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Barton et al.

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(54) **MULTIMEDIA TIME WARPING SYSTEM**

(75) Inventors: **James M. Barton**, Los Gatos;
Roderick James McInnis, Milpitas;
Alan S. Moskowitz, San Francisco;
Andrew Martin Goodman, Menlo
Park; **Ching Tong Chow**, Fremont;
Jean Swey Kao, Cupertino, all of CA
(US)

(73) Assignee: **TiVo, Inc.**, Alviso, CA (US)

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patent is extended or adjusted under 35
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(52) **U.S. Cl.** **386/46**; 386/68

(58) **Field of Search** 386/1, 33, 45,
386/46, 111–112, 125–126, 68; 369/60;
366/7, 33; 348/7, 10, 571, 714, 722, 725;
H04N 5/76, 5/92, 9/79, 5/14

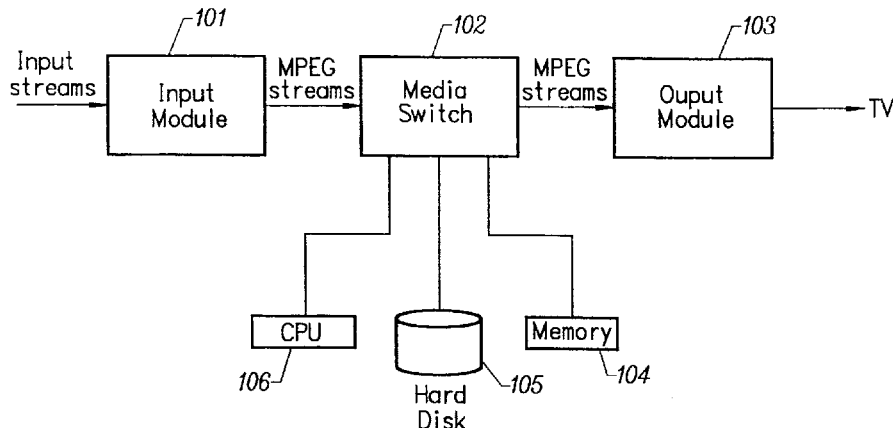(56) **References Cited**

U.S. PATENT DOCUMENTS

Re. 33,535	2/1991	Cooper	358/149
4,313,135	1/1982	Cooper	358/149
4,665,431	5/1987	Cooper	358/145
5,202,761	4/1993	Cooper	358/149
5,371,551	12/1994	Logan et al.	348/571
5,438,423	8/1995	Lynch et al.	358/335
5,550,594	8/1996	Cooper et al.	348/513
5,572,261	11/1996	Cooper	348/512

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

0726574   8/1996 (EP) G11B/27/034

OTHER PUBLICATIONS

ASTARTE DVDirector™ Beta Testing Program.

Primary Examiner—Thai Tran
(74) *Attorney, Agent, or Firm*—Michael A. Glenn; Kirk
Wong

(57) **ABSTRACT**

A multimedia time warping system. The invention allows
the user to store selected television broadcast programs
while the user is simultaneously watching or reviewing
another program. A preferred embodiment of the invention
accepts television (TV) input streams in a multitude of
forms, for example, National Television Standards Commit-
tee (NTSC) or PAL broadcast, and digital forms such as
Digital Satellite System (DSS), Digital Broadcast Services
(DBS), or Advanced Television Standards Committee
(ATSC). The TV streams are converted to an Moving
Pictures Experts Group (MPEG) formatted stream for inter-
nal transfer and manipulation and are parsed and separated
it into video and audio components. The components are
stored in temporary buffers. Events are recorded that indi-
cate the type of component that has been found, where it is
located, and when it occurred. The program logic is notified
that an event has occurred and the data is extracted from the
buffers. The parser and event buffer decouple the CPU from
having to parse the MPEG stream and from the real time
nature of the data streams which allows for slower CPU and
bus speeds and translate to lower system costs. The video
and audio components are stored on a storage device and
when the program is requested for display, the video and
audio components are extracted from the storage device and
reassembled into an MPEG stream which is sent to a
decoder. The decoder converts the MPEG stream into TV
output signals and delivers the TV output signals to a TV
receiver. User control commands are accepted and sent
through the system. These commands affect the flow of said
MPEG stream and allow the user to view stored programs
with at least the following functions: reverse, fast forward,
play, pause, index, fast/slow reverse play, and fast/slow play.

