

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

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**(45) Date of Patent: Feb. 6, 2001**

**(54) MULTIPLE PIPELINE MEMORY CONTROLLER FOR SERVICING REAL TIME DATA**

**(75) Inventors:** **Chun Wang**, Toronto; **Raymond Li**, Markham; **Adrian Hartog**, Toronto; **Daniel Gudmundson**, Newmarket, all of (CA)

**(73) Assignee:** **ATI Technologies, Inc.**, Thornhill (CA)

**(\*) Notice:** Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.

**(21) Appl. No.:** **08/885,335**

**(22) Filed:** **Jun. 30, 1997**

**(51) Int. Cl.<sup>7</sup>** ..... **G06F 13/16**

**(52) U.S. Cl.** ..... **345/521; 345/506; 711/151; 711/158**

**(58) Field of Search** ..... **345/521, 506, 345/512, 302; 711/147, 151, 158, 169; 395/729, 731, 732; 710/241, 243, 244**

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*Primary Examiner*—Raymond J. Bayerl

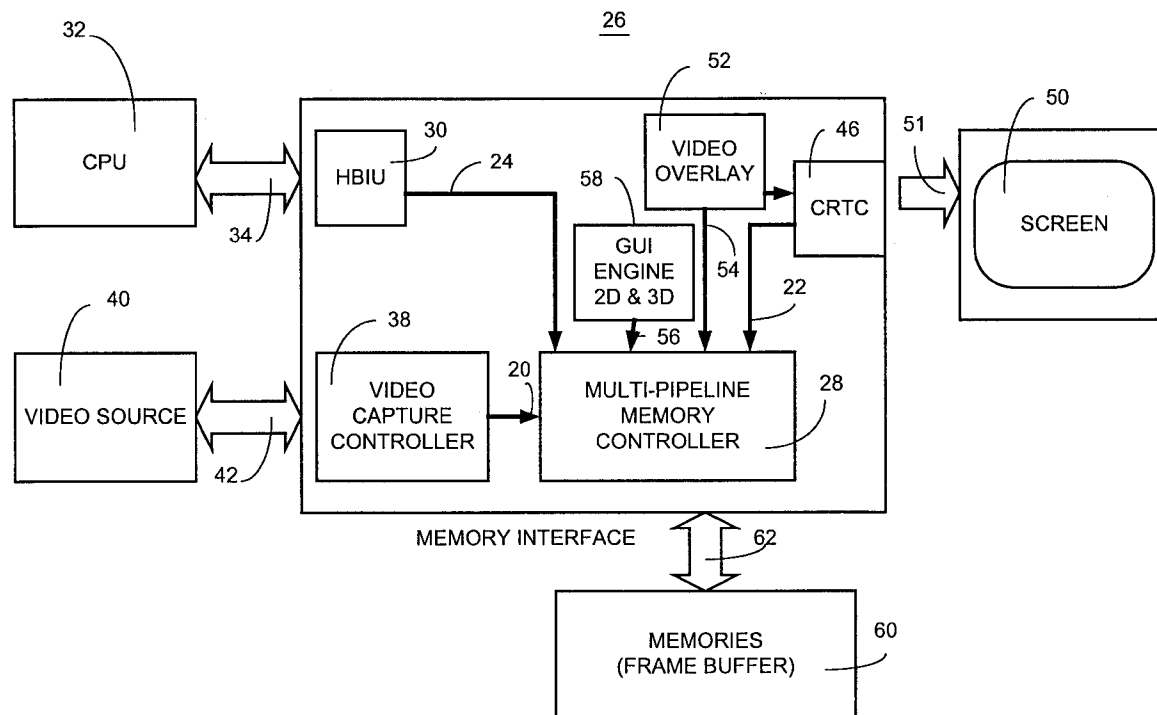
*Assistant Examiner*—Sy D. Luu

**(74) Attorney, Agent, or Firm**—Markison & Reckamp, P.C.

**(57) ABSTRACT**

A multiple pipeline memory controller has a plurality of two stage pipeline processors dedicated to separately process real time video capture and display refresh input request signals. A separate pipeline processor processes non-real time input signals. The multiple pipeline design reduces memory access latency and improves throughput of data in display FIFO memory to effect improved resolution. The multiple pipeline memory controller can be integrated in a video graphics controller (VGC).

