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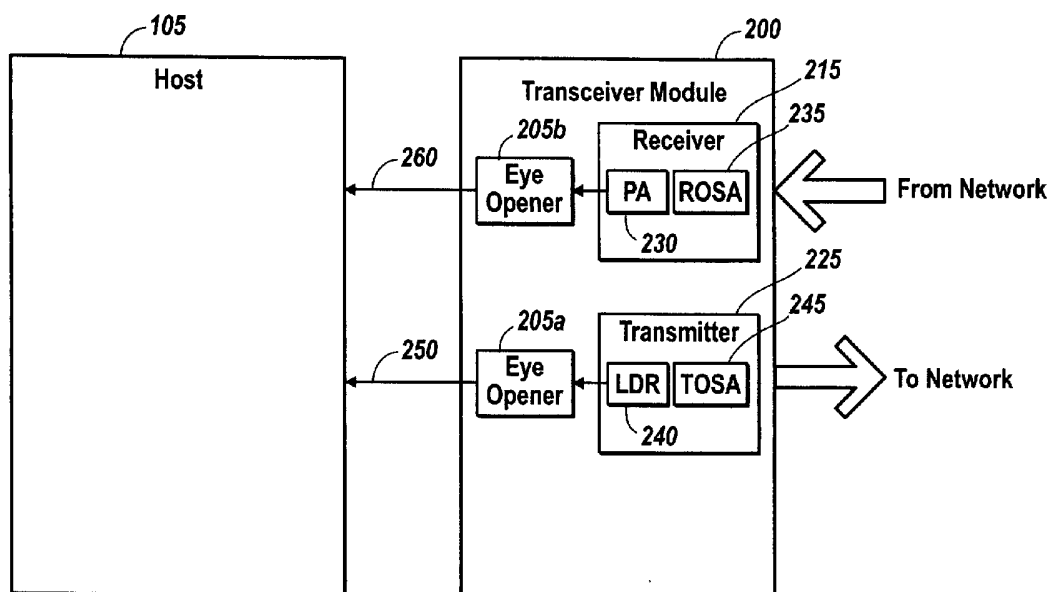
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[Continued on next page]

(54) Title: TRANSCEIVER MODULE AND INTEGRATED CIRCUIT WITH DUAL EYE OPENERS



(57) Abstract: A transceiver module (200) having integrated eye diagram opening functionality for reducing jitter is described. The transceiver module (200) may include a transmitter eye opener (205a) and a receiver eye opener (205b) integrated in a single circuit. The transceiver module (200) may also include serial control and various other integrated components. Other functionalities that may be integrated on the transceiver module (200) include loopback modes, bypass features, bit error rate testing, and power down modes.

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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/US03/20053

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(7) : H04B 10/00, 10/04, 10/06 US CL : 398/135, 155, 175, 182, 202, 209 According to International Patent Classification (IPC) or to both national classification and IPC																													
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) U.S. : 398/135, 155, 175, 182, 202, 209 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EAST, WEST, optical transceiver, clock and data recovery, retiming, reshape, clock reference, phase locked loop, PLL.																													
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <table border="1"> <thead> <tr> <th>Category *</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X, P</td> <td>US 2003/0053170 A1 (LEVINSON et al) 20 March 2003, Figure 2A, page 2, paragraphs [0028]-[0031] and page 3, paragraphs [0041]-[0044]</td> <td>1, 5, 10, 11, 14 and 17</td> </tr> <tr> <td>Y</td> <td>US 2002/0021468 A1 (KATO et al) 21 February 2002, Figures 2 and 3, page 3, paragraphs [0038]-[0045] and page 4, paragraphs [0046]-[0048].</td> <td>2-4, 6, 13, 15, 16, 18</td> </tr> <tr> <td>X</td> <td>US 2002/0060824 A1 (LIOU et al) 23 May 2002, Figure 1, page 2, paragraphs [0016]-[0019] and page 3, paragraphs [0024]-[0025].</td> <td>1, 5, 7-12, 14, 17, 19 and 20</td> </tr> <tr> <td>---</td> <td></td> <td>-----</td> </tr> <tr> <td>Y</td> <td></td> <td>2-4, 6, 13, 15, 16, 18</td> </tr> <tr> <td>A</td> <td>US 4,932,038 A1 (WINDUS) 05 June 1990, Figure 1, col. 1, lines 72-67 and col. 2, lines 1-14.</td> <td>1-20</td> </tr> <tr> <td>A</td> <td>US 5,854,704 A1 (GRANDPIERRE) 29 December 1998, Figures 3 and 4, col. 3, lines 10-67 and col. 4, lines 1-52.</td> <td>1-20</td> </tr> <tr> <td>A</td> <td>US 6,256,127 B1 (TAYLOR) 03 July 2001, Figure 1, col. 2, lines 26-67 and col. 3, lines 1-20.</td> <td>1-20</td> </tr> </tbody> </table>			Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X, P	US 2003/0053170 A1 (LEVINSON et al) 20 March 2003, Figure 2A, page 2, paragraphs [0028]-[0031] and page 3, paragraphs [0041]-[0044]	1, 5, 10, 11, 14 and 17	Y	US 2002/0021468 A1 (KATO et al) 21 February 2002, Figures 2 and 3, page 3, paragraphs [0038]-[0045] and page 4, paragraphs [0046]-[0048].	2-4, 6, 13, 15, 16, 18	X	US 2002/0060824 A1 (LIOU et al) 23 May 2002, Figure 1, page 2, paragraphs [0016]-[0019] and page 3, paragraphs [0024]-[0025].	1, 5, 7-12, 14, 17, 19 and 20	---		-----	Y		2-4, 6, 13, 15, 16, 18	A	US 4,932,038 A1 (WINDUS) 05 June 1990, Figure 1, col. 1, lines 72-67 and col. 2, lines 1-14.	1-20	A	US 5,854,704 A1 (GRANDPIERRE) 29 December 1998, Figures 3 and 4, col. 3, lines 10-67 and col. 4, lines 1-52.	1-20	A	US 6,256,127 B1 (TAYLOR) 03 July 2001, Figure 1, col. 2, lines 26-67 and col. 3, lines 1-20.	1-20
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<table border="1"> <tr> <td>           * 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 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         </td> <td>           "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            "&amp;" document member of the same patent family         </td> </tr> </table>			* 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 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																									
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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 Facsimile No. (703)305-3230		Authorized officer Thanh Phan Telephone No. (703)305-3900																											