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Walton et al.

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(54) **DIVERSITY TRANSMISSION MODES FOR MIMO OFDM COMMUNICATION SYSTEMS**

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H04J 11/00 (2006.01)

(52) **U.S. Cl.** 370/208; 370/341; 375/267

(58) **Field of Classification Search** 370/210,
370/208, 329, 209, 341, 342, 242, 522, 335;
375/130, 285, 146.47, 267, 299; 455/562,
455/561, 67.11

See application file for complete search history.

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Primary Examiner—Duc Ho

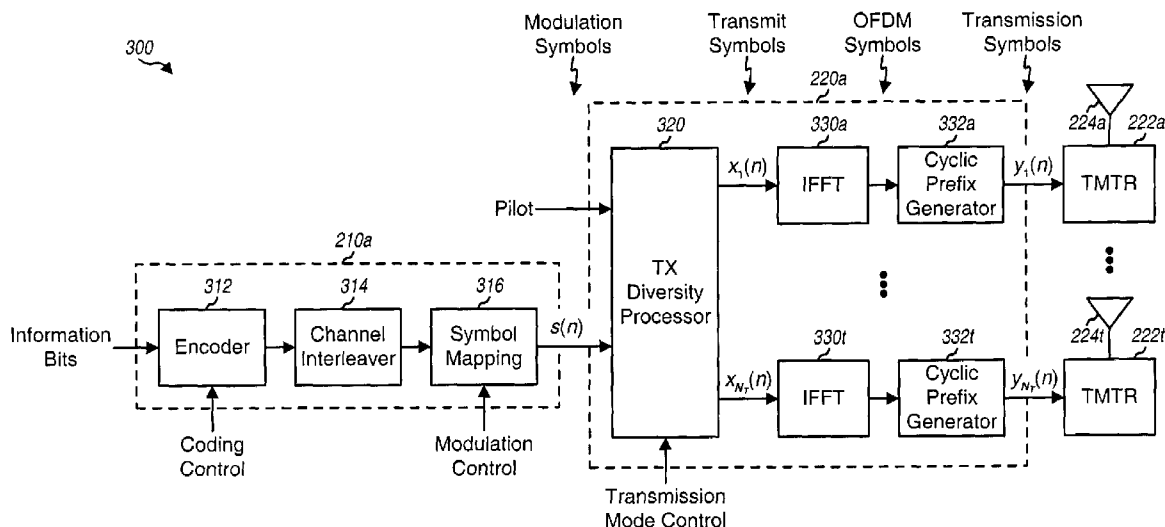
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(57) **ABSTRACT**

Techniques for transmitting data using a number of diversity transmission modes to improve reliability. At a transmitter, for each of one or more data streams, a particular diversity transmission mode is selected for use from among a number of possible transmission modes. These transmission modes may include a frequency diversity transmission mode, a Walsh diversity transmission mode, a space time transmit diversity (STTD) transmission mode, and a Walsh-STTD transmission mode. Each diversity transmission mode redundantly transmits data over time, frequency, space, or a combination thereof. Each data stream is coded and modulated to provide modulation symbols, which are further processed based on the selected diversity transmission mode to provide transmit symbols. For OFDM, the transmit symbols for all data streams are further OFDM modulated to provide a stream of transmission symbols for each transmit antenna used for data transmission.

