

Audio Engineering Associates

1029 N. Allen Ave.
Pasadena, CA 91104

www.wesdooley.com

STUDIO RIBBON MICS • PHASE DISPLAYS
M/S STEREO • TALL STANDS • MIC POSITIONERS

Phone: (626) 798-9128
Fax: (626) 798-2378

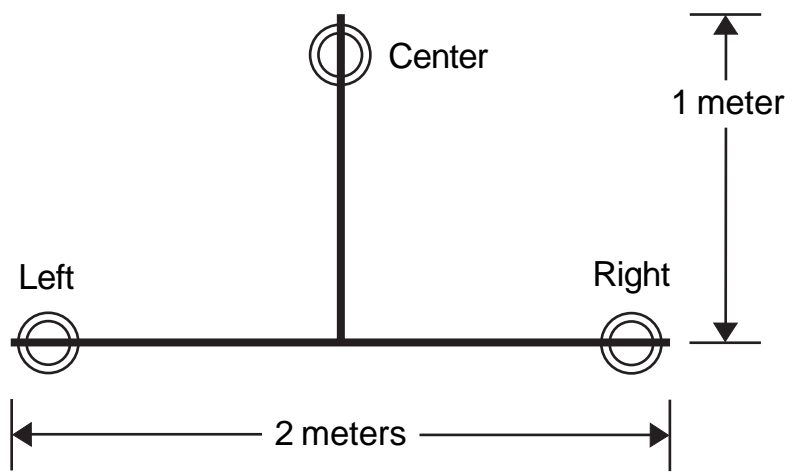
Modular Microphone Positioning Systems: Stereo Bars and “Decca Trees” Instructions for Assembly and Usage

Background

The recording engineers at England’s Decca Records originally conceived the stereo microphone array commonly referred to as the “Decca Tree” for recording large orchestral groups. The configuration quickly became the standard among the classical recording community. The “Decca Tree” is more widely used today by recording engineers than in any other time since its invention . The “Decca Tree” is highly esteemed by both classical recording engineers and film scoring mixers because the configuration produces a good, stable stereo image that holds up well through application of Dolby and other surround-sound matrix systems.

The Stereo Microphone Positioner Bar (SMP) was initially designed by AEA as a device for mounting a stereo pair of Coles 4038 short-ribbon microphones in “ORTF” and “Blumlein” configurations. However, it soon became evident that the bar could be designed to provide a secure and versatile support for microphones from almost any manufacturer—even the heavy large-diaphragm condensers that ordinarily will not fit on the conventional stereo bars produced by other manufacturers.

The original “Decca Tree” array employed three omnidirectional microphones situated at the ends of a large T-shaped fixture, as shown (right). The spacing between the left and right microphones was approximately two meters, and the central microphone was in front of these by approximately one meter. Placement of the array was generally a few feet above the conductor’s head.

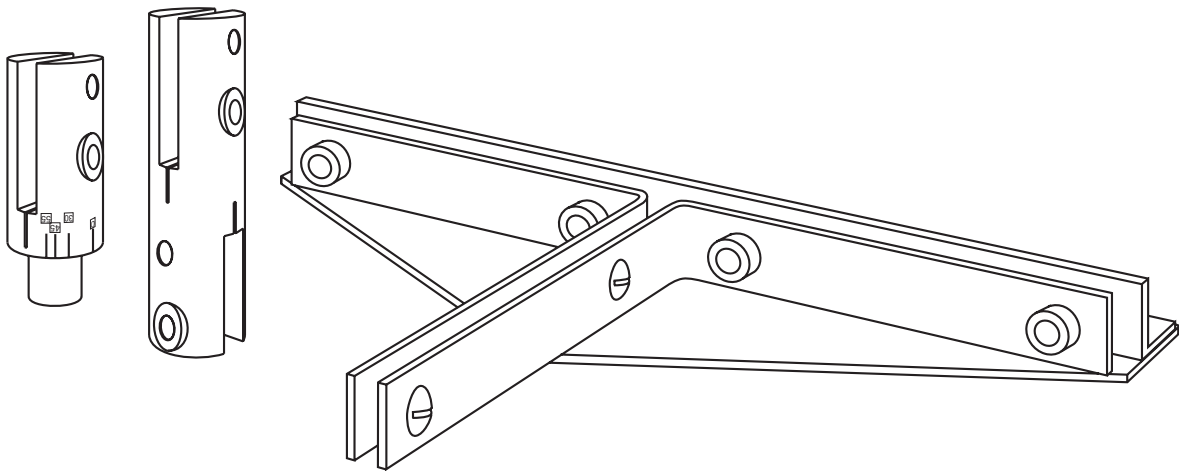


The “Decca Tree”

The microphones originally employed with the tree by Decca Records were the “classic” Neumann M-50 large diaphragm tube condenser microphones that provide a characteristically warm and enveloping sound — a sound still cherished by the engineers of London/Decca Records. However, today other microphones are commonly used that afford the experienced recording engineer many more options for different polar patterns and configurations.

