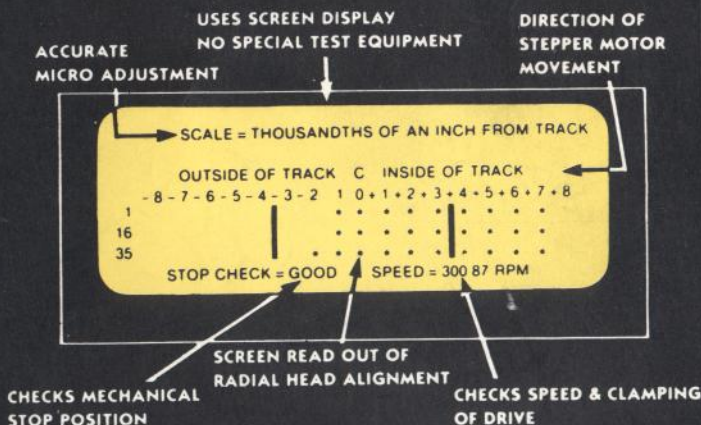


IS YOUR 1541 HEALTHY?
OR WOULD ITS PHYSICAL EXAM
LOOK LIKE THIS ONE?

1541 PHYSICAL EXAM



Package includes:

- True digital alignment disk with offset tracks
- Quiet Drive stops to reduce need for continued realignment on old style drives

TABLE OF CONTENTS

Please Read This	2
Modification for use with MSD Drive	2
Warranty	3
Instructions for Testing Drive	
General Remarks	4
How to Use the Program	5
Speed and Clamping Test	5
Radial Head Alignment Test	6
Stop Location Test	7
Instructions for Reading Test Results	
Comments	7
Sample Screen Displays	8
Drive Information	
Quiet Drive Stop	15
Data Preservation Precaution	16
Drive Identification Alps/Newtronics	16
Alps Drive Old Stop Location	18
Alps Drive Quiet Drive Stop Location	19
Newtronics Drive Speed Location	20
Instructions for the Technician	
Quiet Drive Stop Installation	21
Radial Alignment	23
Alps Drive Speed Location	24
Alps Drive Stepper Motor Mountings	24
Newtronics Drive Stepper Motor	25
Speed Adjustment	26

WARNING!! WARNING!! WARNING!!

DO NOT ATTEMPT TO COPY THIS DISK! THERE IS NO PROTECTION ON THE DISK, BUT A COPY PLACES ALL OF THE SECTORS BACK TO THE "ON TRACK" CONDITION SO THAT THE SPECIAL PROPERTIES OF THE "PHYSICAL EXAM" DISKETTE ARE LOST AND THE RESULTS WILL BE MEANINGLESS!! THE "PHYSICAL EXAM ALIGNMENT TEST-F3" WILL RUN ON THE MSD DISK DRIVE. HOWEVER THE COMMENTS IN THESE REMARKS REGARDING THE "TRACK ONE STOP" AND THE "BELT" ARE NOT APPLICABLE TO THAT DRIVE.

MODIFIED PROGRAM TO ALLOW TESTING BOTH MSD DRIVES

1. TYPE: LIST-40 <R>
2. CURSOR TO LINE 30 AND CHANGE IT TO 32 <R>
3. TYPE: LIST-40 <R>
4. CURSOR TO LINE 30 AND CHANGE THE WORD DEVICE TO DRIVE, THEN CHANGE 8 TO 0, THEN CHANGE D1\$ TO D\$ <R>
5. ON LINE 40 CHANGE D\$="0" TO D=VAL(D\$);DR=D1 <R>
6. TYPE: LIST-620 <R>
7. CHANGE (JOB) TO (JOB+D) <R>

THESE CHANGES WILL ENABLE YOU TO CHECK THE ALIGNMENT ON BOTH DRIVES, HOWEVER THE SPEED TEST WILL NOT WORK.

LIMITED WARRANTY STATEMENT

CARDINAL SOFTWARE wants your continued business. If you fill out the enclosed product registration card and return it to us, you are covered by our product warranty. If your diskette should fail within 90 days of purchase, just return it directly to us with proof of purchase and we will replace it free. After 90 days, enclose \$17.00 plus \$3.50 shipping and handling with the defective diskette and return it to us for replacement.

SORRY, without the registration card, you are not covered by the warranty. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

CARDINAL SOFTWARE, 14840 Build America Drive,
Woodbridge, VA 22191
Phone: (703) 491-6494
Hours: 10 - 4 (Eastern Standard time) Mon-Sat

INSTRUCTIONS for TESTING the 1541 DISK DRIVE

PHYSICAL EXAM General Remarks

The 1541 disk drive performs very well when it is in proper alignment. Unfortunately some drives have shown a tendency to gradually creep out of alignment. It appears that this occurs from a combination of two conditions: (1) When the drive is "hot" from continuous use and/or from high room temperature, and (2) When the operation of such as to cause the drive to repeatedly "bump" the track one stop.

In (1) above, the heat causes the aluminum alloy drive pulley on the step motor shaft to expand more than the stainless steel shaft of the motor on which it is pressed, causing it to be held less tightly.

In (2) above the track step motor rotor is quite heavy. When it drives the pulley against the stop it strikes with considerable impact much as a hammer blow. These repeated "hammer blows" gradually move the shaft within the pulley so that at some point the drive is sufficiently misaligned to cause difficulties in reading and writing diskettes which were recorded on properly aligned drives.

KEEPING OUT OF TROUBLE

The **1541 PHYSICAL EXAM** diskette is especially designed to provide a method by which the performance of your disk drive can be determined without the use of any equipment other than the **PHYSICAL EXAM** diskette, a C-64 or C-128 computer and the 1541 drive itself.

