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(71) Applicant (for all designated States except US): **PULSE-LINK, INC.** [US/US]; 1969 Kellogg Road, Carlsbad, CA 92008 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **LAKKIS, Ismail** [LB/US]; 10131 Prairie Springs Road, San Diego, CA 92127 (US).

(74) Agent: **MARTINEZ, Peter, R.**; c/o Pulse-Link, Inc., 1969 Kellogg Avenue, Carlsbad, CA 92008 (US).

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Declaration under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

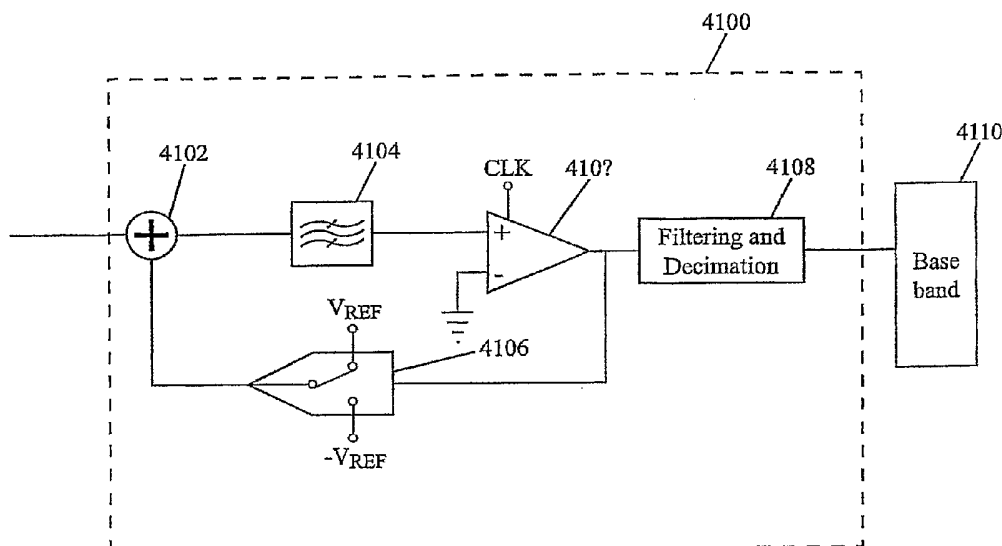
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **ULTRA-WIDEBAND COMMUNICATION APPARATUS AND METHODS**



(57) Abstract: Apparatus and methods of ultra-wideband communication are provided. In one embodiment, an ultra-wideband receiver comprises an envelope detector that detects the amplitude of a received ultra-wideband signal and generates a waveform representative of the envelope of the received ultra wideband signal. A sign detector then determines a sign associated with a data bit encoded on the received ultra-wideband signal. This Abstract is provided for the sole purpose of complying with the Abstract requirement rules that allow a reader to quickly ascertain the subject matter of the disclosure contained herein. This Abstract is submitted with the explicit understanding that it will not be used to interpret or to limit the scope or the meaning of the claims.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/36285

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H03K 7/04 (2006.01)

USPC - 375/239

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)

US: 341/111, 112, 133, 157; 375/239, 295, 316, 332; 455/071, 116, 313, 316, 318

IPC(8): H03M 001/48, 001/60, 001/62; H04L 027/04, 027/12, 027/14, 027/20, 027/22; H04K 007/04, 009/00; H04B 001/26, 015/00 (all 2006.01)

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 practicable, search terms used)

MICROPAT; IEEEEXPLORE; DIALOGPRO

Search terms: ("alternating signs" or "alternating polarity") and (network*3 or communication*2) and ("a/d" or "analog*4digital") and filter and ("envelope detector" or diode or capacitor); ultra-wideband

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,630,897 B2 (LOW et al) 07 October 2003 (07.10.2003) entire document	1-3, 6-8, 11-13

Y		4, 5, 9, 10, 14-16
Y	US 4,317,210 (DEKKER et al) 23 February 1982 (23.02.1982) abstract; column 5; figures 3, 4	4, 5, 9, 10
Y	US 5,642,391 A (EWELL et al) 24 June 1997 (24.06.1997) abstract; column 4	5, 10
Y	US 2004/0151269 A1 (BALAKRISHNAN et al) 05 August 2004 (05.08.2004) paragraphs 0012, 0044, 0063; figure 6	14-16
A	US 6,049,707 A (BUER et al) 11 April 2000 (11.04.2000) entire document	1-16
A	US 5,606,729 A (D'AMICO et al) 25 February 1997 (25.02.1997) entire document	1-16
A	US 6,351,499 B1 (PAULRAJ et al) 26 February 2002 (26.02.2002) entire document	1-16
A	US 6,473,467 B1 (WALLACE et al) 29 October 2002 (29.10.2002) entire document	1-16
A	US 4,632,124 (HILLER et al) 30 December 1986 (30.12.1986) entire document	1-16
A	US 6,549,588 B2 (NEUBAUER) 15 April 2003 (15.04.2003) entire document	1-16

☐ Further documents are listed in the continuation of Box C.

☐ 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 application or patent 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

11 May 2006

Date of mailing of the international search report

02 AUG 2006

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450

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Authorized officer:

Blaine R Copenheaver

Telephone No. 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/36285

Box No. 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 No. 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:
This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-16, drawn to an ultra-wideband receiver comprising an envelope detector and a sign detector.

Group II, claims 17-27, drawn to an ultra-wideband receiver comprising a comparator and signal combiner.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention is an ultra-wideband receiver having an envelope and sign detector wherein the received signals are filtered and amplified as claimed therein, the special technical feature of the Group II invention is an ultra-wideband receiver comprising a comparator to compare the signals to a ground reference according to a clock and combining the ultra-wideband signal with an analog signal of the comparator output as claimed therein.

Since none of the special technical features of the Group I and Group II inventions is found in more than one of the inventions, unity of invention is lacking.

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 additional fees, this Authority did not invite payment of additional fees.
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 and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.