AEA’s modular system allows a variety of stereo microphone positioning bars and “Decca Trees” to be configured from common parts. It is therefore possible to create your own custom-made arrays from the available elements.

The principle elements of the Modular Stereo Microphone Positioning Bar/“Decca Tree” System are the sturdy one-inch wide hard-anodized aluminum bars. The bars are available in 17-inch, 1 meter and 1.25 meter lengths, and have a non-reflective matte black finish. Each bar is laser-engraved across its length in 2.5-cm increments, having zero at the center. These markings designate the distance between the sliders, and include special markings to indicate the 17-cm spacing unique to the “ORTF” stereo system.



Left to right: the slider, the mini decca tree bracket and the standard/super decca tree bracket.

Each slider is marked around its circumference at 0, +/-30, 45, and 55 degrees and represent included angles of 60, 90 and 110 degrees respectively between the microphones. These may be used to facilitate exact and repeatable positioning of any conventional stereo perspective.

Each slider is also fitted with two thumbscrews to secure it onto the bar and extra-wide locking microphone positioning rings. One female threaded coupler is included to allow the unit to be mounted on a microphone stand or a boom. In addition, your system can be mechanically isolated using a “floater”—a heavy-duty shockmount. Floaters are available as an accessory.

Assembling the Stereo Microphone Positioning Bar

Summary of Parts

Quantity	Description	Part	Part No.
1	One of the following anodized aluminum bars:		
	17-inch	SMP-17	SMP-1-0001
	1 meter	SMP-1M	SMP-1-0002
	1.25 meter	SMP-1.25M	SMP-1-0003
3	Sliders	SMP-S	SMP-4-0001
3	Rings (5/8 27)	SMP-R	SMP-4-0002
3	Large black thumbscrews		SMP-4-0003
3	Small black thumbscrews		SMP-4-0004
6	Nylon washers		SMP-4-0005
1	Female-Female Stand Coupler (5/8-27)	SMP-SC	SMP-5-0001

Instructions for Step-By-Step Assembly of the Stereo Microphone Positioning Bar

1. Locate the hard-anodized aluminum bar and the slider (SMP-S), complete with stand coupler and both thumbscrews. Slot the slider onto the bar such that the threads are positioned below the bar. Adjust the slider until it lines up with the center hole in the bar.
2. Slide the small thumbscrew through the central unthreaded hole in the slider and the central hole in the bar and then thread it. Insert the second thumbscrew into the outer hole, which should pass outside the bar, unthreaded hole first. Snug down both of the thumbscrews.

Note: It is possible to position a SMP-S anywhere on the bar by not passing the thumbscrew through the hole and instead threading the thumbscrew directly into the tapped hole and snugging it down directly on the bar itself.

Important: It is recommended that the microphones be placed above the bar to minimize acoustical reflections from the stand and bar. If you intend to mount the bar from a boom, position the threads below the bar so that the microphones hang.

3. Locate the two remaining sliders with rings threaded onto them. Slot one slider onto each end of the bar such that the threads are positioned above the bar. Attach these to the bar in precisely the same way as you did with the first SMP-S.
4. Mount your Stereo Microphone Positioner using the female-to-female coupler. Congratulations, your Stereo Microphone Positioner is complete! Using the threaded ends of the sliders, it should be possible to mount virtually any type of microphone to your stereo bar.

Using Your Stereo Microphone Positioning Bar

Using the Stereo Microphone Positioning Bar horizontally provides a convenient platform for creating any of the common near-coincident stereo pickup configurations with microphones of almost any size, shape, or pickup pattern. Using smaller, axial-address microphones, intensity of coincident stereo configurations can also be achieved.

When creating a coincident stereo array with two axial-address microphones, a vertical offset is desirable so that they may be positioned with their capsules one directly above the other. To accomplish this, a riser may be installed on one of the sliders if there is insufficient thread depth in the microphone's stand adapters to achieve the offset directly. To create the riser, use an Atlas AD-4B male coupler with an AD-5B chrome female coupler. If you prefer, you may order a matching anodized female coupler (SMP-C).

