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UTILITY PATENT APPLICATION TRANSMITTAL <small>(Only for new nonprovisional applications under 37 CFR 1.53(b))</small>	Attorney Docket No.	51876p219
	First Inventor or Application Identifier	Sung-Hoon Baek
	Title	APPARATUS FOR REDUNDANT INTERCONNECTION BETWEEN MULTIPLE...
	Express Mail Label No.	em014066885us

APPLICATION ELEMENTS <small>See MPEP chapter 600 concerning utility patent application contents</small>	ADDRESS TO: Assistant Commissioner for Patents Box Patent Application Washington, DC 20231
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1. Fee Transmittal Form (e.g. PTO/SB/17)
(Submit an original, and a duplicate for fee processing)
2. Applicant claims small entity status.
See 37 CFR 1.27.
3. Specification Total Pages
(preferred arrangement set forth below)
 - Descriptive title of the Invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to sequence listing, a table, or a computer program listing appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
4. Drawing(s) (35 U.S.C. 113) Total Sheets
5. Oath or Declaration Total Pages
 - a. Newly executed (original copy)
 - b. Copy from a prior application (37 CFR 1.63(d))
(for continuation/divisional with Box 18 completed)
 - i. **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. Application Data Sheet. See 37 CFR 1.76.

7. CD-ROM or CD-R in duplicate, large table or Computer Program *(Appendix)*
8. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*
 - a. Computer Readable Form (CFR)
 - b. Specification Sequence Listing on.
 - i. CD-ROM or CD-R (2 copies), or
 - ii. Paper
 - c. Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS	
9. <input checked="" type="checkbox"/> Assignment Papers (cover sheet & document(s))	
10. <input type="checkbox"/> 37 CFR 3.73(b) Statement <input type="checkbox"/> Power of Attorney <i>(when there is an assignee)</i>	
11. <input type="checkbox"/> English Translation Document <i>(if applicable)</i>	
12. <input checked="" type="checkbox"/> Information Disclosure Statement (IDS)/PTO - 1449	<input checked="" type="checkbox"/> Copies of IDS Citations
13. <input type="checkbox"/> Preliminary Amendment	
14. <input checked="" type="checkbox"/> Return Receipt Postcard (MPEP 503) <i>(Should be specifically itemized)</i>	
15. <input checked="" type="checkbox"/> Certified Copy of Priority Document(s) <i>(if foreign priority is claimed)</i>	
16. <input type="checkbox"/> Request and Certification under 35 USC 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.	
17. <input checked="" type="checkbox"/> Other: Request for priority	

18. If a **CONTINUING APPLICATION**, check appropriate box, and supply the requisite information below and in a preliminary amendment:

Continuation Divisional Continuation-in-part (CIP) of prior application No: _____ / _____

Prior application Information: Examiner _____ Group/Art Unit: _____


For **CONTINUATION** or **DIVISIONAL APPS** only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

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Name	BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP				
Address	12400 Wilshire Boulevard, Seventh Floor				
City	Los Angeles	State	California	Zip Code	90025
Country	U.S.A.	Telephone	(310) 207-3800	Fax	(310) 820-5988

Name (Print/Type)	Thomas M. Coester, Reg. No. 39,637		
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<h1 style="margin: 0;">FEE TRANSMITTAL</h1> <h2 style="margin: 0;">for FY 2001</h2> <p style="font-size: small; margin: 0;">Patent fees are subject to annual revision.</p>	Complete if Known	
	Application Number	
	Filing Date	
	First Named Inventor	Sung-Hoon Baek, et al.
	Examiner Name	
	Group Art Unit	
TOTAL AMOUNT OF PAYMENT	(\$)	395.00
	Attorney Docket Number	51876p219

