

SUMMARY OF THE INVENTION

It is therefore one object of the present invention to provide a slider suspension assembly for a data-recording disk file.

It is another object of the present invention to provide an improved slider suspension assembly and a method for mechanically and electronically attaching the slider to the suspension.

According to one aspect of the present invention there is provided a head gimbal assembly comprising: a load beam; a flexure coupled to said load beam; an integrated cable formed at least partially within said load beam along the length thereof, said integrated cable having a dielectric layer and a plurality of conductors disposed upon said dielectric layer; a slider mounted to said flexure having a plurality of conductive pads disposed along a selected edge thereof; a loop within said integrated cable of a radius sufficient to cause said integrated cable to overlie said selected edge of said slider; and at least one aperture within said dielectric layer within said loop of said integrated cable overlying said plurality of conductive pads such that said plurality of conductors are in electrical contact with said plurality of conductive pads.

According to another aspect of the present invention there is provided an information storage system comprising: a storage medium having a plurality of tracks for recording of data; a load beam having arm-electronic termination pads; a flexure coupled to said load beam; an integrated cable formed at least partially within said load beam along the length thereof, said integrated cable having a dielectric layer and a plurality of conductors disposed upon said dielectric layer; a slider mounted to said flexure having a plurality of conductive pads disposed along a selected edge thereof; a loop within said integrated cable of a radius sufficient to cause said integrated cable to overlie said selected edge of said slider; and at least one aperture within said dielectric layer within said loop of said integrated cable overlying said plurality of conductive pads such that said plurality of conductors are in electrical contact with said plurality of conductive pads.

According to still another aspect of the present invention there is provided a method of manufacturing a head gimbal assembly, said method comprising the steps of: positioning a slider proximate to the end of a load beam and rotated 90 degrees with respect to said load beam, said slider having a plurality of conductive pads along one edge thereof; positioning an integrated cable along said load beam and extending beyond an end of said load beam, said integrated cable formed by a dielectric layer and a plurality of conductors disposed thereon; providing a loop within said integrated cable at substantially 90 degrees from a longitudinal axis of said load beam; removing a portion of said dielectric layer within said loop of said integrated cable to provide an aperture at

a point overlying said plurality of conductive pads; mating said plurality of conductors with said plurality of conductive pads through said aperture; rotating said slider 90 degrees to a point adjacent to said load beam; and attaching said slider to said load beam.

The foregoing objects are achieved as is now described.

CLAIMS

1. A head gimbal assembly comprising:
 - a load beam;
 - a flexure coupled to said load beam;
 - an integrated cable formed at least partially within said load beam along the length thereof, said integrated cable having a dielectric layer and a plurality of conductors disposed upon said dielectric layer;
 - a slider mounted to said flexure having a plurality of conductive pads disposed along a selected edge thereof;
 - a loop within said integrated cable of a radius sufficient to cause said integrated cable to overlie said selected edge of said slider; and
 - at least one aperture within said dielectric layer within said loop of said integrated cable overlying said plurality of conductive pads such that said plurality of conductors are in electrical contact with said plurality of conductive pads.
2. The head gimbal assembly according to claim 1 wherein said plurality of conductors are ultrasonically bonded to said plurality of conductive pads.
3. The head gimbal assembly according to claim 1 wherein said plurality of conductors are terminated to said plurality of conductive pads by laser solder reflow.
4. The head gimbal assembly according to claim 1 wherein said slider is offset with respect to a gimbal pivot point within said flexure in order to compensate for bias forces exerted by said integrated cable upon said slider.
5. The head gimbal assembly according to claim 1 wherein said integrated cable is symmetric with respect to a longitudinal axis of said load beam.
6. The head gimbal assembly according to claim 1 wherein said slider is a thin-film inductive head.
7. The head gimbal assembly according to claim 1 wherein said slider is a thin-film MR head.

8. The head gimbal assembly according to claim 1 wherein said plurality of conductors within said integrated cable comprises a pair of read lines nested inside a pair of write lines so that said write lines act as a noise shield during a read operation.

9. The head gimbal assembly according to claim 8 wherein said write lines are grounded during the read operation so as to enhance electrical shielding.

10. The head gimbal assembly according to claim 8 wherein said plurality of conductors are shunted together near said plurality of conductive pads for added electrostatic discharge protection during the assembly process.

