

# The xRemote: A Smart Remote Control

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## Summary

The xRemote is a small and inexpensive multi-device remote controller which can be controlled by smartphone app. It allows user to control household appliances anywhere internet access is available through smartphone. It is designed for all types and brands of infrared-controlled appliances through reserved coding and self-learning. The xRemote will introduce a new kind of lifestyle differing from traditional remote control. It is a big step towards the truly smart home.

## Example Usage

- Replace all traditional remote controls with just one. Your smartphone will be the controller to all appliances.



- Control your home appliances even when you are away from home. When you are in your office, you can use your smartphone to schedule a pre-recording on your TV at home from miles away.
- Help your family member operating your home appliances no matter where you are. When you are out traveling, and your parents or your small kids are having trouble using high-tech appliances at home, you can help them to operate the appliances from your smartphone.

## Features

- **On/Off control:** You can turn on or switch off any infrared controlled devices from your smartphone.
- **Full functionalities of any traditional remote control:** You can turn up/down volume, change channel, mode, mute, all functionalities integrated in xRemote and controlled from your smartphone.

- **Long distance control:** You can use your smartphone to control your home appliances even when you are thousands miles away from home.
- **Multiple device control:** You no longer have to look for the specific controller to operate certain appliance; you can now control all appliances from just ONE remote controller: your smartphone.
- **Environment monitoring:** Temperature sensor, humidity sensor and light sensor are integrated on xRemote, so you can always easily check your home's temperature, humidity and illumination from your smartphone.
- **Long range & Wide angle:** Seven infrared emitters are implemented to cover all directions and make sure the infrared signal is strong.
- **Simple to use:** It can be easily set up in a few steps. The phone app user interface is neat and simple.



## How It Works

- The xRemote contains a Wi-Fi module, which is connected to the home wireless router. This allows for communication between your smartphone and xRemote.
- The xRemote contains infrared receiver and transmitters in order to learn and send infrared signals.
- Before use, you need to take your remote controllers and press different keys for the xRemote to learn and record sequences of code for appliances in your home and thus to control them.

- The codes are then to be send and stored on your smartphone.
- When using app on your smartphone to control appliances, your phone will send the command through network or Wi-Fi, which will be received by xRemote device. The xRemote will then respond and send the sequence of code through infrared transmitters, thus can be received by appliances.

## How We Developed This

- All electrical designs are completed including choosing proper components, designing and testing circuits, and PCB design.
- Individual modules are built and tested, and all functionalities are successfully implemented.
- We've spent months building this working prototype.
- We also worked on creating the smartphone app on Android.
- The Android app is tested together with our prototype.

