QUALITY FUNCTIONAL DEPLOYMENT

SAFE USB PROJECT

TEAM 3

12/21/2010

Mustafa Çağrı İmamoğlu

Mustafa Kantekin

Esat Emre Erdem

Aykut Yıldırım

Table of Contents

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.

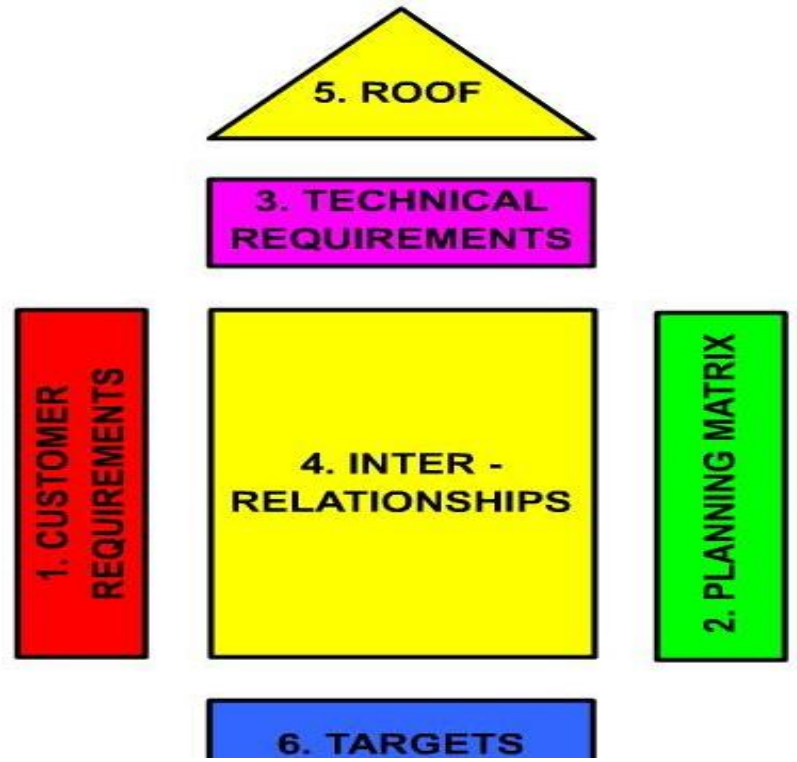

Figure 1.1

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.

General House of Quality is shown in the next page.

