



US 20080108310A1

(19) **United States**

(12) **Patent Application Publication**

Tong et al.

(10) **Pub. No.: US 2008/0108310 A1**

(43) **Pub. Date: May 8, 2008**

(54) **CLOSED LOOP MIMO SYSTEMS AND METHODS**

(76) Inventors: **Wen Tong**, Ottawa (CA); **Ming Jia**, Ottawa (CA); **Jianglei Ma**, Kanata (CA); **Peiyong Zhu**, Kanata (CA); **Hua Xu**, Nepean (CA); **Dong-Sheng Yu**, Ottawa (CA); **Hang Zhang**, Nepean (CA); **Mo-Han Fong**, L'Original (CA)

Related U.S. Application Data

(60) Provisional application No. 60/581,356, filed on Jun. 22, 2004. Provisional application No. 60/582,298, filed on Jun. 24, 2004. Provisional application No. 60/601,178, filed on Aug. 13, 2004. Provisional application No. 60/614,621, filed on Sep. 30, 2004. Provisional application No. 60/619,461, filed on Oct. 15, 2004. Provisional application No. 60/642,697, filed on Jan. 10, 2005.

Correspondence Address:
SMART & BIGGAR
P.O. BOX 2999, STATION D
900-55 METCALFE STREET
OTTAWA, ON K1P5Y6 (CA)

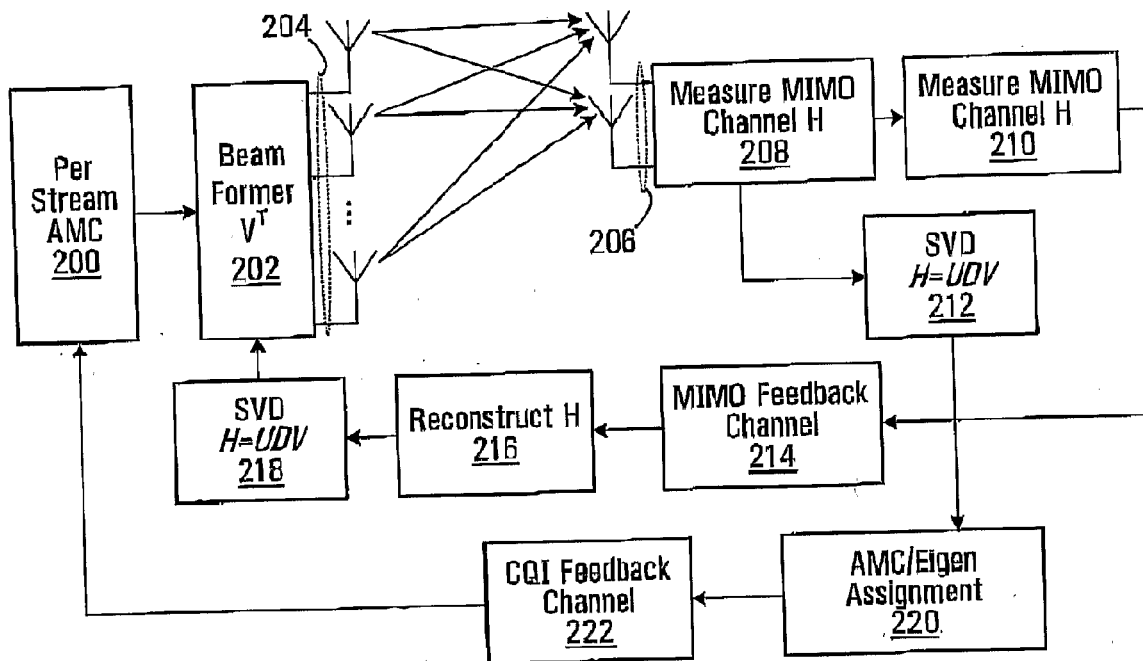
Publication Classification

(51) **Int. Cl.**
H04B 1/00 (2006.01)
(52) **U.S. Cl.** **455/69**

(57) **ABSTRACT**

Systems and methods for closed loop MIMO (multiple input and multiple output) wireless communication are provided. Various transmit formats including spatial multiplexing and STTD are defined in which vector or matrix weighting is employed using information fed back from receivers. The feedback information may include channel matrix or SVD-based feedback.

