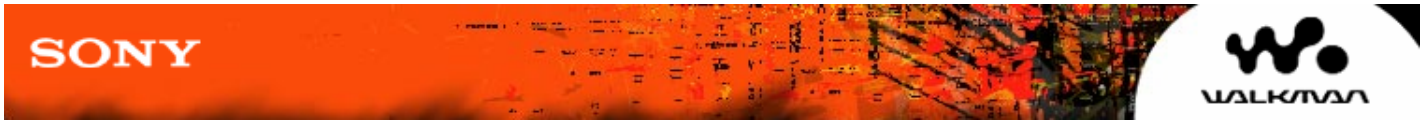


3. When enough melted plastic has collected a hydraulic ram forces the screw forward injecting the thermoplastic through into the mould.



4. Pressure is kept on the mould until the plastic has cooled enough for the mould to be opened and the component ejected.





MANUFACTURE INNOVATIONS I

As part of efforts to contribute to environmental conservation, Sony has developed a new innovative plastic, which was first launched in the casing of the Sony Walkman in autumn 2002.

The plastic is Polylactic acid* created from the fermentation of corn, a widely available natural resource. It is conventionally not suitable for use in the Walkman casing as it lacks the physical properties required in durable consumer goods. At the Sony research center, scientists have developed a method which improves the properties of Polylactic acid, by making it sufficiently

- durable
- heat resistant
- shock resistant
- mouldable

to be used for the outer casing. Sony plans to manufacture the casing so 90% of its overall weight is made from the new material.

Conventional plastics are made from petrochemicals, by using a vegetable based plastic from plants, Sony can save non renewable resources. It also, upon disposal decomposes entirely into carbon dioxide, water and inorganic substances. The decomposition occurs through a catabolic process, which is induced by micro organisms and enzymes in composters*. Although recycling the new plastic is technically impossible.

This has been a giant step for Sony who hopes to develop the material further for use in other products, as well as incorporate its usage into packaging.

Sony continues to contribute to minimizing the impact of its products and manufacturing processes.

*Polylactic acid is made by fermenting corn starch or sugar using lactic acid and bacteria then chemically polymerizing the ingredients.

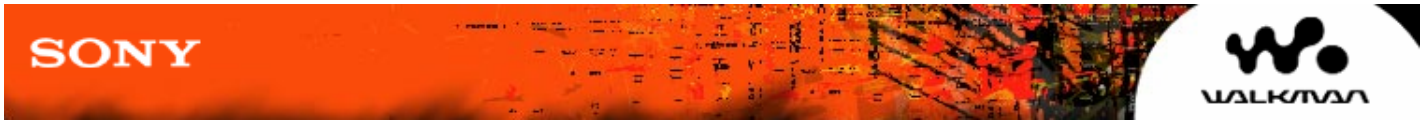
*Composters are machines that produce compost from organic waste such as fallen leaves and kitchen refuse. They provide an environment of high temperature and humidity that is suitable for microorganisms and accelerates natural decomposition of decaying plants.

MANUFACTURE INNOVATIONS II

Sony has begun to use the latest surface mount technology on printed circuit boards in the Walkman.

When the circuit boards are produced for the inside of the Walkman, solder is used to secure the components to the circuit board. To make this process more efficient the melting point of the solder has been significantly lowered, and the solder particles have been produced to be more uniformly shaped and size.

Since the first Walkman was manufactured the number of internal parts used and assembly time of the Walkman, have both been halved. This was accomplished by manufacturing the mechanical block and electrical circuit boards in a single block rather than in two separate pieces, and also by assembling four blocks simultaneously. This reduces the cost and time, but Sony does everything in its power to ensure quality is reduced in this process.



CONCLUSION WHAT HAVE I LEARNT FROM CARRYING OUT THIS STUDY

From carrying out in depth research on the Sony Walkman, I have found out what factors of design and manufacture have led to its success as a timeless classic.

The Walkman has developed significantly over the years, but the underlying concept of musical portability has remained the same since it was first created. It astounds me how the Walkman has been popular with generations of different varieties of people and has never flopped or diminished into a has been. (Another much simpler product which has followed the same route as the Walkman would be the Ballpoint pen. It would be interesting to compare case studies on both products to highlight if it was similar factors or methods of marketing or production which led to their successes.) Through my research I feel that this has been the case for two main reasons. Firstly the design of the Walkman has been adapted to accommodate use feedback. Sony have listened to what the users want in the product and responded to it, rather than telling the consumer what they want. Sony has also been heavily influenced by technological developments, which has also kept them ahead of competitors. From this I have learnt that a successful product needs a great deal of very carefully thought out research, for it to succeed. I have also learned about Sony's 2 fold plan and plan for global consumption which have also contributed to its success.

What I have learned about the technological developments, for example the advance in materials technology I will be able to use to my benefit throughout the rest of my design technology course, as I will have knowledge on innovative new cutting edge technology in examinations, which may give me an edge over other candidates.

By far the most interesting part of this product study to me has been how Japanese culture has influenced the design of the walkman. It is an amazingly well thought out product and I was totally absorbed in my research when it came to learning about, for example, in which ways a bonsai tree is similar to a Walkman, which I never would have even thought about prior to my study. I hope to apply what I haave learnt about the way Sony have used Japanese culture in their design into my design project where I am designing a Hindu shrine. I will use the information I have found to try and identify elements of Indian design culture that I could incorporate into the design of my shrine.

Not only have I thoroughly enjoyed carrying out this study, as it was regarding a product that I am very interested in, I have also developed my researching skills. Whereas at GCSE level I tended to just rewrite information from a single source, I have learnt to gather information from several sources of information and use it to create an interesting study which is entirely individual. In terms of IT skills I feel that my work has been presented a lot better, and looks a great deal more professional than it did at AS level.

CONCLUSION HOW I COULD FURTHER THIS CASE STUDY

my researching skills. Whereas at GCSE level I tended to just rewrite information from a single source, I have learnt to

SONY

