

---

# TOTAL Control – Innovative TV Viewing

---

Faria Bhatti

Final Paper

TC 505 – Computer Mediated Communication

## Executive Summary

---

The goal of this project is to provide a pathway to design a 'smart' remote (TOTAL Control) that will initially be deployed for (Digital Video Recorder) DVRs. TOTAL Control will be able to sense a user's viewing behavior and will actually detect patterns for user's viewing habits. These patterns will be run against an algorithm and the main display will change to reflect the results of the computation. We will effectively advance in suggesting design solutions and design implications in the light of possible research methodologies we implement in our research project.

## Overview

---

Any smart device is an effective means in bridging the gap between human and computer. Since our class is about 'Computer Mediated Communication,' this content will catalyze how we frame the recommendations and design implications for the design. We will also use Information Overload and Usability as a supplementary tool in our project to provide further understanding and emphasis of our design implications that will undoubtedly surface throughout the process.

The purpose of this design project is to explore design by brainstorming and designing an innovative technological tool which assists computer mediated communication (CMC). CMC tools and their use provide us with an understanding of how technology is being used by users and how it facilitates the performance of specific functions. Incorporation of CMC in various information and communication tools makes it very vital for the researchers to keep themselves updated on the CMC issues as it portrays user interactions with technologies.

Since there is an array of the types of technologies being used by various audiences these days, most of the devices lack the adequate usability in products required for the product to be successful in the market today. Keeping this in mind, the major focus of this project is usability in technologies which facilitate CMC. For the purpose of this project, the technology and design of DVR remote control was chosen. The plan of action was to analyze the use of a DVR remote control, how the design has trained users and expects the user behavior to change according to its permanent buttons and functions, why were users strictly obeying to its functionalities and how the technology should be redesigned so that the interface of the technology strictly obeys user demands.

To propose a redesign of the product, a series of steps were taken to gather concrete information about user behavior towards the product and what changes users were expecting to see in the redesign of the remote. The series of steps include a thorough literature review of similar researches, a case study in which users were asked to describe their opinions about the product, and what changes they would prefer in the redesign and, at the end, a recommendation section based on the research.

## Literature Review

---

A study conducted by Walker revealed that devices with remote controls have changed viewer's behavior substantively and it has impacted the way households react towards technology [1]. Another study by Weaver and Walker displayed differences among male and female roles over the control of channel surfing [10]. Study of Walker and Rob also show that VCR did not seem to make much of a dent in regular viewing habits, although cable and remote controls may have changed channel surfing into the most exercise many Americans now get. Remote controls are also sought as devices which parents can use to track and manipulate children's viewing habits. [2]

Hiltz and Turoff explain that various CMC tools that are overloaded with unnecessary information immensely influence user's attitude towards devices and information [3]; thus, influencing users decision-making performances [8]. As Ravid and Rafaeli describe through their empirical experimentation that at times information overload in devices lead to a user attitude which limits the use of the device [4] and leads to user behaviors which involve neglecting and avoiding the use of unwanted information [7]; thus, handicapping the users to efficiently use the features of an interface.

Hearst identified through his empirical research that text expresses a vast, rich range of information, but encodes this information in a form that is difficult to decipher automatically [5]. Therefore, it leaves users with confusion or lack of understanding of the features the buttons provide on the remote control or it requires users to read the user manual and spend some time to figure out how to operate the device [6].

The empirical research by Mulder and Verweijis show the different designs used to handle information overload and how knowledge workers are coping with the problem by investigating concepts behind user's understandings [9]. These underlying concepts lead the redesign of such products in the world of usability and research. Winograd and Flores argue that, far better than finding 'solutions,' is to avoid the problem — dissolve rather than solve. In this view they are supported by many authors such as Whitehead who claimed that civilization advances, not by thinking (solving problems) but by finding ways to avoid thought (dissolving problems) [11].

Therefore, to avoid the problem of information overload or presentation of extraneous information, we came up with a redesign of the existing device. A case study was conducted to observe perceptions of people and learn their behavior towards the DVR remotes which further aided us in the redesign of the DVR remotes.

### Case Study

---

The case study conducted was based on the qualitative research methodology called Ethnography. The case study was conducted to elicit feedback from the participants on their opinions about the remote. In the case study, three participants who had at least 3 years of experience using a DVR remote control were asked to express their views about the remote control. The age of the participants ranged from 30 to 60 years. To ensure participant confidentiality, their names have been changed. Three participants, one male and two females were asked to describe their views and interaction with the remote. It was made sure that the participants had cable connections and were regular users of the remote. The table below describes the participants:

Name	Gender	Age	Profession
Mary	Female	59	Stay home wife
Kate	Female	41	Daycare owner
Sam	Male	33	Doctor

Based on the interviews, some themes that emerged from the quotes included:

**Mary:** “I don’t even understand more than half of the function these buttons do.” [**Theme1:** Lack of description]

**Mary:** “It takes me forever to find this thing when I lose it. I had to turn the mattress over, go through my close, and look under the carpets once to find this remote.” [Theme 2: Locating the remote]