<p>METHOD OF PAYMENT (check one)</p> <p>1. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge indicated fees and credit any over payments to.</p> <p>Deposit Account Number: 02-2666</p> <p>Deposit Account Name: Blakely, Sokoloff, Taylor & Zafman LLP</p> <p><input checked="" type="checkbox"/> Charge Any Additional Fee Required Under 37CFR 1.16 and 1.17</p> <p><input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27</p> <p>2. <input type="checkbox"/> Payment Enclosed:</p> <p style="margin-left: 20px;"><input type="checkbox"/> Check <input type="checkbox"/> Money Order <input type="checkbox"/> Other</p>	<p>FEE CALCULATION (continued)</p> <p>3. ADDITIONAL FEE</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Large Fee Code</th> <th>Entity Fee (\$)</th> <th>Small Fee Code</th> <th>Entity Fee (\$)</th> <th>Fee Description</th> <th>Fee Paid</th> </tr> </thead> <tbody> <tr><td>105</td><td>130</td><td>205</td><td>65</td><td>Surcharge - late filing fee or oath</td><td></td></tr> <tr><td>127</td><td>50</td><td>227</td><td>25</td><td>Surcharge - late provisional filing fee or cover sheet.</td><td></td></tr> <tr><td>139</td><td>130</td><td>139</td><td>130</td><td>Non-English specification</td><td></td></tr> <tr><td>147</td><td>2,520</td><td>147</td><td>2,520</td><td>For filing a request for <i>ex parte</i> reexamination</td><td></td></tr> <tr><td>112</td><td>920</td><td>112</td><td>920</td><td>Requesting publication of SIR prior to Examiner action</td><td></td></tr> <tr><td>113</td><td>1,840</td><td>113</td><td>1,840</td><td>Requesting publication of SIR after Examiner action</td><td></td></tr> <tr><td>115</td><td>110</td><td>215</td><td>55</td><td>Extension for response within first month</td><td></td></tr> <tr><td>116</td><td>390</td><td>216</td><td>195</td><td>Extension for response within second month</td><td></td></tr> <tr><td>117</td><td>890</td><td>217</td><td>445</td><td>Extension for response within third month</td><td></td></tr> <tr><td>118</td><td>1,390</td><td>218</td><td>695</td><td>Extension for response within fourth month</td><td></td></tr> <tr><td>128</td><td>1,890</td><td>228</td><td>945</td><td>Extension for response within fifth month</td><td></td></tr> <tr><td>119</td><td>310</td><td>219</td><td>155</td><td>Notice of Appeal</td><td></td></tr> <tr><td>120</td><td>310</td><td>220</td><td>155</td><td>Filing a brief in support of an appeal</td><td></td></tr> <tr><td>121</td><td>270</td><td>221</td><td>135</td><td>Request for oral hearing</td><td></td></tr> <tr><td>138</td><td>1,510</td><td>138</td><td>1,510</td><td>Petition to institute a public use proceeding</td><td></td></tr> <tr><td>140</td><td>110</td><td>240</td><td>55</td><td>Petition to revive - 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SUBMITTED BY				Complete (if applicable)	
Typed or Printed Name	Thomas M. Coester, Reg. No. 39,637			Reg. Number	
Signature	<i>Thomas Coester</i>	Date	12/29/00	Deposit Account User ID	02-2666

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Our Ref. No.: 51876.P219
Express Mail No. EM014066885US

UTILITY APPLICATION FOR UNITED STATES PATENT

FOR

**APPARATUS FOR REDUNDANT INTERCONNECTION BETWEEN MULTIPLE
HOSTS AND RAID**

Inventor(s): Sung-Hoon Baek et al.

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APPARATUS FOR REDUNDANT INTERCONNECTION
BETWEEN MULTIPLE HOSTS AND RAID

Field of the Invention

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The present invention relates to an apparatus for a redundant interconnection between multiple host computers and a redundant arrays of inexpensive disks (hereinafter, referred to as 'RAID'); and, more particularly, to an apparatus for a redundant interconnection between multiple host computers and multiple controllers of the RAID, which is capable of supporting a fault tolerance of the RAID controllers and simultaneously heightening performance.

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Prior Art of the Invention

A RAID is a storage system based on a large capacity and a high performance, by using much quantity of disks, and is a fault tolerant system in which the disks or controllers etc. have a redundant nature. In general, the RAID has two controllers, which are used like a method shown in Fig. 1 or 2.

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Fig. 1 is an exemplary block diagram showing a general connection method between the host computers and the RAID having the conventional two controllers.

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As shown in the drawing, such system independently uses two RAID controllers 140, 141, and has an independent connection with network interface controllers 110, 111 of the host computers. That

is, such system has twice the bandwidth and twice the performance. However, there is such a problem that a loss of data occurs when one out of two RAID controllers 140,141 has a trouble, in other words, this system does not become the fault tolerant system.

5 Fig. 2 is an exemplary block diagram of a general host interface system having a communication interface for an error recovery between the conventional two controllers.

In order to provide fault tolerance not provided in Fig. 1, two RAID controllers 230, 231 and host computers 200, 201 are connected with each other through a hub or switch 210 in one network. Thus, even though one RAID controller 230 or 231 has a trouble, all of the host computers 200, 201 are connected to a RAID controller that does not have a trouble. That is, this RAID controller not having the trouble serves as a role of the controller that has the trouble. Also, since the RAID controllers 230, 231 should exchange information with each other by preparing in advance against some trouble, the RAID controllers 230, 231 are connected with each other through communication controllers 221, 222. However, in this case only a half of performance for the bandwidth provided in Fig. 1 can be obtained.

Fig. 3 is an exemplary block diagram showing a wiring method between a conventional RAID and the host computers.

The construction shown in the drawing partially represents a systematic connection between a RAID and host computers, which is extracted from contents disclosed in the U.S. Patent No. 5,812,754. However, this construction has no any difference from that of Fig. 2, in the structure of a communication network, and

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