Subject: Solution for raised wood floors and crawlspaces
Posted by Wayne Parham on Fri, 13 Jul 2001 18:13:44 GMT
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We've discussed room modes and the ways to smooth response in the modal region. It's pretty simple, really, you can damp the room modes or you can use dense interference to fill them in. Fortunately for most of us in North America, framed drywall construction provides a built-in measure of room damping, and rooms made with that kind of construction are much better acoustically than rooms with rigid walls. People with brick, plaster, rock or concrete walls generally need to install dampers, and I suggest panel dampers, sort of like false walls. Another thing that helps a lot is to use multiple woofers, which fill in the nulls and make the modal range smoother throughout the room.The one thing we haven't discussed is raised hardwood floors. Some homes are built on concrete slabs but some have hardwood floors built over a crawlspace. This allows access to electrical lines and pipes, so maintenance is easier but acoustically, they're terrible. They floor acts like a resonant diaphragm and the crawlspace forms a resonant chamber. It's like a big drum head, and it usually makes the bass sound terrible.This acoustics of a room with a raised hardwood floor are more complex than rooms with a concrete slab. Not only does this kind of room have modal issues but it also has floor/crawlspace resonance, which is not the same thing. You can't solve bass problems in a room like this simply by wall damping or smoothing room modes. Multipe subs average room modes but do nothing to solve floor resonance. In fact, multiple woofers usually exaggerates the hardwood floor problem because it puts more energy into the floor and crawlspace. In this case, you generally have to damp the crawlspace seperately, sometimes also adding rigidity to shift the floor panel resonance to a higher frequency where it is more easily damped.The best way to do this is to girder the joists in a few places, adding vertical support beams and preloading the floor with them. It may be that just one or a small number fixes the problem entirely. Start with one in the center of the largest expanse and check the acoustics, adding them until you achieve the desired results. Add enough that impacts to the floor do not make a bass sound, but rather sound more like hitting a solid object. Foam insulation sprayed underneath the floor will damp the higher frequency sound formed by a more rigid floor, and will deaden the impact considerably. These steps will cure the problem of the floor/cavity resonance of raised hardwood floors, leaving you to deal only with the room modes.