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**CLAIRE LLOYD** has been a member of the *Homebuilding & Renovating* team for over a decade. She's completed her latest renovation



## HOW TO... design a smart home

From security to cinema rooms, we explain the options available, when to call in a smart home specialist and why it pays to plan for a smart home before you start work on site

There are an increasing – and sometimes overwhelming – number of options now available to make our homes smarter, from a host of Alexa-enabled devices to full-blown cinema rooms. There are even tech solutions to problems we perhaps don't have ('smart' toasters anyone?). Like it or not, technology is all around us and developing at a rapid pace.

It's easy to dismiss the idea of the smart home as a bit of a 'fad'. However, dig a little deeper into how we now live in our homes – browsing the internet on our phones, remote working, and streaming the latest series on our TVs (activities which are often happening simultaneously in a family home) – and you realise how intrinsic technology has become.

Add to this the technology which can help enhance or make life that little more convenient and we can begin to appreciate how making provision for a smarter home is, for the want of a better phrase, a smart thing to do.

### 1 **DIY vs professional installation**

From smart security systems to entertainment, audio-visual solutions and multi-room audio, and automation, which encompasses smart lighting, blind and heating/climate control, the options are plentiful. The starting point is thinking about how you live (is reliable WiFi essential, perhaps?) and what falls under 'nice to have' and 'need to have'. Ultimately, your decision will come down to what you hope to achieve and your budget.

In very broad terms, smart home tech can be divided into two areas: DIY products which

can be purchased ‘off-the-shelf’ and installed by the homeowner (such as the Sonos home sound system or Philips Hue smart lighting), and technology which requires professional install.

“DIY products offer a taster and can be a good solution at a basic cost,” says CEDIA Advanced Member Mike Ranpura of Smart Life AV ([www.smartlifeav.com](http://www.smartlifeav.com)). There are a growing number of products that offer a level of connectivity and options such as voice control. But, as Mike Ranpura points out: “They’re not designed as integrated whole-house solutions.”

“Entry level products tend to act in isolation,” adds smart home specialist Alan Matthews of Automated Spaces ([www.automatedspaces.co.uk](http://www.automatedspaces.co.uk)).

Once you start considering multiple elements of technology – smart lighting, blind control and security, for instance – you ideally need a smart home specialist on board. Their role is to bring all this technology together and in doing so, unify control. In other words, provide you with a single source of control – an easy to use touch-pad, universal remote or app – thus removing the need to open multiple apps or reach for different remotes.

They’ll also help design your smart home. “A good smart home specialist should discuss your lifestyle and the different technology needs of those using the house, and then make suggestions based on this information and your budget,” says Alan Matthews. “Not everyone is aware of the options now available; it’s the job of the smart home specialist to open your eyes to the possibilities.”



## 2 Plan early for a smart home

With a multitude of decisions to make on a self-build or renovation project, it’s tempting to leave decisions regarding smart home technology until the build is underway. However, if you do hope to engage a smart home installer or make provisions for a cabled infrastructure (more on which later), the ideal time to do so is during the design stage.

“We highly recommend you contact a smart home company at the stage when you are close to finalising the floorplans with your architect,” says Mike Ranpura. “Adequate storage space needs to be provisioned for all the AV equipment [see point 6]. It takes a lot of time to plan all the cabling and system for the property; contacting a company the day before you need to run cables isn’t good for anyone,” he continues.

“It’s more cost-effective to make changes when working on paper,” adds CEDIA Advanced Member Alan Matthews.

### A WHOLE-HOUSE SOLUTION

Rachel and Darren Luke’s self-build home is full of eco and high-tech features, including full Lutron home automation incorporating control of lighting throughout the home and adjacent garage flat, as well as 12 electric blinds, a full video distribution matrix throughout, and a 16-channel remote CCTV surveillance linked into an integrated alarm system. In the event of an incident this triggers every light in the house and all external floodlights, with all LED tapes turning red. There is also a nine-room linked MusicCast sound system, and a number of WiFi boosting access points outside as well as hidden in the ceiling internally (as the house’s insulation means the WiFi barely makes it out of the room the router is in). Then there are the two mechanical heat recovery ventilation units and a recirculating hot water supply and pump.

