



Home Theater Seating





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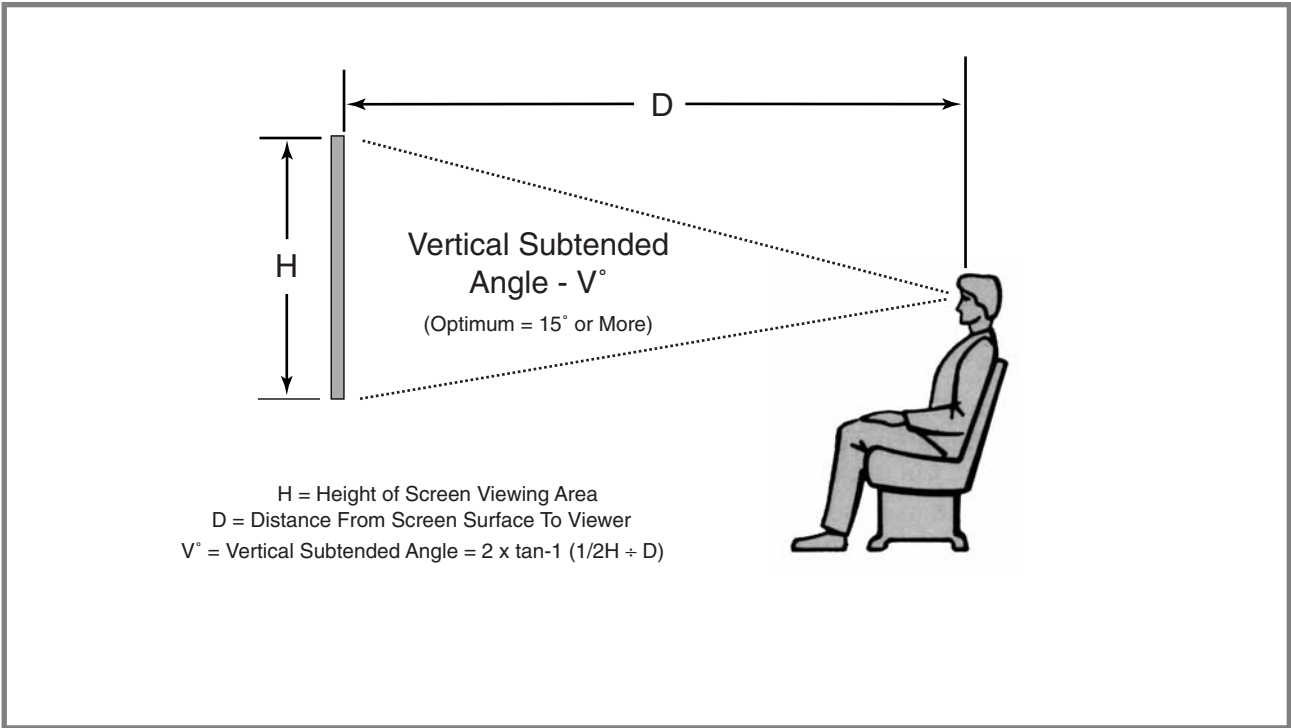
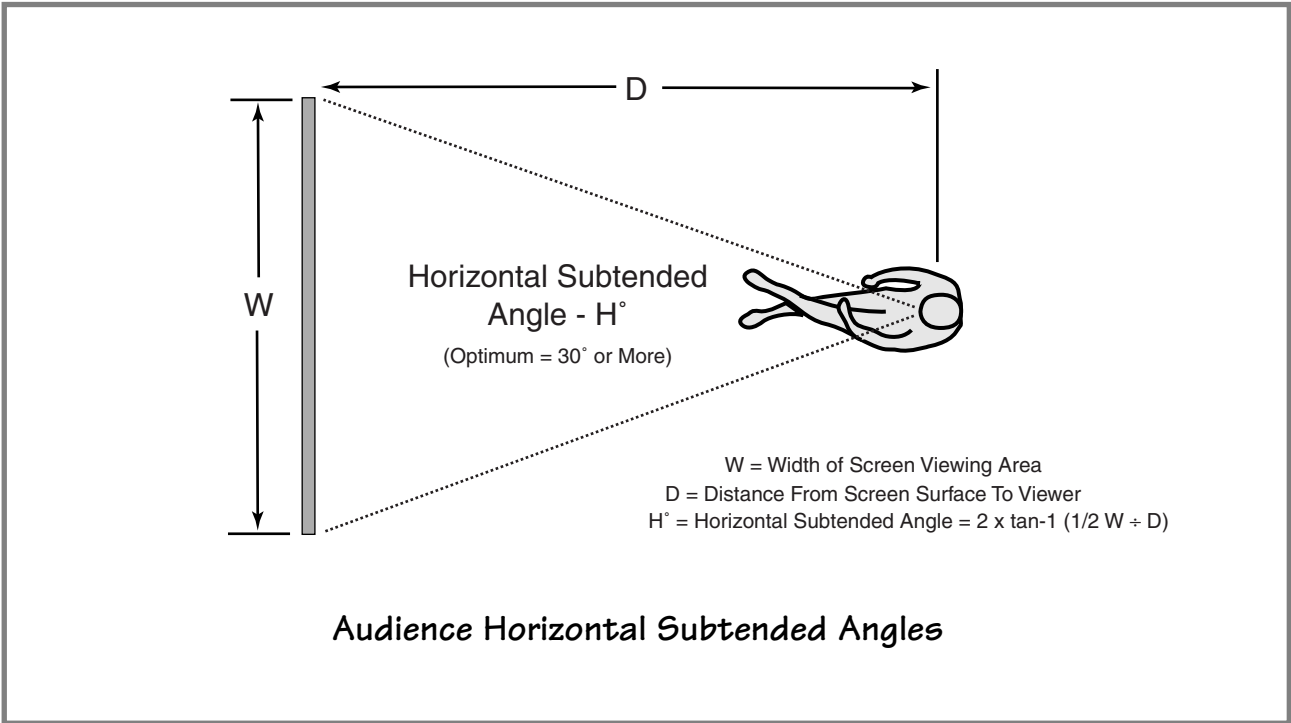
It should be no surprise that professional commercial theater designers strive to deliver a theater's motion picture image and accompanying sound track to the audience with a minimum of obstruction and distortion. Unknown to many, though, is just how important the role of audience seating design is to achieving this goal. In home theaters many of the same commercial seating design principals apply, except that, with careful attention to detail, one can usually optimize a home theater to outperform the finest commercial movie theaters. This section will take a quick look at the design of audience seating in commercial theaters and illustrate how the principals can be extrapolated and, in many cases, improved upon in home theaters.