**Sam:** “I only use the channel up and down button, the numbers, and the power on and off button. That’s about it.” [Theme 3: Use of limited buttons]

**Sam:** “I normally watch series about medicine related stories like House or I watch Star Trek for most of the time or sometimes news, that’s about it.” [Theme 4: User viewing habit]

**Kate:** “I find the text too small to read, especially when it’s dark in the room.” [Theme 5: Visibility]

**Kate:** “There are just so many buttons and their functions to memorize and I really don’t have time for that. My kids usually like watching SpongeBob, Handy Manny and Dora. I just try to memorize the different channels they’re aired on.” [Theme 6: information overload]

## Discussion

---

It was clear from the case study and literature review that the current design of the DVR remote control was problematic to its targeted audience. The only reason to use this remote was that there were no alternative options. Users were trained through the current design and the current design controlled their viewing habits to some extent.

After sufficient critique and discussion about the results obtained and literature review conducted, a set of recommendations were prepared and a redesign model was paper prototyped. The results of the case study indicated that the current design of the remote lacked the needed information, contained too much extraneous information, lacked a system to locate the remote, limited buttons were used, remote failed to track user viewing habits, and lacked visibility due to size of text. We not only focused on these elements in the redesign of the remote but other features which included regular updating and charging of the remote, shape,

and interface. We also renamed the device to TOTAL control which would allow the users to control the remote and not vice versa.

Essentially, TOTAL Control will be able to sense a user's viewing behavior and dynamically adjust its interface to provide the most optimal and efficient selections available. We now advance in effectively discussing and suggesting design solutions and design implications in the light of research methodology implemented and the literature review conducted in the research project.

*Shape:*

We designed a paper prototype of the TOTAL Control's shape similar to a G1 phone's (or an iPhone) shape. Also, TOTAL Control will be thinner and longer than a G1 for a stronger and steady grip.

*Interface:*

The interface of the TOTAL Control will not have any buttons but will instead operate solely through its touch tone surface. TOTAL Control's design is similar to the G1 because most of its real estate will consist of a window where the various action 'buttons' will dynamically appear. There will be three different types of modes which will include static features, home mode dynamic options and TV viewing dynamic options.

**(Physical) static features:** *These are the features that will be physically present on the remote.*

*Speaker* - used to respond to voice commands and for 'remote-locator' feature.

*Volume* - on left side of remote in the form of a toggle switch. Statically set to high for remote-locator feature.

*Microphone* - Receives voice commands

*Padded sleeve* - Protective

*Click-able window* - Similar to the Blackberry Storm: window can be physically depressed.

(Users will get the feeling of a 'response' from TOTAL Control)

**(Home mode) dynamic options:** *These features will be present on the home screen of the remote and will appear as soon as the interface of the remote is touched.*

*Help* - Press to activate and either type or speak question. There is also an introduction video and feature description option.

*Recall* - Recall previous channel viewed (threshold 1 minute)

*Mute* - Sound OFF

*Channel* - Dial (similar to IPOD) to select channel

*Volume* - Dial (similar to IPOD) to select volume level

*Power* - OFF/ON

*Input* - Switch device

*TV* - option to display TV viewing mode features listed below

**(TV viewing mode) dynamic options:**

*Number pad* - Manually jump to selected channel.

*Play* - Resume show

*Stop* - Stop show and return to menu

*Fast forward* - x5 variable speeds to skip forward while viewing

*Rewind* - x5 variable speeds to skip back while viewing

*Record* - Manually record what is currently viewable

*Pause* - Freeze Frame

*Skip back* - Skip back once by 2 seconds

*Skip forward* - Skip forward once by 2 seconds

*Suggestions* - Let TOTAL Control tell you what you want to watch

*Home* - Start screen of Home mode

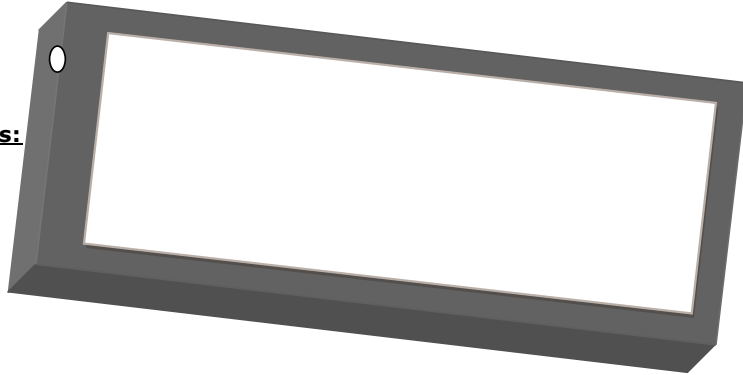
# 6

- **(Physical) static features:**

- speaker
- volume
- microphone
- padded sleeve
- click-able window

- **(Home mode) dynamic options:**

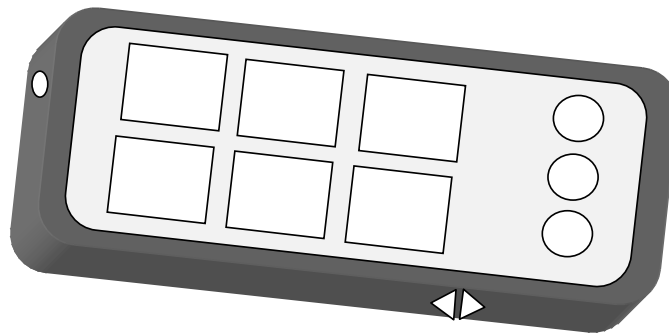
- help
- recall
- mute
- channel
- volume
- power
- input
- home