The whole automation system can be controlled by a mobile remotely from anywhere in the world. Darren reveals the final costs ran to £85k for this element of the project.



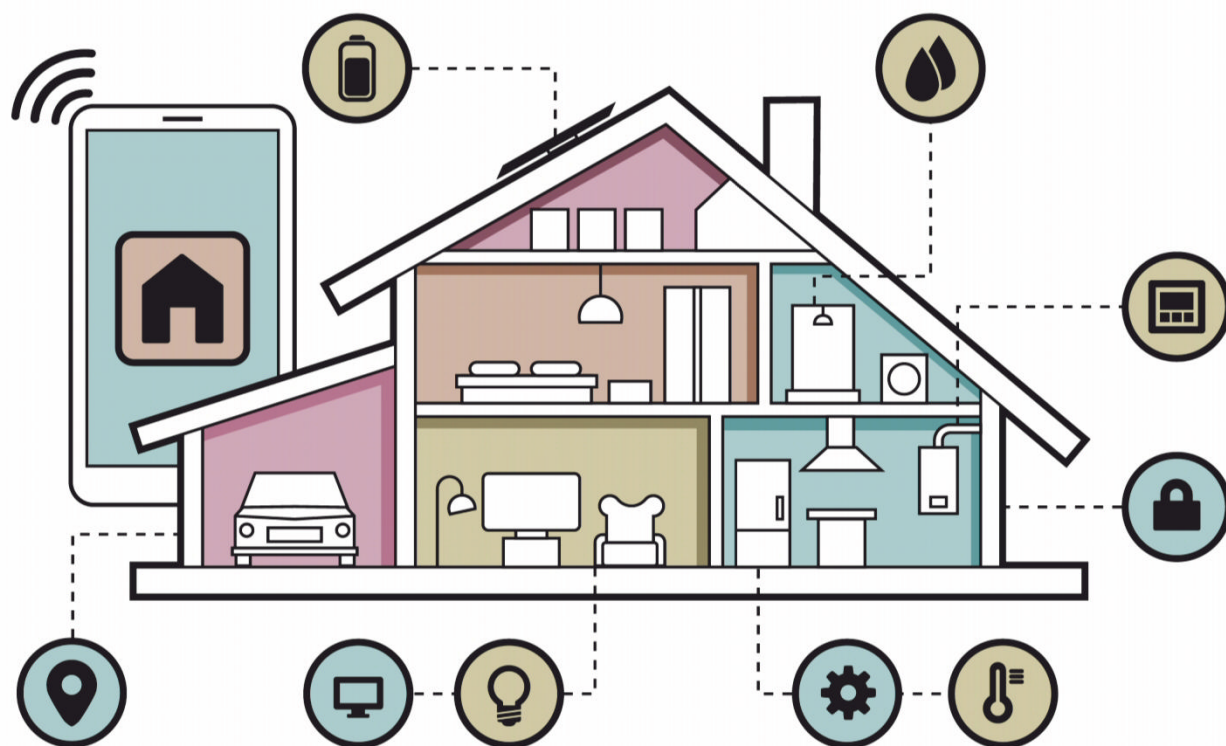
The other key consideration is aesthetics. “Even the majority of wireless solutions need to be plugged in — no one wants to install a wall-mounted smart TV to then see cables hanging below,” says Mike Ranpura. “There are also discreet options such as plaster-over speakers which can be built into the fabric of the building if planned in early.”

### 3 A robust network is the backbone of a smart home

A building project offers a great opportunity to create a smart home. The reason: it provides scope to introduce the cabling you need, in the places you need it. From data cabling, speaker cabling for audio and coaxial cable for TV, to name but a few, installation is more cost-effective when working with a blank canvas. “It’s infinitely more expensive — and often messy — to install a cable when the room is finished,” says smart home specialist and CEDIA Member of Excellence Owen Maddock of ConnectedWorks ([www.connected.works](http://www.connected.works)).