Vertical orientation of the SMP enables even very large side-address microphones to be configured into coincident stereo arrays, such as XY, Mid/Side (M/S) or "Blumlein" (crossed figure-eight). Simply install one slider on either end of the bar. As before, the female coupler may be used to mount the Stereo Microphone Positioning Bar on a stand or boom arm. The other two sliders should be set at a spacing that will allow the microphones to be positioned one over the other (head-to-head) as close together as possible without actually touching each other. Once the microphones are mounted on the bar, simply rotate them in their mounts to achieve the appropriate angle between their axes of pickup.

To protect your microphones, it is recommended that when using the Stereo Microphone Positioning Bar vertically, the lower microphone slider always be positioned such that the small thumb-screw passes through one of the mounting holes.

A special note to Coles 4038 ribbon microphone users: the lower microphone slider may be located at the third hole from the end, and the top slider through the second hole from the end. When used in conjunction with AEA's 4038-SA custom mounting adapters, this will position these microphones such that they do not interfere with each other.

Note: If you regularly use a particular pair of microphones with the Stereo Microphone Positioning Bar, you might consider drilling your own special positioning holes (5/16" diameter) to provide a more secure and repeatable mounting for your microphones.

It may be necessary for your purposes to fly the microphones above an audience to minimize visual intrusion during live performances. To suspend the array horizontally, a single support line should be connected to the center hole of the bar. Monofilament "guy lines" may be tied to outer holes to prevent rotation or to breast the array if necessary. The microphone sliders should be oriented so that the microphones hang down from the bar.

To hang the Stereo Microphone Positioning Bar as a vertical array, the uppermost hole should be used for the support line. The bottom hole should be used for guy lines. Tilting the array down-

ward slightly will lessen the tendency of the array to rotate. To increase stability when using some large or heavy microphones, a conventional stereo bar (such as those available from Atlas, KM, AKG, and others) may be attached to the third slider and mounted at the bottom of the Stereo Microphone Positioning Bar to provide a cross-brace for attaching guy lines.

Note: It is extremely important when flying microphones on the Stereo Microphone Positioning Bar that a strong cable bear the weight of the array, The microphone cables should never be used other than to breast the array. Always remember to fasten the support cable securely to the Stereo Microphone Positioning Bar. To protect bystanders and your own equipment, you may want to consider a second safety line as a backup.

Assembling the Mini “Decca Tree”

The AEA Mini “Decca Tree” was developed by Ron Streicher, author of The New Stereo Soundbook and a classical recording engineer. While the standard “Decca Tree” that most people know, as described in the opening of this manual was designed for large groups, the Mini “Decca Tree” was designed for more intimate recording sessions and its smaller scale fits a chamber group or small jazz group much more appropriately than its larger cousin. The Mini “Decca Tree” is a convenient means of combining the best attributes of both the mid/side and near-coincident technique, by flanking the primary M/S pickup with a pair of near-spaced microphones.