In addition, it permits making a permanent record of the performance so one can determine whether the drive is in fact gradually becoming misaligned. This then allows one to have the drive re-aligned before the drive ceases to function.

HOW TO USE THE PROGRAM SPEED AND CLAMPING TEST

Insert the diskette into the drive.

Type: Load''*'',8 press <RETURN>

When the program has loaded,

Type: RUN press <RETURN>

The screen will display:

TEST WHAT DEVICE #? 8?

OR

Press 9 <RETURN> to test device #9 (if you have a second 1541 disk drive.)

The speed at which the diskette is spinning is very important. The **1541 SPEED TEST** program, when selected, will print on the screen the speeds measured in ten successive tests, and will show the simple average of these measurements. The proper speed value is **300 RPM**. The program checks the average speed and prints "OK" if the speed is within 1% (See typical screen display #10 page 8 for explanation of **SPEED TEST** results). The program also sorts the ten measurements and checks for the difference between the largest and the smallest one. If this difference is greater than 0.6 RPM, the program prints "FAILED BELT TEST", since this indicates that there is something wrong in the speed control system. This can be caused by a loose belt, a diskette which is binding in its jacket, or by mal-adjustment of the clamping mechanism.

There is a rather wide variation in the drag (resistance to rotation) in different diskettes and from one diskette to another. The diskettes used for the **PHYSICAL EXAM** were selected for low drag and uniformity. If you wish, you can run the speed test on other diskettes. In this case the diskette you use must not have a write protect tab over the notch. Your diskette will be *overwritten* on track 37 (yes, track 37) so there should be no damage to the information on your diskette.

If your disk drive does not complete the speed test, it is out of alignment. To determine the speed at which your diskette is spinning, format a blank diskette (do not put a write protect tab on this diskette). Remove it from the drive and load in the **SPEED** test program (F1 on the menu on the **PHYSICAL EXAM** diskette). Remove the **PHYSICAL EXAM** program diskette from the drive

and insert the formatted diskette. Run the Speed test. The results will be displayed.

RADIAL HEAD ALIGNMENT

Run the **PHYSICAL EXAM** program and *choose F3* from the menu. When this option is selected, the program will put a scale on the screen representing the recorded track and the adjacent area on each side of it. It will then read the test diskette on which the sectors have been written '**OFF TRACK**', (using a specially constructed disk drive).

The program will display only the sectors that it is able to read on your drive, and will print them at the proper place on the scale to show how far each sector is from the proper track.

For display purposes the sectors are designed by the character 'asterisk' (*). The diskette was formatted in the normal fashion with the head properly aligned. Seventeen sectors were written with 253 characters consisting of the letters of the alphabet A through Q repeated 14 times plus the letters A through O recorded once.

Sector 0 was recorded "**ON TRACK**" but all of the other even sectors were recorded **inch increments so that sector 16 is actually eight one-thousandths of an inch off of the proper track. Similarly all odd sectors were recorded "OFF TRACK"** on the other side of the proper track.

The screen display with a properly aligned drive will show that the drive can read equally well on both sides of the track. If the display shows that the drive can read all the way out to the end on one side and perhaps only one or two scale divisions on the other side, the operator should be aware that the drive is misaligned.

If the drive shows a well balanced display with all the positions between the vertical "fence" lines filled in--the operator can rest assured that the drive is properly aligned. In this case, the operator should make a permanent record of the display, and file it away for comparison with a retest at some later date. If at some time it can be seen that the pattern is gradually shifting, then one knows that the drive is going to require alignment.

The screen will usually display sectors far outside the "fence". Normally there will be 8 to 10 asterisks indicated on each track. This indicates that the drive electronics is operating properly. If the width of the display on the track with the greatest number of asterisks is less than 8, it is likely that there is something wrong in the read electronics. Or the diskette was not properly centered - try removing the diskette and inserting it again.

STOP ADJUSTMENT

The adjustment of the **TRACK ONE STOP** is very important. At the completion of the alignment test, the **PHYSICAL EXAM** program will test the stop adjustment and print a message on the screen, indicating its condition.

INSTRUCTIONS FOR READING

TEST RESULTS

Comments

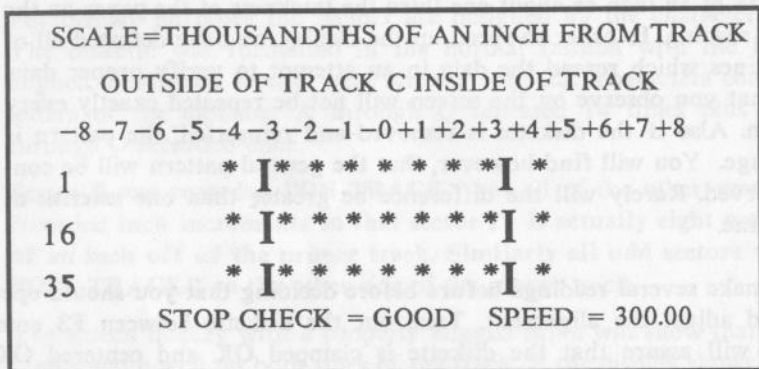
In the following section we will present a number of typical displays. It is important to realize that the measurements being made are really quite precise--for example, the distance represented by two adjacent asterisks is only one thousandth of an inch or about one third the thickness of the paper on the page you are reading. In order to speed up the display we have defeated all of the disk routines which reread the data in an attempt to verify proper data. Therefore what you observe on the screen will not be repeated exactly every time it is run. Also if the diskette is removed and reinserted, the pattern is likely to change. You will find however, that the general pattern will be consistently observed. Rarely will the difference be greater than one asterisk at the end of a line.

