

Earthworks® PIANOMIC™ SYSTEM

USER'S MANUAL PM40 Piano Microphone System

The Ultimate Piano Microphone System
That Will Change Piano Miking Forever



Made in U.S.A.

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Earthworks: the New Science in Microphones

David Blackmer, the brilliant engineer who invented the 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 and details that other microphones cannot. These dramatic improvements are in the areas of impulse response, diaphragm settling time and improved polar pattern technologies. Those who have heard Earthworks High Definition Microphones™ say that they hear more attack, more subtle detail and a more pristine quality in the sound than with any other microphones regardless of price. Since David's death in 2002 the Earthworks engineers have continued to develop new innovations in microphone design such as the PianoMic™ System.

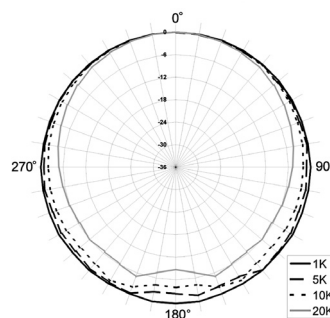
FIFTEEN-YEAR WARRANTY

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.



SPECIFICATIONS

Frequency Response: 9Hz – 40kHz
Polar Pattern: Omni directional (random-incidence)
Sensitivity: 15mV/Pa (-36 dBV/Pa)
Power Requirements: 48V Phantom, 10mA
Peak Acoustic Input: 148 db SPL
Output: XLR3 (Pin 2+)
Min. Output Load: 600 ohms between pins 2 and 3
Maximum Output Level: +30 dBV (peak)
Noise: 22 dBA
Mic Gooseneck Length: 4.75"
Dimensions: 64" fully extended, 46" fully collapsed
Product Weight: Mic Assembly: 0.75lb (350g),
External Electronics Box: 1.5lb (700g)



PianoMic™ Polar Response



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Congratulations on your purchase of the innovative Earthworks PianoMic™ System. We know you will be thrilled with the results you achieve using the PianoMic™ System for both live performance and recording.

Items Enclosed with your New Earthworks PianoMic™ System:

PianoMic™ System Model PM40

- 1 – PianoMic™ telescoping bar with attached microphone heads
- 1 – Microphone electronics box
- 1 – Leather pouch for electronics box
- 1 – Mic stand mounting bracket for electronics box
- 2 – Ears for the mounting bracket
- 2 – Screws for the ears & bracket
- 4 – Felt pads with adhesive backing
- 1 – User's Manual for PianoMic™ System
- 1 – Carrying case

EVEN IF YOU DON'T LIKE READING MANUALS PLEASE READ THIS SECTION BEFORE INSTALLING THE PIANOMIC™ SYSTEM

USING THE PIANOMIC™ SYSTEM

The majority of those who purchase the PianoMic™ System have experience in miking pianos with conventional microphones, and may find the close-miking techniques described in this Manual to be unconventional. Please keep in mind that the PianoMic™ System uses a number of new technologies and that the PianoMic™ microphones work and perform much differently than conventional microphones. The typical practices for piano miking using conventional microphones will most likely not apply when using the PianoMic™ System. With the PianoMic™ System the rules for miking pianos have changed.

Conventional miking practices suggest that a piano must be miked from outside to achieve a good sound, and that a good piano sound cannot be achieved with closely placed microphones inside the piano, especially with the lid closed. When you listen to the incredible results achieved using the PianoMic™ System (at full-stick, half-stick or lid closed), you will realize how unique and ground-breaking it actually is. As the PianoMic™ System changes many of the conventional rules and methods of miking pianos; we strongly suggest that you start by following our guidelines first. Afterwards, if you want to experiment, you can take it from there.

The Earthworks PianoMic™ System incorporates a number of proprietary technologies that allow this method of close-miking pianos to achieve results that have previously not been possible. This improved performance has been accomplished by using specially designed High Definition Microphones created specifically to work inside a piano. These carefully matched Random Incidence omni microphones have extremely fast impulse response, very short diaphragm settling time, extended frequency response (4Hz to 40kHz), near perfect polar response, high current Class A amplifiers and the ability to handle sound pressure levels up to 148dB SPL.