(21) Appl. No.: **11/630,391**
(22) PCT Filed: **Jun. 22, 2005**
(86) PCT No.: **PCT/CA05/00958**
§ 371(c)(1),
(2), (4) Date: **Dec. 22, 2006**



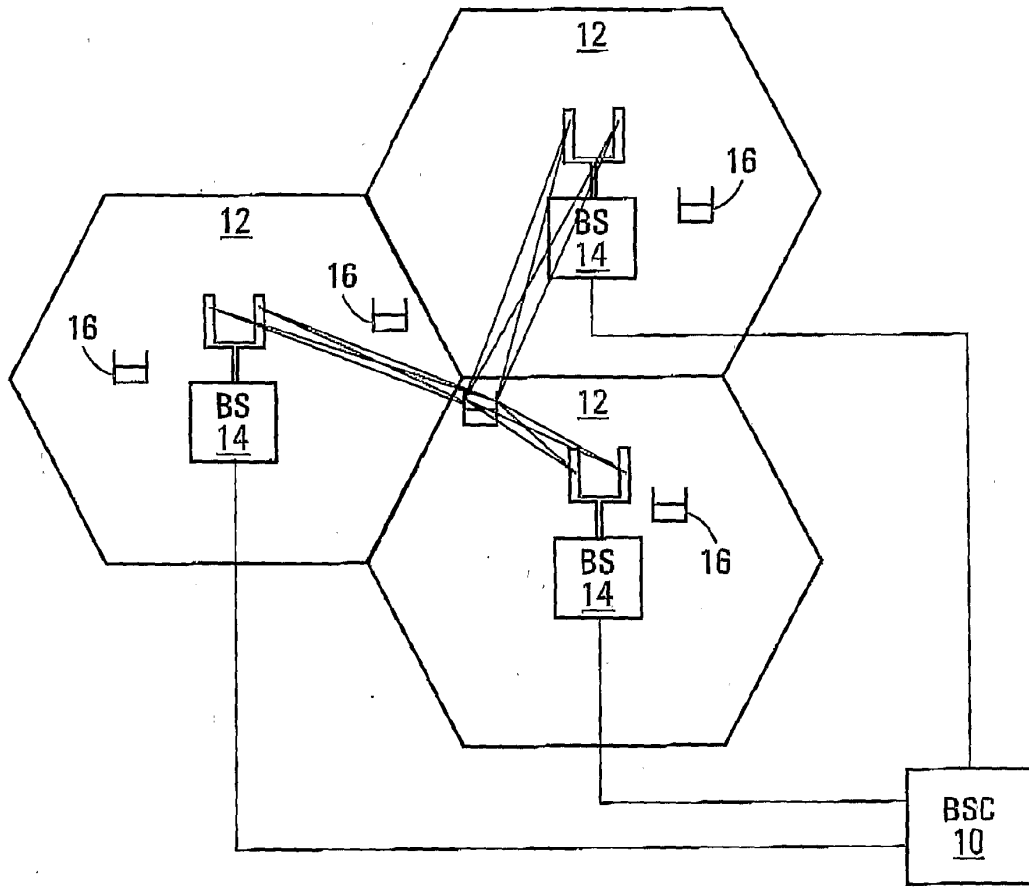


FIG. 1

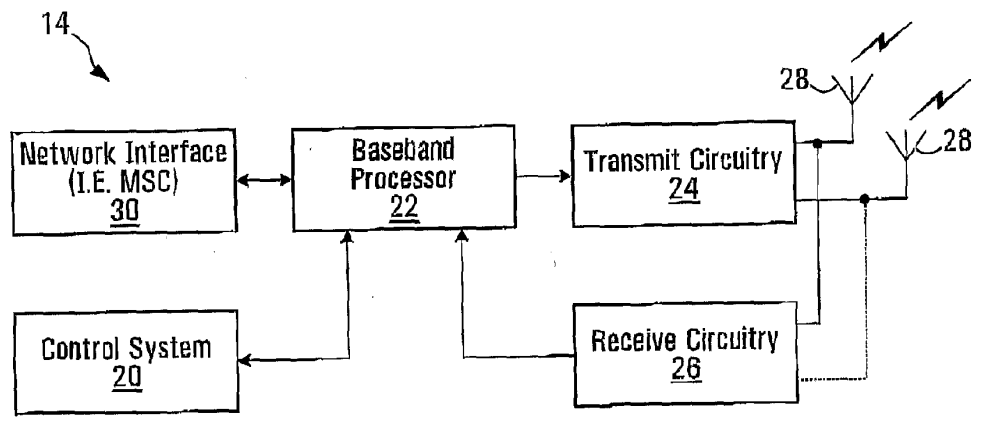


FIG. 2

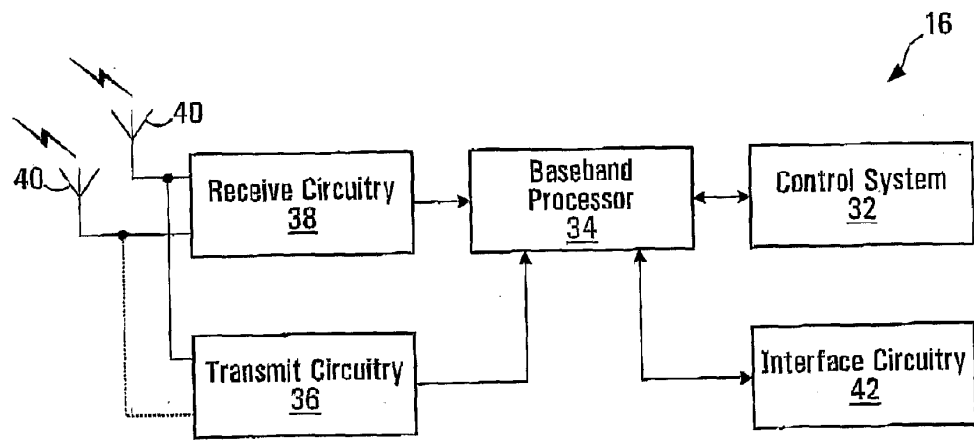


FIG. 3

