

SR25



SR30

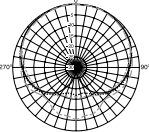


DP30/C



SR25

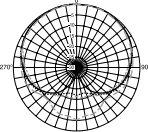
Frequency response	50Hz to 25kHz ± 2 dB@1'
Polar Pattern	Cardioid
Sensitivity	10mV/Pa (-40 dBV/Pa)
Power requirements	48V Phantom, 10mA
Peak acoustic input	145dB SPL
Output	XLR (PIN 2+)
Minimum output load	600 Ω between pins 2&3
Noise	22dB SPL (A weighted)
Dimensions L x D	6.5 x .860 inches (165mm x 22mm)
Weight	.35lb (160g)



----- 500
----- 1K
----- 4K
----- 16K

SR30

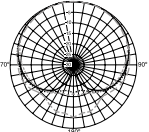
Frequency response	30Hz to 30kHz ± 1.5 dB@1'
Polar Pattern	Cardioid
Sensitivity	10mV/Pa (-40 dBV/Pa)
Power requirements	48V Phantom, 10mA
Peak acoustic input	145dB SPL
Output	XLR (PIN 2+)
Minimum output load	600 Ω between pins 2&3
Noise	22dB SPL (A weighted)
Dimensions L x D	8.4 x .860 inches (212mm x 22mm)
Weight	.5lb (225g)



----- 500
----- 1K
----- 4K
----- 16K

DP30/C

Frequency response	30Hz to 30kHz ± 2 dB@1'
Polar Pattern	Cardioid
Sensitivity	10mV/Pa (-40dBV/Pa)
Power requirements	48V Phantom, 10mA
Peak acoustic input	145dB SPL
Output	XLR (PIN 2+)
Minimum output load	600 Ω , balanced between pins 2&3
Noise	22dB SPL (A weighted)
Dimensions L x D	10.75 x .860 inches (275mm x 22mm)
Weight	.22lb (100g)



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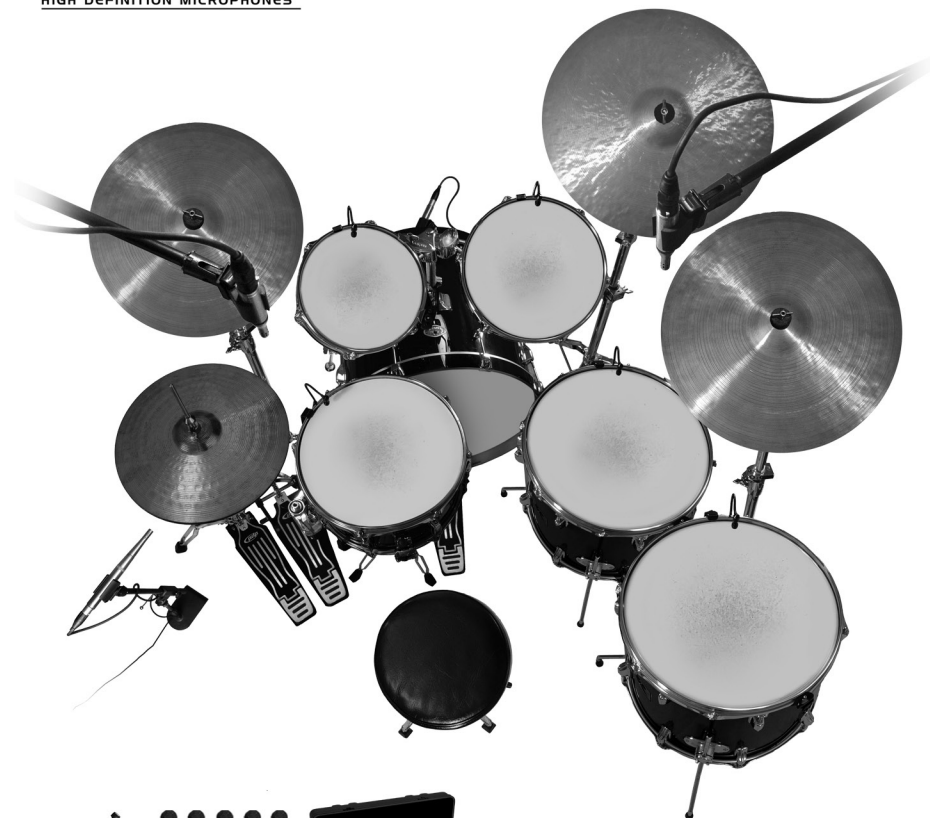


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Earthworks®
**FULL
KIT™**
MULTI-MIC SYSTEM
FOR THE ENTIRE DRUM SET
HIGH DEFINITION MICROPHONES™

**USER'S
MANUAL**
DFK1 MULTI-MIC
SYSTEM
FOR THE ENTIRE DRUM SET



DFK1



NOTES

Congratulations on your purchase of the Earthworks DFK1 FullKit™ High Definition Multi-microphone Drum System. You will be thrilled with the results you will be able to obtain using the DFK1 Drum FullKit™ System. After reading this manual, if you have any unanswered questions, please email or phone us using the contact information on the back page of this manual.

