US007143432B1

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

(10) **Patent No.: US 7,143,432 B1**
(45) **Date of Patent: Nov. 28, 2006**

(54) **SYSTEM FOR TRANSFORMING STREAMING VIDEO DATA**

(75) Inventors: **Roger K. Brooks**, Palo Alto, CA (US); **Stephen A. Molloy**, Los Gatos, CA (US); **Chi-Te Feng**, Hsi Chih (TW); **Qing Zhang**, Sunnyvale, CA (US); **Yanda Ma**, Milpitas, CA (US); **Dave Singhal**, San Jose, CA (US)

(73) Assignee: **Vidiator Enterprises Inc.**, Nassau (BS)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/502,409**

(22) Filed: **Feb. 10, 2000**

Related U.S. Application Data

(60) Provisional application No. 60/157,468, filed on Oct. 1, 1999.

(51) **Int. Cl.**
H04N 7/173 (2006.01)

(52) **U.S. Cl.** **725/105**; 725/109; 725/114; 725/115; 725/117; 725/118; 709/231; 709/235; 709/203; 709/247; 375/240.24; 375/240.25; 375/240.26; 370/437

(58) **Field of Classification Search** 375/240.02, 375/240.24, 240.11, 240.01, 240.25, 240.26; 370/420, 398, 437; 725/118, 105, 114, 109, 725/115, 117; 709/247, 246, 231, 235, 203
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,619,995	A *	4/1997	Lobodzinski	348/398
5,671,319	A	9/1997	Ueda	386/96
5,768,535	A	6/1998	Chaddha et al.	395/200.77
5,903,775	A	5/1999	Murray	395/853
5,914,751	A	6/1999	Korth	348/409
5,970,233	A *	10/1999	Liu et al.	709/246
6,011,868	A	1/2000	van den Branden et al.	382/233
6,028,639	A	2/2000	Bhatt et al.	348/441
6,091,777	A *	7/2000	Guetz et al.	375/240.11
6,141,447	A *	10/2000	Linzer et al.	382/236
6,141,693	A	10/2000	Perlman et al.	709/236

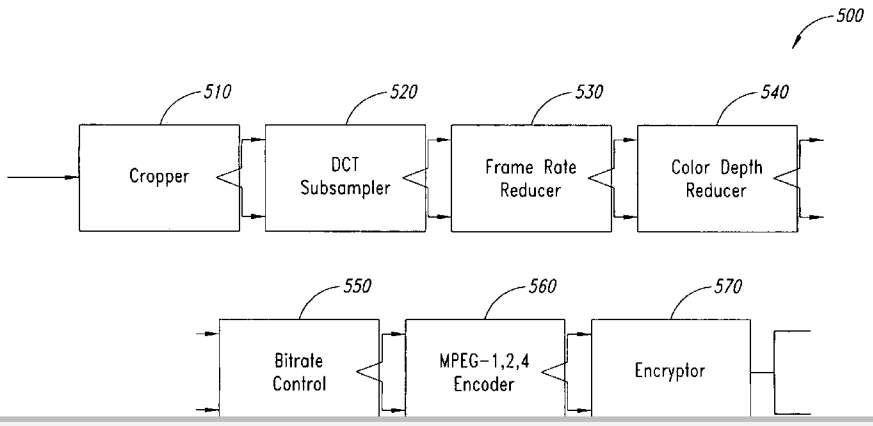
(Continued)

Primary Examiner—Shawn S. An
(74) *Attorney, Agent, or Firm*—Seed IP Law Group PLLC

(57) **ABSTRACT**

According to one embodiment, a circuit configured to form an output video stream includes a resolution modification circuit configured to receive a plurality of video frames from a frame buffer, and configured to modify resolution of the plurality of video frames, when the desired resolution for the output video stream is different than a resolution of the input video stream, the plurality of frames of data derived from an input video stream, a frame reducing circuit coupled to the resolution reducing circuit configured to reduce a number of video frames in the plurality of video frames from the resolution reducing circuit, when a desired frame rate for the output video stream is different than a frame rate of the input video stream, a depth reduction circuit coupled to the frame reducing circuit configured to reduce bit depth of the plurality of video frames from the frame reducing circuit, when a desired bit depth for the output video stream is different than a bit depth of the input video stream, and a rate reduction circuit coupled to the depth reduction circuit, configured to scale the plurality of video frames from the depth reduction circuit, in response to a desired bit rate for the output video stream, and an encoder coupled to the rate reduction circuit, configured to encode the plurality of video frames from the rate reduction circuit into the output video stream is also contemplated.

