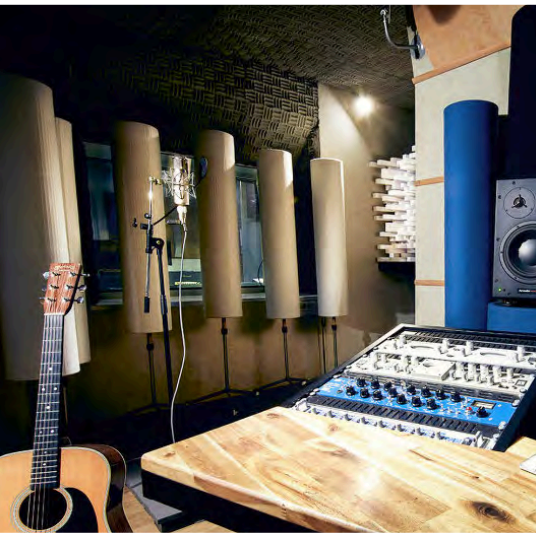
QuickSoundField

Application Guide



Create a Variety of Acoustic Sub-Spaces

ASC Acoustic Sciences Corporation

Creator of the TubeTrap

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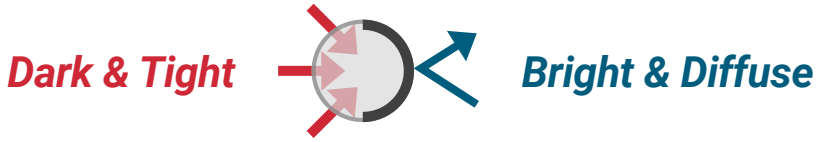
The QuickSoundField

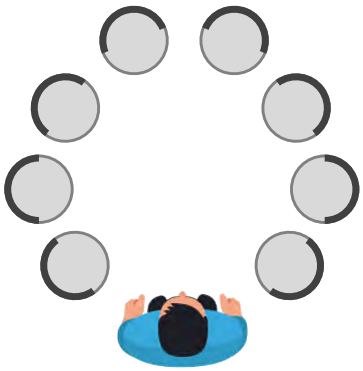
The QuickSoundField offers endless configurations in the studio and the practice room, depending on your application. Some people will want to practice duets with their StudioTraps; others may track a guitar solo, or a narration. Sooner or later, you're going to start putting microphones into the center of the QSF and laying down tracks. The manual that follows is intended to give you ideas to draw upon when you're looking to find a really special sound, as well as some stand-bys that you can always set up to return to a comfortable, familiar space, whatever your surroundings.

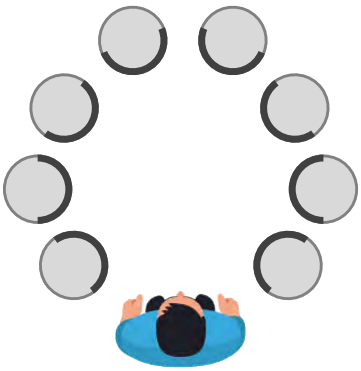
We'll begin by introducing the basic QSF setup, so that you can train your ear and familiarize yourself with the basic effects QSF can help you achieve, then suggest some less conventional arrangements you can use to vary your sound, and begin to see it as an opportunity to catch and channel your voice into various shaped spaces, each with a voice of its own. Our list of uses is by no means exhaustive. StudioTraps let you design, shape, sculpt and voice your own acoustic space with your own hands, and experiment with the shaping of sound in space and time. Experiment, move it around, and make it your own.



Basic Set-ups

Studio Dead: A quiet space. The QSF is easy to adjust from a locally bright space (all reflectors inwards) to a locally dead space (all reflectors facing outwards). To replicate studio dead in your own imperfect environment, use "standard spacing," which equals 6" air space between each pair of StudioTraps, plus reflectors pointed outward. In this QSF dry space, the near-field of the mic is very quiet, and the space has that snug quality of an acoustically dead studio. But the StudioTraps don't exactly absorb all sound—their roll-off is about 110 Hz. That means they are actually supporting the bottom end of the bass range.



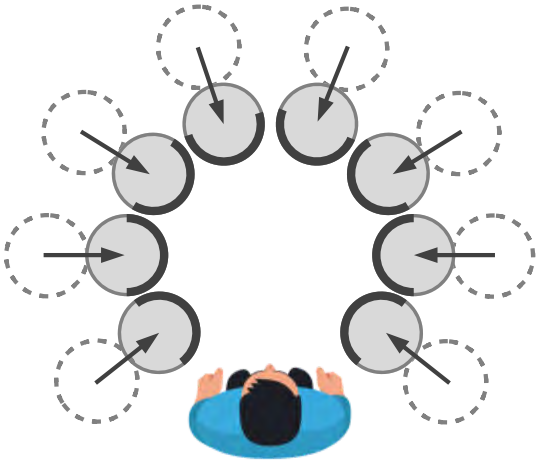


Studio Live: A bright space. Take Studio Dead and rotate the reflectors inward, right where they sit, and the sound instantly brightens. But that's not all: this setup effects a virtual soundproofing on unruly, reverberant rooms. A typical live room can have unwanted reflections from the ceiling, script stands, whatever. With Studio live setup, and all the reflectors pointed inward, these "bad" reflections disappear, lost among the early reflections directed back inward by the QSF. For a more scientific explanation of how and why this works, check out the section later on titled: *"A Discussion of Acoustic Space and Time"*

The basic Studio Live setup is with 6 inches of air space between each pair of StudioTraps, and the reflectors dialed inwards to create the QSF bright sound. Changing this spacing is a great place to begin to experiment.

