Z-100 LifeLine
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June 2023

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SHIP v3 Utility

The Z-DOS v3 Utility That Moves a Hard Drive's Read/Write Heads to a Safe Position!

Edited by Steven W. Vagts
"Z-100 LifeLine"

REFERENCES:

Digital Research CP/M-85 Winchester Supplement
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"Z-100 LifeLine", issue #38, March-April 1995, "Why Should I Ship My Hard Drive", by Mike Zinkow

TRADEMARKS:

The Z-DOS SHIP v3 Utility moves the read/write heads of a Winchester disk to a position where they can not contact and destroy stored data on a disk platter in case the drive or computer is subjected to physical shock.

The SHIP utility is recorded on the Winchester Utility Disk, which is supplied with your Winchester disk hardware documentation. The Winchester Utility Disk runs under the MS-DOS Operating System and is bootable on its own.

1 WINCHESTER DISK SAFETY

Winchester disks are very sensitive precision instruments that can be easily affected by physical shock or impact. The data stored on a Winchester disk is also vulnerable. Sudden contact between the hard ceramic platform to which the read/write heads are attached and the disk itself can damage the thin, precision recording surface.

If the computer is bumped, operational shock could cause the ceramic head platform to come into contact with the spinning disk. Damage could be severe enough to chip away a piece of the recording layer (head crash), leading to a hard error and possible loss of a file.

Non-operational shock is typical of the type of damage that could be sustained while the hard drive/computer is being moved. It can cause the unparked read/write head assembly to slap violently against the recording disk surfaces, actually embedding a footprint into the disk(s). The further away from the innermost cylinder and the more violent the shock, the greater the potential for disaster. Damage from non-operational shock could result in complete failure of the drive.

Another common problem among early hard drives was - STICTION - or 'Why My Hard Disk Won't Come Up To Speed?'

STICTION, or STatIC FricTION, results when two very smooth surfaces come into contact and stick together, much like a drinking glass adheres to the smooth surface of a glass table. Stiction could occur when the read/write head platform came to rest upon the very smooth recording surface of the disk.

Weather also had some influence upon stiction - the lower the computer area's relative humidity, the higher the possibility of stiction.

When stiction occurs, and the read/write head assembly had not been moved to its parking area, the disks will not spin up. Stiction becomes most prevalent when the read/write head assembly
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is allowed to come to rest near the outermost tracks of the disk drive. The heads act upon the disk surface the same way disk brakes stop a car.

The further away the read/write assembly is from the spindle, the more difficult it is for the drive motor to overcome the starting loads and the higher starting currents. If the drive motor's starting current is consistently higher than its design parameters, the motor's windings will eventually either short or open.

To control stiction in newer drives, the disk surfaces may be textured microscopically. Texturing had all but eliminated stiction problems in units where drives were allowed to spin for extended periods of time. However, texturing was not a cure all. If the read/write heads were permitted to constantly land on the recording surfaces instead of the parking cylinder, the start/stop action tended to eventually wear away the anti-stiction texturing and polished the disk surfaces to the point where stiction occurred anyway. (On the newer drives with glass disks, this could occur after 100,000 or more start/stop cycles.)

Also, many of the newer drives were equipped with autopark on power off. However, on the earliest attempts at autopark, the term did not necessarily mean that the heads were parked at the innermost cylinder. On many of the early drives, the heads simply lost the air flow keeping them floating across the disk and allowed them to gently clamp onto the disk at their present location.

The smaller, 5-10 Mb (megabyte) drives supplied with the Z-100, and other drives of that era did not have the surface texturing, but many of the larger 20+ Mb drives had autopark.

Because of these vulnerabilities, unless the drive you are using is known to have autopark, you should take special precautions by running SHIP before moving or shipping the disk or computer containing the disk drive, even before moving it across the room. And to avoid stiction problems, it is particularly imperative that you 'SHIP' your drives each time you power down.

The SHIP command enables you to protect your Winchester disk and the read/write heads by moving the heads towards the hub of the Winchester disk platters, to the parking cylinder.

The parking cylinder is the cylinder nearest the disk assembly spindle. This is the area with minimal disk assembly deflection (reducing the effect of Stiction and physical shock), and the point at which the read/write platform is fully retracted. This is the point of minimal movement and is a non-data storage area of the disk.

The conclusion? Unless you are certain your drive has true Auto-Park, ALWAYS SHIP your hard drives before turning off computer power.

Note: The Z-217 controller card causes the read/write heads to move to cylinder zero the first time you access the Winchester disk after power up. Therefore, the head positioning caused by ship will remain in effect ONLY UNTIL you turn the disk on again and access it.

2 INVOKING SHIP

To invoke SHIP, type the SHIP command and press {RETURN} at the system prompt:

A:SHIP {RETURN}

When invoked, SHIP displays a message in the following form:

SHIP version 2.00
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The SHIP utility helps you to:

* *Position the read/write heads of the Winchester disk at a safe location for subsequent transportation of the Winchester disk unit.*

Winchester drive unit number (0-3): _

Typing {**0**} and pressing {RETURN}, causes the computer to respond with:

Not ready error reading drive E
Abort, Retry, Ignore? _

3 SHIP Error Messages

Unable to communicate with the Z-217 controller

Cause: SHIP cannot locate the Z-217 controller. This could mean that the Z-217 is not firmly plugged into the S-100 bus, that the drive cable connectors are not securely fastened, or that the controller has a hardware malfunction.

Cure: Check to see that the controller card and all cable connectors are secure, and run SHIP again.

If you have any questions or comments, please email me at:
z100lifeline@swvagts.com

Cheers,

Steven W. Vagts