TEAM 3

Final Report

KriptoTech

TEAM 3
21/12/2010

Mustafa Çağrı İmamoğlu

Mustafa Kantekin

Esat Emre Erdem

Aykut Yıldırım

Okan Çalıkoğlu

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Company Profile

Name of the Company:

KriptoTech

Partners:

Mustafa Çağrı İmamoğlu

Mustafa Kantekin

Esat Emre Erdem

Aykut Yıldırım

Okan Çalıkoğlu

Legal Structure:

Corporation

Headquarters:

Ankara

Description of the Business

KriptoTech is founded in September 2010 and its owners and shareholders are Bilkent University undergraduate students. The main aim of the company is to provide a safe way of transporting the data between electronic devices. The products of KriptoTech are safe USB devices. The detailed description of the product is explained in the production description part.

The legal form of the company is considered by the shareholders as corporation. The reason of constructing the business as a corporation is that in later production stages of the product, the company is going to be in mass production and therefore as a gross company the shares are going to be delivered to the public.

The owners and shareholders of the company are also workers of the company. In later stages of the production additional worker hiring will be in consideration. The shareholders have the necessary technical backgrounds. Each owner of the company is specialized in their skills and has specific tasks in the design, development, production and marketing stages. The responsibilities of the owners are described detailed in the Roles of the Members of Company Management part.

The directors of Software and Hardware are enrolled in mostly the design and production stages of the product and have to work together for long hours. They will report every step and developments

to the CEO. The director of R&D always looks for new technologies therefore he always searches information in terms of reducing the cost of the components and reports the developments directly to the CEO. The director of Sales & Marketing is mainly responsible for the sales of the products and searching the market and he also directly reports to the CEO. Chief Executive Officer is the head and control mechanism of the company. He checks the status and makes the necessary coordination between departments. He controls each stage and steps of the whole production process and checks the necessary marketing strategies and gives feedback to the directors of the departments.

Vision & Mission

Vision

The vision of our company is to sustain each person or company a safe data storing device. By the help of our products people will feel free to use their own USBs and will have no confliction about data transfers and they will be able to use comfortably our products. This will give people their privacy and prevent third party members to reach the data in our products.

Mission

Mission of our company is to produce an easy, high qualified and user friendly device at first step. Later on with the help of advertisement we are planning to introduce our products and teach people to use our products and became a confident brand. After implementing our first success we will make mass production for our products and will become the most trusted, best known company for USB device in this sector.

Organization Plan of the Company

Organization Chart
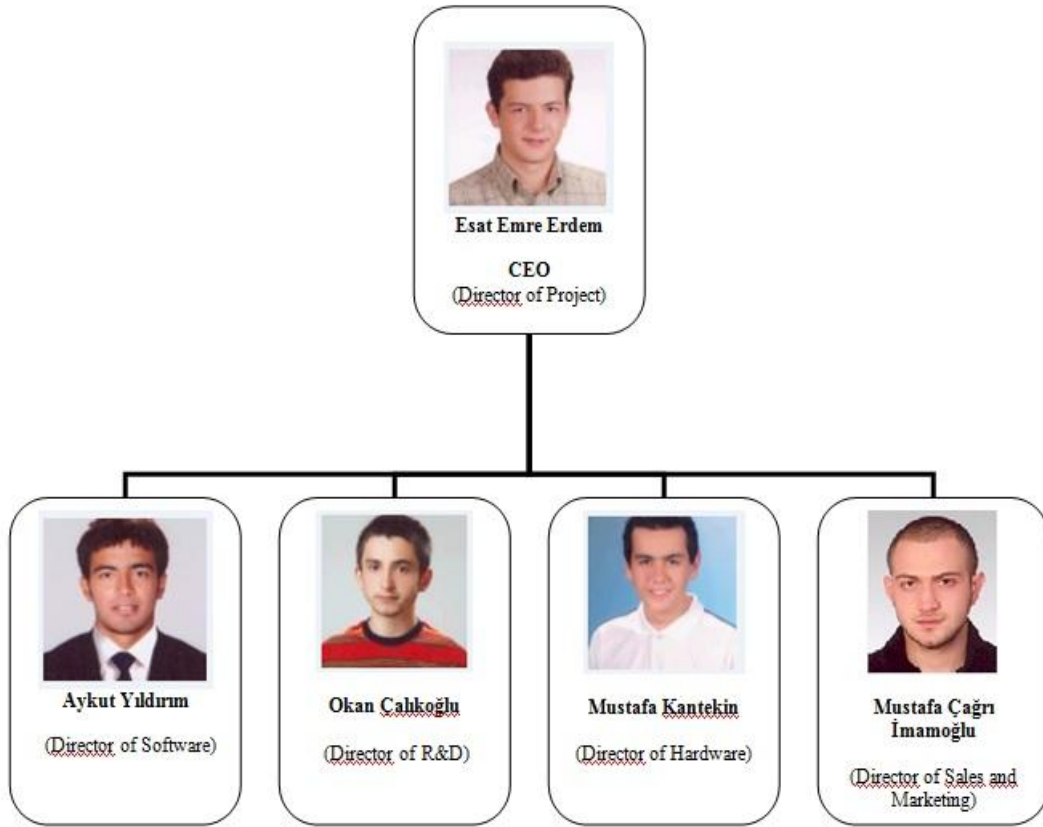
Roles of the Members of Company Management

CEO, Director of Project- Esat Emre Erdem: he has started his education in Bilkent University in 2006, in Industrial Engineering Department. He made his internship in Finansbank at Treasury Department & Moda Timkar Textile Company at Production Department in summer 2009. He is the Chief Executive Officer and Director of Project in the company. He is in the singular organizational position in the company and oversees the departments' operations and takes the necessary strategic decisions for the sake of the company.

Director of Software- Aykut Yıldırım: he has started his education in Bilkent University in 2006, in Electrical and Electronics Department. He made his internship in Selex Communication A.Ş. in 2009 summer in the Production Department. He has worked in NETMON A.Ş. in 2010 summer as a technical support engineer. He is well experienced in the computer skills and takes role in the production stages of the product by using the most appropriate programs, implements the necessary applications in the design stages of the product.

Director of R&D-Okan Çalıkoğlu: he has started his education in Bilkent University in Electrical and Electronics Department in 2006. He made his internship in IBM Turkey at Technical Sales

Department in 2009 summer. He is specialized in the IBM's DB2 products database design. Role of the director of R&D is to make the long term strategic and innovative strategies for the company. He searches for the new technologies to improve the standards of the quality of the product. He is well coordinated with software and hardware departments and observes the manufacturing processes of the product to see if necessary implementations to make.

Director of Hardware-Mustafa Kantekin: he has started his education in Bilkent University in 2006 in Electrical & Electronics Department. He made his internship in ASELSAN at Civil Communication Department in 2009 summer. He is responsible for all the electronic designs of the product and manages the hardware development process from prototype to pre-production stage and coordinates the manufacturing stages of the product. He also considers a cost effective, highly scalable and extendible architectural product in the designing and manufacturing stages.

Director of Sales & Marketing- Mustafa Çağrı İmamoğlu: he has started his education in Bilkent University in 2006 in Industrial Engineering Department. He made his internship in HİDROMEK at Production Department and IBM Turkey at Human Resources Department in 2009 summer and he made internship in MAN at Sales Department in 2010 summer. He is responsible for managing budgets, measuring success and searching for the appropriate market. The responsibilities also include detecting potential customers, managing the customer relationship and developing marketing strategy and planning for the company.

Location

We are planning to locate our head office in Bilkent, in CyberPark. Choosing our office in CyberPark has many advantages to us. As all company stuff is a member of Bilkent University, we will pay less rent, and taxes will also be reduced as the area is supported by government. We will use the benefits of being a member of Bilkent University in Cyberpark and our expenses will be much reduced. KriptoTech is producing safe USB devices and at the first stages of our production part, we are not planning to hire additional workers, the shareholders can maintain necessary work conditions. In later stages of our production part, to satisfy the demand of the orders in the market, we have to make mass production. We are planning to implement our production facility in İstanbul Street, close to the airport. As needed parts may be imported, the transportation of the components cost will be reduced by implementing the facility near airport.

Detailed Description of the Product

KriptoTech's products are safe USB devices. There are various electronic products in all markets however the information and safety of the data is an important issue. Most of the corruptions are occurred when transferring data between electronic devices and USB devices are used commonly in the markets to transfer the data. Our products will keep a safe way to user to transfer their data from one computer to another or between any electronic device and privacy will be highly guarded.

Our company's products are safe and easy to use. The user will enter a password from a keyboard which is implemented to the USB and the result will be shown to the user with LED system which is implemented to the keyboard. When wrong password is entered the system locks itself and USB device does not work in the implemented device so there will be no access to the data inside our products. The data inside the USB is encrypted both before and after using the device.

The components of our product are as follows:

- USB

- Microcontroller

- Keypad

- LED

The main component of our product is USB device. The software of the product will be implemented to the microcontroller component of the product. The keypad is connected to microcontroller and when the user enters the password from the keypad, the result will be shown by the help of LED. This will help user to understand either he entered a correct or wrong password. The working principle of the product is simple but there will be user manuals for the customers to understand the system of the product clearly.

The advantage of using LED system will save space for our product. If an LCD screen were used to display the result of the password instead of the LED system, then an additional space would be required and this would create problems both for producers and for costumers. The cost of LCD would be higher for the producer and big size products would be inefficient for the customers.

The main disadvantage for our product is even though we use LED system, the size of the product will be large and this will create problems for producers in high costs and for customers big size products will keep more space and difficult to use. This may create problem in the beginning however in later stages of production, with the help of new technologies and our R&D department, we are planning to decrease the sizes of the product and produce a more efficient product by the time.