Summary of Parts

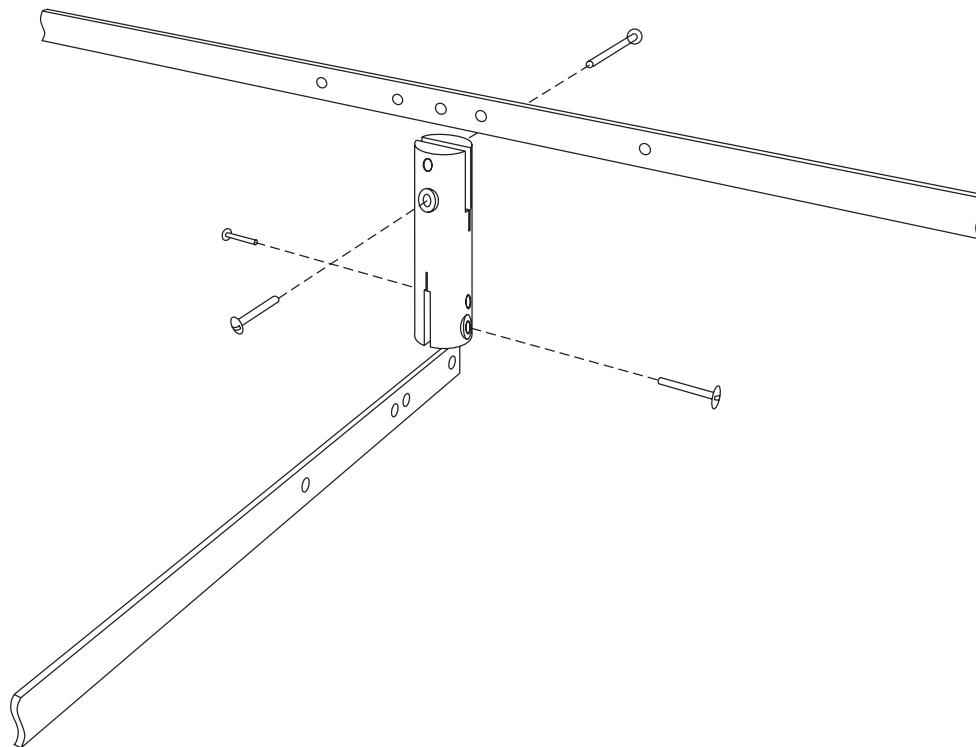
Quantity	Description	Part	Part No.
1	1-meter hard-anodized aluminum bar	SMP-1M	SMP-1-0002
1	17-inch hard-anodized aluminum bar	SMP-17	SMP-1-0001
1	“Mini Tree” Bracket	SMP-MB	SMP-2-0001
4	Long black screws (1/4 -20)		SMP-2-0002
4	Nylon washers		SMP-4-0005
4	Sliders	SMP-S	SMP-4-0001
4	Rings (5/8 27)	SMP-R	SMP-4-0002
4	Lage black thumbscrews		SMP-4-0003
8	Small black thumbscrews		SMP-4-0004
4	Nylon washers		SMP-4-0005
1	Female-Female Stand Coupler (5/8-27)	SMP-SHD	SMP-5-0002

In addition, you will need a blade screwdriver to properly assemble your system.

Instructions for Step-By-Step Assembly of the Mini “Decca Tree”

(Before you assemble your Mini “Decca Tree,” make certain you find an area with adequate space.)

1. Find the 1-meter (SMP-1M) and the 17" (SMP-17) black anodized aluminum bars. In addition, find the “Mini Tree” bracket (SMP-MB), complete with its four nylon washers and four black quarter-twenty screws.
2. Holding the bracket in your hand, slide it onto the 1-meter bar using the lower slot of the bracket until it rests in the center of the bar. Making sure that the nylon washer is in place, slide the screw through the nylon washer, the lower unthreaded hole in the bracket, the hole in the center of the 1 meter bar and snug it down almost tight (you will need a screwdriver to do this.) Insert the second screw into the uppermost hole, which should pass above the bar pushing it through the unthreaded hole first and making sure the nylon washer is in place. Once the bar and bracket are securely aligned, tighten both screws.



3. Next, insert the 17-inch bar into the upper slot so that the end of the bar lines up with the end of the slot. Making sure that the nylon washer is in place, slide the screw through the nylon washer, the upper unthreaded hole in the bracket and the last hole in the 17-inch bar and snug it down. Insert the second screw into the bottom hole, which should pass below the bar, again , unthreaded hole first and making sure they nylon washer is in place. Snug down the second screw. You now should see the characteristic T-shape of the “Decca Tree.”

Note: Although it also is possible to assemble the “Mini Decca Tree” so that the forward bar hangs below the lateral bar, the array will be more stable if configured as described above.

4. Locate the support slider (SMP-S) complete with its stand coupler and its two thumbscrews. Slot the slider onto the extended end of the 17-inch (forward) bar and thread the thumbscrew through the hole above the bar. Initially, set this slider close to the “mini tree bracket” and snug it down, but not too tight. Final positioning of the support slider should be determined after all microphones have been mounted so that the entire array will be in “dynamic” balance.
5. Locate the three remaining sliders with locking rings threaded onto them. Slot one slider onto the end of each of the three available bar ends, again, such that the threaded ends of the sliders are below the bar. Attach these to the bar in precisely the same way as you did with the first SMP-S.

Note: To position a SMP-S anywhere on the bar, thread the central thumbscrew directly into the tapped (rear) hole and snug it down directly on the bar itself.

6. Mount your “Decca Tree” to a stand or boom using the female-to-female coupler. Congratulations, your Mini “Decca Tree” is complete! Using the threaded ends of the sliders, it should be possible to mount virtually any type of microphone to your Mini “Decca Tree.”

