



US007120395B2

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

(10) **Patent No.:** **US 7,120,395 B2**
(45) **Date of Patent:** **Oct. 10, 2006**

(54) **MIMO COMMUNICATIONS**

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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 372 days.

(21) Appl. No.: **10/689,433**

(22) Filed: **Oct. 20, 2003**

(65) **Prior Publication Data**

US 2005/0085195 A1 Apr. 21, 2005

(51) **Int. Cl.**
H04B 7/00 (2006.01)

(52) **U.S. Cl.** **455/101**; 455/69; 455/561;
455/562.1; 375/349

(58) **Field of Classification Search** 455/562.1,
455/101, 70, 103; 370/334; 375/349, 299
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,580,926	B1 *	6/2003	Levy	.....	455/564
6,917,820	B1 *	7/2005	Gore et al.	.....	455/562.1
2003/0003880	A1 *	1/2003	Ling et al.	.....	455/92
2003/0161282	A1	8/2003	Medvedev et al.	.....	370/329
2004/0002364	A1 *	1/2004	Trikkonen et al.	.....	455/562.1
2004/0023621	A1 *	2/2004	Sugar et al.	.....	455/103

2004/0171385	A1 *	9/2004	Haustein et al.	.....	455/450
2005/0003863	A1 *	1/2005	Gorokhov	.....	455/562.1
2005/0085269	A1 *	4/2005	Buljore et al.	.....	455/562.1

FOREIGN PATENT DOCUMENTS

EP	0951091	A2	10/1999
EP	1185001	A2	6/2002
WO	01/78254	A1	10/2001
WO	01/95531	A2	12/2001

OTHER PUBLICATIONS

International Search Report for PCT/GB2004/004443 mailed Jan.
26, 2005.

* cited by examiner

Primary Examiner—George Eng

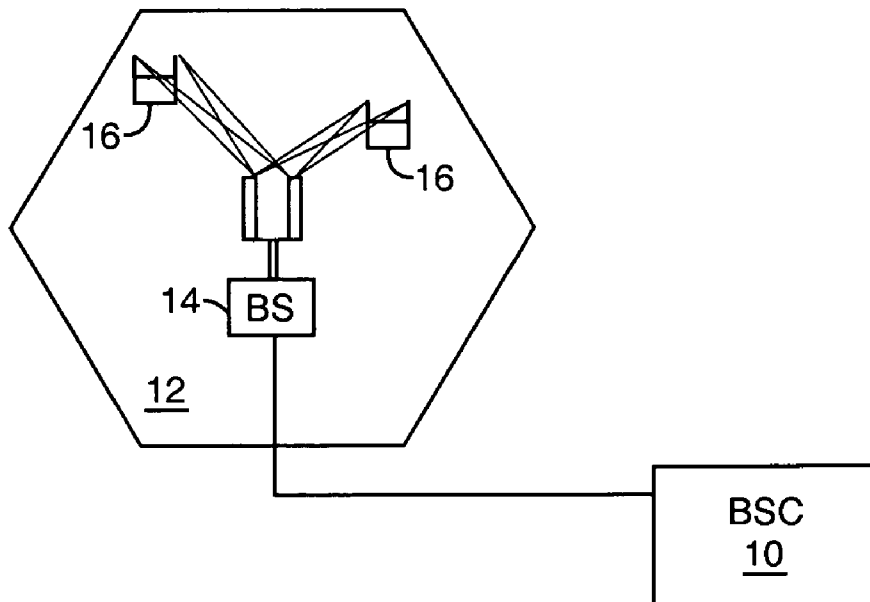
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(57) **ABSTRACT**

The present invention allows a wireless communication system, such as a base station, to select N antennas from an associated group of M antennas for transmitting multiple streams of data to a given user. Based on the channel conditions between the M antennas of the wireless communication system and the multiple antennas at the receiver, the N antennas to use for transmission are selected to enhance channel capacity, signal-to-noise ratios, or a combination thereof. The channel conditions are measured at the receiver, and may be sent back to the wireless communication system for processing or may be processed at the receiver, wherein instructions are transmitted back to the wireless communication system to control antenna selection.

