

Reverse engineering essay

[Engineering](#)



**ASSIGN
BUSTER**

1. Introduction to Reverse Engineering

The purpose of this report is to specify a toaster production plan clearing noting the essence and the sequence of feasibility. The manufacturing plan relates to the operations based on the key manufacturing stages involved in the production. The operational plan focuses on the metrics of operational status precisely noting the purposes of producing the appropriate operation purposes and the floor plans and facilities. The report will describe the interrelationship between the various components, primarily narrowing down to the circuit board because it experiences a plethora of challenges. The section will also be focusing on the labor structure clearing showing the choice of technology that will be adopted in the production process.

1. 1 Background

Reverse engineering is a process of discovering technological aspects or principles of a device, through the analysis of its structure, function, and operations. The disassembly and reassembly of the device while taking care of its documentation are necessary steps involved in the reverse engineering. The reverse engineering is adopted because it is the reverse engineering process presents a conventional manufacturing process presenting an overall manufacturing. The reverse engineering specifies production specification which helps in outlining various conventional manufacturing procedure . The reverse engineering is therefore adopted to help in determining the feasibility of the project while specifying the appropriate accuracy of the product.

2. 0 Brief

<https://assignbuster.com/reverse-engineering-essay/>

2. 1 Product Design Specification

The performance of the product depends naturally on the dimensions of the quality, which involves measurable determining the attributes of the brand that can be ranked objectively on the individual aspects of performance. The design which has been chosen is oval in shape, a primary aspect which makes it competitive against other rivaling in products . The lights and regulation knobs are all touch screens. The reliability of the product depends on the specific time that surrounds the conformance and the precision of the product which is designed to meet the product general output. The serviceability of the product depends on the competence as well as the behavior and the serviceperson of the aesthetics as well as the dimension indicating the kind of response and the product environment. This is based on the perceived quality of the product as well as the service quality and the indirect measures surrounding the product.

2. 2 Assembly Points

The design is consideration of both materials and the architecture based on the design knowledge. The emphasis is based on the conceptual embodiment design that is sustainable through various products and service. For the design to be excellent, the project adopts a process neutral which is the process of entire project that includes creating a detailed list of the product characteristics, while considering the materials and usage requirements for the product. Besides, the design will consider the need grading where different toasters are packaged differently. The grading is important because it helps in outfitting the technology while considering the

ability of the users to afford the product. The need end user requirements should focus predominantly on the possibility of the cosmetic looking design one that focuses predominantly on the ability to speculate and relate to the product development process.

2. 3 Manufacturing Techniques

The mass production technique capitalizes in producing in large numbers. The broadened product portfolio will only be possible if the design team comes up with lucrative product designers. The design team seeks to use a hybrid of technology such that it will only require few number of laborers working through. Most of the employees will be skilled employees (3) and (4) skilled employers who will manufacture a total of 24 toasters in a day. The company will use franchising model to make product that consists of different but cheaper version.

2. 4 Design improvements

The main design improvements will be looking on how to maximize usage. In future, there will be an interaction screen possibly running an android mini app. For instance, a user can remotely regulate the temperature or change the position of the toaster using Bluetooth that connects to the toaster

2. 4. 1 Components

There are various components that are used in the toaster. The three primary components include the circuit board, the metallic element and the plastic cover.

2. 4. 2 Circuit Board

<https://assignbuster.com/reverse-engineering-essay/>

To begin with, the circuit board is made of a terminal board that has two sheets of metal conductors and a layer placed above the sheet. The terminal ends are based on temperature sensing device that are attached to various ends of the components. The circuit board houses the main control terminals as well as the new computerized systems specifically made for toasters . The system design will be set to China for verification and analyzes.

2. 4. 3 Aluminium Sheet

The aluminum sheet is made of a specific size given that it is required to be punched through the toaster shaped die that involves pressing forces against the sheet. The metallic elements are connected to support the bracket which is mounted through a second bracket and allows for the right pivoting and motioning of the mounting bracket that lock the support.

2. 4. 4 Pressure Plastic

This component is important because it helps in recreating and recycling the plastic pellets to ensure that heat is maintained at 350°F where the compound heats become a semi-fluid. The pressure plastic is important in punching the pressure which helps in making the specific heat size required based on the forces of punch that are placed against the sheet. The metallic flows backward and forward are naturally based on the toaster-shaped shell.

3. 0 Comprehensive Design FMEA.

To analyze the quality of the circuit board we use the FMEA. FMEA is the acronym for the Failure Mode Effect Analysis which analyzes the approach of system design by projecting the possible project tree involved in determining

the hardware, interfaces functions w orienting the possible combination of these components. FMEA circuit assembly (CCA) creates a perfect approach which helps in analyzing the possible systems failure. Each part is validated using the CCA standards as well as analyzed using the Reliability Analysis Center (FMD-97). The failure of Mode Distribution guide creates an important approach that could become more daunting and time consuming. The capacitors on board relates to the possibility of the same effect on the CCA that creates a repetitive efforts that provide great return. A common FMEA approach is based on the CCA functionality that provides top level functions for the circuit board performance.

