



## EXPEDITING HOME-CINEMA DREAMS

*A long-standing veteran of the industry, Guy Singleton has developed a specialised software that could revolutionise home-cinema design*

Every reader of *What Hi-Fi?* would be aware of the significant role calibration plays in the installation of a high-end home-theatre. It's actually beneficial at any price level and by no means, any less important for two-channel systems. CEDIA is one of the globally-recognised audio standards and educational entity and Guy Singleton has served at CEDIA in a variety of roles, including home-theatre design. He is also a certified ISF instructor which makes him an authority in all things audio, video and how they both come together in a top-class home-theatre. In recent years, Guy has been involved with the IET's (Institute of Engineering Technology's) new standards

document for 'low voltage DC distribution' in the home (LVDC 2.4 Technical Committee). Guy's electrical expertise and vast experience of custom install make him highly respected as a technical contributor to the standards document. High-end projects require meticulous planning, CAD drawings, quotations and complicated mathematics to ascertain the acoustic signature of the system based on room size, materials and amount of acoustic treatment done to the space. To gather all this data is undeniably a laborious and time-consuming process. Guy Singleton's The Cinema Designer (TCD) cloud-based program aims to revolutionise this process, with a

few clicks. From the material of acoustic treatment to the size/shape of the room, to the specific hardware being used, the designer simply has to enter the values in the program to derive accurate locations and calibration values to achieve a target curve. With a recent update, TCD now also supports high render channel count immersive audio formats and that means it's ready for Auro 3D, Dolby Atmos or DTS:X and not just in their staple 11.1 configuration but right up to 32 channels. TCD allows the designer to quickly hone in on the optimal range of equipment for the particular project, producing a 30+ page proposal (complete with audio and video calibration reports) ready to produce to the client for

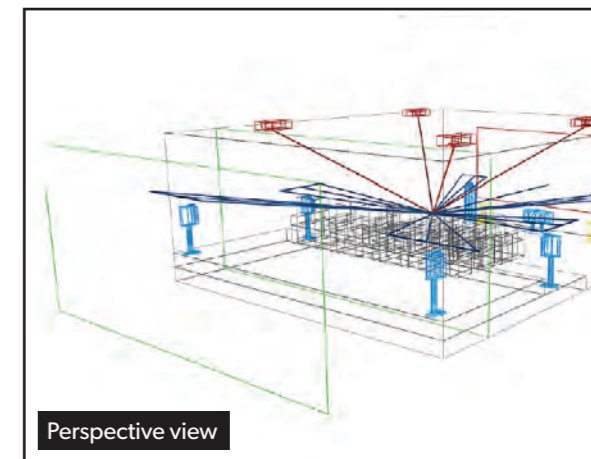
review, including creating a 3D CAD drawing in 30 seconds. The software follows rules governed by mathematics; TCD's theatre designs are based on CEA/CEDIA CEB-22 and CEB-23 home theatre standards for design, as well as several ITU documents on audio and video criteria. Trinnov feels so strongly about the importance of TCD that it

engineering resources in place to do an equally good job designing these more complex theatres. Arnaud Laborie, Founder, Chairman and CEO of Trinnov Audio has also given TCD his full backing: "I think that TCD is a game changer in the way that it allows integrators to specify a project according to industry standards,

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has become a requirement for the manufacturer's Level I Certification program: any company looking to achieve Level I Certification must attend a live training event and either sign up and demonstrate their ability to use TCD, or demonstrate that they have all the

within minutes. TCD really helps to save time on the mechanical, technical aspects, making sure that the projects are compliant with industry standards, allowing the integrator to spend more time with the customer, thinking about the decision that a computer cannot



make: focussing on the art of creating a great home theatre."

Interested users can sign up by visiting the [cinemadesigner.com](http://cinemadesigner.com) and try it out for themselves. For knowing more about TCD, go through Guy Singleton's interview on the following page.





# The Architect of Home-Cinema

*We catch up with Guy Singleton, the designer for The Cinema Designer - a cloud-based program that is transformational in the way professionals kit out their client's dream projects*

**First up, this is a brilliant program and how long did it take you to develop it completely?**

I've been developing TCD for about three years. I got to a point in my career where I was building very large-scale theatres, so I was looking for a quick way to do it. I remember sitting in my office and thinking "I've got to do something - there must be a quicker way to do this."

