



(12) **United States Patent**  
**Li et al.**

(10) **Patent No.:** **US 7,236,748 B2**  
(45) **Date of Patent:** **Jun. 26, 2007**

(54) **CLOSED LOOP FEEDBACK IN MIMO SYSTEMS**

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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 363 days.

(21) Appl. No.: **10/955,826**

(22) Filed: **Sep. 30, 2004**

(65) **Prior Publication Data**

US 2006/0068738 A1 Mar. 30, 2006

(51) **Int. Cl.**  
**H04B 1/38** (2006.01)  
**H04M 1/00** (2006.01)

(52) **U.S. Cl.** ..... **455/69; 455/562.1**

(58) **Field of Classification Search** ..... 455/69, 455/562.1, 561, 101, 103, 272-273, 276.1, 455/277.1, 277.2; 375/299, 347; 370/208  
See application file for complete search history.

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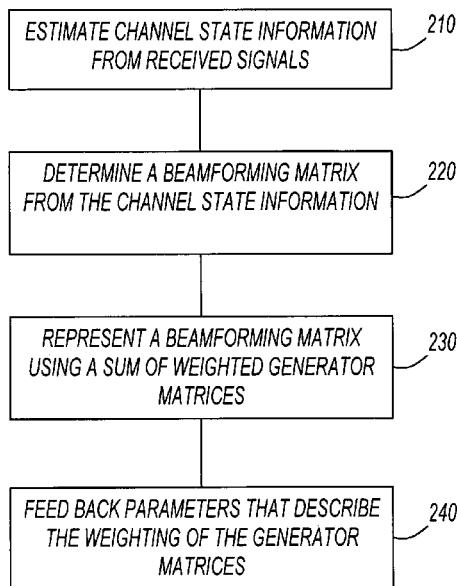
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(57) **ABSTRACT**

Feedback bandwidth may be reduced in a closed loop MIMO system by representing a beamforming matrix using orthogonal generator matrices.

