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# United States Patent [19]

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Schreiber et al.

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[54] TELEVISION TRANSMISSION SYSTEM USING SPREAD SPECTRUM AND ORTHOGONAL FREQUENCY-DIVISION MULTIPLEX

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[21] Appl. No.: 149,264

[22] Filed: Nov. 9, 1993

### Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 965,227, Oct. 23, 1992, Pat. No. 5,311,543.

[51] Int. Cl.<sup>6</sup> ..... H04N 7/167

[52] U.S. Cl. .... 375/200; 380/10; 380/13

[58] Field of Search ..... 375/1; 380/10, 20, 13, 380/19

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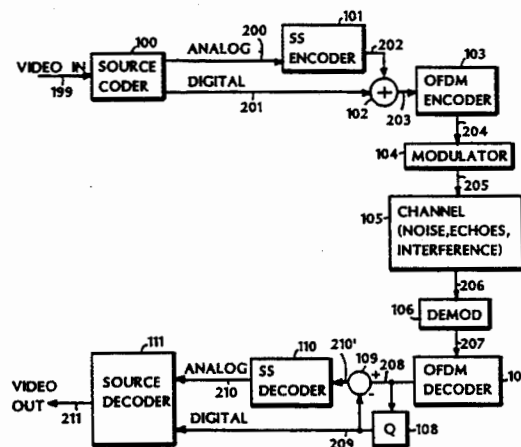
Primary Examiner—David C. Cain

Attorney, Agent, or Firm—Fish & Richardson

### [57] ABSTRACT

An apparatus for encoding a television production signal for transmission, the television production signal including a first input signal carrying a first class of data and a second input signal carrying a second class of data, the second class data requiring a higher-quality transmission the first class data. For each word of the first input signal, the first stage generates N serial samples of the first output sample stream, each of the N serial samples being formed by a different combination of a set of more than one of the N samples of the each word. The second stage includes an input stage combining the second input signal stream with the first output sample stream to generate an intermediate input sample stream; a serial-to-parallel converter receiving the intermediate input sample stream and producing a second stream of words therefrom, each of the words of which being a parallel grouping of M successive samples of the intermediate input sample stream; a Discrete Fourier Transform (DFT) module producing a parallel output stream of words that is the discrete Fourier transform of the second word stream; and a parallel-to-series converter generating the FDM output signal from the parallel output stream of the DFT module.