The PianoMic™ System provides the following benefits:

- Excellent overall piano sound with uniform level from all strings
- Superb sound with the piano lid up or down
- Tremendous gain before feedback
- Minimal leakage from other instruments surrounding the piano (with piano lid closed)
- Microphones are not visible from outside the piano

People are astonished when they hear the exceptional sound quality of the PianoMic™ System with the piano lid closed. Conventional microphones perform poorly in a closed piano as there is no single dominant direction from which sound arrives at the microphone. Every string is a sound source. The sound board is a large and complex sound source. In addition, sounds are reflected off the piano sides, the sound board and the piano lid multiple times with little attenuation. Sounds inside a piano are randomly arriving from every possible direction at similar levels, all at the same time. This is a classic example of a “diffuse sound field” which is defined as a confined area where there are multiple sound sources and multiple reflections arriving at the microphone from every angle at similar levels simultaneously. A microphone that is placed in such a diffuse sound field has to pickup all of the sound with a proper tonal balance. For optimum results, this task requires a High Definition Random-Incidence Microphone.

Conventional microphones (i.e. virtually every microphone used for recording and live sound) are “Free Field” microphones, designed to accurately pick up sounds in front of the microphone (direct sound) (See Figure 1).

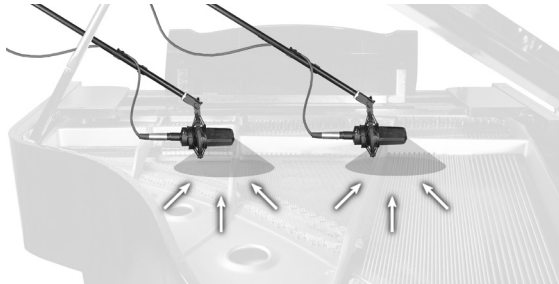


Figure 1. Conventional “Free Field” Microphones Inside a Piano

Random-incidence microphones are designed to respond uniformly to sounds arriving simultaneously from all angles, rather than to the sound coming from a primary source that is in front of the microphone. Random-incidence microphones have exceptional accuracy and tonal balance in a diffuse sound field, where sound arrives from all directions randomly and simultaneously.

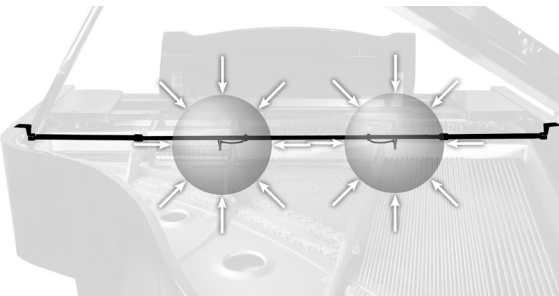


Figure 2. Random Incidence Microphones Inside a Piano

Pouch Attached to Piano Leg

The enclosed leather pouch has Velcro straps that allow it to be attached to the leg of a piano. The pouch is open at the top and the bottom has a strap to prevent the electronics box from falling out of the bottom. There is an opening at the bottom of the pouch to conveniently attach the two standard XLR-3 microphone cables that go to your mixer preamp inputs (See Figures 14 and 15).

Electronics Box Attached to Mic Stand Bracket

The electronics box has a threaded insert in the bottom of the box that will mate with the threads on a standard microphone stand. By this method, the electronics box can be mounted to a short mic stand to keep it above floor level, if desired (see Figure 16).

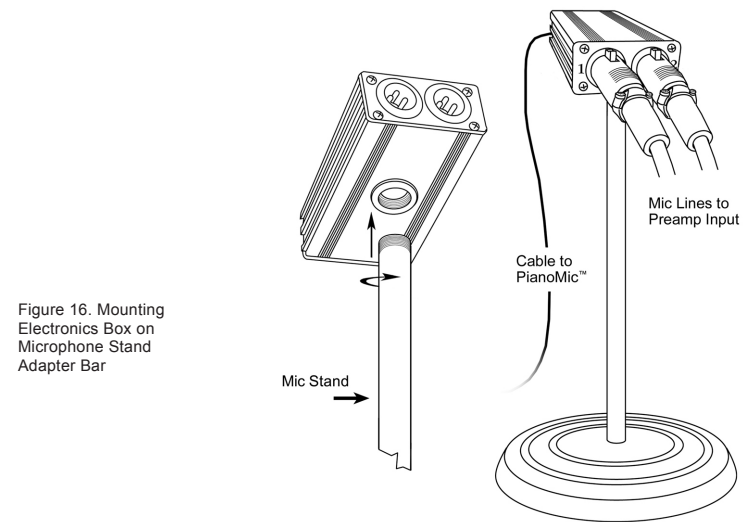


Figure 16. Mounting Electronics Box on Microphone Stand Adapter Bar

Now you should be ready to use the PianoMic™ System and achieve some impressive sonic results for recording or live performances.

If you have any questions after reading and following the directions in this manual, please contact Earthworks directly using the contact information on the back page of the manual.

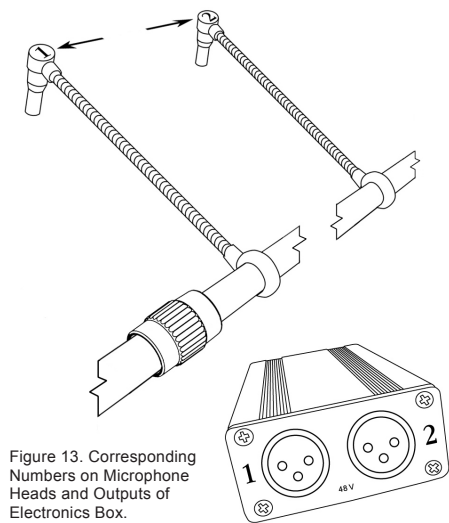


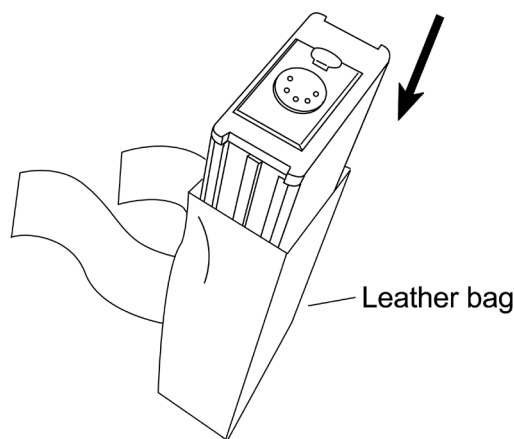
Figure 13. Corresponding Numbers on Microphone Heads and Outputs of Electronics Box.

via a 5-pin XLR connector. The bottom of the electronics box has two XLR-3 connectors that will connect the microphone outputs to the preamp inputs of your mixer.

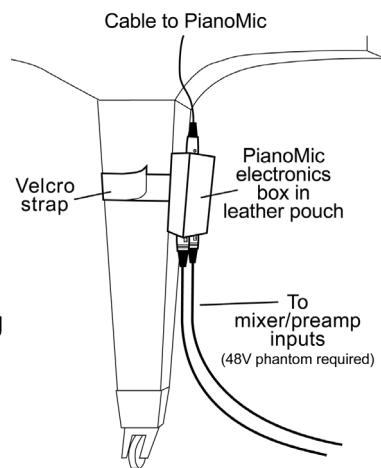
13. Notice that the top of each microphone head has a number. These numbers correspond to the numbers on the bottom of the electronics box. Depending upon how the PianoMic™ is placed in the piano the high strings will be indicated by either the number 1 or number 2. Once the PianoMic™ has been placed, identify the microphone numbers on the mic heads for both the high and low

strings and remember that they correspond to the numbers on the bottom of the electronics box. This will allow you to correctly identify the microphone signals for high and low strings that are connected to the preamps of your mixer. Remember that the PianoMic™ requires 48-volt phantom power.

14. There are two ways to mount the electronics box: (1) in a leather pouch strapped to the leg of the piano, or (2) attached to a bracket that screws onto a short microphone stand. The PianoMic™ System comes with the necessary hardware to install the electronics box in either of these two ways.



Figures 14. Placing the Electronics Box in the Pouch.



Figures 15. Attaching the Pouch to the Piano Leg.

Any recording or live sound engineer will tell you that conventional microphones do a poor job inside a piano with the lid closed. Sound engineers were amazed when they heard the exceptional sound quality of the PianoMic™ System used inside a piano with the lid open and at half-stick. But they were absolutely floored upon hearing the fantastic performance with the lid closed.

When using a PianoMic™ System for live performance you will achieve the most gain before feedback with the piano lid fully closed. You will also have the least amount of leakage from sounds outside the piano with the piano lid closed.

