

Shakin', ALL OVER

Though the home cinema experience isn't completely '4D', motion simulation actuators help you ride every bump and feel every explosion in your favourite film, writes **Jonathan Jackson**.

Sound and movement experiences are not just limited to the home theatre. This type of technology can be applied to virtual reality game simulators, flight simulators, aquasonic speakers for your pool, massage tables using physiotones and to the chronically hearing impaired for whom this is their only outlet to experience external sounds. The purpose is to recreate or heighten real sound and movement; in the case of the cinema experience it is to make the surreal seem normal.

For instance, imagine you are watching *The Fighter* in your personal home theatre. An actuator allows you to experience every jolting punch to the jaw, every drop of sweat that hits the canvas and every knockout in all its psychophysiological glory.

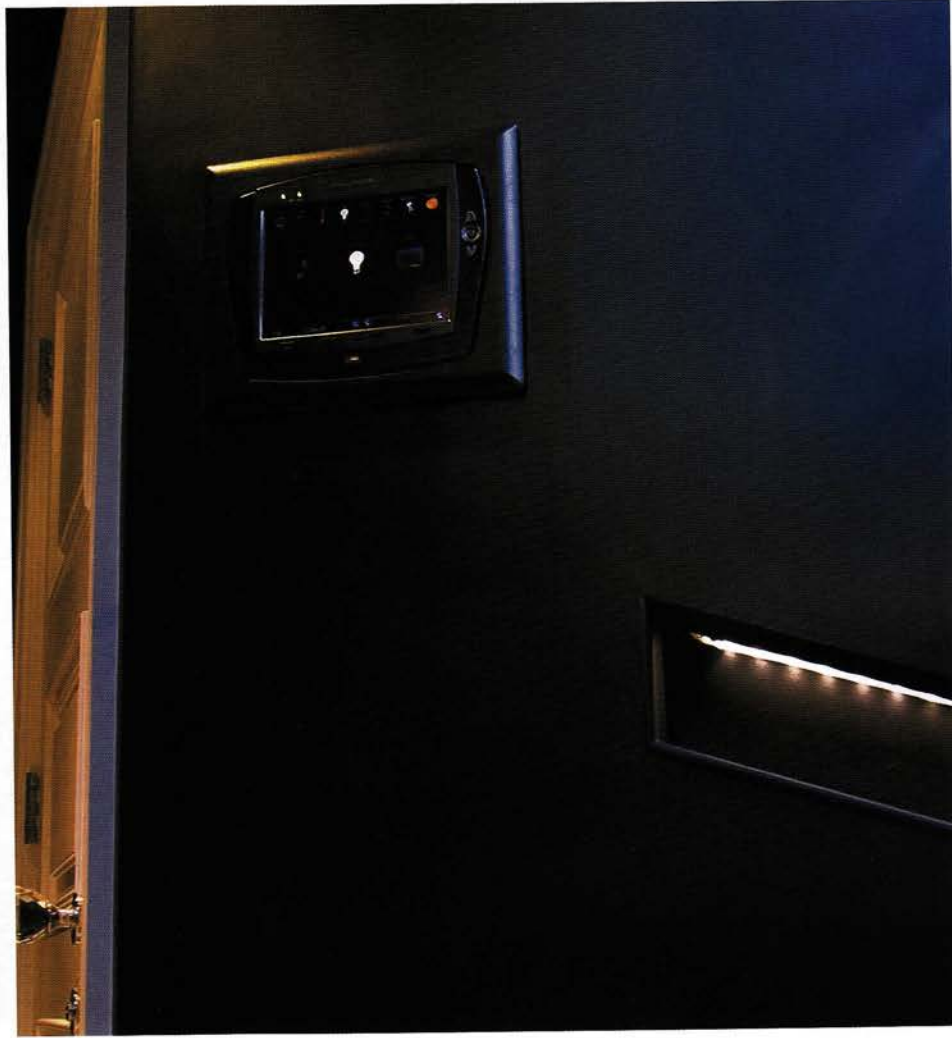
Actuators were originally used as military simulators to generate low frequency

motion cues and simulation soundtracks to impart some realism into flight and tank experiences. They were also used to impart full range sound of the actual craft. In essence, they are designed to tap into the psychophysiological senses.

There are five ways pulsations in the auditory frequency range can be perceived by the human body: hearing via air transmission (the traditional vibrating of sound through the ear canal); through deep tissue movement known as the kinaesthetic sense, which literally means to move; through feeling via deep skeletal joint movement, or haptic movement which means to touch; via tactile stimulation which comes into effect when loud noises are produced and finally via bone conduction directly stimulating the cochlear. Collectively this is known as 'tactile sound'.

The science behind the technology is >





profound, especially when adding real life experiences to simulations such as those mentioned above. So, when taken further by an actuator and applied to your home cinema and music set up, it makes the experience profoundly entertaining.

TECH, TECH, BOOM

There are two types of products on the market that will shake you up: tactile sound transducers (TSTs) and actuators. Both are installed into the bottom of couches or platforms and respond to the 5.1 audio systems, or integrated motion code.

They can then be controlled by an in-wall docked touch pad.

However, if you are looking for more punch, the actuator gives you a far more real experience than the TST.

Wavetrain Distribution – an audio/video distribution company specialising in dedicated cinemas and related products – is

the most respected supplier of actuators. Wavetrain use D-Box technology. The Canadian-based D-Box Technologies Incorporated is largely credited with bringing integrated motion into the mainstream market via D-Box cinema seating, which can be single or loveseats (a pair of luxury seats).

D-Box uses motion simulation actuators. These actuators move up to 60mm vertically and can produce 2Gs of force!

David Moseley is the director of Wavetrain and says technology such as actuators in chairs is gaining in popularity.

