

# **A.P.P.L.E.**

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**PRESENTS:**

## **ApTest**

Apple PugetSound Program Library Exchange

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## APTEST *by Mike Butler*

Aptest is a diagnostic diskette. In many cases, it can be very helpful in diagnosing troubles or apparent troubles in your Apple. *Modifications or adjustments to your Apple or peripherals can void your warranty and/or damage your equipment.* It is therefore suggested that upon finding any indication of fault, take your Apple to an authorized Apple service dealer for repair, and furnish them with the results of your own diagnosis.

The foregoing notwithstanding, there is a program on this diskette which is accessible only after the alignment program has run, titled: "Realignment Instructions". This program furnishes complete instructions for realigning your disk drive, should you find it out of adjustment. We again stress that this is *not recommended*.

Before describing the different tests available on this diskette, one other caution must be observed: the disk speed test requires that you use a scratch diskette. A scratch diskette is one on which you have no *good programs*, since they *will be overwritten*.

Eight tests are supplied on this diskette, as follow:

1. Applesoft ROM or Apple Plus
2. Integer ROM or Apple II
3. RAMtest autorepeat
4. RAMtest one pass
5. Disk Speed test
6. Micromodem test
7. Disk card test
8. Alignment test

They are listed above in the order and form that they appear on the menu when the diskette is booted. A ninth test, for the language card (or RAM card) is also possible using tests 1 or 2. A brief description of each test, including the language card, follows, along with other required information.

## 1. Applesoft ROM test

This tests the main board ROMs on an Apple II Plus or the Applesoft Firmware Card ROMs. You will be asked if you have an Autostart ROM. This is normally answered yes, unless you have a very old firmware card.

## 2. Integer ROM test

This tests the main board ROMs on a standard Apple II or the Integer Basic Firmware Card ROMs. You will be asked if you have the programmer's aid ROM. This is normally answered yes, unless you have a very old standard Apple II.

Each of the above tests take two or three minutes to complete. When the test commences, you will temporarily be left with a blank screen until the first ROM has been tested. The complete test takes between two and three minutes to run. As each ROM is checked in turn, a message will be printed to the screen indicating whether the ROM is good or bad.

### Language Card test

To test the RAM on the language card, boot first on the Basics diskette, then boot APTTEST. If you have a standard Apple II, select test No. 1 from the menu. If you have an Apple II Plus, select test No. 2 from the menu. Answer yes to both questions about the Programmer's Aid and the Autostart ROM. The language card RAM will be tested as if it were ROMs.

## 3. Auto-repeat RAM test

## 4. Single pass RAM test

These tests are identical except the auto-repeat tests in an endless loop. This can be helpful for intermittent problems or heating problems. The auto-repeat test can only be aborted by hitting reset. Each RAM memory location in the Apple starting at \$400 [1024] will be tested by sequentially storing every value from \$00 to \$FF [0 to 255]. Since the screen display area from \$400 to \$7FF [1024 to 2047] is part of RAM memory, you will see all of the ASCII characters displayed on your screen, first in FLASH mode, then in INVERSE, and finally in NORMAL. By watching the characters as they change, you can see how far the test has progressed.

If a bad memory chip is encountered, the test will abort and print an error message identifying the offending location in hex, and the row of RAM chips in which the bad chip may be found. If the test was successful, a message to this effect will be printed at its conclusion.

5. Disk speed test (by Steve Wozniak)

*WARNING! This test requires the use of an expendable diskette. Please obey the prompt which asks you to change diskettes.*

This test displays a range of -100 to +100 on the screen, with an inverse vertical bar labeled 'yours' near the center of the screen. This bar will move back and forth horizontally and display the current speed variation from the scale. Readings in the range  $\pm 10$  are ideal; readings in the range  $\pm 25$  are marginally acceptable. Somewhat closer tolerances are recommended for a multiple drive system.

Should your drives not fall within the recommended range, we suggest the unit be taken to an authorized Apple service center for repair.

The disk speed test will run until interrupted by any keypress.

6. Micromodem test

This tests the D.C. Hayes Associates Micromodem II in answer and originate modes for both 110 and 300 baud. The user is advised of the error status of each sub-test and again at the conclusion. The micromodem must be disconnected from the coupler box (this is what the phone line plugs into) for the test to operate properly.

7. Disk controller ROM test

This tests each ROM on your disk controller card. You must indicate whether you have 13 sector (3.2) or 16 sector (3.3) ROMs, and which slot the controller card to be tested is in. You will receive a message at the end of the test advising of the status of the ROMs.

## 8. Diskette alignment test (by Charles Sutor)

This program requires Applesoft ROM or language card. This program does not measure the absolute alignment of a disk. It does measure the *relative* alignment between a drive and any diskette. There are no standards set for the results. However, they may prove useful in several situations.

The slot and drive that you wish to test will be requested. The program will then try to read the diskette in that drive on and between several tracks. After several seconds, the drive will stop and results will be shown. 'Fraction right' is the fraction that the data tracks were read correctly, and should always equal 1.

