

[54] **INVERSE MODIFIED DISCRETE COSINE TRANSFORM SIGNAL TRANSFORMING SYSTEM**

[75] Inventors: **Mito Sonohara; Kyoya Tsutsui**, both of Kanagawa, Japan

[73] Assignee: **Sony Corporation**, Tokyo, Japan

[21] Appl. No.: **731,645**

[22] Filed: **Oct. 17, 1996**

Related U.S. Application Data

[60] Continuation of Ser. No. 458,338, Jun. 2, 1995, abandoned, which is a division of Ser. No. 119,003, Sep. 9, 1993, abandoned.

Foreign Application Priority Data

Sep. 28, 1992 [JP] Japan 4-282440

[51] Int. Cl.⁶ **H04B 14/00**

[52] U.S. Cl. **375/340; 364/725.01**

[58] Field of Search 375/240, 241, 375/243, 245; 381/29; 348/400, 403, 408; 364/725-726

References Cited

U.S. PATENT DOCUMENTS

5,218,561 6/1993 Iwadare 364/725
 5,311,549 5/1994 Mahieux 375/242
 5,349,549 9/1994 Tsutsui 364/725

FOREIGN PATENT DOCUMENTS

0 402 145 A3 12/1990 European Pat. Off. G06F 15/332
 0 463 473 A2 1/1992 European Pat. Off. G06F 15/332
 0 535 893 A2 4/1993 European Pat. Off. G06F 15/332
 4-44099 2/1992 Japan G10L 9/18

OTHER PUBLICATIONS

E.O. Bringham, "Fast Fourier Transform," transl. by Miyagawa and Imai, pp. 196-198.

F. Hazu et al., "Adaptive Transform Coding with an Adaptive Block Size (ATC-ABS) using MDCT," Extended Abstracts in Spring Meeting of Japan Society of Electronic Information Communication 1990, A-197.

M. Iwadare et al., "On a Modified Discrete Cosine Transform (MDCT) and its Fast Algorithm," C&C Systems Research Laboratories, NEC Corporation, CAS90-9, DSP90-13, pp. 49-54.

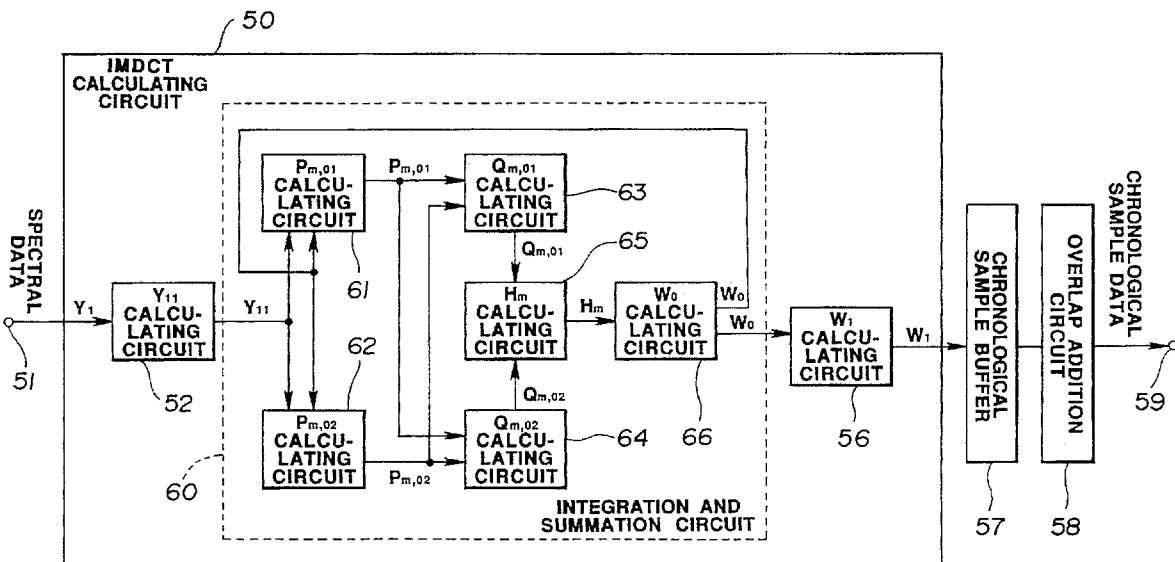
T. Mochizuki et al., "Constraint Conditions for Multiple-Blocksize Modified-DCT," C&C Systems Research Laboratories, NEC Corporation, CAS90-10, DSP90-14, pp. 55-60.