You should make several readings **before** before deciding that you should open the drive and adjust the alignment. Take out the diskette between **F3** commands. This will assure that the diskette is clamped OK and centered OK. Readings should not vary more than **one** track on the same drive.

SAMPLE SCREEN DISPLAYS

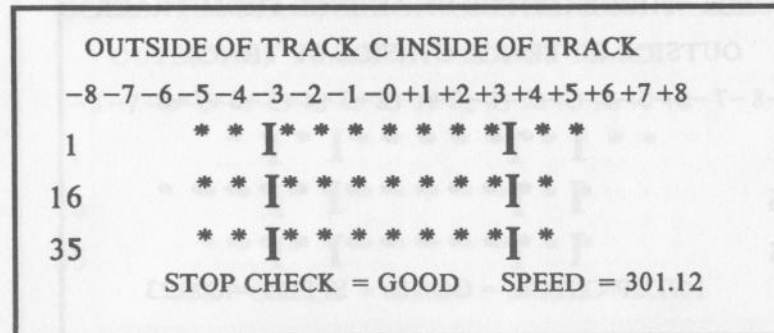
PROBLEM: PHYSICAL EXAM diskette will not load. Your drive may be so far out of alignment that it cannot read the diskette. Try the diskette on another drive. **SOLUTION:** If your drive is out of alignment, use another drive to load the program and then align your drive. If the program fails to load on the second drive, return the diskette to **CARDINAL SOFTWARE** with a copy of your invoice within 90 days. You will receive a new copy. After 90 days, please return your diskette with a copy of your invoice and remit \$17.00 plus \$3.50 for shipping and handling.

TYPICAL SCREEN DISPLAY #1



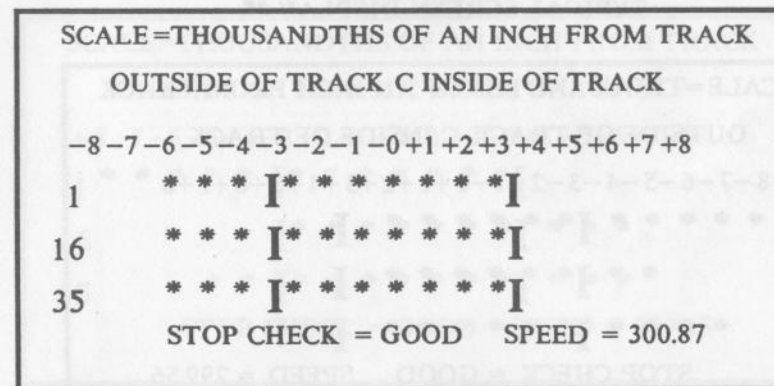
PROBLEM: This test is perfect (never happens).
SOLUTION: No need to make an adjustment.

TYPICAL SCREEN DISPLAY #2
 SCALE=THOUSANDTHS OF AN INCH FROM TRACK



PROBLEM: This test result is acceptable but not perfect.
SOLUTION: No need to make an alignment adjustment, but do need to lower speed.

TYPICAL SCREEN DISPLAY #3



PROBLEM: This test result is marginal but not perfect.
SOLUTION: No need to make an adjustment because the pattern moves to the right with normal wear.

TYPICAL SCREEN DISPLAY #4

```

SCALE=THOUSANDTHS OF AN INCH FROM TRACK
  OUTSIDE OF TRACK C  INSIDE OF TRACK
-8-7-6-5-4-3-2-1-0+1+2+3+4+5+6+7+8
 1          I * * * * * I * * *
16         I * * * * * I * * * *
35         I * * * * * I * * *
          STOP CHECK = GOOD  SPEED = 300.23

```

PROBLEM: The drive is out of alignment toward the inside. The area between the fences must be totally filled in with asterisks.

SOLUTION: Adjust the stepper motor toward the outside.

TYPICAL SCREEN DISPLAY #5

```

SCALE=THOUSANDTHS OF AN INCH FROM TRACK
  OUTSIDE OF TRACK C  INSIDE OF TRACK
-8-7-6-5-4-3-2-1-0+1+2+3+4+5+6+7+8
 1 * * * * * I * * * * * I
16  * * I * * * * * I
35  * * * * I * * * * * I
          STOP CHECK = GOOD  SPEED = 299.56

```

PROBLEM: The drive is out of alignment toward the outside.

SOLUTION: Adjust the stepper motor toward the inside.

TYPICAL SCREEN DISPLAY #6

```

SCALE=THOUSANDTHS OF AN INCH FROM TRACK
  OUTSIDE OF TRACK C  INSIDE OF TRACK
-8-7-6-5-4-3-2-1-0+1+2+3+4+5+6+7+8
 1          I * * * * * I * * * *
16         * * I * * * * * I * *
35         * * I * * * * * I * *
          STOP CHECK = GOOD  SPEED = 300.01

```

PROBLEM: No asterisks are on the outside of the fence on Track #1. The stop is too close.

SOLUTION: Move the stop toward the outside.

TYPICAL SCREEN DISPLAY #7

```

SCALE=THOUSANDTHS OF AN INCH FROM TRACK
  OUTSIDE OF TRACK C  INSIDE OF TRACK
-8-7-6-5-4-3-2-1-0+1+2+3+4+5+6+7+8
 1 * * * * * I * * * * * I
16          I * * * * * I * * *
35         * * I * * * * * I * *
          STOP CHECK = GOOD  SPEED = 299.45

```

PROBLEMS: Placement of asterisks outside of the fence varies, sometimes to the inside and sometimes to the outside. May be caused by the clamping part (flat plastic piece), that holds the diskette in place or that the taut band is not tight.

SOLUTION: Try removing and reinserting the diskette. If the problems remains take the drive to an authorized repair service center.

