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(54) Title: *LIST OUTPUT VITERBI DECODING WITH CRC OUTER CODE FOR MULTI-RATE SIGNAL*

(57) Abstract

A method and apparatus for decoding a frame of multi-rate encoded digital data which contains redundant information provided to validate the decoding operation. A frame of data is received which contains information bits and cyclic redundancy check (CRC) bits. In accordance with the invention, the received frame is decoded and a check is conducted to determine whether the CRC bits correspond correctly for the decoded information bits. If the decoded frame passes the CRC test process, the decoded frame is provided to the user. However, if the decoded frame does not pass the CRC test, then at least one additional decoding process is performed on the received frame. In the first exemplary embodiment of the present invention, on a failure of the CRC check, the data is decoded using a trellis decoder (224) and the data that yields the next most likely path through the trellis is selected. In a second illustrative embodiment, if the CRC test fails, the trellis decoder (224) then identifies all paths having metrics within a predetermined threshold of a metric associated with the optimal path through the trellis. The CRC test is then performed on the decoded frame with respect to the suboptimal paths (starting with the most likely path). If any of these paths pass the CRC check, the information bits are output by the decoder (224). If not, an error is declared.