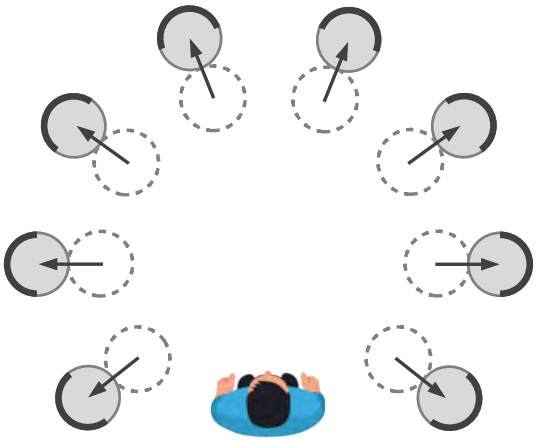
Tight Circle (Little 8)

Try making a smaller circle with the same number 8 StudioTraps, so that the StudioTraps are spaced closer together. Step into the circle and pull each trap in towards the center 6 inches or so. You'll need to keep the opening for the talent just about the same size, but the rest of the StudioTraps will be almost touching. By moving the StudioTraps closer together, more sound is kept inside the QSF and less is allowed to leak out. The strength of the brightness increases.



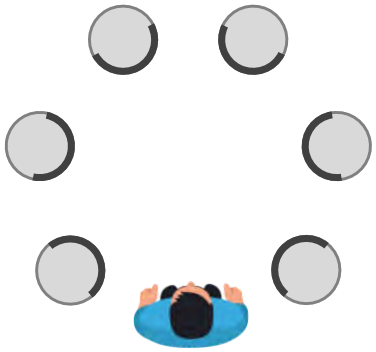
Loose Circle (Big 8)

Next, try opening the spaces between the StudioTraps back up even more than before. Give the StudioTraps about 12" air space between them, to make a circle about 5 feet in diameter. With this wider spacing, the brightness quality becomes less intense, as more sound leaks out of the central QSF space. Notice too, how the farther apart the StudioTraps are positioned, more of the sound of the rest of the room begins to leak into the center of the QSF space. It's important to have a feeling for the brightness and leakage effects of changing the spacing between the StudioTraps. Try using 6 inch spacing, but changing the size and shape of the formation.



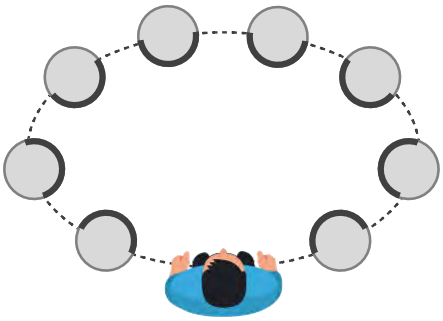
QSF Mini (Circles w/StudioTraps removed)

You can change the size of the circle without changing the spacing of the StudioTraps. To go larger it takes more than 8 StudioTraps, but you can always pull a trap or two, and then shrink the diameter of the circle, keeping the same 6 inches between the StudioTraps. If you pull two StudioTraps, this gives you a 3 foot diameter circle. It sounds similar to the standard 4 foot circle but acoustically faster and brighter. Generally, people prefer to work with an 8 trap QSF in a 4 foot circle, but sometimes this smaller circle sounds interesting.



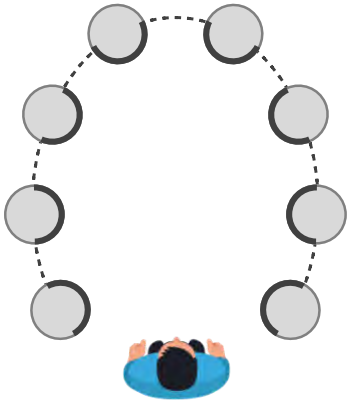
Ellipse 1 (In your face)

Try flattening the circle so that it becomes an oval, or ellipse. Take the StudioTraps across from you and move them towards the center. Move the StudioTraps on either side of you farther away, out of the circle. Then readjust everything so that the 6” air gaps remain, and you’re using 8 StudioTraps in a wide, flat circle. Try vocalizing into the space. You hear an “in your face” type of effect.



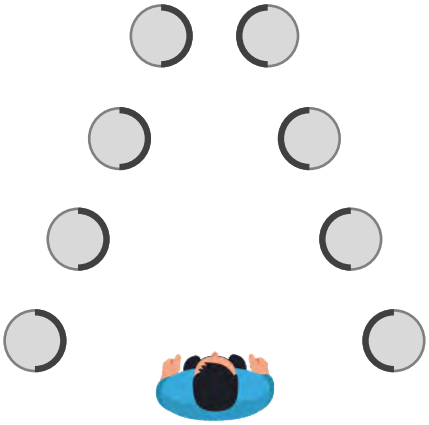
Ellipse 2 (Hallway)

Try the ellipse going the other way, too. Return to the basic circle, then move the StudioTraps opposite from you away from the center of the circle, and bring the StudioTraps to either side in towards the center. You get a hallway effect: a lot of side splash, and very little of the “in your face effect.” It’s not as severe as if you were in a real hallway, but the effect is noticeable. The sound in this long ellipse has a brightness due to the closeness of the side StudioTraps, and a darkness due to the distance of the front StudioTraps. It is the front StudioTraps that hear most directly the top end of your voice.



