(19) World Intellectual Property Organization

International Bureau



(43) International Publication Date 13 March 2003 (13.03.2003)

PCT

(10) International Publication Number WO 03/021667 A3

(51) International Patent Classification⁷: H01L 21/98, 23/64, 25/16, 25/065

(21) International Application Number: PCT/US02/27680

(22) International Filing Date: 29 August 2002 (29.08.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/315,787 29 August 2001 (29.08.2001) US 10/232,269 28 August 2002 (28.08.2002) US

- (71) Applicant: HONEYWELL INTERNATIONAL, INC. [US/US]; 101 Columbia Road, Morristown, NJ 07962 (US).
- (72) Inventors: DETRY, James, F.; 35 Nathan Lane, #102, Plymouth, MN 55441 (US). PECZALSKI, Andrzej; 9873 Balmoral Lane, Eden Prairie, MN 55347 (US).
- (74) Agent: BREMER, Dennis; HoneyWell International, Inc., 101 Columbia Road, POB 2245, Morristown, NJ 07962 (US).

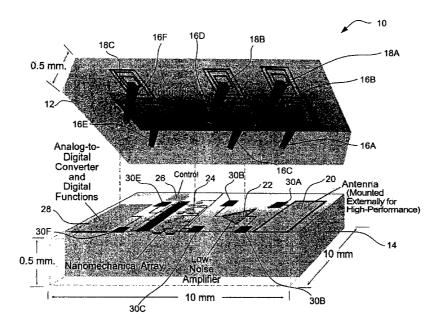
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report: 11 December 2003

[Continued on next page]

(54) Title: PACKAGE WITH INTEGRATED INDUCTOR AND/OR CAPACITOR



(57) **Abstract:** Methods for attaching two wafers are presented along with devices resulting from such methods. In one illustrative embodiment, a first wafer is provided having pillars for conducting an electric signal. The wafer also includes an electronic device such as an inductor or capacitor that may in some instances consume relatively large amounts of space. The first wafer is bonded to a second wafer so that a circuit on the second wafer may be electrically connected to the electronic device of the first wafer.



O 03/021667 A3

WO 03/021667 A3



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.

Internation Application No PCT/US 02/27680

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 H01L21/98 H01L H01L25/065 H01L23/64 H01L25/16 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) H01L B81B IPC 7 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and where practical, search terms used) EPO-Internal C. DOCUMENTS CONSIDERED TO BE RELEVANT Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. Category ° χ US 5 354 695 A (LEEDY GLENN J) 1-3111 October 1994 (1994-10-11) 41-44 32,33,36 Α abstract; figures 5,7,17A-17C,28A,28B,29E,29L column 5, line 23-61 column 11, line 67 -column 12, line 19 column 26, line 52 -column 28, line 55 column 37, line 23-36 column 40, line 41 -column 41, line 27 column 44, line 13 -column 45, line 46 1,2,7,9, X US 5 455 445 A (KURTZ ANTHONY D ET AL) 14-25, 3 October 1995 (1995-10-03) 27-31, 41-44 32,33,36 Α the whole document | X | Further documents are listed in the continuation of box C. X Patent family members are listed in annex Special categories of cited documents: 'T' later document published after the international filing date or pnorty date and not in conflict with the application but cited to understand the principle or theory underlying the 'A' document defining the general state of the art which is not considered to be of particular relevance invention "E" earlier document but published on or after the international *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 filing date "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) '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 docu— "O" document referring to an oral disclosure, use, exhibition or other means ments, such combination being obvious to a person skilled in the art. document published prior to the international filing date but later than the priority date claimed "&" document member of the same patent family Date of the actual completion of the international search Date of mailing of the international search report 21 OCT 2003 26 September 2003 Name and mailing address of the ISA Authorized officer European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Schumacher, H Fax: (+31-70) 340-3016

Internation Application No
PCT/US 02/27680

		PCT/US 02	/27680
	ation) DOCUMENTS CONSIDERED TO BE RELEVANT Citation of document, with indication, where appropriate, of the relevant passages		Relevant to claim No.
Category °	Gilation of document, with indication, where appropriate, of the relevant passages		Relevant to claim No.
X A	WO 01 56921 A (RAYTHEON CO) 9 August 2001 (2001-08-09) abstract; figures 6,7,11-13 page 19, line 32 -page 24, line 3		20-29,31 32,33,36
P,A	WO 01 65598 A (COMMISSARIAT ENERGIE ATOMIQUE ;VIEUX ROCHAZ LINE (FR); CUCHET ROBE) 7 September 2001 (2001-09-07) abstract; figure 10		1,20,30, 31
А	WO 00 65689 A (CHUNG KEVIN KWONG TAI ;AMERASIA INTERNAT TECHNOLOGY I (US)) 2 November 2000 (2000-11-02) abstract; figure 7		13
Α	US 5 625 297 A (ARNAUDOV KONSTANTIN ET AL) 29 April 1997 (1997-04-29) column 9, line 38 -column 10, line 60; figures 2D,E		22,32-40
Α	US 6 133 065 A (AKRAM SALMAN) 17 October 2000 (2000-10-17) column 2, line 40 -column 3, line 30; figure 12		32-40
А	US 5 326 428 A (GRIEF MALCOLM ET AL) 5 July 1994 (1994-07-05) abstract; figures 12,13		32-40

