Home Automation Products

for TANLA Solutions Ltd. Hyderabad

as **Summer Project** from 5 May to 5 June 2008

QORE
A TANLA PRODUCT

Under the guidance of

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By

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Acknowledgement

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Mr. D. Uday Kumar Reddy - Chairman and Managing Director,
Mr. Satish Kathirisetti - Director and Chief Technology Officer and
Mr. Sunit Saraswat - Sr. Vice President , for making available the opportunity for us to work with them for our summer project and for all their guidance and support.

We wish to express our gratitude to
Mr. Sriniwas Sabanna - Delivery Manager, Mr. Fani Kumar Varanasi and their teams for valuable technical inputs and the entire staff of Tanla Solutions Ltd. for their help, support and hospitality.

Our most sincere thanks to Prof. B. K. Chakravarthy, IDC IIT Bombay and his staff for constant support and feedback at various stages of the project.

About the Company

- **Tanla Solutions**, a listed company, founded in 1999.
- Software development center at Hyderabad, India and worldwide marketing office in the UK.
- Dynamism, Innovation, Vision, Focus on quality and Continuous research are the prime movers for the company.
- **Services provided**
  - **Telecom Infrastructure Solutions**
  - **Customized Software Development**
  - **Mobile solutions** through wholly-owned subsidiary 'Tanla Mobile'
    -Global provider of mobile commerce, mobile entertainment, mobile marketing and advertising across Europe, North America, Africa, Middle East and Asia having offices in Colombo, Dubai, Dublin, Hyderabad, London, New York and Singapore.

Scope of the project

As the company is having strong presence in the field of telecom infrastructure solutions and customized software development, the management decided to expand the product line by introducing home automation products for the domestic as well as the international market in different phases. They had already developed the required software and the internal hardware for the products.

Our role was limited to the **External Styling** of the products.
As the production quantity was very small, foreign manufacturers (China and Taiwan) were considered for the same and the products were designed accordingly.
Photo-realistic renderings was the main tool for the presentations and internal approvals.
Mock-up models were presented as the final outcome of the project.

Scope of the project - Product list

Following products were designed as part of the summer project-

- Apartment Control Panel
- Main Door Panel
- Universal Remote with display (26+5 keys)
- Room Remote (8 keys)
- Wired Impact Sensor
- Wireless Impact Sensor
- Panic Switch
- Set Top Box
- IR Sensor

The Methodology

The following methodology was followed during the project to come up to the deliverables stage

- Project Brief
- Market Survey of the similar existing products
- Image Board
- Approval from the company
- Refined project brief
- Idea generation
- Discussions with the CEO and Senior Management
- Refined ideas
- Product renderings
- Presentation and approval from the management
- Mock-up models
- Documentation

Project Brief

To design high quality home automation system with different products having family look, within the given constraints, which satisfies the user needs in terms of usability and aesthetics.

- Ease of use
- Interaction
- Physical appearance, looks
- Brand Identity

Users of the system

- Primary users - Households
- Installation personnel
- Repair/ maintenance personnel

Market Survey

Scene selector/ Remote

Scene selector/ Remote

Switches and IR Sensors

Home Automation Products by **LeGrand**

- After getting the initial project brief of designing products for home automation system including a universal remote, a primary survey of the existing products in the market across the globe was carried out using internet. This helped us a lot in understanding the product in terms of its function and the range available in the market.

- We also visited the wholesale market of electrical items at Lohar Chawl, Mumbai and 'LeGrand' - Worli, Mumbai showroom to have a touch and feel experience of the existing products available in the market.

Inferences from the market survey

- The home automation products are being looked up as high-tech lifestyle products and hence, the new products should be designed accordingly.
- The products available in the market are mostly imported.
- The Indian market for home automation systems is at very early stage.
- More companies are coming in this sector like Anchor, L&T, etc. Our products should give a look and feel that they are ahead of their competitors.

Image board

- Simultaneously, an image board of existing products of different companies viz. Apple and Bang & Olufsen was prepared to get the initial approval from the client on the visual vocabulary of the products to be designed.

The outcomes of the image board were as follows-

- The products should look exclusive.
- All the products to be designed should have similar features i.e. They should follow the same visual language and should have family looks.

- The information collected during the market survey and the image board prepared was then presented to the management of the company which was subsequently approved by them.

- A visit was arranged for us to 'Aparna Sarovar', an upcoming residential apartments scheme at Hyderabad where the products were installed for testing.
This gave us the actual feel of the product and the interaction between the product and user, which was very difficult for us to imagine virtually.

This visit made our ideas very clear about the client's exact requirements and the functioning of the products which later on proved very important in the actual designing phase.

- After the visit, a small meeting was arranged with management to clarify the doubts and to decide on the future course of action from our side.

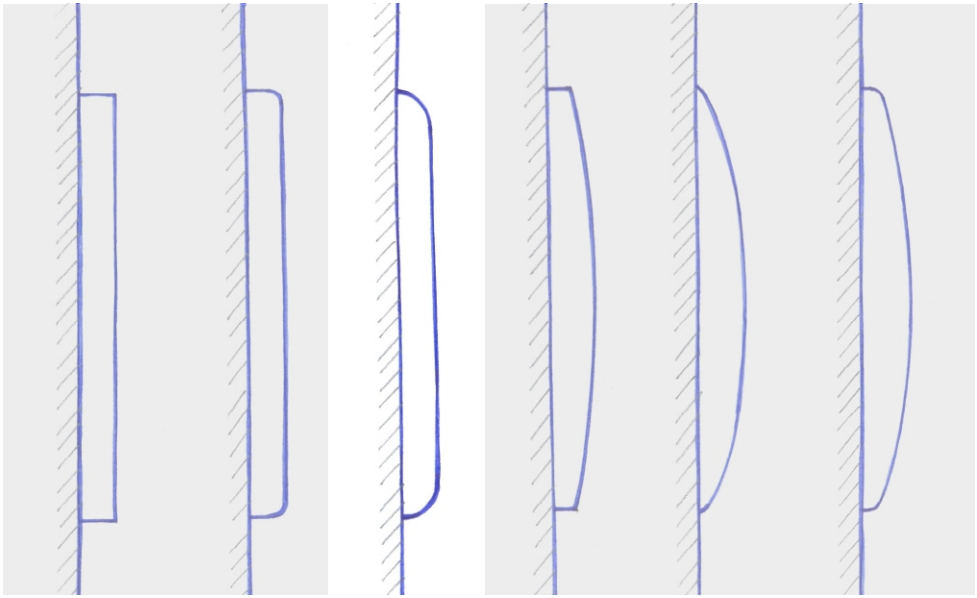
Initial sketches

- We then started working on the options as per the guidelines given to us for the main fascia plate to house all other accessories like switches, controls with PCBs inside them and also for the main door panel with PIN pad and small two line display.

