

## CAD Trion Series Microphones

Mike Rivers



CAD is a company associated with many brand names (Conneaut Audio Devices, Equitek, Omnitronics, Astatic), with a legacy in transducers going back to the 1930s. If you grew up in the 1950s, you probably ran into a portable record player with an Astatic crystal cartridge, and the D-104 was one of the most popular ham radio mics, which continued its popularity into the CD craze of the '70s. The company's microphones have long been associated with communication and installed sound applications, but for the past ten years or so, they've been offering studio mics, with the Trion series being their latest (2006) endeavor. The three mics in this series are about as alike as pumpkins in a patch (I'm writing this the day before Halloween) with two things in common – they're Chinese-built from CAD designs, and they're medium-priced, not just another group of cheaper-than-the-last-model mics.

Both the Trion 8000 and 6000 are three-pattern dual diaphragm condenser mics with bottle-style bodies – a long cylinder with the capsule on a stalk. The 8000 has tube electronics with an external power supply. The 6000 is a solid state phantom powered design. The Trion 7000 is a ribbon microphone with a short, squatty body and a large ball shaped grill. All three are supplied with a cat's cradle suspension type shock mount and each comes in a foam-fitted metal surfaced case with a carrying handle. The 8000 case, which holds the mic, power supply, and a 25 foot 6-conductor cable looks quite businesslike, the other cases are functional. Those cases hold the mics very snugly – removing one of these mics from the snug fitting foam insert required both hands. Ballpark street prices are \$400 for the 8000, \$300 for the 6000, and \$260 for the 7000, putting them in line with similar mics such as the Rode NTK tube mic, Studio Projects C3 solid state mic, and a couple of the higher end Nady ribbon mics.



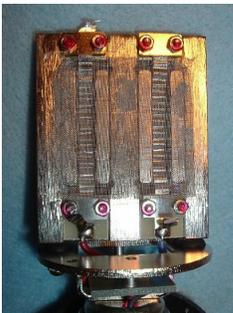
This review represents several firsts for me. It's my first attempt at writing subjectively about microphones, it's my first tube microphone, and it's my first inexpensive ribbon mic.

## Physical Features

These are large and heavy mics. With their shock mounts, the 8000 tips my kitchen scale at 2 lb 13.5 oz, the 6000 is 2 lb 7 oz, and the 7000 is a trim 1.5 lb. You'll need a sturdy stand, particularly for the tube mic. The two condenser mics have different capsules, a 1.2 inch in the 8000 and a 1.0 inch in the 6000, both using traditional center point connection. The capsules are shock mounted in the head section of the case with three resilient blocks. Both mics have a three position mini toggle switch for pattern selection, with the 6000 having additional switches for a 10 dB pad and a 100 Hz low-cut filter.

The 6000 is specified for 48V phantom power at 4.7 mA. In the past, phantom power meant 48 volts, but I've run across a number of contemporary audio devices touting phantom power which supply a lower voltage. I tested the Trion 6000 with my Mackie Satellite Firewire audio interface whose phantom power supply is a wimpy 38V. The mic appeared to be satisfied with the lower phantom voltage, however I didn't have anything loud enough to check the maximum SPL before clipping, which is usually the first spec to go south for a mic running from reduced voltage.

The 8000's power supply is straightforward, silicon diodes and a single IC regulator. The plate supply for the tube is 120V. The tube filaments are fed with DC, a nice touch. The line voltage selector switch is a bit confusing, with the notch in the switch slider lining up with the 230V marking on the chassis when it's actually in the 115V position. Believe what it says on the switch. CAD agrees, and beginning with the next production run, the legend will be removed from the case. A ground lift switch on the power supply disconnects Pin 1 of the output XLR connector from the power supply chassis.



The 7000 dual ribbon assembly consists of two pleated aluminum ribbons, 1.5" long and 0.15" wide, mounted parallel in a frame, about 5/8" apart. Unlike Beyer's use of dual ribbons to extend the frequency response in their M-160, the goal of CAD's dual ribbon design is to provide higher output level than a single ribbon.

The ribbon assembly is covered by a fine mesh screen, but there's no other blast filtering other than the rather coarse grille. These mics should be used with care. It might also be a good idea to store the mic in its case with the hinge at the bottom to keep the ribbons vertical.

Fit and finish of all of these mics is generally good. The mic bodies have a slightly rubbery feel that's easy to grip. Construction is conventional, with decent but not really top shelf thru-hole mounted components, so the curious experimenter might improve low frequency performance or lower the self-noise by selecting premium resistors and capacitors. The impedance converter in the



Build quality is just OK. Circuit board construction is fine, but soldering on the 8000's tube socket was pretty sloppy. The first 7000 that I received hummed badly and had low output. When I opened it up to look for a broken ground connection I discovered that the shield and Pin 2 wires from the XLR connector to the terminal board were swapped, connecting a signal lead to the case. Another one (two, actually) arrived in a few days and were fine. CAD told me that after the initial factory shipment (the faulty mic was from that batch) they are now doing 100% testing in Ohio, so you shouldn't have to worry about this.



## Listening Impressions

Most of the mics that I use regularly are ones that I've owned for 20 years or more, and they've served me well. I don't own any modern, mid-priced mics with which to compare the Trions, so my comparisons are to my old standbys, all of which cost much more than these mics. I was pleasantly surprised at how well they compared.

Since CAD suggests vocals as the primary application for all of these mics (with of course a range of secondary applications), that's what I tried first. I set up the 6000 and 8000 and a Neumann U87 (my usual go-to vocal mic) in a tight cluster and recorded them with my Mackie HDR24/96 multitrack recorder, using the Onyx 800R as the preamp. All were initially set to the cardioid pattern.