**21 Claims, 4 Drawing Sheets**



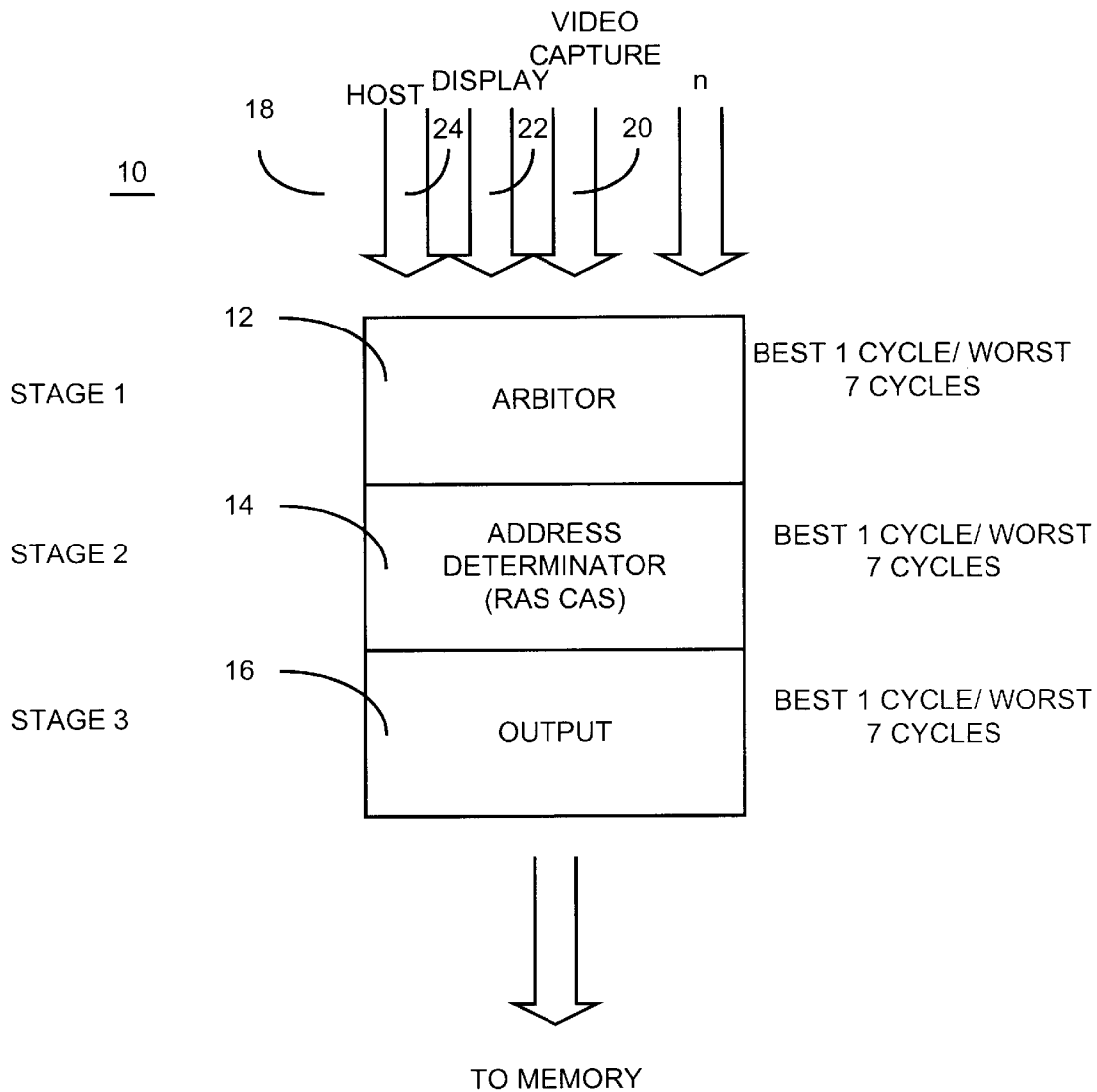