But in an age where we’re surrounded by wireless technology, why is this cabling so important? “A wired infrastructure is so much more reliable; this is perhaps truer now than ever before as we have more devices all fighting for ‘space,’” says Owen Maddock. “We used to have just a laptop or a desktop and a TV that wasn’t connected to the internet. Now we have multiple devices all competing — including your neighbours’. The only way to prevent ‘congestion’ is to put infrastructure in.”

Somewhat ironically, a wired network can provide reliable



WiFi, too. “Good WiFi doesn’t just happen,” says smart home installer Alan Matthews of Automated Spaces. “You need to plan in advance in order to achieve robust coverage throughout the home.”

The building materials we’re using to create our homes can cause WiFi dead spots. “Materials with solid density — concrete, stone, etc — are barriers to WiFi,” says Alan Matthews. “The other problem is metal. Steels hold up our extensions and knock-throughs, foil-backed plasterboard and insulation, metal back boxes for sockets — these create Faraday cages which block wireless really well,” adds Owen Maddock. “Glass is a barrier too,” says Mike Ranpura.

“The best and most reliable solution is to have several WiFi access points throughout the building — these are WiFi aerials, connected via data cables back to a central router. The best access point systems are ‘active’; in other words, when you move about, the system moves your device over to the best aerial,” explains Owen Maddock.

Expect to pay from £5k for a wired data and WiFi network designed and installed by a smart home installer, depending on the house size and location.

#### Finding a smart home installer

Don’t assume the task of designing a smart home and running cabling will fall to your builder or electrician. “Anyone can buy a drum of CAT6 cable, but the challenge is running it properly and to the right places,” says Owen Maddock of ConnectedWorks.

“There are of course some very good electrical companies who are qualified to run cabling, some with CEDIA membership too. But it’s a common misconception — in generic terms, electricians deal with electricity and AV engineers deal with technology,” says Mike Ranpura.

So where can you find a smart home installer? CEDIA is the smart home industry body, and is a very good place to start ([visit www.cedia.co.uk/find-a-cedia-member](http://www.cedia.co.uk/find-a-cedia-member)). As with every professional or trade you intend to hire, it’s important to find someone with previous experience working on projects similar to your own, and to see previous examples of their work.

For those on a tight budget, one solution might be to divide this task up. “To wire a typical four-bed house for wireless access points and fixed devices such as TVs could cost in the region of £1,500,” says Owen Maddock. “A smart home expert could produce a cabling plan from about £800,” he adds. “Once the cabling is installed, usually by the electrician, you could then get the specialist back to terminate and test the cabling — that job needs to be done by someone qualified, with access to the right equipment.”

While it’s another cost to factor into your build budget, there’s perhaps an argument to say that if there’s one thing you should do to futureproof your home for technology, or at least provide a good foundation for the DIY tech products you aim to buy, it’s introducing a data and WiFi cabling infrastructure. Which brings us on to...

**4 Futureproofing** This is particularly important if you’re building a ‘forever’ home or one in which you hope to reside for the next couple of decades. “We can’t really futureproof in so much as we can’t accurately predict what the future of tech will be. But we’ll likely have an appetite for ‘quick’ data — video for security, streaming, gaming, etc. If you have a good cabled infrastructure then, chances are, in 10 years’

This self-build home features an integrated smart home system (from Loxone), allowing the homeowner to control the home’s sound, lighting, alarm, heating and shading all from one app.

time, a smart home installer can come along and say: ‘no problem, we can do things with this’,” says Owen Maddock.

“Plan, plan, plan,” adds Alan Matthews. “Think about the life of the building. Your tech requirements today are going to be different to those in the future; that playroom might become a study or a cinema room, for instance. So consider how your rooms and home might change.”

**5 The costs** You can pick up DIY solutions from as little as £30, ranging into the hundreds and thousands. For those who’d like some degree of connectivity, then look for products which ‘communicate’ with one another. iTec Home, for instance, offers products which use the Z-Wave protocol to communicate. Such wireless products are an option in homes where you perhaps do not want to chase cabling and undertake remedial work.

Costs become more difficult to pin down when it comes to professional design and install

due to the variables involved — the complexity of the project, the house, your location, and the tech you aim to include, for starters.