3 Claims, 11 Drawing Sheets



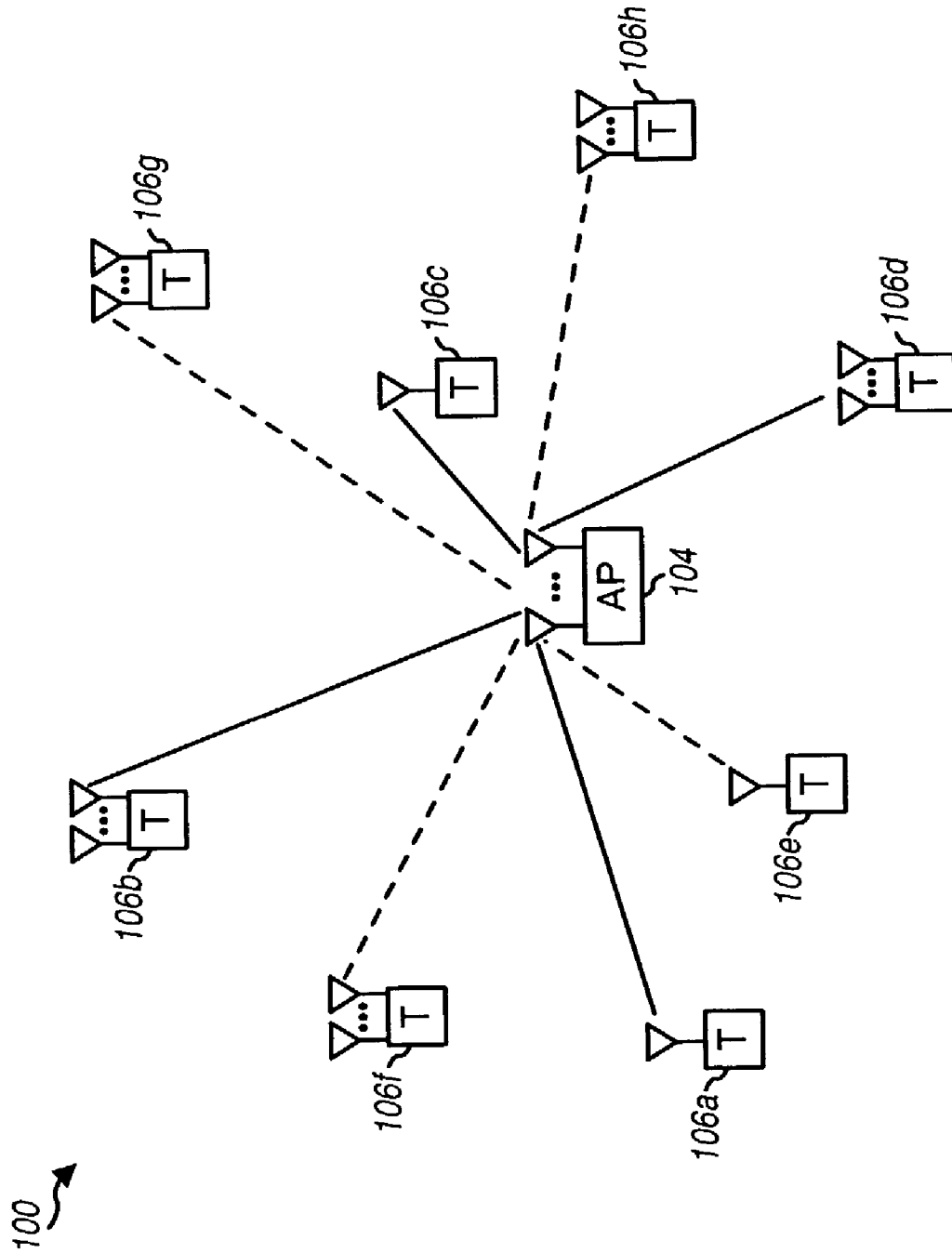


FIG. 1

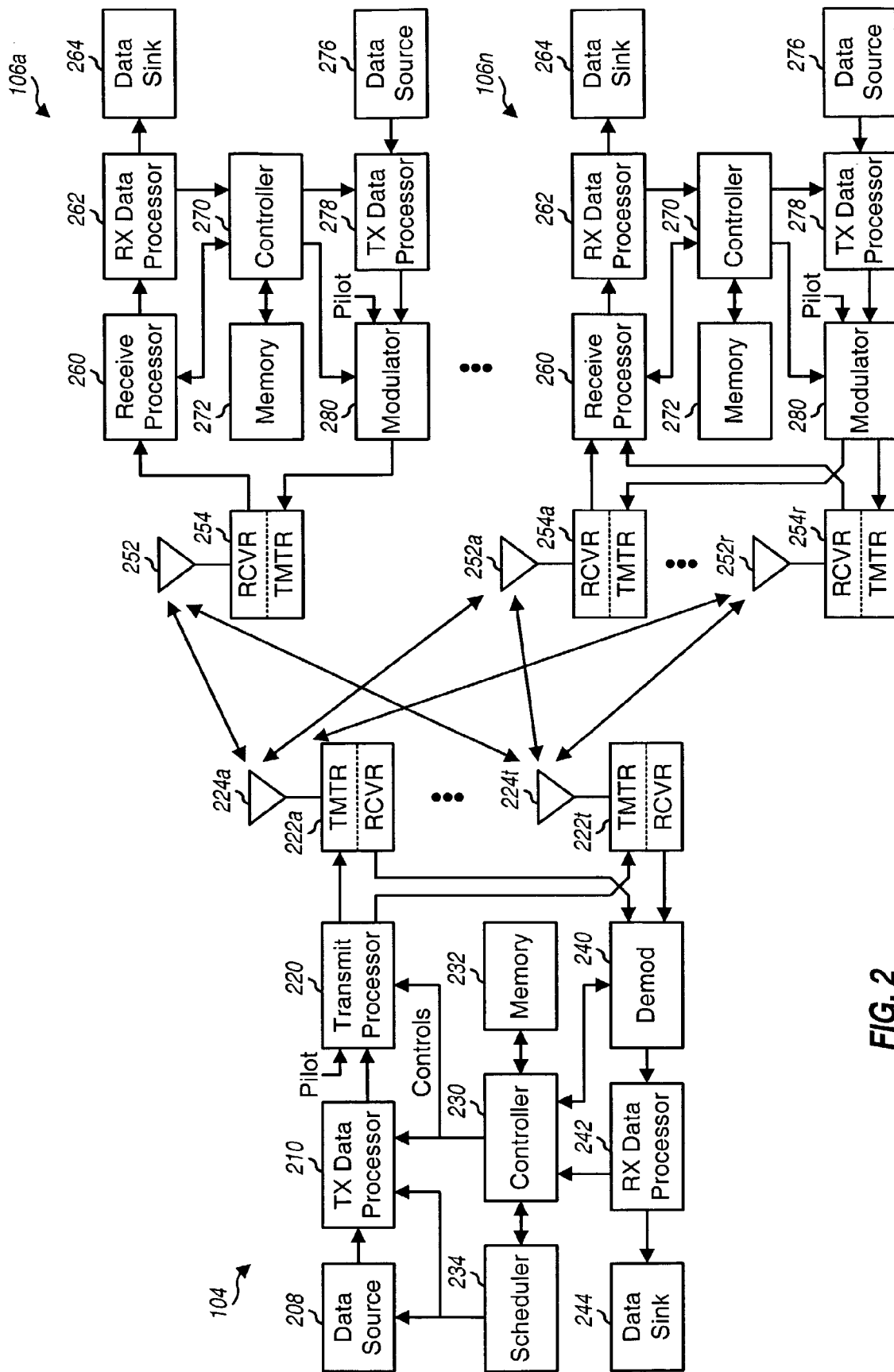


FIG. 2

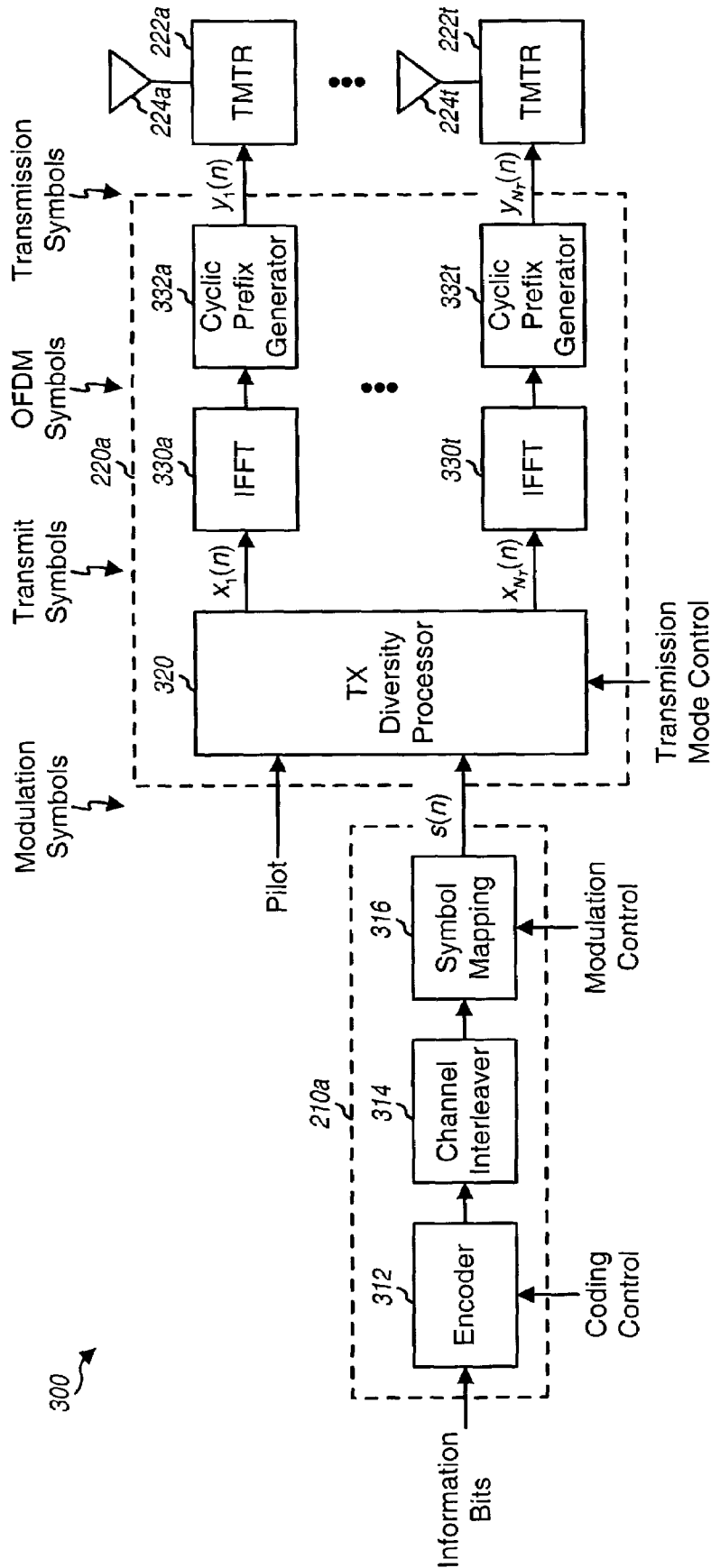


FIG. 3