Numerous options were worked out in this phase and we were working on this for almost a week.

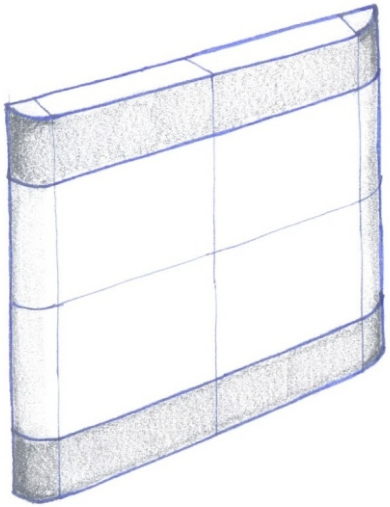
First, we finalized on the cross section of the fascia plate, to be used as a template later; while designing other products. Then we moved on to design the actual fascia plates as per the cross section finalized earlier.

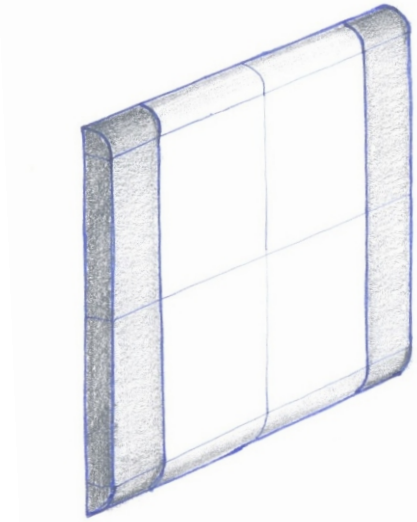
The Main Door Panel was also designed using the same features and visual language as earlier.