“In a typical four- to five-bed house, expect to pay around £6k to £10k for a smart home security system — including video doorbell, CCTV cameras and alarm system,” says Mike Ranpura. “You’d perhaps be looking at £8k-£25k for an automated lighting system. A small cinema room starts from

### A solution for older properties

Adding a cabled infrastructure into the fabric of a new build or extension is all well and good, but what about period homes where the fabric is intrinsic to the character of the property?

“I work on a good number of older properties with features like original coving or plaster which you don’t want to be drilling through to add cabling. The good news is there are clever ways of hiding it,” says Owen Maddock. “For instance, nobody questions a drainpipe on the exterior of the building, but it can be used to hide away all your cabling.”





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£20k. For a whole-house system, upwards of £60-£65k.”

All in all, if you’re hoping to engage a smart home installer for your project, you realistically need to budget around £10k+.

That said, there are ways of achieving a professional install on a tighter budget — focusing on introducing tech in just one room for instance. “If budget is an issue then you could identify a room that will be the most frequently used and install a range of solutions in just that area,” says director of Automated Spaces, Alan Matthews.

A staggered installation could be another alternative. In other words, you could install the cabling, ready to add the technology you want as you can afford it.

## 6 Plan in space for equipment

If you hope to create a truly smart home, you’ll need to plan in space for an equipment rack, which will hold all the kit which your cabling will be wired back to.

While a dedicated ‘plant room’ is increasingly being factored in to many floorplans to house all the inner workings of a new home — such as the underfloor heating manifold, buffer tank and consumer unit — a word to the wise: it’s not the ideal location for your equipment rack. “‘Delicate’ data cables are not best placed near mains cables,” begins smart home installer Owen Maddock.

“Your rack shouldn’t be positioned in a humid environment (don’t place it next to the tumble dryer, for instance!),” adds Mike Ranpura

## Smart home trends

According to CEDIA installer and smart home expert Alan Matthews, hi-res audio (which captures a superior sound) and assisted living are areas which are becoming increasingly popular. On the latter, he says: “Visual prompts can be used to help those with a hearing impairment — for instance, the lights could flash as the doorbell rings. There are also some really good solutions developing around radar in the home — it’s less intrusive than CCTV as it doesn’t record a picture of you in your home. What it can do is tell the difference between you standing

up and lying down / falling over in rooms such as the bathroom and then send an alert.”

Another trend identified by smart home expert Owen Maddock are solutions to overheating: “Shading to assist with overheating is becoming increasingly common. This could be sheer blinds automated to shut when a set temperature/light level is reached.

“Advances in LED lighting are also moving at the speed of light. Bioadaptive lighting, which mimics the sunlight throughout the day and helps regulate our circadian rhythm, is another interesting area,” Owen Maddock concludes.

of Smart Life AV. “You need to consider ventilation too (which tends to be taken care of in new homes with mechanical ventilation with heat recovery), and an ambient temperature of 20-30°C is ideal — so avoid placing the rack in the loft, as this space can get quite hot.”

The space required will depend upon how much tech you aim to include in your home. “A smaller rack may be the size of a fridge, but a large whole-house smart home set-up may require space equivalent to three fridge-freezers,” says Owen Maddock.

“An accessible area of 1 x 2m, at least 2.1m high, tends to be ideal,” concurs Mike Ranpura.

## 7 Factor in maintenance

Technology does need to be updated and occasionally things do go wrong. As such, if you’re opting for a professional install, then bear

in mind that a good installer will talk to you about aftercare and support from the outset.

“We’re the only trade that doesn’t leave once a project is finished,” says Mike Ranpura.

How this service is provided will vary from installer to installer. “Companies offer different levels of support. Usually a maintenance contract would include some level of security updates, call-outs and help when things go wrong. Payment is either on an agreed plan or ‘pay as you go’ basis,” explains Mike Ranpura.

Maintenance is another factor to consider when opting to create a smart home. On the plus side, it means the support is there if and when you need it (and that’s not something readily available when opting for DIY off-the-shelf products). “In many ways, it’s like another utility bill,” concludes Mike Ranpura. **H**



**The smart home installer is the only trade that doesn’t leave once a project is finished**