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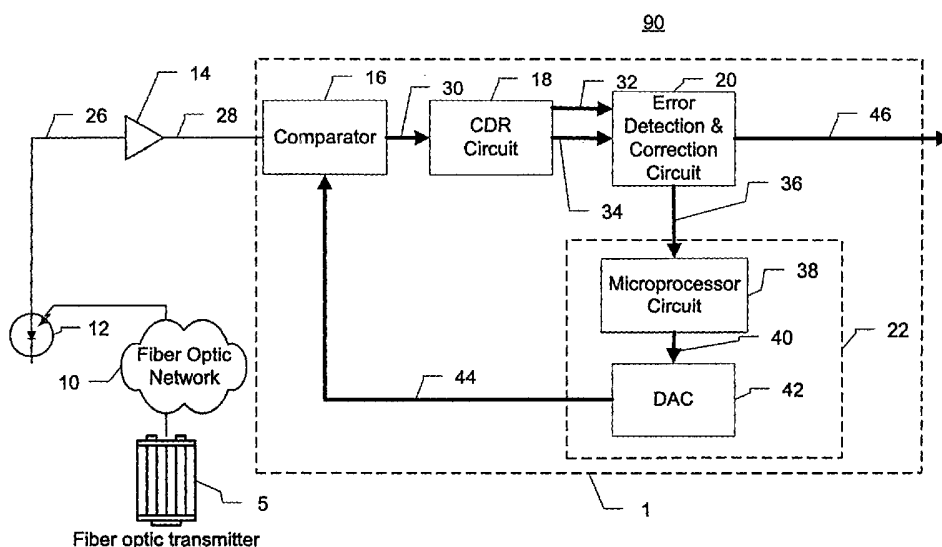
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ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: AN OPTICAL SIGNAL RECEIVER



(57) Abstract: An optical receiver configuration and method of controlling an optical signal receiver adjusts a decision threshold to reduce the bit error rate (BER). The receiver includes a comparator having a data input and a digital data output. An error detection & correction circuit provides an error signal representative of the number of corrected "1"s and "0"s in the data output from the comparator. Based on the error signal, a control circuit modifies the comparator decision threshold in a direction to reduce the BER of the receiver. Dynamic modification of the decision threshold may also be accomplished. A total percentage error indicator is preferably used as the basis of changing the decision threshold value. The total percentage error indicator may be used to variably adjust the decision threshold by an amount that varies according to the magnitude of the total percentage error indicator to thereby more quickly arrive at an acceptable decision threshold and prevent overshoot. A searching method may also be used to determine the usable range of the comparator before tuning the decision threshold-

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INTERNATIONAL SEARCH REPORT

Internati Application No
PCT/ 02/23750

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04B10/08 H04B10/158 H04L25/06

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 H04L 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)

EPO-Internal, WPI Data, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A A	EP 1 085 713 A (MARCONI COMM LTD) 21 March 2001 (2001-03-21). abstract column 1, lines 3-10 column 3, lines 1-11 column 4, line 16 - column 6, line 7 figures 4,5 ----- OHATA N ET AL: "AUTOMATIC THRESHOLD-LEVEL CONTROL (ATC) FOR OPTIMUM DECISION OPERATION IN OPTICAL REPEATERS" ELECTRONICS LETTERS, IEE STEVENAGE, GB, vol. 21, no. 24, 21 November 1985 (1985-11-21), pages 1148-1149, XP000761203 ISSN: 0013-5194 the whole document -----	1,15,21, 25,36,37 2,16,26 1,2,15, 16,21, 25,26, 36,37

☐ 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

1 August 2003

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18.12.03

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INTERNATIONAL SEARCH REPORT

Inter

application No.
/US 02/23750**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, 2, 15, 16, 21, 25, 26, 36, 37

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: 1,2,15,16,21,25,26,36,37

Independent claim 1 relates to an optical signal receiver, comprising a comparator for receiving an input data signal from an optical-to-electrical signal converter and a decision threshold signal and providing a digital output data signal; an error detection and correction circuit for receiving the digital output data signal, detecting errors in the digital output data signal and correcting detected errors in the digital output data signal; said error detection and correction circuit also providing an error signal representative of a number of corrected "1"s and number of corrected "0"s in the output data signal; and a control circuit for receiving the error signal, calculating a total percentage error indicator based on the error signal and adjusting the decision threshold signal in response to the total percentage error indicator.

Claims 2, 16 and 26 depending on claims 1, 15 and 25, respectively, state that the control circuit changes a rate of the decision threshold adjustment based on the total percentage error indicator.

1.1. claims: 21, 36, 37

Claim 21 states that the error detection and correction unit includes an FEC circuit. Claim 37 states that a direction of changes is determined to be effected by adjusting the decision threshold signal.

2. claims: 3, 17, 27

Claims 3, 17 and 27 depending on claims 1, 15 and 25, respectively, state that the control circuit dynamically adjusts the decision threshold signal in response to the total percentage error indicator.

3. claims: 4, 22

Claims 4 and 22 depending on claims 1 and 15, respectively, comprise a clock and data recovery circuit for receiving the digital output data signal and providing a data-recovered output signal and a clock signal to said error detection and correction circuit.

4. claims: 5-14, 23, 28-35

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Claims 5, 6, 23 and 28 depending on claims 1, 15 and 25, respectively, state that the control circuit adjusts the decision threshold by a stepsize amount related to or in response to the total percentage error indicator.

5. claim: 18

Claim 18 depending on claim 15 states that a digital-to-analog converter is operatively coupled to a microprocessor circuit performing the total percentage error indicator calculation and to the decision threshold input port, said digital-to-analog converter adjusting the decision threshold signal based on the digital control signal provided by said microprocessor circuit.

6. claim: 19

Claim 19 depending on claim 15 states that a potentiometer is operatively coupled to a microprocessor circuit performing the total percentage error indicator calculation and to the decision threshold input port, said potentiometer generating the decision threshold signal based on the control signal provided by said microprocessor circuit to thereby adjust the decision threshold signal.

7. claim: 20

Claim 20 depending on claim 15 states that an RC circuit is operatively coupled to a microprocessor circuit performing the total percentage error indicator calculation and to the decision threshold input port; said microprocessor circuit adjusting the decision threshold signal with a pulse-width modulated signal.

INTERNATIONAL SEARCH REPORT

Internatio Application No
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