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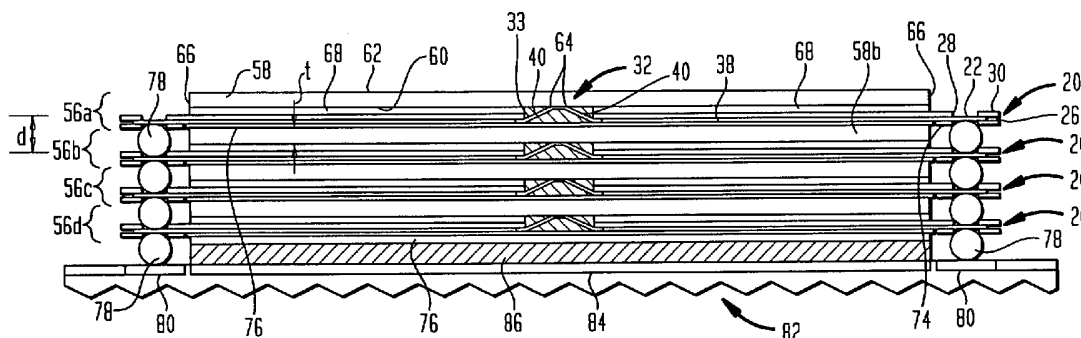
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: STACKED PACKAGES



(57) Abstract: A stacked chip assembly includes individual units (56) having chips (58) mounted on dielectric layers (20) and traces (38) on the dielectric layers interconnecting the contacts of the chips with terminals (22) disposed in peripheral regions of the dielectric layers. At least some of the traces (38a, 38e) are multi-branched traces which connect chip select contacts to chip select terminals. The units are stacked one above the other with corresponding terminals of the different units being connected to one another by solder balls (78) or other conductive elements so as to form vertical buses. Prior to stacking, the multi-branched traced of the individual units are selectively interrupted, as by breking the individual branches (50), so as to leave chip select contact of chips in different units connected to different chip select terminals and thereby connect these chips to different vertical buses. The individual units desirably are thin and directly abut one another so as to provide a low-height assembly with good heat transfer from chips within the stack.



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INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US02/32251

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC(7) :H01L 23/02  
 US CL :267/686, 777; 361/760; 438/108, 109  
 According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**  
 Minimum documentation searched (classification system followed by classification symbols)  
 U.S. : 267/686, 777; 361/760; 438/108, 109

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
 NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
 USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM-TDB; EAST  
 search terms:stack\$3

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P --- A,P	US 6,313,522 B1 (AKRAM et al) 06 November 2001 (06.11.2001), Figure 12.	1-5,7-12,17-27 ----- 6
Y,P	US 6,462,421 B1 (HSU et al) 08 October 2002 (08.10.2002), Figure 4.	1-5,7-12,17-27
Y,P --- A,P	US 6,388,264 B1 (PACE) 14 May 2002 (14.05.2002), see entire document.	1,17 ----- 13,14,28,29
Y,E --- A,E	US 6,496,026 B1 (LONG et al) 17 December 2002 (17.12.2002), Figure 6.	1,13 ----- 15,16
Y,P	US 6,335,565 B1 (MIYAMOTO et al) 01 January 202 (01.01.2002), see entire document.	30,31,33,35

Further documents are listed in the continuation of Box C.  See patent family annex.

* Special categories of cited documents:	"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 03 FEBRUARY 2003	Date of mailing of the international search report <b>20 MAR 2003</b>
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INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US02/32251

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US02/32251

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	US 6,342,728 B2 (MIYAZAKI et al) 29 January 2002 (29.01.2002), see entire document.	30-34
Y,P	US 6,303,997 B1 (LEE) 16 October 2001 (16.10.2001), Figure 3.	30,31,33,36-40
Y	US 6,072,233 A (CORISIS et al) 06 June 2000 (06.06.2000), see entire document.	1-5,7-12,17-27,41-44
Y	US 6,218,848 B1 (HEMBREE et al) 17 April 2001 (17.04.2001), see entire document.	41
Y,P	US 6,369,445 B1 (KHOURY) 09 April 2002 (09.04.2002), see entire document.	36-44
A	US 6,180,881 B1 (ISAAK) 30 January 2001 (30.01.2001), see entire document.	1-44