36 Claims, 9 Drawing Sheets



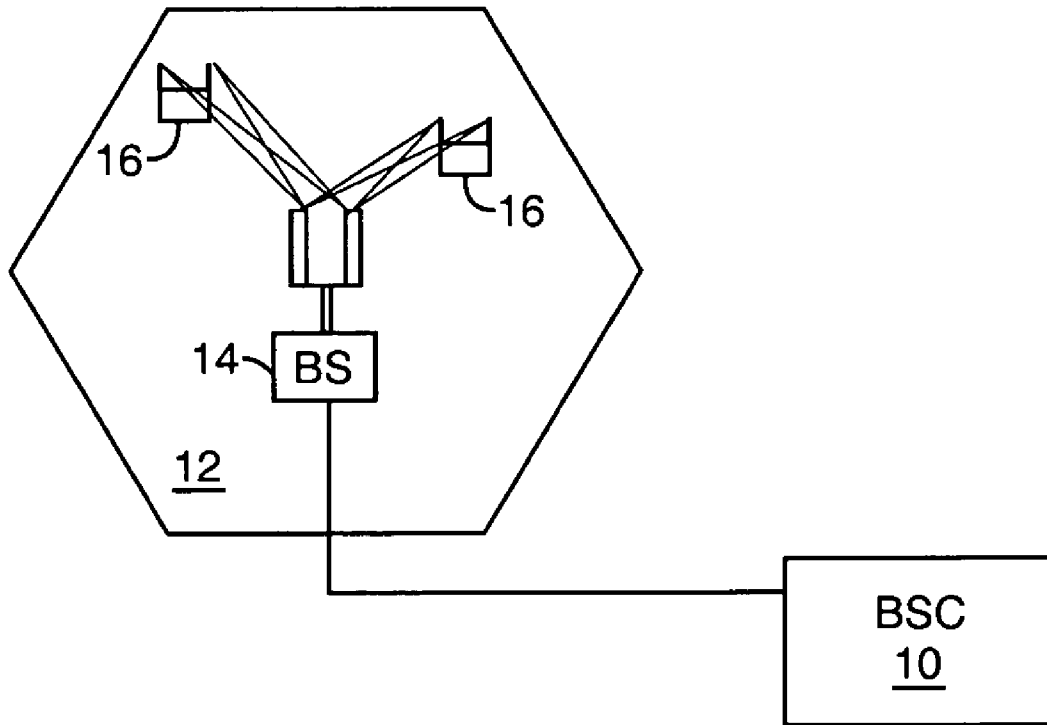


FIG. 1

