Method for preventing excessive trimming of a previously written data track when appending data in a magnetic tape recording device

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Method for preventing excessive trimming of a previously written data track when appending data in a magnetic tape recording device

Abstract

This invention provides a means for protecting previously written data tracks on magnetic tape from excessive trimming due to tape expansion or contraction caused by changes in environmental conditions. The width of tape media varies based on environmental conditions. If data tracks are written on a magnetic tape at one environmental condition and then data is later written to the same tape at a significantly different environmental condition, the previously written tracks can be over written to the point that the data on the previously written tracks can no longer be read. This invention measures the width of the data band on the tape at the time the data is written and records that information for later reference. If data is to be written to the tape at a later time when the environmental conditions may have changed, the new width of the data band is measured and compared to the previously recorded width when the adjacent track was written. If the difference in widths is determined to be large enough to compromise the adjacent track, the write operation will be modified or disabled in order to protect the previously written data.

Prior Solutions

The prior solutions rely on the statistical prediction that the environmental conditions will never cause the tape to change width enough to cause a track to be overwritten. The track misregistration budget has to be very carefully studied and the reader width small enough that overwriting an adjacent track has a very low probability. There is no real-time feedback to ensure it never happens.

There are existing methods that improve the chances of reading a track at a different environmental condition than it was written at. This disclosure focuses on protecting the data that was already written on tape from being over written. When data is appended to a tape at a significantly different environmental condition from the condition that the first data was written, there is danger of over writing the previously written data. This disclosure protects against this happening.

Description

In one embodiment of the invention, the separation between the top and bottom servo bands of a data band is measured and written onto the tape with each data set that is written. When data is to be appended to the previously written tape, the tape drive will read the value of the servo band separation written into the data on the track that is to be appended, or the adjacent track, and compare that value to the current value of servo band separation. If the difference is large enough to cause risk of excessive over writing of the adjacent track, the write operation
will not be allowed and the user will be warned of the reason for not completing the write operation.

In another embodiment, the value of servo band separation could be stored in a non-volatile memory chip in the tape cartridge - instead of in the dataset written on tape - for reference during later write operations to decide if writing should be disabled.

In yet another embodiment, if it has been determined that the tape width has changed enough to compromise the adjacent track during a write append operation, the tape width would be modified by changing the tension before writing the appended data. A flow chart of this embodiment is shown below.

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Write append command received

Search to append point and read stored tape width on adjacent written track

Compare width of adjacent track with current tape width

Is difference large enough to damage adjacent track?

YES

Adjust tension to match tape width as close as possible to adjacent track

NO

Write data using nominal tension

Write data using adjusted tension
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Advantages

The advantage of this invention is that it allows for wider read heads and higher track densities than can be allowed without this real time feedback to protect against overwriting adjacent data tracks.

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