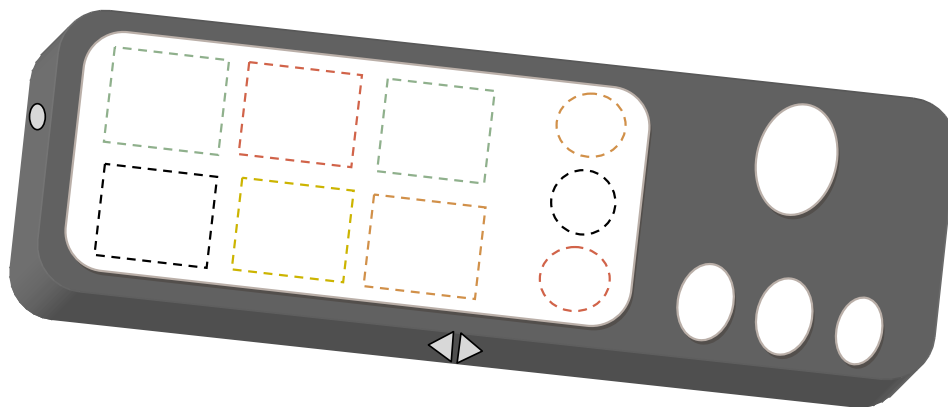
1

- **(TV viewing mode) dynamic options:**

- number pad
- play
- stop
- fast forward
- rewind
- record
- pause
- skip back
- skip forward
- home



2



3



### *Upgrading the Software:*

The mini-USB port on the device will make it possible for TOTAL Control to receive software updates as soon as it is plugged into a computer that is connected to an external network.

### *Navigation:*

As previously alluded to, the navigation of TOTAL Control will be completely dependent on the user's viewing habits. As soon as the user begins to use his/her remote, patterns will begin to record. These patterns will be run against an algorithm and the main display will change to reflect the results of the computation. It could be possible that users will feel overwhelmed in the beginning, like using any other new or upgraded technological CMC device, but it might prove more usable and accessible in the end.

## **Market Launch**

---

In order to successfully launch the product in the market, we considered the following essential components. Addressing these components would not only help to ensure the success of the design of the product but also the success of its launch in the market.

### *Target Audience:*

This remote will essentially be targeted towards users who have experience using an iPhone, G phone or a similar interface. Even though users dislike several features of the current design of the remote, but they are used to using the present day DVR remotes. In order to train the users with a new device, experience using a similar device might help in the learning process, although this does not completely guarantee the success of the product, but only to a high extent.

It might be prudent to conduct further research and confirm that the 'younger generation' will find a universal and dynamic remote useful; intuition and current technological trends tells us that this is the future.

*Resources Available:*

Although not very realistic, for the purposes of this assignment, we are assuming this project is being funded by a large (and wealthy) firm, and that we have access to the finest technical developers in the world. Our firm has given us a deadline of a month to redesign the remote, create a prototype and associated manuscript in a month.

*Production of Prototype:*

The production of TOTAL Control will be controlled in a way that the 25 initial remotes produced will be tested among the participants who meet the criteria we had set for interviewing the participants for the case study. That is, the participants will be required to have at least a 3 year experience using the DVR remote, and an additional requirement would be to have some prior experience of using a device similar to an iPhone or a G phone.

*Quality Control/Testing:*

The testing of the product will require the initial 25 participants to perform a rigorous set of commands and functions on the TOTAL Control the first week. The participants will be asked to log their results in a log book provided to them through the distribution company. After the first week, participants will be encouraged to use it like they 'normally' would use any other remote and send feedback, along with the log book, on how the device responds.

**Conclusion**

---

The goal of this project was to provide a pathway to design a 'smart' remote (TOTAL Control) that will initially be deployed to support interaction with DVRs. Ultimately; TOTAL control will be a universal remote (similar to Logitech's Harmony) that can control everything in the household and will be tailored to the user's needs. In other words, no two TOTAL Controls will be the same.

The redesign of the remote incorporates various features including a set of (Physical) static features like speaker, volume, microphone, padded sleeve, click-able window, a set of (Home mode) dynamic options like help, recall, mute, channel, volume power, input home, and a set of (TV viewing mode) dynamic options like number pad, play, stop fast forward, rewind, record, pause, skip back, skip forward, home. This sums the redesign of the product; the next step in the complete system of redesign is how to successfully launch the product in the market.