Happy Drumming!

Please verify that you have received each of the items listed below.

Items Enclosed with:

DFK1 Drum FullKit™ System

- 2 – SR25 Cardioid Microphones
- 2 – SR30 Cardioid Microphones
- 5 – DP30/C Drum Periscope™ Microphones
- 5 – RM1 RimMounts™ for DP30/Cs
- 9 – LP1530 LevelPads™
- 1 – KickPad™
- 2 – SRW2 Stainless Windscreens for SR30s
- 2 – SRW4 Foam Windscreens for SR30s
- 5 – PW1 Foam Windscreens for DP30/Cs
- 2 – SRW3 Foam Windscreens for SR25s
- 4 – MC1 Mic Clips for SR25s and SR30s
- 1 – CMK-C High Impact Carrying Case
with custom foam insert
- 1 – DFK-C High Impact Carrying Case
with custom foam insert
- 1 – DFK1 User's Manual

IMPORTANT NOTICE - Please Read This:

Use of the LevelPad™ - The DP30/C microphones have a high output level, which may overload the preamps of some mixers or consoles. Many outboard microphone preamplifiers and preamplifiers in mixing consoles will handle as much as +24dbv at the microphone input, without distortion. We suggest that you check the “maximum preamp input level” specifications of your mixer or preamplifier to see if it will accommodate signal levels this high. Some mixers and preamps will not handle this high level at the microphone input. To avoid overload, please use a LevelPad™ in the microphone cable feeding each Drum Periscope Microphones.

Some mixer or outboard preamplifiers have a pad that can be switched in or out. However, some of these pads are not attenuators that precede the pre-amplifier input, instead they only reduce the gain of the preamplifier. These (so called) pads will provide no input overload protection from high level microphone signals (see Fig. 1-A). In contrast, other outboard or mixer pre-amplifiers have actual pads that precede the preamplifier. These types of pads will provide the input overload protection that is needed (see Fig. 1-B). Such pads will typically provide -10dB or -20dB attenuation. However, due to the very high output level of the Drum Periscope™ microphones, -10 dB or even -20dB may not be enough attenuation when close miking snares or toms with Drum Periscope™ Microphones.

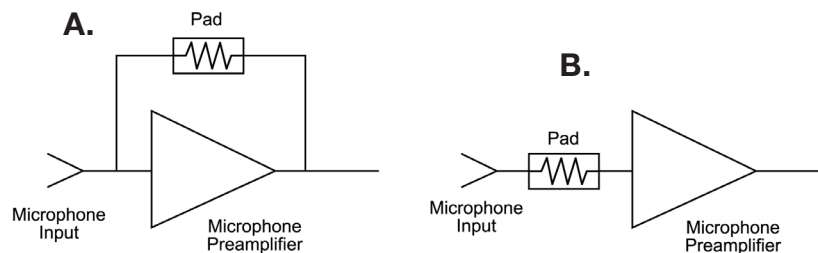


Figure 1-A and 1-B Preamp Input Pads

In any case where the pad does not precede the preamplifier, or the pad does not provide enough attenuation, the Earthworks LP1530 LevelPad™ can be used and will provide either -15dB or -30dB of attenuation. The LevelPad™ comes housed in a stainless steel tube with gold-plated XLR connectors on each end. As the LevelPad™ is inserted in the mic line, it will always precede the preamplifier input. It makes no difference if the LevelPad™ is inserted at the microphone, or somewhere in the middle

Whether your kick drum has a front head or not, place the SR30 at a 45 degree angle to the front of the drum head as indicated in Figure 13-B and 13-C. Do not place the front of the microphone parallel with the drum head as shown in Figure 13-A.

If there is a hole in the front head of the kick drum, do not place the mic directly in front of the hole as there will be a large burst of air hitting the microphone. In our field tests, we achieved the best results and the best sound by miking the drum just off of the rim as shown in Figure 13-B, or you can mic the center of the kick drum as shown in figure 13-C. Whatever your approach, if you get any popping from the air bursts, place the enclosed windscreen on the kick drum mic, and place the mic at a 45° angle to the drum head.

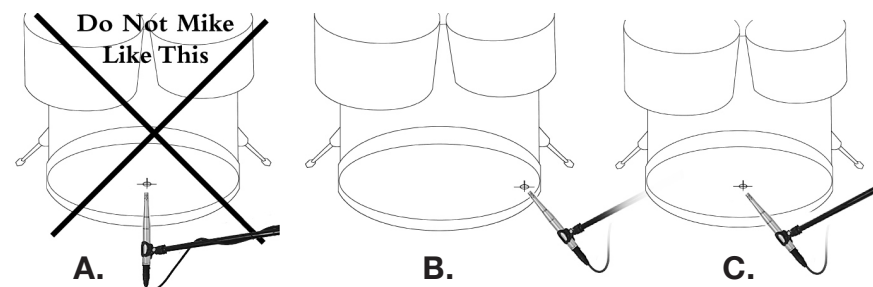


Figure 13-A, 13-B and 13-C Miking a Kick Drum

We know that when you use the Earthworks Drum FullKit™ System for your recording and live performances you will be thrilled with the results. We are pleased to welcome you to the ever-growing family of professionals using Earthworks High Definition Microphones™.

