



Where Innovation Gets Smart

Case study: iKEON

Hey Siri, power up my smart home

Introduction

With smart home technology sweeping the globe backed by major pushes from global behemoths such as Apple, Google and Amazon, a start-up based in Sydney Australia knew it had to do something special to stand out.

Worx Solutions engaged Genesys and industrial designer Design & Industry to develop an app-controlled power-point system for use in domestic and office settings. The smart product range would be branded as iKEON and key deliverables were an enhanced version of the conventional 2-socket wall-mounted power points and light switches, as well as a 4-way power board. These devices were all to be controlled using an app running on a smart device, including web-based monitoring and control.

To compete on the global stage, Worx envisaged devices that ~~was~~were both smarter and aesthetically superior ~~casing~~ to the standards ~~fittings~~fittings endemic in the domestic market. The devices would have virtually every smart feature conceivable and be capable of integration into smart homes.

From an aesthetic point of view, the iKEON range would have touch controls, customisable colour schemas with illuminated rings and status indicators. The electronics controlling the wall-mounted devices would have to be highly constrained to fit into slim designs envisaged and for retrofitting into standard wall box spaces.

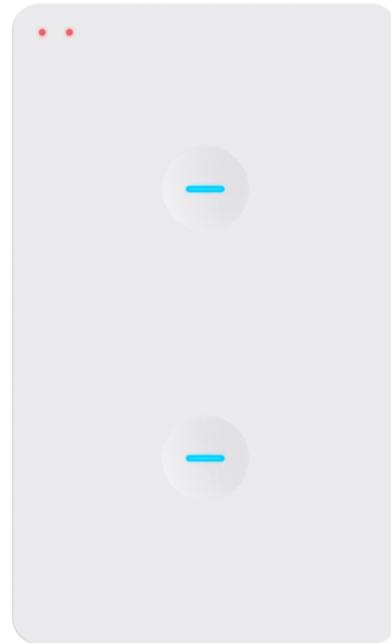


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Features

Genesys worked closely with Worx in refining what was possible and defining the full set of features for iKEON, which included:

- Voice control using key-words to trigger an automated sequence of events, such as turning on particular lights, heaters and power points.
- Remote control of all power points and light switches.
- End-to-end encryption of communication
- Geo-location automation, allowing devices to turn on as you approach home according to your pre-programmed scenes
- Customisable colour schema for illuminated rings and status indicators
- Power plugs remain inactive until approved plugs are inserted, with password activated locks on power outlets
- **Built-Built**-in timers and event schedules for all points of connection
- In-built proximity sensors to active devices and using the iKEON illuminating rings as a night light
- Inbuilt temperature and humidity sensors
- Monitoring of power used by every device and automatic power on/off function to minimise energy consumption and avoid overcharge of electronics
- Devices double up as temperature and humidity sensors to automate control of your HVAC system
- In-built surge protection



A decision was made early in the project to align the devices to Apple's smart home system called HomeKit. This means the customer can integrate the smart devices into their smart home network. With a simple voice command, they can execute any pre-programmed scene, from turning on the kettle or turning off a ceiling fan. For example, in the evening they can simply say "Hey Siri, Good Night" to turn off all the lights in the house.

Solution

The HomeKit alignment required establishing an Apple Mfi development environment and taking all necessary steps to ensure the product could join the Apple ecosystem.

This immediately dictated ~~a number of several~~ technology choices including the use of Apple's authentication coprocessor for encryption, the choice of Marvell's WMSDK operating system for the microcontroller operating system and Marvell's software development kit to manage the HomeKit requirements. Support for Apple HomeKit Support entailed secure flash, over the air updates, creating a Wi-fi connection, including support for Apple Wi-Fi Accessory Configuration mode.

The solution developed by Genesys was primarily a power control system driven by a microcontroller with integrated flash program memory and RAM. The platform included a power monitor for power-on reset and brownout detection, four reduced-power sleep modes ~~and~~, timers for preprogrammed event management ~~and XYZ for ABC~~.

A battery-backed ~~real-real~~ time clock to facilitate data logging, events and alarms to be time stamped. Logged files are retrievable via a smart-phone application.

All devices are configurable via Apple's WAC mode using a hosted website with the device acting as a Wi-Fi hotspot in setup mode.

Peripheral devices included an on-board temperature sensor Tri-colour LEDS supported the user interface. For touch control, capacitive touch buttons were including, with trailing edge lamp dimmers. The plugboard would include a resettable circuit breaker and Qualcomm Quick Charge 3.0 compliant USB ports. The light switch also operates as a dimmer, on up to four circuits and includes filtering for off-peak signals.

The devices were all designed for operation in markets around the world including Australia, North America, Europe and South East Asia. This meant adhering to a range of product and electrical safety standards from those regions, including those related to electromagnetic capability, restriction of hazardous substances and environmental controls on electronic waste.



Outcome

The iKEON product range has won a major international award for its innovative approach in a competitive market. The award was given by the prestigious iF International Forum Design, one of the world's most celebrated and valued design competitions with 6400 entries from 50 countries in 2019. The award was given in the Building Technology Category.

The product range is due to launch in June 2019.



About Genesys

Genesys Electronics Design is a product developer specialising in the design of electronic devices. We bring the power of the Internet of Things to make your product smart.

Our core services include:

- Product design
- Electronics engineering
- Software development (including apps)
- Product manufacturing management
- Regulatory compliance support

Genesys offers a fully bespoke design service where our customer owns the IP, which we develop for them. Alternatively, we offer a white-labelling process for building products on existing designs from our library, with a range of licencing options.

Genesys was founded in 1991 and has grown to 25 staff, with a combination of hardware and software specialists.