

EXHIBIT

A

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

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 (45) **Date of Patent:** Mar. 4, 2008

(54) **VERTEX PROCESSING UNIT SUPPORTING VERTEX TEXTURE MAPPING**

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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 536 days.

(57) **ABSTRACT**

A graphics processing subsystem includes a vertex processing unit that allows vertex shader programs to arbitrarily access data stored in vertex texture maps. The vertex processing unit includes a vertex texture fetch unit and vertex processing engines. The vertex processing engines operate in parallel to execute vertex shader programs that specify operations to be performed on vertices. In response to a vertex texture load instruction, a vertex processing engine dispatches a vertex texture request to the vertex texture fetch unit. The vertex texture fetch unit retrieves the corresponding vertex texture map data. While the vertex texture fetch unit is processing a vertex texture request, the requesting vertex processing engine is adapted to evaluate whether instructions that follow the vertex texture load instruction are dependent on the vertex texture map data, and if the instructions are not dependent on the vertex texture map data, to execute the additional instructions.

(21) Appl. No.: **10/934,119**

(22) Filed: **Sep. 2, 2004**

(51) **Int. Cl.**
G06F 15/00 (2006.01)
G06T 1/00 (2006.01)
G06T 11/40 (2006.01)
G09G 5/36 (2006.01)

(52) **U.S. Cl.** **345/501; 345/552; 345/557**

(58) **Field of Classification Search** **345/501, 345/552, 557**

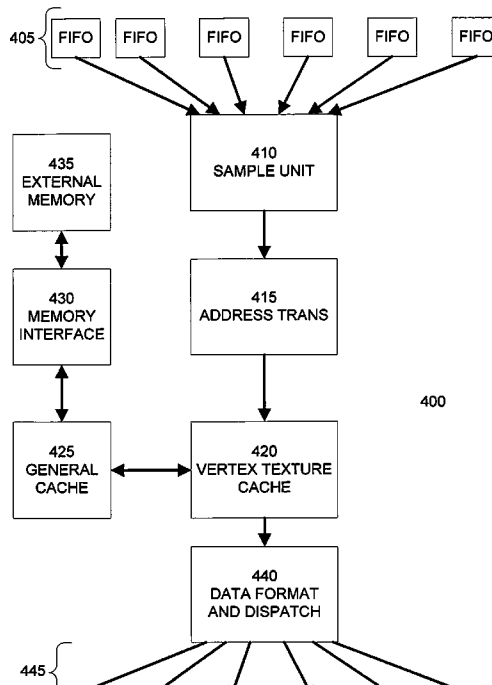
See application file for complete search history.

