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Knowledge of Data Interchange Issues Can be Basis for Improving Error Rate

By Norman Tu, *President, DisCopyLabs*

Less than ten years ago, the error rate of one floppy disk failure out of 100 floppies copied was the generally accepted industry standard for software duplication.

Today the rate has improved to one failed unit out of 1000 copies. The improvement is impressive considering the increased complexity of modern software, for example, the greatly increased number of tracks per disk and density (BPI).

DisCopyLabs believes that is not good enough, certainly not for the future of software industry. So we have undertaken a campaign to lower our defect rate a true order of magnitude to *from one in 1,000 to one in 5,000.*

To achieve this unique, higher level of reliability we have been examining the interrelationship between the media, disk drives and duplication hardware, and their operating environment. This complex, multi-faceted relationship and its management is commonly called the issue of data interchange.

The problem of disk error, typically so called "soft" errors, occurs in a totally random fashion. The same disk might run perfectly on three or four drives and then fail on a fifth. In fact, this is how most soft errors happen. Why it happens is what we intend to learn much more about.

We do know that data interchange failures are a \$100 million a year problem, not including the cost of lost data and end user time. The total price for data interchange failure will skyrocket in the future as performance requirements for flexible disks and drives become more demanding, as formats shrink smaller and capacities expand unless, we all work to improve the quality.

Getting a handle on the growing data



interchange problem through the traditional technique of testing will not be effective enough. Test results are usually too shaky to build solid solutions on. However, analysis indicates that virtually all soft errors can be avoided by

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proper process controls in the production of drives, duplication hardware used and the proper certified media used.

Consequently, what is necessary is a thorough understanding of data interchange issues, the kind of knowledge that is best acquired through investigation and study with experts in the technologies.

At DisCopyLabs, we are well on our way toward this preliminary objective. We have identified a number of areas to examine closely, including how the media coating, coercivity and liner affects performance and yields. We also are studying in detail the various factors that affect drive and system performance, software recording methods, and the operating environment.

To achieve 99.999 percent data interchangeability, we are considering many recommendations in connection with production. Among the more important suggestions is that

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Data Interchange Requires Accurate Understanding of Quality

By William B. Proctor, *Proctor Associates*

A practical definition of a good data interchange is when a disk created on one machine will be read correctly on any other similar machine working within the same specifications. Unfortunately, 2.5 percent of disks duplicated in the U.S. fail to work the first time in a customer's environment.

In more than 90 percent of the cases, the problem is a buildup of tolerances, including tolerances in the manufacture of the diskette, in diskette duplication, in the user's drive and the drive of the software duplicator.

These tolerances involve such obvious factors as track alignment and drive calibration to more esoteric causes, such as instantaneous torque variations. Understanding the cause of these variables is paramount to controlling them.

Everyone has a definition of quality. A

diskette manufacturer, like the software publisher, may define it in terms of product returns. To a duplicator it may mean yield or testing to an industry standard such as ANSI. These are all indirect measurements of quality and many of them are inexact.

The measurement I prefer is in the end user's environment. Does the product work first time, every time? Many duplicators attempt to measure this by using a target drive as quality tool. This allows them to decide that the data recorded is exactly what was intended to be recorded.

While this is an important test, it does not insure that the data recorded will be readable by all drives in the field. They usually do not know if their target drives represent the best, worst or average drive in the field.

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Improving Error Rate

there should be standardization, according to the format type, of all loaders and drives, all duplication systems and software, and all media types. This will greatly reduce the likelihood of error from any incompatibility of process components, however minor those differences might be.

We are making this commitment to an improved error rate of *1 in 1,000 to 1 in 5,000* because software and its production are continually getting more complex. Just look how the number of disks per package have increased, as well as the expense of large packages to the software publisher and software user.

When software companies factor in the expense of managing returns and the loss of customer satisfaction and business, the numbers become even bigger.

Our commitment and investment in data interchange improvement was illustrated when we invited Proctor Associates of Cupertino, CA, to conduct its two-day seminar on interchange issues at DisCopyLabs to our management and technical team. Bill Proctor, a universally acknowledged expert on flexible media recording technology, has given seminars on the subject to such companies as IBM, Hewlett-Packard, Sony and Apple.

Since there is widespread common interest in the subject, we also invited several of our largest customers to participate.

DisCopyLabs is determined to demonstrate its software manufacturing leadership in all ways that are important to its customers. Achieving our objective of reducing the error rate to *1 in 1,000 — 1 in 5,000* will certainly raise quality standards for the entire software industry.

North & South, DisCopyLabs Expands To Increase Its Value to Customers

Expansion of DisCopyLabs' facilities, Fremont and Duarte, continues as the company keeps investing in resources and people to accommodate its growth, said David Tu, Vice President-Operations.

DisCopyLabs-Duarte

At DisCopyLabs-Duarte, we have increased capacity by 300% to meet growing demand. Three additional systems have been added since acquiring Hoffman Computer Systems on February 1, 1991. DisCopyLabs-Duarte is now duplicating all popular tape formats.

As part of the overall upgrade underway at this facility, the duplication and labeling areas have been air-conditioned. The controlled environment has improved work conditions and is resulting in higher production quality. Similar enhancements are being made throughout the building.

Staff training programs have been completed at Duarte, providing trained people for two shifts of two packaging lines each. The capacity of this group is 300,000 packages a month, relieving some of the load at the Fremont facility, according to David.