Operational Plan

Our products are designed as combining components of specific products such as microcontroller, USB, LCD/LED, keypad and implementing the electronic design. KriptoTech does not need to purchase any raw material to handle the production processes however these components can be considered as our raw materials. The expenditure budget includes necessary information about needed equipments, costs of the components and initial expenses of the company for the first periods. (Appendix 9)

Inventory planning is important as we have to minimize the costs while maximizing our profits. This can be made by good inventory planning. KriptoTech uses continuous inventory planning techniques and our inventory sizes are planned to hold approximately 5,000 units. In the later stages of the production our company does mass production and in order to prevent from being out-stock, our inventory sizes should be appropriate for our sale levels.

Competitive Analysis

Being competitive and permanent in the market is an issue for the companies to overcome and to be able to success in satisfactory level of sales the competitors in the market should be analysed. In our

research we found out that we have both direct and indirect competitors in the market. To be successful and reach our sales goals in the market we need to search the market detailed and know our competitive companies. This section provides necessary information about our competitive companies' products.

Direct Competitors

- **Tübitak-SIR**

The products of Tübitak is sharing the same concept with KriptoTech, however Tübitak produces SIR for the military purposes and sells its products to NATO. It is known that they have sold approximately 600 products. The targeted market is military based and have no market share in domestic. This is our main advantage as we are considering to sell our product both public and private companies and KriptoTech has no restriction about its market, it can either be domestic or export. We have a broader range of target market compared to SIRs which will give us the advantage to reach more customers and increase our sales. The selling price of the product is not known due to it is used for military purposes and not it is not on sale for end users.

- **Hypertech- DataSafe Encrypt Plus 2GB USB Flash Drive**

Another direct competitor of our products is HyperTech's DataSafe Encryped Flash Drive. Its selling price is € 25.99. Hypertech company is producing encrypted USB devices. The working principle of the products of Hypertech is different from KriptoTech's. The encryption principle takes place on the connected device and a software program is needed to work the system Our main advantage against this product is that our encryption is made twice. First encryption is made during opening the USB device and second encryption takes place when transfering data from electronic device to our USB devices. This way of encrypting data is a very strict way to protect the information during transfers. It is even impossible to break and reach the data with our encryption system. Our products offer a more secured data transfer and

this makes KriptoTech's product advantages when compared to HyperTech's DataSafe Encrypted USBs.

- ▪ **USB Encryptor Program**

There are various encryption programs for USBs and according to our searches we found out that their prices changes between $19.90 up to $69.95 in the market.This program is software which is considered for the users that use stationary devices such as PCs. The disadvantage of this program is that user need to install the software to the device which he wants to use and this will take place for each electronic device that he wants to encrypt. It is an inefficient way to use and our products are much faster and practical when compared to these programs. Its encryption system is weaker according to KriptoTech's products. Our main advantage against this software is our products are much more practical and provides stronger protection.

Indirect Competitors

- ▪ <u>**Cell phones**</u>

There are various cell phone brands in the market and some of their products use encryption systems. These cell phones prices changes between 300TL-1500TL.New cell phones such as BlackBerries use encrypted messaging system between its products. User can encrypt the data in these products however, the products are multifunctional and designed for many purposes, and to keep a safe information, buying these products will cost too much to the customers.The main disadvantage of these cell phones is that higher prices, weak encryption when compared to KriptoTech's USB devices. Therefore our products are much cheaper and efficient for the customers that want to use it for the purpose of encryption.

Market & Industry Analysis

As our product is a new and not known product the most important part is to introduce people and companies our products, so advertising is a very important issue at the first stages of development.

In domestic market only Tübitak produces encrypted USB devices but its target market is not domestic and it sells its products to military based organization which gives advantage to our company. Our main target is domestic and we do not have any serious competitor in domestic market so this will give our company to grow faster. KriptoTech has no constraints to selling its products to a one type of customers. Our products are produced for all kinds of customers such as military, private organizations, government and public. This large range of customer profile will give the advantage of producing more and reach our goals faster. After being a well known and trusted brand, KriptoTech's future planning is to sell its product export and work with companies rather than public.

The main disadvantage in domestic market is that illegal usage of products. As people may try to find the product in corsair market and this act will reduce the sales of our products. Being a high qualified product producer company, trusted and well known in both domestic and export market are our main goals. Producing the highest qualified products in the lowest price will be our prior considerations.

SWOT Analysis

Strengths

Our company has no direct competitor in the market as it is a new product and this will give the advantage of being long cycled and permanent in the market.

Cost of producing our product is not expensive and in the mass production stages, unit production cost will be much lesser.

The shareholders of the company are well educated and they have strong educational background. This will give necessary skills to manage the company and handle the difficulties.

Being unique in the market gives the chance to dominate the market and will help to set the selling prices to serve for the company's own ends.

Weaknesses:

Even if the shareholders have strong backgrounds they are inexperienced in the business life and company management. It will take time to have the necessary work skills and transform the company to a well developed professional structure.

The production and making the standardization of the product will take time. Strong R&D is needed to improve our product. The size of the product should be small to give an easy use to the customer and we need to develop continuously our product to satisfy the customer demand and become permanent in the market.

In Turkey illegal usage is very common and people are not well educated at using the original products. Instead of buying the qualified products they may prefer to search in the corsair market for it. This is a big threat to the company and may affect the profits seriously.

Opportunities:

As our products are electronically designed and implemented, technologic improvements and developments will give the opportunity to reduce the costs of manufacturing. It will help the company to increase its profits.

Threats:

As it is a new product customers will be suspicious about trusting our product so at this point good advertising strategy is important.

Target Market

Market Research

Our main reason to produce an encrypted product is the necessity of security of technological devices. In many companies IT department plays the key role and safe data transfers are very important issue. Due to loss data which is caused by hackers, many companies' important information is lost. Those loss data damages companies' reputation, their sales and market share.

Encryption technology is a very strong and safe way to protect the data and gives the advantage of companies to protect their information from third party people and by this technology unauthorized people can't access to these important data.

In researches market for the encrypted technology is growing rapidly. The Economic Strategy Institute in Washington D.C. claims that the growth in the years 1998-2002 is close to 60 percent per year. This shows us that the market has a growing and high potential and in the future by its high potential it will even be more important.

The idea for producing an encrypted product has rose from the necessity of companies' security considerations. Our aim is to be permanent and well known brand in the future with our products.

Customer Profile

- **People who need the security information:** This customer type includes any kind of people who needs to protect their data storage strongly. It includes college students, as it will keep the data secret for their term projects and homework and that helps in a way to avoid plagiarism, company employees, as their important data would be keep secret, project managers as some important financial and statistical data would be protected with our highly protected encrypted devices.

- **Private Sector Companies:** Being competitive and stable in the private market sector is very difficult and challenging. As a result of this competitiveness companies should keep some of their important data secret such as employee wages, R&D developments and internal company projects.

- **Government Agencies:** Some government sectors need high security protected data and have very strict rules about keeping the information secret. Our products satisfy the demand of this sector by providing high technologic and secured devices.

- **Military Organizations:** As a competitor for our company, Tübitak produce and sells it encrypted USB devices products to a military organization which is NATO. In the following years, KriptoTech aims to sell its products to military services as Tübitak makes.Being trusted company and working with military organizations will give benefits of keeping constant sales so this will lead to increase the revenues of our firm.

Buying Decisions

Kriptotech company has a broad range of customer profile such as companies, military organizations and public. %5 of our revenues is reserved for our promotional budget. Customers can see our products through our advertisements and purchase them directly or from retailers. Our delivery to our customers is made by hand at the first months especially to reduce the costs, and at later stages sales are made by the delivery channels such as retailers and customers can purchase our products from the retailers instead of purchasing directly from our company. Customers can either pay cash or by credit card and our Sales Department controls and follows the buying decisions periodically.

Control levels of sales and inventory of our products is made continuously, as our products have high level of importance, inventory level controls is important as costs of being out stock will affect the revenues and damage the reputation of our company.

Product Design

Flash Memory Chip Unit:
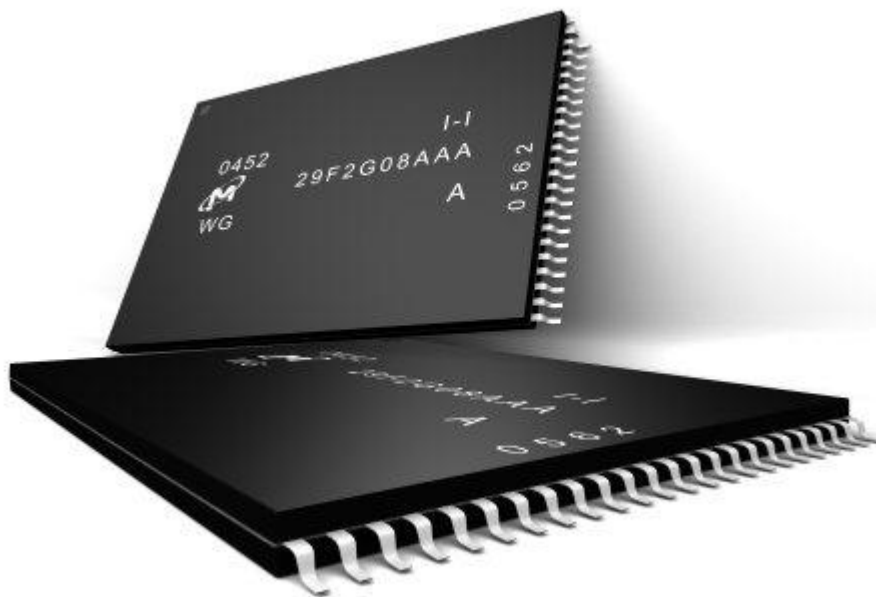
This Unit is the Mass Storage Unit of our safe USB design. It is a specific type of EEPROM (electrically erasable programmable read-only memory) that is erased and programmed. This Unit is connected and controlled by the microcontroller with I2C BUS interface. For this interface, only two bus lines are required; a serial data line (SDA) and a serial clock line (SCL). Each device connected to the bus is being software addressable. Therefore, our mass storage unit is also software addressible

for data storage and control. There will be a data flow speed upto 1Mb/sec by the help of this interface.