“A transducer vibrates to produce the audio and is a completely different type of product. A transducer is working off the audio input of the subwoofer and therefore by default is limited to around 150Hz. While transducers for music reproduction can extend up to 16kHz, I doubt one designed to create vibrations for low bass, would have that sort of frequency response.

“There is nothing that is available commercially, I could not recreate in the home. The same systems used by the Department of Defense are what we use in the home. It’s just a different application. In home and commercial cinema, D-Box is a standalone product, with motion code only available for D-Box products.”

This technology was famously installed into a Kent family home in the UK which took out the 2010 Custom Electronics Design and Installation Association (CEDIA) award for Best Home Cinema in its price category (pictured above).

In completing the project, custom installer Imagine This answered the client’s brief for a THX Imaging Science Foundation (ISF)-calibration reference high definition home cinema for his family to enjoy, but offering the same Crestron control systems as the rest of the high tech property.

MOVIES IN MOTION

D-Box Technologies design and manufacture leading edge high-technology motion systems. The D-Box Motion Code uses motion effects specifically programmed for each film, TV series or video game, which are sent to a motion generating system integrated within either a platform or a seat.

"The real growth is in the importation of chairs with actuators built in or that are D-Box-ready," David says.

The resulting motion is synchronised with all onscreen action, creating a realistic and immersive experience.

Wavetrain imports the Jaymar brand of chair which includes D-Box ready seating.

"Dealers are either selling actuators built into the chair, or selling a combination of loveseats or single seats with built in technology as well as another couple of chairs that are D-Box ready," David says. "These options give the clients the opportunity to purchase as they can afford them."

The loveseat retails for \$19,000, while the associated controller costs \$5,000. All up \$24,000 will buy you a pair of D-Box integrated chairs with controller. It is possible to buy single chairs, but this has its setbacks.

"We recommend the loveseat as it has four actuators built in and gives you unrestricted, full range of motion. Single seats are built with two or four actuators, however four actuators is preferred as two actuators can only move forwards, backwards and sideways. The cost of four actuators in a single chair is roughly the same for doing a loveseat. So with the loveseat, you are not only getting the most cost effective option, you will enjoy the full motion experience."

It is not only the home theatre experience that is benefitting from the technology, commercial cinemas can expect a big roll out during the next six months as well.

The seats will take up about three to four rows, with 50-100 seats being installed depending on what owners want. Customers will pay extra for the seats, but if the popularity of 3D films is anything to go by, cinemas should have no problem in drawing custom for what is effectively a 4D experience.

Cinemas in Australia will begin installing the technology mid 2011, with the technology being installed into over 50 cinemas worldwide, with that number doubling shortly.

On the home front, customers will be able to feel the full cinema experience, even though the systems are different. In fact

the actuators used in the home have more movement), however the power of the TST or D-Box is pretty spectacular for a home theatre experience. David says costs will remain the same, however the D-Box system is the cheapest in the world by half.

Well over 1,000 films have been given D-Box motion code compatibility, but the beauty of the D-Box is that it is not disk dependent. The motion controllers download the code automatically.

A BUYER'S GUIDE FOR ACTUATORS

So what should you be looking out for when purchasing actuators? Firstly, be aware that your actuator is different to a transducer or a 'shaker'. Shakers can be fun, but they can't distinguish between sound, so a car crash will feel the same as a train moving along or someone playing the drums.

Next, as the actuator must emit sound strong enough to transmit through the furniture, you need to find a model that will deliver extreme power. The D-Box delivers 2G of force.

If you are looking at a transducer instead, find one with metal mounting hardware, not plastic. Metal mounting will help reduce breakage resulting from continued use or bumps to the side of the TST.

Beware of in-wall transducers. Drywall is not conducive to sound reproduction and usually fails to reproduce quality sound. Trying to emulate this sound through the wall may be an expensive exercise. If you want decent sound from the walls, invest in high-fidelity speakers.

Finally, ensure you buy your actuators and TSTs from a reputable dealer who offers technical support and warranty.

The home cinema is gaining momentum, not least in part due to the rise of technologies such as D-Box. Getting all shook up while watching your favourite film and being immersed in a Bullitt-like car chase can make you feel like Steve McQueen – how good is that! The beauty is you can go back again and again and become a real part of the cinema experience. ☺

Installer

Imagine This
www.imaginethis.uk.com

PRECISION HOME

The Kent family home plays host to an array of smart home options, but the most impressive is the home cinema. Precision control of the lighting is provided by the lighting control modules. This impressive hybrid system includes no fewer than three rack locations and all the lighting was designed, installed, tested, inspected and certificated by Imagine This, including the additional motor control modules for the curtains and blackout blinds.

Crestron sensors monitor the internal environment, sending temperature readings back to the touch pad. The system then integrates seamlessly with the Daikin air-conditioning unit, under floor heating manifold and boiler control interfaces, as necessary, to ensure that cinema occupants are as comfortable as possible at all times.

In-wall Triad loudspeakers take care of the sound track, with two subwoofers delivering the base. The system also boasts the new Denon HD AVP-1HDA and the POA-A1HD power amp. Weighing in at 60 kilogram and packing 5x500 watt into 4ohms, this is RS232 controlled and delivers full system diagnostic reporting back to the Crestron system, showing any overheating and even allowing remote upgrades.

And, in an example of seamless integration, the multi-aspect ratio screen masking has been programmed to interact with the Crestron system, while the Kaleidescape entertainment server 'talks' to the lighting to ensure that it is raised to the appropriate levels as the credits roll.

On completion, the cinema was calibrated to 'ISF Day and Night' modes, to keep the image crisp and full of detail, while sound levels were calibrated to full THX standards to deliver a stunning audio performance.