Triangle

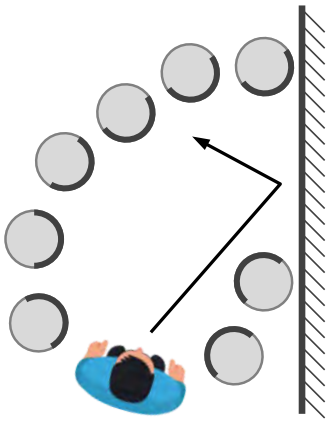
The space in a triangle arrangement lets a little more of the room acoustics leak in than a standard circle, but works pretty well. You start with a wide open space, about 3 1/2 feet, between the first pair of tubes, where the talent stands. Then the next pair are placed about 2 1/2 feet apart. The third pair are set about 1 ½ feet apart, and the fourth pair, the most distant ones, are set about 6” apart. You can adjust the depth and taper of the triangle by changing the spacings and offsets.



Using Corners & Walls

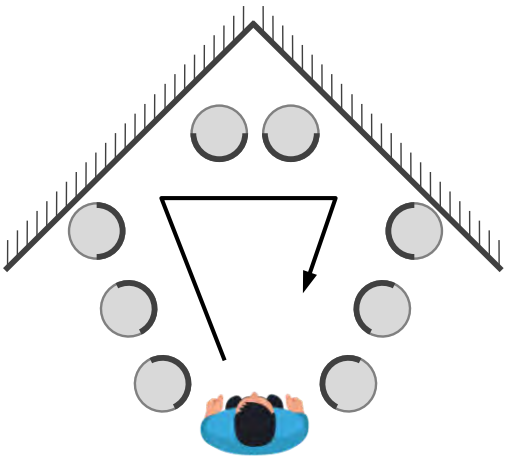
Angled Wall

A sound we usually do not like is to be vocalizing directly towards a flat wall. The voice bounces right back, and a hollow comb filter effect takes place. Flat wall reflections work a lot better if you feed them into the QSF at an angle to your voice. It helps to visualize walls and reflecting surfaces as if they were made of mirrors—that's pretty much how sound feels about them. In this arrangement, the wall is located at an angle of about 45 degrees and to the side, ahead of the talent. The StudioTraps retain the 6" spacing but lead to and from the wall. As long as the wall reflection, as viewed from the talent's position, contains nothing but QSF StudioTraps, you're in pretty good shape. The sound has a bass-heavy effect, and an openness that almost starts to be a hollowness.



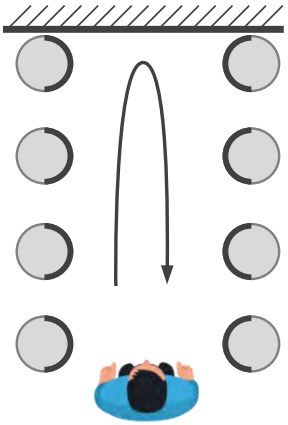
Corner

The QSF can be built into the intersection of two walls. Talent faces the corner, about 5 feet out, with 3 StudioTraps arcing towards each wall, and 2 StudioTraps crossing the corner. This is a double-wall version of the arrangement above; instead of the wall reflecting at, or "seeing" StudioTraps, it sees the other wall. The sound off each wall crosses over the front of the two corner StudioTraps and just comes back at you. It's something like talking directly into a flat wall, but the effect is different because the two sounds switch sides: what comes out the right side of your mouth enters your left ear. This setup may not be of use to you, but it is definitely an interesting experiment.



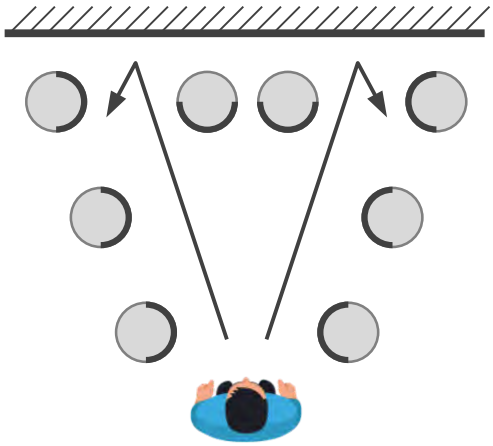
Flat Wall

We've been talking about vocalizing onto a flat wall, so let's try it. Set the talent position about 4 feet straight out from a wall. Set up two rows of 4 StudioTraps each, starting at the shoulders and ending by leaving a gap at the wall. Leave a gap of exposed wall about 3 feet wide. Try vocalizing into the space. It's not quite an in-your-face sound, but definitely related. The hardness and fixed time delay of the wall reflection give a brittleness to the sound, and there's a bass hump present that normally isn't noticed.



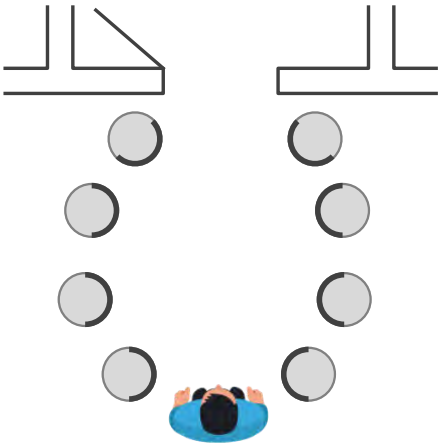
Triangle on a Flat Wall

Try varying the triangle arrangement by incorporating a wall. This arrangement gives a wide, open sound, and a much quieter room acoustic leak than the basic triangle. Start by placing two StudioTraps side by side, about 6” in front of the wall. Place the next pair to either side of the two center StudioTraps, leaving about 2 feet of exposed wall space on each side. Angle the next two pairs back away from the wall, and towards the talent opening. In this arrangement, the row of StudioTraps across from the talent damps the bass-loading of the wall. The presence of the ceiling corner above can be felt, however, especially in low-ceilinged rooms.



Reverb Opening

Instead of using a wall, try using an opening to get a different effect. Make the QSF circle as usual, but open a gap that vents sound into a reverberant space (like a kitchen nook, a bathroom, or even an empty coat room). You can use the opening to this reverberant space as an acoustic reverb feed. And you can adjust the size of the opening as if it were a volume control on your reverb feed circuit. Experiment with shaping the QSF coupling space that connects your voice to the reverb chamber. Make the long ellipse arrangement, or a straight tunnel, two feet wide. Try a wide-to- narrow taper, where the triangle leads towards the reverb room.

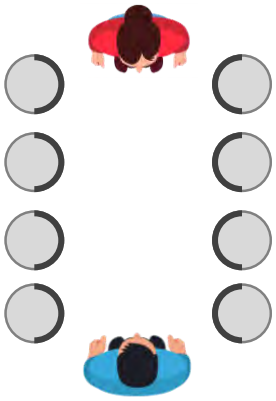


QSF & Duets

Music is not just about soloists, sometimes it's just great to work duets. One of the more typical duets is a guitar player and a vocalist. The QSF setup for this is to locate the two talents opposite from each other and join them with an acoustic hallway. The communication is excellent. Each person hears themselves and each other so clearly that in almost no time they are locked in sync. And that's when the symbiotic energy levels start to build. What is even better about this is when you dip a mic into the middle of that acoustic space, the mic hears just exactly what you hear and that's the sound that goes to tape.

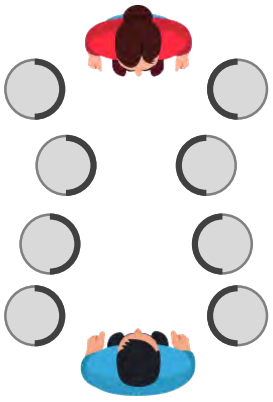
Hallway Duet

The basic arrangement for duet is to locate both talents at opposite ends of a hallway that is simulated by setting up the StudioTraps along a pair of parallel lines, about 3 feet wide. The reflector Dots are set, facing into the interior of the hallway. One talent stands at one open end of the hall and the other at the other. This creates a mixture of the QSF-Bright effect and acoustically couples one talent to the other.



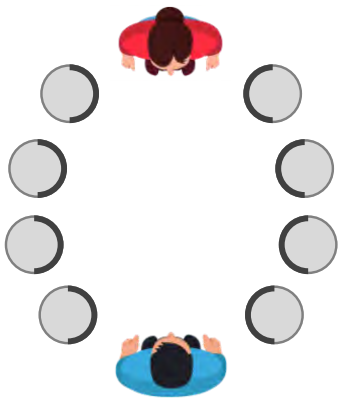
Hourglass Duet

Variations on this pattern can be interesting. Move the middle two pairs of StudioTraps closer together, so that they are 2 feet apart instead of 3 feet. This pinches down the size of the opening between the two talents. More sound is scattered back towards each end of the hallway, towards the talent who generated the sound. Less sound is carried forward, down the hallway to the talent at the opposite end. This hourglass hallway increases the sense of self presence and reduces the strength of the monitoring of the other talent. It is useful when the focus of the exercise is to concentrate on and develop your own sound while in the presence of the other.



Shared QSF Duet

Once you get your sound, the opposite arrangement should be tried. Widen the spacing of StudioTraps in the middle of the hallway, making the hallway elliptical or even circular in shaped. This brings the direct sound of the talents closer to each other. It becomes acoustically, more like two people performing together inside a large QSF circle. The sense of two separate spaces, each with a high degree of self presence, being joined together for a regulated amount of cross fill is lost. What is now heard is the more traditional sound of two people performing together but with the added QSF effect to enhance their combined sound.

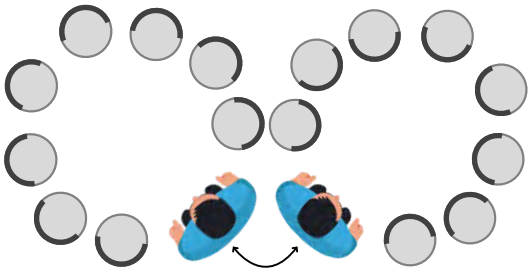


QSF in the Live Room: Real-life Studio Notes

A vocalist can use the StudioTraps to generate real time acoustic effects. The foley artist needs to be able to create a variety of acoustic spaces quickly. Dubbing artists have to work in an acoustic space that simulates the original space. Voiceover workers need their acoustic to match that of the original as do people doing dialog insertion.