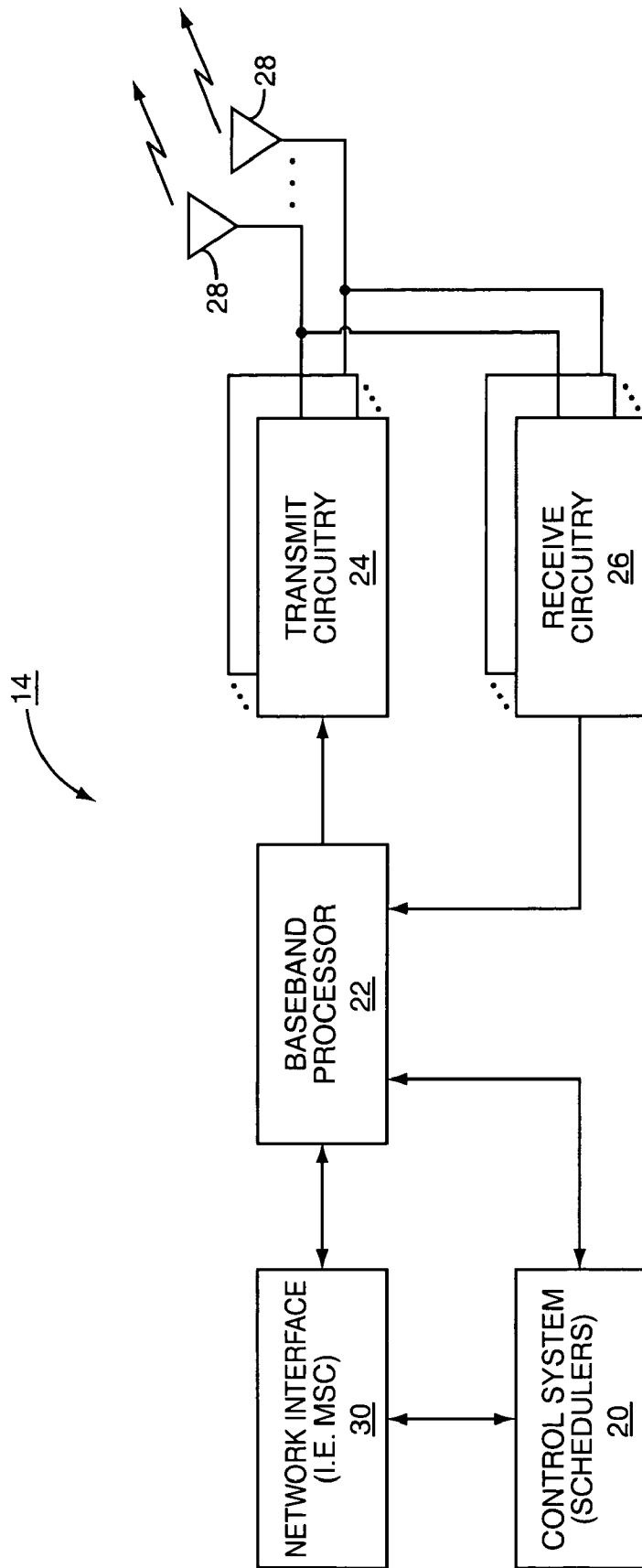


FIG. 2

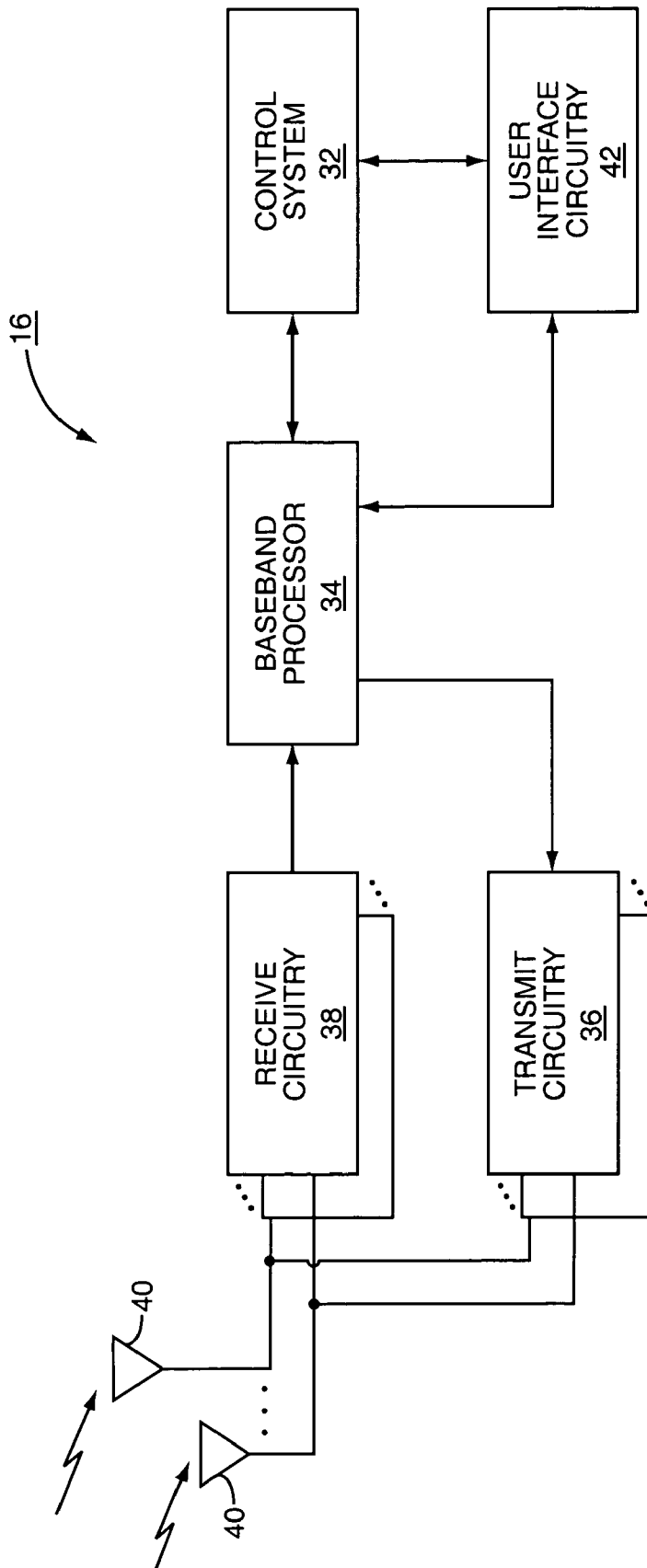


FIG. 3