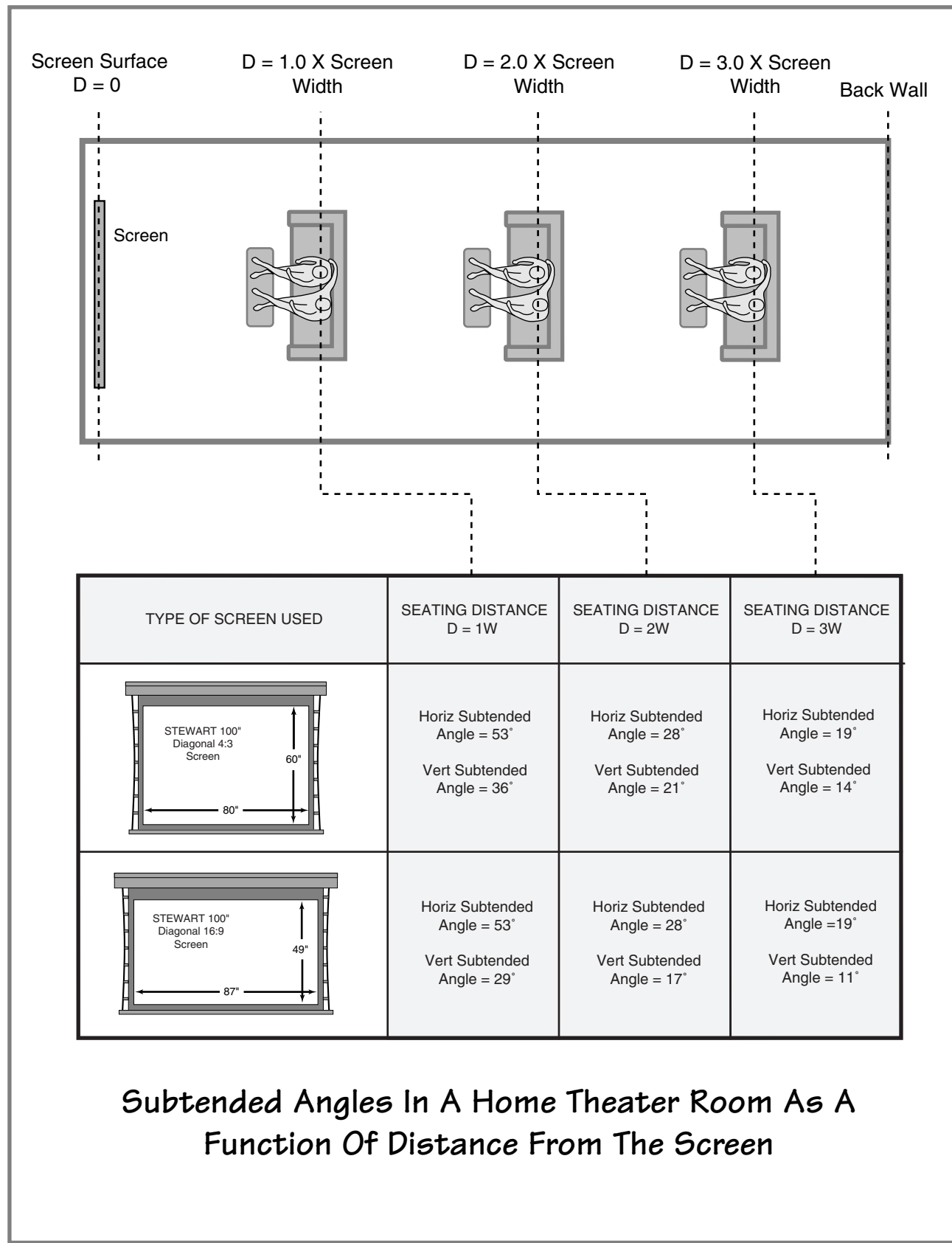
Size Matters

The size of the picture seen in a commercial theater is determined by the distance the audience sits back from the screen. Simply, if you sit up close, you see a large picture; if you sit far back, you see a small one. In order to quantify this relationship, display professionals refer to "the angle subtended". Larger subtended angles, both horizontally and vertically, mean that more of a person's visual field is taken up

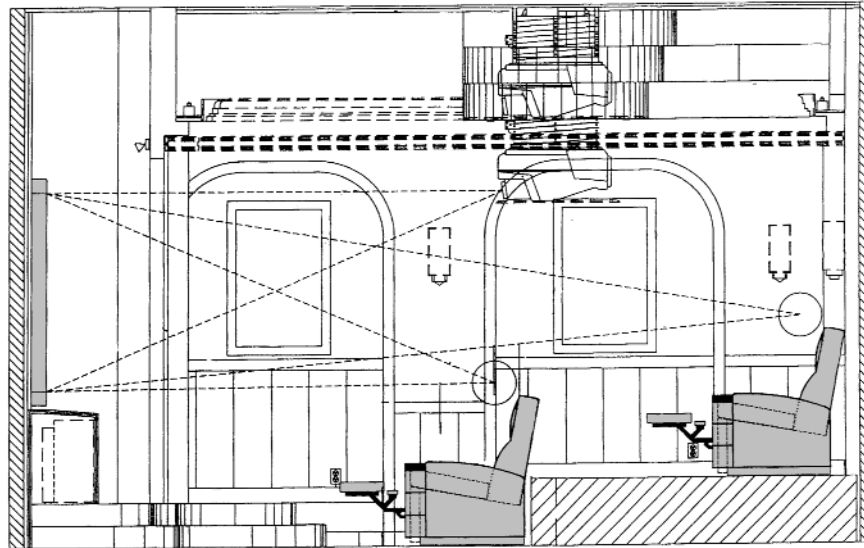
by the image and, thus, the image appears larger (see our diagram). Numerous studies involving subtended angles have been undertaken over the years and in the January 1986 issue of the SMPTE (Society of Motion Picture and Television Engineers) journal, William Szabo summarizes many of these studies in his paper "Guidelines for the Design of Effective Cine Theaters". His summary; "...a screen appears large when it occupies a substantial portion of a viewer's horizontal and vertical field of vision. Our experience indicates that the screen image will appear small [in a theater environment] if the image occupies less than 15% of the viewer's vertical field of vision or less than approximately 30% of the horizontal field of vision".

In the design of a home theater these optimum subtended angles (30°+ Horizontal, 15°+ Vertical) can provide a basic framework for seating placement. However, you should know that there is another criteria that is somewhat at odds with placing the audience seating up close to the screen for a big picture. It comes from the basic way that video display devices generate color images. With CRT-based video projectors, images are made by scanning hundreds of thin scan lines across picture tube faceplates and projecting them up on a screen.





Subtended Angles In A Home Theater Room As A Function Of Distance From The Screen