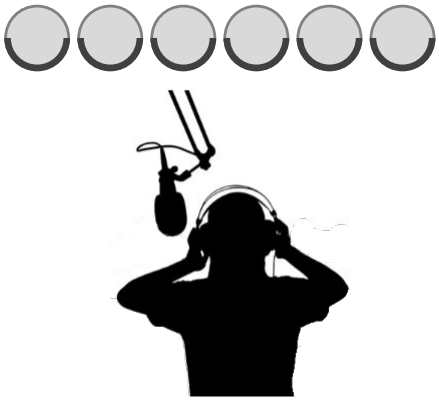
Multiple Acoustic Spaces

Sometimes the song calls for two different acoustic spaces to surround and enfold the talent's voice but the change has to be seamless and fast. The sound of the voice doing one line may be bright and energetic and then, the very next line has to have a dark context. This can be achieved in one take by using two QSF setups in a "W" arrangement. One space is set bright and the other set dark. The two spaces are side by side so that the absorptive back side of the common wall of StudioTraps is used to create the dark space next door. A mic is in each space and the talent turns and steps forward into each space as its sound is needed. Don't stop at the circle: you can setup a dichotomy of live space and dead space using other QSF shapes too.



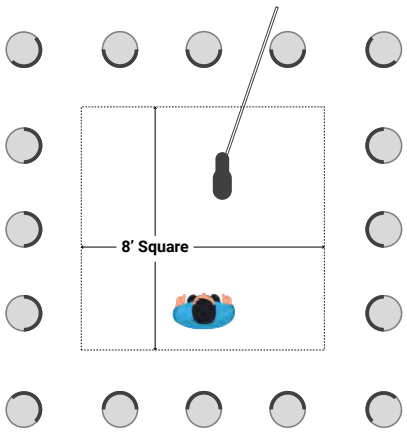
Acoustic Cloud

Overhead trapping is ideal for camera and video production settings where you need an invisible mic. A typical boom mic picks up a lot of room sound, including reflections from the walls and ceiling. For one camera talent, one of the most well known voices in the country, these ceiling reflections became a particular problem as the set of his show was moved around the country to shoot on location. The wall sounds remained the same, because they brought their set with them, but the characteristics of the ceiling reflections changed with each venue. The solution was to fly 6 StudioTraps overhead, with the reflectors directed down and the absorbing side up. This way, the ceiling always sounded the same, no matter what warehouse the show was actually shot in.



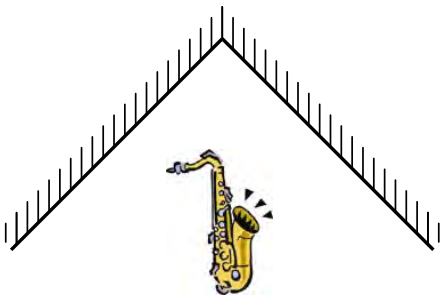
Capturing Natural Rhythm

The overhead mic isn't just for video. One world-famous pop artist records with a mic suspended above a special dance platform surrounded by StudioTraps. With the number and position of the StudioTraps carefully dialed in to capture just the right acoustic mix, this one mic cleanly captures not just the sound of his voice, but also an essence of the characteristic dance movements that make up half of his identity as a performer.



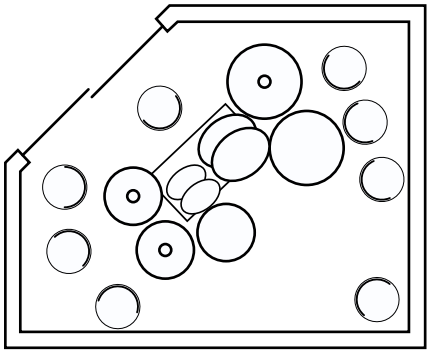
Recording Sax

There's something almost wonderful about recording a sax playing in the corner of the studio. But try putting one Studio Trap in the corner, with the reflector facing out. The harsh part of the sound goes away, leaving nothing but the good. Now that's wonderful.



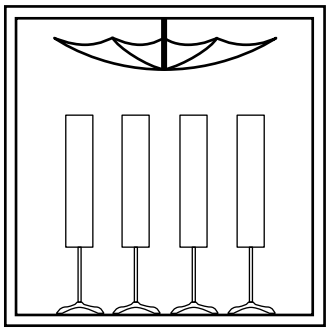
Recording Drums

The drum room is usually nested into the corner of a studio, with a sliding glass door across the diagonal front. It's always just a little too small, and the splash off the glass and walls make it hard, even impossible, to get separate tracks on the drum kit. Try adding a set of StudioTraps to the room. The space will be more crowded, but the sound really opens up. Between the extra diffusion from the reflectors, the absorption from the dead side of the StudioTraps, and their overall bass-absorbing power, they're just what the room needs. The drummer can hear what's going on more clearly, and the engineer gets the separation of mics that he always wanted.



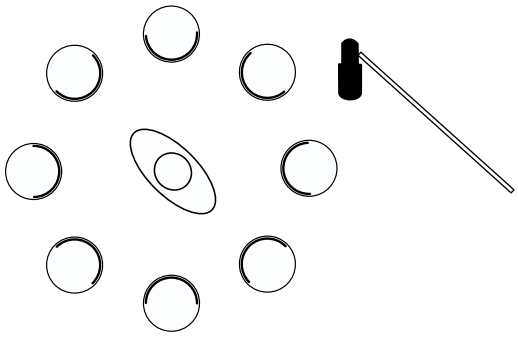
Softening Ceiling Bounce

A major international recording talent has a QSF and loves it. But in the tiny vocal room of his private studio the ceiling bounce seems to penetrate into the mic. He takes a large patio style vinyl umbrella and turns it upside down. He adds some sound absorption into the top of it and mounts the whole thing directly above his QSF. He softened the ceiling bounce, replacing it with a wave spreading curved surface and it sounds even better than he could imagine.