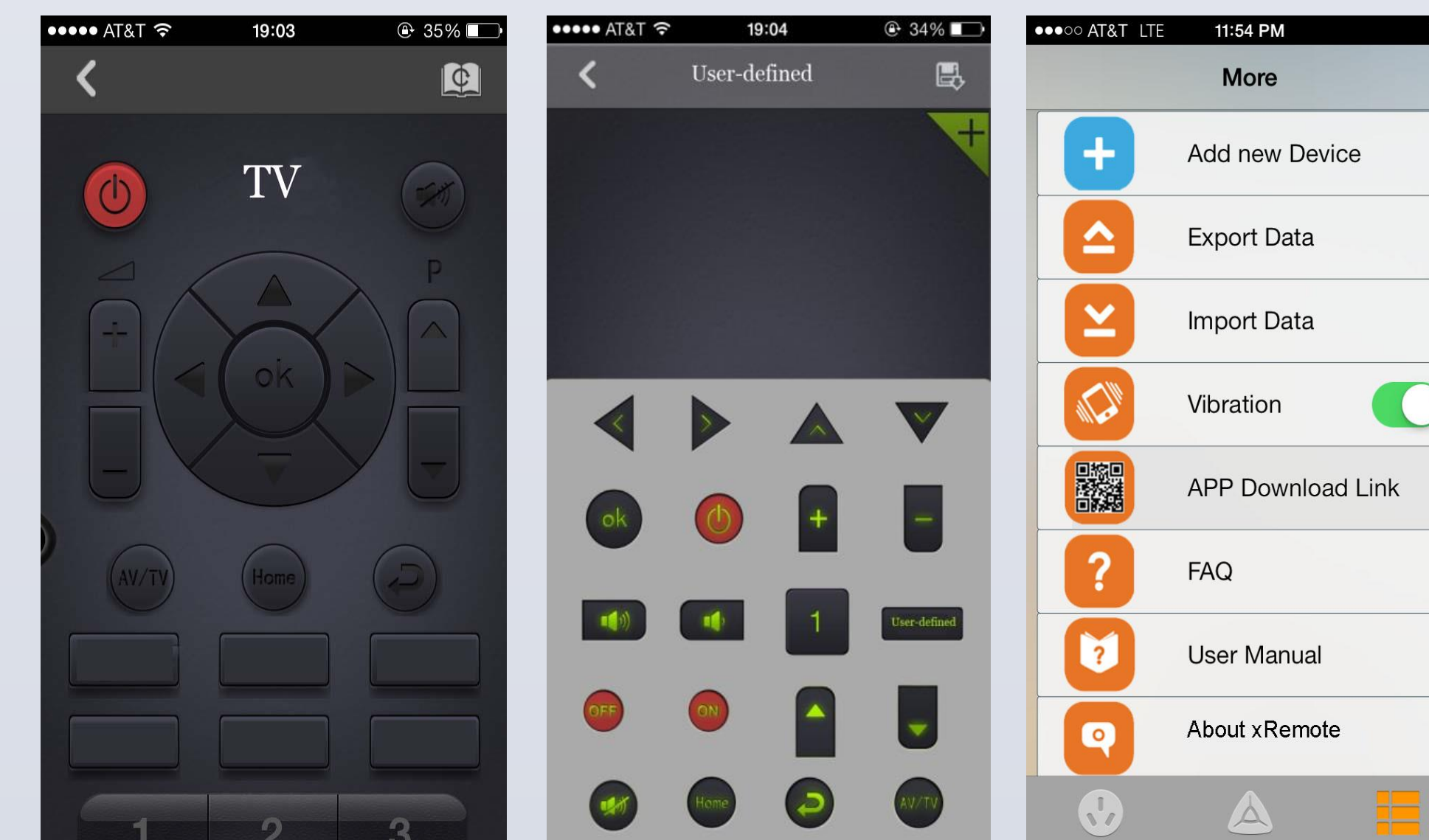


Figure. Smartphone app user interface.

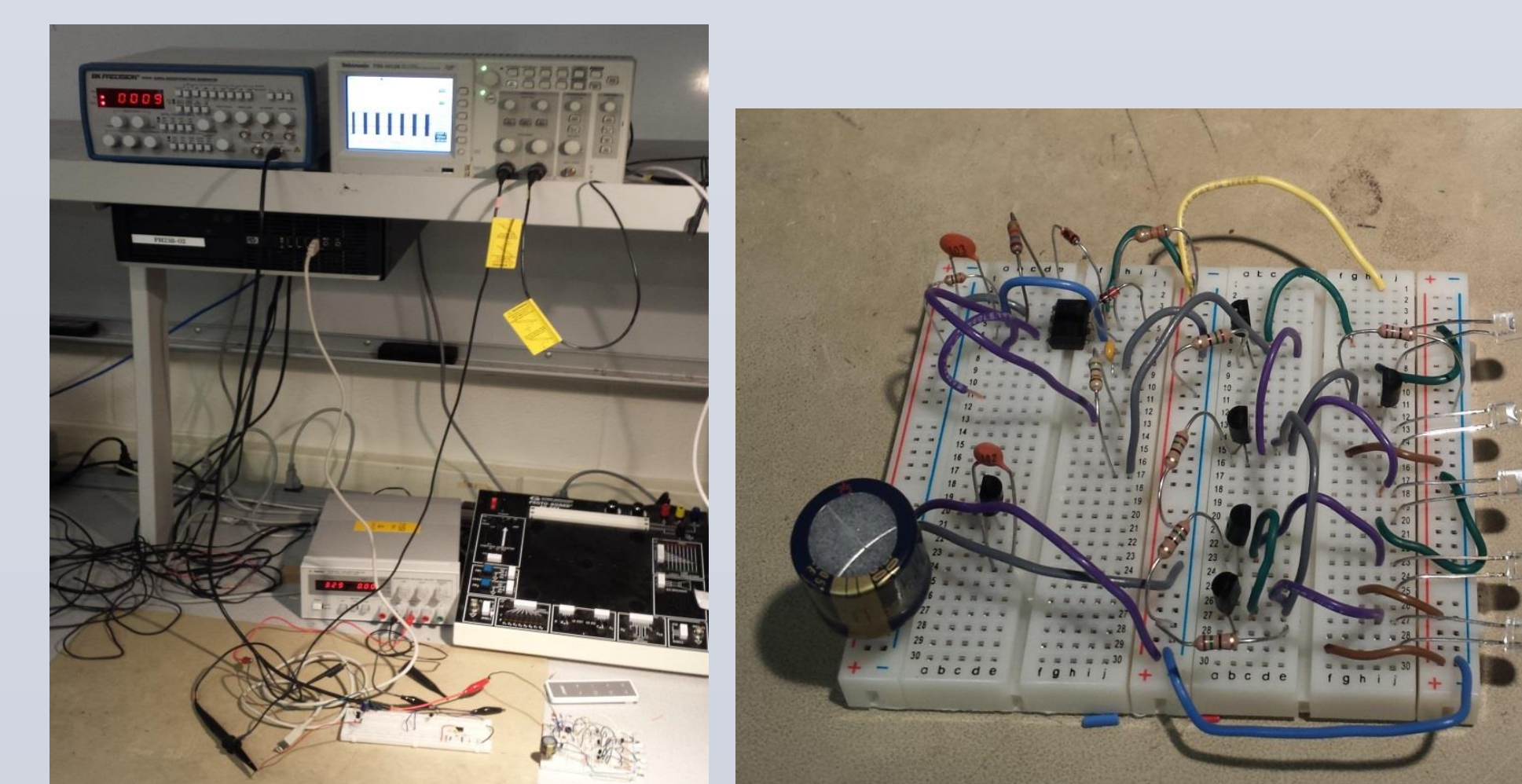


Figure. Infrared transceiver circuit and test bench

- We spent a lot of efforts designing a simple and intuitive product. The finalized design was chosen from our initial 8 design drafts. The cubic design is elegant and compact, dimensioned only 10 cm \* 10 cm \* 4 cm. You will certainly feel good about placing it on top of your coffee table.



Figure. Product design

## Future Improvement

- Integrate Bluetooth module and Zigbee module.
- Complete finalized commercial smartphone app development.
- Launch the beta test for the final prototype.
- Improve the PCB design.
- Complete reliability and stress testing.
- Advertising and marketing.
- Secure certifications.
- Complete the packaging design and order packaging.
- Launch xRemote to market.

## Conclusion

We stick to the time schedule to guarantee the progress of project. We believe this product will become a success and introduce a new smart home lifestyle to the world. It will become an important milestone to enter the next generation Internet-of-Things smart home technology.