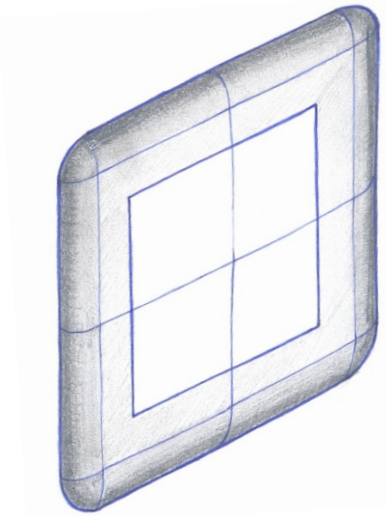


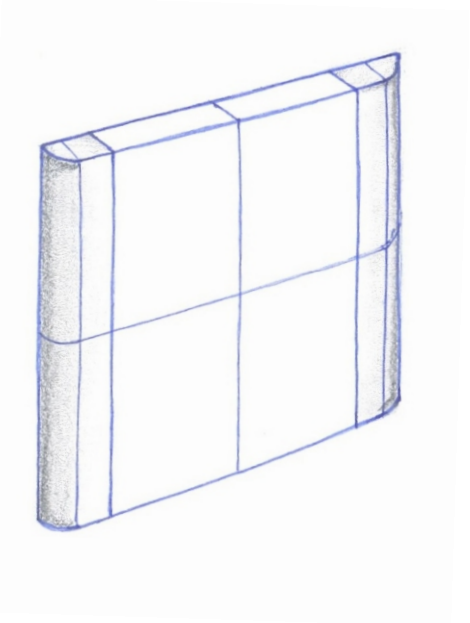
Fascia Plate - Cross Section

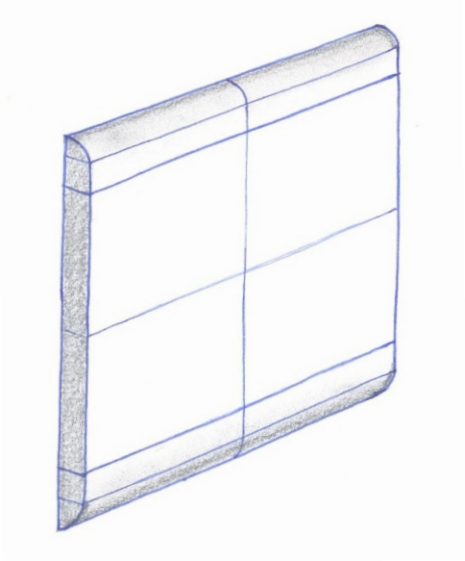
Initial sketches

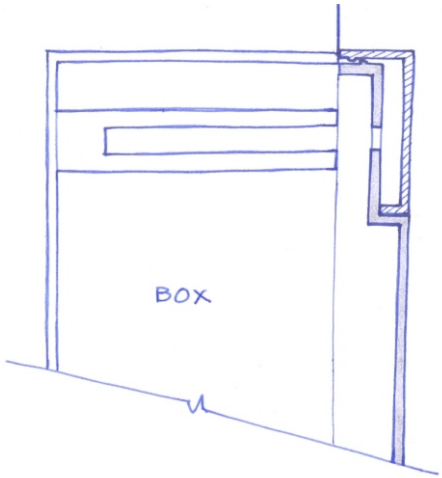






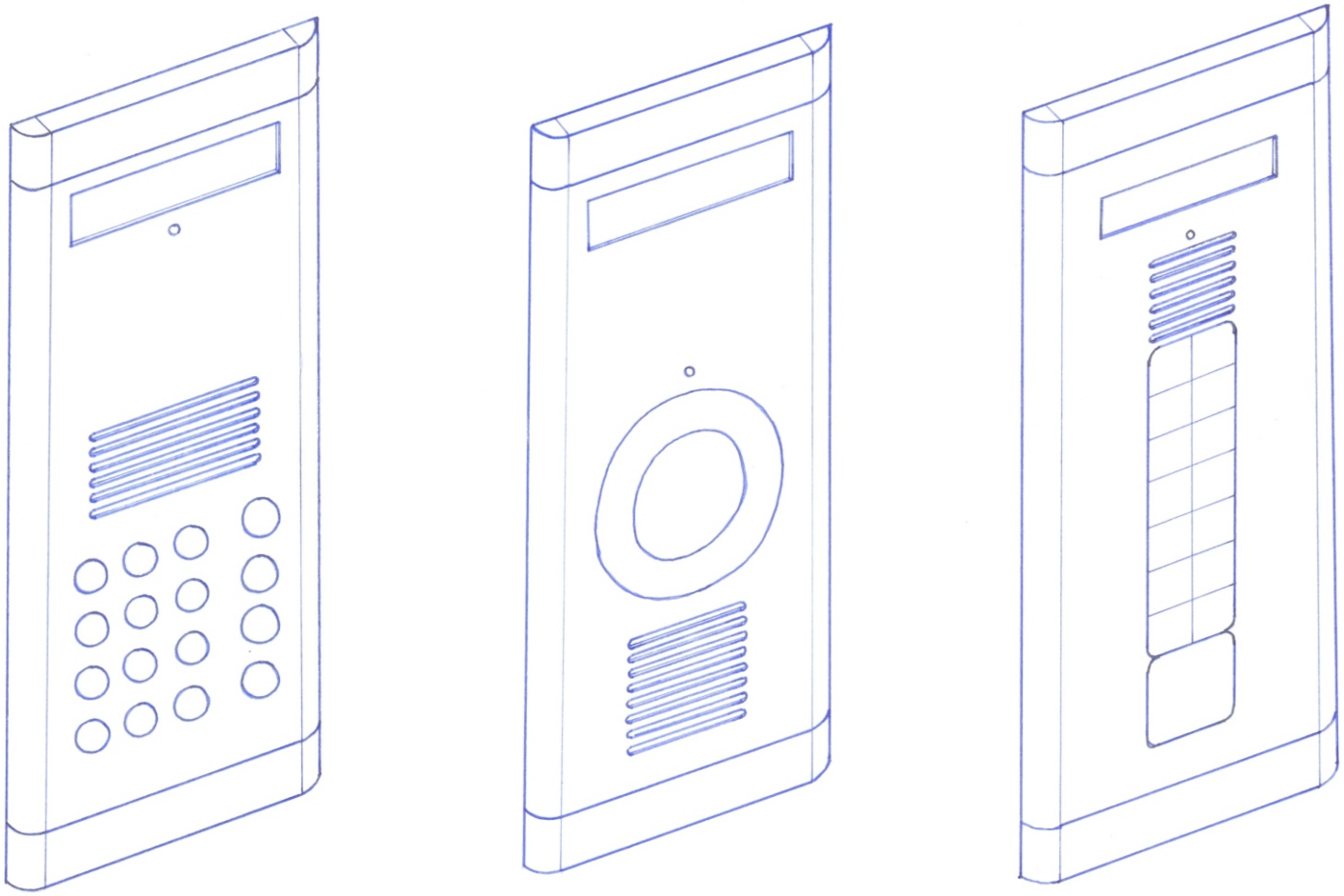






Fascia Plate - Different options

Initial sketches



Main Door Panel

Different options with PIN pad and two line display along with speaker and mic

- Prof. Chakravarthy visited Hyderabad to review the process which was followed by a meeting with the CEO of the company.

  This meeting gave us the exact requirements of the client in terms of visual language and other aesthetic considerations. The hardware part of the products was also freezed upon in the same meeting which made it easier for us to design.

The visual language for the products was decided as follows

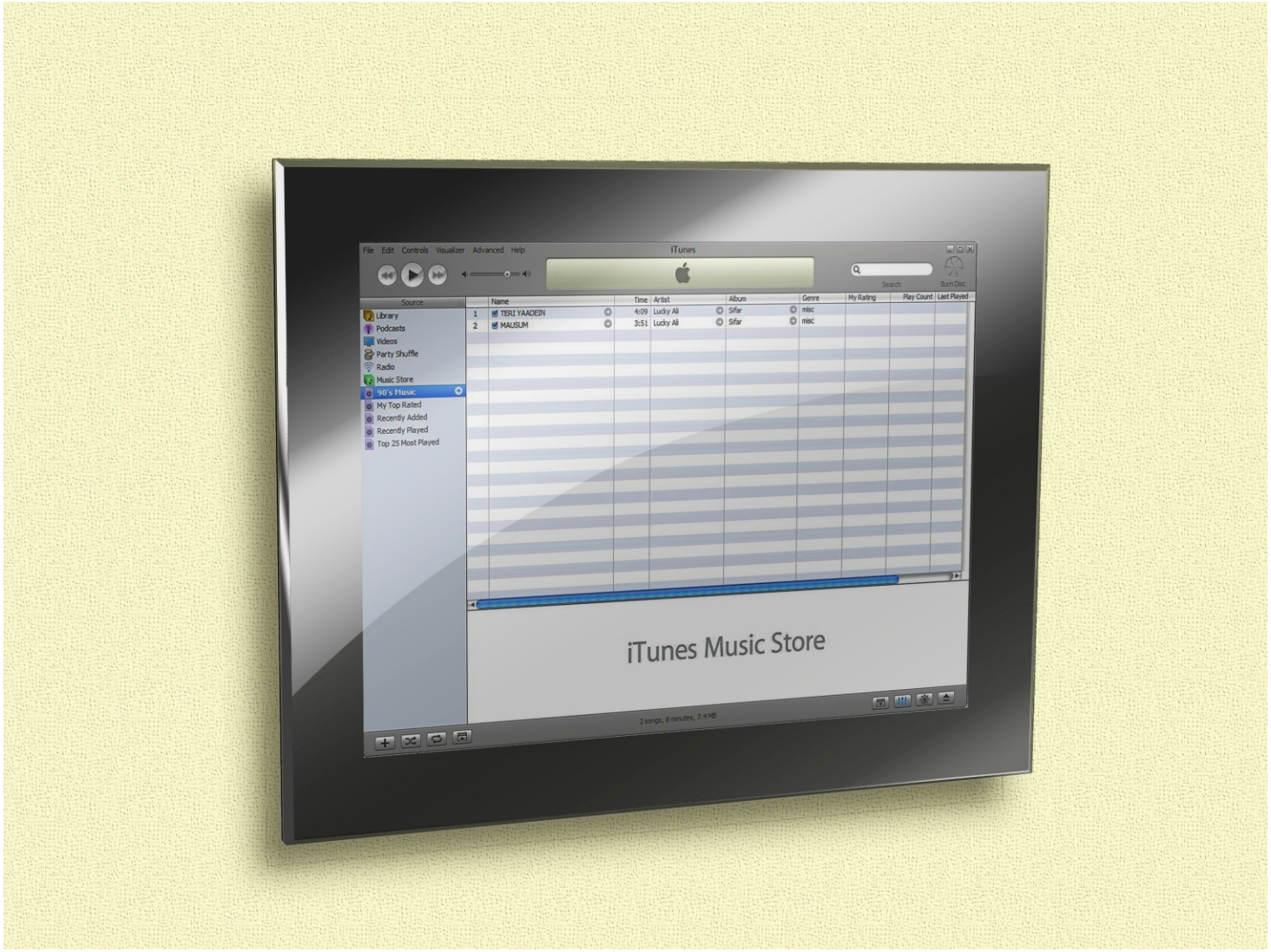
- Sleek but robust
- User friendly
- Simple lines
- Does not call for attention except the ACP
- No round buttons to be used

- The meeting was followed by a brainstorming and sketching session with Prof. Chakravarthy on the same day. Several options were worked out as per the new visual requirements and got approved from the management.
- We then worked out the detailing required for each product with some options in terms of edge fillets/ finishes/ hardware alterations.
- Photorealistic three dimensional images of all the product options were generated using different softwares.

