(12) **United States Patent**   (10) **Patent No.:**   **US 6,792,031 B1**

Sriram et al.   (45) **Date of Patent:**   **Sep. 14, 2004**

(54) **METHOD FOR MAINTAINING TIMING IN A CDMA RAKE RECEIVER**

(75) Inventors: **Sundararajan Sriram**, Dallas, TX (US); **Yuan Kang Lee**, Richardson, TX (US); **Katherine G. Brown**, Coppell, TX (US); **Zhenguo Gu**, Plano, TX (US)

(73) Assignee: **Texas Instruments Incorporated**, Dallas, TX (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 618 days.

(21) Appl. No.: **09/691,576**

(22) Filed: **Oct. 18, 2000**

(51) **Int. Cl.**^{7} **H04B 1/69**; H04B 1/707; H04B 1/713

(52) **U.S. Cl.** **375/147**; 370/320; 370/335; 370/342; 398/78

(58) **Field of Search** 375/147; 370/320; 341/50; 708/190; 714/732

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,282,230 B1 *	8/2001	Brown et al.	375/140
6,567,017 B2 *	5/2003	Medlock et al.	341/50
6,639,907 B2 *	10/2003	Neufeld et al.	370/342

* cited by examiner

(57) **ABSTRACT**

A system and method for maintaining timing in a CDMA rake receiver has a global chip counter that counts CDMA signal chips as they arrive at the CDMA rake receiver. A local pseudo-noise (PN) sequence replica of the incoming CDMA signal is generated and used to perform a sliding window correlation of the locally generated PN sequence replica with the incoming signal to correlate the CDMA signal timing relative to stored CDMA signal chip counts. The PN sequence timing is maintained relative to GCC, which avoids having to keep track of absolute time within each Rake finger.

23 Claims, 5 Drawing Sheets
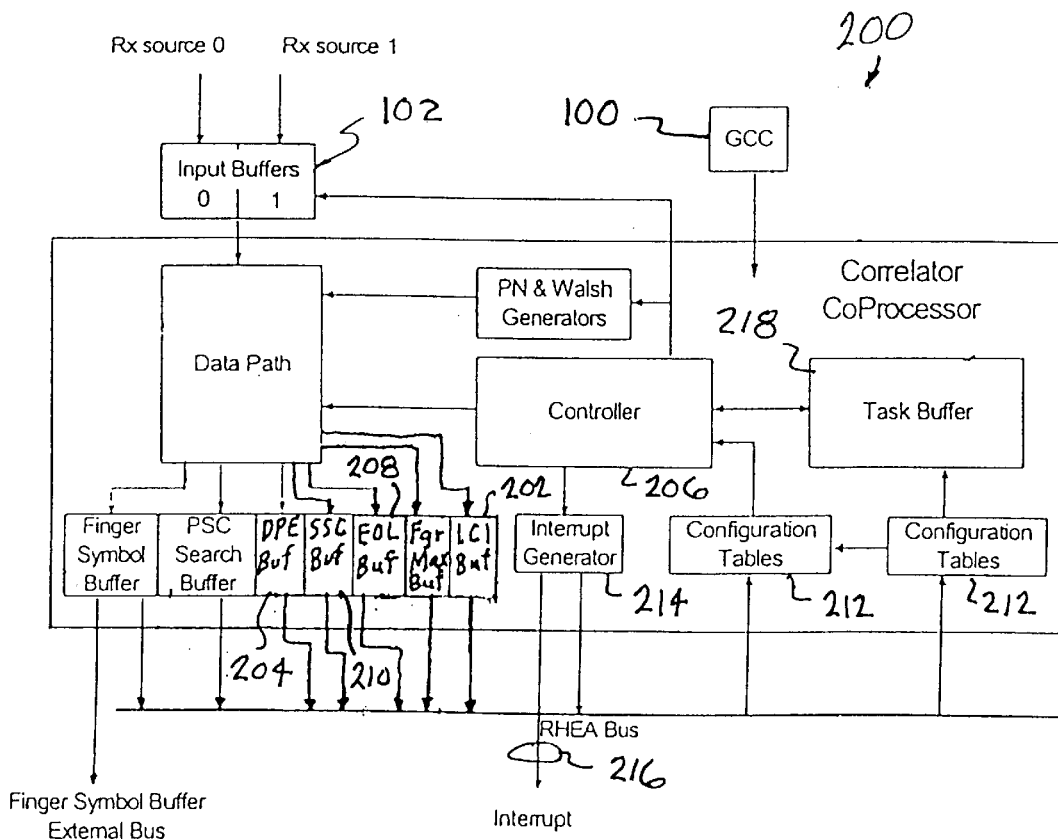
10

Global Chip Counter

0

L-1

......

