OPERATOR INSTRUCTIONS

SINGER MODEL 1501
INTELLIGENT TERMINAL

SINGER
BUSINESS MACHINES

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This manual provides the operating instructions for the Model 1501 Intelligent Terminal. It includes the following information:

SECTION 1 GENERAL DESCRIPTION, which provides a brief description of how the equipment functions from the viewpoint of an operator and identifies all major parts of the equipment.

SECTION 2 OPERATOR CONTROL PANELS. This section shows the location and appearance of all operator controls. It also briefly describes what each control does when it is operated.

SECTION 3 OPERATING PROCEDURES. Included in this section are the step-by-step procedures required to operate the machine. This section does not include instructions that are provided with the operating programs. It does, however, include a list of error conditions and the checks to be made to correct them.

SECTION 4 OPERATOR MAINTENANCE. Routine maintenance functions to be performed by the operator and the procedures to perform them are provided in this section.

The Singer Model 1501 Intelligent Terminal shown in figure 1-1 is a compact desk-top unit that provides all the functions of a mini-computer. It houses a keyboard similar to that of a typewriter, a display screen for efficient fill-in-the-blank type of data entry, two tape drives that can serve as either input or output units, and a memory that stores the program that controls operation of the 1501. Various, wide-ranging functions can be obtained by simply loading different pre-recorded program tapes and following the instructions given by the program.

Operator controls other than the keyboard include power-on, system reset, program load, and program interrupt switches. Notification of data entry errors is both visual on the display screen and audible through a speaker in the keyboard section.

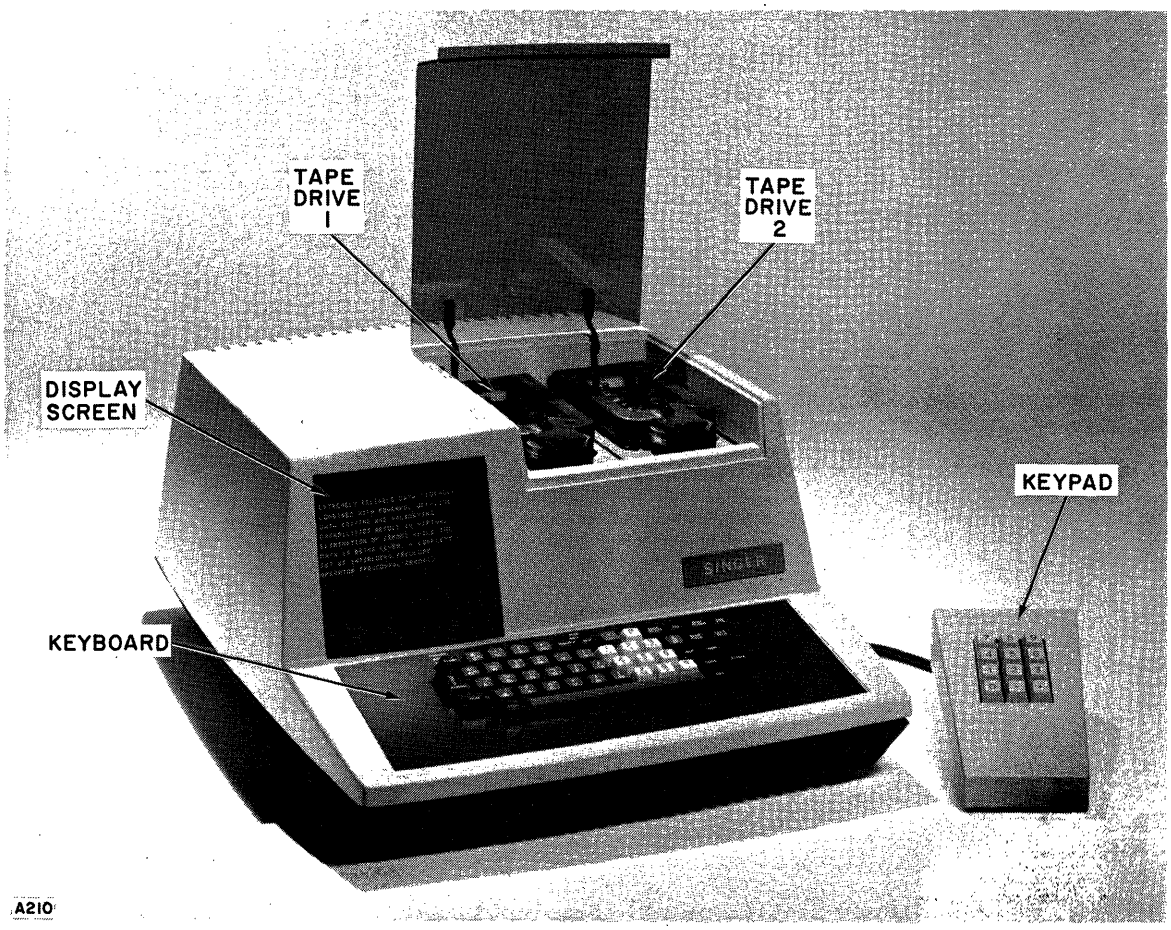


Figure 1-1. Singer Model 1501 Intelligent Terminal

The Model 1501 Intelligent Terminal has relatively few operator controls aside from the keyboard. The function of these controls is described in the table below, and their location is as follows:

a. The power on/off switch is located on the right side panel, as shown in figure 2-1.

b. A well beneath the display screen houses the PROGRAM LOAD/PROGRAM INTERRUPT and the SYSTEM RESET switches, which are shown in figure 2-2.

c. The keyboard, which is similar in layout to that of a typewriter supplemented by the addition of some special purpose keys, is shown in figure 2-3.

d. On each tape drive, there is a manual rewind switch located between the supply and take-up reels. There is also a cartridge lock lever, which is used to lock the tape cartridge in place. The location of these controls is shown in figure 2-4.

Control	Function
Keyboard	Data entry and various functions determined by program
PROGRAM LOAD Switch	Enables operator to load a program from the tape in drive 2 (Switch forward for program load)
PROGRAM INTERRUPT Switch and SYSTEM RESET Switch	Used when called for by specific programs
Rewind Button	Rewinds tape into cartridge
Power on/off	Controls AC power to the 1501 (Switch up for power on)

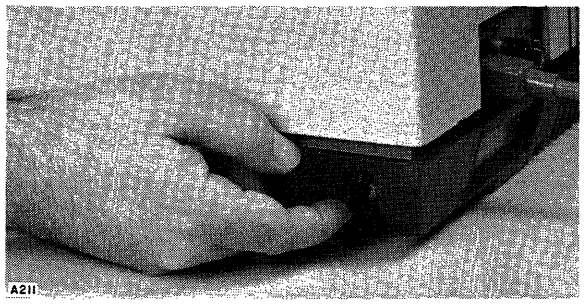


Figure 2-1. Location of the Power On/Off Switch

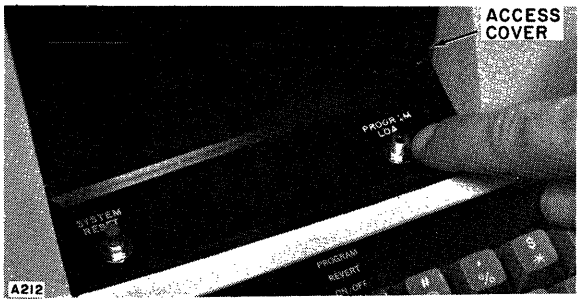


Figure 2-2. Location of the Switch Well

Figure 2-3. Keyboard Layout

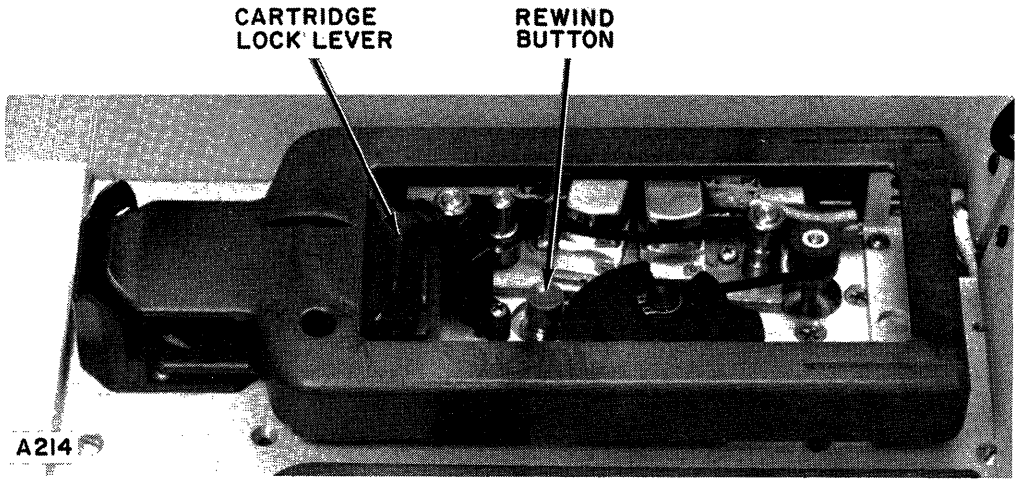


Figure 2-4. Controls on the Tape Drive

Operation of the Model 1501 Intelligent Terminal requires handling of the tape cartridges. This snap-in cartridge, which is shown in figure 2-5, contains 100 feet of computer grade tape on a floating inner reel, and is a storage device used with all Series 1500 Intelligent Terminals. A clear outer case fully encloses the inner tape reel.

Located on the outer case is a two-position hole for the write pin. If the write pin is inserted into the position on top of the cartridge, the tape cannot be written on. If the write pin is inserted into the position on the bottom of the cartridge, the tape may be written on; this is called the "write-enable" position.

It is important that the tape be fully rewound within the cartridge before the tape is loaded or the cartridge removed from the tape drive. The tape leader eyelet must be in the position shown in figure 2-5 before the tape is loaded.

Cartridge caps are supplied with each cartridge to prevent the eyelet from vibrating out of position during shipping. To remove the cap, simply pry it off with fingertips. To install a cap, push cap into place on the bottom side of the tape cartridge. Turn the cap in direction of arrow to rewind loose tapes. (See figure 2-6.)

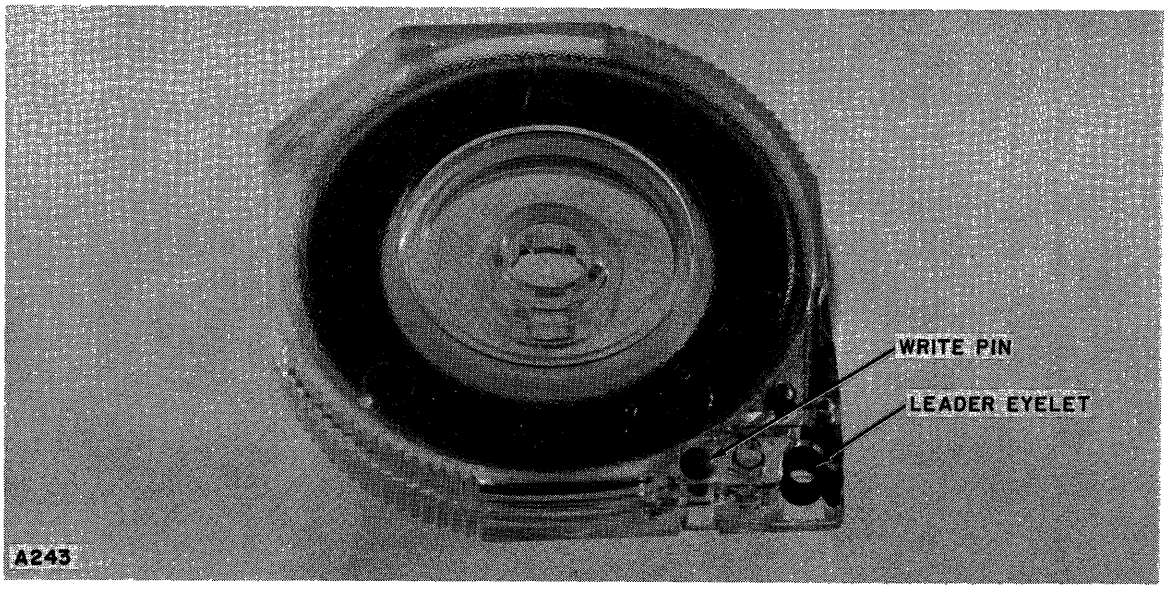


Figure 2-5. Tape Cartridge

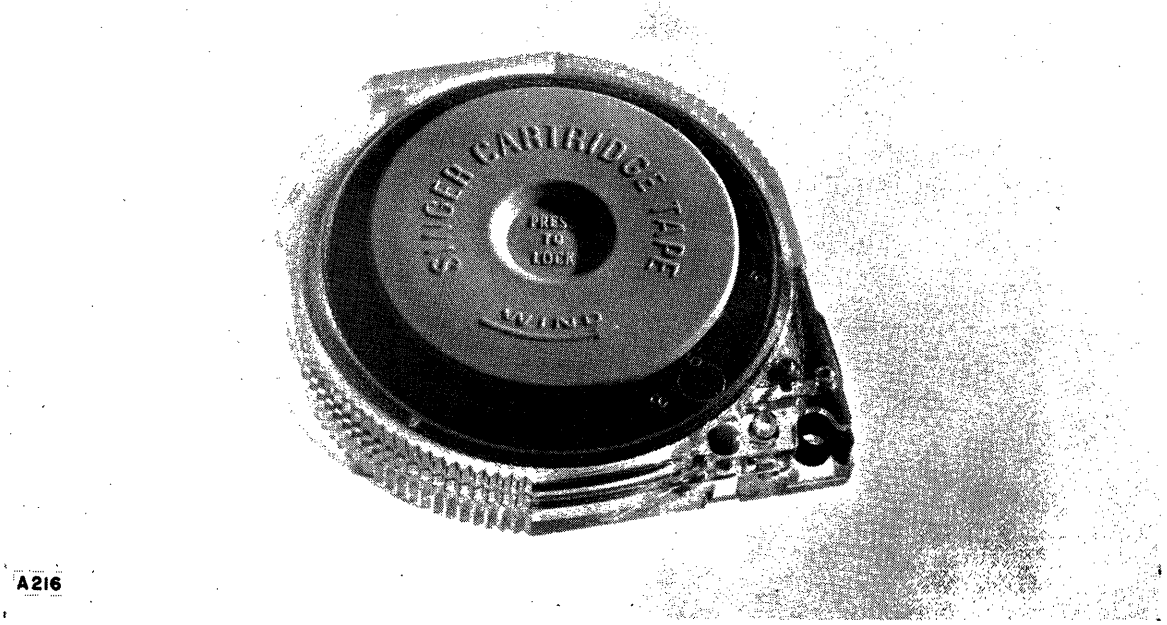


Figure 2-6. Tape Cartridge with Cartridge Cap

3-1. SCOPE OF THIS SECTION.

