Abstract: Methods and apparatus are described for time domain signals. A method includes creating a bipolar pulse whose high (up) and low (down) periods are separately and precisely controllable.
INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/002835

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04L25/49 H03K7/08 H03K9/08

According to International Patent Classification (IPC) or to both national classification and

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04L H03K

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, INSPEC, PAJ, IBM-TDB, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>WO 2005/038479 A (ATMEL CORP [US])</td>
<td>1-8, 11, 12</td>
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<td></td>
<td>28 April 2005 (2005-04-28)</td>
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<tr>
<td></td>
<td>page 3, lines 1-11</td>
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<td></td>
<td>figures 1,2a,2b</td>
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</tbody>
</table>

D. 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

Date of the actual completion of the international search
21 July 2008

Date of mailing of the international search report
20/10/2008

Name and mailing address of the ISA/
European Patent Office, P B 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel (+31-70) 540-2040,
Fax (+31-70) 340-3016

Authorized officer

Baltersee, Jens
Continuation of Box II.1

Claims Nos.: 9

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Continuation of Box II.2

Claims Nos.: 9

The subject-matter of claim 9 is a symbol constellation of 128 members, representing all possible 7-bit binary integers. There appears to be a total lack of support in the description for such subject-matter. Moreover, since the invention in-suit is concerned with multi-dimensional symbols made up of bipolar pulses, it is entirely unclear how such a symbol constellation may be created (Articles 5 and 6 PCT).

It is concluded, in accordance with Art. 17(2)(a)(ii) PCT, that claims 9 fail to comply with the prescribed requirements to such an extent that a meaningful search could not be carried out.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.2), should the problems which led to the Article 17(2)PCT declaration be overcome.
### 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. [X] Claims Nos.: 9
   because they relate to subject matter not required to be searched by this Authority, namely:

2. [X] Claims Nos.: 9
   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:

   see FURTHER INFORMATION sheet PCT/ISA/210

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).

### 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 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. [Y] 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.:

   1-8, 11, 12

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

1. claims: 1-8, 11, 12

   Pulse width modulation with bipolar pulses, the high and low periods of which are separately controllable

2. claim: 10

   Symbol constellation for data symbol and control symbol transmission