**23 Claims, 4 Drawing Sheets**



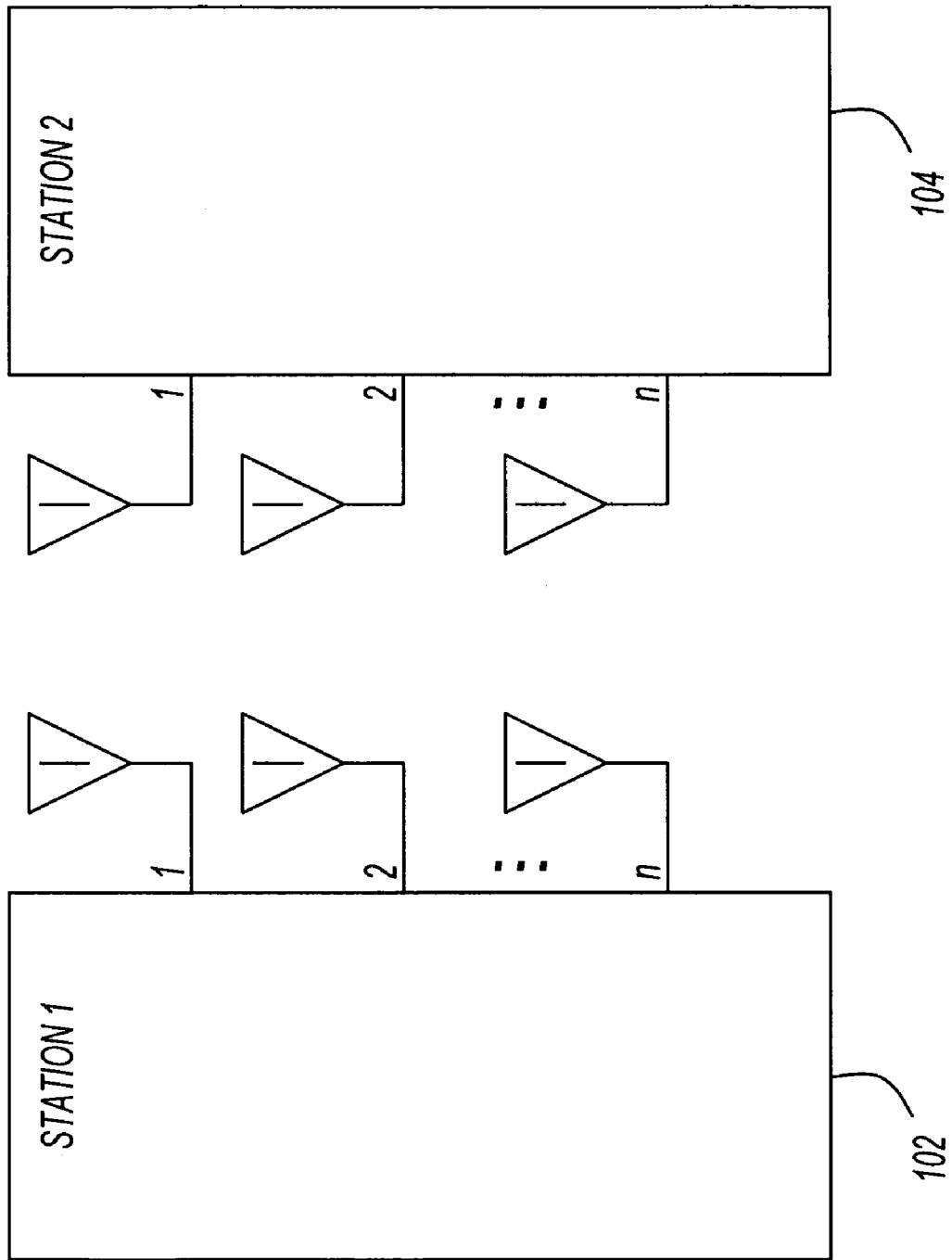


FIG. 1