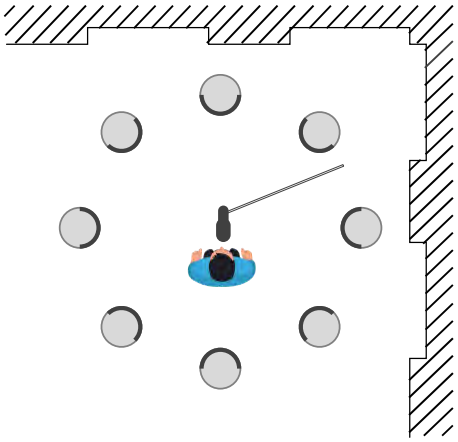
Capturing Room Ambience

A fantastic vocalist has discovered her new home practice and recording venue. She already had a well developed home singing environment in the living room and liked the sound of the room. She tried the QSF setup and found it wiped out the ambient sound of the room. She wanted that room sound back plus the QSF effect. So, she now stands directly in the middle of the QSF and puts her mic outside of the QSF. The mic is still 3' away as it always was but now she has fully encircled herself with StudioTraps. If that isn't enough, she has found hats for each of the StudioTraps and even given them names. It's all starting to look a little too much like Snow White and the 8 Dwarfs. That's show biz.



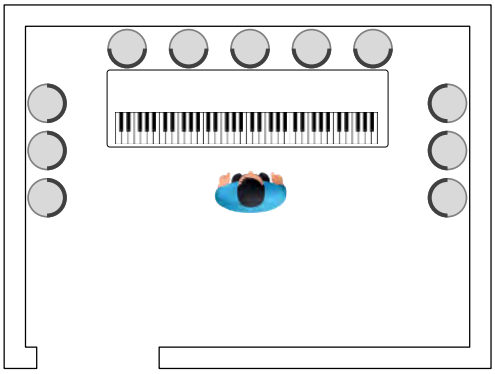
Cathedral Reverb Adjustment

A flautist performs in a cathedral with an overhead mic. The plan is to get a real-time acoustic mix of the direct and reverberant signals, capturing that cathedral essence on the recorded track. The first recording has complex problems: the reverb is too loud, and the voice of the flute seems too thin. So set up a QSF in a fairly large pattern, about 2 ½feet apart. Direct the reflective sides in to increase the aliveness and presence of the flute, and the dead sides face the cathedral, quieting the volume of the reverb. Then you can raise and lower the overhead mic to adjust the ratio of direct- to-reverb until you develop the perfect blend of sound.



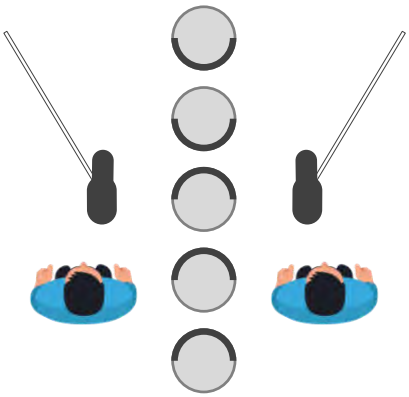
Upright Piano Fix

An upright piano is used in a small room by a pianist preparing for a concert tour. But the dynamic response and intonation of the piano are all wrong, even though it is perfectly tuned. By placing 5 StudioTraps behind the piano, with the reflectors oriented towards the sounding board, the piano regains its sense of dynamic response and intonation. It no longer sounds like a piano in a box, but like one on stage. Then, when the talent moves across the country to the opposite coast, the piano and set of StudioTraps go along, making the new practice environment sound just the old, with no need for adjustment.



Gobo/Acoustic Mix

Two singers work on a duet in a recording studio. Each singer is a powerful, operatic-type singer, and each with their own microphone. To get the kind of sound they want, a close mic setup is not an option. With mics at a distance of one foot, there is way too much bleed-through from one to the other. The solution is to form a wall of StudioTraps between the two talents and their mic positions. The direct sound from each talent to the others mic is blocked by a trap, and so is the direct sound between each talent and the others ear. Then dial in the reflectors to create a low level but effective cross-fill, with independently adjusted levels appropriate for each mic and talent ear.

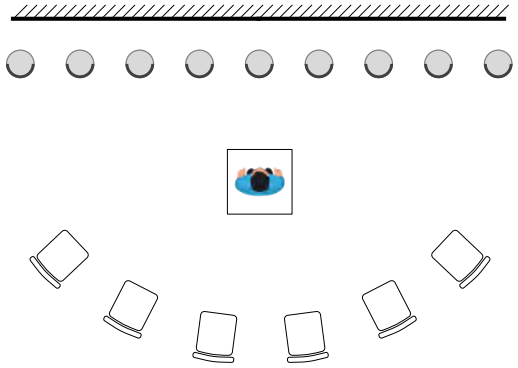


Orchestra Notes: Solving Ensemble Woes and Horn Rivalries

Often in recording sessions, the orchestra gets pushed up against a wall. People and mics along the wall hear each other too loudly; they get almost a hallway effect. Adding StudioTraps on 3 foot centers alongside the wall, with the reflectors facing outward, eliminates this hallway effect and provides just enough bandwidth of bass absorption and treble diffusion to soften the wall.