61 Claims, 12 Drawing Sheets

U.S. PATENT DOCUMENTS

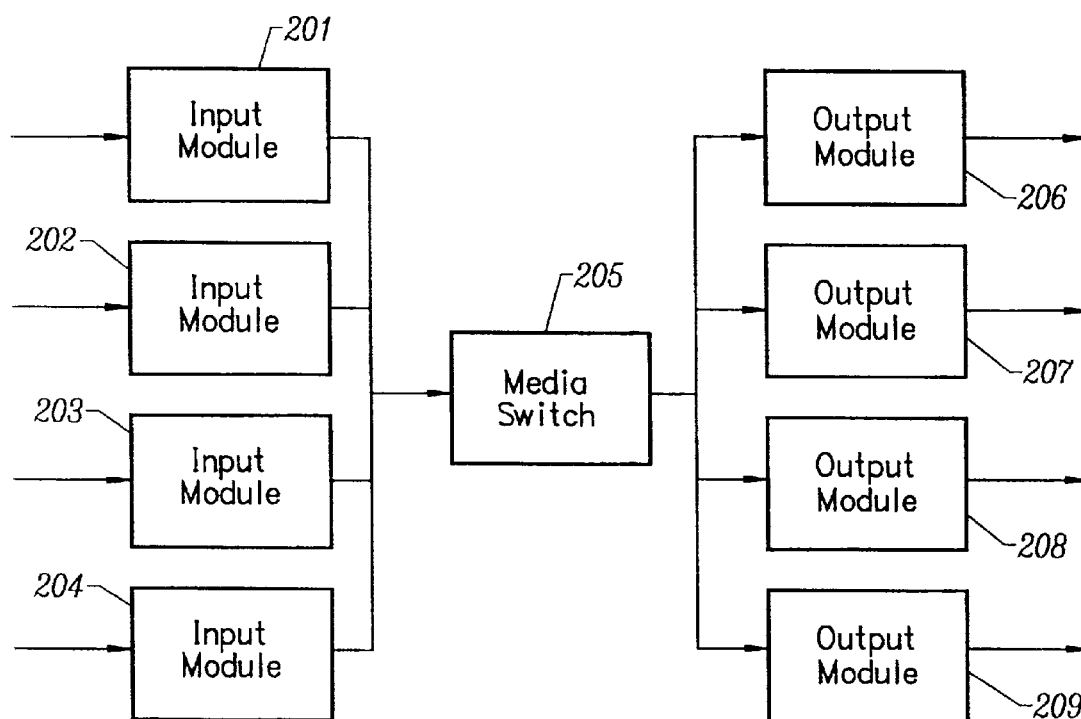|			
5,675,388	10/1997	Cooper	348/461
5,696,868	12/1997	Kim et al.	386/46
5,706,388	1/1998	Isaka	386/125
5,787,225 *	7/1998	Honjo	386/111
5,920,842	7/1999	Cooper et al.	704/503
5,937,138 *	8/1999	Fukuda et al.	386/112