11. An information storage system comprising:

- a storage medium having a plurality of tracks for recording of data;

- a load beam having arm-electronic termination pads;

- a flexure coupled to said load beam;

- an integrated cable formed at least partially within said load beam along the length thereof, said integrated cable having a dielectric layer and a plurality of conductors disposed upon said dielectric layer;

- a slider mounted to said flexure having a plurality of conductive pads disposed along a selected edge thereof;

- a loop within said integrated cable of a radius sufficient to cause said integrated cable to overlie said selected edge of said slider; and

- at least one aperture within said dielectric layer within said loop of said integrated cable overlying said plurality of conductive pads such that said plurality of conductors are in electrical contact with said plurality of conductive pads.

12. The information storage system according to claim 11 wherein said plurality of conductors are ultrasonically bonded to said plurality of conductive pads.

13. The information storage system according to claim 11 wherein said plurality of conductors are terminated to said plurality of conductive pads by laser solder reflow.

14. The information storage system according to claim 11 wherein said slider is offset with respect to a gimbal pivot point within said flexure in order to compensate for bias forces exerted by said integrated cable upon said slider.

15. The information storage system according to claim 11 wherein said integrated cable is symmetric with respect to a longitudinal axis of said load beam.

16. The information storage system according to claim 11 wherein said slider is a thin-film inductive head.

17. The information storage system according to claim 11 wherein said slider is a thin-film MR head.

18. The information storage system according to claim 11 wherein said plurality of conductors within said integrated cable comprises a pair of read lines nested inside a pair of write lines so that said write lines act as a noise shield during a read operation.

19. The information storage system according to claim 18 wherein said write lines are grounded during the read operation so as to enhance electrical shielding.

20. The information storage system according to claim 18 wherein said plurality of conductors are shunted together near said plurality of conductive pads for added electrostatic discharge protection during the assembly process.

21. A method of manufacturing a head gimbal assembly, said method comprising the steps of:

positioning a slider proximate to the end of a load beam and rotated 90 degrees with respect to said load beam, said slider having a plurality of conductive pads along one edge thereof;

positioning an integrated cable along said load beam and extending beyond an end of said load beam, said integrated cable formed by a dielectric layer and a plurality of conductors disposed thereon;

providing a loop within said integrated cable at substantially 90 degrees from a longitudinal axis of said load beam;

removing a portion of said dielectric layer within said loop of said integrated cable to provide an aperture at a point overlying said plurality of conductive pads;

mating said plurality of conductors with said plurality of conductive pads through said aperture;

rotating said slider 90 degrees to a point adjacent to said load beam; and

attaching said slider to said load beam.

22. The method of manufacturing a head gimbal assembly according to claim 21 wherein said load beam includes a flexure mounted to one end thereof and wherein said step of attaching said slider to said load beam comprises the step of attaching said slider to said flexure.

23. The method of manufacturing a head gimbal assembly according to claim 21 wherein said step of mating said plurality of conductors with said plurality of conductive pads through said aperture comprises the step of mating said plurality of conductors with said plurality of conductive pads through said aperture by ultrasonic bonding.

24. The method of manufacturing a head gimbal assembly according to claim 21 wherein said step of mating said plurality of conductors with said plurality of conductive pads through said aperture comprises the step of mating said plurality of conductors with said plurality of conductive pads through said aperture by laser solder reflow.

**SLIDER SUSPENSION ASSEMBLY AND METHOD FOR ATTACHING A
SLIDER TO A SUSPENSION IN A DATA-RECORDING DISK FILE**

ABSTRACT

A slider suspension assembly for a data-recording disk file is disclosed. The slider suspension assembly (10) uses an improved mechanical and electrical attachment arrangement to attach the slider (14) to the suspension (10). The slider suspension assembly utilizes a load beam having an integrated cable formed at least partially within the load beam along the length thereof wherein the integrated cable includes a dielectric layer and a plurality of conductors disposed upon the dielectric layer. A slider mounted to a flexure at the end of the load beam includes multiple conductive pads disposed along one edge thereof. A loop within the integrated cable of a radius sufficient to cause the integrated cable to overlie the selected edge of the slider is utilized to make electrical contact with the slider by providing an aperture within the dielectric layer of the cable at a point overlying the plurality of conductive pads such that the conductors within the integrated cable may be placed in electrical contact with the conductive pads.

Fig. 2A