



- [54] **SPREAD SPECTRUM TIME DIVERSITY COMMUNICATIONS SYSTEM**
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- [73] Assignee: **NEC Corporation**, Tokyo, Japan
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Related U.S. Application Data

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Foreign Application Priority Data

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- [51] **Int. Cl.⁷** **H04B 1/707**
- [52] **U.S. Cl.** **375/143; 375/152**
- [58] **Field of Search** 375/140, 141, 375/142, 143, 147, 150, 152; 370/320, 335, 342, 441

References Cited

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[57] **ABSTRACT**

In a time diversity radio communications system, quadrature-modulated spread spectrum signals of different mutual time delay are combined into a code division multiplex signal and up-converted to a radio-frequency signal and transmitted. At a receive site, the signal is received by an antenna and down-converted to recover the code division multiplex signal. Quadrature-modulated component signals contained in the recovered code division multiplex signal are converted to baseband signals which are then time-aligned with each other. The time-aligned baseband signals are multiplied respectively by complex weighting factors and are combined together to produce an input signal for an adaptive equalizer. This input signal is also applied to an AGC amplifier where it is amplified and applied to correlation detectors where correlations between the amplified signal and the baseband signals are detected and the complex weighting factors are derived respectively from the correlations. In a modified embodiment, the quadrature-modulated component signals are fed into an adaptive RAKE matched filter where the output of the AGC amplifier is used for detecting the correlations.