Assembling the Standard and Super “Decca Trees”

Summary of Parts

Quantity	Description	Part	Part No.
3	Hard-anodized aluminum bars from the following: 1 meter (standard) 1.25 meters (super)	SMP-1M SMP-1.25M	SMP-1-0002 SMP-1-0003
1	“Decca Tree” Bracket base	SMP-B	SMP-3-0001
1	Left “Decca Tree” Bracket clamp		SMP-3-0002
1	Right “Decca Tree” Bracket clamp		SMP-3-0003
6	Short black screws (¼ -20)		SMP-3-0004
4	Sliders	SMP-S	SMP-4-0001
4	Rings (5/8 27)	SMP-R	SMP-4-0002
4	Large black thumbscrews		SMP-4-0003
8	Small black thumbscrews		SMP-4-0004
4	Nylon washers		SMP-4-0005
1	Female-Female Stand Coupler (5/8-27)	SMP-SHD	SMP-5-0002

In addition, you will need a blade screwdriver to properly assemble your system.

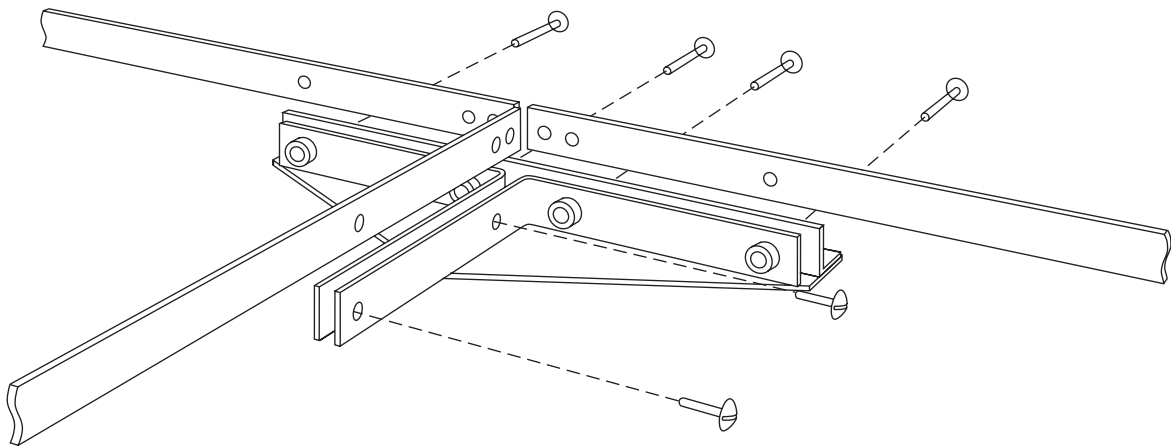
Instructions for Step-By-Step Assembly of the Standard and Super “Decca Trees”

(Before you assemble your “Decca Tree,” make certain you find an area with adequate space.)

1. Find the three 1 or 1.25 meter black anodized aluminum bars. In addition, find the “Decca Tree” bracket complete with its left and right clamps and 6 black quarter-twenty screws. Configure the bars in a T shape.

Note: The left- and right-hand bars must be of the same length; the forward bar, however, may be either desired length.

2. Position the bracket base underneath the two bars you have already positioned end-to-end and line the two outer holes of each bar with the holes in the spine of the bracket base. Configure the third bar at a 90° angle to the first two bars.



3. Position the two bracket clamps on the base. Note that there is only way to position the clamps such that their holes will line up with the holes in the bars and bracket base. With the two bars extending right and left and the third bar oriented toward you, the clamp that has four welded nuts shall be the left clamp, and the clamp with two welded nuts shall be the right clamp.
4. Next, position the right clamp such that the two nuts are adjacent the spine of the bracket base; all four holes should line up. Position the left clamp such that the length of the left clamp that extends toward you is the same dimension as that of the right clamp. If the dimensions are unequal and the clamp has not been positioned correctly, its holes will not line up correctly; simply reverse this clamp for proper alignment.
5. Insert four screws through the holes in the bracket base’s spine, through the holes in the bars and thread them into the clamps. Repeat this with the two remaining screws inserting them into the holes in the right bracket clamp and threading them into the left clamp. Once everything is fitting properly, snug down all six screws.