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13 Claims, 6 Drawing Sheets



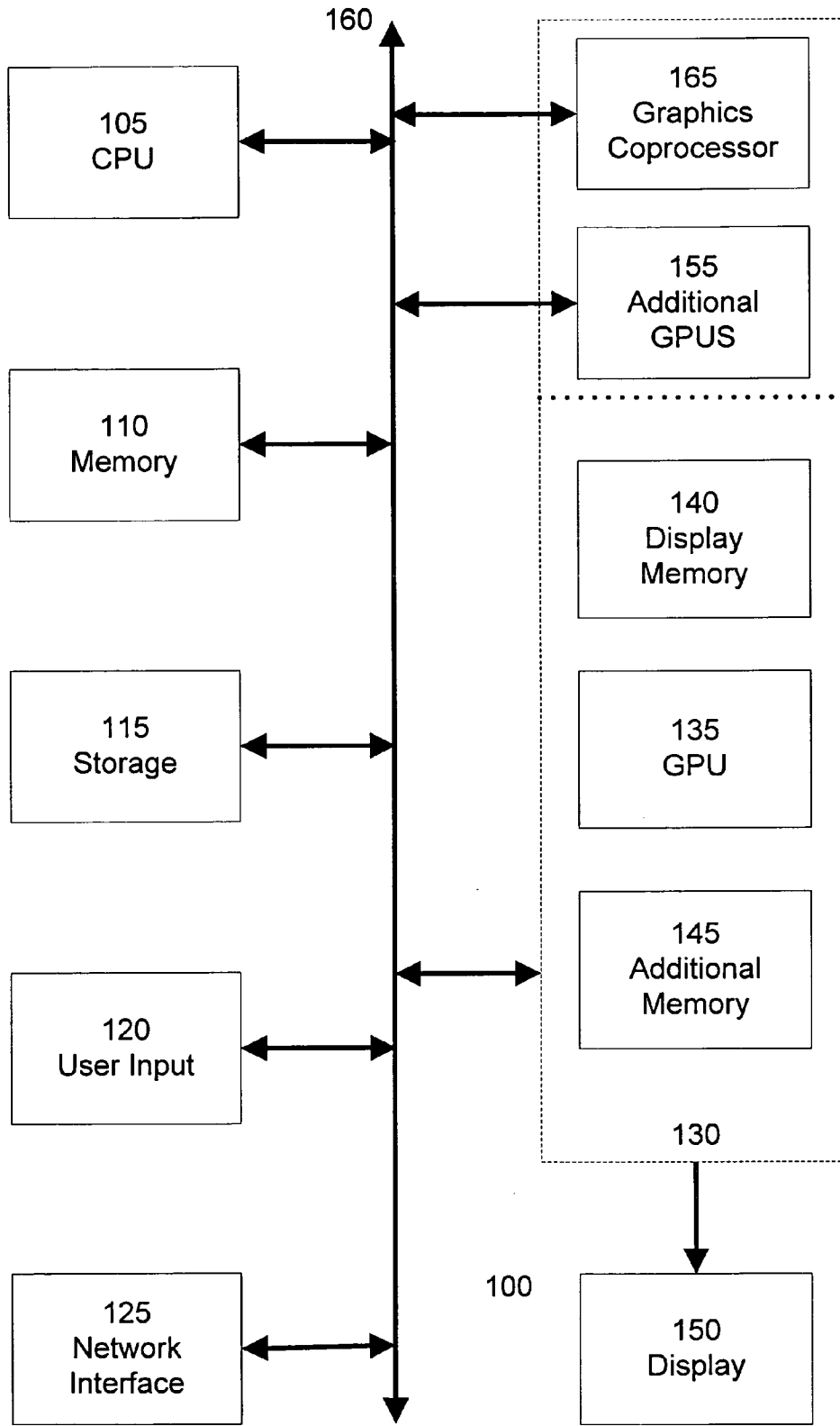


FIG. 1