- **Data Storage Capacity** :It will be as the used USB(2GB/4GB/8GB/16GB etc..)
- **Access Control**: Password protected unit as user defined keyword consits of numbers.
- **Power Supply**: 3.3-5 V USB (powered from the USB connected host device)
- **Operating Temperature Range**: +0°C and +70°C
- **Storage Temperature Between Range:** -20°C and +65°C
- **Relative Humidity:** Between 10% and 90% relative humidity at 40°C

PIC18F2550 MICROCONTROLLER:
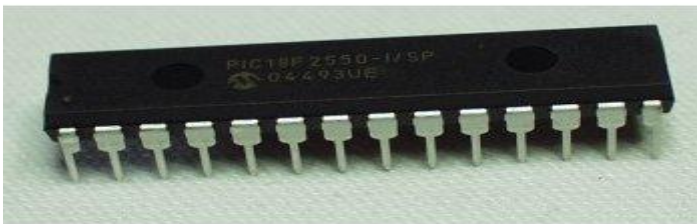
This microcontroller is commonly used in controlling some EEPROMs like the ones we intend to use like above. This microcontroller has the speciality of full speed USB 2.0 communication interface. There is I2C BUS serial communication interface between this microcontroller and the Flash Memory Chip (Data Storage Unit). We will control the data flow to and from the Flash Memory Chip and PC with the help of this microcontroller. In addition to these specifications, we will also control the password that is entered from the keypad with the help of this microcontroller. This password will consist of numbers and it will be kept in this microcontroller's memory. The user will have 3 chance of password entrance. If the user cannot enter the password correctly in the range of password entrance limits, the device will be locked and cannot be reachable for the user.

For the prototype design of our device, we will just use the microcontroller's memory as the Mass Storage Unit. It will be approximately 4 KB. For the development process, we intend to add the Flash Memory Chip to our microcontroller with the I2C BUS communication interface and we will try to use this Flash Memory Chip as the Mass Storage Unit for our USB device.

KEYPAD:

We will be using the keypad like above for the password entrance. This keypad has 4X3 matrix design for the keys. Therefore, we will have 4X3 matrix algorithm that will describe the keys to the microcontroller as software module. While the password entrance is being done, there will be a trible-led unit mode which will show the underlying process. The password will be kept in our microcontroller's memory and it will not be reachable for outer interference.

- **Operating Voltage:** 3.3-5 Vdc scale
- **Current Draw:** Average 5mA,
- **Operating Temperature:** -20~+70°C
- **Ambient Humidity:** 5~95% relative humidity non-condensing

OTHER COMPONENTS AND MECHANICAL PARTS:

- **LEDS:**   We will be using three different colored leds for password entrance process.

  Red LED works approximately at 1,8V and 15mA
  Yellow LED works approximately at 2V and 15mA
  Green LED works approximately at 2,2V and 15mA

  As it seen above, they works at the same range of current flow, but they need different levels of voltage supplies to work properly. They will be controlled with the proper connections of the microcontroller's pins and they will act according to the software regulations.
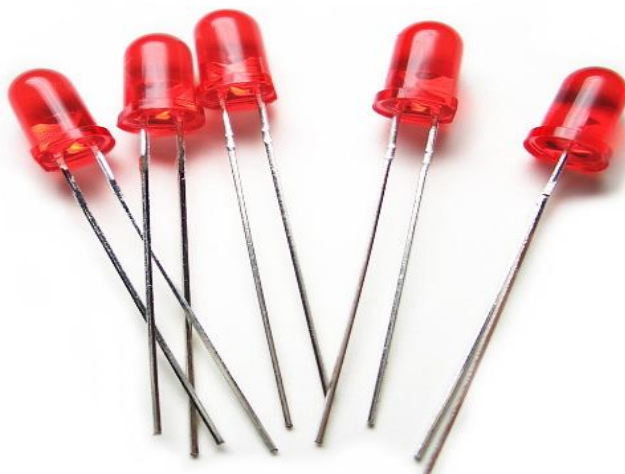
- **USB CONNECTOR:** We will be using the USB female standard A type USB connector like below for our device. Since the connection of PCs to the USB devices is the one like below, we choose to use it. The pin configuration of the connector is like below.

Standard A type   standard B type

Pin	Name	Description
1	VBUS	+5 VDC
2	D-	Data -
3	D+	Data +
4	GND	Ground
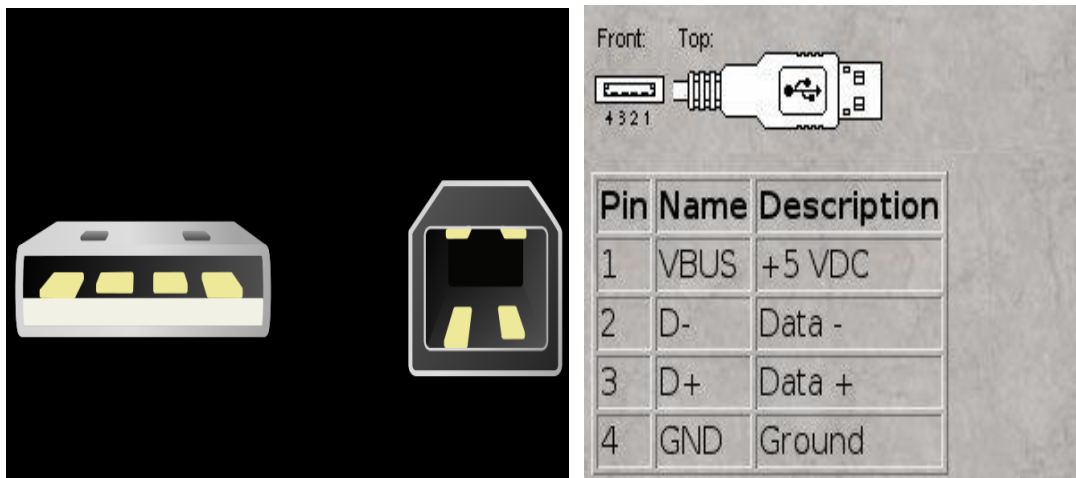
- **PERIPHERAL COMPONENTS OF MICROCONTROLLER:**
  There will be 20 MHz Crystal oscillator, 10 pF and 470 nF capacitors, resistors related to leds load.

Product Tree
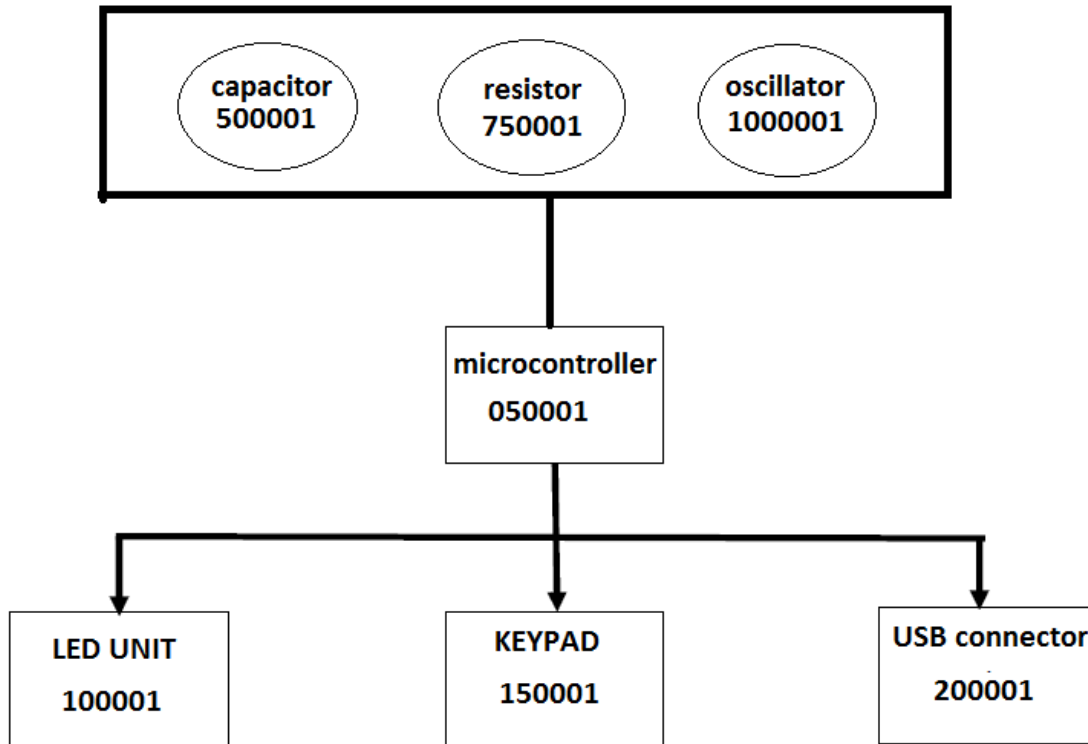
PRODUCT DEFINITION

Our product is a secure type data storage mass unit. We will mainly design a cryptographic data storage unit. It definitely will have a security unit consist of a keypad, LCD user interface and a USB. In today's world, as the technology improves rapidly, there occurs a crucial problem about the

accessibility of the secret information. We intend to serve to these types of environments who should have a security for their data storage. There will be also our main microcontroller unit which is the main control unit for all operations such as password storage, encryption-decryption,data flow in our project.