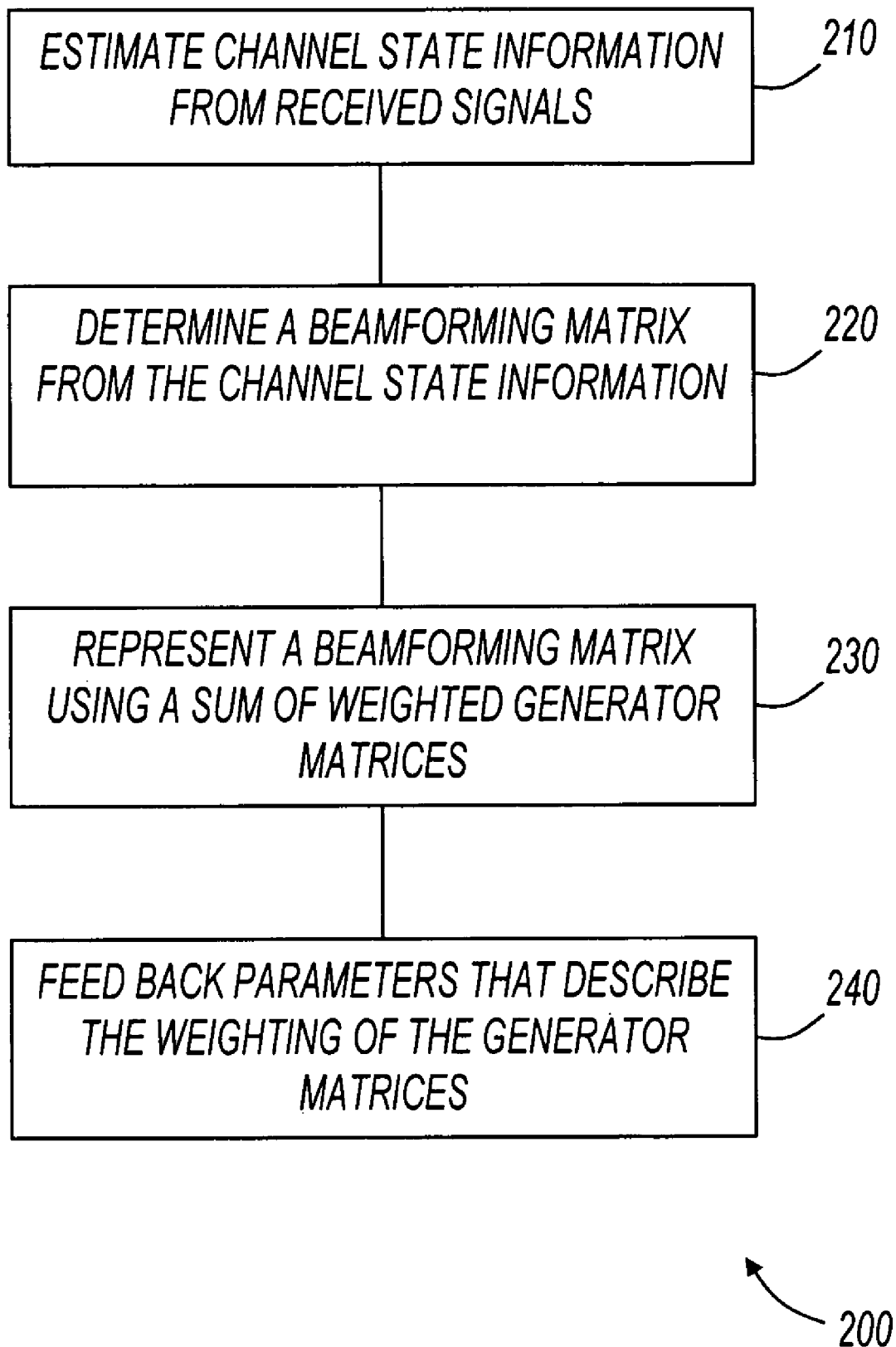


FIG. 2

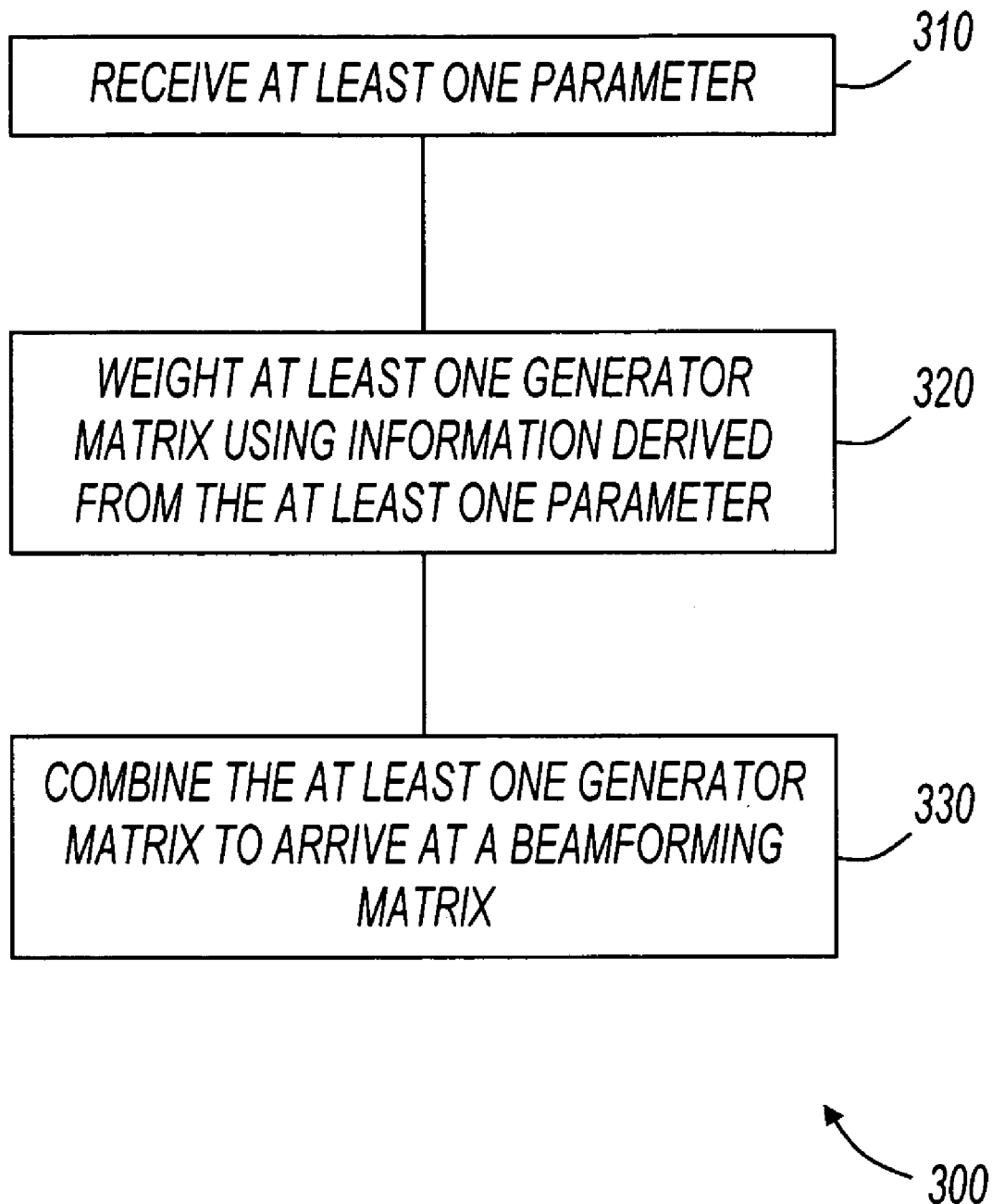


FIG. 3

