



# envigma

## Product guide

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## Home Automation

Home automation is a field within building automation, specializing in the specific automation requirements of private homes and in the application of automation techniques for the comfort and security of its residents.

Although many techniques used in building automation (such as light and climate control, control of doors and window shutters, security and surveillance systems, etc.) are also used in home automation, additional functions in home automation include the control of automatic plant watering, pet feeding, and automatic scenes for dinners and parties.

The main difference between building automation and home automation is the human interface. In home automation, ergonomics is of particular importance; the controller should be largely image-based and self-explanatory.

## Existing Problem

Home automation systems have, in the main, been implemented with a centralised client-server architecture – where the human interface (the client) is connected to a server running the automation software and device drivers.

Implementing a system like this is costly as two dedicated machines are required. Servers require supporting systems – firewalls, virus killers, etc., adding to the complexity, installation time, and cost of the system.

The other weakness is reliability. There are two points of failure, one of which is a server with moving parts. Hardware redundancy is not normally an option in small home automation systems.

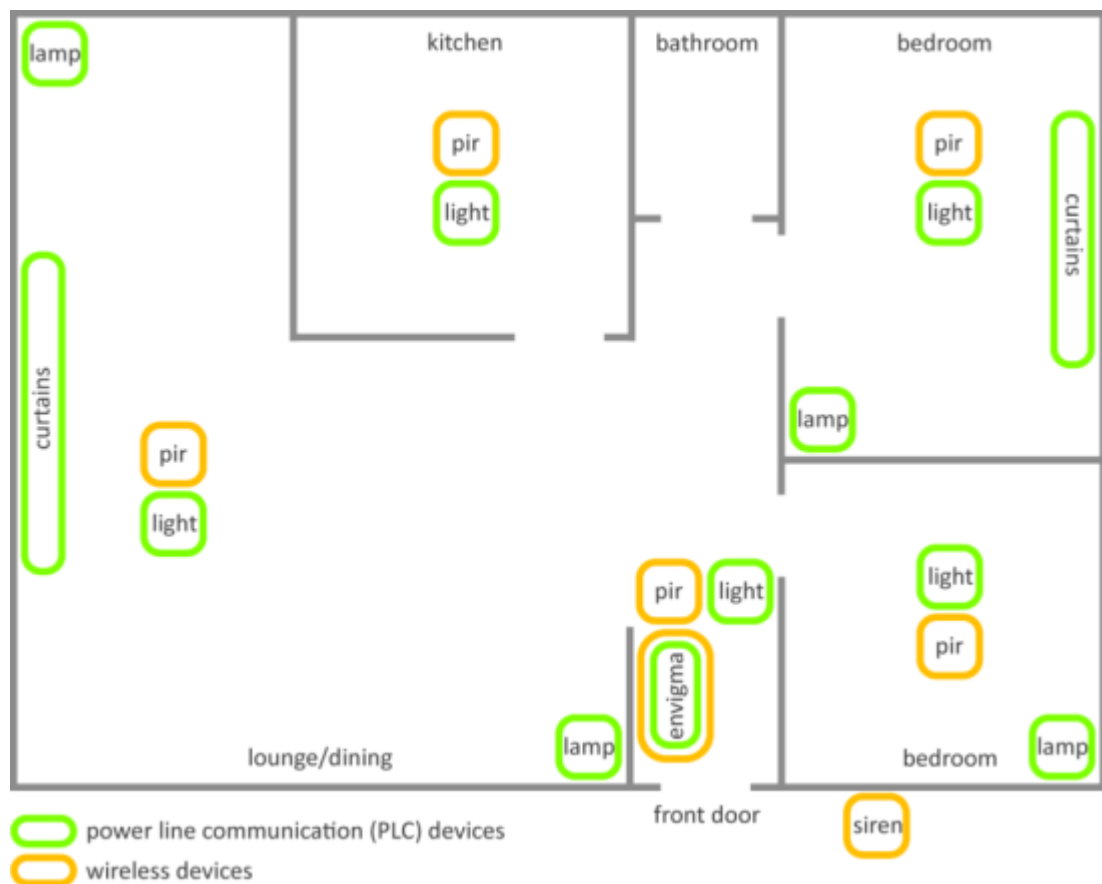
Reselling systems like these result in maintenance contracts that are costly to maintain.