International application No. PCT/US 02/27680

INTERNATIONAL SEARCH REPORT

Box I	Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)
This Inte	ernational Search 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 Inte	ernational Searching Authority found multiple inventions in this international application, as follows:
	see additional sheet
1. X	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.:
Remari	The additional search fees were accompanied by the applicant's protest. X No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

- 1. Claims: 1-31,41-44
 - A method of attaching two wafers comprising:
 - providing a first and second wafer wafer
 - creating a pit to define a pillar in the second wafer
 - adapting the pit to conduct and electric signal
 - attaching the first wafer to the second wafer
- 2. Claims: 32-40
 - A method comprising:
 - providing a first and second wafer wafer
 - creating a pit to define a pillar in the second wafer
 - adapting a first region of the pillar to be electrically conductive
 - adapting a second region of the pillar to be electrically conductive, the second region separate from the first region

Information on patent family members

Internation Application No
PCT/US 02/27680

EP 1233444 A2 21-08-26 EP 0641485 A1 08-03-19 JP 7508614 T 21-09-18 US 6008126 A 28-12-19 WO 9321748 A1 09-02-19 US 5869354 A 09-02-19 US 5869354 A 09-02-19 US 5633209 A 27-05-19 US 5633209 A 27-05-19 US 5633209 A 27-05-19 US 5654220 A 05-08-19 US 5654220 A 05-08-19 US 5654220 A 05-08-19 US 5654220 A 05-08-19 US 5639707 A 10-06-19 US 5592018 A 07-01-19 US 5592018 A 07-01-19 US 5592018 A 07-01-19 US 5592018 A 07-01-19 US 5834334 A 10-11-19 US 5834334 A 10-11-19 US 5840593 A 24-11-19 US 5840593 A 24-11-19 US 5840593 A 24-11-19 US 5840593 A 24-11-19 US 6479320 B1 12-11-20 US 6479320 B1 12-11-20 US 6479320 B1 12-11-20 US 200200646 A1 03-01-26 EP 1272422 A2 08-01-26 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 US 200200646 A1 03-01-26 EP 1272427 A2 08-01-26 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 US 2003022475 A1 30-01-26 EP 1138181 A1 04-10-26 US 2003022475 A1 30-01-26 US 6289905 B1 12-11-20 WO 0065689 A 02-11-2000 US 6353420 B1 05-03-26 US 2003022475 A1 30-01-26 US 2003022475 A1 30-01-26 US 2003022475 A1 30-01-26 US 628905 B1 11-09-20 US 648905 B1 11-09-20	Patent doo ted in sear		Publication date		Patent family member(s)		Publication date
EP 1233444 A2 21-08-26 EP 0641485 A1 08-03-19 JP 7508614 T 21-09-18 US 6008126 A 28-12-19 WO 9321748 A1 28-10-19 US 5609354 A 09-02-19 US 5946559 A 31-08-19 US 5946559 A 31-08-19 US 5633209 A 27-05-19 US 5633209 A 27-05-19 US 5633209 A 27-05-19 US 5654220 A 05-08-19 US 56571741 A 05-11-19 US 6288561 B1 11-09-26 US 5654220 A 05-08-19 US 5637907 A 10-06-19 US 5637907 A 10-06-19 US 5637907 A 10-06-19 US 5580687 A 03-10-19 US 5834334 A 10-11-19 US 5834334 A 10-11-19 US 6294909 B1 25-09-26 US 2003057513 A1 27-03-26 US 200201673 A1 27-03-26 US 200201673 A1 27-03-26 US 200201673 A1 17-01-26 US 5840593 A 24-11-19 US 6479320 B1 12-11-26 WO 0156921 A 09-08-2001 US 6521477 B1 18-02-20 US 200200646 A1 03-01-29 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-26 EP 1272422 A2 08-01-26 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-26 EP 125993 A1 27-11-26 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-26 EP 125993 A1 27-11-26 WO 0165598 A 07-09-2001 US 6353420 B1 07-09-26 US 2003022475 A1 30-01-26 EP 1138181 A1 04-10-26 US 2003022475 A1 30-01-26 EP 1138181 A1 04-10-26 US 20031492 A1 17-01-26 US 628905 B1 11-09-26 US 628905 B1 11	IS 5354	595 A	11-10-1994	4 BR	9306232	Α	23-06-1998
JP 7508614 T 21-09-15				EP	1233444	A2	21-08-2002