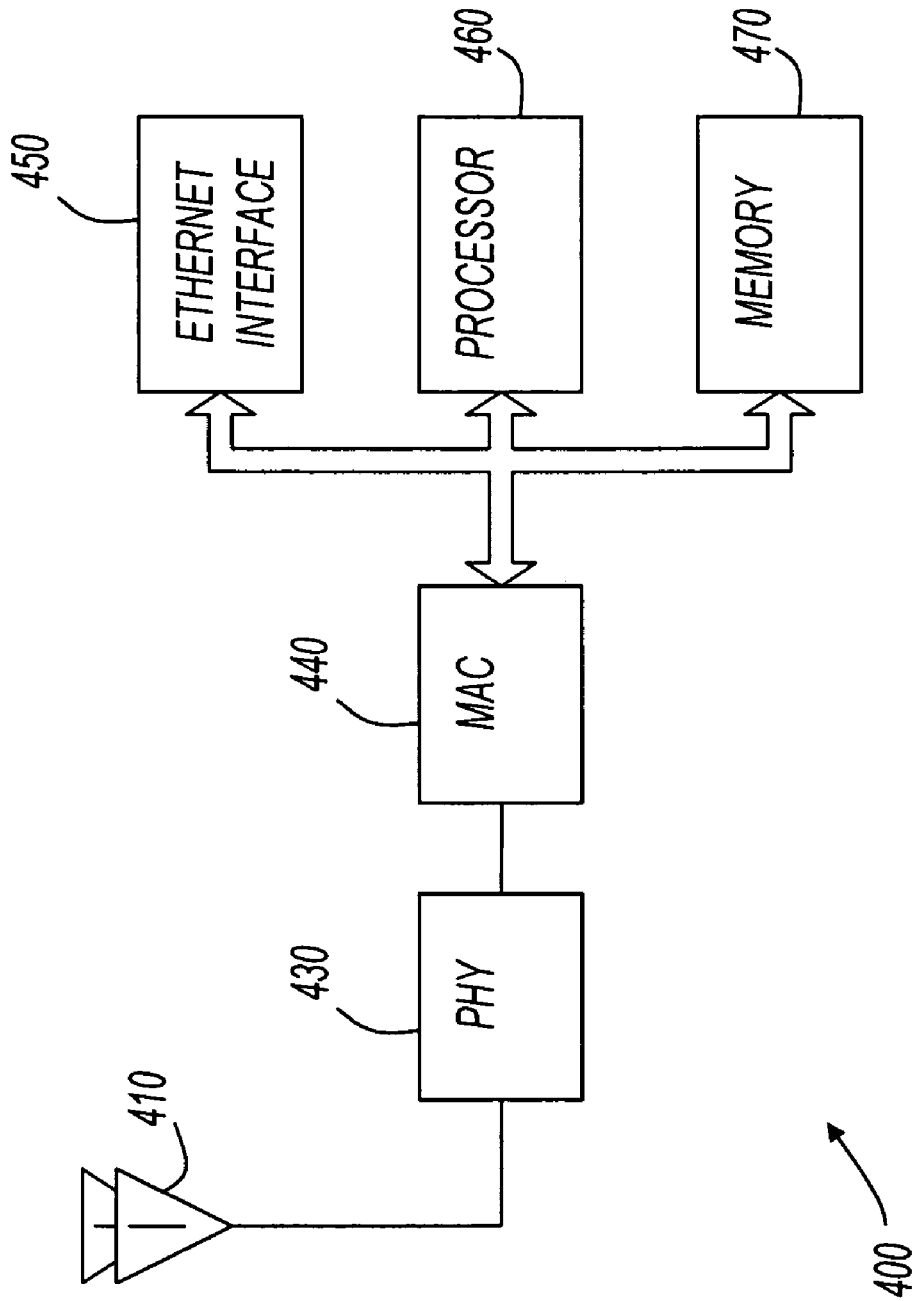


FIG. 4

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