Wollensak/3M 1500SS Tape Recorder Repair Manual

Repair Tech: Bill S.
Date of repairs: 4/7/25 to 4/15/25
Labor cost: Avg of approx 3 hrs/day; total: 24 hrs
Parts cost: $0.59 for one 1.25" washer. All electronics check OK, all belts and rubber idler wheels check OK. Even the small GE 757 bulb to light the front controls is still good.

A vintage Wollensak/3M tape recorder appeared roughly two months ago at my local Habitat Re-Store. The hand written note on the cover said "Bad Motor," which is probably why it sat, unsold, on the store shelf for two months. When the price dropped 50% from $15.00 to $7.50, I decided to roll the dice and give it a go. I enjoy a good repair challenge. I also enjoy the sense of satisfaction that comes from fixing something that others have completely given up on.

This unique looking tape recorder series, together with several slight variations, were used by many small businesses, public school systems and universities throughout the 1950's, 60's and 70's. Build quality was always very high. They were regarded as a very dependable source of audio for events, library research, and classroom work.

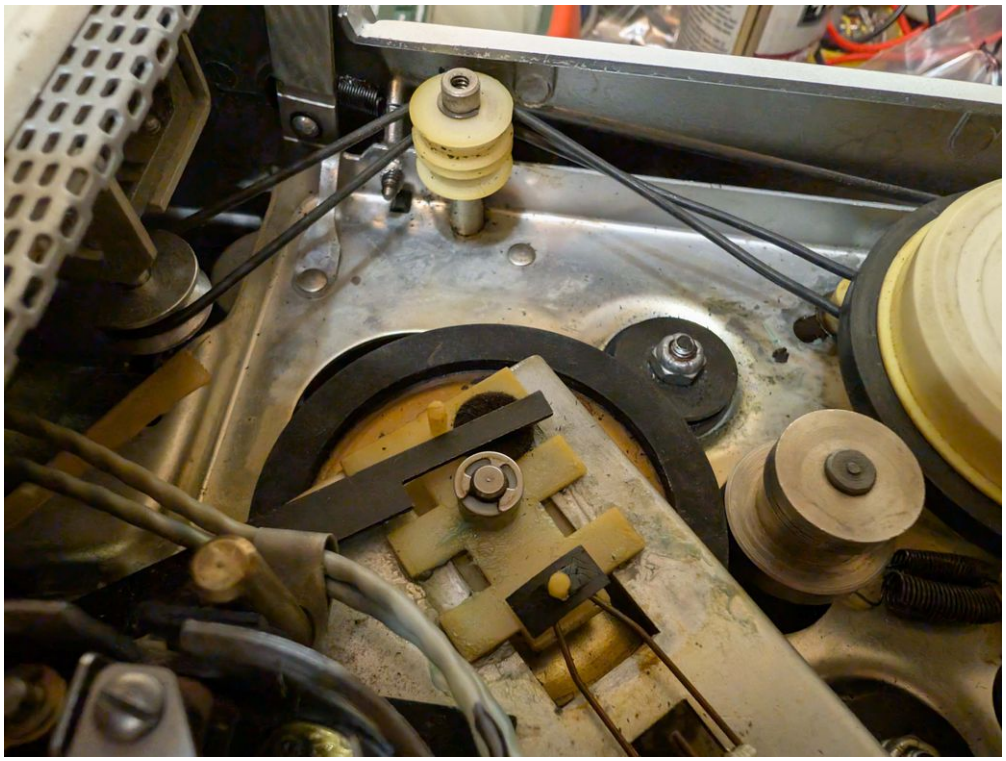
This particular version of the 1500 series of Wollensak recorders was manufactured by 3M in 1967. Solid aluminum side panels were bolted to a very rigid steel chassis. Specs are: FR: 40-15,000Hz at 7.5ips, wow & flutter less than 0.3%, SN ratio greater than 48dB. Tape speeds of 3.75 and 7.5ips. Monophonic half-track record/playback head and a separate erase head were used. It has a single 115vac drive motor with multiple idler wheels to control hub speeds and capstan. An internal amplifier and 5 inch full range speaker are said to produce a rated output of up to 10 watts. Weight is listed as 20 lbs. Built in handle makes it very portable.