7 Claims, 5 Drawing Sheets

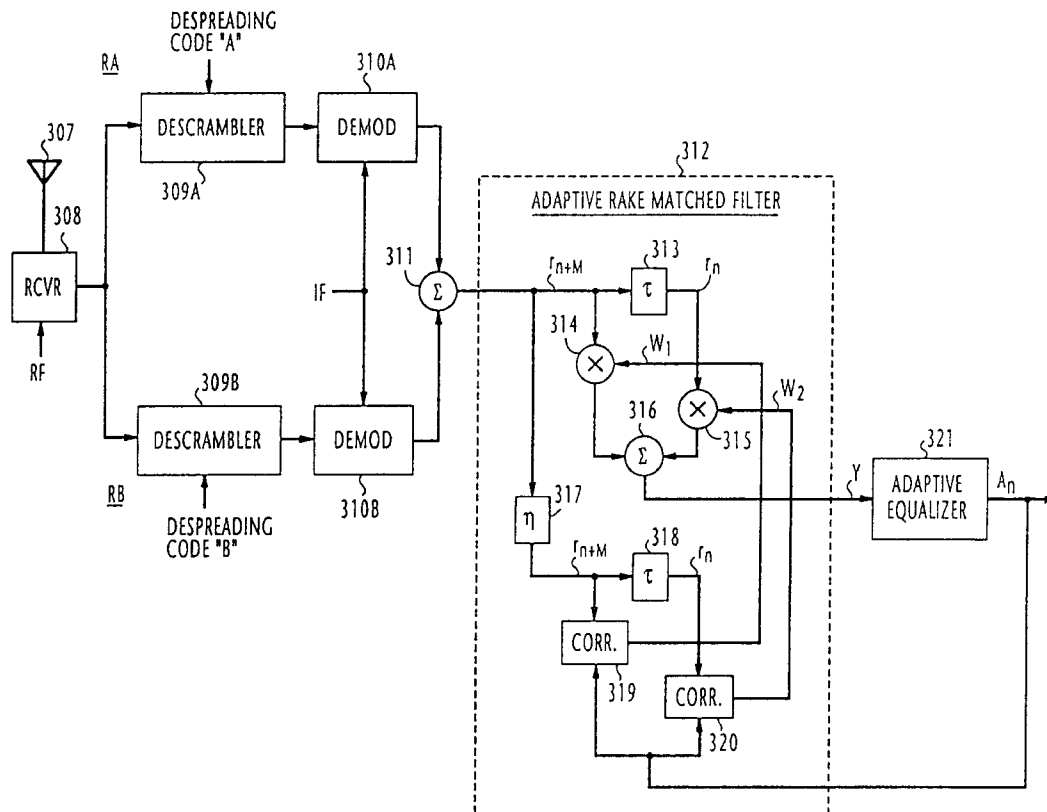


FIG. 1A

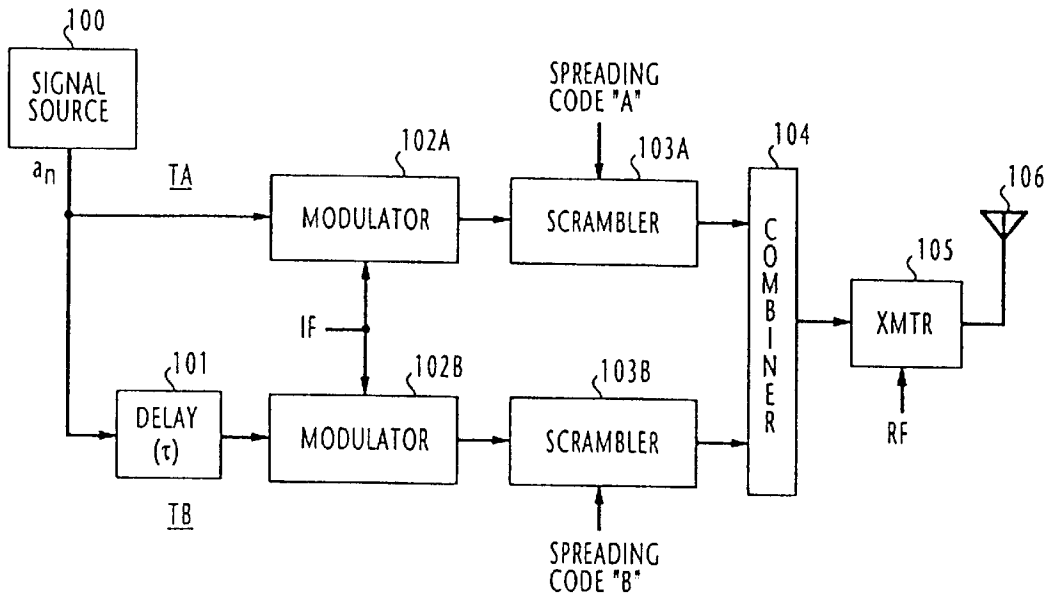


FIG. 1B

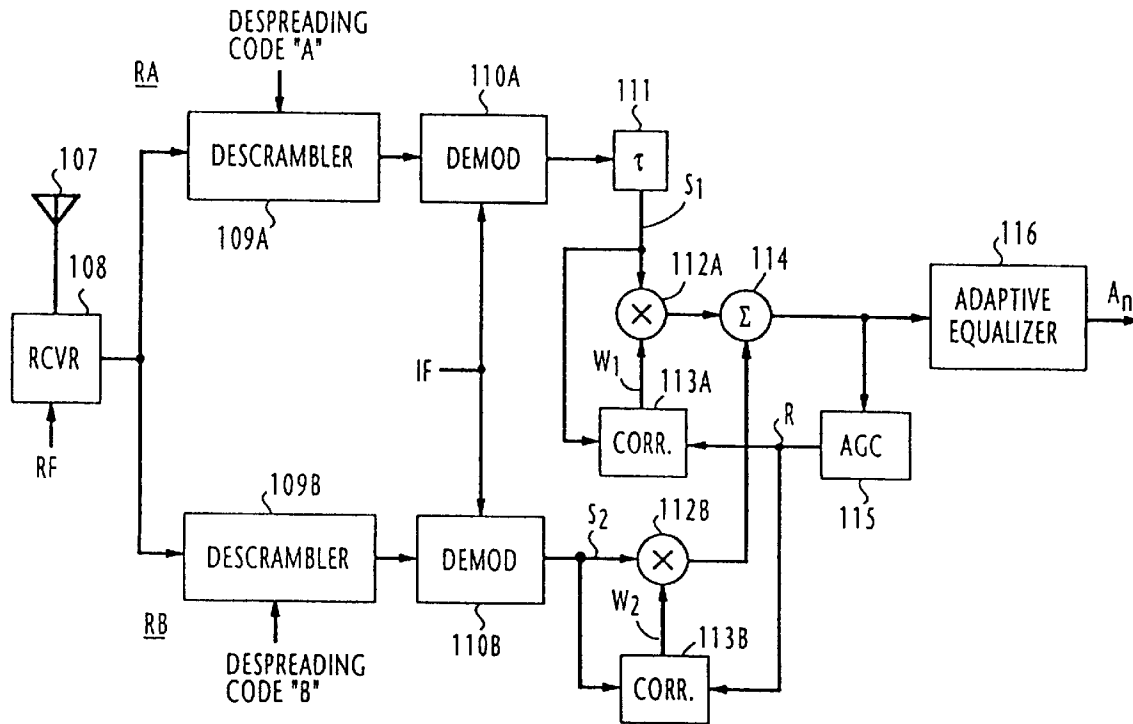
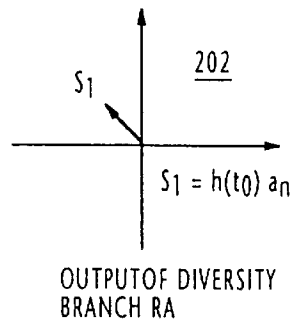
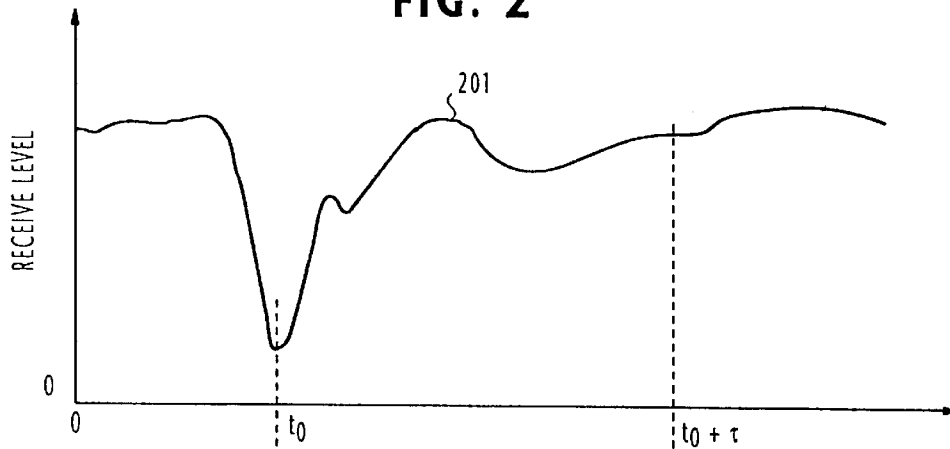
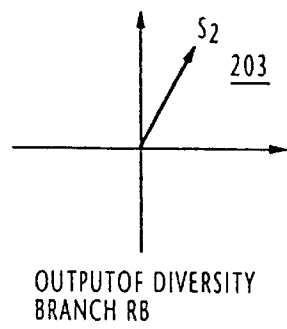