current contents of input buffer
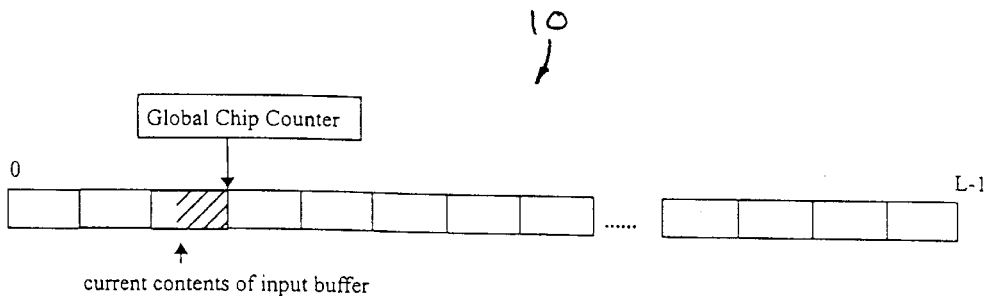
Figure 1. Global chip counter

Global Chip Counter

0

L-1

......

long code with an L chip period for finger "i"

offset i

"spr_factor" chips

symbol boundary

300

302
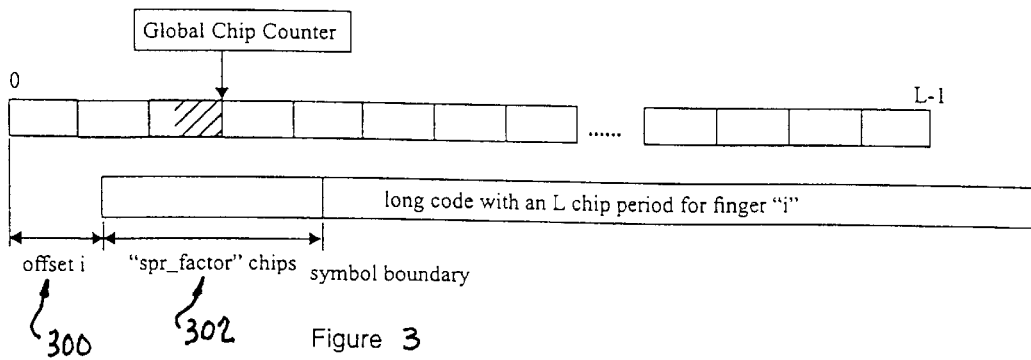
Figure 3

Figure 2

Figure 4 CCP Data Path

500

502