TECHNICAL SPECIFICATION

Data Storage Capacity :It will be as the used USB(2GB/4GB/8GB/16GB etc..)

Access Control: Password protected unit as user defined keyword consits of numbers.

Encryption: offline encryption mode will be used in this project.

Code &Algorithms: It will support one of 256 -bit AES, RSA,DES,RSA, blowfish encryption algorithms. C programming language will be used in project.

Operating Systems: It will support as the support of the used USB such as below;

• Supports : Windows-7,Windows VISTA, Windows XP / 2000 / Me / 98 / 98SE,

MacOS 9.x,

User Interface: 12-key plastic keypad, LCD display unit

Interfaces supported: USB 2.0

Dimensions(WxDxH): 110 x120 x 25 mm

Weight: 120 g (+-10g)

Power Supply: 5 V USB (powered from the USB connected host device)

Power Consumption: will be less than 2.5W

Operating Temperature Range: +0°C and +50°C

Storage Temperature Between Range: -20°C and +65°C

Relative Humidity: Between 10% and 90% relative humidity at 40°C

As the safety,it should be away from water because it is not water resistant, the lithium battery must be away from fire or it shouldn't be damaged seriously. The unit should be kept away from the childrens since it could give damage with improper usage by them. Sice it works with 5v voltage scale, it shouldn't be exposed to high voltage supplies since it damages the electronic components.

QUALITY FUNCTIONAL DEPLOYMENT(QFD)

QFD is a supporting decision and planning tool that provide very effective information about designing quality into the product or service with the customers help. Besides, QFD is an analysis of the correlations between product requirements and customer requirements.

There are some crucial components in QFD. To build a success and complete QFD they are prepared properly. Therefore we should explain what they are and how it affects.

House of Quality:

There are 3 important concepts in house of quality and these are customer requirements, specification target values and the relationship between these two concepts.
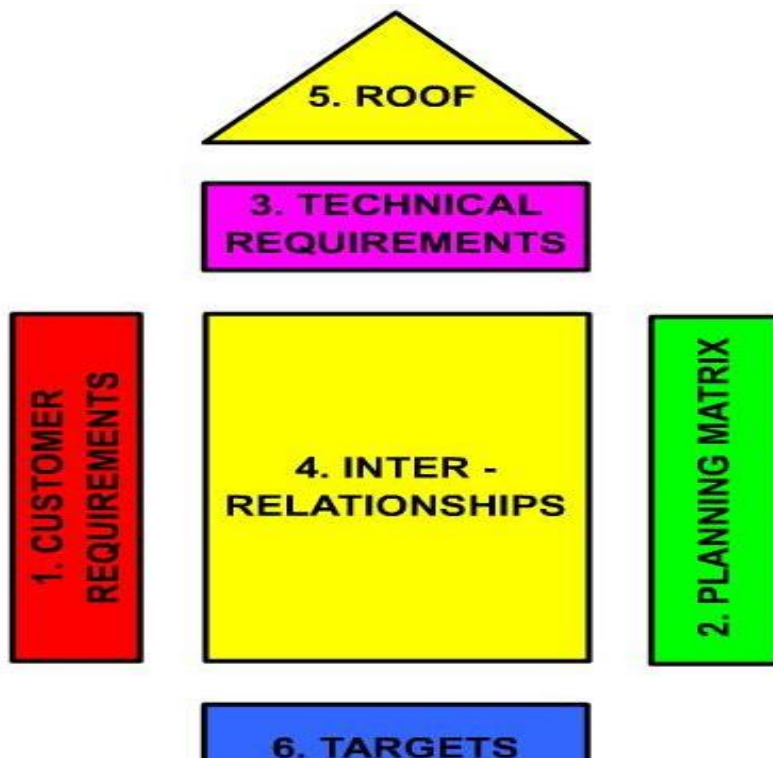
Figure 1.1

In our QFD the customer requirements part is below.

Customer Requirements	
Low Price	4
High Durability	3
High Security	3
Available Capacities	5
Quality Certification	2
Ergonomics	4

Figure 1.2

The numbers shows the customer importance rating for customer requirements. This is the starting point of developing a complete and good QFD.

Another concept is specification target values or product requirements. The figure below shows the relationship between customer requirements and product specifications.
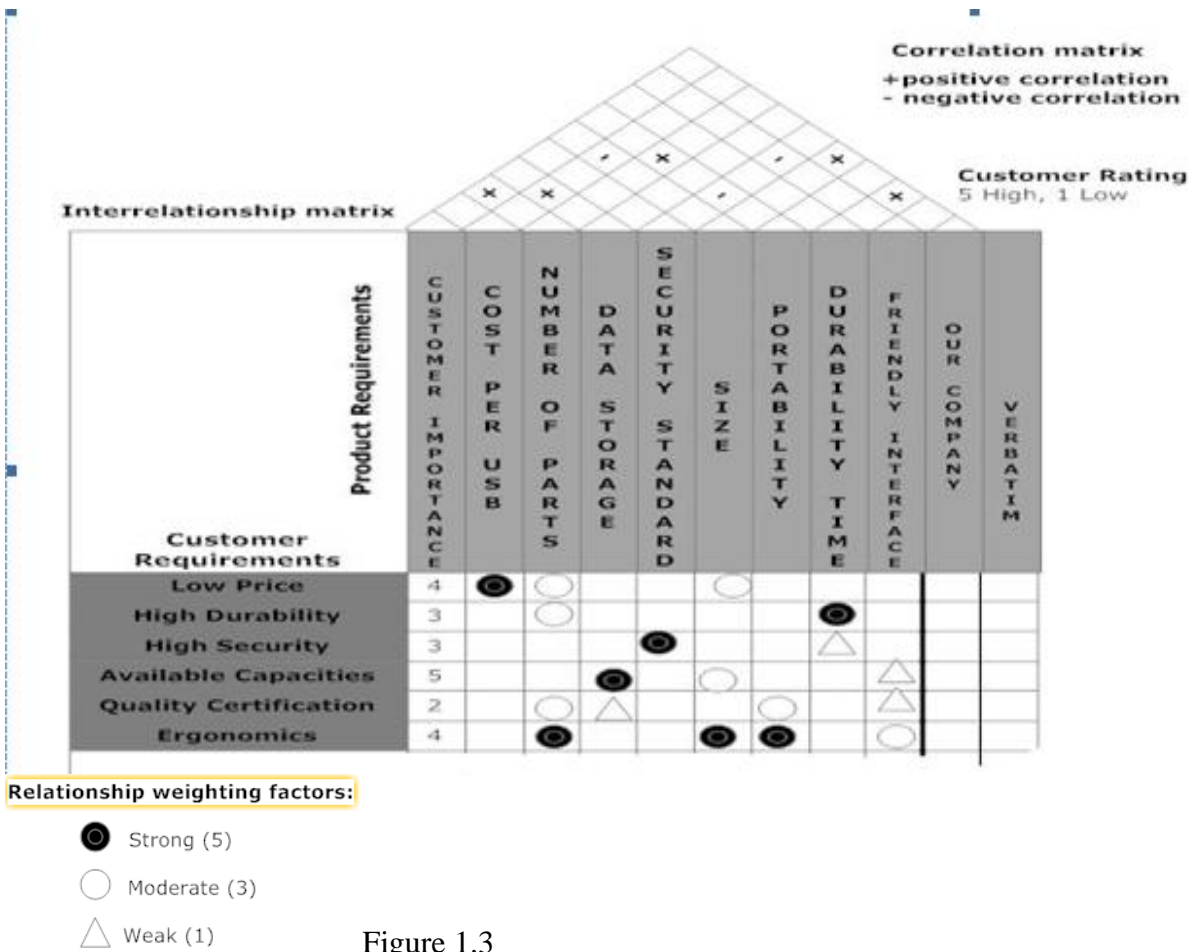
Figure 1.3

In previous figures, we observed that the customer needs and importance ranking from the customers perspective. Besides, the functional requirements are defined. Then, these two concepts are combined with the correlation importance. The Last but the least step is to view correlation between every requirement is either positive or negative. Therefore, the product is planned by helping Quality Functional Deployment (QFD). With the QFD, we can make decisions properly with not only the helping customers and their needs   but also we can also design quality into the product.

Development Plan of Project

Gant Chart-1

	Task Name	Duration	Start	Finish	Predec
1	⊟ Ge 401 Project-Team 3	150 days	Tue 21.09.10	Mon 18.04.11	
2	Prepare Team and proposal of the project	1 day	Tue 21.09.10	Tue 21.09.10	
3	Shared Job Division	1 day	Wed 22.09.10	Wed 22.09.10	2
4	⊟ Institutional Work	37 days	Fri 24.09.10	Tue 16.11.10	3
5	Determine Company Name	0 days	Fri 24.09.10	Fri 24.09.10	2
6	Design of Logo	0 days	Fri 24.09.10	Fri 24.09.10	5
7	Prepare Organizational Plan	2 days	Mon 08.11.10	Tue 09.11.10	2
8	Submission of Organizational Plan	0 days	Tue 09.11.10	Tue 09.11.10	
9	Deliver Corporate Identity	0 days	Tue 16.11.10	Tue 16.11.10	7
10	⊟ Research on possible technologies	12 days	Thu 23.09.10	Fri 08.10.10	2
11	Consulting Dr.Ali Selçuk Aydın	1 day	Thu 23.09.10	Thu 23.09.10	
12	Consulting Senior Lecturer Tarık Reyhan	1 day	Fri 24.09.10	Fri 24.09.10	2
13	Internet Research	2 days	Mon 27.09.10	Tue 28.09.10	12
14	Vendor Research	2 days	Wed 29.09.10	Thu 30.09.10	13
15	Order Required Components	6 days	Fri 01.10.10	Fri 08.10.10	14
16	⊟ Product Documentation and Testing	140 days	Tue 05.10.10	Mon 18.04.11	
17	Prepare HW block diagram and SW flowch	3 days	Mon 11.10.10	Wed 13.10.10	13;15
18	Submit HW block diagram and SW flowcha	0 days	Tue 05.10.10	Tue 05.10.10	
19	Prepare Literature Survey and Competition	3 days	Fri 08.10.10	Tue 12.10.10	13;14
20	Prepare Resubmit Literature survey and c	4 days	Wed 13.10.10	Mon 18.10.10	19
21	Submit Final draft of Literature Survey and	0 days	Tue 19.10.10	Tue 19.10.10	
22	Prepare Product Definition	3 days	Fri 22.10.10	Tue 26.10.10	21
23	Submission of Product Definition	0 days	Tue 26.10.10	Tue 26.10.10	
24	Prepare Preliminary Presentation	2 days	Mon 01.11.10	Tue 02.11.10	22
25	Prepare Product Specification and Prelimin	2 days	Mon 08.11.10	Tue 09.11.10	23
26	Submission of Product Specification and P	0 days	Tue 09.11.10	Tue 09.11.10	
27	Prepare Subassembly Specification Repor	2 days	Mon 22.11.10	Tue 23.11.10	26