Sight lines from all audience seats should be designed for maximum visibility

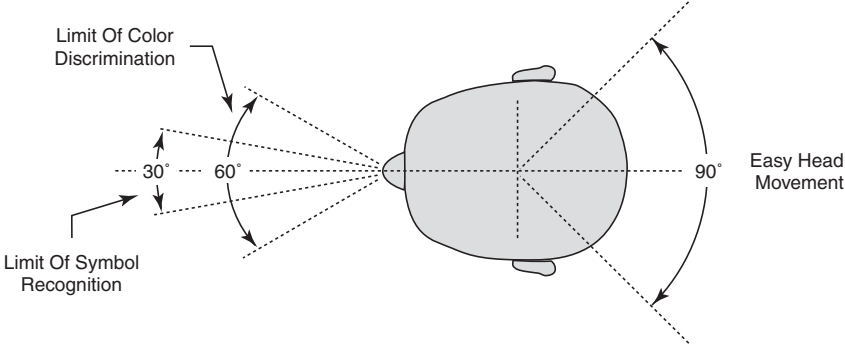
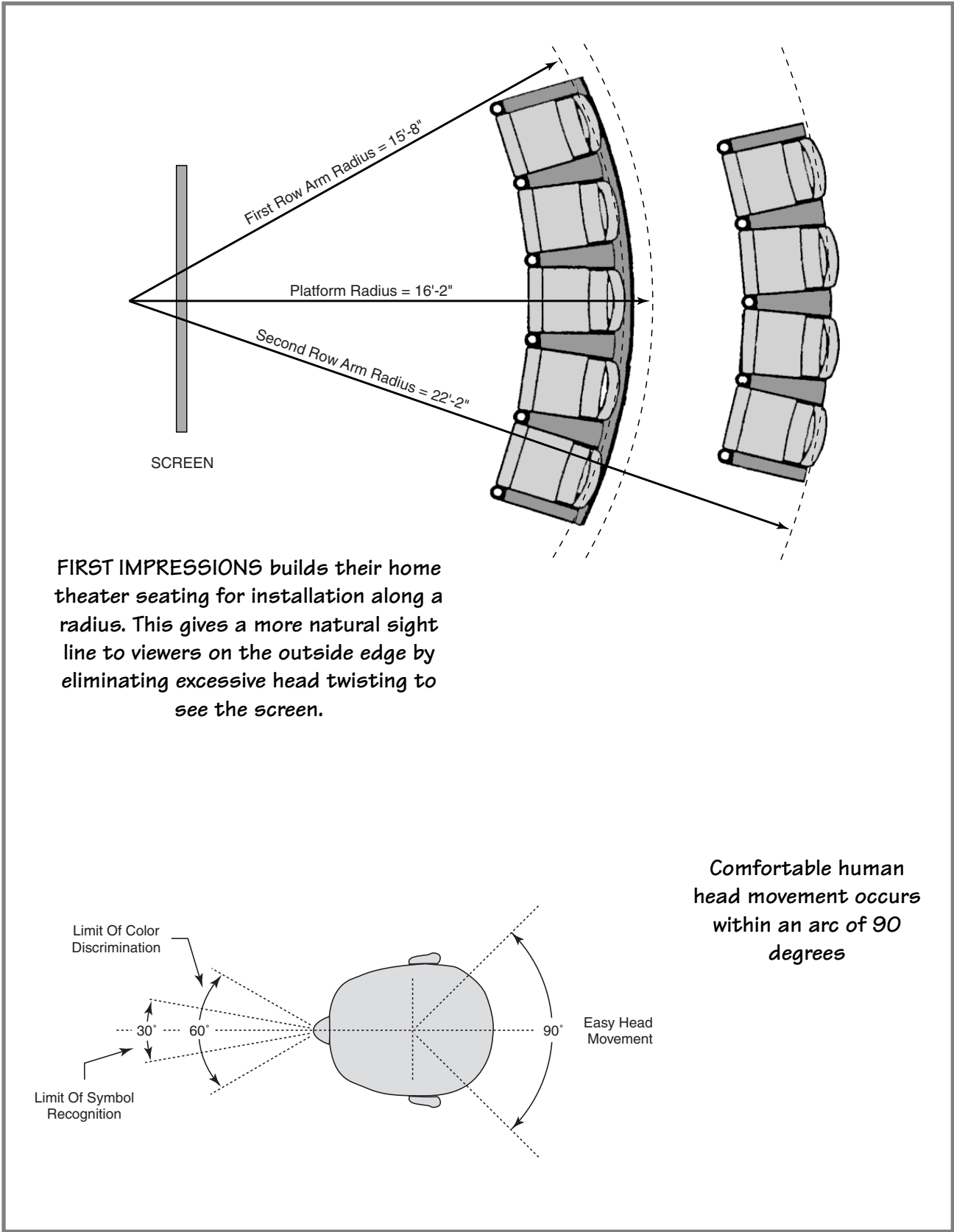
With LCD and DLP-based projectors, the images are made up of thousands of individual semiconductor generated "pixels" which are also projected. Unfortunately, the basic nature of both of these images involves a picture structure that has considerably less resolution than the fine grained structure of film stock. As a result, when you are up close to the picture produced by a video display device, you will most likely see scan lines or pixels. It's simply the nature of the beast. If you are wondering if the "image structure" visibility be reduced; yes, it can. One can smooth out the image with line doublers and quadruplers (CRT projectors), or with depixelization filters (LCD/DLP projectors). And you might want to do this if your budget allows. The point we want to make is that when you sit up close to a video display for large subtended angles, the image structure may become more apparent. The result is that you may opt to purposely sit further back (less than 30°+ Horizontal, 15°+ Vertical) for a subjectively smoother image.

