Technical Update

Removing IBM Ultrium tape drives and tape media

This document describes the procedures for removing IBM® Ultrium tape drives and tape media from IBM TotalStorage® Ultrium Tape Autoloader 3581 Models L28/L38/L3H and F28/F38/F3H

Overview

Use the procedures in the following sections to remove a tape cartridge from an Ultrium 1, 2, or 3 tape drive.

To remove a cartridge manually, complete the following procedures:

For an Ultrium 1 or 2 drive, note the list of required tools and complete the following procedures:

For an Ultrium 3 drive, complete the following procedures:

Removing a Cartridge Manually

Note: IBM Service Personnel should charge their time to perform this procedure against ECA 013.

Removing a cartridge manually becomes necessary when the Autoloader power supply fails or some other problem occurs that requires the unit to be returned to IBM for replacement. Before shipping the unit back to IBM, you will want to remove all cartridges from the unit, if possible. Should it be impossible for a cartridge to be removed, ship the unit back with the cartridge inside and IBM will replace your cartridge with a new cartridge. The information on the cartridge you send back to IBM will not be returned; therefore, the information will be lost.

Attention

(For Ultrium 3 drives only) Before attempting to remove a tape from the Autoloader or drive, it is *very important* to preserve the active dump information in non-volatile storage in case the Autoloader has to be replaced. This dump information will be used by the Repair Center when they perform failure analysis on the returned drive. Perform the "Preserve Dump" procedure from the *IBM TotalStorage 3581 Tape Autoloader Setup, Operator, and Service Guide* ***before*** powering OFF the drive.

The sections that follow give instructions on removing a cartridge slot and cartridge and replacing the cartridge slot.

Removing a Cartridge Slot and Cartridge

In order to be successful in this procedure, you must have an understanding of the cartridge slot. The cartridge slot pin **1** inserts into a loop on the carousel belt. The left **2** and right **3** track pins are seated in the carousel tracks.

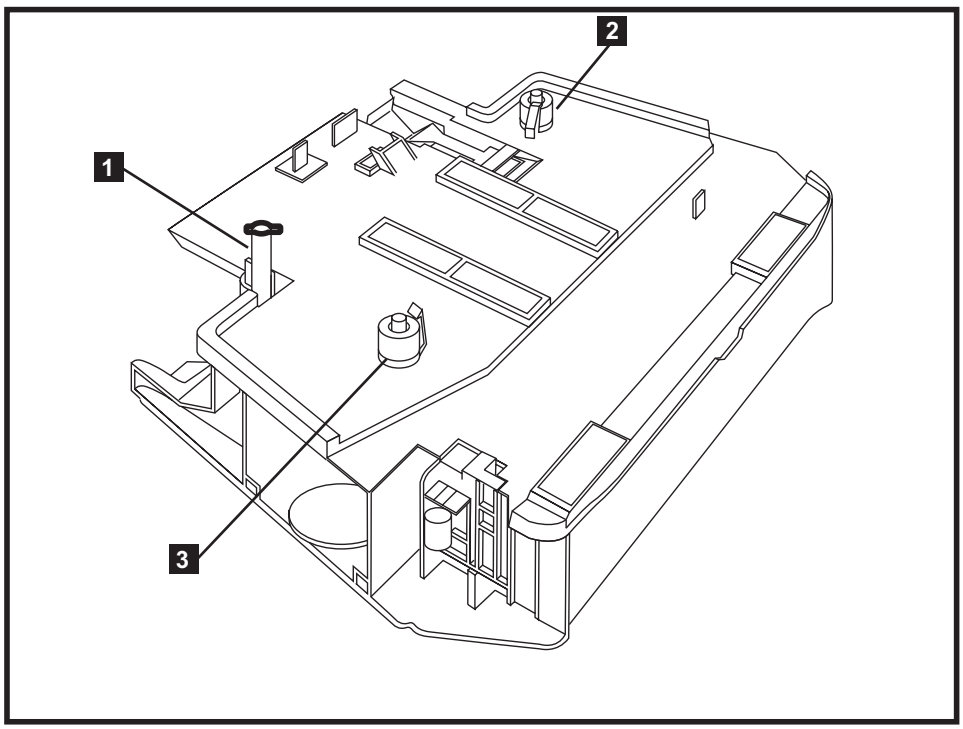

Figure 1. Bottom view of cartridge slot

__ Step 1. Power off the Autoloader.

__ Step 2. Unplug the power cord from the electrical outlet and from the rear panel of the Autoloader.

__ Step 3. Remove all cables and the external fan from the Autoloader rear panel.

__ Step 4. Using a T10 Torx wrench, remove screws from the sides and rear of the Autoloader and remove the top cover.

__ Step 5. To make slot removal easier, rotate the slot to be removed to the nearest corner position in the Autoloader.

a. Facing the front of the Autoloader, place your left hand on the left middle slot in the Autoloader.

b. Place your right hand on the right middle slot.

c. Gently rotate the carousel counterclockwise until the desired slot is in a corner position.

Attention

Do not rotate the carousel clockwise as this will damage the Autoloader.

__ Step 6. Grasp the sides of a cartridge slot.

__ Step 7. Gently lift the left side of the cartridge slot until the right track pin is removed from the track nearest the belt.

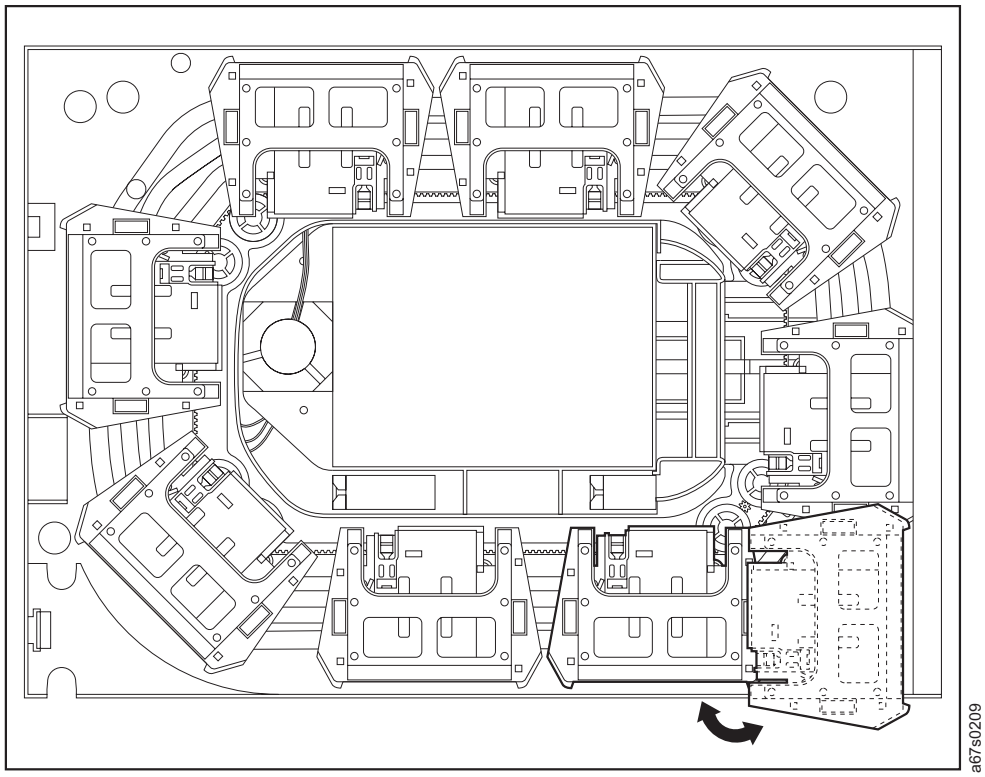

Figure 2. Top view of Autoloader with top cover removed showing cartridge slot being removed

__ Step 8. With the left side of the slot higher than the right side, turn the cartridge slot to the left while gently pulling up until the belt pin is free of the belt loop.

__ Step 9. If necessary, push down on the belt near the belt pin with your free hand.

__ Step 10. When the cartridge slot is removed from the Autoloader, lift the cartridge release lever on the right side of the cartridge slot and remove the cartridge.

