

APPLICATION NOTE ON TOA'S UNIFORM DIRECTIVITY CEILING SPEAKER

In open areas with low ceiling heights, dead spots often occur in areas between speakers mounted in the ceiling. Often, there is a noticeable difference in the quality of the sound between the area directly below the speaker, or on axis, and the area off-axis. Sound engineers and system designers have known for many years that higher frequency material is more narrowly dispersed from cone speakers than lower frequency material. A listener standing on-axis gets a better, more total sound than one standing off-axis. The attenuation of higher frequencies is a problem because of intelligibility loss as well as degradation of quality.

One solution is to decrease the distance between ceiling speakers, thus putting more of the floor space and listening area into the on-axis coverage. However, this will drive up the cost of the system since more speakers, wire, back boxes and labor will be consumed in the installation, and more amplifier power will be needed. A better solution is to use TOA's new F121C Uniform Directivity Ceiling Speaker with the AC-120 Dedicated Equalizer. This speaker is equipped with a unique sound diffuser, housed in an attractive mesh cone. The diffuser helps to smooth out the dispersion of the higher frequencies, which eliminates the dead spots even when the speakers are spread out. The graphics shown on this page and the next dramatically demonstrate how the frequency and polar response of the F-121C compares with standard 4" ceiling speakers, and shows that better sound with less speakers is possible when the F-121C is used in restaurants, offices, shopping malls, retail stores, and other space requiring ceiling mounted speakers.

The F-121CM is transformer equipped with multiple line taps for loudness selection.

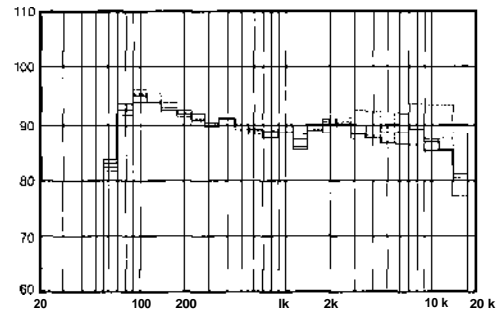
Frequency Response of F-121C/F-121CM

0/Degrees

30/Degrees

60/Degrees

90/Degrees



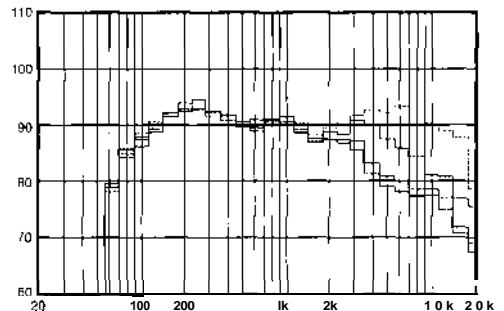
Frequency Response of 4" Ceiling Speaker