Renderings

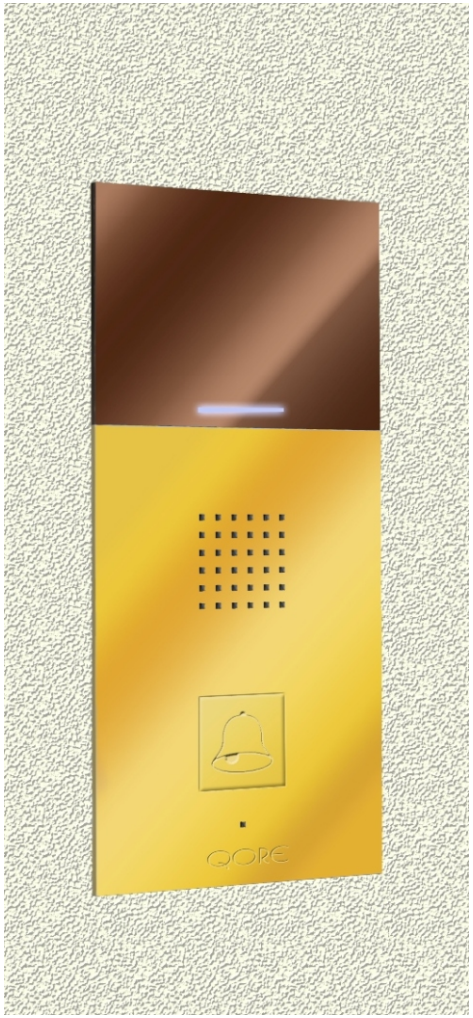
Apartment Control Panel
Option 1 - Straight edges