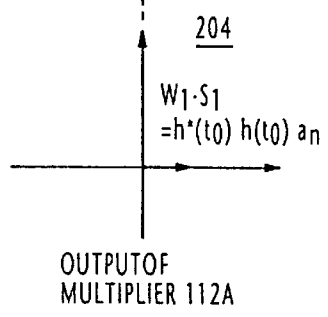
FIG. 2



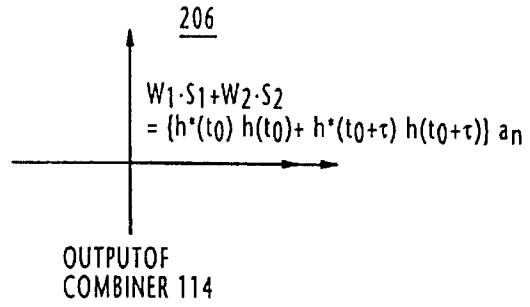
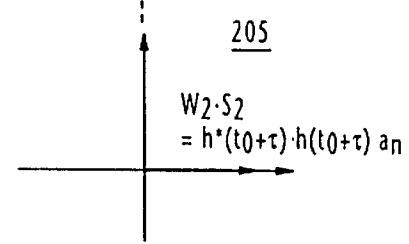
OUTPUT OF DIVERSITY BRANCH RA



