

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
27 February 2003 (27.02.2003)

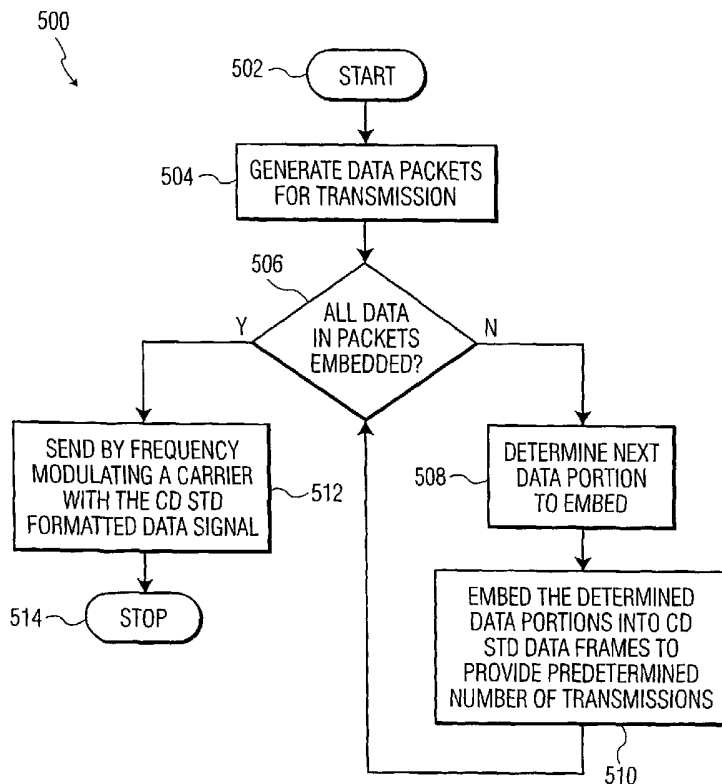
PCT

(10) International Publication Number  
WO 2003/017275 A3

- (51) International Patent Classification<sup>7</sup>: G11B 20/18, 20/10, H04H 1/00, H04L 12/28
- (21) International Application Number: PCT/US2002/025676
- (22) International Filing Date: 13 August 2002 (13.08.2002)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
60/312,030 13 August 2001 (13.08.2001) US  
60/312,031 13 August 2001 (13.08.2001) US  
60/312,033 13 August 2001 (13.08.2001) US
- (71) Applicant (for all designated States except US): THOMSON LICENSING S.A. [FR/FR]; 46, quai Le Gallo, F-92648 Boulogne Cedex (FR).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): CAFFREY, John, Justin [US/US]; 655 East 82nd Street, Indianapolis, IN 46240 (US). REHM, Norbert, Joseph, III [US/US]; 1115 Bear Club Drive, Cicero, IN 46034 (US). CHEAH, Sin, Hui [MY/US]; 14648 Brahms Drive, Carmel, IN 46032 (US). FRIEDLINE, Karl, L. [US/US]; 10192 Parkshore Drive, Noblesville, IN 46060 (US).
- (74) Agents: TRIPOLI, Joseph, S. et al.; Thomson Multimedia Licensing Inc., Two Independence Way, Princeton, NJ 08540 (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, US, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR TRANSMITTING AUDIO AND NON-AUDIO INFORMATION WITH ERROR CORRECTION



(57) Abstract: A method and an apparatus for providing digital quality transmission of audio and non-audio information using low cost components and arrangement. The present invention provides for the transmission of the audio and non-audio transmission by first converting the data to conform to the CD standard format and conditioning the converted signal to thereby generate a conditioned EFM signal. The conditioned EFM signal is used to frequency modulate a carrier (512). By converting the audio and non-audio information to conform to the CD standard format, the present method provides a low cost means of transmitting the data with error detection and correction. Another aspect of the present invention relates to embedding the non-audio information in the SUBCODE block of the data frame according to the CD standard. The non-audio information may be unrelated to the audio information, and the audio and non-audio information may be transmitted to separate devices. Another aspect of the present invention relates to controlling a voltage controlled oscillator in response to the fill level of a file buffer in the decoder.

WO 2003/017275 A3



(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).

(88) **Date of publication of the international search report:**  
18 November 2004

*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.*

**Published:**

— *with international search report*

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/25676

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 G11B20/18 G11B20/10 H04H1/00 H04L12/28

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)  
 IPC 7 H04H H04L

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, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 00 76272 A (AUDIOLOGIC INC) 14 December 2000 (2000-12-14) page 5, line 13 -page 6, line 13; figures 1,5,6,8-10 ---	1,10
A	EP 0 909 112 A (TOUCHTUNES MUSIC CORP) 14 April 1999 (1999-04-14) column 1, line 13 -column 2, line 24 ---	1,10
A	US 5 587 979 A (BLUETHGEN BJOERN) 24 December 1996 (1996-12-24) the whole document --- -/--	1,2,10, 11

Further documents are listed in the continuation of box C.  Patent family members are listed in annex.

\* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" 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</p> <p>"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</p> <p>"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.</p> <p>"&amp;" document member of the same patent family</p>
--	--

Date of the actual completion of the international search <b>24 April 2003</b>	Date of mailing of the international search report <b>13/05/2003</b>
---	---

Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer  <b>Brunet, L</b>
--	--

## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 02/25676

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category <sup>a</sup>	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>PHILIPS SEMICONDUCTORS: "Data Sheet, SAA7392, Channel encoder/decoder CDR60" PHILIPS SEMICONDUCTORS PRELIMINARY SPECIFICATION, [Online] 21 March 2000 (2000-03-21), pages 1-76, XP002239271 Retrieved from the Internet: &lt;URL:http://www.semiconductors.philips.com/acrobat/datasheets/SAA7392_1.pdf&gt; [retrieved on 2003-04-22] cited in the application page 4; figure 1 page 28, paragraph 7.6.1 - paragraph 7.6.2 page 47, paragraph 7.12 page 52, paragraph 7.15 ---</p>	1,2,10, 11
A	<p>PHILIPS SEMICONDUCTORS : "Data Sheet, SAA7325, Digital servo processor and Compact Disc decoder with integrated DAC (CD10 II)" PHILIPS SEMICONDUCTORS PRODUCT SPECIFICATION, [Online] 26 June 2000 (2000-06-26), pages 1-68, XP002239272 Retrieved from the Internet: &lt;URL:http://www.semiconductors.philips.com/acrobat/datasheets/SAA7325_2.pdf&gt; [retrieved on 2003-04-22] cited in the application figures 1,7 page 11, paragraph 7.4 -page 14, paragraph 7.6.1 ---</p>	1,2,10, 11,17
A	<p>POHLMANN K C: "THE COMPACT DISC TECHNOLOGY AND FORMATS: APPLICATIONS" JOURNAL OF THE AUDIO ENGINEERING SOCIETY, AUDIO ENGINEERING SOCIETY, NEW YORK, US, vol. 36, no. 4, 1 April 1988 (1988-04-01), pages 250-253,256-25-4,276-280,282, XP000069980 ISSN: 0004-7554 page 253, right-hand column, last paragraph -page 262, left-hand column, paragraph 1 ---</p>	1,2,10, 11
A	<p>US 6 170 060 B1 (JUN BENJAMIN CHE-MING ET AL) 2 January 2001 (2001-01-02) the whole document ---</p>	1,10,14
A	<p>WO 00 23899 A (QURESHEY SAFI) 27 April 2000 (2000-04-27) claim 1; figure 1 ---</p>	1,10
A	<p>US 5 808 224 A (KATO HIROKAZU) 15 September 1998 (1998-09-15) ---</p>	

-/--

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 02/25676

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category <sup>o</sup>	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 44 22 015 C (BOSCH GMBH ROBERT) 3 August 1995 (1995-08-03) -----	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/25676

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
WO 0076272	A	14-12-2000	AU 2039500	A 28-12-2000
			EP 1135969	A1 26-09-2001
			WO 0076272	A1 14-12-2000
EP 0909112	A	14-04-1999	FR 2769165	A1 02-04-1999
			CA 2249071	A1 26-03-1999
			EP 0909112	A1 14-04-1999
			JP 11163813	A 18-06-1999
US 5587979	A	24-12-1996	DE 3801332	A1 27-07-1989
			DE 3816832	A1 30-11-1989
			AT 142391	T 15-09-1996
			AU 639411	B2 29-07-1993
			AU 2855789	A 20-07-1989
			BR 8900237	A 12-09-1989
			CA 1322593	A1 28-09-1993
			CN 1035577	A ,B 13-09-1989
			CN 1068673	A ,B 03-02-1993
			CZ 8900287	A3 16-12-1998
			DE 68927063	D1 10-10-1996
			DE 68927063	T2 18-09-1997
			EP 0325325	A2 26-07-1989
			HK 1007226	A1 01-04-1999
			JP 2007276	A 11-01-1990
			JP 3092924	B2 25-09-2000
			JP 2000331437	A 30-11-2000
			KR 138112	B1 15-05-1998
			SK 28789	A3 12-06-2000
US 6170060	B1	02-01-2001	AU 1064699	A 27-04-1999
			EP 1025498	A1 09-08-2000
			JP 2001519562	T 23-10-2001
			WO 9918506	A1 15-04-1999
WO 0023899	A	27-04-2000	AU 1207900	A 08-05-2000
			WO 0023899	A1 27-04-2000
US 5808224	A	15-09-1998	JP 7072959	A 17-03-1995
			JP 3318089	B2 26-08-2002
			JP 7202816	A 04-08-1995
DE 4422015	C	03-08-1995	DE 4422015	C1 03-08-1995
			AU 691298	B2 14-05-1998
			AU 2611095	A 05-01-1996
			CA 2192958	A1 21-12-1995
			WO 9534965	A1 21-12-1995
			DE 59506736	D1 07-10-1999
			EP 0765547	A1 02-04-1997
			ES 2137518	T3 16-12-1999
			JP 10502224	T 24-02-1998