TMS320C641x

EMIF

Instructions Buffer

EOL Buffer

Raw Pilot Buffer

DPE/Search Buffer

Combined Symbol Buffer

Instructions Buffer

Channel Estimation Coefficients

I & Q Samples from A/O for multiple antenna

Input Buffer
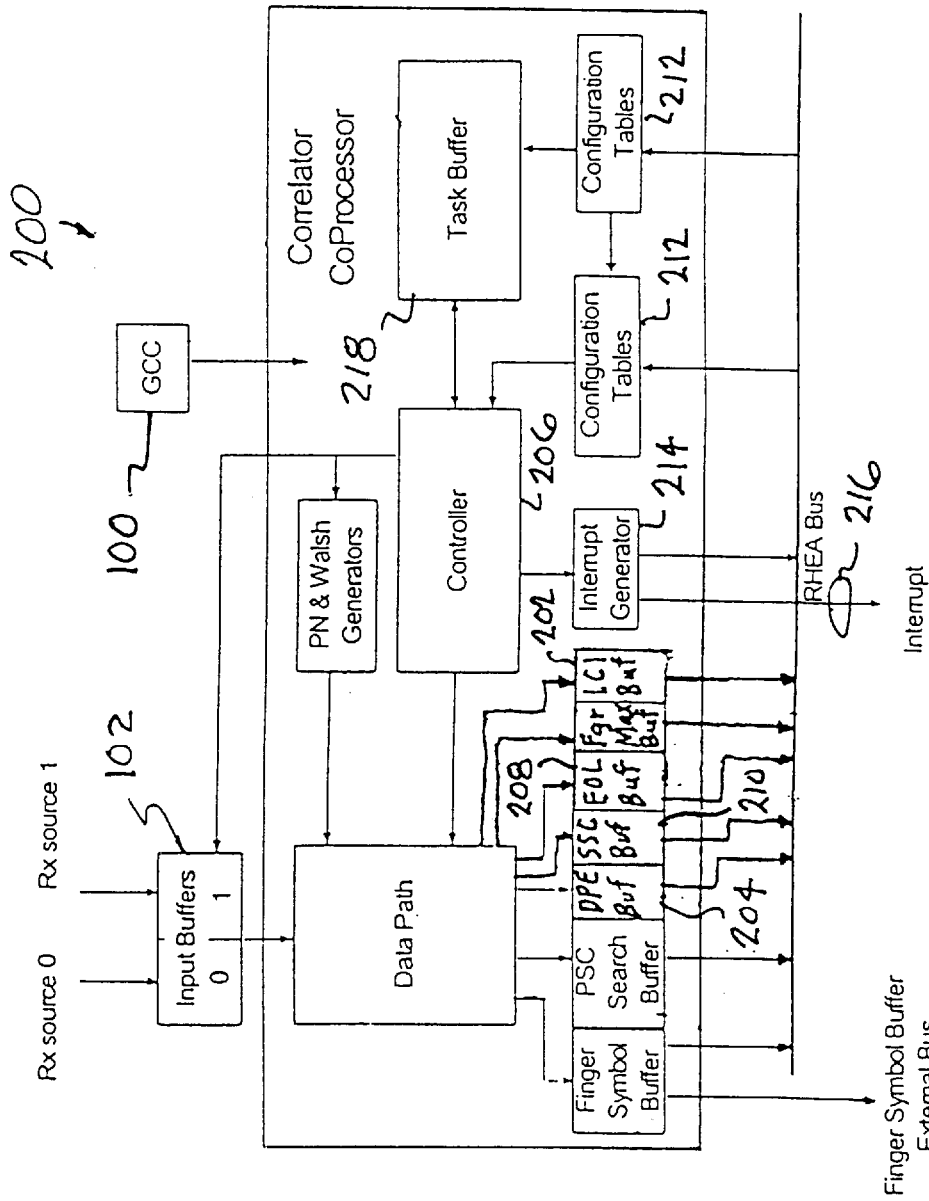
CCP
200
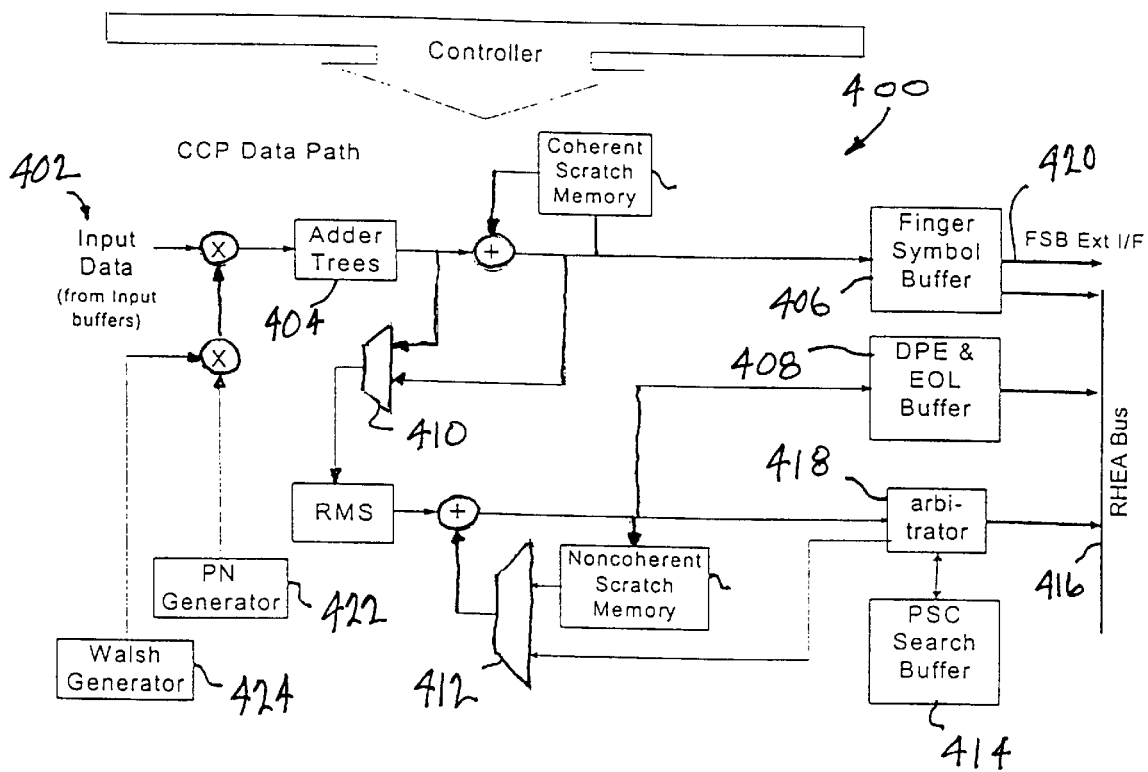
Finger Symbol Buffer