The other numbers are results of trying to read between two tracks. They are the fraction of times the higher track was read, minus the fraction the lower one was read. The first difference is the average of all such tries. The one labeled 'GOING' comes from head motion from low to high tracks, which is the same direction that initialization occurs. Thus this number will usually be small (less than .1) for a diskette tested in the same drive it was initialized in. The difference marked 'COMING' results from motion from high to low tracks and is often .1 to .2 more positive than the 'GOING' difference.

However, these results may vary as much as .1 to .2 on successive trials, so be sure to repeat any questionable tests. If the differences are greater than .9 or less than -.9, the drive is reading one track consistently when it should be reading between two. The drive that initialized the diskette is not positioning its head where yours is. The alignment of the two is different. That alone does not require any action — diskettes can be reliably read with differences of .9 or more. However, if you have problems reading diskettes from a particular source, and the difference on these diskettes is very high, perhaps alignment is a problem.

To see if it is your problem, test diskettes from a reliable source such as Apple Computer, Inc. or other commercial disks. Test as many as you can; not even Apple is infallible.

If your differences are mostly .3 to .4 or less, you are probably quite well aligned; try to persuade your source to check his alignment! If your differences are much more than .3, you may be having problems with diskettes from those who are off similar amounts in the other direction. If you do have problems, take the drive to a reliable service facility and ask them to check and realign your disk drive.

There are many more disk problems than alignment. If you have trouble with disks in the same drive that initialized them, alignment is not the problem.

Many problems are caused by worn or otherwise defective diskettes. If you have problems with diskettes from one drive not being readable by another, these tests may help you isolate your problem.

## Aligning a Drive

If you have any doubts about this procedure, please *do not do it*. These instructions are not official, authoritative or otherwise blessed! No warranty is made as to their accuracy or applicability.

*We recommend that you take your drive to an authorized Apple service dealer.*

The purpose of these instructions is to share our experience with others who would tinker with their drive, despite all advice to the contrary. *You can damage the drive by shorting leads or test points.*

You can put the drive into worse adjustment than it is now.

You can void your warranty!

1. Remove the top cover.
2. Remove the bottom cover.

On the bottom of the drive is a stepping motor, secured on two sides with screws. These screws are in slots so that the motor can rotate slightly when the screws are loose.

This rotation is the alignment adjustment.

Adjust by moving clockwise. If your difference numbers were too negative and you wish to make them more positive, adjust counter-clockwise to make the differences less positive.

Not much movement is required. It is difficult to make adjustments that will change the differences by less than .3.

3. Make the desired adjustment.
4. Check the alignment.
5. Repeat steps 3 and 4 until discouraged.
6. Replace the covers when finished.

## Miscellaneous

APTEST is supplied on a thirteen sector diskette. It will not function in a sixteen sector environment, therefore no purpose would be served by MUF-FINING the programs over to 3.3. All of the included programs will test DOS 3.3 formatted diskettes where required. DOS 3.3 users should boot on the Basics diskette, then boot APTEST for proper operation.

## Towards longer diskette life (and peace of mind)

Diskettes are fragile, perishable magnetic media. The magnetic oxide coating is similar to that of an audio cassette, and subject to many of the same problems. On audio tape, a magnetic "drop out", a minor imperfection in the oxide coating, will cause a barely perceptible, momentary drop in the sound level. On a computer diskette, this tiny drop out is enough to cause a loss of data. A one byte error, in the right (actually wrong) place can make the entire diskette unreadable, the dreaded I/O ERROR.

Modern diskettes with the raised hub ring at the center appear to improve alignment and hence read/write reliability. There are many levels of diskette quality, and we again compare diskettes to cassettes; we recommend using top-of-the-line products for your most critical applications; 'white box' brands are fine for games and backups.

Surfaces wear in time. It is probably a good idea to copy high usage diskettes every few months. Put what had been the original aside as a back up, and start using the copy. If there were any copy errors, you will soon be aware. Above and beyond normal wear and tear, diskettes (like cassettes) are subject to the whims of stray electromagnetic fields, x-rays, coffee, nicotine, and jelly or jam or even just oily fingerprints. To guard against some of these, keep your diskettes in the handy little plastic boxes you can buy (or get free). If you travel by air, ask that they be hand carried through the x-ray inspection station.

Program errors, or a bad copy of DOS can blow a diskette. Always use write protect tabs when you can (although this is no guarantee), and *ALWAYS* keep a backup diskette of valuable programs or data. *NEVER* hit reset when the drive is running without first opening the drive door, and just to be even safer, take the diskette out. Drives sometimes have a will of their own, so if your drive ever comes on without your express permission, *QUICK*, open the door! This is particularly important if you are 'investigating' strange and unknown areas of Apple: best to *leave* your drive door open.

There are both pros and cons about using the reverse side of diskettes. We feel (without going into a full discussion) that the cons outweigh the pros. If you must use the backs at all, then reserve them for games or archival purposes.

### DISCLAIMER

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