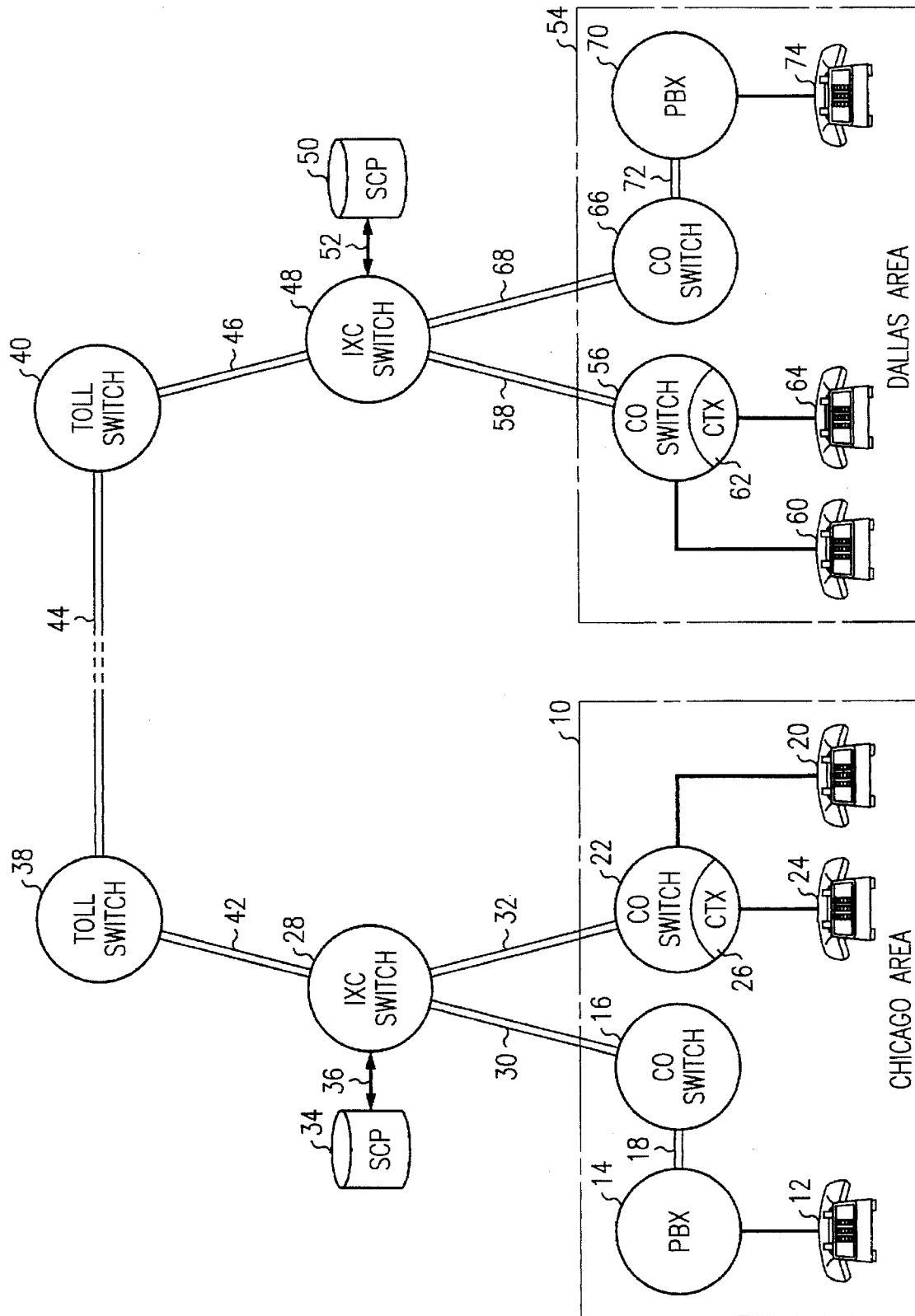
Primary Examiner—Young T. Tse
 Attorney, Agent, or Firm—Limbach & Limbach L.L.P.

ABSTRACT

An MDCT calculating circuit includes an x_{o1} calculating circuit for multiplying input signals with a forward transforming window and a linear forward transforming unit for linear forward transforming an output signal of the calculating circuit. The linear forward transforming unit includes an x_{o2} calculating circuit and an x_{o3} calculating circuit for pre-processing the output signal of the x_{o1} calculating circuit and an integration and summation processing circuit for executing integration and summation processing operations on an output signal of the pre-processing unit. The integration and summation processing circuit executes an integration and summation operation on an $N/2$ number of input signals from the pre-processing unit by grouping a k number of input signals as a processing unit and iteratively executes the integration and summation processing operations a $N/(2 \cdot K)$ number of times for outputting a sum total of $N/2$ number of signals.

16 Claims, 7 Drawing Sheets





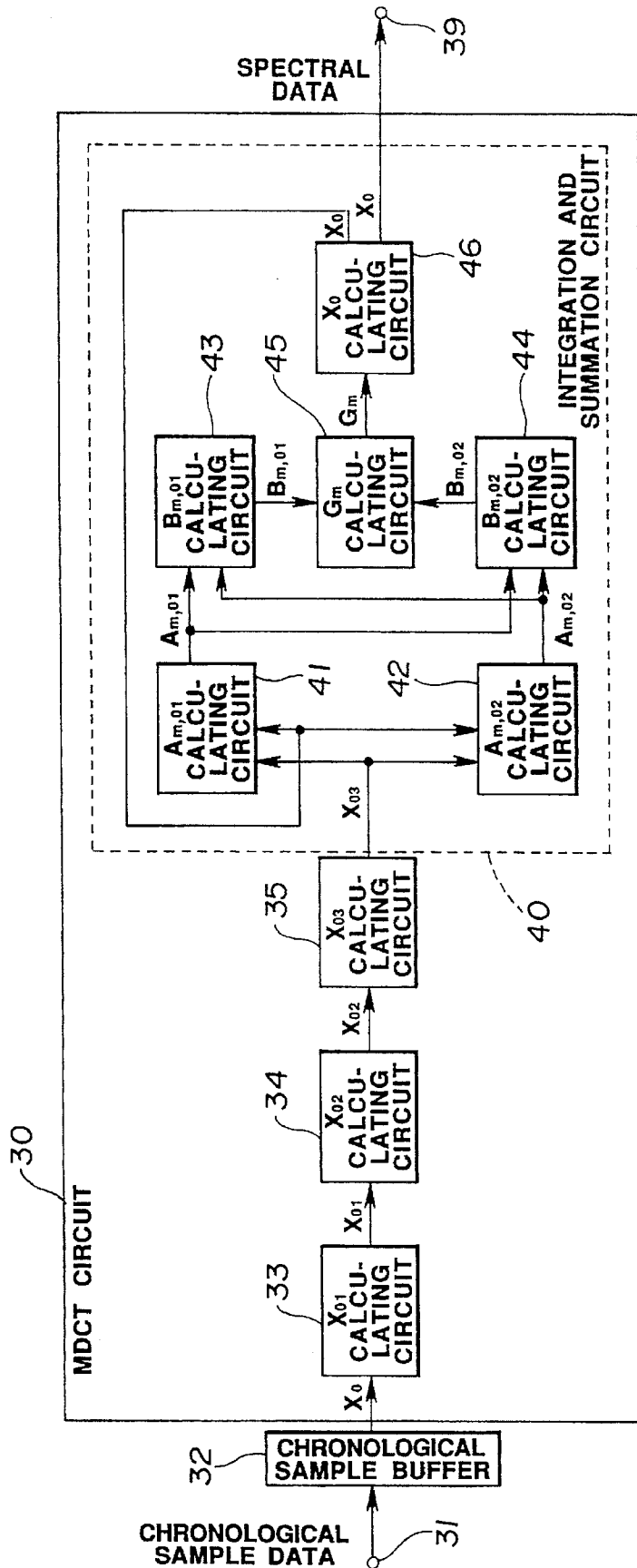


FIG. 2

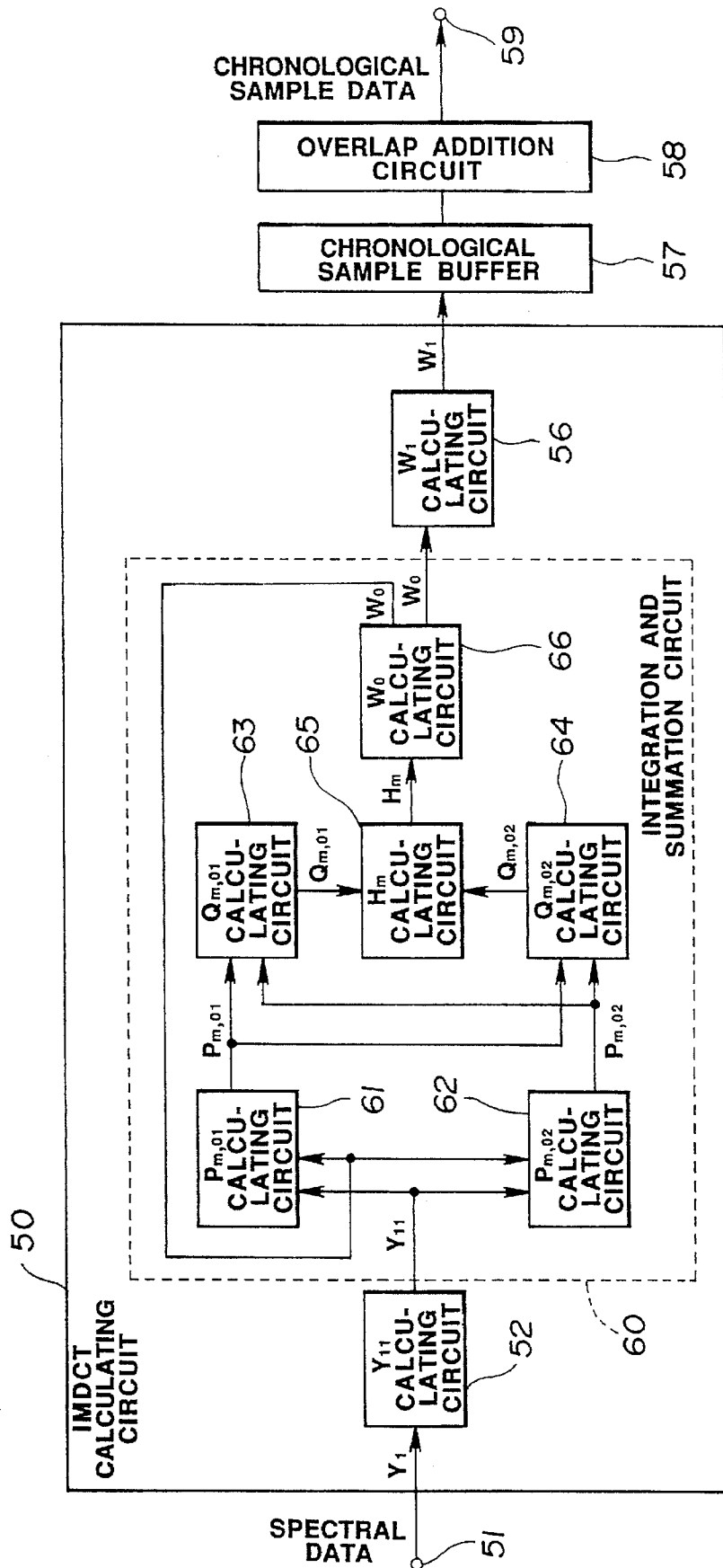


FIG.3

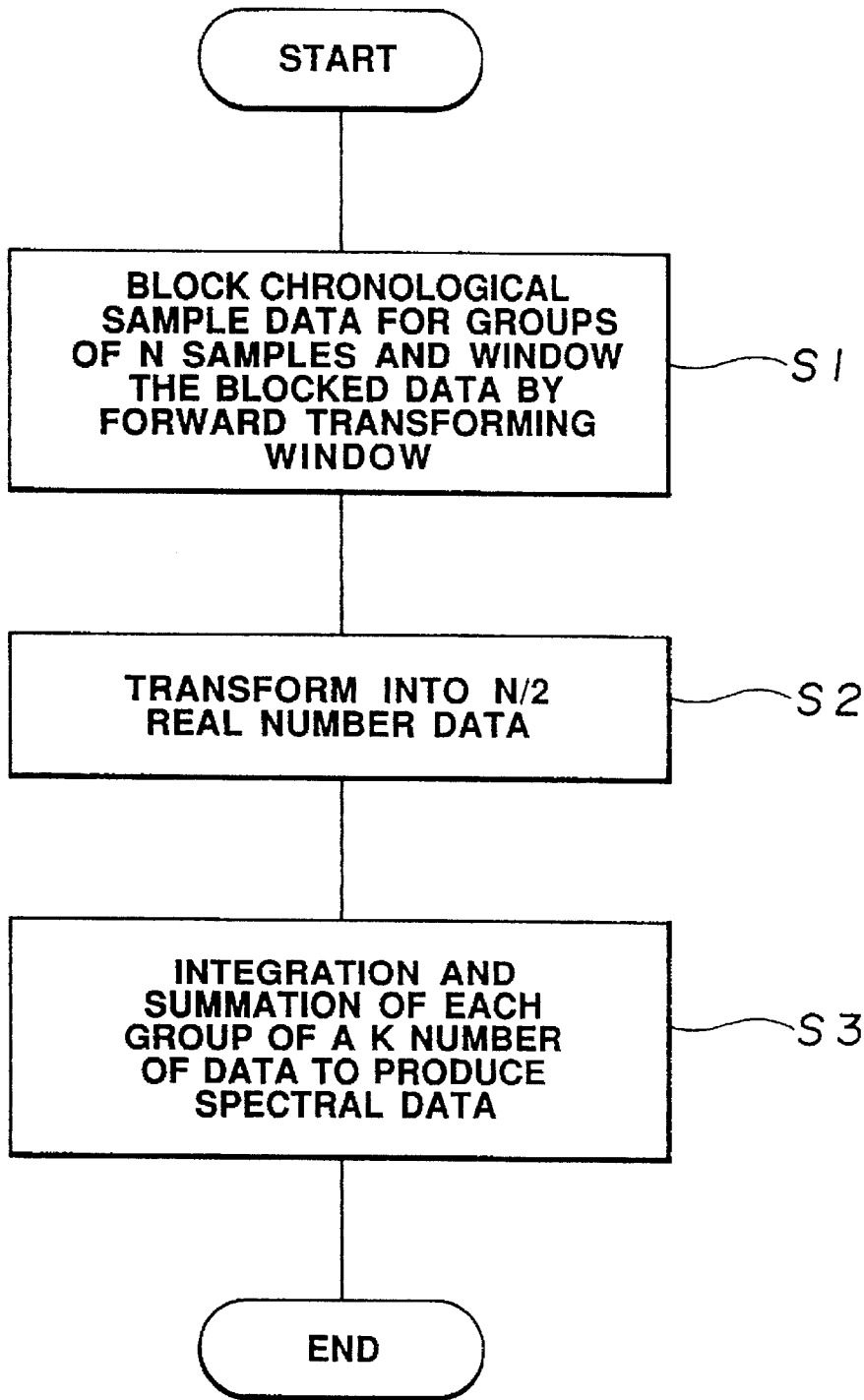


FIG.4

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.