What About DAT?

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It's time for a quick quiz:

1. Do you currently used DAT machines at your radio station?

2. Do you intend to use DAT machines at your radio station?

3. Is there any possibility that you will ever use DAT machines at your radio station?

If you answered "yes" to any of the above questions, read on. If you answered "no" to any of them, you should probably read the rest of this anyway.

For those of you who don't know what DAT machines are, they are a **D**igital **A**udio **T**ape machine. Sometimes they are referred to as RDAT for **R**otary head **D**igital **A**udio **T**ape. They use a small tape cartridge, slightly smaller than an 8 mm video cassette. The tape is slightly narrower than 8 mm tape as well.

If you were to look inside a DAT machine, you would find that it looks a lot like a VCR, only much smaller. Besides the size, there are some major differences. VCR's use a 270° head wrap, while DAT only uses a 90° head wrap. While VCR's have some sort of tracking adjustment (either mechanical or electronic) DAT's have none. Of course, DAT's do not record video, just two channels of audio.

I won't get into how they work, since books have been written on that subject, and we only have a limited amount of space here. If you are interested in checking this out further, I would suggest your local library or a good bookstore.

Many radio stations have begun using DAT's primarily because of the high quality and small package of the recorded material. They are great for remote recordings as well, since some portable machines are only slightly larger than a pack of playing cards. The more rugged machines are a bit larger, but they are still smaller than the laptop computer on which I am writing this article.

DAT is truly a high fidelity medium, using 16 bit linear coding. Consumer grade machines record only at a 48 kHz sampling rate, while professional machines are usually switchable between 48 kHz and 44.1 kHz (the standard used on CD's). Some machines have a long play mode, where they run the tape at half speed and record at a 32 kHz sampling rate, with some sort of compression to reduce the coding to 12 bit. But even this mode is quite good. Most people cannot distinguish one mode from the other in blind listening tests.

Another advantage of DAT is cost. Blank tapes cost about half of what open reel tape costs, for an equivalent time. The machines are also as cheap or cheaper than analog machines, besides taking up less room. You can easily put three DAT machines in the space of one reel-to-reel machine.

Unfortunately, there is no free lunch. After a brief "honeymoon" with DAT, most stations are finding that all is not as it should be. Perhaps you remember all the hype about CD's, how you could do almost anything to them and they would still play? How long after you got your first CD player did your friendly neighborhood jock put his greasy fingers on the face of the disc and all you had was Skip City? The same type of thing happened with DAT, but the problems are not quite so easy to find.

Unfortunately, the instruction manuals for DAT machines are not the best written things in the world. They usually tell you everything you ever wanted to know about how to operate them (including all of the obscure buttons on the machine), but they don't say much, if anything, about maintenance. In fact, I don't know of any DAT machine that comes with any sort of maintenance manual. You have to pay extra for a service manual; then, when you get that manual, it tells you everything you wanted to know about taking it apart, which parts are where, and doing routine adjustments, but it gives you absolutely *nothing* about troubleshooting.

As near as I can tell, what they really want you to do is send the machine back to them for repair (this could take weeks, if not months), or attend a servicing seminar at a cost of over $1,000 just for tuition. Of course, the class is in the other part of the country, so you have to come up with air fare and hotel bills as well. Quite a price to pay for information to service a machine that only costs a thousand or so dollars.

After using DAT's for a number of years, I can give you a few tips that may help keep you out of trouble. First of all, when you buy your machines, make sure you work with a reputable dealer who will support you after the sale. Sometimes even the best manufacturers come up with "lemons" that no one can fix. It is a big help if you have a dealer who will go to bat for you with the manufacturer, especially if you are one of the first ones to find that the "latest, greatest" machine you bought will never work right. By the same token, be sure you buy from an authorized dealer. If you don't, the dealer won't have any "clout" with the manufacturer. In fact, the manufacturer may not honor the warranty if you don't buy from an authorized dealer.

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Once you get your DAT machine (or machines), you don't have to invest in training and special test tapes. If you don't want to go through training or buy test tapes, you should find a good service technician who will talk to you. This may be at the manufacturer's service center, a dealer's service center, or an independent shop. Ask others, who have some experience with DAT machines, who they would recommend for service. Once you have found a good technician, talk to him and let him know that you want a complete report on the problems he finds and what he does to correct them. Keep a record of your problems, the symptoms, the causes, and the solutions. This may help save you some money in the future.

One of the most useful items you can find out from the technician is how to access the machines internal diagnostic codes (if any) and what they mean. Many machines have such codes that will help tell you what is wrong, in the event of problems. Some of them also have internal timers that show you the accumulated time on the heads. This is important, as you will see in the next few paragraphs.

If your machine does not have an internal timer, a good investment would be to install one. I have found that keeping track of the elapsed time on the heads is important to head off problems. If you have to install a timer, I would suggest buying a timer module from a place such as Digi-Key. They have a nice self-powered timer (10 year life) for about $30.00 each. All you have to do is connect a few wires, and it works.

There are two ways to install the timer. One would be to mount it in the machine on the rear panel. You can wire it to the remote control connector (I am assuming you bought a pro model with a parallel remote connector) inside the machine. The down side of this is that it may void the warranty on the machine. You may want to check with the manufacturer if in doubt. Or you could wait the 90 days (the standard warranty period) and then install it. If you don't want to cut a hole in the machine, you could mount the timer on the back with some stick-on Velcro and wire it to the remote connector.

DAT machines are a bit different from analog machines in a number of respects. The most noticeable, from a maintenance standpoint, is that a DAT machine will probably not deteriorate gradually. Being digital, it will work fine until it reaches the point where it can't correct the problems any longer, and then give you all kinds of grief (probably messing up a program on the air). Unless you want to pull the machine out of service periodically, and open it up and check it out, there is only one way to prevent such problems from happening. The best way I know of to prevent problems with DAT machines, is to institute an aggressive maintenance program based on hours of head usage.

Different manufacturers have different recommendations for maintenance, so you will have to find out what it is for your machine. If you can't find a manufacturer's schedule of maintenance, you may want to try the following:

Clean heads & tape path (use a cleaning DAT) — 10-20 Hrs.
Replace heads, pinch roller, check guides — 1000-1500 Hrs.
Replace motors and important gears — 5000-6000 Hrs.

Remember that these are just guidelines. You will have to find what works best for your machines. Also remember that using a cleaning DAT is the easiest way to clean the heads, but accelerates the wear on them. If you can get away with a longer cleaning interval, do it.

There is one other way to avoid problems with DAT machines. Use good quality tapes. Again, check with other users or your service technician for some suggestions. While most of the tapes only come from two or three factories, regardless of brand, some are better than others. Many of the poorer grades of tape will leave excessive amounts of dirt on the heads and will accelerate wear and problems on the machine. They may also have excessive dropouts which may cause on-air problems.

Some people feel that data grade DAT's are better than audio grade. I won't bother getting into the middle of that discussion here, but I would like to warn you that some machines will not accept data grade tapes. The tape is thinner than audio grade DAT, and some machines have sensors to prevent using such tapes.

I hope that I haven't scared you away from DAT — that was not the purpose of this article. I was just trying to share my experience with you, so you don't get caught by surprise. DAT's are handy, good, and relatively inexpensive. While I don't think they will be around for a long time, they appear to be one of the more practical media that is currently available. Probably in, a few more years, they will be replaced by recordable CD's, hard disk storage, or something else that we haven't even thought of. For the moment, though, they are a viable alternative to analog tape. RG

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