We know you will be more than pleased with the performance of the PianoMic™ System for both recording and live sound applications.

SETTING UP THE PIANOMIC™

The PianoMic™ System is quick and easy to install. Once you have initially set up the PianoMic™ System you will be able to do it from that point on in just a few minutes. Here are some helpful guidelines:

CAUTION – the microphone heads and goosenecks are permanently attached to the center section of the PianoMic™ telescoping tube and cannot be moved, or removed. The distance between the two goosenecks is fixed at 16 inches (one-third of the width of a piano keyboard).

1. Check that all items are included with your PianoMic™ System by using the list of “Items Enclosed” on the first page of this manual.

2. Remove the PianoMic™ telescoping bar from the case and loosen the two clutches on either side of the two microphone goosenecks (See Figure 3). When adjusting the clutches, be sure to hold the larger diameter tube section with one hand while rotating the clutch with the other hand as indicated in figure 3. However, do not loosen the clutches all the way; just enough so the bar can be extended and still have a little friction. This will make it easier to adjust the length of the bar from both ends once it is placed inside the piano.

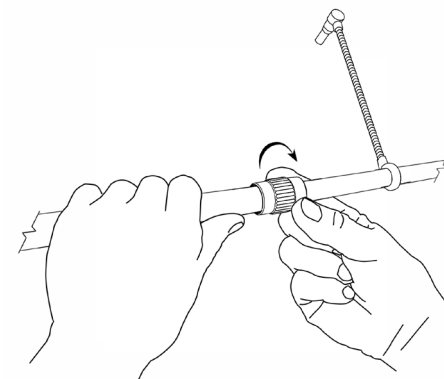


Figure 3. Loosening the Clutches

3. Extend both sides of the bar so that it is wider than the piano.

4. Notice that on each end of the PianoMic™ bar there are support brackets that will be placed on the upper edge of the piano case sides. These support brackets have rounded edges and are covered with a soft coating to avoid scratching the piano. The support brackets are thin enough to allow the piano lid to be completely closed with the PianoMic™ System inside the piano. If you desire a more snug fit with the lid closed or if vibration becomes an issue, install one of the enclosed felt pads on the support brackets as shown in Figure 4. If this is not a snug fit, you can place additional felt pads on top of the support arms as well.

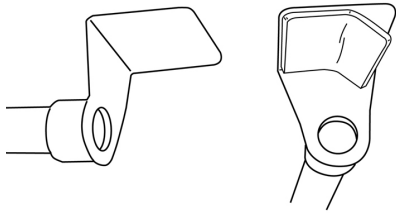


Figure 4. Support Arms and Installing Felt Pads

how it is made. This will govern whether the microphone heads can be faced toward or faced away from the dampers. It is best to position the PianoMic™ System so that the support bracket does not have to rest on the curved part of the piano case.

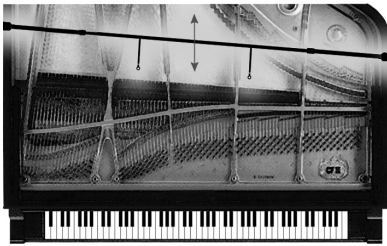


Figure 5. Facing the Mic Heads Towards the Dampers

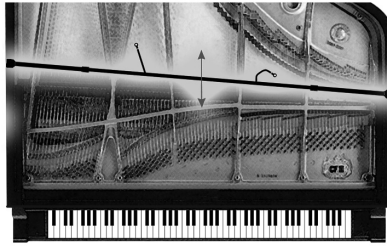


Figure 6. Facing the Mic Heads Away From the Dampers

6. Notice that one end of the PianoMic™ has a multi-conductor shielded cable coming out of the tube below the support arm (Figure 7). It doesn't matter which side of the piano the cable exits. The main objective is to place the PianoMic™ in the piano so that the microphone heads can be easily placed 2 to 3 inches in front of the dampers. The cable is long enough to easily reach the opposite side of the piano should you decide to locate the electronics box on the opposite side of the piano from where the cable comes out of the PianoMic™. You will need to position the cable so it does not lie on top of the support arm. The combined thickness of the support arm with the cable on top if it would exceed the size of the opening between the piano case and the lid. Therefore when the lid is closed it would pinch and deform the cable. To avoid this, place the cable to one side of the support arm. You may also position the cable so it comes out the open area of the piano as illustrated in Figure 7.