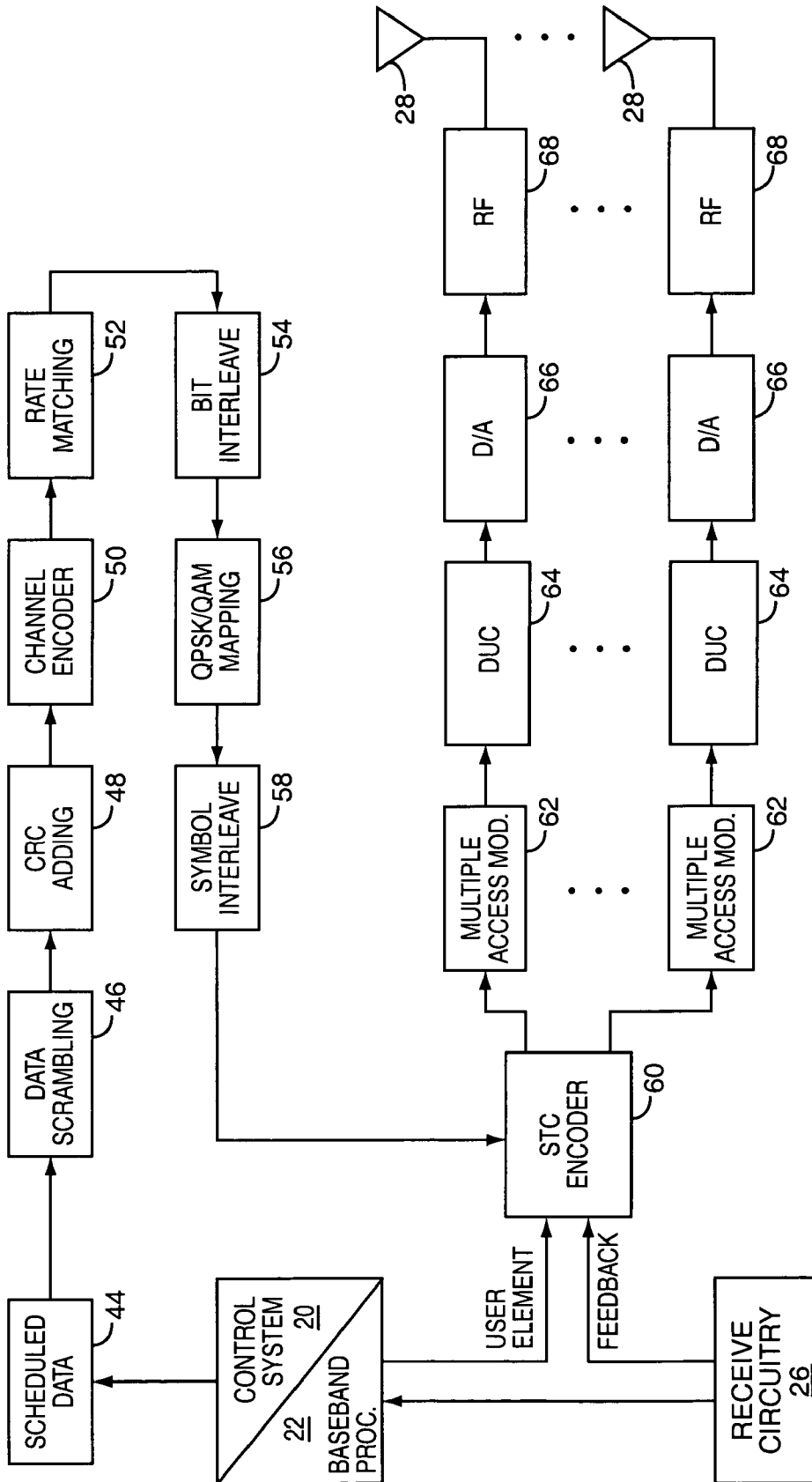


FIG. 4

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