17 Claims, 8 Drawing Sheets



DOCKET ALARM
Find authenticated court documents without watermarks at docketalarm.com.

U.S. PATENT DOCUMENTS

6,141,709	A	10/2000	Cutter	710/100
6,160,544	A	12/2000	Hayashi et al.	345/327
6,236,395	B1	5/2001	Sezan et al.	345/328
6,275,536	B1	8/2001	Chen et al.	375/240.25
6,292,834	B1	9/2001	Ravi et al.	709/233
6,298,385	B1	10/2001	Sparks et al.	709/233
6,343,313	B1	1/2002	Salesky et al.	709/204
6,398,245	B1	6/2002	Gruse et al.	280/228
6,490,627	B1	12/2002	Kalra et al.	709/231
6,505,299	B1	1/2003	Zeng et al.	713/160
6,525,746	B1	2/2003	Lau et al.	345/725
6,567,986	B1 *	5/2003	Ward et al.	725/118
6,795,863	B1 *	9/2004	Doty, Jr.	709/231

* cited by examiner

DOCKET ALARM
Find authenticated court documents without watermarks at docketalarm.com.

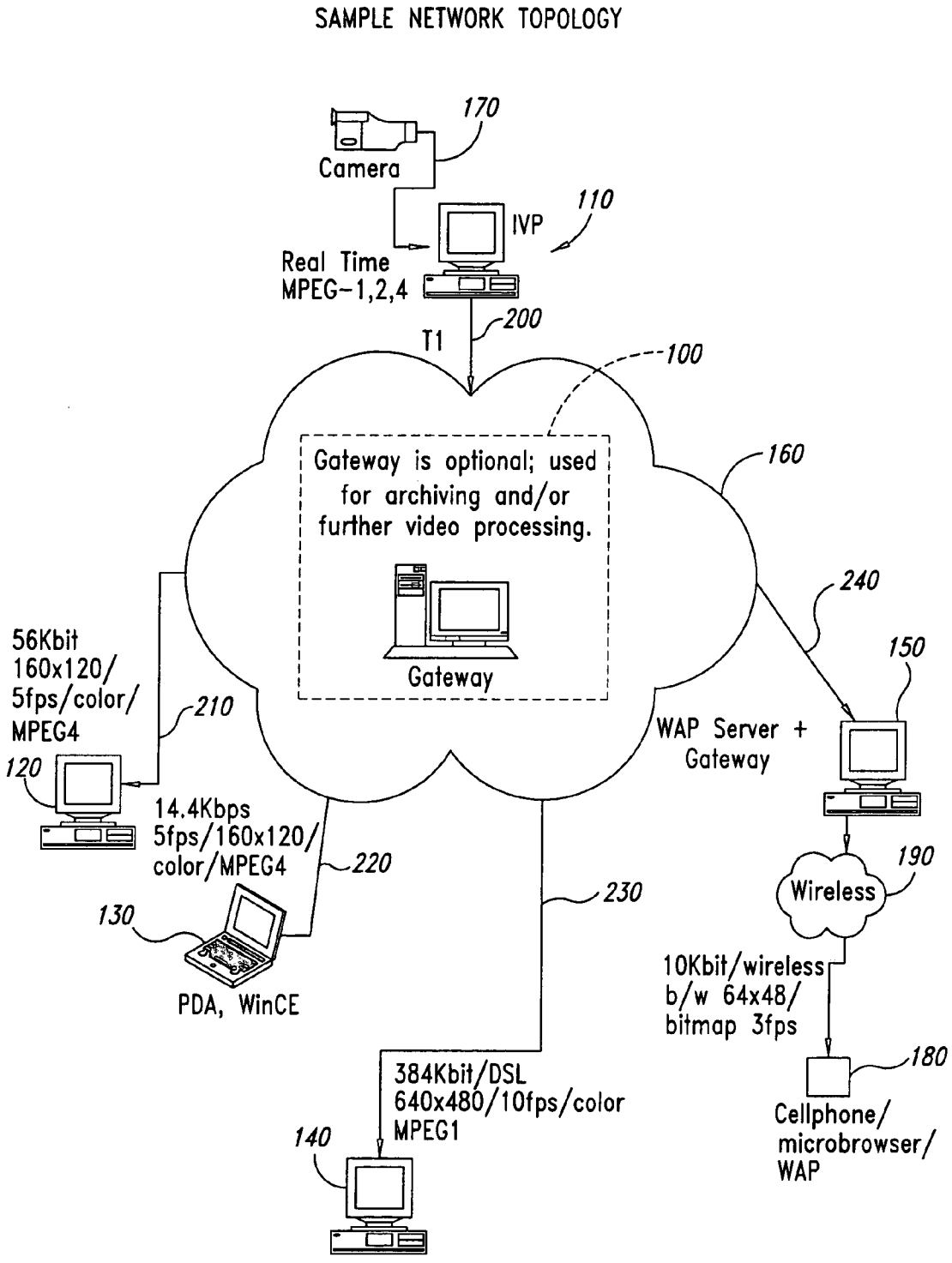


FIG. 1

DOCKET ALARM Find authenticated court documents without watermarks at docketalarm.com.

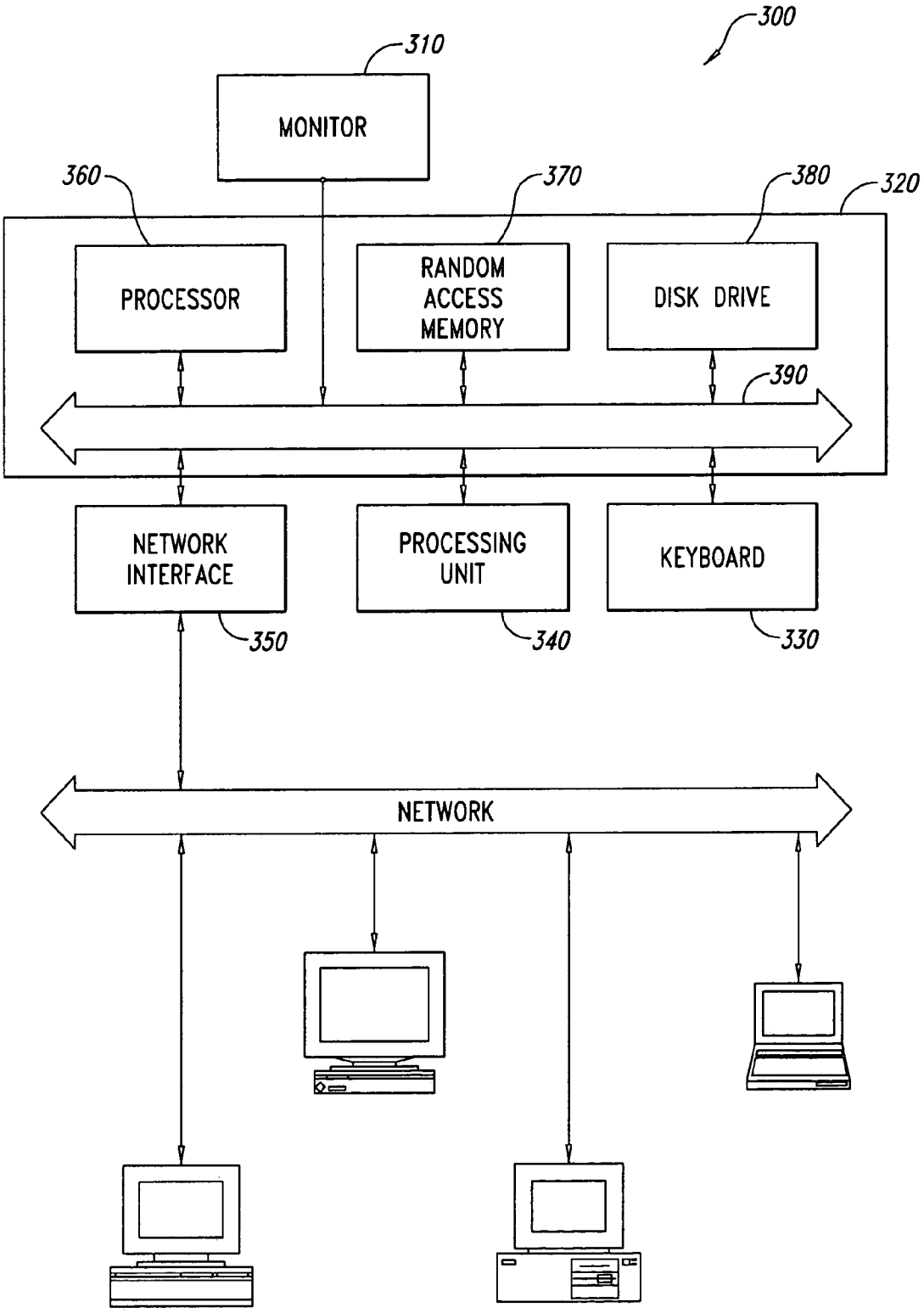


FIG. 2

DOCKET ALARM
Find authenticated court documents without watermarks at docketalarm.com.