US 6008126 A 28-12-15 W0 9321748 A1 28-10-15 US 5869354 A 09-02-15 US 5869354 A 09-02-15 US 5869354 A 09-02-15 US 5696559 A 31-08-15 US 5633209 A 27-05-15 US 5633209 A 27-05-15 US 5633209 A 27-05-15 US 5633209 A 27-05-15 US 563220 A 05-08-15 US 5654220 A 05-08-15 US 5654220 A 05-08-15 US 5637907 A 10-06-15 US 5637907 A 10-06-15 US 5580687 A 03-12-15 US 5580687 A 03-12-15 US 5834334 A 10-11-15 US 5834334 A 10-11-15 US 5834334 A 10-11-15 US 5834334 A 10-11-15 US 5834099 B1 25-09-20 US 2003057513 A1 27-03-20 US 5840593 A 24-11-15 US 200201672 A 17-01-20 US 5455445 A 03-10-1995 US 5401672 A 28-03-15 US 2002005729 A1 17-01-20 US 6479320 B1 12-11-20 US 2003022475 A1 30-01-20 US							08-03-1995
WO 9321748 A1							21-09-1995
US 5869354 A 09-02-15 US 2003151421 A1 14-08-2C US 5946559 A 31-08-15 US 5633209 A 27-05-15 US 5633209 A 27-05-15 US 5633209 A 27-05-15 US 5633209 A 27-05-15 US 563220 A 05-11-19 US 5654220 A 05-08-15 US 5654220 A 05-08-15 US 5637907 A 10-06-15 US 5637907 A 10-06-15 US 5580687 A 03-12-15 US 5580687 A 03-12-15 US 5834334 A 10-11-15 US 6294909 B1 25-09-2C US 2003057513 A1 27-03-2C US 2003057513 A1 27-03-2C US 2002014673 A1 07-02-2C US 540545 A 03-10-1995 US 5401672 A 28-03-15 US 2002005729 A1 17-01-2C US 5455445 A 03-10-1995 US 5401672 A 28-03-15 US 679320 B1 12-11-2C US 6479320 B1 12-11-2C US 6479320 B1 12-11-2C US 6479320 B1 12-11-2C US 6479320 B1 12-11-2C US 2002000646 A1 03-01-2C US 2002000646 A1 03-01-2C US 2002000646 A1 03-01-2C US 2003022475 A1 30-01-2C US 2003032240 B1 10-02-2C US							28-12-1999
US 2003151421 A1 14-08-20 US 5946559 A 31-08-19 US 5633209 A 27-05-19 US 553209 A 27-05-19 US 553209 A 27-05-19 US 6288561 B1 11-09-20 US 5654220 A 05-08-19 US 555420 A 05-08-19 US 555420 A 05-08-19 US 5592018 A 07-01-19 US 5592018 A 07-01-19 US 5592018 A 07-01-19 US 5834334 A 10-11-19 US 6294909 B1 25-09-20 US 2003057513 A1 27-03-20 US 2003057513 A1 27-03-20 US 2002014673 A1 07-02-20 US 2002014673 A1 07-02-20 US 5455445 A 03-10-1995 US 5401672 A 28-03-19 US 5455445 A 03-10-1995 US 5401672 A 28-03-19 US 6479320 B1 12-11-20 US 5455445 A 03-0-1995 US 5401672 A 28-03-19 US 200200646 A1 13-08-20 US 200200646 A1 03-01-20 US 200200646 A1 10-0-20 US 200200640 A1 10-0-20 US 20020060 A1 10-0							28-10-1993
US 5946559 A 31-08-19 US 5633209 A 27-05-19 US 5633209 A 27-05-11 US 5633209 A 27-05-11 US 5633209 A 27-05-11 US 6288661 B1 11-09-20 US 5654220 A 05-08-19 US 5592018 A 07-01-19 US 5637907 A 10-06-19 US 5637907 A 10-06-19 US 5580687 A 03-12-19 US 5834334 A 10-11-19 US 6294909 B1 25-09-20 US 2003057513 A1 27-03-20 US 5840593 A 24-11-11 US 5455445 A 03-10-1995 US 5401672 A 28-03-19 US 5455445 A 03-10-1995 US 5401672 A 28-03-19 US 005005729 A1 17-01-20 US 5455445 A 09-08-2001 US 6521477 B1 18-02-20 US 6479320 B1 12-11-20 US 6479320 B1 12-11-20 US 6479320 B1 12-11-20 US 200200646 A1 03-01-20 US 200200646 A1 03-01-20 US 200200646 A1 03-01-20 US 200200646 A1 03-01-20 US 2003002475 A1 31-08-20 US 2003002475 A1 30-01-20 US 2003000800 B1 10-00-00 US 200300000 B1 10-00-00 US 20030000 B1 10-00-00 US 20030000 B1 11-00-00 US 20030000 B1 11-00-00 US 20030000 B1 11-00-00 US 20030000 B1 11-00-00 US 6004640 B1 11-00-00 US 6004640 B1 11-00-00 US 600460 B1 11-00-00							09-02-1999
US 5633209 A 27-05-15 US 5571741 A 05-11-19 US 6288561 B1 11-09-20 US 5654220 A 05-08-15 US 5654220 A 05-08-15 US 5654220 A 05-08-15 US 5637907 A 10-06-15 US 5580687 A 03-12-15 US 5592007 A 07-01-15 US 5834334 A 10-11-15 US 6294909 B1 25-09-20 US 2003057513 A1 27-03-20 US 2002014673 A1 07-02-20 US 2002014673 A1 07-02-20 US 2002014673 A1 07-02-20 US 5840593 A 24-11-15 US 5840593 A 24-11-15 US 6479320 B1 12-11-20 US 6479320 B1 12-11-20 AU 3475001 A 14-08-20 EP 1272422 A2 08-01-20 WO 0156921 A2 09-08-20 US 200200646 A1 03-01-20 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 EP 1259983 A1 27-11-20 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 US 2003022475 A1 30-01-20 WO 0165598 A 07-09-2001 US 6353420 B1 05-03-20 US 2003022475 A1 30-01-20 WO 0065689 A1 07-09-20 US 2003022475 A1 30-01-20 US 200302475 A1 30-01-20 US 20030							14-08-2003
US 5571741 A 05-11-12 US 6288561 B1 11-09-2 US 5654220 A 05-08-15 US 5654220 A 05-08-15 US 5654220 A 05-08-15 US 5592018 A 07-01-15 US 5637907 A 10-06-15 US 5580687 A 03-12-15 US 5580087 A 07-01-15 US 5834334 A 10-11-15 US 6294909 B1 25-09-22 US 2003057513 A1 27-03-22 US 2002014673 A1 07-02-22 US 5840593 A 24-11-15 US 2002005729 A1 17-01-26 US 5455445 A 03-10-1995 US 5401672 A 28-03-15 US 6479320 B1 12-11-22 AU 3475001 A 14-08-22 US 6479320 B1 12-11-22 AU 3475001 A 14-08-22 US 200200646 A1 03-01-26 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-22 US 200200646 A1 03-01-26 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-22 US 2003022475 A1 30-01-26 WO 0165598 A1 07-09-201 US 6353420 B1 05-03-26 US 2003022475 A1 30-01-26 WO 0065689 A1 02-11-2000 US 6353420 B1 05-03-26 US 2003022475 A1 30-01-26 US 2003022475 A1 30-01-26 US 2003022475 A1 30-01-26 US 2003524811 T 19-08-26 US 2003524811 T 19-08-26 US 2002124392 A1 26-10-26 US 6404643 B1 11-06-26							
US 5628561 B1 11-09-26 US 5654220 A 05-08-19 US 5592018 A 07-01-19 US 5592018 A 07-01-19 US 5592007 A 10-06-19 US 5580687 A 03-12-11 US 5592007 A 07-01-19 US 5834334 A 10-11-19 US 6294909 B1 25-09-26 US 2003057513 A1 27-03-26 US 20030057513 A1 07-02-26 US 2003005793 A 1 17-01-26 US 5840593 A 24-11-19 US 5840593 A 24-11-19 US 5840593 A 24-11-19 US 6479320 B1 12-11-26 US 6479320 B1 12-11-26 US 6479320 B1 12-11-26 US 200200646 A1 03-01-26 US 200200646 A1 03-01-26 US 200200646 A1 03-01-26 US 2003022475 A1 30-01-26 US 2003022475 A1 30-01							
US 5654220 A 05-08-15 US 5592018 A 07-01-15 US 5637907 A 10-06-15 US 5580687 A 03-12-15 US 5592007 A 07-01-15 US 55840597 A 10-11-15 US 6294909 B1 25-09-20 US 2003057513 A1 27-03-20 US 2002014673 A1 07-02-20 US 5840593 A 24-11-15 US 5840593 A 24-11-15 US 2002005729 A1 17-01-20 US 5455445 A 03-10-1995 US 5401672 A 28-03-15 US 6479320 B1 12-11-20 AU 3475001 A 14-08-20 EP 1272422 A2 08-01-20 WO 0156921 A2 09-08-20 US 200200646 A1 03-01-20 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 EP 1272422 A2 08-01-20 WO 0165598 A1 07-09-20 US 2002006646 A1 03-01-20 WO 0165598 A1 07-09-20 US 2003022475 A1 30-01-20 WO 0065689 A 02-11-2000 US 6353420 B1 05-03-20 US 2003022475 A1 30-01-20 EP 1175710 A1 30-01-20 EP 1178710 A1 30-01-20 US 2003524811 T 19-08-20 US 2003524811 T 19-08-20 US 200352481 T 19-08-20 US 200244929 A1 26-10-20 US 200352481 T 19-08-20 US 2002124392 A1 12-09-20 US 200352481 T 19-08-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6376769 B1 23-04-20 US 6376769 B1 23-04-20							
US 5592018 A 07-01-15 US 5637907 A 10-06-15 US 5580687 A 03-12-15 US 5580687 A 07-01-15 US 5580687 A 07-01-15 US 5592007 A 07-01-15 US 6294909 B1 25-09-26 US 2003057513 A1 27-03-26 US 2002014673 A1 07-02-26 US 5840593 A 24-11-15 US 2002005729 A1 17-01-26 US 5455445 A 03-10-1995 US 5401672 A 28-03-15 US 6479320 B1 12-11-26 AU 3475001 A 14-08-26 EP 1272422 A2 08-01-26 WO 0156921 A2 09-08-26 US 2002000646 A1 03-01-26 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-26 US 2002000646 A1 03-01-26 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-26 US 2003022475 A1 30-01-26 WO 0065689 A 02-11-2000 US 6353420 B1 07-09-26 US 2003022475 A1 30-01-26 US 2003022475 A1 30-01-26 US 2003524811 T 19-08-26 US 628905 B1 11-09-26 US 6376769 B1 23-04-26 US 6376769 B1 23-04-26 US 6376769 B1 23-04-26							