OUTPUT OF DIVERSITY BRANCH RB



OUTPUT OF MULTIPLIER 112A



OUTPUT OF COMBINER 114

FIG. 3A

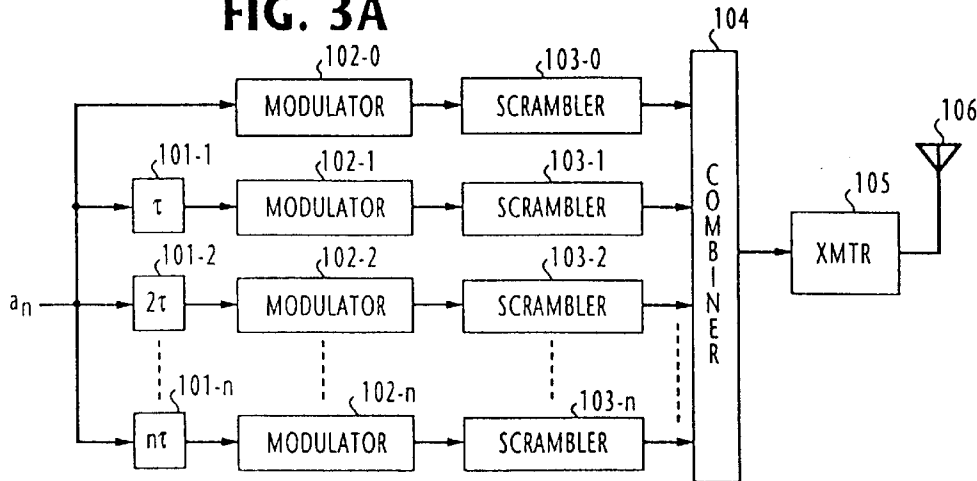
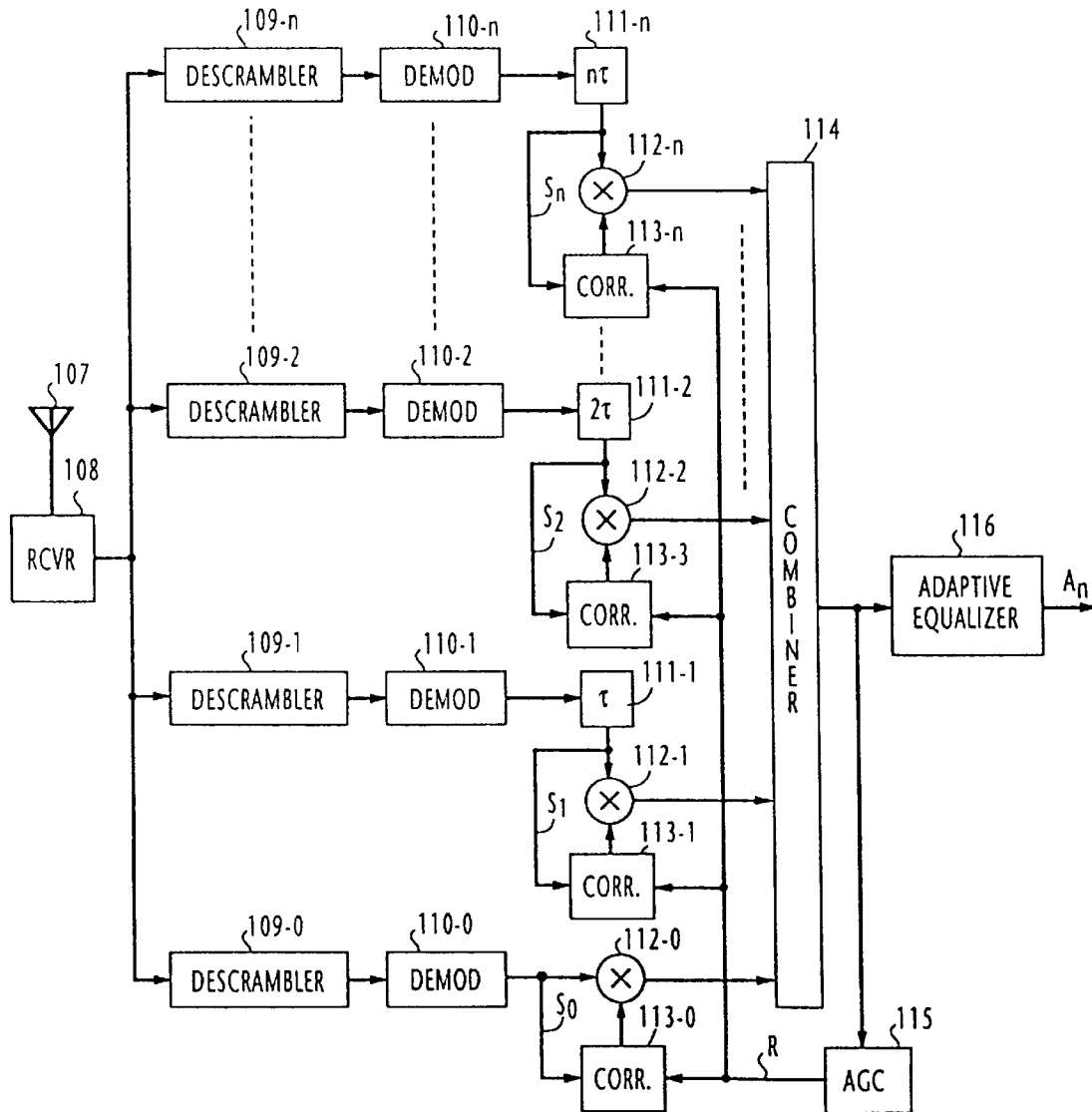


FIG. 3B



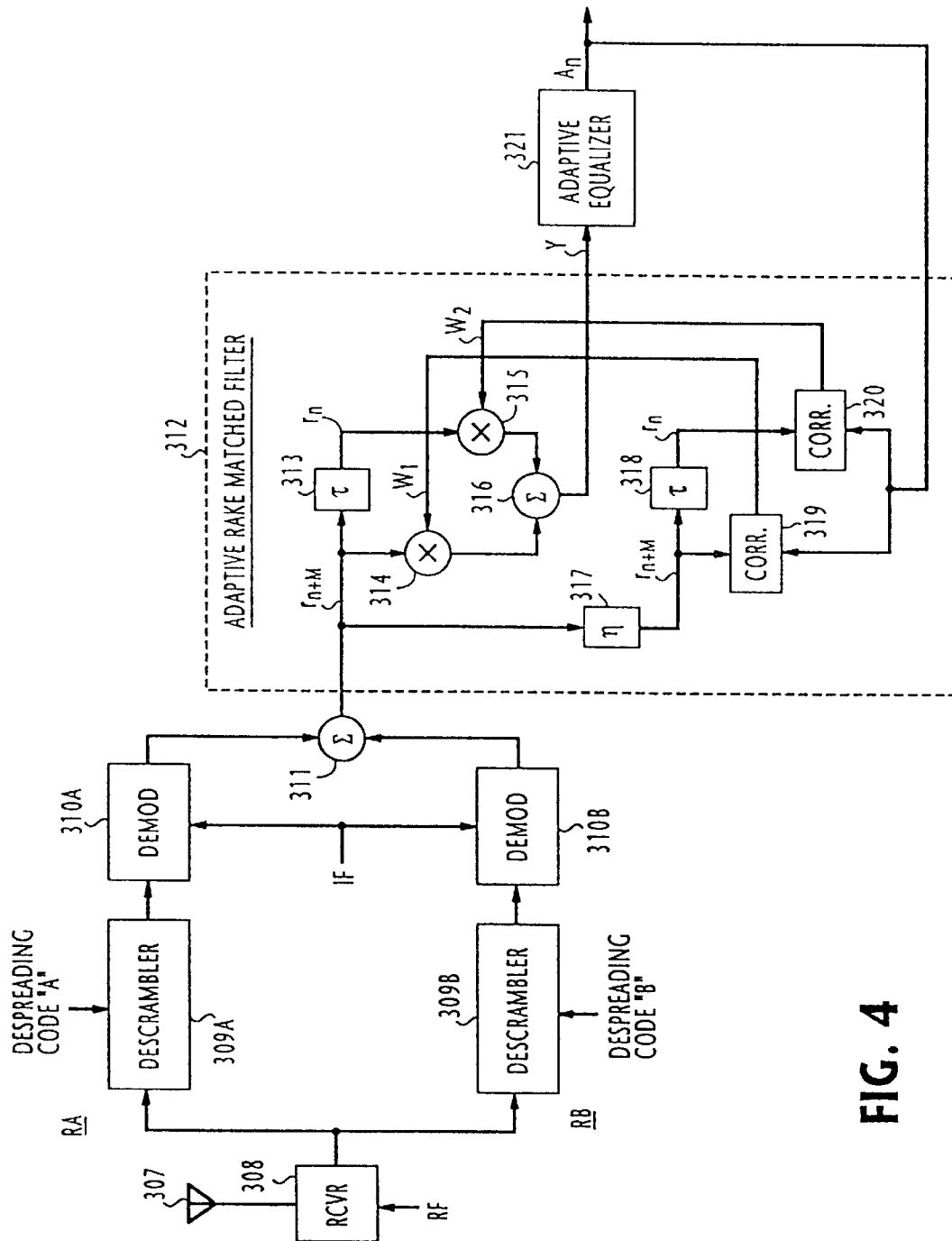


FIG. 4

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