Renderings



Apartment Control Panel
Option 2 - Champhered edges

Renderings



Option 1

Option 2

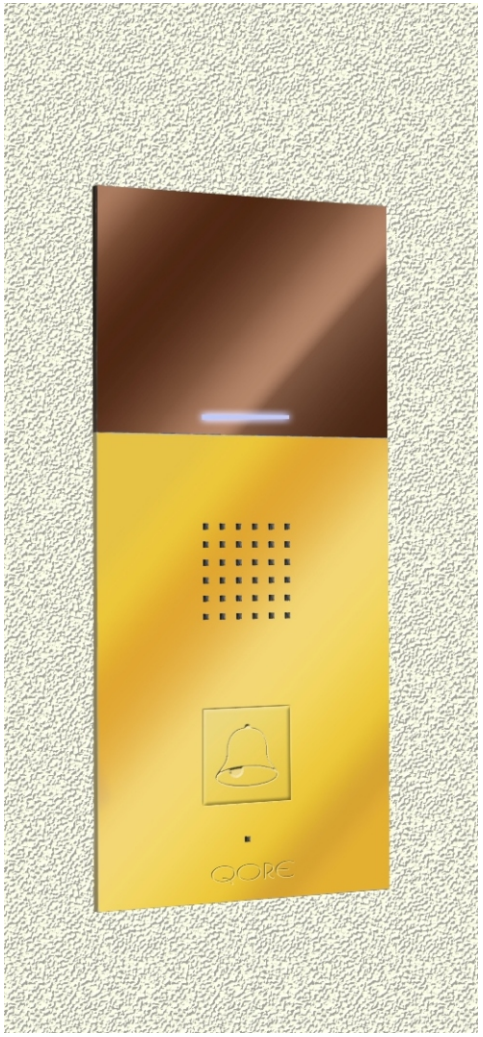
Option 3

Option 4

Main Door Panel

Renderings

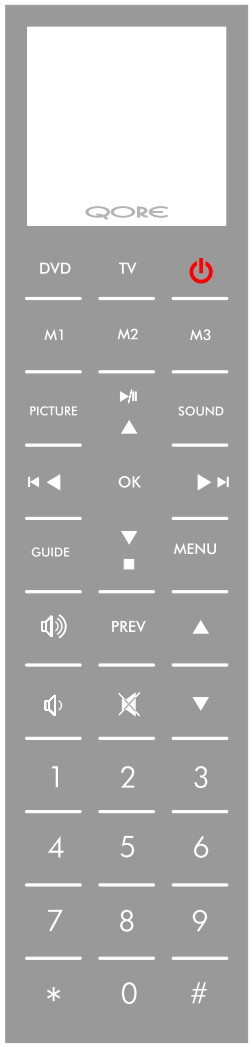
SS Special Finish - Silver



SS Special Finish - Golden

Main Door Panel
Coloring options

Renderings



Option 1

Option 2

Option 3

Universal remote
Initial CAD Drawings

Renderings

Universal Remote
Option 2

Renderings

Universal Remote
Option 2-a

Renderings

Universal Remote
Option 3

Renderings

Universal Remote
Option 3-a

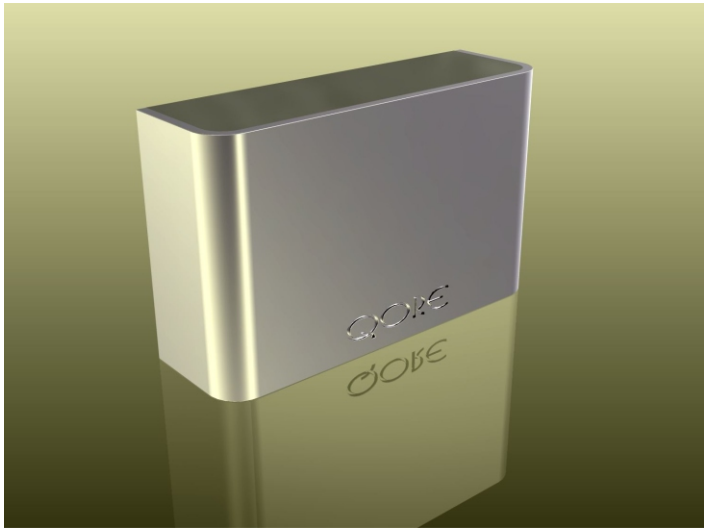
Renderings

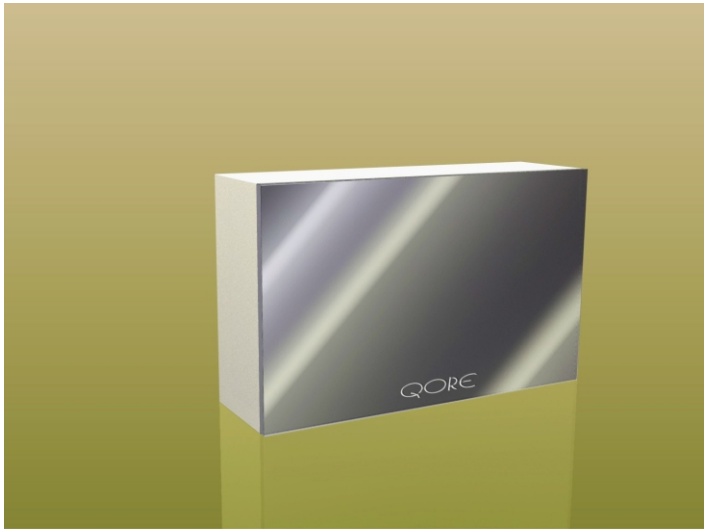
Room Remote
Option 1

Renderings

Room Remote
Option 1-a

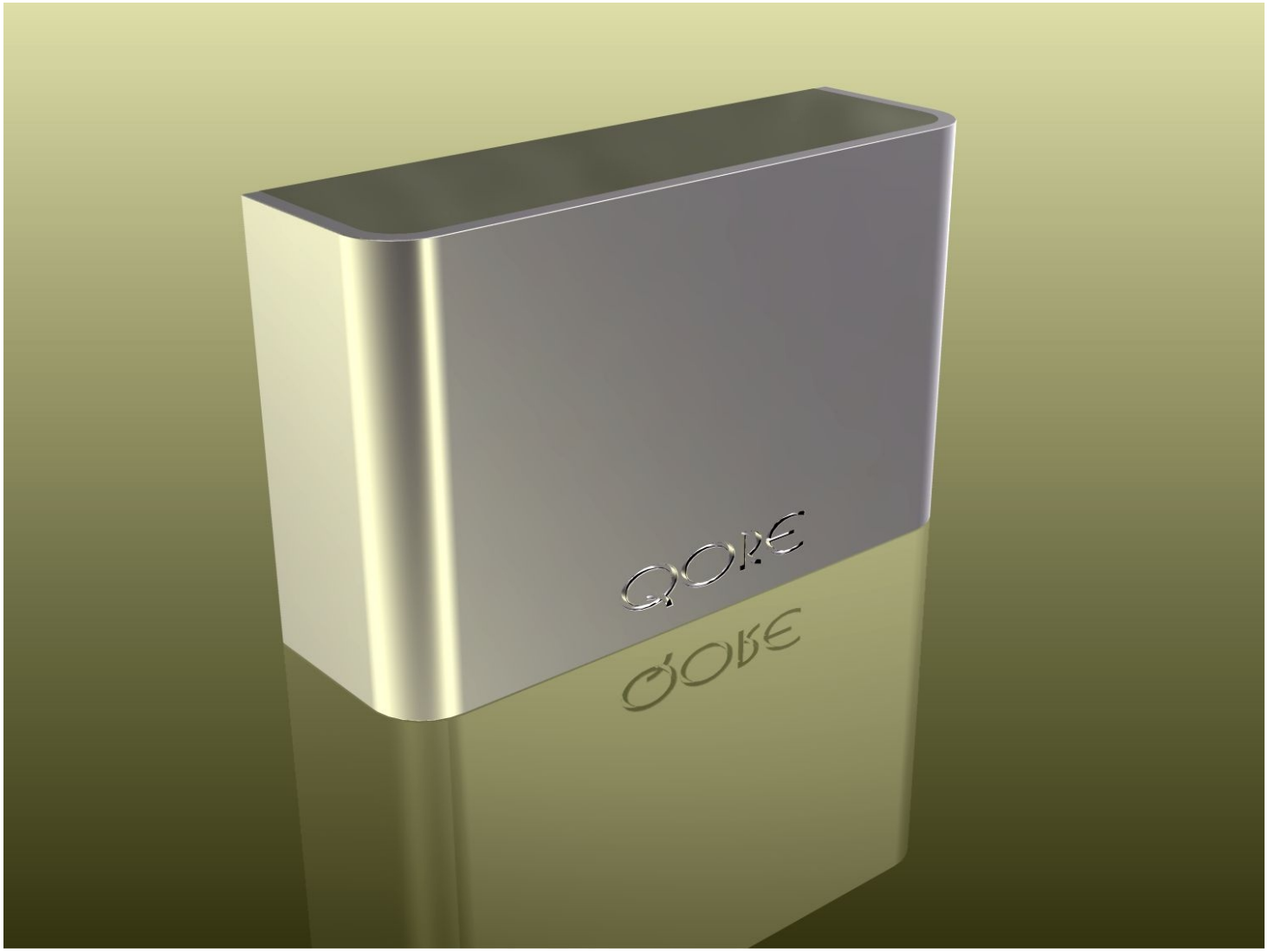
Renderings





Impact Sensor and Panic switch
Wired as well as wireless Impact sensors

Renderings



Impact Sensor and Panic switch
Wired as well as wireless Impact sensors
Option 1

Renderings

Set Top Box
Option 1

Renderings

Set Top Box
Option 2

Renderings

IR Sensor
4 Options

- During the process of developing rendered images of the products, we were closely interacting with the people involved in software/ hardware development to get the required details.

- The product details developed; along with the dimensional drawings were sent to Prof. Chakravarthy who made initial mock-up models of the products to test out the models physically in terms of balance and proportions and to try out different finishes.

Till this stage, the exact products specifications and the features to be provided were not finalized.