## Our Solution

Envigma is an embedded software and hardware solution. Built on one of our powerful embedded computers, envigma is the microprocessor responsible for controlling the different 'controllable' devices in a home.

Whilst envigma retains the centralized architecture of existing systems, it runs everything from a single physical device which has no moving parts.

This improves reliability, simplifies installation and considerably reduces system cost.



No server, no additional equipment hidden away in loft space or under the stairs – everything is implemented in a wall mounted touch screen device.

Installs like the one shown in this diagram can be carried out retrospectively with very little disruption; security is provided using wireless, battery powered sensors (PIR's).

The lights, lamps and curtains are controlled by envigma by sending commands over the existing electricity circuit, using proven PLC (Power Line Communication) or wireless technologies.

Envigma is a self contained unit which only requires a connection to the mains in order to operate. All the Home Automation Interfaces are built into Envigma so no additional cabling is required. All configuration is carried out using the embedded web interface which is both powerful and easy to use.

## Hardware

Our hardware is based around a modern 624Mhz ARM Intel XScale processor with 64MB RAM and 128MB of persistent storage (other processor, RAM and storage configurations are available).

It is self contained wall mounted device with a 5.7" VGA TFT Touch Screen which is used to control your home.



Connectivity includes 1 x Ethernet port, 2 x USB host and 1 x USB device ports, 1 x RS-232 Port and 802.11B/G Wireless Networking.

Additional internal interfaces are available for:

*X10 Power Line Control* – X10 is a common home automation interface and uses the existing mains cabling in your home to transmit and receive commands. X10 is available now

*Z-Wave* – Z-Wave is a new wireless Mesh Network ideally suited for home automation as range problems are eliminated because every Z-Wave device acts as a repeater within the Z-Wave Network. Z-Wave is available now

*Zigbee* – Zigbee is a similar system to Z-Wave in that it is a mesh network but has been more widely adopted in the industrial marketplace. Please contact us for a release date for the Zigbee Communication Interface.

*Energy Monitoring Devices* – Monitor the energy used within your home and act upon the data recorded. Please contact us for a range of compatible energy monitoring devices.

Using the above interfaces it is possible to control and monitor a wide range of devices in the home including (but not limited to):

- Ceiling Lights
- Lamps
- Home Appliances
- Curtains
- Garden Sprinklers
- Outside Lights
- Alarm Systems
- Door Locks
- Home Entertainment Systems (i.e. Projector Screens)
- PIR Sensors
- Humidity Sensors
- Thermostats
- Light Sensors
- CCTV Systems
- Door Bells
- Boilers
- IR Devices

## Software

A customised Windows Embedded CE 6.0 kernel provides the software platform for a heavily optimised core providing the automation logic.

Internet connectivity is optional, but if available can be used by the system to display weather feeds, implement home remote control and send SMS in response to security alerts. In order to use internet connectivity the site must have an in place wired or wireless network and associated internet connection (i.e. ADSL or cable).



All future software updates will be provided free of charge to licensed users of the system.

## Lighting Control

envigma can be used to completely change the way you think of lighting within your home. Each light can be treated as a separate device controlled by envigma.

## Lighting Scenes

Scenes can be set up so that the correct lighting is available depending on what you are doing, such as:

*Dining Scene* – Dining room light on at 50% and 2 Dining Room Lamps on at 100% providing mood lighting, perfect for a romantic evening meal.

*Reading Scene* – All lights in the Lounge on full in order to make reading as easy as possible.

*Energy Save Scene* – All the lights within your home (or just certain ones) controlled by PIR sensors so that they come on when you enter a room and go off when you leave. This can help you to cut your energy bills.

