

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today  
(1) was not written for publication in a law journal and  
(2) is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte RICHARD H. HENZE

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Appeal No. 96-1209  
Application 08/168,805<sup>1</sup>

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ON BRIEF

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Before KRASS, FLEMING and TORCZON, Administrative Patent  
Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of  
claims 1, 2, 4 through 18 and 20. Claims 3 and 19 have been  
canceled.

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<sup>1</sup> Application for patent filed December 15, 1993.

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The invention pertains to minimizing damage to disk drives if and when the disk drive is dropped. More particularly, shock-induced damage to the disk drive is minimized by sensing net acceleration of the drive to determine if it is similar to a free falling object and then, if the acceleration so indicates, determining if the net acceleration event occurs for a sufficient amount of time to indicate that the drive is falling, rather than merely being subjected to some external vibration. If both the acceleration and time period test are affirmative, action is taken to prepare the disk for imminent collision.

Representative independent claim 11 is reproduced as follows:

11. A disk drive comprising:

a housing;

at least one storage disk rotatably connected to the housing to spin about an axis of rotation;

at least one actuator arm operably connected to the housing to move relative to the storage disk and radially position a read/write head across the storage disk;

an accelerometer device mounted within the housing to measure acceleration of the disk drive as it falls along three

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mutually orthogonal axes  $x$ ,  $y$ , and  $z$  and to resolve the measurement into respective vectors  $a_x$ ,  $a_y$ , and  $a_z$ ;

computational means for deriving a net acceleration  $a_{net}$  of the disk drive from the vectors  $a_x$ ,  $a_y$ , and  $a_z$ ;

evaluation means for comparing the net acceleration  $a_{net}$  with a selected acceleration threshold level indicative of a falling disk drive and for outputting a first signal when the net acceleration  $a_{net}$  exceeds the threshold level;

timing means for measuring duration of the first signal output by the evaluation means and for outputting a second signal when the measured duration exceeds a selected reference time period; and

control means for preparing, in response to the second signal output by the timing means, at least one of the storage disk and the actuator arm for a shock induced when the disk drive impacts a surface at the second elevation.

The examiner relies on the following reference:

Comerford	5,227,929	July
13, 1993		

Claims 11 through 15 stand rejected under 35 U.S.C. §§ 102(a) or (e) as anticipated by Comerford. Claims 1, 2, 4 through 10, 15 through 18 and 20 stand rejected under 35 U.S.C.

§ 103 as unpatentable over Comerford.

Reference is made to the brief and answer for the respective positions of appellant and the examiner.

OPINION

Turning first to the rejection of claims 11 through 15 under 35 U.S.C. § § 102(a) or (e), we will sustain this rejection.

Appellant does not deny that Comerford discloses a disk drive having a housing, a storage disk, an actuator arm, accelerometer device, computational means, evaluation means and a control means, as claimed. The only issue, as argued by appellant, is whether Comerford discloses the claimed "timing means." It is appellant's contention that Comerford does not disclose such a means for measuring a duration that a fall of the disk drive is in progress.

Comerford does teach, throughout the disclosure, that a control is activated when a value of a calculated acceleration falls within a preset range of accelerations, understandably leading to appellant's conclusion that Comerford parks the disk head at the first hint of a predetermined acceleration, i.e.,  $1g$ , without any consideration of a predetermined period of time. However, to whatever extent that interpretation might, at first, appear reasonable, the disclosure, by

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Comerford, at column 4, lines 11-15, that

[w]hen the value of the calculated acceleration falls within the range continuously for a period suggesting a fall is in progress, the dedicated processor **24** generates a high priority interrupt to the CPU **26** [emphasis ours]

clearly suggests, in our view, that Comerford does take into account, in the determination of whether to effect a control, a time period during which the acceleration exceeds a threshold level.

While appellant urges us to consider the disclosure of Comerford as a whole, considering that a time period is never mentioned in the summary of the invention or in the claims, we cannot ignore the disclosure, supra, at column 4. While the summary and/or the claims may only describe the invention of Comerford broadly, the section of the specification, i.e. column 4, setting forth the details of the invention, clearly indicates that some time period, wherein the acceleration value falls within a predetermined range, is measured. We cannot find any other reasonable interpretation of the quoted

language in Comerford's disclosure. There does not appear to be any other meaning when one is informed that a value falls within a range continuously for a period than that a time period is measured. Thus, Comerford does not cause the dedicated processor to generate the high priority interrupt to the CPU unless the predetermined value of acceleration has been exceeded continuously for a period, i.e., for some predetermined time period.

Appellant compares the flowcharts of Figure 8 of the instant disclosure and Figure 3 of Comerford in order to show that whereas the latter goes directly to interrupt if the acceleration value is within a predetermined range, the former goes on to a step of measuring a duration after the determination of an acceleration value exceeding a predetermined value, concluding that Comerford takes immediate action, viz., parking the heads, without waiting any prescribed period of time.

