



## R44C/CX

### Quickstart Manual

**CONGRATULATIONS** on your purchase of an AEA R44 Microphone!

The AEA R44 is an exacting reproduction of the RCA 44B/BX Velocity Microphone, circa 1936.

Audio Engineering Associates had already been buying, selling, and repairing vintage RCA and other ribbon microphones for two decades, before deciding to reissue the RCA 44. The first question, however, was “Which model should we rerelease?” Many design

changes had altered the microphone during the production years of 1936 through 1958. We consulted many engineers and users and decided that the earlier versions from the 30’s to mid-40’s were the all-around favorite, the ones with the ‘magic sound.’

The AEA R44C/CX is a faithful reproduction, down to one ten-thousandth of an inch. The parts are completely interchangeable with a real 44, the only difference being the magnets. Our modern AEA R44C/CX uses Neodymium magnets, which are more powerful than the Alnico originals. This produces an output level that is about 1 dB higher than the original microphone, while our R44CX High Output version is about 5 dB higher. The ribbon is made from the original RCA ribbon stock! Yes, some of the real stuff had been stored for all these years after RCA discontinued that arm of its business. We also were able to garner some help from one of the original RCA engineers. With their invaluable help, we were able to make this legendary microphone available again.

**THE RESULT IS THE AEA R44C and CX.**

Painstakingly crafted, and hand-assembled, it looks, feels, and sounds EXACTLY like the original. All of us at AEA are extremely proud to be involved in the reissue of this beloved microphone.

But first, there are a few things you should know about your new R44...

## It's big and heavy!

Yes. About 13 ½ inches (34.3 cm), and about 8 ½ pounds (3.8 Kg).

Remember that we are working with 1936 technology. In order to create a magnetic field powerful enough to yield a useable output, the magnets and the framework to support them had to be big and heavy.

## It's bidirectional!

True. With the magnets and their support and focusing structures wrapping around the sides, top and bottom, the ribbon, which is about .2 inches (.5 cm) wide and about 2 inches (5.08 cm) long, is exposed front and rear. The microphone is therefore, is inherently bidirectional, with the only difference between front and rear response being polarity (phase). The strength of a bidirectional microphone includes the excellent null rejection that naturally occurs at the plane of the ribbon providing good isolation of signals approaching 90 degrees off-axis.

## So, how does it work?

The 44 is a ribbon microphone. An extremely thin aluminum ribbon is placed within a powerful magnetic field. Any sound energy, which moves the ribbon, causes it to travel within the magnetic field. This generates a tiny electrical current within the ribbon, which is an exact analog of the sound. It is called a velocity microphone because its output is a function of particle velocity. Next, there is a transformer, which converts the extremely low impedance of the ribbon to a more useable level. And that's it, no power supply, no pad, and no pattern selector.

The most elegant things in life are always the simplest, don't you think? But it is precisely this simplicity that leads to the character of sound that has been cherished for so many years. No damping, no uncomfortable resonances in the audible range, and no active electronics preserve more sonic accuracy than most or all microphones because no external features are introduced to the signal. This accounts for the "truthfulness" of the sound that has made the 44 a classic.

## It's delicate!

The ribbon has to be able to respond to the tiniest amount of acoustic energy in the air. To do this, it must be 'air-like', or low mass. Low mass means thin, and the ribbon in the 44 is 1.8 microns (1.8 uM) thick, or about one-fiftieth the thickness of a human hair! The ribbon is as thin and delicate as it is because it must be able to react to the air mass around it. It cannot be protected and isolated, but must be exposed to all the extremes that a noisy and sometimes careless world can inflict on it. This is the strength, and the weakness, of all ribbon microphones. The low mass of the ribbon results in an excellent transient response because it is able to "pretend that it is air."

Because the ribbon is supposed to register every tiny movement of air, this makes it extremely sensitive to moving air. There is a big difference between air that is moving in a *pressure wave*, which is energy moving through air in the same way that waves move through the ocean, and *wind*, which is a current, or mass of air, moving from one place to another. Wind is a tremendous stressor to a ribbon and you should protect your microphone from it. Wind can stretch the ribbon which effectively detunes it and will change the character of your microphone.

## It is best to store it vertically.

The case provided with your R44 is specifically designed to store it in the recommended vertical position. The ribbon, which is about 2 inches long (the longest of any microphone), could be degraded by long-term storage in a horizontal position. Gravity will cause the ribbon to sag, and can lead to stretching over time.

## Store your microphone in a plastic bag.

Remember what lies at the heart of this microphone...an ultrathin wisp of metal that, except for the outside grill and some internal blast shields is completely exposed to the air around it. HVAC vents, swinging it in your hand as you walk across the studio, excessive SPLs, things like this can damage or destroy the ribbon. Some engineers feel that it should ALWAYS be bagged except when in actual use. Your R44 has been provided with an exact reproduction of the gray twill bag that RCA shipped with their mics. Any plastic or paper bag will do. Besides protecting the microphone from stray air currents, the bag also protects against tramp iron.

## ‘Tramp iron’

The horizontal surfaces in any technical space are likely to have microscopic bits of metal on them. If you put your R44 down on such a surface, the powerful magnetic field will pick up this ‘tramp iron’. That is bad, but it gets worse. As time goes by, these tiny bits will work their way inside the microphone, and eventually get to where the magnetic field is the strongest, which is the gap where the ribbon is. Now, they will start to combine and build ‘whiskers’ across the gap, following the magnetic lines of force. These whiskers will interfere with the functioning of the ribbon.