On both male and female speech, the Trion 6000 sounded remarkably close to the U87, both when working close (4 inches) and distant (16 inches), other than a slightly brighter top end. This was a perfectly acceptable contemporary vocal sound. The frequency response curve provided by the manufacturer shows a dip at about 7.5 kHz with a hump around 10 kHz which is consistent what I heard. The rise in the 3 to 6 kHz range is similar to the U87, suggesting the similar sound.

Compared to the U87, when working close, the Trion 8000 exaggerated both the low, chesty vocal range (proximity effect) and mouth noises (consistent with the bump at 15 kHz in the published frequency response curve). At about 16 inches, the proximity effect is negligible, while the high end boost added an airy quality to the voice. Although the 6000's frequency response curve actually shows a greater low frequency rise than the 8000, this wasn't evident in my listening tests. Perhaps those curves were plotted at different working distances. I think it's a fair assessment that the Trion 8000 offers up the sonic characteristics that we expect from a tube mic today, and that's a good thing.

Both of the Trion condensers sounded close enough to the U87 on acoustic guitar, banjo, and electric guitar that I'd be happy to use either one in that application. I have a very fat sounding pedal steel, and the exaggerated low end of the 8000 muddied this up a bit much. When placed about 6 inches in front about 4 inches off center of the amplifier's single 12" speaker, my preference, even over the U87, was for the Trion 6000.

In the figure-8 configuration, both the 6000 and 8000 have a good null. The 8000 sounded very much alike from both sides, while the 6000 sounded a little brighter on the back side than the front. Several of today's bi-directional mics advertise this as a feature (two sounds for the price of one mic), though in truth perfect symmetry is very difficult to achieve, and just about any dual diaphragm mic sounds a little different from the back than from the front in the bi-directional mode.

Since I frequently record singing guitarists who aren't comfortable playing without singing, I'll often set up figure-8 mics for both voice and guitar, positioning them with each mic's null aimed toward the other mic's source. While there's rarely enough isolation in this configuration to punch in voice or instrument, separation is good enough so that I can EQ each mic without problems due to leakage. I tried this setup with the Trion condensers, using the tube mic for my voice and the solid state mic for guitar. I was able to get a good guitar sound with practically no vocal leakage, but to avoid too much proximity effect, I had to back far enough away from the vocal mic and couldn't keep much guitar out of the vocal. Working closer and using EQ to cut the low end worked, but I really preferred the sound of my voice a foot from the mic than from three or four inches.

I tried M-S stereo recording using the 6000 in figure-8 together an AKG C451/CK1 cardioid mic and found this combination to work fairly well. Mounting the two mics on a single stand was a bit dicey due to the large size of the Trion shock mount, so I wouldn't recommend this as a regular thing unless you have a very sturdy stand, but it does work. While recording the birds and airplanes in the back yard, I discovered that the Trion 6000 was very sensitive to wind noise, and none of these mics come with a wind screen.

The Trion 7000 ribbon mic is a completely different animal, so it got its own set of listening comparisons alongside a Beyer M160 and a Beyer M260 modified with an RCA 77DX ribbon installed by restorer of RCA ribbon mics Stephen Sank. As previously mentioned, the 7000 sounds best when connected to a 500 ohm input impedance, so that's how I ran it. The two Beyer mics, like many ribbons, prefer being connected to a higher input impedance. The Trion 7000 sounded remarkably like the modified M260, which, coincidentally, sounds remarkably like a 77DX.

The high end of the Trion 7000 drops off quickly, and is pretty much gone above 10 kHz, but what's there sounds smooth, with a pronounced proximity effect

when closer than about six inches. It could make a good voiceover mic, and I wish I had one a year ago when I conducted a workshop on Recording The Plunky Old Banjo - I really liked it for that. I didn't care for it on acoustic guitar, but that top end rolloff was effective on a scratchy fiddle. The M160 (also a dual ribbon mic, but with a very different design) is considerably brighter than the Trion, and while it has a similar low end and it's one of my favorite choices for fiddle, really didn't make for a fair comparison.

Checking the sound on both sides of the 7000 proved to be rather interesting. The rear side was somewhat thinner sounding than the front, but since the acoustic polarity going into the rear is opposite that going into the front, I tried inverting polarity on the console and listened back to the recording. Darn if the recording from the rear, when inverted, didn't sound just like the recording from the front! Out of curiosity (and thinking that maybe we'd been fooling ourselves all these years) I tried the same experiment with the Trion 6000, but on that mic, the rear side still sounded brighter than the front even when reversing the polarity.

According to the spec sheets, the 7000 is about 16 dB less sensitive than its condenser brethren, but in practice (with a 500 ohm load) I found that its output was about 20 dB lower. This is a mic that needs a lot of gain unless you're using it on an electric guitar or other loud source. I would have liked to try it on tuba or trombone, but one didn't show up during my review period. Also, it's somewhat hum sensitive. The steel case and shielded transformer no doubt helps, but the ribbon assembly still makes a pretty good antenna. In one room with some strange AC hum fields, I needed to rotate the mic (which required relocating the player and some gymnastics with the mic stand) in order to null out the hum – but it's good to know that such is possible.

## **Conclusions**

These are all pretty good mics, and I don't feel compelled to add the "for the price" qualifier. CAD has come up with a useful set of microphones that won't break the bank. Don't read into this that Trion condenser mics sound just like a U87 (they don't, but then my two U87s don't sound exactly the same either), but I wouldn't hesitate to try either for any application where I'd reach for a U87. The Trion 7000 ribbon is a special case – it's not a mic for everybody, but if you've been wanting to experiment with a ribbon mic, it should meet your expectations.