

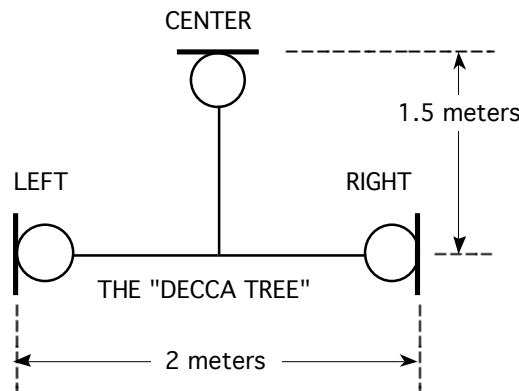


AUDIO ENGINEERING ASSOCIATES

1029 No. Allen Avenue, Pasadena, CA 91104
Phone: (626) 798-9128 / Fax: (626) 798-2378E-mail:
stereoms@compuserve.com

The Decca Tree

The stereo microphone array commonly referred to as the “Decca Tree” was originally conceived by the recording engineers at English Decca Records. It utilized three omnidirectional microphones situated at the ends of a large T-shaped fixture. The spacing between the left and right microphones was approximately 2 meters, and the central microphone was in front of these by about 1.5 meters. Placement of the array was generally a few feet behind and about eight to ten feet above the conductor’s head.



The three microphones are panned Left, Center, and Right respectively. Although it is tempting simply to aim the mics straight out from their support braces, it is preferable actually to point the principal axes of the microphones inward and downward, toward the soundsource; this is because omnidirectional microphones always tend to become more directional as frequency increases.

Because of the relatively close spacing of the outer microphones, the intensity cues necessary for good stereo imaging are combined with sufficient phase information to produce an open, *spacious* sound and, due to the middle microphone, at the same time maintain a solid central image.

The Decca Tree is favored by film scoring mixers because of its ability to produce a good, stable stereo image which will hold-up throughout the application of the Dolby and other surround-sound matrix systems.

USING THE DECCA TREE

The microphones traditionally employed were the “classic” Neumann M-50 large diaphragm tube condenser mics, which provided a characteristically warm and enveloping sound — a sound which is still cherished by the engineers of London/Decca Records. Other microphones, however, also are now commonly in use affording the option for different polar patterns and configurations.

When considering the multitude of variations on the theme of the Decca Tree, the first thing to try is adjusting the spacing between the microphones. The Left and Right microphones may be spaced closer — or even farther — apart, to change the spread of the stereo image. Similarly, the distance of the Center may be varied, relative to the two other mics. All you need to do is adjust the spacing and listen to the results. There are no “hard and fast” rules.

In many situations, using sub-cardioid, cardioid, or bi-directional polar patterns for the Left and Right — or even all three — microphones might offer better focus by improving the direct-to-reverberant ratio. In this situation, aiming the mics becomes even more critical in order to avoid significant off-axis response problems. With more directional patterns, the spacing between the two side microphones generally decreases somewhat.

A variation frequently employed by Ron Streicher is to use a *stereo-pair* of microphones for the center pickup, such as an XY or MS array. When configured in this manner, the center pair provides the “articulation” for the stereo image, and the two outer microphones generate the “spaciousness.” As before, adjusting the relative levels and spacing between the microphones also will affect the overall perspective, and the final result is a matter of judgment and preference.

When using the Decca Tree, or *any* spaced-microphone configuration, it is good practice to pay careful attention to the audio quality of the monophonic-sum of the stereo perspective. With omnidirectional microphones, it is very easy for the combined signal to result in an over-abundance of reverberation (or indirect sound) for the mono listener. Also, due to the time-of-arrival (i.e. phase) differences at the microphones,

some degree of *comb-filtering* will result. While not as noticeable when heard in stereo, these effects can seriously degrade the sound for those listening in mono. The best way to monitor this effect is by listening to the mono-sum (Left plus Right). If there is too much indirect sound or out-of-phase information, it will become immediately evident by a loss of clarity and/or low-frequency information and a rather “hollow” or unnatural character to the sound. (Another way of checking mono-compatibility is to view the stereo signal on an XY phase display, such as the **AEA LD-2020 StereoScope**.)

