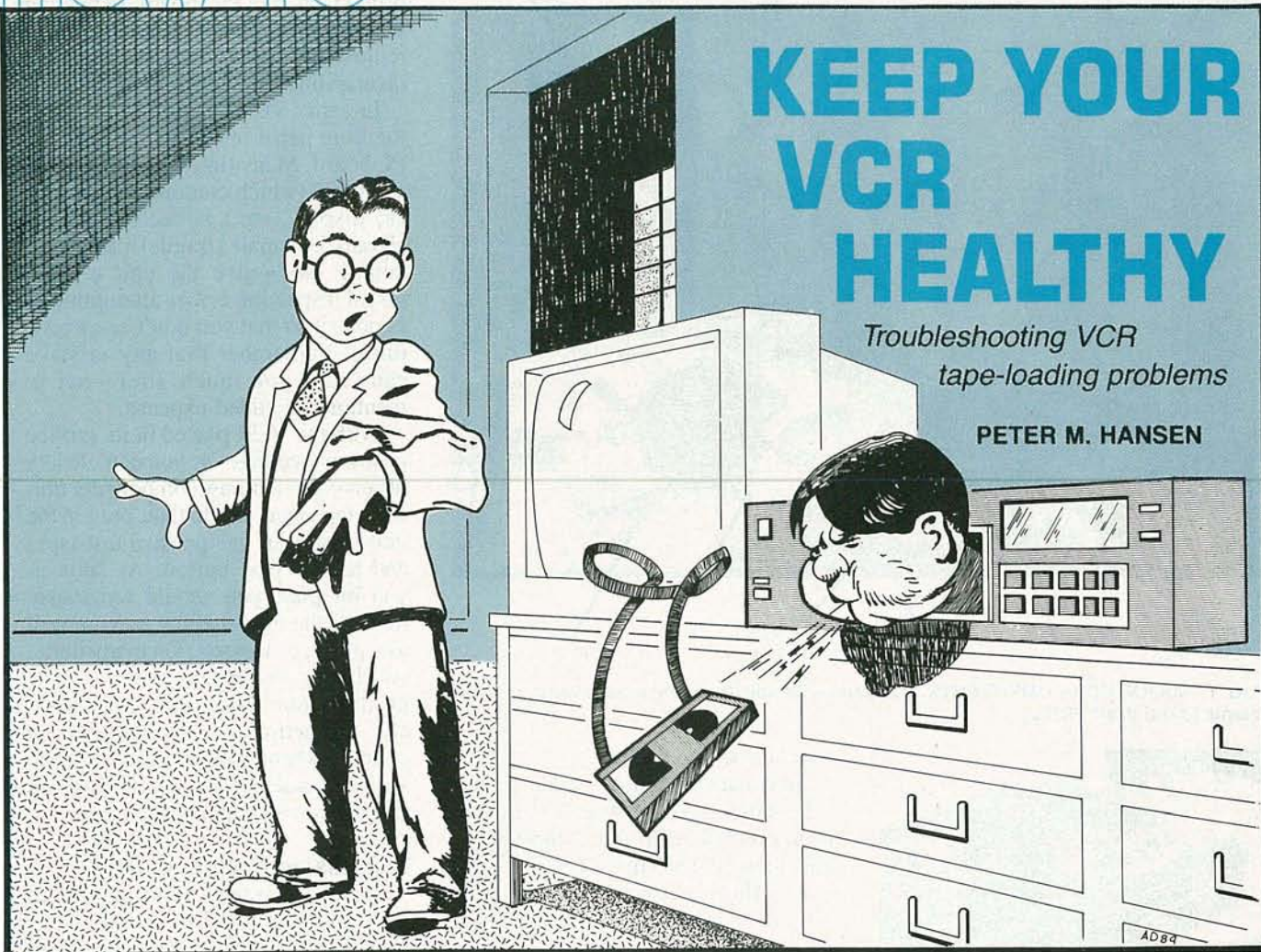


KEEP YOUR VCR HEALTHY

*Troubleshooting VCR
tape-loading problems*

PETER M. HANSEN



ONE OF THE MOST COMMON PROBLEMS found in VCR's is the inability to properly load a tape. Before you try to fix any VCR, though, you should be somewhat familiar with basic VCR disassembly skills and simple servicing precautions. You can learn about the various components inside a VCR by reading our last article on VCR maintenance (**Radio-Electronics**, March 1989). That article covered basic VCR mechanism identification, cleaning techniques, and the necessary hand tools.