Input Buffer

MRC
504

CRP-ASIC

506

Figure 5

DOCKET ALARM
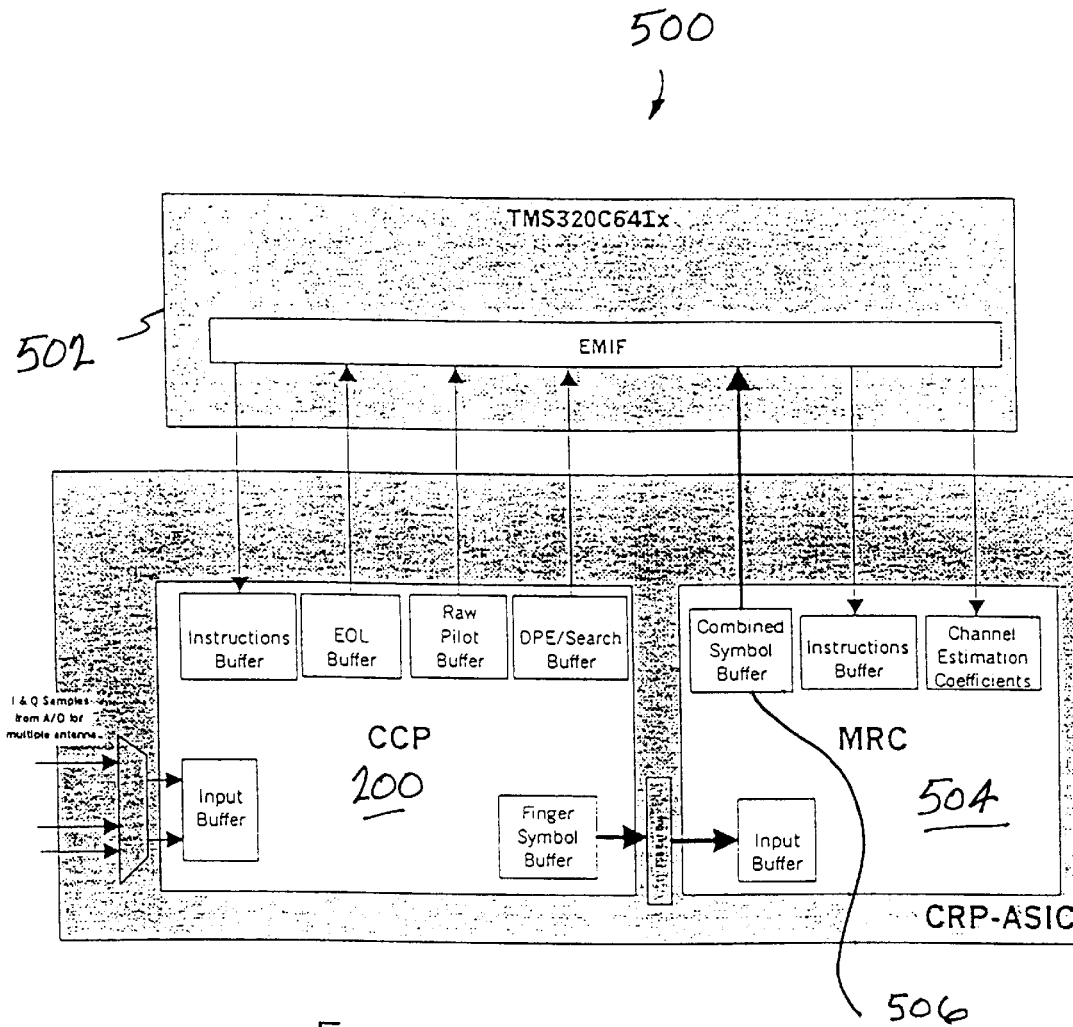
Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.

fastcase®
Smarter legal research.