This section contains the procedures for operating the Model 1501 Intelligent Terminal up to the point at which the program provides further operating instructions. Steps to be taken and checks to be made by an operator when errors or malfunctions occur are also included in this section. Do not attempt to perform any step that is not clear to you; ask your supervisor, sales engineer, or field service representative to explain the procedure to you.

3-2. INSPECTION OF THE TERMINAL.

Inspect the terminal before using, as follows:

a. Make sure that I/O cabling is connected and terminator (if any) is in place correctly.

b. Check to see if the power cord is properly plugged in and any other cables and plugs are properly connected.

c. Make sure that the cooling airways are not blocked.

3-3. APPLICATION OF POWER.

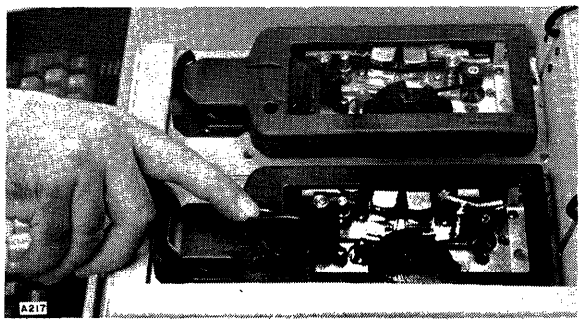
a. Turn the power on/off switch to the on (up) position. The switch is located on the right side of the unit near the back.

b. Listen for indication that the fan is operating properly.

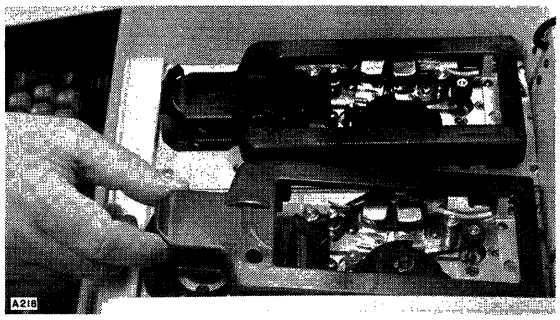
3-4. LOADING A TAPE CARTRIDGE.

Always load the first program tape cartridge on tape drive 2. To load a tape, observe the following instructions and photographs:

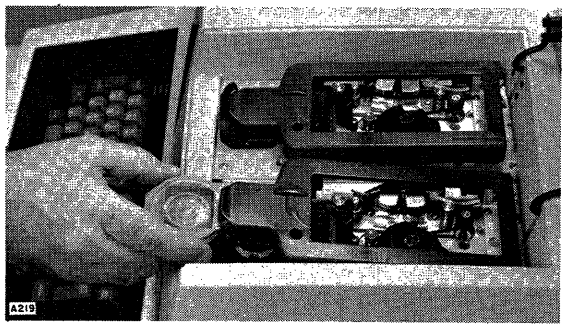
a. After opening the access cover, move the locking lever to the unlock position.



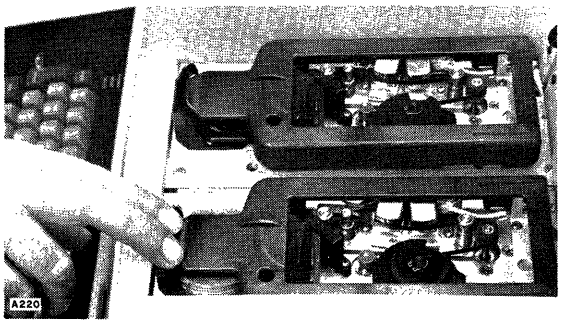
b. Lift the loader. This is called the cartridge insertion position.



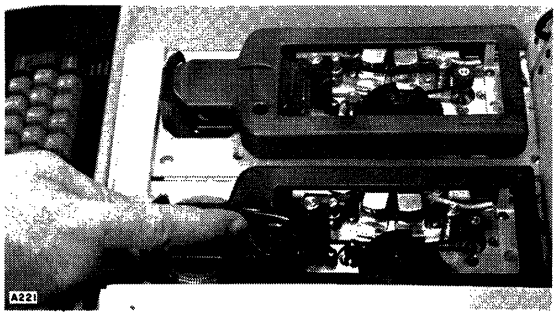
c. Insert the tape cartridge into tape drive 2. Check that the position of write pin is correct.



d. Push down on the loader with the tape cartridge inserted.



e. Move the locking lever to the lock position, and close the access cover.



f. Locate the well beneath the visual display, and lift the well access cover.

g. Move the PROGRAM LOAD switch forward to load the program from the tape, and close the access cover.

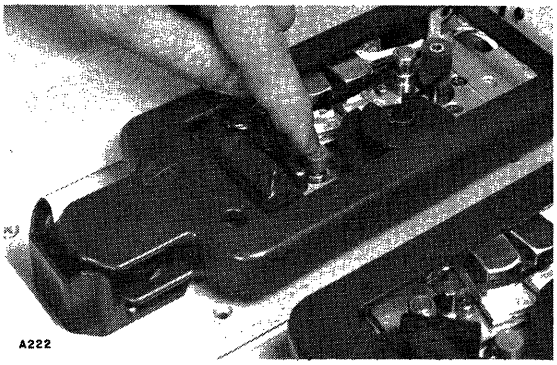
3-5. NORMAL OPERATION.

After the program has been loaded as a result of step (g) above, instructions appear on the display screen. Follow these instructions until the task is completed; then unload the tapes and turn off the machine as described in the following paragraphs.

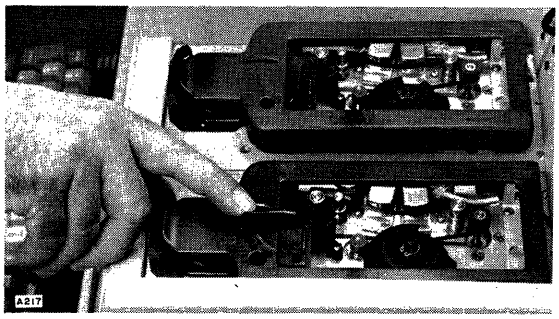
3-6. UNLOADING A TAPE CARTRIDGE.