We disagree. When coupled with the disclosure at column 4 in Comerford, one would reasonably conclude that question box 33 in Comerford's Figure 3, i.e. "ACCEL IN RANGE?" inherently includes the unasked question, "Is the acceleration

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value within range continuously for a predetermined period of time?" There is nothing within the disclosure of Comerford that indicates that Comerford takes action immediately, as contended by appellant. Moreover, there is always some finite period of time between the sensing that some action should be taken and the actual taking of that action. After all, even in appellant's preferred embodiment, with a time period of 90msec, to the ordinary observer, that time period may be considered to be immediate, for all intents and purposes. Therefore, appellant's arguments as to the immediacy of Comerford's actions are not persuasive.

We have weighed appellant's arguments regarding a lack of any time period measurement in Comerford against the examiner's

position that there is such a measurement in view of the column

4 recitation and we find that the preponderance of the evidence favors the examiner's position.

With regard to the rejection of claims 1 and 17 based on

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35 U.S.C. 103, we will also sustain these rejections.

Claims 1 and 17 specifically recite that the time period is at least 90msec. While appellant argues that Comerford discloses no such specific time period, and we agree, there is nothing critical about this number. The critical thing is to set a time period which is not so long that the disk drive collides with the floor, etc., and not so short that a slight vibration might set off the control means unnecessarily. The choice of 90msec would appear to be an obvious choice, based on the particular heights one might conclude the disk drive is in danger of falling from.

Turning now to the rejection of claim 5, appellant argues that Comerford's processor does not perform the combined tasks of (1) through (5) required by claim 5. While it is not clear whether appellant is relying on any particular task, it appears to us that Comerford clearly computes a net acceleration, compares it with a selected acceleration (Comerford determines whether the measured acceleration is within a range of predetermined accelerations), inherently measures a duration that the acceleration exceeds a predetermined acceleration (column 4, lines 11-15), compares

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this to a predetermined time duration (after all, some predetermined time period has been set) and outputs a signal for action if the measured duration exceeds the reference time period.

With regard to claim 6, although a specific "timer" structure is not shown by Comerford, it is clear from the column 4 disclosure that Comerford contemplates a timer. Some timing operation, inherently performed by a "timer," occurs in order to determine if an acceleration is within a predetermined "range continuously for a period . . . ."

With regard to claim 7, we will not sustain the rejection of this claim under 35 U.S.C. § 103. This claim requires that the control action to be taken upon the satisfaction of the two step test is that the actuator arm is instructed to move toward the inner circumference of the disk in preparation for impact. While Comerford discloses parking the disk drive heads and, optionally, braking the disk's rotation, there is no suggestion in Comerford of moving the actuator arm toward the inner circumference of the disk in preparation for impact. As appellant discloses at page 9 of the specification, this action to initiate a seek to the inner radius landing zone of

the disk causes the read/write head to move away from the tracks, minimizing potential damage to the slider, head, suspension and disk while simultaneously preventing write errors. Accordingly, the choice of moving the actuator arm to this location is more than a mere design choice but, rather, has disclosed advantages. Therefore, the examiner's reliance on In re Kuhle, 526 F.2d 553, 554-55, 188 USPQ 7, 8-9 (CCPA 1975) in this regard is misplaced.

With regard to claim 16, although appellant reiterates the claim recitation, at page 14 of the brief, there is no separate argument regarding the merits of this claim, appellant, instead, relying on "the reasons expressed above with respect to claims 1 and 17" [brief - pages 14-15].<sup>2</sup> Accordingly, claim 16 will fall with claim 11.

Dependent claims not specifically argued by appellant will fall with the claims from which they depend.

We have sustained the rejection of claims 11 through 15 under 35 U.S.C. §§ 102 (a) or (e) and we have sustained the

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<sup>2</sup> While claim 16 depends from claim 11 and not from claim 1 or 17, appellant obviously refers to the reasoning of the arguments regarding claims 1 and 17 because the time period of "at least 90msec" was a limitation argued with regard to claims 1 and 17, that limitation not appearing in claim 11.

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rejection of claims 1, 2, 4 through 6, 8 through 10, 15  
through

18 and 20 under 35 U.S.C. § 103. We have, however, not  
sustained the rejection of claim 7 under 35 U.S.C. § 103. The  
examiner's decision is, accordingly, affirmed-in-part.

No time period for taking any subsequent action in  
connection with this appeal may be extended under 37 CFR  
§ 1.136(a).

AFFIRMED-IN-PART

ERROL A. KRASS )  
Administrative Patent Judge )  
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	MICHAEL R. FLEMING	)	BOARD OF
PATENT		)	
	Administrative Patent Judge	)	APPEALS AND
		)	INTERFERENCES
		)	
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