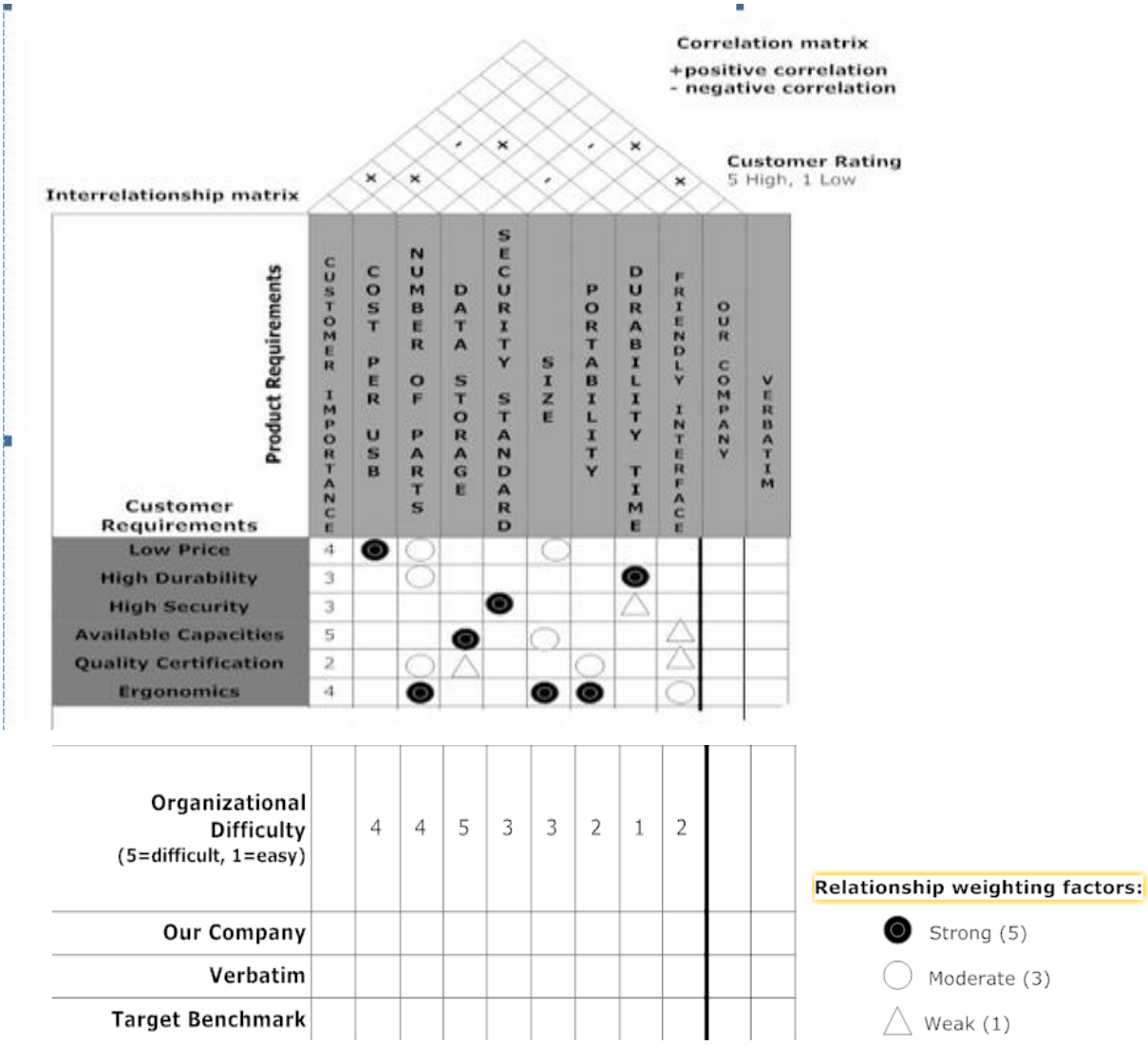
Correlation matrix
+positive correlation
- negative correlation
Customer Rating
5 High, 1 Low
Interrelationship matrix
Product Requirements
Customer Requirements
CUSTOMER IMPORTANCE
COST PER USB
NUMBER OF PARTS
DATA STORAGE
SECURITY STANDARD
SIZE
PORTABILITY
DURABILITY TIME
FRIENDLY INTERFACE
OUR COMPANY
VERBATIM
Low Price 4
High Durability 3
High Security 3
Available Capacities 5
Quality Certification 2
Ergonomics 4
Organizational Difficulty (5=difficult, 1=easy) 4 4 5 3 3 2 1 2
Our Company
Verbatim
Target Benchmark
Relationship weighting factors:
Strong (5)
Moderate (3)
Weak (1)