TYPICAL SCREEN DISPLAY #8

```

SCALE=THOUSANDTHS OF AN INCH FROM TRACK
  OUTSIDE OF TRACK C INSIDE OF TRACK
-8-7-6-5-4-3-2-1-0+1+2+3+4+5+6+7+8
1   * * * I * * * * * * * I
16  * * * I * * * * * * * I
35  * * * I * * * * * * * I
STOP CHECK = BAD   SPEED = 299.90

```

PROBLEM: Stop Adjustment = BAD. The Stop is not placed in the correct position. If the casting on your unit is slightly different on the top of the pedestal that mounts the stop you may have to bend the stop slightly.

SOLUTION: Adjust the position of the stop or bend it slightly.

TYPICAL SCREEN DISPLAY #9

```

SCALE=THOUSANDTHS OF AN INCH FROM TRACK
  OUTSIDE OF TRACK C INSIDE OF TRACK
-8-7-6-5-4-3-2-1-0+1+2+3+4+5+6+7+8
1   * * I * * * * * * * I
16  * * * I * * * * * * * I
35  * I * * * * * * * I
STOP CHECK = GOOD   SPEED = 000.00

```

PROBLEM: Cannot run the SPEED TEST at all. The stop adjustment is not correct and the drive cannot find the sync marks on track 37. You can run the Speed Test on another disk that has been formatted.

SOLUTION: Adjust the Stop a little bit toward the inside of the disk and rerun.

TYPICAL SCREEN DISPLAY #10

```

SCALE=THOUSANDTHS OF AN INCH FROM TRACK
  OUTSIDE OF TRACK C INSIDE OF TRACK
-8-7-6-5-4-3-2-1-0+1+2+3+4+5+6+7+8
1   I * * * * * * * I * * * * *
16  I * * * * * * * I * * * * *
35  I * * * * * * * I * * * * *
STOP CHECK = GOOD   SPEED = 549.30

```

PROBLEM: Alignment test is invalid because the speed of the drive is off. Speed test results: up to 297 BAD; 297-299 FAIR; 299-301 GOOD; 301 - up BAD.

SOLUTION: Adjust the speed using a formatted disk not the PHYSICAL EXAM disk, then retest.

TYPICAL SCREEN DISPLAY #11

```

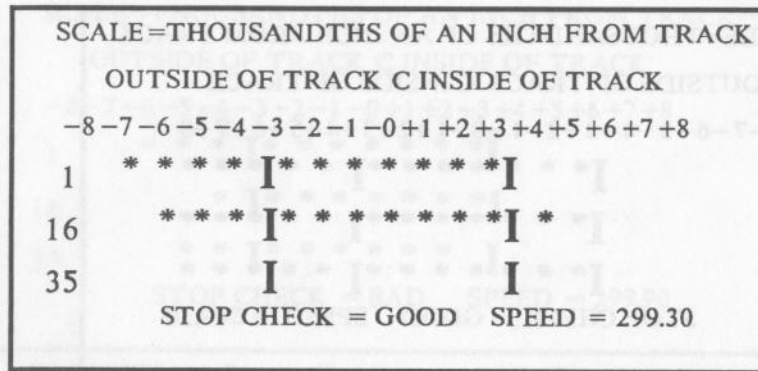
SCALE=THOUSANDTHS OF AN INCH FROM TRACK
  OUTSIDE OF TRACK C INSIDE OF TRACK
-8-7-6-5-4-3-2-1-0+1+2+3+4+5+6+7+8
1   * * * * * I * * * * * * * I * * * * *
16  * * * * * I * * * * * * * I * * * * *
35  * * * * * I * * * * * * * I * * * * *
STOP CHECK = GOOD   SPEED = 300.76

```

PROBLEM: Alignment test was run on a disk other than the Physical Exam disk. You must use the Physical Exam disk to run the alignment test because other diskettes do not contain the test tracks that are recorded between the tracks.

SOLUTION: Make sure that the Physical Exam disk is in the drive when running the alignment test.

TYPICAL SCREEN DISPLAY #12

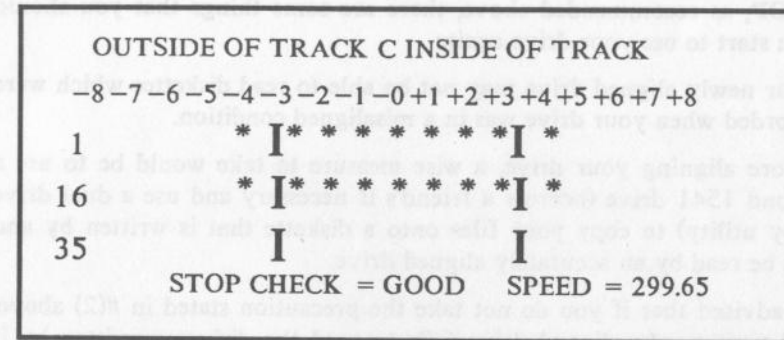


PROBLEM: No asterisks on track 35. Drive is out of alignment, or the taut-band is not tight or you have a bad Physical Exam diskette or the head pressure is too light, see #13.

SOLUTION: Try the Physical Exam test on another drive. If the disk works on another drive take it to a repair shop. If you still can't get a reading on track 35, send the diskette and a copy of your invoice back to Cardinal Software, (if this occurs after the 90 day warranty period, please remit \$17.00 plus \$3.50 shipping and handling along with your disk and a copy of your invoice. (The address is on the Physical Exam diskette.)

TYPICAL SCREEN DISPLAY #13

SCALE=THOUSANDTHS OF AN INCH FROM TRACK



PROBLEM: All or part of track 35 is missing. Usually caused by the pressure pad not having enough pressure on the inner tracks.