53 Claims, 11 Drawing Sheets



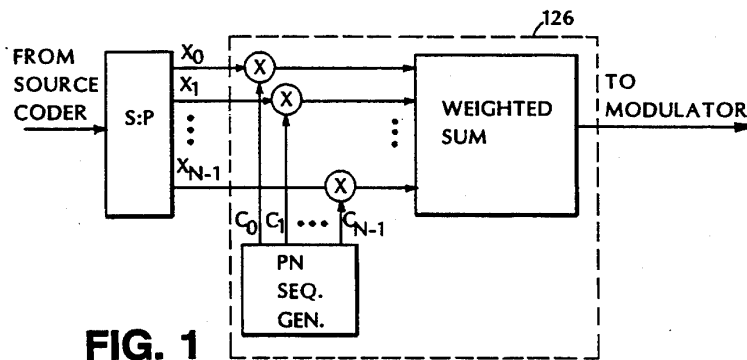


FIG. 1

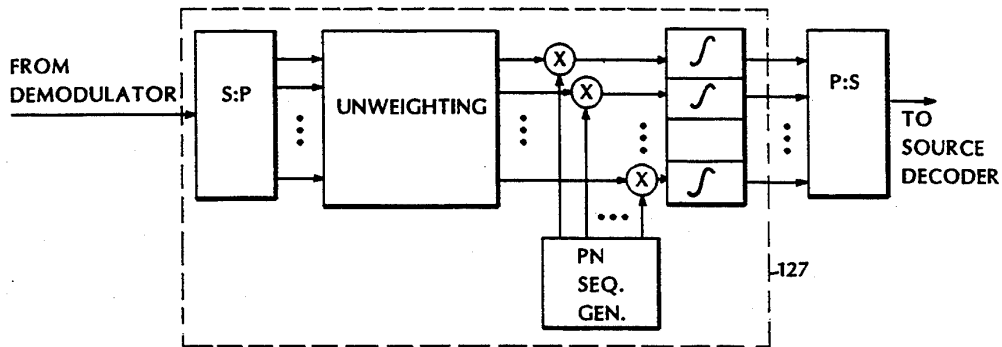


FIG. 2

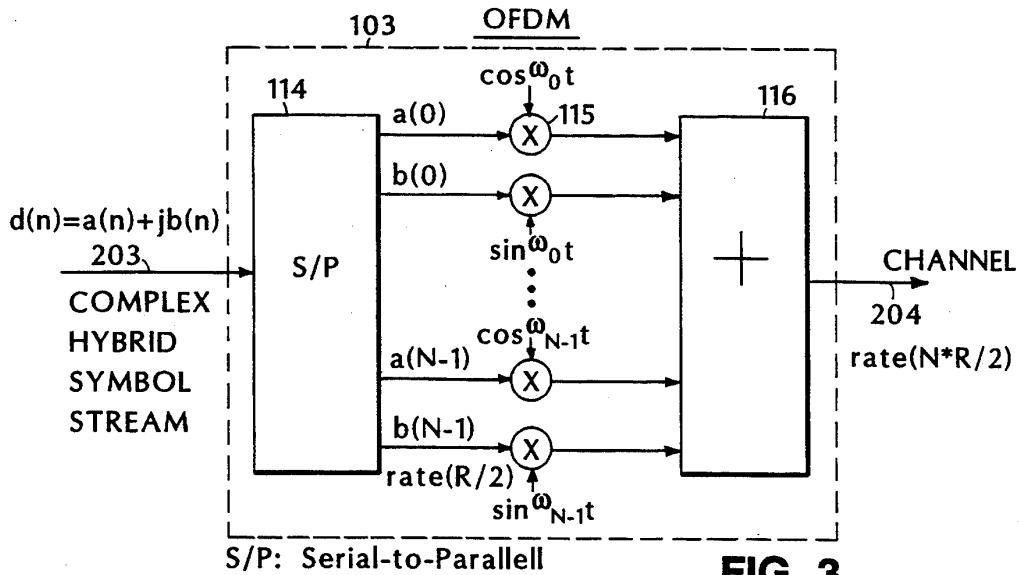


FIG. 3