Initial Mock-up Model

Apartment Control Panel
Option 1 - Straight edges

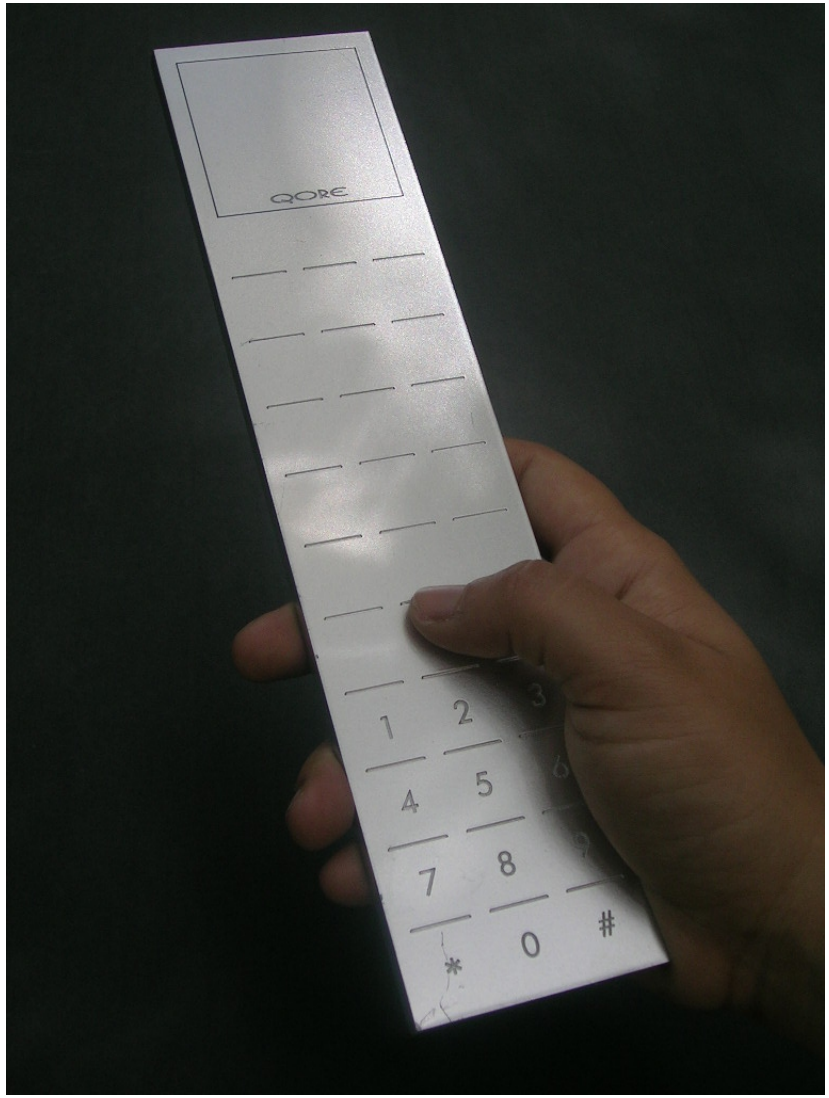
Initial Mock-up Model

Apartment Control Panel
Option 1 - Straight edges

Initial Mock-up Model

Main Door Panel
Option 1 and 4

Initial Mock-up Model



Universal Remote
Option 1

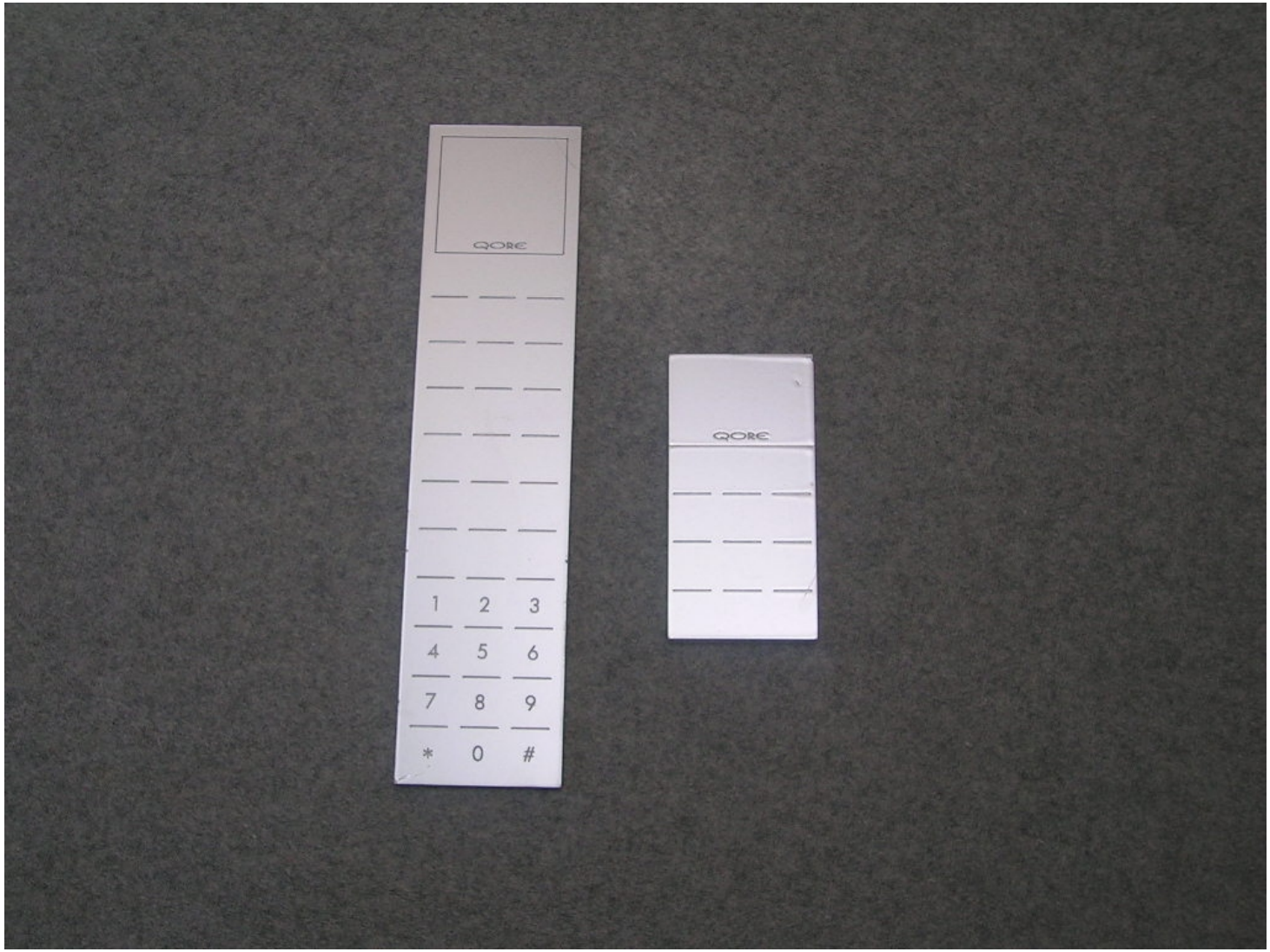
Initial Mock-up Model

Universal Remote
Option 2

Initial Mock-up Model

Room Remotes
Option 2 and 3

Initial Mock-up Model



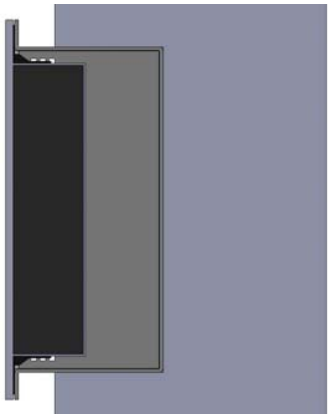
Mock-up models of the universal remote and room remote showing the family look

- A presentation containing all the rendered images with all the options and the images of the mock-up models was then given to the management.
- The selected options were then conveyed to us and for our surprise, all the products were accepted as were proposed or with very minor modifications/ changes.
- Then we made the final mock-up models of the selected options with different finishes and colors options and were presented to the client for further course of action.
- In the next stage, we developed all the product specifications. The entire process was then reviewed and documented for future reference.

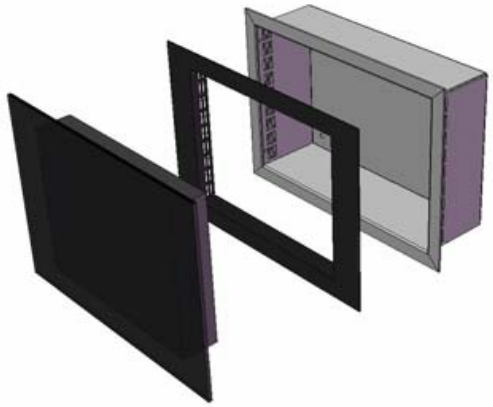
Final Mock-up Model

Apartment Control Panel

Product Specifications



ACP in the wall



ACP Assembly

- **The Apartment Control Panel** is the main interface to the total automation system.

I. Touch screen display is a glass integrated panel where the edges are exposed giving a high tech look.

II. The panel is jetting out of the wall by about 25mm which is used for speaker sound and Mic..

III. The ventilation grills are on all sides of the panel. A portion of control panels is concealed in the wall and flushed with a non reflective touch sense glass.

Main components of the ACP are-

a. Touch screen panel

b. Dispaly device

c. Mother board

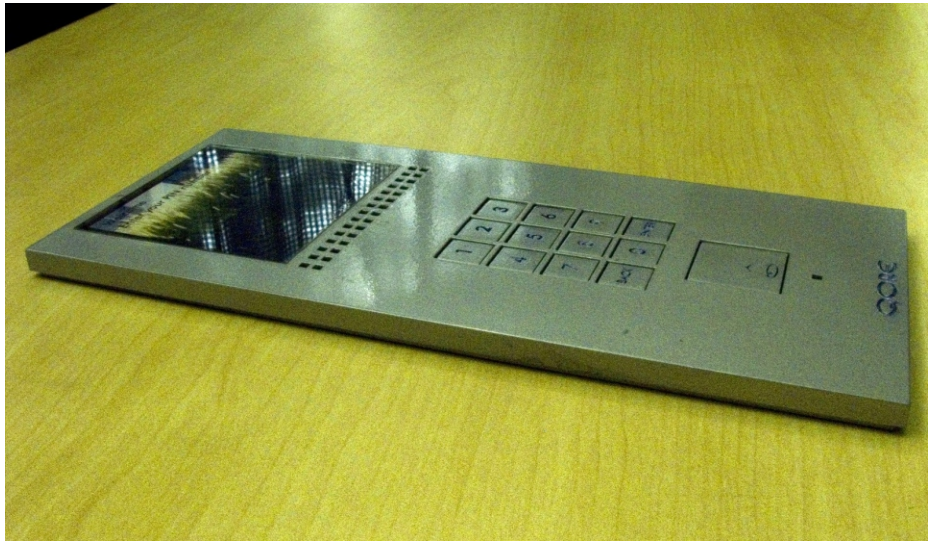
Detailed Description of Mechanical Components

1. Metal concealed enclosure embedded in the wall which will receive the whole electronics of control panel.

2. The mother board and display assembly would be in metal enclosure with ventilation ports and heat sinks.

3. The touch screen glass will be adhesively bonded to a metal/ plastic frame which will be fixed to this metal enclosure.

Final Mock-up Models

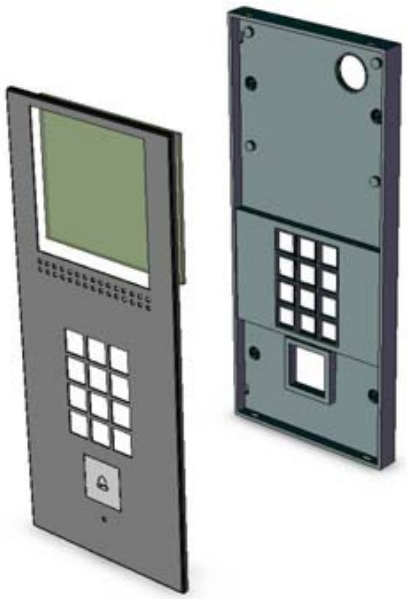


Main Door Panel

Final Mock-up Model

Main Door Panel
with full color graphic display, 12 keys PIN pad and Bell key (Fully loaded option)

Product Specifications



MDP Assembly

Main Door Panel – MDP

The main door panel of the Home Automation System is placed in the wall ideally on the handle side of the door. It has a metal enclosure which houses all the electronics and a stainless steel brush finish cover.

Depending up on the customer needs, it can have four options.

Option 1: With no display with Bell keypad

Option 2: With two line display and Bell keypad

Option 3: With full color graphic display and Bell Key

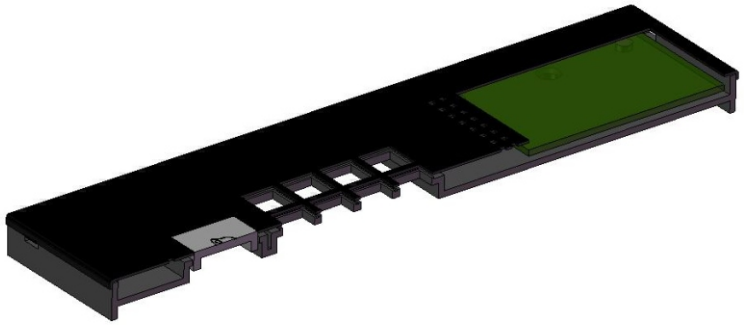
Option 4: With full color graphic display and 12 keys PIN pad & Bell Key

Option 5: With touch screen pin pad and camera at calling bell.

Main Components:

1) Bell Keypad
2) Camera
3) RF ID Reader
4) LCD Display
5) Speaker and Microphone
6) PIN keypad
7) PCBs

Product Specifications



Key Pad cross section

Detailed description of mechanical components

The MDP will predominantly have three major components:

1) Metal box embedded in the wall duly plated.