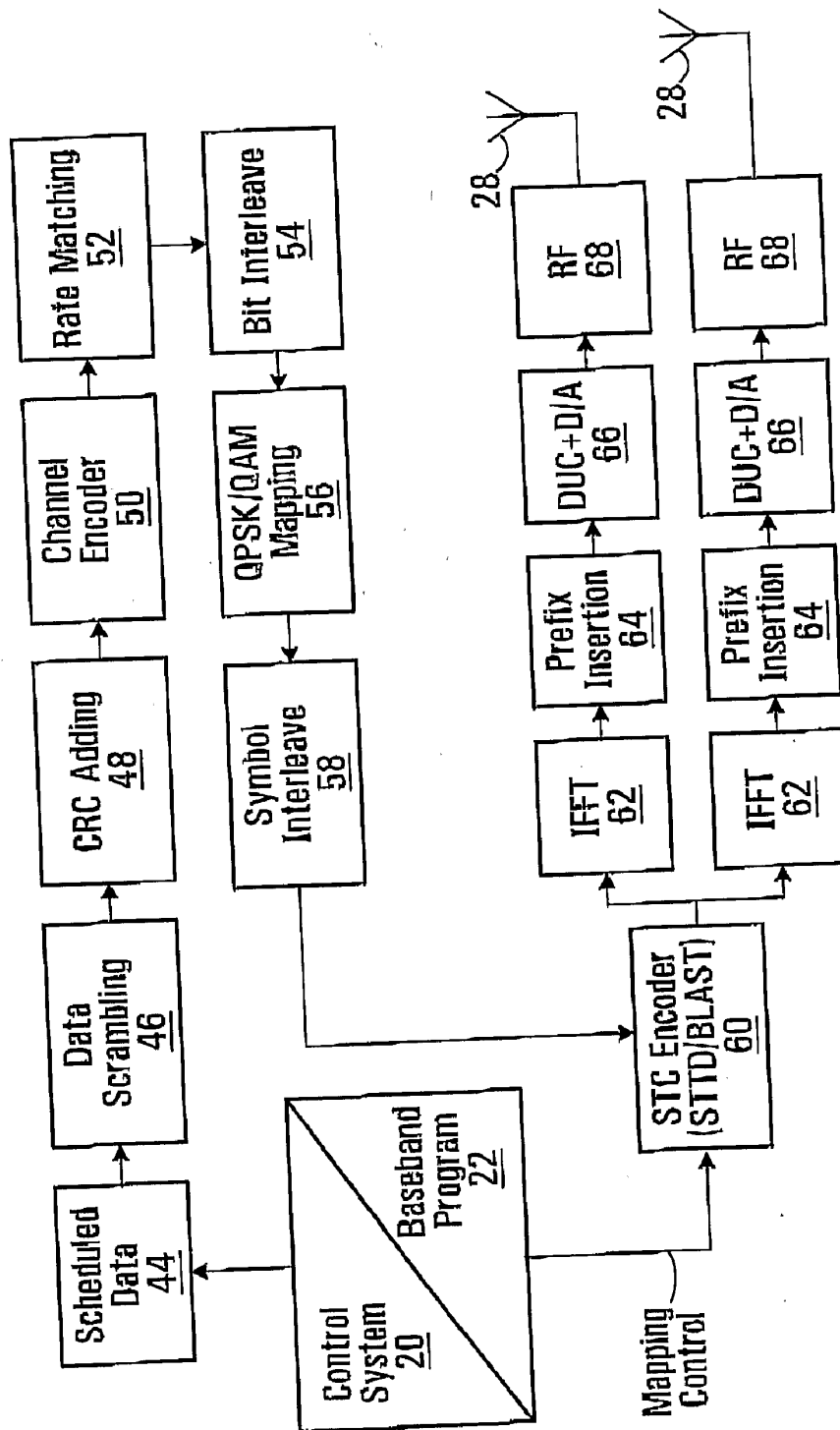


FIG. 4

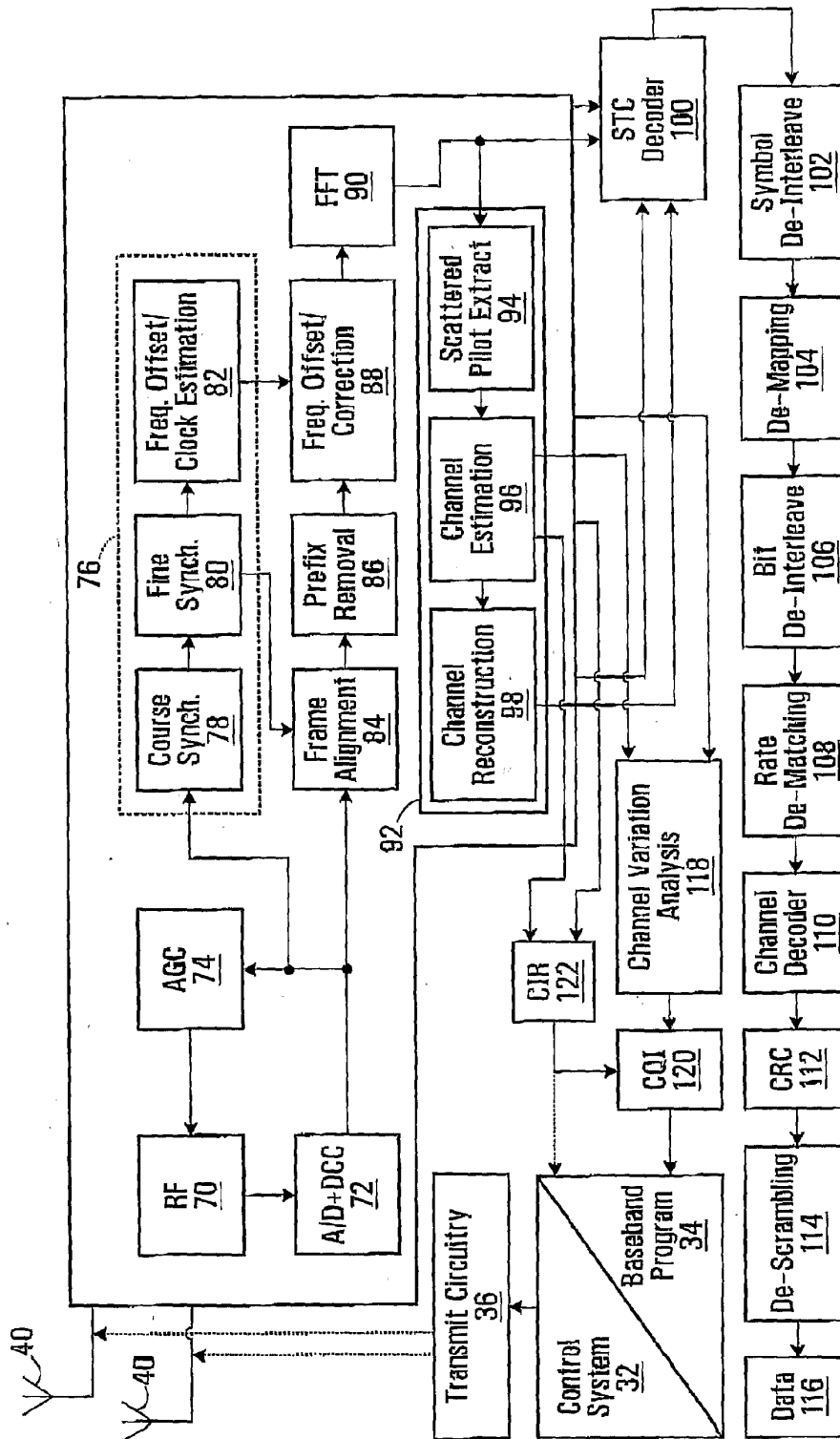


FIG. 5

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.