The launch of the market will begin with identifying the target audience and knowledge of similar interfaces and devices in the market. The resources available will be analyzed and based on those resources; the product will be produced in a low quantity at first. After the production of the remote, a testing method is devised to quality check the final product to verify the existence or nonexistence of possible bugs in the final design. After the bugs are ironed out, TOTAL Control will then possibly incorporate DVD, VCRs, sound systems, lights, house alarm systems, etc.

### **Recommendation**

---

Based on the literature review and research conducted, the concluded recommendations and design implications are that the design of TOTAL control will have three modes. The first mode are the physical features of the device through which basic functionalities like volume control buttons, insertion of the charger, speakers, protection sleeve, microphone, remote locator, ON/OFF button and intercom system.

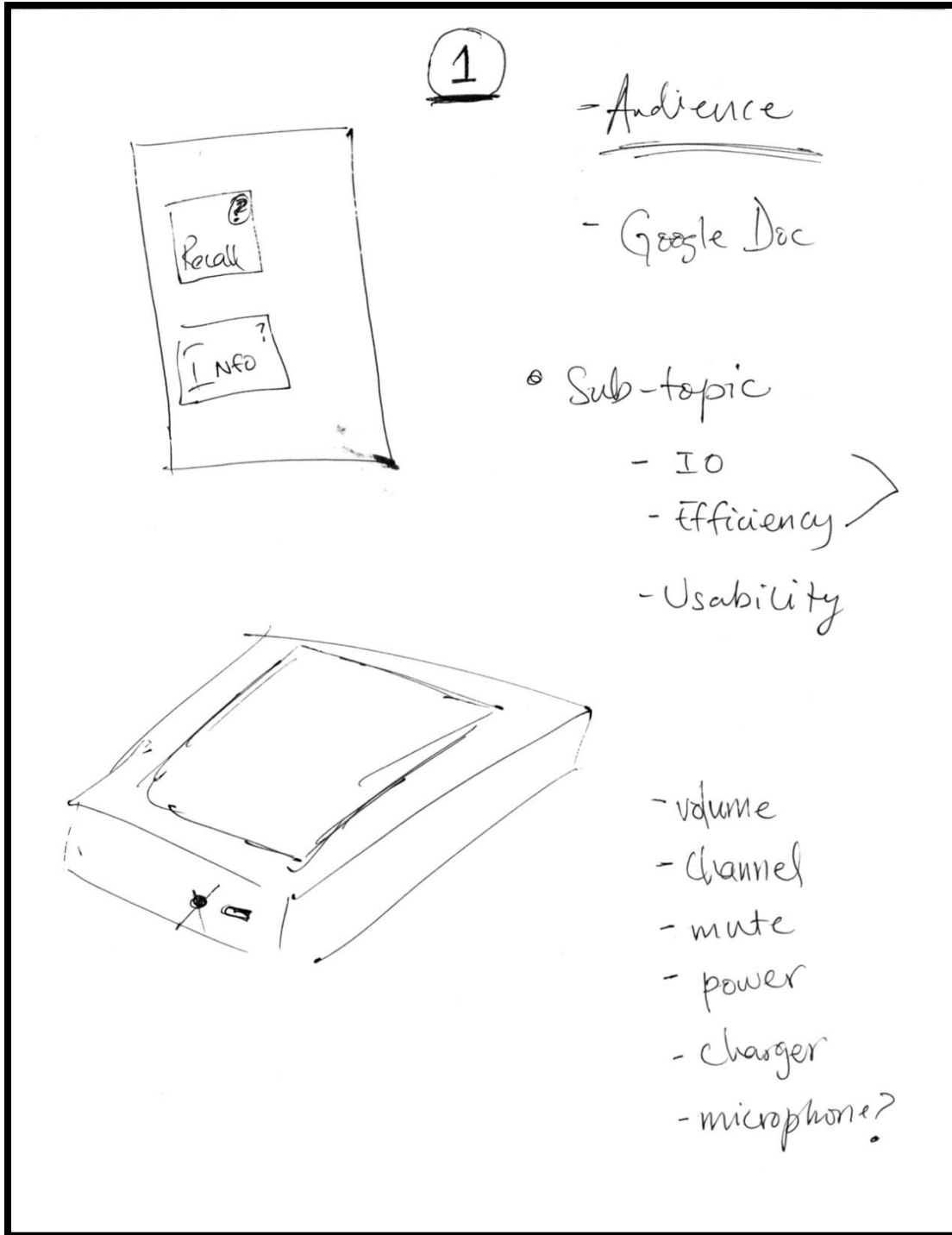
The second mode will be the home screen of the interface. The home screen will have two options 'Home mode' and 'TV viewing mode.' The Home mode will have the options of all the basic features like Help, Recall, Channel Up and Down, Mute, Volume and Power on/off. The third mode will be the TV viewing mode which will have the options like Number Pad, Play, Forward, Rewind, Record, Stop, Skip Back, Skip Forward, Suggestions, and Home.