3. 1 One Component: Circuit Board

In our circuit board, we have 17 decoupling capacitors, 24 resistors, 11 ICs, 11 resistors, and 6 diodes. Hence, we are going to be defining and conducting a failure mode that are associated with the appropriate CCA which creates the right functionality that analyzes the possible failure mode that are analyze the performance of each of the capacitors based on failure mode analysis. The function FMEA approach involves projecting the system on tree and project based on the specific hardware functions while combining a variety of the circuits that are used to approach various interface functions.

3. 1. 1 Failure Modes

The motherboard initial allocation was 99% which has an estimate of about 96%. The gap is created by analyzing the possible bridge issues associated with system engineering .

<https://assignbuster.com/reverse-engineering-essay/>

. The company also focuses on the increased cultural development.

3. 1. 2 Electrical Spikes and Surges

The motherboard might not be able to protect from such, because it does not have a surge or spike suppressor. The sudden change of voltage causes the damaging of switch board that create frequent circulations that are visible from all sides.

3. 1. 3 Heating Issues

The motherboard might not be able to safeguard from heat problem. There are two sources of heat, the aluminum toaster plate and the transformer which is heating. Overheating might occur due to fluctuations of power or overloading of the components.

3. 1. 4 Spills

The motherboard might not be full safeguarded from impact or spills that might be hampering the various production outputs . In fact, the spills might affect the motherboard instantly which leads to the subsequent damages that lead to the damaging of the IC chips that are small in size.

3. 2 Failure Modes

The circuit board might experience a number of minor failure modes, which are not catastrophic. The failure modes might cause mild excess, ionizing radiation, voltage, stress or impact, excess current, stress and impact. The problems might be caused by the heavy heat being caused by the aluminum plate.

Failures are expected to occur during manufacturing and in the process of usage. Using burn-in procedures that will be used to expose the motherboards at high temperatures, failures will be identified as catastrophic or non-catastrophic. The failure modes are not catastrophic if the statistical properties provide guidance to design while establishing the appropriate reliability. The power-handling components creates a resistor based on high altitude for the adequate services. The failure circuit naturally contains the causes the voltage that cause possible damage to essential components for instance resistors.

The Printed Circuit Board uses a slice and dice approach. The approach is a combination of several external techniques that are involved in electrical testing, possible visual inspection and cross-section of the area of interests. The natural technique is increasingly effective given that it applies low effective and identifiable techniques.

3. 3 Evaluation Matrix

The evaluation matrix reflects on the design and build based on the appropriate characteristics for the project delivery. The project characteristics involves identifying the appropriate priorities tools for the identifying the appropriate priorities for the manufacturing of the toaster machine.

3. 4 Concept Failure

Using the life prediction techniques and possible stress models, the traditional failure analysis involves identifying the possible physical defects

that root because the circumferential fatigue that are achieved through Plated Holes. The increasing aspect ratios are differentiation are obvious and require a possibly higher understanding and intersection between the copper points, the laminate material, and possible stress concentrators.

Since the thermal analysis is an important PCB design process that is achieved through a computer-aided design, the implementation process involves Computer aided Design (CAD) where the development environment are concerned more on in identifying the excessive temperature. As noted earlier, the sources of heat are because the hardware experiences possible circuit break down problems as well as the poor duplication of the layout process that predict the board and component temperature for the fabrications.

4. Reverse Engineering Essay Conclusion

Clearly, the circuit toaster performances depends predominantly how the different parts integrate and relate with each other. As established, the fragile parts are highly vulnerable because of the high temperature that the toaster might be experiencing. Most especially, the study has singled out the circuit board because it the main carrier of energy. The fragile components such as resistors and capacitors are highly vulnerable because of the proximity to the aluminum heating template. However, based on the PCB design process, it is possible to regulate the abrupt changes in temperature.

5. References

Verma, P., Chatterjee, D. and Nagarajan, T. (2009). Design and development of a modular valveless micropump on a printed circuit board for integrated <https://assignbuster.com/reverse-engineering-essay/>

electronic cooling. Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science, 223(4), pp. 953-963.

Sisco, Z., Dudenhofer, P. and Bryant, A. (2016). Modeling information flow for an autonomous agent to support reverse engineering work. The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology.

Savage-Knepshield, P. (2008). Incorporating Reverse Engineering and Competitive Analysis Techniques into the System Design Process: A JTRS HMS Case Study. Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 52(24), pp. 1969-1973.

Rysinski, J. and Wrobel, I. (2015). Diagnostics of machine parts by means of reverse engineering procedures. Advances in Mechanical Engineering, 7(5), p. 168781401558454.

Madehow. com, (2017). How toaster is made - manufacture, making, history, used, parts, components, machine, History, Raw Materials. [online] Madehow. com. Available at: <http://www.madehow.com/Volume-7/Toaster.html> [Accessed 24 Mar. 2017].

Kim, E. and Schubert, T. (2016). A low-cost design experience for junior-level electronics circuits laboratories through emulation of industry-printed circuit board design practice. International Journal of Electrical Engineering Education, p. 002072091667365.

Chan, H. (2010). A Process Re-Engineering Framework for Reverse Logistics Based on a Case Study. International Journal of Engineering Business Management, 2, p. 11.

<https://assignbuster.com/reverse-engineering-essay/>

Awasthi, A., Zlamparet, G., Zeng, X. and Li, J. (2017). Evaluating waste printed circuit boards recycling: Opportunities and challenges, a mini review. Waste Management & Research, pp. 0734242X1668260.