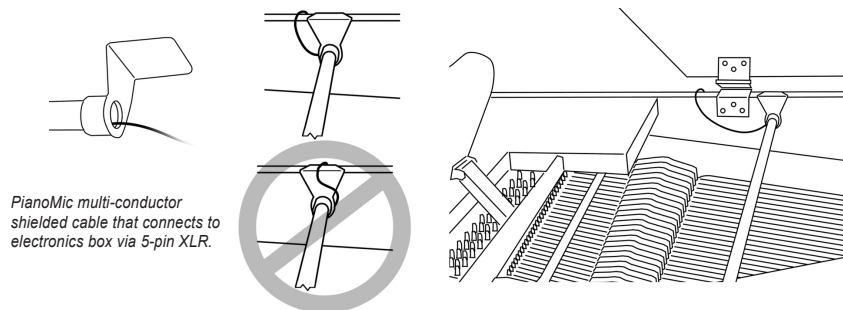


Figure 7. Positioning the PianoMic Cable

5. The PianoMic™ can be placed inside the piano with the microphone heads either facing the dampers (Figure 5) or facing away from the dampers (Figure 6). For optimum results, the PianoMic™ System should be placed in the piano with the microphone heads placed two to three inches away from the dampers. How you place the PianoMic™ System will depend upon the piano, its size and

7. Once you have determined which placement will provide you with the ability to have the microphone heads two to three inches in front of the dampers, you are ready to place the PianoMic™ System inside the piano. With the bar fully extended and the clutch adjusted where there is still a little friction, place the support bracket on the edge of the piano case opposite you. Then push on the bar until the PianoMic™ is the correct length to allow the support bracket to easily rest on the edge of the piano case nearest to you.

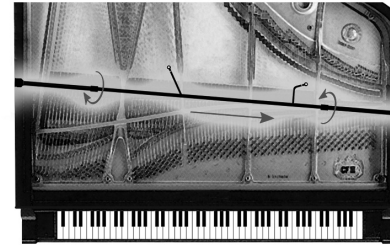


Figure 8. Favoring the High Strings

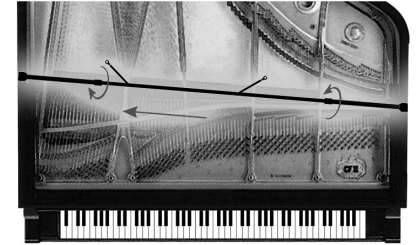


Figure 9. Favoring the Low Strings

8. With the PianoMic™ in place, you will need to determine if you want the microphones to favor the high strings, low strings or neither. The center section of the PianoMic™ can slide up to eight inches in either direction in order to favor the high or low strings, if desired. This positioning is illustrated in Figures 8 and 9.

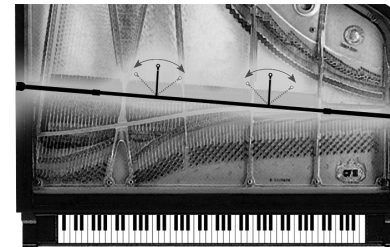


Figure 10. Adjustable flex arms for the Microphones



Figure 11. Adjusting the Microphone Height

9. Once you have positioned the PianoMic™ center section, tighten both clutches to insure that the PianoMic™ bar stays in place.

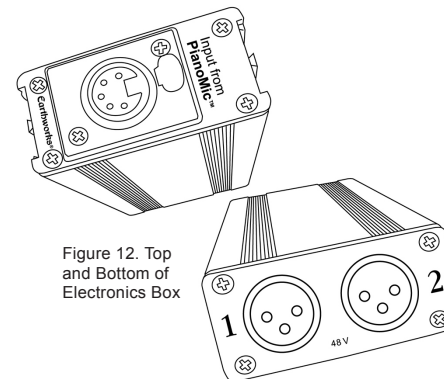


Figure 12. Top and Bottom of Electronics Box

10. With the PianoMic™ in place, you can move the flex arms attached to the microphone heads several inches to the left or to the right to achieve your desired placement (See Figure 10).

11. The flex arms also allow you to adjust the height of the microphone heads as shown in Figure 11.

12. With the PianoMic™ placed inside the piano and the microphones properly positioned you are ready to connect the PianoMic™ cable to the electronics box