## References

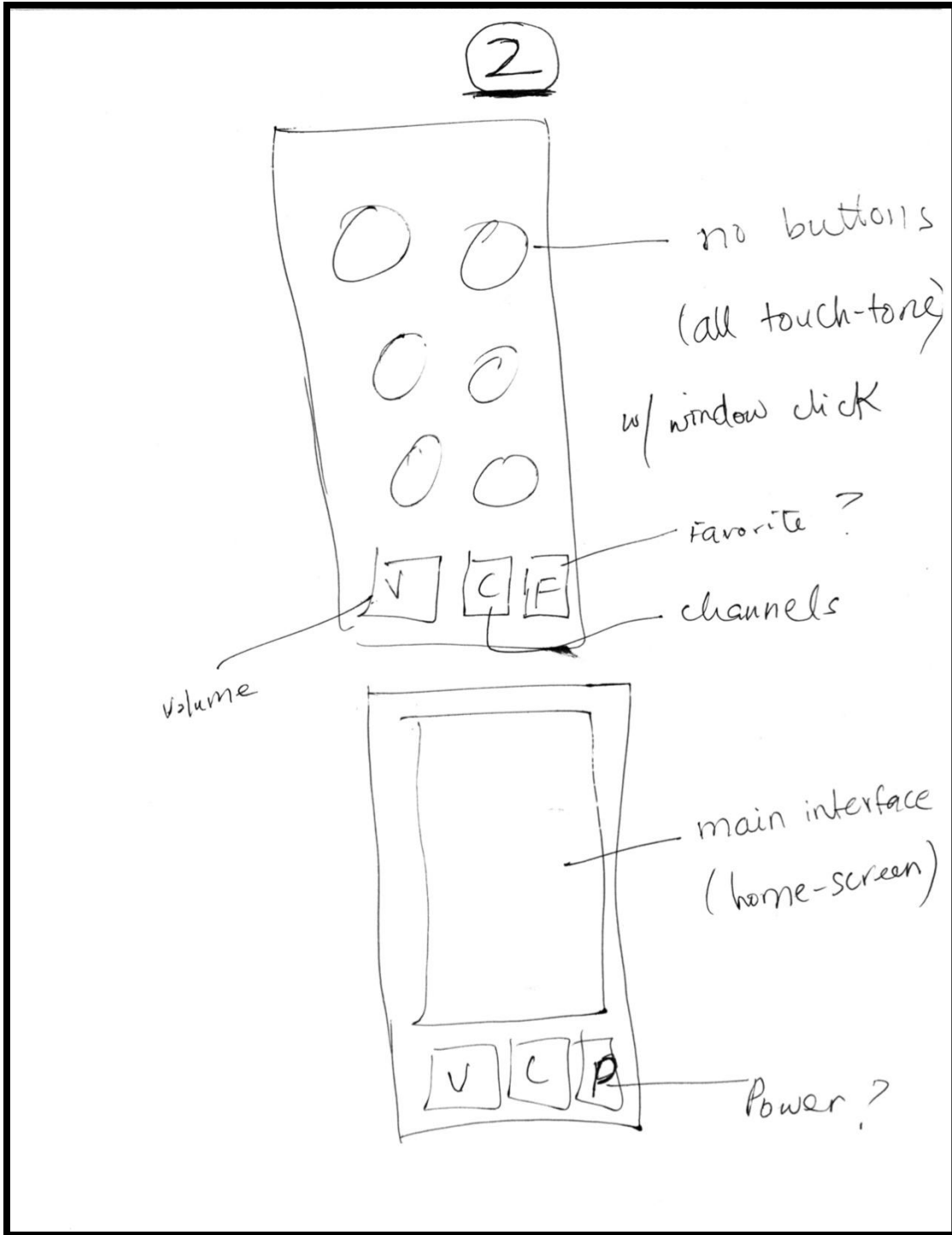
---

- [1] Walker, Alexis J. "Couples Watching Television: Gender, Power, and the Remote Control." *Journal of Marriage and the Family*. 58. 4 (1996): 813.
- [2] Walker, James R. and Rob V. Bellamy, Jr. (2001). "Remote Control Devices and Family Viewing." *Television and the American Family*. 2nd ed., Eds. Jennings Bryant and J. Alison Bryant. Mahwah, NJ: Lawrence Erlbaum. 75-89.
- [3] Hiltz and Turoff. (1985). "Structuring Computer-mediated communication systems to avoid information overload." *Communications of the ACM*.
- [4] Jones, Quentin., Ravid, Giladi & Rafaeli, Sheizaf. (2001). "Information Overload and Virtual Public Discourse Boundaries." *Human Computer Interaction – Interact'01*.
- [5] Hearst, Marti. (1999). "Untangling text data mining." In *Proceedings of the 37th Annual Meeting of the ACL*, pages 3–10, College Park, Maryland.
- [6] Ringwald, M. (2002). "Spontaneous Interaction with Everyday Devices Using a PDA." Presented at the *Supporting Spontaneous Interaction in Ubiquitous Computing Settings Workshop (UBICOMP 2002)*.
- [7] Ravid, Giladi & Rafaeli, Sheizaf. (2004). "Information Overload and the Message Dynamics of Online Interaction Spaces: A Theoretical Model and Empirical Exploration." *Information Systems Research*.
- [8] Speier, C., Valacich, J.S., Vessey, I. (1999). The influence of task interruption on individual decision making: an information overload perspective. *Decision Sciences* 30 (2), 337–360.
- [9] Mulder, Ingrid., Poot, Henk., Verwijs, Carla., Janssen, Ruud., Bijlsma, Marcel "An Information Overload study: Using design methods for understanding." *Telematica Institute* 14-18 Oct. 2006, Vol 189.
- [10] Weaver, J. B., J. R. Walker, L. L. McCord, and R. V. Bellamy. "Exploring the Links between Personality and Television Remote Control Device Use." *Personality and Individual Differences*. 20. 4 (1996): 483.
- [11] Winograd, T. & Flores, F. (1986). "Understanding Computers and Cognition" Ablex.