FIG. 1  
PRIOR ART

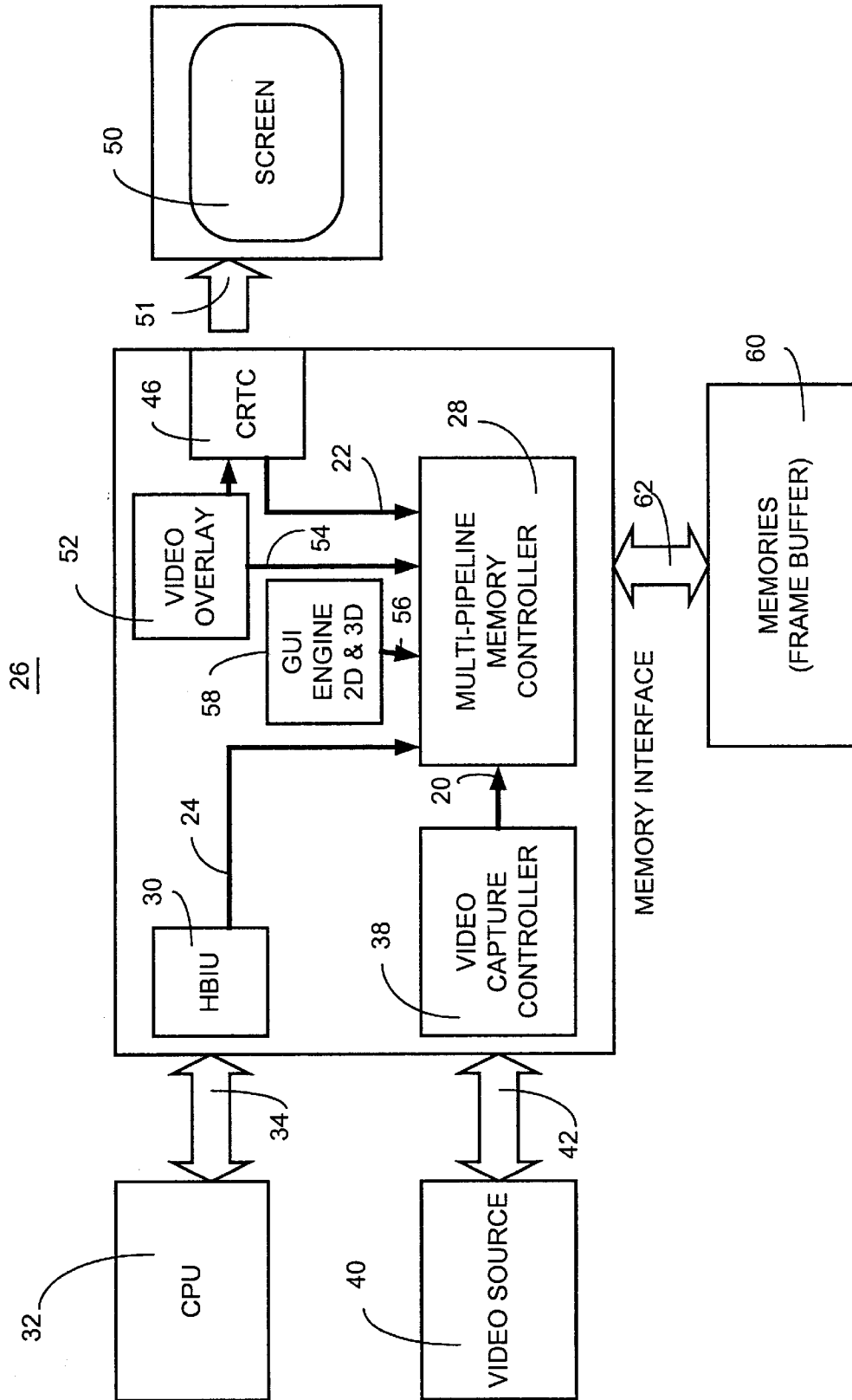


FIG. 2