We have seen this many times with the old RCA mics. The ribbon is OK, but it is impossible to clean out the whiskers without removing the ribbon. Unfortunately, it is also impossible to remove and then reinstall the same ribbon without damaging it, so a good ribbon must be replaced because of tramp iron.

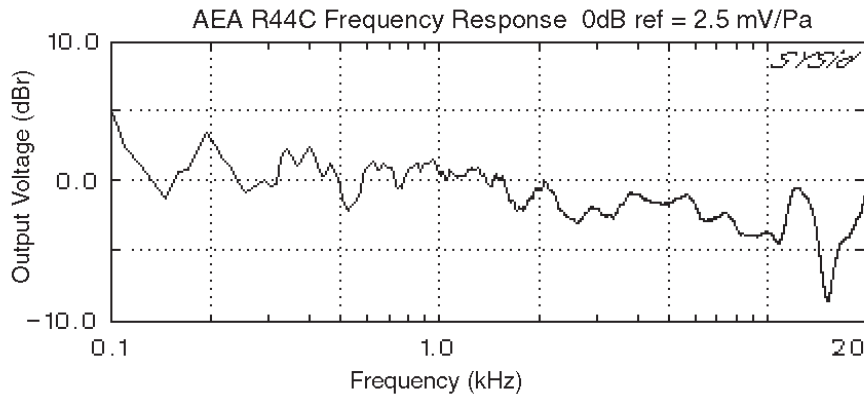
## It doesn’t need, want, or like, phantom power!

What happens when this mic is connected to phantom power? Well, the answer ranges all the way from ‘nothing’ to ‘total disaster.’ If the phantom power is perfect, and the cable is perfect, and the connection transient isn’t too severe, fine. But a bad cable, or unbalanced voltages, or bad patch-point, or large transient can damage or destroy the ribbon. It is much better and safer to not connect this microphone to phantom power!

**A little extra care** in the use and handling of this microphone is all that is needed, and it will give you decades of service. The 44 has been the favorite of recording engineers for nearly as long as there have BEEN recording engineers! Its warm, rich, powerful voice is unmistakable, and irreplaceable.

ENJOY!!

## On-Axis Frequency Response (1 meter)



### Specifications:

Operating Principle: Velocity microphone

Frequency Response: Below 30 Hz to above 20 kHz

Maximum SPL: 140 + dB SPL above 200Hz for 1% third harmonic

Output Sensitivity: 2.25 mV / Pa into unloaded circuit

Output Impedance: 270 ohms broadband

Recommended Load: 1.2 K ohm or greater

Powering: Not required or recommended

Polarity: Pin 2 high for positive pressure on the front of the microphone.

Connector: XLR-3M wired to a 2 meter captive cable

Off Axis Response: (level changes with angle, frequency response is consistent)

Polar Pattern: Native bi-directional pattern

Horizontal: -90 dB null at 90 / 270 degrees

Vertical: Reduced HF response above and below 0 / 180 degree axis, null at 90 / 270 degrees

Transducer element

Ribbon Thickness: 1.8 microns ( .0000018 meter ) of pure aluminum

Ribbon Width: 4.7 mm

Ribbon Length: 59.7 mm

### References and Recommended Reading:

**BASIC STEREO MICROPHONE PERSPECTIVES - A REVIEW**, first published in the AES Journal, vol. 33, no. 7/8, pp. 548-586, 1985 July/August; republished in the STEREOPHONIC TECHNIQUES ANTHOLOGY, pp. 297-305

**THE BIDIRECTIONAL MICROPHONE: A FORGOTTEN PATRIARCH**, was first presented at the 113th AES Convention in Los Angeles, 2002 October, Preprint no. 5646; it is scheduled for publication in the AES Journal in the 2003 April issue (vol. 51, no. 4)

**THE NEW STEREO SOUNDBOOK**, third edition, by Ron Streicher and F. Alton Everest, published by Audio Engineering Associates, 1998; [www.stereosoundbook.com](http://www.stereosoundbook.com).

**RIBBON MICROPHONE ESSAYS** by Wes Dooley, Ron Streicher and Philip Merrill published by Audio Engineering Associates, June 2003; [www.wesdooley.com](http://www.wesdooley.com).

## **Other Products by Audio Engineering Associates:**

### **TRP - The Ribbon Pre**

AEA/Fred Forsell collaboration preamp with no phantom power and 83dB of clean gain

RCA Working Reproduction Microphones and replacement parts

**AEA R44C and CNE Microphone** - Tribute to the classic RCA 44B using NOS ribbons

**AEA R44CX Microphone** - 6db more output for critical digital recordings

**RCA44 and RCA77 microphones** - Spare parts and prop shells

AEA Ribbon Microphones

**AEA R92 Microphone** - Large-ribbon optimized for guitar and other close-micing situations

**AEA R88 Microphone** - Large-ribbon coincident pair in a sleek black "stealth" package

**AEA R84 Microphone** - That big ribbon sound in a smaller more affordable package

Modular Microphone Positioners

**SMT** - Stereo Microphone Template for Blumlein and ORTF spacing

**SMP-17, 1M and 1.25M** - Stereo bars in three lengths for the ultimate in positioning flexibility

**Decca and Mini-Decca Trees** - For microphone arrays including recording for multichannel

Modular Studio Microphone Stands and Booms

**Flightweight Stands**

**Medium-Duty Vertical Stands and Booms**

**Heavy-Duty Stands and Booms**

**Crank-up Stands**

Since 1983 we've been 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 Coles microphones and genuine Coles 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 SR line provides low cost multiple machine remote controls for RS-422, Sony, and Tascam DA88 protocol machines. The new P2DVD Interface may be a RS422 controlled Master with most RS422 synchronisers and Console automation systems.

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.

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