**How easy or difficult is it to get more brands and their models on-board the software?**

In the early days, it was really easy because I chose all the brands that I use at my integration company, Imagine This, and I have relationships with lots of people in the industry. Barco, Bowers and Wilkins, Trinnov, Meridian etc. So, I started with the people I knew. What is proving more challenging is the big corporation Japanese brands; the huge corporations that are difficult to get to. However, the good thing about it is if I show a manufacturer TCD, 99 times out of 100 they are in. Generally, any brand with any real kudos or market share wants to be a manufacturer supplier. Now, they are seeking us out; wind the clock back 12 months and I was knocking on their doors! In the last month alone we've had over 10 really prestigious manufacturers confirm as new suppliers - we are constantly striving to get the best brands our industry has to offer into TCD.

**Is there an accuracy guarantee that TCD aims for or is it the best compromise given the acoustic space and hardware?**

Sometimes TCD will say: "This speaker needs to be 22 degrees or minus 22 degrees off axis," however, that loudspeaker would actually collide with the outside of the room, it would go beyond the screen wall. There is some code written in there that stops any howlers, so it stops speakers colliding with other speakers and stops speakers colliding with walls or ceilings, so when I say it's the best compromise - building theatres is all about managing those compromises. TCD will say: you can't have it where it should go, but TCD will get it as close as you can physically get it.

If you choose a certain loudspeaker channel count, it stops you choosing a processor that isn't capable of decoding that number of channels; if you chose sub locations, it adds those as passive subs to the channel count for amplifiers. It's clever filtering within the database. You need to know what you're looking for when it comes to avoiding making mistakes; this isn't aimed at the public or for someone unexperienced - this is aimed at people who would know that if you've got 10ft. lamberts on your projector, that should flag alarms bells, and that person should know that it isn't going to be bright enough by the time I've calibrated that, plus with some lamp roll off degradation, it's not going to have a bright enough image. You need to know what those numbers mean, and that's where investing in your own

training comes in.

Room isolation is one thing - the other is an acoustical design for a room; there are some really advanced fluid dynamics software packages that are fairly expensive; TCD provides you with a technical, mathematical appraisal of the structure of the room - so every fabric or furnish or carpet or hard surface has coefficient data - those surfaces react to different frequencies. There is a huge algorithm - I can't really even explain how complicated it is! To allow you to predict how the room will behave in something called an RT60 - the reverberation time of the room. This is an industry standard RT60 time, there are lots of theories on this and lots of people have different opinions - 0.3 or 0.4 is a decent time.

**Does it favour or override Trinnov's recommended loudspeaker positioning for height surround systems?**

Trinnov Audio's recommended speaker whitepaper has been incorporated into the cloud-based design tool, allowing home cinema installers to confidently design technically accurate 32 channel count Dolby Atmos and DTS:X home cinemas in a matter of minutes. Using TCD is the only way home technology professionals can accurately design technically perfect high spatial resolution home theatres in such a short space of time. I met with Trinnov in 2016 and we went through their recommended

loudspeaker positioning for height surround systems - it's very, very complicated. So, when you check a button within TCD that suggests that you want a higher render channel count cinema, this is something that goes beyond the capabilities of a DSP chip. DSP is limited to about 11 channels - 7.1.4. A Trinnov or a Linux based back-end has the ability to render 32 channels and upwards of 48, and eventually 64. It will favour those, it will look for the polar coordinate positions of those speakers and if the room size dictates, there is some logic in there that will run the polar cartesian convertor, which will mean that the height channels won't end up on the wall. It gives you a really accurate speaker placement and will provide you with an X, Y and Z axis for this three-point polar coordinates - so it's very, very accurate. Trinnov has written a whitepaper saying "this is how we believe rooms should be designed" and it has been peer-reviewed by Dolby and other codes manufacturers. TCD was really fortuitous to have been involved in that from the beginning, so we're ahead of the curve; the curve starts when they release that whitepaper, and that will be released this month. In our industry, an industry that changes by the hour or the minute, to be nine months ahead of something is very good.