A Seat With A View

The next seating parameter to discuss involves screen visibility. In a home theater room with a

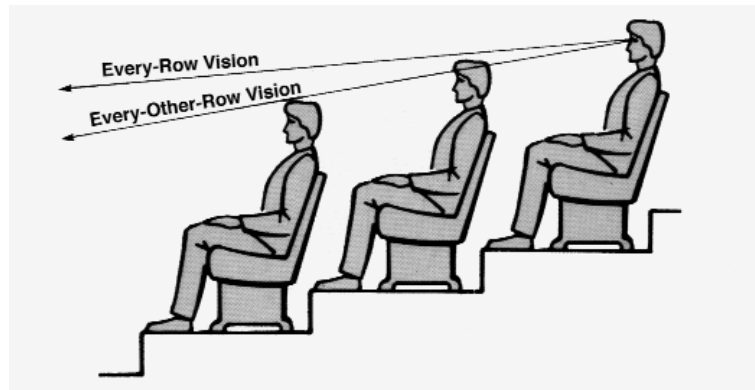
single row of seats, you should be assured of an unobstructed view of the projection screen because you are sitting "front and center". In a commercial theater, or multiple row home theater, this may not be the case. It all depends on where you sit, and the height of the risers.

Risers is the term used in the building trades for the vertical portion of any stepped construction (stair cases are a good example). In theater construction, it refers to the steps that occur between rows of audience seats. One would think the proper height for theater risers would be high enough to allow all audience members to have an open, unencumbered view of screen. Theater designers refer to this as "every-row vision" -because every row has an open view (see diagram). The problem is that this is can result in a steeply-sloped seating profile. To compensate, theater designers design less steeply-sloped profiles (every-other row vision, or more) and stagger the seats so that people can see between the seats in front of them. This is the design used in virtually all multiplex-type theaters. Fortunately, you can do better in a home theater. In a home theater, you can strive for every-row vision, and this generally means that the risers will be "stadium level" or approximately 1 foot high (ordinary riser



Comfortable human head movement occurs within an arc of 90 degrees

Commercial theaters can be designed with “every-row vision” (the vertical sightlines pass completely over the person directly ahead) or “every-other-row vision” (the vertical sightlines pass completely over the person 2 seats ahead). Every-row vision is the best because each person has an unencumbered view of the screen



levels for seating and stairs is approximately 6 to 8 inches). If you have multiple rows of seats in your home theater, and every-row vision isn't possible, then make sure you can stagger the seats for maximum visibility.

Relax In Total Comfort

If you've ever come late to the movies and been forced to sit in the seats on the front, outside edges, you know that twisting your body and head up toward the screen isn't the most comfortable way to view a movie. In a home theater, ditto. If you analyze this discomfort, there are two

components. First, because your seat is on the outside edge, you have to twist your head laterally (sideways) to view the screen. Second, because you are up close to the screen, you have to tilt your head back to see the entire image. Both of these conditions are outside the normal skeletal-muscular range and, as a result, aren't very comfortable. Fortunately, you can avoid such extreme viewing positions in your home theater through proper seating design.

Let's look at the head twisting part first. To prevent anyone from having to do this, you can either physically restrict your seating area so no one is seated near the edges, or install your seats in an

Since the normal line of sight is 12° to 15° below the horizontal, seat backs should tilt back to elevate the line of sight the same amount