Tape-load problems

It is important that you clearly understand the difference between cassette-loading problems and tape-loading problems. A cassette-loading problem is where the cassette carriage assembly does not properly accept the cassette (the shell) into the VCR. A tape-loading problem is when the tape is not properly extracted from the

cassette once the cassette is fully seated inside the VCR.

Figure 1 shows the basic VCR components. You should be somewhat familiar with them before attempting any servicing, but right now our main concern is the tape-loading process. To be able to see the internal components, you first have to remove the VCR's top cover and head shield. You may also have to remove the cassette carriage in order to fully access the components involved in the tape-loading process. Figure 2 shows the cassette carriage being removed from a VCR—there are usually four Phillips-head screws on the top of the assembly that secure it to the VCR chassis. Figure 3 shows the cassette carriage assembly by itself. The gear block and motor assembly on the right side of the carriage is the drive system that is used in front-loading VCR's to load the cassette into the VCR when it is first inserted.

The VCR's guide rollers and slant poles are what actually extract the tape from the cassette and guide it across the video head/drum assembly. After you select play or record, you will see the two guide posts start the tape-extraction process; the video drum starts to spin counterclockwise (it reaches 30 rpm in about 3 seconds), and the pinch roller starts its short movement toward the capstan shaft. It is the action of the pinch roller "pinching" the rotating capstan shaft that actually pulls the tape through the machine during play or record.

Most recent VHS VCR's use a dedicated DC motor to load the tape across the video-drum assembly. The motor is located either above or below the mechanism, and is usually driven by an integrated circuit that receives the motor load and unload signals from the VCR's main microprocessor. Figure 4 shows a typical tape-load

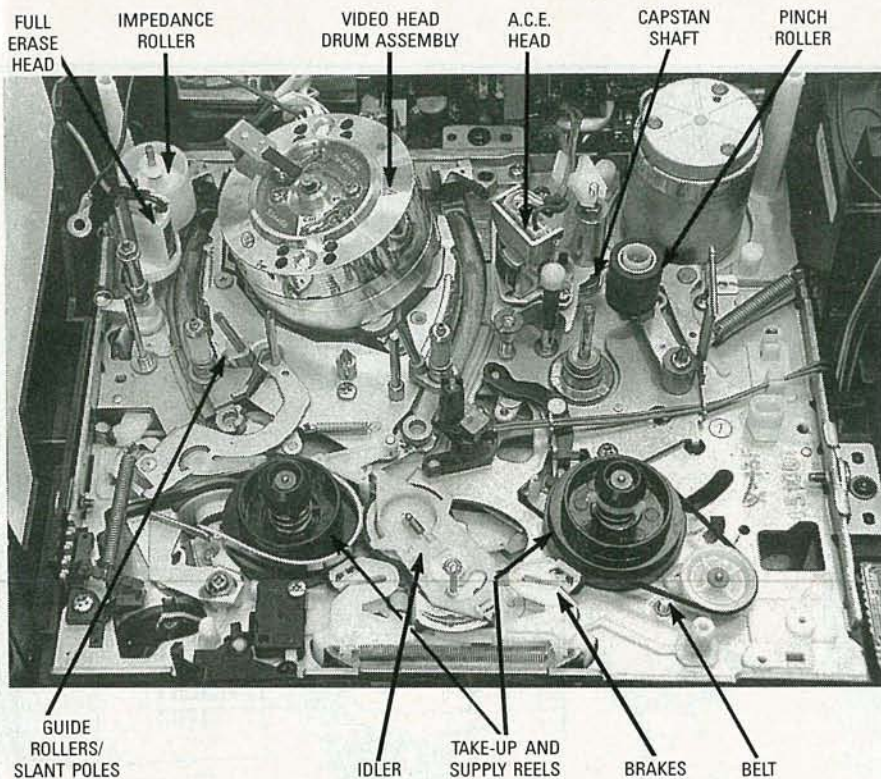


FIG. 1—MAJOR VCR COMPONENTS. You should be able to identify these basic mechanisms found in all VCR's.



FIG. 2—THE CASSETTE CARRIAGE assembly is usually secured to the VCR chassis by four Phillips-head screws.

motor located on the bottom of the VCR's chassis; in this case, the unit is a later model Fisher VCR. In Fig. 5 we see a load motor that is located on the top of the mechanism, with the video drum behind it.

Tape-loading components

The load gear train is located (almost always) on the VCR's bottom side chassis. The load gear train is connected to the load motor via the load belt (or worm gear) and associated linkage rods and connectors. The load-gear assemblies are made out of hard plastic, and have one and sometimes two cam gears with grooves that contain a lubricant. Figure 6 shows a typical loading-gear train on the bot-

tom side of the chassis.