SOLUTION: Replace or adjust the pressure pad. Increase the tension of the spring by putting the spring on the flat surface, (instead of in the groove), of the pressure pad arm.

AN OUNCE OF PREVENTION

If your drive appears to go out of alignment due to the slipping of the shaft in the drive pulley, there are some things that can be done to prevent this in the future. The method that we recommend is the use of the **QUIET DRIVE STOP** for the non "quarter turn lever" 1541 disk drives. (There does not appear to be a need for the **QUIET DRIVE STOP** in the drives with the "quarter turn lever" closure.)

The **QUIET DRIVE STOP** is a replacement for the stop originally installed. It has the same outline shape as the original stop, but it is made of spring wire. This spring absorbs the shock when the pulley hits the stop and thus tends to prevent impacting with enough force to cause the motor shaft to slip inside the pulley.

AS AN ADDED BONUS YOUR DRIVE WILL NO LONGER MAKE THOSE LOUD HAMMERING NOISES-BUT INSTEAD WILL PURR LIKE A KITTEN.

BEWARE BEWARE BEWARE

If your drive is seriously out of alignment, and you have installed the **QUIET DRIVE STOP**, as recommended above, there are some things that you should know as you start to use your drive again:

- (1) Your newly aligned drive may not be able to read diskettes which were recorded when your drive was in a misaligned condition.
- (2) Before aligning your drive, a wise measure to take would be to use a second 1541 drive (borrow a friend's if necessary and use a dual drive copy utility) to copy your files onto a diskette that is written by and can be read by an accurately aligned drive.
- (3) Be advised that if you do not take the precaution stated in #(2) above, and your newly aligned drive fails to read the diskettes written by it when it was in its misaligned state, there is another solution. This would require however that you send the diskettes to a knowledgeable technician, and that considerable amount of time (and cost) may be involved.
- (4) If such assistance is required please contact the facility which realigned your drive.
- (5) The **PHYSICAL EXAM** program can be copied from the diskette to a cassette. (In the event that your drive becomes so misaligned that you could not load the program from diskette, you could load it from the tape, and use the program to realign your drive.) The **PHYSICAL EXAM** program is also available on cartridge for \$35.00. In either case, you would have to use the test tracks on the diskette to actually run the alignment test.

QUIET DRIVE STOP

The **QUIET DRIVE STOP** is a replacement for the **TRACK ONE** stop used in the **ALPS 1541** disk drive. The latch on the front of the **ALPS** drive closes straight down while the **NEWTRONICS** drive has a quarter turn handle. The **QUIET DRIVE STOP** furnished with the package does **NOT** fit and is **NOT** required to maintain proper alignment in the **NEWTRONICS** drive.

The original stop is very rigid. This is annoying from the standpoint of the horrible machine-gun noise it makes when the drive seeks "TRACK ONE", which is a normal requirement when "formatting" a drive and which also frequently occurs when "protected" programs are run. Of even more importance is the fact that this constant "hammering" against the solid stop, can cause the **ALPS** drive to gradually creep out of alignment.

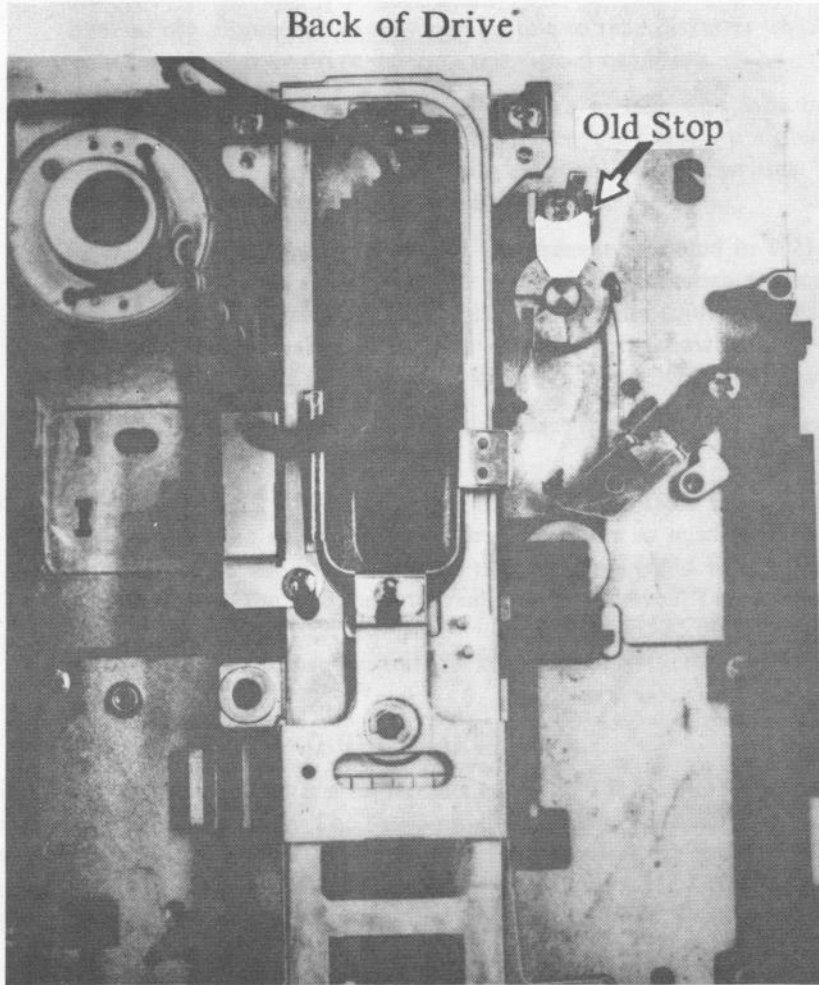
The **QUIET DRIVE STOP** solves both of these problems by providing a stop which has a "SHOCK ABSORBING" action. This reduces the impact between

the head positioning pulley and the **STOP**. The result is a reduction of the loud hammering sound to a gentle *PURR*, while at the same time reducing the hammering action so that the drive will no longer slowly creep out of alignment.