BEFORE REPAIR

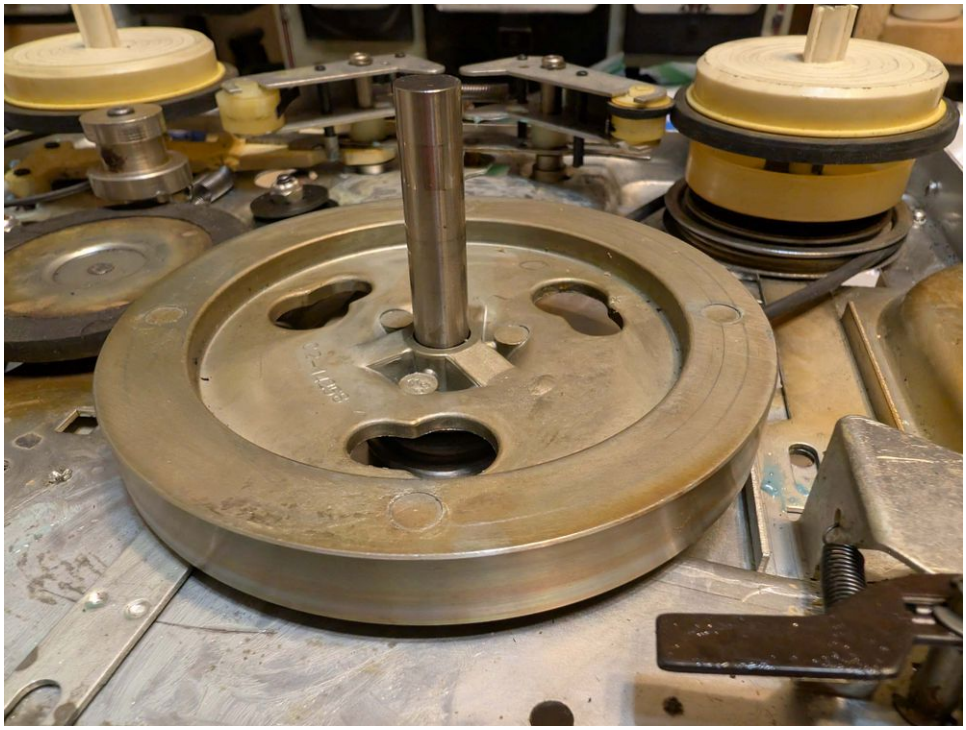
The motor simply buzzed when you plugged it in. The top and bottom bearings were frozen. A small amount of penetrating lubricant loosened them up and restored it back to full speed with high torque and little vibration.

The slip clutch pulley at the base of the take up reel spindle was frozen solid to the shaft. I removed the spindle and slip clutch parts, then cleaned and lubed the bearings. The felt lining pads on the slip clutch were worn down (or pressed flat from 30 years of pressure), so I added a thicker washer to adjust the slip clutch take up reel tension. Works good now.

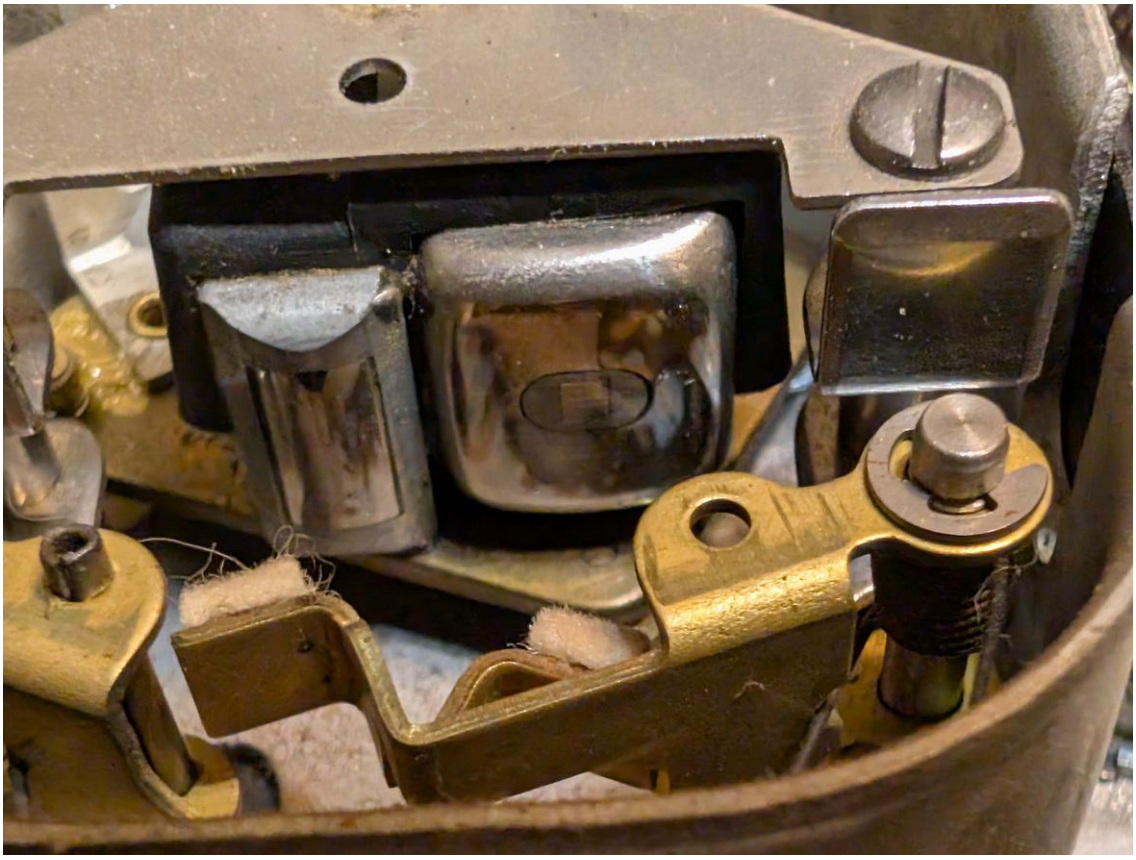
Rewind was sluggish and the tape counter did not work. Turned out that the belt was still good. But the belt had slipped off the pulley beneath the supply reel spindle assembly and was rubbing against the shaft. Simply remounting the belt onto the pulley helped to fix the rewind and tape counter problems.