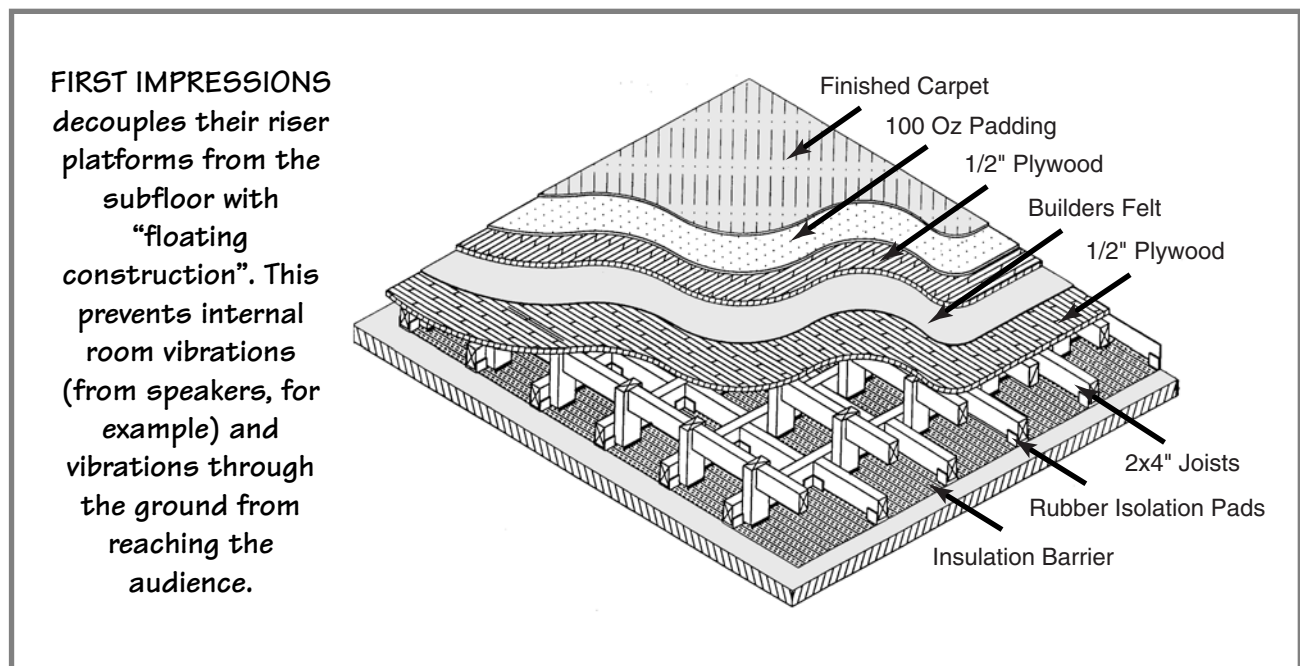
angled or curved fashion (see our diagram). Jeff Smith of First Impressions, a custom home theater design firm, explains: " We refer to it as sight-line sensitive design. The reason that it's important is that the human head is comfortable within a limited rotational angle, some 45 degrees to either side or so. For comfort, this rotational angle can be minimized by installing the seats along a curve. In fact, we design our seats so that they fit together in a group along an arc of a specific radius based on screen size and viewing distance. This assures that all audience members have a good sight-line to the screen and head rotation is minimized. The result is a more comfortable viewing position."

The second issue concerns head tilt. Anthropometric data on human vision shows that the normal line of sight for a sitting human is approximately 15° below the standard line of sight (see our diagram). This suggests that comfortable seating should recline a minimum of 15° from the vertical so that viewers watch along a comfortable sight line. This, in fact, is exactly what most properly designed theater seats are designed to do.

Shake Rattle and Roll

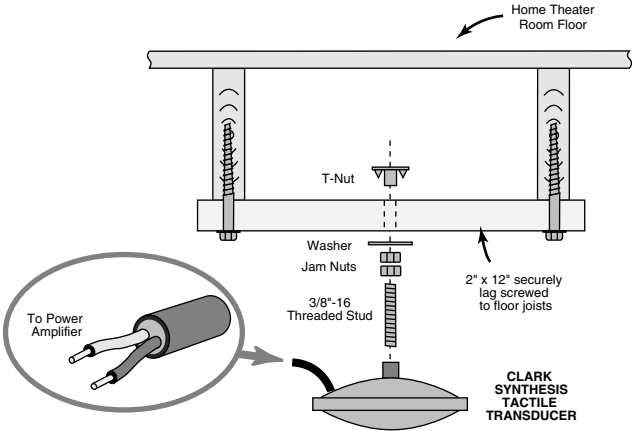
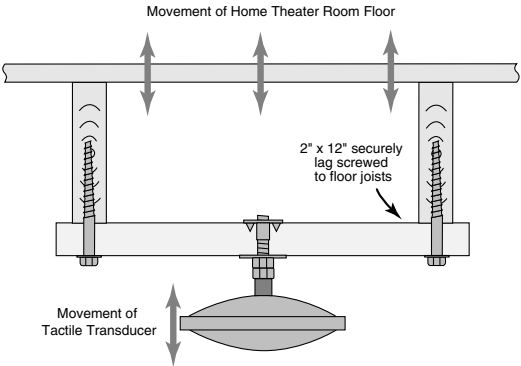
A trend that is catching on in home theater design is to integrate tactile sound into theater seating. Tactile sound is "felt" sound. It is the low frequency feeling that you get when large magnitude events occur nearby. Picture Jurassic Park and the scenes with T-Rexs stomping about. Tactile Transducers mounted under your theater seats, or under your home theater floor, would give you that subtle, but dramatic "ground shaking" whenever one of these creatures walked by. Traditionally, this low frequency energy is created by powerful subwoofers but tactile transducers are a more natural way to do it. They allow one to adjust the volume of the room's subwoofers to more natural levels but still feel the ground move when big things happen.