ALPS STYLE DRIVE

Location of Old Stop

Back of Drive

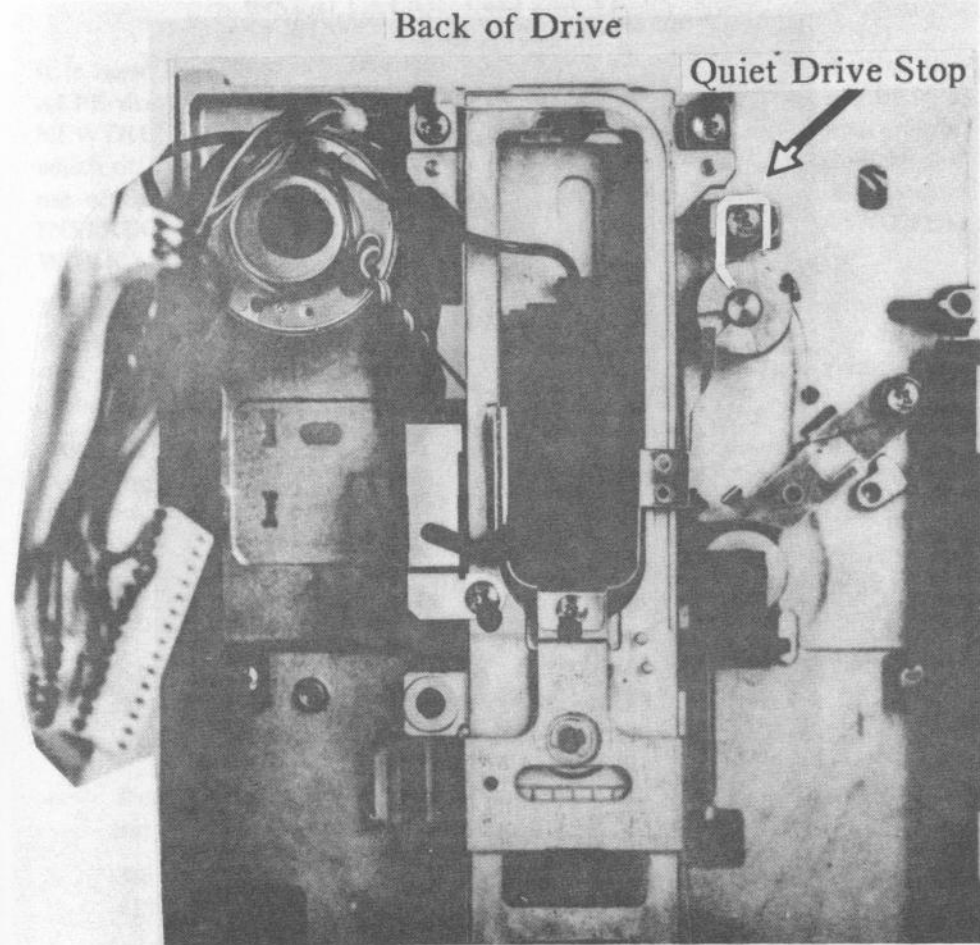


ALPS STYLE DRIVE

Location of Quiet Drive Stop

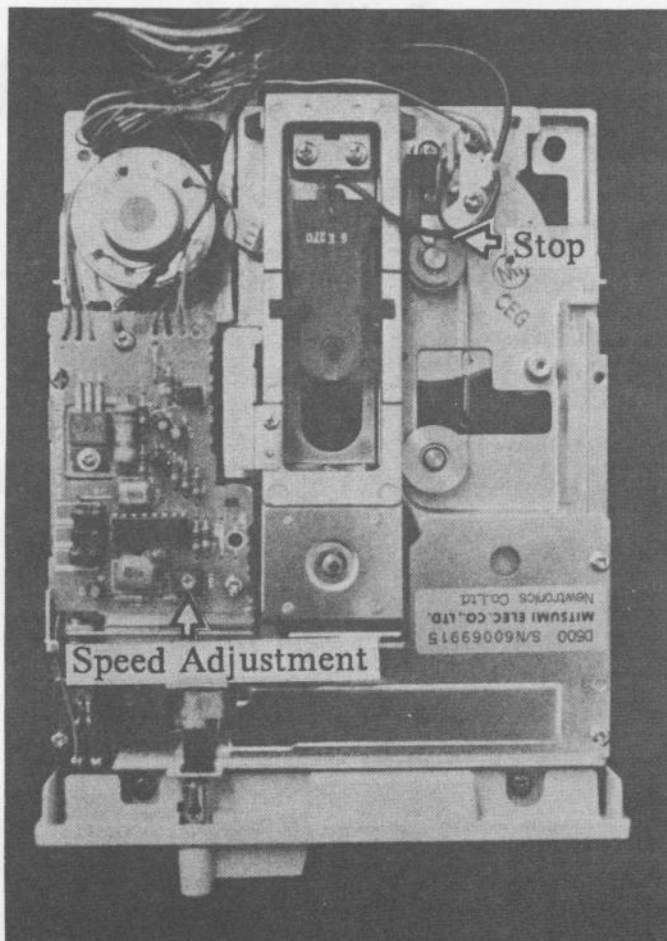
Back of Drive

Quiet Drive Stop



black plug) on the opposite side of the circuit board find the other four plugs which connect to the drive proper. In this case, you must remove this plug. The remaining plugs may be left connected while you remove the drive proper from the chassis. You may however find it more convenient to remove all of these plugs. If so, be sure you remember how they were installed. Now lift the circuit board up and slide the drive proper up and forward. Next set the drive proper down beside and at a right angle to the left side of the case so the cable leading from the drive to the plugs