If the mono-compatibility is unsatisfactory, the first option is to decrease the spacing between the Left and Right microphones or to increase the signal level of the Center microphone relative to the two side mics. Selecting a different polar pattern for the microphones is another option. Relocating the entire array closer into the sound source also should be considered, particularly if there is an excess of reverberant information.

THE AEA DECCA TREE SYSTEM

Audio Engineering Associates has developed a modular system for configuring Decca Tree arrays. This utilizes our **SMP Stereo Microphone Positioners** with a central mounting bracket assembly. With our **SMP-17** (seventeen inch), **SMP-1M** (one meter) and **SMP-1.25M** (1.25 meters) bars, several variations are possible.

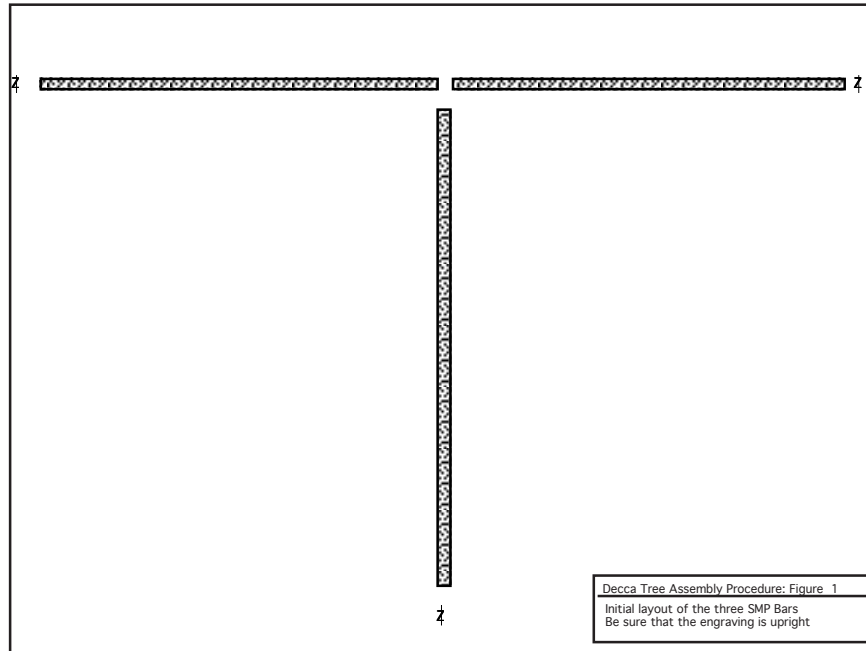
The “Traditional” Decca Tree: one **SMP-1.25M** and two **SMP-1M** bars with our **Decca Tree Bracket** assembly; this produces an array 2 meters wide and 1.25 meter deep; a common alternate employs the **SMP-1M** for all three bars.

The “Super” Decca Tree: three **SMP-1.25M** bars with the **Decca Tree Bracket** assembly; this array will be 2.5 meters wide and 1.25 meters deep, providing an extra degree of width and “spaciousness” to large ensembles.