We hope the suggestions in this manual have been beneficial to you. Don't be afraid to experiment with mic placement. You can be as creative with your mic placement as you are with your music. You are the judge of what works best and sounds best.

If you have any questions, or require any additional information, please do not hesitate to contact Earthworks using the contact information on the back cover of this manual.

FIFTEEN-YEAR WARRANTY

All Earthworks® products (excluding accessories) carry a fifteen-year limited warranty (parts and labor). If you have any problems with your Earthworks products, please contact our warranty/repair department by email at: returns@earthworksaudio.com or by telephone at (603) 654-6427, ext 19.

We also suggest that you place the microphone approximately 2 to 3 inches from the edge of the high-hat cymbals (see Fig 12).

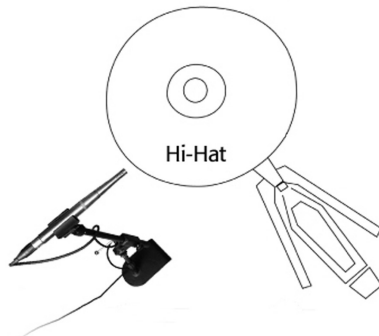


Figure 12 Miking a High-hat (top view)

Using the KickPad™

The KickPad is a passive signal processor that requires no phantom power and will not interfere with the phantom power for your microphone. It can be inserted directly into the XLR connector on the microphone, or somewhere in the mic line between the microphone and the mixer input, or, it can be plugged directly into the microphone input of the mixer.

A good kick drum microphone must be designed and optimized for that specific purpose, which means that particular microphone is great for kick drum and little else. Therefore we designed our kick drum optimization in an external XLR package - the KickPad™. Just plug the KickPad™ into the mic line going to the SR30 kick drum mic for magnificent results.

With the KickPad™ removed, you can use the same SR30 microphone for recording most anything. As an added bonus, the KickPad™ will provide outstanding results on other popular kick drum microphones such as the E-V RE20, Audix D-6, Shure 57 and others. Simply plug the KickPad™ into the mic line feeding the kick drum mic and you will be astonished with the sound.

Important Please Read Using the SR30 on Kick Drum

The Earthworks SR30 supplied for miking kick drum is a precision condenser microphone and is sensitive to overly large bursts of air. However, this microphone, when used properly, will produce an incredible kick drum sound. For optimum results it is crucial to place the SR30 at a 45 degree angle to the head (which reduces the air burst at the front of the microphone).

of the mic line, or by plugging the LevelPad directly into the preamplifier input. The most popular practice is to plug the LevelPad™ into the pre-amplifier input, which makes it more accessible to switch the attenuation settings (-15dB or -30dB) if needed. Figures 2-A, 2-B and 2-C show how the LevelPad can be inserted into the microphone line in one of three ways as indicated below:

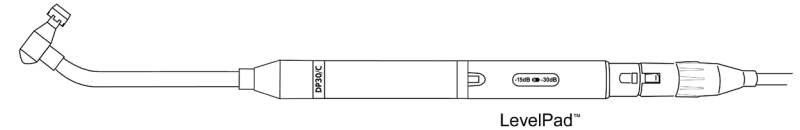


Figure 2-A LevelPad™ inserted at the microphone base

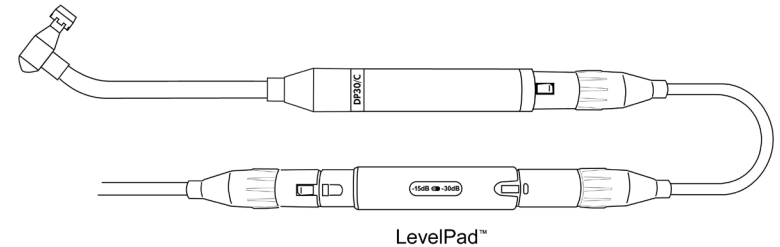
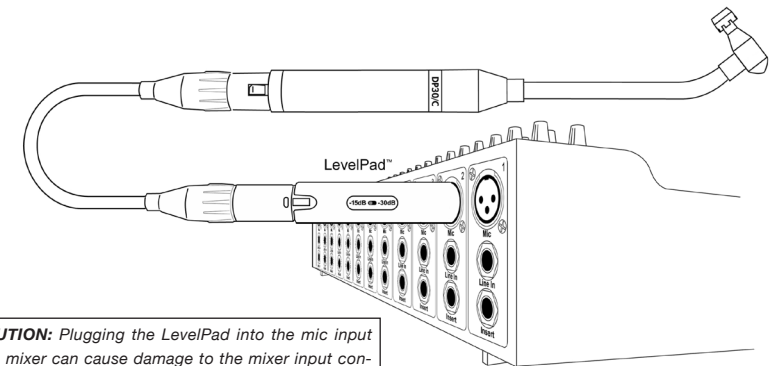


Figure 2-B LevelPad™ inserted in the microphone cable.