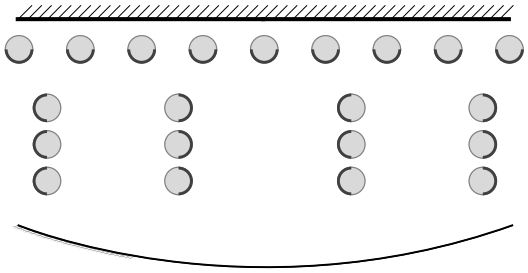
Recording in the Pit

A small but complete orchestra is in a recording session. To back off of one instrument and get a track of the whole section, the engineer needs to pull the mics up out of the orchestra. But as the mic goes higher, and the blend of instruments improves, the unwanted bleed-through of the room increases. So the engineer distributes StudioTraps along the hard-surfaced front wall of the studio, about 1 ½ feet from the wall, with the reflectors facing forward. The combination of increased diffusion off the front of the StudioTraps and absorption at their back side gets the room sound out of the mic for the perfect section blend.



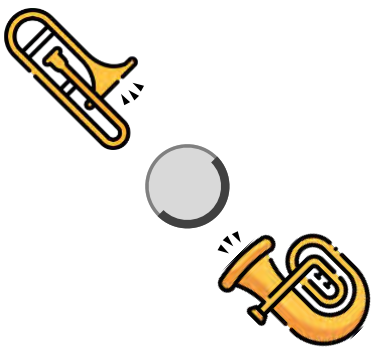
Performing in the Pit

A small ensemble performs in an orchestra pit so long and narrow they can't hear each other. There are a number of overhead section mics, but not enough gain before feedback. Moving the mics closer only zeroes in on a particular instrument. Monitor levels are cut back, before feedback comes in, but then members of the band can't hear one another. So two sets of StudioTraps are distributed along the hard wall of the pit, just below the edge of the stage, with the absorptive side facing the musicians. Another few pairs are mixed into the sections, with the reflectors set to keep the energy in each section and block the bleed from adjacent sections. Problems solved!



Playing with Horn Dynamics

The bell of a french horn, unlike most horns, faces back behind the player, rather than towards the audience. In one ensemble, the trombone player finds that whenever the french horn plays in front of him, the sound comes backwards and chokes him right off key—and vice versa. The exponential horn of each instrument is extremely efficient in both the production and collection of sound. With the bells of the two horns facing each other, they "play catch" with the sound power. Solution: place one Studio Trap behind the french horn, in the path between the two instruments, and both musicians are happy.



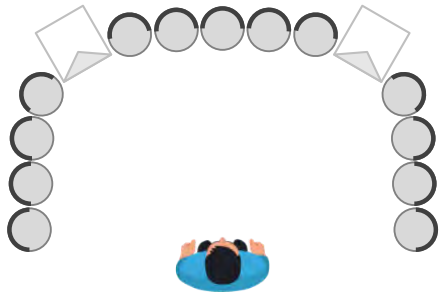
Mixing the Sound: QSF in the AttackWall

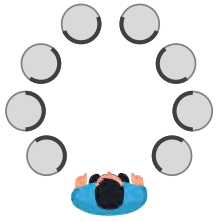
The ASC AttackWall

One of the other systems ASC provides is the AttackWall. It is a setup for mixing. There are many great things about working on the Wall. Like the QSF, the AttackWall is a room independent acoustic space. The rooms may be different but inside these spaces the sound remains the same. The AttackWall was originally developed for project studios but it has become very useful in building home studios. When doing a mix, you need all the StudioTraps in the Wall but when tracking, headphones are used and that leaves the Wall StudioTraps available for setting up the QSF. You can always tear down the AttackWall and use the StudioTraps to set up the QSF for recording. But here we illustrate how the AttackWall and QSF are blended together into a complete working studio.

QSF Behind an AttackWall

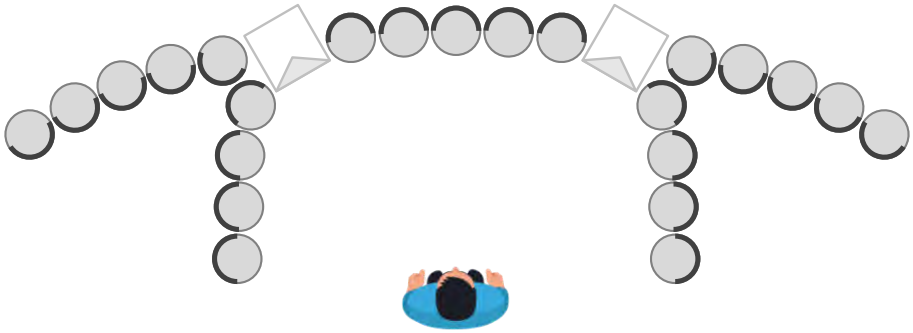
The StudioTraps behind the engineer can easily be integrated into a QSF setup. Their reflectors are already directed away from the mixing area and they are reasonably spaced apart. It is only natural to add a few more StudioTraps and build a permanent vocal space behind the engineer. The sound off the back wall won't change enough to notice for the engineer when the other 4 StudioTraps go in to form the QSF circle. The gaps between the StudioTraps allow for plenty enough line of sight so the talent and engineer can keep an eye on each other, watching for body cues and hand signals.