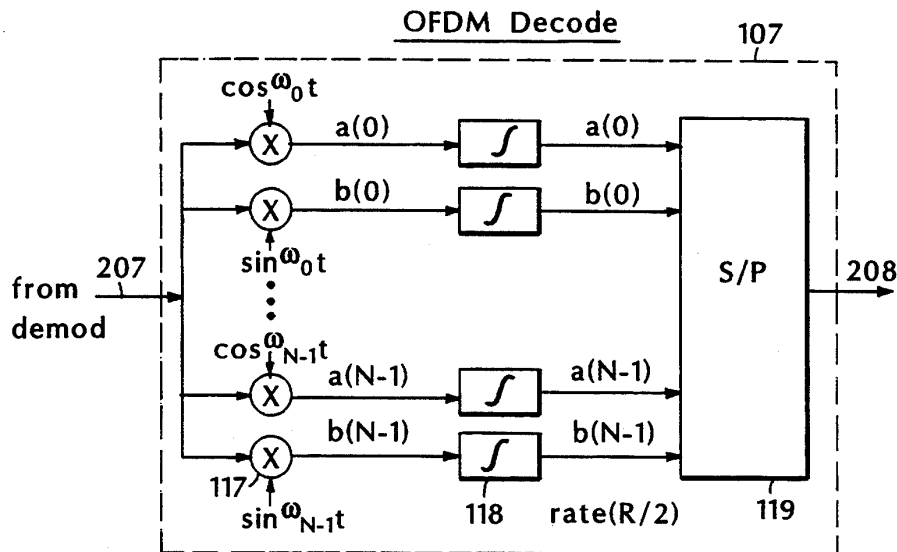


FIG. 4

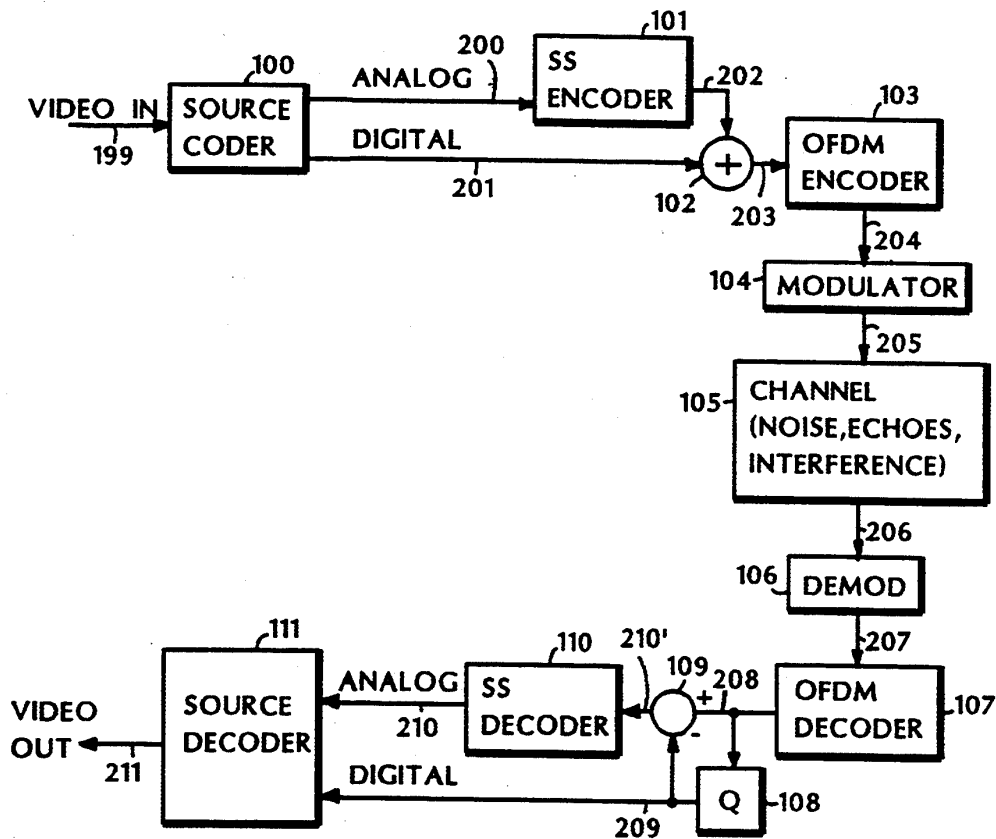


FIG. 5

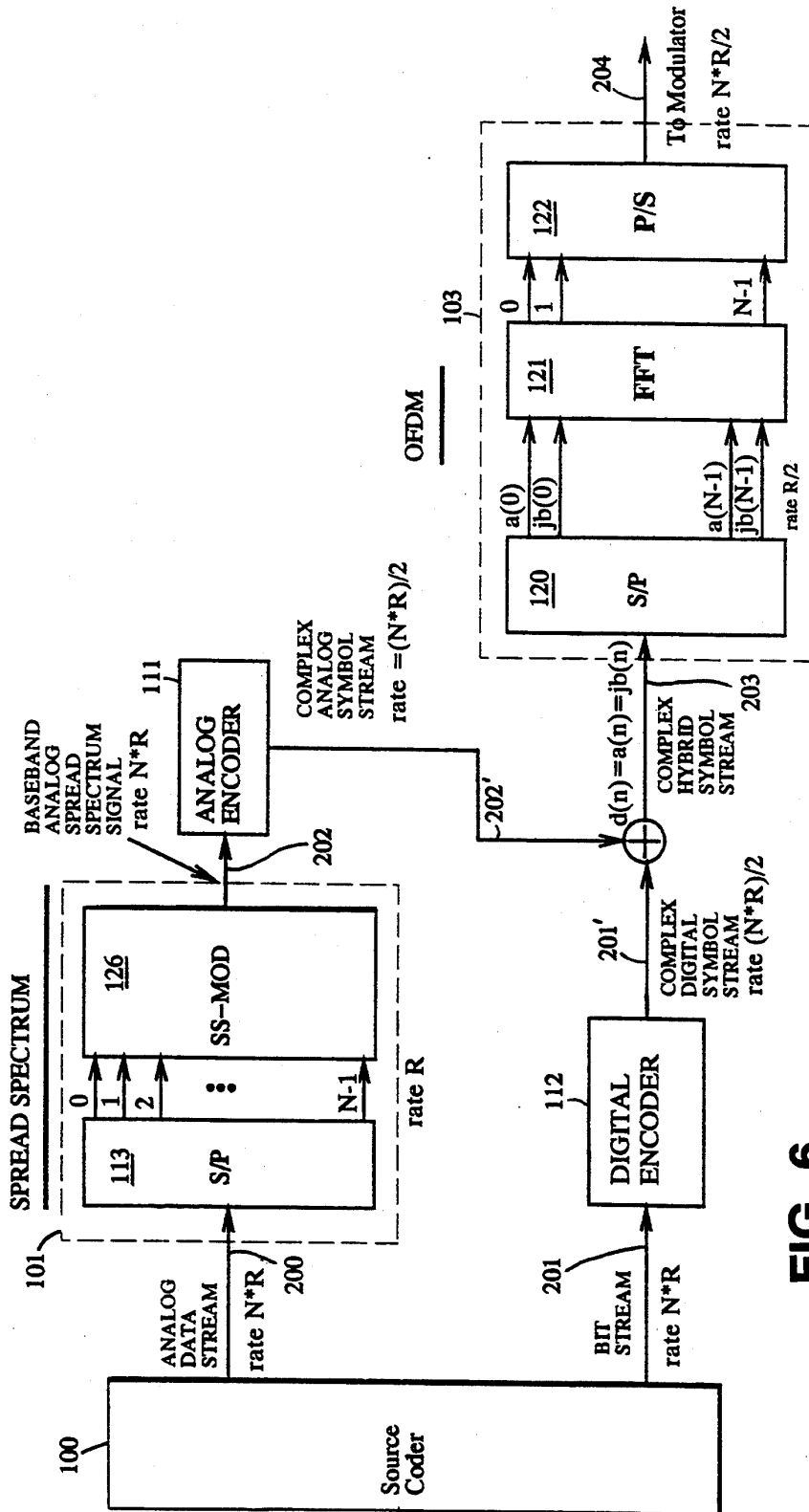


FIG. 6

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