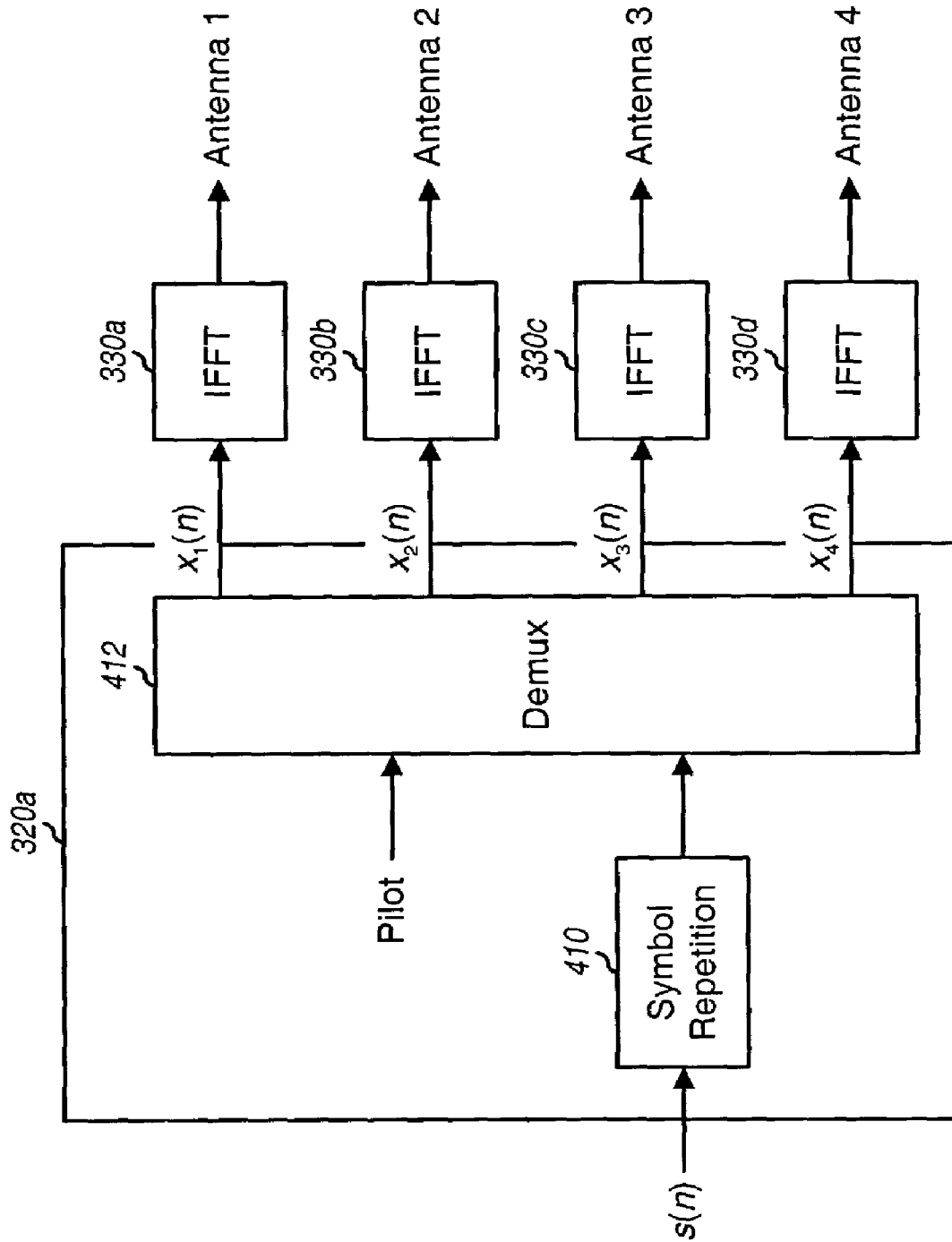


FIG. 4

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