*Night Scene* – If someone gets up during the night to use the bathroom turn on the landing and bathroom lights at 30% automatically. Bright enough so people can see where they are going but not bright enough to wake them up.

All scenes are completely configurable and can be automated depending on the time of day, sunset/sunrise/twilight times or via external sensors.

## Home Entertainment

Home entertainment systems are now a part of every home but can be complicated to set up and use with a multitude of remote controls required in order to set the system up for watching TV, watching a film or listening to music.

Through the use of IR senders it is possible for envigma to be configured with Home Entertainment scenes so for example:

*Home Cinema Scene* – Living Room Light off, Living Room Lamps on at 50%, Projector Screen lowered and surround sound system configured for a film.

## Heating Control

Traditionally central heating systems are very rigid in the amount of control they offer, normally with just one thermostat in the living room or hallway controlling the temperature throughout the entire home.

Using envigma to control your home heating allows you to have a wireless, programmable thermostat in every room allowing all occupants to set the temperature to a level they find most comfortable.

It is even possible to use external temperature sensors which can trigger your heating system depending on the weather outside. This can ensure that your heating is controlled much more precisely as it can respond much quicker. Using external temperature sensors to control your heating can save energy as it means you will not be heating your home unnecessarily.

By connecting your heating system to envigma it is possible to control your heating system even when you are away from home. If you notice the weather is particularly cold whilst you're still at work, you can connect to your home over the internet to make sure it is nice and warm for when you get home.

As everything will be controlled by envigma it is also possible to have different heating profiles set up depending on the time of day so in the evening your home can be nice and warm but overnight the heating can be reduced in order to save energy.

Please contact us for more information on compatible heating control systems.

## Device Grouping

Sometimes it is nice to have several lights within your home connected to one switch so for example:

*Lounge Lamps* – Rather than turning on lamps individually envigma can be configured to turn them on when the Lounge Light Switch is pressed.

*Kitchen Under Cabinet Lights* – Kitchen under cabinet lights are very nice but normally they have been installed after the original house wiring was installed so the switch to control them is normally in a very out of the way place. Using envigma it is possible for the under cabinet lights to come on when the main Kitchen Light is turned on.

Using envigma all the above is possible with no additional wiring required.

## Security When Away

One of the things thieves look for is patterns in lighting so they can ascertain whether anyone is currently in. There are available on the market Time Switches which allow you to set a lamp to turn on and off at certain times. Seen from outside it is very easy to notice this pattern (especially when this is the only light that comes on every night for a week).

Using envigma it is possible to set every light in your home to turn on and off at certain times of day or even depending on sunset, sunrise and twilight times.

So for example it is possible to:

- Turn the lounge light on and shut the curtains at dusk.
- Occasionally turn the hallway or landing light on for a short time giving the impression of someone moving within your home.
- Operate the Garden Sprinkler system at certain times again giving the impression that you are at home.
- Opening all the curtains at sunrise.

It is also possible to use envigma as a full security system responding to PIR's being triggered and sounding alarms and barking dog sirens, sending you an SMS message and allowing you to connect to your home to monitor CCTV systems.

## Appliance Control

The one thing that most people crave most of all when they get up in the morning is a nice cup of coffee.

Using envigma you could set up an automation task such that if the Landing PIR sensor is tripped, the bedroom light is on and it is after 7am, turn on the coffee machine so a fresh pot of coffee is waiting for you when you go downstairs.

## Remote Control

Using the internet it is possible to control all of the systems above remotely.

If you get to work and can't remember if you turned all the lights off or can't remember if you locked the door you can use envigma to check and put the problem right.

All communication with Envigma is encrypted with SSL the industry standard for secure web communications and so you can be assured that it will only be you able to gain access to your Home Automation System.

## Conclusion

All of the above examples are possible with envigma; however the home control possibilities do not stop there.

If you can think of a Home Control function it is probably possible with envigma.

Please contact us if you require any additional information or to see whether envigma can accommodate your home control ideas and needs.