US 5637907 A 10-06-15 US 5580687 A 03-12-1 US 5592007 A 07-01-15 US 5834334 A 10-11-15 US 6294909 B1 25-09-20 US 2003057513 A1 27-03-20 US 2002014673 A1 07-02-20 US 5840593 A 24-11-15 US 5840593 A 24-11-15 US 5840593 A 24-11-15 US 6479320 B1 12-01-20 US 6479320 B1 12-11-20 AU 3475001 A 14-08-20 EP 1272422 A2 08-01-20 WO 0156921 A2 09-08-20 US 200200646 A1 03-01-20 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 US 200200646 A1 03-01-20 WO 0165598 A1 07-09-20 WO 0165598 A1 07-09-20 WO 0165598 A1 07-09-20 WO 01656921 A2 09-08-20 US 2003022475 A1 30-01-20 WO 0065689 A1 02-11-2000 US 6353420 B1 05-03-20 US 2003022475 A1 30-01-20 US 2003022475 A1 30-01-20 US 2003524811 T 19-08-20 EP 1138181 A1 04-10-20 JP 2003524811 T 19-08-20 US 2002124392 A1 20-04-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20							
US 5580687 A 03-12-15 US 5592007 A 07-01-15 US 5592007 A 07-01-15 US 6294909 B1 25-09-20 US 2003057513 A1 27-03-20 US 2002014673 A1 07-02-20 US 5840593 A 24-11-15 US 2002005729 A1 17-01-20 US 5455445 A 03-10-1995 US 5401672 A 28-03-15 W0 0156921 A 09-08-2001 US 6521477 B1 18-02-20 AU 3475001 A 14-08-20 AU 3475001 A 14-08-20 EP 1272422 A2 08-01-20 W0 0156598 A 07-09-2001 FR 2805709 A1 31-08-20 US 2002000646 A1 03-01-20 W0 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 EP 1259983 A1 27-11-20 W0 0165598 A1 07-09-20 US 2003022475 A1 30-01-20 W0 0165598 A1 07-09-20 US 2003022475 A1 30-01-20 W0 0065689 A1 02-11-2000 US 6353420 B1 05-03-20 EP 1138181 A1 04-10-20 EP 1138181 A1 04-10-20 US 2003524811 T 19-08-20 US 20022439 A1 20-04-20 US 2002124392 A1 12-09-20 US 6289905 B1 11-09-20 US 6404643 B1 11-06-20							
US 5592007 A 07-01-15 US 5834334 A 10-11-15 US 6294909 B1 25-09-20 US 2003057513 A1 27-03-20 US 5840593 A 24-11-15 US 5840593 A 24-11-15 US 5840593 A 24-11-15 US 5455445 A 03-10-1995 US 5401672 A 28-03-15 W0 0156921 A 09-08-2001 US 6521477 B1 18-02-20 US 6479320 B1 12-11-20 AU 3475001 A 14-08-20 EP 1272422 A2 08-01-20 W0 0156921 A2 09-08-20 US 200200646 A1 03-01-20 W0 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 US 200200646 A1 03-01-20 W0 0165598 A1 07-09-20 W0 0165598 A1 07-09-20 W0 0165598 A1 07-09-20 US 6353420 B1 05-03-20 EP 175710 A1 30-01-20 EP 1138181 A1 04-10-20 IS 635420 B1 05-03-20 US 2003022475 A1 30-01-20 US 6353420 B1 05-03-20 US 2003022475 A1 30-01-20 US 6353420 B1 05-03-20 US 2003524811 T 19-08-20 US 0065689 A1 02-11-20 US 628905 B1 11-09-20 US 6404643 B1 11-06-20							
US 5834334 A 10-11-15 US 6294909 B1 25-09-20 US 2003057513 A1 27-03-20 US 2002014673 A1 07-02-20 US 5840593 A 24-11-15 US 2002005729 A1 17-01-20 US 5455445 A 03-10-1995 US 5401672 A 28-03-19 WO 0156921 A 09-08-2001 US 6521477 B1 18-02-20 AU 3475001 A 14-08-20 AU 3475001 A 14-08-20 AU 3475001 A 14-08-20 BEP 1272422 A2 08-01-20 WO 0156921 A2 09-08-20 US 200200646 A1 03-01-20 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 US 2003022475 A1 30-01-20 WO 0065689 A 02-11-2000 US 6353420 B1 07-09-20 US 2003022475 A1 30-01-20 WO 0065689 A 02-11-2000 US 6353420 B1 05-03-20 EP 1175710 A1 30-01-20 EP 1175710 A1 30-01-20 EP 1175710 A1 30-01-20 US 2003022475 A1 30-01-20 US 2003022475 A1 30-01-20 US 2003524811 T 19-08-20 US 2002124392 A1 26-10-20 WO 0065689 A1 02-11-20 US 6288905 B1 11-09-20 US 6288905 B1 11-09-20 US 6288905 B1 11-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 US 6404643 B1 11-09-20							
US 6294909 B1 25-09-20 US 2003057513 A1 27-03-20 US 2002014673 A1 07-02-20 US 5840593 A 24-11-15 US 2002005729 A1 17-01-20 US 5455445 A 03-10-1995 US 5401672 A 28-03-15 WO 0156921 A 09-08-2001 US 6521477 B1 18-02-20 US 6479320 B1 12-11-20 AU 3475001 A 14-08-20 EP 1272422 A2 08-01-20 WO 0156921 A2 09-08-20 US 200200646 A1 03-01-20 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 EP 1259983 A1 27-11-20 WO 0165598 A1 07-09-20 US 2003022475 A1 30-01-20 WO 0065689 A 02-11-2000 US 6353420 B1 05-03-20 US 2003022475 A1 30-01-20 WO 0065689 A 02-11-2000 US 6353420 B1 05-03-20 US 2003022475 A1 30-01-20 US 2002124392 A1 19-08-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6288905 B1 11-09-20 US 6288905 B1 11-09-20 US 6288905 B1 11-09-20 US 628905 B1 11-09-20 US 6404643 B1 11-06-20							