CAUTION: Plugging the LevelPad into the mic input of a mixer can cause damage to the mixer input connector if the LevelPad receives a hard push to the side. However, if you are careful, placing the LevelPad at the mixer mic input will provide greater ease of use in changing the LevelPad attenuation switch.

Figure 2-C LevelPad™ inserted into mixer mic input

Earthworks Drum Periscope™ Microphones

The Earthworks DrumKit™ High Definition Three-Microphone Systems have had great success because they pick up drum sounds with far more detail and accuracy than conventional microphones. This improved sound quality is due to proprietary advanced technologies utilized in Earthworks High Definition Microphones.

Many drummers such as Jeff Campitelli with Joe Satriani, Keith Carlock with Steely Dan, and FOH engineers such as Randy Lane with Dream Theater, were using Earthworks High Definition Microphones™ for overheads and kickdrum with exceptional results. They then wanted the same exceptional sound quality from their snare and tom mics. With the introduction of the DP30/C microphone, they were able to get the same pristine, detailed sound from their toms and snares as they were from their Earthworks High Definition drum overhead mics.

We worked with major artists for nearly two years developing and field testing our new High Definition tom and snare mics. During the development phase, we miked a set of drums with nine Earthworks High Definition Microphones (including our new tom and snare mics) and also nine industry favored mics. When veteran engineers heard the difference between these two recordings, they made the comment that the improvement was so dramatic, it didn't even sound like the same set of drums. They all agreed, "the increase in detail and sound quality was staggering."

The DP30/C, designed specifically for use with snare drums and toms. The DP30/C has a flexible mini-gooseneck for easy positioning and can handle up to 145 dB SPL. The Earthworks patented polar technology provides excellent rear rejection and a uniformity of frequency response out to 90 degrees off-axis. This vastly reduces phase cancellation or other phasing issues, and minimizes cymbal leakage as well as acoustic feedback problems in "live sound" applications.

Earthworks High Definition Microphones™ the New Science in Microphones

David Blackmer, the brilliant engineer who invented the unique technologies of dbx, is also the inventor and founder of Earthworks. In the last few years of his life, David developed a number of revolutionary technologies that dramatically improve the quality and performance of microphones. In short, Earthworks High Definition Microphones™ will pick up sounds

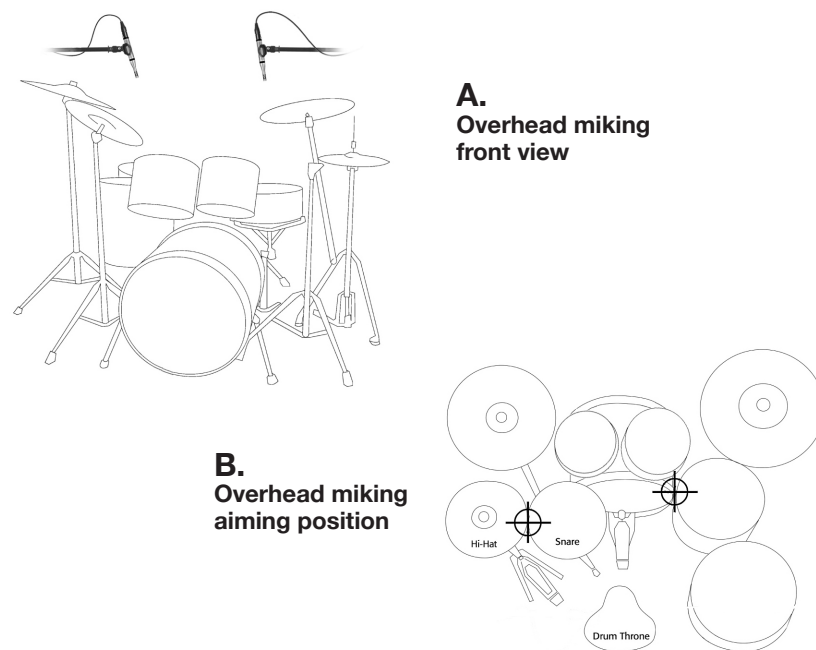


Figure 10-A and 10-B Separated Overhead Miking

Miking the Hi-Hat

There are many various approaches to miking a high-hat. We suggest that you use the SR30 and place it approximately two inches above the top high-hat cymbal (see Fig 11-A). You can also place the microphone under the high-hat in relatively the same position as shown in Figure 11-B. However, if the microphone is placed near the area where the two cymbals come together, the bursts of air from the two cymbals coming together may result in an undesirable thumping or popping sound (see Fig 11-C).