Gant Chart-2

	Task Name	Duration	Start	Finish	Predec	Gantt
27	Prepare Subassembly Specification Repor	2 days	Mon 22.11.10	Tue 23.11.10	26	100%
28	Prepare Sofware Module and Task Specif	2 days	Mon 29.11.10	Tue 30.11.10	26	100%
29	Submission Software Module and Task Sp	0 days	Tue 30.11.10	Tue 30.11.10		30.11
30	⊟ Web Page Design	2 days	Fri 24.12.10	Mon 27.12.10		
31	Prepare Content	1 day	Fri 24.12.10	Fri 24.12.10	4	
32	Coding the pages	1 day	Mon 27.12.10	Mon 27.12.10	31	
33	⊟ Business and Marketing Report	116 days	Mon 08.11.10	Mon 18.04.11		
34	Prepare Marketing Plan	2 days	Mon 29.11.10	Tue 30.11.10		100%
35	Submission of Marketing Plan	0 days	Tue 30.11.10	Tue 30.11.10	34	30.11
36	Prepare of Expenditure Plan	2 days	Mon 08.11.10	Tue 09.11.10	22	100%
37	Submission of Expenditure Plan	0 days	Tue 09.11.10	Tue 09.11.10		09.11
38	Prepare Development Plan	2 days	Mon 13.12.10	Tue 14.12.10	37;29;2	100%
39	Submission of Development Plan	0 days	Tue 14.12.10	Tue 14.12.10		14.12
40	Prepare Final Business Report	2 days	Mon 20.12.10	Tue 21.12.10	39;37;2	
41	Submission of Final Business Report	0 days	Tue 21.12.10	Tue 21.12.10		
42	Prepare Product Definition including QF	2 days	Mon 20.12.10	Tue 21.12.10	23	
43	Submission Product Definition including	0 days	Tue 21.12.10	Tue 21.12.10		
44	Prepare Final Presentation	2 days	Mon 27.12.10	Tue 28.12.10	43;29	
45	Final Presentation	0 days	Tue 28.12.10	Tue 28.12.10		
46	Prototype Demonstration	0 days	Wed 29.12.10	Wed 29.12.10	45	
47	Enter the stock market	5 days	Tue 12.04.11	Mon 18.04.11	46	

Gant Chart-3

	Task Name	Duration	Start	Finish	Predec
27	Prepare Subassembly Specification Repor	2 days	Mon 22.11.10	Tue 23.11.10	26
28	Prepare Sofware Module and Task Specif	2 days	Mon 29.11.10	Tue 30.11.10	26
29	Submission Software Module and Task Sp	0 days	Tue 30.11.10	Tue 30.11.10	
30	⊟ Web Page Design	2 days	Fri 24.12.10	Mon 27.12.10	
31	Prepare Content	1 day	Fri 24.12.10	Fri 24.12.10	4
32	Coding the pages	1 day	Mon 27.12.10	Mon 27.12.10	31
33	⊟ Business and Marketing Report	116 days	Mon 08.11.10	Mon 18.04.11	
34	Prepare Marketing Plan	2 days	Mon 29.11.10	Tue 30.11.10	
35	Submission of Marketing Plan	0 days	Tue 30.11.10	Tue 30.11.10	34
36	Prepare of Expenditure Plan	2 days	Mon 08.11.10	Tue 09.11.10	22
37	Submission of Expenditure Plan	0 days	Tue 09.11.10	Tue 09.11.10	
38	Prepare Development Plan	2 days	Mon 13.12.10	Tue 14.12.10	37;29;2
39	Submission of Development Plan	0 days	Tue 14.12.10	Tue 14.12.10	
40	Prepare Final Business Report	2 days	Mon 20.12.10	Tue 21.12.10	39;37;2
41	Submission of Final Business Report	0 days	Tue 21.12.10	Tue 21.12.10	
42	Prepare Product Definition including QF	2 days	Mon 20.12.10	Tue 21.12.10	23
43	Submission Product Definition including	0 days	Tue 21.12.10	Tue 21.12.10	
44	Prepare Final Presentation	2 days	Mon 27.12.10	Tue 28.12.10	43;29
45	Final Presentation	0 days	Tue 28.12.10	Tue 28.12.10	
46	Prototype Demonstration	0 days	Wed 29.12.10	Wed 29.12.10	45
47	Enter the stock market	5 days	Tue 12.04.11	Mon 18.04.11	46

Gant Chart-4

	Task Name	Duration	Start	Finish	Predec
27	P... cification Repor	2 days	Mon 22.11.10	Tue 23.11.10	26
28	Prepare Sofware Module and Task Specif	2 days	Mon 29.11.10	Tue 30.11.10	26
29	Submission Software Module and Task Sp	0 days	Tue 30.11.10	Tue 30.11.10	
30	⊟ Web Page Design	2 days	Fri 24.12.10	Mon 27.12.10	
31	Prepare Content	1 day	Fri 24.12.10	Fri 24.12.10	4
32	Coding the pages	1 day	Mon 27.12.10	Mon 27.12.10	31
33	⊟ Business and Marketing Report	116 days	Mon 08.11.10	Mon 18.04.11	
34	Prepare Marketing Plan	2 days	Mon 29.11.10	Tue 30.11.10	
35	Submission of Marketing Plan	0 days	Tue 30.11.10	Tue 30.11.10	34
36	Prepare of Expenditure Plan	2 days	Mon 08.11.10	Tue 09.11.10	22
37	Submission of Expenditure Plan	0 days	Tue 09.11.10	Tue 09.11.10	
38	Prepare Development Plan	2 days	Mon 13.12.10	Tue 14.12.10	37;29;
39	Submission of Development Plan	0 days	Tue 14.12.10	Tue 14.12.10	
40	Prepare Final Business Report	2 days	Mon 20.12.10	Tue 21.12.10	39;37;
41	Submission of Final Business Report	0 days	Tue 21.12.10	Tue 21.12.10	
42	Prepare Product Definition including QF	2 days	Mon 20.12.10	Tue 21.12.10	23
43	Submission Product Definition including	0 days	Tue 21.12.10	Tue 21.12.10	
44	Prepare Final Presentation	2 days	Mon 27.12.10	Tue 28.12.10	43;29
45	Final Presentation	0 days	Tue 28.12.10	Tue 28.12.10	
46	Prototype Demonstration	0 days	Wed 29.12.10	Wed 29.12.10	45
47	Enter the stock market	5 days	Tue 12.04.11	Mon 18.04.11	46

Task Name (Name)
Help on Name

Distribution Channels

There are various ways to distribute products to customers to satisfy their demand. Direct sales, using retailers, wholesalers and multi-channeling are some ways to distribute the products. Each way

includes their advantages and disadvantages. For a small startup company the most beneficial way for our sale strategy is to direct sales as it will reduce the costs and help our firm during the growth process. The sales will be made directly to customer by the Sales Department and by our own force, we are not planning to hire additional employee for sales in the beginning period of our production. As our prior target is domestic we can consider our first level of sales as local, however in the future period of our production level we will consider global sales rather than domestic.

In the future periods of our production level, in order to increase our sale region, we are considering to hiring an agent or a broker. The agent will give the benefit to expand our business into global market and will sell our products to retailers, customers and wholesalers. The agent will take a specified commission per products he sells and this will help our company to reach more markets rather than local ones.

Our sales can also be made through our website. This is a cheap way of reaching more customers and internet will be beneficial to customers to view our products and having the chance to observe our encrypted USB devices. The internet will serve our firm both nationally and globally, however at the first periods of our production it will serve us in domestic market and by the growth of our company, international sales will also be made.

Promotion

Promotion strategy is an important factor in order to introduce our products to the market. There are many ways that a company can follow to make its promotional business strategy. For the new start up businesses spending less budget on the advertisement is beneficial to increase the revenues however in the following years more budget can be spend on promotions.

Our first consideration is to use direct response to advertising such as using internet source by using mailers which tell people about our company and products. This will cost less and an effective way of reaching more people.

In the following years we are planning to use media advertising such as newspapers, television and magazines which will cost more however it the most effective way to introduce products into the market. The budget for mass media costs high in order to mailing system however it helps out to grow larger and reaching more people and companies. The promotional budget in the following years is expected to be %5 of our revenues.

Revenue Model

As a new company during first year our aim is to begin selling 350 products for the first **month** and increase the sales by %4 each month thereafter. Their selling price will be set initially to 349 TL for each. Generally we are expecting total revenue of 1,835,402 TL at the end of the year 2011.