Unload a tape cartridge as follows:

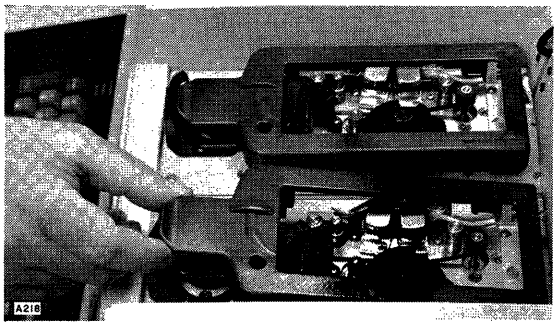
a. Open the access cover and, if tape is not already rewound into the tape cartridge, push the rewind button.



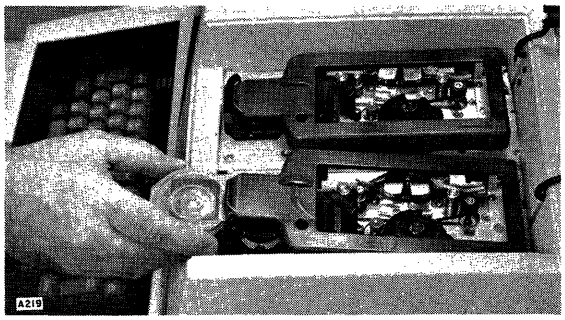
b. Move the locking lever to the unlock position.



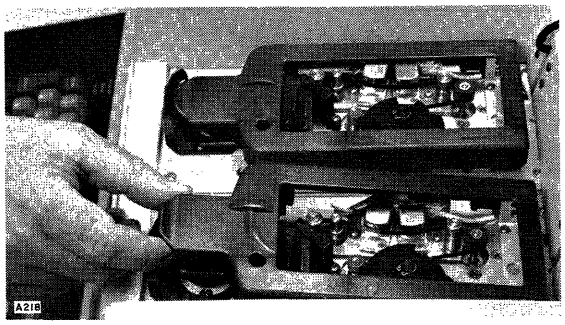
c. Lift the loader



d. Remove the tape cartridge.



e. Push down the loader with tape cartridge removed.



f. Keep the locking lever in the unlock position to keep leader in place, and close the access cover.

3-7. REMOVAL OF POWER.

a. Turn the power on/off switch to the off (down) position. The switch is located on the right side panel near the back.

b. Refer to Section 4 of this manual and perform all necessary operator maintenance procedures.

3-8. ERROR OR CHECK CONDITIONS

There are several steps that an operator can take to correct minor problems that occur during normal operation of the Model 1501 Intelligent Terminal. Table 3-1 lists some of these problems and the action that can be taken.

Table 3-1. Error or Check Conditions

Symptom	Possible Cause	Action to be Taken
Cooling fan not rotating and no lights on tape drives	1. AC line fuse blown 2. AC line cord loose 3. AC power on/off switch not on	Replace fuse. Check line cord. Turn switch on.
Line fuse blows continually	1. Wrong size fuse 2. Internal defect	Check fuse rating Call service representative.
Program does not load	1. Tape cartridge installed improperly 2. PROGRAM LOAD switch defective	Check Tape Loading procedure. Retry PROGRAM LOAD switch
Burning odor	Burned Component	Turn power off and call service representative
Failure during program	Undetermined	Retry program
Display is blank	Program did not load	Retry program load
Read and/or write errors	1. Dirty read head 2. Dirty write head	Follow directions under read/write errors.
Leader has trouble returning to "home" position	1. Dirty capstan 2. Faulty leader	Clean capstan. Replace leader.
Tape runaway	1. Broken leader 2. Broken tape	Follow directions under tape runaway

3-9. TAPE ERRORS.

Tape errors may occur if preventive maintenance is inadequate. If a tape error occurs, the tape read or write operation may have to be aborted, depending on the type of error. The two major error classes are the following:

Tape Runaway.

If both tape reels ever spin uncontrollably at high speeds, turn power off immediately. There are two possible causes. In all cases it is recommended that the entire program be reattempted.

a. If the leader breaks, a tape runaway occurs. Replace the leader, using the procedure in Section 4 of this manual.

b. If the tape breaks, a tape runaway occurs. Replace the tape cartridge, and refer to the procedure for freeing a jammed loader in Section 4 of this manual.

Read/Write Errors.

This type of error is accompanied by an error tone. If read error occurs while loading a program tape, depress the red rewind button in the middle of the tape drive. The program tape, or the copy of the program tape, may be reloaded after the cause of the error is determined and corrected. For read/write errors with data tapes, the current program should be completed and later reattempted. The cause of the read/write error must be determined. Depressing the ERROR key will quiet the error tone.

Possible causes of read/write errors include the following:

a. On a tape write operation, the write pin was not in the bottom cartridge position.

b. Dirt on the read/write heads, caused by inadequate preventive maintenance.

c. Wrinkled tape.

d. The leader threading was not aligned in the proper grooves of the tape guides.

The corrective action to be taken for read/write errors is as follows:

a. If unable to write on a tape, check the position of the write pin. It must be in the bottom position on the cartridge. Retry this operation.

b. Check the leader threading path and inspect the leader. Replace the leader if necessary by following the leader replacement procedure in Section 4 of this manual.

c. Follow the tape drive cleaning procedure in Section 4 of this manual if solutions (a) and (b) above do not apply.

4-1. GENERAL INFORMATION.

The Model 1501 Intelligent Terminal should be given the care worthy of any high-quality piece of electronic equipment. Dust the cabinet, keyboard, and display screen regularly with a clean, soft cloth. Foreign material such as coffee or candy should be removed with a cloth dampened with a mild detergent or Freon. Keep the keyboard free of metallic objects such as paper clips and hairpins, since these items can easily cause jamming of the keys or electrical shorts if they drop through into the electronic circuits.

Other than the overall cleaning outlined above, the only preventive maintenance required of the user is to clean all tape drives at least once each week, using the procedure in this section. Inspect the tape leader each time the tape drive is cleaned, and replace it as necessary. The inspection and replacement procedures are included in this section.

4-2. TAPE DRIVE CLEANING.

Perform the following steps to clean each tape drive:

a. The first step is to move the loader to the upright position, as follows:

   (1) Move the locking lever to the unlock position and lift the loader to the cartridge insertion position. If the loader cannot be raised, perform the steps in paragraph 4-4 before performing the following step.

   (2) Firmly pull the loader retainer lock with a forefinger, as shown in figure 4-1, and lift the loader.

   (3) Now that the loader is in the upright position, take time to become familiar with the various components on the tape drive, as shown in figure 4-2. Note the threading path of the leader.

b. Lift the leader eyelet upward off the pin on the take-up reel, as indicated in figure 4-3. The leader clip will remain in the clip channel because the locking lever is in the unlock position.

c. Remove the leader from its path. If the leader has worn spots or is twisted, replace it as described in the leader replacement procedure in this section.