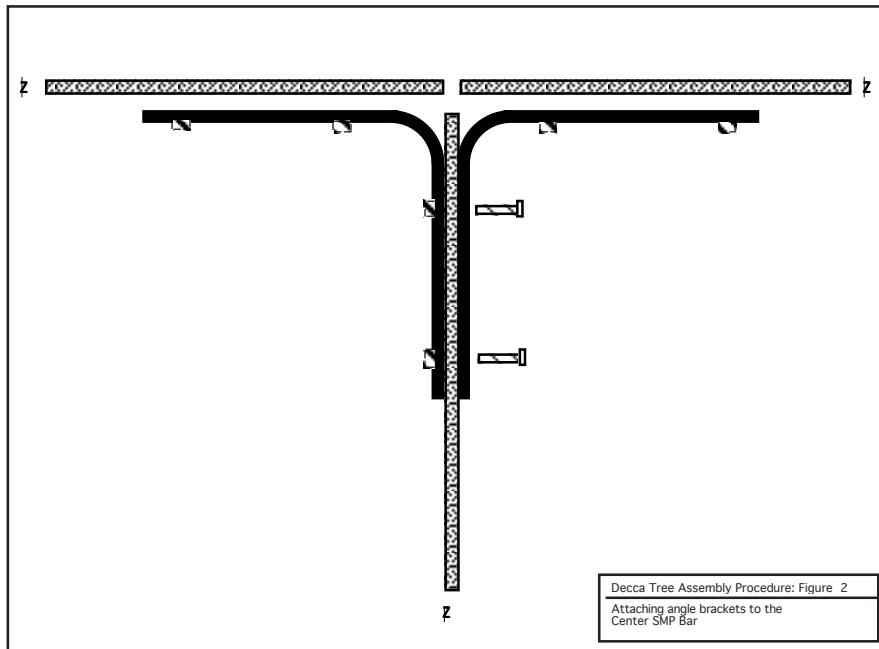
The “Mini” Decca Tree: one **SMP-1M** (or **SMP-1.25M**) bar for the sides and a **SMP-17** for the center, configured using our **“Mini Tree” Bracket**; this array is very useful for smaller ensembles or when a stereo-pair serves as the center pickup.

Of course, any combination of **SMP bars** and **Decca Tree Brackets** may be configured for other arrays. Additional sliders for the **SMP’s** also may be employed when additional microphones are added to the array.

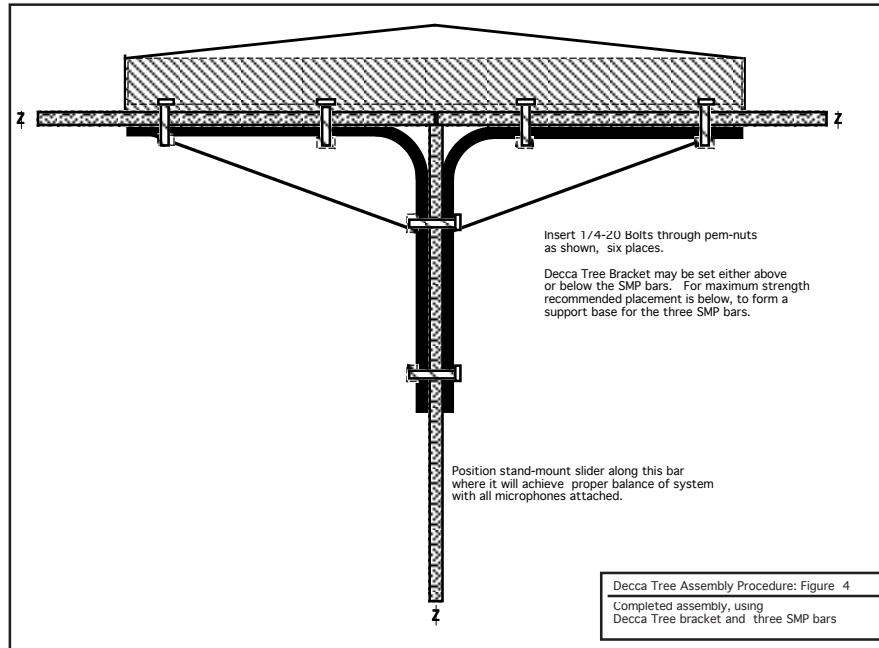
To assemble any of the larger Decca Tree systems, first select the three **SMP** Bars and lay them out in a T-shaped configuration. Be sure that the engraving is upward on all three bars.



Next, fasten the two L-shaped brackets to the forward bar, using two of the 1/4-20 bolts supplied.