US 2003057513 A1 27-03-26 US 2002014673 A1 07-02-26 US 5840593 A 24-11-15 US 2002005729 A1 17-01-26 US 5455445 A 03-10-1995 US 5401672 A 28-03-15 WO 0156921 A 09-08-2001 US 6521477 B1 18-02-26 AU 3475001 A 14-08-26 BP 1272422 A2 08-01-26 WO 0156921 A2 09-08-26 US 200200646 A1 03-01-26 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-26 US 200200646 A1 03-01-26 WO 0165598 A 02-11-2000 US 6353420 B1 07-09-26 US 2003022475 A1 30-01-26 WO 0065689 A 02-11-2000 US 6353420 B1 05-03-26 CN 1323505 T 21-11-26 EP 1175710 A1 30-01-26 EP 1138181 A1 04-10-26 JP 2003524811 T 19-08-26 WO 0064229 A1 26-10-26 WO 0065689 A1 02-11-20 US 2002124392 A1 26-10-26 US 2002124392 A1 12-09-26 US 6288905 B1 11-09-26 US 6376769 B1 23-04-26 US 6376769 B1 23-04-26							
US 2002014673 A1 07-02-20 US 5840593 A 24-11-15 US 2002005729 A1 17-01-20 US 5455445 A 03-10-1995 US 5401672 A 28-03-19 W0 0156921 A 09-08-2001 US 6521477 B1 18-02-20 AU 3475001 A 14-08-20 EP 1272422 A2 08-01-20 W0 0156921 A2 09-08-20 US 200200646 A1 03-01-20 W0 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 EP 1259983 A1 27-11-20 W0 0165598 A1 07-09-2001 US 6353420 B1 02-11-20 W0 0165598 A1 07-09-2001 US 2003022475 A1 30-01-20 W0 0065689 A 02-11-2000 US 6353420 B1 05-03-20 EP 1175710 A1 30-01-20 EP 1175710 A1 30-01-20 US 2003022475 A1 30-01-20 US 2003022475 A1 30-01-20 US 2003022475 A1 30-01-20 US 2003022475 A1 30-01-20 US 6288905 B1 11-09-20 US 6376769 B1 23-04-20 US 6376769 B1 23-04-20 US 6376769 B1 23-04-20							
US 5840593 A 24-11-19 US 5455445 A 03-10-1995 US 5401672 A 28-03-19 W0 0156921 A 09-08-2001 US 6521477 B1 18-02-20 US 6479320 B1 12-11-20 W0 0156921 A 09-08-2001 US 6521477 B1 14-08-20 EP 1272422 A2 08-01-20 W0 0156921 A2 09-08-20 US 2002000646 A1 03-01-20 W0 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 EP 1259983 A1 27-11-20 W0 0165598 A1 07-09-20 US 2003022475 A1 30-01-20 W0 0065689 A 02-11-2000 US 6353420 B1 05-03-20 CN 1323505 T 21-11-20 EP 1175710 A1 30-01-20 EP 1175710 A1 30-01-20 US 2003524811 T 19-08-20 US 2003524811 T 19-08-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 628905 B1 11-09-20 US 628905 B1 11-09-20 US 628905 B1 11-09-20 US 628905 B1 11-09-20 US 6376769 B1 23-04-20 US 6376769 B1 23-04-20							
US 2002005729 A1 17-01-20 US 5455445 A 03-10-1995 US 5401672 A 28-03-19 WO 0156921 A 09-08-2001 US 6521477 B1 18-02-20 BY 6479320 B1 12-11-20 AU 3475001 A 14-08-20 EP 1272422 A2 08-01-20 WO 0156921 A2 09-08-20 US 2002000646 A1 03-01-20 US 2002000646 A1 03-01-20 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 EP 1259983 A1 27-11-20 WO 0165598 A1 07-09-20 US 2003022475 A1 30-01-20 US 2003022475 A1 30-01-20 WO 0065689 A 02-11-2000 US 6353420 B1 05-03-20 EP 1175710 A1 30-01-20 EP 1138181 A1 04-10-20 EP 1138181 A1 04-10-20 US 2003524811 T 19-08-20 WO 0065689 A1 02-11-20 WO 0065689 A1 02-11-20 US 6288905 B1 11-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 US 6404643 B1 11-00-20 US 6476769 B1 23-04-20 US 6376769 B1 23-04-20 US 6376769 B1 23-04-20							
US 5455445 A 03-10-1995 US 5401672 A 28-03-19 WO 0156921 A 09-08-2001 US 6521477 B1 18-02-20 US 6479320 B1 12-11-20 AU 3475001 A 14-08-20 EP 1272422 A2 08-01-20 WO 0156921 A2 09-08-20 US 2002000646 A1 03-01-20 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 EP 1259983 A1 27-11-20 WO 0165598 A1 07-09-20 US 2003022475 A1 30-01-20 WO 0065689 A 02-11-2000 US 6353420 B1 05-03-20 CN 1323505 T 21-11-20 EP 1175710 A1 30-01-20 EP 1138181 A1 04-10-20 EP 1138181 A1 04-10-20 WO 0065689 A1 02-11-20 WO 0065689 A1 02-11-20 US 2003524811 T 19-08-20 WO 0065689 A1 02-11-20 WO 0065689 A1 02-11-20 US 6404643 B1 11-09-20 U							17-01-2002