6. Locate the support slider (SMP-S) complete with its stand coupler and its two thumbscrews. Initially, set this slider close to the Decca Tree Bracket and snug it down, but not too tightly. Final positioning of the support slider should be determined after all microphones have been mounted so that the entire array will be in “dynamic” balance. (For maximum strength when the array is stand mounted, we recommend that all the bars be set on top of the platform that the bracket base provides as shown in the above illustration.) Slide the thumbscrew through the central unthreaded hole in the bracket, the hole in the bar. Insert the second thumbscrew into the outer hole, which should pass below the bar, again unthreaded hole first. Snug down both of the thumbscrews.
7. Locate the three remaining sliders with rings threaded onto them. Slot one slider onto the end of each of the three available bar ends, generally such that the threaded ends of the sliders are below the bar. Attach these to the bar in precisely the same way as you did with the first SMP-S in step 6.
8. Mount your “Decca Tree” to a stand or boom using the female-to-female coupler. Congratulations, your “Decca Tree” is complete! Using the threaded ends of the sliders, it should be possible to mount virtually any type of microphone to your “Decca Tree.”

Note: It is possible to position a SMP-S anywhere on the bar by not passing the thumbscrew through the center hole and instead threading the thumbscrew directly into the tapped (rear) hole and snugging it down directly on the bar itself.

Using Your “Decca Tree” System

The “Decca Tree” may be suspended from the holes at the end of the SMP bars or stand-mounted using one slider (with the female stand coupler) on the forward bar. The microphones may be located as desired along the SMP bars, Left Center and Right. Whenever possible, we 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 under gravity.

When stand-mounting the Decca Tree arrays, be sure to position the microphone stand support slider so that the entire assembly, including the microphones, is properly balanced.

The three microphones can be panned left, center, and right, respectively. Although with omnidirectional microphones it is tempting simply to aim the mics straight out from their support braces, it is preferable actually to point their principle axes inward and downward toward the soundsource, because omnidirectional microphones always tend to become more directional as frequencies increase.

Among the multitude of variations possible, you will probably want to experiment by 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, if you are using the “Decca Tree,” the distance of the center may be varied, relative to the two outer microphones. 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.

In many situations, using sub-cardioid, cardioid, or bi-directional polar patterns for the left, right, or even all three microphones, might offer a better focus by improving the direct-to-reverberant ratio. In this situation, aiming the microphones 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 frequently employed variation (as discussed in the second edition of The New Stereo Soundbook, available from AEA) with the “Decca Tree” uses a stereo-pair of microphones for the center pickup, such as an XY or M/S 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 will affect the overall perspective, however, the result is a matter of judgement and preference.

When using a “Decca Tree,” it is always 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 overabundance 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 likely will result. While not as noticeable in stereo, these effects can 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 microphones. Selecting a different polar pattern for the microphones is another option. Relocating the entire array closer to the sound source also should be considered, particularly if there is an excess of reverberant information.

Note: It is extremely important that when flying microphones on the “Decca Tree, that a strong cable should bear the weight of the entire array, The microphone cables should never be used other than to breast the array. Remember to always securely fasten the support cable to the “Decca Tree.”

This user's guide is the second edition. We would appreciate your comments, whether positive or negative, about this manual and about our products.

Other Products by Audio Engineering Associates:

RCA Working Reproduction Microphones and replacement parts

AEA R44C Microphone

Our tribute to the classic RCA 44B using New Old Stock ribbon material

AEA 44CX Microphone

6db more output for critical digital recordings

RCA44 and RCA77 microphones

Spare parts and prop shells

M/S Stereo Processors

MS 38 MKII

MS 38 Lite

Stereo Phase Displays

AEA LD 2020 "Winkie Blinkie" portable phase display.

SS220 rackmount panel phase display.

Modular Studio Microphone Stands and Booms

Since 1983 we've acted as the US agent for Coles Electroacoustics, manufacturers of the 4038 studio ribbon microphone and the 4104B, "lip" mic for voice-over work in high noise environments. We sell and service the mics and stock spare parts.

In North America we represent CB Electronics, a leading worldwide supplier of machine control equipment to the sound-for-picture industry. Their products specialize in professional control of and translation between bi-phase, 9-pin serial and time code machines. Their new SR line provides low cost multiple machine remote controls for RS-422, Sony, and Tascam DA88 protocol machines.

Our Audio Test Department buys, sells, trades, and rents new and used audio test gear. Audio Precision, B&K, Hewlett Packard, Galaxy, Goldline, Neutrik, and Amber are among the lines we maintain in stock for audio measurements of Level, Polarity, Phase, THD and IMD, W&F, SPL, and Real-Time Analyzers.

Audio Engineering Associates

1029 N. Allen Ave., Pasadena, CA 91104, USA

Phone: (626) 798-9128 Fax: (626) 798-2378

Visit us on the web at www.wesdooley.com