NEWTRONICS STYLE DRIVE



INSTRUCTIONS for the TECHNICIAN
(Quiet Drive Stop)
(Alignment)
(Speed)

INSTALLATION INSTRUCTIONS

It is recommended that the **QUIET DRIVE** be installed the first time that the **ALPS** drive requires alignment. The **QUIET DRIVE STOP** will not fit in a **NEWTRONICS** drive (see explanation on page 16 if you are uncertain as to which drive you have). The need for alignment can easily be ascertained by the use of the **1541 PHYSICAL EXAM**. Should this be required, the following **INSTRUCTIONS SHOULD BE GIVEN TO THE TECHNICIAN DOING THE WORK.**

The **QUIET DRIVE** stop is a spring-like device which has an outline exactly the same as the standard stop. It is installed in the same location as the original stop, using the same screw and enclosed washer. The specific instructions for replacing it are as follows:

NOTE: If **ALIGNMENT** is **NOT** to be performed, the drive need not be removed from the enclosure in which case steps 4, 5, and 6 may be omitted. Disconnect power before disassembly.

1. Remove the 4 screws from the bottom of the unit and lift off the top of the case. Remove the metal cover, some covers have two screws on the left side.
2. Remove the 2 screws on the side of the unit just below the regulator heat sinks.
3. Remove the 5 screws which hold the circuit board to the chassis.
4. Remove the 6 screws (self tapping) which hold the chassis in the enclosure.
5. Now lift up the chassis and remove the 2 screws on each side of the unit. (These hold the drive proper in the chassis.)
6. If your drive is the **long board** type, it will have the head connector (the black plug) on the opposite side of the circuit board from the other four plugs which connect to the drive proper. In this case, you must remove this plug. The remaining plugs may be left connected while you remove the drive proper from the chassis. You may however find it more convenient to remove all of these plugs. If so, be sure you remember how they were installed. Now lift the circuit board up and slide the drive proper up and forward. Next set the drive proper down beside and at a right angle to the left side of the case so the cable leading from the drive to the plugs

on the circuit board will not be stretched. The chassis may remain in the plastic case.

7. **REPLACE 2 (TWO) SCREWS IN THE CIRCUIT BOARD TO AVOID ANY UNPLEASANTNESS LIKE SHORTING THINGS OUT. Be sure to put one of these screws in the LEFT REAR corner since this is the case ground. Now plug the drive back in and turn everything back on.**
8. Using the **1541 PHYSICAL EXAM** diskette, run the **1541 PHYSICAL EXAM** program in the normal manner (using the F3 key). At the end of one complete run (when the menu reappears on the screen), press the **RUN/STOP** key. This will leave the drive with the drive pulley driven tightly against the stop. **Caution! Remove the diskette from the drive before proceeding!**

Note : If you have not removed the drive proper from the chassis, you must **REMOVE THE POWER PLUG THEN** remove the circuit board to perform the next step.

9. The old stop should be removed very carefully so as not to disturb the position of the drive pulley. Remove all of the **paint** from the screw and the grooves into which the new stop will be fitted.
10. Now install the new stop using the same screw (but use the new washer) which held the old stop in place. Install the new stop with the long side of the spring toward the center of the drive and just touching the land on the head drive pulley. The clearance should be essentially **ZERO**. (NOTE: with the **HARD** stop, some clearance is desirable, but with the **QUIET DRIVE** no clearance at all is required since the spring can and will bend slightly.) **However, the stop should not rest on the head drive pulley wheel, thus preventing it from turning freely.**

Note : If the circuit board was removed, it must of course be replaced before performing the next step.

11. The **PHYSICAL EXAM** program should now be run again. If the program ends with the words **STOP ADJUSTMENT = GOOD** then the stop is correctly installed. If the message is **STOP ADJUSTMENT = BAD** then the stop should be moved according to the following instructions:
 - A. If the alignment part of the program is satisfactory, then the stop is set too far away from the pulley. It should be moved toward the pulley (or simply bend the spring using a pair of long nosed pliers).
 - B. If the alignment part of the program shows that the head cannot read the outside sectors of track one, then-the stop should be moved away from the pulley.
 - C. Be sure that the new stop does not rub against the top surface of the head drive pulley.

RADIAL ALIGNMENT

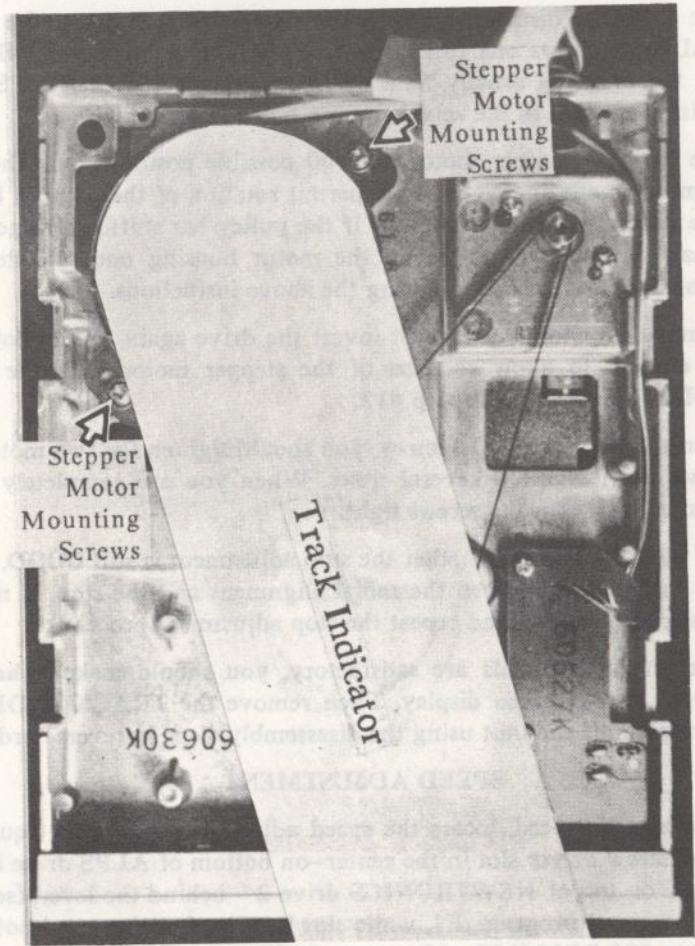
If alignment is not required you may skip to step #19.

