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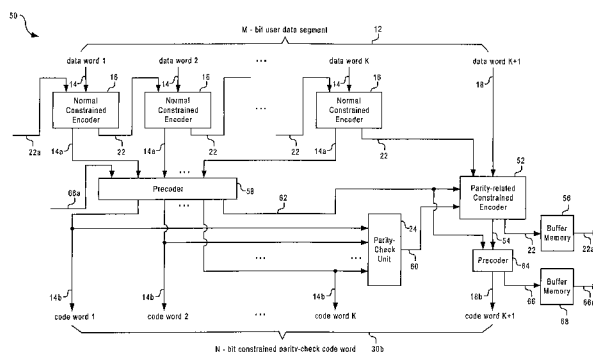
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(54) Title: METHOD AND SYSTEM FOR ENCODING AND DECODING INFORMATION WITH MODULATION CONSTRAINTS AND ERROR CONTROL



(57) Abstract: A method and system for encoding a segment of user data words into a segment of code words so that both modulation constraints and a predetermined parity-check constraint are satisfied. Each segment of the user data is partitioned into several data words, and encoded separately by first and second types of component code, which are referred to as the normal constrained code and the parity-related constrained code, respectively. The parity-check constraint over the combined code word is achieved by concatenating the sequence of normal constrained code words with a specific parity-related constrained code word chosen from a candidate code word set. Both the component codes are finite-state constrained codes, which are designed to have rates close to the Shannon capacity. Furthermore, they are based on the same finite state machine (FSM), which enables them to be connected seamlessly, without violating the modulation constraints. Two preferred embodiments are provided to design a code in the non-return-to-zero inverted (NRZI) format and the non-return-to-zero (NRZ) format, respectively. Designing the codes in NRZ format may reduce the number of parity-check bits required for error detection and simplify error correction or post-processing. The parity-check constraint is defined by the parity-check polynomial or parity-check matrix of a systematic linear block code, which could detect any type of dominant error event as well as error event combinations of a given optical recording system. As a result, the information density of the system is improved.