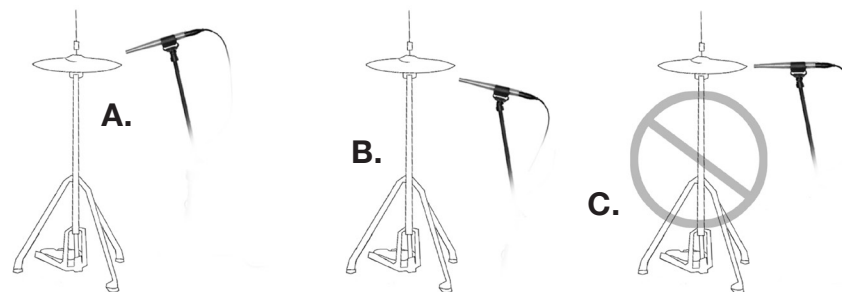


Figure 11-A, B & C Miking a Hi-hat (front view)

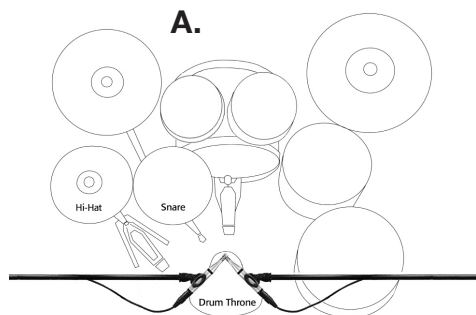


Figure 9-A
Horizontal X/Y Positioning

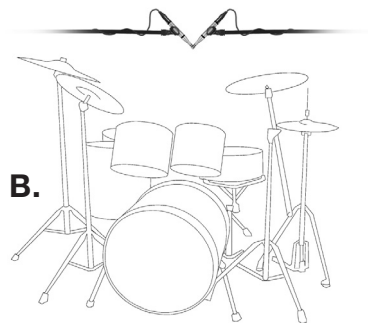


Figure 9-B
Vertical X/Y Positioning

Figures 9-A and 9-B show two variations of X/Y microphone placement. For microphone “height” we suggest that you start with the microphone approximately 2 feet above the drummer’s head. Moving them down will provide more detail, while moving them higher will capture a wider over-all image along with more room sound. Both the horizontal and vertical X/Y positioning will provide excellent results in a drum booth or an acoustically treated small room as well as a large room. If you are using a drum booth or a room with a low ceiling, the horizontal X/Y version shown in Figure 9A may be more ideal, as it requires less height.

Separated Overhead Miking

Another overhead miking approach is called “Separated Overhead Miking.” This method is ideal for those who do not have a drum room or drum booth. This method also provides a much more defined stereo image. In this approach, the microphones are farther apart from each other and can be positioned closer to the drum set, if desired. Placing the overhead mics closer to the drum set will reduce the ambient room sound while picking up more subtle details of the drums. When using Earthworks High Definition Microphones as overheads, you can bring the microphones down closer to the drums without fear of hearing cymbal splash or splatter. However, with conventional microphones you may be restricted in the height of the overheads due to splashing or splattering of the cymbals in your recording or sound system.

The Separated Overhead method is shown in Figures 10-A and 10-B. In Figure 10-A, you can see the positioning of the microphones from a front view and Figure 10-B shows where the microphones are pointed from an overhead view.

and detail that other microphones cannot. These dramatic improvements are in the areas of impulse response, diaphragm settling time and polar technologies. Those who have heard Earthworks High Definition Microphones™, say that they hear more of attack, more subtle details and a more pristine quality in the sound than with any other microphones, regardless of price.

Miking Drums

There are many ways to mic drums and it seems that most every recording or live sound engineer has their own way of doing so. Our objective is not to indicate which drum miking approach is better, but to make suggestions and look at advantages and disadvantages of each. Every engineer or producer uses their own methods to obtain the results they desire, and that’s what matters.

Multi-microphone Method

The objective in multi-microphone drum miking is to place a separate microphone on either most or all the elements of a drum set. Typically, separate mics are used on snare, toms, high-hat and kick drum with one or two overhead microphones. The overhead mics pick up the overall sound of the drums including cymbals, which are typically not miked separately. With this method, the mixing engineer can control the level, and signal processing (limiting, EQ, etc.) for each element of the drum set (toms, snare, hi-hat, etc.). This provides a great deal of control over the sound of the entire drum set and allows bringing out certain patterns on sock cymbal, snare, etc. Multi-miked drums may be desirable when you are recording in a large room with high ambient sound as it will reduce the amount of unwanted room sound. Multi-miking is also a popular practice for miking drums in “live sound” applications such as concerts, as it will provide more gain before feedback in addition to greater control of the drum mix.

No Phase Cancellation Issues with Earthworks™ Microphones

One of the typical disadvantages in the multi-microphone approach, when using conventional microphones, is the interactive microphone phasing problems that result in the cancellation of certain frequencies. These phasing problems are a result of the poor polar response of conventional microphones. Conventional microphones have a drastically different frequency response between the front and sides of the microphone. It is common for conventional microphones to have a loss of 10 to 20 dB at

high frequencies on the sides of the microphone. This is why you cannot place three singers on a conventional microphone, the one in front of the mic sounds great, but the two on the sides have a dramatic loss of quality. These drastic changes in high frequency response on the sides of the microphone cause phase differences, and these are the root cause of phase cancellations with conventional microphones.

In contrast, Earthworks has a patented polar technology that provides our microphones with the same frequency response on the sides of the microphone as it does at the front (no more than a 3dB loss at any frequency out to 90° off-axis). This very uniform frequency response at the front and sides of the microphone will nearly eliminate any phasing issues when using Earthworks microphones. In addition, Earthworks cardioid microphones have a very high rejection of sounds at the rear (back) of the microphone. This feature will greatly reduce the leakage of cymbals or other sounds at the rear of Earthworks microphones.

Close Miking Toms and Snares with Drum Periscope Microphones

Inserting the DP30/C Microphone into the RM1 RimMount

It is suggested that you insert the DP30/C microphone into the RM1 RimMount™ prior to attaching the RimMount to the drum.

To insert the Drum Periscope microphone into the RM1 RimMount™ just place the mic head and the mini-gooseneck into the rubber holder from the bottom of the RimMount. Then push the body of the microphone from the bottom (XLR connector end) to move the microphone up inside the rubber holder. The fit will be firm, so you will need to apply a little pressure to move the microphone body up into the rubber holder. The suggested procedure is indicated in Figure 3.

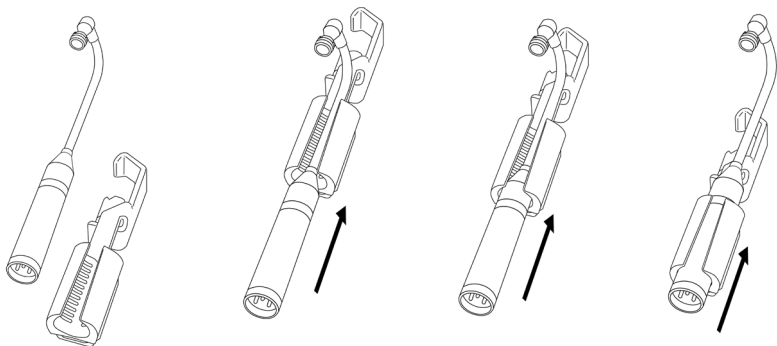


Figure 3. Inserting the Drum Periscope™ Mic into the RimMount™

moved closer to the center of the drumhead by changing the position of the mini-flex gooseneck.

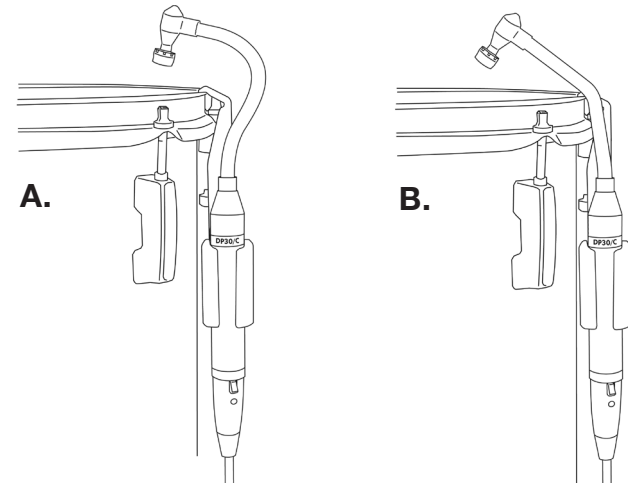


Figure 8-A and 8-B Miking the Top Head of a Tom

The DP30/C High Definition Drum Periscope Microphones™ have been used successfully by drummers with major recording artists in both recording sessions and for live performance. The Drum Periscope Microphones™ will provide you with years of exceptional and reliable results and will withstand the rigors of the road.

Drum Overhead Microphone Placement

For overhead drum miking, we suggest that you use the SR25s from the Drum FullKit. The low frequency specification of 50Hz for the SR25's allows them to pick up less of the kick drum and lower frequencies from the toms. This will be a help during mixing and provide more control in the mix from the individual tom and kick drum mics, rather than fighting having too much of their low frequency information in the overhead mics. We suggest that the SR30s be used for high-hat and kick drum (with a KickPad™). If you desire more low frequencies from your overhead mics, you can instead use the SR30s as overheads and the SR25s on high-hat and kick drum (with a KickPad).

X/Y Stereo Overhead Miking

There are two basic ways to position overhead drum mics, either by putting the mics in an X/Y position or by separating the microphones by some predetermined distance. The X/Y position will provide less of a stereo image than the separated microphone method.

Always position the microphone head at an angle to the drumhead. It is also suggested that the microphone head be positioned between 1.5 inches and 3 inches above the drumhead. All of the previous information in this manual applies to both toms and snares when using a Drum Periscope Microphone.