12. The first step in alignment is to provide a method for reading the step motor position with acceptable accuracy and repeatability. First, you must turn the drive proper over. Next cut out the notches on the **TRACK INDICATOR** (included in the package). Peel off and save the protective film covering the tape on the end of the indicator. The **TRACK INDICATOR should be securely fastened to the bottom of the stepper motor as in the picture with the scale facing up** (away from you). The **TRACK INDICATOR** should be installed parallel to the side of the drive with the **TRACK SCALE** projecting from the front of the drive. Now turn the drive **right side up** and take the enclosed adhesive label and press it onto the front panel of the drive just above the track scale. The two (**TRACK INDICATOR** and adhesive label) will be at right angles to each other. Now draw a pencil line on the label exactly even with the center line of the **TRACK SCALE**.
13. The stepper motor screws now must be loosened. **DO NOT** attempt to do this without the proper screwdriver. The screwdriver must have good sharp flutes and must be the right size and angle.
 - A. Before attempting to remove the screws, remove the "paint" which has been put on the screw and washer to lock them in place. A hobby knife or other sharp object may be used. The drive must of course be inverted to reach these screws.
 - B. Support the drive from the opposite (top) side as close to the screw to be loosened as possible and loosen one screw. Remove the screw and washer completely and clean all of the "paint from it and from the motor flange. Then replace the screw and tighten it **medium tight**.
 - C. Repeat the above, removing the second screw and replace it.
 - D. Check to make sure that the **TRACK SCALE** has not been moved and that the center line is still aligned with the pencil mark on the panel.
14. Now turn the drive **right side up** and run the alignment part of the **PHYSICAL EXAM** program.

ALPS STYLE DRIVE
LOCATION OF STEP MOTOR MOUNTINGS
AND
TRACK INDICATOR



NEWTRONICS STYLE DRIVE
LOCATION OF STEP MOTOR MOUNTINGS
AND
TRACK INDICATOR



moved from the pulley.
to center up the pulley and for each dot on the surface of
the pulley.

There is always a chance for error in critical adjustments such as those after
checking the alignment one should check the SPEED. If it is O.K. all is well.
If the rest hangs up, then the alignment was on the wrong position see note 12.

15. If the pattern of asterisks on the screen is shifted toward the right (inside of the true track) then the stepper motor housing must be turned so that the front panel indicator lines up on the **OUT** side of the track scale. (See step #16 for "HOW TO....."). and of course, if the pattern is shifted to the left (outside of true track) then the motor housing must be turned so the front panel indicator is lined up on the **IN** side of the track scale.

Note (A) The distance between the two outside lines on the **TRACK SCALE** represents one full track spacing. The distance you will need to turn the motor is usually **VERY SMALL**. Since the **TRACK SCALE** is 20 times as great as the actual spacing on the diskette.

Note (B) The stepper motor has 100 possible positions, and the slots in the motor mounting flange only permit rotation of the housing by a little more than one position interval. If the pulley has shifted a large amount, it may be necessary to rotate the motor housing one full step in the **wrong** direction before following the above instructions.

16. To move the motor, you must invert the drive again, loosen both screws just enough to allow rotation of the stepper motor with the **TRACK INDICATOR** instilled in step #12.
17. When the pattern is satisfactory, you should tighten the two motor flange screws and recheck it several times. When you are completely satisfied you should tighten the screws tight.
18. Now you should note whether the stop adjustment is still **GOOD**. There is some interaction between the radial alignment and the stop. If necessary, go back to **STEP #8** and repeat the stop adjustment procedure.
19. When the adjustments are satisfactory, you should make a **hard copy** printout of the screen display. Then remove the **TRACK INDICATOR** and reassemble the unit using the disassembly steps in reverse order.

SPEED ADJUSTMENT

20. To adjust the speed, locate the speed adjust pot (3/8" blue square with yellow screw driver slot in the center--on bottom of **ALPS** drive (see page 24) and on top of **NEWTRONICS** drive 2" behind the lever, (see p. 20). Run the speed program, **F1**, while slowly adjusting the speed pot. Set the speed to 300 RPM (297 - 301 acceptable).

MAYDAY MAYDAY MAYDAY MAYDAY MAYDAY

There is always a chance for error in critical adjustments such as these. After checking the alignment one should recheck the **SPEED**. If it is O.K. all is well. If the rest hangs up, then the alignment was on the wrong position see note 15

(B) above. We suggest you move to the other position of the stepper motor.

Quiet Drive Stops

1 - 9	\$4.95 each
10 - 99	\$3.00 each
100 - up	\$2.00 each



Cardinal Software

14840 Build America Drive
Woodbridge, VA 22191
(703) 491-6494; Hours: Mon-Fri 10 to 4