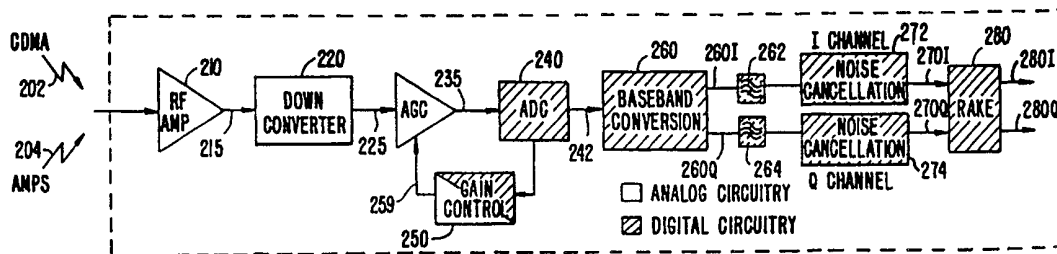




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification <sup>7</sup> : <b>H04B 1/707</b></p>	<p><b>A3</b></p>	<p>(11) International Publication Number: <b>WO 00/03493</b> (43) International Publication Date: 20 January 2000 (20.01.00)</p>
<p>(21) International Application Number: PCT/US99/14625 (22) International Filing Date: 28 June 1999 (28.06.99) (30) Priority Data: 09/113,791 10 July 1998 (10.07.98) US (71) Applicant: HYUNDAI ELECTRONICS AMERICA, INC. [US/US]; 3101 North First Street, San Jose, CA 95134 (US). (72) Inventors: KANG, Inchul; 239 Jo Drive, Los Gatos, CA 95032 (US). SUN, Winston, Y.; 1139 University Avenue, Palo Alto, CA 94301 (US). (74) Agents: COLWELL, Robert, C. et al.; Townsend and Townsend and Crew LLP, Two Embarcadero Center, 8th floor, San Francisco, CA 94111-3834 (US).</p>	<p>(81) Designated States: CN, JP, KR, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i>  (88) Date of publication of the international search report: 13 April 2000 (13.04.00)</p>	

(54) Title: CDMA RECEIVER AND METHOD OF OPERATION



(57) Abstract

The present invention provides a CDMA receiver which uses less expensive, more manufacturable digital filters in combination with noise cancellation circuitry to attenuate highly correlated signals. In addition, the CDMA receiver employs digital IF sampling in the baseband conversion process to remove superimposed DC voltages from the baseband data, obviating the need for DC offset voltage generators.

*FOR THE PURPOSES OF INFORMATION ONLY*

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

INTERNATIONAL SEARCH REPORT

International Application No  
PCT, 3 99/14625

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 H04B1/707

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 H04B

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 640 416 A (CHALMERS HARVEY) 17 June 1997 (1997-06-17) column 4, line 32 -column 6, line 13	1,2, 13-15
Y	column 6, line 58 -column 7, line 55; figure 1 column 8, line 57 -column 9, line 12 column 10, line 6 - line 9 ---	3-6,16, 17
Y	US 5 268 927 A (DIMOS GEORGE ET AL) 7 December 1993 (1993-12-07) abstract column 1, line 47 - line 63 column 3, line 41 - line 49 column 5, line 27 - line 33; figure 1 column 5, line 54 - line 57 column 7, line 15 - line 32; figure 3A --- -/--	3-6,16

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international 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)
- \*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

- \*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
- \*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
- \*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.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

15 October 1999

Date of mailing of the international search report

31. 01. 2000

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

BOSSEN, M

INTERNATIONAL SEARCH REPORT

International Application No

PCT. S 99/14625

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 422 909 A (STEWART KENNETH A ET AL) 6 June 1995 (1995-06-06)	17
X	column 1, line 59 -column 2, line 53 column 3, line 30 - line 58 column 4, line 54 -column 5, line 6; figure 1 column 6, line 46 -column 7, line 15 column 8, line 10 - line 22; figure 4 ---	1,13
A	US 5 361 276 A (SUBRAMANIAN RAVI) 1 November 1994 (1994-11-01) column 1, line 57 - line 58 column 4, line 10 - line 13; figure 1 column 7, line 16 - line 18 column 9, line 37 - line 51; figure 5 -----	1,13

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 99/ 14625

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

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

see additional sheet

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.:

1-6, 13-17

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

1. Claims: 1-6, 13-17

CDMA receiver with digital base band processing

2. Claims: 7-12

CDMA receiver with narrowband interference estimation and cancellation

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT S 99/14625

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
US 5640416	A	17-06-1997	CA 2219498 A WO 9641427 A	19-12-1996 19-12-1996
-----				
US 5268927	A	07-12-1993	NONE	
-----				
US 5422909	A	06-06-1995	CA 2153682 A,C CN 1116891 A FI 953609 A IL 111377 A JP 8506470 T KR 160831 B SE 9502703 A WO 9515639 A	08-06-1995 14-02-1996 28-07-1995 30-09-1997 09-07-1996 01-12-1998 02-10-1995 08-06-1995
-----				
US 5361276	A	01-11-1994	CA 2123735 A EP 0643506 A JP 7115387 A	14-03-1995 15-03-1995 02-05-1995
-----				