Figure 1.3

Breadboard Type of Product

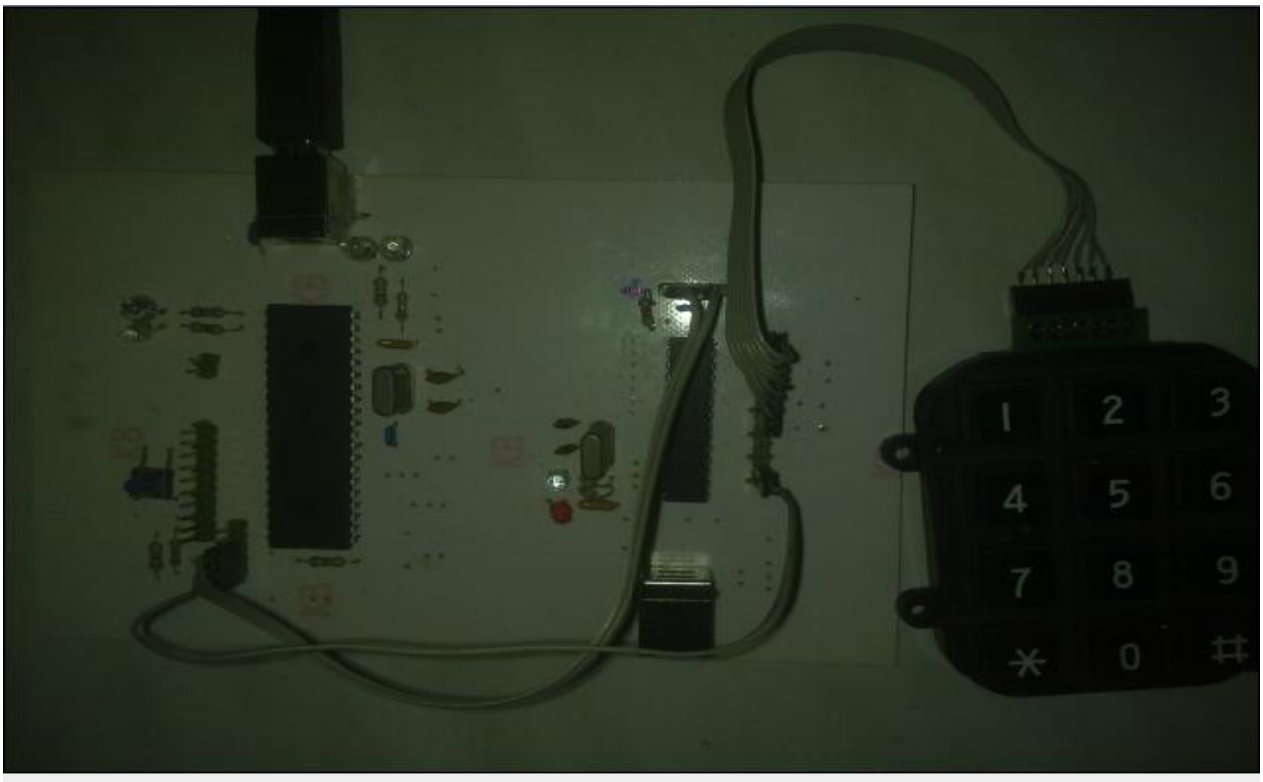

Figure 1.4

Real Model of Product

Figure 1.5

Engineering Drawings

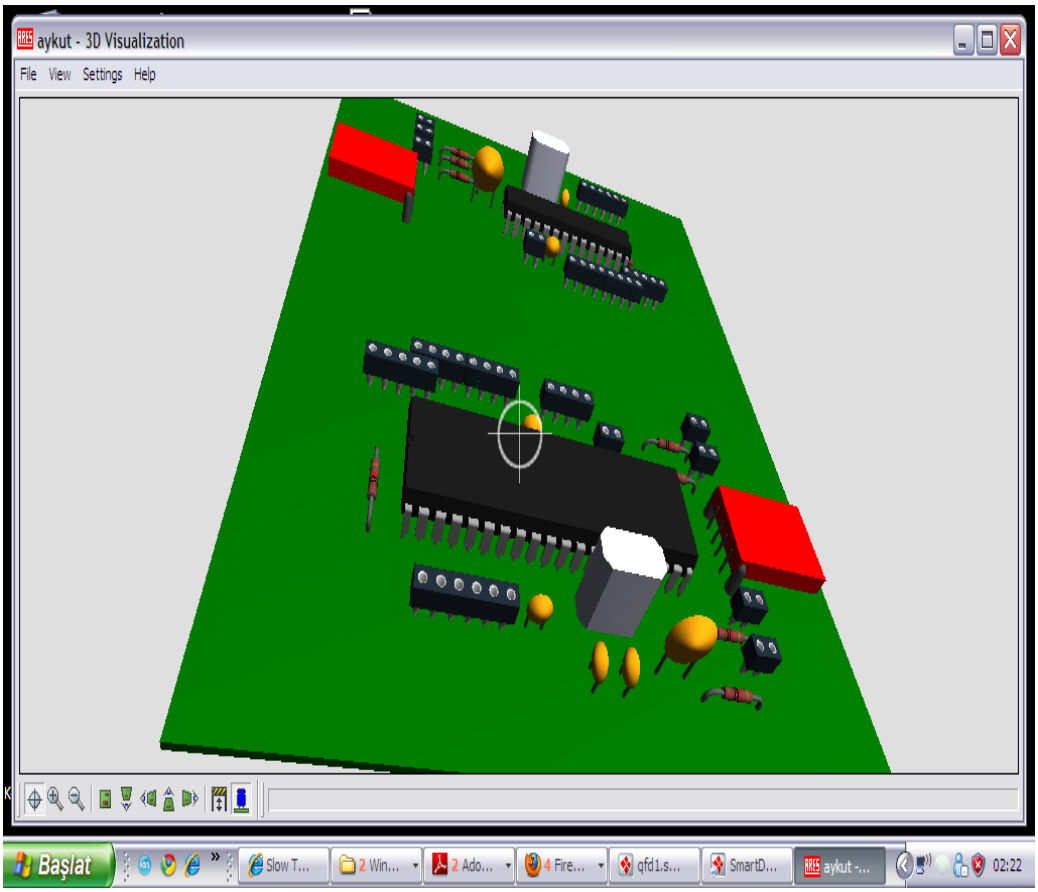

Figure 1.6 screenshot of the 3D visualization of the circuit diagram

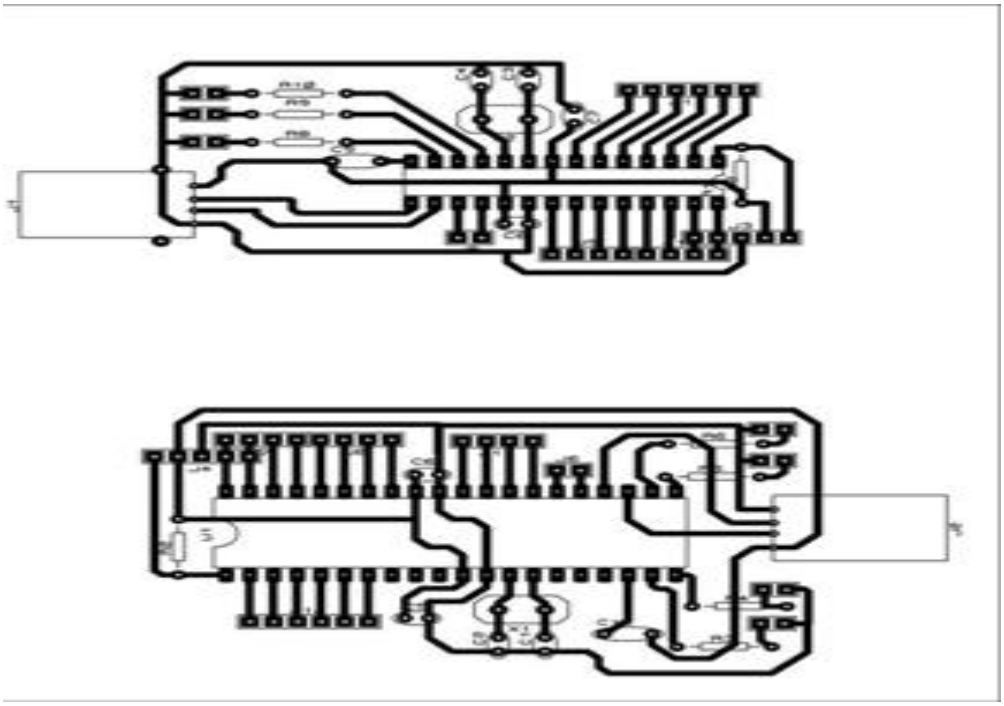

Figure 1.7

Conclusion

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.

As it can be seen from figure 1.3 above, our product has some positive and negative correlation. The most important customer needs is available Capacities on USB. Data storage of our product has a negative correlation with it. However, the other important customer needs is Security. Security standards of our product have positive correlation with it. Therefore, Components of product requirements have changeable correlation between the customer requirements.

References

1) GE401 – QFD presentation 20.12.2010
2) http://www.qfdi.org/