2) A plastic injection moulded carriage which will house the display, the key pad, the bell key and the PCB at the back. This will be mounted on the metal box by 6 screws with provision for levelling. The display glass will be adhesively bonded to the carriage using silicon for cushioning.

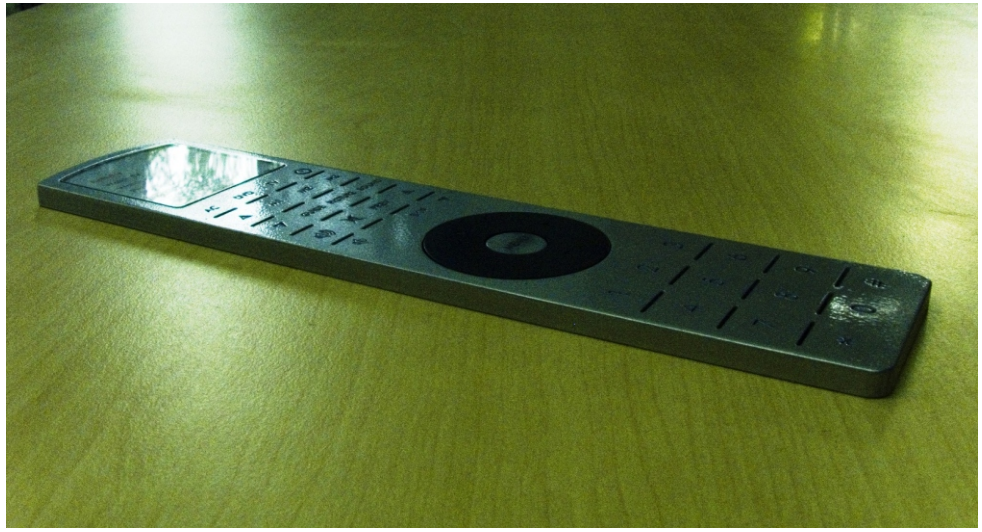
3) The top cover will be made up of 0.2 to 0.4 mm stainless steel formed shells with punching to accommodate the key pad and the bell key. The stainless steel shell willhave a brush-line finish and will be in the shade of Apple iBook Cover.

4) The speaker holes should be through only at the position where speaker is fixed on PCB others should be dummy.

5) The plastic carriage will have the snap lock on the top for the cover will have key slot in the middle.

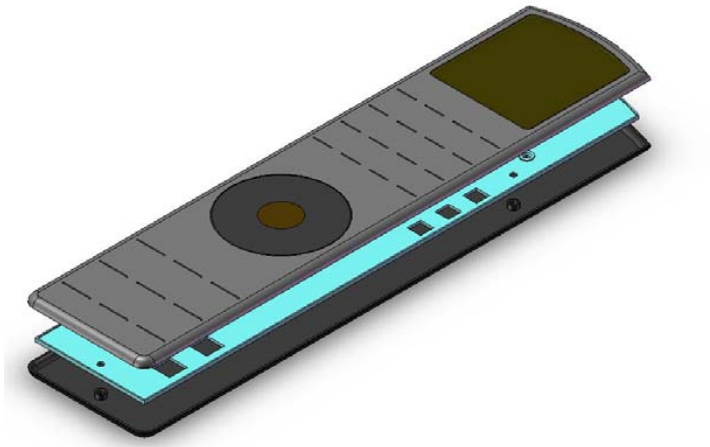
6) Camera will be placed in the centre top with a pivoted hinge for side wise movement which will be executed installation team.

Final Mock-up Models



Universal Remote

Product Specifications



Cross sectional view of construction

Universal Remote

The universal remote will be based on Zigbee technology and will be a full functional remote, which will control all features of the Home Automation System.

Main Components

1) Keypad
2) Track Pad
3) Full Colour Graphic Display
4) PCB
5) Inbuilt Battery
6) Antenna

Product Specifications

Detailed description of mechanical components

Option 1

1) Injection molded plastic (PC + ABS) covers with required details for snap locking and water proofing.

2) Top cover to house display mask.

3) Bottom cover to house PCB with mounted key-pad and Battery.

4) The finish of the room remote will be metallic as shown in the previous image and renderings.

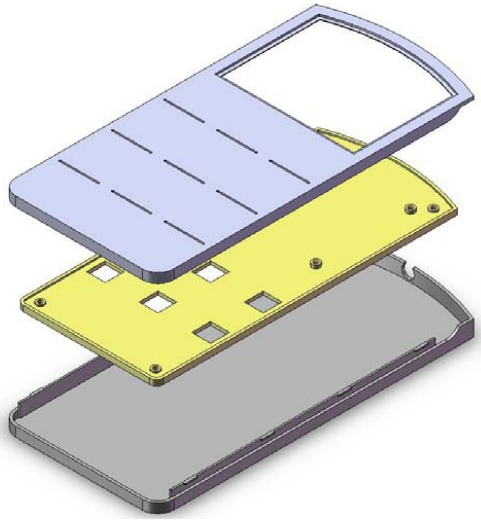
Option 2

1) 0.2 mm Stainless Steel shells

2) Injection molded carriage to house PCB, Display, Key-pad and Battery.

3) Finish like Nokia Phone (Model to be mentioned).

Product Specifications



Cross sectional view of construction

Room Remote

The Room Remotes will use infrared technology and will be able to operate all the gadgets in the room like Air Conditioner, Fan & Lights with possibility of additional keys for controlling additional gadgets. It will have LEDs to showcase which button is pressed.

Main Components

1) Keypad

2) Display mask with Fan, A/C, Lights, Cut-out to glow When LED lights up.

3) PCB

4) Inbuilt Battery

Product Specifications

Detailed description of mechanical components

Option 1

1) Injection moulded plastic (PC + ABS) covers with required details for snap locking and water proofing.

2) Top cover to house display mask.

3) Bottom cover to house PCB with mounted key-pad and Battery.

4) The finish of the room remote will be metallic as shown in the image above.

Option 2

1) 0.2 mm Stainless Steel shells

2) Injection moulded carriage to house PCB, Display, Key-pad and Battery.

3) Finish like Nokia Phone (Model to be mentioned).

Conclusion

It was a nice experience to work with Tanla Solutions, Hyderabad as professional designers though we initially went their as a part of our summer project. It proved very helpful for us as we understood the professional way of designing and presenting the designs to the top authorities in the corporate world.

Key learning from the project

- Interact with the top guys - **always**
- Keep an eye on the shop floor activities
- Try to fit in a team rather than working as an individual

At the end it was very satisfying when we heard that all the designs that we had proposed for the home automation products are accepted as proposed or with minor modifications.

We can conclude that we successfully transformed the ideas and images that were there in the minds of the management of the company into tangible products which is a very rare case in the field of industrial design.