WO 0156921 A 09-08-2001 US 6521477 B1 18-02-20	JS 5455	 445 A	03-10-1995	 5 US			28-03-1995
US							10.00.0000
AU 3475001 A 14-08-20 EP 1272422 A2 08-01-20 W0 0156921 A2 09-08-20 US 2002000646 A1 03-01-20 W0 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 EP 1259983 A1 27-11-20 W0 0165598 A1 07-09-20 US 2003022475 A1 30-01-20 US 2003022475 A1 30-01-20 EP 1175710 A1 30-01-20 EP 1138181 A1 04-10-20 EP 1138181 A1 04-10-20 US 2003524811 T 19-08-20 W0 0065689 A1 02-11-20 W0 0065689 A1 02-11-20 W0 0065689 A1 02-11-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 EP 1194955 A1 10-04-20 US 6376769 B1 23-04-20 US 6376769 B1 23-04-20 US 6376769 B1 23-04-20	IU U156	921 P	4 09-08-2001				
EP 1272422 A2 08-01-20 WO 0156921 A2 09-08-20 US 2002000646 A1 03-01-20 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 EP 1259983 A1 27-11-20 WO 0165598 A1 07-09-20 US 2003022475 A1 30-01-20 WO 0065689 A 02-11-2000 US 6353420 B1 05-03-20 EP 1175710 A1 30-01-20 EP 1175710 A1 30-01-20 EP 1138181 A1 04-10-20 JP 2003524811 T 19-08-20 WO 0065689 A1 02-11-20 WO 0065689 A1 02-11-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 CN 1352804 T 05-06-20 US 6404643 B1 11-06-20							
WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-20							
US 2002000646 A1 03-01-20 WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-20 EP 1259983 A1 27-11-20 WO 0165598 A1 07-09-20 US 2003022475 A1 30-01-20 WO 0065689 A 02-11-2000 US 6353420 B1 05-03-20 EP 1175710 A1 30-01-20 EP 1138181 A1 04-10-20 IP 2003524811 T 19-08-20 WO 0064229 A1 26-10-20 WO 0065689 A1 02-11-20 US 202124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 IP 1194955 A1 10-04-20 US 6376769 B1 23-04-20 US 6376769 B1 23-04-20 US 6376769 B1 23-04-20 US 6376769 B1 23-04-20							
WO 0165598 A 07-09-2001 FR 2805709 A1 31-08-20							
EP 1259983 A1 27-11-200							
WO 0165598 A1 07-09-20 US 2003022475 A1 30-01-20 WO 0065689 A 02-11-2000 US 6353420 B1 05-03-20 CN 1323505 T 21-11-20 EP 1175710 A1 30-01-20 EP 1138181 A1 04-10-20 JP 2003524811 T 19-08-20 WO 0064229 A1 26-10-20 WO 0065689 A1 02-11-20 WO 0022893 A1 20-04-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 EP 1194955 A1 10-04-20 JP 2003500832 T 07-01-20 WO 0070676 A1 23-11-20 US 6376769 B1 23-04-20 US 6376769 B1 23-04-20	0165	598 A	07-09-200				31-08-2001
US 2003022475 A1 30-01-20 WO 0065689 A 02-11-2000 US 6353420 B1 05-03-20 CN 1323505 T 21-11-20 EP 1175710 A1 30-01-20 EP 1138181 A1 04-10-20 JP 2003524811 T 19-08-20 WO 0064229 A1 26-10-20 WO 0065689 A1 02-11-20 WO 0022893 A1 20-04-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 EP 1194955 A1 10-04-20 JP 2003500832 T 07-01-20 WO 0070676 A1 23-11-20 US 6376769 B1 23-04-20 US 6376769 B1 23-04-20 US 6376769 B1 23-04-20							
WO 0065689 A 02-11-2000 US 6353420 B1 05-03-20 CN 1323505 T 21-11-20 EP 1175710 A1 30-01-20 EP 1138181 A1 04-10-20 JP 2003524811 T 19-08-20 WO 0064229 A1 26-10-20 WO 0065689 A1 02-11-20 WO 0022893 A1 20-04-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 EP 1194955 A1 10-04-20 JP 2003500832 T 07-01-20 WO 0070676 A1 23-11-20 US 6376769 B1 23-04-20 WO 0126180 A1 12-04-20							07-09-2001
CN 1323505 T 21-11-20 EP 1175710 A1 30-01-20 EP 1138181 A1 04-10-20 JP 2003524811 T 19-08-20 W0 0064229 A1 26-10-20 W0 0065689 A1 02-11-20 W0 0022893 A1 20-04-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 EP 1194955 A1 10-04-20 JP 2003500832 T 07-01-20 W0 0070676 A1 23-11-20 US 6376769 B1 23-04-20 W0 0126180 A1 12-04-20				US 	2003022475 		30-01-2003