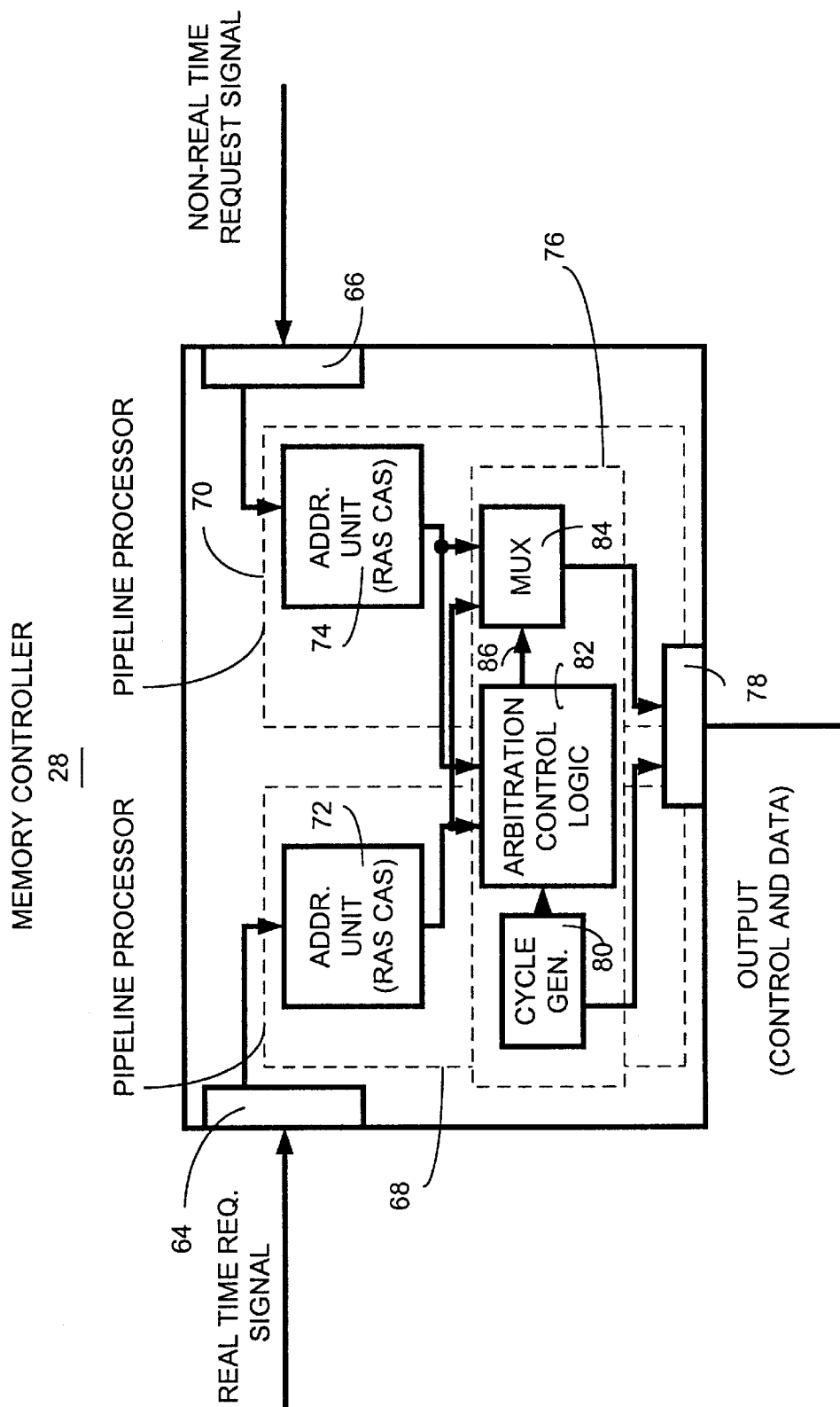


FIG. 3

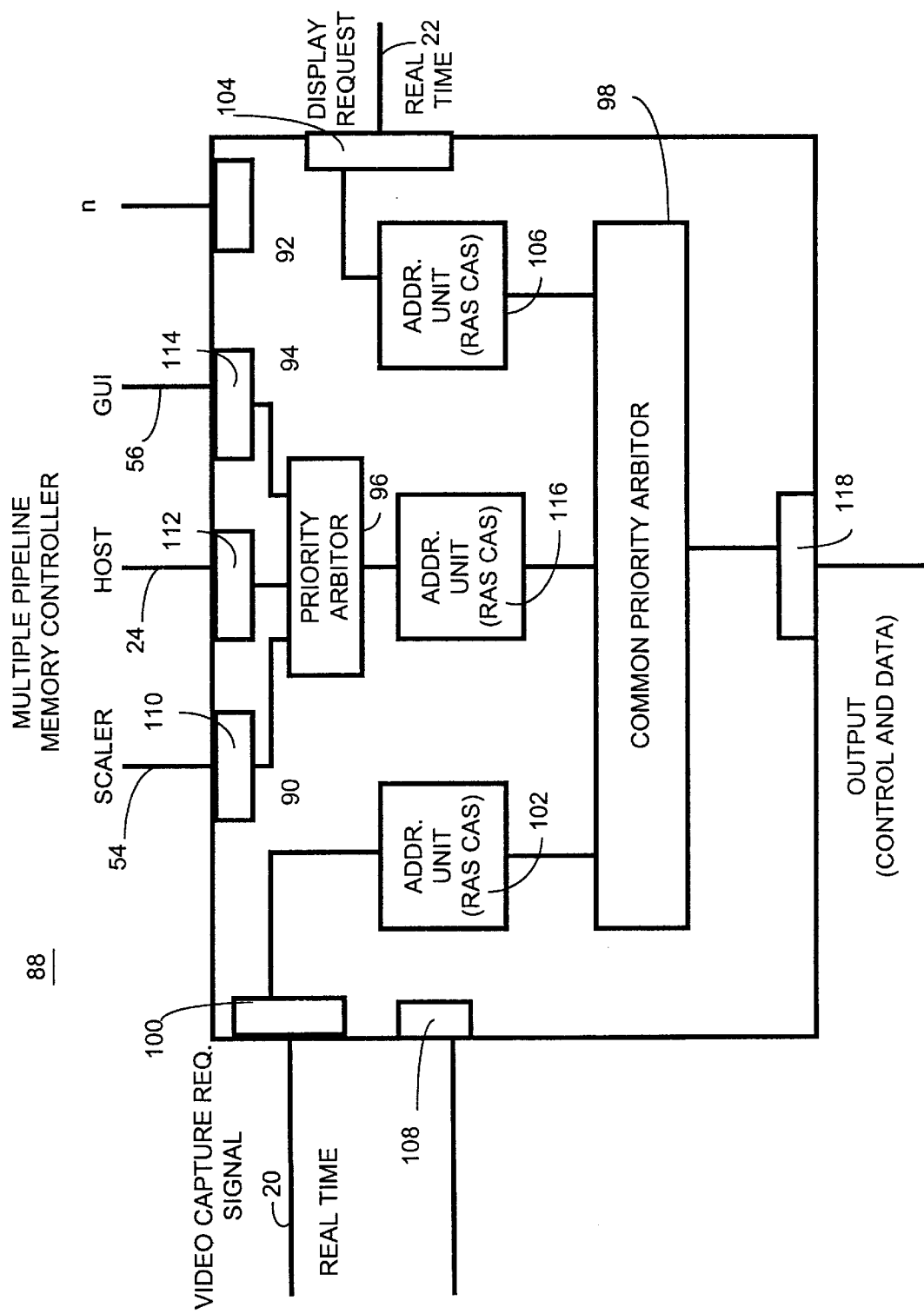


FIG. 4

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