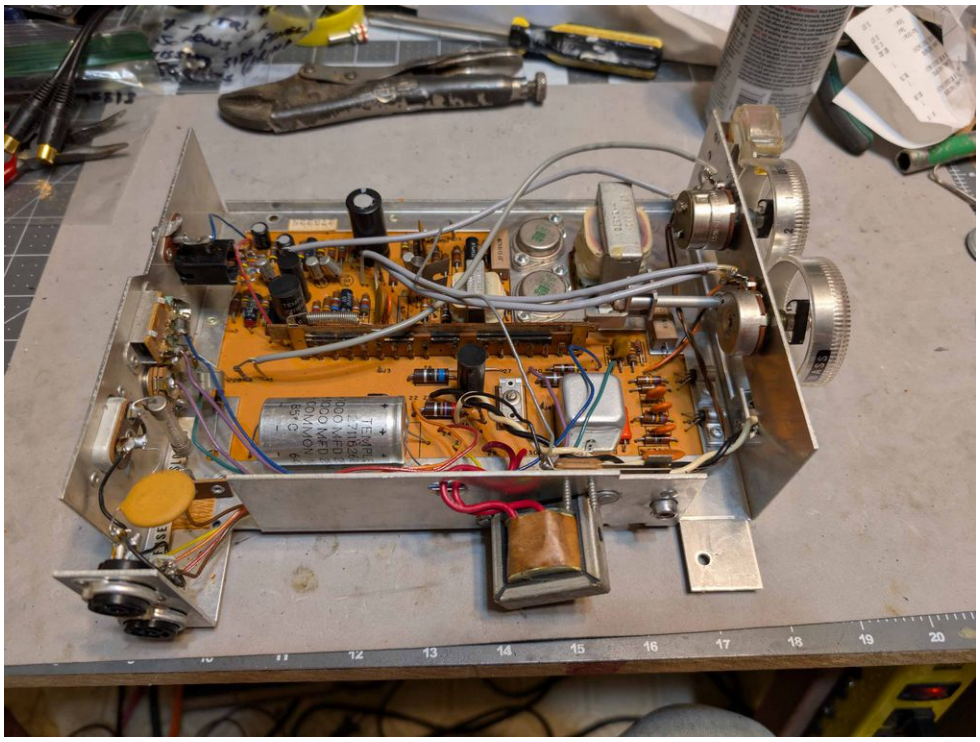
The take up reel spindle belt connects to a small pulley located beneath the capstan flywheel. The belt had slipped off and was rubbing on the capstan shaft. I added a 1.25" diameter fender washer below the pulley to prevent this in the future and then re-mounted the belt. Works good now.