For year 2012 our plan is to increase unit sales by %4 for each **month** as we start with selling 560 products in the first month of this year. We expect 3.176.172 TL revenue from sales at the end of this year.

For the year 2013 we start by selling 897 products from January and expect revenue of 5.364.838 TL at the end of this year.

In year 2014 we start by selling 1.436 products for the first **month** and expect revenue of 9.018.742 TL at the end.

In year 2015 we start by selling 2.300 products for the first **month** and we expect 15.089.064 TL revenue at the end of this year.

The cost of our products will increase by inflation rate **every year** and the inflation rate is determined by looking at the inflation rates of the Central Bank for each year. Our revenue model and budget sales from the year 2011 to 2015 are given in detail in Appendix 3.

Financial Projections

We analyzed and give in detail our financial analysis for the income statement on monthly basis for the first two years and summarized it for the five years annually. Our assumptions for the inflation rates were based on Central Bank's inflation rates. All the assumptions for ratios, profitability analysis, break-even analysis are described in detail and stated clearly in our Appendix-4. All the financial statements, analysis and charts are given in the appendices from 5-8
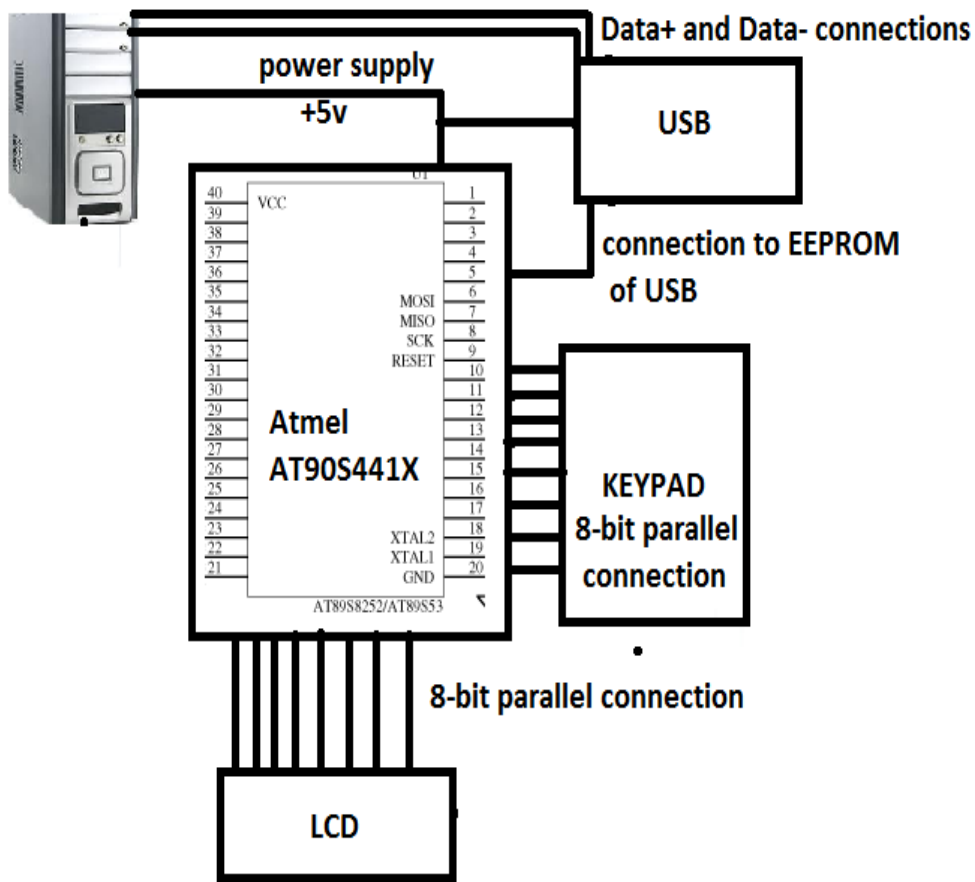
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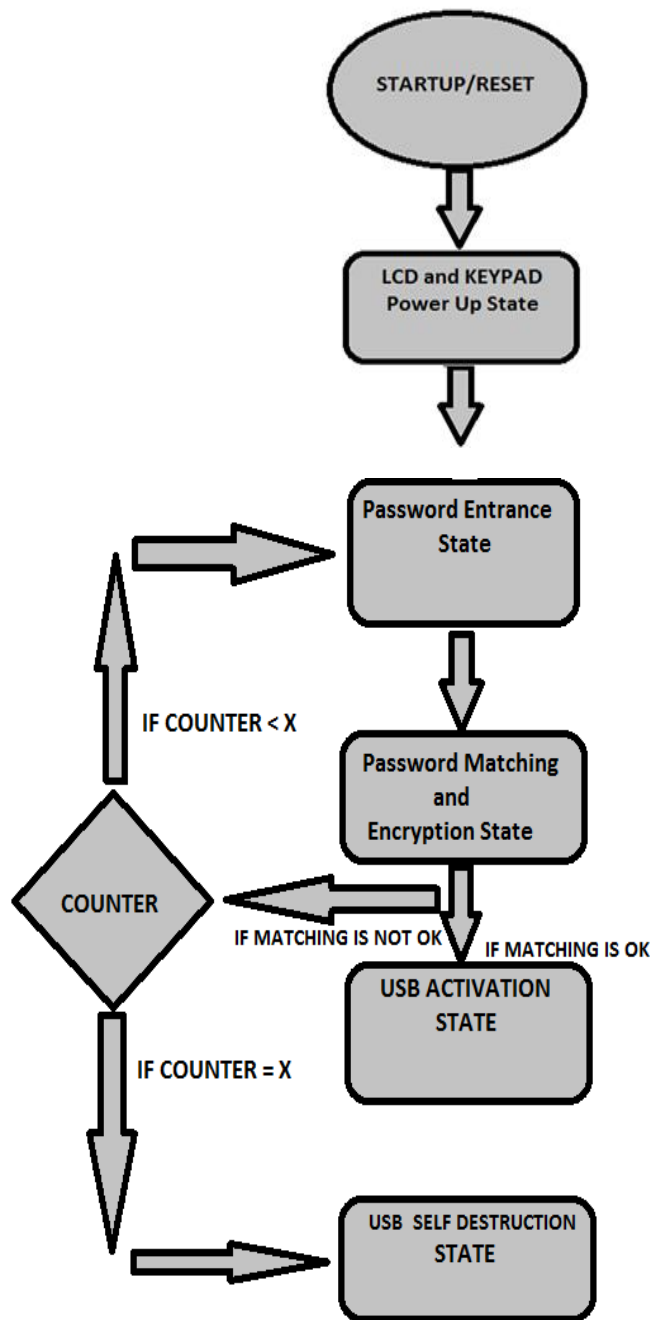
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Appendices

Appendix-1

Block Diagram Prototype of Our Products

Appendix-2

Flow Chart for the Prototype Algorithmic Design

Appendix-3

2011 SALES BUDGET

MONTHS	January	February	March	April	May	June	July	August	September	October	November	December		
													Growth	4%
QUANTITY	350	364	379	394	409	426	443	461	479	498	518	539	Price per unit	349 TL
													Cost per unit	308 TL
													Inflation rate	6,50%
													Mark-Up Ratio	15,00%

2012 SALES BUDGET

MONTHS	January	February	March	April	May	June	July	August	September	October	November	December		
													Growth	4%
QUANTITY	560	583	606	630	656	682	709	737	767	798	829	863	Price per unit	377 TL
													Cost per unit	328 TL
													Inflation rate	5,50%

2013 SALES BUDGET

MONTHS	January	February	March	April	May	June	July	August	September	October	November	December		
													Growth	4%
QUANTITY	897	933	970	1.009	1.050	1.092	1.135	1.181	1.228	1.277	1.328	1.381	Price per unit	398 TL
SALES	357.042 TL	371.323	386.176	401.623	417.688	434.396	451.772	469.842	488.636	508.182	528.509	549.649	Cost per unit	346 TL
COGS	310.471 TL	322.890	335.805	349.238	363.207	377.735	392.845	408.559	424.901	441.897	459.573	477.956	Inflation rate	5,00%

2014 SALES BUDGET

MONTHS	January	February	March	April	May	June	July	August	September	October	November	December		
													Growth	4%
QUANTITY	1.436	1.494	1.554	1.616	1.680	1.748	1.817	1.890	1.966	2.044	2.126	2.211	Price per unit	418 TL
SALES	600.217 TL	624.226	649.195	675.162	702.169	730.256	759.466	789.844	821.438	854.296	888.468	924.006	Cost per unit	363 TL
COGS	521.928 TL	542.805	564.517	587.098	610.582	635.005	660.405	686.821	714.294	742.866	772.580	803.484	Inflation rate	4,50%

2015 SALES BUDGET

MONTHS	January	February	March	April	May	June	July	August	September	October	November	December		
													Growth	4%
QUANTITY	2.300	2.392	2.487	2.587	2.690	2.798	2.910	3.026	3.147	3.273	3.404	3.540	Price per unit	437 TL
SALES	1.004.210 TL	1.044.378	1.086.154	1.129.600	1.174.784	1.221.775	1.270.646	1.321.472	1.374.331	1.429.304	1.486.476	1.545.935	Cost per unit	380 TL
COGS	873.226 TL	908.155	944.481	982.261	1.021.551	1.062.413	1.104.910	1.149.106	1.195.070	1.242.873	1.292.588	1.344.291	Inflation rate	4,00%

Appendix 4
ASSUMPTIONS

1. **Sales:** We start selling 350 units in January 2011 and that amount will increase by 4% **each month** and thereafter. For year 2011, the budgeted sales data is shown in Excel file. The selling price is set by 349TL per unit initially and we determined a mark-up ratio of 15% so that we can get a sustainable growth pattern. We will start applying this ratio in 2012 and will go on so forth.

