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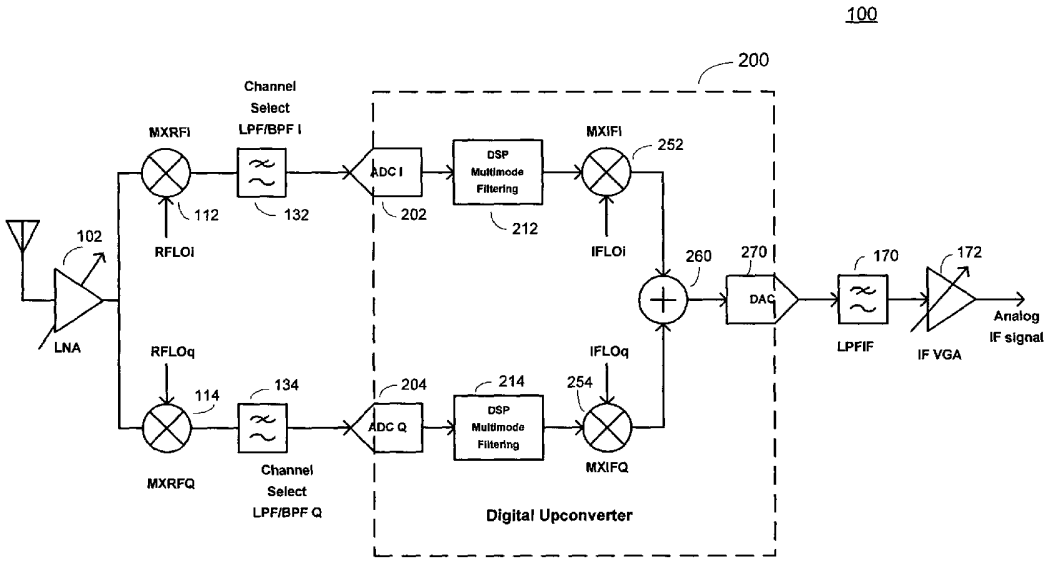
6 July 2006

[Continued on next page]

(54) Title: A RECEIVER ARCHITECTURE WITH DIGITALLY GENERATED INTERMEDIATE FREQUENCY



(57) Abstract: A receiver can be configured to include an RF front end that is configured to downconvert a received signal to a baseband signal or a low Intermediate Frequency (IF) signal. The receiver can downconvert the desired signal from an RF frequency in the presence of numerous interference sources to a baseband or low IF signal for filtering and channel selection. The filtered baseband or low IF signal can be converted to a digital representation. The digital representation of the signal can be upconverted in the digital domain to a programmable IF frequency. The digital IF signal can be converted to an analog IF signal that can be processed by legacy hardware.

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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.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2005/036513

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04B1/30

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)
H04B H03D

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

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/176058 A1 (JOHNSON RICHARD A) 9 September 2004 (2004-09-09) paragraph [0066] - paragraph [0077] paragraph [0084]; figures 5,7c	1-16
X	US 6 334 051 B1 (TSURUMI HIROSHI ET AL) 25 December 2001 (2001-12-25) column 5, line 18 - line 21 column 8, line 11 - line 17	1-4,6-16
A	column 9, line 17 - column 10, line 36; figures 6,9,10	5

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family 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	Date of mailing of the international search report
3 February 2006	19.05.06

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, Fax: (+31-70) 340-3016	Sinapius, G

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2005/036513

Box II Observations where certain claims were found unsearchable (Continuation of item 2 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 III Observations where unity of invention is lacking (Continuation of item 3 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.:

1-16

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

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

1. claims: 1-16

A receiver /method of receiving with downconversion of the input signal to a first frequency band, digitization of the signal in the first frequency band and subsequent digital upconversion to a second frequency band.

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2. claims: 17-21

A calibration method/apparatus in a quadrature receiver comprising coupling a calibration tone to the signal path, detecting the I and Q components and adjusting a gain or a phase of at least one of the I and Q signal paths.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2005/036513

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 275 540 B1 (BARRETT, JR. RAYMOND LOUIS ET AL) 14 August 2001 (2001-08-14)	1-4,8,9, 11-13, 15,16
A	column 2, line 54 - line 61 column 3, line 13 - line 48 column 4, line 18 - line 40 column 4, line 60 - column 5, line 6 column 5, line 36 - line 39; figures 2,3	5-7,10, 14

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2005/036513

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004176058 A1	09-09-2004	EP 1611688 A2	04-01-2006
		WO 2004079924 A2	16-09-2004
US 6334051 B1	25-12-2001	JP 3545606 B2	21-07-2004
		JP 11317777 A	16-11-1999
US 6275540 B1	14-08-2001	NONE	