

MIS 576

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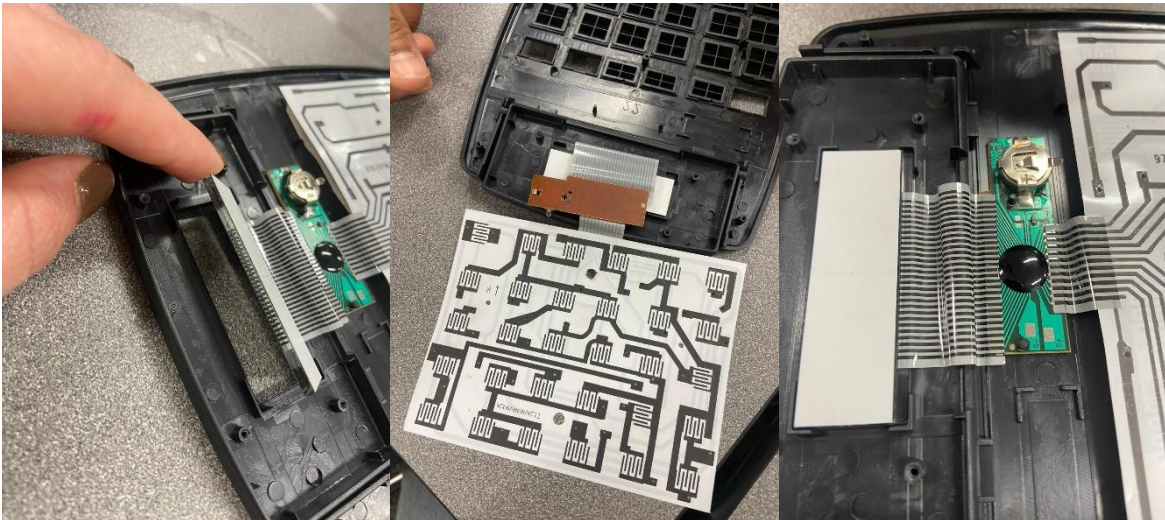
Group Teardown Analysis

For the Teardown Analysis we disassembled the calculator:

1. First, unscrew all eight screws from bottom of the casing of the calculator.
2. Remove the bottom casing exposing the inside of the calculator, place button-side down.
3. Unscrew the 4 screws of the LCD display casing and lift off.



4. Slowly lift off LCD screen, motherboard connectors, motherboard, and key sensor pieces leaving all pieces connected.



5. Remove keypad membrane (rubber) leaving key and casing exposed.



6. Removed remaining key caps.
7. Remove the remaining parts.

Part Name	Hyperlink to a Potential Supplier	Role	Responsibility
Buttons	https://gerhartstamping.com/progressive-die-stamping-of-stainless-steel-calculator-button/	Mechanical Engineer, Usability Engineer	Design and layout of physical buttons and testing tactile feedback, CAD model of each button.
Screws	https://www.gobigbolt.com/products/bolts/carriage-bolts	Mechanical Engineer	Selection of screw type and measurements to fit size and force tolerance requirements. Choose placement inside and outside of casing.
Calculator Casing	https://www.ti.com/ordering-resources/buying-with-ti.html?utm_source=google&utm_medium=cpc&utm_campaign=ocb-tistore-null-58700007762798204_tistore_april22_rsa-cpc-pp-google-ww_en_pur&utm_content=tistore_april22&ds_k=texas+instruments+products&gad_source=1&gclid=EAlalQobChMIIm-	Product Designer, Mechanical Engineer,	Designing the outer casing to ensure protection, good ergonomics, handling and aesthetics. Ensure capability of screw use for proper alignment of screws into casing.

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Keypad membrane (rubber)	https://newenglandkeyboard.com/products/custom-silicone-rubber-keypads/	Product Designer	Ensuring proper connection between keypad and circuit
Battery	https://dakotalithium.com/custom-oem-wholesale-lithium-batteries/?gad_source=1&gclid=Cj0KCQjwmOm3BhC8ARIsAOSbapX9VJmJKhvzANMCAymLYPxSJ9BKxG6bLp4G7A1dX3gSHoJsJwsCEakaAmj3EALw_wcB	Electrical Engineer	Power management and integration of battery with circuit. Choose viable wattage and voltage.
Number LCD Display	https://www.eciscreenprint.com/membrane-switches	Electrical Engineer	Selecting and integrating the correct display type
Processor	https://www.infineon.com/cms/en/	Embedded Systems Engineer	Design/selection of ASIC processor. Ensure proper connection to motherboard. Optimize performance.
Motherboard Connectors	https://www.lapptannehill.com/wire-cable/flat-ribbon-cable	Electrical Engineer	Design and layout of the connectors on the circuit board to the PCB.
Key Sensor (white and black)	https://jnwhiteusa.com/products/membrane-switches/#membrane-switch-constructions	Electrical Engineer, Embedded Systems Engineer	Ensuring the key sensors are functional and responsive
Motherboard (PCB)	https://www.pcbconnectgroup.com/	PCB Designer,	Design of PCB to manage power and connect peripherals to the processor.

In addition to technical engineers / designers, R&D, other departments and roles are necessary for the successful development of the product which are listed below.