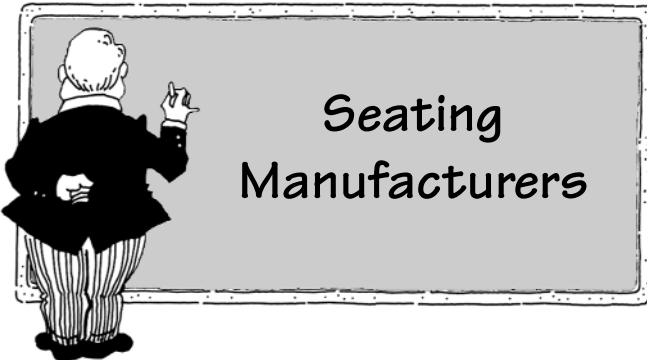
Tactile transducers, themselves, are pretty simple devices. They are electromechanical drivers that are designed to attach directly to seating surfaces and floors. The illustration below shows a suggested way to attach Clark Synthesis transducers to a home theater room floors. Clark recommends several for entire floors, but one per seat should be enough if you decide to attach them directly to seat frames.





Mounting Clark Synthesis Transducers Underneath Home Theater Room Seat Risers





Generally speaking there are four categories of seating you can use in your home theater; Conventional household seating, authentic theater seating, home theater seating and custom seating. Let's look at each.

Conventional Household Seating. This category encompasses the seating options that are commonly found in the home. Sofas, sectionals, overstuffed chairs, etc., can all be options for home theater rooms. For most home theater owners, the reason to use conventional seating is because the home theater room does double duty as a family room, or play room, during the day and more dedicated theater seating designs would hinder the room's alternate activities. The other issue is cost. Using conventional seating, particular if one already owns the seats, can be less expensive than dedicated theater seating.

Authentic Theater Seating. Several firms offer commercial-style theater seats to the public. One of the most well

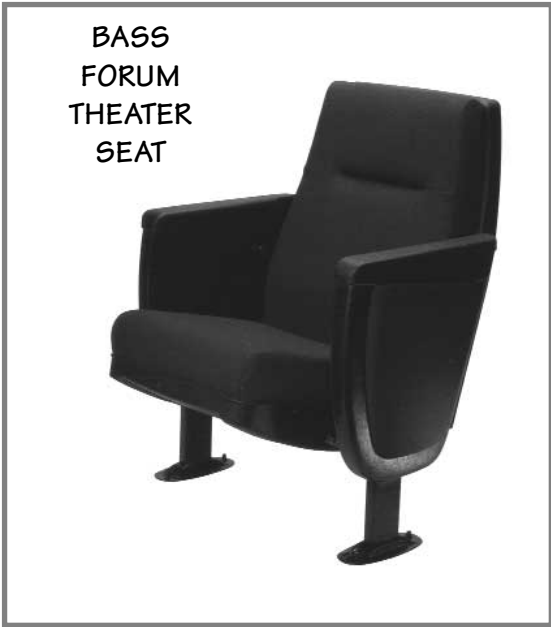
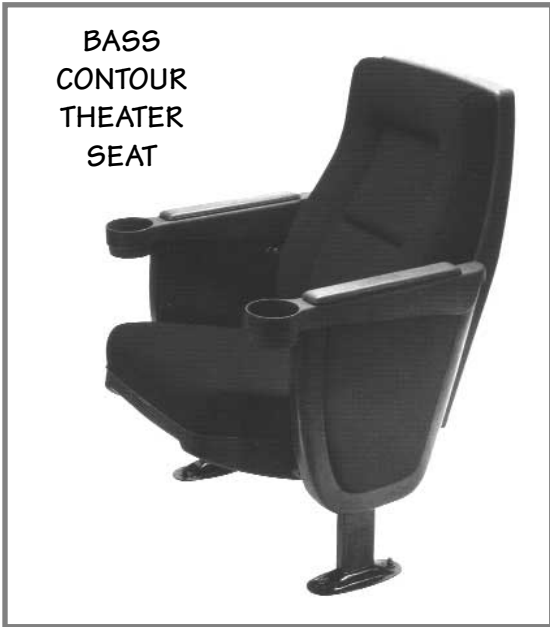
known is Irwin Seating. Irwin Seating has been in the business of producing commercial seating since 1907 and offers several of their commercial models to the home theater market. Their Celebrity Rocker™ seats, for example, are a fixed seat (bolted to the floor), and offers a contemporary "thick-cushioned" megaplex-like look. Their Marquee™ series seats, also a fixed model, have the look of classic tufted velvet theater seating, and their Springfield™ seats offer a beautiful Victorian design complete with cast aluminum period supports and solid oak armrests. Borrowing from the design of its popular Marquee line, Irwin has also designed a new model, the Ambassador™ solely for home theater applications. Prices for Irwin seats range from \$395 to \$695 per chair.