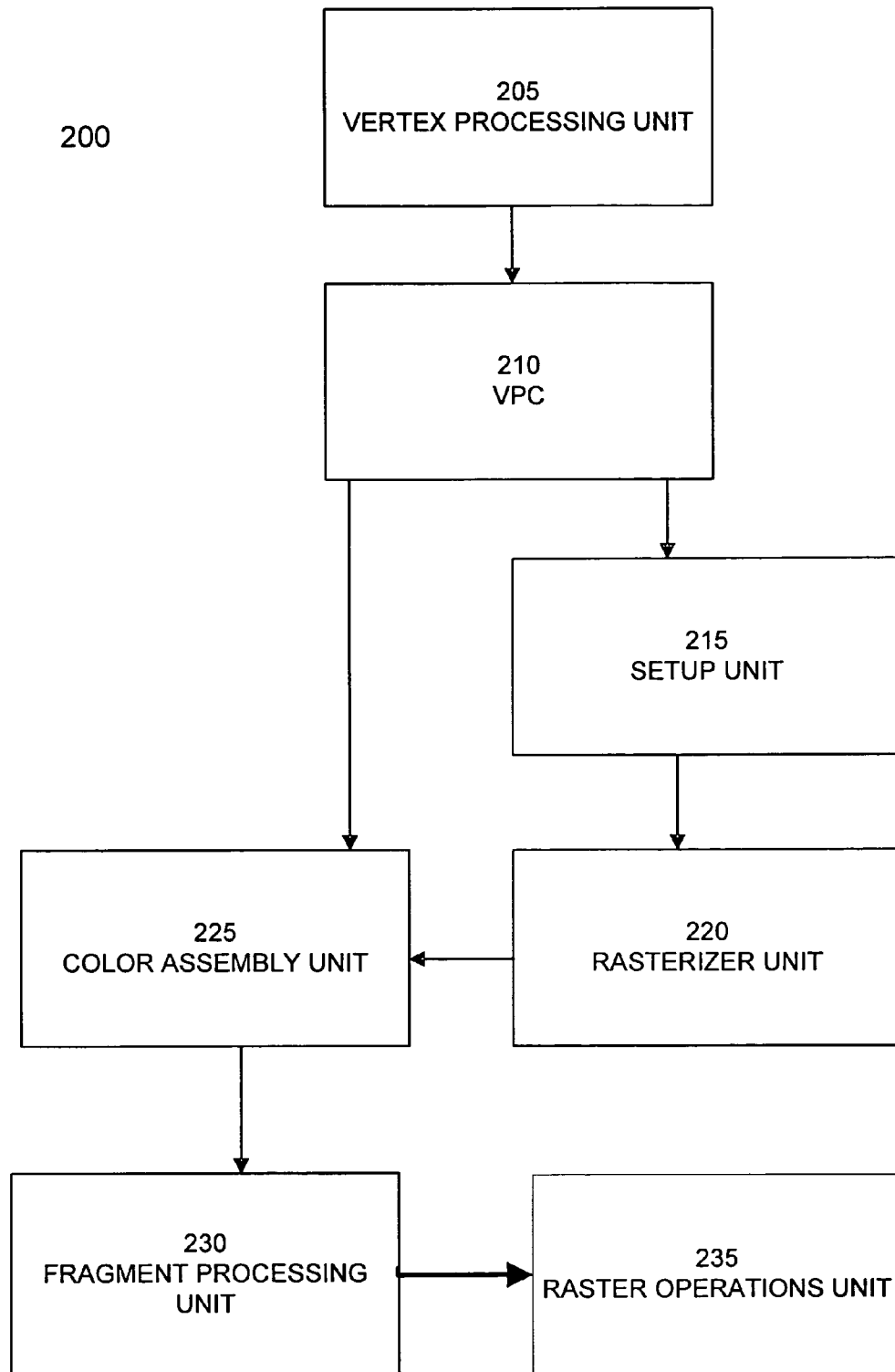


FIG. 2

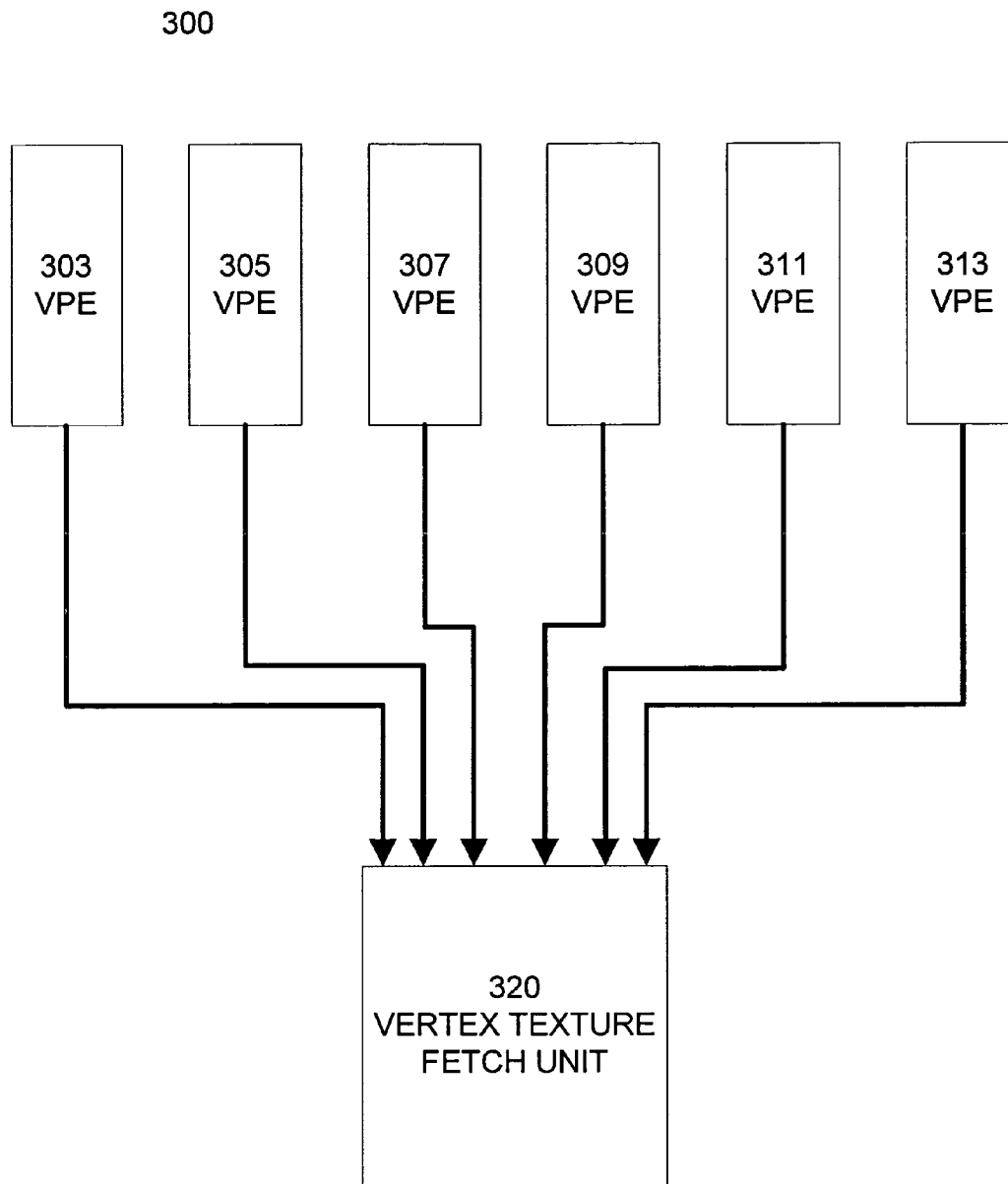


FIG. 3

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