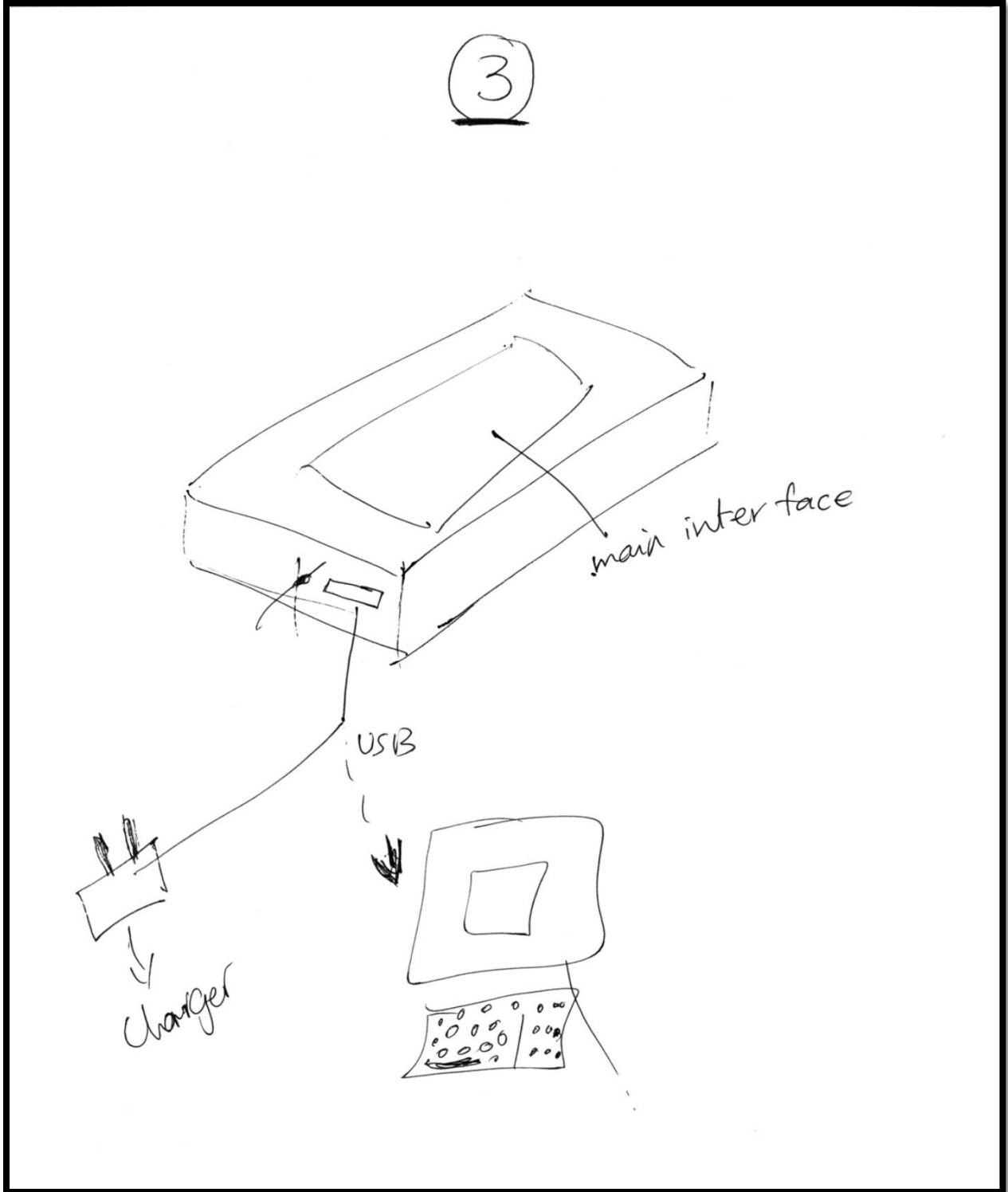
### Appendix I – TOTAL control Iterative Design Process Sketches