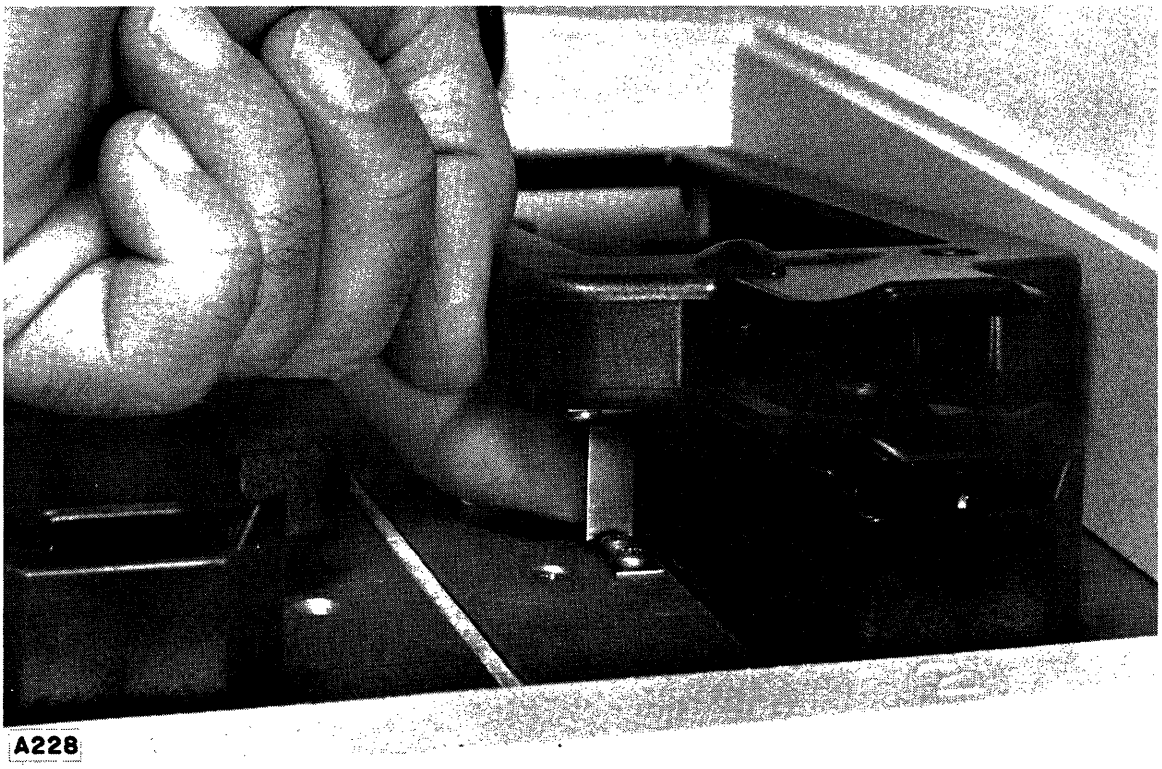


Figure 4-1. Releasing the Loader Retainer Lock

d. Obtain the tape cleaning kit. In the kit, you will find a bottle of Freon liquid, cotton swabs, and cloths.

e. Wet a cotton swab with Freon liquid. Scrub the two tape heads, tape guides, and the capstan. The capstan must be held while being scrubbed, as shown in figure 4-4. The scrubbing motion must be from the side in order to clean the area where the tape moves. Keep the cotton swab wet, and replace it if it becomes dirty.

f. Clean the exposed part of the leader using the cloths wet with Freon. Do not stretch the leader.

g. Place the leader eyelet back on the pin on the take-up reel. Thread the leader along its path, making sure it is in the proper grooves of the tape guides.

h. Return the loader to the cartridge insertion position.