The DP30/C SnareMic has been optimized for miking snare drums and toms and has a low frequency response down to 30Hz. If the DP30/C sounds a little “tubby” on your snare drum, then use a high-pass filter set somewhere between 60Hz and 100Hz to reduce the low frequency response or a low frequency equalizer (EQ) to accomplish the same thing by attenuating/cutting a few dB in the area of 60Hz to 100Hz for the desired results.

The DP30/C SnareMic™ can be used on either the top drumhead, bottom drumhead or both. Figure 7-A shows a snare drum with a DP30/C microphone placed over the top drumhead, while Figure 7-B shows a snare drum with both the top and bottom heads miked.

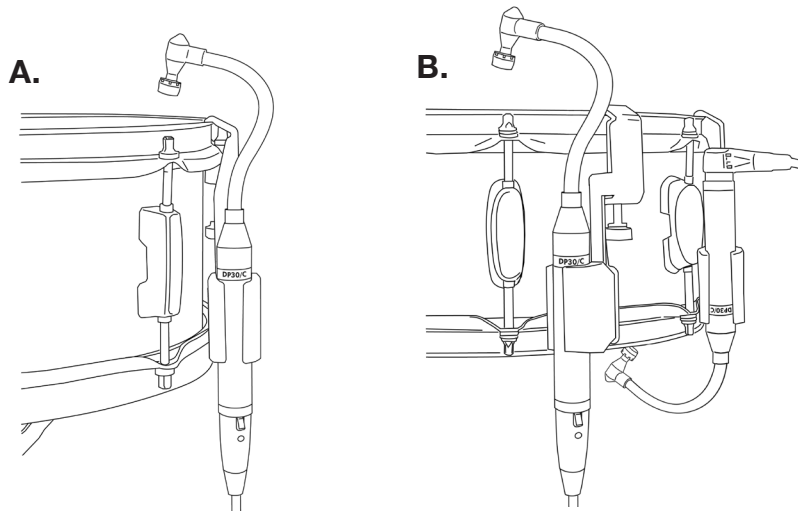


Figure 7-A and 7-B Miking the Top or Top & Bottom of a Snare

Close Miking Toms with the DP30/C

DP30/C will provide a rich and full tom sound. You can mike either the top head of a tom with the DP30/C as indicated in Figure 8 or you can also mike the bottom, or top and bottom of a tom in a similar fashion as shown on a snare in Figure 7-B. You will notice in Figure 8-A the microphone head is placed closer to the drum rim, while in Figure 8-B the microphone head is

Mounting the RM1 RimMount to the Drum

The RM1 RimMount is designed for metal drum rims, and will not work on wooden drum rims. While reading this section, please refer to Figure 4-A, which refers to the various elements of the RimMount™. Mounting the RimMount to the drum rim is quite easy. First, unscrew the thumbscrew so there is more than enough space for the Delrin® cushioned rim-guide to clear the bottom of the drum rim. Then determine where on the drum rim you want to place the microphone and place the top “hook portion” of the RimMount bracket over the drum rim.

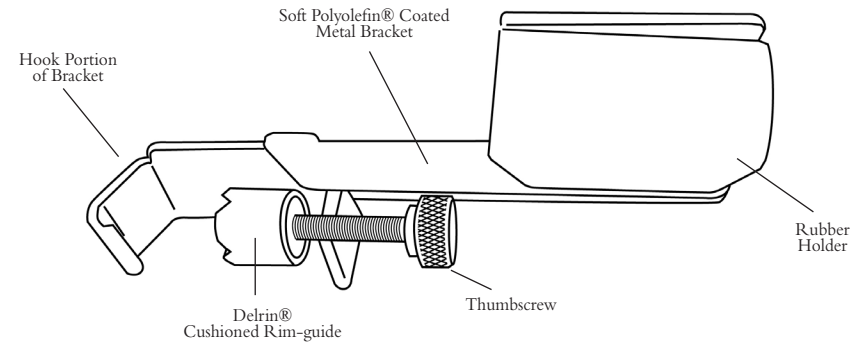


Figure 4-A. Elements of the RM1 RimMount™

Referring to Figure 4-B, notice that on the cushioned rim-guide there are two sets of grooves. One set of grooves is in the “center” of the rim-guide, while the other set of grooves is “off center” (or closer to the edge of the rim-guide). These two sets of grooves provide you with “three” mounting options: (1) placing the “off center” rim-guide grooves close to the drum shell, (2) or rotating the “off center” grooves 180 degrees will place the rim-guide further away from the drum shell, and (3) the “center” grooves will allow placement in-between the positions described in 1 and 2.

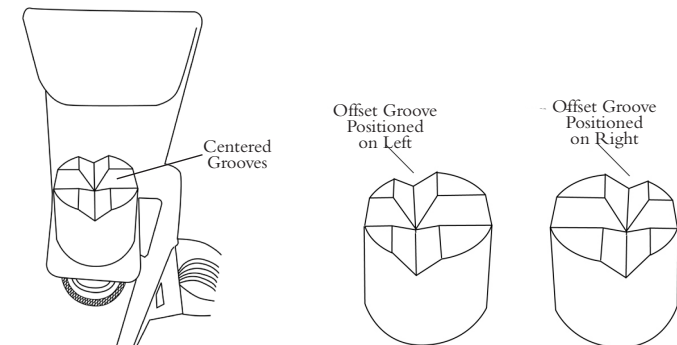


Figure 4-B Positioning the Cushioned Rim-guide

The various types of metal drum rims may have the bottom flange of the rim either closer to the shell or further from the shell. Depending upon the type of metal drum rim, one of the previously described three positions will allow the RimMount bracket to be mounted parallel to the drum shell. The soft protective Polyolefin® coating on the RimMount bracket will prevent the possibility of scratching the drum shell finish. Position the rim-guide so the bottom edge “flange” of the drum rim fits comfortably into one of the rim-guide grooves. This will insure that the cushioned rim-guide remains securely in place as you tighten the thumbscrew to firmly secure the RimMount to the drum rim.

Adjusting the Microphone Height

Once the RimMount is mounted securely on the drum rim with the Drum Periscope microphone housed in the rubber holder, the microphone body can be moved either up or down in the rubber holder to adjust the desired height. Then the mini-gooseneck will provide a good amount of latitude in positioning the microphone head from any pre-set microphone body height. Adjusting the height of the Drum Periscope microphone body is shown in Figure 5-A and 5-B.

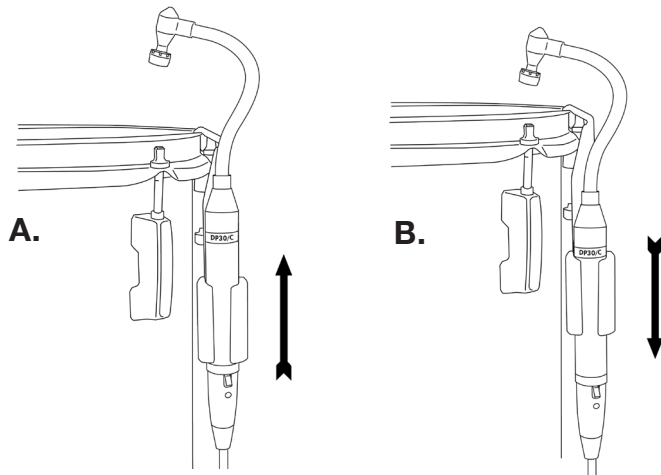


Figure 5-A and 5-B Adjusting DP Microphone Height

Positioning the Microphone Head

Once the Drum Periscope microphone height has been set, then the microphone head can be positioned where you desire. However, you should never place the microphone head “parallel” to the drumhead. The microphone head should always be at “an angle” to the drumhead. This will prevent any possibility of the diaphragm being forced to the microphone

back plate which could cause an unwanted pop or thump in the sound or recording system. The flexible mini-gooseneck will allow you to move the microphone head either up or down above the drumhead as well as in and out from the drum rim. In addition, you can change the angle of the microphone head for your desired results. Figure 6-A shows how the microphone head can be rotated while Figure 6-B shows how the microphone head can be moved more toward the center of the drum by changing the positioning of the mini-gooseneck.

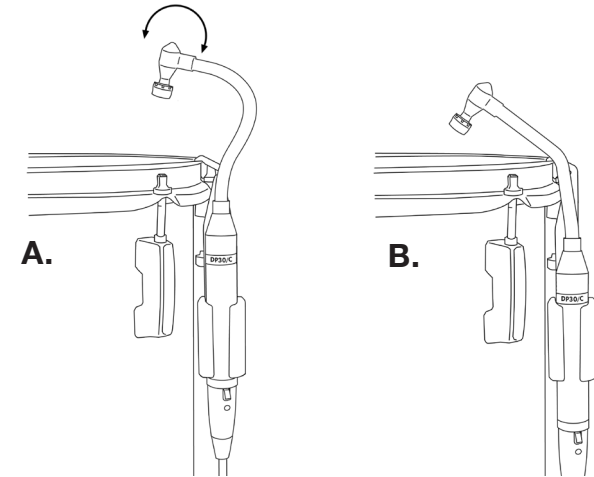


Figure 6-A and 6-B Positioning the Microphone Head

Plug in the LevelPad, if necessary

In close miking drums, one should keep in mind that the peak sound level at the microphone head is extremely loud. Microphones used for close miking drums should have a sound pressure handling capability of at least 140dB SPL with no audible distortion. The Drum Periscope™ microphones will handle up to 145dB SPL without distortion. However, as mentioned earlier, with this kind of high sound pressure level, it is possible for the microphone output to be as much as +24dBV which may overload some microphone preamplifiers. The use of the Earthworks LevelPad in the microphone line will prevent any such distortion or overload. So, to be safe, we suggest that you first plug a LevelPad into the mic line feeding the Drum Periscope microphone. For full information refer to pages 3 and 4 of this manual.

Close Miking Snare Drums with the DP30/C

As previously mentioned, when close miking drums with a Drum Periscope™ microphone, never position the microphone head parallel to the drumhead.