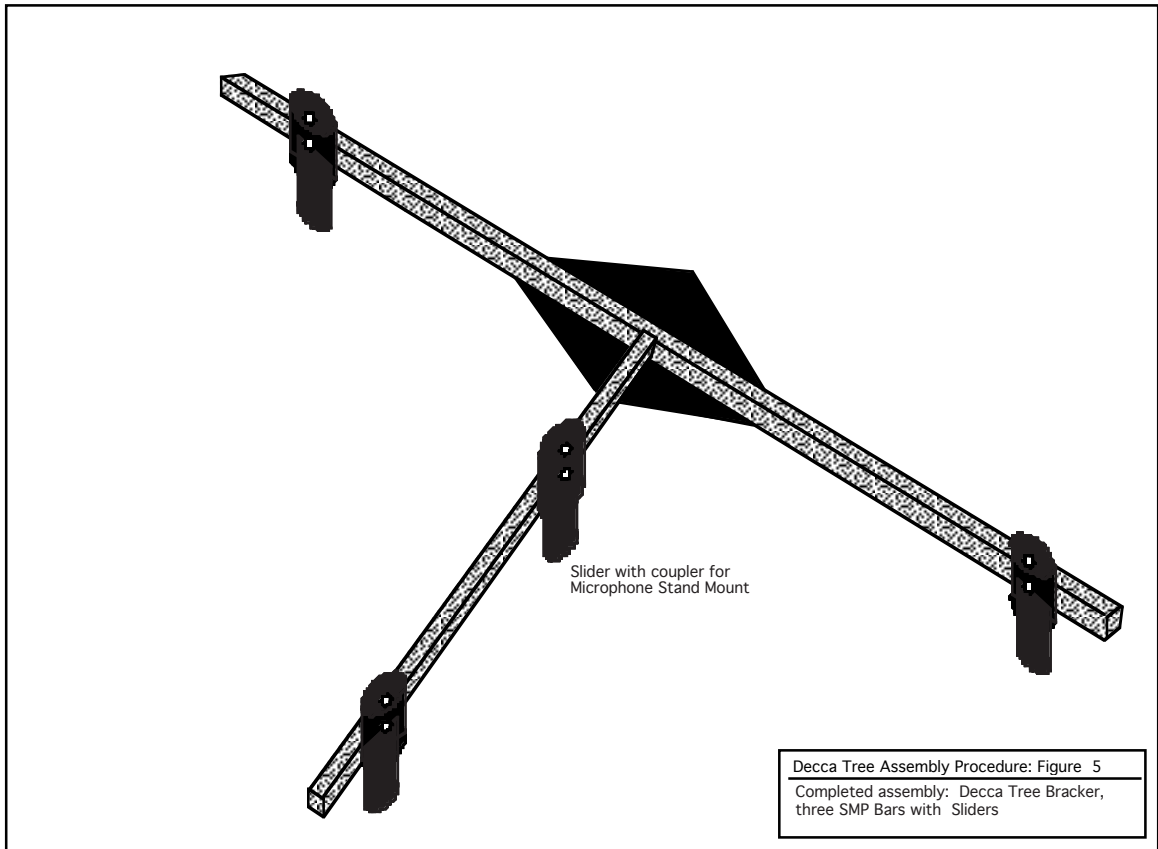


Finally, attach this assembly and the two side bars to the Decca Tree Bracket, using the four remaining bolts.



Now complete, the Decca Tree may be suspended from the holes at the end of the three **SMP** Bars, or stand-mounted using one Slider (with the female stand-coupler) on the forward bar. For maximum strength when the array is stand mounted, we recommend that all of the bars be set on top of the Bracket so that it will form a supporting base for the complete assembly.

The microphones may be located as desired along the three **SMP** Bars — Left, Center, and Right. When stand-mounted, be sure to position the microphone stand support Slider so that the entire array, including the microphones, is properly balanced. Whenever possible, we also recommend that the microphones be mounted below the **SMP** bars (i.e. hanging downward). This will minimize the tendency for the entire array to tip or rotate due to the natural effects of gravity.



As with all stand-mounted microphones, it is good practice to use shock-mount suspensions to attach the microphones to the Decca Tree assembly. We also recommend that the entire array be additionally isolated from the support stand using the AEA **“Floater” shock-mount assembly**. This heavy-duty unit will further reduce mechanical noise by decoupling the entire array from the microphone stand.