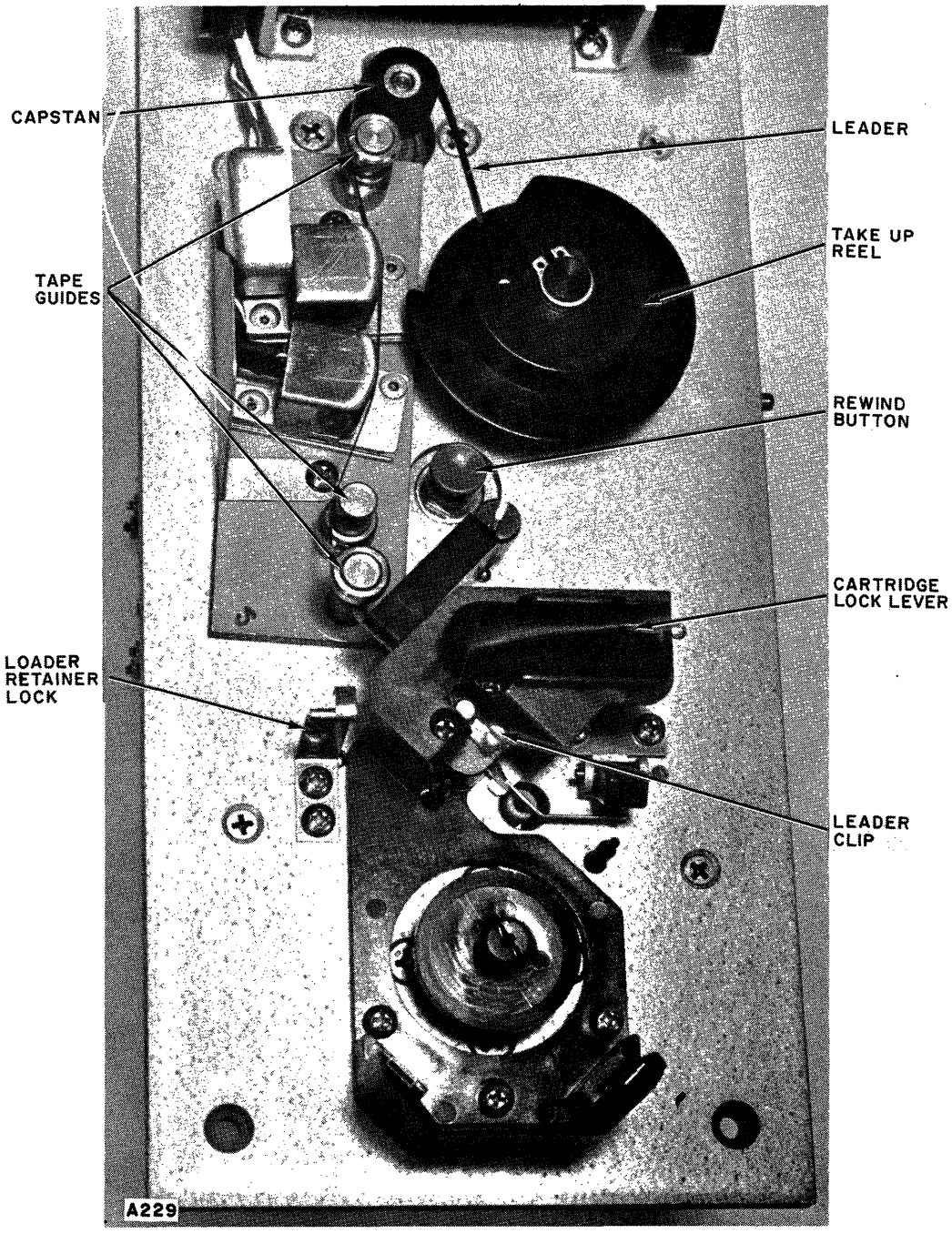


Figure 4-2. Series 1500 Tape Drive

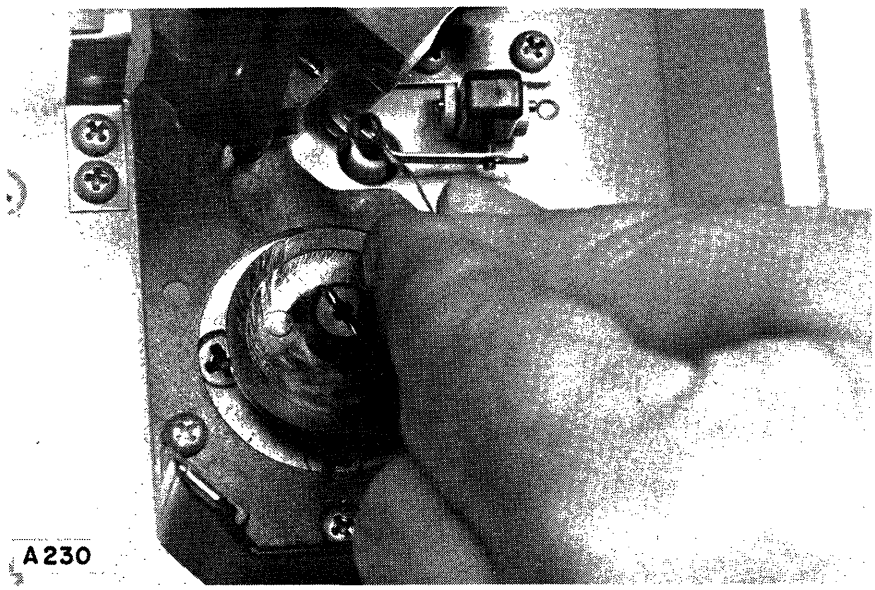


Figure 4-3. Removing the Leader Eyelet

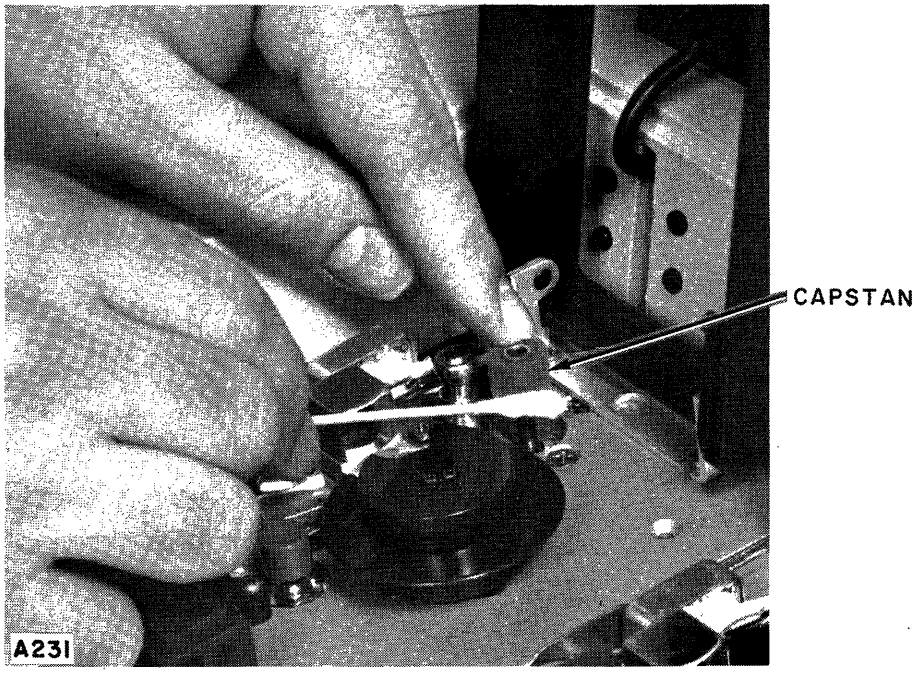


Figure 4-4. Cleaning the Capstan After Leader Removal

4-3. LEADER REPLACEMENT.

The leader should be inspected every time the tape drive is cleaned and each time that it could be the cause of a tape problem. If the leader has worn spots or is wrinkled, it must be replaced. If the loader is jammed in lock position perform the steps in paragraph 4-4 before proceeding.

Perform the following steps to gain access to the leader, inspect it, and if necessary replace it:

a. Move the locking lever to the unlock position.

b. Lift the loader to the cartridge insertion position.

c. Pull the loader retainer lock and lift the loader. (See figure 4-1.)

d. Remove the leader eyelet from the pin on the take-up reel. (See figure 4-3.)

e. Move locking lever to the lock position. When the locking lever is in the lock position, the clip channel is open and the leader clip may be removed. (See figure 4-5 for this step and the following step.)

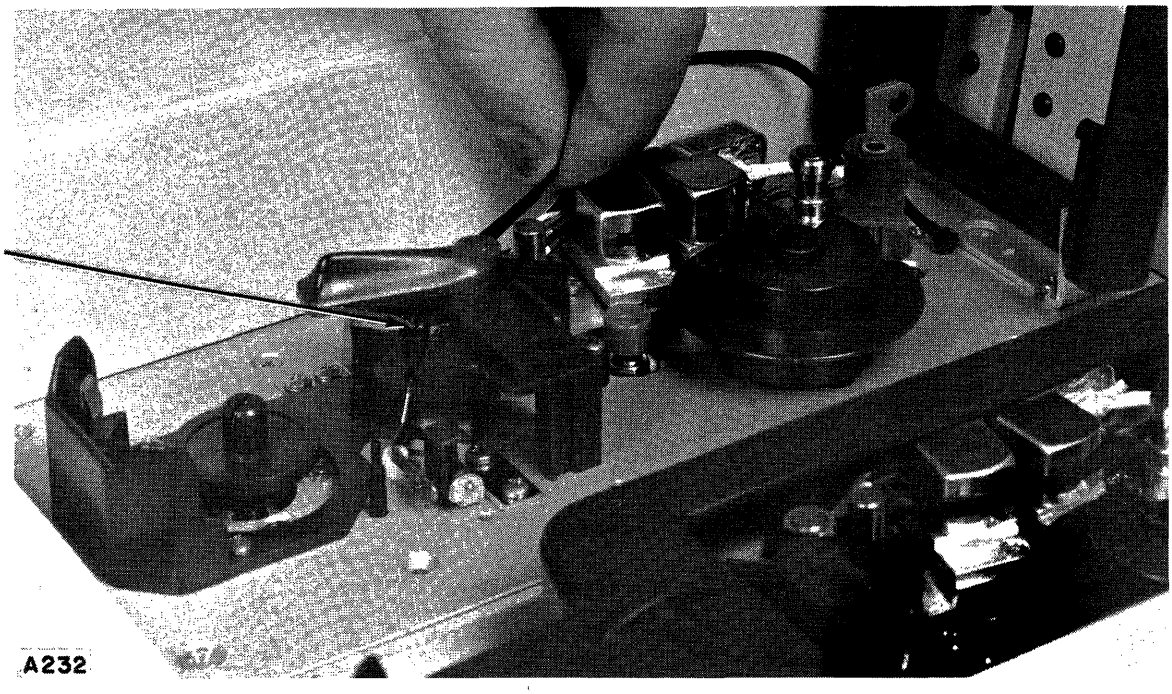


Figure 4-5. Removing the Leader Clip From the Clip Channel

f. Remove the leader clip from the clip channel by pulling it toward the take-up reel. If it is wrinkled, twisted, or has worn spots on it, replace it. If a defective leader is not replaced, tape runaway errors and read/write errors are likely to occur.