DisCopyLabs-Fremont

There has been a great deal of expansion activity at DisCopyLabs' headquarters facility as well.

"We expanded the package labeling and collating operation on the first floor and have added an additional assembly line to an off-site facility on Kato Road. We've also freed up much needed space for our tape division" reported David.

We have added two new Trace duplicating systems recently, raising monthly capacity to five

million disks. The duplication department moved to the second floor, doubling the current space.

Another service in development is an electronic data exchange (EDI). Through this exchange customer purchase orders will automatically enter the DisCopyLabs' data entry system, reducing the time, handling and paperwork usually associated with order processing.

"We are investigating several other conveniences in consultation with customers, and we expect to be introducing some of them in the near term," said David.

Capacity Available for 4 MB - 3.5 in. Formats; Electronic Transfer of Floppies Available

DisCopyLabs has enlarged its capacity to handle the 4 MB -3.5 inch format since it began duplicating the diskette several months ago.

This is in response to the growing interest in the product following IBM's announcement that it will utilize this format.

The company is preparing to accommodate the high volumes of 4 MB media expected within the next few months.

"Our close relationship with Toshiba will assure our customers of an adequate supply of these hard-to-obtain diskettes," said Norman Tu, President.

Electronic Data Transfer

Another service which will soon be offered to customers is the electronic data transfer to floppy disks, which is already in place between DisCopyLabs' facilities in Fremont and Duarte.

In connection with the electronic transfer capability, floppies can be downloaded in minutes, eliminating the need to send masters by couriers.

"Only a small investment of \$2,500 to \$3,500, depending on the configuration, is required to initiate this highly convenient and cost-cutting service at a customer location. Anyone who wants more information can call sales," said Norman



Left to right: Peter Lee, DisCopyLabs Accounting Manager, Paul Caslas, Tax Director, Hemming Morse, Inc., Norman Tu, Mark Constantini, Tax Manager, Erland Frajelin, Staff Accountant.

Hemming Morse, DisCopyLabs' accounting firm for the last 6 years, was honored at a dinner in appreciation for their contribution to DisCopyLabs' growth.

Please note: DisCopyLabs' New Telephone Area Code is 510.

100 Million Disks And Still Going Strong



Scott Davis, Director of Operations,
Autodesk of Sausalito



Vaughn Sucevich, Director of Operations,
Borland of Scotts Valley

100,000,000! That's the milestone DisCopyLabs reached his year when DisCopyLabs duplicated its 100 millionth disk.

To mark this achievement, Norman Tu, Founder and President, recently awarded plaques of appreciation to some of the company's oldest customers.

When he started the company in 1982, with a labor force of one - himself - above a beauty salon in Menlo Park, the prospect of producing even 1,000 disks seemed so far away.

"I continue to be deeply grateful for the first piece of business and all the business we were privileged to handle for our customers over the years, large and small. It is their continuing confidence in DisCopyLabs that has made this event possible, and all of us are thankful for the opportunity to serve their needs," Norman said.

"And now, on to the second hundred million."



Helen Mann, Director of Operations,
The Santa Cruz Operations



Gordon Clochon,
Vice President of Operations,
Symantec of Cupertino



Ned Bodie, Vice President & Vickie Bodie, President,
Volkswriter of Monterey, DisCopyLabs' oldest customer

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Data Interchange

My seminar specifically addresses this area by defining the worse case drive in the field. This definition is based upon actual design data from manufacturers and much practical experience and empirical data. The result is that a drive can be altered to represent the worst case drive. If this drive is used by the QC organization, it can monitor the process and decide when the process is producing product that is likely to fail in the field. Companies employing this technique have reduced field failures from 2 percent to 0.3 percent.

Bill Proctor, an authority in media recording technology, recently presented a two-day seminar at DisCopyLabs on the topic of Data Interchange. His consulting organization in Cupertino, CA, has given this seminar to more than 50 major organizations throughout the world over the past 18 months.

In a continuation of its leadership role in software replication, DisCopyLabs is pleased to announce the availability of duplication in the QIC 320 and QIC 525 data cartridge formats. Call your sales representative for more information.



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A Call For Comments

Interested in CD-ROM, VHS, or 800#? Let Us Know and We May Offer Them

A major component of DisCopyLabs' philosophy is to be the most helpful software manufacturer in the industry. One effective way we demonstrate this concern is to try to anticipate evolving customer needs with responsive new products.

We are asking customers to help us with information. reactions to some proposed offerings we're thinking about. Please take a moment to complete the enclosed survey form and mail it back to us or call your Accounts manager at (510) 651-5100.

One of the areas DisCopyLabs is looking at is CD-ROM duplication. This market is rapidly growing because of the demand for low cost, large capacity storage. Over the past year we've seen major workstation companies move to CD-ROM storage for some of their systems.

We think others will follow and CD-ROM will soon develop sizable market niches for software development and distribution, especially for pre-mastering and write once-only applications.

Another potential new product line is VHS-format video tape duplication. More and more software companies include video training material in their packages. Many would find it convenient if DisCopyLabs could reproduce VHS cartridges along with the software.

A service we've been asked to provide is an order-taking and fulfillment capability, through toll-free 800 numbers, to serve our customers' customers. We have had requests from several software publishers to manage some of their order processing functions, thus freeing them for other work.

The general idea is that software customers would call an 800 number to DisCopyLabs which would accept the order, fill it and do the invoicing.

Your thoughts about these proposals, or any others you wish to make, would be appreciated. They will guide us as we continue to expand and improve our customer support.

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