Another firm, Bass Industries, offers three styles of authentic, fixed-style, theater seats through their Home Cinema Accessories catalog. Their Forum™ seats, for example, are an entry level home theater seat and can be ordered with woven, velour or leather fabrics. The next step up is their Contour™ seats with have a higher form fitting back and cup holders in the arm rests. The top-of-the line model is the Presidential™ which has a high-back headrest and features thick cushioning. Prices for Bass Industries seats range from \$405 to \$897 per chair depending on features and materials.

Home Theater Seating. For those who want seating designed for home theaters but more along the line of large, comfortable, stratolounger-style furniture, several companies rise to the occasion. First Impressions Design and Management, Inc., for example, offers their very comprehensive CineLounger™ collection. This line of seating is designed for comfort, but the styling is definitely

First Impression's Cinelounger collection of home theater seating is designed for maximum comfort. Inclining and reclining backs, foot rests and drink holders are standard.





theater-like (see our illustrations). The series offers recliner and incliner mechanisms, beverage holders (in acrylic, glass or solid marble), illuminated glass end panels, specialty detailing like exotic woods and veneer trim, and each chair can be covered from a custom selection of several hundred fabrics and leathers. As we mentioned previously, many of the Cineloungers can be custom ordered to be installed along a pre-designed seating radius for comfortable sightlines. Contact First Impressions for details.

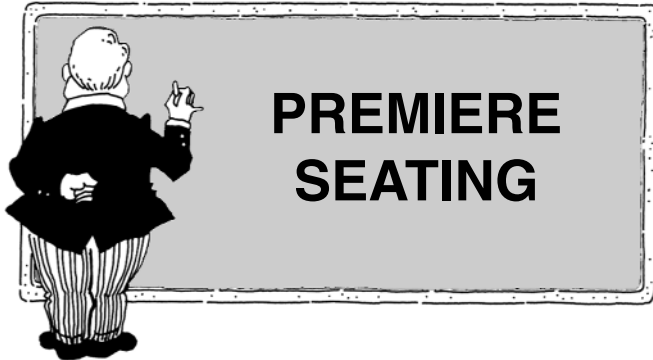
Another firm, Acoustic Innovations, offers their CinemaChair™ line with a similar overstuffed recliner design. The CinemaChairs offer two recline positions and dozens of fabric and leather choices. One of the first firms to enter the period home theater design business, Theater Design Associates, offers their DreamLounger™ line of seating. DreamLounger™s are also available in a multitude of fabrics and are unique in that they can be ordered in custom seat widths and designs. Front row love seat anyone?

Custom Seating. If none of the above interests you than you might want to go the total custom route. Black Canyon Design Group, a custom furniture manufacturer located in Parker, Colorado, is a good source for custom theater seats. Their owner, Dan Mick, offers a unique opinion of home theater design, one that is reflected in his seats. "Home theaters are all designed backwards", he says, "they are environments where people sit down to enjoy audio and video presentations. If the seating isn't designed right, and installed right, then the whole point is missed. Proper seating is the difference between an

average home theater and a great one". As a result, Black Canyon Designs approaches their seat designs with a philosophy; extremely comfortable. Several "standard" designs, the Odyssey™, Classic™ and Roosevelt are currently offered, but from-the-ground-up custom designs are commonly constructed for clients.

**First
Impression's
Cinelounger
collection of
home theater
seating is
designed for
maximum
comfort in home
theaters**





PREMIERE Home Theater
Surroundings
5330 Derry Ave.
Agora Hills, CA 91301
818-706-0700





ENCORE RC-B

Leather: \$1695

Capretto: \$1449

Premium Fabric: \$1399

Standard Fabric: \$1349



ENCORE RCW-B

Leather: \$1695

Capretto: \$1449

Premium Fabric: \$1399

Standard Fabric: \$1349



ENCORE RC-R

Leather: \$1595

Capretto: \$1349

Premium Fabric: \$1299

Standard Fabric: \$1249



ENCORE RCW-R

Leather: \$1595

Capretto: \$1349

Premium Fabric: \$1299

Standard Fabric: \$1249



ENCORE RAC

Leather: \$1495

Capretto: \$1249

Premium Fabric: \$1199

Standard Fabric: \$1149



ENCORE RC-L

Leather: \$1595

Capretto: \$1349

Premium Fabric: \$1299

Standard Fabric: \$1249