



US006493180B1

(12) **United States Patent**
Kang et al.

(10) **Patent No.:** **US 6,493,180 B1**
(45) **Date of Patent:** **Dec. 10, 2002**

(54) **HARD DISK DRIVE COVER THAT
CONTAINS A HELMHOLTZ RESONATOR
WHICH ATTENUATES ACOUSTIC ENERGY**

(75) Inventors: **Seong-Woo Kang**, Santa Clara, CA
(US); **Wilson Long**, San Jose, CA
(US); **Tai-Yeon Hwang**, Santa Clara,
CA (US)

(73) Assignee: **Samsung Electronics Co., Ltd.** (KR)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 30 days.

(21) Appl. No.: **09/593,181**

(22) Filed: **Jun. 13, 2000**

Related U.S. Application Data

(60) Provisional application No. 60/149,943, filed on Aug. 19,
1999.

(51) Int. Cl.⁷ **G11B 33/14**

(52) **U.S. Cl.** **360/97.02**

(58) **Field of Search** **360/97.02**

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,282,100 A * 1/1994 Tacklind 360/97.02
5,781,373 A * 7/1998 Larson 360/97.02
6,243,262 B1 * 6/2001 Koo 361/687

* cited by examiner

Primary Examiner—A. J. Heinz

(74) *Attorney, Agent, or Firm*—Irell & Manella LLP;
Jeffrey P. Aiello

(57) **ABSTRACT**

A disk drive housing that can attenuate noise. The housing
may include a first layer that is attached to a second layer,
and a gap located between the first and second layers. The
layers and gap may be configured to attenuate acoustic
energy within a relatively broad frequency range.

11 Claims, 2 Drawing Sheets