To get at components on the underside of the chassis, first make sure that power is off and the unit is unplugged, and then remove the VCR's bottom plate. There are usually several Phillips screws securing the bottom plate to the chassis. Next, you have to identify the screws that secure the PC

board to the chassis. Many times there will be identifying arrows printed on the PC board indicating which screws must be removed. If you remove the wrong ones, you may be dismantling the wrong thing.

In some VCR's, you must remove the front panel in order to release the PC board. Many times the front-panel assembly (which contains the switches, display, etc.) is secured to the chassis by small (fragile) plastic retaining tabs—give the unit a close visual inspection *before* attempting to remove it so that you don't crack anything! Remember that any mistake can cause you much grief—not to mention the added expense.

With the VCR placed in its service position (see Fig. 7), you can closely observe the loading components during a tape load. To do that, plug in the unit, insert an inexpensive test tape, and hit the play button. As soon as you hit play, you should see movement of the loading gear train as well as the the guide posts. On many units, you'll also see the cam gear as it shifts position from "stop" to "fully loaded." Sometimes a mirror placed on your workbench surface can help you see both sides of the VCR's loading mechanism simultaneously.

Diagnosing malfunctions

A very common malfunction in VCR's is cracked, dirty, or worn (slippery) load belts. The major symptom of that is that when the operator se-

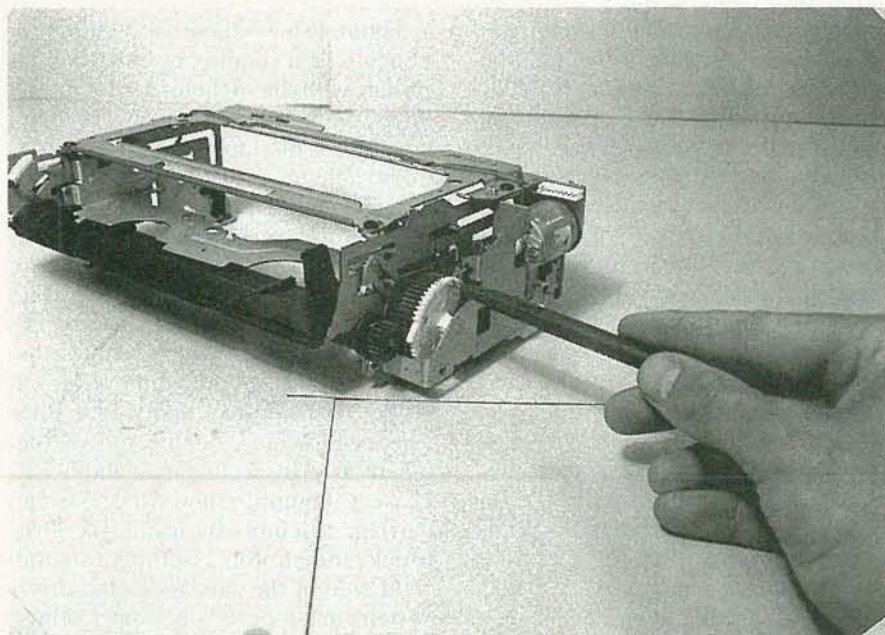


FIG. 3—THE GEAR BLOCK AND MOTOR ASSEMBLY on the right side of the carriage is the drive system that accepts the cassette into a front-loading VCR.

lects play or record, the guide posts will start their path toward the "V" stoppers (the metal brackets situated at the end of the loading grooves), but they will not reach the end of their path. Many times they will appear to have completed the load process, but closer inspection reveals that they only completed about 90% or 95% of the load process. The loading posts will then start retracting back toward the stop position and the video drum will stop spinning. Most of the time, that type of failure is due to a bad load belt.

Because the slipping load belt prevented the load posts from traveling their full distance, the microprocessor did not receive what's called the "load complete," the "after load," or, more simply, the "AL" signal. Some of the older units have a small microswitch embedded in the load gear train that is activated when the load posts are fully extended. However, most newer VCR's have infrared sensors built into the cam-gear assembly that transmit the various mechanical load stages during the tape-load mode to the microprocessor.

In an aborted tape-load attempt, you will also be able to see that the pinch roller does not come in contact with the capstan shaft. The pinch roller will come in contact with the capstan shaft only when the system microprocessor receives a load-complete signal.

A simple test for a malfunctioning load belt is to "assist" the load pro-

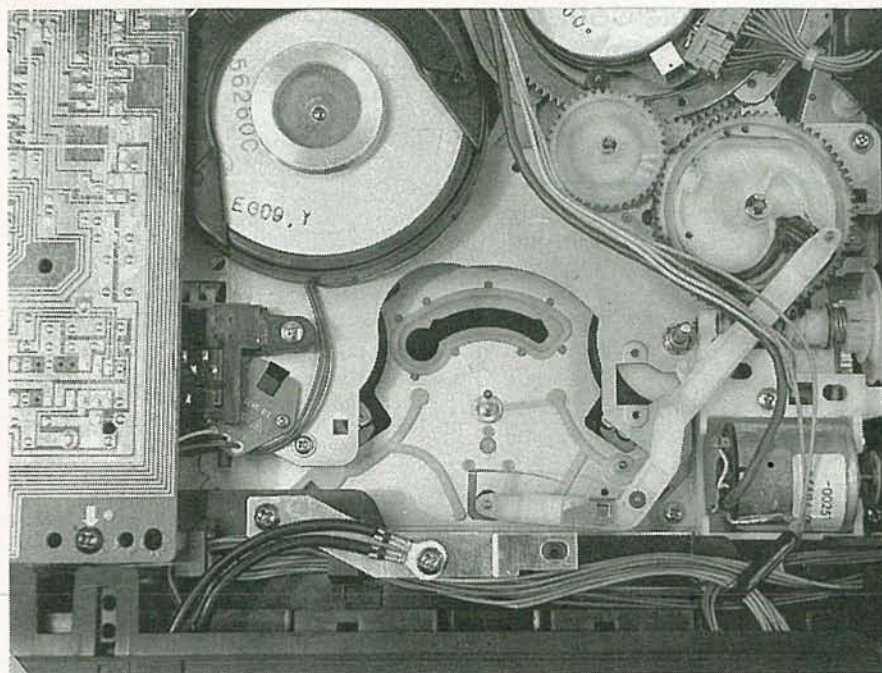


FIG. 4—A TYPICAL LOAD MOTOR is located on the bottom side of the VCR's chassis.

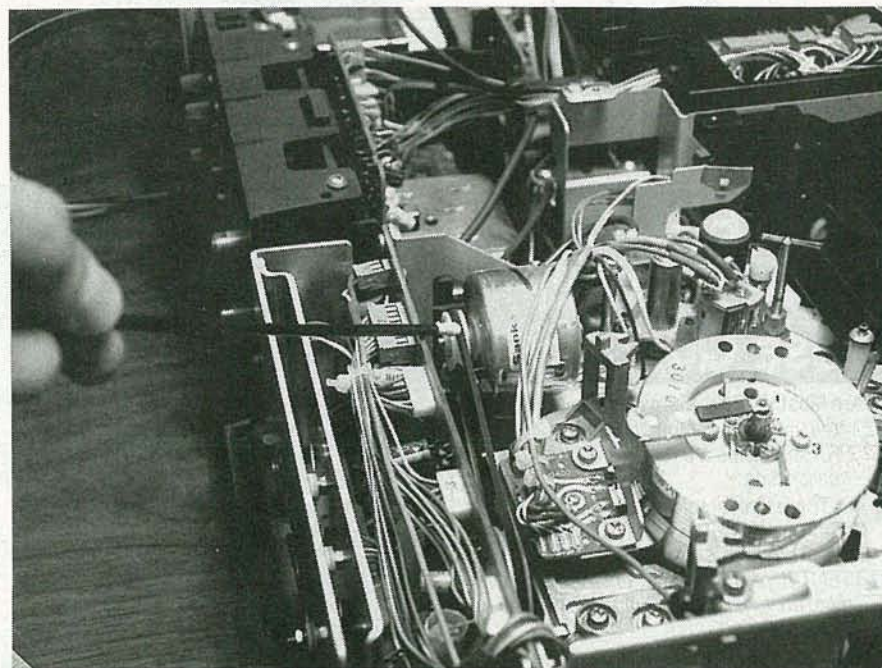


FIG. 5—THIS LOAD MOTOR is located on top of the mechanism, with the video drum directly behind it.

cess with your finger (see Fig. 8). With the VCR in its service position, and a tape inside the machine, select the play mode; you should have your index finger or thumb placed gently on the load-motor shaft. You will feel the rotation of the load motor shaft against your finger. Wait for the load process to be completed (when the load posts appear to have reached the end of their travel), and then "assist" the load process by manually turning

the load motor shaft in the same direction as it was turning by itself. If the belt is bad, the action of your finger will most likely complete the load. The load-complete signal will now be received by the microprocessor, which will issue the signal to activate the pinch roller. A bad belt should be replaced, but sometimes you can extend its life a bit by cleaning the belt and applying some rubber revitalizer.

Sometimes the lubricant that is ap-



Peter M. Hansen is the author of the *Viejo Method of VCR Maintenance and Repair* and president of Viejo Publications. The manual is available with or without the VCR-maintenance kit and training video. The kit contains VCR cleaning materials and an assortment of replacement belts, tires, idlers, etc. Contact Viejo Publications, 3540 Wilshire Blvd., Suite 310, Los Angeles, CA 90010. 1-800-537-0589.



FIG. 6—A TYPICAL LOADING GEAR train is usually covered by a protective plastic guard that must be removed for servicing. This gear train is on the bottom of the chassis.

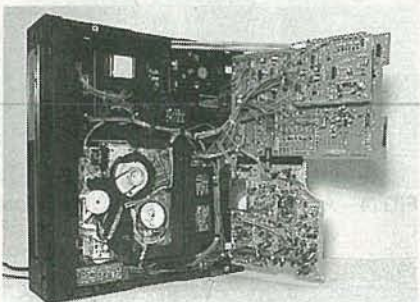


FIG. 7—A VCR IN ITS SERVICE POSITION. A mirror on your workbench surface will allow you to see both sides of the VCR simultaneously.

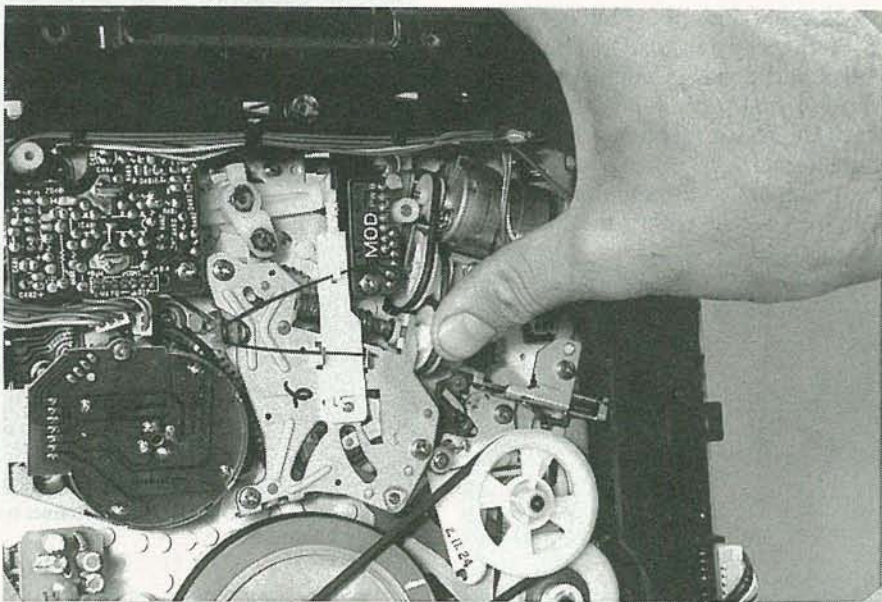


FIG. 8—A MALFUNCTIONING LOAD BELT is can be tested by "assisting" the load process with your finger.

moving the old lubricant. It is also a good idea to first take a photo or make a quick sketch of an assembly before dismantling it for cleaning, so that everything goes back correctly. Many times there will be small alignment arrows imprinted on the gears themselves—pay careful attention to any arrows, as they must be exactly aligned during reassembly.

If the load belt appears to be good, and there is no dried-up lubricant, then you have to inspect the load gears for any signs of cracking—especially hairline cracks. Any gears that show signs of cracking must be replaced. Note that load motors do not usually go bad, but if there is excess freedom of shaft movement, or any signs of excessive friction in the motor, it may have to be replaced.

Another quick test of the load system is to perform a tape "load" by hand, with the unit unplugged and no tape inserted. That will provide an unobstructed view of the loading mechanisms as they operate. Also, the loading process will be greatly slowed down, so you'll be able to see—and perhaps even feel—exactly when a problem occurs. Then you can

plied in sliding tracks and to various components dries up and hardens. That can cause much added friction for the load components, and may cause the load to be aborted. If that's the case, you have to dismantle the assembly, clean off the dried-up lubricant, and apply a fresh coat. It is best to use a cleaner like acetone for re-

determine which part might be causing it to happen. To perform the test, turn the load-motor shaft by hand and observe the unit's operation. Watch for freedom of movement of all of the mechanical components involved in the load process, and check for any obstructions that may impede proper loading.