0/Degrees

30/Degrees

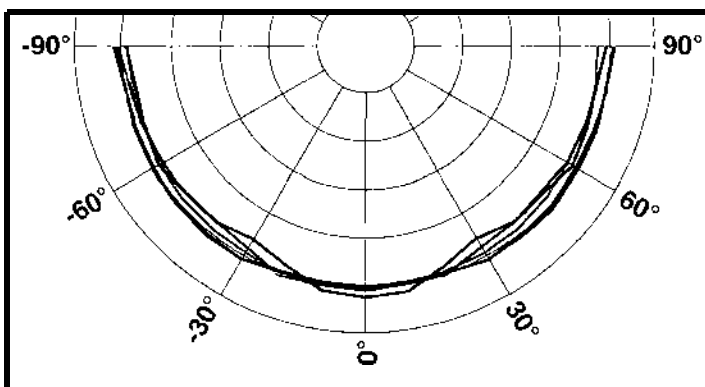
60/Degrees

90/Degrees



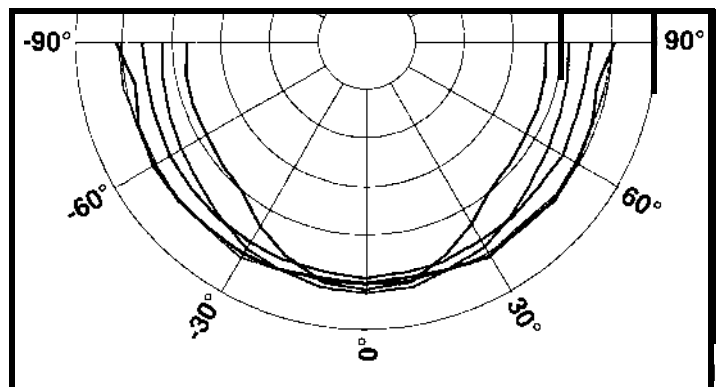
Polar Response F-121C

500Hz 1000Hz 2000Hz 4000Hz 8000Hz

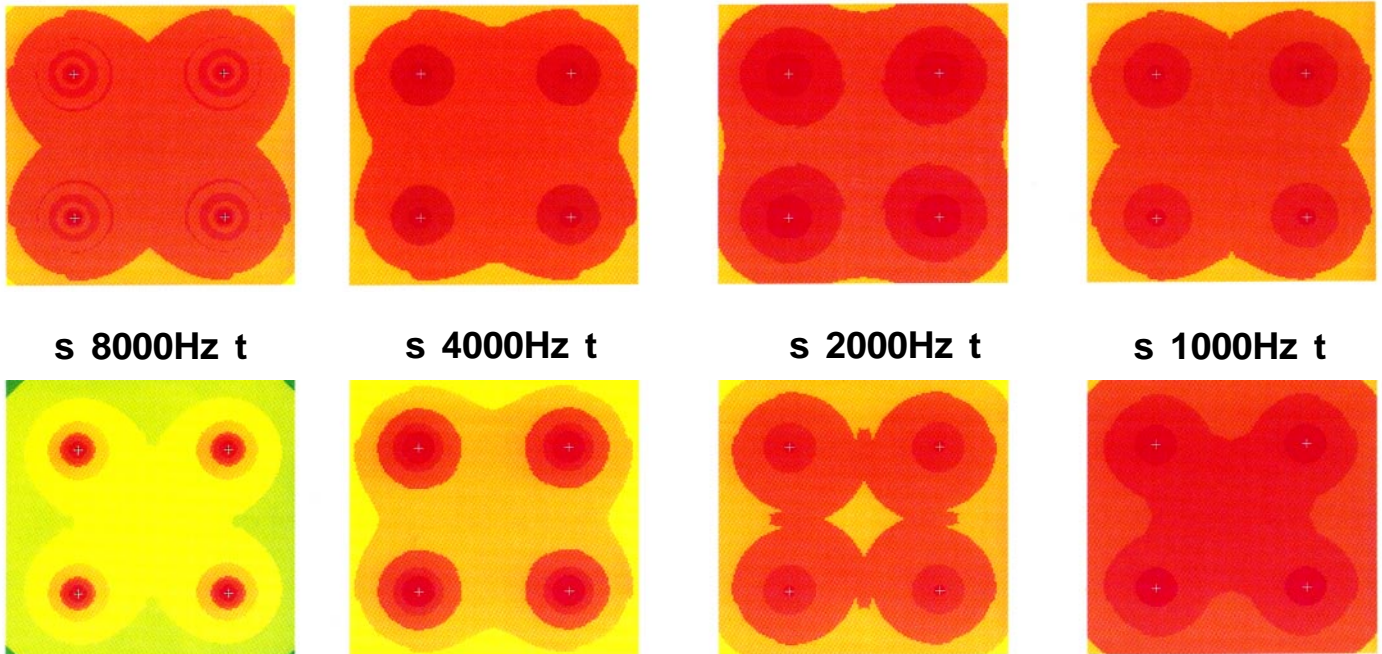


Polar Response 4" Ceiling Speaker

500Hz 1000Hz 2000Hz 4000Hz 8000Hz



Sound Level Distribution Patterns TOA F-121C/F-121CM



Sound Level Distribution Patterns 4" Ceiling Speakers



Sibilants ('s' sounds) and plosives ('p' sounds) are frequent in all human speech. Compared to the F-121C Uniform Directivity Ceiling Speakers, standard 4" and especially 8" co-ax ceiling speakers do not adequately disperse these high frequency sounds.

The above sound level distribution patterns were obtained from four speakers placed (as marked by the '+' signs) in an anechoic space measuring 65 ft. (W) X 65 ft. (W) by 6.5 ft. (H). The patterns above show the area represented by 1 W/m of sound pressure level.