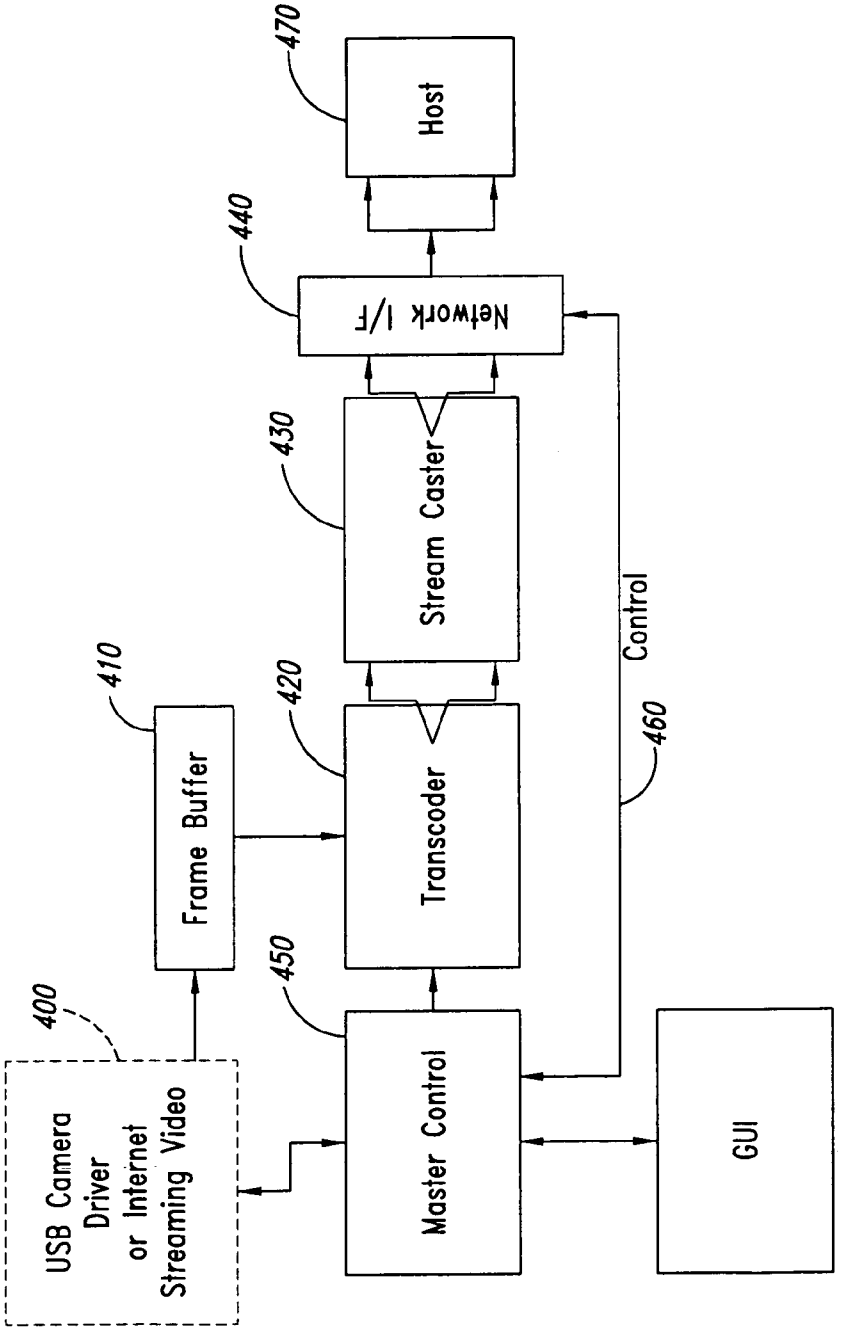


FIG. 3

DOCKET ALARM
Find authenticated court documents without watermarks at docketalarm.com.

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.