



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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| <b>(51) International Patent Classification <sup>6</sup> :</b><br><b>H03M 13/12</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>A2</b> | <b>(11) International Publication Number:</b> <b>WO 96/23360</b><br><b>(43) International Publication Date:</b> 1 August 1996 (01.08.96)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>(21) International Application Number:</b> PCT/US96/01143<br><b>(22) International Filing Date:</b> 22 January 1996 (22.01.96)<br><b>(30) Priority Data:</b><br>08/377,073 23 January 1995 (23.01.95) US<br><b>(71) Applicant:</b> ERICSSON INC. [US/US]; One Triangle Drive,<br>P.O. Box 13969, Research Triangle Park, NC 27709 (US).<br><b>(72) Inventors:</b> RAMESH, Rajaram; 1226F Hamilton Court, Cary,<br>NC 27511 (US). MOLNAR, Barbara, D.; 110 Flying Leaf<br>Court, Cary, NC 27513 (US).<br><b>(74) Agents:</b> GRUDZIECKI, Ronald, L. et al.; Burns, Doane,<br>Swecker & Mathis, L.L.P., P.O. Box 1404, Alexandria, VA<br>22313-1404 (US).                                                                                                                                                                                                                                                                                                                                                                               |           | <b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BB, BG, BR, BY,<br>CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS,<br>JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD,<br>MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD,<br>SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO<br>patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AZ,<br>BY, KG, KZ, RU, TJ, TM), European patent (AT, BE, CH,<br>DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE),<br>OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR,<br>NE, SN, TD, TG).<br><br><b>Published</b><br><i>Without international search report and to be republished<br/>         upon receipt of that report.</i> |
| <b>(54) Title:</b> A DIGITAL COMMUNICATION SYSTEM HAVING A PUNCTURED CONVOLUTIONAL CODING SYSTEM AND METHOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>(57) Abstract</b><br><p>A digital communication system having a punctured convolutional coding system and method. The digital communication system includes a coder for coding a digital input to be transmitted from a transmitter and a decoder for decoding the coded input received at the receiver. The coder includes a convolutional coding circuit of rate <math>k/n</math> for outputting a convolutional coded output and a puncturing circuit for puncturing the convolutionally coded output to achieve a punctured code rate of <math>z/q</math>, where <math>z = \gamma k</math>. The puncturing circuit punctures the convolutional coded output according to a deleting pattern chosen to have a bit length of <math>L = p\gamma n</math>, where <math>p \geq 2</math>. The puncturing circuit outputs a punctured output at punctured code rate of <math>z/q</math> and the punctured output is transmitted to the receiver. The receiver decodes the transmitted punctured output and outputs a decoded output.</p> |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |