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Gronemeyer

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(54) **METHOD AND APPARATUS FOR REAL TIME CLOCK (RTC) BROWNOUT DETECTION**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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Related U.S. Application Data

(63) Continuation-in-part of application No. 10/021,119, filed on Oct. 30, 2001, now Pat. No. 6,662,107.

(51) **Int. Cl.**
G01S 5/02 (2006.01)

(52) **U.S. Cl.** **701/213**; 340/988; 340/990; 342/357.06; 342/357.15; 342/457; 375/136

(58) **Field of Classification Search** 375/324, 375/149, 152, 140, 150, 343, 136, 1; 368/47; 701/213, 214, 226, 215, 216; 342/357.06, 342/357.15, 357.12, 357, 358, 457; 340/990, 340/995, 988; 455/12.1

See application file for complete search history.

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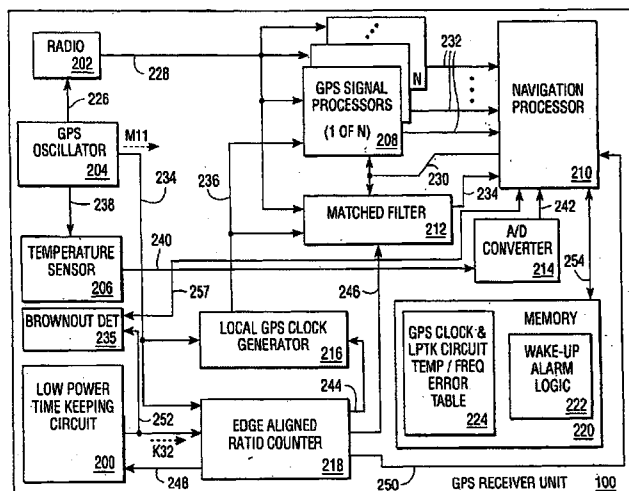
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Assistant Examiner—Tuan C To

(57) **ABSTRACT**

A method and apparatus for real time clock brownout detection. A low power real time clock (RTC) operates continuously to keep time in a global positioning system (GPS) receiver while some receiver components are powered down. In various embodiments, a brownout detector circuit detects a loss of RTC clock cycles. If a loss of RTC clock cycles exceeds a predetermined threshold such that the RTC is not reliable for GPS navigation, an RTC status signal so indicates.

28 Claims, 9 Drawing Sheets



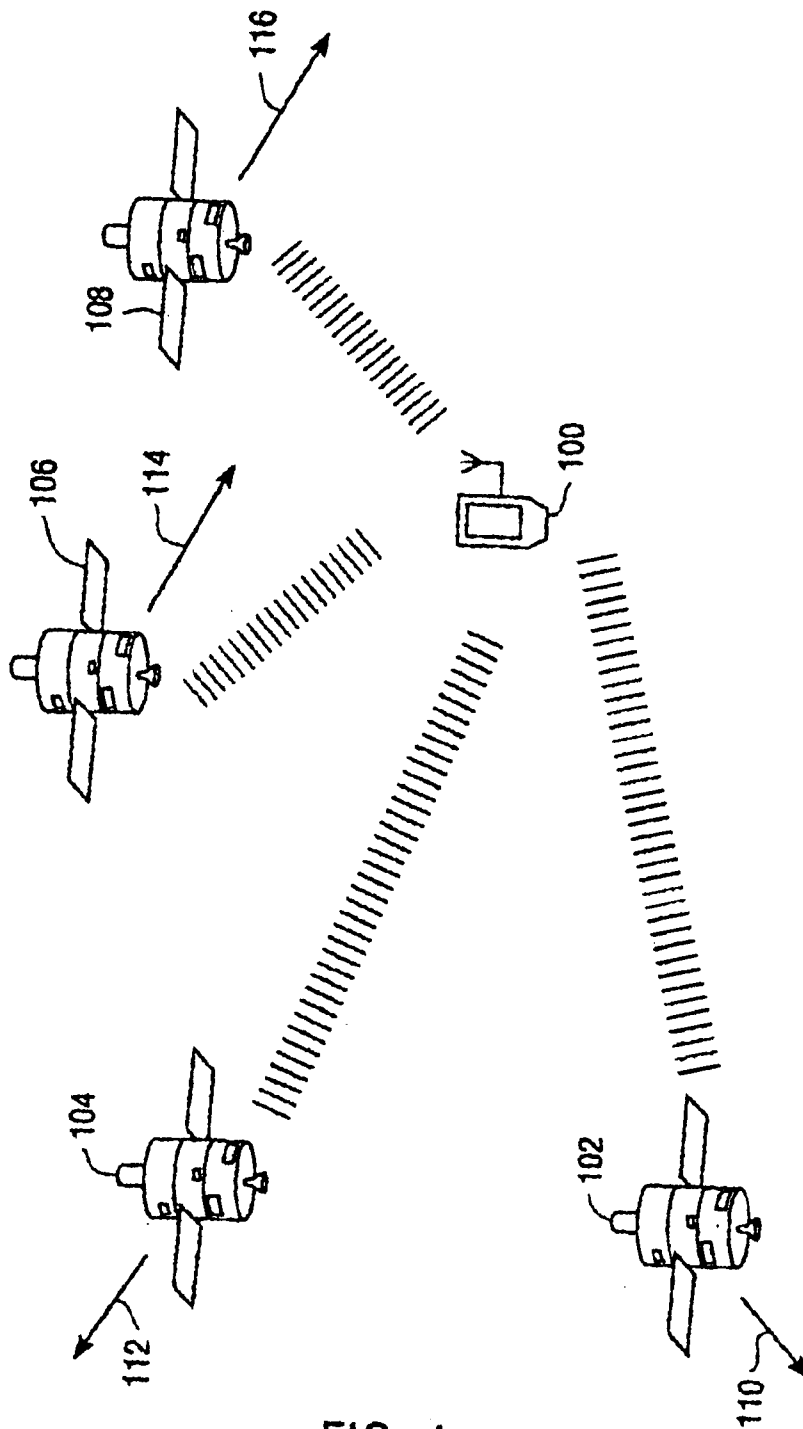


FIG. 1

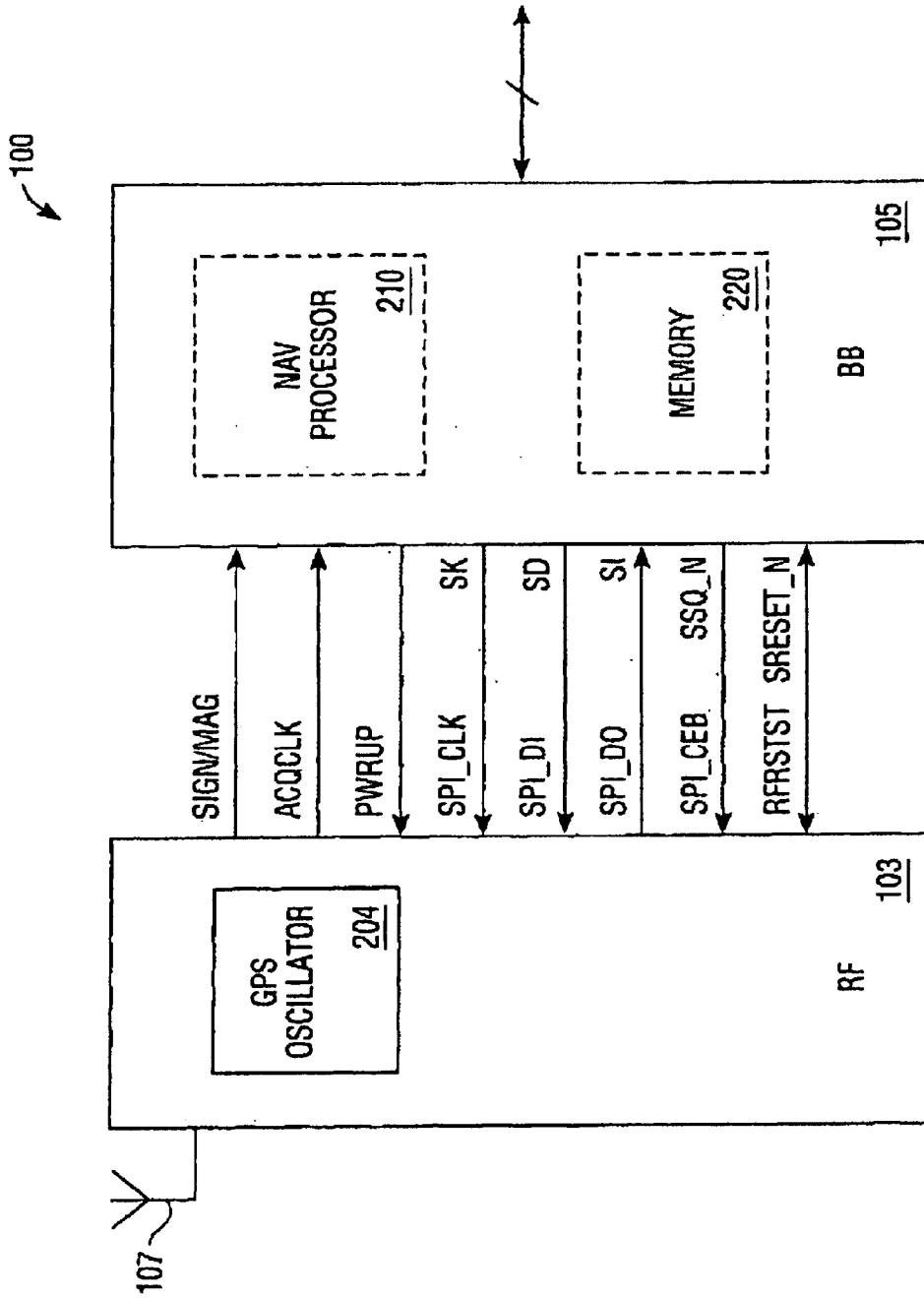


FIG. 2

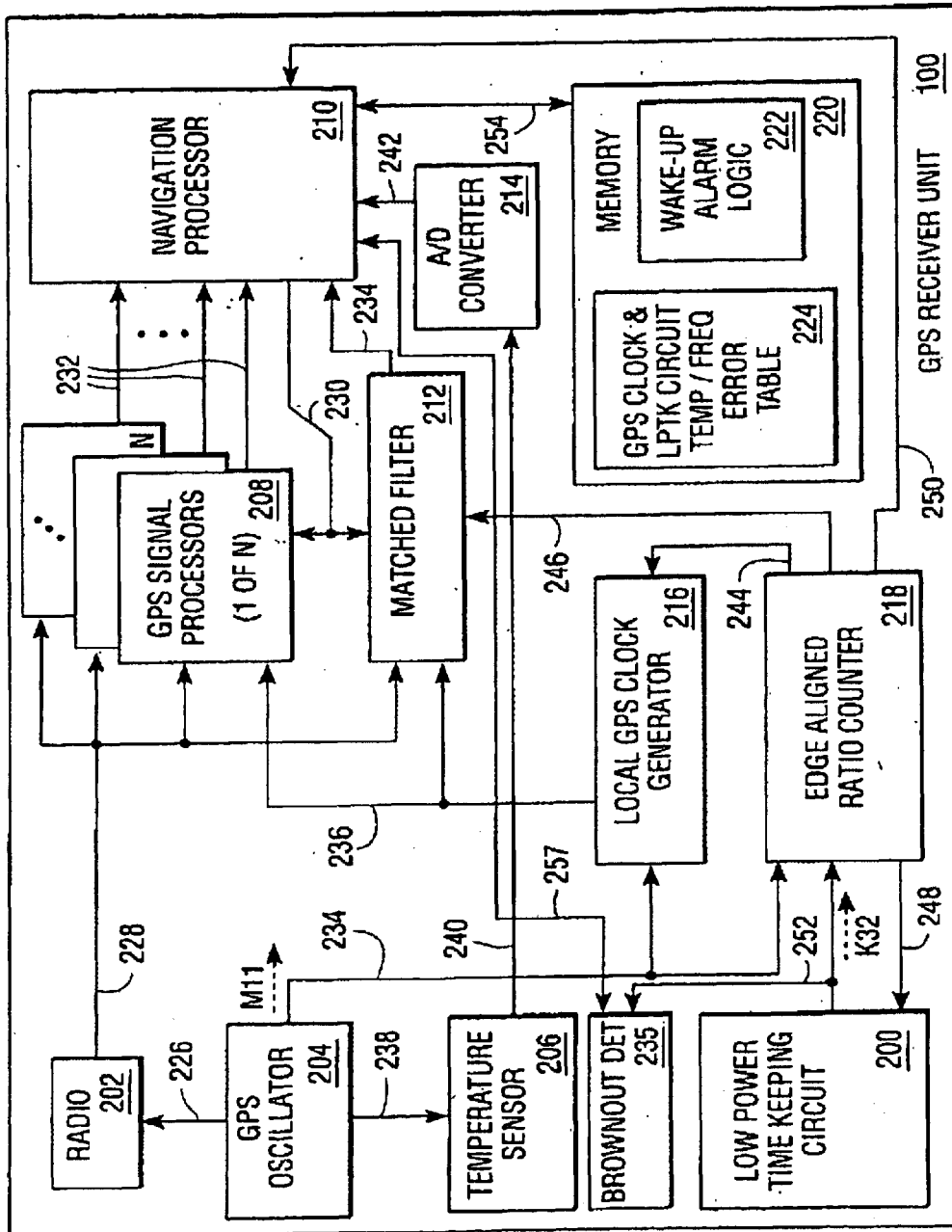
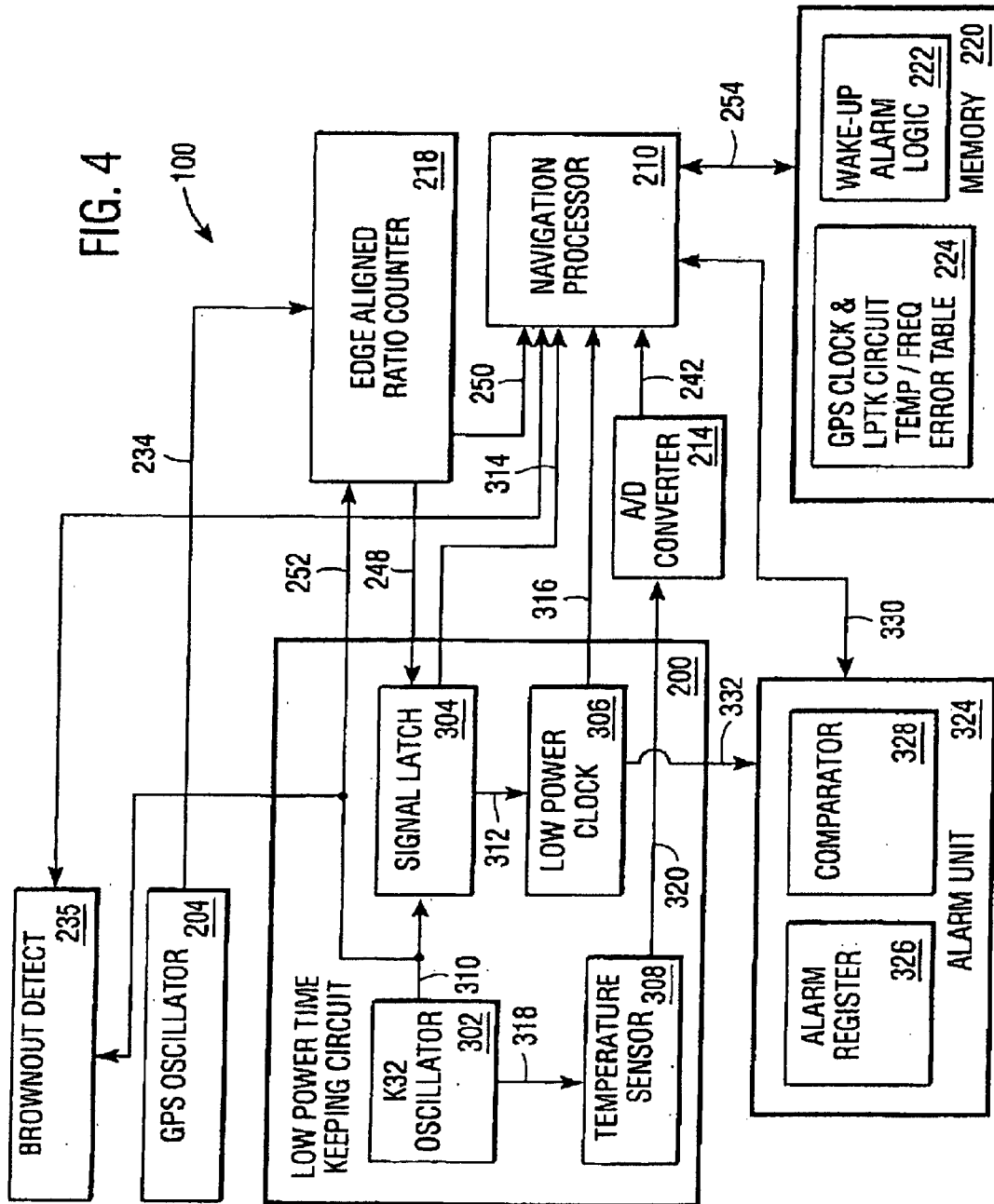


FIG. 3



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