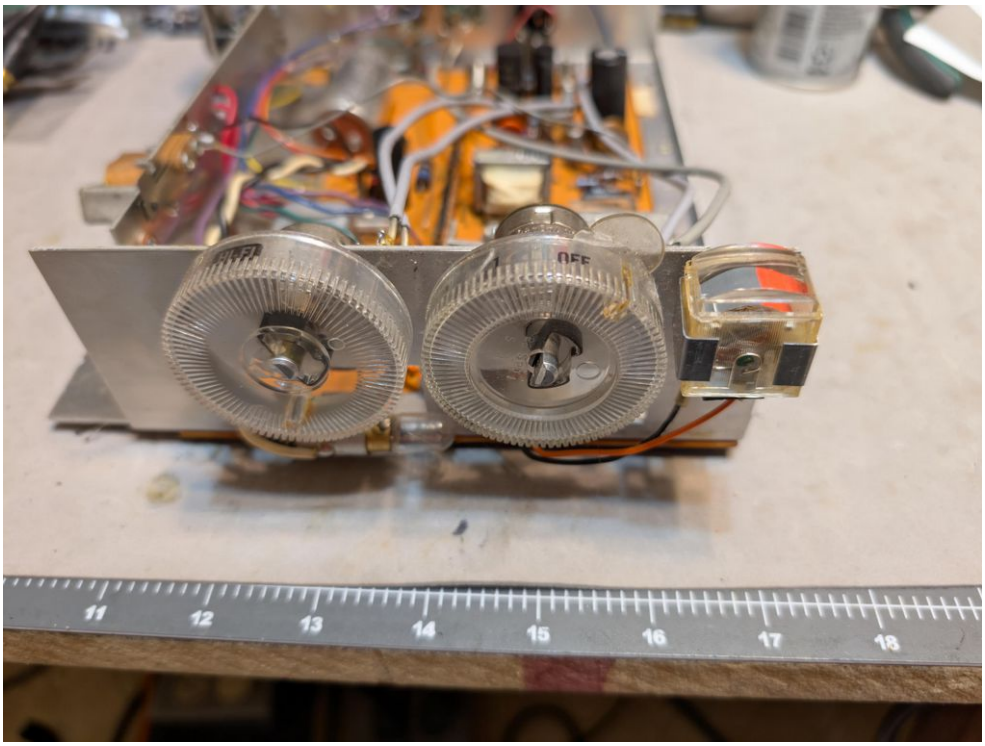


I cleaned the head assembly with isopropyl alcohol. Heads look good with minimal wear.



I inspected the circuit board for signs of bulging caps, burned resistors, cracked solder joints, etc. Nothing looked bad, so I left it alone. Electrolytics are still OK with no signs of leakage. No hum through the speaker. Volume and tone control pots are noise free. If it's not broke, don't fix it!





The main power transformer measurements look good:

Secondary: DC resistance across light brown wire and the center tapped yellow/red wire: 3.24 ohms
DC resistance across other light brown wire and the ctr tapped yellow/red wire: 2.35 ohms
DC resistance across light brown wire and the other light brown wire: 4.86 ohms

Primary: DC resistance across orange/green stripped wire and the black wire: 48.7 ohms.

After putting it all back together, I ran the recorder through a series of tests to check for mechanical type problems. At first, I had a problem with tape spilling during fast rewind, but I was able to fix this by adding the aforementioned washer to increase the take-up reel's slip clutch tension. I also had a slight problem with sluggish rewind speeds, but I was able to fix this by adding an additional small spring to increase the tension on the rewind idler wheel. Also, putting the aforementioned tape counter belt back onto the supply reel spindle pulley helped improve rewind speeds as well.

I also put the recorder through a series of tests to check all record and playback functions. Recording with a Pioneer microphone worked good: very clear sound with low noise. Recording music tracks from my cell phone, connected to the preamp's low level inputs, worked very well, producing very clear recordings with low noise and good dynamic range.

Record/Playback Head alignment: Since the record/playback heads looked almost new and appear to have almost no wear, and because the recorder seems to record and playback with very good fidelity, I made no attempt to adjust or align the head assembly. Again, if it is not broke, don't fix it! I have some alignment tapes that I made a while back that can be used for quarter track and half track stereo record and playback heads, but they cannot be used for the half track monophonic heads used on this recorder. So, I'm going to call this one done!

Conclusion: Was it worth it? Yes, definitely. It took a lot of time, but I always discount my time when working on projects that I enjoy. I like to see if I can get old, abandoned stuff like this working again.

My guess is that this is a very "low hours" type tape recorder that was probably used occasionally by the original owner and then sat idle on a shelf for maybe 30 to 40 years. That is why the motor bearings and take-up reel shafts were frozen in place, yet the heads look almost new. All in all, a very good find. The fact that the motor would not spin up initially was a blessing in disguise.

Picture of finished, fully functional recorder: