

US006314137B1

(12) United States Patent

Ono et al.

(10) Patent No.: US 6,314,137 B1

(45) **Date of Patent:**

Nov. 6, 2001

(54) VIDEO DATA COMPRESSION SYSTEM, VIDEO RECORDING/PLAYBACK SYSTEM, AND VIDEO DATA COMPRESSION ENCODING METHOD

(75) Inventors: Koichi Ono, Yokosuka; Hideo

Nishijima; Takayuki Kanesaki, both of Hitachinaka; Tadasu Horiuchi; Nobuyoshi Tsukiji, both of Yokohama,

all of (JP)

(73) Assignee: Hitachi, Ltd., Tokyo (JP)

(*) 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.: 09/050,568

(22) Filed: Mar. 30, 1998

(30) Foreign Application Priority Data

Mar.	31, 1997	(JP)		9-080082
(51)	Int. Cl. ⁷			H04N 7/12
(52)	U.S. Cl.		375/240;	375/240.01

(56) References Cited

U.S. PATENT DOCUMENTS

3,580,998	*	5/1971	Hammond et al 348/159
3,582,542	*	6/1971	Smierciak 348/385.1

4,158,208	*	6/1979	Dischert 348/176
4,961,211	*	10/1990	Tsugane et al 348/14.08
5,223,949	*	6/1993	Honjo
5,371,535	*	12/1994	Takizawa 348/14.1
5,488,482	*	1/1996	Ueda et al 348/402
5,579,060	*	11/1996	Elberbaum 348/705

FOREIGN PATENT DOCUMENTS

KOKAI

62-179280 8/1987 (JP).

KOKAI

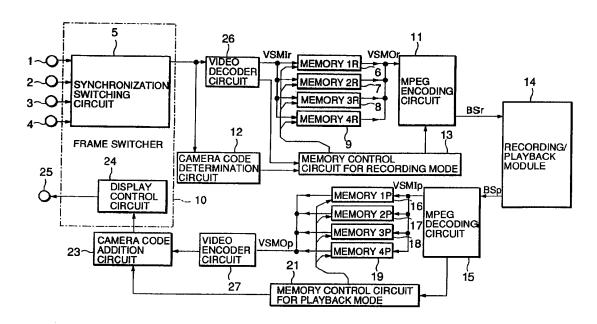
64-65989 3/1989 (JP).

Primary Examiner—Chris Kelley Assistant Examiner—Allen Wong (74) Attorney, Agent, or Firm—Mattingly, Stanger & Malur, P.C.

(57) ABSTRACT

A video data compression/playback system efficiently compresses a plurality of video data pieces through inter-frame predictive-encoding. Mixed video data VSMIr composed of time-divided video data received by video input terminals are divided video data pieces each of which corresponding to video input terminals and the video data pieces are written into memories respectively by a memory control circuit for recording mode. The mixed video data written into the memories is read, a specified number of frames at a time. An MPEG encoding circuit performs inter-frame predictive-encoding for each specified number of frames.

13 Claims, 20 Drawing Sheets





^{*} cited by examiner

Nov. 6, 2001

US 6,314,137 B1

RECORDING/ PLAYBACK MODULE BSp BŠ MPEG DECODING CIRCUIT 5 Y CONTROL FOR RECORDING MODE MPEG ENCODING CIRCUIT VSMIp MEMORY CONTROL CIRCUIT FOR PLAYBACK MODE VSMO **MEMORY 2P** MEMORY 3P MEMORY 1P **MEMORY 4P** 9 MEMORY 3R **MEMORY 4R MEMORY 1R MEMORY 2R** MEMORY (2 VSMOp CAMERA CODE DETERMINATION CIRCUIT DECODER CIRCUIT VIDEO ENCODER CIRCUIT 12 27 10 CAMERA CODE ADDITION CIRCUIT SYNCHRONIZATION SWITCHING CIRCUIT FRAME SWITCHER DISPLAY CONTROL CIRCUIT 25



US 6,314,137 B1

Nov. 6, 2001



US 6,314,137 B1

FIG.3

Nov. 6, 2001

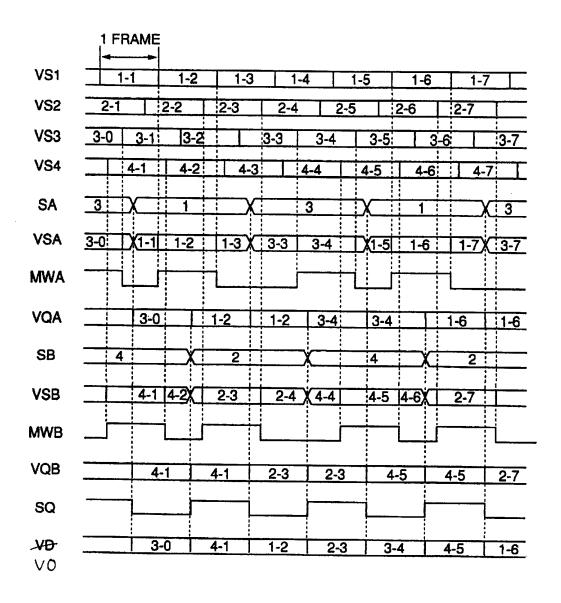


FIG. 4

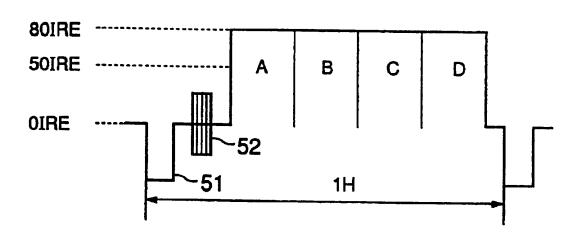
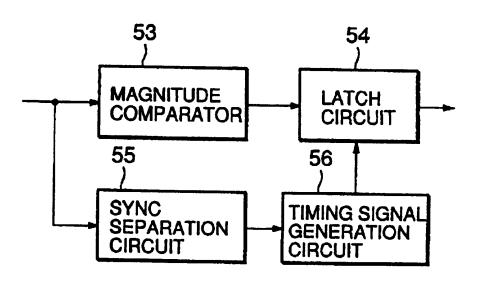


FIG. 5





DOCKET A L A R M

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.