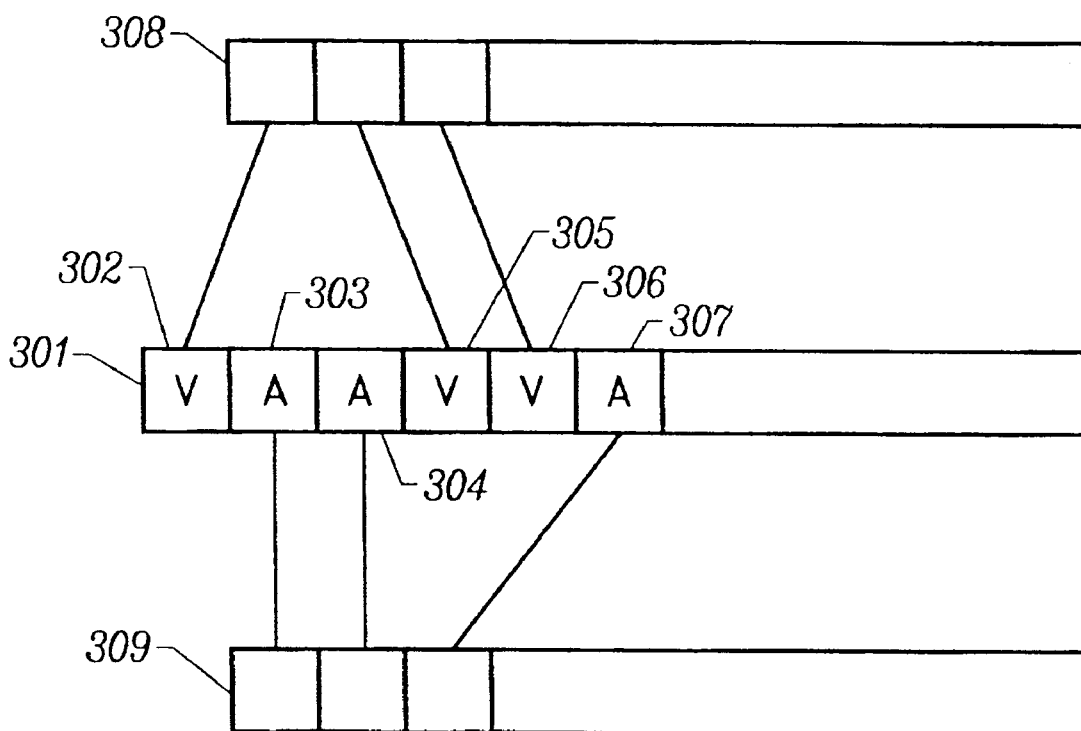* cited by examiner
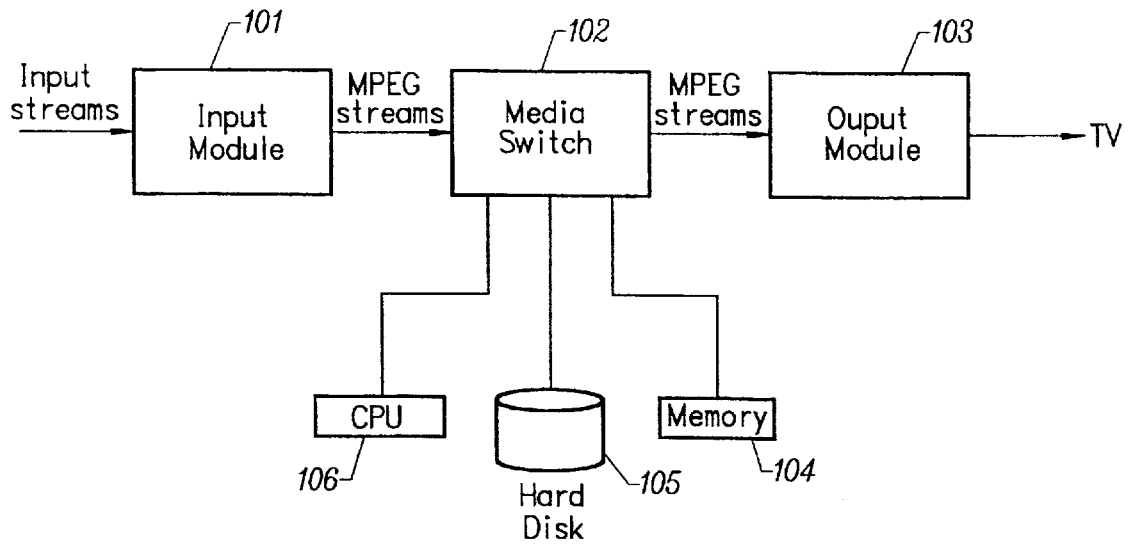
FIG. 1

FIG. 2

FIG. 3

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