



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
25.08.2004 Bulletin 2004/35

(51) Int Cl.7: **G10L 19/06**

(43) Date of publication A2:
19.03.2003 Bulletin 2003/12

(21) Application number: **02255723.5**

(22) Date of filing: **16.08.2002**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
IE IT LI LU MC NL PT SE SK TR
 Designated Extension States:
AL LT LV MK RO SI

(71) Applicant: **Broadcom Corporation**
Irvine, CA 92618-3616 (US)

(72) Inventor: **Thyssen, Jes**
Laguna Niguel, California 92677 (US)

(30) Priority: **16.08.2001 US 312543 P**
07.06.2002 US 163378
07.06.2002 US 163995
07.06.2002 US 163344

(74) Representative: **Jehle, Volker Armin, Dipl.-Ing.**
Patentanwälte
Bosch, Graf von Stosch, Jehle,
Flüggenstrasse 13
80639 München (DE)

(54) **Robust quantization with efficient WMSE search of a sign-shape codebook using illegal space**

(57) A method of searching a signed codebook to quantize a vector includes weighting a shape codevector in a set of shape codevectors with a weighting function for a Weighted Mean Square Error (WMSE) criteria, to produce a weighted shape codevector. The method further includes correlating the weighted shape codevector with the vector to produce a weighted correlation

term. The method also includes determining, based on a sign of the weighted correlation term, a preferred one of a positive and a negative signed codevector associated with the shape codevector. The method further includes determining whether one of the signed codevectors does not belong to an illegal space defining illegal vectors.

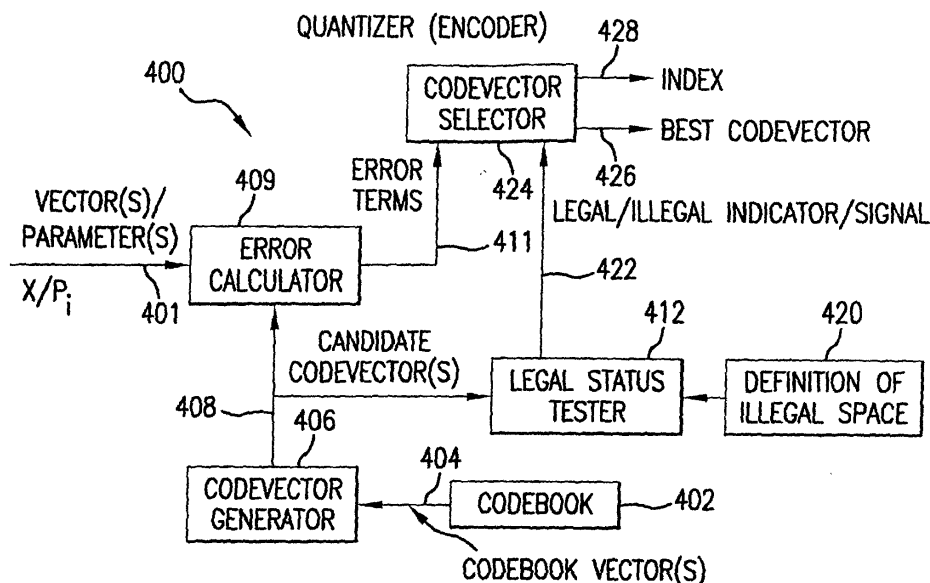


FIG.4A



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 25 5723

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 0 573 216 A (AMERICAN TELEPHONE & TELEGRAPH) 8 December 1993 (1993-12-08)	1-6, 9-12,17, 18, 20-23, 26-29, 34,35	G10L19/06
Y	* page 15, line 9 - page 17, line 9 *	7,8, 13-16, 19,24, 25,30-33	
	* page 6, line 28 - line 44 *		
Y	SMITH A M ET AL: "Normalization and polygon error detection for split VQ of line spectral frequencies" 2000 IEEE WORKSHOP ON SPEECH CODING. PROCEEDINGS., 17 September 2000 (2000-09-17), pages 123-125, XP010520062 * page 123, left-hand column, line 14 - right-hand column, line 3 * * page 125, left-hand column, line 31 - right-hand column, line 3 *	7,8, 13-16, 19,24, 25,30-33	

A	KIM S-J ET AL: "Split vector quantization of LSF parameters with minimum of dLSF constraint" IEEE SIGNAL PROCESSING LETTERS, IEEE SIGNAL PROCESSING SOCIETY, US, vol. 6, no. 9, September 1999 (1999-09), pages 227-229, XP002254930 ISSN: 1070-9908 * the whole document *	7,8, 13-16, 19,24, 25,30-33	

	-/--		
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 7 July 2004	Examiner Dobler, E
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (P04C01)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 25 5723

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	<p>CHAN W-Y ED - INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS: "The design of generalized product-code vector quantizers"</p> <p>DIGITAL SIGNAL PROCESSING 2, ESTIMATION, VLSI. SAN FRANCISCO, MAR. 23, vol. VOL. 5 CONF. 17, 23 March 1992 (1992-03-23), pages 389-392, XP010058929</p> <p>ISBN: 0-7803-0532-9</p> <p>* the whole document *</p> <p>-----</p>	1-35	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		7 July 2004	Dobler, E
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone</p> <p>Y : particularly relevant if combined with another document of the same category</p> <p>A : technological background</p> <p>O : non-written disclosure</p> <p>P : intermediate document</p> <p>T : theory or principle underlying the invention</p> <p>E : earlier patent document, but published on, or after the filing date</p> <p>D : document cited in the application</p> <p>L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (P04C01)