Role	Department	Responsibility
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Quality assurance engineer	Quality	Ensuring the calculator meets established quality standards.
Quality control engineer	Quality	Inspecting and testing the product for defects during and after production.
Procurement manager	Procurement	Overseeing the acquisition of goods and services for the company, negotiating contracts, managing supplier relationships.
Purchasing agent	Procurement	Buying products, materials, and services required by the company, often focusing on cost, quality, and timely delivery.
Supply chain manager	Supply Chain Management	Overseeing the end-to-end supply chain process, including procurement, production, and distribution, to ensure efficient and cost-effective operations.
Logistic manager	Supply Chain Management	Coordinating storage, inventory, and transportation of the product.
Marketing manager	Marketing	Developing and executing strategies, positioning, to promote the calculator.
Salesperson	Sales	Selling the product to customers and managing client relationships, creating sales plans and strategies.
Financial Analyst	Finance	Analyzing costs and revenues associated with the product and ensuring profitability.
Customer Service Staff	Customer Service	Collecting customer feedback, addressing customer inquiries and providing support regarding the product.
Project manager	Project Management	Planning, executing, and closing specific projects for the calculator, ensuring they are completed on time, within budget, and to the required quality standards.
Product manager	Product Management	Overseeing the development, launch, and lifecycle of the calculator, including defining its features, managing its development, and driving its success in the market. Staying in contact with the customers.

Key Partners:

- **Manufacturers:** Responsible for assembling the calculator from individual components, manufacturers play a critical role in ensuring the product is built to specification and quality standards. They manage the assembly line, oversee production efficiency, and ensure consistency in delivering a fully functioning product. Reliable manufacturers are essential for scaling production and meeting market demand.

- **Suppliers:** These partners provide the raw materials and key components, such as plastic for the casing, electronic components, and screws. A strong relationship with suppliers ensures a steady supply of high-quality parts at competitive prices, reducing potential delays and cost fluctuations. Collaborating closely with suppliers also allows for better control over material quality and cost efficiency.
- **Distributors:** Distributors handle the logistics of moving parts from suppliers to the manufacturers and ensuring the final product reaches retailers or consumers. They ensure timely delivery and manage warehousing, inventory, and shipping. Effective distribution partners help streamline the supply chain, reducing lead times and ensuring the calculator gets to market on schedule.
- **R&D Teams:** Research and development (R&D) teams focus on improving the product by enhancing features, ensuring user-friendliness, and optimizing the design for functionality and cost. They also work on innovating future versions of the product, keeping it competitive and aligned with customer needs. R&D is essential for keeping the product relevant and maintaining a competitive edge in the market.

Key Activities:

- **Design and Prototyping:** This phase involves creating detailed design models and developing a prototype of the calculator. The design team uses CAD software to ensure the layout of the components is efficient and ergonomic. Prototyping allows for testing different designs, materials, and functions before full-scale production. This step is crucial for identifying potential flaws or improvements, ensuring that the final product is both functional and aesthetically pleasing. Iterative testing during prototyping helps refine the design to meet customer needs and regulatory requirements.
- **Supply Chain Management:** Effective supply chain management ensures that all necessary components, from raw materials to individual parts, are sourced and delivered on time. This involves coordinating with suppliers, managing inventory, and mitigating risks related to delays or shortages. A well-optimized supply chain reduces production costs, shortens lead times, and ensures that manufacturing operations run smoothly. Careful planning and tracking of the supply chain are essential to maintain consistent production flow and prevent bottlenecks.
- **Assembly and Testing:** Once the parts are sourced, they are assembled to form the final product. Assembly involves bringing together all components, such as the casing, buttons, LCD screen, and internal circuitry. After assembly, thorough testing is conducted to ensure the calculator works as intended, meets quality standards, and is free of defects. Testing may include functionality checks, durability testing, and stress testing to ensure the product is ready for market. This process is vital for maintaining high product quality and reliability.
- **Marketing and Distribution:** After production, the focus shifts to marketing the calculator to target customer segments and distributing it effectively. Marketing involves crafting a

compelling brand message, advertising through various channels, and highlighting the product's unique value proposition. This ensures the product reaches the right audience, such as students or professionals. Distribution involves working with logistics partners to deliver the product to retailers, wholesalers, or directly to consumers. Efficient distribution ensures the product is available in the right locations and at the right time to meet customer demand.

Business Model:

To successfully manage this project, we need to fully understand the remaining sections of the Business Model Canvas: **Value Proposition, Customer Segments, Customer Relationships, Revenue Streams, and Cost Structure**. These components are vital in ensuring the calculator's success in the market. The Value Proposition is key because it defines the unique benefits and features the product offers. We must clearly identify what makes this calculator stand out and why customers would choose it over competitors' products. Understanding Customer Segments is essential for targeting the right audience—whether it's students, professionals, or a specific niche—allowing us to tailor the product and marketing strategies accordingly.

Customer Relationships will focus on fostering long-term connections through excellent after-sales support and intuitive, user-friendly design. Maintaining strong relationships ensures customer satisfaction and loyalty. Next, Revenue Streams will involve determining the best pricing models, whether through direct sales or subscription-based approaches, to optimize profitability. Lastly, the Cost Structure will help us ensure that all manufacturing, labor, and distribution expenses are accounted for, allowing the company to balance costs and maintain a healthy profit margin. Together, these elements will provide a solid foundation for the product's development, from initial design to market success.