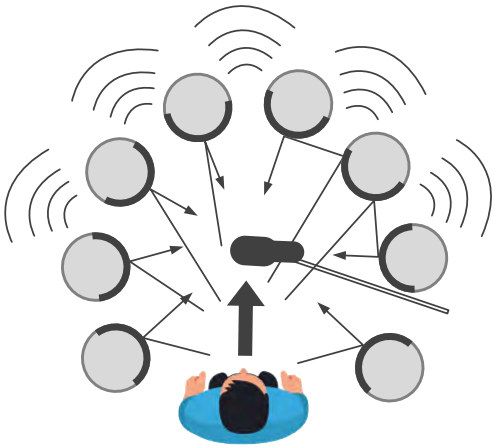
The Wing Setup: AttackWall Heaven

For an arrangement called the "wing," extra StudioTraps are added to a typical AttackWall, allowing two people to record at the same time on either side of the engineer. The engineer mixes in the same room with the performers, and has a direct line of sight to both, so the control booth really feels like part of the mix. Some call it heaven. Plus, by having these QSF StudioTraps do double duty with the AttackWall, you save on the overall cost of the studio.

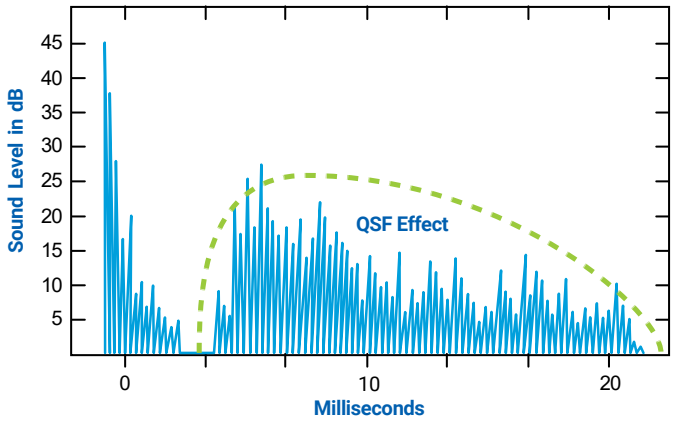


QSF - A Discussion of Acoustic Space & Time

The QuickSoundField is an acoustic space that captures and circulates each sound you make, holding it just long enough so that you get to hear all of it. A very general definition of it is that the QSF is actually a device used to maximize our ability to perceive a sensory experience. Our hearing system collects all similar sounds that exist around us within any given 1/20th of a second and turns this seeming cacophony into one recognizable sound. Our eyes, taste, feeling, and all our senses, work in this way. The QSF collects and holds the sounds we make just long enough to enhance our perception of the sound. If it held it any less time, we wouldn't be saturated with the sound. If it held it any longer, we would become over saturated with each sound and a sonic blur would begin due to the excess lingering of the prior sound. The decay of sound inside the QSF is very fast. It can be calculated and it has been measured. We know that the bulk of any given sound emitted into the QSF must effectively disappear within 1/20th of a second. When the StudioTraps are 6" apart, about 60% of the sound is reflected and 40% is leaked out every time the sound travels the 5 feet distance across the middle, between the sides of the QSF setup. This produces a regulated, steady bleed off of the sound that has been captured inside the QSF space. The decay rate (RT-60 is the time sound takes to die away by the amount of 60 dB) for sound captured inside the QSF is about 1/30th of a second. The RT-60 in a typical recording studio is about 10 times slower, around 1/2 second. Studios are slow because they are big, compared to the small size of the QSF.



If the sound stays inside the QSF too long, we get sonicstreaking, the sound stream becomes a blur. That might not be all bad. Some amount of sonic blur may be good. For example, a crystal clear photograph may be technically correct. The same shot through thin cheese cloth or with the camera slightly defocused adds a visual blur that communicates emotion to the viewer. Sight and sound, are the two wave energy sensory channels that we have to the outside world. In audio, the engineer uses a tube mic to get that fuzzy edge, or they turn to the effects box and dial in the exciter to get hash and smear into the sibilant part of the talent's voice.



There are no rules for calculating the exact amount of sonic defocus that would be best. It is an artistic issue, a matter of flavor to suit, one best left to the spirit of the moment. The QSF collects and holds your sound for a very short moment, right in front of you, before your eyes and ears to behold. It can be adjusted to hold the sound longer or shorter, more strongly or more lightly and in some way, you can even hear the shape of that sound-holding sonic bowl.

A well built studio that has that typical "dead" sound is designed to have absolutely no reflections of sound in the first 1/20th second, this applies to both the control room and the vocal booths. Following this initial short period of absolute silence, known as a "reflection free zone", arrives a quiet, diffusive decay of sound, a backfill that dies away at a rate of 1/2 second. The QSF effect only lasts 1/30th second. Its reflection free zone is about 1/500th of a second, the time it takes for the first reflection to arrive. Then it fills the air around the talent and microphone with a plethora of reflections during the first 1/30th second.

That's just what is so unique about the QSF acoustic space. It is not just another dead studio gobo. It is not just a portable reverb chamber, or a new sounding sonic space. It is essentially an ergosonic designed acoustic space. It recreates a natural, color-free sonic environment inside one of the most unnatural sonic environments around, a small, rectangular room. The QSF might even be considered to mark the beginning of a new era: The Greening of Studio Acoustics.

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