**In your own experience, what has been the most effective and practical speaker layout (positioning and number of units) for the real world?**

I come from a slightly different train of thought where, when you're in the real world you have a budget to drive constraints, which are generally compromises. So, when I have 32 channels, the minimum I need is 32 speakers, a 32-channel processor and 32 channels of amplification. All of that comes with a cost - so inevitably something gives, and that could be the quality of the loudspeaker, the clarity, or how that speaker behaves. I am a fan of immersive spaces, absolutely. For me, the two things that I like are height centres for a sense of real envelopment, and left wide and right wide loudspeakers that fill that hole between

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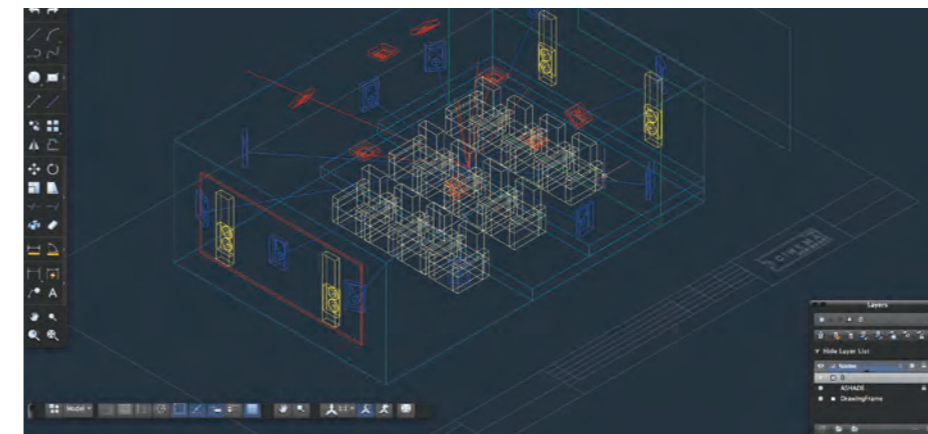
the screen channels and the surrounds, so if I can have an immersive space with those, I'm really, really happy. Equally I like the way that Auro up-mixes conventional 7.1 or 5.1 soundtracks - so the implementation of Auro is also something I would encourage.

**Do you think a distilled version of TCD would ever find its way to tablets or smartphones?**

We've spoken about it in-house and at a development level. We decided to make it a professional tool because what we don't want to do is damage the industry that we love. However, you can use a tablet to use TCD - it's cloud based - you can run it through every web browser whether its Safari, Chrome, Firefox - and it's already available on phones. But if you mean, have it in the app store, then the answer to that is no. I think it would devalue a really high skillset sector, which I don't want to do. My whole career I've written standards, I've been involved in codes of practice and best practices. Everything I do is based on engineering principals - in the wrong hands TCD would not be that helpful. Understanding the metrics and the data is important.

**Can the program be used for hardware that isn't listed already? If yes, are there any limitations compared to listed products?**

Yes. You can have a generic screen and speakers. You can choose 'generic' within the dropdown, but you don't get the nice bells and whistles, you don't get the JPGs that TCD usually produces or the manufacturer's technical specifications. When you select 'generic', the CAD drawing comes with a 300 x 300mm box, which looks like a bookshelf monitor loudspeaker. If you are



using manufacturers in the database, you get the CAD drawing which is technically correct to two decimal places. You're dealing with an engineering document. Ultimately a database is only as good as the products in it, and it's been our mission to take a database from 40 to 100, because we believe the power of this is when all the manufacturers join the club.

**You currently have three options for buying or using the software. Are there any special privileges for existing CEDIA members?**

I've been a CEDIA member for a long time and CEDIA always has a special place with me. We ran a special promotion earlier in the year where we gave a discount to CEDIA members, however I also have strong links to ISF, THX and HAA - so we've also run discounts for those members. TCD was built by home theatre installers, for home theatre installers - so this was our way of giving something back to those trained and skilled professionals.

**What is the minimum proficiency required to operate TCD?**

You need underpinning knowledge and experience - those things make you competent. This is aimed at industry professionals which is a very niche market. Building high render channel count cinemas, screening rooms, media rooms etc., you'll get more out of the tool if you understand the data that TCD produces. If you can understand what your RT value is, your light output, your foot lamberts calculations then you will get more from the tool. In the hands of someone that has experience, knowledge and skills, it's really powerful.

**What's next on your drawing board?**

We recently introduced audio and video calibration reports because we knew our users wanted that, and just before that we brought in immersive audio high render channel count speaker layouts because there is no other way to design cinemas like this so quickly. Beyond that, an API which will allow us to export though VR is on the horizon, so this will mean building a theatre in a minute and virtually walking around it in three minutes, which will be pretty special. Imagine the implications for presenting that to a client. D-Tools integration is something that we know people want, so we're looking at that as well.

Our next big update is bass management - room modes and repeating those within the CAD drawings to show mean spatial variants, seat to seat uniformity, good bass for everybody. We hope to have that ready in a few months. There is a really good roadmap ahead. I'm incredibly proud of what we've done in such a short space of time.