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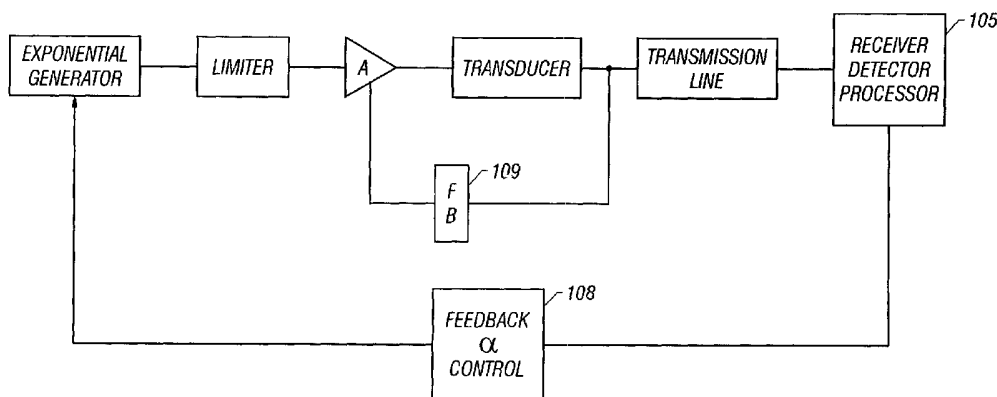
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*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

(54) Title: METHODS FOR TRANSMITTING A WAVEFORM HAVING A CONTROLLABLE ATTENUATION AND PROPAGATION VELOCITY



(57) Abstract: Methods for driving a lossy transmission media with an energy wave defined by an exponential waveform function. The propagation delay and attenuation of the wave is a function of an exponential coefficient, and its propagation velocity is essentially constant and independent of displacement. Utilizing relationships between the propagation velocity, exponential coefficient, attenuation, and transmission line parameters, one may effectively model various transmission media. One may also determine unknown transmission line parameters, waveform exponential coefficients, attenuation, and/or propagation velocities by utilizing those relationships. By modulating the exponential coefficient, information may be encoded onto a waveform.



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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/07172

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04B3/46 G01N25/18

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 G01R G01N H03H G01H G01S

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, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 1 455 712 A (SIEMENS AG ALBIS) 17 November 1976 (1976-11-17)	1-4, 7-16, 23-26, 37
A	page 1, line 10 - line 47	29-36, 38-40, 42-51
	page 2, line 58 - line 102; figures 1-3	
A	POZAR D: "Microwave Engineering" June 1990 (1990-06), ADDISON-WESLEY, READING XP002186190 184260	1-4, 7-16, 23-26, 29-51
	page 69, paragraph 3.1 -page 70 page 126, paragraph 4.1 -page 128	
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☒ 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

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"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

30 January 2003

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13. 02. 2003

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 630 938 A (PIORKOWSKA-PALCZEWSKA EWA ET AL) 23 December 1986 (1986-12-23) column 1, line 14-50 column 4, line 5-53 ----	1,5,6, 21,22,28
A	US 5 713 665 A (KATO HIDEYUKI ET AL) 3 February 1998 (1998-02-03) column 1, line 65 -column 2, line 59 ----	1,5,6, 21,22,28
A	US 4 566 084 A (LAINE EDWIN F) 21 January 1986 (1986-01-21) column 2, line 15 -column 3, line 2 ----	1,17,18, 27
A	US 5 877 997 A (FELL ROGER) 2 March 1999 (1999-03-02) column 1, line 55 -column 2, line 43 -----	1,19,20

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 01/07172

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.:

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: 1-4, 7-16, 23-26, 29-51

Method of transmitting a waveform along an electrical transmission line using exponential signals.

2. Claims: 1,5,6, 28

Method for transmitting a waveform along a diffusion line using exponential signals.

3. Claims: 1, 17, 18, 27

Method for transmitting an acoustical waveform in a viscous absorption media using exponential signals.

4. Claims: 1, 19, 20

Method for transmitting a waveform in a chemical reacting fluid using exponential signal.

5. Claims: 1, 21, 22

Method for transmitting a waveform along a heat-conductive line using exponential signals.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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