__ Step 11. Repeat Steps 5 through 10 for all remaining cartridge slots containing cartridges.

Replacing a Cartridge Slot

__ Step 1. Insert the cartridge's belt pin into the proper belt loop.

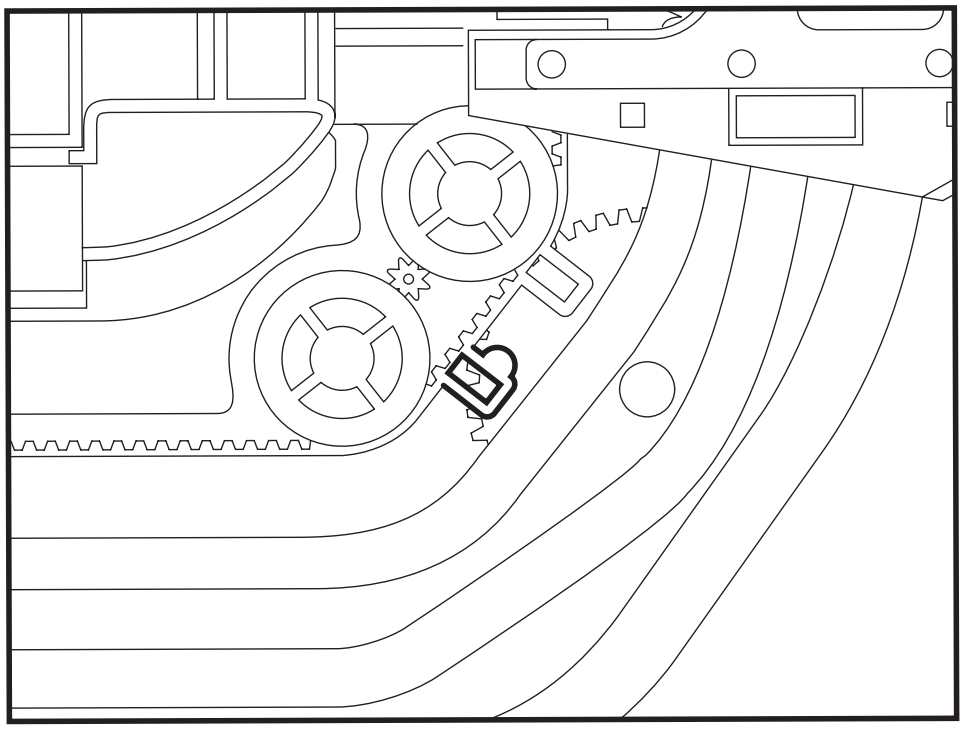

Figure 3. Belt loop for cartridge slot pin

__ Step 2. Rotate the cartridge slot right until the left track pin is seated in the track nearest the belt.

__ Step 3. Replace the top cover and secure with screws.

__ Step 4. Replace the external fan.

Manually removing a tape cartridge from an Ultrium 1 or 2 drive

Note: IBM Service Personnel should charge their time to perform this procedure against ECA 013.

Attention
(For Ultrium 3 drives only) Before attempting to remove a tape from the Autoloader or drive, it is *very important* to preserve the active dump information in non-volatile storage in case the Autoloader has to be replaced. This dump information will be used by the Repair Center when they perform failure analysis on the returned drive. Perform the "Preserve Dump" procedure from the *IBM TotalStorage 3581 Tape Autoloader Setup, Operator, and Service Guide* ***before*** powering OFF the drive.

Attention
Perform this procedure only after you have attempted to remove the tape cartridge by power cycling the Autoloader. Note that (depending on its location on the reel) the tape may take as much as 20 minutes to completely rewind and eject.

If a tape cartridge fails to eject from the Autoloader, you can manually remove the cartridge. The procedure to do so, however, requires care. Success depends on your ability to maintain constant and appropriate tension on the tape while rewinding it into the cartridge and disengaging it from the drive's leader block. Apply too much tension and the tape may break; apply too little tension and the leader pin may fall from the leader block. IBM recommends that you read the complete instructions before starting the task, then perform the steps slowly and carefully to avoid complications.

Required tools

The following tools are required to manually remove a tape cartridge:

- T10 Torx or small, flat-blade screwdriver
- #1 Phillips screwdriver
- 2.5-mm allen wrench
- Small-blade screwdriver or potentiometer screwdriver
- Needle-nose pliers
- Flashlight (optional)

Removing a SCSI drive from the Autoloader

Attention
(LTO-3 only) Before removing the drive from the Autoloader, perform the "Preserve Dump" procedure (see *IBM TotalStorage 3581 Tape Autoloader Setup, Operator, and Service Guide*). To aid in failure analysis for LTO-3 tape drives, prior to ***removing*** the failing drive and while the power is still enabled to the drive, it is very important to preserve any available drive dump that may be in the active dump area in the drive memory.

1. Power off the Autoloader.
2. Remove cables from the rear panel of the Autoloader.
   a. Unplug the Autoloader's power cord from the electrical outlet and from the rear of the Autoloader.
   b. Remove any SCSI cable or SCSI terminator from the LVD SCSI connectors (connections on the SCSI connectors will interfere with the fan housing as it swings out to remove the captured tabs).

c. Remove the RMU cable, if installed.

3. Remove the fan from the rear panel of the Autoloader.
   a. Loosen the two captured thumbscrews that fasten the fan housing to the Autoloader chassis.
   b. Pull gently on the right side (side containing the thumbscrews) of the fan housing until the power connector pulls free of the receptacle and the fan housing is rotated until it is perpendicular with the Autoloader rear panel.
   c. Pull the fan housing straight back, removing the tabs from the openings on the Autoloader's rear panel.
4. Remove the bottom cover of the Autoloader.
   a. Turn the Autoloader over so that the bottom is facing up and the unit is resting on the top cover.
   b. Remove the three screws from the rear panel (**1** in Figure 4).

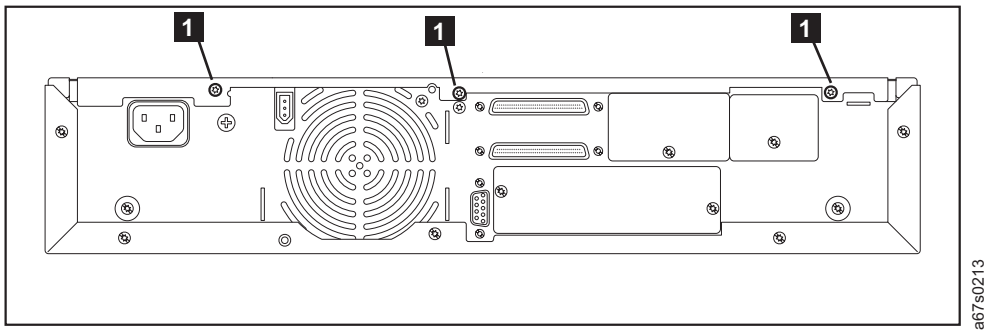

Figure 4. Location of screws on rear panel for drive removal

c. Remove the 12 screws from the bottom cover (1 in Figure 5).
d. Remove the 2 screws attaching the bottom cover to the sides of the Autoloader (2 in Figure 4 on page 6).

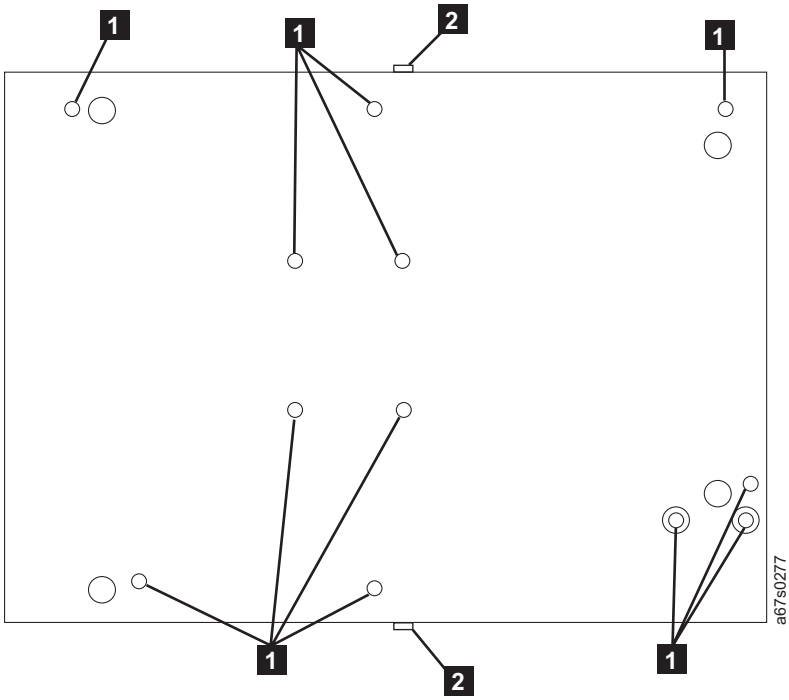

Figure 5. Location of screws on bottom cover for drive removal

e. Lift the bottom cover off of the unit.