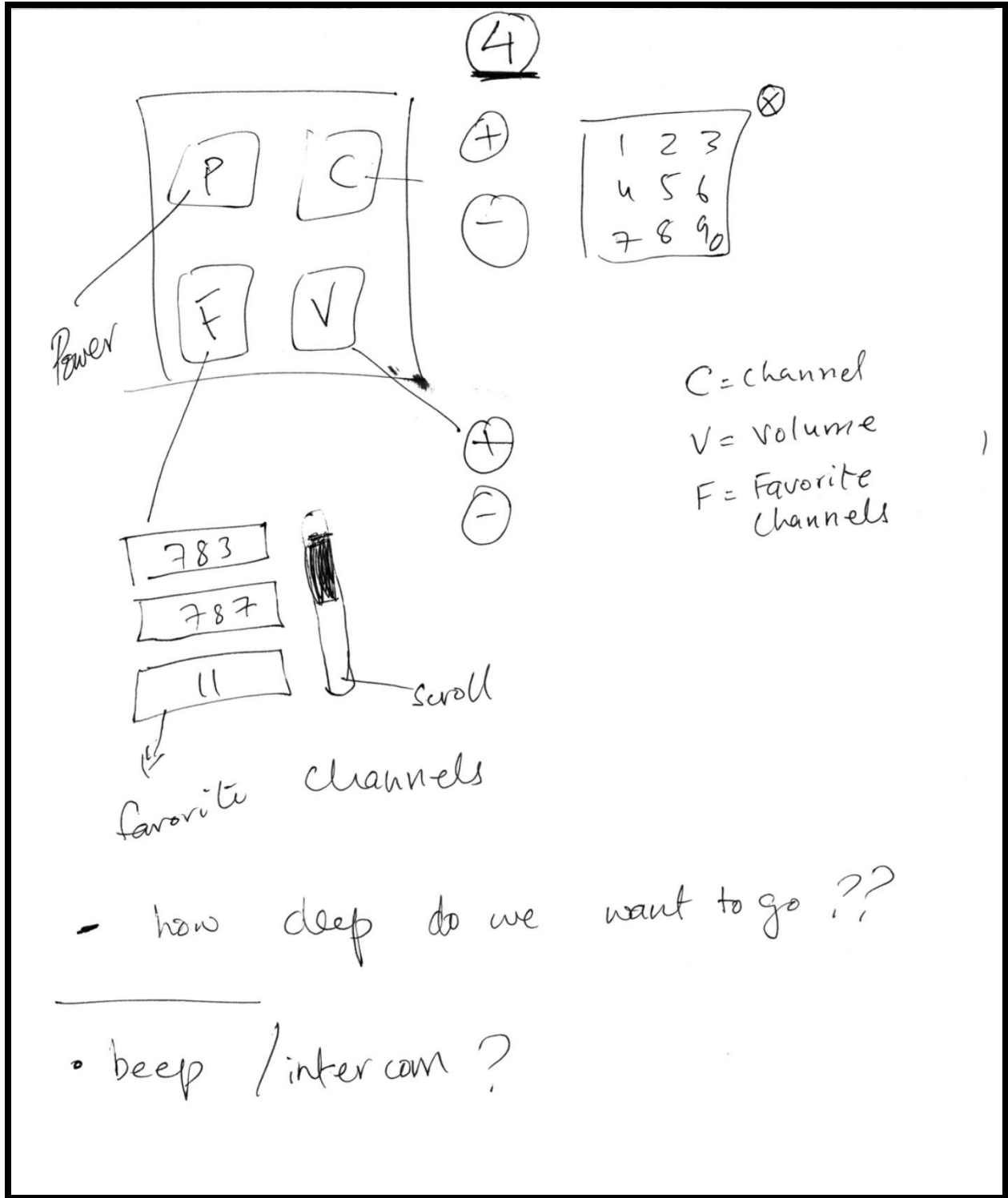
Step 1



Step 2

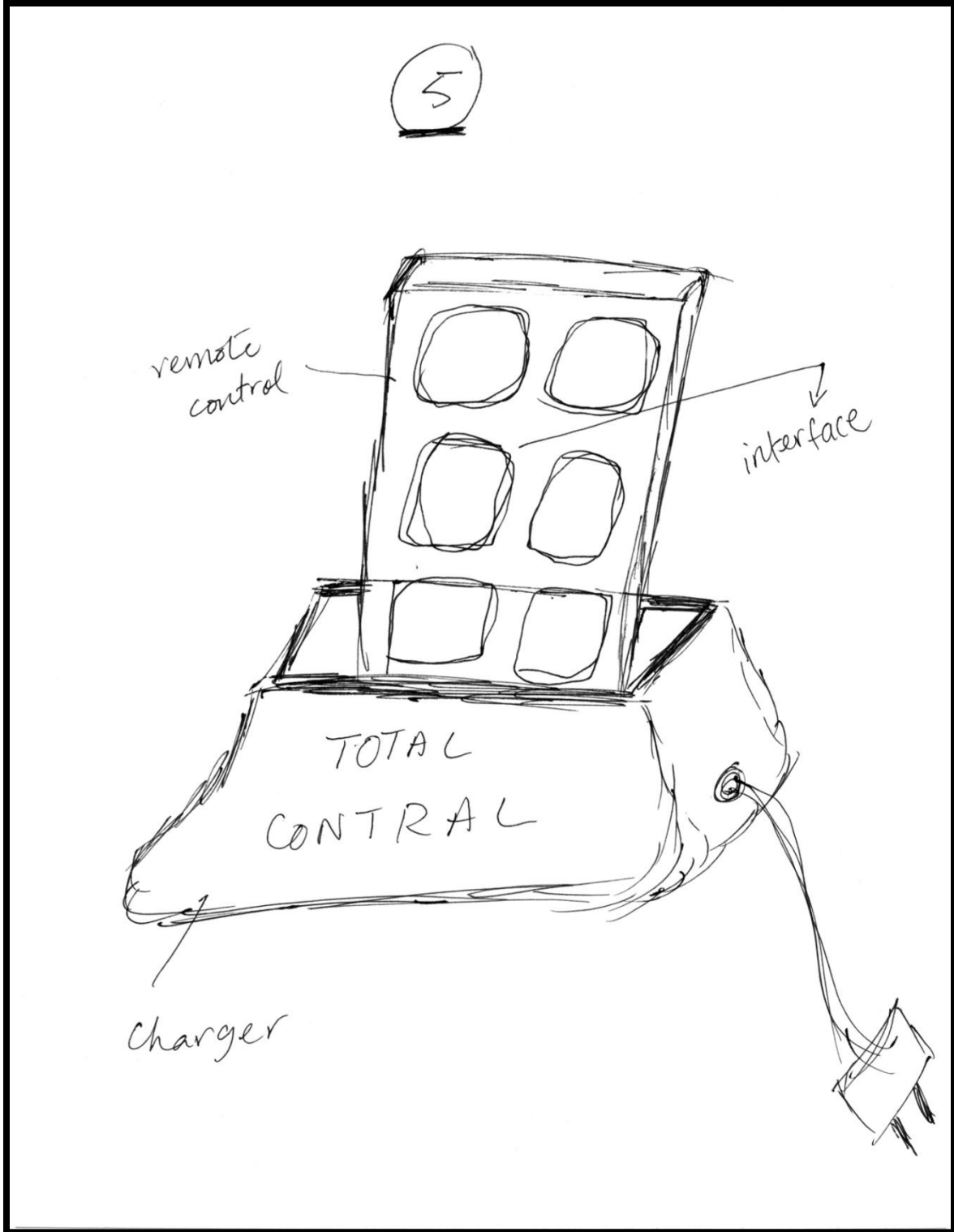


Step 3



Step 4





Step 5

# 6

- **(Physical) static features:**

- speaker
- volume
- microphone
- padded sleeve
- click-able window

- **(Home mode) dynamic options:**

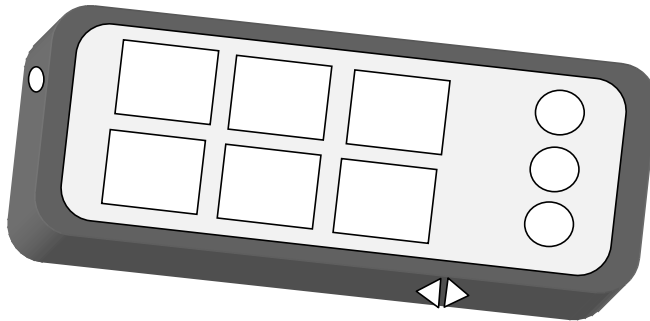
- help
- recall
- mute
- channel
- volume
- power
- input
- home

- **(TV viewing mode) dynamic options:**

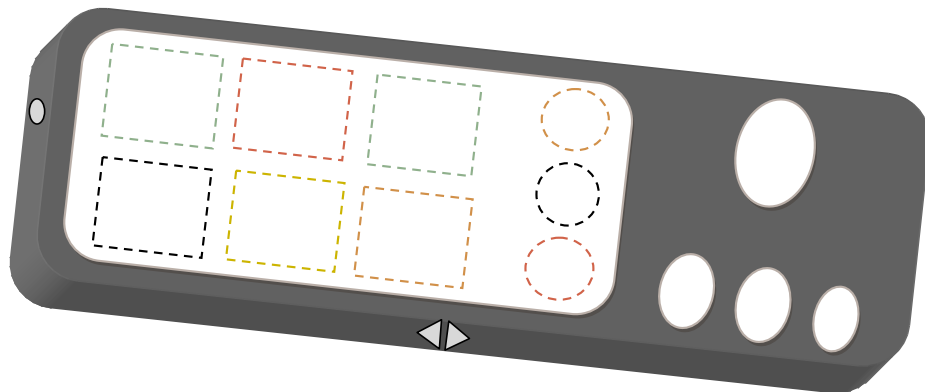
- number pad
- play
- stop
- fast forward
- rewind
- record
- pause
- skip back
- skip forward
- home



1



2



3

Step 6 – Final Design