EP 1175710 A1 30-01-20 EP 1138181 A1 04-10-20 JP 2003524811 T 19-08-20 W0 0064229 A1 26-10-20 W0 0065689 A1 02-11-20 W0 0022893 A1 20-04-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 EP 1194955 A1 10-04-20 JP 2003500832 T 07-01-20 W0 0070676 A1 23-11-20 US 6376769 B1 23-04-20 W0 0126180 A1 12-04-20	VO 0065	689 A	02-11-2000				05-03-2002
EP 1138181 A1 04-10-20 JP 2003524811 T 19-08-20 W0 0064229 A1 26-10-20 W0 0065689 A1 02-11-20 W0 0022893 A1 20-04-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 EP 1194955 A1 10-04-20 JP 2003500832 T 07-01-20 W0 0070676 A1 23-11-20 US 6376769 B1 23-04-20 W0 0126180 A1 12-04-20							21-11-2001
JP 2003524811 T 19-08-20 W0 0064229 A1 26-10-20 W0 0065689 A1 02-11-20 W0 0022893 A1 20-04-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 EP 1194955 A1 10-04-20 JP 2003500832 T 07-01-20 W0 0070676 A1 23-11-20 US 6376769 B1 23-04-20 W0 0126180 A1 12-04-20							30-01-2002
W0 0064229 A1 26-10-20 W0 0065689 A1 02-11-20 W0 0022893 A1 20-04-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 EP 1194955 A1 10-04-20 JP 2003500832 T 07-01-20 W0 0070676 A1 23-11-20 US 6376769 B1 23-04-20 W0 0126180 A1 12-04-20							04-10-2001
WO 0065689 A1 02-11-20 WO 0022893 A1 20-04-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 EP 1194955 A1 10-04-20 JP 2003500832 T 07-01-20 WO 0070676 A1 23-11-20 US 6376769 B1 23-04-20 WO 0126180 A1 12-04-20							19-08-2003
WO 0022893 A1 20-04-20 US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 EP 1194955 A1 10-04-20 JP 2003500832 T 07-01-20 WO 0070676 A1 23-11-20 US 6376769 B1 23-04-20 WO 0126180 A1 12-04-20							26-10-2000
US 2002124392 A1 12-09-20 US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 EP 1194955 A1 10-04-20 JP 2003500832 T 07-01-20 WO 0070676 A1 23-11-20 US 6376769 B1 23-04-20 WO 0126180 A1 12-04-20							
US 6288905 B1 11-09-20 US 6404643 B1 11-06-20 CN 1352804 T 05-06-20 EP 1194955 A1 10-04-20 JP 2003500832 T 07-01-20 WO 0070676 A1 23-11-20 US 6376769 B1 23-04-20 WO 0126180 A1 12-04-20							20-04-2000
US 6404643 B1 11-06-26 CN 1352804 T 05-06-26 EP 1194955 A1 10-04-26 JP 2003500832 T 07-01-26 WO 0070676 A1 23-11-26 US 6376769 B1 23-04-26 WO 0126180 A1 12-04-26							12-09-2002
CN 1352804 T 05-06-26 EP 1194955 A1 10-04-26 JP 2003500832 T 07-01-26 WO 0070676 A1 23-11-26 US 6376769 B1 23-04-26 WO 0126180 A1 12-04-26							-
EP 1194955 A1 10-04-20 JP 2003500832 T 07-01-20 WO 0070676 A1 23-11-20 US 6376769 B1 23-04-20 WO 0126180 A1 12-04-20							
JP 2003500832 T 07-01-20 W0 0070676 A1 23-11-20 US 6376769 B1 23-04-20 W0 0126180 A1 12-04-20							
WO 0070676 A1 23-11-20 US 6376769 B1 23-04-20 WO 0126180 A1 12-04-20							
US 6376769 B1 23-04-20 WO 0126180 A1 12-04-20							
WO 0126180 A1 12-04-20							
03 0721013 01 10 07 20							16-07-2002
	IC E60F	207	A 20_04100				31-10-1990

Information on patent family members

Internation pplication No
PCT/US 02/27680

					
Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 5625297	A		DE	9004562 U	1 19-07-1990
00 3023237	•		DE	59007516 D	
			WO	9013039 A	
			EP	0470118 A	1 12-02-1992
US 6133065	_ А	17-10-2000	US	6040618 A	21-03-2000
			US	2002185704 A	1 12-12-2002
			US	6462399 B	1 08-10-2002
US 5326428	———— А	05-07-1994	JP	2840544 B	2 24-12-1998
			JP	7086346 A	31-03-1995
			US	2002067183 A	1 06-06-2002
			US	2002093361 A	1 18-07-2002
			US	5523697 A	04-06-1996
			US	2001050574 A	1 13-12-2001
			US	5419807 A	30-05-1995
			US	2003006798 A	1 09-01-2003
			US	6380754 B	1 30-04-2002
			US	5483741 A	16-01-1996
			US	5592736 A	14-01-1997
			US	2002140450 A	
			US	6614249 B	
			US	2001050570 A	
			US	2001015655 A	
			US	2001030550 A	
			US	6127195 A	03-10-2000
			US	6124721 A	26-09-2000