2. **COGS:** The product normally costs us 308TL but we need to pay 150TL for logo design only one time, therefore cost of the product is reflected as 458TL in January 2011 budget and then it will be turned out to normal cost of 308TL for the following months. The cost of the product will increase by inflation rate **every year**, which is announced by Central Bank as 6.5% in 2010; 5.5% in 2011, 5% in 2012, 4.5% in 2013 and 4% in 2014, because purchasing

raw materials and some manufacturing overhead costs depend on the price movements caused by inflation. So, we will increase the price carefully based on our mark-up ratio that is 15% above the cost.

3. **Operating Expenses:** We have two types of operating expenses such as Selling &Marketing and General& Administrative expenses. In each category we specified the related expenses that we will have to spend for it.

   - **Salary:** Salary expenses consist of the payroll related expenditures paid to the employees. Since we are a young start-up company we do not need many workers at first sight. However, as the production level increases we will raise the number of employees. We plan to hire people for administrative and sales departments. They approximately will cost us 5.000TL per month for the year 2011. We expect that salary expenses will **increase by 5% each year** as long as we recruit people to our company.

   - **Advertising:** Marketing is very important for all companies and hence we are thinking of doing this by advertising. We will use press, billboards and also Internet sites for advertising and we will spend **5% of each month's revenue** for it.

   - **Rent, Utility and Depreciation:** To operate our business appropriately we will rent a building that costs 3.000TL each month. We calculated our average utility expenses that consist of electricity, water, gas and other bills as 4.000TL each month. We have some fixed assets such as equipment, vehicles and fixtures & furniture and that are all subject to depreciation expense. We use Straight Line Method for all fixed assets and simply reflect 2.500TL depreciation expense each month. All these three costs are classified as fixed costs.

4. **Interest Expense:** We, as 5 partners, have contributed 20.000TL each for this business. Since this amount is not enough for our operation we decided to use financial leverage by borrowing 100.000TL as a long term loan that matures for 5 years from a bank which charges 0.85% monthly interest rate. We calculated our monthly payment as 2135TL using PV formula.

5. **Tax Expense:** Corporate income tax in Turkey is 20%, so our income before tax amount is subject to 20% tax bracket.

Profitability Analysis

Since this is a new established firm we do not expect to earn positive income for the first year and therefore we will close up the year 2011 with loss. Our profitability ratios are not great numbers because we work with high cost. When we look at the common size analysis we can easily see that cost ratio approximately 90% of sales. The reason of this much high cost lies in the purchasing process. Since we could not manufacture the parts of the product we are forced to buy them from an outside supplier instead of making. Although we did a wide search for the cost analysis we could get a total cost price of 308TL per unit. This was the best price we could find. The mark up ratio in this sector is not quite high and therefore contribution margin per unit is low. Another reason of having low margin is; the prices change as inflation changes during the year so we need to pay more and more as long as the inflation rate is added to the cost. All these effects cause a high cost for the product. We try to struggle with this situation by applying 15% mark-up ratio and hence when the cost increases by inflation rate we will price our product 15% above its cost. By this way, we get 10% on the average gross margin in real terms.

Gross Margin Ratio indicates how successful the sales are made. Higher the ratio, lower the cost. Here, we have an increasing rate of this ratio for the first two years and then have a constant rate of 11.75% thereafter which meaning that cost of the goods is set fixed.

If we look at the **Operating Profit Margin** that indicates how good we are in our business, we have a bad year in 2011 due to the start up period but then catch a rise in the following years. Besides COGS, the reason of having low operating profit margin comes from high operating expenses. As long as the firm grows it needs more selling and administrative related expenditures such as more employee, more advertising, more utility etc. However, our operating expenses ratio fall every year from 14.48% to 6.25% indicating that having more operating income year to year. That is a good sign for us in terms of how successful we are at this sector because we have a positive scale in sector profitability.

Net Profit Margin ratio tells us the last statement. It shows the overall profitability of the firm including business and non-business activities. A firm may have other revenues and expenses such as interest income, rent income, interest expense, and loss on sale etc. All these accounts are classified as out of business gain and loss. So when we analyze operating profit margin we speak out by excluding those items, but for talking about overall profitability of the

company these items should be included and it is analyzed by net profit margin. Out of the reasons of low gross profit and operating profit margin, the efficiency of net profit margin can be explained by interest expense. If a firm increases its debt amount its interest payment will also increase based on the loan it used. Therefore, interest expense will rise and this rise will leave a less amount for income before tax. Luckily, we used only one time long term loan as 100.000TL that has a fixed annual interest payment of 25.615TL. We really did need that loan because we thought that we could not achieve our operations functionally without it. The initial capital we raised from ourselves is not sufficient to start the business and that is why we decided to use financial leverage to make us go forward. Since interest expense stays constant we have an upward sloping net profit margin among the years. Our profitability will keep increasing continuously.

To sum up, although we are a brand new company our performance is not bad. If all our expectations come true we can be what we are intended to be presented on the financial statements.

Break-Even Analysis

A calculation of the approximate sales volume required to just cover costs, below which production would be unprofitable and above which it would be profitable. Break-even analysis focuses on the relationship between fixed cost, variable cost, and profit. For this reason, we converted our traditional income statement into contribution format one to be able to see the variable and fixed costs. Contribution format classifies all the expenses as variable and fixed costs and all expenses are combined under each of these categories. To make a cost-volume-profit analysis we need the data in that form.

If a cost is constant on a per units it is called variable such as cost of goods sold, whereas if a cost is constant in total then it is called fixed cost such as rent, depreciation etc. In our budget data salary expense is a mixed cost that contains both variable and fixed cost in it. We applied high-low method to identify the value of variable and fixed parts of that expense. After finding these values we can talk about the break even analyze. Before going into deep explanation, we should state that we did not have any break-even level in any year. This is extremely good for us because we always had much more sales than just break-even level. Catching the break-even level would not bring us any

profit or loss. We can say that our break even quantity level is decreasing each year which gives us a good sign in terms of how quickly we can have a profit after making sales. We are not afraid of our selling strategy because we have high enough sales amounts in each year. Margin of safety % just shows us how safe we are in this situation. If you look at the ratios, it is increasing over and over (20.38% to 91.28%).

Well, why do you think that we are so safe in sales terms? The answer is so obvious; it is because we have very low fixed cost compared to variable. Our total fixed cost is only 171.679TL and this amount is so tiny near to variable cost. If a firm has a heavy fixed cost that can carry a big risk because fixed costs do not change with sales level. Even we have no sales in a month or in a year; we have to pay those fixed charges. On the other hand, variable cost mechanism does not work this way. It depends on the sales level and it increases or decreases with sales. So we pay as much as we sell.

Appendix 5
Income Statement

2011	Income Statement												
	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
Sales	122.150	127.036	132.117	137.402	142.898	148.614	154.559	160.741	167.171	173.858	180.812	188.044	1.835.402
COGS	160.300	112.112	116.596	121.260	126.111	131.155	136.401	141.857	147.532	153.433	159.570	165.953	1.672.282
Gross Profit	-38.150	14.924	15.521	16.142	16.787	17.459	18.157	18.884	19.639	20.425	21.242	22.091	163.120
OPERATING EXPENSES	20.608	20.852	21.106	21.370	21.645	21.931	22.228	22.537	22.859	23.193	23.541	23.902	265.770
*Selling and Marketin Expenses	11.108	11.352	11.606	11.870	12.145	12.431	12.728	13.037	13.359	13.693	14.041	14.402	151.770
Salary expense	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	60.000
Advertising expense	6.108	6.352	6.606	6.870	7.145	7.431	7.728	8.037	8.359	8.693	9.041	9.402	91.770
*General and Administrative Expenses	9.500	9.500	9.500	9.500	9.500	9.500	9.500	9.500	9.500	9.500	9.500	9.500	114.000
Rent expense	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	36.000
Utility expense	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	48.000
Depreciation expense	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	30.000
Operating Income	-58.758	-5.928	-5.585	-5.228	-4.857	-4.472	-4.071	-3.653	-3.220	-2.768	-2.299	-1.811	-102.650
Interest Expense	2.135	2.135	2.135	2.135	2.135	2.135	2.135	2.135	2.135	2.135	2.135	2.135	25.615
Income before Tax	-60.892	-8.062	-7.719	-7.363	-6.992	-6.606	-6.205	-5.788	-5.354	-4.903	-4.434	-3.946	-128.265
Tax Expense (20%)	-12.178	-1.612	-1.544	-1.473	-1.398	-1.321	-1.241	-1.158	-1.071	-981	-887	-789	-25.653
NET INCOME	-48.714	-6.450	-6.176	-5.890	-5.594	-5.285	-4.964	-4.630	-4.283	-3.922	-3.547	-3.156	-102.612

