

## Addendum: Audio samples of tape restoration problems

Given many comments in some of the online forums about the virtues of one of the commercial solutions out there for correcting wow and flutter in a tape (verging on the reverential), I decided to ask John how *he* went about dealing with this issue. He graciously replied, and he sent some before-and-after samples he said I could share.

John replied that a lot of the solution to managing pitch variations (which is what is caused by wow and flutter) lies in the quality of the tape heads and transport used when making the tape or later making a transfer of the tape. He said that Bob Witrak at HDTT is using a pretty special equipment set-up, with obvious great results. He takes the signal right off the tape head and feeds it to a super quality preamp, using nothing else on the tape deck itself. But, when a tape has been stretched or if your working from someone's transfer that has pitch variations in it already, then some specialized software comes into play. Of course, here you must be working in the PCM domain. He said one such piece of software is [iZotope](#) and it addresses wow and flutter works surprisingly well.

The program John works with most frequently, however, is [Capstan from Celemony](#). He says, "Capstan can do wonders, but can also make messes--it has a real learning curve. For Capstan to work at all, the pitch has to be right to within something like a whole step. If the pitch is further off the mark, you have to do some matching initially by ear (basically just getting it into the ballpark). Then Capstan can get it a lot more right. I'll then go back thru and fix what was still wrong in a few spots by ear. Capstan is not perfect--it always leaves some error that needs to be fixed by fine-tuning with your ears. But I like the program a lot for what it will do."

He sent this sample of a live recording of a performance Beethoven's Archduke Trio that someone else had dubbed and then sent to him to see what he could do to make the tape listenable. The tape has a huge about of wow and flutter, plus tape slippage. The first 30 seconds or so is the original, the rest is John's fixed version adjusting first by ear, then applying Capstan, then fine-tuning by ear.

[Track 1]

### Example of fixing wow and flutter and tape slippage, before and after.

Another issue John deals with are vintage acetate and shellac platters with lots of scratchy surface noise. Here's an example of a very noisy acetate record.

[Track 2]

### Example of a very noisy acetate record of music with Nelson Riddle, before and after.

And then there is the challenge of correcting wrong notes in a recording of a live performance. Here are two examples

[Tracks 3 & 4]

### Two examples of correcting wrong notes from a live performance recording.

If you'd like to download these samples, I've placed them in an album for you to download [HERE](#).

From Positive Feedback article [A Conversation with John Haley - Audio Restoration Magician](#).