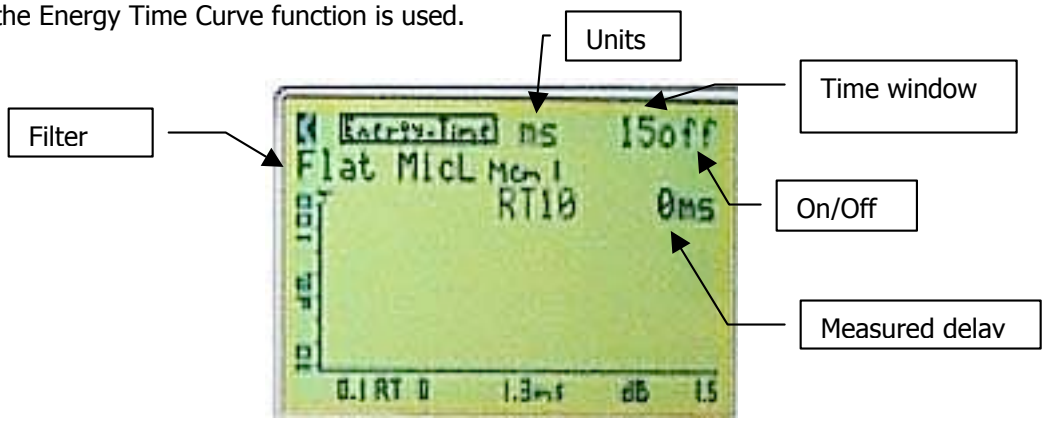
TerraSonde
2440 30th Street
Boulder CO 80301 USA

(303) 545-5848
fax: (303) 545-6066
Sales & support (888) 433-2821

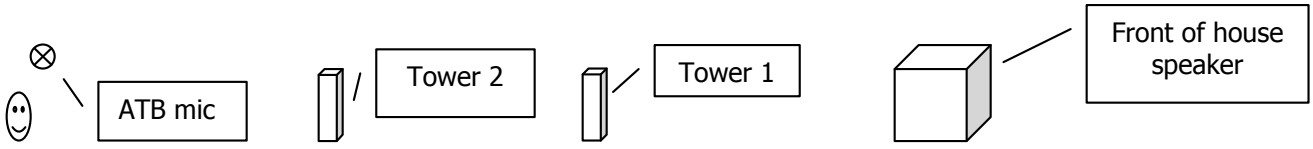
Application Note:
Determining Speaker Delay Time Settings

The Audio Toolbox can be used to accurately measure speaker acoustic delay times. This information can be used to set the digital delay used when a fill speaker is used at some distance from the main speakers.

To do this, the Energy Time Curve function is used.



Setup the Toolbox microphone somewhere behind the speakers. This example shows main (FOH) speakers and 2 fill towers.



Route the Toolbox audio output into the sound system. Turn on only the Front of House (FOH) speakers.

Set the filter to A-WTD (A weighting). This just rolls off a lot of lows and highs and leaves you with the mid-range frequencies. This tends to reduce noise problems.

Make sure the units are set to ms and not Ft or M (feet or meters). Select MicL to start with, if the sound will be less than about 95 dB SPL.

Set the time window to a number somewhat larger than your estimated distance to the FOH speakers. You can use the rule of thumb that sound travel about a foot per ms (millisecond), so if you think are back 75 feet you might pick 120ms for the window.

Use Int mode (Internal trigger).

Turn on the function (click on "off"), and carefully turn up the level. You will see a display that is mostly blank until the first arrival of sound from the FOH speaker. Also, the delay calculation should show a number. This number is the time, in ms, of the initial arrival of sound to the Toolbox mic. Write this down as the "FOH" time. Make sure you have enough level to get a stable reading, but watch for overloads.

Now turn off the FOH speaker and turn on the Tower 1 speaker. Again raise the level to get a good reading. You will get a smaller delay calculation. Write this down as "Tower 1" time.

Repeat for as many fill towers as you need.

Now, to set the delay for a tower, just subtract: Delay time = FOH time – Tower time.