2012	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
Sales	211.381	219.836	228.630	237.775	247.286	257.178	267.465	278.163	289.290	300.861	312.896	325.412	3.176.172
COGS	183.810	191.162	198.809	206.761	215.031	223.633	232.578	241.881	251.556	261.619	272.083	282.967	2.761.889
Gross Profit	27.571	28.674	29.821	31.014	32.255	33.545	34.887	36.282	37.733	39.243	40.812	42.445	414.283
OPERATING EXPENSES	25.319	25.742	26.181	26.639	27.114	27.609	28.123	28.658	29.214	29.793	30.395	31.021	335.809
*Selling and Marketin Expenses	15.819	16.242	16.681	17.139	17.614	18.109	18.623	19.158	19.714	20.293	20.895	21.521	221.809
Salary expense	5.250	5.250	5.250	5.250	5.250	5.250	5.250	5.250	5.250	5.250	5.250	5.250	63.000
Advertising expense	10.569	10.992	11.431	11.889	12.364	12.859	13.373	13.908	14.464	15.043	15.645	16.271	158.809
*General and Administrative Expenses	9.500	9.500	9.500	9.500	9.500	9.500	9.500	9.500	9.500	9.500	9.500	9.500	114.000
Rent expense	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	36.000
Utility expense	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	48.000
Depreciation expense	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	30.000
Operating Income	2.252	2.932	3.640	4.375	5.140	5.936	6.763	7.624	8.519	9.450	10.418	11.424	78.475
Interest Expense	2.135	2.135	2.135	2.135	2.135	2.135	2.135	2.135	2.135	2.135	2.135	2.135	25.615
Income before Tax	118	798	1.505	2.241	3.006	3.801	4.629	5.489	6.384	7.315	8.283	9.290	52.860
Tax Expense (20%)	24	160	301	448	601	760	926	1.098	1.277	1.463	1.657	1.858	10.572
NET INCOME	94	638	1.204	1.793	2.405	3.041	3.703	4.392	5.108	5.852	6.627	7.432	42.288

Income Statement	2011	2012	2013	2014	2015
Sales	1.835.402	3.176.172	5.364.838	9.018.742	15.089.064
COGS	1.672.282	2.761.889	4.665.076	7.842.384	13.120.925
Gross Profit	163.120	414.283	699.761	1.176.358	1.968.139
OPERATING EXPENSES	265.770	335.809	448.392	634.395	941.384
*Selling and Marketin Expenses	151.770	221.809	334.392	520.395	827.384
Salary expense	60.000	63.000	66.150	69.458	72.930
Advertising expense	91.770	158.809	268.242	450.937	754.453
*General and Administrative Expenses	114.000	114.000	114.000	114.000	114.000
Rent expense	36.000	36.000	36.000	36.000	36.000
Utility expense	48.000	48.000	48.000	48.000	48.000
Depreciation expense	30.000	30.000	30.000	30.000	30.000
Operating Income	-102.650	78.475	251.370	541.963	1.026.755
Interest Expense	25.615	25.615	25.615	25.615	25.615
Income before Tax	-128.265	52.860	225.755	516.348	1.001.141
Tax Expense (20%)	-25.653	10.572	45.151	103.270	200.228
NET INCOME	-102.612	42.288	180.604	413.079	800.912

Appendix 6
Loan Amortization Schedule

Loan Amortization Schedule			
Period	Payment	Interest	Repayment	Ending Balance
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0				100.000 TL
1	2.135	850	1.285	98.715
2	2.135	839	1.295	97.420
3	2.135	828	1.306	96.113
4	2.135	817	1.318	94.796
5	2.135	806	1.329	93.467
6	2.135	794	1.340	92.127
7	2.135	783	1.351	90.776
8	2.135	772	1.363	89.413
9	2.135	760	1.375	88.038
10	2.135	748	1.386	86.652
11	2.135	737	1.398	85.254
12	2.135	725	1.410	83.844
13	2.135	713	1.422	82.422
14	2.135	701	1.434	80.988
15	2.135	688	1.446	79.542
16	2.135	676	1.458	78.083
17	2.135	664	1.471	76.613
18	2.135	651	1.483	75.129
19	2.135	639	1.496	73.633
20	2.135	626	1.509	72.125
21	2.135	613	1.522	70.603

22	2.135	600	1.534	69.069
23	2.135	587	1.547	67.521
24	2.135	574	1.561	65.960
25	2.135	561	1.574	64.387
26	2.135	547	1.587	62.799
27	2.135	534	1.601	61.199
28	2.135	520	1.614	59.584
29	2.135	506	1.628	57.956
30	2.135	493	1.642	56.314
31	2.135	479	1.656	54.658
32	2.135	465	1.670	52.988
33	2.135	450	1.684	51.304
34	2.135	436	1.698	49.606
35	2.135	422	1.713	47.893
36	2.135	407	1.727	46.165
37	2.135	392	1.742	44.423
38	2.135	378	1.757	42.666
39	2.135	363	1.772	40.894
40	2.135	348	1.787	39.107
41	2.135	332	1.802	37.305
42	2.135	317	1.817	35.488

43	2.135	302	1.833	33.655
44	2.135	286	1.848	31.806
45	2.135	270	1.864	29.942
46	2.135	255	1.880	28.062
47	2.135	239	1.896	26.166
48	2.135	222	1.912	24.254
49	2.135	206	1.928	22.325
50	2.135	190	1.945	20.381
51	2.135	173	1.961	18.419
52	2.135	157	1.978	16.441
53	2.135	140	1.995	14.447
54	2.135	123	2.012	12.435
55	2.135	106	2.029	10.406
56	2.135	88	2.046	8.360
57	2.135	71	2.064	6.296
58	2.135	54	2.081	4.215
59	2.135	36	2.099	2.117
60	2.135	18	2.117	0

PV	-100000
Rate	0,85%
Period	60
PMT	**2.135 TL**

Appendix 7

Ratios

Income Statement	2011	Common Size	2012	Common Size	2013	Common Size	2014	Common Size	2015	Common Size
Sales	1.835.402	100,00%	3.176.172	100,00%	5.286.076	100,00%	8.886.338	100,00%	14.938.679	100,00%
COGS	1.672.282	91,11%	2.761.889	86,96%	4.665.076	88,25%	7.842.384	88,25%	13.183.705	88,25%
Gross Profit	163.120	8,89%	414.283	13,04%	621.000	11,75%	1.043.954	11,75%	1.754.974	11,75%
OPERATING EXPENSES	265.770	14,48%	335.809	10,57%	444.454	8,41%	627.774	7,06%	933.864	6,25%
*Selling and Marketin Expenses	151.770	8,27%	221.809	6,98%	330.454	6,25%	513.774	5,78%	819.864	5,49%
Salary expense	60.000	3,27%	63.000	1,98%	66.150	1,25%	69.458	0,78%	72.930	0,49%
Advertising expense	91.770	5,00%	158.809	5,00%	264.304	5,00%	444.317	5,00%	746.934	5,00%
*General and Administrative Expenses	114.000	6,21%	114.000	3,59%	114.000	2,16%	114.000	1,28%	114.000	0,76%
Rent expense	36.000	1,96%	36.000	1,13%	36.000	0,68%	36.000	0,41%	36.000	0,24%
Utility expense	48.000	2,62%	48.000	1,51%	48.000	0,91%	48.000	0,54%	48.000	0,32%
Depreciation expense	30.000	1,63%	30.000	0,94%	30.000	0,57%	30.000	0,34%	30.000	0,20%
Operating Income	-102.650	-5,59%	78.475	2,47%	176.547	3,34%	416.179	4,68%	821.109	5,50%
Interest Expense	25.615	1,40%	25.615	0,81%	25.615	0,48%	25.615	0,29%	25.615	0,17%
Income before Tax	-128.265	-6,99%	52.860	1,66%	150.932	2,86%	390.565	4,40%	795.495	5,33%
Tax Expense (20%)	-25.653	-1,40%	10.572	0,33%	30.186	0,57%	78.113	0,88%	159.099	1,07%
NET INCOME	-102.612	-5,59%	42.288	1,33%	120.745	2,28%	312.452	3,52%	636.396	4,26%

Profitability Ratios	2011		2012		2013		2014		2015
Gross Profit Margin	8,89%		13,04%		11,75%		11,75%		11,75%
Operating Profit Margin	-5,59%		2,47%		3,34%		4,68%		5,50%
Net Profit Margin	-5,59%		1,33%		2,28%		3,52%		4,26%

Appendix 8
Break-Even Analysis

Contribution Format Income Statement					
	2011	2012	2013	2014	2015
Sales	1.835.402	3.176.172	5.364.838	9.018.742	15.089.064
Variable Costs	1.766.373	2.924.414	4.939.268	8.302.847	13.890.630
COGS	1.672.282	2.761.889	4.665.076	7.842.384	13.120.925
Salary expense	2.321	3.716	5.950	9.526	15.252
Advertising expense	91.770	158.809	268.242	450.937	754.453
Contribution Margin	69.029	251.758	425.570	715.894	1.198.434
Fixed Costs	171.679	171.679	171.679	171.679	171.679
Salary expense	57.679	57.679	57.679	57.679	57.679
Rent expense	36.000	36.000	36.000	36.000	36.000
Utility expense	48.000	48.000	48.000	48.000	48.000
Depreciation expense	30.000	30.000	30.000	30.000	30.000
Total Costs	1.938.052	3.096.093	5.110.947	8.474.526	14.062.309
Operating Income	-102.650	80.080	253.891	544.216	1.026.755
Interest Expense	25.615	25.615	25.615	25.615	25.615
Income before Tax	-128.265	54.465	228.276	518.601	1.001.141
Tax Expense	-25.653	10.893	45.655	103.720	200.228
Net Income	-102.612	43.572	182.621	414.881	800.912

Quantity (annual)	5.259	8.420	13.480	21.583	34.555
Break-Even Quantity	4.187	3.489	3.307	3.150	3.014
Break-Even Sales (TL)	1.461.363	1.316.204	1.316.204	1.316.204	1.316.204
Margin of Safety	374.039	1.859.968	4.048.633	7.702.538	13.772.860
Margin of Safety %	20,38%	58,56%	75,47%	85,41%	91,28%

High-Low Method for Mixed Cost		
Salary	Unit	Cost
High	34.555	72.930 TL
Low	5.259	60.000 TL
Change	29.296	12.930 TL
VC per unit		0,44 TL
FC		57.679 TL

Appendix 9

Expenditure Plan

Item	Total Price
Microcontroller	160 TL
LCD/LED	40 TL
Keypad	35 TL
USB	28 TL
Transportation	25 TL
Logo Design	150 TL
Chip	20 TL
Total Expected Expenditure	458 TL