5. Remove the drive from the Autoloader.
   a. Remove the four screws securing the drive (4 in Figure 6).

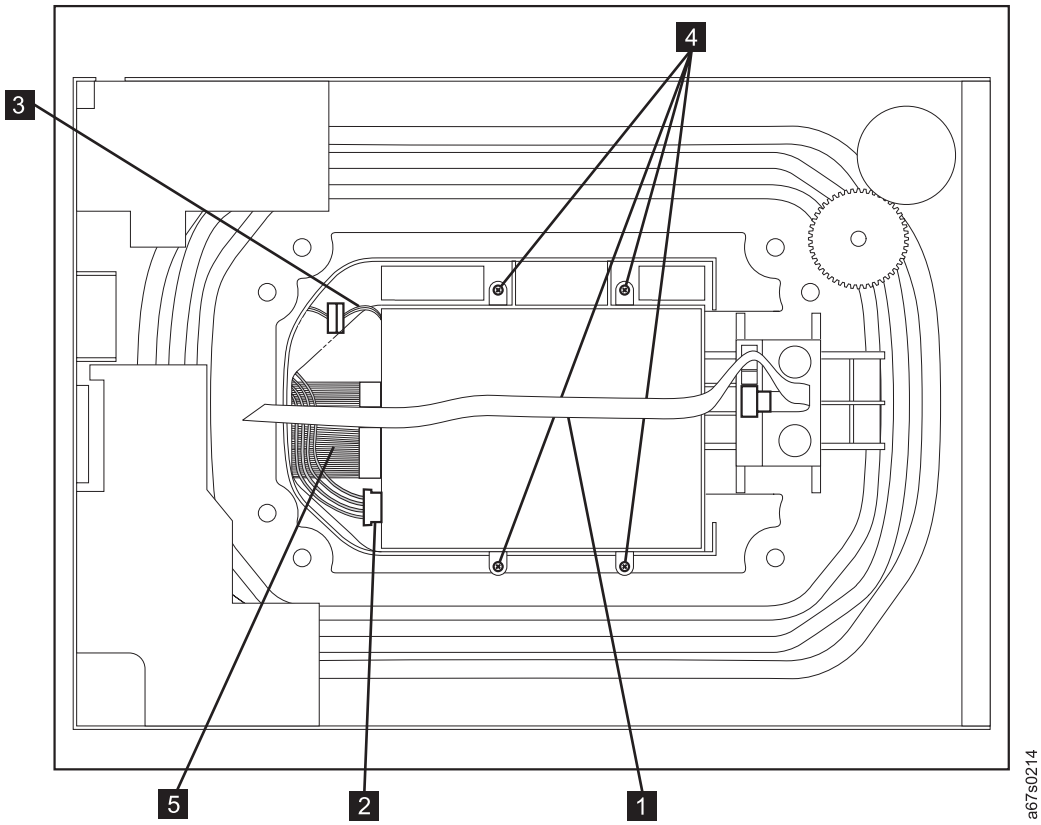

Figure 6. Internal view of drive in the Autoloader

   b. Unplug the SCSI cable (5 in Figure 6).
   c. Unplug the power cable (2 in Figure 6).
   d. Unplug the RS-422 cable (3 in Figure 6). Use a flat blade screw driver to separate the two parts of the connector.
   e. The ribbon cable (1 in Figure 7 on page 10) is secured to the top of the drive by adhesive. Loosen the ribbon cable from the top of the drive, then carefully slide the drive from underneath the ribbon cable and out of the chassis.

Removing a Fibre Channel drive from the Autoloader

Attention

(LTO-3 only) Before removing the drive from the Autoloader, perform the "Preserve Dump" procedure (see *IBM TotalStorage 3581 Tape Autoloader Setup, Operator, and Service Guide*). To aid in failure analysis for LTO-3 tape drives, prior to ***removing*** the failing drive and while the power is still enabled to the drive, it is very important to preserve any available drive dump that may be in the active dump area in the drive memory.

1. Power off the Autoloader.
2. Remove cables from the rear panel of the Autoloader.
   a. Unplug the Autoloader's power cord from the electrical outlet and from the rear of the Autoloader.
   b. Remove the fiber cable from the connectors.

c. Remove the RMU cable, if installed.

3. Remove the fan from the rear panel of the Autoloader.
   a. Loosen the two captured thumbscrews that fasten the fan housing to the Autoloader chassis.
   b. Pull gently on the right side (side containing the thumbscrews) of the fan housing until the power connector pulls free of the receptacle and the fan housing is rotated until it is perpendicular with the Autoloader rear panel.
   c. Pull the fan housing straight back, removing the tabs from the openings on the Autoloader's rear panel.
4. Remove the bottom cover of the Autoloader.
   a. Turn the Autoloader over so that the bottom is facing up and the unit is resting on the top cover.
   b. Remove the three screws from the rear panel (refer to **1** in Figure 7 on page 10).
   c. Remove the 12 screws from the bottom cover (refer to **1** in Figure 5 on page 7).
   d. Remove the 2 screws attaching the bottom cover to the sides of the Autoloader (refer to **2** in Figure 7 on page 10).
   e. Lift the bottom cover off of the unit.

5. Remove the drive from the Autoloader.
   a. Lift the clear tab, squeeze the top and bottom of the cable plug to disengage the plug prongs (located on the underside of the plug) while pulling the fiber cable (**5** in Figure 7) out of the connector on the back of the drive.

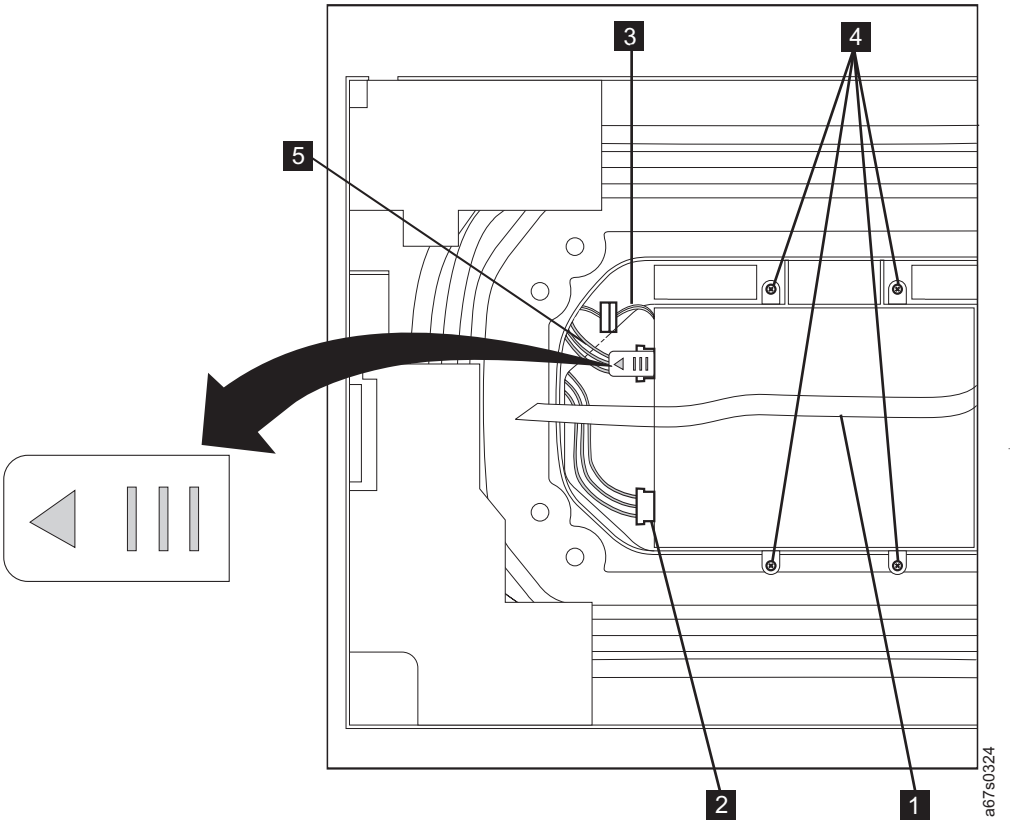

Figure 7. Internal view of drive in the Autoloader

   b. Unplug the power cable (**2** in Figure 7).
   c. Unplug the RS-422 cable (**3** in Figure 7). Use a flat blade screw driver to separate the two parts of the connector.
   d. Remove the four screws securing the drive (**4** in Figure 7).
   e. The ribbon cable (**1** in Figure 7) is secured to the top of the drive by adhesive. Loosen the ribbon cable from the top of the drive, then carefully slide the drive from underneath the ribbon cable and out of the chassis.

Removing the cover of the internal drive

1. Remove the cover of the drive by doing the following:
   a. Remove the four cover-mounting screws and washers (see **1** in Figure 8 on page 11).
   b. Remove the cover **2** by lifting it up. Set the cover aside.

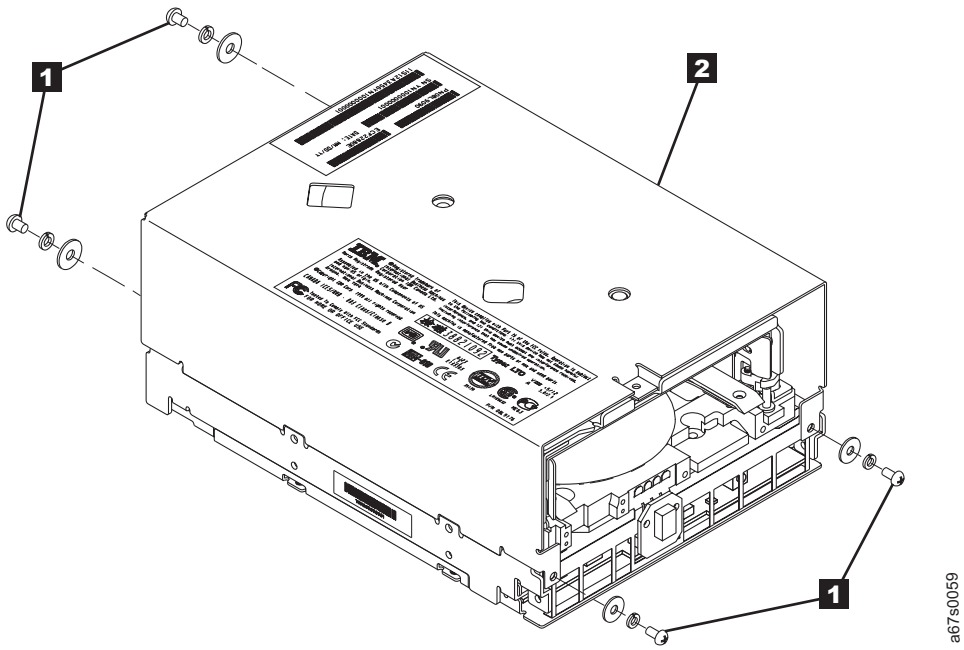

Figure 8. Removing the cover of the tape drive

Fixing the problem

1. Place the tape drive so that the front faces you, then tilt it on its left side (see Figure 9 on page 12).
2. Examine the tape to determine the source of the problem:
   - If the leader pin is jammed in the cartridge, go to the Note contained in step 4.
   - If the leader pin has become detached from the leader block and is lying in the tape path, go to step 3.
   - If the tape has broken between the supply reel and the takeup reel, contact IBM Technical Support.
3. If necessary, use needle-nose pliers to grasp the end of the leader pin and pull it out of the cartridge so that you can grip it with your fingers (see **1** in Figure 9 on page 12).

Reminder: The following step requires care. Success depends on your ability to maintain constant and appropriate tension on the tape while rewinding it into the cartridge. Apply too much tension and the tape may break; apply too little tension and the leader pin may fall from the leader block. Perform the steps slowly and carefully to avoid complications.

4. While keeping the tape taut with your fingers, rotate the allen wrench clockwise **2** to wind the excess tape into the cartridge. Guide the leader pin toward the cartridge and drop it deep inside the cartridge door; do not attempt to seat the leader pin. Remove the allen wrench.

   Note: Ensure that the leader pin drops into the opened cartridge door, falls deeply into the cartridge, and does not jam near the cartridge door. Do not seat the pin into the cartridge's clips; this will interfere with the motion of the leader pin block (you can seat the pin after you have removed the cartridge from the drive). If the tape did not load because the leader pin was wedged in the clip area, grasp the leader pin with needle-nose pliers to free it and drop it into the cartridge.

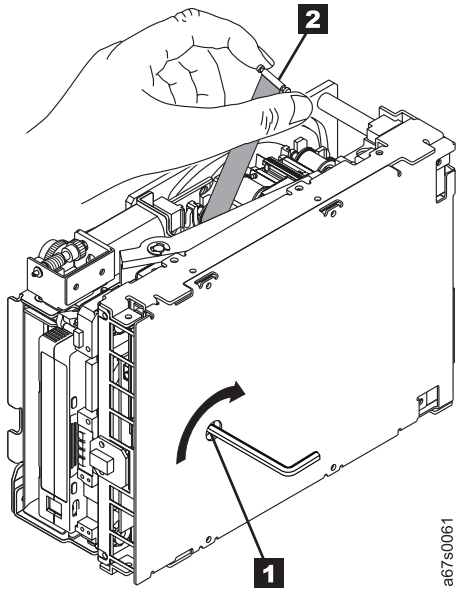

Figure 9. Rewinding the leader pin into the tape cartridge

Removing the cartridge from the drive

1. Manually rotate the loader motor gear (see **1** in Figure 10 on page 13) in the unload direction until the leader pin block **2** reaches the last roller **3**.

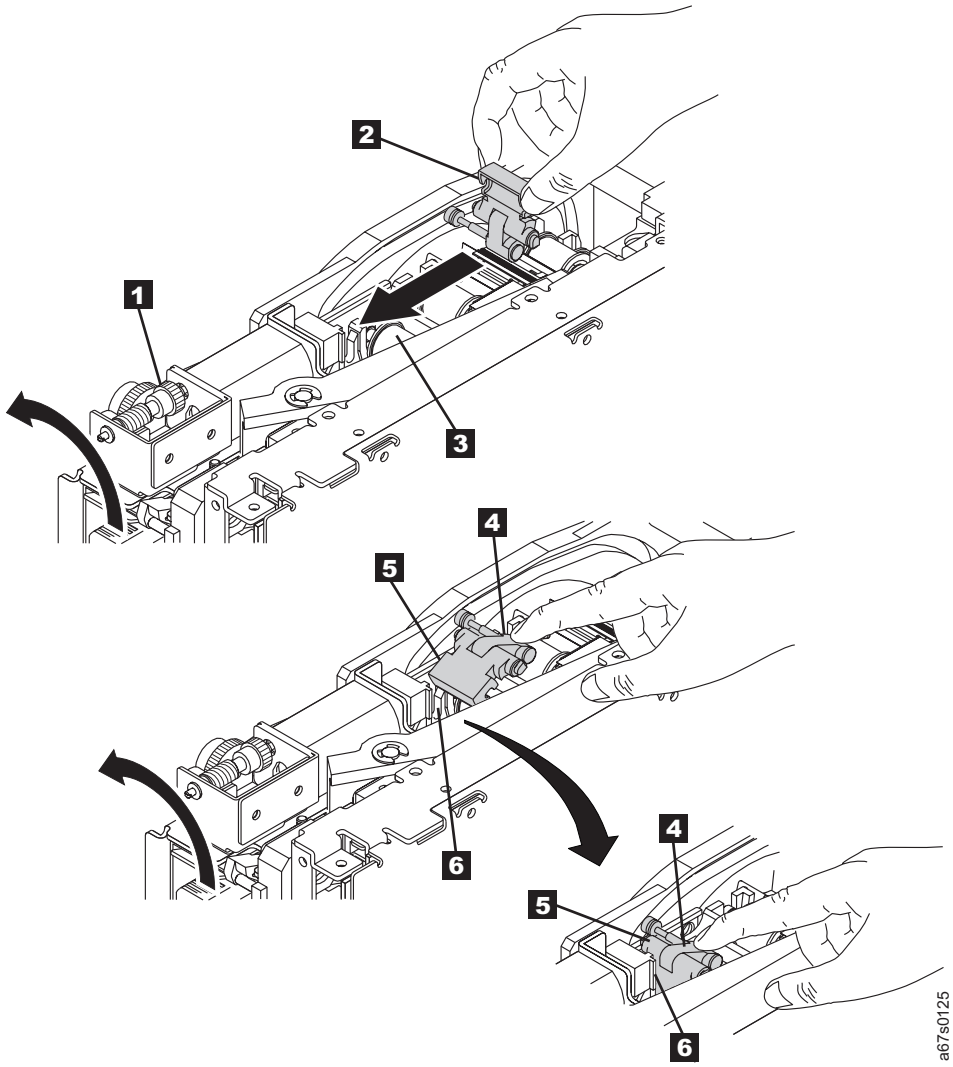

Figure 10. Guiding the leader pin into the tape cartridge

2. To prevent the leader pin block from jamming, press down on the linkage of the leader pin block **4** to force the hinged section of the block upward.
3. While manually rotating the loader motor gear in the unload direction, guide the end of the leader pin block **5** into the white block guide **6**.
4. Continue to rotate the loader motor gear counterclockwise until you feel resistance and the cartridge ejects.
5. Remove the tape cartridge.
6. To reuse the Autoloader, you must raise the drive's loader so that it is able to accept a cartridge. To raise the loader, continue to wind the loader motor gear counterclockwise with the screwdriver until you feel resistance.
7. Remove the small-blade screwdriver.
8. If you choose to replace the Autoloader, return it in its original packaging or in the packaging from its replacement.
9. To reassemble the Autoloader, reverse the preceding steps.

After you remove the stuck tape cartridge, copy the data on the tape to another tape. Then, discard the stuck tape cartridge.

Manually removing a tape cartridge from an Ultrium 3 tape drive

The purpose of this section is to assist you in determining the condition of the cartridge or the magnetic tape and to direct you to the procedure you must follow to remove the cartridge.

Attention

- Before using this procedure, you must have exhausted all other means of removing the tape cartridge from the drive. Use this procedure **only** if you cannot remove the tape cartridge by using any other means.
- Determine from the customer if the cartridge contains **critical customer data**. If the cartridge contains sensitive data that cannot leave the site, inform the customer that certain failure conditions diagnostics will be performed to test the drive for continued use.
- The following removal procedures **can destroy** customer data! Use **extreme care** when handling or removing the customer's tape cartridges to minimize tape damage and lost data.
- **DO NOT TOUCH** the magnetic tape or tape path. Both are extremely sensitive to the oil and salt from your skin. Use clean, lint-free gloves when working around magnetic tape or the tape path components.
- Electrostatic-sensitive components: Consider using an ESD Kit.
- After you remove the tape cartridge, advise the customer to copy the data to another cartridge and to remove this tape cartridge from service.
- Do not use power tools or magnetic tools to perform this procedure.
- To avoid contamination and electrostatic-discharge damage to the drive, never touch the head or electronic components inside the drive.
- If you cannot remove the cartridge from the drive using the following procedures, contact your next level of support.

Before you begin

1. If you have not already done so, attempt to remove the cartridge with the device power ON and using library manager, a host application, or the Unload Button.
2. If you have not already done so, attempt to remove the cartridge by power cycling the drive. Look for the drive to attempt a mid-tape recovery.

   Note: It can take as long as five minutes for the cartridge to rewind and unload.
3. If the cartridge unloads, inform the operator that the cartridge is unloaded. If the cartridge does not unload, continue with this procedure.

Recommended tools

- 2.5 mm offset hex wrench (do not use magnetized wrench)
- #1 Phillips screwdriver
- ESD Kit
- Flashlight (optional)
- #1 Flathead screwdriver (optional)

Beginning procedure

__ 1. Refer to the enclosure documentation for instructions on removing the drive.
__ 2. Place the drive on a non-slip, sturdy work surface.
__ 3. Ground yourself to the drive by using an ESD Kit.
__ 4. Remove the cover of the drive by performing the following steps:

a. Using a Phillips screwdriver, remove the three screws and washers (see 1 in Figure 11) that secure the bezel 2 to the internal drive, then remove the bezel.
b. Remove the cover of the internal drive by performing the following steps:
   1) Remove the four cover-mounting screws and washers 3 .
   2) Remove the cover by lifting it up.

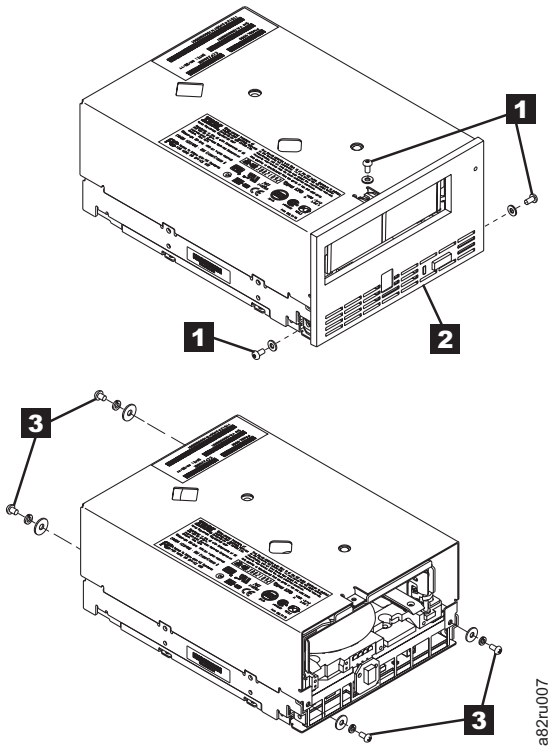

Figure 11. Removing the cover from the internal drive

__ 5. Inspect the drive to decide which of the following conditions most closely matches the symptom on the drive:

- **Tape spooled off the supply reel** - All the tape appears to be on the take up reel and no tape is on the supply reel (inside the cartridge). Test the drive after the procedure is completed.
- **Tape pulled from leader pin (or broken at the front end)** - All the tape appears to be on the supply reel (inside the cartridge) and very little or no tape appears to be on the take up reel. The leader block is positioned in the take up reel. Return the drive after the procedure is completed.
- **Tape broken in mid-tape** - Tape appears to be on both the supply reel (inside the cartridge) and take up reel. Test the drive after the procedure is completed.
- **Tape tangled along tape path** - Tape appears to be tangled and damaged but in tact. Return the drive after the procedure is completed.

  -- OR --

  No damage to tape (or no apparent failure) - There appears to be no damage or slack to the tape. Return the drive after the procedure is completed.

Tape spooled off supply reel

__ 1. With the front of the drive facing you, pull an arm's length of tape out of the take up reel from the left side of the drive.

__ 2. From the take up reel, thread tape around the rear of the tape path and over the head rollers on the left side of the drive.

__ 3. Set the drive on its left side with the head and tape path facing up.

__ 4. Moisten a cotton swab with water and wet approximately 13 mm (0.5 in.) of the tape end and feed it onto the supply reel (inside the cartridge).

__ 5. From the bottom of the drive, insert a 2.5 mm offset hex wrench through the bottom cover access hole and into the reel motor axle.

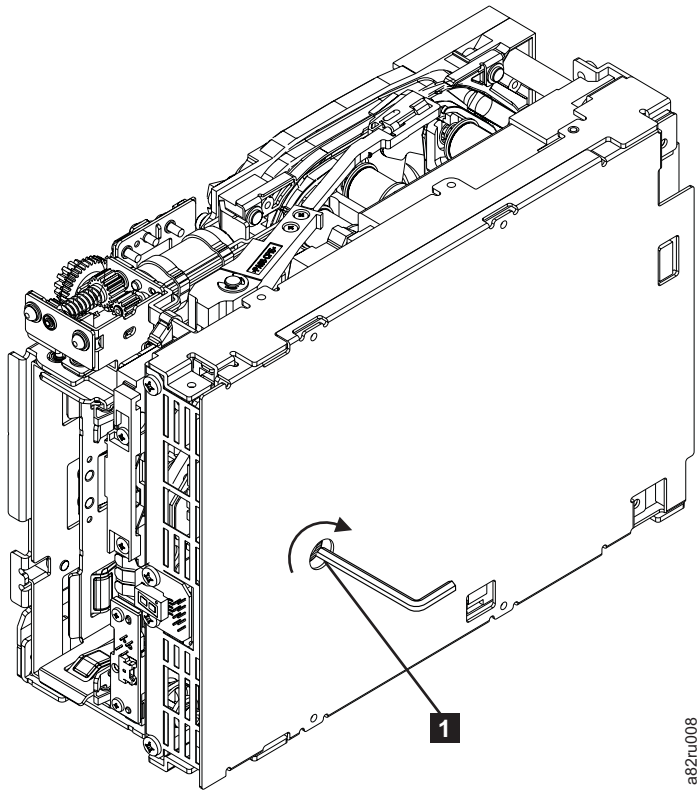

Figure 12. Using hex wrench to rewind tape into cartridge

__ 6. Turn the supply reel clockwise, allowing the moistened tape to adhere to the hub as it winds around the supply reel (inside the cartridge).

__ 7. Continue spooling into the cartridge until the tape is taut and remains within the flanges of the tape guiding rollers. Ensure that you do not stretch the tape.

__ 8. Reassemble the drive, reversing the steps in "Beginning procedure" on page 14.

__ 9. Allow the drive to perform mid-tape recovery. This takes several minutes. When this activity completes, the cartridge ejects automatically.

__ 10. Test the drive to determine if it should be replaced.

Tape pulled from or broken near leader pin

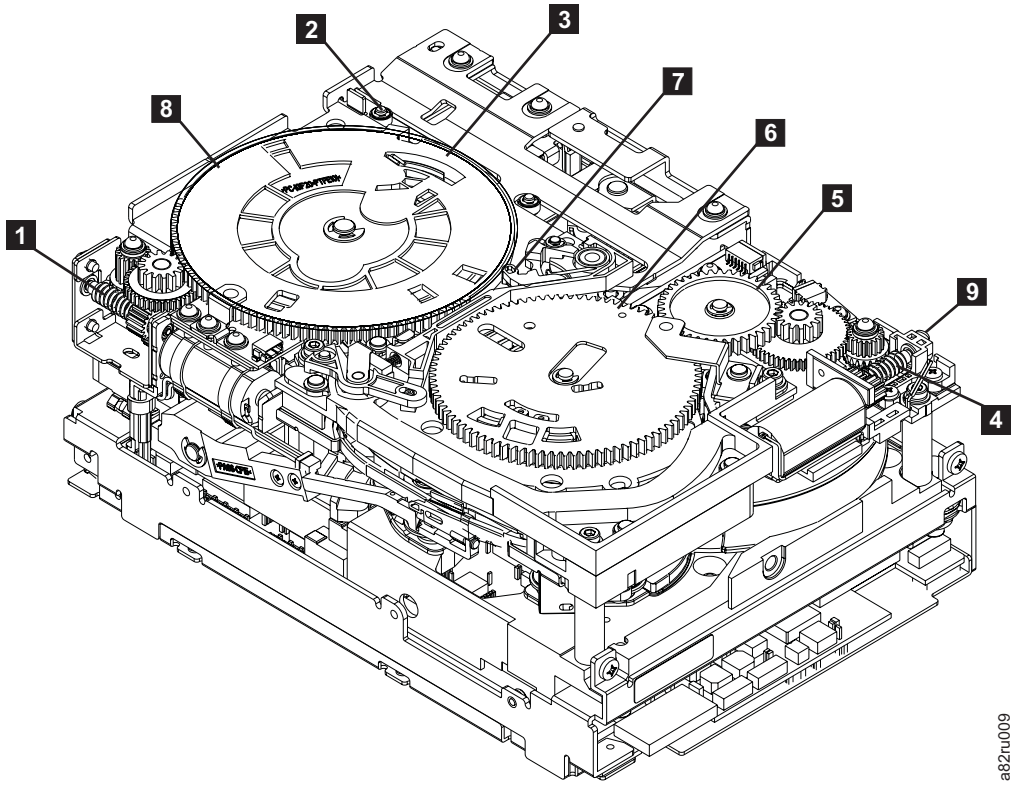

Figure 13. Drive with cover removed to reveal gear train.

1	Loader motor worm gear	6	Threader mechanism gear
2	Cartridge loader tray guide bearing	7	Lever
3	Rotator stub	8	Loader mechanism gear
4	Threader motor worm gear	9	Threader worm gear
5	Threader intermediate gear		

__ 1. From the left side of the drive, pull out tape from the take up reel.

Note: If there is more than approximately 0.6 m (2 ft.) of tape on the take up reel, go to "Tape broken in mid-tape" on page 19.

__ 2. If there is less than approximately 0.6 m (2 ft.) of tape on the take up reel, cut off the excess tape as close to the leader pin, as possible.

__ 3. Locate the threader motor worm gear (4 in Figure 13) the rear of the drive. You can either:

a. Use your finger to rotate the threader motor worm gear and slowly rotate the threader mechanism gear (6 in Figure 13) clockwise; or

b. Use a #1 flathead screwdriver to turn the threader worm gear (9 in Figure 13) clockwise.

This rotates the threader motor worm gear (4 in Figure 13) clockwise, drawing the tape leader block assembly (LBA) into the cartridge.

__ 4. As the LBA is secured in the cartridge, you should hear the LBA retention spring clips click into place. If you do not hear the click, continue rolling until the threader motor worm gear (4 in Figure 13) stops. The LBA is in the correct position.

Note: Be sure to keep tension on the tape as the LBA is drawn into the cartridge by using a hex wrench.

__ 5. Notice the following:

a. Loader mechanism gear (**8** in Figure 13 on page 18) nearest the front of the drive that actuates the cartridge loader mechanism

b. Position of the rotator stub (**3** in Figure 13 on page 18).

c. Front loader motor worm gear (**1** in Figure 13 on page 18). Rotating this gear allows the loader mechanism gear (**8** in Figure 13 on page 18) to turn.

__ 6. Rotate the loader motor worm gear (**1** in Figure 13 on page 18) to turn the loader mechanism gear (**8** in Figure 13 on page 18) counterclockwise. Continue turning until the rotator stub (**3** in Figure 13 on page 18) loses contact with the lever (**7** in Figure 13 on page 18). This releases the LBA leader pin.

__ 7. Rotate the threader motor worm gear (**4** in Figure 13 on page 18) to turn the threader mechanism gear (**6** in Figure 13 on page 18) counterclockwise. This moves the LBA out of the cartridge and past the read/write head. Stop this rotation when the LBA is near the tape guide roller nearest the rear of the drive (**1** in Figure 14).

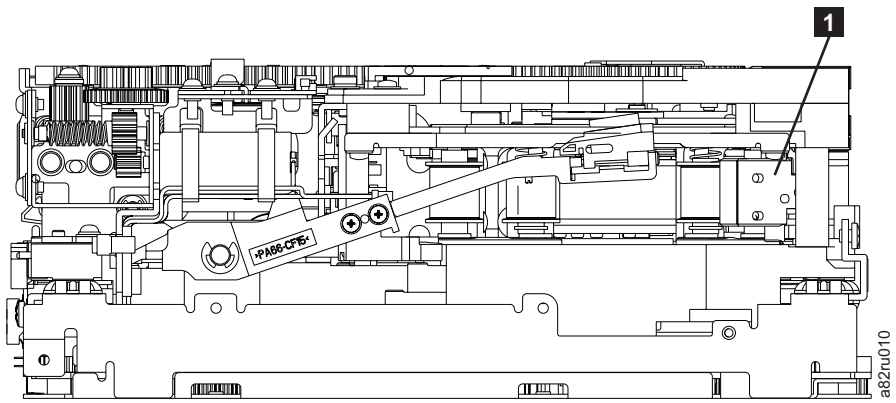

Figure 14. Leader Block Assembly (LBA)

__ 8. Continue rotating the loader motor worm gear (**1** in Figure 13 on page 18) until the rotate stub (**3** in Figure 13 on page 18) is positioned as shown. Notice that the rotator stub (**3** in Figure 13 on page 18) is nearly aligned with the cartridge loader tray guide bearing (**2** in Figure 13 on page 18).

__ 9. Remove the cartridge from the cartridge loader tray.

__ 10. Reassemble the drive by reversing the procedure in Step 4 on page 14 in Beginning procedure.

__ 11. Refer to the appropriate procedure to install the new drive and return the failed drive.

Tape broken in mid-tape

__ 1. With the front of the drive facing you, pull an arm's length of tape out of the take up reel from the left side of the drive.

Note: If there is less than approximately 5 cm (2 in.) of tape on the take up reel, go to "Tape pulled from or broken near leader pin" on page 18.

__ 2. From the supply reel inside the cartridge, pull approximately 0.3 m (1 ft.) of tape.

__ 3. From the take up reel, thread tape around the rear of the tape path and over the head rollers on the left side of the drive.

__ 4. Moisten a cotton swab with water, and wet approximately 13 mm (0.5 in.) of the tape end. Overlap the tape ends, loosely mending them together.

__ 5. Set the drive on its left side with the head and tape path facing up.

__ 6. From the bottom of the drive, locate the access hole (**1** in Figure 15) in the bottom cover. Insert a 2.5 mm offset hex wrench through the bottom cover access hole and into the reel motor axle. begin spooling tape back into the cartridge by turning the hex wrench clockwise.

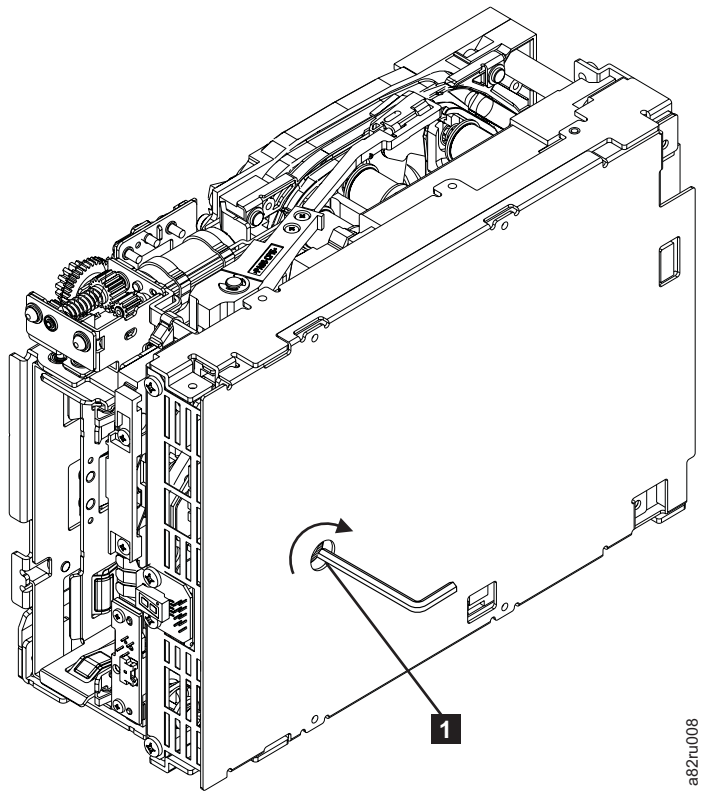

Figure 15. Using hex wrench to rewind tape into cartridge

__ 7. Turn the supply reel clockwise, carefully guiding the mended portion of the tape to wind around the hub of the supply reel located inside the cartridge. Continue spooling into the cartridge until the tape is taut. The tape must remain within the flanges of the tape guiding rollers. Ensure that you do not stretch the tape.

__ 8. Reassemble the drive by reversing the procedure in Step 4 on page 14 in Beginning procedure.

__ 9. Allow the drive to perform mid-tape recovery. This takes several minutes. When this activity completes, the cartridge ejects automatically.

__ 10. Test the drive to determine if it should be replaced.

Tape tangled along tape path

__ 1. Carefully pull out excess tape and untangle.

Note: If you find the tape to be broken, go to one of the following appropriate procedures:

- "Tape spooled off supply reel" on page 16
- "Tape pulled from or broken near leader pin" on page 18

--OR--

"Tape broken in mid-tape" on page 19

__ 2. Set the drive on its left side with the head and tape path facing up.

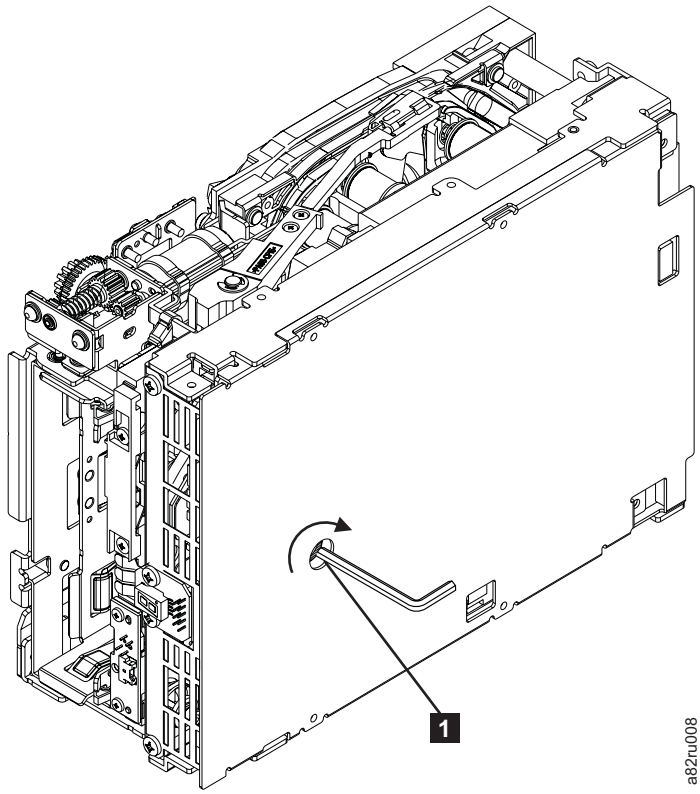

Figure 16. Using hex wrench to rewind tape into cartridge

__ 3. From the bottom of the drive, locate the access hole (**1** in Figure 16).

__ 4. Insert a 2.5 mm offset hex wrench through the bottom cover access hole and into the reel motor axle. Begin spooling the tape back into the cartridge by turning the hex wrench clockwise.

__ 5. Continue spooling into the cartridge until the tape is taut and remains within the flanges of the tape guiding rollers. Ensure that you do not stretch the tape.

__ 6. Locate the threader motor worm gear (**4** in Figure 17 on page 22) on the rear of the drive. You can either:

   a. Use your finger to rotate the treader motor worm gear and slowly rotate the threader mechanism gear (**6** in Figure 17 on page 22) clockwise; OR

   b. Use a #1 flathead screwdriver to turn the worm gear (**9** in Figure 17 on page 22) clockwise.

   This rotates the threader motor worm gear (**4** in Figure 17 on page 22) clockwise, drawing the LBA into the cartridge.

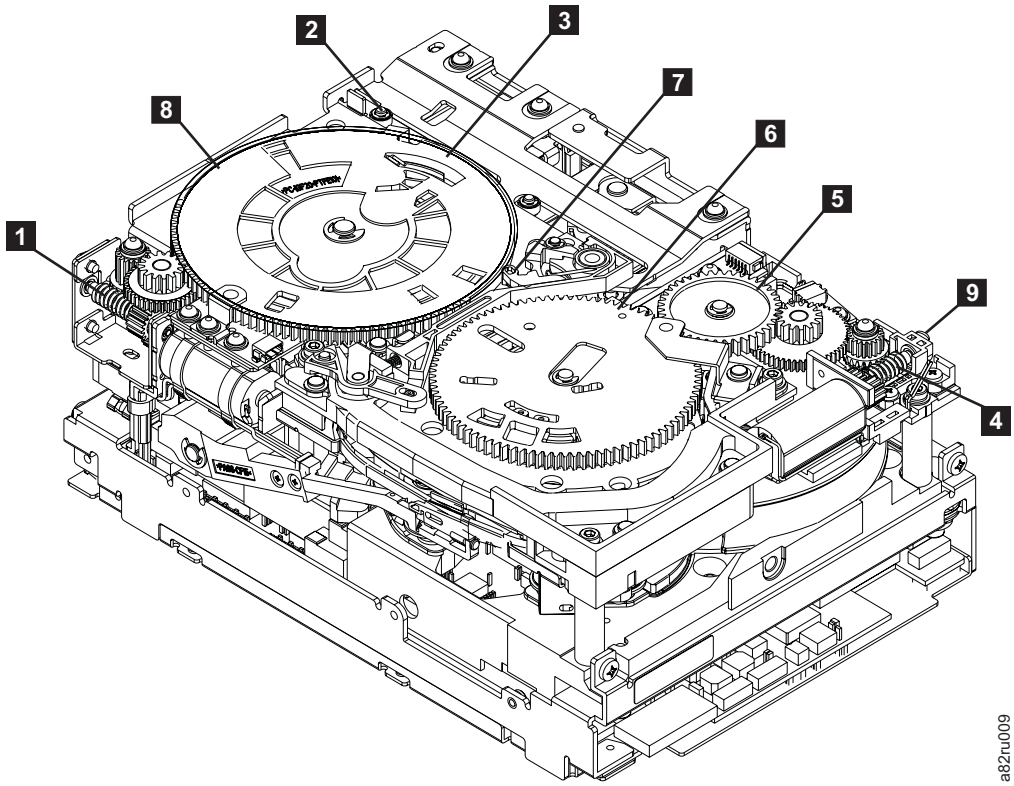

Figure 17. Drive with cover removed to reveal gear train.

1	Loader motor worm gear	6	Threader mechanism gear
2	Cartridge loader tray guide bearing	7	Lever
3	Rotator stub	8	Loader mechanism gear
4	Threader motor worm gear	9	Threader worm gear
5	Threader intermediate gear		

__ 7. As the tape leader block assembly (LBA) is secured in the cartridge, you should hear the LBA retention spring clips click into place. If you do not hear the click, continue rolling until the threader motor worm gear (4 in Figure 17) stops. The LBA is in the correct position.

Note: Be sure to keep tension on the tape as the LBA is drawn into the cartridge by using a hex wrench as shown in Figure 16 on page 21.

__ 8. Notice the:

a. Loader mechanism gear (8 in Figure 17) nearest the front of the drive that actuates the cartridge loader mechanism.

b. Position of the rotate stub (3 in Figure 17).

c. Front loader motor worm gear (1 in Figure 17). Rotating this gear allows the loader mechanism gear (8 in Figure 17) to turn.

__ 9. Rotate the loader motor worm gear (1 in Figure 17) to turn the threader mechanism gear (6 in Figure 17) counterclockwise. Continue turning until the rotator stub (3 in Figure 17) loses contact with the lever (7 in Figure 17). This releases the LBA leader pin.

__ 10. Rotate the threader motor worm gear (4 in Figure 17) to turn the threader mechanism gear (6 in Figure 17) counterclockwise. This moves the LBA out of the cartridge and past the read/write head. Stop this rotation when the LBA is near the tape guide roller nearest the rear of the drive

shown as 1 Figure 18.

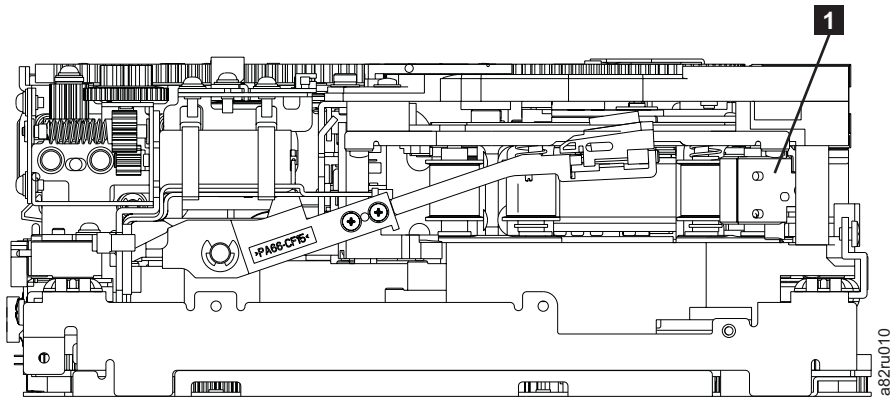

Figure 18. Leader Block Assembly (LBA)

__ 11. Continue rotating the loader motor worm gear (1 in Figure 17 on page 22) until the rotator stub (3 in Figure 17 on page 22) is positioned as shown. Notice that the rotator stub (3 in Figure 17 on page 22) is nearly aligned with the cartridge loader tray guide bearing (2 in Figure 17 on page 22).

__ 12. Remove the cartridge from the cartridge loader tray.

__ 13. Reassemble the drive by reversing the procedure in Step 4 on page 14 in Beginning procedure.

__ 14. Refer to the appropriate procedure to install the new drive and return the failed drive.

No apparent failure or damage to tape

__ 1. Set the drive on its left side with the head and tape path facing up.

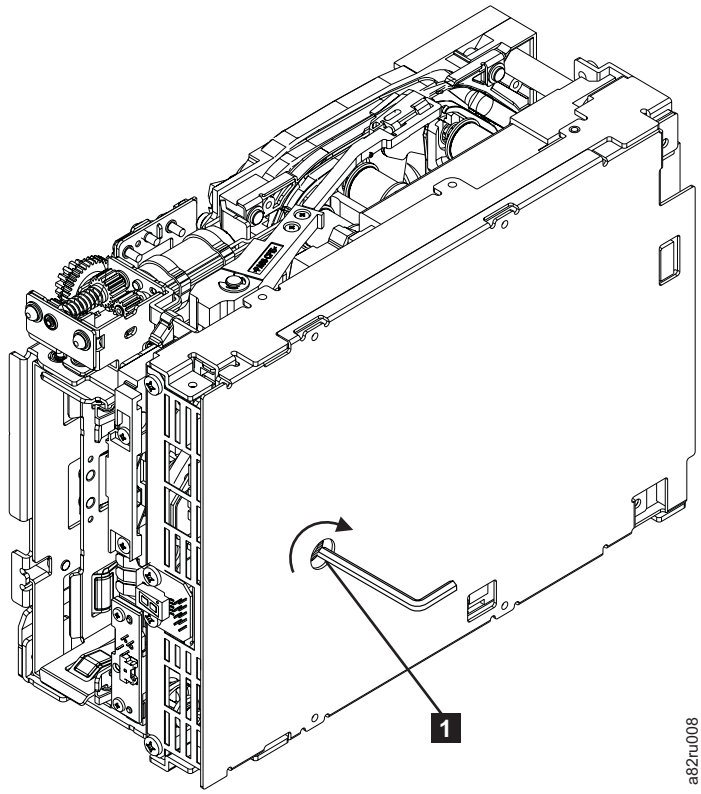

Figure 19. Using hex wrench to rewind tape into cartridge

__ 2. From the bottom of the drive, locate the access hole (**1** in Figure 19).

__ 3. Insert a 2.5 mm offset hex wrench through the bottom cover access hole and into the reel motor axle. Begin spooling the tape back into the cartridge by turning the hex wrench clockwise.

__ 4. Continue spooling into the cartridge until the tape is taut and remains within the flanges of the tape guiding rollers. Ensure that you do not stretch the tape.

__ 5. Locate the threader motor worm gear (**4** in Figure 20 on page 25) on the rear of the drive. You can either:

   a. Use your finger to rotate the threader motor worm gear and slowly rotate the threader mechanism gear (**6** in Figure 20 on page 25) clockwise;

      --OR--

   b. Use a #1 flathead screwdriver to turn the threader worm gear (**9** in Figure 20 on page 25) clockwise.

   This rotates the threader motor worm gear (**4** in Figure 20 on page 25) clockwise, drawing the LBA into the cartridge.

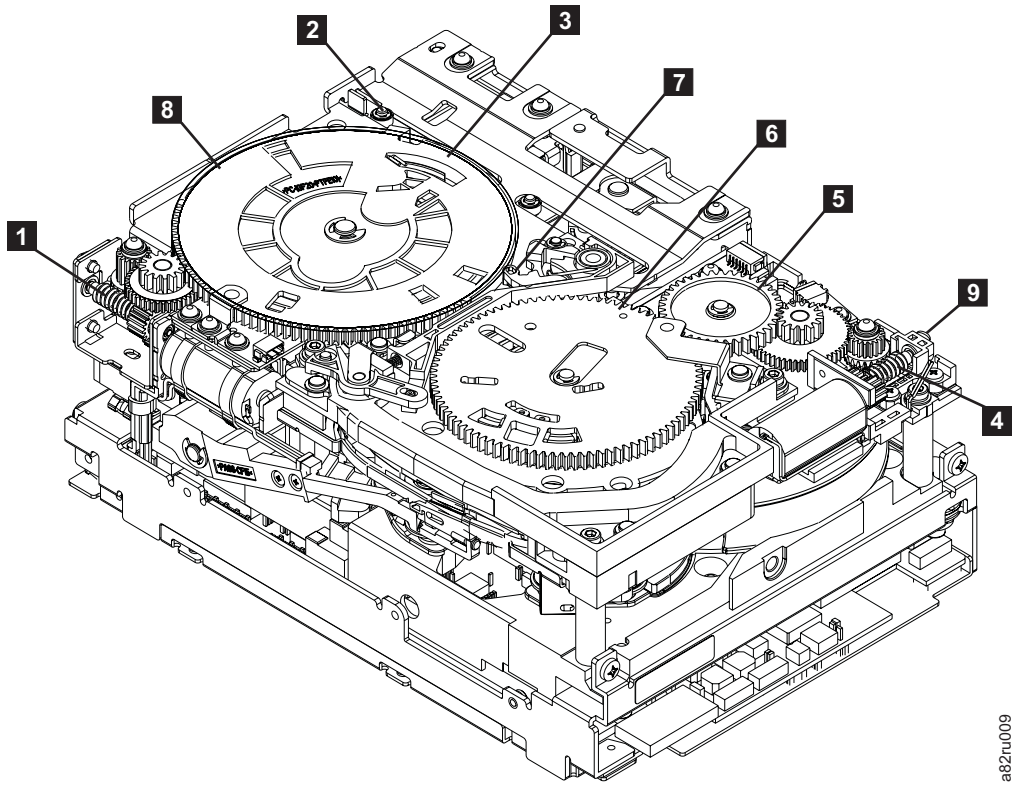

Figure 20. Drive with cover removed to reveal gear train.

1	Loader motor worm gear	6	Threader mechanism gear
2	Cartridge loader tray guide bearing	7	Lever
3	Rotator stub	8	Loader mechanism gear
4	Threader motor worm gear	9	Threader worm gear
5	Threader intermediate gear		

__ 6. As the tape leader block assembly (LBA) is secured in the cartridge, you should hear the LBA retention spring clips click into place. If you do not hear the click, continue rolling until the threader motor worm gear (4 in Figure 17 on page 22) stops. The LBA is in the correct position.

Note: Be sure to keep tension on the tape as the LBA is drawn into the cartridge by using a hex wrench as shown in Figure 16 on page 21.

__ 7. Notice the:

a. Loader mechanism gear (8 in Figure 20) nearest the front of the drive that actuates the cartridge loader mechanism.

b. Position of the rotate stub (3 in Figure 20).

c. Front loader motor worm gear (1 in Figure 20). Rotating this gear allows the loader mechanism gear (8 in Figure 20) to turn.

__ 8. Rotate the loader motor worm gear (1 in Figure 20) to turn the threader mechanism gear (6 in Figure 20) counterclockwise. Continue turning until the rotator stub (3 in Figure 20) loses contact with the lever (7 in Figure 20). This releases the LBA leader pin.

__ 9. Rotate the threader motor worm gear (4 in Figure 20) to turn the threader mechanism gear (6 in Figure 20) counterclockwise. This moves the LBA out of the cartridge and past the read/write head. Stop this rotation when the LBA is near the tape guide roller nearest the rear of the drive

shown as 1 Figure 21.

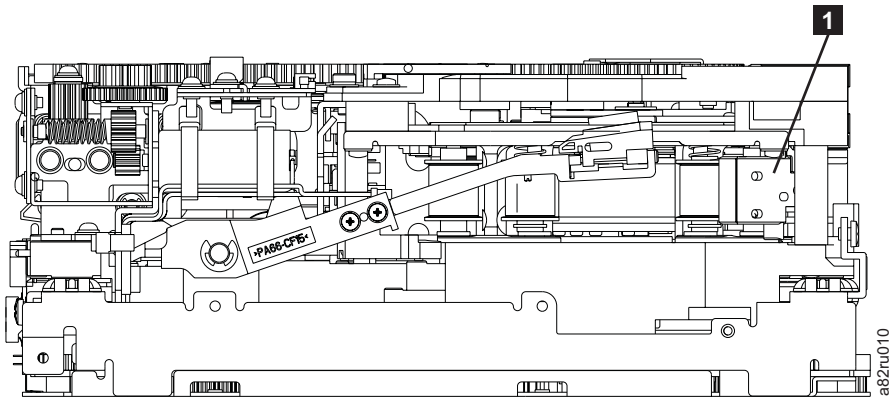

Figure 21. Leader Block Assembly (LBA)

__ 10. Continue rotating the loader motor worm gear (1 in Figure 20 on page 25) until the rotator stub (3 in Figure 20 on page 25) is positioned as shown. Notice that the rotator stub (3 in Figure 20 on page 25) is nearly aligned with the cartridge loader tray guide bearing (2 in Figure 20 on page 25).

__ 11. Remove the cartridge from the cartridge loader tray.

__ 12. Reassemble the drive by reversing the procedure in Step 4 on page 14 in Beginning procedure.

__ 13. Refer to the appropriate procedure to install the new drive and return the failed drive.

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