g. If necessary, the leader, capstan, two tape heads, and three tape guides may be cleaned at this time. Tape drive cleaning is described earlier in this section.

h. With the locking lever in the lock position, insert the leader eyelet in the clip channel, as pictured in figure 4-6. Push the leader eyelet through the clip channel.

i. Connect the leader eyelet to the post on the clip, making a loop, as pictured in figure 4-7. Make sure there are no twists in this loop.

j. Move the leader in a counterclockwise direction as shown in figure 4-8 but with the locking lever in the lock position. Continue to gently pull the leader until the leader clip enters the clip channel and will go no further, as shown in figure 4-8.

k. Move the locking lever to the unlock position. The leader clip is now securely in the clip channel.

l. Lift the leader eyelet off the post on the leader clip and place it on the pin on the take-up reel. Make sure there are no twists in leader.

m. Place the leader along the tape path, making sure the leader is in the proper grooves of the tape guides. Return the loader to the cartridge insertion position. (See figure 4-9.)

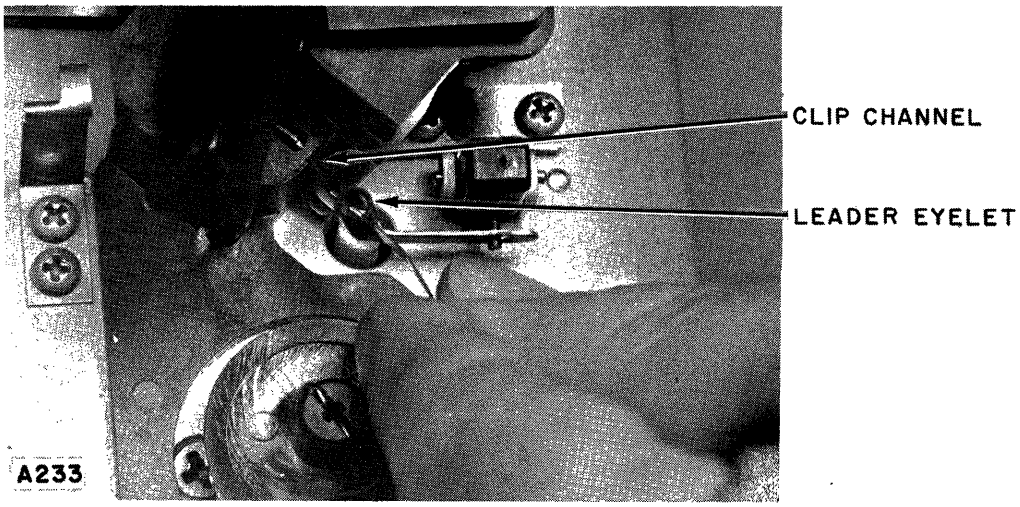


Figure 4-6. Inserting the Leader Eyelet in the Clip Channel

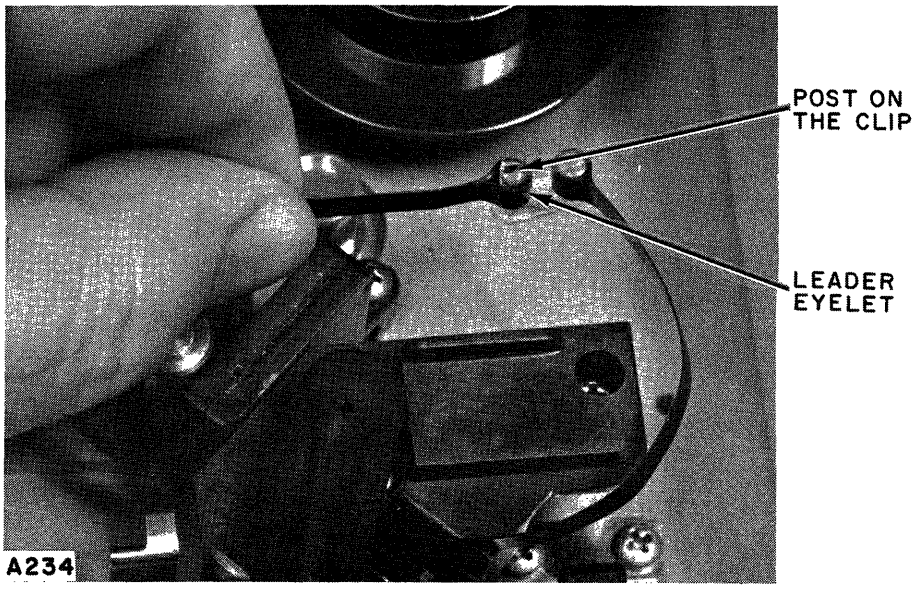


Figure 4-7. Connecting the Leader Eyelet to the Post on the Clip

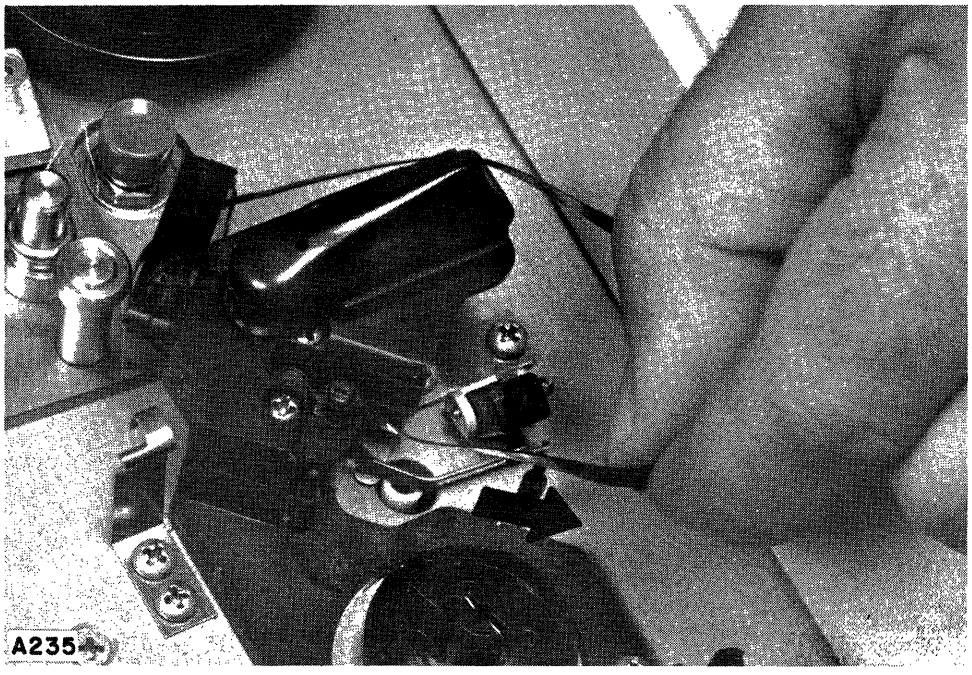


Figure 4-8. Moving the Clip into the Clip Channel

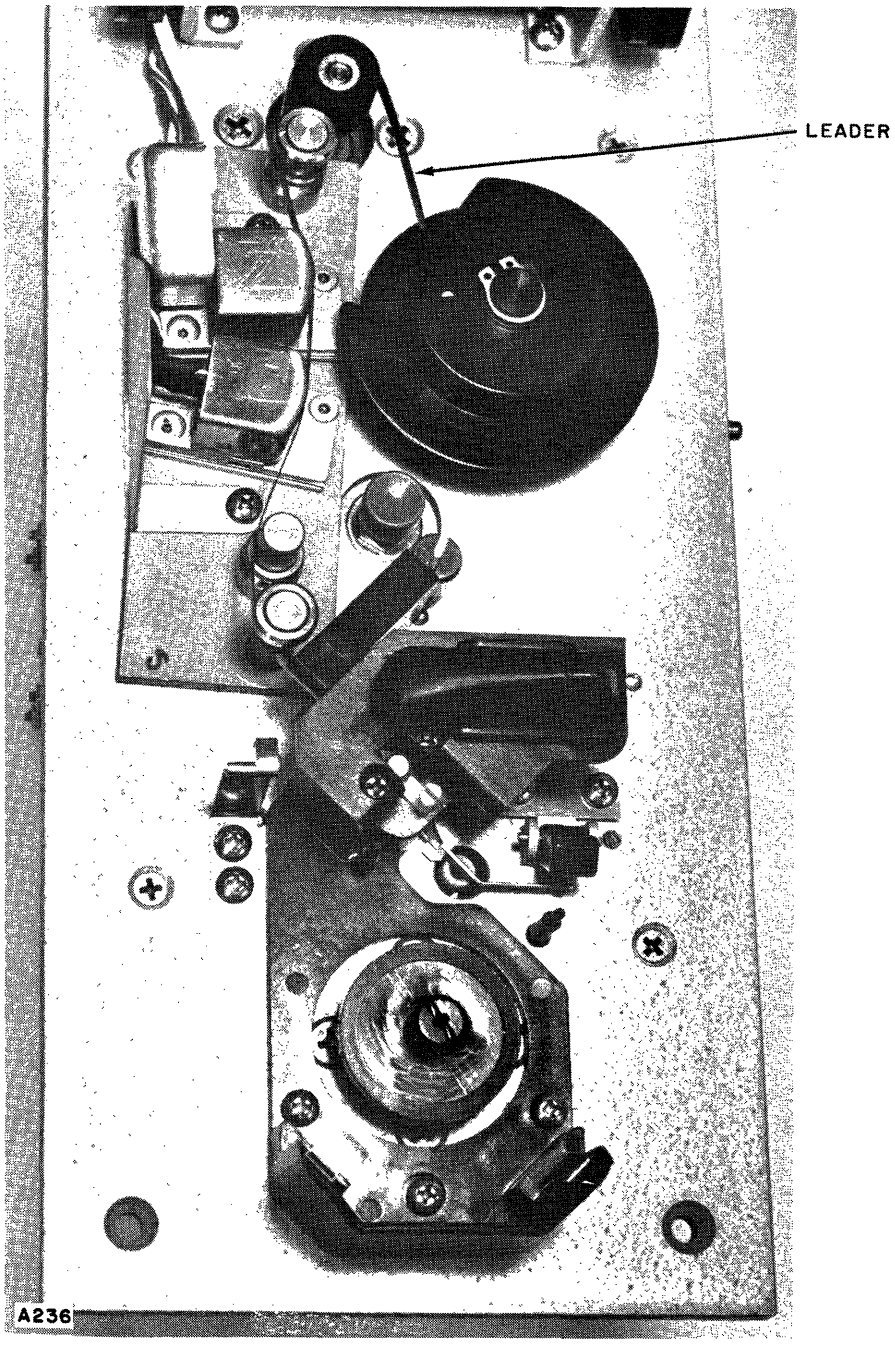


Figure 4-9. Leader Shown in Tape Path

4-4. FREEING A JAMMED LOADER

If the leader or tape breaks during a tape operation, the loader will become jammed in the lock position. The loader may be unjammed by placing a thin pen or pencil in the loader hole. Move the pen or pencil in a downward motion while lifting up on the loader, as shown in figure 4-10. When the loader releases, it can be moved easily to the cartridge insertion position.

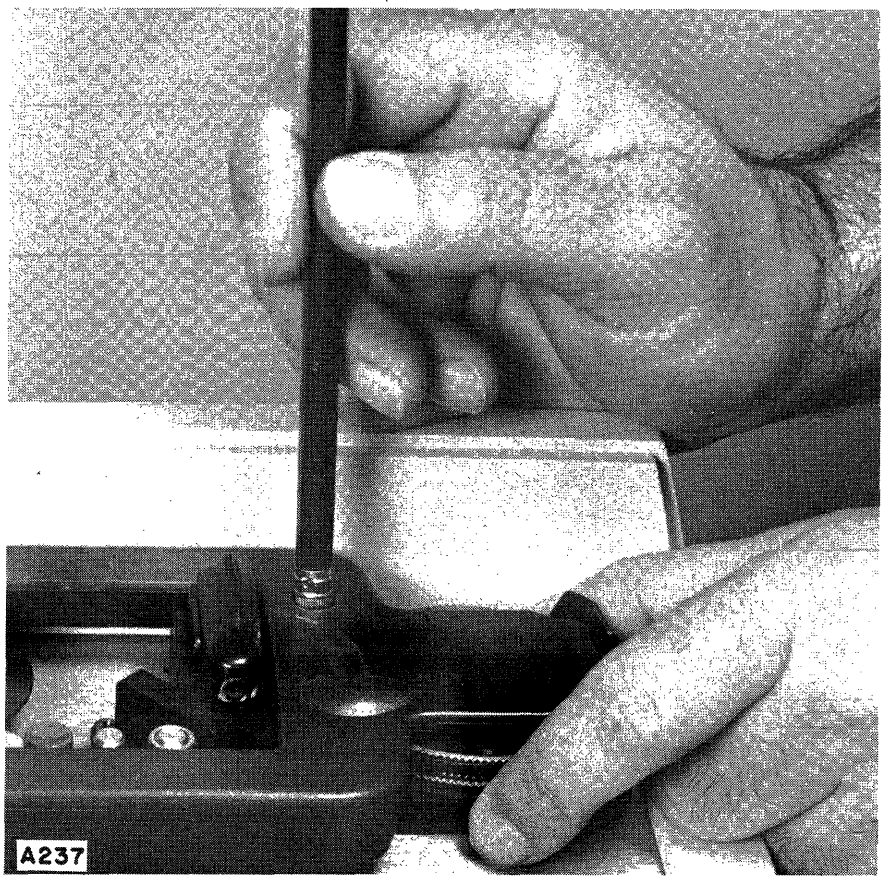


Figure 4-10. Freeing a Jammed Loader

OPERATOR INSTRUCTIONS

FOR THE

MODEL 1501 INTELLIGENT TERMINAL

Publication No. 22-6504-01

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